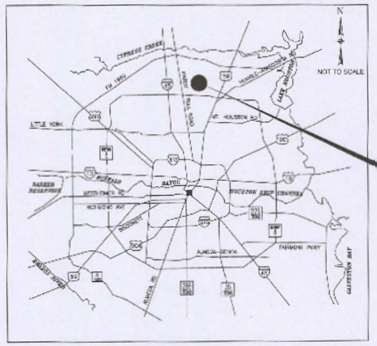
CITY OF HOUSTON

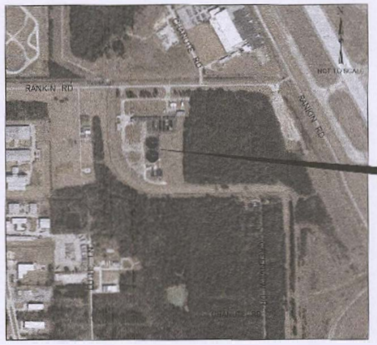
HOUSTON PUBLIC WORKS
CAPITAL PROJECTS
INTERCONTINENTAL AIRPORT
WWTP EXPANSION PROJECT

VOLUME 1 & VOLUME 2
WBS NO. R-000265-0147-4

BLACK & VEATCH



LOCATION MAP



VICINITY MAP

HARRIS COUNTY KEY MAP # 373H AND 373M
2450 Rankin Road
Houston, TX 77032
Council District B

TDLR EABPR _____

CITY OF HOUSTON TEXAS

MAYOR
JOHN WHITMIRE

CONTROLLER
CHRIS HOLLINS

DISTRICT COUNCIL MEMBERS

AMY PECK DISTRICT A | TARSHA JACKSON DISTRICT B | ABBIE KAMIN DISTRICT C | CAROLYN EVANS-SHABAZZ DISTRICT D
FRED FLICKINGER DISTRICT E | TIFFANY D. THOMAS DISTRICT F | MARY NAN HUFFMAN DISTRICT G | MARIO CASTILLO DISTRICT H
JOAQUIN MARTINEZ DISTRICT I | EDWARD POLLARD DISTRICT J | MARTHA CASTEX-TATUM DISTRICT K

COUNCIL MEMBERS AT-LARGE

JULIAN RAMIREZ POSITION 1 | WILLIE DAVIS POSITION 2
TWILA CARTER POSITION 3 | LETITIA PLUMMER POSITION 4
SALLIE ALCORN POSITION 5

Initial: RL

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY SUITE 600,
HOUSTON, TX 77024
(713)-961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
BOBBY FRANK LANE JR.
126582
LICENSED
PROFESSIONAL ENGINEER
7/1/25

Signed by: Sera Poloutzer
PARKS-FORESTRY DEPT.

N/A
METRO

DS: MP — DocuSigned by: Farid Sadeghian
HOUSTON WATER

N/A
TRANSPORTATION & DRAINAGE OPERATIONS

DS: SSS — Signed by: Markos E. Mengistu — DocuSigned by: Jeremy Ellison
CAPITAL PROJECTS — SURVEY

DocuSigned by: Johana Clark 7/22/2025
CITY ENGINEER — DATE

Signed by: Oluwole R. McFoy 7/22/2025
DIRECTOR OF HOUSTON PUBLIC WORKS — DATE

SHEET NO 1 OF 1 SHEETS

FOR CITY OF HOUSTON USE ONLY

80367

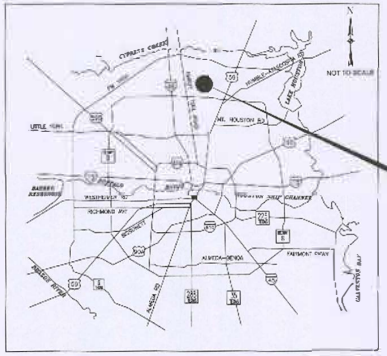
CITY OF HOUSTON

HOUSTON PUBLIC WORKS
CAPITAL PROJECTS
INTERCONTINENTAL AIRPORT
WWTP EXPANSION PROJECT

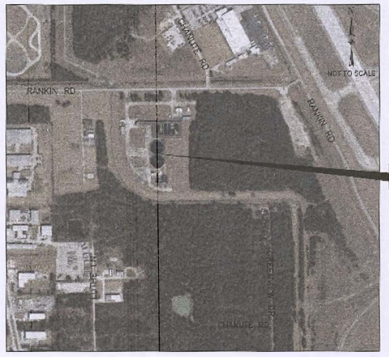
VOLUME 1

WBS NO. R-000265-0147-4

BLACK & VEATCH



LOCATION MAP



VICINITY MAP

HARRIS COUNTY KEY MAP # 373H AND 373M
2450 Rankin Road
Houston, TX 77032
Council District B

TDLR EABPR _____

MAYOR
JOHN WHITMIRE

CONTROLLER
CHRIS HOLLINS

DISTRICT COUNCIL MEMBERS

AMY PECK, DISTRICT A
TARSHA JACKSON, DISTRICT B
ABBIE KAMIN, DISTRICT C
CAROLYN EVANS-SHABAZZ, DISTRICT D
FRED FLICKINGER, DISTRICT E
TIFFANY D. THOMAS, DISTRICT F
MARY NAN HUFFMAN, DISTRICT G
MARIO CASTILLO, DISTRICT H
JOAQUIN MARTINEZ, DISTRICT I
EDWARD POLLARD, DISTRICT J
MARTHA CASTEX-TATUM, DISTRICT K

COUNCIL MEMBERS AT-LARGE

JULIAN RAMIREZ, POSITION 1
WILLIE DAVIS, POSITION 2
TWILA CARTER, POSITION 3
LETITIA PLUMMER, POSITION 4
SALLIE ALCORN, POSITION 5

ORIGINAL VOLUME 1 COVER REPLACED WITH CURRENT VOLUME 1 COVER TO COMPLY WITH ODE COMMENTS AND STANDARDS

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-8182

STATE OF TEXAS
BOBBY FRANK LANE JR.
126582
LICENSED
PROFESSIONAL ENGINEER
7/7/25

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT
PLANT EXPANSION

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAO-LIA (SHANI) LIN, P.E.	
SHEET NO. 1 OF 379	

80367

SHEET INDEX

SHT	DWG #	DRAWING TITLE
GENERAL		
1	G-00-001	COVER SHEET
2	G-00-002	INDEX OF DRAWINGS
3	G-00-003	HGSRB -REVIEW-SHEET
4	G-00-004	GENERAL NOTES SHEET 1 OF 2
5	G-00-005	GENERAL NOTES SHEET 2 OF 2
6	G-00-006	GENERAL LEGEND AND NOTES
7	G-00-007	GENERAL ABBREVIATIONS
8	G-00-008	GENERAL CIVIL LEGEND AND ABBREVIATIONS
9	G-00-009	SURVEY CONTROL MAP (1 OF 2)
10	G-00-010	SURVEY CONTROL MAP (2 OF 2)
11	G-00-011	SWINGTIES
12	G-00-101	EXISTING SITE PLAN
13	G-00-102	PROPOSED SITE PLAN
14	G-00-501	CONSTRUCTION SIGN BU LD HOUSTON FORWARD
15	G-00-601	EXISTING PROCESS FLOW DIAGRAM
16	G-00-602	PROPOSED PROCESS FI OW DIAGRAM
17	G-00-603	EXISTING HYDRAULIC PROFI LE
18	G-00-604	PROPOSED HYDRAULIC PROFILE
DEMOLITION		
19	D-10-101	OVERALL SITE DEMOLITION PLAN
20	D-10-102	DEMOLITION PLAN AREA – 1
21	D-10-103	DEMOLITION PLAN AREA – 2
22	D-10-104	DEMOLITION PLAN AREA – 3
23	D-10-105	DEMOLITION PLAN AREA – 4
24	D-10-106	DEMOLITION PLAN AREA – 5
25	D-10-107	DEMOLITION PLAN AREA – 6
26	D-10-108	DEMOLITION PLAN AREA – 7
27	D-10-109	DEMOLITION PLAN AREA – 8
28	D-10-110	DEMOLITION PLAN AREA – 9
29	D-20-101	INFLUENT LIFT STATION DEMOLITION TOP PLAN
30	D-20-102	INFLUENT LIFT STATION DEMOLITION SECTIONAL PLAN
31	D-20-301	INFLUENT LIFT STATION DEMOITION SECTION 1 OF 2
32	D-20-302	INFLUENT LIFT STATION DEMOITION SECTION 2 OF 2
33	D-30-101	HEADWORKS SCREENING DEMOLITION TOP PLAN
34	D-30-102	HEADWORKS GRIT BASIN DEMOLITION PLAN
35	D-30-103	HEADWORKS GRIT CLASSIFIER DEMOLITION PLAN
36	D-30-301	HEADWORKS SCREENI NG DEMOLITION SECTION 1 OF 2
37	D-30-302	HEADWORKS SCREENING DEMOLITION SECTION 2 OF 2
38	D-30-303	HEADWORKS GRIT BASIN DEMOLITION SECTIONS
39	D-30-304	HEADWORKS GRIT CLASSIFIER DEMOLITION SECTIONS
40	D-30-901	HEADWORKS GRIT CLASSIFIER DEMOLITION PHOTOS
41	D-40-101	AERATION BASINS DEMOLITION PLAN
42	D-40-102	MLSS CHANNEL DEMOLITION PLAN AND ELEVATION
43	D-40-103	WAS – PUM PS DEMOLITION PLAN
44	D-40-301	AERATION BASINS DEMOLITION SECTIONS
45	D-43-101	SCUM PUMP STATION DEMOLITION PLAN
46	D-43-101	PLANT EFFLUENT JUNCTION BOX PLAN AND SECTION
47	D-51-101	EXISTING NPW -CRETEN -DEMOLITION -(WEBHANDAL)
CIVIL		
48	C-10-101	DRAINAGE AREA MAP & CALCULATIONS
49	C-10-102	OVERALL SITE GRADING & DRAINAGE PLAN
50	C-10-103	GRADING & DRAINAGE PLAN AREA – 1
51	C-10-104	GRADING & DRAINAGE PLAN AREA – 2
52	C-10-105	GRADING & DRAINAGE PLAN AREA – 3
53	C-10-106	GRADING & DRAINAGE PLAN AREA – 4
54	C-10-107	GRADING & DRAINAGE PLAN AREA – 5
55	C-10-108	GRADING & DRAINAGE PLAN AREA – 6
56	C-10-109	GRADING & DRAINAGE PLAN AREA – 7
57	C-10-110	GRADING & DRAINAGE PLAN AREA – 8
58	C-10-111	GRADING & DRAINAGE PLAN AREA – 9
59	C-10-112	OVERALL YARD PIPING IMPROVEMENTS PLAN
60	C-10-113	YARD PIPING PLAN AREA – 1
61	C-10-114	YARD PIPING PLAN AREA – 2
62	C-10-115	YARD PIPING PLAN AREA – 3
63	C-10-116	YARD PIPING PLAN AREA – 4
64	C-10-117	YARD PIPING PLAN AREA – 5
65	C-10-118	YARD PIPING PLAN AREA – 6
66	C-10-119	YARD PIPING PLAN AREA – 7
67	C-10-120	YARD PIPING PLAN AREA – 8
68	C-10-121	YARD PIPING PLAN AREA – 9
69	C-10-201	ACCESS ROAD EXTENSION STA 1+00 TO STA 5+50
70	C-10-202	ACCESS ROAD EXTENSION STA 5+50 TO STA 10+00
71	C-10-203	ACCESS ROAD EXTENSION STA 10+00 TO STA 13+20
72	C-10-204	ASPHALT ROAD EXTENSION STA 13+20 TO STA 17+20
73	C-10-205	PROP SAN DRAIN LINE (PLAN) STA 100+00 TO STA 105+00
74	C-10-206	PROP SAN DRAIN LINE (PROFILE) STA 100+00 TO STA 105+00
75	C-10-207	PROP SAN DRAIN LINE (PLAN) STA 105+00 TO STA 109+60
76	C-10-208	PROP SAN DRAIN LINE (PROFILE) STA 105+00 TO STA 109+60
77	C-10-209	PROP SAN DRAIN LINE (PLAN) STA 109+60 TO STA 114+00
78	C-10-210	PROP SAN DRAIN LINE (PROFILE) STA 109+60 TO STA 114+00
79	C-10-211	PLAN & PROFILES PROP STORM B1 TO D1
80	C-10-212	PLAN & PROFILES PROP STORM C1-1 TO DETENTION STA 200+00 TO STA 204+60
81	C-10-213	PLAN & PROFILES PROP STORM C1-1 TO DETENTION STA 204+60 TO DETENTION
82	C-10-214	PLAN & PROFILES PROP STORM C1-1 TO DETENTION STA 204+60 TO DETENTION
83	C-10-215	PLAN & PROFILES PROP STORM C1-2 TO C1 & E2 TO DETENTION
84	C-10-216	UV-INFLUENT JUNCTION BOX-2- CHANNEL-1- DRAIN- (PLAN)
85	C-10-217	UV-INFLUENT JUNCTION BOX-2- CHANNEL-1- DRAIN- (PROFILES)
86	C-10-218	CLARIFIER 3-48-IN-DIA- DRAIN- (PLAN)
87	C-10-219	CLARIFIER 3-48-IN-DIA- DRAIN- (PROFILE)
88	C-10-220	RAS PIPING (PLAN)
89	C-10-221	RAS PIPING (PROFILE)
90	C-10-222	SCUM PIPING (PLAN)
91	C-10-223	SCUM PIPING (PROFILE)
92	C-11-101	DETENTION BASIN – GENERAL ARRANGEMENT
93	C-11-102	DETENTION BASIN – LAYOUT
94	C-11-201	DETENTION BASIN – SECTIONS
95	C-11-202	DETENTION BASIN – OUTFALL PLAN & PROFILE
96	C-11-203	DETENTION BASIN – OFFSITE DIVERSION PLAN & PROFILE
97	C-11-401	DETENTION BASIN – EMERGENCY OVERFLOW WEIR
98	C-11-501	DETENTION BASIN – DETAILS 1
99	C-11-502	DETENTION BASIN – DETAILS 2
100	C-11-503	DETENTION BASIN – DETAILS 3

SHT	DWG #	DRAWING TITLE
CIVIL		
101	C-11-504	DETENTION BASIN – DETAILS 4
102	C-11-505	DETENTION BASIN – DETAILS 5
103	C-11-506	DETENTION BASIN – DETAILS 6
104	C-13-101	EFFLUENT OUTFALL REHABILITATION
105	C-13-101	OVERALL SITE STORM WAT EPPOLLUTION PREVENTION PLAN
106	C-13-102	STORM WATER POLLUTION PRETVENTION PLAN AREA – 1
107	C-13-103	STORM WATER POLLUTION PRETVENTION PLAN AREA – 2
108	C-13-104	STORM WATER POLLUTION PRETVENTION PLAN AREA – 3
109	C-13-105	STORM WATER POLLUTION PRETVENTION PLAN AREA – 4
110	C-13-106	STORM WATER POLLUTION PRETVENTION PLAN AREA – 5
111	C-13-107	STORM WATER POLLUTION PRETVENTION PLAN AREA – 6
112	C-13-108	STORM WATER POLLUTION PRETVENTION PLAN AREA – 7
113	C-13-109	STORM WATER POLLUTION PRETVENTION PLAN AREA – 8
114	C-13-110	STORM WATER POLLUTION PRETVENTION PLAN AREA – 9
115	C-14-101	TREE PROTECTION PLAN SHEET 1 OF 4
116	C-14-102	TREE PROTECTION PLAN SHEET 2 OF 4
117	C-14-103	TREE PROTECTION PLAN SHEET 3 OF 4
118	C-14-104	TREE PROTECTION PLAN SHEET 4 OF 4
119	G-22-501	SITE-PAVING-DRIVEWAY & SIDEWALK- DETAILS- Replaced by Sheet # 33A-D/VOL2
120	G-99-502	SITE-ADA-ABBESS-DETAILS- Replaced by Sheet # 34 / VOL2
121	G-00-503	SITE-STORM -NPDN-POLLUTION-PREVENTION-PLAN-DETAILS- Replaced by Sheet # 35/VOL2
122	G-99-501	SITE-GRADING-DETAILS
123	G-99-503	SITE-STORM-DETAILS-(1'-0"-2)- Both Sheets of Site Storm Details Replaced by Sheet #
124	G-99-508	SITE-STORM-DETAILS-(2'-0"-6)- 37A-B & Sheet #38 VOL2
125	G-99-507	SITE-WATER-DETAILS- Replaced by Sheet # 39A-D/ VOL2
126	G-99-502	SITE-CPR-DETAILS- Replaced by Sheet # 40 /VOL2
127	G-22-502	SITE-SANITARY-DETAILS- Replaced by Sheet # 41A-D/ VOL2
128	G-99-512	HGSRB-DETAILS- Replaced by Sheet # 42A-B/ VOL2
ARCHITECTURAL		
129	A-31-101	GRIT FACILITY PLANS
130	A-31-301	GRIT FACILITY SECTION & ELEVATIONS
131	A-43-201	UV-FACILITY-ELEVATIONS
STRUCTURAL		
132	S-00-001	STRUCTURAL NOTES
133	S-00-002	STRUCTURAL LOADING CRITERIA
134	S-00-003	STRUCTURAL ABBREVIATIONS
135	S-20-101	LIFT STATION ELECTRICAL BUILDING PLAN AND SECTION
136	S-20-102	LIFT STATION ELECTRICAL BUILDING TRANSFORMER PAD PLAN AND SECTION
137	S-30-101	HEADWORKS SCREENING PLAN
138	S-30-102	HEADWORKS GRIT PLAN
139	S-30-301	HEADWORKS SCREENING SECTION
140	S-30-302	HEADWORKS GRIT SECTIONS 1 OF 2
141	S-30-303	HEADWORKS GRIT SECTIONS 2 OF 2
142	S-30-501	HEADWORKS STRUCTURAL SECTIONS AND DETAILS
143	S-31-101	GRIT FACILITY PIER PLAN
144	S-31-102	GRIT FACILITY FOUNDATION PLAN
145	S-31-103	GRIT FACILITY TOP PLAN
146	S-31-301	GRIT FACILITY – SECTIONS 1 OF 5
147	S-31-302	GRIT FACILITY – SECTIONS 2 OF 5
148	S-31-303	GRIT FACILITY – SECTIONS 3 OF 5
149	S-31-304	GRIT FACILITY – SECTIONS 4 OF 5
150	S-31-305	GRIT FACILITY – SECTIONS 5 OF 5
151	S-31-501	GRIT FACILITY DETAILS
152	S-32-101	GRIT CLASSIFIER AREA PLAN
153	S-32-301	GRIT CLASSIFIER AREA SECTIONS
154	S-32-501	GRIT CLASSIFIER AREA DETAILS
155	S-40-101	AERATION BASINS – FOUNDATION PLAN 1 OF 2
156	S-40-102	AERATION BASINS – FOUNDATION PLAN 2 OF 2
157	S-40-103	AERATION BASINS – TOP PLAN 1 OF 2
158	S-40-104	AERATION BASINS – TOP PLAN 2 OF 2
159	S-40-301	AERATION BASINS – SECTIONS 1 OF 2
160	S-40-302	AERATION BASINS – SECTIONS 1 OF 2
161	S-40-401	MLSS CHANNEL RECONSTRUCTION PLAN AND SECTION
162	S-40-402	RAS PUMP STRUCTURAL MODIFICATIONS
163	S-41-101	CLARIFIER NO. 3 – FOUNDATION PLAN
164	S-41-102	CLARIFIER NO. 3 – TOP PLAN
165	S-41-301	CLARIFIERS – SECTIONS 1 OF 2
166	S-41-302	CLARIFIERS – SECTIONS 2 OF 2
167	S-41-303	WAS – SECTIONS
168	S-41-304	MLSS BOX – SECTIONS
169	S-41-401	RAS AIRLIFT NO. 3 ENLARGED PLAN AND SECTIONS
170	S-41-402	CLARIFIER NO. 3 MLSS BOX WALKWAY ENLARGED PLAN
171	S-41-501	STRUCTURAL DETAILS
172	S-41-502	MLSS BOX WALKWAY DETAILS
173	S-41-503	SCUM PUMP NO. 1 PAD PLAN AND SECTION
174	S-42-102	SCUM PUMP NO. 2 PAD PLAN AND SECTION
175	S-43-101	UV-FACILITY-FOUNDATION-PLAN
176	S-43-102	UV-FACILITY-SECTIONS-PLAN
177	S-43-103	UV-FACILITY-TOP-PLAN
178	S-43-104	UV-FACILITY-OPERATR 10-LEVEL(ELEV.)& PLAN
179	S-43-105	UV-FACILITY-INFLUENT-JUNCTION-BOX-PLAN
180	S-43-301	UV-FACILITY-SECTION S-1 OF 5
181	S-43-302	UV-FACILITY-SECTIONS-2-OF-5
182	S-43-303	UV-FACILITY-SECTIONS-3-OF-5
183	S-43-304	UV-FACILITY-SECTIONS-4-OF-5
184	S-43-305	UV-FACILITY-SECTIONS-5-OF-5
185	S-43-306	UV-INFLUENT JUNCTION BOX-SECTIONS-1-OF-2
186	S-43-307	UV-INFLUENT-JUNCTION-BOX-SECTION-1-OF-2
187	S-43-308	UV-INFLUENT-JUNCTION-BOX-SECTION-2-OF-2
188	S-44-101	CCB INFLUENT CHAMBER PLAN AND SECTIONS
189	S-51-101	NPW-PAD-PLAN
190	S-51-102	NPW-CHEMICAL-FEED-PAD-PLAN-AND-SECTION
191	S-51-501	NPW-PAD-SECTIONS
192	S-51-101	UV-ELECTRICAL-BUILDING-FOUNDATION-PLAN-AND-SECTION
193	S-51-102	UV-ENGINE-GENERATOR-PAD-PLAN-AND-SECTION
194	S-51-102	UV-ELECTRICAL-BUILDING-TRANSFORMER-PAD-PLAN-AND-SECTION
195	S-99-501	TYPICAL CONCRETE JOINT DETAILS
196	S-99-502	TYPICAL CONCRETE REINFORCING DETAILS
197	S-99-503	STANDARD CIP CRETE BEAM AND SLAB SCHEDUI E AND DETAILS
198	S-99-504	STANDARD CONCRETE CONNECTION DETAILS
199	S-99-505	TYPICAL ALUMINUM GRATING STAIR DETAILS
200	S-99-506	TYPICAL HANDRAIL & GUARDRAIL DETAILS

SHT	DWG #	DRAWING TITLE
STRUCTURAL		
201	S-99-507	MISCELLANEOUS DETAILS
202	S-99-508	PIPE SUPPORT DETAILS
203	S-99-509	MISCELLANEOUS DETAILS
204	S-99-510	MISCELLANEOUS DETAILS
205	S-99-511	TYPICAL CON CRETE CRACK AND SURFACE REPAIR DETAILS AND NOTES
206	S-99-512	MISCELLANEOUS DETAILS
207	S-99-513	MISCELLANEOUS DETAILS
208	S-99-514	GENERAL ANNOTATION & SYMBOLS LEGEND
PROCESS MECHANICAL		
209	M-20-101	INFLUENT LIFT STATION UPPER PLAN
210	M-20-102	INFLUENT LIFT STATION LOWER PLAN
211	M-20-301	INFLUENT LIFT STATION – SECTION 1 OF 2
212	M-20-302	IN FLUENT LIFT STATION – SECTION 2 OF 2
213	M-20-601	INFLUENT LIFT STATION PROP PUMP DATA & OPERATION TABLES
214	M-20-501	LIFT STATION – DETAILS 1 OF 4
215	M-20-502	LIFT STATION – DETA LS 2 OF 4
216	M-20-503	LIFT STATION – DETAILS 3 OF 4
217	M-20-504	LIFT STATION – DETAILS 4 OF 4
218	M-30-101	HEADWORKS OVERALL PLAN
219	M-30-102	HEADWORKS SCREENING PLAN
220	M-30-301	HEADWORKS SCREENING SECTION
221	M-31-101	GRIT BASINS OVERALL PLAN
222	M-31-102	GRIT BASI NS SECTIONAL PLAN
223	M-31-103	GRIT BASINS TOP PLAN
224	M-31-301	GRIT BASINS – SECTION 1 OF 5
225	M-31-302	GRIT BASINS – SECTION 2 OF 5
226	M-31-303	GRIT BASINS – SECTION 3 OF 5
227	M-31-304	GRIT BASINS – SECTION 4 OF 5
228	M-31-305	GRIT BASINS – SECTION 5 OF 5
229	M-32-101	GRIT CLASSIFIER AREA PLAN
230	M-32-301	GRIT CLASSIFIER AREA SECTIONS
231	M-40-100	AERATION BASINS IMPROVEMENTS PLAN
232	M-40-101	AERATION BASINS – OVERALL SECTIONAL PLAN
233	M-40-102	AERATION BASINS – OVERALL TOP PLAN
234	M-40-300	AERATION BASIN IMPROVEMENTS SECTION
235	M-40-301	AERATION BASINS – SECTIONS 1 OF 4
236	M-40-302	AERATION BASINS – SECTIONS 2 OF 4
237	M-40-303	AERATION BASINS – SECTIONS 3 OF 4
238	M-40-304	AERATION BASINS – SECTIONS 4 OF 4
239	M-40-401	AERATION BASINS – ENLARGED PLAN 1 OF 12
240	M-40-402	AERATION BASINS – ENLARGED PLAN 2 OF 12
241	M-40-403	AERATION BASINS – ENLARGED PLAN 3 OF 12
242	M-40-404	AERATION BASINS – ENLARGED PLAN 4 OF 12
243	M-40-405	AERATION BASINS – ENLARGED PLAN 5 OF 12
244	M-40-406	AERATION BASINS – ENLARGED PLAN 6 OF 12
245	M-40-407	AERATION BASINS – ENLARGED PLAN 7 OF 12
246	M-40-408	AERATION BASINS – ENLARGED PLAN 8 OF 12
247	M-40-409	AERATION BASINS – ENLARGED PLAN 9 OF 12
248	M-40-410	AERATION BASINS – ENLARGED PLAN 10 OF 12
249	M-40-411	AERATION BASINS – ENLARGED PLAN 11 OF 12
250	M-40-412	AERATION BASINS – ENLARGED PLAN 12 OF 12
251	M-40-413	WAS PUMP – ENLARGED PLAN AND SECTION
252	M-40-414	WAS PUMPS – SECTIONS
253	M-41-101	OVERALL CLARIFIER AND RAS PLAN
254	M-41-102	CLARIFIER NO. 3 PLAN
255	M-41-301	CLARIFIER SECTION AND DETAILS
256	M-41-302	CLARIFIER DETAILS
257	M-41-401	CLARIFIER AND RAS ENLARGED PLANS
258	M-41-501	RAS AIRLIFT PUMP SECTION AND DETAILS
259	M-42-101	SCUM SYSTEM OVERALL PLAN
260	M-42-102	SCUM PUMP STATION NO. 1 – PLAN
261	M-42-103	SCUM PUMP STATION NO. 2 – PLAN
262	M-42-301	SCUM PUMP STATION NO. 1 – SECTIONS
263	M-42-302	SCUM PUMP STATION NO. 2 – SECTIONS
264	M-43-100	UV-INFLUENT-JUNCTION-BOX-PLAN
265	M-43-101	UV-FACILITY-OVERALL-PLAN
266	M-43-103	UV-FACILITY-PLAN
267	M-43-104	UV-FACILITY-INFLUENT-JUNCTION-BOX-PLAN
268	M-43-300	UV-INFLUENT-JUNCTION-BOX-SECTIONS
269	M-43-301	UV-FACILITY-SECTIONS-1-OF-2
270	M-43-302	UV-FACILITY-SECTIONS-2-OF-2
271	M-43-303	PLANT-EFFLUENT-JUNCTION-BOX-SECTIONS
272	M-44-101	CCB-INFLUENT-CHAMBER-PLAN-AND-SECTION
273	M-51-101	NPW-SYSTEM-PLANT-LAYOUT-SCHEMATIC
274	M-51-102	NPW-SYSTEM-PLAN
275	M-51-501	NPW-BUILDING-SITE-PLAN-AND-DETAILS
276	M-51-601	NPW-CBESIGNS
277	M-52-101	NATURAL GAS GENERATOR – HEADWORKS AREA PLAN
278	M-99-501	MISCELLANEOUS DETAILS 1 OF 8
279	M-99-502	MISCELLANEOUS DETAILS 2 OF 8
280	M-99-503	MISCELLANEOUS DETAILS 3 OF 8
281	M-99-504	MISCELLANEOUS DETAILS 4 OF 8
282	M-99-505	MISCELLANEOUS DETAILS 5 OF 8
283	M-99-506	MISCELLANEOUS DETAILS 6 OF 8
284	M-99-507	MISCELLANEOUS DETAILS 7 OF 8
285	M-99-508	MISCELLANEOUS DETAILS 8 OF 8
BUILDING MECHANICAL		
286	H-00-001	LEGENDS, ABBREVIATIONS, AND GENERAL NOTES
287	H-31-101	GRIT FACILITY – PUMP ROOM HVAC PLAN
PLUMBING		
288	P-00-001	LEGENDS, ABBREVIATIONS, AND GENERAL NOTES
289	P-31-101	GRIT FACILITY PUMP ROOM PLAN, SCHEDULES, AND DETAILS

SHT	DWG #	DRAWING TITLE
ELECTRICAL		
290	E-00-001	SYMBOLS, ABBREVIATIONS AND NOTES
291	E-00-901	LIGHT FIXTURE SCHEDULE AND LIGHTING CONTROL DIAGRAM
292	E-00-602	CONDUIT AND CONDUCTOR SCHEDULE SHEET 1
293	E-00-603	CON DUIT AND CONDUCTOR SCHEDULE SHEET 2
294	E-00-604	CONDUIT-AND-CONDUCTOR-SCHEDULE SHEET 3
295	E-00-701	EXISTING OVERALL ONE LINE DIAGRAM
296	E-00-702	MODIFIED OVERALL ON E LINE DIAGRAM
297	E-00-703	MODIFIED OVERALL LOAD ANALYSIS
298	E-10-101	EXISTING OVERALL SITE PLAN
299	E-10-102	MODIFI ED OVERALL SITE AND AREA CLASSIFICATION PLAN
300	E-10-103	LIFT STATION AND HEADWORKS AREA PLAN
301	E-10-104	NEW-UV-DISINFEBTION-AREA-PLAN
302	E-30-101	HEADWORKS MODIFICATION PLAN
303	E-30-201	HEADWORKS EQUIPMENT RACK ELEVATIONS
304	E-30-601	HEADWORKS PANELBOARD SCHEDULES
305	E-31-101	AERATED GRIT FACILITY OVERALL PLAN
306	E-31-102	AERATED GRIT FACILITY PUMP ROOM
307	E-31-201	AERATED GRIT FACILITY EQUIPMENT RACK ELEVATION
308	E-31-601	GRIT FACILITY PANELBOARD SCHEDULES
309	E-40-101	AERATION BASINS MIXER AND GATE POWER PLAN
310	E-40-102	AERATION BASINS LIGHTING AND OUTLET POWER PLAN
311	E-40-103	AERATION BASINS INSTRUMENTATI ON PLAN
312	E-40-401	AERATION BASINS WAS PUMP STATION ENLARGED PLAN
313	E-40-601	AERATION BASINS PANELBOARD SCHEDULES SHEET 1
314	E-40-602	AERATION BASINS PANELBOARD SCHEDULES SHEET 2
315	E-41-101	CLARIFIER AREA OVERALL PLAN
316	E-41-401	CLARIFIERS – NEW CLARIFIER NO. 3 PLAN
317	E-41-601	CLARIFI ER AREA PANELBOARD SCHEDULES
318	E-42-401	CLARI FIERS – MODIFIED SCUM PUMP STATIONS PLANS
319	E-42-101	UV-FACILITY-POWER-AND-INSTRUMENTATI-PLAN
320	E-43-101	UV-FACILITY-LIGHTING-PLAN
321	E-43-103	UV-FACILITY-GROUNDING-PLAN
322	E-43-301	UV-FACILITY---UV-BUILDING-SECTION
323	E-43-501	UV-FACILITY---UV-EQUIPMENT-DETAILS-SHEET-1
324	E-43-502	UV-FACILITY---UV-EQUIPMENT-DETAILS-SHEET-2
325	E-43-503	UV-FACILITY---UV-EQUIPMENT-DETAILS-SHEET-3
326	E-43-504	UV-FACILITY---UV-SYSTEM-INTERCONNECTION-DIAGRAM
327	E-51-101	NPW-SYSTEM-AREA-PLAN
328	E-51-102	NPW-CBSDAA-HYDRAULIC-BUILDING-PLAN
329	E-60-101	LIFT STATION NEW ELECTRICAL BUILDING NO. 2 EQUIPMENT PLAN
330	E-60-102	LIFT STATION NEW ELECTRICAL BUILDING NO. 2 POWER AND LIGHTING PLAN
331	E-60-103	LIFT STATION NEW ELECTRICAL BUILDING NO. 2 GROUNDING PLAN
332	E-60-701	NEW MCC-1(SERE) ONE LINE DIAGRAM
333	E-01-101	UV-ELECTRICAL-BUILDING-EQUIPMENT-PLAN
334	E-01-102	UV-ELECTRICAL-BUILDING-POWER-AND-LIGHTING-PLAN
335	E-01-103	UV-ELECTRICAL-BUILDING-GROUNDING-PLAN
336	E-01-201	UV-ELECTRICAL-BUILDING-PANELBOARD-SCHEDULES
337	E-01-701	MVS-UV-SWITCHGEAR-SIDE-LINE-DIAGRAM
338	E-01-702	UV-ELECTRICAL-BUILDING-MCC-UV-ONE-LINE-DIAGRAM
339	E-64-601	SHOP BUILDING PANEL SCHEDULES
340	E-64-701	EXISTING POWER CENTER 2 ONE LINE DIAGRAM
341	E-66-701	NEW MCC-1 SWITCHGEAR ONE LINE DIAGRAM
342	E-67-101	LIFT STATION ELECTRICAL BUILDING NO. 1 AREA PLAN
343	E-67-701	EXISTING MCC-LS ONE LINE DIAGRAM
344	E-99-501	DETAILS 1 OF 7
345	E-99-502	DETAILS 2 OF 7
346	E-99-503	DETAILS 3 OF 7
347	E-99-504	DETAILS 4 OF 7
348	E-99-505	DETAILS 5 OF 7
349	E-99-506	DETAILS 6 OF 7
350	E-99-507	DETAILS-7-OF-7
INSTRUMENTATION		
351	I-00-001	SYMBOLS AND ABBREVIATIONS 1 OF 2
352	I-00-002	SYMBOLS AND ABBREVIATIONS 2 OF 2
353	I-31-501	AERATED GRIT FACILITY GRI T CONTROL PANEL DETAILS
354	I-41-701	CLARIFIERS – CLARIFIER CONTROL SCHEMATI CS
355	I-50-501	DIGESTER-FEED-SYSTEM-DISINFECTION-SYSTEM-MODIFICATIONS
356	I-64-101	EXISTING MAINTENANCE SHOP PLAN
357	I-64-501	SHOP BUILDING EXISTING CONTROL PANEL I MPROVEMENTS
358	I-90-601	INFLUENT LIFT STATION MODIFIED P&ID 1 OF 2
359	I-90-602	INFLUENT LIFT STATION MODIFIED P&I D 2 OF 2
360	I-90-603	HEADWORKS SCREENING NEW BAR SCREEN NO. 3 P&ID
361	I-90-604	NEW AERATED GRIT BASINS P&ID
362	I-90-605	NEW GRIT PUMPS P&ID
363	I-90-606	NEW GRIT DEWATERING P&ID – SHEET 1
364	I-90-607	NEW GRIT DEWATERING P&ID – SHEET 2
365	I-90-608	MODIFIED AERATION BASINS NO. 1 – 4 P&ID
366	I-90-609	MODIFIED AERATION BASINS NO. 5 – 8 P&ID
367	I-90-610	NEW AERATION BASINS NO. 9 – 12 P&ID
368	I-90-611	NEW CLARIFIER NO. 3 P&ID
369	I-90-612	WASTE ACTIVATED SLUDGE (WAS) PUMPS P&ID
370	I-90-613	NEW-UV-DISINFEBTION-FACILITY-P&ID
371	I-90-614	NEW-EFFLUENT-FLOWAND-NPW-PUMPS-P&ID
372	I-90-615	NEW-NPW-HYDROPNEUMATIC-TANK-P&ID
373	I-90-616	NEW-BOOSTER-HYDROPNEUMATIC-P&ID
374	I-90-501	DETAILS 1 OF 4
375	I-90-502	DETAILS 2 OF 4
376	I-90-503	DETAILS 3 OF 4
377	I-90-504	DETAILS 4 OF 4
378	I-99-501	EXISTING-CSADA-NETWORK-DIAGRAM-DEMOLITION
379	I-99-502	MODIFIED-CSADA-NETWORK-DIAGRAM

1 THIS VOLUME 1 DRA WING CONTA INS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRA WINGS. SHEETS STRUCKTHROUGH ARE REMOVED FROM VOLUME 1 SET.

2 THESE VOLUME 1 DRA WINGS HAVE BEEN PHYSICALLY REMOVED AND ARE SUPERCEEDED BY DRA WINGS IN VOLUME 2.

G-00-002

DRAWING NUMBERING SYSTEM

M-00-101
- SHEET SEQUE NTIAL NUMBER
- SHEET 1 YPE DESIGNATOR
- FACILI YAREA DESIGNATION CODE
- DISCIPLINE DESIGNATOR

DISCIPLINE DESIGNATORS

A	ARCHITECTURAL
C	CIVIL
D	DEMOLITION
E	ELECTRICAL
F	FIRE PROTECTION
G	GENERAL
H	HVAC/BUILDING MECHANICAL
I	INSTRUMENTATION AND CONTROLS
L	LANDSCAPE
M	PROCESS MECHANICAL
P	PLUMBING
S	STRUCTURAL

AREA/FACILITY DESIGNATION CODES

00	GENERAL
10	SITEWORK
20	INFLUENT LIFT STATION
30	HEADWORKS
31	GRIT FACILITY
32	GRIT DEWA TERING FACILITY
40	AERATION BASINS
41	CLARIFIERS
42	SCUM FACILITIES
43	UV FACILITY
44	CHLORINE CONTACT BASIN
51	NPW SYSTEM
60	LIFT STATION ELECTRICAL BUILDING NO. 2
61	UV ELEC TRICAL BU LDING
62	FM, ANALYZER, PUMP, PLC BUILDING
90	P&ID
99	DETAILS, SC HEMATIC S SC HE DULES

SHEET TYPE DESIGNATORS

0	GENERAL (SYMBOLS, LEGENDS, NOTES, ETC.)
1	PLANS (ARRANGEMENT PLANS, PARTIAL PLANS)
2	ELEVATIONS
3	SECTIONS
4	LARGE SCALE VIEWS (ENLARGED PLAN

1. PROPERTY DESCRIPTION

I. LOCATION INFORMATION

A. HARRIS COUNTY COMMISSIONER'S PRECINCT:
☒ 1 ☐ 2 ☐ 3 ☐ 4

B. KEY MAP: 373H AND 373M

C. ADDRESS: 2450 RANKIN RD. HOUSTON TX, 77032

II. LEGAL DESCRIPTION

A. ACREAGE: 98 – ACRE

B. ☐ SUBDIVISION:

☒ SURVEY & ABSTRACT: TR 6 & 13
AIRPORT FACILITIES HOUSTON INTERCONTINENTAL
ABST 577 M MCAULEY

C. ADJACENT ROADS:

III. PLATTING

A. SUBDIVISION PLAT
☐ PROPOSED PLAT / REPLAT
☐ RECORDED PLAT / REPLAT

B. STREETS PROPOSED
☐ PUBLIC
☐ PRIVATE
☐ PUBLIC & PRIVATE
☒ NONE

PLAT NAME:

IV. JURISDICTIONS

☒ CITY OF HOUSTON
☐ ETJ, CITY OF HOUSTON
☐ ETJ, CITY OF
☐ NO ETJ
☐ UTILITY DISTRICT (NAME)

V. HCAD ACCOUNT NOS. (ALL)

0440030000005

2. SITE DETENTION DRAINAGE

I. PROPOSED DRAINAGE AREA

☐ NEW DEVELOPMENT AREA:
☒ RE-DEVELOPMENT AREA (AMOUNT INCREASED IMPERVIOUS AREA): 12.74 AC
☐ LOW IMPACT DEVELOPMENT (LID)
METHOD/DESCRIPTION

II. METHODOLOGY

HCFCD PCPM DETENTION METHOD USED:
☐ METHOD 1 (LESS THAN 20 ACRES)
☒ METHOD 2 (20 ACRES TO 640 ACRES)
☐ METHOD 3 (GREATER THAN 640 ACRES)
☐ OTHER

III. DETENTION VOLUME & OUTFALL

OUTFALL TO:
☒ .65, H.C.F.C.D. CHANNEL, (H.C.F.C.D. UNIT NO.) P 119-00-00
☐ .75, EXISTING STORM SEWER (OWNER & OPERATOR)
☐ 1.00, ROADSIDE DITCH, (OWNER & ROAD NAME)
☐ OTHER (OWNER & OPERATOR)

IV. STORMWATER DETENTION BASIN INFORMATION

A. HCFCD PCPM SUMMARY TABLE SEE SHEET C-11-101 OF THESE PLANS.

DETENTION BASIN SERVICE AREA	12.74	acres	
STORM EVENT	50% EXCEEDANCE (2-YEAR)	10% EXCEEDANCE (10-YEAR)	1% EXCEEDANCE (100-YEAR)
MAXIMUM ALLOWABLE OUTFLOW (PRE-DEVELOPMENT PEAK FLOW)	30 CFS	42 CFS	90 CFS
MAXIMUM OUTFLOW PROVIDED (PEAK FLOW FROM BASIN)	28 CFS	42 CFS	67 CFS
LOWEST NATURAL/FINISHED GROUND OR FINISHED FLOOR ELEVATION ESTIMATE		81'	
DESIGN WATER SURFACE ELEVATION	74.11'	76.74'	79.97'
MINIMUM STORAGE REQUIRED (ac-ft)	–	–	8.3
DETENTION STORAGE PROVIDED (ac-ft)	4.0	8.1	14.3
STORAGE RATE PROVIDED (ac-ft/ac)	0.31	0.63	1.12
OUTFLOW VELOCITY INTO CHANNEL (ft/sec)	5.3	4.3	7.0
DRAIN TIME – 1% ONLY (hours)	15.25 HOURS		
EMERGENCY OVERFLOW (TYPE, SIZE, ELEVATION, ETC.)	TRAPEZOIDAL CONCRETE LINED WEIR, 6'WIDE , SIDE SLOPE 1:1 ELEV= 79.97'		

B. DETENTION BASIN TO BE MAINTAINED BY CITY OF HOUSTON

C. DETENTION SERVICE AREA MAP ON SHEET C-11-101

D. ADDITIONAL CRITERIA FOR PUMPED DETENTION BASINS
VOLUME OF PUMPED 1% EXCEEDANCE STORAGE VOLUME = ____ ACFT
MAXIMUM DESIGN OUTFLOW VELOCITY INTO HCFCD CHANNEL = ____
DRAIN TIME FOR BASIN = ____ HOURS BASED ON ____

V. DETENTION PROVIDED IN OTHER PLANS:

HCFCD PROJECT No.
PLAN TITLE
DETENTION POND SERVICE AREA MAP IS '
ENGINEERING FIRM
DETENTION BASIN MAINTAINED BY:

VI. FLOW RESTRICTOR

OUTFALL PIPE SI
R TOBTRO
R ESTR 1 0'ø 1.35'ø

VII

SYSTEM (APPROVED H.C. PRJ NO.):

FOR PROJECTS LOCATED IN ANY FLOODPLAIN
Development constructed or placed in accordance with these plans will comply with all provisions of the designated Floodplain Administrator.
No net fill is allowed in the flood plain and no fill is allowed in the floodway.

OFFSITE SHEET FLOW: (100 YEAR)

OFFSITE SHEET FLOW MAPPING, TOTAL DISCHARGE CALCULATIONS, AND DE SIGNACCOMODATIONS ARE SHOWN ON SHEET ___ OR, AS PRESENTED IN THE APPROVED DRAINAGE STUDY ENTITLED SEE SECTION 6

TOTAL ACREAGE = ___
TOTAL DISCHARGE = ___

NOTE: ALL OFFSITE SHEET FLOW FROM ADJACENT PROPERTIES MUST BE IDENTIFIED AND PROPERLY ACCOUNTED FOR IN THE PROJECT. THE SIGNING ENGINEER HEREBY CERTIFIES THAT THESE AREAS HAVE BEEN ADDRESSED.

3. SWQ DISCHARGE INTO FCD FACILITY

I. SWPPP: CONSTRUCTION MEASURES. (Must complete)

☒ DISTURBS >1AC. SITE PLAN & DETAILS ON SHEET(S) TBD
☐ DISTURBS <1AC. N/A

*II. APPLICABILITY FOR PERMANENT FEATURES (Must complete)

EXEMPT NEW DEVELOPMENT:
☐ PROJECT IS ON A PARCEL (A COMMON PLAN OF DEVELOPMENT) LESS THAN 5 ACRES. (Must be verified with plat)

EXEMPT REDEVELOPMENT:
☐ PROJECT DOES NOT MEET THE DEFINITION OF SIGNIFICANT REDEVELOPMENT (Par t A,Sec. 2.39 of Regulations of Harris County, Texas for Stor mwater Quality Management)

EXEMPT GRANDFATHERED:
☐ PROJECT'S DRAINAGE TIES DIRECTLY INTO AN EXISTING DRAINAGE SYSTEM PRIOR TO OCTOBER 1, 2001. (FOR VERIFICATION: PROVIDE ORIGINAL DRAINAGE AREA MAP INCLUDING CALCULATIONS)

GENERAL:
☒ PROJECT'S SWQ REQUIREMENTS FALL WITHIN THE JURISDICTION OF CITY OF HOUSTON
☐ STORMWATER QUALITY PERMIT REQUIREMENT IS COVERED BY AN EXISTING SWQMP WITHIN PROJECT TITLE:

HARRIS COUNTY PROJECT No _____ & SWQ PERMIT No.

STORMWATER QUALITY MANAGEMENT PLAN:
☐ SITE PLAN ON SHEET(S)

III. PERMANENT SWQ FEATURES: (COMPLETE IF NO
☐ VEGETATIVE CONTROLS USED: (FILTER STRIP, C
URBAN FORESTRY DETAILS AND CALCULAT
SHEET(S)
☒ POND STRUCTURE USED (WET
CALCULATIONSAPPEAR ON
☐ HYDRODYNAMIC TYPE
☐ OTHER(S):

REPORTS/AGREEMENTS

I. HCFCD ACCEPTED REPORTS (ALL)

STORMWATER DRAINAGE DESIGN REPORT
REPORT TITLE INTERCONTINENTAL AIRPORT WWTP EXPANSION PROJECT DRAINAGE IMPACT ANALYSIS
HCFCD PROJECT # 2202010106
ENGINEERING FIRM SENGINEERING, LLC
REPORT ACCEPTANCE DATE JULY 29, 2022

GEOTECHNICAL INVESTIGATION REPORT
REPORT TITLE
HCFCD PROJECT #
ENGINEERING FIRM
REPORT ACCEPTANCE DATE

HCFCD APPROVED VARIANCE
DESCRIPTION OF VARIANCE
DOCUMENT ID #
VARIANCE ACCEPTANCE DATE

II. AGREEMENT TYPE & No.

☐ INTERLOCAL (ILA):
☐ HCFCD MAINTENANCE
☐ TURF ESTABLISHMENT
☐ OTHER

4. FLOOD PLAIN STATUS

I. GENERAL INFORMATION

FIRM PANEL(S) FOR PROPERTY: 48201C0480M
FIRM PANEL(S) DATE: JUNE 5, 2014
STATUS OF PROPERTY ON MAP
☒ ENTIRELY LOCATED IN UNSHADED ZONE "X"
☐ LOCATED PARTIALLY OR ENTIRELY IN ANY "A" ZONE OR SHADED ZONE "X", DELINEATE FLOODPLAIN BOUNDARY ON CONSTRUCTION DRAWINGS (DRAINAGE LAYOUT PG. NO.____) (1% BASE FLOOD LEVEL_____) (0.2% BASE FLOOD LEVEL_____)
☐ SITE REMOVED FROM FLOODPLAIN BY LOMR, LOMR-F, LOMA CASE NO._____ REVISED FLOODPLAIN IS SHOWN ON SHEET____

ELEVATION INFORMATION
BENCHMARK USED
☒ HARRIS COUNTY FLOODPLAIN E MARK
☐ HARRIS-GALVESTON COAS E DISTRICT
BENCHMARK (FOR O
DESCRIPTION OF BENCH N, DATUM AND
YEAR OF ADJUSTMENT

FLOOD PLAIN REFERENCE MAP M THE INTERSECTION OF GREENS ROAD AND GREENVIEW DRIVE, T TELY 0.31 MILE TO DEAD END. TRAVEL EAST ALONG DRAINAGE H. MONUMENT IS LOCATED NEAR TOP OF BANK AT THE END OF P 1988, 2001 ADJUSTMENT) OBSERVED ELEV= 80.08' (NAVD 1988.

FLOOD STAMPED 150875. FROM THE INTERSECTION OF RANKIN ROAD AN IS LOCATED IN THE MEDIAN OF RANKIN ROAD. PUBLISHED ELEV= 1) OBSERVED ELEV= 83.01' (NAVD 1988, COMPUTED USING G2CD 12A)

N DETERMINATION BASED ON GROUND ELEVATION
☐ PROPERTY LIES ENTIRELY ABOVE THE BASE FLOOD LEVEL AND IN SHADED ZONE "X"
☐ PROPERTY LIES PARTIALLY OR ENTIRELY BELOW THE BASE FLOOD LEVEL

III. FLOODPLAIN STORAGE SUMMARY
(APPLIES ONLY TO PORTION OF LAND LOCATED WITHIN FEMA REGULATORY FLOODPLAIN).

A. TOTAL VOLUME OF MATERIAL PROPOSED TO BE MOVED OR PLACED WITHIN THE FIRM DELINEATED FLOODPLAIN (FILL, BASE, CONCRETE, ASPHALT, ETC.): BELOW 0.2% BASE FLOOD ELEVATION (2001 ADJ.) ____ CUBIC YARDS ____
B. TOTAL VOLUME OF MATERIAL PROPOSED TO BE REMOVED FROM THE FIRM DELINEATED FLOODPLAIN: BELOW 0.2% BASE FLOOD ELEVATION (2001 ADJ.) ____ CUBIC YARDS ____ INCLUDING CALCULATIONS)
C. FILL AREA & VOLUME CALCULATIONS ARE SHOWN ON SHEET ____

5. WORK IN HCFCD RIGHT-OF-WAY

I. TYPE OF WORK TO BE PERFORMED IN HCFCD HCFCD ROW

A. BOND/NOTIFICATION INFORMATION
☒ HCFCD WATERSHED GREENS BAYOU
☒ HCFCD UNIT No. P140-00-00
☒ NUMBER OF OUTFALLS 2
☐ UTILITY CROSSING
☐ ROADWAY BRIDGE/CULVERT CROSSING
☐ FILL ACTIVITY
☐ REHABILITATION OF CHANNEL
☐ MAINTENANCE
☐ TEMPORARY CROSSING
☐ TRAIL (LENGTH)
☐ OTHER
COST OF WORK IN HCFCD ROW $120,000

II. USACE ENVIRONMENTAL PERMIT

☒ US ARMY CORPS OF ENGINEERS NATIONWIDE PERMIT NUMBER(S) NWP 13 SWG-1998-02267
☐ US ARMY CORPS OF ENGINEERS INDIVIDUAL PERMITS
☐ OTHER
☐ NO PERMITS REQUIRED
EXPLAIN:

III. REFERENCE / BASIS OF DETERMINATION

☐ ENVIRONMENTAL CONSULTANT REPORT
BY N/A
REPORT TITLE N/A
REPORT DATE N/A
☐ OTHER

NOTES:
I – III REQUIRED ON PROJECTS WITH WP
PLEASE REFERENCE SECTION 17 OF THE POLICY, CRITERIA, AND PROCEDURE MANU

IV. HCFCD STANDARD NOTES: SEE SHEET C-11-101 OF THESE PL
C-11-501–
V. HCFCD STANDARD DETAILS: SEE SHEET C-11-502 OF THESE PLANS

VI. HCFCD ACCESS PLAN SEE SHEET N/A OF THESE PLANS

VII. REFER TO THE FOLLOWING PLAN SHEETS: C-11-101
FOR EXISTING AND PROPOSED RIGHT(S) OF WAY INCLUDING DELINEATION AND RECORDING INFORMATION PER HCFCD POLICY, CRITERIA, & PROCEDURE MANUAL (i.e., DRAIN DE EASEMENT, FEE STRIP, ETC.) AND GRANTEE (e.g. COH, HCFCD , PUBLI TXDOT, E E.)

THIS DRAWING REMOVED FROM PROJECT

HCFCD SIGNATURE BLOCK

PROJECT NAME: INTERCONTINENTAL AIRPORT WWTP EXPANSION
ADDRESS: 2450 RANKIN RD. HOUSTON TX, 77032
WAS ACCEPTED BY HARRIS COUNTY FLOOD CONTROL DISTRICT FOR THE PURPOSES LISTED BELOW:

HARRIS COUNTY FLOOD CONTROL DISTRICT

ENCROACHMENT REMOVAL
BY:
FOR ITEMS LOCATED OUTSIDE OF HCFCD RIGHT-OF-WAY
APPROVED Dennis Todd Miller
BY: 2022.08.25 18:00:50-05'00'
FOR ITEMS LOCATED WITHIN EXISTING HCFCD RIGHT-OF-WAY DCB
APPROVED:
BY:
FOR ITEMS LOCATED WITHIN PROPOSED HCFCD RIGHT-OF-WAY
NO REVIEW REQUIRED
BY:
FINAL PERMITTING BY OTHERS

ADDITIONAL COMMENTS:

THE PROJECT WAS REVIEWED, HOWEVER, THIS DOES NOT MEAN THE ENTIRE PROJECT, INCLUDING ALL SUPPORTING DATA AND CALCULATIONS HAVE BEEN COMPLETELY CHECKED AND VERIFIED. THESE DRAWINGS ARE SIGNED, DATED AND SEALED BY A PROFESSIONAL ENGINEER LICENSED TO PRACTICE IN THE STATE OF TEXAS, WHICH THEREFORE CONVEYS THE ENGINEER'S RESPONSIBILITY AND ACCOUNTABILITY. THIS DOES NOT RELIEVE ANY PARTY FROM COMPLYING WITH APPROPRIATE FEDERAL, STATE AND LOCAL ENVIRONMENTAL RULES, LAWS, AND REGULATIONS AND ANY OTHER LEGALLY ADOPTED REGULATION OR ORDINANCE RELATED TO LAND DEVELOPMENT. IF THE CITY SIGNATURES ARE REQUIRED BY ORDINANCE, COUNTY PERMITS WILL NOT BE ISSUED UNTIL SUCH SIGNATURES ARE OBTAINED. PLAN APPROVAL EXPIRATION TO BE IN ACCORDANCE WITH LOCAL GOVERNEMENT CODE CH. 245

ENGINEER'S CERTIFICATION

I, PIERO BATTISTINI, A LICENSED PROFESSIONAL ENGINEER IN THE STATE OF TEXAS, DO HEREBY CERTIFY THAT THE INFORMATION PRESENTED ON THIS SHEET IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND THAT I AM NOT VIOLATING ANY PROVISION OF THE CURRENT TEXAS ENGINEERING PRACTICE ACT AND RULES CONCERNING THE PRACTICE OF ENGINEERING AND PROFESSIONAL ENGINEERING LICENSURE.

ANY VIOLATIONS WILL BE FORWARDED TO THE HARRIS COUNTY DISTRICT ATTORNEY'S OFFICE FOR PROSECUTION.

THE COMPLETED PROJECT CONSISTS OF DRAWING SHEETS ____ THRU ____

SIGNATURE
08/10/2022
DATE

SEAL
STATE OF TEXAS
PIERO BATTISTINI
80367
LICENSED PROFESSIONAL ENGINEER

REVISIONS

NOTE: REVISION BLOCK IS TO BE USED ONLY FOR CHANGES MADE AFTER PLANS HAVE BEEN APPROVED BY HARRIS COUNTY FLOOD CONTROL.

DATE	SHEET NO.	DESCRIPTION	P.E. INITIALS

HARRIS COUNTY
FLOOD CONTROL DISTRICT
REVIEW SHEET

VERSION 1.0 OCTOBER 2019

HARRIS COUNTY FLOOD CONTROL PROJECT NO. 2202010106

GENERAL NOTES

CITY OF HOUSTON PUBLIC WORKS GENERAL NOTES – INSIDE CITY LIMITS:

1. CONSTRUCT WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE AND STREET PAVING IN ACCORDANCE WITH THE LATEST EDITION OF THE PUBLICATIONS STANDARD CONSTRUCTION SPECIFICATIONS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE AND STREET PAVING, AND STANDARD CONSTRUCTION DETAILS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE, AND STREET PAVING PUBLISHED BY HOUSTON PUBLIC WORKS.
2. THE GEOTECHNICAL INVESTIGATION FOR THIS PROJECT WAS CONDUCTED IN ACCORDANCE WITH CHAPTER 11 OF THE LATEST EDITION OF THE PUBLICATION INFRASTRUCTURE DESIGN MANUAL, PUBLISHED BY HOUSTON PUBLIC WORKS. GEOTECHNICAL INVESTIGATION REPORT WAS PREPARED BY GEOTECH ENGINEERING AND TESTING REPORT NO. 19-061E, DATED JANUARY 2022.
3. UTILITIES PRESENTED ON THESE DRAWINGS ARE SHOWN BASED ON THE BEST AVAILABLE INFORMATION. CONTRACTOR SHALL VERIFY THE EXACT LOCATIONS IN THE FIELD PRIOR TO COMMENCING CONSTRUCTION. CONTRACTOR SHALL NOTIFY TEXAS ONE CALL AT 713-223-4567/811 OR 800-344-8377 AND LONE STAR NOTIFICATION CENTER AT 800-669-8344 AT LEAST 48 HOURS BEFORE PROCEEDING WITH ANY EXCAVATION. UTILITIES MARKED WITHIN THE PUBLIC RIGHT OF WAY OR IN EASEMENTS SHALL COMPLY WITH TAC TITLE 16, PART 1, CHAPTER 18, RULE §18.6 AND THE AMERICAN PUBLIC WORKS ADMINISTRATION (APWA) UNIFORM COLOR CODE.
4. CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGES TO EXISTING WATER, WASTEWATER, STORM WATER LINES AND TRAFFIC CONTROL DEVICES. DAMAGES SHALL BE REPAIRED IN ACCORDANCE WITH THE HOUSTON PUBLIC WORKS, STANDARD CONSTRUCTION SPECIFICATIONS FOR WASTEWATER COLLECTION SYSTEM, WATER LINES, STORM DRAINAGE, AND STREET PAVING AND STANDARD CONSTRUCTION DETAILS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE, AND STREET PAVING, REFERENCED ABOVE, AT NO ADDITIONAL COST.
5. CONTRACTOR SHALL NOTIFY THE OFFICE OF THE CITY ENGINEER, HOUSTON PUBLIC WORKS @ 832-394-9098 OR VIA FAX AT 832-395-4424 FOR INSPECTION AT LEAST 48 HOURS PRIOR TO COMMENCING CONSTRUCTION.
6. ADEQUATE DRAINAGE SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION AND ANY DRAINAGE DITCH OR STRUCTURE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO EXISTING CONDITIONS OR BETTER.
7. CONTRACTOR SHALL TAKE NECESSARY PRECAUTIONS TO PROTECT ROOT SYSTEMS OF SHRUBS, PLANTS AND TREES ALONG THE AREA OF EXCAVATION.
8. CONTRACTOR SHALL COMPLY WITH LATEST EDITION OF OSHA REGULATIONS AND THE STATE OF TEXAS LAWS CONCERNING EXCAVATION.
9. CONTRACTOR SHALL MAINTAIN A SET OF REDLINE DRAWINGS AND RECORD AS-BUILT CONDITIONS DURING CONSTRUCTION. THESE REDLINE MARKED UP DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER WHO WILL MAKE THE CHANGES ON THE ORIGINAL DRAWINGS, LABEL EACH SHEET IN THE SET AS "RECORD DRAWINGS", AND SUBMIT IT TO THE OFFICE OF THE CITY ENGINEER.

STANDARD NOTES FOR CONSTRUCTION DRAWINGS (HCFCD):

1. OBTAIN AND COMPLY WITH ALL APPLICABLE CITY, COUNTY, STATE, AND FEDERAL PERMITS AND APPROVALS, WITH ASSISTANCE FROM ENGINEER, IF NECESSARY. OBTAIN PERMIT (CERTIFICATION) FROM HARRIS COUNTY ENGINEER TO ENTER HARRIS COUNTY FLOOD CONTROL DISTRICT (HCFCD) RIGHT-OF-WAY.
2. NOTIFY THE HARRIS COUNTY FLOOD CONTROL DISTRICT'S DEVELOPMENT COORDINATION AND INSPECTION DEPARTMENT IN WRITING AT LEAST 48 HOURS PRIOR TO CONSTRUCTION. SUBMIT THE HCFCD 48 HOUR PRE-CONSTRUCTION NOTIFICATION FORM, A COPY OF THE APPROVED CONSTRUCTION DRAWINGS, AND A COPY OF THE CORPS OF ENGINEERS INDIVIDUAL SECTION 404 PERMIT OR COMPLIANCE WITH NATIONWIDE PERMIT, IF APPLICABLE, TO HCFCD, 9900 NORTHWEST FREEWAY, HOUSTON, TEXAS 77092, ATTN: DEVELOPMENT COORDINATION AND INSPECTION DEPT. BY HAND DELIVERY, BY EMAIL DCID@HCFCD.ORG, OR FAX TO 713-684-4129 (FAX NUMBER).
3. ENGINEER SHALL SUBMIT CERTIFICATION LETTER AND RECORD DRAWINGS TO THE HARRIS COUNTY FLOOD CONTROL DISTRICT'S DEVELOPMENT COORDINATION AND INSPECTION SECTION REQUESTING INSPECTION OF ITEMS CONSTRUCTED IN HARRIS COUNTY FLOOD CONTROL DISTRICT RIGHT-OF-WAY. PRIOR TO REQUESTING INSPECTION, THE DRAINAGE RIGHT-OF-WAY AND/OR EASEMENTS SHALL BE STAKED AND FLAGGED.
4. PROTECT, MAINTAIN, AND RESTORE EXISTING BACKSLOPE DRAINAGE SYSTEMS.
5. BACKSLOPE SWALE AND INTERCEPTOR STRUCTURE ELEVATIONS AND LOCATIONS SHOWN ON PLANS ARE APPROXIMATE. FINAL ELEVATIONS AND LOCATIONS SHALL BE FIELD VERIFIED BY THE ENGINEER PRIOR TO INSTALLATION.
6. ESTABLISH TURF GRASS ON ALL DISTURBED AREAS WITHIN THE CHANNEL OR DETENTION RIGHT-OF-WAY, EXCEPT THE CHANNEL BOTTOM AND WHERE STRUCTURAL EROSION MEASURES ARE USED. MINIMUM ACCEPTANCE CRITERIA ARE 75% COVERAGE OF LIVE BERMUDA GRASS AND NO EROSION OR RILLS DEEPER THAN 4".
7. PERFORM ALL ACTIVITIES WITHIN HARRIS COUNTY FLOOD CONTROL DISTRICT RIGHT-OF-WAY IN ACCORDANCE WITH THE MOST RECENT HARRIS COUNTY FLOOD CONTROL DISTRICT STANDARD SPECIFICATIONS BOOK.
8. EXCAVATE CHANNEL FLOWLINE TO DESIGN ELEVATION AS SHOWN ON PLANS AND DOWNSTREAM, AS NECESSARY, TO ENSURE NO WATER REMAINS IN THE FACILITY (STORM SEWER, LATERAL CHANNEL, OR DRY BOTTOM DETENTION BASIN) DURING NORMAL WATER SURFACE CONDITIONS IN THE CHANNEL, SO THE FACILITY WILL FUNCTION AS INTENDED. FOR WET BOTTOM DETENTION BASINS, ENSURE NO WATER IS ABOVE THE DESIGN LEVEL IN THE WET BOTTOM DURING NORMAL WATER SURFACE CONDITIONS IN THE CHANNEL.
9. MAINTAIN FLOW IN CHANNEL DURING CONSTRUCTION AND RESTORE CHANNEL TO ORIGINAL CONDITION.
10. REMOVE ALL EXCAVATED MATERIAL FROM THE HARRIS COUNTY FLOOD CONTROL DISTRICT OR DRAINAGE RIGHT-OF-WAY. NO FILL IS TO BE PLACED WITHIN A DESIGNATED FLOOD PLAIN AREA WITHOUT FIRST OBTAINING A FILL PERMIT FROM THE APPROPRIATE JURISDICTIONAL AUTHORITY.

STORM WATER POLLUTION PREVENTION PLAN:

1. THE CONTRACTOR SHALL COMPLY WITH ALL REQUIRED CONSTRUCTION PERMITTING IN ADDITION TO THE PROJECT STORM WATER POLLUTION PREVENTION PLAN.
2. THE CONTRACTOR SHALL PROVIDE A COPY OF THE NOTICE OF INTENT (NOI) AND MAINTENANCE CHECKLIST TO THE CITY ENGINEER FIVE WORKDAYS PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION ACTIVITY.
3. INSPECTION AND MAINTENANCE OF ALL STORM WATER POLLUTION PREVENTION PLAN APPARATUSES SHALL BE PER THE 2006 EDITION OF THE CITY OF HOUSTON STORMWATER MANAGEMENT HANDBOOK FOR CONSTRUCTION ACTIVITY.
4. ALL STORM WATER POLLUTION PREVENTION PLAN ACTIVITY SHALL COMPLY WITH THE CITY OF HOUSTON DEPARTMENT OF PUBLIC WORKS AND ENGINEERING MANUAL CHAPTER 13: STORM WATER QUALITY DESIGN REQUIREMENTS.

CENTERPOINT ENERGY NOTES:

CAUTION: UNDERGROUND GAS FACILITIES:

1. THE CONTRACTOR SHALL CONTACT THE UTILITY COORDINATION COMMITTEE AT 1-800-545-6005 OR 811 A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION TO HAVE MAIN AND SERVICE LINES FIELD LOCATED.

   -WHEN CENTERPOINT ENERGY PIPELINE MARKINGS ARE NOT VISIBLE, CALL 713-207-5463 OR 713-945-8037 (7:00 A.M. TO 4:30 P.M.) FOR STATUS OF LINE LOCATION REQUEST BEFORE EXCAVATION BEGINS.
   -WHEN EXCAVATING WITHIN EIGHTEEN INCHES (18") OF INDICATED LOCATION OF CENTERPOINT ENERGY FACILITIES, ALL EXCAVATION MUST BE ACCOMPLISHED USING NON-MECHANIZED EXCAVATION PROCEDURES.
   -WHEN CENTERPOINT ENERGY FACILITIES ARE EXPOSED, SUFFICIENT SUPPORT MUST BE PROVIDED TO THE FACILITIES TO PREVENT EXCESSIVE STRESS ON THE PIPING.
   -FOR EMERGENCIES REGARDING GAS LINES CALL 713-659-3552 OR 713-207-4200.
2. THE CONTRACTOR IS FULLY RESPONSIBLE FOR ANY DAMAGES CAUSED BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE THE UNDERGROUND FACILITIES.

WARNING: OVERHEAD ELECTRICAL LINES:

1. OVERHEAD LINES MAY EXIST ON THE PROPERTY. THE LOCATION OF OVERHEAD LINES HAS NOT BEEN SHOWN ON THESE DRAWINGS AS THE LINES ARE CLEARLY VISIBLE, BUT YOU SHOULD LOCATE THEM PRIOR TO BEGINNING ANY CONSTRUCTION. TEXAS LAW, SECTION 752, HEALTH & SAFETY CODE FORBIDS ACTIVITIES THAT OCCUR IN CLOSE PROXIMITY TO HIGH VOLTAGE LINES, SPECIFICALLY:

   -ANY ACTIVITY WHERE PERSON OR THINGS MAY COME WITHIN SIX (6) FEET OF LIVE OVERHEAD HIGH VOLTAGE LINES; AND
   -OPERATING A CRANE, DERRICK, POWER SHOVEL, DRILLING RIG, PILE DRIVER, HOISTING EQUIPMENT, OR SIMILAR APPARATUS WITHIN 10 FEET OF LIVE OVERHEAD HIGH VOLTAGE LINES.
2. PARTIES RESPONSIBLE FOR THE WORK, INCLUDING CONTRACTORS ARE LEGALLY RESPONSIBLE FOR THE SAFETY OF CONSTRUCTION WORKERS UNDER THIS LAW. THIS LAW CARRIES BOTH CRIMINAL AND CIVIL LIABILITY. TO ARRANGE FOR LINES TO BE TURNED OFF OR REMOVED CALL CENTERPOINT ENERGY AT 713-207-2222.

ACTIVITIES ON/OR ACROSS CENTERPOINT ENERGY FEE OR EASEMENT PROPERTY

1. NO APPROVAL TO USE, CROSS OR OCCUPY CENTERPOINT FEE OR EASEMENT PROPERTY IS GIVEN. IF YOU NEED TO USE CENTERPOINT PROPERTY, PLEASE CONTACT OUR SURVEYING & RIGHT OF WAY DIVISION AT 713-207-6348 OR 713-207-5769.

GENERAL CONSTRUCTION NOTES:

1. EXISTING UTILITY INFORMATION SHOWN IS NOT GUARANTEED TO BE ACCURATE AND ALL INCLUSIVE ALL EXISTING UTILITY LOCATIONS ARE APPROXIMATE AND SHOULD BE VERIFIED BY THE CONTRACTOR IN ADVANCE OF HIS CONSTRUCTION. ANY CONFLICT OR DISCREPANCY DISCOVERED MUST BE BROUGHT TO THE ENGINEER'S ATTENTION.
2. ANY DAMAGE TO ANY EXISTING PAVEMENT AND/OR UTILITIES MUST BE REPAIRED IMMEDIATELY. THE CONTRACTORS MUST NOTIFY THE APPROPRIATE UTILITY OWNER, WHO WILL MAKE THE REPAIRS AT THE CONTRACTOR'S EXPENSE.
3. GUIDELINES SET FORTH IN THE TEXAS "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", AS CURRENTLY AMENDED, SHALL BE OBSERVED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ADEQUATE FLAGMEN, SIGNING, STRIPING AND WARNING DEVICES, ETC, DURING CONSTRUCTION.
4. THE AREA SHALL BE BARRICADED AND MAINTAIN ILLUMINATION CURRENTLY IN PLACE.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE STORAGE OF MATERIAL AND EQUIPMENT IN A SAFE AND WORKMANLIKE MANNER TO PREVENT INJURIES DURING AND AFTER WORKING HOURS UNTIL PROJECT COMPLETION.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SHIPPING OF ALL MATERIALS, EXCEPT AS NOTED. THE LOADING AND UNLOADING OF ALL EQUIPMENT PIPE, VALVES, PUMPS, MANHOLES AND OTHER MATERIAL SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDED PRACTICES AND SHALL AT ALL TIMES BE PERFORMED WITH CARE TO AVOID ANY DAMAGE TO THE MATERIAL. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO EXAMINE SUCH MATERIAL AT THE POINT OF DELIVERY AND REJECT ALL DEFECTIVE MATERIAL. THE DEFECTIVE MATERIAL MUST BE REPLACED WITH SOUND MATERIAL.
7. ALL PIPE AND REINFORCEMENT STEEL SHALL BE KEPT FREE OF DIRT AND OTHER DEBRIS. ANY DAMAGE TO THE COATING OF THE VARIOUS MATERIALS MUST BE REPAIRED.
8. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ADEQUATE POSITIVE DRAINAGE AT ALL TIMES DURING CONSTRUCTION OF PROPOSED FACILITIES. NATURAL GROUND ADJACENT TO UTILITY TRENCH EXCAVATION SHALL BE GRUBBED PRIOR TO PLACEMENT OF EXCESS TRENCH MATERIAL (NO SEPARATE PAYMENT).
9. ACCESS TO ALL EXISTING STREETS AND DRIVEWAYS SHALL BE MAINTAINED AT ALL TIMES.
10. THE CONTRACTOR IS REQUIRED TO FOLLOW ALL APPLICABLE OSHA RULES AND REGULATIONS.
11. NO CONNECTIONS SHALL BE MADE TO EXISTING WATER LINES OR SANITARY SEWERS UNTIL ALL PROPOSED LINES OR SEWERS HAVE BEEN THOROUGHLY CLEANED, TESTED AND APPROVED BY THE CITY.
12. ALL GEOTECHNICAL REPORTS FOR THIS PROJECT ARE AVAILABLE FOR REFERENCE AT THE OFFICE OF THE CITY.
13. SURFACE RESTORATION: AT THE END OF ALL CONSTRUCTION ACTIVITY, THE CONTRACTOR SHALL RESTORE EXISTING FACILITIES OVER AND ABOVE THE CONTRACT DOCUMENTS, IE. SURROUNDING PROPERTY EQUAL TO OR BETTER THAN THE EXISTING SITE CONDITION PRIOR TO CONSTRUCTION. ALL DISTURBED AREAS ALONG THE ACCESS ROAD AND WITHIN THE PLANT SITE SHALL BE HYDROMULCH SEEDED OR SODDED IN ACCORDANCE WITH THE SPECIFICATIONS.
14. FINAL ACCEPTANCE OF THE UTILITIES WILL NOT BE GIVEN TO THE CONTRACTOR UNTIL THEY ARE INSPECTED AND APPROVED BY THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY.
15. ALL MANHOLES ARE TO BE CONSTRUCTED TO ALLOW FOR A MINIMUM OF 1 FOOT OF VERTICAL ADJUSTMENT.
16. CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING, MAINTAINING AND RESTORING BACKSLOPE DRAINAGE SYSTEM.
17. ALL DISTURBED AREA WITHIN THE DRAINAGE DITCH EXCEPT THE CHANNEL BOTTOM SHALL BE SEEDED.

GENERAL CONSTRUCTION NOTES (CONTINUED):

18. BACKFILL WITHIN THE DRAINAGE DITCH SHALL BE COMPACTED IN NO GREATER THAN ONE FOOT LIFTS TO THE DENSITY OF THE UNDISTURBED ADJACENT SOIL.
19. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING FLOW IN CHANNEL DURING CONSTRUCTION AND RESTORING CHANNEL TO AT LEAST ORIGINAL CONDITIONS.
20. TO PREPARE AN ACCURATE BID AND CONSTRUCT THE SPECIFIC IMPROVEMENTS, THE CONTRACTOR IS RESPONSIBLE FOR UNDERSTANDING ALL MATERIAL AND METHOD OPTIONS IN THE PROJECT SPECIFICATION.
21. EXISTING PAVEMENTS, CURBS, SIDEWALKS AND DRIVEWAYS DAMAGED OR REMOVED DURING CONSTRUCTION SHALL BE REPLACED USING THE CITY OF HOUSTON STANDARDS.
22. THE CONTRACTOR IS RESPONSIBLE TO UNDERSTAND THAT THIS PROJECT INCLUDES ELEMENTS OF DEMOLITION, ADAPTATION AND NEW CONSTRUCTION, THESE DRAWINGS WERE DEVELOPED USING AVAILABLE HISTORICAL DATA COUPLED WITH ON-SITE RECONNAISSANCE SURVEYS. THE CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFICATION OF SITE CONDITIONS PRIOR TO BEGINNING CONSTRUCTION ACTIVITIES. ALL DISCREPANCIES AND DISCOVERIES SHALL BE REPORTED TO THE CONSTRUCTION MANAGER.
23. ALL EXCAVATION SPOILS SHALL BE LAWFULLY DISPOSED OFFSITE BY CONTRACTOR AT NO ADDITIONAL COST TO THE CITY.
24. ALL WORK AT THE SITE THAT COULD POTENTIALLY INTERFERE WITH NORMAL PLANT OPERATIONS (AND/OR OFFSITE FACILITIES) SHALL BE COORDINATED WITH THE PLANT SUPERVISOR. CONTRACTOR SHALL SUBMIT A CONSTRUCTION SEQUENCING PLAN DEMOSTRATION THAT NO PLANT OPPERATIONS (OR OFFSITE FACILITIES) WILL BE ADVERSELY AFFECTED MORE THAN 4 HOURS IN ANY 24 HOUR PERIOD. ALL REQUESTS WHICH IMPACT NORMAL OPERATIONS OF THE PLANT SHALL BE SUBMITTED A MINIMUM OF 5 DAYS IN ADVANCE OF THE ACTIVITY.
25. ALL DRAWINGS DIMENSIONS SHOWN ARE APPROXIMATE AND SHALL BE FIELD VERIFIED BY THE CONTRACTOR. NECESSARY HORIZONTAL AND VERTICAL ALIGNMENT CHANGES SHALL BE APPROVED BY THE CITY.
26. CONTRACTOR SHALL REMOVE ALL TRASH, EXCESS DEBRIS ETC. FROM THE SITE AT PROJECT COMPLETION PRIOR TO INSPECTION AND APPROVAL BY APPROVING AGENCIES.
27. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND RELATED ACCESSORIES TO OPERATE IN THE MANNER INTENDED BY THE ENGINEER AND THE MANUFACTURER AND BE IN COMPLIANCE WITH ALL APPLICABLE CODES AND CONTRACT SPECIFICATIONS. THE CONTRACTOR WILL COORDINATE WORK BETWEEN ALL TRADES AND SUBCONTRACTORS TO PROVIDE A COMPLETE INSTALLATION SO THAT THE EQUIPMENT IS OPERATIONAL DURING SUBSTANTIAL AND FINAL COMPLETION OF THE PROJECT. THE COMPLETED WORK WILL NOT LACK ANY PART WHICH CAN BE REASONABLY IMPLIED AS INCIDENTAL FOR PROPER AND USEFUL OPERATION OF THE FACILITY. THIS INCLUDES ALL ITEMS OF EQUIPMENT, LABOR AND WILL BE IN ACCORDANCE WITH CODE REQUIREMENTS, STANDARDS, REGULATORY AGENCIES, MANUFACTURER'S RECOMMENDATIONS AND ACCEPTABLE INDUSTRY PRACTICE. THIS WORK WILL BE DONE AT NO ADDITIONAL COST TO THE CITY.
28. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SHORING, STABILIZATION AND SUPPORT OF ALL UTILITIES AND STRUCTURES DURING CONSTRUCTION.
29. ALL DIMENSIONS AND QUANTITIES SHALL BE DETERMINED AND/OR VERIFIED BY THE CONTRACTOR.
30. DO NOT SCALE THE DRAWINGS UNLESS OTHERWISE NOTED. REPORT ANY DISCREPANCIES TO THE CONSTRUCTION MANAGER IMMEDIATELY.
31. THE LOCATION AND LIMITS OF ALL ON-SITE WORK AND STORAGE AREAS SHALL BE REVIEWED/COORDINATED WITH AND ACCEPTABLE TO THE CITY OF HOUSTON. THE CONTRACTOR SHALL LIMIT THEIR ACTIVITIES TO THESE AREAS.
32. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING THE LOCATIONS AND ACTIVITIES OF THEIR FORCES WITH THE CITY OF HOUSTON TO MINIMIZE INTERFERENCE WITH NORMAL OPERATIONS.
33. SPECIFICATION SECTION 01110 – SUMMARY OF WORK PROVIDES A SUMMARY OF WORK TO BE COMPLETED AND ADDITIONAL INFORMATION OF CONSTRUCTION ACTIVITY.
34. CONTRACTOR SHALL VERIFY HORIZONTAL AND VERTICAL LOCATIONS OF ALL EXISTING UTILITIES PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITY.
35. CONTRACTOR IS RESPONSIBLE FOR THEIR OWN HORIZONTAL AND VERTICAL CONTROL REFERENCE POINTS AND CONSTRUCTION STAKING IN INCIDENTAL TO THE PROJECT.
36. CONTRACTOR SHALL KEEP ACCESS ROAD TO PLANT OPEN AND FREE FROM CONSTRUCTION RELATED DEBRIS AT ALL TIMES. CONTRACTOR STAGING AREA SHALL BE USED FOR CONTRACTOR'S PERSONNEL, PARKING, MATERIAL AND STORAGE, STOCKPILE, MATERIAL FABRICATION AND RELATED CONSTRUCTION WHICH WILL NOT BE ALLOWED TO INTERFERE WITH NORMAL PLANT OPERATION. CONTRACTOR TO PROVIDE TEMPORARY ALL-WEATHER ACCESS TO ALL UNLOADING AREAS, THROUGHOUT THE DURATION OF THE PROJECT.
37. ADEQUATE DRAINAGE SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION AND ANY DRAINAGE DITCH OR STRUCTURE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO THE FINAL DRAFT OF THE STORM WATER MANAGEMENT HANDBOOK FOR CONSTRUCTION ACTIVITIES. AS PREPARED BY HARRIS COUNTY, HCFCD AND THE CITY OF HOUSTON IN COMPLIANCE WITH NPDES REQUIREMENTS.
38. IN THE EVENT THAT GROUNDWATER IS ENCOUNTERED DURING EXCAVATION, GROUNDWATER SHOULD BE LOWERED TO A DEPTH OF AT LEAST THREE FEET BELOW THE DEEPEST EXCAVATION GRADE TO PROVIDE DRY WORKING CONDITIONS AND FIRM BEDDING. WATER ACCUMULATED IN THE EXCAVATION AREA SHALL BE REMOVED TO MAINTAIN THE WORKING AREA DRY.
39. IT IS CONTRACTOR'S RESPONSIBILITY TO DESIGN AND IMPLEMENT AN EFFECTIVE GROUNDWATER CONTROL SYSTEM. DEWATERING SYSTEM FOR GROUNDWATER AND SURFACE WATER CONTROL SHALL BE IN ACCORDANCE WITH THE CITY OF HOUSTON SPECIFICATION SECTION 01578 - CONTROL OF GROUNDWATER AND SURFACE WATER.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS — JUSTIN R. SANDY — 116989 — LICENSED PROFESSIONAL ENGINEER — 11/11/22

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

GENERAL

GENERAL NOTES SHEET 1 OF 2

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 4 OF 379	

FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS — 80367 — REGISTERED — PROFESSIONAL ENGINEER

G-00-004

FILE PATH: BIM 360://4025000 - COH Intercontinental Airport WWTP Improvements/4025000-GENERAL.rvt

GENERAL NOTES

GENERAL CONSTRUCTION NOTES (CONTINUED):

38. THE CONTRACTOR IS RESPONSIBLE FOR ALL TEMPORARY SUPPORTS AND BRACING FOR ALL STRUCTURAL ELEMENTS INCLUDING, BUT NOT LIMITED TO, PUMPS, PIPING, WALL AND FOUNDATION. ALL PROPOSED TEMPORARY BRACING AND SUPPORTS MUST BE SUBMITTED BY THE PROFESSIONAL ENGINEER RETAINED BY THE CONTRACTOR. ITS IS THE CONTRACTOR'S RESPONSIBILITY TO INSURE THE SAFETY AND FUNCTIONALITY OF THE PIPING AND ASSOCIATED APPURTENANCES DURING ALL PHASES OF CONSTRUCTION. FURTHERMORE, SHOULD THE CONTRACTOR FEEL THAT ANY SUPPORTS OR BRACING ILLUSTRATED OR DEPICTED WITHIN THESE CONSTRUCTION DOCUMENTS PRESENT A POTENTIAL PROBLEM IN TERMS OF SAFETY OR INTERFERENCE WITH OPERATION, IT IS THE CONTRACTOR'S RESPONSIBILITY TO IMMEDIATELY DOCUMENT THESE CONCERNS AND IMMEDIATELY PRESENT THIS SAID DOCUMENTATION TO THE CITY'S ATTENTION.

39. FIELD VERIFY EXISTING UNDERGROUND UTILITIES AND PROCESS PIPING SHOWN ON THE DRAWINGS BY WHATEVER MEANS NECESSARY (METAL DETECTION PROBES, EXCAVATION, SURVEY, OTHERS) PRIOR TO EXCAVATION. FIELD VERIFICATION WORK AND UTILITY ADJUSTMENTS SHALL BE COMPLETED PRIOR TO EXCAVATION AND CONSTRUCTION OF PROPOSED UTILITIES. THE CONSTRUCTION DOCUMENTS WERE PREPARED FROM THE CITY'S RECORD DRAWINGS. THE ACCURACY OF THE EXISTING UTILITIES AND INFRASTRUCTURE SHOWN ON THESE DOCUMENTS IS NOT GUARANTEED AND THE USE OF SUCH INFORMATION IN NO WAY RELIEVES THE CONTRACTOR OR OTHER OF ANY RESPONSIBILITY FOR ANY LOSS DUE TO INACCURACIES NO SEPARATE PAY ITEM.

40. NOTIFY TEXAS ONE CALL AT 811 OR 1-800-545-6005 AT LEAST 48 HOURS PRIOR TO COMMENCEMENT OF WORK.

41. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING REQUIRED SECURITY TO PROTECT HIS OWN PROPERTY.

42. CONTRACTOR SHALL BE RESPONSIBLE FOR ADEQUATELY PROTECTING EXISTING EQUIPMENT, BUILDINGS, STRUCTURES, PIPING, ELECTRICAL CABLES, UTILITIES, TANKS, TREES, SHRUBS AND ASSOCIATED APPURTENANCES DURING CONSTRUCTION AS APPLICABLE AND REPAIR OR REPLACE DUE TO DAMAGE CAUSED BY CONTRACTOR AT NO COST TO THE CITY.

43. IDENTIFY AND OBTAIN ALL REQUIRED CONSTRUCTION PERMITS PRIOR TO COMMENCEMENT OF WORK.

44. THE CONTRACTOR SHALL COMPLY WITH ALL RELEVANT FEDERAL, OSHA, STATE AND LOCAL LAWS AND REGULATIONS CONCERNING SAFETY OF HEALTH PRACTICES. THE DRAWING PREPARED BY THE DESIGN ENGINEERS FOR THE PROJECT DO NOT INCLUDE DESIGN OR SYSTEMS PERTAINING TO THE SAFETY OF THE CONSTRUCTION CONTRACTOR OR ITS EMPLOYEES OR AGENTS.

45. CONTRACTOR SHALL NOT OPERATE EXISTING VALVES, PLANT APPURTENANCES OR PLANT EQUIPMENT UNLESS, IN THE PRESENCE OF THE CITY CONSTRUCTION MANAGER AND/OR CITY WASTEWATER OPERATIONS. PROVIDE SUFFICIENT NOTIFICATION AND LEAD TIME FOR PLANT OPERATOR WHERE IT BECOMES NECESSARY TO ACTUATE OR DE-ACTUATE VALVES, PLANT APPURTENANCE OR PLANT EQUIPMENT.

46. THE CONTRACTOR SHALL PROVIDE TAPE, FITTINGS, PLUGS AND OTHER DEVICES FOR USE IN FILLING, FLUSHING, TESTING ETC. (NO SEPARATE PAYMENT).

GENERAL DEMOLITION NOTES:

1. THE CITY SHALL HAVE THE FIRST RIGHT OF REFUSAL TO RETAIN OR SALVAGE ALL ITEMS SHOWN TO BE DEMOLISHED AND/OR REMOVED, INCLUDING BUT NOT LIMITED TO PUMPS, HATCHES AND ELECTRICAL AND INSTRUMENTATION COMPONENTS. PRIOR TO INITIATING DEMOLITION WORK, THE CONTRACTOR AND THE DESIGNATED FIELD INSPECTOR SHALL MAKE A JOINT INSPECTION OF EACH SITE TO IDENTIFY ALL EQUIPMENT TO BE RETAINED BY THE CITY FOR SALVAGE OR REUSE. ITEMS IDENTIFIED FOR SALVAGE BY THE CITY SHALL BE CAREFULLY REMOVED TO PROTECT FROM DAMAGE. ALL OTHER ITEMS SHOWN TO BE DEMOLISHED/REMOVED THAT ARE NOT RETAINED BY THE CITY SHALL BE PROPERLY REMOVED FROM THE SITE AND HANDLED PER SPECIFICATION 02220—DEMOLITION AT NO ADDITIONAL COST TO THE CITY. CONTACT DESIGNATED CITY REPRESENTATIVE (CAPITAL PROJECTS CONSTRUCTION INSPECTOR) FOR WASTEWATER TREATMENT PLANT SALVAGE AT LEAST 72 HOURS PRIOR TO DEMOLITION IN ORDER TO COORDINATE REMOVAL OF ANY ITEMS THE CITY WISHES TO CLAIM AND SALVAGE. THE CONTRACTOR SHALL DELIVER ALL SALVAGE ITEMS TO A LOCATION WITHIN THE CITY DETERMINED BY THE CITY.

2. SUBMIT CONSTRUCTION SEQUENCING PLAN BEFORE STARTING ANY DEMOLITION ACTIVITIES. CONTRACTORS METHOD OF DEMOLITION SHALL BE APPROVED BY CONSTRUCTION MANAGER PRIOR TO START OF WORK. REFER TO SPECIFICATION 01110 FOR ADDITIONAL INFORMATION ON CONSTRUCTION SEQUENCE.

3. DEMOLITION OF EXISTING STRUCTURE MECHANICAL SYSTEMS OR PROCESS SYSTEMS IS GENERALLY SHOWN OR INDICATED ON THE DRAWINGS UNLESS OTHERWISE INDICATED. THE DEMOLITION OF THE STRUCTURE OF PROCESS SYSTEMS MEANS THE DEMOLITION, REMOVAL, PROPER CLEANING AND DISPOSAL OF THE ENTIRE UNIT, INCLUDING SUBSTRUCTURE, SUPERSTRUCTURE AND APPURTENANCES OR CONTENTS OF THE STRUCTURE OR EQUIPMENT SYSTEM. PROCESS MECHANICAL DEMOLITION IN GENERAL SHALL CONSIST OF DISMANTLING, CLEANING AND REMOVAL OF EXISTING PIPING, TANKS, BLOWERS, PUMPS, MOTORS CONTROLS, INDICATED IN THE CONTRACT DOCUMENT OR REQUIRED FOR THE COMPLETION OF WORK.

4. DEMOLITION OR REMOVAL OF NOTED EQUIPMENT, PIPING SYSTEMS AND APPURTENANCES SHALL INCLUDE ALL SUPPORTS, BOLTS AND STRUCTURAL COMPONENTS.

5. PATCH AND REPAIR WITH MORTAR OR GROUT ALL EXPOSED FLOOR AND WALL PENETRATIONS FOR DEMOLITION ACTIVITIES IN ACCORDANCE WITH SPECIFICATION 03920 – CONCRETE SURFACE REPAIR AND SPECIFICATION 03930 – CONCRETE CRACK REPAIR.

6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PENETRATING NEEDS FOR PASSAGE OF PIPING THROUGH SOLID CONCRETE WALLS, FLOORS OR FOUNDATION WALLS.

7. REUSED EXISTING PIPING SYSTEMS SHALL BE PROPERLY CLEANED AND INSPECTED PRIOR TO REUSE.

8. ALL EQUIPMENT SHALL BE DE-ENERGIZED AND MADE SAFE PRIOR TO DEMOLITION WORK IN ACCORDANCE WITH SPECIFICATION SECTION 16050 – ELECTRICAL DEMOLITION USING LOCK OUT/TAG OUT SAFETY PROCEDURE. THE CONTRACTOR SHALL COORDINATE WITH CENTERPOINT ENERGY TO DISCONNECT THE ELECTRICAL POWER.

9. REFER TO CIVIL, STRUCTURAL, PROCESS MECHANICAL AND ELECTRICAL DRAWINGS FOR ADDITIONAL DEMOLITION INFORMATION.

10. CROSS-HATCHING INDICATES ITEMS TO BE REMOVED AS SHOWN ON THE DRAWINGS. THE DRAWINGS DO NOT NECESSARILY INDICATE ALL ITEMS REQUIRING DEMOLITION, REMOVAL, OR PATCHING/REPAIR. CONTRACTOR SHALL INCLUDE ALL WORK TO ACCOMMODATE NEW CONSTRUCTION IN CONTRACT PRICE.

11. CONTRACTOR SHALL DEMOLISH EVERYTHING WITHIN THE LIMITS OF DEMOLITION, INCLUDING ALL INTERIOR EQUIPMENT, PIPING, ALL CONCRETE AND REINFORCEMENT, APPURTENANCES OR OTHER MISCELLANEOUS ITEMS.

GENERAL NOTES FOR CIVIL DRAWINGS:

1. THE HORIZONTAL DATUM IS REFERENCED TO THE TEXAS COORDINATE SYSTEM, SOUTH CENTRAL ZONE 4204, NAD83 (2011), ITRF (EPOCH 2010.0000) NAVD88 (GD2012A). ALL NAD83 COORDINATES SHOWN HEREIN ARE SURFACE VALUES AND CAN BE CONVERTED TO GRID BY MULTIPLYING THE COMBINED SCALE FACTOR OF 0.9999923883870. (SURFACE X CSF = GRID)

2. THE VERTICAL DATUM IS REFERENCED TO FEMA ELEVATIONS (NAVD88 (2001 ADJ.)). TO CONVERT NAV88 PUBLISHED ELEVATIONS TO OBSERVED SUBTRACT 0.5 FEET. (NAVD88 (2001 ADJ.)–0.5= OBSERVED.)

3. FEMA BASE FLOOD ELEVATION LINE AND VALUE ELEVATION 79 (NAD83 DATUM ELEVATION) AS INDICATED BY THE 0.2% ANNUAL CHANCE FLOODPLAIN BOUNDARY.

4. EXISTING UTILITIES AND STRUCTURES (UNDERGROUND,SURFACE OR OVERHEAD) ARE INDICATED ONLY TO THE EXTENT THAT SUCH INFORMATION WAS KNOWN, OR MADE AVAILABLE TO, OR DISCOVERED BY THE ENGINEER IN PREPARING THE DRAWINGS. THE LOCATION, CONFIGURATIONS, AND ELEVATIONS OF SUBSURFACE FACILITIES AND UTILITIES ARE APPROXIMATE, AND NOT ALL UTILITIES AND FACILITIES MAY BE INDICATED. OVERHEAD UTILITIES ARE NOT INDICATED IN ARCHITECTURAL ELEVATIONS, PROFILE OR SECTION DRAWINGS. THE ENGINEERING INVESTIGATIONS, LOCATIONS AND DESIGNATION OF SUBSURFACE UTILITIES INDICATED IN THESE CONTRACT DOCUMENTS HAS BEEN PERFORMED TO QUALITY LEVEL C IN ACCORDANCE WITH GENERALLY ACCEPTED ENGINEERING PRINCIPLES AND PRACTICES AS OUTLINED IN ASCE STANDARD AND GUIDELINE BULLETIN CI/ASCE 38-02 UNLESS OTHERWISE DESIGNATED. WHERE SUCH ACTIVITIES HAVE BEEN TO A HIGHER LEVEL OF QUALITY, THE HIGHER QUALITY LEVEL FOR THE AFFECTED AREAS IS INDICATED IN THE CONTRACT DOCUMENTS.

5. ALL EXISTING STRUCTURE AND PIPING ELEVATIONS SHALL BE FIELD VERIFIED BY THE CONTRACTOR.

6. "SCREENED"(LIGHT) DELINEATION INDICATED ON THE DRAWINGS DENOTES EXISTING FACILITIES "SCREENED" INFORMATION WAS TAKEN FROM THE EXISTING CONSTRUCTION DRAWINGS AND DATA, IS FOR REFERENCE ONLY AND SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO ORDERING OF MATERIALS AND BEGINNING OF CONSTRUCTION. "BOLD" DELINEATION IS NEW WORK TO BE CONSTRUCTED UNDER THIS PROJECT. "DASHED" DELINEATION IS FOR FUTURE DESIGN WORK NOT CONSTRUCTED UNDER THIS CURRENT CONTRACT.

7. CONTRACTOR'S STAGING, PARKING AND MATERIAL STORAGE SHALL BE LIMITED TO THE SPACE(S) DESIGNATED ON THE DRAWINGS. PROVIDING ADDITIONAL STORAGE OR PARKING SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

8. CALL 811 OR 1-800-545-6005 BEFORE YOU DIG FOR FIELD LOCATIONS OF BURIED ELECTRIC, TELEPHONE, GAS WATER, SEWER, AND CABLE TELEVISION FACILITIES (48 HOURS NOTIFICATION IS REQUIRED.) CONTRACTOR SHALL VERIFY PRECISE LOCATION AND ELEVATIONS OF ALL UTILITIES AND STRUCTURES, WHETHER INDICATED ON THE DRAWINGS OR NOT, IN THE FIELD IN ADVANCE OF EXCAVATING, BY CONTACTING ALL UTILITIES AND OTHER AGENCIES, AND BY PROSPECTING. CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVAL, DEMOLITION, RECONSTRUCTION AND RECONNECTION OF EXISTING FACILITIES AS REQUIRED TO COMPLETE THE WORK. IF REQUIRED AFTER FIELD VERIFICATION, CONTRACTOR SHALL COORDINATE WITH THE ENGINEER TO DETERMINE ANY NECESSARY MODIFICATIONS TO PROPOSED NEW WORK.

9. BEFORE CONSTRUCTION IS STARTED, CONTRACTOR SHALL COORDINATE WITH THE OWNER OF EACH UTILITY AND DEFINE THE REQUIREMENTS AND ACCOMMODATE THE PROTECTION, TEMPORARY SUPPORT, ADJUSTMENT OR RELOCATION OF ANY UTILITIES AFFECTED BY THE PROPOSED NEW WORK.

10. CONTRACTOR SHALL COMPLY WITH THE GOVERNING AGENCY NPDES CONSTRUCTION REQUIREMENTS, AND SHALL PROVIDE APPROPRIATE MITIGATION MEASURES OR PROTECTION AND RESTORATION AT ALL LOCATIONS AS REQUIRED BY THEIR OPERATIONS AND AS DIRECTED BY ENGINEER. SPECIAL CONSTRUCTION REQUIREMENTS, TEMPORARY PROTECTIVE FENCING OR BARRICADES, SHEETING, SHORING, EROSION PROTECTION AND SURFACE RESTORATION AT CERTAIN LOCATIONS ARE INDICATED ON THE DRAWINGS TO BRING CONTRACTORS ATTENTION TO SENSITIVE AREAS.

11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL PROPERTY CORNER MARKERS. PROPERTY CORNER MARKERS DAMAGED BY CONSTRUCTION ACTIVITIES SHALL BE REESTABLISHED BY A PROFESSIONAL SURVEYOR LICENSED IN THE STATE OF TEXAS.

12. THE LOCATION OF SOIL BORINGS INDICATED ON THE DRAWINGS IS APPROXIMATE. CONTRACTOR SHALL REFER TO THE GEOTECHNICAL INVESTIGATION REPORT FOR ACTUAL BORING LOCATIONS AND THE FINDINGS OF THE GEOTECHNICAL INVESTIGATIONS.

13. CONTRACTOR SHALL PROTECT AND MAINTAIN ALL EXISTING TREES, SHRUBS, AND PLANTS UNLESS OTHERWISE NOTED.

14. CONTRACTOR SHALL INSTALL ALL PIPELINES, PAVING, WALKWAYS, AND CURB AND GUTTER AT A UNIFORM GRADE BETWEEN ELEVATIONS DEPICTED ON THE DRAWINGS.

15. FOR ALL SITE GRADING, SMOOTH PARABOLIC TRANSITIONS SHALL BE MADE BETWEEN CHANGES IN SLOPE. PARABOLIC ROUNDING SHALL APPLY TO ALL CUT AND FILL SECTIONS.

16. FINISHED GRADE ELEVATION AT THE BUILDING FACE, WHERE NOT ADJACENT TO PAVEMENT, SHALL BE APPROXIMATELY 6 INCHES BELOW FINISHED FLOOR ELEVATION UNLESS OTHERWISE NOTED. FINISHED GRADE ELEVATION ADJACENT TO BASINS SHALL BE APPROXIMATE AS INDICATED BY CONTOURS OR AS REQUIRED TO MEET STAIR LANDINGS.

17. THE CONTRACTOR'S OPERATIONS SHALL CONFORM TO THE RULES AND REGULATIONS OF THE STATE CONSTRUCTION SAFETY ORDERS AND OSHA PERTAINING TO EXCAVATION AND TRENCHING.

18. ALL BURIED PIPES SHALL BE RESTRAINED UNLESS OTHERWISE NOTED ON THE DRAWINGS OR SPECIFICATIONS.

19. THE DRAWINGS INDICATE TYPES OF PIPE SUPPORT SYSTEMS AT VARIOUS LOCATIONS. HOWEVER, ALL PIPE SUPPORTS, HANGERS, BRACKETS, INSERTS OR BRACES ARE NOT SHOWN. CONTRACTOR SHALL REFER TO SPECIFICATIONS SECTION 15140 AND PROVIDE A COMPLETE SUPPORT SYSTEM AS REQUIRED.

20. THE TERMS "PROPOSED" AS INDICATED ON THE DRAWINGS MEANS THE ITEM IS DESIGNED OR PLANNED TO BE PROVIDED BY OWNER OR OTHERS SEPARATE FROM THIS CONTRACT. THE TERM "FUTURE" AS INDICATED ON THE DRAWINGS REFERS TO THE ENGINEER'S INTERPRETATION OF THE ITEM FOR THE FUTURE, BASED ON AVAILABLE INFORMATION.

21. THE EXISTING PROCESS FACILITIES SHALL REMAIN IN OPERATION CONTINUOUSLY THROUGHOUT THE CONSTRUCTION ACTIVITIES. THE INDIVIDUAL PROCESS FACILITIES CAN BE TAKEN OUT OF SERVICE FOR LIMITED PERIODS OF TIME TO FACILITATE CONSTRUCTION AS SPECIFIED IN THE CONTRACT DOCUMENTS.

GENERAL NOTES FOR CIVIL DRAWINGS (CONTINUED):

21. CONTRACTOR SHALL RESTORE ANY EXISTING STRUCTURES THAT ARE DISTURBED, DAMAGED OR REMOVED BY CONSTRUCTION.

22. CONTRACTOR SHALL PROVIDE ANY TEMPORARY CULVERTS THAT MAY BE REQUIRED FOR CONTRACTOR'S OPERATIONS. CONTRACTORS SHALL COORDINATE REMOVAL AND REPLACEMENT OF ANY CULVERTS WITHIN PUBLIC RIGHT-OF-WAY WITH THE REGULATING AGENCY.

23. CONTRACTOR SHALL PROVIDE THE ACTUAL PIPE LENGTH TO BE DETERMINED BY THE SLOPE OR CURVE ON WHICH THE PIPE IS INSTALLED.

24. MINIMUM PIPE COVER SHALL BE FROM THE EXISTING, PROPOSED OR FUTURE GROUND SURFACE OR ROAD PROFILE, WHICHEVER GROUND SURFACE OR ROAD PROFILE IS APPLICABLE AS INDICATED ON THE DRAWINGS. IF THE PROPOSED GROUND SURFACE IS ABOVE THE EXISTING GROUND SURFACE INDICATED ON THE DRAWINGS AND IS NOT ACTUAL GROUND SURFACE AT THE TIME OF PIPELINE INSTALLATION, INSTALL THE PIPELINE TO PROVIDE MINIMUM PIPE COVER FROM THE ACTUAL GROUND SURFACE IF ACCEPTABLE TO THE ENGINEER. HIGH POINTS IN THE PIPELINE WILL NOT BE PERMITTED EXCEPT AT LOCATIONS OF AIR VALVES AS INDICATED ON THE DRAWINGS. REVIEW THE PIPELINE PROFILE REQUIREMENTS WITH THE ENGINEER PRIOR TO PREPARING LAYING SCHEDULE AND PERFORMING FIELD STAKING.

25. CONTRACTOR SHALL FIELD VERIFY PRECISE LOCATION, ELEVATION AND ARRANGEMENT OF CONNECTIONS OF NEW PIPELINES WITH EXISTING PIPELINES BASED ON FIELD CONDITIONS, INCLUDING EXPOSING EXISTING PIPING PRIOR TO FABRICATING NEW PIPING. CONTRACTOR SHALL PROVIDE FITTINGS, ADAPTERS, SOLID SLEEVE CLOSURES AND HARNESSED MECHANICAL COUPLING, ROTATE FITTINGS, DEFLECT JOINTS AND MODIFY EXISTING PIPING AS APPLICABLE AND AS REQUIRED TO MAKE CONNECTIONS, INCLUDING ADJUSTMENTS FOR ANY OFFSET IN CENTERLINE ELEVATIONS BETWEEN PIPELINES. CONTRACTOR SHALL PROVIDE TEMPORARY PLUG WITH FACTORY OUTLET SIZED AS REQUIRED FOR CONTRACTOR'S TESTING AND DISINFECTION WORK BEFORE MAKING CONNECTION. WHEN APPLICABLE, CONTRACTOR SHALL COORDINATE MAKING EACH CONNECTION WITH THE OWNER.

26. ALL DUCTILE IRON PIPE (DIP) SHALL BE PROTECTED WITH A MINIMUM OF ONE WRAP OF POLYETHYLENE ENCASEMENT LOCATIONS WHERE DIP IS TO BE DOUBLE WRAPPED WITH POLYETHYLENE ENCASEMENT AND PRESTRESSED CONCRETE CYLINDER PIPE (PCCP) IS TO BE WRAPPED (SINGLE OR DOUBLE) WITH POLYETHYLENE ENCASEMENT ARE SPECIFIED AND INDICATED ON THE DRAWING.

27. REMOVED PAVEMENT, SIDEWALK, CURB AND GUTTER ETC. SHALL BE DISPOSED OF OFFSITE BY THE CONTRACTOR AT ITS OWN EXPENSE AND SHALL BE CONSIDERED INCIDENTAL TO THE CONTRACT UNLESS OTHERWISE SPECIFIED IN CONTRACT DOCUMENTS.

28. CONTRACTOR SHALL PROVIDE DUST CONTROL MEASURES TO PREVENT TRAFFIC HAZARDS OR CONDITIONS THAT MAY IMPACT THE HEALTH AND SAFETY OF PERSONS DOWN WIND.

29. CONSTRUCTION INGRESS-EGRESS SHALL BE CONFINED TO DEFINED UTILITY EASEMENTS AND PUBLIC ROADWAYS. CONSTRUCTION EXITS SHALL BE CLEANED DAILY AS NEEDED TO PREVENT THE SPREAD OF SEDIMENTS OR DEBRIS ON EXISTING PAVEMENTS. MUD AND DEBRIS SHALL BE CLEANED FROM THE PAVEMENTS WHENEVER IT OCCURS AND AS REQUIRED BY THE CITY OR ROADWAY AUTHORITY.

30. THE CONTRACTOR SHALL MAKE ARRANGEMENTS FOR THE PROPER BRACING, SHORING AND OTHER REQUIRED PROTECTION OF ALL UTILITIES BEFORE CONSTRUCTION BEGINS. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO THE UTILITIES AND ASSOCIATED STRUCTURES AND SHALL MAKE REPAIRS AS NECESSARY TO THE SATISFACTION OF THE UTILITY OWNER.

31. PLACE SHALL MARKERS (PROVIDED BY OWNERS) ABOVE YARD PIPING GREATER THAN 3" DIAMETER AT 300' SPACING AND ALL HORIZONTAL BENDS TO DEPTH BETWEEN 1' AND 3' BELOW FINISHED GRADE.

MISCELLANEOUS NOTES:

1. CONTRACTOR SHALL VERIFY NUMBER AND SIZE OF ALL OPENINGS SHOWN ON THE DRAWINGS AND COORDINATE WITH CIVIL, ARCHITECTURAL, PLUMBING, MECHANICAL AND ELECTRICAL DRAWINGS AND EQUIPMENTS FURNISHED FOR EXACT LOCATIONS OF OPENINGS.

2. ALL NOZZLES, WEIRS, PIPE THIMBLES, GATES AND THIMBLES AND ALL OTHER EMBEDDED EQUIPMENTS SHALL BE LOCATED AND EMBEDDED ACCORDING TO THE CIVIL, MECHANICAL, STRUCTURAL DRAWINGS AND VENDOR RECOMMENDATIONS.

3. ALL EXPOSED OR ABOVE GROUND POTABLE AND NON-POTABLE WATER LINES ARE TO BE INSULATED.

4. ALL DISTURBED AREA SHALL BE HYDROMULCH SEEDED PER SPECIFICATION 02921 – HYDROMULCH SEEDING.

5. EXISTING PAVEMENTS, CURBS, SIDEWALKS AND DRIVE-WAYS DAMAGED OR REMOVED DURING CONSTRUCTION SHALL BE REPLACED USING CITY OF HOUSTON STANDARDS.

APPLICABLE CODES:

1. DESIGN OF PLANT STRUCTURES IS BASED ON APPLICABLE PORTIONS OF:
   - 2015 IBC WITH CITY OF HOUSTON AMENDMENTS
   - 2015 UPC – UNIFORM PLUMBING CODE
   - 2015 UMC – UNIFORM MECHANICAL CODE
   - 2020 NEC – NATIONAL ELECTRICAL CODE
   - 2012 IFC – INTERNATIONAL FIRE CODE
   - 2015 IECC OR ASHRAE 90.1-2013
   - AIC 318 – BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE
2. ACI 350-01 ENVIRONMENTAL ENGINEERING CONCRETE STRUCTURES
3. ASCE 7-10 MINIMUM DESIGN LOADS FOR BUILDINGS
4. AISC 13TH ADDITION

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JUSTIN R. SANDT
116988
LICENSED
PROFESSIONAL ENGINEER
3/3/23

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

GENERAL

GENERAL NOTES
SHEET 2 OF 2

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 5 OF 379	

80367
REGISTERED
PROFESSIONAL
ENGINEER
3/3/23

G-00-005

FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-GENERAL.rvt

GENERAL LEGENDS

MATERIALS LEGEND

- STONE
- EARTH
- GRANULAR FILL
- CONCRETE
- STEEL
- ALUMINUM
- BEDROCK
- CHECKERED PLATE
- SAND
- RIPRAP
- BRICK
- CMU
- FACE BLOCK
- SOLID FILL
- ENGINEERED FILL
- ENGINEERED FILL (GRAVEL)
- GRATING

NORTH ARROWS LEGEND

ANNOTATIONS LEGEND

GENERAL TEXT
.10" ROMANS BT
DRAWING TEXT, NOTES, SCHEDULES, DIMENSIONS & MINOR CALLOUTS

GENERAL TEXT (UNDERLINED)
.10" ROMANS BT, UNDERLINED
SPECIFIC DRAWING TEXT & NOTES

SUB-TITLE TEXT
.13" ROMANS BT, UNDERLINED
MINOR TITLES & MAJOR CALLOUTS

TITLE TEXT
.16" ROMANS BT, UNDERLINED
MAJOR TITLES

1 SHEET KEYNOTE
NUMERIC SEQUENCE
COORDINATE W/ SHEET KEYNOTES IN BORDER NOTE BLOCK

REVISIONS

2 REVISION TAG

REVISION CLOUD

ELEVATIONS LEGEND

NEW WORK ELEVATIONS

EL 0.00	GENERAL ELEVATION
FLR EL 0.00	FLOOR ELEVATION
CL EL 0.00	CENTERLINE OF PIPE OR EQUIPMENT ELEVATION
INV EL 0.00	INVERT OF PIPE OR EQUIPMENT ELEVATION
TOG EL 0.00	TOP OF GRATING ELEVATION
TOC EL 0.00	TOP OF CONCRETE ELEVATION
EL 0.00	FLOOR ELEVATION IN PLAN VIEW

EXISTING WORK ELEVATIONS

EL 0.00+/-	GENERAL ELEVATION
FLR EL 0.00+/-	FLOOR ELEVATION
CL EL 0.00+/-	CENTERLINE OF PIPE OR EQUIPMENT ELEVATION
INV EL 0.00+/-	INVERT OF PIPE OR EQUIPMENT ELEVATION
TOG EL 0.00+/-	TOP OF GRATING ELEVATION
TOC EL 0.00+/-	TOP OF CONCRETE ELEVATION
EL 0.00+/-	FLOOR ELEVATION IN PLAN VIEW

EL 0.00 — SPOT ELEVATION

N 0'-0"
E 0'-0"
EL 0.00 — SPOT COORDINATE

0.00' — SPOT SLOPE

PIPE AND FITTINGS LEGEND

EXISTING PIPE	TEE UP
NEW PIPE	TEE DOWN
EXISTING PIPING TO BE REMOVED	LATERAL UP
WELDED JOINT	LATERAL DOWN
GROOVED END JOINT	CONCENTRIC REDUC
FLANGED JOINT	ECCENTRIC REDUCE
THERMAL DISPERSION FLOW ELEMENT	REDUCING BUSHING
ELECTRO MAGNETIC FLOW ELEMENT (FM)	UNION
MECHANICAL JOINT	BLIND FLANGE
GROOVED END ADAPTER FLANGE	ELBOW, 90°
FLANGED COUPLING ADAPTER	ELBOW, 45°
FLEXIBLE COUPLING	CROSS
DISMANTLING JOINT	TEE
METAL BELLOWS EXPANSION JOINT	LATERAL
ELASTOMERIC BELLOWS EXPANSION JOINT	
ELBOW UP	
ELBOW DOWN	

NOTE: ONLY FLANGED END CONNECTIONS ARE SHOWN. FITTINGS WITH OTHER END CONNECTION TYPES ARE SHOWN SIMILARLY ON THESE CONTRACT DRAWINGS. REFER TO PIPING SPECIFICATIONS.

ARCHITECTURAL LEGEND

TAGS ARE MEDIUM LINES & CALLOUTS ARE SUB-TITLE TEXT UNLESS NOTED OTHERWISE.

(XX) (XX)	ACCESSORY ITEM LETTER SEQUENCE
C1	CEILING "C" + NUMERIC SEQUENCE
(2) (2)	CURTAIN PANEL LETTER SEQUENCE
WS	CURTAIN WALL or FRAME TYPE LETTER SEQUENCE
F1	FLOOR "F" + NUMERIC SEQUENCE
1D1A	DOOR ROOM NUMBER + LETTER SEQUENCE
1Q1A	LOUVER ROOM NUMBER + LETTER SEQUENCE
QQ	LABORATORY CABINET NUMERIC SEQUENCE
RL1	RAILING "RL" + NUMERIC SEQUENCE
R1	ROOF "R" + NUMERIC SEQUENCE
ROOM NAME 101 150 SF	ROOM NAME & NUMBER FIRST DIGIT LEVEL DESIGNATION + NUMERIC SEQUENCE (01-99)
	OPTIONAL AREA REPORT
Stair No.?	STAIR STAIR No. + NUMERIC SEQUENCE (01-99)
A1	WALL LETTER SEQUENCE + NUMERIC SEQUENCE COORDINATE WITH WALL TYPES
W	WINDOW LETTER SEQUENCE

GENERAL SHEET NOTES

1. THIS IS A GENERAL LEGEND PROVIDED TO FACILITATE USE OF DRAWINGS. REFER TO THE DRAWINGS AND SPECIFICATIONS FOR ITEMS REQUIRED.
2. "SCREENED" (LIGHT) DELINEATION INDICATED ON CIVIL/SITE, DRAWINGS DENOTES EXISTING WORK AND/OR STRUCTURES. THE "SCREENED" INFORMATION WAS TAKEN FROM EXISTING RECORD DRAWINGS, AS BUILT DRAWINGS, AND FIELD SURVEYS. THIS INFORMATION IS FOR REFERENCE ONLY AND SHALL BE FIELD-VERIFIED BY THE CONTRACTOR PRIOR TO THE ORDERING OF MATERIALS OR THE BEGINNING OF CONSTRUCTION, UNLESS OTHERWISE NOTED.
3. "BOLD" OR SOLID (DARK) LINE DELINEATION INDICATED ON ALL DRAWINGS DENOTES NEW WORK THAT IS TO BE CONSTRUCTED OR MODIFIED AS PART OF THIS CONTRACT.
4. ARCHITECTURAL, STRUCTURAL, MECHANICAL, HVAC, PLUMBING, AND ELECTRICAL DISCIPLINE DRAWINGS REFERENCING OTHER DISCIPLINE'S AREA OF WORK INTO THEIR DRAWINGS WILL BE "SCREENED" WITH (LIGHT) DELINEATION. THIS DOES NOT NECESSARILY DENOTE WORK AS EXISTING OR NEW. THE CONTRACTOR SHALL BE RESPONSIBLE TO VERIFY EXISTING FACILITIES AND EQUIPMENT AND MODIFICATIONS TO THEM AND NEW FACILITIES AND NEW WORK.
5. EXISTING DIMENSIONS AND ELEVATIONS ON DRAWINGS ARE APPROXIMATE ONLY AND ARE INDICATED ON THE DRAWINGS WITH +/- SUFFIX. CONTRACTOR SHALL FIELD-VERIFY DIMENSIONS AND ELEVATIONS PRIOR TO ORDERING MATERIALS AND BEGINNING OF CONSTRUCTION.
6. EXISTING STRUCTURES, FACILITIES, EQUIPMENT ETC. SHALL BE NOTED IN ANNOTATIONS WITH "EXIST" OR "EXISTING" IN PREFIX OF THE CALLOUT OR LABEL.
7. REFER TO SPECIFICATION SECTION 01110 FOR CONSTRUCTION SEQUENCING AND SCHEDULE REQUIREMENTS.
8. PRIOR TO CONSTRUCTION THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, ELEVATIONS, AND PIPE SIZES WITH EQUIPMENT MANUFACTURER. PROVIDE NECESSARY FITTINGS, REDUCERS, AND ACCESSORIES FOR INSTALLATION AND TO FACILITATE EQUIPMENT REMOVAL.
9. GENERAL "G" DRAWINGS CONTAIN INFORMATION SUCH AS GENERAL NOTES, LEGENDS, SYMBOLOGY, ANNOTATIONS, AND ABBREVIATIONS WHICH IS INFORMATION THAT IS APPLICABLE TO ALL DRAWINGS OF THIS PROJECT.
10. ALL DRAWINGS WITH PIPING THAT ARE CONTINUOUS SHALL REFER TO THE CIVIL DRAWINGS FOR THEIR CONTINUATION.
11. GRAPHICS WHICH ARE TO BE SHOWN AS SCREENED SHALL BE DELINEATED AS LIGHT. ———
12. GRAPHICS WHICH ARE TO BE SHOWN AS NEW WORK SHALL BE DELINEATED AS SOLID. ———
13. NOT ALL HANGERS, BRACKETS, BRACES OR OTHER SUPPORTS FOR PIPING, DUCTWORK, AND EQUIPMENT ARE INDICATED ON THE DRAWINGS. REFER TO THE SPECIFICATIONS FOR SUPPORT REQUIREMENTS.
14. "SCREENED" (LIGHT) TEXT HAS PREVIOUS PROJECT RECORD DOCUMENTS AND IS NOT APPLICABLE TO NEW WORK BEING PERFORMED WITHIN THIS CONTRACT.

DEMOLITON & RE-USE LEGEND

- DEMOLITION
- MODIFICATION

LINE STYLES LEGEND

- FINE LINES
- THIN LINES
- MEDIUM LINES
- WIDE LINES
- BOLD LINES
- HEAVY LINES
- EXISTING LINES
- CENTERLINE 1/4"
- CENTERLINE 1/2"
- GRID LINE
- HIDDEN LINES
- HIDDEN LINES 1/8"
- HIDDEN LINES 1/16"
- MEDIUM HIDDEN LINES
- MEDIUM HIDDEN LINES 1/8"
- MEDIUM HIDDEN LINES 1/16"
- MECHANICAL HIDDEN
- MATCH LINE
- 1 HOUR FIRE RATED
- 2 HOUR FIRE RATED
- 3 HOUR FIRE RATED
- SMOKE RATED

SECTION/DETAIL/ELEVATIONS LEGEND

CALLOUT DESIGNATION LETTER OR NUMBER — 2 / 2 — VIEW REFERENCE IF REQ'D — DETAIL HEAD CALLOUT — DRAWING REFERENCE

CALLOUT DESIGNATION NUMBER — 2 / 2 — VIEW REFERENCE IF REQ'D — SECTION HEAD CALLOUT — DRAWING REFERENCE

VIEW TITLES LEGEND

PLAN VIEW TITLES

TITLE LINE 1
TITLE LINE 2 BELOW)
SCALE/NO SCALE

SECTION & DETAIL VIEW TITLES

A SECTION
X-XX-XXX SCALE/NO SCALE
X-XX-XXX
X-XX-XXX
SECTIONS WITH CROSS-REFERENCE

A DETAIL
X-XX-XXX SCALE/NO SCALE
X-XX-XXX
X-XX-XXX
DETAILS WITH CROSS-REFERENCE

A DETAIL
SCALE/NO SCALE
DETAILS WITH NO CROSS-REFERENCE

EQUIPMENT & PIPE TAGGING LEGEND

XXX — MECHANICAL EQUIPMENT/VALVE TAG
PIPE SIZE
SYSTEM ABBREVIATION
MATERIAL ABBREVIATION
12" XX MAT
MATERIAL PIPE TAG

VALVE LEGEND (NON-SCHEMATIC)

- CHECK VALVE
- PINCH VALVE
- FLANGED ECCENTRIC PLUG VALVE
- MJ ECCENTRIC PLUG VALVE
- BALL VALVE
- BUTTERFLY VALVE

INTERIOR PIPING ABBREVIATIONS

AFC	ANTI-FOAM CHEMICAL
ALP	AIR LOW PRESSURE
CMS	COMPRESSED AIR-SERVICE
DS	DIGESTED SLUDGE
DR	PLANT DRAIN
ELU	ELUTRIATE
FILT	FILTRATE
FSC	FERMENTER SCUM
MGCL	MAGNESIUM CHLORIDE
NG	NATURAL GAS
OA	ODOROUS AIR
OF	OVERFLOW
PD	SUMP PUMP DISCHARGE
PSD	PRIMARY SLUDGE
PSC	PRIMARY SCUM
PTDS	PHOSPHOROUS TREATED DIGESTED SLUDGE
TFS	THICKENED FERMENTED SLUDGE
RCS	RECIRCULATED SLUDGE
W1	POTABLE WATER
W2	NON-POTABLE WATER
W3	PLANT EFFLUENT WATER

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS — JUSTIN R. SANDT — 119999 — LICENSED PROFESSIONAL ENGINEER — 11/11/22

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

GENERAL

LEGENDS AND NOTES

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 6 OF 379	

FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS — 80367 — REGISTERED — 11/11/22

G-00-006

FILE PATH: C:\pw_working\bvw_americas\d1011535\D-00-006.dwg
8/27/2022 8:40:53 AM

ABBREVIATIONS

A	ACID, AMBER INDICATING LIGHT,AMP
AB	ANCHOR BOLT
ABS	ACID BATH SINK
AC	ALTERNATING CURRENT, ASPHALTIC CONCRETE
A/C	AIR CONDITIONER, (ING)
ACP	ASBESTOS CEMENT PIPE
ACST	ACOUSTIC, (AL
AD	ACCESS DOOR, AREA DRAIN, AIR DAMPER, ANODE
ADD	ADDITIONAL
ADH	ADHESIVE
ADJ	ADJUSTABLE, ADJACENT
ADMIN	ADMINISTRATION
ADP	ALBIN D. POGORSKI
AF	AIR FLOW
AFD	ADJUSTABLE FREQUENCY DRIVE
AFF	ABOVE FINISH FLOOR
AH	AI HEAD
AHU	AIR HANDLING UNIT
AL	ACTIVE LEAF
ALP	AIR LOW PRESSURE
ALT	ALTERNATE, (IVE)
ALUM	ALUMINUM
AM	AMMETER
AMP	AMPERE
ANOD	ANODIZED
AP	ACCESS PANEL
APPR	APPROACH
APPROX	APPROXIMATE, (LY)
AR	ALARM RELAY
ARCH	ARCHITECTURAL
AS	AMMETER SWITCH
ASSY	ASSEMBLY
AUTO	AUTOMATIC
AUX	AUXILIARY
AVS	AUTOMATIC VALVE STATION
AWG	AMERICAN WIRE GAGE
B	BEAM
B TO B	BACK TO BACK
BA	BEARING AREA
BAL	BALANCE
BAT	BATTERY
BC	BEGIN CURVE
BD	BOARD
BEJ	BRICK EXPANSION JOINT
BF	BLIND FLANGE
BHP	BRAKE HORSEPOWER
BTUH	BITUMINOUS
BKR	BREAKER
BLDG	BUILDING
BLK	BLOCK
BM	BENCHMARK
BOF	BOTTOM OF FOOTING
BOT	BOTTOM
BP	BACK PRESSURE
BPMK NO	BASEPLATE MARK NUMBER
BRG	BEARING
BRK	BRICK
BS	BOTH SIDES
B&S	BELL AND SPIGOT
BSMT	BASEMENT
BTU	BRITISH THERMAL UNIT
BTUH	BRITISH THERMAL UNIT-HOUR
BU	BELL-UP
BUR	BUILT UP ROOFING
BVC	BEGIN VERTICAL CURVE
C	COUNTER
C TO C	CENTER TO CENTER
CB	CATCH BASIN
CD	CEILING DIFFUSER
C/EJ	CONTRACTION/EXPANSION JOINT
CFM	CUBIC FEET PER MINUTE
C&G	CURB AND GUTTER
CHKD	CHECKERED
CI	CAST IRON
CIMH	CAST IRON MANHOLE
CIMHS	CAST IRON MANHOLE STEPS
CIP	CAST IRON PIPE
CISP	CAST IRON SOIL PIPE
CJT	CONTROL JOINT
CKT	CIRCUIT
CL	CENTERLINE, CLASS
CLG	CEILING
CLO	CLOSET
CLR	CLEAR, (ANCE)
CMP	CORRUGATED METAL PIPE
CMS	COMPRESSED AIR - SERVICE
CMU	CONCRETE MASONRY UNIT
CO	CLEAN OUT, COMPANY
COD	CHEMICAL OXYGEN DEMAND
COL	COLUMN
COMB	COMBINATION
COMB SWR	COMBINED SEWER
COMP	COMPRESSOR, (ED)
CONC	CONCRETE
CONN	CONNECTION
CONST	CONSTRUCTION
CONT	CONTINUOUS, CONTINUATION, CONTROL
CONTR	CONTRACTOR
COR	CORNER
CORR	CORRIDOR, CORRUGATED
CP	CONTROL PANEL
CPLG	COUPLING
CPT	CONTROL POWER TRANSFORMER
CRS	COURSES, (ING)
CS	CONTROL STATION, CUP SINK, CHLORINE SOLUTION, CONTROL SWITCH
CSK	COUNTERSUNK, (INK)
CT	CERAMIC TILE, CYCLE TIMER
CT	CURRENT TRANSFORMER
CTR(S)	CENTER(S)
CU	CUBIC
CU YD	CUBIC YARD
CW	COLD WATER

D	DOOR, DRAIN
DBL	DOUBLE
DC	DIRECT CURRENT
DEG	DEGREE
DEPT	DEPARTMENT
DET	DETAIL
DF	DRINKING FOUNTAIN
DH	DOOR HEIGHT
DI	DROP INLET, DUCTILE IRON
DIA	DIAMETER
DIFF	DIFFUSER
DIM	DIMENSION
DIP	DUCTILE IRON PIPE
DISCH	DISCHARGE
DISP	DISPENSER
DIST	DISTRIBUTION
DIV	DIVISION
DL	LEAD LOAD
DM	DAMPER MOTOR
DMJ	DISMANTLING JOINT
DN	DOWN
DO	DOOR OPENING, DISSOLVED OXYGEN
DPDT	DOUBLE POLE DOUBLE THROW
DR	DRAIN
DS	DOWNSPOUT
DT	DISTRIBUTION TRANSFORMER
DV	DRAIN VALVE
DWG(S)	DRAWING(S)
DWL(S)	DOWEL(S)
E	EAST, ELECTRICAL
EA	EACH
EAT	ENTERING AIR TEMPERATURE
EC	END CURVE
ECC	ECCENTRIC
ECC RED	ECCENTRIC REDUCER
EEW	EMERGENCY EYEWASH
EF	EACH FACE, EXCESS FLOW
EFF	EFFICIENT
EJ	EXPANSION JOINT
EL	ELEVATION
ELB	ELBOW
ELECT	ELECTRIC, (AL)
ELEV	ELEVATOR
ELU	ELUTRIATE
EMER	EMERGENCY
ENC	ENCASEMENT
ENCL	ENCLOSURE
ENT	ENTRANCE
EOL	END OF LINE
EQ	EQUAL
EQUIP	EQUIPMENT
EW	EACH WAY
EW	EMERGENCY EYEWASH
EWEF	EACH WAY EACH FACE
EXCH	EXCHANGER
EXH	EXHAUST
EXIST	EXISTING
EXP	EXPANSION, EXPOSED
EXP JT	EXPANSION JOINT
EXT	EXTENSION, EXTERIOR, EXTERNAL
F	FAN
F TO F	FACE TO FACE
FB	FACE BRICK
FC	FLEXIBLE CONNECTION, FLOW CONTROL
FCA	FLANGED COUPLING ADAPTER
FD	FLOOR DRAIN
FDN	FOUNDATION
FDPR	FIRE DAMPER
FE	FINAL EFFLUENT, FIRE EXTINGUISHER
FEC	FIRE EXTINGUISHER CABINET
FER	FERMENTER
FF	FINISH FLOOR
FG	FINISH GRADE
FH	FLAT HEAD, FIRE HYDRANT
FHMS	FLAT HEAD MACHINE SCREW
FIG	FIGURE
FIN	FINISH
FL	FLOOR, FLOW LINE
FLEX	FLEXIBLE
FLG	FLANGE, FLASHING
FM	FORCE MAIN
FO	FUEL OIL
FOB	FLAT ON BOTTOM
FOM	FACE OF MASONRY
FOS	FACE OF STUDS
FOT	FLAT ON TOP
FPS	FERMENTATE PRIMARY SLUDGE
FRM	FERMENTATE
FRP	FIBERGLASS REINFORCED PLASTIC
FS	FAR SIDE, FLOOR SLEEVE, FLOAT SWITCH
FT	FOOT
FTG	FOOTING
FURN	FURNISH, FURNISHED
FV	FLAP VALVE
FWD	FORWARD
GA	GAUGE
GAL	GALLON
GALV	GALVANIZED
GC/MS	GAS CHROMATOGRAPH/MASS SPECTROMETER
GEN	GENERAL, GENERATOR
GM	GAS METER
GPM	GALLONS PER MINUTE
GR	GRADE
GWB	GYPSUM WALLBOARD
GTS	GRAVITY THICKENED SLUDGE
GYP	GYPSUM
H	HIGH, HOUR, HYDROGEN
HB	HOSE BIBB
HC	HOLLOW CORE
HDR	HEADER
HE	HEAT EXCHANGER
HEX	HEXAGONAL
HF	HOSE FAUCET
HGT	HEIGHT
HH	HANDHOLE
HLS	HIGH LEVEL SWITCH
HMC	HARNESSED MECHANICAL COUPLING
HMD	HOLLOW METAL DOOR
HMJ	HARNESSED MECHANICAL JOINT
HORIZ	HORIZONTAL
HP	HIGH POINT, HORSEPOWER
HR	HOUR, HANDRAIL
HS	HIGH STRENGTH
HV	HOSE VALVE
HVAC	HEATING,VENTILATING AND AIR CONDITIONING
HW	HOT WATER
HWY	HIGHWAY
HYDRO	HYDROPNEUMATIC

I	INDICATOR
ID	INSIDE DIAMETER
IF	INSIDE FACE
I/I	CURRENT TO CURRENT BOOSTER
IN	INCHES
INC	INCORPORATED
INCL	INCLUDING
INCR	INCREASE
INST	INSTRUMENT, (ATION)
INSUL	INSULATE, (ED), (ING)
INT	INTERIOR, INTERNAL
INV	INVERT
IPS	IRON PIPE SIZE
JAN	JANITOR
JB	JUNCTION BOX
JF	JOINT FILLER
JT	JOINT
K	KIPS
KIT	KITCHEN
KO	KNOCK OUT
KS	KITCHEN SINK
KV	KILOVOLT
KVA	KILOVOLT AMPERE
KW	KILOWATT
KWH	KILOWATT HOUR
L	LOUVER
LAB	LABORATORY
LAM	LAMINATE(D)
LAT	LEAVING AIR TEMPERATURE
LAT	LATERAL
LAV	LAVATORY
LB(S)	POUNDS
LG	LENGTH, LONG
LH	LEFT HAND
LIN	LINEAL, LINEAR
LL	LIVE LOAD
LO	LOUVER OPENING
LS	LEVEL SWITCH
LT	LEFT, LAB TABLE
MA	MILLIAMPERE
MACH	MACHINE
MAINT	MAINTENANCE
MAN	MANUAL
MAS	MASONRY
MAX	MAXIMUM
MB	MACHINE BOLT
MC	MECHANICAL COUPLING
MCC	MOTOR CONTROL CENTER
MECH	MECHANICAL
MED	MEDIUM
MET	METAL
MEZ	MEZZANINE
MFM	MAGNETIC FLOWMETER
MFR(S)	MANUFACTURER(S)
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
MH	MANHOLE
MIN	MINIMUM, MINUTE
MISC	MISCELLANEOUS
MJ	MECHANICAL JOINT
MJRG	MECHANICAL JOINT RETAINER GLAND
MJTR	MECHANICAL JOINT WITH TIE ROD
ML	MIXED LIQUOR
MO	MASONRY OPENING, MOTOR OPERATED
MP	METERING PUMP
MRD	METAL ROOF DECK
MS	MACHINE SCREW
MSL	MEAN SEA LEVEL
MTD	MOUNTED
MTL	MATERIAL
MTR	MOTOR
MXP	SUBMERSIBLE, PROP, BLENDER MIXER
N	NORTH
N/A	NOT APPLICABLE
NBC	NAIL IN BOTTLE CAP
NC	NORMALLY CLOSED
NEUT	NEUTRAL
NF	NEAR FACE
NG	NATURAL GAS
N.O.	NORMALLY OPEN
NO.(S)	NUMBER(S)
NOCL	SODIUM HYPOCHLORITE
NOM	NOMINAL
NORM	NORMAL
NPT	NATIONAL PIPE THREAD
NPW	NONPOTABLE WATER
NS	NEAR SIDE
NTS	NOT TO SCALE
OA	ODOROUS AIR
OC	ON CENTER, ODOR CONTROL
OD	OUTSIDE DIAMETER
OF	OUTSIDE FACE, OVERFLOW
OH	OVERHEAD
OL	OVERLOAD
OPER	OPERATING
OPNG	OPENING
OPP	OPPOSITE
OSL	OUTSTANDING LEG
OZ	OUNCE

PC	POINT OF CURVE
PCC	POINT OF COMPOUND CURVATURE
PCCP	PRESTRESSED CONCRETE CYLINDER PIPE
PCL	CENTRIFUGAL PUMP
PCP	PIER CUTOFF POINT
PD	PLAN DIMENSION, SUMP PUMP DISCHARGE
PDD	DOUBLE DISK PUMP
PE	PRIMARY EFFLUENT, PLAIN END
PG	PRESSURE GAUGE
PH	PIPE HANGER, PENTHOUSE
PI	POINT OF INTERSECTION
PVC	POINT OF INTERSECTION ON VERTICAL CURVE
PL	PLATE
PLYWD	PLYWOOD
PNL(S)	PANEL(S)
POLY	POLYMER
POT	POINT ON TANGENT
PP	POWER POLE
PR	PAIR
PROJ	PROJECTION
PRS	PRESSURE REDUCING STATION
PRV	POWER ROOF VENTILATOR
PSD	PIPE SUPPORT, PUMP STATION, PRIMARY SLUDGE
PSC	PRIMARY SCUM
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PT	POINT, POINT OF TANGENCY
PVC	POLYVINYL CHLORIDE, POINT ON VERTICAL CURVE
PVCP	POLYVINYL CHLORIDE PIPE
PVMT	PAVEMENT
PW	POTABLE WATER
R	RADIUS, RISER, RIM
RAS	RETURN ACTIVATED SLUDGE
RCP	REINFORCED CONCRETE PIPE
RCCP	REINFORCED CONCRETE CYLINDER PIPE
RCHEP	REINFORCED CONCRETE HORIZONTAL ELLIPTICAL PIPE
RCY	RECYCLE
RD	ROOF DRAIN, ROAD
RDL	ROOF DRAIN LEADER
RECEP	RECEPTION
RECIRC	RECIRCULATING
RECP	RECEPTACLE
RED	REDUCER, REDUCING
REG	REGULATOR, REGULATING
REF	REFERENCE
REFR	REFRIGERATION, REFRIGERATOR
REINF	REINFORCING
REM	REMOVABLE
REQD	REQUIRED
RET	RETURN
REV	REVISION, REVISED, REVERSED
RFG	ROOFING
RG	RETAINER GLAND
RH	ROOF HOOD, RIGHT HAND, ROUND HEAD, RED HEAD
RHMS	ROUND HEAD MACHINE SCREW
RHWS	ROUND HEAD WOOD SCREW
RM	ROOM
RO	ROUGH OPENING
RPM	REVOLUTIONS PER MINUTE
RR	RAILROAD
RS	RAW SLUDGE, RAW SEWAGE, ROLLED STEEL
RT	RIGHT
RW	RAW WATER
R/W	RIGHT OF WAY
S	SOUTH, SPEAKER
SAN	SANITARY
SAN SWR	SANITARY SEWER
SCHED	SCHEDULE
SD	STORM DRAIN, SOAP DISH
SE	SECONDARY EFFLUENT
SEC	SECOND
SECT	SECTION
SER SK	SERVICE SINK
SEW	SEWAGE
SG	SLIDE GATE, SUPPLY GRILLE
SHT	SHEET
SHR	SHOWER
SHD	SHOWER DOOR
SIM	SIMILAR
SKL	SKYLIGHT
SM	SHEET METAL
SP	SUMP PUMP
SPA	SPACING, SPACES
SPEC(S)	SPECIFICATION(S)
SPLY	SUPPLY
SQ	SQUARE
SR	SUPPLY REGISTER
SS	STAINLESS STEEL, SANITARY SEWER
SSFM	SANITARY SEWER FORCE MAIN
SSK	SERVICE SINK
ST	SELF TAPPING
STS	STORM SEWER
STA	STATION
STD	STANDARD
STL	STEEL
STM	STORM
STOR	STORAGE
STRUCT	STRUCTURAL
SUP	SUPPLY
SUSP	SUSPENDED
SV	SHUTOFF VALVE
SW	SWITCH
SWBD	SWITCHBOARD
SWGR	SWITCHGEAR
SWS	SEAL WATER SOLENOID
SYM	SYMMETRICAL
SYS	SYSTEM

T	THERMOSTAT, TREAD, TOTALIZER
T	TRANSFORMER, TELEPHONE, TOP
TAN	TANGENT
TB	TERMINAL BOX
T&B	TOP AND BOTTOM
TBE	THREAD BOTH ENDS
TBM	TEMPORARY BENCHMARK
TC	TOWEL CABINET, TOP OF CURB
TC	TERMINAL CABINET
TEL	TELESCOPING
TEMP	TEMPERATURE, TEMPORARY
TERM	TERMINAL
TFD	TRICKLING FILTER DRAIN
TFI	TRICKLING FILTER INFLUENT
TFS	THICKENED FERMENTED SLUDGE
T&G	TONGUE & GROOVE
TH	TEST HOLE
THK	THICK, THICKNESS
THR	THRESHOLD
TI	TOTALIZING INDICATOR, TEMPERATURE INDICATOR
TIR	TOTALIZING INDICATING RECORDER
TOC	TOP OF CONCRETE
TOF	TOP OF FOOTING
TOG	TOP OF GRADE
TOM	TOP OF MASONRY
TOS	TOP OF STEEL
TOW	TOP OF WALL
TP	TWISTED PAIR COUPLE, TOWEL PIN
T/P	TOP OF PIPE
T/W	TOP OF WATER
TRANS	TRANSFORMER, TRANSMITTER, TRANSFER
TS	TEMPERATURE SWITCH
TV	TELEVISION
TYP	TYPICAL
UDM	ULTRASONIC DENSITY METER
UGND	UNDERGROUND
UH	UNIT HEATER
UNO	UNLESS NOTED OTHERWISE
UR	URINAL
USGS	UNITED STATES GEOLOGICAL SURVEY
V	VALVE, VOLT, VENT
VAC	VACUUM
VAR	VARIES
VAT	VINYL ASBESTOS TILE
VBF	VALVE, ARWA BUTTERFLY
VBI	VALVE, INDUSTRIAL BUTTERFLY
VBL	VALVE, BALL
VBM	VALVE, BALL, MISCELLANEOUS
VC	VERTICAL CURVE, VICTAULIC COUPLING
VCD	VERTICAL CONTROL DAMPER
VCK	VALVE, CHECK
VCN	VALVE, CONE
VCP	VITRIFIED CLAY PIPE
VG	VALVE, GATE
VGD	VALVE, DOUBLE DISC GATE
VGL	VALVE, GLOBE
VERT	VERTICAL
VF	VACUUM FILTER
VIB	VIBRATION
VKG	VALVE, KNIFE GATE
VM	VOLT METER
VNR	VENEER
VPC	VALVE, PRESSURE REGULATING
VPG	VALVE, PLUG
VPL	VALVE, ECCENTRIC PLUG
VPR	VALVE, PRESSURE REDUCING
VSP	VALVE, PRESSURE RELIEF
VSPV	VALVE, PRESSURE/VACUUM RELIEF
VSV	VALVE, VACUUM RELIEF
VV	VENT VALVE
VVB	VACUUM BREAKER
W	WEST, WIDE, WINDOW, WATT,
WATER W/	WITH
W1	POTABLE WATER
W2	NON-POTABLE
W3	PLANT EFFLUENT WATER
WAS	WASTE ACTIVATED SLUDGE
WB	WALLBOARD
WC	WATER CLOSET
WD	WOOD, WIDTH
WF	WALL FITTING
WH	WALL HYDRANT
WL	WATER LEVEL
WM	WATER METER, WATTMETER
WO	WINDOW OPENING
W/O	WITHOUT
WOM	WOMEN
WP	WATERPROOF, WORKING POINT
WR	WASTE RECEPTACLE
WRF	WASTE RECLAMATION FACILITY
WS	WATERSTOP
WT	WEIGHT
WW	WETWELL
WWF	WELDED WIRE FABRIC
W3	RECYCLED PLANT EFFLUENT
X	BY,TIMES
YH	YARD HYDRANT
@	ANU
@	AT
Δ	DEFLECTION ANGLE
#	NUMBER
%	PER CENT

GENERAL NOTES:

1 ABBREVIATIONS ARE FOR REFERENCE ONLY AND NOT ALL ABBREVIATIONS ARE USED ON THE DRAWINGS.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100

TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JUSTIN R. SANDT
116986
LICENSED
PROFESSIONAL ENGINEER
11/1/22

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT
PLANT EXPANSION
GENERAL
ABBREVIATIONS

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
G-00-007	SHEET NO. 7 OF 379

APPROVED
PUBLIC WORKS & ENGINEERING
ACCEPTED
80367
DATE OF ISSUANCE

FILE PATH: C:\pw_working\pw_americas\d1011535\G-00-007.dwg

EXISTING PLAN VIEW

- WATER METER
- WATER VALVE (GATE)
- WATER VALVE (BUTTERFLY)
- FIRE HYDRANT/FLUSHING VALVE
- TAPPING SLEEVE & VALVE
- 8" 6" REDUCER
- ROUND CONNECTION
- CO SAN MH — SANITARY SEWER CLEANOUT & MANHOLE
- STM MH — STORM SEWER MANHOLE
- 'B' 'B-B' 'C' 'C-1' 'C-2' 'C-2A' 'GRATE' — STORM SEWER INLETS
- CULVERT PIPE AND HEADWALL
- TC=XX.XX — TOP OF CURB ELEVATION
- G=XX.XX — GUTTER ELEVATION
- TP=XX.XX — TOP OF PAVEMENT ELEVATION
- CONTOUR LINE
- ROW LINE
- PROPERTY LINE
- LOT LINES
- EASEMENT LINE
- CENTER LINE OF ROW
- TRANSIT LINE
- EDGE OF DITCHES
- CENTER LINE OF DITCHES
- EDGE OF DITCHES
- FENCE LINE, WOOD
- FENCE LINE, CHAIN LINK
- FENCE LINE, BARBED WIRE
- FENCE LINE, HOG WIRE
- EDGE OF CONCRETE
- CURB LINE
- CONCRETE WALK
- EDGE OF ASPHALT
- EDGE OF SHELL OR GRAVEL
- 28" 3-17 DIMENSION LINE
- P P CENTERPOINT ENERGY AERIAL LINE
- CENTERPOINT ENERGY UNDERGROUND LINE
- GAS LINE
- MISC UNDERGROUND LINE
- (IDENTIFY CONDUIT) PIPELINE OR WESTERN UNION CONDUIT
- AT&T CONDUIT
- CABLE TV
- RAILROAD LINE
- 20" (AND SMALLER) WATER / 24" (LARGER THAN 20") WATER — WATER LINE
- 24" (AND SMALLER) SANITARY SEWER / 30" (LARGER THAN 24") SANITARY SEWER — SANITARY SEWER LINE
- 24" (AND SMALLER) STORM SEWER / 30" (LARGER THAN 24") STORM SEWER — STORM SEWER LINE
- SANITARY SEWER FORCE MAIN
- RWL RWL — RECLAIMED WATER LINE
- NPW NPW — NON-POTABLE WATER LINE
- GAS METER
- GAS VALVE
- A2 — MISC UNDERGROUND PIPELINE LABLE

PROPOSED PLAN VIEW

- WM — WATER METER
- WV — WATER VALVE (GATE)
- BFWV — WATER VALVE (BUTTERFLY)
- FH WV — FIRE HYDRANT/FLUSHING VALVE
- TS&V — TAPPING SLEEVE & VALVE
- 12" 8" REDUCER
- ROUND CONNECTION
- C.O SAN MH — SANITARY SEWER CLEANOUT & MANHOLE
- STM MH — STORM SEWER MANHOLE
- 'B' 'B-B' 'C' 'C-1' 'C-2' 'C-2A' 'GRATE' — STORM SEWER INLETS
- CULVERT PIPE AND HEADWALL
- TC=XX.XX — TOP OF CURB ELEVATION
- G=XX.XX — GUTTER ELEVATION
- TP=XX.XX — TOP OF PAVEMENT ELEVATION
- CONTOUR LINE
- ROW LINE
- PROPERTY LINE
- LOT LINES
- EASEMENT LINE
- CENTER LINE OF ROW
- TRANSIT LINE
- EDGE OF DITCHES
- CENTER LINE OF DITCHES
- EDGE OF DITCHES
- FENCE LINE, WOOD
- FENCE LINE, CHAIN LINK
- FENCE LINE, BARBED WIRE
- FENCE LINE, HOG WIRE
- EDGE OF CONCRETE
- CURB LINE
- CONCRETE WALK
- EDGE OF ASPHALT
- EDGE OF SHELL OR GRAVEL
- 28" 3-17 DIMENSION LINE
- P P CENTERPOINT ENERGY AERIAL LINE
- CENTERPOINT ENERGY UNDERGROUND LINE
- GAS LINE
- MISC UNDERGROUND LINE
- (IDENTIFY CONDUIT) PIPELINE OR WESTERN UNION CONDUIT
- AT&T CONDUIT
- CABLE TV
- MATCH LINE
- RAILROAD LINE
- 20" (AND SMALLER) WATER / 24" (LARGER THAN 20") WATER — WATER LINE
- 24" (AND SMALLER) SANITARY SEWER / 30" (LARGER THAN 24") SANITARY SEWER — SANITARY SEWER LINE
- 24" (AND SMALLER) STORM SEWER / 30" (LARGER THAN 24") STORM SEWER — STORM SEWER LINE
- SANITARY SEWER FORCE MAIN
- RWL RWL — RECLAIMED WATER LINE
- NPW NPW — NON-POTABLE WATER LINE
- GAS METER
- GAS VALVE
- A2 — MISC UNDERGROUND PIPELINE LABLE

EXISTING PLAN VIEW

- PAVING HEADER
- RES. 1-STORY BR BLDG. — BUILDING, RESIDENTIAL
- COMM. 1-STORY BR BLDG. — BUILDING, COMMERCIAL
- TREE
- HEDGE
- 3/4" IP — IRON PIPE OR IRON ROD MONUMENT
- POINT OF INTERSECTION (PI)
- POINT OF CURVE (PC) POINT OF TANGENCY (PT)
- P P POWER POLE
- P P POWER POLE W/DOWN GUY

PROPOSED PLAN VIEW

- PAVING HEADER
- RES. 1-STORY BR BLDG. — BUILDING, RESIDENTIAL
- COMM. 1-STORY BR BLDG. — BUILDING, COMMERCIAL
- TREE
- HEDGE
- 3/4" IP — IRON PIPE OR IRON ROD MONUMENT
- POINT OF INTERSECTION (PI)
- POINT OF CURVE (PC) POINT OF TANGENCY (PT)
- P P POWER POLE
- P P POWER POLE W/DOWN GUY

EXISTING PROFILE VIEW

- NORTH OR EAST PROPERTY LINE
- SOUTH OR WEST PROPERTY LINE
- NORTH OR EAST CURB
- SOUTH OR WEST CURB
- NORTH OR EAST DITCH
- SOUTH OR WEST DITCH
- NORTH OR EAST NATURAL GROUND
- SOUTH OR WEST NATURAL GROUND
- CULVERT — NORTH OR EAST CULVERT
- CULVERT — SOUTH OR WEST CULVERT
- CENTERLINE OF ROW
- CENTERPOINT ENERGY CONDUIT
- GAS LINE
- WESTERN UNION
- AT&T CONDUIT
- 20" (AND SMALLER) WATER LINE / 24" (LARGER THAN 20") WATER — WATER LINE
- 24" (AND SMALLER) SANITARY SEWER / 30" (LARGER THAN 24") SANITARY SEWER — SANITARY SEWER LINE
- 24" (AND SMALLER) STORM SEWER / 30" (LARGER THAN 24") STORM SEWER — STORM SEWER LINE
- SANITARY SEWER FORCE MAIN
- RWL RWL — RECLAIMED WATER LINE
- NPW NPW — NON-POTABLE WATER LINE
- CENTERPOINT ENERGY MANHOLE
- AT&T MANHOLE
- WATER LINE MANHOLE
- SANITARY SEWER MANHOLE & CLEANOUT
- STORM SEWER MANHOLE
- STORM SEWER INLET

PROPOSED PROFILE VIEW

- NORTH OR EAST PROPERTY LINE
- SOUTH OR WEST PROPERTY LINE
- NORTH OR EAST CURB
- SOUTH OR WEST CURB
- NORTH OR EAST DITCH
- SOUTH OR WEST DITCH
- NORTH OR EAST NATURAL GROUND
- SOUTH OR WEST NATURAL GROUND
- CULVERT — NORTH OR EAST CULVERT
- CULVERT — SOUTH OR WEST CULVERT
- CENTERLINE OF ROW
- CENTERPOINT ENERGY CONDUIT
- GAS LINE
- WESTERN UNION
- AT&T CONDUIT
- 20" (AND SMALLER) WATER LINE / 24" (LARGER THAN 20") WATER — WATER LINE
- 24" (AND SMALLER) SANITARY SEWER / 30" (LARGER THAN 24") SANITARY SEWER — SANITARY SEWER LINE
- 24" (AND SMALLER) STORM SEWER / 30" (LARGER THAN 24") STORM SEWER — STORM SEWER LINE
- SANITARY SEWER FORCE MAIN
- RWL RWL — RECLAIMED WATER LINE
- NPW NPW — NON-POTABLE WATER LINE
- CENTERPOINT ENERGY MANHOLE
- AT&T MANHOLE
- WATER LINE MANHOLE
- SANITARY SEWER MANHOLE & CLEANOUT
- STORM SEWER MANHOLE
- STORM SEWER INLET

GUNDA CORPORATION
P:\2020 Projects\20010-02 B&V IAH WWTP Improvements\CAD\SHEETS\001 GENERAL.dwg Nov 09, 2022-1:44pm WEason

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS — ARAVIND NIMMA — 113151 — LICENSED PROFESSIONAL ENGINEER
11/09/2022

BLACK & VEATCH

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
GENERAL

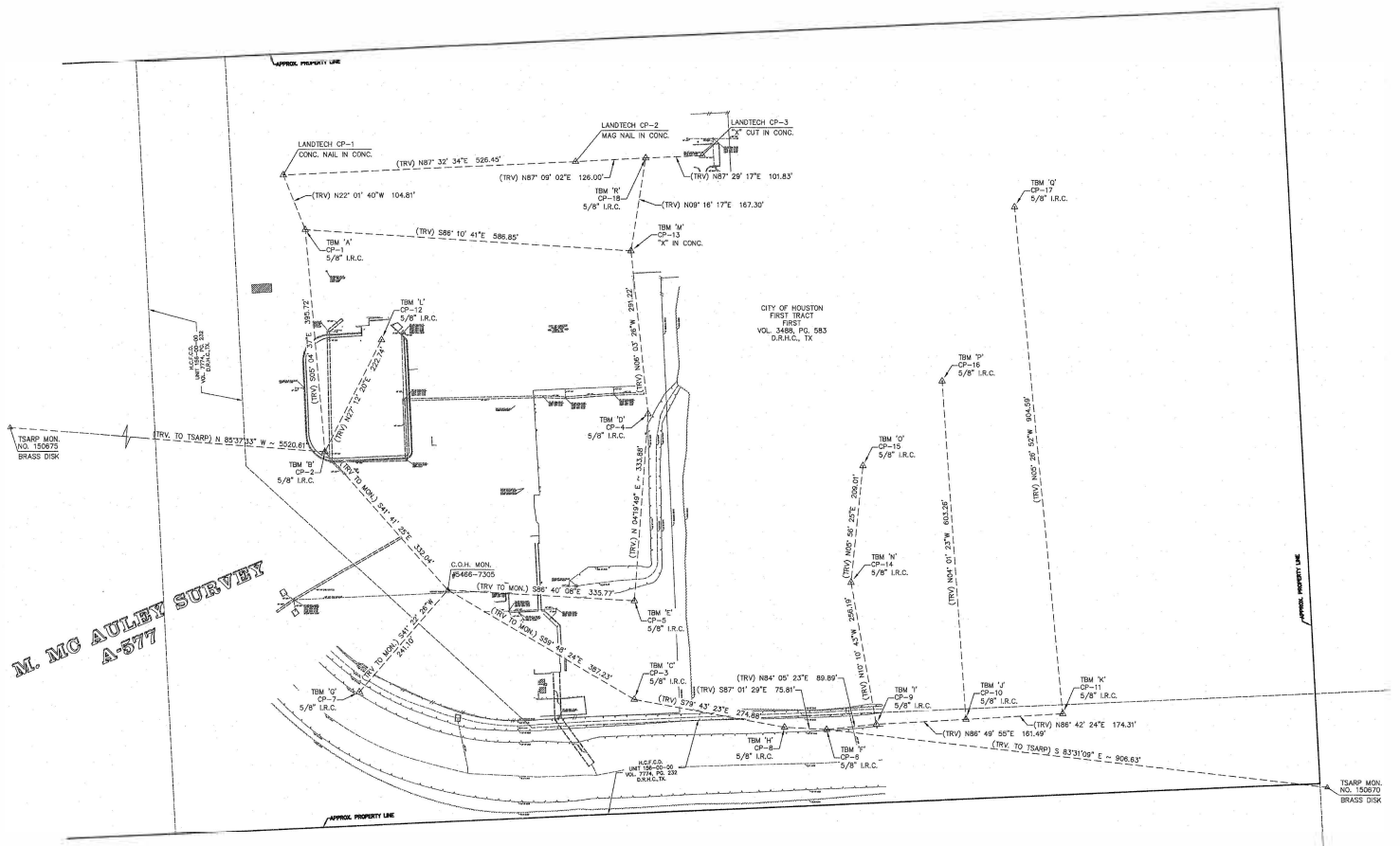
GENERAL CIVIL LEGEND AND ABBREVIATIONS

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	N/A
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.

FOR CITY OF HOUSTON USE ONLY
WORKS TYPE OF CONSTRUCTION — 80367 — REGISTERED PROFESSIONAL ENGINEER — XIAOHUA LIN, TEXAS

G-00-008

SHEET NO. 8 OF 379



SCALE: 1" = 100'

LEGEND:

- HCAD PROPERTY LINE
- EASEMENT
- RIGHT-OF-WAY PROPERTY LINE
- (TRV) N 00° 00' 00" E — TRAVERSE LINE
- (BL) N 00° 00' 00" E — BASELINE
- ● CONTROL MONUMENTS

GENERAL NOTES:
CM indicates Control Monument
Fnd. indicates Found
RT indicates Right
LT indicates Left
TRV indicates Traverse Point
XC indicates "X" Cut
I.P. indicates Iron Pipe
I.R. indicates Iron Rod
I.R.C. indicates Iron Rod w/Cap
P.I.P. indicates Pinch Iron Pipe
@XXXX indicates Address
W.L.E. indicates Water Line Easement
U.E. indicates Utility Easement
S.S.E. indicates Sanitary Sewer Easement

NOTES:

1. All bearings and coordinates shown hereon are tied to the NSRS and expressed in the Texas Coordinate System, South Central Zone 4204, NAD '83 (2011), ITRF (EPOCH 2010.0000), NAVD '88 (GD 2012A).
2. All distances shown hereon are surface values. All coordinates shown hereon are grid values unless otherwise noted. To convert surface values to grid values multiply by the scale factor of 0.99992366370.
3. The right of way shown hereon is based on the best available evidence found in the field at the time of the survey coupled with the documents of record in the County Clerk's Office provided by Courthouse Specialist. No Title Commitment was provided.
4. To convert elevations to TSARP datum, add 0.62 feet.
5. This project includes only a partial topographic survey
6. Area determined to be outside the 500-year floodplain (Zone-X) based on F.I.R.M. #48201C0480M, panel #480 of #1150 Ref. June 9, 2014).
100 YEAR BASE FLOOD ELEV. @ S.E. CNR = 75.7 FEET
500 YEAR BASE FLOOD ELEV. @ S.E. CNR. = 77.0 FEET

CERTIFICATION:

I HEREBY CERTIFY THAT: (1) THIS PLAT WAS PREPARED FROM AN ON THE GROUND SURVEY MADE UNDER MY SUPERVISION; (2) THAT THIS PLAT CORRECTLY REPRESENTS THE FACTS FOUND AT THE TIME OF SURVEY; (3) THAT THIS PLAT AND THE SURVEY IT REPRESENTS, CONFORMS TO THE REQUIREMENTS OF THE LAND SURVEY PRACTICES ACT IN EFFECT AT THE TIME OF THE SURVEY FOR THE TYPE OF PROFESSIONAL SERVICE SO STATED.

TYPE OF PROFESSIONAL SERVICE: TOPOGRAPHIC SURVEY

CHRISTIN M. NORRIS, R.P.L.S. 6207 — DATE 11-7-21

STATE OF TEXAS REGISTERED CHRISTIN MICHAEL NORRIS 6207 PROFESSIONAL LAND SURVEYOR

11-7-21

G-00-009

United Engineers, Inc.
CIVIL ENGINEERING • LAND DEVELOPMENT
CONSTRUCTION MANAGEMENT
SURVEYING • UTILITY ENGINEERING
ENGINEERING FIRM # F-000749 SURVEY FIRM # 101178-00
8303 SOUTHWEST FREEWAY, SUITE 600 TEL (713) 271-2900
HOUSTON, TEXAS 77074 FAX (713) 271-2999

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB No. P-6182

STATE OF TEXAS JUSTIN R. SANDT 115093 LICENSED PROFESSIONAL ENGINEER 3/10/23

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

GENERAL

SURVEY CONTROL MAP
SHEET 1 OF 2

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	S/2 XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 9 OF 379	

FOR CITY OF HOUSTON USE ONLY

ACCEPTED AS NOTED 80367

TSARP CONVERSION REFERENCE
(TSARP) HARRIS COUNTY FLOODPLAIN REFERENCE MARK NUMBER 150670
FLOOD PLAIN REFERENCE MARK, BRASS DISK STAMPED 150670.
FROM THE INTERSECTION OF GREENS ROAD AND GREENVIEW DRIVE,
TRAVEL NORTH ON GREENVIEW APPROXIMATELY 0.31 MILE TO DEAD END.
TRAVEL EAST ALONG DRAINAGE EASEMENT 240 FEET TO BEND IN DITCH
MONUMENT IS LOCATED NEAR TOP OF BANK AT THE END OF BEND.
PUBLISHED ELEV= 80.70' (NAVD 1988, 2001 ADJUSTMENT)
OBSERVED ELEV= 80.08' (NAVD 1988, COMPUTED USING GEOID 12A)

FLOOD PLAIN REFERENCE MARK, BRASS DISK STAMPED 150675.
FROM THE INTERSECTION OF RANKIN ROAD AND AIR CENTER BOULEVARD,
MONUMENT IS LOCATED IN THE MEDIAN OF RANKIN ROAD.
PUBLISHED ELEV= 83.51' (NAVD 1988, 2001 ADJUSTMENT)
OBSERVED ELEV= 83.01' (NAVD 1988, COMPUTED USING GEOID 12A)

PROJECT SITE MONUMENT:
SITE MONUMENT #5466-7305
LOCATED AT SOUTHWEST OF CLARIFIER 2 INSIDE IAH WASTE WATER
TREATMENT PLANT LOCATED AT 2450 RANKIN RD. HOUSTON
ELEV.= 83.65' (NAVD 1988, 2001 ADJUSTMENT)

TBM LIST:

TBM 'A',CP-1, 5/8-INCH IRON ROD WITH CAP. (SEE RECOVERY SKETCH)
ELEV= 80.79'

TBM 'B',CP-2, 5/8-INCH IRON ROD WITH CAP. (SEE RECOVERY SKETCH)
ELEV= 80.64'

TBM 'C',CP-3, 5/8-INCH IRON ROD WITH CAP. (SEE RECOVERY SKETCH)
ELEV= 81.43'

TBM 'D',CP-4, 5/8-INCH IRON ROD WITH CAP. (SEE RECOVE RYSKETCH)
ELEV= 83.13'

TBM 'E',CP-5, 5/8-INCH IRON ROD WITH CAP. (SEE RECOVERY SKETCH)
ELEV= 82.80'

TBM 'F',CP- 6, 5/8-INCH IRON ROD WITH CAP. (SEE RECOVERY SKETCH)
ELEV= 80.35'

TBM 'G',CP-7, 5/8-INCH IRON ROD WITH CAP. (SEE RECOVERY SKETCH)
ELEV= 80.81'

TBM 'H',CP-8, 5/8-INCH IRON ROD WITH CAP. (SEE RECOVERY SKETCH)
ELEV= 80.26'

TBM 'I',CP-9, 5/8-INCH IRON ROD WITH CAP. (SEE RECOVERY SKETCH)
ELEV= 80.10'

TBM 'J',CP-10, 5/8-INCH IRON ROD WITH CAP. (SEE RECOVERY SKETCH)
ELEV= 79.83'

TBM 'K',CP-11, 5/8-INCH IRON ROD WITH CAP. (SEE RECOVERY SKETCH)
ELEV= 80.39'

TBM 'L',CP-12, 5/8-INCH IRON ROD WITH CAP. (SEE RECOVERY SKETCH)
ELEV= 81.74'

TBM 'M',CP-13, 'X' CUT IN CONC. (SEE RECOVERY SKETCH)
ELEV= 84.43'

TBM 'N',CP-14, 5/8-INCH IRON ROD WITH CAP. (SEE RECOVERY SKETCH)
ELEV= 79.35'

TBM 'O',CP-15, 5/8-INCH IRON ROD WITH CAP. (SEE RECOVERY SKETCH)
ELEV= 79.83'

TBM 'P',CP-16, 5/8-INCH IRON ROD WITH CAP. (SEE RECOVERY SKETCH)
ELEV= 80.31'

TBM 'Q',CP-17, 5/8-INCH IRON ROD WITH CAP. (SEE RECOVERY SKETCH)
ELEV= 80.94'

TBM 'R',CP-18, 5/8-INCH IRON ROD WITH CAP. (SEE RECOVERY SKETCH)
ELEV= 80.91'

LANDTECH CP-1, CONC. NAIL. (SEE RECOVERY SKETCH)
ELEV= 80.36'

LANDTECH CP-2, MAG NAIL (SEE RECOVERY SKETCH)
ELEV= 81.19'

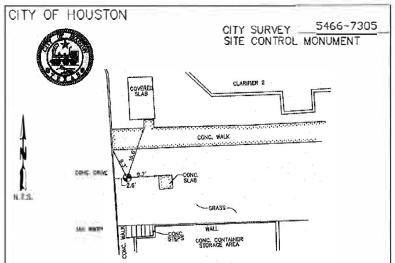
LANDTECH CP-3 'X' CUT IN CONC. (SEE RECOVERY SKETCH)
ELEV= 80.60'

HORIZONTAL AND VERTICAL TRAVERSE TABLE

CP#	GRID NORTHING	GRID EASTING	ELEVATION	DESCRIPTION
CP-1	13916362.59	3122123.44	80.79	5/8" IRON W/CAP
CP-2	13915968.45	3122158.45	80.64	5/8" IRON W/CAP
CP-3	13915525.78	3122713.95	81.43	5/8" IRON W/CAP
CP-4	13916033.90	3122739.66	83.13	5/8" IRON W/CAP
CP-5	13915701.00	3122714.45	82.80	5/8" IRON W/CAP
CP-6	13915472.81	3123060.09	80.35	5/8" IRON W/CAP
CP-7	13915539.60	3122219.93	80.81	5/8" IRON W/CAP
CP-8	13915476.75	3122984.39	80.26	5/8" IRON W/CAP
CP-9	13916482.37	3123149.00	80.10	5/8" IRON W/CAP
CP-10	13915490.99	3123570.75	79.83	5/8" IRON W/CAP
CP-11	13915501.00	3123484.73	80.39	5/8" IRON W/CAP
CP-12	13916185.53	3122280.28	81.74	5/8" IRON W/CAP
CP-13	13916321.47	3122708.93	84.43	"X" IN CONC.
CP-14	13915734.21	3123106.23	79.35	5/8" IRON W/CAP
CP-15	13915942.06	3123125.86	79.83	5/8" IRON W/CAP
CP-16	13915092.72	3123088.41	80.31	5/8" IRON W/CAP
CP-17	13916401.46	3123398.86	80.94	5/8" IRON W/CAP
CP-18	13916488.57	3122735.89	80.81	5/8" IRON W/CAP
54657305	13916470.24	3122547.51	83.65	C.O.H. MONUMENT
2150670	13915370.49	3123960.06	80.08	TSARP-150670
2150675	13916389.46	3116854.34	83.01	TSARP-150675
LT CP-1	13916459.74	3122984.13	80.36	LANDTECH CP-1
LT CP-2	13916482.31	3122610.05	81.19	LANDTECH CP-2
LT CP-3	13916493.04	3122837.81	80.60	LANDTECH CP-3

CITY OF HOUSTON

CITY SURVEY 5466-7305
SITE CONTROL MONUMENT



Project WBS# R-00265-0147-3
Texas Coordinate System of 1983,
South Central Zone, U. S. Survey Feet
X= 3,189,379.25
Y= 13,915,720.53

Lat.= N 29°57'47.18"
Lon.= W 95°21'19.32"

Keymap Page: 373-M
Orthometric Elevation = 83.65
Ellipsoid Height= -6.33
Geoid GEOID 12A
Datum Source & Adjustment:
NAD '83 (CORS '96)

Reference Frame Used: ITRF (EPOCH: 2010.0000)
Vertical Adjustment used: NAVD '88 (GEOID 18)
General Location: AT SOUTHWEST OF CLARIFIER 2 INSIDE IAH WASTE WATER TREATMENT PLANT LOCATED AT 2450 RANKIN ROAD, HOUSTON

Date Set: 08/19/2019 Type of Mark: BRASS DISK IN CONC.

3 Nearest project control points (bearings and distances stated below):
TO CP-5, 5/8" I.R.C. = S 59°45'24" E ~ 357.23'
TO CP-5, 5/8" I.R.C. = S 86°40'08" E ~ 335.77'
TO CP-7, 5/8" I.R.C. = S 41°22'26" W ~ 241.10'

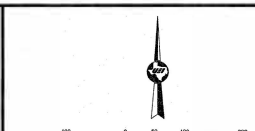
NOTE:
1. Bearings are grid bearings.
2. Scale Factor = 0.999923675080
3. Surface= Grid
S.F.

CHRISTIN MICHAEL NORRIS 6207 REGISTERED PROFESSIONAL LAND SURVEYOR
11-7-20

United Engineers, Inc.

Date Observed: April 27, 2020

City of Houston, Harris County, Texas



LEGEND:
HCAD PROPERTY LINE
EASEMENT
RIGHT-OF-WAY
PROPERTY LINE
(TRV.) N 00° 00' 00" E TRAVERSE LINE
(BL.) N 00° 00' 00" E BASELINE
CONTROL MONUMENTS

GENERAL NOTES:
CM indicates Control Monument
Fnd. indicates Found
RT indicates Right
LT indicates Left
TRV indicates Traverse Point
XC indicates 'X' Cut
I.P. indicates Iron Pipe
I.R. indicates Iron Rod
I.R.C. indicates Iron Rod w/Cap
P.I.P. indicates Pinch Iron Pipe
@XXXX Indicates Address
W.L.E. indicates Water Line Easement
U.E. indicates Utility Easement
S.S.E. indicates Sanitary Sewer Easement

NOTES:
1. All bearings and coordinates shown hereon are tied to the NSRS and expressed in the Texas Coordinate System, South Central Zone 4204, NAD '83 (2011), ITRF (EPOCH 2010.0000), NAVD '88 (GD 2012A).
2. All distances shown hereon are surface values. All coordinates shown are grid values unless otherwise noted. To con vertsurface values to grid values multiply by the scale factor of 0.999923683870.
3. The right of way shown hereon is based on the best available evidence found in the field at the time of the survey coupled with the documents of record in the County Clerk's Office provided by Courthouse Specialist. No Title Commitment was provided.
4. To convert elevations to TSARP datum, add 0.62 feet.
5. This project includes only a partial topographic survey
6. Area determined to be outside the 500-year floodplain (Zone-X) based on F.I.R.M. #48201C0480M, panel #480 of #1150 Ref. June 9, 2014).
100 YEAR BASE FLOOD ELEV. @ S.E. CNR = 75.7 FEET
500 YEAR BASE FLOOD ELEV. @ S.E. CNR. = 77.0 FEET

CERTIFICATION:

I HEREBY CERTIFY THAT: (1) THIS PLAT WAS PREPARED FROM AN ON THE GROUND SURVEY MADE UNDER MY SUPERVISION; (2) THAT THIS PLAT CORRECTLY REPRESENTS THE FACTS FOUND AT THE TIME OF SURVEY; (3) THAT THIS PLAT AND THE SURVEY IT REPRESENTS, CONFORMS TO THE REQUIREMENTS OF THE LAND SURVEYING PRACTICES ACT IN EFFECT AT THE TIME OF THE SURVEY FOR THE TYPE OF PROFESSIONAL SERVICE SO STATED.

TYPE OF PROFESSIONAL SERVICE: TOPOGRAPHIC SURVEY

CHRISTIN M. NORRIS, R.P.L.S. 6207 — DATE 11-7-20

STATE OF TEXAS REGISTERED CHRISTIN MICHAEL NORRIS 6207 PROFESSIONAL LAND SURVEYOR

11-7-20

G-00-010

United Engineers, Inc.
CIVIL ENGINEERING • LAND DEVELOPMENT
CONSTRUCTION MANAGEMENT
SURVEYING • UTILITY ENGINEERING
ENGINEERING FIRM # F-000163 SURVEY FIRM # 10119-00
8303 SOUTHWEST FREEWAY, SUITE 600 TEL (713) 271-2900
HOUSTON, TEXAS 77074 FAX (713) 271-2989

BLACK & VEATCH

BLACK & VEATCH CORPORATION
910 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

STATE OF TEXAS JUSTIN R. SANDT 119989 LICENSED PROFESSIONAL ENGINEER 3/10/23

SURVEYED BY:
UNITED ENGINEERS, INC.
FB No. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

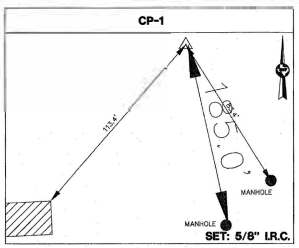
GENERAL

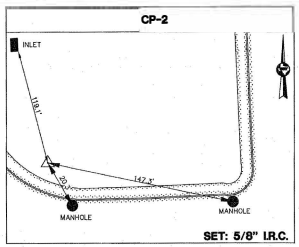
SURVEY CONTROL MAP
SHEET 2 OF 2

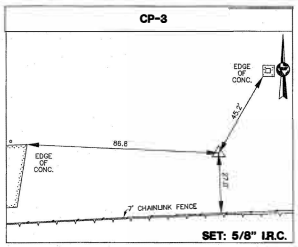
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 10 OF 379	

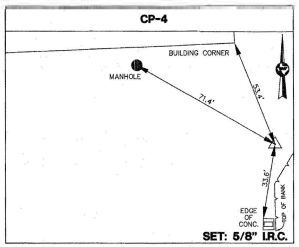
FOR CITY OF HOUSTON USE ONLY

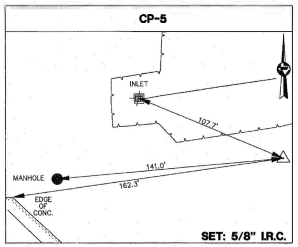
REGISTERED PROFESSIONAL LAND SURVEYOR 80367 STATE OF TEXAS HOUSTON, TEXAS

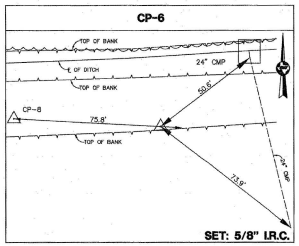


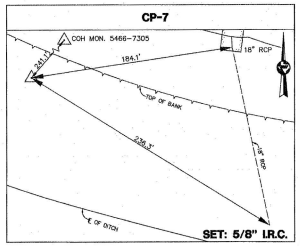


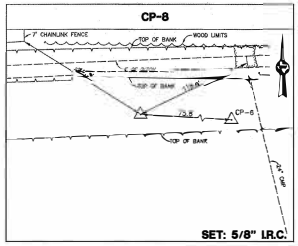


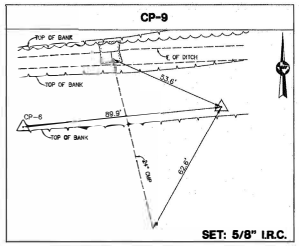


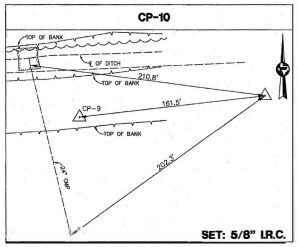


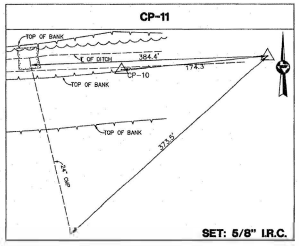


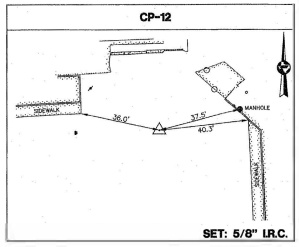


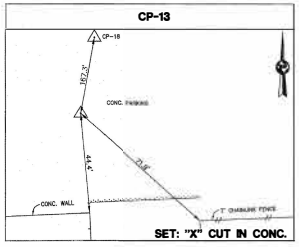


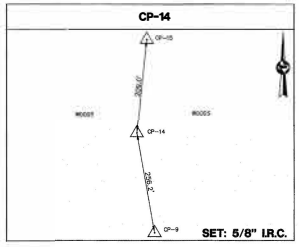


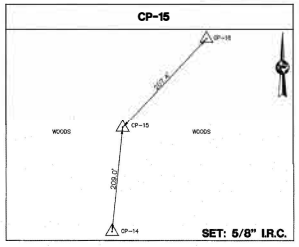


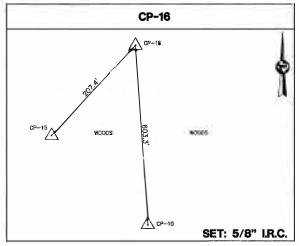


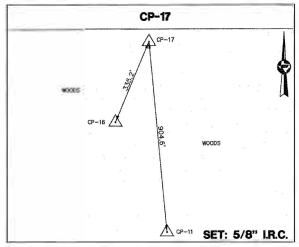


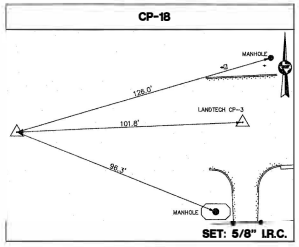


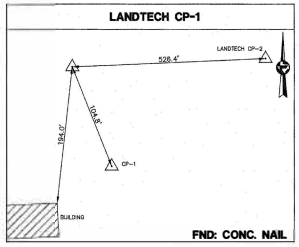


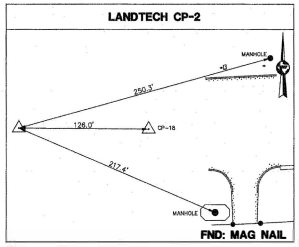


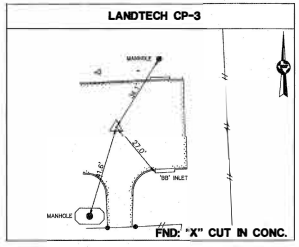












LEGEND:

- HCAD PROPERTY LINE
- 10' U.E. — EASEMENT
- RIGHT-OF-WAY PROPERTY LINE
- (TRV.) N 00° 00' 00" E — TRAVERSE LINE
- (BL.) N 00° 00' 00" E — BASELINE
- 6969 — CONTROL MONUMENTS

GENERAL NOTES:

CM Indicates Control Monument
Fnd. Indicates Found
RT Indicates Right
LT Indicates Left
TRV Indicates Traverse Point
XC Indicates 'X' Cut
I.P. Indicates Iron Pipe
I.R. Indicates Iron Rod
I.R.C. Indicates Iron Rod w/Cap
P.I.P. Indicates Pinch Iron Pipe
#XXXX Indicates Address
W.L.E. Indicates Water Line Easement
U.E. Indicates Utility Easement
S.S.E. Indicates Sanitary Sewer Easement

CERTIFICATION:

I HEREBY CERTIFY THAT: (1) THIS PLAT WAS PREPARED FROM AN ON THE GROUND SURVEY MADE UNDER MY SUPERVISION; (2) THAT THIS PLAT CORRECTLY REPRESENTS THE FACTS FOUND AT THE TIME OF SURVEY; (3) THAT THIS PLAT AND THE SURVEY IT REPRESENTS, CONFORMS TO THE REQUIREMENTS OF THE LAND SURVEYING PRACTICES ACT IN EFFECT AT THE TIME OF THE SURVEY FOR THE TYPE OF PROFESSIONAL SERVICE SO STATED.

TYPE OF PROFESSIONAL SERVICE: TOPOGRAPHIC SURVEY

CHRISTIN M. NORRIS, R.P.L.S. 6207 — DATE 11-7-22

STATE OF TEXAS REGISTERED CHRISTIN MICHAEL NORRIS 6207 LICENSED LAND SURVEYOR

11-7-22

G-00-011

United Engineers, Inc.
CIVIL ENGINEERING • LAND DEVELOPMENT
CONSTRUCTION MANAGEMENT
SURVEYING • UTILITY ENGINEERING
ENGINEERING FIRM # F-000142 SURVEY FIRM # 10176-00
8303 SOUTHWEST FREEWAY, SUITE 600 TEL (713) 271-2900
HOUSTON, TEXAS 77074 FAX (713) 271-2999

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB No. P-6182

STATE OF TEXAS JUSTIN R. SANDT 116599 LICENSED PROFESSIONAL ENGINEER 3/10/23

CITY OF HOUSTON

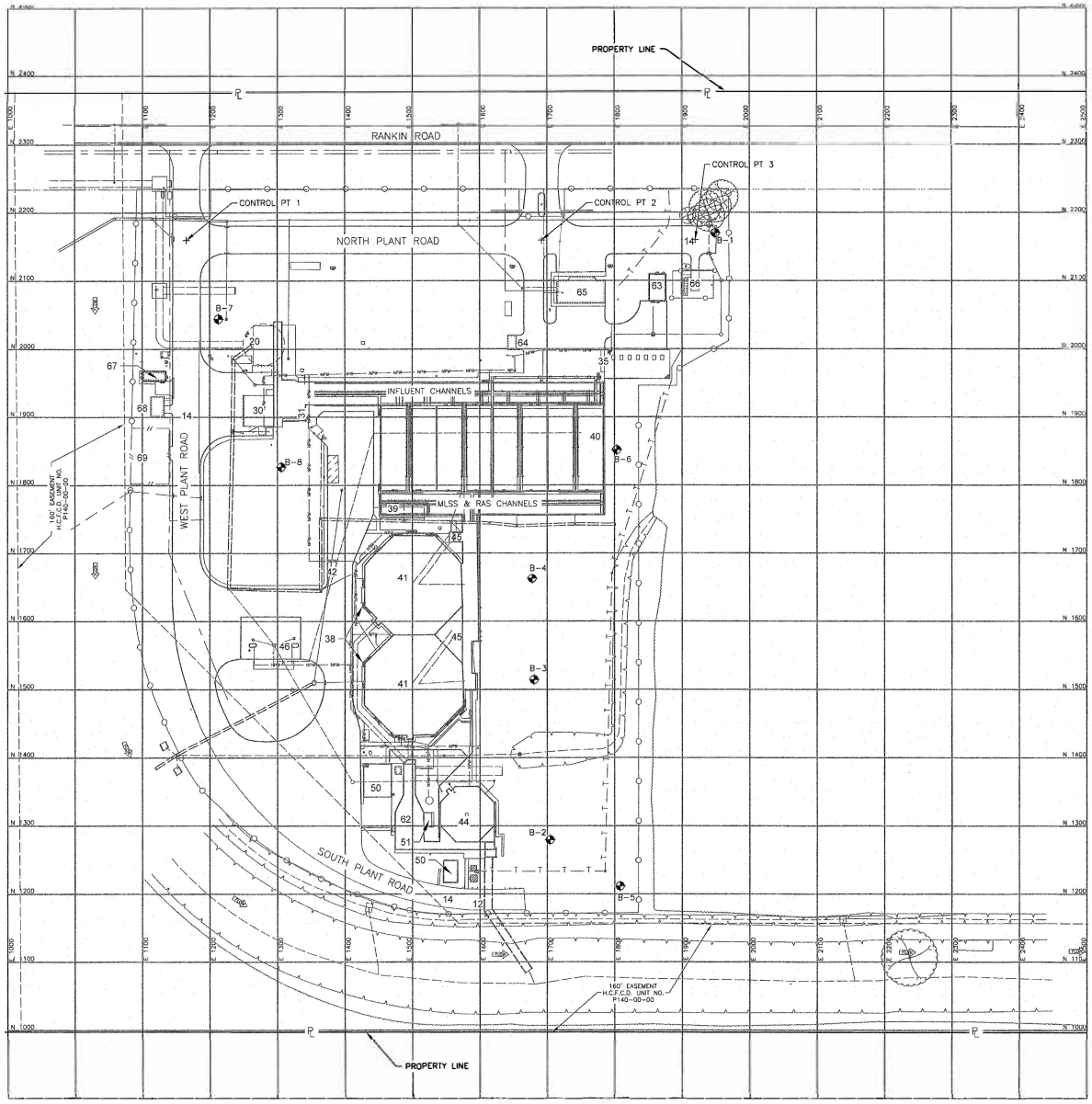
HOUSTON PUBLIC WORKS

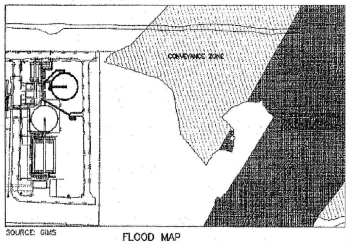
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

GENERAL
SWINGTIES

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
V: N/A H: N/A	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 11 OF 379	

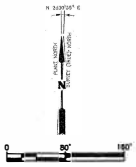
PROFESSIONAL ENGINEER 80367 LICENSED HOUSTON, TEXAS





SOURCE: GIMS

FLOOD MAP



NOTE:
THIS PROJECT LIES WITHIN ZONE-X (UNSHADED) PER FEMA FIRM PANEL NO. 48201C0480M EFFECTIVE DATE IS JUNE 09, 2014
100 YEAR BASE FLOOD ELEVATION:
- RANKIN RD=77.0 FEET
- SOUTHEAST CORNER=75.6 FEET

EXISTING PLANT FACILITIES

12	HCFCD OUTFALL
14	ACCESS ROAD
20	INFLUENT LIFT STATION
30	HEADWORKS FACILITY
31	GRIT FACILITY
35	BLOWER FACILITY
38	CLARIFIER WALKWAY
39	MLSS CHANNEL
40	AERATION/DIGESTION BASINS
41	CLARIFIERS
42	SCUM FACILITIES
44	CHLORINE CONTACT BASIN
45	RAS FACILITY
46	WAS FACILITY
50	CHEMICAL FEED FACILITIES
51	NPW (NON POTABLE WATER) SYSTEM
62	FLOW MEASURING, ANALYZER, PUMP, PLC BUILDING
63	BLOWER ELECTRICAL BUILDING
64	SHOP BUILDING
65	OPERATIONS BUILDING
66	ELECTRICAL SUB-STATION
67	LIFT STATION ELECTRICAL BUILDING NO 1
68	STORAGE BUILDING NO 1
69	STORAGE BUILDING NO 2

NOTE:
℄=PROPERTY LINE, TYP

NOTES:
1. ℄=PROPERTY LINE, TYPICAL.
2. ALL EXISTING DRIVEWAY APPROACHES OFF OF RANKIN ROAD ARE TO REMAIN "AS-IS", THERE IS NO PROPOSED WORK WITHIN THE PUBLICLY ACCESSIBLE RANKIN ROAD, (OR RIGHT-OF-WAY).
3. BORING LOCATIONS AND CONTROL POINTS ARE APPROXIMATE. B-1

PLANT GRID CONTROL POINTS

CONTROL POINT 1
CONCRETE NAIL IN PAVEMENT
N=2,159.61
E=1,165.56

CONTROL POINT 2
MAG NAIL IN PAVEMENT
N=2,159.09
E=1,692.00

CONTROL POINT 3
CONCRETE NAIL IN PAVEMENT
N=2,159.86
E=1,919.81

NOTICE:
FOR YOUR SAFETY, YOU ARE REQUIRED BY TEXAS LAW TO CALL 811 AT LEAST 48 HOURS BEFORE YOU DIG SO THAT UNDERGROUND LINES CAN BE MARKED. THIS SIGNATURE DOES NOT FULFILL YOUR OBLIGATION TO CALL 811

VERIFICATION OF PRIVATE UTILITY LINES

Date

CenterPoint Energy natural gas utilities shown. (Gas service lines are not shown). This signature not be used for conflict verification.

Signature valid for six months.

Date

CenterPoint Energy/UNDERGROUND Electrical Facilities verification ONLY. (This signature verifies existing underground facilities not to be used for conflict verification)

Signature valid for six months.

Date

Approved for AT&T underground conduit facilities only.
Signature valid for one year.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3631

STATE OF TEXAS
ARAVIND NIMMA
113155
LICENSED
PROFESSIONAL
11/09/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
GENERAL

EXISTING SITE PLAN

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	1"=80'
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.

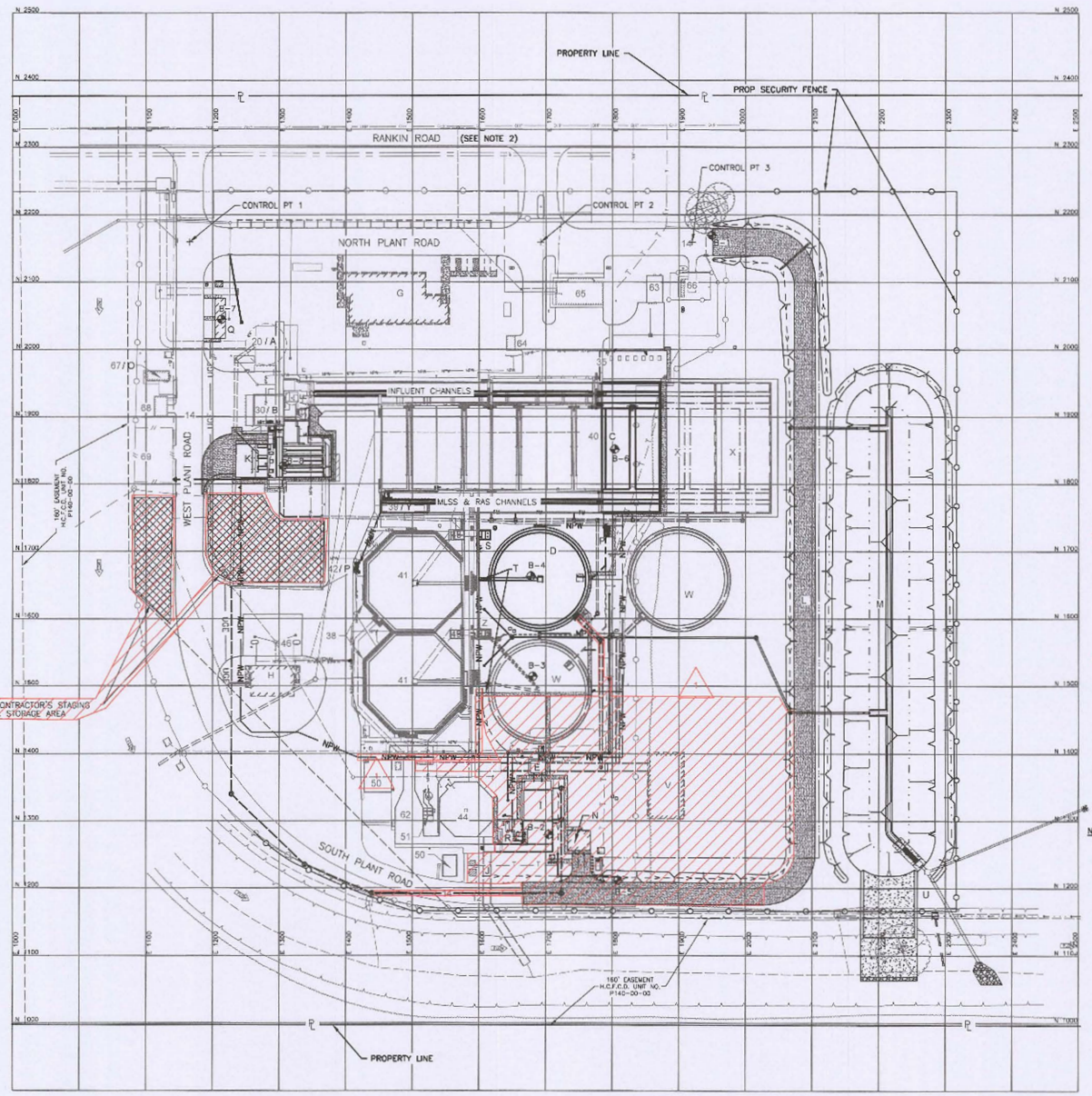
FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
80367
REGISTERED
PROFESSIONAL
ENGINEER
HOUSTON, TX

G-00-101

SHEET NO. 12 OF 379

GUNDA CORPORATION
P:\2020 projects\20010-02 b&v ion wwtp improvements\CAD\SHEETS\002 SITE - with GUNDA BASE.dwg Nov 11, 2022 - 1:47pm WEason



THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS

EXISTING PLANT FACILITIES

12 HCFCD OUTFALL
14 ACCESS ROAD
20 INFLUENT LIFT STATION
30 HEADWORKS FACILITY
31 GRIT FACILITY
35 BLOWER FACILITY
38 CLARIFIER WALKWAY
39 MLSS CHANNEL
40 AERATION/DIGESTION BASINS
41 CLARIFIERS
42 SCUM FACILITIES
44 CHLORINE CONTACT BASIN
45 RAS FACILITY
46 WAS FACILITY
50 CHEMICAL FEED FACILITIES
51 NPW (NON POTABLE WATER) SYSTEM
62 FLOW MEASURING, ANALYZER, PUMP, PLC BUILDING
63 BLOWER ELECTRICAL BUILDING
64 SHOP BUILDING
65 OPERATIONS BUILDING
66 ELECTRICAL SUB-STATION
67 LIFT STATION ELECTRICAL BUILDING NO 1
68 STORAGE BUILDING NO 1
69 STORAGE BUILDING NO 2

PROPOSED PLANT IMPROVEMENTS

A LIFT STATION IMPROVEMENTS
B HEADWORKS IMPROVEMENTS
C AERATION/DIGESTION BASIN PIPING & DIFFUSER IMPROVEMENTS
D NEW CLARIFIER NO 3
E SANITARY JUNCTION STRUCTURE
F GRIT BASIN IMPROVEMENTS
G ADMINISTRATION BLDG (BY OTHERS)
H DE-WATERING FACILITY (BY OTHERS)
J FLOW MEASURING IMPROVEMENTS
K NEW GRIT DE-WATERING FACILITY
L NEW ACCESS ROAD EXTENSION
M NEW DETENTION POND
N NEW LV MCC ELECTRICAL BLDG
O IMPROVEMENTS TO EXIST LIFT STATION ELECTRICAL BLDG
P NEW SCUM PUMP FACILITY IMPROVEMENTS
Q NEW LIFT STATION ELECTRICAL BLDG
R NEW NPW (NON POTABLE WATER) SYSTEM
S RAS FACILITY IMPROVEMENTS
T NEW WALKWAY FOR PROPOSED CLARIFIER
U NEW DETENTION POND OUTFALL TO HCFCD DITCH
V FUTURE FILTER COMPLEX (BY OTHERS)
W FUTURE CLARIFIER (BY OTHERS)
X FUTURE AERATION/DIGESTION BASIN PIPING & DIFFUSER IMPROVEMENTS (BY OTHERS)
Y MLSS CHANNEL IMPROVEMENTS
Z FUTURE RAS FACILITY IMPROVEMENTS

NOTES:
1. ℄=PROPERTY LINE, TYPICAL.
2. ALL EXISTING DRIVEWAY APPROACHES OFF OF RANKIN ROAD ARE TO REMAIN "AS-IS", THERE IS NO PROPOSED WORK WITHIN THE PUBLICLY ACCESSIBLE RANKIN ROAD, (OR RIGHT-OF-WAY).
3. BORING LOCATIONS AND CONTROL POINTS ARE APPROXIMATE. B-1

PLANT GRID CONTROL POINTS

CONTROL POINT 1
CONCRETE NAIL IN PAVEMENT
N=2,159.61
E=1,165.56

CONTROL POINT 2
MAG NAIL IN PAVEMENT
N=2,159.09
E=1,892.00

CONTROL POINT 3
CONCRETE NAIL IN PAVEMENT
N=2,159.86
E=1,919.81



NOTE:
THIS PROJECT LIES WITHIN ZONE=X (UNSHADED) PER FEMA FIRM PANEL NO. 48201C0480M EFFECTIVE DATE IS JUNE 09, 2014
100 YEAR BASE FLOOD ELEVATION:
@ RANKIN RD=77.0 FEET
@ SOUTHEAST CORNER=75.6 FEET

NOTICE:
FOR YOUR SAFETY, YOU ARE REQUIRED BY TEXAS LAW TO CALL 811 AT LEAST 48 HOURS BEFORE YOU DIG SO THAT UNDERGROUND LINES CAN BE MARKED. THIS SIGNATURE DOES NOT FULFILL YOUR OBLIGATION TO CALL 811

VERIFICATION OF PRIVATE UTILITY LINES

Date

CenterPoint Energy natural gas utilities shown. (Gas service lines are not shown). This signature not be used for conflict verification.

Signature valid for six months.

Date

CenterPoint Energy/UNDERGROUND Electrical Facilities Verification ONLY. (This signature verifies existing underground facilities – not to be used for conflict verification)

Signature valid for six months.

Date

Approved for AT&T underground conduit facilities only. Signature valid for one year.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

ARAVIND NIMMA 113155 LICENSED PROFESSIONAL ENGINEER 11/09/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
GENERAL

PROPOSED SITE PLAN

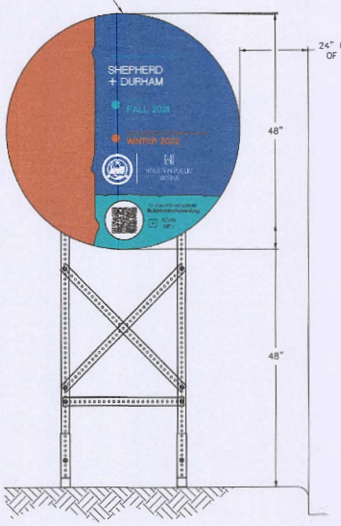
WBS NUMBER	R-000265-0147-4
DRAWING SCALE	1"=80'
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 13 OF 379	

FOR CITY OF HOUSTON USE ONLY

80367

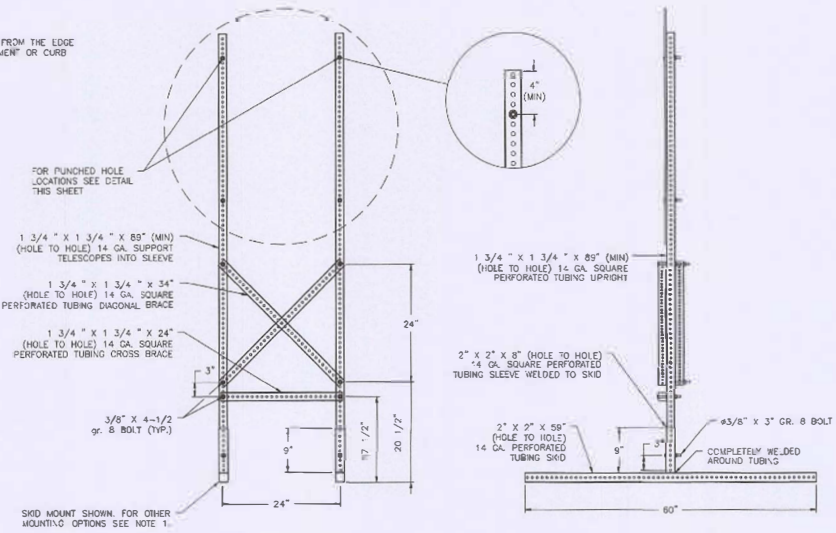
C-00-102

GUNDA CORPORATION
P:\2020 projects\20010-02 b&v ash ww1p improvements\CAD\SHEETS\002 SITE - with GUNDA BASE.dwg Nov 11, 2022 - 1:48pm WEatson



FRONT VIEW

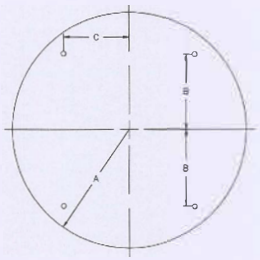
PROJECT SIGN – 48"



FRONT VIEW

SIDE VIEW

SKID MOUNTED SUPPORTS FOR 48" PROJECT SIGN



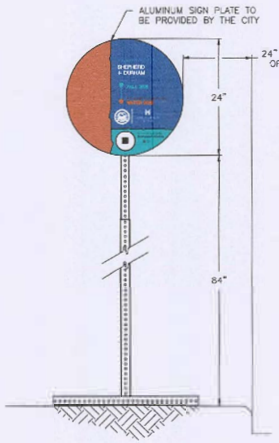
CIRCLE

A	B	C	T
24"	15"	12"	.080"

48" SIGN PLATE HOLE DETAIL

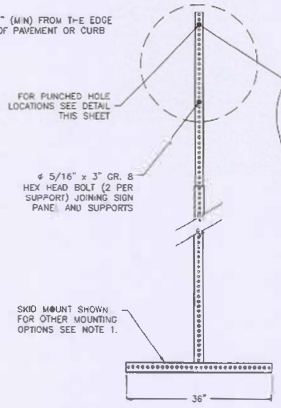
NOTES:

1. ALLOWABLE POST INSTALLATION METHODS ARE: CONCRETE FOOTING, SURFACE MOUNTING, SKID MOUNTING AND PILE DRIVEN POSTS.
2. FOR POST INSTALLATION WITH CONCRETE FOOTING, SEE DETAIL 1509-01
3. FOR SURFACE MOUNTED POST INSTALLATION, SEE DETAIL 1509-01A.
4. FOR SKID MOUNTING REQUIREMENTS SEE SPECIFICATION 01582.
5. PILE DRIVEN POSTS MUST BE DRIVEN TO A MINIMUM DEPTH OF 4-FEET INTO EXISTING GROUND.
6. LAYOUT, TEXT SIZE, AND OVERALL DESIGN OF THE SIGN WILL BE THE RESPONSIBILITY OF THE BUILD HOUSTON COORDINATOR
7. ALL SIGN POSTS, SIGN TUBING, AND SIGN FASTENERS SHALL BE GALVANIZED STEEL PER SPECIFICATION 01582.

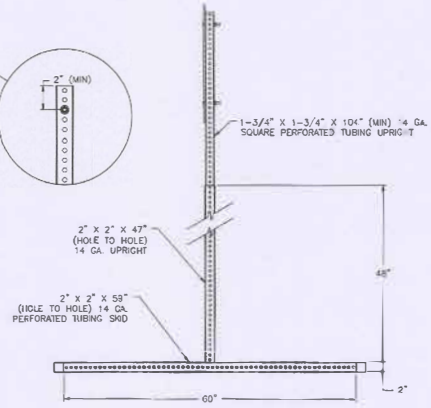


FRONT VIEW

PROJECT SIGN – 24"

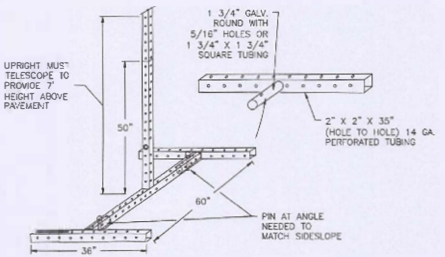


FRONT VIEW

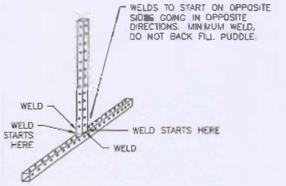


SIDE VIEW

SKID MOUNTED SUPPORTS FOR 24" PROJECT SIGN



ISO VIEW



ISO VIEW



A	B	C
12"	8"	0.080"

24" SIGN PLATE HOLE DETAIL

G-00-501

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JUSTIN R. SANDT
110388
LICENSED
PROFESSIONAL ENGINEER
8/2/23

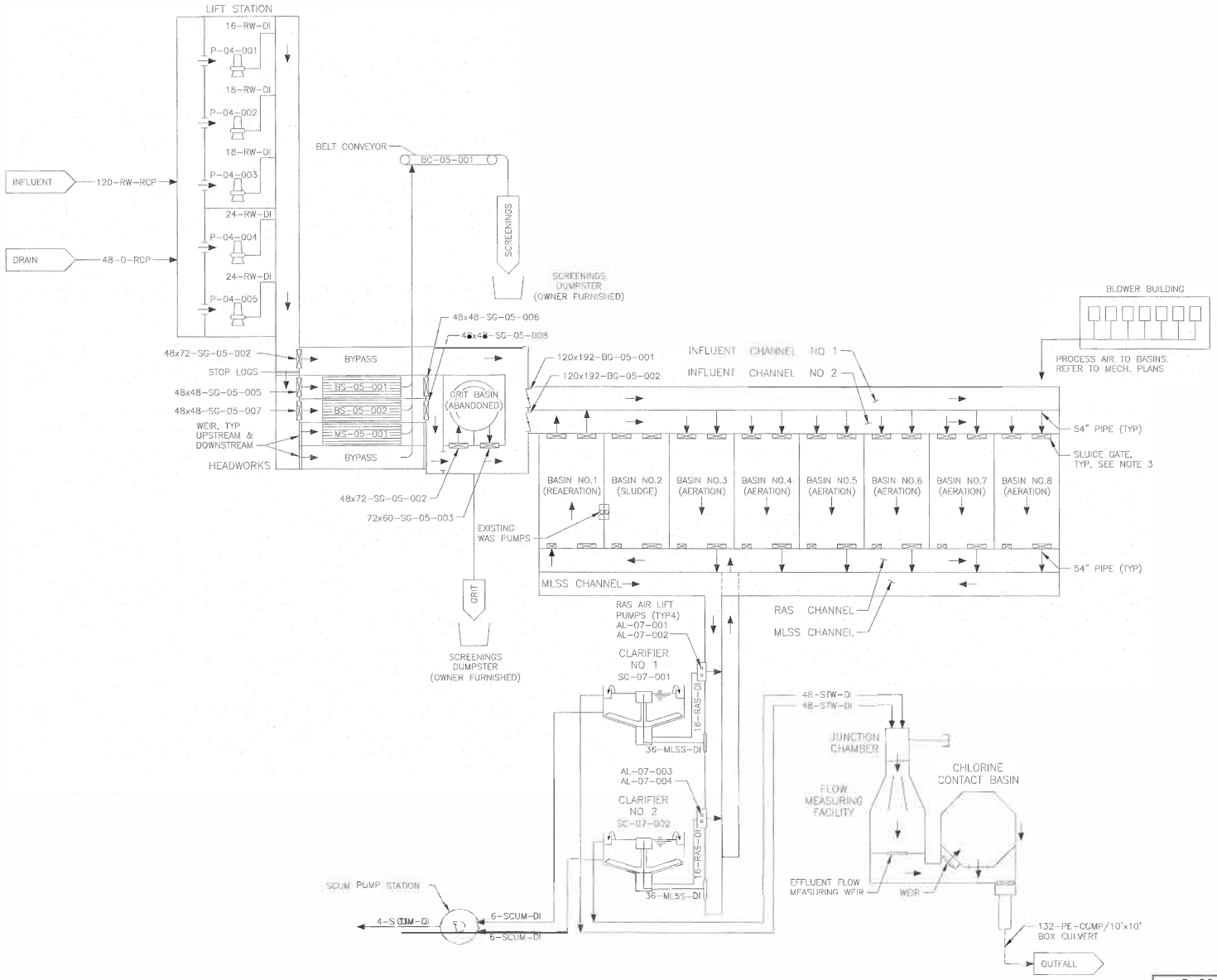
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
GENERAL
CONSTRUCTION SIGN
BUILD HOUSTON FORWARD

W.B.S. NUMBER	
R-00255-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
PRAKASH LA (SARI) LIN, P.E.	
SHEET NO. 14 OF 379	

THIS ITEM OF HOUSTON WAS PREPARED UNDER MY SUPERVISION
80367
8/2/23

FILE NAME: 3W 2500//ACP500 - CIH intercontinental Airport WWTP Improvements/400500-GENERAL.dgn



GENERAL NOTES:

1. PDF SHOWS CURRENT OPERATION OF THE PLANT.
2. THE SIMPLIFIED PROCESS FLOW DIAGRAM IS FOR INFORMATIONAL PURPOSES ONLY TO DEPICT GENERAL PLANT CONFIGURATION.
3. FOR EQUIPMENT TAG NUMBERS IN THE AERATION BASINS, REFER TO ENLARGED DWG SECTIONS M-40-401 TO M-40-412.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JUSTIN R. SANDT
116988
LICENSED
PROFESSIONAL ENGINEER
11/11/22

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

GENERAL

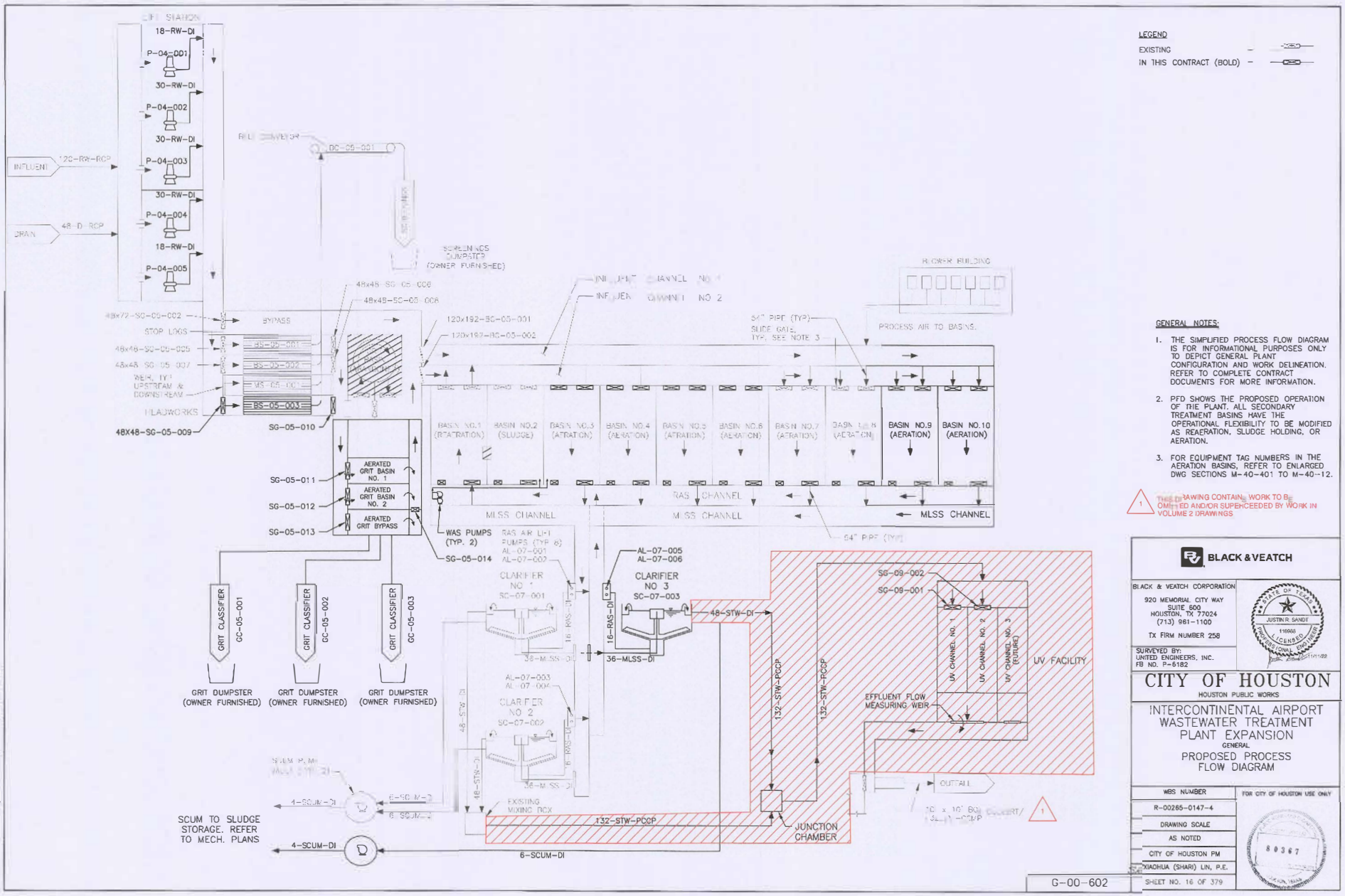
EXISTING PROCESS FLOW DIAGRAM

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 5 OF 37	

80367

G-00-601

FILE PATH: C:\pw_working\bvw_americas\d1011535\G-00-601.dwg



LEGEND

EXISTING –

IN THIS CONTRACT (BOLD) –

GENERAL NOTES:

1. THE SIMPLIFIED PROCESS FLOW DIAGRAM IS FOR INFORMATIONAL PURPOSES ONLY TO DEPICT GENERAL PLANT CONFIGURATION AND WORK DELINEATION. REFER TO COMPLETE CONTRACT DOCUMENTS FOR MORE INFORMATION.
2. PFD SHOWS THE PROPOSED OPERATION OF THE PLANT. ALL SECONDARY TREATMENT BASINS HAVE THE OPERATIONAL FLEXIBILITY TO BE MODIFIED AS REAERATION, SLUDGE HOLDING, OR AERATION.
3. FOR EQUIPMENT TAG NUMBERS IN THE AERATION BASINS, REFER TO ENLARGED DWG SECTIONS M-40-401 TO M-40-12.

1 THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-5182

STATE OF TEXAS — JUSTIN R. SANDT — 116968 — LICENSED PROFESSIONAL ENGINEER

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

GENERAL

PROPOSED PROCESS FLOW DIAGRAM

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 16 OF 379	

80367

G-00-602

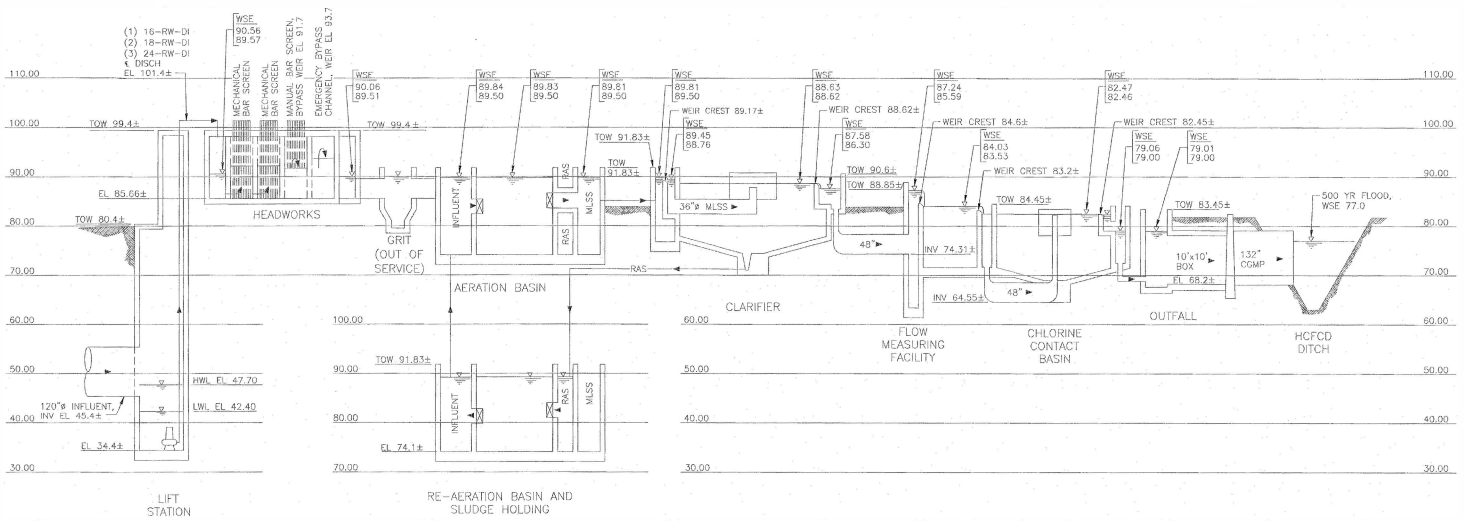
FILE PATH: C:\pw_working\pw_primefocus\d1011535\G-00-602.dwg

NOTES:

1. ELEVATIONS SHOWN ARE FOR REFERENCE INFORMATION ONLY BASED ON EXISTING RECORD DRAWINGS. CONTRACTOR SHALL VERIFY ACTUAL ELEVATIONS DURING CONSTRUCTION.

LEGEND:

WSE
XX.XX
XX.XX — 2-HOUR PEAK PERMITTED FLOW (32.8 MGD)
AVERAGE DAILY PERMITTED FLOW (15.0 MGD)



EXISTING HYDRAULIC PROFILE
NO SCALE

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JUSTIN R. SANDT
110968
LICENSED
PROFESSIONAL ENGINEER
11/11/22

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

GENERAL

EXISTING HYDRAULIC PROFILE

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
G-00-603	SHEET NO. 17 OF 379

80367
REGISTERED
HOUSTON, TEXAS

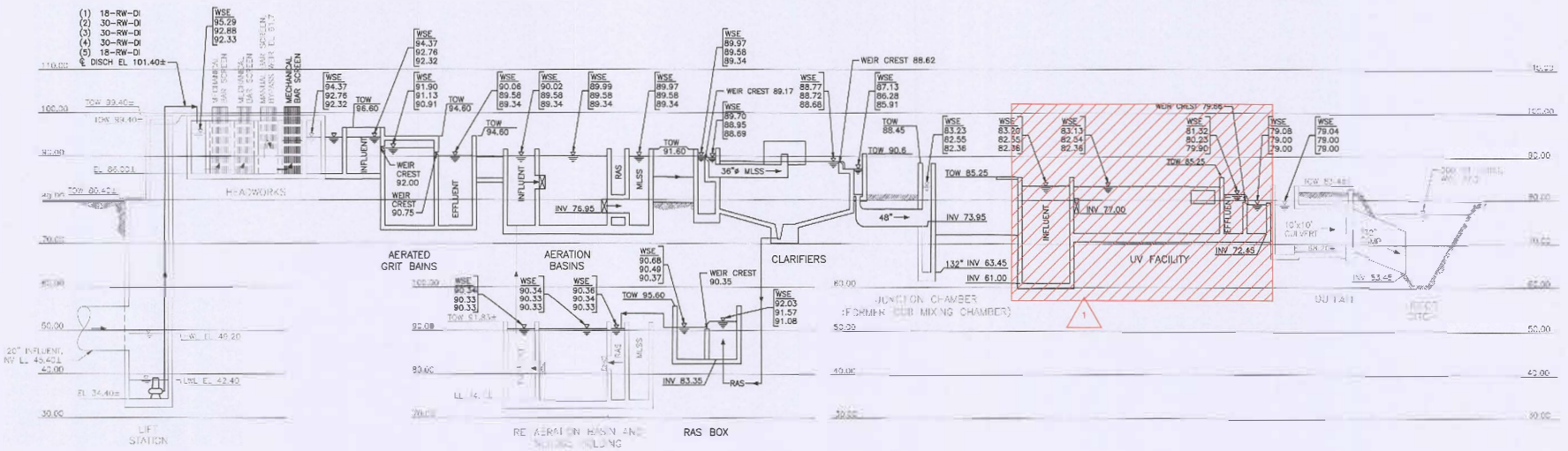
FILE PATH: C:\pw_working\pw_americas\d1011535\G-00-603.dwg

NOTES:

1. PERMITTED ELEVATIONS SHOWN ARE FOR EXPANDED PLANT PERMIT CAPACITY.
2. HISTORICAL AVERAGE FLOW CONDITION WSE THROUGH THE EXPANDED PLANT SHOWN IS PROVIDED FOR REFERENCE ONLY.
3. WSE ELEVATIONS SHOWN ARE BASED ON FLOW CONDITION ASSUMPTIONS SHOWN IN TABLE.
4. NUMBER OF UNITS IN OPERATION SHOWN IN TABLE ARE BASED ON PROCESS AND OPERATION REQUIREMENTS AND PREFERENCES AND ARE NOT HYDRAULICALLY BASED. THESE UNITS ARE NOT HYDRAULICALLY LIMITING PROCESS UNITS IN THIS SCENARIO.

LEGEND:

WSE	
XX.XX	PHASE I – 2-HOUR PEAK PERMITTED FLOW (55.0 MGD)
XX.XX	PHASE I – AVERAGE DAILY PERMITTED FLOW (11.0 MGD)
XX.XX	HISTORICAL AVERAGE DAILY FLOW (3.0 MGD)



HYDRAULIC PROFILE
NO SCALE

1 THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

FACILITY (PROCESS UNIT TOTAL QTY)	AVERAGE DAILY HISTORICAL – 3 MGD		PERMITTED AVERAGE DAILY FLOW – 11 MGD		PERMITTED 2-HR PEAK FLOW – 55 MGD	
	UNITS IN OPERATION	CAPACITY	UNITS IN OPERATION	CAPACITY	UNITS IN OPERATION	CAPACITY
INFLUENT LIFT STATION PUMPS (QTY: 6 SMALL, 3 LARGE)	1 SMALL	7 MGD	2 SMALL	14 MGD	3 SMALL & 2 LARGE	55 MGD
MECHANICAL BAR SCREENS (QTY: 3)	1	18.3 MGD	2	36.6 MGD	3	55 MGD
AERATED GRIT CHAMBERS (QTY: 2)	1	27.5 MGD	1	27.5 MGD	2	55 MGD
INFLUENT CHANNELS (QTY: 2)	1	27.5 MGD	1	27.5 MGD	2	55 MGD
REAERATION BASIN (QTY: 1) – SEE NOTE 4	1	NA	1	NA	1	NA
AERATION BASINS (QTY: 8) – SEE NOTE 4	2	NA	2	NA	8	NA
BLOWERS (QTY: 7) – SEE NOTE 4	3	17,435 SFCM MIN REQUIRED	3	19,849 SFCM MIN REQUIRED	6	42,110 SFCM MIN REQUIRED
SECONDARY CLARIFIERS (QTY: 3)	2	36.6 MGD	2	36.6 MGD	3	55 MGD
RAS CHLORINATION CHANNELS (QTY: 2, 4 BAFFLES PER CHANNEL)	1 (4 BAFFLES)	7.3 MGD	2 (8 BAFFLES)	14.6 MGD	2 (8 BAFFLES)	55 MGD
SLUDGE HOLDING BASIN (QTY: 1) – SEE NOTE 4	1	4 DAYS OF STORAGE	1	4 DAYS OF STORAGE	1	4 DAYS OF STORAGE
RAS AIR LIFTS (QTY: 6; 2 PER CLARIFIER)	4	100% OF ADF	4	100% OF ADF (11 MGD)	6	100% OF ADF (11 MGD)

1

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JUSTIN R. SANDT
116966
LICENSED
PROFESSIONAL ENGINEER
3/10/23

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
GENERAL

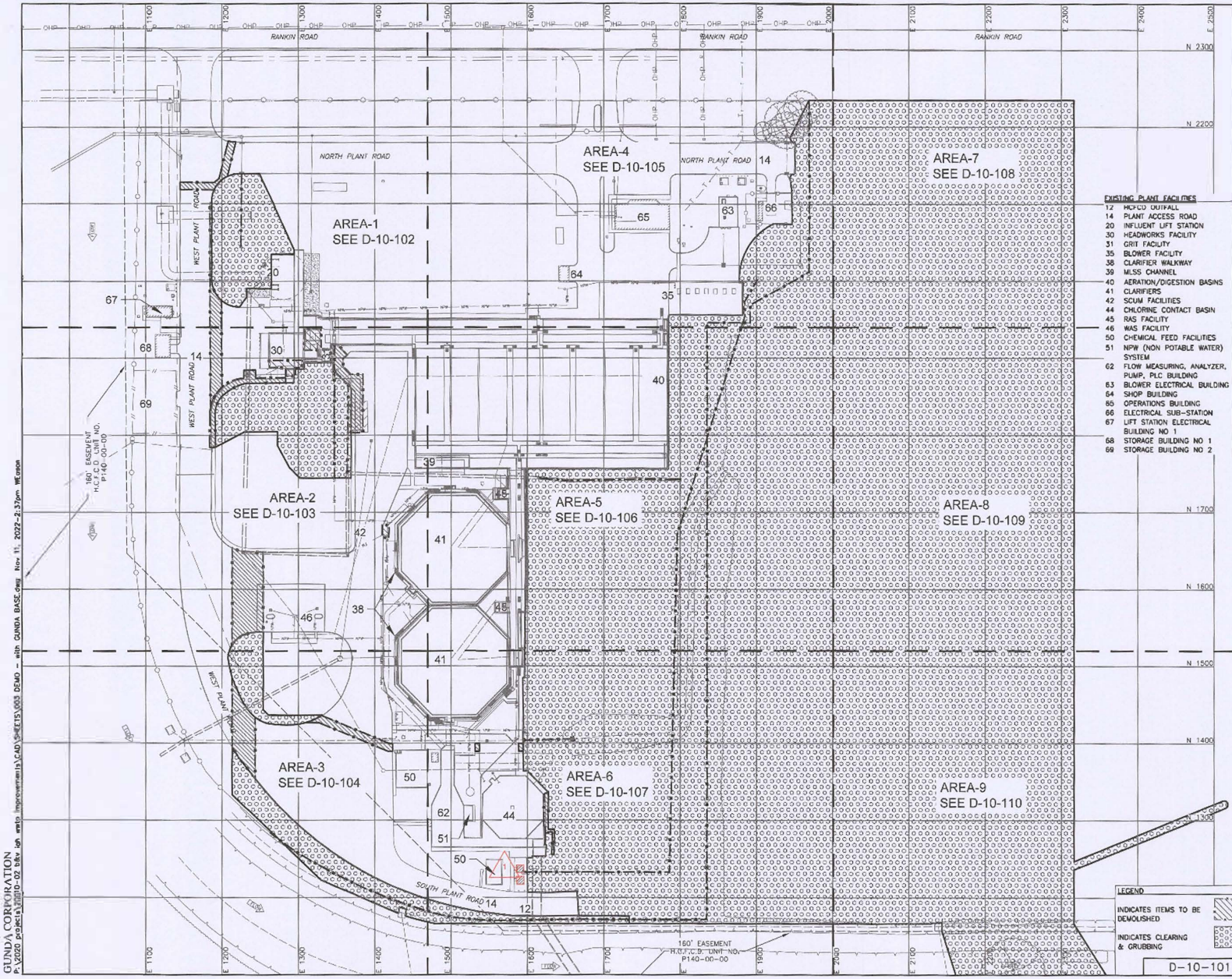
PROPOSED HYRDAULIC PROFILE

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAOHUA (SHARI) LIN, P.E.	
SHEET NO. 15 OF 379	

STATE OF TEXAS
89367
REGISTERED
SHAOHUA LIN
ENGINEER

G-00-604

FILE PATH: C:\pw_working\bvw_americas\d1011535\G-00-604.dwg



EXISTING PLANT FACILITIES

12	HCFCD OUTFALL
14	PLANT ACCESS ROAD
20	INFLUENT LIFT STATION
30	HEADWORKS FACILITY
31	GRIT FACILITY
35	BLOWER FACILITY
38	CLARIFIER WALKWAY
39	MLSS CHANNEL
40	AERATION/DIGESTION BASINS
41	CLARIFIERS
42	SCUM FACILITIES
44	CHLORINE CONTACT BASIN
45	RAS FACILITY
46	WAS FACILITY
50	CHEMICAL FEED FACILITIES
51	NPW (NON POTABLE WATER) SYSTEM
62	FLOW MEASURING, ANALYZER, PUMP, PLC BUILDING
63	BLOWER ELECTRICAL BUILDING
64	SHOP BUILDING
65	OPERATIONS BUILDING
66	ELECTRICAL SUB-STATION
67	LIFT STATION ELECTRICAL BUILDING NO 1
68	STORAGE BUILDING NO 1
69	STORAGE BUILDING NO 2

LEGEND

INDICATES ITEMS TO BE DEMOLISHED

INDICATES CLEARING & GRUBBING

D-10-101

N

0 60' 120'

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

NOTES:

1. REFER TO GENERAL CONSTRUCTION AND DEMOLITION NOTES ON SHEET G-00-004 & G-00-005 FOR ALL REQUIRED DEMOLITION WITHIN THIS CONTRACT.
2. CONTRACTOR SHALL PROTECT EXISTING SYSTEMS FROM DAMAGE.
3. REFER TO CIVIL, STRUCTURAL AND ELECTRICAL SHEETS FOR ADDITIONAL DEMOLITION INFORMATION.
4. REMOVE AND DISPOSE OF ALL ITEMS DURING CONSTRUCTION IN ACCORDANCE WITH STANDARD CITY OF HOUSTON SPECIFICATIONS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FOLLOW ALL APPLICABLE CODES AND REQUIREMENTS FOR DEBRIS REMOVAL AND DISPOSAL AND TO OBTAIN ANY REQUIRED PERMITS.
5. CONTRACTOR SHALL PROTECT EXISTING UTILITY LINES AND APPURTENANCES FROM DAMAGE DURING CONSTRUCTION.
6. ALL WORK AT THE SITE THAT COULD POTENTIALLY INTERFERE WITH NORMAL PLANT OPERATIONS, (AND/OR OFFSITE FACILITIES), SHALL BE COORDINATED WITH THE PLANT SUPERVISOR. CONTRACTOR SHALL SUBMIT A CONSTRUCTION SEQUENCING PLAN DEMONSTRATING THAT NO PLANT OPERATIONS, (OR OFFSITE FACILITIES), WILL BE ADVERSELY AFFECTED MORE THAN 4 HOURS IN ANY 24 HOUR PERIOD. ALL REQUESTS WHICH IMPACT NORMAL OPERATIONS OF THE PLANT SHALL BE SUBMITTED A MINIMUM OF 5 DAYS IN ADVANCE OF THE ACTIVITY.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3550 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED PROFESSIONAL ENGINEER

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

DEMOLITION

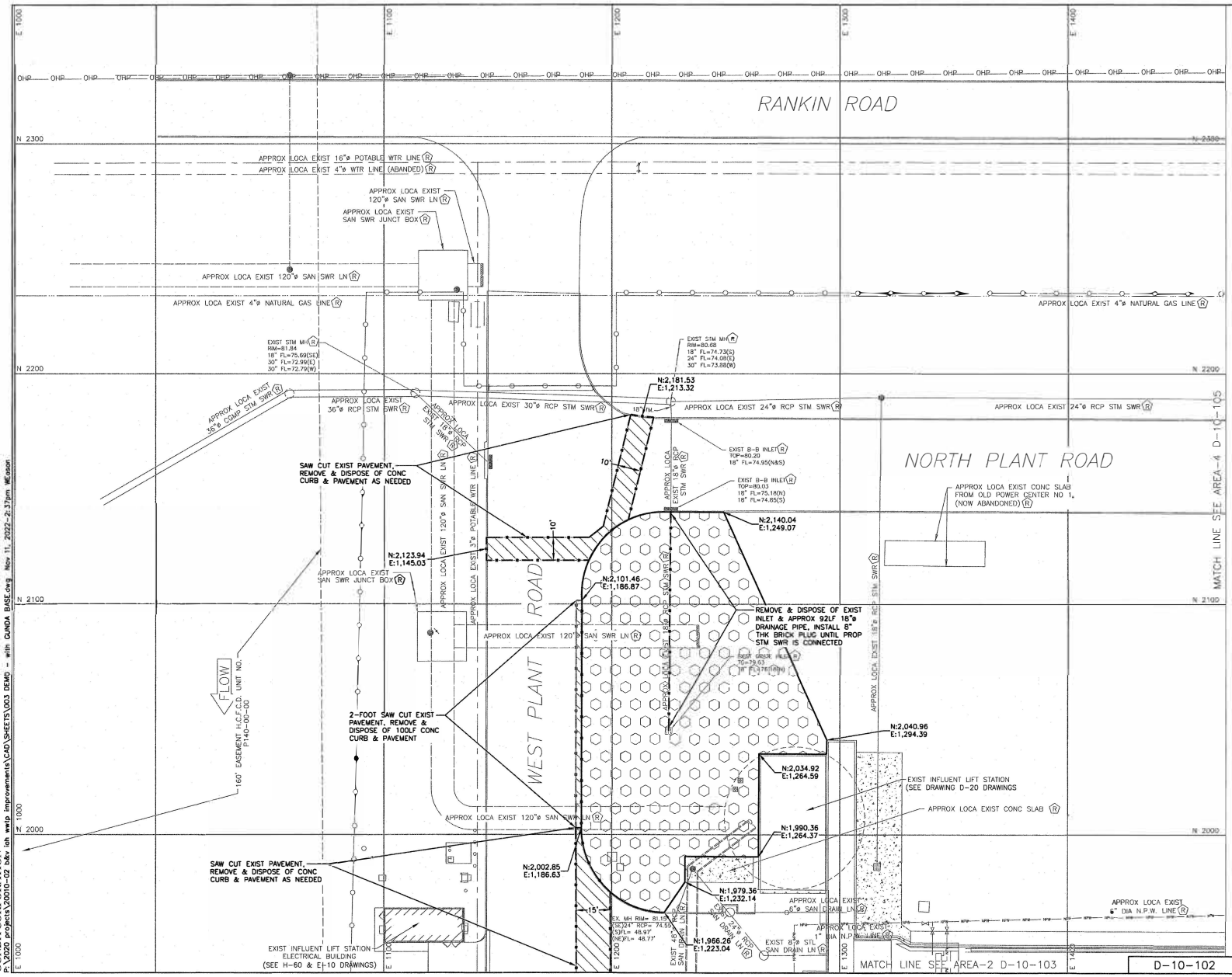
OVERALL SITE DEMOLITION PLAN

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	1"=60'
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 19 OF 379	

FOR CITY OF HOUSTON USE ONLY

80367

GUNDA CORPORATION
P:\2020 projects\2020-02 b&v wpb wwtp improvements\CAD\SHEETS\003 DEMO - with GUNDA BASE.dwg Nov 11, 2022 - 2:37pm WCarson



AREA 1	AREA 4	AREA 7
AREA 2	AREA 5	AREA 8
AREA 3	AREA 6	AREA 9

KEY MAP

LEGEND

INDICATES ITEMS TO BE DEMOLISHED

INDICATES CLEARING & GRUBBING

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED PROFESSIONAL ENGINEER

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

DEMOLITION

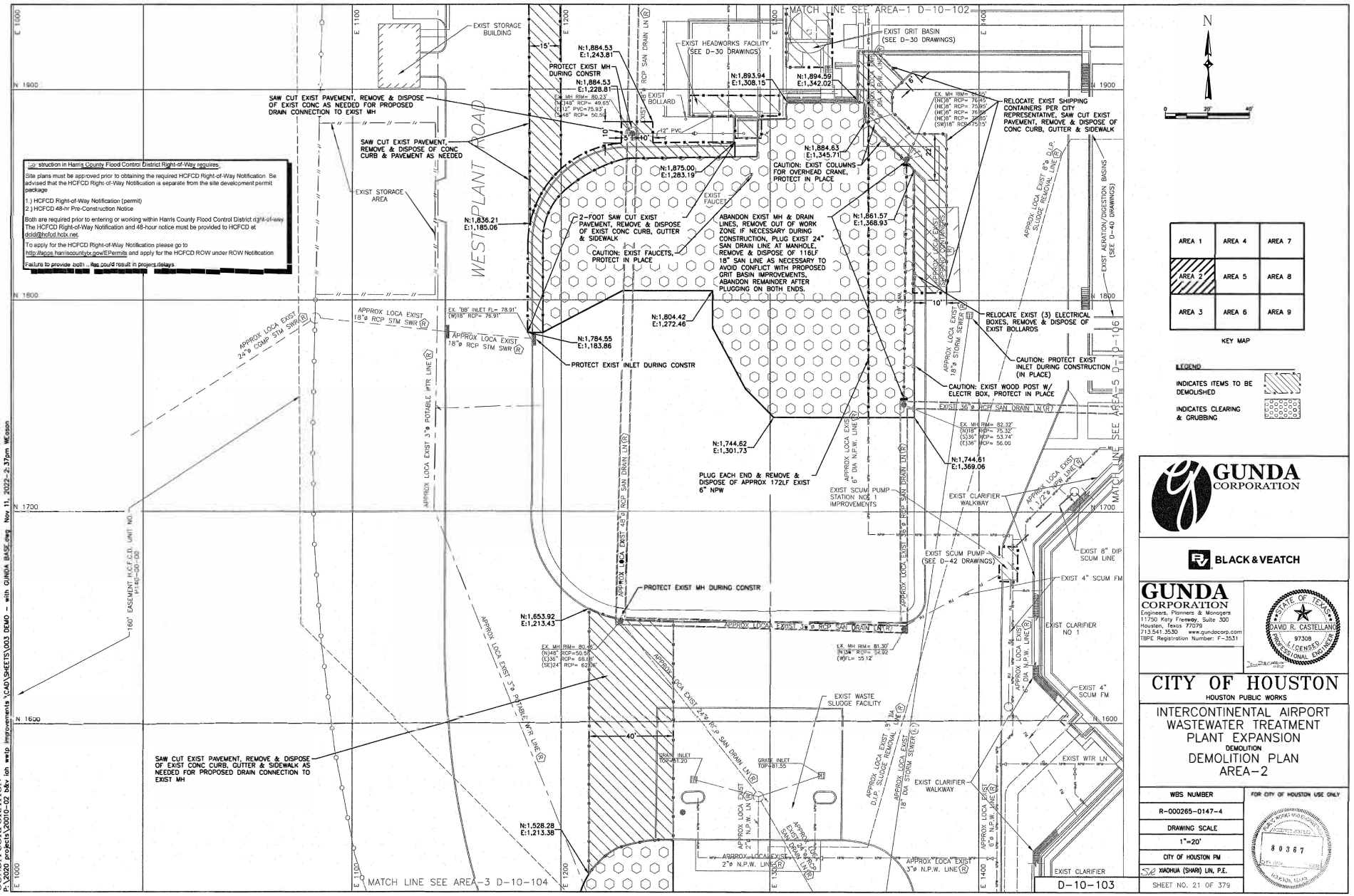
DEMOLITION PLAN AREA-1

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	1"=20'
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 20 OF 379	

FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
80367
REGISTERED
PROFESSIONAL ENGINEER

GUNDA CORPORATION
P:\2020 projects\20010-02 b&v ioh wwip improvements\CAD\SHEETS\003 DEMO - with GUNDA BASE.dwg Nov 11, 2022-2:37pm MCason



GUNDA CORPORATION
P:\2020 projects\20010-02 b&v ion wwtp improvements\CAD\SHEETS\003 DEMO - with GUNDA BASE.dwg Nov 11, 2022 - 2:37pm Wesson

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

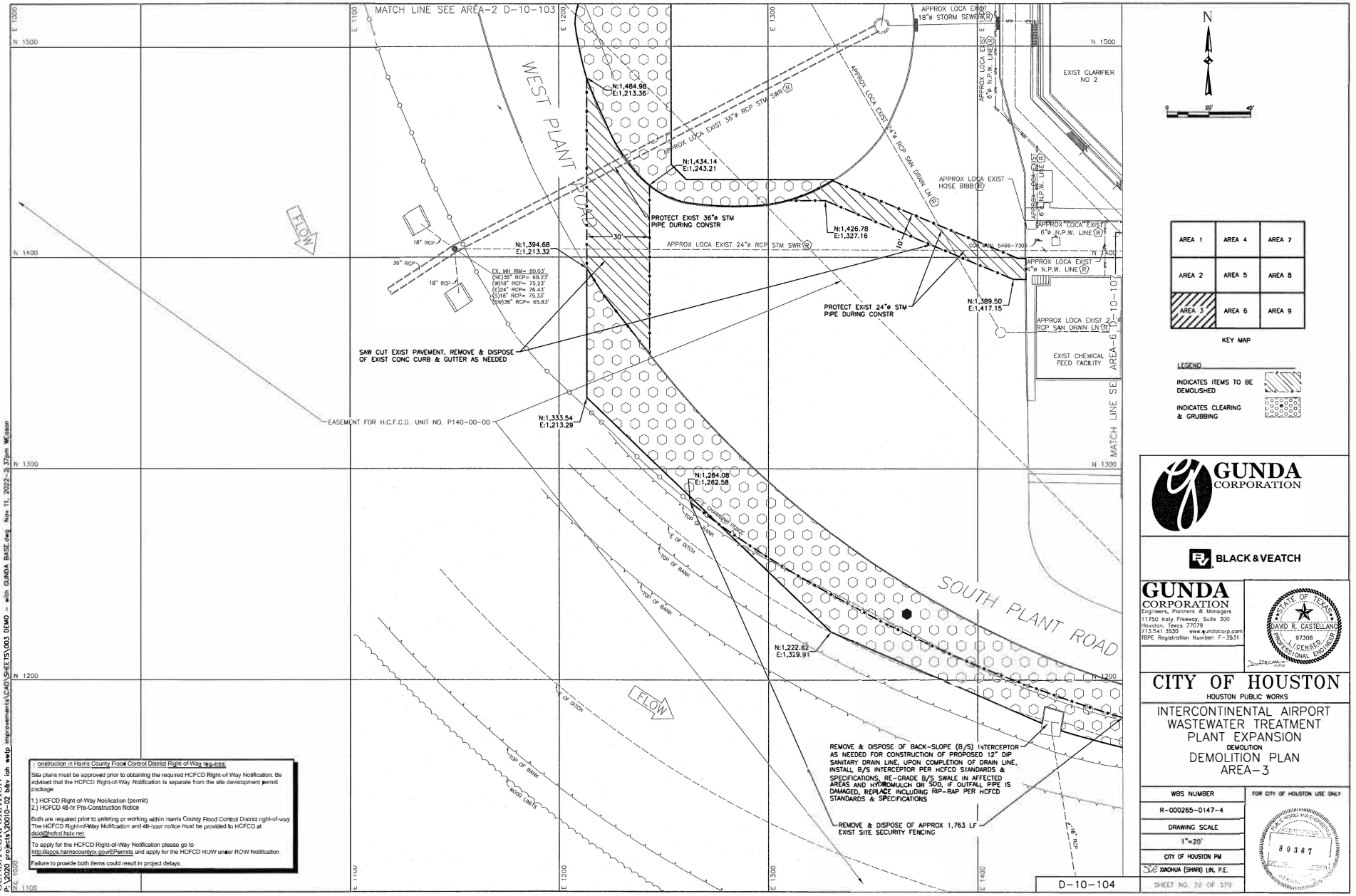
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
DEMOLITION

DEMOLITION PLAN AREA-2

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	1"=20'
CITY OF HOUSTON PM	Se XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 21 OF 379	

FOR CITY OF HOUSTON USE ONLY

PUBLIC WORKS AND ENGINEERING
80367
REGISTERED
HOUSTON, TEXAS



N

0 20' 40'

AREA 1	AREA 4	AREA 7
AREA 2	AREA 5	AREA 8
AREA 3	AREA 6	AREA 9

KEY MAP

LEGEND

INDICATES ITEMS TO BE DEMOLISHED

INDICATES CLEARING & GRUBBING

onstruction in Harris County Flood Control District Right-of-Way requires:

Site plans must be approved prior to obtaining the required HCFCD Right-of-Way Notification. Be advised that the HCFCD Right-of-Way Notification is separate from the site development permit package

1.) HCFCD Right-of-Way Notification (permit)
2.) HCFCD 48-hr Pre-Construction Notice

Both are required prior to entering or working within Harris County Flood Control District right-of-way. The HCFCD Right-of-Way Notification and 48-hour notice must be provided to HCFCD at dcid@hcfcd.hctx.net.

To apply for the HCFCD Right-of-Way Notification please go to http://apps.harriscountytx.gov/EPermits and apply for the HCFCD ROW under ROW Notification.

Failure to provide both items could result in project delays.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED PROFESSIONAL ENGINEER

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

DEMOLITION

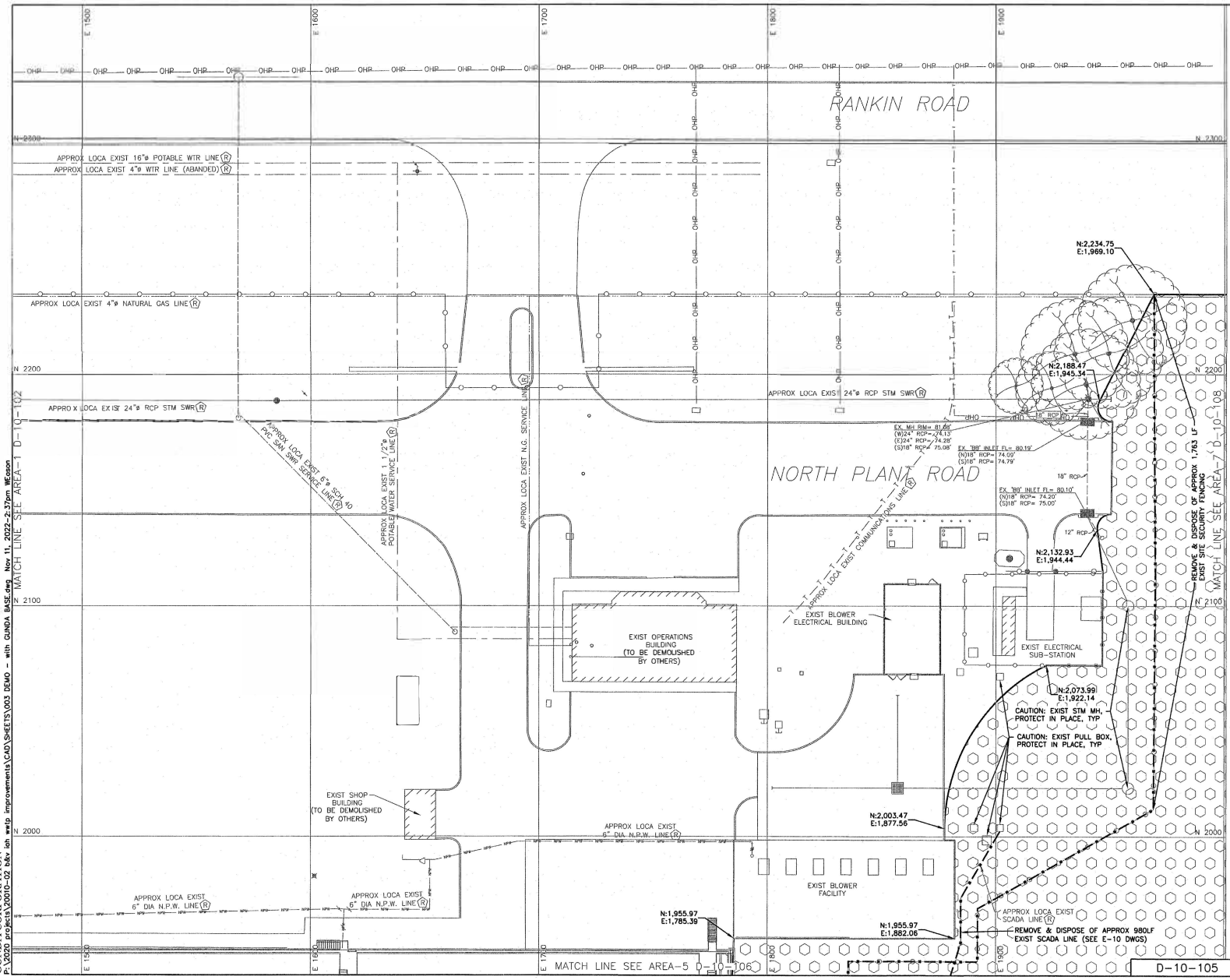
DEMOLITION PLAN AREA-3

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	1"=20'
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 22 OF 379	

FOR CITY OF HOUSTON USE ONLY

80367

P:\2020 projects\20010-02 b&v ion wwtp improvements\CAD\SHEETS\003 DEMO - with GUNDA BASE.dwg Nov 11, 2022 - 2:37pm WCason



N

0 20' 40'

AREA 1	AREA 4	AREA 7
AREA 2	AREA 5	AREA 8
AREA 3	AREA 6	AREA 9

KEY MAP

LEGEND

INDICATES ITEMS TO BE DEMOLISHED

INDICATES CLEARING & GRUBBING

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED PROFESSIONAL ENGINEER

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

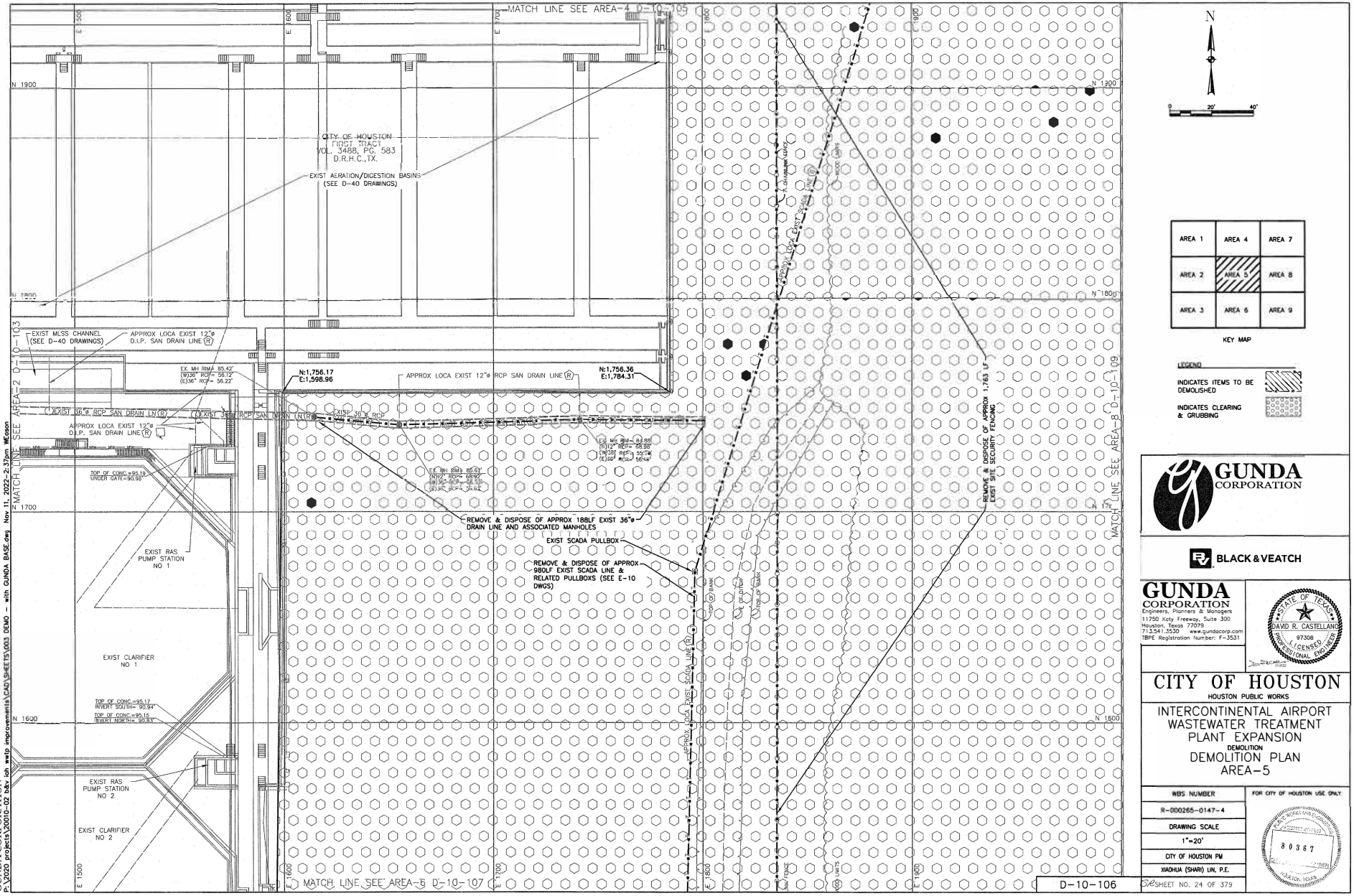
DEMOLITION

DEMOLITION PLAN AREA-4

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
1"=20'	
CITY OF HOUSTON PM	
Sd XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 23 OF 379	

80367

GUNDA CORPORATION
P:\2020 projects\20010-02 b&v ioh wwtp improvements\CAD\SHEETS\003 DEMO - with GUNDA BASE.dwg Nov 11, 2022-2:37pm WEason



GUNDA CORPORATION
P:\2020 projects\20010-02 hdr coh wwtp improvements\CAD\SHEETS\003 DEMO - with GUNDA BASE.dwg Nov 11, 2022 - 2:37pm MEason

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANOS
97308
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

DEMOLITION

DEMOLITION PLAN AREA-5

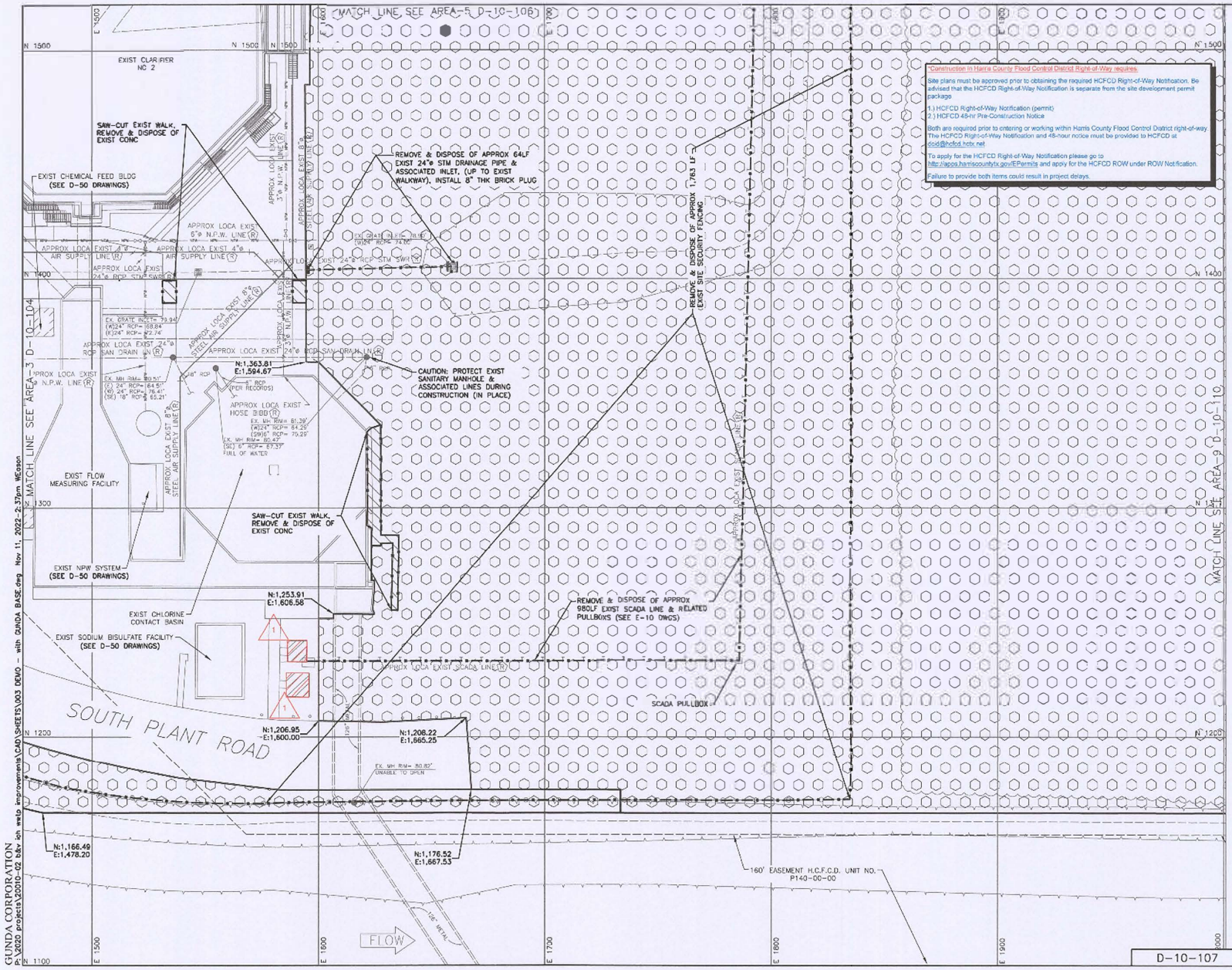
WBS NUMBER	R-000265-0147-4
DRAWING SCALE	1"=20'
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.

FOR CITY OF HOUSTON USE ONLY

REGISTERED PROFESSIONAL ENGINEER
80367
1981
HOUSTON, TEXAS

D-10-106

SHEET NO. 24 OF 379



Construction in Harris County Flood Control District Right-of-Way requires:

Site plans must be approved prior to obtaining the required HCFCD Right-of-Way Notification. Be advised that the HCFCD Right-of-Way Notification is separate from the site development permit package

1.) HCFCD Right-of-Way Notification (permit)
2.) HCFCD 48-hr Pre-Construction Notice

Both are required prior to entering or working within Harris County Flood Control District right-of-way. The HCFCD Right-of-Way Notification and 48-hour notice must be provided to HCFCD at cod@hcfcd.hctx.net

To apply for the HCFCD Right-of-Way Notification please go to http://apps.harriscountytx.gov/EPermits and apply for the HCFCD ROW under ROW Notification.

Failure to provide both items could result in project delays.

1 THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS

AREA 1	AREA 4	AREA 7
AREA 2	AREA 5	AREA 8
AREA 3	AREA 6	AREA 9

KEY MAP

LEGEND

INDICATES ITEMS TO BE DEMOLISHED

INDICATES CLEARING & GRUBBING

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.941.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED PROFESSIONAL ENGINEER

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

DEMOLITION

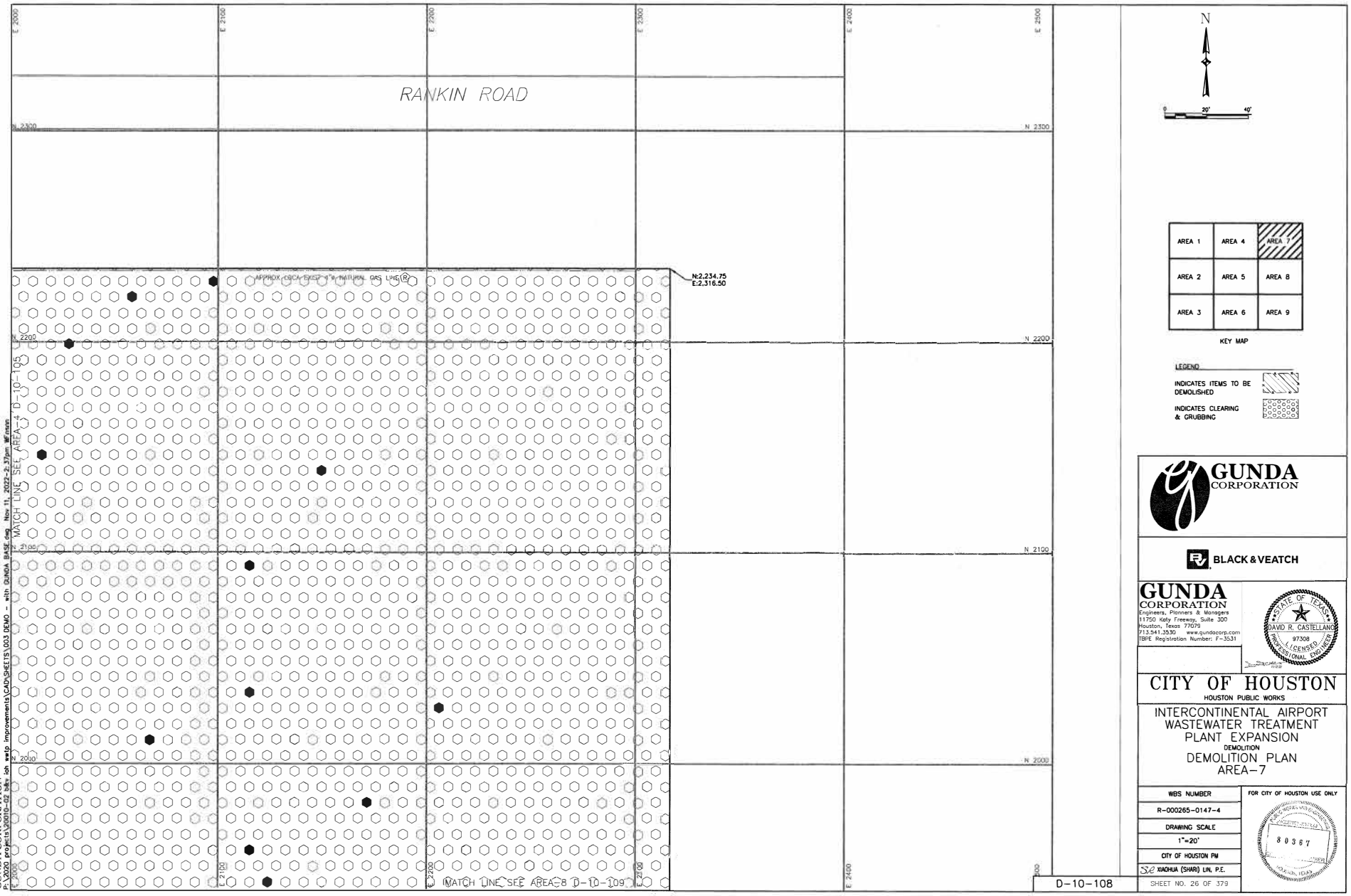
DEMOLITION PLAN AREA-6

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	1"=20'
CITY OF HOUSTON PM	
	XIAOHUA (SHARI) LIN, P.E.
	SHEET NO. 25 OF 378

FOR CITY OF HOUSTON USE ONLY

80367 LICENSED PROFESSIONAL ENGINEER HOUSTON, TEXAS

GUNDA CORPORATION
P:\2020 projects\2010-02 b&v ich wwtp improvements\CAD\SHEETS\003 DEMO - with GUNDA BASE.dwg Nov 11, 2022 - 2:37pm WGason



N

0 20' 40'

AREA 1	AREA 4	AREA 7
AREA 2	AREA 5	AREA 8
AREA 3	AREA 6	AREA 9

KEY MAP

LEGEND

INDICATES ITEMS TO BE DEMOLISHED

INDICATES CLEARING & GRUBBING

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 200
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANOS
97308
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

DEMOLITION

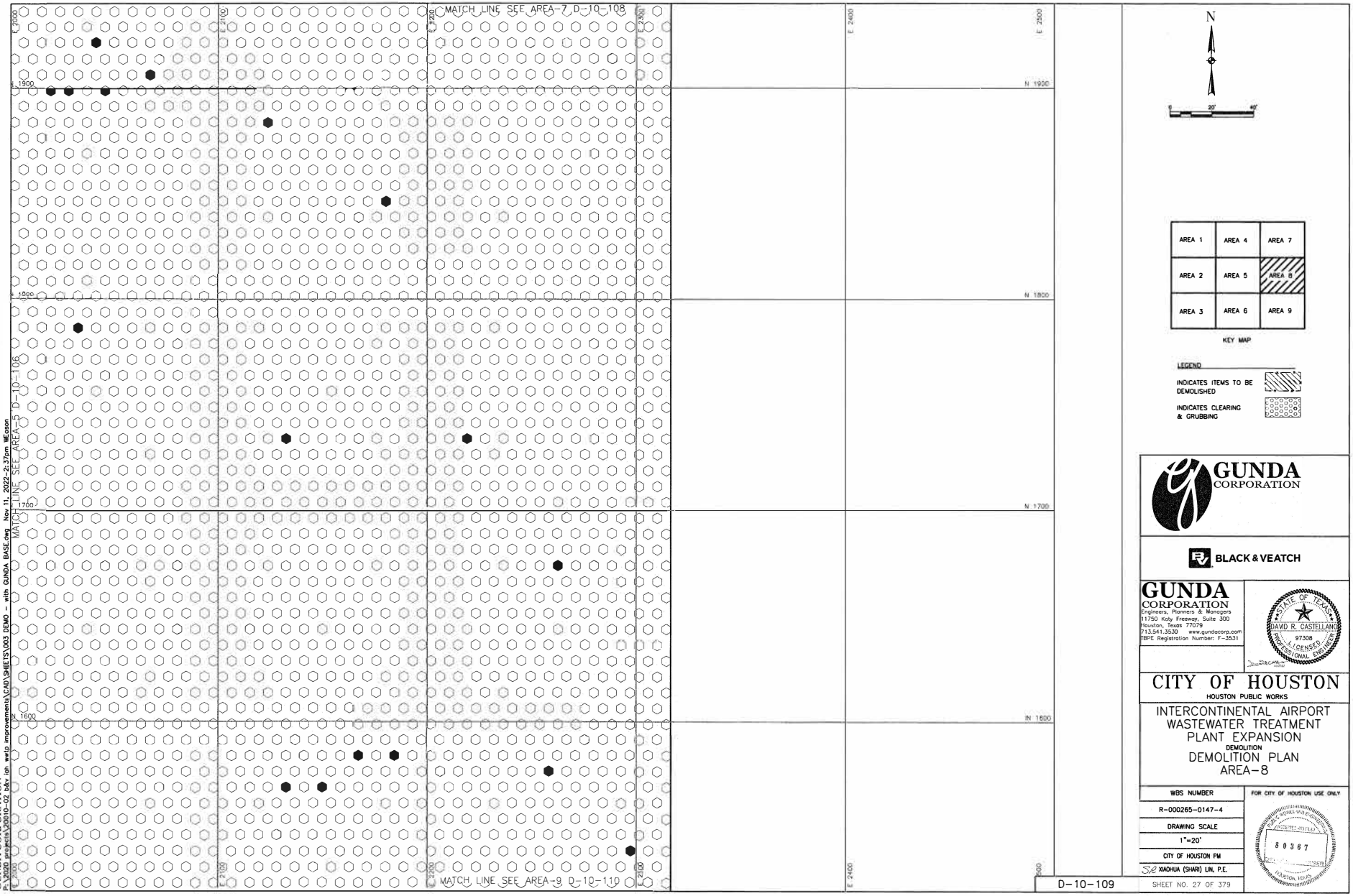
DEMOLITION PLAN AREA-7

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	1"=20'
CITY OF HOUSTON PM	Se XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 26 OF 379	

FOR CITY OF HOUSTON USE ONLY

REGISTERED
80367
XIAOHUA LIN
TEXAS

GUNDA CORPORATION
P:\2020 projects\2019-02 Sec ish wwtp improvements\CAD\SHEETS\03 DEMO - with GUNDA BASE.dwg Nov 11, 2022 - 2:37pm MFriesen



GUNDA CORPORATION

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3520 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED PROFESSIONAL ENGINEER

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

DEMOLITION

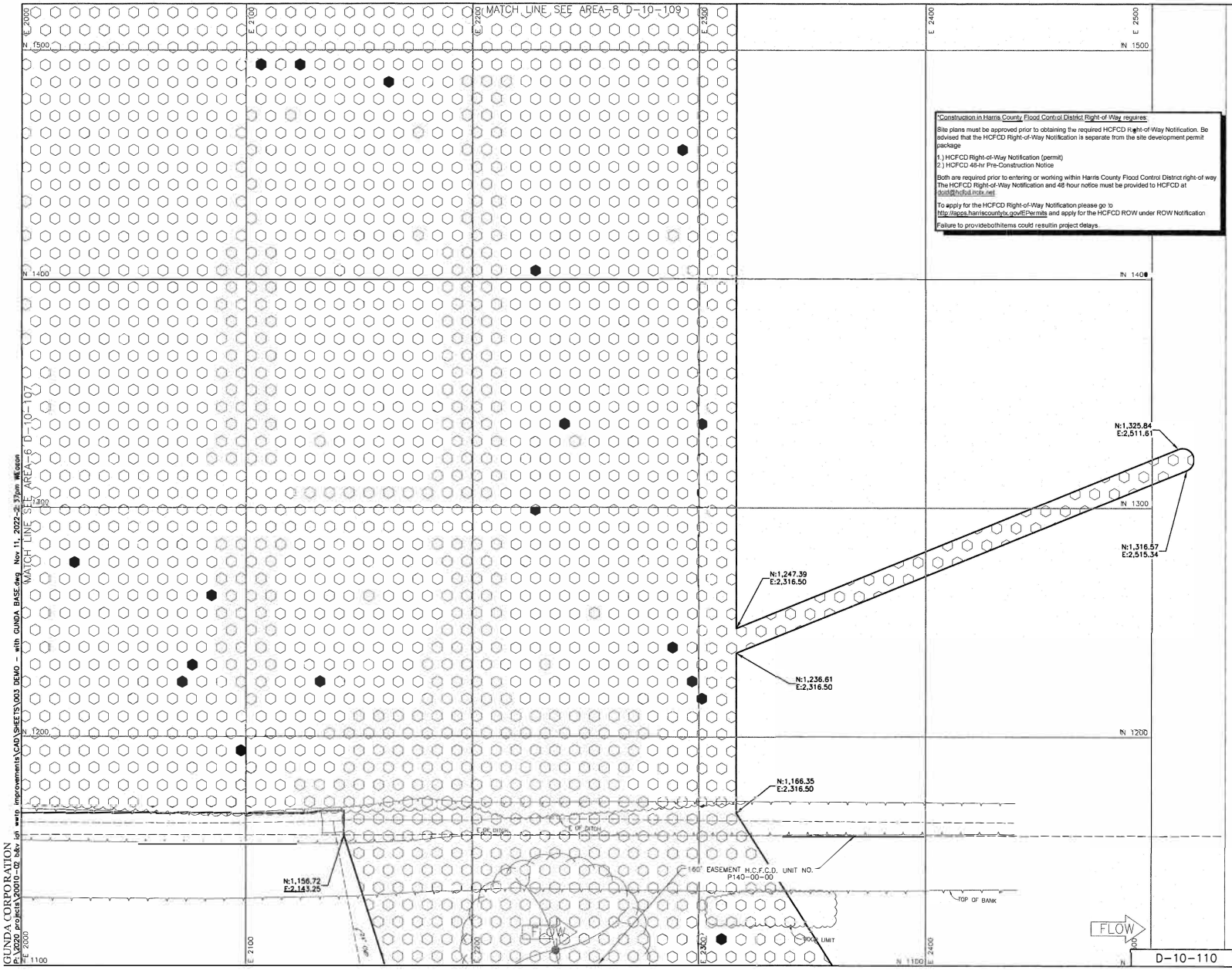
DEMOLITION PLAN AREA-8

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
1"=20'	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 27 OF 379	

P.E. XIAOHUA (SHARI) LIN
80367
REGISTERED
HOUSTON, TEXAS

D-10-109

GUNDA CORPORATION
P:\2020 projects\20010-02 b&v ish ww\p improvements\CAD\SHEETS\003 DEMO - with GUNDA BASE.dwg Nov 11, 2022-2:37pm MEason



*Construction in Harris County Flood Control District Right-of Way requires:

Site plans must be approved prior to obtaining the required HCFCD Right-of-Way Notification. Be advised that the HCFCD Right-of-Way Notification is separate from the site development permit package

1.) HCFCD Right-of-Way Notification (permit)
2.) HCFCD 48-hr Pre-Construction Notice

Both are required prior to entering or working within Harris County Flood Control District right-of way. The HCFCD Right-of-Way Notification and 48 hour notice must be provided to HCFCD at doint@hcfcd.ncbi.net

To apply for the HCFCD Right-of-Way Notification please go to http://apps.harriscountytx.gov/EPermits and apply for the HCFCD ROW under ROW Notification

Failure to provideboth items could resultin project delays.

N

0 20' 40'

AREA 1	AREA 4	AREA 7
AREA 2	AREA 5	AREA 8
AREA 3	AREA 6	AREA 9

KEY MAP

LEGEND

INDICATES ITEMS TO BE DEMOLISHED

INDICATES CLEARING & GRUBBING

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED PROFESSIONAL ENGINEER

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

DEMOLITION

DEMOLITION PLAN AREA-9

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	1"=20'
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.

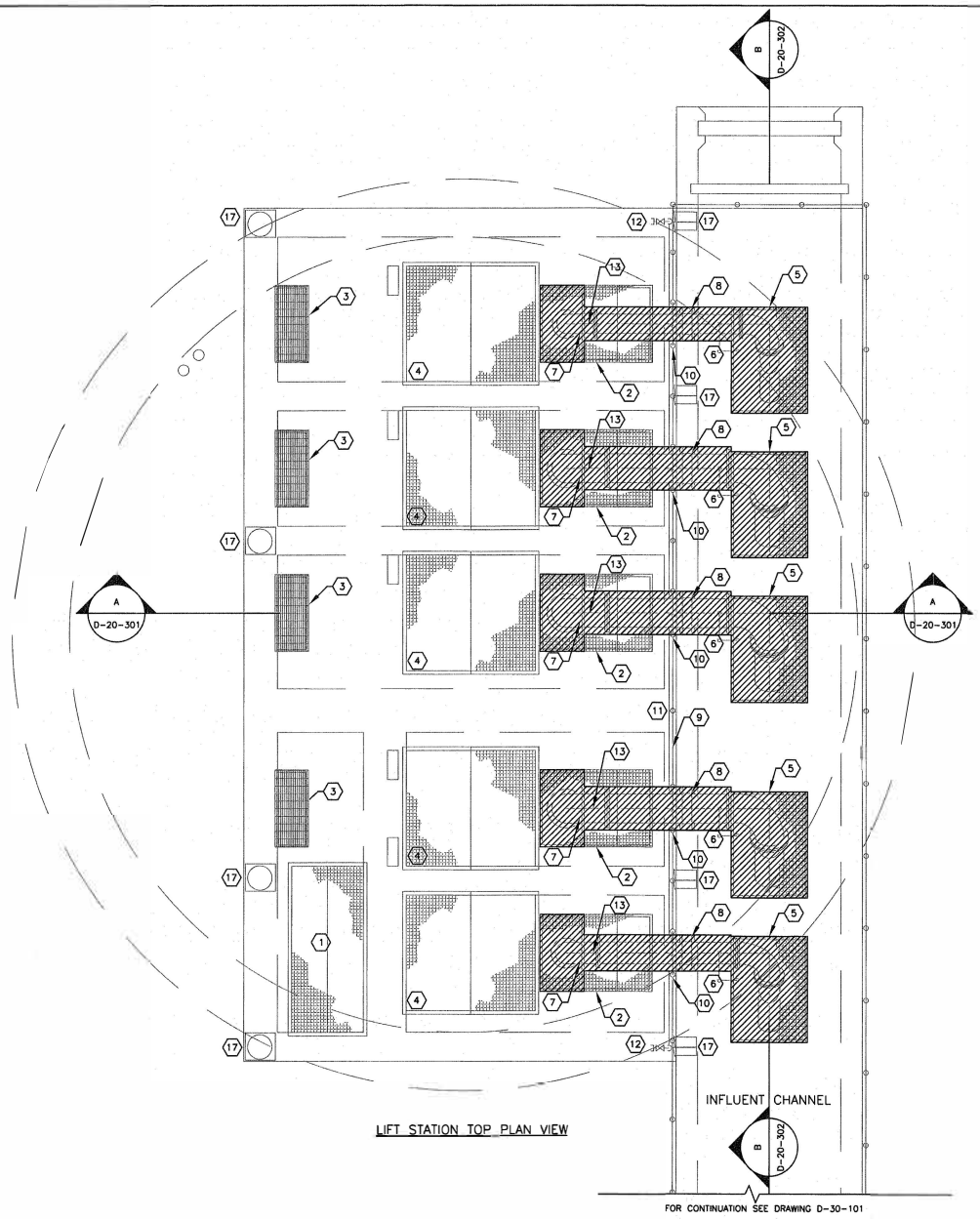
FOR CITY OF HOUSTON USE ONLY

80367

D-10-110

SHEET NO. 28 OF 379

(GUNDA CORPORATION
(GUNDA projects\2020-02.dwg, ipl, www.improvements\CAD\SHEETS\003 DEMO - with GUNDA BASE.dwg Nov 11, 2022 - 2:37pm wfagan



LIFT STATION TOP PLAN VIEW

NOTES:

1. CONTRACTOR SHALL PROTECT EXISTING MONORAIL AND MONORAIL SUPPORT SYSTEMS FROM DAMAGE.
2. REFER TO SPECIFICATION SECTION 01110 FOR ADDITIONAL DEMOLITION INFORMATION.
3. REFER TO STRUCTURAL AND ELECTRICAL SHEETS FOR ADDITIONAL DEMOLITION INFORMATION.
4. REFER TO SPECIFICATION SECTION 01506 FOR DIVERSION PUMPING REQUIREMENTS.
5. REMOVE AND DISPOSE OF ALL GRIT AND DEBRIS IN WETWELL DURING ISOLATION IN ACCORDANCE WITH SPECIFICATION SECTION 01576 AND 02220. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FOLLOW ALL APPLICABLE CODES AND REQUIREMENTS FOR DEBRIS REMOVAL AND DISPOSAL AND TO OBTAIN ANY REQUIRED PERMITS.
6. CONTRACTOR SHALL PROTECT EXISTING NPW LINES AND HOSE BIBBS FROM DAMAGE DURING CONSTRUCTION.
7. CONTRACTOR MEANS & METHODS FOR LIFT STATION BY-PASS, AND COORDINATION WITH DOWNSTREAM SCREENING/GRIT CONSTRUCTION, SHALL BE SUBMITTED FOR APPROVAL PRIOR TO CONSTRUCTION.
8. REMOVE EXISTING SAFETY NETTING AS NEEDED, AND REPLACE WITH ALUMINUM SAFETY GRATE TO COMPLY WITH CURRENT CITY SPECIFICATIONS.

N

0 6' 12'

LEGEND

ITEMS TO BE DEMOLISHED

NOTES BY SYMBOL (X)	
1.	CHK'D PLATE PERSONNEL ACCESS COVER, CURB ANGLE & SAFETY NET TO REMAIN
2.	CHK'D PLATE & CURB ANGLE TO REMAIN
3.	PUMP REMOVABLE GRATING & CURB ANGLE TO REMAIN
4.	PUMP ACCESS COVER & CURB ANGLE TO REMAIN, (SEE NOTE 8)
5.	CHK'D PLATE & CURB ANGLE TO REMAIN
6.	DEMO 2" SIPHON BREAK & SPOTS
7.	CHK'D PLATE TO BE RESIZED
8.	DEMO PIPE STRAP & CONC SUPPORT
9.	SAFETY RAIL TO REMAIN
10.	TEMPORARILY DETACH SAFETY CHAIN
11.	EX 2" NPW LINE TO REMAIN, (SEE NOTE 6)
12.	EX HOSE BIBB TO REMAIN, (SEE NOTE 6)
13.	DEMO PUMP DISCHARGE PIPING
17.	MONORAIL COLUMN & BASE PLATE TO REMAIN (SEE NOTE 1)

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
DEMOLITION

INFLUENT LIFT STATION DEMOLITION TOP PLAN

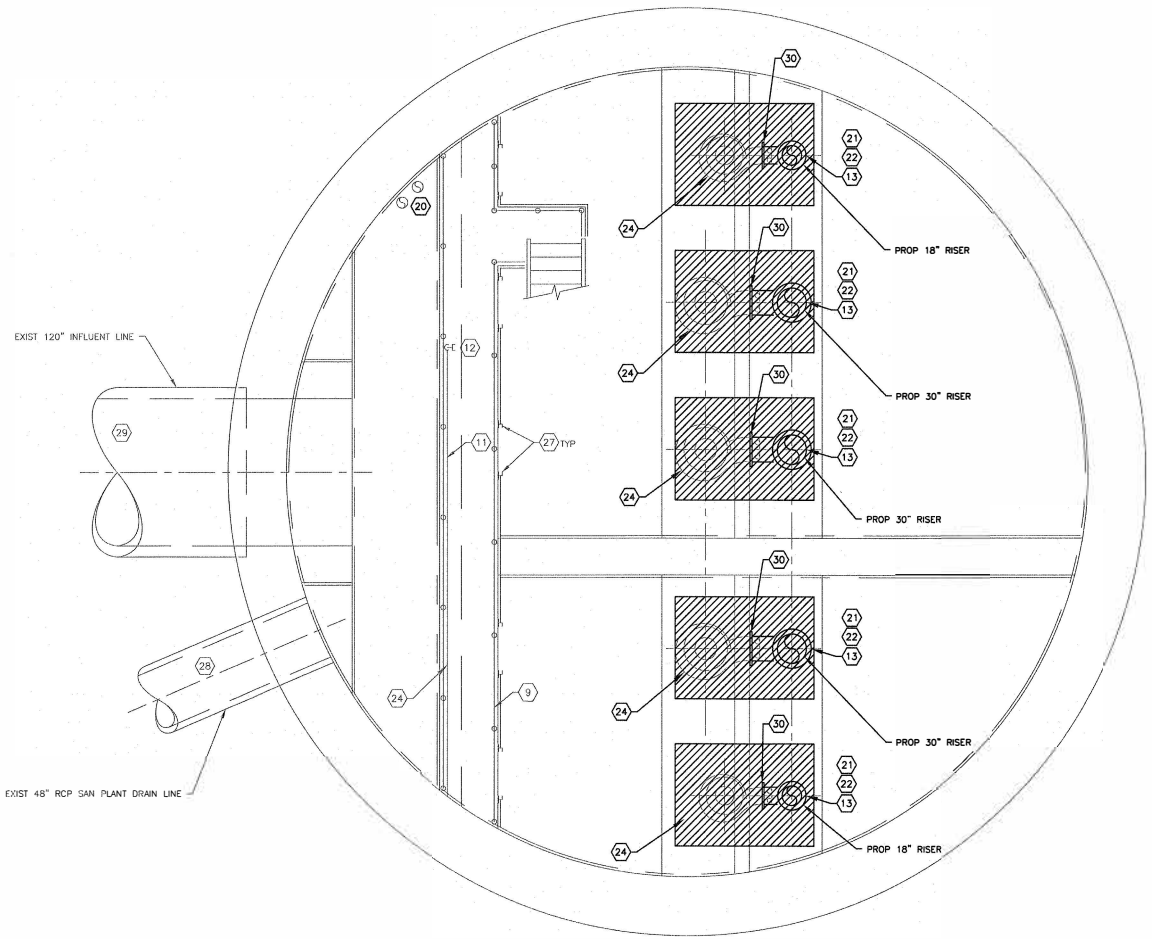
WBS NUMBER	R-000265-0147-4
DRAWING SCALE	1"=6'
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 29 OF 379	

FOR CITY OF HOUSTON USE ONLY

ACCEPTED AS NOTED
80367
REGISTERED
HOUSTON, TEXAS

D-20-101

GUNDA CORPORATION
P:\2020 projects\20010-02 b&v wwtp improvements\CAD\SHEETS\003 DEMO - with GUNDA BASE.dwg Nov 11, 2022 - 3:27pm WEason



LIFT STATION BELOW GROUND PLAN VIEW

N

0 6' 12'

NOTES:

1. CONTRACTOR SHALL PROTECT EXISTING MONORAIL AND MONORAIL SUPPORT SYSTEMS FROM DAMAGE.
2. REFER TO SPECIFICATION SECTION 01110 FOR ADDITIONAL DEMOLITION INFORMATION.
3. REFER TO STRUCTURAL AND ELECTRICAL SHEETS FOR ADDITIONAL DEMOLITION INFORMATION.
4. REFER TO SPECIFICATION SECTION 01506 FOR DIVERSION PUMPING REQUIREMENTS.
5. REMOVE AND DISPOSE OF ALL GRIT AND DEBRIS IN WETWELL DURING ISOLATION IN ACCORDANCE WITH SPECIFICATION SECTION 01576 AND 02220. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FOLLOW ALL APPLICABLE CODES AND REQUIREMENTS FOR DEBRIS REMOVAL AND DISPOSAL AND TO OBTAIN ANY REQUIRED PERMITS..
6. CONTRACTOR SHALL PROTECT EXISTING NPW LINES AND HOSE BIBBS FROM DAMAGE DURING CONSTRUCTION.
7. EXISTING PUMP 1=60 HP 3.5 MGD WITH 16-INCH RISER PIPING, EXISTING PUMPS 2 & 3=140 HP 8.0 MGD WITH 18-INCH RISER PIPING, EXISTING PUMPS 4 & 5=250 HP 16.0 MGD WITH 24-INCH RISER PIPING.
8. CONTRACTOR MEANS & METHODS FOR LIFT STATION BY-PASS, AND COORDINATION WITH DOWNSTREAM SCREENING/GRIT CONSTRUCTION, SHALL BE SUBMITTED FOR APPROVAL PRIOR TO CONSTRUCTION.

LEGEND

ITEMS TO BE DEMOLISHED

NOTES BY SYMBOL (X)	
9.	EX HANDRAIL TO REMAIN
11.	EX 3" NPW LINE TO REMAIN, SEE NOTE 6
12.	EX HOSE BIBB TO REMAIN, SEE NOTE 6
13.	DEMO PUMP DISCHARGE PIPING
20.	DEMO LEVEL TRANSDUCERS
21.	DEMO BASE ELBOW
22.	DEMO REDUCER
24.	DEMO PUMP
27.	PLATE GUIDES TO REMAIN
30.	DEMO GUIDE RAILS & SUPPORTS

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

DEMOLITION

INFLUENT LIFT STATION DEMOLITION SECTIONAL PLAN

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	1"=6'
CITY OF HOUSTON PM	
	XIAOHUA (SHARI) LIN, P.E.

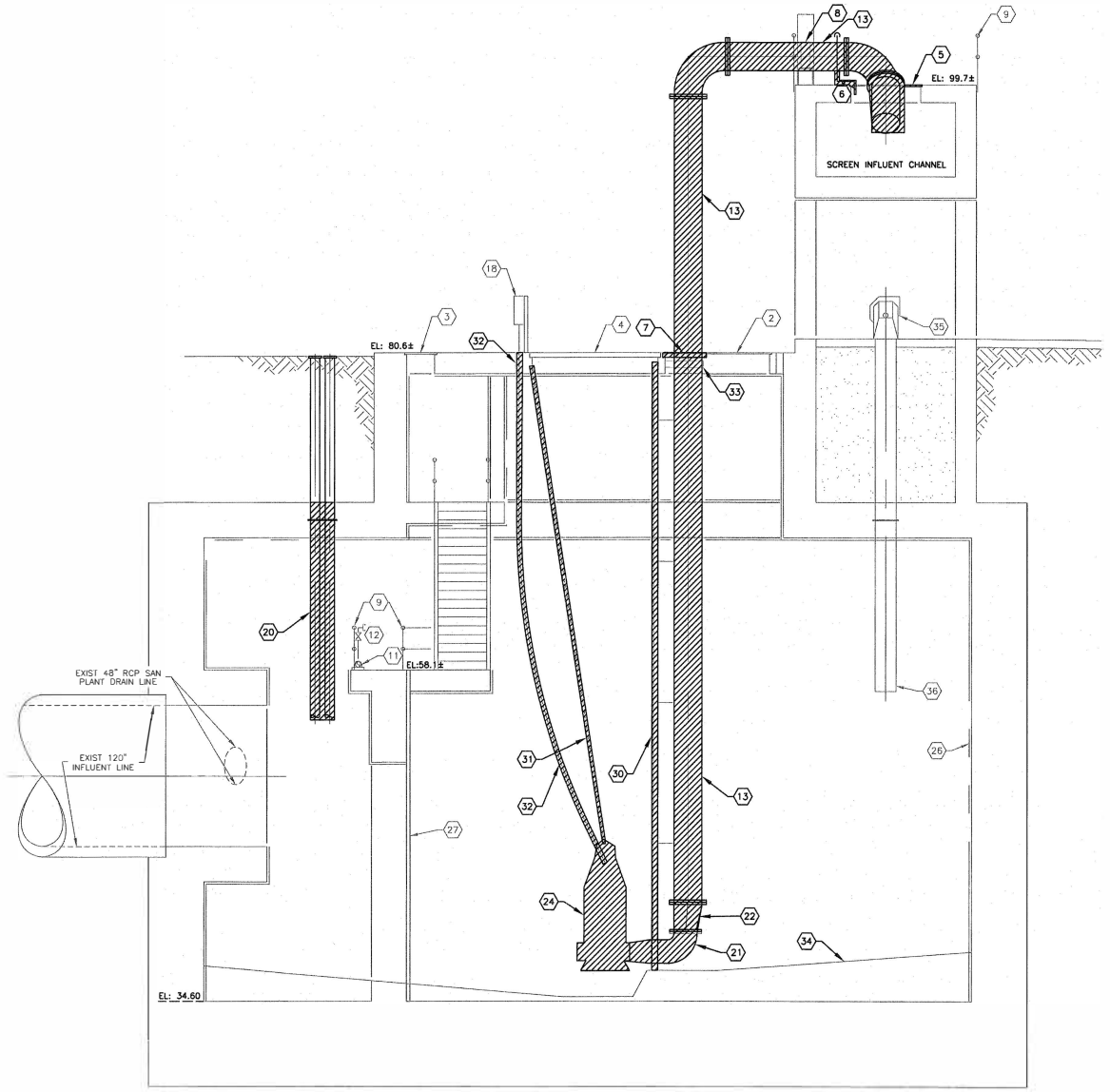
FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
XIAOHUA LIN
80367
LICENSED
PROFESSIONAL ENGINEER

D-20-102

SHEET NO. 30 OF 379

GUNDA CORPORATION
P:\2020 projects\20010-02 b&v ioh ww1p improvements\CAD\SHEETS\003 DEMO - with GUNDA BASE.dwg Nov 11, 2022 - 3:27pm WEdson



LIFT STATION SECTION A-A

NOTES:

1. DEMOLITION SHOWN, THIS SHEET IS TYPICAL FOR ALL FIVE PUMPS.
2. CONTRACTOR SHALL PROTECT EXISTING MONORAIL AND MONORAIL SUPPORT SYSTEMS FROM DAMAGE.
3. REMOVE AND DISPOSE OF ALL GRIT AND DEBRIS IN WETWELL AND SCREEN INFLUENT CHANNEL DURING ISOLATION IN ACCORDANCE WITH SPECIFICATION SECTION 01576 AND 02220. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FOLLOW ALL APPLICABLE CODES AND REQUIREMENTS FOR DEBRIS REMOVAL AND DISPOSAL AND TO OBTAIN ANY REQUIRED PERMITS.
4. REFER TO SPECIFICATION SECTION 01110 FOR ADDITIONAL INFORMATION ON CONSTRUCTION SEQUENCE.
5. CONTRACTOR TO DEMO AND/OR ADD GROUT AS REQUIRED FOR PUMP OR PIPE RELOCATION.
6. REFER TO SPECIFICATION SECTION 03920 & 03930 FOR CONCRETE REPAIR.
7. REFER TO STRUCTURAL AND ELECTRICAL SHEETS FOR ADDITIONAL DEMOLITION INFORMATION.
8. CONTRACTOR SHALL PROVIDE ANY STOP PLATES OR STOP LOGS REQUIRED FOR ISOLATION.
9. CONTRACTOR SHALL PROTECT EXISTING NPW LINE AND HOSE BIBB FROM DAMAGE DURING CONSTRUCTION.
10. SEE SHEET M-20-101 NOTES FOR PLATE RELOCATIONS AND MODIFICATIONS.
11. EXISTING PUMP 1=60 HP 3.5 MGD WITH 16-INCH RISER PIPING, EXISTING PUMPS 2 & 3=140 HP 8.0 MGD WITH 18-INCH RISER PIPING, EXISTING PUMPS 4 & 5=250 HP 16.0 MGD WITH 24-INCH RISER PIPING.
12. CONTRACTOR MEANS & METHODS FOR LIFT STATION BY-PASS, AND COORDINATION WITH DOWNSTREAM SCREENING/GRIT CONSTRUCTION, SHALL BE SUBMITTED FOR APPROVAL PRIOR TO CONSTRUCTION.

LEGEND

ITEMS TO BE DEMOLISHED

NOTES BY SYMBOL (X)

2.	CHK'D PLATE, TO REMAIN
3.	REMOVABLE GRATING TO REMAIN
4.	PUMP ACCESS COVER TO REMAIN
5.	CHK'D PLATE & CURB ANGLE TO BE RELOCATED OR MODIFIED, (SEE NOTE 10)
6.	DEMO 2" SIPHON BREAK & SUPPORTS
7.	CHECKERED PLATE TO BE RESIZED (SEE NOTE 10)
8.	DEMO PIPE SUPPORT STRAP & CONCRETE SUPPORT
9.	EX HANDRAIL TO REMAIN
11.	EX 3/4" NPW LINE TO REMAIN (SEE NOTE 9)
12.	EX HOSE BIBB TO REMAIN (SEE NOTE 9)
13.	DEMO PUMP DISCHARGE PIPING & SUPPORTS
18.	EX CONTROL PANEL BOX TO REMAIN
20.	DEMO LEVEL TRANSDUCERS, PENETRATION TO REMAIN
21.	DEMO BASE ELBOW
22.	DEMO REDUCER
24.	DEMO PUMPS, (SEE NOTE 11)
26.	CONC COATING TO REMAIN
27.	PLATE GUIDES TO REMAIN
30.	DEMO GUIDE RAILS & SUPPORTS
31.	DEMO PUMP LIFTING CABLE
32.	DEMO ELECTRICAL CABLE - CONDUIT PENETRATION TO REMAIN
33.	DEMO PIPE SUPPORT BRACKET
34.	DEMO GROUT AS NEEDED (SEE NOTE 5)
35.	EX-HAUST FAN TO REMAIN
36.	18"DIA SS PIPE TO REMAIN

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11790 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
DEMOLITION

INFLUENT LIFT STATION DEMOITION SECTION 1 OF 2

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
1"=6'	
CITY OF HOUSTON PM	
Sd XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 31 OF 379	

80367 LICENSED PROFESSIONAL ENGINEER

D-20-301

GUNDA CORPORATION
P:\2020 projects\20010-02 b&v on wwtp improvements\CAD\SHEETS\003 DEMO - with GUNDA BASE.dwg Nov 11, 2022 - 3:27pm wilson

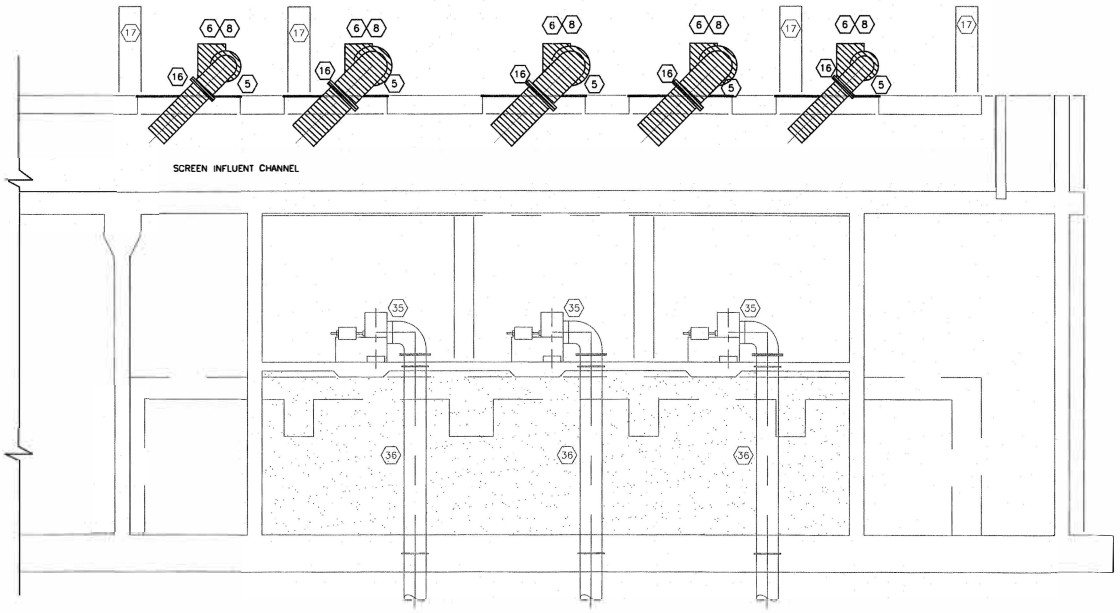
NOTES:

1. REFER TO SPECIFICATION SECTION 01110 FOR ADDITIONAL INFORMATION ON CONSTRUCTION SEQUENCE.
2. REFER TO STRUCTURAL AND ELECTRICAL SHEETS FOR ADDITIONAL DEMOLITION INFORMATION.
3. CONTRACTOR SHALL PROTECT EXISTING MONORAIL AND MONORAIL SUPPORT SYSTEMS FROM DAMAGE.
4. CONTRACTOR MEANS & METHODS FOR LIFT STATION BY-PASS, AND COORDINATION WITH DOWNSTREAM SCREENING/GRIT CONSTRUCTION, SHALL BE SUBMITTED FOR APPROVAL PRIOR TO CONSTRUCTION.

0 6' 12'

LEGEND

ITEMS TO BE DEMOLISHED



LIFT STATION ABOVE GROUND SECTION B-B

NOTES BY SYMBOL (X)	
5.	CHK'D PLATE & CURB ANGLE TO BE RESIZED
6.	DEMO 2" SIPHON BREAK & SUPPORTS
8.	DEMO CONCRETE PIPE SUPPORT & PIPE STRAP
9.	HANDRAIL TO REMAIN
16.	DEMO PUMP DISCHARGE PIPING
17.	MONORAIL COLUMN TO REMAIN, SEE NOTE 3
35.	EXHAUST FAN, MOTOR & EXHAUST DUCT
36.	18" SS EXHAUST BLOWER INTAKE DUCT TO REMAIN

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

DEMOLITION

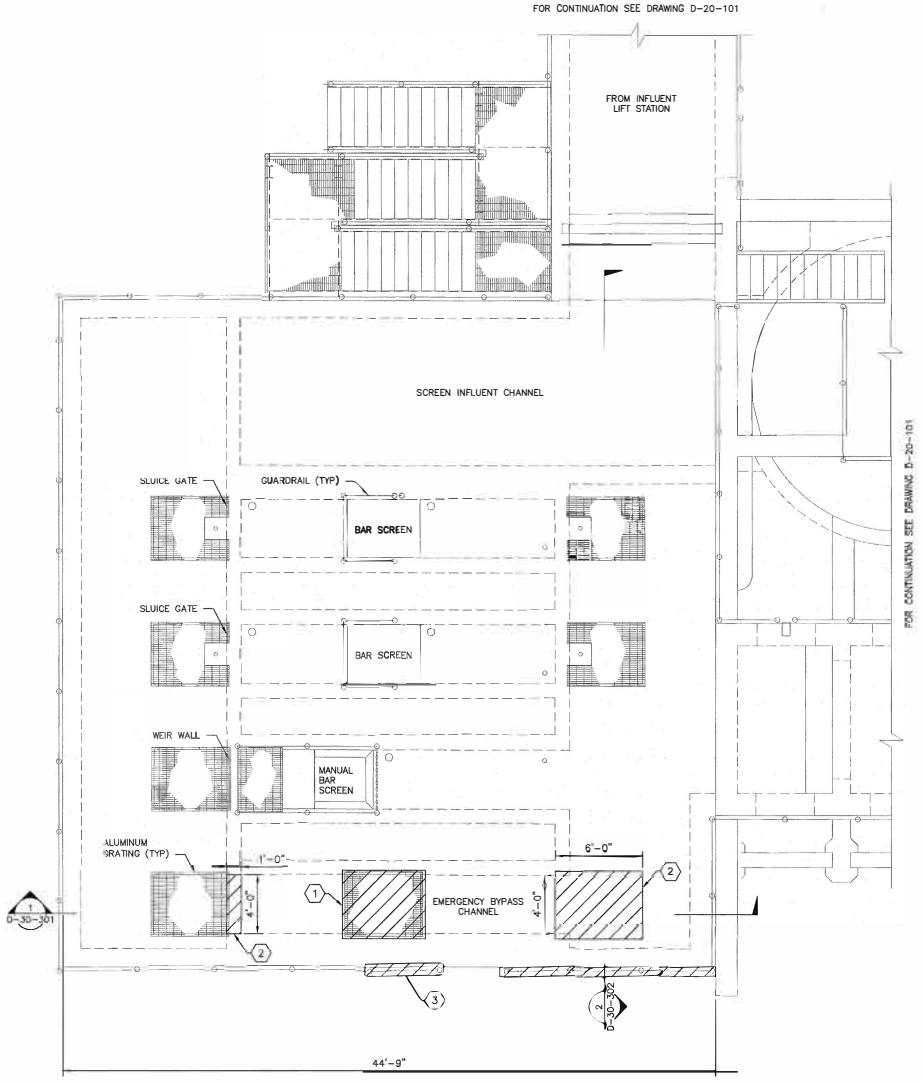
INFLUENT LIFT STATION DEMOITION SECTION 2 OF 2

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
1"=6'	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 32 OF 379	

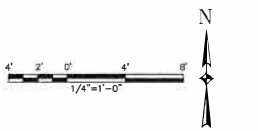
STATE OF TEXAS
80367
REGISTERED
XIAOHUA LIN
PROFESSIONAL ENGINEER

D-20-302

GUNDA CORPORATION
K:\2020 projects\20010-02 b&v ion exchg improvements\CAD\SHEETS\003 DEMO - with GUNDA BASE.dwg Nov 11, 2022 - 3:27pm MEason



HEADWORKS SCREENING DEMOLITION TOP PLAN
1/4" = 1'-0"



LEGEND

ITEMS TO BE DEMOLISHED

DEMOLITION NOTES:

1. CONTRACTOR TO VERIFY EXISTING CONDITIONS AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION OR ORDERING MATERIALS AND COORDINATE WITH THE PLANT OR ANY EXISTING PROCESS/MECHANICAL AND/OR ELECTRICAL ITEMS AFFECTED BY THE WORK.
2. DEMOLITION LIMITS SHOWN ARE APPROXIMATE AND MAY NEED TO BE ADJUSTED BASED ON FIELD CONDITIONS.
3. PERFORM DEMOLITION IN ACCORDANCE WITH ALL DIVISION 2 SPECIFICATION REQUIREMENTS INITIATE DEMOLITION LIMITS WITH A SAW CUT.
4. COORDINATE DEMOLITION WITH HEADWORKS SCREENING RECONSTRUCTION PLANS.

NOTES BY SYMBOL (#)

1. DEMOLISH ALUMINUM GRATING, EMBEDDED ANGLE, AND CONCRETE SLAB AS NEEDED TO INSTALL NEW BAR SCREEN EQUIPMENT.
2. DEMOLISH CONCRETE SLAB.
3. DEMOLISH ALUM GUARDRAIL.

GENERAL NOTES:

1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND EXISTING CONDITIONS AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION OR ORDERING MATERIALS.
2. REFER TO CIVIL, MECHANICAL, AND ELECTRICAL DRAWINGS FOR INFORMATION NOT SHOWN.

CP&Y, INC.
TEXAS REGISTERED ENGINEERING FIRM F-1741

BLACK & VEATCH

CP&Y, INC.
11757 KATY FREEWAY
SUITE 1540
HOUSTON, TX 77079
(713) 532-1730
TX FIRM NUMBER F-1741

SURVEYED BY:
FB NO. 000000

STATE OF TEXAS
JEFFREY P. WOUTERS
80701
REGISTERED PROFESSIONAL ENGINEER
11-07-2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

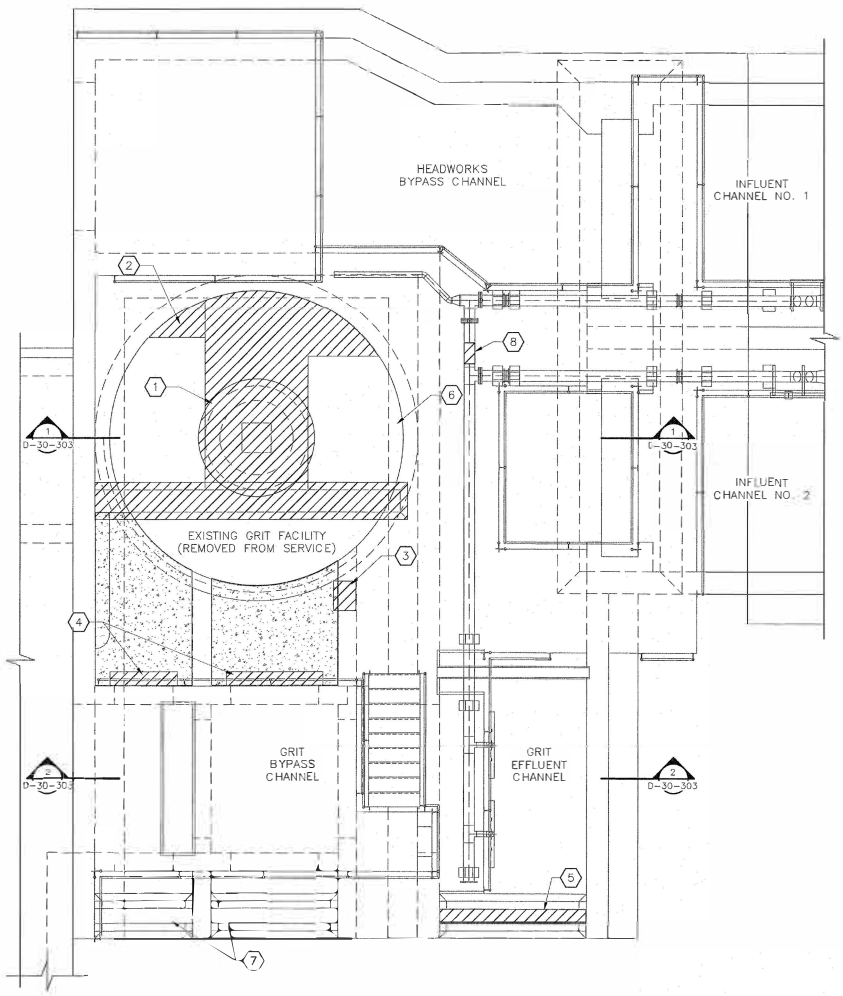
HEADWORKS SCREENING DEMOLITION TOP PLAN

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 33 OF 379	

PROFESSIONAL ENGINEER 80367 STATE OF TEXAS

D-30-101

FILE PATH: C:\pw_working\pw_americas\d1366538\D-30-101.dwg



GRIT BASIN DEMOLITION PLAN
1/4" = 1'-0"

1/4" = 1'-0"

N

LEGEND

ITEMS TO BE DEMOLISHED

NOTES BY SYMBOL ⟨#⟩

1. DEMOLISH MECHANICAL EQUIPMENT AND APPURTENANCES IN THE GRIT BASIN.
2. DEMOLISH CONCRETE BEAM AND SLAB. SLAB SHALL BE CUT NEARLY FLUSH (WITHIN 6-INCHES) OF CIRCULAR WALL WITH SEGMENTED CUTS. BEAM SHALL BE CUT FLUSH WITH TOP SLAB AND WALL AND GROUND SMOOTH WHERE SURFACE WILL REMAIN EXPOSED AFTER FINAL CONSTRUCTION.
3. PLUG AND ABANDON IN PLACE NONPOTABLE WATER HOSE BIB.
4. DEMOLISH SLUICE GATE.
5. DEMOLISH WALL SECTION. REFER TO STRUCTURAL DWGS.
6. DEMOLISH GUARDRAIL WHERE FALL PROTECTION WILL NOT BE REQUIRED DUE TO NEW CONSTRUCTION. GUARDRAIL TO BE MODIFIED SO ALL HORIZONTAL RAILS END WITH EITHER A NEW RETURN/EXTENSION OR A POST AND NO CUT ENDS OR SHARP EDGES REMAIN. GUARDRAIL SHALL RETURN/EXTENSION SHALL HAVE A MAXIMUM LENGTH OF 12-INCHES AND ALL GUARDRAIL SHALL BE MODIFIED TO MEET STANDARD DETAILS REQUIREMENTS.
7. CONSTRUCT NEW CLOSURE WALL/SLAB AND SEAL OPENING. REFER TO STRUCTURAL DWGS.
8. REMOVE SECTION OF EXISTING 8" SS PIPE AND REPLACE WITH 8"X8"X6" TEE. REFER TO M-30-101.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-8182

STATE OF TEXAS
JUSTIN R. BANDT
116988
LICENSED
PROFESSIONAL ENGINEER
11/11/22

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

DEMOLITION

HEADWORKS GRIT BASIN DEMOLITION PLAN

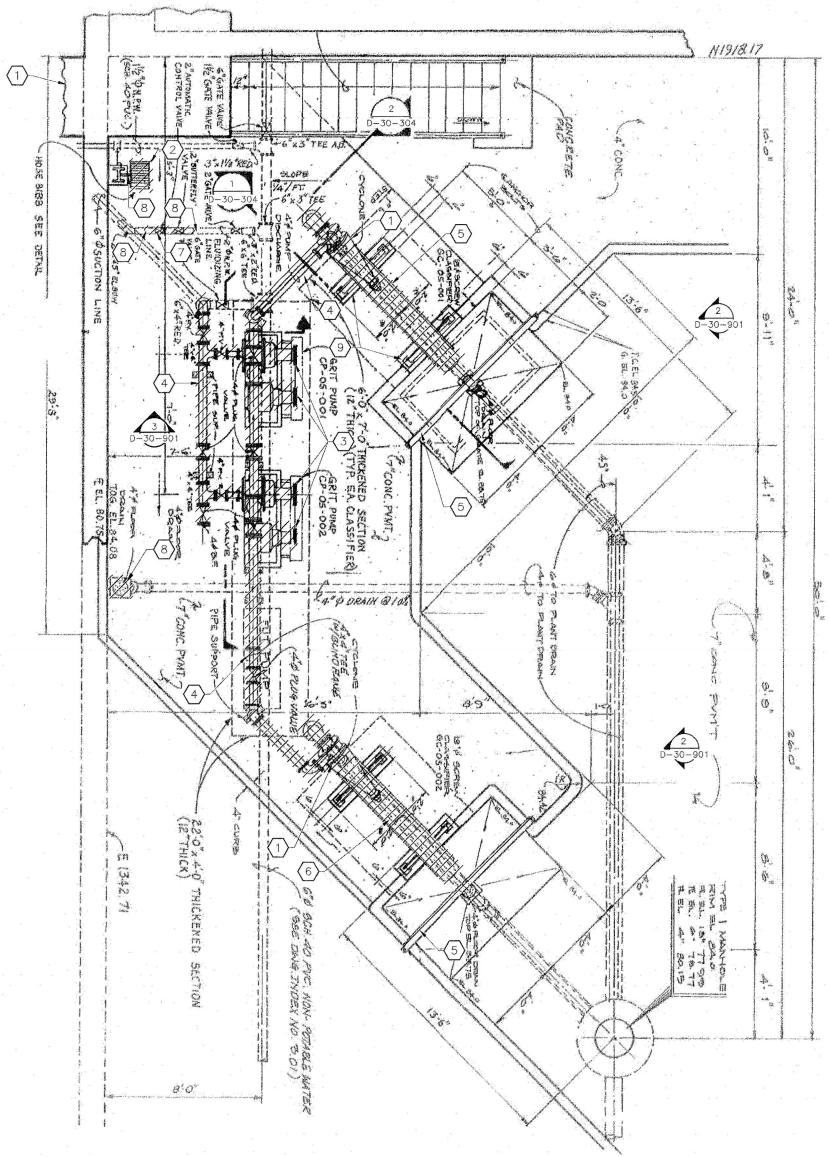
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 34 OF 379	

FOR CITY OF HOUSTON USE ONLY

80367
REGISTERED
PROFESSIONAL ENGINEER
HOUSTON, TEXAS

D-30-102

FILE PATH: BIM 360://4001500 - COH Intercontinental Airport WWTF Improvements/4001500-COH IA WWTF-Byrd



HEADWORKS GRIT CLASSIFIERS DEMOLITION PLAN

NO SCALE

N

LEGEND

ITEMS TO BE DEMOLISHED

NOTES BY SYMBOL (#)

1. DEMOLISH CYCLONE.
2. DEMOLISH HOSE BIB.
3. DEMOLISH GRIT PUMP, CONTROLS AND APPURTENANCES.
4. DEMOLISH GRIT PIPING, PIPE SUPPORT AND APPURTENANCES.
5. DEMOLISH OVERHEAD GUARD.
6. DEMOLISH SCREW CLASSIFIER AND APPURTENANCES.
7. DEMOLISH NONPOTABLE WATER PIPE AND APPURTENANCES, ABOVE GROUND ONLY.
8. PLUG AND ABANDON BURIED PIPES
9. DEMOLISH CEMENT PIPE SUPPORTS AND EQUIPMENT BASES.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC
FB NO. P-6182

STATE OF TEXAS
JUSTIN R. SANDT
119999
LICENSED
PROFESSIONAL ENGINEER
11/11/22

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

DEMOLITION

HEADWORKS GRIT CLASSIFIERS DEMOLITION PLAN

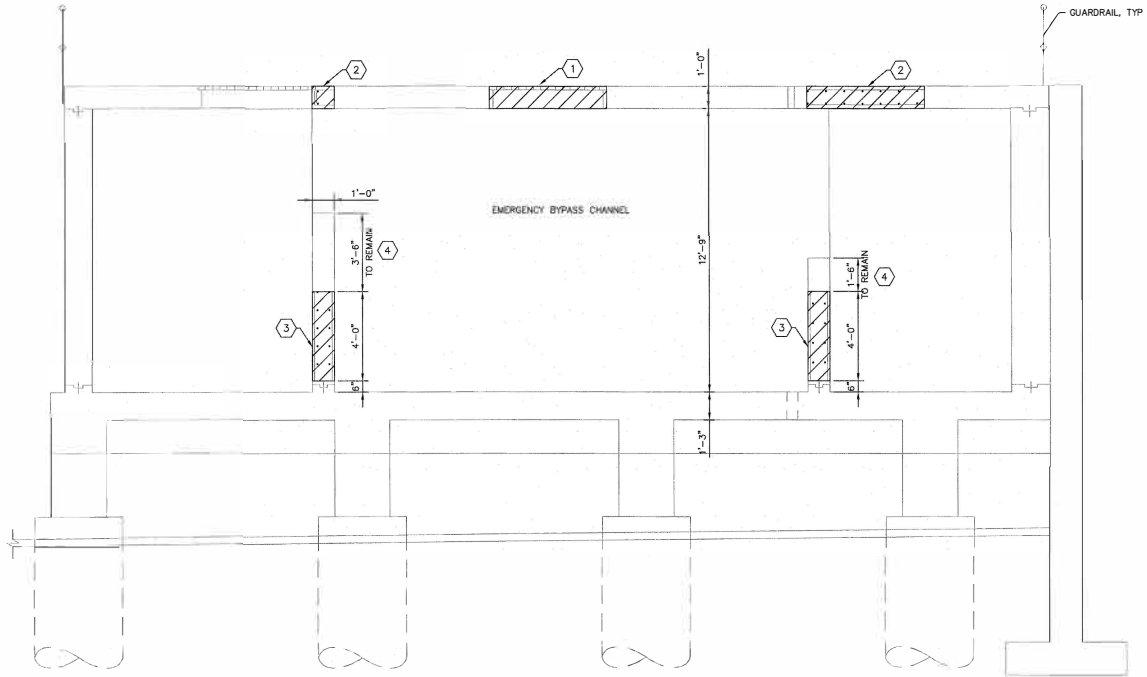
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 35 OF 379	

FOR CITY OF HOUSTON USE ONLY

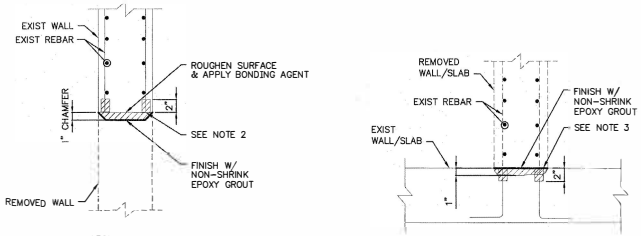
80367

D-30-103

FILE PATH: G:\PM 360\402500 - COH Intercontinental Airport WWTP Improvements\402500-COH IA WWTP-BV.rvt



1 SECTION
D-30-101 3/8" = 1'-0"



NOTES:

1. REMOVE EXIST CONCRETE AS SHOWN AND DRILL BACK EXIST REINFORCEMENT TO A DISTANCE OF 2". IF TRANSVERSE REINFORCEMENT IS PRESENT WITHIN THE 2" DISTANCE, STOP BEFORE THE TRANSVERSE REBAR.
2. GROUT HOLES, RECESSES, AND SURFACES AS SHOWN IN ACCORDANCE WITH THE SPECIFICATION.
3. GRIND SMOOTH ALL DEMOLISHED CONCRETE SURFACES THAT WILL REMAIN AND EXPOSED AFTER DEMOLITION.

A EXISTING WALL/SLAB REMOVAL GROUT PATCH
NTS

4' 2' 0' 4'
3/8"=1'-0"

LEGEND

ITEMS TO BE DEMOLISHED

DEMOLITION NOTES:

1. CONTRACTOR TO VERIFY EXISTING CONDITIONS AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION OR ORDERING MATERIALS AND COORDINATE WITH THE PLANT OR ANY EXISTING PROCESS/MECHANICAL AND/OR ELECTRICAL ITEMS AFFECTED BY THE WORK.
2. DEMOLITION LIMITS SHOWN ARE APPROXIMATE AND MAY NEED TO BE ADJUSTED BASED ON FIELD CONDITIONS.
3. PERFORM DEMOLITION IN ACCORDANCE WITH ALL DIVISION 2 SPECIFICATION REQUIREMENTS INITIATE DEMOLITION LIMITS WITH A SAW CUT.
4. COORDINATE DEMOLITION WITH HEADWORKS SCREENING RECONSTRUCTION PLANS.

NOTES BY SYMBOL (3)

1. DEMOLISH ALUMINUM GRATING, EMBEDDED ANGLE, AND CONCRETE SLAB AS NEEDED TO INSTALL NEW BAR SCREEN EQUIPMENT.
2. DEMOLISH CONCRETE SLAB.
3. DEMOLISH CONCRETE WALL. COORDINATE OPENING WITH MECHANICAL DRAWINGS.
4. ALTERNATELY, CONTRACTOR MAY DEMOLISH AND RECONSTRUCT INTERIOR WEIR WALLS ENTIRELY AT NO ADDITIONAL COST TO THE OWNER.

CP&Y, INC.
TEXAS REGISTERED ENGINEERING FIRM F-1741

BLACK & VEATCH

CP&Y, INC.
11757 KATY FREEWAY
SUITE 1540
HOUSTON, TX 77079
(713) 532-1730
TX FIRM NUMBER F-1741

SURVEYED BY:
FB NO. 000000

STATE OF TEXAS
JEFFREY P. WOUTERS
80701
REGISTERED PROFESSIONAL ENGINEER
11-07-2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

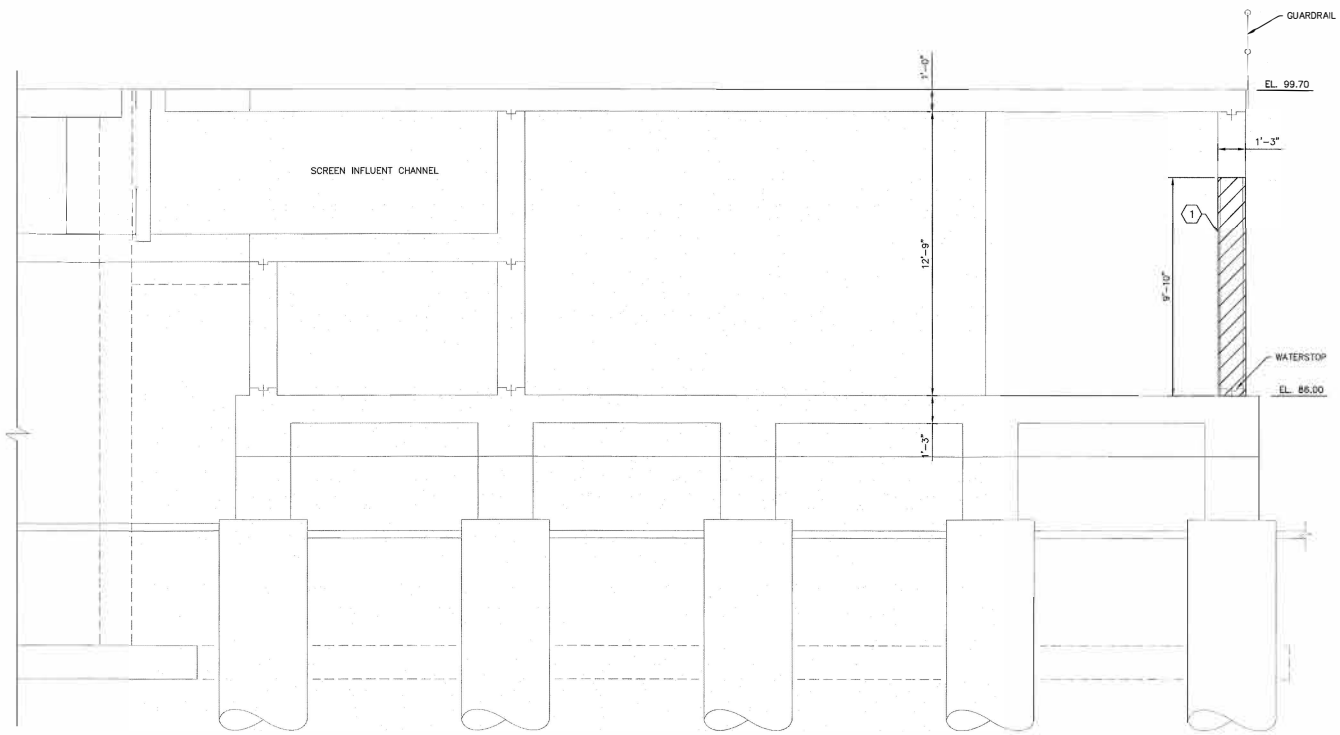
HEADWORKS SCREENING DEMOLITION SECTION 1 OF 2

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 36 OF 378	

JEFFREY P. WOUTERS 80367 REGISTERED PROFESSIONAL ENGINEER

D-30-301

FILE PATH: C:\pw_working\bvw_americas\d13666381\D-30-301.dwg



2 SECTION
D-30-101 3/8" = 1'-0"

4' 2' 0' 4'
3/8"=1'-0"

LEGEND:
ITEMS TO BE DEMOLISHED

DEMOLITION NOTES:

1. CONTRACTOR TO VERIFY EXISTING CONDITIONS AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION OR ORDERING MATERIALS AND COORDINATE WITH THE PLANT OR ANY EXISTING PROCESS/MECHANICAL AND/OR ELECTRICAL ITEMS AFFECTED BY THE WORK.
2. DEMOLITION LIMITS SHOWN ARE APPROXIMATE AND MAY NEED TO BE ADJUSTED BASED ON FIELD CONDITIONS.
3. PERFORM DEMOLITION IN ACCORDANCE WITH ALL DIVISION 2 SPECIFICATION REQUIREMENTS INITIATE DEMOLITION LIMITS WITH A SAW CUT.
4. COORDINATE DEMOLITION WITH HEADWORKS SCREENING RECONSTRUCTION PLANS.

NOTES BY SYMBOL (1)

1. DEMOLISH CONCRETE WALL. COORDINATE OPENING WITH MECHANICAL DRAWINGS.

CP&Y, INC.
TEXAS REGISTERED ENGINEERING FIRM F-1741

BLACK & VEATCH

CP&Y, INC.
11757 KATY FREEWAY
SUITE 1540
HOUSTON, TX 77079
(713) 532-1730
TX FIRM NUMBER F-1741

SURVEYED BY:
FB NO. 000000

STATE OF TEXAS
JEFFREY P. WOUTERS
80701
REGISTERED PROFESSIONAL ENGINEER
11-07-2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

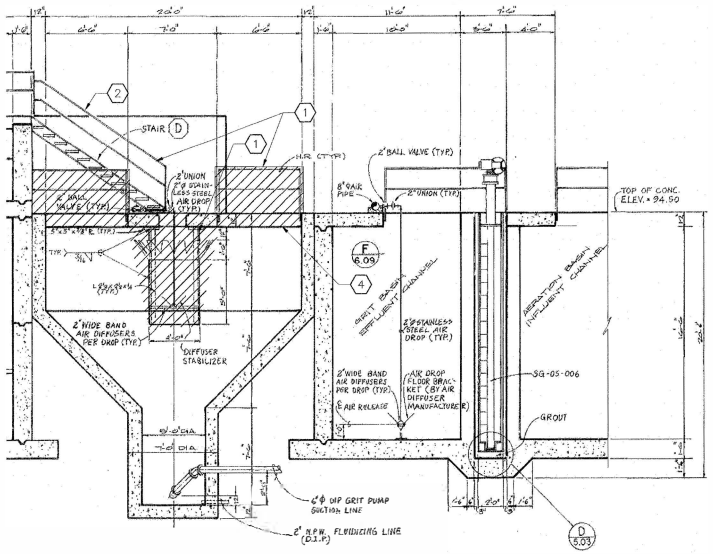
HEADWORKS
SCREENING DEMOLITION
SECTION 2 OF 2

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 37 OF 379	

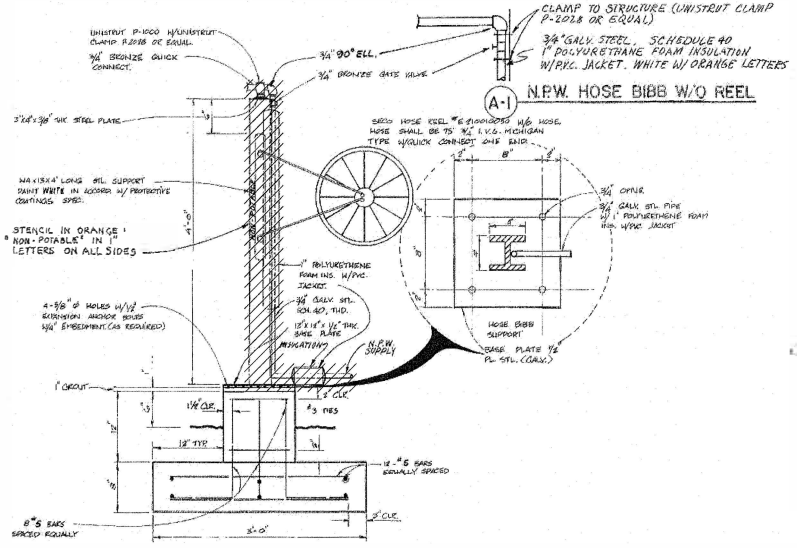
80367

D-30-302

FILE PATH: C:\pw_working\pw_americas\d13566367\D-30-302.dwg

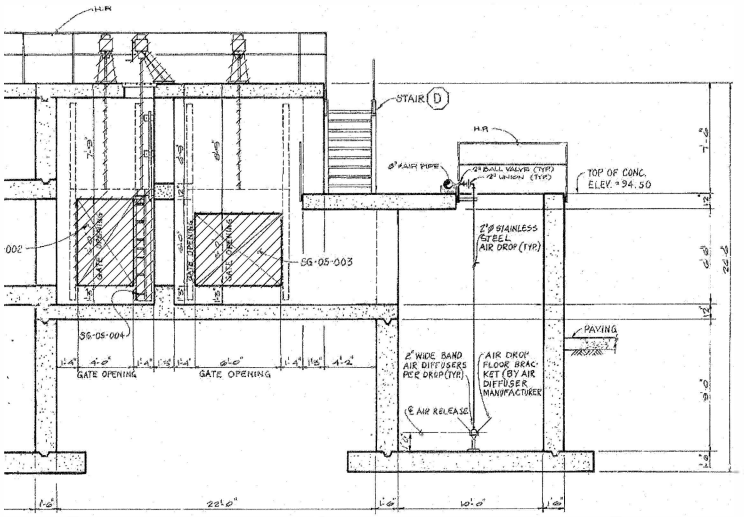


1 SECTION
D-30-103 NO SCALE



NON-POTABLE WATER HOSE BIBB

A DETAIL
D-30-103 NO SCALE



2 SECTION
D-30-103 NO SCALE

LEGEND

ITEMS TO BE DEMOLISHED

NOTES BY SYMBOL (#)

1. DEMOLISH MECHANICAL EQUIPMENT AND APPURTENANCES IN THE GRIT BASIN.
2. STAIR WAS PREVIOUSLY DEMOLISHED BUT IS STILL SHOWN ON EXISTING DRAWINGS.
3. PLUG AND ABANDON IN PLACE NONPOTABLE WATER HOSE BIB.
4. DEMOLISH CONCRETE BEAM AND SLAB.
5. DEMOLISH GUARDRAIL WHERE FALL PROTECTION WILL NOT BE REQUIRED DUE TO NEW CONSTRUCTION.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JUSTIN R. SANDT
119998
LICENSED
PROFESSIONAL ENGINEER
11/1/22

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

DEMOLITION

HEADWORKS GRIT BASIN DEMOLITION SECTIONS

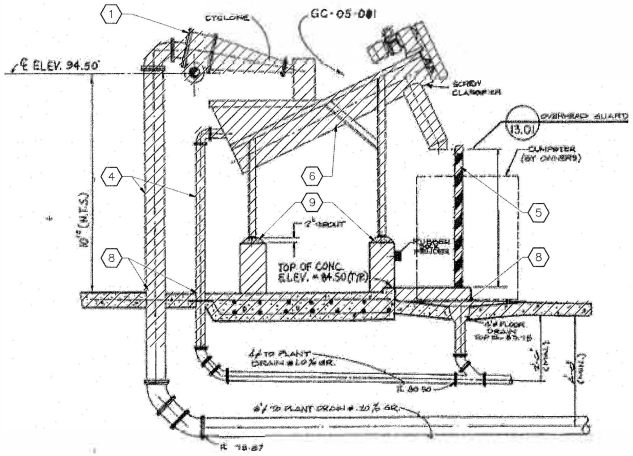
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 38 OF 379	

FOR CITY OF HOUSTON USE ONLY

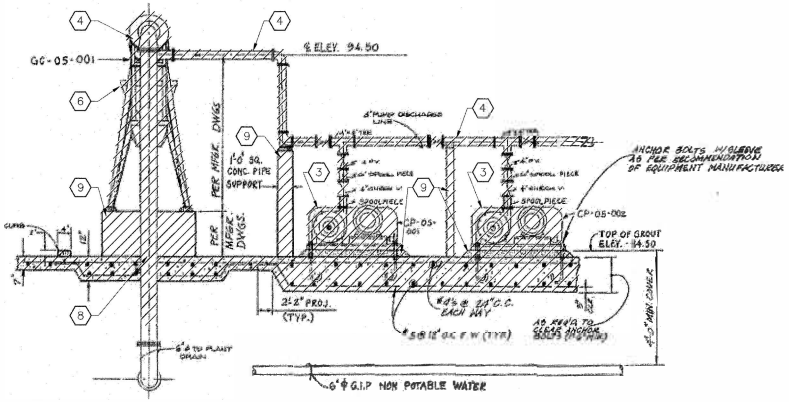
PUBLIC WORKS AND ENGINEERING
ACCEPTED NOTED
80387
APPROVED

D-30-303

FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-COH IA WWTP-BV.rvt



1 SECTION
D-30-104 NO SCALE



2 SECTION
M-30-104 NO SCALE

LEGEND

ITEMS TO BE DEMOLISHED

NOTES BY SYMBOL ⟨#⟩

1. DEMOLISH CYCLONE.
2. DEMOLISH HOSE BIB.
3. DEMOLISH GRIT PUMP, CONTROLS AND APPURTENANCES.
4. DEMOLISH GRIT PIPING, PIPE SUPPORT AND APPURTENANCES.
5. DEMOLISH OVERHEAD GUARD.
6. DEMOLISH SCREW CLASSIFIER AND APPURTENANCES.
7. DEMOLISH NONPOTABLE WATER PIPE AND APPURTENANCES; ABOVE GROUND ONLY.
8. PLUG AND ABANDON BURIED PIPES
9. DEMOLISH CEMENT PIPE SUPPORTS AND EQUIPMENT BASES.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JUSTIN R. SANDT
116986
LICENSED PROFESSIONAL ENGINEER
11/11/22

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
DEMOLITION

HEADWORKS GRIT CLASSIFIER DEMOLITION SECTIONS

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 39 OF 379	

FOR CITY OF HOUSTON USE ONLY

ACCEPTED JOINTLY
80367
CITY ENGINEER
HOUSTON, TEXAS

D-30-304

FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-COH IA WWTP-BIM.rvt



PHOTO
D-30-104 NO SCALE

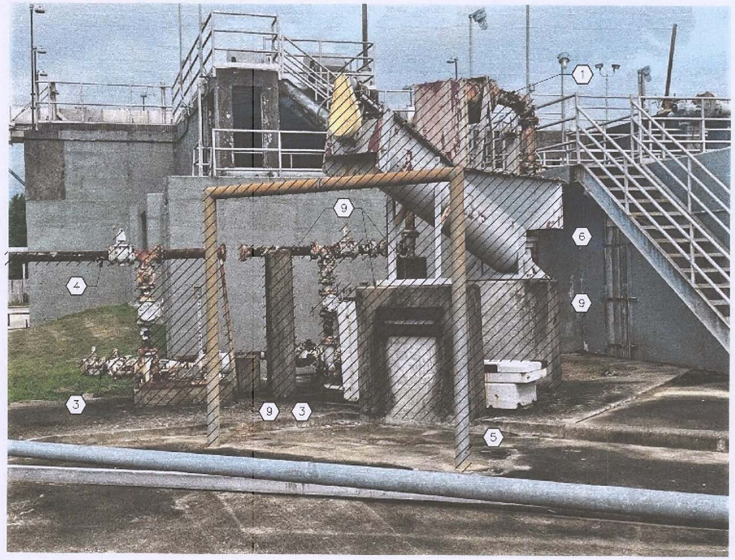


PHOTO
D-30-104 NO SCALE

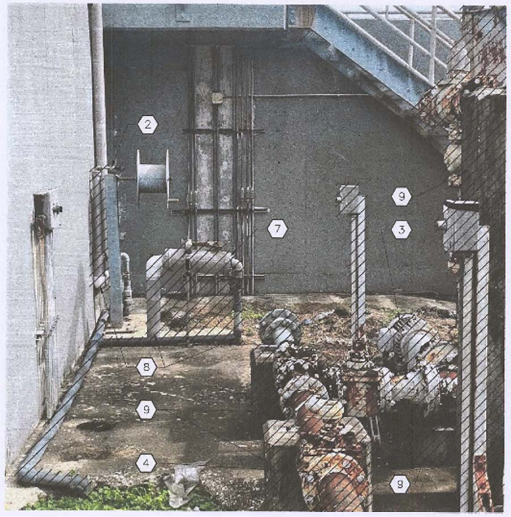


PHOTO
D-30-104 NO SCALE

LEGEND

ITEMS TO BE DEMOLISHED

NOTES BY SYMBOL (#)

1. DEMOLISH CYCLONE.
2. DEMOLISH HOSE B.B.
3. DEMOLISH GRIT PUMP, CONTROLS AND APPURTENANCES.
4. DEMOLISH GRIT PIPING, PIPE SUPPORT AND APPURTENANCES.
5. DEMOLISH OVERHEAD GUARD.
6. DEMOLISH SCREW CLASSIFIER AND APPURTENANCES.
7. DEMOLISH NONPOTABLE WATER PIPE AND APPURTENANCES; ABOVE GROUND ONLY.
8. PLUG AND ABANDON BURIED PIPES.
9. DEMOLISH CEMENT PIPE SUPPORTS AND EQUIPMENT BASES.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1130
TX FIRM NUMBER 266

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-9182

STATE OF TEXAS
JUSTIN R. SANDT
116068
LICENSED
PROFESSIONAL ENGINEER
11/11/22

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT
PLANT EXPANSION
DEMOLITION

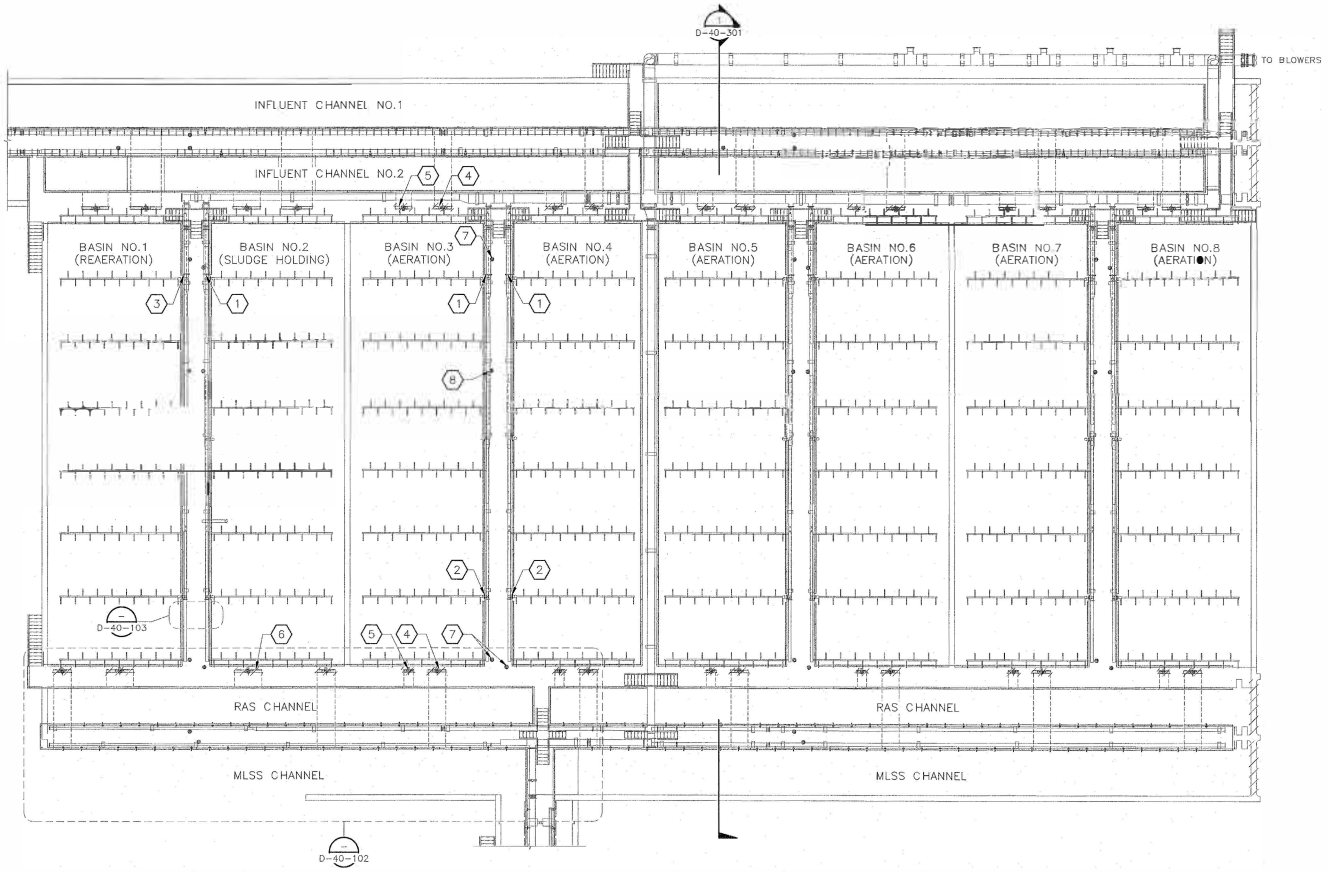
HEADWORKS GRIT CLASSIFIER
DEMOLITION PHOTOS

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SRADHUA (SHARI) LIN, P.E.	
SHEET NO. 40 OF 379	

80367

D-30-901

IAT-PSTH_BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-COH IA WWTP_2021.rvt



AERATION BASINS DEMOLITION PLAN
1/16" = 1'-0"

18' 12' 8' 4' 0' 16' 32'
1/16" = 1'-0"

N

LEGEND

ITEMS TO BE DEMOLISHED

GENERAL NOTES:

1. MODIFICATIONS TO BASIN NO. 4 (AERATION BASIN) FOR AIR PIPING ARE TYPICAL FOR BASINS NO. 6 & 8 (AERATION BASINS) AND MIRRORED IMAGES FOR BASINS NO. 3, 5, & 7 (AERATION BASINS).
2. DIFFUSER GRID MODIFICATIONS ARE NOT SHOWN. DIFFUSERS TO BE REPLACED AS NECESSARY.
3. REMOVAL OF INFLUENT SLUICE GATES ARE TYPICAL FOR BASINS NO. 3, 4, 5, AND 6.
4. REMOVAL OF 54"X54" AND 84"X84" EFFLUENT SLUICE GATES IN BASIN NO.1 ARE TYPICAL FOR NO. 2.
5. REMOVAL OF 48"X48" AND 54"X54" EFFLUENT SLUICE GATES IN BASIN NO. 3 ARE TYPICAL FOR BASINS NO. 4, 5, 6, 7, AND 8.
6. REMOVAL OF 6" AND 8" MUD VALVES ARE TYPICAL FOR BASINS NO. 3, 4, 5, AND 6

NOTES BY SYMBOL (#)

1. REMOVE EXISTING 14" MANUAL BUTTERFLY VALVE AND RELOCATE FURTHER NORTH AT LOCATION SHOWN ON DWG M-40-100, CLOSE TO THE TEE FITTING. PROVIDE A NEW FILL UP FLANGED SPOOL PIPE AS REQUIRED. PIPE MATERIAL AND WALL THICKNESS TO MATCH THE CONNECTING PIPE.
2. REMOVE EXISTING 8" MANUAL BUTTERFLY VALVE.
3. REMOVE EXISTING 14" MANUAL BUTTERFLY VALVE AND RELOCATE FURTHER NORTH AT LOCATION SHOWN ON DWG M-40-100, CLOSE TO THE TEE FITTING.
4. REMOVE EXISTING 54"X54" SLUICE GATE. REPLACE WITH NEW 54"X54" MOTOR ACTUATED SLUICE GATE.
5. REMOVE EXISTING 48"X48" SLUICE GATE. REPLACE WITH NEW 48"X48" MOTOR ACTUATED SLUICE GATE.
6. REMOVE EXISTING 84"X84" SLUICE GATE. REPLACE WITH NEW 84"X84" MOTOR ACTUATED SLUICE GATE.
7. REMOVE EXISTING 6" MUD VALVE.
8. REMOVE EXISTING 8" MUD VALVE.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

STATE OF TEXAS
JUSTIN R. SANDT
116988
LICENSED
PROFESSIONAL ENGINEER
11/11/22

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
DEMOLITION
AERATION BASINS DEMOLITION PLAN

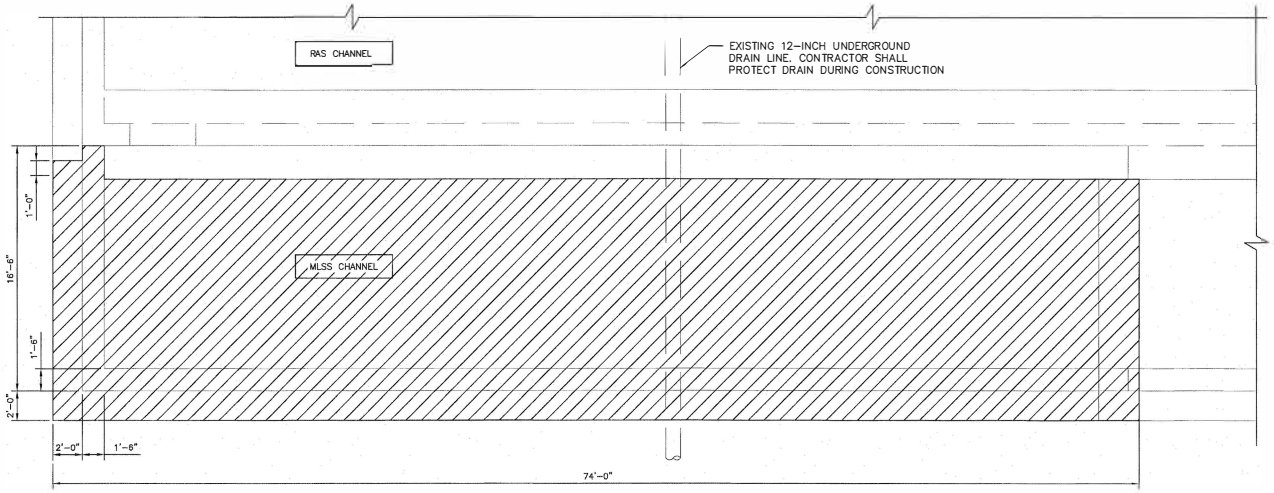
WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 41 OF 379	

FOR CITY OF HOUSTON USE ONLY

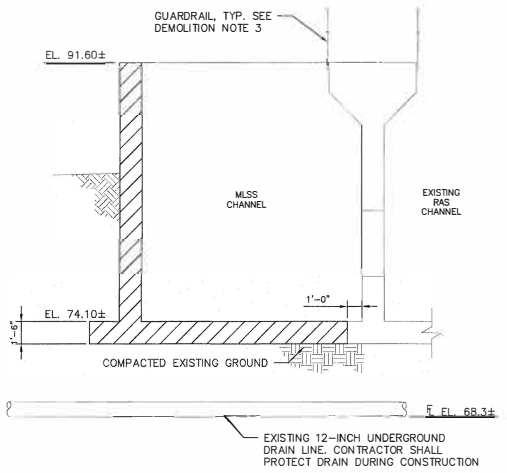
CITY OF HOUSTON
PUBLIC WORKS AND ENGINEERING
REGISTERED
80367
ENGINEER
HOUSTON, TEXAS

D-40-101

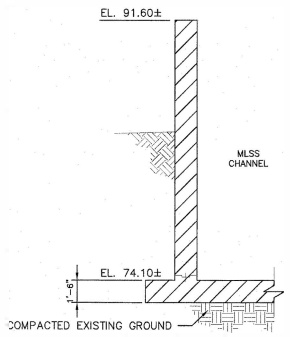
FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-COH IA WWTP-BV.rvt



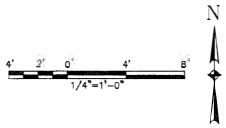
MLSS CHANNEL DEMOLITION PLAN
1/4" = 1'-0"



1 WALL ELEVATION
1/4"=1'-0"



2 WALL ELEVATION
1/4"=1'-0"



LEGEND

ITEMS TO BE DEMOLISHED

DEMOLITION NOTES:

1. CONTRACTOR TO VERIFY EXISTING CONDITIONS AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION OR ORDERING MATERIALS AND COORDINATE WITH THE PLANT ON ANY EXISTING PROCESS/MECHANICAL AND/OR ELECTRICAL ITEMS AFFECTED BY THE WORK
2. DEMOLITION LIMITS SHOWN ARE APPROXIMATE AND MAY NEED TO BE ADJUSTED BASED ON FIELD CONDITIONS.
3. TEMPORARILY REMOVE EXISTING GUARDRAIL AS REQUIRED AND REINSTALL WHEN THE WORK IS COMPLETE.
4. PERFORM DEMOLITION IN ACCORDANCE WITH ALL DIVISION 2 SPECIFICATION REQUIREMENTS INITIATE DEMOLITION LIMITS WITH A SAW CUT.
5. COORDINATE DEMOLITION WITH MLSS CHANNEL RECONSTRUCTION PLANS.

GENERAL NOTES:

1. CONTRACTOR TO VERIFY EXISTING CONDITIONS AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION OR ORDERING MATERIALS.
2. COORDINATE INFORMATION ON THIS DRAWING WITH MECHANICAL AND ELECTRICAL DRAWINGS, SEE THESE DRAWINGS FOR INFORMATION NOT SHOWN.
3. SEE STRUCTURAL GENERAL NOTES, STANDARD DETAIL AND SPECIFICATIONS FOR INFORMATION NOT SHOWN.

CP&Y, INC.
TEXAS REGISTERED ENGINEERING FIRM F-1741

BLACK & VEATCH

CP&Y, INC.
11757 KATY FREEWAY
SUITE 1540
HOUSTON, TX 77079
(713) 532-1730
TX FIRM NUMBER F-1741

SURVEYED BY:
FB NO. 000000

STATE OF TEXAS
JEFFREY P. WOUTERS
80701
REGISTERED
PROFESSIONAL ENGINEER
11-07-2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

DEMOLITION

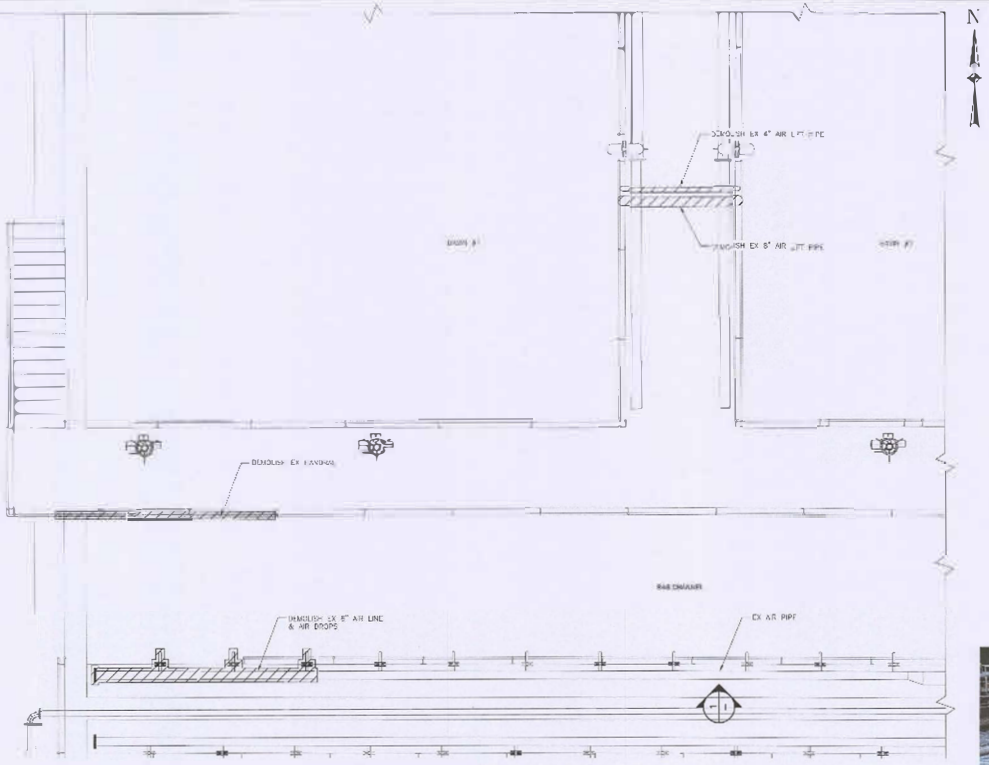
MLSS CHANNEL DEMOLITION PLAN AND ELEVATION

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 42 OF 379	

80367

D-40-102

FILE PATH: C:\pw_working\pw_cmerrick\d1366638\D-40-102.dwg



WAS PUMP – DEMOLITION PLAN
NO TO SCALE

ITEMS TO BE DEMOLISHED

SHEET NOTES:

1. EXISTING STRUCTURES, EQUIPMENT, ELEVATIONS, AND DETAILS SHOWN ARE NOT GUARANTEED TO BE ACCURATE AND ALL INCLUSIVE. EXISTING INFORMATION SHOWN IS APPROXIMATE, BASED ON AVAILABLE RECORD DRAWINGS, AND SHOULD BE VERIFIED BY CONTRACTOR PRIOR TO START OF CONSTRUCTION.
2. CONTRACTOR SHALL VERIFY EXACT LOCATIONS, ROUTING, AND DEPTH OF ALL ON-SITE EXISTING UTILITIES BEFORE COMMENCEMENT OF CONSTRUCTION ACTIVITIES. NOTIFY CONSTRUCTION MANAGER IF SIGNIFICANT DISCREPANCIES ARE DISCOVERED FROM ITEMS SHOWN IN DRAWINGS.
3. CONCRETE DAMAGED DURING DEMOLITION OR UNFINISHED CONCRETE EXPOSED DUE TO DEMOLITION SHALL BE REPAIRED AND REHABILITATED, INCIDENTAL TO THE WORK.
4. CONTRACTOR SHALL CERTIFY THAT EQUIPMENT DESIGNATED FOR DEMOLITION IS SAFELY DISCONNECTED AND LOCKED OUT OF ALL SERVICES AND UTILITIES PRIOR TO COMMENCING THAT WORK.
5. EXISTING EQUIPMENT SHOWN MAY BE MISSING, NOT AS SHOWN, OR NOT FUNCTIONAL AT THE TIME OF CONSTRUCTION. CONTRACTOR SHALL VERIFY FIELD CONDITIONS AT THE START OF CONSTRUCTION AND IMMEDIATELY NOTIFY THE OWNER OF ANY VARIATIONS THAT AFFECT THE PROPOSED WORK.
6. CONTRACTOR SHALL NOT PROCEED WITH DEMOLITION WORK UNTIL AUTHORIZED BY WASTEWATER OPERATIONS.
7. CONTRACTOR IS RESPONSIBLE FOR PROVIDING SAFE WORKING CONDITION FOR EMPLOYEES DURING DEMOLITION AND REMOVAL WORK.
8. CONTRACTOR SHALL MAINTAIN SAFE ACCESS TO ADJACENT BUILDINGS. DO NOT OBSTRUCT ROADWAYS, SIDEWALKS, OR PASSAGEWAYS ADJACENT TO THE WORK.
9. CONTRACTOR SHALL PERFORM DEMOLITION WORK IN A MANNER TO PREVENT DAMAGE TO ADJACENT FACILITIES.
10. REMOVAL OF PIPING, WIRING, CONDUITS, DUCTWORK, AND OTHER MISCELLANEOUS ITEMS RELATED TO DEMOLITION OF PUMPS SHALL BE INCIDENTAL TO THE DEMOLITION WORK UNLESS OTHERWISE SPECIFIED IN DRAWINGS AND CONTRACT DOCUMENTS.
11. DO NOT BACKFILL WITH MATERIAL FROM DEMOLITION UNLESS APPROVED BY OWNER.
12. SEQUENCE OF WORK SHALL BE COORDINATED WITH OTHER CONSTRUCTION ACTIVITIES, INCLUDING CONSTRUCTION OF NEW DIGESTERS AND NEW WAS PUMP STATION.



1 PHOTO
NO SCALE

5engineering

BLACK & VEATCH

5ENGINEERING, LLC
11200 WESTHEIMER ROAD
SUITE 353
HOUSTON, TX 77042
(832) 800-3483
TX FIRM NUMBER F-13748

STATE OF TEXAL
TODD BATTEN
104895
LICENSED
PROFESSIONAL
ENGINEER
11/09/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

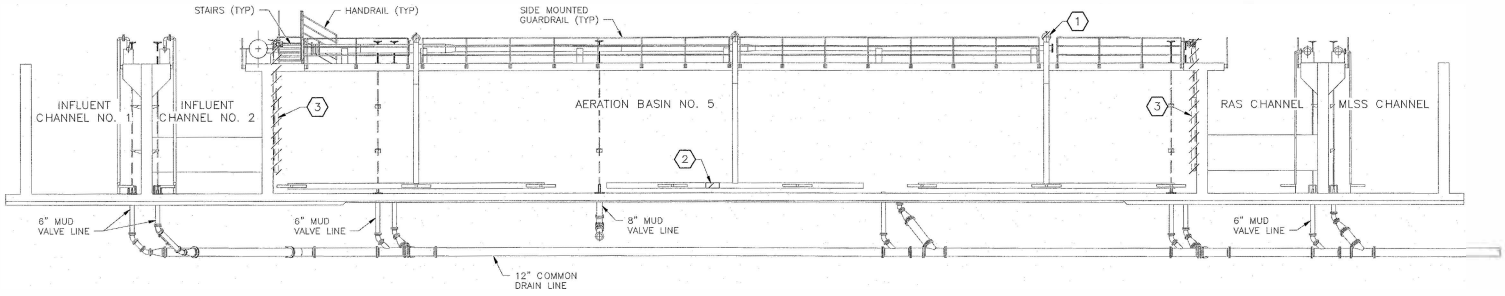
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
DEMOLITION
WAS – PUMPS
DEMOLITION PLAN

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 43 OF 379	

STATE OF TEXAS
80367
REGISTERED
PROFESSIONAL
ENGINEER

D-40-103

FILE PATH: I:\0092\001\04 Cadd-GIS\02 SHEETS\40 - WAS\D-40-103 WAS PUMPS - DEMOLITION PLAN.dwg



SECTION
D-40-101 1/8" = 1'-0"

8' 4' 0' 8' 16'
1/8" = 1'-0"

LEGEND

ITEMS TO BE DEMOLISHED

GENERAL NOTES:

1. MODIFICATIONS TO BASIN NO. 4 (AERATION BASIN) FOR AIR PIPING ARE TYPICAL FOR BASINS NO. 6 & 8 (AERATION BASINS) AND MIRRORED IMAGES FOR BASINS NO. 3, 5, & 7 (AERATION BASINS).
2. DIFFUSER GRID MODIFICATIONS ARE NOT SHOWN. DIFFUSERS TO BE REPLACED AS NECESSARY.

NOTES BY SYMBOL (#)

1. REMOVE EXISTING 8" MANUAL BUTTERFLY VALVE.
2. REMOVE PORTION OF PIPE AND CAP ENDS WITH BLIND FLANGE.
3. REMOVE EXISTING 54"X54" SLUICE GATE. REPLACE WITH NEW 54"X54" MOTOR ACTUATED SLUICE GATE.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JUSTIN R. SANDT
116998
LICENSED PROFESSIONAL ENGINEER
11/11/22

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

DEMOLITION

AERATION BASINS DEMOLITION SECTIONS

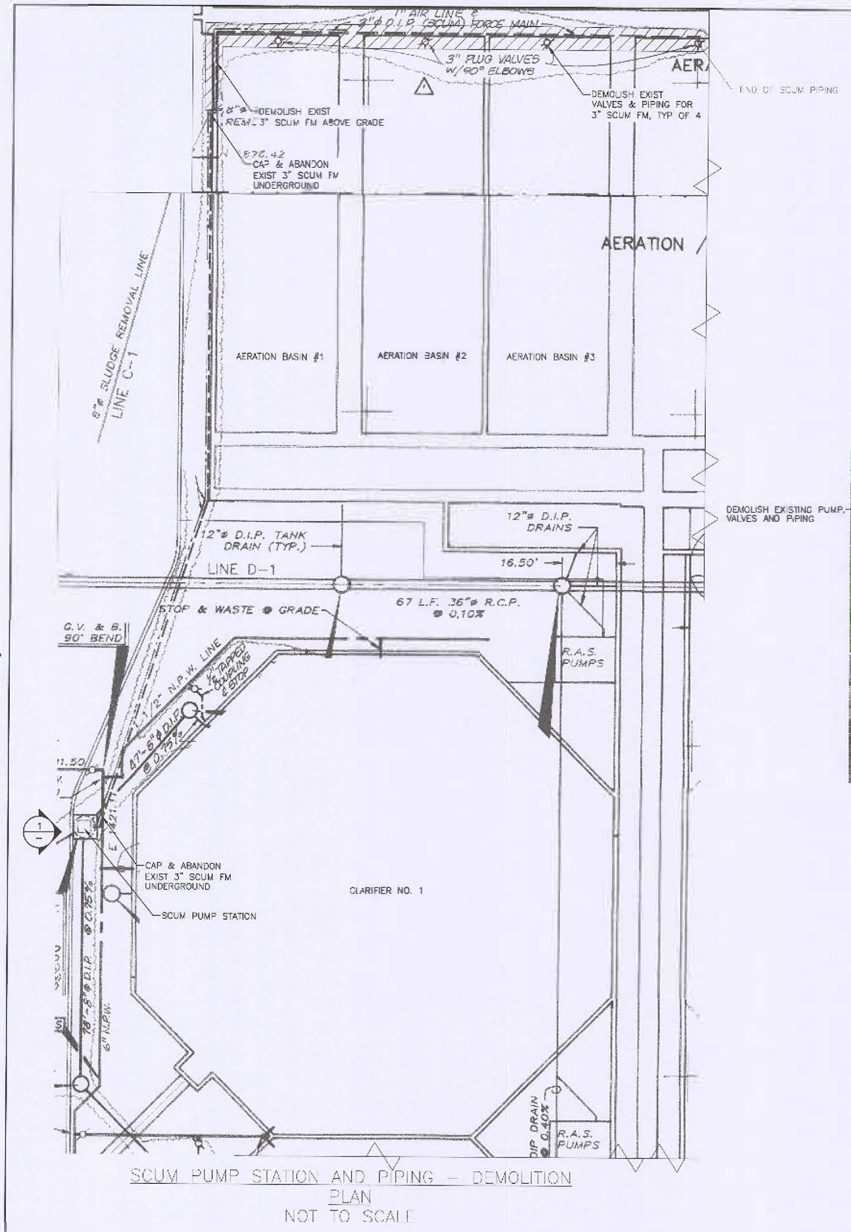
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 44 OF 379	

FOR CITY OF HOUSTON USE ONLY

PUBLIC WORKS ENGINEERING
JOSEPH JOSTLAR
80367
CITY OF HOUSTON, TEXAS

D-40-301

FILE PATH: BIM 360://402500 - CDH Intercontinental Airport WWTP Improvements/402500-CDH IA WWTP-Bry.rvt



SCUM PUMP STATION AND PIPING – DEMOLITION PLAN
NOT TO SCALE

DEMOLISH EXISTING PUMP, VALVES AND PIPING



1 PHOTO
NO SCALE

N

LEGEND

ITEMS TO BE DEMOLISHED

GENERAL NOTES:

1. EXISTING STRUCTURES, EQUIPMENT, ELEVATIONS, AND DETAILS SHOWN ARE NOT GUARANTEED TO BE ACCURATE AND ALL INCLUSIVE. EXISTING INFORMATION SHOWN IS APPROXIMATE, BASED ON AVAILABLE RECORD DRAWINGS, AND SHOULD BE VERIFIED BY CONTRACTOR PRIOR TO START OF CONSTRUCTION.
2. CONTRACTOR SHALL VERIFY EXACT LOCATIONS, ROUTING, AND DEPTH OF ALL ON-SITE EXISTING UTILITIES BEFORE COMMENCEMENT OF CONSTRUCTION ACTIVITIES. NOTIFY CONSTRUCTION MANAGER IF SIGNIFICANT DISCREPANCIES ARE DISCOVERED FROM ITEMS SHOWN IN DRAWINGS.
3. CONCRETE DAMAGED DURING DEMOLITION OR UNFINISHED CONCRETE EXPOSED DUE TO DEMOLITION SHALL BE REPAIRED AND REHABILITATED, INCIDENTAL TO THE WORK.
4. CONTRACTOR SHALL CERTIFY THAT EQUIPMENT DESIGNATED FOR DEMOLITION IS SAFELY DISCONNECTED AND LOCKED OUT OF ALL SERVICES AND UTILITIES PRIOR TO COMMENCING THAT WORK.
5. EXISTING EQUIPMENT SHOWN MAY BE MISSING, NOT AS SHOWN, OR NOT FUNCTIONAL AT THE TIME OF CONSTRUCTION. CONTRACTOR SHALL VERIFY FIELD CONDITIONS AT THE START OF CONSTRUCTION AND IMMEDIATELY NOTIFY THE OWNER OF ANY VARIATIONS THAT AFFECT THE PROPOSED WORK.
6. CONTRACTOR SHALL NOT PROCEED WITH DEMOLITION WORK UNTIL AUTHORIZED BY WASTEWATER OPERATIONS.
7. CONTRACTOR IS RESPONSIBLE FOR PROVIDING SAFE WORKING CONDITION FOR EMPLOYEES DURING DEMOLITION AND REMOVAL WORK.
8. CONTRACTOR SHALL MAINTAIN SAFE ACCESS TO ADJACENT BUILDINGS. DO NOT OBSTRUCT ROADWAYS, SIDEWALKS, OR PASSAGEWAYS ADJACENT TO THE WORK.
9. CONTRACTOR SHALL PERFORM DEMOLITION WORK IN A MANNER TO PREVENT DAMAGE TO ADJACENT FACILITIES.
10. REMOVAL OF PIPING, WIRING, CONDUITS, DUCTWORK, AND OTHER MISCELLANEOUS ITEMS RELATED TO DEMOLITION OF PUMPS SHALL BE INCIDENTAL TO THE DEMOLITION WORK UNLESS OTHERWISE SPECIFIED IN DRAWINGS AND CONTRACT DOCUMENTS.
11. DO NOT BACKFILL WITH MATERIAL FROM DEMOLITION UNLESS APPROVED BY OWNER.

5engineering

BLACK & VEATCH

5ENGINEERING, LLC
11200 WESTHEIMER ROAD
SUITE 353
HOUSTON, TX 77042
(832) 800-3483
TX FIRM NUMBER F-13748

STATE OF TEXAS
PEDRO BATTISTINI
104595
LICENSED PROFESSIONAL ENGINEER
11/09/2022

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

DEMOLITION

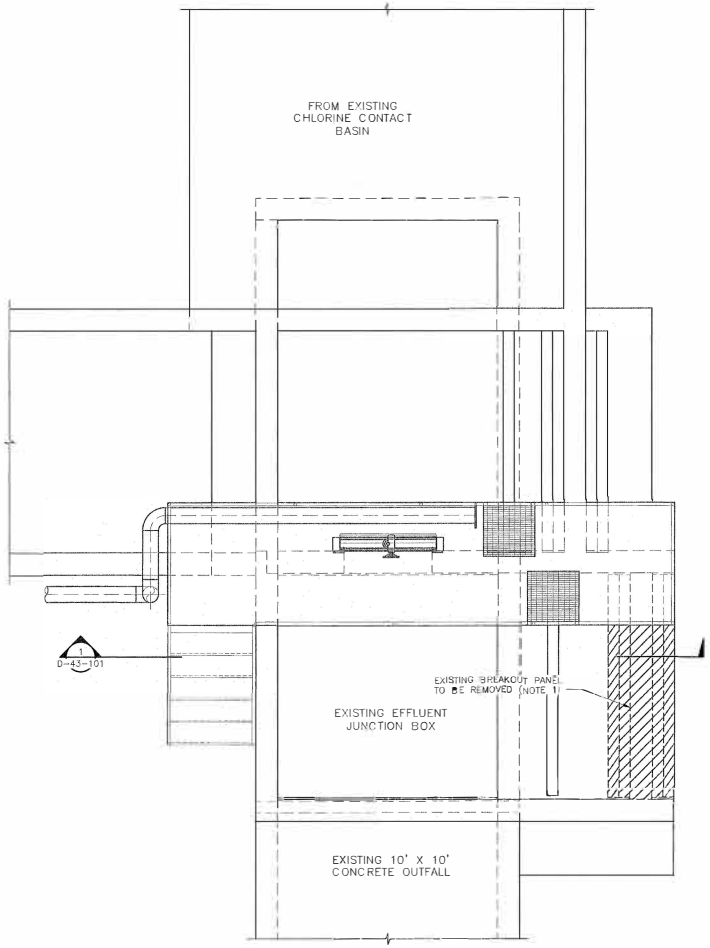
SCUM PUMP STATION DEMOLITION PLAN

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
Se XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 45 OF 379	

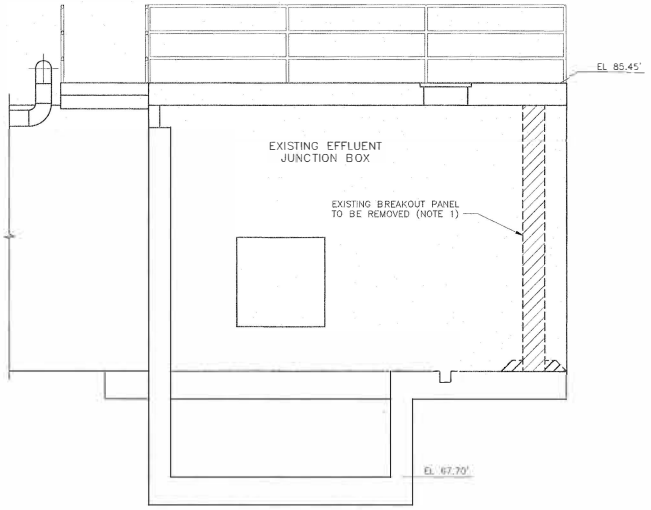
PUBLIC WORKS & ENGINEERING
80367
REGISTERED
ENGINEER

D-42-101

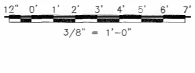
FILE PATH: P:\0092\001\04 Cadd-GIS\02 SHEETS\42 - SCUM SYSTEM\D-42-101 SCUM PUMP STATION DEMOLITION PLAN.dwg



TOP PLAN
3/8" = 1'-0"



1
D-43-101 SECTION 3/8" = 1'-0"



N

LEGEND

ITEMS TO BE DEMOLISHED

GENERAL NOTES:

1. CONTRACTOR SHALL COORDINATE WITH CITY OF HOUSTON OPERATION AND CONSTRUCTION MANAGER FOR THE CONSTRUCTION OF STEEL PLATE. REFER TO SPECIFICATION SECTION 01110 FOR THE CONSTRUCTION WORK SEQUENCY.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 900
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JUSTIN R. SANDT
116688
LICENSED
PROFESSIONAL ENGINEER
11/11/22

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

DEMOLITION

PLANT EFFLUENT JUNCTION BOX PLAN AND SECTION

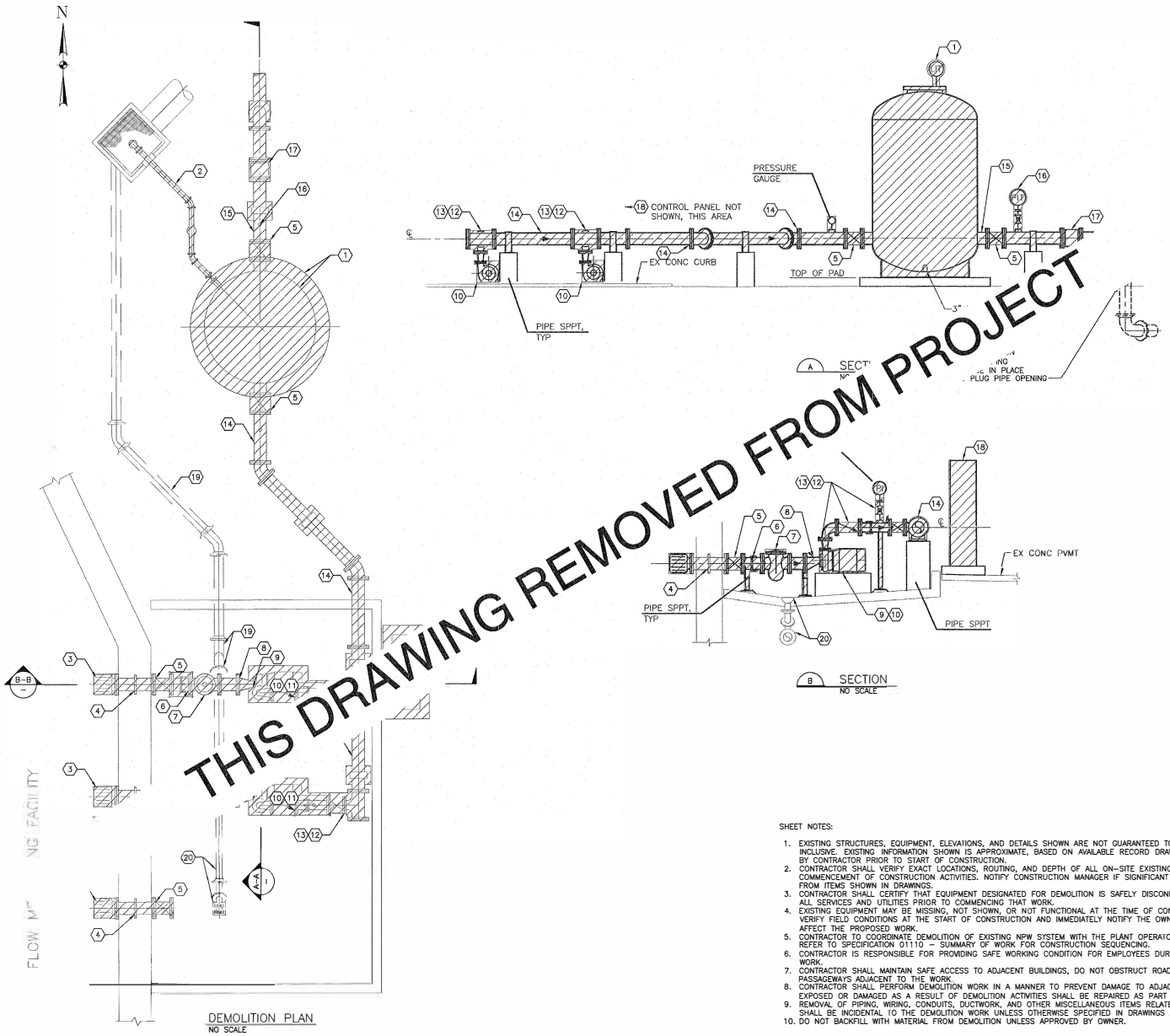
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 46 OF 379	

FOR CITY OF HOUSTON USE ONLY

PUBLIC WORKS AND ENGINEERING
80367
REGISTERED
ENGINEER

D-43-101

FILE PATH: BIM 360://432500 - COH Intercontinental Airport WWTP Improvements/432500-IJX-FACILITY.rvt



THIS DRAWING REMOVED FROM PROJECT

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

LEGEND:

ITEMS TO BE DEMOLISHED

NOTES BY SYMBOL (#)

1. DEMO HTP-12-001, 1,986 GAL HYDRO-PNEUMATIC TANK AND APPURTENANCES.
2. DEMO 3" TANK DRAIN LINE & APPURTENANCES.
3. DEMO 8" SUCTION STRAINER.
4. PROVIDE BLIND FLANGES AT ENDS OF FLANGED WALL PIPE AFTER APPURTENANCES ARE REMOVED.
5. DEMO 8" GATE VALVE.
6. DEMO 8" FLANGED COUPLING ADAPTER.
7. DEMO 8" BASKET STRAINER.
8. DEMO 8"x4" ECCENTRIC REDUCER.
9. DEMO 4" PUMP SUCTION AND APPURTENANCES.
10. DEMO NPW PUMP.
11. DEMO NPW PUMP BASE.
12. DEMO 3" & 4" PUMP DISCHARGE APPURTENANCES & SUPPORTS.
13. DEMO 6" DISCHARGE PIPING AND APPURTENANCES.
14. DEMO 8" DISCHARGE HEADER, APPURTENANCES & SUPPORT TO TANK INLET FLANGE.
15. DEMO 8" TANK OUTLET LINE.
16. DEMO 8" PRESSURE INDICATING TRANSMITTER.
17. DEMO 8" FLOW INDICATING TRANSMITTER.
18. DEMO PUMP CONTROL PANEL AND EQUIPMENT PAD.
19. EXIST. 6" DRAIN LINE & DRAINS TO REMAIN, PROTECT IN PLACE.
20. EXIST. 4" DRAIN LINE & DRAINS TO REMAIN, PROTECT IN PLACE.

SHEET NOTES:

1. EXISTING STRUCTURES, EQUIPMENT, ELEVATIONS, AND DETAILS SHOWN ARE NOT GUARANTEED TO BE ACCURATE AND ALL INCLUSIVE. EXISTING INFORMATION SHOWN IS APPROXIMATE, BASED ON AVAILABLE RECORD DRAWINGS, AND SHOULD BE VERIFIED BY CONTRACTOR PRIOR TO START OF CONSTRUCTION.
2. CONTRACTOR SHALL VERIFY EXACT LOCATIONS, ROUTING, AND DEPTH OF ALL ON-SITE EXISTING UTILITIES BEFORE COMMENCEMENT OF CONSTRUCTION ACTIVITIES. NOTIFY CONSTRUCTION MANAGER IF SIGNIFICANT DISCREPANCIES ARE DISCOVERED FROM ITEMS SHOWN IN DRAWINGS.
3. CONTRACTOR SHALL CERTIFY THAT EQUIPMENT DESIGNATED FOR DEMOLITION IS SAFELY DISCONNECTED AND LOCKED OUT OF ALL SERVICES AND UTILITIES PRIOR TO COMMENCING THAT WORK.
4. EXISTING EQUIPMENT MAY BE MISSING, NOT SHOWN, OR NOT FUNCTIONAL AT THE TIME OF CONSTRUCTION. CONTRACTOR SHALL VERIFY FIELD CONDITIONS AT THE START OF CONSTRUCTION AND IMMEDIATELY NOTIFY THE OWNER OF ANY VARIATIONS THAT AFFECT THE PROPOSED WORK.
5. CONTRACTOR TO COORDINATE DEMOLITION OF EXISTING NPW SYSTEM WITH THE PLANT OPERATOR PRIOR TO TAKING OFF LINE. REFER TO SPECIFICATION 01110 - SUMMARY OF WORK FOR CONSTRUCTION SEQUENCING.
6. CONTRACTOR IS RESPONSIBLE FOR PROVIDING SAFE WORKING CONDITION FOR EMPLOYEES DURING DEMOLITION AND REMOVAL WORK.
7. CONTRACTOR SHALL MAINTAIN SAFE ACCESS TO ADJACENT BUILDINGS, DO NOT OBSTRUCT ROADWAYS, SIDEWAYS, OR PASSAGEWAYS ADJACENT TO THE WORK.
8. CONTRACTOR SHALL PERFORM DEMOLITION WORK IN A MANNER TO PREVENT DAMAGE TO ADJACENT FACILITIES. ANY CONCRETE EXPOSED OR DAMAGED AS A RESULT OF DEMOLITION ACTIVITIES SHALL BE REPAIRED AS PART OF THE BASE BID SCOPE.
9. REMOVAL OF PIPING, WIRING, CONDUITS, DUCTWORK, AND OTHER MISCELLANEOUS ITEMS RELATED TO DEMOLITION OF PUMPS SHALL BE INCIDENTAL TO THE DEMOLITION WORK UNLESS OTHERWISE SPECIFIED IN DRAWINGS AND CONTRACT DOCUMENTS.
10. DO NOT BACKFILL WITH MATERIAL FROM DEMOLITION UNLESS APPROVED BY OWNER.

D-51-101

5engineering
BLACK & VEATCH
5ENGINEERING, LLC
11200 WESTHEIMER ROAD
SUITE 353
HOUSTON, TX 77042
(832) 800-3483
TX FIRM NUMBER F-13748
STATE OF TEXAS
PIERO BATTISTINI
104895
LICENSED PROFESSIONAL ENGINEER
11/09/2022

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

DEMOLITION

EXISTING NPW SYSTEM DEMOLITION (MECHANICAL)

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SC XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 47 OF 379	

FOR CITY OF HOUSTON USE ONLY

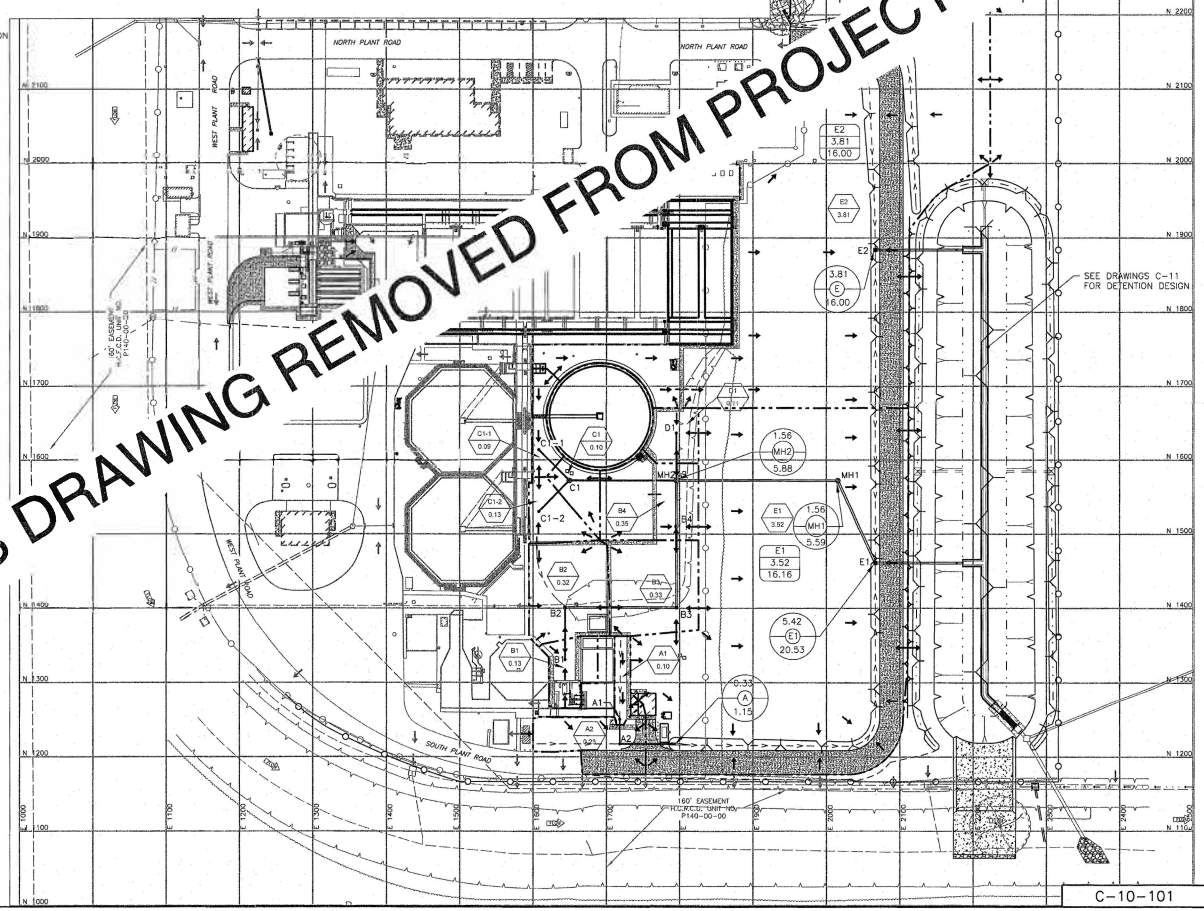
80967

FILE PATH: P:\0092\001\04 Cadd-GIS\02 SHEETS\51 - NPW SYSTEM\D-51-102 EXISTING NPW SYSTEM - DEMOLITION (MECHANICAL).dwg

LINE "A"		100 YEAR STORM CALCULATIONS (CITY OF HOUSTON E,B,D CONSTANTS)																								2 YEAR STORM CALCS			
Pipe Run		Area	Increment Area		Total Acres Drained		Sum of	Intensity	Sum of	Time of	Reach	Diameter		Manning's	Design	Design	Fall	MH Drop	Flow Line		Actual	Hydraulic	Change	Hydraulic Gradient		Nat Grd	Nat Grd	Intensity	Sum of	Hydraulic Gradient	
From	To	No.	(ac)	(ac)	Drained	Drained	CA		Flow	Conc	Length	of Pipe	Slope	"n"	Capacity	Velocity		Upstream	upstrm	dwnstrm	Velocity	Gradient	in Head	Upstrm	Dnstrm	Upstream	Dnstrm		Flow	Upstrm	Dnstrm
MH	MH		C = 0.90	C = 0.30	C = 0.90	C = 0.30		(in/hr)	(cfs)	(min)	(ft)	(in)	(%)	(cfs)	(cfs)	(fps)	(ft)	(ft)	(ft)	(ft)	(fps)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(in/hr)	(cfs)	(ft)	(ft)
INLET E2	OUTFALL	E2	0.55	3.26	0.55	3.26	1.47	10.66	**16.00**	15.00	120.0	30	1.200	0.013	44.93	9.15	1.44	0.00	73.88	72.44	3.26	0.15	0.18	77.95	77.77	78.20	80.00	4.83	**7.11**	76.38	74.94
INLET D1	MH2	D1	0.01	0.10	0.01	0.10	0.04	10.86	0.42	15.00	64.0	8	0.750	0.011	1.24	3.54	0.48	0.00	81.73	81.25	1.21	0.09	0.06	82.40	81.92	83.75	83.50	4.83	0.19	82.40	81.92
INLET C1-2	INLET C1	C1-2	0.01	0.12	0.01	0.12	0.05	10.86	0.49	15.00	59.0	8	0.750	0.011	1.24	3.54	0.44	0.00	81.29	80.85	1.40	0.12	0.07	81.96	81.51	83.35	83.35	4.83	0.22	81.96	81.51
INLET C1-1	C1	C1-1	0.01	0.08	0.01	0.08	0.03	10.86	0.36	15.00	59.0	8	0.750	0.011	1.24	3.54	0.44	0.00	81.29	80.85	1.03	0.06	0.04	81.96	81.51	83.65	83.35	4.83	0.16	81.96	81.51
C1	MH2	C1-2,C1	0.02	0.21	0.03	0.29	0.11	10.56	1.20	15.96	146.0	12	0.500	0.011	2.98	3.79	0.73	0.83	80.02	79.29	1.53	0.08	0.12	81.02	80.29	83.35	83.50	4.54	0.52	81.02	80.29
INLET B1	INLET B2	B1	0.09	0.04	0.09	0.04	0.09	10.86	1.01	15.00	70.0	8	0.750	0.011	1.24	3.54	0.53	0.00	78.25	77.73	2.89	0.50	0.35	79.80	79.45	80.00	80.00	4.83	0.45	78.92	78.40
INLET B2	INLET B3	B2	0.02	0.30	0.11	0.34	0.20	10.73	2.16	15.40	152.0	12	0.500	0.011	2.98	3.79	0.76	0.33	77.40	76.64	2.75	0.26	0.40	79.45	79.06	80.00	82.20	4.70	0.94	78.40	77.64
INLET B3	INLET B4	B3	0.02	0.31	0.13	0.65	0.31	10.45	3.26	16.33	109.0	12	0.500	0.011	2.98	3.79	0.55	0.00	76.64	76.09	4.15	0.60	0.65	79.06	78.40	82.20	83.00	4.43	1.38	77.64	77.09
INLET B4	MH2	B4	0.01	0.34	0.14	0.99	0.42	10.33	4.37	16.76	62.0	18	0.300	0.013	5.75	3.26	0.19	0.50	75.59	75.40	2.47	0.17	0.11	78.40	78.29	83.00	83.50	4.31	1.82	77.09	76.90
MH2	MH1	C,D	0.00	0.00	0.18	1.38	0.58	10.21	5.88	17.18	220.0	24	0.200	0.013	10.12	3.22	0.44	0.50	74.90	74.46	1.87	0.07	0.15	78.29	78.15	83.50	81.40	4.21	2.42	76.90	76.46
MH1	INLET E1	-	0.00	0.00	0.18	1.38	0.58	9.71	5.59	19.14	122.0	24	0.200	0.013	10.12	3.22	0.24	0.00	74.46	74.22	1.78	0.06	0.07	78.15	78.07	81.40	78.20	3.77	2.17	76.46	76.22
INLET E1	OUTFALL	E1,A1,A2	0.72	2.80	0.91	4.51	2.17	9.45	**20.53**	20.28	120.0	30	1.200	0.013	44.93	9.15	1.44	1.17	73.05	71.61	4.18	0.25	0.30	78.07	77.77	78.20	80.00	3.55	**7.71**	75.55	74.11
A1	A2	A1	0.00	0.10	0.00	0.10	0.03	10.86	0.33	15.00	35.0	8	0.750	0.011	1.24	3.54	0.26	0.00	79.71	79.45	0.93	0.05	0.02	80.38	80.12	82.38	80.95	4.83	0.14	80.38	80.12
A2	OUTFALL	A2	0.01	0.23	0.01	0.33	0.11	10.66	1.15	15.62	75.0	12	0.130	0.013	1.28	1.64	0.10	0.33	79.12	79.02	1.47	0.10	0.08	80.12	80.02	80.95	80.85	4.63	0.50	80.12	80.02

CALCULATIONS UNCHANGED FOR INLET RELOCATION OR EXISTING INLETS; REFER TO DRAINAGE ANALYSIS REPORT FOR DISCHARGE COMPENSATION DETENTION CALCULATIONS.

THIS DRAWING REMOVED FROM PROJECT



LEGEND

→	PROPOSED SHEET FLOW DIRECTION
⇢	EXISTING SHEET FLOW DIRECTION
1 / 1.50	DRAINAGE AREA I.D. DRAINAGE AREA (ACRES)
E2 / 2.12 / 1.00	DRAINAGE AREA I.D. DRAINAGE AREA (ACRES) 100-YR RUNOFF (CFS)
3.20 / E1 / 24.54	CUMULATIVE AREA(ACRES) STRUCTURE I.D. CUMULATIVE 100- YR (CFS)

N

0 80' 160'

NOTE:
THIS PROJECT LIES WITHIN ZONE-X (UNSHADED) PER FEMA FIRM PANEL NO. 48201C0480M EFFECTIVE DATE IS JUNE 09, 2014
100 YEAR BASE FLOOD ELEVATION:
- RANKIN RD=77.0 FEET
- SOUTHEAST CORNER=75.6 FEET

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
CIVIL
DRAINAGE AREA MAP & CALCULATIONS

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	1"=80'
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.

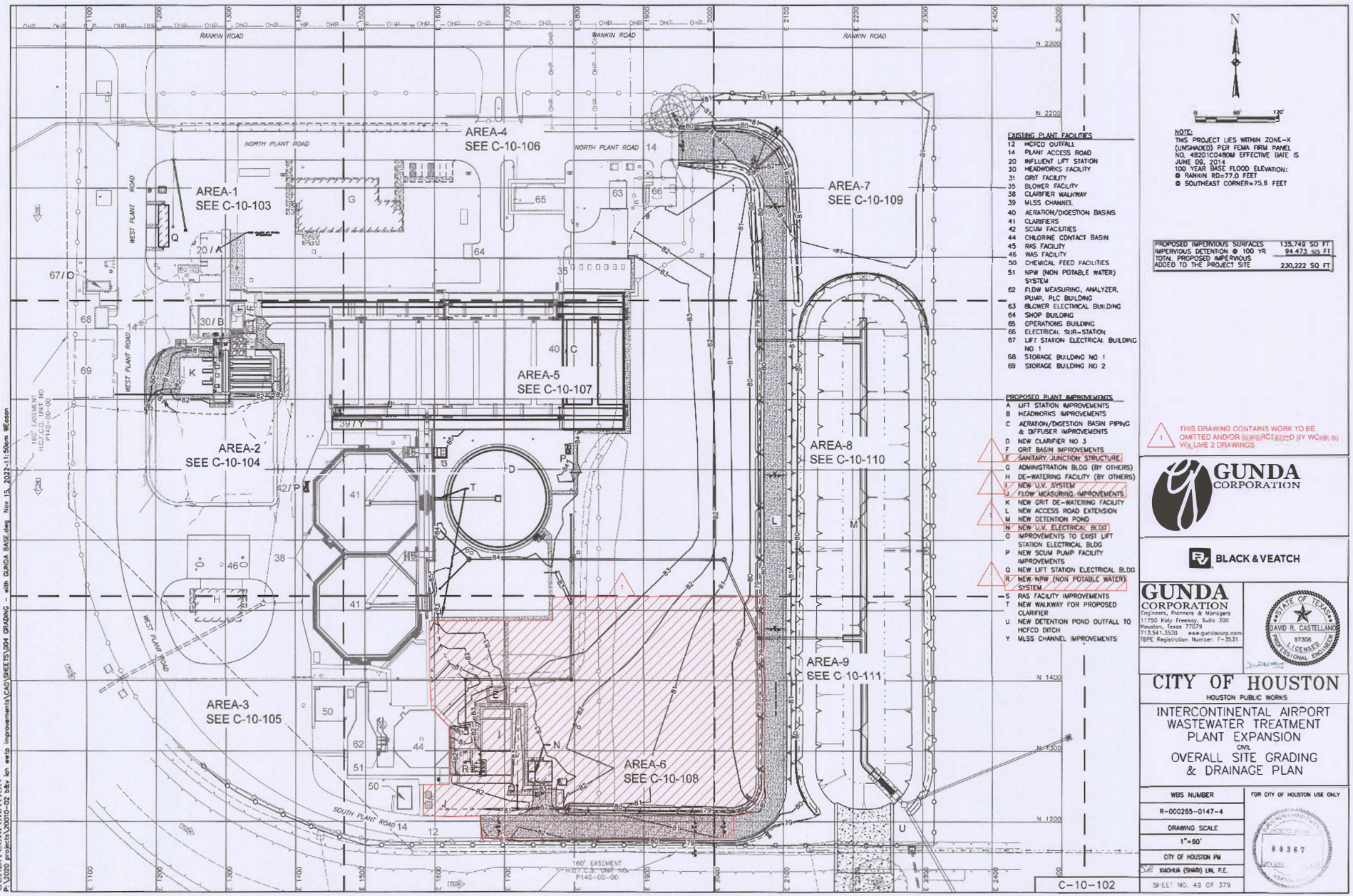
FOR CITY OF HOUSTON USE ONLY

80367 REGISTERED PROFESSIONAL ENGINEER STATE OF TEXAS

C-10-101

SHEET NO. 48 OF 379

GUNDA CORPORATION
P:\2020 projects\2010-02 b&v ion wwtp improvements\CAD\SHEETS\004 GRADING - with GUNDA BASE.dwg Nov 11, 2022 - 2:57pm WEsson



EXISTING PLANT FACILITIES

12	HCFCD OUTFALL
14	PLANT ACCESS ROAD
20	INFLUENT LIFT STATION
30	HEADWORKS FACILITY
31	GRIT FACILITY
35	BLOWER FACILITY
38	CLARIFIER WALKWAY
39	MLSS CHANNEL
40	AERATION/DIGESTION BASINS
41	CLARIFIERS
42	SCUM FACILITIES
44	CHLORINE CONTACT BASIN
45	RAS FACILITY
46	WAS FACILITY
50	CHEMICAL FEED FACILITIES
51	NPW (NON POTABLE WATER) SYSTEM
62	FLOW MEASURING, ANALYZER, PUMP, PLC BUILDING
63	BLOWER ELECTRICAL BUILDING
64	SHOP BUILDING
65	OPERATIONS BUILDING
66	ELECTRICAL SUB-STATION
67	LIFT STATION ELECTRICAL BUILDING NO 1
68	STORAGE BUILDING NO 1
69	STORAGE BUILDING NO 2

PROPOSED PLANT IMPROVEMENTS

A	LIFT STATION IMPROVEMENTS
B	HEADWORKS IMPROVEMENTS
C	AERATION/DIGESTION BASIN PIPING & DIFFUSER IMPROVEMENTS
D	NEW CLARIFIER NO 3
F	GRIT BASIN IMPROVEMENTS
E	SANITARY JUNCTION STRUCTURE
G	ADMINISTRATION BLDG (BY OTHERS)
H	DE-WATERING FACILITY (BY OTHERS)
I	NEW U.V. SYSTEM
J	FLOW MEASURING IMPROVEMENTS
K	NEW GRIT DE-WATERING FACILITY
L	NEW ACCESS ROAD EXTENSION
M	NEW DETENTION POND
N	NEW U.V. ELECTRICAL BLDG
O	IMPROVEMENTS TO EXIST LIFT STATION ELECTRICAL BLDG
P	NEW SCUM PUMP FACILITY IMPROVEMENTS
Q	NEW LIFT STATION ELECTRICAL BLDG
R	NEW NPW (NON POTABLE WATER) SYSTEM
S	RAS FACILITY IMPROVEMENTS
T	NEW WALKWAY FOR PROPOSED CLARIFIER
U	NEW DETENTION POND OUTFALL TO HCFCD DITCH
Y	MLSS CHANNEL IMPROVEMENTS

NOTE:
THIS PROJECT LIES WITHIN ZONE-X (UNSHADED) PER FEMA FIRM PANEL NO. 48201C0480M EFFECTIVE DATE IS JUNE 09, 2014
100 YEAR BASE FLOOD ELEVATION:
@ RANKIN RD=77.0 FEET
@ SOUTHEAST CORNER=75.8 FEET

PROPOSED IMPERVIOUS SURFACES	135,749 SQ FT
IMPERVIOUS DETENTION @ 100 YR	94,473 SQ FT
TOTAL PROPOSED IMPERVIOUS ADDED TO THE PROJECT SITE	230,222 SQ FT

1 THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEDED BY WORK IN VOLUME 2 DRAWINGS.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3511

STATE OF TEXAS
DAVID R. CASTELLANOS
97308
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT
PLANT EXPANSION
CIVIL
OVERALL SITE GRADING
& DRAINAGE PLAN

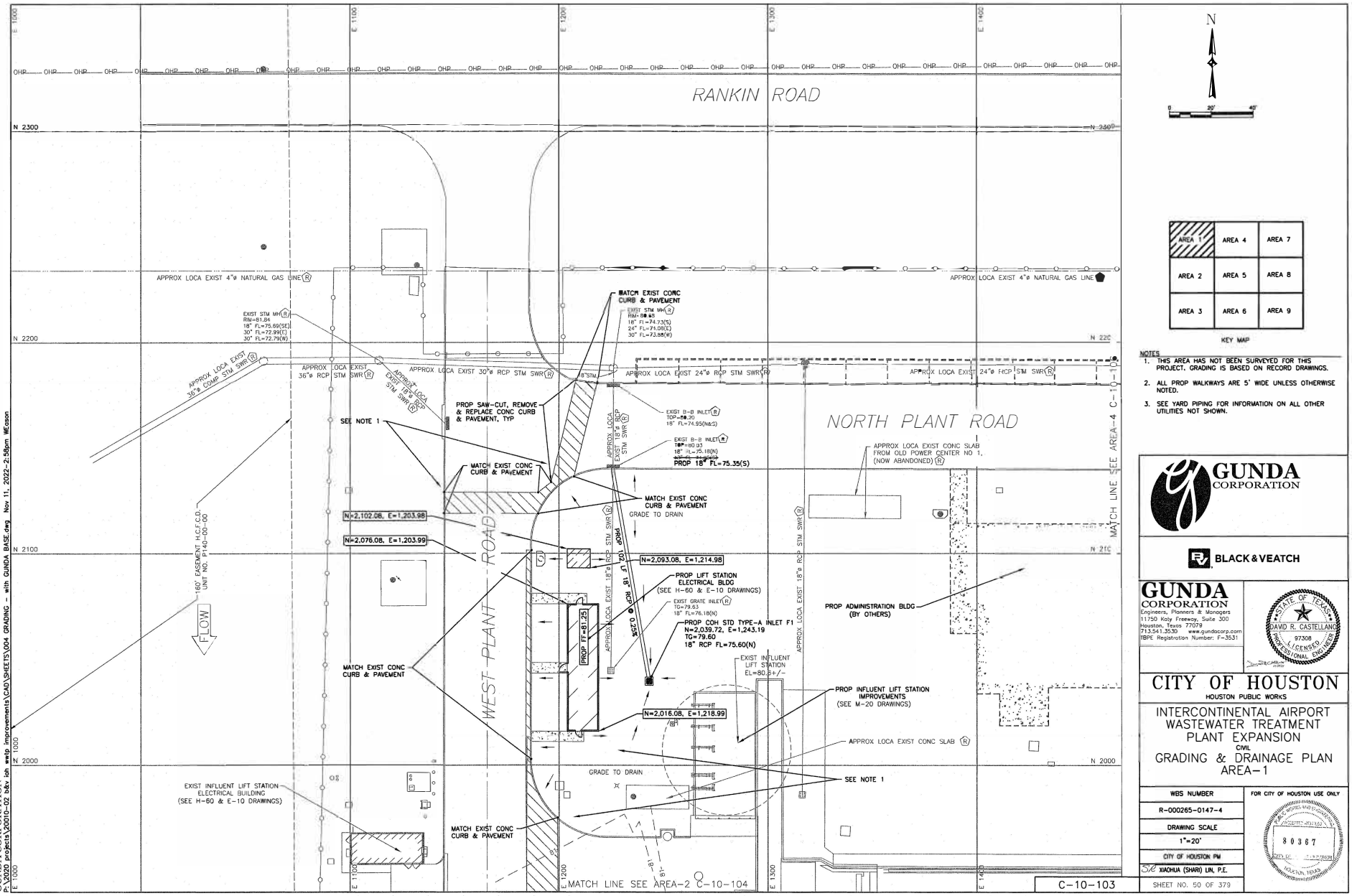
WBS NUMBER	R-000265-0147-4
DRAWING SCALE	1"=50'
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 49 OF 379	

FOR CITY OF HOUSTON USE ONLY

80367

C-10-102

GUNDA CORPORATION
P:\2020 projects\20010-02 58x ion ewtp improvements\CAD\SHEETS\004 GRADING - with GUNDA BASE.dwg Nov 15, 2022-11:50am WEason



N

0 20' 40'

AREA 1	AREA 4	AREA 7
AREA 2	AREA 5	AREA 8
AREA 3	AREA 6	AREA 9

KEY MAP

NOTES

1. THIS AREA HAS NOT BEEN SURVEYED FOR THIS PROJECT. GRADING IS BASED ON RECORD DRAWINGS.
2. ALL PROP WALKWAYS ARE 5' WIDE UNLESS OTHERWISE NOTED.
3. SEE YARD PIPING FOR INFORMATION ON ALL OTHER UTILITIES NOT SHOWN.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

CIVIL

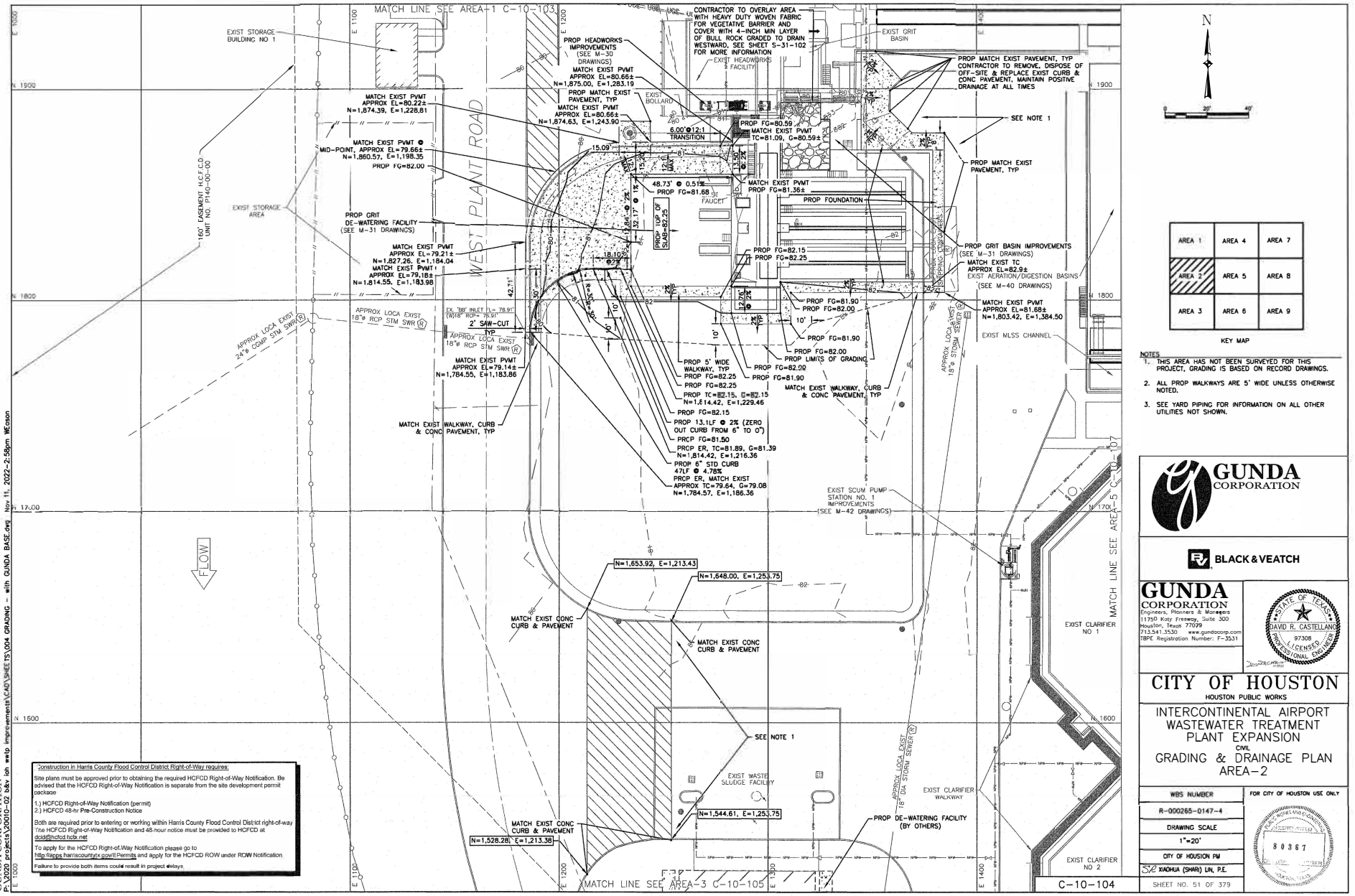
GRADING & DRAINAGE PLAN AREA-1

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	1"=20'
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 50 OF 379	

FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
80367
REGISTERED
PROFESSIONAL ENGINEER
CITY OF HOUSTON
HOUSTON, TEXAS

GUNDA CORPORATION
P:\2020 projects\2010-02 b&v wwtp improvements\CAD\SHEETS\004 GRADING - with GUNDA BASE.dwg Nov 11, 2022-2:58pm MGeason



NOTES

1. THIS AREA HAS NOT BEEN SURVEYED FOR THIS PROJECT, GRADING IS BASED ON RECORD DRAWINGS.
2. ALL PROP WALKWAYS ARE 5' WIDE UNLESS OTHERWISE NOTED.
3. SEE YARD PIPING FOR INFORMATION ON ALL OTHER UTILITIES NOT SHOWN.

Construction in Harris County Flood Control District Right-of-Way requires:

Site plans must be approved prior to obtaining the required HCFCD Right-of-Way Notification. Be advised that the HCFCD Right-of-Way Notification is separate from the site development permit package

1.) HCFCD Right-of-Way Notification (permit)
2.) HCFCD 48-hr Pre-Construction Notice

Both are required prior to entering or working within Harris County Flood Control District right-of-way The HCFCD Right-of-Way Notification and 48-hour notice must be provided to HCFCD at dcid@hcfcd.hctx.net

To apply for the HCFCD Right-of-Way Notification please go to http://apps.harriscountytx.gov/EPermits and apply for the HCFCD ROW under ROW Notification

Failure to provide both items could result in project delays.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

CIVIL

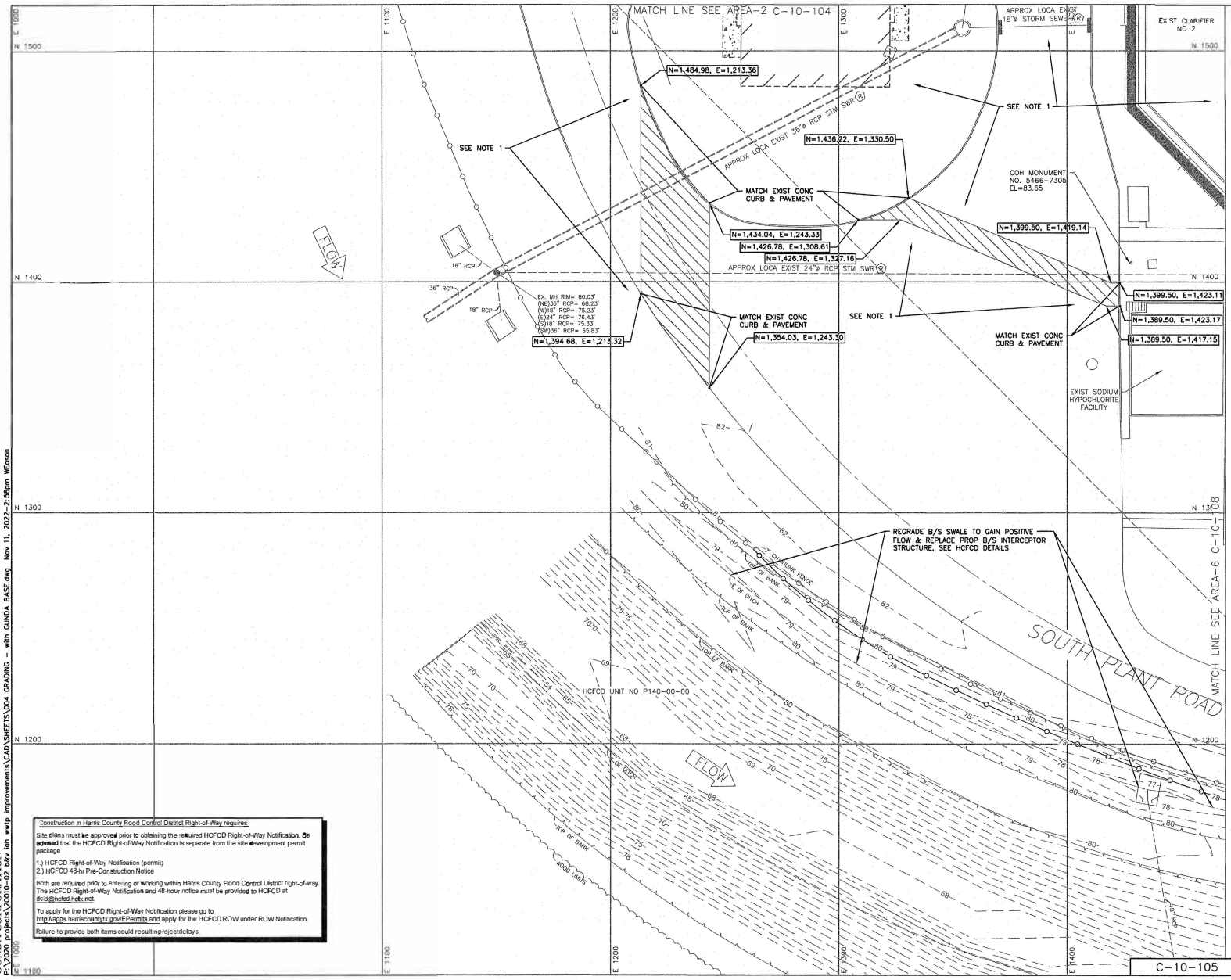
GRADING & DRAINAGE PLAN AREA-2

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	1"=20'
CITY OF HOUSTON PM	
Sig XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 51 OF 379	

FOR CITY OF HOUSTON USE ONLY

80367
LICENSED
PROFESSIONAL ENGINEER

GUNDA CORPORATION
P:\2020 projects\20010-02 b&v ioh wwtp improvements\CAD\SHEETS\004 GRADING - with GUNDA BASE.dwg Nov 11, 2022 - 2:58pm MEason



Construction in Harris County Flood Control District Right-of-Way requires:

Site plans must be approved prior to obtaining the required HCFCD Right-of-Way Notification. Be advised that the HCFCD Right-of-Way Notification is separate from the site development permit package

1.) HCFCD Right-of-Way Notification (permit)
2.) HCFCD 48-hr Pre-Construction Notice

Both are required prior to entering or working within Harris County Flood Control District right-of-way
The HCFCD Right-of-Way Notification and 48-hour notice must be provided to HCFCD at dcid@hcfcd.hctx.net

To apply for the HCFCD Right-of-Way Notification please go to http://apps.harriscountytx.gov/EPermits and apply for the HCFCD ROW under ROW Notification

Failure to provide both items could resultinprojectdelays

N

0 20' 40'

AREA 1	AREA 4	AREA 7
AREA 2	AREA 5	AREA 8
AREA 3	AREA 6	AREA 9

KEY MAP

NOTES:
1. THIS AREA HAS NOT BEEN SURVEYED FOR THIS PROJECT. GRADING IS BASED ON RECORD DRAWINGS.
2. ALL PROP WALKWAYS ARE 5' WIDE UNLESS OTHERWISE NOTED.
3. SEE YARD PIPING FOR INFORMATION ON ALL OTHER UTILITIES NOT SHOWN.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
CIVIL

GRADING & DRAINAGE PLAN AREA-3

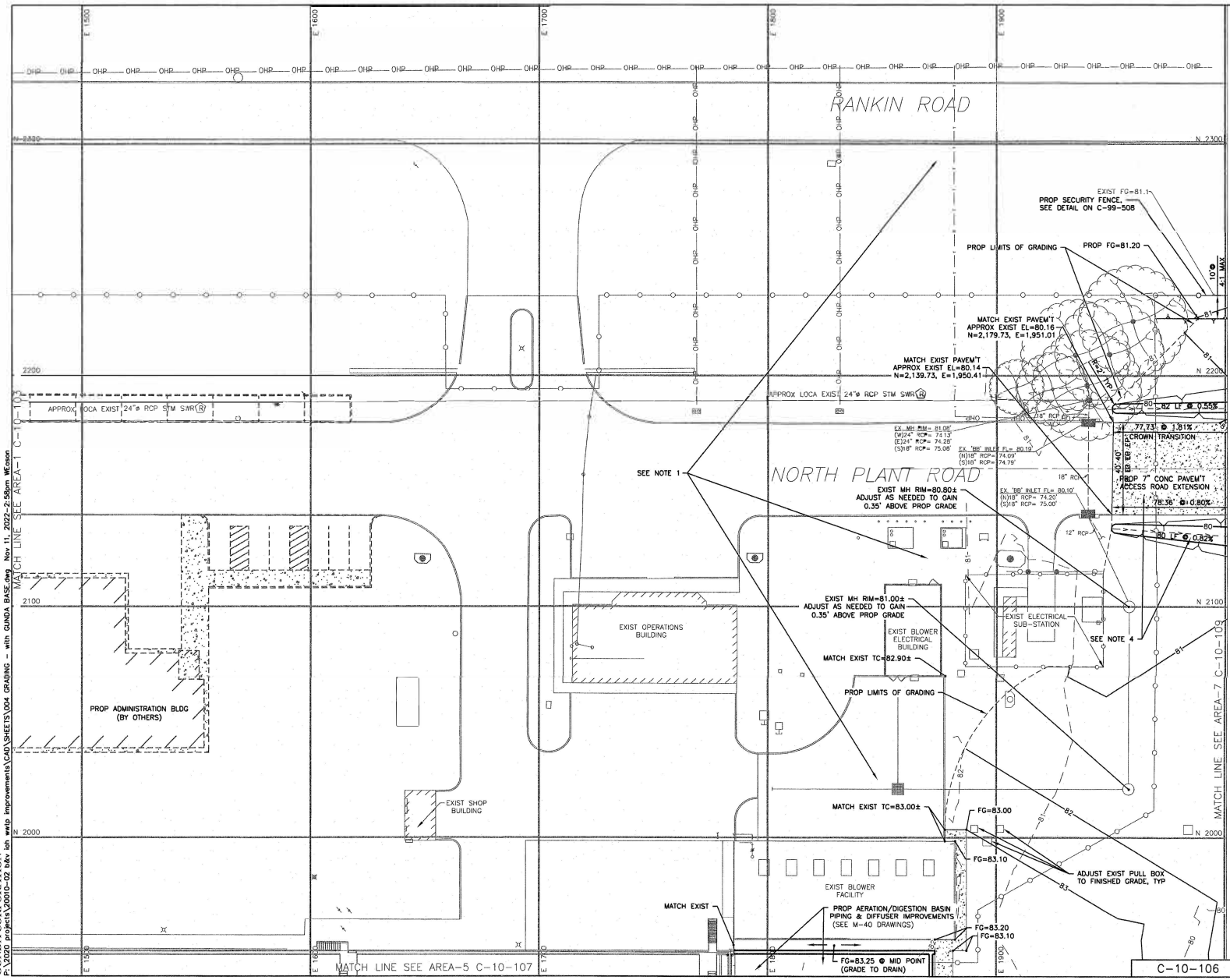
WBS NUMBER	R-000265-0147-4
DRAWING SCALE	1"=20'
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 52 OF 379	

FOR CITY OF HOUSTON USE ONLY

80367

C-10-105

GUNDA CORPORATION
P:\2020 projects\20010-02 h&v wh wwtp improvements\CAD\SHEETS\004 GRADING - with GUNDA BASE.dwg Nov 11, 2022 - 2:58pm WEolson



N

0 20' 40'

AREA 1	AREA 4	AREA 7
AREA 2	AREA 5	AREA 8
AREA 3	AREA 6	AREA 9

KEY MAP

NOTES

1. THIS AREA HAS NOT BEEN SURVEYED FOR THIS PROJECT, GRADING IS BASED ON RECORD DRAWINGS.
2. ALL PROP WALKWAYS ARE 5' WIDE UNLESS OTHERWISE NOTED.
3. SEE YARD PIPING FOR INFORMATION ON ALL OTHER UTILITIES NOT SHOWN.
4. SEE PLAN & PROFILES FOR MORE DETAILED GRADING INFORMATION ON PROP ACCESS ROAD & DITCHES

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED PROFESSIONAL ENGINEER

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

CIVIL

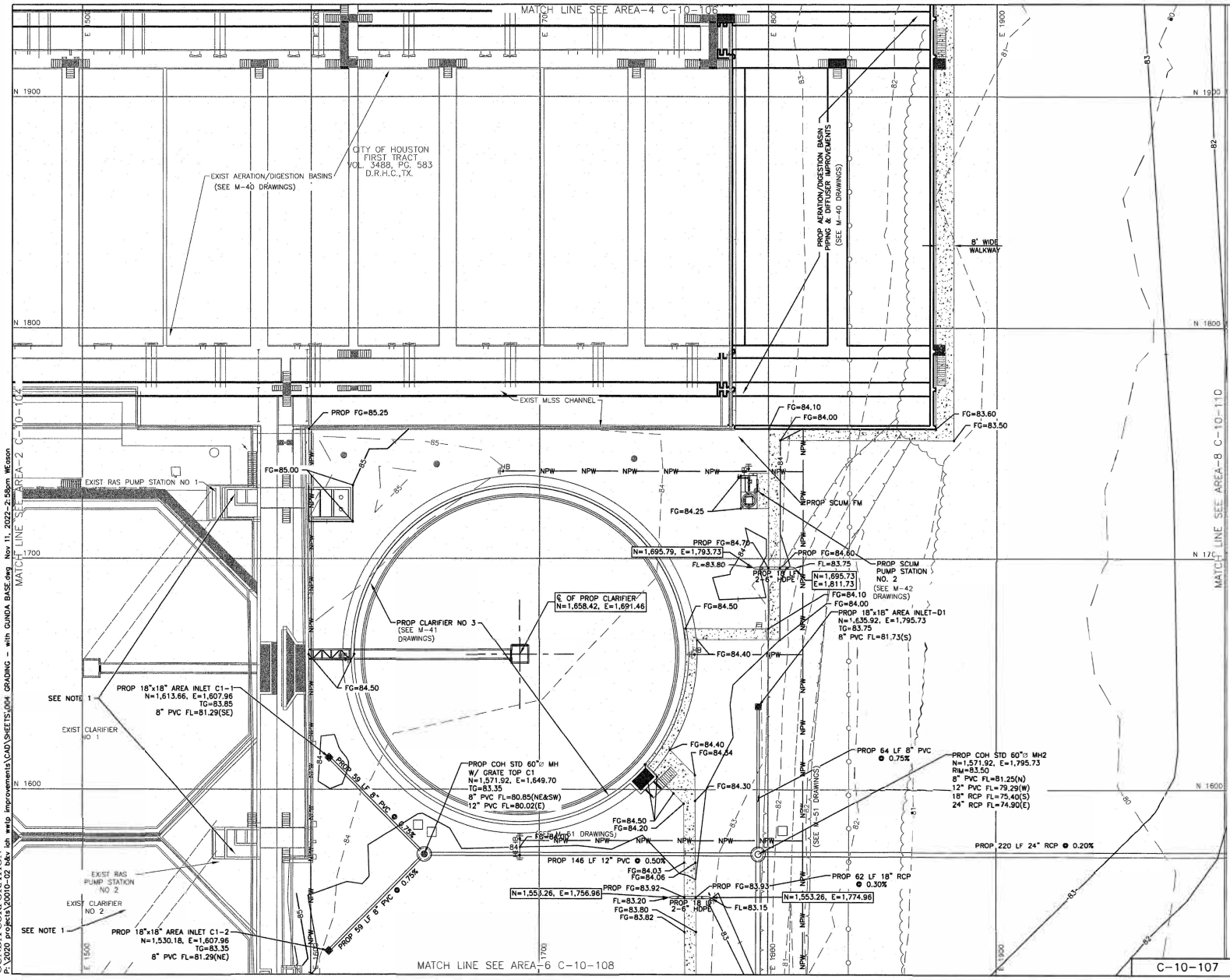
GRADING & DRAINAGE PLAN AREA-4

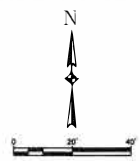
WBS NUMBER	R-000265-0147-4
DRAWING SCALE	1"=20'
CITY OF HOUSTON PM	Se XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 53 OF 379	

FOR CITY OF HOUSTON USE ONLY

80367

GUNDA CORPORATION
P:\2020 projects\20010-02 b&v ioh wwip improvements\CAD\SHEETS\004 GRADING - with GUNDA BASE.dwg Nov 11, 2022 - 2:58pm WEason





AREA 1	AREA 4	AREA 7
AREA 2	AREA 5	AREA 8
AREA 3	AREA 6	AREA 9

KEY MAP

NOTES

1. THIS AREA HAS NOT BEEN SURVEYED FOR THIS PROJECT. GRADING IS BASED ON RECORD DRAWINGS.
2. ALL PROP WALKWAYS ARE 5' WIDE UNLESS OTHERWISE NOTED.
3. SEE YARD PIPING FOR INFORMATION ON ALL OTHER UTILITIES NOT SHOWN.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED PROFESSIONAL ENGINEER

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

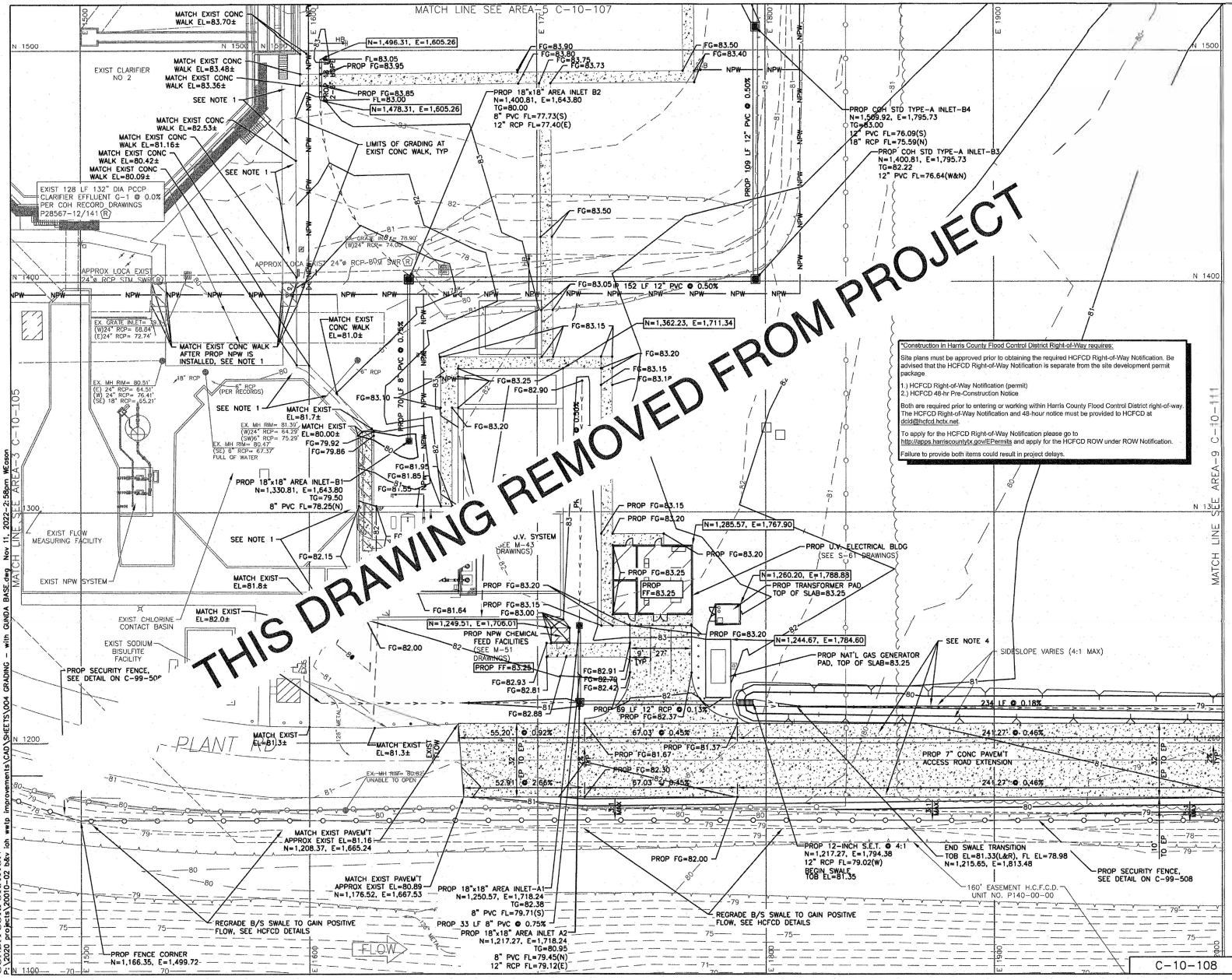
CIVIL

GRADING & DRAINAGE PLAN AREA-5

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
1"=20'	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 54 OF 379	

80387
REGISTERED
XIAOHUA LIN
PROFESSIONAL ENGINEER
HOUSTON, TEXAS

GUNDA CORPORATION
P:\2020 projects\20010-02 b&v ioh wwtp improvements\CAD\SHEETS\004 GRADING - with GUNDA BASE.dwg Nov 11, 2022 - 2:58pm WEason



THIS DRAWING REMOVED FROM PROJECT

*Construction in Harris County Flood Control District Right-of-Way requires:

Site plans must be approved prior to obtaining the required HCFCD Right-of-Way Notification. Be advised that the HCFCD Right-of-Way Notification is separate from the site development permit package.

1.) HCFCD Right-of-Way Notification (permit)
2.) HCFCD 48-hr Pre-Construction Notice

Both are required prior to entering or working within Harris County Flood Control District right-of-way. The HCFCD Right-of-Way Notification and 48-hour notice must be provided to HCFCD at dcid@hcfcd.hctx.net.

To apply for the HCFCD Right-of-Way Notification please go to http://apps.harriscountytx.gov/EPermits and apply for the HCFCD ROW under ROW Notification.

Failure to provide both items could result in project delays.

N

0 20' 40'

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

AREA 1	AREA 4	AREA 7
AREA 2	AREA 5	AREA 8
AREA 3	AREA 6	AREA 9

KEY MAP

NOTES

1. THIS AREA HAS NOT BEEN SURVEYED FOR THIS PROJECT. GRADING IS BASED ON RECORD DRAWINGS.
2. ALL PROP WALKWAYS ARE 5' WIDE UNLESS OTHERWISE NOTED.
3. SEE YARD PIPING FOR INFORMATION ON ALL OTHER UTILITIES NOT SHOWN.
4. SEE PLAN & PROFILES FOR MORE DETAILED GRADING INFORMATION ON PROP ACCESS ROAD & DITCHES.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

CIVIL

GRADING & DRAINAGE PLAN AREA-6

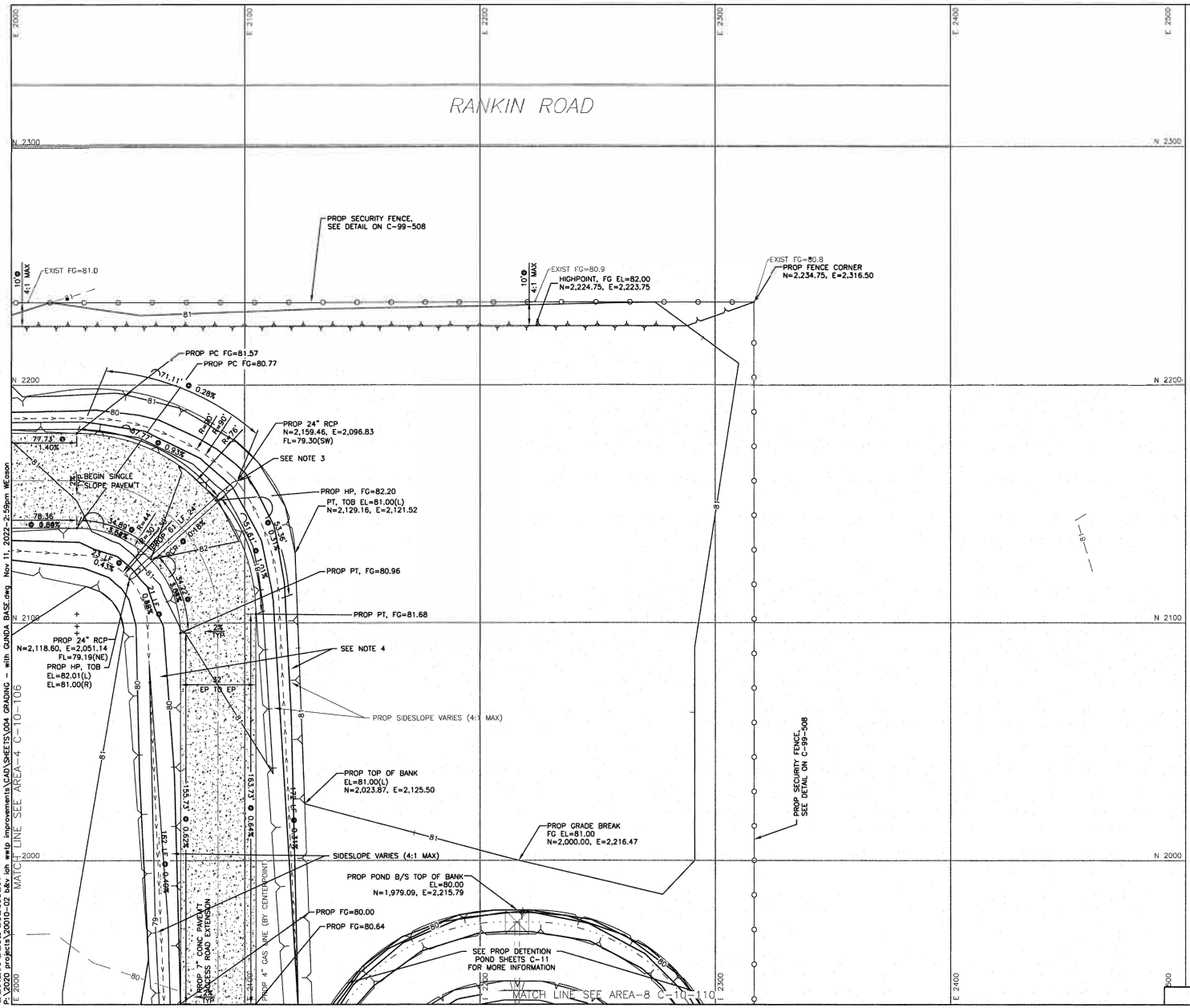
WBS NUMBER	R-000265-0147-4
DRAWING SCALE	1"=20'
CITY OF HOUSTON PM	Se XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 55 OF 379	

FOR CITY OF HOUSTON USE ONLY

80367

C-10-108

GUNDA CORPORATION P:\2020 projects\20010-02 b&v ion wstp improvements\CAD\SHEETS\004 GRADING - with GUNDA BASE.dwg Nov 11, 2022-2:58pm MEason



AREA 1	AREA 4	AREA 7
AREA 2	AREA 5	AREA 8
AREA 3	AREA 6	AREA 9

KEY MAP

NOTES

1. ALL PROP WALKWAYS ARE 5' WIDE UNLESS OTHERWISE NOTED.
2. SEE YARD PIPING FOR INFORMATION ON ALL OTHER UTILITIES NOT SHOWN.
3. PROP 24" CULVERT SHALL BE TRAFFIC RATED.
4. SEE PLAN & PROFILES FOR MORE DETAILED GRADING INFORMATION ON PROP ACCESS ROAD & DITCHES

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED PROFESSIONAL ENGINEER

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

CIVIL

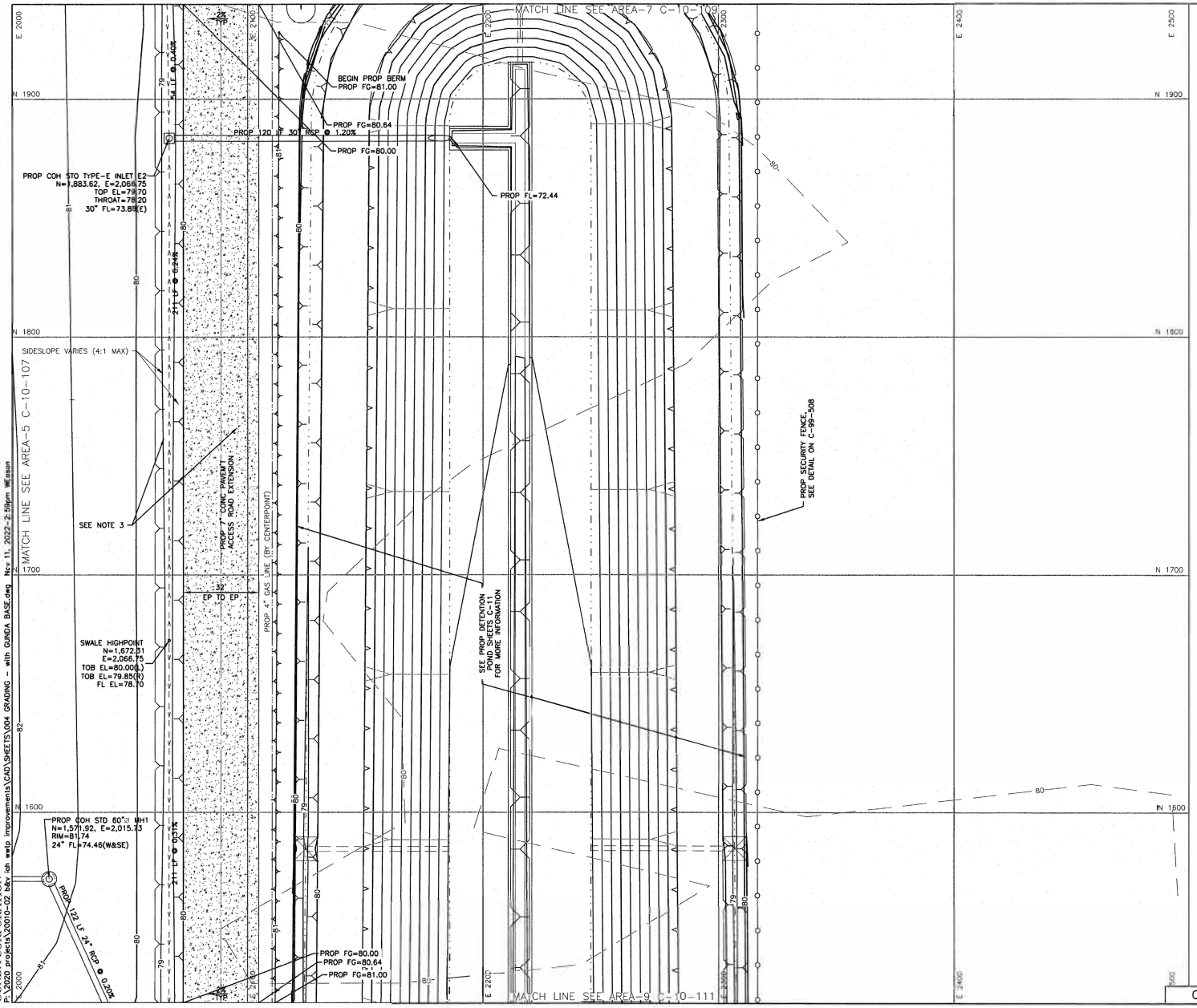
GRADING & DRAINAGE PLAN AREA-7

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	1"=20'
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 56 OF 379	

FOR CITY OF HOUSTON USE ONLY

80367

GUNDA CORPORATION
P:\2020 projects\20010-02 b&v ioh ewip improvements\CAD\SHEETS\004 GRADING - with GUNDA BASE.dwg Nov 11, 2022 2:39pm WEsson



GUNDA CORPORATION
P:\2020 projects\20010-02 b&v iah wstp improvements\CAD\SHEETS\004 GRADING - with GUNDA BASE.dwg Nov 11, 2022 - 2:59pm WEason

C-10-110

N

0 20' 40'

AREA 1	AREA 4	AREA 7
AREA 2	AREA 5	AREA 8
AREA 3	AREA 6	AREA 9

KEY MAP

NOTES

1. ALL PROP WALKWAYS ARE 5' WIDE UNLESS OTHERWISE NOTED.
2. SEE YARD PIPING FOR INFORMATION ON ALL OTHER UTILITIES NOT SHOWN.
3. SEE PLAN & PROFILES FOR MORE DETAILED GRADING INFORMATION ON PROP ACCESS ROAD & DITCHES

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

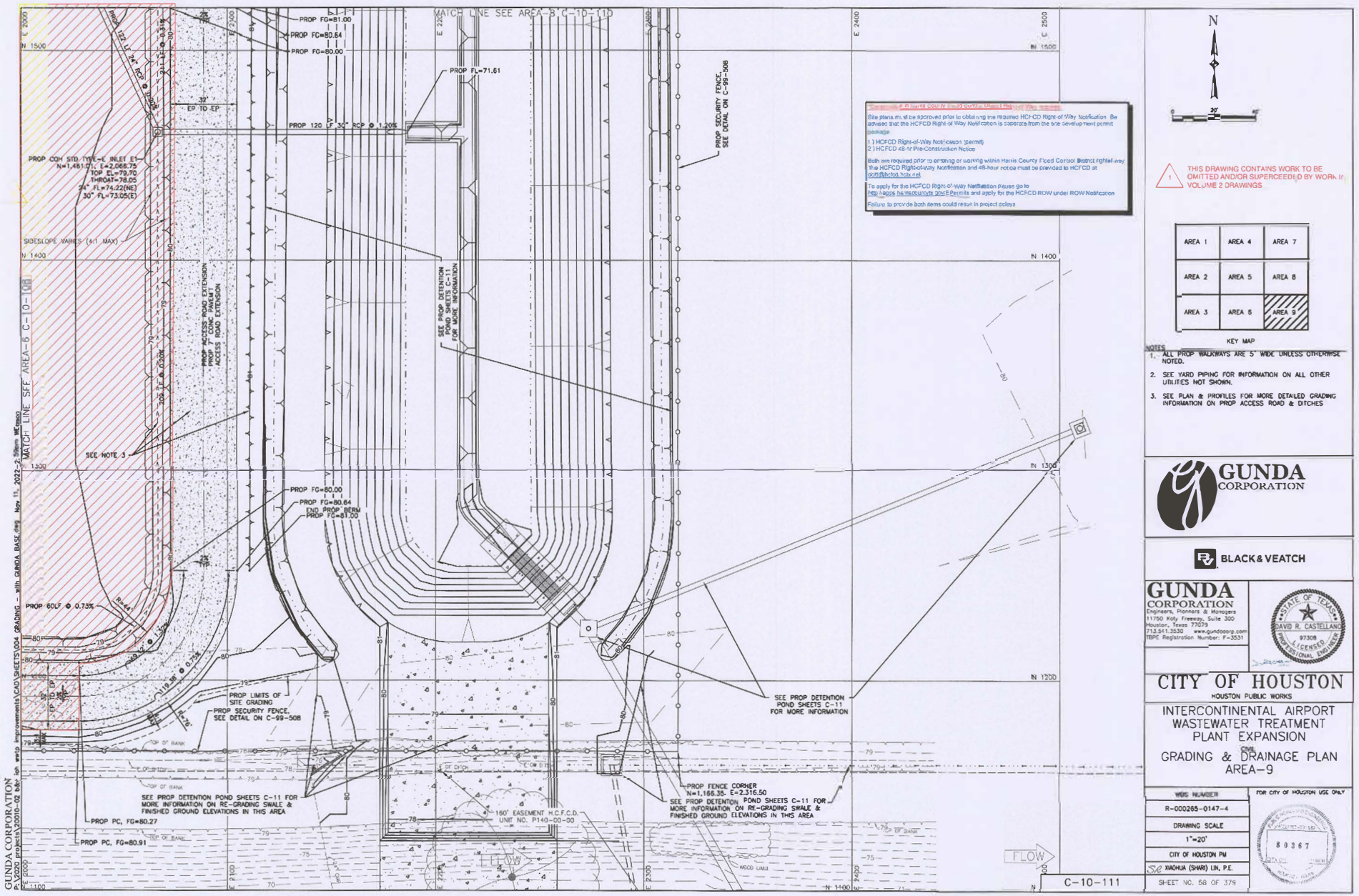
CIVIL

GRADING & DRAINAGE PLAN AREA-8

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	1"=20'
CITY OF HOUSTON PM	Se XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 57 OF 379	

FOR CITY OF HOUSTON USE ONLY

80367
LICENSED PROFESSIONAL ENGINEER



Site plans must be approved prior to obtaining the required HCFCD Right-of-Way Notification. Be advised that the HCFCD Right-of-Way Notification is separate from the site development permit package

1.) HCFCD Right-of-Way Notification (permit)
2.) HCFCD 48-hr Pre-Construction Notice

Both are required prior to entering or working within Harris County Flood Control District right-of-way. The HCFCD Right-of-Way Notification and 48-hour notice must be provided to HCFCD at dcfd@hcfcd.hcbx.net.

To apply for the HCFCD Right-of-Way Notification please go to http://apps.hcfcdwaterways.com/ePermits and apply for the HCFCD ROW under ROW Notification

Failure to provide both items could result in project delays

N

1 THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS

AREA 1	AREA 4	AREA 7
AREA 2	AREA 5	AREA 8
AREA 3	AREA 6	AREA 9

KEY MAP

NOTES:
1. ALL PROP WALKWAYS ARE 5' WIDE UNLESS OTHERWISE NOTED.
2. SEE YARD PIPING FOR INFORMATION ON ALL OTHER UTILITIES NOT SHOWN.
3. SEE PLAN & PROFILES FOR MORE DETAILED GRADING INFORMATION ON PROP ACCESS ROAD & DITCHES

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

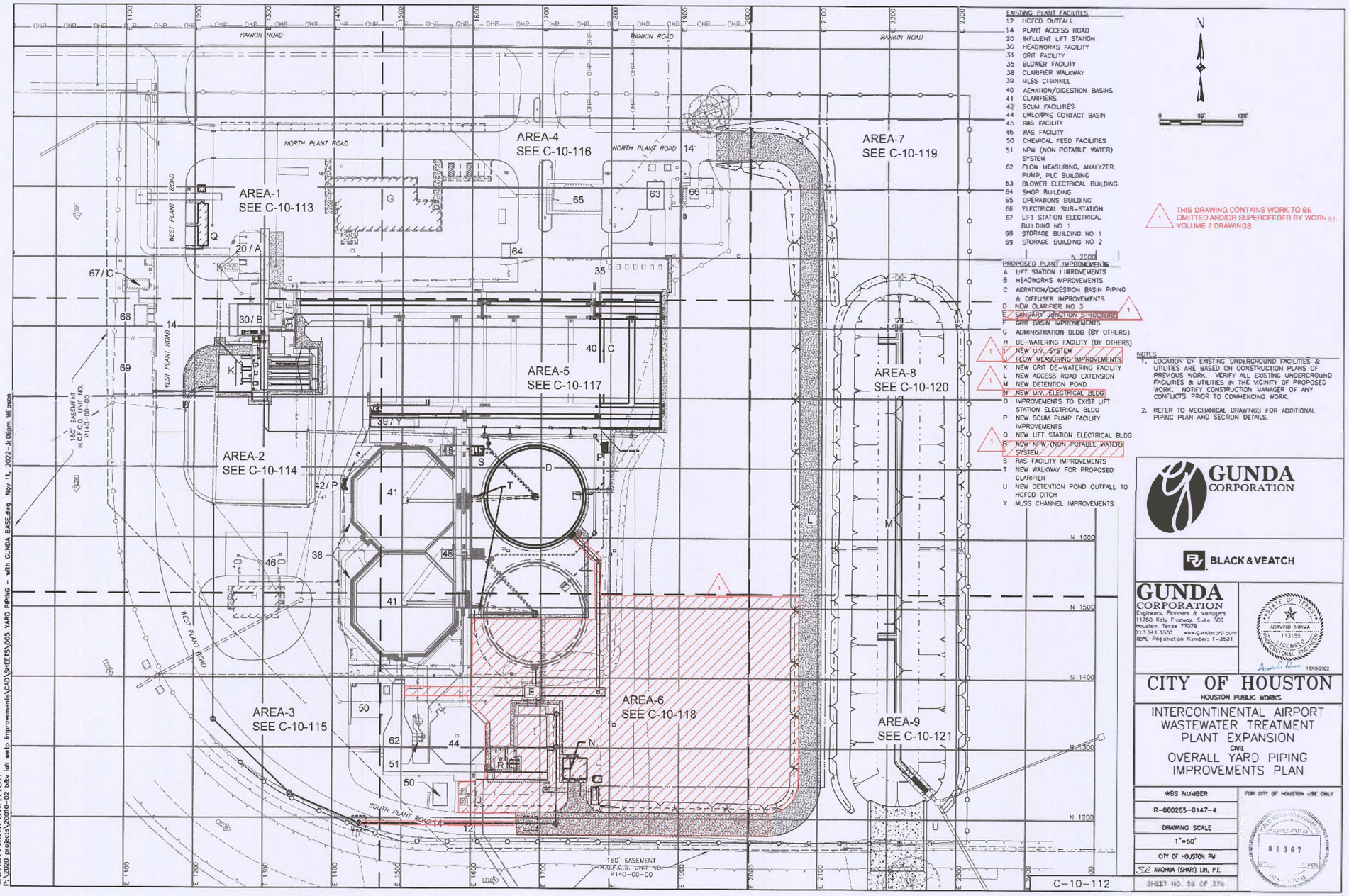
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

GRADING & DRAINAGE PLAN AREA-9

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	1"=20'
CITY OF HOUSTON PM	Se XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 58 OF 378	

FOR CITY OF HOUSTON USE ONLY

CIVIL
80367
REGISTERED



EXISTING PLANT FACILITIES

12 HCFCD OUTFALL
14 PLANT ACCESS ROAD
20 INFLUENT LIFT STATION
30 HEADWORKS FACILITY
31 GRIT FACILITY
35 BLOWER FACILITY
38 CLARIFIER WALKWAY
39 MLSS CHANNEL
40 AERATION/DIGESTION BASINS
41 CLARIFIERS
42 SCUM FACILITIES
44 CHLORINE CONTACT BASIN
45 RAS FACILITY
46 WAS FACILITY
50 CHEMICAL FEED FACILITIES
51 NPW (NON POTABLE WATER) SYSTEM
62 FLOW MEASURING, ANALYZER, PUMP, PLC BUILDING
63 BLOWER ELECTRICAL BUILDING
64 SHOP BUILDING
65 OPERATIONS BUILDING
66 ELECTRICAL SUB-STATION
67 LIFT STATION ELECTRICAL BUILDING NO 1
68 STORAGE BUILDING NO 1
69 STORAGE BUILDING NO 2

PROPOSED PLANT IMPROVEMENTS

A LIFT STATION IMPROVEMENTS
B HEADWORKS IMPROVEMENTS
C AERATION/DIGESTION BASIN PIPING & DIFFUSER IMPROVEMENTS
D NEW CLARIFIER NO 3
E SANITARY JUNCTION STRUCTURE
F GRIT BASIN IMPROVEMENTS
G ADMINISTRATION BLDG (BY OTHERS)
H DE-WATERING FACILITY (BY OTHERS)
I NEW U.V. SYSTEM
J FLOW MEASURING IMPROVEMENTS
K NEW GRIT DE-WATERING FACILITY
L NEW ACCESS ROAD EXTENSION
M NEW DETENTION POND
N NEW U.V. ELECTRICAL BLDG
O IMPROVEMENTS TO EXIST LIFT STATION ELECTRICAL BLDG
P NEW SCUM PUMP FACILITY IMPROVEMENTS
Q NEW LIFT STATION ELECTRICAL BLDG
R NEW NPW (NON POTABLE WATER) SYSTEM
S RAS FACILITY IMPROVEMENTS
T NEW WALKWAY FOR PROPOSED CLARIFIER
U NEW DETENTION POND OUTFALL TO HCFCD DITCH
Y MLSS CHANNEL IMPROVEMENTS

1 THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

NOTES

1. LOCATION OF EXISTING UNDERGROUND FACILITIES & UTILITIES ARE BASED ON CONSTRUCTION PLANS OF PREVIOUS WORK. VERIFY ALL EXISTING UNDERGROUND FACILITIES & UTILITIES IN THE VICINITY OF PROPOSED WORK. NOTIFY CONSTRUCTION MANAGER OF ANY CONFLICTS PRIOR TO COMMENCING WORK.
2. REFER TO MECHANICAL DRAWINGS FOR ADDITIONAL PIPING PLAN AND SECTION DETAILS.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 700
Houston, Texas 77079
713.541.3535 www.gundacorp.com
TBPE Registration Number: F-3531

ARAVIND NIMMA 113155 LICENSED PROFESSIONAL ENGINEER 11/09/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

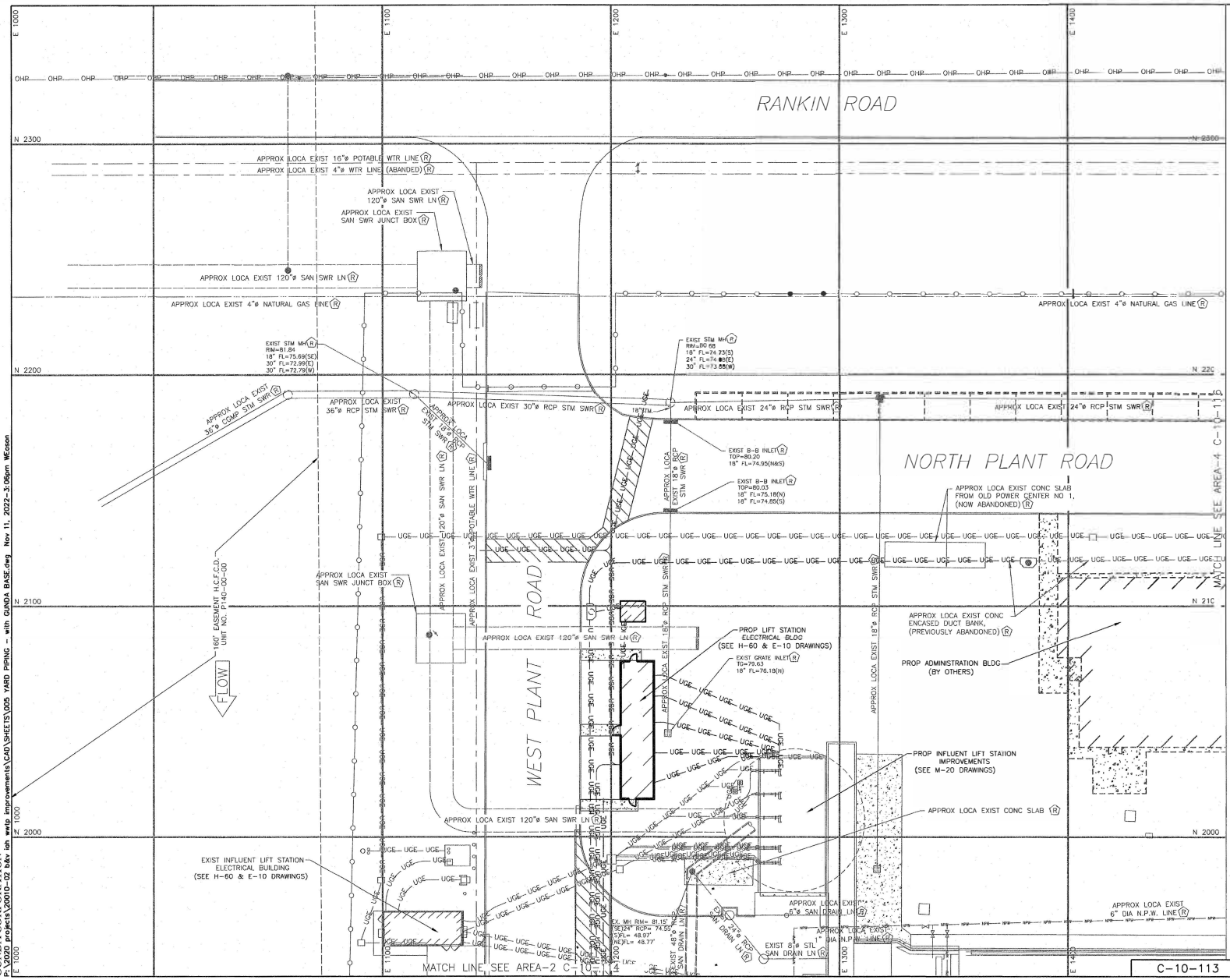
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
CIVIL
OVERALL YARD PIPING IMPROVEMENTS PLAN

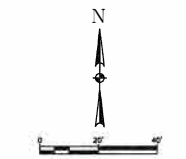
WBS NUMBER	R-000265-0147-4
DRAWING SCALE	1"=60'
CITY OF HOUSTON PM	SJ XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 59 OF 376	

FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS 80367 REGISTERED PROFESSIONAL ENGINEER

GUNDA CORPORATION
P:\2020 projects\20010-02 b&v coh wwtp improvements\CAD\SHEETS\005 YARD PIPING - with GUNDA BASE.dwg Nov 11, 2022 - 3:06pm WEmson





AREA 1	AREA 4	AREA 7
AREA 2	AREA 5	AREA 8
AREA 3	AREA 6	AREA 9

KEY MAP

NOTES:

1. SEE ELECTRICAL PLANS E-10 FOR MORE INFORMATION ON UNDERGROUND ELECTRICAL LINES, (PROP CONC ENCASED DUCT BANK).
2. SEE GRADING & DRAINAGE PLANS C-10 FOR THE PROPOSED STORM SEWER.
3. LOCATION OF EXISTING UNDERGROUND FACILITIES & UTILITIES ARE BASED ON CONSTRUCTION PLANS OF PREVIOUS WORK. VERIFY ALL EXISTING UNDERGROUND FACILITIES & UTILITIES IN THE VICINITY OF PROPOSED WORK. NOTIFY CONSTRUCTION MANAGER OF ANY CONFLICTS PRIOR TO COMMENCING WORK.
4. REFER TO MECHANICAL DRAWINGS FOR ADDITIONAL PIPING PLAN AND SECTION DETAILS.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
ARAVIND NIMMA
113155
LICENSED
PROFESSIONAL ENGINEER
11/01/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
CIVIL

YARD PIPING PLAN AREA-1

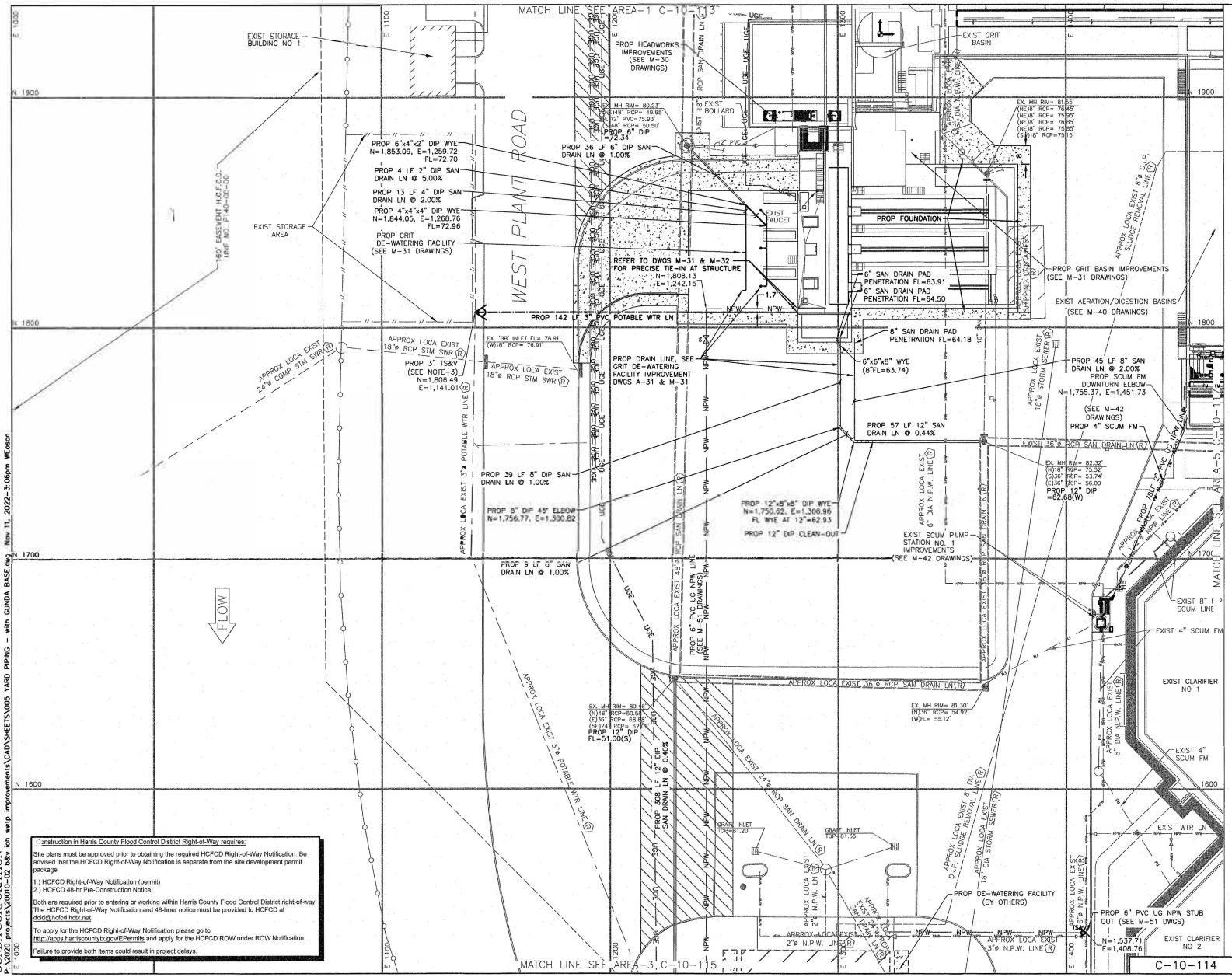
WBS NUMBER	R-000265-0147-4
DRAWING SCALE	1"=20'
CITY OF HOUSTON PM	Se XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 60 OF 379	

FOR CITY OF HOUSTON USE ONLY

PUBLIC WORKS AND ENGINEERING
80367
CITY OF HOUSTON

C-10-113

GUNDA CORPORATION
P:\2020 projects\20010-02 b&v iah wwip improvements\CAD\SHEETS\005 YARD PIPING - with GUNDA BASE.dwg Nov 11, 2022-3:06pm WEason



GUNDA CORPORATION
P:\2020 projects\20010-02 b&v ioh wwip improvements\CAD\SHEETS\005 YARD PIPING - with GUNDA BASE.dwg Nov 11, 2022-3:06pm WEason

Construction in Harris County Flood Control District Right-of-Way requires:

Site plans must be approved prior to obtaining the required HCFCD Right-of-Way Notification. Be advised that the HCFCD Right-of-Way Notification is separate from the site development permit package

1.) HCFCD Right-of-Way Notification (permit)
2.) HCFCD 48-hr Pre-Construction Notice

Both are required prior to entering or working within Harris County Flood Control District right-of-way. The HCFCD Right-of-Way Notification and 48-hour notice must be provided to HCFCD at doid@hcfcd.hctx.net

To apply for the HCFCD Right-of-Way Notification please go to http://apps.harriscountytx.gov/EPermits and apply for the HCFCD ROW under ROW Notification.

Failure to provide both items could result in project delays.

N

0 20' 40'

AREA 1	AREA 4	AREA 7
AREA 2	AREA 5	AREA 8
AREA 3	AREA 6	AREA 9

KEY MAP

NOTES:

1. SEE ELECTRICAL PLANS E-10 FOR MORE INFORMATION ON UNDERGROUND ELECTRICAL LINES, (PROP CONC ENCASED DUCT BANK).
2. SEE GRADING & DRAINAGE PLANS C-10 FOR THE PROPOSED STORM SEWER.
3. CONTRACTOR TO FIELD LOCATE EXIST 3" PW LINE PRIOR TO CONSTRUCTION OF PROP 3" PW LINE.
4. LOCATION OF EXISTING UNDERGROUND FACILITIES & UTILITIES ARE BASED ON CONSTRUCTION PLANS OF PREVIOUS WORK. VERIFY ALL EXISTING UNDERGROUND FACILITIES & UTILITIES IN THE VICINITY OF PROPOSED WORK. NOTIFY CONSTRUCTION MANAGER OF ANY CONFLICTS PRIOR TO COMMENCING WORK.
5. REFER TO MECHANICAL DRAWINGS FOR ADDITIONAL PIPING PLAN AND SECTION DETAILS.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS ARAWIND NIMMA 113155 LICENSED PROFESSIONAL ENGINEER 11/09/2022

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

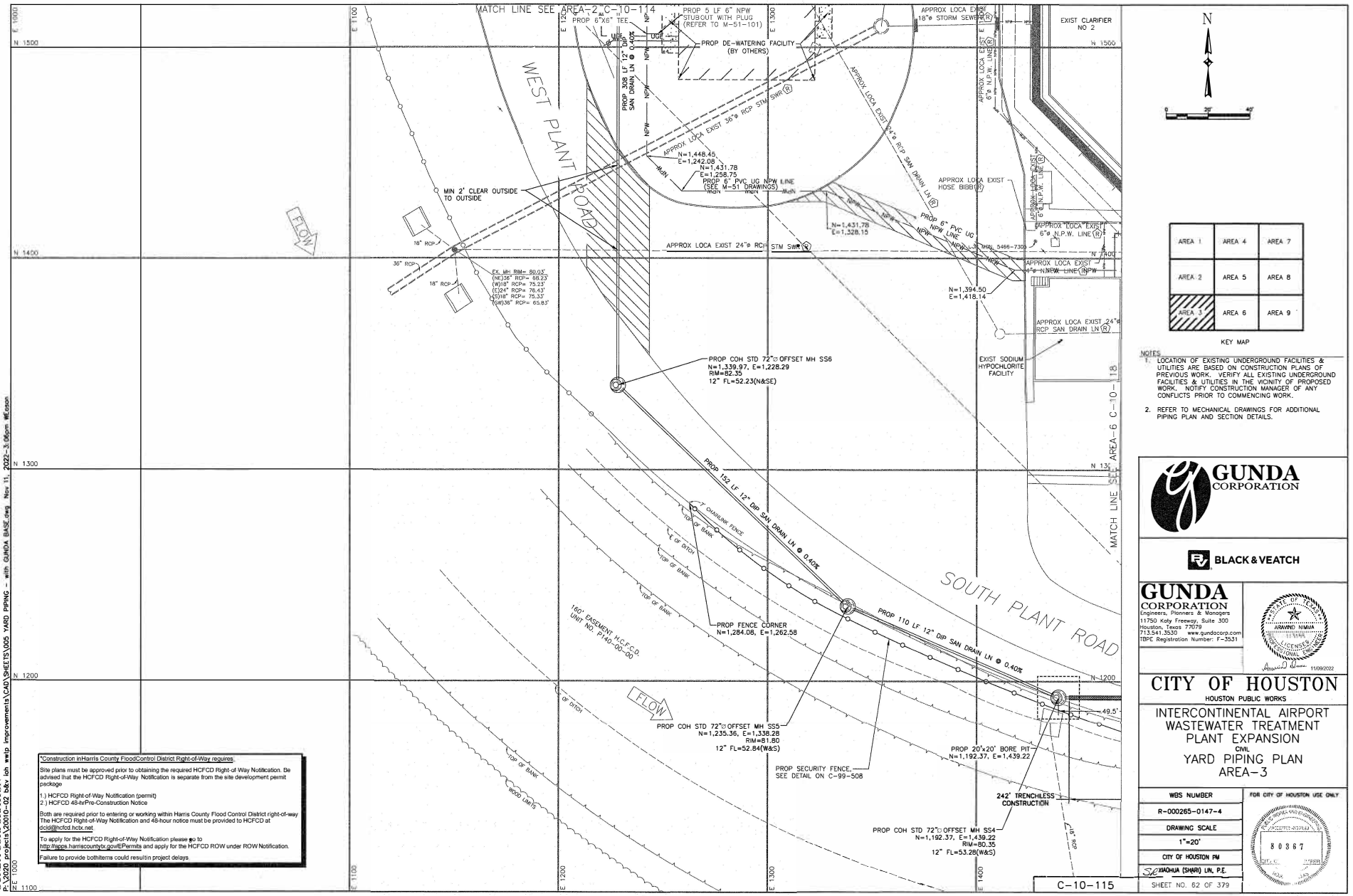
CIVIL

YARD PIPING PLAN AREA-2

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	1"=20'
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 61 OF 379	

FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS 80367 REGISTERED PROFESSIONAL ENGINEER 11/09/2022



NOTES

1. LOCATION OF EXISTING UNDERGROUND FACILITIES & UTILITIES ARE BASED ON CONSTRUCTION PLANS OF PREVIOUS WORK. VERIFY ALL EXISTING UNDERGROUND FACILITIES & UTILITIES IN THE VICINITY OF PROPOSED WORK. NOTIFY CONSTRUCTION MANAGER OF ANY CONFLICTS PRIOR TO COMMENCING WORK.
2. REFER TO MECHANICAL DRAWINGS FOR ADDITIONAL PIPING PLAN AND SECTION DETAILS.

*Construction in Harris County FloodControl District Right-of-Way requires.

Site plans must be approved prior to obtaining the required HCFCD Right-of Way Notification. Be advised that the HCFCD Right-of-Way Notification is separate from the site development permit package

1.) HCFCD Right-of Way Notification (permit)
2.) HCFCD 48-hrPre-Construction Notice

Both are required prior to entering or working within Harris County Flood Control District right-of-way The HCFCD Right-of-Way Notification and 48-hour notice must be provided to HCFCD at dcid@hcfcd.hctx.net.

To apply for the HCFCD Right-of-Way Notification please go to http://apps.harriscountytx.gov/EPermits and apply for the HCFCD ROW under ROW Notification.

Failure to provide bothitems could resultin project delays.

GUNDA CORPORATION

P:\2020 projects\20010-02 b&v ioh wwtp improvements\CAD\SHEETS\005 YARD PIPING - with GUNDA BASE.dwg Nov 11, 2022 - 3:06pm wEason

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

ARAVIND NIMMA LICENSED PROFESSIONAL ENGINEER 11/09/2022

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

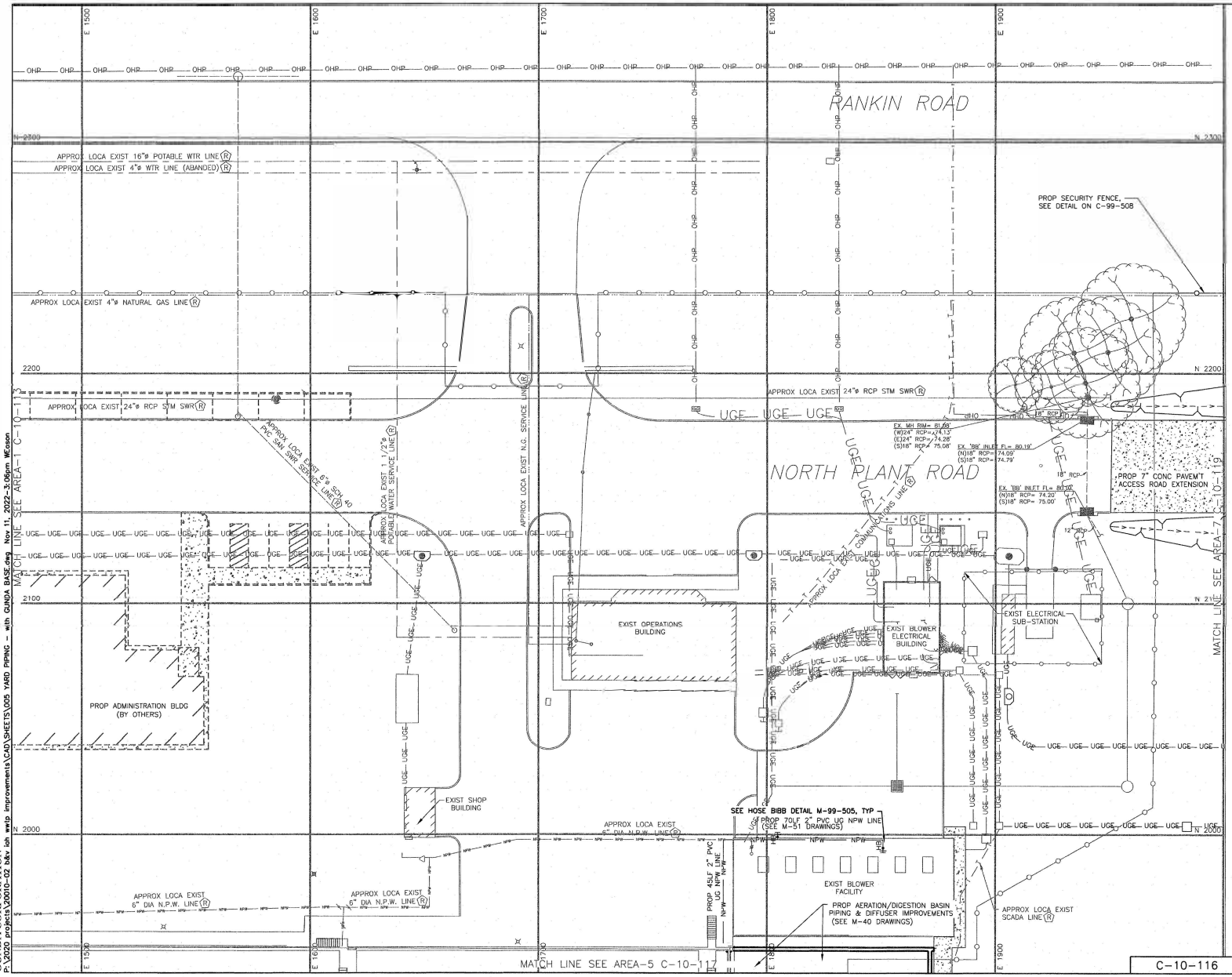
CIVIL

YARD PIPING PLAN AREA-3

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	1"=20'
CITY OF HOUSTON PM	Se XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 62 OF 379	

FOR CITY OF HOUSTON USE ONLY

ACCEPTED - NOT FOR CONSTRUCTION 80367 CIVIL



N

0 20' 40'

LEGEND

HB HOSE BIBB (SEE NPW DWGS M-51 & S-51)

AREA 1	AREA 4	AREA 7
AREA 2	AREA 5	AREA 8
AREA 3	AREA 6	AREA 9

KEY MAP

NOTES:

1. SEE ELECTRICAL PLANS E-10 FOR MORE INFORMATION ON UNDERGROUND ELECTRICAL LINES, (PROP CONC ENCASED DUCT BANK).
2. LOCATION OF EXISTING UNDERGROUND FACILITIES & UTILITIES ARE BASED ON CONSTRUCTION PLANS OF PREVIOUS WORK. VERIFY ALL EXISTING UNDERGROUND FACILITIES & UTILITIES IN THE VICINITY OF PROPOSED WORK. NOTIFY CONSTRUCTION MANAGER OF ANY CONFLICTS PRIOR TO COMMENCING WORK.
3. REFER TO MECHANICAL DRAWINGS FOR ADDITIONAL PIPING PLAN AND SECTION DETAILS.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS ARAVIND NIMMA 113155 LICENSED PROFESSIONAL ENGINEER 11/09/2022

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

CIVIL

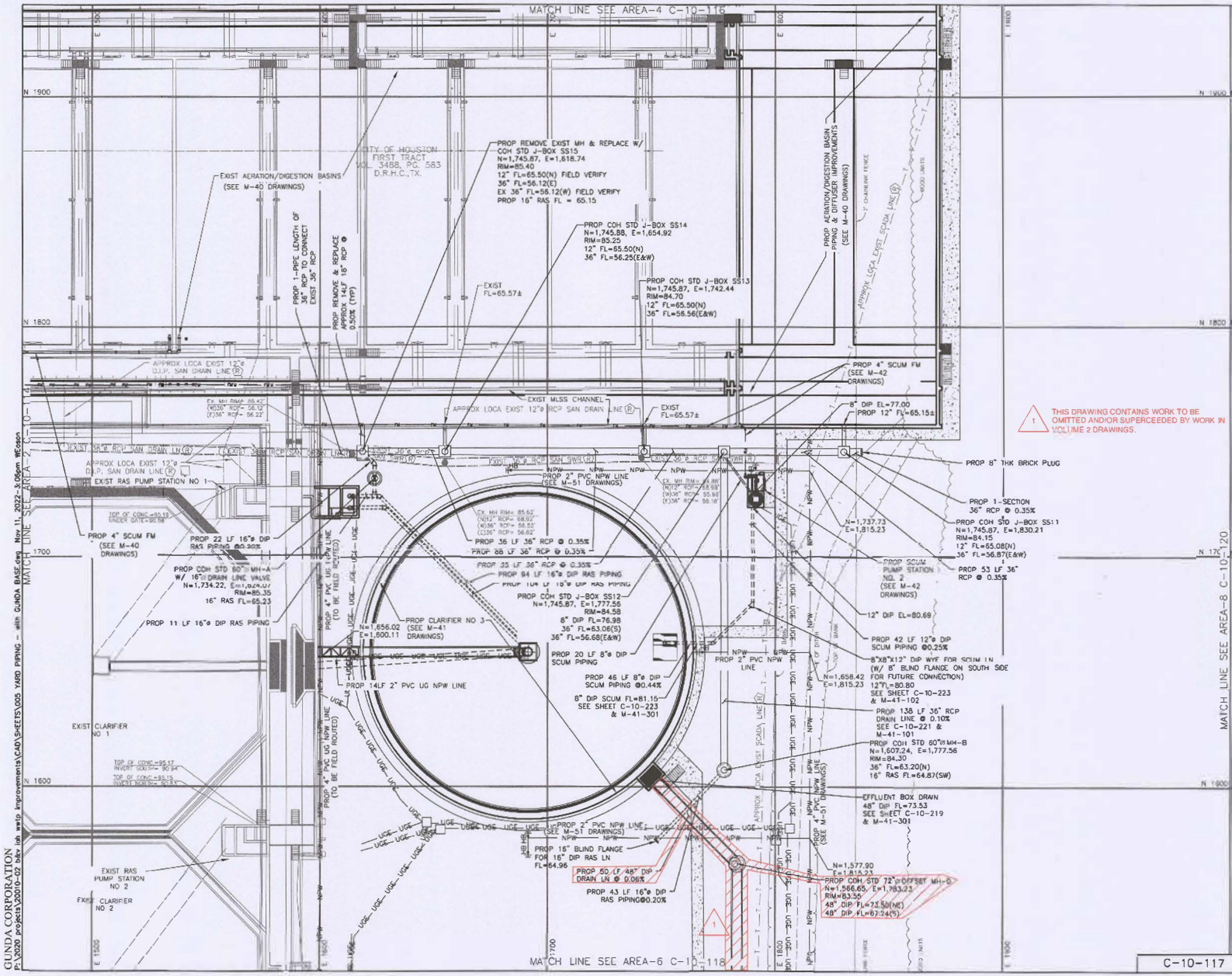
YARD PIPING PLAN AREA-4

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	1"=20'
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO.	63 OF 379

FOR CITY OF HOUSTON USE ONLY

80367

GUNDA CORPORATION
P:\2020 projects\20010-02 b&v ioh wwtp improvements\CAD\SHEETS\05 YARD PIPING - with GUNDA BASE.dwg Nov 11, 2022 - 3:06pm WCason



THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

LEGEND

HB HOSE BIBB (SEE NPW DWGS M-51 & S-51)

KEY MAP

AREA 1	AREA 4	AREA 7
AREA 2	AREA 5	AREA 8
AREA 3	AREA 6	AREA 9

NOTES:

1. SEE ELECTRICAL PLANS E-10 FOR MORE INFORMATION ON UNDERGROUND ELECTRICAL LINES. (PROP CONC ENCASED DUCT BANK).
2. SEE GRADING & DRAINAGE PLANS C-10 FOR THE PROPOSED STORM SEWER.
3. LOCATION OF EXISTING UNDERGROUND FACILITIES & UTILITIES ARE BASED ON CONSTRUCTION PLANS OF PREVIOUS WORK. VERIFY ALL EXISTING UNDERGROUND FACILITIES & UTILITIES IN THE VICINITY OF PROPOSED WORK. NOTIFY CONSTRUCTION MANAGER OF ANY CONFLICTS PRIOR TO COMMENCING WORK.
4. REFER TO MECHANICAL DRAWINGS FOR ADDITIONAL PIPING PLAN AND SECTION DETAILS.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS ARAVIND NIMMA 113155 LICENSED PROFESSIONAL ENGINEER 11/09/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
CIVIL

YARD PIPING PLAN AREA-5

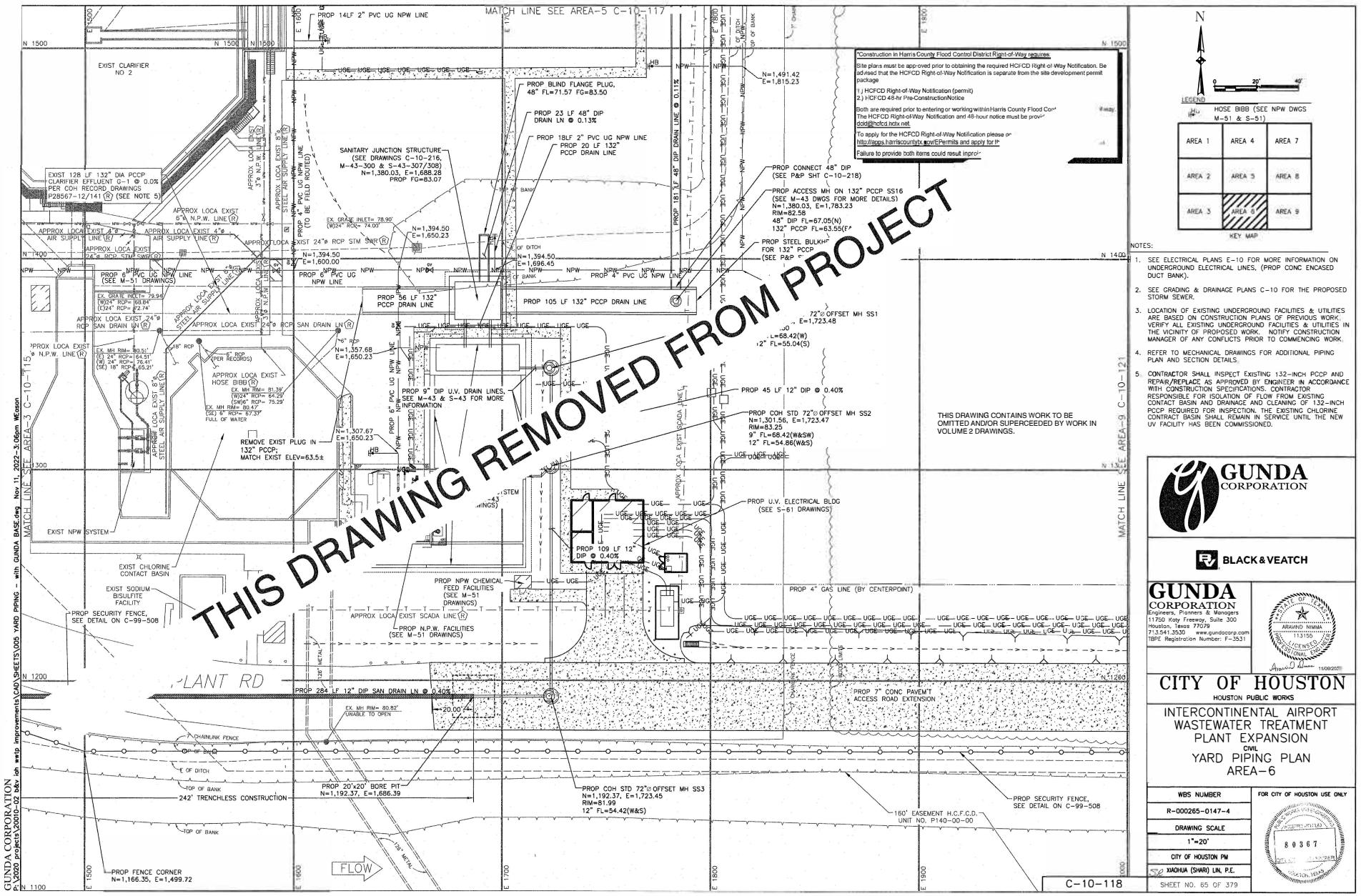
WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
1"=20'	
CITY OF HOUSTON PM	
ZACHARIA (SHAUN) LIN, P.E.	

STATE OF TEXAS 80367 REGISTERED PROFESSIONAL ENGINEER

C-10-117

SHEET NO. 64 OF 379

GUNDA CORPORATION
P:\2020 projects\20010-02 hdr iah ww1p improvements\CAD\SHEETS\05 YARD PIPING - with GUNDA BASE.dwg Nov 11, 2022 - 3:08pm WCason



*Construction in Harris County Flood Control District Right-of-Way requires

Site plans must be approved prior to obtaining the required HCFCD Right-of-Way Notification. Be advised that the HCFCD Right-of-Way Notification is separate from the site development permit package

1.) HCFCD Right-of-Way Notification (permit)
2.) HCFCD 48-hr Pre-ConstructionNotice

Both are required prior to entering or working within Harris County Flood Con* The HCFCD Right-of-Way Notification and 48-hour notice must be provi* dodd@hcfcd.hctx.net

To apply for the HCFCD Right-of-Way Notification please o http://pags.harriscountytx.gov/EPermits and apply for th*

Failure to provide both items could result inproj*

N

0 20' 40'

LEGEND

HB HOSE BIBB (SEE NPW DWGS M-51 & S-51)

AREA 1	AREA 4	AREA 7
AREA 2	AREA 5	AREA 8
AREA 3	AREA 6	AREA 9

KEY MAP

NOTES:

1. SEE ELECTRICAL PLANS E-10 FOR MORE INFORMATION ON UNDERGROUND ELECTRICAL LINES, (PROP CONC ENCASED DUCT BANK).
2. SEE GRADING & DRAINAGE PLANS C-10 FOR THE PROPOSED STORM SEWER.
3. LOCATION OF EXISTING UNDERGROUND FACILITIES & UTILITIES ARE BASED ON CONSTRUCTION PLANS OF PREVIOUS WORK. VERIFY ALL EXISTING UNDERGROUND FACILITIES & UTILITIES IN THE VICINITY OF PROPOSED WORK. NOTIFY CONSTRUCTION MANAGER OF ANY CONFLICTS PRIOR TO COMMENCING WORK.
4. REFER TO MECHANICAL DRAWINGS FOR ADDITIONAL PIPING PLAN AND SECTION DETAILS.
5. CONTRACTOR SHALL INSPECT EXISTING 132-INCH PCCP AND REPAIR/REPLACE AS APPROVED BY ENGINEER IN ACCORDANCE WITH CONSTRUCTION SPECIFICATIONS. CONTRACTOR RESPONSIBLE FOR ISOLATION OF FLOW FROM EXISTING CONTACT BASIN AND DRAINAGE AND CLEANING OF 132-INCH PCCP REQUIRED FOR INSPECTION. THE EXISTING CHLORINE CONTRACT BASIN SHALL REMAIN IN SERVICE UNTIL THE NEW UV FACILITY HAS BEEN COMMISSIONED.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

ARWIND NIMMA 113155 LICENSED PROFESSIONAL ENGINEER 11/09/2022

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

CIVIL

YARD PIPING PLAN AREA-6

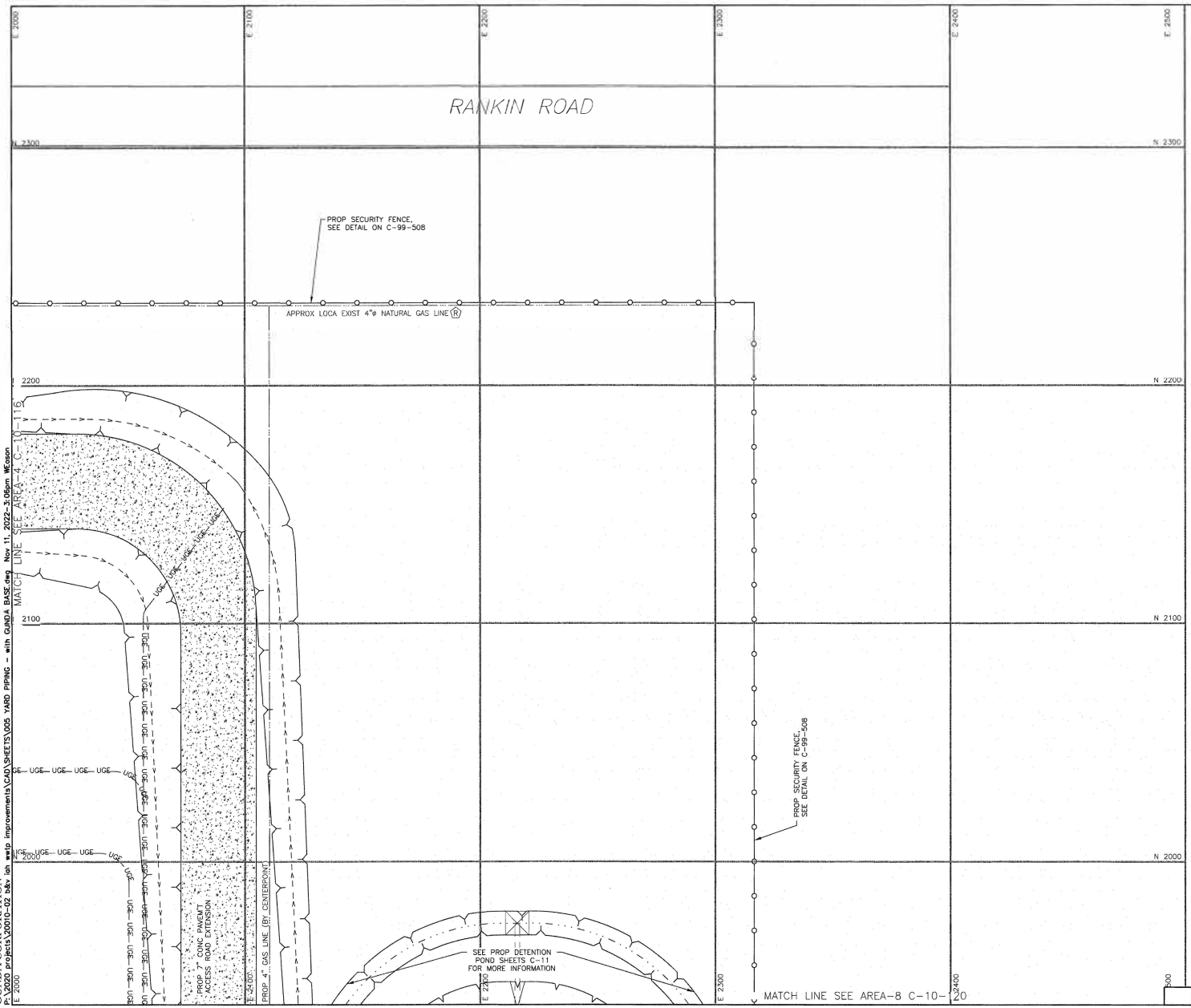
WBS NUMBER	R-000265-0147-4
DRAWING SCALE	1"=20'
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 65 OF 379	

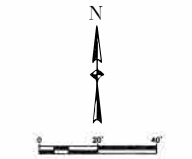
FOR CITY OF HOUSTON USE ONLY

80367 REGISTERED PROFESSIONAL ENGINEER

C-10-118

GUNDA CORPORATION
P:\2020 projects\20010-02 b&v on wwtp improvements\CAD\SHEETS\005 YARD PIPING - with GUNDA BASE.dwg Nov 11, 2022 - 3:06pm WCason





AREA 1	AREA 4	AREA 7
AREA 2	AREA 5	AREA 8
AREA 3	AREA 6	AREA 9

KEY MAP

NOTES:

1. SEE ELECTRICAL PLANS E-10 FOR MORE INFORMATION ON UNDERGROUND ELECTRICAL LINES, (PROP CONC ENCASED DUCT BANK).
2. SEE GRADING & DRAINAGE PLANS C-10 FOR THE PROPOSED STORM SEWER.
3. LOCATION OF EXISTING UNDERGROUND FACILITIES & UTILITIES ARE BASED ON CONSTRUCTION PLANS OF PREVIOUS WORK. VERIFY ALL EXISTING UNDERGROUND FACILITIES & UTILITIES IN THE VICINITY OF PROPOSED WORK. NOTIFY CONSTRUCTION MANAGER OF ANY CONFLICTS PRIOR TO COMMENCING WORK.
4. REFER TO MECHANICAL DRAWINGS FOR ADDITIONAL PIPING PLAN AND SECTION DETAILS.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
ARAVIND NIMMA
113155
LICENSED
PROFESSIONAL ENGINEER
11/09/2022

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

CIVIL

YARD PIPING PLAN AREA-7

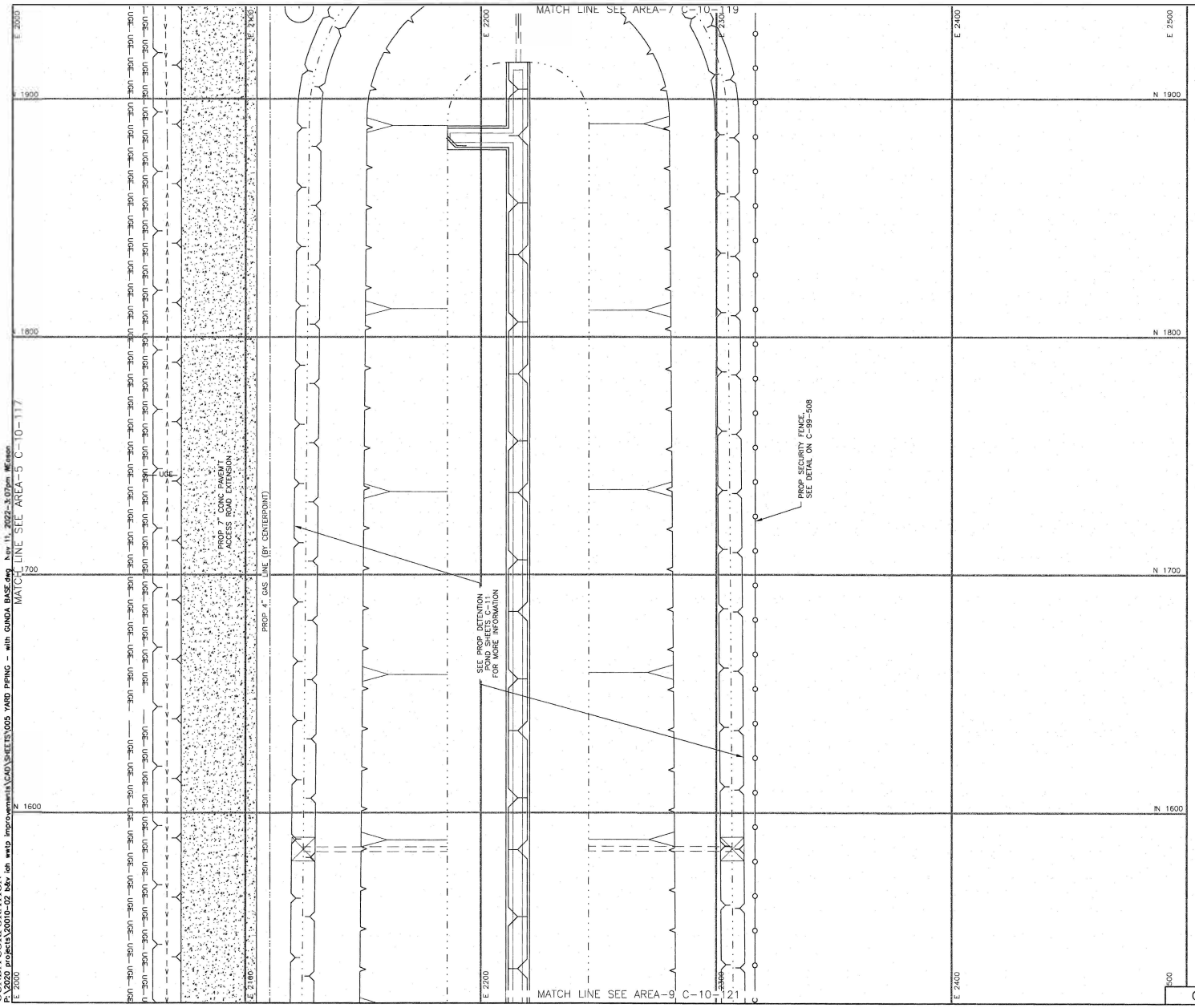
WBS NUMBER	R-000265-0147-4
DRAWING SCALE	1"=20'
CITY OF HOUSTON PM	Se XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 66 OF 379	

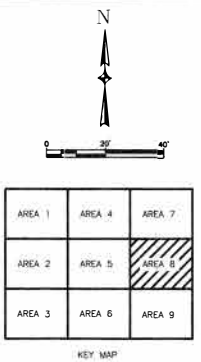
FOR CITY OF HOUSTON USE ONLY

80367

C-10-119

P:\2020 projects\20010-02 b&v iah wwtp improvements\CAD\SHEETS\005 YARD PIPING - with GUNDA BASE.dwg Nov 11, 2022 - 3:06pm WEason
GUNDA CORPORATION





NOTES:

1. SEE ELECTRICAL PLANS E-10 FOR MORE INFORMATION ON UNDERGROUND ELECTRICAL LINES, (PROP CONC ENCASED DUCT BANK).
2. SEE GRADING & DRAINAGE PLANS C-10 FOR THE PROPOSED STORM SEWER.
3. LOCATION OF EXISTING UNDERGROUND FACILITIES & UTILITIES ARE BASED ON CONSTRUCTION PLANS OF PREVIOUS WORK. VERIFY ALL EXISTING UNDERGROUND FACILITIES & UTILITIES IN THE VICINITY OF PROPOSED WORK. NOTIFY CONSTRUCTION MANAGER OF ANY CONFLICTS PRIOR TO COMMENCING WORK.
4. REFER TO MECHANICAL DRAWINGS FOR ADDITIONAL PIPING PLAN AND SECTION DETAILS.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
ARAVIND NIMMA
113150
LICENSED PROFESSIONAL ENGINEER
11/09/2022

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

CIVIL

YARD PIPING PLAN AREA-8

WBS NUMBER
R-000265-0147-4
DRAWING SCALE
1"=20'
CITY OF HOUSTON PM
XIAOHUA (SHARI) LIN, P.E.

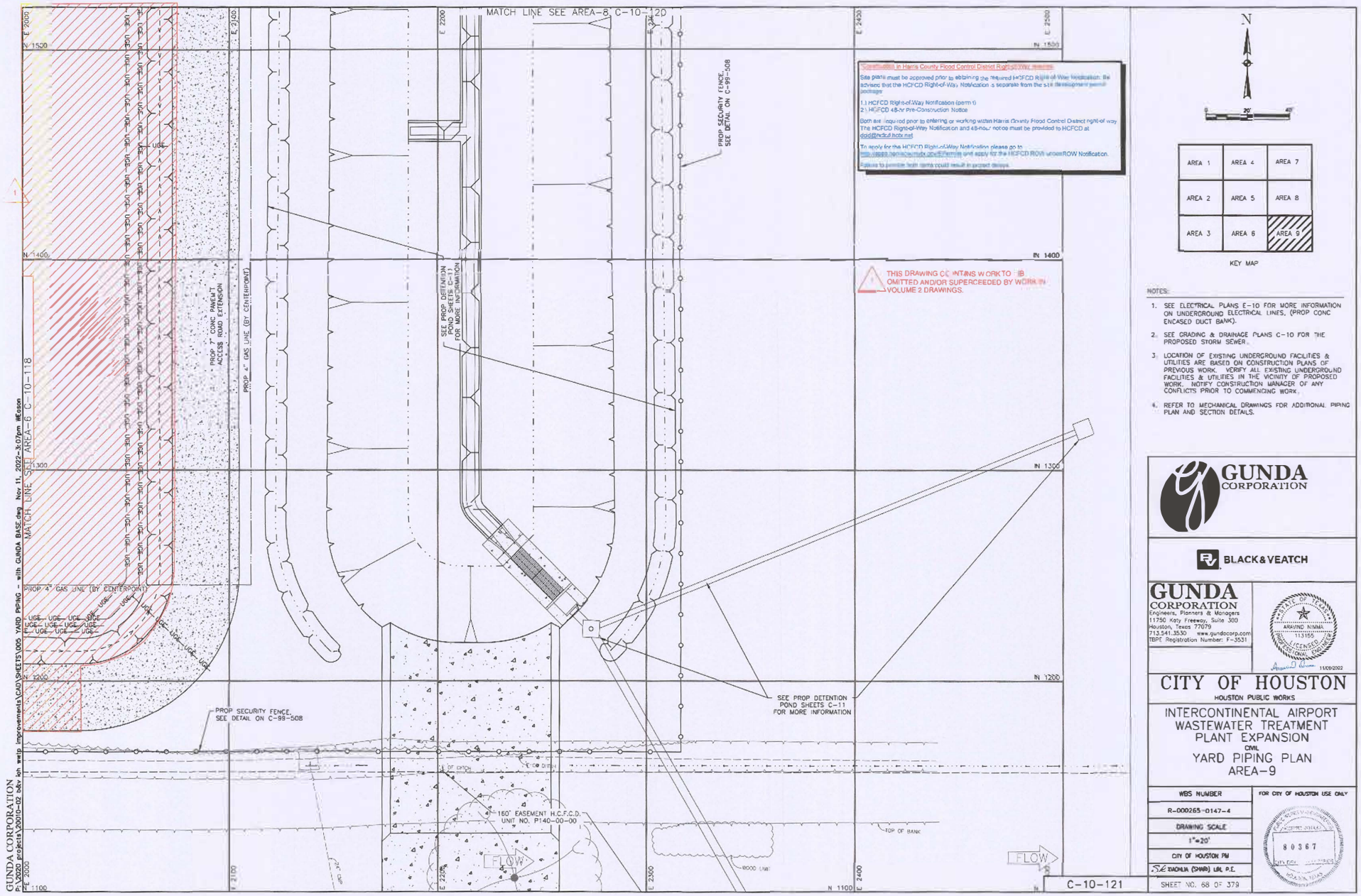
FOR CITY OF HOUSTON USE ONLY

ACCEPTED NOTED
80367
CITY ENG. HOUSTON, TEXAS

C-10-120

SHEET NO. 67 OF 379

GUNDA CORPORATION
P:\2020 projects\20010-02 bbv ioh wwtp improvements\CAD\SHEETS\005 YARD PIPING - with GUNDA BASE.dwg Nov 11, 2022-3:07pm MKeen



Construction in Harris County Flood Control District Right-of-Way requires:

Site plans must be approved prior to obtaining the required HCFCD Right-of-Way Notification. Be advised that the HCFCD Right-of-Way Notification is separate from the site development permit package

1.) HCFCD Right-of-Way Notification (permit)
2.) HCFCD 48-hr Pre-Construction Notice

Both are required prior to entering or working within Harris County Flood Control District right-of-way. The HCFCD Right-of-Way Notification and 48-hour notice must be provided to HCFCD at dod@hcfcd.hctx.net

To apply for the HCFCD Right-of-Way Notification please go to http://www.hcfcdmaps.com/Permits and apply for the HCFCD ROW or non-ROW Notification.

Failure to provide both items could result in project delays.

N

0 20' 40'

AREA 1	AREA 4	AREA 7
AREA 2	AREA 5	AREA 8
AREA 3	AREA 6	AREA 9

KEY MAP

NOTES:

1. SEE ELECTRICAL PLANS E-10 FOR MORE INFORMATION ON UNDERGROUND ELECTRICAL LINES, (PROP CONC ENCASED DUCT BANK).
2. SEE GRADING & DRAINAGE PLANS C-10 FOR THE PROPOSED STORM SEWER.
3. LOCATION OF EXISTING UNDERGROUND FACILITIES & UTILITIES ARE BASED ON CONSTRUCTION PLANS OF PREVIOUS WORK. VERIFY ALL EXISTING UNDERGROUND FACILITIES & UTILITIES IN THE VICINITY OF PROPOSED WORK. NOTIFY CONSTRUCTION MANAGER OF ANY CONFLICTS PRIOR TO COMMENCING WORK.
4. REFER TO MECHANICAL DRAWINGS FOR ADDITIONAL PIPING PLAN AND SECTION DETAILS.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

ARAVIND NIMMA 113155 LICENSED PROFESSIONAL ENGINEER 11/09/2022

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

CIVIL

YARD PIPING PLAN AREA-9

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	1"=20'
CITY OF HOUSTON PM	SHAHLA (SHARI) LAL P.E.

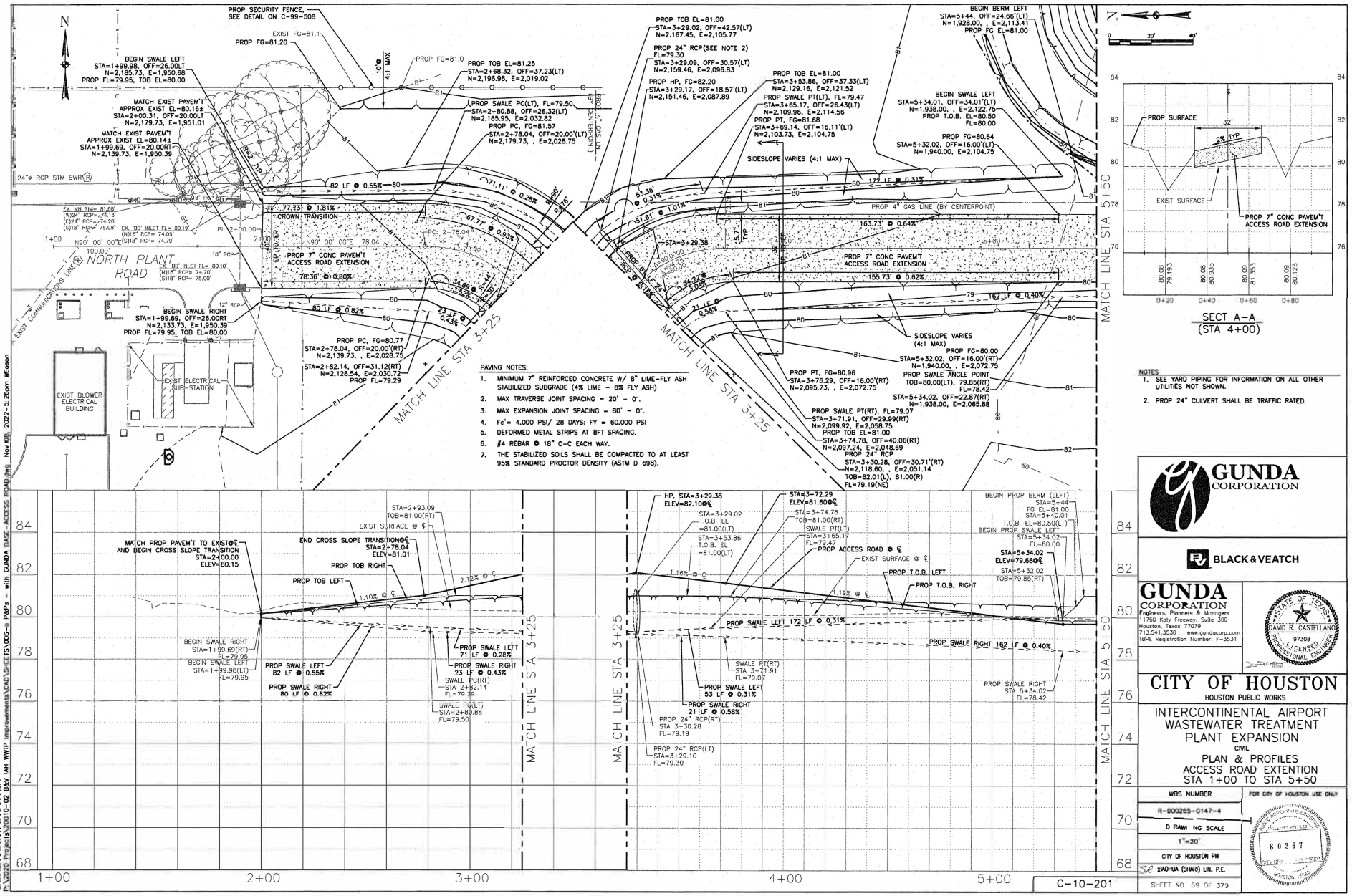
FOR CITY OF HOUSTON USE ONLY

80367 REGISTERED PROFESSIONAL ENGINEER 11/09/2022

C-10-121

SHEET NO. 68 OF 379

GUNDA CORPORATION
P:\2020 projects\2020-02 ibh wwtp improvements\CAD\SHEETS\005 YARD PIPING - with GUNDA BASE.dwg Nov 11, 2022 - 3:07pm WEason



GUNDA CORPORATION

GUNDA CORPORATION
BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
CIVIL

PLAN & PROFILES ACCESS ROAD EXTENTION STA 1+00 TO STA 5+50

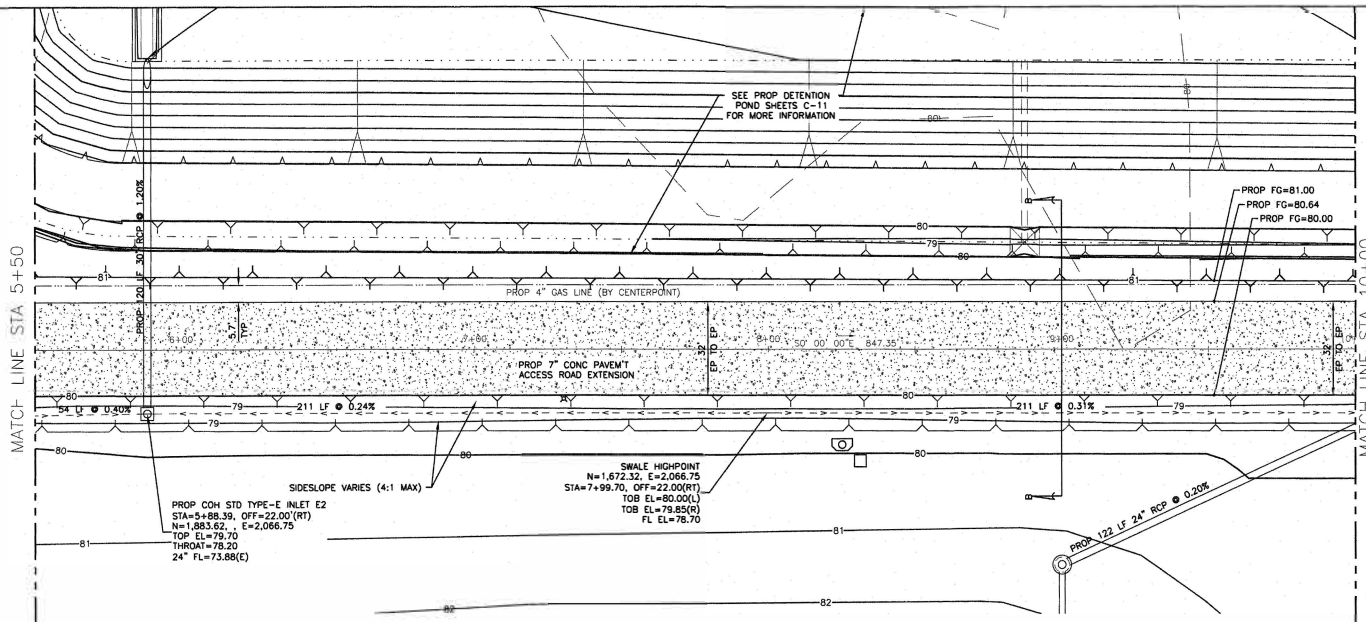
WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
D RAWI NG SCALE	
1"=20'	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	

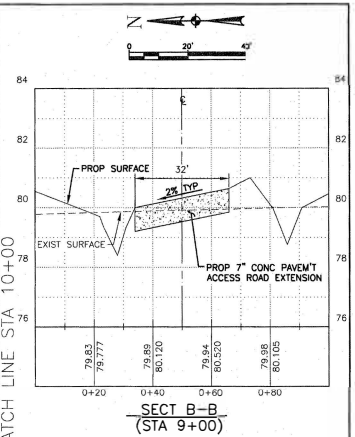
80367
REGISTERED
CITY OF HOUSTON, TEXAS

C-10-201

SHEET NO. 69 OF 379

GUNDA CORPORATION
P:\2020 Projects\20010-02 B&V IAH WWTP Improvements\CAD\SHEETS\005-a P&Ps - with GUNDA BASE-ACCESS ROAD.dwg Nov 08, 2022-5:26pm WEason

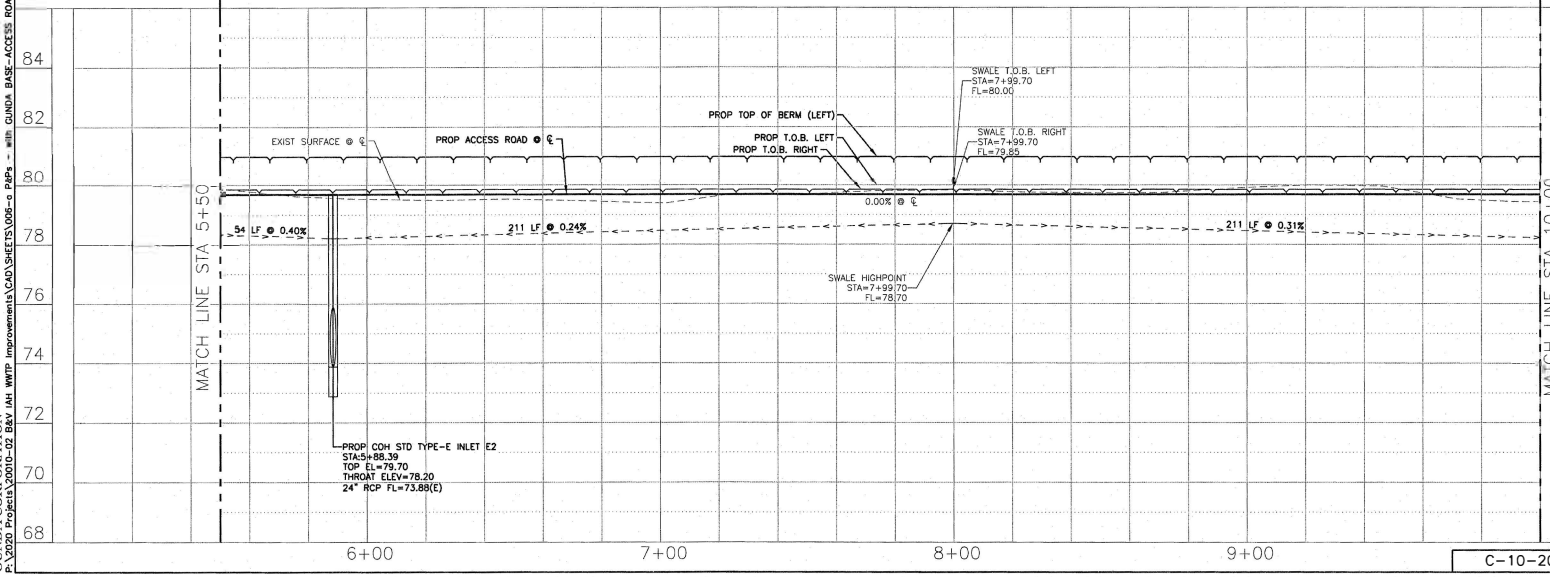




SECT B-B
(STA 9+00)

PAVING NOTES:

1. MINIMUM 7" REINFORCED CONCRETE W/ 8" LIME-FLY ASH STABILIZED SUBGRADE (4% LIME - 8% FLY ASH)
2. MAX TRAVERSE JOINT SPACING = 20' - 0".
3. MAX EXPANSION JOINT SPACING = 80' - 0".
4. Fc'= 4,000 PSI/ 28 DAYS; FY = 60,000 PSI
5. DEFORMED METAL STRIPS AT 8FT SPACING.
6. #4 REBAR @ 18" C-C EACH WAY.
7. THE STABILIZED SOILS SHALL BE COMPACTED TO AT LEAST 95% STANDARD PROCTOR DENSITY (ASTM D 698).



GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
CIVIL

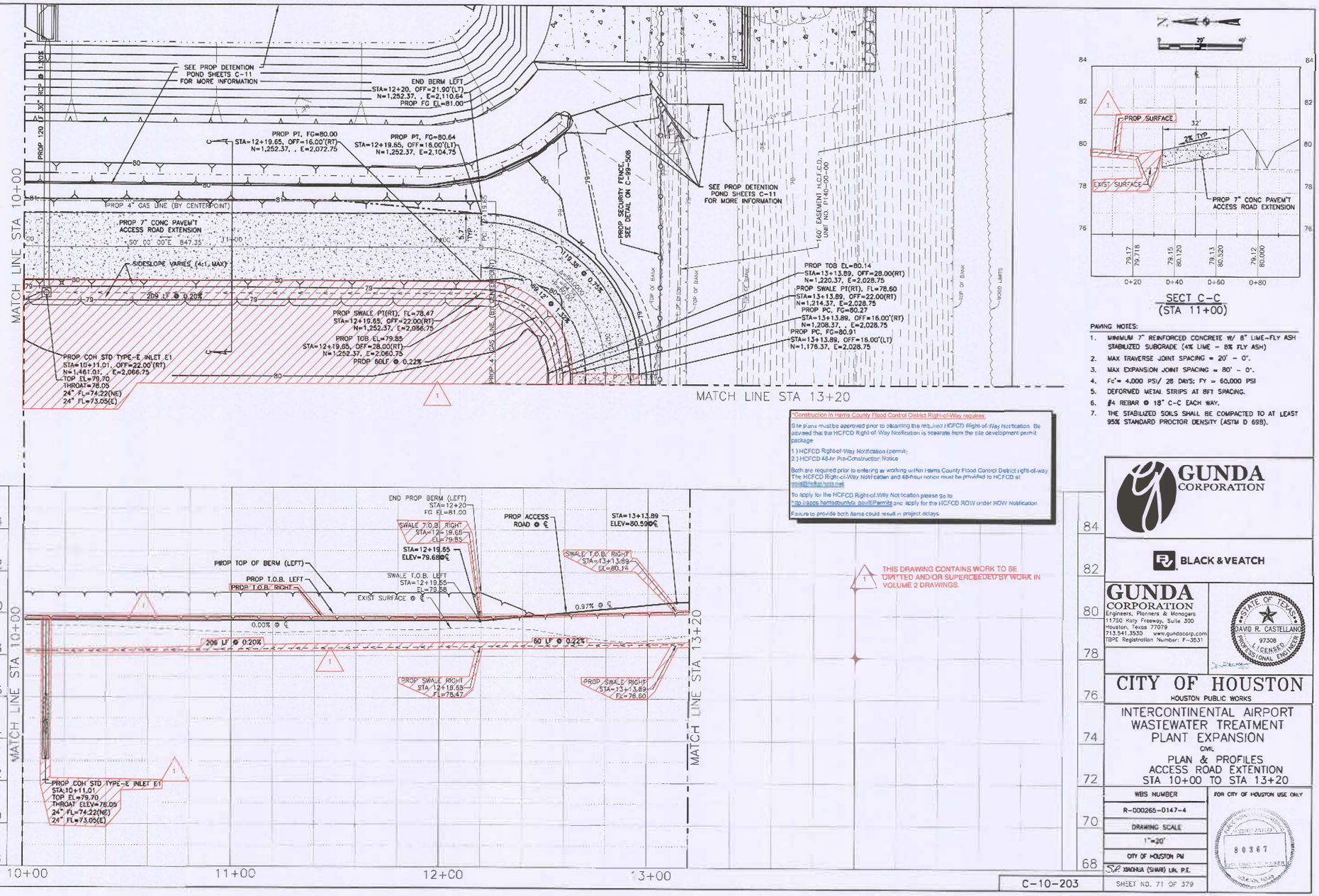
PLAN & PROFILES
ACCESS ROAD EXTENTION
STA 5+50 TO STA 10+00

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	1"=20'
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 70 OF 379	C-10-202

FOR CITY OF HOUSTON USE ONLY

80367
REGISTERED
PROFESSIONAL ENGINEER

GUNDA CORPORATION
P:\2020 Projects\20010-02 B&V IAH WWTP Improvements\CAD\SHEETS\006-a PAPs - with GUNDA BASE-ACCESS ROAD.dwg Nov 08, 2022-5:26pm WEason



SECT C-C
(STA 11+00)

PAVING NOTES:

1. MINIMUM 7" REINFORCED CONCRETE W/ 8" LIME-FLY ASH STABILIZED SUBGRADE (4% LIME – 8% FLY ASH)
2. MAX TRAVERSE JOINT SPACING = 20' – 0".
3. MAX EXPANSION JOINT SPACING = 80' – 0".
4. Fc'= 4,000 PSI/ 28 DAYS; FY = 60,000 PSI
5. DEFORMED METAL STRIPS AT 8FT SPACING.
6. #4 REBAR @ 18" C-C EACH WAY.
7. THE STABILIZED SOILS SHALL BE COMPACTED TO AT LEAST 95% STANDARD PROCTOR DENSITY (ASTM D 698).

*Construction in Harris County Flood Control District Right-of-Way requires:

Site plans must be approved prior to obtaining the required HCFCD Right-of-Way Notification. Be advised that the HCFCD Right-of-Way Notification is separate from the site development permit package

1.) HCFCD Right-of-Way Notification (permit)
2.) HCFCD 48-hr Pre-Construction Notice

Both are required prior to entering or working within Harris County Flood Control District right-of-way. The HCFCD Right-of-Way Notification and 48-hour notice must be provided to HCFCD at inspect@hcfcd.hctx.net

To apply for the HCFCD Right-of-Way Notification please go to https://apps.harriscountytx.gov/IEPermits and apply for the HCFCD ROW under ROW Notification

Failure to provide both items could result in project delays.

1 THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3631

STATE OF TEXAS DAVID R. CASTELLANO 97308 LICENSED PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
CIVIL

PLAN & PROFILES ACCESS ROAD EXTENTION STA 10+00 TO STA 13+20

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	1"=20'
CITY OF HOUSTON PM	XIAOHUA (SHAWN) LIN, P.E.

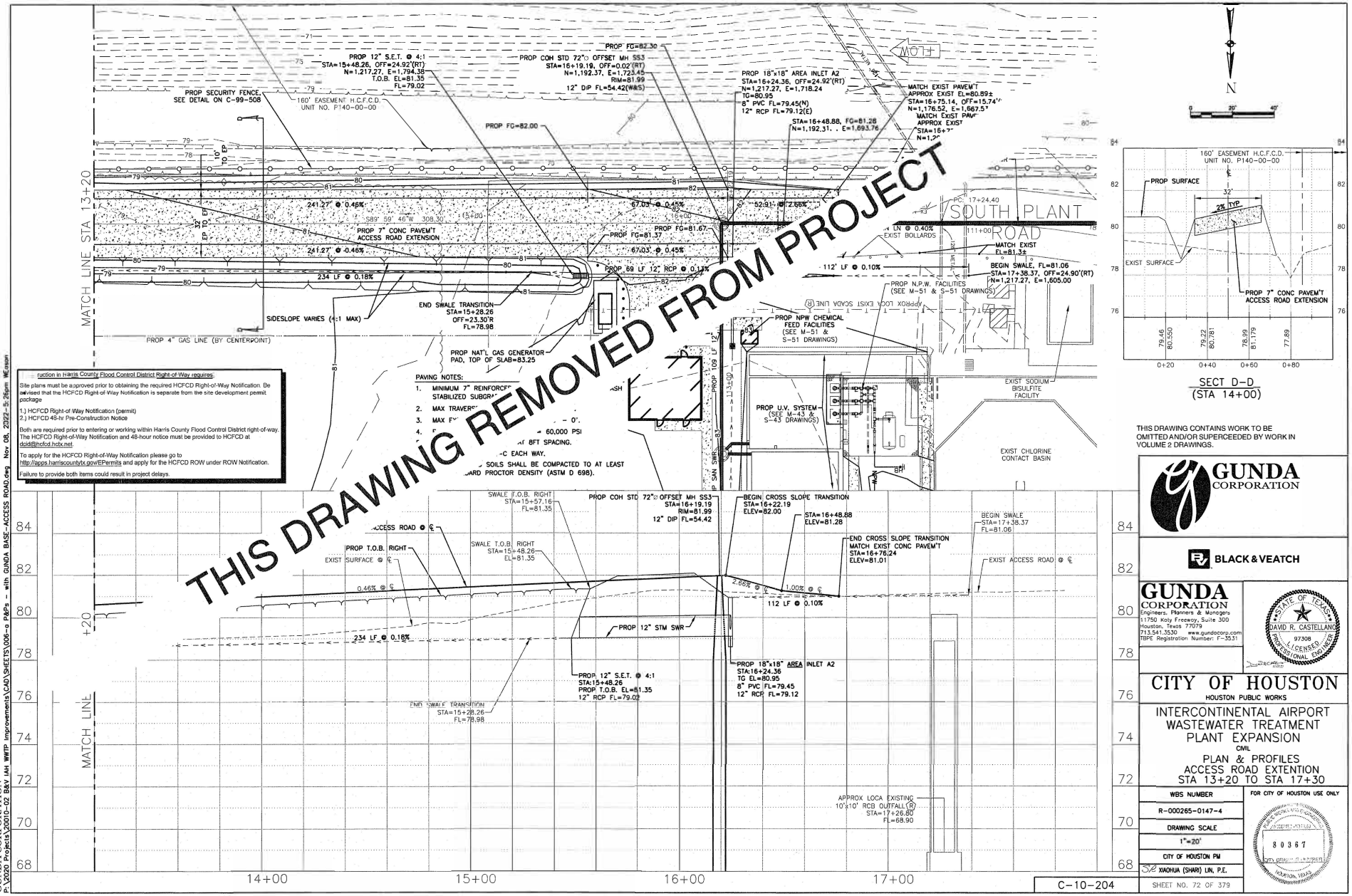
FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS 80367 LICENSED PROFESSIONAL ENGINEER JOHN W. TOWNS

C-10-203

SHEET NO. 71 OF 379

GUNDA CORPORATION
P:\2020 Projects\2020-02 B&V IAH WWTP Imp ovements\CAD\SHEETS\006-a P&Ps - with GUNDA BASE-ACCESS ROAD.dwg Nov 08, 2022-5:36pm MEcason



SECT D-D
(STA 14+00)

THIS DRAWING REMOVED FROM PROJECT

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

uction in Harris County Flood Control District Right-of-Way requires:

Site plans must be approved prior to obtaining the required HCFCD Right-of-Way Notification. Be advised that the HCFCD Right-of-Way Notification is separate from the site development permit package

1.) HCFCD Right-of Way Notification (permit)
2.) HCFCD 48-hr Pre-Construction Notice

Both are required prior to entering or working within Harris County Flood Control District right-of-way. The HCFCD Right-of-Way Notification and 48-hour notice must be provided to HCFCD at dcid@hcfcd.hctx.net.

To apply for the HCFCD Right-of-Way Notification please go to http://apps.harriscountytx.gov/EPermits and apply for the HCFCD ROW under ROW Notification.

Failure to provide both items could result in project delays.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

CIVIL

PLAN & PROFILES
ACCESS ROAD EXTENTION
STA 13+20 TO STA 17+30

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	1"=20'
CITY OF HOUSTON PM	SHARI LIN, P.E.

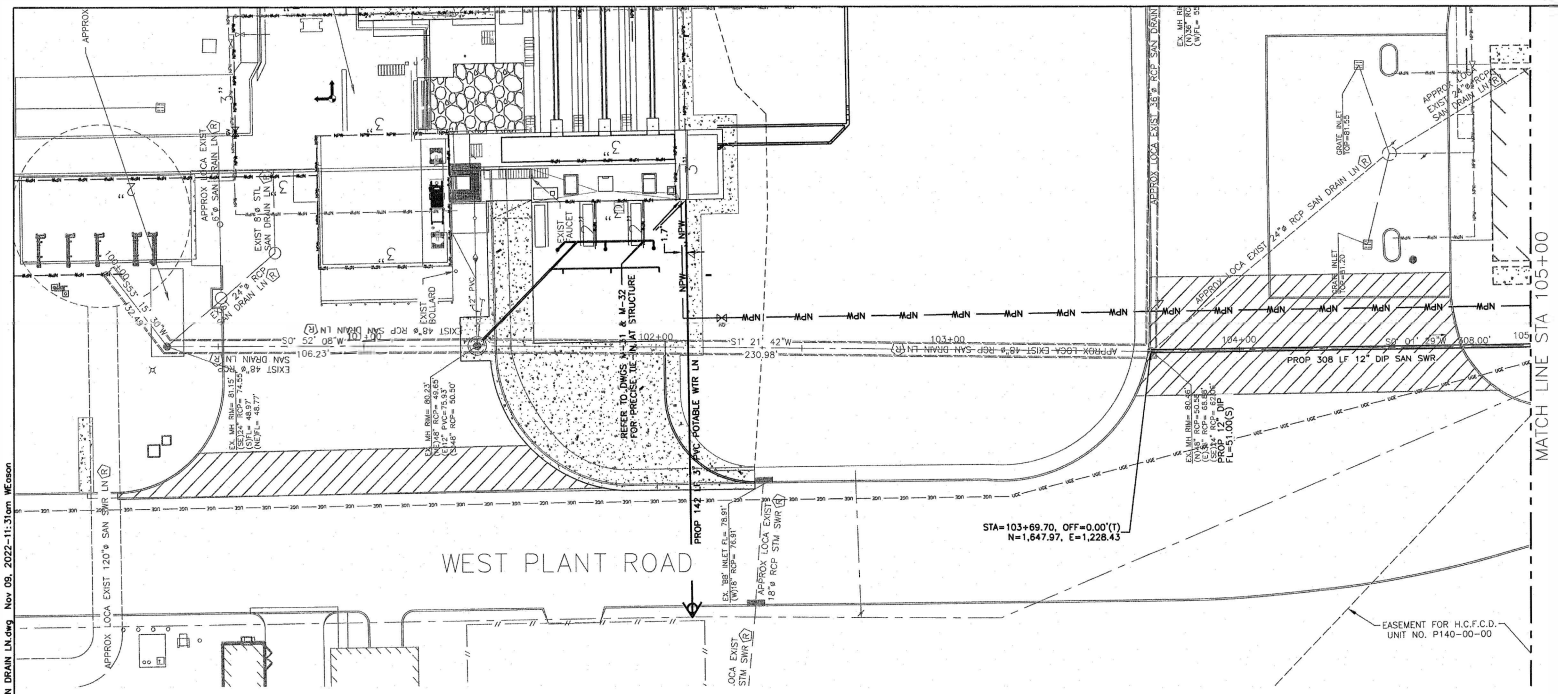
FOR CITY OF HOUSTON USE ONLY

80367
REGISTERED
CITY OF HOUSTON, TEXAS

C-10-204

SHEET NO. 72 OF 379

GUNDA CORPORATION
P:\2020 Projects\20010-02 B&V IAH WWTP Improvements\CAD\SHEETS\006-a P&Ps - with GUNDA BASE-ACCESS ROAD.dwg Nov 08, 2022-5:26pm WEcrain



SEE NEXT SHEET FOR PROFILE

GUNDA CORPORATION
P:\2020 Projects\20010-02 B&V IAH WWTP Improvements\CAD\SHEETS\006-b P&Ps - with GUNDA BASE-12 IN SAN DRAIN LN.dwg Nov 09, 2022-11:31am WEcson

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
ARAVIND NIMMA
113155
LICENSED
PROFESSIONAL ENGINEER
11/09/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

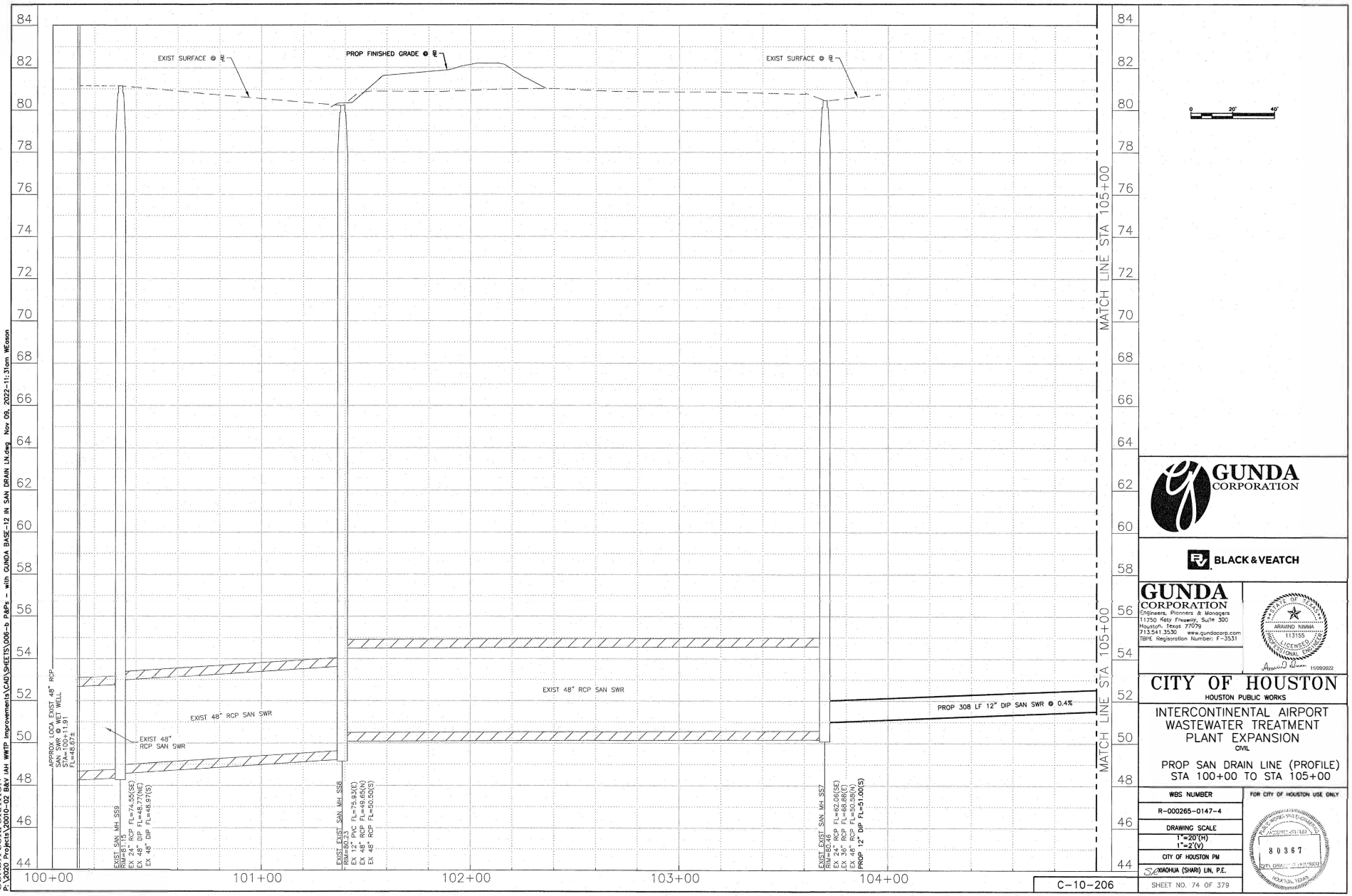
INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT
PLANT EXPANSION
CIVIL

PROP SAN DRAIN LINE (PLAN)
STA 100+00 TO STA 105+00

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
1"=20'	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 73 OF 379	

PROFESSIONAL ENGINEER
80367
CITY OF HOUSTON
HOUSTON, TEXAS

C-10-205



GUNDA CORPORATION
P:\2020 Projects\20010-02 B&V IAH WWTP Improvements\CAD\SHEETS\006-b P&Ps - with GUNDA BASE-12 IN SAN DRAIN LN.dwg Nov 09, 2022-11:31am WEason

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
ARAVIND NIMMA
113155
LICENSED
PROFESSIONAL
ENGINEER
11/09/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

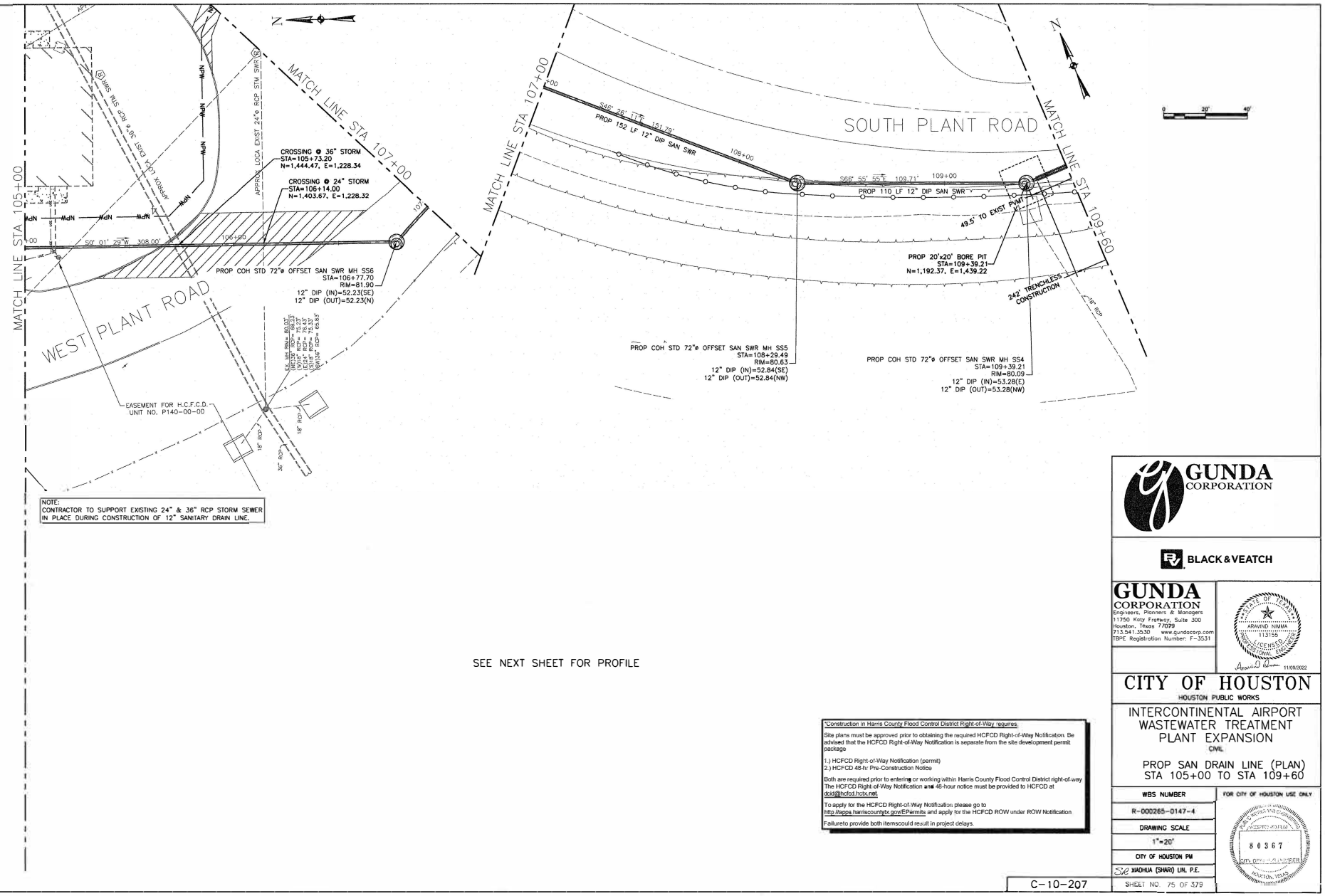
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
CIVIL

PROP SAN DRAIN LINE (PROFILE)
STA 100+00 TO STA 105+00

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	1"=20'(H) 1"=2'(V)
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 74 OF 379	

FOR CITY OF HOUSTON USE ONLY

REGISTERED
80367



NOTE:
CONTRACTOR TO SUPPORT EXISTING 24" & 36" RCP STORM SEWER IN PLACE DURING CONSTRUCTION OF 12" SANITARY DRAIN LINE.

SEE NEXT SHEET FOR PROFILE

*Construction in Harris County Flood Control District Right-of-Way requires

Site plans must be approved prior to obtaining the required HCFCD Right-of-Way Notification. Be advised that the HCFCD Right-of-Way Notification is separate from the site development permit package

1.) HCFCD Right-of-Way Notification (permit)
2.) HCFCD 48-hr Pre-Construction Notice

Both are required prior to entering or working within Harris County Flood Control District right-of-way The HCFCD Right-of-Way Notification and 48-hour notice must be provided to HCFCD at dcid@hcfcd.hctx.net.

To apply for the HCFCD Right-of-Way Notification please go to http://apps.harriscountytx.gov/EPermits and apply for the HCFCD ROW under ROW Notification

Failureto provide both itemscould result in project delays.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
ARAVIND NIMMA
113155
LICENSED
PROFESSIONAL ENGINEER
11/09/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
CIVIL

PROP SAN DRAIN LINE (PLAN)
STA 105+00 TO STA 109+60

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	1"=20'
CITY OF HOUSTON PM	Se XIAOHUA (SHARI) LIN, P.E.

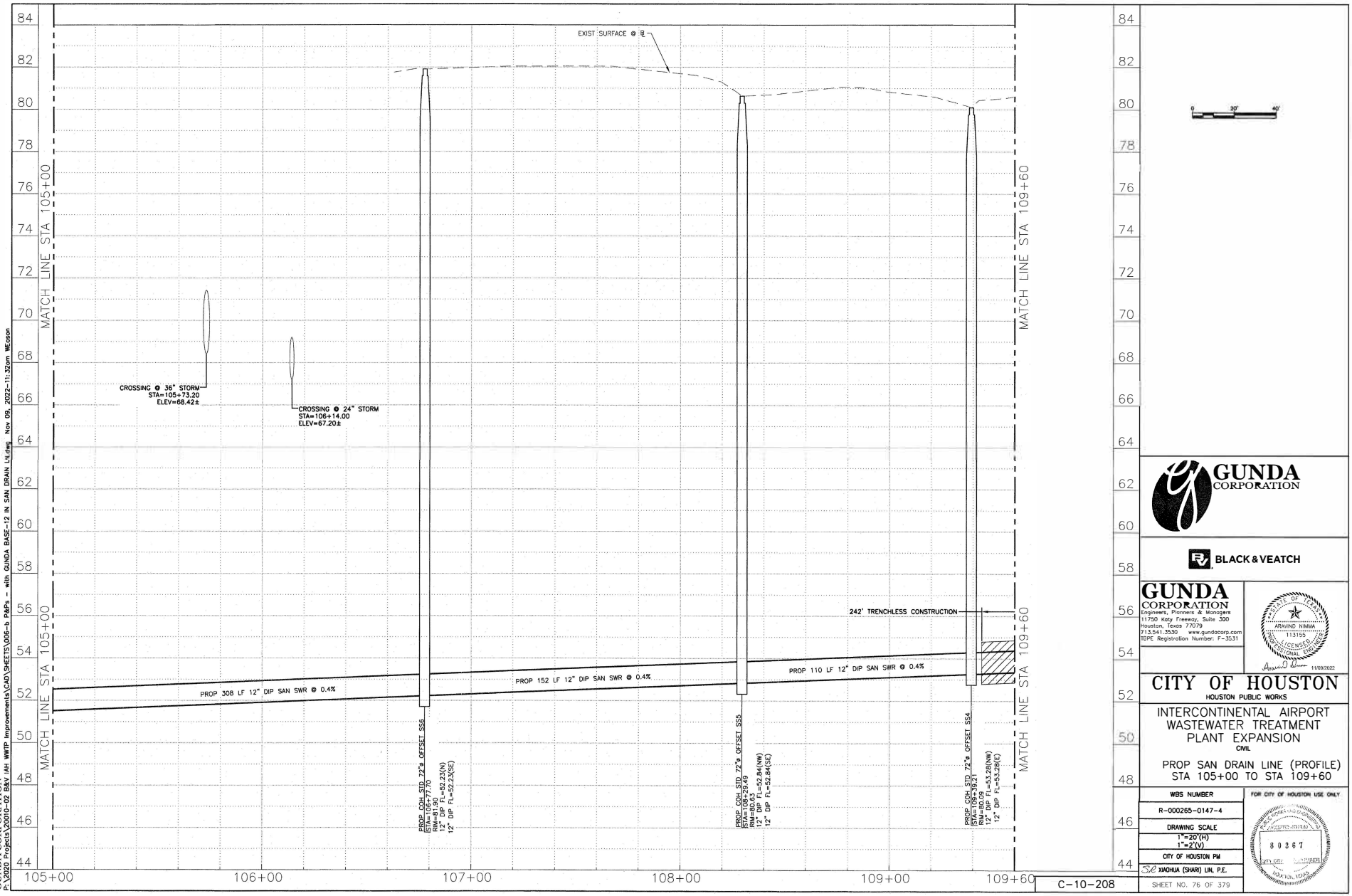
FOR CITY OF HOUSTON USE ONLY

REGISTERED PROFESSIONAL ENGINEER
80367
CITY OF HOUSTON, TEXAS

C-10-207

SHEET NO. 75 OF 379

GUNDA CORPORATION
P:\2020 Projects\20010-02 B&V IAH WWTP Improvements\CAD\SHEETS\005-b P&P's - with GUNDA BASE-12 IN SAN DRAIN LN.dwg Nov 09, 2022-11:32am WEcson



GUNDA CORPORATION
P:\2020 Projects\20010-02 B&V JAH WWTP Improvements\CAD\SHEETS\006-b P&Ps - with GUNDA BASE-12 IN SAN DRAIN L4.dwg Nov 09, 2022-11:32am WEason

C-10-208

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
ARAVIND NIMMA
113155
LICENSED
PROFESSIONAL ENGINEER
11/09/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

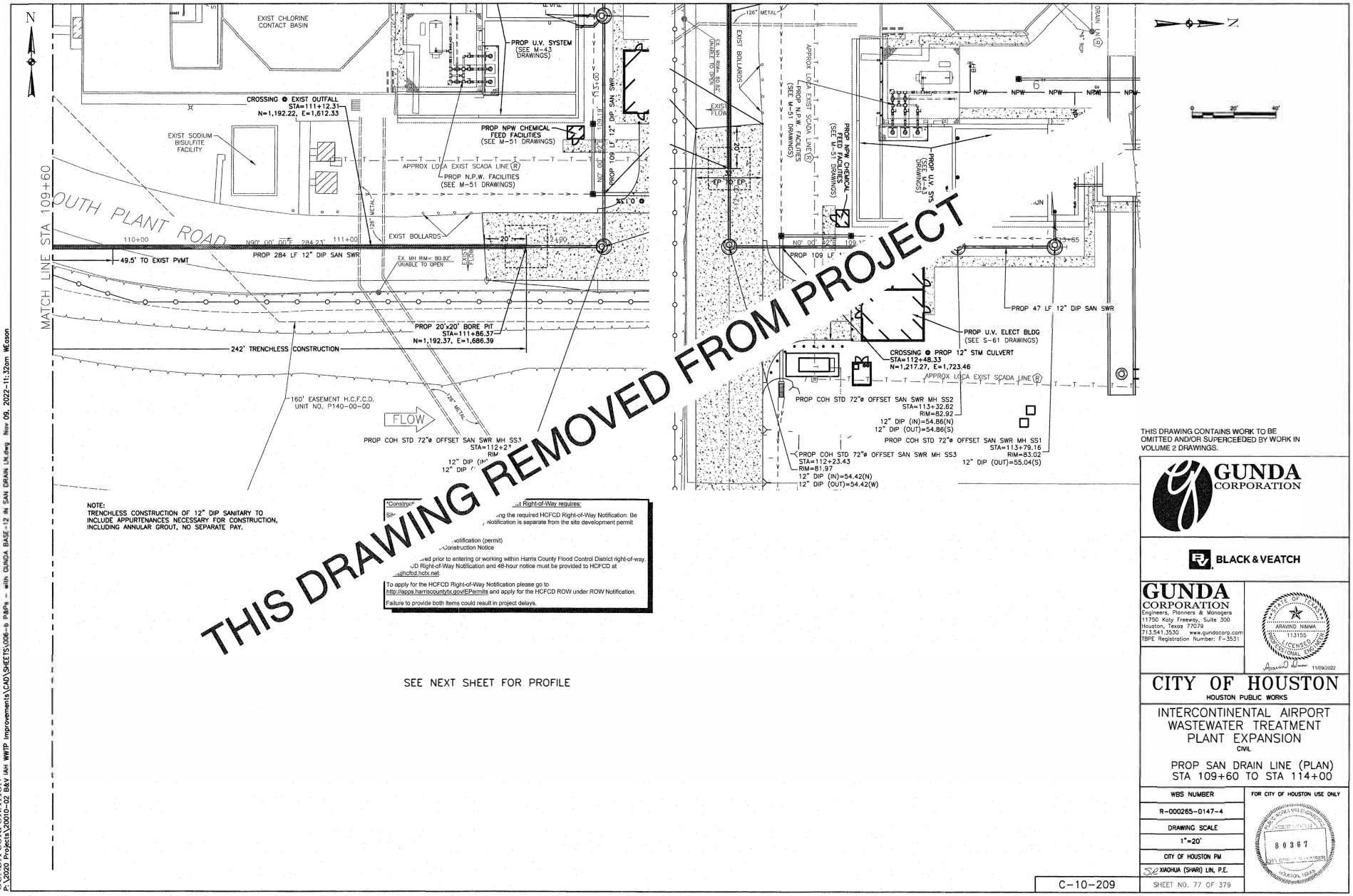
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
CIVIL

PROP SAN DRAIN LINE (PROFILE)
STA 105+00 TO STA 109+60

WBS NUMBER
R-000265-0147-4
DRAWING SCALE
1"=20'(H) 1"=2'(V)
CITY OF HOUSTON PM
XIAOHUA (SHAR) LIN, P.E.
SHEET NO. 76 OF 379

FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
80367
REGISTERED
CITY OF HOUSTON, TEXAS



THIS DRAWING REMOVED FROM PROJECT

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS ARAVIND NIMMA 113155 LICENSED PROFESSIONAL ENGINEER 11/09/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
CIVIL

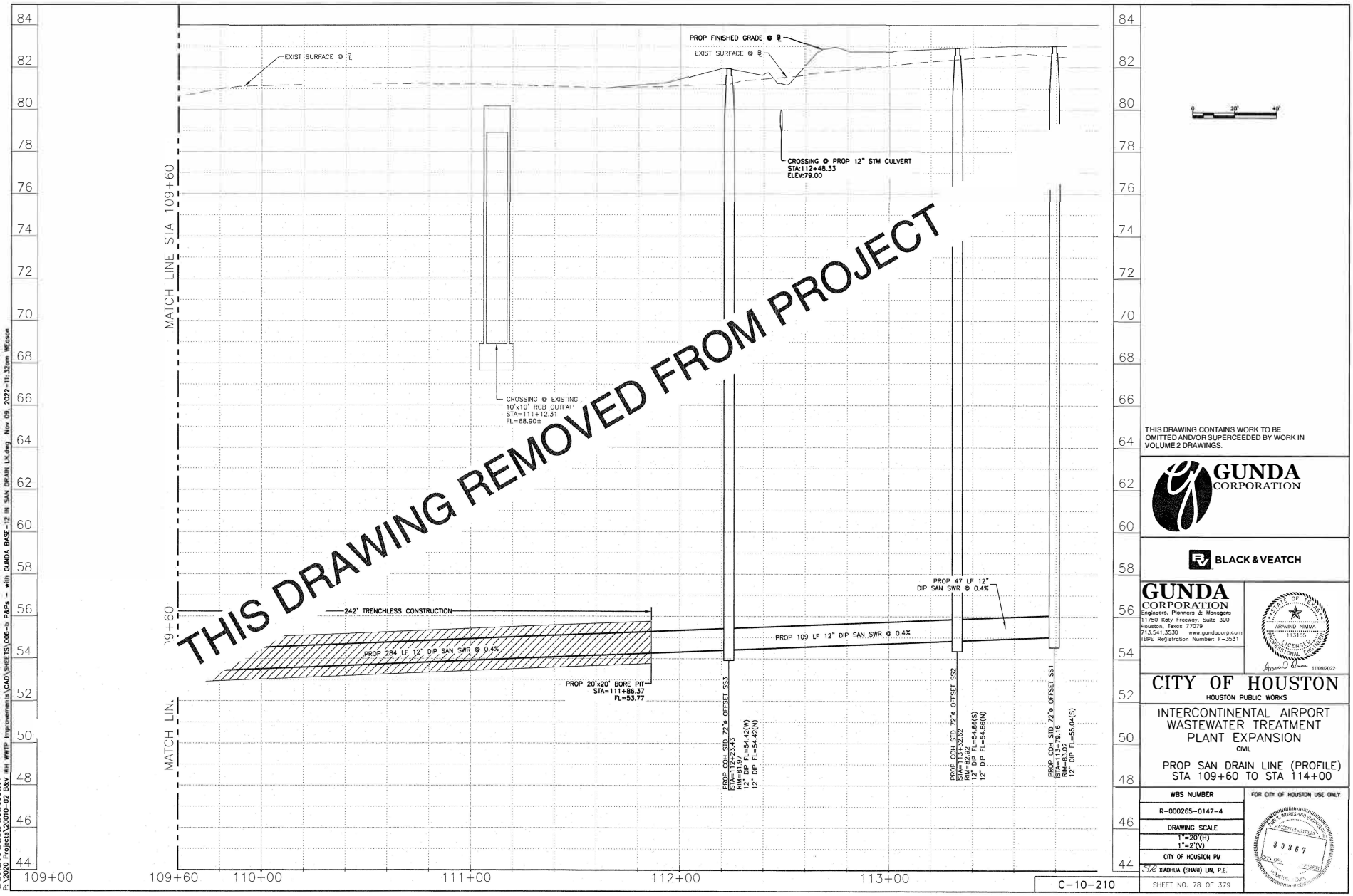
PROP SAN DRAIN LINE (PLAN)
STA 109+60 TO STA 114+00

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
1"=20'	
CITY OF HOUSTON PM	
Se XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 77 OF 379	

STATE OF TEXAS 80367 REGISTERED PROFESSIONAL ENGINEER 10/31/2022

C-10-209

GUNDA CORPORATION
P:\2020 Projects\20010-02 B&V AH WWTP Improvements\CAD\SHEETS\006-b PMPs - with GUNDA BASE-12 IN SAN DRAIN LN.dwg Nov 09, 2022-11:32am WEason



THIS DRAWING REMOVED FROM PROJECT

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

ARAVIND NIMMA
113155
LICENSED
PROFESSIONAL
ENGINEER
11/09/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
CIVIL

PROP SAN DRAIN LINE (PROFILE)
STA 109+60 TO STA 114+00

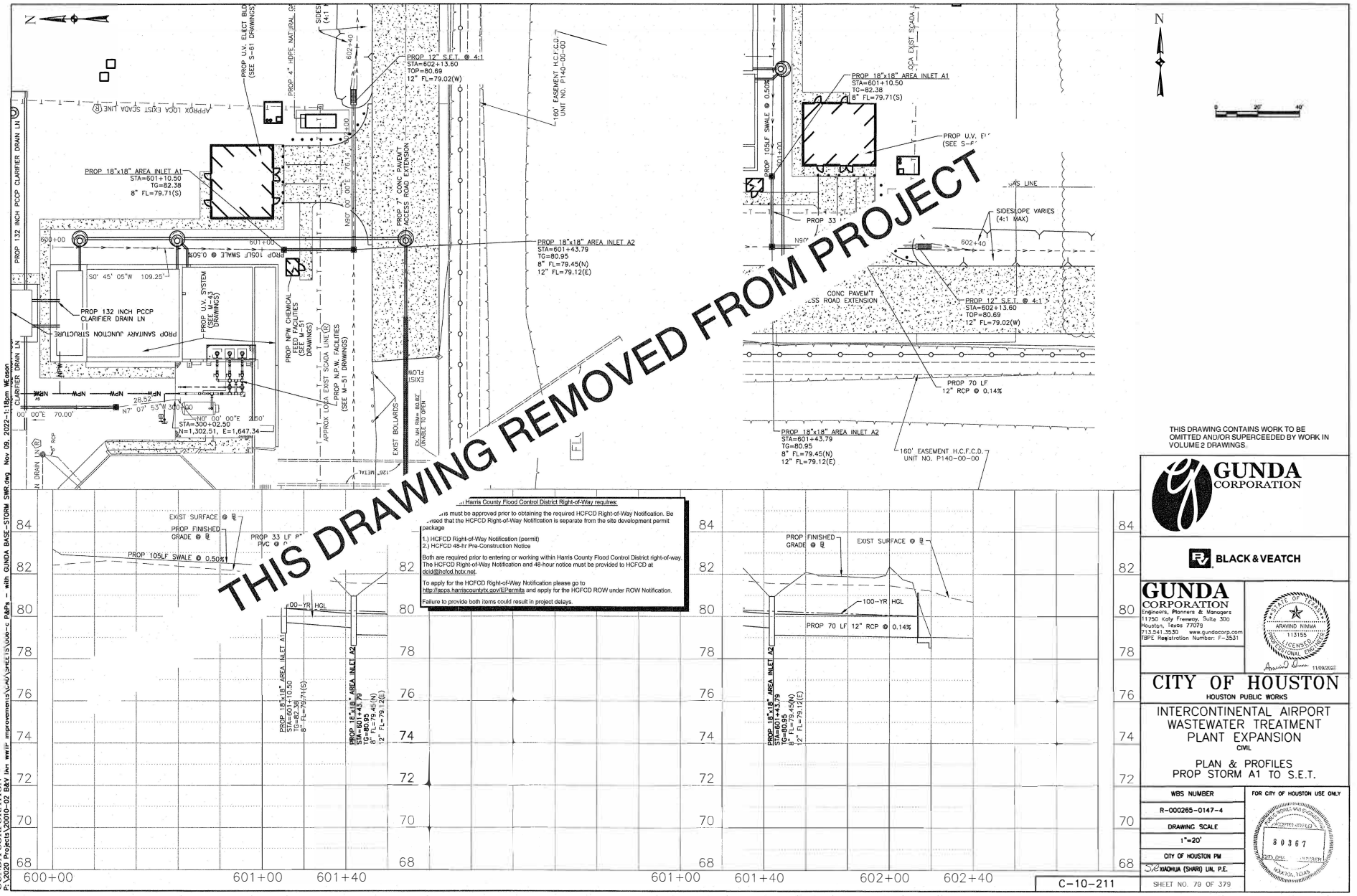
WBS NUMBER
R-000265-0147-4
DRAWING SCALE
1"=20'(H) 1"=2'(V)
CITY OF HOUSTON PM
XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 78 OF 379

FOR CITY OF HOUSTON USE ONLY

80387

C-10-210

GUNDA CORPORATION
P:\2020 Projects\2010-02 B&V 8MI WWTP Improvements\CAD\SHEETS\006-S P&Ps - with GUNDA BASE-12 IN SAN DRAIN LK.dwg Nov 09, 2022 - 11:32am WEdson



Harris County Flood Control District Right-of-Way requires:

...is must be approved prior to obtaining the required HCFCD Right-of-Way Notification. Be ...vised that the HCFCD Right-of-Way Notification is separate from the site development permit package

1.) HCFCD Right-of-Way Notification (permit)
2.) HCFCD 48-hr Pre-Construction Notice

Both are required prior to entering or working within Harris County Flood Control District right-of-way. The HCFCD Right-of-Way Notification and 48-hour notice must be provided to HCFCD at dcd@hcfcd.hctx.net.

To apply for the HCFCD Right-of-Way Notification please go to http://eaps.harriscountytx.gov/EPermits and apply for the HCFCD ROW under ROW Notification.

Failure to provide both items could result in project delays.

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundocorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
ARAVIND NIMMA
113155
LICENSED
PROFESSIONAL ENGINEER
11/09/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
CIVIL

PLAN & PROFILES
PROP STORM A1 TO S.E.T.

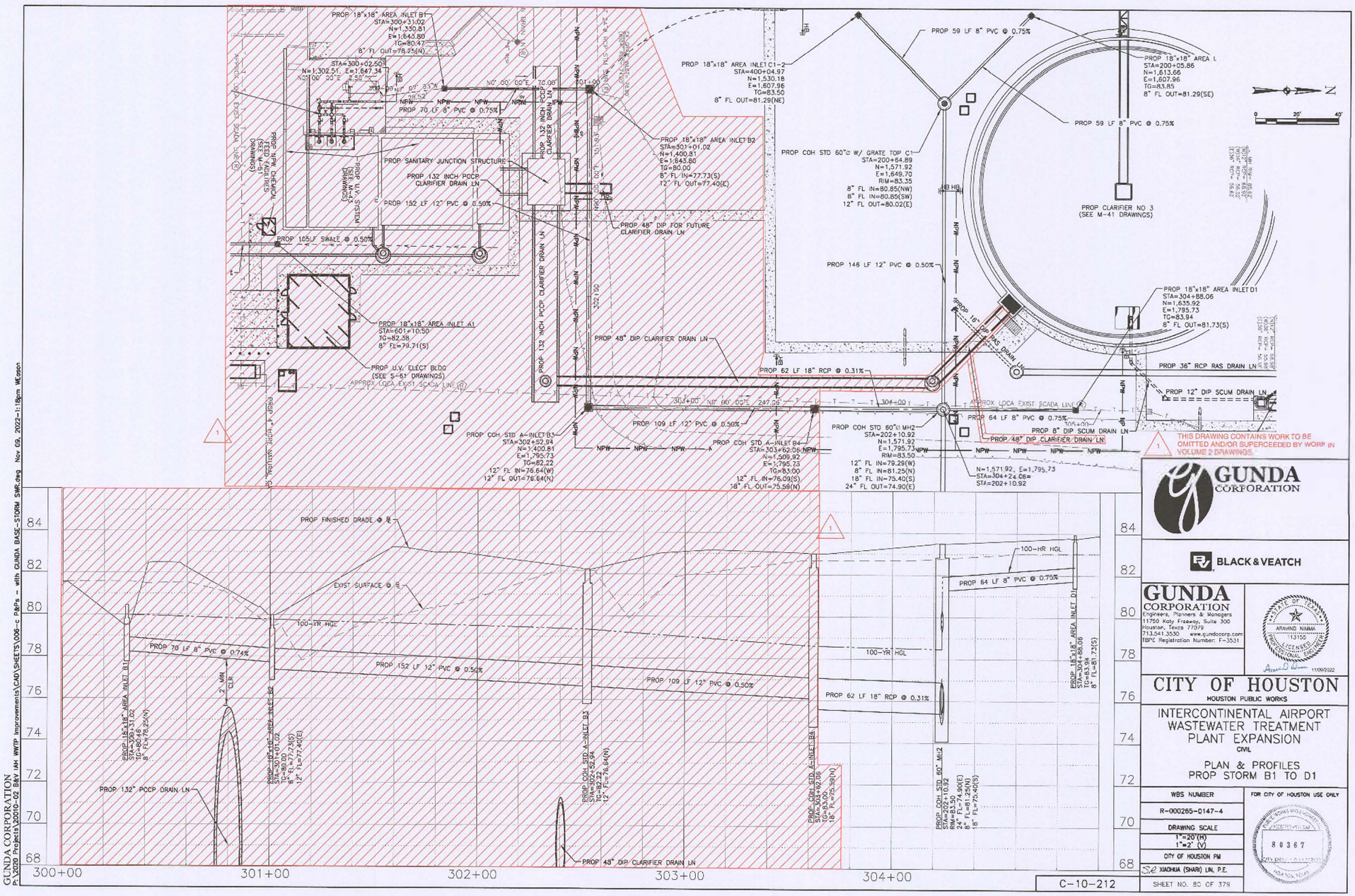
WBS NUMBER
R-000265-0147-4
DRAWING SCALE
1"=20'
CITY OF HOUSTON PM
XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 79 OF 379

FOR CITY OF HOUSTON USE ONLY

ACCEPTED NOTED
P.E. APPROVAL NOT REQUIRED
30367
CITY ENGINEER
HOUSTON, TEXAS

C-10-211

GUNDA CORPORATION
P:\2020 Projects\2020-02 B&V Jan wwtp improvements\CAD\SHEETS\G06-c PAPs - with GUNDA BASE-STORM SWR.dwg Nov 09, 2022-1:18pm WEason



GUNDA CORPORATION

P:\2020 Projects\20010-02 B&V IAH WWTP Improvements\CAD\SHEETS\006-c P&Ps - with GUNDA BASE-STORM SWR.dwg Nov 09, 2022-1:18pm WEason

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

ARAVIND NIMMA
13115
LICENSED
PROFESSIONAL ENGINEER
11/09/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
CIVIL

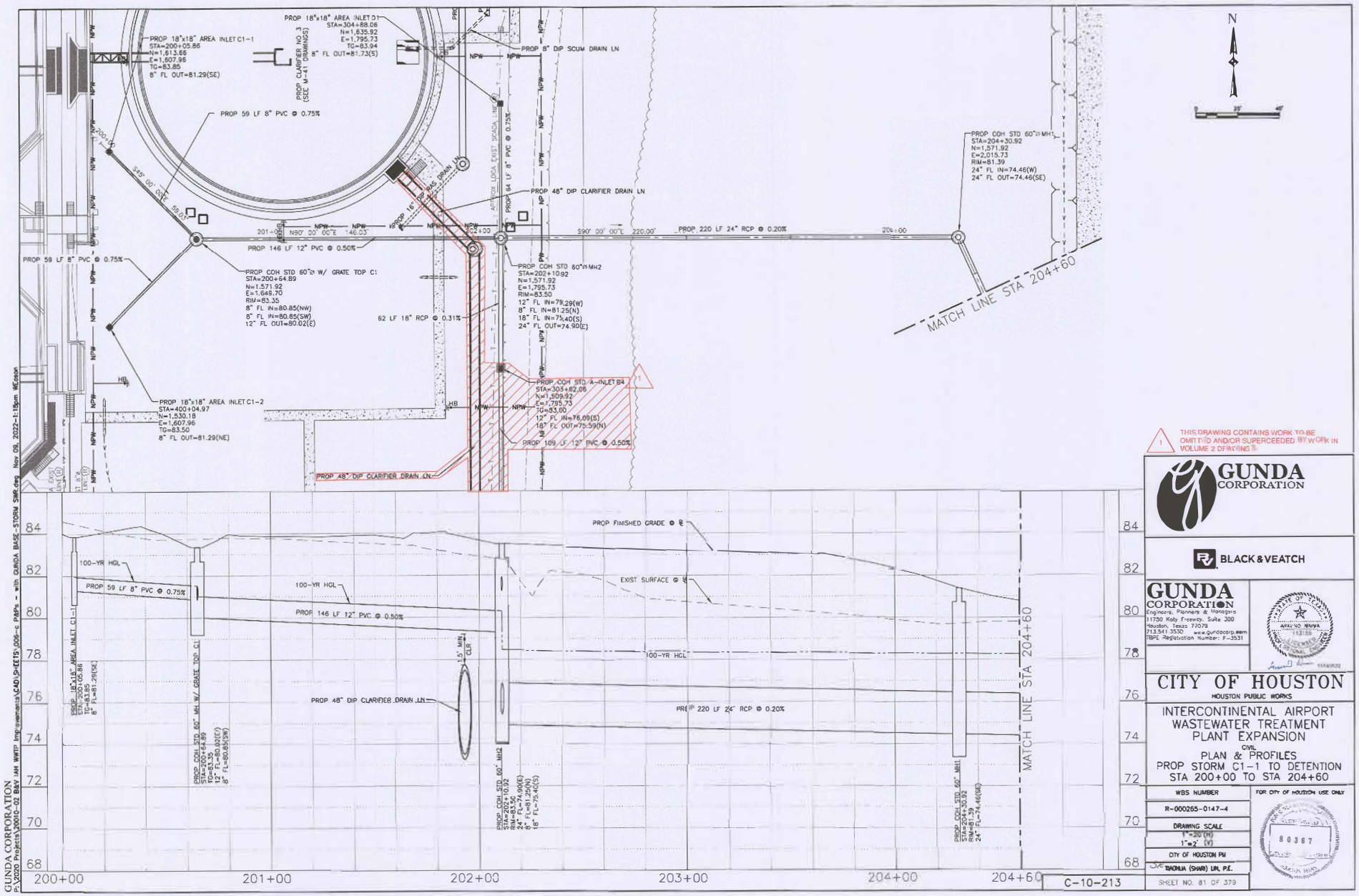
PLAN & PROFILES PROP STORM B1 TO D1

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	1"=20'(H) 1"=2' (V)
CITY OF HOUSTON PM	Sd XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 80 OF 379	

FOR CITY OF HOUSTON USE ONLY

80367

C-10-212



THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWING 1.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
CIVIL
PLAN & PROFILES
PROP STORM C1-1 TO DETENTION
STA 200+00 TO STA 204+60

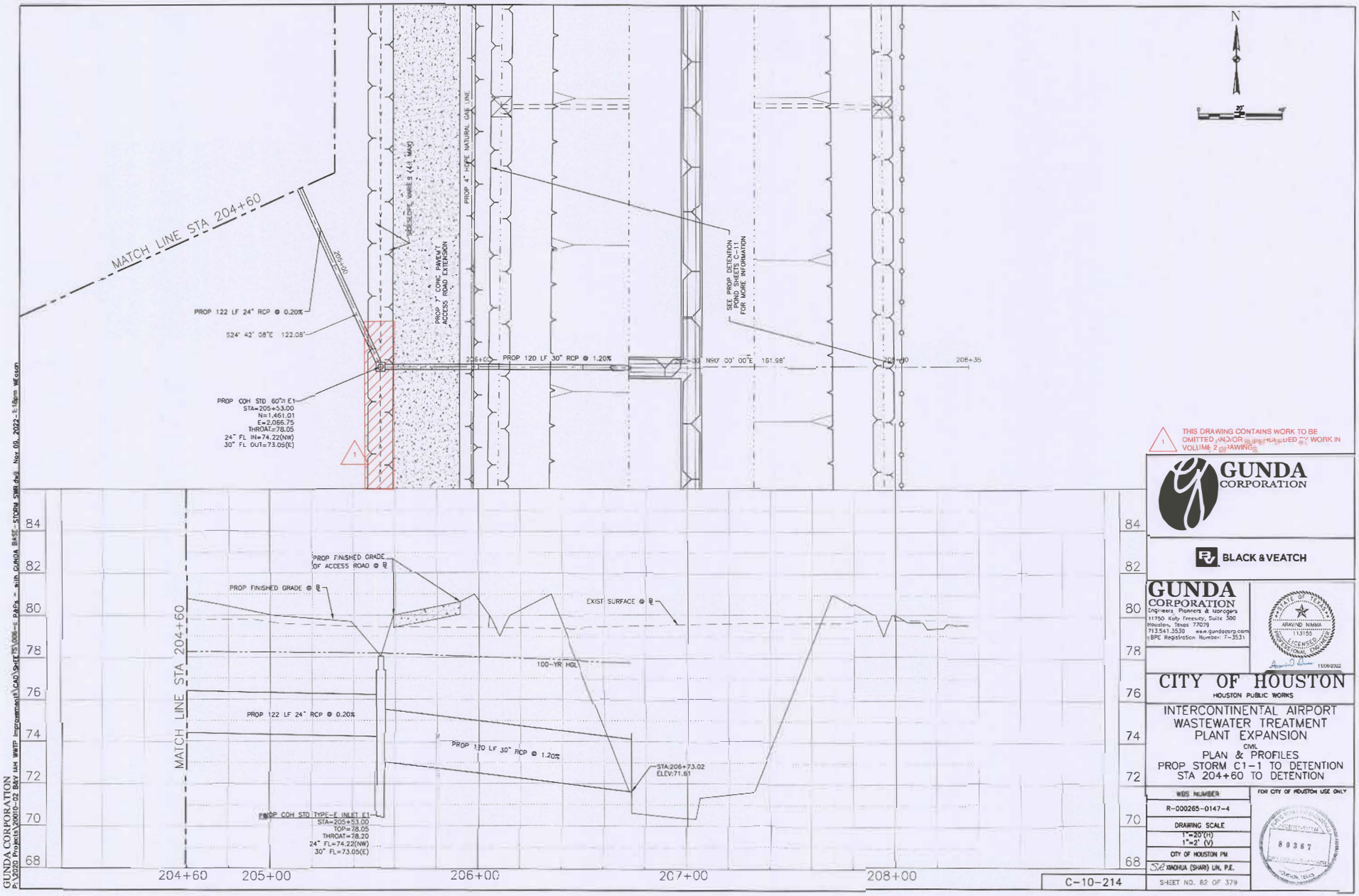
WBS NUMBER	R-000265-0147-4
DRAWING SCALE	1"=80' (H) 1"=2' (V)
CITY OF HOUSTON PM	TAOMIA (SHARI) LIN, P.E.
SHEET NO. 81 OF 379	

FOR CITY OF HOUSTON USE ONLY

80367

C-10-213

GUNDA CORPORATION
P:\2020 Projects\20010-02 B&V IAH WWTP Img\pwelements\CAD\SHEETS\006-c PMPs - with GUNDA BASE-STORM SWR.dwg Nov 09, 2022-1:19pm WEason



GUNDA CORPORATION
P:\2020 Projects\20010-02 B&V IAH WWTP Improvement\CAD\Sheet Files\006 - PAPA - with GUNDA BASE - STORM STR.dwg Nov 09, 2022 - 5:18pm WEsson

1 THIS DRAWING CONTAINS WORK TO BE OMITTED (N)/OR SUPERSEDED BY WORK IN VOLUME 2 OF DRAWINGS

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
BPE Registration Number: F-3531

ARAVIND NIMMA
113155
LICENSED PROFESSIONAL ENGINEER
11/09/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

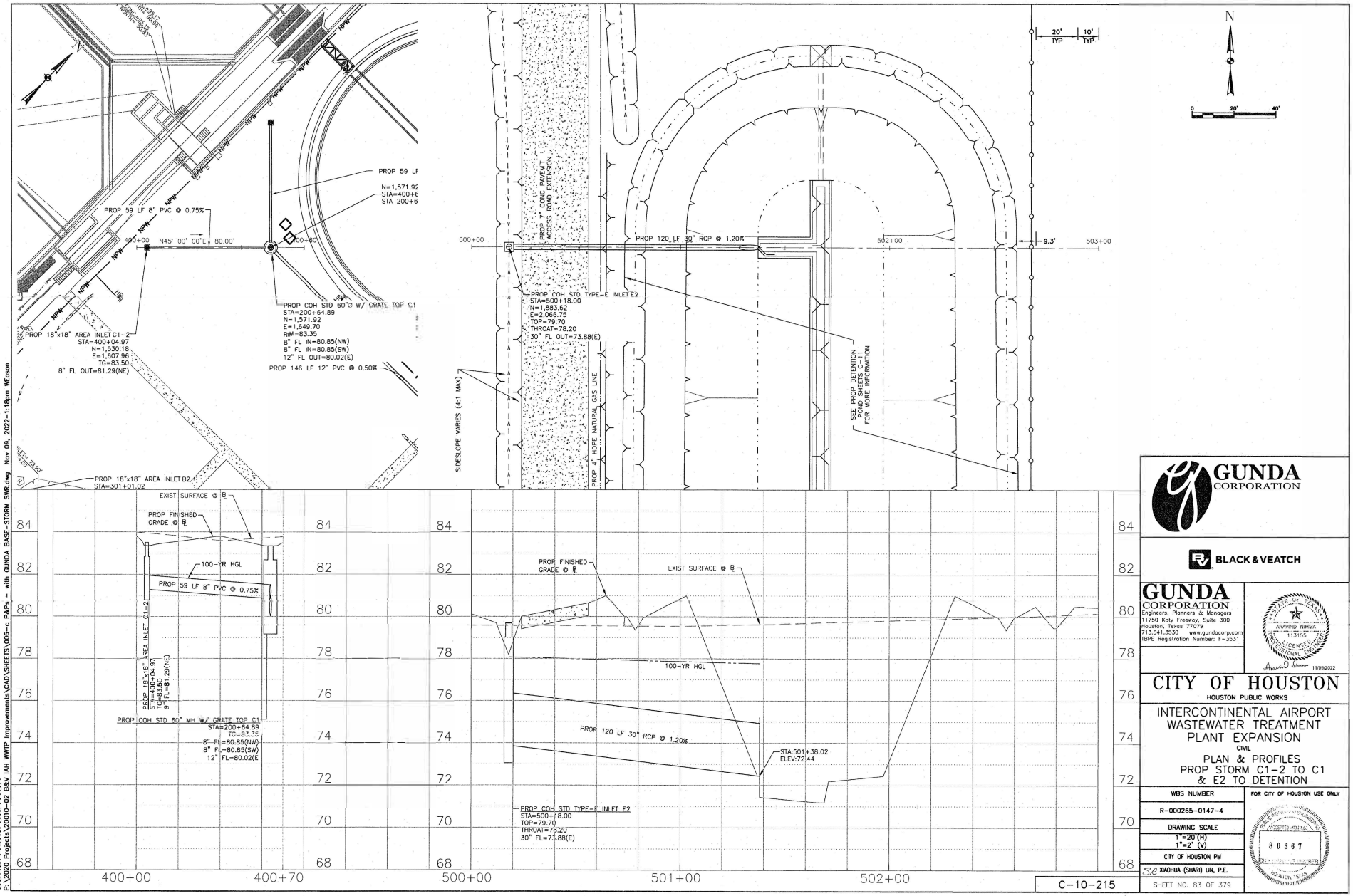
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
CIVIL
PLAN & PROFILES
PROP STORM C1-1 TO DETENTION
STA 204+60 TO DETENTION

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	1"=20'(H) 1"=2' (V)
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 82 OF 379	

FOR CITY OF HOUSTON USE ONLY

80367
REGISTERED PROFESSIONAL ENGINEER
STATE OF TEXAS

C-10-214



GUNDA CORPORATION

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

BLACK & VEATCH

STATE OF TEXAS
ARAVIND NIMMA
113155
LICENSED
PROFESSIONAL ENGINEER
11/09/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

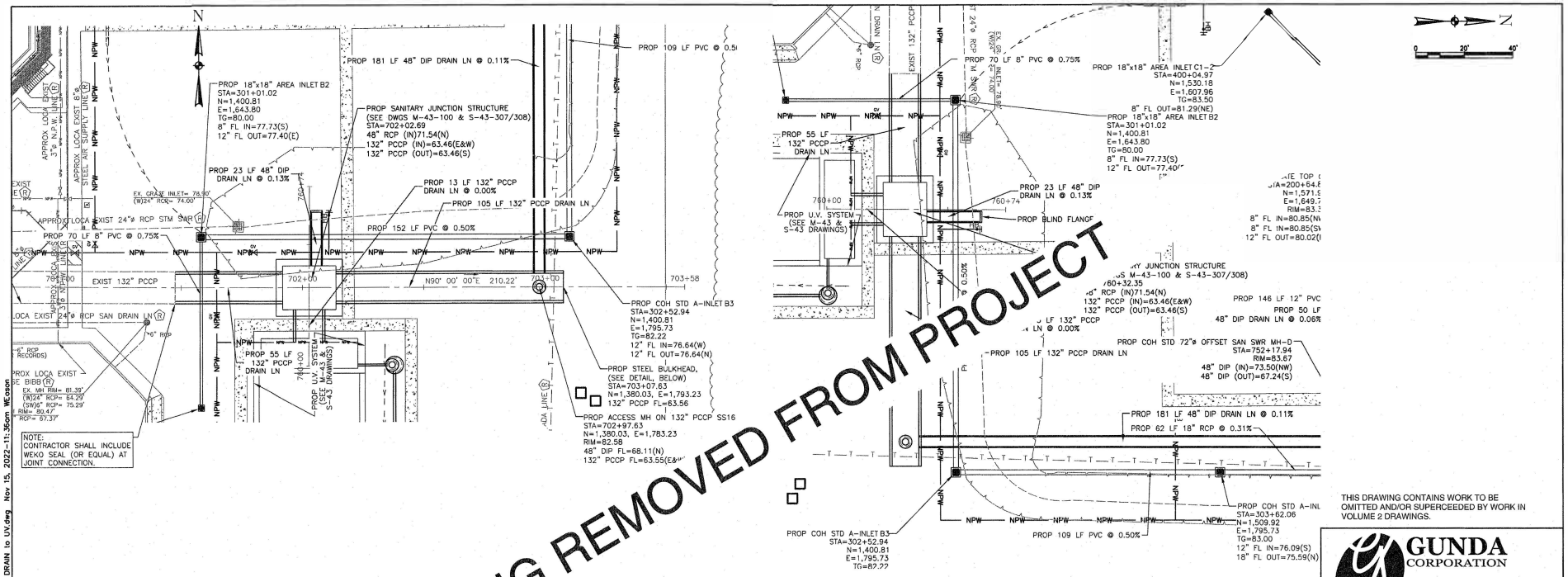
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
CIVIL

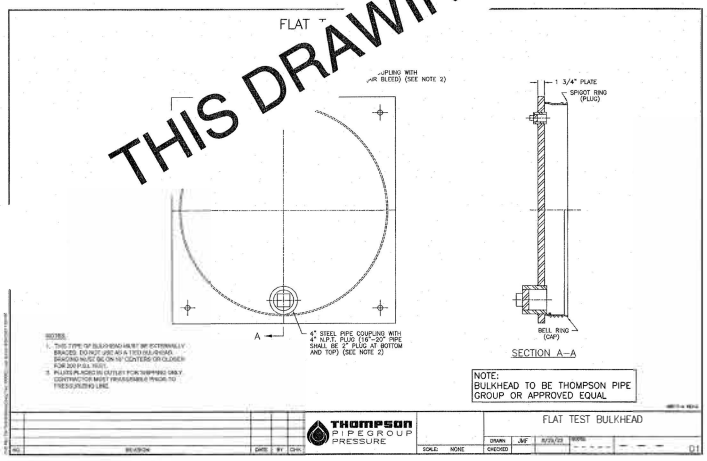
PLAN & PROFILES
PROP STORM C1-2 TO C1
& E2 TO DETENTION

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
1"=20'(H) 1"=2' (V)	
CITY OF HOUSTON PM	
Se XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 83 OF 379	

C-10-215

GUNDA CORPORATION
P:\2020 Projects\20010-02 B&V IAH WWTP Improvements\CAD\SHEETS\006-c P&Ps - with GUNDA BASE-STORM SWR.dwg Nov 09, 2022-1:18pm WEason





THIS DRAWING REMOVED FROM PROJECT

SEE NEXT SHEET FOR PROFILE

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

CIVIL

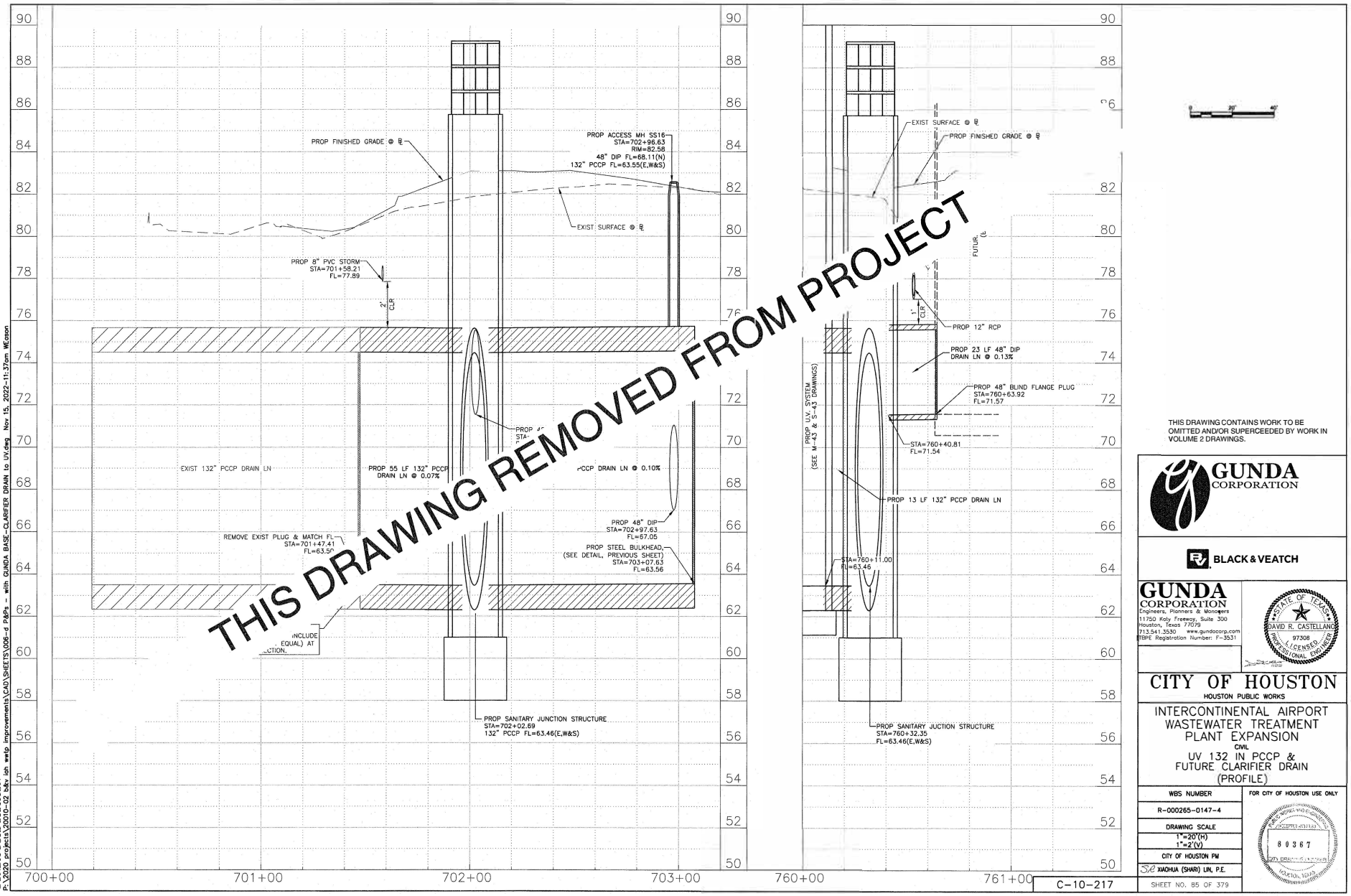
UV 132 IN PCCP &
FUTURE CLARIFIER DRAIN
(PLAN)

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000285-0147-4	
DRAWING SCALE	
1"=20'(H) 1"=2' (V)	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 84 OF 379	

80367
CITY DRAWING NUMBER

C-10-216

GUNDA CORPORATION
P:\2020 projects\20010-02 b&v idh wslp improvements\CAD\SHEETS\006-d P&Ps - with GUNDA BASE--CLARIFIER DRAIN to UV.dwg Nov 15, 2022-11:35am WEcason



THIS DRAWING REMOVED FROM PROJECT

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

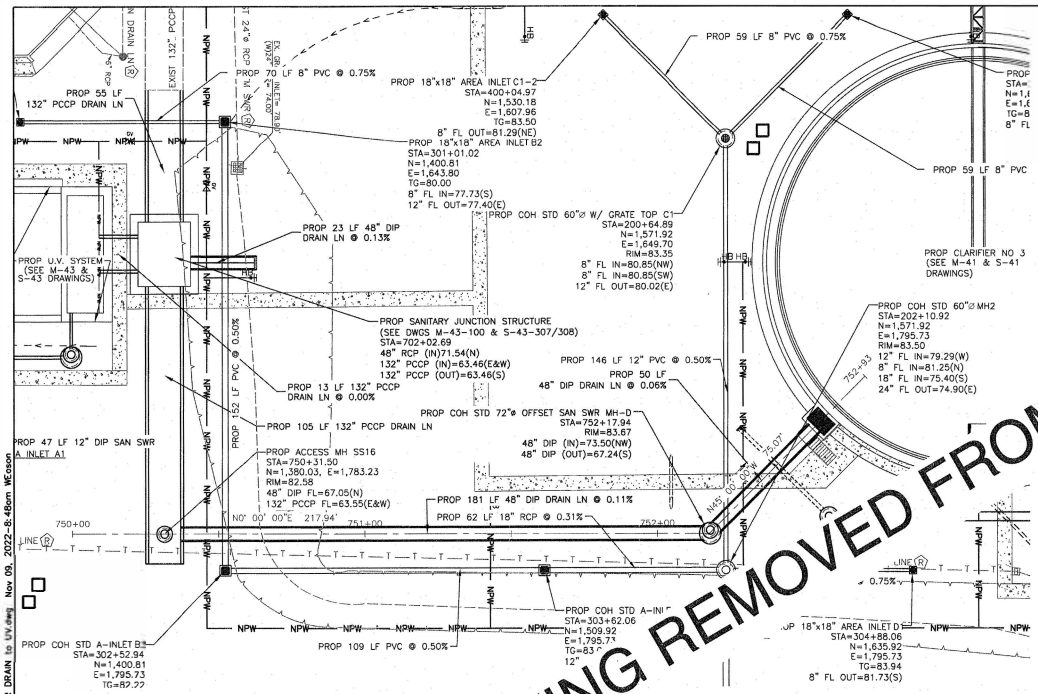
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
CIVIL

UV 132 IN PCCP & FUTURE CLARIFIER DRAIN (PROFILE)

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	ACCEPTED AS NOTED
DRAWING SCALE	1"=20'(H) 1"=2'(V)
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 85 OF 379	80367

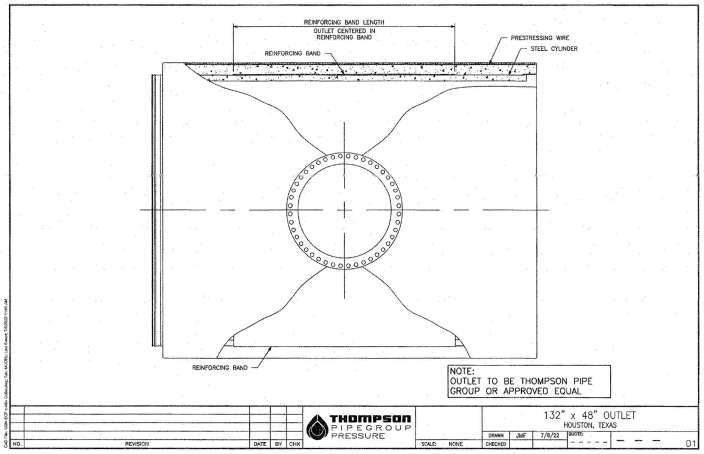
C-10-217

GUNDA CORPORATION
P:\2020 projects\20010-02 b&v ioh wwtp improvements\CAD\SHEETS\006-d P&Ps - with GUNDA BASE-CLARIFIER DRAIN to UV.dwg Nov 15, 2022-11:37am WEason



THIS DRAWING REMOVED FROM PROJECT

SEE NEXT SHEET FOR PROFILE



THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
CIVIL

CLARIFIER-3 48 IN DIP DRAIN (PLAN)

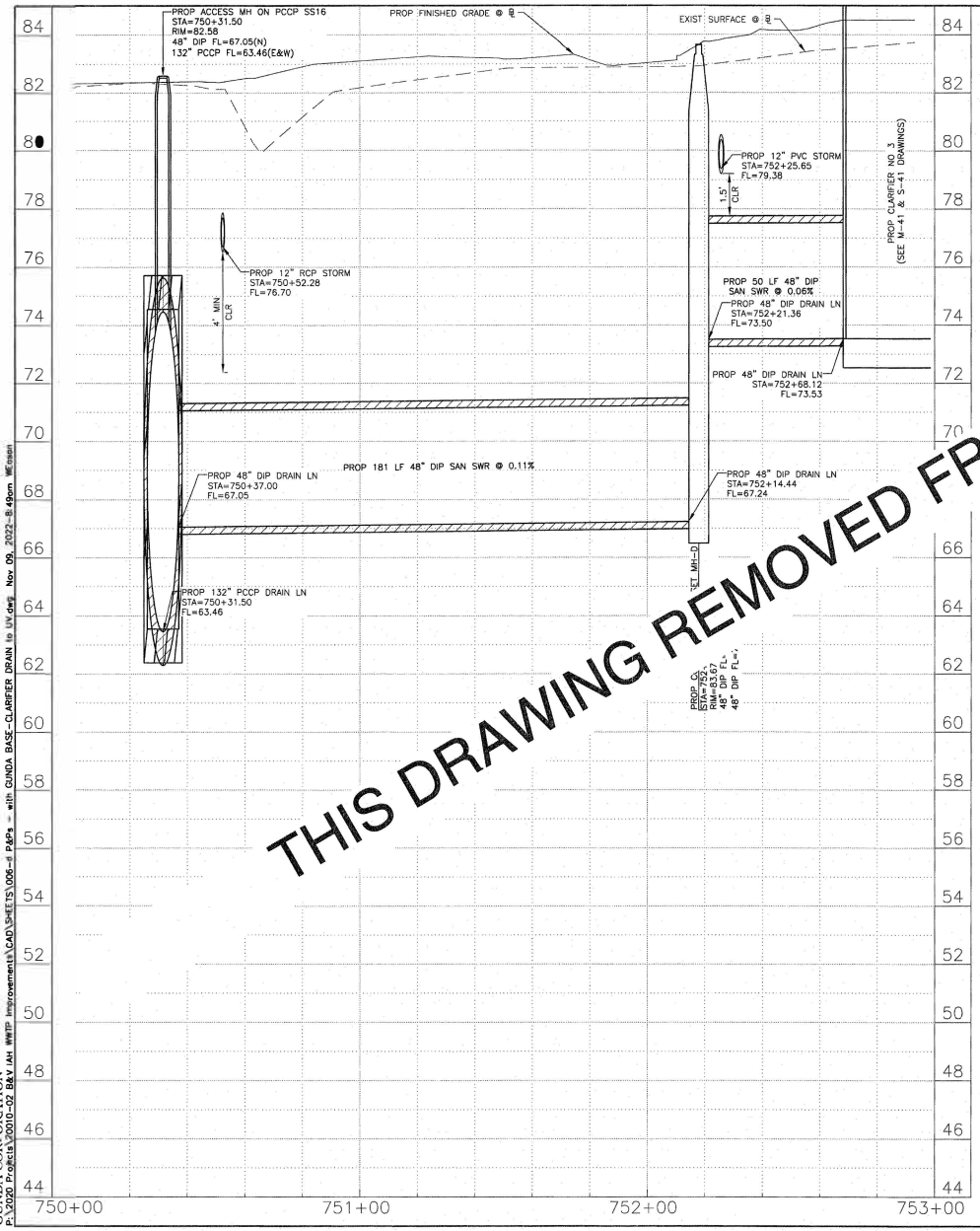
WBS NUMBER	R-000265-0147-4
DRAWING SCALE	1"=20'(H) 1"=2' (V)
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
	SHEET NO. 86 OF 379

FOR CITY OF HOUSTON USE ONLY

80387

C-10-218

GUNDA CORPORATION
P:\2020 Projects\20010-02 B&V AH WWTP Improvements\CAD\SHEETS\006-d P&Ps - with GUNDA BASE-CLARIFIER DRAIN to UV.dwg Nov 09, 2022-8:48am WEcson



THIS DRAWING REMOVED FROM PROJECT

0 30' 40'

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
CIVIL

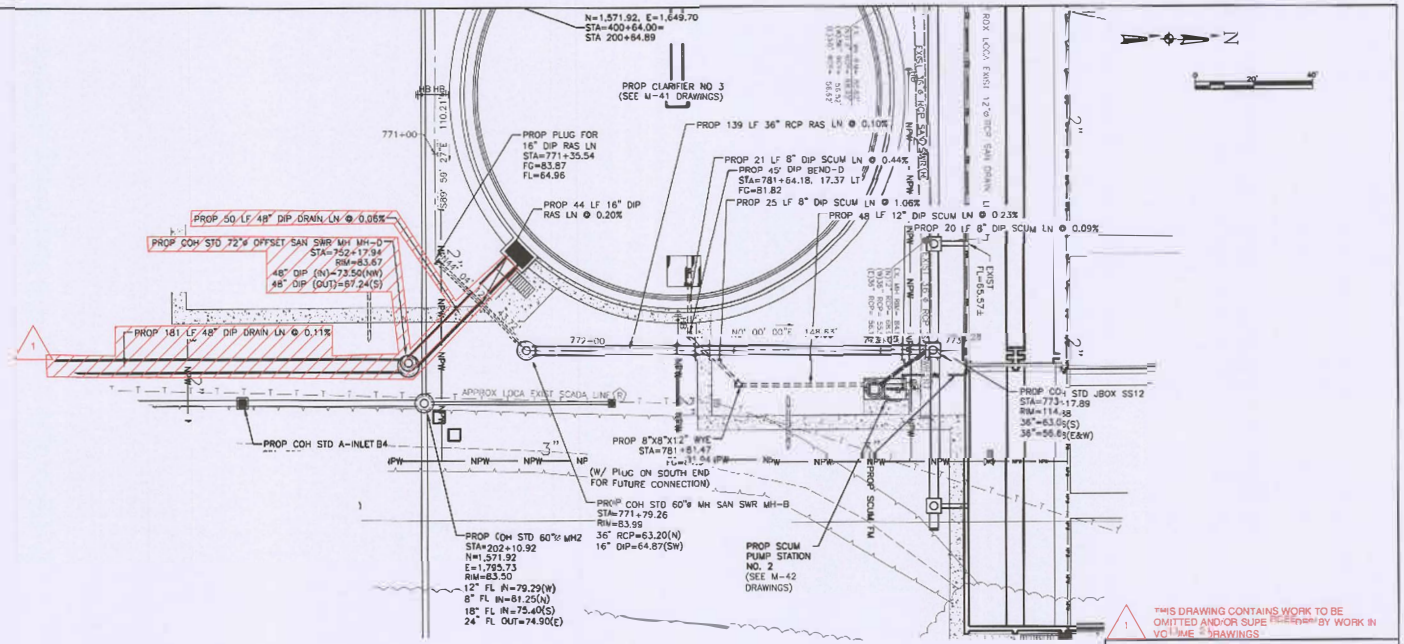
CLARIFIER-3 48 IN DIP DRAIN (PROFILE)

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
1"=20'(H) 1"=2'(V)	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 87 OF 379	

80367
REGISTERED PROFESSIONAL ENGINEER
STATE OF TEXAS

C-10-219

GUNDA CORPORATION
P:\2020 Projects\20010-02 B&V IAH WWTP Improvements\CAD\SHEETS\006-d PAPs - with GUNDA BASE-CLARIFIER DRAIN to UW.dwg, Nov 09, 2022-8:49pm, WEbsen



SEE NEXT SHEET FOR PROFILE

1 THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERSEDED BY WORK IN VOLUME 2 DRAWINGS

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
1760 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
BPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANOS
97308
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
CIVIL

RAS PIPING (PLAN)

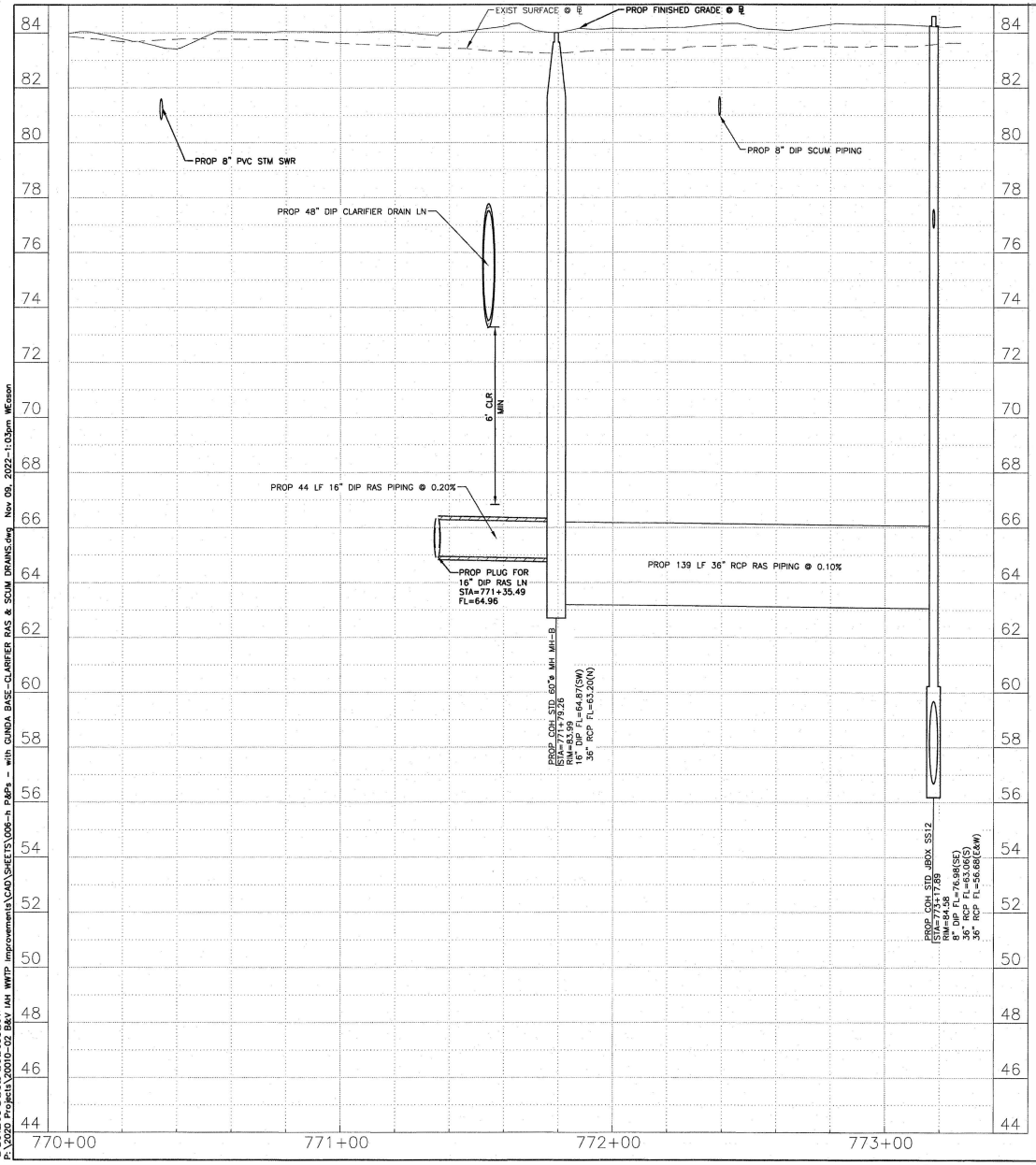
WBS NUMBER	R-000265-0147-4
DRAWING SCALE	1"=20'(H) 1"=2'(V)
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 88 OF 379	

FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
80367
REGISTERED
PROFESSIONAL ENGINEER

C-10-220

GUNDA CORPORATION
P:\2020 Projects\20010-02 B&V IAH WWTP Improvements\CAD\SHEETS\006-h P&Ps - with GUNDA BASE-CLARIFIER RAS & SCUM DRAINS.dwg Nov 09, 2022-1:03pm MEmon



0 20' 40'

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
CIVIL

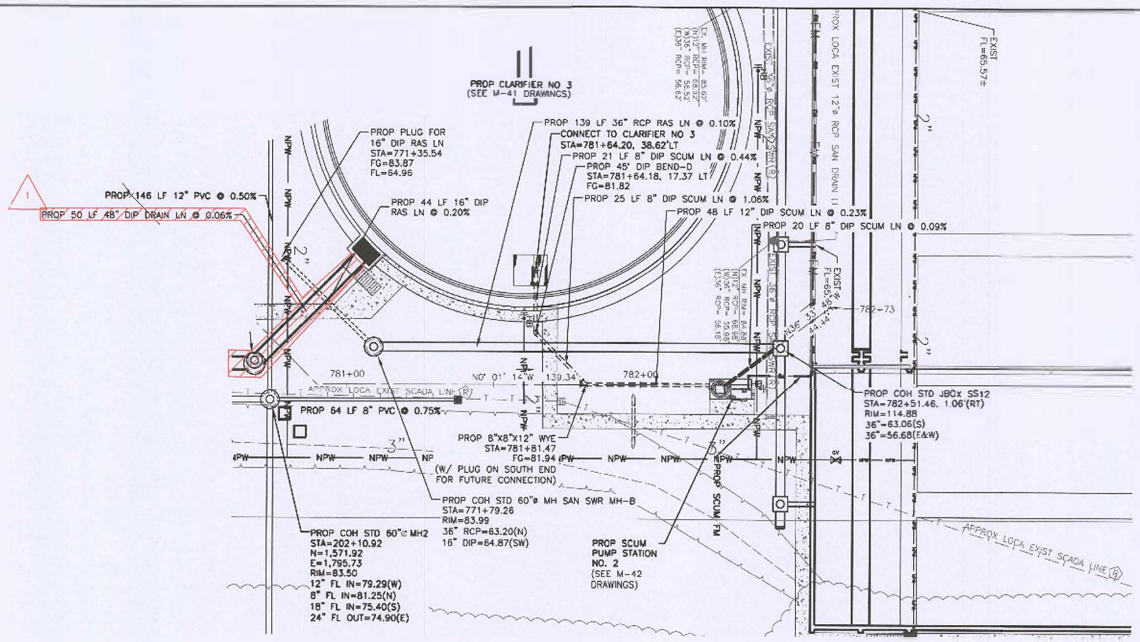
RAS PIPING (PROFILE)

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
1"=20'(H) 1"=2'(V)	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 89 OF 379	

80367
REGISTERED
PROFESSIONAL ENGINEER
HOUSTON, TEXAS

C-10-221

P:\2020 Projects\20010-02 B&V IAH WWTP Improvements\CAD\SHEETS\006-n P&Ps - with GUNDA BASE-CLARIFIER RAS & SCUM DRAINS.dwg Nov 09, 2022-1:03pm WEason



SEE NEXT SHEET FOR PROFILE

1 THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANOS
97308
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
CIVIL

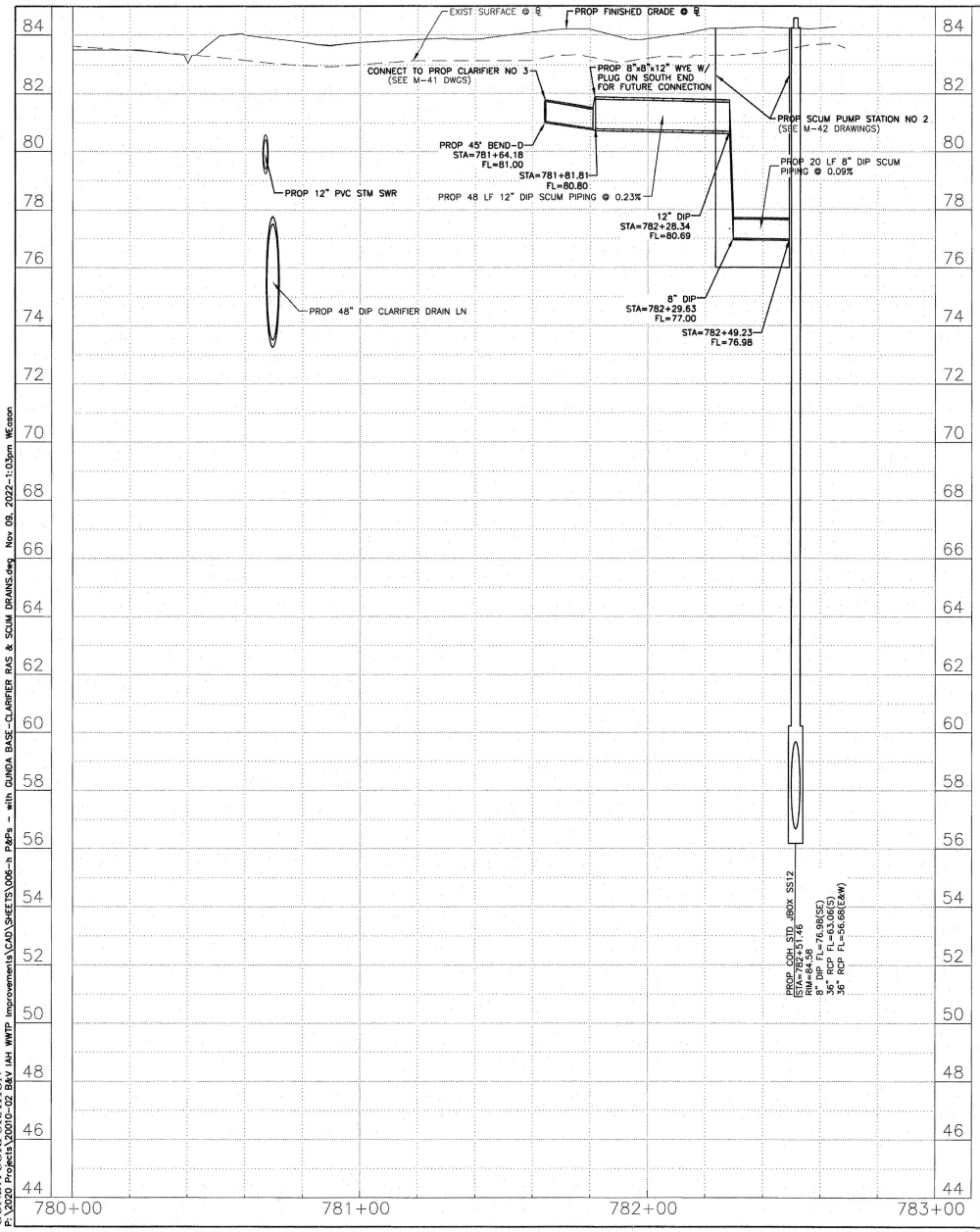
SCUM PIPING (PLAN)

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE 1"=20' (H) 1"=2' (V)	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 90 OF 379	

80367

C-10-222

GUNDA CORPORATION
P:\2020 Projects\20010-02 B&V IAH WWTP Improvements\CAD\SHEETS\006-n. P&Ps - with GUNDA BASE-CLARIFIER RAS & SCUM DRAINS.dwg Nov 09, 2022-11:03pm WEason



GUNDA CORPORATION
P:\2020 Projects\20010-02 B&V IAH WWTP Improvements\CAD\SHEETS\006-h P&Ps - with GUNDA BASE-CLARIFIER RAS & SCUM DRAINS.dwg Nov 09, 2022-1:03pm WEason

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

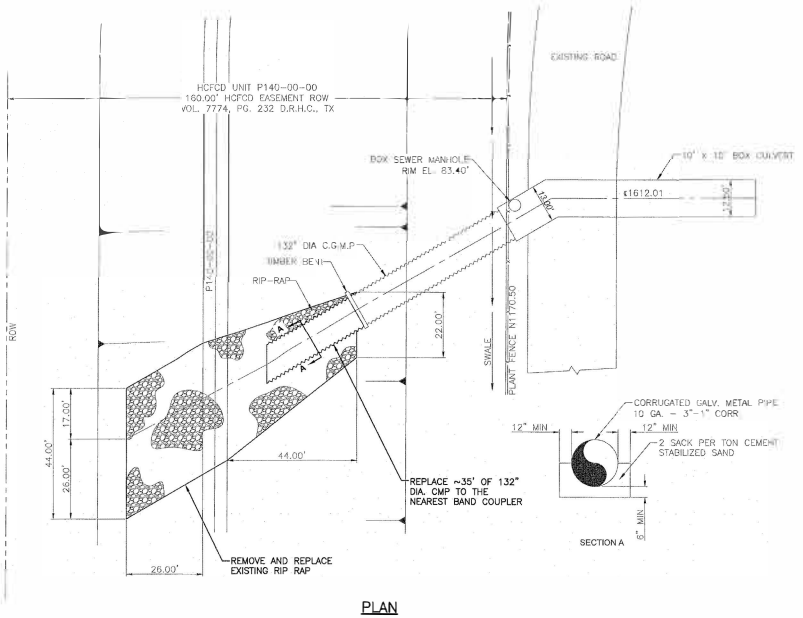
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
CIVIL

SCUM PIPING
(PROFILE)

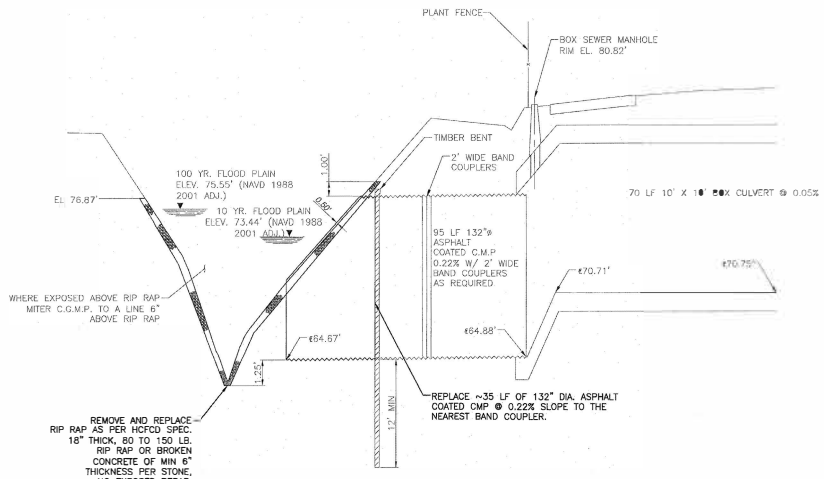
WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
1"=20'(H) 1"=2'(V)	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 91 OF 379	

80967

C-10-223



PLAN
NTS



ELEVATION
NTS

5engineering

BLACK & VEATCH

5ENGINEERING, LLC
11200 WESTHEIMER ROAD
SUITE 353
HOUSTON, TX 77042
(832) 800-3483
TX FIRM NUMBER F-13748

STATE OF TEXAS
PIERO BATTISTINI
104895
LICENSED PROFESSIONAL ENGINEER
11/09/2022

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

CWL

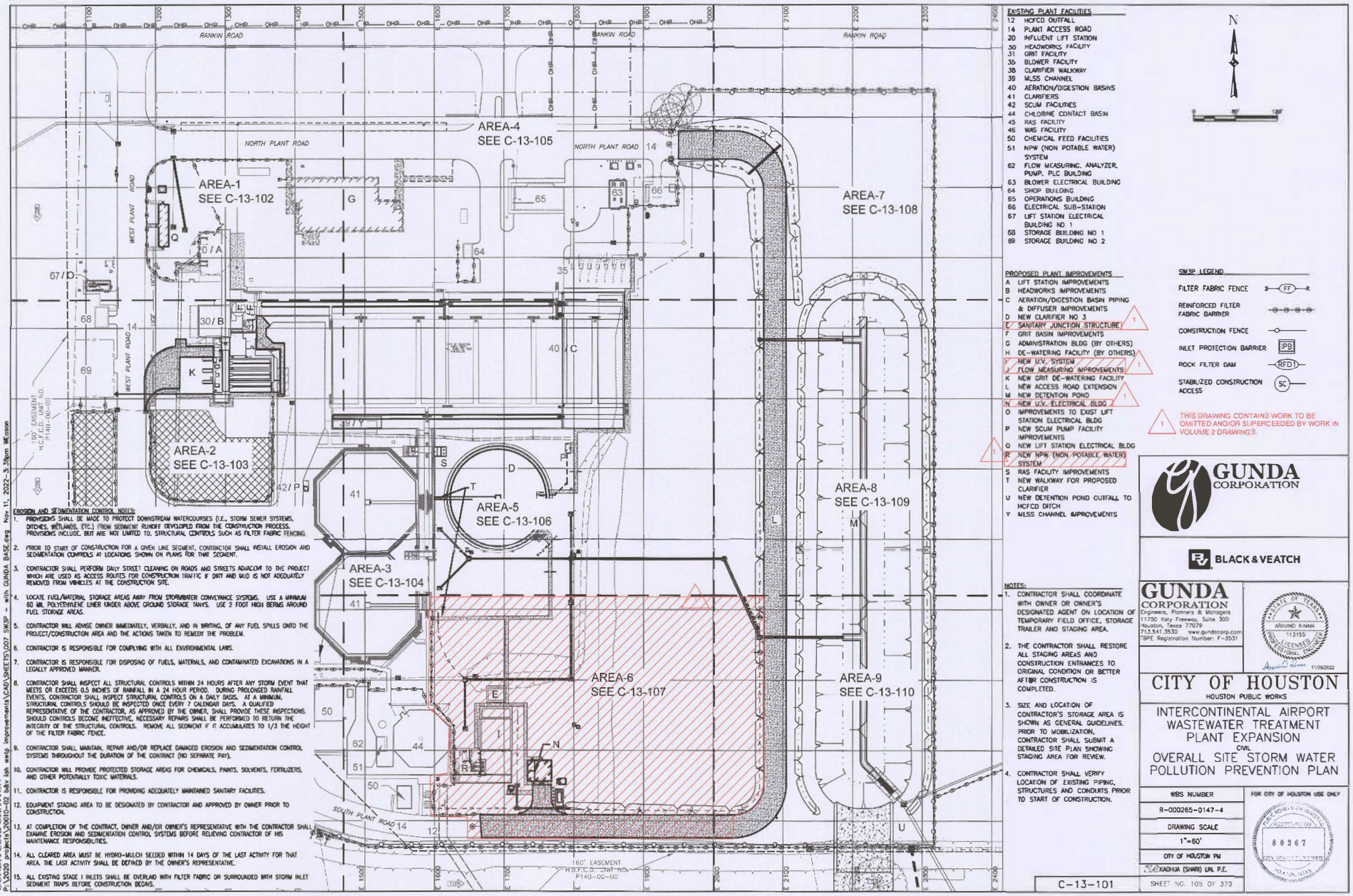
EFFLUENT OUTFALL REHABILITATION

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SEXIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 104 OF 379	

80367

C-12-101

FILE PATH: P:\0092\001\04 Cadd-GIS\02 SHEETS\12 - OUTFALL\C-12-101 HCFCD OUTFALL - PLAN.dwg



EXISTING PLANT FACILITIES

12 HCFCD OUTFALL
14 PLANT ACCESS ROAD
20 INFLUENT LIFT STATION
30 HEADWORKS FACILITY
31 GRIT FACILITY
35 BLOWER FACILITY
38 CLARIFIER WALKWAY
39 MLSS CHANNEL
40 AERATION/DIGESTION BASINS
41 CLARIFIERS
42 SCUM FACILITIES
44 CHLORINE CONTACT BASIN
45 RAS FACILITY
46 WAS FACILITY
50 CHEMICAL FEED FACILITIES
51 NPW (NON POTABLE WATER) SYSTEM
62 FLOW MEASURING, ANALYZER, PUMP, PLC BUILDING
63 BLOWER ELECTRICAL BUILDING
64 SHOP BUILDING
65 OPERATIONS BUILDING
66 ELECTRICAL SUB-STATION
67 LIFT STATION ELECTRICAL BUILDING NO 1
68 STORAGE BUILDING NO 1
69 STORAGE BUILDING NO 2

PROPOSED PLANT IMPROVEMENTS

A LIFT STATION IMPROVEMENTS
B HEADWORKS IMPROVEMENTS
C AERATION/DIGESTION BASIN PIPING & DIFFUSER IMPROVEMENTS
D NEW CLARIFIER NO 3
E SANITARY JUNCTION STRUCTURE
F GRIT BASIN IMPROVEMENTS
G ADMINISTRATION BLDG (BY OTHERS)
H DE-WATERING FACILITY (BY OTHERS)
I NEW U.V. SYSTEM
J FLOW MEASURING IMPROVEMENTS
K NEW GRIT DE-WATERING FACILITY
L NEW ACCESS ROAD EXTENSION
M NEW DETENTION POND
N NEW U.V. ELECTRICAL BLDG
O IMPROVEMENTS TO EXIST LIFT STATION ELECTRICAL BLDG
P NEW SCUM PUMP FACILITY IMPROVEMENTS
Q NEW LIFT STATION ELECTRICAL BLDG
R NEW NPW (NON POTABLE WATER) SYSTEM
S RAS FACILITY IMPROVEMENTS
T NEW WALKWAY FOR PROPOSED CLARIFIER
U NEW DETENTION POND OUTFALL TO HCFCD DITCH
Y MLSS CHANNEL IMPROVEMENTS

SWPP LEGEND

FILTER FABRIC FENCE — FF
REINFORCED FILTER FABRIC BARRIER
CONSTRUCTION FENCE
INLET PROTECTION BARRIER — IPB
ROCK FILTER DAM — RFD1
STABILIZED CONSTRUCTION ACCESS — SC

1 THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS

NOTES:

1. CONTRACTOR SHALL COORDINATE WITH OWNER OR OWNER'S DESIGNATED AGENT ON LOCATION OF TEMPORARY FIELD OFFICE, STORAGE TRAILER AND STAGING AREA.
2. THE CONTRACTOR SHALL RESTORE ALL STAGING AREAS AND CONSTRUCTION ENTRANCES TO ORIGINAL CONDITION OR BETTER AFTER CONSTRUCTION IS COMPLETED.
3. SIZE AND LOCATION OF CONTRACTOR'S STORAGE AREA IS SHOWN AS GENERAL GUIDELINES. PRIOR TO MOBILIZATION, CONTRACTOR SHALL SUBMIT A DETAILED SITE PLAN SHOWING STAGING AREA FOR REVIEW.
4. CONTRACTOR SHALL VERIFY LOCATION OF EXISTING PIPING, STRUCTURES AND CONDUITS PRIOR TO START OF CONSTRUCTION.

EROSION AND SEDIMENTATION CONTROL NOTES:

1. PROVISIONS SHALL BE MADE TO PROTECT DOWNSTREAM WATERCOURSES (I.E., STORM SEWER SYSTEMS, DITCHES, WETLANDS, ETC.) FROM SEDIMENT RUNOFF DEVELOPED FROM THE CONSTRUCTION PROCESS. PROVISIONS INCLUDE, BUT ARE NOT LIMITED TO, STRUCTURAL CONTROLS SUCH AS FILTER FABRIC FENCING.
2. PRIOR TO START OF CONSTRUCTION FOR A GIVEN LINE SEGMENT, CONTRACTOR SHALL INSTALL EROSION AND SEDIMENTATION CONTROLS AT LOCATIONS SHOWN ON PLANS FOR THAT SEGMENT.
3. CONTRACTOR SHALL PERFORM DAILY STREET CLEANING ON ROADS AND STREETS ADJACENT TO THE PROJECT WHICH ARE USED AS ACCESS ROUTES FOR CONSTRUCTION TRAFFIC IF DIRT AND MUD IS NOT ADEQUATELY REMOVED FROM VEHICLES AT THE CONSTRUCTION SITE.
4. LOCATE FUEL/MATERIAL STORAGE AREAS AWAY FROM STORMWATER CONVEYANCE SYSTEMS. USE A MINIMUM 60 MIL POLYETHYLENE LINER UNDER ABOVE GROUND STORAGE TANKS. USE 2 FOOT HIGH BERMS AROUND FUEL STORAGE AREAS.
5. CONTRACTOR WILL ADVISE OWNER IMMEDIATELY, VERBALLY, AND IN WRITING, OF ANY FUEL SPILLS ONTO THE PROJECT/CONSTRUCTION AREA AND THE ACTIONS TAKEN TO REMEDY THE PROBLEM.
6. CONTRACTOR IS RESPONSIBLE FOR COMPLYING WITH ALL ENVIRONMENTAL LAWS.
7. CONTRACTOR IS RESPONSIBLE FOR DISPOSING OF FUELS, MATERIALS, AND CONTAMINATED EXCAVATIONS IN A LEGALLY APPROVED MANNER.
8. CONTRACTOR SHALL INSPECT ALL STRUCTURAL CONTROLS WITHIN 24 HOURS AFTER ANY STORM EVENT THAT MEETS OR EXCEEDS 0.5 INCHES OF RAINFALL IN A 24 HOUR PERIOD. DURING PROLONGED RAINFALL EVENTS, CONTRACTOR SHALL INSPECT STRUCTURAL CONTROLS ON A DAILY BASIS. AT A MINIMUM, STRUCTURAL CONTROLS SHOULD BE INSPECTED ONCE EVERY 7 CALENDAR DAYS. A QUALIFIED REPRESENTATIVE OF THE CONTRACTOR, AS APPROVED BY THE OWNER, SHALL PROVIDE THESE INSPECTIONS. SHOULD CONTROLS BECOME INEFFECTIVE, NECESSARY REPAIRS SHALL BE PERFORMED TO RETURN THE INTEGRITY OF THE STRUCTURAL CONTROLS. REMOVE ALL SEDIMENT IF IT ACCUMULATES TO 1/3 THE HEIGHT OF THE FILTER FABRIC FENCE.
9. CONTRACTOR SHALL MAINTAIN, REPAIR AND/OR REPLACE DAMAGED EROSION AND SEDIMENTATION CONTROL SYSTEMS THROUGHOUT THE DURATION OF THE CONTRACT (NO SEPARATE PAY).
10. CONTRACTOR WILL PROVIDE PROTECTED STORAGE AREAS FOR CHEMICALS, PAINTS, SOLVENTS, FERTILIZERS, AND OTHER POTENTIALLY TOXIC MATERIALS.
11. CONTRACTOR IS RESPONSIBLE FOR PROVIDING ADEQUATELY MAINTAINED SANITARY FACILITIES.
12. EQUIPMENT STAGING AREA TO BE DESIGNATED BY CONTRACTOR AND APPROVED BY OWNER PRIOR TO CONSTRUCTION.
13. AT COMPLETION OF THE CONTRACT, OWNER AND/OR OWNER'S REPRESENTATIVE WITH THE CONTRACTOR SHALL EXAMINE EROSION AND SEDIMENTATION CONTROL SYSTEMS BEFORE RELIEVING CONTRACTOR OF HIS MAINTENANCE RESPONSIBILITIES.
14. ALL CLEARED AREA MUST BE HYDRO-MULCH SEEDED WITHIN 14 DAYS OF THE LAST ACTIVITY FOR THAT AREA. THE LAST ACTIVITY SHALL BE DEFINED BY THE OWNER'S REPRESENTATIVE.
15. ALL EXISTING STAGE I INLETS SHALL BE OVERLAID WITH FILTER FABRIC OR SURROUNDED WITH STORM INLET SEDIMENT TRAPS BEFORE CONSTRUCTION BEGINS.

GUNDA CORPORATION
P:\2020 projects\20010-02 bdv ish ewip improvements\CAD\SHEETS\007 SWPP - with GUNDA BASE.dwg Nov 11, 2022 - 3:39pm WEason

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

ARVIND NANNA 113155 LICENSED PROFESSIONAL ENGINEER 11/09/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
CIVIL
OVERALL SITE STORM WATER POLLUTION PREVENTION PLAN

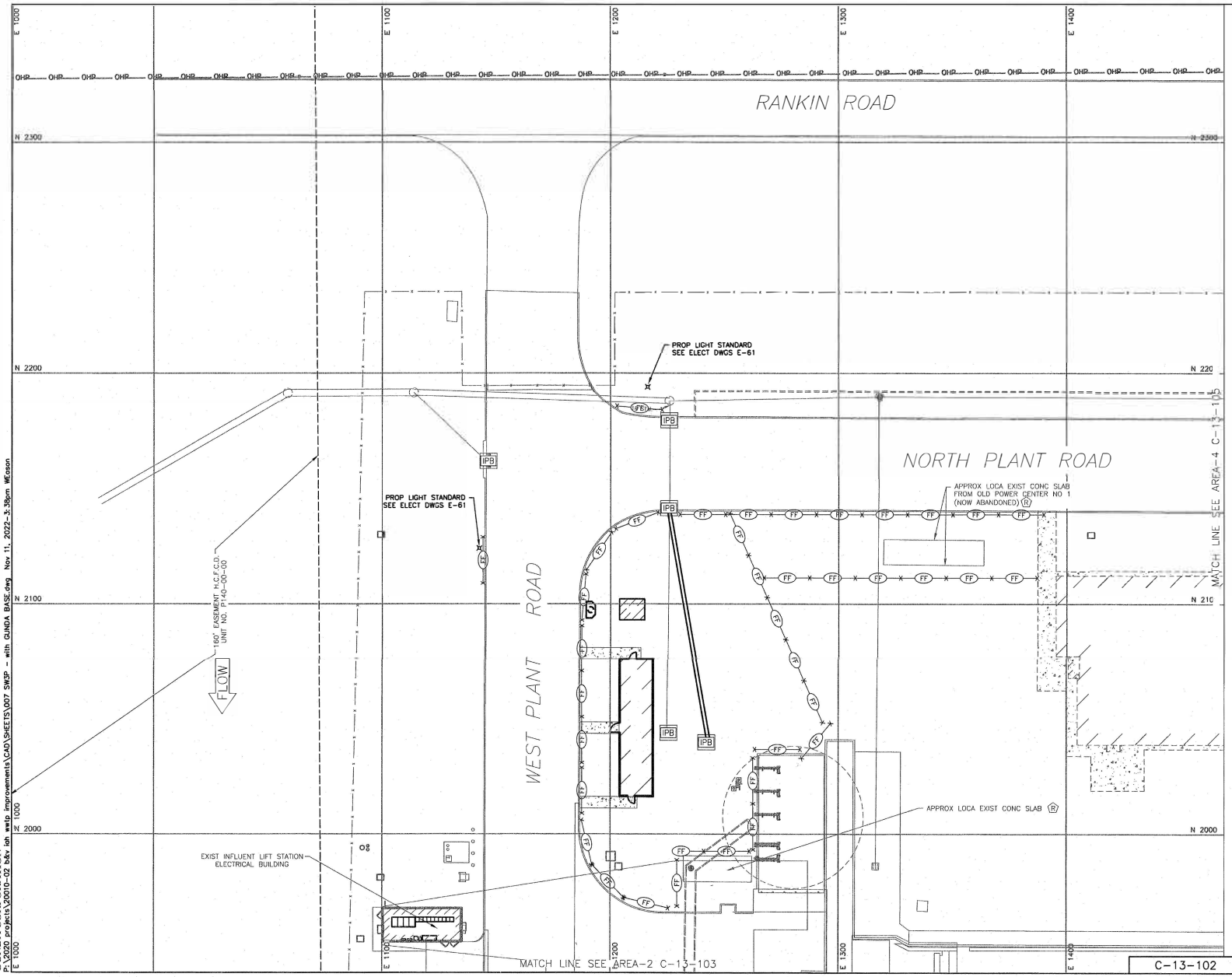
WBS NUMBER	R-000265-0147-4
DRAWING SCALE	1"=60'
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.

FOR CITY OF HOUSTON USE ONLY

80367 LICENSED PROFESSIONAL ENGINEER

C-13-101

SHEET NO. 105 OF 379



GUNDA CORPORATION
P:\2020 projects\20010-02 b&v ioh wwtp improvements\CAD\SHEETS\007 SW3P - with GUNDA BASE.dwg Nov 11, 2022-3:38pm WEason

N

0 20' 40'

AREA 1	AREA 4	AREA 7
AREA 2	AREA 5	AREA 8
AREA 3	AREA 6	AREA 9

KEY MAP

SW3P LEGEND

- FILTER FABRIC FENCE (FF)
- REINFORCED FILTER FABRIC BARRIER (RFB)
- CONSTRUCTION FENCE
- INLET PROTECTION BARRIER (IPB)
- ROCK FILTER DAM (RFD1)
- STABILIZED CONSTRUCTION ACCESS (SC)

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

ARVIND MAMA 113155 LICENSED PROFESSIONAL ENGINEER 11/9/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

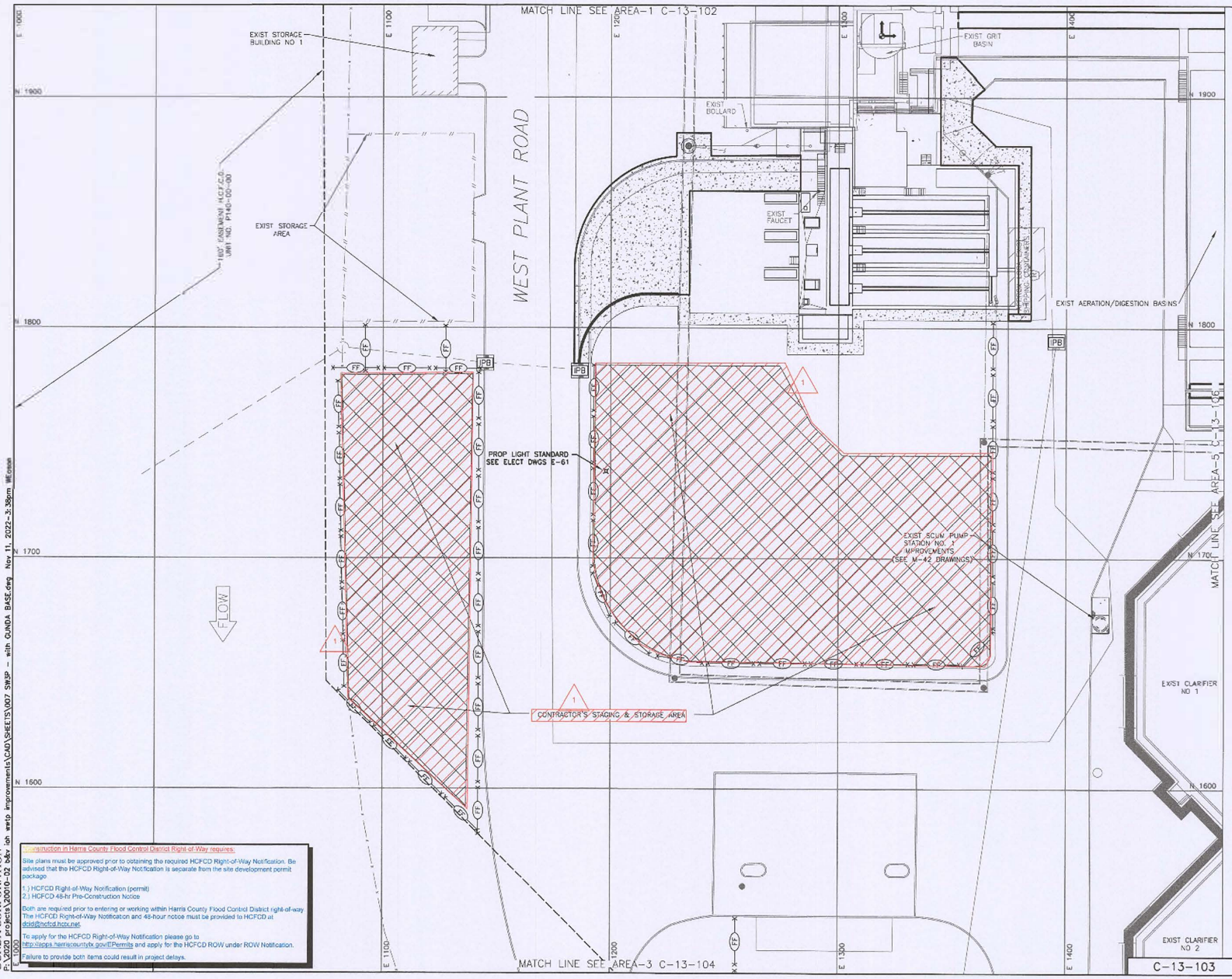
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
CIVIL
STORM WATER POLLUTION PREVENTION PLAN AREA-1

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	1"=20'
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.

FOR CITY OF HOUSTON USE ONLY
80367

C-13-102

SHEET NO. 106 OF 379



GUNDA CORPORATION
P:\2020 projects\20010-02 bdv ioh ewtp improvements\CAD\SHEETS\007 SW3P - with GUNDA BASE.dwg Nov 11, 2022 - 3:38pm MKocsan

Construction in Harris County Flood Control District Right-of-Way requires:

Site plans must be approved prior to obtaining the required HCFCD Right-of-Way Notification. Be advised that the HCFCD Right-of-Way Notification is separate from the site development permit package.

1.) HCFCD Right-of-Way Notification (permit)
2.) HCFCD 48-hr Pre-Construction Notice

Both are required prior to entering or working within Harris County Flood Control District right-of-way. The HCFCD Right-of-Way Notification and 48-hour notice must be provided to HCFCD at dcid@hcfcd.hctx.net.

To apply for the HCFCD Right-of-Way Notification please go to http://apps.harriscountytx.gov/EPermits and apply for the HCFCD ROW under ROW Notification.

Failure to provide both items could result in project delays.

N

0 20' 40'

AREA 1	AREA 4	AREA 7
AREA 2	AREA 5	AREA 8
AREA 3	AREA 6	AREA 9

KEY MAP

SW3P LEGEND

- FILTER FABRIC FENCE (FF)
- REINFORCED FILTER FABRIC BARRIER (RFB)
- CONSTRUCTION FENCE
- INLET PROTECTION BARRIER (IPB)
- ROCK FILTER DAM (RFD1)
- STABILIZED CONSTRUCTION ACCESS (SC)

1 THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEDED BY WORK IN VOLUME 2 DRAWINGS

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS ARAVIND NIMMA 117155 LICENSED PROFESSIONAL ENGINEER 11/09/2022

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

CIVIL

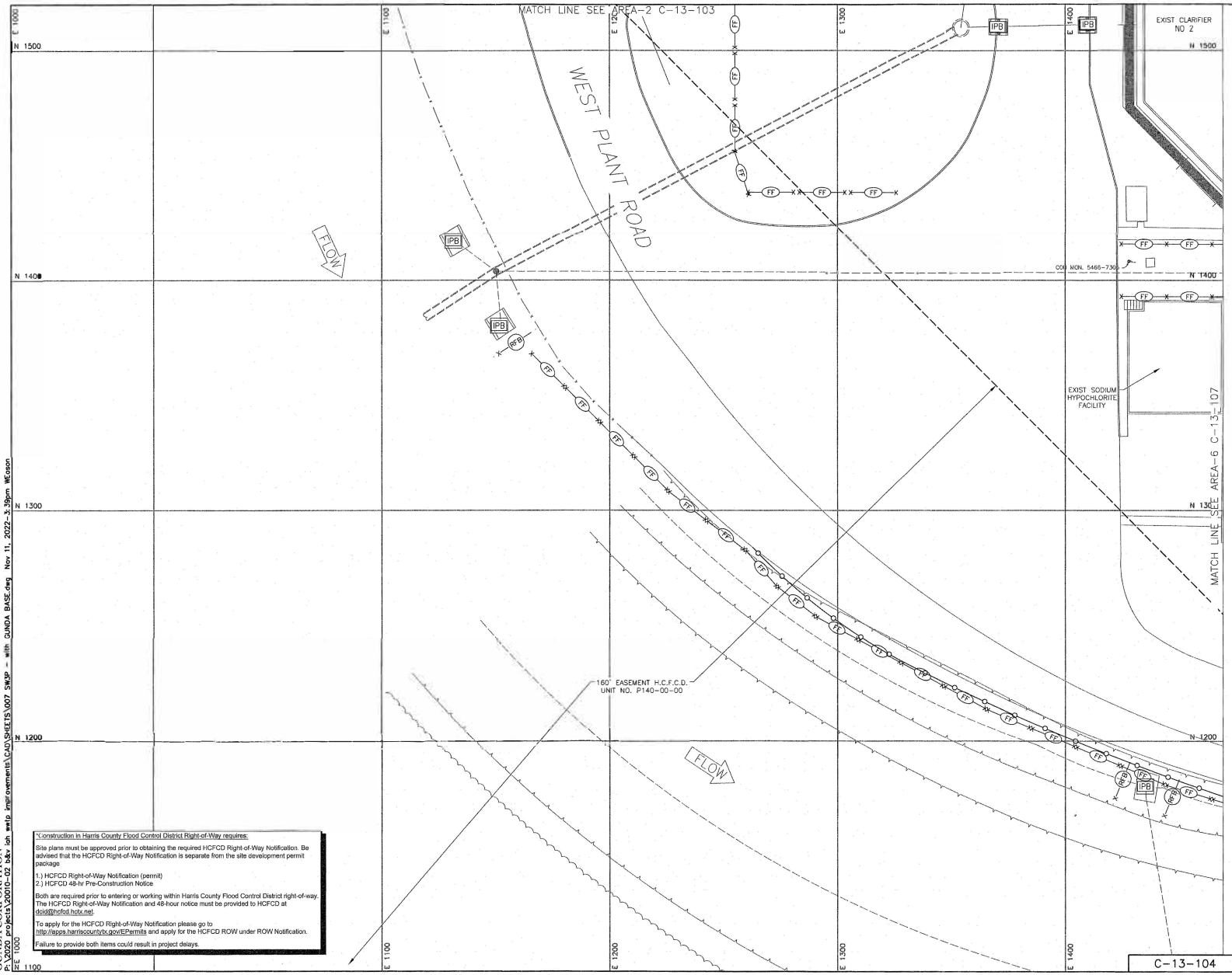
STORM WATER POLLUTION PREVENTION PLAN AREA-2

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	1"=20'
CITY OF HOUSTON PM	S.H. XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 107 OF 379	

FOR CITY OF HOUSTON USE ONLY

REGISTERED PROFESSIONAL ENGINEER 80367 SIGNATURE DATE INSPECTOR

C-13-103



N

0 20' 40'

AREA 1	AREA 4	AREA 7
AREA 2	AREA 5	AREA 8
AREA 3	AREA 6	AREA 9

KEY MAP

SW3P LEGEND

- FILTER FABRIC FENCE
- REINFORCED FILTER FABRIC BARRIER
- CONSTRUCTION FENCE
- INLET PROTECTION BARRIER
- ROCK FILTER DAM
- STABILIZED CONSTRUCTION ACCESS

*Construction in Harris County Flood Control District Right-of-Way requires:

Site plans must be approved prior to obtaining the required HCFCD Right-of-Way Notification. Be advised that the HCFCD Right-of-Way Notification is separate from the site development permit package

1.) HCFCD Right-of-Way Notification (permit)
2.) HCFCD 48-hr Pre-Construction Notice

Both are required prior to entering or working within Harris County Flood Control District right-of-way. The HCFCD Right-of-Way Notification and 48-hour notice must be provided to HCFCD at dcid@hcfcd.hctx.net.

To apply for the HCFCD Right-of-Way Notification please go to http://apps.harriscountytx.gov/EPermits and apply for the HCFCD ROW under ROW Notification.

Failure to provide both items could result in project delays.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
ARAVIND NIMMA
113155
LICENSED PROFESSIONAL ENGINEER
CIVIL
11/09/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
CIVIL

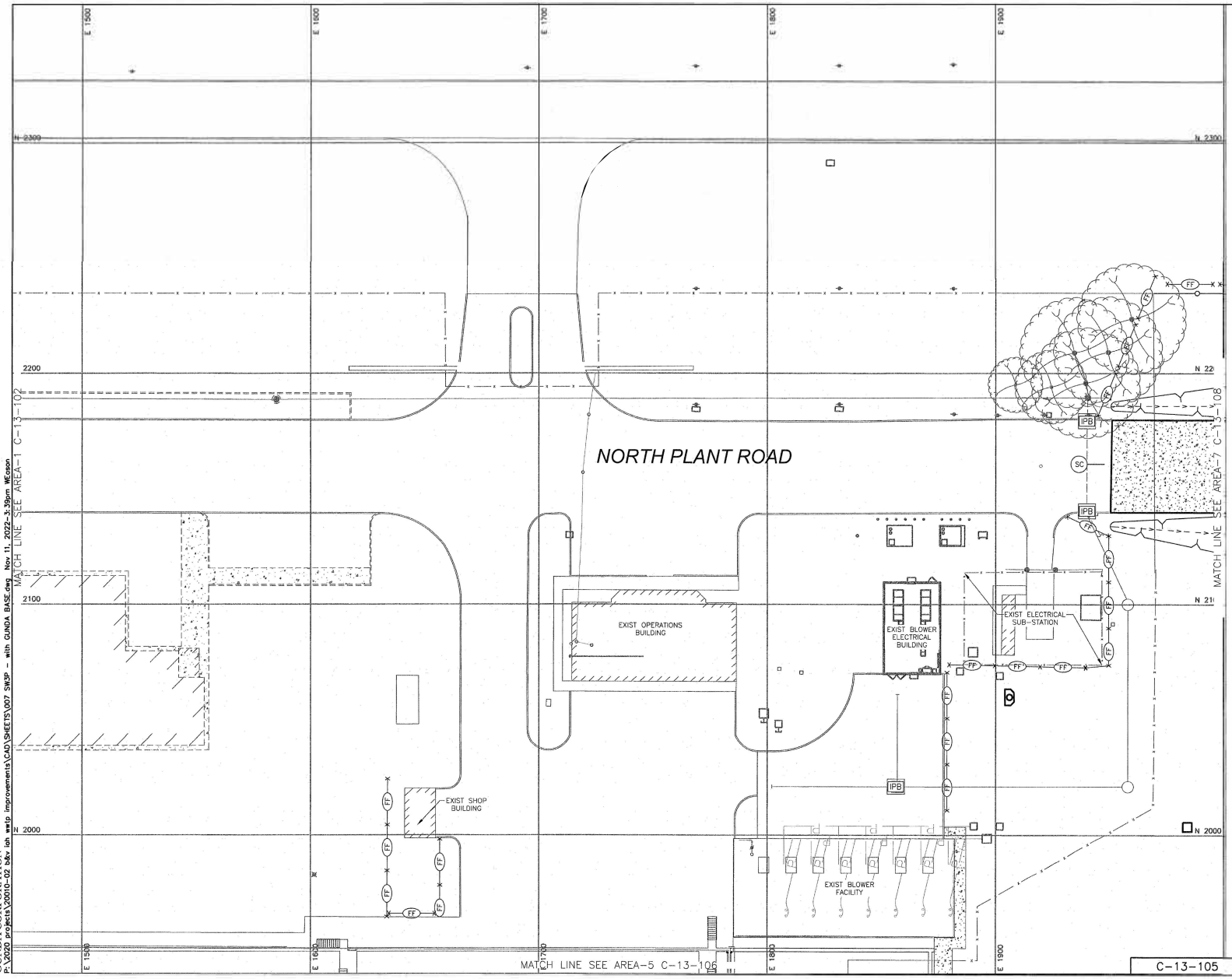
STORM WATER POLLUTION PREVENTION PLAN AREA-3

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	1"=20'
CITY OF HOUSTON PM	Xiaohua (Shari) Lin, P.E.
SHEET NO. 108 OF 379	

FOR CITY OF HOUSTON USE ONLY
ACCEPTED RECORDS
80367
CITY DATE
HOUSTON, TEXAS

C-13-104

GUNDA CORPORATION
P:\2020 projects\20010-02 b&v ioh ww1p pmf\ovements\CAD\SHEETS\007 SW3P - with GUNDA BASE.dwg Nov 11, 2022-3:39pm WEason



N

0 20' 40'

AREA 1	AREA 4	AREA 7
AREA 2	AREA 5	AREA 8
AREA 3	AREA 6	AREA 9

KEY MAP

SW3P LEGEND

- FILTER FABRIC FENCE (FF)
- REINFORCED FILTER FABRIC BARRIER (RFB)
- CONSTRUCTION FENCE
- INLET PROTECTION BARRIER (IPB)
- ROCK FILTER DAM (RFD1)
- STABILIZED CONSTRUCTION ACCESS (SC)

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
ARAVIND NIMMA
113155
LICENSED PROFESSIONAL ENGINEER
11/09/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

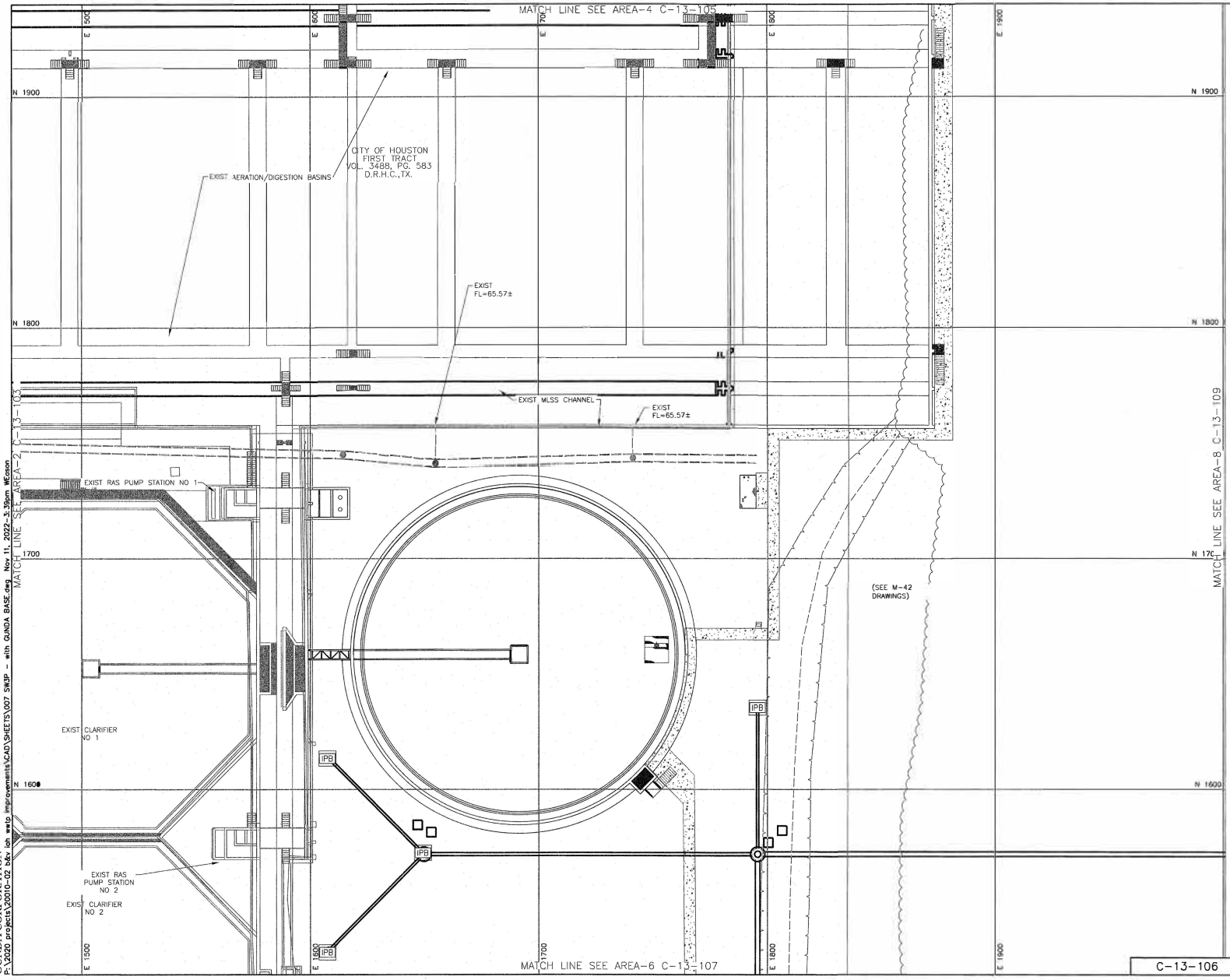
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
CIVIL
STORM WATER POLLUTION PREVENTION PLAN AREA-4

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	1"=20'
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 109 OF 379	

FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
80367
REGISTERED
XIAOHUA LIN
PROFESSIONAL ENGINEER

GUNDA CORPORATION
P:\2020 projects\20010-02 b&v ion ww\p improvements\CAD\SHEETS\007 SW3P - with GUNDA BASE.dwg Nov 11, 2022 - 3:39pm WEgson



GUNDA CORPORATION
P:\2020 projects\20010-02 b&v ioh ww\p improvements\CAD\SHEETS\007 SW3P - with GUNDA BASE.dwg Nov 11, 2022 - 3:39pm MEason

N

0 20' 40'

AREA 1	AREA 4	AREA 7
AREA 2	AREA 5	AREA 8
AREA 3	AREA 6	AREA 9

KEY MAP

SW3P LEGEND

- FILTER FABRIC FENCE (FF)
- REINFORCED FILTER FABRIC BARRIER (RFB)
- CONSTRUCTION FENCE
- INLET PROTECTION BARRIER (IPB)
- ROCK FILTER DAM (RFD1)
- STABILIZED CONSTRUCTION ACCESS (SC)

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
ARAVIND NIMMA
113155
LICENSED
PROFESSIONAL ENGINEER
11/09/2022

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

CIVIL

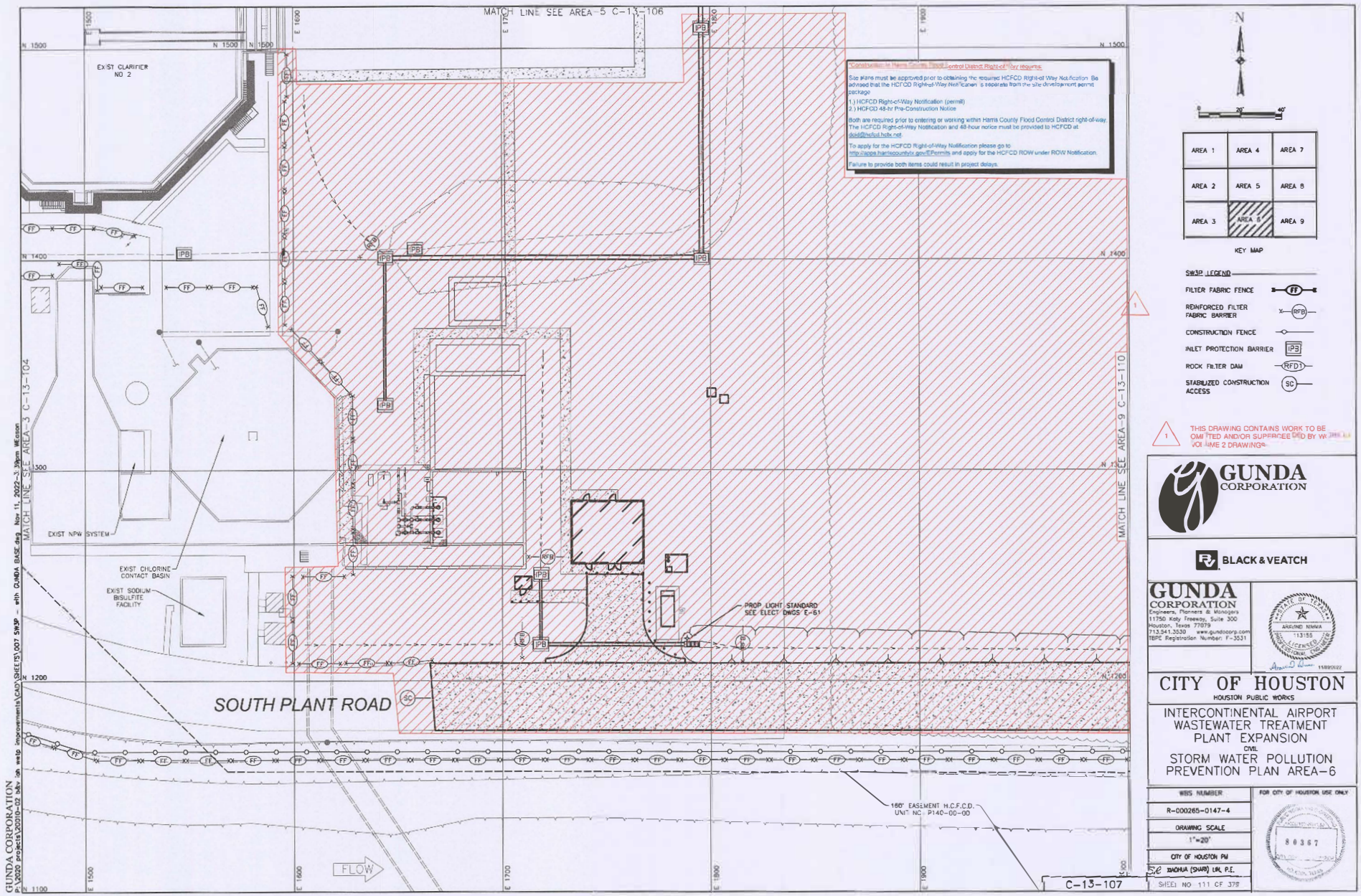
STORM WATER POLLUTION PREVENTION PLAN AREA-5

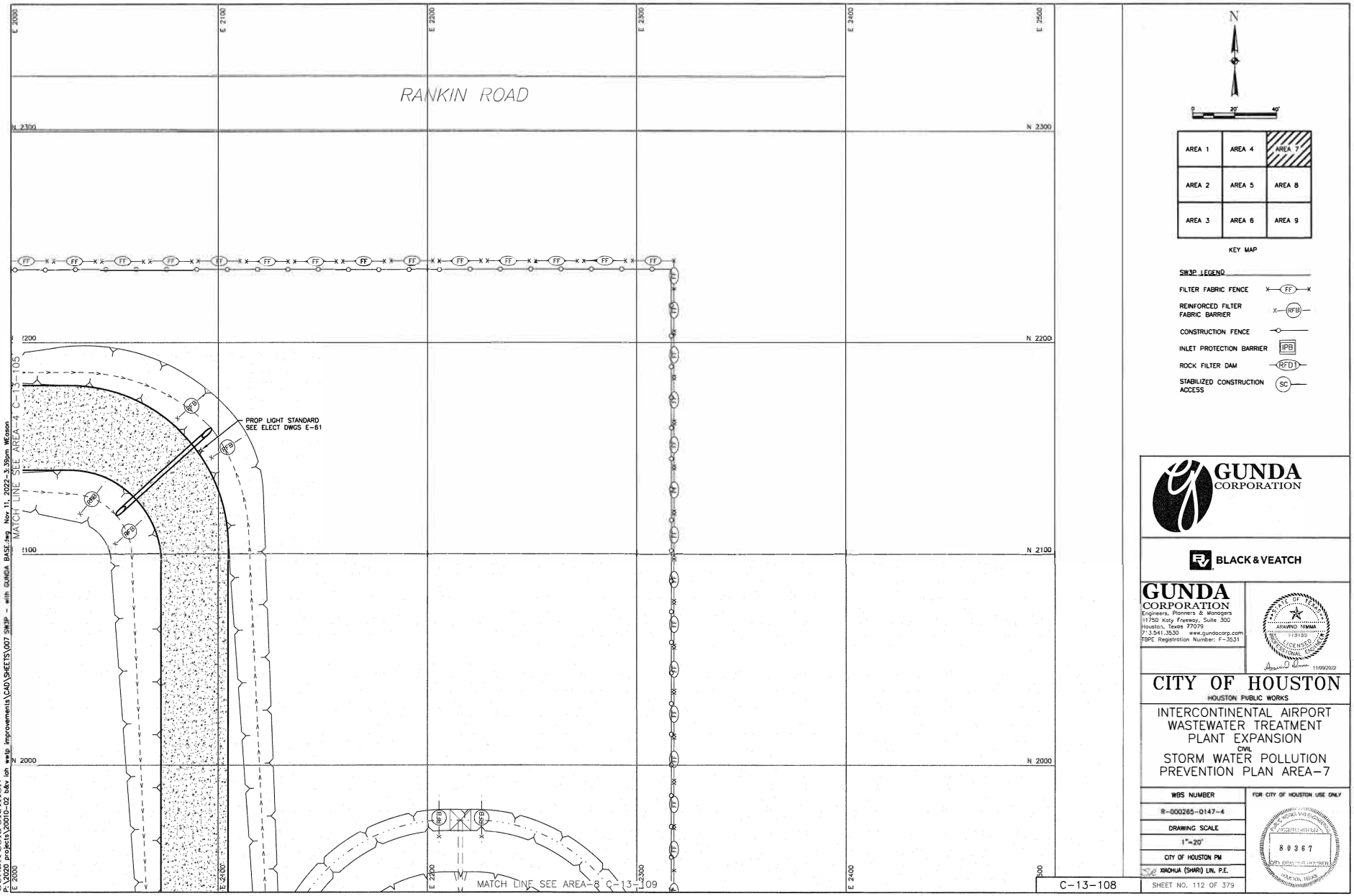
WBS NUMBER	R-000265-0147-4
DRAWING SCALE	1"=20'
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO.	110 OF 379

FOR CITY OF HOUSTON USE ONLY

ACCEPTED AS NOTED
80367
CITY OF HOUSTON ENGINEER
HOUSTON, TEXAS

C-13-106


MATCH LINE SEE AREA-5 C-13-106
EXIST CLARIFIER NO 2
EXIST NPW SYSTEM
EXIST. CHLORINE CONTACT BASIN
EXIST SODIUM BISULFITE FACILITY
PROP. LIGHT STANDARD SEE ELECT DWGS E-61
SOUTH PLANT ROAD
160' EASEMENT H.C.F.C.D. UNIT NO. P140-00-00
FLOW
MATCH LINE SEE AREA-3 C-13-104
MATCH LINE SEE AREA-9 C-13-110
C-13-107
N 1500
N 1400
N 1300
N 1200
N 1100
E 1500
E 1600
E 1700
E 1800
E 1900
*Construction in Harris County Flood Control District Right-of-Way requires:
Site plans must be approved prior to obtaining the required HCFCD Right-of-Way Notification. Be advised that the HCFCD Right-of-Way Notification is separate from the site development permit package.
1.) HCFCD Right-of-Way Notification (permit)
2.) HCFCD 48-hr Pre-Construction Notice
Both are required prior to entering or working within Harris County Flood Control District right-of-way. The HCFCD Right-of-Way Notification and 48-hour notice must be provided to HCFCD at doid@hcfcd.hctx.net.
To apply for the HCFCD Right-of-Way Notification please go to http://apps.harriscountytx.gov/EPermits and apply for the HCFCD ROW under ROW Notification.
Failure to provide both items could result in project delays.
N
0
20'
40'
AREA 1
AREA 4
AREA 7
AREA 2
AREA 5
AREA 8
AREA 3
AREA 6
AREA 9
KEY MAP
SWPP LEGEND
FILTER FABRIC FENCE
REINFORCED FILTER FABRIC BARRIER
CONSTRUCTION FENCE
INLET PROTECTION BARRIER
ROCK FILTER DAM
STABILIZED CONSTRUCTION ACCESS
1
THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEDED BY WORK IN VOLUME 2 DRAWINGS.
GUNDA CORPORATION
BLACK & VEATCH
GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530
www.gundacorp.com
TBPE Registration Number: F-3531
ARVIND NIMKAR
113152
LICENSED PROFESSIONAL ENGINEER
CITY OF HOUSTON
HOUSTON PUBLIC WORKS
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
CIVIL
STORM WATER POLLUTION PREVENTION PLAN AREA-6
WBS NUMBER
R-000265-0147-4
DRAWING SCALE
1"=20'
CITY OF HOUSTON PM
XIAOHUA (SHARI) LIN, P.E.
SHEET NO 111 OF 379
FOR CITY OF HOUSTON USE ONLY
80367
GUNDA CORPORATION
P:\2020 projects\20010-02 hdv ish wstp improvements\CAD\SHEET(S)\007 SWPP - with GUNDA BASE.dwg Nov 11, 2022-3:39pm WEason



N

0 20' 40'

AREA 1	AREA 4	AREA 7
AREA 2	AREA 5	AREA 8
AREA 3	AREA 6	AREA 9

KEY MAP

SWPP LEGEND

FILTER FABRIC FENCE — FF

REINFORCED FILTER FABRIC BARRIER — RFB

CONSTRUCTION FENCE

INLET PROTECTION BARRIER — IPB

ROCK FILTER DAM — RFD1

STABILIZED CONSTRUCTION ACCESS — SC

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
ARAVIND NIMMA
113151
LICENSED PROFESSIONAL ENGINEER
11/09/2022

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

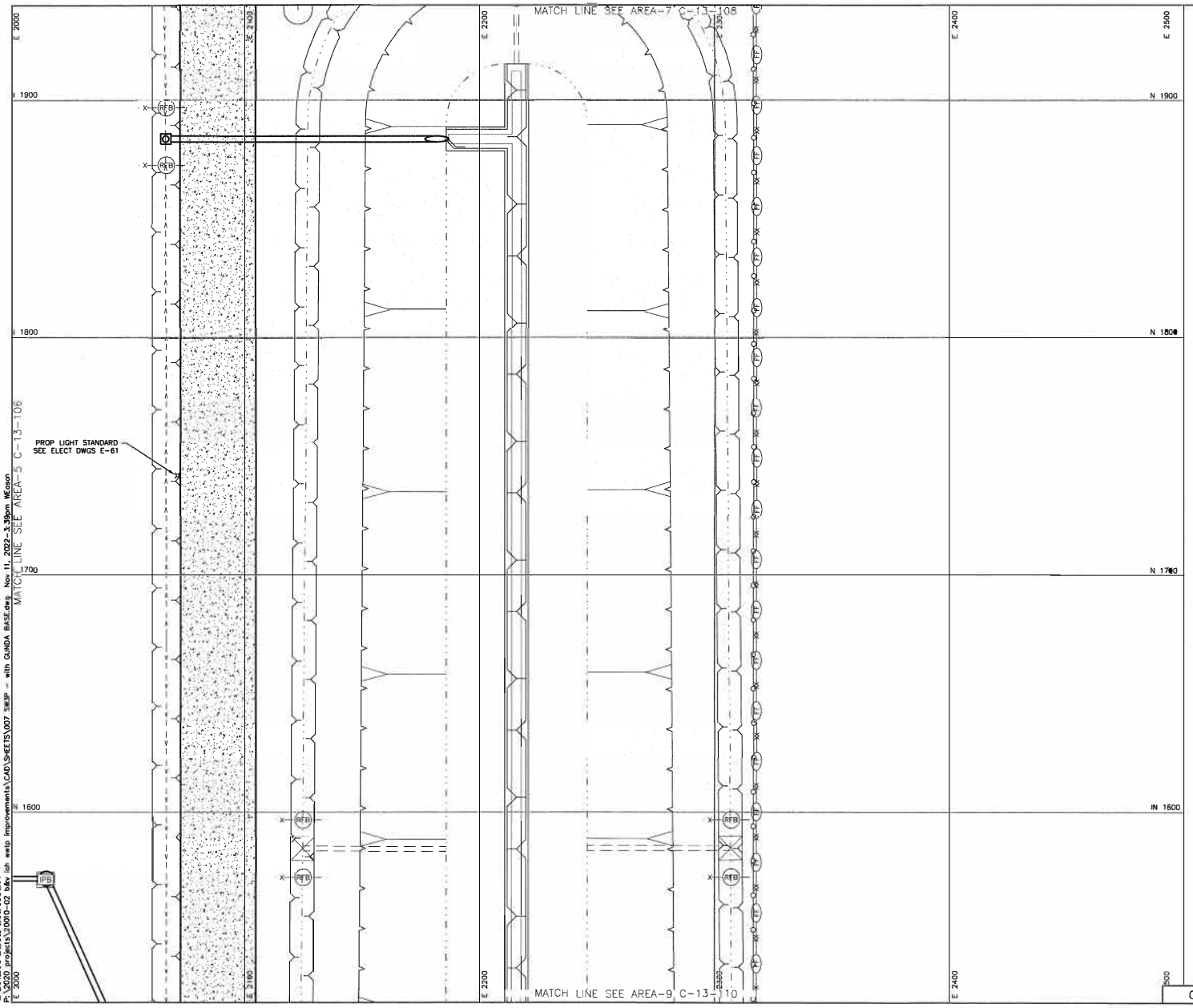
CIVIL

STORM WATER POLLUTION PREVENTION PLAN AREA-7

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
1"=20'	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 112 OF 379	

80367

GUNDA CORPORATION
P:\2020 projects\20010-02 b&v ish ww\p improvements\CAD\SHEETS\007 SWPP - with GUNDA BASE.dwg Nov 11, 2022-3:39pm WEason



GUNDA CORPORATION
P:\2020 projects\20010-02 b&v iah swip improvements\CAD\SHEETS\007 SWIP - with GUNDA BASE.dwg Nov 11, 2022 - 3:39pm WEason

N

0 20' 40'

AREA 1	AREA 4	AREA 7
AREA 2	AREA 5	AREA 8
AREA 3	AREA 6	AREA 9

KEY MAP

SW3P LEGEND

- FILTER FABRIC FENCE
- REINFORCED FILTER FABRIC BARRIER
- CONSTRUCTION FENCE
- INLET PROTECTION BARRIER
- ROCK FILTER DAM
- STABILIZED CONSTRUCTION ACCESS

C-13-109

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
ARAVIND NIMMA
113166
LICENSED PROFESSIONAL ENGINEER
11/09/2022

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

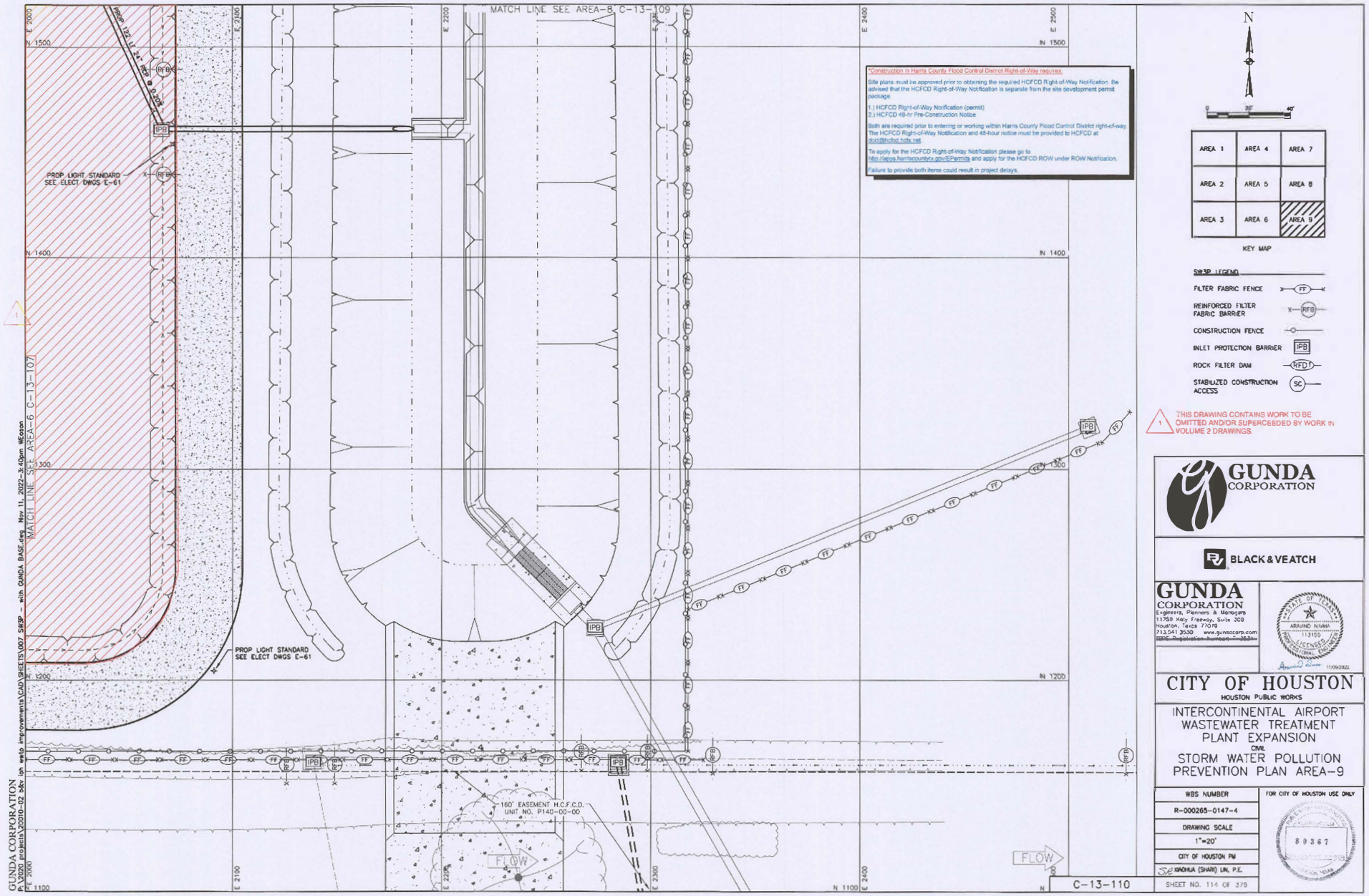
CIVIL

STORM WATER POLLUTION PREVENTION PLAN AREA-8

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	1"=20'
CITY OF HOUSTON PM	Se XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 113 OF 379	

FOR CITY OF HOUSTON USE ONLY

80367
REGISTERED



*Construction in Harris County Flood Control District Right-of-Way requires:

Site plans must be approved prior to obtaining the required HCFCD Right-of-Way Notification. Be advised that the HCFCD Right-of-Way Notification is separate from the site development permit package.

1.) HCFCD Right-of-Way Notification (permit)
2.) HCFCD 48-hr Pre-Construction Notice

Both are required prior to entering or working within Harris County Flood Control District right-of-way. The HCFCD Right-of-Way Notification and 48-hour notice must be provided to HCFCD at dock@hcfcd.hctx.net

To apply for the HCFCD Right-of-Way Notification please go to http://epos.harriscountytx.gov/EPermits and apply for the HCFCD ROW under ROW Notification.

Failure to provide both items could result in project delays.

N

0 30' 40'

AREA 1	AREA 4	AREA 7
AREA 2	AREA 5	AREA 8
AREA 3	AREA 6	AREA 9

KEY MAP

SW3P LEGEND

- FILTER FABRIC FENCE (FF)
- REINFORCED FILTER FABRIC BARRIER (RFB)
- CONSTRUCTION FENCE
- INLET PROTECTION BARRIER (IPB)
- ROCK FILTER DAM (RFD)
- STABILIZED CONSTRUCTION ACCESS (SC)

1 THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number F-3534

ARAVIND NIMMA
113100
LICENSED
CIVIL
11/09/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

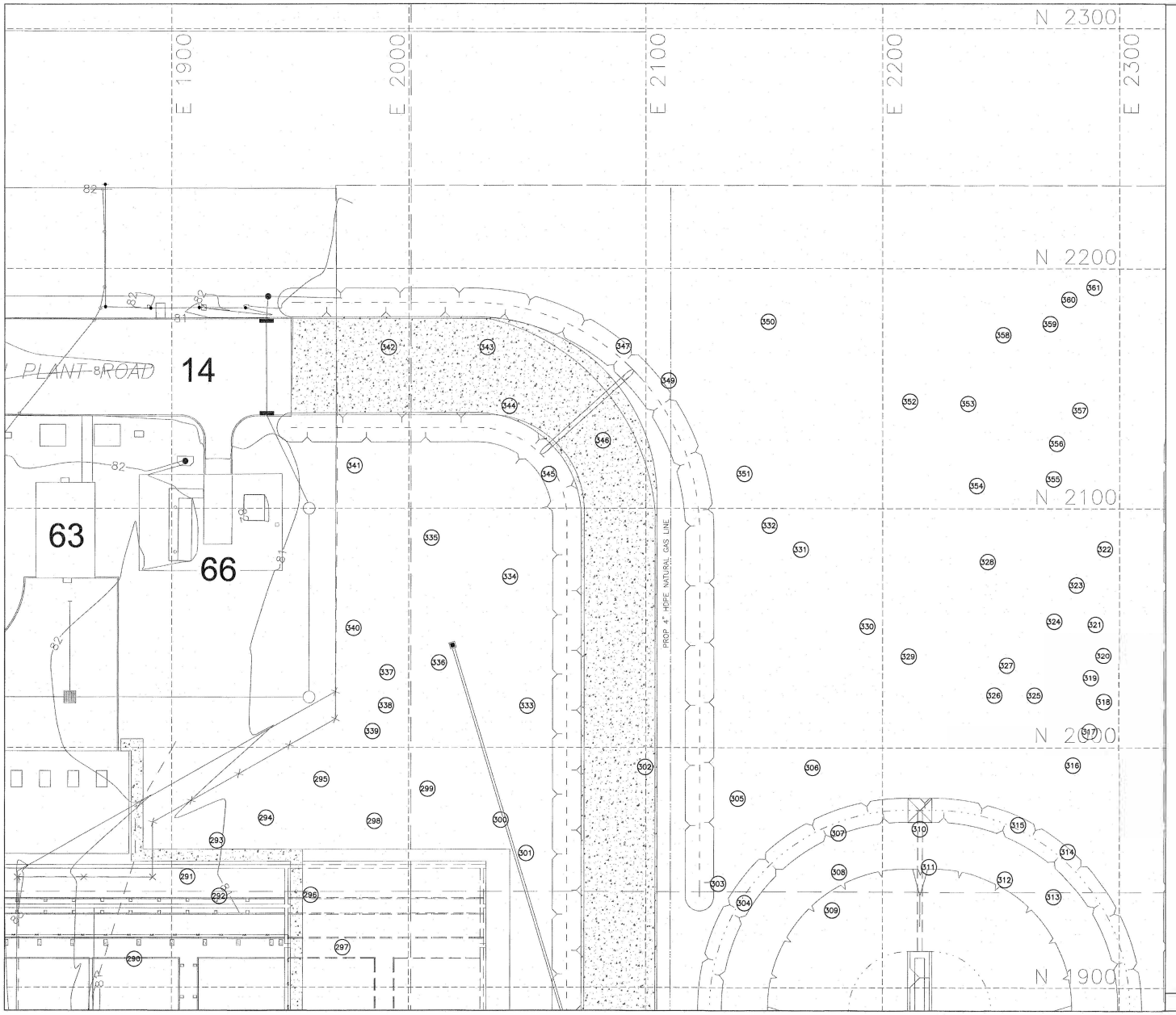
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
CIVIL

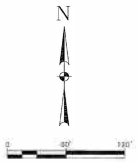
STORM WATER POLLUTION PREVENTION PLAN AREA-9

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
1"=20'	
CITY OF HOUSTON PM	
Se XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 114 OF 379	

80367

GUNDA CORPORATION
P:\2020 projects\20010-02 bby on wwtp improvements\CAD\SHEETS\007 SW3P - with GUNDA BASE.dwg Nov 11, 2022-3:40pm MEdson





LEGEND

(1) TREE LISTED IN APPENDIX A OF CHAPTER 33 TO BE REMOVED.

NOTES:

1. TREES SHOWN ON PLAN ARE SPECIES LISTED IN APPENDIX A OF CHAPTER 33. THIS PLAN DOES NOT INCLUDE ALL TREES LOCATED ON SITE.
2. TREE LOCATIONS ARE APPROXIMATE AND SHOWN FOR CONTRACTOR'S REFERENCE ONLY AND DO NOT DEPICT FULL EXTENT OF CLEARING/GRUBBING REQUIRED ON THE PROJECT. ENGINEER DOES NOT CERTIFY OR REPRESENT SHOWN LOCATIONS OR QUANTITIES AS FIELD ACCURATE.

C.N. Koehl
Urban Forestry, Inc.
210 Stone Bush Ct. ◦ Katy, Texas 77493
281-391-0022 ckoehl@koehlurbanforestry.com

Approved:

BLACK & VEATCH

BLACK & VEATCH CORPORATION
4400 POST OAK PARKWAY
SUITE 1200
HOUSTON, TX 77027
(713) 961-1100
TX FIRM NUMBER 258

STATE OF TEXAS
JUSTIN R. SANDT
116988
LICENSED
PROFESSIONAL ENGINEER
11/11/22

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

CIVIL

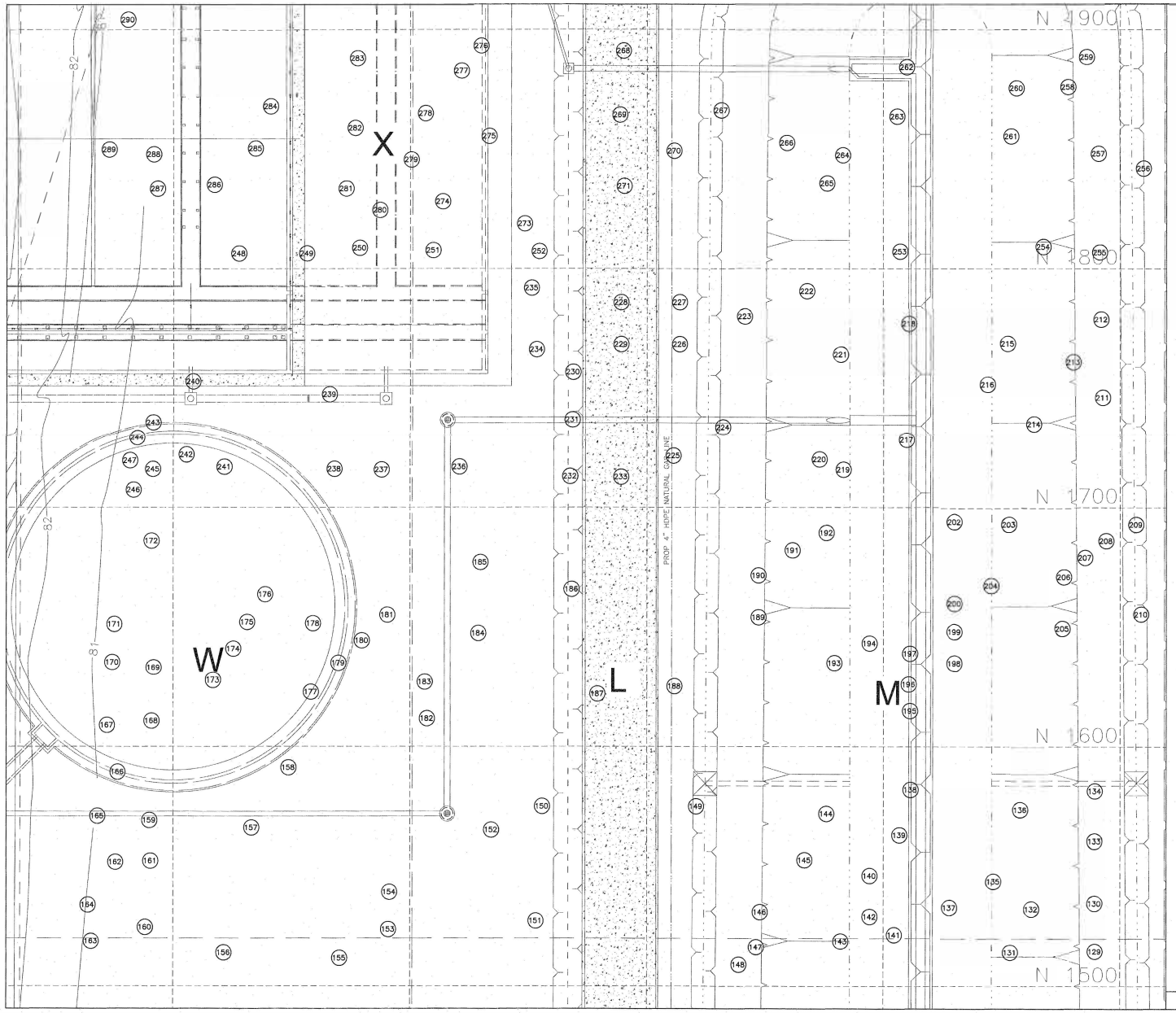
TREE PROTECTION PLAN
SHEET 1 OF 4

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-3	
DRAWING SCALE	
1"=20'	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 115 OF 379	

80367
REGISTERED
PROFESSIONAL
ENGINEER

C-14-101

FILE PATH: C:\Users\Ned\Desktop\BV IAH EXPANSION\XXX TPP-1.dwg



N

LEGEND

(1) TREE LISTED IN APPENDIX A OF CHAPTER 33 TO BE REMOVED.

NOTES:

1. TREES SHOWN ON PLAN ARE SPECIES LISTED IN APPENDIX A OF CHAPTER 33. THIS PLAN DOES NOT INCLUDE ALL TREES LOCATED ON SITE.
2. TREE LOCATIONS ARE APPROXIMATE AND SHOWN FOR CONTRACTOR'S REFERENCE ONLY AND DO NOT DEPICT FULL EXTENT OF CLEARING/GRUBBING REQUIRED ON THE PROJECT. ENGINEER DOES NOT CERTIFY OR REPRESENT SHOWN LOCATIONS OR QUANTITIES AS FIELD ACCURATE.

C.N. Koehl
Urban Forestry, Inc.
210 Stone Bush Ct. • Katy, Texas 77493
281-391-0022 ckoehl@koehlurbanforestry.com

Approved

BLACK & VEATCH

BLACK & VEATCH CORPORATION
4400 POST OAK PARKWAY
SUITE 1200
HOUSTON, TX 77027
(713) 961-1100
TX FIRM NUMBER 258

STATE OF TEXAS
JUSTIN R. SANDT
116988
LICENSED
PROFESSIONAL ENGINEER
11/11/22

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

CIVIL

TREE PROTECTION PLAN
SHEET 2 OF 4

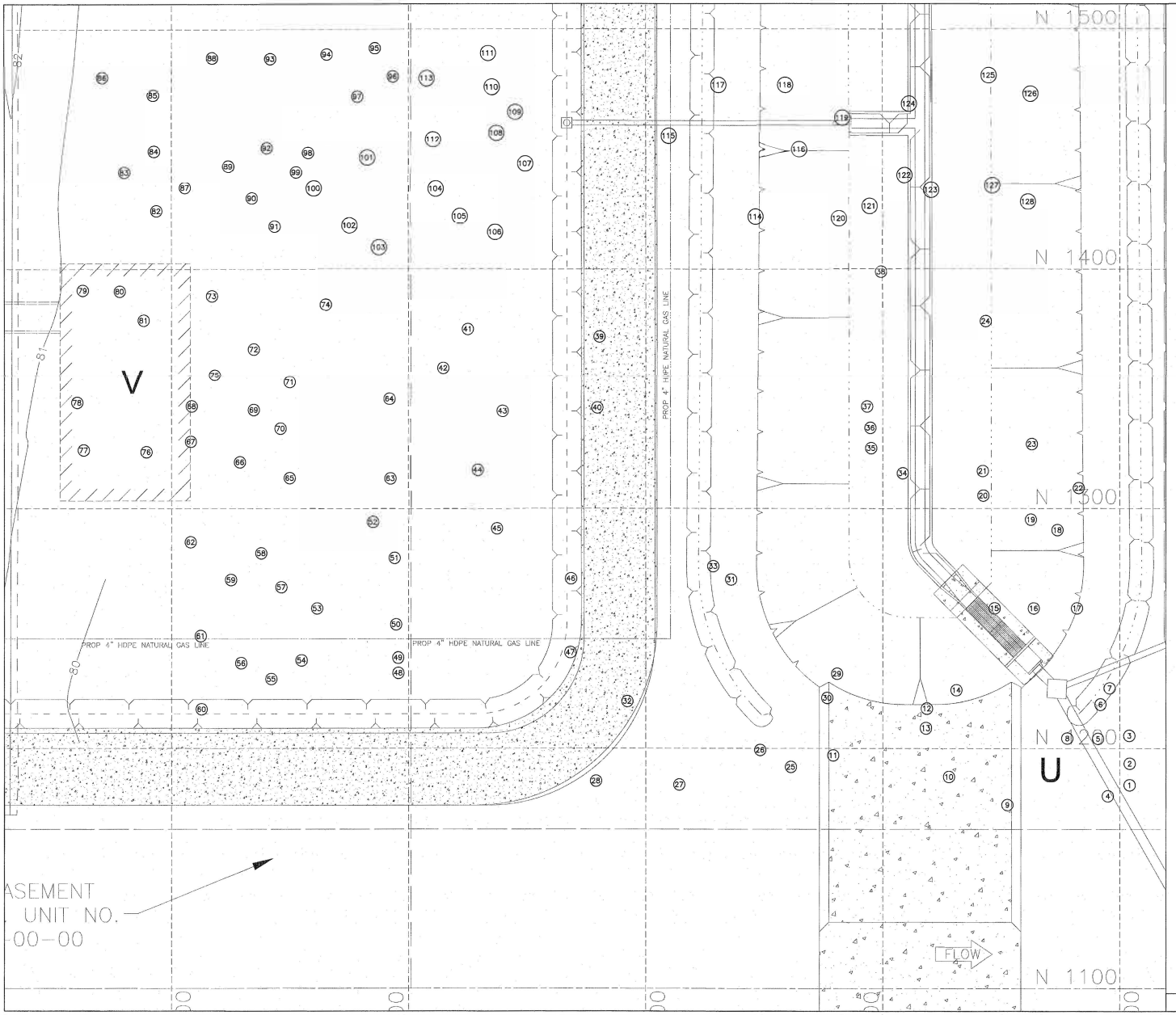
WBS NUMBER	R-000265-0147-3
DRAWING SCALE	1"=20'
CITY OF HOUSTON PM	Se XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 116 OF 379	

FOR CITY OF HOUSTON USE ONLY

80367

C-14-102

FILE PATH: C:\Users\Ved\Desktop\BV IAH EXPANSION\XXX TPP-1.dwg



N

0 50' 100'

LEGEND

(1) TREE LISTED IN APPENDIX A OF CHAPTER 33 TO BE REMOVED.

NOTES:

1. TREES SHOWN ON PLAN ARE SPECIES LISTED IN APPENDIX A OF CHAPTER 33. THIS PLAN DOES NOT INCLUDE ALL TREES LOCATED ON SITE.
2. TREE LOCATIONS ARE APPROXIMATE AND SHOWN FOR CONTRACTOR'S REFERENCE ONLY AND DO NOT DEPICT FULL EXTENT OF CLEARING/GRUBBING REQUIRED ON THE PROJECT. ENGINEER DOES NOT CERTIFY OR REPRESENT SHOWN LOCATIONS OR QUANTITIES AS FIELD ACCURATE.

C.N. Koehl
Urban Forestry, Inc.
210 Stone Bush Ct. ♀ Katy, Texas 77493
281-391-0022 ckoehl@koehlurbanforestry.com
Approved :

BLACK & VEATCH

BLACK & VEATCH CORPORATION
4400 POST OAK PARKWAY
SUITE 1200
HOUSTON, TX 77027
(713) 961-1100
TX FIRM NUMBER 258

STATE OF TEXAS
JUSTIN R. SANDT
116988
LICENSED
PROFESSIONAL ENGINEER
11/11/22

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

CIVIL

TREE PROTECTION PLAN
SHEET 3 OF 4

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-3	
DRAWING SCALE	
1"=20'	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
C-14-103	SHEET NO. 117 OF 379

PUBLIC WORKS AND ENGINEERING
80367
REGISTERED
HOUSTON, TEXAS

FILE PATH: C:\Users\Ned\Desktop\BV IAH EXPANSION\XXX TPP-1.dwg

Tree Removal List

Tree No.	Location	Description	Replacement requirement
1	2450 Rankin Road	14" Loblolly Pine	0
2	2450 Rankin Road	18" Loblolly Pine	0
3	2450 Rankin Road	20" Loblolly Pine	0
4	2450 Rankin Road	19" Loblolly Pine	0
5	2450 Rankin Road	12" Loblolly Pine	0
6	2450 Rankin Road	9" Loblolly Pine	0
7	2450 Rankin Road	15" Loblolly Pine	0
8	2450 Rankin Road	14" Loblolly Pine	0
9	2450 Rankin Road	16" Loblolly Pine	0
10	2450 Rankin Road	14" Loblolly Pine	0
11	2450 Rankin Road	8" Loblolly Pine	0
12	2450 Rankin Road	13" Loblolly Pine	0
13	2450 Rankin Road	13" Loblolly Pine	0
14	2450 Rankin Road	15" Loblolly Pine	0
15	2450 Rankin Road	17" Loblolly Pine	0
16	2450 Rankin Road	13" Loblolly Pine	0
17	2450 Rankin Road	12" Loblolly Pine	0
18	2450 Rankin Road	14" Loblolly Pine	0
19	2450 Rankin Road	16" Loblolly Pine	0
20	2450 Rankin Road	16" Loblolly Pine	0
21	2450 Rankin Road	18" Loblolly Pine	0
22	2450 Rankin Road	19" Loblolly Pine	0
23	2450 Rankin Road	21" Loblolly Pine	0
24	2450 Rankin Road	9" Loblolly Pine	0
25	2450 Rankin Road	9" Loblolly Pine	0
26	2450 Rankin Road	15" Loblolly Pine	0
27	2450 Rankin Road	14" Sweetgum	0
28	2450 Rankin Road	16" Loblolly Pine	0
29	2450 Rankin Road	19" Loblolly Pine	0
30	2450 Rankin Road	14" Loblolly Pine	0
31	2450 Rankin Road	12" Loblolly Pine	0
32	2450 Rankin Road	12" Loblolly Pine	0
33	2450 Rankin Road	12" Loblolly Pine	0
34	2450 Rankin Road	9" Loblolly Pine	0
35	2450 Rankin Road	15" Loblolly Pine	0
36	2450 Rankin Road	14" Loblolly Pine	0
37	2450 Rankin Road	16" Loblolly Pine	0
38	2450 Rankin Road	24" Loblolly Pine	0
39	2450 Rankin Road	18" Loblolly Pine	0
40	2450 Rankin Road	9" Loblolly Pine	0
41	2450 Rankin Road	22" Loblolly Pine	0
42	2450 Rankin Road	6" Loblolly Pine	0
43	2450 Rankin Road	16" Loblolly Pine	0
44	2450 Rankin Road	6" Loblolly Pine	0
45	2450 Rankin Road	12" Loblolly Pine	0
46	2450 Rankin Road	16" Loblolly Pine	0
47	2450 Rankin Road	12" Loblolly Pine	0
48	2450 Rankin Road	10" Loblolly Pine	0
49	2450 Rankin Road	9" Loblolly Pine	0
50	2450 Rankin Road	5" Loblolly Pine	0
51	2450 Rankin Road	12" Loblolly Pine	0
52	2450 Rankin Road	10" Loblolly Pine	0
53	2450 Rankin Road	8" Loblolly Pine	0
54	2450 Rankin Road	15" Loblolly Pine	0
55	2450 Rankin Road	18" Loblolly Pine	0
56	2450 Rankin Road	18" Loblolly Pine	0
57	2450 Rankin Road	15" Loblolly Pine	0
58	2450 Rankin Road	16" Loblolly Pine	0
59	2450 Rankin Road	22" Loblolly Pine	0
60	2450 Rankin Road	15" Sweetgum	0
61	2450 Rankin Road	15" Loblolly Pine	0
62	2450 Rankin Road	17" Loblolly Pine	0
63	2450 Rankin Road	13" Loblolly Pine	0
64	2450 Rankin Road	16" Loblolly Pine	0
65	2450 Rankin Road	10" Loblolly Pine	0
66	2450 Rankin Road	16" Loblolly Pine	0
67	2450 Rankin Road	11" Loblolly Pine	0
68	2450 Rankin Road	18" Loblolly Pine	0
69	2450 Rankin Road	18" Loblolly Pine	0
70	2450 Rankin Road	9" Sweetgum	0
71	2450 Rankin Road	21" Loblolly Pine	0
72	2450 Rankin Road	7" Loblolly Pine	0
73	2450 Rankin Road	18" Sweetgum	0
74	2450 Rankin Road	16" Loblolly Pine	0
75	2450 Rankin Road	9" Loblolly Pine	0
76	2450 Rankin Road	22" Loblolly Pine	0
77	2450 Rankin Road	23" Loblolly Pine	0
78	2450 Rankin Road	13" Loblolly Pine	0
79	2450 Rankin Road	18" Loblolly Pine	0
80	2450 Rankin Road	14" Loblolly Pine	0
81	2450 Rankin Road	23" Loblolly Pine	0
82	2450 Rankin Road	9" Loblolly Pine	0
83	2450 Rankin Road	19" Loblolly Pine	0
84	2450 Rankin Road	16" Loblolly Pine	0
85	2450 Rankin Road	14" Loblolly Pine	0
86	2450 Rankin Road	21" Loblolly Pine	0
87	2450 Rankin Road	18" Loblolly Pine	0
88	2450 Rankin Road	25" Loblolly Pine	0
89	2450 Rankin Road	5" Loblolly Pine	0
90	2450 Rankin Road	9" Loblolly Pine	0
91	2450 Rankin Road	16" Loblolly Pine	0
92	2450 Rankin Road	18" Loblolly Pine	0
93	2450 Rankin Road	21" Loblolly Pine	0
94	2450 Rankin Road	17" Loblolly Pine	0
95	2450 Rankin Road	13" Loblolly Pine	0
96	2450 Rankin Road	7" Loblolly Pine	0
97	2450 Rankin Road	25" Loblolly Pine	0
98	2450 Rankin Road	15" Loblolly Pine	0
99	2450 Rankin Road	15" Loblolly Pine	0
100	2450 Rankin Road	15" Loblolly Pine	0
101	2450 Rankin Road	19" Loblolly Pine	0
102	2450 Rankin Road	18" Loblolly Pine	0
103	2450 Rankin Road	19" Loblolly Pine	0
104	2450 Rankin Road	9" Loblolly Pine	0
105	2450 Rankin Road	11" Loblolly Pine	0
106	2450 Rankin Road	10" Loblolly Pine	0
107	2450 Rankin Road	14" Loblolly Pine	0
108	2450 Rankin Road	5" Loblolly Pine	0

Tree Removal List

Tree No.	Location	Description	Replacement requirement
109	2450 Rankin Road	8" Loblolly Pine	0
110	2450 Rankin Road	9" Loblolly Pine	0
111	2450 Rankin Road	10" Loblolly Pine	0
112	2450 Rankin Road	17" Loblolly Pine	0
113	2450 Rankin Road	7" Loblolly Pine	0
114	2450 Rankin Road	22" Loblolly Pine	0
115	2450 Rankin Road	17" Sweetgum	0
116	2450 Rankin Road	16" Loblolly Pine	0
117	2450 Rankin Road	21" Loblolly Pine	0
118	2450 Rankin Road	20" Loblolly Pine	0
119	2450 Rankin Road	15" Loblolly Pine	0
120	2450 Rankin Road	9" Loblolly Pine	0
121	2450 Rankin Road	10" Loblolly Pine	0
122	2450 Rankin Road	14" Loblolly Pine	0
123	2450 Rankin Road	9" Loblolly Pine	0
124	2450 Rankin Road	5" Loblolly Pine	0
125	2450 Rankin Road	20" Loblolly Pine	0
126	2450 Rankin Road	18" Loblolly Pine	0
127	2450 Rankin Road	17" Loblolly Pine	0
128	2450 Rankin Road	16" Loblolly Pine	0
129	2450 Rankin Road	5" Loblolly Pine	0
130	2450 Rankin Road	14" Loblolly Pine	0
131	2450 Rankin Road	11" Loblolly Pine	0
132	2450 Rankin Road	25" Loblolly Pine	0
133	2450 Rankin Road	15" Loblolly Pine	0
134	2450 Rankin Road	15" Red Maple	0
135	2450 Rankin Road	13" Loblolly Pine	0
136	2450 Rankin Road	14" Loblolly Pine	0
137	2450 Rankin Road	15" Loblolly Pine	0
138	2450 Rankin Road	10" Loblolly Pine	0
139	2450 Rankin Road	15" Loblolly Pine	0
140	2450 Rankin Road	14" Loblolly Pine	0
141	2450 Rankin Road	9" Loblolly Pine	0
142	2450 Rankin Road	10" Loblolly Pine	0
143	2450 Rankin Road	8" Loblolly Pine	0
144	2450 Rankin Road	4" Loblolly Pine	0
145	2450 Rankin Road	9" Loblolly Pine	0
146	2450 Rankin Road	2" Loblolly Pine	0
147	2450 Rankin Road	11" Loblolly Pine	0
148	2450 Rankin Road	9" Loblolly Pine	0
149	2450 Rankin Road	21" Loblolly Pine	0
150	2450 Rankin Road	14" Loblolly Pine	0
151	2450 Rankin Road	13" Loblolly Pine	0
152	2450 Rankin Road	16" Loblolly Pine	0
153	2450 Rankin Road	14" Loblolly Pine	0
154	2450 Rankin Road	15" Loblolly Pine	0
155	2450 Rankin Road	13" Loblolly Pine	0
156	2450 Rankin Road	28" Loblolly Pine	0
157	2450 Rankin Road	26" Loblolly Pine	0
158	2450 Rankin Road	9" Loblolly Pine	0
159	2450 Rankin Road	28" Loblolly Pine	0
160	2450 Rankin Road	17" Loblolly Pine	0
161	2450 Rankin Road	4" Loblolly Pine	0
162	2450 Rankin Road	15" Sweetgum	0
163	2450 Rankin Road	19" Loblolly Pine	0
164	2450 Rankin Road	18" Loblolly Pine	0
165	2450 Rankin Road	13" Loblolly Pine	0
166	2450 Rankin Road	6" Persimmon	0
167	2450 Rankin Road	28" Loblolly Pine	0
168	2450 Rankin Road	7" Loblolly Pine	0
169	2450 Rankin Road	13" Loblolly Pine	0
170	2450 Rankin Road	25" Loblolly Pine	0
171	2450 Rankin Road	15" Loblolly Pine	0
172	2450 Rankin Road	8" Loblolly Pine	0
173	2450 Rankin Road	17" Loblolly Pine	0
174	2450 Rankin Road	16" Loblolly Pine	0
175	2450 Rankin Road	24" Loblolly Pine	0
176	2450 Rankin Road	25" Loblolly Pine	0
177	2450 Rankin Road	17" Loblolly Pine	0
178	2450 Rankin Road	25" Loblolly Pine	0
179	2450 Rankin Road	19" Loblolly Pine	0
180	2450 Rankin Road	12" Loblolly Pine	0
181	2450 Rankin Road	15" Loblolly Pine	0
182	2450 Rankin Road	8" Loblolly Pine	0
183	2450 Rankin Road	9" Loblolly Pine	0
184	2450 Rankin Road	14" Loblolly Pine	0
185	2450 Rankin Road	15" Loblolly Pine	0
186	2450 Rankin Road	13" Loblolly Pine	0
187	2450 Rankin Road	11" Loblolly Pine	0
188	2450 Rankin Road	13" Loblolly Pine	0
189	2450 Rankin Road	11" Loblolly Pine	0
190	2450 Rankin Road	12" Loblolly Pine	0
191	2450 Rankin Road	16" Loblolly Pine	0
192	2450 Rankin Road	14" Loblolly Pine	0
193	2450 Rankin Road	12" Loblolly Pine	0
194	2450 Rankin Road	9" Loblolly Pine	0
195	2450 Rankin Road	9" Loblolly Pine	0
196	2450 Rankin Road	16" Loblolly Pine	0
197	2450 Rankin Road	12" Loblolly Pine	0
198	2450 Rankin Road	13" Loblolly Pine	0
199	2450 Rankin Road	15" Loblolly Pine	0
200	2450 Rankin Road	16" Loblolly Pine	0
201	Not used		
202	2450 Rankin Road	11" Loblolly Pine	0
203	2450 Rankin Road	22" Loblolly Pine	0
204	2450 Rankin Road	13" Loblolly Pine	0
205	2450 Rankin Road	22" Sweetgum	0
206	2450 Rankin Road	26" Loblolly Pine	0
207	2450 Rankin Road	15" Loblolly Pine	0
208	2450 Rankin Road	9" Loblolly Pine	0
209	2450 Rankin Road	16" Loblolly Pine	0
210	2450 Rankin Road	14" Loblolly Pine	0
211	2450 Rankin Road	14" Loblolly Pine	0
212	2450 Rankin Road	12" Loblolly Pine	0
213	2450 Rankin Road	13" Loblolly Pine	0
214	2450 Rankin Road	15" Loblolly Pine	0
215	2450 Rankin Road	10" Loblolly Pine	0
216	2450 Rankin Road	9" Loblolly Pine	0
217	2450 Rankin Road	13" Loblolly Pine	0
218	2450 Rankin Road	11" Loblolly Pine	0
219	2450 Rankin Road	14" Loblolly Pine	0
220	2450 Rankin Road	13" Loblolly Pine	0
221	2450 Rankin Road	15" Loblolly Pine	0
222	2450 Rankin Road	17" Loblolly Pine	0

Tree Removal List

Tree No.	Location	Description	Replacement requirement
223	2450 Rankin Road	11" Loblolly Pine	0
224	2450 Rankin Road	7" Loblolly Pine	0
225	2450 Rankin Road	13" Loblolly Pine	0
226	2450 Rankin Road	14" Loblolly Pine	0
227	2450 Rankin Road	22" Loblolly Pine	0
228	2450 Rankin Road	15" Loblolly Pine	0
229	2450 Rankin Road	17" Loblolly Pine	0
230	2450 Rankin Road	12" Loblolly Pine	0
231	2450 Rankin Road	16" Loblolly Pine	0
232	2450 Rankin Road	13" Loblolly Pine	0
233	2450 Rankin Road	8" Loblolly Pine	0
234	2450 Rankin Road	16" Loblolly Pine	0
235	2450 Rankin Road	10" Loblolly Pine	0
236	2450 Rankin Road	18" Loblolly Pine	0
237	2450 Rankin Road	15" Loblolly Pine	0
238	2450 Rankin Road	10" Loblolly Pine	0
239	2450 Rankin Road	13" Loblolly Pine	0
240	2450 Rankin Road	7" Loblolly Pine	0
241	2450 Rankin Road	14" Loblolly Pine	0
242	2450 Rankin Road	17" Loblolly Pine	0
243	2450 Rankin Road	18" Loblolly Pine	0
244	2450 Rankin Road	17" Loblolly Pine	0
245	2450 Rankin Road	16" Loblolly Pine	0
246	2450 Rankin Road	15" Loblolly Pine	0
247	2450 Rankin Road	22" Loblolly Pine	0
248	2450 Rankin Road	15" Loblolly Pine	0
249	2450 Rankin Road	17" Loblolly Pine	0
250	2450 Rankin Road	16" Loblolly Pine	0
251	2450 Rankin Road	16" Loblolly Pine	0
252	2450 Rankin Road	11" Loblolly Pine	0
253	2450 Rankin Road	15" Loblolly Pine	0
254	2450 Rankin Road	13" Loblolly Pine	0
255	2450 Rankin Road	11" Loblolly Pine	0
256	2450 Rankin Road	13" Loblolly Pine	0
257	2450 Rankin Road	16" Loblolly Pine	0
258	2450 Rankin Road	12" Loblolly Pine	0
259	2450 Rankin Road	16" Loblolly Pine	0
260	2450 Rankin Road	14" Loblolly Pine	0
261	2450 Rankin Road	12" Loblolly Pine	0
262	2450 Rankin Road	18" Loblolly Pine	0
263	2450 Rankin Road	12" Loblolly Pine	0
264	2450 Rankin Road	15" Loblolly Pine	0
265	2450 Rankin Road	13" Loblolly Pine	0
266	2450 Rankin Road	18" Loblolly Pine	0
267	2450 Rankin Road	14" Loblolly Pine	0
268	2450 Rankin Road	9" Loblolly Pine	0
269	2450 Rankin Road	4" Loblolly Pine	0
270	2450 Rankin Road	2" Loblolly Pine	0
271	2450 Rankin Road	12" Loblolly Pine	0
272	Not used		
273	2450 Rankin Road	13" Loblolly Pine	0
274	2450 Rankin Road	16" Loblolly Pine	0
275	2450 Rankin Road	11" Loblolly Pine	0
276	2450 Rankin Road	17" Loblolly Pine	0
277	2450 Rankin Road	15" Loblolly Pine	0
278	2450 Rankin Road	12" Loblolly Pine	0
279	2450 Rankin Road	14" Loblolly Pine	0
280	2450 Rankin Road	11" Loblolly Pine	0
281	2450 Rankin Road	12" Loblolly Pine	0
282	2450 Rankin Road	23" Loblolly Pine	0
283	2450 Rankin Road	19" Loblolly Pine	0
284	2450 Rankin Road	13" Loblolly Pine	0
285	2450 Rankin Road	18" Loblolly Pine	0
286	2450 Rankin Road	16" Loblolly Pine	0
287	2450 Rankin Road	15" Loblolly Pine	0
288	2450 Rankin Road	21" Loblolly Pine	0
289	2450 Rankin Road	13" Sweetgum	0
290	2450 Rankin Road	28" Loblolly Pine	0
291	2450 Rankin Road	18", 23", 18" Loblolly Pine	0
292	2450 Rankin Road	13" Loblolly Pine	0
293	2450 Rankin Road	19" Loblolly Pine	0
294	2450 Rankin Road	24" Loblolly Pine	0
295	2450 Rankin Road	13" Loblolly Pine	0
296	2450 Rankin Road	20" Loblolly Pine	0
297	2450 Rankin Road	18" Loblolly Pine	0
298	2450 Rankin Road	13" Loblolly Pine	0
299	2450 Rankin Road	13" Loblolly Pine	0
300	2450 Rankin Road	19" Loblolly Pine	0
301	2450 Rankin Road	20" Loblolly Pine	0
302	2450 Rankin Road	11" Loblolly Pine	0
303	2450 Rankin Road	13" Loblolly Pine	0
304	2450 Rankin Road	14" Loblolly Pine	0
305	2450 Rankin Road	15" Loblolly Pine	0
306	2450 Rankin Road	12" Loblolly Pine	0
307	2450 Rankin Road	10" Loblolly Pine	0
308	2450 Rankin Road	13" Loblolly Pine	0
309	2450 Rankin Road	19" Loblolly Pine	0
310	2450 Rankin Road	12" Loblolly Pine	0
311	2450 Rankin Road	11" Loblolly Pine	0
312	2450 Rankin Road	19" Loblolly Pine	0
313	2450 Rankin Road	14" Loblolly Pine	0
314	2450 Rankin Road	13" Loblolly Pine	0
315	2450 Rankin Road	15" Loblolly Pine	0
316	2450 Rankin Road	8" Loblolly Pine	0
317	2450 Rankin Road	16" Loblolly Pine	0
318	2450 Rankin Road	23" Loblolly Pine	0
319	2450 Rankin Road	12" Loblolly Pine	0
320	2450 Rankin Road	19" Loblolly Pine	0
321	2450 Rankin Road	14" Loblolly Pine	0
322	2450 Rankin Road	18" Loblolly Pine	0
323	2450 Rankin Road	18" Loblolly Pine	0
324	2450 Rankin Road	6" Loblolly Pine	0
325	2450 Rankin Road	5" Loblolly Pine	0
326	2450 Rankin Road	16" Loblolly Pine	0
327	2450 Rankin Road	15" Loblolly Pine	0
328	2450 Rankin Road	17" Loblolly Pine	0
329	2450 Rankin Road	18" Loblolly Pine	0
330	2450 Rankin Road	30" Loblolly Pine	0
331	2450 Rankin Road	20" Loblolly Pine	0
332	2450 Rankin Road	15" Sweetgum	0
333	2450 Rankin Road	24" Loblolly Pine	0
334	2450 Rankin Road	21" Sweetgum	0
335	2450 Rankin Road	23" Loblolly Pine	0
336	2450 Rankin Road	22" Loblolly Pine	0

Tree Removal List

Tree No.	Location	Description	Replacement requirement
337	2450 Rankin Road	19" Loblolly Pine	0
338	2450 Rankin Road	18" Loblolly Pine	0
339	2450 Rankin Road	17" Loblolly Pine	0
340	2450 Rankin Road	27" Loblolly Pine	0
341	2450 Rankin Road	16" Sweetgum	0
342	2450 Rankin Road	21" Loblolly Pine	0
343	2450 Rankin Road	22" Loblolly Pine	0
344	2450 Rankin Road	25" Loblolly Pine	0
345	2450 Rankin Road	10" Persimmon	0
346	2450 Rankin Road	22" Loblolly Pine	0
347	2450 Rankin Road	19" Loblolly Pine	0
348	Not used		
349	2450 Rankin Road	20" Loblolly Pine	0
350	2450 Rankin Road	21" Loblolly Pine	0
351	2450 Rankin Road	11" Loblolly Pine	0
352	2450 Rankin Road	12" Loblolly Pine	0
353	2450 Rankin Road	12" Loblolly Pine	0
354	2450 Rankin Road	14" Loblolly Pine	0
355	2450 Rankin Road	11" Loblolly Pine	0
356	2450 Rankin Road	15" Loblolly Pine	0
357	2450 Rankin Road	18" Loblolly Pine	0
358	2450 Rankin Road	16" Loblolly Pine	0
359	2450 Rankin Road	17" Loblolly Pine	0
	TOTAL REPLACEMENT INCHES REQUIRED		0

Tree Replacement List

Quantity	Caliper Size	Species	Container/Tree Spade size
	TOTAL REPLACEMENT INCHES INCLUDED IN		0

NOTES:

No tree mitigation/replacement required to comply with Chapter 33, per City of Houston Parks review and Tree Removal Permit #180538. Trees listed in this table and identified/numbered on Tree Protection Plan are species included in Appendix A of Chapter 33. This list and Tree Protection Plan does not include trees not listed in Appendix A, and does not include all trees located on site. List provided for City Parks review and contractor's information only.

C.N. Koehl
Urban Forestry, Inc.
210 Stone Bush Ct. • Katy, Texas 77493
281-391-0022 ckoehl@koehlurbanforestry.com
Approved:

BLACK & VEATCH

BLACK & VEATCH CORPORATION
4400 POST OAK PARKWAY
SUITE 1200
HOUSTON, TX 77027
(713) 961-1100
TX FIRM NUMBER 258

STATE OF TEXAS
JUSTIN R. SANDT
116988
LICENSED
PROFESSIONAL ENGINEER
11/11/22

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
CIVIL

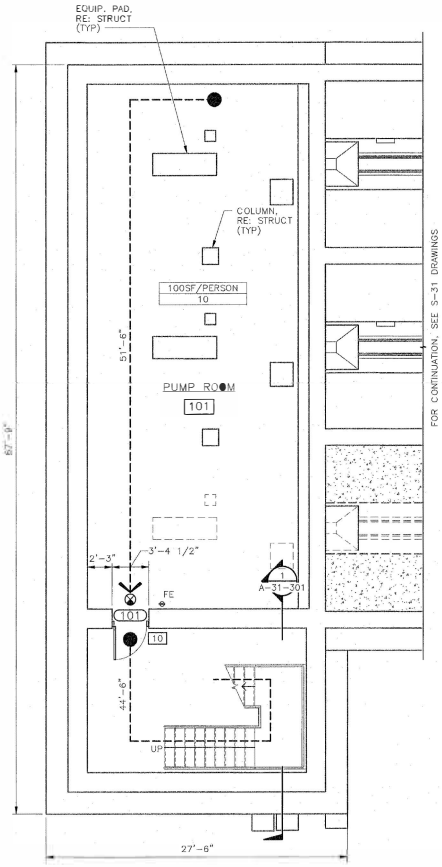
TREE PROTECTION PLAN
SHEET 4 OF 4

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-3	
DRAWING SCALE	
N.T.S.	
CITY OF HOUSTON PM	
Se XIAOHUA (SHARI) LIN, P.E.	

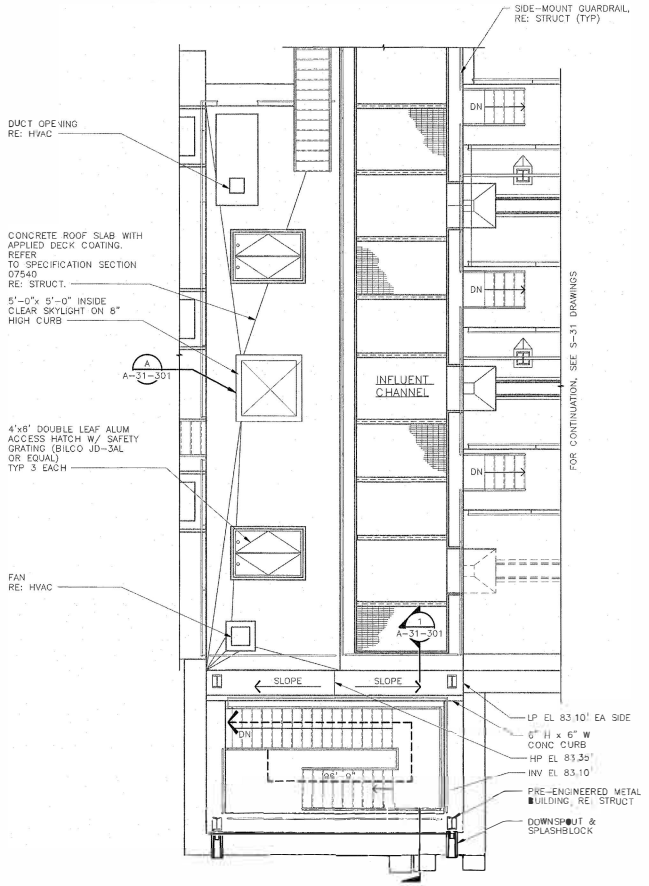
REGISTERED 80367 PROFESSIONAL LANDSCAPE ARCHITECT

C-14-104 | SHEET NO. 118 OF 379

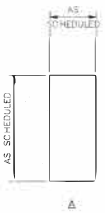
FILE PATH: C:\Users\Ned\Desktop\BV IAH EXPANSION\XXX TPP-1.dwg



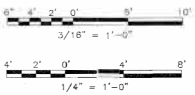
LOWER LEVEL FLOOR / LIFE SAFETY PLAN
3/16" = 1'-0"



UPPER LEVEL FLOOR & LFE SAFETY PLAN
3/16" = 1'-0"



DOOR TYPE
1/4" = 1'-0"



BUILDING CODE SUMMARY	
PUMP STATION	
BUILDING CODE	2012 IBC
OCCUPANCY TYPE	F-2
CONSTRUCTION TYPE	II-B
AREA ALLOWED	23,000 SQ FT
ACTUAL AREA	940 SQ FT
EXITS PROVIDED	1
OCCUPANT LOAD	10
FIRE PROTECTION	NOT PROVIDED
ADA ACCESS	NOT REQUIRED
BUILDING HEIGHT ALLOWED	3 STORIES (55 FT)
BUILDING HEIGHT ACTUAL	1 STORY (16 FT)
COMMON PATH TO GRADE	96 FT

ROOM WILL BE CONSIDERED A NON-PERMITTED CONFINED SPACE.
PROVIDE EXTERIOR SWITCH TO ACTIVATE VENTILATION & SIGNAGE SIMILAR TO "RUN VENTILATION SYSTEM FOR 10 MINUTES & NOTIFY PLANT MANAGER PRIOR TO ENTRY."

LIFE SAFETY LEGEND

- FIRE EXTINGUISHER (FE)
- X'-X" — MAXIMUM COMMON PATH OF TRAVEL
- 100SF/PERSON / 10 — OCCUPANTS PER SF OCCUPANT LOAD
- 5 — CUMULATIVE OCCUPANT LOAD
- EXIT

DOOR SCHEDULE

LEVEL	DOOR No. (D)	DOOR SIZE WIDTH	DOOR SIZE HEIGHT	DOOR DETAILS HEAD	DOOR DETAILS JAMB	DOOR DETAILS SILL	DOOR TYPE (D)	DOOR HDWR	DOOR RATING	DOOR MATERIAL	FRAME DIMENSIONS HEAD	FRAME DIMENSIONS WIDTH	FRAME DIMENSIONS DEPTH	REMARKS
LOWER LEVEL	101	3'-0"	7'-10"	–	–	–	A	–	–	HM	2"	2"	5 3/4"	

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO P-6182

REGISTERED ARCHITECT RICHARD ALAN BARTHOLOMEW 11/1/2022 24338 STATE OF TEXAS

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

ARCHITECTURAL

GRIT FACILITY PLANS

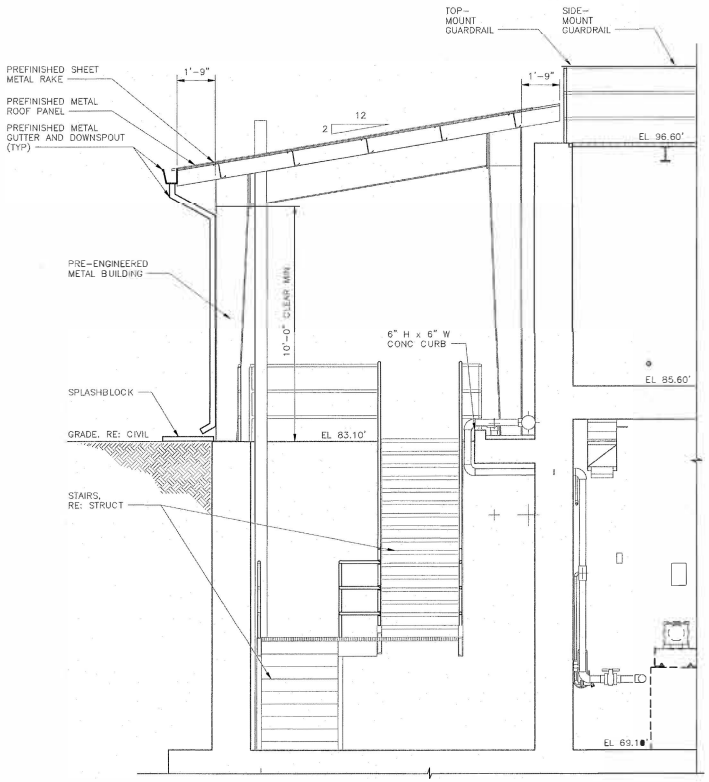
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 129 OF 379	

FOR CITY OF HOUSTON USE ONLY

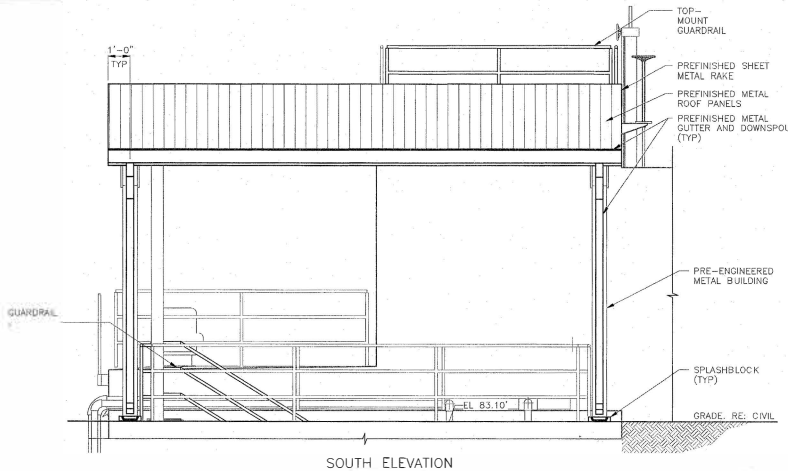
80367 REGISTERED ENGINEER HOUSTON, TEXAS

A-31-101

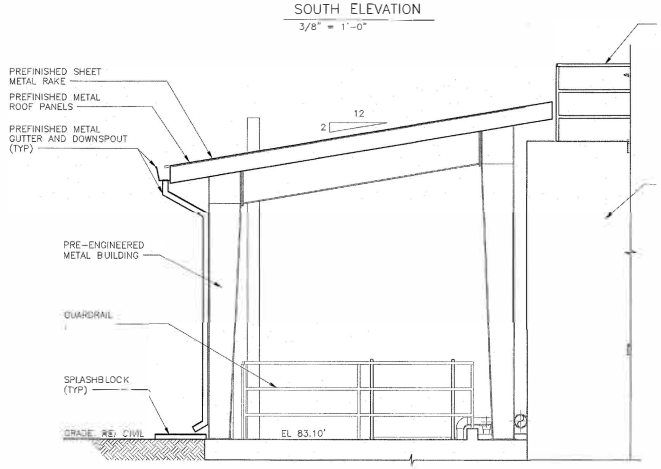
FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-COH IA WWTP-BIM.rvt



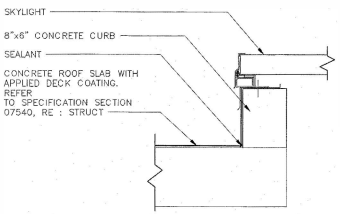
1 CANOPY SECTION
A-31-101 3/8" = 1'-0"



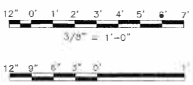
SOUTH ELEVATION
3/8" = 1'-0"



EAST ELEVATION
(WEST ELEVATION OPPOSITE)
3/8" = 1'-0"



A CURB DETAIL
A-31-101 1 1/2" = 1'-0"



GENERAL NOTES:

1. REFER TO SPECIFICATION 13122 FOR PRE-ENGINEERED METAL BUILDING REQUIREMENTS FOR CANOPY.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

REGISTERED ARCHITECT
STATE OF TEXAS

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

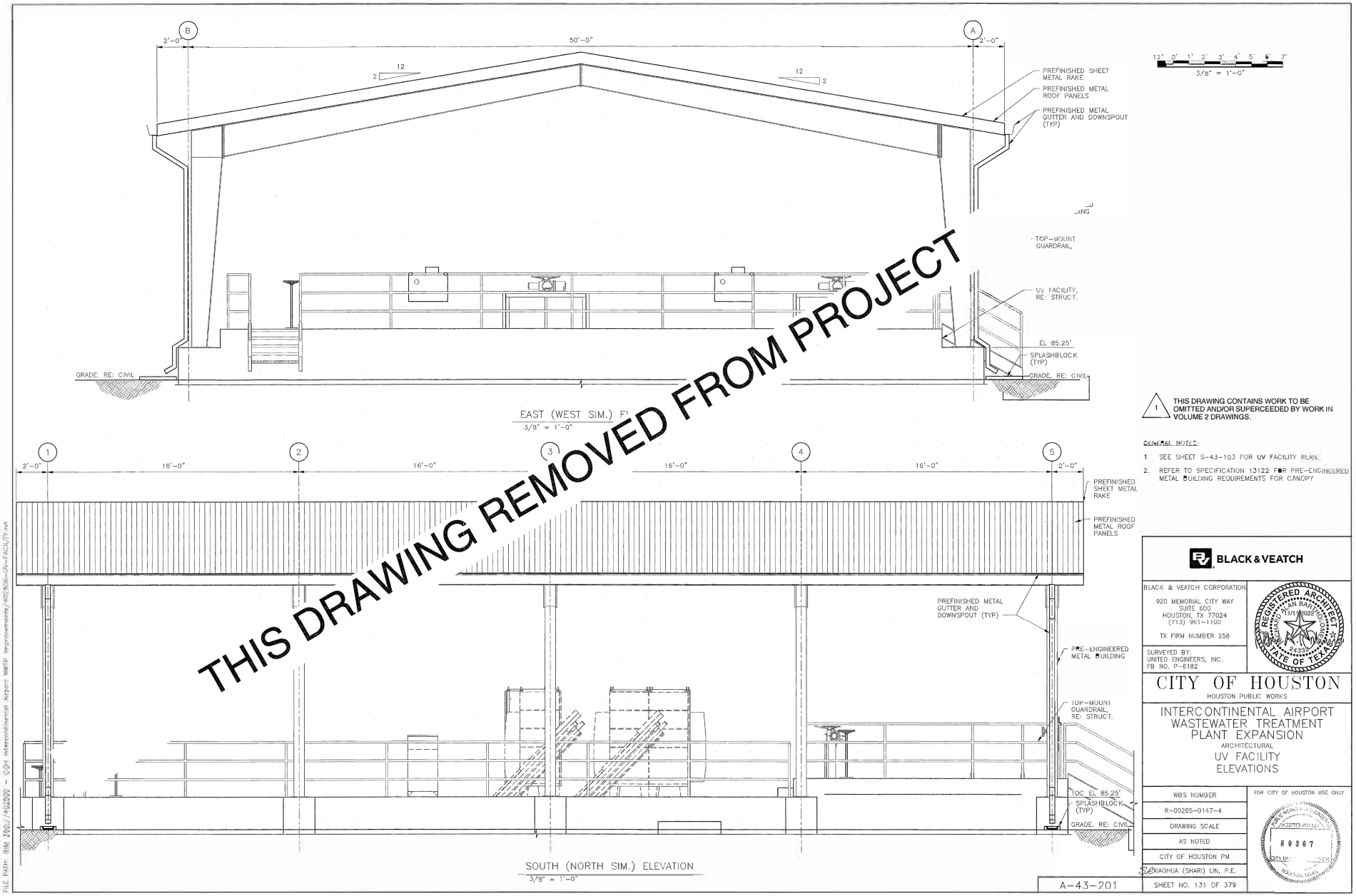
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
ARCHITECTURAL
GRIT FACILITY
SECTION & ELEVATIONS

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 130 OF 379	

80367

A-31-301

FILE PATH: Bim 360://4023500 - COH Intercontinental Airport WWTP Improvements/402350-COH IA WWTP-BV.rvt



THIS DRAWING REMOVED FROM PROJECT

1 THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

GENERAL NOTES:

1. SEE SHEET S-43-103 FOR UV FACILITY PLAN.
2. REFER TO SPECIFICATION 13122 FOR PRE-ENGINEERED METAL BUILDING REQUIREMENTS FOR CANOPY

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

REGISTERED ARCHITECT
XIAOHUA LIN
2439
STATE OF TEXAS

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

ARCHITECTURAL

UV FACILITY ELEVATIONS

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 131 OF 379	

FOR CITY OF HOUSTON USE ONLY

ACCEPTED
80367
CITY OF HOUSTON

A-43-201

FILE PATH: RIM: 2900//402500 - IGH Intercontinental Airport WWTP Improvements/402500-UV-FACILITY.rvt

STRUCTURAL NOTES

GENERAL

1. THE APPLICABLE BUILDING CODE IS INDICATED ON THE LOADING CRITERIA DRAWING.
2. THE REQUIREMENTS INDICATED ON THIS SHEET ARE INTENDED AS A BASIC SUMMARY OF THE MATERIAL AND CONSTRUCTION REQUIREMENTS FOR THE PROJECT. ADDITIONAL, MORE STRINGENT REQUIREMENTS ARE GIVEN IN THE PROJECT DETAIL DRAWINGS AND SPECIFICATIONS.
3. ALL STRUCTURAL RELATED SHOP DRAWINGS SHALL BE REVIEWED BY THE ENGINEER PRIOR TO CONSTRUCTION.
4. STRUCTURES MAY BE BUOYANT WHEN EMPTY DURING CONSTRUCTION. CONTRACTOR SHALL PROTECT STRUCTURES AGAINST FLOTATION UNTIL CONSTRUCTION IS COMPLETE.
5. STRUCTURES MAY BE UNSTABLE UNTIL THEY ARE CONSTRUCTED IN THEIR ENTIRETY. CONTRACTOR IS RESPONSIBLE FOR DESIGNING TEMPORARY STRUCTURAL SUPPORTS TO RESIST WIND LOADS, CONSTRUCTION LOADS, AND ANY OTHER TEMPORARY CONDITIONS THAT MAY OCCUR DURING CONSTRUCTION, IN ORDER TO MAINTAIN STABILITY OF THE CONSTRUCTION WORK. ANCHORS FOR CONTRACTOR'S TEMPORARY SUPPORT SYSTEMS THAT ATTACH TO CONCRETE OR MASONRY SHALL BE LOCATED TO AVOID DAMAGING EMBEDDED REINFORCEMENT OR UTILITIES.

CAST-IN-PLACE CONCRETE

1. A MINIMUM 28 DAY COMPRESSIVE STRENGTH (f'c) OF 4,000 PSI WAS UTILIZED IN THE DESIGN OF STRUCTURAL REINFORCED CONCRETE. SEE SPECIFICATIONS FOR CONSTRUCTION STRENGTH REQUIREMENTS.
2. THE LOCATION OF ALL CONSTRUCTION JOINTS AND OTHER TYPES OF JOINTS, OTHER THAN THOSE SPECIFIED OR SHOWN ON THE PLANS, SHALL BE ACCEPTABLE TO THE ENGINEER PRIOR TO PLACING CONCRETE.

REINFORCING STEEL

1. ALL REINFORCING BAR SHALL BE GRADE 60, DEFORMED, ASTM A615, UNLESS NOTED OTHERWISE.
2. DIMENSIONS TO REINFORCING BARS ARE TO BAR CENTERLINES, UNLESS NOTED OTHERWISE. BAR COVER IS THE CLEAR DISTANCE BETWEEN THE BAR AND THE CONCRETE SURFACE.
3. NO WELDING OF REINFORCING BARS SHALL BE PERMITTED UNLESS APPROVAL IS OBTAINED FROM THE ENGINEER PRIOR TO CONSTRUCTION.
4. FOR CONCRETE SLABS THAT HAVE A SLOPING TOP FACE, THE TOP LAYERS OF REINFORCEMENT SHALL BE PLACED ON A SIMILAR SLOPE SO THAT SPECIFIED COVER IS MAINTAINED.

POST-INSTALLED ANCHORS

1. POST-INSTALLED ANCHORS SHALL INCLUDE ADHESIVE ANCHORS (THREADED RODS, BOLTS OR REINFORCING BARS), EXPANSION ANCHORS, AND UNDERCUT ANCHORS INSTALLED INTO HARDENED CONCRETE OR MASONRY. SEE THE ANCHORAGE IN CONCRETE AND MASONRY SPECIFICATION SECTION FOR ADDITIONAL REQUIREMENTS.
2. POST-INSTALLED ANCHORS SHALL ONLY BE USED WHERE INDICATED ON THE DRAWINGS. CONTRACTOR SHALL OBTAIN APPROVAL FROM ENGINEER PRIOR TO USING POST-INSTALLED ANCHORS FOR MISSING OR MISPLACED CAST-IN-PLACE ANCHORS.
3. CARE SHALL BE TAKEN TO AVOID CONFLICTS WITH EXISTING REINFORCING STEEL AND OTHER EMBEDDED ITEMS WHEN DRILLING HOLES. REINFORCING BARS SHALL NOT BE DAMAGED DURING DRILLING OF ANCHOR INSTALLATION HOLES SHALL BE DRILLED AND CLEANED PER THE PRODUCT MANUFACTURER'S INSTRUCTIONS. ANCHORS SHALL BE INSTALLED PER THE PRODUCT MANUFACTURER'S INSTRUCTIONS AT NOT LESS THAN MINIMUM EDGE DISTANCES AND/OR SPACING INDICATED IN THE MANUFACTURER'S LITERATURE.
4. SUBSTITUTION REQUESTS FOR PRODUCTS OTHER THAN THOSE LISTED IN THE SPECIFICATION OR INDICATED ON THE DRAWINGS SHALL BE SUBMITTED TO ENGINEER FOR REVIEW AND APPROVAL. PRODUCT ICC-ESR EVALUATION REPORTS SHALL BE INCLUDED WITH THE SUBMITTAL PACKAGE. IF REQUESTED, CALCULATIONS PREPARED BY A REGISTERED PROFESSIONAL ENGINEER USING METHODS AND PROCEDURES REQUIRED BY THE BUILDING CODE MAY BE REQUIRED AS PART OF THE SUBMITTAL PACKAGE.
5. UNLESS NOTED OTHERWISE, THE MINIMUM EMBEDMENT PROVIDED FOR ADHESIVE ANCHORED REINFORCING BARS SHALL DEVELOP THE FULL TENSILE STRENGTH OF THE BAR.
6. SPECIAL INSPECTION WILL BE PROVIDED FOR ALL POST-INSTALLED ANCHORS.

STAINLESS STEEL

1. STAINLESS STEEL BOLTS SHALL CONFORM TO ASTM F593, ALLOY GROUP 1 OR 2, UNLESS NOTED OTHERWISE. MINIMUM YIELD STRENGTH SHALL BE 45 KSI.
2. STAINLESS STEEL PLATES SHALL CONFORM TO ASTM A240, TYPE 316L.
3. STAINLESS STEEL STRUCTURAL SHAPES SHALL CONFORM TO ASTM A1069 OR ASTM A276, TYPE 316L.

ALUMINUM

1. UNLESS NOTED OTHERWISE, ALUMINUM ALLOY IN ALL ALUMINUM STRUCTURAL MATERIALS SHALL BE 6061-T6. PIPE AND TUBING FOR GUARDRAIL AND HANDRAIL SHALL BE ALLOY 6061-T6 OR 6005A-T61.
2. ALL ALUMINUM SURFACES IN CONTACT WITH CONCRETE OR DISSIMILAR METALS SHALL BE COATED OR COVERED WITH A HEAVY COAT OF BITUMINOUS PAINT TO PREVENT ALUMINUM-CONCRETE REACTION OR ELECTROLYTIC ACTION.

STRUCTURAL STEEL

1. ROLLED WIDE FLANGE SHAPES SHALL HAVE A MINIMUM YIELD STRENGTH OF 50 KSI;
   CHANNELS, PLATES AND ANGLES A MINIMUM OF 36 KSI;
   STRUCTURAL PIPES A MINIMUM OF 35 KSI;
   ROUND STRUCTURAL TUBES A MINIMUM OF 46 KSI;
   RECTANGULAR STRUCTURAL TUBES A MINIMUM OF 50 KSI.
2. WELDING SHALL BE DONE WITH A FILLER MATERIAL HAVING A MINIMUM TENSILE STRENGTH OF 70 KSI.
3. BOLTED CONNECTIONS SHALL USE 3/4" DIA ASTM F3125, GRADE A325 BOLTS OR GRADE F1852 TWIST-OFF BOLTS, WITH THE THREADS EXCLUDED FROM THE SHEAR PLANE, UNLESS NOTED OTHERWISE.
4. CARBON STEEL OR GALVANIZED STEEL ANCHOR RODS AND ANCHOR BOLTS SHALL CONFORM TO ASTM F1554 GRADE 36.
5. HOLES FOR ANCHOR RODS AND ANCHOR BOLTS IN COLUMN BASE PLATES USING ASTM F844 OR F436 FLAT CIRCULAR WASHERS SHALL BE AS FOLLOWS:

   BOLTS/RODS 3/4" TO 1" – 5/16" OVERSIZE
   BOLTS/RODS 1" TO 2" – 1/2" OVERSIZE
   BOLTS/RODS OVER 2" – 1" OVERSIZE

   AT THE CONTRACTORS OPTION, OVERSIZE HOLES LARGER THAN THOSE LISTED ABOVE MAY BE USED, PROVIDED THAT 3/8" PLATE WASHERS ARE USED WITH STANDARD HOLES AND FIELD WELDED WITH A 5/16" FILLET WELD TO THE BASE PLATE ALONG A MIN OF 3 SIDES.
6. STEEL LEGEND

   - INDICATES TWO BOLT ATTACHMENT OF HORIZONTAL BRACING TO UNDERSIDE OF BEAM, SHIM AS REQUIRED
   - INDICATES ANGLE OR PLATE TO BE WELDED ON THREE SIDES
   - INDICATES FOUR BOLT ATTACHMENT OF MONORAIL TO UNDERSIDE OF SUPPORT BEAM. SPACER OR STANDOFF DETAIL AS REQUIRED
   - (1) INDICATES NONSTANDARD FRAMING CONNECTION
   - (XXX) INDICATES HORIZONTAL OR VERTICAL BRACING CONNECTION DETAIL
   - INDICATES MOMENT CONNECTION

   VERTICAL BRACING IS SHOWN ON PLAN THUS:

   - EXTENDING UP FROM THE ELEVATION INDICATED
   - EXTENDING DOWN FROM THE ELEVATION INDICATED
   - EXTENDING UP AND DOWN FROM THE ELEVATION INDICATED

EXCAVATION, BACKFILL AND FOUNDATIONS

1. FOUNDATION CONSTRUCTION SHALL NOT BEGIN UNTIL ANY REQUIRED SPECIAL INSPECTION HAS BEEN COMPLETED AND THE CONTRACTOR NOTIFIED TO PROCEED.
2. TO FACILITATE SCHEDULING, AT LEAST 48 HOURS ADVANCE NOTICE SHALL BE GIVEN TO THE ENGINEER PRIOR TO THE REQUIRED INSPECTIONS.
3. UNLESS NOTED OTHERWISE, BACKFILL SHALL NOT BE PLACED AGAINST WALLS WHICH SUPPORT A CONCRETE SLAB OR WALKWAY UNTIL THE TOP SLAB OR WALKWAY HAS BEEN PLACED IN ITS ENTIRETY AND ALL CONCRETE HAS REACHED THE SPECIFIED DESIGN STRENGTH.
4. OVER-EXCAVATION OF SOIL OR OVER-BREAKING OF ROCK THAT WOULD RESULT IN A STRUCTURAL CONCRETE THICKNESS GREATER THAN INDICATED ON THE DRAWINGS SHALL BE CLASSIFIED AS UNAUTHORIZED EXCAVATION. CONTRACTOR SHALL SELECT ONE OF TWO METHODS TO ADDRESS UNAUTHORIZED EXCAVATION.

   REPLACE UNAUTHORIZED EXCAVATION MATERIAL WITH LEAN CONCRETE THAT IS PLACED SEPARATELY FROM THE STRUCTURAL CONCRETE INDICATED ON THE DRAWINGS. CONTRACTOR WILL RECEIVE NO ADDITIONAL PAYMENT FOR THE LEAN CONCRETE.

   REPLACE UNAUTHORIZED EXCAVATION MATERIAL WITH STRUCTURAL CONCRETE THAT IS PLACED MONOLITHICALLY WITH THE STRUCTURAL CONCRETE INDICATED ON THE DRAWINGS, CREATING AN ENLARGED SECTION. CONTRACTOR SHALL NOTIFY ENGINEER FOR DIRECTION PRIOR TO PERFORMING THIS WORK. THE INCREASED CONCRETE THICKNESS MAY REQUIRE ADDITIONAL REINFORCEMENT AND/OR OTHER DESIGN MODIFICATIONS. IF THE INCREASED CONCRETE THICKNESS EXCEEDS 36 INCHES, ENGINEER MAY REQUIRE CONTRACTOR TO IMPLEMENT MASS CONCRETE HEAT MITIGATION PROCEDURES. CONTRACTOR WILL RECEIVE NO ADDITIONAL PAYMENT FOR EXTRA STRUCTURAL CONCRETE, ADDITIONAL REINFORCEMENT, OTHER DESIGN MODIFICATIONS, OR MASS CONCRETING PROCEDURES.
5. THE FOLLOWING BEARING CAPACITIES WERE UTILIZED IN THE DESIGN OF THE FOUNDATIONS.

CLARIFIER #1 FOUNDATION	3000 PSF NET ALLOWABLE
CLARIFIER #2 FOUNDATION	3000 PSF NET ALLOWABLE
CLASS I DIV EQUIPMENT FOUNDATION	3000 PSF NET ALLOWABLE
ELECTRICAL BUILDING FOUNDATION	3000 PSF NET ALLOWABLE
RAS BOX #3 MAT FOUNDATION	3000 PSF NET ALLOWABLE
RAS BOX #4 MAT FOUNDATION	2500 PSF NET ALLOWABLE
UV STRUCTURE FOUNDATION	2500 PSF NET ALLOWABLE
UV WET WELL FOUNDATION (TYP3)	2500 PSF NET ALLOWABLE
UV MAT FOUNDATION (TYP3)	3500 PSF NET ALLOWABLE
GRIT FACILITY DRILLED PIER	REFER TO DWG S-31-101

1

6. FOUNDATION DESIGN IS BASED ON THE GEOTECHNICAL REPORT FOR THIS PROJECT BY GEOTECHNICAL ENGINEERING AND TESTING DATED JANUARY 5TH, 2022 AND SEALED BY SHAILESH "JAMES" NAMEKAR ON FEBRUARY 10TH, 2022.

EXISTING STRUCTURES

1. THE DRAWINGS DEPICT WORK AT EXISTING STRUCTURES. ALL DIMENSIONS AND ALL DEPICTIONS SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO ORDERING MATERIALS, SHOP/MILL FABRICATION, OR STARTING CONSTRUCTION.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE, REPAIRS OR STRUCTURAL MODIFICATIONS THAT ARE REQUIRED DUE TO DEMOLITION BEYOND THE LIMITS IDENTIFIED IN THE DRAWINGS.
3. REINFORCEMENT FOR ANY EXISTING CONCRETE OR MASONRY ELEMENT SHALL NOT BE DAMAGED UNLESS THE ELEMENT IS TO BE DEMOLISHED. WHEN LOCATING EXISTING REINFORCEMENT IS REQUIRED, IT SHALL BE LOCATED USING NON-DESTRUCTIVE METHODS. REINFORCING STRANDS IN EXISTING PRESTRESSED CONCRETE SHALL NOT BE CUT UNLESS INDICATED ON THE DRAWINGS OR OTHERWISE AUTHORIZED BY THE ENGINEER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE, REPAIRS OR STRUCTURAL MODIFICATIONS THAT ARE REQUIRED DUE TO DAMAGE OF CONCRETE, MASONRY OR REINFORCEMENT THAT HAS BEEN IDENTIFIED ON THE DRAWINGS TO REQUIRE FIELD VERIFICATION.
4. CORE DRILLING AND SAW CUTTING SHALL NOT BE PERFORMED UNLESS INDICATED ON THE DRAWINGS OR APPROVED BY ENGINEER.
5. EXPOSED CONCRETE SURFACES THAT REMAIN AFTER DEMOLITION SHALL BE REPAIRED TO MATCH ADJACENT CONCRETE SURFACES.
6. UNLESS OTHERWISE INDICATED ON THE DRAWINGS, EXPOSED CONCRETE SURFACES WITH REINFORCEMENT, ANCHOR BOLTS, HANGER RODS, OR OTHER EXPOSED METAL EMBEDMENTS SHALL BE REPAIRED BY CUTTING OFF THE METAL AT THE FACE OF THE CONCRETE, GRINDING SMOOTH, AND COATING. COATING SHALL EXTEND A MINIMUM OF 1" BEYOND THE EDGE OF ANY EXPOSED METAL.

SPECIAL INSPECTIONS

1. CODE REQUIRED SPECIAL INSPECTIONS AND TESTS WILL BE CONDUCTED BY APPROVED AGENCIES EMPLOYED BY THE OWNER IN ACCORDANCE WITH THE APPLICABLE BUILDING CODE.
2. THE STATEMENT OF SPECIAL INSPECTIONS WILL BE PREPARED BY THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE DURING CONSTRUCTION.
3. EACH CONTRACTOR RESPONSIBLE FOR THE CONSTRUCTION OF A MAIN WIND OR SEISMIC FORCE RESISTING SYSTEM, DESIGNATED SEISMIC SYSTEM OR A WIND OR SEISMIC RESISTING COMPONENT LISTED IN THE STATEMENT OF SPECIAL INSPECTIONS SHALL SUBMIT A WRITTEN STATEMENT OF RESPONSIBILITY TO THE BUILDING OFFICIAL AND OWNER PRIOR TO COMMENCEMENT OF WORK ON THE SYSTEM OR COMPONENT.
4. SEE THE QUALITY CONTROL SECTION AND THE CODE REQUIRED SPECIAL INSPECTIONS AND PROCEDURES SECTION OF THE SPECIFICATIONS FOR FURTHER CLARIFICATION OF RESPONSIBILITIES.

DELEGATED DESIGN

1. THE FOLLOWING ITEMS ARE IDENTIFIED IN THE DRAWINGS AND SPECIFICATIONS AS BEING DESIGNED AND SEALED BY OTHERS. SUBMITTALS FOR THESE ITEMS SHALL BE PREPARED BY THE SUPPLIERS AND SUBMITTED TO ENGINEER AND CODE OFFICIAL FOR REVIEW.

   SECTION 01612 – EQUIPMENT AND NON-STRUCTURAL COMPONENTS
   SECTION 05520 – METAL RAILINGS
   SECTION 05550 – EQUIPMENT ANCHORAGE
   SECTION 05590 – METAL STAIRS
   SECTION 11425 – SECONDARY CLARIFIER
   SECTION 13120 – PRECAST SEGMENTAL CONCRETE BUILDING
   SECTION 13122 – METAL BUILDING SYSTEMS.

1 THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC
FB NO. 4-6182

STATE OF TEXAS – JEFFREY A. BOOS – 116686 – LICENSED PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
STRUCTURAL
STRUCTURAL NOTES

WBS NUMBER	THE CITY OF HOUSTON HAS THIS
R-00268-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON ID	
APPROVED (SHARI) L.M., P.E.	80967
S-00-001	SHEET NO. 132 OF 329

FILE PATH: BIM 360://402300 - CWI Intercontinental Airport WWTP Improvements/402300-GENERAL.rvt

BASIC LOADING CRITERIA

THE APPLICABLE BUILDING CODE IS THE 2015 INTERNATIONAL BUILDING CODE (IBC)

1. DEAD LOAD ..... CALCULATED
2. LIVE LOADS
   - OPERATING AND PROCESS FLOORS ..... 150 PSF
   - STAIRS, SERVICE PLATFORMS & LANDINGS ..... 100 PSF
   - ELECTRICAL AND CONTROL ROOM FLOORS ..... 250 PSF
   - CHEMICAL STORAGE ROOMS ..... 250 PSF
   - STORAGE ..... 250 PSF
   - ALL FLOORS NOT INDICATED ..... 100 PSF
   - ROOF ..... 20 PSF(UNREDUCED)
3. LATERAL EARTH PRESSURE (EQUIVALENT FLUID PRESSURE)
   - NON-SATURATED ..... 90 PSF/FT
   - SATURATED ..... 95 PSF/FT
4. LATERAL SURCHARGE ..... EQUIVALENT TO 2 FEET OF SOIL WHERE ADJACENT TO A ROADWAY
5. COMPACTIVE SURCHARGE LOAD ..... 400 PSF AT FINISH GRADE ELEVATION DECREASING LINEARLY AT SAME RATE AS BACKFILL LOAD INCREASES. FOR WALLS 8 FEET OR LESS IN HEIGHT, USE CRITERIA 4 ABOVE AS COMPACTIVE SURCHARGE
6. HYDROSTATIC FLUID PRESSURE ..... 62 PSF/FT
7. SNOW LOAD
   - GROUND SNOW LOAD (P_g) ..... 5 PSF
   - SNOW EXPOSURE FACTOR (C_e) 1.0
8. SEISMIC LOAD
   - MAPPED MCE SHORT PERIOD SPECTRAL RESPONSE ACCELERATION (S_s) 0.073g
   - MAPPED MCE ONE SECOND PERIOD SPECTRAL RESPONSE ACCELERATION (S_1) 0.040g
   - DESIGN SPECTRAL RESPONSE ACCELERATION AT SHORT PERIODS (S_{DS}) 0.078g
   - DESIGN SPECTRAL RESPONSE ACCELERATION AT ONE SECOND PERIOD (S_{D1}) 0.064g
   - SITE CLASS ..... D
9. WIND LOAD
   - ULTIMATE DESIGN WIND SPEED ..... 150 MPH
   - NOMINAL DESIGN WIND SPEED ..... 119 MPH
   - EXPOSURE C
10. 500 YEAR FLOOD ELEVATION ..... EL 79.00 USGS

NOTE: FOR GUARDRAIL LOADINGS REFER TO DRAWINGS S-99-505 AND THE METAL RAILINGS SPECIFICATION. FOR STAIR LOADINGS REFER TO S-99-505 AND THE STRUCTURAL METALS SPECIFICATION.

SNOW LOADING CRITERIA FOR BUILDINGS	
RISK CATEGORY	II
FLAT-ROOF SNOW LOAD (P_f), PSF	5.5
SNOW DRIFT SURCHARGE LOAD (P_d), PSF	11.7
SNOW DRIFT WIDTH (W), FEET	3.19
SNOW IMPORTANCE FACTOR (I_s)	1.1
THERMAL FACTOR (C_t)	1.2

SEISMIC LOADING CRITERIA FOR BUILDINGS	
RISK CATEGORY	II
SEISMIC IMPORTANCE FACTOR	1.25
SEISMIC DESIGN CATEGORY	A

SEISMIC LOAD DOES NOT GOVERN WIND LOAD CONTROLS

UV FACILITY

INTERNAL PRESSURE COEFFICIENT ..... NOT APPLICABLE
DIMENSION "a" ..... 5.4 FT
ROOF TYPE ..... PITCHED FREE ROOFS

COMPONENT AND CLADDING WIND PRESSURES, PSF

EFFECTIVE WIND AREA (SQR FT)		≤ 10	>10, <43.0	≥ 43.0
ROOF INTERIOR ZONE	(+)	46	46	46
	(−)	-72	-72	-72
ROOF EDGE ZONE	(+)	72	72	46
	(−)	-110	-110	-72
ROOF CORNER ZONE	(+)	93	72	46
	(−)	-216	-110	-72

NOTES:
1. POSITIVE PRESSURES ACT TOWARDS THE SURFACE, NEGATIVE PRESSURES ACT AWAY FROM THE SURFACE.
2. LINEARLY INTERPOLATE PRESSURES FOR EFFECTIVE WIND AREAS BETWEEN THOSE SCHEDULED OR USE PRESSURES FOR THE SMALLER EFFECTIVE WIND AREA.
3. ALL ROOF OVERHANG PRESSURES ACT UPWARD.

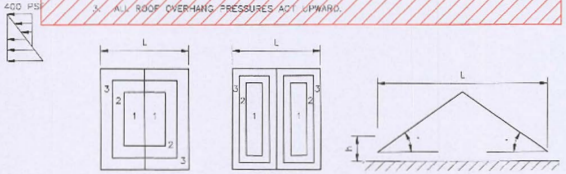
GRIT FACILITY

INTERNAL PRESSURE COEFFICIENT ..... NOT APPLICABLE
DIMENSION "a" ..... 3 FT
ROOF TYPE ..... MONOSLOPE FREE ROOF

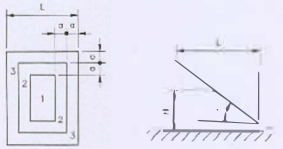
COMPONENT AND CLADDING WIND PRESSURES, PSF

EFFECTIVE WIND AREA (SQR FT)		≤ 10	>10, ≤43.0	≥ 43.0
ROOF INTERIOR ZONE	(+)	66.0	66.0	66.0
	(−)	-77.0	77.0	-77.0
ROOF EDGE ZONE	(+)	99.0	99.0	66.0
	(−)	-187.0	-116.0	-77.0
ROOF CORNER ZONE	(+)	132.0	99.0	66.0
	(−)	-156.0	-116.0	-77.0

4 SOFFITS BELOW ROOF OVERHANGS ARE DESIGNED FOR THE WINDWARD PRESSURE ON THE WALL BELOW THE SOFFIT



ROOF PLAN (PITCHED FREE ROOF) — ROOF ELEVATION



ROOF PLAN (MONOSLOPE FREE ROOF) — ROOF ELEVATION

COMPONENTS AND CLADDING WIND LOAD CRITERIA FOR BUILDINGS

NO SCALE

1 THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 500
HOUSTON, TX 77024
(713) 951-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS — JEFFREY A. BOOS — 116686 — LICENSED PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

STRUCTURAL

STRUCTURAL LOADING CRITERIA

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.

FOR CITY OF HOUSTON USE ONLY — 80367

S-00-002 — SHEET NO. 133 OF 373

FILE PATH: P:\M 365\1\1\0\1\0\0 - COH Interconti\engr\drawn\AWTP Improvements\402650-0147\M\M.mf

STRUCTURAL ABBREVIATIONS

A

ADDL	ADDITION &
AFF	ABOVE FINISH FLOOR
AHR	ANCHOR
ALT	ALTERNATE
ALUM	ALUMINUM
APPROX	APPROXIMATE
ARCH	ARCHITECTURAL
AROD	ANCHOR ROD
ASSY	ASSEMBLY
AWG	AMERICAN WIRE GAUGE

B

BLDG	BUILDING
BM	BENCHMARK, BEAM
BO	BOTTOM OF
BOT	BOTTOM
BRDG	BRIDGING
BRG	BEARING
BTWN	BETWEEN

C

C	CAMBER
CANTIL	CANTILEVER
CHKD	CHECKERED
CHKDPL	CHECKERED PLATE
CIP	CAST-IN-PLACE
CJ	CONTRACTION JOINT
CJP	COMPLETE JOINT PENETRATION
CL	CENTERLINE
CLR	CLEAR
CMU	CONCRETE MASONRY UNIT
COL	COLUMN
CONC	CONCRETE
CONN	CONNECTION
CONSTR	CONSTRUCTION
CONT	CONTINUOUS,CONTINUATION, CONTROL
COORD	COORDINATE
COV	COVER
CRNR	CORNER
CSJ	CONSTRUCTION JOINT
CTRD	CENTERED
CTRS	CENTERS

D

db	BAR DIAMETER
DBA	DEFORMED BAR ANCHOR
DET	DETAIL
DIA	DIAMETER
DIAG	DIAGONAL
DIM	DIMENSION
DN	DOWN
DWA	DEFORMED WIRE ANCHOR
DWG(S)	DRAWING, DRAWINGS
DWL(S)	DOWEL, DOWELS

E

E	EAST
EA	EACH
EE	EACH END
EF	EACH FACE
EJ	EXPANSION JOINT
EL	ELEVATION
EMBED	EMBEDMENT
EMER	EMERGENCY
ENGR	ENGINEER
EQ	EQUAL
EQUIP	EQUIPMENT
EQUIV	EQUIVALENT
EW	EACH WAY
EXIST	EXISTING
EXP	EXPANSION
EXT	EXTERIOR

F

FAB	FABRICATE
f'c	28 DAY CONCRETE STRENGTH =
FD	FLOOR DRAIN
FDN	FOUNDATION
FIN	FINISH(ED)
FLR	FLOOR
FS	FAR SIDE
FT	FOOT
FTG	FOOTING
FUT	FUTURE
FV	FIELD VERIFY
Fy	STRUCTURAL STEEL YIELD STRENGTH =
fy	REINFORCING STEEL YIELD STRENGTH =

G

GA	GAUGE
GALV	GALVANIZED
GEN	GENERAL
GR	GRADE

H

H	HORIZONTAL REACTION
HC	HOLLOW CORE
HCA	HEADED CONCRETE ANCHOR
HEX	HEXAGONAL
HGR	HANGER
HORIZ	HORIZONTAL
HP	HIGH POINT
HSS	HOLLOW STRUCTURAL SECTION

I

ID	INSIDE DIAMETER
IF	INSIDE FACE
IN	INCHES
INT	INTERIOR, INTERNAL
INV	INVERT

J

JT	JOINT

K

k	KIPS (1000 LBS)
KSF	KIPS PER SQUARE FOOT
KSI	KIPS PER SQUARE INCH

L

L	LENGTH, ANGLE
LAB	LABORATORY
LB(S)	POUND, POUNDS
ld	DEVELOPMENT LENGTH
LE	LEFT END
LIN	LINES
LLBB	LONG LEG BACK TO BACK
LLH	LONG LEG HORIZONTAL
LLV	LONG LEG VERTICAL
LONG	LONGITUDINAL
LP	LOW POINT
LSH	LONG SIDE HORIZONTAL
LSHP	LONG SLOTTED HOLE PARALLEL
LSLT	LONG SLOTTED HOLE TRANSVERSE
LSV	LONG SIDE VERTICAL
LWC	LIGHTWEIGHT CONCRETE

M

M	MOMENT
MAS	MASONRY
MATL	MATERIAL
MAX	MAXIMUM
MC	MOMENT CONNECTION, MECHANICAL COUPLING
MECH	MECHANICAL
MEZZ	MEZZANINE
MFR	MANUFACTURE(R)
MIN	MINIMUM
MISC	MISCELLANEOUS
MTL	METAL

N

N	NORTH
N/A	NOT APPLICABLE
NIC	NOT IN CONTRACT
NO.	NUMBER
NOM	NOMINAL
NS	NEAR SIDE
NTS	NOT TO SCALE
NWC	NORMAL WEIGHT CONCRETE

O

OC	ON CENTER
OD	OUTSIDE DIAMETER
OF	OUTSIDE FACE
OPER	OPERATING
OPH	OPPOSITE HAND
OPNG	OPENING
OPP	OPPOSITE
OVS	OVERSIZED HOLE
OZ	OUNCE

P

P	AXIAL LOAD
PAF	POWDER ACTUATED FASTENER
PAR	PARALLEL
PCC	PRECAST CONCRETE
PCF	POUNDS PER CUBIC FOOT
PEMB	PRE-ENGINEERED METAL BUILDING
PERP	PERPENDICULAR
PJP	PARTIAL JOINT PENETRATION
PL	PLATE
PLCS	PLACES
PLF	POUNDS PER LINEAR FOOT
PR	PAIR
PRELIM	PRELIMINARY
PROJ	PROJECTION
PROP	PROPERTY
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PT	POST TENSIONED

Q

QTY	QUANTITY

R

R	RADIUS, RISER, REMAINDER
RCP	REINFORCED CONCRETE PIPE
RD	ROOF DRAIN
RECT	RECTANGULAR
REF	REFERENCE
REINF	REINFORCEMENT
REQD	REQUIRED
REV	REVISION
RO	ROUGH OPENING

S

S	SOUTH
SC	SLIP CRITICAL, SHEAR CONNECTOR
SCHED	SCHEDULE
SECT	SECTION
SF	SIDE FACE
SH	SHEET
SIM	SIMILAR
SJ	SAW JOINT
SLBB	SHORT LEG BACK TO BACK
SPA	SPACING
SPEC	SPECIFICATION
SPRT	SUPPORT
SQ	SQUARE
SS	STAINLESS STEEL
SSHP	SHORT SLOTTED HOLE PARALLEL
SSHT	SHORT SLOTTED HOLE TRANSVERSE
STD	STANDARD
STIF	STIFFENER
STIR	STIRRUP
STL	STEEL
STR	STRUCTURE, STRUCTURAL
SYM	SYMMETRICAL

T

T	TREAD, SCHEDULED PLATE THICKNESS, TOP
T&B	TOP & BOTTOM
TAN	TANGENT
TEMP	TEMPERATURE
THD	THREADED
THK	THICK, THICKNESS
TO	TOP OF
TOC	TOP OF CONCRETE
TOF	TOP OF FOOTING
TOM	TOP OF MASONRY
TOS	TOP OF STEEL
TOW	TOP OF WALL
TYP	TYPICAL

U

UNO	UNLESS NOTED OTHERWISE
USGS	UNITED STATES GEOLOGICAL SURVEY

V

VERT	VERTICAL
VNR	VENEER

W

W	WEST
W/	WITH
W/O	WITHOUT
WF	WIDE FLANGE
WP	WORK POINT
WS	WATERSTOP
WT	WEIGHT
WWR	WELDED WIRE REINFORCEMENT

X

x	BY, TIMES
XS	EXTRA STRONG
XXS	DOUBLE EXTRA STRONG

Y

NOT USED

Z

NOT USED

SPECIAL CHARACTERS

@	AT
&	AND
ø	DIAMETER
#	NUMBER
%	PERCENT

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED
PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT
PLANT EXPANSION
STRUCTURAL
STRUCTURAL ABBREVIATIONS

WBS NUMBER	R-00285-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	QIAOHUA (SHARI) LIN, P.E.

FOR CITY OF HOUSTON USE ONLY

80367

S-00-003

SHEET NO. 134 OF 379

FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-GENERAL.rvt

GENERAL NOTES FOR FOUNDATION AND SUBGRADE PREPARATION

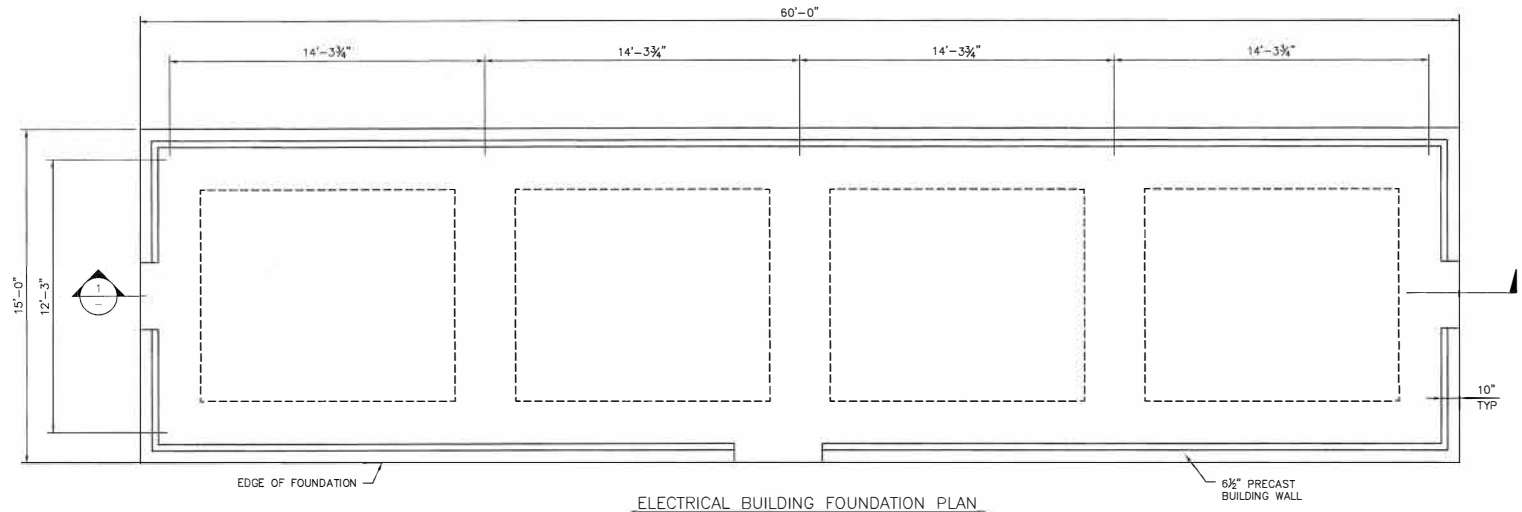
1. FOUNDATION DESIGN IS IN ACCORDANCE WITH SUBSURFACE EXPLORATION MEMORANDUM BY GEOTECH ENGINEERING AND TESTING, HOUSTON, TEXAS, JOB NUMBER 19-061E, DATE, NOVEMBER 24, 2021. COPIES OF THE REPORT MAY BE OBTAINED FROM THE OWNER. ALL BIDDERS MUST BECOME FAMILIAR WITH THE CONTENTS OF THIS REPORT. THE FOLLOWING INFORMATION IS PROVIDED TO ASSIST IN THE LEVEL OF UNDERSTANDING OF THE SUBSURFACE CONDITIONS BUT SHALL NOT BE CONSIDERED TO COMPLETELY DESCRIBE ALL CONDITIONS PRESENT AND RELEVANT TO THE FOUNDATION CONSTRUCTION.
2. SITE CONDITIONS AT THE ELECTRICAL BUILDING, B-7, GENERALLY CONSIST OF THE FOLLOWING:

   0' – 2' FILL: LEAN CLAY (CL)
   2' – 10' LEAN CLAY (CL)
   10' – 23' FAT CLAY (CH)

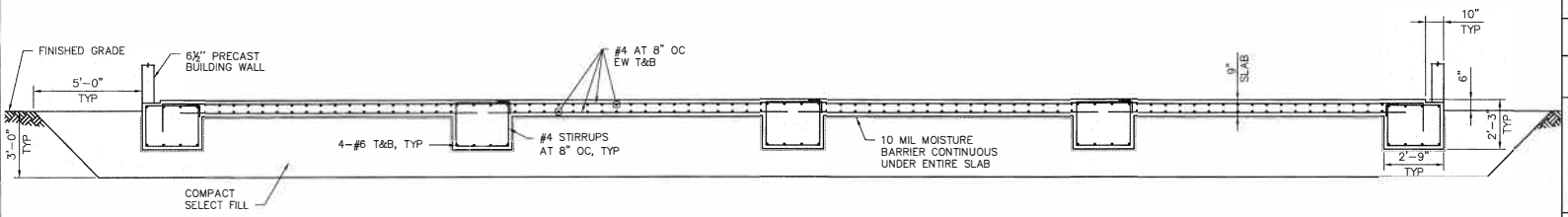
3. AT THE TIME OF TESTING, GROUNDWATER WAS ENCOUNTERED AT A DEPTH OF 21.5 FT. GROUNDWATER LEVELS MAY BE DIFFERENT DURING CONSTRUCTION.
4. A FOUNDATION HAS BEEN DESIGNED FOR BEARING INTO SOIL AT A MINIMUM DEPTH OF 21" BELOW THE FINAL GRADE ELEVATION. THE GRADE BEAMS HAVE BEEN DESIGNED FOR A NET ALLOWABLE SOIL BEARING PRESSURE OF 3000 PSF.
5. REMOVE UPPER 3 FT OF EXISTING SOILS FROM FOOTING AND REPLACE WITH COMPACTED SELECT STRUCTURAL FILL. THE SELECT STRUCTURAL FILL SHALL EXTEND 5 FT BEYOND THE STRUCTURE PERIMETER. THESE SOILS SHALL BE PLACED IN LOOSE LIFTS NOT EXCEEDING 8" AND COMPACTED TO 95% OF MAXIMUM STANDARD DENSITY (ASTM D-698) AND THE MOISTURE CONTENT ADJUSTED BETWEEN OPTIMUM AND 3%
6. AT THE TIME OF EXCAVATION, THE OWNER'S TESTING LABORATORY AND THE ENGINEER SHALL BE NOTIFIED TO OBSERVE FOUNDATION CONSTRUCTION TO ENSURE A DESIRABLE STRATUM HAS BEEN REACHED.

GENERAL NOTES:

1. REFER TO CIVIL, MECHANICAL, AND ELECTRICAL SHEETS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
2. SEE STRUCTURAL GENERAL NOTES, STANDARD DETAILS, AND PROJECT SPECIFICATIONS FOR ADDITIONAL INFORMATION NOT SHOWN.
3. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS PRIOR TO CONSTRUCTION OR ORDERING MATERIALS.
4. CONDUIT AND PIPE PENETRATIONS SHALL AVOID STUBBING THROUGH GRADE BEAMS. ADDITIONALLY, GRADE BEAM AND SLAB REINFORCEMENT SHALL NOT BE CUT TO ACCOMMODATE CONDUIT. SEE STRUCTURAL STANDARD DETAILS FOR SLAB REINFORCEMENT TREATMENT AT PENETRATIONS AND BLOCKOUTS.



ELECTRICAL BUILDING FOUNDATION PLAN
3/8" = 1'-0"



1 SECTION
3/8" = 1'-0"

CP&Y, INC.
TEXAS REGISTERED ENGINEERING FIRM F-1741

BLACK & VEATCH

CP&Y, INC.
11757 KATY FREEWAY
SUITE 1540
HOUSTON, TX 77079
(713) 532-1730
TX FIRM NUMBER F-1741

SURVEYED BY:
FB NO. 000000

STATE OF TEXAS
JEFFREY P. WOUTERS
80701
REGISTERED PROFESSIONAL ENGINEER
11-07-2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
STRUCTURAL

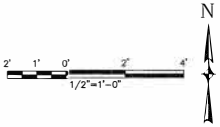
LIFT STATION ELECTRICAL BUILDING PLAN AND SECTION

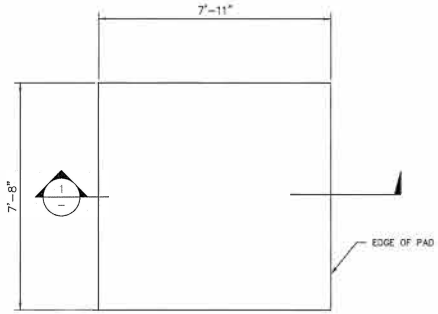
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	
SIGNATURE	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 135 OF 379	

FOR CITY OF HOUSTON USE ONLY
80367

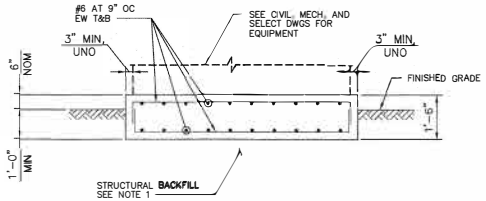
S-20-101

FILE PATH: C:\pw_working\pw_americas\d1366638\S-20-101.dwg





ELECTRICAL BUILDING TRANSFORMER PAD PLAN
1/2" = 1'-0"



NOTES:
1. REMOVE AND REPLACE EXISTING SOILS WITH STRUCTURAL BACKFILL TO A DEPTH OF 6 FEET BELOW FOUNDATION AND EXTENDING 5 FEET, EACH SIDE, BEYOND THE FOOTPRINT OF THE FOUNDATION AND SLOPING UP TOWARDS GRADE AT A 1 TO 1 SLOPE. PROVIDE FILTER FABRIC TYPR A BELOW STRUCTURAL BACKFILL.

1 SECTION
1/2" = 1'-0"

GENERAL NOTES FOR FOUNDATION AND SUBGRADE PREPARATION

1. FOUNDATION DESIGN IS IN ACCORDANCE WITH SUBSURFACE EXPLORATION MEMORANDUM BY GEOTECH ENGINEERING AND TESTING, HOUSTON, TEXAS, JOB NUMBER 19-061E, DATE, NOVEMBER 24, 2021. COPIES OF THE REPORT MAY BE OBTAINED FROM THE OWNER. ALL BIDDERS MUST BECOME FAMILIAR WITH THE CONTENTS OF THIS REPORT. THE FOLLOWING INFORMATION IS PROVIDED TO ASSIST IN THE LEVEL OF UNDERSTANDING OF THE SUBSURFACE CONDITIONS BUT SHALL NOT BE CONSIDERED TO COMPLETELY DESCRIBE ALL CONDITIONS PRESENT AND RELEVANT TO THE FOUNDATION CONSTRUCTION.
2. SITE CONDITIONS AT THE LS ELECTRICAL BUILDING TRANSFORMER PAD, B-7, GENERALLY CONSIST OF THE FOLLOWING:

   0' – 2' FILL: LEAN CLAY (CL)
   2' – 10' LEAN CLAY (CL)
   10' – 23' FAT CLAY (CH)

3. AT THE TIME OF TESTING, GROUNDWATER WAS ENCOUNTERED AT A DEPTH OF 21.5 FT. GROUNDWATER LEVELS MAY BE DIFFERENT DURING CONSTRUCTION.
4. A FOUNDATION HAS BEEN DESIGNED FOR BEARING INTO SOIL AT A MINIMUM DEPTH OF 12" BELOW THE FINAL GRADE ELEVATION. THE GRADE BEAMS HAVE BEEN DESIGNED FOR A NET ALLOWABLE SOIL BEARING PRESSURE OF 3000 PSF.
5. THE SELECT STRUCTURAL FILL SHALL EXTEND 5 FT BEYOND THE STRUCTURE PERIMETER. THESE SOILS SHALL BE PLACED IN LOOSE LIFTS NOT EXCEEDING 8" AND COMPACTED TO 95% OF MAXIMUM STANDARD DENSITY (ASTM D-698) AND THE MOISTURE CONTENT ADJUSTED BETWEEN OPTIMUM AND 3%.
6. AT THE TIME OF EXCAVATION, THE OWNER'S TESTING LABORATORY AND THE ENGINEER SHALL BE NOTIFIED TO OBSERVE FOUNDATION CONSTRUCTION TO ENSURE A DESIRABLE STRATUM HAS BEEN REACHED.

GENERAL NOTES:

1. REFER TO CIVIL, MECHANICAL, AND ELECTRICAL SHEETS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
2. SEE STRUCTURAL GENERAL NOTES, STANDARD DETAILS, AND PROJECT SPECIFICATIONS FOR ADDITIONAL INFORMATION NOT SHOWN.
3. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS PRIOR TO CONSTRUCTION OR ORDERING MATERIALS.
4. CONDUIT AND PIPE PENETRATIONS SHALL AVOID STUBBING THROUGH GRADE BEAMS. ADDITIONALLY, GRADE BEAM AND SLAB REINFORCEMENT SHALL NOT BE CUT TO ACCOMMODATE CONDUIT. SEE STRUCTURAL STANDARD DETAILS FOR SLAB REINFORCEMENT TREATMENT AT PENETRATIONS AND BLOCKOUTS.

CP&Y, INC.
TEXAS REGISTERED ENGINEERING FIRM F-1741

BLACK & VEATCH

CP&Y, INC.
11757 KATY FREEWAY
SUITE 1540
HOUSTON, TX 77079
(713) 532-1730
TX FIRM NUMBER F-1741

SURVEYED BY:
FB NO. 000000

STATE OF TEXAS
JEFFREY P. WOUTERS
80701
REGISTERED PROFESSIONAL ENGINEER
11-07-2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
STRUCTURAL

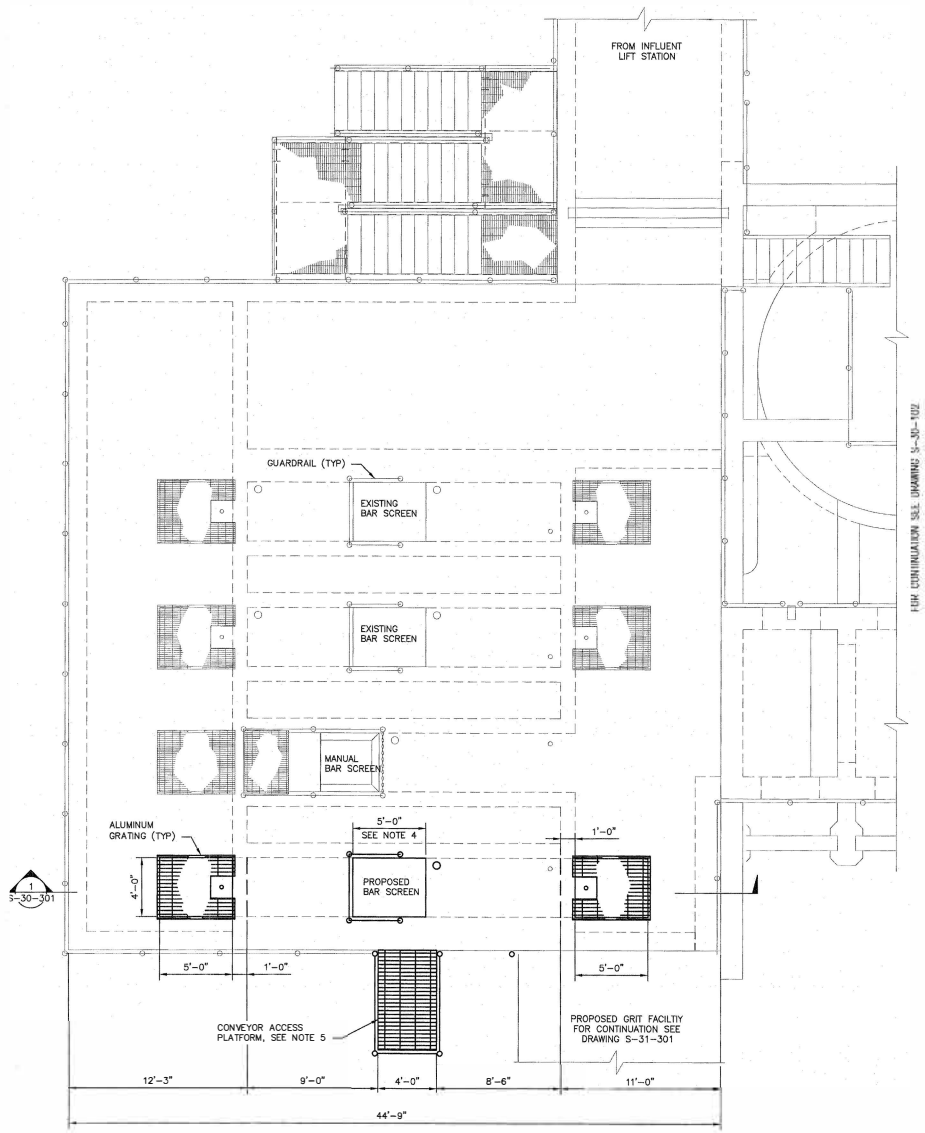
LIFT STATION ELECTRICAL BUILDING TRANSFORMER PAD PLAN AND SECTION

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
Se XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 136 OF 379	

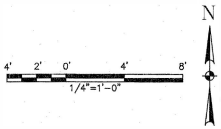
ACCEPTED AS NOTED
80367
CITY DRAINAGE ENGINEER
HOUSTON, TEXAS

S-20-102

FILE PATH: C:\pw_working\pww_americas\d1366638\S-20-102.dwg



HEADWORKS SCREENING PLAN
1/4" = 1'-0"



GENERAL NOTES:

1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND EXISTING CONDITIONS AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION OR ORDERING MATERIALS.
2. REFER TO CIVIL, MECHANICAL, AND ELECTRICAL DRAWINGS FOR INFORMATION NOT SHOWN.
3. REFER TO STRUCTURAL GENERAL NOTES AND STANDARD DETAILS FOR MORE INFORMATION.
4. COORDINATE OPENING LENGTH WITH BAR SCREEN MANUFACTURER.
5. SEE S-30-501 FOR CONVEYOR ACCESS PLATFORM DETAILS. COORDINATE OPENING IN GUARDRAIL FOR ACCESS TO CONVEYOR BEARING ASSEMBLY. FIELD VERIFY OPENING SIZE AND LOCATION.

CP&Y, INC.
TEXAS REGISTERED ENGINEERING FIRM F-1741

BLACK & VEATCH

CP&Y, INC.
11757 KATY FREEWAY
SUITE 1540
HOUSTON, TX 77079
(713) 532-1730
TX FIRM NUMBER F-1741

SURVEYED BY:
FB NO. 000000

STATE OF TEXAS
JEFFREY P. WOUTERS
80701
REGISTERED PROFESSIONAL ENGINEER
11-07-2022

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

HEADWORKS SCREENING PLAN

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) UN, P.E.

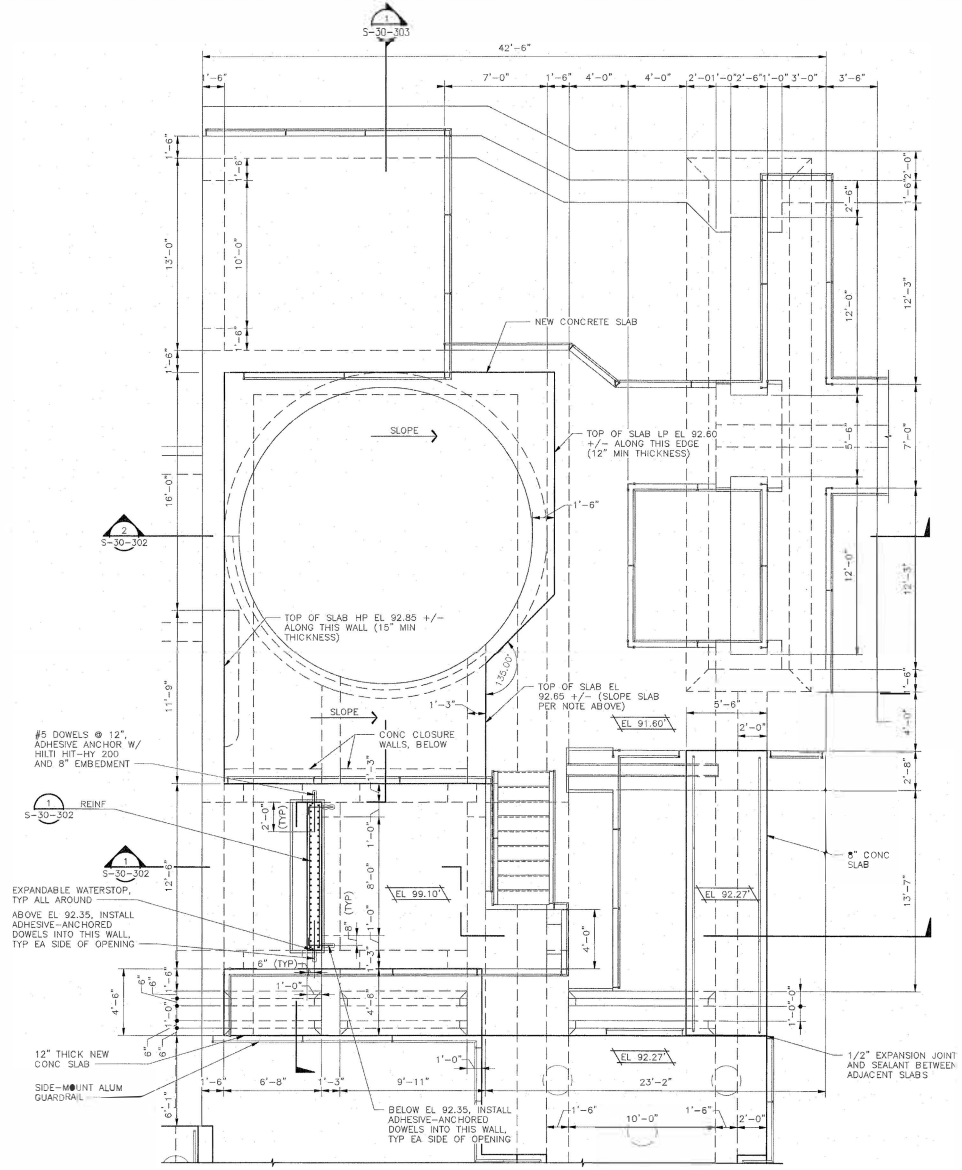
FOR CITY OF HOUSTON USE ONLY

PUBLIC WORKS AND ENGINEERING
ASSISTANT DIRECTOR
80367
CITY OF HOUSTON TEXAS

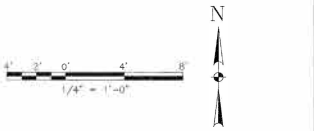
S-30-101

SHEET NO. 137 OF 379

FILE PATH: C:\pw_working\pw_americas\d1366638\S-30-101.dwg



HEADWORKS GRIT PLAN
1/4" = 1'-0"



GENERAL NOTES:

1. ALL DIMENSIONS AND ELEVATIONS ARE BASED ON EXISTING DRAWINGS AND SHALL BE FIELD VERIFIED BY THE CONTRACTOR AT THE START OF CONSTRUCTION. ANY DEVIATIONS SHALL BE COORDINATED WITH THE ENGINEER PRIOR TO FABRICATION AND CONSTRUCTION. TYPICAL FOR ALL EXISTING CONSTRUCTION.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 256

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED
PROFESSIONAL ENGINEER
11/11/2009

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT
PLANT EXPANSION
STRUCTURAL
HEADWORKS GRIT
PLAN

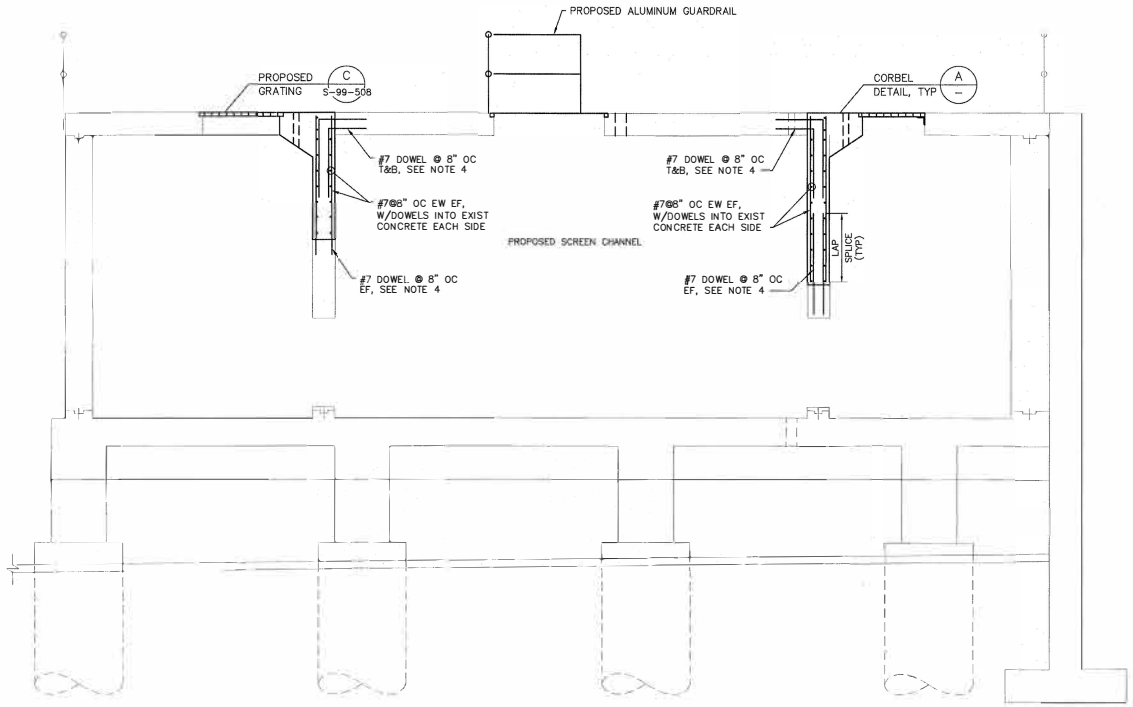
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	Se XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 138 OF 379	

FOR CITY OF HOUSTON USE ONLY

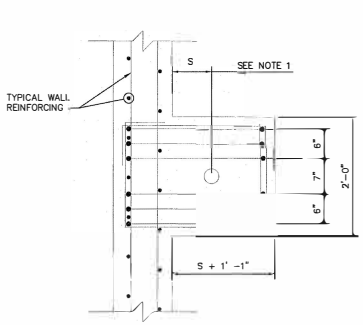
80367

S-30-102

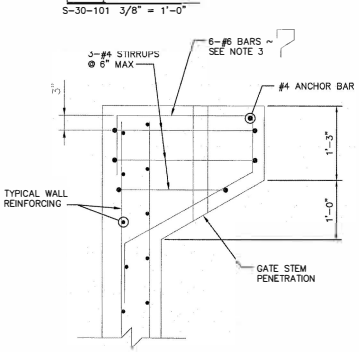
FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-COH_A WWTP-BV.rvt



1 SECTION
S-30-101 3/8" = 1'-0"



PLAN

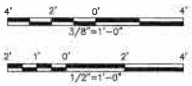


SECTION

A CORBEL DETAILS
1/2"=1'-0"

NOTES:

1. COORDINATE LOCATION OF GATE STEM PENETRATION WITH SLIDE GATE MANUFACTURER. S, MAX = 8".
2. CORBEL TO BE CAST MONOLITHICALLY WITH WALL.
3. ADJUST SPACING TO ACCOMMODATE PEDESTAL ANCHORAGE. COORDINATE LOCATIONS WITH PEDESTAL MANUFACTURER.
4. MAX STALL LOAD = 120K



GENERAL NOTES:

1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND EXISTING CONDITIONS AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION OR ORDERING MATERIALS.
2. REFER TO CIVIL, MECHANICAL, AND ELECTRICAL DRAWINGS FOR INFORMATION NOT SHOWN.
3. REFER TO STRUCTURAL GENERAL NOTES AND STANDARD DETAILS FOR MORE INFORMATION.
4. DOWEL BARS SHALL BE INSTALLED WITH HILTI HIT–HY 200, OR APPROVED EQUAL. EPOXY ADHESIVE. DOWELS SHALL BE EMBEDDED 8" MINIMUM INTO EXISTING CONCRETE AND INSTALLED PER MANUFACTURER SPECIFICATIONS.

CP&Y, INC.
TEXAS REGISTERED ENGINEERING FIRM F-1741

BLACK & VEATCH

CP&Y, INC.
11757 KATY FREEWAY
SUITE 1540
HOUSTON, TX 77079
(713) 532-1730

TX FIRM NUMBER F-1741

SURVEYED BY:
FB NO. 000000

STATE OF TEXAS
JEFFREY P. WOUTERS
80701
REGISTERED PROFESSIONAL ENGINEER
11-07-2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

HEADWORKS
SCREENING SECTION

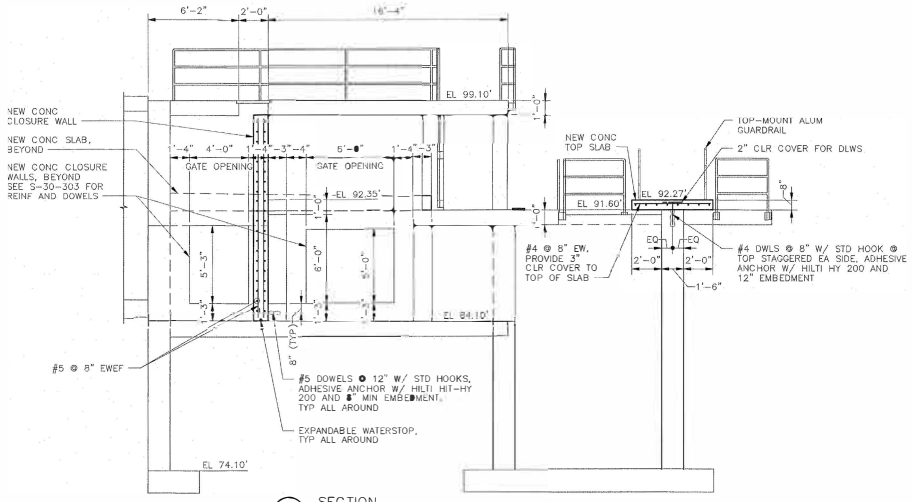
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	
	SE XIAOHUA (SHARI) LIN, P.E.

FOR CITY OF HOUSTON USE ONLY
80367

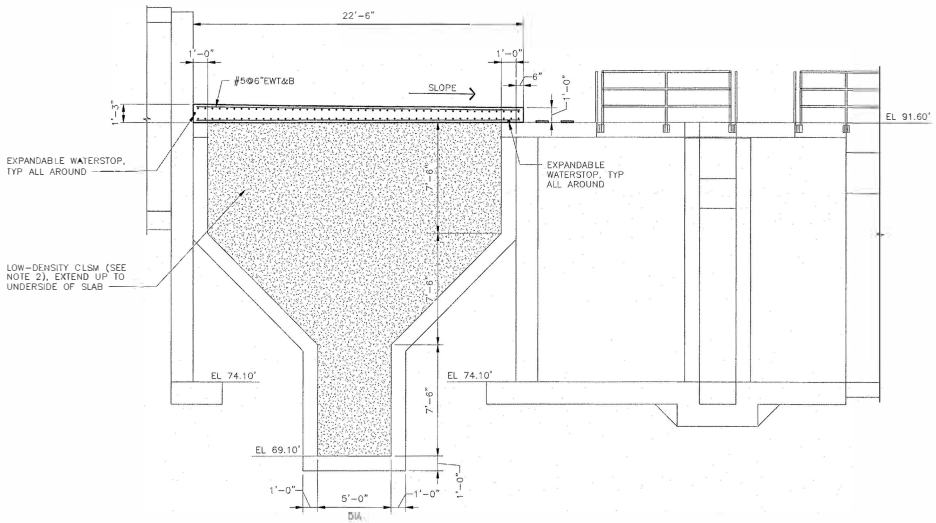
S-30-301

SHEET NO. 139 OF 379

FILE PATH: C:\pw_working\pw_americas\d1369838\S-30-301.dwg



1 SECTION
S-30-102 1/4" = 1'-0"



2 SECTION
S-30-102 1/4" = 1'-0"



GENERAL NOTES:

1. ALL DIMENSIONS AND ELEVATIONS ARE BASED ON EXISTING DRAWINGS AND SHALL BE FIELD VERIFIED BY THE CONTRACTOR AT THE START OF CONSTRUCTION. ANY DEVIATIONS SHALL BE COORDINATED WITH THE ENGINEER PRIOR TO FABRICATION AND CONSTRUCTION. TYPICAL FOR ALL EXISTING CONSTRUCTION.
2. PROVIDE LOW-DENSITY CLSM (LD-CLSM) PER ACI 229R. LD-CLSM SHALL, AT A MINIMUM, INCLUDE THE FOLLOWING MATERIALS: PORTLAND CEMENT (ASTM C 150, TYPE I OR II), POTABLE WATER, AND PREFORMED FOAM. THE LD-CLSM SHALL BE CLASS IV WITH AN IN-SERVICE DENSITY BETWEEN 36 TO 42 LBS PER CUBIC FOOT AND A MINIMUM COMPRESSIVE STRENGTH OF 120 PSI. TRIAL BATCHES SHALL BE PERFORMED TO VERIFY COMPRESSIVE STRENGTH, CONSISTENCY, AND IN-SERVICE DENSITY. TEST RESULTS AND MATERIALS SHALL BE SUBMITTED FOR REVIEW PRIOR TO CONSTRUCTION

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED
PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

STRUCTURAL

HEADWORKS GRIT SECTIONS 1 OF 2

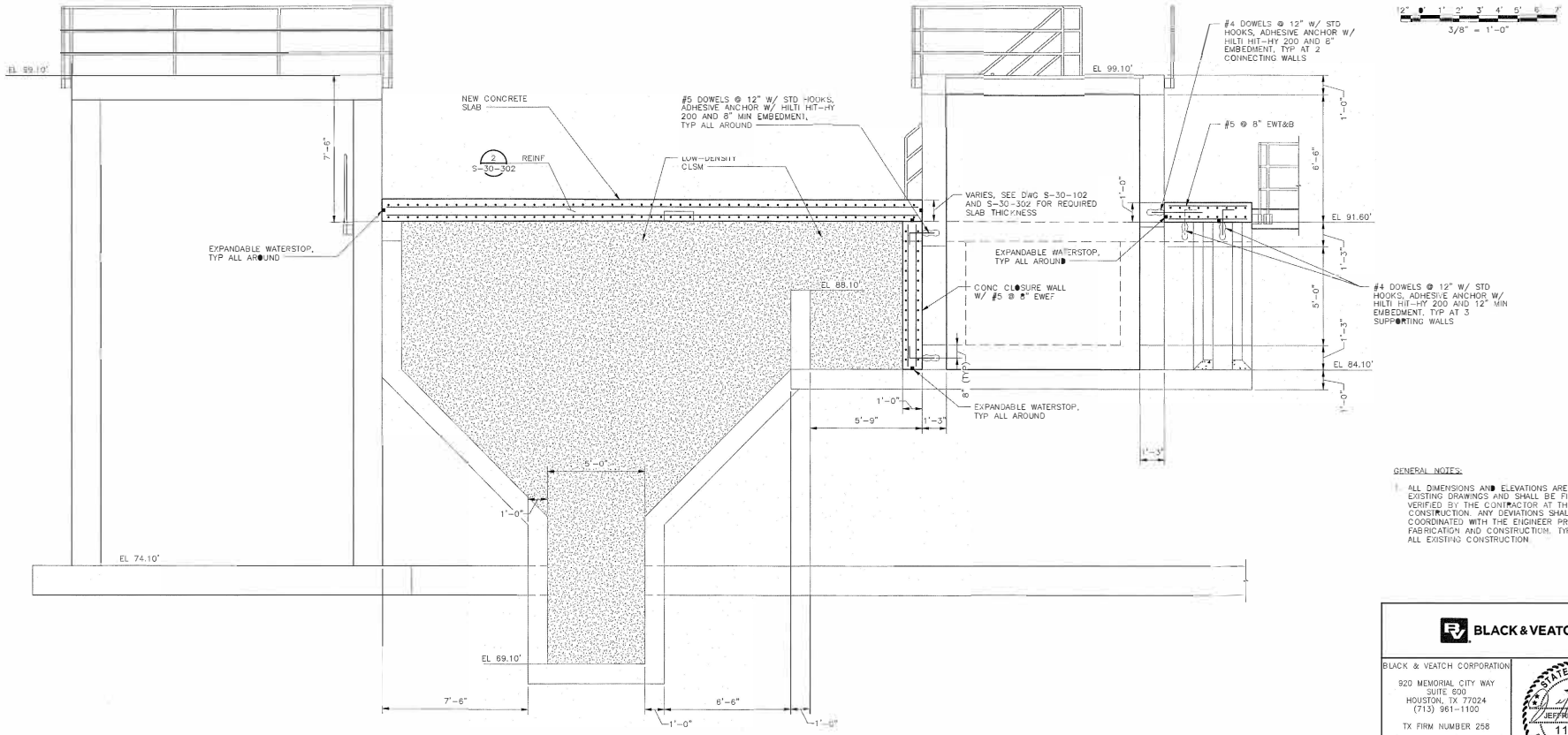
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 140 OF 379	

FOR CITY OF HOUSTON USE ONLY

ACCEPTED AS NOTED
80367
APPROVED
DATE

S-30-302

FILE PATH: BW 360://4013560 - CDH Intercontinental Airport WWTP Improvements/4013560-CDH IA WWTP-BW.rvt



1 SECTION
S-30-102 3/8" = 1'-0"

GENERAL NOTES:

1. ALL DIMENSIONS AND ELEVATIONS ARE BASED ON EXISTING DRAWINGS AND SHALL BE FIELD VERIFIED BY THE CONTRACTOR AT THE START OF CONSTRUCTION. ANY DEVIATIONS SHALL BE COORDINATED WITH THE ENGINEER PRIOR TO FABRICATION AND CONSTRUCTION. TYPICAL FOR ALL EXISTING CONSTRUCTION.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED
PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

STRUCTURAL

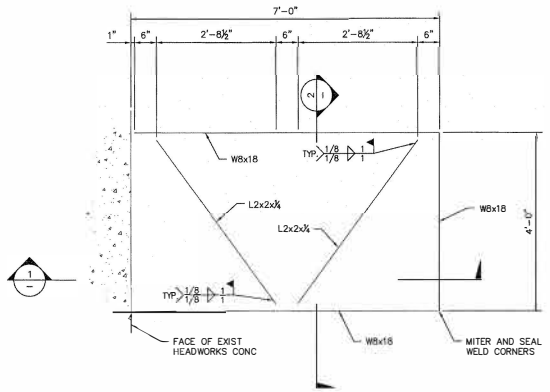
HEADWORKS GRIT SECTIONS 2 OF 2

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 141 OF 379	

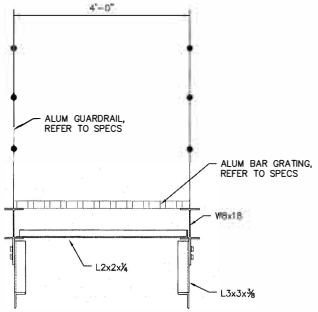
ACCEPTED HOUSTON PUBLIC WORKS
80367
APPROVED
ACTION TAKEN

S-30-303

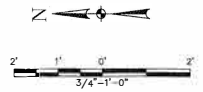
FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-COH IA WWTP-BV.rvt



PLATFORM FRAMING PLAN
3/4" = 1'-0"

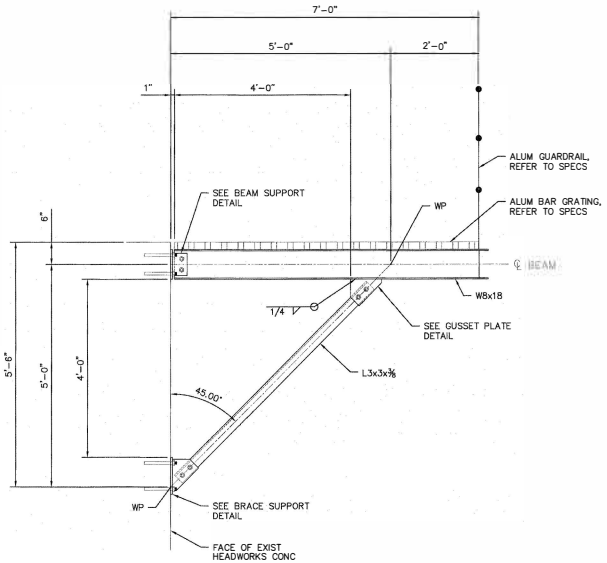


2 SECTION
3/4" = 1'-0"

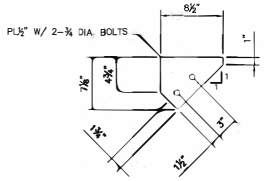


GENERAL NOTES:

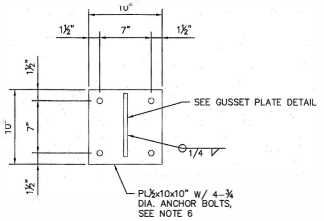
1. REFER TO MECHANICAL & ELECTRICAL PLANS FOR ADDITIONAL INFORMATION NOT SHOWN.
2. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION OR ORDERING MATERIALS.
3. SEE STRUCTURAL GENERAL NOTES, STANDARDS DETAILS, AND PROJECT SPECIFICATIONS FOR ADDITIONAL INFORMATION NOT SHOWN.
4. ALL STRUCTURAL STEEL SHALL BE GALVANIZED AND OF THE FOLLOWING MATERIALS. WIDE FLANGE SECTIONS – A992, ANGLE SECTION A36, PLATE STEEL – A36.
5. ALL STRUCTURAL BOLTS SHALL BE ASTM F3125 GRADE A325 TYPE 1 AND SHALL BE GALVANIZED.
6. ANCHOR BOLTS SHALL BE 316 SS THREADED RODS WITH HILTI HIT-RE 500 V3, OR APPROVED EQUAL, EPOXY ADHESIVE. ADHESIVE ANCHORS SHALL BE EMBEDDED 6" MINIMUM INTO EXISTING CONCRETE AND INSTALLED PER MANUFACTURER SPECIFICATIONS.



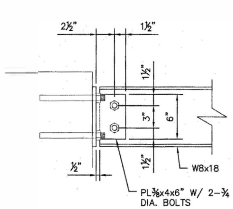
1 SECTION
3/4" = 1'-0"

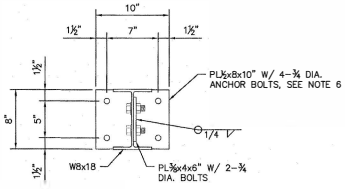


A GUSSET PLATE DETAIL
1 1/2"=1'-0"



B BRACE SUPPORT DETAIL
1 1/2"=1'-0"





C BEAM SUPPORT DETAIL
1 1/2"=1'-0"

CP&Y, INC.
TEXAS REGISTERED ENGINEERING FIRM F-1741

BLACK & VEATCH

CP&Y, INC.
11757 KATY FREEWAY
SUITE 1540
HOUSTON, TX 77079
(713) 532-1730
TX FIRM NUMBER F-1741

SURVEYED BY:
FB NO. 000000

STATE OF TEXAS
JEFFREY P. WOUTERS
80701
REGISTERED PROFESSIONAL LAND SURVEYOR
11-07-2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

HEADWORKS STRUCTURAL SECTIONS AND DETAILS

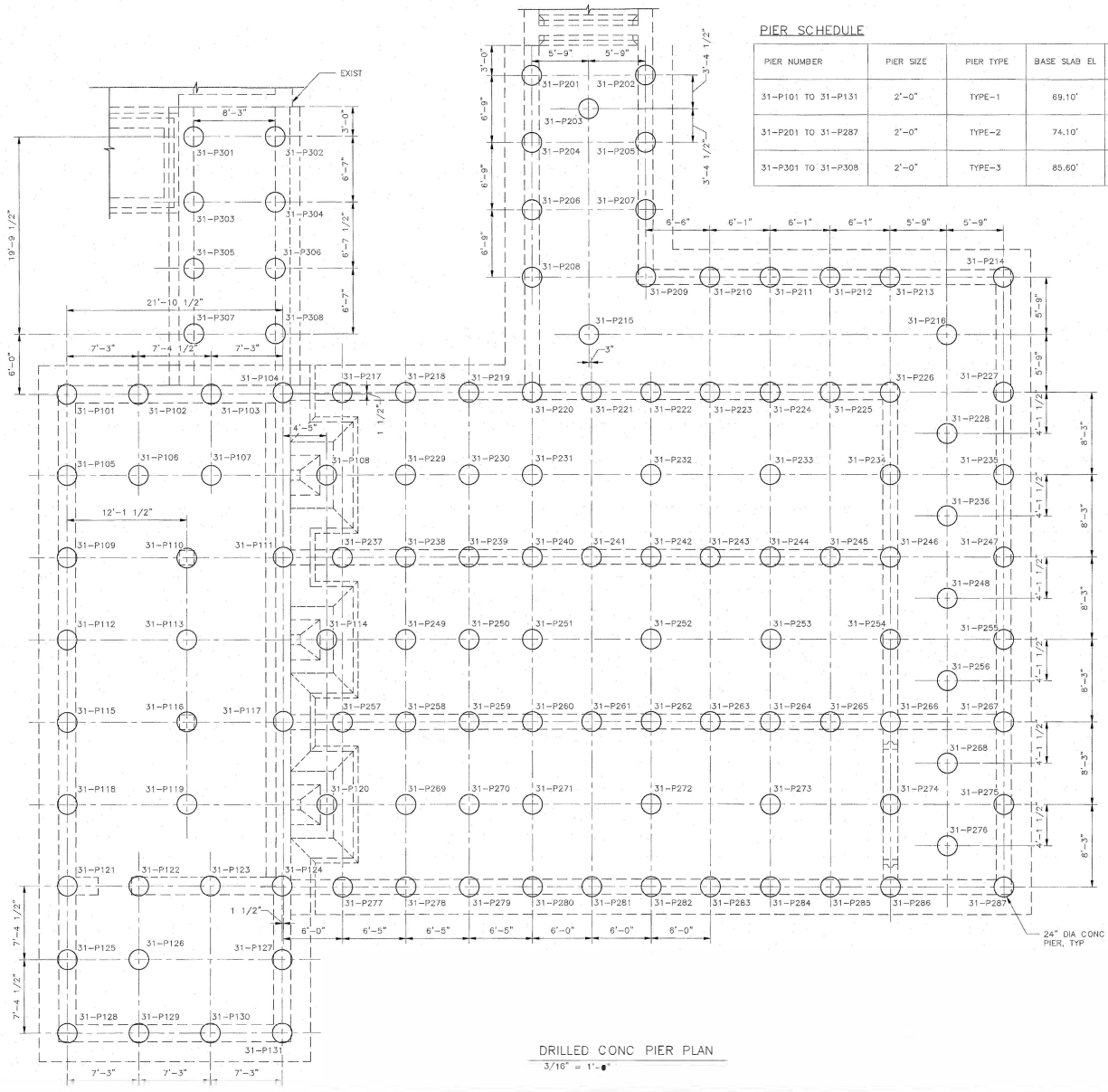
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.

FOR CITY OF HOUSTON USE ONLY
ACCEPTED AS NOTED
80367
REGISTERED PROFESSIONAL ENGINEER
HOUSTON, TEXAS

S-30-501

SHEET NO. 142 OF 379

FILE PATH: C:\pw_working\pw_americas\d136638\S-30-501.dwg



DRILLED CONC PIER PLAN
3/16" = 1'-0"

6" 4' 2' 0' 5' 10'
3/16" = 1'-0"

N

PIER SCHEDULE

PIER NUMBER	PIER SIZE	PIER TYPE	BASE SLAB EL	BASE SLAB THICKNESS	PIER CAPACITY (KIPS)			PIER CUTOFF ELEVATION	PIER TIP ELEVATION
					AXIAL COMP.*	AXIAL TENSION	SHEAR		
31-P101 TO 31-P131	2'-0"	TYPE-1	69.10'	VARIES 2'-6" TO 2'-4"	128	-47	±7	66.85'	40.00'
31-P201 TO 31-P287	2'-0"	TYPE-2	74.10'	2'-6"	156	-66	±8	71.85'	40.00'
31-P301 TO 31-P308	2'-0"	TYPE-3	85.60'	1'-6"	128	-47	±7	84.35'	40.00'

* = COMPRESSION

GENERAL NOTES

1. FOR GENERAL STRUCTURAL NOTES, REFER TO SHEET S-00-001.
2. FOR STRUCTURAL ABBREVIATIONS, REFER TO SHEET S-00-003.
3. FOR TYPICAL DRILLED CONCRETE PIER DETAILS REFER TO SHEET S-31-501.
4. FOR UNDERGROUND PIPES / PIPE OPENINGS, EQUIPMENT LOCATION & DETAILS REFER TO RELEVANT MECHANICAL DRAWINGS M-31-101 THROUGH M-31-305.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100

TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

STRUCTURAL

GRIT FACILITY PIER PLAN

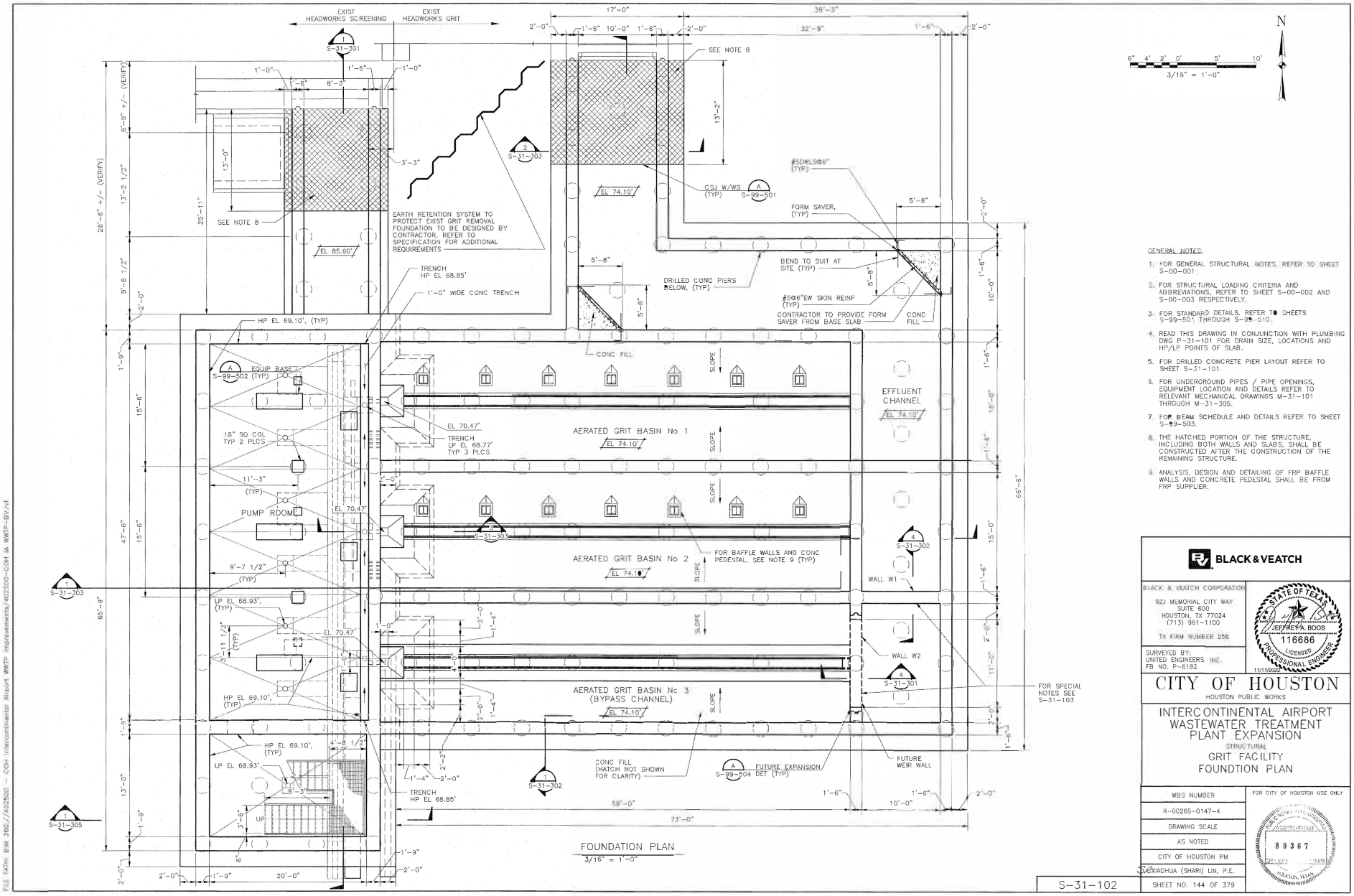
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	Se XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 143 OF 379	

FOR CITY OF HOUSTON USE ONLY

80367

S-31-101

FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-COH IA WWTP-BV.rvt



N

3/16" = 1'-0"

GENERAL NOTES:

1. FOR GENERAL STRUCTURAL NOTES, REFER TO SHEET S-00-001
2. FOR STRUCTURAL LOADING CRITERIA AND ABBREVIATIONS, REFER TO SHEET S-00-002 AND S-00-003 RESPECTIVELY.
3. FOR STANDARD DETAILS, REFER TO SHEETS S-99-501 THROUGH S-99-510.
4. READ THIS DRAWING IN CONJUNCTION WITH PLUMBING DWG P-31-101 FOR DRAIN SIZE, LOCATIONS AND HP/LP POINTS OF SLAB.
5. FOR DRILLED CONCRETE PIER LAYOUT REFER TO SHEET S-31-101
6. FOR UNDERGROUND PIPES / PIPE OPENINGS, EQUIPMENT LOCATION AND DETAILS REFER TO RELEVANT MECHANICAL DRAWINGS M-31-101 THROUGH M-31-305.
7. FOR BEAM SCHEDULE AND DETAILS REFER TO SHEET S-99-503.
8. THE HATCHED PORTION OF THE STRUCTURE, INCLUDING BOTH WALLS AND SLABS, SHALL BE CONSTRUCTED AFTER THE CONSTRUCTION OF THE REMAINING STRUCTURE.
9. ANALYSIS, DESIGN AND DETAILING OF FRP BAFFLE WALLS AND CONCRETE PEDESTAL SHALL BE FROM FRP SUPPLIER.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED
PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

STRUCTURAL

GRIT FACILITY FOUNDTION PLAN

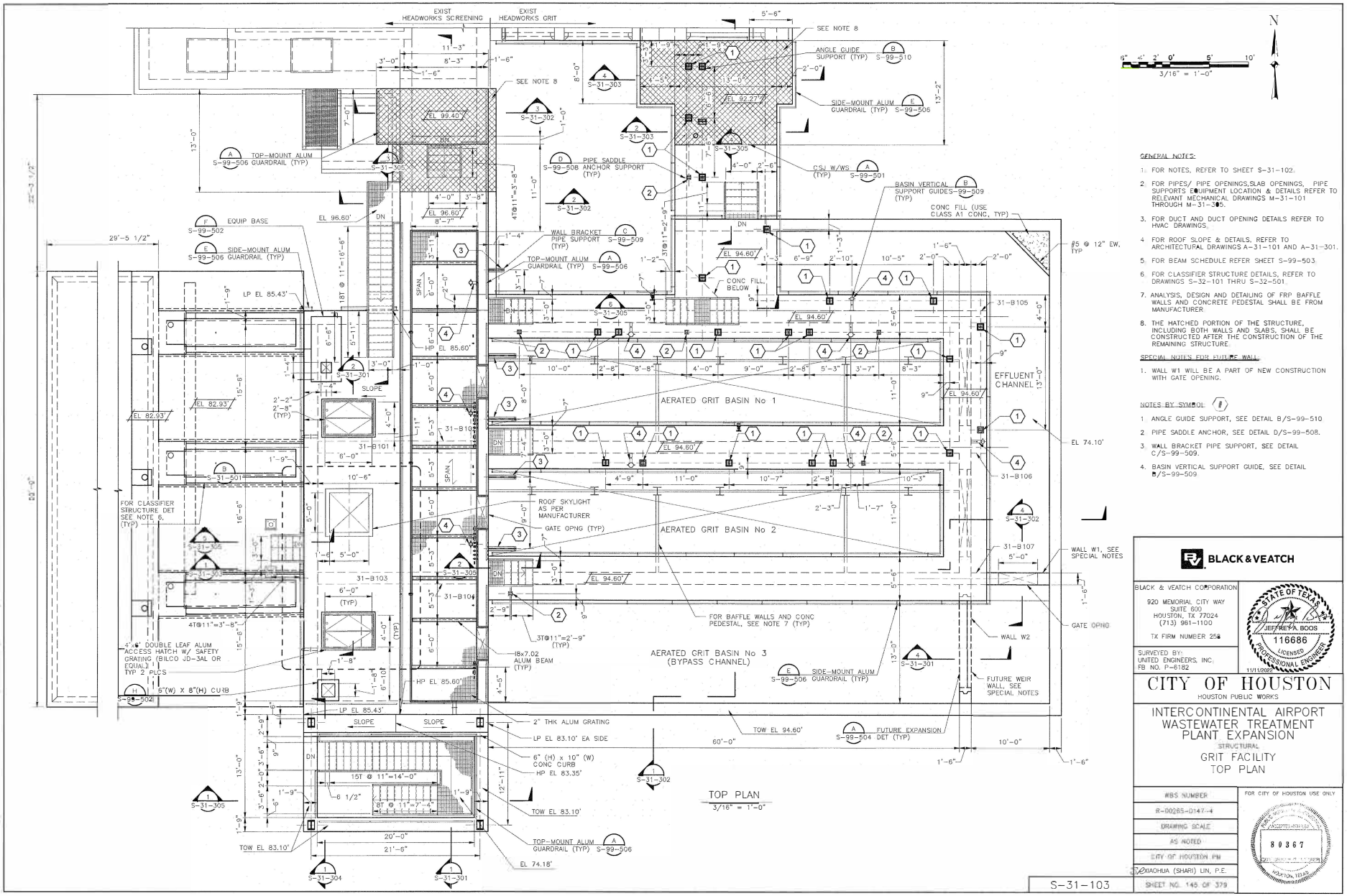
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 144 OF 379	

FOR CITY OF HOUSTON USE ONLY

80367

S-31-102

FILE PATH: BIM 360://A02500 - COH Interconinental Airport WWTP Improvements/A02500-COH IA WWTP-BV.rvt



GENERAL NOTES:

1. FOR NOTES, REFER TO SHEET S-31-102.
2. FOR PIPES/ PIPE OPENINGS,SLAB OPENINGS, PIPE SUPPORTS EQUIPMENT LOCATION & DETAILS REFER TO RELEVANT MECHANICAL DRAWINGS M-31-101 THROUGH M-31-305.
3. FOR DUCT AND DUCT OPENING DETAILS REFER TO HVAC DRAWINGS.
4. FOR ROOF SLOPE & DETAILS, REFER TO ARCHITECTURAL DRAWINGS A-31-101 AND A-31-301.
5. FOR BEAM SCHEDULE REFER SHEET S-99-503.
6. FOR CLASSIFIER STRUCTURE DETAILS, REFER TO DRAWINGS S-32-101 THRU S-32-501.
7. ANALYSIS, DESIGN AND DETAILING OF FRP BAFFLE WALLS AND CONCRETE PEDESTAL SHALL BE FROM MANUFACTURER.
8. THE HATCHED PORTION OF THE STRUCTURE, INCLUDING BOTH WALLS AND SLABS, SHALL BE CONSTRUCTED AFTER THE CONSTRUCTION OF THE REMAINING STRUCTURE.

SPECIAL NOTES FOR FUTURE WALL:

1. WALL W1 WILL BE A PART OF NEW CONSTRUCTION WITH GATE OPENING.

NOTES BY SYMBOL (#):

1. ANGLE GUIDE SUPPORT, SEE DETAIL B/S-99-510
2. PIPE SADDLE ANCHOR, SEE DETAIL D/S-99-508.
3. WALL BRACKET PIPE SUPPORT, SEE DETAIL C/S-99-509.
4. BASIN VERTICAL SUPPORT GUIDE, SEE DETAIL B/S-99-509.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 256

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

STRUCTURAL

GRIT FACILITY TOP PLAN

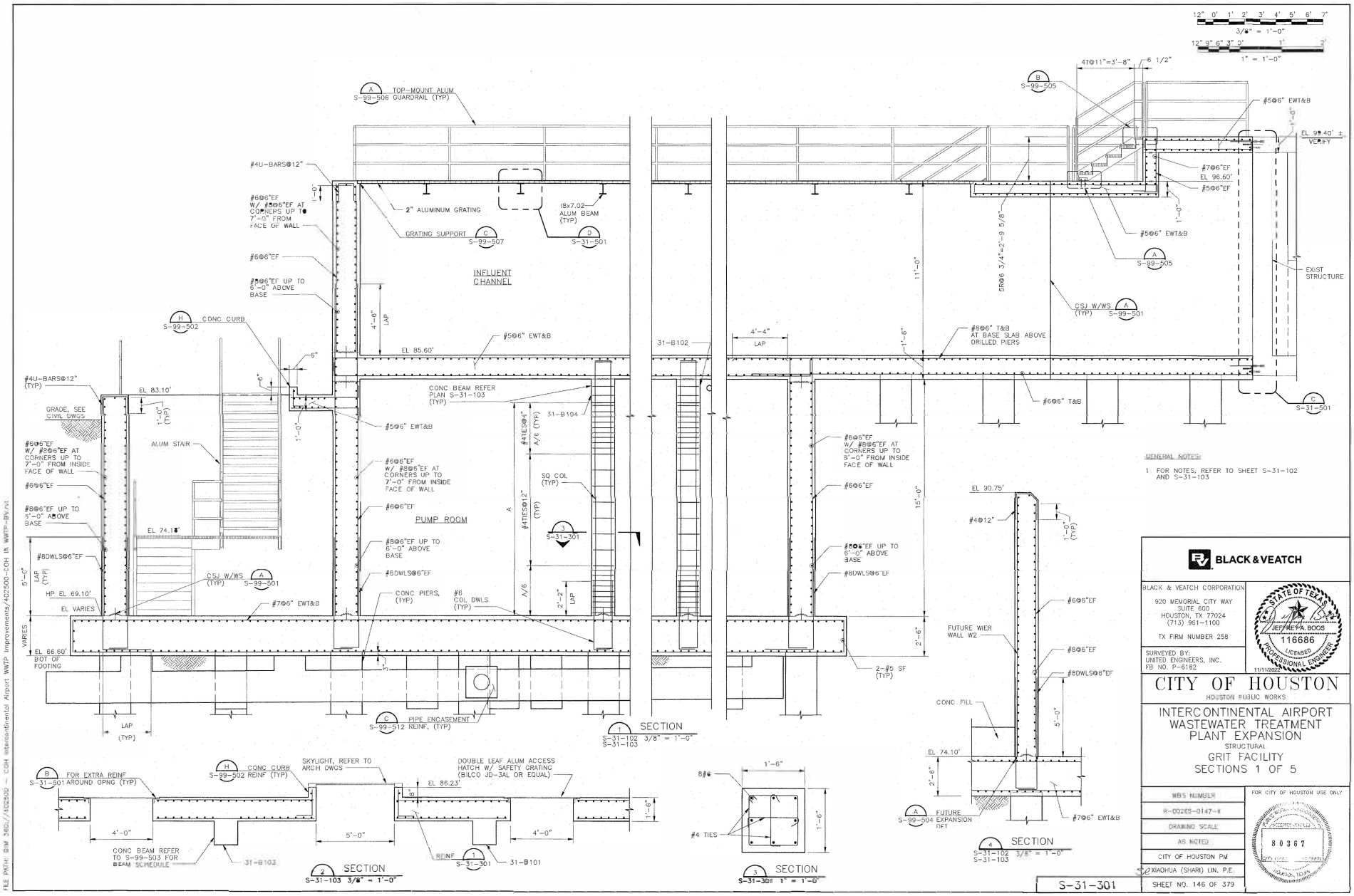
WBS NUMBER	R-00285-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 148 OF 379	

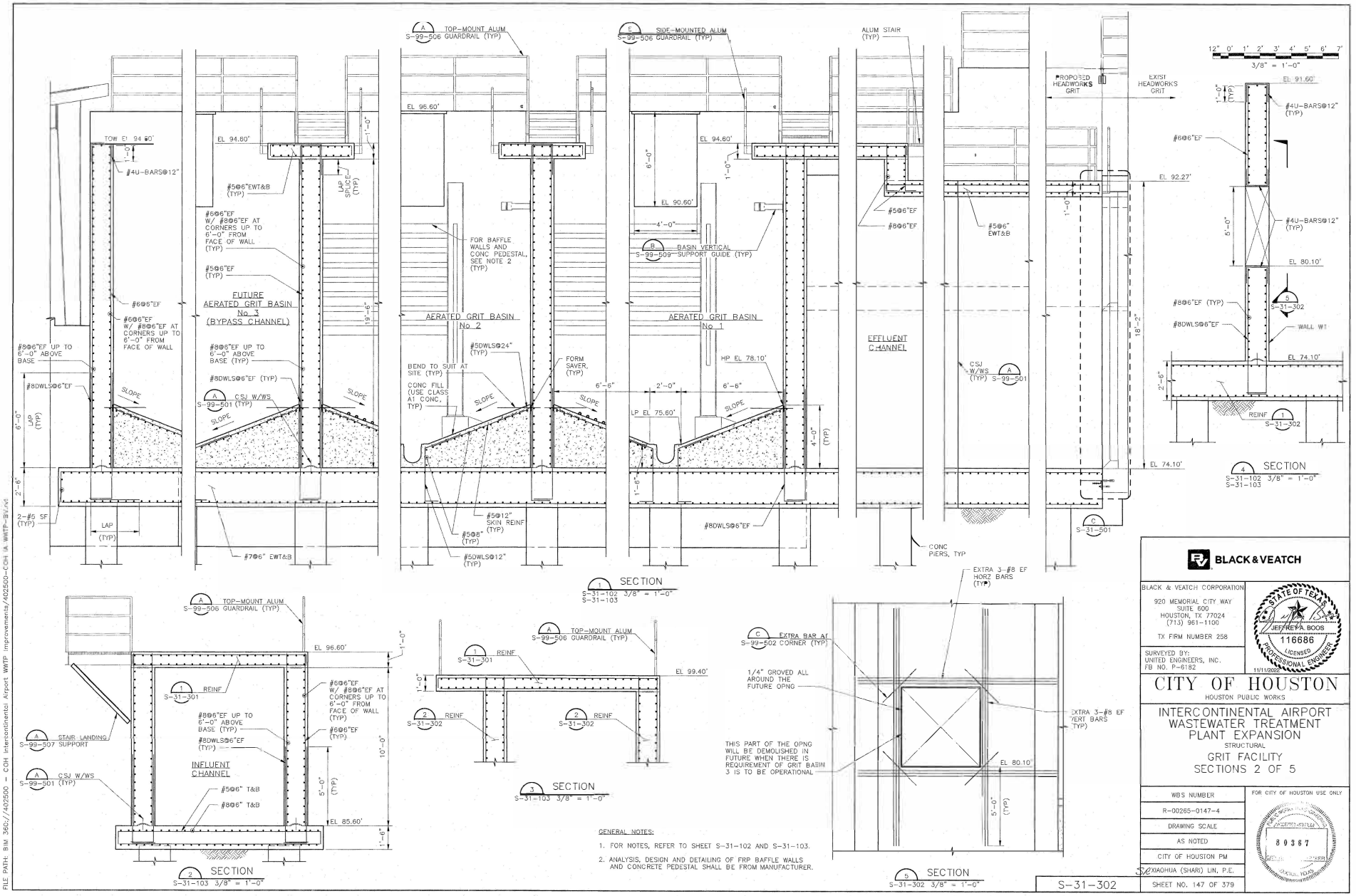
FOR CITY OF HOUSTON USE ONLY

ACCEPTED FOR CITY OF HOUSTON
80367
DATE 12/21

S-31-103

FILE PATH: BIM 360://402550 - COH Intercontinental Airport WWTP Improvements/402550-COH A WWTP-BV.rvt


TOP-MOUNT ALUM GUARDRAIL (TYP)
S-99-506
#4U-BARS@12"
#6@6"EF W/ #8@6"EF AT CORNERS UP TO 7'-0" FROM FACE OF WALL
#6@6"EF
#8@6"EF UP TO 6'-0" ABOVE BASE
2" ALUMINUM GRATING
GRATING SUPPORT
S-99-507
18x7.02 ALUM BEAM (TYP)
D
S-31-501
INFLUENT CHANNEL
CONC CURB
S-99-502
#5@6" EWT&B
EL 85.60'
31-B102
4'-6" LAP
EL 83.10'
GRADE, SEE CIVIL DWGS
ALUM STAIR
CONC BEAM REFER PLAN S-31-103 (TYP)
31-B104
#4TIES@4" A/6 (TYP)
#4TIES@12" (TYP)
SQ COL (TYP)
PUMP ROOM
#8@6"EF UP TO 6'-0" ABOVE BASE
#8DWLS@6"EF
EL 74.18'
CSJ W/WS (TYP)
A
S-99-501
#7@6" EWT&B
CONC PIERS, (TYP)
#6 COL DWLS (TYP)
HP EL 69.10'
EL VARIES
VARIES
EL 66.60' BOT OF FOOTING
LAP (TYP)
PIPE ENCASEMENT
S-99-512 REINF. (TYP)
3
S-31-301
SECTION
S-31-102 3/8" = 1'-0"
S-31-103
B
S-99-505
4T@11"=3'-8"
6 1/2"
#5@6" EWT&B
EL 98.40' ± VERIFY
#7@6"EF
EL 96.60'
#5@6"EF
5R@6 3/4"=2'-9 5/8"
11'-0"
EXIST STRUCTURE
4'-4" LAP
#8@6" T&B AT BASE SLAB ABOVE DRILLED PIERS
#6@6" T&B
15'-0"
2'-6"
2-#5 SF (TYP)
FUTURE WIER WALL W2
EL 90.75'
#4@12"
#5@6"EF UP TO 6'-0" ABOVE BASE
#8DWLS@6"EF
#6@6"EF
#8@6"EF
5'-0"
CONC FILL
EL 74.10'
FUTURE EXPANSION DET
S-99-504
SECTION
S-31-102 3/8" = 1'-0"
S-31-103
GENERAL NOTES:
1. FOR NOTES, REFER TO SHEET S-31-102 AND S-31-103
FOR EXTRA REINF AROUND OPNG (TYP)
S-31-501
CONC CURB
S-99-502 REINF (TYP)
SKYLIGHT, REFER TO ARCH DWGS
DOUBLE LEAF ALUM ACCESS HATCH W/ SAFETY GRATING (BILCO JD-3AL OR EQUAL)
EL 86.23'
4'-0"
5'-0"
4'-0"
CONC BEAM REFER TO S-99-503 FOR BEAM SCHEDULE
31-B103
REINF
1
S-31-301
31-B101
SECTION
S-31-103 3/8" = 1'-0"
8#8
#4 TIES
1'-6"
SECTION
S-31-301 1" = 1'-0"
BLACK & VEATCH
BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258
SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182
STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED
PROFESSIONAL ENGINEER
11/11/2022
CITY OF HOUSTON
HOUSTON PUBLIC WORKS
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
STRUCTURAL
GRIT FACILITY
SECTIONS 1 OF 5
WBS NUMBER
R-00265-0147-4
DRAWING SCALE
AS NOTED
CITY OF HOUSTON PM
XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 146 OF 379
FOR CITY OF HOUSTON USE ONLY
80367
S-31-301
FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-COH IA WWTP-BV.rvt



GENERAL NOTES:

1. FOR NOTES, REFER TO SHEET S-31-102 AND S-31-103.
2. ANALYSIS, DESIGN AND DETAILING OF FRP BAFFLE WALLS AND CONCRETE PEDESTAL SHALL BE FROM MANUFACTURER.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED
PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

STRUCTURAL

GRIT FACILITY SECTIONS 2 OF 5

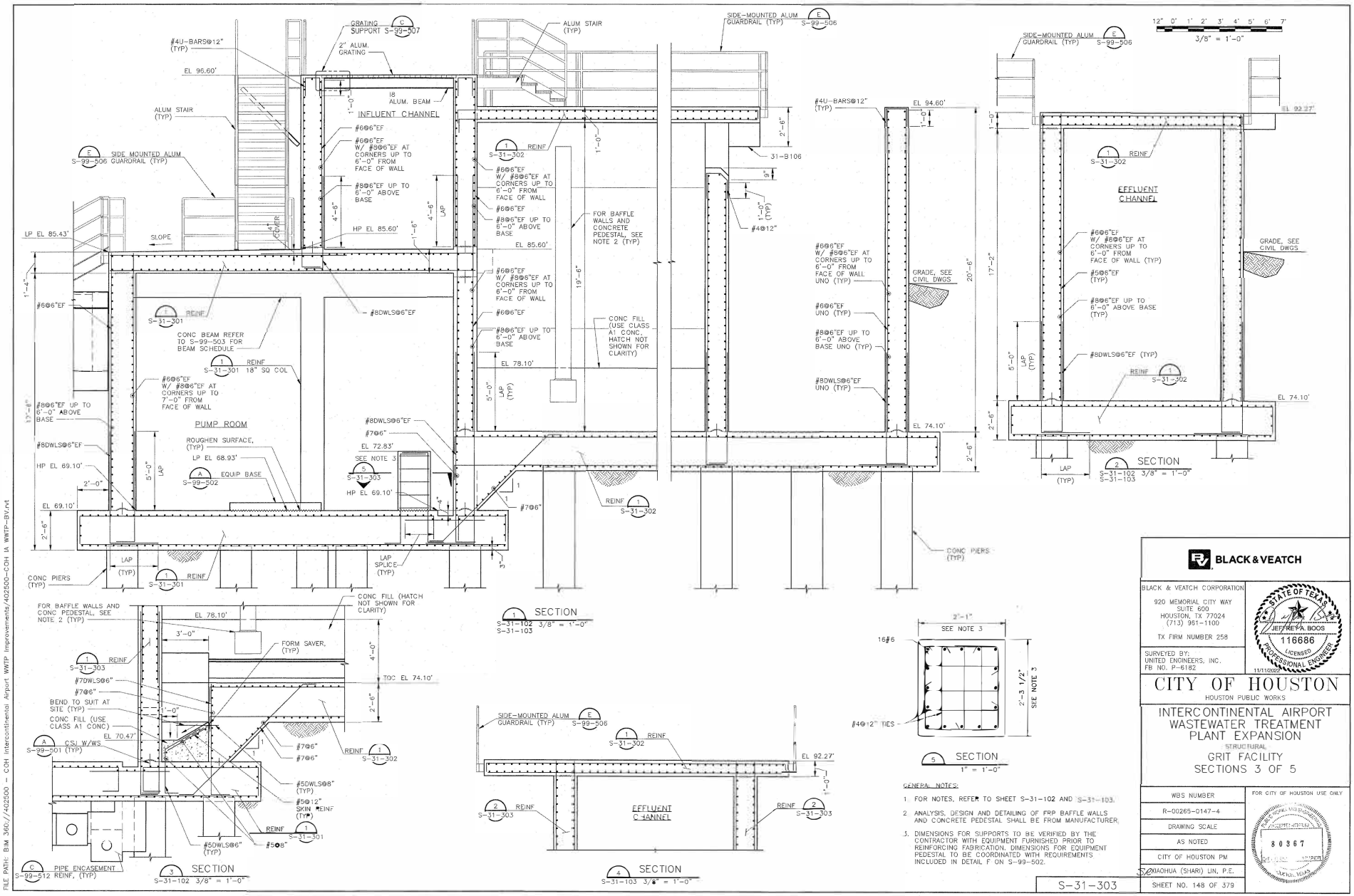
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 147 OF 379	

FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
89367
REGISTERED
ENGINEER
XIAOHUA LIN
11/11/2022

S-31-302

FILE PATH: BIM 360://402500 - COH intercontinental Airport WWTP improvements/402500-COH IA WWTP-STRUCT



FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-COH IA WWTP-BV.rvt

GENERAL NOTES:

1. FOR NOTES, REFER TO SHEET S-31-102 AND S-31-103.
2. ANALYSIS, DESIGN AND DETAILING OF FRP BAFFLE WALLS AND CONCRETE PEDESTAL SHALL BE FROM MANUFACTURER.
3. DIMENSIONS FOR SUPPORTS TO BE VERIFIED BY THE CONTRACTOR WITH EQUIPMENT FURNISHED PRIOR TO REINFORCING FABRICATION. DIMENSIONS FOR EQUIPMENT PEDESTAL TO BE COORDINATED WITH REQUIREMENTS INCLUDED IN DETAIL F ON S-99-502.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED PROFESSIONAL ENGINEER
11/13/2025

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

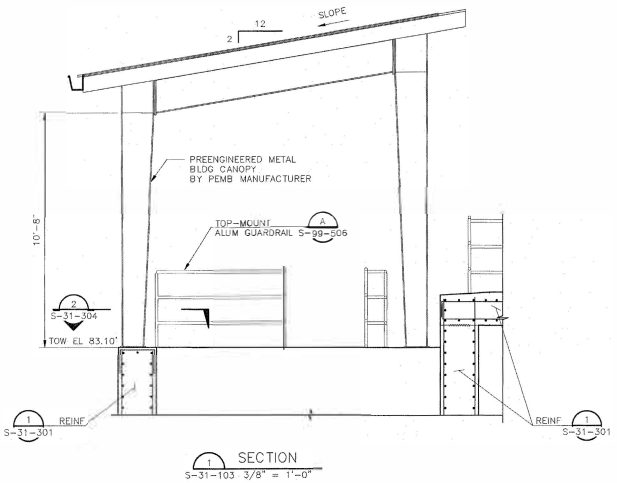
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
STRUCTURAL

GRIT FACILITY SECTIONS 3 OF 5

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 148 OF 379	S-31-303

FOR CITY OF HOUSTON USE ONLY

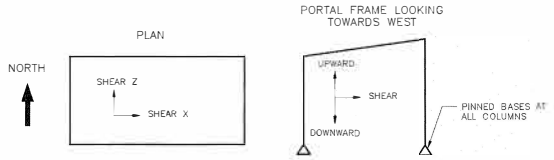
STATE OF TEXAS
80367
REGISTERED



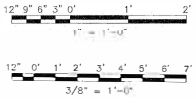
1 SECTION
S-31-103 3/8" = 1'-0"

BUILDING LOADS TO FOUNDATION				
COLUMN LOCATION	DOWNWARD (KIPS)	UPWARD (KIPS)	SHEAR X E/W (KIPS)	SHEAR Z E/W (KIPS)
ALL 4 STEEL COLUMNS	17	-8	±8	±2

1. FOUNDATIONS HAVE BEEN DESIGNED FOR THE SERVICE LOAD COMBINATIONS INDICATED IN THE TABLE. THE INDICATED LOADS ARE THOSE FROM THE BUILDING TO THE FOUNDATION.
2. CONSTRUCTION OF FOUNDATIONS SHALL NOT BEGIN UNTIL ENGINEER HAS REVIEWED ALL PEMB SUBMITTAL DRAWINGS AND ANY ANCHORAGE AND FOUNDATION MODIFICATIONS HAVE BEEN PROVIDED TO MANUFACTURER / CONTRACTOR.
3. SPANDREL BEAMS SHALL BE DESIGNED BY THE PEMB MANUFACTURER.



BUILDING LOADS TO FOUNDATION

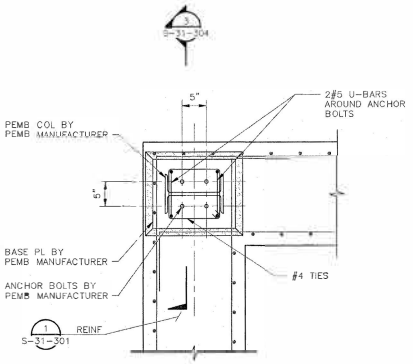


LEGEND

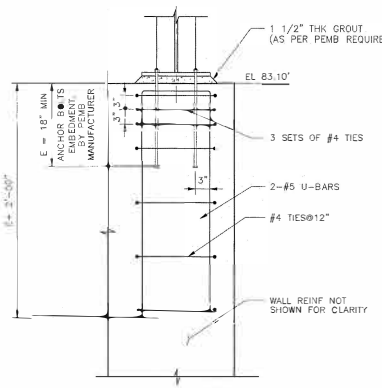
PEMB = PRE-ENGINEERED METAL BUILDING

GENERAL NOTES:

1. FOR NOTES, REFER TO SHEET S-31-102 AND S-31-103.



2 SECTION
S-31-304 1" = 1'-0"



3 SECTION
S-31-304 1" = 1'-0"

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED
PROFESSIONAL ENGINEER
11/11/2020

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
STRUCTURAL
GRIT FACILITY
SECTIONS 4 OF 5

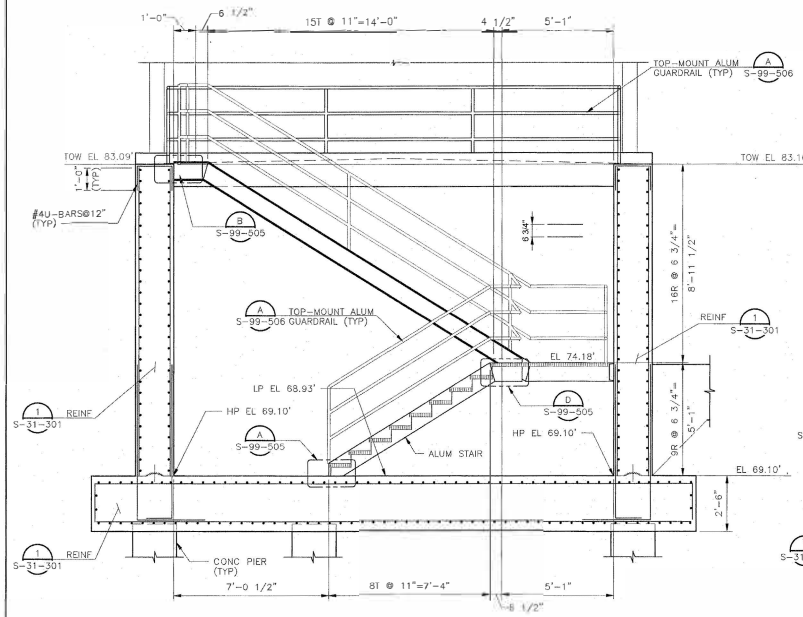
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 149 OF 379	

FOR CITY OF HOUSTON USE ONLY

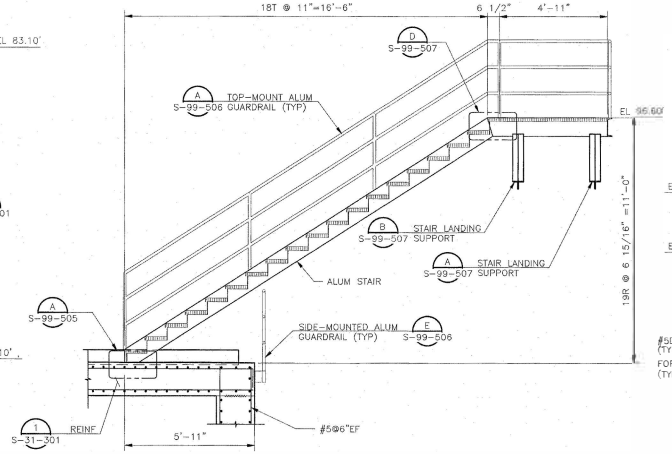
PUBLIC WORKS AND ENGINEERING
ACCEPTED AS NOTED
80367
CITY OF HOUSTON, TEXAS

S-31-304

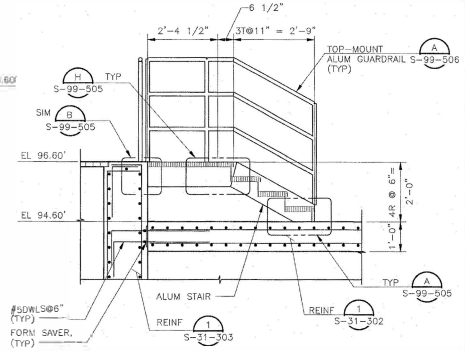
FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-COH IA WWTP-BV.rvt



1 SECTION
S-31-102 3/8" = 1'-0"
S-31-103



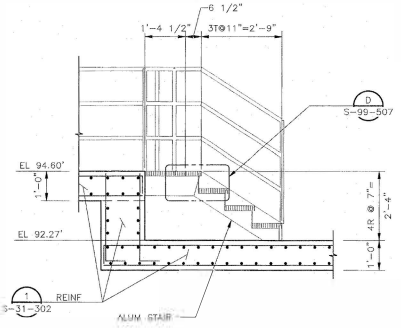
3 SECTION
S-31-103 3/8" = 1'-0"



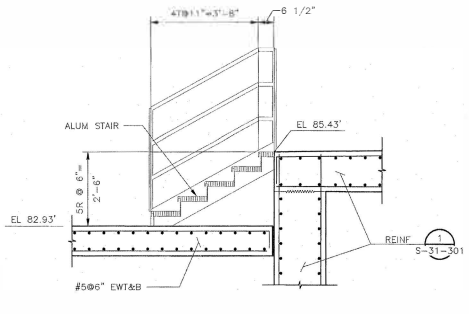
2 SECTION
S-31-103 1/2" = 1'-0"

GENERAL NOTES:

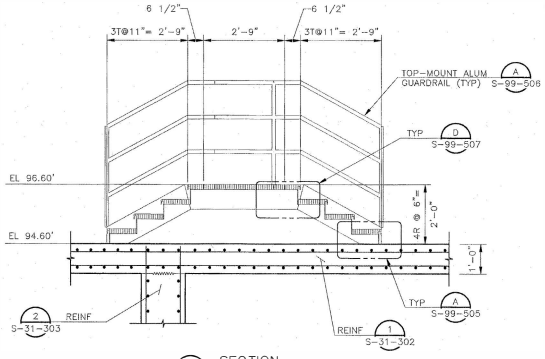
1. ALL STAIRS ARE ALUM MATERIAL & IN THE SCOPE OF STAIR CONTRACTOR.
2. FOR NOTES, REFER TO SHEET S-31-102 AND S-31-103.



4 SECTION
S-31-103 1/2" = 1'-0"



5 SECTION
S-31-103 1/2" = 1'-0"



6 SECTION
S-31-103 1/2" = 1'-0"

S-31-305

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 256

SURVEYED BY:
UNIFIED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED
PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

STRUCTURAL

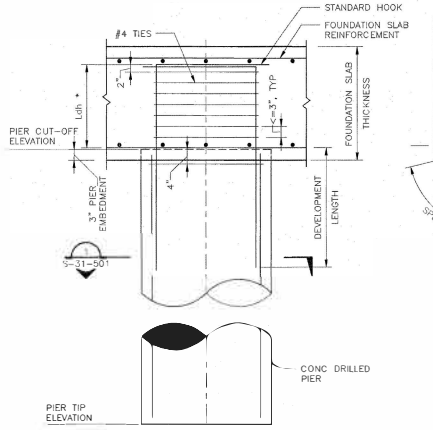
GRIT FACILITY SECTIONS 5 OF 5

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 159 OF 379	

FOR CITY OF HOUSTON USE ONLY

80367

FILE PATH: B:\at 365\402500 - COH Intercontinental Airport WWTF Improvements\402500-CO-1 IA WWTF-BV.rvt

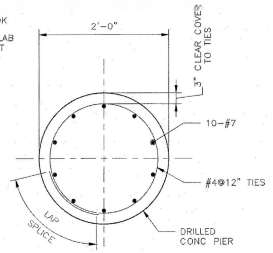


ELEVATION

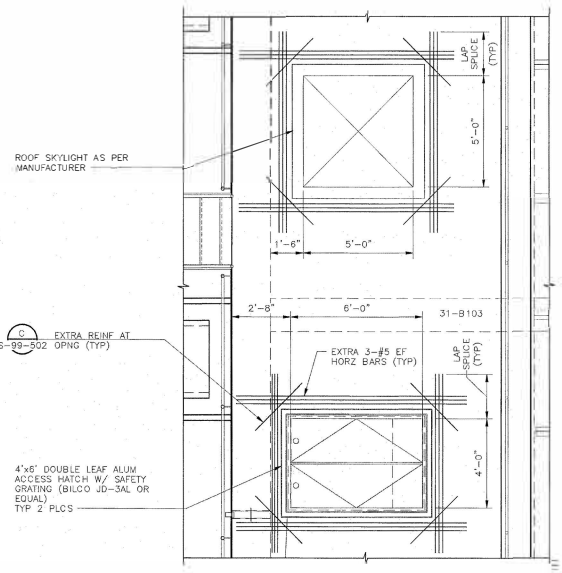
NOTES:

1. FOR PIER CAPACITIES AND OTHER DETAILS SEE PIER TABLE ON SHEET NO S-31-101
2. REINFORCEMENT EXTENDING IN TO FOUNDATION SLAB TO MATCH PIER REINFORCEMENT
3. REFER TO SHEET S-99-502 FOR DEVELOPMENT LENGTH
4. FOR PIER LOCATIONS AND NUMBERING, REFER TO PIER LAYOUT SHEET S-31-101.
5. REINFORCING SPACING MAY BE ADJUSTED TO AVOID PIER INTERFERENCE MAX SPACING BETWEEN PARALLEL REINFORCING IN A GIVEN LAYER SHALL NOT EXCEED 6" OC.
6. ALL REINFORCING BARS SHALL BE GRADE 60, DEFORMED, ASTM A615.
7. LOCATION OF NEW PIERS SHALL BE APPROVED BY ENGINEER PRIOR TO DRILLING.

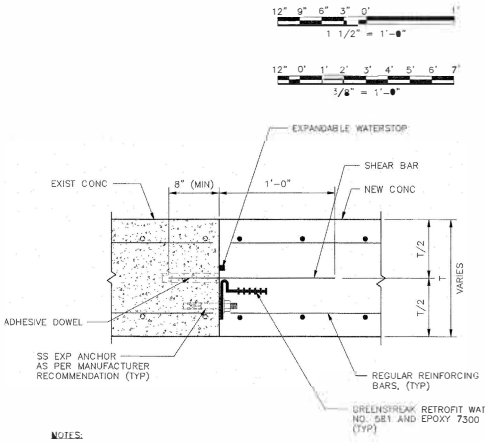
A TYPICAL PIER HEAD DETAIL
NO SCALE



1 SECTION
S-31-501 3/4" = 1'-0"



B DETAIL
S-31-103 3/8" = 1'-0"



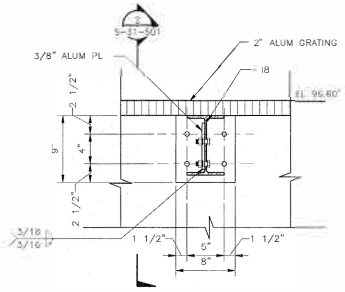
NOTES:

1. PROVIDE #5 BARS @18" CTRS ACROSS JOINT UNO.
2. REINFORCING STEEL SHALL NOT BE EXTENDED ACROSS JOINT UNO

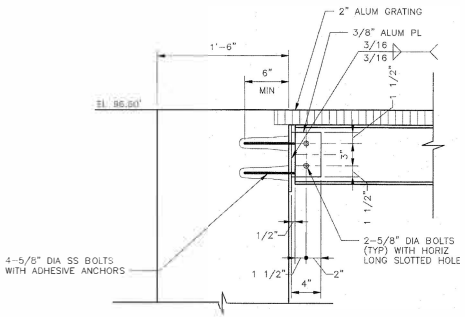
C WALL/SLAB RETROFIT
NO SCALE

GENERAL NOTES:

1. FOR NOTES, REFER TO SHEET S-31-102 AND S-31-103



A DETAIL
S-31-301 1 1/2" = 1'-0"



2 SECTION
1 1/2" = 1'-0"

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED
PROFESSIONAL ENGINEER
11/11/2005

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

STRUCTURAL
DETAILS

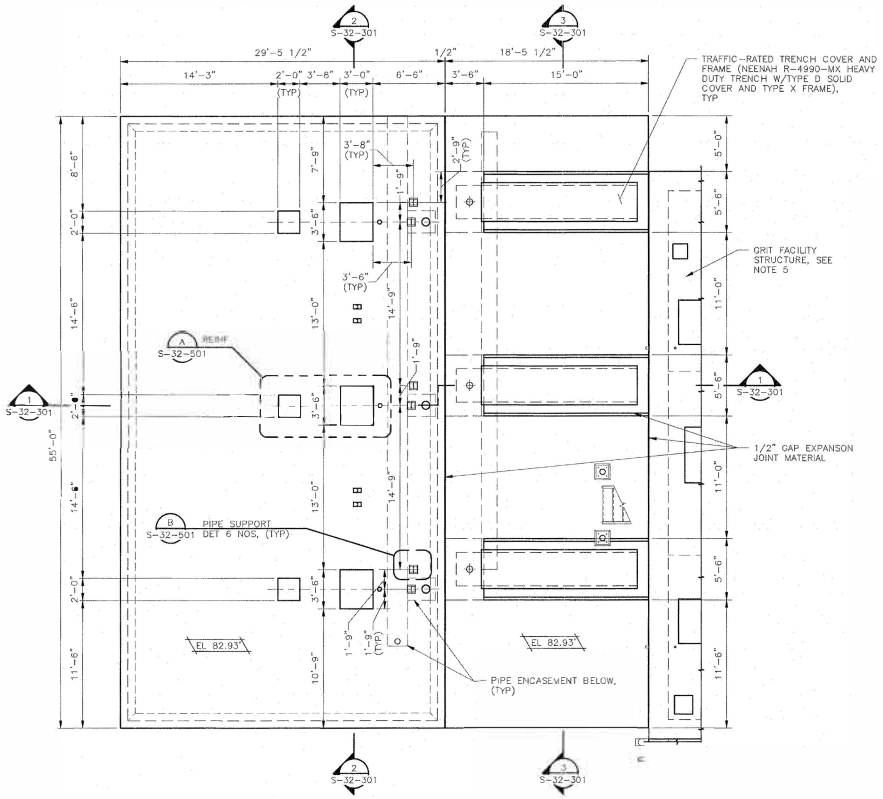
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.

FOR CITY OF HOUSTON USE ONLY
80367

S-31-501

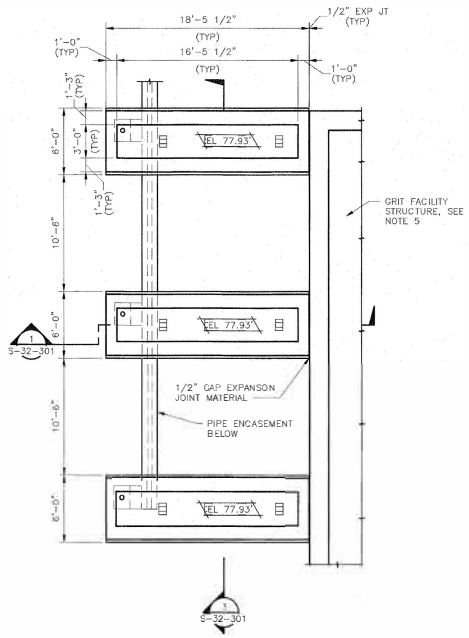
SHEET NO. 151 OF 379

FILE PATH: BW 360://4029500 - COH Intercontinental Airport WWTP Improvements/4029500-COH IA WWTP-BW.cnt



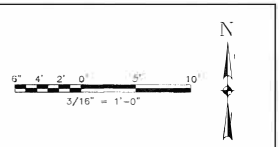
GRIT CLASSIFIER AREA – PLAN AT EL 82.93'

3/16" = 1'-0"



GRIT CLASSIFIER AREA – PLAN AT EL 77.93'

3/16" = 1'-0"



GENERAL NOTES:

1. FOR GENERAL STRUCTURAL NOTES, REFER TO SHEET S-00-001
2. FOR STRUCTURAL LOADING CRITERIA AND ABBREVIATIONS, REFER TO SHEET S-00-002 & S-00-003 RESPECTIVELY.
3. FOR STANDARD DETAILS, REFER TO SHEET S-99-501 THROUGH S-99-510
4. FOR UNDERGROUND PIPES / PIPE OPENINGS, EQUIPMENT LOCATION & DETAILS REFER TO RELEVANT MECHANICAL DRAWINGS.
5. FOR GRIT FACILITY STRUCTURE, REFER TO SHEETS S-31-101 THRU S-31-501

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED
PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

STRUCTURAL

GRIT CLASSIFIER AREA PLAN

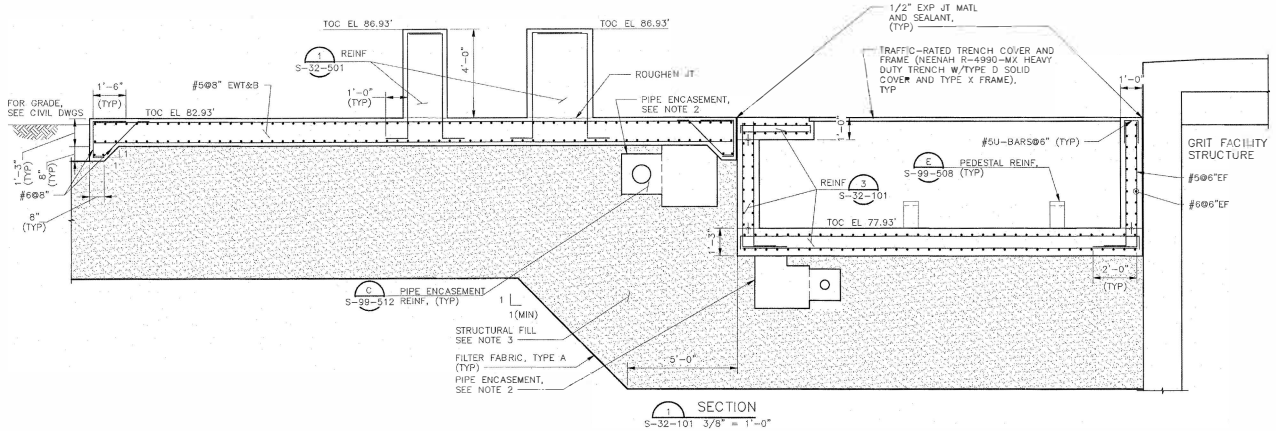
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 152 OF 379	

FOR CITY OF HOUSTON USE ONLY

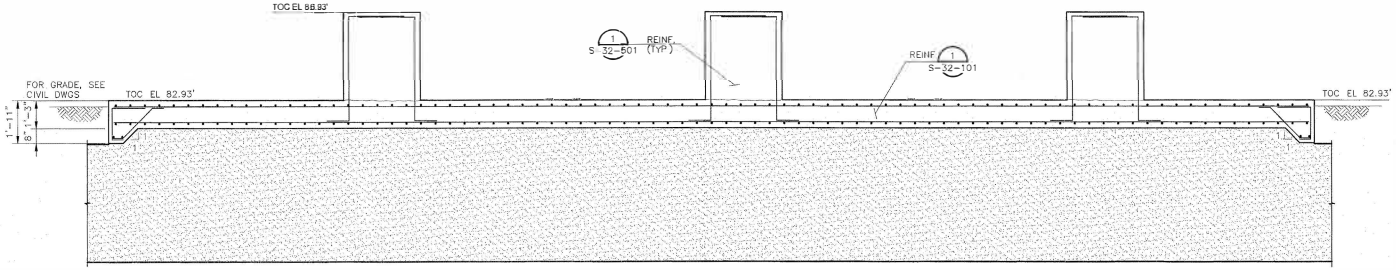
80367

S-32-101

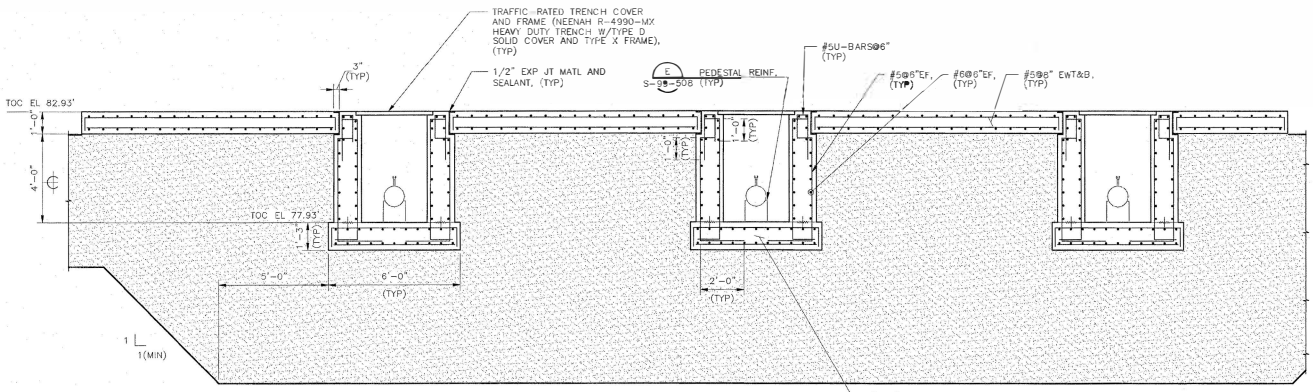
FILE PATH: BIM 360:///402500 - COH Intercontinental Airport WWTP Improvements/402500-COH IA WWTP-BV.rvt



1 SECTION
S-32-101 3/8" = 1'-0"



2 SECTION
S-32-101 3/8" = 1'-0"



3 SECTION
S-32-101 3/8" = 1'-0"

12" 0' 1' 2' 3' 4' 5' 6' 7'
3/8" = 1'-0"

GENERAL NOTES:

1. FOR NOTES, REFER TO SHEET S-32-101.
2. IN NO CASE SHALL PIPE ENCASEMENT BE CONNECTED TO ANY STRUCTURAL MEMBERS WITHOUT PRIOR APPROVAL FROM THE ENGINEER.
3. REMOVE AND REPLACE EXISTING SOILS WITH STRUCTURE BACKFILL TO A DEPTH OF 6'-0" BELOW FOUNDATION AND EXTENDING 5'-0", EACH SIDE, BEYOND THE FOOTPRINT OF THE FOUNDATION AND SLOPING UP TOWARDS GRADE AT A 1 TO 1 SLOPE. PROVIDE FILTER FABRIC TYPE A BELOW STRUCTURE BACKFILL.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100

TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED
PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
STRUCTURAL

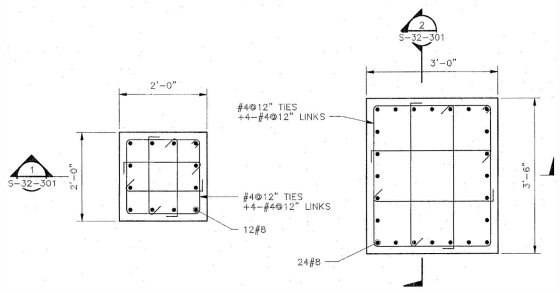
GRIT CLASSIFIER AREA SECTIONS

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 153 OF 379	

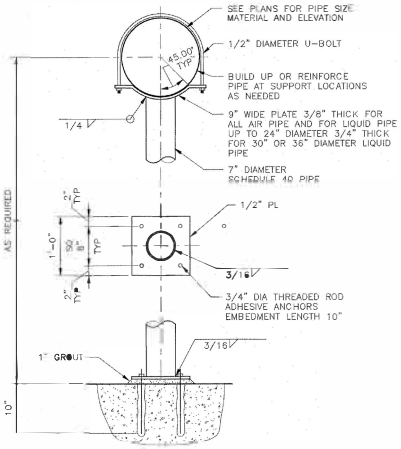
80367
REGISTERED
PROFESSIONAL
ENGINEER

S-32-301

FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-C3H-IA_WWTP-REV.rvt



A DETAIL
S-32-101 3/4" = 1'-0"



NOTE:

ALL MATERIALS TO BE HOT-DIPPED GALVANIZED, UNO

B DETAIL - VERTICAL SUPPORT GUIDE
S-32-101 1" = 1'-0"

12" 6" 0" 1' 2' 3'
3/4" = 1'-0"

12" 9" 6" 3" 0" 1' 2'
1" = 1'-0"

GENERAL NOTES:

1. FOR NOTES, REFER TO SHEET S-31-102 AND S-31-103.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100

TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

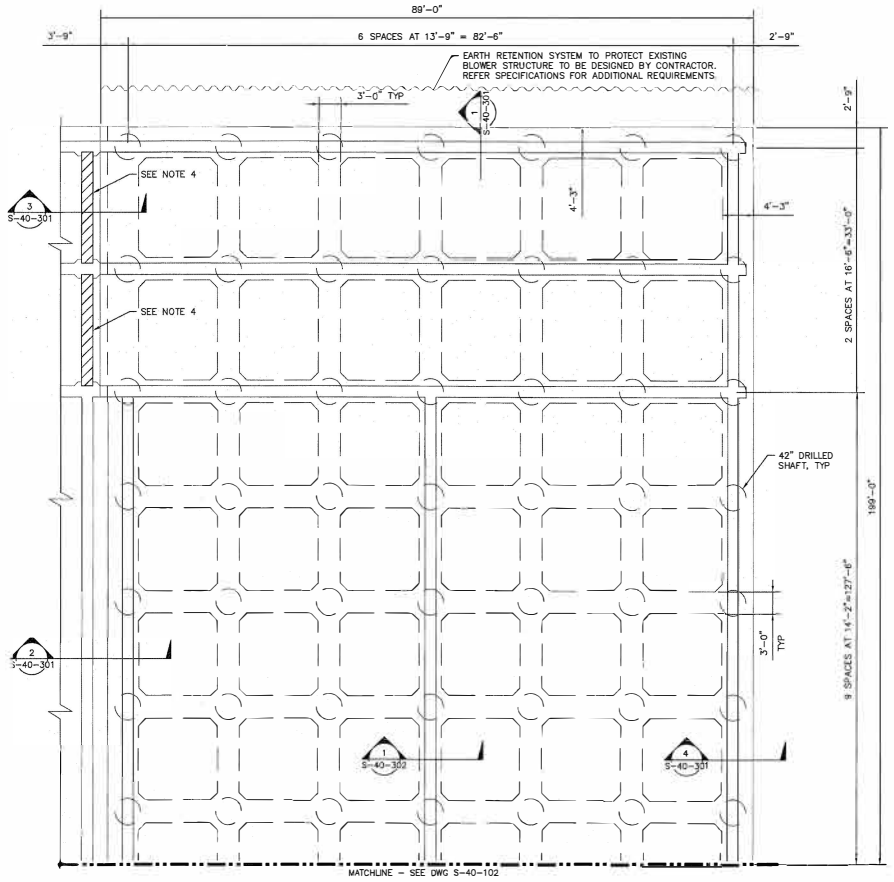
INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT
PLANT EXPANSION
STRUCTURAL
GRIT CLASSIFIER AREA
DETAILS

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.

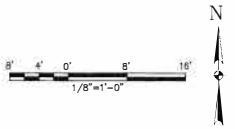
FOR CITY OF HOUSTON USE ONLY
80367

S-32-501 SHEET NO. 154 OF 378

FILE PATH: Bim 360://4235/0 - COH Intercontinental Airport WWTP Improvements/402500-COH IA WWTP-BV.rvt



AERATION BASINS – FOUNDATION PLAN
1/8" = 1'-0"



GENERAL NOTES:

1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND EXISTING CONDITIONS AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION OR ORDERING MATERIALS.
2. REFER TO CIVIL, MECHANICAL, AND ELECTRICAL PLANS FOR INFORMATION NOT SHOWN.
3. REFER TO STRUCTURAL GENERAL NOTES AND STANDARD DETAILS FOR MORE INFORMATION.
4. UPON COMPLETION OF CONSTRUCTION OF BASINS 9&10, DEMOLISH EXISTING WALLS BETWEEN INFLUENT AND MLSS CHANNELS.

CP&Y, INC.
TEXAS REGISTERED ENGINEERING FIRM F-1741

BLACK & VEATCH

CP&Y, INC.
11757 KATY FREEWAY
SUITE 1540
HOUSTON, TX 77079
(713) 532-1730
TX FIRM NUMBER F-1741

SURVEYED BY:
FB NO. 000000

STATE OF TEXAS
JEFFREY P. WOUTERS
80701
REGISTERED PROFESSIONAL ENGINEER
11-07-2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

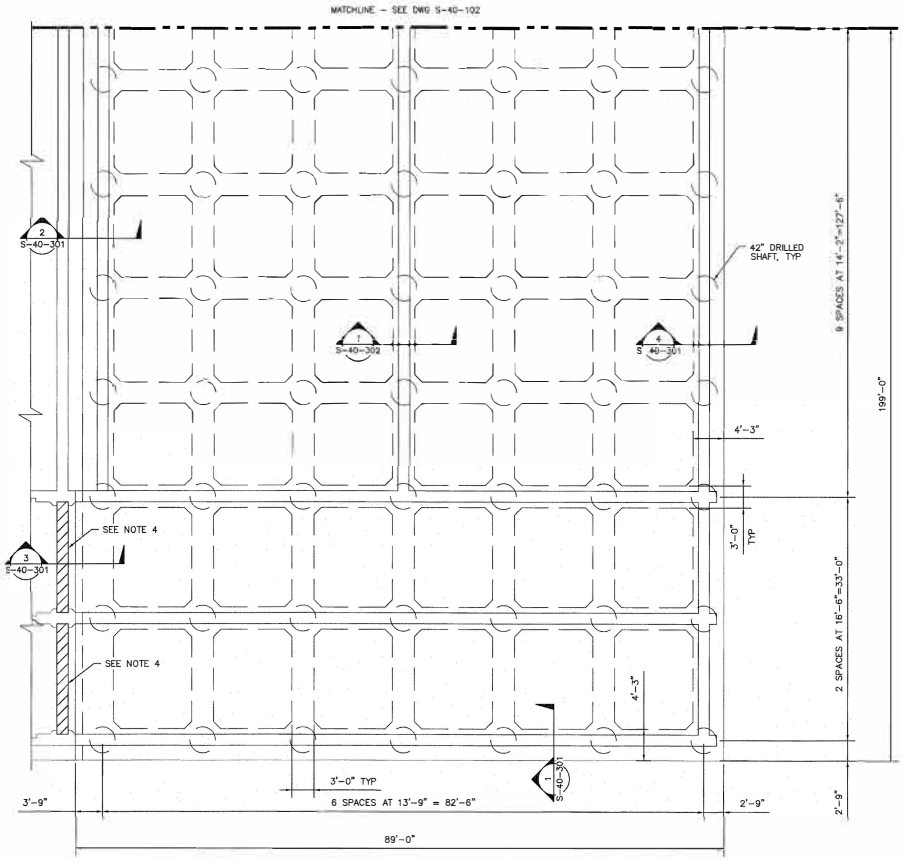
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
STRUCTURAL
AERATION BASINS
FOUNDATION PLAN 1 OF 2

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 155 OF 379	

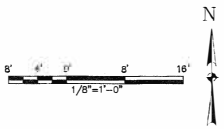
80367

S-40-101

FILE PATH: c:\pw_working\bvw_americas\d1366538\S-40-101.dwg



AERATION BASINS – FOUNDATION PLAN
1/8" = 1'-0"



GENERAL NOTES:

1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND EXISTING CONDITIONS AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION OR ORDERING MATERIALS.
2. REFER TO CIVIL, MECHANICAL, AND ELECTRICAL PLANS FOR INFORMATION NOT SHOWN.
3. REFER TO STRUCTURAL GENERAL NOTES AND STANDARD DETAILS FOR MORE INFORMATION.
4. UPON COMPLETION OF CONSTRUCTION OF BASINS 9&10, DEMOLISH EXISTING WALLS BETWEEN INFLUENT AND MLSS CHANNELS.

CP&Y, INC.
TEXAS REGISTERED ENGINEERING FIRM F-1741

BLACK & VEATCH

CP&Y, INC.
11757 KATY FREEWAY
SUITE 1540
HOUSTON, TX 77079
(713) 532-1730
TX FIRM NUMBER F-1741

SURVEYED BY:
FB NO. 000000

STATE OF TEXAS
JEFFREY P. WOUTERS
80701
REGISTERED PROFESSIONAL ENGINEER
11-07-2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
STRUCTURAL

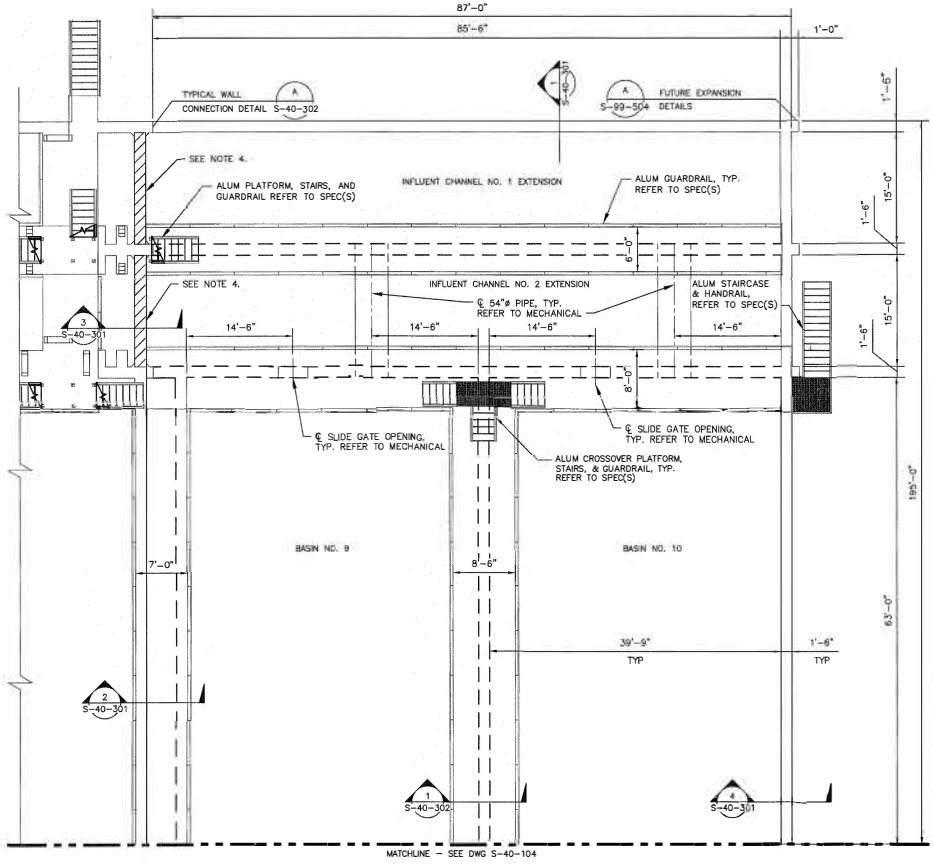
AERATION BASINS FOUNDATION PLAN 2 OF 2

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SEXIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 156 OF 379	

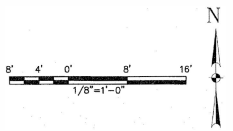
80367

S-40-102

FILE PATH: C:\pw_working\pw_americas\d1366538\S-40-102.dwg



AERATION BASINS – TOP PLAN
1/8" = 1'-0"



GENERAL NOTES:

1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND EXISTING CONDITIONS AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION OR ORDERING MATERIALS.
2. REFER TO CIVIL, MECHANICAL, AND ELECTRICAL PLANS FOR INFORMATION NOT SHOWN.
3. REFER TO STRUCTURAL GENERAL NOTES AND STANDARD DETAILS FOR MORE INFORMATION.
4. UPON COMPLETION OF CONSTRUCTION OF BASINS 9&10, DEMOLISH EXISTING WALLS BETWEEN INFLUENT, RASS, AND MLSS CHANNELS.

CP&Y, INC.
TEXAS REGISTERED ENGINEERING FIRM F-1741

BLACK & VEATCH

CP&Y, INC.
11757 KATY FREEWAY
SUITE 1540
HOUSTON, TX 77079
(713) 532-1730
TX FIRM NUMBER F-1741

SURVEYED BY:
FB NO. 000000

STATE OF TEXAS
JEFFREY P. WOUTERS
80701
REGISTERED PROFESSIONAL ENGINEER
02-28-2023

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

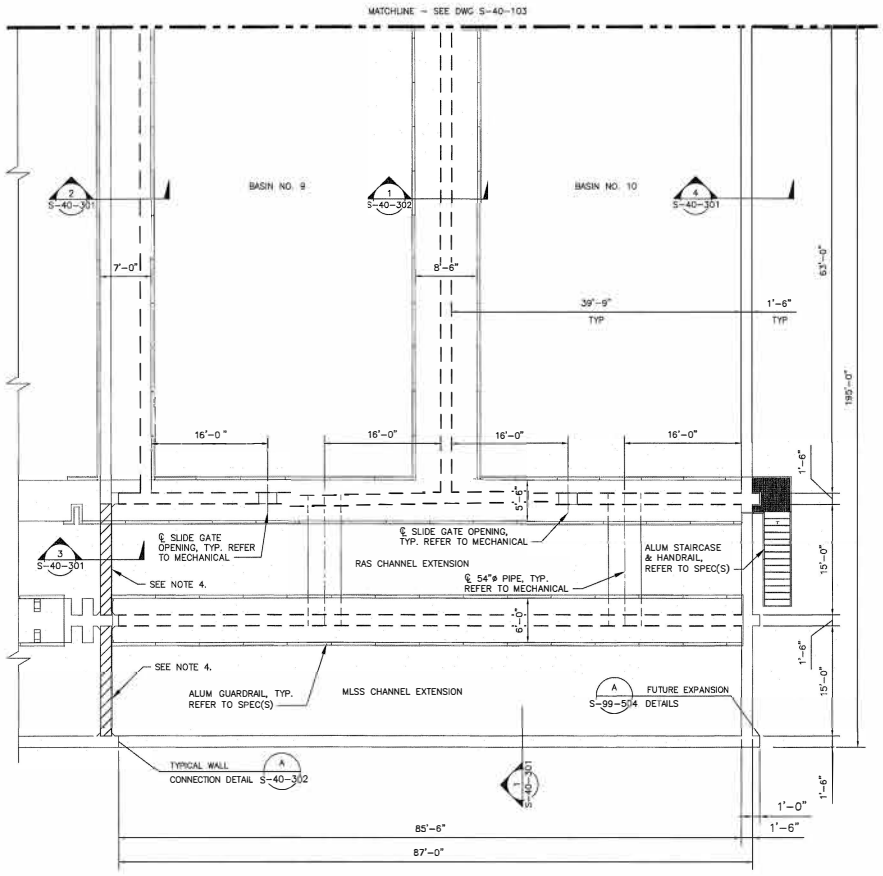
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
STRUCTURAL
AERATION BASINS
TOP PLAN
1 OF 2

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	Se XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 157 OF 379	

FOR CITY OF HOUSTON USE ONLY
80367

S-40-103

FILE PATH: C:\pw_working\pwm_americas\d1356636\S-40-103.dwg



AERATION BASINS – TOP PLAN
1/8" = 1'-0"

8' 4' 0' 8' 16'
1/8"=1'-0"

N

GENERAL NOTES:

1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND EXISTING CONDITIONS AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION OR ORDERING MATERIALS.
2. REFER TO CIVIL, MECHANICAL, AND ELECTRICAL PLANS FOR INFORMATION NOT SHOWN.
3. REFER TO STRUCTURAL GENERAL NOTES AND STANDARD DETAILS FOR MORE INFORMATION.
4. UPON COMPLETION OF CONSTRUCTION OF BASINS 9&10, DEMOLISH EXISTING WALLS BETWEEN INFLUENT, RASS, AND MLSS CHANNELS.

CP&Y, INC.
TEXAS REGISTERED ENGINEERING FIRM F-1741

BLACK & VEATCH

CP&Y, INC.
11757 KATY FREEWAY
SUITE 1540
HOUSTON, TX 77079
(713) 532-1730
TX FIRM NUMBER F-1741

SURVEYED BY:
FB NO. 000000

STATE OF TEXAS
JEFFREY P. WOUTERS
80701
REGISTERED PROFESSIONAL ENGINEER
02-28-2023

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
STRUCTURAL

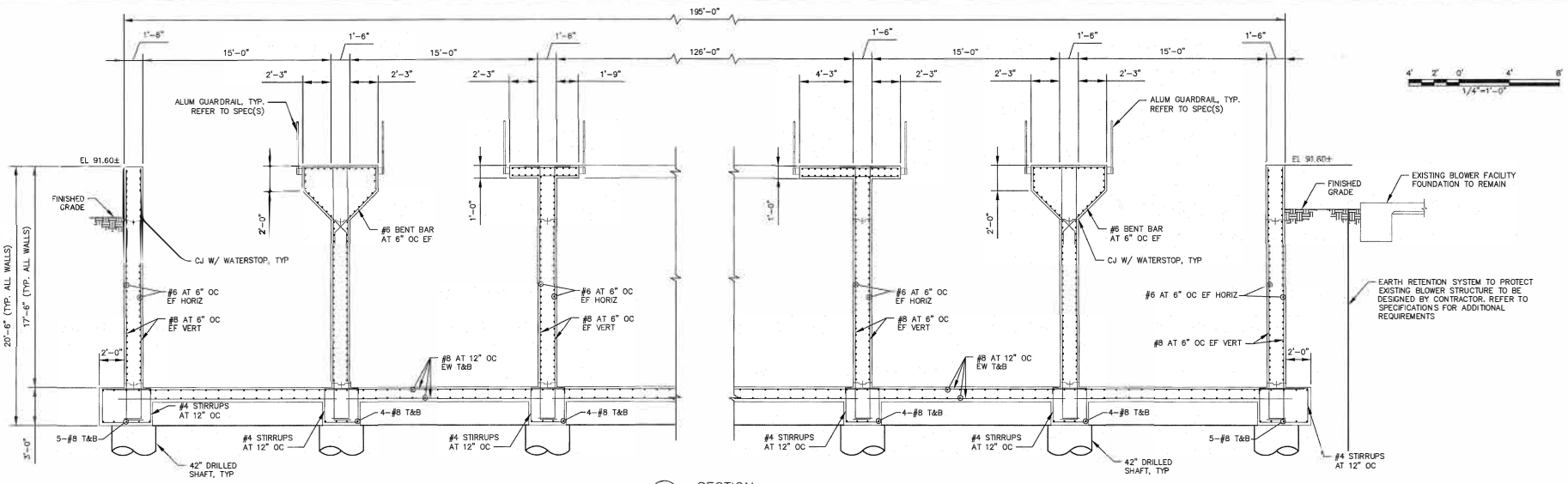
AERATION BASINS TOP PLAN 2 OF 2

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 158329	

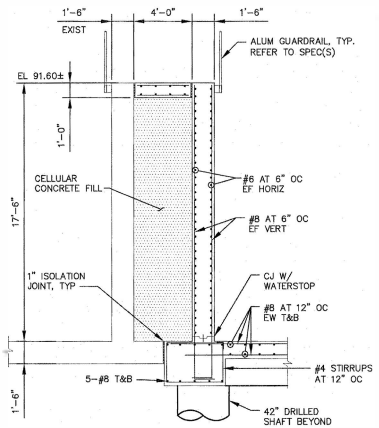
80367

S-40-104

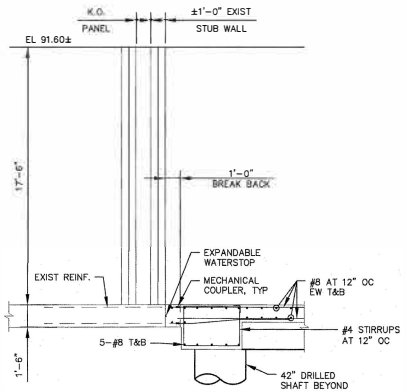
FILE PATH: C:\pw_working\pw_americas\d1366838\S-40-104.dwg



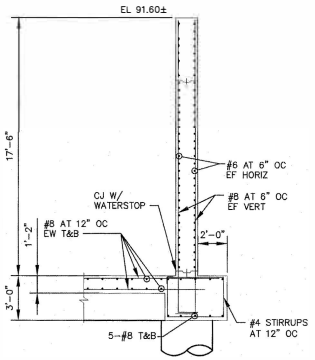
1 SECTION
S-40-101 TO S-40-104 1/4" = 1'-0"



2 SECTION
S-40-101 TO S-40-104 1/4" = 1'-0"



3 SECTION
S-40-101 TO S-40-104 1/4" = 1'-0"



4 SECTION
S-40-101 TO S-40-104 1/4" = 1'-0"

CP&Y, INC.
TEXAS REGISTERED ENGINEERING FIRM F-1741

BLACK & VEATCH

CP&Y, INC.
11757 KATY FREEWAY
SUITE 1540
HOUSTON, TX 77079
(713) 532-1730
TX FIRM NUMBER F-1741

SURVEYED BY:
FB NO. 000000

STATE OF TEXAS
JEFFREY P. WOUTERS
80701
REGISTERED PROFESSIONAL ENGINEER
11-07-2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
STRUCTURAL
AERATION BASINS
SECTIONS
1 OF 2

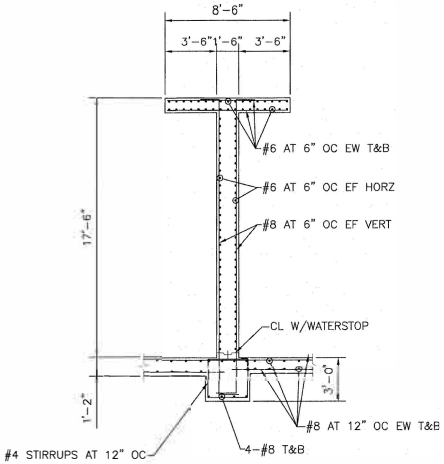
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.

FOR CITY OF HOUSTON USE ONLY
PROFESSIONAL ENGINEER
80367
CITY OF HOUSTON, TEXAS

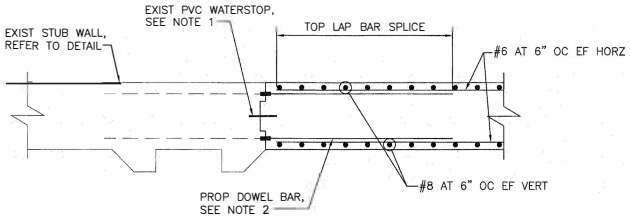
S-40-301

SHEET NO. 159 OF 379

FILE PATH: C:\pw_working\pw_americas\d136665\S-40-301.dwg



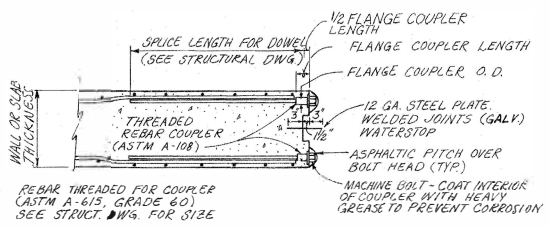
1 SECTION
S-40-101 TO S-40-104 1/4" = 1'-0"



NOTES:

1. CONTRACTOR SHALL INSPECT EXISTING PVC WATERSTOP FOR CONDITION AND SUPPLY AN ADDITIONAL EXPANDABLE WATERSTOP IF NEEDED. CONTRACTOR SHALL BE RESPONSIBLE FOR LIQUID-TIGHTNESS OF FINAL STRUCTURE.
2. PROPOSED DOWEL BAR SHALL BE MINIMUM #6 BAR AND MAY BE SIZED LARGER AS NEEDED TO MATCH EXISTING COUPLER SIZE.

A TYPICAL WALL CONNECTION DETAIL
S-40-103 S-40-104 NOT TO SCALE

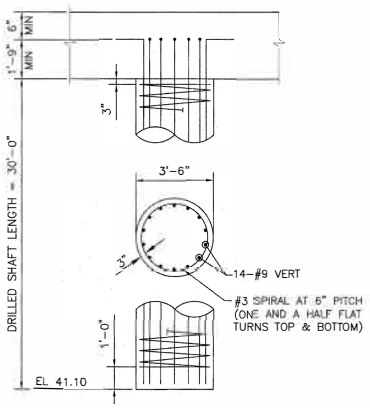


Threaded Bar Size	Min. Yield Strength of Bar (lbs.)	Min. Ult. Strength of Bar (lbs.)	Flange Coupler O. D. (in.)	Flange Coupler Length (in.)	Tensile Stress Area (in.²)	Rolled Thread Size	Min. Ult. Strength of Coupler (lbs.)
4	8,500	15,000	3/4	1-3/4	.142	1/2"-13 NC	26,000
5	13,000	24,000	1	2	.226	5/8"-11 NC	50,000
6	20,000	33,000	1-1/8	2-1/4	.334	3/4"-10 NC	59,000
7	27,000	46,000	1-1/4	2-1/2	.462	7/8"- 9 NC	76,000
8	36,000	60,000	1-1/2	3	.606	1"- 9 NC	92,000
9	45,000	76,000	1-5/8	4	.763	1-1/8"- 7 NC	131,000
10	58,000	96,000	1-7/8	4	.969	1-1/4"- 7 NC	143,000
11	73,000	123,000	2-1/8	4	1.230	1-3/8"- 8 NC	184,000
14	114,000	190,000	2-5/8	5	1.90	1-3/4"- 5 NC	280,000

NOTES:

1. RECORD DOCUMENTS PROVIDED FOR REFERENCE ONLY. CONTRACTOR SHALL FIELD VERIFY CONDITION, DIMENSIONS, AND CONFIGURATION OF EXISTING STUB WALL/REBAR COUPLERS.
2. RECORD DOCUMENTS INDICATE THE EXISTING THREADED REBAR DOWEL ARE #7 BARS.
3. WALL CONNECTION MAY REQUIRE CONTRACTOR TO REMOVE AND REPLACE EXISTING COUPLERS WITH NEW MECHANICAL COUPLERS DEPENDING ON CONDITION OF EXISTING COUPLERS.
4. CONTRACTOR SHALL NOTIFY ENGINEER OF DISCREPANCIES THROUGH FORMAL RFI.

B REBAR COUPLER DETAILS
NOT TO SCALE



C DRILLED SHAFT DETAIL
NOT TO SCALE

4' 2' 0' 4' 8'
1/4"=1'-0"

CP&Y, INC.
TEXAS REGISTERED ENGINEERING FIRM F-1741

BLACK & VEATCH

CP&Y, INC.
11757 KATY FREEWAY
SUITE 1540
HOUSTON, TX 77079
(713) 532-1730
TX FIRM NUMBER F-1741

SURVEYED BY: FB NO. 000000

STATE OF TEXAS
JEFFREY P. WOUTERS
80701
REGISTERED PROFESSIONAL ENGINEER
11-07-2022

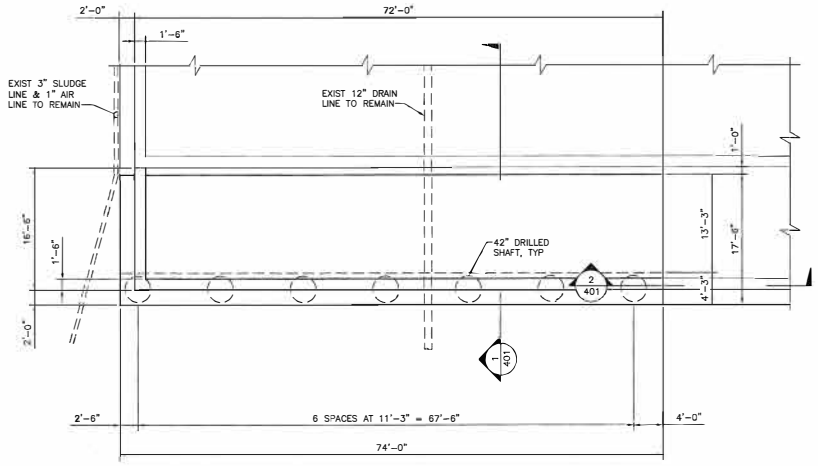
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
STRUCTURAL
AERATION BASINS SECTIONS
2 OF 2

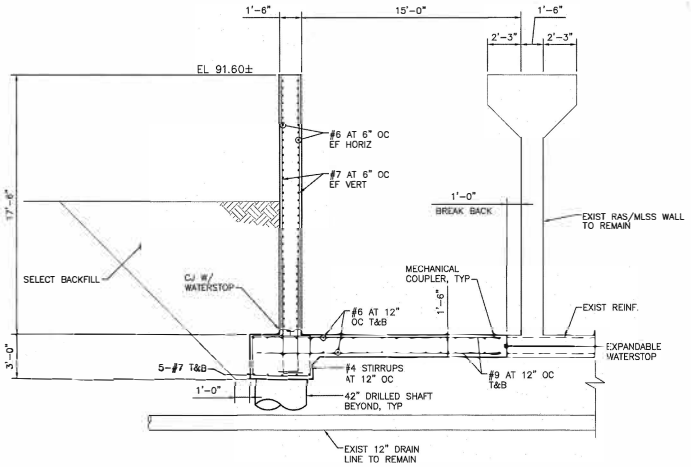
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	Sd XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 160 OF 379	S-40-302

FOR CITY OF HOUSTON USE ONLY
80367
REGISTERED
JOSHUA, TEXAS

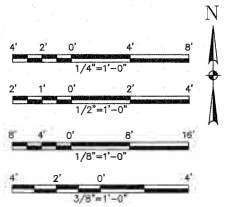
FILE PATH: C:\pw_working\pw_americas\d1366838\S-40-302.dwg



MLSS CHANNEL RECONSTRUCTION PLAN
1/8" = 1'-0"

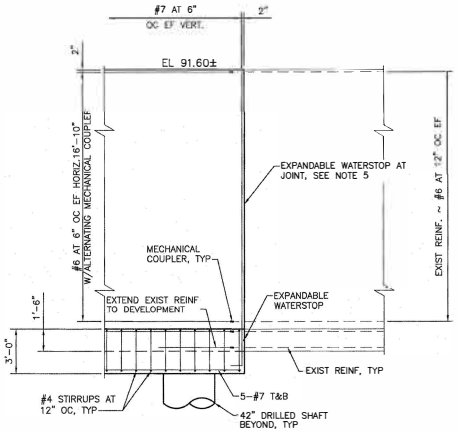


1 SECTION
S-40-401 1/4" = 1'-0"

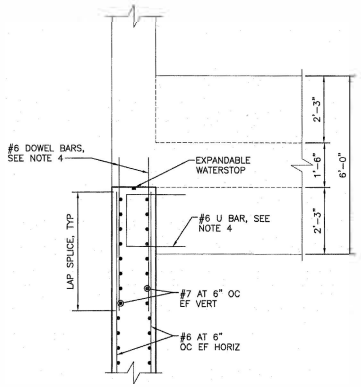


GENERAL NOTES:

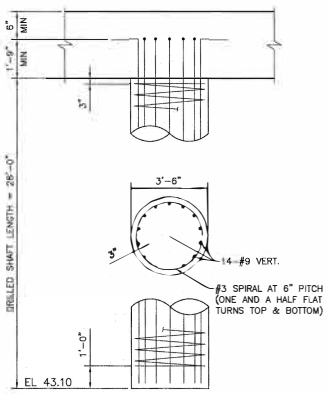
1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND EXISTING CONDITIONS AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION OR ORDERING MATERIALS.
2. REFER TO CIVIL AND MECHANICAL SHEETS FOR ADDITIONAL INFORMATION.
3. CONTRACTOR TO PROTECT EXISTING UTILITIES DURING CONSTRUCTION.
4. DOWEL BARS SHALL BE EMBEDDED 12" MINIMUM WITH HILTI HIT-RE 500 V3, OR APPROVED EQUAL, EPOXY ADHESIVE. DOWEL BARS SHALL BE INSTALLED PER ADHESIVE MANUFACTURER SPECIFICATIONS.
5. EXPANDABLE WATERSTOP SHALL BE PROVIDED ON ENTIRE PERIMETER BETWEEN EXISTING AND NEW CONSTRUCTION.
6. REINSTALL GUARDRAIL AS REQUIRED WHEN THE RECONSTRUCTION WORK IS COMPLETE.



2 SECTION
S-40-401 1/4" = 1'-0"



DETAIL TOP PLAN
1/2" = 1'-0"



DRILLED SHAFT DETAIL
3/8" = 1'-0"

CP&Y, INC.
TEXAS REGISTERED ENGINEERING FIRM F-1741

BLACK & VEATCH

CP&Y, INC.
11757 KATY FREEWAY
SUITE 1540
HOUSTON, TX 77079
(713) 532-1730
TX FIRM NUMBER F-1741

SURVEYED BY:
FB NO. 000000

STATE OF TEXAS
JEFFREY P. WOUTERS
80701
REGISTERED PROFESSIONAL ENGINEER
11-07-2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
STRUCTURAL

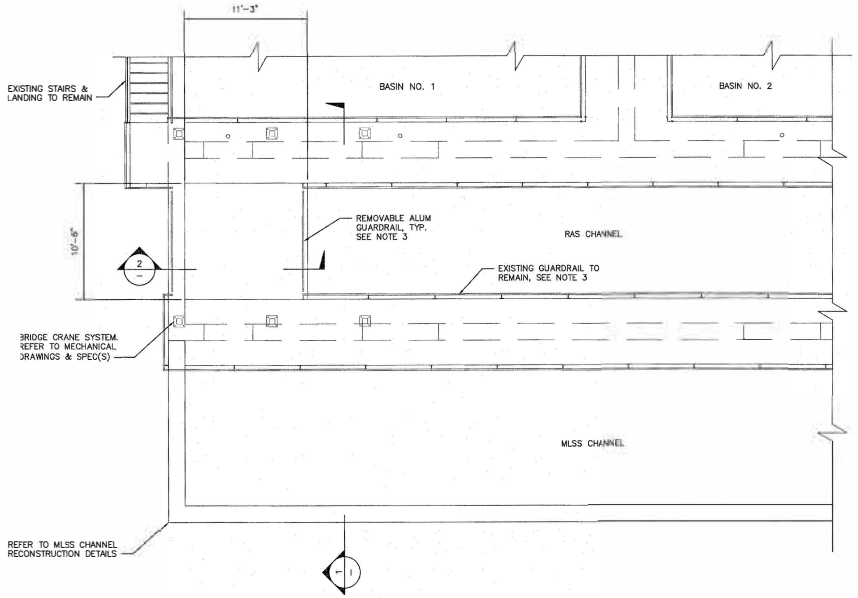
MLSS CHANNEL RECONSTRUCTION PLAN AND SECTION

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
GAOHUA (SHARI) LIN, P.E.	
SHEET NO. 161 OF 379	

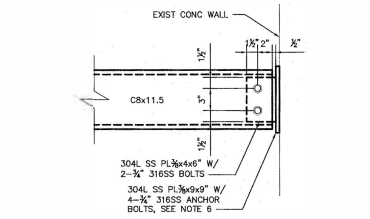
STATE OF TEXAS
80367
REGISTERED PROFESSIONAL ENGINEER

S-40-401

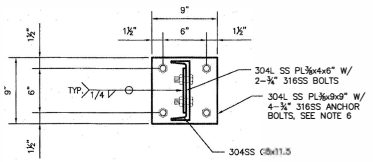
FILE PATH: C:\pw_working\bvw_americas\d1366638\S-40-401.dwg



RAS PUMP STRUCTURAL MODIFICATIONS
3/16" = 1'-0"



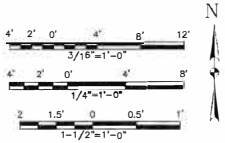
ELEVATION



PLAN

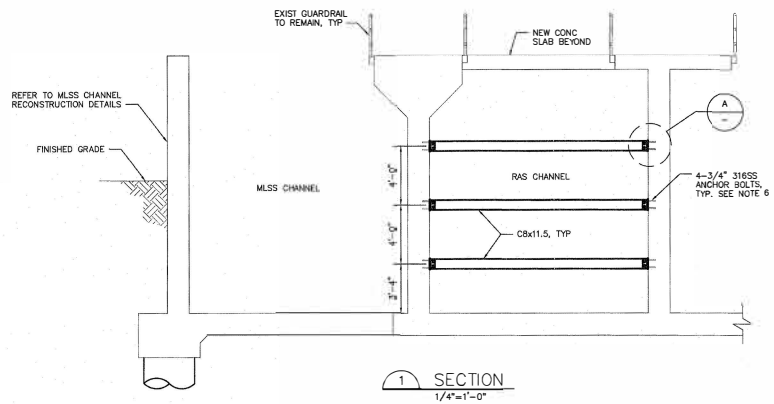
NOTE: PROVIDE HORIZONTAL SHORT SLOTTED HOLES AT ONE END TO AID FIELD FIT-UP.

A WALL PLATE DETAIL
1-1/2"=1'-0"

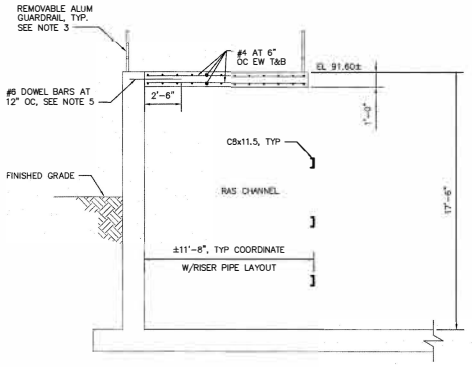


GENERAL NOTES:

1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND EXISTING CONDITIONS AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION OR ORDERING MATERIALS.
2. REFER TO CIVIL, MECHANICAL, AND ELECTRICAL PLANS FOR INFORMATION NOT SHOWN.
3. DEMOLISH PORTION OF EXISTING GUARDRAIL AND INSTALL NEW REMOVABLE ALUMINUM GUARDRAIL. COORDINATE REMOVABLE GUARDRAIL WITH PROPOSED RAS PIPING AND BRIDGE CRANE.
4. CONTRACTOR TO PROTECT EXISTING PIPING, RAILING TO REMAIN, AND SLUICE GATE OPERATORS DURING CONSTRUCTION.
5. DOWEL BARS SHALL BE CENTERED IN PROPOSED SLAB AND INSTALLED INTO EXISTING CONCRETE STRUCTURE ON 3 SIDES. DOWEL BARS SHALL BE EMBEDDED 12" MINIMUM WITH HILTI HIT-RE 500 V3, OR APPROVED EQUAL, EPOXY ADHESIVE. DOWEL BARS SHALL BE INSTALLED PER ADHESIVE MANUFACTURER SPECIFICATIONS.
6. POST-INSTALLED ANCHOR BOLTS SHALL BE 316SS THREADED ROD EMBEDDED 6" MINIMUM WITH HILTI HIT-RE 500 V3, OR APPROVED EQUAL, EPOXY ADHESIVE. ANCHORS SHALL BE INSTALLED PER ADHESIVE MANUFACTUER SPECIFICATIONS.



1 SECTION
1/4"=1'-0"



2 SECTION
1/4"=1'-0"

CP&Y, INC.
TEXAS REGISTERED ENGINEERING FIRM F-1741

BLACK & VEATCH

CP&Y, INC.
11757 KATY FREEWAY
SUITE 1540
HOUSTON, TX 77079
(713) 532-1730
TX FIRM NUMBER F-1741

SURVEYED BY:
FB NO. 000000

STATE OF TEXAS
JEFFREY P. WOUTERS
80701
REGISTERED PROFESSIONAL ENGINEER
02-28-2023

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
STRUCTURAL
RAS PUMP STRUCTURAL MODIFICATIONS

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.

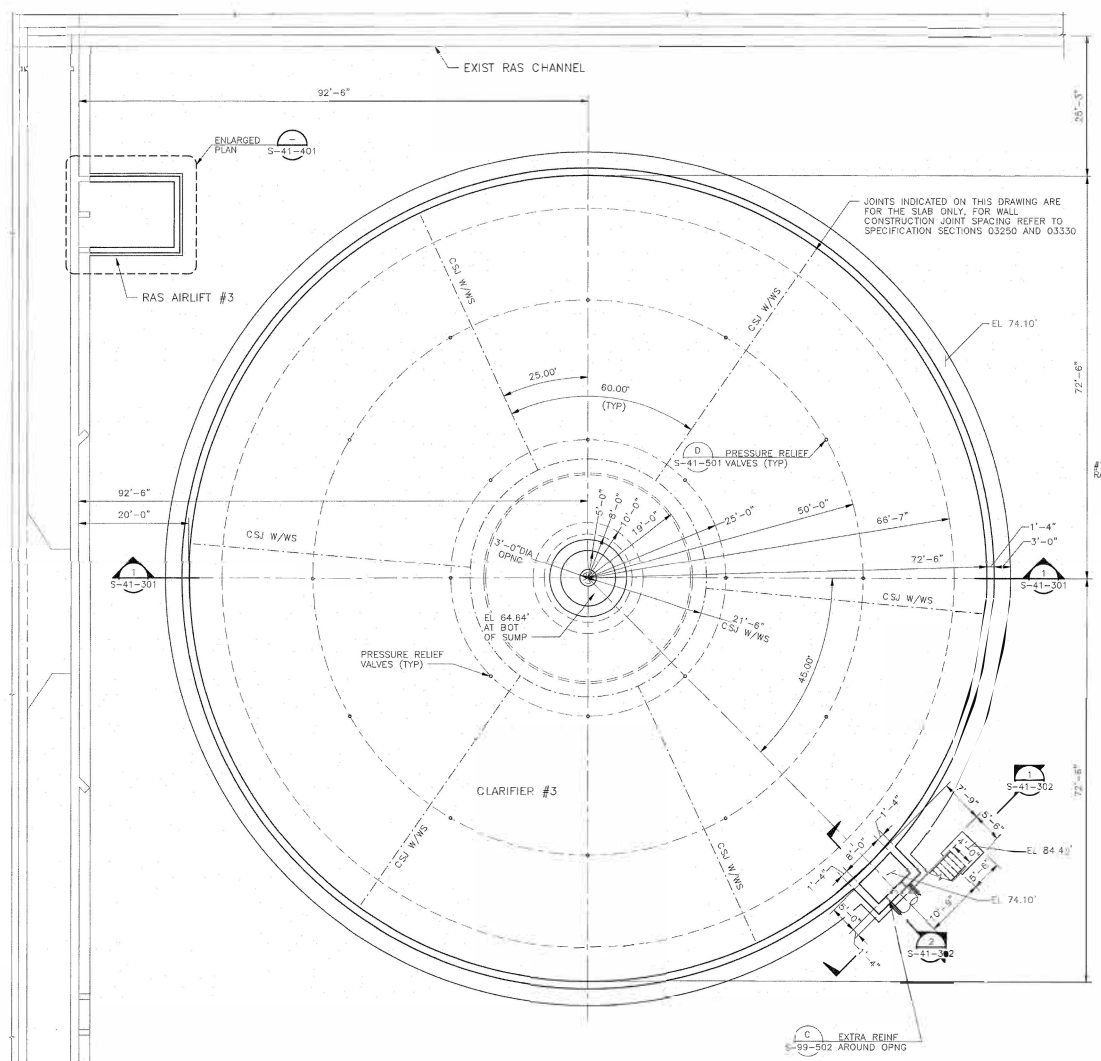
FOR CITY OF HOUSTON USE ONLY

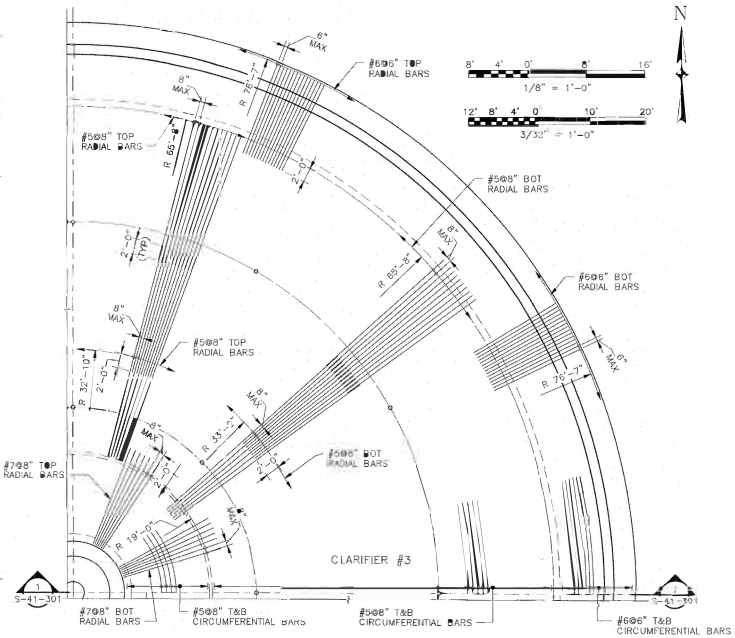
80367

S-40-402

SHEET NO. 162 OF 379

FILE PATH: C:\pw_working\pw_americas\d136863b\S-40-402.dwg





BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED PROFESSIONAL ENGINEER
11/11/2005

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

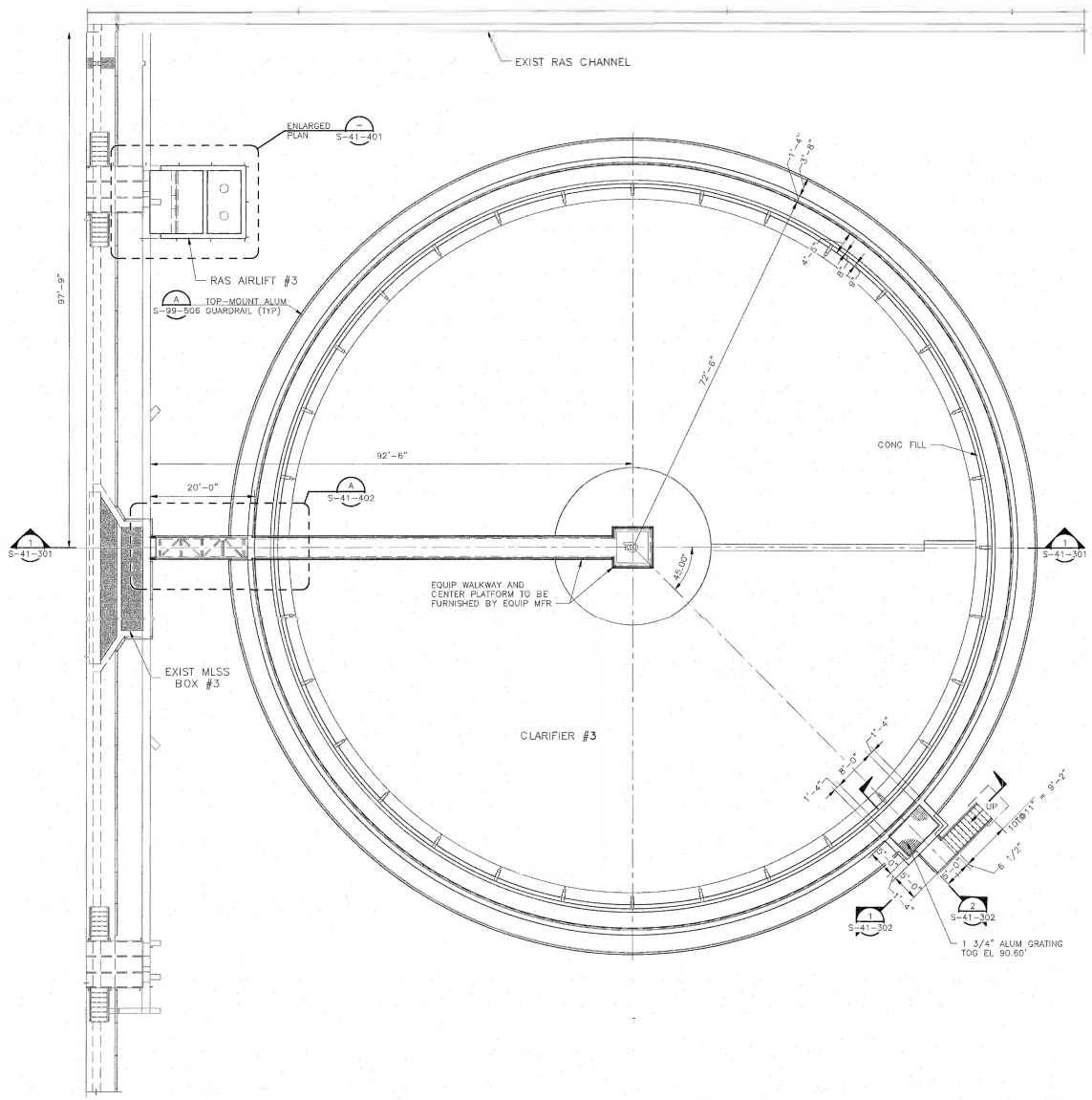
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
STRUCTURAL
CLARIFIER #3
FOUNDATION PLAN

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E	
SHEET NO. 163 OF 379	

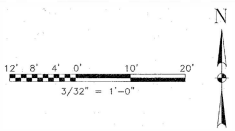
80367

S-41-101

FILE PATH: BIM 360://4023500 - COH Intercontinental Airport WWTP Improvements/4023500-COH IA WWTP-BV.rvt



TOP PLAN
3/32" = 1'-0"



BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED
PROFESSIONAL ENGINEER
11/11/2025

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

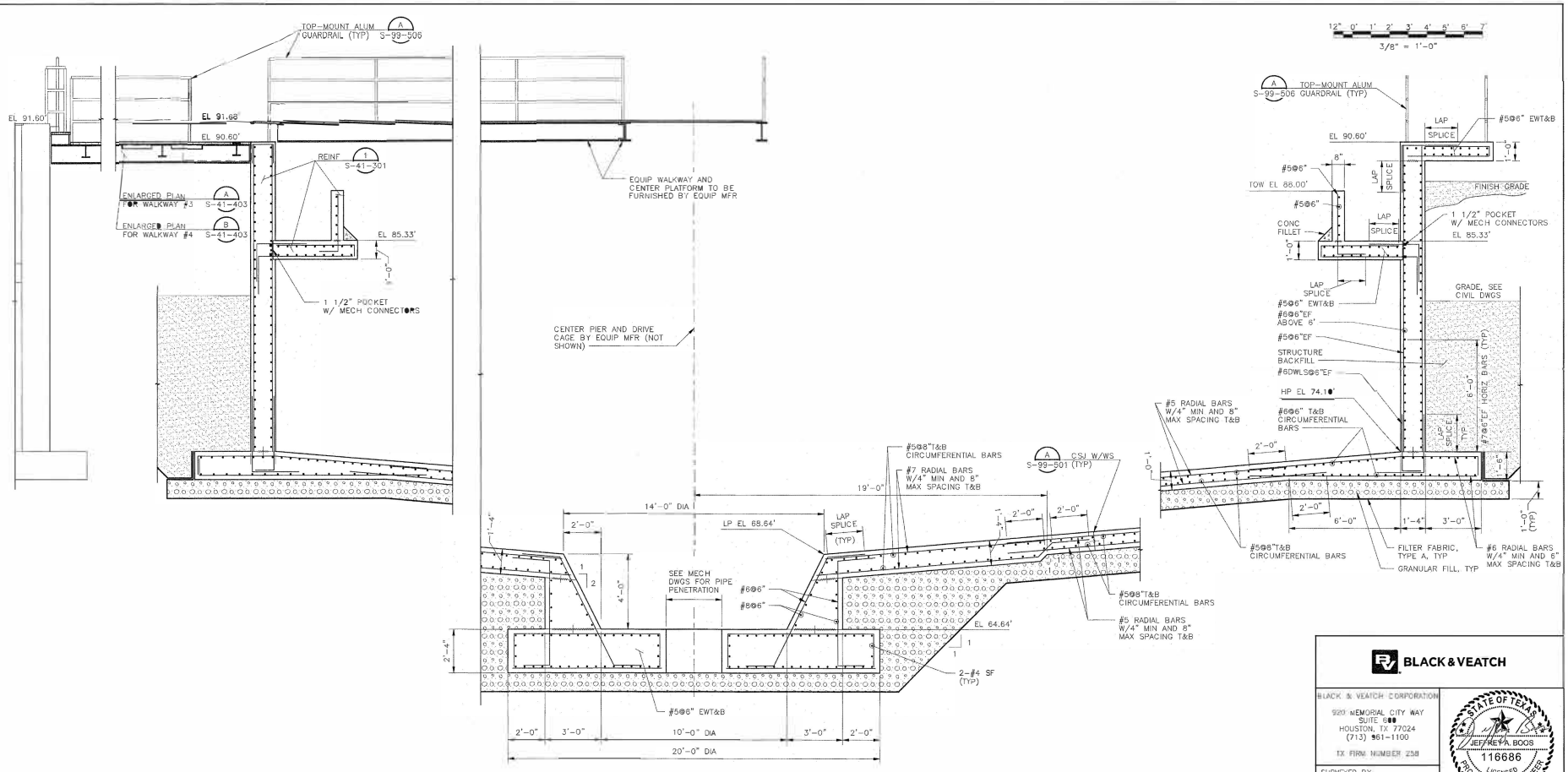
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
STRUCTURAL
CLARIFIERS #3
TOP PLAN

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 164 OF 379	

FOR CITY OF HOUSTON USE ONLY
80367

S-41-102

FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-20H IA WWTP-BV.rvt



FILE PATH: BIM 360://402500 - COH Interconintental Airport WWTF Improvements/402500-COH IA WWTF-BV.rvt

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 800
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED
PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

STRUCTURAL

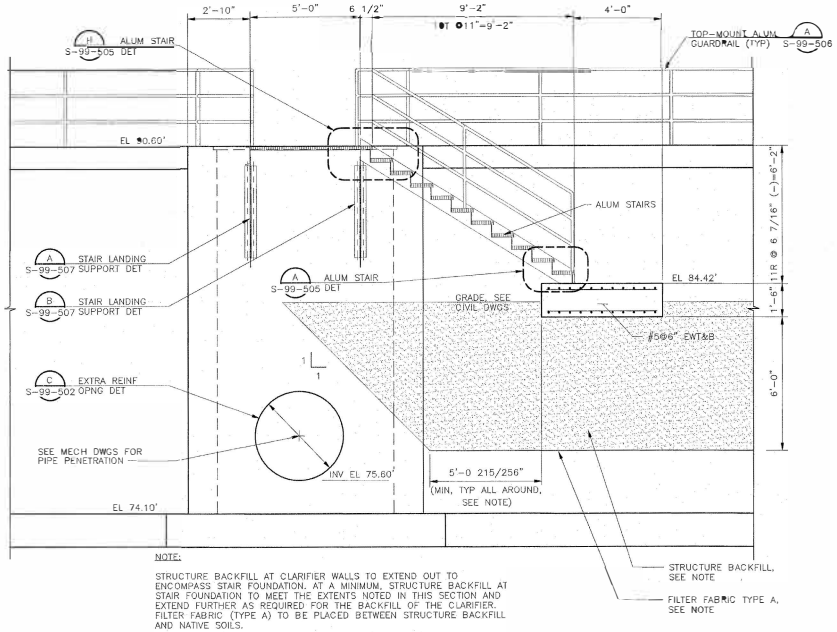
CLARIFIERS SECTIONS 1 OF 2

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 165 OF 379	

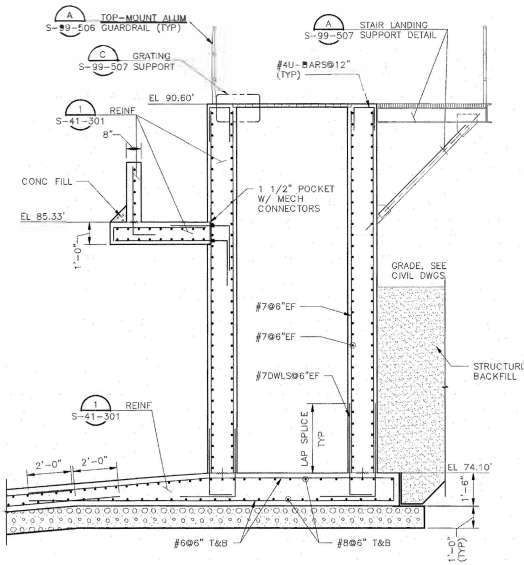
FOR CITY OF HOUSTON USE ONLY

80367

S-41-301



1 SECTION
S-41-101 3/8" = 1'-0"
S-41-102



2 SECTION
S-41-101 3/8" = 1'-0"
S-41-102

12" 0" 1' 2' 3' 4' 5' 6' 7'
3/8" = 1'-0"

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

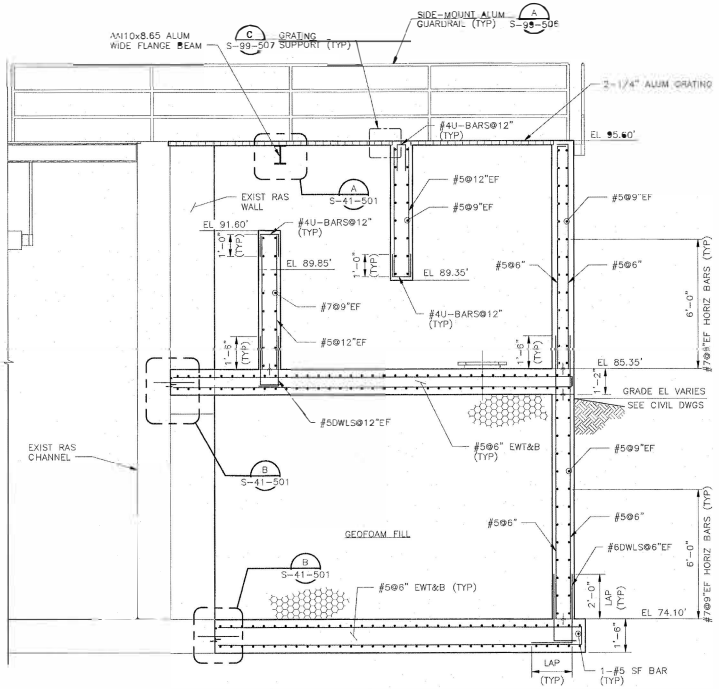
INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT
PLANT EXPANSION
STRUCTURAL
CLARIFIERS
SECTIONS 2 OF 2

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 166 OF 379	

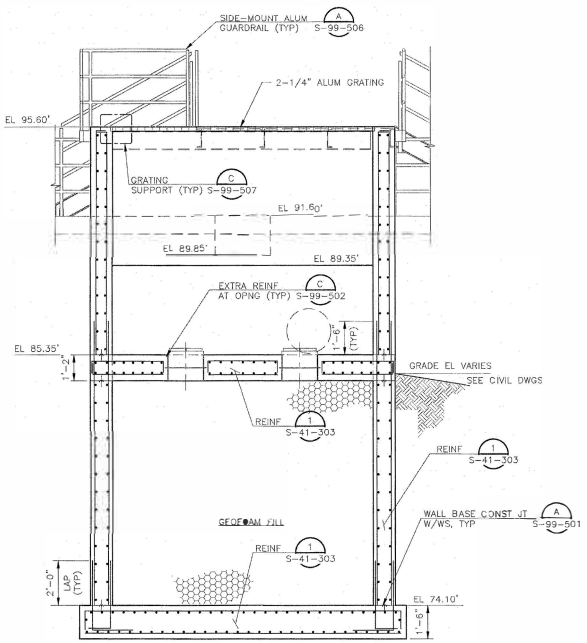
FOR CITY OF HOUSTON USE ONLY
80987

S-41-302

FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-COH IA WWTP-BIM.rvt



1 SECTION
S-41-401 3/8" = 1'-0"



2 SECTION
S-41-401 3/8" = 1'-0"

12" 0' 1' 2' 3' 4' 5' 6' 7'
3/8" = 1'-0"

FILE PATH: BIM 360://402501 — EDM Intercontinental Airport WWTP Improvements/402501-CO4 ik WWTP-BIM.rvt

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

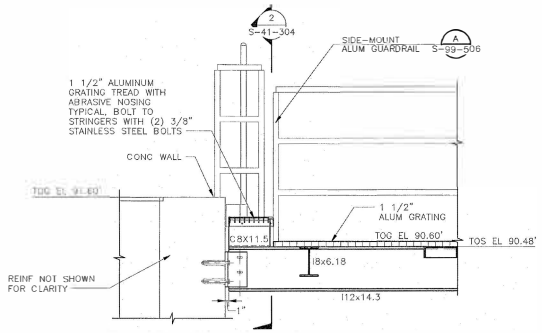
STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

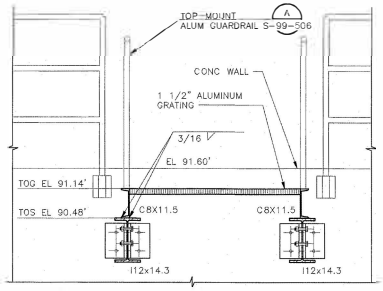
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
STRUCTURAL
RAS SECTIONS

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	80367
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 167 OF 379	

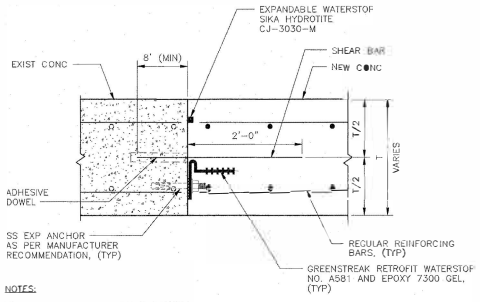
S-41-303



1 SECTION
S-41-402 3/4" = 1'-0"



2 SECTION
S-41-402 3/4" = 1'-0"



NOTES:

1. PROVIDE #5 SHEAR BARS @12" CTRS ACROSS JOINT UNO.
2. REINFORCING STEEL SHALL NOT BE EXTENDED ACROSS JOINT UNO.

A SLAB/WALL RETROFIT
NO SCALE

12" 6" 0' 1' 2' 3'
3/4" = 1'-0"

GENERAL NOTES:

1. FOR GENERAL STRUCTURAL NOTES, REFER TO SHEET S-41-402

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED
PROFESSIONAL ENGINEER
11/11/2025

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

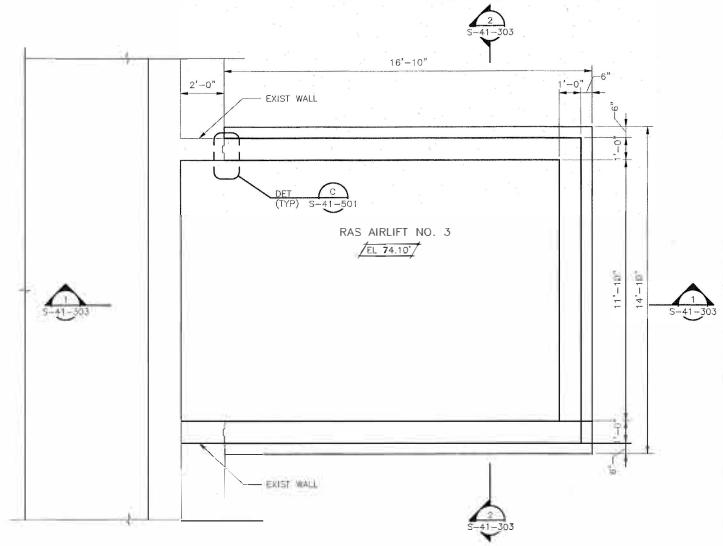
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
STRUCTURAL
MLSS BOX SECTIONS

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 168 OF 379	

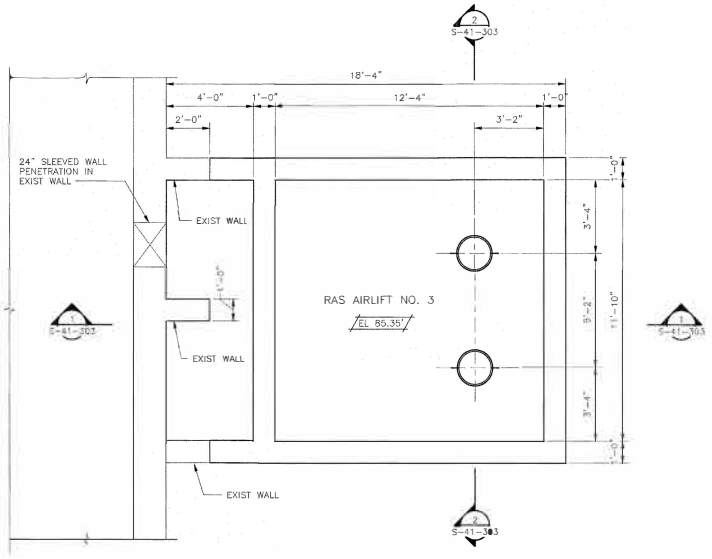
FOR CITY OF HOUSTON USE ONLY
80367

S-41-304

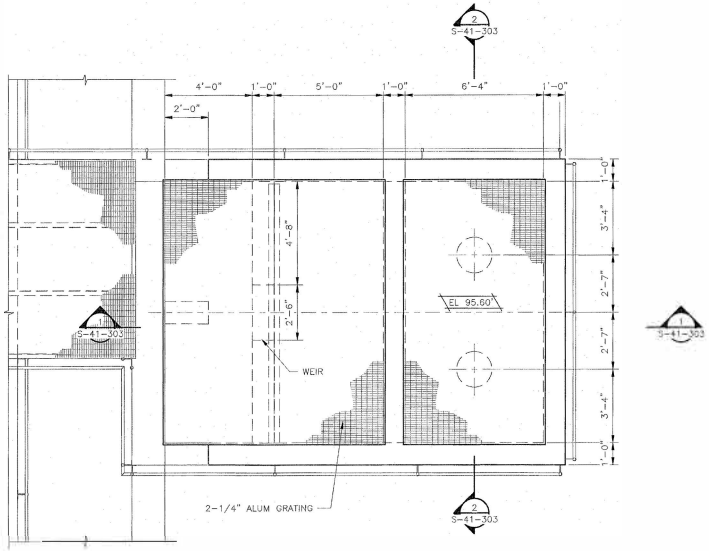
FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-COH IA WWTP-BV.rvt



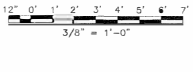
FOUNDATION PLAN AT EL 74.10'
3/8" = 1'-0"



PLAN AT EL 83.35'
3/8" = 1'-0"



ENLARGED TOP PLAN
3/8" = 1'-0"

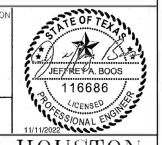




BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182



CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
STRUCTURAL

RAS AIRLIFT NO. 3 ENLARGED PLAN

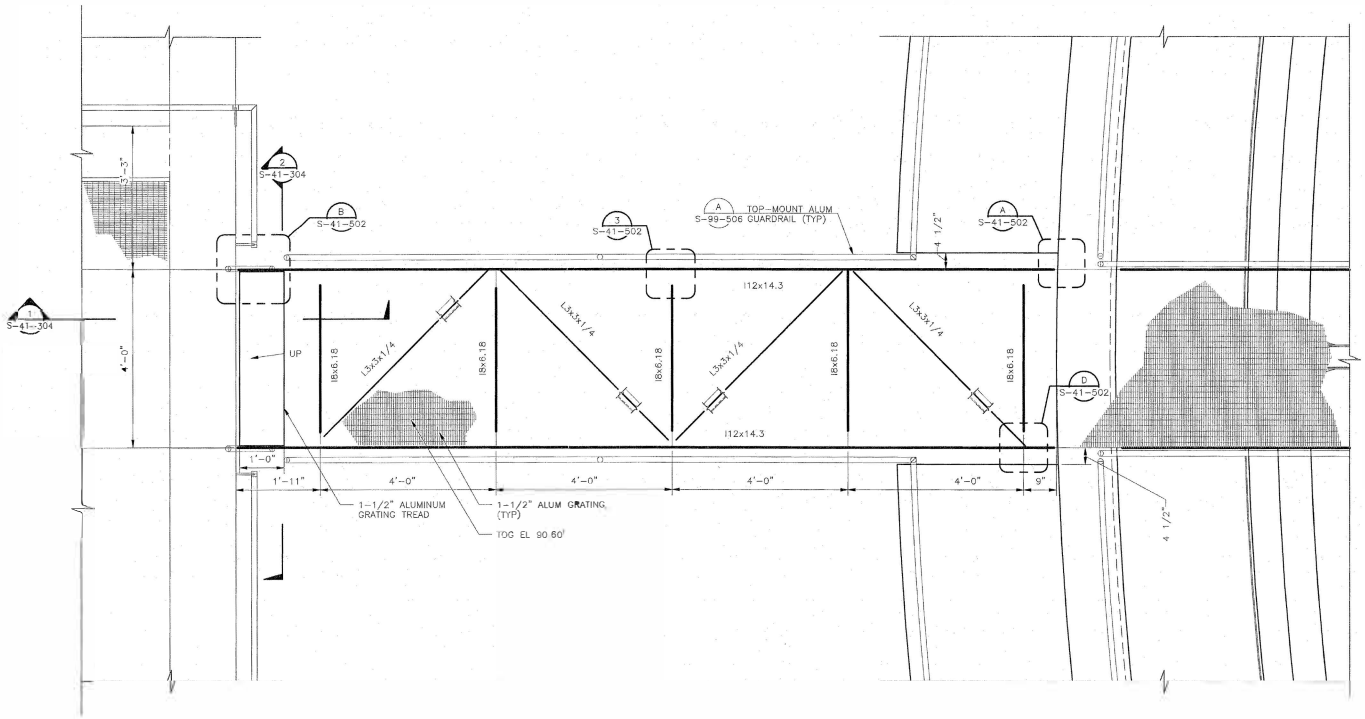
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 169 OF 379	

FOR CITY OF HOUSTON USE ONLY



S-41-401

FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP improvements/402500-COH IA WWTP-BV.rvt



A DETAIL
S-41-102 3/4" = 1'-0"

12" 6" 0 1' 2' 3'
3/4" = 1'-0"

N

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED
PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
STRUCTURAL
CLARIFIER NO. 3
MLSS BOX WALKWAY
ENLARGED PLANS

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 170 OF 379	

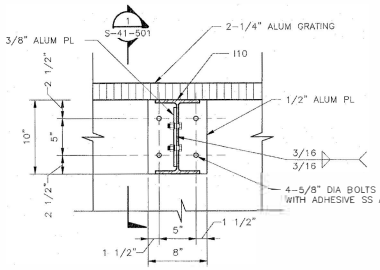
REGISTERED
80367
HOUSTON, TEXAS

S-41-402

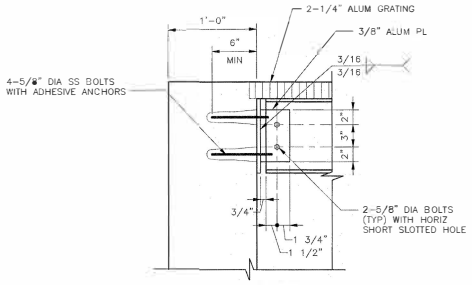
FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402506-COH IA WWTP-EV.rvt

NOTES:

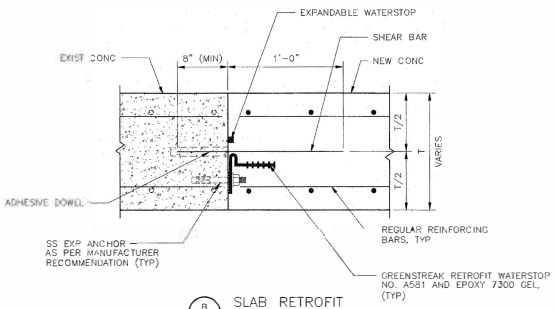
1. PROVIDE #5 BARS @16" CTRS ACROSS JOINT UNLESS NOTED OTHERWISE.
2. REINFORCING STEEL SHALL NOT BE EXTENDED ACROSS JOINT UNLESS NOTED OTHERWISE.



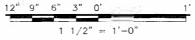
A DETAIL
S-41-303 1 1/2" = 1'-0"

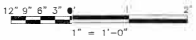


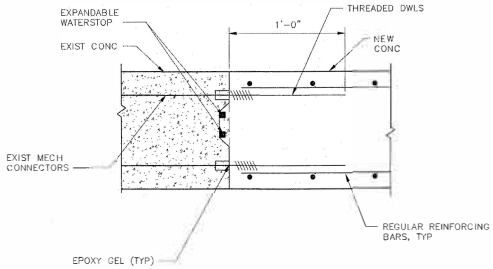
1 SECTION
1 1/2" = 1'-0"



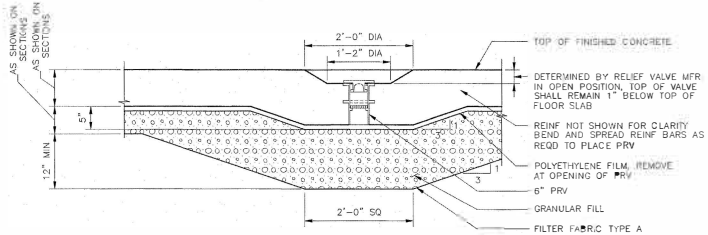
B SLAB RETROFIT
S-41-303 NO SCALE







C WALL RETROFIT
S-41-401 NO SCALE



D PRESSURE RELIEF VALVE
NO SCALE

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED
PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

STRUCTURAL

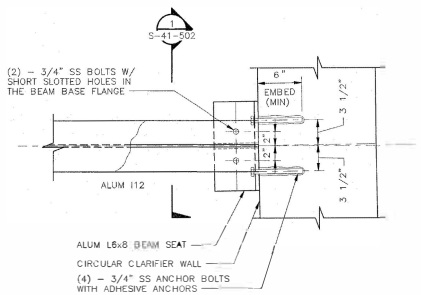
DETAILS

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	GIAOHUA (SHARI) LIN, P.E.
SHEET NO. 171 OF 379	

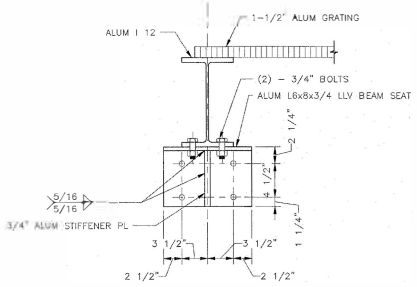
FOR CITY OF HOUSTON USE ONLY
ACCEPTED AS NOTED
80367
CITY OF HOUSTON

S-41-501

FILE PATH: BIM 360://402500 - IAH Intercontinental Airport WWTP Improvements/402500-CON IA WWTP-R1.rvt



PLAN

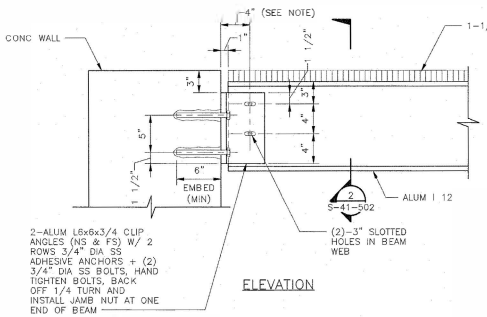


1 SECTION
1 1/2" = 1'-0"

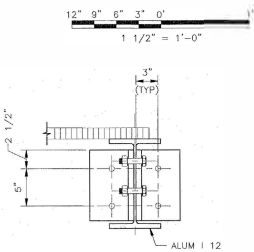
NOTE: 1. FIELD VERIFY DISTANCE BETWEEN CIRCULAR CLARIFIER AND RECARB BASIN AT CENTERLINE OF BEAM PRIOR TO BEAM FABRICATION.

2. ENSURE THAT THE WALL SURFACE IS SMOOTH BEFORE PLACING THE ANCHOR BOLTS.

A ALUM BEAM CONNECTION TO CIRCULAR WALL
S-41-402 1 1/2" = 1'-0"



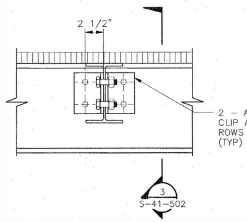
ELEVATION



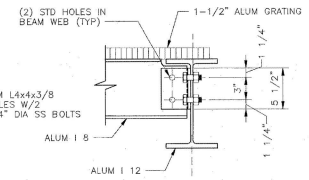
2 SECTION
1 1/2" = 1'-0"

NOTE: FIELD VERIFY DISTANCE BETWEEN CIRCULAR CLARIFIER AND RECARB BASIN AT CENTERLINE OF BEAM PRIOR TO BEAM FABRICATION; BOLTS TO BE INSTALLED AT CENTERLINE OF SLOT HOLE DURING INITIAL ERECTION

B ALUM BEAM CONNECTION TO WALL
S-41-402 1 1/2" = 1'-0"

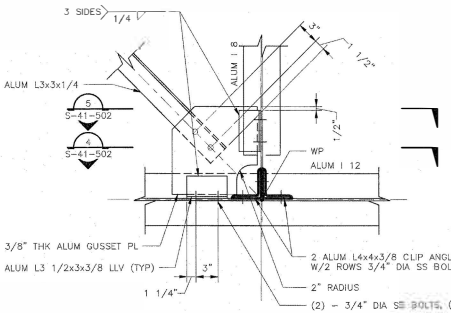


ELEVATION

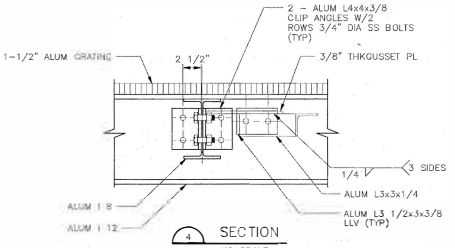


3 SECTION
1 1/2" = 1'-0"

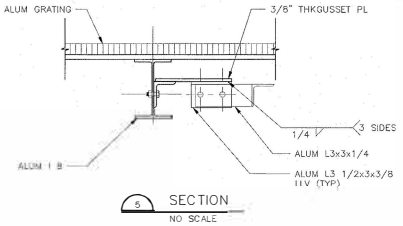
30 CONNECTION DETAILS
1 1/2" = 1'-0"



PLAN



4 SECTION
NO SCALE



5 SECTION
NO SCALE

D HORIZONTAL BRACING DETAIL
S-41-402 1 1/2" = 1'-0"

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED
PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

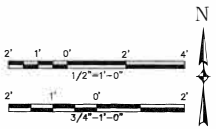
INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT
PLANT EXPANSION
STRUCTURAL
MLSS BOX WALKWAY DETAILS

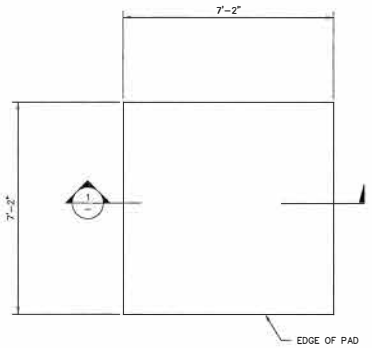
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 172 OF 379	

FOR CITY OF HOUSTON USE ONLY
80367

S-41-502

FILE PATH: BM 300//402500 – COH Intercontinental Airport WWTP Improvements/402500-COH IA WWTP-Sht.rvt





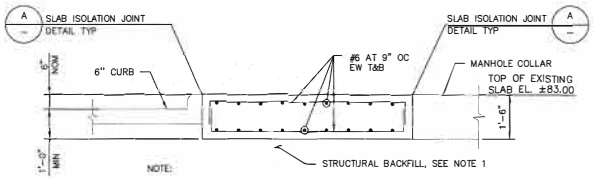
SCUM PUMP PAD PLAN
1/2"=1'-0"

SHEET NOTES:

1. FOUNDATION DESIGN IS IN ACCORDANCE WITH SUBSURFACE EXPLORATION BY GEOTECH ENGINEERING AND TESTING, TEXAS, JOB NUMBER 19-01E DATED MAY 4, 2021. COPIES OF THE REPORT MAY BE OBTAINED FROM THE OWNER. ALL BIDDERS MUST BECOME FAMILIAR WITH THE CONTENTS OF THIS REPORT. THE FOLLOWING INFORMATION IS PROVIDED TO ASSIST IN THE LEVEL OF UNDERSTANDING OF THE SUBSURFACE CONDITIONS BUT SHALL NOT BE CONSIDERED TO COMPLETELY DESCRIBE ALL CONDITIONS PRESENT AND RELEVANT TO THE FOUNDATION CONSTRUCTION.
2. SITE CONDITIONS AT THE SCUM PUMP FACILITY, B-8, GENERALLY CONSISTS OF THE FOLLOWING:
   0'-2' FILL: LEAN CLAY (CL)
   2'-4' LEAN CLAY (CL)
   4'-6' LEAN CLAY (CL)
3. AT THE TIME OF TESTING, GROUNDWATER WAS ENCOUNTERED AT A DEPTH OF 18.4 FT. GROUNDWATER LEVELS MAY BE DIFFERENT DURING CONSTRUCTION.
4. A FOUNDATION HAS BEEN DESIGNED FOR BEARING INTO SOIL AT A MINIMUM OF 12" BELOW FINAL GRADE. THE GRADE BEAMS HAVE BEEN DESIGNED FOR A NET ALLOWABLE SOIL BEARING PRESSURE OF 2400 PSF.
5. THE SELECT STRUCTURAL FILL SHALL EXTEND 5 FT BEYOND THE STRUCTURE PERIMETER. THESE SOILS SHALL BE PLACED IN LOOSE LIFTS NOT EXCEEDING 8" AND COMPACTED TO 95% OF MAXIMUM STANDARD DENSITY (ASTM D-698) AND THE MOISTURE CONTENT ADJUSTED BETWEEN OPTIMUM AND 3%.
6. PROPER DRAINAGE SHALL BE MAINTAINED AT ALL TIMES BOTH UNDER AND ADJACENT TO FOUNDATIONS. EXCAVATIONS SHALL AT NO TIME BE ALLOWED TO RETAIN WATER. IF EXCAVATIONS BECOME WET, THE WET MATERIALS SHALL BE REMOVED TO DRY, SOUND MATERIAL AND THE TESTING LABORATORY SHALL PERFORM TESTS TO CONFIRM APPROPRIATE DENSITY PRIOR TO PLACEMENT OF CONCRETE.

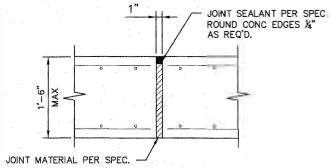
GENERAL NOTES:

1. REFER TO CIVIL, MECHANICAL, AND ELECTRICAL SHEETS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
2. SEE STRUCTURAL GENERAL NOTES, STANDARD DETAILS, AND PROJECT SPECIFICATIONS FOR ADDITIONAL INFORMATION NOT SHOWN.
3. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS PRIOR TO CONSTRUCTION OR ORDERING MATERIALS.



NOTE:
1. REMOVE AND REPLACE EXISTING SOILS WITH STRUCTURAL BACKFILL TO A DEPTH OF 6 FT BELOW FOUNDATION AND EXTENDING 5 FT, EACH SIDE, BEYOND THE FOOTPRINT OF THE FOUNDATION AND SLOPING TOWARDS GRADE AT A 1 TO 1 SLOPE. PROVIDE FILTER FABRIC TYPE A BELOW STRUCTURAL BACKFILL.

1 SECTION
1/2"=1'-0"



A SLAB ISOLATION JOINT DETAIL
3/4"=1'-0"

CP&Y, INC.
TEXAS REGISTERED ENGINEERING FIRM F-1741

BLACK & VEATCH

CP&Y, INC.
11757 KATY FREEWAY
SUITE 1540
HOUSTON, TX 77079
(713) 532-1730
TX FIRM NUMBER F-1741

SURVEYED BY:
FB NO. 000000

STATE OF TEXAS
JEFFREY P. WOUTERS
80701
REGISTERED
PROFESSIONAL ENGINEER
11-07-2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

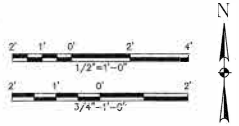
SCUM PUMP NO. 1 PAD
PLAN AND SECTION

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 173 OF 379	

80367

S-42-101

FILE PATH: C:\pw_working\pw_americas\d136663\S-42-101.dwg

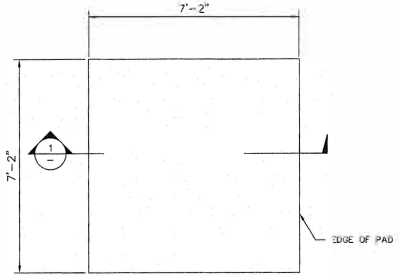


SHEET NOTES:

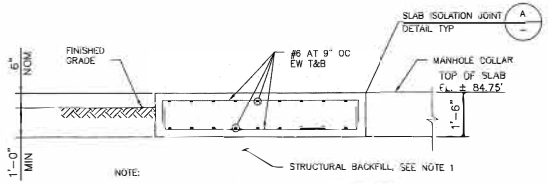
1. FOUNDATION DESIGN IS IN ACCORDANCE WITH SUBSURFACE EXPLORATION BY GEOTECH ENGINEERING AND TESTING, TEXAS, JOB NUMBER 19-01E DATED MAY 4, 2021. COPIES OF THE REPORT MAY BE OBTAINED FROM THE OWNER. ALL BIDDERS MUST BECOME FAMILIAR WITH THE CONTENTS OF THIS REPORT. THE FOLLOWING INFORMATION IS PROVIDED TO ASSIST IN THE LEVEL OF UNDERSTANDING OF THE SUBSURFACE CONDITIONS BUT SHALL NOT BE CONSIDERED TO COMPLETELY DESCRIBE ALL CONDITIONS PRESENT AND RELEVANT TO THE FOUNDATION CONSTRUCTION.
2. SITE CONDITIONS AT THE SCUM PUMP FACILITY, B-6, GENERALLY CONSISTS OF THE FOLLOWING:
   0'-2' FILL: LEAN CLAY (CL)
   2'-14' LEAN CLAY (CL)
   14'-33' FAT CLAY (CH)
3. AT THE TIME OF TESTING, GROUNDWATER WAS ENCOUNTERED AT A DEPTH OF 18.4 FT. GROUNDWATER LEVELS MAY BE DIFFERENT DURING CONSTRUCTION.
4. A FOUNDATION HAS BEEN DESIGNED FOR BEARING INTO SOIL AT A MINIMUM OF 12" BELOW FINAL GRADE. THE GRADE BEAMS HAVE BEEN DESIGNED FOR A NET ALLOWABLE SOIL BEARING PRESSURE OF 2400 PSF.
5. THE SELECT STRUCTURAL FILL SHALL EXTEND 5 FT BEYOND THE STRUCTURE PERIMETER. THESE SOILS SHALL BE PLACED IN LOOSE LIFTS NOT EXCEEDING 8" AND COMPACTED TO 95% OF MAXIMUM STANDARD DENSITY (ASTM D-698) AND THE MOISTURE CONTENT ADJUSTED BETWEEN OPTIMUM AND 3%.
6. PROPER DRAINAGE SHALL BE MAINTAINED AT ALL TIMES BOTH UNDER AND ADJACENT TO FOUNDATIONS. EXCAVATIONS SHALL AT NO TIME BE ALLOWED TO RETAIN WATER. IF EXCAVATIONS BECOME WET, THE WET MATERIALS SHALL BE REMOVED TO DRY, SOUND MATERIAL AND THE TESTING LABORATORY SHALL PERFORM TESTS TO CONFIRM APPROPRIATE DENSITY PRIOR TO PLACEMENT OF CONCRETE.

GENERAL NOTES:

1. REFER TO CIVIL, MECHANICAL, AND ELECTRICAL SHEETS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
2. SEE STRUCTURAL GENERAL NOTES, STANDARD DETAILS, AND PROJECT SPECIFICATIONS FOR ADDITIONAL INFORMATION NOT SHOWN.
3. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS PRIOR TO CONSTRUCTION OR ORDERING MATERIALS.

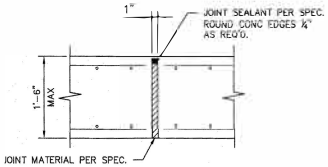


SCUM PUMP PAD PLAN
1/2"=1'-0"



NOTE:
1. REMOVE AND REPLACE EXISTING SOILS WITH STRUCTURAL BACKFILL TO A DEPTH OF 6 FT BELOW FOUNDATION AND EXTENDING 5 FT, EACH SIDE, BEYOND THE FOOTPRINT OF THE FOUNDATION AND SLOPING TOWARDS GRADE AT A 1 TO 1 SLOPE. PROVIDE FILTER FABRIC TYPE A BELOW STRUCTURAL BACKFILL.

1 SECTION
1/2"=1'-0"



A SLAB ISOLATION JOINT DETAIL
3/4"=1'-0"

CP&Y, INC.
TEXAS REGISTERED ENGINEERING FIRM F-1741

BLACK & VEATCH

CP&Y, INC.
11757 KATY FREEWAY
SUITE 1540
HOUSTON, TX 77079
(713) 532-1730
TX FIRM NUMBER F-1741

SURVEYED BY:
FB NO. 000000

STATE OF TEXAS
JEFFREY P. WOUTERS
80701
REGISTERED PROFESSIONAL ENGINEER
11-07-2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

SCUM PUMP NO. 2 PAD PLAN AND SECTION

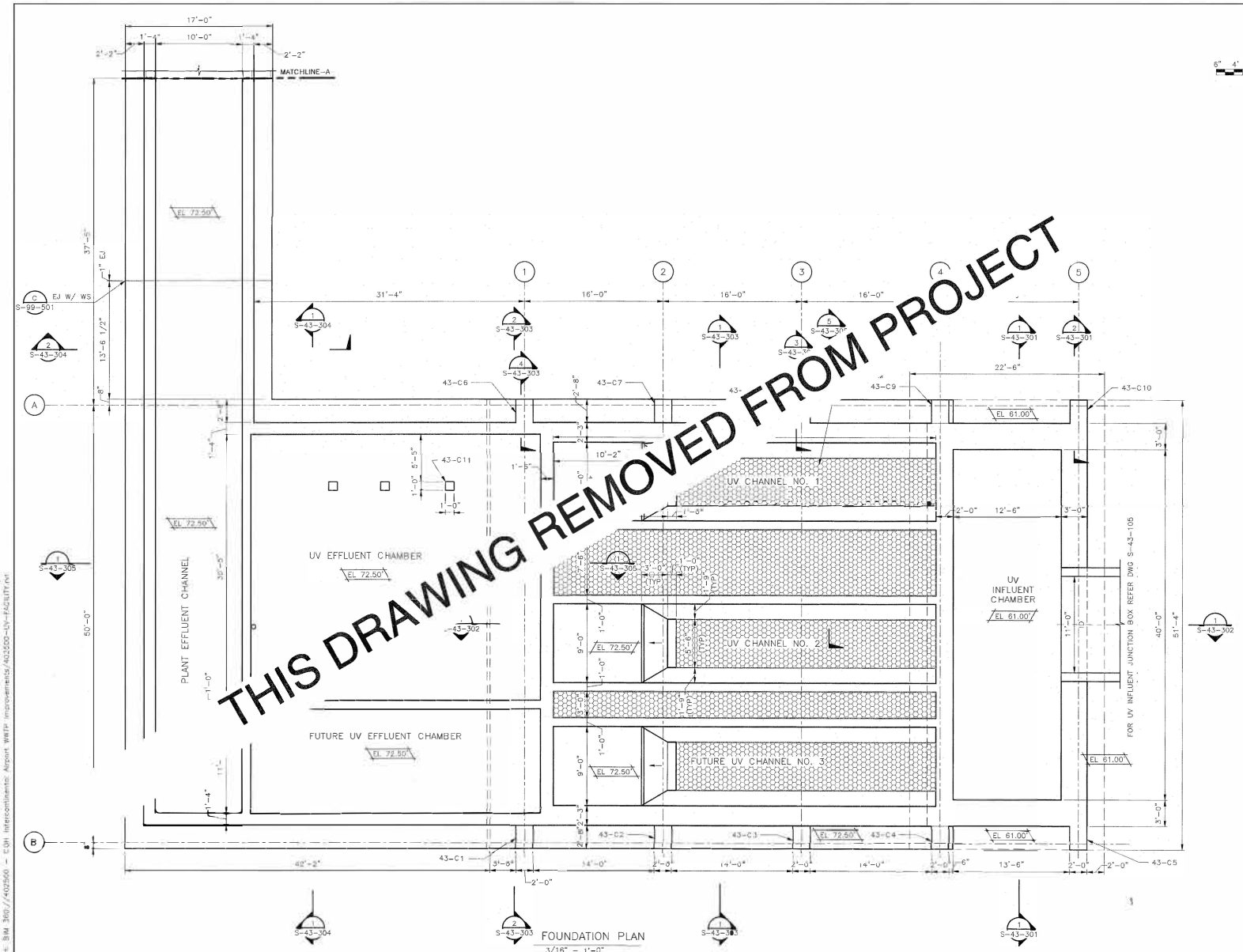
WBS NUMBER
R-00265-0147-4
DRAWING SCALE
AS NOTED
CITY OF HOUSTON PM
XIAOHUA (SHARI) LIN, P.E.

FOR CITY OF HOUSTON USE ONLY
STATE OF TEXAS
80367
REGISTERED
HARRIS, TEXAS

S-42-102

SHEET NO. 174 OF 379

FILE PATH: C:\pw_working\pw_americas\d1356535\S-42-102.dwg



FOUNDATION PLAN
3/16" = 1'-0"

THIS DRAWING REMOVED FROM PROJECT

GENERAL NOTES:

1. FOR GENERAL STRUCTURAL NOTES, REFER TO SHEET S-00-001
2. FOR STRUCTURAL ABBREVIATIONS , REFER TO SHEET S-00-003
3. FOR PIPING/PIPE OPENINGS, EQUIPMENT LOCATION AND DETAILS REFER TO RELEVANT MECHANICAL DRAWINGS M-43-101 THROUGH M-43-302.

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100

TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED
PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
STRUCTURAL
UV FACILITY
FOUNDATION PLAN

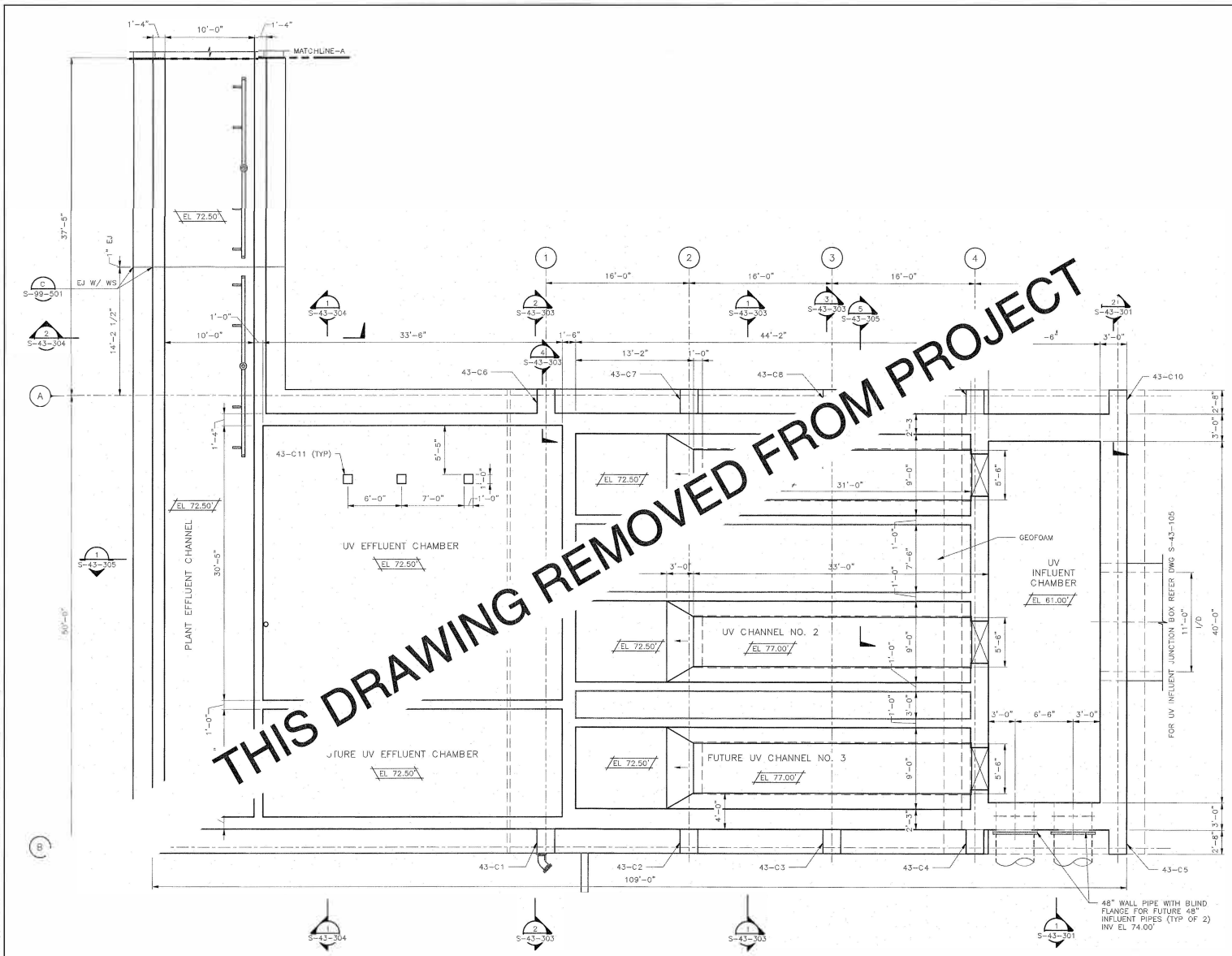
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 175 OF 379	

FOR CITY OF HOUSTON USE ONLY

80367
REGISTERED
PROFESSIONAL
ENGINEER

S-43-101

FILE PATH: BIM 360://402500 - CUH Intercontinental Airport WWTP Improvements/402500-UV-FACILITY.rvt



SECTIONAL PLAN AT EL 77.00
3/18" = 1'-0"

6" 4' 2' 0' 5' 10'
3/16" = 1'-0"

THIS DRAWING REMOVED FROM PROJECT

NOTE
1. FOR NOTES REFER TO DWG NO. S-43-101.

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED
PROFESSIONAL ENGINEER
11/11/2005

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

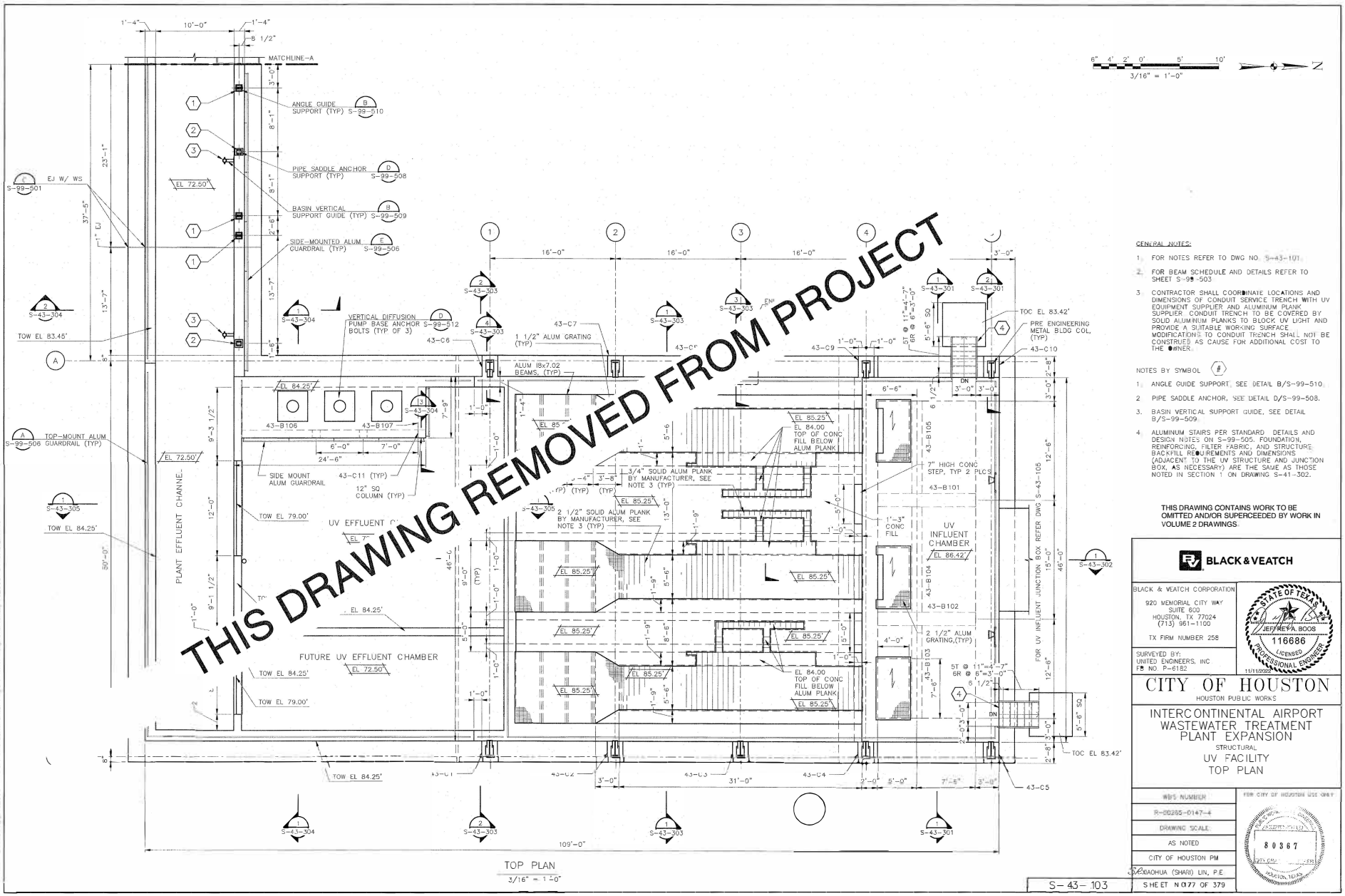
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
STRUCTURAL
UV FACILITY SECTIONAL PLAN

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 176 OF 379	

FOR CITY OF HOUSTON USE ONLY
80367

S-43-102

FILE PATH: BIM 360://402500 - CIH Intercontinental Airport WWTF Improvements/402500-UV-FACILITY.rvt



THIS DRAWING REMOVED FROM PROJECT

GENERAL NOTES:

1. FOR NOTES REFER TO DWG NO. S-43-101.
2. FOR BEAM SCHEDULE AND DETAILS REFER TO SHEET S-99-503.
3. CONTRACTOR SHALL COORDINATE LOCATIONS AND DIMENSIONS OF CONDUIT SERVICE TRENCH WITH UV EQUIPMENT SUPPLIER AND ALUMINUM PLANK SUPPLIER. CONDUIT TRENCH TO BE COVERED BY SOLID ALUMINUM PLANKS TO BLOCK UV LIGHT AND PROVIDE A SUITABLE WORKING SURFACE. MODIFICATIONS TO CONDUIT TRENCH SHALL NOT BE CONSTRUED AS CAUSE FOR ADDITIONAL COST TO THE OWNER.

NOTES BY SYMBOL (#)

1. ANGLE GUIDE SUPPORT, SEE DETAIL B/S-99-510.
2. PIPE SADDLE ANCHOR, SEE DETAIL D/S-99-508.
3. BASIN VERTICAL SUPPORT GUIDE, SEE DETAIL B/S-99-509.
4. ALUMINUM STAIRS PER STANDARD DETAILS AND DESIGN NOTES ON S-99-505. FOUNDATION, REINFORCING, FILTER FABRIC, AND STRUCTURE BACKFILL REQUIREMENTS AND DIMENSIONS (ADJACENT TO THE UV STRUCTURE AND JUNCTION BOX, AS NECESSARY) ARE THE SAME AS THOSE NOTED IN SECTION 1 ON DRAWING S-41-302.

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED PROFESSIONAL ENGINEER
11/11/2005

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

STRUCTURAL

UV FACILITY TOP PLAN

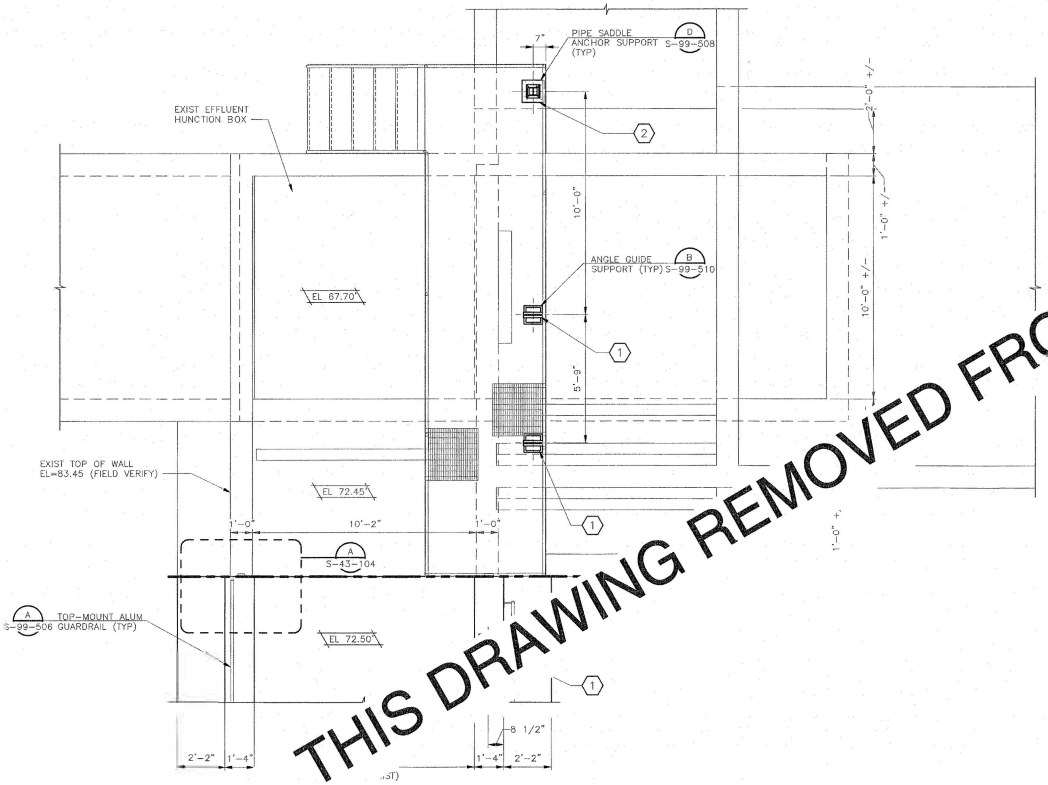
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	ALEXIAOHUA (SHARI) LIN, P.E.
SHEET NO.	77 OF 379

FOR CITY OF HOUSTON USE ONLY

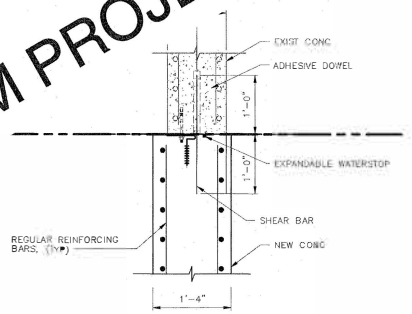
80367

S-43-103

FILE PATH: BIM 360://4402500 - IAH Intercontinental Airport WWTP Improvements/4402500-UV-FACILITY.rvt



OPERATING LEVEL – OUTFALL PLAN
3/8" = 1'-0"



DETAIL
S-43-104 1" = 1'-0"

NOTES:
1. PROVIDE #5 BARS @18" CTRS ACROSS JOINT UNLESS NOTED OTHERWISE.
2. REINFORCING STEEL SHALL NOT BE EXTENDED ACROSS JOINT UNLESS NOTED OTHERWISE.

12" 9" 6" 3" 0" 1' 2'
1" = 1'-0"

12" 0' 1' 2' 3' 4' 5' 6' 7'
3/8" = 1'-0"

GENERAL NOTE:
1. FOR NOTES REFER TO DWG NO. S-43-101.

NOTES BY SYMBOL (#)
1. ANGLE GUIDE SUPPORT, SEE DETAIL B/S-99-510.
2. PIPE SADDLE ANCHOR, SEE DETAIL D/S-99-508.

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

THIS DRAWING REMOVED FROM PROJECT

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED
PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

STRUCTURAL

UV FACILITY
OPERATING LEVEL–OUTFALL PLAN

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.

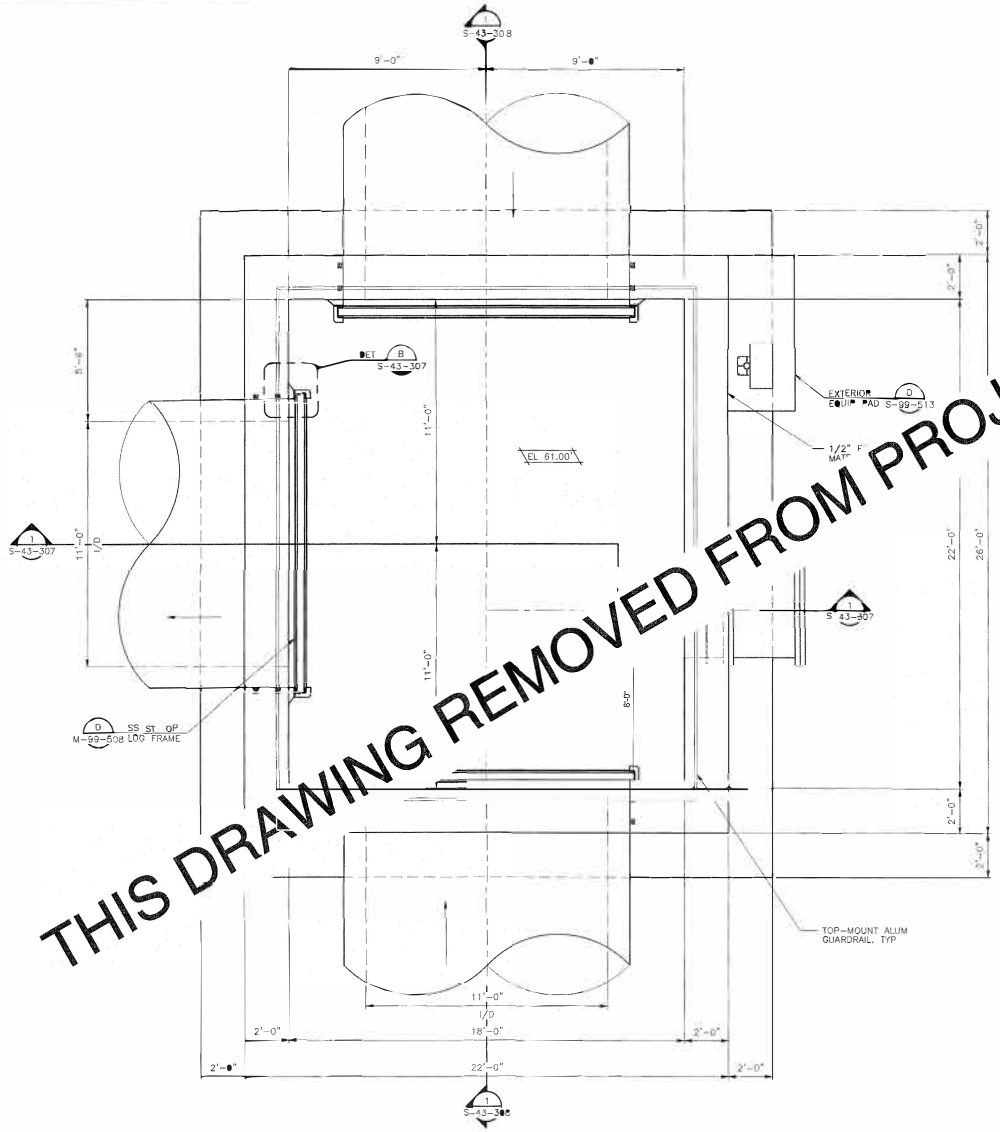
FOR CITY OF HOUSTON USE ONLY

80367
REGISTERED
PROFESSIONAL
ENGINEER
HOUSTON, TEXAS

S-4343-104

SHEET NO. 178 of 9

FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-UV-FACILITY.rvt



TOP PLAN
3/8" = 1'-0"

12" 0' 1' 2' 3' 4' 5' 6' 7'
3/8" = 1'-0"

GENERAL NOTE:

1. SLIDE GATE/STOP LOGS DETAILS SHALL BE AS PER MANUFACTURER REQUIREMENT.

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

THIS DRAWING REMOVED FROM PROJECT

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED
PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

STRUCTURAL

UV INFLUENT JUNCTION BOX PLAN

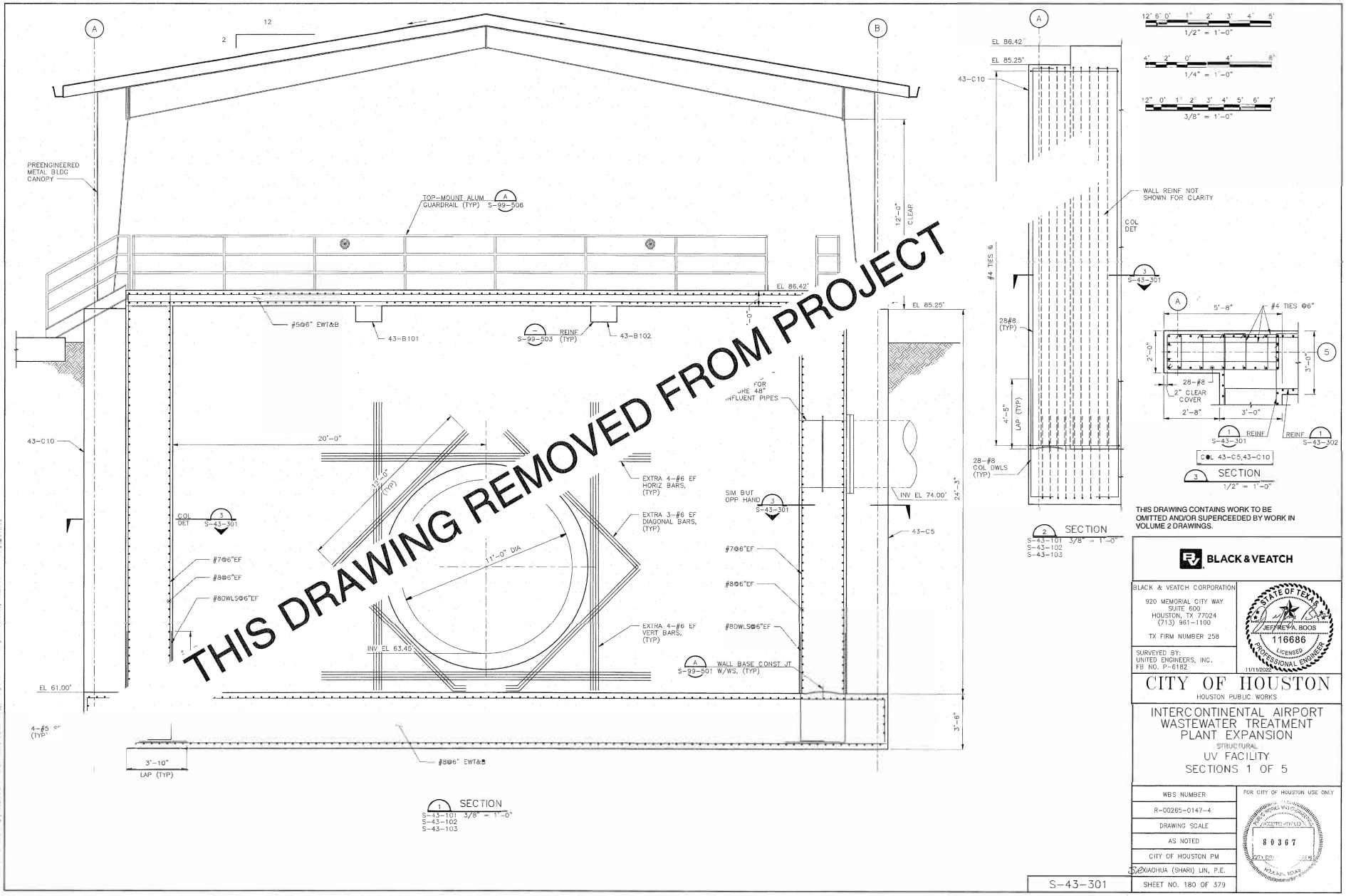
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 179 OF 379	

FOR CITY OF HOUSTON USE ONLY

80367

S-43-105

FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-UV-FACILITY.rvt



THIS DRAWING REMOVED FROM PROJECT

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

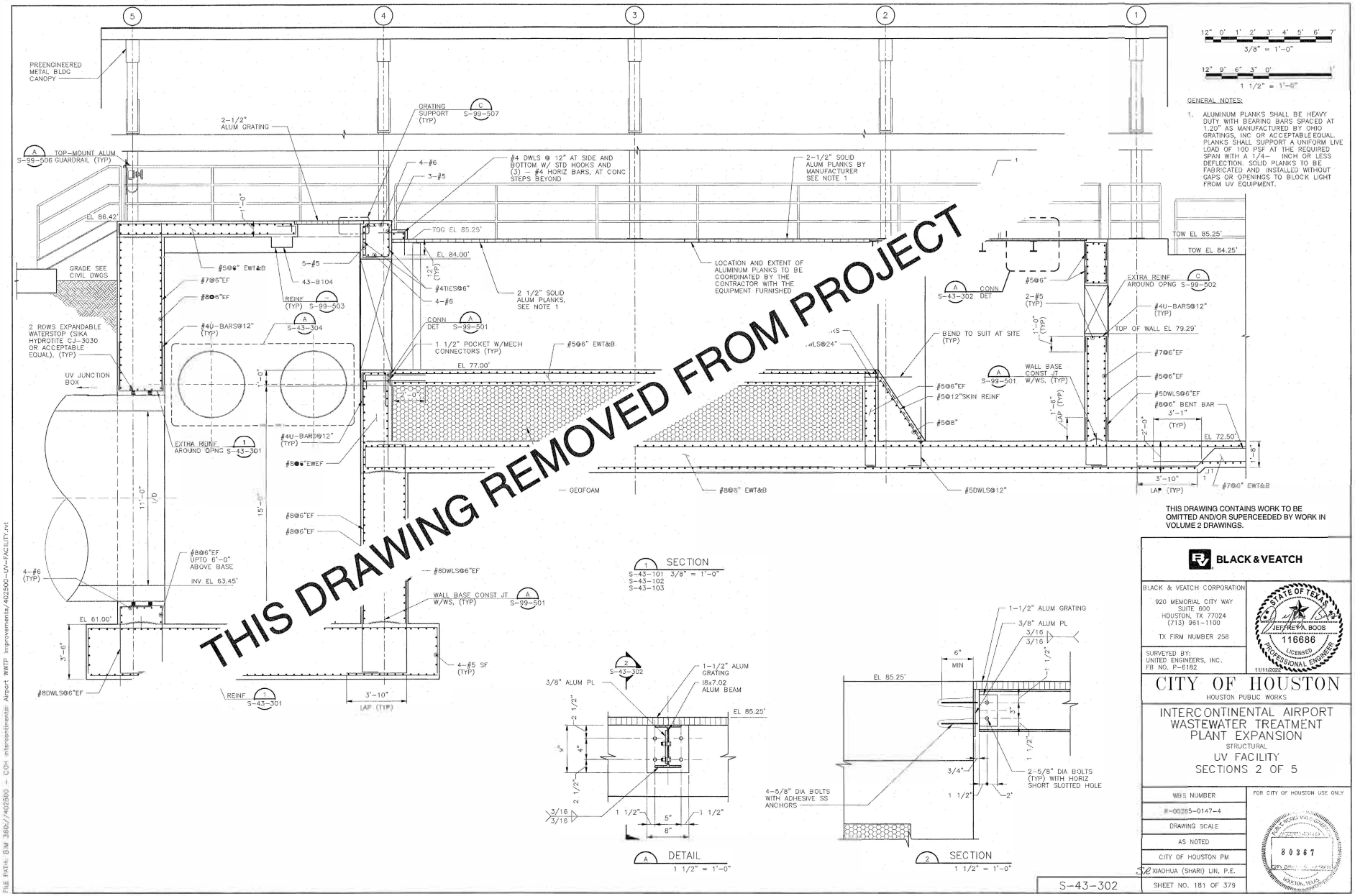
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
STRUCTURAL
UV FACILITY
SECTIONS 1 OF 5

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 180 OF 379	

FOR CITY OF HOUSTON USE ONLY
80367

S-43-301

FILE PATH: BW 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-UV-S-43UTY.rvt



GENERAL NOTES:

1. ALUMINUM PLANKS SHALL BE HEAVY DUTY WITH BEARING BARS SPACED AT 1.20" AS MANUFACTURED BY OHIO GRATINGS, INC OR ACCEPTABLE EQUAL. PLANKS SHALL SUPPORT A UNIFORM LIVE LOAD OF 100 PSF AT THE REQUIRED SPAN WITH A 1/4- INCH OR LESS DEFLECTION. SOLID PLANKS TO BE FABRICATED AND INSTALLED WITHOUT GAPS OR OPENINGS TO BLOCK LIGHT FROM UV EQUIPMENT.

THIS DRAWING REMOVED FROM PROJECT

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED
PROFESSIONAL ENGINEER
11/11/2020

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

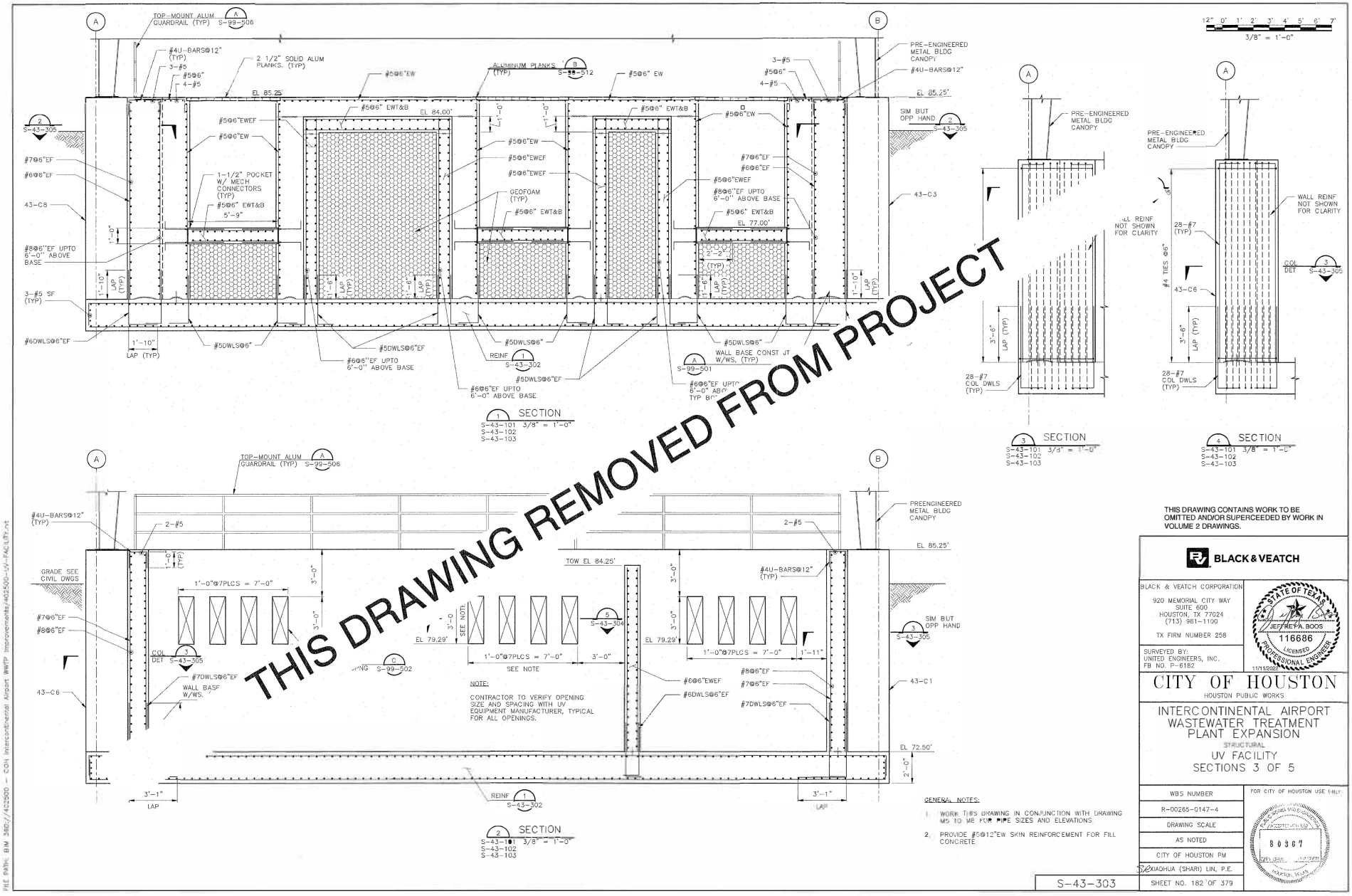
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
STRUCTURAL
UV FACILITY
SECTIONS 2 OF 5

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-002165-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 181 OF 379	

80387

S-43-302

FILE PATH: B:\w 360\402360 - COH intercontinental Airport WWTP Improvements\402500-UV-FACILITY.rvt



THIS DRAWING REMOVED FROM PROJECT

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

STRUCTURAL

UV FACILITY SECTIONS 3 OF 5

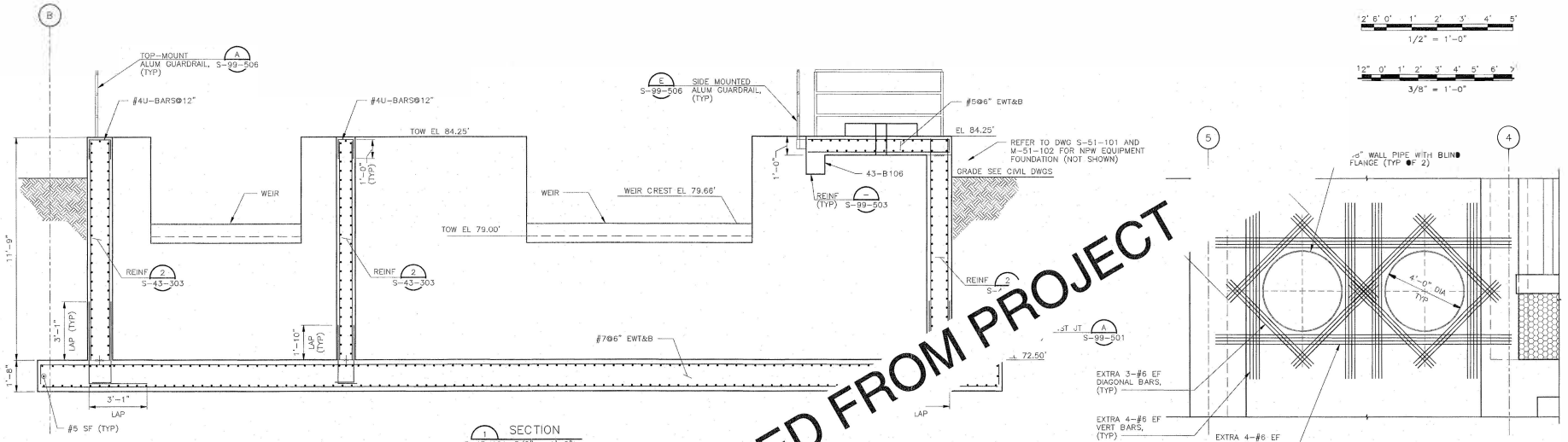
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 182 OF 379	

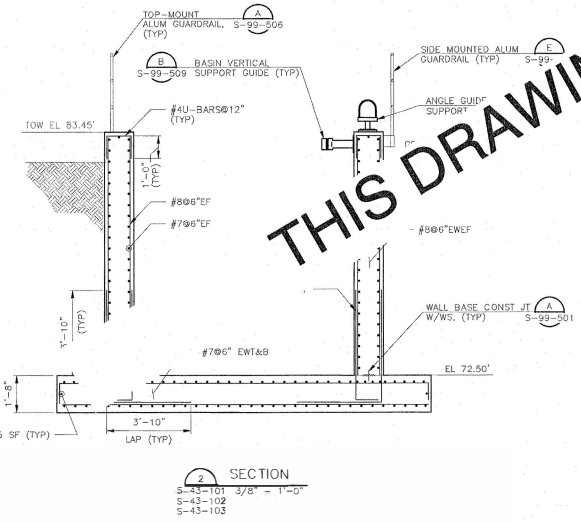
FOR CITY OF HOUSTON USE ONLY

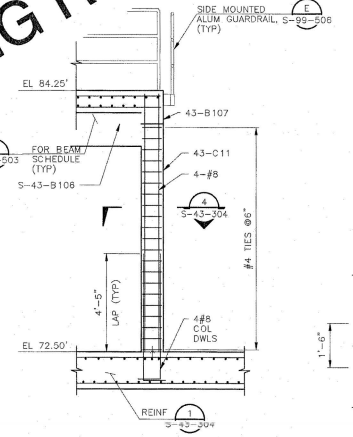
80367

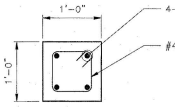
S-43-303

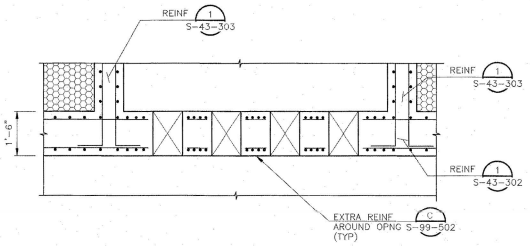
FILE PATH: BIM 360://422500 - COH Intercontinental Airport WWTP Improvements/422500-uv-FACILITY.rvt











THIS DRAWING REMOVED FROM PROJECT

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

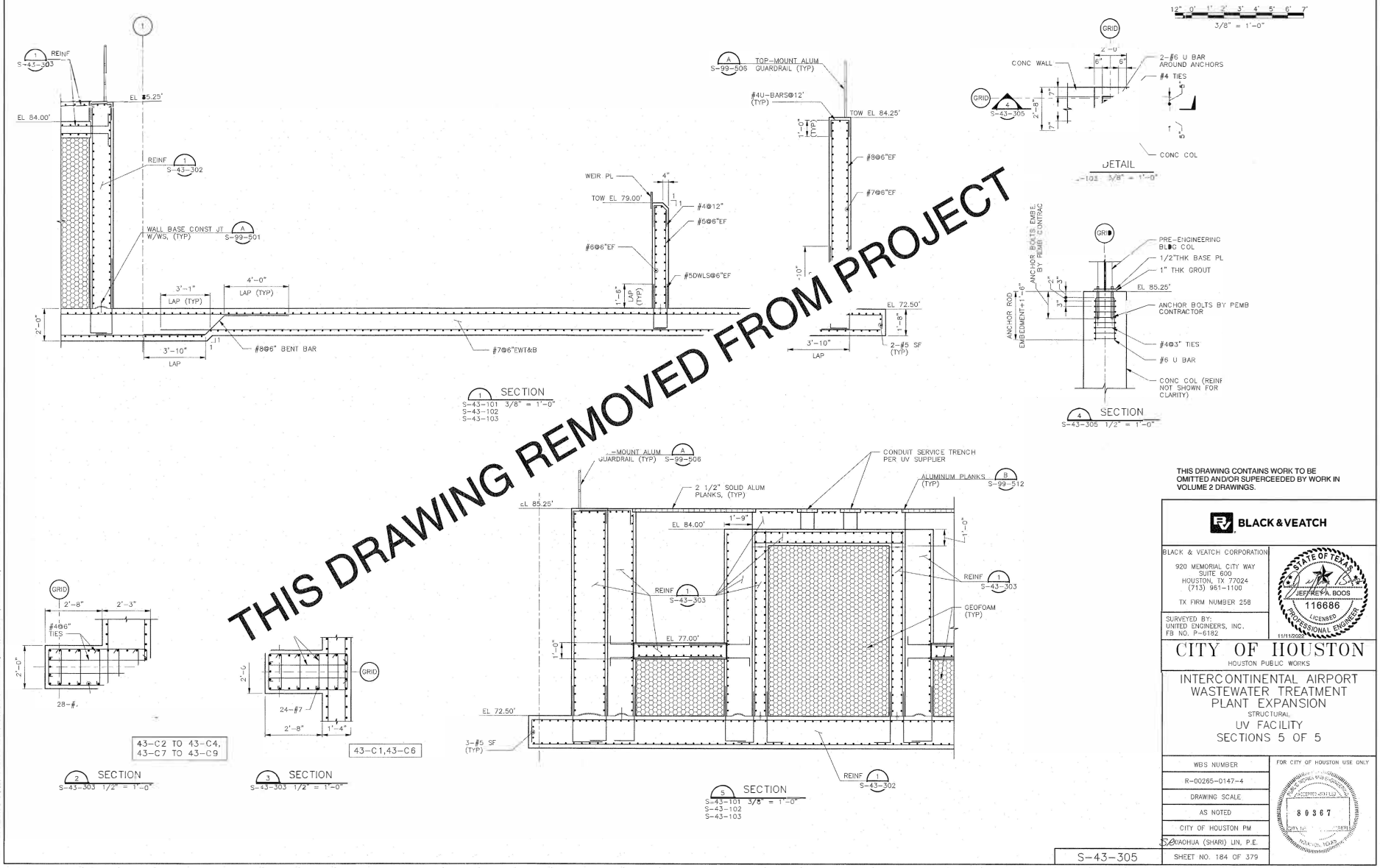
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
STRUCTURAL
UV FACILITY
SECTIONS 4 OF 5

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 183 OF 379	

FOR CITY OF HOUSTON USE ONLY
80367

S-43-304

FILE PATH: BIM 360://402500 - C2M Intercontinental Airport WWTP Improvements/402500-UV-FACILITY.rvt



THIS DRAWING REMOVED FROM PROJECT

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED PROFESSIONAL ENGINEER
11/11/2025

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

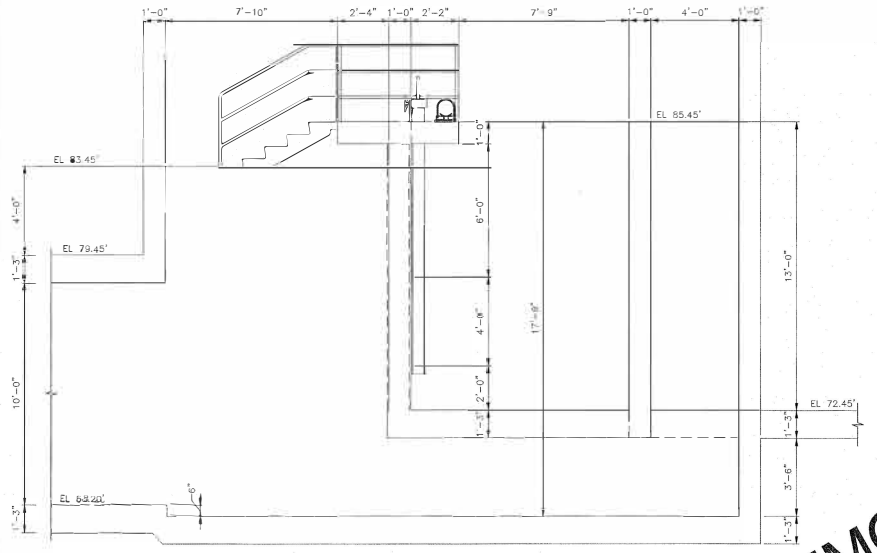
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
STRUCTURAL
UV FACILITY
SECTIONS 5 OF 5

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 184 OF 379	

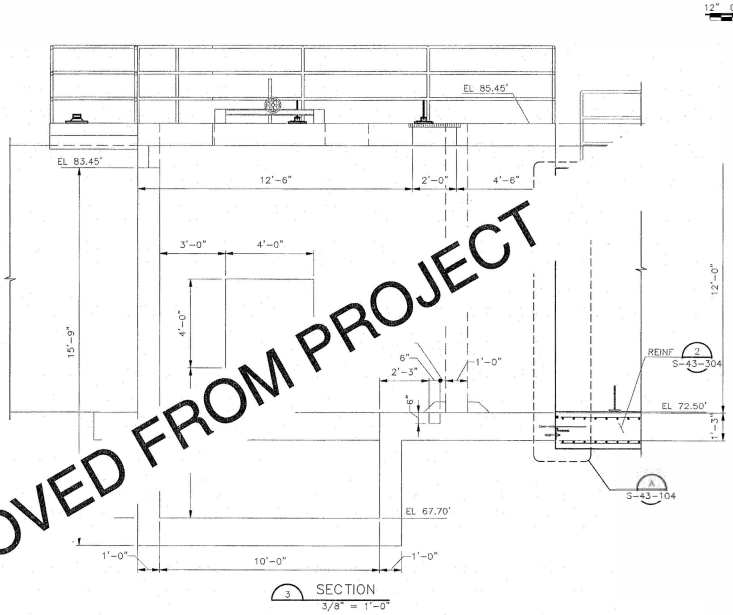
FOR CITY OF HOUSTON USE ONLY
80367

S-43-305

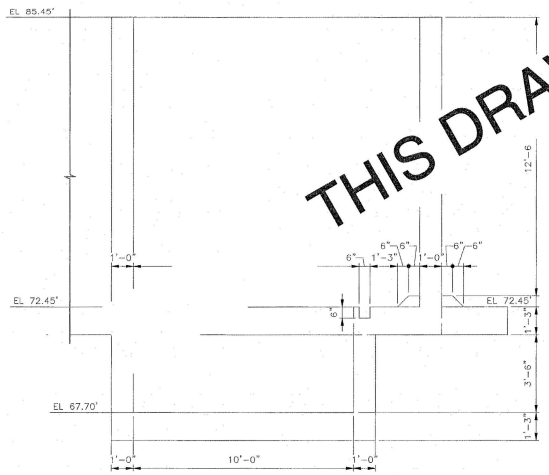
FILE PATH: RVT 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-UV-FACILITY.rvt



1 SECTION
3/8" = 1'-0"



3 SECTION
3/8" = 1'-0"



2 SECTION
3/8" = 1'-0"

THIS DRAWING REMOVED FROM PROJECT

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED
PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

STRUCTURAL

UV EFFLUENT JUNCTION BOX SECTIONS

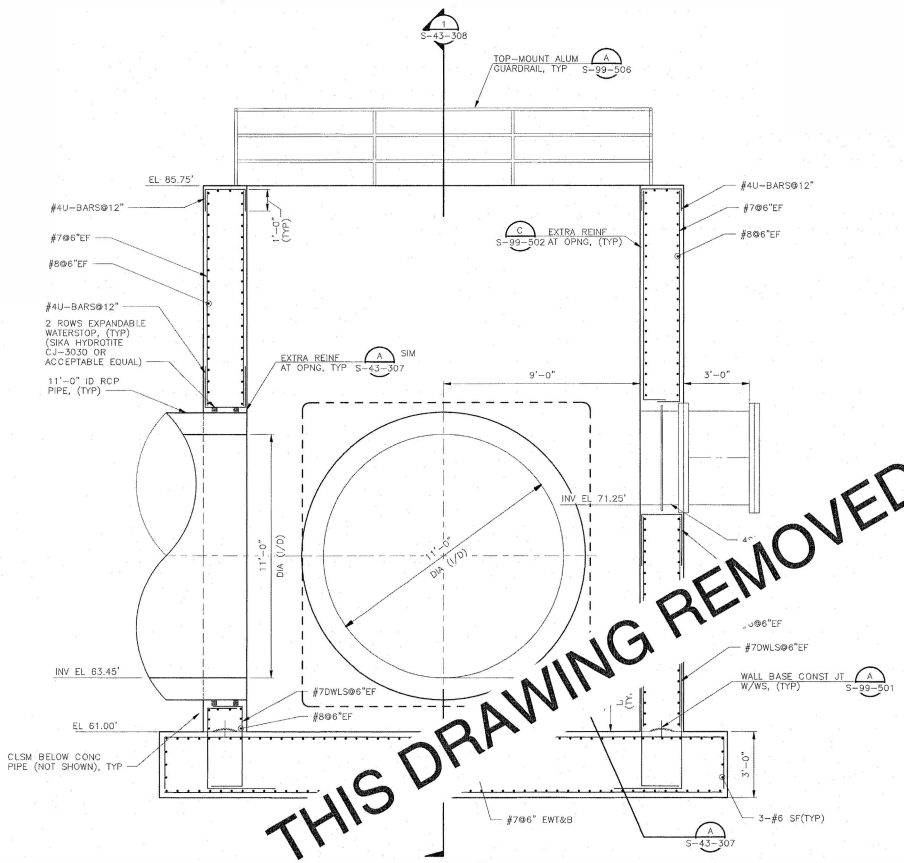
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 185 OF 379	

FOR CITY OF HOUSTON USE ONLY

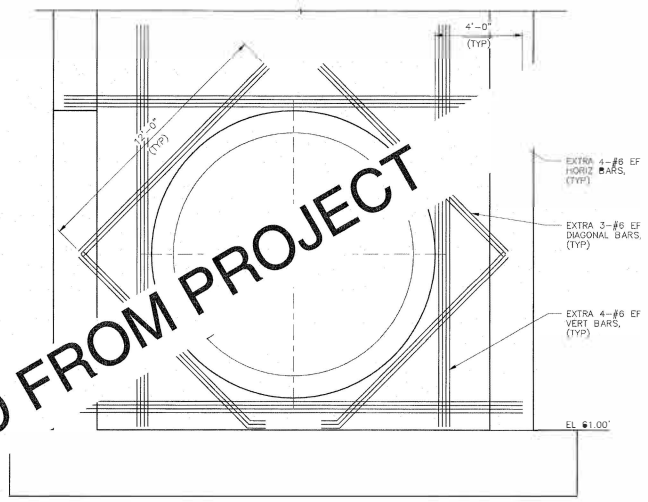
ACCEPTED AS NOTED
80367

S-43-306

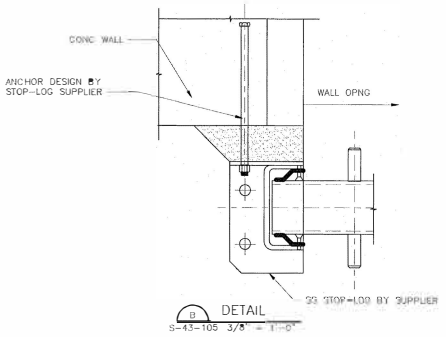
FILE PATH: BIM 360://402500 - CoH Intercontinental Airport WWTP Improvements/402500-UV-FACILITY.rvt



1 SECTION
S-43-105 3/8" = 1'-0"



A DETAIL
S-43-307 3/8" = 1'-0"



B DETAIL
S-43-105 3/8" = 1'-0"

12" 6" 1' 2" 3' 4' 5' 6' 7'
3/8" = 1'-0"

GENERAL NOTES:

1. STOP LOGS AND FRAME NOT SHOWN FOR CLARITY.

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

THIS DRAWING REMOVED FROM PROJECT

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100

TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED
PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

STRUCTURAL

UV INFLUENT JUNCTION BOX SECTION 1 OF 2

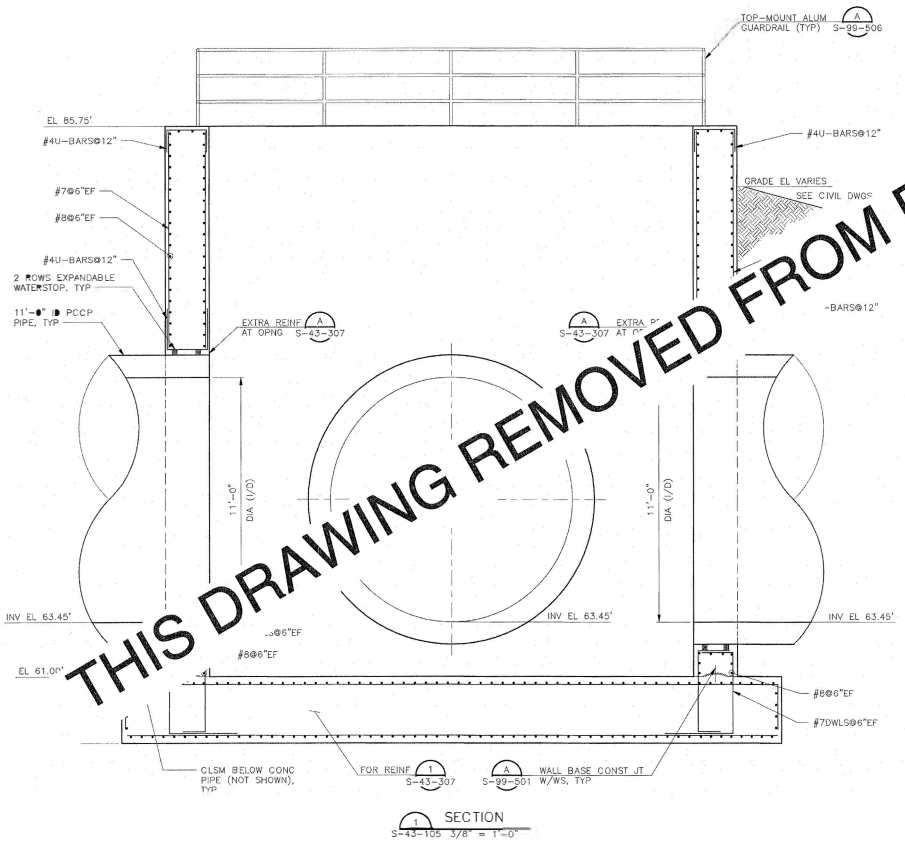
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 180 OF 379	

FOR CITY OF HOUSTON USE ONLY

80367

S-43-307

FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-UV-FACILITY.rvt



1 SECTION
S-43-105 3/8" = 1'-0"

THIS DRAWING REMOVED FROM PROJECT

12" 0" 1' 2' 3' 4' 5' 6" 7'
3/8" = 1'-0"

GENERAL NOTES:

1. STOP LOGS AND FRAME NOT SHOWN FOR CLARITY.

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

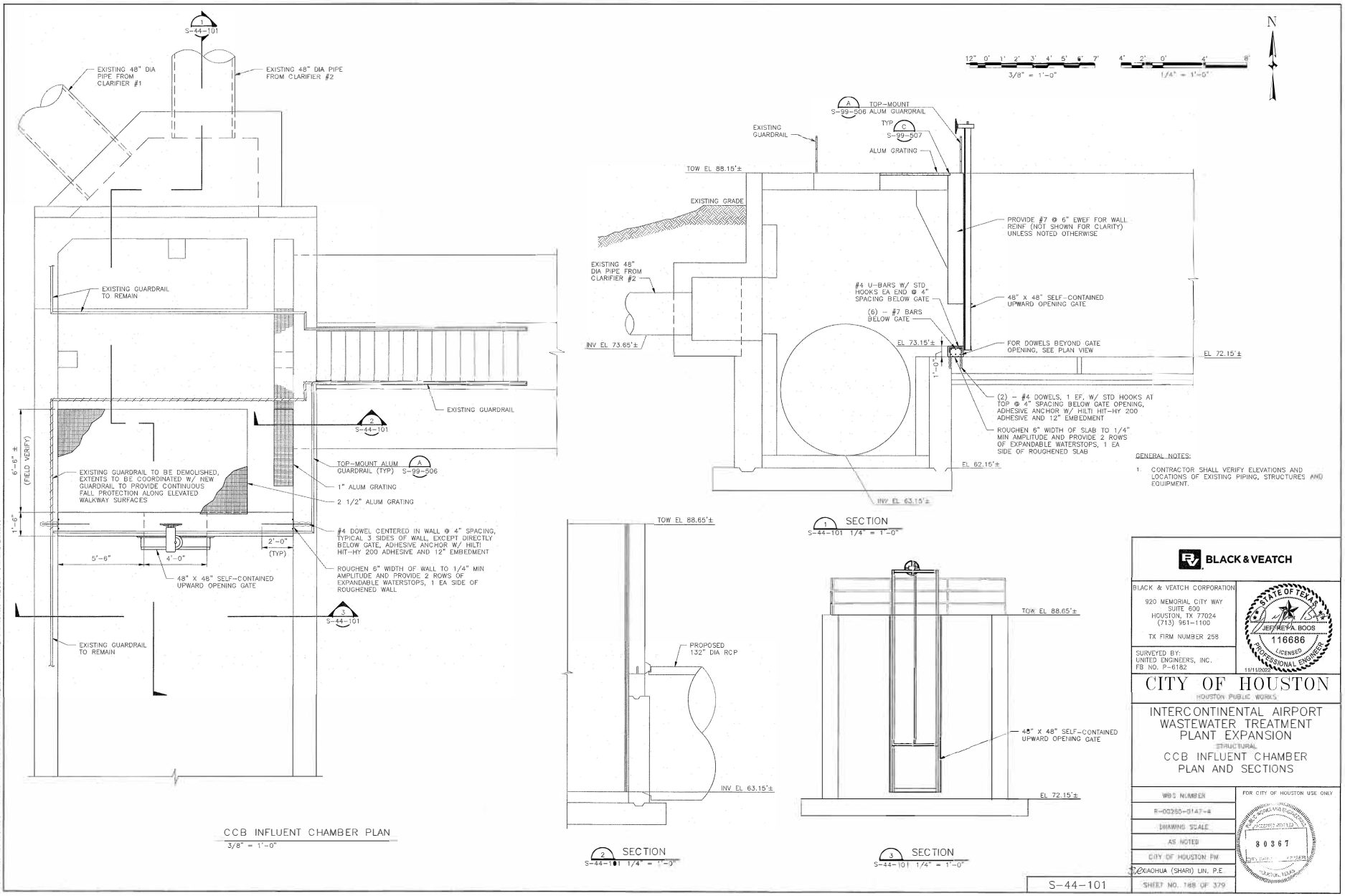
INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT
PLANT EXPANSION
STRUCTURAL
UV INFLUENT JUNCTION BOX
SECTION 2 OF 2

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 187 OF 379	

FOR CITY OF HOUSTON USE ONLY
80367

S-43-308

FILE PATH: BIM 360://402500 - City Intercontinental Airport WWTP Improvements/402500-UV-FACILITY.rvt



BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED PROFESSIONAL ENGINEER
11/11/2025

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

STRUCTURAL

CCB INFLUENT CHAMBER PLAN AND SECTIONS

WBS NUMBER	R-00350-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 188 OF 379	

FOR CITY OF HOUSTON USE ONLY

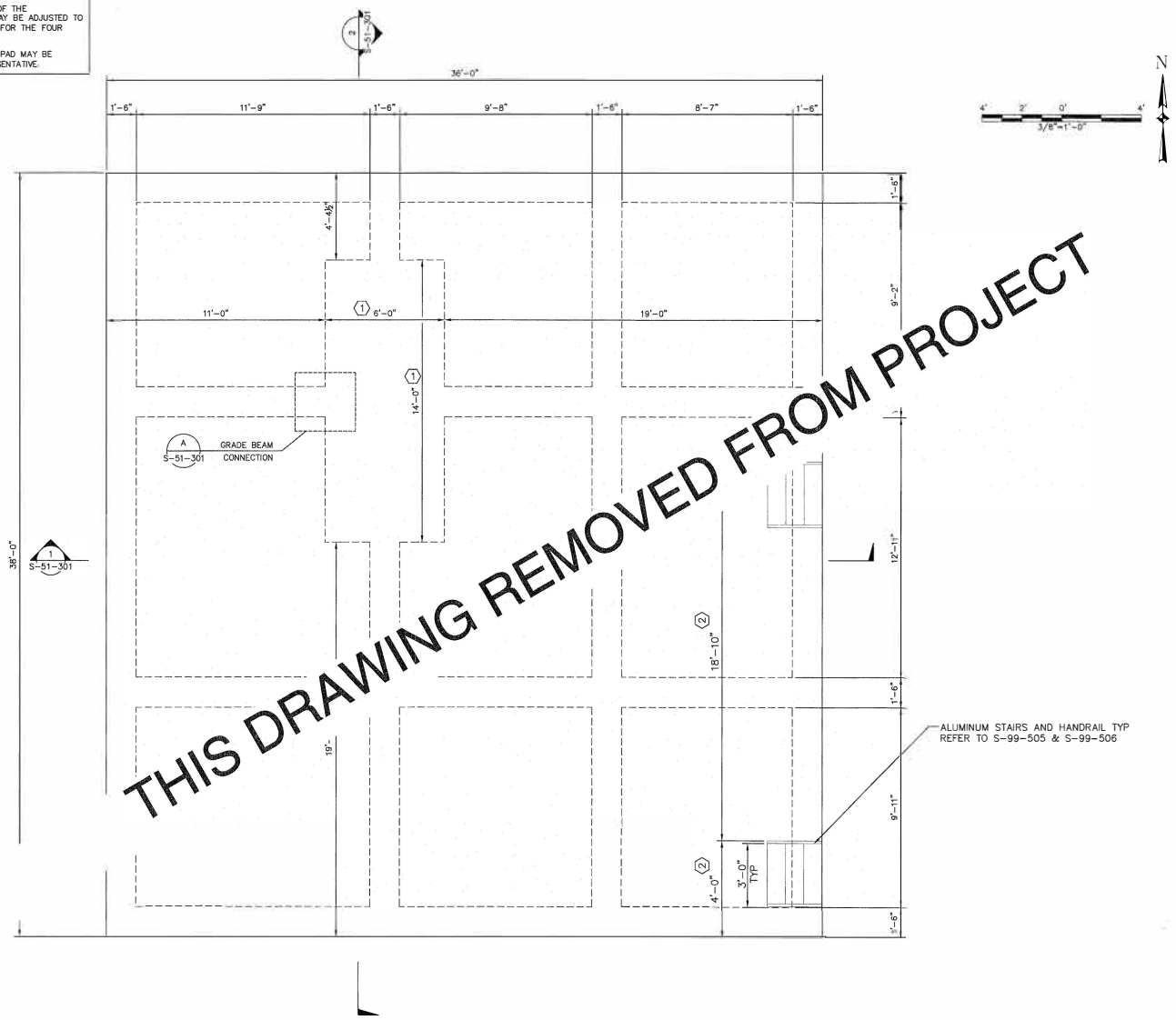
80367

S-44-101

FILE PATH: BIM 360://403500 - COH Intercontinental Airport WWTP Improvements/403500-W-FACILITY.rvt

NOTES BY SYMBOL (X)

1. IF REQUIRED, THE DIMENSIONS OF THE HYDRO-PNEUMATIC TANK PAD MAY BE ADJUSTED TO ALLOW FOR ADEQUATE SPACING FOR THE FOUR PEDESTAL SUPPORTS.
2. EXACT LOCATION OF STAIRS ON PAD MAY BE ADJUSTED PER OWNER'S REPRESENTATIVE.



NPW STATION PAD
3/8"=1'-0"

N

4' 2' 0' 4'
3/8"=1'-0"

THIS DRAWING REMOVED FROM PROJECT

SHEET NOTES:

1. FOUNDATION DESIGN IS IN ACCORDANCE WITH SUBSURFACE EXPLORATION BY GEOTECH ENGINEERING AND TESTING, HOUSTON TEXAS, JOB NUMBER 19-01E DATED NOVEMBER 24, 2021. COPIES OF THE REPORT MAY BE OBTAINED FROM THE OWNER. ALL BIDDERS MUST BECOME FAMILIAR WITH THE CONTENTS OF THIS REPORT. THE FOLLOWING INFORMATION IS PROVIDED TO ASSIST IN THE LEVEL OF UNDERSTANDING OF THE SUBSURFACE CONDITIONS BUT SHALL NOT BE CONSIDERED TO COMPLETELY DESCRIBE ALL CONDITIONS PRESENT AND RELEVANT TO THE FOUNDATION CONSTRUCTION.
2. SITE CONDITIONS AT THE NPW PAD, B-2, GENERALLY CONSIST OF THE FOLLOWING:
   0'-2' FILL: LEAN CLAY (CL)
   2'-14' LEAN CLAY (CL)
   14'-33' FAT CLAY (CH)

   HE TIME OF TESTING, GROUNDWATER WAS ENCOUNTERED DEPTH OF 21 FT. GROUNDWATER LEVELS MAY BE NT DURING CONSTRUCTION.
   . FOUNDATION HAS BEEN DESIGNED FOR BEARING INTO SOIL AT A MINIMUM OF 1'-6" BELOW FINAL GRADE. THE GRADE BEAMS HAVE BEEN DESIGNED FOR A NET ALLOWABLE SOIL BEARING PRESSURE OF 2500 PSF.
5. REMOVE UPPER 3 FT OF EXISTING SOILS FROM FOOTING AND REPLACE WITH COMPACTED SELECT STRUCTURAL FILL. THE SELECT STRUCTURAL FILL SHALL EXTEND 5 FT BEYOND THE STRUCTURE PERIMETER. THESE SOILS SHALL BE PLACED IN LOOSE LIFTS NOT EXCEEDING 8" AND COMPACTED TO 95% OF MAXIMUM STANDARD DENSITY (ASTM D-698) AND THE MOISTURE CONTENT ADJUSTED OPTIMUM AND 3%.
6. PROPER DRAINAGE SHALL BE MAINTAINED AT ALL TIMES BOTH UNDER AND ADJACENT TO FOUNDATIONS. EXCAVATIONS SHALL AT NO TIME BE ALLOWED TO RETAIN WATER. IF EXCAVATIONS BECOME WET, THE WET MATERIALS SHALL BE REMOVED TO DRY, SOUND MATERIAL AND THE TESTING LABORATORY SHALL PERFORM TESTS TO CONFIRM APPROPRIATE DENSITY PRIOR TO PLACEMENT OF CONCRETE.

GENERAL NOTES:

1. REFER TO CIVIL, MECHANICAL, AND ELECTRICAL SHEETS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
2. SEE STRUCTURAL GENERAL NOTES, STANDARD DETAILS, AND PROJECT SPECIFICATIONS FOR ADDITIONAL INFORMATION NOT SHOWN.
3. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS PRIOR TO CONSTRUCTION OR ORDERING MATERIALS.
4. CONDUIT AND PIPE PENETRATIONS SHALL AVOID STUBBING THROUGH GRADE BEAMS. ADDITIONALLY, GRADE BEAM AND SLAB REINFORCEMENT SHALL NOT BE CUT TO ACCOMMODATE CONDUIT. SEE STRUCTURAL STANDARD DETAILS FOR SLAB REINFORCEMENT TREATMENT AT PENETRATIONS AND BLOCKOUTS.

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

CP&Y, INC.
TEXAS REGISTERED ENGINEERING FIRM F-1741

BLACK & VEATCH

CP&Y, INC.
11757 KATY FREEWAY
SUITE 1540
HOUSTON, TX 77079
(713) 532-1730
TX FIRM NUMBER F-1741

SURVEYED BY:
FB NO. 000000

STATE OF TEXAS
JEFFREY P. WOUTERS
80701
REGISTERED PROFESSIONAL ENGINEER
11-07-2022

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

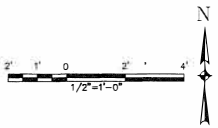
NPW PAD PLAN

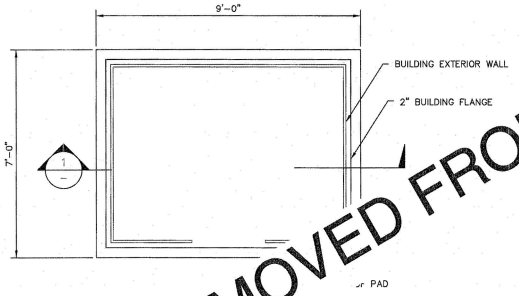
WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO.: 189 OF 379	

80367

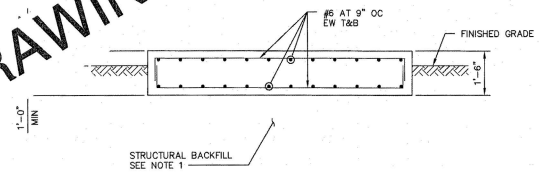
S-51-101

FILE PATH: C:\pw_working\pw_americas\d1366538\S-51-101.dwg





NPW C[illegible]AD PLAN
1/2"



NOTES:
1. REMOVE AND REPLACE EXISTING SOILS WITH STRUCTURAL BACKFILL TO A DEPTH OF 6 FEET BELOW FOUNDATION AND EXTENDING 5 FEET, EACH SIDE, BEYOND THE FOOTPRINT OF THE FOUNDATION AND SLOPING UP TOWARDS GRADE AT A 1 TO 1 SLOPE. PROVIDE FILTER FABRIC TYPR A BELOW STRUCTURAL BACKFILL.

1 SECTION
1/2" = 1'-0"

THIS DRAWING REMOVED FROM PROJECT

SHEET NOTES:

1. FOUNDATION DESIGN IS IN ACCORDANCE WITH SUBSURFACE EXPLORATION BY GEOTECH ENGINEERING AND TESTING, HOUSTON TEXAS, JOB NUMBER 19-01E DATED NOVEMBER 24, 2021. COPIES OF THE REPORT MAY BE OBTAINED FROM THE OWNER. ALL BIDDERS MUST BECOME FAMILIAR WITH THE CONTENTS OF THIS REPORT. THE FOLLOWING INFORMATION IS PROVIDED TO ASSIST IN THE LEVEL OF UNDERSTANDING OF THE SUBSURFACE CONDITIONS BUT SHALL NOT BE CONSIDERED TO COMPLETELY DESCRIBE ALL CONDITIONS PRESENT AND RELEVANT TO THE FOUNDATION CONSTRUCTION.
2. SITE CONDITIONS AT THE NPW CHEMICAL FEED PAD, B-2, GENERALLY CONSIST OF THE FOLLOWING:
   0'-2' FILL:LEAN CLAY (CL)
   2'-14' LEAN CLAY (CL)
   14'-33' FAT CLAY (CH)

   'E TIME OF TESTING, GROUNDWATER WAS ENCOUNTERED 'EPTH OF 21 FT. GROUNDWATER LEVELS MAY BE NT DURING CONSTRUCTION.

   FOUNDATION HAS BEEN DESIGNED FOR BEARING INTO SOIL AT A MINIMUM OF 12" BELOW FINAL GRADE. THE GRADE BEAMS HAVE BEEN DESIGNED FOR A NET ALLOWABLE SOIL BEARING PRESSURE OF 2500 PSF.
5. THE SELECT STRUCTURAL FILL SHALL EXTEND 5 FT BEYOND THE STRUCTURE PERIMETER. THESE SOILS SHALL BE PLACED IN LOOSE LIFTS NOT EXCEEDING 8" AND COMPACTED TO 95% OF MAXIMUM STANDARD DENSITY (ASTM D-698) AND THE MOISTURE CONTENT ADJUSTED OPTIMUM AND 3%.
6. PROPER DRAINAGE SHALL BE MAINTAINED AT ALL TIMES BOTH UNDER AND ADJACENT TO FOUNDATIONS. EXCAVATIONS SHALL AT NO TIME BE ALLOWED TO RETAIN WATER. IF EXCAVATIONS BECOME WET, THE WET MATERIALS SHALL BE REMOVED TO DRY, SOUND MATERIAL AND THE TESTING LABORATORY SHALL PERFORM TESTS TO CONFIRM APPROPRIATE DENSITY PRIOR TO PLACEMENT OF CONCRETE.

GENERAL NOTES:

1. REFER TO CIVIL, MECHANICAL, AND ELECTRICAL SHEETS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
2. SEE STRUCTURAL GENERAL NOTES, STANDARD DETAILS, AND PROJECT SPECIFICATIONS FOR ADDITIONAL INFORMATION NOT SHOWN.
3. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS PRIOR TO CONSTRUCTION OR ORDERING MATERIALS.
4. CONDUIT AND PIPE PENETRATIONS SHALL AVOID STUBBING THROUGH GRADE BEAMS. ADDITIONALLY, GRADE BEAM AND SLAB REINFORCEMENT SHALL NOT BE CUT TO ACCOMMODATE CONDUIT. SEE STRUCTURAL STANDARD DETAILS FOR SLAB REINFORCEMENT TREATMENT AT PENETRATIONS AND BLOCKOUTS.

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

CP&Y, INC.
TEXAS REGISTERED ENGINEERING FIRM F-1741

BLACK & VEATCH

CP&Y, INC.
11757 KATY FREEWAY
SUITE 1540
HOUSTON, TX 77079
(713) 532-1730
TX FIRM NUMBER F-1741

SURVEYED BY:
FB NO. 000000

STATE OF TEXAS
JEFFREY P. WOUTERS
80701
REGISTERED PROFESSIONAL ENGINEER
11-07-2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

NPW CHEMICAL FEED PAD PLAN AND SECTION

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 190 OF 379	

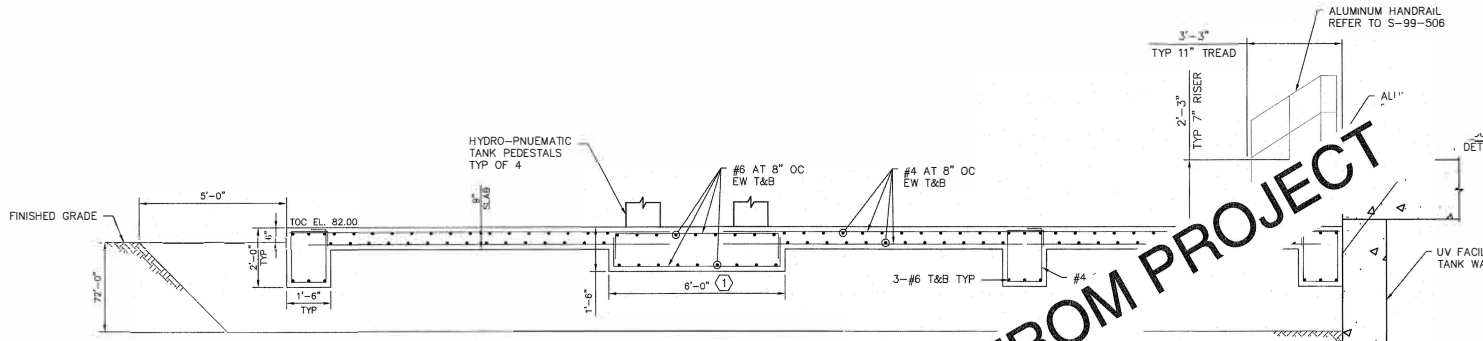
80367

S-51-102

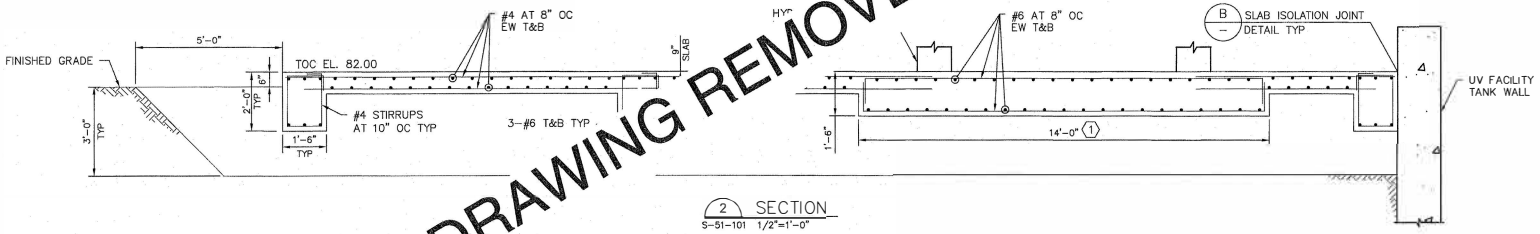
FILE PATH: C:\pw_working\pw_americas\d136658\S-51-102.dwg

NOTES BY SYMBOL (X)

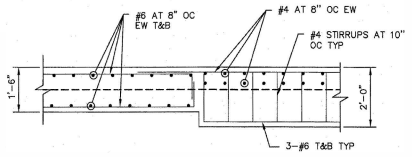
1. IF REQUIRED, THE DIMENSIONS OF THE HYDRO-PNEUMATIC TANK PAD MAY BE ADJUSTED TO ALLOW FOR ADEQUATE SPACING FOR THE FOUR PEDESTAL SUPPORTS.
2. PROVIDE VERTICAL SHORT-SLOTTED HOLES IN FLANGE CONNECTING TO THE UV FACILITY TANK WALL.



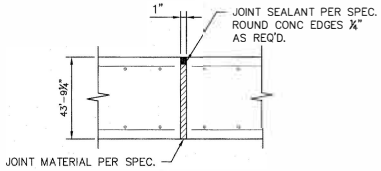
1 SECTION
S-51-101 1/2"=1'-0"



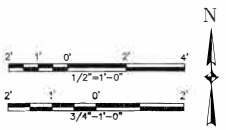
2 SECTION
S-51-101 1/2"=1'-0"



A GRADE BEAM CONNECTION
S-51-101 1/2"=1'-0"



B SLAB ISOLATION JOINT DETAIL
3/4"=1'-0"



SHEET NOTES:

1. FOUNDATION DESIGN IS IN ACCORDANCE WITH SUBSURFACE EXPLORATION BY GEOTECH ENGINEERING AND TESTING, HOUSTON TEXAS, JOB NUMBER 19-01E DATED NOVEMBER 24, 2021. COPIES OF THE REPORT MAY BE OBTAINED FROM THE OWNER. ALL BIDDERS MUST BECOME FAMILIAR WITH THE CONTENTS OF THIS REPORT. THE FOLLOWING INFORMATION IS PROVIDED TO ASSIST IN THE LEVEL OF UNDERSTANDING OF THE SUBSURFACE CONDITIONS BUT SHALL NOT BE CONSIDERED TO COMPLETELY DESCRIBE ALL CONDITIONS PRESENT AND RELEVANT TO THE FOUNDATION CONSTRUCTION.
2. SITE CONDITIONS AT THE NPW PAD, B-2, GENERALLY CONSIST OF THE FOLLOWING:
   0'-2' FILL: LEAN CLAY (CL)
   2'-14' LEAN CLAY (CL)
   14'-33' FAT CLAY (CH)

   THE TIME OF TESTING, GROUNDWATER WAS ENCOUNTERED DEPTH OF 21 FT. GROUNDWATER LEVELS MAY BE ENT DURING CONSTRUCTION.

   UNDATION HAS BEEN DESIGNED FOR BEARING INTO SOIL AT A MINIMUM OF 1'-6" BELOW FINAL GRADE. THE GRADE BEAMS HAVE BEEN DESIGNED FOR A NET ALLOWABLE SOIL BEARING PRESSURE OF 2500 PSF.
5. REMOVE UPPER 3 FT OF EXISTING SOILS FROM FOOTING AND REPLACE WITH COMPACTED SELECT STRUCTURAL FILL. THE SELECT STRUCTURAL FILL SHALL EXTEND 5 FT BEYOND THE STRUCTURE PERIMETER. THESE SOILS SHALL BE PLACED IN LOOSE LIFTS NOT EXCEEDING 8" AND COMPACTED TO 95% OF MAXIMUM STANDARD DENSITY (ASTM D-698) AND THE MOISTURE CONTENT ADJUSTED OPTIMUM AND 3%.
6. PROPER DRAINAGE SHALL BE MAINTAINED AT ALL TIMES BOTH UNDER AND ADJACENT TO FOUNDATIONS. EXCAVATIONS SHALL AT NO TIME BE ALLOWED TO RETAIN WATER. IF EXCAVATIONS BECOME WET, THE WET MATERIALS SHALL BE REMOVED TO DRY, SOUND MATERIAL AND THE TESTING LABORATORY SHALL PERFORM TESTS TO CONFIRM APPROPRIATE DENSITY PRIOR TO PLACEMENT OF CONCRETE.

GENERAL NOTES:

1. REFER TO CIVIL, MECHANICAL, AND ELECTRICAL SHEETS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
2. SEE STRUCTURAL GENERAL NOTES, STANDARD DETAILS, AND PROJECT SPECIFICATIONS FOR ADDITIONAL INFORMATION NOT SHOWN.
3. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS PRIOR TO CONSTRUCTION OR ORDERING MATERIALS.
4. CONDUIT AND PIPE PENETRATIONS SHALL AVOID STUBBING THROUGH GRADE BEAMS. ADDITIONALLY, GRADE BEAM AND SLAB REINFORCEMENT SHALL NOT BE CUT TO ACCOMMODATE CONDUIT. SEE STRUCTURAL STANDARD DETAILS FOR SLAB REINFORCEMENT TREATMENT AT PENETRATIONS AND BLOCKOUTS.

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

THIS DRAWING REMOVED FROM PROJECT

CP&Y, INC.
TEXAS REGISTERED ENGINEERING FIRM F-1741

BLACK & VEATCH

CP&Y, INC.
11757 KATY FREEWAY
SUITE 1540
HOUSTON, TX 77079
(713) 532-1730
TX FIRM NUMBER F-1741

SURVEYED BY:
FB NO. 000000

STATE OF TEXAS
JEFFREY P. WOUTERS
80701
REGISTERED PROFESSIONAL ENGINEER
11-07-2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

NPW PAD SECTIONS

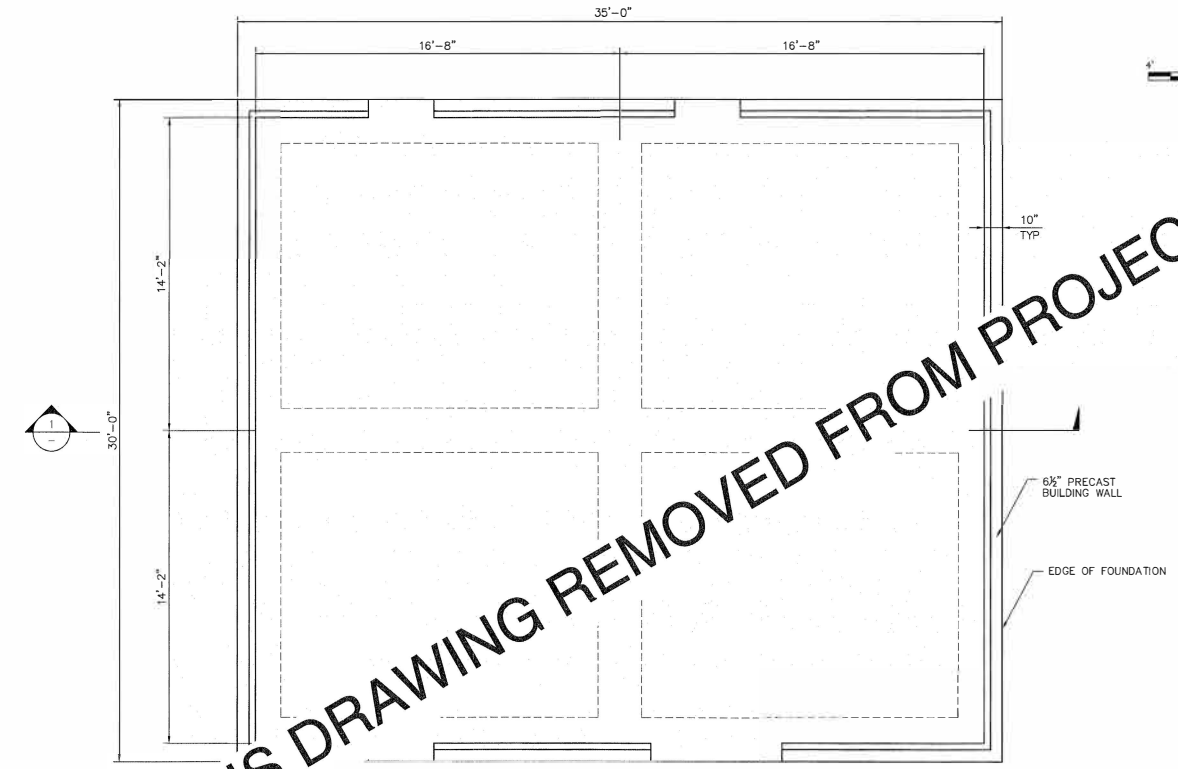
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 191 OF 379	

FOR CITY OF HOUSTON USE ONLY

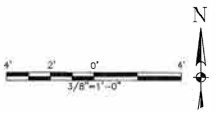
STATE OF TEXAS
80367
REGISTERED
XIAOHUA LIN
HOUSTON, TEXAS

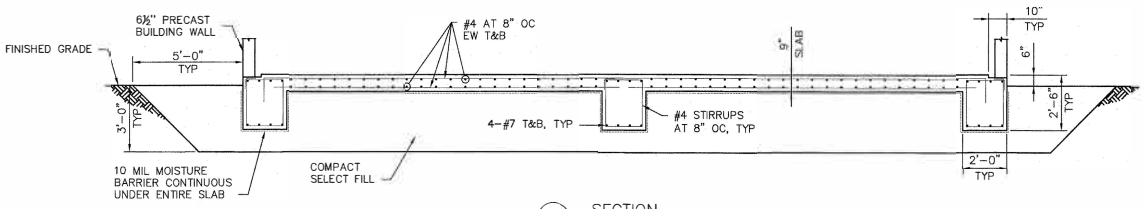
S-51-301

FILE PATH: C:\pw_working\bvw_americas\d1366638\S-51-301.dwg



UV ELECTRICAL BUILDING FOUNDATION PLAN
3/8" = 1'-0"





1 SECTION
3/8" = 1'-0"

GENERAL NOTES FOR FOUNDATION AND SUBGRADE PREPARATION

1. FOUNDATION DESIGN IS IN ACCORDANCE WITH SUBSURFACE EXPLORATION MEMORANDUM BY GEOTECH ENGINEERING AND TESTING, HOUSTON, TEXAS, JOB NUMBER 19-061E, DATE, NOVEMBER 24, 2021. COPIES OF THE REPORT MAY BE OBTAINED FROM THE OWNER. ALL BIDDERS MUST BECOME FAMILIAR WITH THE CONTENTS OF THIS REPORT. THE FOLLOWING INFORMATION IS PROVIDED TO ASSIST IN THE LEVEL OF NDERSTANDING OF THE SUBSURFACE CONDITIONS BUT SHALL T BE CONSIDERED TO COMPLETELY DESCRIBE ALL DITIONS PRESENT AND RELEVANT TO THE FOUNDATION TRUCTION.

   NDITIONS AT THE UV ELECTRICAL BUILDING, B-5, LLY CONSIST OF THE FOLLOWING:

   0' – 2' FILL: LEAN CLAY (CL)
   2' – 12' LEAN CLAY (CL)
   12' – 40' FAT CLAY (CH)

3. AT THE TIME OF TESTING, GROUNDWATER WAS ENCOUNTERED AT A DEPTH OF 28.3 FT. GROUNDWATER LEVELS MAY BE DIFFERENT DURING CONSTRUCTION.
4. A FOUNDATION HAS BEEN DESIGNED FOR BEARING INTO SOIL AT A MINIMUM DEPTH OF 24" BELOW THE FINAL GRADE ELEVATION. THE GRADE BEAMS HAVE BEEN DESIGNED FOR A NET ALLOWABLE SOIL BEARING PRESSURE OF 2500 PSF.
5. REMOVE UPPER 3 FT OF EXISTING SOILS FROM FOOTING AND REPLACE WITH COMPACTED SELECT STRUCTURAL FILL. THE SELECT STRUCTURAL FILL SHALL EXTEND 5 FT BEYOND THE STRUCTURE PERIMETER. THESE SOILS SHALL BE PLACED IN LOOSE LIFTS NOT EXCEEDING 8" AND COMPACTED TO 95% OF MAXIMUM STANDARD DENSITY (ASTM D-698) AND THE MOISTURE CONTENT ADJUSTED OPTIMUM AND 3%.
6. AT THE TIME OF EXCAVATION, THE OWNER'S TESTING LABORATORY AND THE ENGINEER SHALL BE NOTIFIED TO OBSERVE FOUNDATION CONSTRUCTION TO ENSURE A DESIRABLE STRATUM HAS BEEN REACHED.

GENERAL NOTES

1. REFER TO CIVIL, MECHANICAL, AND ELECTRICAL SHEETS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
2. SEE STRUCTURAL GENERAL NOTES, STANDARD DETAILS, AND PROJECT SPECIFICATIONS FOR ADDITIONAL INFORMATION NOT SHOWN.
3. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS PRIOR TO CONSTRUCTION OR ORDERING MATERIALS.
4. CONDUIT AND PIPE PENETRATIONS SHALL AVOID STUBBING THROUGH GRADE BEAMS. ADDITIONALLY, GRADE BEAM AND SLAB REINFORCEMENT SHALL NOT BE CUT TO ACCOMMODATE CONDUIT. SEE STRUCTURAL STANDARD DETAILS FOR SLAB REINFORCEMENT TREATMENT AT PENETRATIONS AND BLOCKOUTS.

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

THIS DRAWING REMOVED FROM PROJECT

CP&Y, INC.
TEXAS REGISTERED ENGINEERING FIRM F-1741

BLACK & VEATCH

CP&Y, INC.
11757 KATY FREEWAY
SUITE 1540
HOUSTON, TX 77079
(713) 532-1730
TX FIRM NUMBER F-1741

SURVEYED BY:
FB NO. 000000

STATE OF TEXAS
JEFFREY P. WOUTERS
80701
REGISTERED PROFESSIONAL ENGINEER
11-07-2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
STRUCTURAL
UV ELECTRICAL BUILDING FOUNDATION PLAN AND SECTION

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.

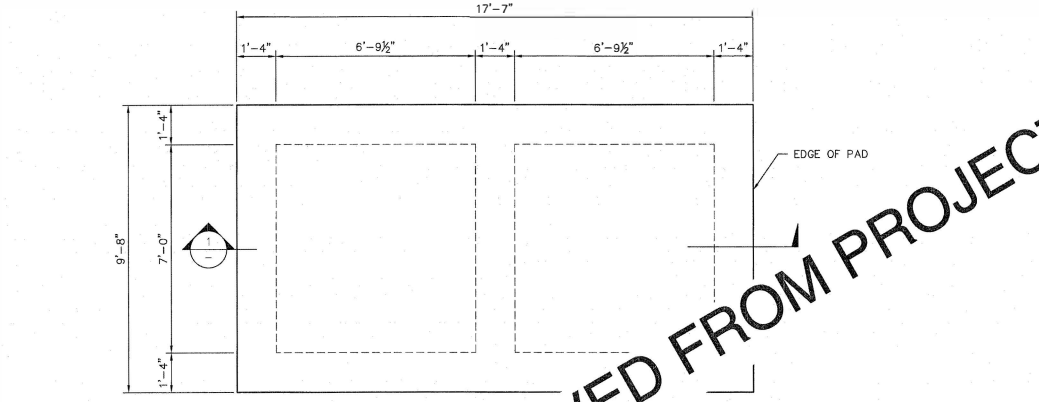
FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
80367
REGISTERED PROFESSIONAL ENGINEER
HOUSTON, TEXAS

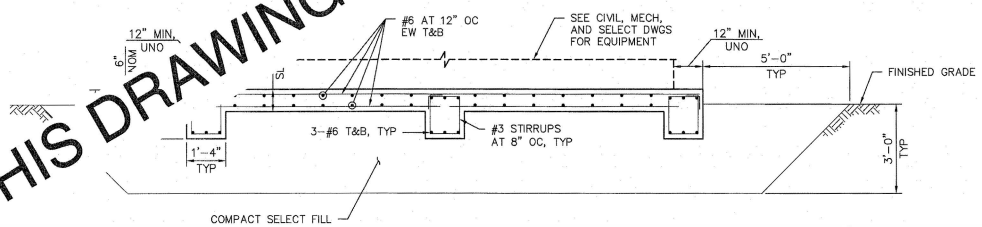
S-61-101

SHEET NO. 192 OF 379

FILE PATH: C:\pw_working\pw_americas\d1366535\S-61-101.dwg

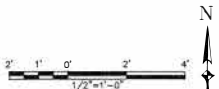


UV ENGINE GENERATOR PAD PLAN
1/2" = 1'-0"



1 SECTION
1/2" = 1'-0"

THIS DRAWING REMOVED FROM PROJECT



GENERAL NOTES FOR FOUNDATION AND SUBGRADE PREPARATION

1. FOUNDATION DESIGN IS IN ACCORDANCE WITH SUBSURFACE EXPLORATION MEMORANDUM BY GEOTECH ENGINEERING AND TESTING, HOUSTON, TEXAS, JOB NUMBER 19-061E, DATE, NOVEMBER 24, 2021. COPIES OF THE REPORT MAY BE OBTAINED FROM THE OWNER. ALL BIDDERS MUST BECOME FAMILIAR WITH THE CONTENTS OF THIS REPORT. THE FOLLOWING INFORMATION IS PROVIDED TO ASSIST IN THE LEVEL OF UNDERSTANDING OF THE SUBSURFACE CONDITIONS BUT SHALL NOT BE CONSIDERED TO COMPLETELY DESCRIBE ALL CONDITIONS PRESENT AND RELEVANT TO THE FOUNDATION CONSTRUCTION.

   SITE CONDITIONS AT THE UV ENGINE GENERATOR PAD, B-5, GENERALLY CONSIST OF THE FOLLOWING:

0' – 2'	FILL: LEAN CLAY (CL)
2' – 12'	LEAN CLAY (CL)
12' – 40'	FAT CLAY (CH)

3. AT THE TIME OF TESTING, GROUNDWATER WAS ENCOUNTERED AT A DEPTH OF 28.3 FT. GROUNDWATER LEVELS MAY BE DIFFERENT DURING CONSTRUCTION.
4. A FOUNDATION HAS BEEN DESIGNED FOR BEARING INTO SOIL AT A MINIMUM DEPTH OF 14" BELOW THE FINAL GRADE ELEVATION. THE GRADE BEAMS HAVE BEEN DESIGNED FOR A NET ALLOWABLE SOIL BEARING PRESSURE OF 2500 PSF.
5. REMOVE UPPER 3 FT OF EXISTING SOILS FROM FOOTING AND REPLACE WITH COMPACTED SELECT STRUCTURAL FILL. THE SELECT STRUCTURAL FILL SHALL EXTEND 5 FT BEYOND THE STRUCTURE PERIMETER. THESE SOILS SHALL BE PLACED IN LOOSE LIFTS NOT EXCEEDING 8" AND COMPACTED TO 95% OF MAXIMUM STANDARD DENSITY (ASTM D-698) AND THE MOISTURE CONTENT ADJUSTED OPTIMUM AND 3%.
6. AT THE TIME OF EXCAVATION, THE OWNER'S TESTING LABORATORY AND THE ENGINEER SHALL BE NOTIFIED TO OBSERVE FOUNDATION CONSTRUCTION TO ENSURE A DESIRABLE STRATUM HAS BEEN REACHED.

GENERAL NOTES

1. REFER TO CIVIL, MECHANICAL, AND ELECTRICAL SHEETS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
2. SEE STRUCTURAL GENERAL NOTES, STANDARD DETAILS, AND PROJECT SPECIFICATIONS FOR ADDITIONAL INFORMATION NOT SHOWN.
3. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS PRIOR TO CONSTRUCTION OR ORDERING MATERIALS.
4. CONDUIT AND PIPE PENETRATIONS SHALL AVOID STUBBING THROUGH GRADE BEAMS. ADDITIONALLY, GRADE BEAM AND SLAB REINFORCEMENT SHALL NOT BE CUT TO ACCOMMODATE CONDUIT. SEE STRUCTURAL STANDARD DETAILS FOR SLAB REINFORCEMENT TREATMENT AT PENETRATIONS AND BLOCKOUTS.

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

CP&Y, INC.
TEXAS REGISTERED ENGINEERING FIRM F-1741

BLACK & VEATCH

CP&Y, INC.
11757 KATY FREEWAY
SUITE 1540
HOUSTON, TX 77079
(713) 532-1730
TX FIRM NUMBER F-1741

SURVEYED BY:
FB NO. 000000

STATE OF TEXAS
JEFFREY P. WOUTERS
80701
REGISTERED PROFESSIONAL ENGINEER
11-07-2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
STRUCTURAL
UV ENGINE GENERATOR PAD PLAN AND SECTION

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.

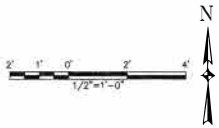
FOR CITY OF HOUSTON USE ONLY
80367
REGISTERED PROFESSIONAL ENGINEER

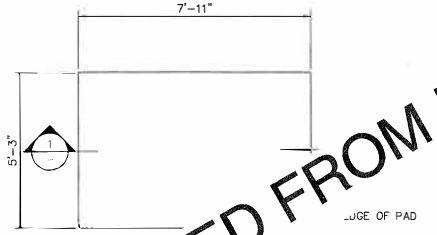
S-61-102

SHEET NO. 193 OF 379

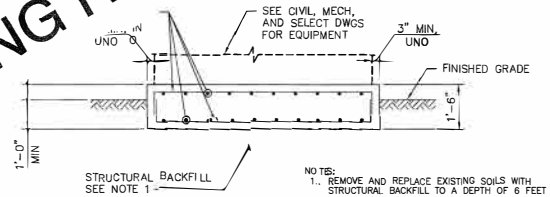
FILE PATH: C:\pw_working\pw_omarlcsa\d1366838\S-61-102.dwg

THIS DRAWING REMOVED FROM PROJECT





UV ELECTRICAL TRANSFORMER PAD PLAN
1/2" = 1'-0"



NOTES:
1. REMOVE AND REPLACE EXISTING SOILS WITH STRUCTURAL BACKFILL TO A DEPTH OF 6 FEET BELOW FOUNDATION AND EXTENDING 5 FEET, EACH SIDE, BEYOND THE FOOTPRINT OF THE FOUNDATION AND SLOPING UP TOWARDS GRADE AT A 1 TO 1 SLOPE. PROVIDE FILTER FABRIC TYPR A BELOW STRUCTURAL BACKFILL.

1 SECTION
1/2" = 1'-0"

GENERAL NOTES FOR FOUNDATION AND SUBGRADE PREPARATION

1. FOUNDATION DESIGN IS IN ACCORDANCE WITH SUBSURFACE EXPLORATION MEMORANDUM BY GEOTECH ENGINEERING AND TESTING, HOUSTON, TEXAS, JOB NUMBER 19-061E, DATE, NOVEMBER 24, 2021. COPIES OF THE REPORT MAY BE OBTAINED FROM THE OWNER. ALL BIDDERS MUST BECOME FAMILIAR WITH THE CONTENTS OF THIS REPORT. THE FOLLOWING INFORMATION IS PROVIDED TO ASSIST IN THE LEVEL OF UNDERSTANDING OF THE SUBSURFACE CONDITIONS BUT SHALL NOT BE CONSIDERED TO COMPLETELY DESCRIBE ALL CONDITIONS PRESENT AND RELEVANT TO THE FOUNDATION CONSTRUCTION.
2. SITE CONDITIONS AT THE UV ELECTRICAL BUILDING TRANSFORMER PAD, B-5, GENERALLY CONSIST OF THE FOLLOWING:

   0' – 2' FILL: LEAN CLAY (CL)
   2' – 12' LEAN CLAY (CL)
   12' – 40' FAT CLAY (CH)

3. AT THE TIME OF TESTING, GROUNDWATER WAS ENCOUNTERED AT A DEPTH OF 28.3 FT. GROUNDWATER LEVELS MAY BE DIFFERENT DURING CONSTRUCTION.
4. A FOUNDATION HAS BEEN DESIGNED FOR BEARING INTO SOIL AT A MINIMUM DEPTH OF 12" BELOW THE FINAL GRADE ELEVATION. THE GRADE BEAMS HAVE BEEN DESIGNED FOR A NET ALLOWABLE SOIL BEARING PRESSURE OF 2500 PSF.
5. THE SELECT STRUCTURAL FILL SHALL EXTEND 5 FT BEYOND THE STRUCTURE PERIMETER. THESE SOILS SHALL BE PLACED IN LOOSE LIFTS NOT EXCEEDING 8" AND COMPACTED TO 95% OF MAXIMUM STANDARD DENSITY (ASTM D-698) AND THE MOISTURE CONTENT ADJUSTED OPTIMUM AND 3%.
6. AT THE TIME OF EXCAVATION, THE OWNER'S TESTING LABORATORY AND THE ENGINEER SHALL BE NOTIFIED TO OBSERVE FOUNDATION CONSTRUCTION TO ENSURE A DESIRABLE STRATUM HAS BEEN REACHED.

GENERAL NOTES

1. REFER TO CIVIL, MECHANICAL, AND ELECTRICAL SHEETS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
2. SEE STRUCTURAL GENERAL NOTES, STANDARD DETAILS, AND PROJECT SPECIFICATIONS FOR ADDITIONAL INFORMATION NOT SHOWN.
3. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS PRIOR TO CONSTRUCTION OR ORDERING MATERIALS.
4. CONDUIT AND PIPE PENETRATIONS SHALL AVOID STUBBING THROUGH GRADE BEAMS. ADDITIONALLY, GRADE BEAM AND SLAB REINFORCEMENT SHALL NOT BE CUT TO ACCOMMODATE CONDUIT. SEE STRUCTURAL STANDARD DETAILS FOR SLAB REINFORCEMENT TREATMENT AT PENETRATIONS AND BLOCKOUTS.

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

CP&Y, INC.
TEXAS REGISTERED ENGINEERING FIRM F-1741

BLACK & VEATCH

CP&Y, INC.
11757 KATY FREEWAY
SUITE 1540
HOUSTON, TX 77079
(713) 532-1730
TX FIRM NUMBER F-1741

SURVEYED BY:
FB NO. 000000

STATE OF TEXAS
JEFFREY P. WOUTERS
80701
REGISTERED PROFESSIONAL ENGINEER
11-07-2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
STRUCTURAL

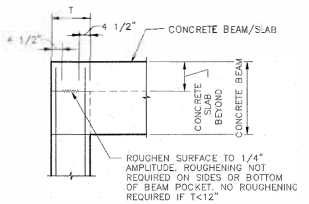
UV ELECTRICAL BUILDING TRANSFORMER PAD PLAN AND SECTION

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 194 OF 379	

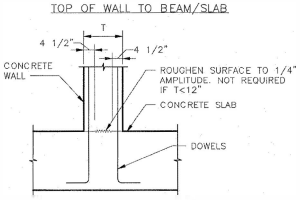
STATE OF TEXAS
80367
REGISTERED
HOUSTON, TEXAS

S-61-103

FILE PATH: C:\pw_working\pw_americon\d1366638\S-61-103.dwg

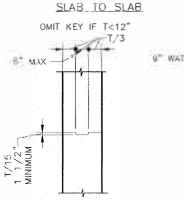


TOP OF WALL TO BEAM/SLAB



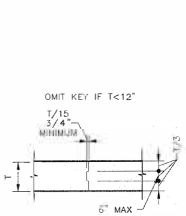
SLAB TO BOTTOM OF WALL

JOINTS WITHOUT WATERSTOPS

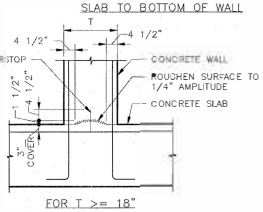


WALL TO WALL

JOINTS WITHOUT WATERSTOPS



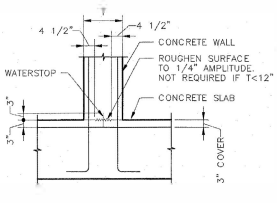
SLAB TO SLAB



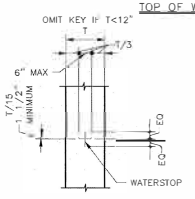
FOR T >= 18"

SLAB TO BOTTOM OF WALL

JOINTS WITH WATERSTOPS

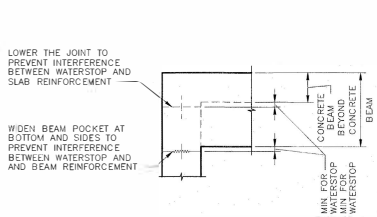


FOR T < 18"

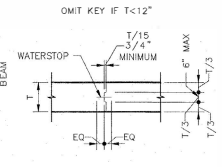


WALL TO WALL

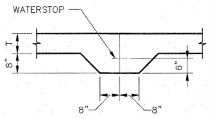
JOINTS WITH WATERSTOPS



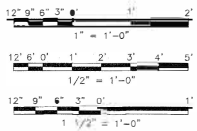
TOP OF WALL TO BEAM/SLAB



SLAB TO SLAB (T>=12")



SLAB TO SLAB (T<12")



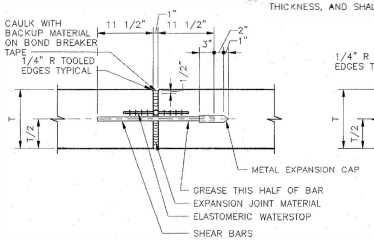
GENERAL NOTES:

1. DETAILS ON THIS DRAWING APPLY TO ALL DRAWINGS UNLESS NOTED OTHERWISE.
2. WORK THIS DRAWING WITH THE STANDARD CONCRETE REINFORCEMENT DETAILS.
3. AT WALL JOINTS AND AT WALL BASE JOINTS, SECURE ALL ELASTOMERIC WATERSTOPS IN THE CORRECT POSITION USING HOG RINGS OR GROMMETS SPACED AT 12 INCHES ALONG THE LENGTH OF THE WATERSTOP AND WIRE TIE TO ADJACENT REINFORCING STEEL.
4. AT SLAB JOINTS AND FOOTING JOINTS, ENSURE SPACE BENEATH AND AROUND WATERSTOP IS COMPLETELY FILLED WITH CONSOLIDATED CONCRETE, DURING OPERATION, MAKE VISUAL INSPECTION OF ENTIRE WATERSTOP AREA. LIMIT CONCRETE PLACEMENT TO ELEVATION OF WATERSTOP IN FIRST LIFT. RAISE ELASTOMERIC WATERSTOPS TO CONFIRM FULL CONSOLIDATION WITHOUT VOIDS. PLACE REMAINING CONCRETE TO FULL DEPTH OF SLAB.

NOTES:

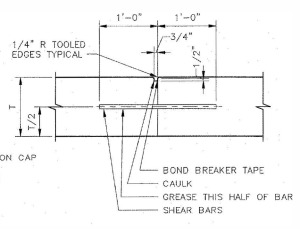
1. REINFORCEMENT STEEL IS CONTINUOUS THROUGH ALL CONSTRUCTION JOINTS.
2. "CSJ W/ WS" – CONSTRUCTION JOINT WITH WATERSTOP.
3. "CSJ" – CONSTRUCTION JOINT WITHOUT WATERSTOP.
4. UNLESS NOTED OTHERWISE, WATERSTOPS MAY BE STEEL OR PVC. WATERSTOP SIZE SHALL BE 6" FOR WALLS AND SLABS 18" OR LESS IN THICKNESS, AND SHALL BE 9" FOR WALLS AND SLABS THICKER THAN 18".

A TYPICAL CONSTRUCTION JOINTS
1/2" = 1'-0"



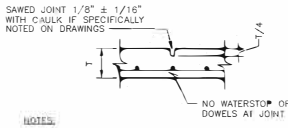
SLABS

EXPANSION JOINTS



SLABS

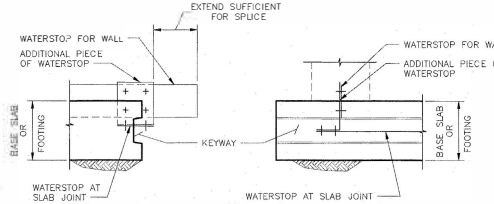
CONTRACTION JOINTS



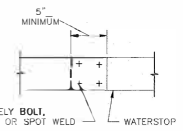
NOTES:

1. TYPICAL CONTROL JOINT NOTES NOT APPLICABLE FOR SAWED CONTRACTION JOINT.
2. "SJ" SAWED JOINT WITH NO WATERSTOP.
3. JOINT FORMED WITH TOOL OR INSERT STRIP MAY BE SUBSTITUTED FOR SAWED TYPE ONLY WITH PRIOR ACCEPTANCE BY THE ENGINEER.
4. IF SINGLE LAYER REINFORCEMENT, EVERY OTHER BAR IS DISCONTINUOUS AT JOINT. IF 2 LAYER REINFORCEMENT, TOP LAYER IS COMPLETELY DISCONTINUOUS AT JOINT.

SAWED CONTRACTION JOINT
SLAB ON GRADE

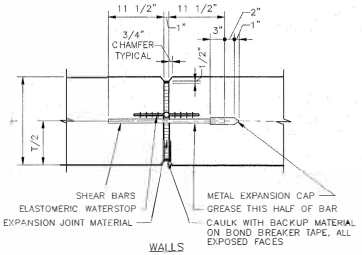


METAL WATERSTOP INTERSECTION AT BASE SLAB CONSTRUCTION JOINT



METAL WATERSTOP SPLICE

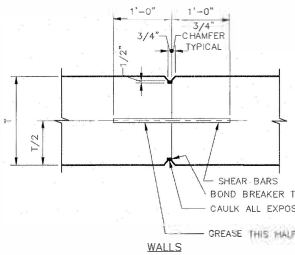
B METAL WATERSTOPS
1 1/2" = 1'-0"



WALLS

EXPANSION JOINTS

NOTE:
"EJ W/ WS" – EXPANSION JOINT WITH ELASTOMERIC WATERSTOP
"EJ" – EXPANSION JOINT WITHOUT WATERSTOP



WALLS

CONTRACTION JOINTS

NOTE:
"CJ" – CONTRACTION JOINT WITHOUT WATERSTOP

C TYPICAL CONTROL JOINTS
1" = 1'-0"

NOTES:

1. PROVIDE 3/4" SHEAR BARS @ 1'-6" CENTERS ACROSS JOINT UNLESS NOTED OTHERWISE.
2. REINFORCING STEEL SHALL NOT BE EXTENDED ACROSS JOINT UNLESS NOTED OTHERWISE. SHEAR BARS SHALL BE SMOOTH FREE FROM RUST OR SCALE, AND GREASED TO PREVENT BOND (ONE HALF BAR ONLY).
3. WATERSTOP SIZE SHALL BE 6" FOR WALLS AND SLABS LESS THAN 18" IN THICKNESS, AND SHALL BE 9" FOR WALLS AND SLABS THICKER THAN 18".

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED PROFESSIONAL ENGINEER
11/11/2025

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

STRUCTURAL

TYPICAL CONCRETE JOINT DETAILS

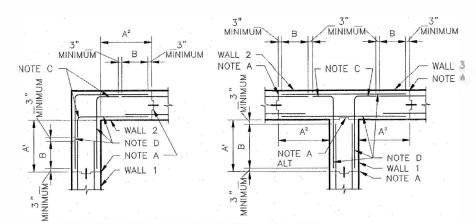
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 195 OF 379	

FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
80367
REGISTERED
SHARI LIN
11/10/25

S-99-501

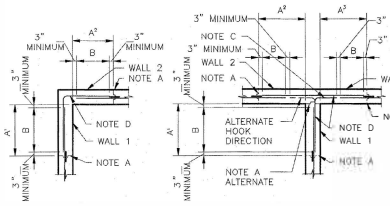
FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-GENERAL.rvt



A = VERTICAL CONSTRUCTION JOINT NEAREST TO WALL CORNER.

A (ALTERNATE) = ALTERNATE VERTICAL CONSTRUCTION JOINT NEAREST TO WALL CORNER IN T WALL JOINT WHICH DOES NOT REQUIRE WATERSTOP.

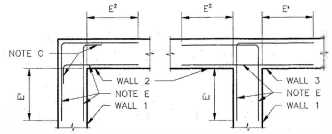
A^1 = DISTANCE FROM INSIDE CORNER FACE TO NEAREST VERTICAL CONSTRUCTION JOINT IN SIMILARLY NUMBERED WALL. A^1 SHALL NOT BE LESS THAN DIMENSIONS INDICATED BY THESE DETAILS; NOR GREATER THAN INDICATED ON PLAN DRAWINGS; BUT IN ANY CASE SHALL NOT EXCEED 30 FEET IN LIQUID CONTAINMENT STRUCTURES OR 40 FEET IN OTHER STRUCTURES. IN T WALL JOINTS WHICH DO NOT REQUIRE WATERSTOP, A1 MAY BE ZERO.



B = OPTIONAL SPLICE LOCATION UNLESS SPECIFICALLY NOTED ON PLAN DRAWINGS. SPLICE LENGTH SHALL NOT BE LESS THAN THAT REQUIRED FOR TOP BARS AS SHOWN IN TABLE ON THIS SHEET. USE SPLICE LENGTH FOR THE SMALLER OF THE TWO BARS BEING SPLICED.

C = STANDARD HOOK.

D = TYPICAL CORNER REINFORCEMENT. SIZE SHALL MATCH LARGEST ADJACENT WALL HORIZONTAL REINFORCEMENT; SPACING SHALL MATCH MINIMUM ADJACENT WALL HORIZONTAL REINFORCEMENT SPACING.



E = WHERE SPECIFICALLY NOTED ON THE DRAWINGS, ADDITIONAL CORNER REINFORCEMENT SHALL BE PLACED IN BOTH FACES OF THE INDICATED CORNER OVER THE FULL HEIGHT. ADDITIONAL CORNER REINFORCEMENT SHALL BE OF THE SAME SIZE AND SPACING AS THE MAIN CORNER REINFORCEMENT. PLACE ADDITIONAL REINFORCEMENT ALTERNATELY WITH, AND EQUAL DISTANCE BETWEEN, MAIN CORNER REINFORCEMENT.

E^1 = DISTANCE FROM INSIDE CORNER FACE TO TERMINATION OF ADDITIONAL CORNER REINFORCEMENT IN SIMILARLY NUMBERED WALL. E^2 SHALL NOT BE LESS THAN 0.20 THE CLEAR SPAN DISTANCE MEASURED HORIZONTALLY BETWEEN THIS CORNER AND THE NEXT OR 0.40 THE CLEAR SPAN DISTANCE OR CANTILEVERED DISTANCE MEASURED VERTICALLY, WHICHEVER IS SMALLER, BUT NOT LESS THAN 3'-0".

CONTRACTORS OPTION: E BAR TAILS MAY BE SPLICED USING LAPPED SPLICE LENGTHS FOR TOP BARS. SPLICES SHALL NOT BE LOCATED IN THE CORNER AREA COMMON TO BOTH WALLS AND SHALL CLEAR HOOK ENDS BY 3" MINIMUM.

ADDITIONAL REINFORCEMENT WHERE SPECIFICALLY NOTED ON THE DRAWINGS

B STANDARD CONCRETE REINFORCMENT DETAILS

NO SCALE

GENERAL NOTES:

1. DETAILS ON THIS DRAWING APPLY TO ALL DRAWINGS UNLESS OTHERWISE NOTED.
2. WORK THIS DRAWING WITH THE STANDARD CONCRETE JOINT DETAILS

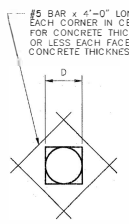
12" 9" 6" 3" 0" 1' 2"

1" = 1'-0"

MAIN REINFORCEMENT FOR ALL STRUCTURES

NOTES:

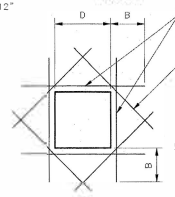
1. VERTICAL REINFORCEMENT IS NOT SHOWN.
2. THESE DETAILS SHALL BE APPLICABLE TO ALL WALL CORNERS UNLESS NOTED OTHERWISE ON THE DRAWINGS.



FOR OPENINGS 12" < = D < = 21"

A STANDARD CONCRETE REINFORCMENT DETAILS

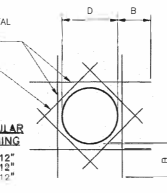
NO SCALE



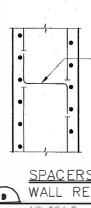
THICKNESS OF CONCRETE	DIAGONAL BAR LENGTH: DIAGONAL BAR SIZE	RECTANGULAR OPENING	CIRCULAR OPENING
< 12"	#4	3'-0"	D+12"
12" TO 18"	#5	3'-0"	D+12"
> 18"	#6	3'-0"	D+12"

FOR RECTANGULAR OPENINGS 21" < D < = 54"

B = THE REQUIRED LENGTH FOR LAPPED SPLICE FOR TOP BARS AS SHOWN ON THIS SHEET

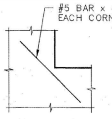


FOR CIRCULAR OPENINGS 21" < D < = 54"



D SPACERS FOR WALL REINFORCEMENT

NO SCALE



E TYPICAL EXTRA REINFORCEMENT AT ISOLATED RE-ENTRANT CORNERS

NO SCALE

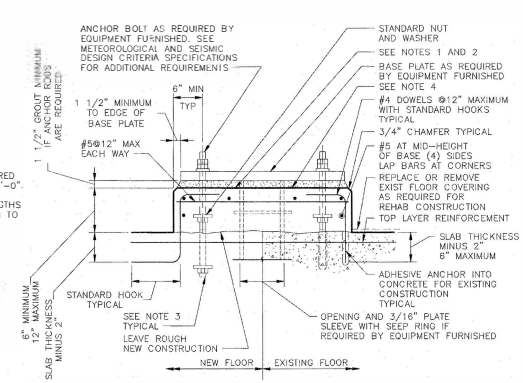
NOTE:

TYPICAL REQUIRED UNLESS ADDITIONAL REINFORCEMENT SPECIFICALLY INDICATED AT OPENINGS ON DRAWINGS

TYPICAL REQUIRED UNLESS ADDITIONAL REINFORCEMENT SPECIFICALLY INDICATED AT OPENINGS ON DRAWINGS

C TYPICAL EXTRA REINFORCEMENT AT OPENINGS 12" TO < = 54"

NO SCALE

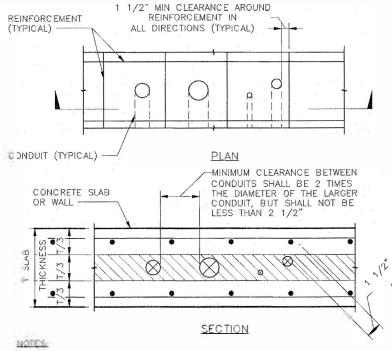


NOTES:

1. EQUIPMENT MANUFACTURER TO INDICATE REQUIRED FLATNESS WHERE NO GROUT IS SPECIFIED. TOLERANCES SHALL BE IN CONFORMANCE WITH ACI 117 - SPECIFICATION FOR TOLERANCES FOR CONCRETE CONSTRUCTION.
2. CONTRACTOR AND SUPPLIER SHALL COORDINATE FINAL LOCATION AND SIZE OF PADS WITH EQUIPMENT FURNISHED. COORDINATE ANCHOR BOLT REQUIREMENTS FOR REQUIRED EMBEDMENT DEPTHS AND CONCRETE EDGE DISTANCES.
3. WHERE THE DESIGN ANCHOR BOLT EMBEDMENT IS GREATER THAN THE CONCRETE EQUIPMENT BASE THICKNESS, THEN THE REQUIRED DEPTH OF EMBEDMENT SHALL BE MEASURED FROM THE TOP OF STRUCTURAL SLAB AND NOT THE TOP OF THE EQUIPMENT BASE.
4. EQUIPMENT BASE SHALL USE STRUCTURAL CONCRETE AS INDICATED IN THE CAST-IN-PLACE CONCRETE SPECIFICATION.
5. ANCHOR BOLTS AND REINFORCING WILL BE INSPECTED IN ACCORDANCE WITH THE CODE REQUIRED SPECIAL INSPECTIONS AND PROCEDURES SPECIFICATION.

F EQUIPMENT BASE DETAIL

1" = 1'-0"

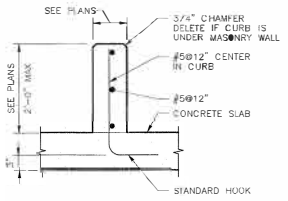


NOTES:

1. PLACE CONDUIT ONLY IN SHADED AREA.
2. FOR CONDUIT REQUIREMENTS SEE THE ELECTRICAL DRAWINGS AND SPECIFICATIONS.
3. CONDUIT THAT IS TOO LARGE OR CONGESTED TO FIT WITHIN THE SLAB AND REINFORCEMENT AS INDICATED SHALL BE ROUTED BELOW THE SLAB AS INDICATED IN THE ELECTRICAL SPECIFICATIONS OR ON THE DRAWINGS.

G CONDUIT PLACING DETAIL

1" = 1'-0"



NOTE:

WHEN CURB WIDTH EXCEEDS 8", PROVIDE ABOVE REINFORCEMENT IN EACH FACE OF CURB

H TYPICAL CONCRETE CURB DETAIL

1" = 1'-0"

LENGTH OF LAPPED SPLICES FOR REINFORCEMENT (INCHES)

UNLESS NOTED OTHERWISE ON THE DRAWINGS

BAR SIZE *	BEAMS & COLUMNS **TOP BARS	BEAMS & COLUMNS OTHERS	WALLS & SLABS **TOP BARS	WALLS & SLABS OTHERS	BAR SIZE *
#3	16	16	16	16	#3
#4	19	16	19	16	#4
#5	24	18	24	18	#5
#6	33	26	29	22	#6
#7	55	42	48	37	#7
#8	69	53	60	46	#8
#9	84	65	74	57	#9
#10	103	79	91	70	#10
#11	122	94	108	83	#11

* LAP SPLICE LENGTH FOR BARS OF DIFFERENT SIZES SHALL BE THE GREATER OF THE SMALL BAR LAP LENGTH OR 0.75x THE LARGER BAR LAP LENGTH

** TOP BARS ARE HORIZONTAL BARS SO PLACED THAT MORE THAN 12" OF CONCRETE IS CAST IN THE MEMBER BELOW THE BAR. HORIZONTAL BARS IN WALLS ARE TO BE PROVIDED WITH LAP LENGTHS AS REQUIRED FOR TOP BARS. VERTICAL BARS MAY BE CONSIDERED AS OTHER BARS.

CONCRETE COVER FOR REINFORCEMENT

UNLESS NOTED OTHERWISE ON THE DRAWINGS

LOCATION	SPECIFIED COVER
UNFORMED SURFACES ADJACENT TO EXCAVATION	3"
SURFACES INSIDE OF OZONE CONTACTORS EXPOSED TO OZONE IN WATER OR AIR	3"
TOP SURFACES OF SLABS THAT ARE SUBMERGED	3"
FORMED SURFACES THAT ARE SUBMERGED, AND FORMED OR TOP SURFACES EXPOSED TO WEATHER, SATURATED AIR, OR EARTH	2"
OTHER LOCATIONS:	
BEAMS AND GIRDERS	1 1/2"
SLABS, WALLS AND JOISTS:	
#6 AND LARGER	1 1/2"
#5 AND SMALLER	1"

NOTES:

1. COVER IS MEASURED TO NEAREST BAR, STIRRUP, TIE, OR SPIRAL, AS APPLICABLE.
2. TOLERANCES FOR CONCRETE COVER AND THE FABRICATION AND PLACING OF REINFORCEMENT SHALL CONFORM TO ACI 117.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 800
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC
FB NO. P-5182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

STRUCTURAL

TYPICAL CONCRETE REINFORCING DETAILS

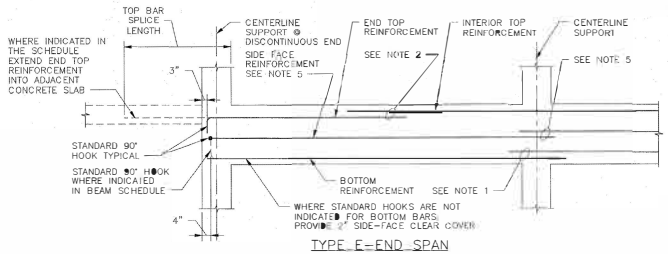
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHARI LIN
SHEET NO.	196 OF 379

FOR CITY OF HOUSTON USE ONLY

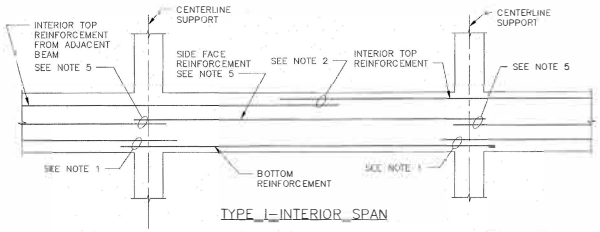
STATE OF TEXAS
80367
REGISTERED
PROFESSIONAL ENGINEER

S-99-502

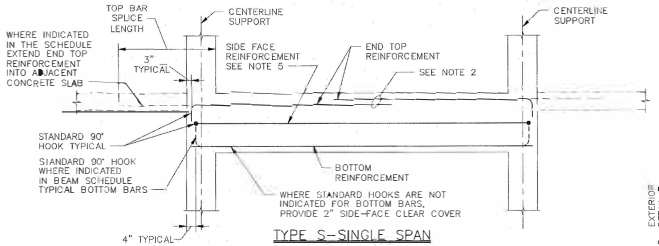
FILE PATH: BIM 360://402500 - CON Intercontinental Airport WWTP Improvements/402500-GENERAL.rvt



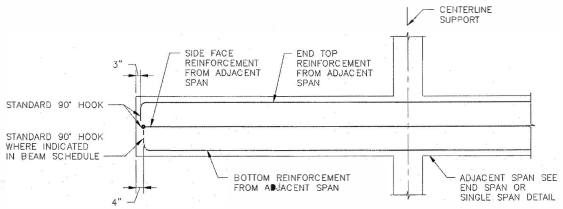
TYPE E-END SPAN



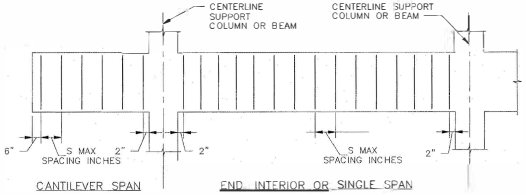
TYPE I-INTERIOR SPAN



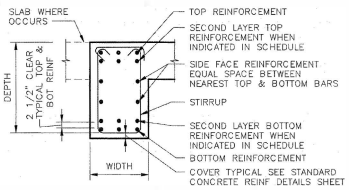
TYPE S-SINGLE SPAN



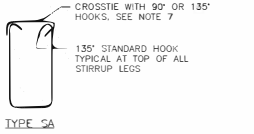
TYPE C-CANTILEVER SPAN



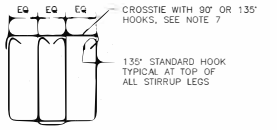
STIRRUP SPACING LAYOUT



TYPICAL BEAM SECTION

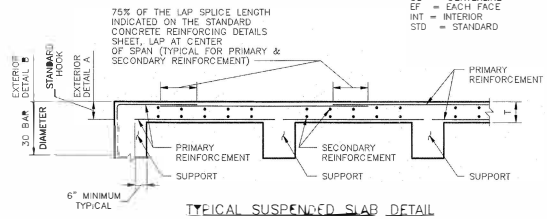


TYPE SA

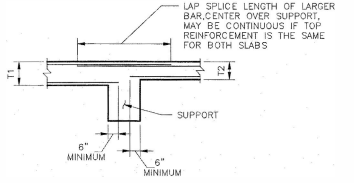


TYPE SB

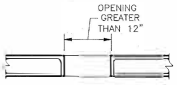
STIRRUP DETAILS



TYPICAL SUSPENDED SLAB DETAIL



SLAB INTERACTION DETAIL



NOTE:
FOR ADDITIONAL REINFORCING AROUND OPENING - SEE THE STANDARD CONCRETE REINFORCING DETAILS SHEET

DETAIL AT OPENINGS

BEAM SCHEDULE

MARK	TYPE	BEAM SIZE		BOTTOM REINF	END TOP REINF	INT TOP REINF	SIDE FACE REINF EF	STIRRUPS			REMARKS
		WIDTH	DEPTH					TYPE	SIZE	S	
GRIT FACILITY											
31-B105,31-B106,31-B107	C	18	30	2-#5	2-#5	-	2-#5	SA	#4	12"	TOP & BOTTOM SINGLE LAYER
31-B101,31-B102,31-B103,31-B104	E	18	30	4-#5	4-#5	-	2-#5	SA	#4	12"	TOP & BOTTOM SINGLE LAYER
31-B101,31-B102,31-B103,31-B104	I	18	30	4-#5	-	4-#5	2-#5	SA	#4	12"	TOP & BOTTOM SINGLE LAYER
WW FACILITY											
43-B101,43-B102	S	20	24	5-#6	5-#6	5-#6	2-#5	SA	#4	6"	TOP & BOTTOM SINGLE LAYER
43-B 1 03,43-B 05	E	18	20	4-#5	4-#5	4-#5	2-#5	SA	#4	6"	TOP & BOTTOM SINGLE LAYER
43-B107	S	12	18	2-#7	2-#7	2-#7	2-#5	SA	#4	6"	TOP & BOTTOM SINGLE LAYER
43-B104	I	16	20	4-#5	4-#5	4-#5	2-#5	SA	#4	6"	TOP & BOTTOM SINGLE LAYER
43-B106	S	12	24	2-#8	2-#8	2-#8	2-#5	SA	#4	6"	TOP & BOTTOM SINGLE LAYER

BEAM SCHEDULE NOTES:

1. UNLESS INDICATED OTHERWISE IN BEAM SCHEDULE, BOTTOM REINFORCEMENT SHALL HAVE LAP SPLICES CENTERED ON THE CENTERLINE OF THE SUPPORT USING 75% OF THE LAP SPLICE LENGTH INDICATED ON THE STANDARD CONCRETE REINFORCING DETAILS SHEET. USE THE LAP SPLICE REQUIREMENT OF THE SMALLER BOTTOM BAR IF BAR SIZES IN ADJACENT SPANS DIFFER. AT THE CONTRACTOR'S OPTION, BOTTOM REINFORCEMENT MAY BE MADE CONTINUOUS, WITHOUT SPLICING, ACROSS THE SUPPORT IF BARS IN THE ADJACENT SPAN ARE EQUAL IN SIZE AND QUANTITY.
2. END AND INTERIOR TOP REINFORCEMENT SHALL BE LAPPED AT MID SPAN BETWEEN SUPPORTS USING 75% OF THE LAP SPLICE LENGTH INDICATED ON THE STANDARD CONCRETE REINFORCING DETAILS SHEET. USE THE LAP SPLICE REQUIREMENT OF THE SMALLER TOP BAR, IF THE BAR SIZES EACH SIDE OF MID SPAN DIFFER, AT THE CONTRACTOR'S OPTION, TOP REINFORCEMENT MAY BE MADE CONTINUOUS, WITHOUT SPLICING, IF THE TOP BARS EACH SIDE OF MID SPAN ARE EQUAL IN SIZE AND QUANTITY.
3. TOP AND BOTTOM BARS SHALL BE PLACED IN THE BEAM SECTION SUCH THAT ONE OF THE BARS IS LOCATED IN EACH CORNER OF THE BEAM STIRRUPS.
4. ALL TOP AND BOTTOM BARS SHALL BE PLACED IN ONE LAYER UNLESS INDICATED OTHERWISE. WHERE MORE THAN ONE LAYER IS NOTED, PROVIDE 2.5 INCHES CLEAR BETWEEN LAYERS, AND PLACE HALF OF THE BARS IN EACH LAYER.
5. SIDE FACE REINFORCEMENT SHALL BE CONTINUOUS WITH LAP SPLICES CENTERED AT THE CENTERLINE OF THE SUPPORT. A 90° STANDARD HOOK SHALL BE PROVIDED AT THE EXTERIOR ENDS OF END SPANS AND AT BOTH ENDS OF SINGLE SPANS. SIDE FACE REINFORCEMENT SHALL BE SPACED EQUALLY ON EACH FACE.
6. PROVIDE MINIMUM #5 STIRRUP SUPPORT BARS IN ALL CORNERS OF STIRRUPS WHEN TOP OR BOTTOM BARS ARE NOT PRESENT. LAP #5 BARS 1'-8" MINIMUM TO SCHEDULED REINFORCEMENT.
7. UNLESS INDICATED OTHERWISE, CONSECUTIVE STIRRUP CROSSTIES SHALL HAVE THEIR 90° HOOK PLACED ON OPPOSITE SIDES. IN THE EVENT THAT A SLAB FRAMES INTO ONLY ONE SIDE OF A BEAM, THEN THE 90 DEGREE HOOK SHALL BE PLACED ON THE SLAB SIDE CONSISTENTLY. IN THE EVENT A BEAM IS NOT CONFINED BY A SLAB ON EITHER SIDE, THE STIRRUP CROSSTIE SHALL HAVE TWO 135° HOOKS AND NO 90° HOOK.
8. ABBREVIATIONS USED:

CL = CENTERLINE	DEG = DEGREE
EF = EACH FACE	EQ = EQUAL
INT = INTERIOR	REINF = REINFORCEMENT
STD = STANDARD	TYP = TYPICAL

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 800
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-5182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED PROFESSIONAL ENGINEER
11/11/2005

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

STRUCTURAL

STANDARD CONCRETE BEAM AND SLAB SCHEDULE AND DETAILS

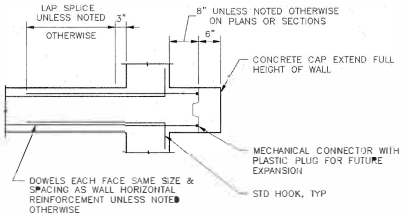
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 197 OF 379	

FOR CITY OF HOUSTON USE ONLY

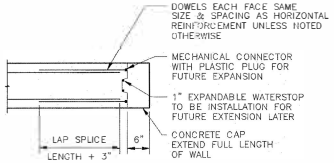
STATE OF TEXAS
80367
REGISTERED
PROFESSIONAL ENGINEER
HOUSTON, TEXAS

S-99-503

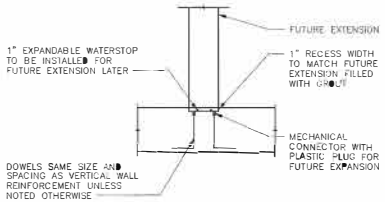
FILE PATH: BIM 360://4025500 - CIH Intercontinental Airport WWTP Improvements/4025500-GENERAL.rvt



WALLS (PLAN)

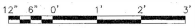


WALLS, SLABS (SECTION)



WALL/SLAB (SECTION)

A FUTURE EXPANSION DETAILS
3/4" = 1'-0"



BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED
PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
STRUCTURAL

STANDARD CONCRETE CONNECTION DETAILS

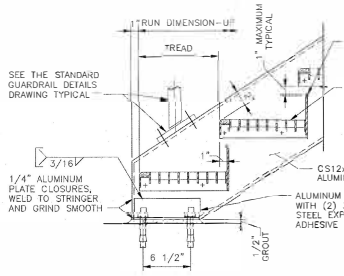
WBS NUMBER	R-00285-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 198 OF 379	

FOR CITY OF HOUSTON USE ONLY

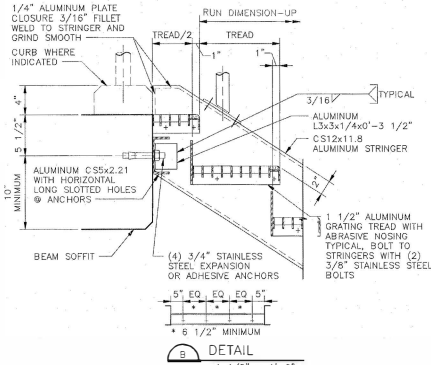
80367
REGISTERED
PROFESSIONAL ENGINEER
HOUSTON, TEXAS

S-99-504

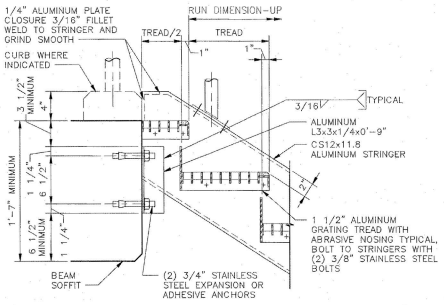
FILE PATH: BIM 360://4025500 - COH Intercontinental Airport WWTP Improvements/4025500-GENERAL.rvt



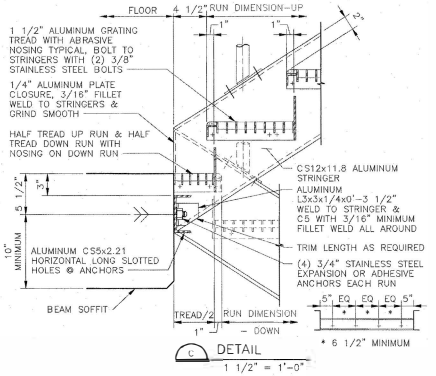
A DETAIL
1 1/2" = 1'-0"



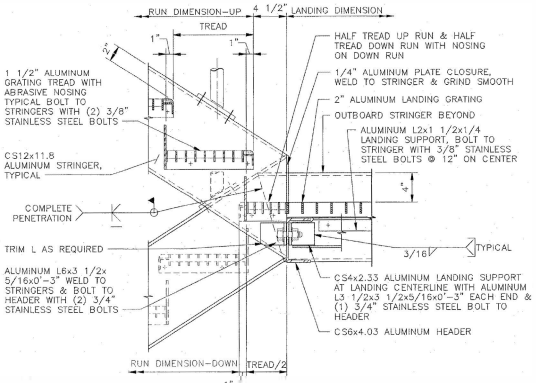
B DETAIL
1 1/2" = 1'-0"



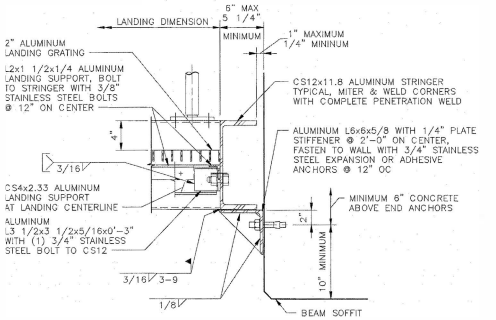
BB ALTERNATE DETAIL
1 1/2" = 1'-0"



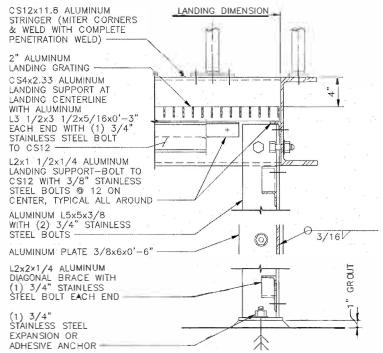
C DETAIL
1 1/2" = 1'-0"



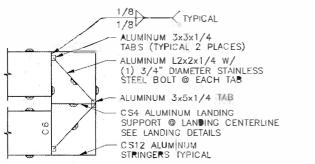
D DETAIL
1 1/2" = 1'-0"



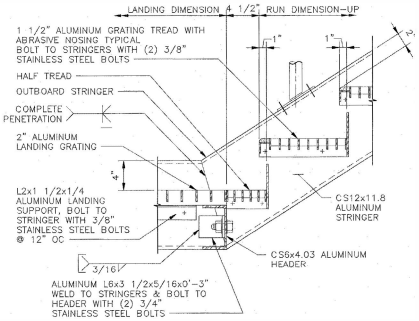
E DETAIL
1 1/2" = 1'-0"



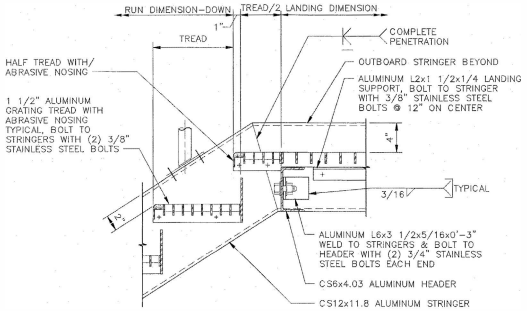
F DETAIL
1 1/2" = 1'-0"



TYPICAL LANDING BRACING
1 1/2" = 1'-0"



G DETAIL
1 1/2" = 1'-0"



H DETAIL
1 1/2" = 1'-0"

ALUMINUM GRATING STAIR NOTES:

1. ALL ALUMINUM SHAPES SHALL BE ALUMINUM ASSOCIATION STANDARD STRUCTURAL SHAPES.
2. DESIGNATION LEGEND FOR ALUMINUM SHAPES:

CS 12 x 11.8		L 5 x 5 x 3/8
CHANNEL		ANGLE
DEPTH		LEG LENGTH
MEMBER WEIGHT LB/FT		LEG LENGTH
		LEG THICKNESS

3. WELDS NOT DIMENSIONED ON THE DRAWINGS SHALL BE SIZED TO DEVELOP THE FULL STRENGTH OF THE LEAST STRENGTH COMPONENT OF THE CONNECTION.

STAIR DESIGN NOTES:

1. STAIRS SHALL BE DESIGNED BY THE SUPPLIER IN GENERAL ACCORDANCE WITH DETAILS INDICATED ON THESE DESIGN DRAWINGS. THE DESIGN SHALL COMPLY WITH ALL APPLICABLE PROVISIONS OF THE LOCAL BUILDING CODE, ANSI A117.1 AND OSHA.
2. THE SHOP DRAWINGS SHALL BE SEALED BY AN ENGINEER REGISTERED IN THE SIATE OF THE PROJECT IF REQUESTED, SEALED CALCULATIONS SHALL BE SUBMITTED FOR REVIEW.
3. THE COMPLETED FABRICATIONS SHALL SUPPORT A UNIFORM LIVE LOAD OF 100 LBS PER SQUARE FOOT AND A CONCENTRATED LOAD OF 300 LBS APPLIED AT THE CENTER OF THE SPAN. INDIVIDUAL TREADS AND PLATFORMS SHALL BE DESIGNED TO SUPPORT A UNIFORM LIVE LOAD OF 100 LBS PER SQUARE FOOT OR A 300 LB CONCENTRATED LIVE LOAD APPLIED ON AN AREA OF 4 SQUARE INCHES. FOR ADDITIONAL LOADS AND DEFLECTION CRITERIA REFER TO THE STRUCTURAL METALS SPECIFICATION.
4. THE STAIR DESIGN AND DETAILS SHALL BE COORDINATED WITH THE HANDRAILING AND GUARDRAILING SUPPLIED. STAIR MEMBERS SHALL BE ADEQUATE TO ACCEPT LOADS FROM THE RAIL POSTS BASED UPON THE CRITERIA INDICATED IN THE RAILING SPECIFICATIONS.
5. CONNECTIONS TO THE SUPPORTING STRUCTURE SHALL BE ADEQUATE TO TRANSFER ALL LOADINGS, AND SHALL BE DESIGNED IN ACCORDANCE WITH ALL APPLICABLE PROVISIONS OF THE AISC MANUAL AND ACI 318. THE NUMBER AND TYPE OF CONNECTIONS SHALL COMPLY AT A MINIMUM, WITH THESE DESIGN DRAWINGS. ALL NECESSARY BRACKETS, BOLTS, AND ANCHORS SHALL BE PROVIDED.

S-99-505

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

STRUCTURAL

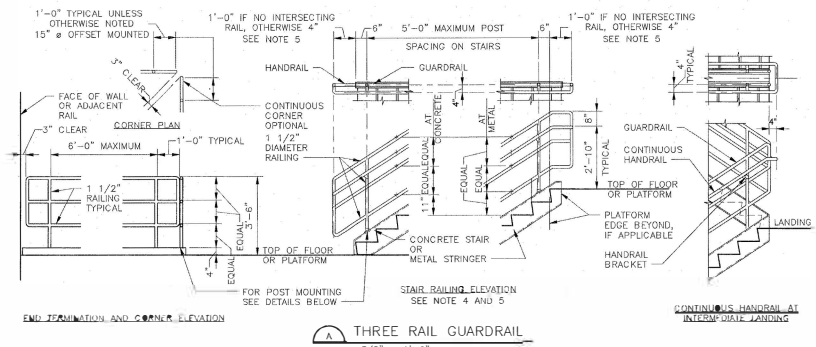
TYPICAL ALUMINUM GRATING STAIR DETAILS

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 199 OF 379	

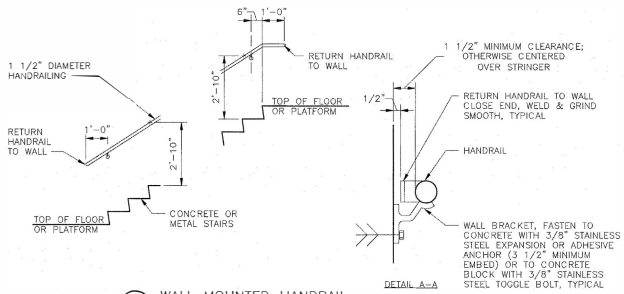
FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
80367
REGISTERED
HOUSTON, TEXAS

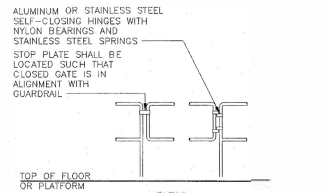
FILE PATH: BIM 360://4002600 - CIH Intercontinental Airport WWTP Improvements/4002600-GENERAL.rvt



A THREE RAIL GUARDRAIL
3/8" = 1'-0"



B WALL MOUNTED HANDRAIL
3/8" = 1'-0"

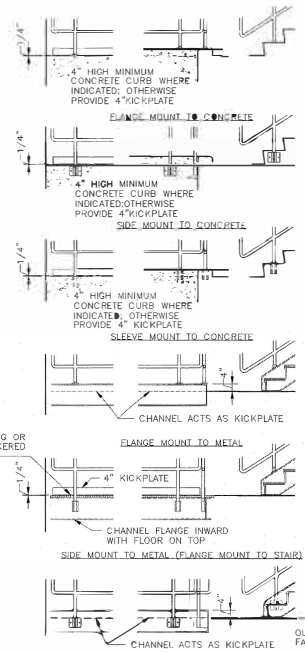


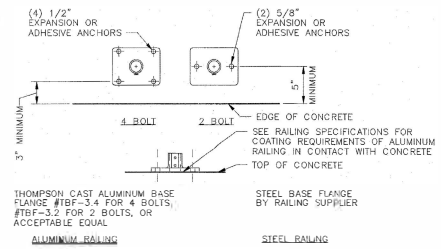
GATE CONFIGURATION TO MATCH ADJACENT RAILING OR AS PROVIDED BY SELF-CLOSING SAFETY GATE MANUFACTURER IN SAME MATERIAL AS GUARDRAIL SWING GATE INWARD WITH HINGES LOCATED TO PROVIDE LEAST OBSTRUCTION TO ACCESS

C SELF-CLOSING SWING GATE
3/8" = 1'-0"

NOTES:

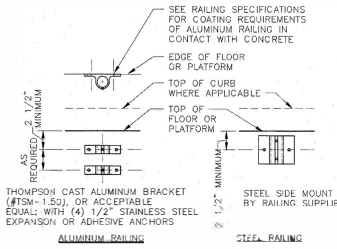
1. RAILING MATERIAL AND FABRICATION SHALL BE AS INDICATED ON THE DESIGN DRAWINGS AND IN THE PROJECT SPECIFICATIONS FOR METAL RAILINGS. AT A MINIMUM, GUARDRAILING AND HANDRAILING SHALL BE DESIGNED TO WITHSTAND A UNIFORM LOAD OF 50 LBS PER FT APPLIED IN ANY DIRECTION, AND A CONCENTRATED LOAD OF 200 LBS APPLIED IN ANY DIRECTION AT ANY POINT ALONG THE TOP. THE UNIFORM LOAD AND THE CONCENTRATED LOAD NEED NOT BE ASSUMED TO ACT CONCURRENTLY. THE DESIGN LOAD SHALL BE TRANSFERRED THROUGH THE ENTIRE RAILING SYSTEM AND ITS ATTACHMENT TO THE STRUCTURE.
2. ALL RAILING AND MOUNTINGS SHALL BE DESIGNED AND FABRICATED IN COMPLIANCE WITH THE MOST STRINGENT REQUIREMENTS OF THE RAILING SPECIFICATIONS, THE APPLICABLE LOCAL BUILDING CODE AND ALL PERTINENT OSHA AND LOCAL SAFETY REGULATIONS. THE SHOP DRAWINGS SHALL BE SEALED BY AN ENGINEER REGISTERED IN THE STATE OF THE PROJECT.
3. GUARDRAIL AND HANDRAIL SHALL BE DESIGNED AND FABRICATED IN CONFIGURATIONS REQUIRED TO FIT THE LOCATIONS INDICATED ON THE DESIGN DRAWINGS. CONTRACTOR SHALL VERIFY FINAL DIMENSIONS BEFORE FABRICATION.
4. GUARDRAIL MAY BE REPLACED WITH WALL MOUNTED HANDRAIL AT STAIR EDGES AND STRINGERS LOCATED ADJACENT TO WALLS. IF THE OUTSIDE EDGE OF THE STAIR STRINGER IS MORE THAN 3" FROM THE WALL FACE, GUARDRAIL SHALL BE USED.
5. THE INBOARD HANDRAILING AT SWITCHBACK STAIR LANDINGS MUST BE CONTINUOUS FROM ONE STAIR RUN TO THE NEXT. ADJUST INDICATED DIMENSION AS REQUIRED TO ALIGN AND CONNECT RAILINGS OVER THE LANDING EDGE.
6. AT LOCATIONS SPECIFICALLY INDICATED AS REMOVABLE RAILING, GUARDRAILING AND MOUNTING DETAILS SHALL BE MODIFIED AS FOLLOWS:
   - RAILING SHALL BE DETAILED IN SHORT LENGTHS THAT WEIGH NO MORE THAN 50 LBS EACH PIECE. SHALL INCLUDE AT LEAST 2, BUT NOT MORE THAN 3 POSTS. RAIL ENDS SHALL BE TERMINATED SIMILAR TO THE END TERMINATION DETAILS THIS SHEET.
   - MOUNTING DETAILS SHALL BE MODIFIED TO PERMIT RAILING PIECES TO BE REMOVED AND REINSTALLED WITHOUT USE OF TOOLS.





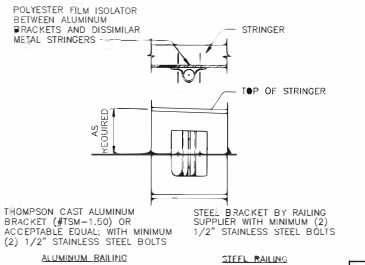
NOTE: USE SIDE-MOUNTED DETAILS UNLESS NOT FEASIBLE TO INSTALL.

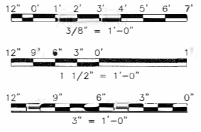
D BASE FLANGE MOUNT
1 1/2" = 1'-0"



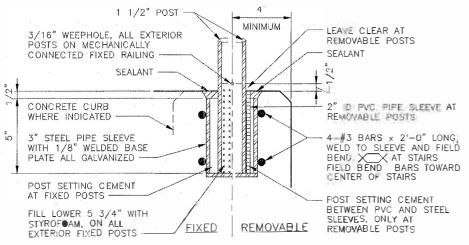
NOTE: USE SIDE-MOUNTED DETAILS UNLESS NOT FEASIBLE TO INSTALL.

E SIDE MOUNT
1 1/2" = 1'-0"





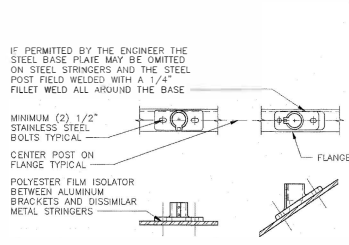
H SIDE MOUNT
1 1/2" = 1'-0"



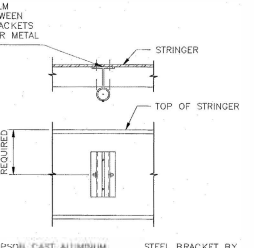
NOTES:

1. FIXED AND REMOVABLE DETAILS SIMILAR EXCEPT AS NOTED.
2. THE REMOVABLE SLEEVE MOUNT DETAIL SHALL NOT BE USED IN WET LOCATIONS SUBJECT TO FREEZING. SUBSTITUTE A REMOVABLE BASE FLANGE OR SIDE MOUNT DETAIL.

F SLEEVE MOUNT
3" = 1'-0"



G BASE FLANGE MOUNT
1 1/2" = 1'-0"



J OFFSET SIDE MOUNT
1 1/2" = 1'-0"

POST MOUNTED TO METAL

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC
FB NO. P-6182

STATE OF TEXAS
XIAOHUA LIN
116686
LICENSED PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
STRUCTURAL
TYPICAL HANDRAIL & GUARDRRAIL DETAILS

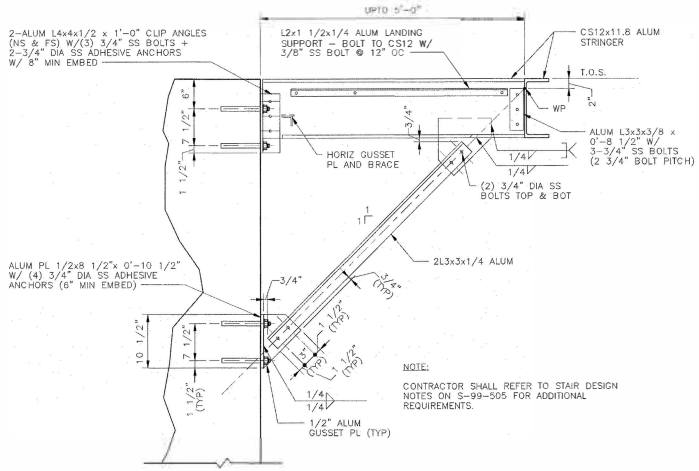
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 200 OF 379	

FOR CITY OF HOUSTON USE ONLY

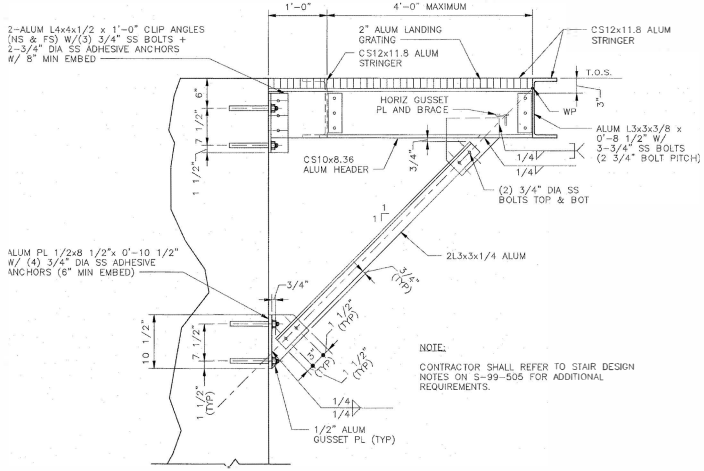
STATE OF TEXAS
80367
REGISTERED
ENGINEER

S-99-506

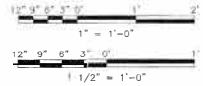
FILE PATH: BIM 360://4025650 - CIH Intercontinental Airport WWTP Improvements/4025650-GENERAL.rvt

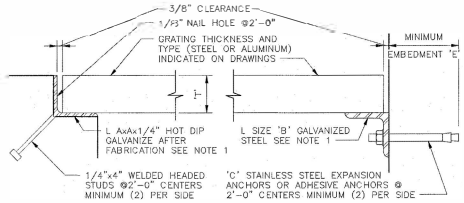


A STAIR LANDING SUPPORT DETAIL
1" = 1'-0"



B STAIR LANDING SUPPORT DETAIL
1" = 1'-0"



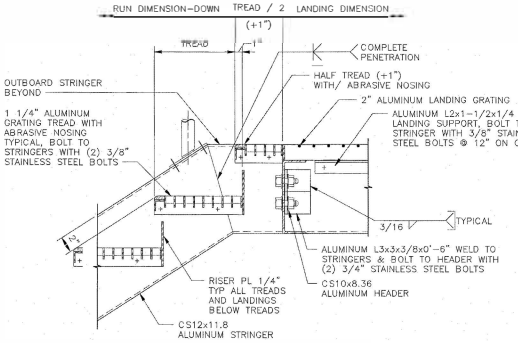


GRATING THICKNESS "T"	L SIZE AxAx1/4 INCHES	L SIZE 'B' INCHES	'C' ANCHOR DIA	'C' ANCHOR MIN 'E'
1"	1 3/4 x 1 3/4*	2 1/2x2 1/2x1/4	1/2"	3 1/4"
1 1/4"	1 3/4 x 1 3/4*	2 1/2x2 1/2x1/4	1/2"	3 1/4"
1 1/2"	1 3/4 x 1 3/4	2 1/2x2 1/2x1/4	1/2"	3 1/4"
1 3/4"	2x2	3x3x3/8	3/4"	4 3/4"
2"	2 1/2x2 1/2*	3x3x3/8	3/4"	4 3/4"
2 1/4"	2 1/2x2 1/2	3x3x3/8	3/4"	4 3/4"
2 1/2"	3x3*	3x3x3/8	3/4"	4 3/4"

* TRIM AND BEVEL UPSTANDING LEG TO FIT

NOTE:
1. ALL GRATING SUPPORTED ON CONCRETE SHALL HAVE AN EMBEDDED ANGLE RECESSED AS SHOWN UNLESS NOTED OTHERWISE. GRATING SUPPORTED BY THE FACE MOUNTED ANGLE SHALL BE USED WHERE THE CONCRETE EXTENDS ABOVE THE TOP OF THE GRATING OR AT EXISTING STRUCTURES.

C GRATING SUPPORT
NO SCALE



D DETAIL
1 1/2" = 1'-0"

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

STRUCTURAL

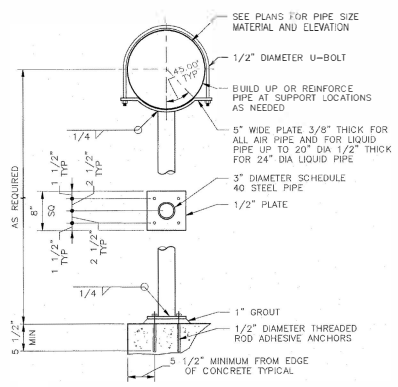
MISCELLANEOUS DETAILS

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO.	201 OF 379

FOR CITY OF HOUSTON USE ONLY
ACCEPTED JOSTLEN
80367
DATE
HOUSTON, TEXAS

S-99-507

FILE PATH: Bim 360://4026500 - COH Intercontinental Airport WWTP Improvements/4026500-GENERAL.rvt

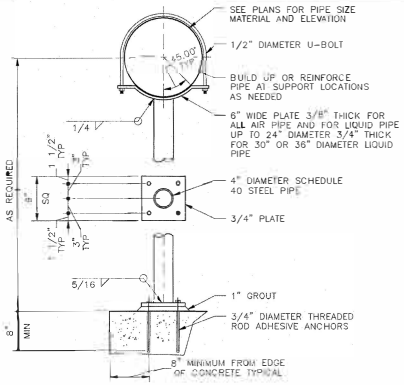


NOTE:

ALL STEEL MATERIALS SHALL BE HOT-DIP GALVANIZED FOR EXTERIOR LOCATIONS. VENT HOLES FOR GALVANIZING SHALL BE THE MINIMUM SIZE NECESSARY. HOLES SHALL BE LOCATED IN THE BOTTOM BASEPLATE AND ALSO LOCATED IN THE TOP OF THE PIPE, ADJACENT TO THE CURVED PLATE.

A 3 INCH DIAMETER STEEL COLUMN PIPE SUPPORT

1" = 1'-0"



NOTE:

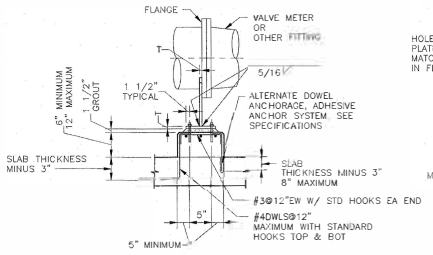
ALL STEEL MATERIALS SHALL BE HOT-DIP GALVANIZED FOR EXTERIOR LOCATIONS. VENT HOLES FOR GALVANIZING SHALL BE THE MINIMUM SIZE NECESSARY. HOLES SHALL BE LOCATED IN THE BOTTOM BASEPLATE AND ALSO LOCATED IN THE TOP OF THE PIPE, ADJACENT TO THE CURVED PLATE.

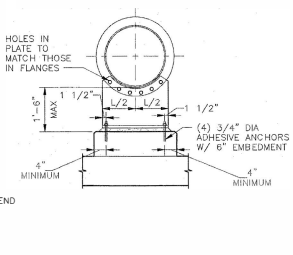
B 4 INCH DIAMETER STEEL COLUMN PIPE SUPPORT

1" = 1'-0"



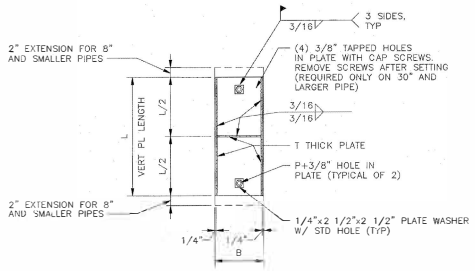
PIPE SIZE	T	L
6"-12"	5/8"	12"



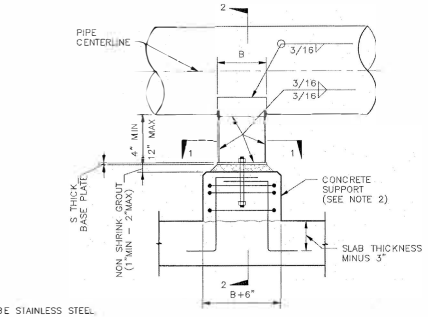


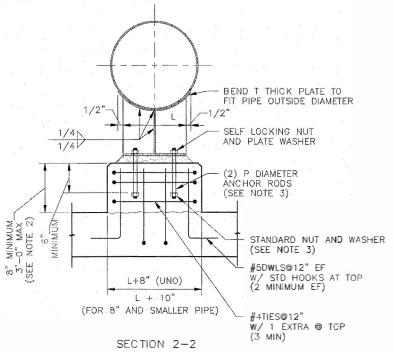
C FLANGED PIPE SUPPORT DETAIL

1/2" = 1'-0"



DIMENSIONS IN INCHES						
PIPE SIZE	T	S	B	P	W	L
6"	1/4	3/8	8	1	0	5
8"	1/4	3/8	8	1	1/2	6
14"	1/4	3/8	8	1	2 1/2	10



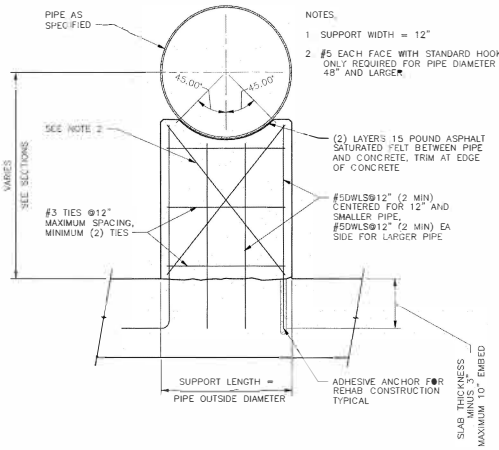


NOTES:

1. ALL MATERIALS TO BE STAINLESS STEEL.
2. WHERE CENTERLINE OF PIPE IS LESS THAN 1'-6" FROM SUPPORTING CONCRETE SLAB, OMIT THE CONCRETE SUPPORT AND MOUNT THE SADDLE DIRECTLY TO THE CONCRETE SLAB.
3. WHERE SADDLE IS MOUNTED DIRECTLY TO CONCRETE SLAB, PROVIDE ADHESIVE ANCHORS WITH HILTI HIT-HY 200 AND 8" EMBEDMENT. STANDARD SIZE HOLES WITHOUT A WELDED PLATE WASHER MAY BE UTILIZED.

D STEEL SADDLE PIPE SUPPORT (FIXED)

1" = 1'-0"



NOTES:

1. SUPPORT WIDTH = 12"
2. #5 EACH FACE WITH STANDARD HOOK, ONLY REQUIRED FOR PIPE DIAMETER 48" AND LARGER.

E CONCRETE SADDLE PIPE SUPPORT

1" = 1'-0"

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 561-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
STRUCTURAL
PIPE SUPPORT DETAILS

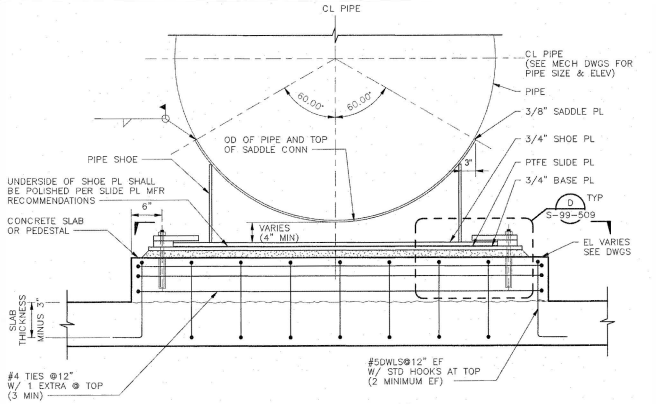
WBS NUMBER	R-00269-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAOHUA (SHARI) LIN, P.E.
SHEET NO. 202 OF 379	

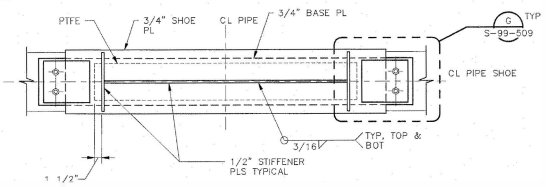
FOR CITY OF HOUSTON USE ONLY

80367

S-99-508

FILE PATH: R:\WBS\R-4402500 - COH Intercontinental Airport WWTP Improvements\4402500-GENERAL.rvt



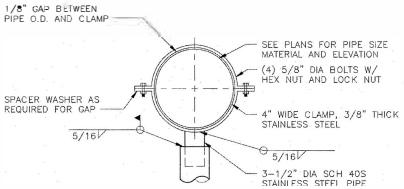


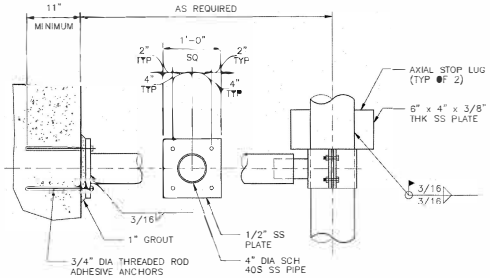
SECTION

NOTES:

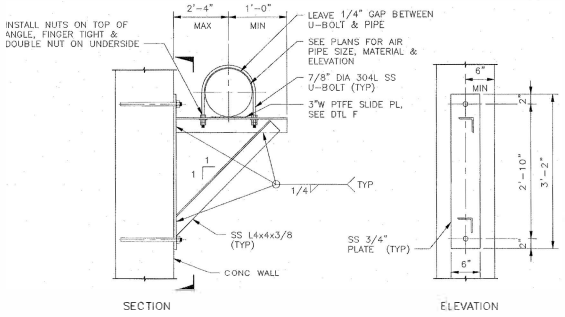
1. ALL MATERIALS TO BE STAINLESS STEEL
2. CONCRETE PEDESTAL HEIGHT LESSER THAN 8" EXTEND PIPE SHOE OVER TO THE SLAB.

A PIPE SADDLE SUPPORT
NO SCALE

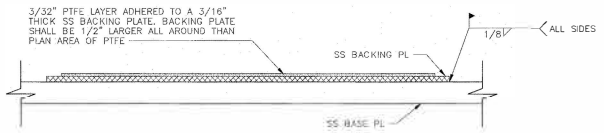




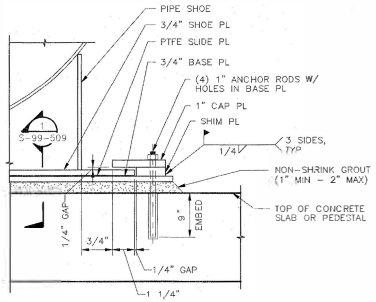
B BASIN VERTICAL SUPPORT GUIDE
NO SCALE



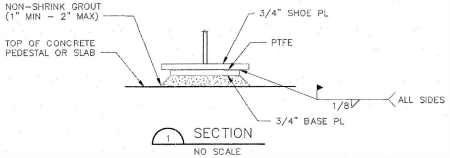
C WALL BRACKET PIPE SUPPORT (C)
NO SCALE



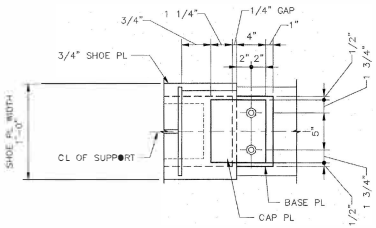
F PTFE PIPE SUPPORT SLIDE PLATE
NO SCALE



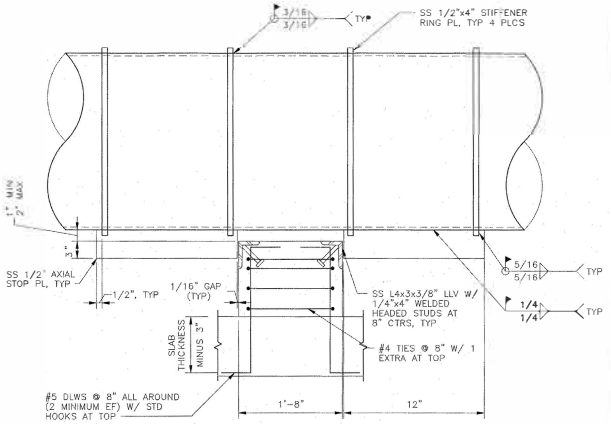
D DETAIL
NO SCALE



1 SECTION
NO SCALE



G DETAIL
NO SCALE



NOTE:
LENGTH OF SUPPORT IS EQUAL TO PIPE DIAMETER

E DETAIL
NO SCALE

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-5182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED
PROFESSIONAL ENGINEER
11/11/2025

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
STRUCTURAL

MISCELLANEOUS DETAILS

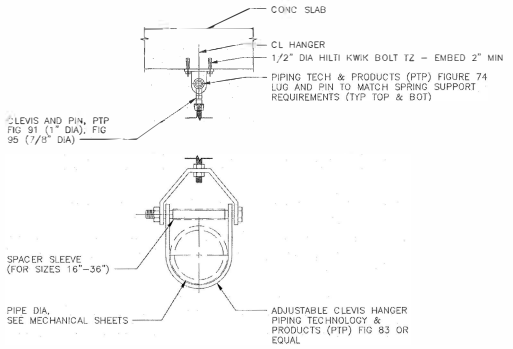
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 203 OF 379	

FOR CITY OF HOUSTON USE ONLY

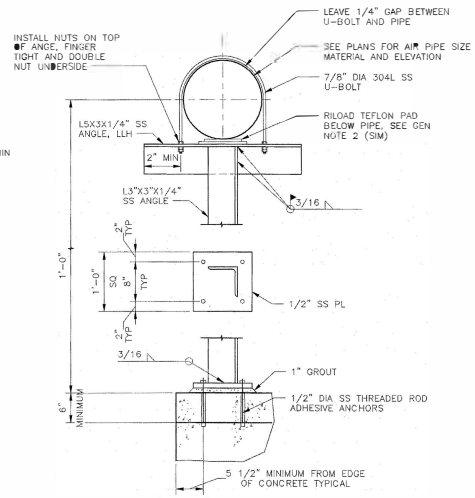
80367

S-99-509

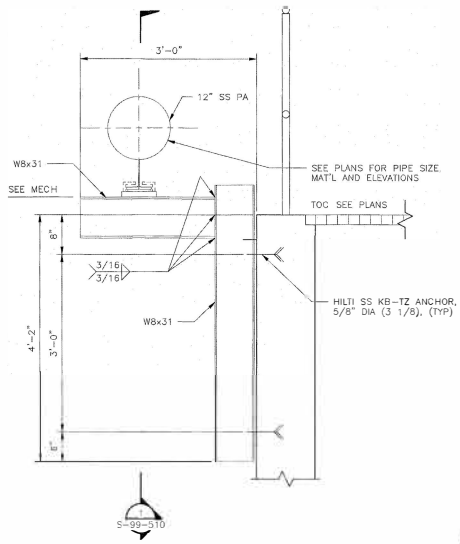
FILE PATH (R:\ 360\\402500 - COH Intercontinental Airport WWTP Improvements\402500-GENERAL.rvt

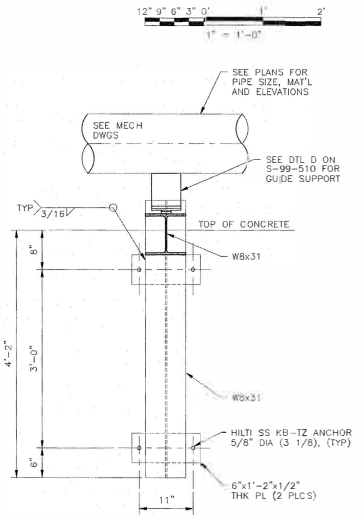


A CLEVIS HANGER (CONCRETE) SUPPORT
1" = 1'-0"



B ANGLE GUIDE SUPPORT
NO SCALE

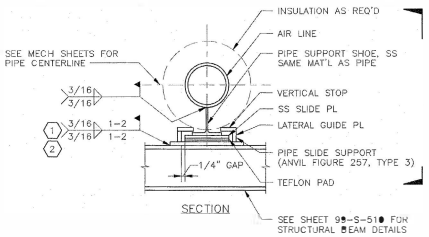


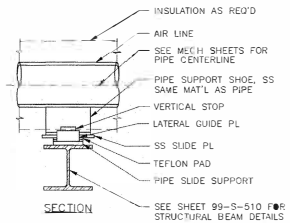


SECTION 1–1

NOTE:
CONTRACTOR SHALL COORDINATE TOP OF PIPE SUPPORT STEEL WITH PIPE CL ELEVATION AND FURNISHED PIPE SUPPORT.

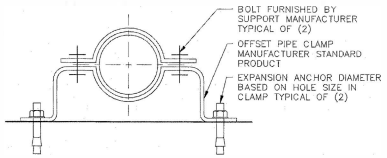
C PIPE SUPPORT
1" = 1'-0"





NOTE:
PIPE SUPPORTS SHALL BE STAINLESS STEEL EXCEPT WHERE NOTED.

D GUIDE SUPPORT
1 1/2" = 1'-0"



NOTE:
CLAMP, BOLTS AND EXPANSION ANCHORS SHALL BE SIMILAR MATERIALS.

E OFFSET PIPE CLAMP
3" = 1'-0"

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED
PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
STRUCTURAL

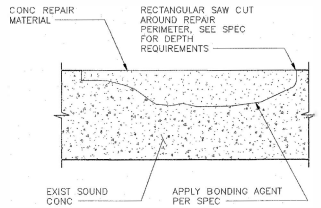
MISCELLANEOUS DETAILS

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHIAOHUA (SHARI) LIN, P.E.
	SHEET NO. 204 OF 379

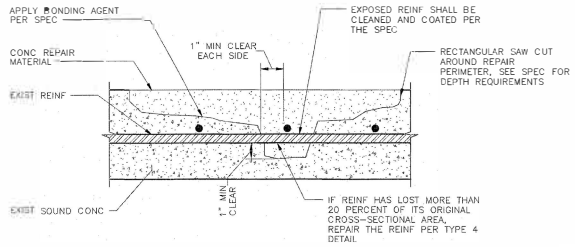
FOR CITY OF HOUSTON USE ONLY
80367

S-99-510

FILE PATH: 3INF XREF://402500 - COH Intercontinental Airport WWTP Improvements/402500-GENERAL.rvt



TYPE 1 – NO EXPOSED REINFORCEMENT

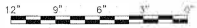


TYPE 2 – MINOR EXPOSED REINFORCEMENT

GENERAL REPAIR NOTES

1. REPAIR PRODUCTS SHALL BE AS INDICATED IN THE PROJECT SPECIFICATIONS.
2. REPAIR ACTIVITIES SUCH AS CLEANING, SURFACE PREPARATION, PRODUCT APPLICATION, AND CURING SHALL BE AS INDICATED IN THE PROJECT SPECIFICATIONS.
3. THE CONCRETE SURFACE REPAIR DETAILS ARE APPLICABLE TO EXISTING CONCRETE THAT IS DAMAGED. SURFACE DEFECTS IN NEW CONCRETE CONSTRUCTED AS PART OF THIS PROJECT SHALL BE REPAIRED IN ACCORDANCE WITH THE CAST-IN-PLACE CONCRETE SPECIFICATIONS.
4. SURFACE REPAIR AREAS LESS THAN 2 FEET APART SHALL BE COMBINED INTO ONE LARGER RECTANGULAR REPAIR AREA WITH NO IRREGULAR SHAPES. SEE FIGURE.
5. IF CRACK REPAIR AND SURFACE REPAIR ARE REQUIRED IN A COMMON AREA, THE CRACK REPAIR PROCEDURE SHALL BE PERFORMED FIRST.





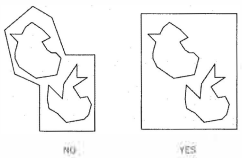
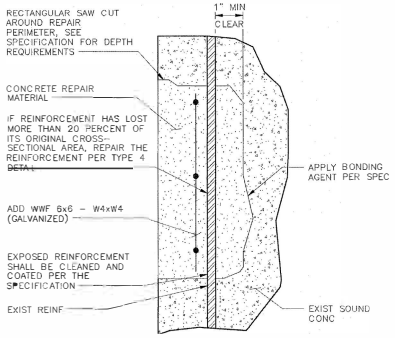
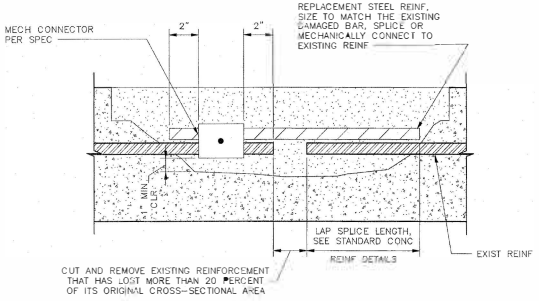


FIGURE
3" = 1'-0"



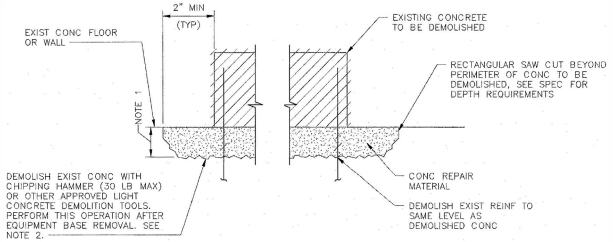
TYPE 3 – MAJOR EXPOSED REINFORCEMENT



FOR CLARITY, THE NEW BAR IS SHOWN ABOVE THE EXISTING BAR. FOR ACTUAL INSTALLATION, THE NEW BAR SHALL BE PLACED BESIDE THE EXISTING BAR SO BOTH HAVE THE SAME CONC COVER.

TYPE 4 – REINFORCEMENT REPAIR

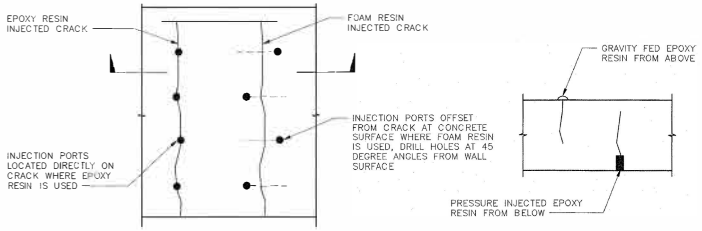
A CONCRETE SURFACE REPAIR
3" = 1'-0"



NOTES:

1. DEPTH OF CONCRETE DEMOLITION SHALL BE THE LESSER OF 2" OR THE DEPTH OF CONCRETE COVER OVER THE EXISTING REINFORCEMENT. DO NOT DAMAGE EXISTING REINFORCEMENT PARALLEL TO REPAIRED SURFACE.
2. CARE SHALL BE TAKEN TO AVOID DAMAGING CONCRETE SUBSTRATE DURING CHIPPING OPERATION.

B CONCRETE FLOOR OR WALL REPAIR FOLLOWING DEMOLITION
3" = 1'-0"



WALL ELEVATION SLAB SECTION

INJECTION PORT SPACING AND ARRANGEMENT SHALL BE AS RECOMMENDED BY THE MATERIAL MANUFACTURER.

C CONCRETE CRACK REPAIR
1 1/2" = 1'-0"

EFFLORESCENCE REPAIR NOTES:

1. EFFLORESCENCE IS DEFINED AS A GENERALLY WHITE DEPOSIT FORMED WHEN WATER-SOLUBLE COMPOUNDS EMERGE IN SOLUTION FROM CONCRETE OR MASONRY AND PRECIPITATE BY REACTION SUCH AS CARBONATION OR CRYSTALLIZE BY EVAPORATION.
2. EFFLORESCENCE SALTS SHALL BE REMOVED WITH A STIFF BRUSH, WIRE BRUSH OR SCRAPER. IF THE EFFLORESCENCE IS SLIGHT, BRUSHING WITH WATER MAY REMOVE IT. IF NOT, BRUSHING WITH DILUTE ACID SUCH AS MURIATIC OR SULFAMIC ACID IS RECOMMENDED. IF THE CONCRETE IS PIGMENTED, IT IS RECOMMENDED THAT SULFAMIC ACID IN THE 5 TO 10% CONCENTRATION RANGE SHALL BE USED. NOTE THAT STRONGER ACIDS MAY ALTER THE COLOR.
3. A PRESSURE WASHER SHALL NOT BE USED FOR REMOVING THE EFFLORESCENCE SALTS.

CRAZING REPAIR NOTES:

1. CRAZING IS DEFINED AS A PATTERN OF FINE RANDOM CRACKS OCCURRED ON A CONCRETE SURFACE.
2. ROUGHEN THE CRAZING AREA ON THE CONCRETE SURFACE TO A 1/4" AMPLITUDE AND APPLY AN APPROVED SURFACE REPAIR MORTAR.
3. SURFACE PREPARATION, MIXING, APPLICATION AND CURING SHALL BE PERFORMED PER MANUFACTURER'S RECOMMENDATIONS.

D TYPICAL MISCELLANEOUS REPAIR NOTES
12" = 1'-0"

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED PROFESSIONAL ENGINEER
11/1/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
STRUCTURAL

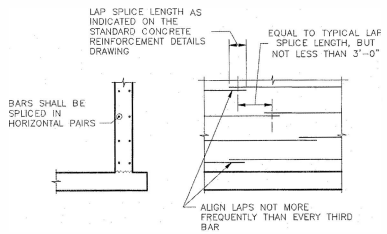
TYPICAL CONCRETE CRACK AND SURFACE REPAIR DETAILS AND NOTES

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 205 OF 379	

80967
REGISTERED
HOUSTON, TEXAS

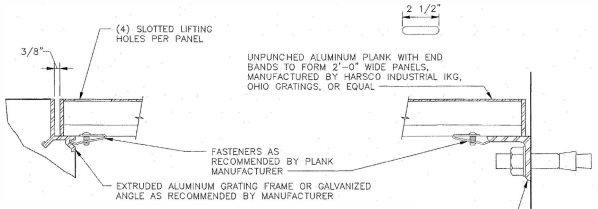
S-99-511

FILE PATH: BIM 360://4401500 - COH Intercontinental Airport WWTP Improvements/4401500-GENERAL.rvt



A TYPICAL CIRCULAR TANK OR RING WALL REINFORCEMENT SPLICE DETAIL

12" = 1'-0"



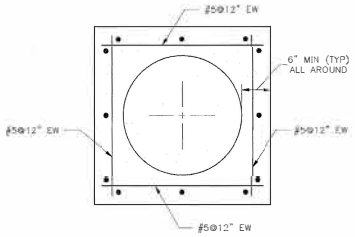
PLANK THICKNESS	GALVANIZE ANGLE SIZE	STAINLESS STEEL EXPANSION ANCHOR	MINIMUM EMBED
1 1/2"	2 1/2x2 1/2x1/4	1/2"@2'-0"OC, MINIMUM (2) PER SIDE	3 1/4"
2 1/2"	3x3x3/8	3/4"@2'-0"OC, MINIMUM (2) PER SIDE	4 3/4"

NOTES

1. ALUMINUM PLANK SHALL BE HEAVY DUTY WITH BEARING BARS SPACED AT 1.20" AS MANUFACTURED BY OHIO GRATING, INC OR ACCEPTABLE EQUAL.
2. ALUMINUM PLANKS SHALL HAVE A NON-SLIP SURFACE.
3. ALUMINUM SURFACES IN CONTACT WITH CONCRETE SHALL BE COATED WITH BITUMINOUS PAINT.
4. UNLESS NOTED OTHERWISE, PLANKS SHALL SUPPORT 150 PSF WITH 1/4 INCH MAXIMUM DEFLECTION.
5. ALL PLANKS SUPPORTED ON CONCRETE SHALL HAVE AN EMBEDDED ANGLE RECESSED AS SHOWN UNLESS NOTED OTHERWISE. PLANKS SUPPORTED BY THE FACE MOUNTED ANGLE SHALL BE USED WHERE THE CONCRETE EXTENDS ABOVE THE TOP OF THE PLANKS OR AT EXISTING STRUCTURES.

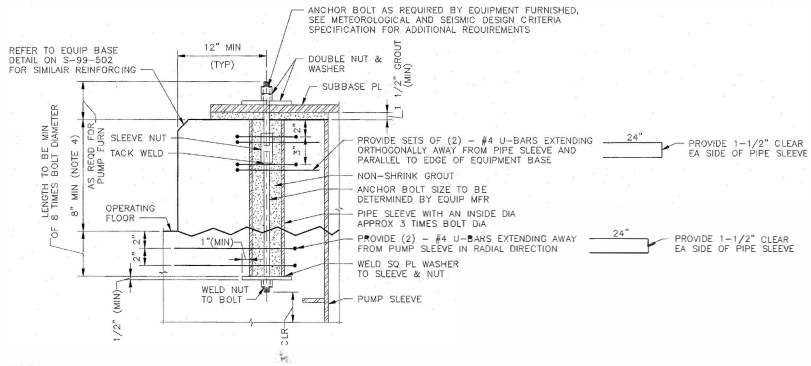
B ALUMINUM PLANKS

3" = 1'-0"



C TYPICAL PIPE ENCASEMENT DETAIL

1" = 1'-0"

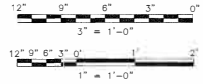


NOTES:

1. THE ANCHOR BOLTS SHALL BE COVERED WITH A NON-BINDING MATERIAL, SUCH AS GREASE, PUTTY, OR TAPE GROUTING IN SLEEVE, TO FACILITATE STRETCH.
2. SLEEVE NUT SHALL BE TAPPERED AND SHALL HAVE ULTIMATE STRETCH EQUAL TO OR GREATER THAN THE ANCHOR ROD STRETCH.
3. AFTER FINAL ASSEMBLY OF THE PUMP, ALL ANCHOR BOLTS SHALL BE PRETENSIONED (TIGHTENED) AS RECOMMENDED BY THE PUMP MANUFACTURER.
4. DIMENSIONS TO BE DETERMINED BY THE CONTRACTOR'S PROPOSED PUMP SELECTION.
5. FOR FUTURE PUMP, INSTALL PIPE SLEEVES AS SHOWN AND PROVIDE 3/8-INCH ALUM CHECKERED PLATE BOLTED TO TOP OF EQUIPMENT PAD USING PIPE SLEEVES AND FUTURE EQUIPMENT ANCHORS. PROVIDE 1/8-INCH DURO 50 ASTM D2000 SHEET ADHERED TO UNDERSIDE OF ALUMINUM PLATE FOR ISOLATION OF ALUMINUM TO CONCRETE.

D VERTICAL DIFFUSION PUMP BASE ANCHOR BOLT DETAIL

NO SCALE



BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED
PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

STRUCTURAL

MISCELLANEOUS DETAILS

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E

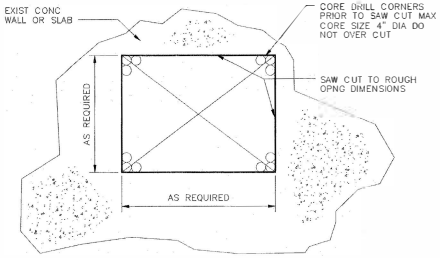
FOR CITY OF HOUSTON USE ONLY

80367

S-99-512

SHEET NO. 206 OF 379

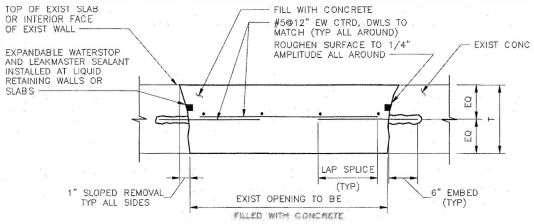
FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-GENERAL.rvt



NOTES:

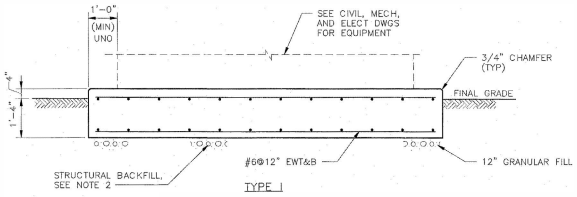
1. SIZES AND LOCATIONS OF ALL OPENINGS MUST BE APPROVED BY ENGINEER PRIOR TO BEGINNING CORING OR CUTTING OPERATIONS.
2. UNLESS NOTED OTHERWISE, EXPOSED METAL EMBEDMENTS SHALL BE REPAIRED BY CUTTING OFF THE METAL AT THE FACE OF THE CONCRETE, GRINDING SMOOTH AND COATING. COATING SHALL EXTEND A MINIMUM OF 1" BEYOND THE EDGE OF THE EXPOSED METAL

A PROCEDURE FOR CUTTING OR ENLARGING OPENINGS IN EXISTING CONCRETE SLABS OR WALLS
NO SCALE

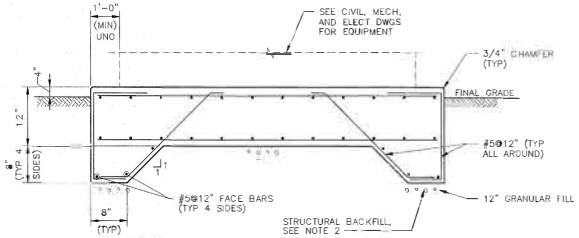


NOTE: FIELD VERIFY OPNG SIZE PRIOR TO REBAR FABRICATION.

B INFILL DETAIL FOR EXISTING WALL OR SLAB OPENING GREATER THAN 12"
NO SCALE



TYPE I

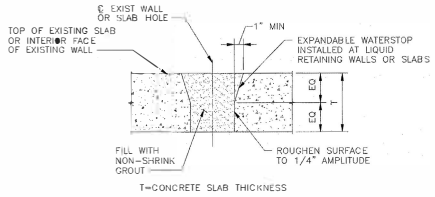


NOTES:

1. PAD DIMENSIONS DETERMINED BY EQUIPMENT FURNISHED FOR EQUIPMENT PADS LESS THAN 10FT IN WIDTH, PROVIDE TYPE 1 EQUIPMENT PAD
2. REMOVE AND REPLACE EXISTING SOILS WITH STRUCTURE BACKFILL TO A DEPTH OF 6'-0" BELOW FOUNDATION AND EXTENDING 6'-0" EACH SIDE, BEYOND THE FOOTPRINT OF THE FOUNDATION AND SLOPING UP TOWARDS GRADE AT A 1 TO 1 SLOPE. PROVIDE FILTER FABRIC TYPE A BELOW STRUCTURE BACKFILL.

TYPE II

D EXTERIOR EQUIPMENT PAD
NO SCALE



C INFILL DETAIL WALL AND SLAB OPENINGS LESS THAN 12"
NO SCALE

FILE PATH: S:\W 245\...\402500 - CDM Intercontinental Airport WWTP Improvements\402500-GENERAL.rvt

BLACK & VEATCH

BLACK & VEATCH CORPORATION
9229 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED
PROFESSIONAL ENGINEER
11/11/2025

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

STRUCTURAL

MISCELLANEOUS DETAILS

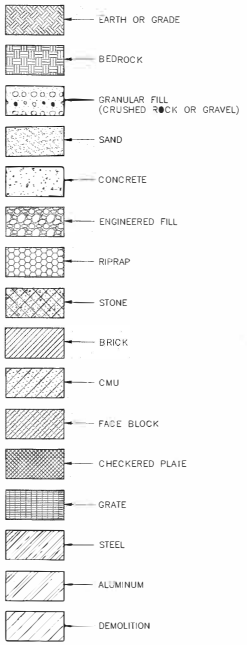
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 207 OF 375	

FOR CITY OF HOUSTON USE ONLY

80367

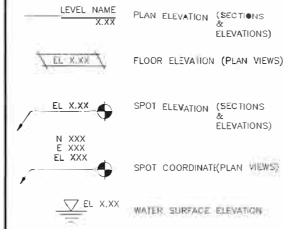
S-99-513

FILL PATTERNS

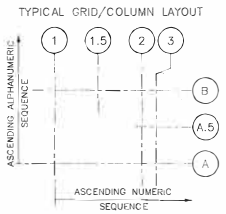


ELEVATION & GRID CALLOUTS

ELEVATION CALLOUTS

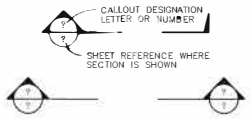


GRID/COLUMN CALLOUTS

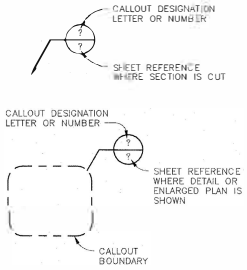


VIEW CALLOUTS

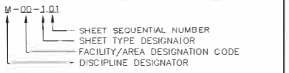
SECTION CALLOUTS



DETAIL/ENLARGED PLAN AREA CALLOUTS



DRAWING NUMBERING SYSTEM



DISCIPLINE DESIGNATORS

- A ARCHITECTURAL
- C CIVIL
- D DEMOLITION
- E ELECTRICAL
- F FIRE PROTECTION
- G GENERAL
- H HVAC/BUILDING MECHANICAL
- I INSTRUMENTATION AND CONTROLS
- L LANDSCAPE
- M PROCESS MECHANICAL
- P PLUMBING
- S STRUCTURAL

AREA/FACILITY DESIGNATION CODES

REFER TO THE PROJECT SITE PLAN FOR AREA OR FACILITY DESIGNATIONS.

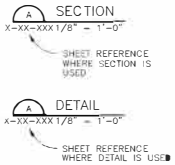
SHEET TYPE DESIGNATORS

- 0 GENERAL (SYMBOLS, LEGENDS, NOTES, ETC.)
- 1 PLANS (ARRANGEMENT PLANS, PARTIAL PLANS)
- 2 ELEVATIONS
- 3 SECTIONS
- 4 LARGE SCALE VIEWS (ENLARGED PLANS, STAIR SECTIONS OR SECTIONS THAT ARE NOT DETAILS)
- 5 DETAILS
- 6 SCHEDULES & DIAGRAMS
- 7 SCHEMATICS (ONE-LINES, BLOCK DIAGRAMS)
- 8 USER DEFINED
- 9 3D MODEL (PERSPECTIVES, ISOMETRICS, PHOTOGRAPHS)

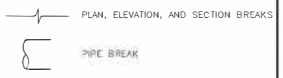
NORTH ARROW



SECTION & DETAIL VIEW TITLES

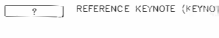


BREAKS



ANNOTATION

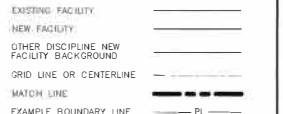
SHEET NOTES



REVISIONS



LINE STYLES



S-99-514

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED
PROFESSIONAL ENGINEER
11/11/2025

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

STRUCTURAL

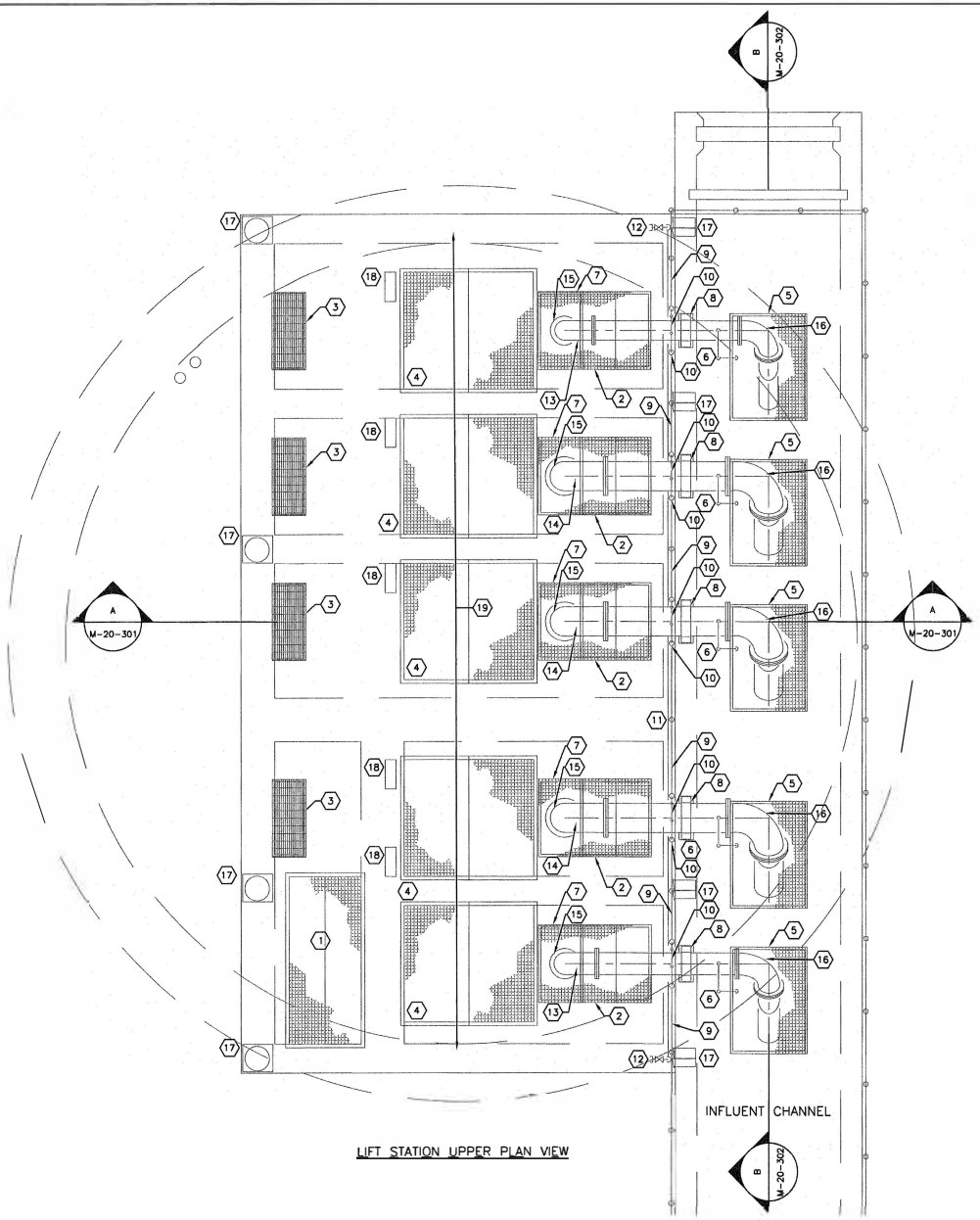
GENERAL ANNOTATION & SYMBOLS LEGEND

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 208 OF 379	

FOR CITY OF HOUSTON USE ONLY

80367

FILE PATH: BM 360://A02500 - COH Intercontinental Airport WWTP Improvements/A02500-GENERAL.rvt



LIFT STATION UPPER PLAN VIEW

NOTES:

1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS AND LOCATIONS PRIOR TO FABRICATIONS OF NEW ITEMS.
2. CONTRACTOR SHALL PROTECT EXISTING MONORAIL AND MONORAIL SUPPORT SYSTEMS FROM DAMAGE DURING CONSTRUCTION.
3. REFER TO SPECIFICATION SECTION 01110 FOR ADDITIONAL INFORMATION ON CONSTRUCTION SEQUENCE.
4. MINIMUM ACCESS HATCH DIMENSIONS SHOWN. CONTRACTOR SHALL CONFIRM SIZE OF WETWELL HATCHES AND CLEARANCE WITH ALUMINUM SAFETY GRATE PER SELECTED PUMP MANUFACTURER.
5. ROTATE 90 LONG RADIUS ELBOW TO MATCH EXISTING INSTALLATION. MATCH LENGTH OF EXISTING SPOOL PIECE AND EXTENT THROUGH EXISTING OPENING OF CHECKERED PLATE.
6. REFER TO STRUCTURAL AND ELECTRICAL SHEETS FOR ADDITIONAL INFORMATION.
7. FOR PIPING 4" AND SMALLER, FURNISH AND INSTALL UNIONS, BUSHINGS, COUPLINGS, AND OTHER FITTINGS, AS NECESSARY, FOR EASE OF INSTALLATION AND MAINTENANCE OF EQUIPMENT.
8. REFER TO SPECIFICATION SECTION 15140 FOR PIPE SUPPORT/HANGER SPACING. PROVIDE AT LEAST ONE SUPPORT FOR EACH LENGTH OF PIPE, AT EACH CHANGE OF DIRECTION AND AT EACH VALVE. SUPPORT AND HANGER TYPES SHOWN INDICATE SUITABLE CHOICES. REFER TO MECHANICAL DETAIL SHEETS FOR POSSIBLE ALTERNATES TO BE USED WITH ENGINEER'S APPROVAL.
9. ROUTING IS SHOWN IN GENERAL ONLY FOR PIPES OF 3" DIAMETER AND SMALLER. SUCH PIPING SHALL BE FIELD ROUTED. VERIFY EXACT PIPING CONFIGURATION WITH OWNER'S ON-SITE REPRESENTATIVE PRIOR TO INSTALLATION.
10. REMOVE AND REPLACE SIPHON.
11. DOUBLE LEAF ALUMINUM ACCESS HATCH AND FRAME.
12. PROVIDE ENLARGED OPENINGS AS NECESSARY FOR PUMP DISCHARGE PIPING AND SIPHON BREAKS. OPENINGS IN CHECKERED PLATE FOR PIPE PENETRATIONS SHALL LEAVE NO MORE THAN 1" GAP BETWEEN PIPE AND CHECKERED PLATE.
13. RELOCATE EXISTING 18" RISER HATCHES TO NEW 18" PIPING LOCATION ENLARGE 3 OTHER RISER OPENINGS AND RELOCATE TO 30" DIAMETER LOCATIONS.
14. REMOVE EXISTING SAFETY NETTING AS NEEDED, AND REPLACE WITH ALUMINUM SAFETY GRATE TO COMPLY WITH CURRENT CITY SPECIFICATIONS.

N

NOTES BY SYMBOL (X)	
1.	EXIST 5'-0"x11'-6" CHK'D PLATE PERSONNEL ACCESS HATCH & FRAME TO REMAIN. SEE NOTE 14.
2.	EXIST CHK'D PLATE OPENING TO REMAIN.
3.	EXIST 2'-0"x5'-0" REMOVABLE GRATING W/CURB ANGLE TO REMAIN.
4.	EXIST 9'-0"x8'-0" ACCESS HATCH & FRAME W/CURB ANGLE TO REMAIN. SEE NOTE 14.
5.	7'-0"X5'-0" CHK'D PLATE W/CURB ANGLE & BANDED OPENINGS FOR PUMP DISCH & SIPHON BREAK, SEE NOTES 12 & 13.
6.	2" SIPHON BREAK, SEE NOTE 10.
7.	3'-0" X 5'-0" CHK'D PLATE OPENING, SEE NOTES 12 & 13.
8.	PIPE STRAP, ATTACH TO NEW CONC PIPE SUPPORT WITH PIPE STRAP.
9.	EXIST SAFETY RAIL TO REMAIN.
10.	EXIST SAFETY CHAIN BETWEEN RAILS TO REMAIN.
11.	EXIST 3" NPW LINE TO REMAIN.
12.	EXIST HOSE BIBB TO REMAIN.
13.	18" DI PUMP DISCHARGE RISER, SEE NOTE 12 & 13.
14.	30" DI PUMP DISCHARGE RISER, SEE NOTE 12 & 13.
15.	90 DEG LR ELBOW.
16.	90 DEG LR ELBOW, ROTATED 45 DEG.
17.	EX MONORAIL SUPPORT TO REMAIN.
18.	EXIST CONTROL PANEL BOX TO REMAIN.
19.	EXIST MONORAIL & MONORAIL SUPPORT SYSTEM NOT SHOWN.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
PROCESS MECHANICAL
INFLUENT LIFT STATION UPPER PLAN

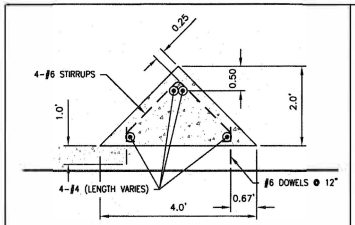
WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
1"=6'	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	

80367

M-20-101

SHEET NO. 209 OF 379

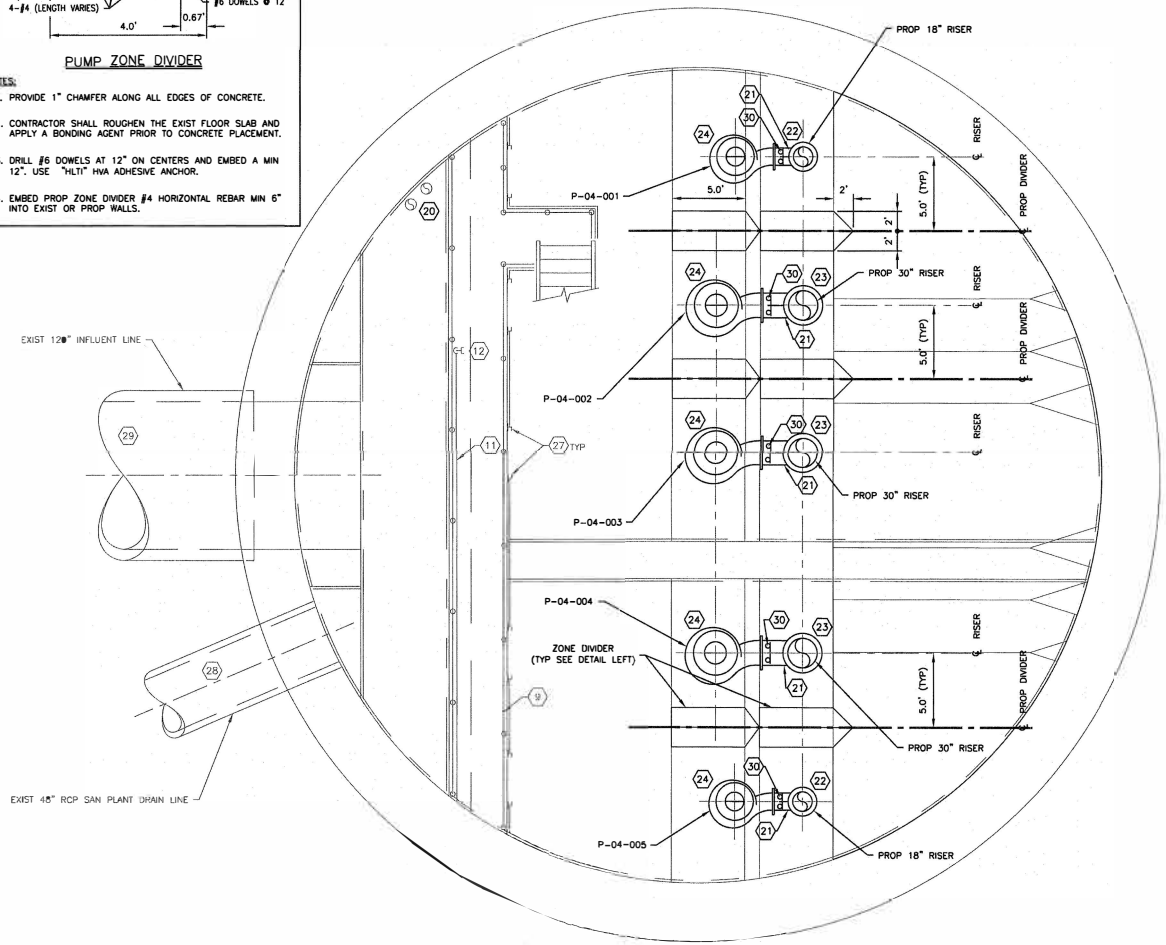
GUNDA CORPORATION
P:\2020 projects\20010-02 b&v\ dgn ww\p improvements\CAD\SHEETS\009 MECHANICAL - with GUNDA BASE.dwg Nov 11, 2022 - 4:05pm WEason



PUMP ZONE DIVIDER

NOTES:

1. PROVIDE 1" CHAMFER ALONG ALL EDGES OF CONCRETE.
2. CONTRACTOR SHALL ROUGHEN THE EXIST FLOOR SLAB AND APPLY A BONDING AGENT PRIOR TO CONCRETE PLACEMENT.
3. DRILL #6 DOWELS AT 12" ON CENTERS AND EMBED A MIN 12". USE "HILTI" HVA ADHESIVE ANCHOR.
4. EMBED PROP ZONE DIVIDER #4 HORIZONTAL REBAR MIN 6" INTO EXIST OR PROP WALLS.



LIFT STATION LOWER PLAN VIEW

NOTES:

1. PRIOR TO INSTALLING NEW EQUIPMENT IN WETWELL, CONTRACTOR SHALL CLEAN WETWELL AND REMOVE ANY ACCUMULATED SOLIDS, GRIT AND DEBRIS. CONTRACTOR SHALL DISPOSE OF REMOVED SOLIDS, GRIT AND DEBRIS AS SPECIFIED IN SPECIFICATION SECTION 01576 AND 02220.
2. CONTRACTOR SHALL INSPECT AND REPAIR CONCRETE AND COATING IN ACCORDANCE WITH CONSTRUCTION SPECIFICATIONS. PREPARE ALL CONCRETE SURFACES IN WETWELL IN ACCORDANCE WITH THE COATING MANUFACTURER'S INSTRUCTIONS PRIOR TO APPLICATION OF CONCRETE COATING. APPLY COATING AFTER ALL OTHER MODIFICATIONS ARE COMPLETE. COATING APPLICATION INCLUDES AREAS OF REPAIR WITHIN THE WETWELL. COAT INDICTED AREAS WITH SYSTEM 106 – 100% SOLIDS EPOXY AS SPECIFIED IN SECTION 09901 AND THE OWNER'S LIST OF APPROVED MATERIALS.
3. FOR PIPING 4" AND SMALLER, FURNISH AND INSTALL UNIONS, BUSHINGS, COUPLINGS AND OTHER FITTINGS, AS NECESSARY FOR EASE OF INSTALLATION AND MAINTENANCE OF EQUIPMENT.
4. REFER TO SPECIFICATION SECTION 15140 FOR PIPE SUPPORT/HANGER SPACING. PROVIDE AT LEAST ONE SUPPORT FOR EACH LENGTH OF PIPE, AT EACH CHANGE OF DIRECTION AND AT EACH VALVE. EXISTING SUPPORT AND HANGER TYPES SHOWN INDICATE SUITABLE CHOICES. REFER TO LIFT STATION DETAIL SHEETS FOR POSSIBLE ALTERNATES TO BE USED WITH ENGINEER'S APPROVAL.
5. ROUTING IS SHOWN IN GENERAL ONLY FOR PIPES OF 3" DIAMETER AND SMALLER. SUCH PIPING SHALL BE FIELD ROUTED. VERIFY EXACT PIPING CONFIGURATION WITH OWNER'S ON-SITE REPRESENTATIVE PRIOR TO INSTALLATION.
6. REFER TO STRUCTURAL AND ELECTRICAL SHEETS FOR ADDITIONAL INFORMATION.
7. INSTALL CATHODIC PROTECTION AT LIFT STATION PUMPS AS REQUIRED IN SPECIFICATION SECTION 16645 AND SHEET M-20-502. CONTRACTOR SHALL SUBMIT INSTALLATION DRAWINGS FOR CATHODIC PROTECTION, SEALED BY LICENSED PROFESSIONAL ENGINEER FOR REVIEW. CATHODIC PROTECTION SHALL BE AT NO ADDITIONAL COST TO THE OWNER.
8. CONTRACTOR SHALL VERIFY RADAR LEVEL SENSOR INSTALLATION REQUIREMENTS WITH MANUFACTURER AND ADJUST/RELOCATE SENSORS AS NEEDED.

NOTES BY SYMBOL ⟨X⟩	
9.	EXIST SAFETY RAIL
11.	EXIST 3" NPW LINE.
12.	EXIST HOSE BIBB.
20.	LIFT STATION RADAR LEVEL SENSORS, REFER TO ELECTRICAL SHEETS, SEE NOTE 8.
21.	BASE ELBOW.
22.	18" X 14" ECC REDUCER & 18" DIA PUMP DISCHARGE RISER.
23.	30" X 20" ECC REDUCER & 30" DIA PUMP DISCHARGE RISER.
24.	SUBMERSIBLE PUMP, SEE SHEET M-20-503. REFER TO ELECTRICAL SHEETS FOR INFORMATION ON ELECTRICAL CABLE.
25.	RETROFIT STILLING WELL FOR NEW SENSORS.
26.	CONCRETE COATING, SEE NOTE 2.
27.	EXIST PLATE GUIDES.
28.	EXIST 48" DIA PLANT DRAIN.
29.	EXIST 120" DIA SAN INFLUENT.
30.	PUMP GUIDE RAILS & GUIDE RAIL SUPPORT.

N

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

PROCESS MECHANICAL

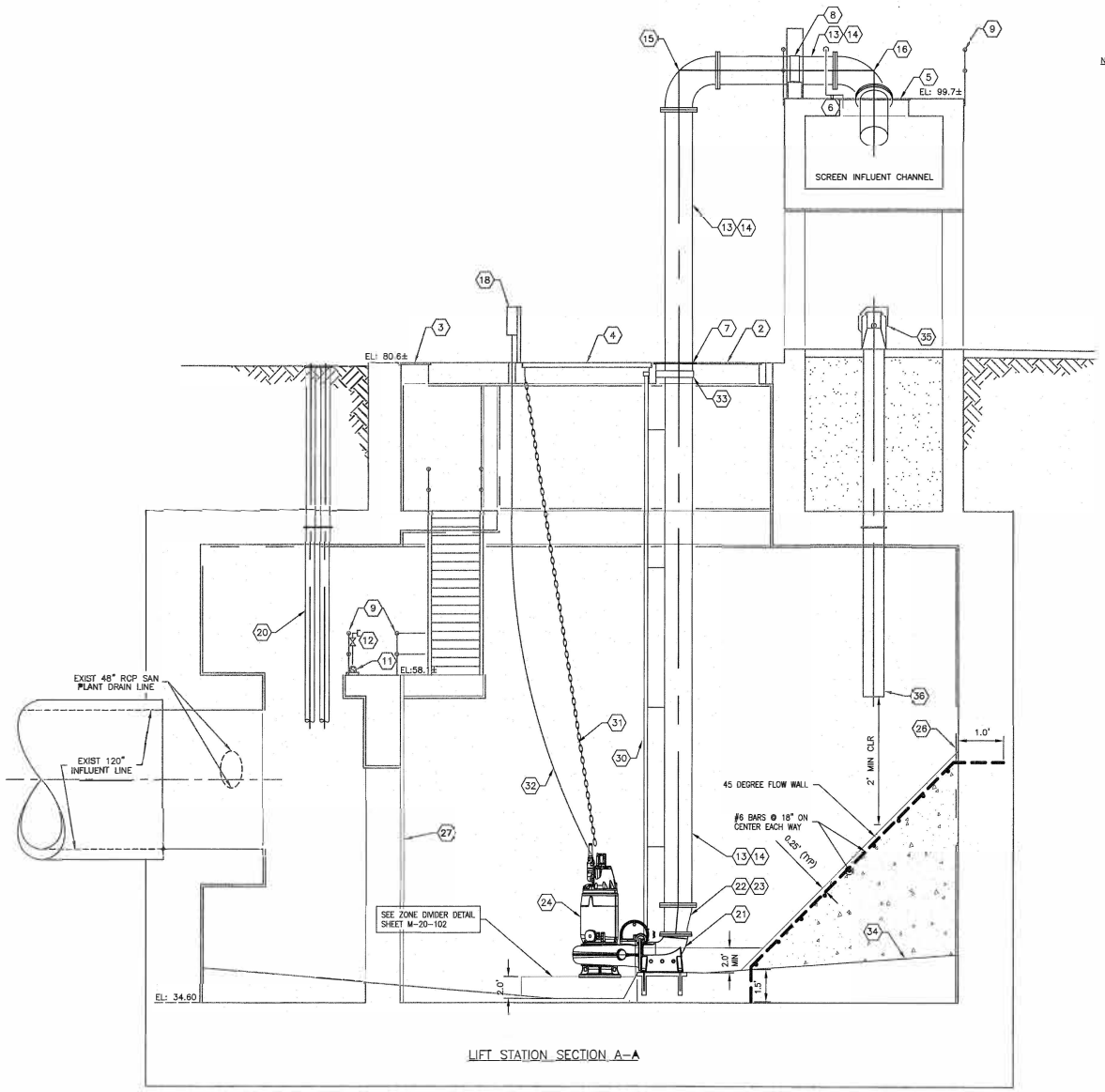
INFLUENT LIFT STATION LOWER PLAN

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
1"=6'	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 210 OF 379	

80367

M-20-102

GUNDA CORPORATION
P:\2020 Projects\20010-02 B&V IAH WWTP Improvements\CAD\SHEETS\009 MECHANICAL - with GUNDA BASE.dwg Feb 22, 2023-4:47pm LJames



LIFT STATION SECTION A-A

NOTES:

1. INFORMATION SHOWN, THIS SHEET, IS TYPICAL FOR ALL FIVE PUMPS.
2. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS AND LOCATIONS PRIOR TO FABRICATION OF NEW ITEMS.
3. CONTRACTOR SHALL PROTECT EXISTING MONORAIL AND MONORAIL SUPPORT SYSTEM FROM DAMAGE.
4. CONTRACTOR SHALL INSPECT AND REPAIR CONCRETE AND COATING IN ACCORDANCE WITH SPECIFICATION SECTION 03920 & 03930. PREPARE ALL CONCRETE SURFACES IN WETWELL IN ACCORDANCE WITH THE COATING MANUFACTURER'S INSTRUCTION PRIOR TO APPLICATION OF CONCRETE COATING. APPLY COATING IN WETWELL AND WHERE INDICATED AFTER ALL OTHER MODIFICATIONS ARE COMPLETE. COAT INDICATED AREAS WITH SYSTEM 106-100% SOLIDS EPOXY AS SPECIFIED IN SECTION 09901 AND OWNER'S LIST OF APPROVED MATERIALS.
5. ROTATE 90 LONG RADIUS ELBOW TO MATCH EXISTING INSTALLATION . MATCH LENGTH OF EXISTING SPOOL PIECE.
6. FOR PIPING 4" AND SMALLER, FURNISH AND INSTALL UNIONS, BUSHINGS, COUPLINGS AND OTHER FITTINGS, AS NECESSARY, FOR EASE OF INSTALLATION AND MAINTENANCE OF EQUIPMENT.
7. PRIOR TO INSTALLING NEW EQUIPMENT IN WETWELL, CONTRACTOR SHALL CLEAN WETWELL AND REMOVE ANY ACCUMULATED SOLIDS, GRIT AND DEBRIS. CONTRACTOR SHALL DISPOSE OF REMOVED SOLIDS, GRIT AND DEBRIS IN ACCORDANCE WITH ALL APPLICABLE REQUIREMENTS AND CODES. CONTRACTOR SHALL OBTAIN ANY REQUIRED PERMITS.
8. CONTRACTOR SHALL PROVIDE PUMP BASE AND ADD GROUT AS REQUIRED TO FIT THE SELECTED PUMP INTO THE EXISTING CONFIGURATION AT NO ADDITIONAL COST TO THE OWNER. COORDINATE WITH STRUCTURAL SHEETS FOR ANCHORS, REINFORCEMENT, ETC.
9. REFER TO M-20-601 FOR PUMP OPERATING LEVELS.
10. MOUNT CHAIN HOLDER ASSEMBLY TO WALL OF HATCH OPENINGS.
11. RELOCATE EXISTING 18" RISER HATCHES TO NEW 18" RISER PIPING.
12. PROVIDE OPENINGS AS NECESSARY FOR PUMP DISCHARGE PIPING AND SIPHON BREAKS. OPENINGS IN CHECKERED PLATE FOR PIPE PENETRATIONS SHALL LEAVE NO MORE THAN 1" GAP BETWEEN PIPE AND CHECKERED PLATE.
13. PROVIDE EMERGENCY BACK-UP FLOAT SWITCH (ALL PUMPS ON) PER M-20-601. CONTRACTOR SHALL FIELD LOCATE INSTALLATION.

0 6" 12"

FOR ITEMS 1-19 SEE UPPER PLAN, SHEET M-20-101.
FOR ITEMS 20-30 SEE LOWER PLAN, SHEET M-20-102.

NOTES BY SYMBOL (X)
13. 18" DI PUMP DISCHARGE RISER, SEE NOTE 12.
14. 30" DI PUMP DISCHARGE RISER, SEE NOTE 12.
31. STAINLESS STEEL PUMP LIFTING CHAIN, LENGTH AS REQUIRED.
32. LIQUID TIGHT FEEDER, REFER TO ELECTRICAL SHEETS.
33. PIPE SUPPORT BRACKET, SEE NOTE 11.
34. GROUT, SEE NOTE 9.
35. EXIST EXHAUST FAN.
36. EXIST EXHAUST FAN INTAKE PIPE.

PIPING SCHEDULE (ITEMS 13 & 14)
20" X 30" ECCENTRIC REDUCERS, F/F
30" DIA SPOOL PIECE (VARIOUS LENGTHS), F/F
30" DIA X 90 DEGREE LONG RADIUS ELBOW, F/F
30" DIA X 5'-0" LONG SPOOL PIECES, F/OPEN END
14" X 18" ECCENTRIC REDUCERS, F/F
18" DIA X 12" OFFSET, F/F
18" DIA SPOOL PIECE (VARIOUS LENGTHS), F/F
18" DIA X 90 DEGREE LONG RADIUS ELBOW, F/F
18" DIA X 7'-0" LONG SPOOL PIECES, F/OPEN END

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

BLACK & VEATCH

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT
PLANT EXPANSION
PROCESS MECHANICAL
INFLUENT LIFT STATION
SECTION-1

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	1"=6'
CITY OF HOUSTON PM	SZ XIAOHUA (SHARI) LIN, P.E.

FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
XIAOHUA LIN
80367
REGISTERED
PROFESSIONAL ENGINEER

M-20-301

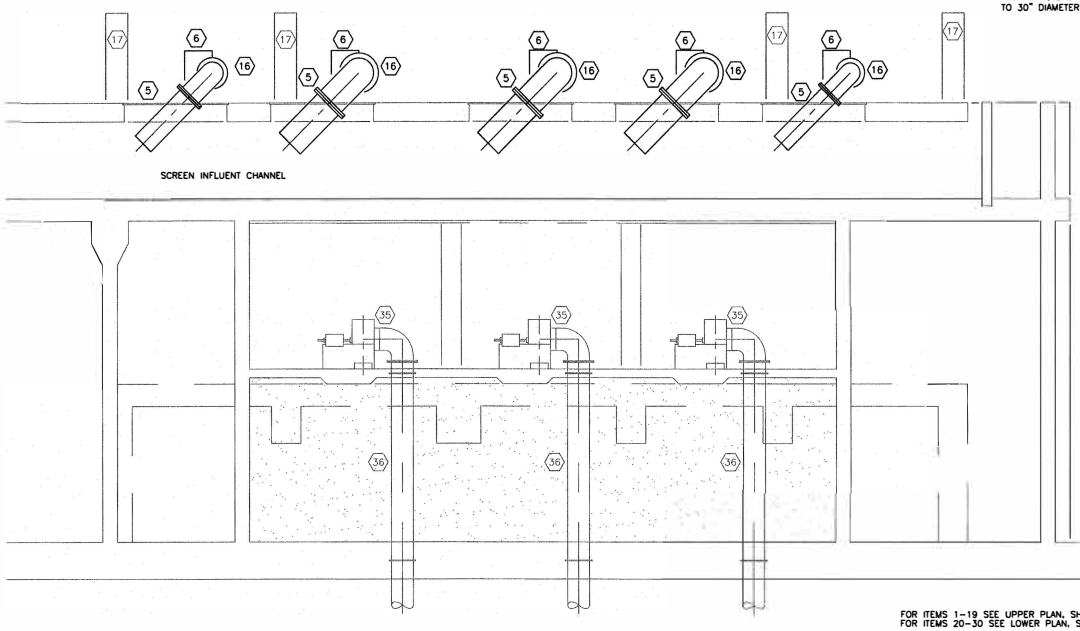
SHEET NO. 211 OF 379

GUNDA CORPORATION
P:\2020 Projects\2010-02 B&V AH WWTP Improvements\CAD\SHEETS\009 MECHANICAL - with GUNDA BASE.dwg Feb 22, 2023 - 4:47pm Lidmes

NOTES:

1. CONTRACTOR SHALL INSPECT AND REPAIR CONCRETE AND COATING IN ACCORDANCE WITH SPECIFICATION SECTION 03920 & 03930. PREPARE SURFACE OF CONCRETE SLAB ABOVE VENTILATORS IN ACCORDANCE WITH THE COATING MANUFACTURER'S INSTRUCTIONS PRIOR TO APPLICATION OF CONCRETE COATING. APPLY COATING AFTER ALL OTHER MODIFICATIONS ARE COMPLETE. COAT INDICATED AREAS WITH SYSTEM 106 – 100% SOLIDS EPOXY AS SPECIFIED IN SECTION 09901 AND OWNER'S LIST OF APPROVED MATERIALS.
2. ROTATE 90° LONG RADIUS ELBOW TO MATCH EXISTING INSTALLATION. MATCH LENGTH OF EXISTING SPOOL PIECE.
3. THREAD 2" GALVANIZED STEEL PIPE INTO PUMP DISCHARGE PIPE. ROUTE 2" SIPHON BREAK THROUGH EXISTING OPENING IN CHECKERED PLATE. CONTRACTOR SHALL PROVIDE SUPPORTS FOR 2" PIPE AS NECESSARY.
4. PROVIDE ENLARGED OPENINGS AS NECESSARY FOR PUMP DISCHARGE PIPING AND SIPHON BREAKS. OPENINGS IN CHECKERED PLATE FOR PIPE PENETRATIONS SHALL LEAVE NO MORE THAN 1" GAP BETWEEN PIPE AND CHECKERED PLATE.
5. RELOCATE EXISTING 18" RISER HATCHES TO NEW 18" PIPING LOCATIONS; ENLARGE 3 OTHER RISER OPENINGS AND RELOCATE TO 30" DIAMETER LOCATIONS.

0 6" 12"



LIFT STATION ABOVE GROUND SECTION B–B

FOR ITEMS 1-19 SEE UPPER PLAN, SHEET M-20-101.
FOR ITEMS 20-30 SEE LOWER PLAN, SHEET M-20-102.

NOTES BY SYMBOL (X)	
5.	EXIST CHECKERED PLATE. SEE NOTES 4 & 5.
6.	2" SIPHON BREAK; SEE NOTE 3.
16.	90 DEGREE LR ELBOW, SEE NOTE 2.
17.	EXIST MONORAIL SUPPORT TO REMAIN.
35.	EXIST EXHAUST FAN.
36.	EXIST EXHAUST FAN INTAKE PIPE.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

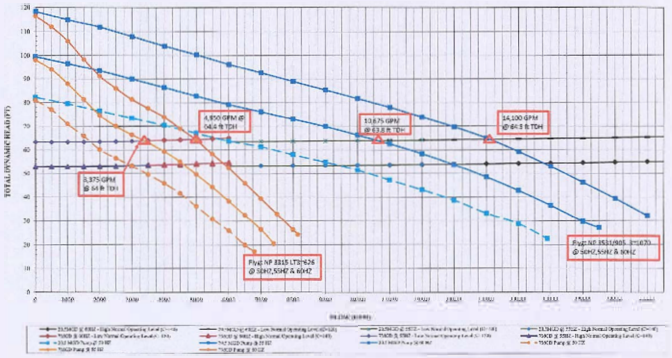
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
PROCESS MECHANICAL
INFLUENT LIFT STATION SECTION–2

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	ACCEPTED AS NOTED 80367
DRAWING SCALE	
1"=6"	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 212 OF 379	

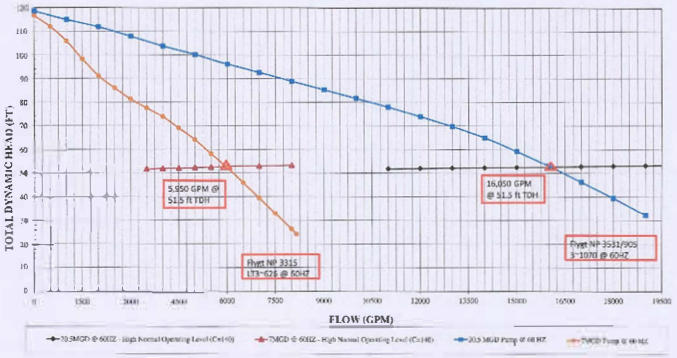
M-20-302

GUNDA CORPORATION
P:\2020 projects\20010-02 b&v ion wwtp improvements\CAD\SHEETS\009 MECHANICAL - with GUNDA BASE.dwg Nov 11, 2022 - 4:05pm WEason

PUMP & SYSTEM CURVES - COH IAH STP LS
2-7 MGD (VFD's) & 3-20.5 MGD (1-VFD) Pumps at 50 to 60 HZ



PUMP & SYSTEM CURVES - COH IAH STP LS
FLOODED LEVEL SERVICE CONDITIONS
2-7 MGD (VFD's) & 3-20.5 MGD (1-VFD) Pumps at 60 HZ



NOTES

1. SEE INSTRUMENTATION DWGS I-90-601 & 602 FOR PROGRAMING SCHEMATIC.
2. REFER TO SPECIFICATION CONTROL NARRATIVE FOR SPEED CONTROL OF VARIABLE SPEED PUMPS. IN AUTO, PUMP SPEED SHALL AUTOMATICALLY ADJUST WITHIN OPERATING BAND. CONTRACTOR/MANUFACTURER SHALL VERIFY MIN/MAX SPEED SETTINGS REQUIRED BASED ON SELECTED PUMP.

Pump Data Table

	Single Pump Operation - Individual Outflows	
	7 MGD Pump* (Pump @ 60 HZ)	20.5 MGD Pump** (Pump @ 60 HZ)
Motor Data		
Rated Power (HP)	110	385
Rated Speed (RPM)	1185	710
Design Efficiency		
Minimum Wire to Water (%)	73.3	79.5
Solids Passage		
Minimum Sphere (IN)	4	4
Capacity		
Design (C=120) (GPM)	4950	14100
Design (C=140) (GPM)	5800	16775
Runout (GPM)	8150	19000
Discharge Head		
Shutoff (FT)	116.5	118.5
Design (C=120) (FT)	64.4	64.5
Design (C=140) (FT)	54.4	54.4
Runout (FT)	24.0	32.3
Discharge Pipe Size		
Diameter (IN)	18	30

*Proposed Pumps 1 & 5 - Flygt NP 3315 LT3-626 or Equal (Both Pumps VFD)
**Proposed Pumps 2, 3 & 4 - Flygt NP 3531/905 3~1070 or Equal (Pump 3-VFD)
Pump Operations designed for C=120.

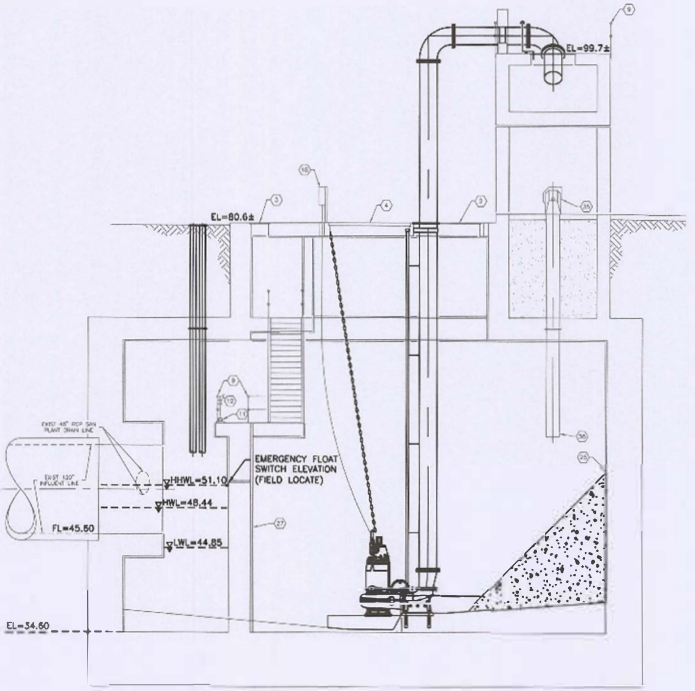
Station Operation Table

Rising Level Cycle		
Water Level Elevation*	Action	Pump(s) in Operation*
44.85	LOW WATER LEVEL ALARM	-
45.55	-	ALL PUMPS OFF
45.90	PUMP 1 ON	PUMP 1
46.25	PUMP 5 ON	PUMP 1, 5
46.61	PUMP 3 ON, PUMPS 1 & 5 OFF	PUMP 3
46.96	PUMP 1 ON	PUMP 1, 3
47.31	PUMP 2 ON, PUMP 5 ON, PUMP 3 OFF	PUMP 1, 2, 5
47.67	PUMP 3 ON, PUMPS 1 & 5 OFF	PUMP 2, 3
48.01	PUMP 1 ON	PUMP 1, 2, 3
48.38	PUMP 5 ON	PUMP 1, 2, 3, 5
48.44	HIGH WATER LEVEL ALARM (120-inch)	
51.10	HIGH HIGH WATER LEVEL ALARM (66-inch)	EMERGENCY FLOAT-ALL PUMPS ON

Falling Level Cycle		
Water Level Elevation	Action	Pump(s) in Operation
48.44	HIGH WATER LEVEL ALARM	-
48.01	PUMP 5 OFF	PUMP 1, 2, 3
47.67	PUMP 1 OFF	PUMP 2, 3
47.31	PUMP 3 OFF, PUMPS 1 & 5 ON	PUMP 1, 2, 5
46.96	PUMP 2 & 5 OFF, PUMP 3 ON	PUMP 1, 3
46.61	PUMP 1 OFF	PUMP 3
46.25	PUMP 3 OFF, PUMPS 1 & 5 ON	PUMP 1, 5
45.90	PUMP 5 OFF	PUMP 1
45.55	PUMP 1 OFF	ALL PUMPS OFF
44.85	LOW WATER LEVEL ALARM	

*Pumps 1,3 & 5 peak at 60HZ at WLE silted

Minimum Speed Pump 1 or 5 @ 2378 GPM @ N/S
Minimum Speed Pump 3 @ 3508 GPM @ N/S
Pumps 1 & 5 to Alternate
Pumps 2 & 4 to Alternate



LIFT STATION SECTION - PUMP OPERATION ELEVATIONS

M-20-601

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 108
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number F-3531

BLACK & VEATCH

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED
PROFESSIONAL ENGINEER

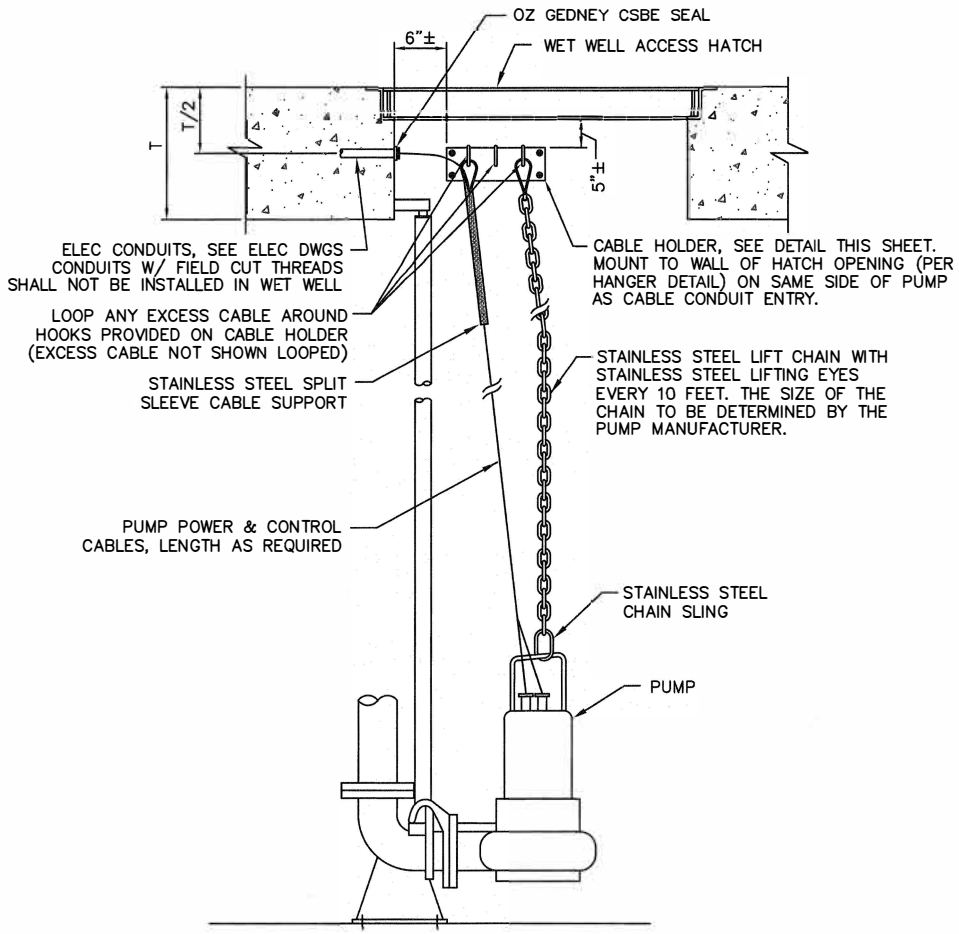
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT
PLANT EXPANSION
PROCESS MECHANICAL
INFLUENT LIFT STATION
PROP PUMP DATA &
OPERATION TABLES

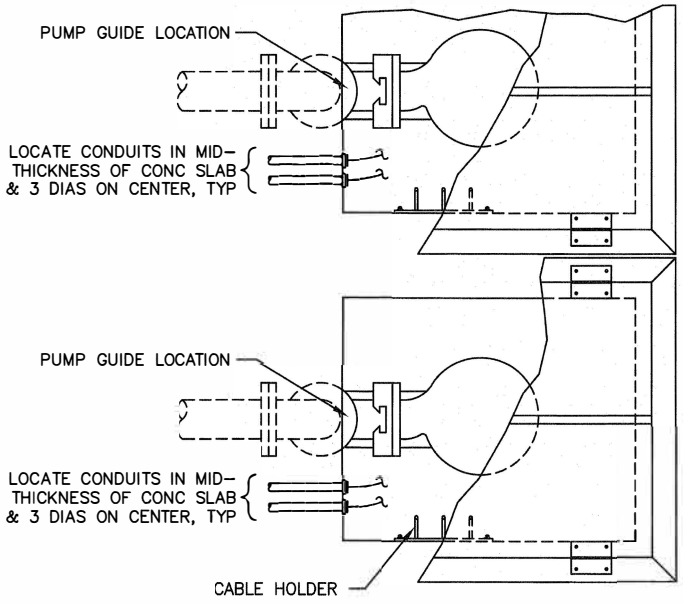
WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
N/A	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 213 OF 378	

80367

GUNDA CORPORATION
A:\2020 Projects\20092-02 B&V IAH WWTP Improvements\CAD\SHEETS\009 MECHANICAL - with GUNDA BASE.dwg Feb 22, 2023-4:48pm jlaimes



SECTION VIEW



PLAN VIEW

THIS DETAIL IS A STANDARD COH DETAIL FOR SUBMERSIBLE LIFT STATIONS, DWG NO. Z0C02, SEE CITY STANDARDS FOR APPLICABILITY. FIELD LOCATIONS OF DETAILS TO REMAIN THE SAME.

TYPICAL PUMP LIFTING & CABLING DETAIL

NTS

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANOS
97308
LICENSED
PROFESSIONAL ENGINEER

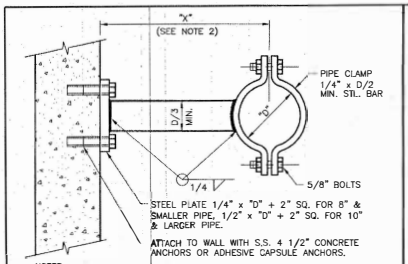
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT
PLANT EXPANSION
PROCESS MECHANICAL
LIFT STATION DETAILS
(1 OF 4)

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	ACCEPTED AS NOTED 80367
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
Sd XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 214 OF 579	

M-20-501

GUNDA CORPORATION
P:\2020 projects\20010-02 Sabine Lake wwtp improvements\CAD\SHEETS\009 MECHANICAL - with GUNDA BASE.dwg Nov 11, 2022 - 6:08pm WEason

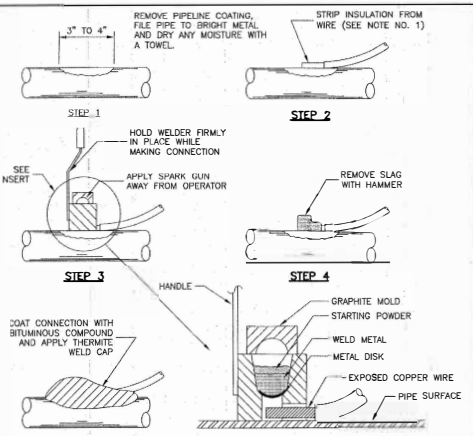


NOTES:

1. SWAY BRACE SHALL NOT SUPPORT VERTICAL LOADS.
2. FOR USE WHEN "X" IS GREATER THAN 12". FOR "X" 12" OR LESS, USE DETAIL CI/STD-M-3 OR AS OTHERWISE NOTED.
3. SWAY BRACES SHALL BE HOT DIP GALVANIZED AFTER FABRICATION. WHERE SUBMERGED OR LOCATED ON OR ABOVE TOP OF WALL OF HYDRAULIC STRUCTURE, ASSEMBLY SHALL BE FABRICATED FROM TYPE 316L SS.
4. SEE GENERAL NOTE 1.

PLAN

PIPE SWAY BRACE

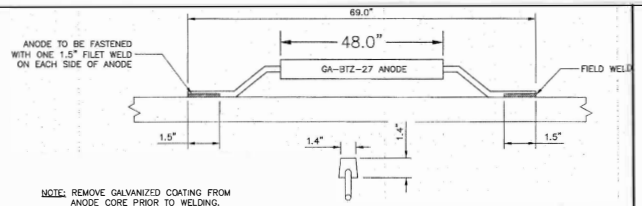


NOTES:

1. WHEN #14 AWG SOLID TO #10 STRANDED WIRE IS USED, IT WILL BE NECESSARY TO INSTALL A COPPER SLEEVE OF ADEQUATE SIZE OVER BARE SECTION OF WIRE BEFORE CONNECTION IS ATTEMPTED.
2. THERMITE WELD PROCEDURES SIMILAR FOR "L" BRACKETS.
3. REPAIR ALL DAMAGE TO COATING AND LINING IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

HORIZONTAL THERMITE BRAZED CONNECTION

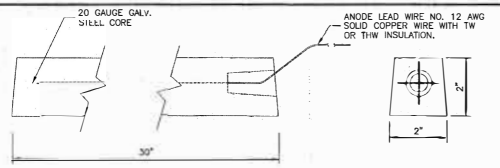
NOT TO SCALE SEE DETAIL QE FOR VERTICAL CONNECTION



NOTE: REMOVE GALVANIZED COATING FROM ANODE CORE PRIOR TO WELDING.

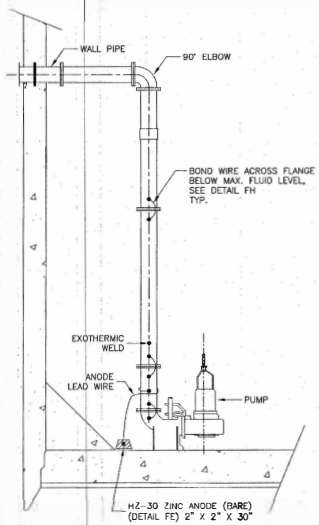
WELD-ON ANODE DETAIL

NOT TO SCALE



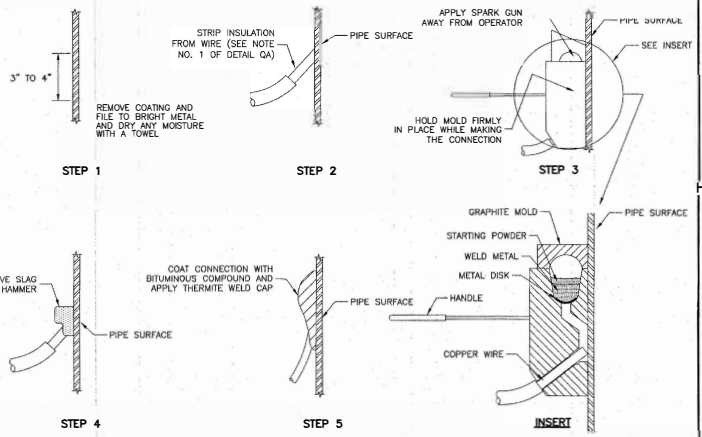
WET WELL ANODE DETAIL
HZ-30 ZINC ANODE (BARE)

NOT TO SCALE



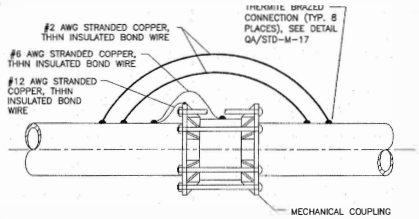
WET WELL DIRECT CONNECT ANODE INSTALLATION

NOT TO SCALE



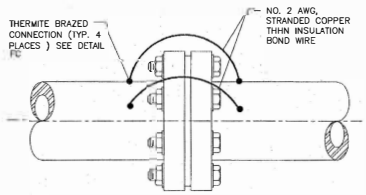
VERTICAL THERMITE BRAZED CONNECTION

NOT TO SCALE SEE DETAIL QA FOR HORIZONTAL CONNECTION



ELECTRICAL BONDING ACROSS MECHANICAL COUPLING DETAIL

NOT TO SCALE



NOTE: BOND WIRES SHALL BE PLACED A MINIMUM OF 6" APART.

ELECTRICAL BONDING ACROSS FLANGE DETAIL

NOT TO SCALE

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED PROFESSIONAL ENGINEER

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

PROCESS MECHANICAL

LIFT STATION DETAILS (2 OF 4)

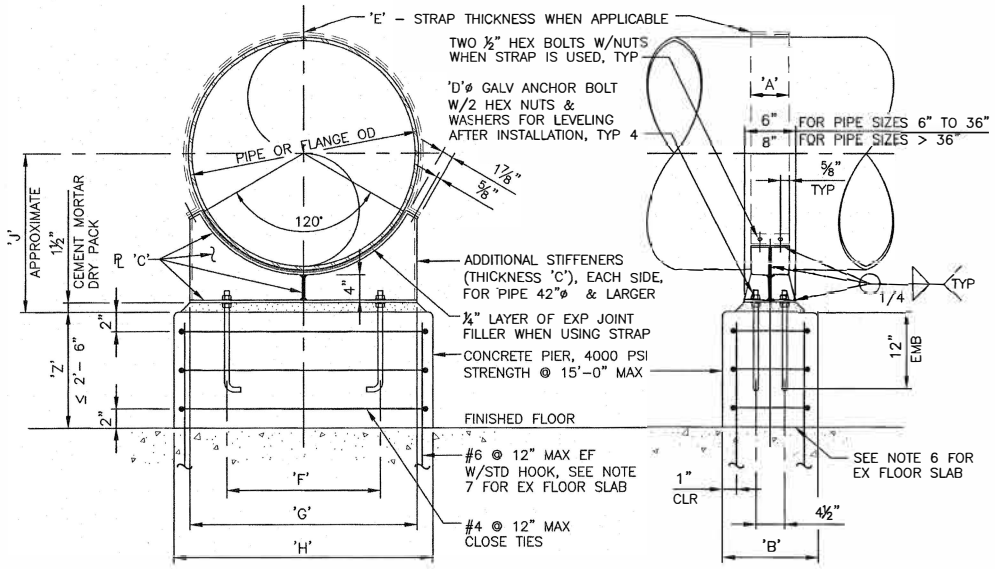
WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SIEXIAOHUA (SHARI) LIN, P.E.	

80367 REGISTERED PROFESSIONAL ENGINEER

SHEET NO. 215 OF 379

M-20-502

GUNDA CORPORATION
P:\2020 projects\0010-02 b&v iah wwtp improvements\CAD\SHEETS\009 MECHANICAL - with GUNDA BASE.dwg Nov 11, 2022 - 4:06pm MKasan



DIMENSIONS IN INCHES													
NOM PIPE SIZE	A	B	C	D	E	SUPPORTING							
						PIPE				FLANGE			
						F	G	H	J	F	G	H	J
6	4	12	3/8	5/8	1/4	4½	9	14	10	7	13	18	13
8	4	12	3/8	5/8	1/4	5	11	16	11	9	15	20	14
10	4	12	3/8	5/8	1/4	6	12	17	12	12	18	23	15
12	4	12	3/8	5/8	1/4	7	14	19	13	13	20	25	16
14	4	12	3/8	5/8	1/4	10	16	21	14	15	22	27	17
16	4	12	3/8	5/8	1/4	12	18	23	15	16	24	29	18
18	4	12	3/8	5/8	1/4	12	20	35	16	17	25	30	19
20	5	12	3/8	5/8	3/8	13	21	26	17	20	28	33	21
22	5	12	3/8	5/8	3/8	15	23	28	18	20	29	34	22
24	5	12	3/8	5/8	3/8	17	25	30	19	21	31	36	23
26	5	12	3/8	3/4	3/8	18	26	31	20	23	33	38	24
30	5	12	3/8	3/4	3/8	22	30	35	22	26	37	42	26
34	5	15	3/8	3/4	3/8	24	33	38	24	28	41	46	29
36	6	15	3/8	3/4	3/8	25	35	40	25	32	44	49	30
42	6	18	1/2	1	3/8	28	40	45	28	36	50	55	33
48	6	18	1/2	1	3/8	31	45	48	31	39	55	60	37
54	6	18	1/2	1	3/8	36	50	55	34	45	61	66	40
60	6	18	1/2	1	3/8	42	56	61	37	51	67	72	44
66	6	18	1/2	1⅛	3/8	43	61	66	40	59	77	82	47
72	6	18	1/2	1⅛	3/8	47	66	71	43	67	79	84	50

NOTES:

1. WHEN SUPPORTING PIPE & FLANGE ALTERNATELY ON SAME LINE, CONCRETE PIERS FOR PIPE SUPPORTS SHALL HAVE SAME DIMENSION 'H' AS FOR FLANGE SUPPORT.
2. GALVANIZE AFTER FABRICATION.
3. WHERE USED UNDER BENDS OR OTHERWISE SKEWED, DIMENSIONS & SADDLE FABRICATION SHALL BE AS ACCEPTABLE TO ENGINEER.
4. IF 'Z' IS 6" OR LESS, OMIT REINFORCING & SIZE ANCHOR BOLTS TO PROJECT 6" MINIMUM INTO FLOOR.
5. PROVIDE ¾" CHAMFER, ALL EDGES OF CONCRETE PIER.
6. CONTRACTOR TO ROUGHEN EXIST FLOOR SLAB AND APPLY BONDING AGENT PRIOR TO CONCRETE PLACEMENT.
7. DRILL #6 DOWELS AT 12" O.C. EF. W/6⅝" MIN EMB. USE "HILTI" HVA ADHESIVE ANCHOR.
8. CONTRACTOR SHALL VERIFY THE EXISTING FLOOR SLAB THICKNESS IS ADEQUATE TO ACCOMMODATE MINIMUM DOWEL EMBEDMENT LENGTH PRIOR TO DRILLING.

SADDLE PIPE SUPPORT DETAIL
(WITH OR WITHOUT STRAP)
N.T.S

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT
PLANT EXPANSION
PROCESS MECHANICAL
LIFT STATION DETAILS
(3 OF 4)

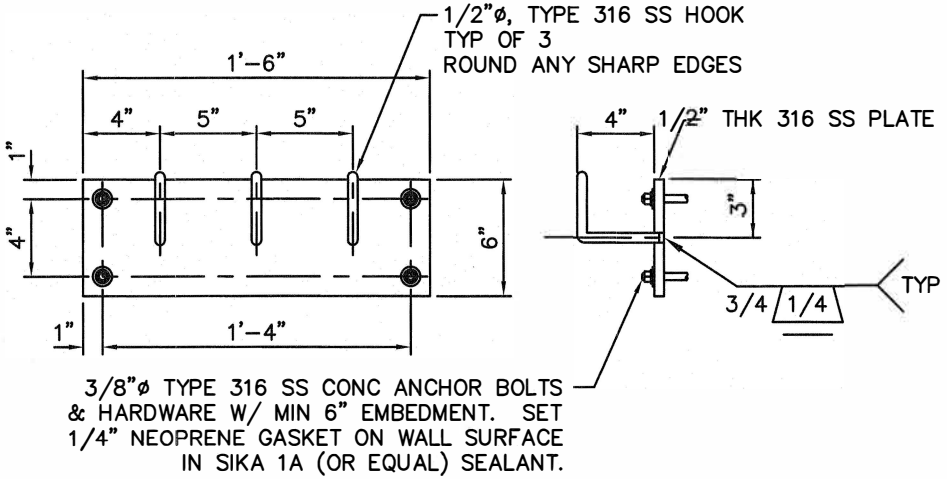
WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	

80367

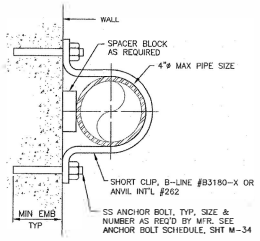
M-20-503

SHEET NO. 216 OF 379

GUNDA CORPORATION
P:\2020 projects\20010-02 b&v ioh wwtp improvements\CAD\SHEETS\009 MECHANICAL - with GUNDA BASE.dwg Nov 11, 2022 - 4:08pm WEcpon



TYPICAL CABLE HOLDER ASSY



NOTES:

1. FOR VERTICAL PIPES ONLY.
2. ALL BOLTS AND NUTS SHALL BE TYPE 316 SS.
3. SUPPORT SPACING SHALL BE 10'-0" MAX.
4. WHEN SUPPORT IS USED WITH PVC PIPE, WRAP PIPE WITH 1/4" NEOPRENE SHEET AND PROVIDE LOOSE FITTING STEELSHEILD AROUND PIPE AT CLIP.
5. ON STEEL BEAMS AND COLUMNS, SECURE SUPPORTS WITH SS NUTS AND BOLTS AS REQUIRED.

PIPE SUPPORT DETAIL
N.T.S.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

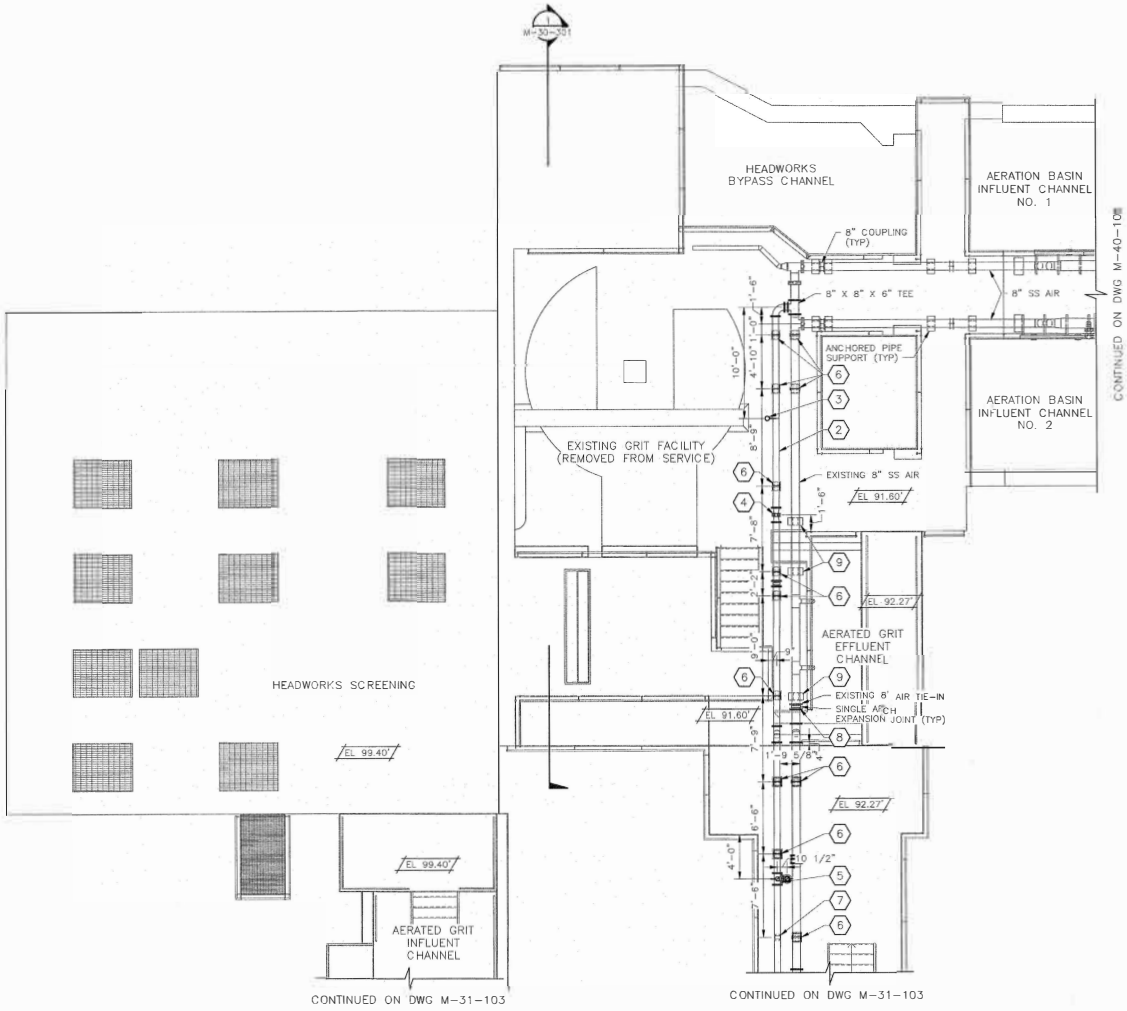
INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT
PLANT EXPANSION
PROCESS MECHANICAL
LIFT STATION DETAILS
(4 OF 4)

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 217 OF 379	

80367

M-20-504

GUNDA CORPORATION
P:\2020 projects\20010-02 hdw iah wwtp improvements\CAD\SHEETS\009 MECHANICAL - with GUNDA BASE.dwg Nov 11, 2022 - 4:06pm WEsam



HEADWORKS – TOP PLAN
3/16" = 1'-0"

NOTES BY SYMBOL (#)

1. NEW STAINLESS STEEL 8" AIR PIPING
2. NEW STAINLESS STEEL 6" AIR PIPING
3. NEW 6" THERMAL DISPERSION MASS FLOW METER. PROVIDE MINIMUM 10 PIPE DIAMETERS UPSTREAM STRAIGHT RUN AND 5 PIPE DIAMETERS DOWNSTREAM STRAIGHT RUN FOR THE FLOW METER.
4. NEW 6" BUTTERFLY VALVE
5. NEW 4" STAINLESS STEEL DROPLEG WITH 4" BUTTERFLY VALVE
6. ANGLE GUIDE SUPPORT, SEE DETAIL B/S-99-510
7. PIPE SADDLE ANCHOR, SEE DETAIL D/S-99-505.
8. INSTALL EXPANSION JOINT AT EXISTING PIPE FLANGE
9. EXISTING PIPE SUPPORTS, NO CHANGE

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC
FB NO. P-5182

STATE OF TEXAS
JUSTIN R. SANDT
119899
LICENSED
PROFESSIONAL ENGINEER
11/11/22

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
PROCESS MECHANICAL

HEADWORKS OVERALL PLAN

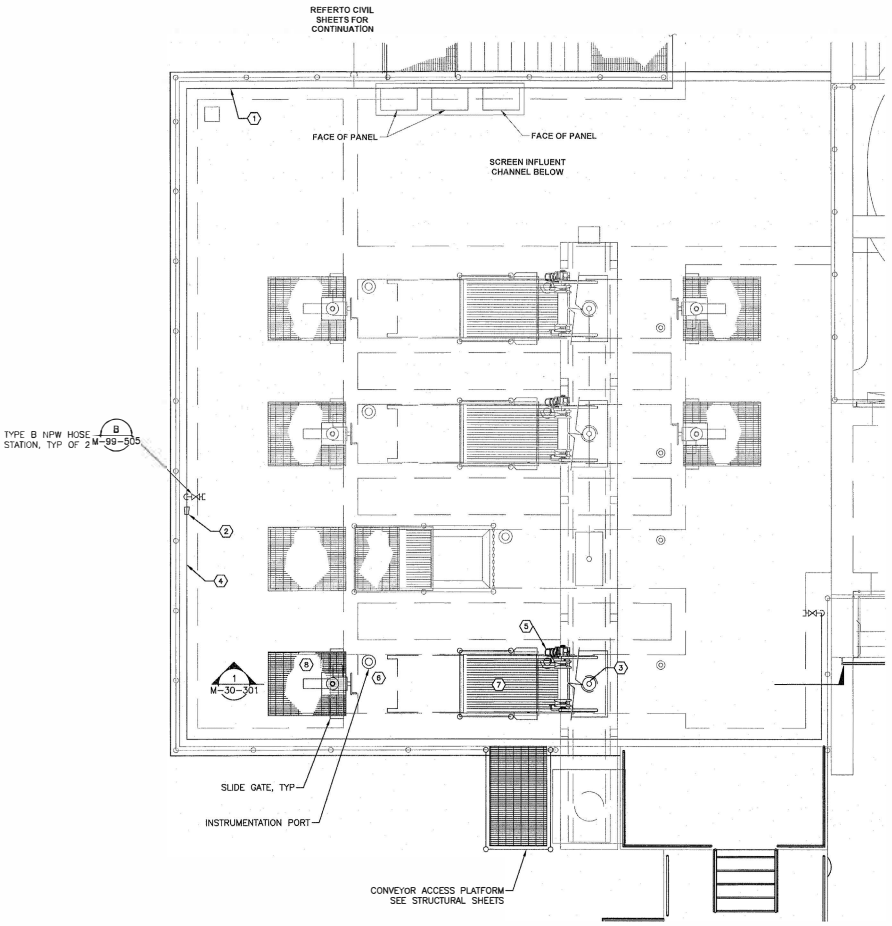
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 218 OF 379	

FOR CITY OF HOUSTON USE ONLY

REGISTERED PROFESSIONAL ENGINEER
80367
STATE OF TEXAS

M-30-101

FILE PATH: BIM 360://162500 - CDH Intercontinental Airport WWTP Improvements/ADDSO-CDH IA WWTP-BV.rvt



HEADWORKS – UPPER PLAN, EL 99.40±
1/4" = 1'-0"

N

1/4" = 1'-0"

NOTES BY SYMBOL ⟨#⟩

1. INSULATED 2-NPW-PVC
2. 2"x1½" CONCENTRIC REDUCER
3. 3"ø CONVEYOR DRIP PAN DRAIN, ROUTE TO FLOOR PENETRATION AT BS-05-001
4. INSULATED 1½"-NPW-PVC
5. LEVEL TRANSMITTER INDICATOR
6. LEVEL TRANSDUCER
7. BS-05-003, MECHANICAL BAR SCREEN
8. 48x48-SG-009

GENERAL NOTES:

1. CONTRACTOR SHALL FOLLOW MANUFACTURER'S RECOMMENDATION FOR MOUNTING AND SEALING OF THE MECHANICAL BAR SCREENS.
2. CONTRACTOR SHALL INSTALL SLIDE GATES PER MANUFACTURER'S RECOMMENDATIONS.
3. FOR FLUSHING CLEANOUT, PROVIDE BLIND FLANGE DRILLED AND TAPPED FOR ½" 316 S.S. NIPPLE, BALL VALVE & BRASS QUICK COUPLER.

5engineering
BLACK & VEATCH
5ENGINEERING, LLC
11200 WESTHEIMER ROAD
SUITE 353
HOUSTON, TX 77042
(832) 800-3483
TX FIRM NUMBER F-13748
STATE OF TEXAS
113240
LICENSED
PROFESSIONAL ENGINEER
11/09/2022

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

PROCESS MECHANICAL

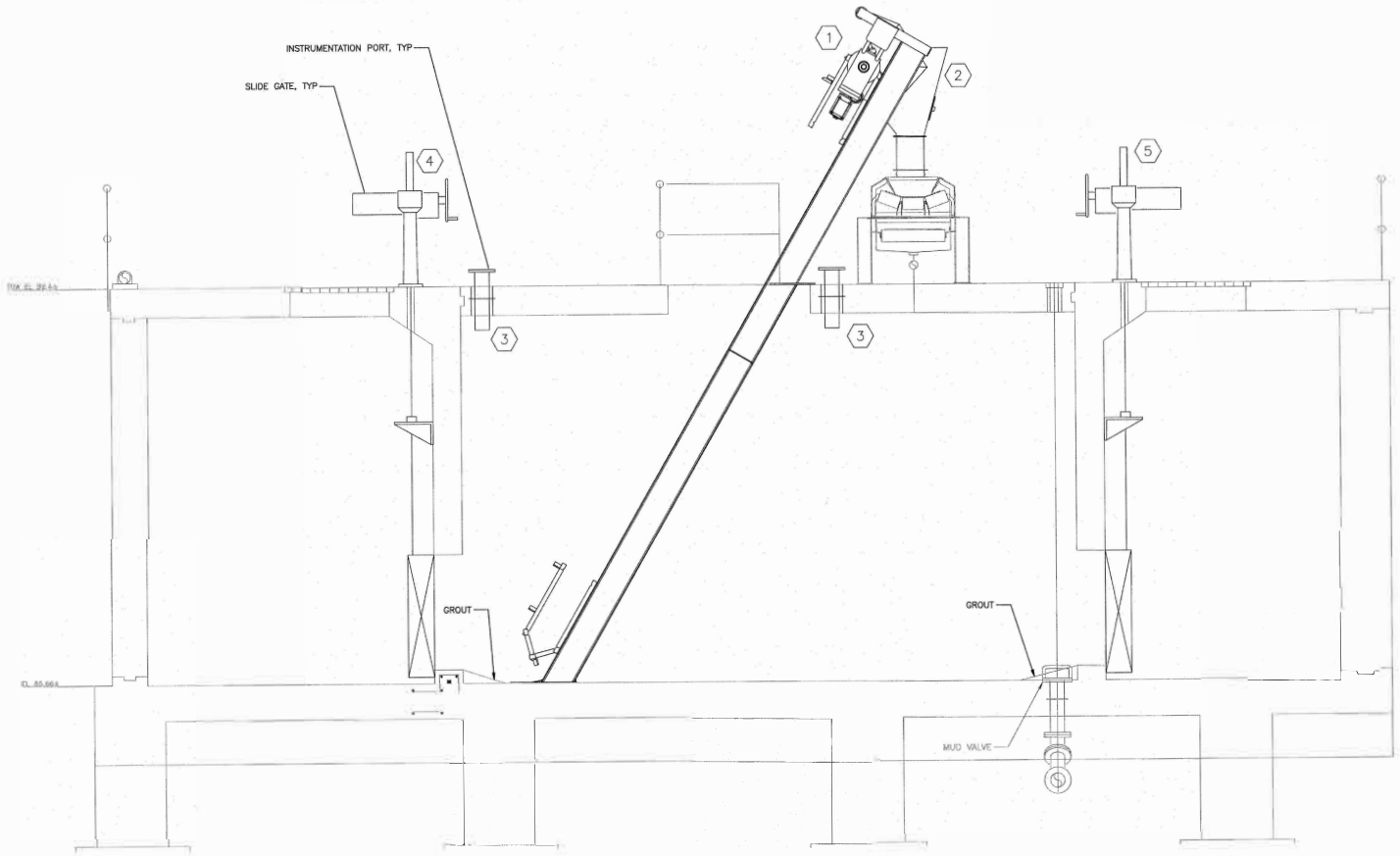
HEADWORKS SCREENING PLAN

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 21 9 OF 379	

ACCEPTED AS NOTED
80367

M-30-102

FILE PATH: P:\00921\01\04 Cadd-GIS\VS SHEETS\30 - HEADWORKS\M-30-102 HEADWORKS SCREENING PLAN.dwg



1 SECTION
M-30-102 1/2" = 1'-0"

NOTES BY SYMBOL ⟨#⟩

1. BS-05-003, MECHANICAL BAR SCREEN
2. MECHANICAL BAR SCREEN CHUTE
3. LEVEL INDICATOR TRANSMITTER
4. 48x48-SG-05-009, MOTOR OPERATED SLIDE GATE
5. 48x48-SG-05-010, MOTOR OPERATED SLIDE GATE

5engineering

BLACK & VEATCH

5ENGINEERING, LLC
11200 WESTHEIMER ROAD
SUITE 353
HOUSTON, TX 77042
(832) 800-3483
TX FIRM NUMBER F-13748

STATE OF TEXAS
YVONNE RIVERA
113240
LICENSED
PROFESSIONAL ENGINEER
11/09/2022

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

PROCESS MECHANICAL

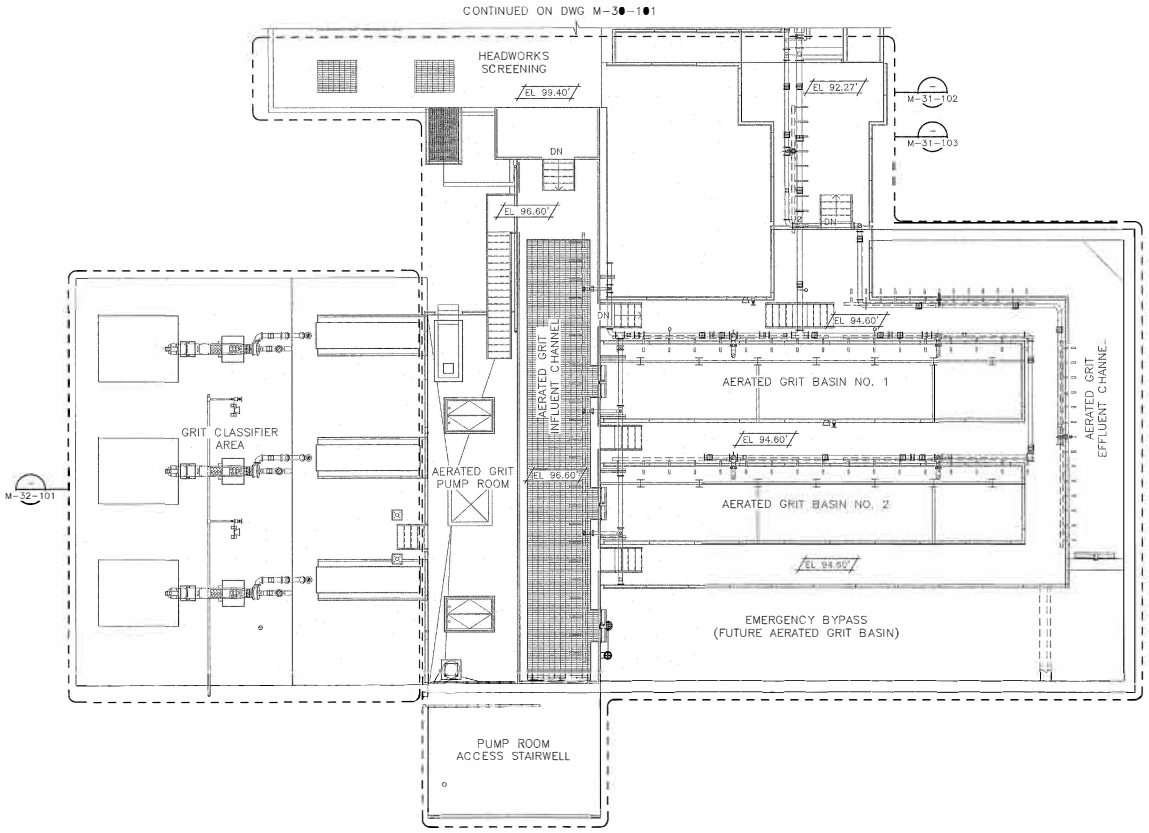
HEADWORKS SCREENING SECTION

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 220 OF 379	

80367

M-30-301

FILE PATH: P:\0092\001\04 Cadd-GIS\02 SHEETS\30 - HEADWORKS\M-30-301 HEADWORKS SCREENING SECTION.dwg



GRIT FACILITY – OVERALL PLAN
1/8" = 1'-0"

1/8" = 1'-0"

N

GENERAL NOTES:

1. CONTRACTOR SHALL PROTECT EXISTING CONVEYOR AND SUPPORT SYSTEM FROM DAMAGE.
2. REFER TO SPECIFICATION SECTION 01110 FOR ADDITIONAL INFORMATION ON CONSTRUCTION SEQUENCE.
3. REFER TO CIVIL, STRUCTURAL AND ELECTRICAL DRAWINGS FOR ADDITIONAL INFORMATION.
4. ALL EXPOSED OR ABOVE GROUND POTABLE AND NON-POTABLE PIPING SHALL BE INSULATED.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 255

SURVEYED BY:
UNITED ENGINEERS, INC
FB NO. P-6182

STATE OF TEXAS
JUSTIN R. SANDT
118988
LICENSED
PROFESSIONAL ENGINEER
3/9/22

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

PROCESS MECHANICAL

AERATED GRIT FACILITY OVERALL PLAN

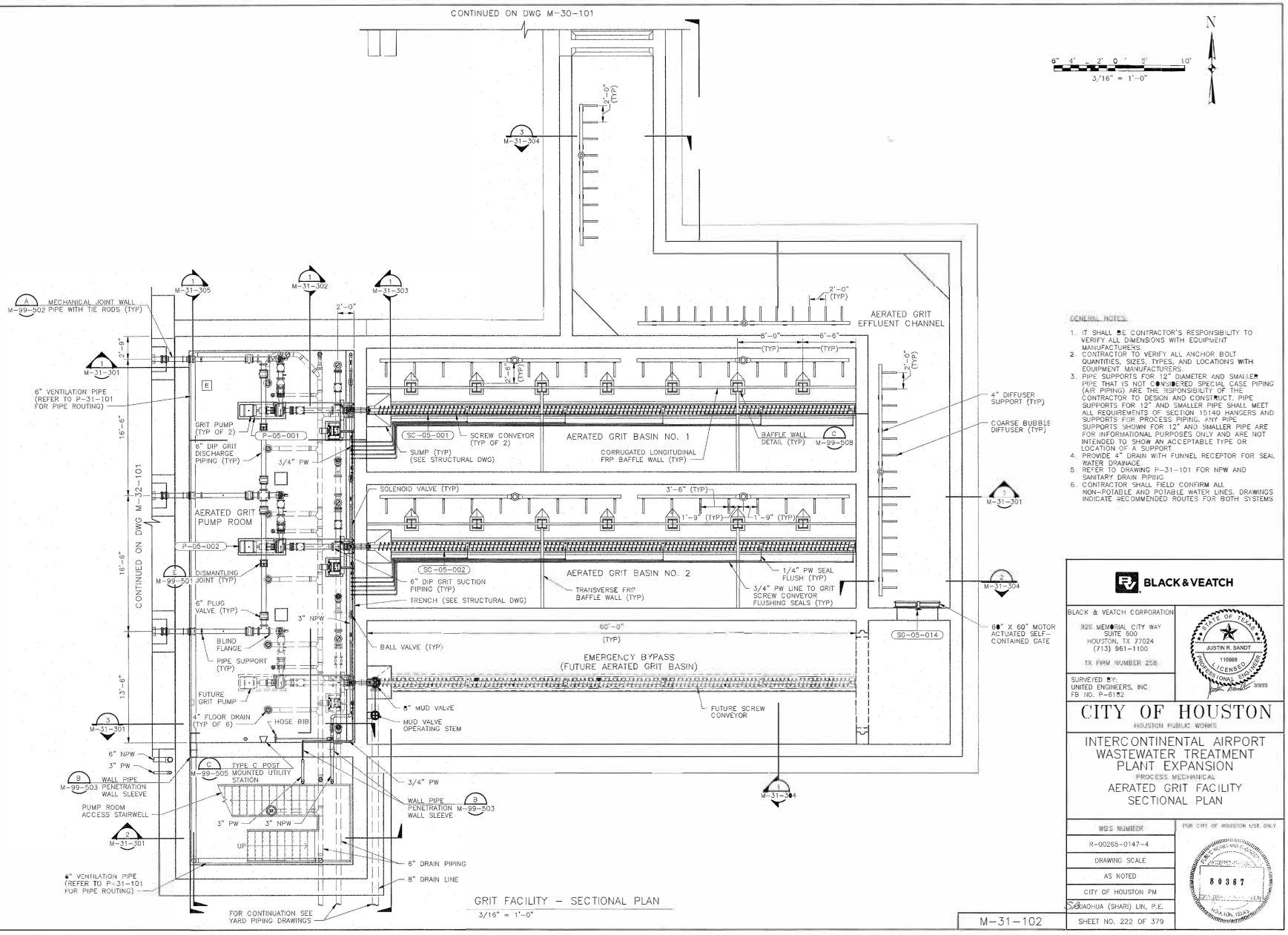
WBS NUMBER	R-00285-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E
SHEET NO. 221 OF 379	

FOR CITY OF HOUSTON USE ONLY

PUBLIC WORKS AND ENGINEERING
ACCEPTED AS NOTED
80367
DATE: 6/21
HOUSTON, TEXAS

M-31-101

FILE PATH: BIM 360://402600 - COH Intercontinental Airport WWTP Improvements/402600-COH IA WWTP-BV.rvt



GRIT FACILITY – SECTIONAL PLAN
3/16" = 1'-0"

GENERAL NOTES:

1. IT SHALL BE CONTRACTOR'S RESPONSIBILITY TO VERIFY ALL DIMENSIONS WITH EQUIPMENT MANUFACTURERS.
2. CONTRACTOR TO VERIFY ALL ANCHOR BOLT QUANTITIES, SIZES, TYPES, AND LOCATIONS WITH EQUIPMENT MANUFACTURERS.
3. PIPE SUPPORTS FOR 12" DIAMETER AND SMALLER PIPE THAT IS NOT CONSIDERED SPECIAL CASE PIPING (AIR PIPING) ARE THE RSPONSIBILITY OF THE CONTRACTOR TO DESIGN AND CONSTRUCT. PIPE SUPPORTS FOR 12" AND SMALLER PIPE SHALL MEET ALL REQUIREMENTS OF SECTION 15140 HANGERS AND SUPPORTS FOR PROCESS PIPING. ANY PIPE SUPPORTS SHOWN FOR 12" AND SMALLER PIPE ARE FOR INFORMATIONAL PURPOSES ONLY AND ARE NOT INTENDED TO SHOW AN ACCEPTABLE TYPE OR LOCATION OF A SUPPORT.
4. PROVIDE 4" DRAIN WITH FUNNEL RECEPTOR FOR SEAL WATER DRAINAGE.
5. REFER TO DRAWING P-31-101 FOR NPW AND SANITARY DRAIN PIPING.
6. CONTRACTOR SHALL FIELD CONFIRM ALL NON-POTABLE AND POTABLE WATER LINES. DRAWINGS INDICATE RECOMMENDED ROUTES FOR BOTH SYSTEMS

BLACK & VEATCH

BLACK & VEATCH CORPORATION
9210 MEMORIAL CITY WAY
SUITE 500
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC
FB NO. P-6182

STATE OF TEXAS
JUSTIN R. SANDT
116988
LICENSED
PROFESSIONAL ENGINEER
3/9/23

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

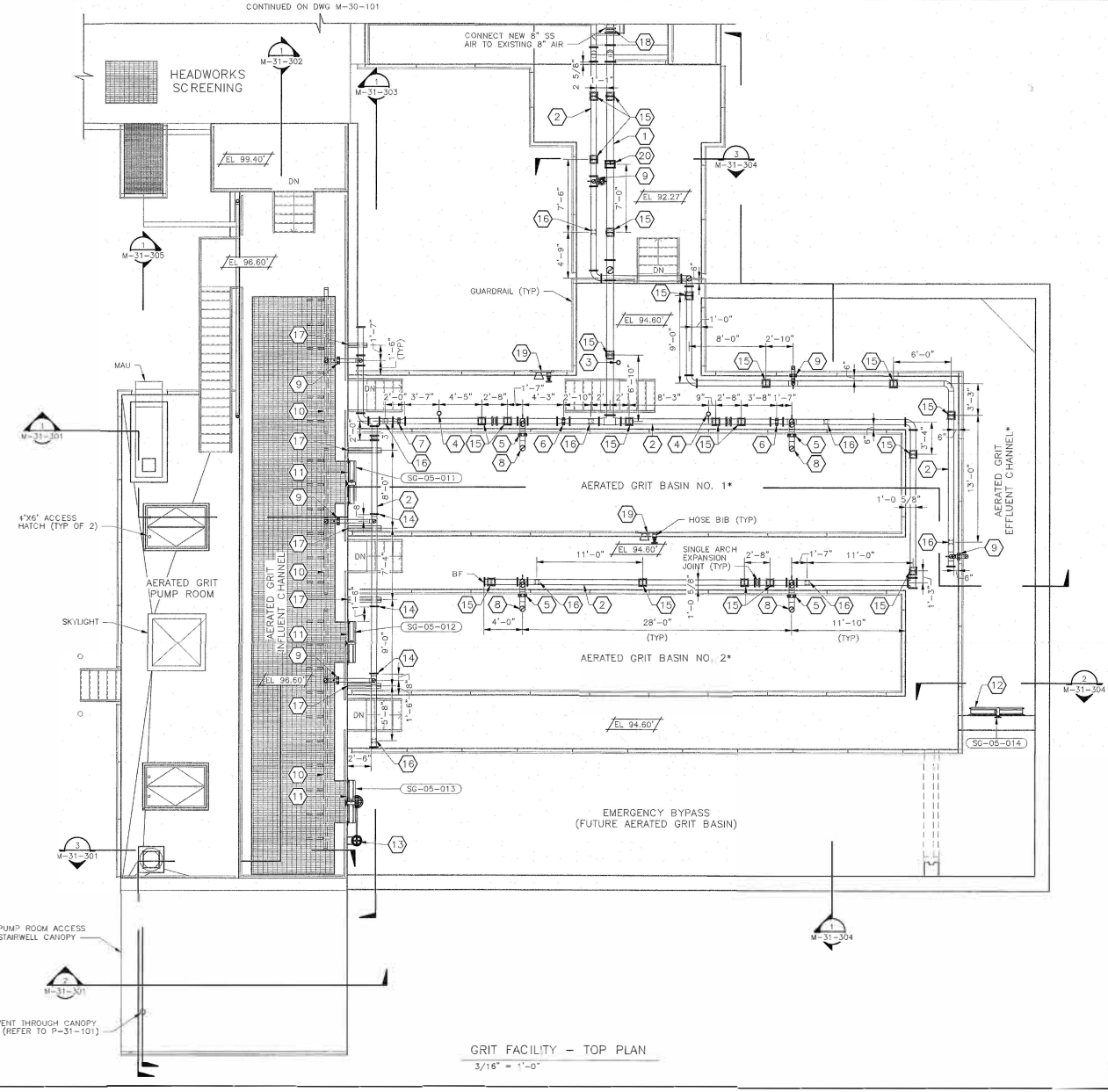
INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT
PLANT EXPANSION
PROCESS MECHANICAL
AERATED GRIT FACILITY
SECTIONAL PLAN

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 222 OF 379	

80367
REGISTERED
PROFESSIONAL
ENGINEER

M-31-102

FILE PATH: Bim 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-COH IA WWTP-BIV.rvt



GRIT FACILITY – TOP PLAN
3/16" = 1'-0"

3/16" = 1'-0"

GENERAL NOTES:

1. CONTRACTOR RESPONSIBILITY TO VERIFY ALL DIMENSIONS WITH EQUIPMENT MANUFACTURERS.
2. CONTRACTOR TO VERIFY ALL ANCHOR BOLT QUANTITIES, SIZES, TYPES, AND LOCATIONS WITH EQUIPMENT MANUFACTURERS.
3. REFER TO SPECIFICATION SECTION 15140 FOR PIPE SUPPORT/HANGER SPACING AND MECHANICAL DETAILS FOR POSSIBLE ALTERNATIVES TO BE USED WITH ENGINEER'S APPROVAL.
4. *DIFFUSERS, BAFFLES, AND BAFFLE COLUMNS NOT SHOWN IN THE EFFLUENT CHANNEL AND AERATED GRIT BASINS 1 AND 2 FOR CLARITY. REFER TO M-31-102 AND SECTIONS FOR DETAILS.

NOTES BY SYMBOL ⟨#⟩

1. NEW STAINLESS STEEL 8" AIR PIPING
2. NEW STAINLESS STEEL 6" AIR PIPING
3. NEW 8" THERMAL DISPERSION MASS FLOW METER. PROVIDE MINIMUM 10 PIPE DIAMTERS UPSTREAM STRAIGHT RUN AND 5 PIPE DIAMETERS DOWNSTREAM STRAIGHT RUN FOR THE FLOW METER.
4. NEW 6" THERMAL DISPERSION MASS FLOW METER. PROVIDE MINIMUM 10 PIPE DIAMTERS UPSTREAM STRAIGHT RUN AND 5 PIPE DIAMETERS DOWNSTREAM STRAIGHT RUN FOR THE FLOW METER.
5. NEW 6" BUTTERFLY VALVE
6. NEW 4" BUTTERFLY VALVE
7. NEW 3" BUTTERFLY VALVE
8. NEW 6" STAINLESS STEEL DROPLEG
9. NEW 4" STAINLESS STEEL DROPLEG WITH 4" BUTTERFLY VALVE
10. NEW 4" STAINLESS STEEL DIFFUSER HEADER
11. NEW 48" X 72" MOTOR ACTUATED SELF-CONTAINED SLIDE GATE
12. NEW 60" X 60" MOTOR ACTUATED SELF-CONTAINED SLIDE GATE
13. NEW 8" MUD VALVE
14. NEW 6" ASSEMBLY FLANGE
15. ANGLE GUIDE SUPPORT, SEE DETAIL B/S-99-510.
16. PIPE SADDLE ANCHOR, SEE DETAIL D/S-99-508.
17. WALL BRACKET PIPE SUPPORT, SEE DETAIL C/S-99-509.
18. INSTALL EXPANSION JOINT AT EXISTING PIPE FLANGE.
19. TYPE B POST MOUNTED UTILITY STATION, SEE DETAIL B/M-99-506.
20. DISMANTLING JOINT, SEE DETAIL E/M-99-501.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS · JUSTIN R. SANDT · 116988 · LICENSED PROFESSIONAL ENGINEER · 9/9/23

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
PROCESS MECHANICAL

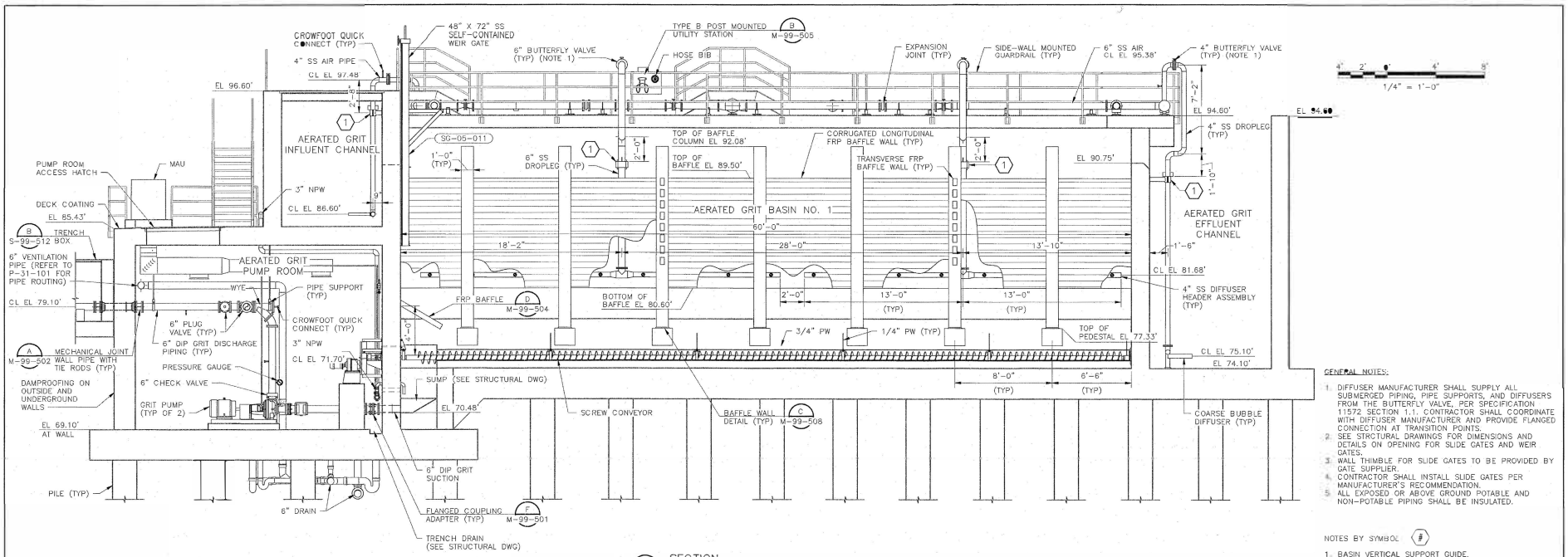
AERATED GRIT FACILITY TOP PLAN

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 223 OF 379	

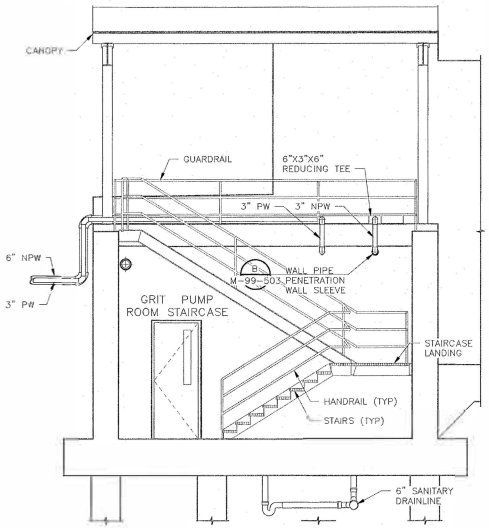
FOR CITY OF HOUSTON USE ONLY
ENGINEERING AND CONSTRUCTION DIVISION · APPROVED · 80367 · HOUSTON, TEXAS

M-31-103

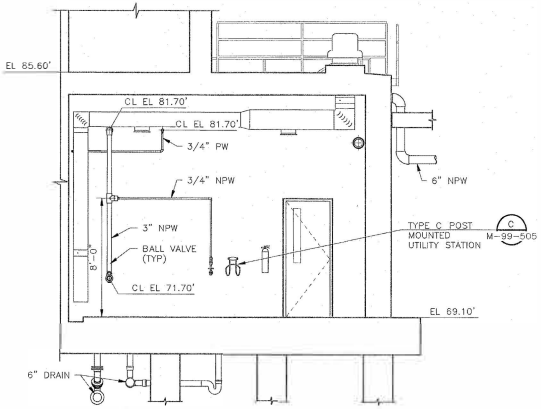
FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-COH IA WWTP-BIM.rvt



1 SECTION
M-31-102 1/4" = 1'-0"
M-31-103



2 SECTION
M-31-102 1/4" = 1'-0"
M-31-103



3 SECTION
M-31-102 1/4" = 1'-0"
M-31-103

GENERAL NOTES:

1. DIFFUSER MANUFACTURER SHALL SUPPLY ALL SUBMERGED PIPING, PIPE SUPPORTS, AND DIFFUSERS FROM THE BUTTERFLY VALVE, PER SPECIFICATION 11572 SECTION 1.1. CONTRACTOR SHALL COORDINATE WITH DIFFUSER MANUFACTURER AND PROVIDE FLANGED CONNECTION AT TRANSITION POINTS.
2. SEE STRUCTURAL DRAWINGS FOR DIMENSIONS AND DETAILS ON OPENING FOR SLIDE GATES AND WEIR GATES.
3. WALL THIMBLE FOR SLIDE GATES TO BE PROVIDED BY GATE SUPPLIER.
4. CONTRACTOR SHALL INSTALL SLIDE GATES PER MANUFACTURER'S RECOMMENDATION.
5. ALL EXPOSED OR ABOVE GROUND POTABLE AND NON-POTABLE PIPING SHALL BE INSULATED.

NOTES BY SYMBOL (#)

1. BASIN VERTICAL SUPPORT GUIDE, SEE DETAIL B/S-99-509.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JUSTIN R. SANDT
116988
LICENSED
PROFESSIONAL ENGINEER
3/3/23

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

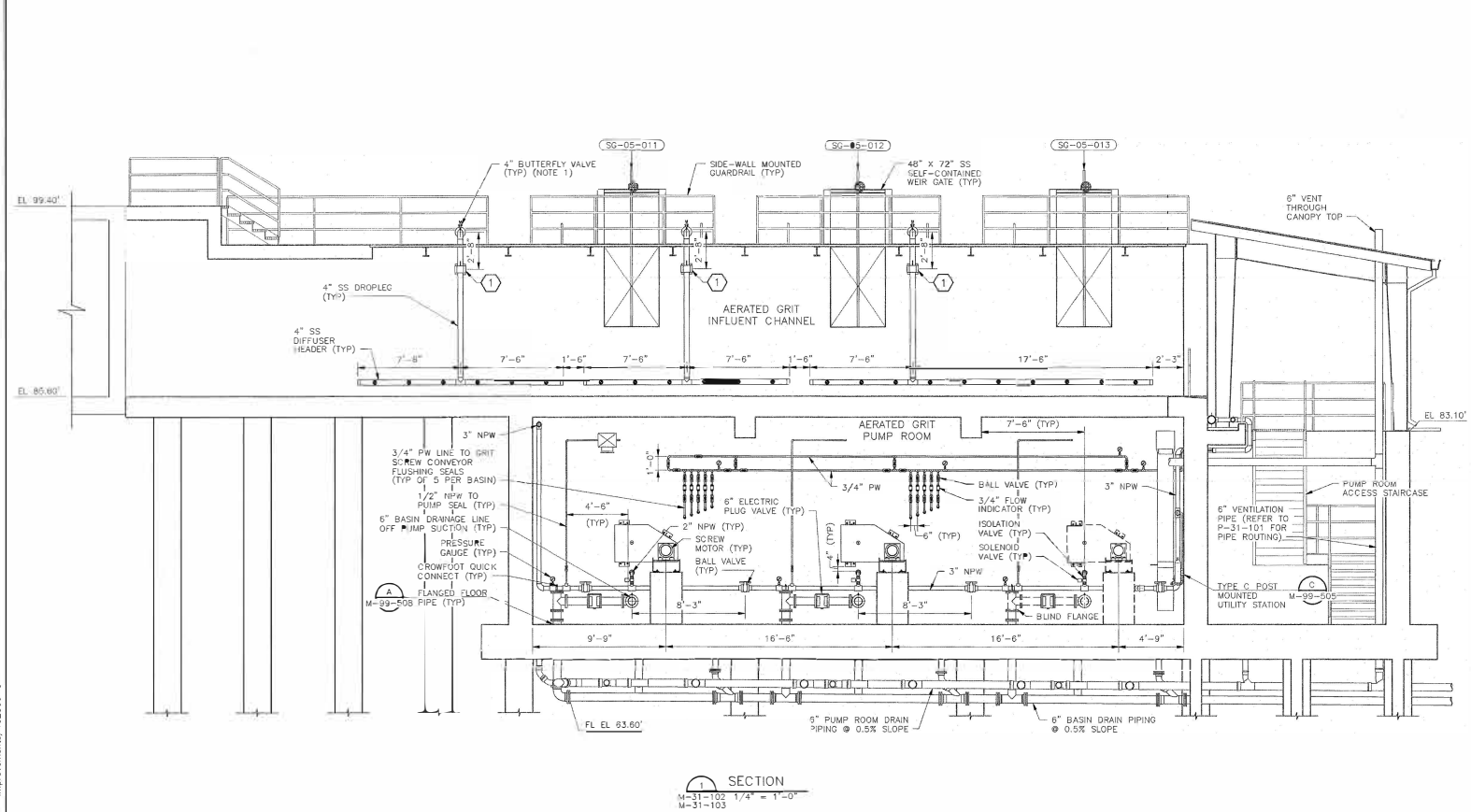
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
PROCESS MECHANICAL
AERATED GRIT FACILITY SECTIONS 1 OF 5

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.

FOR CITY OF HOUSTON USE ONLY
80367
REGISTERED
PROFESSIONAL
ENGINEER
HOUSTON, TEXAS

M-31-301
SHEET NO. 224 OF 379

FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-COH IA WWTP-BV.rvt



1 SECTION
M-31-102 1/4" = 1'-0"
M-31-103

4' 2' 0' 4' 8'
1/4" = 1'-0"

GENERAL NOTES:

1. DIFFUSER MANUFACTURER SHALL SUPPLY ALL SUBMERGED PIPING, PIPE SUPPORTS, AND DIFFUSERS FROM THE BUTTERFLY VALVE, PER SPECIFICATION 11572 SECTION 1.1. CONTRACTOR SHALL COORDINATE WITH DIFFUSER MANUFACTURER AND PROVIDE FLANGED CONNECTION AT TRANSITION POINTS.
2. ALL EXPOSED OR ABOVE GROUND POTABLE AND NON-POTABLE PIPING SHALL BE INSULATED.

NOTES BY SYMBOL (#)

1. BASIN VERTICAL SUPPORT GUIDE, SEE DETAIL B/S-99-509

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JUSTIN R. SANDT
116988
LICENSED
PROFESSIONAL ENGINEER
3/2/23

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
PROCESS MECHANICAL
AERATED GRIT FACILITY
SECTIONS 2 OF 5

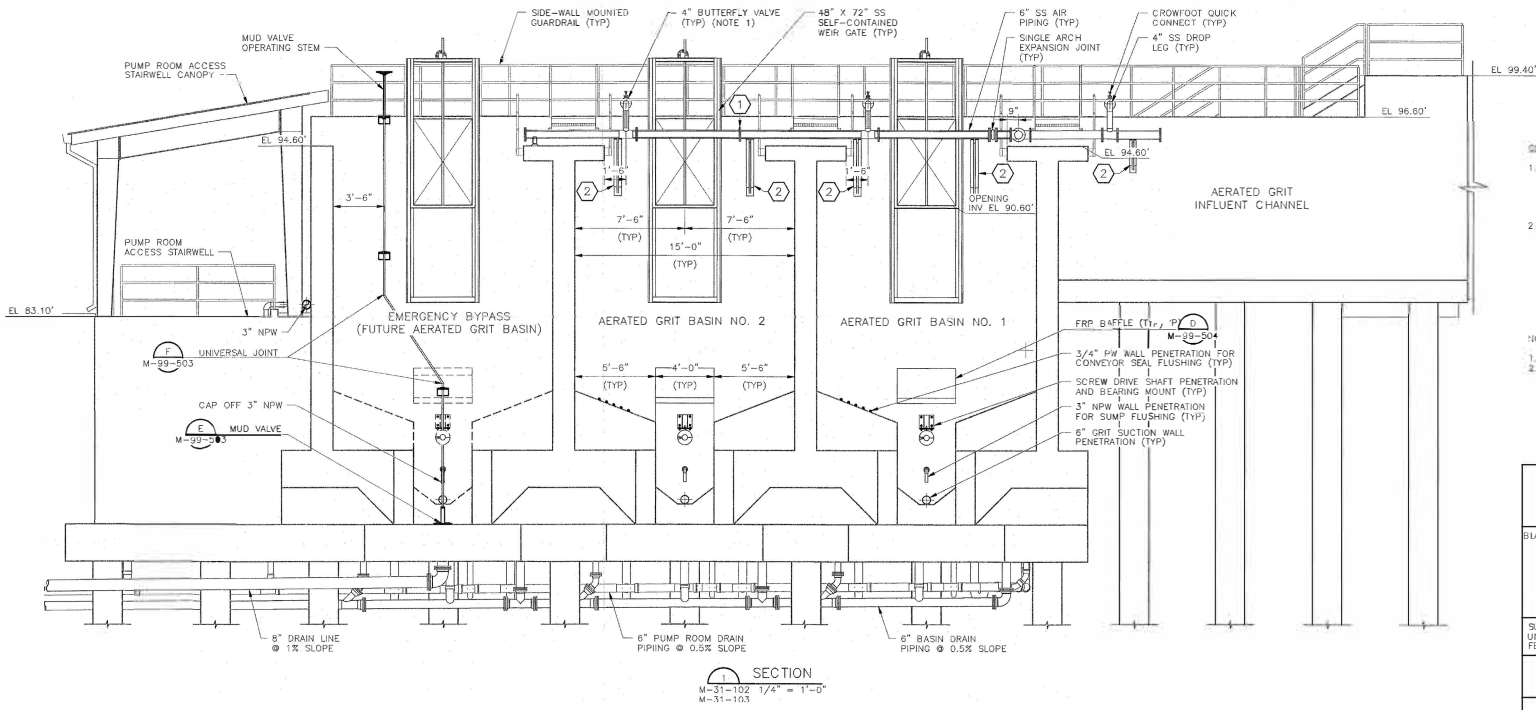
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 225 OF 379	

FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
80367
XIAOHUA LIN
3/2/23

M-31-302

FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-COH IA WWTP-BV.rvt



1 SECTION
M-31-102 1/4" = 1'-0"
M-31-103

4' 2' 0' 4' 8'
1/4" = 1'-0"

GENERAL NOTES:

1. DIFFUSER MANUFACTURER SHALL SUPPLY ALL SUBMERGED PIPING, PIPE SUPPORTS, AND DIFFUSERS FROM THE BUTTERFLY VALVE, PER SPECIFICATION 11572 SECTION 1.1. CONTRACTOR SHALL COORDINATE WITH DIFFUSER MANUFACTURER AND PROVIDE FLANGED CONNECTION AT TRANSITION POINTS
2. CONTRACTOR TO PROVIDE FLANGED TYPE MUD VALVE WITH POSITIVE SEAL UNDER BOTH SEATING AND UNSEATING HEAD CONDITIONS. FRAME, PLUG, OPERATING STEM, AND YOKE SHALL BE STAINLESS STEEL. PROVIDE STAINLESS STEEL STEM GUIDE AND MOUNTING BRACKET SUCH THAT HANDWHEEL CAN BE OPERATED FROM WALKWAY. PROVIDE U-JOINTS AS REQUIRED FOR PROPER OPERATION.

NOTES BY SYMBOL (#)

1. NEW 6" ASSEMBLY FLANGE, TYP OF THREE LOCATIONS.
2. WALL BRACKET PIPE SUPPORT, SEE DETAIL C/S-99-509.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

STATE OF TEXAS JUSTIN R SANDT 116988 LICENSED PROFESSIONAL ENGINEER 3/9/23

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

PROCESS MECHANICAL

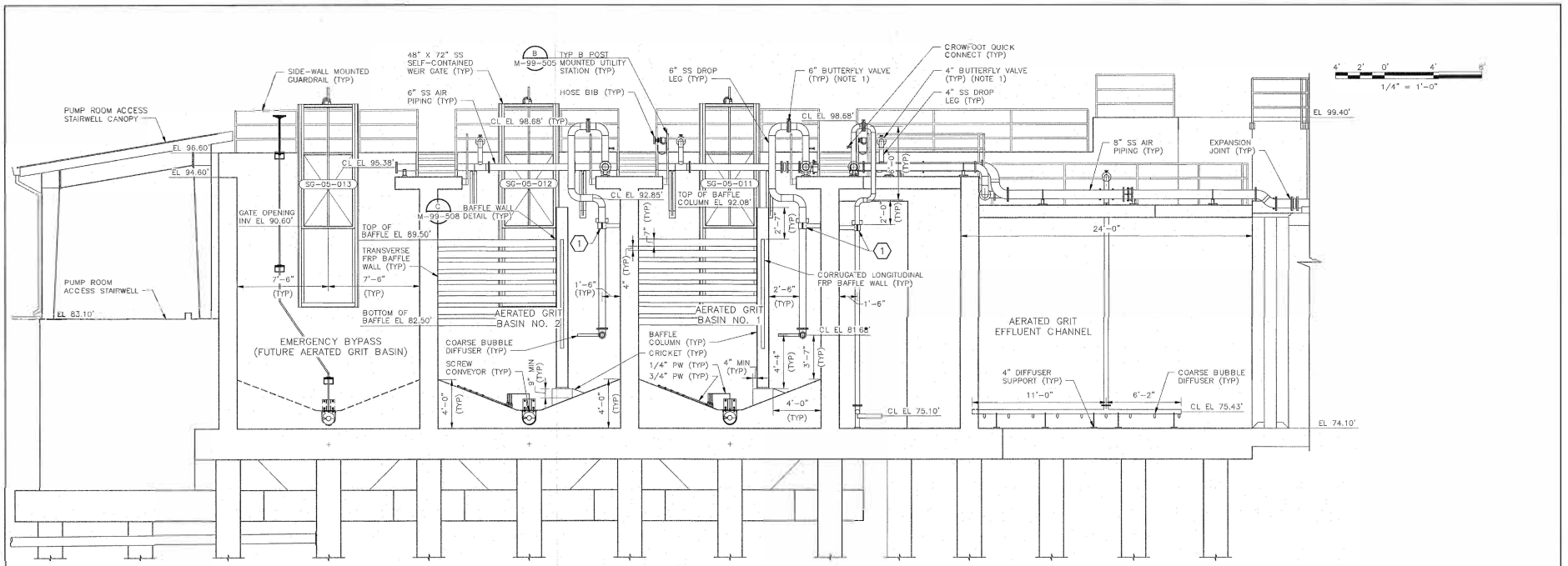
AERATED GRIT FACILITY SECTIONS 3 OF 5

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) UN, P.E.
	SHEET NO. 226 OF 379

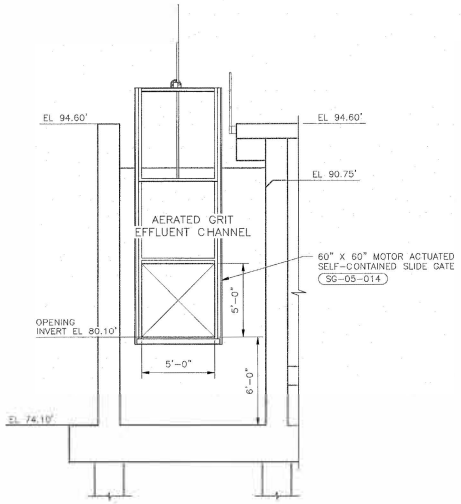
FOR CITY OF HOUSTON USE ONLY
ACCEPTED 80367

M-31-303

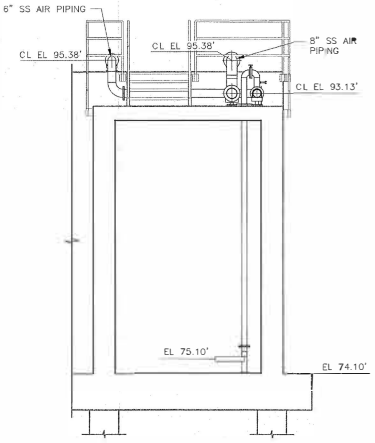
FILE PATH: BIM 360://4422500 - COH Intercontinental Airport WWTF Improvements/4422500-COH IA WWTF-BV.rvt



1 SECTION
M-31-102 1/4" = 1'-0"
M-31-103



2 SECTION
M-31-102 1/4" = 1'-0"
M-31-103



3 SECTION
M-31-102 1/4" = 1'-0"
M-31-103

GENERAL NOTES:

1. DIFFUSER MANUFACTURER SHALL SUPPLY ALL SUBMERGED PIPING, PIPE SUPPORTS, AND DIFFUSERS FROM THE BUTTERFLY VALVE, PER SPECIFICATION 11572 SECTION 1.1. CONTRACTOR SHALL COORDINATE WITH DIFFUSER MANUFACTURER AND PROVIDE FLANGED CONNECTION AT TRANSITION POINTS.
2. TRANSVERSE FRP BAFFLE WALLS ARE NOT SHOWN FOR CLARITY.

NOTES BY SYMBOL (#)

1. BASIN VERTICAL SUPPORT GUIDE, SEE DETAIL B/S-99-509

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 500
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JUSTIN R. SANDT
116998
LICENSED
PROFESSIONAL ENGINEER
3/3/23

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

PROCESS MECHANICAL

AERATED GRIT FACILITY SECTIONS 4 OF 5

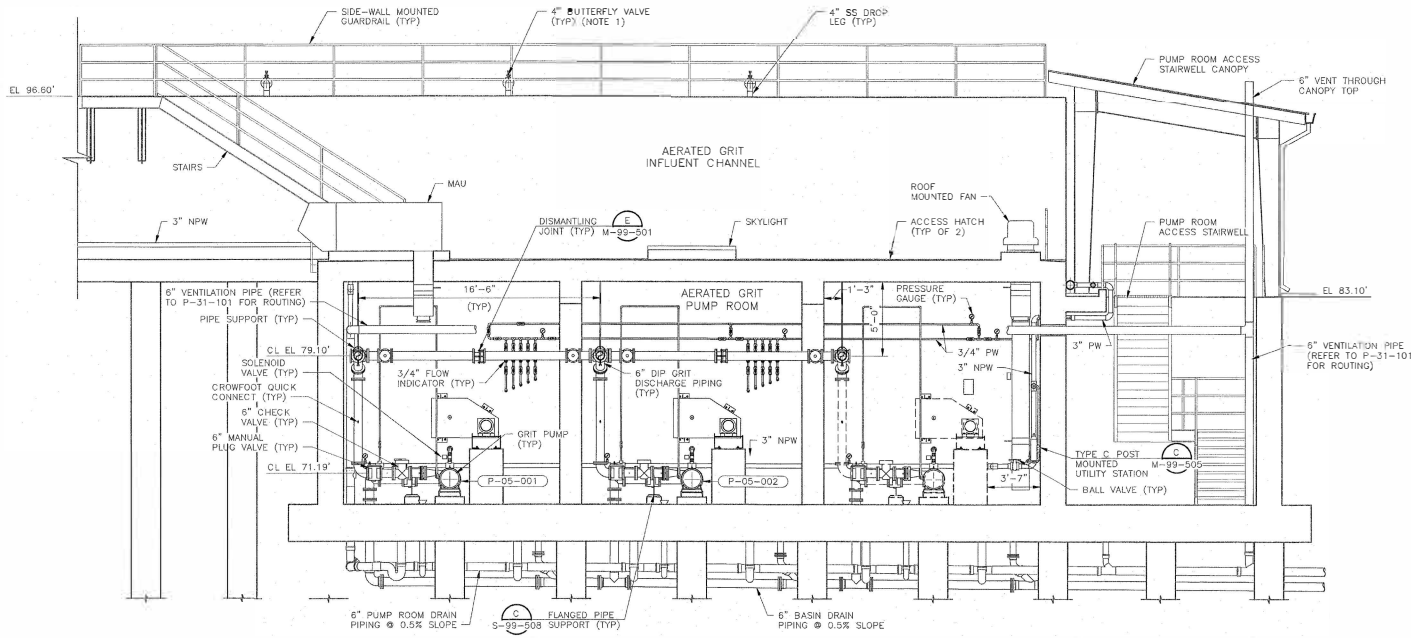
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO.	227 OF 379

FOR CITY OF HOUSTON USE ONLY

80367

M-31-304

FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-COH IA WWTP-BV.rvt



1 SECTION
M-31-102 1/4" = 1'-0"
M-31-103

4' 2' 0 4' 8'
1/4" = 1'-0"

GENERAL NOTES:

1. DIFFUSER MANUFACTURER SHALL SUPPLY ALL SUBMERGED PIPING, PIPE SUPPORTS, AND DIFFUSERS FROM THE BUTTERFLY VALVE, PER SPECIFICATION 11572 SECTION 1.1. CONTRACTOR SHALL COORDINATE WITH DIFFUSER MANUFACTURER AND PROVIDE FLANGED CONNECTION AT TRANSITION POINTS.
2. PIPE SUPPORTS FOR 12-INCH DIAMETER AND SMALLER PIPE THAT IS NOT CONSIDERED SPECIAL CASE PIPING (AIR PIPING) ARE THE RESPONSIBILITY OF THE CONTRACTOR TO DESIGN AND CONSTRUCT. PIPE SUPPORTS FOR 12-INCH AND SMALLER PIPE SHALL MEET ALL REQUIREMENTS OF SECTION 15140 HANGERS AND SUPPORTS FOR PROCESS PIPING. ANY PIPE SUPPORTS SHOWN FOR 12-INCH AND SMALLER PIPE ARE FOR INFORMATIONAL PURPOSES ONLY AND ARE NOT INTENDED TO SHOW AN ACCEPTABLE TYPE OR LOCATION OF A SUPPORT.
3. FOR AERATED GRIT AND CLASSIFICATION FACILITY EQUIPMENT RACK AND PANEL LOCATION AND DIMENSIONS, REFER TO E-31-101 AND E-31-301.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JUSTIN R. SANDT
116966
LICENSED
PROFESSIONAL ENGINEER
3/3/23

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
PROCESS MECHANICAL
AERATED GRIT FACILITY
SECTIONS 5 OF 5

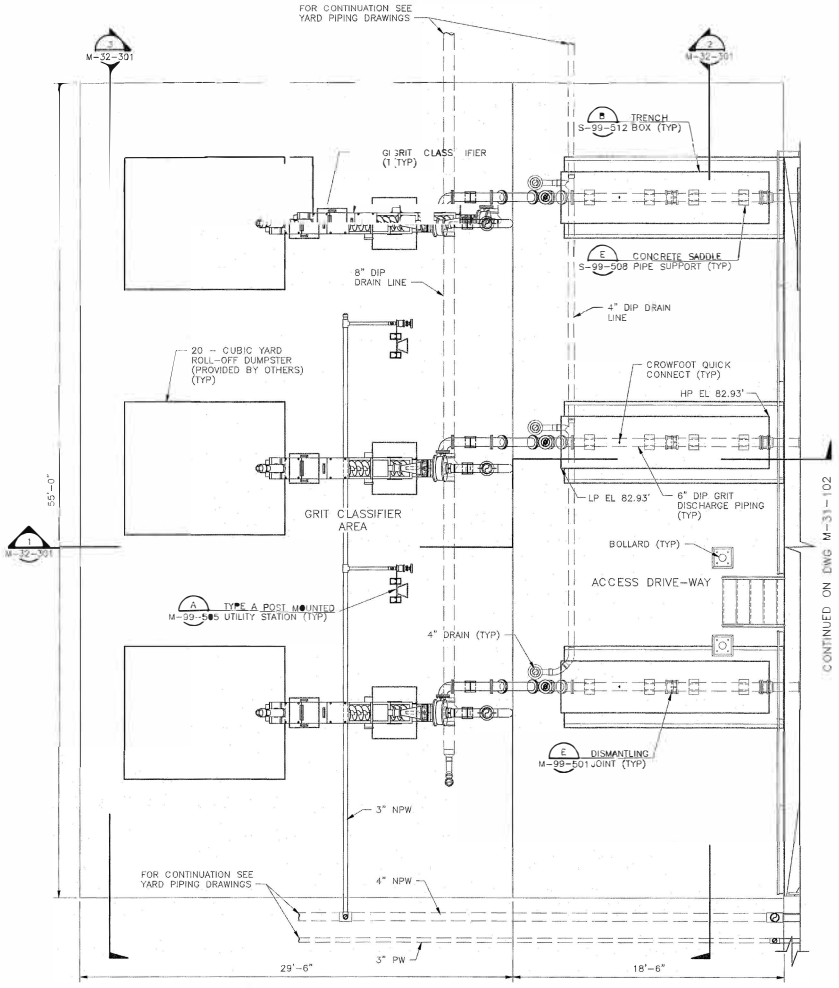
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.

FOR CITY OF HOUSTON USE ONLY
PUBLIC WORKS AND ENGINEERING
80367
REGISTERED
PROFESSIONAL
ENGINEER
STATE OF TEXAS

M-31-305

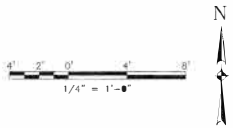
SHEET NO. 228 OF 379

FILE PATH: BIM 360://402500 - COH intercontinental Airport WWTP Improvements/402500-COH IA WWTP-BV.rvt



GRIT DEWATERING - PLAN

1/4" = 1'-0"



BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JUSTIN R. SANDT
119969
LICENSED
PROFESSIONAL ENGINEER
11/11/22

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

PROCESS MECHANICAL

GRIT CLASSIFIER AREA PLAN

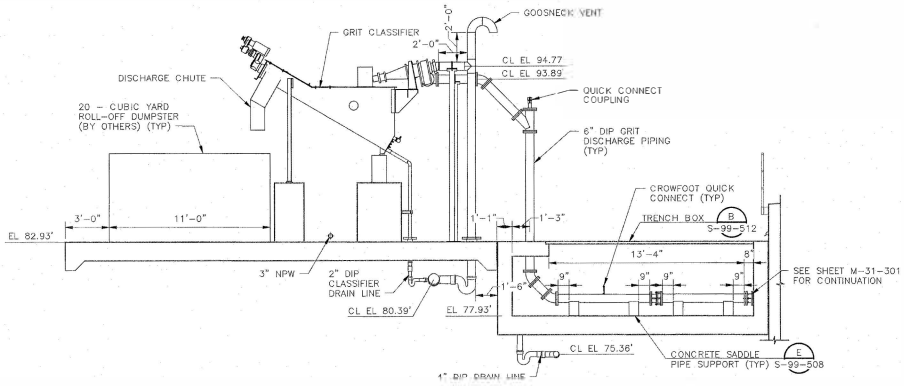
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 229 OF 379	

FOR CITY OF HOUSTON USE ONLY

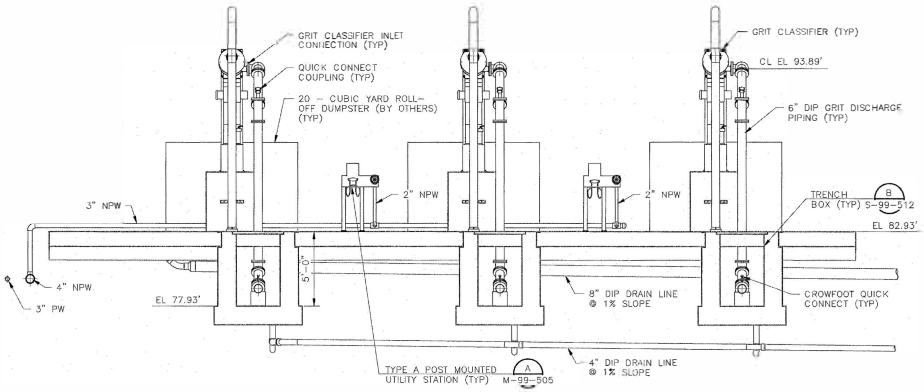
ENGINEERING RECORDS
Accepted 20160
80367
REGISTERED
HOUSTON, TEXAS

M-32-101

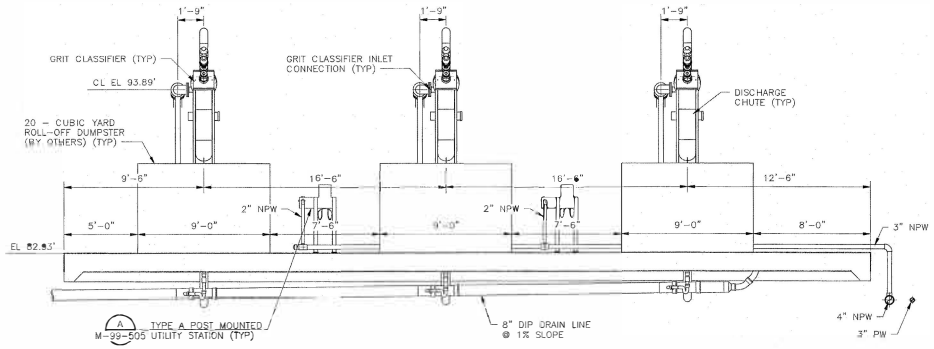
File Path: Bim 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-COH IA WWTP-BV.rvt



1 SECTION
M–32–101 1/4" = 1'–0"



2 SECTION
M–32–101 1/4" = 1'–0"



3 SECTION
M–32–101 1/4" = 1'–0"

GENERAL NOTES:

1. PIPE SUPPORTS FOR 12" DIAMETER AND SMALLER PIPE THAT IS NOT CONSIDERED SPECIAL CASE PIPING (AIR PIPING) ARE THE RESPONSIBILITY OF THE CONTRACTOR TO DESIGN AND CONSTRUCT. PIPE SUPPORTS FOR 12" AND SMALLER PIPE SHALL MEET ALL REQUIREMENTS OF SECTION 15140 HANGERS AND SUPPORTS FOR PROCESS PIPING. ANY PIPE SUPPORTS SHOWN FOR 12" AND SMALLER PIPE ARE FOR INFORMATIONAL PURPOSES ONLY AND ARE NOT INTENDED TO SHOW AN ACCEPTABLE TYPE OR LOCATION OF A SUPPORT.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961–1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P–6182

STATE OF TEXAS
JUSTIN R. SANDT
116988
LICENSED
PROFESSIONAL ENGINEER
11/11/22

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
PROCESS MECHANICAL

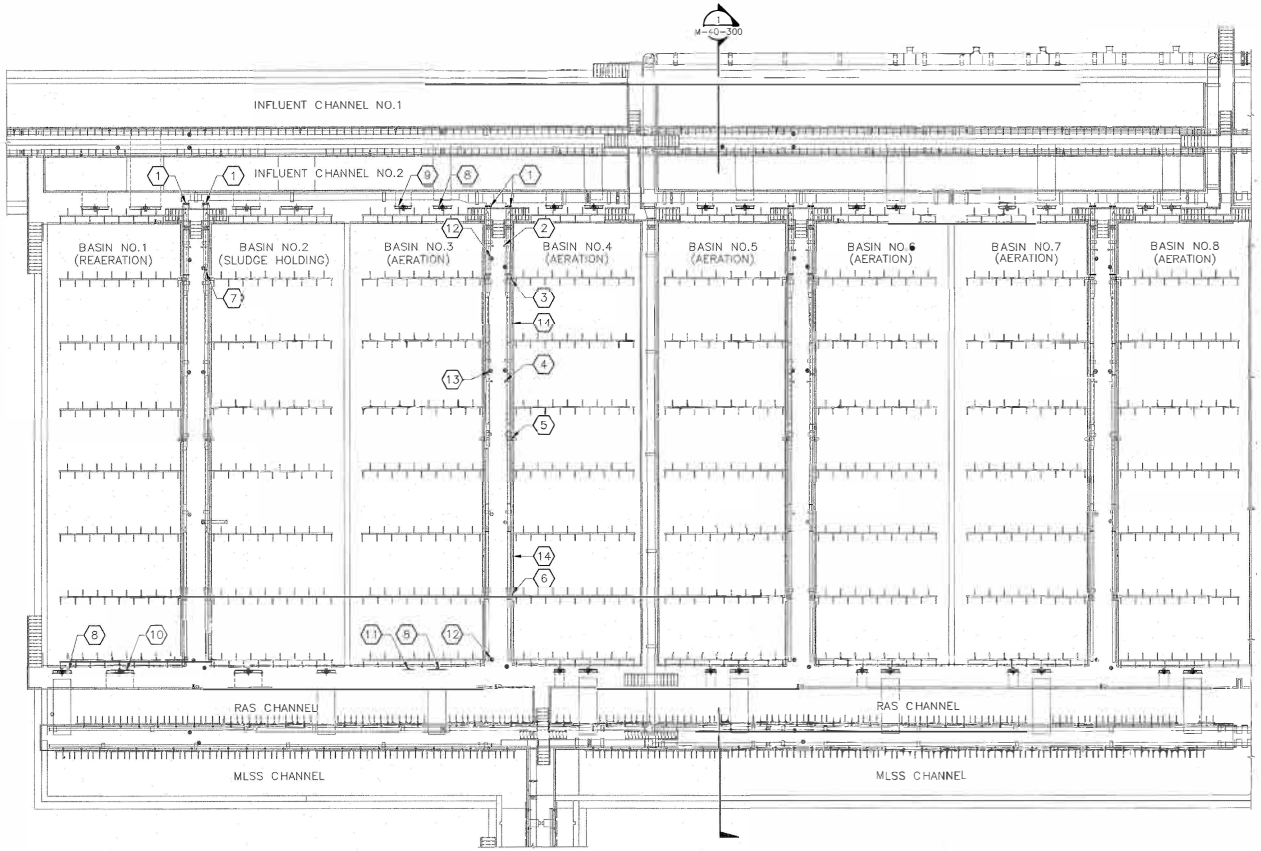
GRIT CLASSIFIER AREA SECTIONS

WBS NUMBER	R–00265–0147–4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 230 OF 379	

FOR CITY OF HOUSTON USE ONLY
PUBLIC WORKS AND ENGINEERING
ACCEPTED
80367
CITY OF HOUSTON, TEXAS

M–32–301

FILE PATH: BIM 360://402500 – CDH Intercontinental Airport WWTP Improvements/402500–COH IA WWTP–BV.rvt



AERATION BASINS PLAN
1/16" = 1'-0"

N

16' 12' 8' 4' 0' 16' 32'
1/16" = 1'-0"

GENERAL NOTES:

1. SHEET INDICATES IMPROVEMENTS TO THE EXISTING AERATION BASIN FACILITY.
2. REPLACEMENT OF INFLUENT SLUICE GATES ARE TYPICAL FOR BASINS NO. 3, 4, 5, AND 6.
3. REPLACEMENT OF 54"X54" AND 84"X84" EFFLUENT SLUICE GATES IN BASIN NO. 1 ARE TYP FOR NO. 2.
4. REPLACEMENT OF 48"X48" AND 54"X54" EFFLUENT SLUICE GATES IN BASIN NO.3 ARE TYPICAL FOR BASINS NO. 4, 5, 6, 7, AND 8.
5. REPLACEMENT OF 6" AND 8" MUD VALVES ARE TYPICAL FOR BASINS 3, 4, 5, AND 6.
6. MODIFICATIONS TO EXISTING AIR PIPING FOR BASIN NO. 4 IS TYPICAL FOR BASINS 3, 5, 6, 7, AND 8.
7. CONTRACTOR SHALL SUBMIT THE CONTRACTOR NOTIFICATION FOR OPERATIONS ASSISTANCE (NOA) TO CITY CONSTRUCTION TEAM AND COORDINATE WITH WASTEWATER OPS USING NOA PRIOR TO CONSTRUCTION ACTIVITIES.
8. REFER TO ENLARGED PLAN SECTIONS FOR EQUIPMENT TAG NUMBERS.

NOTES BY SYMBOL (#)

1. RELOCATED 14" MANUAL BUTTERFLY VALVE. CUT EXISTING 14" PIPE AS REQUIRED AND WELD FLANGES FOR INSTALLATION OF THE RELOCATED BUTTERFLY VALVE.
2. INSTALL NEW 14" THERMAL DISPERSION MASS FLOW METER. PROVIDE MINIMUM 10 PIPE DIAMETERS UPSTREAM STRAIGHT RUN AND 5 PIPE DIAMETERS DOWNSTREAM STRAIGHT RUN FOR THE FLOW METER.
3. INSTALL NEW 6" ELECTRIC, MODULATING INDUSTRIAL BUTTERFLY VALVE. REPLACE EXISTING 8" ELBOWS UPSTREAM AND DOWNSTREAM OF BUTTERFLY VALVE WITH 8"X6" REDUCING ELBOWS AS NEEDED.
4. INSTALL NEW 10" THERMAL DISPERSION MASS FLOW METER. PROVIDE MINIMUM 10 PIPE DIAMETERS UPSTREAM STRAIGHT RUN AND 5 PIPE DIAMETERS DOWNSTREAM STRAIGHT RUN FOR THE FLOW METER.
5. INSTALL NEW 6" ELECTRIC, MODULATING INDUSTRIAL BUTTERFLY VALVE. REPLACE EXISTING 8" ELBOWS UPSTREAM AND DOWNSTREAM OF BUTTERFLY VALVE WITH 8"X6" REDUCING ELBOWS AS NEEDED.
6. INSTALL A SPACER PLATE BETWEEN THE PIPE FLANGES TO CAP THE DROP LEG.
7. INSTALL NEW 6" ELECTRIC, MODULATING INDUSTRIAL BUTTERFLY VALVE WITH 14"X6" REDUCERS UPSTREAM AND DOWNSTREAM. CUT EXISTING PIPING AS NEEDED
8. NEW 54"X54" MOTOR ACTUATED SLIDE GATE.
9. NEW 48"X48" MOTOR ACTUATED SLIDE GATE.
10. NEW 84"X84" MOTOR ACTUATED SLIDE GATE.
11. NEW 30"X30" MOTOR ACTUATED SLIDE GATE.
12. NEW 6" MUD VALVE.
13. NEW 8" MUD VALVE.
14. INSTALL DISSOLVED OXYGEN (DO) PROBES.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 900
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 358

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JUSTIN R. SANDT
116988
LICENSED
PROFESSIONAL ENGINEER
11/11/22

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

PROCESS MECHANICAL

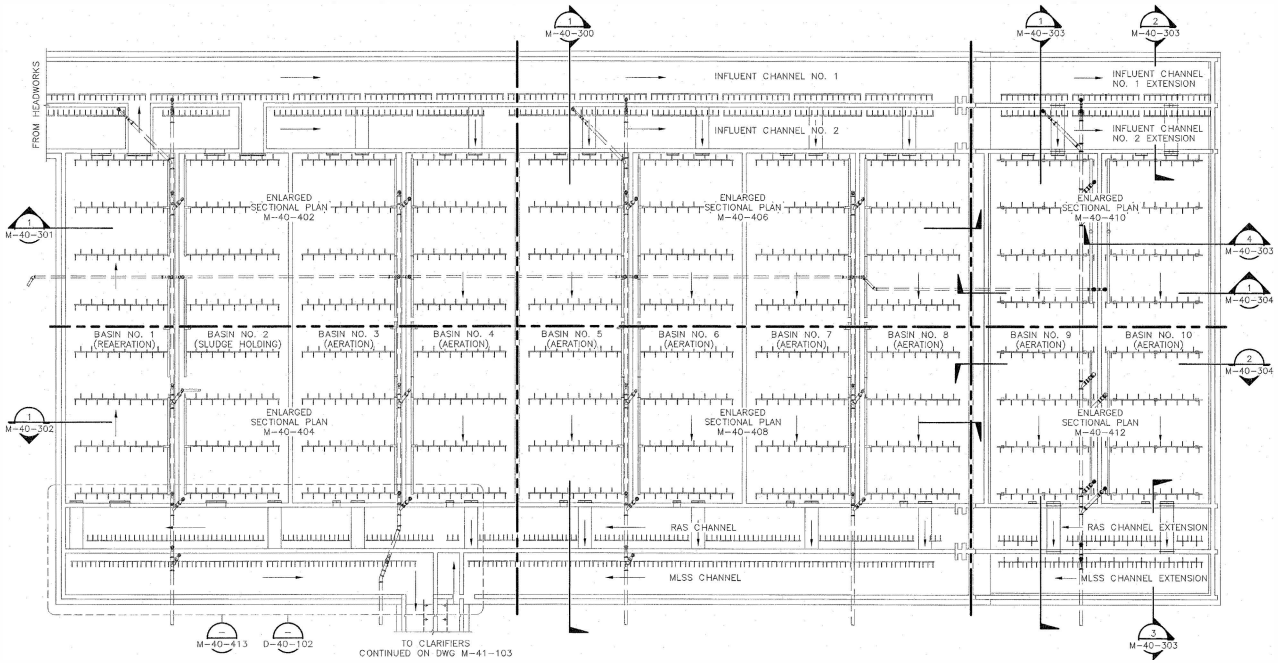
EXISTING AERATION BASINS IMPROVEMENTS PLAN

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 231 OF 379	

PROFESSIONAL ENGINEER
80367
HOUSTON, TEXAS

M-40-100

FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-COH IA WWTP-Style.rvt



BASIN OVERALL SECTIONAL PLAN

3/64" = 1'-0"

N

24' 16' 8' 0' 20' 40'

3/64" = 1'-0"

GENERAL NOTES:

1. REFER TO ENLARGED PLAN SECTIONS FOR EQUIPMENT TAG NUMBERS.

KEY PLAN

M-40-101

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JUSTIN R. SANDT
110986
LICENSED
PROFESSIONAL ENGINEER
11/11/22

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

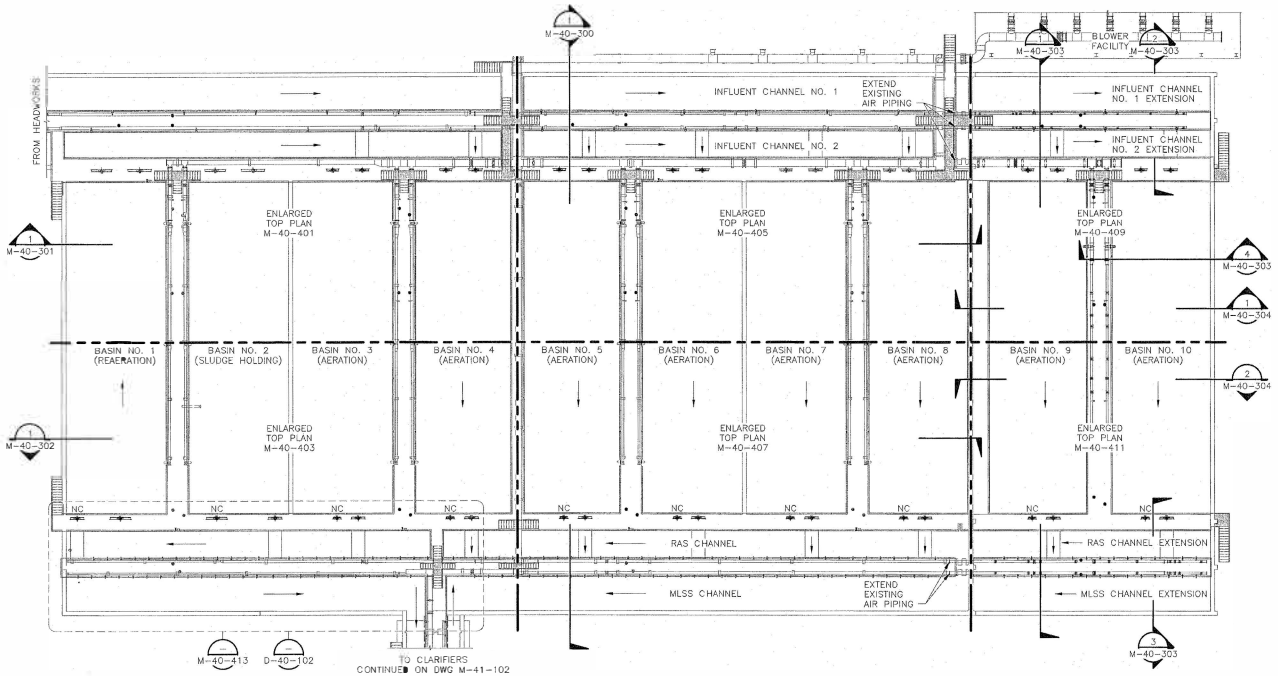
INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT
PLANT EXPANSION
PROCESS MECHANICAL
AERATION BASINS
OVERALL SECTIONAL PLAN

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 232 OF 379	

FOR CITY OF HOUSTON USE ONLY

PUBLIC WORKS AND ENGINEERING
ACCEPTED
80367
REGISTERED
ENGINEER
HOUSTON, TEXAS

FILE PATH: BIM 360://402550 - COH Intercontinental Airport WWTP Improvements/402550-COH IA WWTP-BV.rvt



BASIN OVERALL TOP PLAN

3/64" = 1'-0"

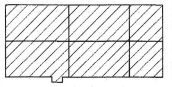
24' 16' 8' 0' 20' 40'

3/64" = 1'-0"

N

GENERAL NOTES:

1. REFER TO ENLARGED PLAN SECTIONS FOR EQUIPMENT TAG NUMBERS.



KEY PLAN

M-40-102

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JUSTIN R. SANDT
110568
LICENSED
PROFESSIONAL ENGINEER
11/11/22

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

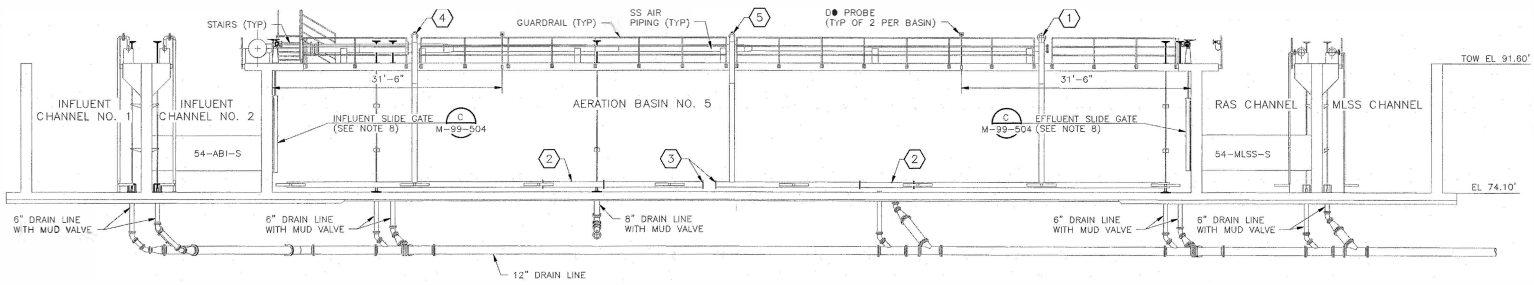
INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT
PLANT EXPANSION
PROCESS MECHANICAL
AERATION BASINS
OVERALL TOP PLAN

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 233 OF 379	

FOR CITY OF HOUSTON USE ONLY

80367

FILE PATH: BIM 360://422500 - COH Intercontinental Airport WWTP Improvements/422500-COH IA WWTP-BV.rvt



1 SECTION
M-40-100 1/8" = 1'-0"
M-40-101
M-40-102
M-40-405
M-40-406
M-40-407
M-40-408

8' 4' 0' 8' 16'
1/8" = 1'-0"

GENERAL NOTES:

1. MODIFICATIONS TO BASIN NO. 5 ARE TYPICAL FOR BASIN NO. 7 AND MIRROR IMAGES FOR BASINS NO. 4, 6, AND 8.
2. CONTRACTOR SHALL REPLACE ALL VISIBLE BROKEN, DEFECTIVE, OR MISSING COARSE BUBBLE DIFFUSERS IN EXISTING AERATION BASINS NO. 1 TO 8. COARSE BUBBLE DIFFUSER SHALL BE REPLACED WITH SANITAIRE'S D-24 316 STAINLESS STEEL WIDE BAND DIFUSERS TO MATCH EXISTING. PROVIDE SUPPORTS AS NEEDED BY MANUFACTUER RECOMMENDATION.
3. CONTRACTOR TO SUPPLY MODIFICATIONS TO EXISING 8" 304L SS DIFFUSER HEADER PIPING ARRANGMENT CONTRACTOR TOVERIFY MATERIAL OF EXISTING AIR HEADERS.
4. REFER TO P&IDs AND AERATION BASIN ENLARGED PLAN SECTIONS FOR EQUIPMENT TAG NUMBERS.
5. CONTRACTOR TO FIELD VERIFY EXISTING BUTTERFLY VALVE SIZES, MUD VALVE SIZES, END CONNECTIONS, LAYING LENGTH, AND SPACE AVAILABILITY WHEN MODIFYING EXISTING AIR PIPING, DIFFUSER PIPING, DRAIN PIPING, AND VALVE REPLACEMENT.
6. CONTRACTOR SHALL FIELD VERIFY GATE OPENINGS AND WALL THIMBLE LOCATIONS FOR GATE REPLACEMENT.
7. SHALL VERIFY ELEVATIONS AND LOCATIONS OF EXISTING PIPING, STRUCTURES AND EQUIPMENT.
8. REFER TO DETAIL E ON M-99-504 FOR GATE INSTALLATION, WITHOUT WALL THIMBLE.

NOTES BY SYMBOL (#)

1. CONTRACTOR TO INSTALL SPACER PLATE BLANK BETWEEN PIPE FLANGES TO CAP THIRD DROPLEG.
2. CONTRACTOR TO INSTALL 4" PIPE AND CLANDED CONNECTIONS TO EXISTING 4" DIFFUSER HEADER.
3. CONTRACTOR TO INSTALL BLIND FLANGES TO CAP ENDS OF DIFFUSER HEADERS.
4. CONTRACTOR TO INSTALL NEW 6" ELECTRIC, MODULATING INDUSTRIAL BUTTERFLY VALVE. REPLACE EXISTING 8" ELBOWS UPSTREAM AND DOWNSTREAM OF BUTTERFLY VALVE WITH 8"X6" REDUCING ELBOWS AS NEEDED.
5. CONTRACTOR TO INSTALL NEW 5" ELECTRIC, MODULATING INDUSTRIAL BUTTERFLY VALVE. REPLACE EXISTING 8" ELBOWS UPSTREAM AND DOWNSTREAM OF BUTTERFLY VALVE WITH 8"X5" REDUCING ELBOWS AS NEEDED.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-8182

STATE OF TEXAS
JUSTIN R. SANDT
116998
LICENSED PROFESSIONAL ENGINEER
Date: January 11, 2011

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

PROCESS MECHANICAL

EXISTING AERATION BASINS IMPROVEMENTS SECTION

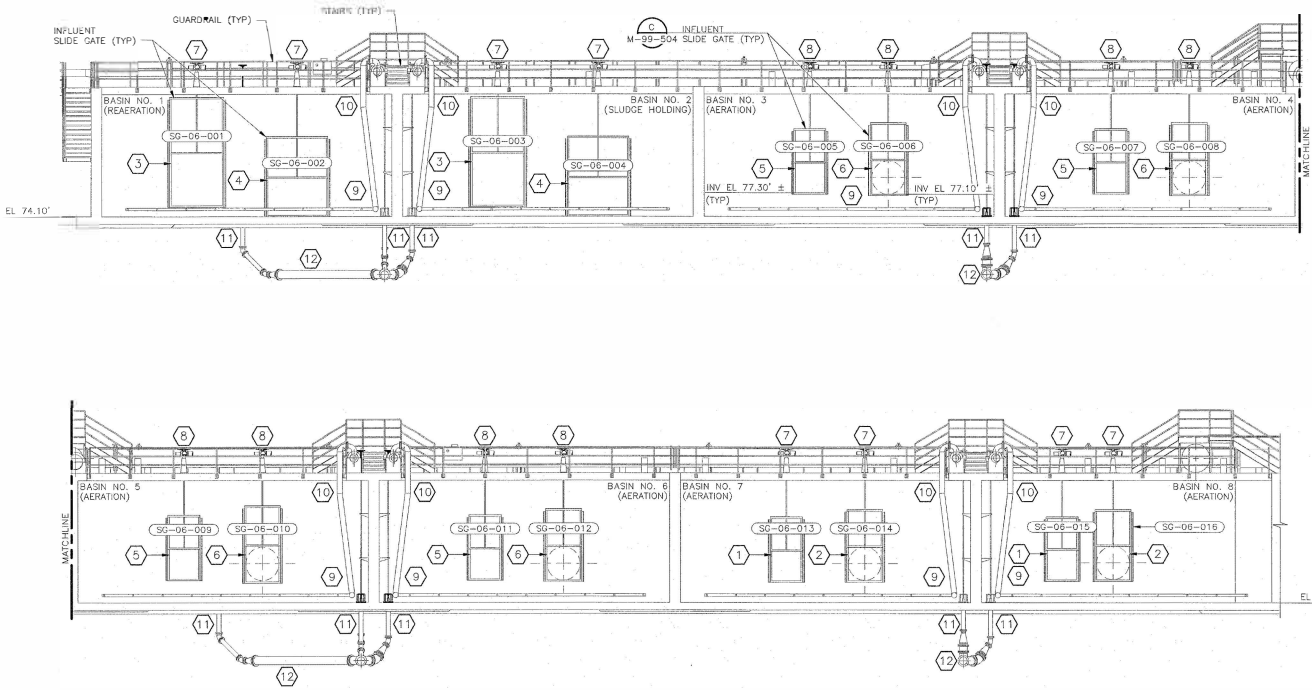
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 234 OF 379	

FOR CITY OF HOUSTON USE ONLY

REGISTERED ENGINEER
80367
DATE: JANUARY 11, 2011
HOUSTON, TEXAS

M-40-300

FILE PATH: P:\M 360\14026500 - COH Intercontinental Airport WWTP Improvements\402650-COH IS WWTP-BV.mxl



1 SECTION
1/8" = 1'-0"

M-40-101
M-40-102
M-40-401
M-40-402
M-40-405
M-40-406

8' 4' 0' 8' 16'
1/8" = 1'-0"

GENERAL NOTES:

1. CONTRACTOR TO FIELD VERIFY EXISTING BUTTERFLY VALVE SIZES, MUD VALVE SIZES, END CONNECTIONS, LAYING LENGTH, AND SPACE AVAILABILITY WHEN MODIFYING EXISTING AIR PIPING, DIFFUSER PIPING, DRAIN PIPING, AND VALVE REPLACEMENT.
2. CONTRACTOR SHALL FIELD VERIFY GATE OPENINGS AND WALL THIMBLE LOCATIONS FOR GATE REPLACEMENT.
3. SHALL VERIFY ELEVATIONS AND LOCATIONS OF EXISTING PIPING, STRUCTURES AND EQUIPMENT.
4. CONTRACTOR SHALL SUBMIT THE CONTRACTOR NOTIFICATION FOR OPERATIONS ASSISTANCE (NOA) TO CITY CONSTRUCTION TEAM AND COORDINATE WITH WASTEWATER OPS USING NOA PRIOR TO CONSTRUCTION ACTIVITIES.

NOTES BY SYMBOL (#)

1. EXISTING 48"X48" MOTOR ACTUATED SLIDE GATE
2. EXISTING 54"X54" MOTOR ACTUATED SLIDE GATE
3. EXISTING 84"X84" MOTOR ACTUATED SLIDE GATE
4. EXISTING 96"X60" MOTOR ACTUATED SLIDE GATE
5. NEW 48"X48" MOTOR ACTUATED SLIDE GATE
6. NEW 54"X54" MOTOR ACTUATED SLIDE GATE
7. EXISTING MOTORIZED SLIDE GATE ACTUATOR
8. NEW MOTORIZED SLIDE GATE ACTUATOR
9. EXISTING 4" STAINLESS STEEL AIR HEADER AND DIFFUSER SUPPORT
10. EXISTING 8" STAINLESS STEEL AIR DROPLEG
11. EXISTING 6" DRAIN LINE WITH MUD VALVE
12. EXISTING 12" DRAIN LINE

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 800
HOUSTON, TX 77024
(713) 961-1100

TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JUSTIN R. SANDT
116988
LICENSED
PROFESSIONAL ENGINEER
11/11/22

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

PROCESS MECHANICAL

AERATION BASINS SECTIONS 1 OF 4

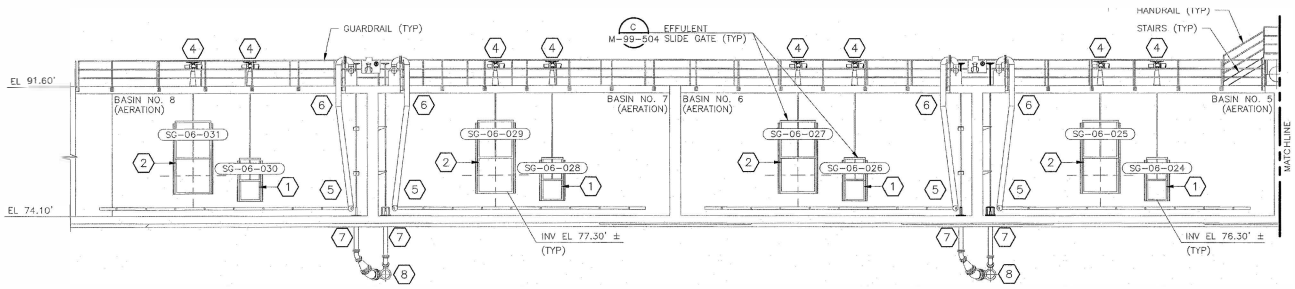
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 235 OF 379	

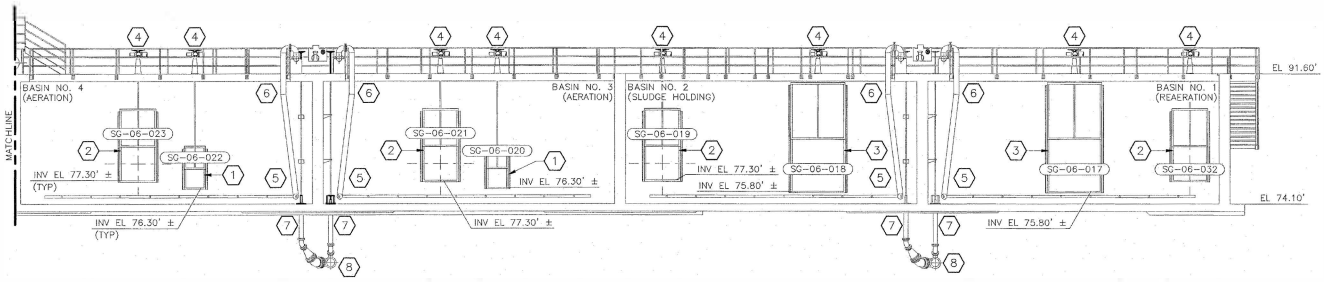
FOR CITY OF HOUSTON USE ONLY

PUBLIC WORKS AND ENGINEERING
ACCEPTED NOTED
80367
CITY OF HOUSTON, TEXAS

M-40-301

FILE PATH: BIM 360://402500 - CIH Intercontinental Airport WWTP Improvements/402500-CIH is WWTP-BV.rvt





1 SECTION
M-40-101 1/8" = 1'-0"
M-40-102
M-40-403
M-40-404
M-40-407
M-40-408

8' 4' 0' 8' 16'
1/8" = 1'-0"

GENERAL NOTES:

1. CONTRACTOR TO FIELD VERIFY EXISTING BUTTERFLY VALVE SIZES, MUD VALVE SIZES, END CONNECTIONS, LAYING LENGTH, AND SPACE AVAILABILITY WHEN MODIFYING EXISTING AIR PIPING, DIFFUSER PIPING, DRAIN PIPING, AND VALVE REPLACEMENT.
2. CONTRACTOR SHALL FIELD VERIFY GATE OPENINGS AND WALL THIMBLE LOCATIONS FOR GATE REPLACEMENT.
3. SHALL VERIFY ELEVATIONS AND LOCATIONS OF EXISTING PIPING, STRUCTURES AND EQUIPMENT.

NOTES BY SYMBOL (#)

1. NEW 30"X30" MOTOR ACTUATED SLIDE GATE
2. NEW 54"X54" MOTOR ACTUATED SLIDE GATE
3. NEW 84"X84" MOTOR ACTUATED SLIDE GATE
4. NEW MOTORIZED SLIDE GATE ACTUATOR
5. EXISTING 4" STAINLESS STEEL AIR HEADER AND DIFFUSER SUPPORT
6. EXISTING 6" STAINLESS STEEL AIR DROPLEG
7. EXISTING 6" DRAIN LINE WITH MUD VALVE
8. EXISTING 12" DRAIN LINE

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100

TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JUSTIN R. SANDT
110988
LICENSED
PROFESSIONAL ENGINEER
3/20/25

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

PROCESS MECHANICAL

AERATION BASINS SECTIONS 2 OF 4

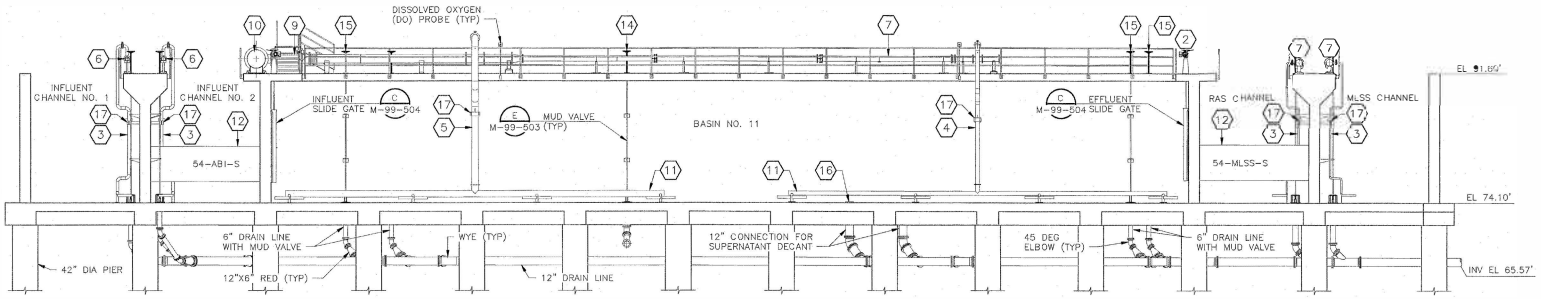
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 236 OF 379	

FOR CITY OF HOUSTON USE ONLY

PUBLIC WORKS AND ENGINEERING
ACCEPTED AS NOTED
80367
HOUSTON, TEXAS

M-40-302

FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-COH IA WWTP-RV.rvt



1 SECTION
M-40-101 1/8" = 1'-0"
M-40-102
M-40-409
M-40-410
M-40-411
M-40-412

8' 4' 0' 8' 16'
1/8" = 1'-0"

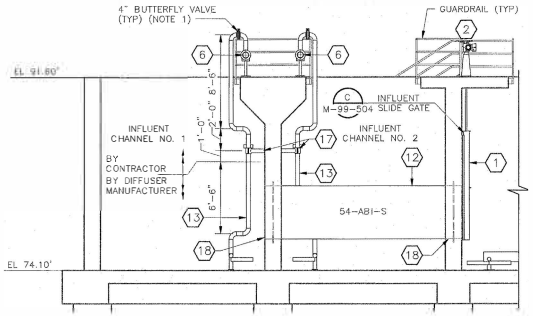
6" 4" 2" 0" 5' 10'
3/16" = 1'-0"

GENERAL NOTES:

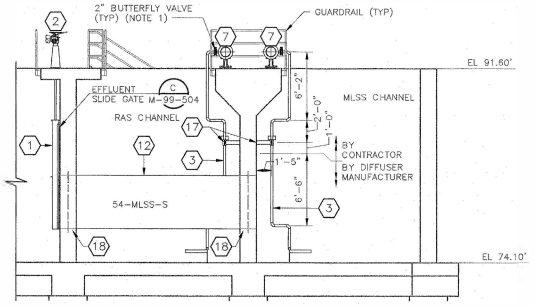
1. DIFFUSER MANUFACTURER SHALL SUPPLY ALL SUBMERGED PIPING, PIPE SUPPORTS, AND DIFFUSERS FROM THE BUTTERFLY VALVE, PER SPECIFICATION 11572 SECTION 1.1. CONTRACTOR SHALL COORDINATE WITH DIFFUSER MANUFACTUREP AND PROVIDE FLANGED CONNECTION AT TRANSITION POINTS.
2. CONTRACTOR SHALL VERIFY ELEVATIONS AND LOCATIONS OF EXISTING PIPING, STRUCTURES AND EQUIPMENT
3. GUARDRAILS AND STAIRS NOT SHOWN FOR CLARITY. REFER TO STRUCTURAL DRAWINGS.

NOTES BY SYMBOL (#)

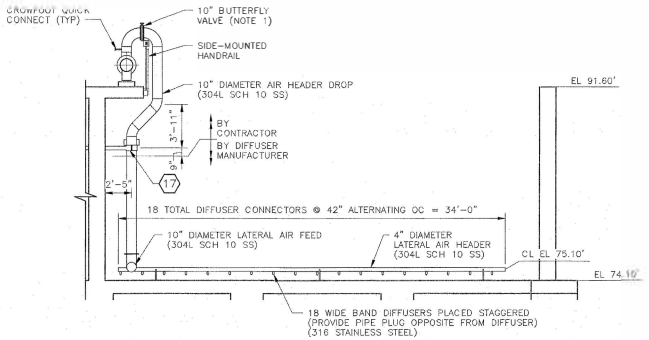
1. NEW 54"X54" MOTOR ACTUATED SLIDE GATE
2. NEW MOTORIZED SLIDE GATE ACTUATOR
3. NEW 2" STAINLESS STEEL AIR DROPLEG
4. NEW 8" STAINLESS STEEL AIR DROPLEG
5. NEW 10" STAINLESS STEEL AIR DROPLEG
6. NEW 6" STAINLESS STEEL AIR HEADER
7. NEW 8" STAINLESS STEEL AIR HEADER
8. NEW 10" STAINLESS STEEL AIR HEADER
9. NEW 14" STAINLESS STEEL AIR HEADER
10. NEW 24" STAINLESS STEEL AIR HEADER
11. NEW 4" STAINLESS STEEL AIR HEADER AND DIFFUSER SUPPORT
12. NEW 54" STEEL PIPE
13. NEW 4" STAINLESS STEEL DROPLEG
14. NEW 8" MUD VALVE WITH STEM OPERATOR
15. NEW 6" MUD VALVE WITH STEM OPERATOR
16. 12" CONNECTION FOR SUPERNATANT DECANT IF NEEDED
17. BASIN VERTICAL SUPPORT GUIDE, SEE DETAIL B/S-99-509
18. FLANGED WALL PIPE SEE DETAIL B/M-99-508



2 SECTION
M-40-101 3/16" = 1'-0"
M-40-102
M-40-409
M-40-410



3 SECTION
M-40-101 3/16" = 1'-0"
M-40-102
M-40-411
M-40-412



4 SECTION
M-40-101 3/16" = 1'-0"
M-40-102
M-40-409
M-40-410

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JUSTIN R. SANDT
116599
LICENSED
PROFESSIONAL ENGINEER
3/3/23

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

PROCESS MECHANICAL

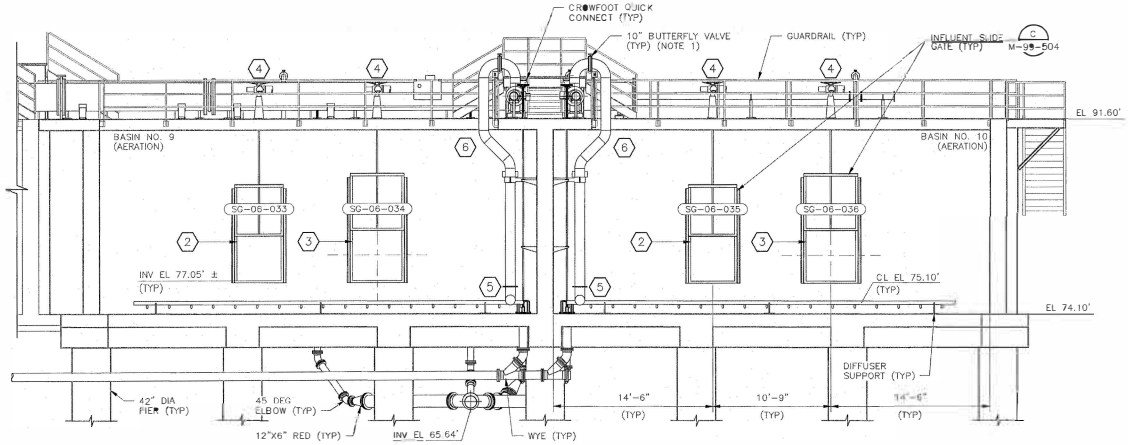
AERATION BASINS SECTIONS 3 OF 4

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAOHUA (SHARI) LIN, P.E.
SHEET NO. 237 OF 379	

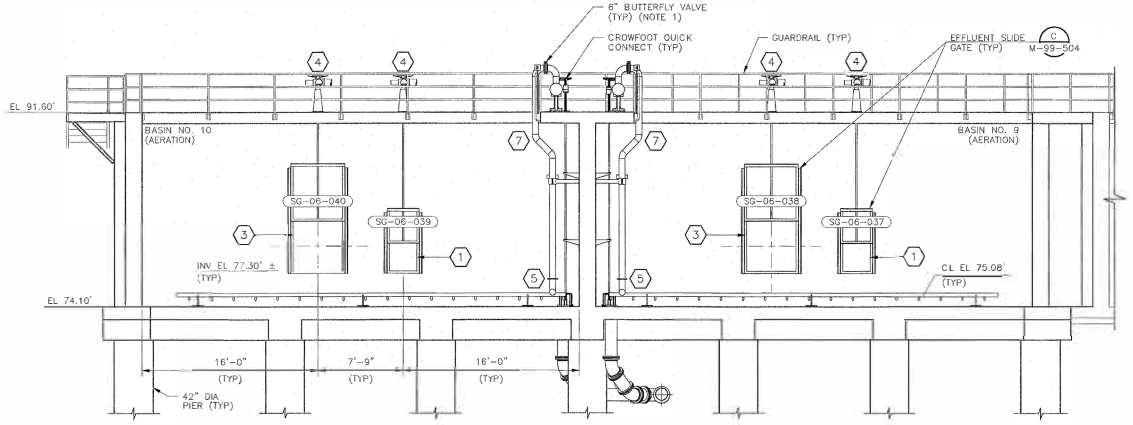
FOR CITY OF HOUSTON USE ONLY
80367

M-40-303

FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-COH IA WWTP-Bv.rvt



1 SECTION
M-40-101 3/16" = 1'-0"
M-40-102
M-40-409
M-40-410



2 SECTION
M-40-101 3/16" = 1'-0"
M-40-102
M-40-411
M-40-412

1/8" = 1'-0"

GENERAL NOTES:

1. DIFFUSER MANUFACTURER SHALL SUPPLY ALL SUBMERGED PIPING, PIPE SUPPORTS, AND DIFFUSERS FROM THE BUTTERFLY VALVE, PER SPECIFICATION 11572 SECTION 1.1. CONTRACTOR SHALL COORDINATE WITH DIFFUSER MANUFACTURER AND PROVIDE FLANGED CONNECTION AT TRANSITION POINTS.
2. REFER TO STRUCTURAL DRAWINGS FOR GATE OPENING DETAILS.
3. REFER TO DETAIL E ON M-99-504 FOR SLIDE GATE INSTALLATION. WALL THIMBLES TO BE PROVIDED BY GATE MANUFACTURER.

NOTES BY SYMBOL ⟨#⟩

1. NEW 30"X30" MOTOR ACTUATED SLIDE GATE
2. NEW 48"X48" MOTOR ACTUATED SLIDE GATE
3. NEW 54"X54" MOTOR ACTUATED SLIDE GATE
4. NEW MOTORIZED SLIDE GATE ACTUATOR
5. NEW 4" STAINLESS STEEL AIR HEADER AND DIFFUSER SUPPORT
6. NEW 10" STAINLESS STEEL AIR DROPLEG
7. NEW 8" STAINLESS STEEL AIR DROPLEG

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

STATE OF TEXAS · JUSTIN R. SANDT · 116988 · LICENSED PROFESSIONAL ENGINEER · 5/3/23

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

PROCESS MECHANICAL

AERATION BASINS SECTIONS 4 OF 4

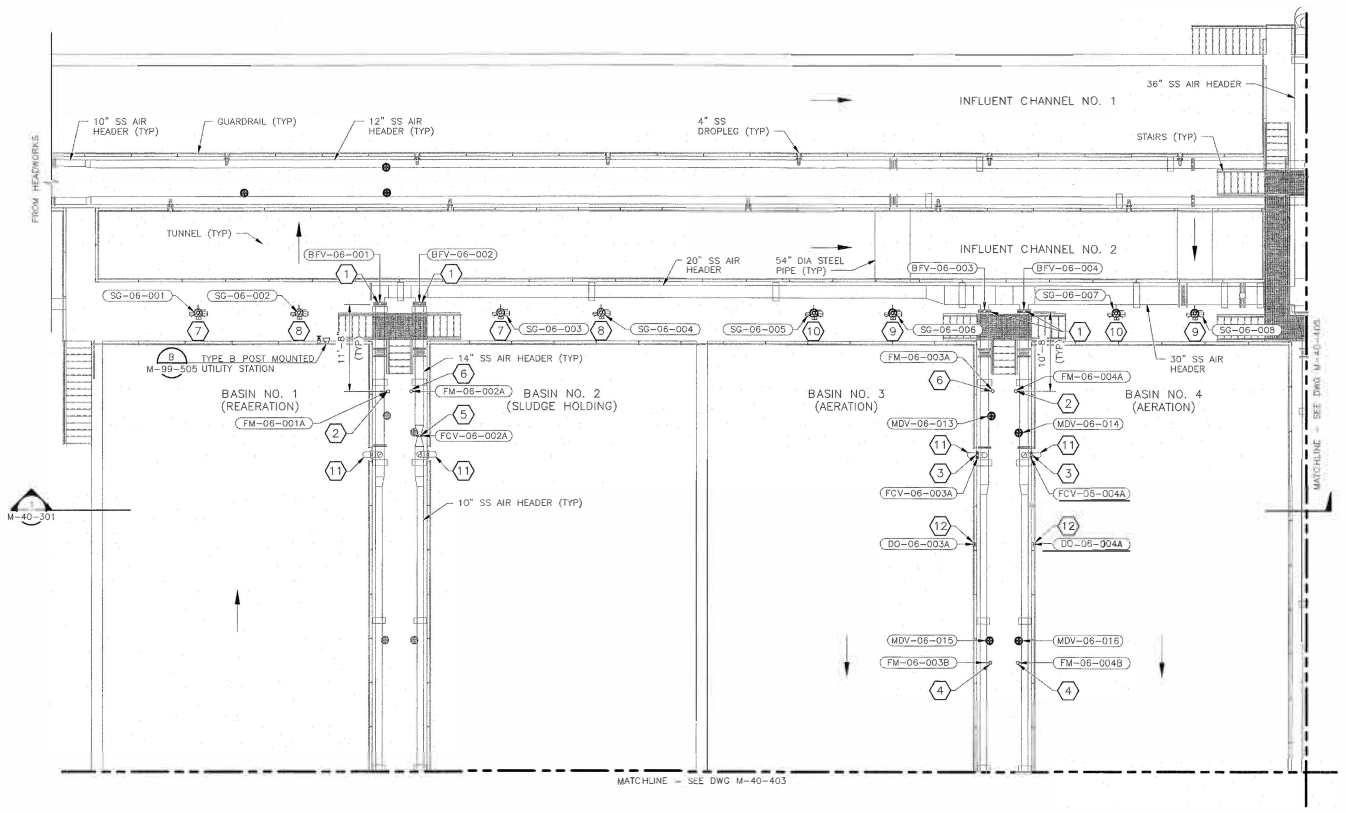
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 238 OF 379	

FOR CITY OF HOUSTON USE ONLY

80367 · REGISTERED · PROFESSIONAL ENGINEER · STATE OF TEXAS

M-40-304

FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-COH IA WWTP-BIM.rvt



ENLARGED TOP PLAN
1/8" = 1'-0"

GENERAL NOTES:

1. MODIFICATIONS TO BASIN NO. 4 (AERATION BASIN) FOR AIR PIPING ARE TYPICAL FOR BASINS NO. 6 & 8 (AERATION BASINS) AND MIRRORED IMAGES FOR BASINS NO. 3, 5 & 7 (AERATION BASINS).
2. DIFFUSER GRID MODIFICATIONS ARE NOT SHOWN. DIFFUSERS TO BE REPLACED AS NECESSARY.
3. CONTRACTOR TO FIELD VERIFY EXISTING BUTTERFLY VALVE SIZES, END CONNECTIONS, LAYING LENGTH, AND SPACE AVAILABILITY WHEN MODIFYING EXISTING AIR PIPING AND VALVE REPLACEMENT.
4. CONTRACTOR SHALL VERIFY ELEVATIONS AND LOCATIONS OF EXISTING PIPING, STRUCTURES AND EQUIPMENT.
5. COARSE BUBBLE DIFFUSERS IN BASINS 1 THROUGH 8 SHALL BE SANITAIRE D-24 304L STAINLESS STEEL WDE BAND DIFFUSERS TO MATCH EXISTING.
6. REFER TO AERATION BASINS P&ID DRAWINGS FOR EQUIPMENT TAG NUMBERS.
7. CONTRACTOR TO VERIFY THE DIMENSIONS, ANCHOR BOLTS LOCATIONS OF EXISTING GATES IN THE FIELD PRIOR TO THE MANUFACTURE OF THE GATES.
8. REFER TO DETAIL E ON M-99-504 FOR GATE INSTALLATION, WITHOUT WALL THIMBLE.

NOTES BY SYMBOL (#)

1. RELOCATED 14" MANUAL BUTTERFLY VALVE. CUT EXISTING 14" PIPE AS REQUIRED AND WELD FLANGES FOR INSTALLATION OF THE RELOCATED BUTTERFLY VALVE.
2. NEW 14" THERMAL DISPERSION MASS FLOW METER. PROVIDE MINIMUM 10 PIPE DIAMETERS UPSTREAM STRAIGHT RUN AND 5 PIPE DIAMETERS DOWNSTREAM STRAIGHT RUN FOR THE FLOW METER.
3. NEW 6" ELECTRIC, MODULATING INDUSTRIAL BUTTERFLY VALVE.
4. NEW 10" THERMAL DISPERSION MASS FLOW METER. PROVIDE MINIMUM 10 PIPE DIAMETERS UPSTREAM STRAIGHT RUN AND 5 PIPE DIAMETERS DOWNSTREAM STRAIGHT RUN FOR THE FLOW METER.
5. NEW 6" ELECTRIC, MODULATING INDUSTRIAL BUTTERFLY VALVE WITH 14"X6" REDUCERS UPSTREAM AND DOWNSTREAM. CUT EXISTING PIPING AS NEEDED.
6. NEW 14" THERMAL DISPERSION MASS FLOW METER. PROVIDE MINIMUM 10 PIPE DIAMETERS UPSTREAM STRAIGHT RUN AND 5 PIPE DIAMETERS DOWNSTREAM STRAIGHT RUN FOR THE FLOW METER.
7. EXISTING 54"X84" MOTOR ACTUATED SLIDE GATE
8. EXISTING 96"X96" MOTORACTUATED SLIDE GATE
9. NEW 54"X54" MOTOR ACTUATED SLIDE GATE
10. NEW 48"X48" MOTOR ACTUATED SLIDE GATE
11. EXISTING 8" DROPLEG
12. NEW DISSOLVED OXYGEN (DO) PROBE

KEY PLAN

M-40-401

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 800
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JUSTIN R. BANDT
116988
LICENSED
PROFESSIONAL ENGINEER
Date: 11/11/22

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

PROCESS MECHANICAL

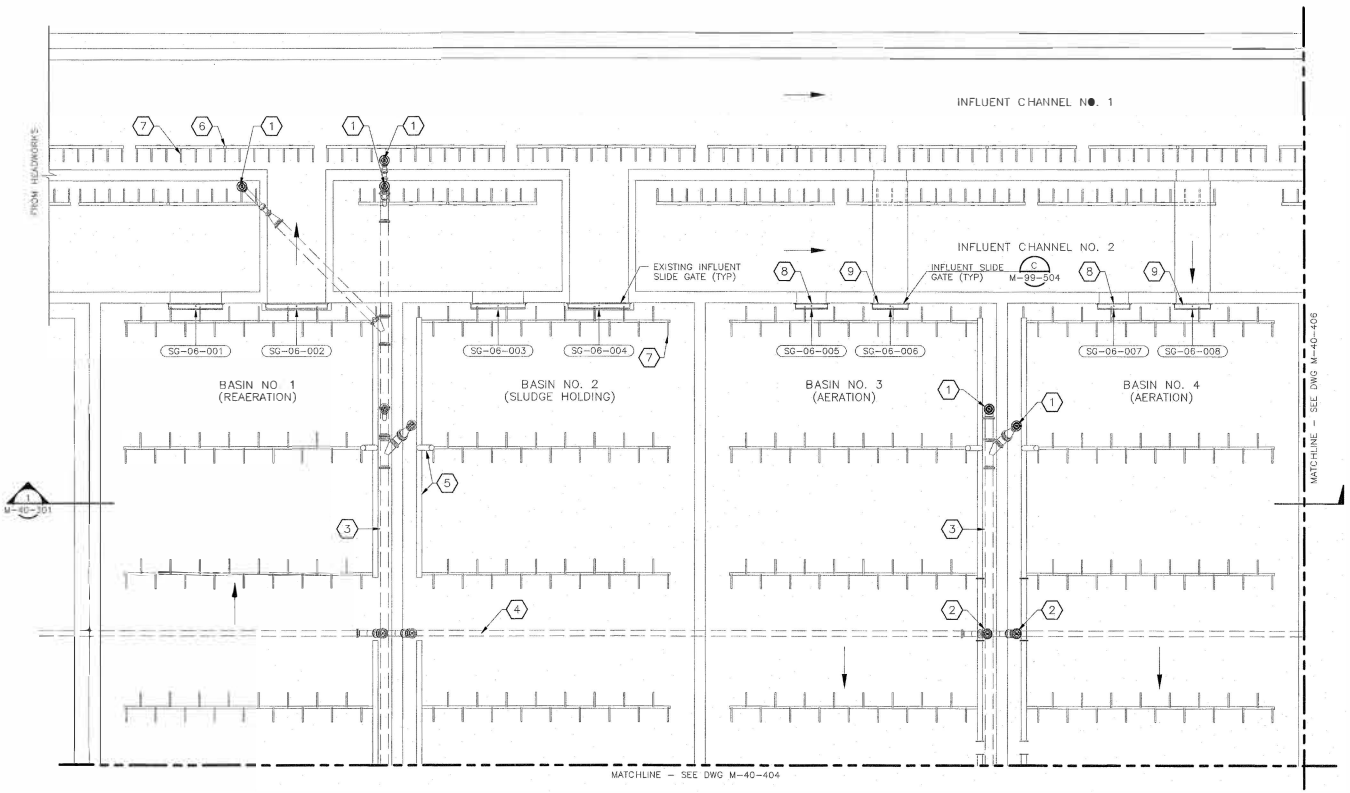
AERATION BASINS ENLARGED PLAN 1 OF 12

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 239 OF 379	

FOR CITY OF HOUSTON USE ONLY

80367

FILE PATH: BIM 360 //402500 - COH Intercontinental Airport WWTP Improvements/402500-COH IA WWTP-25V.rvt



ENLARGED SECTIONAL PLAN
1/8" = 1'-0"

8' 4' 0' 8' 16'
1/8" = 1'-0"

N

GENERAL NOTES:

1. CONTRACTOR TO FIELD VERIFY EXISTING BUTTERFLY VALVE SIZES, END CONNECTIONS, LAYING LENGTH, AND SPACE AVAILABILITY WHEN MODIFYING EXISTING AIR PIPING AND VALVE REPLACEMENT.
2. CONTRACTOR SHALL VERIFY ELEVATIONS AND LOCATIONS OF EXISTING PIPING, STRUCTURES AND EQUIPMENT.
3. MODIFICATIONS TO BASIN NO. 4 (AERATION BASIN) FOR AIR PIPING ARE TYPICAL FOR BASINS NO. 6 & 8 (AERATION BASINS) AND MIRRORED IMAGES FOR BASINS NO. 3, 5 & 7 (AERATION BASINS).
4. DIFFUSER GRID MODIFICATIONS ARE NOT SHOWN. DIFFUSERS TO BE REPLACED AS NECESSARY.
5. COARSE BUBBLE DIFFUSERS IN BASINS 1 THROUGH 8 SHALL BE SANITAIRE D-24 304L STAINLESS STEEL WIDE BAND DIFFUSERS TO MATCH EXISTING.
6. REFER TO AERATION BASINS P&ID DRAWINGS FOR EQUIPMENT TAG NUMBERS.
7. CONTRACTOR TO VERIFY THE DIMENSIONS, ANCHOR BOLTS LOCATIONS OF EXISTING GATES IN THE FIELD PRIOR TO THE MANUFACTURE OF THE GATES.
8. REFER TO DETAIL E ON M-99-504 FOR GATE INSTALLATION, WITHOUT WALL THIMBLE.

NOTES BY SYMBOL (#)

1. NEW 6" MUD VALVE WITH OPERATING STEM AND NUT, SEE NOTE 6
2. NEW 8" MUD VALVE WITH OPERATING STEM AND NUT, SEE NOTE 6
3. EXISTING 12" DRAINLINE
4. EXISTING 6" DRAINLINE
5. EXISTING 8" STAINLESS STEEL AIR HEADER FOR DIFFUSER SUPPORT PIPE
6. EXISTING 4" STAINLESS STEEL DIFFUSER HEADER
7. EXISTING STAINLESS STEEL COARSE BUBBLE DIFFUSER
8. NEW 48"X48" SLIDE GATE WITH MOTOR ACTUATOR, SEE NOTE 3, 4 AND 5.
9. NEW 54"X54" SLIDE GATE WITH MOTOR ACTUATOR, SEE NOTE 3, 4 AND 5.

KEY PLAN

M-40-402

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JUSTIN R. SANDT
116988
LICENSED
PROFESSIONAL ENGINEER
11/11/22

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

PROCESS MECHANICAL

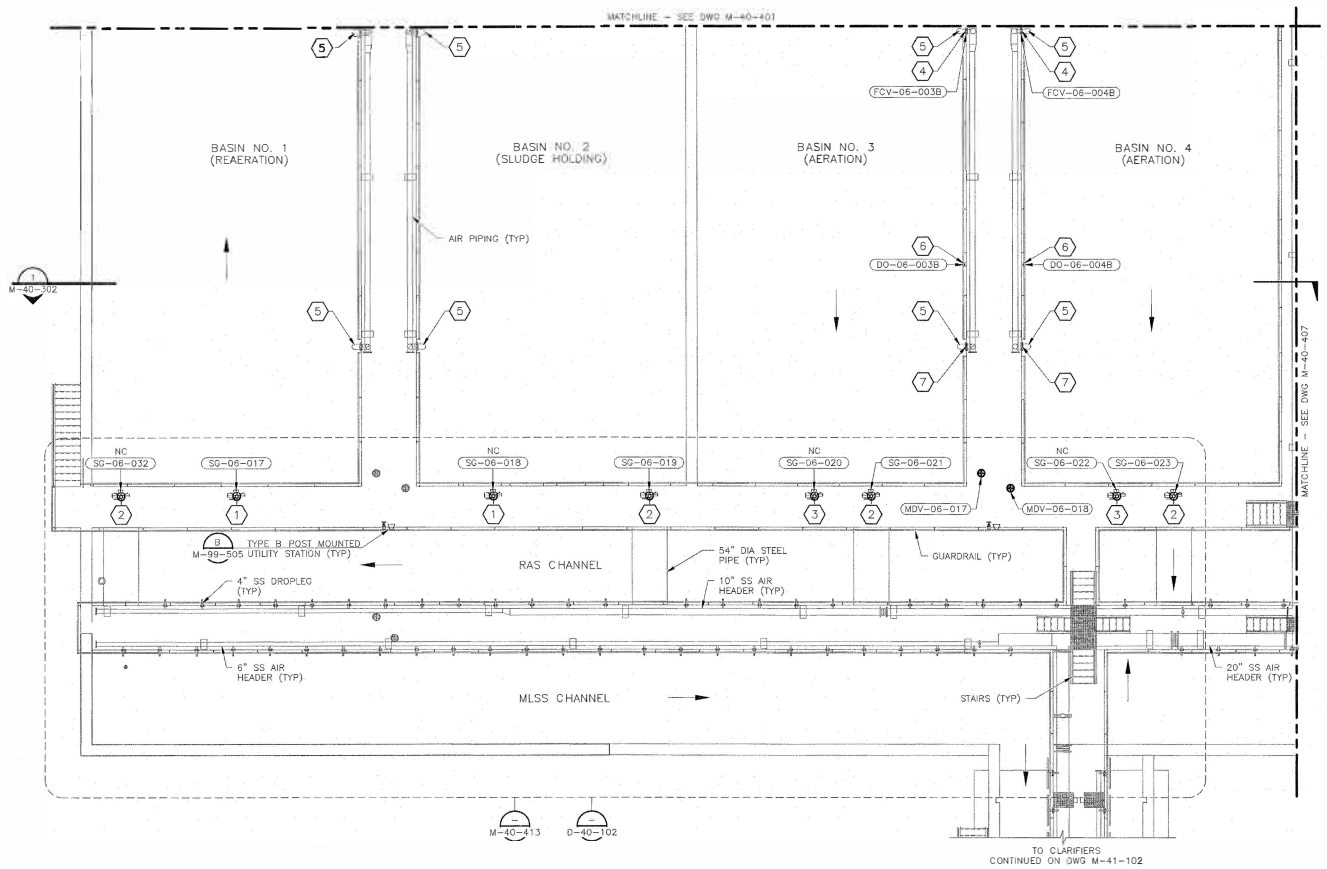
AERATION BASINS ENLARGED PLAN 2 OF 12

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 240 OF 379	

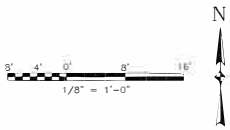
FOR CITY OF HOUSTON USE ONLY

APPROVED
80367
CITY OF HOUSTON, TEXAS

FILE PATH: BIM 360:///402500 - CDH Intercontinental Airport WWTP Improvements/402500-CDH IA WWTP-REV.rvt



ENLARGED TOP PLAN
1/8" = 1'-0"

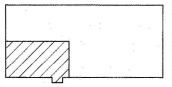


GENERAL NOTES:

1. MODIFICATIONS TO BASIN NO. 4 (AERATION BASIN) FOR AIR PIPING ARE TYPICAL FOR BASINS NO. 6 & 8 (AERATION BASINS) AND MIRRORED IMAGES FOR BASINS NO. 5 & 7 (AERATION BASINS).
2. DIFFUSER GRID MODIFICATIONS ARE NOT SHOWN. DIFFUSERS TO BE REPLACED AS NECESSARY.
3. CONTRACTOR TO FIELD VERIFY EXISTING BUTTERFLY VALVE SIZES, END CONNECTIONS, LAYING LENGTH, AND SPACE AVAILABILITY WHEN MODIFYING EXISTING AIR PIPING AND VALVE REPLACEMENT.
4. CONTRACTOR SHALL VERIFY ELEVATIONS AND LOCATIONS OF EXISTING PIPING, STRUCTURES AND EQUIPMENT.
5. COARSE BUBBLE DIFFUSERS IN BASINS 1 THROUGH 8 SHALL BE SANITAIRE D-24 304L STAINLESS STEEL WIDE BAND DIFFUSERS TO MATCH EXISTING.
6. REFER TO AERATION BASINS P&ID DRAWINGS FOR EQUIPMENT TAG NUMBERS.
7. CONTRACTOR TO VERIFY THE DIMENSIONS, ANCHOR BOLTS LOCATIONS OF EXISTING GATES IN THE FIELD PRIOR TO THE MANUFACTURE OF THE GATES.
8. REFER TO DETAIL E ON M-99-504 FOR GATE INSTALLATION, WITHOUT WALL THIMBLE.

NOTES BY SYMBOL (#)

1. REPLACE 84"X84" SLIDE GATE WITH 84"X84" MOTOR ACTUATED SLIDE GATE.
2. REPLACE 54"X54" SLIDE GATE WITH 54"X54" MOTOR ACTUATED SLIDE GATE.
3. REPLACE 30"X30" SLIDE GATE WITH 30"X30" MOTOR ACTUATED SLIDE GATE.
4. NEW 5" ELECTRIC, MODULATING INDUSTRIAL BUTTERFLY VALVE.
5. EXISTING 8" STAINLESS STEEL DROPLEG
6. NEW DISSOLVED OXYGEN (DO) PROBE
7. CONTRACTOR TO INSTALL SPACER PLATE BETWEEN PIPE FLANGES.



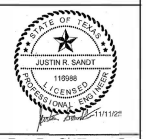
KEY PLAN

M-40-403

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 900
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 358

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182



CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

PROCESS MECHANICAL

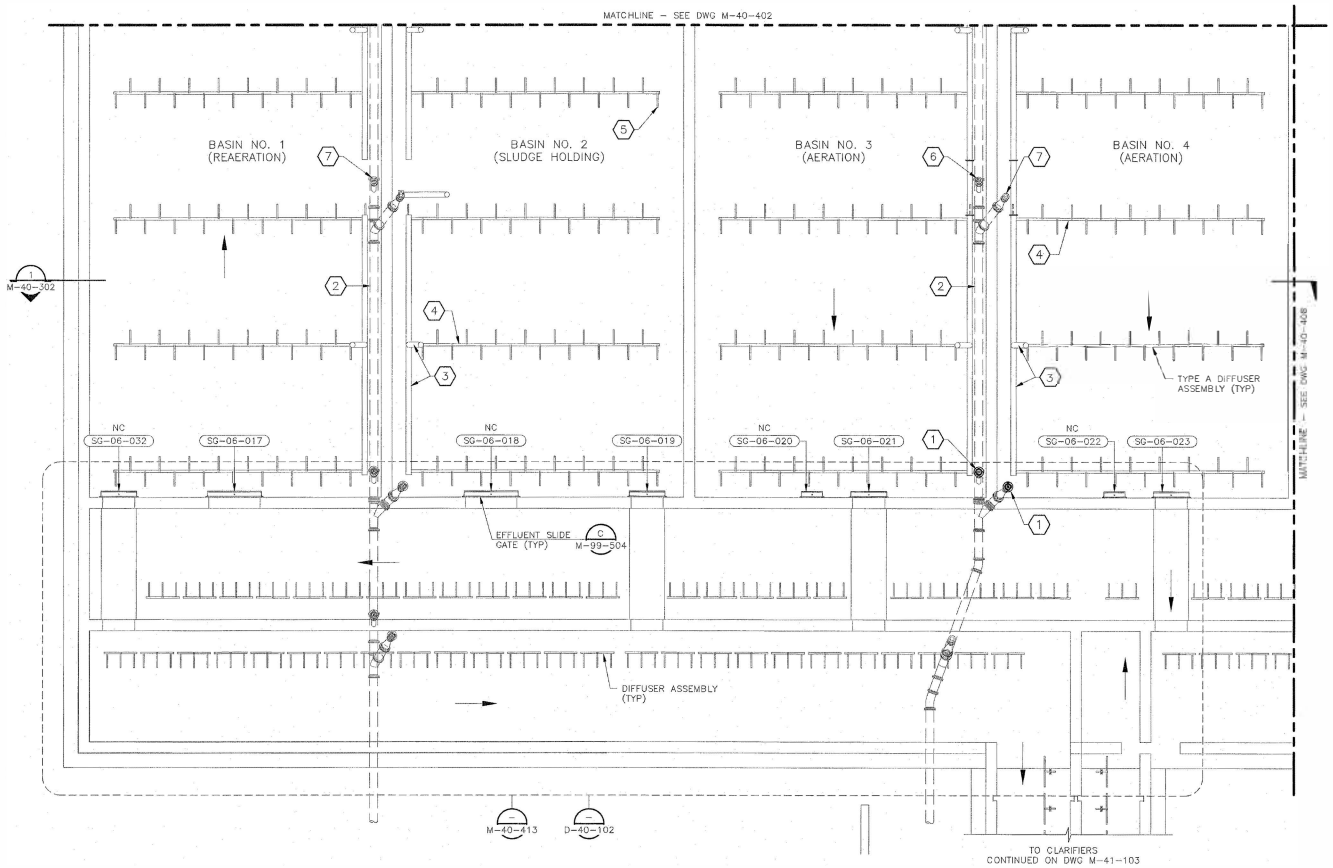
AERATION BASINS ENLARGED PLAN 3 OF 12

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 241 OF 379	

FOR CITY OF HOUSTON USE ONLY



FILE PATH: BIM 365://402500 – COH Intercontinental Airport WWTP Improvements/402500–COH IA WWTP–BV.rvt



ENLARGED SECTIONAL PLAN
1/8" = 1'-0"

8' 4' 0' 8' 16'
1/8" = 1'-0"

N

GENERAL NOTES:

1. CONTRACTOR TO FIELD VERIFY EXISTING BUTTERFLY VALVE SIZES, END CONNECTIONS, LAYING LENGTH, AND SPACE AVAILABILITY WHEN MODIFYING EXISTING AIR PIPING AND VALVE REPLACEMENT.
2. CONTRACTOR SHALL VERIFY ELEVATIONS AND LOCATIONS OF EXISTING PIPING, STRUCTURES AND EQUIPMENT.
3. MODIFICATIONS TO BASIN NO. 4 (AERATION BASIN) FOR AIR PIPING ARE TYPICAL FOR BASINS NO. 6 & 8 (AERATION BASINS) AND MIRRORED IMAGES FOR BASINS NO. 5 & 7 (AERATION BASINS).
4. DIFFUSER GRID MODIFICATIONS ARE NOT SHOWN. DIFFUSERS TO BE REPLACED AS NECESSARY.
5. COARSE BUBBLE DIFFUSERS IN BASINS 1 THROUGH 8 SHALL BE SANITAIRE D-24 304L STAINLESS STEEL WIDE BAND DIFFUSERS TO MATCH EXISTING.
6. REFER TO AERATION BASINS P&ID DRAWINGS FOR EQUIPMENT TAG NUMBERS.
7. CONTRACTOR TO VERIFY THE DIMENSIONS, ANCHOR BOLTS LOCATIONS OF EXISTING GATES IN THE FIELD PRIOR TO THE MANUFACTURE OF THE GATES.
8. REFER TO DETAIL E ON M-99-504 FOR GATE INSTALLATION, WITHOUT WALL THIMBLE.

NOTES BY SYMBOL (#)

1. NEW 6" MUD VALVE WITH OPERATING STEM AND NUT
2. EXISTING 12" DRAINLINE
3. EXISTING 8" STAINLESS STEEL AIR HEADER FOR DIFFUSER SUPPORT PIPE
4. EXISTING 4" STAINLESS STEEL DIFFUSER HEADER
5. EXISTING STAINLESS STEEL COARSE BUBBLE DIFFUSER
6. NEW 12" CONNECTION FOR SUPERNATANT DECANT
7. BLIND FLANGE FOR FUTURE DECANT LINE

KEY PLAN

M-40-404

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-11●●
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JUSTIN R. SANDT
119268
LICENSED
PROFESSIONAL ENGINEER
CIVIL
11/11/22

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

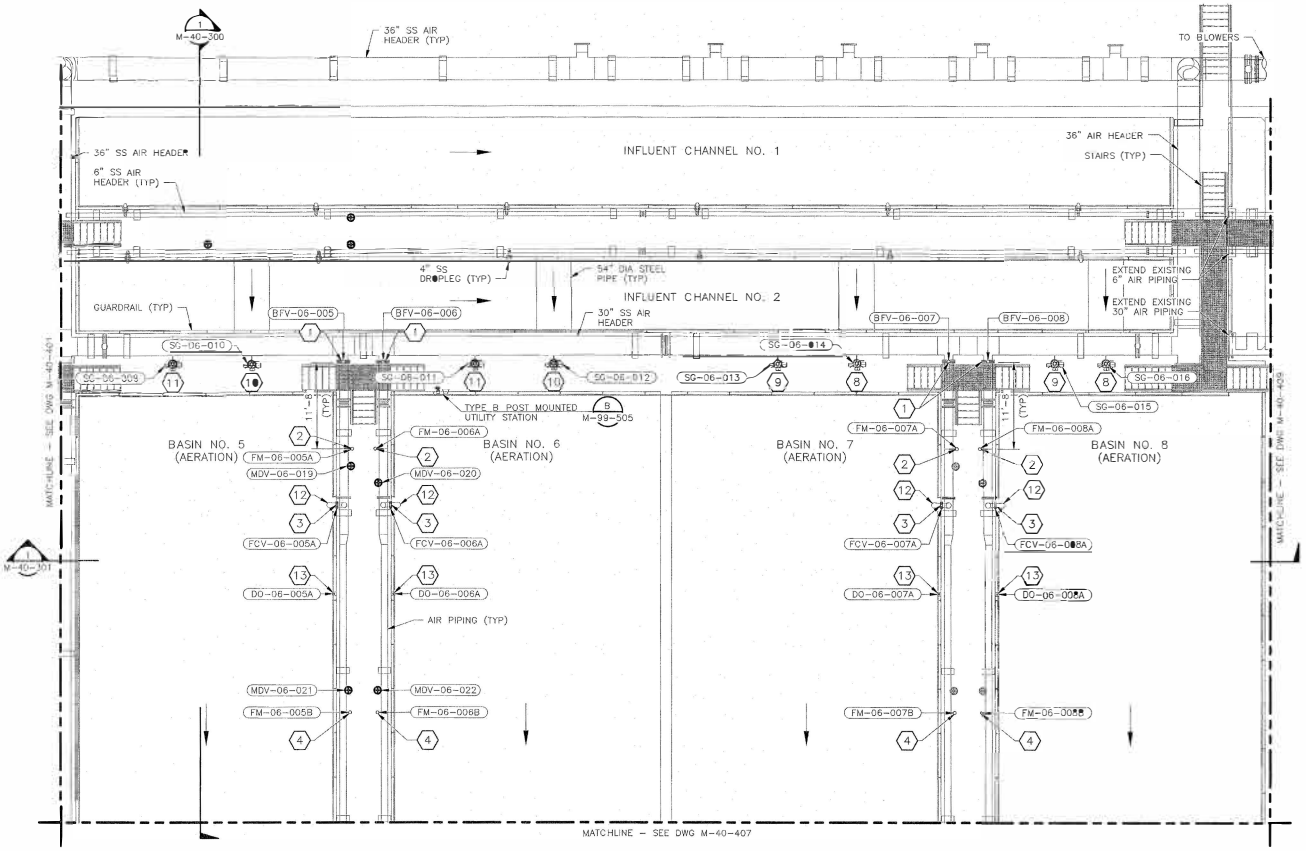
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
PROCESS MECHANICAL
AERATION BASINS ENLARGED PLAN 4 OF 12

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 242 OF 379	

FOR CITY OF HOUSTON USE ONLY

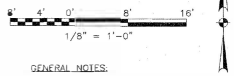
REGISTERED
80367
PROFESSIONAL ENGINEER
STATE OF TEXAS

FILE PATH: BIM 360://402500 – COH Intercontinental Airport WWTP Improvements/402500-COH IA WWTP-BV.rvt



ENLARGED TOP PLAN

1/8" = 1'-0"

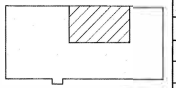


GENERAL NOTES:

1. MODIFICATIONS TO BASIN NO. 6 (AERATION BASIN) FOR AIR PIPING ARE TYPICAL FOR BASIN NO. 8 (AERATION BASIN) AND MIRRORED IMAGES FOR BASINS NO. 5 & 7 (AERATION BASINS).
2. DIFFUSER GRID MODIFICATIONS ARE NOT SHOWN. DIFFUSERS TO BE REPLACED AS NECESSARY.
3. CONTRACTOR TO FIELD VERIFY EXISTING BUTTERFLY VALVE SIZES, END CONNECTIONS, LAYING LENGTH, AND SPACE AVAILABILITY WHEN MODIFYING EXISTING AIR PIPING AND VALVE REPLACEMENT.
4. CONTRACTOR SHALL VERIFY ELEVATIONS AND LOCATIONS OF EXISTING PIPING, STRUCTURES AND EQUIPMENT.
5. COARSE BUBBLE DIFFUSERS IN BASINS 1 THROUGH 8 SHALL BE SANITAIRE D-24 304L STAINLESS STEEL WDE BAND DIFFUSERS TO MATCH EXISTING.
6. REFER TO AERATION BASINS P&ID DRAWINGS FOR EQUIPMENT TAG NUMBERS.
7. CONTRACTOR TO VERIFY THE DIMENSIONS, ANCHOR BOLTS LOCATIONS OF EXISTING GATES IN THE FIELD PRIOR TO THE MANUFACTURE OF THE GATES.
8. REFER TO DETAIL E ON M-99-504 FOR GATE INSTALLATION, WITHOUT WALL THIMBLE.

NOTES BY SYMBOL ⟨#⟩

1. RELOCATED 14" MANUAL BUTTERFLY VALVE. CUT EXISTING 14" PIPE AS REQUIRED AND WELD FLANGES FOR INSTALLATION OF THE RELOCATED BUTTERFLY VALVE.
2. NEW 14" THERMAL DISPERSON MASS FLOW METER. PROVIDE MINIMUM 10 PIPE DIAMETERS UPSTREAM STRAIGHT RUN AND 5 PIPE DIAMETERS DOWNSTREAM STRAIGHT RUN FOR THE FLOW METER.
3. NEW 6" ELECTRIC, MODULATING INDUSTRIAL BUTTERFLY VALVE.
4. NEW 10" THERMAL DISPERSION MASS FLOW METER.PROVIDE MINIMUM 10 PIPE DIAMETERS UPSTREAM STRAIGHT RUN AND 5 PIPE DIAMETERS DOWNSTREAM STRAIGHT RUN FOR THE FLOW METER.
5. NEW 6" ELECTRIC, MODULATING INDUSTRIAL BUTTERFLY VALVE WITH 14"X6" REDUCERS UPSTREAM AND DOWNSTREAM. CUT EXISTING PIPING AS NEEDED.
6. EXISTING 84"X84" MOTOR ACTUATED SLIDE GATE.
7. EXISTING 96"X60" MOTOR ACTUATED SLIDE GATE.
8. EXISTING 54"X54" MOTOR ACTUATED SLIDE GATE.
9. EXISTING 48"X48" MOTOR ACTUATED SLIDE GATE.
10. NEW 54"X54" MOTOR ACTUATED SLIDE GATE.
11. NEW 48"X48" MOTOR ACTUATED SLIDE GATE.
12. EXISTING 8" STAINLESS STEEL DROPLEG.
13. NEW DISSOLVED OXYGEN (DO) PROBE.



KEY PLAN

M-40-405

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JUSTIN R. SANDT
115989
LICENSED
PROFESSIONAL ENGINEER
11/11/22

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

PROCESS MECHANICAL

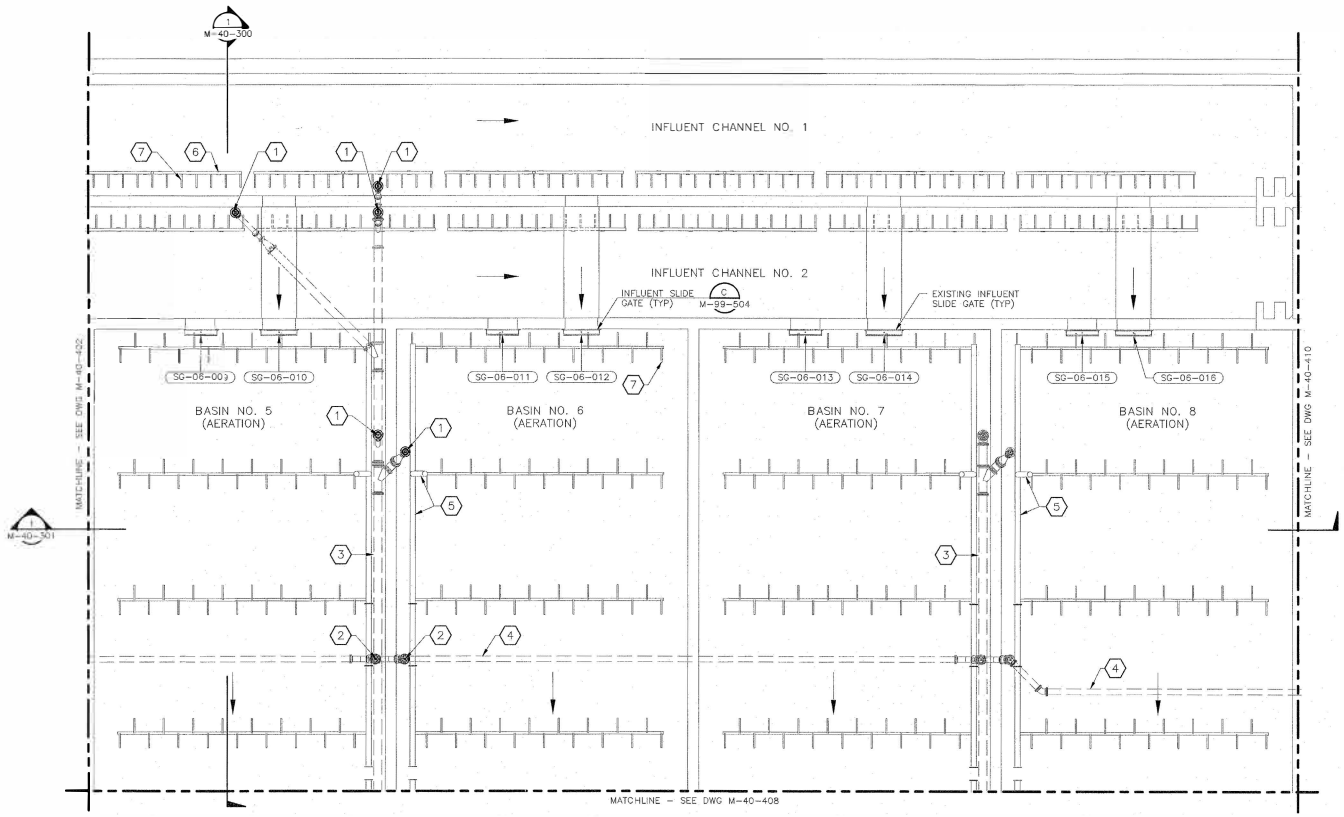
AERATION BASINS ENLARGED PLAN 5 OF 12

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 243 OF 379	

FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
80367
REGISTERED
ENGINEER

FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-COH_A WWTP-BV.rvt



ENLARGED SECTIONAL PLAN
1/8" = 1'-0"

8' 4' 0' 8' 16'
1/8" = 1'-0"

N

GENERAL NOTES:

1. CONTRACTOR TO FIELD VERIFY EXISTING BUTTERFLY VALVE SIZES, END CONNECTIONS, LAYING LENGTH, AND SPACE AVAILABILITY WHEN MODIFYING EXISTING AIR PIPING AND VALVE REPLACEMENT.
2. CONTRACTOR SHALL VERIFY ELEVATIONS AND LOCATIONS OF EXISTING PIPING, STRUCTURES AND EQUIPMENT.
3. MODIFICATIONS TO BASIN NO. 6 (AERATION BASIN) FOR AIR PIPING ARE TYPICAL FOR BASINS NO. 8 (AERATION BASIN) AND MIRRORED IMAGES FOR BASINS NO. 5 & 7 (AERATION BASINS).
4. DIFFUSER GRID MODIFICATIONS ARE NOT SHOWN. DIFFUSERS TO BE REPLACED AS NECESSARY.
5. COARSE BUBBLE DIFFUSERS IN BASINS 1 THROUGH 8 SHALL BE SANITAIRE D-24 304L STAINLESS STEEL WDE BAND DIFFUSERS TO MATCH EXISTING.
6. REFER TO AERATION BASINS P&ID DRAWINGS FOR EQUIPMENT TAG NUMBERS.
7. CONTRACTOR TO VERIFY THE DIMENSIONS, ANCHOR BOLTS LOCATIONS OF EXISTING GATES IN THE FIELD PRIOR TO THE MANUFACTURE OF THE GATES.
8. REFER TO DETAIL E ON M-99-504 FOR GATE INSTALLATION, WITHOUT WALL THIMBLE.

NOTES BY SYMBOL (#)

1. NEW 6" MUD VALVE WITH OPERATING STEM AND NUT
2. NEW 8" MUD VALVE WITH OPERATING STEM AND NUT
3. EXISTING 12" DRAINLINE
4. EXISTING 6" DRAINLINE
5. EXISTING 8" STAINLESS STEEL AIR HEADER FOR DIFFUSER SUPPORT PIPE
6. EXISTING 4" STAINLESS STEEL DIFFUSER HEADER
7. STAINLESS STEEL COARSE BUBBLE DIFFUSER

KEY PLAN

M-40-406

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JUSTIN R. SANDT
116988
LICENSED
PROFESSIONAL ENGINEER
11/11/22

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

PROCESS MECHANICAL

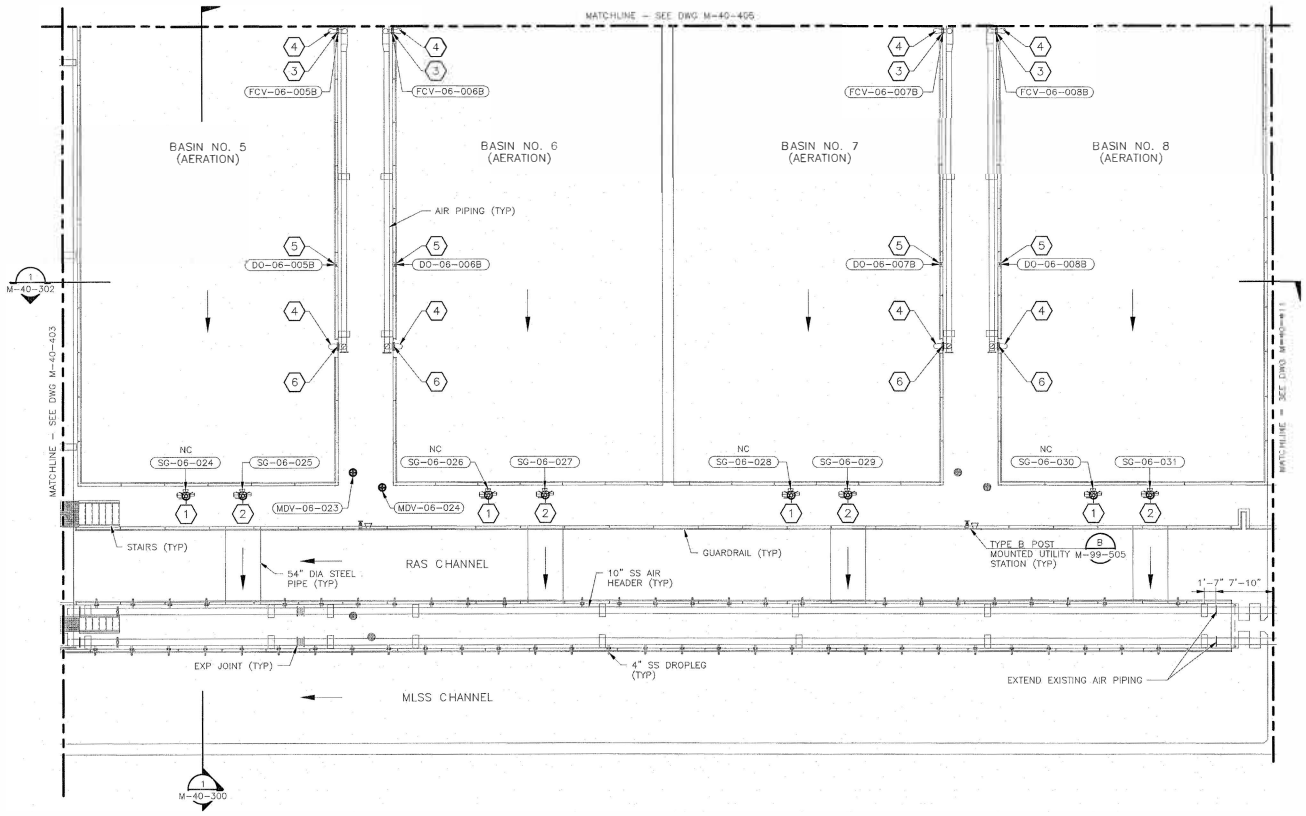
AERATION BASINS ENLARGED PLAN 6 OF 12

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 244 OF 379	

FOR CITY OF HOUSTON USE ONLY

TEXAS REGISTERED ENGINEERING FIRM F-1046
80367
PROFESSIONAL ENGINEER
11/11/22

FILE PATH: BIM 360://402500 - COH intercontinental Airport WWTP Improvements/402500-COH IA WWTP-BV.rvt



ENLARGED TOP PLAN

1/8" = 1'-0"

N

1/8" = 1'-0"

GENERAL NOTES:

1. MODIFICATIONS TO BASIN NO. 5 (AERATION BASIN) FOR AIR PIPING ARE TYPICAL FOR BASIN NO. 8 (AERATION BASIN) AND MIRRORED IMAGES FOR BASINS NO. 5 & 7 (AERATION BASINS).
2. DIFFUSER GRID MODIFICATIONS ARE NOT SHOWN. DIFFUSERS TO BE REPLACED AS NECESSARY.
3. CONTRACTOR TO FIELD VERIFY EXISTING BUTTERFLY VALVE SIZES, END CONNECTIONS, LAYING LENGTH, AND SPACE AVAILABILITY WHEN MODIFYING EXISTING AIR PIPING AND VALVE REPLACEMENT.
4. CONTRACTOR SHALL VERIFY ELEVATIONS AND LOCATIONS OF EXISTING PIPING, STRUCTURES AND EQUIPMENT.
5. COARSE BUBBLE DIFFUSERS IN BASINS 1 THROUGH 8 SHALL BE SANITAIRE D-24 304L STAINLESS STEEL WDE BAND DIFFUSERS TO MATCH EXISTING.
6. REFER TO AERATION BASINS P&ID DRAWINGS FOR EQUIPMENT TAG NUMBERS.
7. CONTRACTOR TO VERIFY THE DIMENSIONS, ANCHOR BOLTS LOCATIONS OF EXISTING GATES IN THE FIELD PRIOR TO THE MANUFACTURE OF THE GATES.
8. REFER TO DETAIL E ON M-99-504 FOR GATE INSTALLATION, WITHOUT WALL THIMBLE.

NOTES BY SYMBOL (#)

1. NEW 54"X54" MOTOR ACTUATED SLIDE GATE.
2. NEW 30"X30" MOTOR ACTUATED SLIDE GATE.
3. NEW 6" ELECTRIC, MODULATING INDUSTRIAL BUTTERFLY VALVE.
4. EXISTING 8" STAINLESS STEEL DROPLEG.
5. NEW DISSOLVED OXYGEN (DO) PROBE.
6. CONTRACTOR TO INSTALL SPACER PLATE BETWEEN PIPE FLANGES.

KEY PLAN

M-40-407

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

STATE OF TEXAS
JUSTIN R. SANDT
116988
LICENSED
PROFESSIONAL ENGINEER
11/11/22

SURVEYED BY:
UNITED ENGINEERS, INC
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

PROCESS MECHANICAL

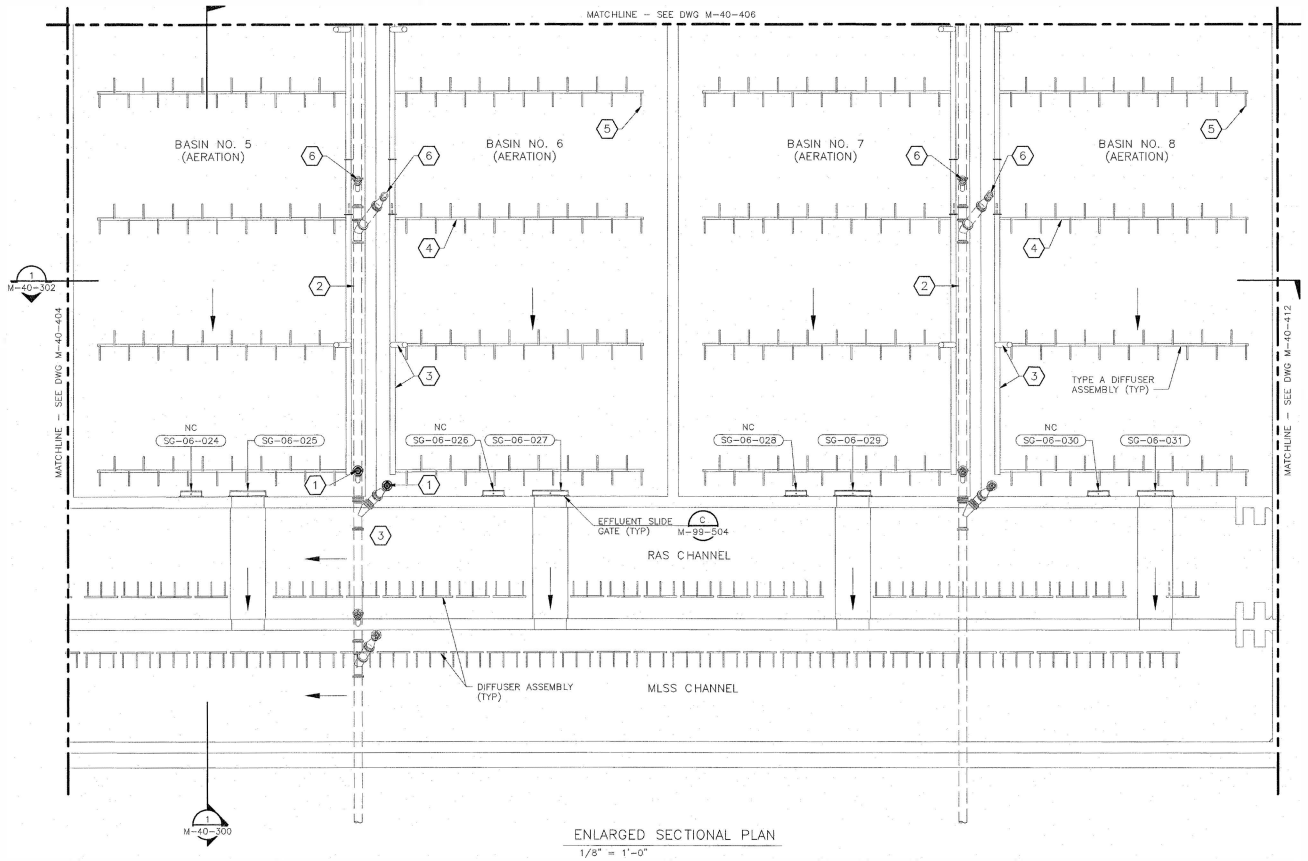
AERATION BASINS ENLARGED PLAN 7 OF 12

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 245 OF 379	

FOR CITY OF HOUSTON USE ONLY

PUBLIC WORKS AND ENGINEERING
80367
REGISTERED
HOUSTON, TEXAS

FILE PATH: Bim 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-COH_A WWTP-ELV.rvt



ENLARGED SECTIONAL PLAN
1/8" = 1'-0"

8' 4' 0' 8' 16'
1/8" = 1'-0"

N

GENERAL NOTES:

1. CONTRACTOR TO FIELD VERIFY EXISTING BUTTERFLY VALVE SIZES, END CONNECTIONS, LAYING LENGTH, AND SPACE AVAILABILITY WHEN MODIFYING EXISTING AIR PIPING AND VALVE REPLACEMENT.
2. CONTRACTOR SHALL VERIFY ELEVATIONS AND LOCATIONS OF EXISTING PIPING, STRUCTURES AND EQUIPMENT.
3. MODIFICATIONS TO BASIN NO. 6 (AERATION BASIN) FOR AIR PIPING ARE TYPICAL FOR BASINS NO. 8 (AERATION BASIN) AND MIRRORED IMAGES FOR BASINS NO. 5 & 7 (AERATION BASINS).
4. DIFFUSER GRID MODIFICATIONS ARE NOT SHOWN. DIFFUSERS TO BE REPLACED AS NECESSARY.
5. COARSE BUBBLE DIFFUSERS IN BASINS 1 THROUGH 8 SHALL BE SANITAIRE D-24 304L STAINLESS STEEL WDE BAND DIFFUSERS TO MATCH EXISTING.
6. REFER TO AERATION BASINS P&ID DRAWINGS FOR EQUIPMENT TAG NUMBERS.
7. CONTRACTOR TO VERIFY THE DIMENSIONS, ANCHOR BOLTS LOCATIONS OF EXISTING GATES IN THE FIELD PRIOR TO THE MANUFACTURE OF THE GATES.
8. REFER TO DETAIL E ON M-99-504 FOR GATE INSTALLATION, WITHOUT WALL THIMBLE.

NOTES BY SYMBOL (#)

1. NEW 6" MUD VALVE WITH OPERATING STEM AND NUT
2. EXISTING 12" DRAINLINE
3. EXISTING 8" STAINLESS STEEL AIR HEADER FOR DIFFUSER SUPPORT PIPE
4. EXISTING 4" STAINLESS STEEL DIFFUSER HEADER
5. STAINLESS STEEL COARSE BUBBLE DIFFUSER
6. BLIND FLANGE FOR FUTURE DECANT LINE

KEY PLAN

M-40-408

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JUSTIN R. SANDT
116988
LICENSED
PROFESSIONAL ENGINEER
11/11/22

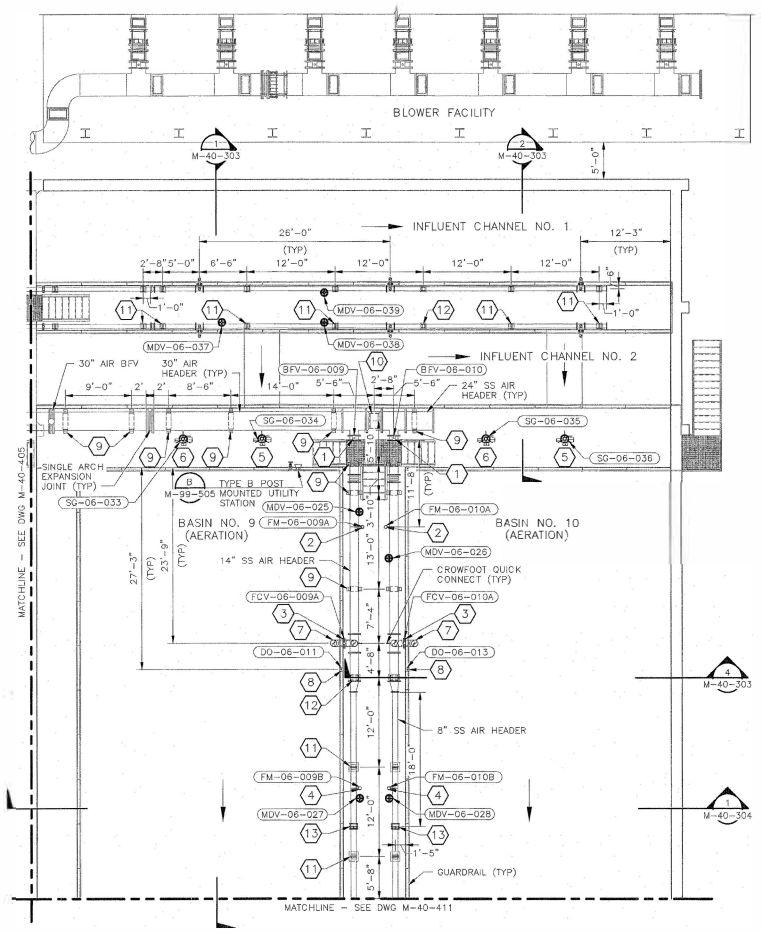
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT
PLANT EXPANSION
PROCESS MECHANICAL
AERATION BASINS
ENLARGED PLAN 8 OF 12

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 246 OF 379	

FOR CITY OF HOUSTON USE ONLY
80367

FILE PATH: BIM 360://402500 – CDH Intercontinental Airport WWTP Improvements/402500-CDH IA WWTP-BV.rvt



ENLARGED TOP PLAN
1/8" = 1'-0"

N

1/8" = 1'-0"

GENERAL NOTES:

1. REFER TO AERATION BASINS P&ID DRAWINGS FOR EQUIPMENT TAG NUMBERS.
2. CONTRACTOR TO VERIFY THE DIMENSIONS, ANCHOR BOLTS LOCATIONS OF EXISTING GATES IN THE FIELD PRIOR TO THE MANUFACTURE OF THE GATES.
3. REFER TO DETAIL E ON M-99-504 FOR GATE INSTALLATION, WITHOUT WALL THIMBLE.
4. PIPE SUPPORT CALLOUTS AND DIMENSIONS AS SHOWN FOR BASIN NO. 9 ARE TYPICAL OF SUPPORTS FOR BASIN 10.
5. PIPE SUPPORT CALLOUT AS SHOWN FOR INFLUENT CHANNEL NO. 2 ARE TYPICAL OF CHANNEL NO. 1.

NOTES BY SYMBOL (#)

1. NEW 14" MANUAL BUTTERFLY VALVE.
2. NEW 14" THERMAL DISPERSION MASS FLOW METER, PROVIDE MINIMUM 10 PIPE DIAMETERS UPSTREAM STRAIGHT RUN AND 5 PIPE DIAMETERS DOWNSTREAM STRAIGHT RUN FOR THE FLOW METER.
3. NEW 10" ELECTRIC, MODULATING INDUSTRIAL BUTTERFLY VALVE.
4. NEW 10" THERMAL DISPERSION MASS FLOW METER, PROVIDE MINIMUM 10 PIPE DIAMETERS UPSTREAM STRAIGHT RUN AND 5 PIPE DIAMETERS DOWNSTREAM STRAIGHT RUN FOR THE FLOW METER.
5. NEW 54"X54" MOTOR ACTUATED SLIDE GATE.
6. NEW 48"X48" MOTOR ACTUATED SLIDE GATE.
7. NEW 10" STAINLESS STEEL DROPLEG.
8. NEW DISSOLVED OXYGEN (DO) PROBE.
9. PIPE SADDLE GUIDE SUPPORT, SEE DETAIL A/S-99-509.
10. AXIAL STOP PIPE SUPPORT, SEE DETAIL E/S-99-509.
11. ANGLE GUIDE SUPPORT, SEE DETAIL B/S-99-510.
12. PIPE SADDLE ANCHOR, SEE DETAIL D/S-99-508.
13. DISMANTLING JOINT, SEE DETAIL E/M-99-501.

KEY PLAN

M-40-409

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JUSTIN R. SANDT
116568
LICENSED
PROFESSIONAL ENGINEER
11/11/22

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

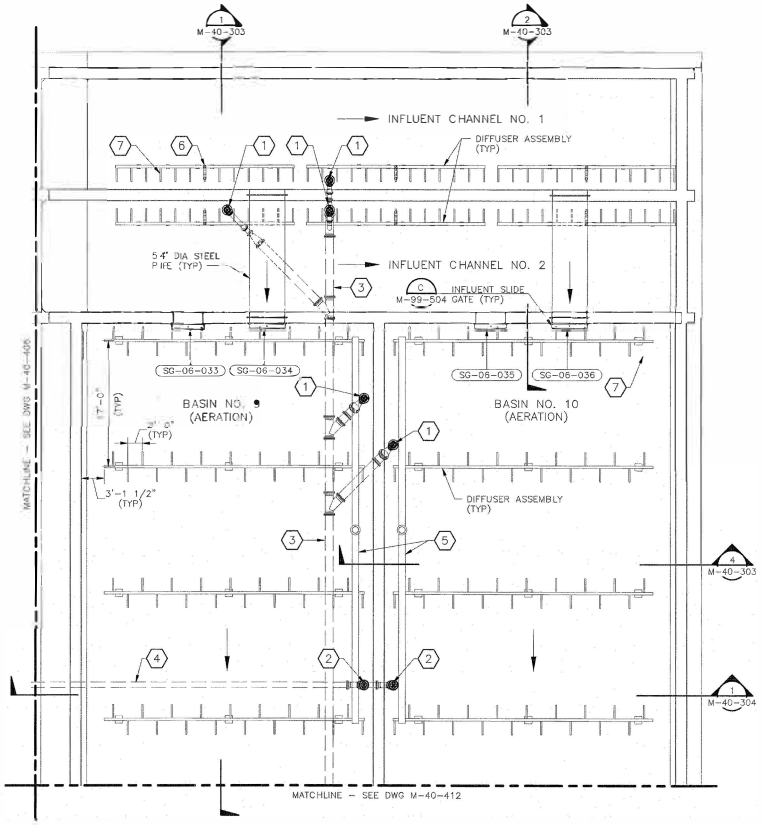
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
PROCESS MECHANICAL
AERATION BASINS ENLARGED PLAN 9 OF 12

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 247 OF 379	

FOR CITY OF HOUSTON USE ONLY

PROFESSIONAL ENGINEER
80367
HOUSTON, TEXAS

FILE PATH: BIM 360://4022500 – COH Intercontinental Airport WWTP Improvements/4022500-COH IA WWTP-RV.rvt



ENLARGED SECTIONAL PLAN

1/8" = 1'-0"

8' 4' 0' 8' 16'

1/8" = 1'-0"

N

GENERAL NOTES:

1. CONTRACTOR SHALL VERIFY ELEVATIONS AND LOCATIONS OF EXISTING PIPING, STRUCTURES AND EQUIPMENT.
2. REFER TO AERATION BASINS P&ID DRAWINGS FOR EQUIPMENT TAG NUMBERS.
3. CONTRACTOR TO VERIFY THE DIMENSIONS, ANCHOR BOLTS LOCATIONS OF EXISTING GATES IN THE FIELD PRIOR TO THE MANUFACTURE OF THE GATES.
4. REFER TO DETAIL E ON M-99-504 FOR GATE INSTALLATION, WITHOUT WALL THIMBLE.

NOTES BY SYMBOL (#)

1. NEW 6" MUD VALVE WITH OPERATING STEM AND NUT
2. NEW 8" MUD VALVE WITH OPERATING STEM AND NUT
3. NEW 12" DRAINLINE
4. NEW 6" DRAINLINE
5. NEW 8" STAINLESS STEEL AIR HEADER FOR DIFFUSER SUPPORT PIPE
6. NEW 4" STAINLESS STEEL DIFFUSER HEADER
7. NEW STAINLESS STEEL COARSE BUBBLE DIFFUSER

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

STATE OF TEXAS
JUSTIN R. SANDT
115968
LICENSED
PROFESSIONAL ENGINEER
11/11/22

SURVEYED BY:
UNITED ENGINEERS, INC
FB NO. P-6182

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

PROCESS MECHANICAL

AERATION BASINS ENLARGED PLAN 10 OF 12

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 248 OF 379	

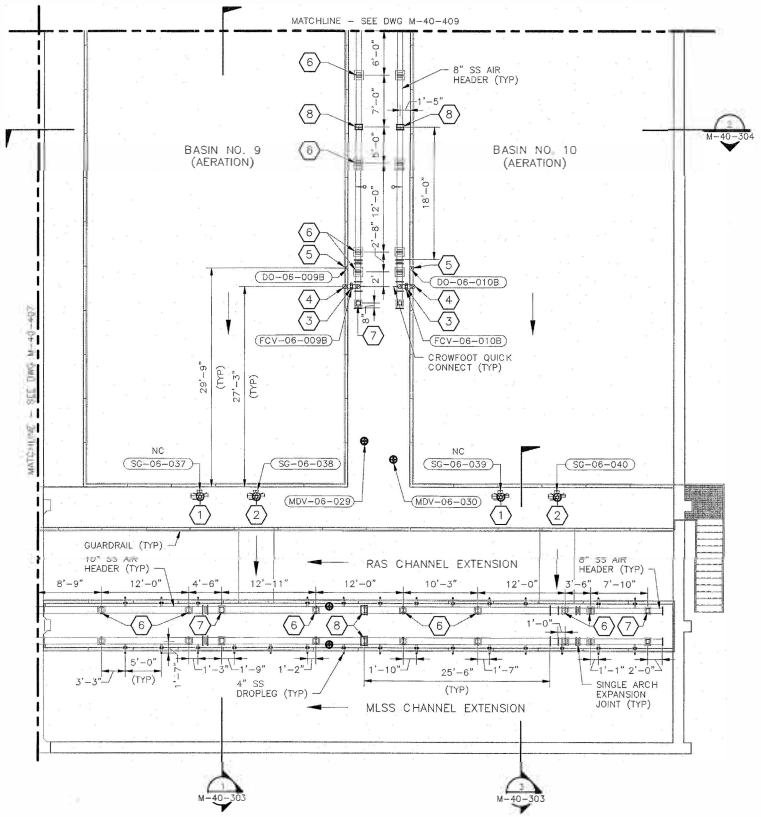
FOR CITY OF HOUSTON USE ONLY

80367

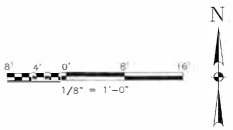
KEY PLAN

M-40-410

FILE PATH: BIM 360://402500 - CDH Intercontinental Airport WWTF Improvements/402500-CDH IA WWTF-BVAA



ENLARGED TOP PLAN
1/8" = 1'-0"



GENERAL NOTES:

1. REFER TO AERATION BASINS P&ID DRAWINGS FOR EQUIPMENT TAG NUMBERS.
2. CONTRACTOR TO VERIFY THE DIMENSIONS, ANCHOR BOLTS LOCATIONS OF EXISTING GATES IN THE FIELD PRIOR TO THE MANUFACTURE OF THE GATES.
3. REFER TO DETAIL E ON M-99-504 FOR GATE INSTALLATION, WITHOUT WALL THIMBLE.
4. PIPE SUPPORT CALLOUTS AND DIMENSIONS AS SHOWN FOR BASIN NO. 9 ARE TYPICAL OF SUPPORTS FOR BASIN NO. 10.

NOTES BY SYMBOL (#)

1. NEW 54"X54" MOTOR ACTUATED SLIDE GATE.
2. NEW 30"X30" MOTOR ACTUATED SLIDE GATE.
3. NEW 6" ELECTRIC, MODULATING INDUSTRIAL BUTTERFLY VALVE.
4. NEW 6" STAINLESS STEEL DROPLEG.
5. NEW DISSOLVED OXYGEN (DO) PROBE
6. ANGLE GUIDE SUPPORT, SEE DETAIL B/S-99-510.
7. PIPE SADDLE ANCHOR, SEE DETAIL D/S-99-508.
8. DISMANTLING JOINT, SEE DETAIL E/M-99-501.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 256

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JUSTIN R. SANDT
116989
LICENSED
PROFESSIONAL ENGINEER
3/3/23

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

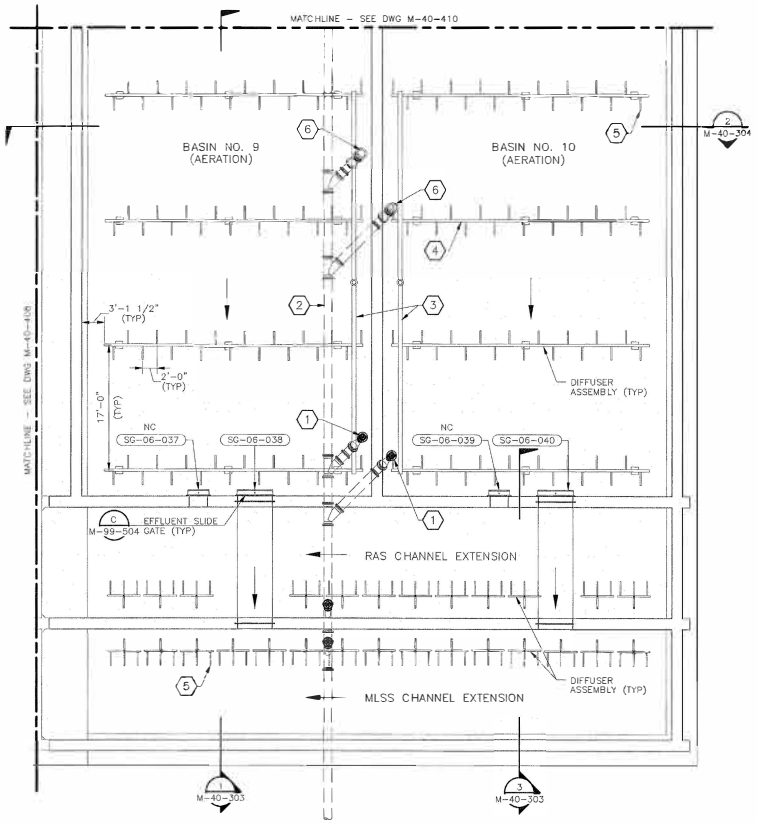
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
PROCESS MECHANICAL
AERATION BASINS
ENLARGED PLAN 11 OF 12

KEY PLAN
M-40-411

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO.	249 OF 379

FOR CITY OF HOUSTON USE ONLY
80367

FILE PATH: R:\Projects\402500 - COH Intercontinental Airport WWTP Improvements\402500-COH IK WWTP-Bu.rvt



ENLARGED SECTIONAL PLAN

1/8" = 1'-0"

8' 4' 0' 8' 16'

1/8" = 1'-0"

N

GENERAL NOTES:

1. REFER TO AERATION BASINS P&ID DRAWINGS FOR EQUIPMENT TAG NUMBERS.
2. CONTRACTOR TO VERIFY THE DIMENSIONS, ANCHOR BOLTS LOCATIONS OF EXISTING GATES IN THE FIELD PRIOR TO THE MANUFACTURE OF THE GATES.
3. REFER TO DETAIL E ON M-99-504 FOR GATE INSTALLATION, WITHOUT WALL THIMBLE.

NOTES BY SYMBOL (#)

1. NEW 6" MUD VALVE WITH OPERATING STEM AND NUT
2. NEW 12" DRAINLINE
3. NEW 8" STAINLESS STEEL AIR HEADER FOR DIFFUSER SUPPORT PIPE
4. NEW 4" STAINLESS STEEL DIFFUSER HEADER
5. NEW STAINLESS STEEL COARSE BUBBLE DIFFUSER
6. NEW BLIND FLANGE FOR FUTURE DECANT LINE

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC
FB NO. P-5182

STATE OF TEXAS
JUSTIN R. SANDT
116999
LICENSED
PROFESSIONAL ENGINEER
3/5/23

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

PROCESS MECHANICAL

AERATION BASINS ENLARGED PLAN 12 OF 12

KEY PLAN

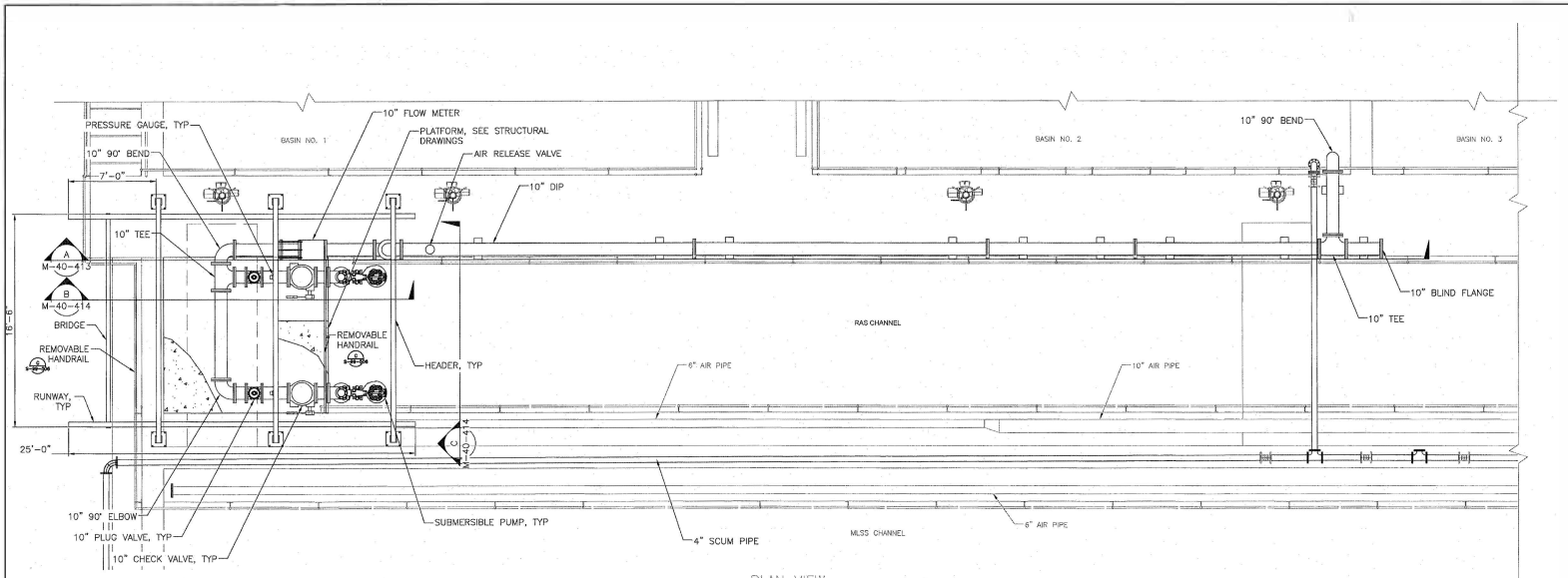
M-40-412

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 250 OF 379	

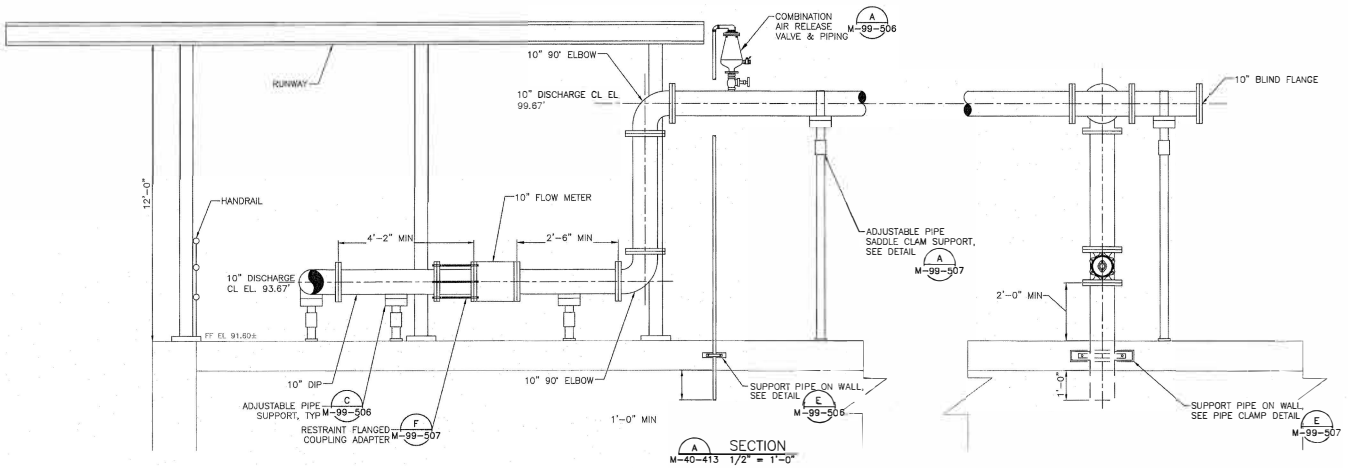
FOR CITY OF HOUSTON USE ONLY

80367

FILE PATH: Bim 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-COH IA WWTP-BV.rvt



PLAN VIEW
1/4"=1'-0"



A M-40-413 SECTION 1/2" = 1'-0"

N

1/4" = 1'-0"

1/2" = 1'-0"

5engineering

BLACK & VEATCH

5ENGINEERING, LLC
11200 WESTHEIMER ROAD
SUITE 353
HOUSTON, TX 77042
(832) 800-3483
TX FIRM NUMBER F-13748

STATE OF TEXAS
PIERO BATTISTINI
104895
LICENSED
PROFESSIONAL ENGINEER
11/09/2022

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

PROCESS MECHANICAL

WAS PUMP – ENLARGED PLAN AND SECTION

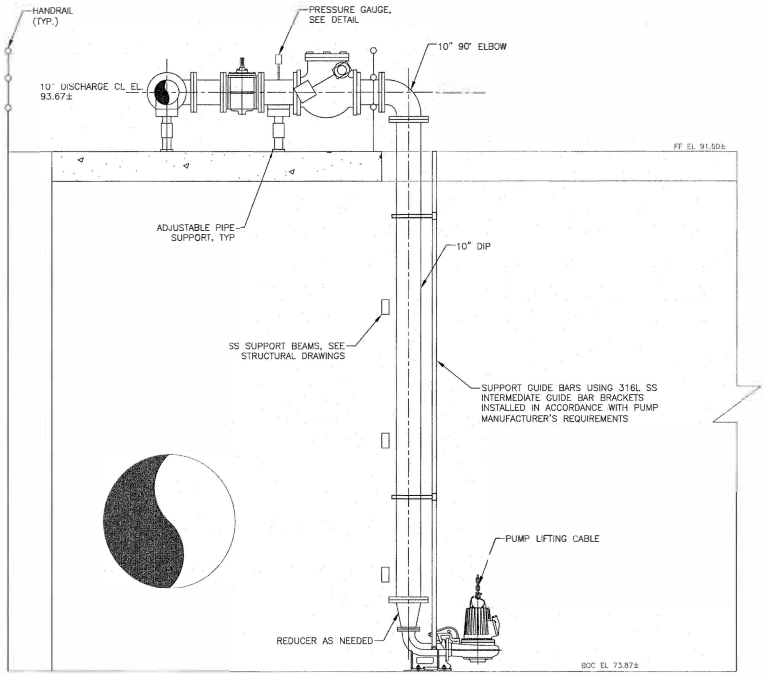
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 251 OF 379	

FOR CITY OF HOUSTON USE ONLY

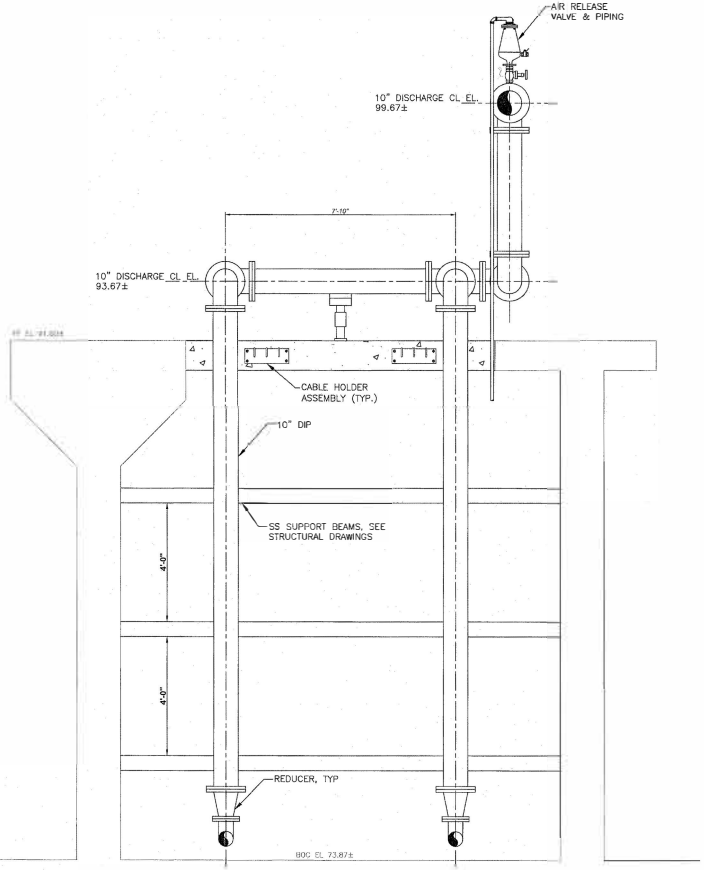
ACCEPTED
80367

M-40-413

FILE PATH: P:\0092\001\04 Cadd-GIS\02 SHEETS\40 - WAS\M-40-413 WAS PUMPS - PLAN.dwg



B SECTION
M-40-413 1/2" = 1'-0"



C SECTION
M-40-413 1/2" = 1'-0"

1/2" = 1'-0"

5engineering

BLACK & VEATCH

5ENGINEERING, LLC
11200 WESTHEIMER ROAD
SUITE 353
HOUSTON, TX 77042
(832) 800-3483
TX FIRM NUMBER F-13748

STATE OF TEXAS
PEDRO BATTISTINI
104895
LICENSED PROFESSIONAL ENGINEER
11/09/2022

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

PROCESS MECHANICAL

WAS PUMPS – SECTIONS

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.

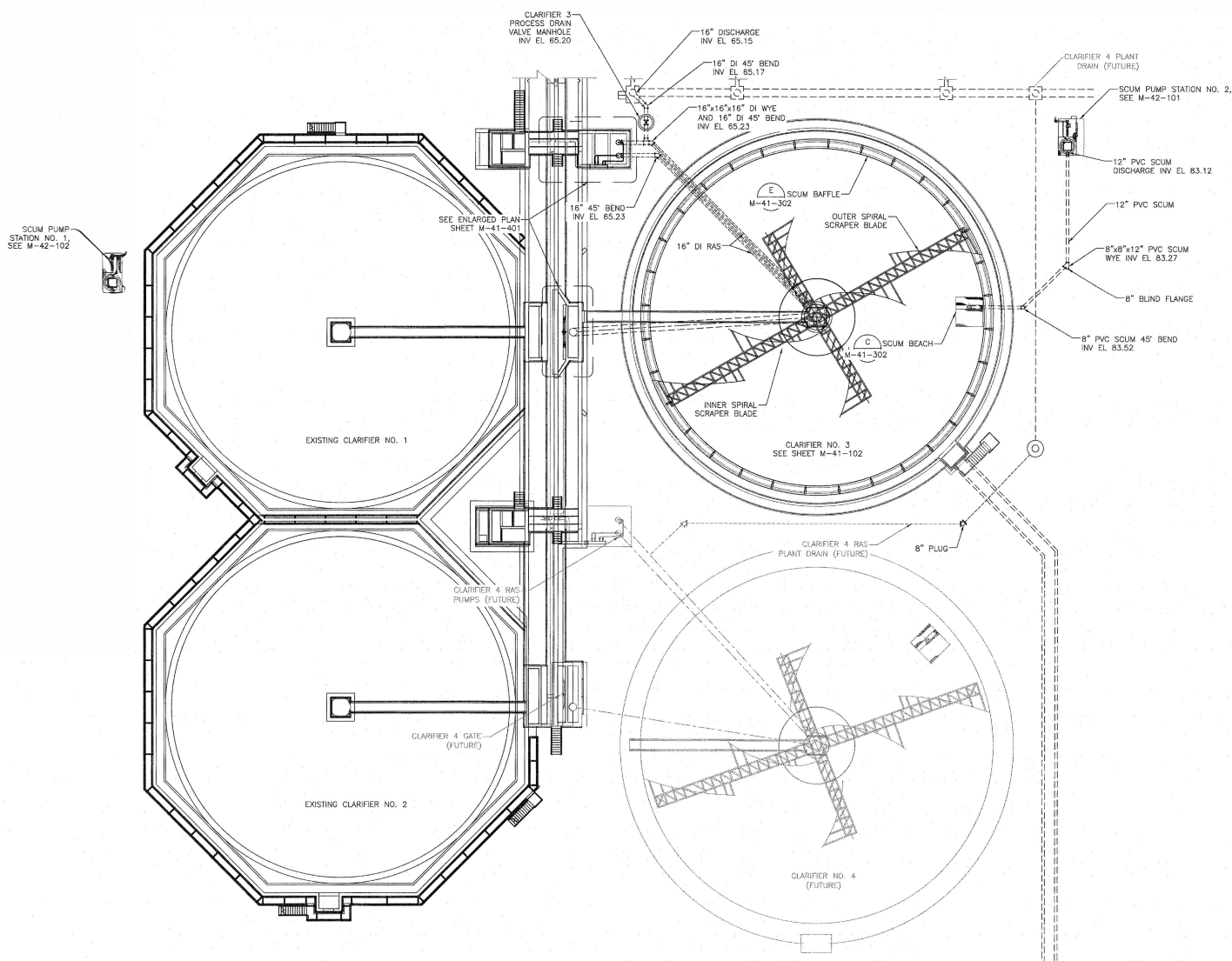
FOR CITY OF HOUSTON USE ONLY

80367

M-40-414

SHEET NO. 252 OF 379

FILE PATH: P:\0092\001\04 Cad-GIS\02 SHEETS\40 - WAS\M-40-414 WAS PUMPS - SECTIONS.dwg



CLARIFIER PIPING AND PLANT DRAIN OVERALL PLAN
SCALE 1"=10'

GENERAL NOTES:

1. EXISTING STRUCTURES, EQUIPMENT, ELEVATIONS, AND DETAILS SHOWN ARE NOT GUARANTEED TO BE ACCURATE AND ALL INCLUSIVE. EXISTING INFORMATION SHOWN IS APPROXIMATE, BASED ON AVAILABLE RECORD DRAWINGS, AND SHOULD BE VERIFIED BY CONTRACTOR PRIOR TO START OF CONSTRUCTION.
2. CONTRACTOR SHALL COORDINATE LAYOUT OF PROPOSED PIPING WITH EXISTING HARD PIPE CONNECTIONS. COORDINATE FIELD CHANGES WITH THE ENGINEER OF RECORD IF WORKS DEVIATES SUBSTANTIALLY FROM THE PROPOSED DESIGN.
3. CONTRACTOR SHALL VERIFY EXACT LOCATIONS, ROUTING, AND DEPTH OF ALL ON-SITE EXISTING UTILITIES BEFORE COMMENCEMENT OF CONSTRUCTION ACTIVITIES. NOTIFY OWNER IF SIGNIFICANT DISCREPANCIES ARE DISCOVERED FROM ITEMS SHOWN IN DRAWINGS.
4. CONTRACTOR SHALL COORDINATE ALL SHUT DOWNS AND SHUT DOWN ACTIVITIES WITH CITY OPERATIONS STAFF AS NEEDED.
5. SEE STRUCTURAL DRAWINGS FOR DIMENSIONS.

5engineering

BLACK & VEATCH

5ENGINEERING, LLC
11200 WESTHEIMER ROAD
SUITE 353
HOUSTON, TX 77042
(832) 800-3483
TX FIRM NUMBER F-13748

STATE OF TEXAS FRANK L. STEPHENS 104104 LICENSED PROFESSIONAL ENGINEER
11-09-22

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

PROCESS MECHANICAL

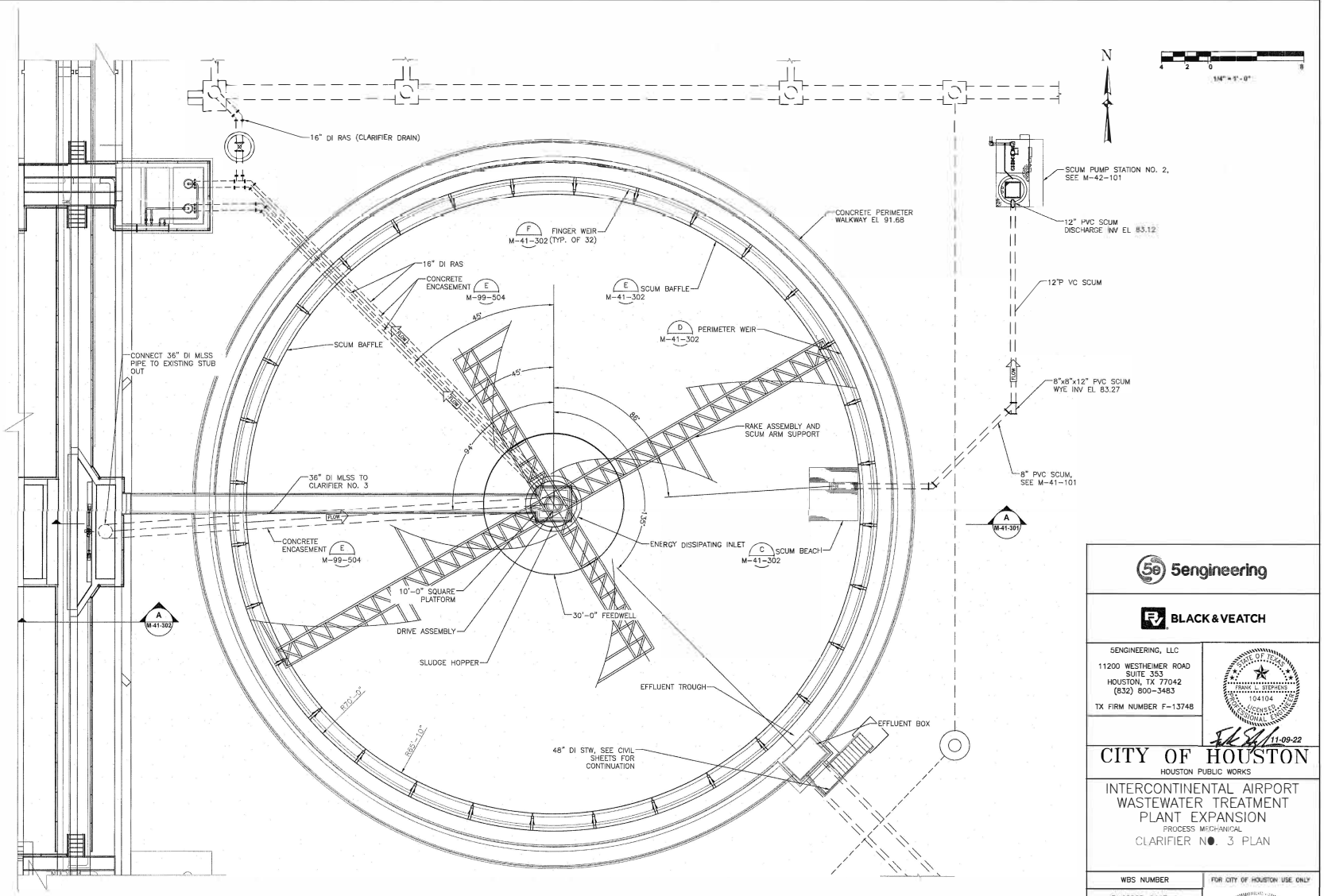
OVERALL CLARIFIER AND RAS PLAN

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00255-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	

80367 REGISTERED PROFESSIONAL ENGINEER HOUSTON, TEXAS

M-41-101 | SHEET NO. 253 OF 379

FILE PATH: P:\0092\001\04 Cadd-GIS\02 SHEETS\40 - RAS\M-41-101-102-103 Overall.dwg



CLARIFIER NO. 3 PLAN
SCALE 1"=10'

5engineering

BLACK & VEATCH

5ENGINEERING, LLC
11200 WESTHEIMER ROAD
SUITE 353
HOUSTON, TX 77042
(832) 800-3483
TX FIRM NUMBER F-13748

STATE OF TEXAS
FRANK L. STEPHENS
104104
LICENSED
PROFESSIONAL ENGINEER

11-09-22

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

PROCESS MECHANICAL

CLARIFIER NO. 3 PLAN

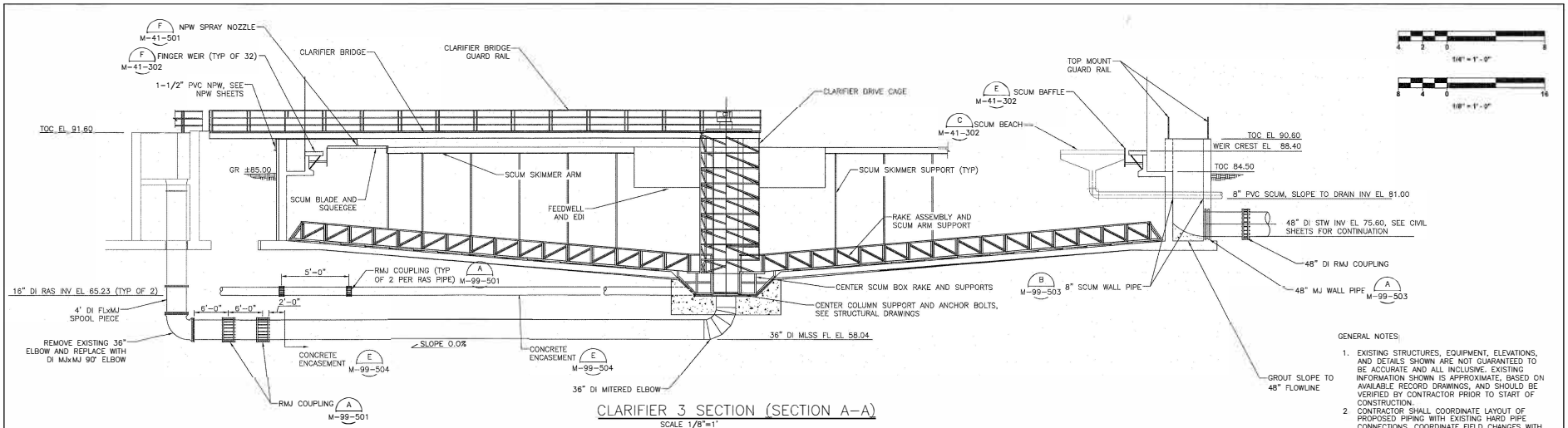
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	
5E XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 254 OF 379	

FOR CITY OF HOUSTON USE ONLY

CONCEPTION JOULLIAN
80367
REGISTERED
DENTON, TEXAS

M-41-102

FILE PATH: P:\0092\001\04 Cadd-GIS\02 SHEETS\40 - RAS\M-41-101-102-103 Overall.dwg

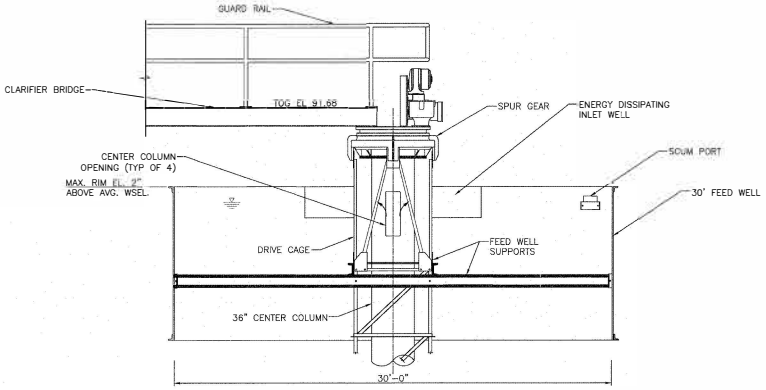


CLARIFIER 3 SECTION (SECTION A–A)

SCALE 1/8"=1'

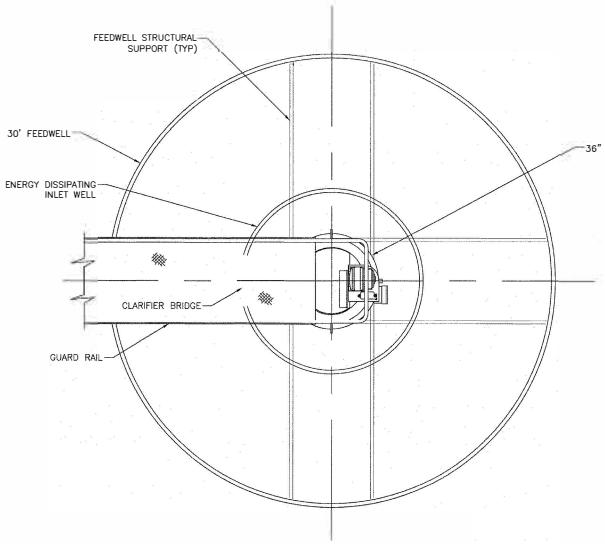
GENERAL NOTES:

1. EXISTING STRUCTURES, EQUIPMENT, ELEVATIONS, AND DETAILS SHOWN ARE NOT GUARANTEED TO BE ACCURATE AND ALL INCLUSIVE. EXISTING INFORMATION SHOWN IS APPROXIMATE, BASED ON AVAILABLE RECORD DRAWINGS, AND SHOULD BE VERIFIED BY CONTRACTOR PRIOR TO START OF CONSTRUCTION.
2. CONTRACTOR SHALL COORDINATE LAYOUT OF PROPOSED PIPING WITH EXISTING HARD PIPE CONNECTIONS. COORDINATE FIELD CHANGES WITH THE ENGINEER OF RECORD IF WORKS DEVIATES SUBSTANTIALLY FROM THE PROPOSED DESIGN.
3. CONTRACTOR SHALL VERIFY EXACT LOCATIONS, ROUTING, AND DEPTH OF ALL ON-SITE EXISTING UTILITIES BEFORE COMMENCEMENT OF CONSTRUCTION ACTIVITIES. NOTIFY OWNER IF SIGNIFICANT DISCREPANCIES ARE DISCOVERED FROM ITEMS SHOWN IN DRAWINGS.
4. CONTRACTOR SHALL COORDINATE ALL SHUT DOWNS AND SHUT DOWN ACTIVITIES WITH CITY OPERATIONS STAFF AS NEEDED.
5. SEE STRUCTURAL DRAWINGS FOR DIMENSIONS.



CLARIFIER CENTER COLUMN SECTION

SCALE 1/4"=1'



CLARIFIER FEED WELL DETAIL

SCALE 1/4"=1'

5engineering

BLACK & VEATCH

5ENGINEERING, LLC
11200 WESTHEIMER ROAD
SUITE 353
HOUSTON, TX 77042
(832) 800-3483
TX FIRM NUMBER F-13748

STATE OF TEXAS — FRANK L. STEVENS — 104104 — LICENSED PROFESSIONAL ENGINEER — 11-09-22

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

PROCESS MECHANICAL

CLARIFIER SECTION AND DETAILS

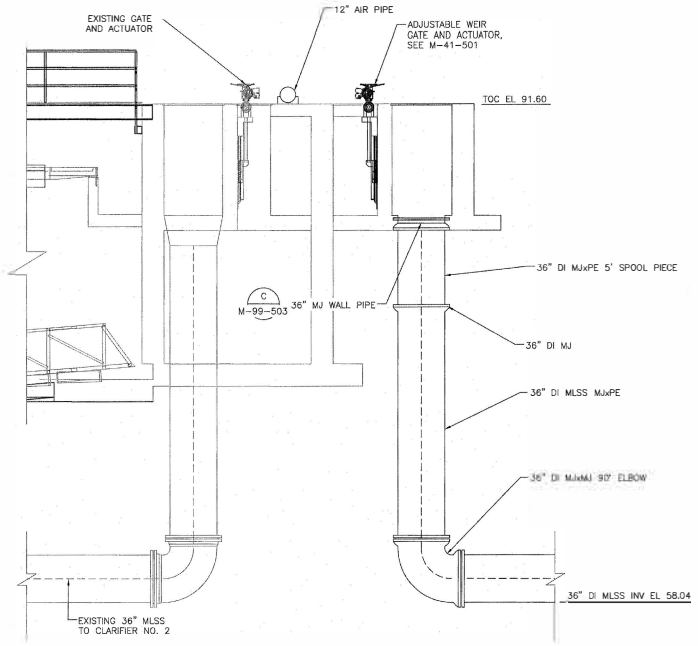
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	Sd XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 255 OF 379	

FOR CITY OF HOUSTON USE ONLY

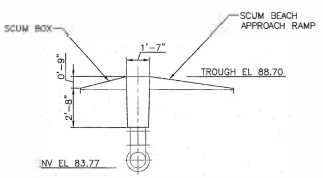
80367

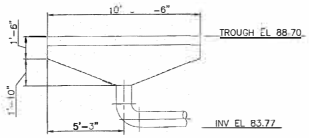
M-41-301

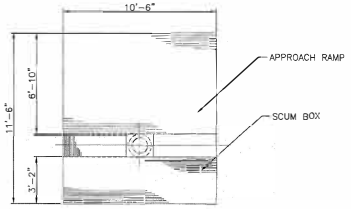
FILE PATH: P:\0092\001\04 Cadd-GIS\02 SHEETS\40 - RAS\M-41-301 Clarifier Sections.dwg



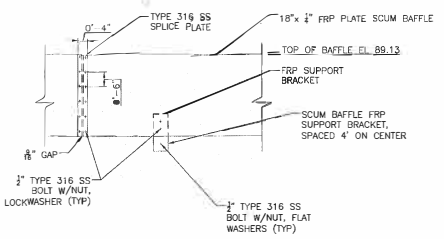
A SECTION
M-41-301 SCALE 1/4":1'



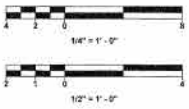


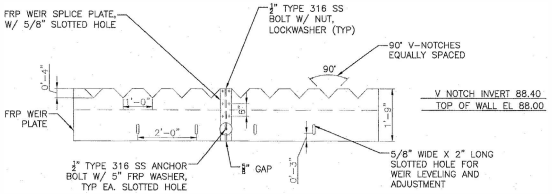


C SCUM BEACH
SCALE 1/4":1'

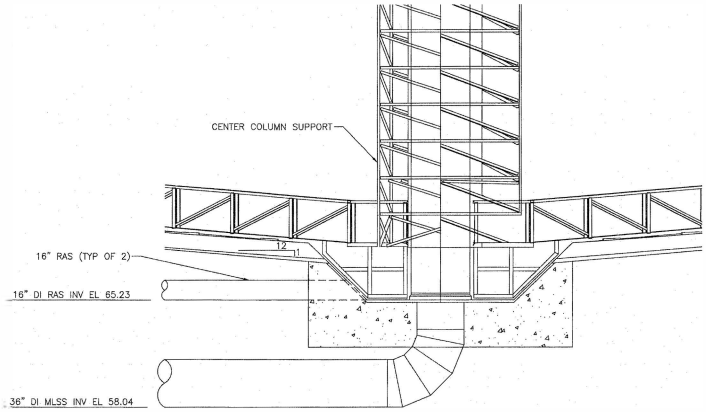


E SCUM BAFFLE
SCALE 1/2":1'

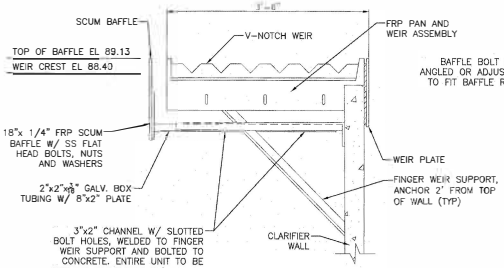




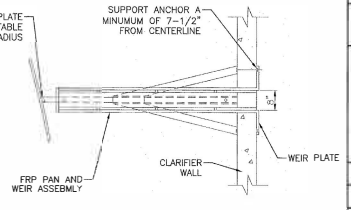
D CLARIFIER WEIR PLATE
SCALE 1/2":1'



B SECTION
M-41-301 SCALE 1/4":1'



F FINGER WEIR
NTS



5engineering
BLACK & VEATCH
SENGINEERING, LLC
11200 WESTHEIMER ROAD
SUITE 353
HOUSTON, TX 77042
(832) 800-3483
TX FIRM NUMBER F-13748
FRANK L. STEPHENS
104104
LICENSED PROFESSIONAL ENGINEER
11-09-22

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

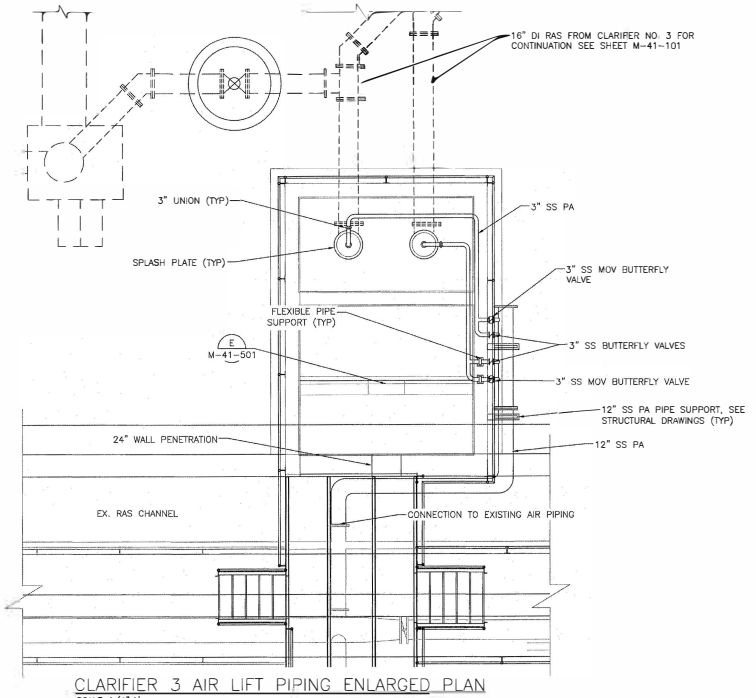
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
PROCESS MECHANICAL
CLARIFIER DETAILS

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAOHUA (SHARI) LIN, P.E.
SHEET NO. 256 OF 379	

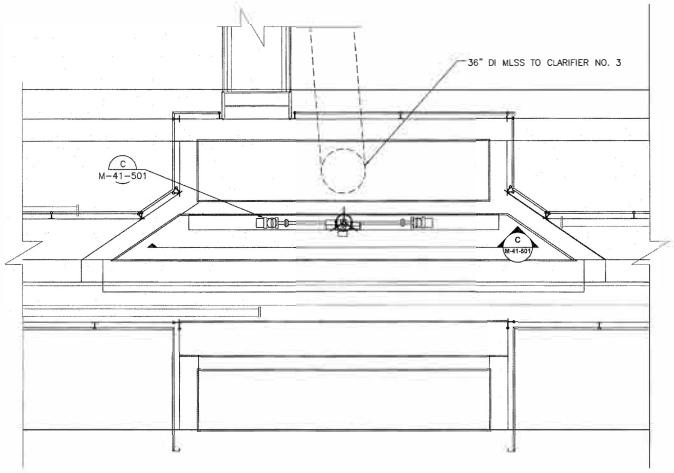
FOR CITY OF HOUSTON USE ONLY
80367

M-41-302

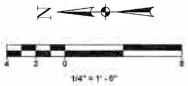
FILE PATH: P:\0092\001\04 Cadd-GIS\02 SHEETS\40 - RAS\M-41-105 Clarifier Details.dwg



CLARIFIER 3 AIR LIFT PIPING ENLARGED PLAN
SCALE 1/4":1'



CLARIFIER 3 INFLUENT ENLARGED PLAN
SCALE 1/4":1'



5engineering

BLACK & VEATCH

5ENGINEERING, LLC
11200 WESTHEIMER ROAD
SUITE 353
HOUSTON, TX 77042
(832) 800-3483
TX FIRM NUMBER F-13748

STATE OF TEXAS
FRANK L. STEPHENS
104104
LICENSED
PROFESSIONAL ENGINEER

11-09-22

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

PROCESS MECHANICAL

CLARIFIER AND RAS ENLARGED PLANS

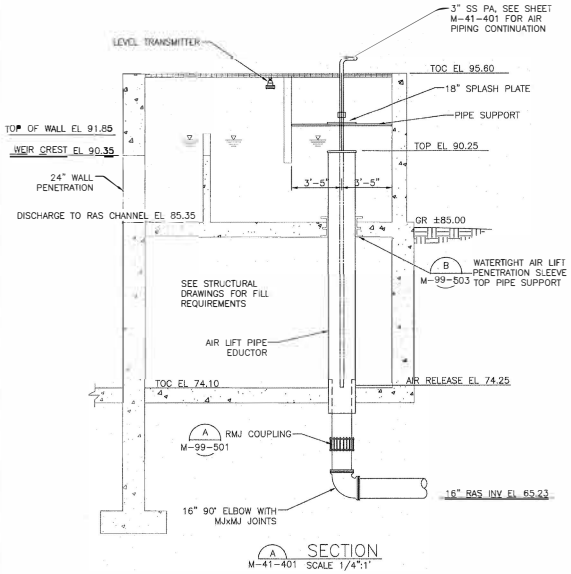
WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	

ACCEPTED
80367
SOLON, TEXAS

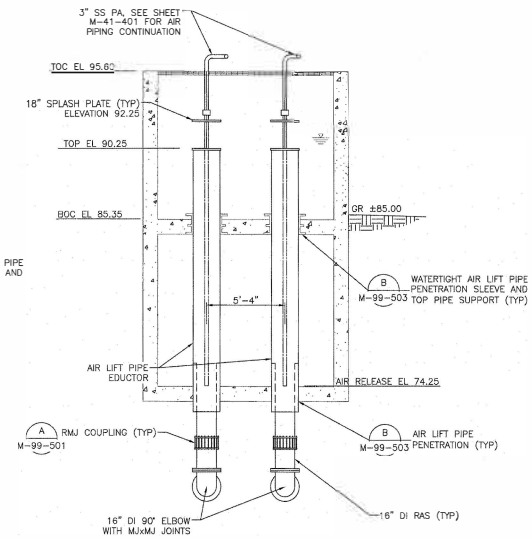
M-41-401

SHEET NO. 257 OF 379

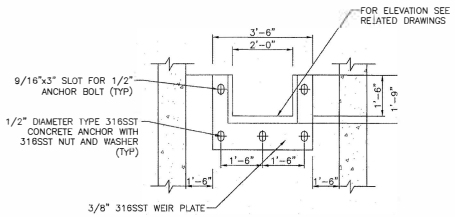
FILE PATH: P:\0092\001\04 Cadd-GIS\05 SHEETS\40 - RAS\M-41-401 RAS Airlift Pump Plans.dwg



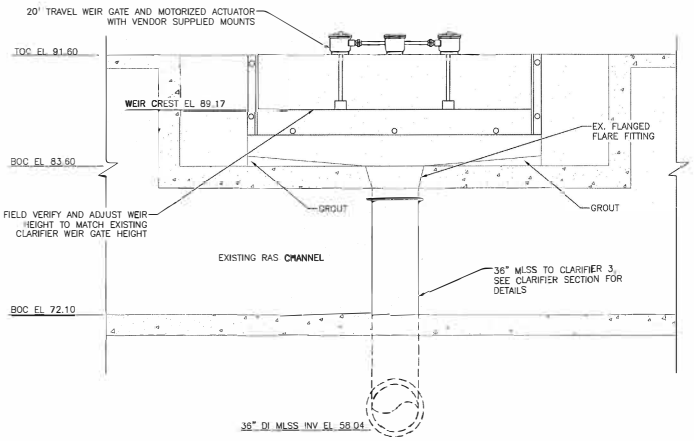
A SECTION
M-41-401 SCALE 1/4":1'



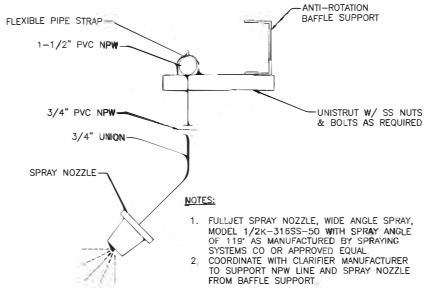
B SECTION
M-41-401 SCALE 1/4":1'



E RAS CHANNEL WEIR PLATE
NTS



C SECTION
M-41-401 SCALE 1/4":1'



NOTES:
1. FULLJET SPRAY NOZZLE, WIDE ANGLE SPRAY, MODEL 1/2K-316SS-50 WITH SPRAY ANGLE OF 115° AS MANUFACTURED BY SPRAYING SYSTEMS CO OR APPROVED EQUAL.
2. COORDINATE WITH CLARIFIER MANUFACTURER TO SUPPORT NPW LINE AND SPRAY NOZZLE FROM BAFFLE SUPPORT.

F SPRAY NOZZLE
NTS

1/4" = 1'-0"

NOTES:
1. FIELD VERIFY EXISTING TOP OF CONCRETE ELEVATIONS AND MATCH PROPOSED RAS TOC ELEVATIONS TO EXISTING.
2. AIR LIFT PIPE AND EDUCTOR SHALL BE MADE OF 316 STAINLESS STEEL.

5engineering

BLACK & VEATCH

5ENGINEERING, LLC
11200 WESTHEIMER ROAD
SUITE 353
HOUSTON, TX 77042
(832) 800-3483
TX FIRM NUMBER F-13748

STATE OF TEXAS
FRANK L. STEPHENS
104104
LICENSED PROFESSIONAL ENGINEER
11-09-22

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
PROCESS MECHANICAL
RAS AIR LIFT PUMP SECTIONS AND DETAILS

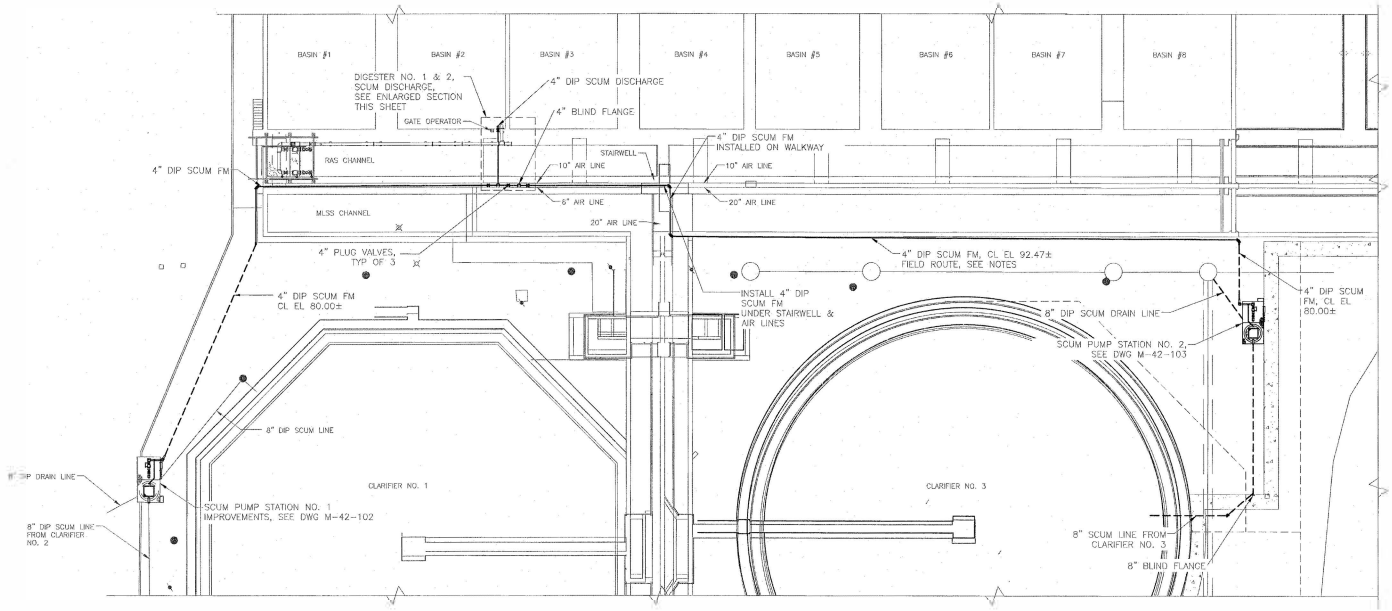
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.

FOR CITY OF HOUSTON USE ONLY
STATE OF TEXAS
XIAOHUA LIN
80367
REGISTERED
PROFESSIONAL ENGINEER
JANUARY 10, 2023

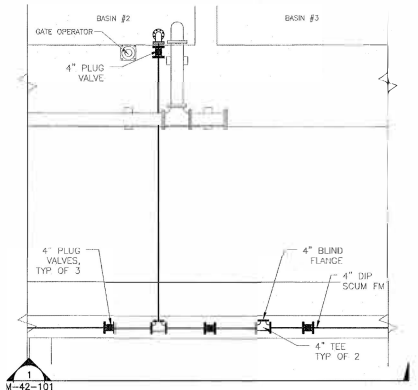
M-41-501

SHEET NO. 258 OF 379

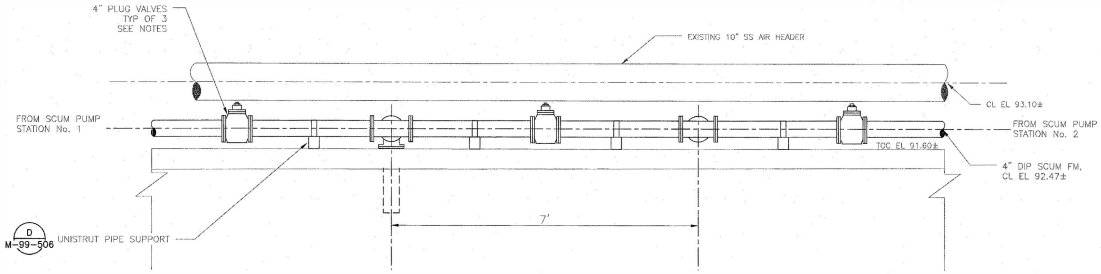
FILE PATH: P:\0092\001\04 Cadd-GIS\02 SHEETS\40 - RAS\M-41-402 RAS Airlift Pump Sections.dwg



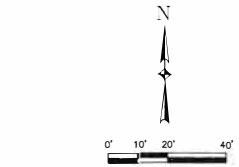
SCUM SYSTEM OVERALL PLAN
1" = 20'-0"



ENLARGED PLAN, SCUM PUMP DISCHARGE
3" = 1'-0"



1 DIGESTER NO. 1 & 2, SCUM DISCHARGE
3/4" = 1'-0"



GENERAL NOTES:

1. EXISTING STRUCTURES, EQUIPMENT, ELEVATIONS, AND DETAILS SHOWN ARE NOT GUARANTEED TO BE ACCURATE AND ALL INCLUSIVE. EXISTING INFORMATION SHOWN IS APPROXIMATE, BASED ON AVAILABLE RECORD DRAWINGS, AND SHOULD BE VERIFIED BY CONTRACTOR PRIOR TO START OF CONSTRUCTION.
2. CONTRACTOR SHALL COORDINATE LAYOUT OF PROPOSED PIPING AND PUMPS WITH EXISTING HARD PIPE CONNECTIONS. COORDINATE FIELD CHANGES WITH THE ENGINEER OF RECORD IF WORKS DEVIATES SUBSTANTIALLY FROM PROPOSED DESIGN.
3. CONTRACTOR SHALL VERIFY EXACT LOCATIONS, ROUTING, AND DEPTH OF ALL ON-SITE EXISTING UTILITIES BEFORE COMMENCEMENT OF CONSTRUCTION ACTIVITIES. NOTIFY CONSTRUCTION MANAGER IF SIGNIFICANT DISCREPANCIES ARE DISCOVERED FROM ITEMS SHOWN IN DRAWINGS.
4. CONTRACTOR SHALL COORDINATE ALL SHUT DOWNS AND SHUT DOWN ACTIVITIES WITH CITY OPERATIONS STAFF AS NEEDED.
5. INSTALL PLUG VALVES TO OPEN UPWARDS.
6. FIELD ROUTE 4" FORCE MAIN. SUPPORT PIPE EVERY 10-FT OR LESS, SEE DETAIL.

5engineering
BLACK & VEATCH
5ENGINEERING, LLC
11200 WESTHEIMER ROAD
SUITE 353
HOUSTON, TX 77042
(832) 800-3483
TX FIRM NUMBER F-13748

STATE OF TEXAS
PIERO BATTISTINI
104895
LICENSED
PROFESSIONAL ENGINEER
11/09/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

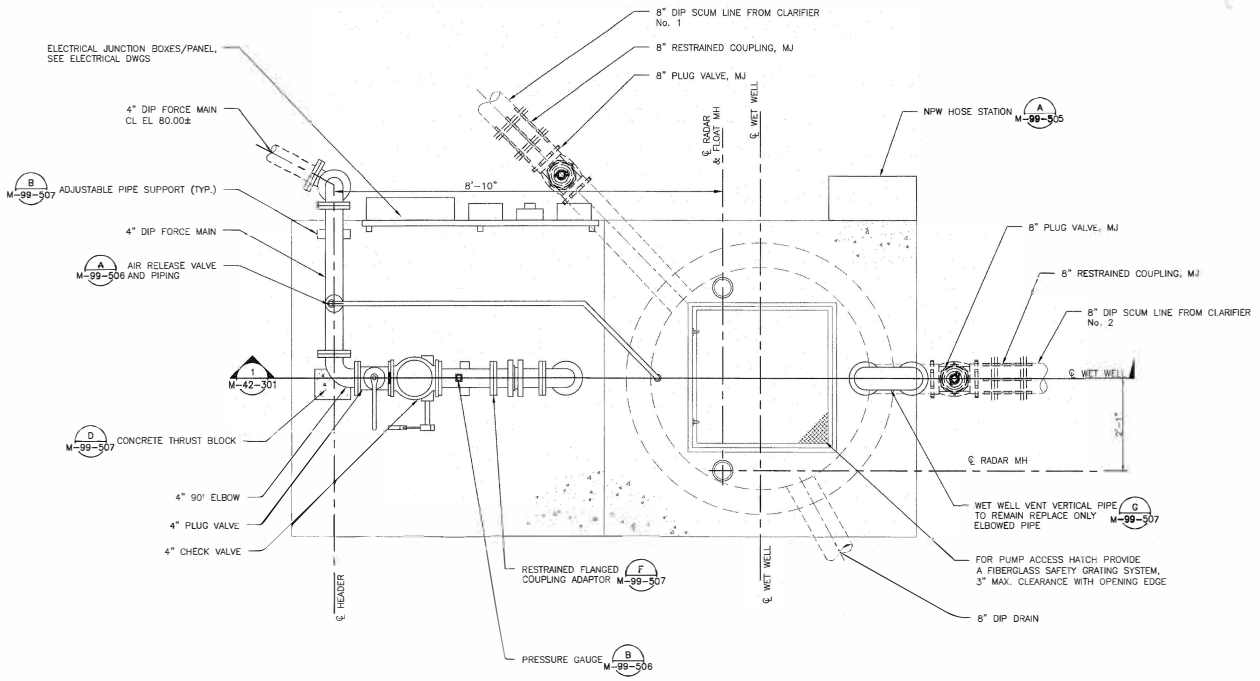
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
PROCESS MECHANICAL
SCUM SYSTEM OVERALL PLAN

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAOHUA (SHARI) LIN, P.E.

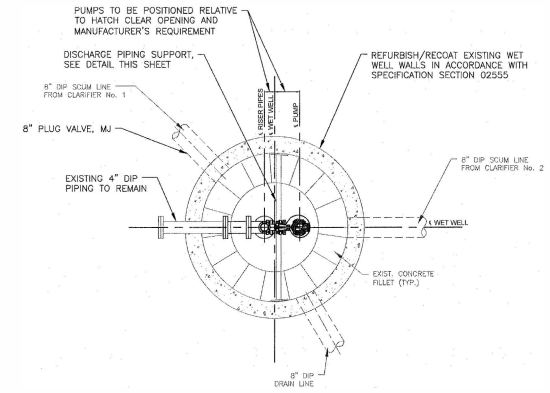
FOR CITY OF HOUSTON USE ONLY
ACCEPTED
80367
REGISTERED
PROFESSIONAL ENGINEER

M-42-101
SHEET NO. 259 OF 379

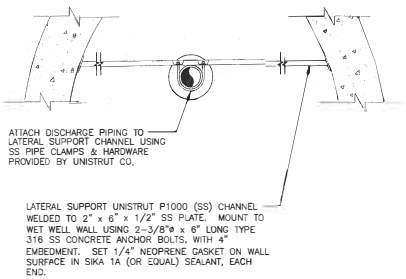
FILE PATH: P:\0092\001\04 Cadd-GIS\02 SHEETS\42 - SCUM SYSTEM\M-42-101 SCUM SYSTEM - LAYOUT.dwg



SCUM PUMP PLAN @ GRADE
3/4" = 1'-0"



SCUM WET WELL LOWER PLAN
1/2" = 1'-0"



DISCHARGE PIPING SUPPORT DETAIL
NOT TO SCALE

SCALE: 1/2"=1'

SCALE: 3/4"=1'

GENERAL NOTES:

1. EXISTING STRUCTURES, EQUIPMENT, ELEVATIONS, AND DETAILS SHOWN ARE NOT GUARANTEED TO BE ACCURATE AND ALL INCLUSIVE. EXISTING INFORMATION SHOWN IS APPROXIMATE, BASED ON AVAILABLE RECORD DRAWINGS, AND SHOULD BE VERIFIED BY CONTRACTOR PRIOR TO START OF CONSTRUCTION.
2. CONTRACTOR SHALL COORDINATE LAYOUT OF PROPOSED PIPING AND PUMPS WITH EXISTING HARD PIPE CONNECTIONS. COORDINATE FIELD CHANGES WITH THE ENGINEER OF RECORD IF WORKS DEVIATES SUBSTANTIALLY FROM THE PROPOSED DESIGN.
3. CONTRACTOR SHALL VERIFY EXACT LOCATIONS, ROUTING, AND DEPTH OF ALL ON-SITE EXISTING UTILITIES BEFORE COMMENCEMENT OF CONSTRUCTION ACTIVITIES. NOTIFY OWNER IF SIGNIFICANT DISCREPANCIES ARE DISCOVERED FROM ITEMS SHOWN IN DRAWINGS.
4. CONTRACTOR SHALL COORDINATE ALL SHUT DOWNS AND SHUT DOWN ACTIVITIES WITH CITY OPERATIONS STAFF AS NEEDED. CONTRACTOR SHALL COORDINATE DECOMMISSIONING OF SCUM COLLECTION VAULT WITH CITY OPERATIONS STAFF.
5. SEE STRUCTURAL DRAWINGS FOR DIMENSIONS.
6. CONTRACTOR TO CONFIRM SIZE AND LOCATION OF THE WET WELL HATCHES PER SELECTED HATCH AND PUMP MANUFACTURERS' REQUIREMENTS.
7. INSTALL PLUG VALVES TO OPEN UPWARD AND TO CLOSE TO A SEATING POSITION.
8. INSTALL CHECK VALVES SO THAT THE WEIGHT LEVER POSITION IS APPROXIMATELY 45° BELOW THE VALVE HORIZONTAL CENTER LINE IN THE CLOSED POSITION; AND APPROXIMATELY 45° ABOVE THE VALVE HORIZONTAL CENTER LINE IN THE FULL OPEN POSITION.
9. SLEEVED OR CORED DISCHARGE PIPE OPENINGS SEALED WITH LINK-SEAL (OR APPROVED EQUAL) MAY BE SUBSTITUTED FOR POURED IN PLACE WALL PIPES TO ACCOMMODATE CONSTRUCTION METHOD.

5engineering

BLACK & VEATCH

5ENGINEERING, LLC
11200 WESTHEIMER ROAD
SUITE 353
HOUSTON, TX 77042
(832) 800-3483
TX FIRM NUMBER F-13748

STATE OF TEXAS
PEDRO BATTISTINI
104895
LICENSED PROFESSIONAL ENGINEER
11/09/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
PROCESS MECHANICAL

SCUM PUMP STATION NO. 1 – PLAN

WBS NUMBER
R-00265-0147-4
DRAWING SCALE
AS NOTED
CITY OF HOUSTON PM
XIAOHUA (SHARI) LIN, P.E.

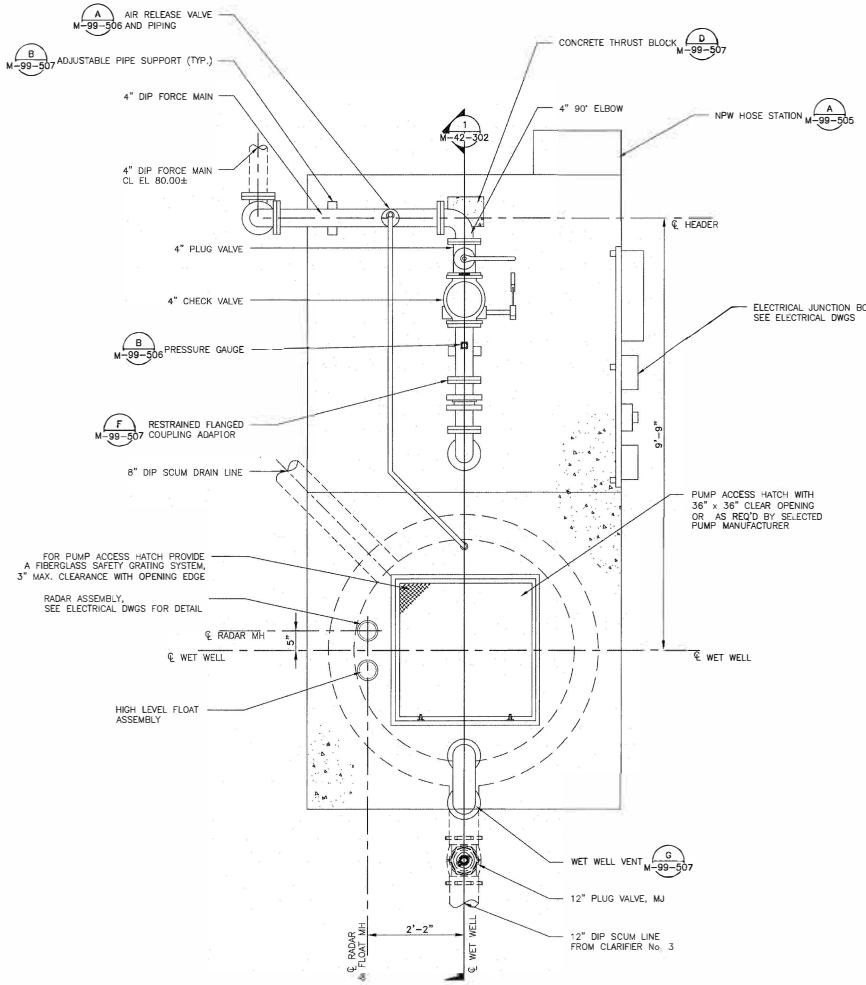
FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
30367
REGISTERED
XIAOHUA LIN

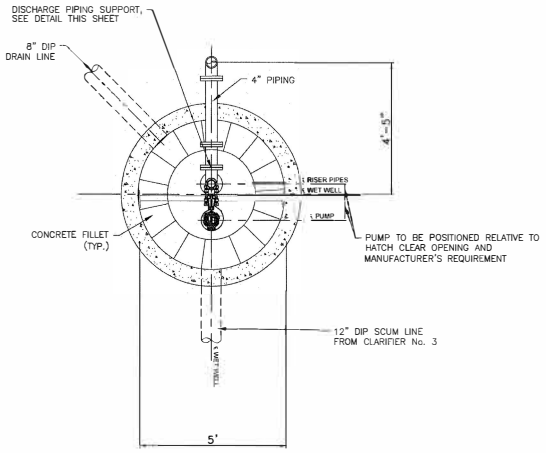
M-42-102

SHEET NO. 260 OF 397

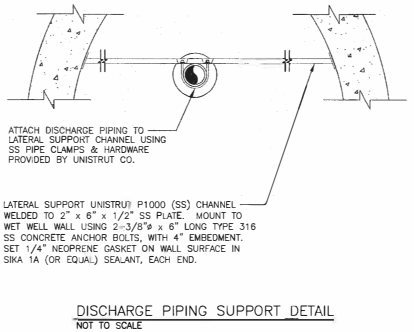
FILE PATH: P:\0082\001\04 Cadd-GIS\02 SHEETS\42 - SCUM SYSTEM\M-42-102 SCUM PUMP STATION NO. 1 - PLAN.dwg



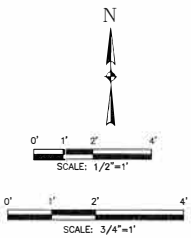
SCUM PUMP PLAN @ GRADE
3/4" = 1'-0"



SCUM WET WELL LOWER PLAN
1/2" = 1'-0"



DISCHARGE PIPING SUPPORT DETAIL
NOT TO SCALE



GENERAL NOTES:

1. EXISTING STRUCTURES, EQUIPMENT, ELEVATIONS, AND DETAILS SHOWN ARE NOT GUARANTEED TO BE ACCURATE AND ALL INCLUSIVE. EXISTING INFORMATION SHOWN IS APPROXIMATE, BASED ON AVAILABLE RECORD DRAWINGS, AND SHOULD BE VERIFIED BY CONTRACTOR PRIOR TO START OF CONSTRUCTION.
2. CONTRACTOR SHALL COORDINATE LAYOUT OF PROPOSED PIPING AND PUMPS WITH EXISTING HARD PIPE CONNECTIONS. COORDINATE FIELD CHANGES WITH THE ENGINEER OF RECORD IF WORKS DEVIATES SUBSTANTIALLY FROM THE PROPOSED DESIGN.
3. CONTRACTOR SHALL VERIFY EXACT LOCATIONS, ROUTING, AND DEPTH OF ALL ON-SITE EXISTING UTILITIES BEFORE COMMENCEMENT OF CONSTRUCTION ACTIVITIES. NOTIFY OWNER IF SIGNIFICANT DISCREPANCIES ARE DISCOVERED FROM ITEMS SHOWN IN DRAWINGS.
4. CONTRACTOR SHALL COORDINATE ALL SHUT DOWNS AND SHUT DOWN ACTIVITIES WITH CITY OPERATIONS STAFF AS NEEDED.
5. SEE STRUCTURAL DRAWINGS FOR DIMENSIONS.
6. CONTRACTOR TO CONFIRM SIZE AND LOCATION OF THE WET WELL HATCHES PER SELECTED HATCH AND PUMP MANUFACTURERS' REQUIREMENTS.
7. INSTALL PLUG VALVES TO OPEN UPWARD AND TO CLOSE TO A SEATING POSITION.
8. INSTALL CHECK VALVES SO THAT THE WEIGHT LEVER POSITION IS APPROXIMATELY 45° BELOW THE VALVE HORIZONTAL CENTER LINE IN THE CLOSED POSITION; AND APPROXIMATELY 45° ABOVE THE VALVE HORIZONTAL CENTER LINE IN THE FULL OPEN POSITION.
9. SLEEVED OR CORED DISCHARGE PIPE OPENINGS SEALED WITH LINK-SEAL (OR APPROVED EQUAL) MAY BE SUBSTITUTED FOR POURED IN PLACE WALL PIPES TO ACCOMMODATE CONSTRUCTION METHOD.

5engineering

BLACK & VEATCH

5ENGINEERING, LLC
11200 WESTHEIMER ROAD
SUITE 353
HOUSTON, TX 77042
(832) 800-3483
TX FIRM NUMBER F-13748

STATE OF TEXAS
DANIEL
104895
LICENSED
PROFESSIONAL
ENGINEER
11/09/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

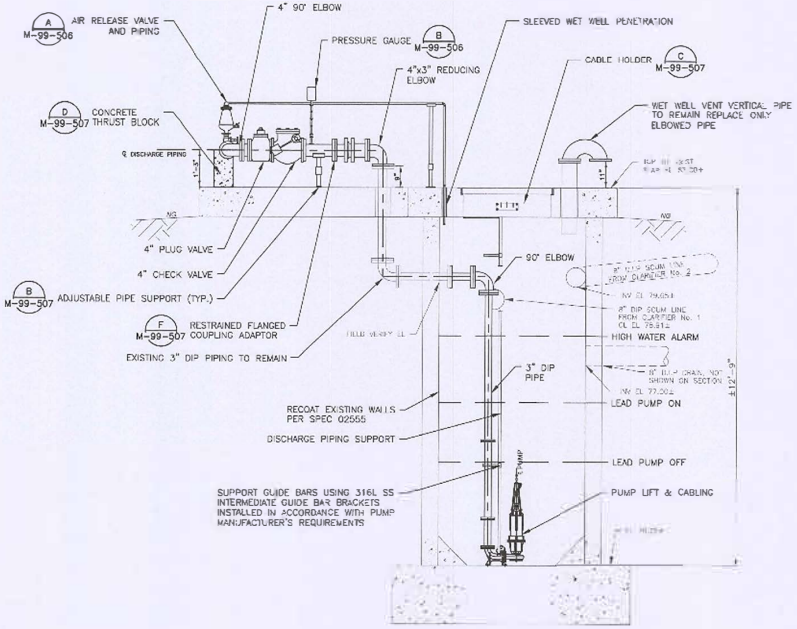
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
PROCESS MECHANICAL
SCUM PUMP STATION NO. 2 – PLAN

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
	SHEET NO. 261 OF 379

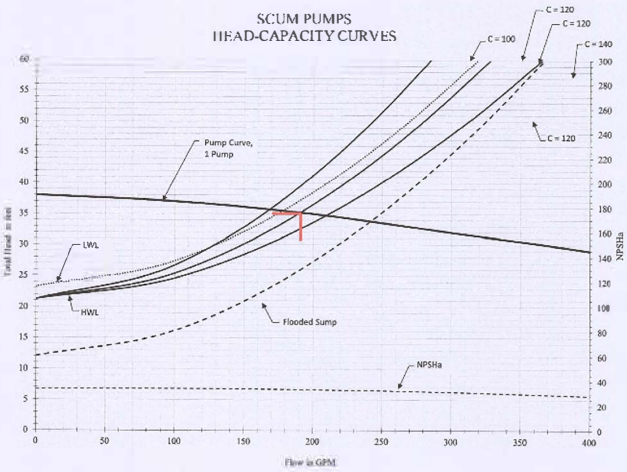
FOR CITY OF HOUSTON USE ONLY
STATE OF TEXAS
XIAOHUA (SHARI) LIN
80367
LICENSED
PROFESSIONAL
ENGINEER

M-42-103

FILE PATH: P:\0092\001\04 Cadd-GIS\02 SHEETS\42 - SCUM SYSTEM\M-42-103 SCUM PUMP STATION NO. 2 - PLAN.dwg



1 SCUM PUMP SECTION
1/2" = 1'-0"





GENERAL NOTES:

1. EXISTING STRUCTURES, EQUIPMENT, ELEVATIONS, AND DETAILS SHOWN ARE NOT GUARANTEED TO BE ACCURATE AND ALL INCLUSIVE. EXISTING INFORMATION SHOWN IS APPROXIMATE, BASED ON AVAILABLE RECORD DRAWINGS, AND SHOULD BE VERIFIED BY CONTRACTOR PRIOR TO START OF CONSTRUCTION.
2. CONTRACTOR SHALL COORDINATE LAYOUT OF PROPOSED PIPING AND PUMPS WITH EXISTING HARD PIPE CONNECTIONS. COORDINATE FIELD CHANGES WITH THE ENGINEER OF RECORD IF WORKS DEVIATES SUBSTANTIALLY FROM THE PROPOSED DESIGN.
3. CONTRACTOR SHALL VERIFY EXACT LOCATIONS, ROUTING, AND DEPTH OF ALL ON-SITE EXISTING UTILITIES BEFORE COMMENCEMENT OF CONSTRUCTION ACTIVITIES. NOTIFY OWNER IF SIGNIFICANT DISCREPANCIES ARE DISCOVERED FROM ITEMS SHOWN IN DRAWINGS.
4. CONTRACTOR SHALL COORDINATE ALL SHUT DOWNS AND SHUT DOWN ACTIVITIES WITH CITY OPERATIONS STAFF AS NEEDED.
5. SEE STRUCTURAL DRAWINGS FOR DIMENSIONS.
6. CONTRACTOR TO CONFIRM SIZE AND LOCATION OF THE WET WELL HATCHES PER SELECTED HATCH AND PUMP MANUFACTURERS' REQUIREMENTS.
7. INSTALL PLUG VALVES TO OPEN UPWARD AND TO CLOSE TO A SEATING POSITION.
8. INSTALL CHECK VALVES SO THAT THE WEIGHT LEVER POSITION IS APPROXIMATELY 45° BELOW THE VALVE HORIZONTAL CENTER LINE IN THE CLOSED POSITION; AND APPROXIMATELY 45° ABOVE THE VALVE HORIZONTAL CENTER LINE IN THE FULL OPEN POSITION.
9. SLEEVED OR CORED DISCHARGE PIPE OPENINGS SEALED WITH LINK-SEAL (OR APPROVED EQUAL) MAY BE SUBSTITUTED FOR POURED IN PLACE WALL PIPES TO ACCOMMODATE CONSTRUCTION METHOD.

PUMP DATA TABLE

PUMP CHARACTERISTICS	PUMP NO. 1
MOTOR DATA NOMINAL SIZE (HP) MAX SPEED (RPM)	7.5 1170
SOLIDS PASSAGE MIN SPHERE (IN)	3
CAPACITY (GPM) DESIGN RUNOUT	200 800
DISCHARGE HEAD (FT) DESIGN RUNOUT SHUT OFF	34 9 38
EFFICIENCY (%) DESIGN	50

STATION OPERATION TABLES

RISING LEVEL CYCLE

WATER LEVEL ELEVATION	ACTION	PUMP(S) IN OPERATION
73.75	PUMP OFF LEVEL – NO ACTION	LEAD PUMP IS OFF
75.75	LEAD PUMP TURNS ON	LEAD PUMP ON
78.00	HIGH WATER ALARM ON	HIGH WATER ALARM SOUND

FALLING LEVEL CYCLE

WATER LEVEL ELEVATION	ACTION	PUMP(S) IN OPERATION
75.75	HIGH WATER LEVEL ALARM OFF	LEAD PUMP ON
73.75	LEAD PUMP TURNS OFF	LEAD PUMP STOPPED

5engineering
BLACK & VEATCH
5ENGINEERING, LLC
11200 WESTHEIMER ROAD
SUITE 353
HOUSTON, TX 77042
(832) 800-3483
TX FIRM NUMBER F-13748

STATE OF TEXAS
FRED BATISTINI
104895
LICENSED
PROFESSIONAL
ENGINEER
11/09/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

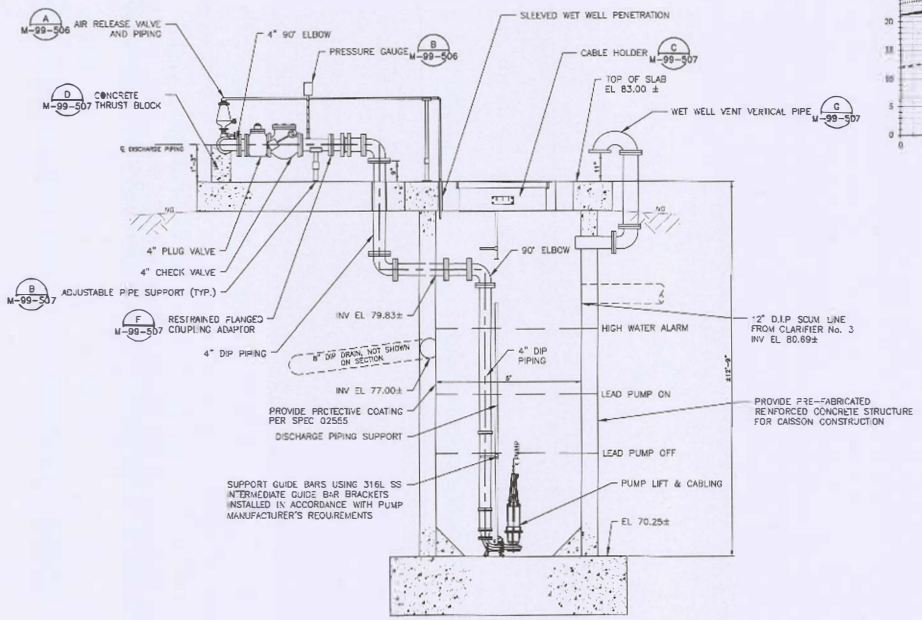
INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT
PLANT EXPANSION
PROCESS MECHANICAL
SCUM PUMP STATION
NO. 1 – SECTIONS

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 262 OF 379	

STATE OF TEXAS
80367
LICENSED
PROFESSIONAL
ENGINEER

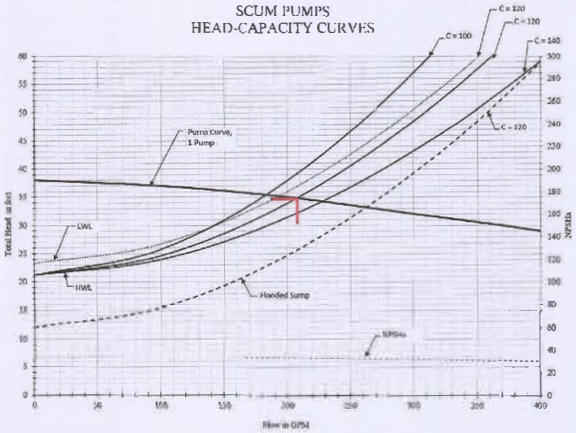
M-42-301

FILE PATH: P:\0092\001\04 Cadd-GIS\02 SHEETS\42 – SCUM SYSTEM\M-42-301 SCUM PUMP STATION NO. 1 – SECTIONS.dwg



1 SCUM PUMP SECTION
1/2" = 1'-0"

SCUM PUMPS
HEAD-CAPACITY CURVES



0' 1' 2' 4'
SCALE: 1/2"=1'

GENERAL NOTES:

1. EXISTING STRUCTURES, EQUIPMENT, ELEVATIONS, AND DETAILS SHOWN ARE NOT GUARANTEED TO BE ACCURATE AND ALL INCLUSIVE. EXISTING INFORMATION SHOWN IS APPROXIMATE, BASED ON AVAILABLE RECORD DRAWINGS, AND SHOULD BE VERIFIED BY CONTRACTOR PRIOR TO START OF CONSTRUCTION.
2. CONTRACTOR SHALL COORDINATE LAYOUT OF PROPOSED PIPING AND PUMPS WITH EXISTING HARD PIPE CONNECTIONS. COORDINATE FIELD CHANGES WITH THE ENGINEER OF RECORD IF WORK IS DEVIATES SUBSTANTIALLY FROM THE PROPOSED DESIGN.
3. CONTRACTOR SHALL VERIFY EXACT LOCATIONS, ROUTING, AND DEPTH OF ALL ON-SITE EXISTING UTILITIES BEFORE COMMENCEMENT OF CONSTRUCTION ACTIVITIES. NOTIFY OWNER IF SIGNIFICANT DISCREPANCIES ARE DISCOVERED FROM ITEMS SHOWN IN DRAWINGS.
4. CONTRACTOR SHALL COORDINATE ALL SHUT DOWNS AND SHUT DOWN ACTIVITIES WITH CITY OPERATIONS STAFF AS NEEDED.
5. SEE STRUCTURAL DRAWINGS FOR DIMENSIONS.
6. CONTRACTOR TO CONFIRM SIZE AND LOCATION OF THE WET WELL HATCHES PER SELECTED HATCH AND PUMP MANUFACTURERS' REQUIREMENTS.
7. INSTALL PLUG VALVES TO OPEN UPWARD AND TO CLOSE TO A SEATING POSITION.
8. INSTALL CHECK VALVES SO THAT THE WEIGHT LEVER POSITION IS APPROXIMATELY 45° BELOW THE VALVE HORIZONTAL CENTER LINE IN THE CLOSED POSITION; AND APPROXIMATELY 45° ABOVE THE VALVE HORIZONTAL CENTER LINE IN THE FULL OPEN POSITION.
9. SLEEVED OR CORED DISCHARGE PIPE OPENINGS SEALED WITH LINK-SEAL (OR APPROVED EQUAL) MAY BE SUBSTITUTED FOR POURED IN PLACE WALL PIPES TO ACCOMMODATE CONSTRUCTION METHOD.

PUMP DATA TABLE

PUMP CHARACTERISTICS	PUMP NO. 1
MOTOR DATA NOMINAL SIZE (HP) MAX SPEED (RPM)	7.5 1170
SOLIDS PASSAGE MIN SPHERE (IN)	3
CAPACITY (GPM) DESIGN RUNOUT	200 600
DISCHARGE HEAD (FT) DESIGN RUNOUT SHUT OFF	34 9 38
EFFICIENCY (%) DESIGN	50

STATION OPERATION TABLES

RISING LEVEL CYCLE

WATER LEVEL ELEVATION	ACTION	PUMP(S) IN OPERATION
77.75	PUMPS OFF LEVEL – NO ACTION	LEAD PUMP IS OFF
78.25	LEAD PUMP TURNS ON	LEAD PUMP ON
79.00	HIGH WATER ALARM ON	HIGH WATER ALARM SOUND

FALLING LEVEL CYCLE

WATER LEVEL ELEVATION	ACTION	PUMP(S) IN OPERATION
78.75	HIGH WATER LEVEL ALARM OFF	LEAD PUMP ON
77.75	LEAD PUMP TURNS OFF	LEAD PUMP STOPPED

5engineering

BLACK & VEATCH

5ENGINEERING, LLC
11200 WESTHEIMER ROAD
SUITE 353
HOUSTON, TX 77042
(832) 800-3483
TX FIRM NUMBER F-13748

STATE OF TEXAS
REGISTERED
PROFESSIONAL
ENGINEER
104895
11/09/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT
PLANT EXPANSION
PROCESS MECHANICAL
SCUM PUMP STATION
NO. 2 – SECTIONS

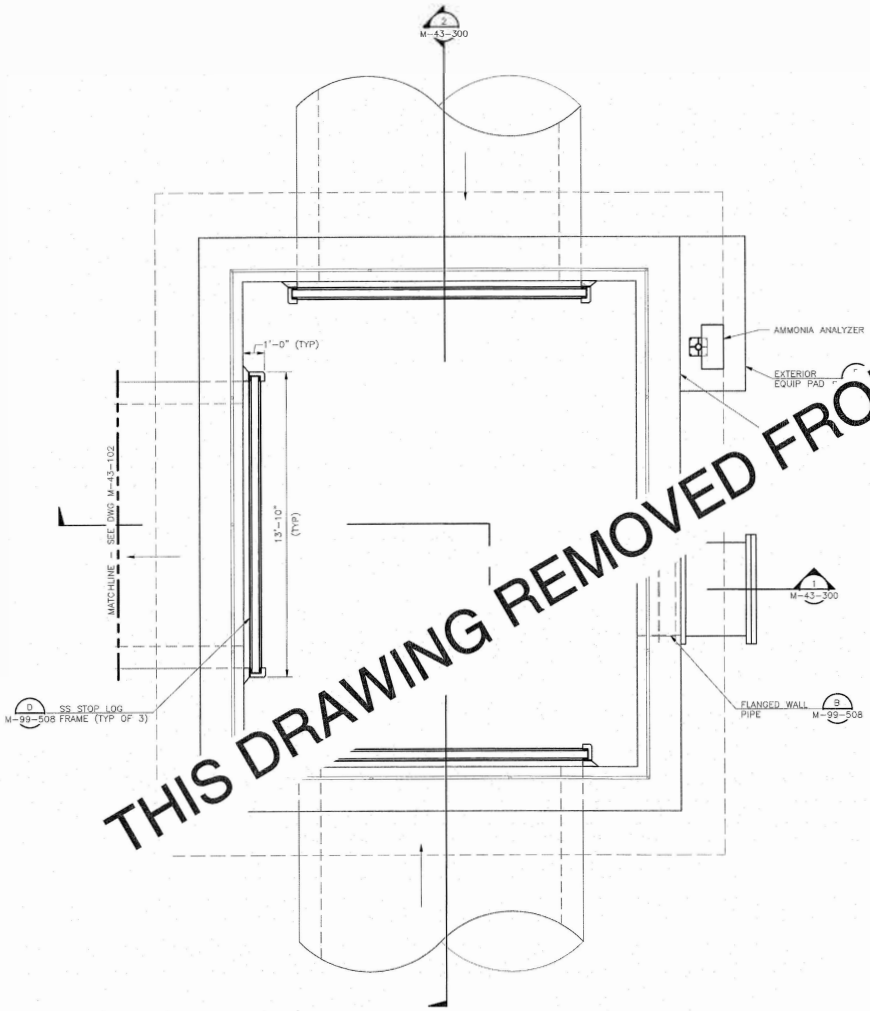
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 263 OF 379	

FOR CITY OF HOUSTON USE ONLY

80367

W-12-302

FILE PATH: P:\0092\001\04 Cadd-GIS\02 SHEETS\42 – SCUM SYSTEM\W-42-302 SCUM PUMP STATION NO. 2 – SECTIONS.dwg



TOP PLAN
3/8" = 1'-0"

12" 0' 1' 2' 3' 4' 5' 6' 7'
3/8" = 1'-0"

N

THIS DRAWING REMOVED FROM PROJECT

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JUSTIN R. SANDT
116988
LICENSED
PROFESSIONAL ENGINEER
11/11/22

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

PROCESS MECHANICAL

UV INFLUENT JUNCTION BOX PLAN

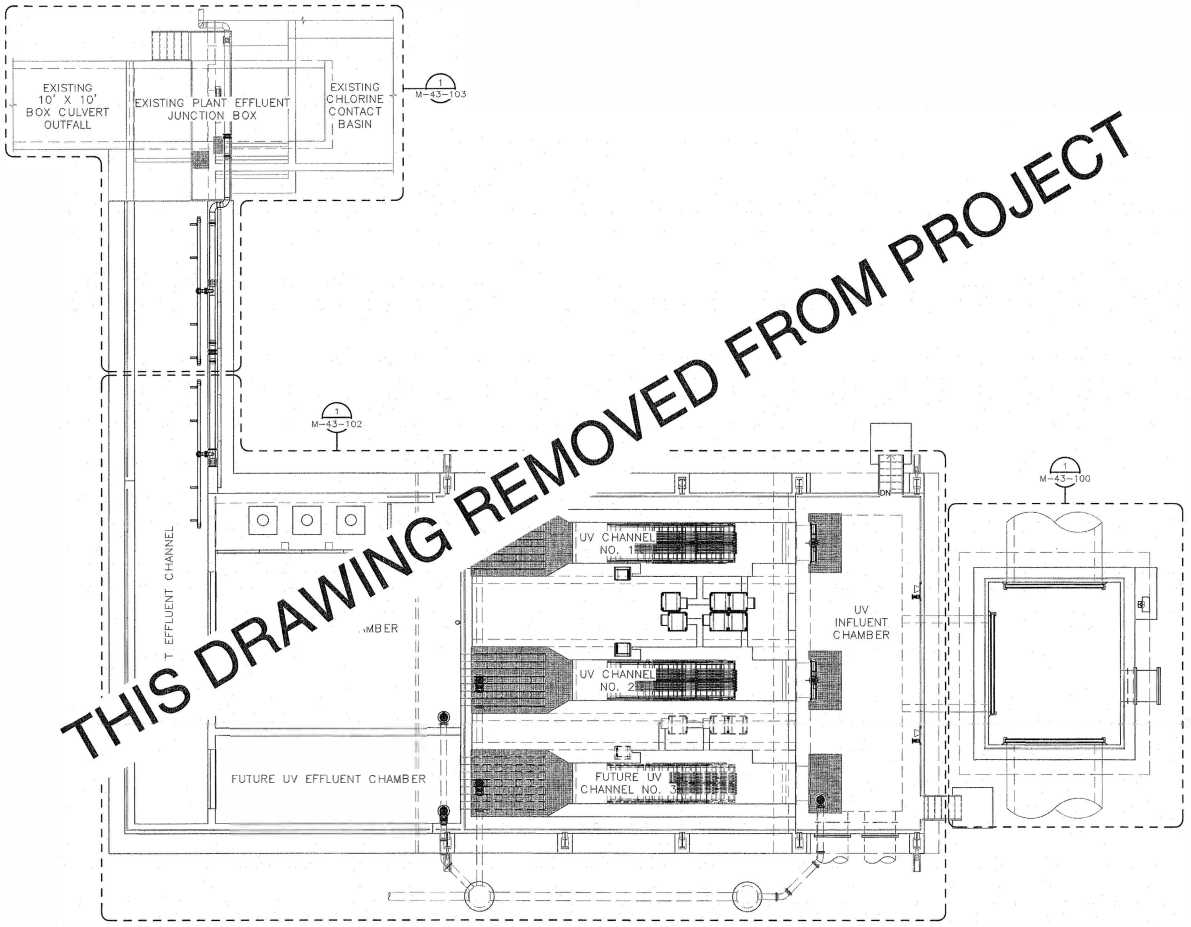
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAOHUA (SHARI) LIN, P.E.
SHEET NO. 264 OF 379	

FOR CITY OF HOUSTON USE ONLY

80367

M-43-100

FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-UV-FACILITY.rvt



OVERALL TOP PLAN
1/8" = 1'-0"

1/8" = 1'-0"

THIS DRAWING REMOVED FROM PROJECT

GENERAL NOTES:

1. CONTRACTOR SHALL COORDINATE CONSTRUCTION ACTIVITIES AND TIE-INS WITH WASTEWATER OPS PER CONSTRUCTION SEQUENCING DOCUMENT.

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC
FB NO. P-6182

STATE OF TEXAS
JUSTIN R. SANDT
110968
LICENSED
PROFESSIONAL ENGINEER
3/3/23

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

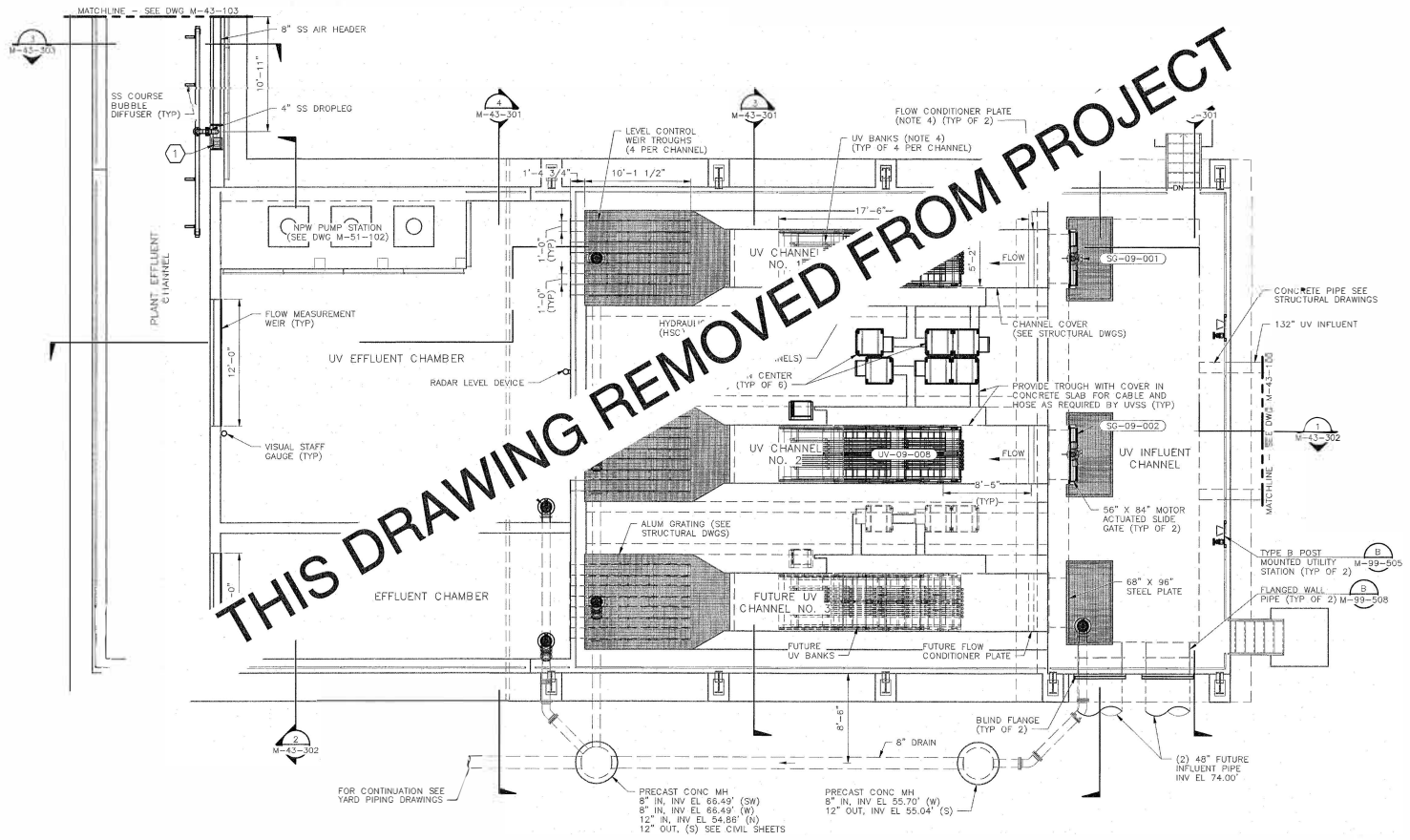
INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT
PLANT EXPANSION
PROCESS MECHANICAL
UV FACILITY
OVERALL TOP PLAN

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 265 OF 379	

80367

M-43-101

FILE PATH: R:\a 340_\402500 - COH Intercontinental Airport WWTP Improvements\4025500-UV-FACILITY.rvt



TOP PLAN
3/16" = 1'-0"

THIS DRAWING REMOVED FROM PROJECT

3/16" = 1'-0"

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

GENERAL NOTES:

1. DO NOT SLOPE CHANNEL FLOOR.
2. CHANNEL WIDTH MUST BE KEPT WITHIN A TOLERANCE OF +/- 1/4".
3. CHANNEL ELEVATIONS MUST BE KEPT WITHIN A TOLERANCE OF +/- 1/4".
4. EQUIPMENT TO BE PROVIDED BY UV SYSTEM SUPPLIER (UVSS).
5. CONTRACTOR SHALL REVIEW ALL UVSS INSTALLATION REQUIREMENTS PRIOR TO CONSTRUCTION OF UV FACILITY AND EQUIPMENT INSTALLATION.
6. CONTRACTOR SHALL COORDINATE UV DISINFECTION SYSTEM INSTALLATION WITH UVSS. FOR ADDITIONAL INFORMATION, REFER TO SPECIFICATION SECTION 13700 OPEN CHANNEL ULTRAVIOLET DISINFECTION SYSTEM.
7. REMOVABLE GRATING SECTIONS SHALL BE EASILY REMOVED BY ONE PERSON. MAXIMUM WEIGHT OF THE SECTIONS SHALL BE IN ACCORDANCE WITH REQUIREMENTS OF THE APPLICABLE JURISDICTION.
8. CONTRACTOR SHALL INSTALL EFFLUENT FLOW MEASUREMENT AND SAMPLING EQUIPMENT REQUIRED BY TCEQ AND CURRENT CITY STANDARDS AND FIELD ROUTE ASSOCIATED PIPING. THE RECOMMENDED LOCATION IS ROOM WITHIN UV CONTROL BUILDING COORDINATE LOCATION WITH CITY.

NOTES BY SYMBOL (#)

1. PIPE SADDLE ANCHOR, SEE DETAIL D/S-99-508.

NO	DATE	REVISION	APP
1	11/11/22	REPACKAGED SET	JRS
0	05/16/22	PERMITTING SET	JRS

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

STATE OF TEXAS · JUSTIN R. SANDT · 116988 · LICENSED PROFESSIONAL ENGINEER · 3/16/23

SURVEYED BY:
UNITED ENGINEERS, INC
FB NO. P-6152

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

PROCESS MECHANICAL

UV FACILITY PLAN

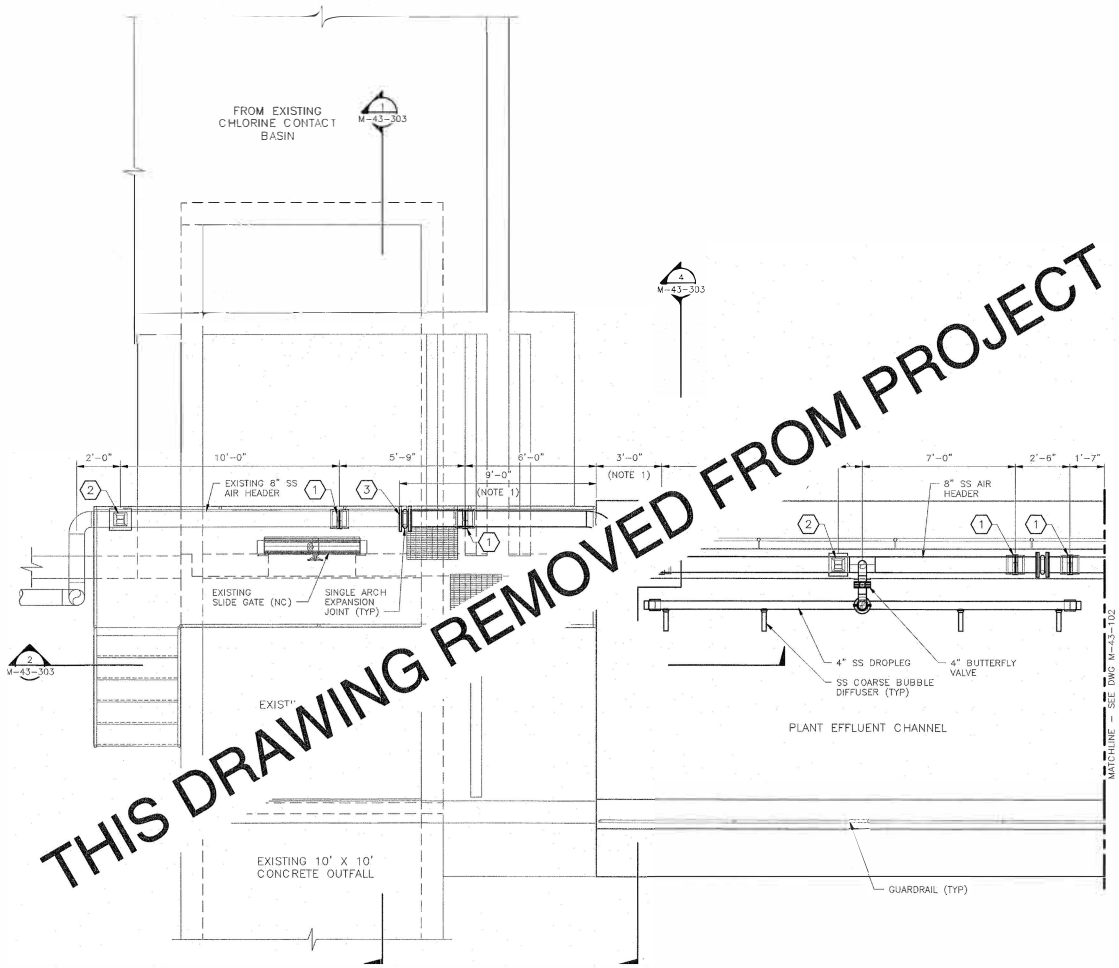
WBS NUMBER	R-00268-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 266 OF 379	

FOR CITY OF HOUSTON USE ONLY

ACCEPTED · 80367 · REGISTERED PROFESSIONAL ENGINEER · 3/16/23

M-43-102

FILE PATH: BIM 360:///402500 - COH Intercontinental Airport WWTP Improvements/402500-UV-FACILITY.rvt



TOP PLAN
3/8" = 1'-0"

12" 0' 1' 2' 3' 4' 5' 6' 7'
3/8" = 1'-0"

N

THIS DRAWING REMOVED FROM PROJECT

GENERAL NOTES:

1. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING STRUCTURES AND ELEVATIONS.
2. CONTRACTOR SHALL COORDINATE CONNECTION TO EXISTING OUTFALL STRUCTURE WITH WASTEWATER OPS.

NOTES BY SYMBOL ⟨#⟩

1. ANGLE GUIDE SUPPORT, SEE DETAIL B/S-99-510.
2. PIPE SADDLE ANCHOR, SEE DETAIL D/S-99-508.
3. INSTALL EXPANSION JOINT AT EXISTING PIPE FLANGE.

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JUSTIN R. SANDT
116988
LICENSED PROFESSIONAL ENGINEER
11/11/22

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
PROCESS MECHANICAL

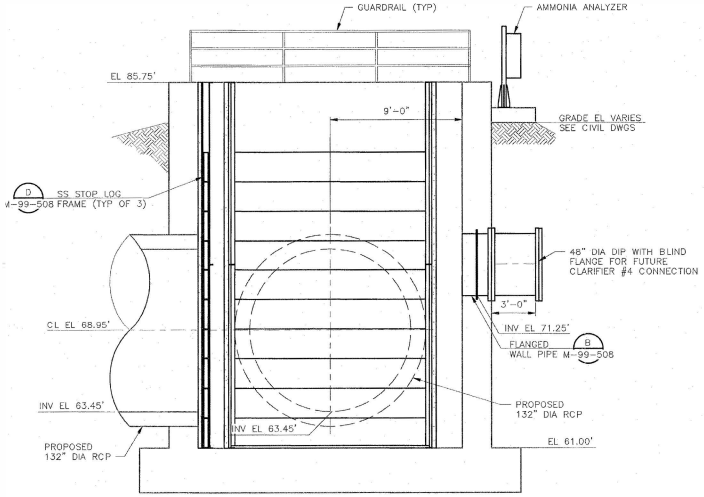
PLANT EFFLUENT JUNCTION BOX PLAN

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 207 OF 379	

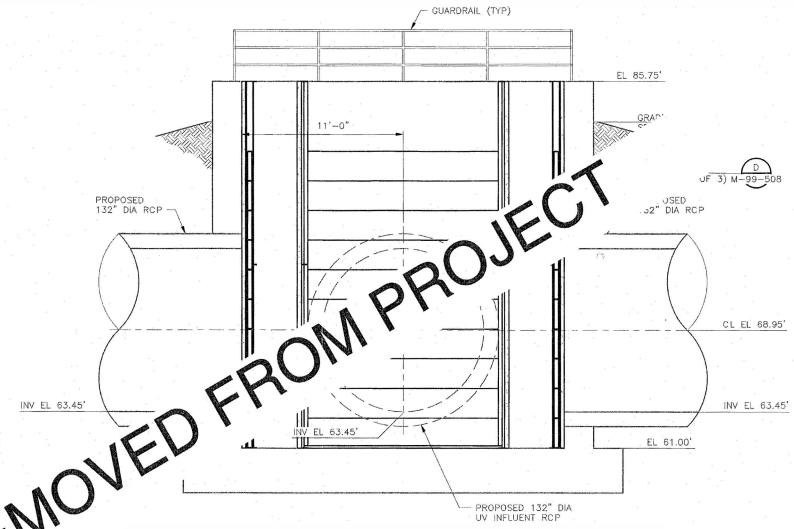
FOR CITY OF HOUSTON USE ONLY
80367

M-43-103

FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTF Improvements/402500-UV-FACILITY.rvt



1 SECTION
M-43-100 1/4" = 1'-0"



2 SECTION
M-43-100 1/4" = 1'-0"

4' 2' 0' 4' 8'
1/4" = 1'-0"

THIS DRAWING REMOVED FROM PROJECT

GENERAL NOTES:

1. CONTRACTOR TO PROVIDE STOP LOG FRAMES AT THE JUNCTION BOX FOR ALL 132" DIAMETER PIPE ENTRANCES.

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JUSTIN R. SANDT
116986
LICENSED
PROFESSIONAL ENGINEER
11/11/22

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

PROCESS MECHANICAL

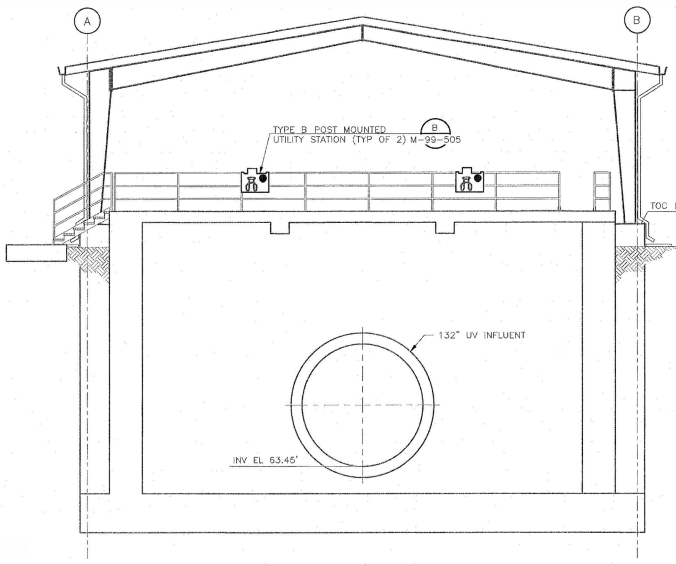
UV INFLUENT JUNCTION BOX SECTIONS

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 268 OF 379	

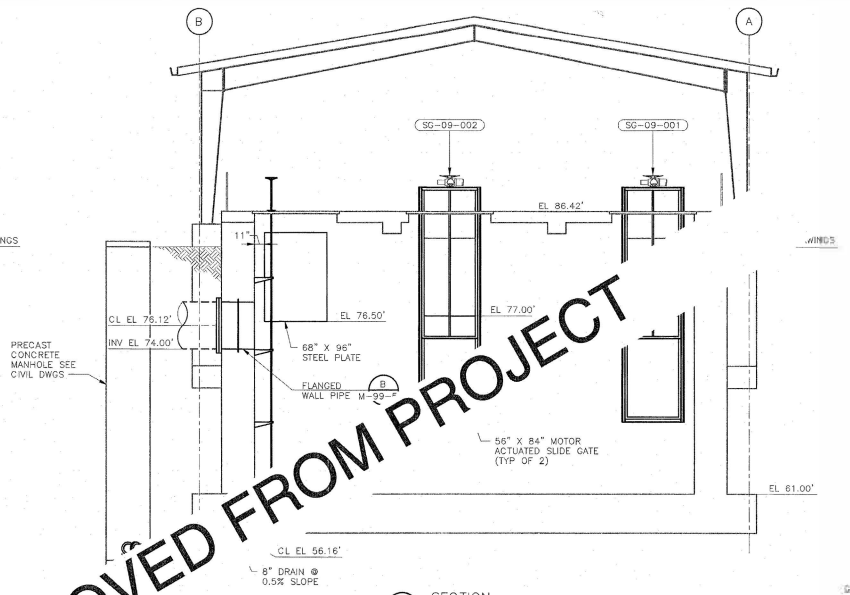
FOR CITY OF HOUSTON USE ONLY
80367

M-43-300

FILE PATH: BIM 360://402530 - COH Intercontinental Airport WWTP Improvements/402530-UV-FACILITY.rvt

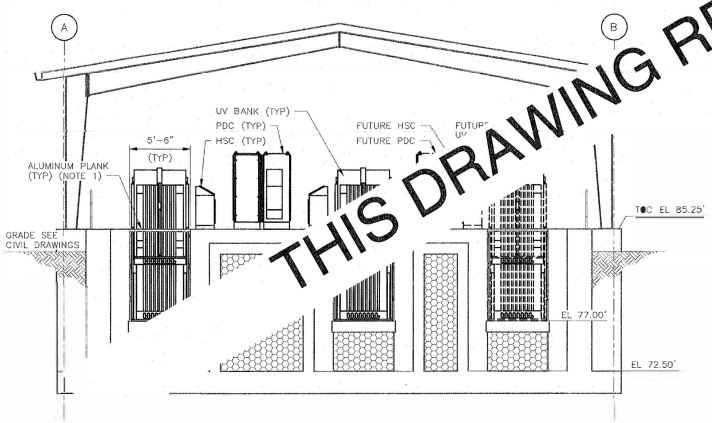


1 SECTION
M-43-102 3/16" = 1'-0"

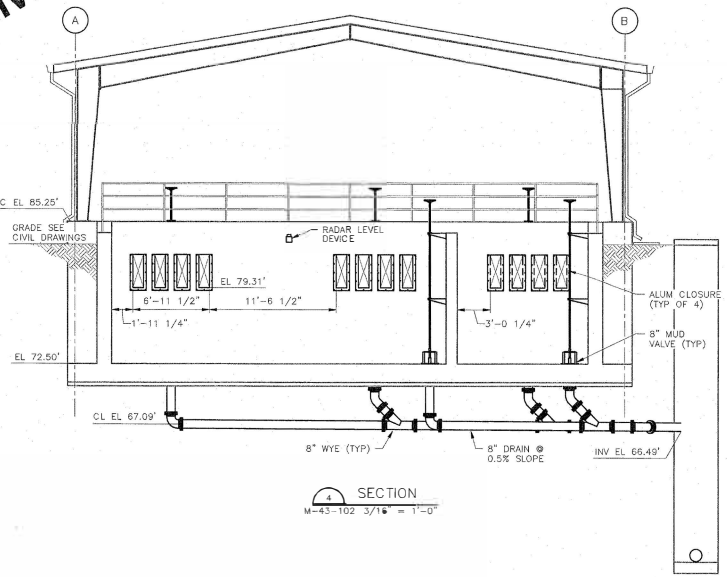


2 SECTION
M-43-102 3/16" = 1'-0"

6" 4' 2' 0' 5' 10'
3/16" = 1'-0"



3 SECTION
M-43-102 3/16" = 1'-0"



4 SECTION
M-43-102 3/16" = 1'-0"

THIS DRAWING REMOVED FROM PROJECT

GENERAL NOTES:

1. ALUMINUM PLANKS SHALL BE PLACED OVER EXTENT OF UV DISINFECTION SYSTEM AS REQUIRED BY UVSS. REMOVABLE ALUM PLANK SECTIONS SHALL BE EASILY REMOVED BY ONE PERSON. MAXIMUM WEIGHT OF THE SECTIONS SHALL BE IN ACCORDANCE WITH REQUIREMENTS OF THE APPLICABLE JURISDICTION.

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
9200 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

STATE OF TEXAS
JUSTIN R. SANDT
116988
LICENSED
PROFESSIONAL ENGINEER
05/11/22

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

PROCESS MECHANICAL

UV FACILITY SECTIONS 1 OF 2

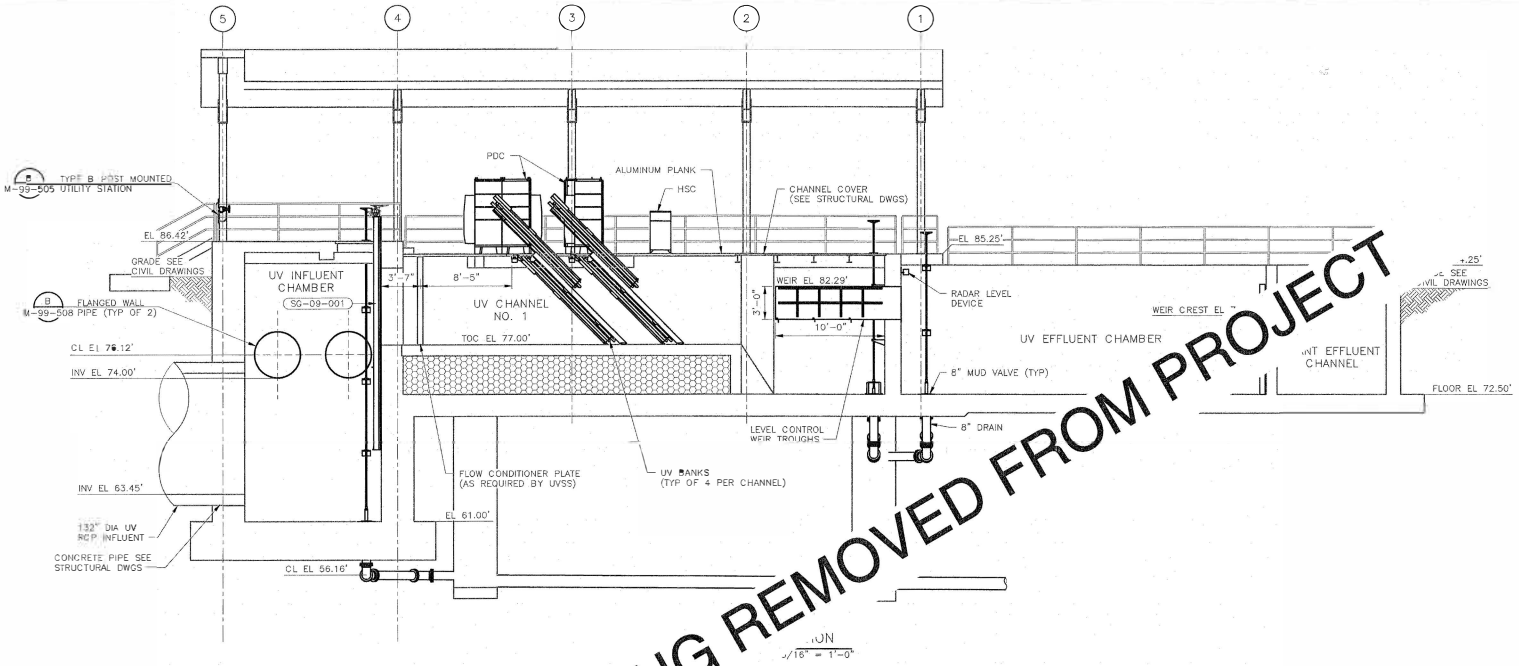
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 269 OF 379	

FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
80367
REGISTERED
PROFESSIONAL
ENGINEER

M-43-301

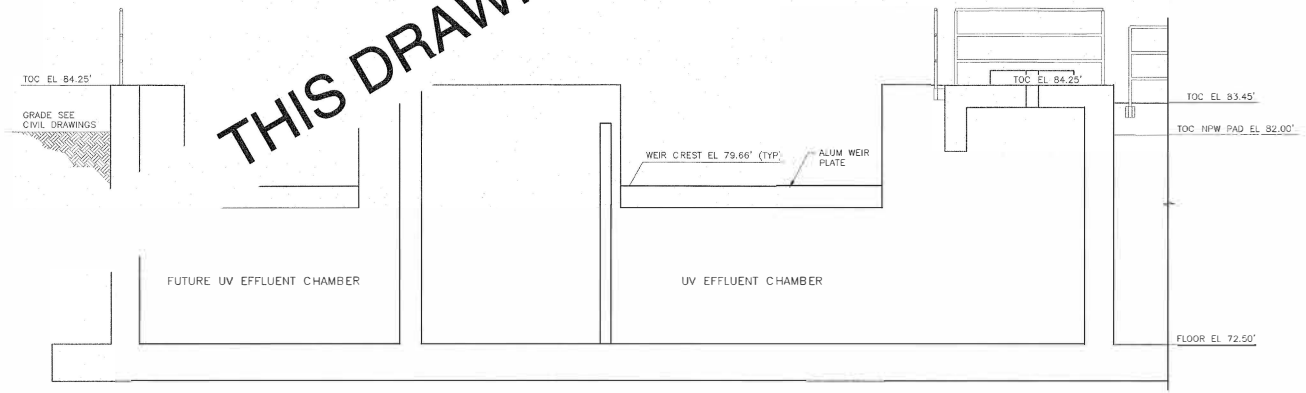
FILE PATH: BIM 360://4021500 - COH Intercontinental Airport WWTP Improvements/4021500-UV-FACILITY.rvt



ION
3/16" = 1'-0"

6" 4' 2' 0' 5' 10'
3/16" = 1'-0"

1' 2' 3' 4' 5' 6' 7'
3/8" = 1'-0"



2 SECTION
M-43-102 3/8" = 1'-0"

THIS DRAWING REMOVED FROM PROJECT

GENERAL NOTES:

1. FOR GENERAL NOTES, SEE DWG M-43-102.

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JUSTIN R. SANDT
116889
LICENSED
PROFESSIONAL ENGINEER
11/11/22

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

PROCESS MECHANICAL

UV FACILITY
SECTIONS 2 OF 2

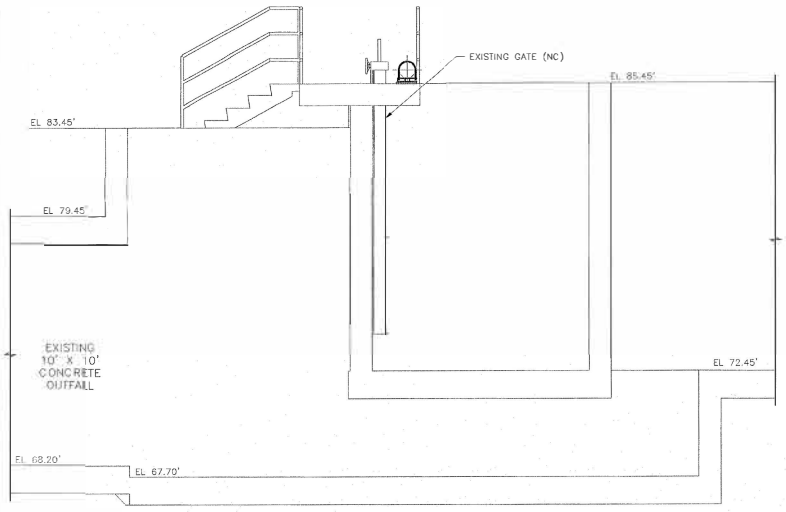
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 270 OF 379	

FOR CITY OF HOUSTON USE ONLY

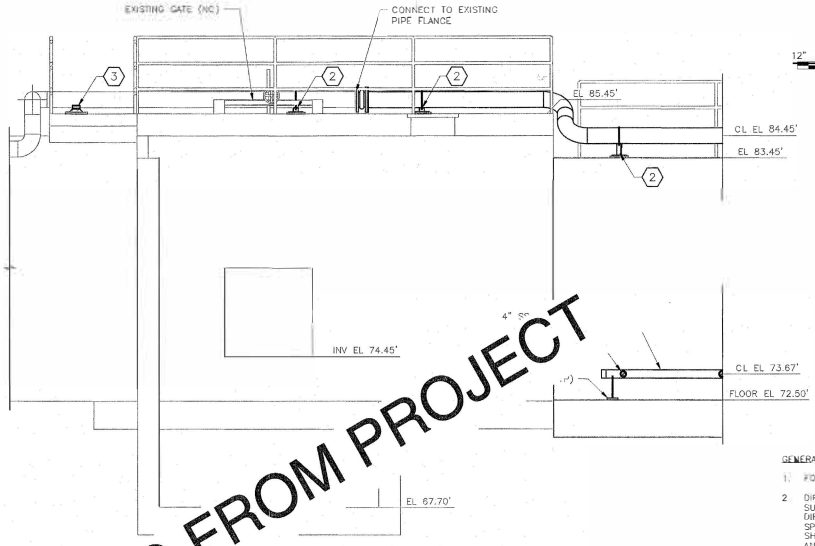
PAUL BOSSE AND E. OWEN
CONCRETE HOUSTON
80367

M-43-302

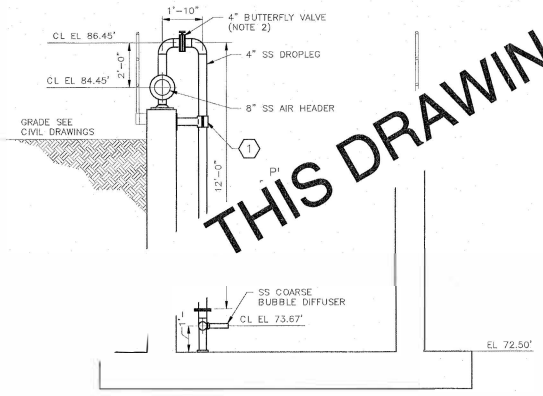
FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTF Improvements/402500-UV-FACILITY.rvt



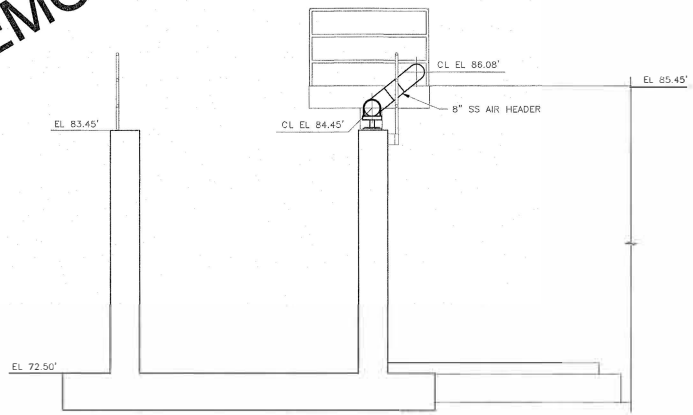
1 SECTION
M-43-103 3/8" = 1'-0"



2 SECTION
M-43-103 3/8" = 1'-0"



3 SECTION
M-43-102 3/8" = 1'-0"



4 SECTION
M-43-103 3/8" = 1'-0"

12" 0' 1' 2' 3' 4' 5' 6' 7'
3/8" = 1'-0"

GENERAL NOTES:

1. FOR GENERAL NOTES, SEE DWG M-43-102.
2. DIFFUSER MANUFACTURER SHALL SUPPLY ALL SUBMERGED PIPING, PIPE SUPPORTS, AND DIFFUSERS FROM THE BUTTERFLY VALVE, PER SPECIFICATION 11572 SECTION 1.1. CONTRACTOR SHALL COORDINATE WITH DIFFUSER MANUFACTURER AND PROVIDE FLANGED CONNECTION AT TRANSITION POINTS.

NOTES BY SYMBOL (#)

1. BASIN VERTICAL SUPPORT GUIDE, SEE DETAIL B/S-99-509.
2. ANGLE GUIDE SUPPORT, SEE DETAIL B/S-99-510.
3. PIPE SADDLE ANCHOR, SEE DETAIL D/S-99-508.

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

THIS DRAWING REMOVED FROM PROJECT

BLACK & VEATCH

BLACK & VEATCH CORPORATION
9210 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC
FB NO. P-6182

STATE OF TEXAS
JUSTIN R. SANDT
116998
LICENSED
PROFESSIONAL ENGINEER
11/11/22

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
PROCESS MECHANICAL

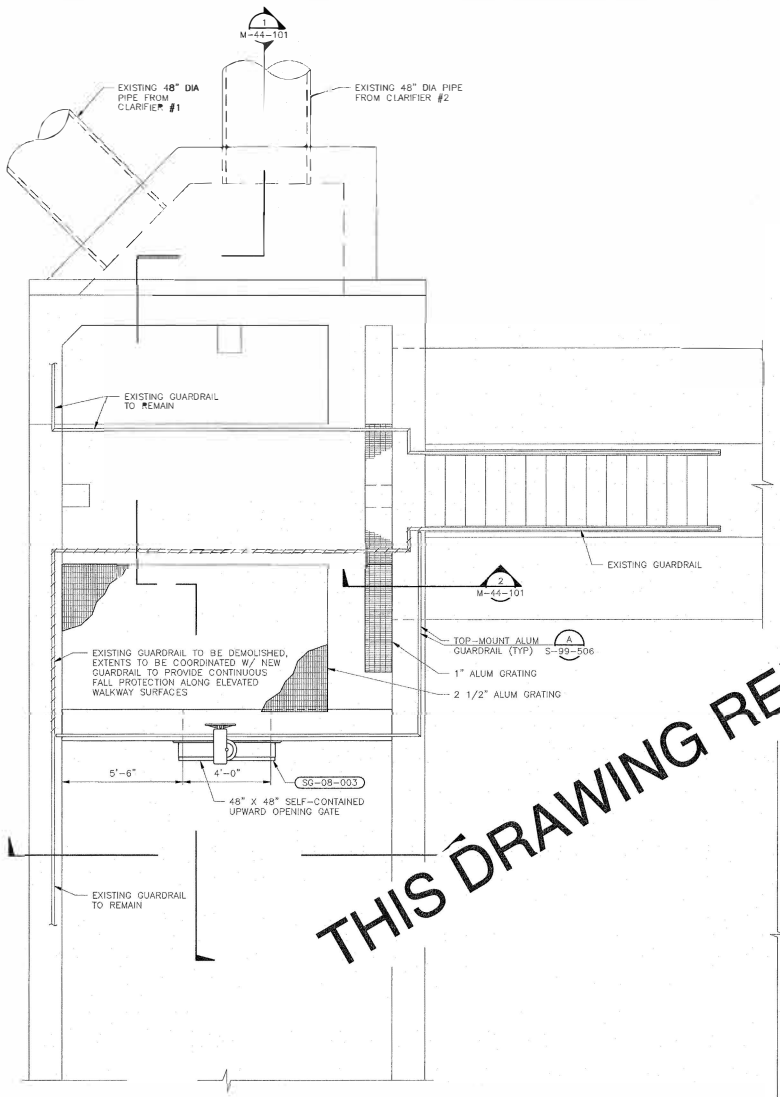
PLANT EFFLUENT JUNCTION BOX SECTIONS

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
B-00285-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 271 OF 579	

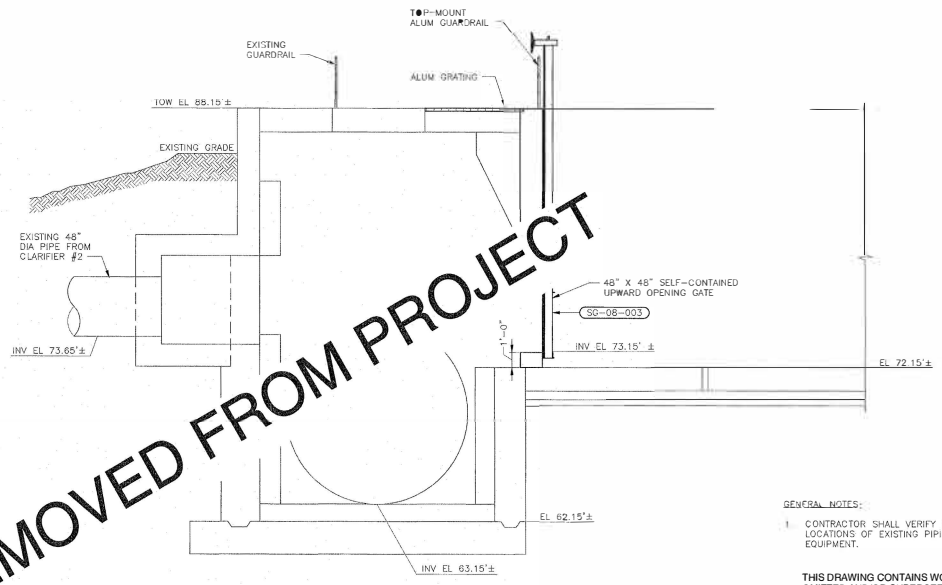
80367
REGISTERED
PROFESSIONAL ENGINEER
HOUSTON, TEXAS

M-43-303

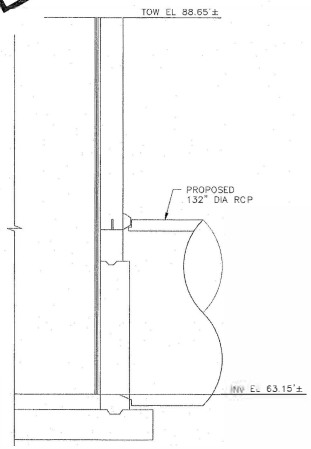
FILE PATH: BIM 360://402503 - CDH Intercontinental Airport WWTP Improvements/402503C-UV-FACILITY.rvt



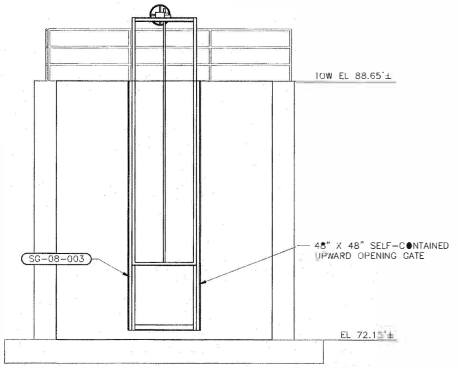
CCB INFLUENT CHAMBER PLAN
3/8" = 1'-0"



1 SECTION
M-44-101 1/4" = 1'-0"



2 SECTION
M-44-101 1/4" = 1'-0"



3 SECTION
M-44-101 1/4" = 1'-0"

THIS DRAWING REMOVED FROM PROJECT

GENERAL NOTES:

1. CONTRACTOR SHALL VERIFY ELEVATIONS AND LOCATIONS OF EXISTING PIPING, STRUCTURES AND EQUIPMENT.

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JUSTIN R. SANDT
115988
LICENSED PROFESSIONAL ENGINEER
11/11/22

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

PROCESS MECHANICAL

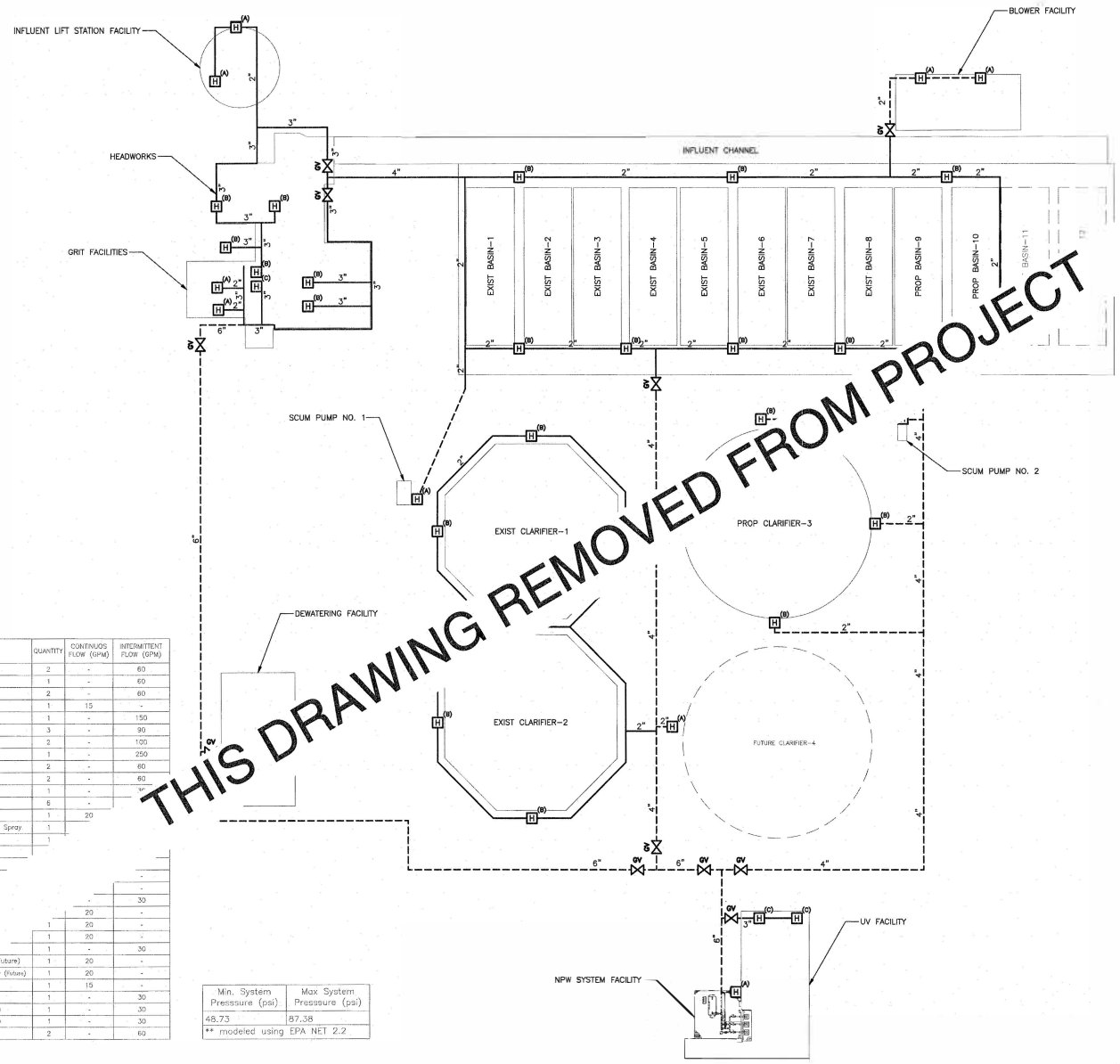
CCB INFLUENT CHAMBER PLAN AND SECTIONS

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 272 OF 379	

FOR CITY OF HOUSTON USE ONLY
80367

M-44-101

FILE PATH: Bild 365 //4402500 — COH Intercontinental Airport WWTP Improvements/4025500-JV-FAC&UTY.rvt



THIS DRAWING REMOVED FROM PROJECT

N

LEGEND:

- EXPOSED NPW
- BURIED NPW
- HOSE BIB (HOSE STATION TYPE)
- GATE ISOLATION VALVE

SHEET NOTES:

1. EXISTING STRUCTURES, EQUIPMENT, ELEVATIONS, AND DETAILS SHOWN ARE NOT GUARANTEED TO BE ACCURATE AND ALL INCLUSIVE. EXISTING INFORMATION SHOWN IS APPROXIMATE, BASED ON AVAILABLE RECORD DRAWINGS, AND SHOULD BE VERIFIED BY CONTRACTOR PRIOR TO START OF CONSTRUCTION.
2. CONTRACTOR SHALL COORDINATE LAYOUT OF PROPOSED PIPING AND PUMPS WITH EXISTING HARD PIPE CONNECTIONS, COORDINATE FIELD CHANGES WITH THE ENGINEER OF RECORD IF WORKS DEVIATE SUBSTANTIALLY FROM THE PROPOSED DESIGN.
3. CONTRACTOR SHALL VERIFY EXACT LOCATIONS, ROUTING, AND DEPTH OF ALL ON-SITE EXISTING UTILITIES BEFORE COMMENCEMENT OF CONSTRUCTION ACTIVITIES. NOTIFY CONSTRUCTION MANAGER IF SIGNIFICANT DISCREPANCIES ARE DISCOVERED FROM ITEMS SHOWN IN DRAWINGS.
4. CONTRACTOR SHALL COORDINATE ALL SHUT DOWNS AND SHUT DOWN ACTIVITIES WITH CITY OPERATIONS STAFF AS NEEDED.

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

SYSTEM	QUANTITY	CONTINUOS FLOW (GPM)	INTERMITTENT FLOW (GPM)
Influent Pump Station Washdown	2	-	60
Headworks Bar Screens	1	-	60
Headworks Washdown	2	-	60
Grit Pump Seal Water	1	15	-
Grit Fluidizer	1	-	150
Grit Facilities Washdown	3	-	90
Grit Cannon	2	-	100
Dewatering Centrifuges (Future)	1	-	250
Dewatering Washdown (Future)	2	-	60
Blower Washdown	2	-	60
Influent Channel Washdown	1	-	-
Aeration Basins Washdown	5	-	-
Clarifier 1 Scum Beach Spray	1	20	
Clarifier 1 Surface Foam Control Spray	1		
Clarifier 1 Scum Spray	1		
Clarifier 1 Washdown			
Clarifier 2 Scum Beach Spray			
Clarifier 2 Surface Foam Contr			-
Clarifier 2 Scum Spray			-
Clarifier 2 Washdow		-	30
Clarifier 3 Scum Beac		20	-
Clarifier 3 Surface Foam	1	20	-
Clarifier 3 Scum Spray	1	20	-
Clarifier 3 Washdown	1	-	30
Clarifier 4 Scum Beach Spray (Future)	1	20	-
Clarifier 4 Surface Foam Control Spray (Future)	1	20	-
Clarifier 4 Scum Spray (Future)	1	15	-
Clarifier 4 Washdown (Future)	1	-	30
Scum Pump Station 1 Washdown	1	-	30
Scum Pump Station 2 Washdown	1	-	30
UV Facility Washdown	2	-	60

Min. System Pressure (psi)	Max System Pressure (psi)
48.73	87.38
** modeled using EPA NET 2.2	

5ENGINEERING, LLC
11200 WESTHEIMER ROAD
SUITE 353
HOUSTON, TX 77042
(832) 800-3483
TX FIRM NUMBER F-13748

PIERO BATTISTINI 104895 LICENSED PROFESSIONAL ENGINEER
11/09/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
PROCESS MECHANICAL

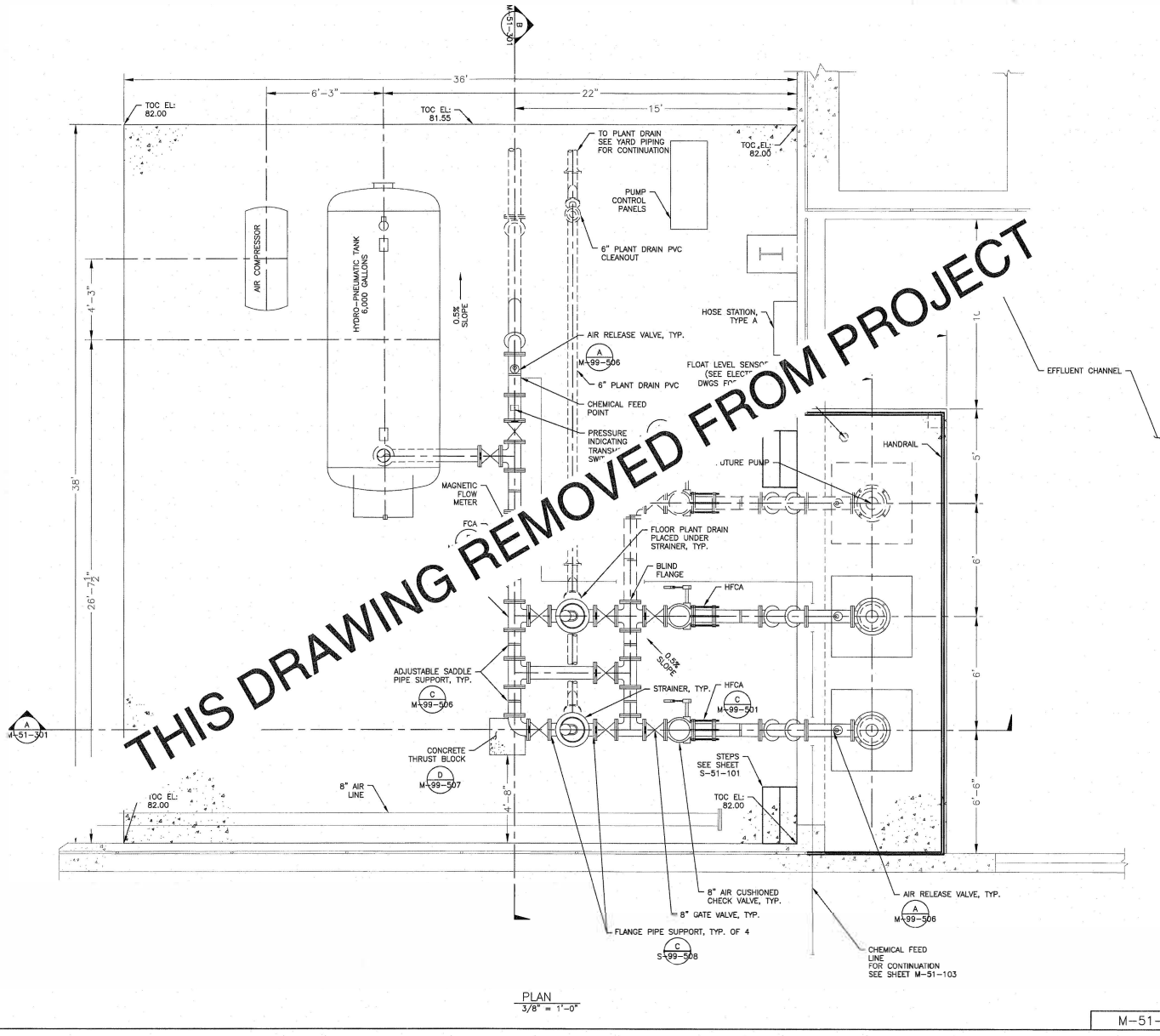
NPW SYSTEM PLANT LAYOUT SCHEMATIC

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 273 OF 379	

APPROVED FOR CONSTRUCTION 89367 CITY DEPT. XFB DATE 10/31/2022

M-51-101

FILE PATH: P:\0092\001\04 Cadd-GIS\02 SHEETS\51 - NPW SYSTEM\M-51-101 NPW SYSTEM - PLANT LAYOUT SCHEMATIC.dwg



PLAN
3/8" = 1'-0"

THIS DRAWING REMOVED FROM PROJECT

NOTES:

1. EXISTING STRUCTURES, EQUIPMENT, ELEVATIONS, AND DETAILS SHOWN ARE NOT GUARANTEED TO BE ACCURATE AND ALL INCLUSIVE. EXISTING INFORMATION SHOWN IS APPROXIMATE, BASED ON AVAILABLE RECORD DRAWINGS, AND SHOULD BE VERIFIED BY CONTRACTOR PRIOR TO START OF CONSTRUCTION.
2. CONTRACTOR SHALL COORDINATE LAYOUT OF PROPOSED PIPING AND PUMPS WITH EXISTING HARD PIPE CONNECTIONS, COORDINATE FIELD CHANGES WITH THE ENGINEER OF RECORD IF WORKS DEVIATE SUBSTANTIALLY FROM THE PROPOSED DESIGN.
3. CONTRACTOR SHALL VERIFY EXACT LOCATIONS, ROUTING, AND DEPTH OF ALL ON-SITE EXISTING UTILITIES BEFORE COMMENCEMENT OF CONSTRUCTION ACTIVITIES. NOTIFY CONSTRUCTION MANAGER IF SIGNIFICANT DISCREPANCIES ARE DISCOVERED FROM ITEMS SHOWN IN DRAWINGS.
4. CONTRACTOR SHALL COORDINATE ALL SHUT DOWNS AND SHUT DOWN ACTIVITIES WITH CITY OPERATIONS STAFF AS NEEDED.
5. SEE STRUCTURAL DRAWINGS FOR DIMENSIONS NOT SHOWN.
6. INSTALL CHECK VALVES SO THAT THE WEIGHT LEVER POSITION IS APPROXIMATELY 45° BELOW THE VALVE HORIZONTAL CENTER LINE IN THE CLOSED POSITION; AND APPROXIMATELY 45° ABOVE THE VALVE HORIZONTAL CENTER LINE IN THE FULL OPEN POSITION.
7. CONTRACTOR TO MAINTAIN 4' MINIMUM COVER FOR NON-POTABLE WATER SYSTEM.
8. LAYOUT OF SELF-BACKWASHING STRAINER (SBS) PIPING IS TYPICAL FOR COMPONENT REQUIREMENTS, BUT VARIES FOR EACH MANUFACTURER. CHANGES MADE TO ACCOMMODATE SPECIFIC SELF-BACKWASHING STRAINERS SHALL BE FINISHED AT NO ADDITIONAL COST TO THE CITY.
9. DRAIN LINE TO MAINTAIN MINIMUM 1/4" PER FOOT SLOPE.
10. CONTRACTOR TO INSTALL AIR RELEASE VALVE PIPING TO FLOOR DRAIN.

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

5engineering
BLACK & VEATCH
5ENGINEERING, LLC
11200 WESTHEIMER ROAD
SUITE 353
HOUSTON, TX 77042
(832) 800-3483
TX FIRM NUMBER F-13748
STATE OF TEXAS
PIERO BATTISTINI
104895
LICENSED PROFESSIONAL ENGINEER
02/28/2023

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

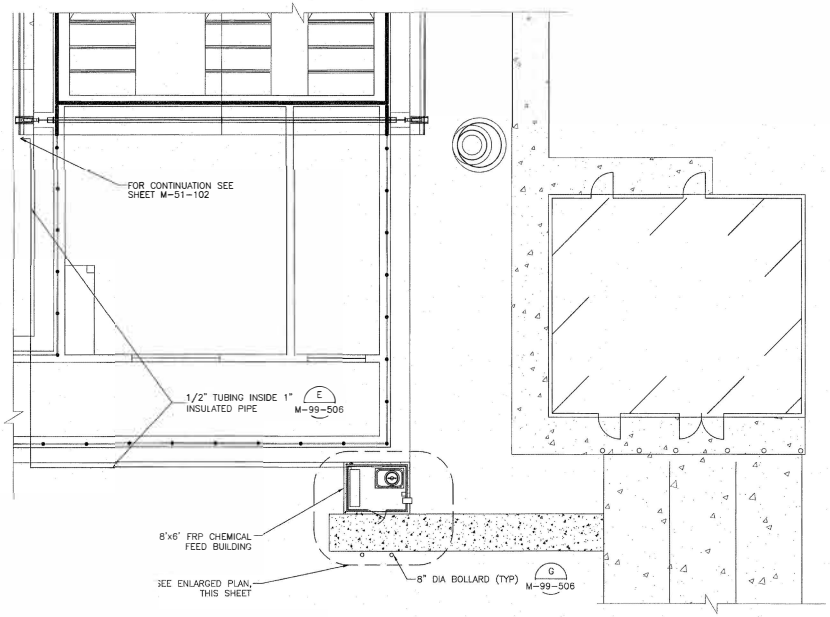
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
PROCESS MECHANICAL
NPW SYSTEM
PLAN

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
	SHEET NO. 274 OF 379

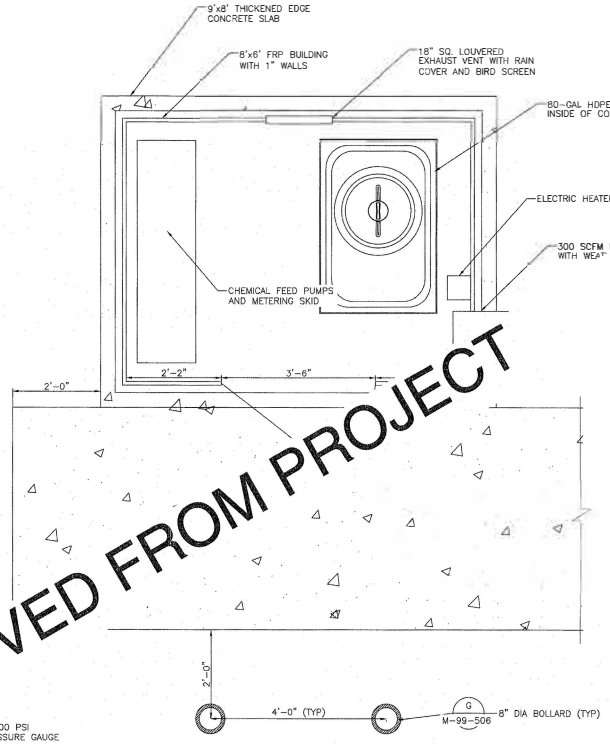
FOR CITY OF HOUSTON USE ONLY
89367

M-51-102

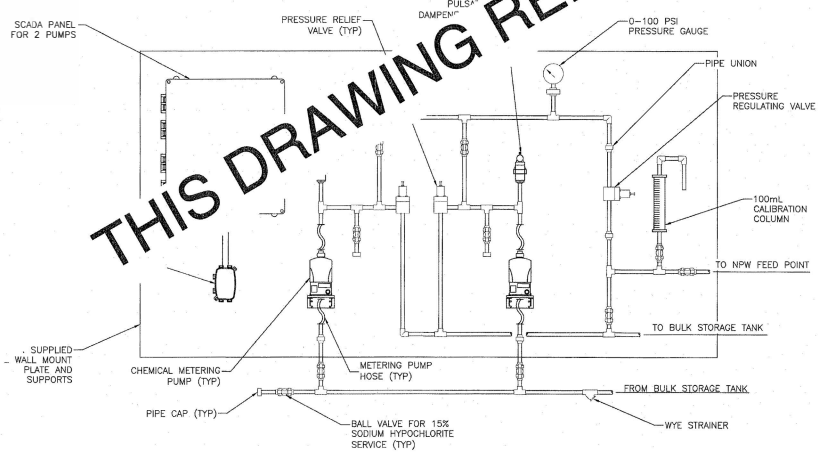
FILE PATH: P:\0092\001\04 Cad-dgn\02 SHEETS\51 - NPW SYSTEM\M-51-102 NPW SYSTEM - PLAN.dwg



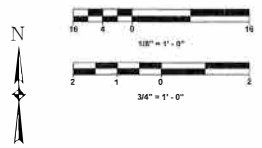
SODIUM HYPOCHLORITE SITE PLAN
SCALE 1/8":1'



ENLARGED PLAN
SCALE 3/4":1'



CHEMICAL FEED PUMP SKID PROFILE
NTS



NOTES:

1. COORDINATE EQUIPMENT WITH SPECIFICATION 11311 NPW CHEMICAL FEED SYSTEM.
2. FIELD ROUTE INTERIOR PIPING ALONG THE INSIDE PERIMETER OF THE CHEMICAL BUILDING.
3. FIELD ROUTE EXTERIOR PIPING AS SHOWN. AVOID CREATING WALKING PATH OBSTRUCTIONS.
4. METERING PUMP AND SKID SHALL BE PROVIDED BY PUMP MANUFACTURER. EQUIPMENT ARRANGEMENT MAY VARY BASED ON SELECTED VENDOR. CONTRACTOR IS RESPONSIBLE FOR ANY MODIFICATIONS TO THE PUMP AND SKID AT NO ADDITIONAL COST TO THE OWNER.

THIS DRAWING REMOVED FROM PROJECT

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

5engineering
BLACK & VEATCH
5ENGINEERING, LLC
11200 WESTHEIMER ROAD
SUITE 353
HOUSTON, TX 77042
(832) 800-3483
TX FIRM NUMBER F-13748
11-09-22

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

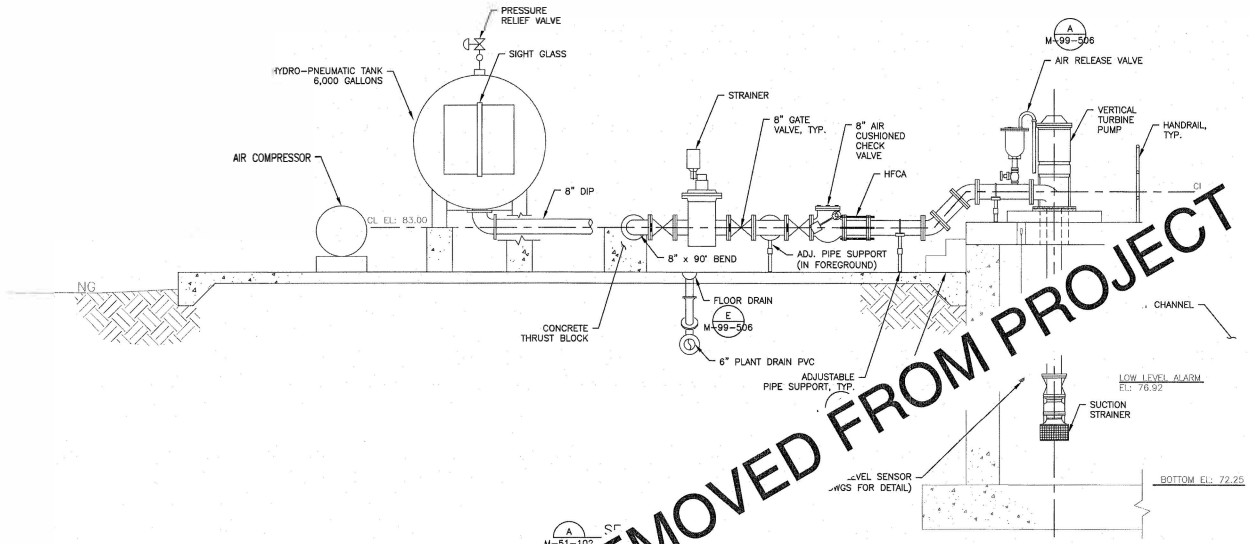
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
PROCESS MECHANICAL
SODIUM HYPOCHLORITE SITE PLAN AND DETAILS

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHAR) LIN, P.E.	
SHEET NO. 275 OF 379	

80367

M-51-103

FILE PATH: P:\0092\001\04 Cadd-GIS\02 SHEETS\51 - NPW SYSTEM\M-51-103 SODIUM HYPOCHLORITE SITE PLAN AND DETAILS.dwg



B SECTION
M-51-102 3/8" = 1'-0"

THIS DRAWING REMOVED FROM PROJECT

2 1 0 4
3/8" = 1' - 0"

NOTES:

1. EXISTING STRUCTURES, EQUIPMENT, ELEVATIONS, AND DETAILS SHOWN ARE NOT GUARANTEED TO BE ACCURATE AND ALL INCLUSIVE. EXISTING INFORMATION SHOWN IS APPROXIMATE, BASED ON AVAILABLE RECORD DRAWINGS, AND SHOULD BE VERIFIED BY CONTRACTOR PRIOR TO START OF CONSTRUCTION.
2. CONTRACTOR SHALL COORDINATE LAYOUT OF PROPOSED PIPING AND PUMPS WITH EXISTING HARD PIPE CONNECTIONS, COORDINATE FIELD CHANGES WITH THE ENGINEER OF RECORD IF WORKS DEVIATE SUBSTANTIALLY FROM THE PROPOSED DESIGN.
3. CONTRACTOR SHALL VERIFY EXACT LOCATIONS, ROUTING, AND DEPTH OF ALL ON-SITE EXISTING UTILITIES BEFORE COMMENCEMENT OF CONSTRUCTION ACTIVITIES. NOTIFY CONSTRUCTION MANAGER IF SIGNIFICANT DISCREPANCIES ARE DISCOVERED FROM ITEMS SHOWN IN DRAWINGS.
4. CONTRACTOR SHALL COORDINATE ALL SHUT DOWNS AND SHUT DOWN ACTIVITIES WITH CITY OPERATIONS STAFF AS NEEDED.
5. SEE STRUCTURAL DRAWINGS FOR DIMENSIONS NOT SHOWN.
6. INSTALL CHECK VALVES SO THAT THE WEIGHT LEVER POSITION IS APPROXIMATELY 45° BELOW THE VALVE HORIZONTAL CENTER LINE IN THE CLOSED POSITION; AND APPROXIMATELY 45° ABOVE THE VALVE HORIZONTAL CENTER LINE IN THE FULL OPEN POSITION.
7. CONTRACTOR TO MAINTAIN 4' MINIMUM COVER FOR NON-POTABLE WATER SYSTEM.
8. LAYOUT OF SELF-BACKWASHING STRAINER (SBS) PIPING IS TYPICAL FOR COMPONENT REQUIREMENTS, BUT VARIES FOR EACH MANUFACTURER. CHANGES MADE TO ACCOMMODATE SPECIFIC SELF-BACKWASHING STRAINERS SHALL BE FINISHED AT NO ADDITIONAL COST TO THE CITY.
9. DRAIN LINE TO MAINTAIN MINIMUM 1/4" PER FOOT SLOPE.
10. CONTRACTOR TO INSTALL AIR RELEASE VALVE PIPING TO FLOOR DRAIN.

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

5engineering
BLACK & VEATCH
5ENGINEERING, LLC
11200 WESTHEIMER ROAD
SUITE 353
HOUSTON, TX 77042
(832) 800-3483
TX FIRM NUMBER F-13748

STATE OF TEXAS
PEDRO BATTISTINI
104895
LICENSED
PROFESSIONAL ENGINEER
11/09/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

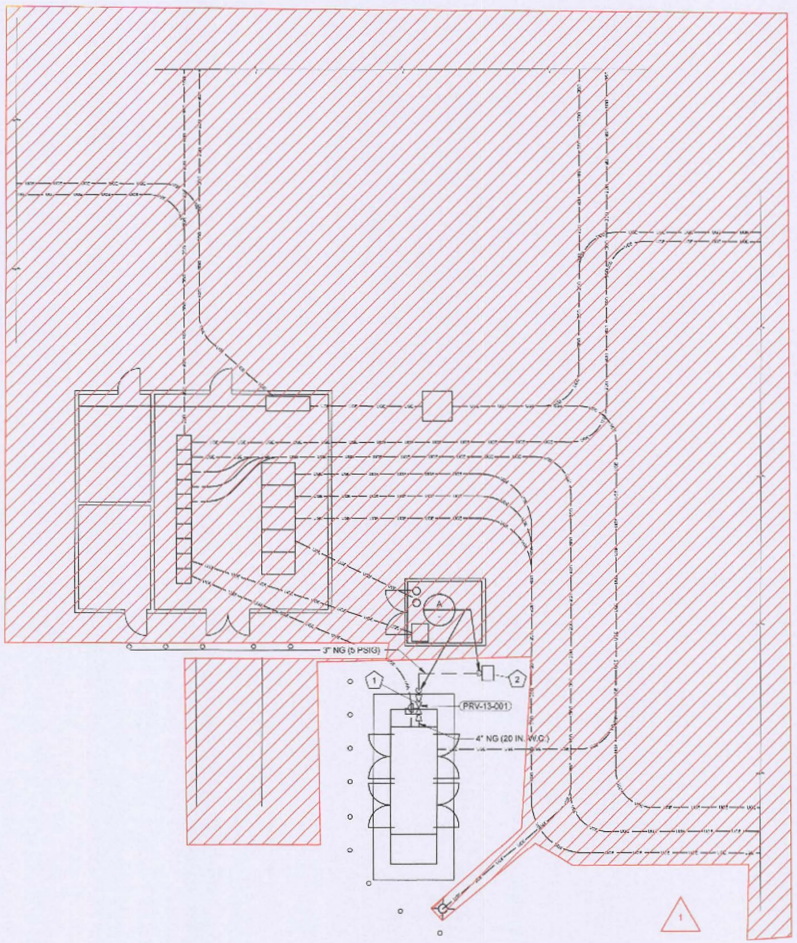
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
PROCESS MECHANICAL
NPW SECTIONS

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
Se XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 276 OF 379	

STATE OF TEXAS
XIAOHUA (SHARI) LIN
80367
LICENSED
PROFESSIONAL ENGINEER

M-51-301

FILE PATH: P:\0092\001\04 Cadd-GIS\02 SHEETS\51 - NPW SYSTEM\M-51-301 NPW SECTIONS.dwg



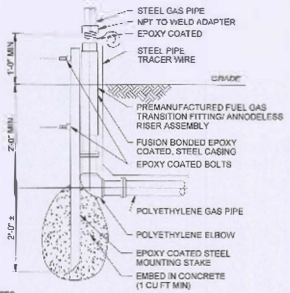
NATURAL GAS ENGINE GENERATOR AREA PLAN
1/4" = 1'-0"

4' 2' 0 4' 8'
1/4"=1'-0"

N

PRESSURE REDUCING VALVE SCHEDULE

UNIT NUMBER	LOCATION	MANUFACTURER	MODEL	SERVICE	TYPE	FLOW RATE (GAS-SCFH) MINIMUM	MAXIMUM	ORDINARY	REDUCED PRESSURE SETPOINT (24 WC)	INLET PRESSURE (IN WC) MINIMUM	MAXIMUM	MINIMUM PRESSURE AT MAXIMUM FLOW (IN WC)	NOTES
PRV-13-001	NATURAL GAS GENERATOR	FISHER CONTROLS	CS800	NATURAL GAS	DIRECT ACTING	0	7674	5600.0	20	124.7	138.9	14	



NOTES:
1. ASSEMBLY SHALL MEET DEPT. OF TRANSPORTATION 192.281, 192.283 AND 192.375.
2. ASSEMBLY SHALL MEET ASTM D2513 CAT-1
3. ASSEMBLY SHALL BE LISTED WITH IAPMO/UPC AND CSA

A FUEL GAS TRANSITION FITTING
M-52-101 NO SCALE

PLAN NOTES:
1. PRV TO BE LOCATED 5 TO 10 FT OF THE ENGINE IN A STRAIGHT RUN OF PIPING
2. METER PROVIDED BY THE UTILITY COMPANY. APPROXIMATE LOCATION

1 THIS VOLUME I DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS RANDY W. CANTRELL 115374 LICENSED PROFESSIONAL ENGINEER 10/1/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
PROCESS MECHANICAL
NATURAL GAS GENERATOR – HEADWORKS AREA PLAN

CHLORINE CONTACT BASIN

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 227 OF 378	

STATE OF TEXAS 80367 REGISTERED PROFESSIONAL ENGINEER

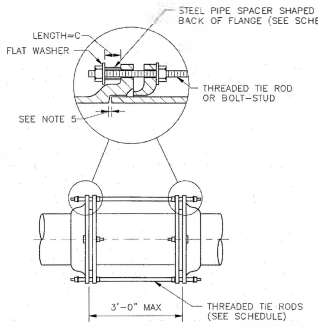
M-52-101

FILE PATH: C:\pw_working\bvw_americas\d1011537\M-52-101.dwg

MECHANICAL TIE ROD SCHEDULE

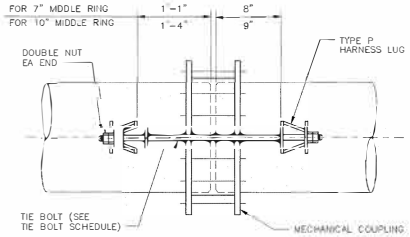
PIPE SIZE (INCHES)	MINIMUM PRESSURE (PSI) (NOTE 1)	TIE RODS		PIPE SPACERS		
		NO. OF RODS (NOTE 2)	DIA OF RODS (INCHES)	DIA OF SPACERS (INCHES)	LENGTH=C (INCHES)	PIPE SCHEDULE
4	350 OR LESS	2	3/4	1	2 1/2	40
6	250 OR LESS 350	2 4	3/4	1	2 1/2	40
8	150 OR LESS 300 350	2 4 6	3/4	1	2 1/2	40
10	200 OR LESS 350	2 4	3/4	1	2 1/2	80
12	150 OR LESS 300 350	2 4 6	3/4	1	2 1/2	80
14	100 OR LESS 200 350	2 4 6	3/4	1	3 1/2	80
16	150 OR LESS 250 350	4 6 8	3/4	1	3 1/2	80
18	150 OR LESS 200 300 350	4 6 8 10	3/4	1	3 1/2	80
20	100 OR LESS 150 200 300 350	4 6 8 10 12	3/4	1	3 1/2	80
24	100 OR LESS 150 200 250 300 350	6 8 10 12 14 16	3/4	1	3 1/2	80
30	100 OR LESS 150 200 250	8 10 12 16	1	1 1/4	4	80
36	100 OR LESS 150 200 250	8 12 16 22	1	1 1/4	4	80
42	100 OR LESS 150 200 250	8 12 16 20	1 1/4	1 1/2	4	80
48	100 OR LESS 150 200 250	12 16 22 28	1 1/4	1 1/2	4	80

A DIP MECHANICAL JOINT COUPLING WITH TIE RODS
NO SCALE



NOTES:

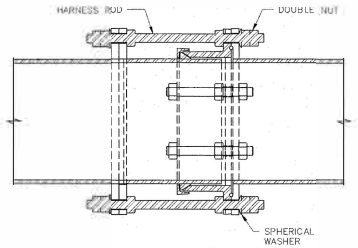
1. PRESSURE SHALL BE THE PRESSURE AT WHICH THE PIPE IS HYDROSTATICALLY TESTED, OR IF THERE IS NO HYDROSTATIC FIELD TEST, IT SHALL BE THE SPECIFIED SHOP TEST PRESSURE.
2. UNLESS OTHERWISE INDICATED, TIE RODS SHALL BE SPACED UNIFORMLY AROUND THE PIPE, BEGINNING WITH THE FIRST TWO AT THE HORIZONTAL CENTERLINE OF THE PIPE, SUBJECT TO THE APPROVAL OF THE ENGINEER.
3. EXCEPT WHERE TIE RODS ARE REQUIRED, BOLTS FOR FOLLOWER RINGS SHALL BE TEE HEAD BOLTS.
4. AT CONTRACTOR'S OPTION, 4" THROUGH 48" MAY BE FURNISHED AS MECHANICAL JOINT STYLE WITH TIE RODS, OR POSITIVE LOCKING SEGMENTS AND/OR RINGS SUCH AS AMERICAN PIPE 14" THROUGH 36" SIZE MAY BE FURNISHED AS FLEX - RING STYLE RESTRAINED JOINTS AND 42" THROUGH 64" SIZE MAY BE FURNISHED AS LOC RING STYLE RESTRAINED JOINTS, OR U.S. PIPE "TR-FLEX", OR GRIFFIN PIPE "SNAP-LOCK".
5. FOR PIPING FLEXIBILITY, PROVIDE GAP LARGE ENOUGH TO FACILITATE PIPE ASSEMBLY AND DISASSEMBLY AT ASSOCIATED FLANGED PIPE JOINTS.



NOTE:

1. THE PIPE FOR LUG DESIGN SHALL INCLUDE WRAPPERS OR PADS OR THE PIPE WALL THICKNESS INCREASED AS REQUIRED TO MEET MINIMUM PIPE THICKNESS IN ACCORDANCE WITH AWWA M-11 DESIGN REQUIREMENTS.

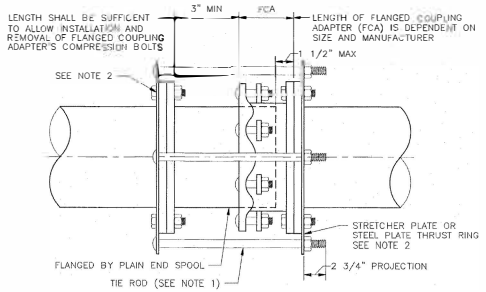
B STEEL PIPE HARNESSED MECHANICAL COUPLING WITH TYPE P LUGS
NO SCALE



NOTES:

1. CONTRACTOR TO DETERMINE AS DISMANTLING JOINT, DRESSER COUPLING, VICTAULIC COUPLING, OR SIMILAR.

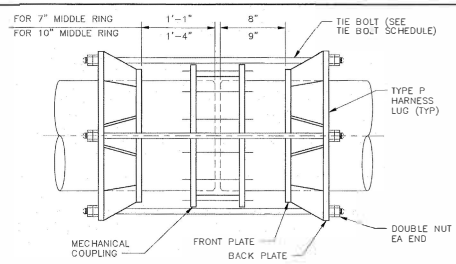
E DISMANTLING JOINT
NO SCALE



NOTES:

1. PROVIDE NUMBER AND DIAMETER OF TIE RODS PER AWWA MANUAL M-11 REQUIREMENTS. EVENLY SPACE INSTALLATION OF THE TIE RODS. LENGTH OF THE TIE RODS TO BE DETERMINED BY THE CONTRACTOR BASED ON SIZE AND LANGED COUPLING ADAPTER AND FINAL LENGTH OF SPOOL PIECE.
2. PROVIDE STRETCHER PLATE FOR ATTACHMENT OF TIE RODS. FOR SIZE SEE AWWA M-11 MANUAL.

F FLANGED COUPLING ADAPTER
NO SCALE



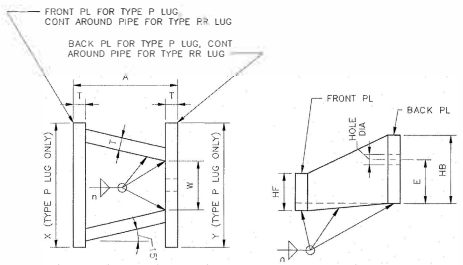
NOTES:

1. THE PIPE FOR LUG DESIGN SHALL INCLUDE WRAPPERS OR PADS OR THE PIPE WALL THICKNESS INCREASED AS REQUIRED TO MEET MINIMUM PIPE THICKNESS IN ACCORDANCE WITH AWWA M-11 DESIGN REQUIREMENTS.
2. WHERE HARNESS LUGS ARE SPECIFIED FOR VERTICAL TURBINE PUMP DISCHARGE OUTLETS, THE NUMBER AND SIZE OF THE TIE RODS FOR THE HARNESS COUPLING MUST EQUAL THE AREA OF THE CONNECTING STEEL PIPE WALL. CONTRACTOR SHALL COORDINATE THIS DESIGN REQUIREMENT WITH THE PUMP AND PIPE MANUFACTURERS.

C STEEL PIPE HARNESSED MECHANICAL COUPLING WITH TYPE RR LUGS
NO SCALE

DIMENSIONS IN INCHES

TIE BOLT DIAMETER	T	A	Y	W	X	HB	E	HF	HOLE DIAMETER
5/8	3/8	5	5	1 3/8	5	3 7/8	3	2	3/4
3/4	3/8	5	5	1 1/2	5	4 1/8	3 1/16	2	7/8
7/8	1/2	5 1/2	5	1 5/8	5	4 1/4	3 1/16	2	1
1	1/2	5 3/4	RING	1 3/4	RING	4 1/2	3 1/4	2	1 1/8
1 1/8	1/2	7	RING	1 7/8	RING	4 3/4	3 5/8	2 1/2	1 1/4
1 1/4	5/8	7 1/2	RING	2	RING	5	3 3/4	2 1/2	1 3/8
1 3/8	5/8	8 3/4	RING	2 1/8	RING	5 3/8	3 3/4	2 1/2	1 1/2
1 1/2	3/4	10	RING	2 1/4	RING	5 1/2	3 7/8	2 1/2	1 5/8
1 5/8	3/4	10 3/4	RING	2 3/8	RING	5 5/8	3 7/8	2 1/2	1 3/4
1 3/4	7/8	12	RING	2 1/2	RING	5 7/8	4	2 1/2	1 7/8
1 7/8	7/8	13	RING	2 5/8	RING	6	4	2 1/2	2
2	1	14	RING	2 3/4	RING	6 1/4	4 1/4	2 1/2	2 1/8
2 1/4	1	15 3/4	RING	3	RING	6 3/4	4 5/16	2 1/2	2 3/8



NOTES:

1. N = PIPE WALL THICKNESS.
2. FOR HARNESS LUG TYPE RR, THE GUSSET PLATES BETWEEN THE FRONT PLATE AND THE BACK PLATE MAY BE PERPENDICULAR TO THE FRONT AND BACK PLATES WITH A MINIMUM CLEAR DISTANCE BETWEEN EACH PAIR OF GUSSET PLATES OF DIMENSION W.

D STEEL PIPE HARNESS LUGS
NO SCALE

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 256

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS — JUSTIN R. SANDT — 116988 — LICENSED PROFESSIONAL ENGINEER — 11/11/22

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

PROCESS MECHANICAL

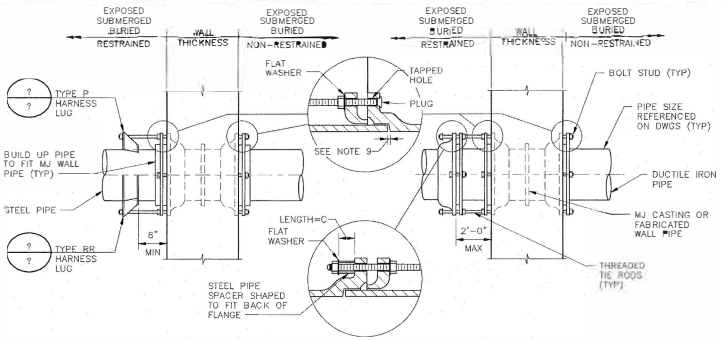
MISCELLANEOUS DETAILS 1 OF 8

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 278 OF 379	

FOR CITY OF HOUSTON USE ONLY — PUBLIC WORKS — 80367 — REGISTERED ENGINEER — HOUSTON, TEXAS

M-99-501

FILE PATH: BW 360 // 402500 - CIH Intercontinental Airport WWTP Improvements/402500-GENERAL.rvt



STEEL PIPE DUCTILE IRON PIPE

NOTES:

1. MECHANICAL JOINT OR PUSH-ON STYLE FITTINGS MAY BE FURNISHED WHERE RESTRAINED JOINTS ARE NOT CALLED FOR ON THE DRAWINGS OR PIPE SCHEDULE.
2. PRESSURE SHALL BE THE PRESSURE AT WHICH THE PIPE IS HYDROSTATICALLY TESTED, OR IF THERE IS NO HYDROSTATIC FIELD TEST, IT SHALL BE THE SPECIFIED SHOP TEST PRESSURE.
3. UNLESS OTHERWISE INDICATED, TIE RODS SHALL BE SPACED UNIFORMLY AROUND THE PIPE, BEGINNING WITH THE FIRST TWO AT THE HORIZONTAL CENTERLINE OF THE PIPE, SUBJECT TO THE APPROVAL OF THE ENGINEER.
4. EXCEPT WHERE TIE RODS ARE REQUIRED, BOLTS FOR FOLLOWER RINGS SHALL BE BOLT-STUDS ON WALL PIPE. ALL BOLT HOLES IN WALL PIPE SHALL BE TAPPED. WALL PIPES SHALL BE ORIENTED SO THAT THE BOLT HOLES STRADDLE THE TOP CENTERLINE.
5. AT CONTRACTOR'S OPTION, 4" THROUGH 48" MAY BE FURNISHED AS MECHANICAL JOINT STYLE WITH TIE RODS, OR POSITIVE LOCKING SEGMENTS AND/OR RINGS SUCH AS AMERICAN JOINT STYLE PIPE 14" THROUGH 36" SIZE MAY BE FURNISHED AS FLEX RING STYLE RESTRAINED JOINTS AND 42" THROUGH 64" SIZE MAY BE FURNISHED AS LOC RING STYLE RESTRAINED JOINTS, OR U.S. PIPE "TR-FLEX", OR GRIFFIN PIPE "SNAP-LOCK".
6. FOR BURIED PIPING, CONTRACTOR SHALL PROVIDE AN ADDITIONAL FIELD JOINT AS CLOSE AS PRACTICAL TO FACE OF WALL, BUT NO MORE THAN 5 FEET.
7. USE WAX TAPE TO PROTECT ALL BURIED FERROUS SURFACES, INCLUDING PAINTED SURFACES. FOR PROTECTION OF ADJACENT PIPE BARREL SURFACES, SHRINK WRAP MAY BE USED IN LIEU OF WAX TAPE. SEE SPECIFICATIONS.
8. WHERE PIPE IS REQUIRED ON ONE SIDE ONLY, PROVIDE MJxPE WALL PIPE.
9. FOR PIPING FLEXIBILITY, PROVIDE GAP LARGE ENOUGH TO FACILITATE PIPE ASSEMBLY AND DISASSEMBLY AT ASSOCIATED FLANGE PIPE JOINTS.

MECHANICAL JOINT TIE ROD SCHEDULE

NOMINAL PIPE SIZE (INCHES)	MAX PRESSURE (PSI) (NOTE 2)	TIE BOLTS		PIPE SPACERS		
		NO. OF RODS (NOTE 3)	DIA OF RODS (INCHES)	DIA (INCHES)	LENGTH (INCHES)	PIPE SCHEDULE
4	350 OR LESS	2	3/4	1	2 1/2	40
6	250 OR LESS 350	2 4	3/4	1	2 1/2	40
8	150 OR LESS 300 350	2 4 6	3/4	1	2 1/2	40
10	200 OR LESS 350	2 4	3/4	1	2 1/2	80
12	150 OR LESS 300 350	2 4 6	3/4	1	2 1/2	80
14	100 OR LESS 200 350	2 4 6	3/4	1	3 1/2	80
16	150 OR LESS 250 350	4 6 8	3/4	1	3 1/2	80
18	150 OR LESS 200 300 350	4 6 8 10	3/4	1	3 1/2	80
20	100 OR LESS 150 200 300 350	4 6 8 10 12	3/4	1	3 1/2	80
24	100 OR LESS 150 200 250 300 350	6 8 10 12 14 16	3/4	1	3 1/2	80
30	100 OR LESS 150 200 250	8 10 12 16	1	1 1/4	4	80
36	100 OR LESS 150 200 250	8 12 18 22	1	1 1/4	4	80
42	100 OR LESS 150 200 250	8 12 16 20	1 1/4	1 1/2	4	80
48	100 OR LESS 150 200 250	12 16 22 28	1 1/4	1 1/2	4	80

A MECHANICAL JOINT WALL PIPE WITH TIE RODS
NO SCALE

STEEL PIPE TIE BOLT SCHEDULE FOR HARNESSED JOINTS

NOMINAL PIPE SIZE (INCHES)	PRESSURE (psi) (NOTE 1)	LUG TYPE	TIE BOLT DIA (INCHES)	NO. BOLTS (NOTE 3)
6	250 OR LESS	P	5/8	2
8	250 OR LESS	P	5/8	2
10	50	P	5/8	2
	100	P	5/8	2
	150	P	5/8	2
	200	P	3/4	2
	250	P	3/4	2
12	50	P	5/8	2
	100	P	5/8	2
	150	P	5/8	2
	200	P	3/4	2
	250	P	7/8	2
14	50	P	5/8	2
	100	P	5/8	2
	150	P	3/4	2
	200	P	7/8	2
	250	P	1	2
16	50	RR	5/8	2
	100	RR	3/4	2
	150	RR	7/8	2
	200	RR	1	2
	250	RR	1 1/8	2
18	50	RR	5/8	2
	100	RR	7/8	2
	150	RR	1	2
	200	RR	1 1/4	2
	250	RR	1 1/4	2
20	50	RR	5/8	2
	100	RR	7/8	2
	150	RR	1 1/8	2
	200	RR	1 1/4	2
	250	RR	1	4
24	50	RR	3/4	2
	100	RR	3/4	4
	150	RR	1	4
	200	RR	1 1/8	4
	250	RR	1 1/4	4
30	50	RR	3/4	4
	100	RR	1	4
	150	RR	1 1/8	4
	200	RR	1 1/4	4
	250	RR	1 1/2	4
36	50	RR	7/8	4
	100	RR	1 1/8	4
	150	RR	1 3/8	4
	200	RR	1 1/4	6
	250	RR	1 3/8	6
42	50	RR	7/8	4
	100	RR	1 1/4	4
	150	RR	1 1/4	6
	200	RR	1 1/2	6
	250	RR	1 3/4	6
48	50	RR	1	4
	100	RR	1 1/2	4
	150	RR	1 1/2	6
	200	RR	1 3/4	6
	250	RR	2	6
54	50	RR	1 1/8	4
	100	RR	1 3/8	4
	150	RR	1 3/4	6
	200	RR	2	6
	250	RR	1 3/4	6
60	50	RR	1 1/4	4
	100	RR	1 1/2	6
	150	RR	1 1/2	8
	200	RR	1 3/4	8
	250	RR	1 3/4	10
66	50	RR	1 3/8	4
	100	RR	1 3/4	6
	150	RR	1 3/4	8
	200	RR	1 3/4	10
	250	RR	1 3/4	12
72	50	RR	1 1/4	6
	100	RR	1 1/2	8
	150	RR	2	8
	200	RR	2	10
	250	RR	2	12
78	50	RR	1 3/8	8
	100	RR	2	8
	150	RR	2	8
	200	RR	2	10
	250	RR	2 1/4	12
84	50	RR	1 1/2	8
	100	RR	1 3/4	8
	150	RR	2	10
	200	RR	2 1/4	12
	250	RR	2 1/4	14
90	50	RR	1 1/2	8
	100	RR	2	8
	150	RR	2	10
	200	RR	2 1/4	12
	250	RR	2 1/4	14
96	50	RR	1 3/4	8
	100	RR	2	8
	150	RR	2 1/4	10
	200	RR	2 1/4	12
	250	RR	2 1/4	16

NOTES:

1. PRESSURE SHALL BE THE PRESSURE AT WHICH THE PIPE IS HYDROSTATICALLY TESTED, OR IF THERE IS NO HYDROSTATIC FIELD TEST, IT SHALL BE THE SPECIFIED SHOP TEST PRESSURE.
2. NUMBER OF TIE BOLTS IS BASED ON AN ALLOWABLE STRESS ON NET TENSION AREA OF 40,000 PSI.
3. UNLESS OTHERWISE INDICATED, TIE BOLTS SHALL BE SPACED UNIFORMLY AROUND THE PIPE, BEGINNING WITH THE FIRST TWO AT THE HORIZONTAL CENTERLINE OF THE PIPE, SUBJECT TO THE APPROVAL OF THE ENGINEER.

B STEEL PIPE TIE BOLT SCHEDULE FOR HARNESSED JOINTS
NO SCALE

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC
FB NO. P-6182

STATE OF TEXAS
JUSTIN R. SANDT
116986
LICENSED
PROFESSIONAL ENGINEER
11/11/22

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

PROCESS MECHANICAL

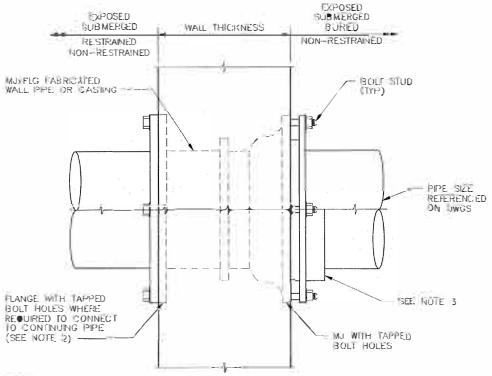
MISCELLANEOUS DETAILS 2 OF 8

W.O.'S NUMBER	
IP-00285-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
JEXIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 279 OF 379	

FOR CITY OF HOUSTON USE ONLY
80367

M-99-502

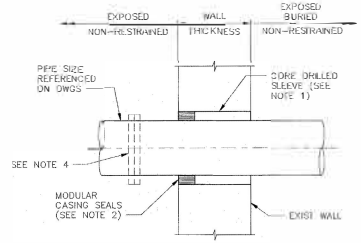
FILE PATH: BIM 360://4025500 - COH Intercontinental Airport WWTP Improvements/4025500-GENERAL.rvt



NOTES :

1. WALL PIPE SHALL BE ORIENTED SO THAT THE BOLT HOLES STRADDLE THE TOP CENTERLINE.
2. WHERE PIPE IS REQUIRED ON ONE SIDE ONLY, PROVIDE MJxPE WALL PIPE.
3. FOR STEEL PIPE APPLICATIONS BUILD UP END OF STEEL PIPE TO FIT MJ WALL PIPE.
4. FOR BURIED PIPING, CONTRACTOR SHALL PROVIDE AN ADDITIONAL FIELD JOINT AS CLOSE AS PRACTICAL TO FACE OF WALL, BUT NO MORE THAN 5 FEET.
5. USE WAX TAPE TO PROTECT ALL BURIED FERROUS SURFACES, INCLUDING PAINTED SURFACES. FOR PROTECTION OF ADJACENT PIPE BARREL SURFACES, SHRINK WRAP MAY BE USED IN LIEU OF WAX TAPE. SEE SPECIFICATIONS.

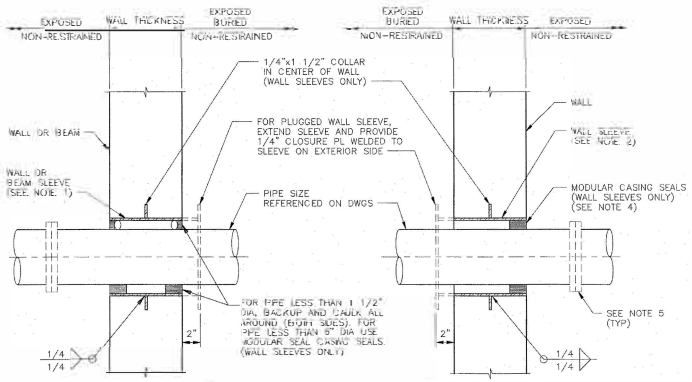
A FLANGED – MECHANICAL JOINT WALL PIPE
NO SCALE



NOTES :

1. CORE DRILL SMOOTH WALL OPENING. COORDINATE CORE DIAMETER AS REQUIRED WITH CASING SEAL MANUFACTURER. MAXIMUM CORE DIAMETER SHALL BE 12".
2. WHEN SOIL MAY BE PRESENT, USE TWO SETS OF CASING SEALS. ONE AT EACH FACE OF WALL.
3. FIRESAFING TO BE PROVIDED AT ALL RATED WALLS INDICATED ON THE DRAWINGS AND INSTALLED PER ACCEPTED UL RATED SYSTEM.
4. TO MINIMIZE SLEEVE SIZE, PROVIDE A SCREW-ON FLANGE, GROOVED COUPLING, OR MECHANICAL COUPLING WITH ANCHOR STUDS ON ONE SIDE OF OPENING.
5. FOR BURIED PIPING, CONTRACTOR SHALL PROVIDE AN ADDITIONAL FIELD JOINT AS CLOSE AS PRACTICAL TO FACE OF WALL, BUT NO MORE THAN 5 FEET.
6. USE WAX TAPE TO PROTECT ALL BURIED FERROUS SURFACES INCLUDING PAINTED SURFACES. FOR PROTECTION OF ADJACENT PIPE BARREL SURFACES, SHRINK WRAP MAY BE USED IN LIEU OF WAX TAPE. SEE SPECIFICATIONS.

D CORE DRILLED WALL SLEEVE
NO SCALE



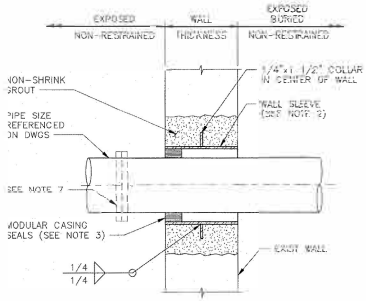
FOR PIPE SMALLER THAN 6 INCH DIAMETER

FOR PIPE 6 INCH DIAMETER AND LARGER

NOTES :

1. SCHEDULE 40 GALV STEEL PIPE SLEEVE. SIZE TO PROVIDE 3/4" ANNULAR SPACE AROUND PIPE FOR ALL BEAM SLEEVES AND FOR WALL SLEEVES FOR PIPES SMALLER THAN 1 1/2" DIAMETER. FOR PIPE SMALLER THAN 6" DIAMETER, COORDINATE WALL SLEEVE DIAMETER WITH MODULAR CASING SEAL MANUFACTURER.
2. WALL SLEEVE, SCHEDULE 40 STEEL PIPE FOR 12" AND SMALLER SLEEVES, 1/4" STEEL PIPE FOR SLEEVES LARGER THAN 12", AND HOT DIP GALVANIZED AFTER FABRICATION, 304 SS, OR OTHER MATERIAL AS SPECIFIED OR INDICATED ON DRAWINGS. COORDINATE WALL SLEEVE DIAMETER WITH MODULAR CASING SEAL MANUFACTURER.
3. FIRESAFING TO BE PROVIDED AT ALL RATED WALLS INDICATED ON THE DRAWINGS AND INSTALLED PER ACCEPTED UL RATED SYSTEM.
4. WHERE SOIL MAY BE PRESENT, USE TWO SETS OF CASING SEALS. ONE AT EACH FACE OF WALL.
5. TO MINIMIZE SLEEVE SIZE, PROVIDE A SCREW-ON FLANGE, GROOVED COUPLING, OR MECHANICAL COUPLING WITH ANCHOR STUDS ON ONE SIDE OF OPENING.
6. FOR BURIED PIPING, CONTRACTOR SHALL PROVIDE AN ADDITIONAL FIELD JOINT AS CLOSE AS PRACTICAL TO FACE OF WALL, BUT NO MORE THAN 5 FEET.
7. USE WAX TAPE TO PROTECT ALL BURIED FERROUS SURFACES INCLUDING PAINTED SURFACES. FOR PROTECTION OF ADJACENT PIPE BARREL SURFACES, SHRINK WRAP MAY BE USED IN LIEU OF WAX TAPE. SEE SPECIFICATIONS.

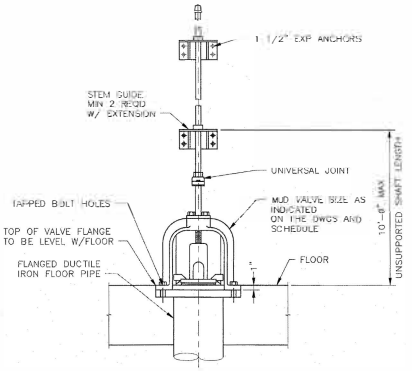
B CONCRETE WALL OR BEAM SLEEVE
NO SCALE



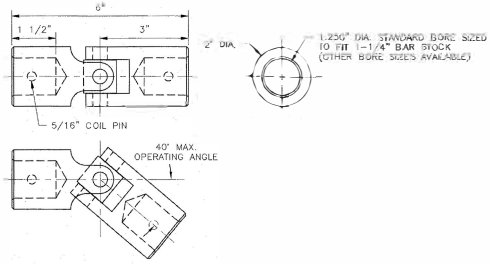
NOTES :

1. CUT OPENING FOR WALL SLEEVE, ROUGHEN EXIST CONCRETE, APPLY BONDING AGENT AND FILL WITH NON-SHRINK GROUT PER THE SPECIFICATIONS. DIAMETER OF OPENING TO BE COLLAR DIAMETER + 4".
2. WALL SLEEVE, SCHEDULE 40 STEEL PIPE FOR 12" AND SMALLER SLEEVES, 1/4" STEEL PIPE FOR SLEEVES LARGER THAN 12", AND HOT DIP GALVANIZED AFTER FABRICATION, 304 SS, OR OTHER MATERIAL AS SPECIFIED OR INDICATED ON DRAWINGS. COORDINATE SLEEVE SIZE WITH MODULAR CASING SEAL MANUFACTURER.
3. WHERE SOIL MAY BE PRESENT, USE TWO SETS OF CASING SEALS. ONE AT EACH FACE OF WALL.
4. FIRESAFING TO BE PROVIDED AT ALL RATED WALLS INDICATED ON THE DRAWINGS AND INSTALLED PER ACCEPTED UL RATED SYSTEM.
5. FOR BURIED PIPING, CONTRACTOR SHALL PROVIDE AN ADDITIONAL FIELD JOINT AS CLOSE AS PRACTICAL TO FACE OF WALL, BUT NO MORE THAN 5 FEET.
6. USE WAX TAPE TO PROTECT ALL BURIED FERROUS SURFACES INCLUDING PAINTED SURFACES. FOR PROTECTION OF ADJACENT PIPE BARREL SURFACES, SHRINK WRAP MAY BE USED IN LIEU OF WAX TAPE. SEE SPECIFICATIONS.
7. TO MINIMIZE SLEEVE SIZE, PROVIDE A SCREW-ON FLANGE, GROOVED COUPLING, OR MECHANICAL COUPLING WITH ANCHOR STUDS ON ONE SIDE OF OPENING.

C WALL SLEEVE AT EXISTING CONCRETE WALL
NO SCALE



E MUD VALVE
NO SCALE



NOTES:

1. STANDARD U-JOINT BORE IS SIZED TO FIT 1-1/4" BAR STOCK.
2. A EPDM BOOT IS RECOMMENDED TO PROTECT THE WORKING KNUCKLE OF THE JOINT, AND CAN BE PACKED WITH A WATER-PROOF LUBRICATING GREASE FOR PROLONGED OPERATING LIFE. GREASE BY CUSTOMER. THE OPTIONAL BOOT INCLUDES A PAIR OF STAINLESS STEEL HOSE-TYPE BAND CLAMPS.
3. THE U-JOINT IS INTENDED FOR MANUAL OPERATION.

F UNIVERSAL JOINT
NO SCALE

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 500
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC
FB NO. P-5152

STATE OF TEXAS
JUSTIN R. BANDT
116998
LICENSED
PROFESSIONAL ENGINEER
11/11/22

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

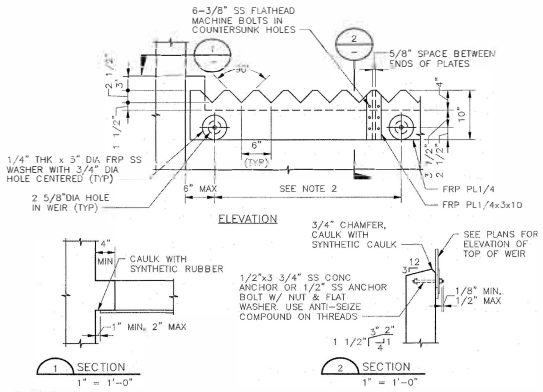
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
PROCESS MECHANICAL
MISCELLANEOUS DETAILS 3 OF 8

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	Sexaonia (Spar) Un, P.E.
SHEET NO. 280 OF 379	

FOR CITY OF HOUSTON USE ONLY
ACCEPTED
80367
HOUSTON, TEXAS

M-99-503

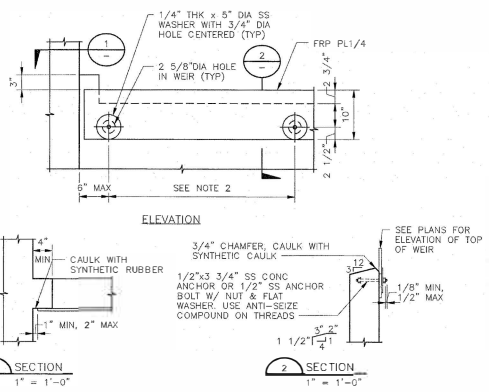
FILE PATH: B:\M_366_//402500 - CIH Intercontinental Airport WWTP Improvements/402500-GENERAL.mt



NOTES:

1. ALL EDGES, VOIDS, AND SPLICES SHALL BE SEALED WATER TIGHT WITH SYNTHETIC RUBBER.
2. ANCHOR BOLT SPACING = 12"OC FOR STRAIGHT WEIRS AND 2'-0" FOR CIRCULAR WEIRS.
3. WEIR TO BE SET LEVEL TO PROVIDE UNIFORM DISCHARGE.

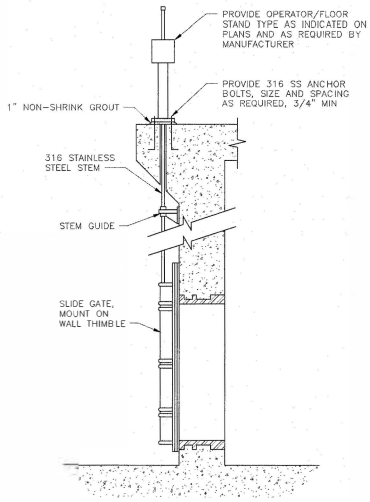
A V-NOTCHED WEIR
NO SCALE



NOTES:

1. ALL EDGES, VOIDS, AND SPLICES SHALL BE SEALED WATER TIGHT WITH SYNTHETIC RUBBER.
2. ANCHOR BOLT SPACING = 12"OC FOR STRAIGHT WEIRS AND 2'-0" FOR CIRCULAR WEIRS.
3. WEIR TO BE SET LEVEL TO PROVIDE UNIFORM DISCHARGE AND ALL ADJACENT WEIRS SHALL BE SET AT THE INDICATED ELEVATION WITH ZERO TOLERANCE.

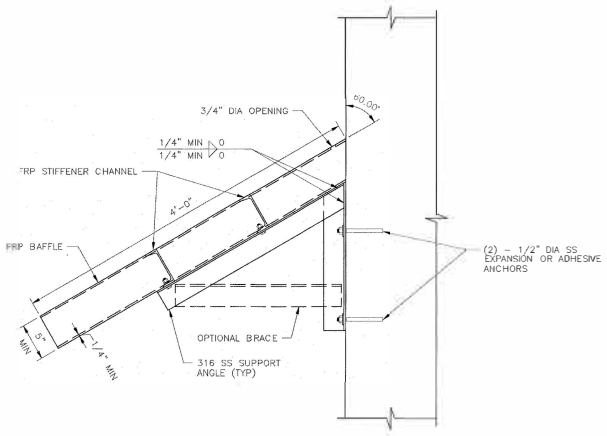
B SHARP CRESTED WEIR
NO SCALE



NOTES:

1. REFER TO STRUCTURAL SHEETS FOR CORBEL DETAIL.
2. WALL THIMBLES NOT REQUIRED AT EXISTING OPENINGS.

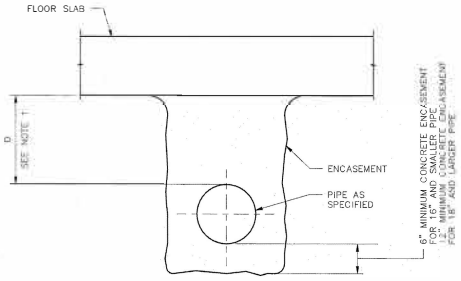
C SLIDE GATE
NO SCALE



NOTE:

1. FOR FRP DESIGN NOTES SEE M-99-508 DETAIL C - BAFFLE COLUMN DETAIL.

D AERATED GRIT BAFFLE DETAIL
NO SCALE



NOTE:

1. IF D IS LESS THAN 1'-6", PROVIDE ENCASEMENT CONTINUOUS TO SLAB. IF D IS GREATER THAN 1'-6", ENCASEMENT MAY BE SEPARATED FROM SLAB.

E CONCRETE PIPE ENCASEMENT
1" = 1'-0"

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JUSTIN R. SANDT
116988
LICENSED
PROFESSIONAL ENGINEER
3/9/23

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

PROCESS MECHANICAL

MISCELLANEOUS DETAILS 4 OF 8

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.

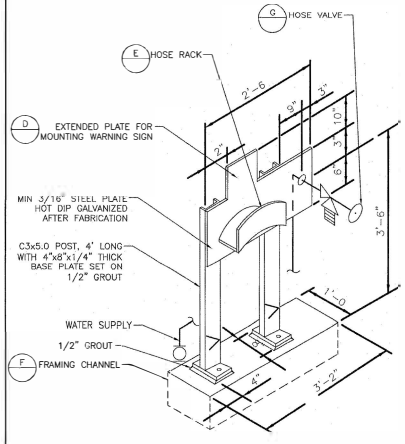
FOR CITY OF HOUSTON USE ONLY

ACCEPTED - NOT RELEASED FOR CONSTRUCTION
80387

M-99-504

SHEET NO. 281 OF 379

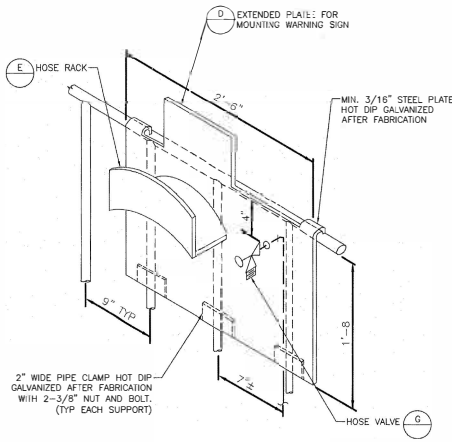
FILE PATH: BIM 360://4405500 - Old Intercontinental Airport WWTP Improvements/4405500-GENERAL.rvt



NOTES:

1. HOOK ANCHOR BOLTS UNDER REINFORCING STEEL OR INTO BASE SLAB.
2. LOCATE WATER NEXT TO HOSE RACK.

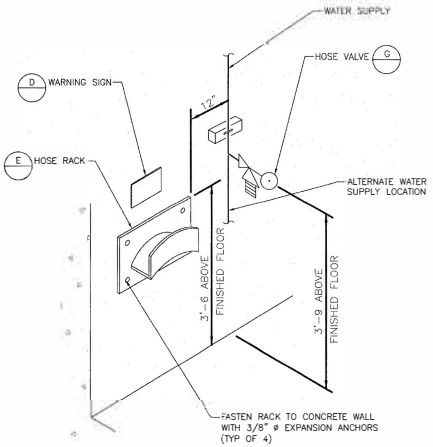
A TYPE A YARD MOUNTED UTILITY STATION
NTS



NOTES:

1. PROVIDE 1/4" NEOPRENE GASKET BETWEEN STEEL PLATE AND ALUMINUM GUARD RAIL.
2. LOCATE WATER NEXT TO HOSE RACK.

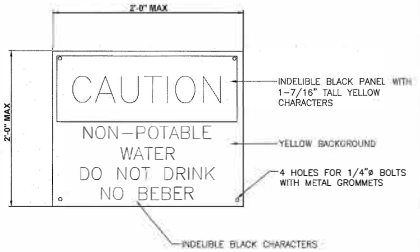
B TYPE B POST MOUNTED UTILITY STATION
NTS



NOTES:

1. LOCATE WATER NEXT TO HOSE RACK.

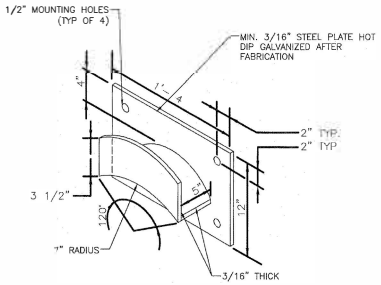
C TYPE C WALL MOUNTED UTILITY STATION
NTS



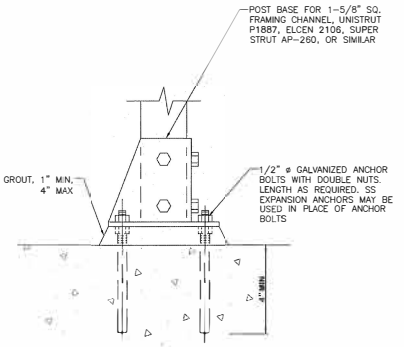
NOTES:

1. MATERIAL TO BE SEMI-RIGID BUTYRATE AS MANUFACTURED BY SETON NAME PLATE CORP., NEW HAVEN CT. 06505, W.H. BRADY CO., MILWAUKEE, WI 43201 OR APPROVED EQUAL.
2. COLORS AND LETTER SIZES PER OSHA STANDARDS.
3. PROVIDE THIS SIGN AT ALL HOSE BIBB LOCATIONS WHERE WATER IS NON-POTABLE OR DOWNSTREAM OF A BACKFLOW PREVENTER

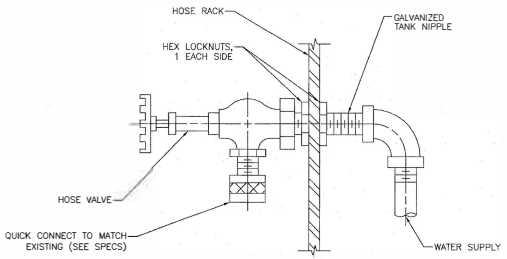
D NON-POTABLE WATER WARNING SIGN
NTS



E HOSE RACK
NTS



F FRAMING CHANNEL POST BASE
NTS



NOTES:

1. HOSE VALVE SHALL BE SELF-DRAINING, FREEZE PROOF TYPE. SEE HOSE VALVE/BIBB SPECIFICATIONS.
2. PROVIDE VACUUM BREAKER ON HOSE BIBBS.

G WATER HOSE VALVE
NTS

5engineering

BLACK & VEATCH

5ENGINEERING, LLC
11200 WESTHEIMER ROAD
SUITE 353
HOUSTON, TX 77042
(832) 800-3483
TX FIRM NUMBER F-13748

STATE OF TEXAS
PEDRO BATTISTINI
104895
LICENSED
PROFESSIONAL ENGINEER
11/09/2022

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

PROCESS MECHANICAL

MISCELLANEOUS DETAILS 5 OF 8

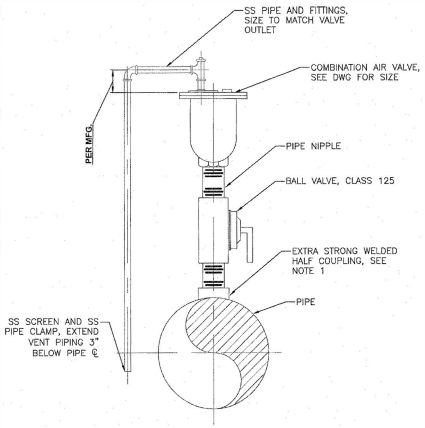
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SEXIAOHUA (SHARI) LIN, P.E.
SHEET NO.	282 OF 379

FOR CITY OF HOUSTON USE ONLY

80387

M-99-505

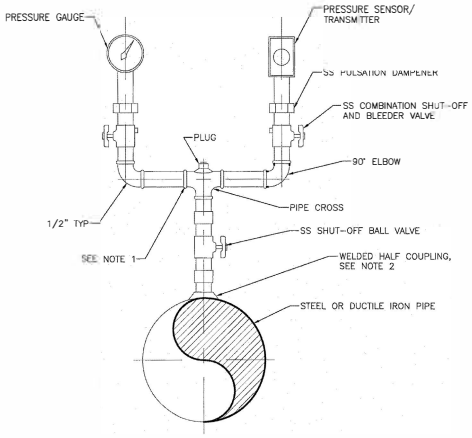
FILE PATH: P:\0092\001\04 Cadd-GIS\02 SHEETS\99 - DETAILS\M-99-501 MISC DETAILS.dwg



NOTES:

1. USE SCH40 SS FOR ALL PIPE AND FITTINGS.
2. USE SERVICE SADDLE AT DI PIPE.
3. USE FLANGED PIPING AND BUTTERFLY VALVE FOR 4" AND LARGER COMBINATION AIR VALVES.
4. USE TEE FITTING FOR PVC PIPING.

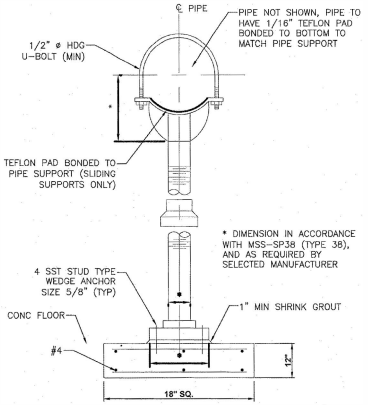
A COMBINATION AIR VALVE
NTS



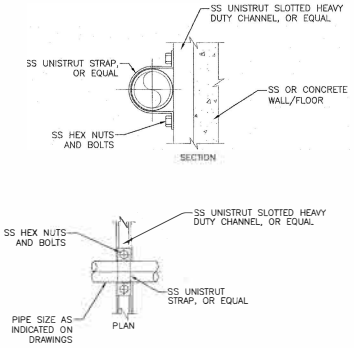
NOTES:

1. USE SCH40 SS FOR ALL PIPE AND FITTINGS.
2. USE SERVICE SADDLE AT DI PIPE.
3. PROVIDE A DIAPHRAGM SEAL FOR GAUGES ON ALL PIPING OTHER THAN POTABLE WATER INCLUDING OZONE GAS AND AIR PIPING.

B PRESSURE GAUGE AND SENSOR MOUNTING
NTS

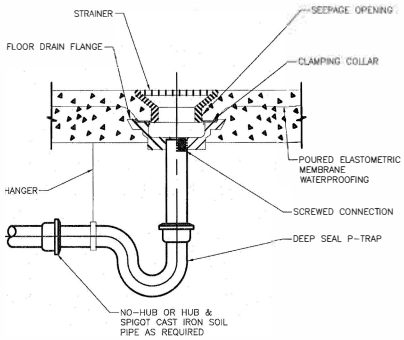


C ADJUSTABLE SADDLE SUPPORT
NTS

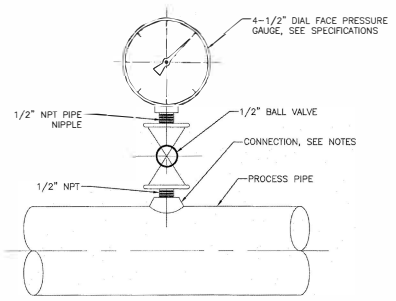


NOTES:
1. FOR MULTIPLE PIPES, EXTEND LENGTH OF STAINLESS STEEL CHANNEL AND PROVIDE 6" MIN. BETWEEN EACH CONDUIT.

D PIPE SUPPORT 1/2" THROUGH 6"
NTS



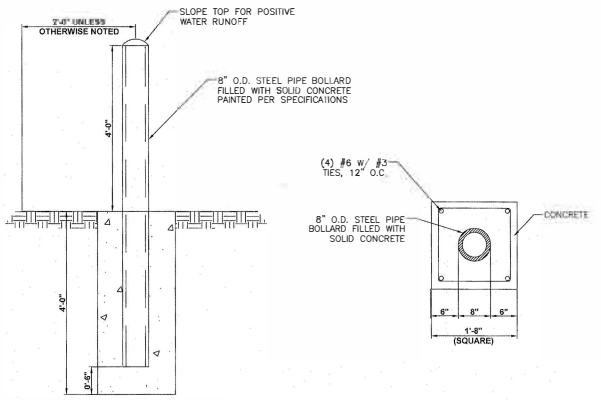
E PROCESS FLOOR DRAIN
NTS



NOTES:

1. FOR STEEL GALV AND PVC 2-1/2" AND SMALLER USE A BUSHING IN A TEE.
2. FOR ALL DI PIPE SIZES, USE PIPE SADDLE WITH A BUSHING.
3. FOR STEEL AND SS PIPES 3" AND LARGER, AND PRESSURE VESSELS, USE THRED-O-LET AS SHOWN.
4. PROVIDE SNUBBER FOR POSITIVE DISPLACEMENT PUMP INSTALLATIONS.
5. ALL GAUGE PIPING SHALL BE SCH40 SS.
6. FOR GAUGES ON ALL PIPING OTHER THAN POTABLE WATER, INCLUDING OZONE GAS OR AIR PIPING, A DIAPHRAM SEAL SHALL BE PROVIDED.

F PRESSURE GAUGE TOP MOUNTED
NTS



G BOLLARD
NTS

5engineering

BLACK & VEATCH

5ENGINEERING, LLC
11200 WESTHEIMER ROAD
SUITE 353
HOUSTON, TX 77042
(832) 800-3483
TX FIRM NUMBER F-13748

STATE OF TEXAS — PEDRO BATTISTINI — 104895 — LICENSED PROFESSIONAL ENGINEER
11/09/2022

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

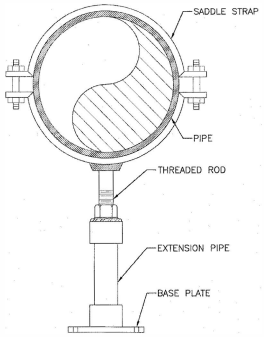
PROCESS MECHANICAL

MISCELLANEOUS DETAILS 6 OF 8

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
M-99-506	SHEET NO. 283 OF 379

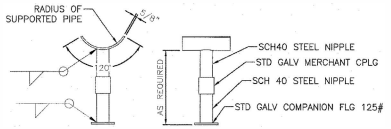
80367 — REGISTERED — HOUSTON, TEXAS

FILE PATH: P:\0092\001\04 Cadd-GIS\02 SHEETS\99 - DETAILS\M-99-501 MISC DETAILS.dwg

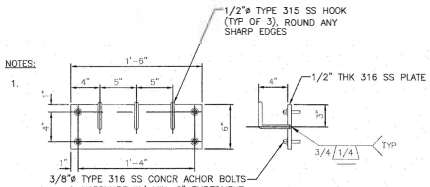


NOTES:
1. STANDON MODEL C92 ADJUSTABLE PIPE CLAMP.

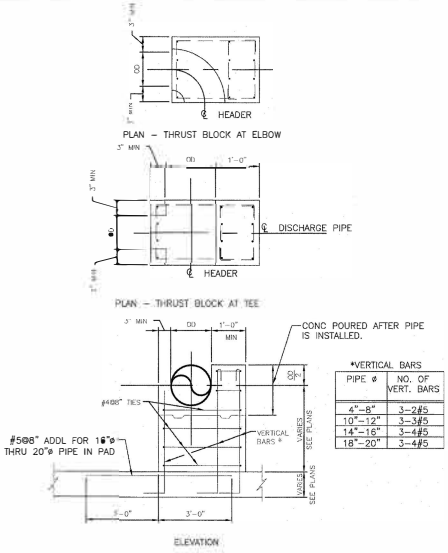
A ADJUSTABLE PIPE SADDLE CLAM SUPPORT
NTS



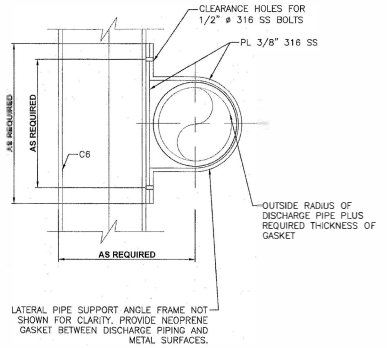
B ADJUSTABLE PIPE SUPPORT
NTS



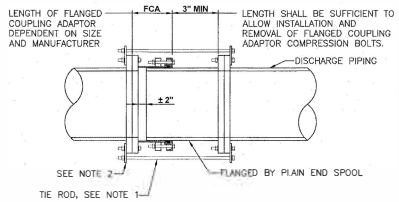
C CABLE HOLDER ASSEMBLY
NTS



D THRUST BLOCK
NTS

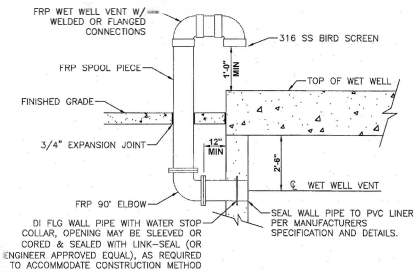


E PIPE CLAMP
NTS

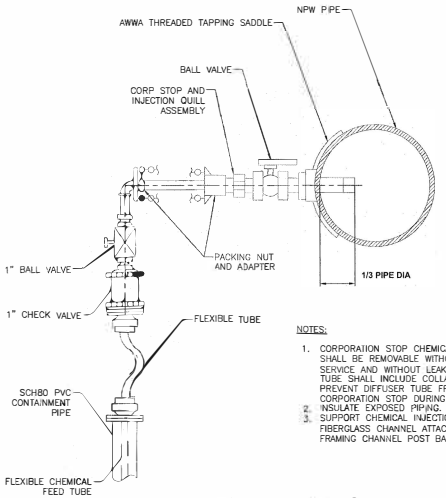


NOTES:
1. PROVIDE A NUMBER OF EVENLY SPACED TIE RODS EQUAL TO 1/2 THE NUMBER OF FLANGE BOLTS. DIAMETER OF TIE RODS TO BE EQUAL TO THE DIAMETER OF THE FLANGE BOLTS. LENGTH OF TIE RODS TO BE BASED ON THE SIZE AND MANUFACTURER OF FLANGED COUPLING ADAPTOR AND FINAL SPOOL PIECE LENGTH.
2. PROVIDE 316 SS TAB FOR ATTACHMENT OF TIE RODS. SIZE TO BE DETERMINED BY CONTRACTOR.
3. ALL HARDWARE TO BE 316 STAINLESS STEEL. TIE RODS TO BE THREADED.
4. THIS RESTRAINT DOES NOT REPLACE THE NEED FOR THRUST BLOCKS AT OTHER LOCATIONS. THRUST BLOCKS TO BE PROVIDED AS REQUIRED.
5. CONTRACTOR TO SUBMIT DETAILS WITH SHOP DRAWING SUBMISSION PER SPECIFICATION 01300.

F FLANGED COUPLING ADAPTOR RESTRAINT
NTS



G HIGH PROFILE WET WELL VENT
NTS



NOTES:
1. CORPORATION STOP CHEMICAL INJECTOR ASSEMBLY TUBE SHALL BE REMOVABLE WITHOUT TAKING PIPE MAIN OUT OF SERVICE AND WITHOUT LEAKING OF CHEMICAL SOLUTION AND TUBE SHALL INCLUDE COLLAR AND SAFETY CHAIN TO PREVENT DIFFUSER TUBE FROM BLOWING OUT OF CORPORATION STOP DURING REMOVAL.
2. INSULATE EXPOSED PIPING.
3. SUPPORT CHEMICAL INJECTION ASSEMBLY ON UNISTRUT FIBERGLASS CHANNEL ATTACHED TO CONCRETE SLAB USING FRAMING CHANNEL POST BASE.

H CHEMICAL INJECTION QUILL
NTS

5engineering

BLACK & VEATCH

5ENGINEERING, LLC
11200 WESTHEIMER ROAD
SUITE 353
HOUSTON, TX 77042
(832) 800-3483
TX FIRM NUMBER F-13748

STATE OF TEXAS
PIERO BATTISTINI
104895
LICENSED
PROFESSIONAL ENGINEER
11/09/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

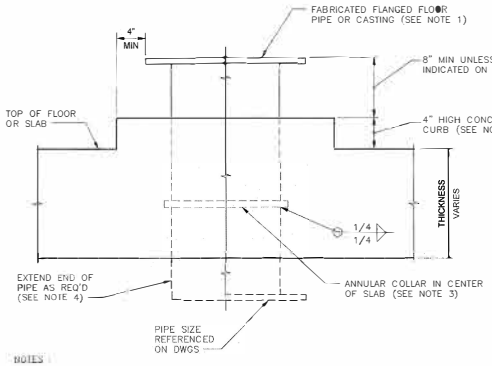
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
PROCESS MECHANICAL
MISCELLANEOUS DETAILS 7 OF 8

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 284 OF 379	

FOR CITY OF HOUSTON USE ONLY
STATE OF TEXAS
XIAOHUA LIN
80367
LICENSED
PROFESSIONAL ENGINEER

M-99-507

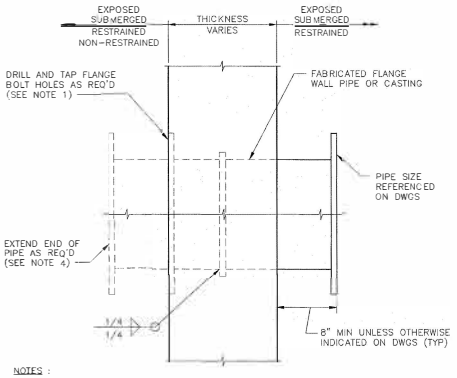
FILE PATH: P:\0092\001\04 Cadd-GIS\02 SHEETS\99 - DETAILS\M-99-501 MISC DETAILS.dwg



NOTES :

1. FLOOR PIPE MATERIAL SHALL BE DUCTILE IRON, STEEL, OR AS INDICATED ON DRAWINGS. STEEL PIPE SHALL BE SCHEDULE 40 FOR PIPE 20" AND SMALLER, 3/8" FOR PIPE LARGER THAN 20", AND COATINGS SAME AS CONNECTING PIPE.
2. IF CONNECTING STEEL PIPE THICKNESS IS GREATER THAN 3/8", STEEL FLOOR PIPE THICKNESS SHALL BE INCREASED TO MATCH CONNECTING PIPE.
3. ANNULAR COLLAR SHALL BE SAME MATERIAL AS PIPE AND SHALL BE 1/4"x2" FOR PIPE 20" AND SMALLER, AND 3/8"x3" FOR PIPE LARGER THAN 20".
4. FLOOR PIPE MAY BE FLUSH WITH FLOOR OR SLAB OR EXTENDED WITH END AS REQUIRED OR INDICATED ON DRAWINGS.
5. CURB MAY BE ROUND OR HEXAGONAL AT CONTRACTOR'S OPTION.
6. ORIENTATION OF FLOOR PIPE SHALL BE COORDINATED WITH CONNECTING PIPE.

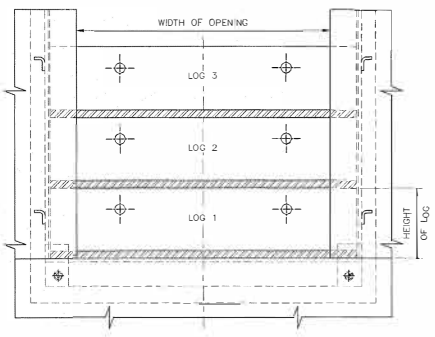
A FLANGED FLOOR PIPE
NO SCALE



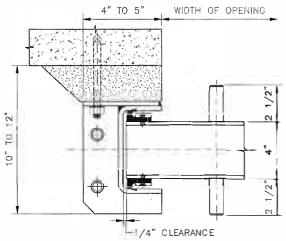
NOTES :

1. WALL PIPE MATERIAL SHALL BE DUCTILE IRON, STEEL OR AS INDICATED ON THE DRAWINGS. STEEL PIPE SHALL BE SCHEDULE 40 FOR PIPE 20 INCHES AND SMALLER, 3/8" FOR PIPE LARGER THAN 20", AND COATINGS SAME AS CONNECTING PIPE.
2. IF CONNECTING STEEL PIPE THICKNESS IS GREATER THAN 3/8", STEEL WALL PIPE THICKNESS SHALL BE INCREASED TO MATCH CONNECTING PIPE.
3. ANNULAR COLLAR SHALL BE SAME MATERIAL AS PIPE, 1/4" X 2" FOR PIPE 20" AND SMALLER, AND 3/8" X 3" FOR PIPE LARGER THAN 20".
4. WALL PIPE MAY BE FLUSH WITH FACE OF WALL OR EXTENDED WITH END AS REQUIRED OR INDICATED ON DRAWINGS.
5. WALL PIPE SHALL BE ORIENTED SO THAT THE BOLT HOLES STRADDLE THE TOP CENTERLINE.

B FLANGED WALL PIPE
NO SCALE

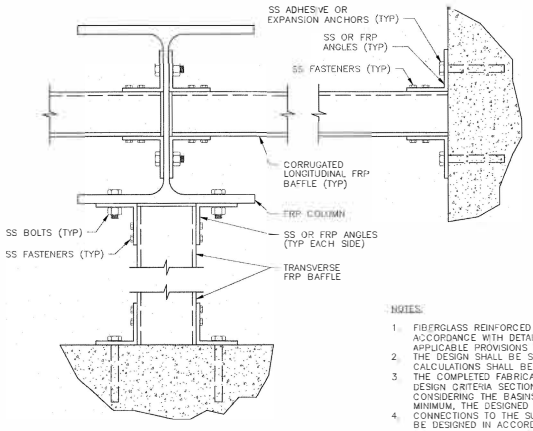


FRONT VIEW

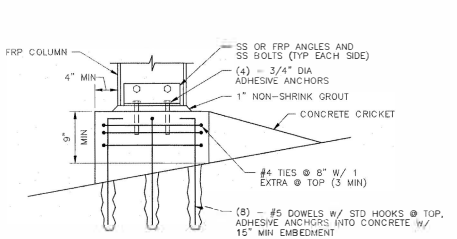


LOG MOUNTED SEALING ARRANGEMENT

D SS STOP LOG DETAIL
NO SCALE



PLAN



SECTION

NOTES:

1. FIBERGLASS REINFORCED PLASTIC (FRP) BAFFLE WALLS SHALL BE DESIGNED BY THE SUPPLIER IN GENERAL ACCORDANCE WITH DETAILS INDICATED ON THESE DESIGN DRAWINGS. THE DESIGN SHALL COMPLY WITH ALL APPLICABLE PROVISIONS OF THE LOCAL BUILDING CODE AND ASCE 7-10.
2. THE DESIGN SHALL BE SEALED BY AN ENGINEER REGISTERED IN THE STATE OF THE PROJECT. IF REQUESTED, CALCULATIONS SHALL BE SUBMITTED FOR REVIEW.
3. THE COMPLETED FABRICATIONS SHALL SUPPORT THE LOADS INDICATED IN THE METEOROLOGICAL AND SEISMIC DESIGN CRITERIA SECTION. THE FRP BAFFLE WALLS SHALL BE DESIGNED FOR THE REQUIRED WIND LOADS CONSIDERING THE BASINS ARE EMPTY AND SUBJECTED TO WIND LOADS WITH EXPOSURE CATEGORY B. AT A MINIMUM, THE DESIGNED FABRICATIONS SHALL SUPPORT A 30 PSF (SERVICE LEVEL) LATERAL LOAD.
4. CONNECTIONS TO THE SUPPORTING STRUCTURE SHALL BE ADEQUATE TO TRANSFER ALL LOADINGS, AND SHALL BE DESIGNED IN ACCORDANCE WITH ALL APPLICABLE PROVISIONS OF THE ACI 318 CHAPTER 17. THE NUMBER AND TYPE OF CONNECTIONS SHALL COMPLY AT A MINIMUM, WITH THESE DESIGN DRAWINGS. ALL NECESSARY CLIP ANGLES, BOLTS, AND ANCHORS SHALL BE PROVIDED. ANCHOR BOLTS, DESIGNED BY THE SUPPLIER, SHALL BE AS INDICATED IN THE ANCHORAGE IN CONCRETE AND MASONRY SECTION.
5. ALL COLUMNS, BEAMS, AND BAFFLE WALL PANELS SHALL BE FRP AS MANUFACTURED BY FIBERGRATE OR APPROVED EQUAL. FRP MANUFACTURER SHALL SUBMIT SHOP DRAWINGS TO ENGINEER PRIOR TO FABRICATION. ALL FASTENERS SHALL BE TYPE 316 STAINLESS STEEL.

C BAFFLE COLUMN DETAIL
NO SCALE

BLACK & VEATCH

BLACK & VEATCH CORPORATION
9201 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 255

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JUSTIN R. SANDT
116986
LICENSED PROFESSIONAL ENGINEER
11/11/22

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
PROCESS MECHANICAL

MISCELLANEOUS DETAILS 8 OF 8

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-002165-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	

ACCEPTED FOR CONSTRUCTION
80367
HOUSTON, TEXAS

M-99-508

SHEET NO. 265 OF 379

FILE PATH: BIM 360://402500 - CDH Intercontinental Airport WWTP Improvements/402500-GENERAL.rvt

HVAC LEGENDS, ABBREVIATIONS, AND GENERAL NOTES

SYSTEM ABBREVIATIONS

CWR	CHILLED WATER RETURN
CWS	CHILLED WATER SUPPLY
C	CONDENSATE DRAIN
CDWR	CONDENSER WATER RETURN
CDWS	CONDENSER WATER SUPPLY
HWR	HEATING WATER RETURN
HWS	HEATING WATER SUPPLY
LPC	LOW PRESSURE CONDENSATE
LPS	LOW PRESSURE STEAM (<15 PSIG)
R	REFRIGERANT

HVAC LEGEND

- DIFFUSER FOR FLEXIBLE DUCT
- 30"x20"(L) — DUCTWORK DIMENSIONS. THE FIRST DIMENSION IS THE SIDE SEEN OR SIDE THE LEADER LINE TOUCHES. SEE GENERAL MECHANICAL NOTES.
- FLEXIBLE CONNECTION
- FLEXIBLE DUCTWORK
- UP / DN — INCLINED RISE (UP) OR DROP (DN) IN RESPECT TO DIRECTION OF AIRFLOW
- NEGATIVE PRESSURE DUCT
- POSITIVE PRESSURE DUCT
- REGISTER, GRILLE OR DIFFUSER
- ROUND OR FLEXIBLE DUCT TAKEOFF
- ROUND TO SQUARE TRANSITION
- TURNING VANES

AIR INLET & OUTLET IDENTIFICATIONS

- SIZE-LENGTH BY WIDTH (INCHES)
- FLEXIBLE DUCT DIAMETER (INCHES, IF USED)
- 24"x10"-10' SR-1-760
- CFM THRU DEVICE
- DEVICE DESIGNATION
- DEVICE GROUP: R-REGISTER, G-GRILLE, D-DIFFUSER
- DEVICE TYPE: S-SUPPLY, E-EXHAUST, R-RETURN, T-TRANSFER

CONTROLS & INSTRUMENTATION LEGEND

- CS — CONTROL STATION
- DG — DRAFT GAUGE
- E — ELECTRIC OPERATOR (EXPLOSION PROOF)
- EM — ELECTRIC OPERATOR (MODULATING)
- E — ELECTRIC OPERATOR (2 POSITION)
- EVS1 — EMERGENCY VENTILATION SWITCH W/ NUMBER
- FS — FLOW SWITCH
- GAUGE ACTIVATOR/ISOLATOR
- H1 — HUMIDISTAT W/ NUMBER
- LS — LEVEL SWITCH
- PDS1 — PRESSURE DIFFERENTIAL SWITCH W/ NUMBER
- P — PRESSURE GAUGE W/ SHUTOFF VALVE
- PS — PRESSURE SWITCH
- SMD1 — SMOKE DETECTOR W/ NUMBER
- S — SOLENOID OPERATOR
- THERMOMETER - DIAL TYPE
- THERMOMETER - STEM TYPE
- TS1 — TEMPERATURE SENSOR WITH NUMBER
- T1 — THERMOSTAT WITH NUMBER
- V — VACUUM GAUGE W/ SHUTOFF VALVE

HVAC ABBREVIATIONS

A

A	ALARM
AC	AIR COMPRESSOR
AD	ACCESS DOOR
AF	AIR FLOW, AIRFOIL
AFD	ADJUSTABLE FREQUENCY DRIVE
AFF	ABOVE FINISH FLOOR
AFM	AIR FLOW MONITOR
AHU	AIR HANDLING UNIT
ALUM	ALUMINUM
AP	ACCESS PANEL
APPROX	APPROXIMATE
AS	AIR SEPARATOR
ATU	AIR TERMINAL UNIT
AUTO	AUTOMATIC
AVG	AVERAGE

B

B	BELT DRIVE, BLOW THROUGH
BDD	BACKDRAFT DAMPER
BF	BLIND FLANGE
BFF	BELOW FINISH FLOOR
BFP	BACKFLOW PREVENTER
BH	BASEBOARD HEATER
BI	BACKWARD INCLINED, BUILT-IN THERMOSTAT
BL	BOTTOM LEVEL
BLDG	BUILDING
BLR	BLOWER
BOD	BOTTOM OF DUCT ELEVATION
BOT	BOTTOM
BTUH	BRITISH THERMAL UNITS PER HOUR
BU	BELL-UP
BV	BALL VALVE

C

C	CHANNEL, CONVECTOR, COOLING, COOLING (MAKE ON RISE)
CB	CENTRIFUGAL BLOWER
CBD	COUNTERBALANCE BACKDRAFT DAMPER
CC	COOLING COIL
CD	CONTROL DAMPER
CDWP	CONDENSER WATER PUMP
CENTR	CENTRIFUGAL
CF	CABINET FAN
CFM	CUBIC FEET PER MINUTE
CH	CONVECTION HEATER
C/L	CENTERLINE
CO	CLEANOUT
CONC	CONCRETE
CONN	CONNECTION
CONT	CONTINUATION
CS	CONTROL STATION
CT	COOLING TOWER
CU	CONDENSING UNIT
CV	CHECK VALVE, CONTROL VALVE
CWP	CHILLED WATER PUMP

D

D	DIRECT DRIVE, DRAW-THRU
DB	DRY BULB
DDC	DIRECT DIGITAL CONTROL
DEH	DEHUMIDIFIER
DF	DUCT FAN
DIA	DIAMETER
DM	DUCT MOUNTED
DN	DOWN
DX	DIRECT EXPANSION

E

E	ELECTRIC, ELECTRIC OPERATOR, EXHAUST
EA	EACH, EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EC	ECONOMIZER, EVAPORATIVE COOLER
ECH	ELECTRIC CABINET HEATER
ECP	EQUIPMENT CONTROL PANEL
EDH	ELECTRIC DUCT HEATER
EF	EXHAUST FAN
EFF	EFFICIENCY
EGS	EMERGENCY GAS SCRUBBER
EIH	ELECTRIC INFRARED HEATER
EL	ELEVATION
EP	EXPLOSION PROOF
EQUIP	EQUIPMENT
ES	EMERGENCY SWITCH
ESP	EXTERNAL STATIC PRESSURE
ET	EXPANSION TANK
EUH	ELECTRIC UNIT HEATER
EV	EXHAUST VALVE
EVS	EMERGENCY VENTILATION SWITCH
EWT	ENTERING WATER TEMPERATURE
EXIST	EXISTING

F

F	DEGREES FAHRENHEIT
FBD	FACE AND BYPASS DAMPER
FC	FORWARD CURVE, FAN COIL
FD	FIRE DAMPER
FDB	DEGREES FAHRENHEIT DRY BULB
FEF	FUME EXHAUST FAN
FLEX	FLEXIBLE
FM	FLOW METER
FPM	FEET PER MINUTE
FR	FUNNEL RECEPTOR
FRP	FIBERGLASS REINFORCED PLASTIC PIPE
FS	FLOW SWITCH
FSD	COMBINATION FIRE/SMOKE DAMPER
FT	FEET, FIN TUBE HEATER
FUR	FURNACE
FWB	DEGREES FAHRENHEIT WET BULB

G

GA	GAUGE
GALV	GALVANIZED
GIH	GAS INFRARED HEATER
GPM	GALLONS PER MINUTE
GUH	GAS UNIT HEATER
GV	GATE VALVE

H

H	HAND OPERATOR, HEATING, HEATING (MAKE ON FALL), HEIGHT, HORIZONTAL, HUMIDISTAT
HC	HEATING COIL
HCH	HEATING WATER CABINET HEATER
HE	HEAT EXCHANGER
HO	HAND-OFF
HOA	HAND-OFF-AUTO
HP	HEAT PUMP, HORSEPOWER
HR	HEAT RECOVERY UNIT
HUH	HEATING WATER UNIT HEATER
HUM	HUMIDIFIER
HVAC	HEATING VENTILATION AND AIR CONDITIONING
HWB	HEATING WATER BOILER
HWP	HEATING WATER PUMP
HZ	HERTZ

I

I	INTAKE
ID	INSIDE DIAMETER
IN	INCHES
INV	INVERT

K

KW	KILOWATT

L

L	LINED DUCT, LOUVER
LAT	LEAVING AIR TEMPERATURE
LBS	POUNDS
LD	COMBINATION LOUVER/DAMPER
LI	LEVEL INDICATOR
LS	LEVEL SWITCH
LWT	LEAVING WATER TEMPERATURE

M

MAU	MAKEUP AIR UNIT
MAX	MAXIMUM
MCA	MINIMUM CIRCUIT AMPS
ME	MIST ELIMINATOR
MFR	MANUFACTURER
MOCP	MAXIMUM OVERCURRENT PROTECTION
MIN	MINIMUM
MOD	MODULATING

N

NC	NORMALLY CLOSED
NO	NORMALLY OPEN, NUMBER
NPSHR	NET POSITIVE SUCTION HEAD REQUIRED

O

OA	OUTSIDE AIR
OD	OUTSIDE DIAMETER

P

P	PNEUMATIC
PD	PRESSURE DROP (INCHES OF WATER FOR AIR, FEET OF WATER FOR FLUIDS)
PAC	PACKAGED AIR CONDITIONING UNIT
PAH	PACKAGED AIR HANDLING UNIT
PDS	PRESSURE DIFFERENTIAL SWITCH
PF	PROPELLER FAN
PHP	PACKAGED HEAT PUMP
PL	PLATE
POS	POSITION
PPM	PARTS PER MILLION
PROP	PROPELLER
PRS	PRESSURE REDUCING STATION
PRV	POWER ROOF VENTILATOR, PRESSURE REDUCING VALVE
PS	PRESSURE SWITCH
PSI	POUNDS PER SQUARE INCH
PSIA	POUNDS PER SQUARE INCH ABS
PSIG	POUNDS PER SQUARE INCH GAUGE
PTAC	PACKAGED TERMINAL AIR CONDITIONER

R

RA	REACTIVATION AIR, RETURN AIR
RAC	ROOM AIR CONDITIONER
RCS	REMOTE CONTROL STATION
REQD	REQUIRED
RH	RELATIVE HUMIDITY, ROOF HOOD
RSF	ROOF SUPPLY FAN

S

SA	SUPPLY AIR
SCD	SMOKE CONTROL DAMPER
SCFM	STANDARD CUBIC FEET PER MINUTE
SF	SQUARE FEET, SUPPLY FAN
SH	SHEET
SIM	SIMILAR
SMD	SMOKE DETECTOR
SP	STATIC PRESSURE (INCHES OF WATER)
SPS	STATIC PRESSURE SENSOR
SS	STAINLESS STEEL
STD	STANDARD
SV	SERVICE VALVE, SHUTOFF VALVE, SOLENOID VALVE

T

T	THERMOSTAT
TCP	TEMPERATURE CONTROL PANEL
TCV	TEMPERATURE CONTROL VALVE
TE	TEMPERATURE ELEMENT
TL	TOP LEVEL
TS	TIP SPEED
TYP	TYPICAL

V

V	VERTICAL
VAC	VACUUM OUTLET
VANE	VANEAXIAL
VAV	VARIABLE AIR VOLUME
VCD	VOLUME CONTROL DAMPER
VF	VANEAXIAL FAN

W

W	WIDE FLANGE, WIDTH
WB	WET BULB
WC	WATER CHILLER, WATER COLUMN
WF	WALL FAN
WG	WATER GAUGE
WH	WALL HEATER
WM	WALL MOUNTED
WST	WATER STORAGE TANK
WT	WEIGHT
WV	WATER CONTROL VALVE

Z

ZD	ZONE DAMPER

GENERAL HVAC NOTES

1. THIS IS GENERAL LEGEND AND ABBREVIATION SHEET FOR BUILDING MECHANICAL DRAWINGS. SOME ITEMS CONTAINED ON THIS SHEET MAY NOT BE USED ON THIS SPECIFIC PROJECT.
2. ALL BUILDING MECHANICAL WORK SHALL BE IN ACCORDANCE WITH THE FOLLOWING APPLICABLE CODES WITH CITY OF HOUSTON AMENDMENTS:
   - 2012 INTERNATIONAL BUILDING CODE
   - 2012 UNIFORM MECHANICAL CODE
   - 2012 INTERNATIONAL FIRE CODE
   - 2015 INTERNATIONAL ENERGY CONSERVATION CODE
3. SEE ARCHITECTURAL AND STRUCTURAL DRAWINGS FOR ALL EQUIPMENT BASE DETAILS.
4. "SCREENED" DELINEATION DENOTES EXISTING AND NEW FACILITIES AND IS FOR REFERENCE ONLY. "LIGHT" LINE DELINEATION DENOTES EXISTING MECHANICAL EQUIPMENT AND SYSTEMS. EXISTING FACILITY AND MECHANICAL SYSTEMS INFORMATION WAS TAKEN FROM PREVIOUS DRAWINGS, CONSTRUCTION RECORDS, DATA, AND FIELD SURVEY INFORMATION. ACTUAL LOCATION, ARRANGEMENT, AND DIMENSIONS SHALL BE FIELD VERIFIED AND WORK INSTALLED TO MEET ACTUAL CONDITIONS AND LOCATIONS ENCOUNTERED. "BOLD" (DARK) DELINEATION IS NEW WORK TO BE CONSTRUCTED UNDER THIS CONTRACT.
5. ALL HANGERS, BRACKETS, OR BRACES FOR PIPING, DUCTWORK AND EQUIPMENT ARE NOT INDICATED ON THE DRAWINGS. REFER TO THE SPECIFICATIONS FOR SUPPORT REQUIREMENTS NOT SHOWN ON THE PLANS.
6. OUTSIDE AIR INLETS SHALL BE LOCATED A MINIMUM OF 10'-0" AWAY FROM ANY EXHAUST AIR OR PLUMBING VENT OUTLET.
7. ALL EQUIPMENT, PIPING AND DUCTWORK FINAL LOCATIONS SHALL BE COORDINATED TO AVOID INTERFERENCES WITH STRUCTURE, OTHER PIPING, EQUIPMENT, DUCTWORK, AND CONDUIT. UNLESS SPECIFICALLY DIMENSIONED, THE PIPE AND DUCTWORK ROUTING SHOWN IS INTENDED TO INDICATE GENERAL LOCATION ONLY. INSTALL DUCTWORK TO ALLOW FOR PIPING TO BE ROUTED NEAR WALLS.
8. ALL PIPING AND DUCTWORK SHALL BE ROUTED AS HIGH AS POSSIBLE WITH A MINIMUM HEIGHT OF 8'-0" ABOVE THE WALKING SURFACE UNLESS OTHERWISE INDICATED BY A CENTERLINE OR BOTTOM OF DUCT ELEVATION.
9. DUCTWORK SHALL BE FABRICATED, REINFORCED, SUPPORTED AND SEALED FOR OPERATING PRESSURES INDICATED IN THE SCHEDULES FOR THE EQUIPMENT IT SERVES. ALL DUCTWORK SHALL HAVE A MINIMUM SMACNA PRESSURE CLASSIFICATION OF ONE INCH.
10. DUCT CONNECTIONS TO EQUIPMENT, PIPING SIZES TO EQUIPMENT, AND EQUIPMENT SUPPORTS SHALL BE VERIFIED AND ADJUSTED TO MATCH ACTUAL EQUIPMENT FURNISHED.
11. ROOFTOP EQUIPMENT SHALL NOT BE LOCATED SUCH THAT ACCESS TO CONTROLS AND TO PERFORM SERVICE FOR EQUIPMENT IS LOCATED WITHIN 10 FEET OF THE BUILDING EDGE.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100

TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS — RANDY W. CANTRELL — 115374 — LICENSED PROFESSIONAL ENGINEER — 11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
HVAC
LEGENDS, ABBREVIATIONS, AND GENERAL NOTES

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 286 OF 379	

FOR CITY OF HOUSTON USE ONLY — APPROVED — ACCEPTED — 80367 — CITY OF HOUSTON, TEXAS

H-00-001

FILE PATH: BIM 360://4002600 - COH Intercontinental Airport WWTP Improvements/4002600-GENERAL.rvt

AIR DEVICE SCHEDULE

SYMBOL	MANUFACTURER	MODEL	FRAME/BORDER	MODULE SIZE	MATERIAL	FINISH	DAMPER TYPE	NOTES
ER-1	PRICE INDUSTRIES	70 SERIES	SURFACE MOUNT	SEE PLANS	ALUMINUM	BAKED ALUM ENAMEL	OPPOSED BLADE	1
SR-1	PRICE INDUSTRIES	21 SERIES	SURFACE MOUNT	SEE PLANS	ALUMINUM	BAKED ALUM ENAMEL	OPPOSED BLADE	1

FAN SCHEDULE

UNIT NUMBER	LOCATION	MANUFACTURER	MODEL	FAN TYPE	AIRFLOW (CFM)	ESP (IN WC)	MOTOR HP	POWER SUPPLY VOLTS	POWER SUPPLY PHASE	MINIMUM WHEEL DIAMETER (IN)	WHEEL TYPE	DRIVE	VIBRATION ISOLATION	APPROX WEIGHT (LBS)	NOTES
PRV-1	GRIT PUMP ROOM ROOF	GREENHECK	GB-140	PRV	1700	0.375	1/3	480	3	14	C	BELT	INTERNAL	150	1, 2

MAKEUP AIR UNIT SCHEDULE

UNIT NUMBER	LOCATION	MANUFACTURER	MODEL	HEATING TYPE	AIRFLOW (CFM)	ESP (IN WC)	MOTOR HP	POWER SUPPLY VOLTS	POWER SUPPLY PHASE	OUTPUT CAPACITY (BTUH OR (KW))	MINIMUM WHEEL DIA (IN)	FILTER DATA TYPE	FILTER DATA THICKNESS (IN)	VIBRATION ISOLATION	APPROX WEIGHT (LBS)	NOTES
MAU-1	GRIT PUMP ROOM ROOF	GREENHECK	MSX	E	2000	0.375	3/4	480	3	(25)	9	METAL	2	INTERNAL	750	1, 2, 3, 4, 5, 6, 7

NOTES BY SYMBOL (#)

1. 12"x14" DUCT DOWN, TERMINATE 12" AFF, COVER INLET WITH 1/2" ALUMINUM BIRDSCREEN. PROVIDE VCD AT 5'-0" AFF, BALANCE TO 850 CFM.

SCHEDULE NOTES:

AIR DEVICE SCHEDULE:

NOTES:
1. SEE DRAWINGS FOR DEVICE LENGTH, WIDTH, AND SUPPLY PATTERN.

FAN SCHEDULE:

FAN TYPE ABBREVIATIONS:
PRV – POWER ROOF VENTILATOR

WHEEL TYPE ABBREVIATIONS:
C – CENTRIFUGAL

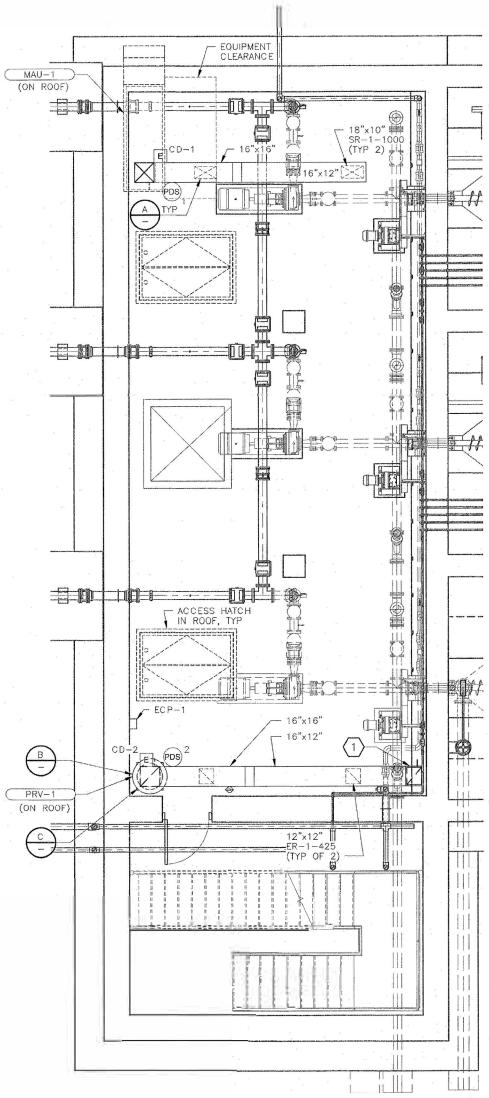
NOTES:
1. ALUMINUM FAN BLADES CONSTRUCTION
2. PROVIDE ROOF CURB

MAKEUP AIR UNIT SCHEDULE:

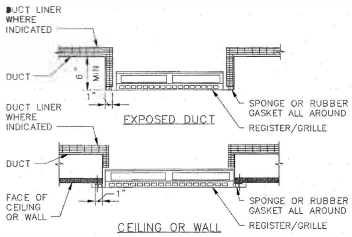
CAPACITY NOTE: CAPACITIES LISTED IN PARENTHESES ARE IN UNITS OF "KW". CAPACITIES LISTED WITHOUT PARENTHESES ARE IN UNITS OF "BTUH"

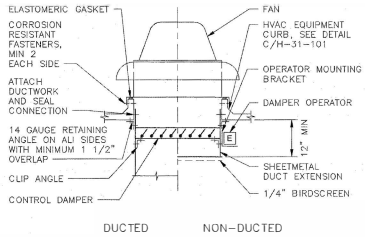
HEATING TYPE ABBREVIATIONS:
E – ELECTRIC

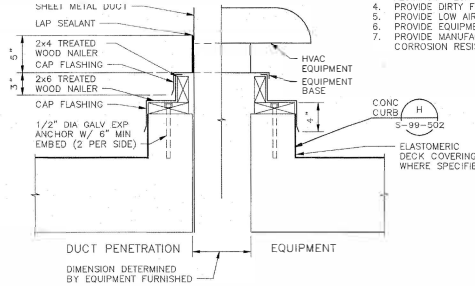
NOTES:
1. FILTER VELOCITY SHALL NOT EXCEED 350 FPM
2. PROVIDE ROOF CURB
3. PROVIDE WEATHERHOOD WITH 2 INCH ALUMINUM MESH FILTERS
4. PROVIDE DIRTY FILTER SENSOR
5. PROVIDE LOW AIR TEMPERATURE SENSOR
6. PROVIDE EQUIPMENT CONTROL PANEL
7. PROVIDE MANUFACTURER'S STANDARD CORROSION RESISTANT COATING.



LOWER LEVEL – HVAC/PLUMBING PLAN
1/4" = 1'-0"







A REGISTER/GRILLE
NO SCALE

B ROOF MOUNTED FAN
NO SCALE

C HVAC EQUIPMENT CURB
NO SCALE

HVAC SEQUENCE OF OPERATION

1. SYSTEM INTERLOCKS AND ALARMS

UNLESS OTHERWISE INDICATED, ALL EQUIPMENT INTERLOCKING DEVICES AS DESCRIBED HEREIN SHALL BE PROVIDED WITHIN THE RESPECTIVE EQUIPMENT CONTROL PANEL (ECP).

1.1. LOW TEMPERATURE PROTECTION. A LOW AIR TEMPERATURE SENSOR SHALL BE LOCATED IN THE SYSTEMS INDICATED BELOW. UPON DETECTION OF LOW AIR TEMPERATURE, THE SENSOR SHALL DE-ENERGIZE THE RESPECTIVE EQUIPMENT AND ALL INTERLOCKED EQUIPMENT. CONTROL DAMPER(S) OF THE RESPECTIVE EQUIPMENT AND INTERLOCKED EQUIPMENT SHALL RETURN TO THE NORMAL POSITION, AND A "LOW AIR TEMPERATURE" ALARM LIGHT ON THE FACE OF THE RESPECTIVE EQUIPMENT CONTROL PANEL SHALL BE ILLUMINATED. AN ADJUSTABLE 0 TO 5 MINUTE TIME DELAY RELAY SHALL BE PROVIDED TO ALLOW FOR STARTING OF THE EQUIPMENT UNDER COLD AMBIENT CONDITIONS. UPON LOW TEMPERATURE SHUTDOWN, THE EQUIPMENT SHALL REQUIRE A MANUAL RESTART.

EQUIPMENT	THERMOSTAT	EQUIPMENT CONTROL PANEL
MAU-1	BUILT-IN	ECP-1

1.2. HIGH FILTER PRESSURE LOSS. A HIGH LIMIT PRESSURE DIFFERENTIAL FLOW SWITCH SHALL BE LOCATED ACROSS THE FILTER BANK OF THE EQUIPMENT INDICATED BELOW. IN THE EVENT THE PRESSURE DIFFERENTIAL ACROSS THE FILTER EXCEEDS THE PRESET VALUE, A "HIGH FILTER PRESSURE LOSS" ALARM LIGHT ON THE FACE OF THE EQUIPMENT CONTROL PANEL OR THERMOSTAT (WHERE FURNISHED WITH LIGHTS) SHALL BE ILLUMINATED.

EQUIPMENT	FLOW SWITCH	EQUIPMENT CONTROL PANEL
MAU-1	BUILT-IN	ECP-1

1.3. VENTILATION SYSTEM FAILURE. VENTILATION SYSTEM FAILURE (AIRFLOW SWITCHES). VENTILATION SYSTEM FAILURE PRESSURE DIFFERENTIAL SWITCHES SHALL BE LOCATED IN THE SYSTEMS INDICATED BELOW. IN THE EVENT THAT AIRFLOW IS NOT ATTAINED OR LOST AS DETERMINED BY THE PRESSURE DIFFERENTIAL FLOW SWITCH, A "VENTILATION SYSTEM FAILURE" SIGNAL SHALL BE TRANSMITTED TO THE PLANT CONTROL SYSTEM (PCS).

EQUIPMENT	FLOW SWITCH	EQUIPMENT CONTROL PANEL
MAU-1	PDS-1	ECP-1
PRV-1	PDS-2	ECP-1

2. VENTILATING/EXHAUST SYSTEMS.

2.1. "ON-OFF-AUTO" EQUIPMENT CONTROL. EQUIPMENT INDICATED FOR "ON-OFF-AUTO" CONTROL SHALL EACH BE CONTROLLED BY AN INDIVIDUAL "ON-OFF-AUTO" FAN SELECTOR SWITCH. THE SWITCH LOCATION SHALL BE AS INDICATED BELOW. WHEN THE SWITCH IS PLACED IN THE "AUTO" POSITION, THE FAN SHALL BE INTERLOCKED AND CONTROLLED BY THE FAN INTERLOCK. WHEN THE SWITCH IS PLACED IN THE "ON" POSITION, THE FAN SHALL BE ENERGIZED. BEFORE A FAN CAN OPERATE, THE CONTROL DAMPER(S) SHALL BE PROVEN OPEN. WHERE THE FAN IS INTERLOCKED WITH ANOTHER FAN OR EQUIPMENT WITH A FAN, THE FANS SHALL BE ENERGIZED SIMULTANEOUSLY. AFTER ALL ASSOCIATED CONTROL DAMPERS ARE PROVEN OPEN. WHEN THE FAN IS DE-ENERGIZED, THE CONTROL DAMPER(S) SHALL RETURN TO THE NORMALLY CLOSED POSITION UNLESS OTHERWISE INDICATED.

EQUIPMENT	SWITCH LOCATION	FAN INTERLOCK	CONTROL DAMPER
PRV-1	STARTER	MAU-1	CD-2

3. HEATING AND VENTILATING SYSTEMS.

3.1. MAKEUP AIR UNITS (100% OUTSIDE AIR). MAKEUP AIR UNITS SHALL EACH BE CONTROLLED BY AN INDIVIDUAL "ON-OFF" SYSTEM SELECTOR SWITCH. THE SWITCH LOCATION SHALL BE AS INDICATED BELOW. WHEN THE SWITCH IS PLACED IN THE "ON" POSITION, THE FAN SHALL OPERATE AND THE SUPPLY AIR SENSOR SHALL MODULATE THE HEATING OUTPUT OF THE UNIT TO MAINTAIN THE DESIRED SUPPLY AIR TEMPERATURE. BEFORE THE FAN CAN OPERATE, THE CONTROL DAMPERS SHALL BE PROVEN OPEN. WHEN THE OUTSIDE AIR TEMPERATURE IS GREATER THAN THE HEATING CHANGEOVER TEMPERATURE SETPOINT AS DETECTED BY THE OUTDOOR AIR SENSOR, THE HEATING SHALL BE LOCKED OUT. WHEN THE UNIT IS DE-ENERGIZED, THE CONTROL DAMPER(S) SHALL CLOSE.

EQUIPMENT	SWITCH LOCATION	SUPPLY AIR THERMOSTAT	CONTROL DAMPER
MAU-1	ECP-1	BUILT-IN	CD-1

4. THERMOSTAT SETPOINTS

4.1 THERMOSTAT SETPOINTS SHALL BE AS INDICATED BELOW, UNLESS THE SETPOINT HAS BEEN DESCRIBED PREVIOUSLY IN THIS SEQUENCE OF OPERATIONS.

LOW TEMPERATURE THERMOSTATS	– 40 F
MAKEUP AIR SUPPLY HEATING	– 60 F
CHANGEOVER TEMPERATURE SETPOINT	– 60 F

H-31-101

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS – RANDY W. CANTRELL – 115374 – LICENSED PROFESSIONAL ENGINEER – 11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
HVAC

GRIT FACILITY HVAC PLAN, SCHEDULES, AND DETAILS

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 287 OF 379	

FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS – 80367 – LICENSED PROFESSIONAL ENGINEER – 11/11/2022

FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-COH IA WWTP-BV.rvt

PLUMBING LEGENDS, ABBREVIATIONS, AND GENERAL NOTES

GENERAL ABBREVIATIONS

A	
A	ALARM, COMPRESSED AIR OUTLET
AC	AIR COMPRESSOR
AD	ACCESS DOOR, AIR DRYER
AFD	ADJUSTABLE FREQUENCY DRIVE
AFF	ABOVE FINISH FLOOR
ALUM	ALUMINUM
AP	ACCESS PANEL
APPROX	APPROXIMATE
AR	AIR RECEIVER
AUTO	AUTOMATIC
AVG	AVERAGE
AVS	AUTOMATIC VALVE STATION
B	
BF	BLIND FLANGE
BFF	BELOW FINISH FLOOR
BFP	BACKFLOW PREVENTER
BLDG	BUILDING
BOT	BOTTOM
BTUH	BRITISH THERMAL UNITS PER HOUR
BU	BELL-UP
BV	BALL VALVE
C	
C	CHANNEL
CENTR	CENTRIFUGAL
CF	CABINET FAN
C/L	CENTERLINE
CO	CLEANOUT
CONC	CONCRETE
CONN	CONNECTION
CONT	CONTINUATION
CP	CIRCULATING PUMP
CS	CONTROL STATION
CV	CHECK VALVE, CONTROL VALVE
CWW	CLEAR WATER WASTE
D	
D	DIRECT DRIVE
DEH	DEHUMIDIFIER
DF	DRINKING FOUNTAIN
DIA	DIAMETER
DN	DOWN
DSN	DOWNSPOUT NOZZLE

E	
E	ELECTRIC
EA	EACH
EEW	EMERGENCY EYE WASH
EFF	EFFICIENCY
EL	ELEVATION
EP	EXPLOSION PROOF
EQUIP	EQUIPMENT
ES	EMERGENCY SHOWER
ES/EEW	EMERGENCY SHOWER AND EYEWASH
ET	EXPANSION TANK
EWC	ELECTRIC WATER COOLER
EWH	ELECTRIC WATER HEATER
EWT	ENTERING WATER TEMPERATURE
EXIST	EXISTING
F	
F	DEGREES FAHRENHEIT
FCO	FLOOR CLEANOUT
FD	FLOOR DRAIN
FDB	DEGREES FAHRENHEIT DRY BULB
FLEX	FLEXIBLE
FM	FLOW METER
FPM	FEET PER MINUTE
FR	FUNNEL RECEPTOR
FS	FLOOR SINK
FSH	FLOW SWITCH HIGH
FSW	FILTER SURFACE WASH
FT	FEET
G	
G	GAS OUTLET
GA	GAUGE
GALV	GALVANIZED
GCO	GRADE CLEANOUT
GD	GARBAGE DISPOSER
GIH	GAS INFRARED HEATER
GPM	GALLONS PER MINUTE
GUH	GAS UNIT HEATER
GV	GATE VALVE
GW	GLASS WASHER
GWH	GAS WATER HEATER
H	
H	HAND OPERATOR, HEIGHT, HORIZONTAL
HE	HEAT EXCHANGER, HELIUM
HF	HOSE FAUCET
HO	HAND-OFF
HOA	HAND-OFF-AUTO
HP	HORSEPOWER
HR	HOUR, HOSE REEL
HUM	HUMIDIFIER
HV	HOSE VALVE
HWB	HEATING WATER BOILER
HZ	HERTZ

I	
I	INTAKE
ID	INSIDE DIAMETER
IN	INCHES
INV	INVERT
J	
JS	JANITOR'S SINK
K	
KS	KITCHEN SINK
KW	KILOWATT
L	
LAV	LAVATORY
LBS	POUNDS
LI	LEVEL INDICATOR
LS	LABORATORY SINK, LEVEL SWITCH
LWT	LEAVING WATER TEMPERATUREMAU MAKEUP AIR UNIT
M	
MAX	MAXIMUM
MCA	MINIMUM CIRCUIT AMPS
MFR	MANUFACTURER
MIN	MINIMUM
MOD	MODULATING
MS	MOP SINK
N	
NC	NORMALLY CLOSED
NO	NORMALLY OPEN, NUMBER
NPSHR	NET POSITIVE SUCTION HEAD REQUIRED
NT	NEUTRALIZATION TANK
O	
OD	OUTSIDE DIAMETER
ORD	OVERFLOW ROOF DRAIN
P	
PD	PRESSURE DROP (FEET OF WATER)
PAC	PACKAGED AIR CONDITIONING UNIT
PDI	PLUMBING AND DRAINAGE INSTITUTE
PDS	PRESSURE DIFFERENTIAL SWITCH
PL	PLATE
POS	POSITION
PPM	PARTS PER MILLION
PRS	PRESSURE REDUCING STATION
PRV	PRESSURE REDUCING VALVE
PS	PRESSURE SWITCH
PSI	POUNDS PER SQUARE INCH
PSIA	POUNDS PER SQUARE INCH ABSOLUTE
PSIG	POUNDS PER SQUARE INCH GAUGE

R	
RCS	REMOTE CONTROL STATION
RD	ROOF DRAIN
REQD	REQUIRED
S	
SF	SQUARE FEET, SUPPLY FAN
SH	SHEET, SHOWER
SIM	SIMILAR
SS	STAINLESS STEEL
SSK	SERVICE SINK
SSP	SUBMERSIBLE SUMP PUMP
STD	STANDARD
SV	SERVICE VALVE, SHUTOFF VALVE, SUPPLY VALVE, SOLENOID VALVE
T	
TD	TRENCH DRAIN
TPP	TRAP PRIMING PANEL
TS	TAMPER SWITCH
TYP	TYPICAL
U	
UR	URINAL
V	
V	VERTICAL
VAC	VACUUM OUTLET
VB	VACUUM BREAKER
VCD	VOLUME CONTROL DAMPER
VF	VANEAXIAL FAN
VP	VACUUM PUMP
VSP	VERTICAL COLUMN SUMP PUMP
VTR	VENT THRU ROOF
W	
W	WIDE FLANGE, WIDTH
WBP	WATER BOOSTER PUMP
WC	WATER CLOSET, WATER COLUMN
WCO	WALL CLEANOUT
WG	WATER GAUGE
WH	WALL HYDRANT
WHA	WATER HAMMER ARRESTOR
WM	WALL MOUNTED
WST	WATER STORAGE TANK
WT	WEIGHT

VALVE LEGEND

PLAN SECTION

- ANGLE VALVE
- BACKFLOW PREVENTER W/ STRAINER (2" AND SMALLER)
- BACKFLOW PREVENTER
- BACKWATER VALVE
- BALL VALVE
- BUTTERFLY VALVE
- CHECK VALVE
- GATE VALVE
- GLOBE VALVE
- PLUG VALVE
- PRESSURE REDUCING VALVE
- THREE WAY VALVE

PIPING ACCESSORIES LEGEND

- FLEXIBLE CONNECTION
- HOSE FAUCET W/O VACUUM BREAKER
- HOSE FAUCET W/ VACUUM BREAKER
- HOSE VALVE W/ HOSE NIPPLE
- PRESSURE REDUCING STATION
- PRESSURE RELIEF VALVE
- PRESSURE / TEMPERATURE RELIEF VALVE
- QUICK COUPLING
- WALL HYDRANT W/ VACUUM BREAKER
- METER
- WYE STRAINER
- WYE STRAINER W/ BLOWOFF
- VACUUM BREAKER

PIPING LEGEND

- PIPING ABOVE FLOOR OR GRADE
- PIPING BELOW FLOOR OR GRADE
- PIPE TURNING UP
- PIPE TURNING DOWN

PIPE FITTINGS LEGEND

- BLIND FLANGE
- CAP
- REDUCER
- SLEEVE
- TEST PLUG
- UNION
- P-TRAP
- VTR

PLUMBING LEGEND

- BELL-UP DRAIN OR FUNNEL RECEPTOR W/ TRAP
- CLEANOUT (FLOOR)
- CLEANOUT (PIPE)
- BLENDING VALVE
- DOWNSPOUT NOZZLE
- EMERGENCY SHOWER / EYEWASH
- FLOOR DRAIN
- HOSE RACK
- HOSE REEL
- ROOF DRAIN
- SHOWER
- SPLASH BLOCK
- WATER HAMMER ARRESTOR W/PDI SIZE DESIGNATION

GENERAL PLUMBING NOTES

1. THIS IS GENERAL LEGEND AND ABBREVIATION SHEET FOR THE PLUMBING DRAWINGS. SOME ITEMS CONTAINED ON THIS SHEET MAY NOT BE USED ON THIS SPECIFIC PROJECT.
2. ALL MECHANICAL PLUMBING WORK SHALL BE IN ACCORDANCE WITH THE FOLLOWING APPLICABLE CODES WITH CITY OF HOUSTON AMENDMENTS:
   - 2012 INTERNATIONAL BUILDING CODE
   - 2012 INTERNATIONAL FIRE CODE
   - 2012 UNIFORM PLUMBING CODE
   - 2015 INTERNATIONAL ENERGY CONSERVATION CODE
3. FOR PLUMBING VENTS, FLUE FLASHING, AND ROOF DRAIN DETAILS, SEE ARCHITECTURAL DRAWINGS.
4. SEE ARCHITECTURAL AND STRUCTURAL DRAWINGS FOR ALL EQUIPMENT BASE DETAILS.
5. "SCREENED" DELINEATION DENOTES EXISTING AND NEW FACILITIES AND IS FOR REFERENCE ONLY. "LIGHT" LINE DELINEATION DENOTES EXISTING MECHANICAL EQUIPMENT AND SYSTEMS. EXISTING FACILITY AND MECHANICAL SYSTEMS INFORMATION WAS TAKEN FROM PREVIOUS DRAWINGS, CONSTRUCTION RECORDS, DATA, AND FIELD SURVEY INFORMATION. ACTUAL LOCATION, ARRANGEMENT, AND DIMENSIONS SHALL BE FIELD VERIFIED AND WORK INSTALLED TO MEET ACTUAL CONDITIONS AND LOCATIONS ENCOUNTERED. "BOLD" (DARK) DELINEATION IS NEW WORK TO BE CONSTRUCTED UNDER THIS CONTRACT.
6. ALL HANGERS, BRACKETS, OR BRACES FOR EQUIPMENT AND PIPING ARE NOT INDICATED ON THE DRAWINGS. REFER TO THE SPECIFICATIONS FOR SUPPORT REQUIREMENTS NOT SHOWN ON THE PLANS.
7. ALL EQUIPMENT AND PIPING FINAL LOCATIONS SHALL BE COORDINATED TO AVOID INTERFERENCES WITH STRUCTURE, OTHER PIPING, EQUIPMENT, DUCTWORK, AND CONDUIT. UNLESS SPECIFICALLY DIMENSIONED, THE PIPE ROUTING SHOWN IS INTENDED TO INDICATE GENERAL LOCATION ONLY.
8. ALL PIPING SHALL BE ROUTED AS HIGH AS POSSIBLE WITH A MINIMUM HEIGHT OF 8'-0" ABOVE THE WALKING SURFACE UNLESS OTHERWISE INDICATED BY A CENTERLINE OR INVERT ELEVATION.
9. ALL HOSE FAUCETS AND HOSE VALVES SHALL BE INSTALLED 3'-0" ABOVE FINISHED FLOOR UNLESS OTHERWISE NOTED.
10. ALL HOSE FAUCETS AND WALL HYDRANTS SHALL BE NOMINAL 3/4" PIPE SIZE UNLESS OTHERWISE NOTED.
11. ALL HOSE FAUCETS, AND OTHER OUTLETS ON NON-POTABLE WATER LINES WHICH COULD BE USED FOR DRINKING OR DOMESTIC USE SHALL BE POSTED AS REQUIRED BY THE APPLICABLE CODES. IN ABSENCE OF A CODE REQUIREMENT, THE OUTLETS SHALL BE POSTED WITH A TAG IN THE SHAPE OF A 4" EQUILATERAL TRIANGLE BEARING THE LEGEND "DANGER: UNSAFE WATER" IN LETTERS NOT LESS THAN 1/2" IN HEIGHT. THIS TAG SHALL BE SECURELY ATTACHED IN A VISIBLE LOCATION DIRECTLY ABOVE OUTLET. THE TAG SHALL BE PAINTED ORANGE AND THE LETTERS BLACK.
15. INSULATION SHALL BE PROVIDED FOR EQUIPMENT AND PIPING SYSTEMS AS INDICATED IN THE SPECIFICATIONS.
16. PLUMBING VENTS OUTLETS SHALL BE LOCATED A MINIMUM OF 10'-0" AWAY FROM ANY OUTSIDE AIR INLET.
17. PIPING SIZES TO EQUIPMENT AND EQUIPMENT SUPPORTS SHALL BE VERIFIED AND ADJUSTED TO MATCH ACTUAL EQUIPMENT FURNISHED.

SYSTEM ABBREVIATIONS

WATER	
CW	COLD WATER (POTABLE)
DI	DEIONIZED WATER
DW	DISTILLED WATER
FW	FIRE PROTECTION WATER
FSW	FILTER SURFACE WATER
HW	HOT WATER (POTABLE)
HWC	HOT WATER CIRCULATING (POTABLE)
NPHW	HOT WATER (NON-POTABLE)
NPW	COLD WATER (NON-POTABLE)
PW	PLANT WATER
SW	SERVICE WATER
TNPW	TEPID NON-POTABLE WATER
TW	TEPID OR BLENDED WATER

WASTE	
CRV	CHEMICAL RESISTANT VENT
CRW	CHEMICAL RESISTANT WASTE
CWW	CLEAR WATER WASTE
D	SUMP PUMP DISCHARGE
ID	INDIRECT DRAIN
SAN	SANITARY DRAIN
ST	STORM DRAIN
V	VENT
FUEL GAS	
NG	NATURAL GAS
PG	PROPANE GAS
SG	SLUDGE GAS

SPECIAL	
A	COMPRESSED AIR
AC	ACETYLENE
AR	ARGON
H	HYDROGEN
HE	HELIUM
ME	METHANE
N	NITROGEN
NO	NITROUS OXIDE
O	OXYGEN
VAC	VACUUM

SCHEMATIC FITTINGS

- BLIND FLANGE
- CAP
- REDUCER
- SLEEVE
- TEST PLUG
- UNION
- P-TRAP
- VENT THROUGH ROOF (VTR)

SCHEMATIC VALVES

- ANGLE VALVE
- BACKFLOW PREVENTER W/STRAINER (2" AND SMALLER)
- BACKFLOW PREVENTER
- BACKWATER VALVE
- BALL VALVE
- BUTTERFLY VALVE
- CHECK VALVE
- GATE VALVE
- GLOBE VALVE
- PLUG VALVE
- PRESSURE REDUCING VALVE
- THREE WAY VALVE

PLUMBING SCHEMATICS

- BELL-UP DRAIN OR FUNNEL RECEPTOR W/ TRAP
- CLEANOUT (FLOOR)
- CLEANOUT (PIPE)
- BLENDING VALVE
- DOWNSPOUT NOZZLE OR SHOWER
- EMERGENCY SHOWER/EYEWASH
- FLOOR DRAIN
- P-TRAP
- ROOF DRAIN
- SPLASHBLOCK
- WATER HAMMER ARRESTOR W/ PDI SIZE DESIGNATION

SCHEMATICS SPECIALTIES

- AUTOMATIC VALVE STATION
- BASKET STRAINER
- COMBINATION PUMP DISCHARGE VALVE
- FLEXIBLE CONNECTION
- FLOW CONTROL VALVE
- FLOW SENSOR METER
- HOSE FAUCET
- HOSE FAUCET W/ VACUUM BREAKER
- HOSE VALVE W/ HOSE NIPPLE
- AIR VENT
- PRESSURE REDUCING STATION
- PRESSURE RELIEF VALVE
- PRESSURE/TEMPERATURE RELIEF VALVE
- QUICK COUPLING
- ROTAMETER
- SIGHT FLOW INDICATOR
- SUCTION DIFFUSER (SCHEMATIC)
- TRAP PRIMER
- WALL HYDRANT W/ VACUUM BREAKER
- METER
- WYE STRAINER
- WYE STRAINER W/ BLOWOFF
- VACUUM BREAKER

SCHEMATICS

- AIR-GAP FITTING
- BELL-UP DRAIN OR FUNNEL RECEPTOR
- FLOOR CLEANOUT
- FLOOR DRAIN
- FLOOR DRAIN W/ FUNNEL

CONTROLS AND INSTRUMENTATION

- FLOW SWITCH HIGH
- GAUGE ACTIVATOR/ISOLATOR
- LEVEL SWITCH
- PRESSURE GAUGE W/ SHUTOFF VALVE
- SOLENOID OPERATOR
- THERMOMETER – DIAL TYPE
- THERMOMETER – STEM TYPE
- VACUUM GAUGE W/ SHUTOFF VALVE

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
RANDY W. CANTRELL
115374
LICENSED PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

PLUMBING

LEGENDS, ABBREVIATIONS, AND GENERAL NOTES

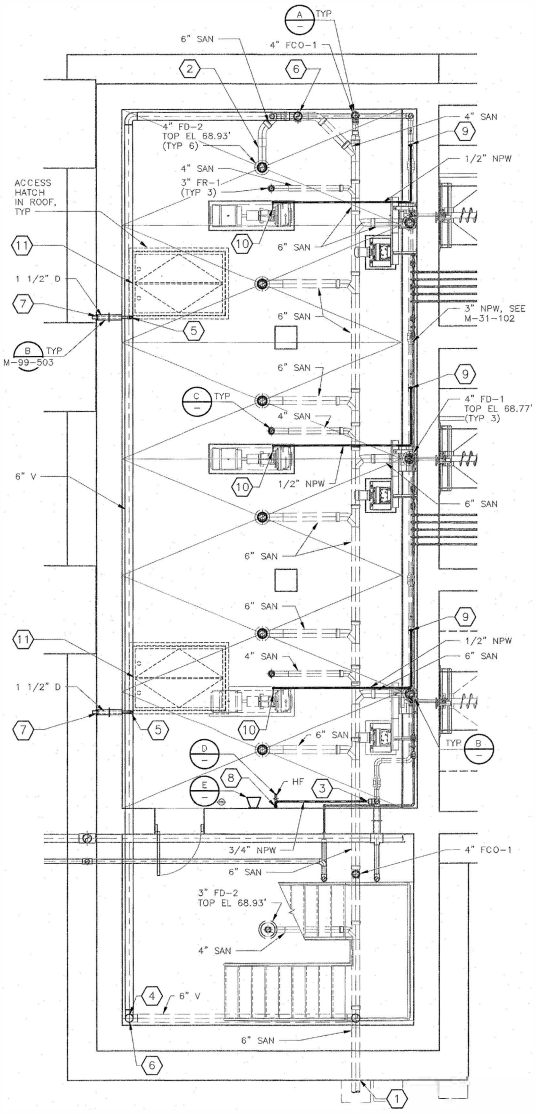
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 288 OF 379	

FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
XIAOHUA LIN
80367
REGISTERED
PROFESSIONAL ENGINEER
HOUSTON, TEXAS

P-00-001

FILE PATH: B:\W 360\402500 - COH Intercontinental Airport WWTP Improvements\402500-GENERAL.mt



LOWER LEVEL – PLUMBING PLAN

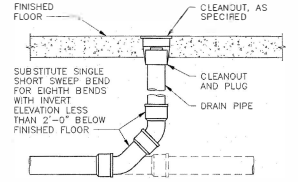
1/4" = 1'-0"

PIPING ACCESSORIES SCHEDULE				
UNIT NUMBER	MANUFACTURER	MODEL	DESCRIPTION	NOTES
FD-1	SMITH	2310-D SERIES	MEDIUM DUTY CAST IRON FLOOR DRAIN, ADJUSTABLE TOP, DOME GRATE	
FD-2	SMITH	2310 SERIES	MEDIUM DUTY CAST IRON FLOOR DRAIN, ADJUSTABLE TOP, LOOSE SET CAST IRON GRATE	
FR-1	SMITH	3500 SERIES	MEDIUM DUTY CAST IRON FUNNEL RECEPTOR, WATERSTOP FLANGE, THREADED OR NO-HUB CONNECTION	

4' 2' 0' 4' 8'

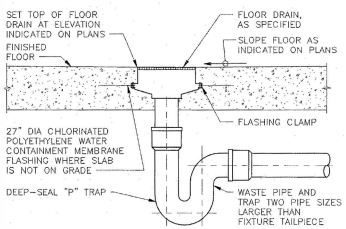
1/4" = 1'-0"

N



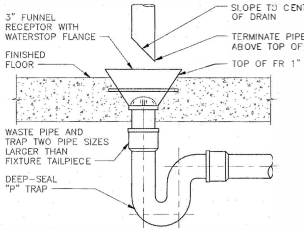
A FLOOR CLEANOUT – NEW FLOOR

NO SCALE



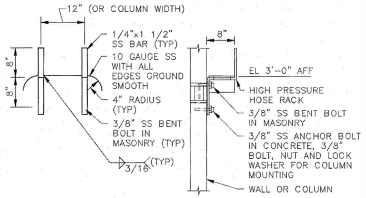
B FLOOR DRAIN – NEW FLOOR

NO SCALE



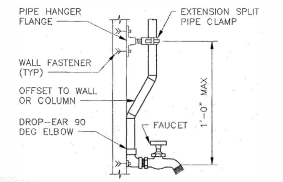
C FUNNEL DRAIN – NEW FLOOR

NO SCALE



E WALL OR COLUMN MOUNTED HOSE RACK

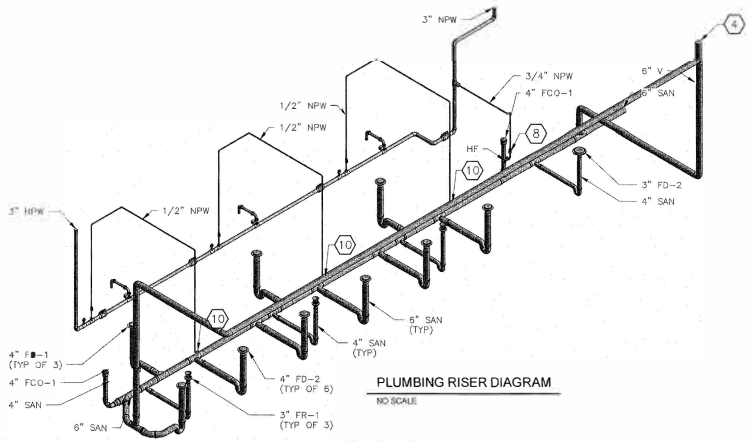
NO SCALE



NOTES:
1. SEE PLANS FOR PIPE DIAMETERS AND SPECIFICATIONS FOR PIPING INSULATION INFORMATION.

D HOSE FAUCET PIPE MOUNTING

NO SCALE



PLUMBING RISER DIAGRAM

NO SCALE

GENERAL NOTE:

1. ALL EXPOSED OR ABOVE GROUND POTABLE AND NON-POTABLE PIPING SHALL BE INSULATED.

GENERAL SHEET NOTES:

PIPING MATERIALS:

D – GALVANIZED STEEL PIPE, TYPE E
NPW – COPPER TUBING, TYPE L
SAN – CAST IRON SOIL PIPE, BELL & SPIGOT
V – CAST IRON SOIL PIPE, HUBLESS

SEE SPECIFICATIONS FOR PIPING MATERIAL DETAILS.

NOTES BY SYMBOL (#)

1. 6" SAN INV EL 64.34', SEE SHEET C-10-114 FOR CONTINUATION.
2. 6" SAN, INV EL 65.21'.
3. CONNECT 3/4" NPW INTO 3" NPW, SEE SHEET M-31-101 FOR CONTINUATION.
4. 6" VENT UP THRU CANOPY ROOF.
5. 1 1/2" D UP TO ACCESS HATCH DRAIN CONNECTION.
6. CLEANOUT IN VERTICAL 12" AFF.
7. 1 1/2" USN AT INV EL 83.45', DISCHARGE TO CONCRETE.
8. PROVIDE SV IN RISER.
9. CONNECT 1/2" NPW INTO 3" NPW WITH SV IN RISER, SEE SHEET M-31-101 FOR CONTINUATION.
10. ROUTE 1/2" NPW TO PUMP SEAL WATER CONNECTION.
11. AVOID INTERFERENCE WITH HATCH OPENINGS.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

STATE OF TEXAS
RANDY W. CANTRELL
115374
LICENSED
PROFESSIONAL ENGINEER

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

PLUMBING

GRIT FACILITY
PLUMBING PLAN, SCHEDULES, AND DETAILS

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 289 OF 379	

FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
80367
REGISTERED
RANDY W. CANTRELL
HOUSTON, TEXAS
PROFESSIONAL ENGINEER

P-31-101

FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-COH IA WWTP-BIV.rvt

PLAN SYMBOLS

SYMBOL	DESCRIPTION
	LINEAR LIGHT FIXTURE
	BRACKET MOUNTED INCANDESCENT OR LED
	POLE OR HIGH BAY LIGHT FIXTURE
	WALL PACK OR FLOOD LIGHT FIXTURE
	BATTERY BACKUP LIGHT FIXTURE
	BRACKET MOUNTED EXIT FIXTURE
	SINGLE CONVENIENCE RECEPTACLE
WP	DUPLEX CONVENIENCE RECEPTACLE (WP INDICATES CAST WEATHER PROOF OUTLET BOX & COVER)
A	SINGLE SPECIAL PURPOSE RECEPTACLE (LETTER INDICATES TYPE PER SCHEDULE)
	240V AC, 20 AMP RECEPTACLE
	TELEPHONE/UTILITY SYSTEM OUTLET
	UNFUSED SAFETY SWITCH – 3P, 30A, 600V UNLESS OTHERWISE INDICATED
30	FUSED SAFETY SWITCH – 3P, 600V, 30A MINIMUM OR AS REQUIRED TO ACCOMODATE FUSE SIZE INDICATED
	OUTLET, PULL OR JUNCTION BOX
M	COMBINATION PROTECTIVE DEVICE & MAGNETIC STARTER
	SINGLE UNIT PUSHBUTTON STATION
	2-UNIT PUSHBUTTON STATION
	3-UNIT PUSHBUTTON STATION
5	ELECTRIC MOTOR – NUMBER INDICATES HORSEPOWER
LS	LIMIT SWITCH
FS	FLOW SWITCH
PS	PRESSURE SWITCH
TS	TEMPERATURE SENSOR
DS	MAGNETIC REED DOOR SWITCH
TB	TERMINAL BOX

SYMBOL	DESCRIPTION
PC	PHOTO CELL
FS	FLUAS SWITCH
EP	ELECTRO-PNEUMATIC VALVE
S	SOLENOID VALVE
T	ELECTRIC THERMOSTAT
TT	TEMPERATURE ACTUATED DEVICE
	SINGLE POLE TOGGLE SWITCH
	DOUBLE POLE TOGGLE SWITCH
	3 – WAY SWITCH
M	MOTOR RATED TOGGLE SWITCH
T	MANUAL ROTARY TIMER LIGHT SWITCH
	ELECTRIC UNIT HEATER
	CLASS 1, DIV I, CONDUIT SEAL
	EXPOSED CONDUIT
	EXPOSED PUMP CABLE
	CONDUIT CONCEALED IN FLOOR SLAB OR UNDERGROUND (CONDUITS 1-1/2" OR LARGER SHALL BE INSTALLED INSTALLED UNDER FLOOR SLAB). SEE NOTE 2
	HOMERUN TO PANEL OR MCC, AS NOTED
	AIR TERMINAL
	3/4"x20' GROUND ROD
	3/4"x20' GROUND ROD & TEST WELL
G	4/0 BARE COPPER GROUND LOOP AT 24" BELOW GRADE
XXX	CONDUIT TAG
GND	GROUND BUS
OH	OVERHEAD ELECTRICAL LINE
	RADIO ANTENNA
	CAMERA
HOA	HAND-OFF-AUTO SWITCH

DRAWING NOTES:

A. EXISTING FACILITIES AND OTHER DISCIPLINE'S NEW WORK IS SHOWN LIGHT IN THESE ELECTRICAL DRAWINGS. NEW ELECTRICAL WORK IS SHOWN DARK IN THESE ELECTRICAL DRAWINGS.

B. FOR CLARITY NOT ALL CONDUITS REQUIRED IN THIS PROJECT ARE ILLUSTRATED IN THESE ELECTRICAL DRAWINGS.

C. PLAN DRAWINGS DO NOT ILLUSTRATES ALL ASPECTS OF ELECTRICAL REQUIREMENTS. SEE SPECIFICATIONS, DIAGRAMS, DETAILS AND SCHEDULES FOR COMPLETE WORK SCOPE.

CONDUIT SYSTEM NOTES

1. ANY CONDUIT WITHOUT DESIGNATION CONTAINS 3 #10, #12 AWG IN 1" CONDUIT.
2. CONDUITS IMBEDDED IN STRUCTURAL CONCRETE (FLOOR SLABS, ETC.) SHALL BE SO LOCATED AS NOT TO UNDULY IMPAIR THE STRENGTH OF THE CONSTRUCTION AND SHALL BE SPACED NOT LESS THAN TWO TIMES THE CONDUIT OD BETWEEN ADJACENT CONDUITS, EXCEPT WHERE CROSSING OR OTHERWISE APPROVED BY THE ENGINEER.
3. WIRING FOR LIGHTING, RECEPTACLES AND OTHER MISCELLANEOUS CIRCUITS SHALL CONFORM TO THE CIRCUITING INDICATED ON THE DRAWINGS WITH FIELD ARRANGEMENT AND ROUTING AS REQUIRED.
4. THE WIRING SHALL BE INSTALLED WITH NO MORE THAN 6 CURRENT CARRYING CONDUCTORS IN A CONDUIT.
5. CONDUIT AND CIRCUITS ORIGINATING FROM DIFFERENT SOURCES SHALL BE INSTALLED IN SEPARATE RACEWAYS.

BASIC ELECTRICAL MATERIAL NOTES:

A. ALL OUTDOOR CONDUIT SHALL BE PVC COATED RIGID ALUMINUM. CONDUIT BODIES SHALL BE FORM 9 FERROUS FREE ALUMINUM WITH CAPTIVE 316SS SCREWS AND GASKETS. ALL INDOOR CONDUIT SHALL BE RIGID ALUMINUM CONDUIT.

B. ALL FINAL CONNECTIONS SHALL BE FLEXIBLE METALLIC ALUMINUM CONDUIT, WITH SUNLIGHT RESISTANT JACKET AND ALUMINUM WOUND CORE. FLEXIBLE FINAL CONNECTIONS SHALL BE NO LONGER THAN 3'-0" (36" MAX) IN LENGTH WITHOUT SPECIAL PERMISSION. ALL FLEX FITTINGS 1" TRADE SIZE AND SMALLER SHALL BE 316SS. ALL FLEX FITTINGS 1 1/4" TRADE SIZE AND LARGER MAY BE FERROUS FREE ALUMINUM OR 316SS.

C. MEDIUM VOLTAGE CABLE FOR THIS PROJECT SHALL BE EPR, MV-105, 15KV RATED. ALL 600V RATED POWER AND CONTROL CONDUCTORS, ROUTED IN CONDUIT, SHALL BE DESIGNATED XHHW-2 TYPE. ALL CONTROL WIRING, ROUTED WITHIN CABINETS, SHALL BE MTW TYPE.

C. ALL OUTDOOR PULL, JUNCTION AND TERMINATION BOXES SHALL BE NEMA 4X, 316SS PER SPECIFICATION.

B. ALL STRUT AND STRUT FITTINGS SHALL BE 316SS. ALL ANCHORS, HARDWARE AND CONDUIT STRAPS SHALL BE 316SS.

DIAGRAM SYMBOLS

SYMBOL	DESCRIPTION
	CONTACT, NORMALLY OPEN
	CONTACT, NORMALLY CLOSED
	PUSHBUTTON, NORMALLY CLOSED
	PUSHBUTTON, NORMALLY OPEN
	SELECTOR SWITCH
OL	OVERLOADS
	FUSE
	PILOT LIGHT, PUSH TO TEST
M	AUXILIARY STARTER CONTACTS
	PRESSURE SWITCH, OPENS ON RISE
	PRESSURE SWITCH, CLOSES ON RISE
	LIMIT SWITCH, NORMALLY CLOSED
	LIMIT SWITCH, NORMALLY OPEN
	TEMPERATURE ACTUATED SWITCH, OPENS ON RISE
	TEMPERATURE ACTUATED SWITCH, CLOSES ON RISE
	VACUUM SWITCH, OPENS ON RISE
	VACUUM SWITCH, CLOSES ON RISE
	THERMAL OVERLOAD
EHP	EQUIPMENT SPACE HEATER
	GROUND CONNECTION
	SOLENOID
M	MOTORIZED TIME DELAY RELAY
TD	TIME DELAY RELAY
TD O–O–X	TIME DELAY CONTACT (O=OPEN, X=CLOSED, DESIGNATION INDICATES CONTACT POSITION WHEN RELAY IS RESET-TIMING-TIMED OUT)
R	AUXILIARY RELAY
ETM	ELAPSED TIME METER
	CONTROL POWER TRANSFORMER
M	MOTOR STARTER OPERATING COIL
	SEPARABLE CONTACTS
	CIRCUIT BREAKER
	COMBINATION MOTOR STARTER
V	VOLTMETER
VS	VOLTMETER SWITCH
A	AMMETER
AS	AMMETER SWITCH
3000/5	CURRENT TRANSFORMER (CT) DESIGNATION INDICATES QUANTITY & RATIO
	POTENTIAL TRANSFORMER
	POWER TRANSFORMER
	POWER FACTOR CORRECTION CAPACITOR
47	PHASE FAILURE/UNDERVOLTAGE MONITOR RELAY
	FUSED DISCONNECT SWITCH
	SURGE PROTECTIVE DEVICE
	FUSED CUTOUT

ABBREVIATIONS

A	AMP
ACL	ACROSS LINE STARTER
ADJ	ADJUSTABLE
AFF	ABOVE FINISHED FLOOR
AI	ANALOG INPUT
ALT	ALTERNATOR
AO	ANALOG OUTPUT
ASD	ADJUSTABLE SPEED DRIVE
C	CONDUIT
CA	CABLE
CAB	CABINET
CAT	CATALOG
CB	CIRCUIT BREAKER
CKT	CIRCUIT
CNP	CENTERPOINT ENERGY
CNTR	CONTROL
COMM	COMMUNICATIONS
CONT	CONTINUED
CP	CONTROL PANEL
CPT	CONTROL POWER TRANSFORMER
CPU	CENTRAL PROCESSING UNIT
CT	CURRENT TRANSFORMER
CU	COPPER
DC	DIRECT CURRENT
DI	DISCRETE INPUT
DIREC	DIRECTIONAL
DIV	DIVISION
DO	DISCRETE OUTPUT
DWG	DRAWING
ETM	ELAPSED TIME METER
FLA	FULL LOAD AMPS
FM	FLOWMETER
FO	FIBER OPTIC
FOC	FIBER OPTIC CABLE
GFCI	GROUND FAULT CIRCUIT INTERRUPT
GND	GROUND
HOA	HAND OFF AUTO
HYD	HYDRAULIC
IC	INTERMEDIATE CLASS
JB	JUNCTION BOX
KA SYM	THOUSAND AMPS SYMMETRICAL
KS	KEY SWITCH
KVA	KILO-VOLT-AMPS
LPI	LIGHTNING PROTECTION INSTITUTE
LS	LIMIT SWITCH
LV	LOW VOLTAGE
M	MOTOR RUN CONTACT
MA	MILLIAMPERE
MADC	MILLIAMPERE DIRECT CURRENT
MCC	MOTOR CONTROL CENTER
MCP	MOTOR CIRCUIT PROTECTOR
MIN	MINUTES
MOR	MOTOR OVERLOAD RELAY
MPC	MINI-POWER CENTER
MV	MEDIUM VOLTAGE
mS	MILLISECOND
N	NEUTRAL
NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRICAL CODE
NEUT	NEUTRAL
NO	NORMALLY OPEN
NTS	NOT TO SCALE
OL	OVERLOAD
OD	OUTER DIAMETER
OH	OVERHEAD
P	POLE
PFCC	POWER FACTOR CORRECTION CAPACITOR
PLC	PROGRAMMABLE LOGIC CONTROLLER
POS	POSITION
PS	PRESSURE SWITCH
PVC	POLYVINYL CHLORIDE
PVC RGS	PVC COATED RIGID GALV STEEL CONDUIT
PWR	POWER
R	RELAY
RAC	RIGID ALUMINUM CONDUIT
RALM	PUMP ALARM RELAY
REE	ELEC BLDG ENTRY AUX RELAY
RGS	RIGID GALVANIZED STEEL CONDUIT
RHLA	HIGH LEVEL ALARM RELAY
RM	PUMP RUN AUX RELAY
RMOR	MOTOR OVERLOAD AUX RELAY
R.O.W.	RIGHT OF WAY
RPLC	PLC MODE AUX RELAY
RPLOR	PLC OVERRIDE
RPLM	PLC PUMP RUN RELAY
RPUMP	BACKUP SYSTEM RUN RELAY
RR	REMOTE RADIO
RRST	PUMP RESET AUX RELAY
RTAH	TEMPERATURE ALARM AUX RELAY
RTD	REMOTE THERMAL DETECTOR
RUV	UNDERVOLTAGE AUX RELAY
RVSS	REDUCED VOLTAGE SOLID STATE STARTER
RWD	WATCHDOG RELAY
SE	SERVICE ENTRANCE
SEC	SECONDS
SL	SEAL LEAK
SN	SOLID NEUTRAL
SPD	SURGE PROTECTIVE DEVICE
SPST	SINGLE POLE SINGLE THROW
SS	STAINLESS STEEL
SW	SWITCH
SWGR	SWITCHGEAR
TB	TERMINAL BOX
TEMP	TEMPERATURE
TD	TIME DELAY RELAY
TDLP	LOSS OF POWER TIME DELAY RELAY
TDRM	PUMP TIME DELAY RELAY
TRANS	TRANSITION
TSP	TWISTED SHIELDED PAIR
TST	TWISTED SHIELDED TRIAD
TYP	TYPICAL
UG	UNDERGROUND
UPS	UNINTERRUPTIBLE POWER SUPPLY
V	VOLTS
VA	VOLT-AMP
VAC	VOLTS ALTERNATING CURRENT
VDC	VOLTS DIRECT CURRENT
VFD	VARIABLE FREQUENCY DRIVE
VT	VOLTAGE TRANSFORMER
W	WATT OR WIRE

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

ZM. BRIGHT
77702
REGISTERED PROFESSIONAL LAND SURVEYOR

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
ELECTRICAL

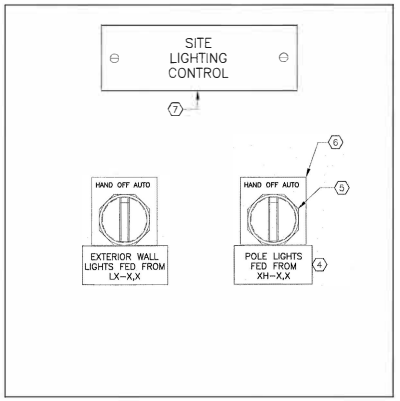
SYMBOLS, ABBREVIATIONS AND NOTES

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 289 OF 378	

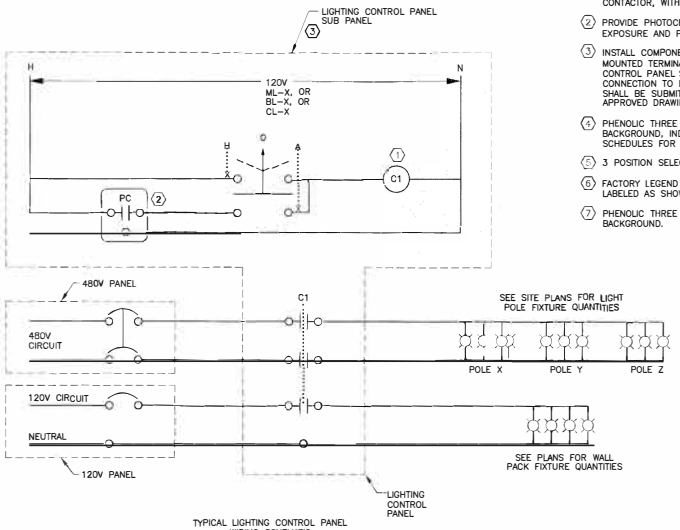
80367

E-00-001

FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\41160-BV (4th Imp Pkg 2)\Drawings\E-00-001 Symbols Abbreviations And Conduit Notes.dwg



TYPICAL LIGHTING CONTROL PANEL
FRONT



TYPICAL LIGHTING CONTROL PANEL
WIRING SCHEMATIC

NOTES:

1. PROVIDE EATON "CN35 SERIES" (OR EQUAL) ELECTRICALLY HELD LIGHTING CONTACTOR, WITH MINIMUM OF TWO SPARE CONTACTS PER CONTACTOR.
2. PROVIDE PHOTOCELL 4' MINIMUM ABOVE ROOF LINE LOCATED WITH NORTHERN EXPOSURE AND PROVEN FUNCTIONAL FOR SUNSET TO SUNRISE OPERATION.
3. INSTALL COMPONENTS ON SUB PANEL, PROVIDE FIELD WIRING AND RAIL MOUNTED TERMINAL BLOCKS (30A MIN.). ALL CONDUCTORS TO/FROM CONTROL PANEL SHALL PASS THROUGH TERMINAL BLOCKS BEFORE CONNECTION TO DEVICE WITHIN THE PANEL. PANEL WIRING SHOP DRAWING SHALL BE SUBMITTED FOR ENGINEER APPROVAL AND A PERMANENT COPY OF APPROVED DRAWING SHALL BE PROVIDE IN POCKET INSIDE ON PANEL DOOR.
4. PHENOLIC THREE LAYER NAMEPLATE WITH 3/16" BLACK LETTERS ON WHITE BACKGROUND, INDICATE CIRCUIT NUMBERS FOR EACH CIRCUIT. SEE PANEL SCHEDULES FOR RELATED CIRCUITS.
5. 3 POSITION SELECTOR SWITCH WITH SEALED MAINTAINED CONTACTS.
6. FACTORY LEGEND PLATE WITH 3/16" BLACK TEXT ON WHITE LABELED AS SHOWN.
7. PHENOLIC THREE LAYER NAMEPLATE WITH 3/8" BLACK LETTERS ON WHITE BACKGROUND.

LIGHT FIXTURE SCHEDULE

TYPE	CATALOG NUMBER	DESCRIPTION	LAMPS	INPUT VOLTAGE	INPUT WATTS	REMARKS
A	LITHONIA CLX-L48-7000LM-HEF-WDL-MVOLT-GZ10-50K-80CRI-WH-A268	WHITE LINEAR 48" LED FIXTURE WITH WIDE DIFFUSE LENS AND HIGH EFFICIENCY PACKAGE	LED	120	45	INSTALL SUSPENDED FIXTURE ROWS ON CONTINUOUS TYPE 316 S.S. 1⅝" X 1⅝" STRUT SUSPENDED BY ¼" TYPE 316 S.S. THREADED RODS. SINGLE FIXTURES TO BE INSTALLED SIMILAR TO THAT DESCRIBED FOR FIXTURE ROWS.
B	LITHONIA WST-LED-P3-50K-VF-MVOLT-E20WC-DDBXD-A268	DARK BRONZE ALUMINUM WALL PACK LED FIXTURE WITH 90 MINUTE EMERGENCY BATTERY PACK.	LED	120	50	INSTALL FIXTURE WITH TOP AT ONE FOOT BELOW ROOF.
C	LITHONIA ELT24-W-MT-H-A268 WITH ELAMSTS MOUNTING SHELF. PAINT SHELF WHITE.	EMERGENCY FIXTURE WITH TWO HEADS AND SEALED LEAD ACID 90 MINUTE BATTERY.	HALOGEN	120	20	INSTALL FIXTURE WITH BOTTOM OF FIXTURE AT 10'-0" ABOVE THE FLOOR. ADD A CORD WITH PLUG TO THE FIXTURE AND PLUG THE CORD INTO A RECEPTACLE MOUNTED TO THE SIDE OF THE FIXTURE.
D	LITHONIA JHBL-24000LM-GL-WD-MVOLT-GZ10-50K-80CRI-CS89-DWHXD-A268 WITH ACCESSORIES JHBLSCK84 AND HKM	WHITE CAST ALUMINUM HIGH BAY LED FIXTURE WITH GLASS LENS, A HOOK FOR MOUNTING FROM AN EYEBOLT, A 84" SAFETY CABLE AND A 72" CORD FOR CONNECTION TO A JUNCTION BOX.	LED	120	185	PROVIDE TYPE 316 S.S. STRUT TO MOUNT A TYPE 316 S.S. EYEBOLT AT THE DIMENSIONED LOCATION INDICATED ON PROJECT DRAWINGS. INSTALL SAFETY CABLE TO SECURE FIXTURE. CONNECT FIXTURE POWER CORD TO A JUNCTION BOX NEAR THE FIXTURE.
E	LITHONIA FEM-L48-6000LM-IMAFL-WD-MVOLT-GZ10-40K-80CRI-SPD-STSL-WLF-A268	WET LOCATION 52" LED FIXTURE WITH FIBERGLASS HOUSING, ACRYLIC LENS, AND STAINLESS STEEL LENS LATCHES.	LED	120	45	INSTALL EACH FIXTURE ON TYPE 316 S.S. 1⅝" X 1⅝" STRUT SUSPENDED BY ¼" TYPE 316 S.S. THREADED ROD. INSTALL BOTTOM OF FIXTURES AT 10' ABOVE THE FLOOR.
X	LITHONIA LQM-S-W-3-R-120/277-ELN	WHITE LED EXIT SIGN FIXTURE IN A THERMOPLASTIC HOUSING WITH RED LETTERS AND NICKEL CADMIUM BATTERY	LED	120	1	INSTALL A FIXTURE ABOVE EACH EXIT DOOR.

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

ELECTRICAL

LIGHT FIXTURE SCHEDULE AND CONTROL DIAGRAM

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	
	XIAOHUA (SHARI) LIN, P.E.
SHEET NO.	290 OF 378

FOR CITY OF HOUSTON USE ONLY

80367

E-00-601

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\Drawings\E-00-601 Light Fixture Schedule And Control Diagram.dwg

TAG	DESCRIPTION	ROUTING		CONDUIT & WIRE SIZES	COMMENTS
		FROM	TO		
T-LSEB2	TRANSFORMER T-LSEB2 FEEDER	MVS-1	TRANSFORMER T-LSEB2 PRIMARY	4"C, 3-#3/0, 1-#1 GND.	8KV MV-105
MCC-LSEB2	MCC-LSEB2 FEEDER	TRANSFORMER T-LSEB2 SECONDARY	MCC-LSEB2 INCOMING SECTION	(7) 4"C, 6 WITH 3-500 KCMIL & #1/0 GND.	1 SPARE
P-04-1-P	PUMP 1 POWER	PUMP 1 ASD	TERMINAL BOX 135 HP	4"C, EACH WITH 3-250 KCMIL & #6 GND	135 HP
P-04-2-P	PUMP 2 POWER	PUMP 2 ASD	TERMINAL BOX 135 HP	4"C, EACH WITH 3-250 KCMIL & #6 GND	135 HP
P-04-3-P	PUMP 3 POWER	PUMP 3 ASD	TERMINAL BOX 385 HP	(2) 4"C, EACH WITH 3-500 KCMIL & #1/0 GND	385 HP
P-04-4-P	PUMP 4 POWER	PUMP 4 RVAT	TERMINAL BOX 385 HP	(2) 4"C, EACH WITH 3-500 KCMIL & #1/0 GND	385 HP
P-04-5-P	PUMP 5 POWER	PUMP 5 RVAT	TERMINAL BOX 385 HP	(2) 4"C, EACH WITH 3-500 KCMIL & #1/0 GND	385 HP
P-04-1-C	PUMP 1 CONTROL CABLE	PUMP 1 ASD	TERMINAL BOX 135 HP	2"C, WITH 5-#16 TSP	
P-04-2-C	PUMP 2 CONTROL CABLE	PUMP 2 ASD	TERMINAL BOX 135 HP	2"C, WITH 5-#16 TSP	
P-04-3-C	PUMP 3 CONTROL CABLE	PUMP 3 ASD	TERMINAL BOX 385 HP	2"C, WITH 5-#16 TSP	
P-04-4-C	PUMP 4 CONTROL CABLE	PUMP 4 RVAT	TERMINAL BOX 385 HP	2"C, WITH 5-#16 TSP	
P-04-5-C	PUMP 5 CONTROL CABLE	PUMP 5 RVAT	TERMINAL BOX 385 HP	2"C, WITH 5-#16 TSP	
P-04-1-G	PUMP 1 GENERATOR POWER	MCC-LSEB2	400A GENERATOR CONNECTION CABINET	(2) 4"C, EACH WITH 3-250 KCMIL & #1 GND	
P-04-2-G	PUMP 2 GENERATOR POWER	MCC-LSEB2	400A GENERATOR CONNECTION CABINET	(2) 4"C, EACH WITH 3-250 KCMIL & #1 GND	
P-04-3-G	PUMP 3 GENERATOR POWER	MCC-LSEB2	800A GENERATOR CONNECTION CABINET	(3) 4"C, EACH WITH 3-350 KCMIL & #1/0 GND	
P-04-4-G	PUMP 4 GENERATOR POWER	MCC-LSEB2	800A GENERATOR CONNECTION CABINET	(3) 4"C, EACH WITH 3-350 KCMIL & #1/0 GND	
P-04-5-G	PUMP 5 GENERATOR POWER	MCC-LSEB2	800A GENERATOR CONNECTION CABINET	(3) 4"C, EACH WITH 3-350 KCMIL & #1/0 GND	
HW-38,40,42	BAR SCREEN #3 CP POWER	PANELBOARD "HW"	BAR SCREEN #3 CONTROL PANEL	1"C, 3-#10, #10 GND	
BS-3-C1	BAR SCREEN #3 TO #1 CONTROL INTERCONNECTIONS	BAR SCREEN #3 CONTROL PANEL	BAR SCREEN #1 CONTROL PANEL	1"C, 6-#14, 1-CAT5E, #10 GND	
BS-3-C2	BAR SCREEN #3 TO #2 CONTROL INTERCONNECTIONS	BAR SCREEN #3 CONTROL PANEL	BAR SCREEN #2 CONTROL PANEL	1"C, 6-#14, 1-CAT5E, #10 GND	
BS-3-CONV	BAR SCREEN #3 TO CONVEYOR CONTROL INTERCONNECTIONS	BAR SCREEN #3 CONTROL PANEL	CONVEYOR CONTROL PANEL	1"C, 6-#14, 1-CAT5E, #10 GND	
HW-44,46,48	BAR SCREEN #3 GATE POWER	PANELBOARD "HW"	BAR SCREEN #3 INLET AND OUTLET GATES	1"C, 3-#10, #10 GND	
BS-3-P	BAR SCREEN #3 CP POWER	PANELBOARD "HW"	BAR SCREEN #3 CONTROL PANEL	1"C, 3-#10, #10 GND	
LW-10,12	BAR SCREEN #3 RECEPT AND INST POWER	PANELBOARD "LW"	BAR SCREEN #3 RECEPT AND INST	1"C, 4-#12, #12 GND	
GRIT-P	PANELBOARD H-G FEEDER	MCC-LS	PANELBOARD H-G	2"C, 3-#3/0, #1 GND	
T-L-G	MINI-POWER CENTER "L-G" FEEDER	PANELBOARD "H-G"	MINI-POWER CENTER L-G PRIMARY	2"C, 2-#6, 1-#8 GND	
GRIT-COM	ETHERNET CAT CABLE TO GRIT CONTROL PANEL	EXISTING LS ELECT BLDG CONTROL PANEL	GRIT FACILITY CONTROL PANEL	2"C, 2-CAT5E, 2-#16TSP, #12 GND	
GRIT-SP1	SPARE FROM HEADWORKS TO GRIT- SEE DRAWINGS	EXISTING HEADWORKS STRUCTURE	GRIT FACILITY CONTROL PANEL	2"C, CAPPED WITH STRING	
GSC-1-P	GRIT SCREW CONVEYOR 1 POWER & E-STOP	GRIT FACILITY CONTROL PANEL	GRIT SCREW CONVEYOR #1 E-STOP & MOTOR	1"C, 3-#12, 8-#14, #12 GND	
GSC-2-P	GRIT SCREW CONVEYOR 2 POWER & E-STOP	GRIT FACILITY CONTROL PANEL	GRIT SCREW CONVEYOR #2 E-STOP & MOTOR	1"C, 3-#12, 8-#14, #12 GND	
GSC-3-P	FUTURE GRIT SCREW CONVEYOR 3 POWER & E-STOP	GRIT FACILITY CONTROL PANEL	GRIT SCREW CONVEYOR #3 E-STOP & MOTOR	1"C, CAPPED AS SHOWN ON DRAWINGS	
G-1-C1	GRIT TRAIN 1 PLUG VALVE AND WATER SOLENOID	GRIT FACILITY CONTROL PANEL	GRIT 1 PLUG VALVE AND SOLENOID	1"C, 3-#12, 6-#14, #12 GND	
G-2-C1	GRIT TRAIN 2 PLUG VALVE AND WATER SOLENOID	GRIT FACILITY CONTROL PANEL	GRIT 1 PLUG VALVE AND SOLENOID	1"C, 3-#12, 6-#14, #12 GND	
G-3-C1	FUTURE GRIT TRAIN 3 PLUG VALVE AND WATER SOLENOID	GRIT FACILITY CONTROL PANEL	GRIT 1 PLUG VALVE AND SOLENOID	1"C, CAPPED AS SHOWN ON DRAWINGS	
GP-1-P	GRIT PUMP 1 POWER & E-STOP	GRIT FACILITY CONTROL PANEL	GRIT PUMP #1 E-STOP & MOTOR	1"C, 3-#12, 8-#14, #12 GND	
GP-2-P	GRIT PUMP 2 POWER & E-STOP	GRIT FACILITY CONTROL PANEL	GRIT PUMP #1 E-STOP & MOTOR	1"C, 3-#12, 8-#14, #12 GND	
GP-3-P	FUTURE GRIT PUMP 3 POWER & E-STOP	GRIT FACILITY CONTROL PANEL	GRIT PUMP #1 E-STOP & MOTOR	1"C, CAPPED AS SHOWN ON DRAWINGS	
G-SG-P1	GRIT BASIN SLIDE GATES SG-05-11 AND 12 POWER	GRIT FACILITY CONTROL PANEL	GRIT BASIN J-BOX, THEN GATES	1"C, 6-#12, #12 GND	COMBINE CKTS BREAK OUT FOR EACH GATE
G-SG-P2	GRIT BASIN SLIDE GATES SG-05-13 AND 14 POWER	GRIT FACILITY CONTROL PANEL	GRIT BASIN J-BOX, THEN GATES	1"C, 6-#12, #12 GND	COMBINE CKTS BREAK OUT FOR EACH GATE
G-SG-C1	GRIT BASIN SLIDE GATES SG-05-11 AND 12 CONTROL	GRIT FACILITY CONTROL PANEL	GRIT BASIN J-BOX, THEN GATES	1"C, 16-#14, #12 GND	COMBINE CKTS BREAK OUT FOR EACH GATE
G-SG-C2	GRIT BASIN SLIDE GATES SG-05-13 AND 14 CONTROL	GRIT FACILITY CONTROL PANEL	GRIT BASIN J-BOX, THEN GATES	1"C, 16-#14, #12 GND	COMBINE CKTS BREAK OUT FOR EACH GATE
GC-1-P	GRIT CLASSIFIER 1 POWER & E-STOP	GRIT FACILITY CONTROL PANEL	GRIT CLASSIFIER 1 MOTOR & E-STOP	1"C, 3-#12, 6-#14, #12 GND	
GC-2-P	GRIT CLASSIFIER 2 POWER & E-STOP	GRIT FACILITY CONTROL PANEL	GRIT CLASSIFIER 2 MOTOR & E-STOP	1"C, 3-#12, 6-#14, #12 GND	
GC-3-P	FUTURE GRIT CLASSIFIER 3 POWER & E-STOP	GRIT FACILITY CONTROL PANEL	GRIT CLASSIFIER 3 MOTOR & E-STOP	1"C, CAPPED AS SHOWN ON DRAWINGS	
GC-1-C	GRIT CLASSIFIER 1 CONTROLS	GRIT FACILITY CONTROL PANEL	GRIT CLASSIFIER 1 CONTROL DEVICES	1"C, 3-#12, 8-#14, #12 GND	
GC-2-C	GRIT CLASSIFIER 2 CONTROLS	GRIT FACILITY CONTROL PANEL	GRIT CLASSIFIER 2 CONTROL DEVICES	1"C, 3-#12, 8-#14, #12 GND	
GC-3-C	FUTURE GRIT CLASSIFIER 3 CONTROLS	GRIT FACILITY CONTROL PANEL	GRIT CLASSIFIER 3 CONTROL DEVICES	1"C, CAPPED AS SHOWN ON DRAWINGS	
H-AB1	PANELBOARD H-AB1 FEEDER	EXISTING POWER PANELBOARD PP-2A	PANELBOARD H-AB1 MAIN BREAKER	2"C, 3-2/0 AWG, 1/0 GND	USE SAME CONDUCTORS TO FEED H-AB1 SECTION 2
H-AB2	PANELBOARD H-AB2 FEEDER	EXISTING POWER PANELBOARD PP-2B	PANELBOARD H-AB2 MAIN BREAKER	2"C, 3-2/0 AWG, 1/0 GND	
H-AB3	PANELBOARD H-AB3 FEEDER	EXISTING POWER PANELBOARD DPB	PANELBOARD H-AB3 MAIN BREAKER	2"C, 3-2/0 AWG, 1/0 GND	
AB-C	AERATION BASINS GATE CONTROLS	AERATION BASINS JUNCTION BOX	MAINTENANCE SHOP PLC CABINET	2"C, 60-#14 AWG, #10 GND	
AB-WAS-COM	AERATION BASIN WAS PUMP STATION CP COMMUNICATION	AB WAS PUMP STATION CP	MAINT SHOP PLC CONTROL PANEL	2"C, 2-CAT5E, 4-#16TSP, 8-#14, #12 GND	A-BASINS WAS PUMPS STATION COMM & CNTR
AB-COM-1	AERATION BASIN COMMUNICATIONS	AB-COM J-BOX1	MAINT SHOP PLC CONTROL PANEL	EXISTING 1"C, 4-#16TSP	A-BASINS 1-4 ANALOGS & PROPORTIONAL CNTR
AB-COM-2	AERATION BASIN COMMUNICATIONS	AB-COM J-BOX2	MAINT SHOP PLC CONTROL PANEL	EXISTING 1"C, 4-#16TSP	A-BASINS 5-7 ANALOGS & PROPORTIONAL CNTR
AB-COM-3	AERATION BASIN COMMUNICATIONS	AB-COM J-BOX3	MAINT SHOP PLC CONTROL PANEL	EXISTING 1"C, 4-#16TSP	A-BASINS 8-12 ANALOGS & PROPORTIONAL CNTR
AB-CNTR-1	AERATION BASIN CONTROLS	AB-CNTR J-BOX1	MAINT SHOP PLC CONTROL PANEL	EXISTING 1"C, 8-#14	A-BASINS 1-4 GATES CONTROLS
AB-CNTR-2	AERATION BASIN CONTROLS	AB-CNTR J-BOX2	MAINT SHOP PLC CONTROL PANEL	EXISTING 1"C, 8-#14	A-BASINS 5-7 GATES CONTROLS
AB-CNTR-3	AERATION BASIN CONTROLS	AB-CNTR J-BOX3	MAINT SHOP PLC CONTROL PANEL	EXISTING 1"C, 8-#14	A-BASINS 8-12 GATES CONTROLS
AB-CNTR-4	AERATION BASIN CONTROLS	AB-CNTR J-BOX4	MAINT SHOP PLC CONTROL PANEL	EXISTING 1"C, 8-#14	A-BASINS 1-4 MISC CONTROLS

E-00-602

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-385-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 385-9288
TX FIRM NUMBEIR F-665

STATE OF TEXAS
ZM. SHOUKAT
97702
REGISTERED
PROFESSIONAL
ENGINEER

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT
PLANT EXPANSION
ELECTRICAL
CONDUIT AND CONDUCTOR
SCHEDULE SHEET 1

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 291 OF 378	

STATE OF TEXAS
XIAOHUA LIN
80367
REGISTERED
PROFESSIONAL
ENGINEER

FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4150-BV (IAH Imp Prg 2)\Drawings\E-00-602 Conduit And Conductor Schedule Sheet 1.dwg

CONDUIT TAG	DESCRIPTION	ROUTING		CONDUIT & WIRE SIZES	COMMENTS
		FROM	TO		
ABSG-CNTR-1	NORTH AERATION BASIN 1-4 SLIDE GATE CONTROLS	ABSG-JBOX-1	MAINT SHOP PLC CONTROL PANEL	2"C, 48-#14, #12 GND	
ABSG-CNTR-2	NORTH AERATION BASIN 5-7 SLIDE GATE CONTROLS	ABSG-JBOX-2	MAINT SHOP PLC CONTROL PANEL	2"C, 48-#14, #12 GND	
ABSG-CNTR-3	NORTH AERATION BASIN 8-12 SLIDE GATE CONTROLS	ABSG-JBOX-3	MAINT SHOP PLC CONTROL PANEL	2"C, 48-#14, #12 GND	
ABSG-CNTR-4	SOUTH AERATION BASIN 1-4 SLIDE GATE CONTROLS	ABSG-JBOX-4	MAINT SHOP PLC CONTROL PANEL	2"C, 48-#14, #12 GND	
ABSG-CNTR-5	SOUTH AERATION BASIN 5-7 SLIDE GATE CONTROLS	ABSG-JBOX-5	MAINT SHOP PLC CONTROL PANEL	2"C, 48-#14, #12 GND	
ABSG-CNTR-6	SOUTH AERATION BASIN 8-12 SLIDE GATE CONTROLS	ABSG-JBOX-6	MAINT SHOP PLC CONTROL PANEL	2"C, 48-#14, #12 GND	
WAS-P1-P	AERATION BASIN WAS PUMP 1 POWER	AB WAS PUMP STATION CP	PUMP CABLE TERMINAL BOX	1"C, 3-#8, #10 GND	PUMP NO. 1 POWER FROM CP
WAS-P1-C	AERATION BASIN WAS PUMP 1 PROTECTIONS	AB WAS PUMP STATION CP	PUMP CABLE TERMINAL BOX	1"C, 2-#12, 6-#14, #12 GND	PUMP NO. 1 HEATER & PROTECTIONS
WAS-P1-P	AERATION BASIN WAS PUMP 1 POWER	AB WAS PUMP STATION CP	PUMP CABLE TERMINAL BOX	1"C, 3-#8, #10 GND	PUMP NO. 2 POWER FROM CP
WAS-P1-C	AERATION BASIN WAS PUMP 1 PROTECTIONS	AB WAS PUMP STATION CP	PUMP CABLE TERMINAL BOX	1"C, 2-#12, 6-#14, #12 GND	PUMP NO. 2 HEATER & PROTECTIONS
WAS-PS-FM-P	AERATION BASIN WAS PS FLOW METER POWER	AB-WAS PUMP STATION CONTROL PANEL	AB-WAS FLOW METER	1"C, 2-#12, #12 GND	
WAS-PS-FM-S	AERATION BASIN WAS PS FLOW METER SIGNAL	AB-WAS FLOW METER OUTPUT	AB-WAS FLOW TRANSMITTER	1"C, 1-#16TSP, #12 GND	
WAS-FIT-P	AERATION BASIN WAS PS FLOW TRANSMITTER POWER	AB-WAS PUMP STATION CONTROL PANEL	AB-WAS FLOW TRANSMITTER	1"C, 2-#12, #12 GND	
WAS-FIT-S	AERATION BASIN WAS PS FLOW TRANSMITTER SIGNAL	AB-WAS FLOW SIGNAL	AB-WAS PS CONTROL PANEL	1"C, 1-#16TSP, #12 GND	
CLFR3-P	CLARIFIER 3 CONTROL PANEL POWER	PANEL H-CL	CLARIFIER 3 CONTROL PANEL	SEE PANEL SCHEDULE	
CLFR4-P	FUTURE CLARIFIER 4 CONTROL PANEL POWER	PANEL H-CL	CLARIFIER 4 CONTROL PANEL	SEE PANEL SCHEDULE	
CLFR5-P	FUTURE CLARIFIER 5 CONTROL PANEL POWER	PANEL H-CL	CLARIFIER 5 CONTROL PANEL	SEE PANEL SCHEDULE	
CLFR6-P	FUTURE CLARIFIER 6 CONTROL PANEL POWER	PANEL H-CL	CLARIFIER 6 CONTROL PANEL	SEE PANEL SCHEDULE	
CLFR1-C	CLARIFIER 1 CONTROL	CLARIFIER 1 CONTROL PANEL	UNDERGROUND I PULL BOX	1"C, 1-8C#14	
CLFR2-C	CLARIFIER 2 CONTROL	CLARIFIER 2 CONTROL PANEL	UNDERGROUND I PULL BOX	1"C, 1-8C#14	
CLFR3-C	CLARIFIER 3 CONTROL	CLARIFIER 3 CONTROL PANEL	UNDERGROUND I PULL BOX	1"C, 1-8C#14	
CLFR4-C	FUTURE CLARIFIER 4 CONTROL	CLARIFIER 4 CONTROL PANEL	UNDERGROUND I PULL BOX	1"C, 1- JET LINE	
CLFR5-C	FUTURE CLARIFIER 5 CONTROL	CLARIFIER 5 CONTROL PANEL	UNDERGROUND I PULL BOX	1"C, 1- JET LINE	
CLFR6-C	FUTURE CLARIFIER 6 CONTROL	CLARIFIER 6 CONTROL PANEL	UNDERGROUND I PULL BOX	1"C, 1- JET LINE	
CLFR-C	CLARIFIERS 1-6 CONTROL (SCADA) CIRCUITS	UNDERGROUND I PULL BOX	CCB BLDG SCADA CONTROL PANEL	2 - 2"C, ONE WITH 3-8C#14, 6-#16TSP; ONE WITH JET LINE	
RAS1-L	RAS PS-1 LEVEL INSTRUMENT SIGNAL	RAS PS-1 STRUCTURE	UNDERGROUND I PULL BOX	1"C, 1-#16TSP	
RAS2-L	RAS PS-2 LEVEL INSTRUMENT SIGNAL	RAS PS-2 STRUCTURE	UNDERGROUND I PULL BOX	1"C, 1-#16TSP	
RAS3-L	RAS PS-3 LEVEL INSTRUMENT SIGNAL	RAS PS-3 STRUCTURE	UNDERGROUND I PULL BOX	1"C, 1-#16TSP	
RAS4-L	FUTURE RAS PS-4 LEVEL INSTRUMENT SIGNAL	FUTURE RAS PS-4 STRUCTURE	UNDERGROUND I PULL BOX	1"C, 1-JET LINE	
RAS5-L	FUTURE RAS PS-5 LEVEL INSTRUMENT SIGNAL	FUTURE RAS PS-5 STRUCTURE	UNDERGROUND I PULL BOX	1"C, 1-JET LINE	
RAS6-L	FUTURE RAS PS-6 LEVEL INSTRUMENT SIGNAL	FUTURE RAS PS-6 STRUCTURE	UNDERGROUND I PULL BOX	1"C, 1-JET LINE	
RAS LEVEL A	RAS PS 1-3 LEVEL INSTRUMENT SIGNALS	UNDERGROUND I PULL BOX	CCB BLDG SCADA CONTROL PANEL	1"C, 3-#16TSP	
RAS LEVEL B	RAS PS 4-6 LEVEL INSTRUMENT SIGNALS	UNDERGROUND I PULL BOX	CCB BLDG SCADA CONTROL PANEL	1"C, JET LINE	
CL3-120V	CLARIFIER 3 120V POWER CIRCUITS	PANEL L-CL	CLARIFIER 3 120V POWER CIRCUITS	1"C, 6-#12, 3-#12 GND	INDIVIDUAL NEUTRALS AND GROUNDS
CL4-120V	FUTURE CLARIFIER 4 120V POWER CIRCUITS	PANEL L-CL	CLARIFIER 4 STUB OUT MARKER	1"C, 1- JET LINE	
CL5-120V	FUTURE CLARIFIER 5 120V POWER CIRCUITS	PANEL L-CL	CLARIFIER 5 STUB OUT MARKER	1"C, 1- JET LINE	
CL5-120V	FUTURE CLARIFIER 6 120V POWER CIRCUITS	PANEL L-CL	CLARIFIER 6 STUB OUT MARKER	1"C, 1- JET LINE	
FUTURE 1 CL-120	FUTURE POWER CIRCUITS	PANEL L-CL	UNDERGROUND E PULL BOX	1"C, 1- JET LINE	
FUTURE 2 CL-120	FUTURE POWER CIRCUITS	PANEL L-CL	UNDERGROUND E PULL BOX	1"C, 1- JET LINE	
CL3-IN-C	CLARIFIER 3 INFLUENT GATE CONTROL	UNDERGROUND I PULL BOX	CLARIFIER 3 INFLUENT GATE	1"C, 2- #16 TSP, 8- #14	
CL4-IN-C	FUTURE CLARIFIER 4 INFLUENT GATE CONTROL	UNDERGROUND I PULL BOX	CLARIFIER 4 INFLUENT GATE STUB OUT	1"C, 1- JET LINE	
CL5-IN-C	FUTURE CLARIFIER 5 INFLUENT GATE CONTROL	UNDERGROUND I PULL BOX	CLARIFIER 5 INFLUENT GATE STUB OUT	1"C, 1- JET LINE	
CL6-IN-C	FUTURE CLARIFIER 6 INFLUENT GATE CONTROL	UNDERGROUND I PULL BOX	CLARIFIER 6 INFLUENT GATE STUB OUT	1"C, 1- JET LINE	
CL-IN-C	CLARIFIERS 3-6 INFLUENT GATE CONTROL	UNDERGROUND I PULL BOX	CCB BLDG SCADA CONTROL PANEL	2"C, 2- #16 TSP, 4 JET LINES	
SPS1-P	SCUM PUMP STATION 1 POWER	EXISTING MCC-2A	SCUM PUMP STATION 1 CONTROL PANEL	1"C, 3- #6 AWG, #8 GND	ROUTED UNDERGROUND AND ON CLARIFIER WALLS
SPS1-C	SCUM PUMP STATION 1 CONTROL	SCUM PUMP STATION 1 CONTROL PANEL	CCB BLDG SCADA CONTROL PANEL	1"C, 1- 8C#14	ROUTED UNDERGROUND AND ON CLARIFIER WALLS
SPS1-SP	SCUM PUMP STATION 1 SPARE	SCUM PUMP STATION 1 CONTROL PANEL	CCB BLDG SCADA CONTROL PANEL	1"C, 2- #16 TSP	ROUTED UNDERGROUND AND ON CLARIFIER WALLS
SPS2-C	SCUM PUMP STATION 2 CONTROL	SCUM PUMP STATION 2 CONTROL PANEL	CCB BLDG SCADA CONTROL PANEL	1"C, 1- 8C#14	ROUTED UNDERGROUND AND ON CLARIFIER WALLS
~~MVS-UV~~	~~SWITCHGEAR-MVS-UV-FEEDER~~	~~SWITCHGEAR-MVS-1~~	~~MVS-UV-INCOMING-SECTION~~	~~1"C, WITH 3-350KCMIL-3-#4-GND~~	~~CIEV-UV-105~~
~~MVS-UV-SP1~~	~~FUTURE FEEDER TO FILTER AREA~~	~~SWITCHGEAR-MVS-UV~~	~~FUTURE FILTER AREA STUB-OUT~~	~~EMPTY-1"C~~	
~~MVS-UV-SP2~~	~~FUTURE FEEDER TO EXPANSION~~	~~SWITCHGEAR-MVS-UV~~	~~FUTURE EXPANSION STUB-OUT~~	~~EMPTY-1"C~~	
~~T-UV~~	~~TRANSFORMER T-UV FEEDER~~	~~SWITCHGEAR-MVS-UV~~	~~TRANSFORMER T-UV PRIMARY~~	~~1"C, WITH 3-#1/0-AWG-5-#1-GND~~	~~CIEV-UV-105~~
~~MSS-UV~~	~~MSS-UV FEEDER~~	~~TRANSFORMER T-UV SECONDARY~~	~~MSS-UV-INCOMING-SECTION~~	~~(5)-1"C, (3)-5#-WITH-3-400-KCMIL, 400-NEUT, 1/0-GND~~	
~~GEN-UV~~	~~GENERATOR FEEDER TO MSS-UV~~	~~GENERATOR OUTPUT BREAKER~~	~~MSS-UV-GENERATOR FEEDER BREAKER~~	~~(5)-1"C, (3)-5#-WITH-3-400-KCMIL, 400-NEUT, 1/0-GND~~	

1 THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

No.	Date	Revisions	App
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

ELECTRICAL

CONDUIT AND CONDUCTOR SCHEDULE SHEET 2

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 292 OF 378	

80367

E-00-603

FILE PATH: C:\Users\howard\Kalluri Group, Inc\KGI - Documents\41160-BV (IAH Imp Pkg 2)\Drawings\E-00-603 Conduit And Conductor Schedule Sheet 2.dwg

CONDUIT TAG	DESCRIPTION	ROUTING		CONDUIT & WIRE SIZES	COMMENTS
		FROM	TO		
H-UV	PANELBOARD H-UV FEEDER	MCC-UV	PANEL H-UV MAIN LUGS	2 1/2"C, WITH 3-4/0, 1/0 GND	
H-CL	PANELBOARD H-CL FEEDER	MCC-UV	PANEL H-CL MAIN BREAKER	2 1/2"C, WITH 3-4/0, 1/0 GND	
UV1-PDC1-P	UV1 POWER DISTRIBUTION CENTER 1	MCC-UV	UV-C1 PDU-1	1 1/2"C, 3-#2, #2 NEUT, #4 GND	
UV1-PDC2-P	UV1 POWER DISTRIBUTION CENTER 2	MCC-UV	UV-C1 PDU-2	1 1/2"C, 3-#2, #2 NEUT, #4 GND	
UV1-HSC-P	UV1 HYDRAULIC SYSTEM CENTER	MCC-UV	UV HYD UNIT CP-1	1"C, 3-#8, #10 GND	
UV2-PDC1-P	UV2 POWER DISTRIBUTION CENTER 1	MCC-UV	UV-C2 PDU-1	1 1/2"C, 3-#2, #2 NEUT, #4 GND	
UV2-PDC2-P	UV2 POWER DISTRIBUTION CENTER 2	MCC-UV	UV-C2 PDU-2	1 1/2"C, 3-#2, #2 NEUT, #4 GND	
UV2-HSC-P	UV2 HYDRAULIC SYSTEM CENTER	MCC-UV	UV HYD UNIT CP-2	1"C, 3-#8, #10 GND	
UV3-PDC1-P	FUTURE UV3 POWER DISTRIBUTION CENTER 1	MCC-UV	UV-C3 PDU-1	1 1/2"C, WITH A PULL STRING	
UV3-PDC2-P	FUTURE UV3 POWER DISTRIBUTION CENTER 1	MCC-UV	UV-C3 PDU-2	1 1/2"C, WITH A PULL STRING	
UV3-HSC-P	FUTURE UV3 HYDRAULIC SYSTEM CENTER	MCC-UV	UV HYD UNIT CP-3	1"C, WITH A PULL STRING	
NPW-P	NPW POWER	MCC-UV	NPW CONTROL PANEL	(2) 2 1/2"C, EA WITH 3-250 KCMIL, 1/0 GND	
F-FF-P	FILTER FACILITY	MCC-UV	FUTURE FILTER FACILITY	(2) 4"C, WITH A 1/4" PULL ROPE TO LAST PULL BOX	
UV-AC2-P	UV AC 2	MCC-UV	HVAC PKG 2	1 1/4"C, 3-#4, #8 GND	
UV-AC1-P	UV AC 1	MCC-UV	HVAC PKG 1	1 1/4"C, 3-#4, #8 GND	
UV-SP-1	UV SPARE 1	MCC-UV	SPARE	2"C, WITH A PULL STRING	
UV-SP-2	UV SPARE 2	MCC-UV	SPARE	2"C, WITH A PULL STRING	
UV-SP-3	UV SPARE 3	MCC-UV	SPARE	2"C, WITH A PULL STRING	
UV-SP-4	UV SPARE 4	MCC-UV	SPARE	2"C, WITH A PULL STRING	
UV-SP-5	UV SPARE 5	MCC-UV	SPARE	2"C, WITH A PULL STRING	
HCL-SP	SPARE TO CLARIFIER EQUIPMENT RACK	MCC-UV	CLARIFIER AREA RACK J-BOX	2"C, WITH JET LINE	
GEN-C	GENERATOR CONTROLS	MCC-UV AUTOMATIC TRANSFER CONTROLLER	GENERATOR CONTROL PANEL	2"C, GENERATOR MANUFACTURER FACTORY CABLE	
GEN-COM	GENERATOR COMMUNICATION	MCC-UV AUTOMATIC TRANSFER CONTROLLER	UV BLDG SCADA CONTROL PANEL	1"C, AUTOMATIC TRANSFER CONTROLLER COMM	
AIR COMP-C	AIR COMPRESSOR CONTROL	NPW CONTROL PANEL	AIR COMPRESSOR CONTROL PANEL	1"C, 8- #14, 2- #16 TS	
AIR COMP-P	AIR COMPRESSOR POWER	NPW CONTROL PANEL	AIR COMPRESSOR CONTROL PANEL	1"C, 3- #10, #10 G	
BS1-DP	BASKET STRAINER 1 DIFFERENTIAL PRESSURE SIGNAL	STRAINER 1 PRESSURE TRANSMITTER	NPW CONTROL PANEL	1"C, 4- #14,	
BS2-DP	BASKET STRAINER 2 DIFFERENTIAL PRESSURE SIGNAL	STRAINER 2 PRESSURE TRANSMITTER	NPW CONTROL PANEL	1"C, 4- #	
BS1-FV-P	BASKET STRAINER 1 FLUSH VALVE POWER	NPW CONTROL PANEL	BASKET STRAINER 1 FLUSH VALVE	1"C	
BS2-FV-P	BASKET STRAINER 2 FLUSH VALVE POWER	NPW CONTROL PANEL	BASKET STRAINER 2 FLUSH VALVE		
HPT-A	HYDRO-PNEUMATIC TANK LEVEL SIGNAL	DIFFERENTIAL PRESSURE TRANSMITTER	NPW CONTROL PANEL		
HPT-C	HYDRO-PNEUMATIC TANK LEVEL PROBE SWITCH	PROBE SWITCH	NPW CONTROL PANEL	GND	
HPT-P	HYDRO-PNEUMATIC TANK	NPW CONTROL PANEL	HYDRO TANK INSTRUMENT BOX PO	2- #12 NEUT, #10 GND	
NPW-COM	NPW CONTROL PANEL COMMUNICATIONS	UV BLDG SCADA CONTROL PANEL	NPW CONTROL PANEL	AT 6, 2- #16 TSP	
NPW-SP	NPW CONTROL PANEL TO PLC SPARE	UV BLDG SCADA CONTROL PANEL	NPW CONTROL PANEL	, JET LINE	
NPW-P1-PT	NPW PUMP 1 PRESSURE TRANSMITTER	NPW PUMP 1 TRANSMITTER	NPW CONTROL PA	1"C, 2- #16 TSP	
NPW-P1-P	NPW PUMP 1 POWER FEEDER	NPW CONTROL PANEL	NPW PUMP 1	2"C, WITH 3-3/0, 1/0 GND	
NPW-P1-C	NPW PUMP 1 CONTROLS	NPW CONTROL PANEL	NPW PU	1"C, 8- #14, #10 GND	
NPW-P2-PT	NPW PUMP 2 PRESSURE TRANSMITTER	NPW PUMP 2 TRANSMITTER	NP	1"C, 2- #16 TSP	
NPW-P2-P	NPW PUMP 2 POWER FEEDER	NPW CONTROL PANEL	AL BOX	2"C, WITH 3-3/0, 1/0 GND	
NPW-P2-C	NPW PUMP 2 CONTROLS	NPW CONTROL PANEL	RMINAL BOX	1"C, 8- #14, #10 GND	
NPW-P3-PT	NPW PUMP 3 PRESSURE TRANSMITTER	NPW PUMP 3 TRANSMITTER STUB UP	VEL	1"C, JET LINE	
NPW-P2-P	NPW PUMP 3 POWER FEEDER	NPW CONTROL PANEL	CABLE TERMINAL BOX STUB UP	2"C, WITH 3-3/0, 1/0 GND	
NPW-P2-C	NPW PUMP 3 CONTROLS	NPW CONTROL PANEL	MP 1 CABLE TERMINAL BOX STUB UP	1"C, 8- #14, #10 GND	
NPW-FM-P	NPW FLOW METER POWER	NPW CONTROL PANEL	OW METER POWER INPUT	1"C, 2- #14, #12 GND	
NPW-FM-S	NPW FLOW METER POWER	FLOW METER SI	NPW CONTROL PANEL	1"C, 1- #16 TSP	
NPW-LVL	NPW LOW LEVEL SHUT DOWN	NPW LEVEL	NPW CONTROL PANEL	1"C, 1- #16 TSP	
SHC-A	SODIUM HYPO METERING SKID SIGNALS	TROL PANEL	SODIUM HYPO SKID CONTROL PANEL	2"C, 6- #16 TSP	
SHC-D	SODIUM HYPO METERING SKID CONTROLS	CONTROL PANEL	SODIUM HYPO SKID CONTROL PANEL	1"C, 12- #14 AWG	
SHC-P1	SODIUM HYPO METERING SKID POWER	OARD L-UV	SODIUM HYPO SKID CONTROL PANEL	SEE PANEL SCHEDULE	
SHC-P2	SODIUM HYPO BUILDING LIGHT AND OUT	ANELBOARD L-UV	UV BLDG LIGHT AND OUTLET	SEE PANEL SCHEDULE	
SHC-P3	SODIUM HYPO BUILDING HEATER	UV PANELBOARD L-UV	UV BLDG HEATER OUTLET	SEE PANEL SCHEDULE	
SHC-SP	SODIUM HYPO BUILDING SPAR	UV BLDG SCADA CONTROL PANEL	UV BLDG EXTERIOR WALL STUB UPS	1"C, JET LINE	

THIS DRAWING REMOVED FROM PROJECT

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

ELECTRICAL

CONDUIT AND CONDUCTOR SCHEDULE SHEET 3

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 293 OF 378	

E-00-604

FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\41160-BV (JAH Imp Pkg 2)\Drawings\E-00-604 Conduit And Conductor Schedule Sheet 3.dwg

KEYED NOTES:

(1) REMOVE ALL EXPOSED CONDUIT ASSOCIATED WITH EXISTING LIFT STATION PUMPS. ALL EQUIPMENT REMOVAL ACTIVITIES SHALL BE COORDINATED/APPROVED BY WASTEWATER OPERATIONS AND PROJECT MANAGER. PUMPS SHALL BE REMOVED AND REPLACED. PROPOSED PUMPS SHALL BE SERVED FROM MCC–LSEB2, IN THE NEW FACILITIES. CONTRACTOR SHALL COORDINATE TRANSITION OF POWER AND CONTROL EQUIPMENT FEEDING THE EXISTING PUMPS IN MCC–LS SHALL BE DECOMMISSIONED IN PLACE. EXISTING NAMEPLATES SHALL BE REMOVED AND A "SPARE" DESCRIPTIVE PHENOLIC NAMEPLATE SHALL BE PROVIDED.

(2) EXISTING SWITCHGEAR MVS–1 WILL BE REMOVED AND REPLACED. REMOVE ALL ASSOCIATED CONDUIT AND WIRING TO AND FROM EXISTING MVS–1 (WITH EXCEPTION OF FEEDER TO POWER CENTER NO.2). NEW MVS–1 WILL BE INSTALLED IN SAME PLACE AND MATCH FOOTPRINT. CONTRACTOR SHALL USE THE

(3) UTMOST CARE DURING DEMO OF EXISTING MVS–1 TO PROTECT FEEDER CONDUCTORS TO POWER CENTER NO.2. CABLES TO POWER CENTER NO.2 WILL BE REUSED ONCE NEW MVS–1 IS IN SERVICE.

PRIOR TO ANY REMOVING THE EXISTING MVS–1, THE CONTRACTOR, SHALL PROVIDE A 480 VOLT, 400 AMP, 3 PHASE TEMPORARY POWER SOURCE TO THE EXISTING POWER CENTER NO.2 SWITCHBOARD. THE CONTRACTOR SHALL PROVIDE A "MVS–1 REPLACEMENT TEMPORARY POWER PLAN" FOR ACCEPTANCE. EXISTING MCC–8A MAY BE UTILIZED FOR THE TEMPORARY POWER SOURCE AND CONTRACTOR SHALL PROVIDE TEMPORARY CONDUCTORS IN COMPLIANCE WITH NEC 590. OR THE CONTRACTOR MAY PROVIDE TEMPORARY POWER GENERATORS AND TEMPORARY CONDUCTORS. ALL TEMPORARY SHALL BE INCLUDED IN

(4) THE BASE BID. ANY TEMPORARY OUTAGE SHALL BE KEPT TO MINIMUM AND SHALL BE APPROVED IN WRITING BY OWNER'S REPRESENTATIVE. POWER CENTER NO.2 SHALL HAVE POWER ON ALL THE TIME EXCEPT SWITCHING BACK TO NEW MVS–1, POWER CENTER NO. 2, 480V SWITCHBOARD SHALL BE

(5) PROVIDED A TEMPORARY FEEDER BREAKER IN PROPOSED WORK, SEE PROPOSED ONE LINES FOR ADDITIONAL INFORMATION.

KEYED NOTES CONTINUED:

(4) REMOVE ALL THE PLASTIC PVC CONDUIT AND RUSTED SUPPORTS ON THE AERATION BASINS. CONTRACTOR SHALL PROVIDE TEMPORARY POWER TO KEEP FUNCTIONAL AND REQUIRED BASIN LOADS AVAILABLE DURING CONDUIT SYSTEM REPLACEMENT.

(5) MCC–2A, SHALL BE PROVIDED A NEW FEEDER BREAKER, FOR SCUM PUMP STATION 1, IN PROPOSED WORK. SEE PROPOSED ONE LINES FOR ADDITIONAL INFORMATION.

1 THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEDED BY WORK IN VOLUME 2 DRAWINGS.

EQUIPMENT REMOVAL NOTES:

1. THE EXISTING DRAWINGS ILLUSTRATE AND DESCRIBE THE ELECTRICAL EQUIPMENT TO BE REMOVED AND OR REPLACED.
2. CONTRACTOR SHALL DOCUMENT OPERATIONAL STATUS OF ALL EQUIPMENT TO HAVE POWER REMOVED PRIOR TO SCHEDULING REMOVAL. THE STATUS OF POWER, CONTROL AND SCADA CIRCUITS SHALL BE CONFIRMED. TEMPORARY POWER SHALL BE PROVIDED FOR EXISTING FUNCTIONAL FACILITIES.
3. CONTRACTOR SHALL NOTIFY THE CITY CONSTRUCTION REPRESENTATIVE OF ANY DISCREPANCIES BETWEEN EXISTING SITE CONDITION AND THESE DRAWINGS, AND PROVIDE LIST OF AERATION BASIN EQUIPMENT NOT FUNCTIONAL AND NOT TO BE PROVIDED TEMPORARY POWER.

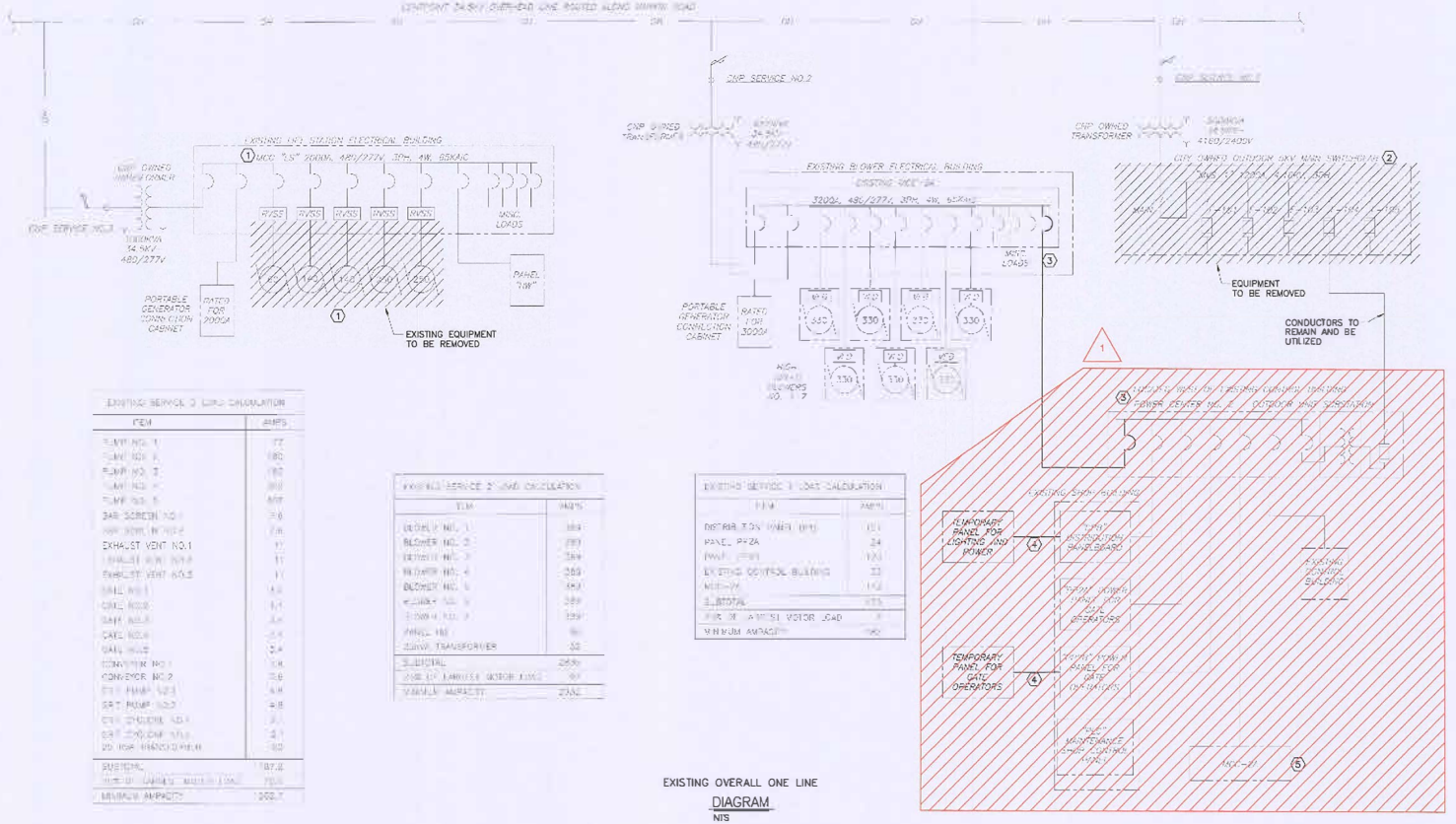
GENERAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE EXISTING CONDITIONS AND TEMPORARY POWER REQUIRED.

B. CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS REQUIRED TO PROTECT THE EXISTING FACILITIES FROM DAMAGE. ANY DAMAGE TO EXISTING FACILITIES INCURRED AS A RESULT OF CONSTRUCTION SHALL BE CORRECTED BY THE CONTRACTOR AT THE CONTRACTORS EXPENSE.

C. CONTRACTOR SHALL GIVE WRITTEN NOTICE TO THE CITY CONSTRUCTION REPRESENTATIVE PRIOR TO COMMENCEMENT OF ANY EQUIPMENT REMOVAL WORK.

D. THE INFORMATION CONTAINED IN THIS DRAWING SET, RELATED TO EXISTING EQUIPMENT, IS BASED ON RECORD DRAWINGS AND DATA COLLECTED FROM SITE. ITS ACCURACY IS NOT GUARANTEED AND ITS USE IN NO WAY RELIEVES THE CONTRACTOR OF ANY RESPONSIBILITY FOR LOSS DUE TO INACCURACIES. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO STARTING TASKS.



EXISTING SERVICE 2 LOAD CALCULATION	
ITEM	AMPS
PUMP NO. 1	77
PUMP NO. 2	180
PUMP NO. 3	180
PUMP NO. 4	360
PUMP NO. 5	360
BAR SCREEN NO.1	7.6
BAR SCREEN NO.2	7.6
EXHAUST VENT NO.1	11
EXHAUST VENT NO.2	11
EXHAUST VENT NO.3	11
SWELL NO.1	4.2
SWELL NO.2	4.2
GATE NO.1	2.4
GATE NO.2	2.4
GATE NO.3	2.4
CONVEYOR NO.1	7.6
CONVEYOR NO.2	7.6
GRIT PUMP NO.1	4.8
GRIT PUMP NO.2	4.8
GRIT CYCLONE NO.1	2.1
GRIT CYCLONE NO.2	2.1
20 HOR WINCH/CRANE	80
SUBTOTAL	1107.6
SIZE OF LARGEST MOTOR (LRA)	720
MINIMUM AMPACITY	1007.7

EXISTING SERVICE 2 LOAD CALCULATION	
ITEM	AMPS
BLOWER NO. 1	189
BLOWER NO. 2	189
BLOWER NO. 3	189
BLOWER NO. 4	189
BLOWER NO. 5	189
BLOWER NO. 6	189
BLOWER NO. 7	189
PANEL "HE"	90
34KV TRANSFORMER	52
SUBTOTAL	2659
SIZE OF LARGEST MOTOR (LRA)	720
MINIMUM AMPACITY	2342

EXISTING SERVICE 1 LOAD CALCULATION	
ITEM	AMPS
DISTRIBUTION PANEL (PP1)	151
PANEL PP2A	24
PANEL PP2B	120
EXISTING CONTROL BUILDING	33
MCC-2A	142
SUBTOTAL	470
FOR 0.4 MOST MOTOR LOAD	0
MINIMUM AMPACITY	470

EXISTING OVERALL ONE LINE DIAGRAM
NTS

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/19/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-655
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713) 365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-655

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
R.M. SHOEMAKE
77702
REGISTERED
PROFESSIONAL
ENGINEER
10/31/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
ELECTRICAL

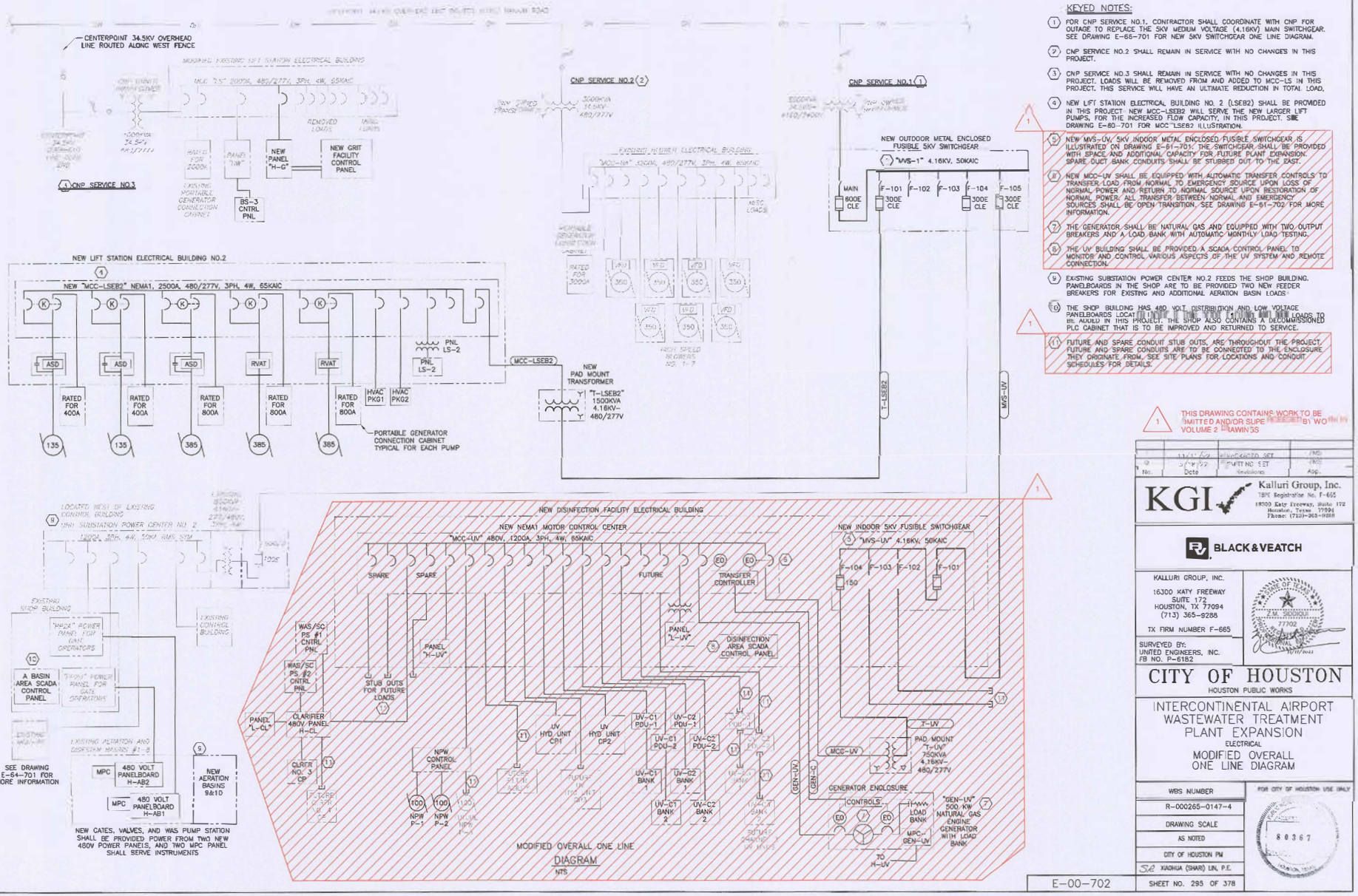
EXISTING OVERALL ONE LINE DIAGRAM

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 294 OF 378	

FOR CITY OF HOUSTON USE ONLY
80367

E-00-701

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4160-8V (4H Imp Pkg 2)\Drawings\E-00-701 Existing Overall One Line Diagram.dwg



KEYED NOTES:

1. FOR CNP SERVICE NO.1, CONTRACTOR SHALL COORDINATE WITH CNP FOR OUTAGE TO REPLACE THE 5KV MEDIUM VOLTAGE (4.16KV) MAIN SWITCHGEAR. SEE DRAWING E-66-701 FOR NEW 5KV SWITCHGEAR ONE LINE DIAGRAM.
2. CNP SERVICE NO.2 SHALL REMAIN IN SERVICE WITH NO CHANGES IN THIS PROJECT.
3. CNP SERVICE NO.3 SHALL REMAIN IN SERVICE WITH NO CHANGES IN THIS PROJECT. LOADS WILL BE REMOVED FROM AND ADDED TO MCC-LS IN THIS PROJECT. THIS SERVICE WILL HAVE AN ULTIMATE REDUCTION IN TOTAL LOAD.
4. NEW LIFT STATION ELECTRICAL BUILDING NO. 2 (LSEB2) SHALL BE PROVIDED IN THIS PROJECT. NEW MCC-LSEB2 WILL SERVE THE NEW LARGER LIFT PUMPS, FOR THE INCREASED FLOW CAPACITY, IN THIS PROJECT. SEE DRAWING E-80-701 FOR MCC LSEB2 ILLUSTRATION.
5. NEW MVS-UV, 5KV INDOOR METAL ENCLOSED FUSIBLE SWITCHGEAR IS ILLUSTRATED ON DRAWING E-61-701. THE SWITCHGEAR SHALL BE PROVIDED WITH SPACE AND ADDITIONAL CAPACITY FOR FUTURE PLANT EXPANSION. SPARE DUCT BANK CONDUITS SHALL BE STUBBED OUT TO THE EAST.
6. NEW MCC-UV SHALL BE EQUIPPED WITH AUTOMATIC TRANSFER CONTROLS TO TRANSFER LOAD FROM NORMAL TO EMERGENCY SOURCE UPON LOSS OF NORMAL POWER AND RETURN TO NORMAL SOURCE UPON RESTORATION OF NORMAL POWER. ALL TRANSFER BETWEEN NORMAL AND EMERGENCY SOURCES SHALL BE OPEN TRANSITION. SEE DRAWING E-61-702 FOR MORE INFORMATION.
7. THE GENERATOR SHALL BE NATURAL GAS AND EQUIPPED WITH TWO OUTPUT BREAKERS AND A LOAD BANK WITH AUTOMATIC MONTHLY LOAD TESTING.
8. THE UV BUILDING SHALL BE PROVIDED A SCADA CONTROL PANEL TO MONITOR AND CONTROL VARIOUS ASPECTS OF THE UV SYSTEM AND REMOTE CONNECTION.
9. EXISTING SUBSTATION POWER CENTER NO.2 FEEDS THE SHOP BUILDING. PANELBOARDS IN THE SHOP ARE TO BE PROVIDED TWO NEW FEEDER BREAKERS FOR EXISTING AND ADDITIONAL AERATION BASIN LOADS.
10. THE SHOP BUILDING HAS 480 VOLT DISTRIBUTION AND LOW VOLTAGE PANELBOARDS LOCATED IN THE SHOP TO FEED THE LOADS TO BE ADDED IN THIS PROJECT. THE SHOP ALSO CONTAINS A DECOMMISSIONED PLC CABINET THAT IS TO BE IMPROVED AND RETURNED TO SERVICE.
11. FUTURE AND SPARE CONDUIT STUB OUTS, ARE THROUGHOUT THE PROJECT. FUTURE AND SPARE CONDUITS ARE TO BE CONNECTED TO THE ENCLOSURE THEY ORIGINATE FROM. SEE SITE PLANS FOR LOCATIONS AND CONDUIT SCHEDULES FOR DETAILS.

1 THIS DRAWING CONTAINS WORK TO BE SUBMITTED AND/OR SUPERSEDED BY WORK IN VOLUME 2 DRAWINGS

No.	Date	Revisions	App.
1	3/31/22	ADDENDUM SET	
0	3/18/22	PERMIT SET	

KGI — Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS — 77702 — REGISTERED PROFESSIONAL LAND SURVEYOR — 3/31/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

ELECTRICAL

MODIFIED OVERALL ONE LINE DIAGRAM

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
	CITY OF HOUSTON PM
	XIAOHUA (SHARI) LIN, P.E.

FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS — 80367 — LICENSED PROFESSIONAL ENGINEER — 3/31/2022

E-00-702

SHEET NO. 295 OF 378

FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\Drawings\E-00-702 Proposed Overall One Line Diagram.dwg

ELECTRICAL LOAD ANALYSIS FOR IAH WWTP - CNP SERVICE NO. 1

	KVA
LOADS ADDED	
MCC-1&2	
PUMP 1: 135 HP@0.86pf and 0.92eff (135 x 0.746)/(0.86 x 0.92)	127
PUMP 2: 135 HP@0.86pf and 0.92eff (135 x 0.746)/(0.86 x 0.92)	127
PUMP 3: 385 HP@0.81pf and 0.952eff (385 x 0.746)/(0.83 x 0.952) x1.25 for Largest Motor	465
PUMP 3: 385 HP@0.81pf and 0.952eff (385 x 0.746)/(0.81 x 0.952)	372
PUMP 5: 385 HP@0.81pf and 0.952eff (385 x 0.746)/(0.81 x 0.952)	372
MISC LOADS	91
MCC-UV	
MOTOR LOAD 200 HP@0.86pf and 0.92eff (200 x 0.746)/(0.86 x 0.92)	189
MISC LOADS	328
AERATION & DIGESTER BASIN	
MISC LOADS	861
TOTAL LOADS ADDED	2352
LOAD DELETED	0
PEAK DEMAND OVER PREVIOUS 12 MONTHS - 43 KVA X 1.25	51.25
TOTAL DEMAND	2385.25
SERVICE SIZE	4325
SPARE CAPICITY	1939.75

1

ELECTRICAL LOAD ANALYSIS FOR IAH WWTP - CNP SERVICE NO. 2

	KVA
LOADS ADDED	0
LOADS DELETED	0
PEAK DEMAND OVER PREVIOUS 12 MONTHS - 738 KVA X 1.25	912.5
TOTAL DEMAND	912.5
SERVICE SIZE @ 480V	2660
SPARE CAPICITY	1747.5

ELECTRICAL LOAD ANALYSIS FOR IAH WWTP - CNP SERVICE NO. 3

	KVA
LOADS ADDED	
MCC-LS	
PANEL HG	71.46
PANEL HW	3.42
TOTAL LOAD ADDED	23.9
LOADS DELETED	
LIFT STATION PUMPS 101 THD,RGH 105 840 KVA (NOTE THESE LOAD HAVE NOT BEEN UTILIZED OR LIGHTLY UTILIZED IN PAST 12 MONTHS PERIOD, THEREFORE THESE LOAD WILL N OT BE USED IN THIS CALCULATION.)	0
PEAK DEMAND OVER PREVIOUS 12 MONTHS - 302 KVA X 1.25	377.5
TOTAL DEMAND	475.3
SERVICE SIZE @ 480V	1663
SPARE CAPICITY	1237.7

MODIFIED OVERALL LOAD
ANALYSIS
NTS

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS

No.	Date	Revisions	App.
4	11/21/22	ADDENDUM #1R	ZMS
3	5/ 6/22	PERMITTING SET	ZMS
2			

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-385-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 385-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
Z.M. SEDIQUI
77702
REGISTERED
PROFESSIONAL
12/16/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
ELECTRICAL
MODIFIED OVERALL LOAD ANALYSIS

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SYE XIAOHUA (SHARI) LIN, P.E.

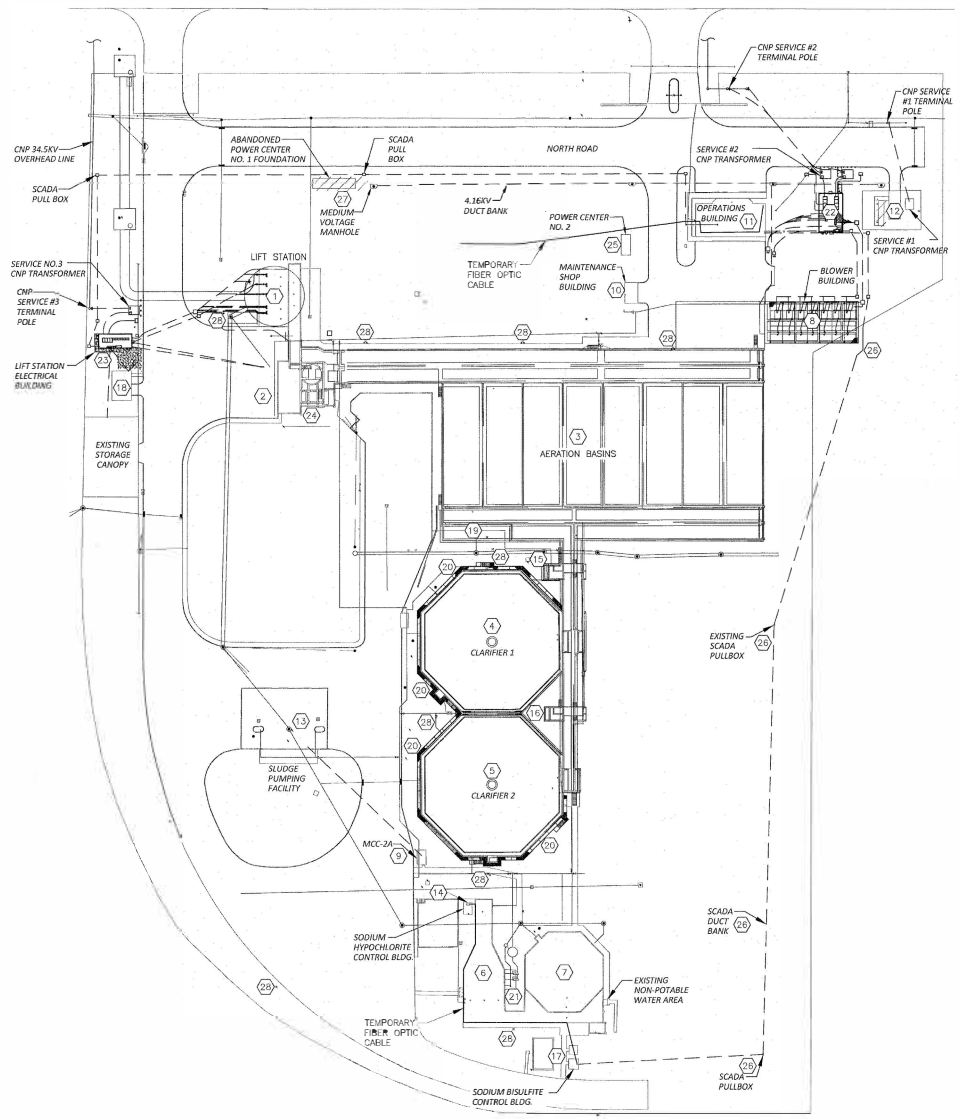
FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
80357
LIN
12/31/2022

E-00-703

SHEET NO 295 OF 378

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\Drawings\E-00-703 Modified Overall Load Analysis.dwg



EXISTING OVERALL
SITE PLAN
1"-0" = 60'

ELECTRICAL TASKS NOTES:

1. THE INFLUENT LIFT STATION IS TO HAVE ALL PUMPS REMOVED AND REPLACED. EXISTING INSTRUMENTATION IS TO BE REMOVED AND REPLACED.
2. THE HEADWORKS FACILITY IS TO BE PROVIDED A NEW MECHANICAL SCREEN, GATES AND INSTRUMENTATION. TWO EXISTING GRIT FACILITY GATES ARE TO BE REMOVED.
3. THE AERATION/DIGESTION BASINS ARE TO HAVE ALL EXPOSED ELECTRICAL CONDUIT REMOVED AND REPLACED. THIS TASK IS COMPLICATED AND OPERATION OF THE EXISTING BASINS IS REQUIRED. TEMPORARY POWER PROVISIONS WILL NEED TO "JUMP ACROSS" EXISTING PVC CONDUIT THAT IS DETERIORATED, WITH NEW CONDUIT AND CONDUCTORS PROVIDED. ALL POWER ORIGINATES FROM THE EXISTING MAINTENANCE SHOP BUILDING, CONDUCTORS ARE TO BE REMOVED AND REPLACED. ALL MISCELLANEOUS POWER OUTLETS, LIGHTING AND INSTRUMENTATION IS TO BE REMOVED AND REPLACED. ADDITIONAL 480V, 120V AND INSTRUMENTATION CIRCUITS ARE REQUIRED FOR THE NEW BASINS IMPROVEMENTS. ALL DISCRETE AND ANALOG CIRCUITS FROM THE BASINS ORIGINATE FROM THE MAINTENANCE SHOP BUILDING PLC. ALL SCADA CONDUCTORS ARE TO BE REMOVED AND REPLACED. THE MAINTENANCE SHOP PLC IS TO BE REMOVED AND REPLACED.
4. CLARIFIER NO 1 IS TO BE PROVIDED COMMUNICATIONS TO THE SCADA NETWORK.
5. CLARIFIER NO 2 IS TO BE PROVIDED COMMUNICATIONS TO THE SCADA NETWORK.
6. ALL ELECTRICAL AND INSTRUMENTATION ASPECTS OF THE EXISTING FLOW MEASURING FACILITY ARE TO BE REMOVED AND REPLACED IN THIS PROJECT. THE CONTRACTOR SHALL PROVIDE ANY TEMPORARY FACILITIES REQUIRED TO KEEP THE DISINFECTION AND FLOW MONITORING EQUIPMENT IN OPERATION UNTIL NEW UV FACILITIES ARE IN SERVICE. THIS INCLUDES TEMPORARY CONDUIT AND CONDUCTORS ALL TO BE INSTALLED IN COMPLIANCE WITH THE NEC ARTICLE 590.
7. THE CHLORINE CONTACT BASIN IS TO BE TAKEN OUT OF SERVICE WHEN THE NEW DISINFECTION FACILITY IS ACCEPTED FOR OPERATION. ALL ELECTRICAL AND INSTRUMENTATION ASPECTS ARE TO BE REMOVED.
8. THE BLOWER FACILITY HAS NO IMPROVEMENT TASK IN THIS PROJECT, FIBER FOR THE SCADA NETWORK MAY BE REQUIRED TO ROUTE THROUGH THE BUILDING.
9. MCC-2A WAS RECENTLY INSTALLED AND IS NOT TO BE IMPROVED. MCC-2A IS AVAILABLE FOR LOCAL TEMPORARY POWER TO PROCESS RELATED TASKS. SOME LOADS INVOLVED IN THIS PROJECT ARE FED FROM MCC-2A. THE MCC SHALL BE KEPT CLOSED AND OPERATIONAL THROUGHOUT THE PROJECT.
10. THE AERATION BASINS POWER AND INSTRUMENTATION IS PROVIDED AND SERVED BY EQUIPMENT LOCATED IN THE MAINTENANCE SHOP BUILDING. IMPROVEMENTS AND TEMPORARY CONNECTIONS TO THE EQUIPMENT IN THIS BUILDING WILL BE REQUIRED. THE PLC CABINET LOCATED IN THIS BUILDING IS TO BE IMPROVED. EXISTING POWER, INSTRUMENTATION AND COMMUNICATION WIRING RESEARCH IS REQUIRED TO ACCOMPLISH IMPROVEMENTS, PLC REPLACEMENT AND PROPOSED WIRING.
11. THE OPERATIONS BUILDING IS WHERE THE MAIN CONTROL ROOM FOR THE PLANT IS LOCATED. SCADA COMMUNICATIONS ORIGINATE FROM EQUIPMENT IN THIS BUILDING. FOR EARLY TESTING AND TRANSFER OF OPERATION BETWEEN TWO CONTROLS ROOMS A TEMPORARY FIBER IS TO BE PROVIDED BETWEEN THE EXISTING CONTROL ROOM AND THE PROPOSED ADMINISTRATION BUILDING CONTROL ROOM.
12. THE ELECTRICAL SUB-STATION IS WHERE THE CNP UTILITY SERVICE NO. 1 IS LOCATED. THE CNP TRANSFORMER WAS REPLACED RECENTLY AND IS TO REMAIN IN SERVICE. THE OUTDOOR MAIN SWITCHGEAR, FOR SERVICE NO.1, IS TO BE REMOVED AND REPLACED WITH NEW SWITCHGEAR. THE CONTRACTOR SHALL PROVIDE TEMPORARY FACILITIES TO THE UNIT SUBSTATION NO.2 480 VOLT LOADS, FOR CONTINUOUS PLANT OPERATION. THE CONTRACTOR SHALL COORDINATE WITH CNP TO REPLACE SWITCHGEAR DURING OUTAGES PLANNED IN ADVANCE THROUGH PLANT OPERATIONS AND PROJECT MANAGEMENT.
13. THE WASTE SLUDGE FACILITY IS TO REMAIN IN SERVICE, NO ELECTRICAL TASK ARE ANTICIPATED FOR THIS AREA.
14. AFTER NEW FACILITIES ARE COMPLETE THE EXISTING SODIUM HYPOCHLORITE FACILITY IS TO BE TAKEN OUT OF SERVICE. THE CONTROL BUILDING IS TO DEMOLISHED AND THE AREA MADE CLEAN. DURING CONSTRUCTION TEMPORARY FIBER IS TO BE PROVIDED TO THE SODIUM BISULFITE PLC FROM THIS PLC CABINET. THE PLC CONTROL PANEL IS TO BE VERY CAREFULLY REMOVED AND RETURNED TO THE CITY. THE MINI-POWER CENTER LOCATED ON THE WEST EXTERIOR WALL OF THE BUILDING IS TO REMAIN IN SERVICE DURING CONSTRUCTION.
15. RAS PUMP STATION NO 1 IS TO BE IMPROVED, COORDINATE WITH MECHANICAL FOR ELECTRICAL AND INSTRUMENTATION ACTIVITIES REQUIRED.
16. RAS PUMP STATION NO 2 IS TO BE IMPROVED, COORDINATE WITH MECHANICAL FOR ELECTRICAL AND INSTRUMENTATION ACTIVITIES REQUIRED.
17. THE SODIUM BISULFITE FACILITY INCLUDING TWO STRUCTURES IS TO BE REMOVED FROM SERVICE UPON COMPLETION AND OPERATIONAL ACCEPTANCE OF THE NEW DISINFECTION SYSTEMS. THE EXISTING FACILITY IS TO BE PROVIDED TEMPORARY FIBER FOR THE PLC LOCATED IN THE FLOW METERING PLC BUILDING. THE PLC WAS RECENTLY INSTALLED AND IS TO BE CAREFULLY REMOVED AND RETURNED TO THE CITY AFTER PROJECT.
18. THERE ARE NO ANTICIPATED TASKS FOR THE STORAGE BUILDING IN THIS PROJECT.
19. THE AERATION BASIN CHANNELS ARE TO BE IMPROVED AND EXPANDED IN THIS PROJECT WITH TWO NEW BASINS BEING ADDED. THE INFLUENT CONFIGURATION IS TO BE RECONFIGURED TO ACCEPT THE HEADWORKS IMPROVEMENTS. THE CONTRACTOR SHALL COORDINATE FOR ELECTRICAL FACILITIES TO BE REMOVED AND REPLACED, OR RELOCATED, FOR STRUCTURAL MODIFICATIONS AND ADDITIONS. ALL TEMPORARY REQUIRED FOR MECHANICAL AND STRUCTURAL IMPROVEMENTS IS TO BE COORDINATED AND INCLUDED.
20. THE CLARIFIER WALKWAY STRUCTURAL MEMBERS MAY BE UTILIZED FOR NEW CONDUIT AND BOX SUPPORT.
21. THE NPW SYSTEM IS TO BE RELOCATED AND IMPROVED. THE CONTRACTOR SHALL PROVIDE TEMPORARY FACILITIES REQUIRED TO KEEP NON POTABLE WATER AVAILABLE FOR THE PLANT OPERATION.
22. THE BLOWER ELECTRICAL BUILDING HAS NO IMPROVEMENT TASK IN THIS PROJECT, FIBER FOR THE SCADA NETWORK MAY BE REQUIRED TO ROUTE THROUGH THE BUILDING.
23. THE LIFT STATION ELECTRICAL BUILDING POWER EQUIPMENT IS TO BE MODIFIED. THE NEW LIFT STATION PUMPS WILL BE PROVIDED POWER FROM THE NEW LIFT STATION ELECTRICAL BUILDING NO. 2. SOME MCC-LS COMPONENTS FOR STARTING AND RUNNING THE EXISTING PUMPS IS TO BE ABANDONED IN PLACE. ADDITIONAL LOADS, FOR THE HEADWORKS IMPROVEMENTS, ARE TO BE PROVIDED POWER FROM THE EXISTING MCC-LS.
24. THE GRIT BASIN IS TO REMOVED FROM SERVICE AND REPLACED WITH A NEW FACILITY. STRUCTURAL AND MECHANICAL TASKS FOR THE NEW GRIT IMPROVEMENTS MAY REQUIRE REMOVAL AND REPLACEMENT OR RELOCATION OF EXISTING ELECTRICAL AND INSTRUMENTATION CONDUIT AROUND THE EXISTING GRIT STRUCTURE. THE CONTRACTOR SHALL PROVIDE ALL TEMPORARY REQUIRED TO MAINTAIN OPERATION OF THE PLANT.
25. UNIT SUBSTATION NO. 2 IS TO BE UTILIZED IN THIS PROJECT FOR NEW AERATION BASIN LOADS.
26. THE SCADA DUCT BANK AND PULL BOXES, SERVING THE EXISTING PLC IN THE SODIUM BISULFITE FACILITY, SHALL BE REMOVED FOR NEW FACILITIES INSTALLATION. PRIOR TO FIBER OPTIC CABLE REMOVAL COORDINATE AND PROVIDE A TEMPORARY FIBER TO THE SCADA NETWORK FOR THE EXISTING PLC, FROM THE EXISTING CHLORINE BUILDING.
27. THE EXISTING FOUNDATION, OF ABANDONED POWER CENTER NO.1, IS TO BE REMOVED FOR INSTALLATION OF NEW DUCT BANKS. ALL UNDERGROUND CONCRETE IN THE PATH OF THE PROPOSED DUCT BANK IS TO BE REMOVED AND DISPOSED OF OFFSITE AT CONTRACTOR'S EXPENSE. NO ADDITIONAL FUNDS WILL BE CONSIDERED FOR REMOVAL OF FOUNDATION OR DUCT BANKS IN PROPOSED DUCT BANK PATH.
28. EXISTING SITE LIGHTING POLE. ALL EXISTING SITE LIGHT POLES ARE TO REMAIN IN SERVICE. SITE LIGHTING IMPROVEMENTS ARE ALSO INCLUDED IN THIS PROJECT.

N

0' 30' 60' 120'

SCALE: 1"=60'

GENERAL ELECTRICAL NOTES:

A. CONTRACTOR SHALL BE PERFORMING TASKS IN THIS PROJECT IN NEAR PROXIMITY TO OVERHEAD POWER LINES. CONTRACTOR SHALL FOLLOW NEC AND CNP STANDARDS FOR SAFE WORKING DISTANCE, TEMPORARY SIGNAGE AND PROCEDURES.

B. THE ONSITE LIFT STATION AND NEW GRIT AREA HAVE AREAS THAT ARE CLASSIFIED. PROPER MATERIALS AND METHODS ARE REQUIRED. CONTRACTOR SHALL FOLLOW NEC AND CITY OF HOUSTON STANDARDS FOR SAFE WORKING DISTANCE, TEMPORARY SIGNAGE AND PROCEDURES.

TEMPORARY POWER AND EQUIPMENT REMOVAL NOTES:

1. THIS DRAWING DESCRIBES TEMPORARY POWER WORK AND EQUIPMENT TO BE REMOVED OR REPLACED IN THIS PROJECT. SEE NATIONAL ELECTRICAL CODE AND DIVISION 16 SPECIFICATIONS FOR REQUIREMENTS.
2. CONTRACTOR SHALL DOCUMENT THE OPERATIONAL STATUS OF ALL EQUIPMENT TO BE PROVIDED TEMPORARY OR REMOVED PRIOR TO SCHEDULING REMOVAL. THE STATUS, SOURCE AND PATH OF POWER, CONTROL AND SCADA CIRCUITS SHALL BE CONFIRMED PRIOR TO INSTALLATION OF TEMPORARY OR REMOVAL FROM AVAILABILITY. "AS FOUND" CONDITIONS DETERMINE TEMPORARY POWER REQUIREMENT. EQUIPMENT THAT IS NOT FUNCTIONAL MAY NOT REQUIRE TEMPORARY FACILITIES FOR CONSTRUCTION. INCLUDING AERATION BASIN'S INSTRUMENTATION AND DEVICES.
3. CONTRACTOR SHALL NOTIFY THE CITY CONSTRUCTION REPRESENTATIVE UPON DISCOVERY OF ALL DEVIATIONS FROM THE DRAWINGS PRIOR TO BEGINNING WORK.

No.	Date	Revisions	App.
1	11/11/22	RE-PACKAGED SET	ZMS
0	5/15/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
Z.M. SIDDIQUI
77702
REGISTERED
PROFESSIONAL
ENGINEER
10/10/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
ELECTRICAL
EXISTING OVERALL SITE PLAN

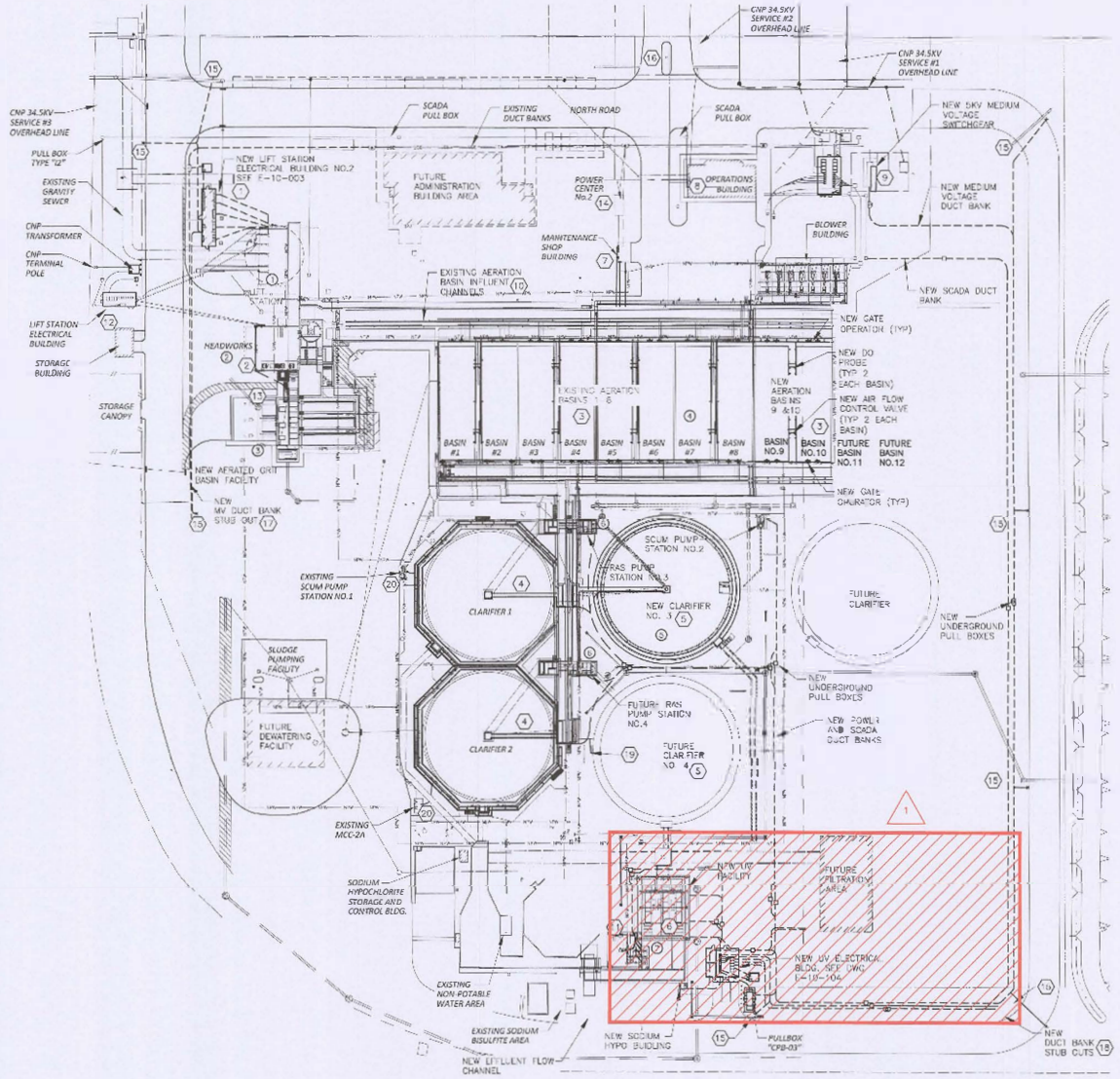
WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO.	297 OF 378

FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
89367
LICENSED
PROFESSIONAL
ENGINEER
HOUSTON, TEXAS

E-10-101

FILE PATH: C:\Users\KGI Laptop\KGI Laptop\Kalluri Group, Inc\KGI - Documents\4180-6V (IAH Imp Pkg 2)\Drawings\E-10-101 Existing Overall Site Plan.dwg



MODIFIED OVERALL
SITE PLAN
1" = 60'-0"

TEMPORARY POWER NOTES:

1. CONTRACTOR SHALL DOCUMENT THE OPERATIONAL STATUS OF ALL EQUIPMENT TO BE PROVIDED TEMPORARY OR REMOVED PRIOR TO SCHEDULING REMOVAL. THE STATUS, SOURCE AND PATH OF POWER, CONTROL AND SCADA CIRCUITS SHALL BE CONFIRMED PRIOR TO INSTALLATION OF TEMPORARY OR REMOVAL FROM AVAILABILITY. "AS FOUND" CONDITIONS DETERMINE TEMPORARY POWER REQUIREMENT. EQUIPMENT THAT IS NOT FUNCTIONAL AT START OF PROJECT, MAY NOT REQUIRE TEMPORARY FACILITIES FOR CONSTRUCTION INCLUDING AERATION BASIN'S INSTRUMENTATION AND DEVICES. COORDINATE REQUIRED TEMPORARY POWER WITH PLANT OPERATIONS UPON COMPLETION OF FUNCTIONAL EQUIPMENT LIST.
2. CONTRACTOR SHALL NOTIFY THE CITY CONSTRUCTION REPRESENTATIVE UPON DISCOVERY OF ALL DEVIATIONS FROM THE DRAWINGS PRIOR TO BEGINNING WORK.

ELECTRICAL TASKS NOTES:

(1) THE INFLUENT LIFT STATION IS TO BE PROVIDED NEW LARGER PUMPS, A NEW BUILDING, TO HOUSE DRIVES, AND ALL LIFT STATION INSTRUMENTATION IS TO BE REMOVED AND REPLACED.

(2) THE HEADWORKS FACILITY IS TO BE PROVIDED A NEW MECHANICAL SCREEN, WITH NEW ADDITIONAL GATES AND INSTRUMENTATION. TWO NEW AERATED GRIT CHAMBERS, CLASSIFIERS AND PUMPING SYSTEM. SEE DRAWING E-10-003 FOR ENLARGED PLAN.

(3) THE EXISTING AERATION/DIGESTION BASINS ARE TO HAVE ALL PLASTIC PVC CONDUIT REMOVED, TEMPORARY PROVIDED FOR WORKING EQUIPMENT, AND ALL NEW CONDUIT AND CONDUCTORS PROVIDED. PROVIDE COMPLETE NEW POWER PROVISIONS FOR EXISTING INSTRUMENTATION, GATES, VALVES AND LIGHTING. NEW CONDUIT AND CONDUCTORS FOR INSTRUMENTATION SIGNAL WIRING IS TO BE PROVIDED BACK TO MAINTENANCE SHOP PLC CABINET.

(4) EXISTING CLARIFIER CONTROL PANEL ALARM CIRCUITS ARE TO BE CONNECTED TO THE SCADA NETWORK CABINET AND PLC-UV IN THE UV ELECTRICAL BUILDING. SCUM PUMPING FOR EACH CLARIFIER IS TO BE IMPROVED.

(5) NEW CLARIFIER NO.3 IS TO BE PROVIDED 480 VOLT POWER, CONVENIENCE POWER, LIGHTING, AND VENDOR SUPPLIED CONTROL PANEL SHALL BE CONNECTED TO THE SCADA NETWORK. CLARIFIER WALKWAY STRUCTURAL MEMBERS MAY BE UTILIZED FOR NEW CONDUIT AND BOX SUPPORT. FUTURE CLARIFIER NO. 4 IS TO BE PROVIDED UNDERGROUND PROVISIONS ILLUSTRATED.

(6) ~~THE EXISTING RECORD PACKAGE AS BE PROVIDED INCLUDING ALL CONTROL DRAWINGS AND SCHEMATICS FOR ALL EXISTING EQUIPMENT TO BE MODIFIED OR CONNECTED TO THE SCADA NETWORK. CONTRACTOR SHALL VERIFY AND FIELD VERIFY ALL CONTROL DRAWINGS IS TO BE PROVIDED IN THE OPERATING E-10-00 FOR CITY RECORDS.~~

(7) THE MAINTENANCE SHOP BUILDING ELECTRICAL PANELBOARDS ARE TO BE MODIFIED. WIRING TO THE AERATION BASINS IS TO BE REMOVED AND THE PLASTIC CONDUIT ON THE BASINS IS TO BE REMOVED AND REPLACED WITH PVC COATED ALUMINUM. THE SCADA PLC CABINET IS TO BE REHABILITATED TO SERVE EXISTING AND NEW INSTRUMENTATION.

(8) THE OPERATIONS BUILDING IS NOT TO BE IMPROVED IN THIS PROJECT. THE MAIN CONTROL ROOM, FOR THE PLANT IS LOCATED IN IT. SCADA FIBER OPTIC COMMUNICATIONS TO BE MODIFIED ORIGINATE FROM EQUIPMENT IN THIS BUILDING.

(9) THE MAIN 5KV SWITCHGEAR, FOR SERVICE NO.1 IS TO BE REMOVED AND REPLACED WITH NEW 5KV OUTDOOR SWITCHGEAR. THE CONTRACTOR SHALL COORDINATE WITH CNP FOR DISCONNECT AND RECONNECT OF THE SWITCHGEAR. PLAN OUTAGE THROUGH PLANT OPERATIONS AND PROJECT MANAGEMENT. TEMPORARY POWER MUST BE SUPPLIED TO UNIT SUBSTATION POWER CENTER NO.2, 480 VOLT LOADS, FOR CONTINUOUS PLANT OPERATIONS.

(10) THE EXISTING AND NEW AERATION BASIN INFLUENT CHANNELS ARE TO BE PROVIDED NEW POWER, LIGHTING, AND GATE CONTROLS IN THIS PROJECT.

(11) ~~THE EXISTING GATES, VALVES AND NEW OPERATORS, AND OTHER EQUIPMENT TO BE CONNECTED TO THE SCADA NETWORK REMOTE I/O CABINETS AND CITY CONTRACTOR IS TO BE CONTACTED THE CONTRACTOR SHALL BE NEW EQUIPMENT AND FACILITIES INSTALLED AND TESTED BY OPERATION.~~

(12) THE EXISTING LIFT STATION ELECTRICAL BUILDING SHALL BE RENAMED "LIFT STATION ELECTRICAL BUILDING NO.1". IT SHALL STAY IN SERVICE TO PROVIDE POWER TO THE EXISTING MODIFIED HEADWORKS AND NEW GRIT FACILITIES. SEE DRAWING E-10-003 FOR ENLARGED PLAN.

(13) A NEW 480 VOLT PANELBOARD "H-6" SHALL BE PROVIDED FOR THE GRIT AREA EQUIPMENT, GATES AND MISCELLANEOUS LOADS.

(14) UNIT SUBSTATION POWER CENTER NO.2 IS TO REMAIN IN SERVICE. IT SHALL BE UTILIZED IN THIS PROJECT FOR EXISTING AND NEW AERATION BASIN LOADS.

(15) ~~TYPICAL SITE LIGHT POLE TO BE INSTALLED IN THIS PROJECT.~~ 1

(16) PLANT ENTRANCE GATE LIGHT FIXTURES ARE TO BE REPLACED IN THIS PROJECT.

(17) STUB OUT MEDIUM VOLTAGE DUCT BANK, FOR FUTURE DEWATERING FACILITY, WITH SITE LIGHTING.

(18) STUB OUT MEDIUM VOLTAGE, LOW VOLTAGE AND SCADA DUCT BANKS FOR FUTURE PLANT EXPANSION.

(19) STUB OUT POWER AND SCADA CONDUITS FOR FUTURE CLARIFIER NO. 4.

(20) EXISTING MCC-2A IS TO MODIFIED, TO FEED SCUM PUMP STATION NO.1. PROVIDE A NEW BUCKET AND FEEDER BREAKER.

1 THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

N
60 0 60 120

GENERAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE THE LOCATION AND GENERAL DESCRIPTION OF THE MAJOR ELECTRICAL TASKS IN THIS PROJECT. INSTRUMENTATION AND CONTROL CONDUITS AND CONDUCTORS ARE ALSO DESCRIBED IN THE ELECTRICAL DRAWINGS.

B. INFORMATION IS SUBJECT TO THE SPECIFIC MECHANICAL AND ELECTRICAL EQUIPMENT CHOSEN BY THE CONTRACTOR AND APPROVED FOR SUPPLY.

C. ALL PROPOSED ANCHORS, HARDWARE, SIRUT, STRUT FITTINGS AND CONDUIT STRAPS SHALL BE 316 STAINLESS STEEL ON THIS PROJECT. EXCEPTION AREA BEING CHEMICAL AREAS DESCRIBED IN THE DRAWINGS.

ELECTRICAL CLASSIFICATION LEGEND:

TAG	AREA		ELEC. CLASSIFICATION
(1)	INFLUENT LIFT STATION	WET WELL	CLASS I, DIVISION 1 & II
		VENTS	CLASS I, DIVISION 1
(2)	HEADWORKS	ABOVE DECK	CLASS I, DIVISION 1
		BELOW DECK	CLASS I, DIVISION 1
(3)	GRIT FACILITY	ABOVE DECK	CLASS I, DIVISION 1
		BELOW DECK	CLASS I, DIVISION 1
(4)	AERATION/DIGESTION		UNCLASSIFIED
(5)	CLARIFIERS		UNCLASSIFIED
(6)	SCUM PITS		UNCLASSIFIED
(7)	DISINFECTION FACILITY		UNCLASSIFIED

No.	Date	Revisions	Asp.
1	11/1/22	REPACKAGED SET	JWB
0	5/18/22	PERMITTING SET	JWB

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
S. M. SERVICE
77703
REGISTERED
PROFESSIONAL
ENGINEER
SHARI LIN
80367
11/30/2024

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
ELECTRICAL

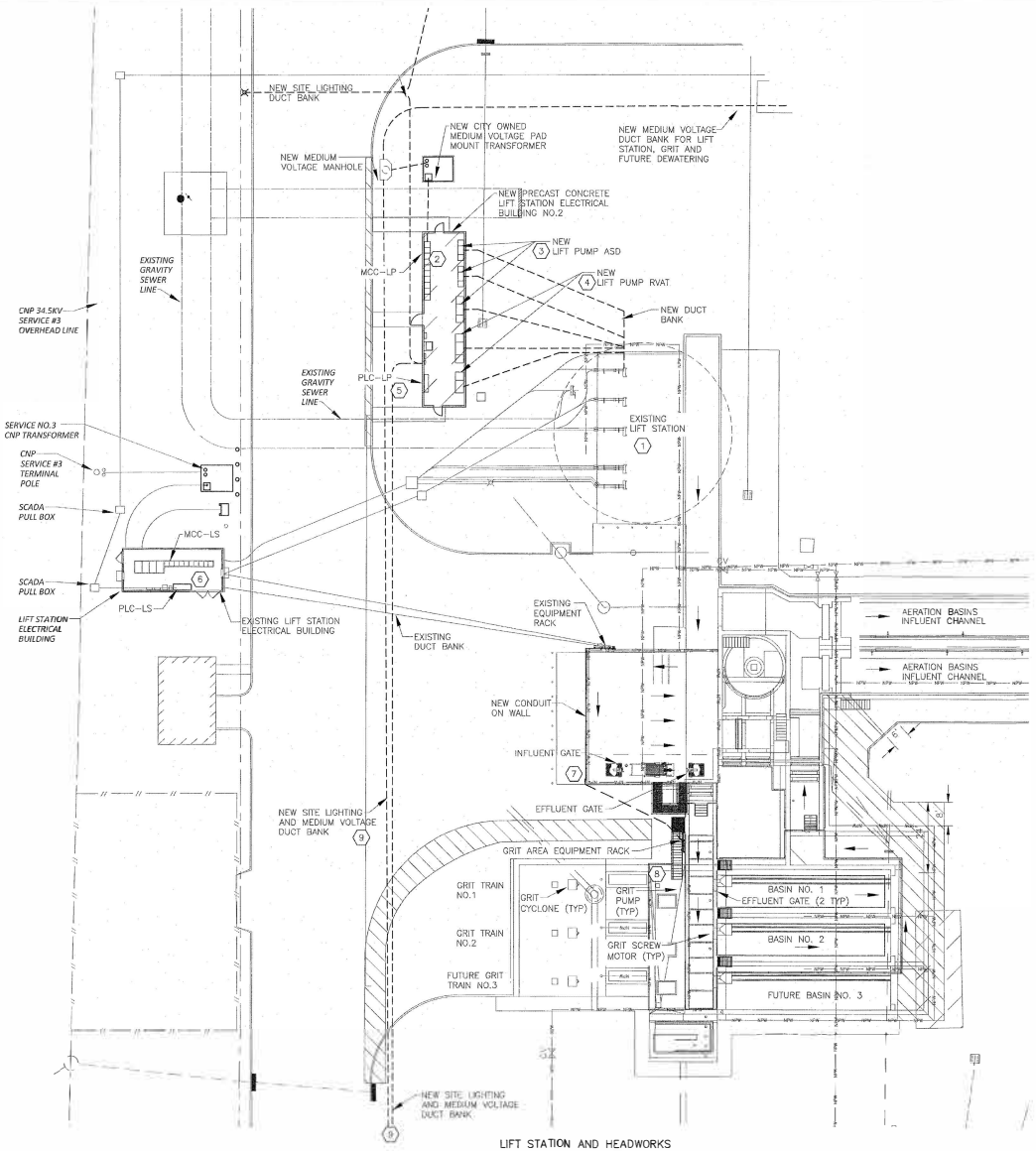
MODIFIED OVERALL SITE AND AREA CLASSIFICATION PLAN

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO.	298 OF 378

FOR CITY OF HOUSTON USE ONLY

E-10-102

FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160-BV (WH Imp Pkg 2)\Drawings\E-10-102 103 104 Proposed Site Plans.dwg



LIFT STATION AND HEADWORKS
AREA PLAN
1" = 20'-0"

ELECTRICAL TASKS NOTES:

1. THE INFLUENT LIFT STATION IS TO BE PROVIDED NEW, LARGER PUMPS. FEEDERS AND NEW LARGER CONDUIT PENETRATION CORES WILL BE REQUIRED IN THE LIFT STATION LID.
2. THE NEW LIFT STATION ELECTRICAL BUILDING NO. 2 SHALL BE PROVIDED EMERGENCY LIGHTING AND AIR CONDITIONING. SEE ONE LINE DIAGRAM FOR ELECTRICAL POWER EQUIPMENT DESCRIPTION.
3. THE TWO SMALLER, AND ONE OF THE LARGER, NEW PUMPS SHALL BE PROVIDED AN ADJUSTABLE SPEED DRIVE WITH AN ACROSS THE LINE BYPASS STARTER THAT ALLOWS THE ASD TO BE REMOVED FROM SERVICE FOR REPAIR OR MAINTENANCE.
4. TWO OF THE THREE LARGER PUMPS ARE TO BE PROVIDED REDUCED VOLTAGE AUTOTRANSFORMER STARTERS. EACH SHALL HAVE A BYPASS ACROSS THE LINE STARTER THAT ALLOWS REMOVAL, SERVICE OR MAINTENANCE ON THE RVAT STARTER.
5. THE NEW PLC SHALL BE CONNECTED TO THE EXISTING PLC IN THE EXISTING LIFT STATION ELECTRICAL BUILDING AS A REMOTE I/O EXTENSION.
6. THE EXISTING LIFT STATION ELECTRICAL BUILDING SHALL CONTINUE TO PROVIDE POWER TO THE EXISTING AND NEW HEADWORKS EQUIPMENT. MCC-LS SHALL BE MODIFIED TO INCREASE THE CAPACITY OF PANELBOARD "HW". COMPONENTS IN MCC-LS RELATED TO LIFT STATION PUMPS SHALL BE ABANDONED IN PLACE.
7. THE HEADWORKS FACILITY IS TO BE PROVIDED A NEW MECHANICAL SCREEN, ELECTRICALLY ACTUATED INFLUENT AND EFFLUENT GATES AND INSTRUMENTATION. HEADWORKS IMPROVEMENTS SHALL BE PROVIDED POWER FROM EXISTING PANELBOARD "HW". SEE E-30-101 FOR ENLARGED PLAN.
8. COORDINATE LOCATION OF THE NEW GRIT FACILITY 480 VOLT PANELBOARD "HG". IT SHALL BE FED FROM EXISTING PANELBOARD HW. PANELBOARD "HG" SHALL PROVIDE POWER TO THE NEW AND FUTURE GRIT AREA SYSTEMS, EQUIPMENT AND GATES. A SCADA TERMINATION AND PULL BOX SHALL BE LOCATED ADJACENT TO PANELBOARD "HG" AND GRIT CIRCUITS SHALL BE ROUTED THROUGH IT.
9. PROVIDE A SCADA, SITE LIGHTING AND MEDIUM VOLTAGE DUCT BANK, ACROSS PAVEMENT, FOR THE SITE LIGHTING IN THIS PROJECT AND FUTURE DEWATERING FACILITY. STUB OUT 20' INTO THE GRASSY AREA. PROVIDE AN END OF DUCT BANK, TOMB STONE TYPE CONCRETE, MARKER ABOVE THE EXACT LOCATION.

N

0' 10' 20' 40'
SCALE: 1"=20'

GENERAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE AN OVERVIEW OF THE SITE WORK REQUIRED IN THE MODIFIED LIFT STATION AREA, NEW GRIT AREA AND DEWATERING AREA PROPOSED IN ANOTHER PROJECT.

B. REUSE OF EXISTING OR RELOCATED CONDUIT WILL NOT BE CONSIDERED IN THE DISINFECTION AREA. ALL CONDUIT ON, AND OR CONNECTING TO, THE UV SYSTEM SHALL BE NEW.

C. NPW SYSTEM CONDUIT AND CONDUCTORS SHALL ALL BE NEW.

D. ALL STRUT, HARDWARE, STRAPS AND ANCHORS SHALL BE 316 STAINLESS STEEL, WITHOUT EXCEPTION.

No	Date	Revisions	App
1	11/11/22	REPACKAGED SET	ZMS
0	5/19/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-655
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
M. SEBROSKI
77702
PROFESSIONAL SURVEYOR
10/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

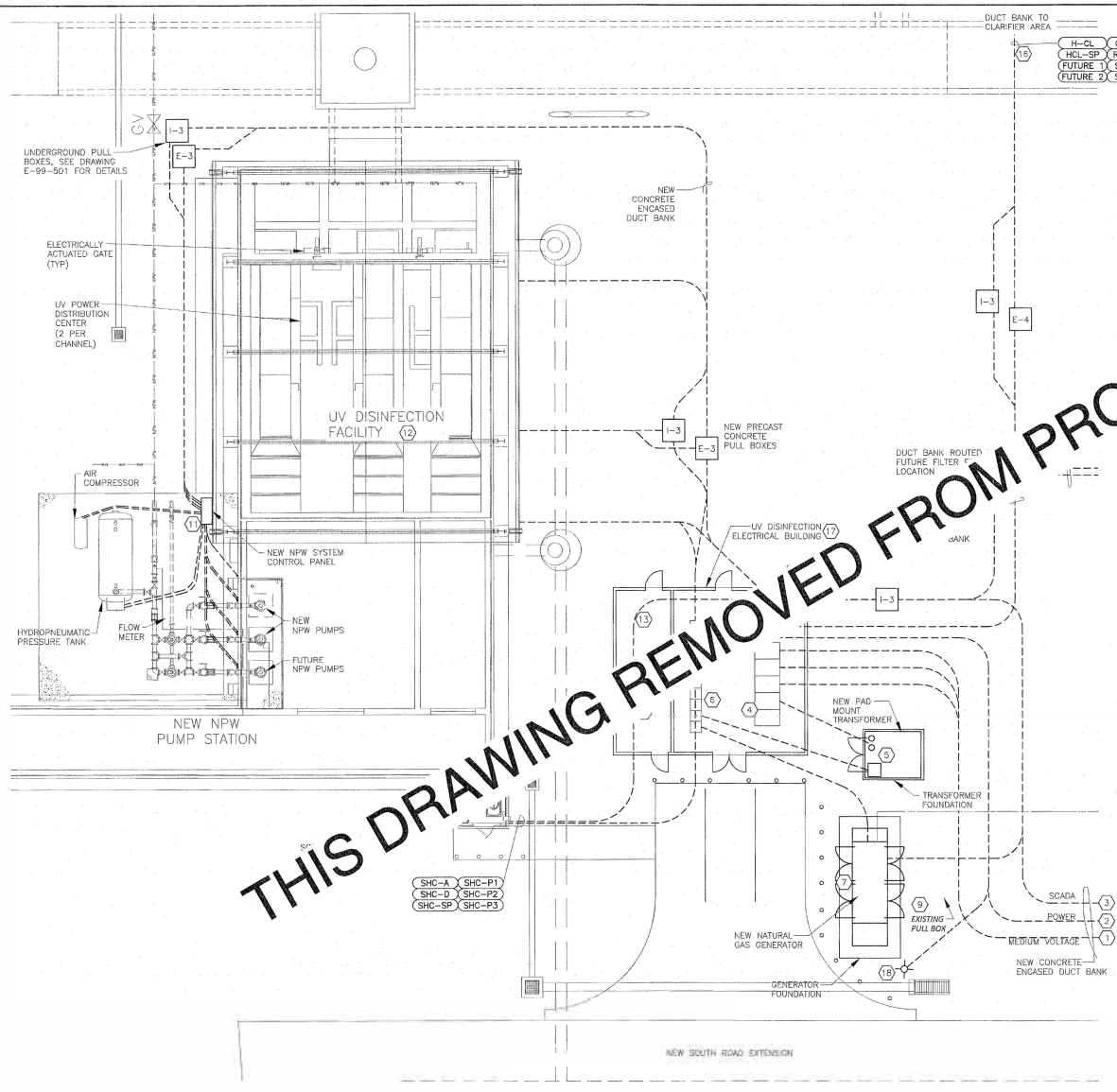
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
ELECTRICAL
LIFT STATION AND HEADWORKS AREA PLAN

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	Se XIAOHUA (SHARI) LIN, P.E.
SHEET NO.	299 OF 378

FOR CITY OF HOUSTON USE ONLY
STATE OF TEXAS
80367
REGISTERED
PROFESSIONAL ENGINEER
10/11/2022

E-10-103

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\Drawings\E-10-102 103 104 Proposed Site Plans.dwg



NEW UV DISINFECTION
AREA PLAN
1" = 10'-0"

THIS DRAWING REMOVED FROM PROJECT

KEYED NOTES:

1. THE MEDIUM VOLTAGE (4.16KV) CIRCUIT IS ROUTED FROM THE MAIN SWITCHGEAR, FED FROM CNP SERVICE NO. 1 .
2. 480/120 VOLT POWER CIRCUITS AND FUTURE DUCTS WILL BE ROUTED WITH THE MEDIUM VOLTAGE AND SCADA DUCT BANKS.
3. SCADA AND INSTRUMENTATION DUCT BANK IS ROUTED FROM THE BLOWER BUILDING AREA. FIBER WILL BE ROUTED TO THE CONTROL BUILDING. INSTRUMENTATION DUCTS FOR NEW AND FUTURE USAGE ARE INCLUDED.
4. THE MEDIUM VOLTAGE SWITCHGEAR SHALL CONTAIN ADDITIONAL CAPACITY AND SPACE FOR FUTURE EXPANSION. A SPARE AND A FUTURE DUCT WILL BE STUBBED OUT TO THE EAST END OF THE NEW DUCT BANKS.
5. THE PAD MO[illegible]NSFORMER SHALL BE PROVIDED A STRUCTUR[illegible]N AND SIDEWALK ACCESS.
6. TH[illegible]PROVIDED A HOUSEKEEPING PAD. MCC [illegible]NFIGURED TO AUTOMATICALLY TRANSFER [illegible] SOURCE TO THE NATURAL GAS GENERATOR TO [illegible]OUS DISINFECTION.
7. [illegible]RAL GAS GENERATOR SHALL BE PROVIDED A STRUCTURAL [illegible]ATION AND SIDEWALK ACCESS ALL AROUND IT. A TWO STEP [illegible]ND BANK AND PROVISIONS FOR AUTOMATIC EXERCISE. THE GENERATOR SHALL PROVIDE POWER TO ALL LOADS CONNECTED TO THE MCC.
8. THE DISINFECTION, CLARIFICATION, RAS, WAS, SCUM, AND NPW SYSTEMS NEW IN THIS PROJECT SHALL ALL BE CONNECTED TO THIS PLC. THE PLC WILL BE FULLY EQUIPPED WITH SIEMENS S7 PLATFORM COMPONENTS, PER DIVISION 13 SPECIFICATIONS AND CITY STANDARDS.
9. EXISTING PULL BOX AND DUCT BANK CONTAINS THE FIBER FOR EXISTING SODIUM BISULFITE PLC SCADA CONNECTION TO THE CONTROL BUILDING. CONTRACTOR SHALL PROVIDE TEMPORARY FIBER CONNECTION FROM THE EXISTING OUTFALL PLC TO THE CONTROL BUILDING. CONTRACTOR SHALL COORDINATE REMOVAL OF DUCT BANK AND BOX WITH TEMPORARY PROVISIONS.
10. THE ELECTRICAL ROOM SHALL BE PROVIDED AIR CONDITIONING AND EMERGENCY LIGHTING.
11. THE NPW SYSTEM SHALL BE PROVIDED A CONTROL PANEL EQUIPPED WITH MOTOR STARTERS AND PROTECTION MODULES. FLOW METER SIGNALS AND SYSTEM STATUS SHALL BE CONNECTED TO THE UV ELECTRICAL BUILDING PLC.
12. THE UV FACILITY SHALL BE PROVIDED LED LIGHTING, CONVENIENCE POWER AND A LIGHTNING PROTECTION SYSTEM. ALL CONDUIT ROUTED TO AND FROM THE UV FIXTURE POWER DISTRIBUTION UNITS SHALL BE CONCRETE EMBEDDED. EXPOSED CONDUIT SHALL NOT BE ROUTED ON WALKING SURFACES.
13. SPARE PARTS STORAGE AND BENCH SPACE SHALL BE PROVIDED FOR UV SYSTEM MAINTENANCE.
14. NPW WATER TREATMENT SHALL BE PROVIDED A SPACE FOR METERING PUMPS AND CHEMICAL STORAGE.
15. STUB OUT POWER AND SCADA CONDUIT FOR FUTURE FILTER FACILITY.
16. ROUTE DUCT BANK TO CLARIFIER AREA LOADS.
17. SEE DRAWINGS E-61-101 AND E-61-102 FOR ENLARGED PLANS.
18. NEW SITE LIGHTING POLE, SEE DRAWING E-99-504 FOR SITE LIGHTING DETAILS.

N

0' 5' 10' 20'

SCALE: 1"=10'

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

GENERAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE THE SITE WORK REQUIRED IN THE NEW UV BUILDING AREA. SEE ENLARGED PLANS FOR EXACT DETAILS OF AREA'S REQUIREMENTS.

B. REUSE OF EXISTING OR RELOCATED CONDUIT WILL NOT BE CONSIDERED IN THE DISINFECTION AREA. ALL CONDUIT ON, AND OR CONNECTING TO, THE UV SYSTEM SHALL BE NEW.

C. NPW SYSTEM CONDUIT AND CONDUCTORS SHALL ALL BE NEW.

D. ALL STRUT, HARDWARE, STRAPS AND ANCHORS SHALL BE 316 STAINLESS STEEL, WITHOUT EXCEPTION.

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS 77702 REGISTERED PROFESSIONAL ENGINEER 10/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

ELECTRICAL

NEW UV DISINFECTION AREA PLAN

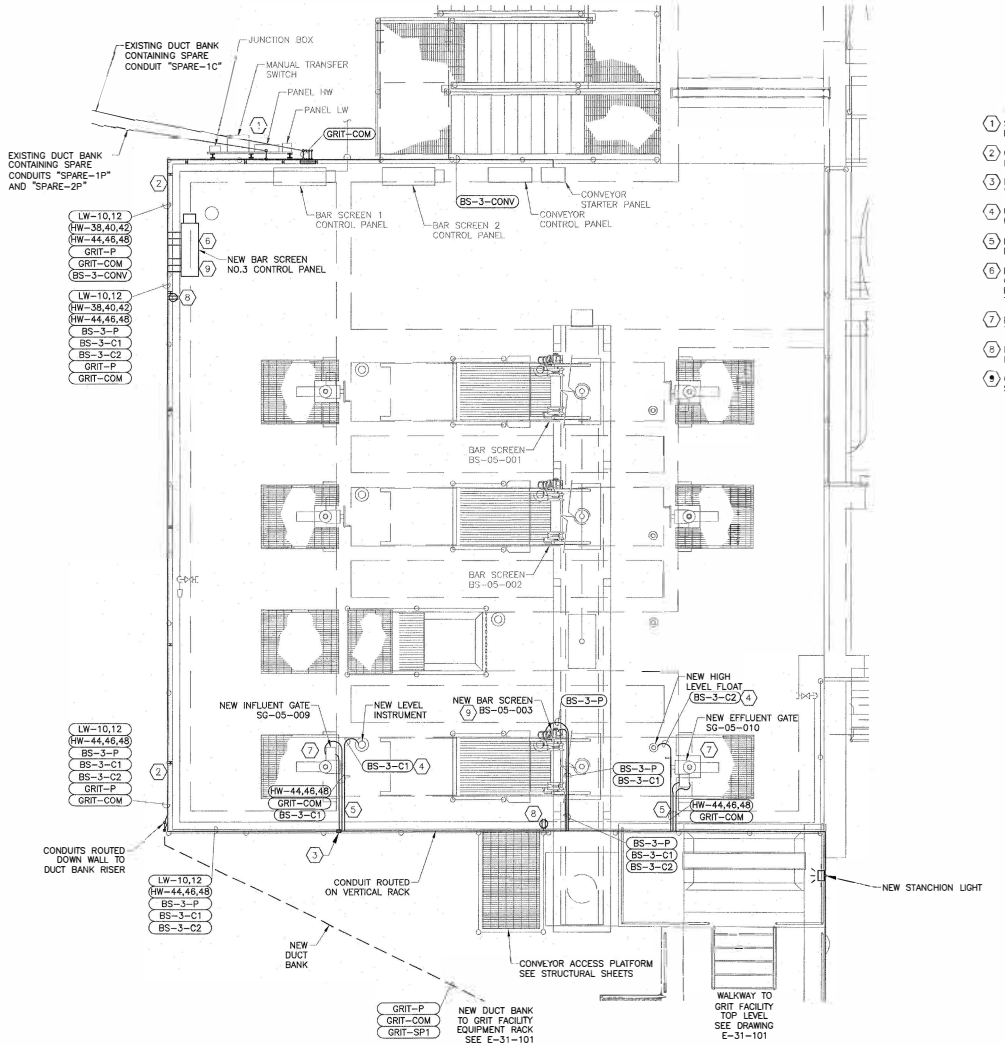
WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 300 OF 378	

FOR CITY OF HOUSTON USE ONLY

ACCEPTED 80367 10/11/2022

E-10-104

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\Drawings\E-10-102 103 104 Proposed Site Plans.dwg



HEADWORKS MODIFICATION
PLAN
1/4" = 1'-0"

N

0' 2' 4' 8'

SCALE: 1/4"=1'

KEYED NOTES:

1. SEE DRAWING E-30-201 FOR EXISTING HEADWORKS EQUIPMENT RACK MODIFICATION DETAILS.
2. CONDUITS ROUTED ON VERTICAL SUPPORTS MAY REQUIRE DOUBLE STRUT TO CLEAR EXISTING OBSTACLES.
3. PROVIDE NEMA 4X, 6" X 6" X 4" MINIMUM JUNCTION BOX FOR CONNECTION OF 480 VOLT GATE POWER CONDUCTORS. SPLICES IN TEE FITTINGS ARE NOT ACCEPTABLE.
4. UTILIZE BS3-C1 CONDUIT FOR ANALOG SIGNALS TO SCREEN CONTROL PANEL. UTILIZE BS3-C2 FOR SCREEN CONTROL AND DISCRETE I/O WIRING.
5. PROVIDE WALK-OVER TREAD PLATES FOR CONDUITS CROSSING FROM WALL TO EQUIPMENT.
6. NEW VENDOR PROVIDED MECHANICAL SCREEN CONTROL PANEL NO. 3 SHALL BE CONNECTED TO THE EXISTING CONVEYOR CONTROL PANEL AND COORDINATED FOR PROPER OPERATION. THE NEW SCREEN CONTROL PANEL SHALL COMMUNICATE WITH THE EXISTING LIFT STATION PLC.
7. ELECTRICALLY ACTUATED INFLUENT AND EFFLUENT GATES SHALL BE CONNECTED TO THE LIFT STATION PLC THROUGH THE GRIT-COM CONDUIT.
8. PROVIDE GFCI RECEPTACLE WITH IN-USE COVER, SEE E-30-601 FOR CIRCUIT NUMBER.
9. COORDINATE PRIOR TO THE BID FOR ACTUAL BRAND OF PROPOSED MECHANICAL SCREEN CONNECTION DETAILS. CONNECTIONS ILLUSTRATED ARE FOR BID PURPOSES.

GENERAL NOTES:

A. REUSE OF EXISTING CONCRETE EMBEDDED CONDUIT WILL BE CONSIDERED IN THE HEADWORKS AREA.

B. ALL STRUT, HARDWARE, STRAPS AND ANCHORS SHALL BE 316 STAINLESS STEEL, WITHOUT EXCEPTION.

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
Z. M. SIDDIQUI
77702
LICENSED PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

ELECTRICAL

HEADWORKS MODIFICATION PLAN

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 301 OF 378	

STATE OF TEXAS
80367
REGISTERED
PROFESSIONAL ENGINEER

E-30-101

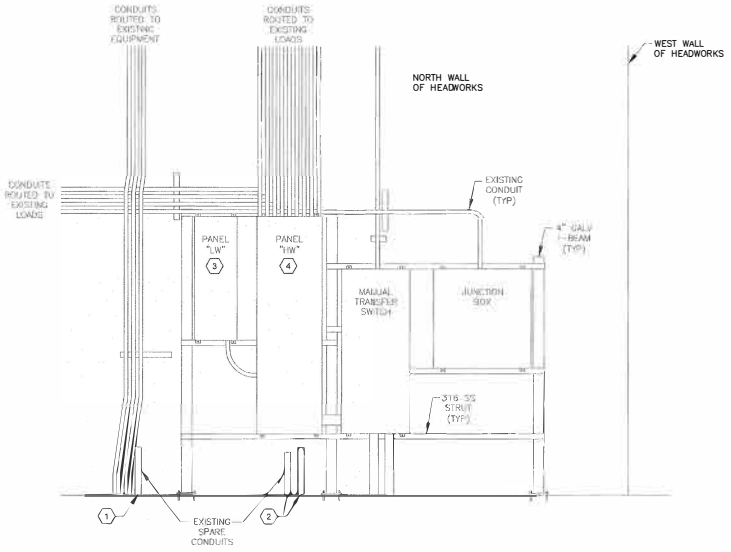
FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\Drawings\E-30-101 Headworks Modification Plan.dwg

KEYED NOTES:

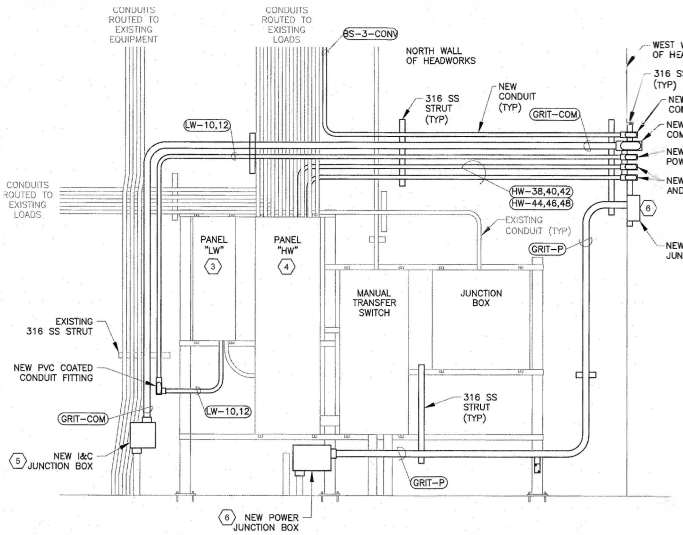
1. EXISTING SPARE CONDUIT "SPARE-1C" IS TO BE UTILIZED FOR MECHANICAL SCREEN NO. 3 AND GRIT AREA COMMUNICATIONS. RE-TAG CONDUIT AS GA-COMM AND ROUTE IT TO THE GRIT AREA I&C JUNCTION BOX LOCATED ON THE NORTH WALL OF THE NEW GRIT FACILITY.
2. EXISTING SPARE CONDUITS "SPARE-1P" AND "SPARE-2P" ARE STUBBED UP UNDER PANEL "HW". UTILIZE THE TALLER CONDUIT, ON THE RIGHT HAND SIDE, AND EXTEND IT TO THE GRIT AREA 480 VOLT PANEL "HG".
3. EXISTING PANEL "LW" CONTAINS SPARE BREAKERS, UTILIZE POWER FROM "LW" TO SERVE THE MECHANICAL SCREEN CONVENIENCE OUTLET AND INSTRUMENT POWER REQUIRED. SEE PANEL SCHEDULE ON DRAWING E-30-601.
4. EXISTING PANEL "HW" CONTAINS SPARE BREAKERS, UTILIZE POWER FROM "HW" TO SERVE THE NEW MECHANICAL SCREEN AND RELATED GATES. SEE PANEL SCHEDULE ON DRAWING E-30-601.
5. NEW PULL BOX SHALL BE; NEMA 4X, 316 SS, 8" X 8" X 6" DEEP MINIMUM IN SIZE.
6. NEW PULL BOX SHALL BE; NEMA 4X, 316 SS, 8" X 12" X 6" DEEP MINIMUM IN SIZE.
7. ROUTE BS-05-003 CONVEYOR CONTROL CONDUIT TO CONVEYOR CONTROL PANEL IN SIMILAR MANNER TO EXISTING CONDUITS.

GENERAL NOTES:

A. REUSE OF EXISTING CONCRETE EMBEDDED CONDUIT WILL BE CONSIDERED IN THE HEADWORKS AREA.
B. ALL CONDUIT SHALL BE PVC COATED ALUMINUM WITH PVC COATED FITTINGS.
C. ALL STRUT, HARDWARE, STRAPS AND ANCHORS SHALL BE 316 STAINLESS STEEL, WITHOUT EXCEPTION.



EXISTING HEADWORKS EQUIPMENT RACK
ELEVATION
NTS



MODIFIED HEADWORKS EQUIPMENT RACK
ELEVATION
NTS

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
ZM. SHOKOUHI
77702
REGISTERED
PROFESSIONAL
ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

ELECTRICAL

HEADWORKS EQUIPMENT RACK ELEVATIONS

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	
	XIAOHUA (SHARI) LIN, P.E.
SHEET NO.	302 OF 378

FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
80367
REGISTERED
PROFESSIONAL
ENGINEER
HOUSTON, TEXAS

E-30-201

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4180-BV (IAH Imp Pkg 2)\Drawings\E-30-201 Headworks Equipment Rack.dwg

EXISTING PANELBOARD "HW"
LOCATED ON THE HEADWORKS
EQUIPMENT RACK

PANEL "HW"

BUS AMPS 400
MAIN BRKR. AMPS 225 WIRE SIZE
VOLTS 480 AIC 50K AIC
PHASE 3 WIRE 3 SN ✓

NOTES
1. BREAKERS 3P/20A UNLESS MARKED OTHERWISE
2. ADJ. CKTS. TO BAL. PNL.
3. SURFACE MOUNT, NEMA 1 PANEL INSIDE A HINGED DOOR NEMA 4X 316 STAINLESS STEEL ENCLOSURE

CKT.	DESCRIPTION	WIRE	LOAD	BKR.			BKR.	LOAD	WIRE	CKT.	DESCRIPTION
		12			1	2			12		
	GATE SLG-05-001	12	600	20	3	4	20	600	12		GATE SLG-05-002
		12			5	6			12		
		12			7	8			12		
	GATE SLG-05-003	12	600	20	9	10	20	600	12		GATE SLG-05-004
		12			11	12			12		
		12			13	14			12		
	GATE SLG-05-005	12	600	20	15	16	20	600	12		GATE SLG-05-006
		12			17	18			12		
		12			19	20			12		
	GATE SLG-05-007	12	600	20	21	22	20	600	12		GATE SLG-05-008
		12			23	24			12		
		12			25	26			12		
	GATE BG-05-001	12	600	20	27	28	20	600	12		GATE BG-05-002
		12			29	30			12		
		12			31	32			12		
	BAR SCREEN BS-05-01	12	800	20	33	34	20	800	12		BAR SCREEN BS-05-02
		12			35	36			12		
		12			37	38					
	CONVEYOR BC-05-001	12	1250	20	39	40	20				SPARE
		12			41	42					
		8			43	44					
	PANEL LW	8	8500	50	45	46	20				SPARE (1)
					47	48					

N

TOTAL VA = 17,350
17.4 KVA AT 480V = 20 AMPS
THE CONDUCTORS, PANEL, AND MAIN BREAKER ARE ALL RATED PROPERLY TO SERVE THE LOAD

MODIFIED PANELBOARD "HW"
LOCATED ON THE HEADWORKS
EQUIPMENT RACK

PANEL "HW"

BUS AMPS 400
MAIN BRKR. AMPS 225 WIRE SIZE
VOLTS 480 AIC 50K AIC
PHASE 3 WIRE 3 SN ✓

NOTES
1. BREAKERS 3P/20A UNLESS MARKED OTHERWISE
2. ADJ. CKTS. TO BAL. PNL.
3. SURFACE MOUNT, NEMA 1 PANEL INSIDE A HINGED DOOR NEMA 4X 316 STAINLESS STEEL ENCLOSURE

CKT.	DESCRIPTION	WIRE	LOAD	BKR.			BKR.	LOAD	WIRE	CKT.	DESCRIPTION
		12			1	2			12		
	GATE SLG-05-001	12	600	20	3	4	20	600	12		GATE SLG-05-002
		12			5	6			12		
		12			7	8			12		
	GATE SLG-05-003	12	600	20	9	10	20	600	12		GATE SLG-05-004
		12			11	12			12		
		12			13	14			12		
	GATE SLG-05-005	12	600	20	15	16	20	600	12		GATE SLG-05-006
		12			17	18			12		
		12			19	20			12		
	GATE SLG-05-007	12	600	20	21	22	20	600	12		GATE SLG-05-008
		12			23	24			12		
		12			25	26			12		
	GATE BG-05-001	12	600	20	27	28	20	600	12		GATE BG-05-002
		12			29	30			12		
		12			31	32			12		
	BAR SCREEN BS-05-01	12	800	20	33	34	20	800	12		BAR SCREEN BS-05-02
		12			35	36			12		
		12			37	38			10		NEW BAR SCREEN BS-05-03
	CONVEYOR BC-05-001	12	1250	20	39	40	20	800	10		
		12			41	42			10		
		8			43	44			10		NEW GATES
	PANEL LW	8	8500	50	45	46	30	1200	10		SG-05-009 & (1)
					47	48			10		SG-05-010

N

TOTAL VA = 19,350
19.4 KVA AT 480V = 23 AMPS
THE CONDUCTORS, PANEL, AND MAIN BREAKER ARE ALL RATED PROPERLY TO SERVE THE LOAD

KEYED NOTES:

(1) EXISTING 20 AMP 3 POLE BREAKER IS TO BE REMOVED AND RETURNED TO THE OWNER. PROVIDE NEW 30 A 3POLE BREAKER FOR NEW GATE OPERATORS

EXISTING PANELBOARD "LW"
LOCATED ON THE HEADWORKS
EQUIPMENT RACK

PANEL "LW"

MAIN BRKR. AMPS 60
TRANSFORMER 15KVA
VOLTS 120/240 AIC 18 KA
PHASE 1 WIRE 2 SN ✓

NOTES
1. BREAKERS 1P/20A UNLESS MARKED OTHERWISE.
2. ADJ. CKTS. TO BAL. PNL.
3. SURFACE MOUNT, NEMA 3R SS
4. MOUNT MINI POWER CENTER WITH PANEL COVER HINGE AT 72" AFF.

CKT.	DESCRIPTION	WIRE	LOAD	BKR.			BKR.	LOAD	WIRE	CKT.	DESCRIPTION
	HW SITE LIGHTS	12	500	20	1	2	20	500	12		HW SITE LIGHTS
	HW RECEPTACLES	12	1440	20	3	4	20				SPARE
	SPARE			20	5	6	20				SPARE
	SPARE			20	7	8	20				SPARE
	SPARE			20	9	10	20				SPARE
	SPARE			20	11	12	20				SPARE
	SPARE			20	13	14	20				SPARE
	SPARE			20	15	16	20				SPARE
					17	18					
					19	20					
					21	22					
					23	24					
					25	26					

N

TOTAL VA = 2,440
2.5 KVA AT 24V = 10 AMPS
THE CONDUCTORS, PANEL, AND MAIN BREAKER ARE ALL RATED PROPERLY TO SERVE THE LOAD

MODIFIED PANELBOARD "LW"
LOCATED ON THE HEADWORKS
EQUIPMENT RACK

PANEL "LW"

MAIN BRKR. AMPS 60
TRANSFORMER 15KVA
VOLTS 120/240 AIC 18 KA
PHASE 1 WIRE 2 SN ✓

NOTES
1. BREAKERS 1P/20A UNLESS MARKED OTHERWISE.
2. ADJ. CKTS. TO BAL. PNL.
3. SURFACE MOUNT, NEMA 3R SS
4. MOUNT MINI POWER CENTER WITH PANEL COVER HINGE AT 72" AFF.

CKT.	DESCRIPTION	WIRE	LOAD	BKR.			BKR.	LOAD	WIRE	CKT.	DESCRIPTION
	HW SITE LIGHTS	12	500	20	1	2	20	500	12		HW SITE LIGHTS
	HW RECEPTACLES	12	1440	20	3	4	20				SPARE
	SPARE			20	5	6	20				SPARE
	SPARE			20	7	8	20				SPARE
	SPARE			20	9	10	20	360	12		BS-3 RECEPTACLE
	SPARE			20	11	12	20	60	12		BS-3 INSTRUMENTS
	SPARE			20	13	14	20				SPARE
	SPARE			20	15	16	20				SPARE
					17	18					
					19	20					
					21	22					
					23	24					
					25	26					

N

TOTAL VA = 2,860
2.9 KVA AT 240V = 12 AMPS
THE CONDUCTORS, PANEL, AND MAIN BREAKER ARE ALL RATED PROPERLY TO SERVE THE LOAD

HEADWORKS PANELBOARD
SCHEDULES
NTS

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

STATE OF TEXAS ZACHARY M. SMITH 77702 REGISTERED PROFESSIONAL ENGINEER 11/11/2022

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT
PLANT EXPANSION
ELECTRICAL
HEADWORKS
PANELBOARD
SCHEDULES

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	Se XIAOHUA (SHARI) LIN, P.E.

FOR CITY OF HOUSTON USE ONLY
STATE OF TEXAS XIAOHUA LIN 80367 LICENSED PROFESSIONAL ENGINEER HOUSTON, TEXAS

E-30-601

SHEET NO 03 OF 378

FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\Drawings\E-30-601 Headworks Panel Schedules.dwg

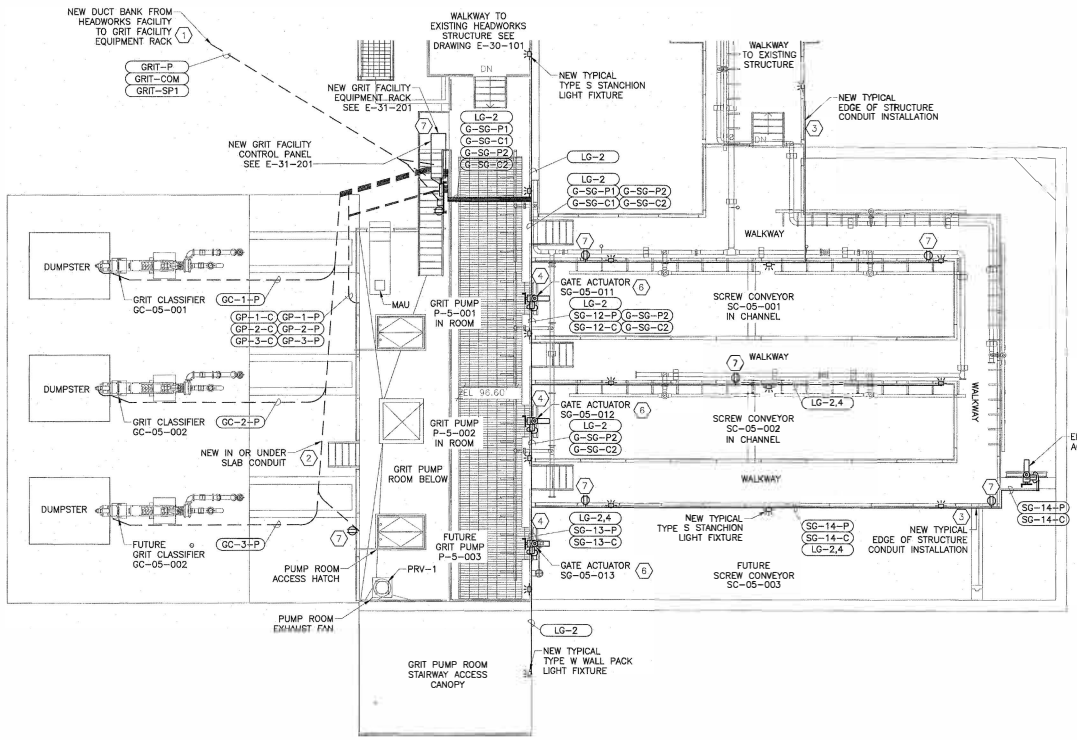
KEYED NOTES:

1. SEE DRAWING E-30-101 FOR HEADWORKS CONDUIT ROUTING CONTINUATION.
2. CONDUITS ROUTED IN-SLAB SHALL BE DEEP SO AS TO NOT SHOW 90 DEGREE STUB UP ELBOW RADIUS.
3. EXPOSED CONDUIT ROUTED AROUND STRUCTURE SHALL BE ON VERTICAL SUPPORTS AND MAY REQUIRE DOUBLE STRUT TO CLEAR OBSTACLES.
4. PROVIDE NEMA 4X, 6" X 6" X 4" MINIMUM JUNCTION BOX FOR CONNECTION OF 480 VOLT GATE POWER CONDUCTORS. SPLICES IN TEE FITTINGS ARE NOT ACCEPTABLE.
5. UTILIZE G-SG-CX AND G-SG-PX CONDUITS FOR MULTIPLE GATE'S CONDUCTORS ROUTED TO THE GRIT CONTROL PANEL.
6. ELECTRICALLY ACTUATED INFLUENT AND EFFLUENT GATES SHALL BE CONNECTED TO THE GRIT FACILITY CONTROL PANEL PLC.
7. PROVIDE GFCI RECEPTACLE WITH IN-USE COVER, SEE E-31-601 FOR CIRCUIT NUMBER.

N

0' 4' 8' 16'

SCALE: 1/8"=1'



AERATED GRIT FACILITY OVERALL PLAN

1/8" = 1'-0"

GENERAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE THE MAJOR EQUIPMENT AND OVERALL LAYOUT OF THE GRIT FACILITY.

B. ROUTE CONDUIT IN CONCRETE WHERE PRACTICAL IN THE GRIT FACILITY AREA.

C. ALL STRUT, HARDWARE, STRAPS AND ANCHORS SHALL BE 316 STAINLESS STEEL, WITHOUT EXCEPTION.

No.	Date	Revisions	App.
1	11/11/22	ADDENDUM SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
ZM. SHARIAT
77701
REGISTERED
PROFESSIONAL
ENGINEER
10-31-2022

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

ELECTRICAL

AERATED GRIT FACILITY OVERALL PLAN

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.

FOR CITY OF HOUSTON USE ONLY

ACCEPTED AS NOTED
80367
10/31/2022

E-31-101

SHEET NO. 304 OF 378

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\Drawings\E-31-101 Grit Facility Overall Plan.dwg

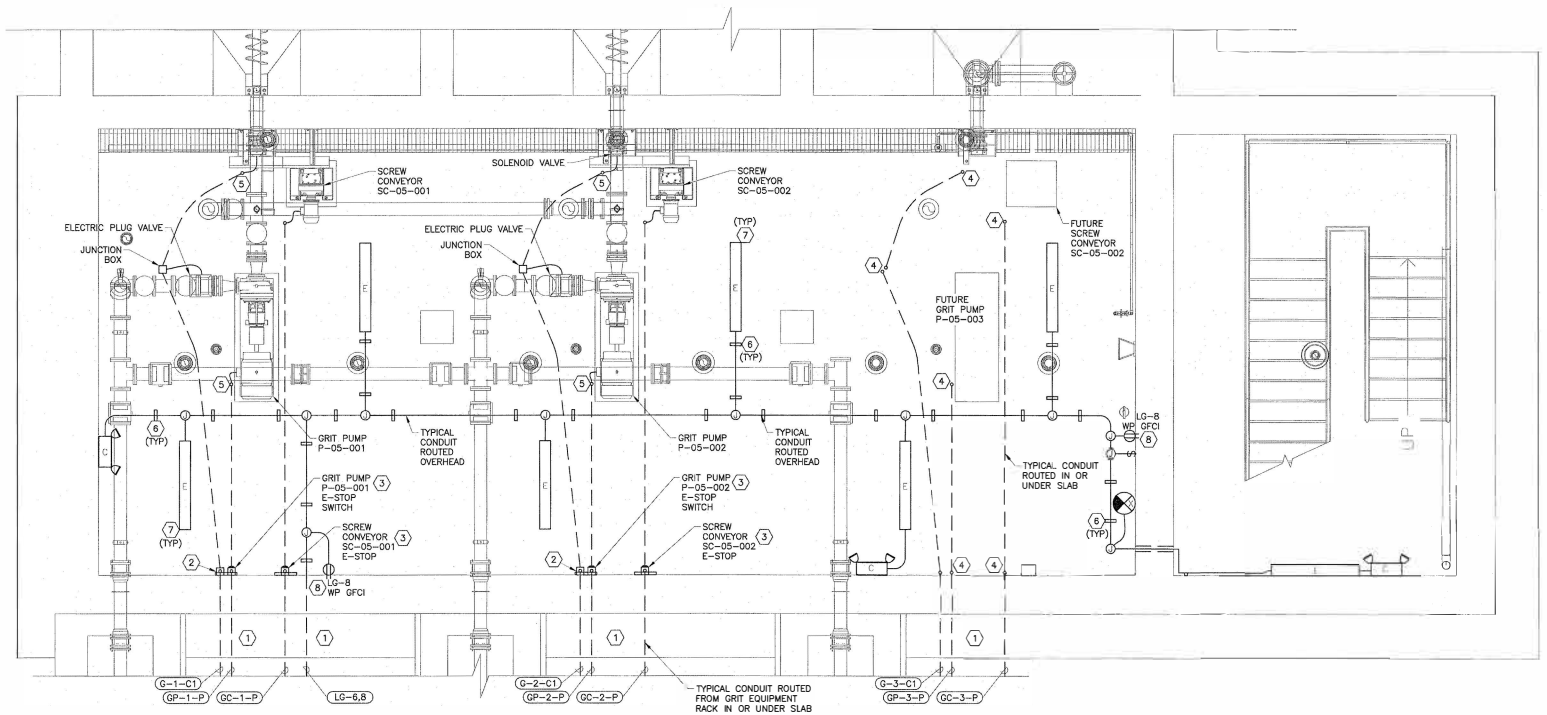
KEYED NOTES:

1. CONDUITS FROM THE GRIT CONTROL PANEL ARE TO BE ROUTED UNDER THE CLASSIFIER SLAB TO THE PUMP ROOF WALL AND STUB IN NEAR THE CEILING.
2. PROVIDE AN LB FITTING WITH LONG SIDE DOWN AT WALL PENETRATION CONDUIT. PROVIDE A NEMA 4X, 316SS JUNCTION BOX AT 48" AFF FOR UNDER SLAB CONDUIT CONDUCTOR PULL BOX.
3. PROVIDE AN LB FITTING WITH LONG SIDE DOWN AT WALL PENETRATION CONDUIT. PROVIDE A MUSHROOM HEAD E-STOP SWITCH WITH MAINTAINED CONTACT AND PAD LOCK PROVISION IN A NEMA 4X, 316SS JUNCTION BOX. MOUNT E-STOP AT 48" AFF FOR UNDER SLAB CONDUIT CONDUCTOR PULL BOX.
4. PROVIDE ALL CONCRETE ENCASED CONDUIT REQUIRED FOR FUTURE CHANNEL NO. 3 EQUIPMENT.
5. STUB UP CONCRETE ENCASED CONDUIT 12 INCHES ABOVE GRADE INTO A C-CONDULET FOR CONDUCTOR PULL POINT. SPLICES ARE NOT ALLOWED IN CONDUIT FITTINGS, PROVIDE A NEMA 4X, 316SS JUNCTION BOX FOR CONNECTIONS.
6. ROUTE OVERHEAD CONDUIT ON 316SS STRUT ATTACHED TO THE CEILING WITH 316SS WEDGE ANCHORS.
7. ATTACH LIGHT FIXTURES DIRECTLY TO THE CONCRETE CEILING WITH WEDGE ANDCHORS.
8. INSTALL LIGHT SWITCH AND RECEPTACLES 48 INCHES TO THE BOTTOM OF THE BOX AFF, PROVIDE IN-USE COVERS. PROVIDE RED DOT "CODE KEEPER TYPE (OR APPROVED EQUAL) METALLIC "IN-USE" GFCI COVER.

N

0' 2' 4' 8'

SCALE: 1/4"=1'



AERATED GRIT FACILITY PUMP ROOM

PLAN

1/4" = 1'-0"

GENERAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE ELECTRICAL WORK REQUIRED IN THE GRIT FACILITY PUMP ROOM.

B. ROUTE CONDUIT IN THE CONCRETE SLAB WHERE PRACTICAL IN THE GRIT AREA.

C. ALL STRUT, HARDWARE, STRAPS AND ANCHORS SHALL BE 316 STAINLESS STEEL, WITHOUT EXCEPTION.

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-565
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

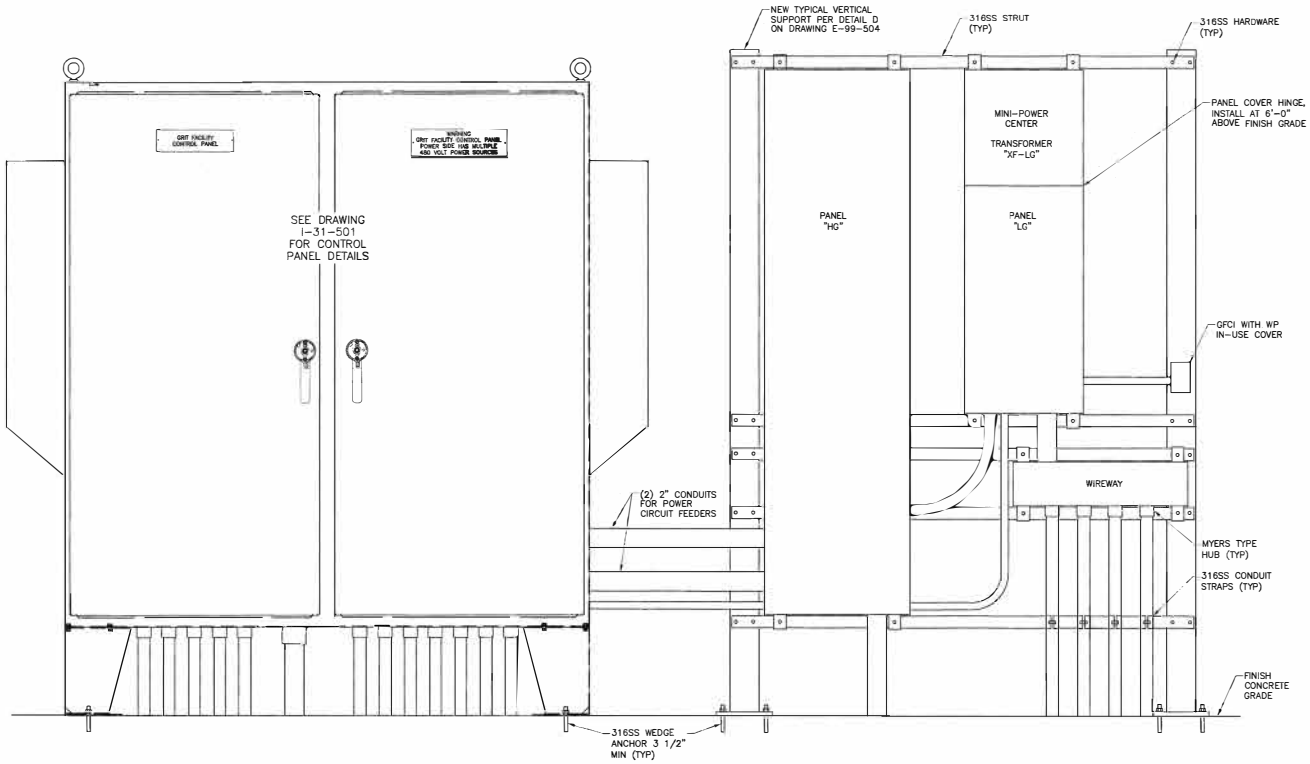
ELECTRICAL

AERATED GRIT FACILITY PUMP ROOM PLAN

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 305 OF 378	

E-31-102

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4160-BV (Wet Imp Proj 2)\Drawings\E-31-102 Grit Facility Pump Room Plan.dwg



GRIT FACILITY EQUIPMENT RACK
ELEVATION
1" = 1'-0"

GENERAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE GENERAL ARRAIGNMENT OF THE GRIT FACILITY EQUIPMENT RACK.

B. INSTALL CONDUIT IN OR UNDER SLAB WHERE MOST PRACTICAL IN THE GRIT FACILITY AREA.

C. ALL EXPOSED CONDUIT SHALL BE PVC COATED ALUMINUM WITH PVC COATED FITTINGS.

D. ALL STRUT, HARDWARE, STRAPS AND ANCHORS SHALL BE 316 STAINLESS STEEL, WITHOUT EXCEPTION.

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
ZAKI SHAIKH
77702
PROFESSIONAL ENGINEER
10/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT
PLANT EXPANSION
ELECTRICAL
AERATED GRIT FACILITY
EQUIPMENT RACK ELEVATION

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.

FOR CITY OF HOUSTON USE ONLY
APPROVED AS NOTED
80367
HOUSTON, TEXAS

E-31-201

SHEET NO. 306 OF 378

FILE PATH: C:\Users\KGI Laptop-A\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\Drawings\E-31-201 Grit Facility Equipment Rack.dwg

NEW PANELBOARD "H-G" IS TO BE LOCATED ON THE NEW GRIT FACILITY EQUIPMENT RACK

PANEL "H-G"

BUS AMPS 225
MAIN BRKR. AMPS 200
VOLTS 480 KAIC 35
PHASE 3 WIRE 3

NOTES
1. BREAKERS 3P/20A UNLESS MARKED OTHERWISE
2. ADJ. CKTS. TO BAL. PNL.
3. SURFACE MOUNT, NEMA 1 PANEL INSIDE A HINGED DOOR NEMA 4X 316 STAINLESS STEEL ENCLOSURE

CKT. DESCRIPTION	WIRE	LOAD	BKR.			BKR.	LOAD	WIRE	CKT. DESCRIPTION
	12			1	2			12	GRIT PUMP
GATE SG-05-011	12	600	20	3	4	20	3000	12	P-05-001
	12			5	6			12	
	12			7	8			12	GRIT PUMP
GATE SG-05-012	12	600	20	9	10	20	3000	12	P-05-002
	12			11	12			12	
	12			13	14			12	GRIT PUMP
GATE SG-05-013	12	600	20	15	16	20	3000	12	P-05-003
	12			17	18			12	
	12			19	20			12	GRIT CLASSIFIER
GATE SG-05-014	12	600	20	21	22	20	800	12	GC-05-001
	12			23	24			12	
SCREW CONVEYOR	12			25	26			12	GRIT CLASSIFIER
SC-05-001	12	1100	20	27	28	20	800	12	GC-05-002
	12			29	30			12	
SCREW CONVEYOR	12			31	32			12	GRIT CLASSIFIER
SC-05-002	12	1100	20	33	34	20	800	12	GC-05-003
	12			35	36			12	
SCREW CONVEYOR	12			37	38			12	PUMP ROOM MAKEUP AIR
SC-05-003	12	1100	20	39	40	20	500	12	MUA-1
	12			41	42			12	
				43	44			12	PUMP ROOM EXHAUST
SPARE			20	45	46	20	400	12	PRV-1
				47	48			12	
MINI-POWER CENTER	8	3480	50	49	50	20			SPARE
PANEL L-G	8			51	52				
SPACE				53	54				
		12,660					12,300		

TOTAL VA = 24,960
25 KVA AT 480V = 31 AMPS
THE CONDUCTORS, PANEL, AND MAIN BREAKER ARE ALL RATED PROPERLY TO SERVE THE LOAD

NEW MPC PANELBOARD "L-G" IS TO BE LOCATED ON THE NEW GRIT FACILITY EQUIPMENT RACK

PANEL "L-G"

MAIN BRKR. AMPS 50
TRANSFORMER 15KVA
VOLTS 120/240 AIC 18 KA
PHASE 1 WIRE 2 SN ✓

50
80

NOTES
1. BREAKERS 1P/20A UNLESS MARKED OTHERWISE.
2. ADJ. CKTS. TO BAL. PNL.
3. SURFACE MOUNT, NEMA 3R SS
4. MOUNT MINI POWER CENTER WITH PANEL COVER HINGE AT 72" AFF.

CKT. DESCRIPTION	WIRE	LOAD	BKR.			BKR.	LOAD	WIRE	CKT. DESCRIPTION
GRIT CP UPS	12	100	20	1	2	20	400	12	GRIT TOP LIGHTING
GRIT CP RECEPTACLE	12	360	20	3	4	20	400	12	GRIT TOP RECEPTACLES
GRIT CP VENTILATION	12	650	20	5	6	20	130	12	PUMP ROOM LIGHTING
GRIT RACK RECEPTACLE	12	360	20	7	8	20	720	12	PUMP ROOM RECEPTACLES
GRIT CLASSIFIER RCEPT	12	360	20	9	10	20			SPARE
SPARE			20	11	12	20			SPARE
SPARE			20	13	14	20			SPARE
SPARE			20	15	16	20			SPARE
SPARE			20	17	18	20			SPARE
SPARE			20	19	20	20			SPARE
SPARE			20	21	22	20			SPARE
SPARE			20	23	24	20			SPARE
SPARE			20	25	26	20			SPARE
		1,830					1,650		

TOTAL VA = 3,480
3.5 KVA AT 240V = 14.5 AMPS
THE CONDUCTORS, PANEL, AND MAIN BREAKER ARE ALL RATED PROPERLY TO SERVE THE LOAD

GRIT FACILITY PANELBOARD SCHEDULES
NTS

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
ZAK BERKOUH
80367
REGISTERED
PROFESSIONAL
ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

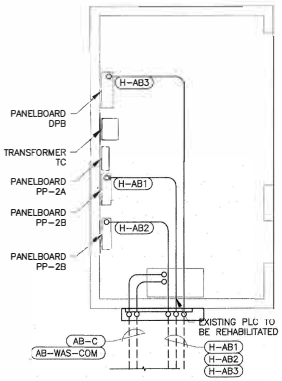
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
ELECTRICAL
GRIT FACILITY PANELBOARD SCHEDULES

WBS NUMBER
R-000265-0147-4
DRAWING SCALE
AS NOTED
CITY OF HOUSTON PM
XIAOHUA (SHARI) LIN, P.E.

FOR CITY OF HOUSTON USE ONLY
ACCEPTED
80367
11/11/2022

E-31-601
SHEET NO. 307 OF 378

FILE PATH: C:\Users\KGI Laptop-A\Kalluri Group, Inc\KGI - Documents\4180-BV (IAH Imp Pkg 2)\Drawings\E-31-601 Grit Facility Panel Schedules.dwg



MAINTENANCE SHOP ENLARGED PLAN
NTS

CONDUIT REPLACEMENT NOTES:

A. ALL EXPOSED PLASTIC PVC CONDUIT ON THE AERATION BASINS SHALL BE REMOVED AND REPLACED WITH PVC COATED CONDUIT WITH NEW CONDUCTORS IN THIS PROJECT. EXISTING PVC COATED CONDUIT ON THE BASINS, ROUTED ON FERROUS METAL SUPPORTS, SHALL BE REMOVED IN THIS PROJECT AND 316SS SUPPORT SYSTEM INSTALLED. CONTRACTOR MAY REMOVE ACCEPTABLE CONDUIT INSTALLATION TO EXPEDITE AND REDUCE EFFORT IN COMPLETE REPLACEMENT.

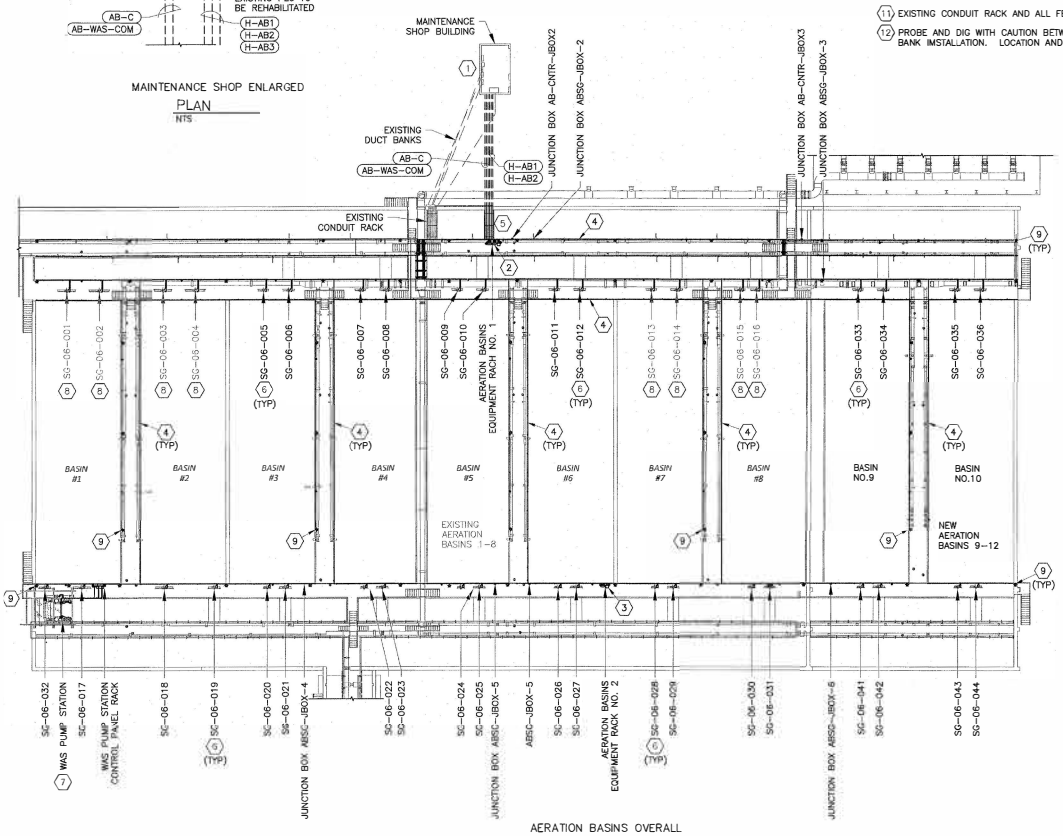
B. EXISTING CONCRETE EMBEDDED CONDUIT MAY BE UTILIZED IN THE CONDUIT REPLACEMENT TASKS. THREE NEW PANELBOARDS ARE BEING INSTALLED ON THE AERATION BASIN STRUCTURE IN THIS PROJECT TO REPLACE THE POWER CIRCUIT SOURCE FOR EXISTING AND PROPOSED LOADS ON THE AERATION BASINS. SOME EXISTING DUCT BANK SHALL BE REQUIRED TO SERVE ALL LOADS, CONTROLS AND INSTRUMENTATION CONDUCTORS REQUIRED. EXISTING DUCT BANK CIRCUITS MAY BE UTILIZED FOR TEMPORARY DURING CONDUIT REPLACEMENT.

C. DUCT BANK CONDUITS BETWEEN THE AERATION BASIN NOT UTILIZED FOR PROPOSED CONDUCTORS TO THE MAINTENANCE BUILDING AND PLC CONTROL PANEL ARE TO CAPPED AT THE BASIN WALL RISER.

D. EXISTING DUCT BANKS CONDUITS ARE NOT ILLUSTRATED FOR CLARITY. SEE PANELBOARD SCHEDULES AND CONDUIT AND CONDUCTOR SCHEDULES FOR MORE INFORMATION.

KEYED NOTES:

1. POWER TO THE NEW AERATION BASINS EQUIPMENT RACKS SHALL BE PROVIDED FROM UNIT PANELBOARDS IN THE MAINTENANCE SHOP BUILDING.
2. EQUIPMENT RACK NO.1 SHALL SUPPLY POWER TO THE GATES AND LOADS LOCATED ON THE NORTH SIDE OF THE AERATION BASINS. SEE DRAWING E-61-601 FOR PANEL H-AB1 CIRCUIT SCHEDULE.
3. EQUIPMENT RACK NO.2 SHALL SUPPLY POWER TO THE GATES AND LOADS LOCATED ON THE SOUTH SIDE OF THE AERATION BASINS. SEE DRAWING E-61-602 FOR PANEL H-AB2 CIRCUIT SCHEDULE.
4. EXPOSED CONDUIT ROUTED AROUND STRUCTURE SHALL BE ON VERTICAL SUPPORTS AND MAY REQUIRE DOUBLE STRUT TO CLEAR OBSTACLES. SEE DRAWING E-99-503 FOR EDGE OF STRUCTURE CONDUIT INSTALLATION DETAILS.
5. BRIDGE CHANNEL FOR CONDUIT ROUTING.
6. INFLUENT AND EFFLUENT GATE CONTROL SHALL BE PROVIDED FROM THE MODIFIED SHOP BUILDING PLC.
7. THE WAS PUMP STATION REQUIRES A FREESTANDING RACK, CONTROL PANEL WITH STARTERS AND A FLOW METER. SEE DRAWING E-40-401 FOR ENLARGED PLAN AND RACK ELEVATION.
8. EXISTING GATES ARE TO HAVE PLASTIC PVC CONDUIT REMOVED AND BE PROVIDED NEW CONDUIT AND CONDUCTORS BACK TO THE POWER PANELS LOCATED IN THE SHOP BUILDING. EACH BASIN'S PAIR OF GATES SHALL SHARE A CIRCUIT.
9. LIGHTING REPLACEMENT ON THE BASIN SHALL BE A MINIMUM OF 54 STANCHION TYPE LED FIXTURES.
10. EXISTING DUCT BANK MAY BE UTILIZED FOR REPLACEMENT OF EXISTING EQUIPMENT CONDUIT AND CONDUCTORS. EXISTING CONDUIT RISERS ARE RUSTING AND ARE TO BE REMOVED AND REPLACED.
11. EXISTING CONDUIT RACK AND ALL FERROUS METAL SUPPORTS ARE TO BE REMOVED AND REPLACED.
12. PROBE AND DIG WITH CAUTION BETWEEN AERATION BASINS AND MAINTENANCE SHOP BUILDING FOR DUCT BANK INSTALLATION. LOCATION AND QUANTITY OF UNDERGROUND FACILITIES ARE NOT KNOWN.



AERATION BASINS OVERALL PLAN
1" = 25'-0"

N

0' 25' 50'

SCALE: 1"=25'

GENERAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE THE LOCATION OF AERATION BASIN LOADS TO BE REHABILITATED AND ADDED IN THIS PROJECT.

B. EACH CONDUIT SHALL BE TAGGED WITH THE PANEL DESIGNATOR AND CIRCUIT NUMBERS THAT ARE IN THE CONDUIT AT EACH BOX, STUB UP, TRANSITION THRU WALL AND END OF CIRCUIT.

C. ALL ANCHORS, STRUT, STRUT FITTINGS, AND HARDWARE SHALL BE 316 STAINLESS STEEL.

D. ROUTE CONDUIT SUCH THAT THERE NO CONNECTIONS IN CONDUIT FITTINGS. IF CONNECTIONS ARE REQUIRED A BOX SIZED ACCORDINGLY SHALL BE PROVIDED.

E. INSTALL PANELBOARDS 6'-0" ABOVE FINISHED FLOOR TO THE TOP OF ENCLOSURE.

F. PVC COATED RIGID CONDUIT WILL BE CONSIDERED FOR REUSE. CONTRACTOR SHALL EXERCISE MEANS AND METHODS DECISIONS FOR CONDUIT ROUTING, CIRCUIT TO PANELBOARD ALLOCATION AND JUNCTION BOX LOCATIONS

No.	Date	Revisions	App.
1	1/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

STATE OF TEXAS
ZAHID M. SHAIKH
77702
REGISTERED
PROFESSIONAL
ENGINEER
10/11/2022

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
ELECTRICAL
AERATION BASINS OVERALL PLAN

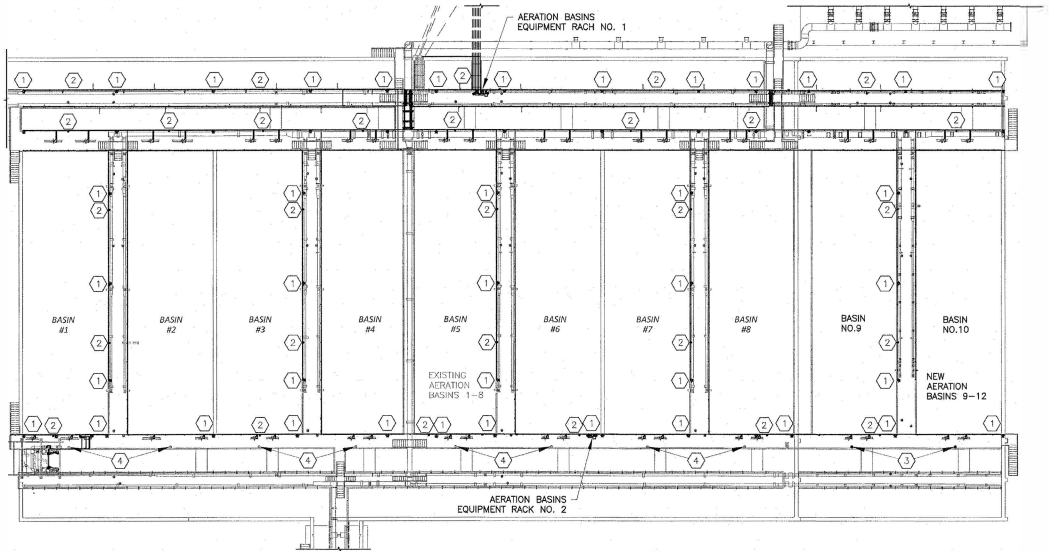
WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	Se XIAOHUA (SHARI) LIN, P.E.
SHEET NO.	308 OF 378

FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
80367
REGISTERED
PROFESSIONAL
ENGINEER

E-40-101

FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160-BV (AH Imp Plg 2)\Drawings\E-40-101 102 103 Aeration Basins Plans.dwg



AERATION BASINS LIGHTING
PLAN
1" = 25'-0"

N

0' 25' 50'
SCALE: 1"=25'

KEYED NOTES:

1. PROVIDE MINIMUM 54 STANCHION, TYPE S, FIXTURE.
2. PROVIDE GFCI OUTLET WITH WEATHERPROOF IN-USE COVER.
3. TWO NEW 50 AMP PIN AND SLEEVE RECEPTACLES ARE TO BE PROVIDED AND CONNECTED TO NEW CONDUIT AND CONDUCTORS. LOCATE RECEPTACLES SIMILARLY TO THE EXISTING RECEPTACLES.
4. EIGHT EXISTING 50 AMP PIN AND SLEEVE RECEPTACLES ARE TO BE DISCONNECTED AND RECONNECTED TO NEW CONDUIT AND CONDUCTORS. CONTRACTOR SHALL VERIFY THE CONDITION OF EACH RECEPTACLE AND FUNCTIONALITY OF THE POWER CIRCUIT, FOR TEMPORARY POWER CONSIDERATION.

TASK NOTES:

A. ALL PLASTIC PVC SHALL BE REMOVED AND REPLACED ON EACH BASIN IN THIS PROJECT.

B. ALL EXISTING FERROUS METAL SUPPORTS, STRAPS, HARDWARE AND ANCHORS SHALL BE REMOVED AND REPLACED.

C. CONCRETE ENCASED DUCT BANK CONDUITS BETWEEN THE AERATION BASIN WALL AND THE MAINTENANCE SHOP ARE TO BE UTILIZED FOR PROPOSED CIRCUITS ROUTED TO AND FROM THE MAINTENANCE BUILDING ELECTRICAL EQUIPMENT AND PLC CONTROL PANEL TO THE AERATION BASINS.

D. LIGHTING AND RECEPTACLE CIRCUIT CONDUCTORS, FROM THE SHOP BUILDING, ARE TO BE REMOVED AND NEW CONDUIT AND CONDUCTORS PROVIDED FROM THE NEW PANELBOARDS.

GENERAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE THE AERATION BASIN LIGHTING IN THIS PROJECT.

B. EACH CONDUIT SHALL BE TAGGED WITH THE PANEL DESIGNATOR AND CIRCUIT NUMBERS THAT ARE IN THE CONDUIT AT EACH BOX, STUB UP, TRANSITION THRU WALL AND END OF CIRCUIT.

C. ALL ANCHORS, STRUT, STRUT FITTINGS, AND HARDWARE SHALL BE 316 STAINLESS STEEL.

D. ROUTE CONDUIT SUCH THAT THERE NO CONNECTIONS IN CONDUIT FITTINGS. IF CONNECTIONS ARE REQUIRED A BOX SIZED ACCORDINGLY SHALL BE PROVIDED.

E. INSTALL PANELBOARDS 6'-0" ABOVE FINISHED FLOOR TO THE TOP OF ENCLOSURE.

F. PVC COATED RIGID CONDUIT WILL BE CONSIDERED FOR REUSE. CONTRACTOR SHALL EXERCISE MEANS AND METHODS DECISIONS FOR CONDUIT ROUTING, CIRCUIT TO PANELBOARD ALLOCATION AND JUNCTION BOX LOCATIONS

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

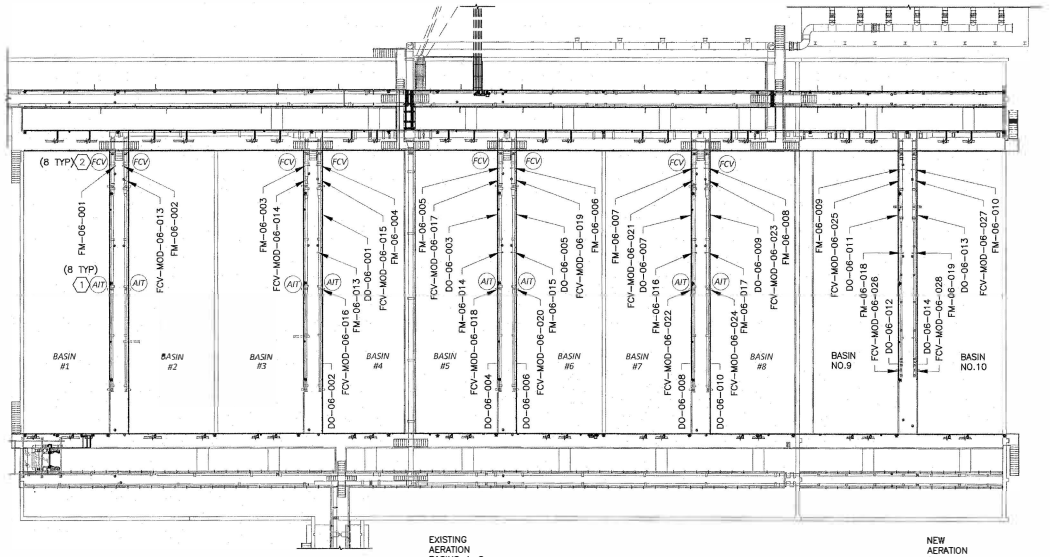
ELECTRICAL

AERATION BASINS LIGHTING AND OUTLET POWER PLAN

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 309 OF 378	

E-40-102

FILE PATH: C:\Users\Vsheard\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH imp Pkg 2)\Drawings\E-40-131 102 103 Aeration Basins Plans.dwg



AERATION BASINS INSTRUMENTATION PLAN
1" = 25'-0"

KEYED NOTES:

(1) ALL EXISTING INSTRUMENTATION PLASTIC PVC CONDUIT SHALL BE REMOVED, AND REPLACED FOR INSTRUMENTS THAT REMAIN. COORDINATE WITH SYSTEM INTEGRATOR TO ENSURE RELOCATED AND DELETED INSTRUMENTS ARE NOT PROVIDED NEW CONDUIT AND CONDUCTORS.

(2) ALL EXISTING FLOW CONTROL VALVE PLASTIC PVC CONDUIT SHALL BE REMOVED, AND REPLACED.

N

0' 25' 50'

SCALE: 1"=25'

GENERAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE THE LOCATION OF AERATION BASIN INSTRUMENTATION AND VALVES TO BE REMOVED AND RECONNECTED, OR PROVIDED NEW IN THIS PROJECT.

B. ALL EXISTING PLASTIC PVC CONDUIT SHALL BE REMOVED ALONG WITH FERROUS METAL SUPPORTS AND RELATED ANCHORS.

C. EACH NEW INSTRUMENT CONDUIT FOR EXISTING OR PROPOSED SHALL BE TAGGED WITH THE INSTRUMENT DESIGNATOR AT EACH FINAL CONNECTION BOX, DUCT BANK STUB UP, TRANSITION THRU WALL AND ORIGIN OF THE CIRCUIT. LIKE SIGNALS AND VOLTAGES SHALL BE COLLETED IN LARGER CONDUITS. SEE CONDUIT AND CONDUCTOR SCHEDULES FOR TAG DESIGNATOR CONCEPTS.

D. ALL ANCHORS, STRUT, STRUT FITTINGS, AND HARDWARE SHALL BE 316 STAINLESS STEEL.

E. ROUTE CONDUIT SUCH THAT THERE NO CONNECTIONS IN CONDUIT FITTINGS. IF CONNECTIONS ARE REQUIRED A BOX SIZED ACCORDINGLY SHALL BE PROVIDED.

F. INSTALL PANELBOARDS 6'-0" ABOVE FINISHED FLOOR TO THE TOP OF ENCLOSURE.

G. PVC COATED RIGID CONDUIT WILL BE CONSIDERED FOR REUSE. CONTRACTOR SHALL EXERCISE MEANS AND METHODS DECISIONS FOR CONDUIT ROUTING, CIRCUIT TO PANELBOARD ALLOCATION AND JUNCTION BOX LOCATIONS.

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
ZIA SHAMOUN
77709
REGISTERED PROFESSIONAL ENGINEER
10/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

ELECTRICAL

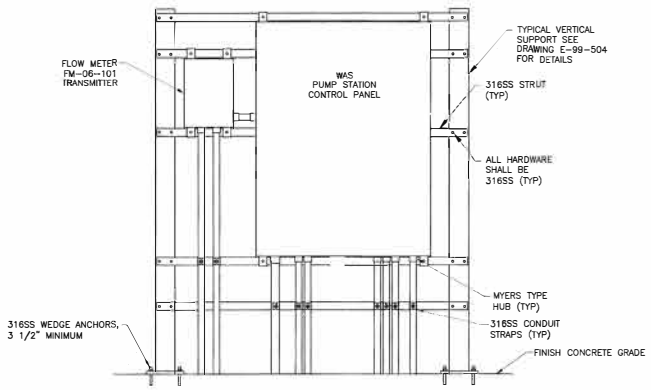
AERATION BASINS INSTRUMENTATION PLAN

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 310 OF 378	

RECEIVED
OCT 31 2022
80367
10/31/2022

E-40-103

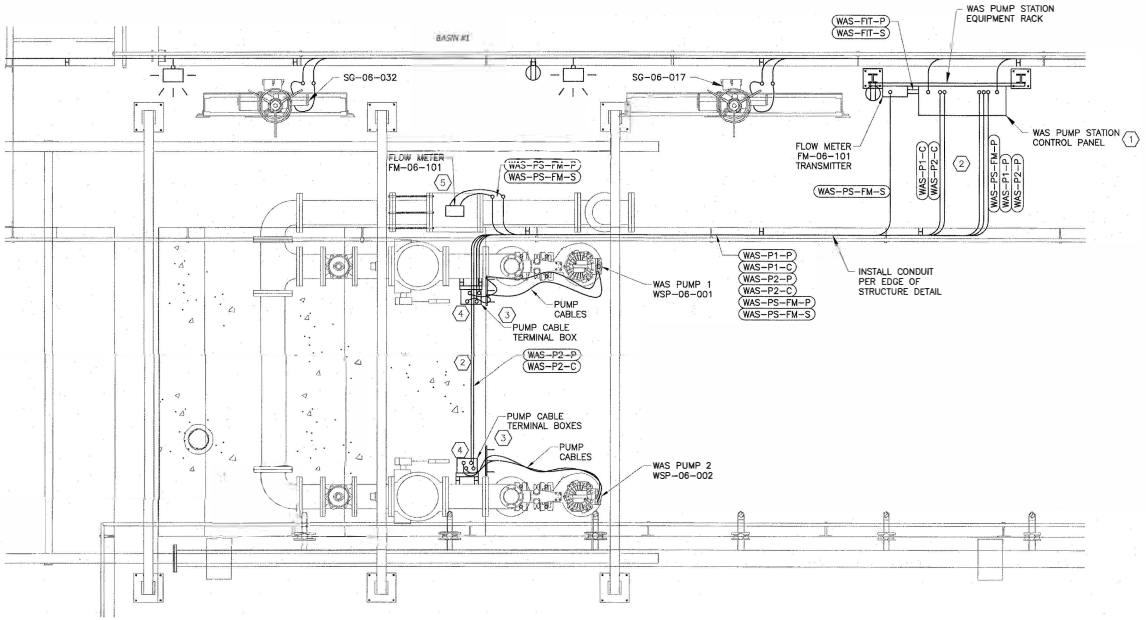
FILE PATH: C:\Users\Vickward\Kalluri Group, Inc\KGI - Documents\41160-BV (WH Imp. Pkg 2)\Drawings\E-40-101 102 103 Aeration Basins Plans.dwg



WAS PUMP STATION EQUIPMENT RACK
ELEVATION
NTS

KEYED NOTES:

1. POWER TO THE NEW AERATION BASINS WAS PUMP STATION CONTROL PANEL SHALL BE PROVIDED FROM H-AB2, ON EQUIPMENT RACK 2. SEE DRAWING E-40-602 FOR FEEDER BREAKER INFORMATION.
2. ROUTE CONDUITS UNDER WALKWAY, CORE DRILL WALLS AS REQUIRED.
3. INSTALL PUMP CABLE TERMINAL BOXES SIMILAR TO DETAIL F ON DRAWING E-99-503.
4. COORDINATE WITH MECHANICAL PIPING TO ENSURE MECHANICS HAVE ROOM TO REMOVE AND HANDLE PUMPS BETWEEN TERMINAL BOXES. PROVIDE PUMP CABLE TERMINAL BOXES 12"W X 18"H X 6"D SIMILAR TO DETAIL D ON DRAWING E-99-506.
5. ROUTE FLOW METER POWER AND SIGNAL CONDUITS UNDER AIRLINE AND STUB UP. FINAL FLEXIBLE CONDUIT SHALL NOT EXCEED 3 FOOT IN LENGTH.



WAS PUMP STATION ENLARGED
PLAN
1" = 25'-0"

N

0' 4' 8'
SCALE: 1/4"=1'-0"

GENERAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE THE NEW WAS PUMP STATION, LOCATED ON THE AERATION BASIN WALKWAY TO.

B. ALL ANCHORS, STRUT, STRUT FITTINGS, AND HARDWARE SHALL BE 316 STAINLESS STEEL.

C. ROUTE CONDUIT SUCH THAT THERE NO CONNECTIONS IN CONDUIT FITTINGS. IF CONNECTIONS ARE REQUIRED A BOX SIZED ACCORDINGLY SHALL BE PROVIDED.

D. INSTALL PANELBOARDS 6'-0" ABOVE FINISHED FLOOR TO THE TOP OF ENCLOSURE.

No.	Date	Revisions	App.
1	11/11/22	READVANCED SET	ZMS
B	5/18/23	BIDDING SET	PMC

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
XIAOHUA LIN
80367
REGISTERED
PROFESSIONAL
ENGINEER
10/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
ELECTRICAL

AERATION BASINS WAS PUMP STATION ENLARGED PLAN

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 311 OF 378	

E-40-401

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\Drawings\E-40-101 102 103 Aeration Basins Plans.dwg

PANELBOARD "L-AB1" IS TO BE LOCATED ON THE AERATION BASINS EQUIPMENT RACK NO. 1

PANEL "L-AB1"

MAIN BRKR. AMPS 60
TRANSFORMER 15KVA
VOLTS 120/240 AIC 18 KA
PHASE 1 WIRE 2 SN ✓

NOTES
1. BREAKERS 1P/20A UNLESS MARKED OTHERWISE.
2. ADJ. CKTS. TO BAL. PNL.
3. SURFACE MOUNT, NEMA 3R SS
4. MOUNT MINI POWER CENTER WITH PANEL COVER HINGE AT 72" AFF.

CKT. DESCRIPTION	WIRE	LOAD	BKR.			BKR.	LOAD	WIRE	CKT. DESCRIPTION
BASIN LIGHTING	12	200	20	1	2	20	185	12	FLOW VALES
BASIN LIGHTING	12	200	20	3	4	20	185	12	FLOW VALVES/VALES
BASIN LIGHTING	12	200	20	5	6	20	185	12	FLOW VALES
BASIN LIGHTING	12	200	20	7	8	20	185	12	FLOW VALES
BASIN OUTLETS	12	360	20	9	10	20	70	12	INSTRUMENT POWER
BASIN OUTLETS	12	360	20	11	12	20	70	12	INSTRUMENT POWER
BASIN OUTLETS	12	360	20	13	14	20	70	12	INSTRUMENT POWER
BASIN OUTLETS	12	360	20	15	16	20	70	12	INSTRUMENT POWER
FLOW METER	12	60	20	17	18	20	70	12	INSTRUMENT POWER
FLOW METER	12	60	20	19	20	20	70	12	INSTRUMENT POWER
FLOW METER	12	60	20	21	22	20	70	12	INSTRUMENT POWER
FLOW METER	12	60	20	23	24	20	70	12	INSTRUMENT POWER
SPARE	12	60	20	25	26	20	70	12	INSTRUMENT POWER

PANELBOARD "H-AB1 S-1" IS TO BE LOCATED ON THE AERATION BASINS EQUIPMENT RACK NO. 1

PANEL "H-AB1" "SECTION 1"

BUS AMPS 225
MAIN BREAKER 150
VOLTS 480 KAIC 35
PHASE 3 WIRE 3

NOTES
1. BREAKERS 3P/20A UNLESS MARKED OTHERWISE
2. ADJ. CKTS. TO BAL. PNL.
3. SURFACE MOUNT, NEMA 1 PANEL INSIDE A HINGED DOOR NEMA 4X 316 STAINLESS STEEL ENCLOSURE

CKT. DESCRIPTION	WIRE	LOAD	BKR.			BKR.	LOAD	WIRE	CKT. DESCRIPTION
BASIN 1 INLET GATES	12			1	2			12	EXISTING BASIN 7 GATES
SG-06-001 AND	12	2990	20	3	4	20	2990	12	SG-06-013 AND
SG-06-002	12			5	6			12	SG-06-014
BASIN 2 INLET GATES	12			7	8			12	EXISTING BASIN 8 GATES
SG-06-003 AND	12	2990	20	9	10	20	2990	12	SG-06-015 AND
SG-06-004	12			11	12			12	SG-06-016
BASIN 3 INLET GATES	12			13	14			12	NEW BASIN 9 GATES
SG-06-005 AND	12	2990	20	15	16	20	2990	12	SG-06-033 AND
SG-06-006	12			17	18			12	SG-06-034
BASIN 4 INLET GATES	12			19	20			12	NEW BASIN 10 GATES
SG-06-007 AND	12	2990	20	21	22	20	2990	12	SG-06-035 AND
SG-06-008	12			23	24			12	SG-06-036
BASIN 5 INLET GATES	12			25	26				FUTURE BASIN 11
SG-06-009 AND	12	2990	20	27	28	20			SG-06-037 AND
SG-06-010	12			29	30				SG-06-038
BASIN 6 INLET GATES	12			31	32				FUTURE BASIN 12
SG-06-011 AND	12	2990	20	33	34	20			SG-06-039 AND
SG-06-012	12			35	36				SG-06-040
EXISTING BASIN 1	12			37	38			12	EXISTING BASIN 4
AIR FLOW	12	2990	20	39	40	20	2990	12	AIR FLOW
CONTROL VALVES	12			41	42			12	CONTROL VALVES
EXISTING BASIN 2	12			37	44			12	EXISTING BASIN 5
AIR FLOW	12	2990	20	39	46	20	2990	12	AIR FLOW
CONTROL VALVES	12			41	48			12	CONTROL VALVES
EXISTING BASIN 3	12			37	50			12	EXISTING BASIN 6
AIR FLOW	12	2990	20	39	52	20	2990	12	AIR FLOW
CONTROL VALVES	12			41	54			12	CONTROL VALVES

150

FEED THRU LUGS

PANELBOARD "H-AB1 S-2" IS TO BE LOCATED ON THE AERATION BASINS EQUIPMENT RACK NO. 1

PANEL "H-AB1" "SECTION 2"

BUS AMPS 225
BOTTOM FEED MLO YES
VOLTS 480 KAIC 35
PHASE 3 WIRE 3

NOTES
1. BREAKERS 3P/20A UNLESS MARKED OTHERWISE
2. ADJ. CKTS. TO BAL. PNL.
3. SURFACE MOUNT, NEMA 1 PANEL INSIDE A HINGED DOOR NEMA 4X 316 STAINLESS STEEL ENCLOSURE

CKT. DESCRIPTION	WIRE	LOAD	BKR.			BKR.	LOAD	WIRE	CKT. DESCRIPTION
EXISTING BASIN 7	12			1	2			12	NEW BASIN 10
AIR FLOW	12	2990	20	3	4	20	2990	12	AIR FLOW
CONTROL VALVES	12			5	6			12	CONTROL VALVES
EXISTING BASIN 8	12			7	8				FUTURE BASIN 11
AIR FLOW	12	2990	20	9	10	20			AIR FLOW
CONTROL VALVES	12			11	12				CONTROL VALVES
NEW BASIN 9	12			13	14				FUTURE BASIN 12
AIR FLOW	12	2990	20	15	16	20			AIR FLOW
CONTROL VALVES	12			17	18				CONTROL VALVES
SPARE			20	19	20				
				21	22	20			SPARE
				23	24				
SPARE			20	25	26				
				27	28	20			SPARE
				29	30				
SPARE			20	31	32				
				33	34	20			SPARE
				35	36				
SPARE			20	37	38				
				39	40	20			SPARE
				41	42				
SPARE			20	37	44				
				39	46	20			SPARE
				41	48				
SPARE			20	37	50				
				39	52	20			SPARE
				41	54				

FEED THRU LUGS

AERATION BASINS PANELBOARD SCHEDULES
NTS

GENERAL NOTES:

A. EACH CIRCUIT SHALL BE PROVIDED A DEDICATED NEUTRAL, IDENTIFIED WITH CORRESPONDING CIRCUIT NUMBER.

B. EACH CONDUIT SHALL BE TAGGED WITH THE PANEL DESIGNATOR AND CIRCUIT NUMBERS THAT ARE IN THE CONDUIT AT EACH BOX, STUB UP, TRANSITION THRU WALL AND END OF CIRCUIT.

C. ALL ANCHORS, STRUT, STRUT FITTINGS, AND HARDWARE SHALL BE 316 STAINLESS STEEL.

D. ROUTE CONDUIT SUCH THAT THERE NO CONNECTIONS IN CONDUIT FITTINGS. IF CONNECTIONS ARE REQUIRED A BOX SIZED ACCORDINGLY SHALL BE PROVIDED.

E. INSTALL PANELBOARDS 6'-0" ABOVE FINISHED FLOOR TO THE TOP OF ENCLOSURE.

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
ZIA M. SIDDIQUI
77702
PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT
PLANT EXPANSION
ELECTRICAL
AERATION BASINS
PANELBOARD SCHEDULES
SHEET 1

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 312 OF 378	

STATE OF TEXAS
80367
XIAOHUA LIN
11/11/2022

E-40-601

FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\Drawings\E-40-601 Aeration Basin Panel Schedules Sheet 1.dwg

PANELBOARD "L-AB2" IS TO BE
LOCATED ON THE AERATION BASINS
EQUIPMENT RACK NO. 2

PANEL "L-AB2"

MAIN BRKR. AMPS 50
TRANSFORMER 15KVA
VOLTS 120/240 AIC 18 KA
PHASE 1 WIRE 2 SN ✓

50
80

NOTES
1. BREAKERS 1P/20A UNLESS MARKED OTHERWISE.
2. ADJ. CKTS. TO BAL. PNL.
3. SURFACE MOUNT, NEMA 3R SS
4. MOUNT MINI POWER CENTER WITH PANEL COVER HINGE AT 72" AFF.

CKT. DESCRIPTION	WIRE	LOAD	BKR.			BKR.	LOAD	WIRE	CKT. DESCRIPTION
BASIN LIGHTING	12	200	20	1	2	20	185	12	AIR FLOW CONTROL VALVES
BASIN LIGHTING	12	200	20	3	4	20	185	12	AIR FLOW CONTROL VALVES
BASIN LIGHTING	12	200	20	5	6	20	185	12	AIR FLOW CONTROL VALVES
BASIN LIGHTING	12	200	20	7	8	20	185	12	AIR FLOW CONTROL VALVES
BASIN OUTLETS	12	360	20	9	10	20	70	12	INSTRUMENT POWER
BASIN OUTLETS	12	360	20	11	12	20	70	12	INSTRUMENT POWER
BASIN OUTLETS	12	360	20	13	14	20	70	12	INSTRUMENT POWER
BASIN OUTLETS	12	360	20	15	16	20	70	12	INSTRUMENT POWER
FLOW METER	12	60	20	17	18	20	70	12	INSTRUMENT POWER
FLOW METER	12	60	20	19	20	20	70	12	INSTRUMENT POWER
FLOW METER	12	60	20	21	22	20	70	12	INSTRUMENT POWER
FLOW METER	12	60	20	23	24	20	70	12	INSTRUMENT POWER
WAS PS FLOW METER	12	60	20	25	26	20	70	12	INSTRUMENT POWER

PANELBOARD "H-AB2" IS TO BE
LOCATED ON THE AERATION BASINS
EQUIPMENT RACK NO. 2

PANEL "H-AB2"

BUS AMPS 225
MAIN BREAKER 150
VOLTS 480 KAIC 35
PHASE 3 WIRE 3

150

NOTES
1. BREAKERS 3P/20A UNLESS MARKED OTHERWISE
2. ADJ. CKTS. TO BAL. PNL.
3. SURFACE MOUNT, NEMA 1 PANEL INSIDE A HINGED DOOR NEMA 4X 316 STAINLESS STEEL ENCLOSURE

CKT. DESCRIPTION	WIRE	LOAD	BKR.			BKR.	LOAD	WIRE	CKT. DESCRIPTION
EFFLUENT GATES	12			1	2			12	EFFLUENT GATES
SG-06-032 AND	12	2990	20	3	4	20	2990	12	SG-06-032 AND
SG-06-017	12			5	6			12	SG-06-017
EFFLUENT GATES	12			7	8			12	EFFLUENT GATES
SG-06-018 AND	12	2990	20	9	10	20	2990	12	SG-06-018 AND
SG-06-019	12			11	12			12	SG-06-019
EFFLUENT GATES	12			13	14			12	EFFLUENT GATES
SG-06-020 AND	12	2990	20	15	16	20	2990	12	SG-06-020 AND
SG-06-021	12			17	18			12	SG-06-021
EFFLUENT GATES	12			19	20			12	EFFLUENT GATES
SG-06-022 AND	12	2990	20	21	22	20	2990	12	SG-06-022 AND
SG-06-023	12			23	24			12	SG-06-023
EFFLUENT GATES	12			25	26			12	EFFLUENT GATES
SG-06-024 AND	12	2990	20	27	28	20	2990	12	SG-06-024 AND
SG-06-025	12			29	30			12	SG-06-025
EFFLUENT GATES	12			31	32			12	EFFLUENT GATES
SG-06-026 AND	12	2990	20	33	34	20	2990	12	SG-06-026 AND
SG-06-027	12			35	36			12	SG-06-027
SPARE			20	37	38				
				39	40	20			SPARE
				41	42				
SPARE			20	37	44				
				39	46	20			SPARE
				41	48				
WAS PUMP STATION	4			37	50				
WAS-CP	4	22,380	100	39	52	100			SPARE
	4			41	54				

FEED THRU LUGS

PANELBOARD "H-AB3" IS TO BE
LOCATED ON THE AERATION BASINS
EQUIPMENT RACK NO. 2

PANEL "H-AB3"

BUS AMPS 225
MAIN BREAKER 150
VOLTS 480 KAIC 35
PHASE 3 WIRE 3

150

NOTES
1. BREAKERS 3P/20A UNLESS MARKED OTHERWISE
2. ADJ. CKTS. TO BAL. PNL.
3. SURFACE MOUNT, NEMA 1 PANEL INSIDE A HINGED DOOR NEMA 4X 316 STAINLESS STEEL ENCLOSURE

CKT. DESCRIPTION	WIRE	LOAD	BKR.			BKR.	LOAD	WIRE	CKT. DESCRIPTION
BASIN 1	6			1	2			6	BASIN 7
50 AMP	6	4500	50	3	4	50	2990	6	50 AMP
RECEPTACLE	6			5	6			6	RECEPTACLE
BASIN 1	6			7	8			6	BASIN 8
50 AMP	6	4500	50	9	10	50	4500	6	50 AMP
RECEPTACLE	6			11	12			6	RECEPTACLE
BASIN 1	6			13	14			6	BASIN 9
50 AMP	6	4500	50	15	16	50	4500	6	50 AMP
RECEPTACLE	6			17	18			6	RECEPTACLE
BASIN 1	6			19	20			6	BASIN 10
50 AMP	6	4500	50	21	22	50	4500	6	50 AMP
RECEPTACLE	6			23	24			6	RECEPTACLE
BASIN 1	6			25	26			6	FUTURE BASIN 11
50 AMP	6	4500	50	27	28	50	4500	6	50 AMP
RECEPTACLE	6			29	30			6	RECEPTACLE
BASIN 1	6			31	32			6	FUTURE BASIN 12
50 AMP	6	4500	50	33	34	50	4500	6	50 AMP
RECEPTACLE	6			35	36			6	RECEPTACLE
SPARE			50	37	38				
				39	40	50			SPARE
				41	42				
SPARE			50	37	44				
				39	46	50			SPARE
				41	48				
SPARE			50	37	50				
				39	52	50			SPARE
				41	54				

FEED THRU LUGS

AERATION BASINS PANELBOARD
SCHEDULES
NTS

GENERAL NOTES:

A. EACH CIRCUIT SHALL BE PROVIDED A DEDICATED NEUTRAL, IDENTIFIED WITH CORRESPONDING CIRCUIT NUMBER.

B. EACH CONDUIT SHALL BE TAGGED WITH THE PANEL DESIGNATOR AND CIRCUIT NUMBERS THAT ARE IN THE CONDUIT AT EACH BOX, STUB UP, TRANSITION THRU WALL AND END OF CIRCUIT.

C. ALL ANCHORS, STRUT, STRUT FITTINGS, AND HARDWARE SHALL BE 316 STAINLESS STEEL.

D. ROUTE CONDUIT SUCH THAT THERE NO CONNECTIONS IN CONDUIT FITTINGS. IF CONNECTIONS ARE REQUIRED A BOX SIZED ACCORDINGLY SHALL BE PROVIDED.

E. INSTALL PANELBOARDS 6'-0" ABOVE FINISHED FLOOR TO THE TOP OF ENCLOSURE.

No	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
77702
REGISTERED
PROFESSIONAL
ENGINEER
10-11-2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

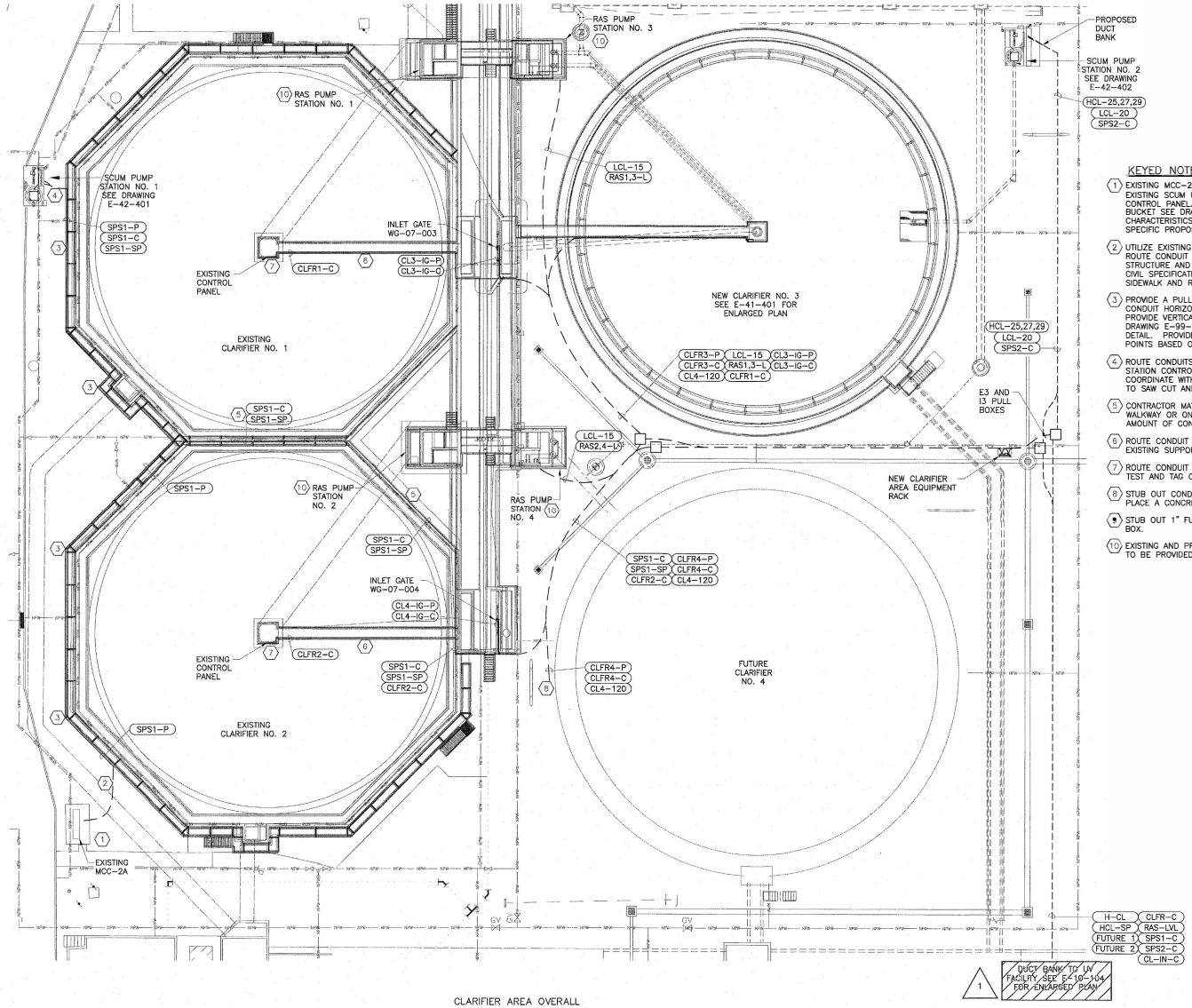
INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT
PLANT EXPANSION
ELECTRICAL
AERATION BASINS
PANELBOARD SCHEDULES
SHEET 2

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 313 OF 378	

STATE OF TEXAS
80367
LICENSED
PROFESSIONAL
ENGINEER
HOUSTON, TEXAS

E-40-602

FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4150-EV (HAH Imp Pkg 2)\Drawings\E-40-602 Aeration Basin Panel Schedules Sheet 2.dwg



CLARIFIER AREA OVERALL PLAN
1" = 20'-0"

N

0' 10' 20' 40'

SCALE: 1"=20'

KEYED NOTES:

1. EXISTING MCC-2A SHALL BE MODIFIED TO FEED THE EXISTING SCUM PUMP STATION NO. 1 PROPOSED CONTROL PANEL. PROVIDE A NEW FEEDER BREAKER BUCKET SEE DRAWING E-64-701, (BREAKER CHARACTERISTICS SHALL BE COORDINATED TO THE SPECIFIC PROPOSED PUMP'S REQUIREMENTS).
2. UTILIZE EXISTING STUB OUT FROM MCC-2A AND ROUTE CONDUIT UNDERGROUND TO THE CLARIFIER STRUCTURE AND STUB UP. COORDINATE WITH WITH CIVIL SPECIFICATION REQUIREMENTS TO SAW CUT SIDEWALK AND REPAIR.
3. PROVIDE A PULL POINT ON THE WALL AND ROUTE CONDUIT HORIZONTAL ABOVE THE EXISTING CONDUIT. PROVIDE VERTICAL STRUT WITH. SEE DETAIL D ON DRAWING E-99-503, FOR CONDUIT INSTALLATION DETAIL. PROVIDE C TYPE CONDULETS FOR PULL POINTS BASED ON NEC REQUIREMENTS.
4. ROUTE CONDUITS UNDERGROUND TO THE SCUM PUMP STATION CONTROL PANEL RACK AND STUB UP. COORDINATE WITH CIVIL SPECIFICATION REQUIREMENTS TO SAW CUT AND REPAIR SIDEWALK.
5. CONTRACTOR MAY FIELD ROUTE CONDUIT UNDER WALKWAY OR ON EDGE OF STRUCTURE FOR LEAST AMOUNT OF CONFLICTS.
6. ROUTE CONDUIT ON EDGE OF WALKWAY STRUCTURE, EXISTING SUPPORTS MAY BE UTILIZED.
7. ROUTE CONDUIT INTO CLARIFIER CONTROL PANEL, TEST AND TAG CONDUCTORS PER SPECIFICATIONS.
8. STUB OUT CONDUITS, 24 INCHES BELOW GRADE, AND PLACE A CONCRETE TOMBSTONE MARKER ABOVE.
9. STUB OUT 1" FUTURE 1 AND FUTURE 2 TO E PULL BOX.
10. EXISTING AND PROPOSED RAS PUMP STATIONS ARE TO BE PROVIDED A LEVEL INSTRUMENT.

1 THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

GENERAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE THE CLARIFIER AREA. WORK FOR CLARIFIER 1 AND CLARIFIER 2 IS ONLY DESCRIBED ON THIS DRAWING. WORK IN MCC-2A IS DESCRIBED ON THIS DRAWING AND E-64-701.

B. ALL CONDUITS REQUIRED MAY NOT BE ILLUSTRATED ON THIS DRAWING. REFER TO THE CLARIFIER AREA PANELBOARDS AND CONDUIT SCHEDULE FOR COMPLETE INFORMATION.

C. USE OF EXISTING CONDUIT AND CONDUCTORS, FOR SCUM PUMP STATION NO. 1, WILL BE CONSIDERED.

D. COORDINATE INSTRUMENTATION, DEVICE AND CONTROL PANEL LOCATIONS IN REQUIRED SPECIFICATION 13300 COORDINATION MEETINGS.

E. ALL STRUT, HARDWARE, STRAPS AND ANCHORS SHALL BE 316 STAINLESS STEEL, WITHOUT EXCEPTION.

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
F.M. SIDDIQUI
77702
REGISTERED PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

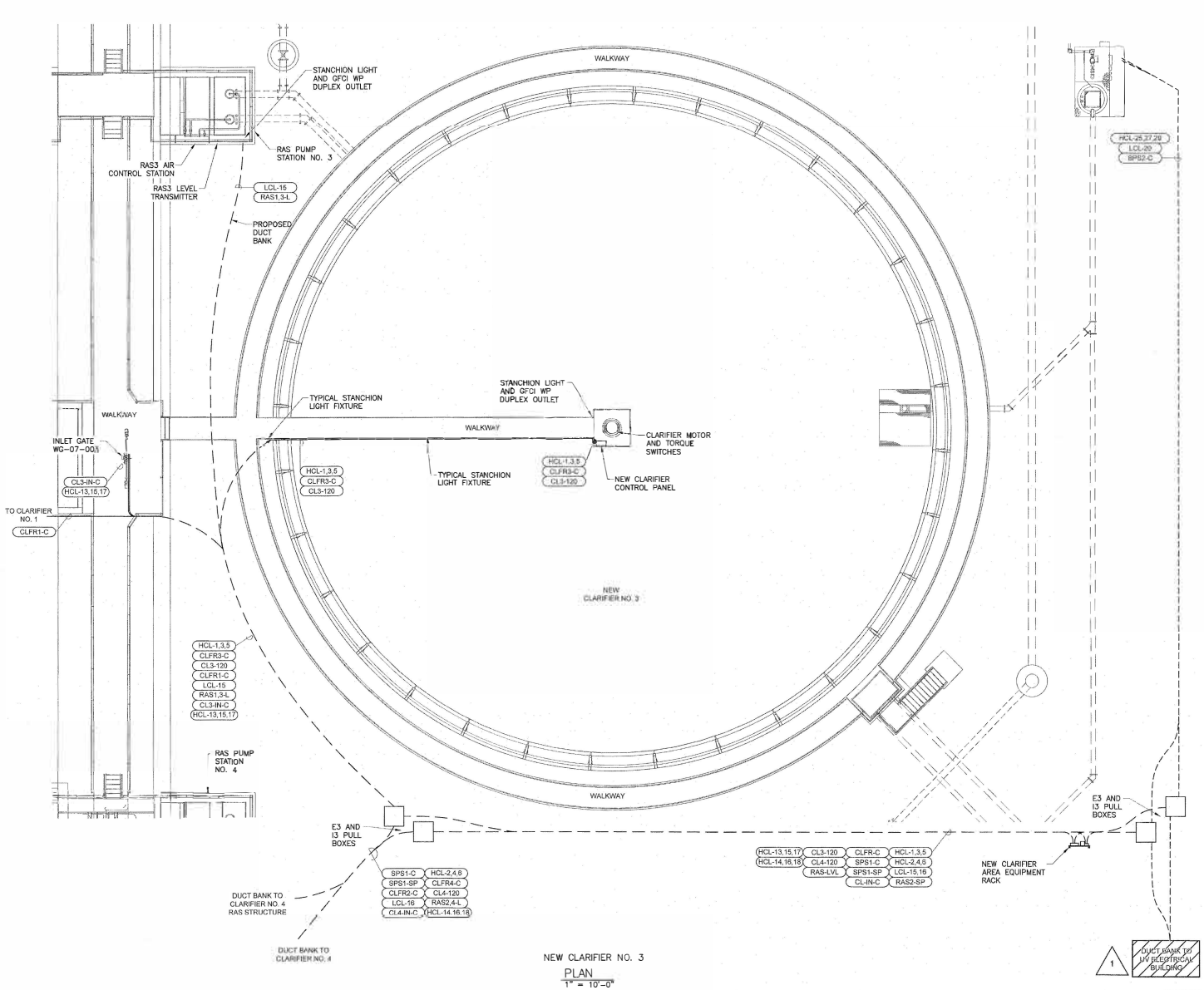
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
ELECTRICAL
CLARIFIER AREA OVERALL PLAN

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 314 OF 378	

80387
REGISTERED
LIN, XIAOHUA
HOUSTON, TEXAS

E-41-101

FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160-BV (WH Imp Pkg 2)\Drawings\E-10-102 103 104 Proposed Site Plans.dwg



NEW CLARIFIER NO. 3
PLAN
1" = 10'-0"

1 THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

GENERAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE THE NEW CLARIFIER NO. 3 WORK AREA.

B. ALL STRUT, HARDWARE, STRAPS AND ANCHORS SHALL BE 316 STAINLESS STEEL, WITHOUT EXCEPTION.

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
ZHUHUA SHARI LIN
80367
LICENSED PROFESSIONAL ENGINEER
10/10/22

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
ELECTRICAL
CLARIFIERS
NEW CLARIFIER NO. 3
PLAN

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	
	XIAOHUA (SHARI) LIN, P.E.
SHEET NO.	315 OF 378

FOR CITY OF HOUSTON USE ONLY
ACCEPTED
80367
10/10th, 2022

E-41-401

FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\14160-BV (IAH Imp. Prg. 2)\Drawings\E-41-401 Clarifier No. 3 Plan.dwg

NEW PANELBOARD "H-CL"
IS TO BE LOCATED ON
THE CLARIFIER AREA
EQUIPMENT RACK

PANEL "H-CL"

BUS AMPS 225
MAIN BRKR. AMPS 200
VOLTS 480 KAIC 35
PHASE 3 WIRE 3

NOTES
1. BREAKERS 3P/20A UNLESS MARKED OTHERWISE
2. ADJ. CKTS. TO BAL. PNL.
3. SURFACE MOUNT, NEMA 1 PANEL INSIDE A HINGED DOOR NEMA 4X 316 STAINLESS STEEL ENCLOSURE

CKT.	DESCRIPTION	WIRE	LOAD	BKR.			BKR.	LOAD	WIRE	CKT.	DESCRIPTION
	CLARIFIER NO. 3	12	3,730	20	1	2	20				FUTURE CLARIFIER NO. 4
		12			3	4					
		12			5	6					
1 CLFR5-P	FUTURE CLARIFIER NO. 5			20	7	8	20				FUTURE CLARIFIER NO. 6
					9	10					
					11	12					
	INLET GATE WG-07-003	12	1,492	20	13	14	20				FUTURE INLET GATE WG-07-004
		12			15	16					
		12			17	18					
1 CL5-IG-P	FUTURE INLET GATE WG-07-005			20	19	20	20				FUTURE INLET GATE WG-07-006
					21	22					
					23	24					
	SCUM PUMP STATION NO. 2	4	11,190	50	25	26	20				SPARE
		4			27	28					
		4			29	30					
	SPARE			20	43	44	50				SPARE
					45	46					
					47	48					
	PANEL L-CL	8	3480	50	49	50	50				SPARE
		8	3480		51	52					
	SPACE				53	54					SPACE
			12,660					12,300			

CLFR4-P 1 | CLFR6-P 1 | CL4-IG-P 1 | CL6-IG-P 1

TOTAL VA = 24,960
25 KVA AT 480V = 31 AMPS
THE CONDUCTORS, PANEL, AND MAIN BREAKER ARE ALL RATED PROPERLY TO SERVE THE LOAD

NEW PANELBOARD "L-CL"
IS TO BE LOCATED ON
THE CLARIFIER AREA
EQUIPMENT RACK

PANEL "L-CL"

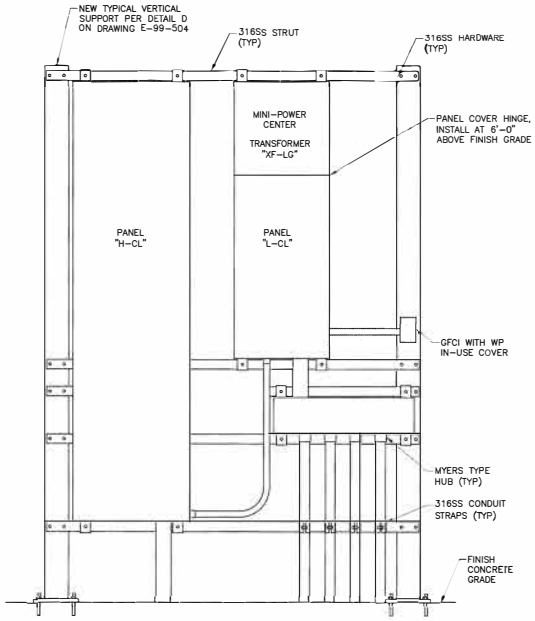
MAIN BRKR. AMPS 80
TRANSFORMER 15KVA
VOLTS 120/240 AIC 18 KA
PHASE 1 WIRE 2 SN √

NOTES
1. BREAKERS 1P/20A UNLESS MARKED OTHERWISE.
2. ADJ. CKTS. TO BAL. PNL.
3. SURFACE MOUNT, NEMA 3R SS MOUNT MINI POWER CENTER WITH PANEL COVER HINGE AT 72" AFF.

CKT.	DESCRIPTION	WIRE	LOAD	BKR.			BKR.	LOAD	WIRE	CKT.	DESCRIPTION
CL3-120V	CL #3 LIGHTING	12	100	20	1	2	20				CL #4 LIGHTING
	CL #3 OUTLETS	12	360	20	3	4	20				CL #4 OUTLETS
	CL #3 LVL INST	12	60	20	5	6	20				CL #4 LVL INST
		12	100	20	7	8	20				CL #6 LIGHTING
1 CL5-120V		12	360	20	9	10	20				CL #6 OUTLETS
		12	60	20	11	12	20				CL #6 LVL INST
	RAS-1 LEVEL INSTRUMENT	12	60	20	13	14	20	60	12	RAS-2 LEVEL INSTRUMENT	
	RAS-3 LEVEL INSTRUMENT	12	60	20	15	16	20			RAS-4 LEVEL INSTRUMENT	
1	RAS-5 LEVEL INSTRUMENT			20	17	18	20			RAS-6 LEVEL INSTRUMENT	
	SPARE			20	19	20	20	80	12	SCUM PUMP STATION 2	
	SPARE			20	21	22	20			SPARE	
	FUTURE 1 CL-120			20	23	24	20			SPARE	
	FUTURE 2 CL-120			20	25	26	20	180	12	RACK OUTLET	
			1,830		NEUT			1,650			

45
80
CL4-120V 1 | CL6-120V 1 | 1

TOTAL VA = 3,480
3.5 KVA AT 240V = 14.5 AMPS
THE CONDUCTORS, PANEL, AND MAIN BREAKER ARE ALL RATED PROPERLY TO SERVE THE LOAD



CLARIFIER AREA EQUIPMENT RACK
ELEVATION
NTS

KEYED NOTES:

1 STUB OUT CONDUIT ADJACENT TO FUTURE STRUCTURE OR EQUIPMENT AND PROVIDE MARKERS AS ILLUSTRATED IN THE PLAN DRAWINGS.

GENERAL NOTES:

A. THIS DRAWING IS PROVIDED TO DESCRIBE THE CLARIFIER AREA ELECTRICAL RACK AND PANELBOARD SCHEDULES.

B. CONDUITS REQUIRED MAY NOT BE ILLUSTRATED ON ALL DRAWINGS SHOWING AN AREA. REFER TO THE CONDUIT AND CONDUCTOR SCHEDULES FOR MORE INFORMATION.

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
M. SIDDIQUI
77094
REGISTERED
PROFESSIONAL
ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
ELECTRICAL
CLARIFIER AREA PANELBOARD SCHEDULES

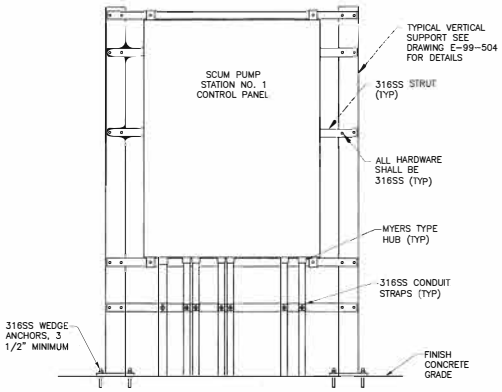
WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	Se XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 316 OF 378	

FOR CITY OF HOUSTON USE ONLY
REGISTERED
80367
ENGINEER
HOUSTON, TEXAS

CLARIFIER AREA PANELBOARD
SCHEDULES
NTS

E-41-601

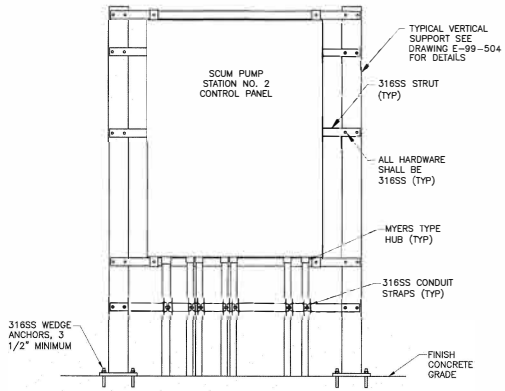
FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\Drawings\E-41-601 Clarifier Area Panel Schedules.dwg



SCUM PUMP STATION NO. 1 EQUIPMENT RACK

ELEVATION

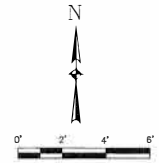
NTS



SCUM PUMP STATION NO. 2 EQUIPMENT RACK

ELEVATION

NTS



SCALE: 3/8" = 1'-0"

GENERAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE THE MODIFIED SCUM PUMP STATIONS WORK.

B. ALL ANCHORS, STRUT, STRUT FITTINGS, AND HARDWARE SHALL BE 316 STAINLESS STEEL.

C. USE OF EXISTING CONCRETE ENCASED CONDUITS MAY BE CONSIDERED IN THIS PROJECT. DURING CONSTRUCTION CONTRACTOR MAY RESEARCH THE CONDITION OF THE EXISTING CONDUIT WHEN REMOVING EXISTING CONDUCTORS AND REQUEST USE THROUGH RFI.

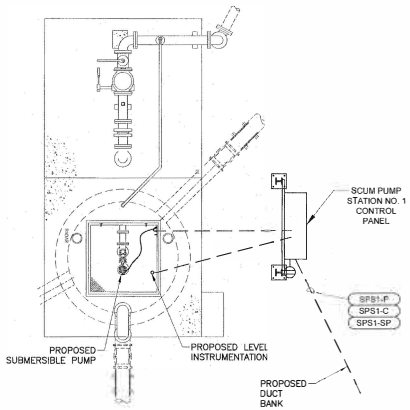
D. INSTALL CONTROL PANELS 6'-0" ABOVE FINISHED FLOOR TO THE TOP OF ENCLOSURE.

E. COORDINATE WITH MECHANICAL TO ENSURE METHOD OF PUMP STATION IMPROVEMENT IS PROVIDED TEMPORARY FACILITES REQUIRED IN CLUDING CONTROL AND POWER.

F. COORDINATE NEW CABLE RACK, LEVEL INSTRUMENT AND BACKUP FLOAT PER MECHANICAL.

KEYED NOTES:

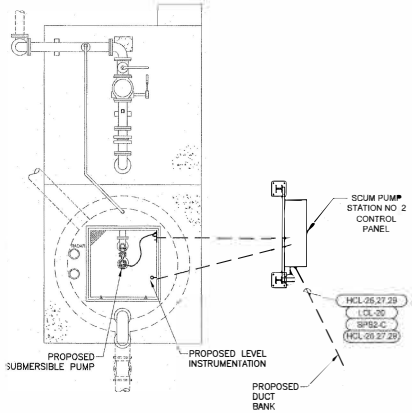
1. POWER TO SCUM PUMP STATION NO. 1 IT TO BE FROM MCC-2A. THE CONTROL PANEL SHALL BE PROVIDED AND COORDINATED BY THE PUMP PROVIDER.
2. ROUTE CONDUITS UNDER WALKWAY, CORE DRILL WALLS AS REQUIRED.
3. INSTALL PUMP CABLE TERMINAL BOXES SIMILAR TO DETAIL F ON DRAWING E-99-503.
4. PROVIDE PUMP CABLE TERMINAL BOXES IN ACCORDANCE WITH DETAIL D ON DRAWING E-99-506.



SCUM PUMP STATION NO. 1

PLAN

3/8" = 1'-0"



SCUM PUMP STATION NO. 2

PLAN

3/8" = 1'-0"

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
18300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
ZM. SIDDIQUI
77702
REGISTERED
PROFESSIONAL
ENGINEER

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

ELECTRICAL

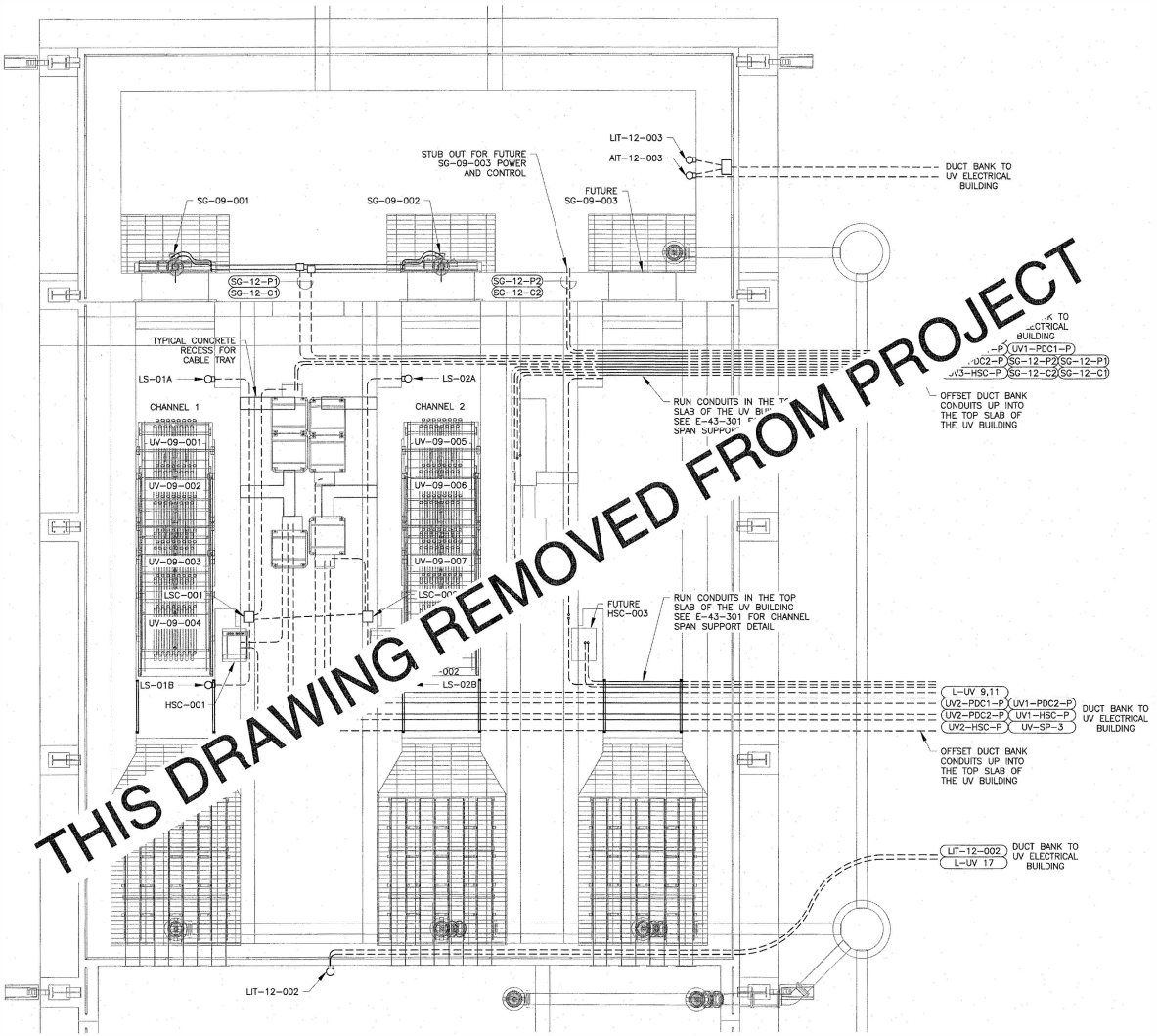
CLARIFIERS MODIFIED SCUM PUMP STATIONS PLANS

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
Se XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 317 OF 378	

STATE OF TEXAS
80367
LICENSED
PROFESSIONAL
ENGINEER
HOUSTON, TEXAS

E-42-401

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\Drawings\E-42-401 Scum Pump Station Plans.dwg



UV FACILITY POWER AND INSTRUMENT PLAN

1/4" = 1'-0"

N

0' 2' 4' 8'

SCALE: 1/4"=1'

THIS DRAWING REMOVED FROM PROJECT

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

No.	Date	Revisions	Appd
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
M. SHOUKRI
77702
REGISTERED
PROFESSIONAL
ENGINEER
10/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT
PLANT EXPANSION
ELECTRICAL
UV FACILITY
POWER AND INSTRUMENT
PLAN

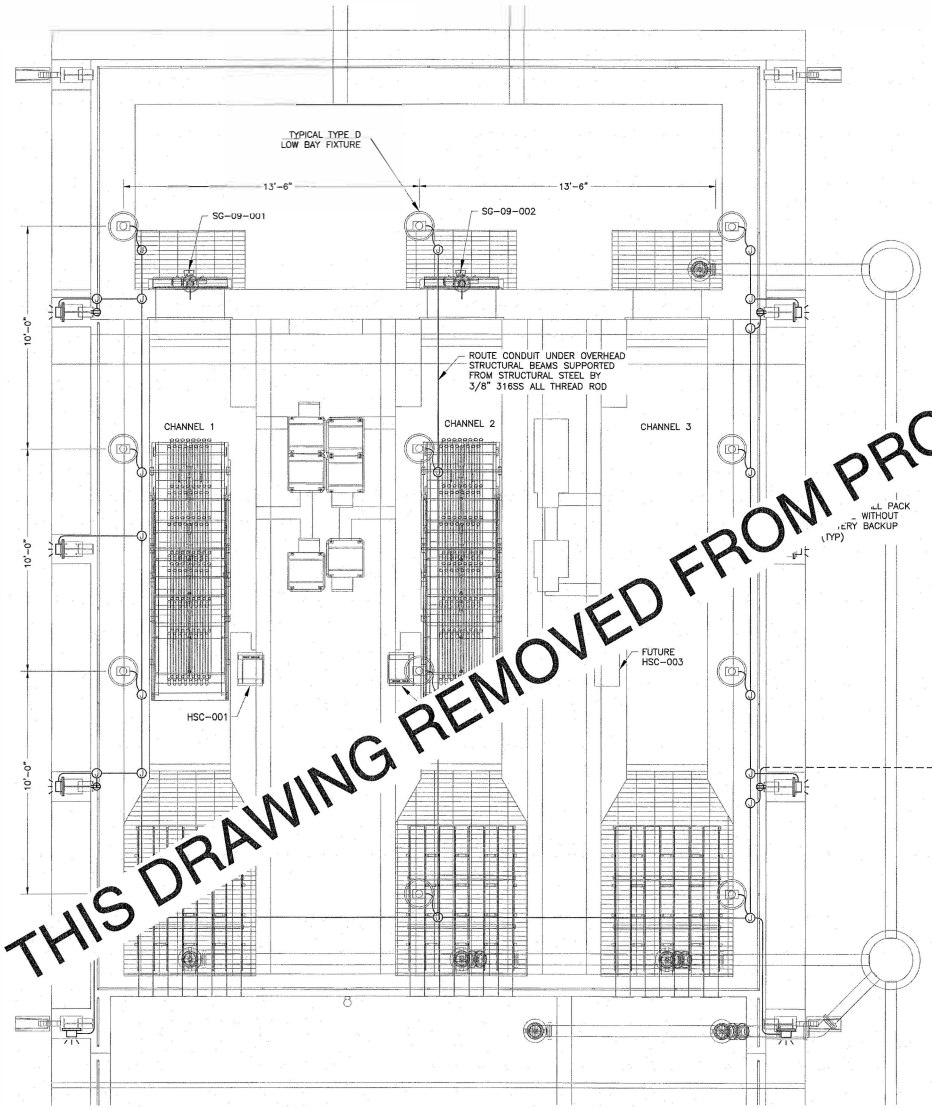
WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	Se XIAOHUA (SHARI) LIN, P.E.
SHEET NO.	318 OF 378

FOR CITY OF HOUSTON USE ONLY

PUBLIC WORKS
ENGINEERING
89367
REGISTERED
PROFESSIONAL
ENGINEER
STATE OF TEXAS

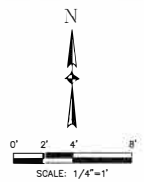
E-43-101

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KG - Documents\WWE-BV (Wastewater Proj 2)\Drawings\E-43-101e uv facility plans.dwg



UV FACILITY LIGHTING
PLAN
1/4" = 1'-0"

THIS DRAWING REMOVED FROM PROJECT



THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

GENERAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE THE LIGHTING AND CONVENIENCE OUTLET LAYOUT OF THE UV FACILITY BUILDING. SEE DRAWING E-43-301 FOR BUILDING SECTION VIEW.

B. ROUTE CONDUIT IN CONCRETE WHERE PRACTICAL IN THE GRIT FACILITY AREA.

C. ALL STRUT, HARDWARE, STRAPS AND ANCHORS SHALL BE 316 STAINLESS STEEL, WITHOUT EXCEPTION.

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

STATE OF TEXAS
ZM. SHAKIL
77702
REGISTERED
PROFESSIONAL
ENGINEER
11/11/2022

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

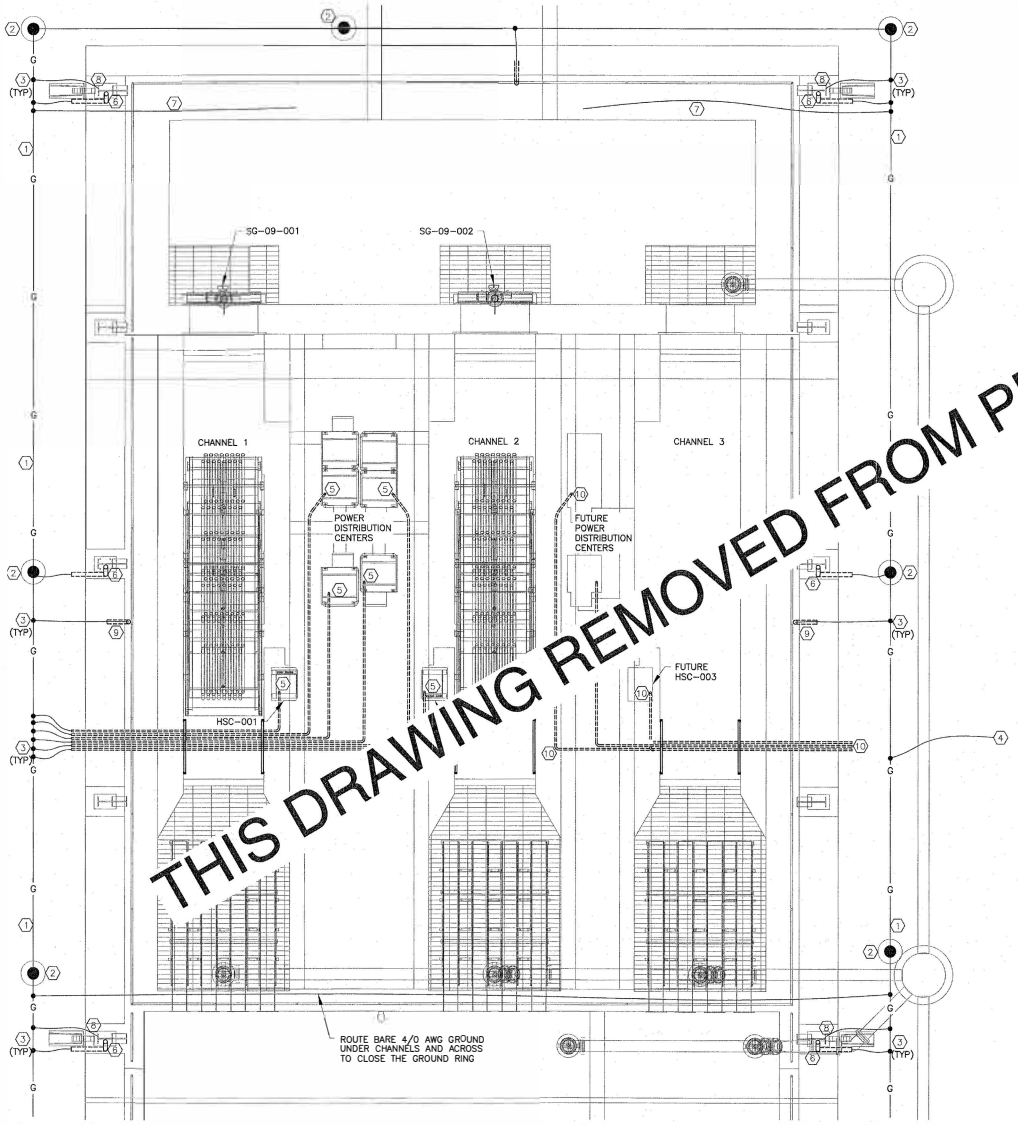
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
ELECTRICAL
UV FACILITY
LIGHTING PLAN

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	
Se XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 3119 OF 378	

FOR CITY OF HOUSTON USE ONLY
ACCEPTED
80367
HOUSTON, TEXAS

E-43-102

FILE PATH: C:\Users\KGI scarpa\Kalluri Group, Inc\KGI - Documents\4160-BV (Aeis proj 2)\Drawings\E-43-102a UV Facility Plans.dwg



UV FACILITY GROUNDING PLAN
1/4" = 1'-0"

KEYED NOTES:

1. 4/0 COPPER GROUND RING AT 24" MINIMUM BELOW GRADE.
2. 3/4"X20' GROUND ROD WITH EXOTHERMIC CONNECTIONS TO GROUND RING.
3. EXOTHERMICALLY WELDED CONNECTION, SEE SPECIFICATIONS FOR REQUIREMENTS.
4. CONNECT 4/0 COPPER DUCT BANK GROUNDING CONDUCTOR, TO GROUND RING.
5. PROVIDE A #6 COPPER GROUNDING CONDUCTOR, TO EACH 480V FED UV EQUIPMENT ENCLOSURE.
6. COORDINATE WITH LIGHTNING PROTECTION SYSTEM TO PROVIDE ONE, 1 1/2" SCH-40 PVC CONDUIT, FROM 12" BELOW TOP OF STEEL TO GROUND RING FOR LIGHTNING PROTECTION DOWN LEAD AT EACH CORNER OF THE BUILDING AND IN THE CENTER OF THE LONG SIDES AS INDICATED.
7. PROVIDE UFFER GROUN[illegible] BUILDING.
8. PROVIDE GROUN[illegible] STRUCTURE.
9. GROUND [illegible] SILICONE BRONZE MECH[illegible] 316SS HARDWARE. ALUMINUM [illegible] CEPTABLE AND FERROUS METAL [illegible] LECTED.

[illegible] -SLAB CONDUIT REQUIRED FOR THE FUTURE UV

N

0' 2' 4' 8'

SCALE: 1/4"=1'

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

GENERAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE THE UV BUILDING GROUNDING AND LIGHTNING PROTECTION UNDER SLAB PROVISIONS.

B. CONTRACTOR SHALL RETAIN THE SERVICE OF A STATE OF TEXAS LICENSED LP PROVIDER TO DESIGN AND INSTALL THE SYSTEM. CONTRACTOR SHALL COORDINATE PRIOR TO THE BID TO INCLUDE ALL PROVISIONS REQUIRED FOR AN APPROVED SYSTEM.

C. ELECTRICAL EQUIPMENT, STRUCTURAL STEEL, FOUNDATION REBAR AND DUCT BANK SYSTEM SHALL ALL BE CONNECTED TO THE GROUND RING.

THIS DRAWING REMOVED FROM PROJECT

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
ZM. SHIOUH
77702
REGISTERED
PROFESSIONAL
ENGINEER
10-11-2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

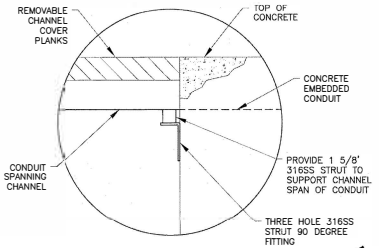
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
ELECTRICAL
UV FACILITY
GROUNDING PLAN

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
Se XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 320 OF 378	

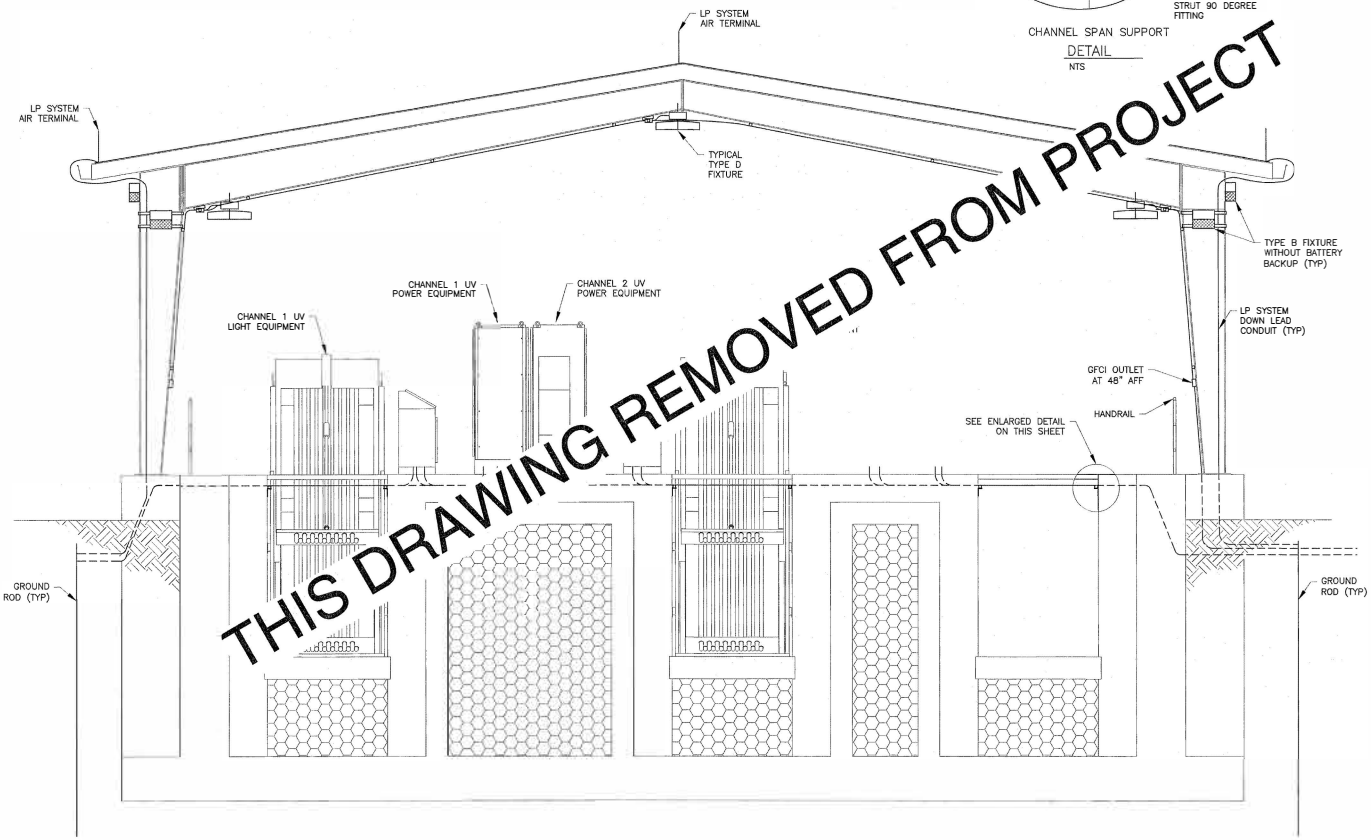
STATE OF TEXAS
80367
REGISTERED
PROFESSIONAL
ENGINEER
HOUSTON, TEXAS

E-43-103

T.E. Path: C:\Users\KGI Central4\Kalluri Group, Inc\KGI - Documents\4168-BV UAH Imp Pkg 2\1Drawings\E-43-103x UV Facility Planning.dwg



CHANNEL SPAN SUPPORT DETAIL
NTS



UV FACILITY UV BUILDING
SECTION
1/4" = 1'-0"

THIS DRAWING REMOVED FROM PROJECT

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

GENERAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE A SECTIONAL VIEW OF THE UV BUILDING LAYOUT.

B. ROUTE CONDUIT ON 1 5/8" 316SS STRUT IN THE UV BUILDING. PROVIDE TRAPEZE TYPE HANGERS WHERE REQUIRED.

C. ALL STRUT, HARDWARE, STRAPS AND ANCHORS SHALL BE 316 STAINLESS STEEL, WITHOUT EXCEPTION.

No	Date	Revisions	App
I	11/11/22	REPACKAGED SET	ZMS
H	5/13/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
Z.M. SIDDIQUI
77702
REGISTERED
PROFESSIONAL
ENGINEER
10/10/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT
PLANT EXPANSION
ELECTRICAL
UV FACILITY
UV BUILDING
SECTION

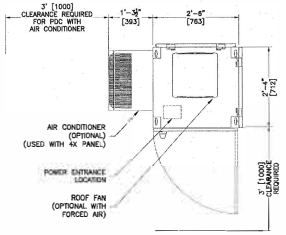
WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 321 OF 378	

FOR CITY OF HOUSTON USE ONLY
80367
REGISTERED
PROFESSIONAL
ENGINEER
10/10/2022

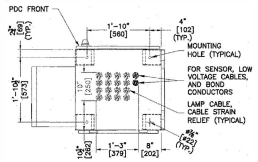
E-43-301

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\Drawings\E-43-301 UV Facility Section.dwg

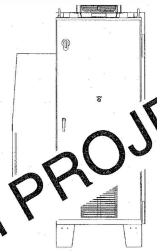
THIS DRAWING REMOVED FROM PROJECT



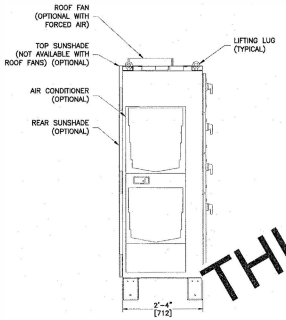
PLAN VIEW
SCALE:AS SHOWN



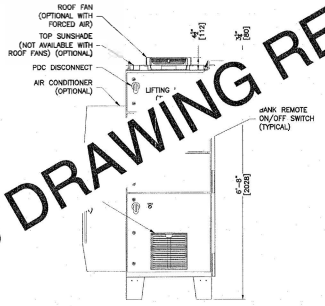
BOTTOM VIEW
CONDUIT ENTRANCE)
SCALE:AS SHOWN



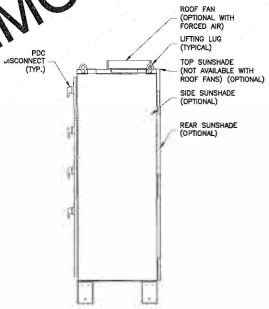
FRONT VIEW (1 BANK)
SCALE:AS SHOWN
NOTE: MAXIMUM 1 BANK OF 8 TO 24 UV LAMPS PER BANK.



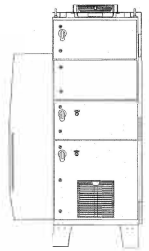
LEFT SIDE
VIEW
SCALE:AS SHOWN



FRONT VIEW OF
(3 BANK)
SCALE:AS SHOWN
NOTE: MAXIMUM 3 BANKS OF 8 TO 16 UV LAMPS PER BANK.
ONE (1) DOOR PER BANK.



RIGHT SIDE
VIEW
SCALE:AS SHOWN



FRONT VIEW (2 BANK)
SCALE:AS SHOWN
NOTE: MAXIMUM 2 BANKS OF 8 TO 16 UV LAMPS PER BANK.
ONE (1) DOOR PER BANK.

SINGLE PDC CABINET
A DETAIL
NTS

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

GENERAL NOTES:

A. THIS DRAWING IS PROVIDED FOR BIDDING INFORMATIONAL PURPOSES AND WAS CREATED BASED ON DATA RECEIVED FROM THE TROJAN BRAND OF EQUIPMENT USED IN THE SYSTEM DESIGN.

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
C.M. SIDDIQUI
77702
REGISTERED
PROFESSIONAL
ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
ELECTRICAL

UV FACILITY
UV EQUIPMENT DETAILS
SHEET 1

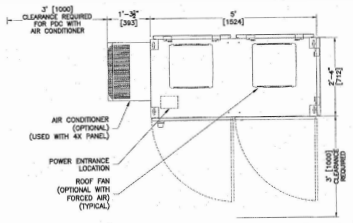
WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	

ACCEPTED
80367
10/31/23

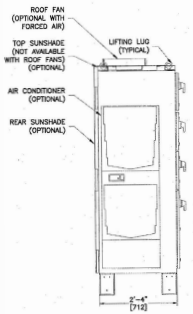
E-43-501

SHEET NO. 322 OF 378

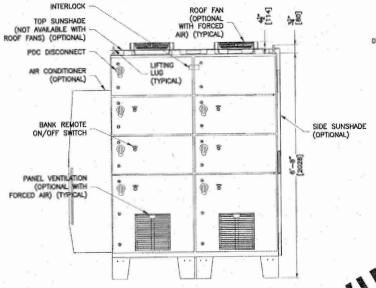
FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\Drawings\E-43-501 UV Facility UV Equipment Details Sheet 1.dwg



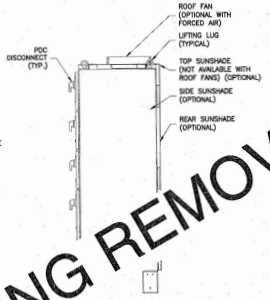
PLAN VIEW
SCALE:NOT TO SCALE



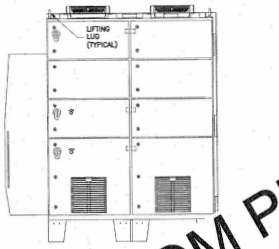
LEFT SIDE VIEW
SCALE:AS SHOWN



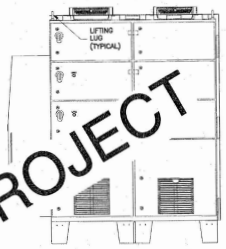
FRONT VIEW OF (6 BANK)
SCALE:AS SHOWN
NOTE: MAXIMUM 6 BANKS OF 8 ... ONE (1) DOOR PER BANK.



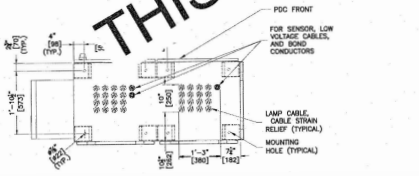
RIGHT SIDE VIEW
SCALE:AS SHOWN



FRONT ... -DC (2 ...
SCALE:AS SHOWN
... 24 UV LAMPS PER BANK.

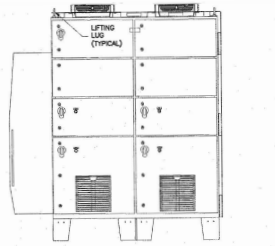


FRONT VIEW OF PDC (3 BANK)
SCALE:AS SHOWN
NOTE: MAXIMUM 3 BANKS OF 16 TO 24 UV LAMPS PER BANK. TWO (2) DOORS PER BANK.

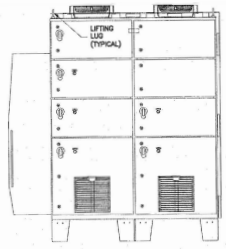


BOTTOM VIEW (CONDUIT ENTRANCE)
SCALE:AS SHOWN

DOUBLE PDC CABINET
A DETAIL
NTS



FRONT VIEW OF PDC (4 BANK)
SCALE:AS SHOWN
NOTE: MAXIMUM 4 BANKS OF 8 TO 16 UV LAMPS PER BANK. ONE (1) DOOR PER BANK.



FRONT VIEW OF PDC (5 BANK)
SCALE:AS SHOWN
NOTE: MAXIMUM 5 BANKS OF 8 TO 16 UV LAMPS PER BANK. ONE (1) DOOR PER BANK.

THIS DRAWING REMOVED FROM PROJECT

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

GENERAL NOTES:

A. THIS DRAWING IS PROVIDED FOR BIDDING INFORMATIONAL PURPOSES AND WAS CREATED BASED ON DATA RECEIVED FROM THE TROJAN BRAND OF EQUIPMENT USED IN THE SYSTEM DESIGN.

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

Z.M. SIDDIQUI
77702
LICENSED PROFESSIONAL ENGINEER
12/31/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
ELECTRICAL
UV FACILITY
UV EQUIPMENT DETAILS
SHEET 2

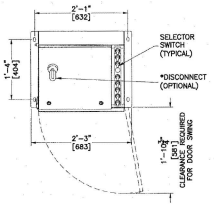
WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
Se XIAOHUA (SHARI) LIN, P.E.	

80367
LICENSED PROFESSIONAL ENGINEER
HOUSTON, TEXAS

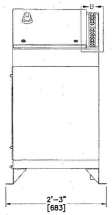
E-43-502

SHEET NO. 323 OF 378

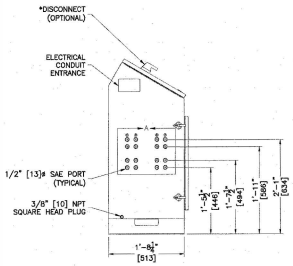
FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4160-BV (Alt Imp Pkg 2)\Drawings\E-43-502 UV Facility UV Equipment Details Sheet 2.dwg



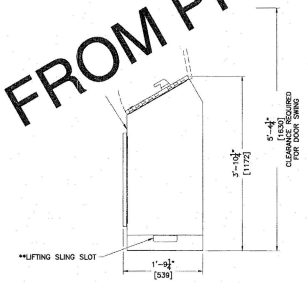
PLAN VIEW
SCALE:NOT TO SCALE



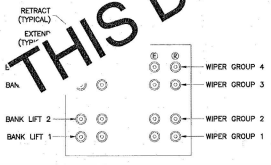
FRONT VIEW
SCALE:NOT TO SCALE



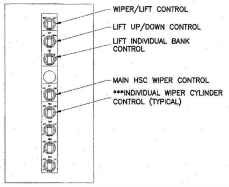
LEFT VIEW
SCALE:NOT TO SCALE



RIGHT VIEW
SCALE:NOT TO SCALE



DETAIL A
SCALE:NOT TO SCALE



DETAIL B
SCALE:NOT TO SCALE

HYDRAULIC SYSTEM CENTER

A DETAIL
NTS

THIS DRAWING REMOVED FROM PROJECT

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

GENERAL NOTES:

A. THIS DRAWING IS PROVIDED FOR BIDDING INFORMATIONAL PURPOSES AND WAS CREATED BASED ON DATA RECEIVED FROM THE TROJAN BRAND OF EQUIPMENT USED IN THE SYSTEM DESIGN.

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
10300 Katy Freeway, Suite 172
Houston, Texas 77024
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

ELECTRICAL

UV FACILITY
UV EQUIPMENT DETAILS
SHEET 3

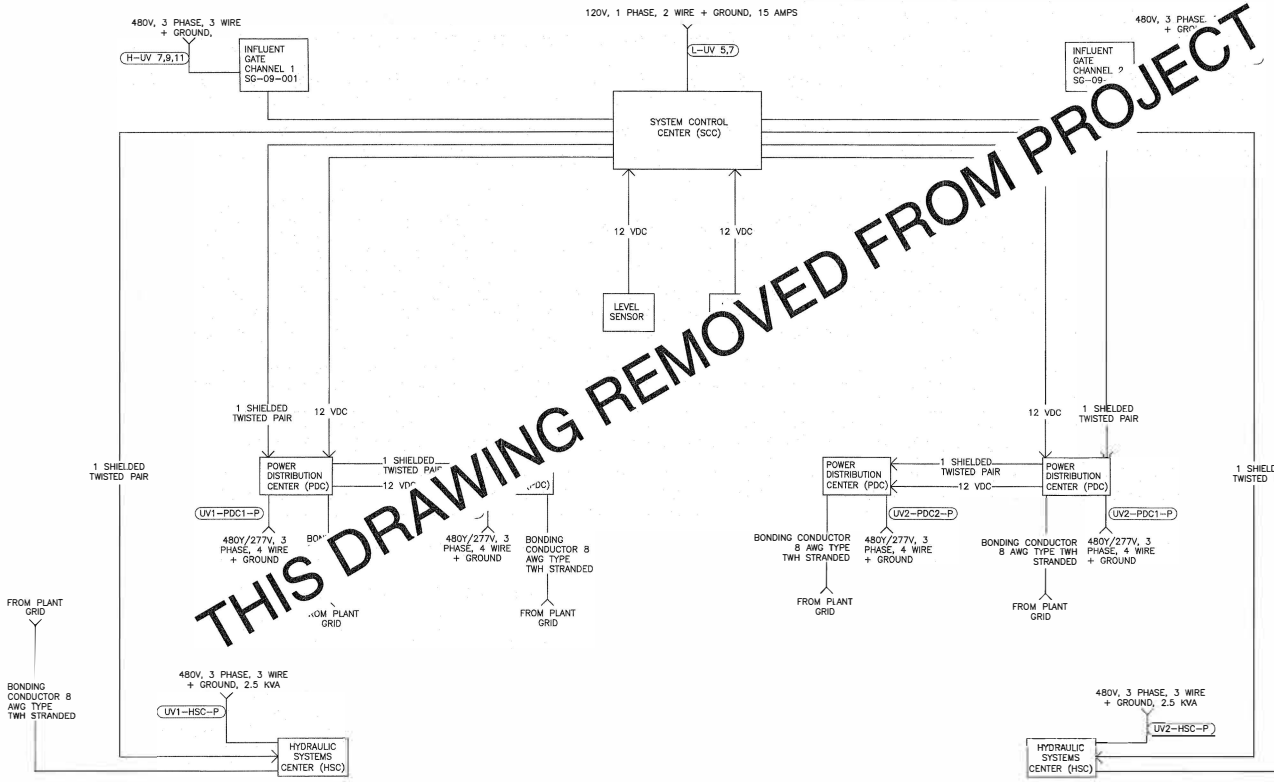
WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 324 OF 378	

FOR CITY OF HOUSTON USE ONLY

80367

E-43-503

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4160-GV (AH Imp Pkg 2)\Drawings\E-43-503 UV Facility UV Equipment Details Sheet 3.dwg



THIS DRAWING REMOVED FROM PROJECT

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

GENERAL NOTES:

A. THIS DRAWING IS PROVIDED FOR BIDDING INFORMATIONAL PURPOSES AND WAS CREATED BASED ON DATA RECEIVED FROM THE TROJAN BRAND OF EQUIPMENT USED IN THE SYSTEM DESIGN.

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-360-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
ZIAOHUA SHARI LIN
77702
REGISTERED PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
ELECTRICAL

UV FACILITY
UV SYSTEM INTERCONNECTION DIAGRAM

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SZ XIAOHUA (SHARI) LIN, P.E.

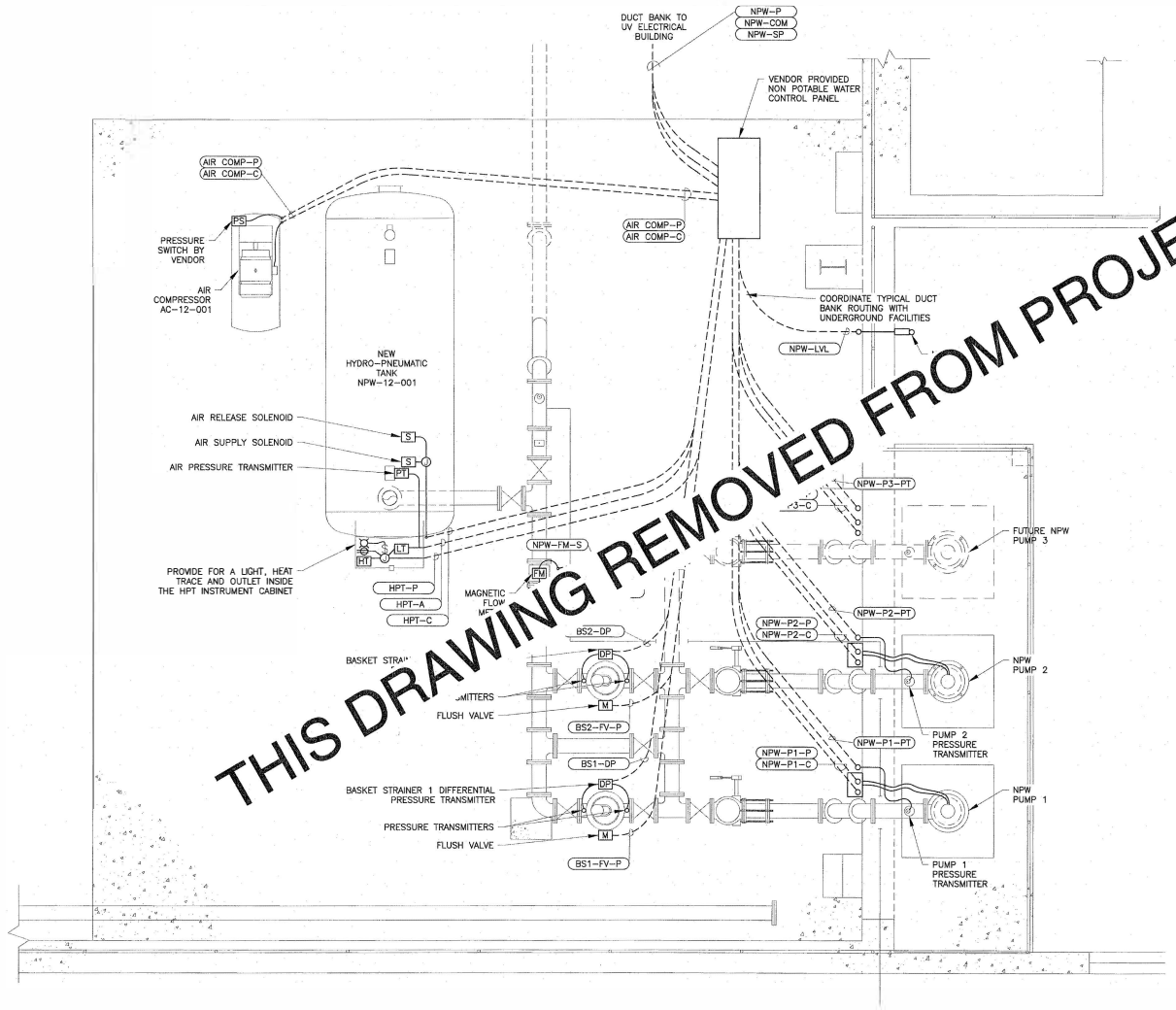
FOR CITY OF HOUSTON USE ONLY

80367
REGISTERED PROFESSIONAL ENGINEER
HOUSTON, TEXAS

E-43-601

SHEET NO. 325 OF 378

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4180-BV (WH imp Prg 2)\Drawings\E-43-601 UV Facility UV System Interconnection Diagram.dwg



NPW SYSTEM AREA
PLAN
3/8" = 1'-0"

THIS DRAWING REMOVED FROM PROJECT

N

3/8" = 1' - 0"

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

GENERAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE THE NPW SYSTEM EQUIPMENT AND RELATED ELECTRICAL.

B. CONTRACTOR SHALL COORDINATE WITH GENERAL PRIOR TO THE BID TO INCLUDE ALL PROVISIONS REQUIRED FOR THE PROPOSED APPROVED SYSTEM.

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
ZW. SIDDIQUI
77702
REGISTERED
PROFESSIONAL
ENGINEER
11/11/2022

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

ELECTRICAL

NPW SYSTEM AREA PLAN

WBS NUMBER
R-000265-0147-4
DRAWING SCALE
AS NOTED
CITY OF HOUSTON PM
XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 326 OF 3788

FOR CITY OF HOUSTON USE ONLY

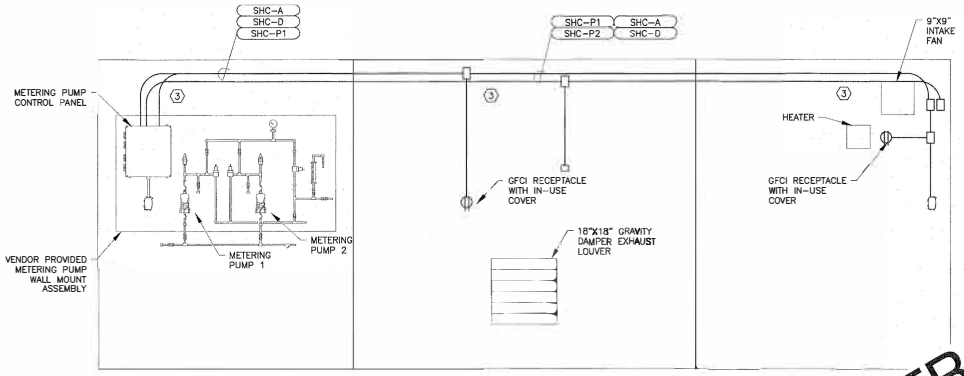
80367

STATE OF TEXAS
REGISTERED
PROFESSIONAL
ENGINEER
HOUSTON, TEXAS

E-51-101

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4160-BV (AH Imp Pkg 2)\Drawings\E-51-101 NPW System Area Plan.dwg

THIS DRAWING REMOVED FROM PROJECT

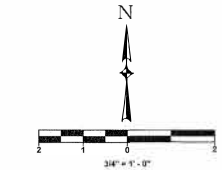


KEYED NOTES:

1. PROVIDE 4/0 COPPER GROUND IN DUCT BANK AND BOND TO BUILDING FOUNDATION REBAR.
2. STUB UP DUCT BANK RISERS ON EXTERIOR WALL AND PENETRATE WALL WITHIN 18 INCHES OF THE ROOF.
3. ROUTE ALL CONDUIT HIGH ON WALL AND DROP A VERTICAL CONDUIT TO DEVICE BOXES PANELS OR EQUIPMENT.
4. COORDINATE PROCUREMENT AND CONTROL REQUIREMENTS PRIOR TO PURCHASE TO ENSURE COMPLETE AND FUNCTIONAL

...VIDED IS VAPOR TIGHT AND RATED ... ENVIRONMENT.

...UIT, FITTINGS, DEVICE BOXES, AND COVERS SHALL ...C PLASTIC WITH WEATHERPROOF RATING.



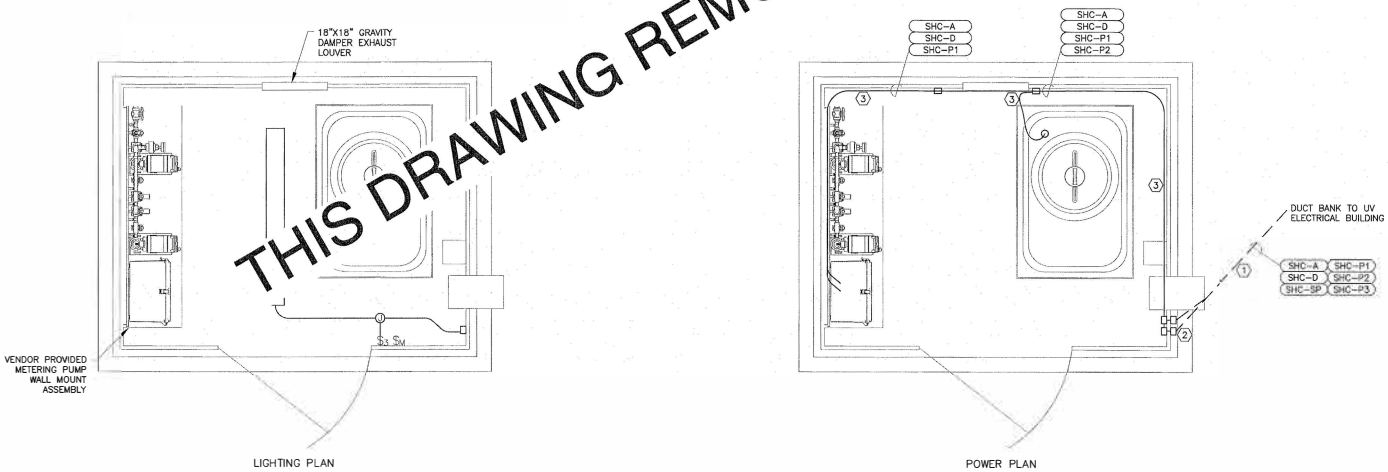
THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

GENERAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE THE NPW SODIUM HYPOCHLORITE SYSTEM EQUIPMENT AND RELATED ELECTRICAL.

B. CONTRACTOR SHALL COORDINATE WITH GENERAL PRIOR TO THE BID TO INCLUDE ALL PROVISIONS REQUIRED FOR THE PROPOSED APPROVED SYSTEM.

C. CHEMICAL SHELTER MAY BE VENDOR PROVIDED IN FULL COMPLIANCE WITH DIVISION 16 SPECIFICATIONS.



NPW SODIUM HYPOCHLORITE BUILDING PLAN
3/4" = 1'-0"

No.	Date	Revisions	App.
1	1/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT
PLANT EXPANSION
ELECTRICAL
NPW SODIUM HYPOCHLORITE
BUILDING PLAN

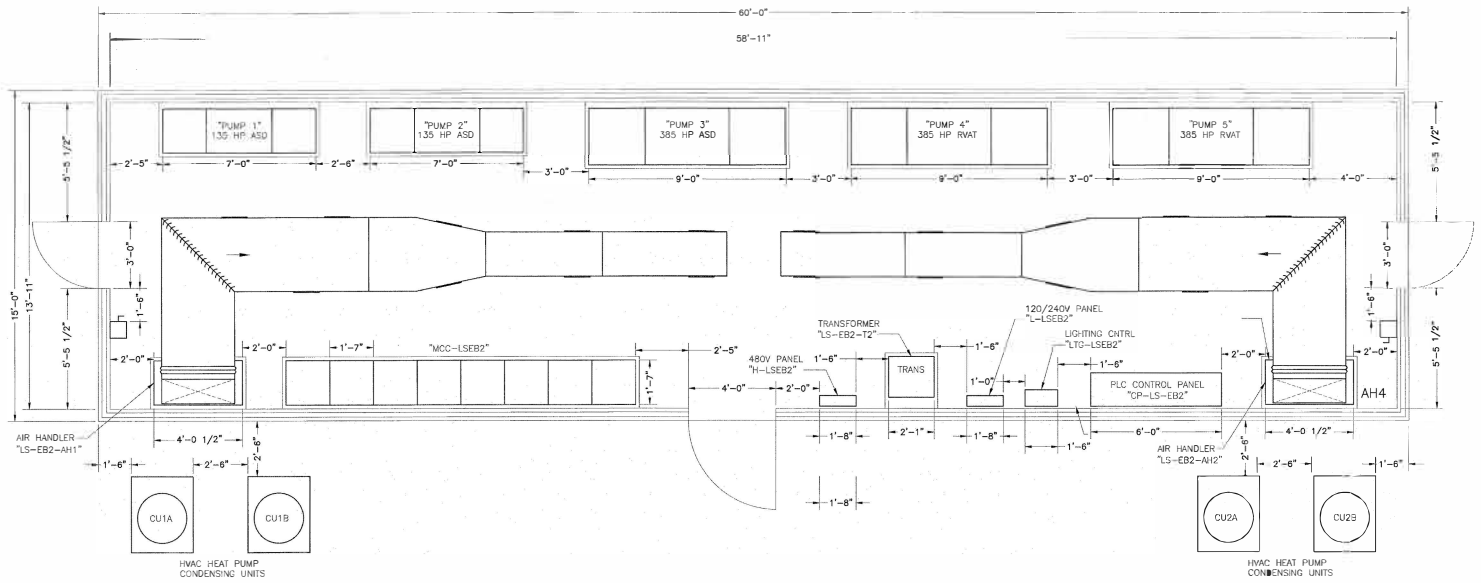
WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 327 OF 378	

80367

E-51-102

FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160-BV (4H Imp Pkg 2)\Drawings\E-51-102 Sodium Hypochlorite Building Plan.dwg

EQUIPMENT	WEIGHT &	HEAT LOAD
2-135HP ASD	= 850LB EACH	= 2.7KW (2 DUTY)
1-385HP ASD	= 1680LB	= 7.7KW
2-385HP RVAT	= 1405LB EACH	= 2.4KW (1 DUTY)
1-MCC	= 2350LB	= 1.1KW
1-37.5 KVA TRANSFORMER	= 400LB	= 2.2KW
1-PLC CONTROL PANEL	= 300LB	= 200W
1-PLC CP UPS	= 100LB	= 120W
1-480V PANEL	= 130LB	= 150W
1-240/120V PANEL	= 100LB	= 100W
LIGHTING PKG	= 140LB	= 200W
HVAC AIR HANDLER & DUCT	= 630LB	= 580W



LIFT STATION NEW ELECTRICAL BUILDING NO.2 EQUIPMENT PLAN
3/8" = 1'-0"

0' 1' 2'-0"
SCALE: 3/8"=1'

GENERAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE THE GENERAL ARRANGEMENT OF HVAC AND ELECTRICAL EQUIPMENT IN THE LIFT STATION NEW ELECTRICAL BUILDING NO. 2.

B. BUILDING PROVIDER SHALL UTILIZE THE HEAT LOADING FOR HVAC UNIT SIZING.

C. DIMENSIONS ARE SUBJECT TO THE NEW BUILDING DIMENSIONS, NEW ELECTRICAL EQUIPMENT DIMENSIONS AND SHALL BE APPROVED PRIOR TO UNDERGROUND INSTALLATIONS.

No.	Date	Revisions	App.
7	11/11/22	RE-PACKAGED SET	ZMS
6	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

ELECTRICAL

LIFT STATION NEW ELECTRICAL BUILDING NO.2 EQUIPMENT PLAN

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 328 OF 378	

E-60-101

FILE PATH: E:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4160-BV (JAH Hou Proj 2)\Drawings\E-60-100s Lift Station Electrical Building No. 2 Plans.dwg

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\2418-Rv (AH Imp Pkg 2)\Drawings\E-60-102a LIft Station Electrical Building No 2 Plans.dwg

0' 1' 2'-0"
SCALE: 3/8"=1'

GENERAL NOTES:

A. ROUTE CONDUITS UNDERGROUND IF POSSIBLE. IF CONDUITS MUST BE ROUTED OVERHEAD, ROUTE CONDUITS ON STRUT, ATTACHED TO STRUCTURE OR ON TRAPEZE TYPE HANGERS.

B. ALL ANCHORS, STRUT, STRUT FITTINGS, STRAPS AND HARDWARE SHALL BE 316 STAINLESS STEEL.

C. PROVIDE NEMA 4X, 316SS ENCLOSED, FUSED DISCONNECTS FOR THE A/C UNITS. A/C UNIT FEEDERS MAY BE ROUTED UNDER THE SLAB.

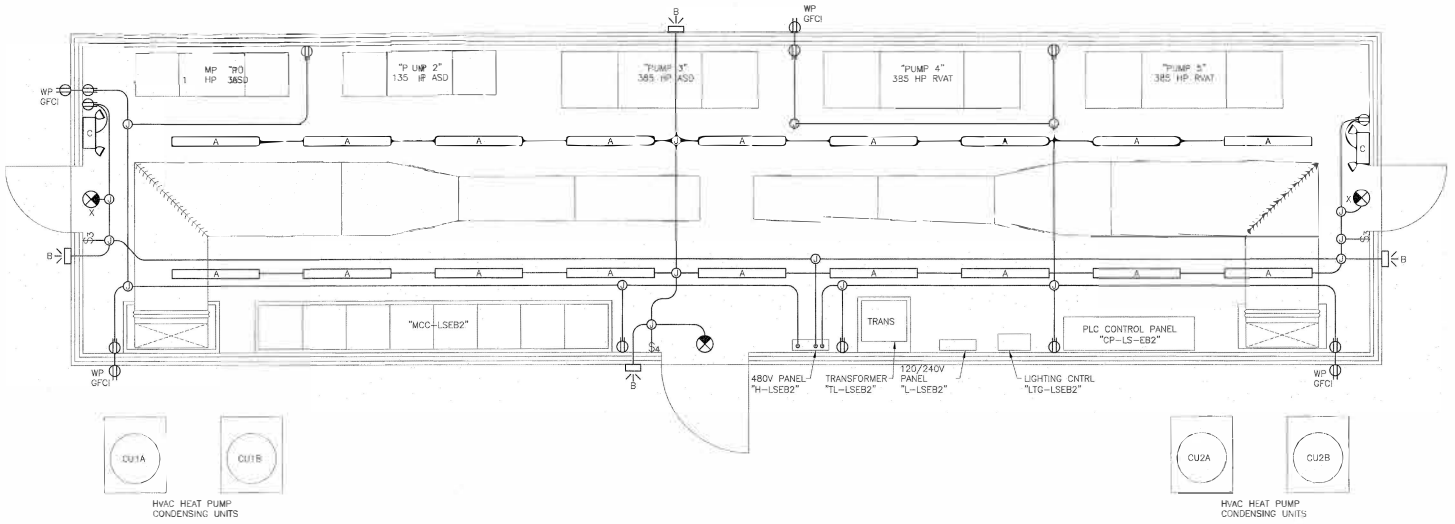
D. PROVIDE CONDUIT AND PULL STRING FOR HVAC THERMOSTATS.

E. SEE LIGHT FIXTURE SCHEDULE FOR LIGHT FIXTURE CATALOG NUMBERS, FIXTURE DESCRIPTIONS AND INSTALLATION INSTRUCTIONS.

F. ROUTE CONDUIT SUCH THAT THERE NO CONNECTIONS IN CONDUIT FITTINGS. IF CONNECTIONS ARE REQUIRED A BOX SIZED ACCORDINGLY SHALL BE PROVIDED.

G. PROVIDE RED DOT "CODE KEEPER TYPE (OR APPROVED EQUAL) METALLIC "IN-USE" GFCI COVER, INSTALLED AT 2'-0" ABOVE GRADE.

H. INSTALL RECEPTACLES 2'-0" ABOVE FINISHED FLOOR OR FINISHED GRADE. INSTALL LIGHT SWITCHES 3'-6" ABOVE FINISHED FLOOR.



LIFT STATION NEW ELECTRICAL BUILDING NO.2 POWER AND LIGHTING PLAN
3/8" = 1'-0"

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/23	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-565
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
Z.M. SHEIKH
77702
REGISTERED
PROFESSIONAL
ENGINEER
10/12/2023

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
ELECTRICAL

LIFT STATION NEW ELECTRICAL BUILDING NO.2 POWER AND LIGHTING PLAN

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO.	329 OF 378

FOR CITY OF HOUSTON USE ONLY
80367
REGISTERED
PROFESSIONAL
ENGINEER
HOUSTON, TEXAS

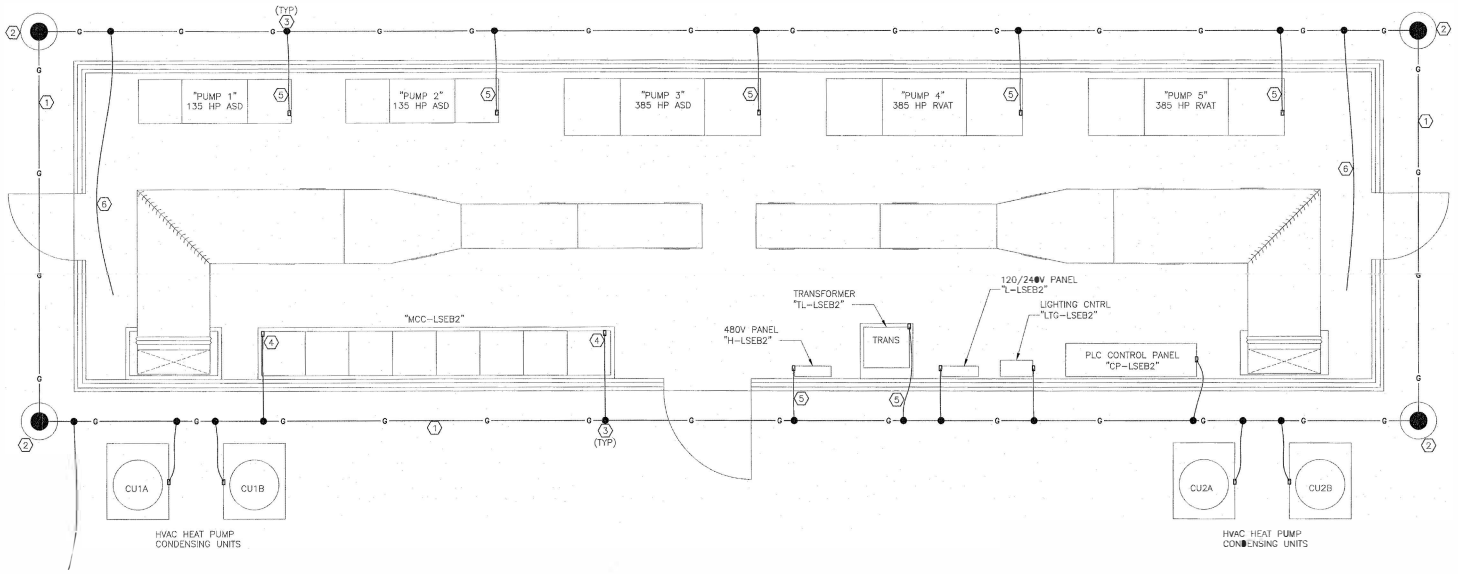
E-60-102

KEYED NOTES:

1. 4/0 COPPER GROUND RING AT 24" MINIMUM BELOW GRADE.
2. 3/4"X20' GROUND ROD WITH EXOTHERMIC CONNECTIONS TO GROUND RING.
3. EXOTHERMICALLY WELDED CONNECTION, SEE SPECIFICATIONS FOR REQUIREMENTS.
4. PROVIDE A 4/0 COPPER GROUNDING CONDUCTOR, TO MCC-LSEB2 EQUIPMENT GROUND BAR AND ENCLOSURE STRUCTURE FRAME.
5. PROVIDE A #2 COPPER GROUNDING CONDUCTOR, TO EACH 480V FED MISCELLANEOUS EQUIPMENT ENCLOSURE.
6. PROVIDE UFFER GROUND IN SLAB OF BUILDING.

N

0' 1' 2'-0"
SCALE: 3/8"=1'



LIFT STATION NEW ELECTRICAL BUILDING NO.2 GROUNDING PLAN
3/8" = 1'-0"

GENERAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE THE NEW LIFT STATION ELECTRICAL BUILDING NO. 2 GROUNDING, LIGHTNING PROTECTION AND UNDER SLAB PROVISIONS.

B. ELECTRICAL EQUIPMENT, STRUCTURAL STEEL, FOUNDATION REBAR AND DUCT BANK SYSTEM SHALL ALL BE CONNECTED TO THE GROUND RING.

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
Z.M. SHEIKH
77702
REGISTERED
PROFESSIONAL
ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT
PLANT EXPANSION
ELECTRICAL
LIFT STATION NEW
ELECTRICAL BUILDING NO.2
GROUNDING PLAN

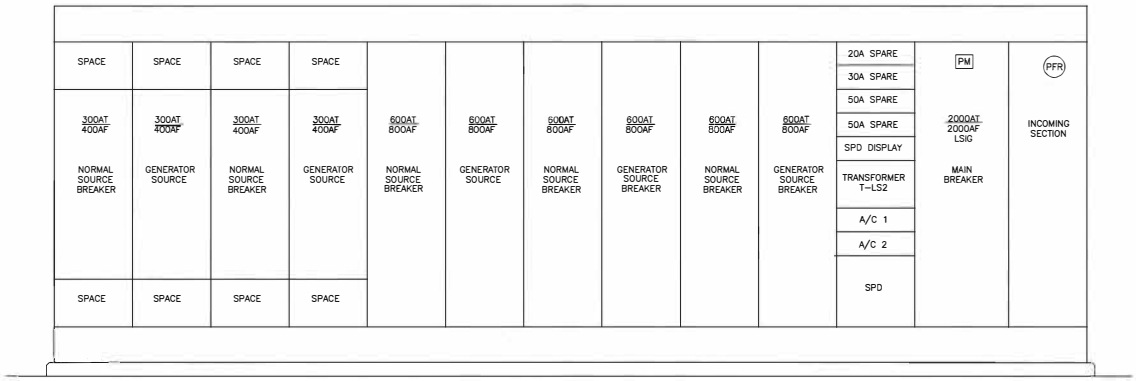
WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO.	330 OF 378

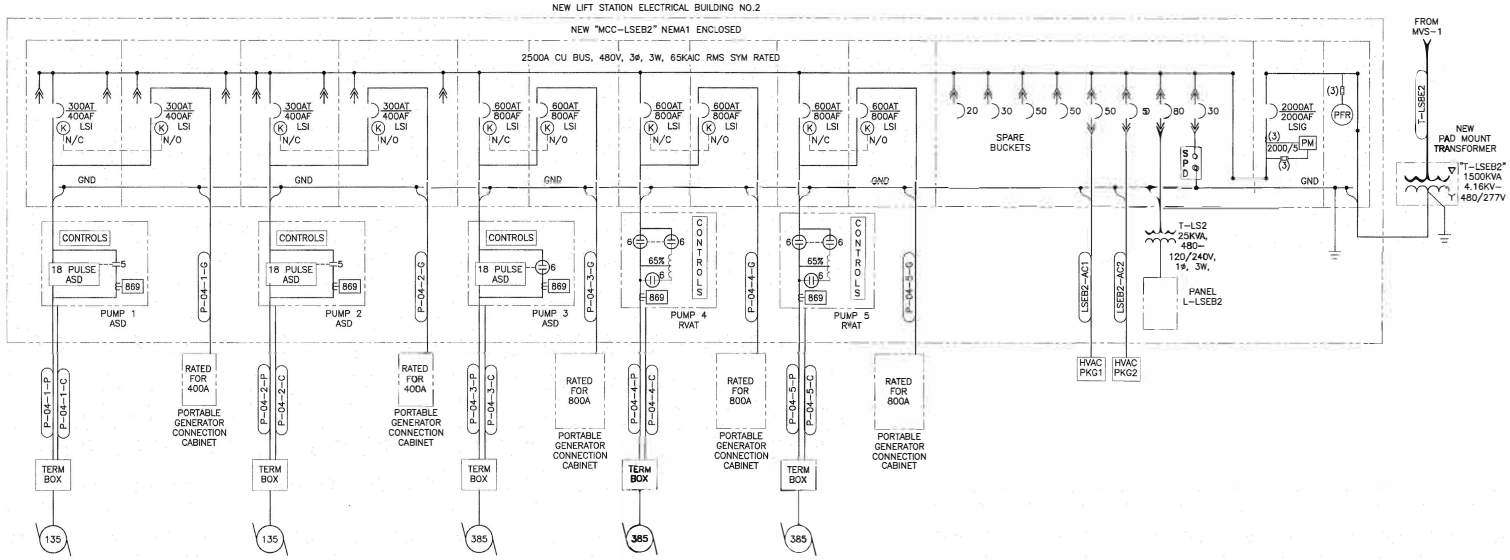
FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
80367
REGISTERED
PROFESSIONAL
ENGINEER
HOUSTON, TEXAS

E-60-103

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\16-BV (IAH Imp Pkg 2)\Drawings\E-60-Title Lift Station Electrical Building No 2 Phase.dwg





No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

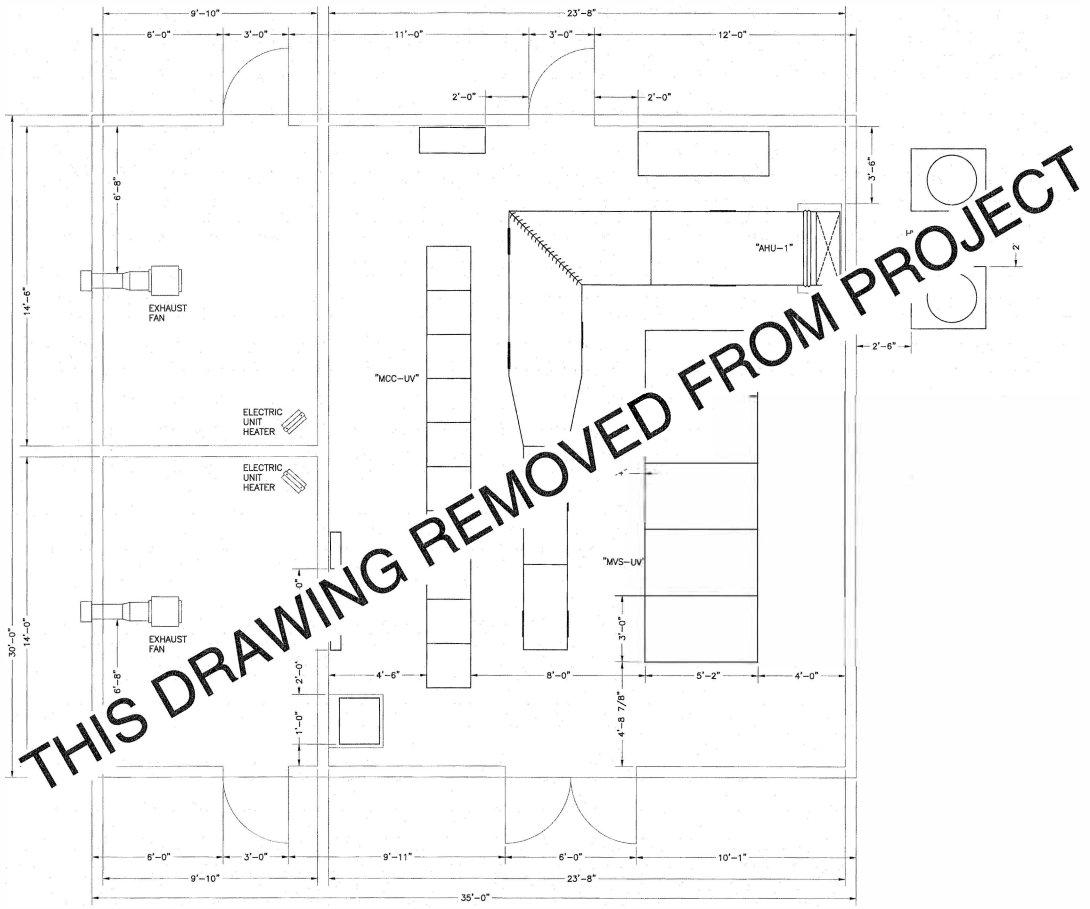
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
ELECTRICAL
NEW MCC-LSEB2
ONE LINE DIAGRAM

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	
	Se XIAOHUA (SHARI) LIN, P.E.
SHEET NO.	331 OF 378

FOR CITY OF HOUSTON USE ONLY

E-60-701

C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\Drawings\E-60-701 New MCC-LSEB2 One Line Diagram.dwg, 11/9/2022 8:19:04 PM, DWG To PDF.pc3
FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\Drawings\E-60-701 New MCC-LSEB2 One Line Diagram.dwg



UV ELECTRICAL BUILDING EQUIPMENT PLAN
3/8" = 1'-0"

THIS DRAWING REMOVED FROM PROJECT

N

0' 1' 2'-0"
SCALE: 3/8"=1'

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

GENERAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE THE GENERAL ARRANGEMENT OF ELECTRICAL EQUIPMENT IN THE UV DISINFECTION NEW ELECTRICAL BUILDING.

B. DIMENSIONS ARE SUBJECT TO THE NEW BUILDING DIMENSIONS, NEW ELECTRICAL EQUIPMENT DIMENSIONS AND SHALL BE APPROVED PRIOR TO UNDERGROUND INSTALLATIONS.

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
ZHIHUA SHARI LIN
80367
REGISTERED
PROFESSIONAL
ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

ELECTRICAL

UV ELECTRICAL BUILDING EQUIPMENT PLAN

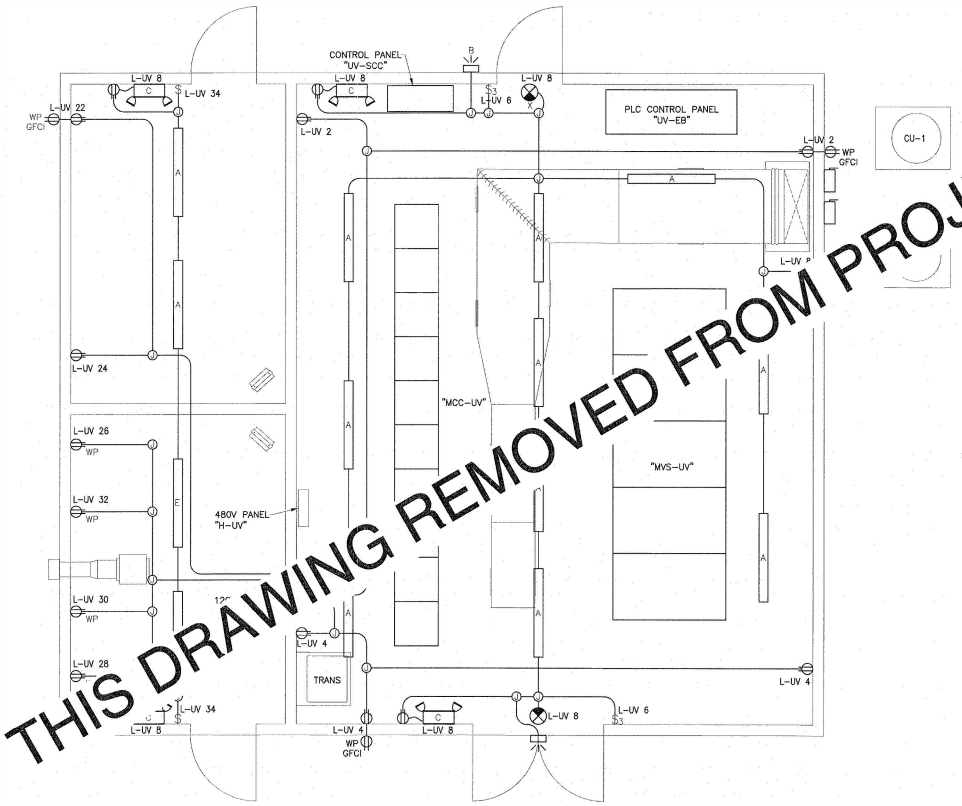
WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
	SHEET NO. 332 OF 378

FOR CITY OF HOUSTON USE ONLY

80367

E-61-101

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4180-BV (WH Imp Pkg 2)\Drawings\E-61-100s UV Electrical Building Plans.dwg



UV ELECTRICAL BUILDING POWER AND LIGHTING PLAN
3/8" = 1'-0"

THIS DRAWING REMOVED FROM PROJECT

N

0' 1' 2'-0"
SCALE: 3/8"=1'

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

GENERAL NOTES:

A. ROUTE CONDUITS UNDERGROUND IF POSSIBLE. IF CONDUITS MUST BE ROUTED OVERHEAD, ROUTE CONDUITS ON STRUT, ATTACHED TO STRUCTURE OR ON TRAPEZE TYPE HANGERS.

B. ALL ANCHORS, STRUT, STRUT FITTINGS, STRAPS AND HARDWARE SHALL BE 316 STAINLESS STEEL.

C. PROVIDE NEMA 4X, 316SS ENCLOSED, FUSED DISCONNECTS FOR THE A/C UNITS. A/C UNIT FEEDERS MAY BE ROUTED UNDER THE SLAB.

D. PROVIDE CONDUIT AND PULL STRING FOR HVAC THERMOSTATS.

E. SEE LIGHT FIXTURE SCHEDULE FOR LIGHT FIXTURE CATALOG NUMBERS, FIXTURE DESCRIPTIONS AND INSTALLATION INSTRUCTIONS.

F. ROUTE CONDUIT SUCH THAT THERE NO CONNECTIONS IN CONDUIT FITTINGS. IF CONNECTIONS ARE REQUIRED A BOX SIZED ACCORDINGLY SHALL BE PROVIDED.

G. PROVIDE RED DOT "CODE KEEPER TYPE (OR APPROVED EQUAL) METALLIC "IN-USE" GFCI COVER, INSTALLED AT 2'-0" ABOVE GRADE.

H. INSTALL RECEPTACLES 2'-0" ABOVE FINISHED FLOOR OR FINISHED GRADE. INSTALL LIGHT SWITCHES 3'-6" ABOVE FINISHED FLOOR.

No.	Date	Revisions	App.
1	11/11/22	RETACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

ELECTRICAL

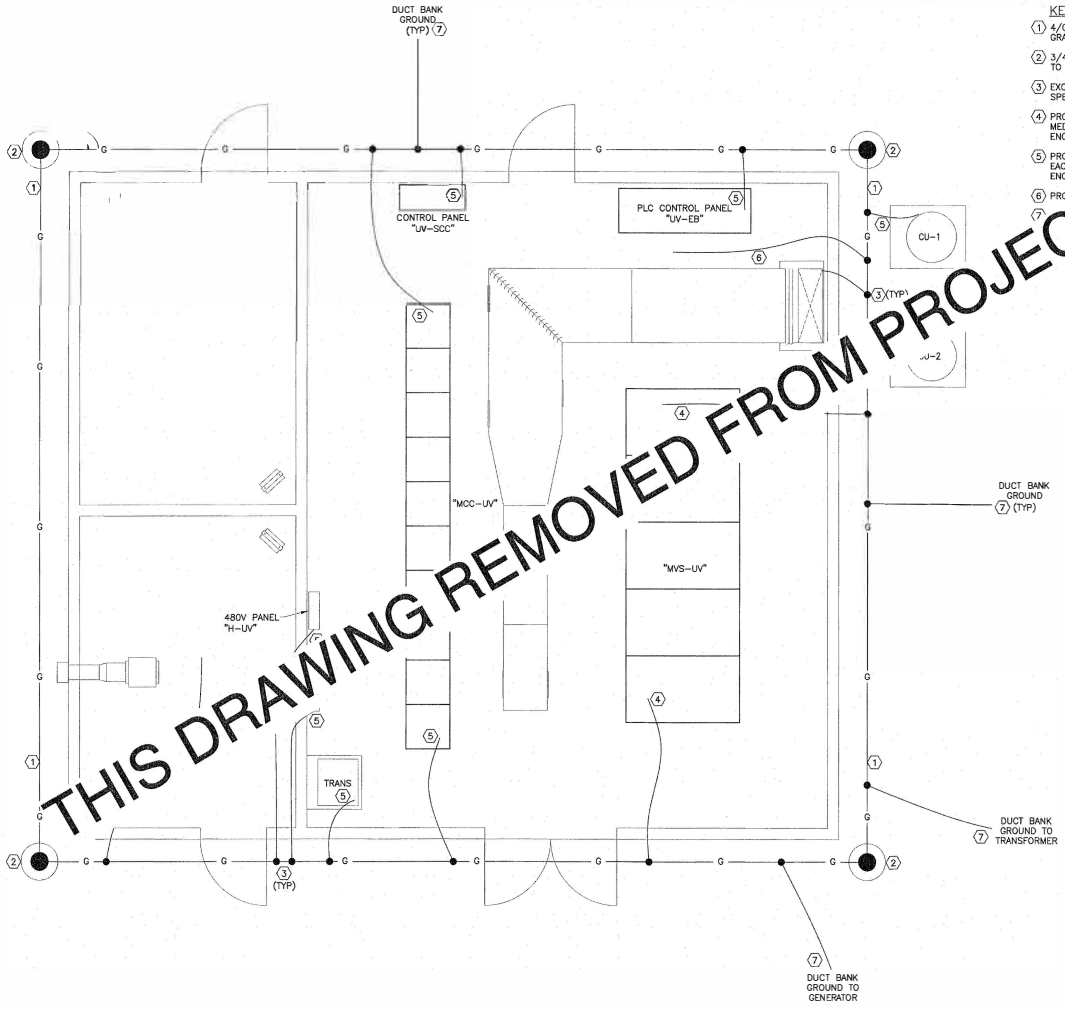
UV ELECTRICAL BUILDING POWER AND LIGHTING PLAN

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 333 OF 378	

FOR CITY OF HOUSTON USE ONLY

E-61-102

File PATH: C:\Users\KGI Laptop\Kalluri Group, Inc\WBS - Documents\4160-By Wtr Imp Pkg 2\Drawings\E-61-102a UV Electrical Building Plans.dwg



UV ELECTRICAL BUILDING GROUNDING
PLAN
3/8" = 1'-0"

KEYED NOTES:

1. 4/0 COPPER GROUND RING AT 24" MINIMUM BELOW GRADE.
2. 3/4"X20' GROUND ROD WITH EXOTHERMIC CONNECTIONS TO GROUND RING.
3. EXOTHERMICALLY WELDED CONNECTION, SEE SPECIFICATIONS FOR REQUIREMENTS.
4. PROVIDE A 4/0 COPPER GROUNDING CONDUCTOR, TO MEDIUM VOLTAGE EQUIPMENT GROUND BAR AND ENCLOSURE STRUCTURE FRAME.
5. PROVIDE A #2 COPPER GROUNDING CONDUCTOR, TO EACH 480V FED MISCELLANEOUS EQUIPMENT ENCLOSURE.
6. PROVIDE ... ER GROUND IN SLAB OF BUILDING.
7. ... GROUNDS ARE REQUIRED TO BE 4/0.

N

0' 1' 2'-0"
SCALE: 3/8"=1'

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

GENERAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE THE NEW UV ELECTRICAL BUILDING GROUNDING, LIGHTNING PROTECTION AND UNDER SLAB PROVISIONS.

B. ELECTRICAL EQUIPMENT, STRUCTURAL STEEL, FOUNDATION REBAR AND DUCT BANK SYSTEM SHALL ALL BE CONNECTED TO THE GROUND RING.

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
K.M. SOVICH
77702
REGISTERED
PROFESSIONAL
ENGINEER
10/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT
PLANT EXPANSION
ELECTRICAL
UV ELECTRICAL BUILDING
GROUNDING
PLAN

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	Se XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 334 OF 378	

FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
80367
LICENSED
PROFESSIONAL
ENGINEER
HOUSTON, TEXAS

E-61-103

THIS DRAWING REMOVED FROM PROJECT

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group Inc\KGI - Documents\4-61-SV (IAH Wst Pkg 2)\Drawings\E-61-103a UV Electrical Building Plan.dwg

NEW PANELBOARD "H-UV" IS TO BE LOCATED IN THE NEW UV ELECTRICAL BUILDING

PANEL "H-UV"

BUS AMPS 225
MLO YES
VOLTS 480 KAIC 35
PHASE 3 WIRE 3

NOTES
1. BREAKERS 3P/20A UNLESS MARKED OTHERWISE
2. ADJ. CKTS. TO BAL. PNL.
3. SURFACE MOUNT, NEMA 1.
4. BOLT IN BREAKERS
5. ALL BUS SHALL BE COPPER

CKT. DESCRIPTION	WIRE	LOAD	BKR.			BKR.	LOAD	WIRE	CKT. DESCRIPTION
	12			1	2			12	HVAC COND UNIT
GATE SG-08-003	12	1500	20	3	4	50	3000	12	CU-09-001
	12			5	6			12	
UV CHANNEL 1 INLET	12			7	8			12	HVAC AH UNIT
GATE SG-09-001	12	1500	20	9	10	30	3000	12	AH-09-002
	12			11	12			12	
UV CHANNEL 2 INLET	12			13	14			12	NPW AIR COMPRSSOR
GATE SG-09-002	12	1500	20	15	16	20	3000	12	AC-12-001
	12			17	18			12	
FUTURE				19	20				
UV CHANNEL 3 INLET			20	21	22	50			SPARE
GATE SG-09-003				23	24				
SPARE				25	26				
			20	27	28	40			SPARE
				29	30				
SPARE				31	32				
			20	33	34	30			SPARE
				35	36				
SPARE				37	38				
			20	39	40	20			SPARE
				41	42				
SPARE				43	44				
			30	45	46	30			SPARE
				47	48				
	6			49	50	45			SPARE
SITE LIGHTING	6	1270	30	51	52		15000	8	MINI-POWER CENTER
	6			53	54	45		8	MPC-GEN

NEW MINI-POWER CENTER "MPC-GEN-UV" IS TO BE LOCATED IN THE NEW UV GENERATOR ENCLOSU

PANEL MPC-GEN-

MAIN BRKR. AMPS 50
TRANSFORMER 15KVA
VOLTS 120/240 AIC 18 KA
PHASE 1 WIRE 2 SN ✓

NOTES
1. BREAKERS 1P/20A UNLESS MARKED OTHERWISE.
2. ADJ. CKTS. TO BAL. PNL.
3. SURFACE MOUNT, NEMA 3R SS
4. MOUNT MINI POWER CENTER WITH PANEL COVER HINGE AT 72" AFF.

CKT. DESCRIPTION	WIRE	LOAD	BKR.			BKR.	LOAD	WIRE	CKT. DESCRIPTION
GENSET BATTERY CHARGER	12	200		1	2	20	400	12	ENCLOSURE LIGHTING
CONTROLS	12	150		3	4	20	400	12	ENCOSURE OUTLETS
SPARE			20	5	6	20			CONTROLS
SPARE			20	7	8	20			SPARE
SPARE			20	9	10	20			SPARE
SPARE			20	11	12	20			SPARE
SPARE			20	13	14	20			SPARE
SPARE			20	15	16	20			SPARE
SPARE			20	17	18	20			SPARE
SPARE			20	19	20	30	400	10	WATER JACKET HEATER
SPARE			20	21	22			10	
SPARE			20	23	24	30			SPARE
SPARE			20	25	26				
		350					1,200		

TOTAL VA = 1,550
1,550 VA AT 240 V= 6.5 AMPS
THE CONDUCTORS, PANEL, AND MAIN BREAKER ARE ALL RATED PROPERLY TO SERVE THE LOAD

NEW PANELBOARD "L-UV" IS TO BE LOCATED IN THE NEW UV ELECTRICAL BUILDING

PANEL "L-UV"

BUS AMPS 150
MAIN BRKR 125A WIRE SIZE #1 AWG
VOLTS 120/240 AIC 10 KAIC
PHASE 1 WIRE 3 SN YES

NOTES
1. BREAKERS 1P/20A UNLESS MARKED OTHERWISE.
2. ADJ. CKTS. TO BAL. PNL.
3. SURFACE MOUNT, NEMA 1.
4. BOLT IN BREAKERS
5. ALL BUS SHALL BE COPPER

CKT. DESCRIPTION	WIRE	LOAD	BKR.	A	B	BKR.	LOAD	WIRE	CKT. DESCRIPTION
PLC-UV CABINET UPS	12	300	20	1	2	20	360	12	UV ELECTRICAL ROOM NORTH OUTLETS
PLC-UV CABINET CONVENIENCE OUTLET	12	360	20	3	4	20	360	12	UV ELECTRICAL ROOM SOUTH OUTLETS
UV SYSTEM CONTROL CENTER CABINET	10	750	20	5	6	20	280	12	UV ELECTRICAL ROOM LIGHTS
UV SCC CABINET CONVENIENCE OUTLET	10	750	20	7	8	20	210	12	UV BLDG EMER & EXIT LIGHTS
LEVEL SENSOR CONTROL BOX CHANNEL 1	10	750	20	9	10	20	–	–	SPARE
LEVEL SENSOR CONTROL BOX CHANNEL 2	10	750	20	11	12	20	–	–	SPARE
LEVEL SENSOR CONTROL BOX CHANNEL 3			20	13	14	20	–	–	SPARE
UV INFLUENT LEVEL TRANSMITTER	12	40	20	15	16	20	–	–	SPARE
UV EFFLUENT LEVEL TRANSMITTER	12	40	20	17	18	20	–	–	SPARE
SPARE	–	–	20	19	20	20	–	–	SPARE
UV FACILITY EAST OUTLETS	–	–	20	21	22	20	360	12	STORAGE ROOM OUTLETS
UV FACILITY WEST OUTLETS	–	–	20	23	24	20	360	12	STORAGE ROOM OUTLETS
UV FACILITY LOW BAY LIGHTS	–	–	20	25	26	20	360	12	EFFLUENT ROOM OUTLETS
UV FACILITY LOW BAY LIGHTS	–	–	20	27	28	20	360	12	EFFLUENT ROOM OUTLETS
SPARE	–	–	20	29	30	20	100	12	EFFLUENT ROOM INSTRUMENT POWER
SPARE	–	–	20	31	32	20	100	12	EFFLUENT ROOM INSTRUMENT POWER
SPARE	–	–	20	33	34	20	160	12	STORAGE & EFFLUENT ROOM LIGHTS
SODIUM HYPO METERING SKID POWER	12	150	20	35	36	20	–	–	SPARE
SODIUM HYPO BLDG LIGHT AND OUTLET	12	360	20	37	38	20	–	–	SPARE
SODIUM HYPO BLDG HEATER	12	900	20	39	40	20	–	–	SPARE
SPARE	–	–	20	41	42	20	–	–	SPARE
		4,250					3,010		

TOTAL VA = 7,260
7,260 VA = 30 AMPS AT 240 VOLTS
THE PANEL, TRANSFORMER AND FEEDER ARE RATED FOR THE LOAD

UV ELECTRICAL BUILDING PANELBOARD SCHEDULES
NTS

THIS DRAWING REMOVED FROM PROJECT

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

GENERAL NOTES:

A. EACH CIRCUIT SHALL BE PROVIDED A DEDICATED NEUTRAL, IDENTIFIED WITH CORRESPONDING CIRCUIT NUMBER.

B. EACH CONDUIT SHALL BE TAGGED WITH THE PANEL DESIGNATOR AND CIRCUIT NUMBERS THAT ARE IN THE CONDUIT AT EACH BOX, STUB UP, TRANSITION THRU WALL AND END OF CIRCUIT.

C. ALL ANCHORS, STRUT, STRUT FITTINGS, AND HARDWARE SHALL BE 316 STAINLESS STEEL.

D. ROUTE CONDUIT SUCH THAT THERE NO CONNECTIONS IN CONDUIT FITTINGS. IF CONNECTIONS ARE REQUIRED A BOX SIZED ACCORDINGLY SHALL BE PROVIDED.

E. INSTALL PANELBOARDS 6'-0" ABOVE FINISHED FLOOR TO THE TOP OF ENCLOSURE.

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT
PLANT EXPANSION
ELECTRICAL

UV ELECTRICAL BUILDING
PANELBOARD
SCHEDULES

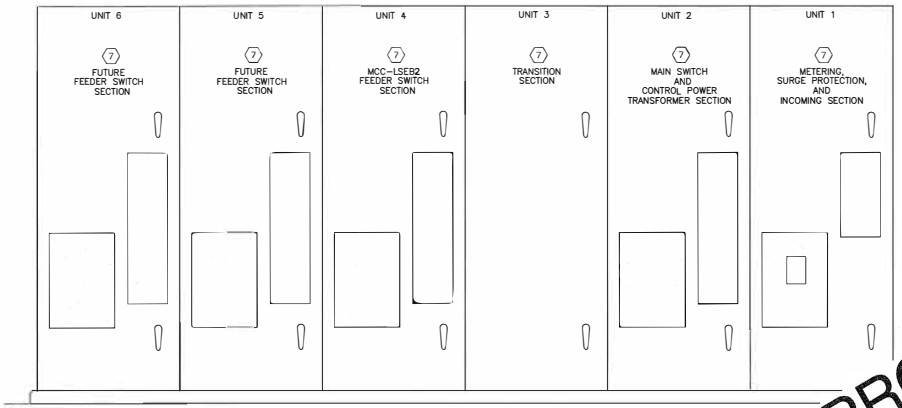
WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.

FOR CITY OF HOUSTON USE ONLY

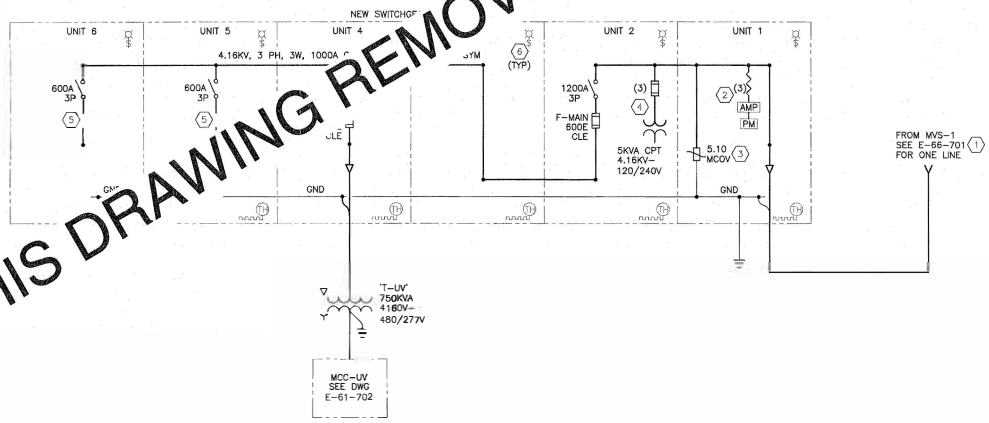
E-61-601 SHEET NO. 35 OF 378

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\Drawings\E-61-601 UV Electrical Building Panel Schedules.dwg

NEW SWITCHGEAR MVS-UV, INDOOR METAL-ENCLOSED, 5 KV LOAD INTERRUPTER SWITCHGEAR



NEW MVS-UV SWITCHGEAR
ELEVATION
NTS



MVS-UV SWITCHGEAR ONE LINE
DIAGRAM
NTS

KEYED NOTES:

1. FEEDER ROUTED THROUGH EXISTING AND PROPOSED UNDERGROUND DUCT BANK. SEE SITE PLAN E-00-102 FOR OVERALL ROUTE
2. PROVIDE OHMIC TYPE RESISTIVE VOLTAGE DIVIDER SENSING SYSTEM, AMPLIFIER AND POWER METER. PT STYLE VOLTAGE SENSING IS NOT ACCEPTABLE.
3. MANUFACTURER SHALL CONFIRM SIZING AND PROVIDE METAL OXIDE SURGE ARRESTER PROTECTION.
4. PROVIDE CPT FOR LIGHTS, HEATERS AND AUXILIARY POWER REQUIRED. MANUFACTURER SHALL CONFIRM SIZE AND LOCATION OF CPT.
5. MANUFACTURER SHALL EQUIP AND PROVIDE ALL COMPONENTS, HARDWARE AND WIRING REQUIRED TO PREPARE SECTION FOR FUSE INSTALLATION AND OPERATION.
6. MANUFACTURER SHALL PROVIDE FACTORY INSTALLED SECTION HEATERS, AND LIGHTING ON DOOR OR TOGGLE SWITCH, COORDINATE OWNER PREFERENCE AND BRAND STANDARD CONSTRUCTION.
7. SEE SPECIFICATION SECTION 16195 FOR GEAR IDENTIFICATION REQUIREMENTS. PROVIDE LARGE PHENOLIC NAMEPLATES FOR EXTERIOR DOORS.

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

GENERAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE THE NEW UV FACILITY 5KV SWITCHGEAR. CONTRACTOR SHALL COORDINATE PRIOR TO SHOP DRAWING CREATION TO CONFIRM LAYOUT OF PROPOSED SWITCHGEAR CONFIGURATION.

B. CONTRACTOR SHALL GIVE WRITTEN NOTICE TO THE CITY CONSTRUCTION REPRESENTATIVE PRIOR TO COMMENCEMENT OF ANY EQUIPMENT REMOVAL WORK.

C. INFORMATION CONTAINED IN THIS ONE LINE WAS CREATED BASED ON RECORD DRAWINGS AND INFORMATION COLLECTED. ITS ACCURACY IS NOT GUARANTEED AND ITS USE IN NO WAY RELIEVES THE CONTRACTOR OF ANY RESPONSIBILITY FOR LOSS DUE TO INACCURACIES.

THIS DRAWING REMOVED FROM PROJECT

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration № F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

STATE OF TEXAS
77709
REGISTERED
PROFESSIONAL
ENGINEER
10/11/2022

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

ELECTRICAL

MVS-UV SWITCHGEAR ONE LINE DIAGRAM

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.

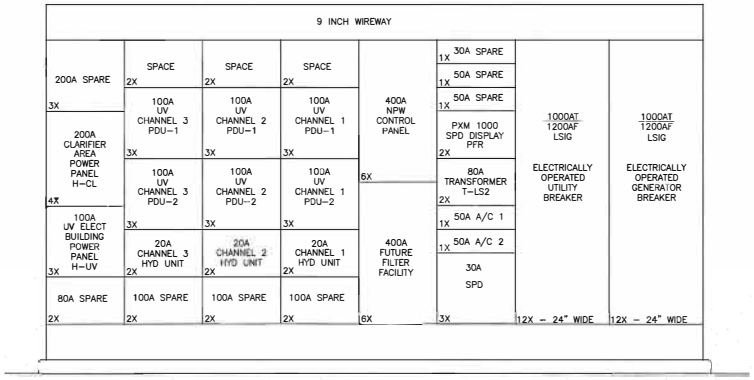
FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
80367
LICENSED
PROFESSIONAL
ENGINEER

E-61-701

SHEET NO. 336 OF 378

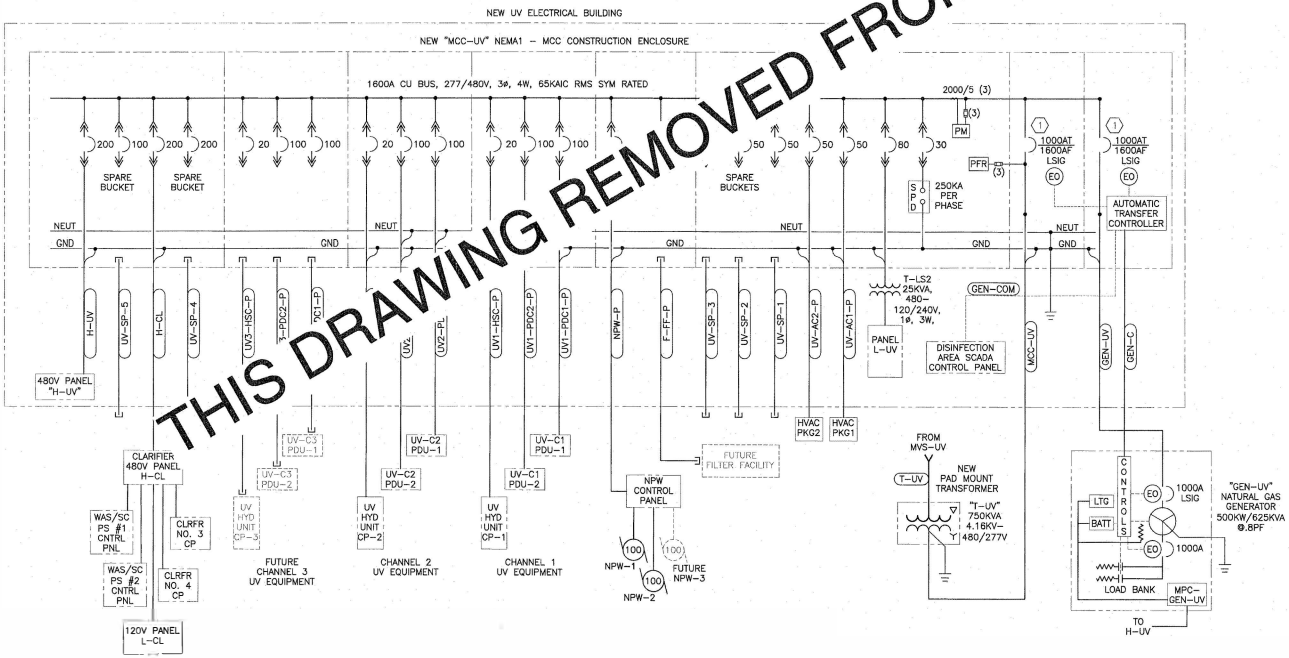
FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\A160-BV (AH Imp Pkg 2)\Drawings\E-61-701 MVS-UV Switchgear One Line Diagram.dwg



UV ELECTRICAL BUILDING MCC–UV
ELEVATION
NTS

KEYED NOTES:

(1) MAIN UTILITY AND GENERATOR BREAKERS SHALL BE 4 POLE. NEUTRAL SHALL BE SOLID AND AS ILLUSTRATED, THE MCC–UV SHALL BE SUPPLIED WITH SOLID NEUTRAL FOR 277V LOADS.



MCC–UV ONE LINE
DIAGRAM
NTS

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

GENERAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE THE DISINFECTION AREA MOTOR CONTROL CENTER MCC–UV. WORK DESCRIBED ON THIS DRAWING WILL REQUIRE COORDINATION BETWEEN THE GENERATOR MANUFACTURER AND THE MCC MANUFACTURER.

B. COORDINATE INSTRUMENTATION, AND POWER TRANSFER CONTROLS WITH SYSTEM INTEGRATOR IN SPECIFICATION 13300 COORDINATION MEETINGS.

C. ALL STRUT, HARDWARE, STRAPS AND ANCHORS SHALL BE 316 STAINLESS STEEL, WITHOUT EXCEPTION.

THIS DRAWING REMOVED FROM PROJECT

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

ELECTRICAL

UV ELECTRICAL BUILDING MCC–UV ONE LINE DIAGRAM

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.

FOR CITY OF HOUSTON USE ONLY

80367

E-61-702

SBL E3E57 NOF 38

FILE PATH: c:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160-BV (JAH Imp Pkg 2)\Drawings\E-61-702 MCC-UV One Line Diagram.dwg

PANEL "DPB" (1)

BUS AMPS 225
MAIN BRKR. AMPS 225
VOLTS 480/277 AIC 42 K
PHASE 3 WIRE 4 SN ✓

CKT. DESCRIPTION	WIRE	LOAD	BKR.			BKR.	LOAD	WIRE	CKT. DESCRIPTION
SITE LIGHTING		8800	20	1	2	20	5000		TRANSFORMER "TC"
SITE LIGHTING		8800	20	3	4	20	5000		TRANSFORMER "TC"
SITE LIGHTING		8800	20	5	6	20	800		LIGHTING
SPACE			20	7	8	20			SPACE
				9	10				
				11	12				
				13	14				
				15	16				
				17	18				
				19	20				
				21	22	150			PANELBOARD H-AB3 (5)
				23	24				

225
N
TOTAL LOAD = XX KVA

* USE 1°C. UNLESS STATED OTHERWISE. LOCATION: HEADWORKS AREA

PANEL "LPC" (2)

MAIN BRKR. AMPS 225
BUS AMPS 225
VOLTS 120/240 AIC 18 KA
PHASE 1 WIRE 3 SN ✓

CKT. DESCRIPTION	WIRE	LOAD	BKR.			BKR.	LOAD	WIRE	CKT. DESCRIPTION
LIGHTING-AERATION BASIN		280	20	1	2	20	280		LIGHTING-AERATION BASIN
LIGHTING-AERATION BASIN		280	20	3	4	20	280		LIGHTING-AERATION BASIN
RECEPT. AERATION BASIN		360	20	5	6	20	360		RECEPT. AERATION BASIN
RECEPT. AERATION BASIN		360	20	7	8	20	360		RECEPT. AERATION BASIN
RECEPT. AERATION BASIN		360	20	9	10	20	360		RECEPT. AERATION BASIN
RECEPT. AERATION BASIN		360	20	11	12	20	360		RECEPT. AERATION BASIN
RECEPT. SHOP BLDG		360	20	13	14	20			PROGRAMMABLE CONTROLLER
SPACE			20	15	16	20			SPACE
SPACE			20	17	18	20			SPACE
SPACE			20	19	20	20			SPACE
SPACE			20	21	22	20			SPACE
SPACE				23	24				SPACE
				25	26				
				27	28				
				29	30				

225
N
TOTAL LOAD = XX KVA

(4) (4)

* USE 1°C. UNLESS STATED OTHERWISE. LOCATION: BLOWER BUILDING

PANEL "PP-2A" (3)

BUS AMPS 400
MAIN BRKR. AMPS ____ WIRE SIZE ____
VOLTS 480/277 AIC ____
PHASE 3 WIRE 4 SN ✓

CKT. DESCRIPTION	WIRE	LOAD	BKR.			BKR.	LOAD	WIRE	CKT. DESCRIPTION
GATE OPERATOR #12			20	1	2	20			GATE OPERATOR #1
				3	4				
				5	6				
GATE OPERATOR #2			20	7	8	20			GATE OPERATOR #3
				9	10				
				11	12				
GATE OPERATOR #4			20	13	14	20			GATE OPERATOR #5
				15	16				
				17	18				
GATE OPERATOR #6			20	19	20	20			GATE OPERATOR #7
				21	22				
				23	24				
GATE OPERATOR #8			20	25	26	20			GATE OPERATOR #9
				27	28				
				29	30				
GATE OPERATOR #10			20	31	32	20			GATE OPERATOR #11
				33	34				
				35	36				
SPACE				37	38				
				39	40	150			PANELBOARD H-AB1 (5)
				41	42				

N
TOTAL LOAD = XX KVA

(4) (4)

* USE 1°C. UNLESS STATED OTHERWISE. LOCATION: XXXX

PANEL "PP-2B" (3)

BUS AMPS 400
MAIN BRKR. AMPS ____ WIRE SIZE ____
VOLTS 480/277 AIC ____
PHASE 3 WIRE 3 SN ✓

CKT. DESCRIPTION	WIRE	LOAD	BKR.			BKR.	LOAD	WIRE	CKT. DESCRIPTION
GATE OPERATOR #16			20	1	2	30			30 A. RCPT. S. AERATION
				3	4				
				5	6				
30 A. RCPT. S. AERATION			30	7	8	30			30 A. RCPT. S. AERATION
				9	10				
				11	12				
30 A. RCPT. S. AERATION			30	13	14	30			30 A. RCPT. S. AERATION
				15	16				
				17	18				
30 A. RCPT. S. AERATION			30	19	20	30			30 A. RCPT. S. AERATION
				21	22				
				23	24				
30 A. RCPT. S. AERATION			30	25	26	20			GATE OPERATOR #13
				27	28				
				29	30				
GATE OPERATOR #14			20	31	32	20			GATE OPERATOR #15
				33	34				
				35	36				
SPACE				37	38				
				39	40	150			PANELBOARD H-AB2 (5)
				41	42				

N
TOTAL LOAD = XX KVA

(4) (4)

* USE 1°C. UNLESS STATED OTHERWISE. LOCATION: XXXX

NOTES:

1. LOADS IN DPB SHALL REMAIN AND SERVE EXISTING CIRCUITS AS IS.
2. PANELBOARD LPC SHALL REMAIN AND SERVE THE EXISTING SHOP CIRCUITS. AERATION BASIN CIRCUITS MAY BE SERVED FROM NEW MINI-POWER CENTERS LOCATED ON THE BASIN STRUCTURE.
3. PANELBOARD PP-2A AND PP-2B SHALL REMAIN AND SERVE EXISTING SHOP CIRCUITS AND EACH HAVE A NEW FEEDER BREAKER INSTALLED. NEW AND EXISTING AERATION BASIN CIRCUITS MAY BE SERVED FROM NEW PANELBOARDS LOCATED ON THE BASIN STRUCTURE.
4. CONDUCTORS TO BE REMOVED AND REPLACED. RED LINE DRAWINGS FOR ACCURATE RECORD DRAWING CREATION.
5. PROVIDE NEW FEEDER BREAKER IN EXISTING PANELBOARD FOR NEW AERATION BASIN PANELBOARD.

GENERAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE THE EXISTING MAINTENANCE SHOP PANELBOARD CIRCUIT SCHEDULES. PROVIDE TWO FEEDER BREAKERS TO SERVE THE PANELBOARDS TO BE ADDED ON THE AERATION BASIN STRUCTURE.

B. ALL AERATION BASIN CIRCUIT CONDUCTORS ARE TO BE REMOVED AND REPLACED WITH NEW CONDUCTORS SERVED FROM NEW PANELBOARDS ON THE AERATION BASINS AND THESE EXISTING PANELBOARDS.

C. ALL PROPOSED CONDUIT SHALL BE PVC COATED RIGID ALUMINUM. ALL ANCHORS, HARDWARE, STRUT, STRUT FITTINGS AND CONDUIT STRAPS SHALL BE 316 STAINLESS STEEL ON THIS PROJECT.

TEMPORARY POWER NOTES:

1. CONTRACTOR SHALL DOCUMENT THE OPERATIONAL STATUS OF ALL EQUIPMENT TO BE PROVIDED TEMPORARY OR REMOVED PRIOR TO SCHEDULING REMOVAL. THE STATUS, SOURCE AND PATH OF POWER, CONTROL AND SCADA CIRCUITS SHALL BE CONFIRMED PRIOR TO INSTALLATION OF TEMPORARY OR REMOVAL FROM AVAILABILITY. "AS FOUND" CONDITIONS DETERMINE TEMPORARY POWER REQUIREMENT. EQUIPMENT THAT IS NOT FUNCTIONAL, AT START OF PROJECT, MAY NOT REQUIRE TEMPORARY FACILITIES FOR CONSTRUCTION. INCLUDING AERATION BASIN'S INSTRUMENTATION AND DEVICES.
2. CONTRACTOR SHALL NOTIFY THE CITY CONSTRUCTION REPRESENTATIVE UPON DISCOVERY OF ALL DEVIATIONS FROM THE DRAWINGS PRIOR TO BEGINNING WORK.

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

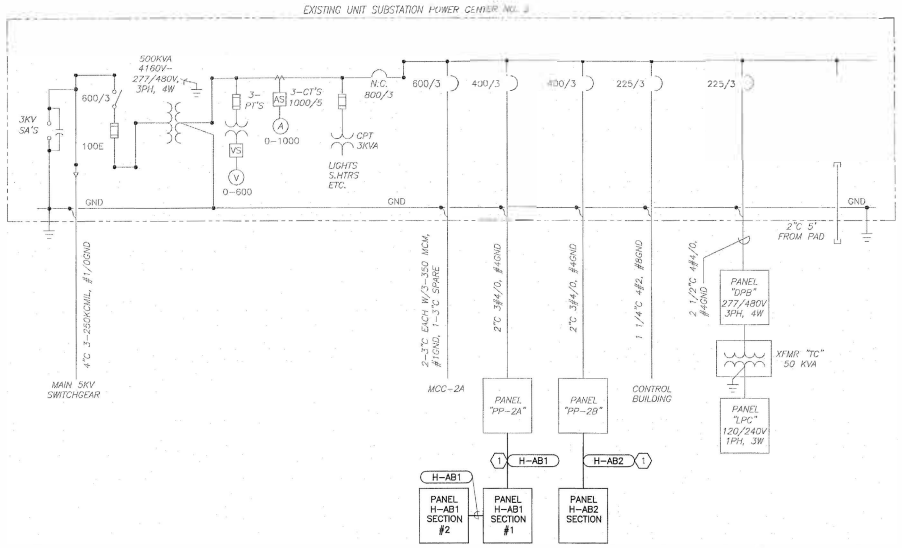
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
ELECTRICAL
SHOP BUILDING PANEL SCHEDULES

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO.	338 OF 378

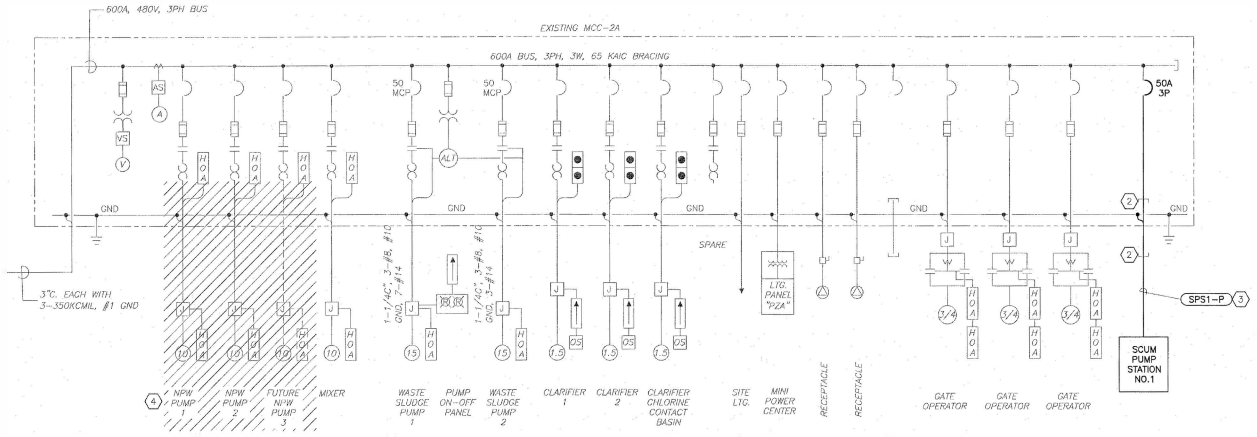
FOR CITY OF HOUSTON USE ONLY

E-64-601

FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160-BV (4H Imp Proj 2)\Drawings\E-64-601 Shop Building Panel Schedules.dwg



EXISTING POWER CENTER 2 ONE LINE DIAGRAM
NTS



EXISTING MCC-2A ONE LINE DIAGRAM
NTS

KEYED NOTES:

1. EXISTING CONCRETE ENCASED CONDUITS TO AERATION BASIN WALL MAY BE CONSIDERED FOR USE.
2. UTILIZE EXISTING STUB OUT FOR PROPOSED DUCT BANK TO STRUCTURE WALL.
3. ROUTE CONDUIT ON STRUCTURE WALLS TO EXISTING SCUM PUMP STATION NO.1.
4. EXISTING NPW PUMPS STATION IS TO BE REMOVED FROM SERVICE. COORDINATE THE REMOVAL OF ALL EXISTING NPW SYSTEM ELECTRICAL ASPECTS.

GENERAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE THE EXISTING MODIFICATIONS TO LOADS ON POWER CENTER NO.2 AND MCC-2A.

B. THIS DRAWING WAS CREATED FROM RECORD DRAWINGS AND OBSERVATIONS, ENCLOSURE INTERIOR ACCURACY WAS NOT VERIFIED.

No.	Date	Revisions	Appr.
1	11/21/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
ZHAOHUA SHARI LIN
80367
PROFESSIONAL ENGINEER
77702

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

ELECTRICAL

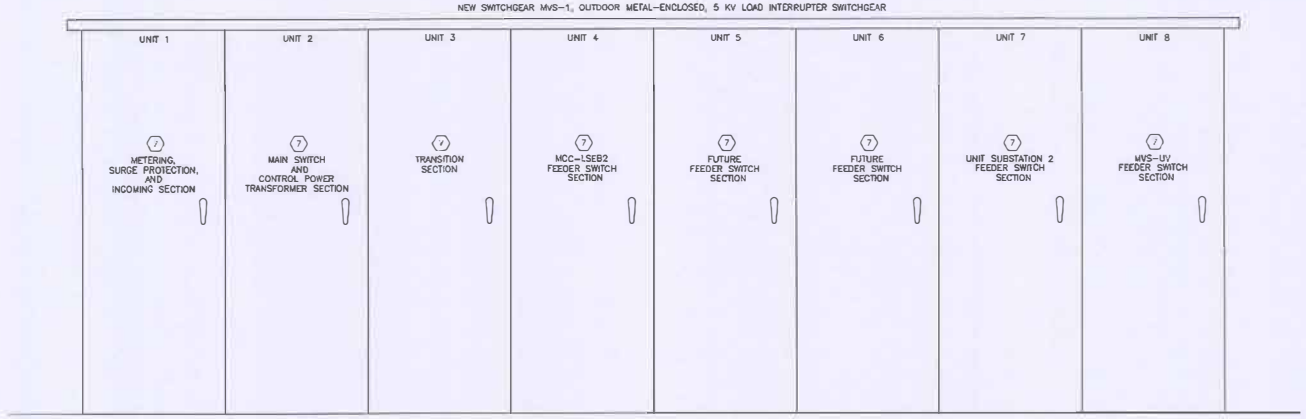
EXISTING POWER CENTER 2 ONE LINE DIAGRAMS

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 339 OF 378	

E-64-701

FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\Drawings\E-64-701 Existing Power Center 2 One Line Diagram.dwg

NEW SWITCHGEAR MVS-1, OUTDOOR METAL-ENCLOSED, 5 KV LOAD INTERRUPTER SWITCHGEAR



NEW MVS-1 SWITCHGEAR
ELEVATION
NTS

KEYED NOTES:

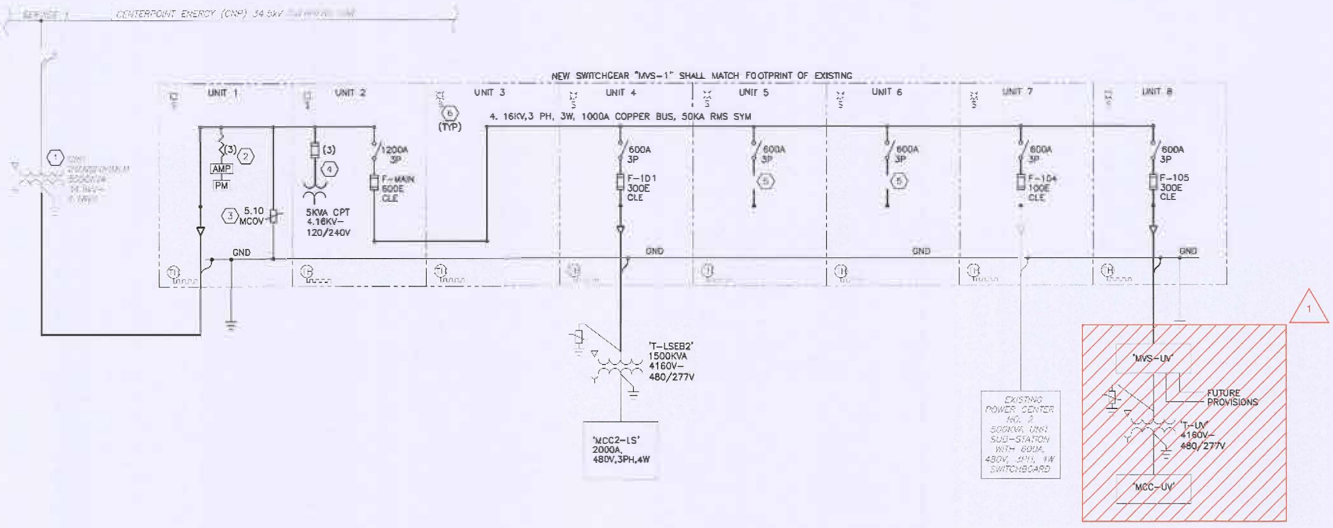
1. FOR CENTERPOINT ENERGY (CNP) SERVICE NO.1, CONTRACTOR SHALL COORDINATE WITH CNP FOR OUTAGE TO REPLACE THE OUTDOOR 5kV MEDIUM VOLTAGE METAL-ENCLOSED (4.16kV) MAIN SWITCHGEAR. SEE DRAWING E 00-701 FOR EXISTING ONE LINE DIAGRAM.
2. PROVIDE OHMIC TYPE RESISTIVE VOLTAGE DIVIDER SENSING SYSTEM, AMPLIFIER AND POWER METER. PT STYLE VOLTAGE SENSING IS NOT ACCEPTABLE.
3. MANUFACTURER SHALL CONFIRM SIZING AND PROVIDE METAL OXIDE SURGE ARRESTER PROTECTION.
4. PROVIDE CPT FOR LIGHTS, HEATERS AND AUXILIARY POWER REQUIRED. MANUFACTURER SHALL CONFIRM SIZE AND LOCATION OF CPT.
5. MANUFACTURER SHALL EQUIP AND PROVIDE ALL COMPONENTS, HARDWARE AND WIRING REQUIRED TO PREPARE SECTION FOR FUSE INSTALLATION AND OPERATION.
6. MANUFACTURER SHALL PROVIDE FACTORY INSTALLED SECTION LIGHTING ON DOOR OR TOGGLE SWITCH. COORDINATE OWNER PREFERENCE AND BRAND STANDARD CONSTRUCTION.
7. SEE SPECIFICATION SECTION 16195 FOR GEAR IDENTIFICATION REQUIREMENTS. PROVIDE LARGE PHENOLIC NAMEPLATES FOR EXTERIOR DOORS.
8. UTILIZE EXISTING EQUIPMENT GROUNDING CONDUCTORS.

GENERAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE THE NEW MAIN SWITCHGEAR. EXACT CONFIGURATION OF UNDERGROUND DUCT BANKS AND STUB-UPS IS NOT KNOWN. CONTRACTOR SHALL INVESTIGATE PRIOR TO SHOP DRAWING CREATION TO CONFIRM LAYOUT AND PROPOSED SWITCHGEAR CONFIGURATION.

B. CONTRACTOR SHALL GIVE WRITTEN NOTICE TO THE CITY CONSTRUCTION REPRESENTATIVE PRIOR TO COMMENCEMENT OF ANY EQUIPMENT REMOVAL WORK.

C. INFORMATION CONTAINED IN THIS ONE LINE WAS CREATED BASED ON RECORD DRAWINGS AND INFORMATION COLLECTED. ITS ACCURACY IS NOT GUARANTEED AND ITS USE IN NO WAY RELIEVES THE CONTRACTOR OF ANY RESPONSIBILITY FOR LOSS DUE TO INACCURACIES.



NEW MVS-1 SWITCHGEAR ONE LINE
DIAGRAM
NTS

1 THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

No.	Date	Revisions	App.
1	11/21/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-565
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-565

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
Z.M. SHOHOJI
77702
REGISTERED
PROFESSIONAL
ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

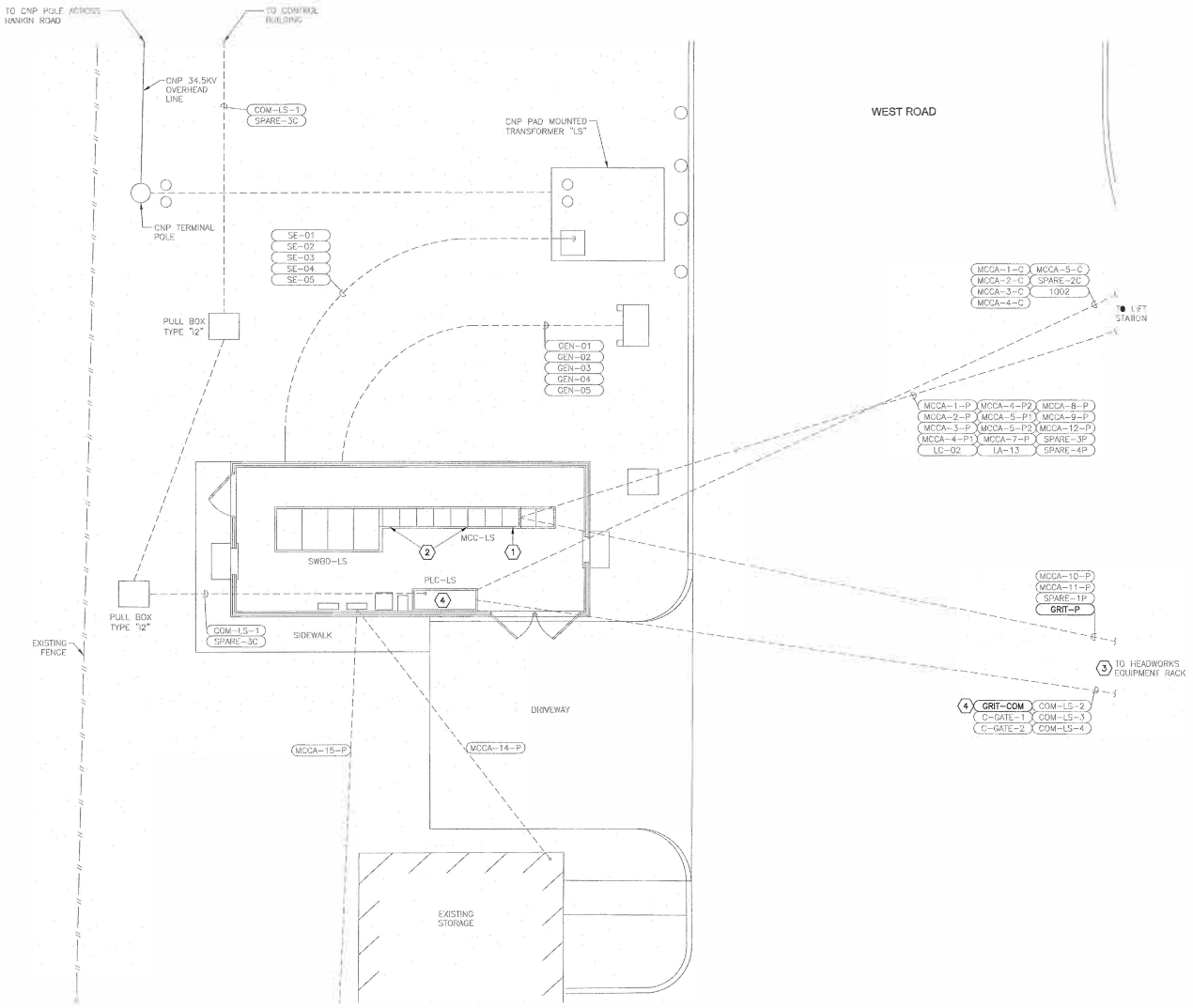
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
ELECTRICAL
NEW MVS-1 SWITCHGEAR ONE LINE DIAGRAM

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000283-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SA XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 340 OF 378	

STATE OF TEXAS
80367
LICENSED
PROFESSIONAL
ENGINEER

E-66-701

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4160-BV (WI Imp Pkg 2)\Drawings\E-66-701 New MVS-1 Switchgear One Line Diagram.dwg



LIFT STATION ELECTRICAL BUILDING NO.1 AREA

PLAN

3/16" = 1'-0"

N

0' 2' 4' 8'

SCALE: 1/4"=1'

KEYED NOTES:

1. PROVIDE NEW BREAKER BUCKET FOR GRIT POWER; SEE DRAWING E-67-701 FOR MCC-LS ONE LINE DIAGRAM.
2. MODIFY THE FIVE LIFT STATION PUMP STARTER BUCKETS. SEE DRAWING E-67-701 FOR MCC-LS ONE LINE DIAGRAM.
3. SEE DRAWING E-30-201 FOR EXISTING HEADWORKS EQUIPMENT RACK MODIFICATION DETAILS.
4. ALL EXISTING AND NEW SCADA COMMUNICATION AND CONTROL FOR THE HEADWORKS AND GRIT AREA IS TO BE ROUTED TO THE EXISTING LIFT STATION PLC CABINET.

GENERAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE THE EXISTING LFIT STATION ELECTRICAL BUILDING NO. 1 AREA AND LOCATIONS OF WORK RELATED TO THIS PROJECT.

B. REUSE OF EXISTING CONCRETE EMBEDDED CONDUIT WILL BE CONSIDERED IN THE LIFT STATION ELECTRICAL BUILDING NO.1 AREA.

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/16/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-565
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

ELECTRICAL

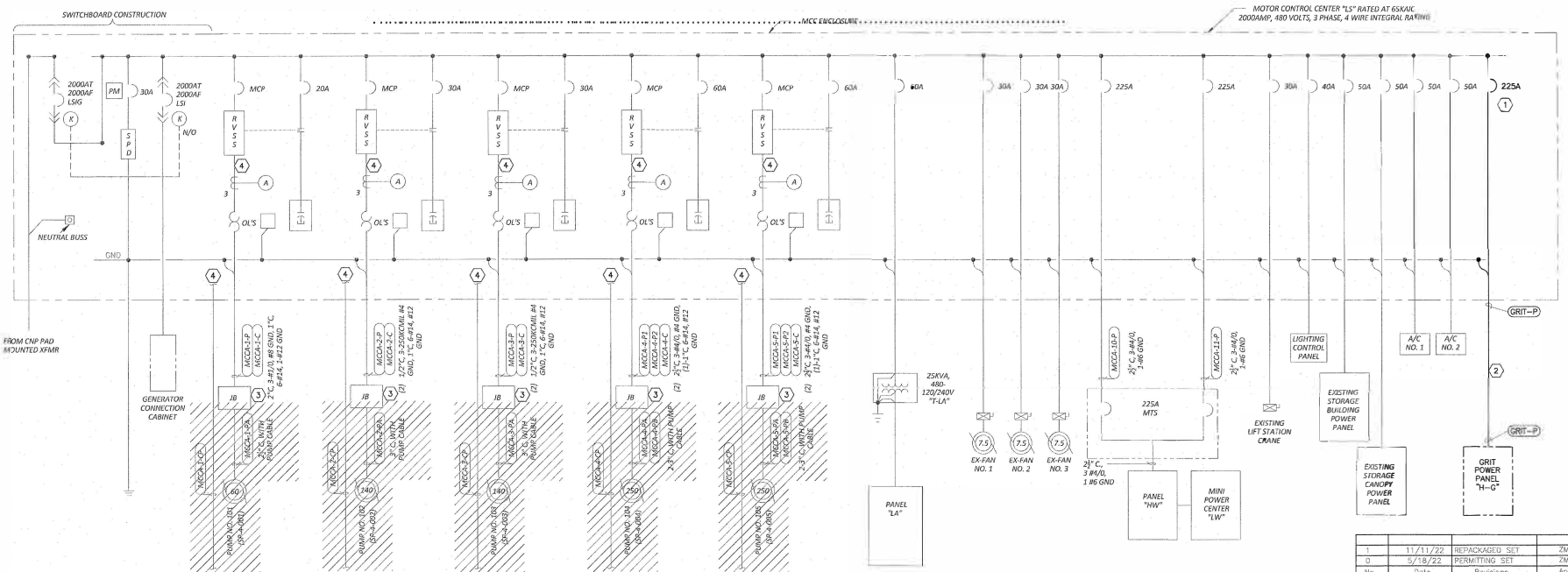
LIFT STATION ELECTRICAL BUILDING NO.1 AREA PLAN

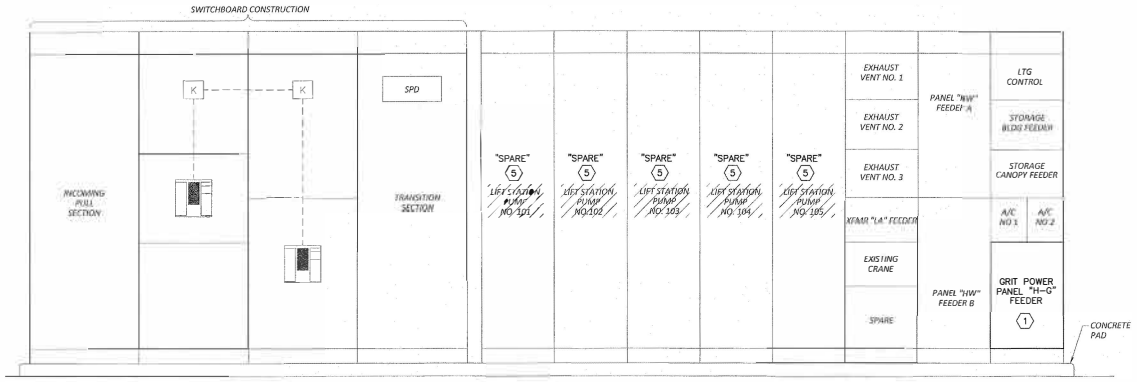
WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 341 OF 378	

80367

E-67-101

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\Drawings\E-67-101 Lift Station Electrical Building No 1 Area Plan.dwg





EXISTING MCC-LS ONE LINE DIAGRAM
NTS

KEYED NOTES:

1. REMOVE EXISTING COMPONENTS FROM SPACES AND PROVIDE A 200 AMP FEEDER BREAKER BUCKET WITH ALL ANCILLARY PARTS REQUIRED.
2. ROUTED IN EXISTING DUCT BANK AND NEW CONDUIT FROM THE EXITING HEADWORKS RACK TO THE NEW PANEL ON THE GRIT STRUCTURE.
3. ALL FIVE PUMPS AND CABLES ARE TO BE REMOVED. REMOVE CONDUCTORS TO THE TERMINATION BOX AND SEAL CONDUITS ROUTED TO THE WET WELL.
4. DETERMINATE FIELD WIRING FROM STARTER AND ABANDON CONDUCTORS IN PLACE. CAP CONDUCTOR ENDS WITH HEAT SHRINK CAPS.
5. REMOVE EXISTING NAMEPLATES AND PROVIDE NAMEPLATES IDENTIFYING THE STARTERS AS "SPARE".

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
77702
REGISTERED PROFESSIONAL LAND SURVEYOR
TOTAL STATION

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

ELECTRICAL

EXISTING MCC-LS ONE LINE DIAGRAM

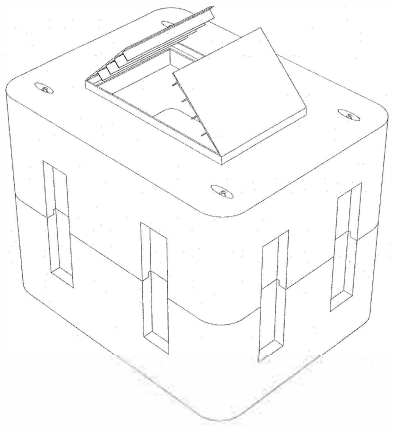
WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 342 OF 378	

FOR CITY OF HOUSTON USE ONLY

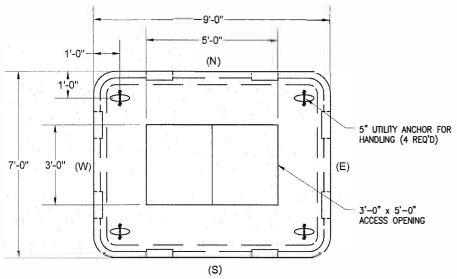
80367
REGISTERED
XIAOHUA LIN
TEXAS

E-67-701

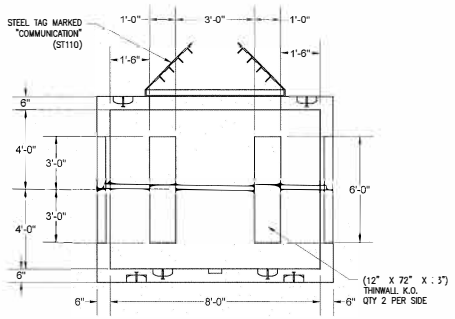
FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160-BV (XH Imp Prg 2)\Drawings\E-67-701 Existing MCC-LS One Line Diagram.dwg



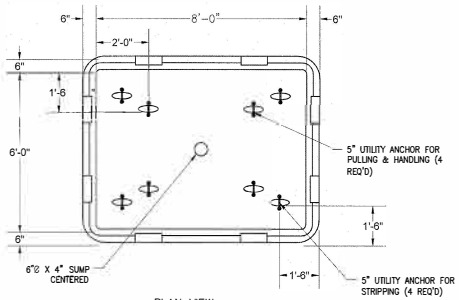
ISOMETRIC VIEW



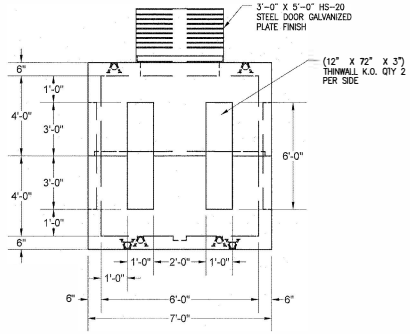
PLAN VIEW
(TOP BASE)



VIEW LOOKING NORTH
ELEVATION VIEW



PLAN VIEW
(BASE BASE)



VIEW LOOKING WEST
ELEVATION VIEW

MEDIUM VOLTAGE UNDERGROUND PULLBOX – TYPE E6

A DETAIL
NTS

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
FIRM REGISTERED
77702
PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
ELECTRICAL
DETAILS 1 OF 7

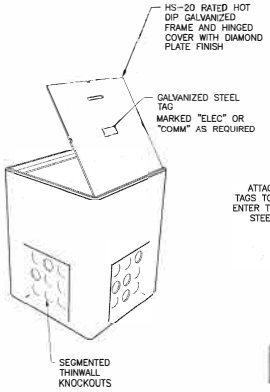
WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	Se XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 343 OF 378	

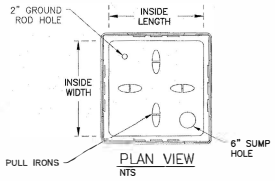
FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
80367
REGISTERED
PROFESSIONAL ENGINEER
HOUSTON, TEXAS

E-99-501

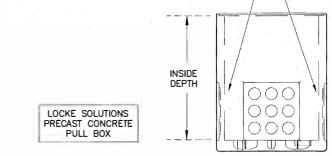
FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\V4160-BV (AH Imp Pkg 2)\Drawings\E-99-501 Details 1.dwg





PLAN VIEW
NTS

ATTACH STAMPED STAINLESS STEEL IDENTIFICATION TAGS TO CABLES AT EACH LOCATION WHERE CABLES ENTER THE PULL BOX. ATTACH TAGS WITH STAINLESS STEEL WIRE. TAGS TO LIST CONDUIT NUMBER IN 3/16" LETTERS.



ELEVATION
NTS

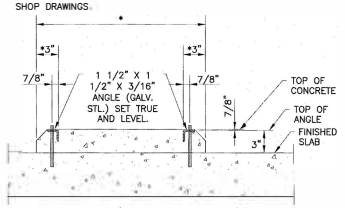
TYPICAL UNDERGROUND PULL BOX

A DETAIL
NTS

PULL BOX SIZES			
DESIGANTION	INSIDE WIDTH (W)	INSIDE LENGTH (L)	INSIDE DEPTH (D)
E1	12"	24"	22"
E2	24"	24"	42"
E3	36"	36"	48"
E4	48"	48"	72"
E6	72"	96"	72"
I1	12"	24"	22"
I2	24"	24"	42"
I3	36"	36"	48"
I4	48"	48"	48"

NOTES:
1. PRECAST CONCRETE PULL BOX DESIGNED FOR HS-20 LOADING.
2. COVERS FOR ALL PULL BOXES TO BE HOT-DIP GALVANIZED AND DESIGNED FOR AASHTO HS-20 LOADING.
3. "E" PULL BOXES TO HAVE "ELECTRICAL" TAG ON THE COVER.
4. "I" PULL BOXES TO HAVE "INSTRUMENT" TAG ON THE COVER.

* ACTUAL DIMENSIONS INCLUDING LENGTH TO BE DETERMINED FROM MANUFACTURER'S CERTIFIED SHOP DRAWINGS.

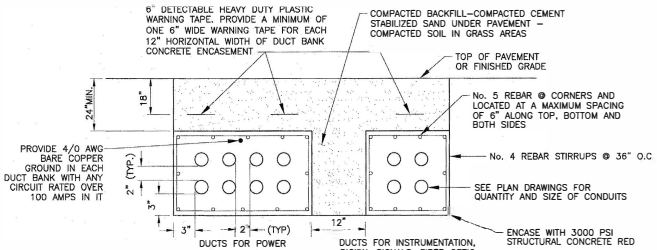


6 (3 EACH ANGLE) 3/8" DIAMETER X 5 1/2" DROP-IN ANCHOR BOLTS ZINC PLATED WITH 2 NUTS. CUT BOLTS OFF FLUSH WITH TOP OF ANGLE BEFORE SETTING EQUIPMENT.

MEDIUM VOLTAGE EQUIPMENT PAD

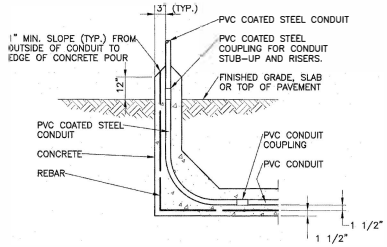
B DETAIL
NTS

DUCT BANK CONCRETE ENCASEMENT SHALL BE CONTINUOUS AND DUCT BANK REINFORCEMENT REBAR SHALL BE CONNECTED TO THE DESTINATION. FOR PULL BOX ENTRY OR RISING NEXT TO A STRUCTURE DRILL BOX OR STRUCTURE AND PROVIDE #5 DOWELS 4 INCHES DEEP. FOR ENTRY TO STRUCTURE SLAB OR FOUNDATIONS CONNECT BOTH REINFORCEMENT REBAR SYSTEMS WITH 6 INCH OVERLAP DOUBLE TIED.



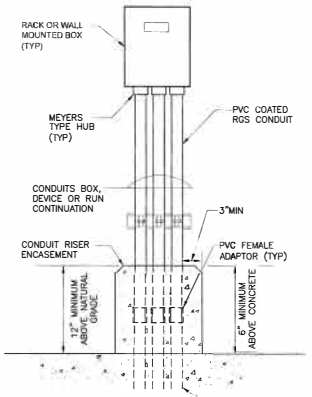
TYPICAL DUCT BANK INSTALLATION

C DETAIL
NTS



TYPICAL SINGLE CONDUIT STUB-UP

D DETAIL
NTS



CONDUIT RISER CONCRETE ENCASEMENT

E DETAIL
NTS

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

ZI MING XU 77702 PROFESSIONAL 11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
ELECTRICAL
DETAILS 2 OF 7

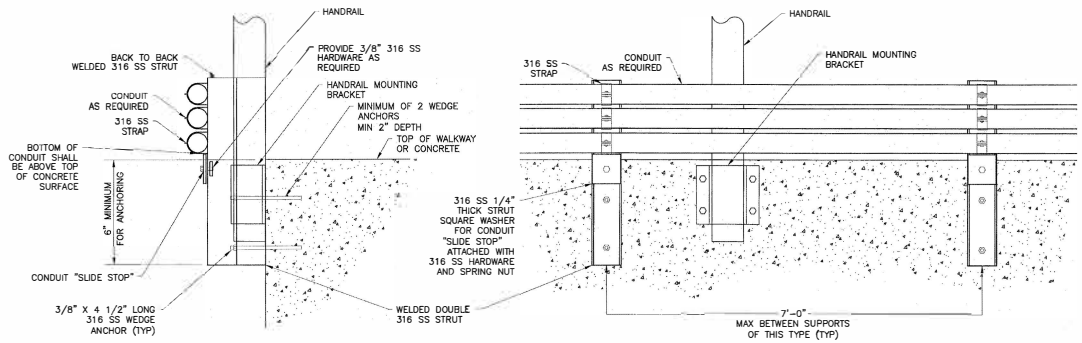
WBS NUMBER
R-000265-0147-4
DRAWING SCALE
AS NOTED
CITY OF HOUSTON PM
XIAOHUA (SHARI) LIN, P.E.

FOR CITY OF HOUSTON USE ONLY
REGISTERED 80367 PROFESSIONAL ENGINEER

E-99-502

SHEET NO. 344 OF 378

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\Drawings\E-99-502 Details 2.dwg

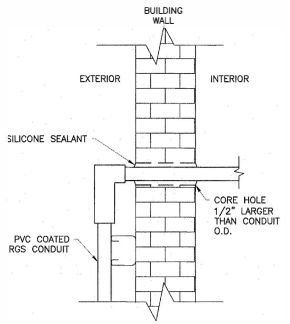


SIDE VIEW
EDGE OF STRUCTURE CONDUIT SUPPORT

A DETAIL NTS

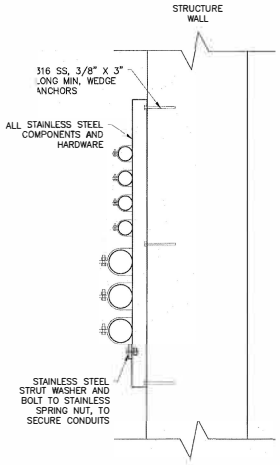
ELEVATION
EDGE OF STRUCTURE CONDUIT SUPPORT

B DETAIL NTS



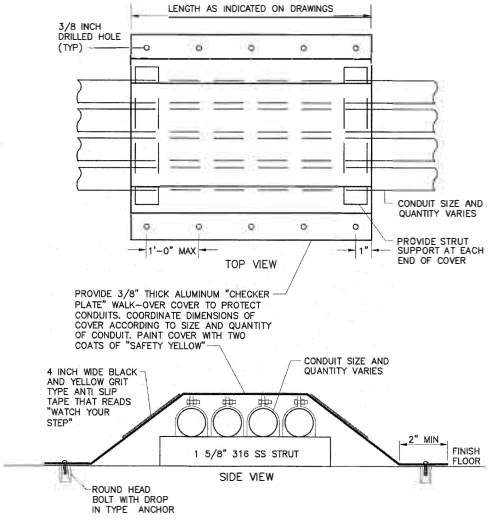
TYPICAL WALL PENETRATION

C DETAIL NTS



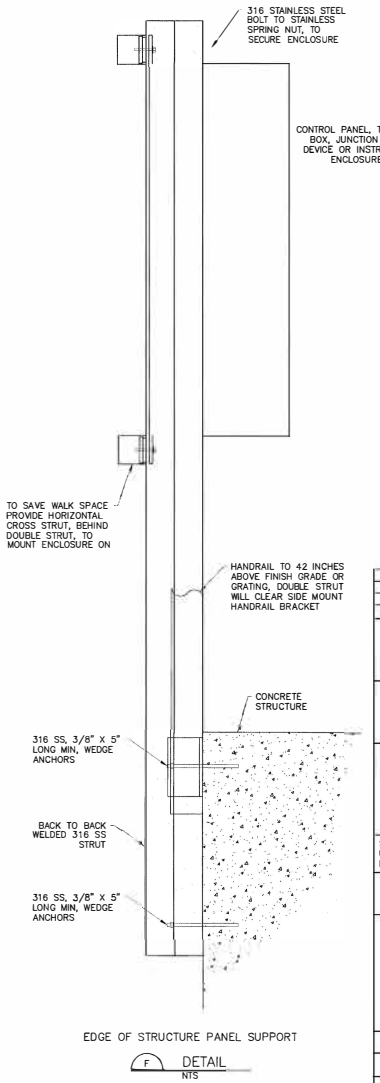
TYPICAL VERTICAL WALL RACK

D DETAIL NTS



TYPICAL WALK-OVER TREAD PLATE

E DETAIL NTS



EDGE OF STRUCTURE PANEL SUPPORT

F DETAIL NTS

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
80367
77702
REGISTERED
PROFESSIONAL
ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
ELECTRICAL
DETAILS 3 OF 7

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	Se XIAOHUA (SHARI) LIN, P.E.

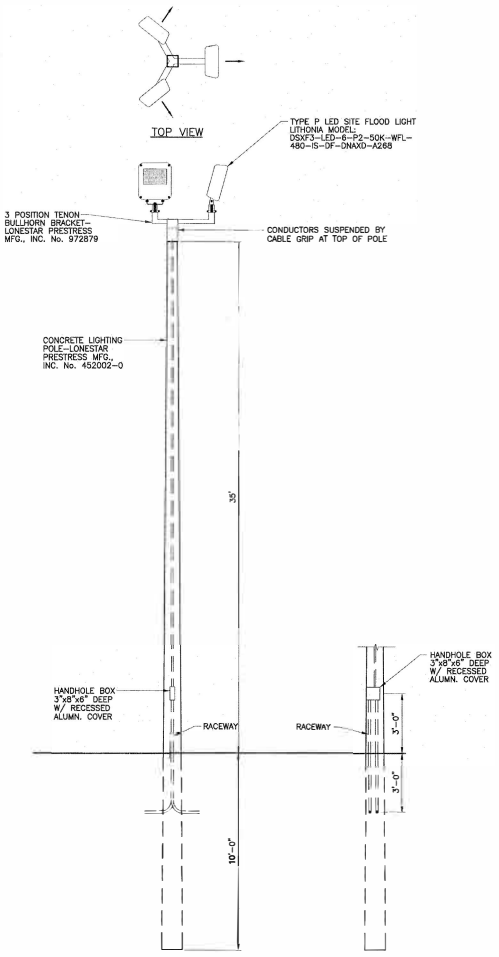
FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
80367
REGISTERED
PROFESSIONAL
ENGINEER

E-99-503

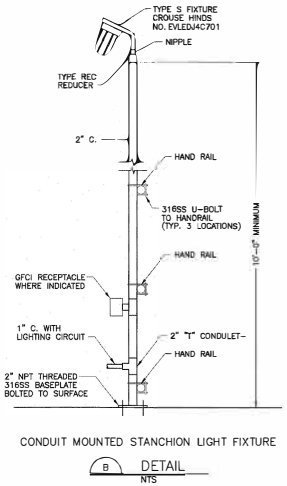
SHEET NO. 345 OF 378

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\Drawings\E-99-503 Details 3.dwg



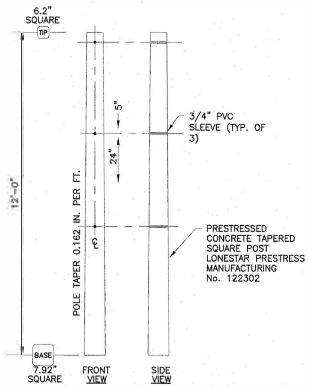
SITE LIGHT

A DETAIL NTS



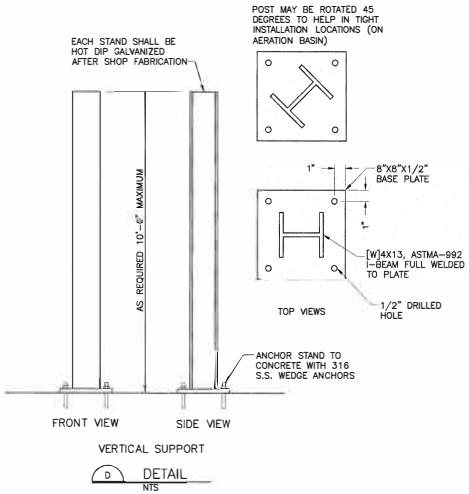
CONDUIT MOUNTED STANCHION LIGHT FIXTURE

B DETAIL NTS



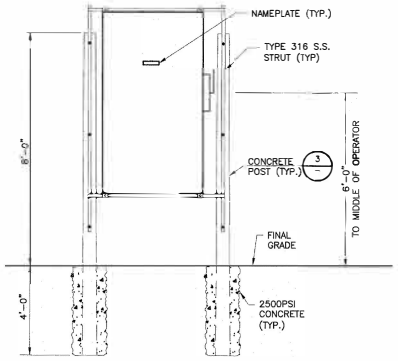
CONCRETE POST DETAIL

C DETAIL NTS



VERTICAL SUPPORT

D DETAIL NTS



MOBILE GENERATOR CONNECTION CABINET SUPPORT

E DETAIL NTS

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
Z.M. SIDDIQUI
77702
REGISTERED
PROFESSIONAL
ENGINEER

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

ELECTRICAL

DETAILS 4 OF 7

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	Se XIAOHUA (SHARI) LIN, P.E.

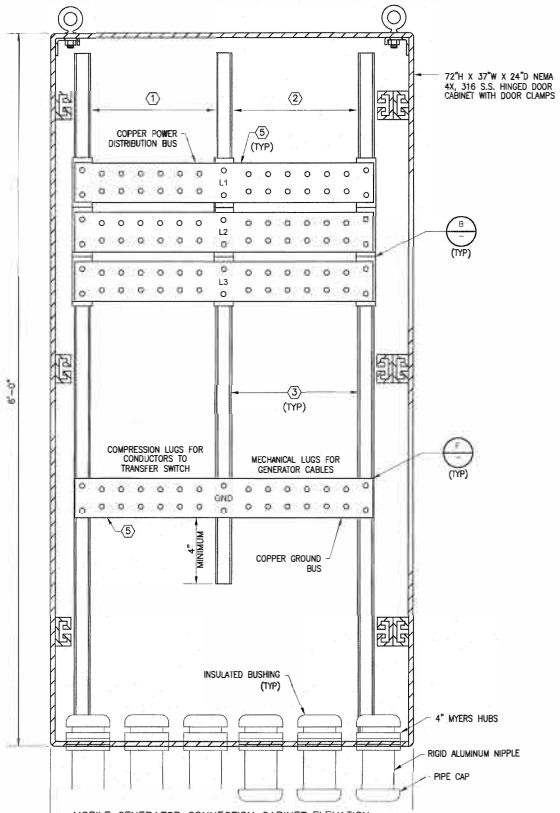
FOR CITY OF HOUSTON USE ONLY

ACCEPTED AS NOTED
80367
REGISTERED
PROFESSIONAL
ENGINEER

E-99-504

SHEET NO. 346 OF 378

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\Drawings\E-99-504 Details 4.dwg

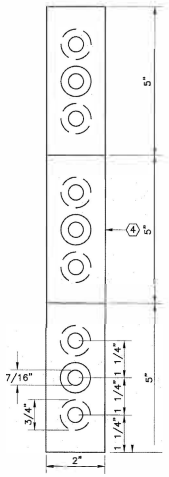


MOBILE GENERATOR CONNECTION CABINET ELEVATION

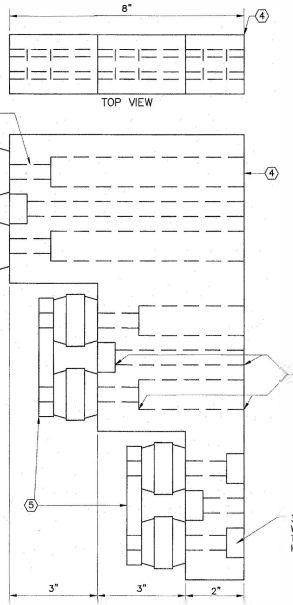
MOBILE GENERATOR CONNECTION CABINET BOTTOM VIEW

A DETAIL NTS

CONTRACTOR SHALL PROVIDE A SHOP DRAWING FOR THE GENERATOR CONNECTION CABINET.



FRONT VIEW



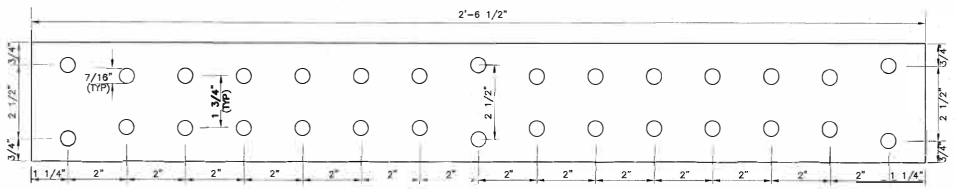
SIDE VIEW

PHASE BUS INSULATED SUPPORT

B DETAIL NTS

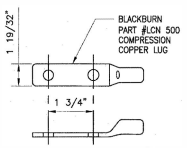
NOTES:

(1) CABLES CONNECTED TO TRANSFER SWITCH.
(2) PROVISIONS TO CONNECT PORTABLE GENERATOR CABLES.
(3) TYPE 316 STAINLESS STEEL 1 5/8" 12 GAUGE STRUT.
(4) 2" THICK MICARTA INSULATING BOARD.
(5) 1/2" X 4" COPPER BAR.
(6) TYPE 316 STAINLESS STEEL BOLTS.



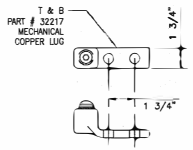
TYPICAL BUS HOLE LAYOUT

C DETAIL NTS



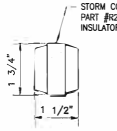
LUGS FOR CABLES TO TRANSFER SWITCH

D DETAIL NTS



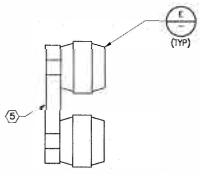
LUGS FOR CABLES TO PORTABLE GENERATOR

E DETAIL NTS



INSULATOR

F DETAIL NTS



GROUND BUS INSULATED SUPPORT

G DETAIL NTS

No.	Date	Revisions	App.
1	11/21/22	REPACKAGED SET	ZMS
0	9/16/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

STATE OF TEXAS
ZAL MOHMOOD
77702
LICENSED
PROFESSIONAL
ENGINEER
10/11/2022

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
ELECTRICAL

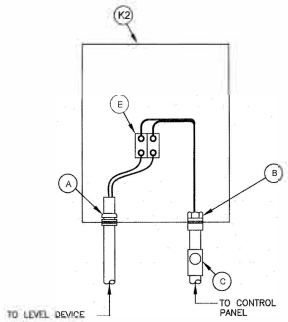
DETAILS 5 OF 7

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	Se XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 347 OF 378	

FOR CITY OF HOUSTON USE ONLY
80367
REGISTERED
PROFESSIONAL
ENGINEER
HOUSTON, TEXAS

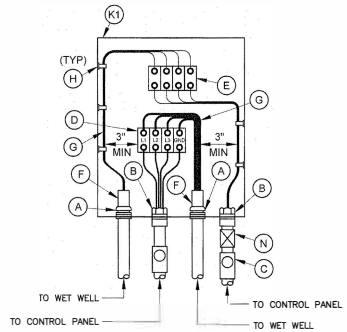
E-99-505

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4180-BV (IAH Imp Pkg 2)\Drawings\E-99-505 Details 5.dwg



LEVEL SIGNAL JUNCTION BOX

A DETAIL NTS



PUMP CABLE JUNCTION BOX

B DETAIL NTS

JUNCTION BOX EQUIPMENT SCHEDULE

A – OZ GEDNEY CSBE SEAL WITH 316 S.S. PRESSURE PLATES AND HARDWARE
B – WATERTIGHT CONDUIT HUB WITH INSULATED BUSHING
C – CLASS I, DIV 1, EXLOSION PROOF SEAL INSTALLED PER NEC DIV 501
D – POWER TERMINAL BLOCK W/SCREW DOWN BOX LUGS
E – CONTROL TERM BLOCK W/SCREW DOWN BOX LUGS
F – MULTI-CONDUCTOR CABLE, REMOVE OUTER JACKET AS SHOWN
G – WIRING AS SCHEDULED
H – WIRING HARNESS PERMANENTLY AFFIXED
I – PUMP CONTROL WIRING FROM PUMPS 2; 2 & 3; 4; OR D2, AS APPLICABLE
J – 1 1/2" PVC COATED CONDUIT NIPPLE
K1 – NEMA 4X 316 STAINLESS STEEL JUNCTION BOX WITH GASKETED FRONT COVER, SINGLE QUARTER TURN, OIL-TIGHT LATCH AND PADLOCKING PROVISIONS, HOFFMAN A24H2010SS6LP OR EQUAL. MINIMUM SIZE: 20"W X 24"H X 10"D
K2 – NEMA 4X 316 STAINLESS STEEL JUNCTION BOX WITH GASKETED FRONT COVER, SINGLE QUARTER TURN, OIL-TIGHT LATCH AND PADLOCKING PROVISIONS, HOFFMAN A16H1206SS6LP OR EQUAL. MINIMUM SIZE: 12"W X 16"H X 6"D
L – NAMEPLATE, 3/8" HIGH LETTERS IN WHITE ON BLACK BAKELIGHT (SEE NAMEPLATE SCHEDULE)
M – TRANSDUCER BREATHER PERMANENTLY AFFIXED
N – EXPANSION JOINT/SLEEVES

GENERAL NOTES:

A. NAMEPLATES SHALL BE MOUNTED TO JUNCTION BOXES USING 316 STAINLESS STEEL HARDWARE.

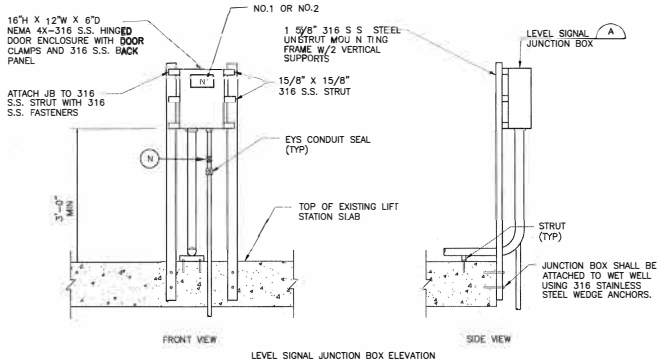
B. MAINTAIN MINIMUM SEPARATION REQUIRED UNDER NEC ARTICLE 504, BETWEEN INTRINSICALLY SAFE CONTROL WIRING AND NON-INTRINSICALLY SAFE MOTOR FEEDER WIRING.

D. UNLESS OTHERWISE NOTED, ALL EXPOSED CONDUITS SHALL BE PVC COATED RIGID GALVANIZED STEEL.

E. UNLESS OTHERWISE NOTED, ALL NUTS, BOLTS, SCREWS WASHERS, ETC SHALL BE TYPE 316 STAINLESS STEEL.

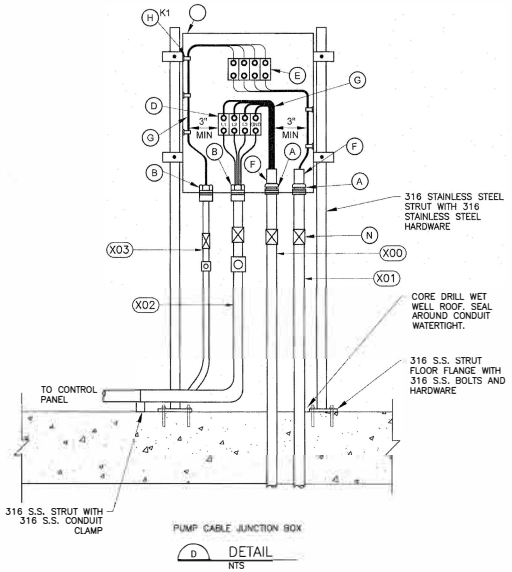
F. ALL UNDERGROUND CONDUITS TO BE ENCASED IN REINFORCED CONCRETE DUCT BANK.

G. PROVIDE ANTI-CORROSIVE SPRAY ON ANY BARE METAL PARTS OR EXPOSED WIRE.



LEVEL SIGNAL JUNCTION BOX ELEVATION

C DETAIL NTS



PUMP CABLE JUNCTION BOX

D DETAIL NTS

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
ZACHARY M. SKIDMORE
77702
PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
ELECTRICAL

DETAILS 6 OF 7

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	Se XIAOHUA (SHARI) LIN, P.E.

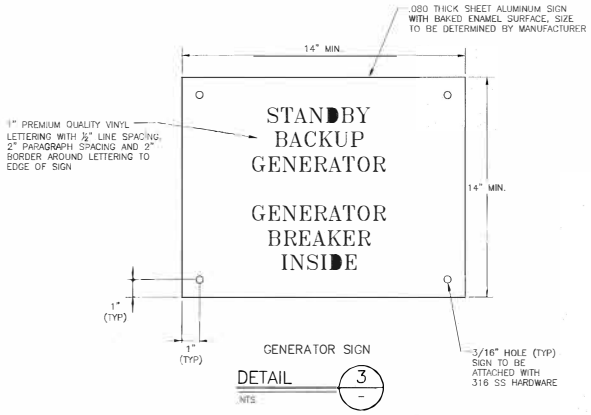
FOR CITY OF HOUSTON USE ONLY

CERTIFICATE OF REGISTRATION
80367
REGISTERED
PROFESSIONAL
ENGINEER
TEXAS

E-99-506

SHEET NO. 348 OF 378

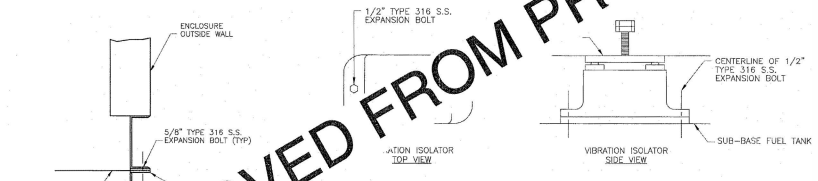
FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4160-BV (AH Imp Pkg 2)\Drawings\E-99-506 Details 6.dwg



GENERATOR SIGN

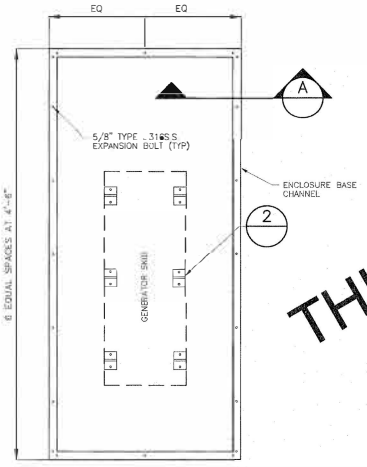
DETAIL 3 N.T.S.

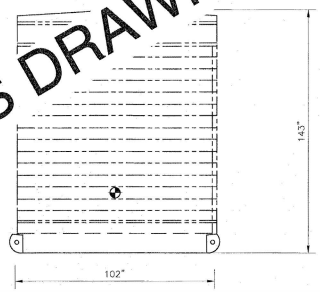
GENERATOR CONCEPT AND DIMENSIONS ARE APPROXIMATE, COORDINATE GENERATOR FOUNDATION AND ITS INSTALLATION WITH THE CONTRACTOR'S PROPOSED GENERATOR SHOP DRAWING INFORMATION, PROVIDED BY THE GENERATOR AND ENCLOSURE MANUFACTURER'S VENDOR

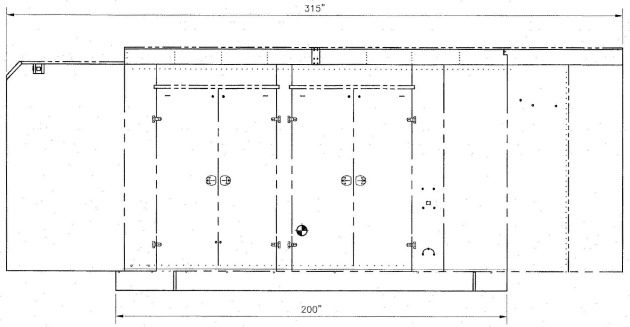


ANCHORING DETAIL FOR GENERATOR SKID

DETAIL 2 N.T.S.







ENCLOSURE INTERFACE WITH SUB-BASE FUEL TANK

DETAIL 1 N.T.S.

THIS DRAWING REMOVED FROM PROJECT

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
ELECTRICAL
DETAILS 7 OF 7

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	
	XIAOHUA (SHARI) LIN, P.E.
SHEET NO.	349 OF 378

FOR CITY OF HOUSTON USE ONLY

80367

E-99-507

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\Drawings\E-99-507 Details 7.dwg

GENERAL INSTRUMENT OR FUNCTION SYMBOLS

SHARED DISPLAY/ SHARED CONTROL				
PRIMARY CHOICE	SECONDARY CHOICE	COMPUTER SOFTWARE	DISCRETE	LOCATION AND ACCESSIBILITY
○	◇	⬡	○	FIELD MOUNTED AND NORMALLY OPERATOR ACCESSIBLE
○	◇	⬡	○	PRIMARY CONTROL PANEL MOUNTED AND NORMALLY OPERATOR ACCESSIBLE
○	◇	⬡	○	PRIMARY CONTROL PANEL MOUNTED AND NOT NORMALLY OPERATOR ACCESSIBLE
○	◇	⬡	○	SECONDARY CONTROL PANEL MOUNTED AND NORMALLY OPERATOR ACCESSIBLE
○	◇	⬡	○	SECONDARY CONTROL PANEL MOUNTED AND NOT NORMALLY OPERATOR ACCESSIBLE

○○ INSTRUMENTS SHARING COMMON HOUSING

○ PILOT LIGHT

MISCELLANEOUS SYMBOLS

MOTOR

M VARIABLE FREQUENCY DRIVE

MCC INDICATES INTERLOCK OR LOGIC IN A MOTOR CONTROL CENTER

I INDICATES GENERAL OR MISCELLANEOUS HARDWIRED INTERLOCK

MS MOTOR STARTER

SCR SILICONE CONTROL RECTIFIER

VFD VARIABLE FREQUENCY DRIVE

P PURGE OR FLUSHING DEVICE

TYPICAL TAG NUMBERS & DESIGNATION

HS 1000 HOA 16

- INSTRUMENT TYPE SEE "INSTRUMENTATION FUNCTION CODE" TABLE
- ADDITIONAL INSTRUMENT IDENTIFICATION SEE "HAND SWITCH ABBREVIATIONS"
- INSTRUMENT IDENTIFICATION (FIRST TWO DIGITS DENOTE ASSOCIATED AREA)
- USED TO DENOTE THE DIVISION THE INSTRUMENT IS SUPPLIED UNDER OR IF THE INSTRUMENT IS EXISTING OR FUTURE.
- WHEN USED, LETTER DISTINGUISHES BETWEEN MULTIPLE, SIMILAR DEVICES.
- USED WHEN MULTIPLE TRAINS ARE USED AND REPRESENTS THE TRAIN NUMBER.

HAND SWITCH ABBREVIATIONS

AO = AUTO/OFF
AM = AUTO/MANUAL
CM = COMPUTER/MANUAL
CL = COMPUTER/LOCAL
E-STOP = EMERGENCY STOP
FR = FORWARD/REVERSE
FOR = FORWARD/OFF/REVERSE
FS = FAST SLOW
FOS = FAST/OFF/SLOW
HOA = HAND/OFF/AUTO
LLS = LEAD/LAG/STANDBY
LOC = LOCAL/OFF/COMPUTER
LOR = LOCAL/OFF/REMOTE
LOS = LOCKOUT/STOP
LA = LOCAL/AUTO
LR = LOCAL/REMOTE
OC = OPEN/CLOSE
OCA = OPEN/CLOSE/AUTO
OO = ON/OFF
OOA = ON/OFF/AUTO
OSC = OPEN/STOP/CLOSE
RSL = RAISE/STOP/LOWER
SS = START/STOP
SOR = START/OFF/RESET

INSTRUMENTATION FUNCTION CODE

	FIRST LETTERS		SUCCEEDING LETTERS		
	COLUMN 1 MEASURED/INITIATING VARIABLE	COLUMN 2 VARIABLE MODIFIER	COLUMN 3 READOUT/PASSIVE FUNCTION	COLUMN 4 OUTPUT/ACTIVE FUNCTION	COLUMN 5 FUNCTION MODIFIER
A	ANALYSIS		ALARM		
B	BURNER, COMBUSTION		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
C	USER'S CHOICE			CONTROL	CLOSED
D	USER'S CHOICE	DIFFERENCE, DIFFERENTIAL			DEVIATION
E	VOLTAGE		SENSOR, PRIMARY ELEMENT		
F	FLOW, FLOW RATE	RATIO			
G	USER'S CHOICE		GLASS, GAUGE, VIEWING DEVICE		
H	HAND				HIGH
I	CURRENT		INDICATE		
J	POWER		SCAN		
K	TIME, SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L	LEVEL		LIGHT		LOW
M	MOISTURE				MIDDLE, INTERMEDIATE
N	USER'S CHOICE		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
O	USER'S CHOICE		ORIFICE, RESTRICTION		OPEN
P	PRESSURE		POINT (TEST CONNECTION)		
Q	QUANTITY	INTEGRATE, TOTALIZE	INTEGRATE, TOTALIZE		
R	RADIATION		RECORD		RUN
S	SPEED, FREQUENCY	SAFETY		SWITCH	STOP
T	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION	
V	VIBRATION, MECHANICAL, ANALYSIS			VALVE, DAMPER, LOUVER	
W	WEIGHT, FORCE		WELL, PROBE		
X	UNCLASSIFIED (1)	X-AXIS	ACCESSORY DEVICES, UNCLASSIFIED (1)	UNCLASSIFIED (1)	UNCLASSIFIED (1)
Y	EVENT, STATE, PRESENCE	Y-AXIS		AUXILIARY DEVICES	
Z	POSITION, DIMENSION	Z-AXIS, SAFETY INSTRUMENT SYSTEM		DRIVER, ACTUATOR, UNCLASSIFIED, FINAL CONTROL ELEMENT	

TABLE NOTES:
(1) WHEN USED SYMBOL OR SIGNAL LINE IS ANNOTATED.

INSTRUMENT LINE SYMBOLS

- ELECTRICAL SIGNAL
- TELEPHONE SIGNAL
- ELECTROMAGNETIC OR SONIC SIGNAL (GUIDED)
- ELECTROMAGNETIC OR SONIC SIGNAL (UNGUIDED)
- PNEUMATIC SIGNAL
- CAPILLARY TUBE
- HYDRAULIC SUPPLY
- VENDOR SUPPLIED CABLE
- COMMUNICATION LINK - COPPER (HARDWIRED)
- COMMUNICATION LINK - FIBER OPTICS
- COMMUNICATION LINK - SERIAL

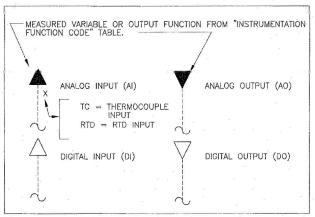
ELECTRICAL / AIR SOURCES

UPS - - - ► UPS POWERED ELECTRICAL SOURCE
ES - - - ► ELECTRICAL SOURCE
IA ——— ► INSTRUMENT AIR SOURCE

GENERAL NOTES

1. LIGHTER WEIGHT LINES, SHOWN AS ———, INDICATE EQUIPMENT, INSTRUMENTS OR PIPING THAT ARE EXISTING. WEIGHTED LINES, SHOWN AS ———, INDICATE EQUIPMENT, INSTRUMENTS OR PIPING THAT ARE NEW. DASHED WEIGHTED LINES, SHOWN AS - - - - - INDICATED EQUIPMENT, INSTRUMENTS OR PIPING THAT ARE GROUPED AS A PACKAGE.

I/O SIGNALS



GENERAL ABBREVIATIONS

AI	ANALOG IN
AO	ANALOG OUT
ASD	ADJUSTABLE SPEED DRIVE
CPU	CENTRAL PROCESSOR UNIT
DI	DIGITAL OR DISCRETE INPUT
DO	DIGITAL OUTPUT
FC	FAIL CLOSED
FO	FAIL OPEN OR FIBER OPTIC
HMI	HUMAN MACHINE INTERFACE
MCC	MOTOR CONTROL CENTER
NC	NORMALLY CLOSED
NPW	NON-POTABLE WATER
NO	NORMALLY OPEN
PLC	PROGRAMMABLE LOGIC CONTROLLER
PW	PLANT WATER
RIO	REMOTE INPUT/OUTPUT
UPS	UNINTERRUPTIBLE POWER SUPPLY
OC	OPEN/CLOSE

PRIMARY ELEMENTS

- FE M — MAGNETIC FLOW METER
- FE — TURBINE OR PROPELLER FLOW METER
- FE — AVERAGING PITOT TUBE
- FE — ULTRASONIC FLOW METER
- FE — ROTAMETER
- FE — WEIR
- FE — ORIFICE PLATE
- FE — VENTURI TUBE
- FE — FLUME
- FE X — GENERAL INSERTION FLOW METER (TM=INSERT MAG)
- FE — THERMAL MASS FLOW METER
- PE — PRESSURE SENSOR
- LE — FLOAT SWITCH
- LE — ULTRASONIC LEVEL SENSOR
- LE — RADAR LEVEL SENSOR
- LE — CAPACITANCE LEVEL SENSOR
- PI — PRESSURE GAUGE
- PDI — DIFFERENTIAL PRESSURE GAUGE
- TI — TEMPERATURE GAUGE
- AE X — GENERAL ANALYZER (pH=pH, DO=DISSOLVED OXYGEN, H2S=HYDROGEN SULFIDE, LEL=% LOWER EXPLOSIVE LIMIT, O2=OXYGEN, O3=OZONE, NH3=NITRATE, TURB=TURBIDITY, FL=FLUORIDE, CL2=CHLORINE, UVT=ULTRAVIOLET TRANSMITTANCE, UVI= ULTRAVIOLET INTENSITY)

GENERAL NOTES:

1. THIS LEGEND APPLIES TO P&IDS ONLY AND MAY DIFFER FROM LEGENDS FOR OTHER SHEETS.
2. IN GENERAL THIS LEGEND SHEET AND THE P&IDS ARE BASED ON THE INTERNATIONAL SOCIETY OF AUTOMATION (ISA) STANDARDS AND RECOMMENDED PRACTICES FOR INSTRUMENTS AND CONTROL. SOME MODIFICATIONS, ADDITIONS AND ALTERATIONS HAVE BEEN MADE AS REQUIRED TO ACCOMMODATE PROJECT REQUIREMENTS.
3. SOME PROCESS ITEMS SUCH AS EQUIPMENT ISOLATION VALVES, BYPASS LINES, ETC., WHICH ARE NOT CRITICAL FOR AN UNDERSTANDING OF THE INSTRUMENTATION FUNCTIONS ARE NOT SHOWN ON THE P&IDS.
4. SEE ELECTRICAL AND MECHANICAL SHEETS AND SPECIFICATIONS FOR ADDITIONAL CONTROL AND INTERLOCK REQUIREMENTS.
5. LIGHTER WEIGHT LINES, SHOWN AS———, INDICATE EQUIPMENT, INSTRUMENT OR PIPING, THAT ARE EXISTING. WEIGHTED LINES, SHOWN AS OR HEAVIER ———, INDICATE EQUIPMENT, INSTRUMENTS OR PIPING THAT ARE NEW. DASHED WEIGHTED LINES, SHOWN AS - - - - - INDICATED EQUIPMENT, INSTRUMENTS OR PIPING THAT ARE GROUPED AS A PACKAGE.
6. HATCHED INSTRUMENTS ARE PROVIDED BY EQUIPMENT SUPPLIER PER SPECIFICATIONS
7. P&IDS ARE NOT INTENDED TO SHOW ALL DETAILS OF PIPING, JOINTS, SUPPORTS, ETC. CONTRACTOR SHALL INSTALL A COMPLETE SYSTEM PER THE CONTRACT DOCUMENTS AND AS REQUIRED TO PROVIDE A FULLY FUNCTIONING SYSTEM.

No	Date	Revisions	App
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

RAMESH KALLURI
68078
REGISTERED
PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
INSTRUMENTATION

SYMBOLS AND ABBREVIATIONS 1 OF 2

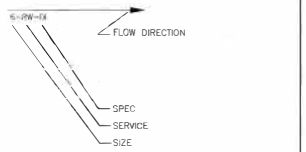
WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO.	350 OF 378

FOR CITY OF HOUSTON USE ONLY
ACCEPTED
80387

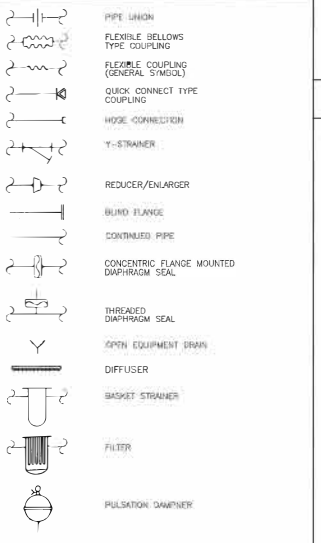
I-00-001

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4160-RV (AH ims Proj 2)\Drawings\I-00-001 Symbols & Abbreviations 1 Of 2.dwg

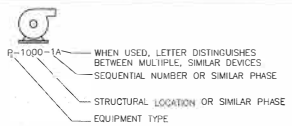
TYPICAL PIPE TAG NUMBERS & DESIGNATION



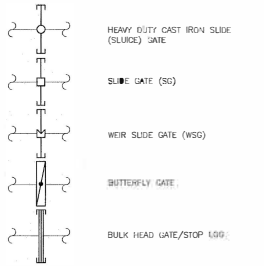
PIPE LINE SYMBOLS



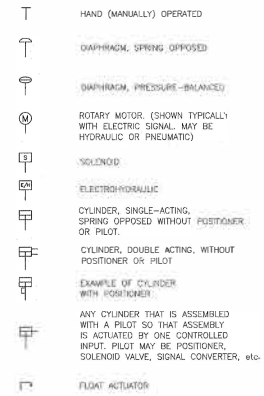
TYPICAL EQUIPMENT TAG NUMBERS & DESIGNATION



GATE SYMBOLS



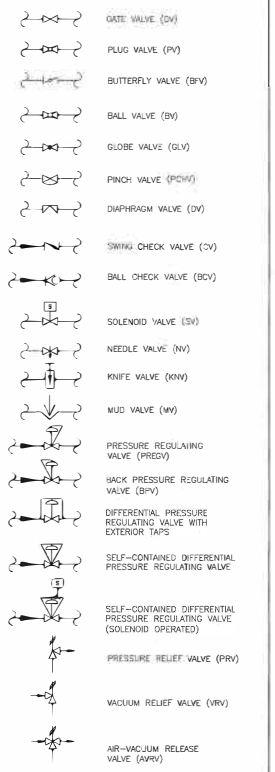
VALVE ACTUATORS



SERVICE LEGEND

DESIGNATION	SERVICE
DR	DRAIN
GR	GRIT
MLSS	MIXED LIQUOR SUSPENDED SOLIDS
NPW	NON-POTABLE WATER
PA	PROCESS AIR
RAS	RETURN ACTIVATED SLUDGE
RW	RAW WATER
SC	SCUM
SCE	SECONDARY CLARIFIER EFFLUENT
WAS	WASTE ACTIVATED SLUDGE

VALVE SYMBOLS

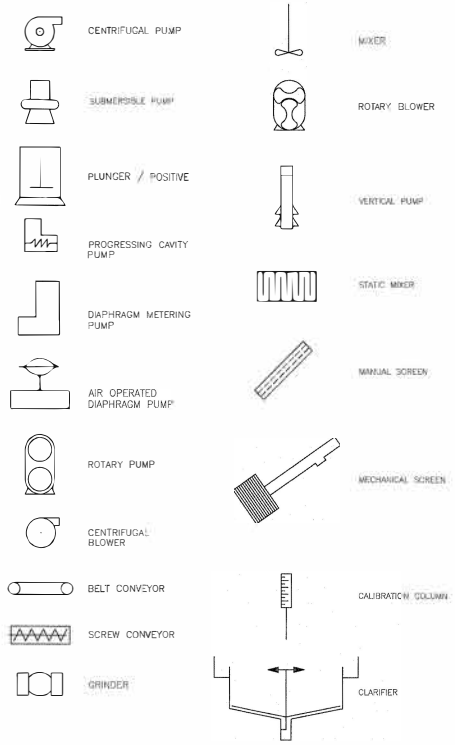


PIPE SPEC LEGEND

DESIGNATION	PIPE MATERIALS
ABS	ACRYLONITRILE – BUTADIENE – STYRENE
BS	BLACK STEEL
CI	CAST IRON
CIS	CAST IRON – SOIL
CM	CORRUGATED METAL
CPVC	CHLORINATED POLYVINYL CHLORIDE
CS	CARBON STEEL
CU	COPPER
DI	DUCTILE IRON
FRP	FIBER REINFORCED PLASTIC
GCS	GALVANIZED CARBON STEEL
PE	POLYETHLENE
PP	POLYPROPYLENE
PVC	POLYVINYL CHLORIDE
PVCI	POLYVINYL CHLORIDE (DOUBLED WALLED PIPE)
RBH	RUBBER HOSE
RC	REINFORCED CONCRETE
RCC	REINFORCED CONCRETE CYLINDER
SS	STAINLESS STEEL
STL	STEEL (CARBON)
VC	VITRIFIED CLAY

PROCESS EQUIPMENT

PARTIAL LIST – ADDITIONAL SYMBOLS MAY BE SHOWN ON THE FLOW DIAGRAMS



No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

RAMESH KALLURI — 80367 — REGISTERED PROFESSIONAL ENGINEER — 11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
INSTRUMENTATION

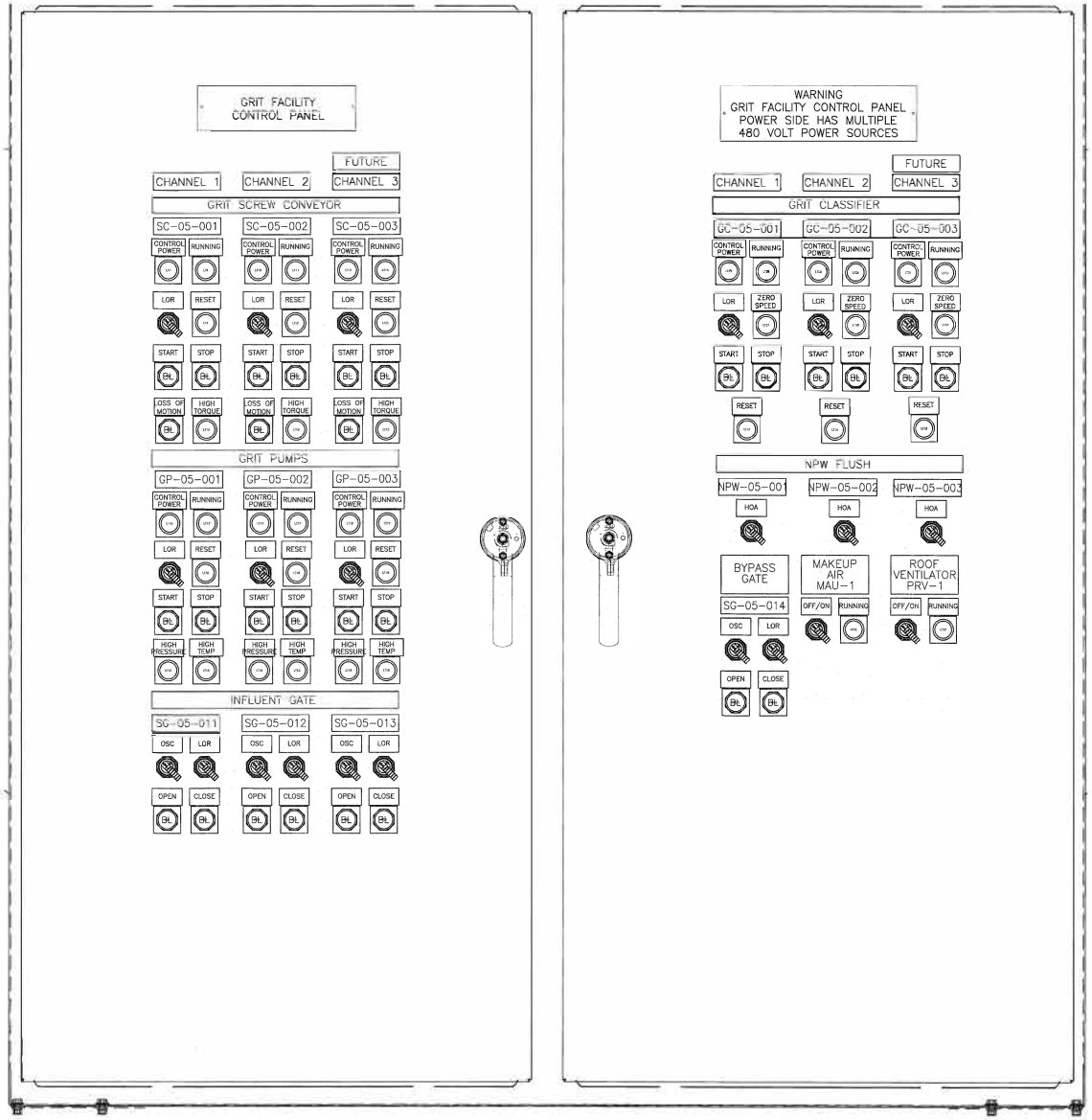
SYMBOLS AND ABBREVIATIONS 2 OF 2

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO.	351 OF 378

FOR CITY OF HOUSTON USE ONLY

I-00-002

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, inc\KG - Documents\4160-PW (Wet Imp Pkg 2)\Drawings\I-00-002 Symbols & Abbreviations 2 Of 2.dwg



GRIT FACILITY CONTROL PANEL
DETAILS
NTS

A. CONTRACTOR TO PROVIDE A 2-DOOR FLOOR-STAND, 3-POINT LATCH, TYPE 4X, 316SS, 74"H x 72"W x 24" D ENCLOSURE.

B. THE CONTROL PANEL WILL HAVE BOTH POWER AND CONTROL SECTIONS SEPARATED. NO MIXING OF VOLTAGES. CONTROL PANEL SHOULD BE DESIGNED AND LABELED FOR UL-508A COMPLIANCE.

C. THE EQUIPMENT INSTALLED ON THE DOOR SHOULD BE ACCESSIBLE TO THE OPERATOR.

D. PANEL SHOULD BE SUPPLIED WITH ENCLOSURE LIGHTING, CORROSION INHIBITORS AND INTRUSION DETECTION GOING TO PLC DIGITAL INPUT POINT.

E. ALL MARKINGS ON THE PANEL TO BE SUPPLIED AS REQUIRED FOR SAFE OPERATION AND MAINTENANCE OF THE CONTROL PANEL.

F. CONTRACTOR TO PROVIDE HEATING AND COOLING CALCULATIONS AS PART OF THE SUBMITTAL.

G. ALL CONTROL PANEL COMPONENTS HAVE TO BE LABELED WITH PHENOLIC LABELS WITH WHITE BACKGROUND AND BLACK LETTERS

H. BOTH CONTROL AND POWER WIRE IN THE PANEL SHOULD BE ROUTED IN A WIRE WAY.

I. UPS TO POWER ONLY PLC AND CONTROL EQUIPMENT.

J. CONVENIENCE RECEPTACLE AND VENTILATION/AIR CONDITIONING EQUIPMENT WILL NOT BE ON UPS POWER.

K. 120VAC CIRCUIT AND PLC INPUT/OUTPUT POINTS TO BE PROTECTED FOR SURGES AND OVER CURRENT.

L. DIGITAL OUTPUTS SHOULD BE ISOLATED USING CONTROL RELAYS.

M. ANALOG INPUTS/ OUTPUT CARDS SHOULD BE ISOLATED TYPE

N. REFERENCE SPECIFICATION SECTION 13 FOR EQUIPMENT AND DESIGN GUIDELINES

L. CONTRACTOR TO PROVIDE THE PANEL INSTALLED AND WIRED TO MAKE FUTURE EXPANSION POSSIBLE.

M. PROGRAMMING CONTRACTOR TO PROGRAM THE PLC FOR EQUIPMENT REQUIRED TO MAKE FUTURE EXPANSION POSSIBLE.

N. GRIT FACILITY CONTROL PANEL POWER SIDE HAS MULTIPLE POWER SOURCES.

O. ANY TIME DELAY RELAY REQUIRED FOR LOGIC OPERATION SHOULD BE MOUNTED ON A CUSTOM BRACKET ABOVE THE BACK PANEL FOR EASE OF OPERATOR ACCESS.

P. ALL PANEL MOUNTED DEVICES TO BE INSTALLED IN A MANNER THAT IT IS EASY FOR FUTURE MAINTENANCE AND REPAIRS. WIRING FROM THE BACK PANEL SHOULD BE TIED SEPARATELY FOR EACH ROW.

No.	Date	Revisions	App.
I	11/11/22	REPACKAGED SET	ZMS
H	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
RAMESH KALLURI
68078
REGISTERED
PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
INSTRUMENTATION

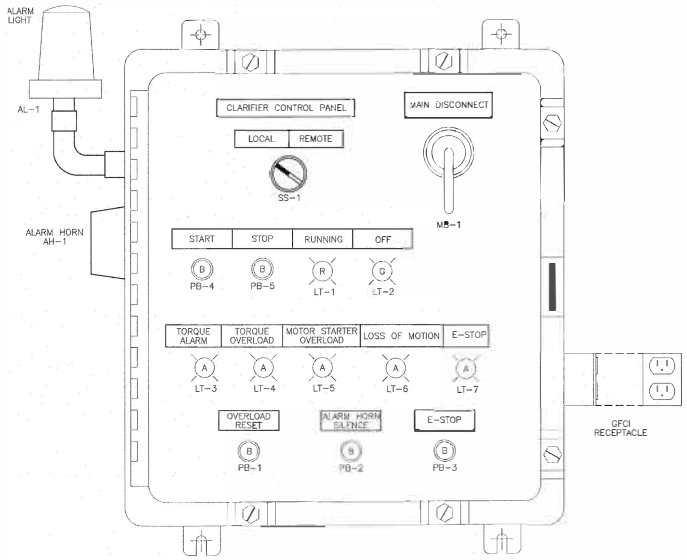
AERATED GRIT FACILITY GRIT CONTROL PANEL DETAILS

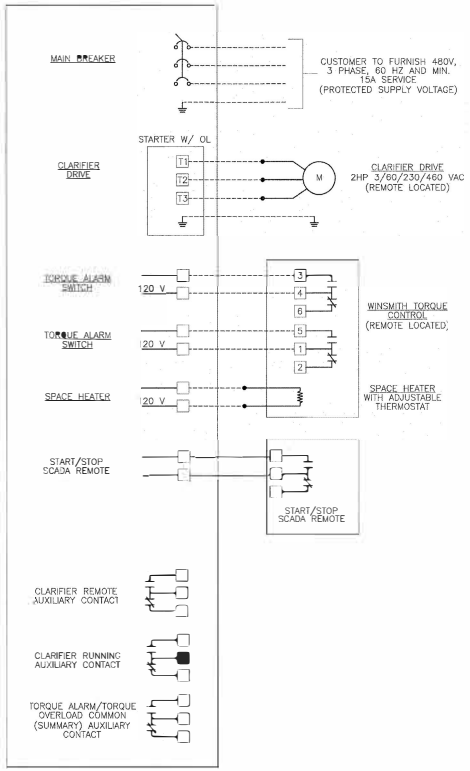
WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	Se XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 352 OF 378	

FOR CITY OF HOUSTON USE ONLY
ACCEPTED
80367

I-31-501

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\Drawings\I-31-501 Grit Facility Control Panel Details.dwg





FIELD WIRING DIAGRAM

KEYED NOTES:

NONE

GENERAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE THE EXISTING CLARIFIER NO. 1 AND NO. 2 SCHEMATIC. AND THE NEW CLARIFIER NO. 3 SCHEMATIC.

B. ALL MATERIALS AND PARTS SHALL BE PER DIV. 13 SPECIFICATION, WITHOUT EXCEPTION.

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI
Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
RAMESH KALLURI
68078
REGISTERED
PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

INSTRUMENTATION

CLARIFIERS

CLARIFIER CONTROL SCHEMATICS

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 353 OF 378	

80367

I-41-701

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\Drawings\I-41-701 Clarifier Control Schematics.dwg



EXISTING SODIUM HYPO CONTROL BUILDING ①

A DETAIL NTS



EXISTING SODIUM HYPO CONTROL PANEL ②

B DETAIL NTS

KEYED NOTES:

① THE EXISTING SODIUM HYPO CONTROL BUILDING PLC IS NOT CURRENTLY CONNECTED TO THE FIBER NETWORK. RESEARCH THE DISCONNECT LOCATION AND RECONNECT THE FIBER TO RESTORE COMMUNICATIONS. THE EXISTING CONTROL PANEL IS TO BE REMOVED AND DELIVERED TO WASTEWATER OPERATIONS AFTER NEW FACILITIES ARE IN SERVICE.

② THIS CONTROL PANEL MAY BE CONNECTED TO THE EXISTING EFFLUENT BUILDINGS PLC BY FIBER OR COPPER. FIBER IS STATED IN THE DRAWINGS HOWEVER A FUNCTION CONNECTION IS ACCEPTABLE IN EITHER.

③ THE EXISTING EFFLUENT CONTROL BUILDINGS SHALL REMAIN IN OPERATION UNTIL NEW FACILITIES ARE IN SERVICE. ENSURE THE TEMPORARY CONNECTION IS MAINTAINED THROUGHOUT CONSTRUCTION.

● THE TEMPORARY CONNECTION IS TO BE TESTED AND COMMISSIONED WITH OPERATIONS INVOLVEMENT. COORDINATE THE TRANSITION THROUGH PROJECT MANAGEMENT.

⑤ CONFIRM ALL ASPECTS OF THE EXISTING ARE FUNCTIONAL PRIOR TO DEMOLITION OF FIBER DUCT BANK.

THIS DRAWING REMOVED FROM PROJECT

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERSEDED BY WORK IN VOLUME 2 DRAWINGS

GENERAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE THE TEMPORARY FIBER CONNECTION REQUIRED BETWEEN THE EXISTING SODIUM HYPO BUILDING AND THE EXISTING OUTFALL FACILITY BUILDINGS.

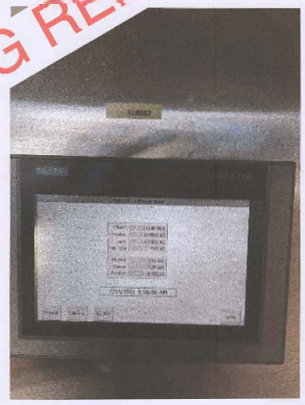
B. ROUTE FIBER OVERHEAD WHERE PRACTICAL AND OUT OF HARMS WAY FOR THE DURATION OF PROPOSED FIBER AND FACILITIES COMPLETION.

C. ALL FIBER MATERIALS AND PARTS FOR THE TEMPORARY CONNECTION SHALL BE PER DIV. 13 SPECIFICATION, WITHOUT EXCEPTION.



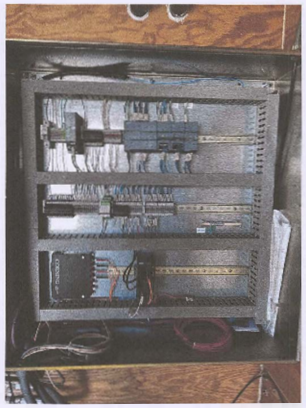
EXISTING EFFLUENT AND CHEMICAL CONTROL BUILDINGS ③

C DETAIL NTS



EXISTING EFFLUENT HMI ④

D DETAIL NTS



EXISTING EFFLUENT CONTROL PANEL ⑤

E DETAIL NTS

No.	Date	Revision	App.
1	5/15/22	SCRB TWO SET	ZMS
0	3/17/22	RESUBMITTED SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

STATE OF TEXAS
RAMESH KALLURI
68078
REGISTERED
PROFESSIONAL ENGINEER
11/11/2022

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-8182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

INSTRUMENTATION

CHEMICAL FEED FACILITIES EXISTING SYSTEM MODIFICATIONS

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	ZACHARIA (ZAKI) DAI, P.E.

FOR CITY OF HOUSTON USE ONLY

80367

I-50-501

SHEET NO. 354 OF 378

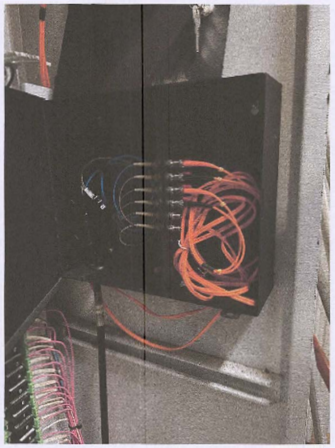
FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\Drawings\I-50-501 Existing System Modifications.dwg



EXISTING MAINTENANCE SHOP CONTROL PANEL

PHOTO

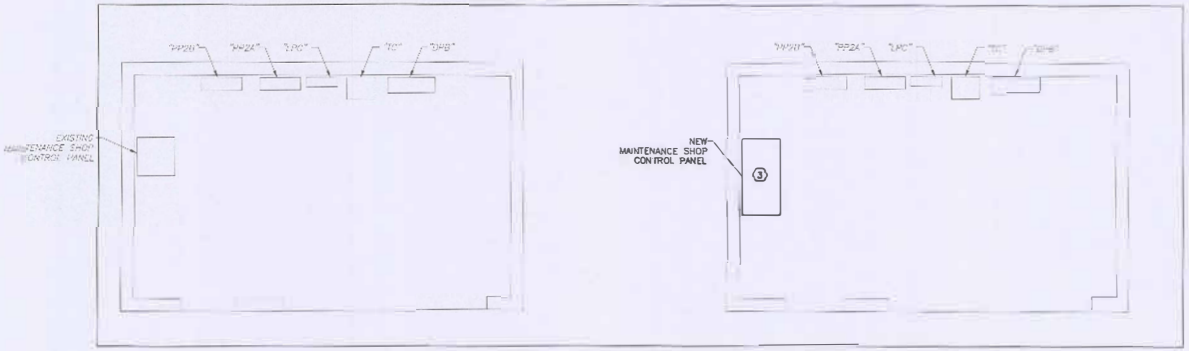
NTS



EXISTING MAINTENANCE SHOP CONTROL PANEL FIBER

PHOTO

NTS



EXISTING MAINTENANCE SHOP

PLAN

NTS

MODIFIED MAINTENANCE SHOP

PLAN

NTS

KEYED NOTES:

1. PRIOR TO REMOVAL OF THE ENCLOSURE, DISCONNECT FIBER OPTIC CABLE AND PROTECT IT FOR RE-USE.
2. ALL EXISTING CONDUCTORS ROUTED TO THE AERATION BASINS IS ARE TO BE REMOVED AND REPLACED.
3. PROPOSED CONTROL PANEL ENCLOSURE SHALL BE A MINIMUM OF 48 INCHES WIDE TO ACCOMMODATE THE ADDITIONAL WIRING AND DEVICES REQUIRED IN THIS PROJECT.

GENERAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE THE MAINTENANCE SHOP CONTROL PANEL REPLACEMENT AND DESCRIBE THE TASKS REQUIRED.

B. CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS REQUIRED TO PROTECT THE EXISTING FACILITIES FROM DAMAGE. ANY DAMAGE TO EXISTING FACILITIES INCURRED AS A RESULT OF CONSTRUCTION SHALL BE CORRECTED BY THE CONTRACTOR AT THE CONTRACTORS EXPENSE.

C. CONTRACTOR SHALL GIVE WRITTEN NOTICE TO THE CITY CONSTRUCTION REPRESENTATIVE PRIOR TO COMMENCEMENT OF ANY EQUIPMENT REMOVAL WORK.

D. THE INFORMATION CONTAINED IN THIS DRAWING SET, RELATED TO EXISTING EQUIPMENT, IS BASED ON RECORD DRAWINGS AND DATA COLLECTED FROM SITE. ITS ACCURACY IS NOT GUARANTEED AND ITS USE IN NO WAY RELIEVES THE CONTRACTOR OF ANY RESPONSIBILITY FOR LOSS DUE TO INACCURACIES. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO STARTING TASKS.

1	11/11/22	REPURPOSED SI	ZMS
0	5/18/22	PERMIT ISSUE	ZMS
No.	Date	Revisions	Appd.

KGI

Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

STATE OF TEXAS
RAMESH KALLURI
68078
REGISTERED
PROFESSIONAL ENGINEER
11/11/2022

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

INSTRUMENTATION

EXISTING MAINTENANCE SHOP PLAN

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
S/E XIAOHUA (SHARI) LIU, P.E.	80367
SHEET NO. 355 OF 378	

I-64-101

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\41160-BV (IAH Imp Pkg 2)\Drawings\I-64-101 Existing Maintenance Shop Plan.dwg

KEYED NOTES:

(1) THE EXISTING SHOP AND CONTROL BUILDINGS ARE TO REMAIN AND BE UTILIZED IN THIS PROJECT.

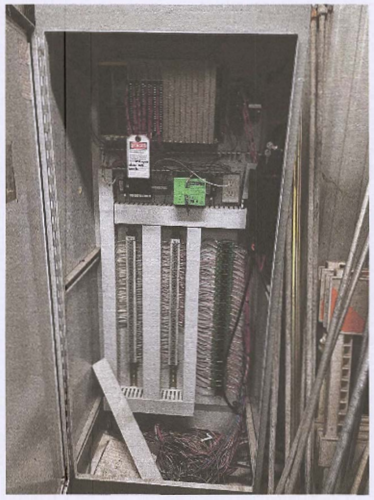
(2) EXISTING PVC CONDUIT ON THE BASIN STRUCTURE IS TO BE REMOVED AND REPLACED IN THIS PROJECT. COORDINATE CONTROL PANEL IMPROVEMENTS WITH CONDUIT AND CONDUCTOR REPLACEMENT.

(3) THE EXISTING PLC IS NOT CURRENTLY CONNECTED TO THE NETWORK. RESEARCH THE DISCONNECT LOCATION AND RECONNECT THE FIBER TO ENSURE FIBER COMMUNICATIONS ARE FUNCTIONAL. THE EXISTING CONTROL PANEL IS TO BE IMPROVED WITH A NEW FIBER TO COPPER SWITCH, POWER SUPPLIES, PLC AND ALL ANCILLARY DEVICES REQUIRED TO RETURN THE PANEL TO SERVICE AND SUPPORT ALL THE NEW AND EXISTING DEVICES AND INSTRUMENTS.



EXISTING BASINS, SHOP AND CONTROL BUILDING

A DETAIL NTS



EXISTING CONTROL PANEL IN THE SHOP BUILDING (3)

B DETAIL NTS

GENERAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE THE SHOP BUILDING CONTROL PANEL IMPROVEMENTS REQUIRED.

B. ALL MATERIALS AND PARTS FOR THE CONTROL PANEL IMPROVEMENTS SHALL BE PER DIV. 13 SPECIFICATION, WITHOUT EXCEPTION.

1	11/11/22	REPACKAGED SET	
0	1/18/22	PERMIT/I.C. SET	
REV	Date	Revisions	Appr.

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713) 365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
RAMESH KALLURI
68078
REGISTERED
PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

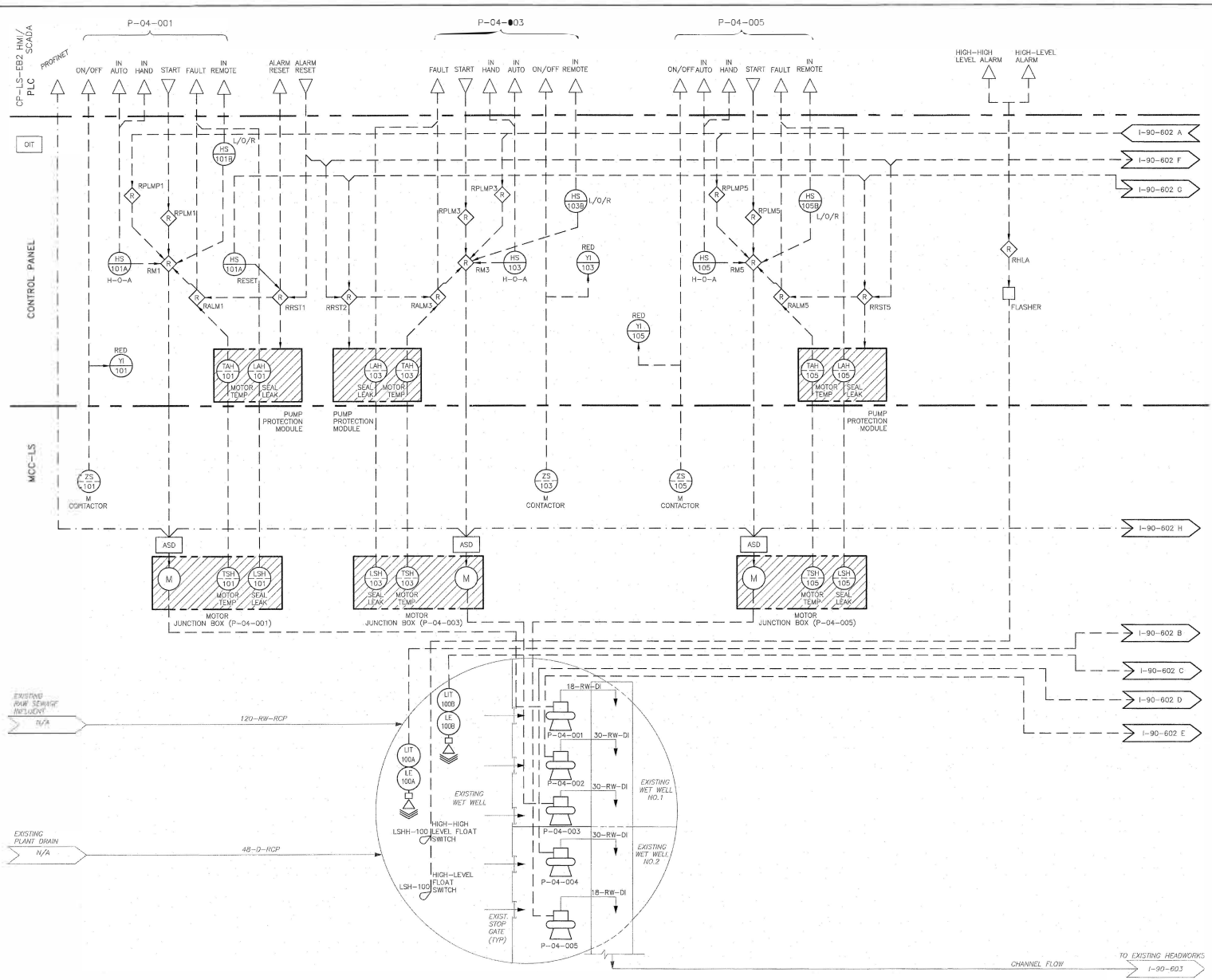
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
INSTRUMENTATION

SHOP BUILDING EXISTING CONTROL PANEL IMPROVEMENTS

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
I-64-501	SHEET NO. 356 OF 378

80367

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\Drawings\I-64-501 Shop Building Control Panel Improvements.dwg



GENERAL NOTES:

1. CONTRACTOR SHALL CONFIRM PROPOSED SYSTEM OPERATION WITH WASTE WATER OPERATION, SCADA GROUP, AND PROJECT MANAGEMENT DURING THE COORDINATION MEETING REQUIRED IN SPECIFICATION SECTION 13300.

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
RAMESH KALLURI
68078
LICENSED PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

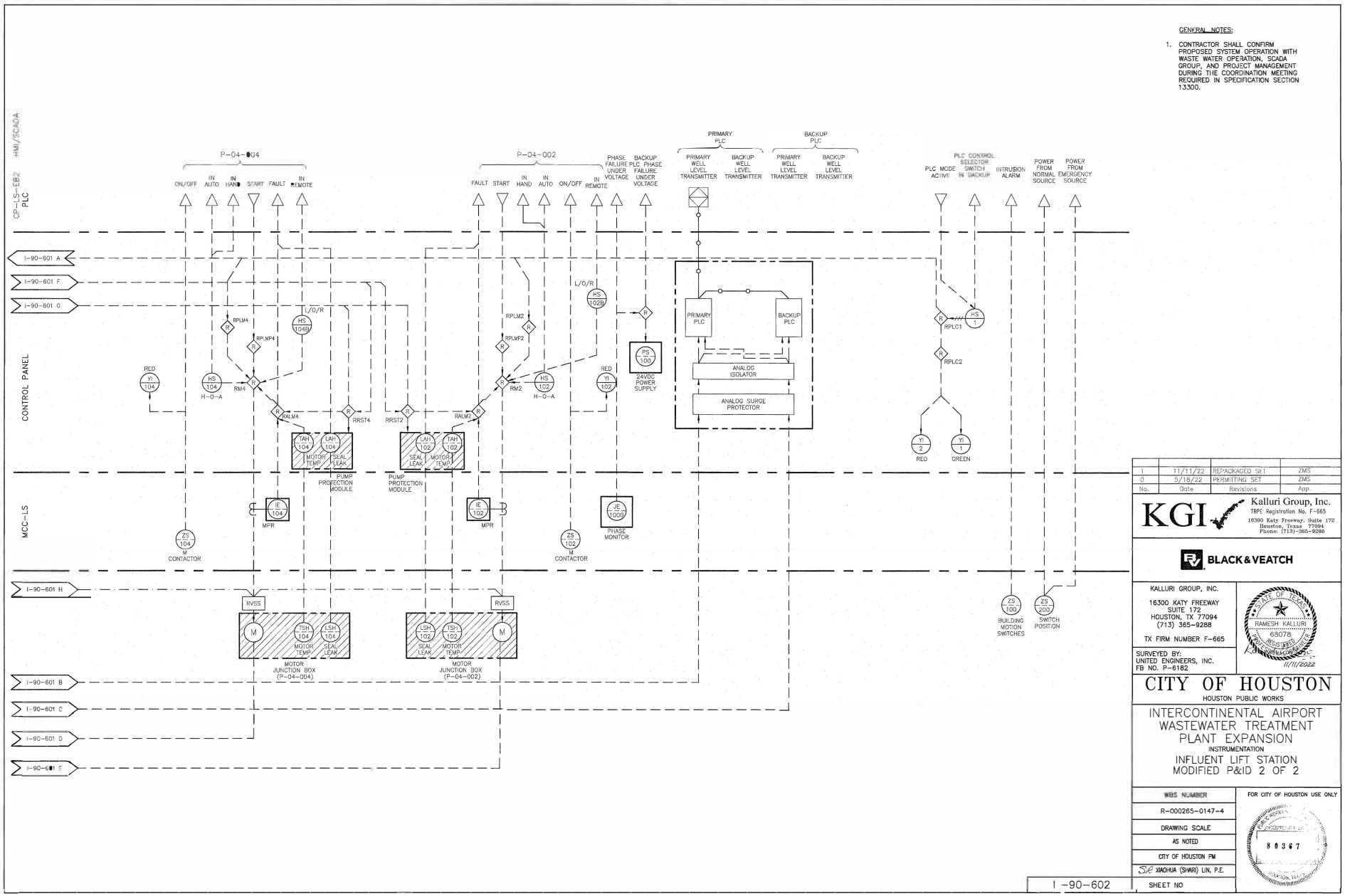
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
INSTRUMENTATION

INFLUENT LIFT STATION MODIFIED P&ID 1 OF 2

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO.	357 OF 378

FOR CITY OF HOUSTON USE ONLY
80367

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4160-BV (MH Imp Pkg 2)\Drawings\I-90-601 Lift Station Modified P&ID 1 Of 2.dwg



GENERAL NOTES:

1. CONTRACTOR SHALL CONFIRM PROPOSED SYSTEM OPERATION WITH WASTE WATER OPERATION, SCADA GROUP, AND PROJECT MANAGEMENT DURING THE COORDINATION MEETING REQUIRED IN SPECIFICATION SECTION 13300.

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
RAMESH KALLURI
68078
REGISTERED PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

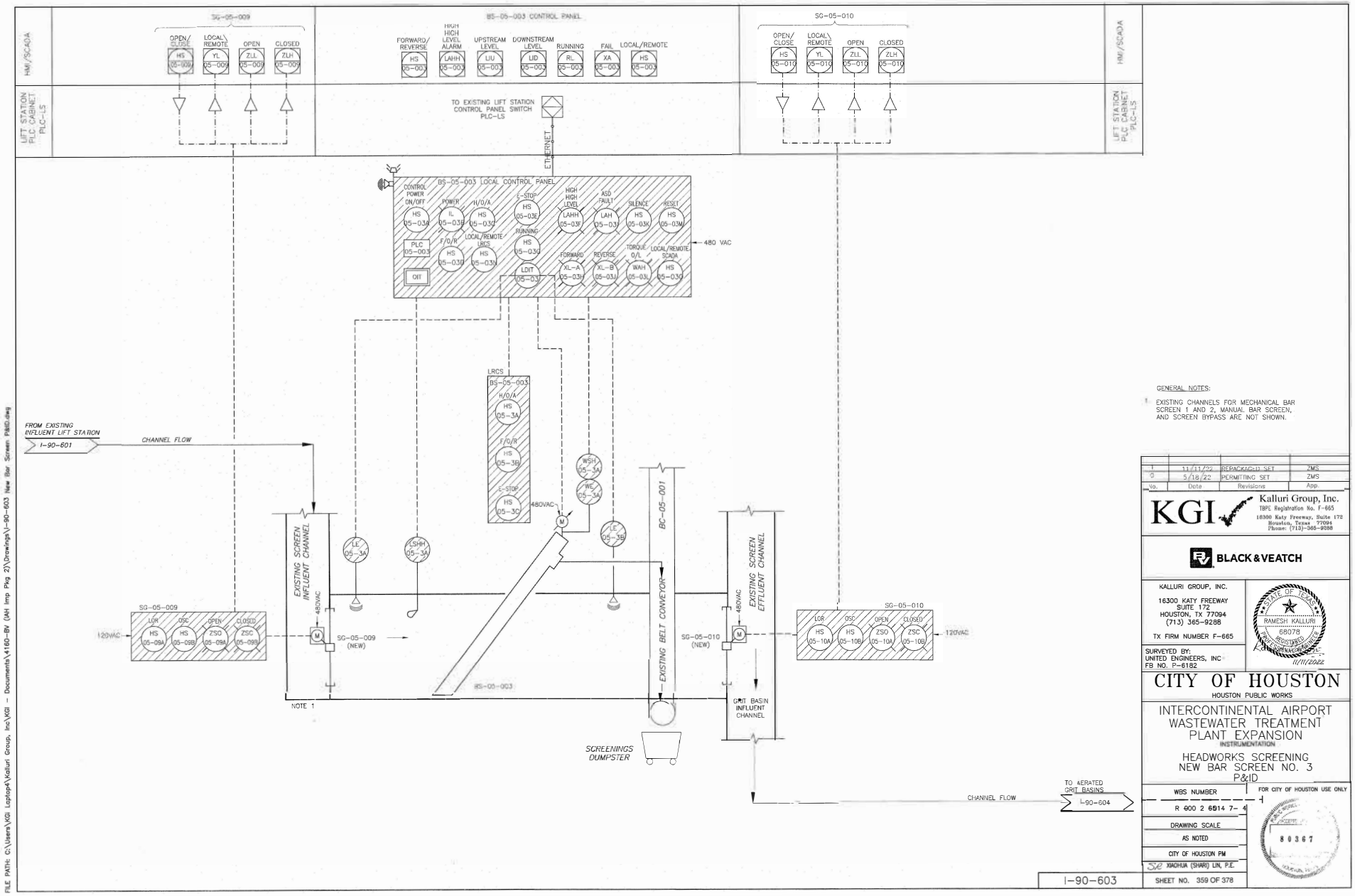
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
INSTRUMENTATION
INFLUENT LIFT STATION
MODIFIED P&ID 2 OF 2

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	Se XIAOHUA (SHARI) LIN, P.E.
SHEET NO	I-90-602

FOR CITY OF HOUSTON USE ONLY

PROFESSIONAL ENGINEER
80367
11/11/2022

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4160-BV (AH Imp Pkg 2)\Drawings\I-90-602 Lift Station Modified P&ID 2 Of 2.dwg



GENERAL NOTES:

1. EXISTING CHANNELS FOR MECHANICAL BAR SCREEN 1 AND 2, MANUAL BAR SCREEN, AND SCREEN BYPASS ARE NOT SHOWN.

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC
FB NO. P-6182

RAMESH KALLURI
68078
REGISTERED
PROFESSIONAL
ENGINEER
STATE OF TEXAS
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
INSTRUMENTATION

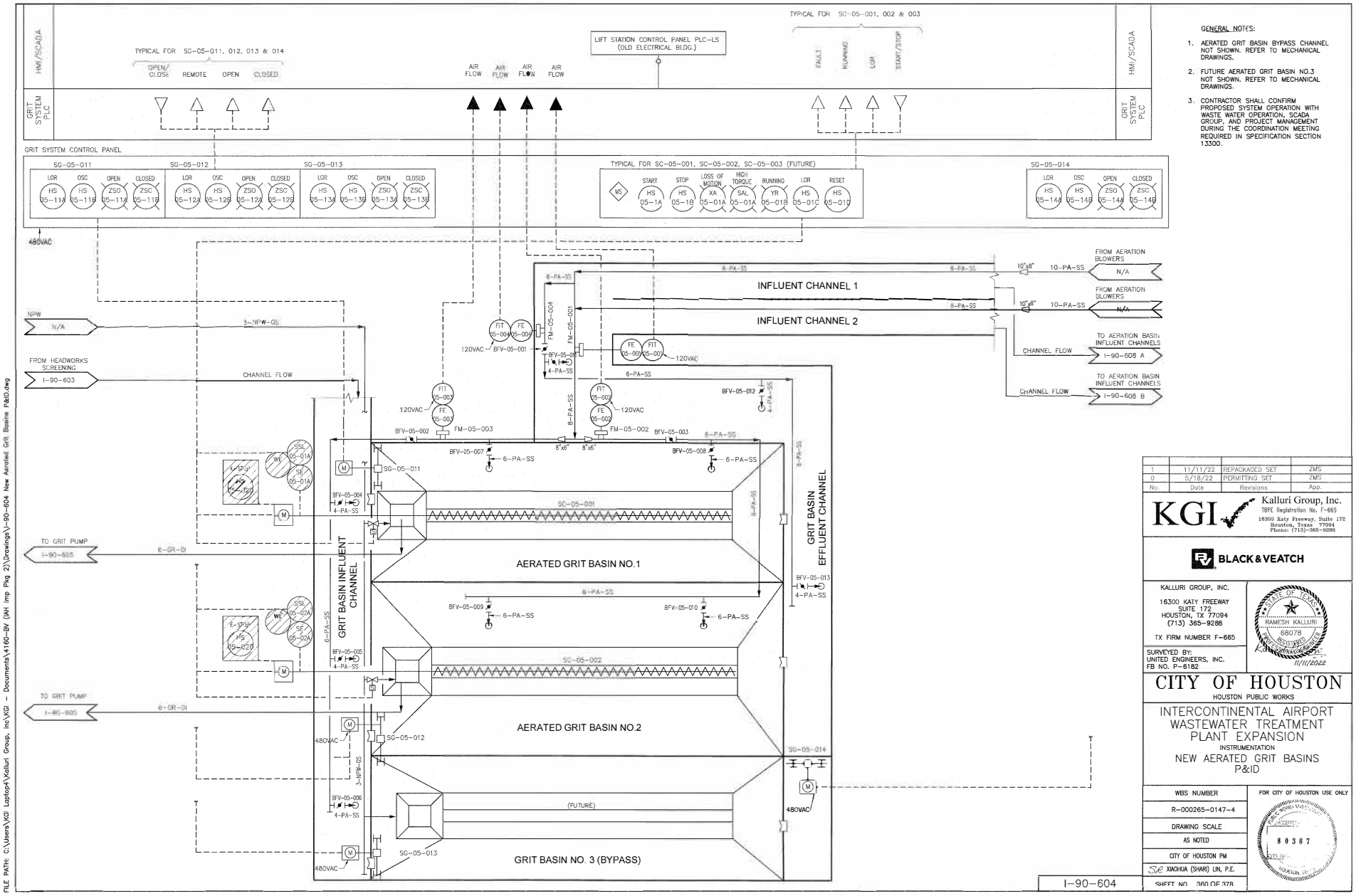
HEADWORKS SCREENING NEW BAR SCREEN NO. 3 P&ID

WBS NUMBER	R 000 2 6914 7- 4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO.	359 OF 378

FOR CITY OF HOUSTON USE ONLY

80367
REGISTERED
PROFESSIONAL
ENGINEER

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4160-BV (AH Imp Pkg 2)\Drawings\I-90-603 New Bar Screen P&ID.dwg



GENERAL NOTES:

1. AERATED GRIT BASIN BYPASS CHANNEL NOT SHOWN. REFER TO MECHANICAL DRAWINGS.
2. FUTURE AERATED GRIT BASIN NO.3 NOT SHOWN. REFER TO MECHANICAL DRAWINGS.
3. CONTRACTOR SHALL CONFIRM PROPOSED SYSTEM OPERATION WITH WASTE WATER OPERATION, SCADA GROUP, AND PROJECT MANAGEMENT DURING THE COORDINATION MEETING REQUIRED IN SPECIFICATION SECTION 13300.

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
RAMESH KALLURI
68078
REGISTERED
PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

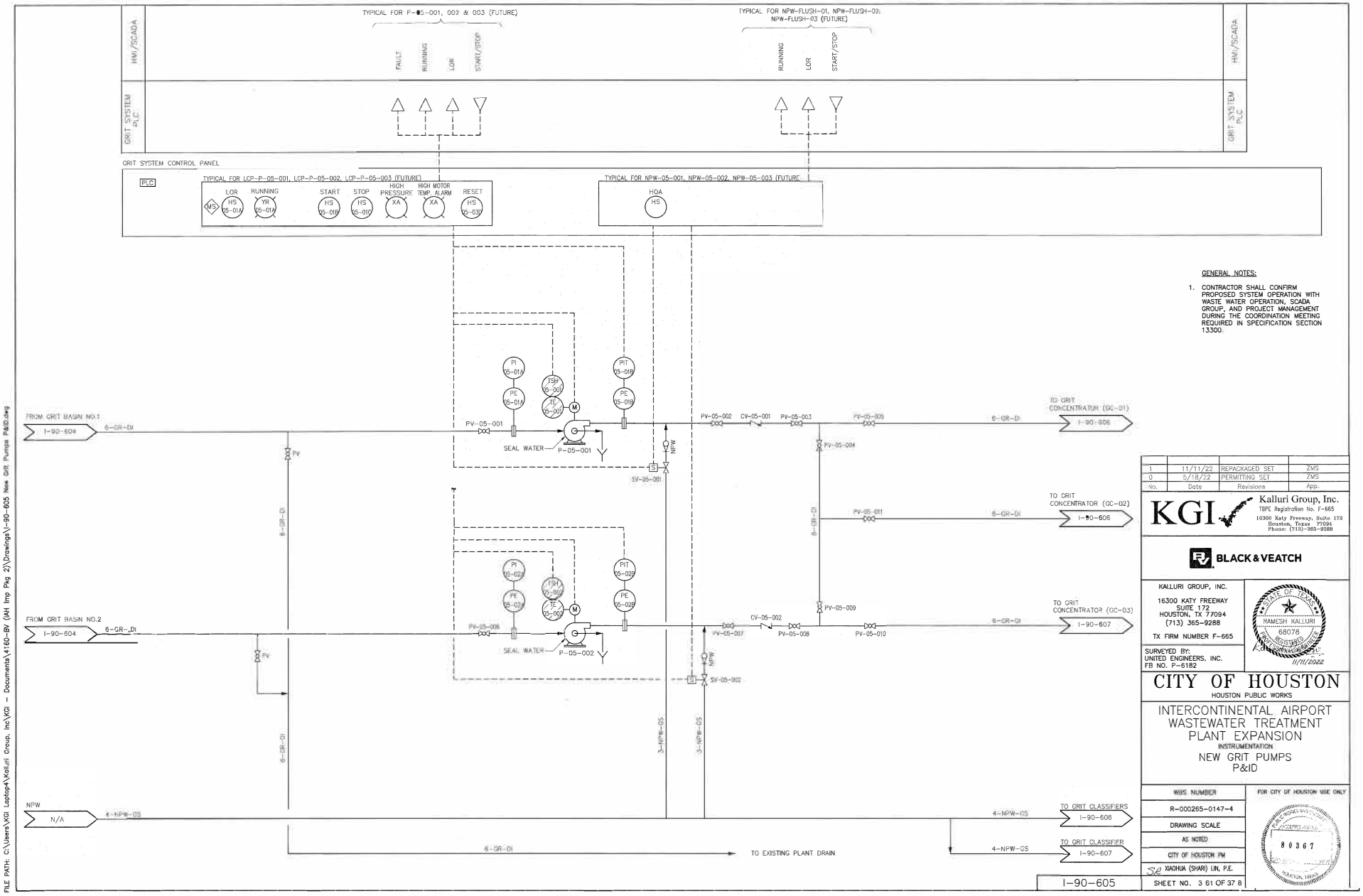
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
INSTRUMENTATION
NEW AERATED GRIT BASINS
P&ID

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO.	360 OF 378

FOR CITY OF HOUSTON USE ONLY
ACCEPTED
80367
REGISTERED ENGINEER

I-90-604

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4160-GV (IAH Imp Pkg 2)\Drawings\I-90-604 New Aerated Grit Basins P&ID.dwg



GENERAL NOTES:

1. CONTRACTOR SHALL CONFIRM PROPOSED SYSTEM OPERATION WITH WASTE WATER OPERATION, SCADA GROUP, AND PROJECT MANAGEMENT DURING THE COORDINATION MEETING REQUIRED IN SPECIFICATION SECTION 13300.

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
RAMESH KALLURI
68076
REGISTERED
PROFESSIONAL
ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

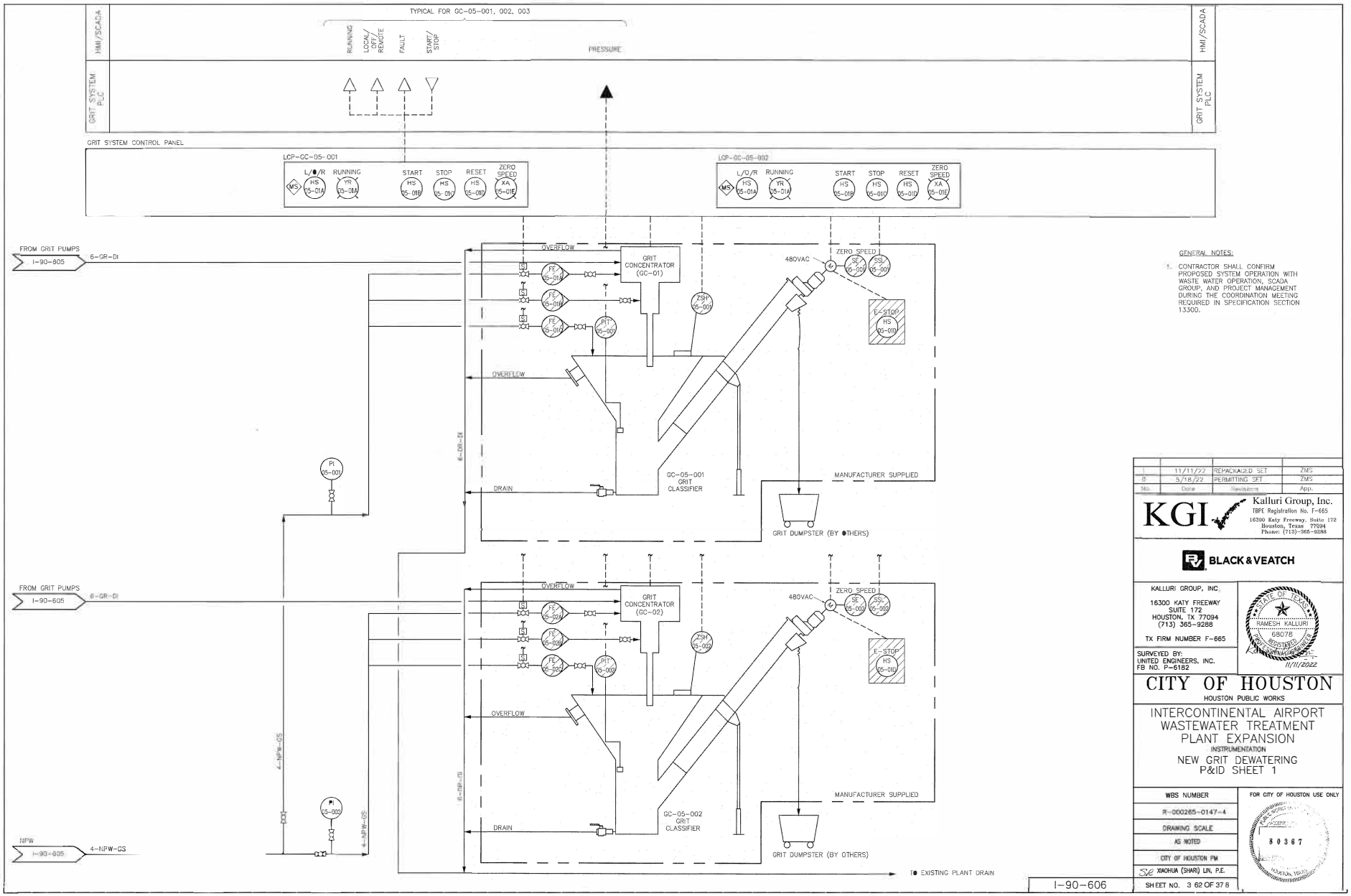
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
INSTRUMENTATION
NEW GRIT PUMPS
P&ID

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	Se XIAOHUA (SHARI) LIN, P.E.
SHEET NO.	3 61 OF 37 8

FOR CITY OF HOUSTON USE ONLY
ACCEPTED AS NOTED
80367
HOUSTON, TEXAS

I-90-605

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4160-BV (AH Imp Pkg 2)\Drawings\I-90-605 New Grit Pumps P&ID.dwg



GENERAL NOTES:

1. CONTRACTOR SHALL CONFIRM PROPOSED SYSTEM OPERATION WITH WASTE WATER OPERATION, SCADA GROUP, AND PROJECT MANAGEMENT DURING THE COORDINATION MEETING REQUIRED IN SPECIFICATION SECTION 13300.

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS — RAMESH KALLURI — 68078 — REGISTERED PROFESSIONAL ENGINEER — 11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
INSTRUMENTATION
NEW GRIT DEWATERING P&ID SHEET 1

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 362 OF 378	

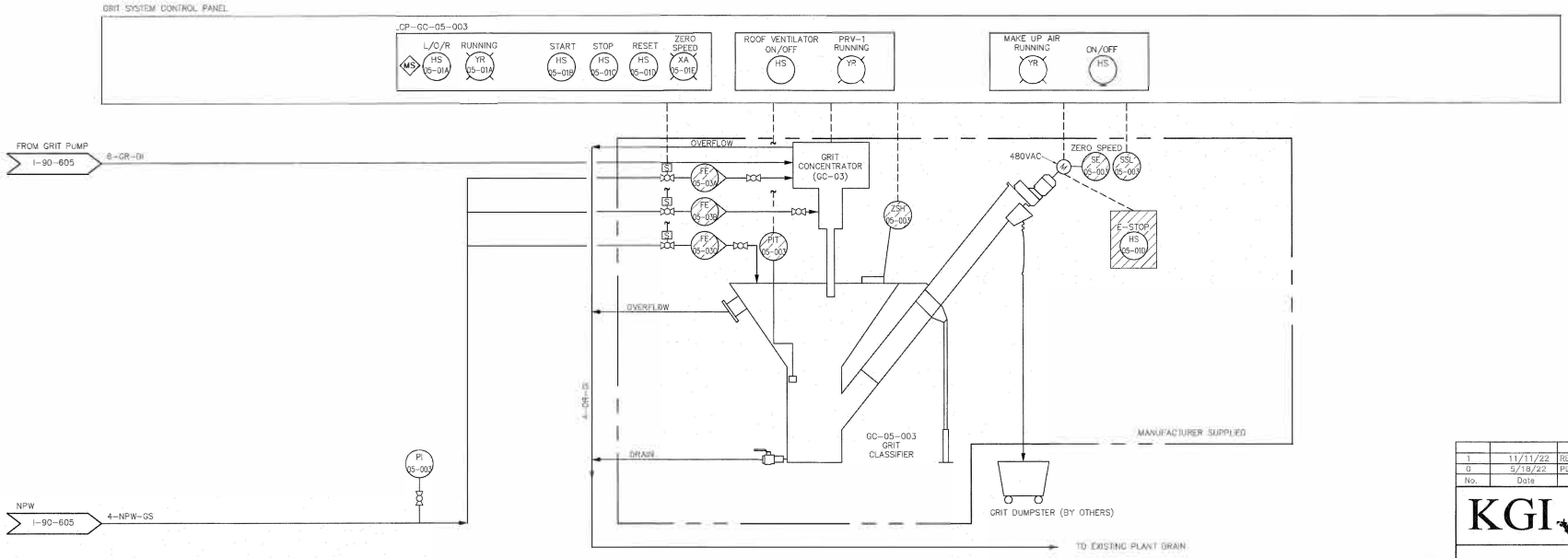
APPROVED — CITY OF HOUSTON — 80367 — ENGINEERING DIVISION

I-90-606

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\Drawings\I-90-606 New Grit Dewatering P&ID.dwg

GENERAL NOTES:

1. ROOF VENTILATOR AND MAKE UP AIR CONTROLS ARE LOCAL ONLY FROM THE GRIT CONTROL PANEL.
2. CONTRACTOR SHALL CONFIRM PROPOSED SYSTEM OPERATION WITH WASTE WATER OPERATION, SCADA GROUP, AND PROJECT MANAGEMENT DURING THE COORDINATION MEETING REQUIRED IN SPECIFICATION SECTION 13300.



No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
RAMESH KALLURI
68078
REGISTERED
PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
INSTRUMENTATION
NEW GRIT DEWATERING P&ID SHEET 2

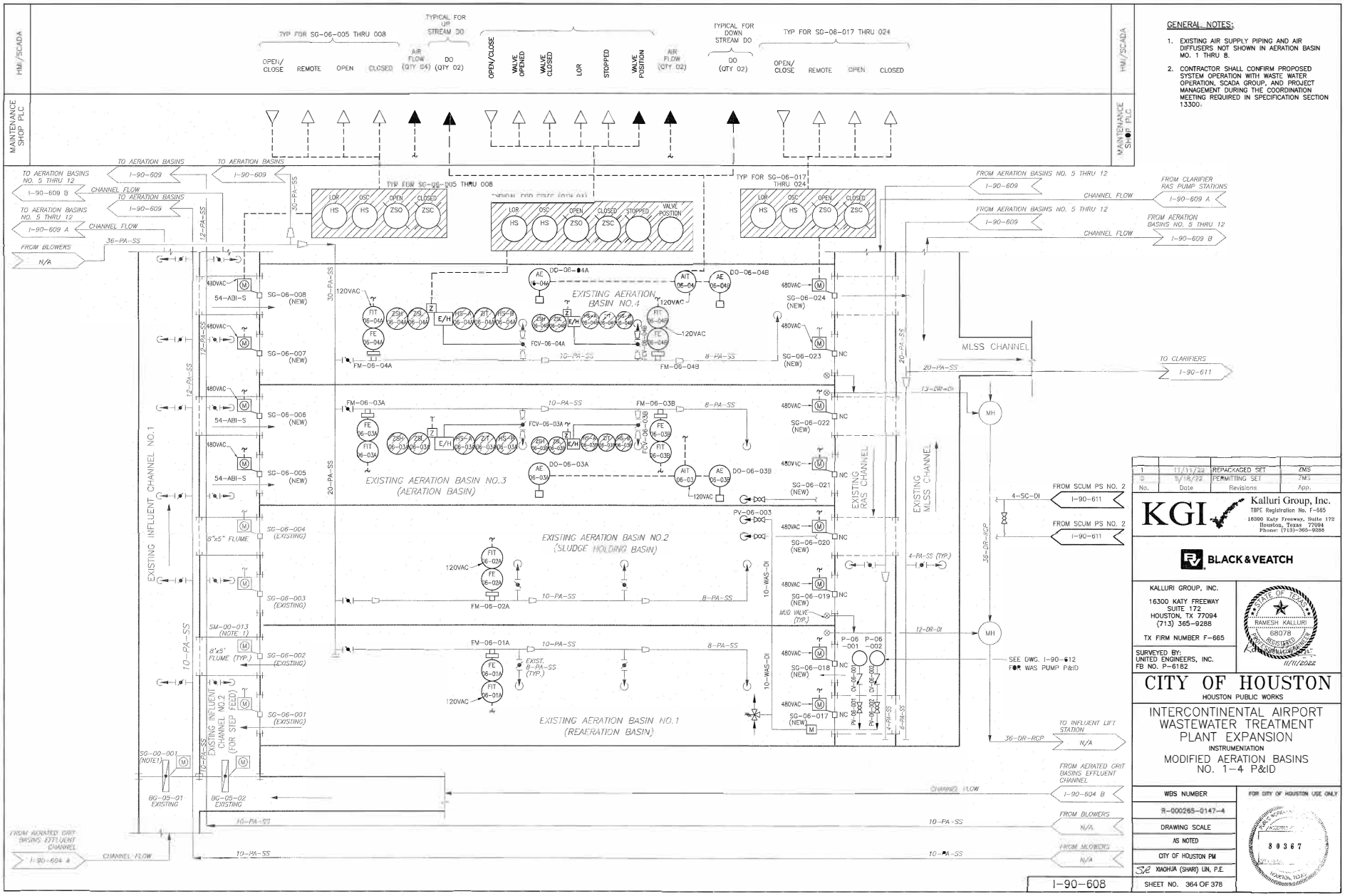
WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	Se XIAOHUA (SHARI) LIN, P.E.
SHEET NO.	363 OF 378

FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
80367
REGISTERED
ENGINEER
HOUSTON, TEXAS

I-90-607

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4160-BV (AH Imp Pkg 2)\Drawings\I-90-607 New Grit Dewatering P&ID.dwg



GENERAL NOTES:

1. EXISTING AIR SUPPLY PIPING AND AIR DIFFUSERS NOT SHOWN IN AERATION BASIN NO. 1 THRU 8.
2. CONTRACTOR SHALL CONFIRM PROPOSED SYSTEM OPERATION WITH WASTE WATER OPERATION, SCADA GROUP, AND PROJECT MANAGEMENT DURING THE COORDINATION MEETING REQUIRED IN SPECIFICATION SECTION 13300.

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
RAMESH KALLURI
68078
REGISTERED
PROFESSIONAL
ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
INSTRUMENTATION

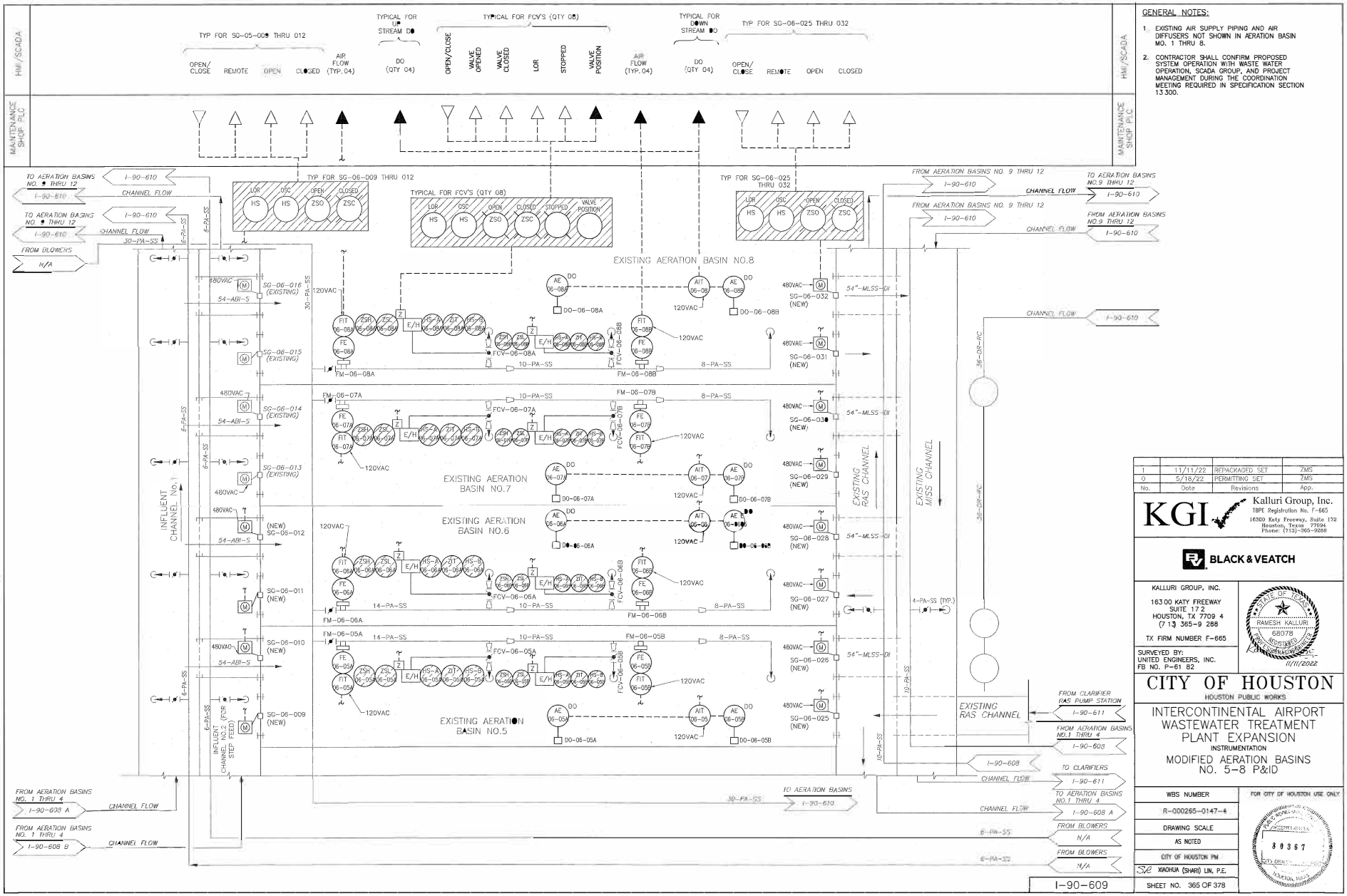
MODIFIED AERATION BASINS NO. 1–4 P&ID

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO.	364 OF 378

FOR CITY OF HOUSTON USE ONLY
80367
REGISTERED
PROFESSIONAL
ENGINEER
HOUSTON, TEXAS

I-90-608

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI – Documents\4160-BV (IAH Imp Pkg 2)\Drawings\I-90-608 Modified Aeration Basins No 1-4 P&ID.dwg



GENERAL NOTES:

1. EXISTING AIR SUPPLY PIPING AND AIR DIFFUSERS NOT SHOWN IN AERATION BASIN NO. 1 THRU 8.
2. CONTRACTOR SHALL CONFIRM PROPOSED SYSTEM OPERATION WITH WASTE WATER OPERATION, SCADA GROUP, AND PROJECT MANAGEMENT DURING THE COORDINATION MEETING REQUIRED IN SPECIFICATION SECTION 13 300.

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-61 82

STATE OF TEXAS
RAMESH KALLURI
68078
REGISTERED
PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
INSTRUMENTATION

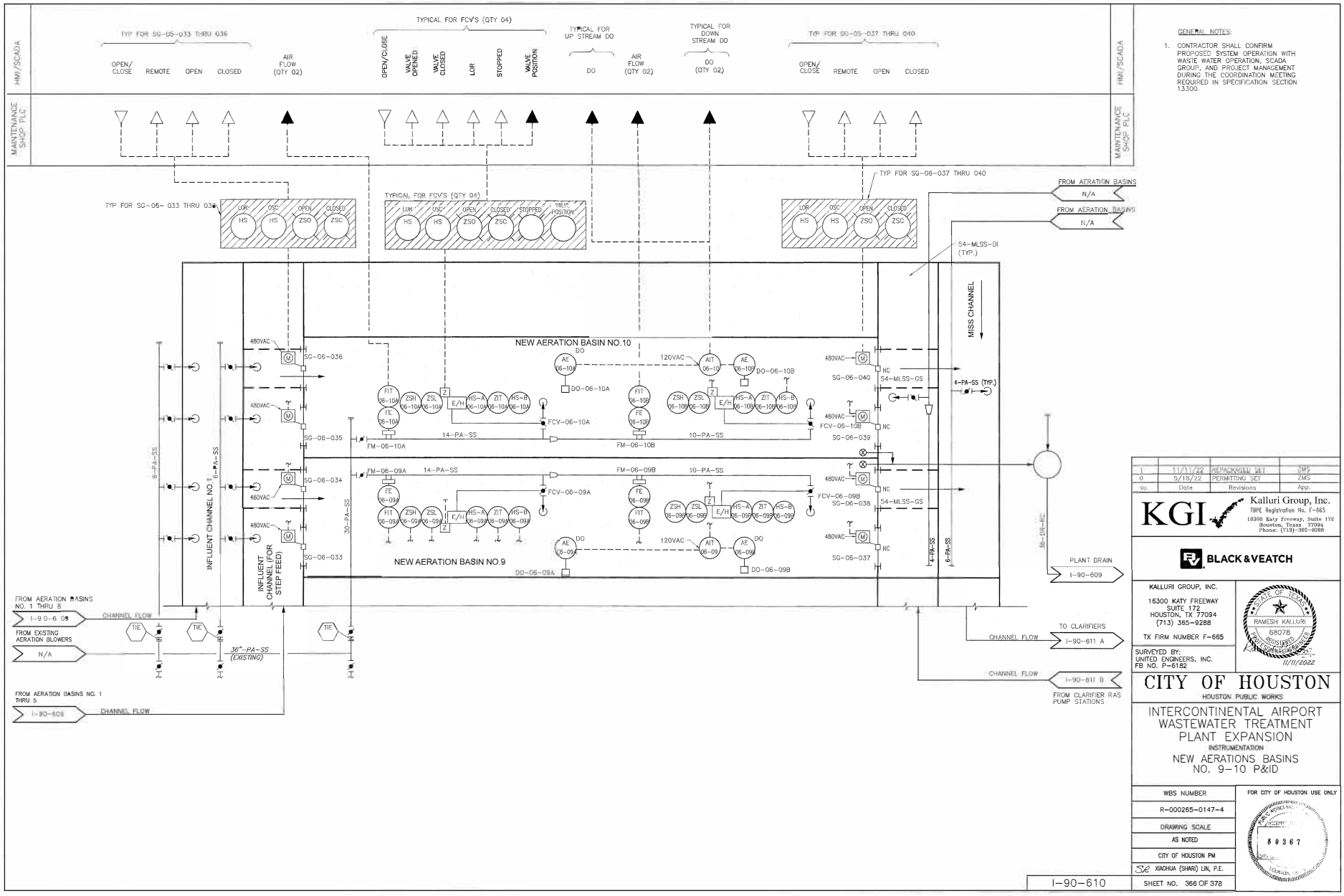
MODIFIED AERATION BASINS NO. 5-8 P&ID

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO.	365 OF 378

FOR CITY OF HOUSTON USE ONLY
ACCEPTED
80367
CITY ENGINEER

I-90-609

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4160-BV (AH Imp Pkg 2)\Drawings\I-90-609 Modified Aeration Basins No 5-8 P&ID.dwg



No.	Date	Revisions	App.
1	11/11/22	RE-PACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
RAMESH KALLURI
68078
REGISTERED
PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

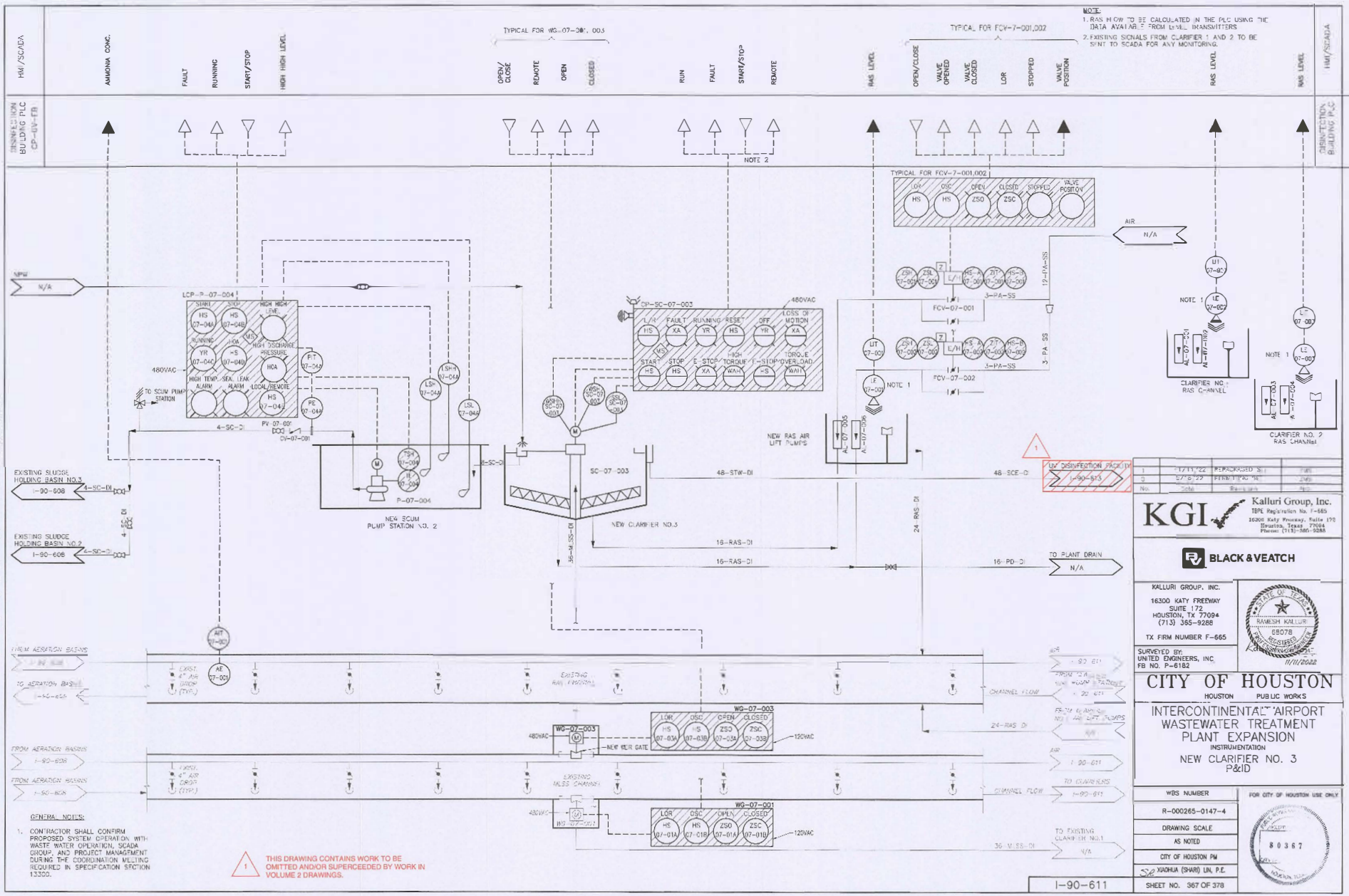
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
INSTRUMENTATION
NEW AERATIONS BASINS NO. 9–10 P&ID

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO.	366 OF 378

FOR CITY OF HOUSTON USE ONLY
ACCEPTED
80367

I-90-610

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\1160 - BY (IAH Imp Pkg 2)\Drawings\I-90-610 New Aeration Basins P&ID.dwg



No.	Date	Revisions	By
1	12/11/22	REVISED SEQ	PWB
2	07/18/23	FINAL PHASE	PWB

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713) 365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

RAMESH KALLURI
98078
REGISTERED
PROFESSIONAL ENGINEER
11/11/2022

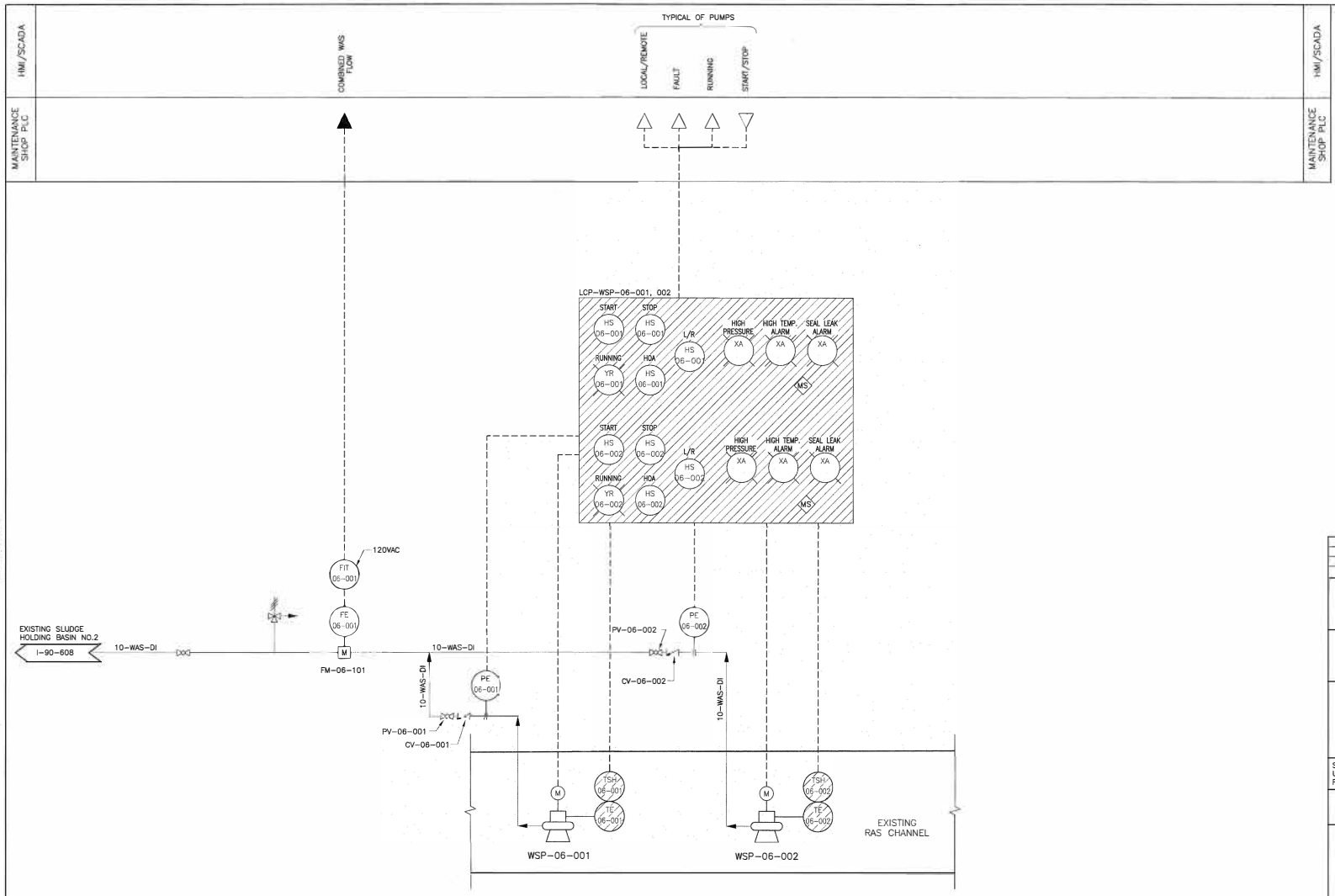
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT
PLANT EXPANSION
INSTRUMENTATION
NEW CLARIFIER NO. 3
P&ID

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	Se XIAOHUA (SHARI) LIN, P.E.
SHEET NO.	367 OF 378

FOR CITY OF HOUSTON USE ONLY
80367

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp. Pkg 2)\Drawings\I-90-611 New Clarifier No 3 P&ID.dwg



GENERAL NOTES:

1. CONTRACTOR SHALL CONFIRM PROPOSED SYSTEM OPERATION WITH WASTE WATER OPERATION, SCADA GROUP, AND PROJECT MANAGEMENT DURING THE COORDINATION MEETING REQUIRED IN SPECIFICATION SECTION 13300.

No	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZWS
0	5/18/22	PERMITTING SET	ZWS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
RAMESH KALLURI
68078
REGISTERED
PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
INSTRUMENTATION

WASTE ACTIVATED SLUDGE (WAS) PUMPS P&ID

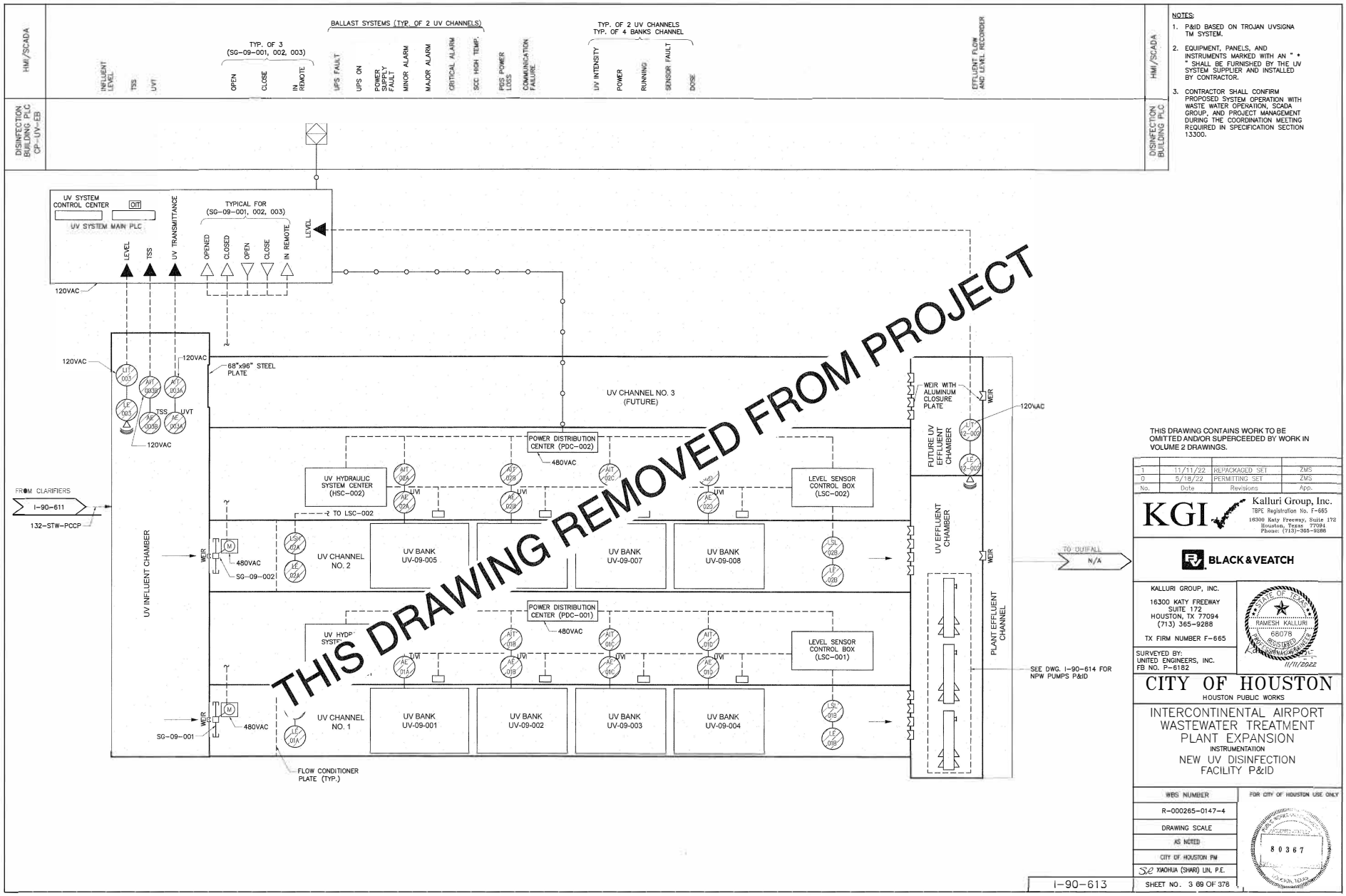
WBS NUMBER
R-000265-0147-4
DRAWING SCALE
AS NOTED
CITY OF HOUSTON PM
XIAOHUA (SHARI) LIN, P.E.
SHEET NO. 38 OF 378

FOR CITY OF HOUSTON USE ONLY

ACCEPTED AS NOTED
80367

I-90-612

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\Drawings\I-90-612 Waste Activated Sludge (WAS) Pumps P&ID.dwg



THIS DRAWING REMOVED FROM PROJECT

NOTES:

1. P&ID BASED ON TROJAN UVSIGNA TM SYSTEM.
2. EQUIPMENT, PANELS, AND INSTRUMENTS MARKED WITH AN " * " SHALL BE FURNISHED BY THE UV SYSTEM SUPPLIER AND INSTALLED BY CONTRACTOR.
3. CONTRACTOR SHALL CONFIRM PROPOSED SYSTEM OPERATION WITH WASTE WATER OPERATION, SCADA GROUP, AND PROJECT MANAGEMENT DURING THE COORDINATION MEETING REQUIRED IN SPECIFICATION SECTION 13300.

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

RAMESH KALLURI
68078
LICENSED PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
INSTRUMENTATION
NEW UV DISINFECTION FACILITY P&ID

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.

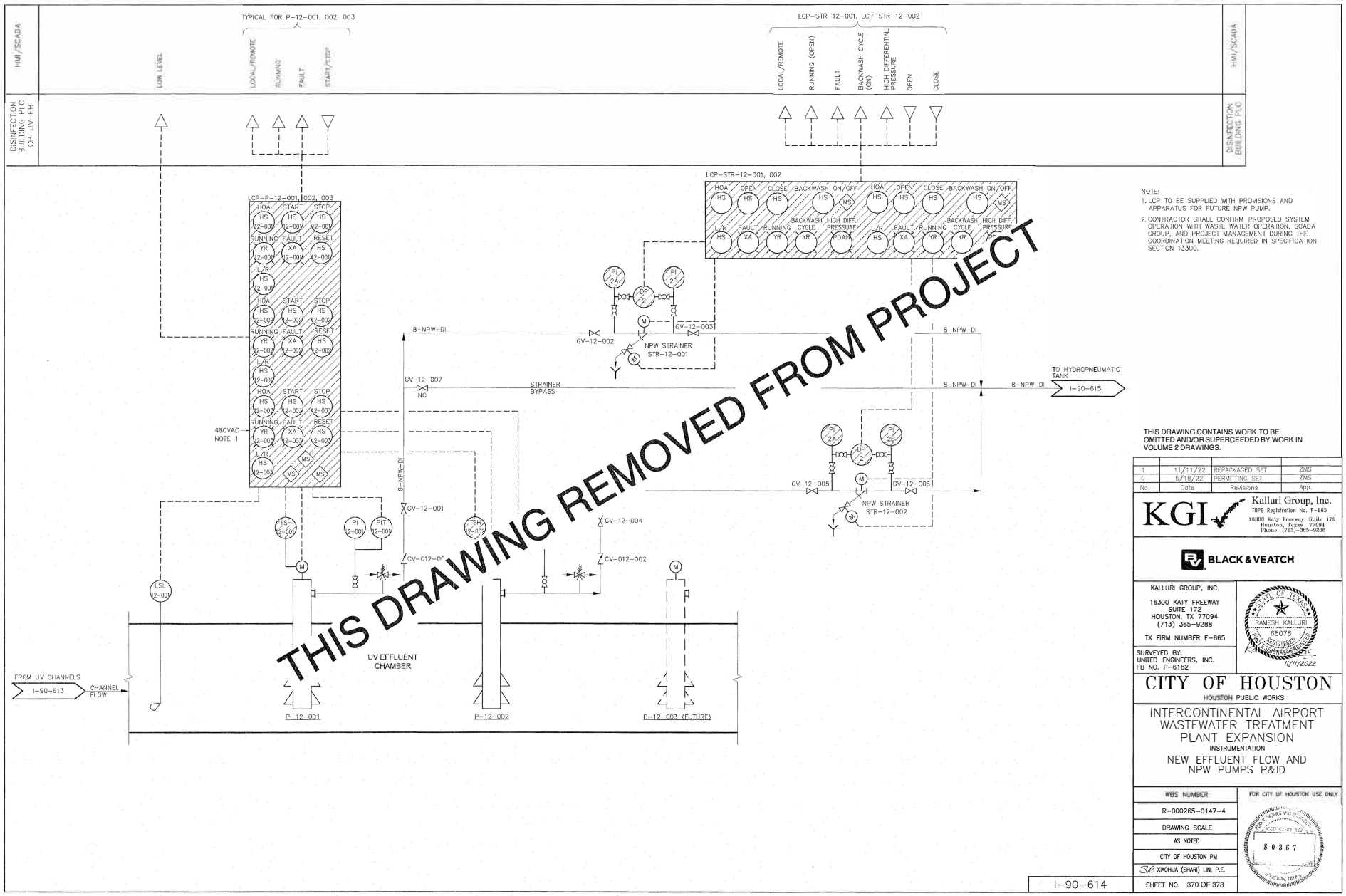
FOR CITY OF HOUSTON USE ONLY

80367

I-90-613

SHEET NO. 369 OF 378

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\Drawings\I-90-613 New UV Disinfection Facility P&ID.dwg



THIS DRAWING REMOVED FROM PROJECT

NOTE:
1. LCP TO BE SUPPLIED WITH PROVISIONS AND APPARATUS FOR FUTURE NPW PUMP.
2. CONTRACTOR SHALL CONFIRM PROPOSED SYSTEM OPERATION WITH WASTE WATER OPERATION, SCADA GROUP, AND PROJECT MANAGEMENT DURING THE COORDINATION MEETING REQUIRED IN SPECIFICATION SECTION 13300.

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
RAMESH KALLURI
98078
REGISTERED PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
INSTRUMENTATION

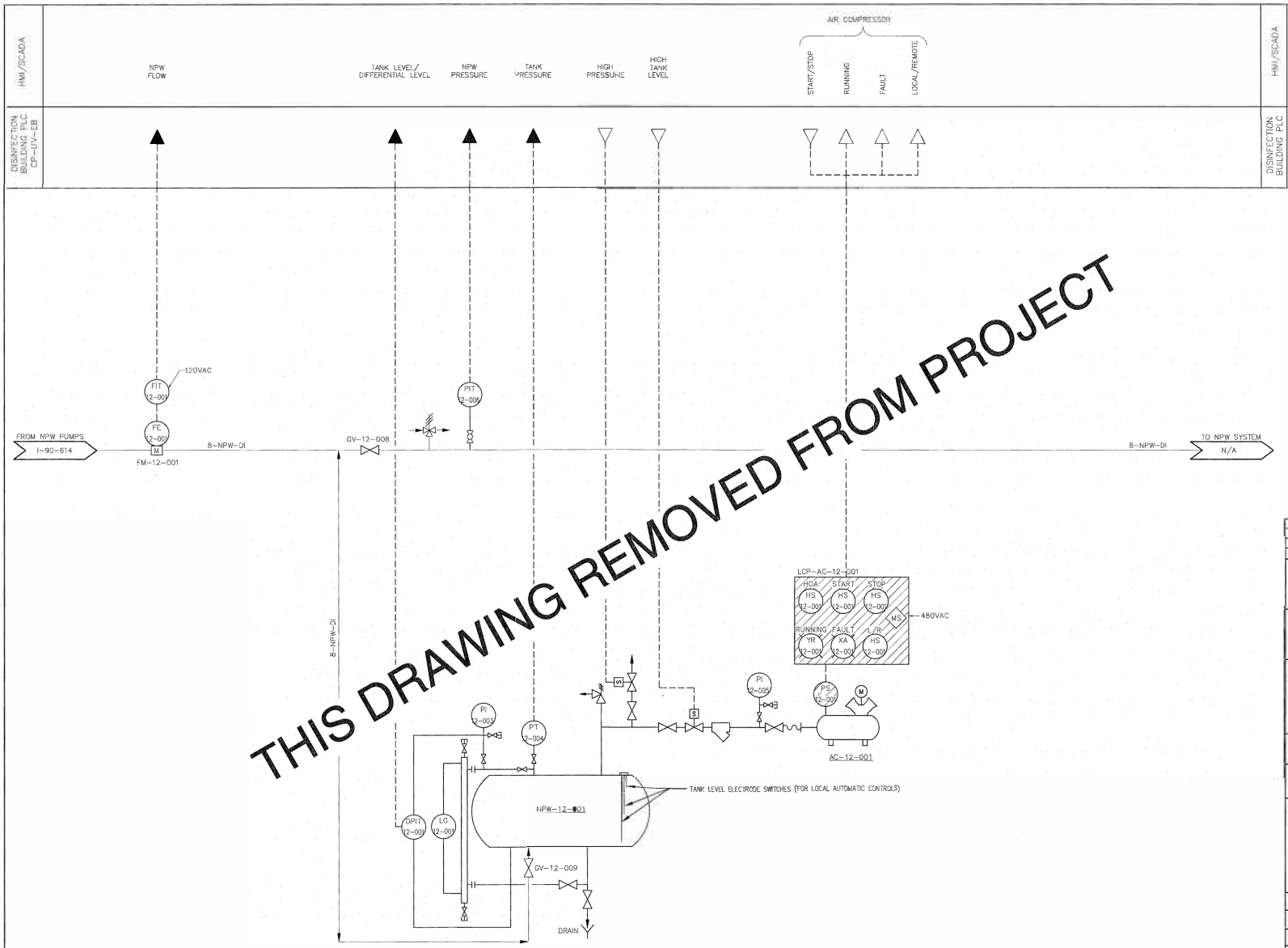
NEW EFFLUENT FLOW AND NPW PUMPS P&ID

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
	SHEET NO. 370 OF 378

FOR CITY OF HOUSTON USE ONLY
STATE OF TEXAS
80367
REGISTERED
XIAOHUA LIN
HOUSTON, TEXAS

I-90-614

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\Drawings\I-90-614 New Effluent Flow And NPW Pumps P&ID.dwg



THIS DRAWING REMOVED FROM PROJECT

GENERAL NOTES:

1. CONTRACTOR SHALL CONFIRM PROPOSED SYSTEM OPERATION WITH WASTE WATER OPERATION, SCADA GROUP, AND PROJECT MANAGEMENT DURING THE COORDINATION MEETING REQUIRED IN SPECIFICATION SECTION 13300.
2. HYDROTANK SUPPLIER AND CONTRACTOR TO COORDINATE WITH INSTRUMENTATION DIV 13. TO ENSURE ALL ANCILLARY EQUIPMENT REQUIRED FOR SAFE OPERATIONS OF THE HYDROTANK ARE PROVIDED.

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

No.	Date	Revisions	App.
1	11/11/22	RESUBMITTED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS 68078 REGISTERED RAMESH KALLURI PROFESSIONAL ENGINEER 11/11/2022

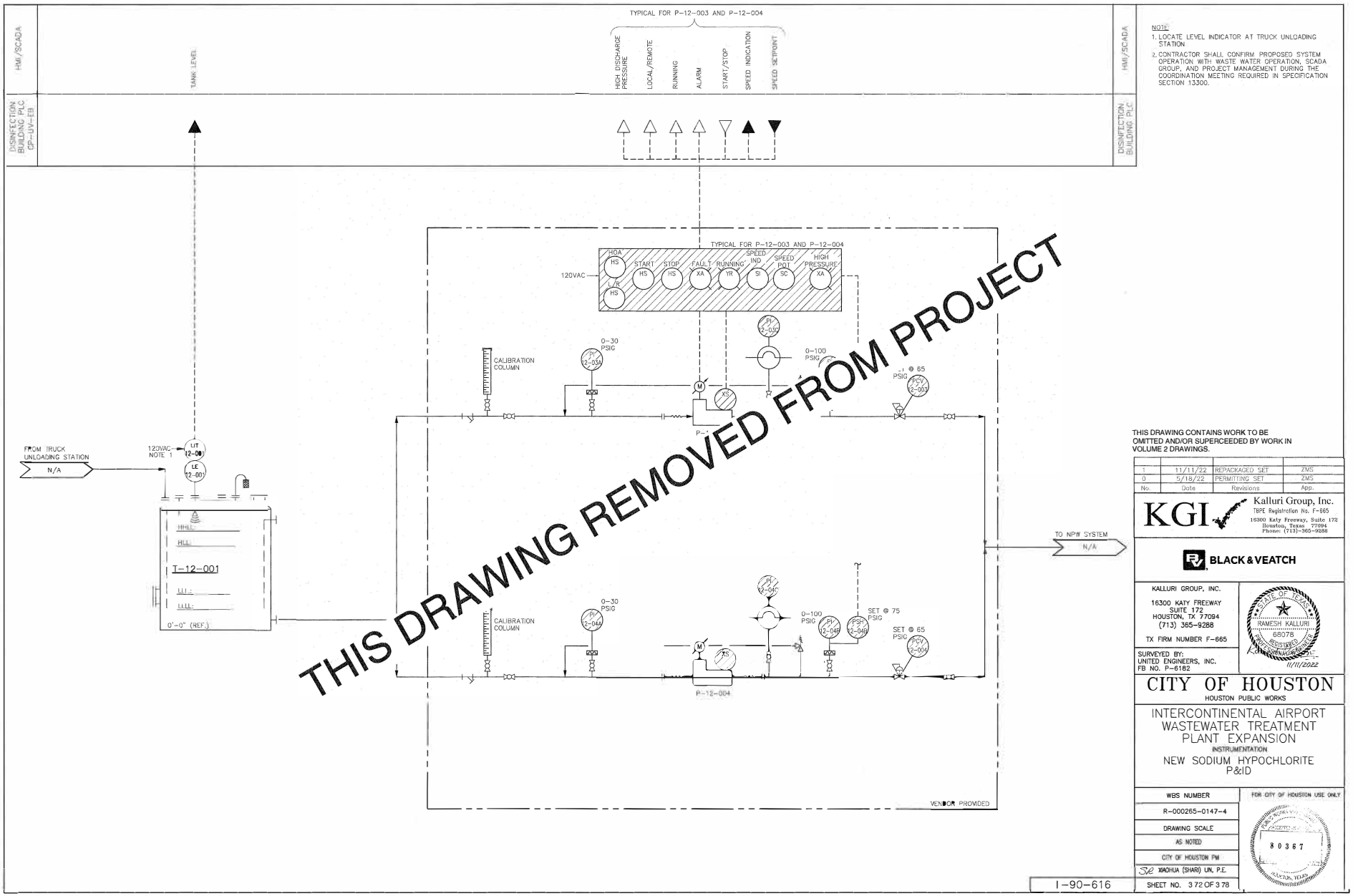
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
INSTRUMENTATION
NEW NPW HYDROPNEUMATIC TANK P&ID

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
I-90-615	SHEET NO. 371 OF378

FOR CITY OF HOUSTON USE ONLY
PUBLIC WORKS & ENGINEERING ACCEPTED 80367 TEXAS

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\Drawings\I-90-615 New NPW Hydropneumatic Tank P&ID.dwg



THIS DRAWING REMOVED FROM PROJECT

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
RAMESH KALLURI
68075
REGISTERED
PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
INSTRUMENTATION

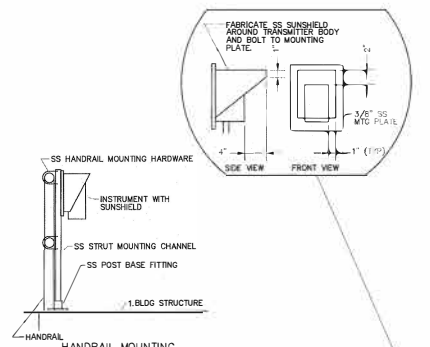
NEW SODIUM HYPOCHLORITE P&ID

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
XIAOHUA (SHARI) UN, P.E.	
SHEET NO. 372 OF 378	

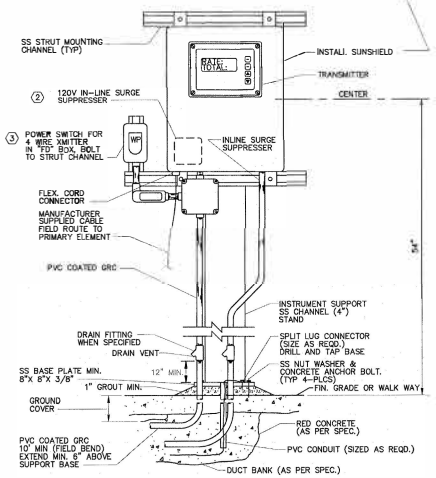
STATE OF TEXAS
80367
REGISTERED
XIAOHUA UN
11/11/2022

I-90-616

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\Drawings\I-90-516 New Sodium Hypochlorite P&ID.dwg



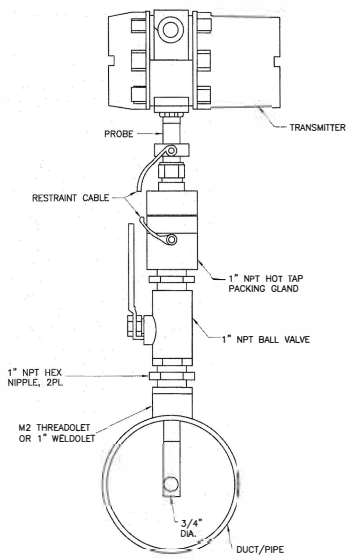
HANDRAIL MOUNTING
SEE NOTE 1



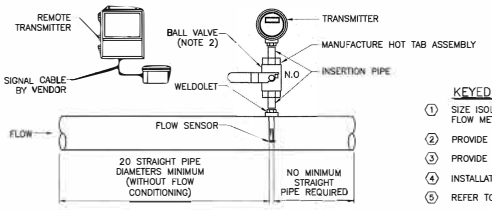
KEYED NOTES:

1. THIS DETAIL IS APPLICABLE FOR HANDRAIL MOUNTING. CONTRACTOR TO MODIFY INSTALLATION AS REQUIRED BY SITE CONDITIONS.
2. SWITCH REQUIRED WHEN UNIT IS REMOTE MOUNTED, OUT OF SIGHT OF CONTROLLING CIRCUIT BREAKER.
3. DIN RAIL MOUNTED SILICON DIODE TYPE SUPPRESSOR FOR REMOTE UNITS MOUNTED OUTSIDE ONLY.

TYPICAL INSTRUMENTATION INSTALLATION
A DETAIL
NTS



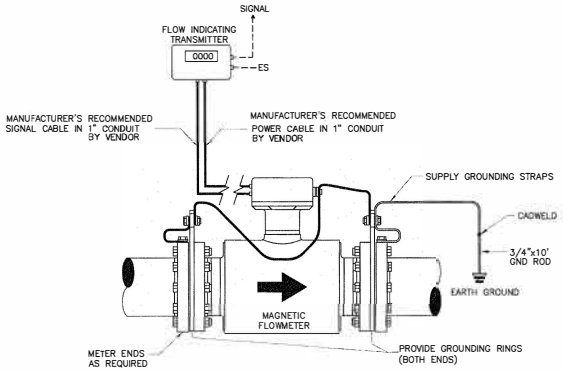
THERMAL MASS FLOW ELEMENT INSTALLATION
B DETAIL
NTS



THERMAL MASS FLOW METER (WITH HOT TAP)
D DETAIL
NTS

KEYED NOTES:

1. SIZE ISOLATION BALL VALVE TO ACCOMMODATE THE INSERTION OF THE FLOW METER.
2. PROVIDE CLEARANCE FOR REMOVAL OF PROBE.
3. PROVIDE HOT TAP MANUFACTURER ASSEMBLY.
4. INSTALLATION OF METERS SHALL PER MANUFACTURERS RECOMMENDATION.
5. REFER TO DETAIL G FOR TRANSMITTER SUNSHIELD.



KEYED NOTES:

1. POWER SUPPLY TO MAGNETIC METER PRIMARY DEVICE AND TRANSMITTER TO BE FROM SAME SOURCE WITH RESPECT TO VOLTAGE, FREQUENCY AND PHASE.
2. INSTALLATION OF METERS SHALL PROVIDE FOR 6 PIPE DIAMETERS UPSTREAM AND 6 PIPE DIAMETERS DOWNSTREAM AND PER MANUFACTURERS RECOMMENDATION.
3. METER MUST HAVE ULTRASONIC SELF-CLEANING ELECTRODES.
4. METER SHALL BE INSTALLED SO THAT IT CAN BE TAKEN OUT OF SERVICE FOR CALIBRATION AND/OR MAINTENANCE WITHOUT DISRUPTING ASSOCIATED PROCESS.
5. METER SHALL NOT BE LOCATED NEAR HEAVY INDUCTION EQUIPMENT (MIN 20 FEET) AND PER MANUFACTURERS RECOMMENDATION.
6. ORIENT THE METER SO THAT THE ELECTRODES LIE IN PLANE PARALLEL TO FLOOR.
7. WALL MOUNT THE TRANSMITTER WITHIN SITE OF METER.
8. INSTALL AIR BLEED VALVES FOR METER MOUNTED HORIZONTALLY.
9. REFER DETAIL A AND G FOR GENERAL INSTALLATION DETAILS AND TRANSMITTER SUNSHIELD INSTALLATION.

MAGNETIC FLOW METER INSTALLATION
C DETAIL
NTS

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
RAMESH KALLURI
68078
REGISTERED
PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
INSTRUMENTATION
DETAILS 1 OF 4

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	Se XIAOHUA (SHARI) LIN, P.E.

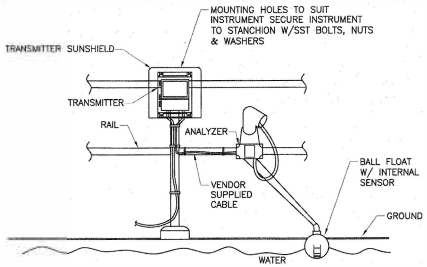
FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
80367
XIAOHUA LIN
REGISTERED
PROFESSIONAL ENGINEER

I-99-501

SHEET NO. 373 OF 378

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\Drawings\I-99-501 Details 1.dwg

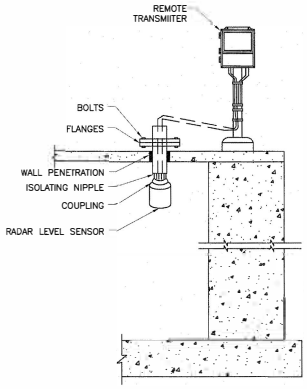


KEYED NOTES:

1. CONSULT THE ENGINEER AND FINALIZE THE LOCATION FOR INSTALLATION.
2. ENSURE TO PROVIDE EASY ACCESS TO THE FLOATING BALL PROBE FOR MAINTENANCE REASONS.
3. ENSURE THE FLOATING BALL IS LOCATED IN A TURBULENT FREE AREA.
4. ENSURE THE FLOATING BALL IS LOCATED IN A PLACE THAT IS AWAY FROM THE AIR INJECTION POINT IN THE PROCESS.
5. REFER TO DETAIL G FOR TRANSMITTER SUNSHIELD.

DISSOLVED OXYGEN (DO) AND AMMONIA ANALYZER TRANSMITTERS (FLOATING BALL)

E DETAIL NTS

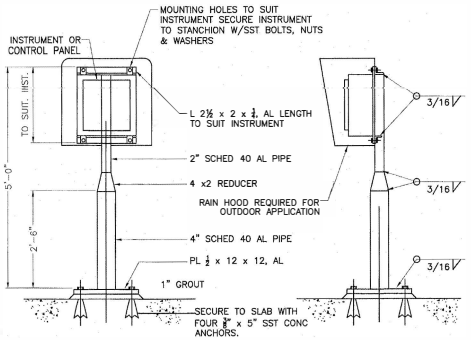


KEYED NOTES:

1. CONTRACTOR TO INSTALL PER MANUFACTURE RECOMMENDATION.
2. CONTRACTOR SHALL COORDINATE WITH ENGINEER TO FINALIZE THE CORE DRILL LOCATIONS
3. REFER TO DETAIL G FOR TRANSMITTER SUNSHIELD.

RADAR LEVEL SENSOR MOUNT

F DETAIL NTS

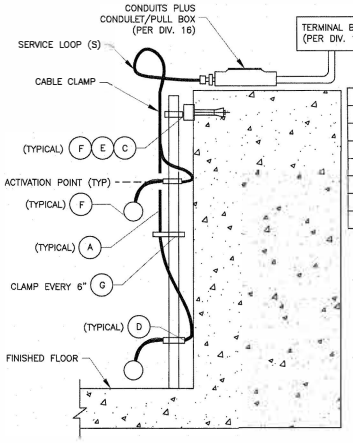


KEYED NOTES:

1. ROUND OFF ALL EXPOSED EDGES AND CORNERS.
2. PAINT ALUMINUM IN CONTACT WITH CONCRETE ACCORDING TO SPECIFICATIONS FOR PAINTING.

STANCHION SUPPORT FOR CASE MOUNTED INSTRUMENTS

G DETAIL NTS



ITEM	DESCRIPTION	MATERIAL
A	FLOAT SWITCH	SEE 13729
B	1" RIGID PIPE	316SS
C	PIPE WALL MOUNTING BRACKET	316SS
D	PIPE MOUNTING CLIP	316SS
E	NEOPRENE SHEET	N/A
F	1/2" DIA. EXPANSION BOLTS	316SS
G	CABLE CLAMP	316SS

KEYED NOTES:

1. FLOAT SWITCHES SHALL BE POSITIONED TO AVOID OBSTRUCTIONS FROM THE WALL, PROCESS EQUIPMENT OR OTHER FLOATS. ALL FLOAT SWITCHES MUST BE AT MINIMUM 45 DEGREES FROM ANY WALL AND REQUIRE AT LEAST 12 INCHES OF CLEARANCE IN THE HORIZONTAL AND VERTICAL AXIS.
2. FOR INSTALLATIONS WHERE MULTIPLE FLOAT SWITCHES ARE INSTALLED WITHIN THE 12 INCHES OF EACH OTHER, OFFSET THE SWITCHES AT 90 DEGREES FROM THE ADJACENT FLOAT WHILE STILL REMAINING THE CLEARANCE LIMITATIONS IN NOTE 1.

FLOAT SWITCH (OPEN CHANNEL/POLE MOUNTED)

H DETAIL NTS

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
RAMESH KALLURI
68078
LICENSED PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
INSTRUMENTATION
DETAILS 2 OF 4

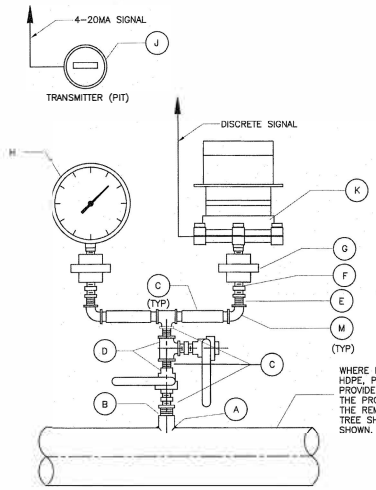
WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO.	374 OF 378

FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
80367
REGISTERED
XIAOHUA LIN
11/11/22

I-99-502

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4160-BV (AH Imp Pkg 2)\Drawings\I-99-502 Details 2.dwg



	ITEM	DESCRIPTION	MATERIAL
*	A	1 1/2" PROCESS CONNECTION	MATCH PIPE
*	B	1 1/2" X 3/4" BUSHING	304SS
*	C	3/4" NIPPLE	304SS
*	D	3/4" BALL VALVE	304SS
*	E	3/4" X 1/2" BUSHING	304SS
*	F	1/2" NIPPLE	304SS
*	G	THREADED DIAPHRAGM SEAL	REFER SPEC
*	H	PRESSURE GAUGE (PG)	REFER SPEC
*	J	PRESSURE TRANSMITTER (PIT)	REFER SPEC
*	K	PRESSURE SWITCH (PSH/PSL)	REFER SPEC
*	L	3/4" TEE	304SS
*	M	3/4" ELBOW	304SS

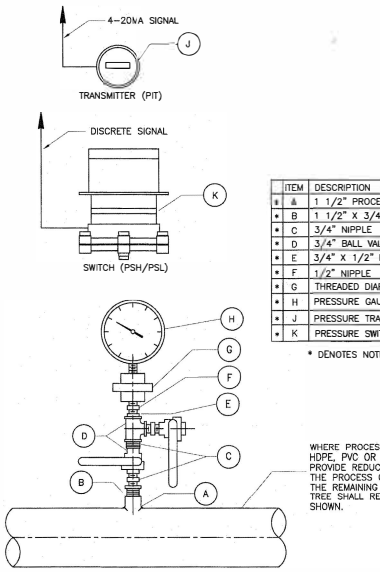
* DENOTES NOTE TO CONTRACTOR

KEYED NOTES:

1. PROVIDE PROCESS CONNECTION (ITEM A) ACCORDING TO MECHANICAL DETAILS.
2. COMBINATION BLOCK AND BLEED MANIFOLD MAY BE INSTALLED IN PLACE OF BALL VALVES (ITEM D).
3. PROVIDE THREADED DIAPHRAGM SEAL WHERE INDICATED ON DRAWINGS. REFER TO SPECS FOR GUIDANCE.
4. WHEN DIAPHRAGM SEAL IS INSTALLED, EVACUATE SECTION BETWEEN DIAPHRAGM AND INSTRUMENT OF AIR AND SEAL WITH SILICONE FILL FLUID UNLESS SPECIFIED OTHERWISE.
5. PROVIDE PRESSURE DEVICE (ITEM H, J, OR K) WHERE INDICATED ON THE DRAWINGS. REFER TO SPECS FOR GUIDANCE.
6. ROUTE FIELD WIRES FROM DEVICE TO JUNCTION BOX IN FLEXIBLE CONDUIT.
7. SPACE PRESSURE DEVICES TO PROMOTE SERVICING DEVICE WITHOUT INTERFERENCE.

PRESSURE DEVICE (DOUBLE TREE) STANDARD SERVICE TAP

I DETAIL
NTS



	ITEM	DESCRIPTION	MATERIAL
*	A	1 1/2" PROCESS CONNECTION	MATCH PIPE
*	B	1 1/2" X 3/4" BUSHING	304SS
*	C	3/4" NIPPLE	304SS
*	D	3/4" BALL VALVE	304SS
*	E	3/4" X 1/2" BUSHING	304SS
*	F	1/2" NIPPLE	304SS
*	G	THREADED DIAPHRAGM SEAL	REFER SPEC
*	H	PRESSURE GAUGE (PG)	REFER SPEC
*	J	PRESSURE TRANSMITTER (PIT)	REFER SPEC
*	K	PRESSURE SWITCH (PSH/PSL)	REFER SPEC

* DENOTES NOTE TO CONTRACTOR

KEYED NOTES:

1. PROVIDE PROCESS CONNECTION (ITEM A) ACCORDING TO MECHANICAL DETAILS.
2. COMBINATION BLOCK AND BLEED MANIFOLD MAY BE INSTALLED IN PLACE OF BALL VALVES (ITEM D).
3. PROVIDE THREADED DIAPHRAGM SEAL WHERE INDICATED ON DRAWINGS. REFER TO SPECS FOR GUIDANCE.
4. WHEN DIAPHRAGM SEAL IS INSTALLED, EVACUATE SECTION BETWEEN DIAPHRAGM AND INSTRUMENT OF AIR AND SEAL WITH SILICONE FILL FLUID UNLESS SPECIFIED OTHERWISE.
5. PROVIDE PRESSURE DEVICE (ITEM H, J, OR K) WHERE INDICATED ON THE DRAWINGS. REFER TO SPECS FOR GUIDANCE.
6. ROUTE FIELD WIRES FROM DEVICE TO JUNCTION BOX IN FLEXIBLE CONDUIT.

PRESSURE DEVICE (SINGLE TREE) STANDARD SERVICE TAP

J DETAIL
NTS

No.	Date	Revisions	App
1	11/11/22	REPACKAGED SET	ZMS
0	5/16/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
RAMESH KALLURI
68078
REGISTERED
PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

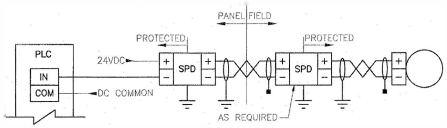
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
INSTRUMENTATION
DETAILS 3 OF 4

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SZ XIAOHUA (SHARI) LIN, P.E.
SHEET NO.	375 OF 378

FOR CITY OF HOUSTON USE ONLY
80367
REGISTERED
PROFESSIONAL ENGINEER

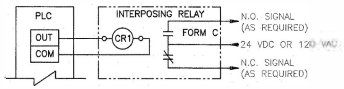
I-99-503

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\Drawings\I-99-503 Details 3.dwg



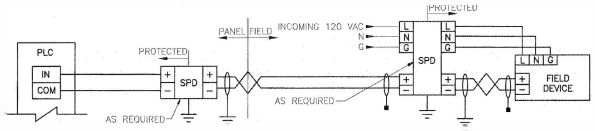
TYPICAL TRANSMITTER LOOP (LOOP POWERED: 2 WIRE)

K DETAIL NTS



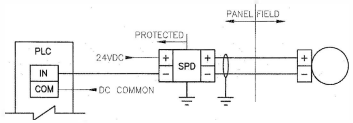
TYPICAL DISCRETE OUTPUT LOOP

N DETAIL NTS



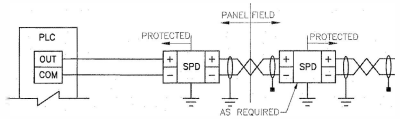
TYPICAL TRANSMITTER LOOP (LOOP POWERED: 4 WIRE)

L DETAIL NTS



TYPICAL DSCRETE INPUT LOOP

O DETAIL NTS



TYPICAL ANALOG OUTPUT LOOP

M DETAIL NTS

KEYED NOTES:

1. TERMINATE SPD DIRECTLY TO GROUND BUS. DO NOT DAISY CHAIN.
2. TERMINATE SHIELD/DRAIN WIRE DIRECTLY TO SHIELD BUS/GROUND. DO NOT DAISY CHAIN.
3. TAPE BACK SHIELD/DRAIN WIRE WHERE INDICATED.
4. WHERE SPD ARE REQUIRED IN THE FIELD, INSTALL SURGE PROTECTION AS CLOSE TO FIELD DEVICE AS POSSIBLE.
5. ALL CIRCUITS TO BE FUSED PROTECTED.

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
RAMESH KALLURI
68078
REGISTERED
PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

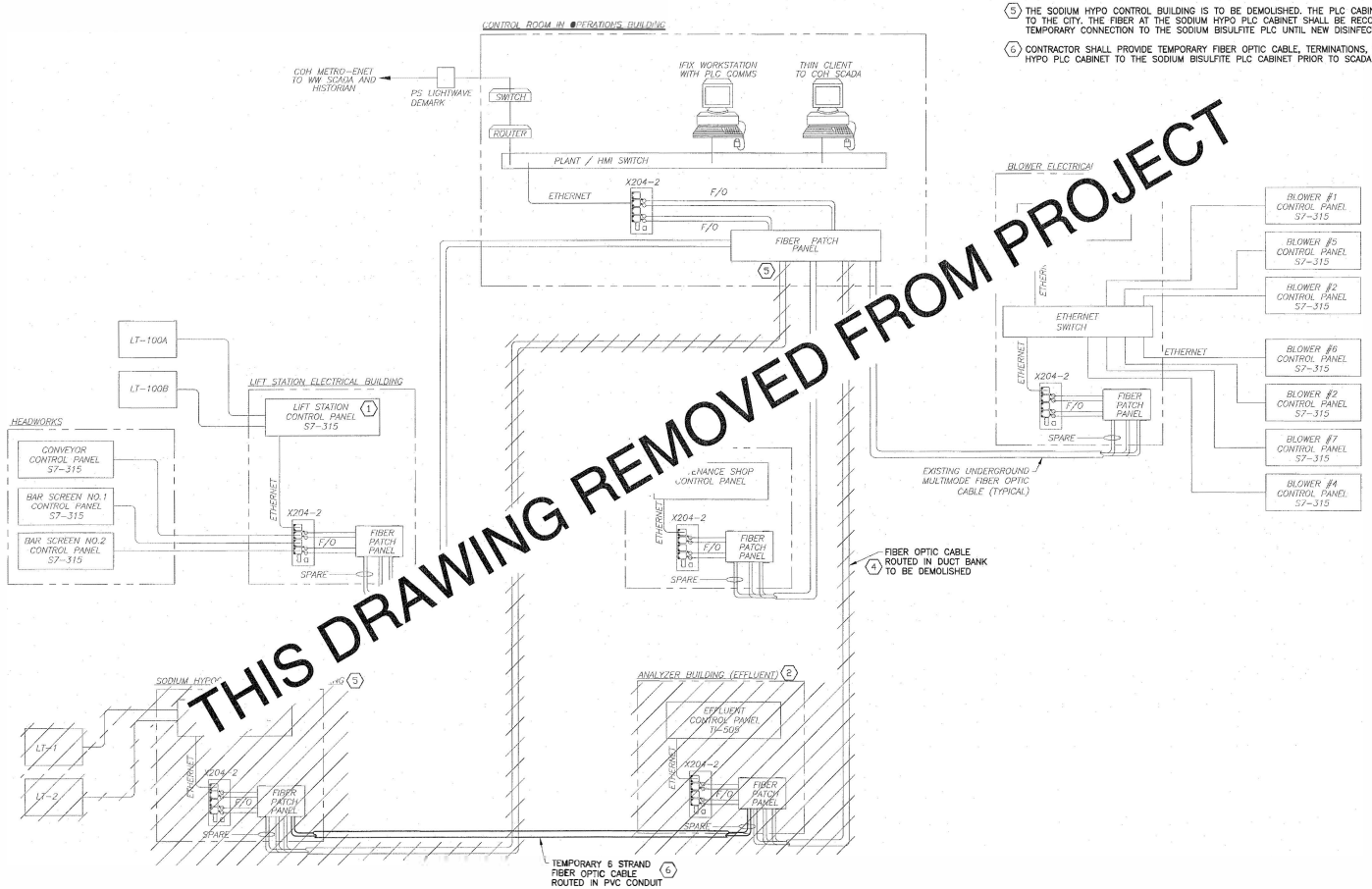
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
INSTRUMENTATION
DETAILS 4 OF 4

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
Sc XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 378 OF 378	

80367
LICENSED
PROFESSIONAL ENGINEER

I-99-504

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4180-BV (IAH Imp Pkg 2)\Drawings\I-99-504 Details 4.dwg



EXISTING SCADA NETWORK DIAGRAM

NTS

NOTES:

1. THE INFLUENT LIFT STATION AND HEADWORKS IS TO HAVE PROGRAMMING AND GRAPHICS MODIFIED TO REPRESENT NEW FACILITIES AND CONTROL PHILOSOPHY. THE EXISTING PLC IS TO HAVE NAMEPLATE AND WIRING TAGS RELEVANT TO LIFT STATION PUMPS, EXISTING HEADWORKS GRIT SYSTEM AND INSTRUMENTATION REMOVED REPLACED WITH APPROPRIATE NAMEPLATES AND TAGS.
2. THE EXISTING CHLORINE CONTACT BASINS, FLOW MEASURING, NPW AND POST TREATMENT CHEMICAL FACILITY ARE TO BE REMOVED AND REPLACED IN THIS PROJECT. THE CONTRACTOR SHALL PROVIDE ANY TEMPORARY FIBER OPTIC CABLE REQUIRED TO KEEP THE DISINFECTION AND FLOW MONITORING EQUIPMENT IN OPERATION, UNTIL NEW UV FACILITIES ARE IN SERVICE, INCLUDING ALL TEMPORARY CONDUIT AND CONDUCTORS REQUIRED.
3. THE TI-500 PLC HAS BEEN REMOVED FROM SERVICE. THE ENCLOSURE IS TO REMAIN AND BE IMPROVED, RESEARCH OF EXISTING INSTRUMENTATION AND COMMUNICATION WIRING IS REQUIRED TO ACCOMPLISH THE PLC REPLACEMENT AND EXPANSION.
4. THIS DUCT BANK MUST BE REMOVED FOR CONSTRUCTION OF NEW FACILITIES. COORDINATE WITH ELECTRICAL AND WASTEWATER SCADA GROUP TO CONNECT A TEMPORARY FIBER OPTIC CABLE TO THE PLANT NETWORK AND ENSURE FULL PLANT OPERATION.
5. THE SODIUM HYPO CONTROL BUILDING IS TO BE DEMOLISHED. THE PLC CABINET IS TO BE CAREFULLY REMOVED AND RETURNED TO THE CITY. THE FIBER AT THE SODIUM HYPO PLC CABINET SHALL BE RECONNECTED AT THE OPERATIONS BUILDING TO ALLOW TEMPORARY CONNECTION TO THE SODIUM BISULFITE PLC UNTIL NEW DISINFECTION FACILITY IS ONLINE.
6. CONTRACTOR SHALL PROVIDE TEMPORARY FIBER OPTIC CABLE, TERMINATIONS, TESTING AND CROSS CONNECTION FROM THE SODIUM HYPO PLC CABINET TO THE SODIUM BISULFITE PLC CABINET PRIOR TO SCADA DUCT BANK REMOVAL.

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

EQUIPMENT REMOVAL NOTES:

A. THIS DRAWING ILLUSTRATES AND DESCRIBES EQUIPMENT TO BE REMOVED IN THIS PROJECT.
B. CONTRACTOR SHALL DOCUMENT THE OPERATIONAL STATUS OF ALL EQUIPMENT TO BE REMOVED PRIOR TO SCHEDULING REMOVAL. THE STATUS, SOURCE, PATH OF SIGNALS, CONTROL AND SCADA CIRCUITS SHALL BE CONFIRMED.
C. CONTRACTOR SHALL NOTIFY THE CITY CONSTRUCTION REPRESENTATIVE UPON DISCOVERY OF ANY DEVIATIONS FROM THE DRAWINGS.
D. ALL EQUIPMENT SHALL CAREFULLY REMOVED, SAFELY STORED IN DRY FACILITY TO BE RETURNED TO THE CITY THROUGH TRANSMITTAL PROCESS.

GENERAL NOTES:

1. THE EXISTING OPERATIONS BUILDING AND CONTROL ROOMS ARE TO REMAIN IN SERVICE THROUGH THIS PROJECT. THERE ARE CHANGES TO ETHERNET CONNECTIONS AND SOFTWARE IN THIS PROJECT.

THIS DRAWING REMOVED FROM PROJECT

No	Date	Revisions	App
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
RAMESH KALLURI
68078
REGISTERED
PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT
PLANT EXPANSION
INSTRUMENTATION
EXISTING SCADA NETWORK
DIAGRAM

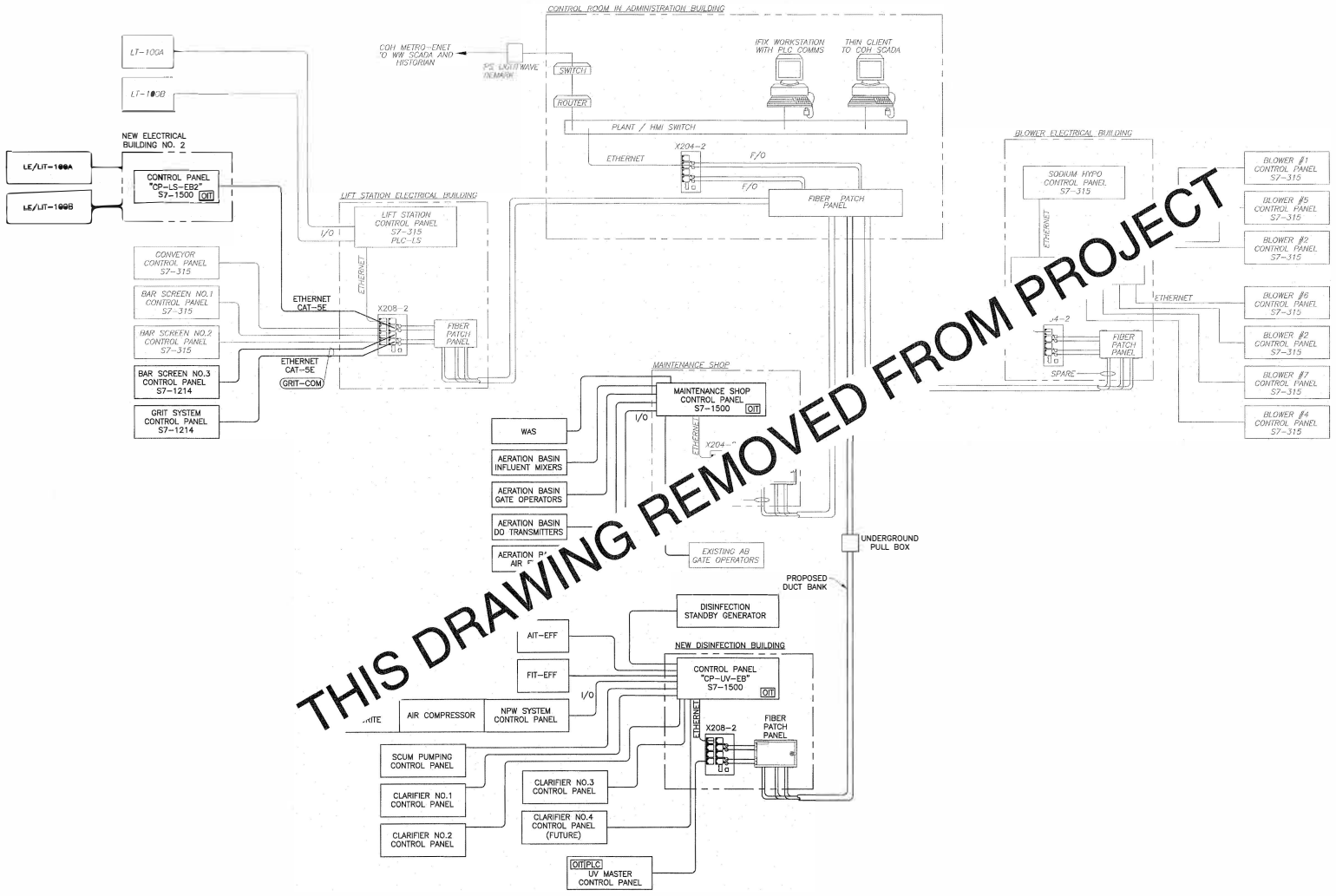
WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	XIAOHUA (SHARI) LIN, P.E.
SHEET NO.	377 OF 378

FOR CITY OF HOUSTON USE ONLY

ACCEPTED AS NOTED
80367
11/11/2022

I-99-601

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4160-BV (AH Imp Pkg 2)\Drawings\I-99-601 Existing Scada Network Configuration.dwg



MODIFIED SCADA NETWORK DIAGRAM
NTS

THIS DRAWING REMOVED FROM PROJECT

GENERAL NOTES:

A. COORDINATE WITH PROJECT MANAGEMENT AND PLANT OPERATIONS ANY TIME EXISTING, TEMPORARY OR NEW WORK IS PERFORMED ON PLANT SCADA, CONTROLS OR INSTRUMENTATION.

B. CLARIFIER#4 IS FOR FUTURE BUT CP-UV-EB TO BE PROVIDED WITH PROVISIONS TO ACCEPT FUTURE I/O POINTS FOR IT. CONSIDER CLARIFIER#4 CONSTRUCTION TO MATCH CLARIFIER#3.

THIS DRAWING CONTAINS WORK TO BE OMITTED AND/OR SUPERCEEDED BY WORK IN VOLUME 2 DRAWINGS.

No.	Date	Revisions	App.
1	11/11/22	REPACKAGED SET	ZMS
0	5/18/22	PERMITTING SET	ZMS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
RAMESH KALLURI
69078
REGISTERED
PROFESSIONAL ENGINEER
11/11/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
INSTRUMENTATION
MODIFIED SCADA NETWORK DIAGRAM

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
Se XIAOHUA (SHARI) LIN, P.E.	
SHEET NO. 378 OF 378	

STATE OF TEXAS
80367
REGISTERED
PROFESSIONAL ENGINEER
HOUSTON, TEXAS

I-99-602

FILE PATH: C:\Users\KGI Laptop4\Kalluri Group, Inc\KGI - Documents\4160-BV (AH Imp Pkg 2)\Drawings\I-99-602 Modified Scada Network Configuration.dwg

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

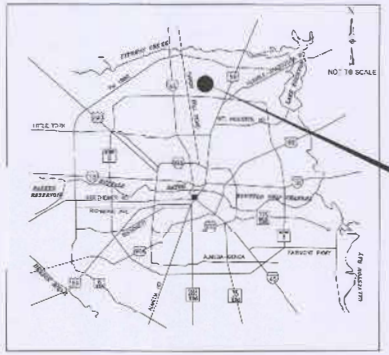
CAPITAL PROJECTS

INTERCONTINENTAL AIRPORT
WWTP EXPANSION PROJECT
DISINFECTION REDESIGN AMENDMENT

VOLUME 2

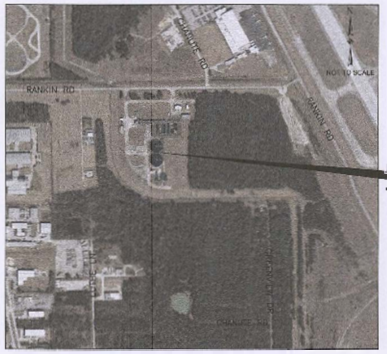
WBS NO. R-000265-0147-4

BLACK & VEATCH



PROJECT LOCATION

LOCATION MAP



PROJECT SITE

VICINITY MAP

HARRIS COUNTY KEY MAP # 373H AND 373M
2450 Rankin Road
Houston, TX 77032
Council District B

TDLR EABPR _____

MAYOR
JOHN WHITMIRE

CONTROLLER
CHRIS HOLLINS

DISTRICT COUNCIL MEMBERS

AMY PECK, DISTRICT A
TARSHA JACKSON, DISTRICT B
ABBIE KAMIN, DISTRICT C
CAROLYN EVANS-SHABAZZ, DISTRICT D
FRED FLICKINGER, DISTRICT E
TIFFANY D. THOMAS, DISTRICT F
MARY NAN HUFFMAN, DISTRICT G
MARIO CASTILLO, DISTRICT H
JOAQUIN MARTINEZ, DISTRICT I
EDWARD POLLARD, DISTRICT J
MARTHA CASTEX-TATUM, DISTRICT K

COUNCIL MEMBERS AT-LARGE

JULIAN RAMIREZ, POSITION 1
WILLIE DAVIS, POSITION 2
TWILA CARTER, POSITION 3
LETITIA PLUMMER, POSITION 4
SALLIE ALCORN, POSITION 5

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-7100
TX FIRM NUMBER 258

SURVEYED BY
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
BOBBY FRANK LANE JR.
26582
LICENSED
PROFESSIONAL ENGINEER
7/1/25

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAMIMUR RAHMAN, P.E.	
SHEET NO. 1 OF 173	

80367

SHEET INDEX

SHT	DWG #	DRAWING TITLE
GENERAL		
1	G-00-001	COVER SHEET
2	G-00-002	INDEX OF DRAWINGS
2A	G-00-002A	HCPCOREVIEW SHEET
3	G-00-003	GENERAL NOTESSHEET 1 OF 2
4	G-00-004	GENERAL NOTESSHEET 2 OF 2
5	G-00-005	GENERALLEGENDANDNOTES
6	G-00-006	GENERALABBREVIATIONS
7	G-00-008	GENERAL CIVIL LEGEND AND ABBREVIATIONS
8	G-00-100	PROPOSEDSITE PLAN
8A	G-00-102A	SITE PLAN AREA-9 BUILDING DATASHEET
9	G-00-600	PROPOSED PROCESSFLOW DIAGRAM
10	G-00-604	INDEX OF DRAWINGS
DEMOLITION		
11	D-51-101	EXISTING NPW SYSTEM DEMOLITION
CIVIL		
12	C-10-101	DRAINAGEAREA MAP &CALCULATIONS
13	C-10-102	OVERALLSITE GRADING & DRAINAGE PLAN
14	C-10-108	GRADING &DRAINAGE PLAN AREA 6
15	C-10-111	GRADING & DRAINAGE PLANAREA-9
16	C-10-112	OVERALLYARD PIPING IMPROVEMENTSPLAN
17	C-10-118	YARD PIPING PLAN AREA-6
18	C-10-121	YARDPIPING PLANAREA 9
19	C-10-202	PLAN & PROFILE ACCESSROADEXTENSIONSTA 16+00 TOSTA 13+20
20	C-10-204	PLAN & PROFILE ACCESSROADEXTENSION STA13+20 TOSTA 17+30
21	C-10-209	PROPOSEDSAN DRAIN LINE (PLAN) STA 109+60 TOSTA 114+20
22	C-10-210	PROPOSEDSAN DRAIN LINE (PROFILE) STA 109+60 TO STA 114+20
23	C-10-211A	PLAN & PROFILE PROPSTORM A1 TOS.E.T
24	C-10-211B	PLAN &PROFILEPROP STORM A1 TOS.E.T
25	C-10-213	PLAN &PROFILEPROPSTORM B1 TO D1
26	C-10-216	CCB 132 IN PCCP & FUTURECLARIFIER DRAIN (PLAN)
27	C-10-217	CCB 132 IN PCCP & FUTURECLARIFIERDRAIN (PROFILE)
28	C-10-218	CLARIFIER-3 48IN DIPDRAIN PLAN)
29	C-10-219	CLARIFIER-3 48IN DIPDRAIN (PROFILE)
29A	C-11-101	DETENTION BASINSERVICEAREA MAP
29B	C-11-102	DETENTION BASINLAYOUT
29C	C-11-301	DETENTION BASINSECTIONS
29D	C-11-302	DETENTION BASINOUTFALL PLAN & PROFILE
29E	C-11-303	OFFSITEDIVERSION PLAN &PROFILE
29F	C-11-401	DETENTION BASIN EMERGENCY OVERFLOWWEIR
29G	C-11-501	DETENTION BASINDETAILS 1
29H	C-11-502	DETENTIONBASIN DETAILS 2
29I	C-11-503	DETENTION BASIN DETAILS 3
29J	C-11-504	DETENTIONBASINDETAILS 4
29K	C-11-505	DETENTI ON BASINDETAILS 5
29L	C-11-506	DETENTION BASIN DETAILS 6
29M	C-11-506A	DETENTION BASIN DETAILS 7
29N	C-11-506B	DETENTION BASIN DETAILS 8
30	C-13-101	OVERALL SITE STORM WATER POLLUTION PREVENTION PLAN
31	C-13-107	STORM WATER POLLUTION PREVENTIONPLAN AREA-6
32	C-13-110	STORM WATER POLLUTION PREVENTION PLAN AREA-9
33A	C-99-901A	SITE PAVING, DRIVEWAY & SIDEWALK DETAILS (1 OF 2)
33B	C-99-901B	SITE PAVING, DRIVEWAY & SIDEWALK DETAILS (2 OF 2)
33C	C-99-901C	CURB, CURB AND GUTTER AND HEADER DETAILS
33D	C-99-901D	DRIVEWAY DETAIL WITH 6" CURBEDSTREETS
34	C-99-902	SITEADA ACCESSDETAILS
35	C-99-903	ONSITESTORM WATER POLLUTI ONPREVENTION PLAN DETAILS
36	C-99-904	PAVEMENT MARKINGS GENERA LNOTES AND LEGENDS
37A	C-99-905A	SITESTORM DETAILS (1 OF 7)
37B	C-99-905B	SITESTORM DETAILS (2 OF 7)
37C	C-99-905C	SITESTORM DETAILS (3 OF 7)
37D	C-99-905D	SITESTORM DETAILS (4 OF 7)
37E	C-99-905E	SITESTORM DETAILS (5 OF 7)
37F	C-99-905F	SITESTORM DETAILS (6 OF 7)
38	C-99-906	SITE STORM DETAILS (7 OF 7)
39A	C-99-907A	SITE WATER DETAILS (1 OF 3)
39B	C-99-907B	SITE WATERDETAILS (2 OF 3)
39C	C-99-907C	SITE WATERDETAILS (3 OF 3)
40	C-99-909	SITE MISCL DETAILS
41A	C-99-909A	SITE SANITARY DETAILS (1 OF 3)
41B	C-99-909B	SITE SANITARYDETAILS (2 OF 3)
41C	C-99-909C	SITE SANITARY DETAILS (3 OF 3)
42A	C-99-910A	BEDDING & BACKFILLDETAILS (1 OF 2)
42B	C-99-910B	BEDDING & BACKFILLDETAILS (2 OF 2)
ARCHITECTURAL		
43	A-43-101	BLOWER CANOPY LIFE SAFETY PLAN AND CODE ANALYSIS
44	A-60-101	SODIUM HYPOCHLORITE BLDG LIFE SAFETY PLAN AND CODE ANALYSIS
45	A-61-102	SODIUM BISULFATE BLDG LIFE SAFETYPLANAND CODE ANALYSIS
46	A-61-101	ELECTRICAL BUILDINGLIFE SAFETY PLAN ANDCODEANALYSIS
STRUCTURAL		
47	S-00-001	STRUCTURAL NOTES
48	S-00-002	STRUCTURALLOADINGCRITERIA
49	S-99-003	STRUCTURALABBREVIATIONS
50	S-43-100	CHLORINECONTACT BASIN JUNCTION BOX FOUNDATIONPLAN
51	S-43-101	CHLORINECONTACT BASIN JUNCTION BOX OPERATING LEVELPLAN
52	S-43-102	CHLORINE CONTACT BASIN OVERALL FOUNDATION PLAN
53	S-43-103	CHLORINE CONTACT BASIN OVERALL TOP PLAN
54	S-43-104	CHLORINECONTACTBASINENLARGED FOUNDATION PLAN AREAA
55	S-43-105	CHLORINECONTACT BASIN ENLARGED FOUNDATION PLANAREAB
56	S-43-106	CHLORINECONTACT BASINENLARGED TOPPLAN AREAA
57	S-43-107	CHLORINECONTACTBASINENLARGEDTOP PLAN AREAB
58	S-43-300	CHLORINECONTACTBASIN JUNCTION BOX SECTIONS
59	S-43-301	CHLORINE CONTACT BASINSECTIONS
60	S-43-302	CHLORINECONTACT BASINSECTIONS
61	S-43-303	CHLORINECONTACT BASINSTAIRSECTIONS
62	S-43-304	BLOWER FOUNDATION SECTION
63	S-43-401	BLOWERCANO PY ENLARGEDFOUNDATIONPLAN
64	S-60-100	SODIUM HYPOCHLORITE OVERALL PLAN
65	S-60-101	SODIUM BISULFITESTORAGE OVERALL PLAN
66	S-60-102	SODIUM HYPOCHLORITE BULK STORAGE FOUNDATION AND TOP PLAN
67	S-60-103	SODIUM BISULFITEBULK STORAGE FOUNDATION AND TOPPLAN
68	S-60-104	CHEM FEED BUILDING FOUNDATION PLANS
69	S-60-300	SODIUM HYPOCHLORITE STORAGE SECTION
70	S-60-301	SODIUM BISULFITE STORAGE SECTION
71	S-60-302	CHEM FEED BUILDINGSECTION
72	S-60-303	STAIR CASE SECTIONS
73	S-60-304	HILL STATION SUMP AND CONTAINMENT CURB
74	S-61-101	NPW PAD PLAN AND SECTIONS
STRUCTURAL		
75	S-61-101	DISINFECTION ELECTRICAL BUILDINGFOUNDATION PLANAND SECTIONS
76	S-61-102	DISINFECTION ENGINE GENERATOR PAD PLAN AND SECTION
77	S-61-103	DISINFECTIONELECTRICALBUILDING TRANSFORMER PADPLAN ANDSECTION
78	S-99-501	TYPICAL CONCRETE JOINTDETAILS
79	S-99-502	TYPICALCONCRETE REINFORCING DETAILS
80	S-99-503	STANDARD CONCRETE BEAM AND SLAB SCHEDULE AND DETAILS
81	S-99-504	LADDERAND MISCELLANEOUSDETAILS
82	S-99-505	TYPICAL ALUMINUMGRATINGSTAIR DETAILS
83	S-99-506	TYPICALHANDRAIL & GUARDRAILDETAILS
84	S-99-507	MISCELLANEOUSDETAILS
85	S-99-508	PIPE SUPPORT DETAILS
86	S-99-509	MISCELLANEOUSDETAILS
87	S-99-510	MISCELLANEOUSDETAILS
88	S-99-511	TYPICAL CONCRETE CRACK AND SURFACE REPAIR DETAILS AND NOTES
89	S-99-512	MISCELLANEOUS DETAILS
PROCESSMECHANICAL		
90	M-43-100	CHLORINECONTACT BASIN JUNCTION BOX PLAN
91	M-43-101	CHLORINECONTACT BASINOVERALLTOP PLAN
92	M-43-102	CHLORINECONTACTBASIN PLAN
93	M-43-103	PLANT EFFLUENT JUNCTION BOX PLAN
94	M-43-104	CHEMICAL FEED PIPETRENCH AND DOSE POINT LOCATIONS
95	M-43-300	CHLORINECONTACT BASIN JUNCTION BOX SECTIONS
96	M-43-301	CHLORINECONTACT BASINSECTIONS 1 OF 3
97	M-43-302	CHLORINE CONTACT BASIN SECTIONS 2 OF 3
98	M-43-303	CHLORINE CONTACT BASIN SECTIONS 3 OF 3
99	M-43-304	PLANTEFFLUENT JUNCTION BOX SECTIONS
100	M-43-305	CHEMICAL FEED PIPETRENCHSECTIONS
101	M-43-401	BLOWER HADENLARGED PLAN
102	M-44-101	EXISTINGCCB INFLUENT CHAMBER PLAN ANDSECTIONS
103	M-50-101	SODIUM HYPOCHLORITE PLAN
104	M-50-102	SODIUM HYPOCHLORITE BULK STORAGE PLAN
105	M-50-103	SODIUM HYPOCHLORITECHEMICAL FEED BUILDING PLAN
106	M-50-104	SODIUM BISULFITE PLAN
107	M-50-105	SODIUM BISULFITE BULK STORAGE PLAN
108	M-50-106	SODIUM BISULFITECHEMICAL FEEDPLAN& SECTION
109	M-50-107	SODIUM HYPOCHLORITE BULK STORAGETANK SECTIONS
110	M-50-109	SODIUM BISULFITE BULK STORAGETANK SECTIONS
111	M-50-110	STORAGE TANK TYPICALDETAILS
112	M-50-110	TYPICALMETERING PUMP DETAILS
113	M-50-111	FACILITIES STANDARD DETAILS I
114	M-50-112	FACILITIESSTANDARD DETAILS- II
115	M-51-101	NPW SYSTEMPLANTLAYOUT SCHEMATIC
116	M-51-102	NPW SYSTEM PLAN
117	M-51-201	NPW SECTIONS
118	M-99-501	MISCELLANEOUS DETAILS 1 OF 4
119	M-99-502	MISCELLANEOUSDETAILS 2 OF 4
120	M-99-503	MISCELLANEOUS DETAILS 3 OF 4
121	M-99-504	MISCELLANEOUSDETAILS 4 OF 4
ELECTRICAL		
122	E-00-001	SYMBOLS, ABBREVIATIONS AND CONDUIT NOTES
123	E-00-601	LIGHT FIXTURE SCHEDULEAND CONTROL DIAGRAM
124	E-00-602	CONDUIT ANDCONDUCTOR SCHEDULESHEET 1
125	E-00-603	CONDUIT AND CONDUCTOR SCHEDULE SHEET 2
126	E-00-701	EXISTING OVERALL ONE LINE DIAGRAM
127	E-00-702	MODIFIEDOVERALL ONE LINE DIAGRAM
128	E-00-703	MODIFIEDOVERALL LOAD ANALYSIS
129	E-10-101	EXISTINGOVERALLSITE PLAN
130	E-10-102	PROPOSEDOVERALLSITE PLAN
131	E-10103	PROPOSEDENLARGED SITE PLAN
132	E-43-101	PROPOSEDCHLORINE CONTACTBASINAREA
133	E-43-401	PROPOSED BLOWERPAD AREA PLAN
134	E-50-101	PROPOSED CHEMICAL FEED FACILITIES PLAN
135	E-60-101	PROPOSED SODIUMHYPOCHLORITE AREA PLAN
136	E-60-103	PROPOSEDSODIUMHYPOCHLORITE BUILDING PLANS
137	E-60-104	PROPOSEDSODIUM BISULFITEAREA PLAN
138	E-60-105	PROPOSED SODIUM BISULFITE BUILDING PLANS
139	E-61-101	NPW SYSTEM PLAN
140	E-61-101	CCB ELECTRICAL BUILDING EQUIPMENT PLAN
141	E-61-102	CCBELECTRICAL BUILDING POWERAND LIGHTING PLAN
142	E-61103	CCB ELECTRICAL BUILDINGGROUNDING PLAN
143	E-61-601	CC BAREA PANELBOARDSCHEDULES
144	E-61-701	MVS-CCB SWITCHGEAR ONELINE DIAGRAM
145	E-61-702	MCC-CCB ONELINE DIAGRAM
146	E-69-701	NEW MVS-1 SWITCHGEAR ONELINE DIAGRAM
147	E-99-501	DETAILS 1 OF 8
148	E-99-502	DETAILS 2 OF 8
149	E-99-503	DETAILS 3 OF 8
150	E-99-504	DETAILS 4 OF 8
151	E-99-505	DETAILS 5 OF 8
152	E-99-506	DETAILS 6 OF 8
153	E-99-507	DETAILS 7 OF 8
154	E-99-508	DETAILS 8 OF 8
INSTRUMENTATION		
155	I-00-001	SYMBOLS, AB BREVIATIONSSHEET 1 OF 2
156	I-00-002	SYMBOLS, ABBREVIATIONSSHEET 2 OF 2
157	I-60-601	NEW CHLORINECONTACT BASINP&ID
158	I-60-602	NEW CHLORINECONTACT HASIN BLOWERP&ID
159	I-60-603	NEW EFFLUENTFLOW AND NPW PUMPSP&ID
160	I-60-604	NEW NPW HYDROPNEUMATIC TANK P&ID
161	I-60-605	NEW SODIUM HYPOCHLORITE BULK STORAGETANKS 1 AND 2 P&ID
162	I-60-606	NEW SODIUM HYPOCHLORITE BULK STORAGE TANKS 3 AND 4 P&ID
163	I-60-607	NEW SODIUM BISULFITEBULK STORAGE TANKS 1 AND 2 P&ID
164	I-60-608	NEW SODIUM HYPOCHLORITE PUMP SKID 01 P&ID
165	I-60-609	NEW SODIUMHYPOCHLORITE PUMPSKID 02 P&ID
166	I-60-610	NEW SODIUM BISULFITE PUMP SKID 01 P&ID
167	I-60-611	NEW CHEMICALBULK STORAGE SUMPPUMPS 1&2 P&ID
168	I-69-601	DETAILS 1 OF 4
169	I-69-602	DETAILS 2 OF 4
170	I-69-603	DETAILS 3 OF 4
171	I-69-604	DETAILS 4 OF 4
172	I-99-601	EXISTING SCADA NETWORK DIAGRAM
173	I-99-602	MODIFIED SCADA NETWORK DIAGRAM

DRAWING NUMBERING SYSTEM

M-00-101

- 101 — SHEET SEQUENTIAL NUMBER
- 00 — SHEET TYPE DESIGNATOR
- M — FACILITY/AREA DESIGNATION CODE
- M — DISCIPLINE DESIGNATOR

DISCIPLINE DESIGNATORS

A	ARCHITECTURAL
C	CIVIL
D	DEMOLITION
E	ELECTRICAL
F	FIRE PROTECTION
G	GENERAL
H	HVAC/BUILDING MECHANICAL
I	INSTRUMENTATION AND CONTROLS
L	LANDSCAPE
M	PROCESS MECHANICAL
P	PLUMBING
S	STRUCTURAL

AREA/FACILITY DESIGNATION CODES

00	GENERAL
10	SITEWORK
20	INFLUENT LIFT STATION
30	HEADWORKS
31	GRIT FACILITY
32	GRIT DEWATERING FACILITY
40	AERATION BASINS
41	CLARIFIERS
42	SCUM FACILITIES
43	UV FACILITY
44	CHLORINE CONTACT BASIN
51	NPW SYSTEM
60	LIFT STATION ELECTRICAL BUILDING NO. 2
61	UV ELECTRICAL BUILDING
62	FM, ANALYZER, PUMP, PLC BUILDING
90	P&ID
99	DETAILS, SCHEMATICS, SCHEDULES

SHEET TYPE DESIGNATORS

0	GENERAL (SYMBOLS, LEGENDS, NOTES, ETC.)
1	PLANS (ARRANGEMENT PLANS, PARTIAL PLANS)
2	ELEVATIONS
3	SECTIONS
4	LARGE SCALE VIEWS (ENLARGED PLANS, STAIR SECTIONS OR SECTIONS THAT ARE NOT DETAILS)
5	DETAILS
6	SCHEDULES & DIAGRAMS
7	SCHEMATICS (ONE-LINES, BLOCK DIAGRAMS)
8	USER DEFINED
9	3D MODEL (PERSPECTIVES, ISOMETRICS, PHOTOGRAPHS)

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

STATE OF TEXAS — BOBBY FRANK LANE JR. — 126582 — LICENSED PROFESSIONAL ENGINEER — 7/9/25

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT

GENERAL

INDEX OF DRAWINGS

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	2 OF 173

FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS — 80367 — LICENSED — PROFESSIONAL ENGINEER

G-00-002

1. PROPERTY DESCRIPTION

I. LOCATION INFORMATION

A. HARRIS COUNTY COMMISSIONER'S PRECINCT:
☒ 1 ☐ 2 ☐ 3 ☐ 4

B. KEY MAP: 373H AND 373M

C. ADDRESS: 2450 RANKIN RD. HOUSTON TX. 77032

II. LEGAL DESCRIPTION

A. ACREAGE: 98 – ACRE

B. ☐ SUBDIVISION:

☒ SURVEY & ABSTRACT: TR 6 & 13 AIRPORT FACILITIES HOUSTON INTERCONTINENTAL ABST 577 M MCAULEY

C. ADJACENT ROADS:

III. PLATTING

A. SUBDIVISION PLAT
☐ PROPOSED PLAT / REPLAT
☐ RECORDED PLAT / REPLAT
PLAT NAME:

B. STREETS PROPOSED
☐ PUBLIC
☐ PRIVATE
☐ PUBLIC & PRIVATE
☒ NONE

IV. JURISDICTIONS

☒ CITY OF HOUSTON
☐ ETJ, CITY OF HOUSTON
☐ ETJ, CITY OF
☐ NO ETJ
☐ UTILITY DISTRICT (NAME)

V. HCAD ACCOUNT NOS. (ALL)

0440030000005

2. SITE DETENTION DRAINAGE

I. PROPOSED DRAINAGE AREA

☐ NEW DEVELOPMENT AREA:
☒ RE-DEVELOPMENT AREA (AMOUNT INCREASED IMPERVIOUS AREA): 12.74 AC
☐ LOW IMPACT DEVELOPMENT (LID)
METHOD/DESCRIPTION

II. METHODOLOGY

HCFCD PCPM DETENTION METHOD USED:
☐ METHOD 1 (LESS THAN 20 ACRES)
☒ METHOD 2 (20 ACRES TO 640 ACRES)
☐ METHOD 3 (GREATER THAN 640 ACRES)
☐ OTHER

III. DETENTIO NVOLUME & OUTFALL

OUTFALL TO:
☒ .65, H.C.F.C.D. CHANNEL, (H.C.F.C.D. UNIT NO.) P140-00-00
☐ .75, EXISTING STORM SEWER (OWNER & OPERATOR)
☐ 1.00, ROADSIDE DITCH, (OWNER & ROAD NAME)
☐ OTHER (OWNER & OPERATOR)

V. STORMWATER DETENTION BASIN INFORMATION

A. HCFCD PCPM SUMMARY TABLE SEE SHEET C-11-301 OF THESE PLANS.

DETENTION BASIN SERVICE AREA	12.74	acres	
STORM EVENT	50% EXCEEDANCE (2-YEAR)	10% EXCEEDANCE (10-YEAR)	1% EXCEEDANCE (100-YEAR)
MAXIMUM ALLOWABLE OUTFLOW (PRE-DEVELOPMENT PEAK FLOW)	30 CFS	42 CFS	90 CFS
MAXIMUM OUTFLOW PROVIDED (PEAK FLOW FROM BASIN)	28 CFS	42 CFS	67 CFS
LOWEST NATURAL/FINISHED GROUND OR FINISHED FLOOR ELEVATION ESTIMATE		81'	
DESIGN WATER SURFACE ELEVATION	74.11'	76.74'	79.97'
MINIMUM STORAGE REQUIRED (ac-ft)	–	–	8.3
DETENTION STORAGE PROVIDED (ac-ft)	4.0	8.1	14.3
STORAGE RATE PROVIDED (ac-ft/ac)	0.31	0.63	1.12
OUTFLOW VELOCITY INTO CHANNEL (ft/sec)	5.3	4.3	7.0
DRAIN TIME – 1% ONLY (hours)	15.25 HOURS		
EMERGENCY OVERFLOW (TYPE, SIZE, ELEVATION, ETC.)	TRAPEZOIDAL CONCRETE LINED WEIR, BW: 77', SS: 5:1, ELEV: 79.97'		

B. DETENTION BASIN TO BE MAINTAINED BY CITY OF HOUSTON

C. DETENTION SERVICE AREA MAP ON SHEET C-11-101

D. ADDITIONAL CRITERIA FOR PUMPED DETENTION BASINS
VOLUME OF PUMPED 1% EXCEEDANCE STORAGE VOLUME = _____ ACFT _____ % OF TOTAL VOLUME
MAXIMUM DESIGN OUTFLOW VELOCITY INTO HCFCD CHANNEL = _____ FT/SEC
DRAIN TIME FOR BASIN = _____ HOURS BASED ON _____ HEAD CONDITIONS

V. DETENTION PROVIDED IN OTHER PLANS:

HCFCD Project No. _____ DATE SIGNED BY HCFCD: _____
PLAN TITLE _____
DETENTION POND SERVICE AREA MAP IS PROVIDED ON SHEET _____
ENGINEERING FIRM _____
DETENTION BASIN MAINTAINED BY: _____

VI. FLOW RESTRICTOR SIZE

OUTFALL PIPE SIZE: 42"
RESTRICTOR PIPE SIZE:
RESTRICTOR PLATE DIMENSION: 1.2"ø, 1.0"ø, 1.35"ø,

VII. DETENTION PROVIDED BY

☐ REGIONAL DETENTION BASIN SYSTEM (APPROVED H.C. PRJ NO.):

FOR PROJECTS LOCATED IN ANY FLOODPLAIN
Development constructed or placed in accordance with these plans will comply with all provisions of the designated Floodplain Administrator.
No net fill is allowed in the flood plain and no fill is allowed in the floodway.

OFFSITE SHEET FLOW: (100 YEAR)

OFFSITE SHEET FLOW MAPPING, TOTAL DISCHARGE CALCULATIONS, AND DESIGN ACCOMODATIONS ARE SHOWN ON SHEET _____ OR, AS PRESENTED IN THE APPROVED DRAINAGE STUDY ENTITLED SEE SECTION 6

TOTAL ACREAGE =
TOTAL DISCHARGE =

NOTE: ALL OFFSITE SHEET FLOW FROM ADJACENT PROPERTIES MUST BE IDENTIFIED AND PROPERLY ACCOUNTED FOR IN THE PROJECT. THE SIGNING ENGINEER HEREBY CERTIFIES THAT THESE AREAS HAVE BEEN ADDRESSED.

3. SWQ DISCHARGE INTO FCD FACILITY

I. SWPPP: CONSTRUCTION MEASURES. (Must complete)

☒ DISTURBS >1AC. SITE PLAN & DETAILS ON SHEET(S) TBD
☐ DISTURBS <1AC. N/A

*II. APPLICABILITY FOR PERMANENT FEATURES. (Must complete)

EXEMPT NEW DEVELOPMENT:
☐ PROJECT IS ON A PARCEL (A COMMON PLAN OF DEVELOPMENT) LESS THAN 5 ACRES. (Must be verified with plat)

EXEMPT REDEVELOPMENT:
☐ PROJECT DOES NOT MEET THE DEFINITION OF SIGNIFICANT REDEVELOPMENT (Part A,Sec. 2.39 of Regulations of Harris County, Texas for Stormwater Quality Management)

EXEMPT GRANDFATHERED:
☐ PROJECT'S DRAINAGE TIES DIRECTLY INTO AN EXISTING DRAINAGE SYSTEM PRIOR TO OCTOBER 1, 2001. (FOR VERIFICATION: PROVIDE ORIGINAL DRAINAGE AREA MAP INCLUDING CALCULATIONS)

GENERAL:
☒ PROJECT'S SWQ REQUIREMENTS FALL WITHIN THE JURISDICTION OF: CITY OF HOUSTON
☐ STORMWATER QUALITY PERMIT REQUIREMENT IS COVERED BY AN EXISTING SWQMP WITHIN PROJECT TITLE:
HARRIS COUNTY PROJECT No _____ & SWQ PERMIT No.

STORMWATER QUALITY MANAGEMENT PLAN:
☐ SITE PLAN ON SHEET(S)

III. PERMANENT SWQ FEATURES. (COMPLETE IF NOT EXEMPT)

☐ VEGETATIVE CONTROLS USED: (FILTER STRIP, GRASSY SWALE, URBAN FORESTRY DETAILS AND CALCULATIONS APPEAR ON SHEET(S))
☒ POND STRUCTURE USED (WET, DRY, WETLANDS) DETAILS AND CALCULATIONSAPPEAR ON SHEET(S) C-11-504
☐ HYDRODYNAMIC TYPE SEPARATOR MODEL:
☐ OTHER(S):

4. FLOOD PLAIN STATUS

I. GENERAL INFORMATION

FIRM PANEL(S) FOR PROPERTY: 48201C0480M
FIRM PANEL(S) DATE: JUNE 9, 2014
STATUS OF PROPERTY ON MAP
☒ ENTIRELY LOCATED IN UNSHADED ZONE "X"
☐ LOCATED PARTIALLY OR ENTIRELY IN ANY "A" ZONE OR SHADED ZONE "X", DELINEATE FLOODPLAIN BOUNDARY ON CONSTRUCTION DRAWINGS (DRAINAGE LAYOUT PG. NO._____) (1% BASE FLOOD LEVEL_____) (0.2% BASE FLOOD LEVEL_____)
☐ SITE REMOVED FROM FLOODPLAIN BY LOMR, LOMR-F, LOMA CASE NO._____ REVISED FLOODPLAIN IS SHOWN ON SHEET_____

ELEVATION INFORMATION
BENCHMARK USED
☒ HARRIS COUNTY FLOODPLAIN REFERENCE MARK
☐ HARRIS-GALVESTON COASTAL SUBSIDENCE DISTRICT BENCHMARK (FOR COASTAL AREAS)
DESCRIPTION OF BENCHMARK INCLUDING ELEVATION, DATUM AND YEAR OF ADJUSTMENT *(2001 ADJ.)*

FLOOD PLAIN REFERENCE MARK BRASS DISK STAMPED 150670. FROM THE INTERSECTION OF GREENS ROAD AND GREENVIEW DRIVE, TRAVEL NORTH ON GREENVIEW APPROXIMATELY 0.31 MILE TO DEAD END. TRAVEL EAST ALONG DRAINAGE EASEMENT 240 FEET TO BEND IN DITCH. MONUMENT IS LOCATED NEAR TOP OF BANK AT THE END OF BEND. PUBLISHED ELEV= 80.70' (NAVD 1988, 2001 ADJUSTMENT) OBSERVED ELEV= 80.08' (NAVD 1988, COMPUTED USING GEOID 12A)

FLOOD PLAIN REFERENCE MARK, BRASS DISK STAMPED 150675. FROM THE INTERSECTION OF RANKIN ROAD AND AIRCENTER BOULEVARD, MONUMENT IS LOCATED IN THE MEDIAN OF RANKIN ROAD. PUBLISHED ELEV= 83.51' (NAVD 1988, 2001 ADJUSTMENT) OBSERVED ELEV= 83.01' (NAVD 1988, COMPUTED USING GEOID 12A)

II. FLOOD PLAIN DETERMINATION BASED ON GROUND ELEVATION

☐ PROPERTY LIES ENTIRELY ABOVE THE BASE FLOOD LEVEL AND IN SHADED ZONE "X"
☐ PROPERTY LIES PARTIALLY OR ENTIRELY BELOW THE BASE FLOOD LEVEL

III. FLOODPLAIN STORAGE SUMMARY
(APPLIES ONLY TO PORTION OF LAND LOCATED WITHIN FEMA REGULATORY FLOODPLAIN).

A. TOTAL VOLUME OF MATERIAL PROPOSED TO BE MOVED OR PLACED WITHIN THE FIRM DELINEATED FLOODPLAIN (FILL, BASE, CONCRETE, ASPHALT, ETC.) BELOW 0.2% BASE FLOOD ELEVATION (2001 ADJ.) _____ CUBIC YARDS _____
B. TOTAL VOLUME OF MATERIAL PROPOSED TO BE REMOVED FROM THE FIRM DELINEATED FLOODPLAIN: BELOW 0.2% BASE FLOOD ELEVATION (2001 ADJ.) _____ CUBIC YARDS _____ INCLUDING CALCULATIONS)
C. FILL AREA & VOLUME CALCULATIONS ARE SHOWN ON SHEET _____

5. WORK IN HCFCD RIGHT-OF-WAY

I. TYPE OF WORK TO BE PERFORMED IN HCFCD /HCFCD ROW

A. BOND/NOTIFICATION INFORMATION
☒ HCFCD WATERSHED GREENS BAYOU
☒ HCFCD UNIT No. P140-00-00
☒ NUMBER OF OUTFALLS 2
☐ UTILITY CROSSING
☐ ROADWAY BRIDGE/CULVERT CROSSING
☐ FILL ACTIVITY
☐ REHABILITATION OF CHANNEL
☐ MAINTENANCE
☐ TEMPORARY CROSSING
☐ TRAIL (LENGTH)
☐ OTHER
COST OF WORK IN HCFCD ROW $120,000

II. USACE ENVIRONMENTAL PERMIT

☒ US ARMY CORPS OF ENGINEERS NATIONWIDE PERMIT NUMBER(S) NW 57
☐ US ARMY CORPS OF ENGINEERS INDIVIDUAL PERMIT
☐ OTHER
☐ NO PERMITS REQUIRED
EXPLAIN:

III. REFERENCE / BASIS OF DETERMINATION

☐ ENVIRONMENTAL CONSULTANT REPORT
BY N/A
REPORT TITLE N/A
REPORT DATE N/A
☐ OTHER

NOTES:
I. – III. REQUIRED ON PROJECTS WITH WORK IN A HCFCD CHANNEL. PLEASE REFERENCE SECTION 17 OF THE FLOOD CONTROL DISTRICT POLICY, CRITERIA, AND PROCEDURE MANUAL FOR MORE INFORMATION.

IV. HCFCD STANDARD NOTES: SEE SHEET C-11-101 OF THESE PLANS.

V. HCFCD STANDARD DETAILS: SEE SHEET C-11-301 OF THESE PLANS.

VI. HCFCD ACCESS PLAN: SEE SHEET N/A OF THESE PLANS.

VII. REFER TO THE FOLLOWING PLAN SHEETS: C-11-101
FOR EXISTING AND PROPOSED RIGHT(S) OF WAY INCLUDING DELINEATION AND RECORDING INFORMATION PER HCFCD POLICY, CRITERIA, & PROCEDURE MANUAL (i.e., DRAINAGE EASEMENT, FEE STRIP, ETC.) AND GRANTEE (e.g. COH, HCFCD, PUBLIC, TXDOT, ETC.)

6. REPORTS/AGREEMENTS

I. HCFCD ACCEPTED REPORTS (ALL)

STORMWATER DRAINAGE DESIGN REPORT
REPORT TITLE INTERCONTINENTAL AIRPORT WWTP EXPANSION PROJECT DRAINAGE IMPACT ANALYSIS
HCFCD PROJECT # 220201010B
ENGINEERING FIRM SENGINEERING, LLC
REPORT ACCEPTANCE DATE JULY 29, 2022

GEOTECHNICAL INVESTIGATION REPORT
REPORT TITLE
HCFCD PROJECT #
ENGINEERING FIRM
REPORT ACCEPTANCE DATE

HCFCD APPROVED VARIANCE
DESCRIPTION OF VARIANCE
DOCUMENT ID #
VARIANCE ACCEPTANCE DATE

II. AGREEMENT TYPE & No.:

☐ INTERLOCAL (ILA)#:
☐ HCFCD MAINTENANCE
☐ TURF ESTABLISHMENT
☐ OTHER

HCFCD SIGNATURE BLOCK

PROJECT NAME: INTERCONTINENTAL AIRPORT WWTP EXPANSION
ADDRESS 2450 RANKIN RD. HOUSTON TX. 77032
WAS ACCEPTED BY HARRIS COUNTY FLOOD CONTROL DISTRICT FOR THE PURPOSES LISTED BELOW:

HARRIS COUNTY FLOOD CONTROL DISTRICT

INTERPOSE NO OBJECTION
BY: _____
FOR ITEMS LOCATED OUTSIDE OF HCFCD RIGHT-OF-WAY
BY: _____ APPROVED Dennis Todd Miller 2022.08.23 16:00:50 05'00'
FOR ITEMS LOCATED WITH EXISTING HCFCD RIGHT-OF-WAY DEB
APPROVED:
BY: _____
FOR ITEMS LOCATED WITHIN PROPOSED HCFCD RIGHT-OF-WAY
NO REVIEW REQUIRED:
BY: _____
FINAL PERMITTING BY OTHERS

ADDITIONAL COMMENTS:

THE PROJECT WAS REVIEWED, HOWEVER, THIS DOES NOT MEAN THE ENTIRE PROJECT, INCLUDING ALL SUPPORTING DATA AND CALCULATIONS HAVE BEEN COMPLETELY CHECKED AND VERIFIED. THESE DRAWINGS ARE SIGNED DATED AND SEALED BY A PROFESSIONAL ENGINEER LICENSED TO PRACTICE IN THE STATE OF TEXAS, WHICH THEREFORE CONVEYS THE ENGINEER'S RESPONSIBILITY AND ACCOUNTABILITY. THIS DOES NOT RELIEVE ANY PARTY FROM COMPLYING WITH APPROPRIATE FEDERAL, STATE AND LOCAL ENVIRONMENTAL RULES, LAWS, AND REGULATIONS AND ANY OTHER LEGALLY ADOPTED REGULATION OR ORDINANCE RELATED TO LAND DEVELOPMENT. IF THE CITY SIGNATURES ARE REQUIRED BY ORDINANCE, COUNTY PERMITS WILL NOT BE ISSUED UNTIL SUCH SIGNATURES ARE OBTAINED. PLAN APPROVAL EXPIRATION TO BE IN ACCORDANCE WITH LOCAL GOVERNMENT CODE CH. 245.

ENGINEER'S CERTIFICATION

I, PIERO BATTISTINI , A LICENSED PROFESSIONAL ENGINEER IN THE STATE OF TEXAS, DO HEREBY CERTIFY THAT THE INFORMATION PRESENTED ON THIS SHEET IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND THAT I AM NOT VIOLATING ANY PROVISION OF THE CURRENT TEXAS ENGINEERING PRACTICE ACT AND RULES CONCERNING THE PRACTICE OF ENGINEERING AND PROFESSIONAL ENGINEERING LICENSURE.

ANY VIOLATIONS WILL BE FORWARDED TO THE HARRIS COUNTY DISTRICT ATTORNEY'S OFFICE FOR PROSECUTION.

THE COMPLETED PROJECT CONSISTS OF DRAWING SHEETS _____ (THRU _____)

SIGNATURE _____ DATE 08/19/2022

SEAL: STATE OF TEXAS PIERO BATTISTINI 104895 LICENSED PROFESSIONAL ENGINEER

REVISIONS

NOTE: REVISION BLOCK IS TO BE USED ONLY FOR CHANGES MADE AFTER PLANS HAVE BEEN APPROVED BY HARRIS COUNTY FLOOD CONTROL.

DATE	SHEET NO.	DESCRIPTION	P.E. INITIAL	H.C.F.C.D APPROVED DATE
10/24/2024	C-11-101	DISINFECTION SYSTEM CHANGED TO CHLORINE CONTACT	PGB	2024.11.08 16:19:37 -06'00'

HARRIS COUNTY
FLOOD CONTROL DISTRICT
REVIEW SHEET

VERSION 1.0 OCTOBER 2019

HARRIS COUNTY FLOOD CONTROL PROJECT NO. 220-2100065

GENERAL NOTES

CITY OF HOUSTON PUBLIC WORKS GENERAL NOTES – INSIDE CITY LIMITS:

1. UNLESS OTHERWISE NOTED AND APPROVED ON DRAWINGS, CONSTRUCT CIVIL INFRASTRUCTURE IN ACCORDANCE WITH THE EFFECTIVE EDITION OF THE HOUSTON PUBLIC WORKS STANDARD CONSTRUCTION SPECIFICATIONS, STANDARD CONSTRUCTION DETAILS, AND SUPPLEMENTS, ADDENDA AND AMENDMENTS THERETO. THE LATEST EDITION OF THE ABOVE PUBLICATIONS CAN BE FOUND AT: HTTP://WWW.HOUSTONPERMITTINGCENTER.ORG/OFFICE-CITY-ENGINEER/DESIGN-AND-CONSTRUCTION-STANDARDS.
2. THE DESIGN MUST BE CONSISTENT WITH THE EFFECTIVE EDITION OF HOUSTON PUBLIC WORKS INFRASTRUCTURE DESIGN MANUAL AND TCEQ (TEXAS COMMISSION ON ENVIRONMENTAL QUALITY) REQUIREMENTS.
3. THE GEOTECHNICAL INVESTIGATION FOR THIS PROJECT WAS CONDUCTED IN ACCORDANCE WITH CHAPTER 11 OF THE LATEST EDITION OF THE PUBLICATION INFRASTRUCTURE DESIGN MANUAL, PUBLISHED BY HOUSTON PUBLIC WORKS. SOILS REPORT WAS PREPARED BY [GEOTECHNICAL ENGINEERING FIRM] REPORT NO. [NO. OF REPORT], DATED [DATE OF REPORT].
4. UTILITIES PRESENTED ON THESE DRAWINGS ARE SHOWN BASED ON THE BEST AVAILABLE INFORMATION. CONTRACTOR SHALL VERIFY THE EXACT LOCATIONS IN THE FIELD PRIOR TO COMMENCING CONSTRUCTION. CONTRACTOR SHALL NOTIFY TEXAS ONE CALL AT 713-223-4567/811 OR 800-344-8377 AND LONE STAR NOTIFICATION CENTER AT 800-669-8344 AT LEAST 48 HOURS BEFORE PROCEEDING WITH ANY EXCAVATION. UTILITIES MARKED WITHIN THE PUBLIC RIGHT OF WAY OR IN EASEMENTS SHALL COMPLY WITH TAC TITLE 16, PART 1, CHAPTER 18, RULE §18.6 AND THE AMERICAN PUBLIC WORKS ADMINISTRATION (APWA) UNIFORM COLOR CODE.
5. CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGES TO EXISTING WATER, WASTEWATER, STORM WATER LINES AND TRAFFIC CONTROL DEVICES. DAMAGES SHALL BE REPAIRED IN ACCORDANCE WITH THE EFFECTIVE EDITION OF HOUSTON PUBLIC WORKS, STANDARD CONSTRUCTION SPECIFICATIONS FOR WASTEWATER COLLECTION SYSTEM, WATER LINES, STORM DRAINAGE, STREET PAVING, AND TRAFFIC AND STANDARD CONSTRUCTION DETAILS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE, STREET PAVING, AND TRAFFIC, REFERENCED ABOVE AND SUPPLEMENTS
6. CONTRACTOR SHALL NOTIFY THE OFFICE OF THE CITY ENGINEER, HOUSTON PUBLIC WORKS @ 832-394-9098 OR VIA FAX AT 832-395-4424 FOR INSPECTION AT LEAST 48 HOURS PRIOR TO COMMENCING CONSTRUCTION.
7. ADEQUATE DRAINAGE SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION AND ANY DRAINAGE DITCH OR STRUCTURE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO EXISTING CONDITIONS OR BETTER AND TO THE SATISFACTION OF THE OWNING AUTHORITY.
8. CONTRACTOR SHALL TAKE NECESSARY PRECAUTIONS TO PROTECT ROOT SYSTEMS OF SHRUBS, PLANTS AND TREES ALONG THE AREA OF EXCAVATION.
9. CONTRACTOR SHALL COMPLY WITH LATEST EDITION OF OSHA REGULATIONS AND THE STATE OF TEXAS LAWS CONCERNING EXCAVATION.
10. CONTRACTOR SHALL MAINTAIN A SET OF REDLINE DRAWINGS AND RECORD AS-BUILT CONDITIONS DURING CONSTRUCTION. THESE AS-BUILT DRAWINGS WILL BE SUBMITTED TO THE DESIGN CONSULTANT WHO WILL MAKE THE CHANGES ON THE ORIGINAL TRACINGS, LABEL EACH SHEET IN THE SET AS "RECORD DRAWINGS", AND RETURN IT TO THE OFFICE OF THE CITY ENGINEER.

STANDARD NOTES FOR CONSTRUCTION DRAWINGS (HCFCD):

1. FENCES AND/OR OTHER ENCROACHMENTS IN THE HCFCD RIGHT-OF-WAY ARE NOT TO BE REMOVED UNLESS OTHERWISE STATED ON THE PLANS. IN CASES WHERE FENCE REMOVAL IS INDICATED ON THE PLANS, THE FENCE SHALL BE REMOVED AND PLACED NEATLY ON THE ADJACENT PROPERTY AT THE START OF CONSTRUCTION. WHERE THERE IS NOT A SEPARATE ITEM LISTED ON THE UNIT PRICE SCHEDULE, THE ENCROACHMENT REMOVAL IS INCIDENTAL TO SITE PREPARATION AND RESTORATION.
2. DO NOT ENTER PRIVATE PROPERTY WITHOUT PROPER WRITTEN AUTHORIZATION FROM THE OWNER. PROVIDE COPY OF WRITTEN PERMISSION TO HCFCD.
3. STRIP VEGETATION AND TOPSOIL AND STOCKPILE FOR REUSE ONSITE. MATERIAL FOUND UNACCEPTABLE BY THE ENGINEER WILL BE REMOVED AND PAID AS EXCAVATION AND OFFSITE DISPOSAL. NO SEPARATE MEASUREMENT AND PAYMENT WILL BE MADE FOR STRIPPING, STOCKPILING AND PLACING ON-SITE TOPSOIL. THE COST FOR THIS WORK WILL BE INCIDENTAL TO RELATED PAY ITEMS UNDER SPECIFICATION SECTION NUMBER 02315 LISTED ON THE UNIT PRICE SCHEDULE.
4. RIPRAP AND GRANULAR FILL MATERIAL REMOVED DURING EXCAVATION, MEETING SPECIFICATION SECTION NUMBER 02378, SHALL BE REUSED AS DIRECTED BY THE ENGINEER. REUSED MATERIAL WILL BE MEASURED AND PAID FOR AS EXCAVATION AND ON-SITE FILL UNDER SPECIFICATION NUMBER 02315. NO SEPARATE MEASUREMENT OR PAYMENT WILL BE MADE FOR PROCESSING, HANDLING, STOCKPILING, AND PLACING MATERIAL FOUND TO BE ACCEPTABLE FOR REUSE. UPON APPROVAL OF THE ENGINEER, DISPOSAL OF NONCONFORMING RIPRAP AND GRANULAR FILL MATERIAL WILL BE MEASURED AND PAID FOR AS REMOVE AND DISPOSE OF CONCRETE RUBBLE UNDER SPECIFICATION SECTION NUMBER 02120, MATERIAL DISPOSAL.
5. THE LOCATION AND GRADE OF THE BACKSLOPE INTERCEPTOR STRUCTURES AND SWALES MAY BE ADJUSTED IN THE FIELD BY THE ENGINEER AT THE TIME OF CONSTRUCTION UNLESS OTHERWISE INSTRUCTED BY THE ENGINEER. THE BACKSLOPE INTERCEPTOR STRUCTURE SHALL BE SET AT A MAXIMUM DEPTH OF 2.5 FEET AND THE MINIMUM GRADE FOR BACKSLOPE SWALES SHALL BE 0.2%.
6. ADJUST AND/OR EXTEND YARD DRAINS TO OUTFALL AT TOE OF CHANNEL PER STANDARD OUTFALL DETAILS. PAYMENT WILL BE INCIDENTAL TO SITE PREPARATION AND RESTORATION.
7. COMPLETED SECTIONS OF THE CHANNEL WILL BE TURNED OVER FOR VEGETATION ESTABLISHMENT IN MAXIMUM 1500 LINEAR FOOT SEGMENTS. CONTRACTOR MAY NOT DISTURB GREATER THAN 1500 LF OF CHANNEL AT A TIME.
8. CLEAR AND REMOVE ALL SILT FROM CULVERTS, PIPES AND UNDER BRIDGES TO THE PROPOSED DESIGN GRADES TO PROVIDE POSITIVE FLOW.
9. LENGTHS AND DIAMETERS REPRESENTED ON PLANS ARE APPROXIMATE. CONTRACTOR WILL BE RESPONSIBLE FOR FIELD VERIFICATION PRIOR TO ORDERING MATERIALS.
10. ACTIVITIES THAT DISTURB BIRD HABITAT, INCLUDING BUT NOT LIMITED TO CLEARING, GRUBBING, AND IMPACTS TO STRUCTURES MIGRATORY BIRDS AND BALD EAGLES MIGHT NEST, REQUIRE A NEST HABITAT SURVEY. DO NOT PROCEED UNTIL HARRIS COUNTY FLOOD CONTROL DISTRICT HAS CONDUCTED A NEST HABITAT SURVEY TO VERIFY ACTIVE MIGRATORY BIRD NESTS AND BALD EAGLE NESTS ARE NOT PRESENT. THE HARRIS COUNTY FLOOD CONTROL DISTRICT MUST PROVIDE WRITTEN AUTHORIZATION TO PROCEED.
11. WHEN BANK EROSION REPAIRS CALL FOR THE PLACEMENT OF 3"x5" GRANULAR FILL IN THE CHANNEL BOTTOM TO ESTABLISH A SECURE TOE, THE 3"x5" GRANULAR FILL SHALL BE LIMITED TO AN ELEVATION 6-INCHES ABOVE THE NORMAL WATER SURFACE ELEVATION LEVEL.
12. THE CONTRACT CONTAINS UNIT ITEMS FOR THE ESTABLISHMENT OF BEST MANAGEMENT PRACTICES FOR STORM WATER QUALITY PURPOSES. WHEN NOT CALLED FOR IN THE PROJECT PLANS, COORDINATE THE NEED AND LOCATION OF THESE UNIT ITEMS WITH THE DISTRICT REPRESENTATIVE ON SITE PRIOR TO PLACEMENT. THESE UNIT ITEMS INCLUDE, BUT ARE NOT LIMITED TO, REINFORCED SILT FENCE FOR MATERIAL STOCKPILES, ANCHORED SODDING FOR DISTURBED EARTHEN AREAS OR AROUND CONCRETE AND CONCRETE INTERCEPTOR, AND STABILIZED CONSTRUCTION ACCESS FOR PROJECT SITE INGRESS/EGRESS.
13. WHEN INCLUDED IN THE SCOPE OF WORK, THE PURPOSE OF DEEP PLOWING THE SLOPE OR BERM OF A CHANNEL IS TO BREAK UP THE DESICCATED SOILS AND TO ELIMINATE ANY VOIDS, OR RILLING CLOSE TO THE SURFACE OF THE SLOPE OR BERM. THE CONTRACTOR WILL DEEP PLOW THE SLOPE OR BERM TO A MINIMUM DEPTH OF 2 FEET IN AREAS CONTAINING VOIDS AND/OR RILLING. IN AREAS OF VOIDS ONLY, THE SURFACE FROM WHICH THE 2 FEET DEPTH IS MEASURED WILL BE THE LEVEL OF THE SURROUNDING UNDISTURBED SOIL. IN AREAS OF RILLING, THE RILLS WILL FIRST BE KNOCKED DOWN AND LEVELED OFF. THE 2 FEET DEPTH WILL THEN BE MEASURED FROM THIS NEW SURFACE. THE CONTRACTOR WILL DETERMINE THE MEANS AND METHODS FOR DEEP PLOWING.)
14. TREES AND PLANTS LOCATED WITHIN A DESIGNATED TREE PROTECTION ZONE (TPZ) SHALL BE PRESERVED. REFER TO SPECIFICATION SECTION 01586 – TREE AND PLANT PROTECTION, FOR DETAILED INFORMATION ON TREE AND PLANT PRESERVATION PRACTICES AND PROCEDURES INCLUDING, BUT NOT LIMITED TO, ROOT PRUNING, VEGETATION TRIMMING, FENCING AND OTHER PRESERVATION OPERATIONS.
15. IF APPLICABLE, CONTRACTOR SHALL AVOID ANY WETLAND AREAS BEYOND THE LIMITS OF EXCAVATION AND CLEARING AS THE FIRST WORK ITEM CONTRACTOR WILL BE RESPONSIBLE FOR INSTALLING FENCING OR OTHER MATERIAL TO IDENTIFY AND PROTECT THE IDENTIFIED WETLAND AREAS, UNLESS WETLANDS HAVE BEEN IDENTIFIED AND FENCED BY HCFCD PRIOR TO CONSTRUCTION AND CONTRACTOR HAS WRITTEN EVIDENCE OF SUCH.

STORM WATER POLLUTION PREVENTION PLAN:

1. CONTRACTOR SHALL IMPLEMENT INLET PROTECTION DEVICES AND REINFORCED FILTER FABRIC BARRIER ALONG ROAD AND SIDE DITCHES AT LOCATIONS SHOWN ON THE TYPICAL STORM WATER POLLUTION PREVENTION (SWPP) PLANS TO KEEP SILT AND OR EXCAVATED MATERIALS FROM ENTERING INTO THE STORM WATER INLETS AND DITCHES EVENTUALLY POLLUTING THE RECEIVING STORM.
2. DURING THE EXCAVATION PHASE OF THE PROJECT, CONTRACTOR SHALL SCHEDULE THE WORK IN SHORT SEGMENTS SO THAT EXCAVATION MATERIAL CAN BE QUICKLY HAULED AWAY FROM THE SITE AND TO PREVENT IT FROM STAYING UNCOLLECTED ON THE EXISTING PAVEMENT. ANY LOOSE EXCAVATED MATERIAL WHICH FALLS ON PAVEMENTS OR DRIVEWAYS SHALL BE SWEPT BACK INTO THE EXCAVATED AREA.
3. CONTRACTOR SHALL CLEAN UP THE EXISTING STREET INTERSECTIONS AND DRIVEWAYS DAILY, AS NECESSARY, TO REMOVE ANY EXCESS MUD, SILT OR ROCK TRACKED FORM THE EXCAVATED AREA.
4. CONTRACTOR SHALL FOLLOW GOOD HOUSEKEEPING PRACTICES DURING THE CONSTRUCTION OF THE PROJECT, ALWAYS CLEANING UP DIRT AND LOOSE MATERIAL AS CONSTRUCTION PROGRESSES.
5. CONTRACTOR TO INSPECT AND MAINTAIN THE AREAS LISTED BELOW AT LEAST ONCE EVERY FOURTEEN (14) CALENDAR DAYS AND WITHIN 24 HOURS OF THE END OF A STORM EVENT OF 0.5 INCHES OR GREATER.
   - DISTURBED AREAS OF THE CONSTRUCTION SITE THAT HAVE NOT BEEN FINALLY STABILIZED.
   - AREAS USED FOR STORAGE OF MATERIALS THAT ARE EXPOSED TO PRECIPITATION.
   - STRUCTURAL CONTROL MEASURES.
   - LOCATIONS WHERE VEHICLES ENTER OR EXIT THE SITE.
6. CONTRACTOR TO BE RESPONSIBLE TO MAINTAIN EXISTING DITCHES AND OR CULVERTS FOR UNOBSTRUCTED DRAINAGE AT ALL TIMES. WHERE SODDING IS DISTURBED BY EXCAVATION ON BACKFILLING OPERATIONS, SUCH AREAS SHALL BE REPLACED BY SEEDING OR SODDING. SLOPES 4:1 OR STEEPER SHALL BE REPLACED BY BLOCK SODDING.

CENTERPOINT ENERGY NOTES:

CAUTION: UNDERGROUND GAS FACILITIES:

1. THE CONTRACTOR SHALL CONTACT THE UTILITY COORDINATING COMMITEE AT 1-800-545-6005 OR 811 A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION TO HAVE MAIN AND SERVICE LINES FIELD LOCATED.
   - WHEN CENTERPOINT ENERGY PIPE LINE MARKINGS ARE NOT VISIBLE, CALL (713) 207-5463 OR (713- 945-8037 (7:00A.M. TO 4:30 P.M.) FOR STATUS OF LINE LOCATION REQUEST BEFORE EXCAVATION BEGINS.
   - WHEN EXCAVATING WITHIN EIGHTEEN INCHES (18") OF THE INDICATED LOCATION OF CENTERPOINT ENERGY FACILITIES, ALL EXCAVATION MUST BE ACCOMPLISHED USING NON-MECHANIZED EXCAVATION PROCEDURES.
   - WHEN CENTERPOINT ENERGY FACILITIES ARE EXPOSED, SUFFICIENT SUPPORT MUST BE PROVIDED TO THEFACILITIES TO PREVENT EXCESSIVE STRESS ON THE PIPING.
   - FOR EMERGENCIES REGARDING GAS LINES CALL (713) 659-2111 OR (713) 207-4200
2. THE CONTRACTOR IS FULLY RESPONSIBLE FOR ANY DAMAGES CAUSED BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE THESE UNDERGROUND FACILITIES.

WARNING: OVERHEAD ELECTRICAL LINES:

1. OVERHEAD LINES MAY EXIST ON THE PROPERTY. THE LOCATION OF OVERHEAD LINES HAS NOT BEEN SHOWN ON THESE DRAWINGS AS THE LINES ARE CLEARLY VISIBLE, BUT YOU SHOULD LOCATE THEM PRIOR TO BEGINNING ANY CONSTRUCTION. TEXAS LAW, SECTION 752, HEALTH & SAFETY CODE FORBIDS ACTIVITIES THAT OCCUR IN CLOSE PROXIMITY TO HIGH VOLTAGE LINES, SPECIFICALLY:
   - ANY ACTIVITY WHERE PERSON OR THINGS MAY COME WITHIN SIX(6) FEET OF LIVE OVERHEAD HIGH VOLTAGE LINES; AND
   - OPERATING A CRANE, DERRICK, POWER SHOVEL, DRILLING RIG, PILE DRIVER, HOISTING EQUIPMENT, OR SIMILARAPPARATUS WITHIN 10 FEET OF LIVE OVERHEAD HIGH VOLTAGE LINES.
2. PARTIES RESPONSIBLE FOR THE WORK, INCLUDING CONTRACTORS ARE LEGALLY RESPONSIBLE FOR THE SAFETY OF CONSTRUCTION WORKERS UNDER THIS LAW. THIS LAW CARRIES BOTH CRIMINAL AND CIVIL LIABILITY. TO ARRANGE FOR LINES TO BE TURNED OFF OR REMOVED CALL CENTERPOINT ENERGY AT (713) 207-2222.

ACTIVITIES ON/OR ACROSS CENTERPOINT ENERGY FEE OR EASEMENT PROPERTY

1. NO APPROVAL TO USE, CROSS OR OCCUPY CENTERPOINT FEE OR EASEMENT PROPERTY IS GIVEN. IF YOU NEED TO USE CENTERPOINT PROPERTY, PLEASE CONTACT OUR SURVEYING & RIGHT OF WAY DIVISION AT 713-207-6348 OR 713-207-5769

GENERAL CONSTRUCTION NOTES:

1. EXISTING UTILITY INFORMATION SHOWN IS NOT GUARANTEED TO BE ACCURATE AND ALL INCLUSIVE ALL EXISTING UTILITY LOCATIONS ARE APPROXIMATE AND SHOULD BE VERIFIED BY THE CONTRACTOR IN ADVANCE OF HIS CONSTRUCTION. ANY CONFLICT OR DISCREPANCY DISCOVERED MUST BE BROUGHT TO THE ENGINEER'S ATTENTION.
2. ANY DAMAGE TO ANY EXISTING PAVEMENT AND/OR UTILITIES MUST BE REPAIRED IMMEDIATELY. THE CONTRACTOR MUST NOTIFY THE APPROPRIATE UTILITY OWNER, WHO WILL MAKE THE REPAIRS AT THE CONTRACTOR'S EXPENSE.
3. GUIDELINES SET FORTH IN THE TEXAS "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", AS CURRENTLY AMENDED, SHALL BE OBSERVED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ADEQUATE FLAGMEN, SIGNING, STRIPING AND WARNING DEVICES, ETC., DURING CONSTRUCTION.
4. THE AREA SHALL BE BARRICADED AND MAINTAIN ILLUMINATION CURRENTLY IN PLACE.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE STORAGE OF MATERIAL AND EQUIPMENT IN A SAFE AND WORKMANLIKE MANNER TO PREVENT INJURIES DURING AND AFTER WORKING HOURS UNTIL PROJECT COMPLETION.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SHIPPING OF ALL MATERIALS, EXCEPT AS NOTED. THE LOADING AND UNLOADING OF ALL EQUIPMENT PIPE, VALVES, PUMPS, MANHOLES AND OTHER MATERIAL SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDED PRACTICES AND SHALL AT ALL TIMES BE PERFORMED WITH CARE TO AVOID ANY DAMAGE TO THE MATERIAL. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO EXAMINE SUCH MATERIAL AT THE POINT OF DELIVERY AND REJECT ALL DEFECTIVE MATERIAL. THE DEFECTIVE MATERIAL MUST BE REPLACED WITH SOUND MATERIAL.
7. ALL PIPE AND REINFORCEMENT STEEL SHALL BE KEPT FREE OF DIRT AND OTHER DEBRIS. ANY DAMAGE TO THE COATING OF THE VARIOUS MATERIALS MUST BE REPAIRED.
8. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ADEQUATE POSITIVE DRAINAGE AT ALL TIMES DURING CONSTRUCTION OF PROPOSED FACILITIES. NATURAL GROUND ADJACENT TO UTILITY TRENCH EXCAVATION SHALL BE GRUBBED PRIOR TO PLACEMENT OF EXCESS TRENCH MATERIAL (NO SEPARATE PAYMENT).
9. ACCESS TO ALL EXISTING STREETS AND DRIVEWAYS SHALL BE MAINTAINED AT ALL TIMES.
10. THE CONTRACTOR IS REQUIRED TO FOLLOW ALL APPLICABLE OSHA RULES AND REGULATIONS.
11. NO CONNECTIONS SHALL BE MADE TO EXISTING WATER LINES OR SANITARY SEWERS UNTIL ALL PROPOSED LINES OR SEWERS HAVE BEEN THOROUGHLY CLEANED, TESTED AND APPROVED BY THE CITY.
12. ALL GEOTECHNICAL REPORTS FOR THIS PROJECT ARE AVAILABLE FOR REFERENCE AT THE OFFICE OF THE CITY.

GENERAL CONSTRUCTION NOTES (CONTINUED):

13. SURFACE RESTORATION: AT THE END OF ALL CONSTRUCTION ACTIVITY, THE CONTRACTOR SHALL RESTORE EXISTING FACILITIES OVER AND ABOVE THE CONTRACT DOCUMENTS, IE. SURROUNDING PROPERTY EQUAL TO OR BETTER THAN THE EXISTING SITE CONDITION PRIOR TO CONSTRUCTION. ALL DISTURBED AREAS ALONG THE ACCESS ROAD AND WITHIN THE PLANT SITE SHALL BE HYDROMULCH SEEDED OR SODDED IN ACCORDANCE WITH THE SPECIFICATIONS.
14. FINAL ACCEPTANCE OF THE UTILITIES WILL NOT BE GIVEN TO THE CONTRACTOR UNTIL THEY ARE INSPECTED AND APPROVED BY THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY.
15. ALL MANHOLES ARE TO BE CONSTRUCTED TO ALLOW FOR A MINIMUM OF 1 FOOT OF VERTICAL ADJUSTMENT.
16. CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING, MAINTAINING AND RESTORING BACKSLOPE DRAINAGE SYSTEM.
17. ALL DISTURBED AREA WITHIN THE DRAINAGE DITCH EXCEPT THE CHANNEL BOTTOM S HALL BE SEEDED.
18. BACKFILL WITHIN THE DRAINAGE DITCH SHALL BE COMPACTED IN NO GREATER THAN ONE FOOT LIFTS TO THE DENSITY OF THE UNDISTURBED ADJACENT SOIL.
19. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING FLOW IN CHANNEL DURING CONSTRUCTION AND RESTORING CHANNEL TO AT LEAST ORIGINAL CONDITIONS.
20. TO PREPARE AN ACCURATE BID AND CONSTRUCT THE SPECIFIC IMPROVEMENTS, THE CONTRACTOR IS RESPONSIBLE FOR UNDERSTANDING ALL MATERIAL AND METHOD OPTIONS IN THE PROJECT SPECIFICATION.
21. EXISTING PAVEMENTS, CURBS, SIDEWALKS AND DRIVEWAYS DAMAGED OR REMOVED DURING CONSTRUCTION SHALL BE REPLACED USING THE CITY OF HOUSTON STANDARDS.
22. THE CONTRACTOR IS RESPONSIBLE TO UNDERSTAND THAT THIS PROJECT INCLUDES ELEMENTS OF DEMOLITION, ADAPTATION AND NEW CONSTRUCTION, THESE DRAWINGS WERE DEVELOPED USING AVAILABLE HISTORICAL DATA COUPLED WITH ON-SITE RECONNAISSANCE SURVEYS. THE CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFICATION OF SITE CONDITIONS PRIOR TO BEGINNING CONSTRUCTION ACTIVITIES. ALL DISCREPANCIES AND DISCOVERIES SHALL BE REPORTED TO THE CONSTRUCTION MANAGER.
23. ALL EXCAVATION SPOILS SHALL BE LAWFULLY DISPOSED OFFSITE BY CONTRACTOR AT NO ADDITIONAL COST TO THE CITY.
24. ALL WORK AT THE SITE THAT COULD POTENTIALLY INTERFERE WITH NORMAL PLANT OPERATIONS (AND/OR OFFSITE FACILITIES) SHALL BE COORDINATED WITH THE PLANT SUPERVISOR. CONTRACTOR SHALL SUBMIT A CONSTRUCTION SEQUENCING PLAN DEMOSTRATION THAT NO PLANT OPPERATIONS (OR OFFSITE FACILITIES) WILL BE ADVERSELY AFFECTED MORE THAN 4 HOURS IN ANY 24 HOUR PERIOD. ALL REQUESTS WHICH IMPACT NORMAL OPERATIONS OF THE PLANT SHALL BE SUBMITTED A MINIMUM OF 5 DAYS IN ADVANCE OF THE ACTIVITY.
25. ALL DRAWINGS DIMENSIONS SHOWN ARE APPROXIMATE AND SHALL BE FIELD VERIFIED BY THE CONTRACTOR. NECESSARY HORIZONTAL AND VERTICAL ALIGNMENT CHANGES SHALL BE APPROVED BY THE CITY.
26. CONTRACTOR SHALL REMOVE ALL TRASH, EXCESS DEBRIS ETC. FROM THE SITE AT PROJECT COMPLETION PRIOR TO INSPECTION AND APPROVAL BY APPROVING AGENCIES.
27. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND RELATED ACCESSORIES TO OPERATE IN THE MANNER INTENDED BY THE ENGINEER AND THE MANUFACTURER AND BE IN COMPLIANCE WITH ALL APPLICABLE CODES AND CONTRACT SPECIFICATIONS. THE CONTRACTOR WILL COORDINATE WORK BETWEEN ALL TRADES AND SUBCONTRACTORS TO PROVIDE A COMPLETE INSTALLATION SO THAT THE EQUIPMENT IS OPERATIONAL DURING SUBSTANTIAL AND FINAL COMPLETION OF THE PROJECT. THE COMPLETED WORK WILL NOT LACK ANY PART WHICH CAN BE REASONABLY IMPLIED AS INCIDENTAL FOR PROPER AND USEFUL OPERATION OF THE FACILITY. THIS INCLUDES ALL ITEMS OF EQUIPMENT, LABOR AND WILL BE IN ACCORDANCE WITH CODE REQUIREMENTS, STANDARDS, REGULATORY AGENCIES, MANUFACTURER'S RECOMMENDATIONS AND ACCEPTABLE INDUSTRY PRACTICE. THIS WORK WILL BE DONE AT NO ADDITIONAL COST TO THE CITY.
28. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SHORING, STABILIZATION AND SUPPORT OF ALL UTILITIES AND STRUCTURES DURING CONSTRUCTION.
29. ALL DIMENSIONS AND QUANTITIES SHALL BE DETERMINED AND/OR VERIFIED BY THE CONTRACTOR.
30. DO NOT SCALE THE DRAWINGS UNLESS OTHERWISE NOTED. REPORT ANY DISCREPANCIES TO THE CONSTRUCTION MANAGER IMMEDIATELY
31. THE LOCATION AND LIMITS OF ALL ON-SITE WORK AND STORAGE AREAS SHALL BE REVIEWED/COORDINATED WITH AND ACCEPTABLE TO THE CITY OF HOUSTON. THE CONTRACTOR SHALL LIMIT THEIR ACTIVITIES TO THESE AREAS.
32. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING THE LOCATIONS AND ACTIVITIES OF THEIR FORCES WITH THE CITY OF HOUSTON TO MINIMIZE INTERFERENCE WITH NORMAL OPERATIONS.
33. SPECIFICATION SECTION 01110 – SUMMARY OF WORK PROVIDES A SUMMARY OF WORK TO BE COMPLETED AND ADDITIONAL INFORMATION OF CONSTRUCTION ACTIVITY.
34. CONTRACTOR SHALL VERIFY HORIZONTAL AND VERTICAL LOCATIONS OF ALL EXISTING UTILITIES PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITY.
35. CONTRACTOR IS RESPONSIBLE FOR THEIR OWN HORIZONTAL AND VERTICAL CONTROL REFERENCE POINTS AND CONSTRUCTION STAKING IN INCIDENTAL TO THE PROJECT.
36. CONTRACTOR SHALL KEEP ACCESS ROAD TO PLANT OPEN AND FREE FROM CONSTRUCTION RELATED DEBRIS AT ALL TIMES. CONTRACTOR STAGING AREA SHALL BE USED FOR CONTRACTOR'S PERSONNEL, PARKING, MATERIAL AND STORAGE, STOCKPILE, MATERIAL FABRICATION AND RELATED CONSTRUCTION WHICH WILL NOT BE ALLOWED TO INTERFERE WITH NORMAL PLANT OPERATION. CONTRACTOR TO PROVIDE TEMPORARY ALL-WEATHER ACCESS TO ALL UNLOADING AREAS, THROUGHOUT THE DURATION OF THE PROJECT.
37. ADEQUATE DRAINAGE SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION AND ANY DRAINAGE DITCH OR STRUCTURE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO THE FINAL DRAFT OF THE STORM WATER MANAGEMENT HANDBOOK FOR CONSTRUCTION ACTIVITIES, AS PREPARED BY HARDIS CONSTRUCTION, HCFCD AND THE CITY OF HOUSTON IN COMPLIANCE WITH NPDES REQUIREMENTS.
38. IN THE EVENT THAT GROUNDWATER IS ENCOUNTERED DURING EXCAVATION, GROUNDWATER SHOULD BE LOWERED TO A DEPTH OF AT LEAST THREE FEET BELOW THE DEEPEST EXCAVATION GRADE TO PROVIDE DRY WORKING CONDITIONS AND FIRM BEDDING. WATER ACCUMULATED IN THE EXCAVATION AREA SHALL BE REMOVED TO MAINTAIN THE WORKING AREA DRY.
39. IT IS CONTRACTOR'S RESPONSIBILITY TO DESIGN AND IMPLEMENT AN EFFECTIVE GROUNDWATER CONTROL SYSTEM. DEWATERING SYSTEM FOR GROUNDWATER AND SURFACE WATER CONTROL SHALL BE IN ACCORDANCE WITH THE CITY OF HOUSTON SPECIFICATION SECTION 01578 – CONTROL OF GROUNDWATER AND SURFACE WATER.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS – BOBBY FRANK LANE JR. – 126582 – LICENSED – PROFESSIONAL ENGINEER – 7/1/25

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION–DISINFECTION REDESIGN
AMENDMENT

GENERAL
GENERAL NOTES
SHEET 1 OF 2

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
G-00-003	SHEET NO. 3 OF 173

STATE OF TEXAS – REGISTERED – 80367 – PROFESSIONAL ENGINEER – HOUSTON, TEXAS

FILE PATH: [illegible] 3002/7492900 - IAH intercontinental Airport WWTP Improvements/7492900-GENERAL_V03.mxl

GENERAL NOTES

GENERAL CONSTRUCTION NOTES (CONTINUED):

35. THE CONTRACTOR IS RESPONSIBLE FOR ALL TEMPORARY SUPPORTS AND BRACING FOR ALL STRUCTURAL ELEMENTS INCLUDING, BUT NOT LIMITED TO, PUMPS, PIPING, WALL AND FOUNDATION. ALL PROPOSED TEMPORARY BRACING AND SUPPORTS MUST BE SUBMITTED BY THE PROFESSIONAL ENGINEER RETAINED BY THE CONTRACTOR. IT IS THE CONTRACTOR'S RESPONSIBILITY TO INSURE THE SAFETY AND FUNCTIONALITY OF THE PIPING AND ASSOCIATED APPURTENANCES DURING ALL PHASES OF CONSTRUCTION. FURTHERMORE, SHOULD THE CONTRACTOR FEEL THAT ANY SUPPORTS OR BRACING ILLUSTRATED OR DEPICTED WITHIN THESE CONSTRUCTION DOCUMENTS PRESENT A POTENTIAL PROBLEM IN TERMS OF SAFETY OR INTERFERENCE WITH OPERATION, IT IS THE CONTRACTOR'S RESPONSIBILITY TO IMMEDIATELY DOCUMENT THESE CONCERNS AND IMMEDIATELY PRESENT THIS SAID DOCUMENTATION TO THE CITY'S ATTENTION.
36. FIELD VERIFY EXISTING UNDERGROUND UTILITIES AND PROCESS PIPING SHOWN ON THE DRAWINGS BY WHATEVER MEANS NECESSARY (METAL DETECTION PROBES, EXCAVATION, SURVEY, OTHERS) PRIOR TO EXCAVATION. FIELD VERIFICATION WORK AND UTILITY ADJUSTMENTS SHALL BE COMPLETED PRIOR TO EXCAVATION AND CONSTRUCTION OF PROPOSED UTILITIES. THE CONSTRUCTION DOCUMENTS WERE PREPARED FROM THE CITY'S RECORD DRAWINGS. THE ACCURACY OF THE EXISTING UTILITIES AND INFRASTRUCTURE SHOWN ON THESE DOCUMENTS IS NOT GUARANTEED AND THE USE OF SUCH INFORMATION IN NO WAY RELIEVES THE CONTRACTOR OR OTHER OF ANY RESPONSIBILITY FOR ANY LOSS DUE TO INACCURACIES. NO SEPARATE PAY ITEM.
40. NOTIFY TEXAS ONE CALL AT 811 OR 1-800-545-6005 AT LEAST 48 HOURS PRIOR TO COMMENCEMENT OF WORK.
41. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING REQUIRED SECURITY TO PROTECT HIS OWN PROPERTY.
42. CONTRACTOR SHALL BE RESPONSIBLE FOR ADEQUATELY PROTECTING EXISTING EQUIPMENT, BUILDINGS, STRUCTURES, PIPING, ELECTRICAL CABLES, UTILITIES, TANKS, TREES, SHRUBS AND ASSOCIATED APPURTENANCES DURING CONSTRUCTION AS WELL AS REPAIR OR REPLACE DUE TO DAMAGE CAUSED BY CONTRACTOR AT NO COST TO THE CITY.
43. IDENTIFY AND OBTAIN ALL REQUIRED CONSTRUCTION PERMITS PRIOR TO COMMENCEMENT OF WORK.
44. THE CONTRACTOR SHALL COMPLY WITH ALL RELEVANT FEDERAL, OSHA, STATE AND LOCAL LAWS AND REGULATIONS CONCERNING SAFETY OF HEALTH PRACTICES. THE DRAWING PREPARED BY THE DESIGN ENGINEERS FOR THE PROJECT DO NOT INCLUDE DESIGN OR SYSTEMS PERTAINING TO THE SAFETY OF THE CONSTRUCTION CONTRACTOR OR ITS EMPLOYEES OR AGENTS.
45. CONTRACTOR SHALL NOT OPERATE EXISTING VALVES, PLANT APPURTENANCES OR PLANT EQUIPMENT UNLESS, IN THE PRESENCE OF THE CITY CONSTRUCTION MANAGER AND/OR CITY WASTEWATER OPERATIONS, PROVIDE SUFFICIENT NOTIFICATION AND LEAD TIME FOR PLANT OPERATOR WHERE IT BECOMES NECESSARY TO ACTUATE OR DE-ACTUATE VALVES, PLANT APPURTENANCE OR PLANT EQUIPMENT.
46. THE CONTRACTOR SHALL PROVIDE TAPE, FITTINGS, PLUGS AND OTHER DEVICES FOR USE IN FILLING, FLUSHING, TESTING ETC. (NO SEPARATE PAYMENT)

GENERAL DEMOLITION NOTES:

1. THE CITY SHALL HAVE THE FIRST RIGHT OF REFUSAL TO RETAIN OR SALVAGE ALL ITEMS SHOWN TO BE DEMOLISHED AND/OR REMOVED, INCLUDING BUT NOT LIMITED TO PUMPS, HATCHES AND ELECTRICAL AND INSTRUMENTATION COMPONENTS. PRIOR TO INITIATING DEMOLITION WORK, THE CONTRACTOR AND THE DESIGNATED FIELD INSPECTOR SHALL MAKE A JOINT INSPECTION OF EACH SITE TO IDENTIFY ALL EQUIPMENT TO BE RETAINED BY THE CITY FOR SALVAGE OR REUSE. ITEMS IDENTIFIED FOR SALVAGE BY THE CITY SHALL BE CAREFULLY REMOVED TO PROTECT FROM DAMAGE. ALL OTHER ITEMS SHOWN TO BE DEMOLISHED/REMOVED THAT ARE NOT RETAINED BY THE CITY SHALL BE PROPERLY REMOVED FROM THE SITE AND HANDLED PER SPECIFICATION 02220-DEMOLITION AT NO ADDITIONAL COST TO THE CITY. CONTACT DESIGNATED CITY REPRESENTATIVE (CAPITAL PROJECTS CONSTRUCTION INSPECTOR) FOR WASTEWATER TREATMENT PLANT SALVAGE AT LEAST 72 HOURS PRIOR TO DEMOLITION IN ORDER TO COORDINATE REMOVAL OF ANY ITEMS THE CITY WISHES TO CLAIM AND SALVAGE. THE CONTRACTOR SHALL DELIVER ALL SALVAGE ITEMS TO A LOCATION WITHIN THE CITY DETERMINED BY THE CITY.
2. SUBMIT CONSTRUCTION SEQUENCING PLAN BEFORE STARTING ANY DEMOLITION ACTIVITIES. CONTRACTORS METHOD OF DEMOLITION SHALL BE APPROVED BY CONSTRUCTION MANAGER PRIOR TO START OF WORK. REFER TO SPECIFICATION 01110 FOR ADDITIONAL INFORMATION ON CONSTRUCTION SEQUENCE.
3. DEMOLITION OF EXISTING STRUCTURE MECHANICAL SYSTEMS OR PROCESS SYSTEMS IS GENERALLY SHOWN OR INDICATED ON THE DRAWING'S UNLESS OTHERWISE INDICATED, THE DEMOLITION OF THE STRUCTURE OF PROCESS SYSTEMS MEANS THE DEMOLITION, REMOVAL, PROPER CLEANING AND DISPOSAL OF THE ENTIRE UNIT, INCLUDING SUBSTRUCTURE, SUPERSTRUCTURE AND APPURTENANCES OR CONTENTS OF THE STRUCTURE OR EQUIPMENT SYSTEM. PROCESS MECHANICAL DEMOLITION IN GENERAL SHALL CONSIST OF DISMANTLING, CLEANING AND REMOVAL OF EXISTING PIPING, TANKS, BLOWERS, PUMPS, MOTORS CONTROLS, INDICATED IN THE CONTRACT DOCUMENT OR REQUIRED FOR THE COMPLETION OF WORK.
4. DEMOLITION OR REMOVAL OF NOTED EQUIPMENT, PIPING SYSTEMS AND APPURTENANCES SHALL INCLUDE ALL SUPPORTS, BOLTS AND STRUCTURAL COMPONENTS.
5. PATCH AND REPAIR WITH MORTAR OR GROUT ALL EXPOSED FLOOR AND WALL PENETRATIONS FOR DEMOLITION ACTIVITIES IN ACCORDANCE WITH SPECIFICATION 03920 – CONCRETE SURFACE REPAIR AND SPECIFICATION 09930 – CONCRETE COATINGS.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PENETRATING NEEDS FOR PASSAGE OF PIPING THROUGH SOLID CONCRETE WALLS, FLOORS OR FOUNDATION WALLS.
7. REUSED EXISTING PIPING SYSTEMS SHALL BE PROPERLY CLEANED AND INSPECTED PRIOR TO REUSE.
8. ALL EQUIPMENT SHALL BE DE-ENERGIZED AND MADE SAFE PRIOR TO DEMOLITION WORK IN ACCORDANCE WITH SPECIFICATION 16060 – ELECTRICAL DEMOLITION USING LOCK OUT/TAG OUT SAFETY PROCEDURE. THE CONTRACTOR SHALL COORDINATE WITH CENTERPOINT ENERGY TO DISCONNECT THE ELECTRICAL POWER.
9. REFER TO CIVIL, STRUCTURAL, PROCESS MECHANICAL, AND ELECTRICAL DRAWINGS FOR ADDITIONAL DEMOLITION INFORMATION.
10. CROSS-HATCHING INDICATES ITEMS TO BE REMOVED AS SHOWN ON THE DRAWINGS. THE DRAWINGS DO NOT NECESSARILY INDICATE ALL ITEMS REQUIRING DEMOLITION, REMOVAL, OR PATCHING/REPAIR. CONTRACTOR SHALL INCLUDE ALL WORK TO ACCOMMODATE NEW CONSTRUCTION IN CONTRACT PRICE.
11. CONTRACTOR SHALL DEMOLISH EVERYTHING WITHIN THE LIMITS OF DEMOLITION, INCLUDING ALL INTERIOR EQUIPMENT, PIPING, ALL CONCRETE AND REINFORCEMENT, APPURTENANCES OR OTHER MISCELLANEOUS ITEMS.

GENERAL NOTES FOR CIVIL DRAWINGS:

1. THE HORIZONTAL DATUM IS REFERENCED TO THE TEXAS COORDINATE SYSTEM, SOUTH CENTRAL ZONE 4204, NAD83 (2011), ITRF (EPOCH 2010.0000) NAVD88 (GD2012A). ALL NAD83 COORDINATES SHOWN HEREIN ARE SURFACE VALUES AND CAN BE CONVERTED TO GRID BY MULTIPLYING THE COMBINED SCALE FACTOR OF 0.99992.3883870. (SURFACE X CSF = GRID)
2. THE VERTICAL DATUM IS REFERENCED TO FEMA ELEVATIONS (NAVD88 (2001 ADJ.)). TO CONVERT NAV88 PUBLISHED ELEVATIONS TO OBSERVED SUBTRACT 0.5 FEET. (NAVD88) (2001 ADJ.)-0.5= OBSERVED.)
3. FEMA BASE FLOOD ELEVATION LINE AND VALUE ELEVATION 79 (NAD83 DATUM ELEVATION) AS INDICATED BY THE 0.2% ANNUAL CHANCE FLOODPLAIN BOUNDARY.
4. EXISTING UTILITIES AND STRUCTURES (UNDERGROUND,SURFACE OR OVERHEAD) ARE INDICATED ONLY TO THE EXTENT THAT SUCH INFORMATION WAS KNOWN, OR MADE AVAILABLE TO, OR DISCOVERED BY THE ENGINEER IN PREPARING THE DRAWINGS. THE LOCATION, CONFIGURATIONS, AND ELEVATIONS OF SUBSURFACE FACILITIES AND UTILITIES ARE APPROXIMATE, AND NOT ALL UTILITIES AND FACILITIES MAY BE INDICATED. OVERHEAD UTILITIES ARE NOT INDICATED IN ARCHITECTURAL ELEVATIONS, PROFILE OR SECTION DRAWINGS. THE ENGINEERING INVESTIGATIONS, LOCATIONS AND DESIGNATION OF SUBSURFACE UTILITIES INDICATED IN THESE CONTRACT DOCUMENTS HAS BEEN PERFORMED TO QUALITY LEVEL 'C' IN ACCORDANCE WITH GENERALLY ACCEPTED ENGINEERING PRINCIPLES AND PRACTICES AS OUTLINED IN ASCE STANDARD AND GUIDELINE BULLETIN CI/ASCE 38-02 UNLESS OTHERWISE DESIGNATED. WHERE SUCH ACTIVITIES HAVE BEEN TO A HIGHER LEVEL OF QUALITY, THE HIGHER QUALITY LEVEL FOR THE AFFECTED AREAS IS INDICATED IN THE CONTRACT DOCUMENTS.

GENERAL NOTES FOR CIVIL DRAWINGS (CONTINUED):

5. ALL EXISTING STRUCTURE AND PIPING ELEVATIONS SHALL BE FIELD VERIFIED BY THE CONTRACTOR.
6. "SCREENED"(LIGHT) DELINEATION INDICATED ON THE DRAWINGS DENOTES EXISTING FACILITIES "SCREENED" INFORMATION WAS TAKEN FROM THE EXISTING CONSTRUCTION DRAWINGS AND DATA, IS FOR REFERENCE ONLY, AND SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO ORDERING OF MATERIALS AND BEGINNING OF CONSTRUCTION. "BOLD" DELINEATION IS NEW WORK TO BE CONSTRUCTED UNDER THIS PROJECT. "DASHED" DELINEATION IS FOR FUTURE DESIGN WORK NOT CONSTRUCTED UNDER THIS CURRENT CONTRACT.
7. CONTRACTOR'S STAGING, PARKING AND MATERIAL STORAGE SHALL BE LIMITED TO THE SPACE(S) DESIGNATED ON THE DRAWINGS. PROVIDING ADDITIONAL STORAGE OR PARKING SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
8. CALL 811 OR 1-800-545-6005 BEFORE YOU DIG FOR FIELD LOCATIONS OF BURIED ELECTRIC, TELEPHONE, GAS WATER, SEWER, AND CABLE TELEVISION FACILITIES (48 HOURS NOTIFICATION IS REQUIRED.) CONTRACTOR SHALL VERIFY PRECISE LOCATION AND ELEVATIONS OF ALL UTILITIES AND STRUCTURES, WHETHER INDICATED ON THE DRAWINGS OR NOT, IN THE FIELD IN ADVANCE OF EXCAVATING, BY CONTACTING ALL UTILITIES AND OTHER AGENCIES, AND BY PROSPECTING. CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVAL, DEMOLITION, RECONSTRUCTION AND RECONNECTION OF EXISTING FACILITIES AS REQUIRED TO COMPLETE THE WORK. IF REQUIRED AFTER FIELD VERIFICATION, CONTRACTOR SHALL COORDINATE WITH THE ENGINEER TO DETERMINE ANY NECESSARY MODIFICATIONS TO PROPOSED NEW WORK.
9. BEFORE CONSTRUCTION IS STARTED, CONTRACTOR SHALL COORDINATE WITH THE OWNER OF EACH UTILITY AND DEFINE THE REQUIREMENTS AND ACCOMMODATE THE PROTECTION, TEMPORARY SUPPORT, ADJUSTMENT OR RELOCATION OF ANY UTILITIES AFFECTED BY THE PROPOSED NEW WORK.
10. CONTRACTOR SHALL COMPLY WITH THE GOVERNING AGENCY NPDES CONSTRUCTION REQUIREMENTS, AND SHALL PROVIDE APPROPRIATE MITIGATION MEASURES OR PROTECTION AND RESTORATION AT ALL LOCATIONS AS REQUIRED BY THEIR OPERATIONS AND AS DIRECTED BY ENGINEER. SPECIAL CONSTRUCTION REQUIREMENTS, TEMPORARY PROTECTIVE FENCING OR BARRICADES, SHEETING, SHORING, EROSION PROTECTION AND SURFACE RESTORATION AT CERTAIN LOCATIONS ARE INDICATED ON THE DRAWINGS TO BRING CONTRACTORS ATTENTION TO SENSITIVE AREAS.
11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL PROPERTY CORNER MARKERS. PROPERTY CORNER MARKERS DAMAGED BY CONSTRUCTION ACTIVITIES SHALL BE REESTABLISHED BY A PROFESSIONAL SURVEYOR LICENSED IN THE STATE OF TEXAS.
12. THE LOCATION OF SOIL BORINGS INDICATED ON THE DRAWINGS IS APPROXIMATE. CONTRACTOR SHALL REFER TO THE GEOTECHNICAL INVESTIGATION REPORT FOR ACTUAL BORING LOCATIONS AND THE FINDINGS OF THE GEOTECHNICAL INVESTIGATIONS.
13. CONTRACTOR SHALL PROTECT AND MAINTAIN ALL EXISTING TREES, SHRUBS, AND PLANTS UNLESS OTHERWISE NOTED.
14. CONTRACTOR SHALL INSTALL ALL PIPELINES, PAVING, WALKWAYS, AND CURB AND GUTTER AT A UNIFORM GRADE BETWEEN ELEVATIONS DEPICTED ON THE DRAWINGS.
15. FOR ALL SITE GRADING, SMOOTH PARABOLIC TRANSITIONS SHALL BE MADE BETWEEN CHANGES IN SLOPE. PARABOLIC ROUNDING SHALL APPLY TO ALL CUT AND FILL SECTIONS.
16. FINISHED GRADE ELEVATION AT THE BUILDING FACE, WHERE NOT ADJACENT TO PAVEMENT, SHALL BE APPROXIMATELY 6 INCHES BELOW FINISHED FLOOR ELEVATION UNLESS OTHERWISE NOTED. FINISHED GRADE ELEVATION ADJACENT TO BASINS SHALL BE APPROXIMATE AS INDICATED BY CONTOURS OR AS REQUIRED TO MEET STAIR LANDINGS.
17. THE CONTRACTOR'S OPERATIONS SHALL CONFORM TO THE RULES AND REGULATION OF THE STATE CONSTRUCTION SAFETY ORDERS AND OSHA PERTAINING TO EXCAVATION AND TRENCHING.
18. ALL BURIED PIPES SHALL BE RESTRAINED UNLESS OTHERWISE NOTED ON THE DRAWINGS OR SPECIFICATIONS.
19. THE DRAWINGS INDICATE TYPES OF PIPE SUPPORT SYSTEMS AT VARIOUS LOCATIONS. HOWEVER, A LL PIPE SUPPORTS; HANGERS, BRACKETS, INSERTS OR BRACES ARE NOT SHOWN. CONTRACTOR SHALL REFER TO SPECIFICATIONS SECTION 15140 AND PROVIDE A COMPLETE SUPPORT SYSTEM AS REQUIRED.
20. THE TERMS "PROPOSED" AS INDICATED ON THE DRAWINGS MEANS THE ITEM IS DESIGNED OR PLANNED TO BE PROVIDED BY OWNER OR OTHERS SEPARATE FROM THIS CONTRACT. THE TERM "FUTURE" AS INDICATED ON THE DRAWINGS REFERS TO THE ENGINEER'S INTERPRETATION OF THE ITEM FOR THE FUTURE, BASED ON AVAILABLE INFORMATION.
21. THE EXISTING PROCESS FACILITIES SHALL REMAIN IN OPERATION CONTINUOUSLY THROUGHOUT THE CONSTRUCTION ACTIVITIES. THE INDIVIDUAL PROCESS FACILITIES CAN BE TAKEN OUT OF SERVICE FOR LIMITED PERIODS OF TIME TO FACILITATE CONSTRUCTION AS SPECIFIED IN THE CONTRACT DOCUMENTS.
22. CONTRACTOR SHALL RESTORE ANY EXISTING STRUCTURES THAT ARE DISTURBED, DAMAGED OR REMOVED BY CONSTRUCTION.
23. CONTRACTOR SHALL PROVIDE ANY TEMPORARY CULVERTS THAT MAY BE REQUIRED FOR CONTRACTOR'S OPERATIONS. CONTRACTORS SHALL COORDINATE REMOVAL AND REPLACEMENT OF ANY CULVERTS WITHIN PUBLIC RIGHT-OF-WAY WITH THE PERMITTING AGENCY.
24. CONTRACTOR SHALL PROVIDE THE ACTUAL PIPE LENGTH TO BE DETERMINED BY THE SLOPE OR CURVE ON WHICH THE PIPE IS INSTALLED.
25. MINIMUM PIPE COVER SHALL BE FROM THE EXISTING, PROPOSED OR FUTURE GROUND SURFACE OR ROAD PROFILE, WHICHEVER GROUND SURFACE OR ROAD PROFILE IS APPLICABLE AS INDICATED ON THE DRAWINGS. IF THE PROPOSED GROUND SURFACE IS ABOVE THE EXISTING GROUND SURFACE INDICATED ON THE DRAWINGS AND IS NOT ACTUAL GROUND SURFACE AT THE TIME OF PIPELINE INSTALLATION, INSTEAD, THE PIPELINE TO PROVIDE MINIMUM PIPE COVER FROM THE ACTUAL GROUND SURFACE IF ACCEPTABLE TO THE ENGINEER. HIGH POINTS IN THE PIPELINE WILL NOT BE PERMITTED EXCEPT AT LOCATIONS OF AIR VALVES AS INDICATED ON THE DRAWINGS. REVIEW THE PIPELINE PROFILE REQUIREMENTS WITH THE ENGINEER PRIOR TO PREPARING LAYING SCHEDULE AND PERFORMING FIELD STAKING.
26. CONTRACTOR SHALL FIELD VERIFY PRECISE LOCATION, ELEVATION AND ARRANGEMENT OF CONNECTIONS OF NEW PIPELINES WITH EXISTING PIPELINES BASED ON FIELD CONDITIONS, INCLUDING EXPOSING EXISTING PIPING PRIOR TO FABRICATING NEW PIPING. CONTRACTOR SHALL PROVIDE FITTINGS, ADAPTERS, SOLID SLEEVE CLOSURES AND HARNESSED MECHANICAL COUPLING, ROTATE FITTINGS, DEFLECT JOINTS AND MODIFY EXISTING PIPING AS APPLICABLE AND AS REQUIRED TO MAKE CONNECTIONS, INCLUDING ADJUSTMENTS FOR ANY OFFSET IN CENTERLINE ELEVATIONS BETWEEN PIPELINES. CONTRACTOR SHALL PROVIDE TEMPORARY PLUG WITH FACTORY OUTLET SIZED AS REQUIRED FOR CONTRACTOR'S TESTING AND DISINFECTION WORK BEFORE MAKING CONNECTION. WHEN APPLICABLE, CONTRACTOR SHALL COORDINATE MAKING EACH CONNECTION WITH THE OWNER.
27. ALL DUCTILE IRON PIPE (DIP) SHALL BE PROTECTED WITH A MINIMUM OF ONE WRAP OF POLYETHYLENE ENCASEMENT. LOCATIONS WHERE DIP IS TO BE DOUBLE WRAPPED WITH POLYETHYLENE ENCASEMENT AND PRESTRESSED CONCRETE CYLINDER PIPE (PCCP) IS TO BE WRAPPED (SINGLE OR DOUBLE) WITH POLYETHYLENE ENCASEMENT ARE SPECIFIED AND INDICATED ON THE DRAWING.
28. REMOVED PAVEMENT, SIDEWALK, CURB AND GUTTER ETC. SHALL BE DISPOSED OF OFFSITE BY THE CONTRACTOR AT ITS OWN EXPENSE AND SHALL BE CONSIDERED INCIDENTAL TO THE CONTRACT UNLESS OTHERWISE SPECIFIED IN CONTRACT DOCUMENTS.
29. CONTRACTOR SHALL PROVIDE DUST CONTROL MEASURES TO PREVENT TRAFFIC HAZARDS OR CONDITIONS THAT MAY IMPACT THE HEALTH AND SAFETY OF PERSONS DOWN WIND.
30. CONSTRUCTION INGRESS-EGRESS SHALL BE CONFINED TO DEFINED, UTILITY EASEMENTS AND PUBLIC ROADWAYS. CONSTRUCTION EXITS SHALL BE CLEANED DAILY AS NEEDED TO PREVENT THE SPREAD OF SEDIMENTS OR DEBRIS ON EXISTING PAVEMENTS. MUD AND DEBRIS SHALL BE CLEANED FROM THE PAVEMENTS WHENEVER IT OCCURS AND AS REQUIRED BY THE CITY OR ROADWAY AUTHORITY.
31. THE CONTRACTOR SHALL MAKE ARRANGEMENTS FOR THE PROPER BRACING, SHORING AND OTHER REQUIRED PROTECTION OF ALL UTILITIES BEFORE CONSTRUCTION BEGINS. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO THE UTILITIES AND ASSOCIATED STRUCTURES AND SHALL MAKE REPAIRS AS NECESSARY TO THE SATISFACTION OF THE UTILITY OWNER.
32. PLACE 8 ALL MARKERS (PROVIDED BY OWNERS) ABOVE YARD PIPING GREATER THAN 3" DIAMETER AT 300' SPACING AND ALL HORIZONTAL BENDS TO DEPTH BETWEEN 1' AND 3' BELOW FINISHED GRADE.

STORM CONSTRUCTION NOTES:

1. STORM SEWER SHALL BE REINFORCED CONCRETE PIPE (C-76, CLASS III), AND SHALL BE INSTALLED, BEDDED, AND BACK FILLED IN ACCORDANCE WITH THE CITY OF HOUSTON DRAWING NOS. 02317-02, 02317-3, 02317-05, 02317-06, AND 02317-07 (JULY 2019) AS APPLICABLE UNLESS OTHERWISW SHOWN ON THE DRAWINGS.
2. ALL STORM SEWER CONSTRUCTED IN SIDELOT EASMENT SHALL BE R.C.P. (C-76, CLASSIII) AND SHALL BE EMBEDDED IN ACCORDANCE WITH THE CITY OF HOUSTON DRAWING NOS. 02317-02, 02317-03, 02317-05, 02317-06, AND 02317-07 AS APPLICABLE.
3. ALL SEWER UNDER PROPOSED OR FUTURE PAVEMENT AND TO A POINT ONE (1) FOOT BACK OF ALL PROPOSED OR FUTURE CURBS SHALL BE BACKFILLED WITH 1-1/2 SACK CEMENT/C.Y. STABLIZED SAND TO WITHIN ONE (1) FOOT OF SUBGRADE. THE REMAINING DEPTH OF TRENCH SHALL BE BACKFILLED WITH SUITABLE EARTH MATERIAL.
4. ALL TRENCH BACKFILL SHALL BE IN 8" LIFTS, WITH TESTS TAKEN AT 100 FOOT INTERVALS IN EACH LIFT, AND MECHNICALLY COMPACTED TO A DENSITY OF NOT LESS THAN 95% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY THE STANDARD PROCTOR COMACTION TEST (ASTM D-698/AASHTO T99).
5. CIRCULAR AND ELLIPTICAL REINFORCED CONCRETE PIPE SHALL BE INSTALLED USING RUBBER GASKET JOINT CONFORMING TO ASTM C443 AND ASTM C877 RESPECTIVELY.
6. ALL STORM SEWER PIPES AND INLET LEADS SHALL BE 24" AND LARGER R.C.P. (C-76, CLASSIII).
7. ALL PROPOSED PIPE STUB-OUTS FROM MANHOLES AND INLET LEADS ARE TO BE PLUGGED WITH 8" BRICK WALLS UNLESS OTHERWISE NOTED.
8. MINIMUM HORIZONTAL CLEARANCE BETWEEN ANY STORM PIPE AND BOX SHALL BE AT LEAST 48-INCHES FROM EXTERIOR OF THE STORM PIPE OR BOX TO THE EXTERIOR OF THE EXISTING OR PROPOSED PUBLIC OR PRIVATE UTILITY AND OTHER APPURTENANCES. MINIMUM VERTICAL CLEARANCE BETWEEN ANY STORM PIPE AND BOX SHALL BE AT LEAST 24-INCHES FROM EXTERIOR OF THE STORM PIPE OR BOX TO THE EXTERIOR OF THE EXISTING OR PROPOSED PUBLIC OR PRIVATE UTILITY AND OTHER APPURTENANCES.
9. ADJUST MANHOLE COVERS TO GRADE CONFORMING TO REQUIREMENTS OF SECTION 02005-ADJUSTING MANHOLES, INLETS, AND VALAVE BOXES TO GRADE.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING, MAINTAINING, AND RESTORING ANY BACK SLOPE DRAINAGE SYSTEM DISTURBED AS A RESULT OF THIS WORK.
11. ALL DITCHES SHALL BE GRADED TO PROPOSED ELEVATIONS TO INSURE PROPER DRAINAGE. ALL OUTFALLS SHALL BE PROPERLY BACKFILLED AND COMPACTED. ALL DISTURBED AREA SHALL BE REGRADED, SEEDED, AND FERTILIZED.
12. ALL DRIVEWAYS WILL BE LOCATED TO AVOID EXISTING CURB INLET STRUCTURES.

APPLICABLE CODES:

2021 IBC WITH CITY OF HOUSTON AMENDMENTS AS PER SEC. 101.2
2021 CITY OF HOUSTON CODES
2021 UMC – UNIFORM MECHANICAL CODE (W/ CITY OF HOUSTON AMENDMENTS)
2021 IEBC – INTERNATIONAL EXISTING BUILDING CODE (W/ CITY OF HOUSTON AMENDMENTS)
2023 NEC – NATIONAL ELECTRICAL CODE
2021 IECC OR ASHRAE 90.1 ENERGY CODE
2021 IFC – INTERNATIONAL FIRE CODE

CITY OF HOUSTON FOOD ORDINANCE (HEALTH CODE)

MISCELLANEOUS NOTES:

1. CONTRACTOR SHALL VERIFY NUMBER AND SIZE OF ALL OPENINGS SHOWN ON THE DRAWINGS AND COORDINATE WITH CIVIL, ARCHITECTURAL, PLUMBING, MECHANICAL AND ELECTRICAL DRAWINGS AND EQUIPMENTS FURNISHED FOR EXACT LOCATIONS OF OPENINGS.
2. ALL NOZZLES, WEIRS, PIPE THIMBLES, GATES AND THIMBLES AND ALL OTHER EMBEDDED EQUIPMENTS SHALL BE LOCATED AND EMBEDDED ACCORDING TO THE CIVIL, MECHANICAL, STRUCTURAL DRAWINGS AND VENDOR RECOMMENDATIONS.
3. ALL EXPOSED OR ABOVE GROUND POTABLE AND NON-POTABLE WATER LINES ARE TO BE INSULATED.
4. ALL DISTURBED AREA SHALL BE HYDROMULCH SEEDED PER SPECIFICATION 02921-HYDROMULCH SEEDING.
5. EXISTING PAVEMENTS, CURBS, SIDEWALKS AND DRIVE-WAYS DAMAGED OR REMOVED DURING CONSTRUCTION SHALL BE REPLACED USING CITY OF HOUSTON STANDARDS.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

STATE OF TEXAS – BOBBY FRANK LANE JR. – 126582 – LICENSED – PROFESSIONAL ENGINEER – 7/1/25

SURVEYED BY:
UNITED ENGINEERS, INC
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT

GENERAL
GENERAL NOTES
SHEET 2 OF 2

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	4 OF 173

FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS – 80367 – REGISTERED – PROFESSIONAL ENGINEER – HOUSTON, TEXAS

G-00-004

FILE PATH: R:\365\402500-ICON Intercontinental Airport WWTP Improvements\402500-GENERAL_V02.rvt

GENERAL LEGENDS

MATERIALS LEGEND

- STONE
- EARTH
- GRANULAR FILL
- CONCRETE
- STEEL
- ALUMINUM
- BEDROCK
- CHECKERED PLATE
- SAND
- RIPRAP
- BRICK
- CMU
- FACE BLOCK
- SOLID FILL
- ENGINEERED FILL
- ENGINEERED FILL (GRAVEL)
- GRATING

NORTH ARROWS LEGEND

N

ANNOTATIONS LEGEND

GENERAL TEXT
.10" ROMANS BT
DRAWING TEXT, NOTES, SCHEDULES, DIMENSIONS & MINOR CALLOUTS

GENERAL TEXT (UNDERLINED)
.10" ROMANS BT, UNDERLINED
SPECIFIC DRAWING TEXT & NOTES

SUB-TITLE TEXT
.13" ROMANS BT, UNDERLINED
MINOR TITLES & MAJOR CALLOUTS

TITLE TEXT
.16" ROMANS BT, UNDERLINED
MAJOR TITLES

1 SHEET KEYNOTE
NUMERIC SEQUENCE
COORDINATE W/ SHEET KEYNOTES IN BORDER NOTE BLOCK

REVISIONS

1 REVISION TAG

REVISION CLOUD

ELEVATIONS LEGEND

NEW WORK ELEVATIONS

EL 0.00	GENERAL ELEVATION
FLR EL 0.00	FLOOR ELEVATION
CL EL 0.00	CENTERLINE OF PIPE OR EQUIPMENT ELEVATION
INV EL 0.00	INVERT OF PIPE OR EQUIPMENT ELEVATION
TOG EL 0.00	TOP OF GRATING ELEVATION
TOC EL 0.00	TOP OF CONCRETE ELEVATION
EL 0.00	FLOOR ELEVATION IN PLAN VIEW

EXISTING WORK ELEVATIONS

EL 0.00+/-	GENERAL ELEVATION
FLR EL 0.00+/-	FLOOR ELEVATION
CL EL 0.00+/-	CENTERLINE OF PIPE OR EQUIPMENT ELEVATION
INV EL 0.00+/-	INVERT OF PIPE OR EQUIPMENT ELEVATION
TOG EL 0.00+/-	TOP OF GRATING ELEVATION
TOC EL 0.00+/-	TOP OF CONCRETE ELEVATION
EL 0.00+/-	FLOOR ELEVATION IN PLAN VIEW

EL 0.00 — N 0'-0" E 0'-0" EL 0.00 — SPOT ELEVATION

SPOT COORDINATE

0.0% — SPOT SLOPE

PIPE AND FITTINGS LEGEND

- EXISTING PIPE
- NEW PIPE
- EXISTING PIPING TO BE REMOVED
- WELDED JOINT
- GROOVED END JOINT
- FLANGED JOINT
- THERMAL DISPERSION FLOW ELEMENT
- ELECTRO MAGNETIC FLOW ELEMENT (FM)
- MECHANICAL JOINT
- GROOVED END ADAPTER FLANGE
- FLANGED COUPLING ADAPTER
- FLEXIBLE COUPLING
- DISMANTLING JOINT
- METAL BELLOWS EXPANSION JOINT
- ELASTOMERIC BELLOWS EXPANSION JOINT
- ELBOW UP
- ELBOW DOWN
- TEE UP
- TEE DOWN
- LATERAL UP
- LATERAL DOWN
- CONCENTRIC REDUC
- ECCENTRIC REDUCE
- REDUCING BUSHING
- UNION
- BLIND FLANGE
- ELBOW, 90°
- ELBOW, 45°
- CROSS
- TEE
- LATERAL

NOTE: ONLY FLANGED END CONNECTIONS ARE SHOWN. FITTINGS WITH OTHER END CONNECTION TYPES ARE SHOWN SIMILARLY ON THESE CONTRACT DRAWINGS. REFER TO PIPING SPECIFICATIONS.

ARCHITECTURAL LEGEND

TAGS ARE MEDIUM LINES & CALLOUTS ARE SUB-TITLE TEXT UNLESS NOTED OTHERWISE

XX XX	ACCESSORY ITEM LETTER SEQUENCE
C1	CEILING "C" + NUMERIC SEQUENCE
② ②	CURTAIN PANEL LETTER SEQUENCE
WS	CURTAIN WALL or FRAME TYPE LETTER SEQUENCE
F1	FLOOR "F" + NUMERIC SEQUENCE
101A	DOOR ROOM NUMBER + LETTER SEQUENCE
101A	LOUVER ROOM NUMBER + LETTER SEQUENCE
00	LABORATORY CABINET NUMERIC SEQUENCE
RL1	RAILING "R.L" + NUMERIC SEQUENCE
R1	ROOF "R" + NUMERIC SEQUENCE
ROOM NAME 101 150 SF	ROOM NAME & NUMBER FIRST DIGIT LEVEL DESIGNATION + NUMERIC SEQUENCE (01-99) OPTIONAL AREA REPORT
Stair No.?	STAIR STAIR No. + NUMERIC SEQUENCE (01-99)
A1	WALL LETTER SEQUENCE + NUMERIC SEQUENCE COORDINATE WITH WALL TYPES
W	WINDOW LETTER SEQUENCE

GENERAL SHEET NOTES

1. THIS IS A GENERAL LEGEND PROVIDED TO FACILITATE USE OF DRAWINGS. REFER TO THE DRAWINGS AND SPECIFICATIONS FOR ITEMS REQUIRED.
2. "SCREENED" (LIGHT) DELINEATION INDICATED ON CIVIL/SITE, DRAWINGS DENOTES EXISTING WORK AND/OR STRUCTURES. THE "SCREENED" INFORMATION WAS TAKEN FROM EXISTING RECORD DRAWINGS, AS BUILT DRAWINGS, AND FIELD SURVEYS. THIS INFORMATION IS FOR REFERENCE ONLY AND SHALL BE FIELD-VERIFIED BY THE CONTRACTOR PRIOR TO THE ORDERING OF MATERIALS OR THE BEGINNING OF CONSTRUCTION, UNLESS OTHERWISE NOTED.
3. "BOLD" OR SOLID (DARK) LINE DELINEATION INDICATED ON ALL DRAWINGS DENOTES NEW WORK THAT IS TO BE CONSTRUCTED OR MODIFIED AS PART OF THIS CONTRACT.
4. ARCHITECTURAL, STRUCTURAL, MECHANICAL, HVAC, PLUMBING, AND ELECTRICAL DISCIPLINE DRAWINGS REFERENCING OTHER DISCIPLINE'S AREA OF WORK INTO THEIR DRAWINGS WILL BE "SCREENED" WITH (LIGHT) DELINEATION. THIS DOES NOT NECESSARILY DENOTE WORK AS EXISTING OR NEW. THE CONTRACTOR SHALL BE RESPONSIBLE TO VERIFY EXISTING FACILITIES AND EQUIPMENT AND MODIFICATIONS TO THEM AND NEW FACILITIES AND NEW WORK.
5. EXISTING DIMENSIONS AND ELEVATIONS ON DRAWINGS ARE APPROXIMATE ONLY AND ARE INDICATED ON THE DRAWINGS WITH +/- SUFFIX. CONTRACTOR SHALL FIELD-VERIFY DIMENSIONS AND ELEVATIONS PRIOR TO ORDERING MATERIALS AND BEGINNING OF CONSTRUCTION.
6. EXISTING STRUCTURES, FACILITIES, EQUIPMENT ETC. SHALL BE NOTED IN ANNOTATIONS WITH "EXIST" OR "EXISTING" IN PREFIX OF THE CALLOUT OR LABEL.
7. REFER TO SPECIFICATION SECTION 01110 FOR CONSTRUCTION SEQUENCING AND SCHEDULE REQUIREMENTS.
8. PRIOR TO CONSTRUCTION THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, ELEVATIONS, AND PIPE SIZES WITH EQUIPMENT MANUFACTURER. PROVIDE NECESSARY FITTINGS, REDUCERS, AND ACCESSORIES FOR INSTALLATION AND TO FACILITATE EQUIPMENT REMOVAL.
9. GENERAL "G" DRAWINGS CONTAIN INFORMATION SUCH AS GENERAL NOTES, LEGENDS, SYMBOLOGY, ANNOTATIONS, AND ABBREVIATIONS WHICH IS INFORMATION THAT IS APPLICABLE TO ALL DRAWINGS OF THIS PROJECT.
10. ALL DRAWINGS WITH PIPING THAT ARE CONTINUOUS SHALL REFER TO THE CIVIL DRAWINGS FOR THEIR CONTINUATION.
11. GRAPHICS WHICH ARE TO BE SHOWN AS SCREENED SHALL BE DELINEATED AS LIGHT. ———
12. GRAPHICS WHICH ARE TO BE SHOWN AS NEW WORK SHALL BE DELINEATED AS SOLID. ———
13. NOT ALL HANGERS, BRACKETS, BRACES OR OTHER SUPPORTS FOR PIPING, DUCTWORK, AND EQUIPMENT ARE INDICATED ON THE DRAWINGS. REFER TO THE SPECIFICATIONS FOR SUPPORT REQUIREMENTS.
14. "SCREENED" (LIGHT) TEXT HAS PREVIOUS PROJECT RECORD DOCUMENTS AND IS NOT APPLICABLE TO NEW WORK BEING PERFORMED WITHIN THIS CONTRACT.

DEMOLITON & RE-USE LEGEND

- DEMOLITION
- MODIFICATION

LINE STYLES LEGEND

- FINE LINES
- THIN LINES
- MEDIUM LINES
- WIDE LINES
- BOLD LINES
- HEAVY LINES
- EXISTING LINES
- CENTERLINE 1/4"
- CENTERLINE 1/2"
- GRID LINE
- HIDDEN LINES
- HIDDEN LINES 1/8"
- HIDDEN LINES 1/16"
- MEDIUM HIDDEN LINES
- MEDIUM HIDDEN LINES 1/8"
- MEDIUM HIDDEN LINES 1/16"
- MECHANICAL HIDDEN
- MATCH LINE
- 1 HOUR FIRE RATED
- 2 HOUR FIRE RATED
- 3 HOUR FIRE RATED
- SMOKE RATED

SECTION/DETAIL/ELEVATIONS LEGEND

CALLOUT DESIGNATION LETTER OR NUMBER — VIEW REFERENCE IF REQ'D — DETAIL HEAD CALLOUT — DRAWING REFERENCE

CALLOUT DESIGNATION NUMBER — VIEW REFERENCE IF REQ'D — SECTION HEAD CALLOUT — DRAWING REFERENCE

VIEW TITLES LEGEND

PLAN VIEW TITLES

TITLE LINE 1
TITLE LINE 2 BELOW)
SCALE/NO SCALE

SECTION & DETAIL VIEW TITLES

A SECTION
X-XX-XXX SCALE/NO SCALE
X-XX-XXX
X-XX-XXX
SECTIONS WITH CROSS-REFERENCE

A DETAIL
X-XX-XXX SCALE/NO SCALE
X-XX-XXX
X-XX-XXX
DETAILS WITH CROSS-REFERENCE

A DETAIL
SCALE/NO SCALE
DETAILS WITH NO CROSS-REFERENCE

EQUIPMENT & PIPE TAGGING LEGEND

XXX — MECHANICAL EQUIPMENT/VALVE TAG
PIPE SIZE
SYSTEM ABBREVIATION
MATERIAL ABBREVIATION
12" XX MAT
MATERIAL PIPE TAG

VALVE LEGEND (NON-SCHEMATIC)

- CHECK VALVE
- PINCH VALVE
- FLANGED ECCENTRIC PLUG VALVE
- MJ ECCENTRIC PLUG VALVE
- BALL VALVE
- BUTTERFLY VALVE

INTERIOR PIPING ABBREVIATIONS

AFC	ANTI-FOAM CHEMICAL
ALP	AIR LOW PRESSURE
CMS	COMPRESSED AIR-SERVICE
DS	DIGESTED SLUDGE
DR	PLANT DRAIN
ELU	ELUTRIATE
FILT	FILTRATE
FSC	FERMENTER SCUM
MGCL	MAGNESIUM CHLORIDE
NG	NATURAL GAS
OA	ODOROUS AIR
OF	OVERFLOW
PD	SUMP PUMP DISCHARGE
PSD	PRIMARY SLUDGE
PSC	PRIMARY SCUM
PTDS	PHOSPHOROUS TREATED DIGESTED SLUDGE
TFS	THICKENED FERMENTED SLUDGE
RCS	RECIRCULATED SLUDGE
W1	POTABLE WATER
W2	NON-POTABLE WATER
W3	PLANT EFFLUENT WATER

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS — BOBBY FRANK LANE JR. — 126582 — LICENSED — PROFESSIONAL ENGINEER — 7/1/25

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION-DISINFECTION REDESIGN AMENDMENT

GENERAL

LEGENDS AND NOTES

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	5 OF 173

FOR CITY OF HOUSTON USE ONLY

ACCEPTED — 80367 — CITY OF HOUSTON, TEXAS

G-00-005

ABBREVIATIONS

A	ACID, AMBER INDICATING LIGHT,AMP
AB	ANCHOR BOLT
ABS	ACID BATH SINK
AC	ALTERNATING CURRENT, ASPHALTIC CONCRETE
A/C	AIR CONDITIONER, (ING)
ACP	ASBESTOS CEMENT PIPE
ACST	ACOUSTIC, (AL
AD	ACCESS DOOR, AREA DRAIN, AIR DAMPER, ANODE
ADD	ADDITIONAL
ADH	ADHESIVE
ADJ	ADJUSTABLE, ADJACENT
ADMIN	ADMINISTRATION
ADP	ALBIN D. POGORSKI
AF	AIR FLOW
AFD	AJUSTABLE FREQUENCT DRIVE
AFF	ABOVE FINISH FLOOR
AH	AHEAD
AHU	AIR HANDLING UNIT
AL	ACTIVE LEAF
ALP	AIR LOW PRESSURE
ALT	ALTERNATE, (IVE)
ALUM	ALUMINUM
AM	AMMETER
AMP	AMPERE
ANOD	ANODIZED
AP	ACCESS PANEL
APPR	APPROACH
APPROX	APPROXIMATE, (LY)
AR	ALARM RELAY
ARCH	ARCHITECTURAL
AS	AMMETER SWITCH
ASSY	ASSEMBLY
AUTO	AUTOMATIC
AUX	AUXILIARY
AVS	AUTOMATIC VALVE STATION
AWG	AMERICAN WIRE GAGE
B	BEAM
B TO B	BACK TO BACK
BA	BEARING AREA
BAL	BALANCE
BAT	BATTERY
BC	BEGIN CURVE
BD	BOARD
BEJ	BRICK EXPANSION JOINT
BF	BLIND FLANGE
BHP	BRAKE HORSEPOWER
BITUM	BITUMINOUS
BKR	BREAKER
BLDG	BUILDING
BLK	BLOCK
BM	BENCHMARK
BOF	BOTTOM OF FOOTING
BOT	BOTTOM
BP	BACK PRESSURE
BPMK NO	BASEPLATE MARK NUMBER
BRG	BEARING
BRK	BRICK
BS	BOTH SIDES
B&S	BELL AND SPIGOT
BSMT	BASEMENT
BTU	BRITISH THERMAL UNIT
BTUH	BRITISH THERMAL UNIT–HOUR
BU	BELL–UP
BUR	BUILT UP ROOFING
BVC	BEGIN VERTICAL CURVE
C	COUNTER
C TO C	CENTER TO CENTER
CB	CATCH BASIN
CD	CEILING DIFFUSER
C/EJ	CONTRACTION/EXPANSION JOINT
CFM	CUBIC FEET PER MINUTE
C&G	CURB AND GUTTER
CHKD	CHECKERED
CI	CAST IRON
CIMH	CAST IRON MANHOLE
CIMHS	CAST IRON MANHOLE STEPS
CIP	CAST IRON PIPE
CISP	CAST IRON SOIL PIPE
CJT	CONTROL JOINT
CKT	CIRCUIT
CL	CENTERLINE, CLASS
CLG	CEILING
CLO	CLOSET
CLR	CLEAR, (ANCE)
CMP	CORRUGATED METAL PIPE
CMS	COMPRESSED AIR – SERVICE
CMU	CONCRETE MASONRY UNIT
CO	CLEAN OUT, COMPANY
COD	CHEMICAL OXYGEN DEMAND
COL	COLUMN
COMB	COMBINATION
COMB SWR	COMBINED SEWER
COMP	COMPRESSOR, (ED)
CONC	CONCRETE
CONN	CONNECTION
CONST	CONSTRUCTION
CONT	CONTINUOUS, CONTINUATION, CONTROL
CONTR	CONTRACTOR
COR	CORNER
CORR	CORRIDOR, CORRUGATED
CP	CONTROL PANEL
CPLG	COUPLING
CPT	CONTROL POWER TRANSFORMER
CRS	COURSES, (ING)
CS	CONTROL STATION, CUP SINK, CHLORINE SOLUTION, CONTROL SWITCH
CSK	COUNTERSUNK, (INK)
CT	CERAMIC TILE, CYCLE TIMER
CT	CURRENT TRANSFORMER
CTR(S)	CENTER(S)
CU	CUBIC
CU YD	CUBIC YARD
CW	COLD WATER
D	DOOR, DRAIN
DBL	DOUBLE
DC	DIRECT CURRENT
DEG	DEGREE
DEPT	DEPARTMENT
DET	DETAIL
DF	DRINKING FOUNTAIN
DH	DOOR HEIGHT
DI	DROP INLET, DUCTILE IRON
DIA	DIAMETER
DIFF	DIFFUSER
DIM	DIMENSION
DIP	DUCTILE IRON PIPE
DISCH	DISCHARGE
DISP	DISPENSER
DIST	DISTRIBUTION
DIV	DIVISION
DL	DEAD LOAD
DM	DAMPER MOTOR
DMJ	DISMANTLING JOINT
DN	DOWN
DO	DOOR OPENING, DISSOLVED OXYGEN
DPDT	DOUBLE POLE DOUBLE THROW
DR	DRAIN
DS	DOWNSPOUT
DT	DISTRIBUTION TRANSFORMER
DV	DRAIN VALVE
DWG(S)	DRAWING(S)
DWL(S)	DOWEL(S)
E	EAST, ELECTRICAL
EA	EACH
EAT	ENTERING AIR TEMPERATURE
EC	END CURVE
ECC	ECCENTRIC
ECC RED	ECCENTRIC REDUCER
EEW	EMERGENCY EYEWASH
EF	EACH FACE, EXCESS FLOW
EFF	EFFLUENT
EJ	EXPANSION JOINT
EL	ELEVATION
ELB	ELBOW
ELECT	ELECTRIC, (AL)
ELEV	ELEVATOR
ELU	ELUTRIATE
EMER	EMERGENCY
ENC	ENCASEMENT
ENCL	ENCLOSURE
ENT	ENTRANCE
EOL	END OF LINE
EQ	EQUAL
EQUIP	EQUIPMENT
EW	EACH WAY
EW	EMERGENCY EYEWASH
EWEF	EACH WAY EACH FACE
EXCH	EXCHANGER
EXH	EXHAUST
EXIST	EXISTING
EXP	EXPANSION, EXPOSED
EXP JT	EXPANSION JOINT
EXT	EXTENSION, EXTERIOR, EXTERNAL
F	FAN
F TO F	FACE TO FACE
FB	FACE BRICK
FC	FLEXIBLE CONNECTION, FLOW CONTROL
FCA	FLANGED COUPLING ADAPTER
FD	FLOOR DRAIN
FDN	FOUNDATION
FDPR	FIRE DAMPER
FE	FINAL EFFLUENT, FIRE EXTINGUISHER
FEC	FIRE EXTINGUISHER CABINET
FER	FERMENTER
FF	FINISH FLOOR
FG	FINISH GRADE
FH	FLAT HEAD, FIRE HYDRANT
FHMS	FLAT HEAD MACHINE SCREW
FIG	FIGURE
FIN	FINISH
FL	FLOOR, FLOW LINE
FLEX	FLEXIBLE
FLG	FLANGE, FLASHING
FM	FORCE MAIN
FO	FUEL OIL
FOB	FLAT ON BOTTOM
FOM	FACE OF MASONRY
FOS	FACE OF STUDS
FOT	FLAT ON TOP
FPS	FERMENTATE PRIMARY SLUDGE
FRM	FERMENTATE
FRP	FIBERGLASS REINFORCED PLASTIC
FS	FAR SIDE, FLOOR SLEEVE, FLOAT SWITCH
FT	FOOT
FTG	FOOTING
FURN	FURNISH, FURNISHED
FV	FLAP VALVE
FWD	FORWARD
GA	GAUGE
GAL	GALLON
GALV	GALVANIZED
GC/MS	GAS CHROMATOGRAPH/MASS SPECTROMETER
GEN	GENERAL, GENERATOR
GM	GAS METER
GPM	GALLONS PER MINUTE
GR	GRADE
GWB	GYPSUM WALLBOARD
GTS	GRAVITY THICKENED SLUDGE
GYP	GYPSUM
H	HIGH, HOUR, HYDROGEN
HB	HOSE BIBB
HC	HOLLOW CORE
HDR	HEADER
HE	HEAT EXCHANGER
HEX	HEXAGONAL
HF	HOSE FAUCET
HGT	HEIGHT
HH	HANDHOLE
HLS	HIGH LEVEL SWITCH
HMC	HARNESSED MECHANICAL COUPLING
HMD	HOLLOW METAL DOOR
HMJ	HARNESSED MECHANICAL JOINT
HORIZ	HORIZONTAL
HP	HIGH POINT, HORSEPOWER
HR	HOUR, HANDRAIL
HS	HIGH STRENGTH
HV	HOSE VALVE
HVAC	HEATING,VENTILATING AND AIR CONDITIONING
HW	HOT WATER
HWY	HIGHWAY
HYDRO	HYDROPNEUMATIC
I	INDICATOR
ID	INSIDE DIAMETER
IF	INSIDE FACE
I/I	CURRENT TO CURRENT BOOSTER
IN	INCHES
INC	INCORPORATED
INCL	INCLUDING
INCR	INCREASE
INST	INSTRUMENT, (ATION)
INSUL	INSULATE, (ED), (ING)
INT	INTERIOR, INTERNAL
INV	INVERT
IPS	IRON PIPE SIZE
JAN	JANITOR
JB	JUNCTION BOX
JF	JOINT FILLER
JT	JOINT
K	KIPS
KIT	KITCHEN
KO	KNOCK OUT
KS	KITCHEN SINK
KV	KILOVOLT
KVA	KILOVOLT AMPERE
KW	KILOWATT
KWH	KILOWATT HOUR
L	LOUVER
LAB	LABORATORY
LAM	LAMINATE(D)
LAT	LEAVING AIR TEMPERATURE
LAT	LATERAL
LAV	LAVATORY
LB(S)	POUNDS
LG	LENGTH, LONG
LH	LEFT HAND
LIN	LINEAL, LINEAR
LL	LIVE LOAD
LO	LOUVER OPENING
LS	LEVEL SWITCH
LT	LEFT, LAB TABLE
MA	MILLIAMPERE
MACH	MACHINE
MAINT	MAINTENANCE
MAN	MANUAL
MAS	MASONRY
MAX	MAXIMUM
MB	MACHINE BOLT
MC	MECHANICAL COUPLING
MCC	MOTOR CONTROL CENTER
MECH	MECHANICAL
MED	MEDIUM
MET	METAL
MEZZ	MEZZANINE
MFM	MAGNETIC FLOWMETER
MFR(S)	MANUFACTURER(S)
MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY
MH	MANHOLE
MIN	MINIMUM, MINUTE
MISC	MISCELLANEOUS
MJ	MECHANICAL JOINT
MJRG	MECHANICAL JOINT RETAINER GLAND
MJTR	MECHANICAL JOINT WITH TIE ROD
ML	MIXED LIQUOR
MO	MASONRY OPENING, MOTOR OPERATED
MP	METERING PUMP
MRD	METAL ROOF DECK
MS	MACHINE SCREW
MSL	MEAN SEA LEVEL
MTD	MOUNTED
MTL	MATERIAL
MTR	MOTOR
MXP	SUBMERSIBLE, PROP, BLENDER MIXER
N	NORTH
N/A	NOT APPLICABLE
NBC	NAIL IN BOTTLE CAP
NC	NORMALLY CLOSED
NEUT	NEUTRAL
NF	NEAR FACE
NG	NATURAL GAS
N.O.	NORMALLY OPEN
NO.(S)	NUMBER(S)
NOCL	SODIUM HYPOCHLORITE
NOM	NOMINAL
NORM	NORMAL
NPT	NATIONAL PIPE THREAD
NPW	NONPOTABLE WATER
NS	NEAR SIDE
NTS	NOT TO SCALE
OA	ODOROUS AIR
OC	ON CENTER, ODOR CONTROL
OD	OUTSIDE DIAMETER
OF	OUTSIDE FACE, OVERFLOW
OH	OVERHEAD
OL	OVERLOAD
OPER	OPERATING
OPNG	OPENING
OPP	OPPOSITE
OSL	OUTSTANDING LEG
OZ	OUNCE
PC	POINT OF CURVE
PCC	POINT OF COMPOUND CURVATURE
PCCP	PRESTRESSED CONCRETE CYLINDER PIPE
PCL	CENTRIFUGAL PUMP
PCP	PIER CUTOFF POINT
PD	PLAN DIMENSION, SUMP PUMP DISCHARGE
PDD	DOUBLE DISK PUMP
PE	PRIMARY EFFLUENT, PLAIN END
PG	PRESSURE GAUGE
PH	PIPE HANGER, PENTHOUSE
PI	POINT OF INTERSECTION
PIVC	POINT OF INTERSECTION ON VERTICAL CURVE
PL	PLATE
PLYWD	PLYWOOD
PNL(S)	PANEL(S)
POLY	POLYMER
POT	POINT ON TANGENT
PP	POWER POLE
PR	PAIR
PROJ	PROJECTION
PRS	PRESSURE REDUCING STATION
PRV	POWER ROOF VENTILATOR
PSD	PIPE SUPPORT, PUMP STATION, PRIMARY SLUDGE
PSC	PRIMARY SCUM
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PT	POINT, POINT OF TANGENCY
PVC	POLYVINYL CHLORIDE, POINT ON VERTICAL CURVE
PVCP	POLYVINYL CHLORIDE PIPE
PVMT	PAVEMENT
PW	POTABLE WATER
R	RADIUS, RISER, RIM
RAS	RETURN ACTIVATED SLUDGE
RCP	REINFORCED CONCRETE PIPE
RCCP	REINFORCED CONCRETE CYLINDER PIPE
RCHEP	REINFORCED CONCRETE HORIZONTAL ELLIPTICAL PIPE
RCY	RECYCLE
RD	ROOF DRAIN, ROAD
RDL	ROOF DRAIN LEADER
RECEP	RECEPTION
RECIRC	RECIRCULATING
RECP	RECEPTACLE
RED	REDUCER, REDUCING
REG	REGULATOR, REGULATING
REF	REFERENCE
REFR	REFRIGERATION, REFRIGERATOR
REINF	REINFORCING
REM	REMOVABLE
REQD	REQUIRED
RET	RETURN
REV	REVISION, REVISED, REVERSED
RFG	ROOFING
RG	RETAINER GLAND
RH	ROOF HOOD, RIGHT HAND, ROUND HEAD, RED HEAD
RHMS	ROUND HEAD MACHINE SCREW
RHWS	ROUND HEAD WOOD SCREW
RM	ROOM
RO	ROUGH OPENING
RPM	REVOLUTIONS PER MINUTE
RR	RAILROAD
RS	RAW SLUDGE, RAW SEWAGE, ROLLED STEEL
RT	RIGHT
RW	RAW WATER
R/W	RIGHT OF WAY
S	SOUTH, SPEAKER
SAN	SANITARY
SAN SWR	SANITARY SEWER
SCHED	SCHEDULE
SD	STORM DRAIN, SOAP DISH
SE	SECONDARY EFFLUENT
SEC	SECOND
SECT	SECTION
SER SK	SERVICE SINK
SEW	SEWAGE
SG	SLIDE GATE, SUPPLY GRILLE
SHT	SHEET
SHR	SHOWER
SHD	SHOWER DOOR
SIM	SIMILAR
SKL	SKYLIGHT
SM	SHEET METAL
SP	SUMP PUMP
SPA	SPACING, SPACES
SPEC(S)	SPECIFICATION(S)
SPLY	SUPPLY
SQ	SQUARE
SR	SUPPLY REGISTER
SS	STAINLESS STEEL, SANITARY SEWER
SSFM	SANITARY SEWER FORCE MAIN
SSK	SERVICE SINK
ST	SELF TAPPING
STS	STORM SEWER
STA	STATION
STD	STANDARD
STL	STEEL
STM	STORM
STOR	STORAGE
STRUCT	STRUCTURAL
SUP	SUPPLY
SUSP	SUSPENDED
SV	SHUTOFF VALVE
SW	SWITCH
SWBD	SWITCHBOARD
SWGR	SWITCHGEAR
SWS	SEAL WATER SOLENOID
SYM	SYMMETRICAL
SYS	SYSTEM
T	THERMOSTAT, TREAD, TOTALIZER
T	TRANSFORMER, TELEPHONE, TOP
TAN	TANGENT
TB	TERMINAL BOX
T&B	TOP AND BOTTOM
TBE	THREAD BOTH ENDS
TBM	TEMPORARY BENCHMARK
TC	TOWEL CABINET, TOP OF CURB
TC	TERMINAL CABINET
TEL	TELESCOPING
TEMP	TEMPERATURE, TEMPORARY
TERM	TERMINAL
TFD	TRICKLING FILTER DRAIN
TFI	TRICKLING FILTER INFLUENT
TFS	THICKENED FERMENTED SLUDGE
T&G	TONGUE & GROOVE
TH	TEST HOLE
THK	THICK, THICKNESS
THR	THRESHOLD
TI	TOTALIZING INDICATOR, TEMPERATURE INDICATOR
TIR	TOTALIZING INDICATING RECORDER
TOC	TOP OF CONCRETE
TOF	TOP OF FOOTING
TOG	TOP OF GRADE
TOM	TOP OF MASONRY
TOS	TOP OF STEEL
TOW	TOP OF WALL
TP	TWISTED PAIR COUPLE, TOWEL PIN
T/P	TOP OF PIPE
T/W	TOP OF WATER
TRANS	TRANSFORMER, TRANSMITTER, TRANSFER
TS	TEMPERATURE SWITCH
TV	TELEVISION
TYP	TYPICAL
UDM	ULTRASONIC DENSITY METER
UGND	UNDERGROUND
UH	UNIT HEATER
UNO	UNLESS NOTED OTHERWISE
UR	URINAL
USGS	UNITED STATES GEOLOGICAL SURVEY
V	VALVE, VOLT, VENT
VAC	VACUUM
VAR	VARIES
VAT	VINYL ASBESTOS TILE
VBF	VALVE, AWWA BUTTERFLY
VBI	VALVE, INDASTRIAL BUTTERFLY
VBL	VALVE, BALL
VBM	VALVE, BALL MISCELLANEOUS
VC	VERTICAL CURVE, VICTAULIC COUPLING
VCD	VERTICAL CONTROL DAMPER
VCK	VALVE, CHECK
VCN	VALVE, CONE
VCP	VITRIFIED CLAY PIPE
VG	VALVE, GATE
VGD	VALVE, DOUBLE DISC GATE
VGL	VALVE, GLOBE
VERT	VERTICAL
VF	VACUUM FILTER
VIB	VIBRATION
VKG	VALVE, KNIFE GATE
VM	VOLT METER
VNR	VENEER
VPC	VALVE, PRESSURE REGULATING
VPG	VALVE, PLUG
VPL	VALVE, ECCENTRIC PLUG
VPR	VALVE, PRESSURE REDUCING
VSP	VALVE, PRESSURE RELIEF
VSPV	VALVE, PRESSURE/VACUUM RELIEF
VSV	VALVE, VACUUM RELIEF
VV	VENT VALVE
VVB	VACUUM BREAKER
W	WEST, WIDE, WINDOW, WATT,
WATER W/	WITH
W1	POTABLE WATER
W2	NON–POTABLE
W3	PLANT EFFLUENT WATER
WAS	WASTE ACTIVATED SLUDGE
WB	WALLBOARD
WC	WATER CLOSET
WD	WOOD, WIDTH
WF	WALL FITTING
WH	WALL HYDRANT
WL	WATER LEVEL
WM	WATER METER, WATTMETER
WO	WINDOW OPENING
W/O	WITHOUT
WOM	WOMEN
WP	WATERPROOF, WORKING POINT
WR	WASTE RECEPTACLE
WRF	WASTE RECLAMATION FACILITY
WS	WATERSTOP
WT	WEIGHT
WW	WETWELL
WWF	WELDED WIRE FABRIC
W3	RECYCLED PLANT EFFLUENT
x	BY,TIMES
YH	YARD HYDRANT
&	AND
@	AT
∠	DEFLECTION ANGLE
#	NUMBER
%	PER CENT

GENERAL NOTES:

1. ABBREVIATIONS ARE FOR REFERENCE ONLY AND NOT ALL ABBREVIATIONS ARE USED ON THE DRAWINGS.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961–1100

TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P–6182

STATE OF TEXAS — BOBBY FRANK LANE JR. — 126582 — LICENSED — PROFESSIONAL ENGINEER — 7/9/25

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION–DISINFECTION REDESIGN
AMENDMENT

GENERAL
ABBREVIATIONS

WBS NUMBER	R–00265–0147–4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	6 OF 173

FOR CITY OF HOUSTON USE ONLY

ACCEPTED — 80367

G–00–006

EXISTING PLAN VIEW

- WATER METER
- WATER VALVE (GATE)
- WATER VALVE (BUTTERFLY)
- FIRE HYDRANT/FLUSHING VALVE
- TAPPING SLEEVE & VALVE
- 8" — 6" REDUCER
- ROUND CONNECTION
- CO — SAN MH — SANITARY SEWER CLEANOUT & MANHOLE
- STM MH — STORM SEWER MANHOLE
- 'B' 'B-B' 'C' 'C-1' 'C-2' 'C-2A' 'GRATE' — STORM SEWER INLETS
- CULVERT PIPE AND HEADWALL
- TC=XX.XX — TOP OF CURB ELEVATION
- G=XX.XX — GUTTER ELEVATION
- TP=XX.XX — TOP OF PAVEMENT ELEVATION
- CONTOUR LINE
- ROW LINE
- PROPERTY LINE
- LOT LINES
- EASEMENT LINE
- CENTER LINE OF ROW
- TRANSIT LINE
- EDGE OF DITCHES
- CENTER LINE OF DITCHES
- EDGE OF DITCHES
- FENCE LINE, WOOD
- FENCE LINE, CHAIN LINK
- FENCE LINE, BARBED WIRE
- FENCE LINE, HOG WIRE
- EDGE OF CONCRETE
- CURB LINE
- CONCRETE WALK
- EDGE OF ASPHALT
- EDGE OF SHELL OR GRAVEL
- 28" 3-17 DIMENSION LINE
- P — P CENTERPOINT ENERGY AERIAL LINE
- CENTERPOINT ENERGY UNDERGROUND LINE
- GAS LINE
- MISC UNDERGROUND LINE
- (IDENTIFY CONDUIT) PIPELINE OR WESTERN UNION CONDUIT
- AT&T CONDUIT
- CABLE TV
- RAILROAD LINE
- 20" (AND SMALLER) WATER / 24" (LARGER THAN 20") WATER — WATER LINE
- 24" (AND SMALLER) SANITARY SEWER / 30" (LARGER THAN 24") SANITARY SEWER — SANITARY SEWER LINE
- 24" (AND SMALLER) STORM SEWER / 30" (LARGER THAN 24") STORM SEWER — STORM SEWER LINE
- SANITARY SEWER FORCE MAIN
- RWL — RWL RECLAIMED WATER LINE
- NPW — NPW NON-POTABLE WATER LINE
- GAS METER
- GAS VALVE
- A2 MISC UNDERGROUND PIPELINE LABLE

PROPOSED PLAN VIEW

- WM — WATER METER
- WV — WATER VALVE (GATE)
- BFWV — WATER VALVE (BUTTERFLY)
- FH / WV — FIRE HYDRANT/FLUSHING VALVE
- TS&V — TAPPING SLEEVE & VALVE
- 12" — 8" REDUCER
- ROUND CONNECTION
- CO — SAN MH — SANITARY SEWER CLEANOUT & MANHOLE
- STM MH — STORM SEWER MANHOLE
- 'B' 'B-B' 'C' 'C-1' 'C-2' 'C-2A' 'GRATE' — STORM SEWER INLETS
- CULVERT PIPE AND HEADWALL
- TC=XX.XX — TOP OF CURB ELEVATION
- G=XX.XX — GUTTER ELEVATION
- TP=XX.XX — TOP OF PAVEMENT ELEVATION
- CONTOUR LINE
- ROW LINE
- PROPERTY LINE
- LOT LINES
- EASEMENT LINE
- CENTER LINE OF ROW
- TRANSIT LINE
- EDGE OF DITCHES
- CENTER LINE OF DITCHES
- EDGE OF DITCHES
- FENCE LINE, WOOD
- FENCE LINE, CHAIN LINK
- FENCE LINE, BARBED WIRE
- FENCE LINE, HOG WIRE
- EDGE OF CONCRETE
- CURB LINE
- CONCRETE WALK
- EDGE OF ASPHALT
- EDGE OF SHELL OR GRAVEL
- 28" 3-17 DIMENSION LINE
- P — P CENTERPOINT ENERGY AERIAL LINE
- CENTERPOINT ENERGY UNDERGROUND LINE
- GAS LINE
- MISC UNDERGROUND LINE
- (IDENTIFY CONDUIT) PIPELINE OR WESTERN UNION CONDUIT
- AT&T CONDUIT
- CABLE TV
- MATCH LINE
- RAILROAD LINE
- 20" (AND SMALLER) WATER / 24" (LARGER THAN 20") WATER — WATER LINE
- 24" (AND SMALLER) SANITARY SEWER / 30" (LARGER THAN 24") SANITARY SEWER — SANITARY SEWER LINE
- 24" (AND SMALLER) STORM SEWER / 30" (LARGER THAN 24") STORM SEWER — STORM SEWER LINE
- SANITARY SEWER FORCE MAIN
- RWL — RWL RECLAIMED WATER LINE
- NPW — NPW NON-POTABLE WATER LINE
- GAS METER
- GAS VALVE
- A2 MISC UNDERGROUND PIPELINE LABLE

EXISTING PLAN VIEW

- PAVING HEADER
- PRES. 1-STORY RES. BLDG. — BUILDING, RESIDENTIAL
- COMM. 1-STORY RES. BLDG. — BUILDING, COMMERCIAL
- TREE
- HEDGE
- 3/4" IP — IRON PIPE OR IRON ROD MONUMENT
- POINT OF INTERSECTION (PI)
- POINT OF CURVE (PC) / POINT OF TANGENCY (PT)
- P — P POWER POLE
- P — P POWER POLE W/DOWN GUY

PROPOSED PLAN VIEW

- PAVING HEADER
- PRES. 1-STORY RES. BLDG. — BUILDING, RESIDENTIAL
- COMM. 1-STORY RES. BLDG. — BUILDING, COMMERCIAL
- TREE
- HEDGE
- 3/4" IP — IRON PIPE OR IRON ROD MONUMENT
- POINT OF INTERSECTION (PI)
- POINT OF CURVE (PC) / POINT OF TANGENCY (PT)
- P — P POWER POLE
- P — P POWER POLE W/DOWN GUY

EXISTING PROFILE VIEW

- NORTH OR EAST PROPERTY LINE
- SOUTH OR WEST PROPERTY LINE
- NORTH OR EAST CURB
- SOUTH OR WEST CURB
- NORTH OR EAST DITCH
- SOUTH OR WEST DITCH
- NORTH OR EAST NATURAL GROUND
- SOUTH OR WEST NATURAL GROUND
- CULVERT — NORTH OR EAST CULVERT
- CULVERT — SOUTH OR WEST CULVERT
- CENTERLINE OF ROW
- CENTERPOINT ENERGY CONDUIT
- GAS LINE — GASLINE
- WESTERN UNION
- AT&T CONDUIT
- 20" (AND SMALLER) WATER LINE / 24" (LARGER THAN 20") WATER — WATER LINE
- 24" (AND SMALLER) SANITARY SEWER / 30" (LARGER THAN 24") SANITARY SEWER — SANITARY SEWER LINE
- 24" (AND SMALLER) STORM SEWER / 30" (LARGER THAN 24") STORM SEWER — STORM SEWER LINE
- SANITARY SEWER FORCE MAIN
- RWL — RWL RECLAIMED WATER LINE
- NPW — NPW NON-POTABLE WATER LINE
- CENTERPOINT ENERGY MANHOLE
- AT&T MANHOLE
- WATER LINE MANHOLE
- SANITARY SEWER MANHOLE & CLEANOUT
- STORM SEWER MANHOLE
- STORM SEWER INLET

PROPOSED PROFILE VIEW

- NORTH OR EAST PROPERTY LINE
- SOUTH OR WEST PROPERTY LINE
- NORTH OR EAST CURB
- SOUTH OR WEST CURB
- NORTH OR EAST DITCH
- SOUTH OR WEST DITCH
- NORTH OR EAST NATURAL GROUND
- SOUTH OR WEST NATURAL GROUND
- CULVERT — NORTH OR EAST CULVERT
- CULVERT — SOUTH OR WEST CULVERT
- CENTERLINE OF ROW
- CENTERPOINT ENERGY CONDUIT
- GAS LINE
- WESTERN UNION
- AT&T CONDUIT
- 20" (AND SMALLER) WATER LINE / 24" (LARGER THAN 20") WATER — WATER LINE
- 24" (AND SMALLER) SANITARY SEWER / 30" (LARGER THAN 24") SANITARY SEWER — SANITARY SEWER LINE
- 24" (AND SMALLER) STORM SEWER / 30" (LARGER THAN 24") STORM SEWER — STORM SEWER LINE
- SANITARY SEWER FORCE MAIN
- RWL — RWL RECLAIMED WATER LINE
- NPW — NPW NON-POTABLE WATER LINE
- CENTERPOINT ENERGY MANHOLE
- AT&T MANHOLE
- WATER LINE MANHOLE
- SANITARY SEWER MANHOLE & CLEANOUT
- STORM SEWER MANHOLE
- STORM SEWER INLET

GUNDA CORPORATION

C:\Users\ctron\DC\ACCDocs\Arduro, Inc\20010-02\Project Files\03-Prod\03-Dwgs\SHEETS\001 GENERAL.dwg Jul 01, 2025-3:19pm ctron

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS — DAVID R. CASTELLANO — 97308 — LICENSED PROFESSIONAL ENGINEER

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT

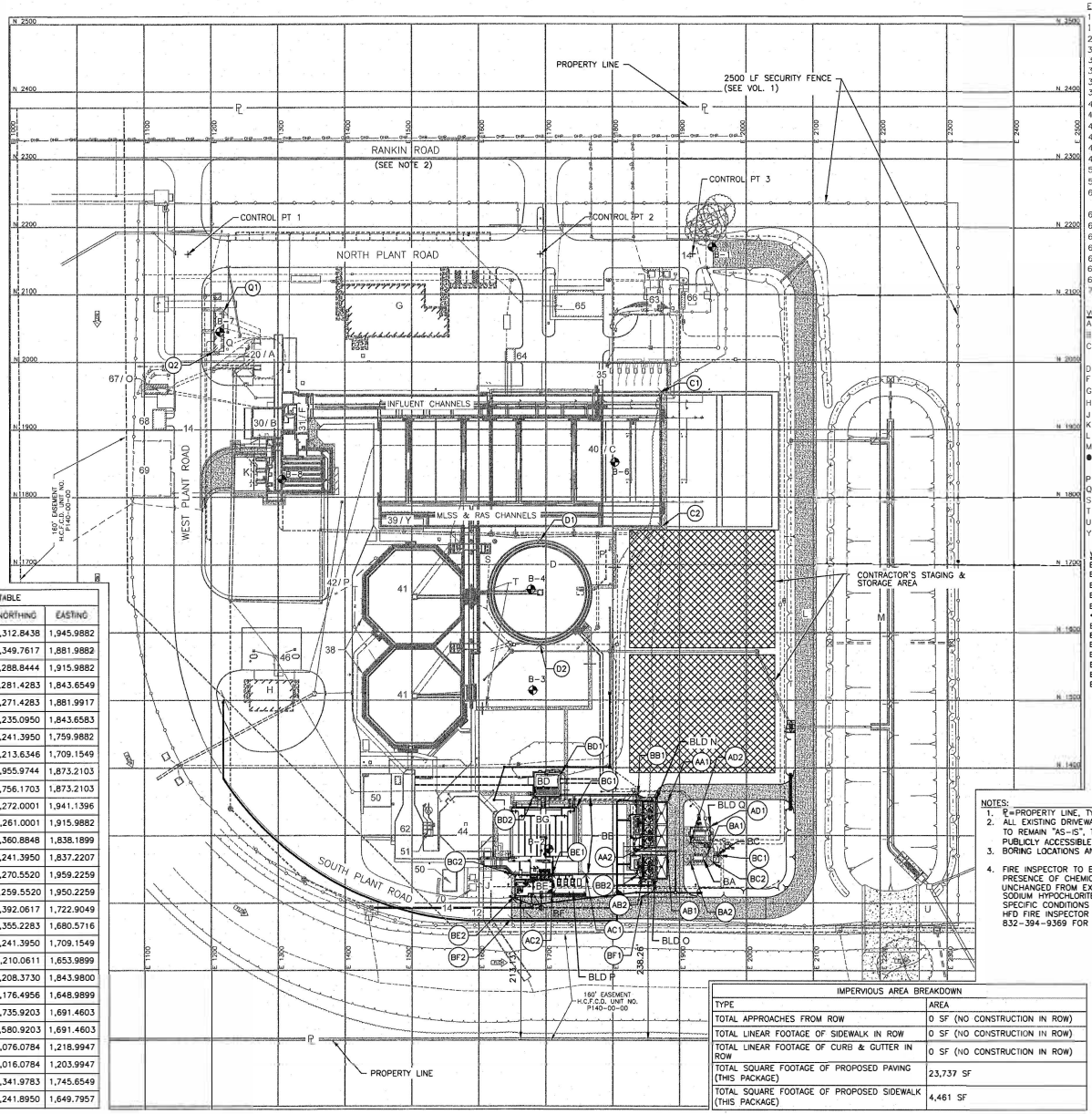
GENERAL CIVIL LEGEND AND ABBREVIATIONS

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	N/A
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO. 07 OF 173	

FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS — SHAHIDUR RAHMAN — 89367 — LICENSED PROFESSIONAL ENGINEER

G-00-008



EXISTING PLANT FACILITIES

12 HCFCD OUTFALL
14 ACCESS ROAD
20 INFLUENT LIFT STATION
30 HEADWORKS FACILITY
31 GRIT FACILITY
35 BLOWER FACILITY
38 CLARIFIER WALKWAY
39 MLSS CHANNEL
40 AERATION/DIGESTION BASINS
41 CLARIFIERS
42 SCUM FACILITIES
44 CHLORINE CONTACT BASIN
45 RAS FACILITY
46 WAS FACILITY
50 CHEMICAL FEED FACILITIES
51 NPW (NON POTABLE WATER) SYSTEM
62 FLOW MEASURING, ANALYZER, PUMP, PLC BUILDING
63 BLOWER ELECTRICAL BUILDING
64 SHOP BUILDING
65 OPERATIONS BUILDING
66 ELECTRICAL SUB-STATION
67 LIFT STATION ELECTRICAL BUILDING NO 1
68 STORAGE BUILDING NO 1
69 STORAGE BUILDING NO 2
70 SODIUM BISULFITE PROCESS

VOL 1 (PREVIOUS PACKAGE) IMPROVEMENTS*

A LIFT STATION IMPROVEMENTS
B HEADWORKS IMPROVEMENTS
C AERATION/DIGESTION BASIN PIPING & DIFFUSER IMPROVEMENTS
D CLARIFIER NO 3
F GRIT BASIN IMPROVEMENTS
G ADMINISTRATION BUILDING (BY OTHERS)
H DE-WATERING FACILITY (BY OTHERS)
J FLOW MEASURING IMPROVEMENTS
K GRIT DEWATERING FACILITY
L ACCESS ROAD EXTENSION
M DETENTION POND
● IMPROVEMENTS TO EXISTING LIFT STATION ELECTRICAL BUILDING
P SCUM PUMP FACILITY IMPROVEMENTS
Q LIFT STATION ELECTRICAL BUILDING
S RAS FACILITY IMPROVEMENTS
T WALKWAY FOR CLARIFIER
U DETENTION POND OUTFALL TO HCFCD DITCH
Y MLSS CHANNEL IMPROVEMENTS

VOL 2 (THIS PACKAGE) IMPROVEMENTS

BUILDING DESIGNATIONS
BLD N SODIUM HYPOCHLORITE CHEMICAL FEED BLDG* (AA)
BLD O SODIUM BISULFITE CHEMICAL FEED BLDG* (AB)
BLD P BLOWER CANOPY* (AC)
BLD Q CHLORINE CONTACT BASIN ELECTRICAL BUILDING* (AD)
* CONTRACTOR DELEGATED DESIGN AND PERMITTING:
BA GENERATOR
BB CHEMICAL FEED TRENCHES
BC TRANSFORMER
BD SANITARY JUNCTION STRUCTURE
BE NPW (NON POTABLE WATER) SYSTEM
BF ACCESS ROAD EXTENSION REGRADING
BG CHLORINE CONTACT BASIN

NOTES:
1. ℄=PROPERTY LINE, TYPICAL.
2. ALL EXISTING DRIVEWAY APPROACHES OFF OF RANKIN ROAD ARE TO REMAIN "AS-IS", THERE IS NO PROPOSED WORK WITHIN THE PUBLICLY ACCESSIBLE RANKIN ROAD, (OR RIGHT-OF-WAY).
3. BORING LOCATIONS AND CONTROL POINTS ARE APPROXIMATE.
4. FIRE INSPECTOR TO BE CONTRACTED BY THE CONTRACTOR FOR PRESENCE OF CHEMICALS ON SITE. EMERGENCY ACCESS IS UNCHANGED FROM EXISTING. CHEMICALS INCLUDE CHLORINE, SODIUM HYPOCHLORITE, AND SODIUM BISULFITE. GATES REQUIRE SPECIFIC CONDITIONS FOR EMERGENCY VEHICLE ACCESS. CONTACT HFD FIRE INSPECTOR EVA JENKINS, EVA.JENKINS@HOUSTONTX.GOV, 832-394-9369 FOR SPECIFIC REQUIREMENTS.

NOTE:
THIS PROJECT LIES WITHIN ZONE-X (UNSHADED) PER FEMA FIRM PANEL NO. 48201C0480M EFFECTIVE DATE IS JUNE 09, 2014
100 YEAR BASE FLOOD ELEVATION:
@ RANKIN RD=77.0 FEET
@ SOUTHEAST CORNER=75.6 FEET

NOTICE:
FOR YOUR SAFETY, YOU ARE REQUIRED BY TEXAS LAW TO CALL 811 AT LEAST 48 HOURS BEFORE YOU DIG SO THAT UNDERGROUND LINES CAN BE MARKED. THIS SIGNATURE DOES NOT FULFILL YOUR OBLIGATION TO CALL 811

VERIFICATION OF PRIVATE UTILITY LINES

Date

CenterPoint Energy natural gas utilities shown. (Gas service lines are not shown). This signature not be used for conflict verification.

Signature valid for six months.

Date

CenterPoint Energy/ UNDERGROUNDElectrical Facilities Verification ONLY. (This signature verifies existing underground facilities - not to be used for conflict verification)

Signature valid for six months.

Date

Approved for AT&T underground conduit facilities only.
Signature valid for one year.

POINT TABLE			
POINT #	DESCRIPTION	NORTHING	EASTING
9	AD1	1,312.8438	1,945.9882
1	AA1	1,349.7617	1,881.9882
10	AD2	1,288.8444	1,915.9882
2	AA2	1,281.4283	1,843.6549
3	AB1	1,271.4283	1,881.9917
4	AB2	1,235.0950	1,843.6583
7	AC1	1,241.3950	1,759.9882
8	AC2	1,213.6346	1,709.1549
11	C1	1,955.9744	1,873.2103
12	C2	1,756.1703	1,873.2103
13	BA1	1,272.0001	1,941.1396
14	BA2	1,261.0001	1,915.9882
15	BB1	1,360.8848	1,838.1899
16	BB2	1,241.3950	1,837.2207
17	BC1	1,270.5520	1,959.2259
18	BC2	1,259.5520	1,950.2259
19	BD1	1,392.0617	1,722.9049
20	BD2	1,355.2283	1,680.5716
21	BE1	1,241.3950	1,709.1549
22	BE2	1,210.0611	1,653.9899
23	BF1	1,208.3730	1,843.9800
24	BF2	1,176.4956	1,648.9899
25	D1	1,735.9203	1,691.4603
26	D2	1,580.9203	1,691.4603
27	Q1	2,076.0784	1,218.9947
28	Q2	2,016.0784	1,203.9947
5	BG1	1,341.9783	1,745.6549
6	BG2	1,241.8950	1,649.7957

SEE PLANT GRID CONTROL POINTS TO THE RIGHT THIS SHEET

IMPERVIOUS AREA BREAKDOWN	
TYPE	AREA
TOTAL APPROACHES FROM ROW	0 SF (NO CONSTRUCTION IN ROW)
TOTAL LINEAR FOOTAGE OF SIDEWALK IN ROW	0 SF (NO CONSTRUCTION IN ROW)
TOTAL LINEAR FOOTAGE OF CURB & GUTTER IN ROW	0 SF (NO CONSTRUCTION IN ROW)
TOTAL SQUARE FOOTAGE OF PROPOSED PAVING (THIS PACKAGE)	23,737 SF
TOTAL SQUARE FOOTAGE OF PROPOSED SIDEWALK (THIS PACKAGE)	4,461 SF

LANDTECH PLANT GRID CONTROL POINTS

CONTROL POINT 1
CONCRETE NAIL IN PAVEMENT
N=2,159.61
E=1,165.56

CONTROL POINT 2
MAG NAIL IN PAVEMENT
N=2,159.09
E=1,692.00

CONTROL POINT 3
CONCRETE NAIL IN PAVEMENT
N=2,159.86
E=1,919.81

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED
PROFESSIONAL ENGINEER

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION-DISINFECTION REDESIGN AMENDMENT

PROPOSED SITE PLAN

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	1"=80'
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.

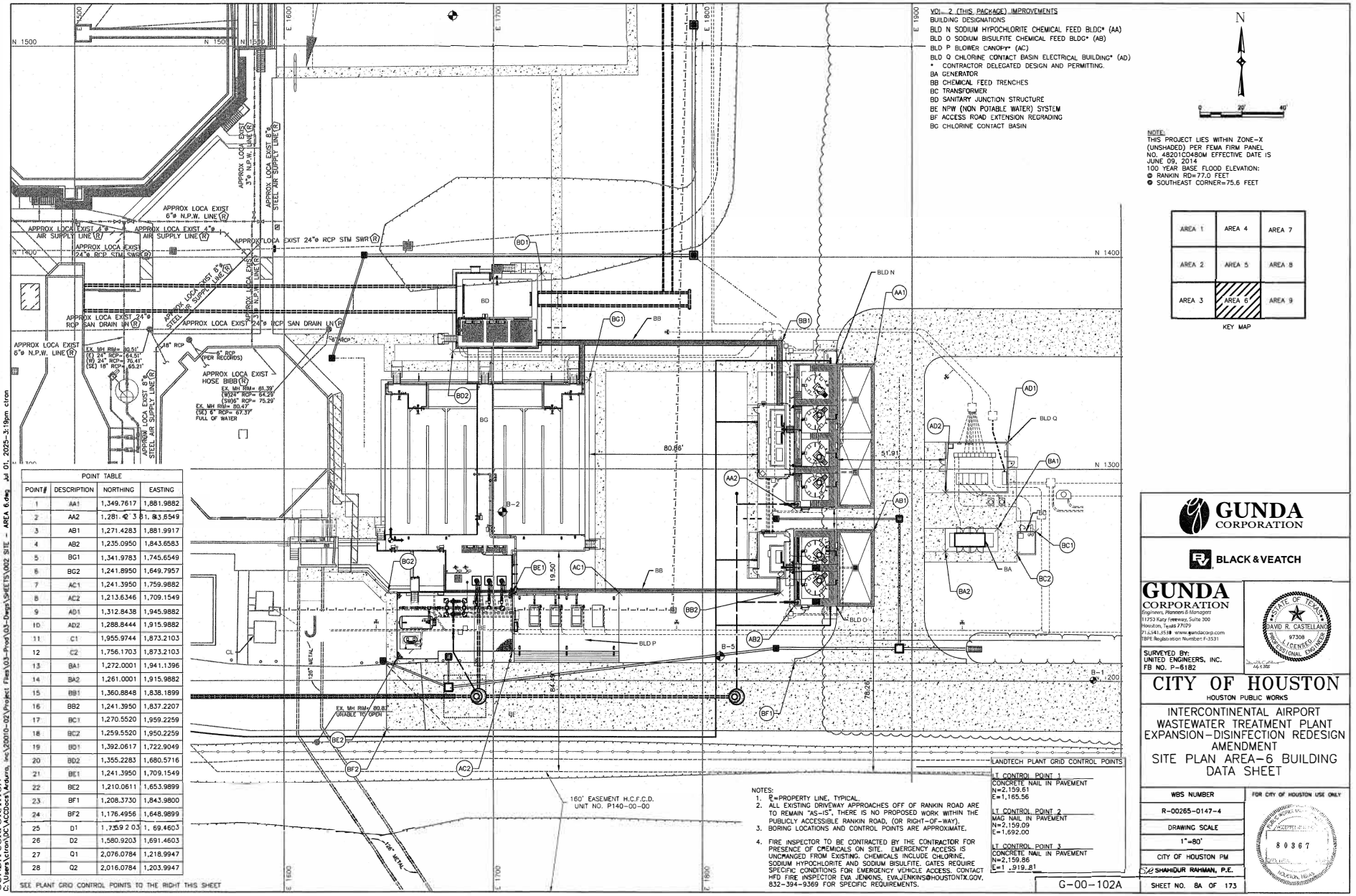
FOR CITY OF HOUSTON USE ONLY

89367
CITY OF HOUSTON
REGISTERED ENGINEER

G-00-102

SHEET NO. 08 OF 173

GUNDA CORPORATION
C:\Users\ctron\DC\ACCDocs\Arcurra, Inc\20010-02\Project Files\03-Prod\03-Dwgs\SHEETS\002 SITE - with GUNDA BASE.dwg Jul 01, 2023 - 3:19pm ctron



POINT TABLE			
POINT #	DESCRIPTION	NORTHING	EASTING
1	AA1	1,349.7617	1,881.9882
2	AA2	1,281.4273	1,883.6549
3	AB1	1,271.4283	1,881.9917
4	AB2	1,235.0950	1,843.6583
5	BG1	1,341.9783	1,745.6549
6	BG2	1,241.8950	1,649.7957
7	AC1	1,241.3950	1,759.9882
8	AC2	1,213.6346	1,709.1549
9	AD1	1,312.8438	1,945.9882
10	AD2	1,288.8444	1,915.9882
11	C1	1,955.9744	1,873.2103
12	C2	1,756.1703	1,873.2103
13	BA1	1,272.0001	1,941.1396
14	BA2	1,261.0001	1,915.9882
15	BB1	1,360.8848	1,838.1899
16	BB2	1,241.3950	1,837.2207
17	BC1	1,270.5520	1,959.2259
18	BC2	1,259.5520	1,950.2259
19	BD1	1,392.0617	1,722.9049
20	BD2	1,355.2283	1,680.5716
21	BE1	1,241.3950	1,709.1549
22	BE2	1,210.0611	1,653.9899
23	BF1	1,208.3730	1,843.9800
24	BF2	1,176.4956	1,648.9899
25	D1	1,735.9203	1, 69.4603
26	D2	1,580.9203	1,691.4603
27	Q1	2,076.0784	1,218.9947
28	Q2	2,016.0784	1,203.9947

SEE PLANT GRID CONTROL POINTS TO THE RIGHT THIS SHEET

NOTES:
1. R=PROPERTY LINE, TYPICAL.
2. ALL EXISTING DRIVEWAY APPROACHES OFF OF RANKIN ROAD ARE TO REMAIN "AS-IS", THERE IS NO PROPOSED WORK WITHIN THE PUBLICLY ACCESSIBLE RANKIN ROAD, (OR RIGHT-OF-WAY).
3. BORING LOCATIONS AND CONTROL POINTS ARE APPROXIMATE.
4. FIRE INSPECTOR TO BE CONTRACTED BY THE CONTRACTOR FOR PRESENCE OF CHEMICALS ON SITE. EMERGENCY ACCESS IS UNCHANGED FROM EXISTING. CHEMICALS INCLUDE CHLORINE, SODIUM HYPOCHLORITE AND SODIUM BISULFITE. GATES REQUIRE SPECIFIC CONDITIONS FOR EMERGENCY VEHICLE ACCESS. CONTACT HFD FIRE INSPECTOR EVA JENKINS, EVA.JENKINS@HOUSTONTX.GOV, 832-394-9369 FOR SPECIFIC REQUIREMENTS.

LANDTECH PLANT GRID CONTROL POINTS

LT CONTROL POINT 1
CONCRETE NAIL IN PAVEMENT
N=2,159.61
E=1,165.56

LT CONTROL POINT 2
MAG NAIL IN PAVEMENT
N=2,159.09
E=1,692.00

LT CONTROL POINT 3
CONCRETE NAIL IN PAVEMENT
N=2,159.86
E=1 ,919.81

G-00-102A

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.1518 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED PROFESSIONAL ENGINEER

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

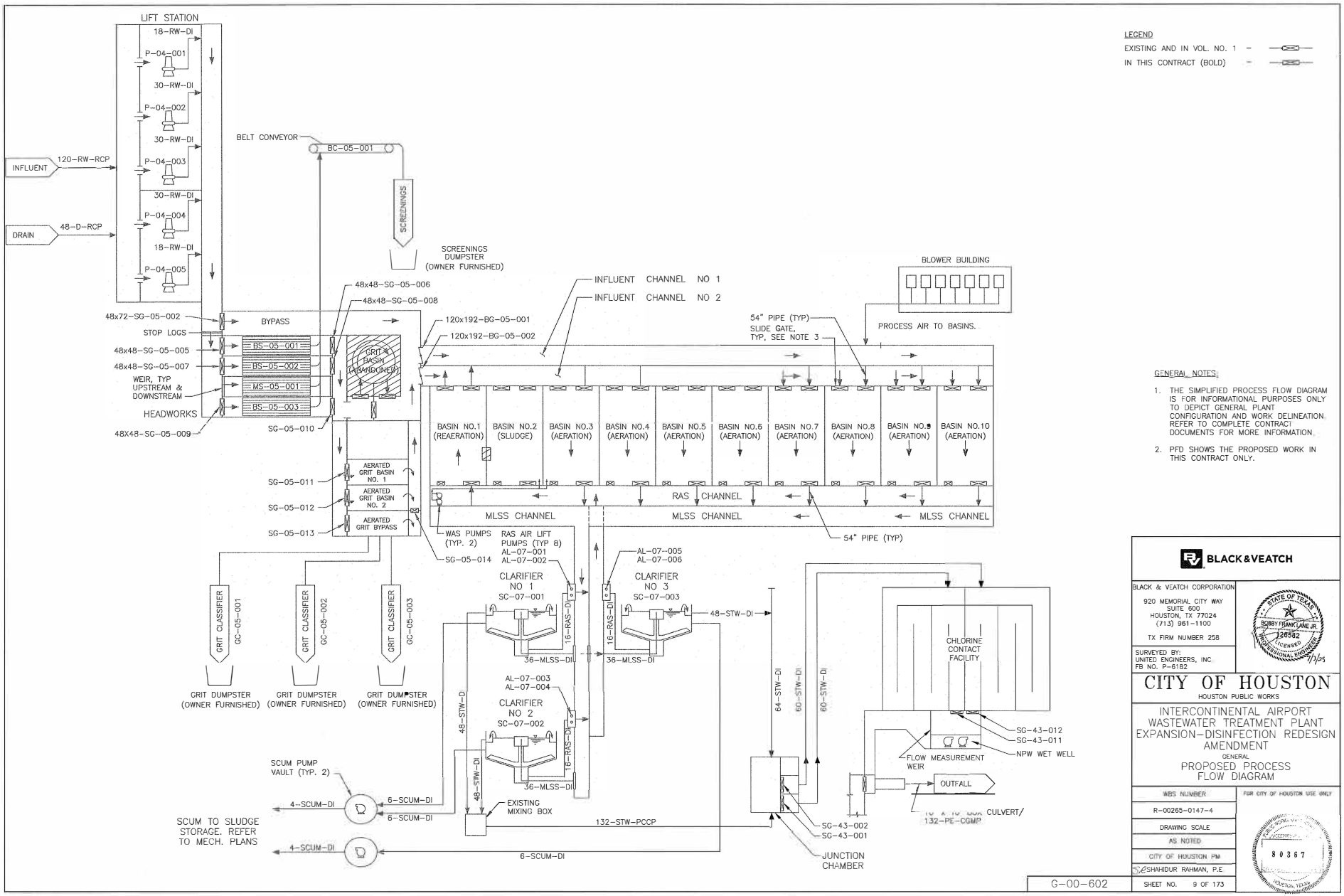
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION-DISINFECTION REDESIGN AMENDMENT
SITE PLAN AREA-6 BUILDING DATA SHEET

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
1"=80'	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 8A OF 173	

PUBLIC WORKS
ACCEPTED
80367
REVIEWED

GUNDA CORPORATION
C:\Users\ctron\DCXCDocs\Arduino, Inc\20010-02\Project Files\03-Prod\03-Dwgs\SHEETS\002 SITE - AREA 6.dwg Jul 01, 2025-3:19pm ctron



LEGEND

EXISTING AND IN VOL. NO. 1 –

IN THIS CONTRACT (BOLD) –

GENERAL NOTES:

1. THE SIMPLIFIED PROCESS FLOW DIAGRAM IS FOR INFORMATIONAL PURPOSES ONLY TO DEPICT GENERAL PLANT CONFIGURATION AND WORK DELINEATION. REFER TO COMPLETE CONTRACT DOCUMENTS FOR MORE INFORMATION.
2. PFD SHOWS THE PROPOSED WORK IN THIS CONTRACT ONLY.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
BOBBY FRANK LANE JR.
126582
LICENSED PROFESSIONAL ENGINEER
7/5/05

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION–DISINFECTION REDESIGN
AMENDMENT

GENERAL
PROPOSED PROCESS
FLOW DIAGRAM

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 9 OF 173	

80367
REGISTERED
ENGINEER
HOUSTON, TEXAS

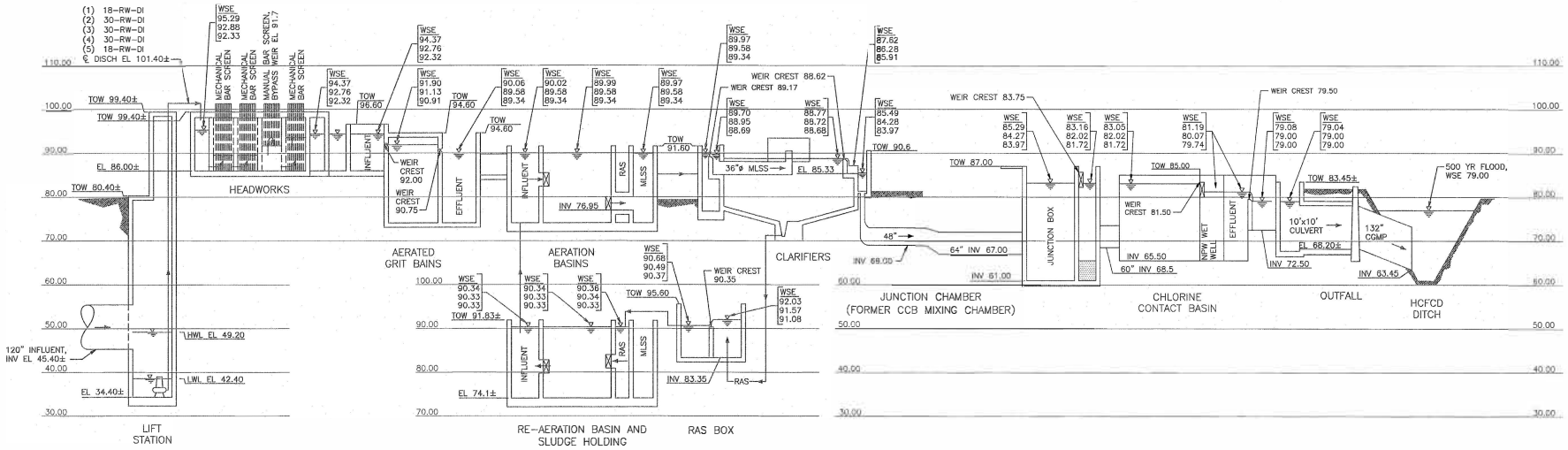
G-00-602

NOTES:

1. PERMITTED ELEVATIONS SHOWN ARE FOR EXPANDED PLANT PERMIT CAPACITY.
2. HISTORICAL AVERAGE FLOW CONDITION WSE THROUGH THE EXPANDED PLANT SHOWN IS PROVIDED FOR REFERENCE ONLY.
3. WSE ELEVATIONS SHOWN ARE BASED ON FLOW CONDITION ASSUMPTIONS SHOWN IN TABLE.
4. NUMBER OF UNITS IN OPERATION SHOWN IN TABLE ARE BASED ON PROCESS AND OPERATION REQUIREMENTS AND PREFERENCES AND ARE NOT HYDRAULICALLY BASED. THESE UNITS ARE NOT HYDRAULICALLY LIMITING PROCESS UNITS IN THIS SCENARIO.
5. HYDRAULIC PROFILE SHOWS THE PROPOSED WORK IN THIS CONTRACT ONLY.

LEGEND:

WSE
XX.XX PHASE I – 2-HOUR PEAK PERMITTED FLOW (55.0 MGD)
XX.XX PHASE I – AVERAGE DAILY PERMITTED FLOW (11.0 MGD)
XX.XX HISTORICAL AVERAGE DAILY FLOW (3.0 MGD)



HYDRAULIC PROFILE
NO SCALE

FACILITY (PROCESS UNIT TOTAL QTY)	AVERAGE DAILY HISTORICAL – 3 MGD		PERMITTED AVERAGE DAILY FLOW – 11 MGD		PERMITTED 2-HR PEAK FLOW – 55 MGD	
	UNITS IN OPERATION	CAPACITY	UNITS IN OPERATION	CAPACITY	UNITS IN OPERATION	CAPACITY
INFLUENT LIFT STATION PUMPS (QTY: 2 SMALL, 3 LARGE)	1 SMALL	7 MGD	2 SMALL	14 MGD	2 SMALL & 2 LARGE	55 MGD
MECHANICAL BAR SCREENS (QTY: 3)	1	18.3 MGD	2	36.6 MGD	3	55 MGD
AERATED GRIT BASINS (QTY: 2)	1	27.5 MGD	1	27.5 MGD	2	55 MGD
INFLUENT CHANNELS (QTY: 2)	1	27.5 MGD	1	27.5 MGD	2	55 MGD
REAERATION BASIN (QTY: 1) – SEE NOTE 4	1	NA	1	NA	1	NA
AERATION BASINS (QTY: 8) – SEE NOTE 4	2	NA	2	NA	8	NA
BLOWERS (QTY: 7) – SEE NOTE 4	3	17,435 SFCM MIN REQUIRED	3	19,875 SFCM MIN REQUIRED	6	42,110 SFCM MIN REQUIRED
SECONDARY CLARIFIERS (QTY: 3)	2	36.6 MGD	2	36.6 MGD	3	55 MGD
CHLORINE CONTACT BASIN (QTY: 1 – SPLIT EQUALLY INTO 2)	1	27.5 MGD	1	27.5 MGD	2	55 MGD
SLUDGE HOLDING BASIN (QTY: 1) – SEE NOTE 4	1	4 DAYS OF STORAGE	1	4 DAYS OF STORAGE	1	4 DAYS OF STORAGE
RAS AIRLIFTS (QTY: 6; 2 PER CLARIFIER)	4	100% OF ADF	4	100% OF ADF (11 MDG)	6	100% OF ADF (11 MDG)

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
BOBBY FRANK LANE JR.
125582
LICENSED
PROFESSIONAL ENGINEER
7/1/05

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION–DISINFECTION REDESIGN
AMENDMENT

GENERAL

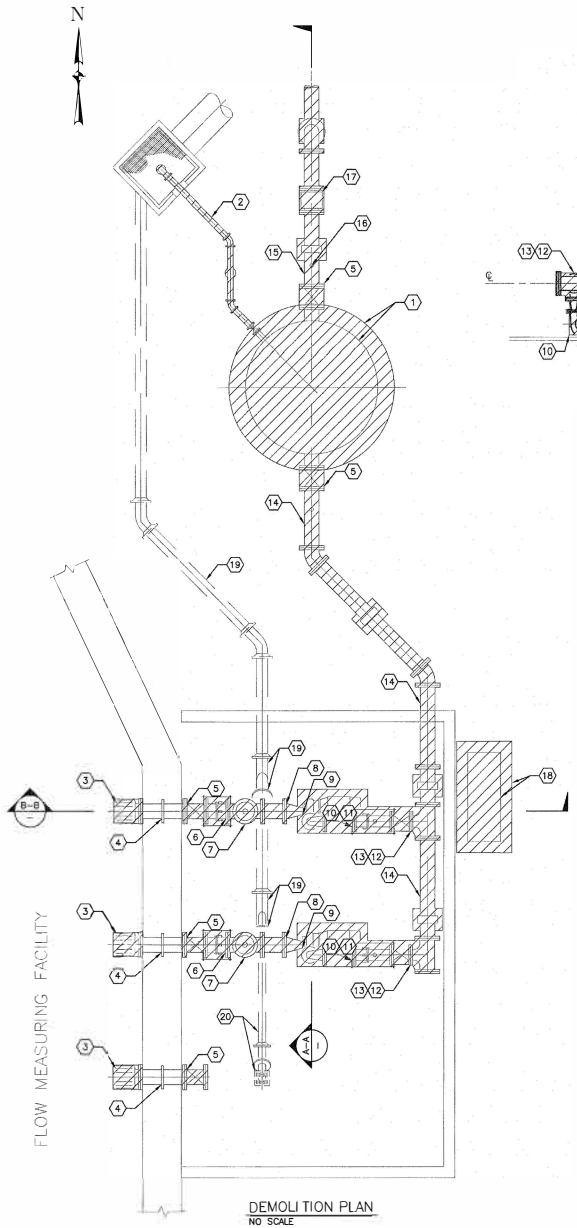
PROPOSED HYDRAULIC PROFILE

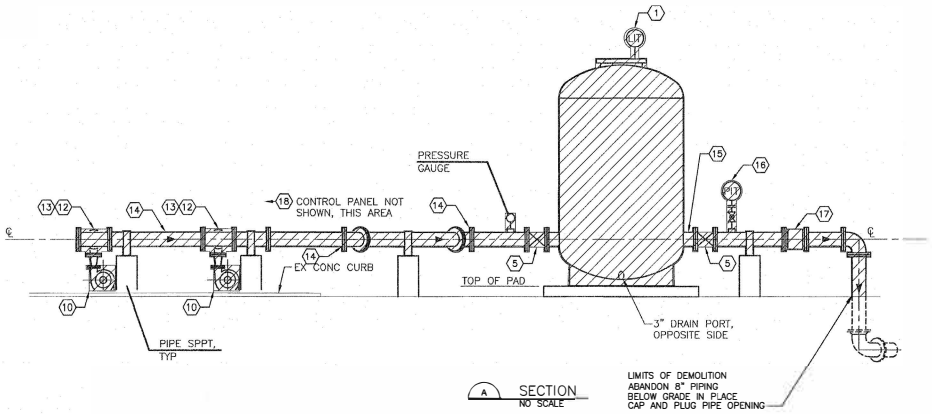
WBS NUMBER	R-00285-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	10 OF 173

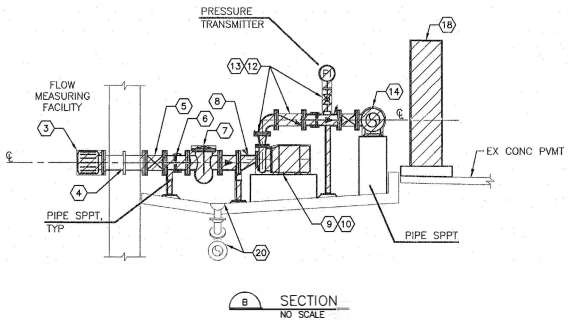
FOR CITY OF HOUSTON USE ONLY

80367
REGISTERED
PROFESSIONAL
ENGINEER
HOUSTON, TEXAS

G-00-604







LEGEND:

ITEMS TO BE DEMOLISHED

NOTES BY SYMBOL

1. DEMO HTP-12-001, 1,986 GAL HYDRO-PNEUMATIC TANK AND APPURTENANCES.
2. DEMO 3" TANK DRAIN LINE & APPURTENANCES.
3. DEMO 8" SUCTION STRAINER.
4. PROVIDE BLIND FLANGES AT ENDS OF FLANGED WALL PIPE AFTER APPURTENANCES ARE REMOVED.
5. DEMO 8" GATE VALVE.
6. DEMO 8" FLANGED COUPLING ADAPTER.
7. DEMO 8" BASKET STRAINER.
8. DEMO 8"x4" ECCENTRIC REDUCER.
9. DEMO 4" PUMP SUCTION AND APPURTENANCES.
10. DEMO NPW PUMP.
11. DEMO NPW PUMP BASE.
12. DEMO 3" & 4" PUMP DISCHARGE APPURTENANCES & SUPPORTS.
13. DEMO 6" DISCHARGE PIPING AND APPURTENANCES.
14. DEMO 8" DISCHARGE HEADER, APPURTENANCES & SUPPORT TO TANK INLET FLANGE.
15. DEMO 8" TANK OUTLET LINE.
16. DEMO 8" PRESSURE INDICATING TRANSMITTER.
17. DEMO 8" FLOW INDICATING TRANSMITTER.
18. DEMO PUMP CONTROL PANEL AND EQUIPMENT PAD.
19. EXIST. 6" DRAIN LINE & DRAINS TO REMAIN, PROTECT IN PLACE.
20. EXIST. 4" DRAIN LINE & DRAINS TO REMAIN, PROTECT IN PLACE.

SHEET NOTES:

1. EXISTING STRUCTURES, EQUIPMENT, ELEVATIONS, AND DETAILS SHOWN ARE NOT GUARANTEED TO BE ACCURATE AND ALL INCLUSIVE. EXISTING INFORMATION SHOWN IS APPROXIMATE, BASED ON AVAILABLE RECORD DRAWINGS, AND SHOULD BE VERIFIED BY CONTRACTOR PRIOR TO START OF CONSTRUCTION.
2. CONTRACTOR SHALL VERIFY EXACT LOCATIONS, ROUTING, AND DEPTH OF ALL ON-SITE EXISTING UTILITIES BEFORE COMMENCEMENT OF CONSTRUCTION ACTIVITIES. NOTIFY CONSTRUCTION MANAGER IF SIGNIFICANT DISCREPANCIES ARE DISCOVERED FROM ITEMS SHOWN IN DRAWINGS.
3. CONTRACTOR SHALL CERTIFY THAT EQUIPMENT DESIGNATED FOR DEMOLITION I S SAFELY DISCONNECTED AND LOCKED OUT OF ALL SERVICES AND UTILITIES PRIOR TO COMMENCING THAT WORK.
4. EXISTING EQUIPMENT MAY BE MISSING, NOT SHOWN, OR NOT FUNCTIONAL AT THE TIME OF CONSTRUCTION. CONTRACTOR SHALL VERIFY FIELD CONDITIONS AT THE START OF CONSTRUCTION AND IMMEDIATELY NOTIFY THE OWNER OF ANY VARIATIONS THAT AFFECT THE PROPOSED WORK.
5. CONTRACTOR TO COORDINATE DEMOLITION OF EXISTING NPW SYSTEM WITH THE PLANT OPERATOR PRIOR TO TAKING OFF LINE. REFER TO SPECIFICATION 01110 - SUMMARY OF WORK FOR CONSTRUCTION SEQUENCING.
6. CONTRACTOR IS RESPONSIBLE FOR PROVIDING SAFE WORKING CONDITION FOR EMPLOYEES DURING DEMOLITION AND REMOVAL WORK.
7. CONTRACTOR SHALL MAINTAIN SAFE ACCESS TO ADJACENT BUILDINGS, DO NOT OBSTRUCT ROADWAYS, SIDEWAYS, OR PASSAGEWAYS ADJACENT TO THE WORK.
8. CONTRACTOR SHALL PERFORM DEMOLITION WORK IN A MANNER TO PREVENT DAMAGE TO ADJACENT FACILITIES. ANY CONCRETE EXPOSED OR DAMAGED A S A RESULT OF DEMOLITION ACTIVITIES SHALL BE REPAIRED AS PART OF THE BASE BID SCOPE.
9. REMOVAL OF PIPING, WI RI NGCONDUITS, DUCTWORK, AND OTHER MISCELLANEOUS ITEMS RELATED TO DEMOLITION OF PUMPS SHALL BE INCIDENTAL TO THE DEMOLITION WORK UNLESS OTHERWISE SPECIFIED IN DRAWINGS AND CONTRACT DOCUMENTS.
10. DO NOT BACKFILL WITH MATERIAL FROM DEMOLITION UNLESS APPROVED BY OWNER.

D-51-101

5engineering

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

STATE OF TEXAS — PEDRO MATTIONI — 104895 — LICENSED PROFESSIONAL ENGINEER

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

07/02/2025

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION-DISINFECTION REDESIGN AMENDMENT

DEMOLITION

EXISTING NPW SYSTEM DEMOLITION (MECHANICAL)

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	11 OF 173

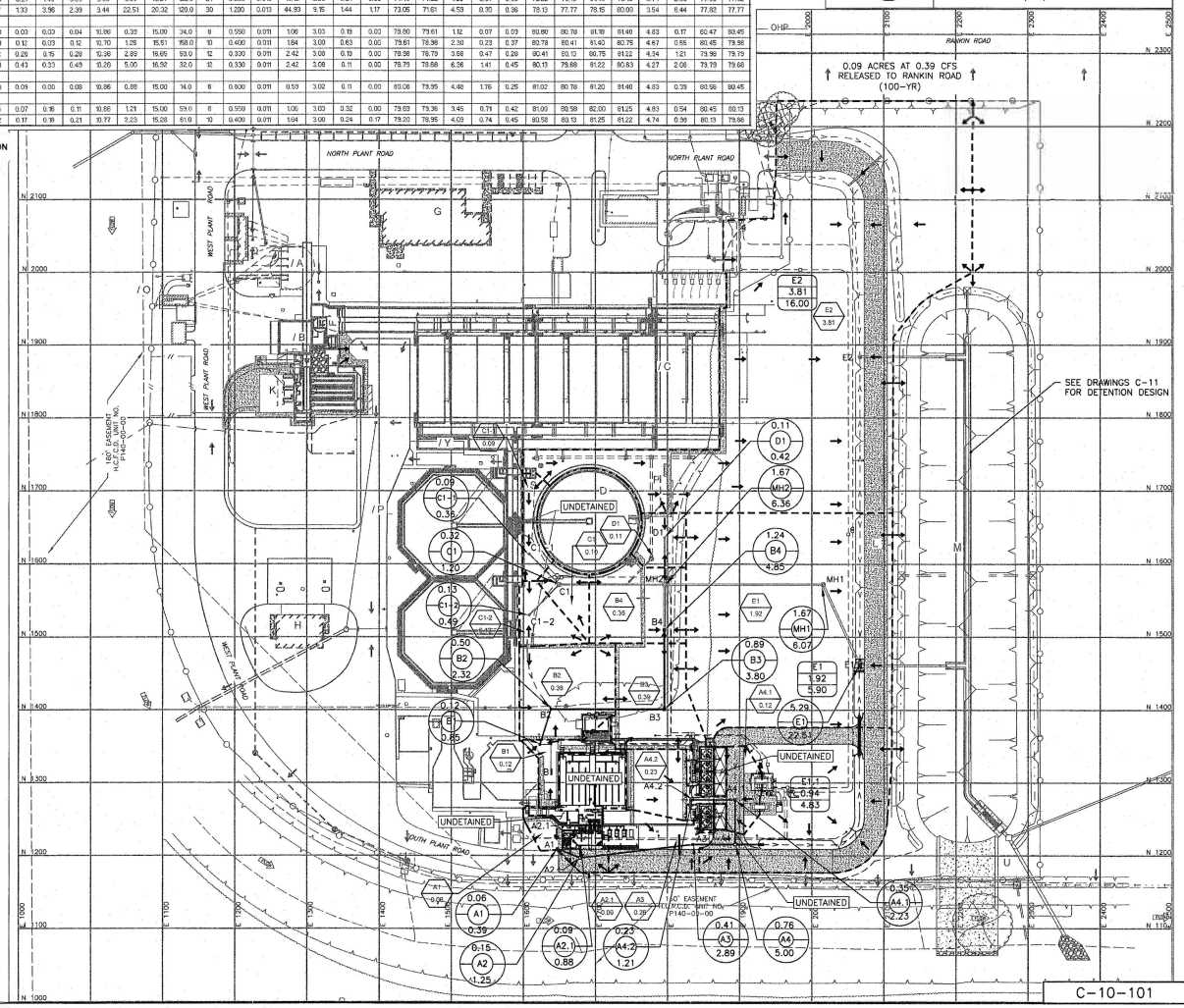
FOR CITY OF HOUSTON USE ONLY

ACCEPTED — 80367 — CITY OF HOUSTON, TEXAS

FILE PATH: P:\00062\001 IAH WWTP\04 Cadd-GIS\02 SHEETS\51 - NPW SYSTEM\D-51-102 EXISTING NPW SYSTEM - DEMOLITION (MECHANICAL).dwg

LINE "A"		100 YEAR STORM CALCULATIONS (CITY OF HOUSTON E&D CONSTANTS)																								2 YEAR STORM CALCS			
Pipe Run		Area	Increment Area		Total Acres Drained	Drained	Sum of	Intensity	Sum of	Time of	Pipe	Diameter		Manning's	Design	Design	Fall	HH Drop	Flow Line		Actual	Hydraulic	Change	Hydraulic Gradient		Nat Grd	Nat Grd	Intensity	Sum of	Hydraulic Gradient	
From MH	To MH	No.	(ac)	(ac)	C x 0.00	C x 0.00	CA	(in/hr)	Flow (cfs)	Conc (min)	Length (ft)	of Pipe (in)	Slope (%)	"n" (n/d)	Capacity (cfs)	Velocity (fps)	(ft)	Upstream (ft)	Upstream (ft)	Downstream (ft)	Velocity (fps)	Gradient (%)	in Head (ft)	Upstrm (ft)	Dnstrm (ft)	Upstream (ft)	Dnstrm (ft)	(in/hr)	Flow (cfs)	Upstrm (ft)	Dnstrm (ft)
INLET E2	OUTFALL	E2	0.55	3.26	0.55	3.26	1.47	10.06	16.00	15.00	120.0	30	1.200	0.013	44.93	3.15	1.44	0.00	73.06	72.44	3.26	0.35	0.10	77.95	77.77	78.20	80.00	4.83	7.11	77.81	77.77
INLET C1	MH2	D1	0.01	0.10	0.01	0.10	0.04	10.06	0.42	15.00	64.0	8	0.750	0.011	1.24	3.54	0.46	0.00	81.73	81.25	1.21	0.09	0.06	82.40	81.92	83.75	83.50	4.83	0.19	82.40	81.92
INLET C1-2	INLET C1	C1-2	0.01	0.12	0.01	0.12	0.05	10.06	0.49	15.00	53.0	8	0.750	0.011	1.24	3.54	0.44	0.00	81.29	80.85	1.40	0.12	0.07	81.96	81.51	83.35	83.35	4.83	0.22	81.96	81.51
INLET C1-1	C1	C1-1	0.01	0.08	0.01	0.08	0.03	10.06	0.36	15.00	53.0	8	0.750	0.011	1.24	3.54	0.44	0.00	81.29	80.85	1.03	0.06	0.04	81.96	81.51	83.35	83.35	4.83	0.16	81.96	81.51
C1	MH2	C1-2,C1	0.01	0.09	0.03	0.29	0.11	10.56	1.20	15.96	146.0	12	0.500	0.011	2.99	3.79	0.73	0.83	80.02	79.29	1.53	0.09	0.12	81.02	80.29	83.35	83.50	4.54	0.52	81.02	80.29
INLET B1	INLET B2	B1	0.07	0.05	0.07	0.05	0.06	10.06	0.65	15.00	51.0	8	0.750	0.011	1.24	3.54	0.38	0.00	77.92	77.54	2.43	0.35	0.18	79.33	78.95	79.50	80.00	4.83	0.38	78.56	78.20
INLET B2	INLET B3	B2	0.04	0.24	0.11	0.33	0.22	10.75	2.32	15.35	157.0	12	0.500	0.011	2.39	3.73	0.79	0.33	77.20	76.42	2.36	0.30	0.48	78.15	77.67	80.00	82.00	4.72	1.02	78.20	77.91
INLET B3	INLET B4	B3	0.05	0.34	0.16	0.73	0.36	10.48	3.80	16.24	109.0	18	0.300	0.013	5.75	3.26	0.33	0.50	75.92	75.59	2.15	0.15	0.14	78.67	78.53	82.00	83.00	4.46	1.62	77.91	77.69
INLET B4	MH2	B4	0.01	0.34	0.17	1.07	0.47	10.24	4.85	17.08	62.0	18	0.300	0.013	5.75	3.26	0.19	0.00	75.59	75.40	2.75	0.21	0.13	78.53	78.39	83.00	83.50	4.23	2.01	77.69	77.66
MH2	MH1	C,D	0.00	0.00	0.21	1.48	0.63	10.14	6.36	17.46	220.0	24	0.200	0.013	10.12	3.22	0.44	0.50	74.90	74.46	2.02	0.08	0.17	78.39	78.22	83.50	81.40	4.14	2.53	77.66	77.63
MH1	INLET E1		0.00	0.00	0.21	1.48	0.63	9.68	6.07	19.27	122.0	24	0.200	0.013	10.12	3.22	0.24	0.00	74.46	74.22	1.93	0.07	0.09	78.22	78.13	81.40	78.15	3.74	2.35	77.63	77.62
INLET E1	OUTFALL	E1,E1-1,A1,A2.1,A3,A4.2,A4.1	0.69	2.17	1.33	3.96	2.39	3.44	22.51	20.32	120.0	30	1.200	0.013	44.93	5.15	1.44	1.17	73.05	71.61	4.53	0.35	0.36	78.13	77.77	78.15	80.00	3.54	6.44	77.62	77.77
INLET A1	A2	A1	0.03	0.03	0.03	0.03	0.04	10.06	0.39	15.00	34.0	8	0.550	0.011	1.06	3.03	0.19	0.00	79.80	79.61	1.12	0.07	0.03	80.86	80.79	81.19	81.46	4.83	0.17	80.47	80.45
A2	INLET A3	A2.1	0.00	0.00	0.12	0.03	0.12	10.70	1.25	15.51	158.0	10	0.400	0.011	1.84	3.00	0.83	0.00	79.61	78.98	2.30	0.23	0.37	80.79	80.41	81.40	80.75	4.67	0.55	80.45	79.98
INLET A3	A4	A3	0.16	0.12	0.28	0.15	0.28	10.26	2.89	16.65	93.0	12	0.330	0.011	2.42	3.08	0.19	0.00	78.98	78.79	3.68	0.47	0.28	80.41	80.13	80.75	81.22	4.34	1.21	79.98	79.79
A4	OUTFALL	A4.2, A4.1	0.00	0.00	0.43	0.53	0.43	10.26	5.00	16.92	32.0	12	0.330	0.011	2.42	3.08	0.11	0.00	78.79	78.68	6.36	1.41	0.45	80.13	79.68	81.22	80.83	4.27	2.06	79.79	79.66
INLET A2.1	A2	A2.1	0.09	0.00	0.09	0.00	0.09	10.06	0.88	15.00	14.0	8	0.600	0.011	0.59	3.02	0.11	0.00	80.06	79.95	4.46	1.76	0.25	81.02	80.78	81.20	81.46	4.83	0.79	80.56	80.45
INLET A4.2	INLET A4.1	A4.2	0.07	0.16	0.07	0.16	0.11	10.06	1.21	15.00	53.0	8	0.559	0.011	1.06	3.03	0.32	0.00	79.63	79.36	3.45	0.71	0.42	81.00	80.58	82.00	81.25	4.83	0.54	80.45	80.13
INLET A4.1	A4	A4.1	0.10	0.02	0.17	0.18	0.21	10.77	2.23	15.28	51.0	10	0.400	0.011	1.84	3.00	0.24	0.17	79.20	78.95	4.09	0.74	0.45	80.58	80.13	81.25	81.22	4.74	0.99	80.13	79.96

CALCULATIONS UNCHANGED FOR INLET RELOCATION OR EXISTING INLETS;
REFER TO DRAINAGE ANALYSIS REPORT FOR DISCHARGE COMPENSATION DETENTION CALCULATIONS.



LEGEND	
→	PROPOSED SHEET FLOW DIRECTION
⇢	EXISTING SHEET FLOW DIRECTION
1 / 1.50	DRAINAGE AREA I.D. DRAINAGE AREA (ACRES)
E2 / 3.81 / 16.00	DRAINAGE AREA I.D. DRAINAGE AREA (ACRES) 100-YR RUNOFF (CFS)
2.83 / E1 / 21.92	CUMULATIVE AREA(ACRES) STRUCTURE I.D. CUMULATIVE 100- YR RUNOFF (CFS)

N

0 80' 160'

NOTE:
THIS PROJECT LIES WITHIN ZONE-X (UNSHADED) PER FEMA FIRM PANEL NO. 48201C0480M EFFECTIVE DATE IS JUNE 09, 2014
100 YEAR BASE FLOOD ELEVATION:
@ RANKIN RD=77.0 FEET
@ SOUTHEAST CORNER=75.6 FEET

500-YEAR BASE FLOOD ELEVATION= 79.0 FEET.
ALL BUILDINGS ARE PROPOSED WITH A FINISHED FLOOR ELEVATION AT LEAST TWO FEET HIGHER THAN THE 500-YEAR BASE FLOOD ELEVATION.

DETENTION AND DRAINAGE DESIGN REVIEWED AND APPROVED BY HCFCD. SEE 5-ENGINEERING DRAINAGE IMPACT REPORT WBS NO. R-000265-0147-4.
REQUIRED DETENTION CALCULATED BASED ON DISTURBED SERVICE AREA. REQUIRED DETENTION = 0.65 AC-FT/AC * 12.74 AC = 8.3 AC-FT. HOWEVER, 14.3 AC-FT OF STORAGE IS PROVIDED IN DETENTION BASIN, SEE VOLUME 1 FOR DETENTION DESIGN.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3331

STATE OF TEXAS
DANIEL KOHRER
143574
LICENSED
PROFESSIONAL ENGINEER
07-01-25

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

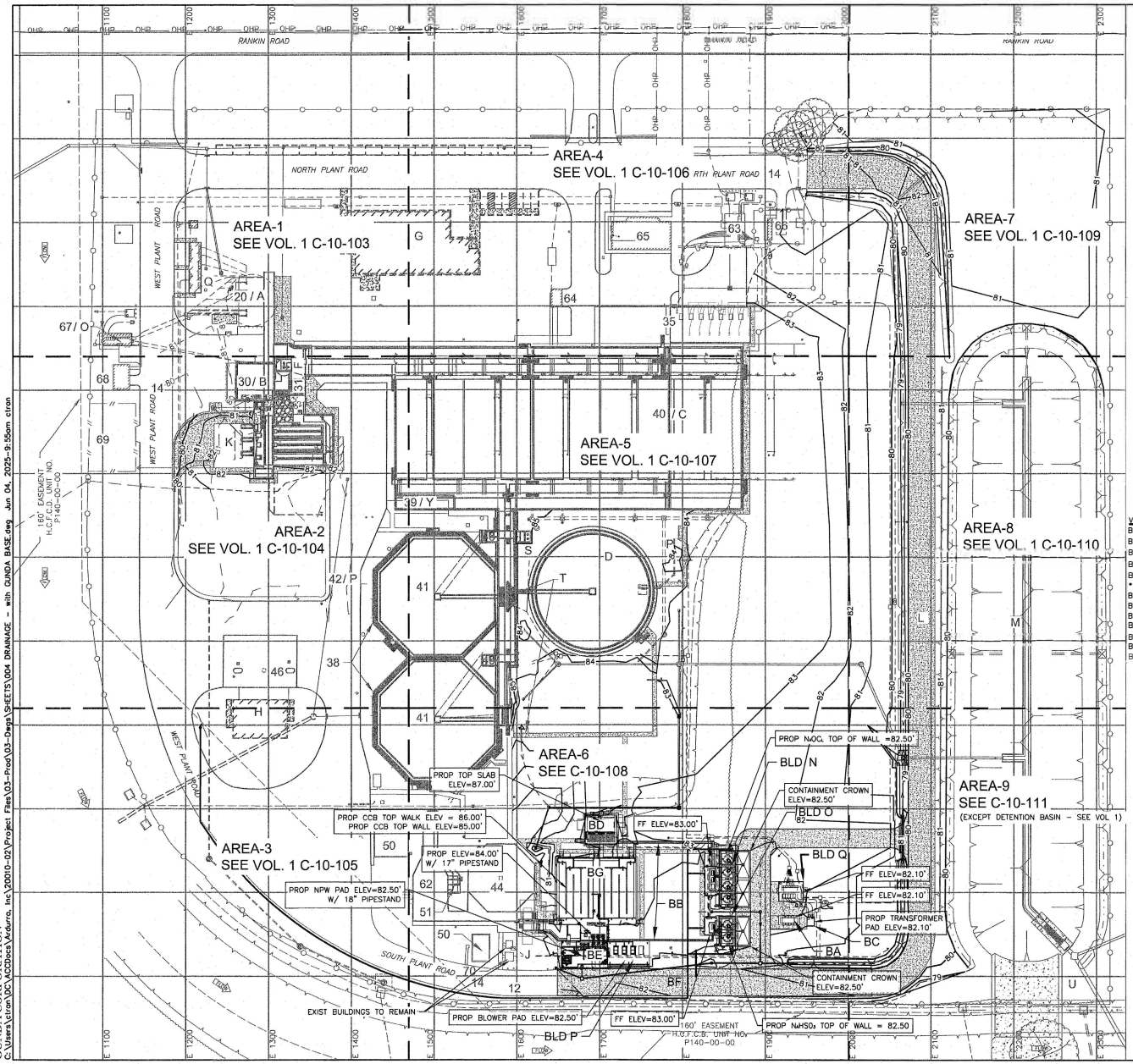
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION-DISINFECTION REDESIGN AMENDMENT
DRAINAGE AREA MAP & CALCULATIONS

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
1"=80'	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 12 OF 173	

STATE OF TEXAS
DANIEL KOHRER
80367
LICENSED
PROFESSIONAL ENGINEER

C-10-101

GUNDA CORPORATION
C:\Users\kohrer\OPC\ACCDocs\McAlarney, Inc\J00010-02\Project Files\03-Prod\03-Dwgs\SHEETS\004 DRAINAGE - with GUNDA BASE.dwg Jul 01, 2025-3:20pm ckrohr



EXISTING PLANT FACILITIES

12 HCFCD OUTFALL
14 ACCESS ROAD
20 INFLUENT LIFT STATION
30 HEADWORKS FACILITY
31 GRIT FACILITY
35 BLOWER FACILITY
38 CLARIFIER WALKWAY
39 MLSS CHANNEL
40 AERATION/DIGESTION BASINS
41 CLARIFIERS
42 SCUM FACILITIES
44 CHLORINE CONTACT BASIN
45 RAS FACILITY
46 WAS FACILITY
50 CHEMICAL FEED FACILITIES
51 NPW (NON POTABLE WATER) SYSTEM
62 FLOW MEASURING, ANALYZER, PUMP, PLC BUILDING
63 BLOWER ELECTRICAL BUILDING
64 SHOP BUILDING
65 OPERATIONS BUILDING
66 ELECTRICAL SUB-STATION
67 LIFT STATION ELECTRICAL BUILDING NO 1
68 STORAGE BUILDING NO 1
69 STORAGE BUILDING NO 2
70 SODIUM BISULFITE PROCESS

VOL. 1 (PREVIOUS PACKAGE) IMPROVEMENTS*

A LIFT STATION IMPROVEMENTS
B HEADWORKS IMPROVEMENTS
C AERATION/DIGESTION BASIN PIPING & DIFFUSER IMPROVEMENTS
D CLARIFIER NO 3
F GRIT BASIN IMPROVEMENTS
G ADMINISTRATION BUILDING (BY OTHERS)
H DE-WATERING FACILITY (BY OTHERS)
J FLOW MEASURING IMPROVEMENTS
K GRIT DEWATERING FACILITY
L ACCESS ROAD EXTENSION
M DETENTION POND
O IMPROVEMENTS TO EXISTING LIFT STATION ELECTRICAL BUILDING
P SCUM PUMP FACILITY IMPROVEMENTS
Q LIFT STATION ELECTRICAL BUILDING
S HAS FACILITY IMPROVEMENTS
T WALKWAY FOR CLARIFIER
U DETENTION POND OUTFALL TO HCFCD DITCH
Y MLSS CHANNEL IMPROVEMENTS

VOL. 2 (THIS PACKAGE) IMPROVEMENTS

BUILDING DESIGNATIONS

BLD N SODIUM HYPOCHLORITE CHEMICAL FEED BLDG* (AA)
BLD O SODIUM BISULFITE CHEMICAL FEED BLDG* (AB)
BLD P BLOWER CANOPY* (AC)
BLD Q CHLORINE CONTACT BASIN ELECTRICAL BUILDING* (AD)
* CONTRACTOR DELEGATED DESIGN AND PERMITTING.

BA GENERATOR
BB CHEMICAL FEED TRENCHES
BC TRANSFORMER
BD SANITARY JUNCTION STRUCTURE
BE NPW (NON POTABLE WATER) SYSTEM
BF ACCESS ROAD EXTENSION REGRADING
BG CHLORINE CONTACT BASIN

N

0 60' 120'

NOTE:
THIS PROJECT LIES WITHIN ZONE-X (UNSHADED) PER FEMA FIRM PANEL NO. 48201C0480M EFFECTIVE DATE IS JUNE 09, 2014
100 YEAR BASE FLOOD ELEVATION:
@ RANKIN RD=77.0 FEET
@ SOUTHEAST CORNER=75.6 FEET

500-YEAR BASE FLOOD ELEVATION= 79.0 FEET. ALL BUILDINGS ARE PROPOSED WITH A FINISHED FLOOR ELEVATION AT LEAST TWO FEET HIGHER THAN THE 500-YEAR BASE FLOOD ELEVATION.

DETENTION AND DRAINAGE DESIGN REVIEWED AND APPROVED BY HCFCD. SEE 5-ENGINEERING DRAINAGE IMPACT REPORT WBS NO. R-000265-0147-4. REQUIRED DETENTION CALCULATED BASED ON DISTURBED SERVICE AREA. REQUIRED DETENTION = 0.65 AC-FT/AC * 12.74 AC = 8.3 AC-FT. HOWEVER, 14.3 AC-FT OF STORAGE IS PROVIDED IN DETENTION BASIN, SEE VOLUME 1 FOR DETENTION DESIGN.

STORM WATER DETENTION PONDS & SWALES SHOULD BE DESIGNED, ENGINEERED, CONSTRUCTED AND MAINTAINED FOR A MAXIMUM 48-HOUR DETENTION PERIOD AFTER THE DESIGN STORM AND REMAINS COMPLETELY DRY BETWEEN STORMS.

DETENTION CALCULATION FOR THIS PROJECT (ADDITION)		
THIS PROJECT IS WITHIN THE SCOPE OF SITEWORK PROJECT #22053435.	12.74	AC
DISTURBED AREA OF THIS PROJECT (ADDITION-INCLUDING PAVEMENT, SIDEWALK, BUILDINGS AND STRUCTURES)	48,824	SF
DISTURBED AREA OF THIS PROJECT (ADDITION-INCLUDING PAVEMENT, SIDEWALK, BUILDINGS AND STRUCTURES)	1.12	AC
TOTAL IMPERVIOUS AREA RESULTED FROM DISTURBED AREA	1.12	AC
DETENTION REQUIRED FOR ADDITION BASED ON COH IDM TABLE 9.6	1.12x0.98=1.10	AC-FT
EXCESS DETENTION VOLUME IN SITEWORK PROJECT#22053435	14.3-8.3=6.0	AC-FT
DETENTION VOLUME PROVIDED FOR THIS PROJECT	1.10	AC-FT
EXCESS OF DETENTION REMAINING AFTER THIS PROJECT FOR FUTURE DEVELOPMENT	4.90	AC-FT

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3539 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DANIEL KEHRER
143574
LICENSED PROFESSIONAL ENGINEER
08-04-25

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

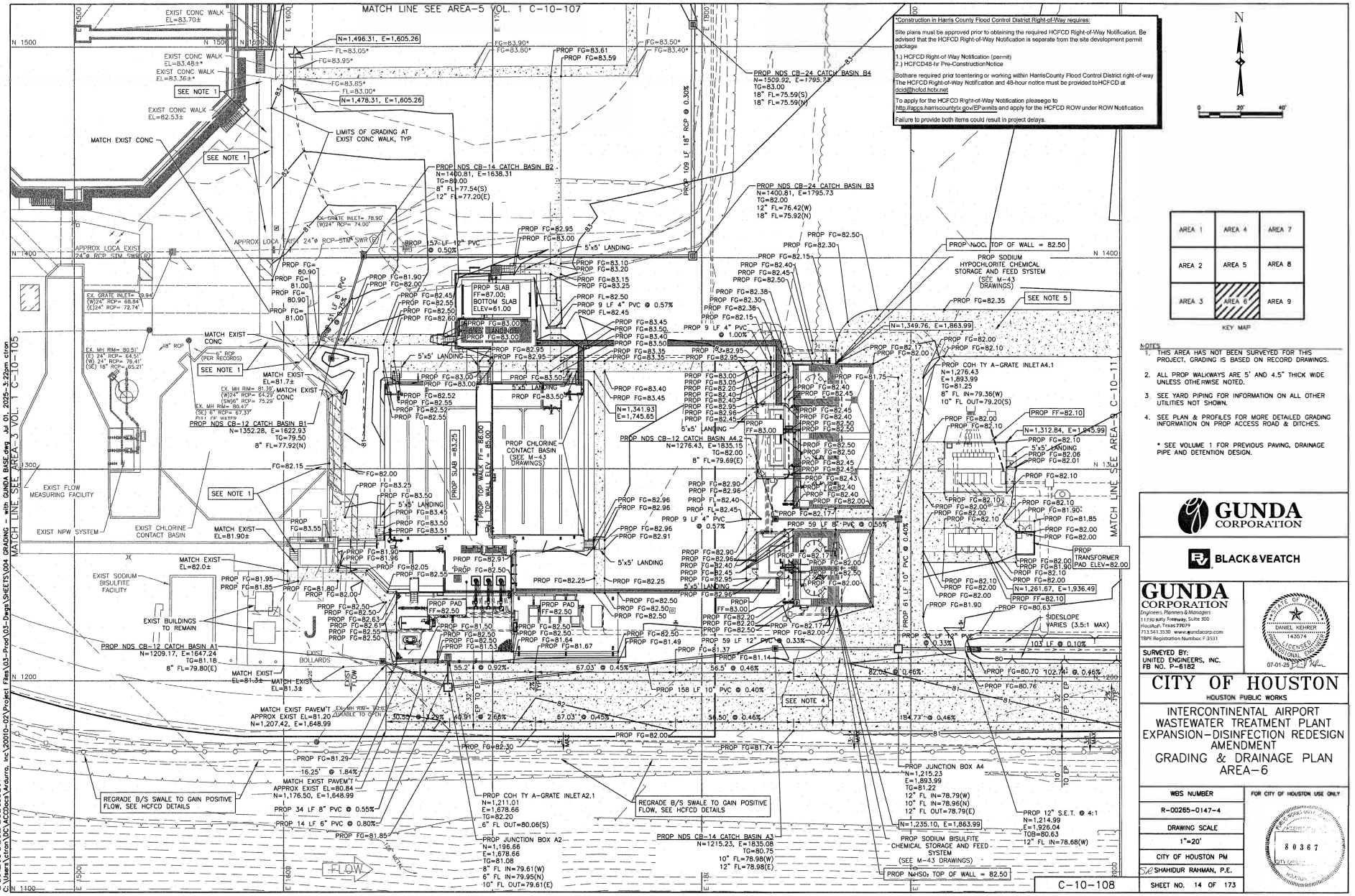
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION-DISINFECTION REDESIGN AMENDMENT
OVERALL SITE GRADING & DRAINAGE PLAN

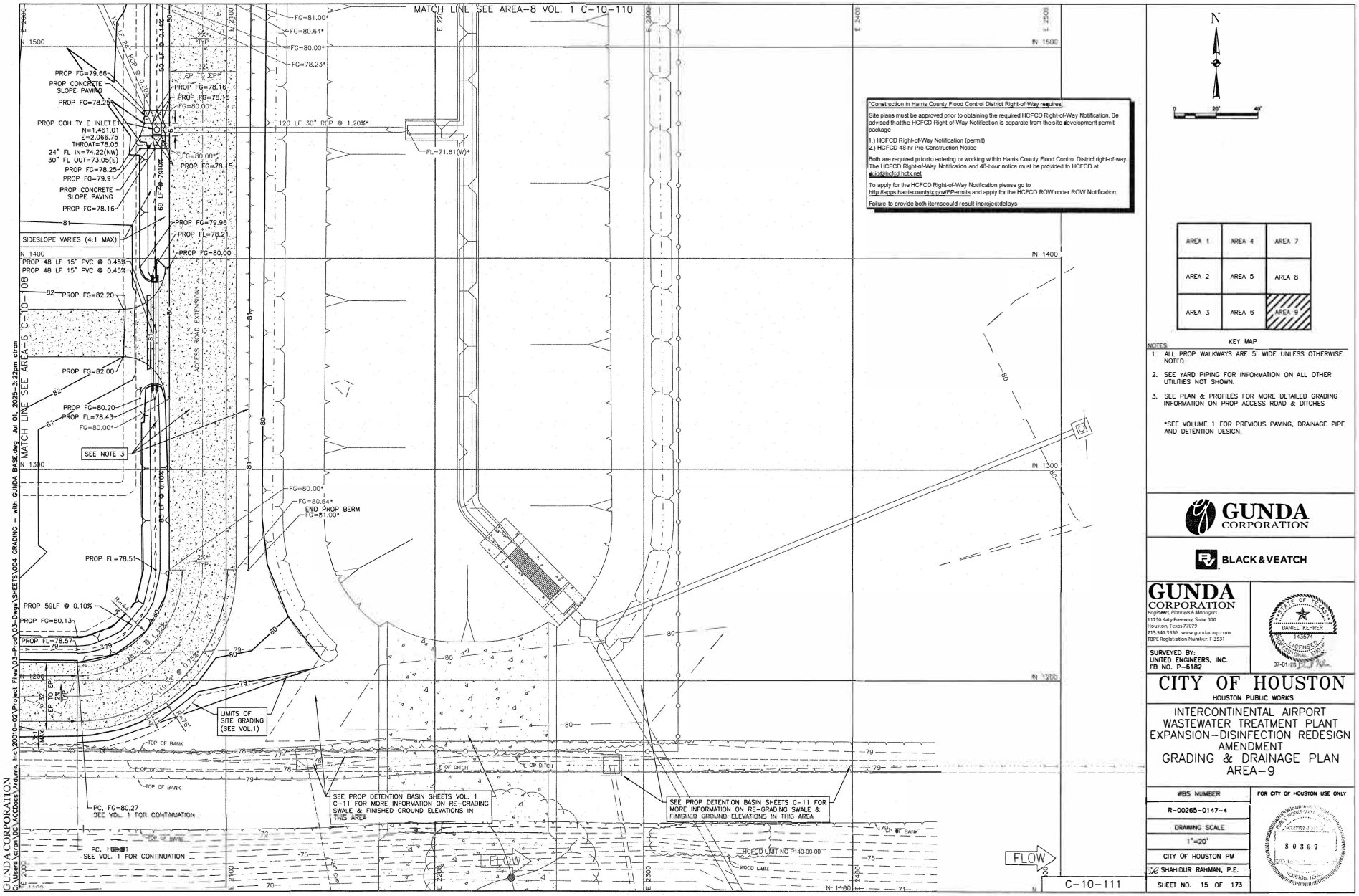
WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
1"=60'	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 13 OF 173	

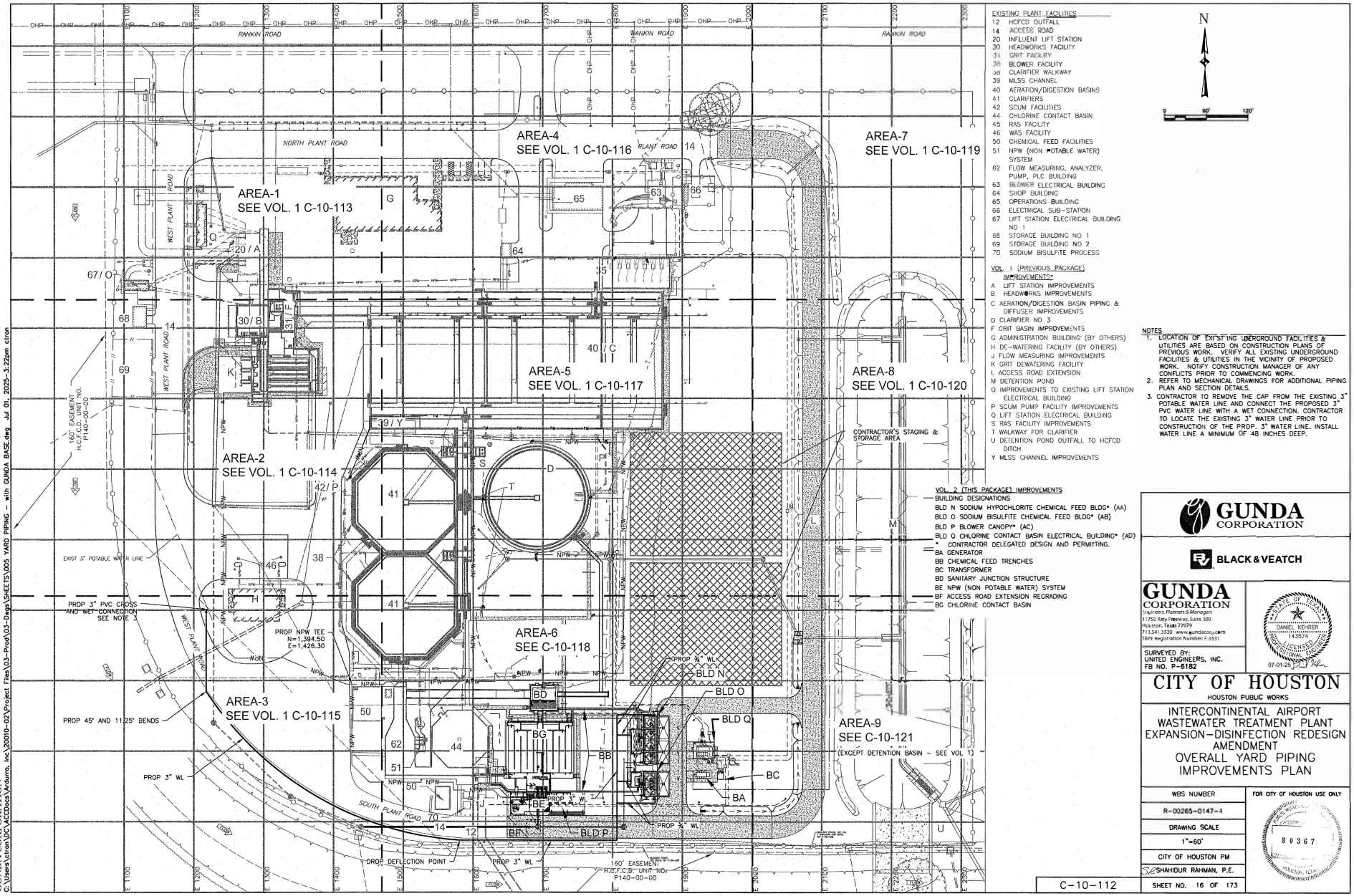
STATE OF TEXAS
80367
REGISTERED
PROFESSIONAL ENGINEER

C-10-102

GUNDA CORPORATION
C:\Users\vtron\DC\ACCDocs\Arburra, Inc\20010-02\Project Files\03-Prod\03-Dwgs\SHEETS\004 DRAINAGE - with GUNDA BASE.dwg Jun 04, 2025-9:55am ctron


MATCH LINE SEE AREA-5 VOL. 1 C-10-107
MATCH LINE SEE AREA-3 VOL. 1 C-10-105
MATCH LINE SEE AREA-9 C-10-111
*Construction in Harris County Flood Control District Right-of-Way requires:
Site plans must be approved prior to obtaining the required HCFCD Right-of-Way Notification. Be advised that the HCFCD Right-of-Way Notification is separate from the site development permit package
1.) HCFCD Right-of-Way Notification (permit)
2.) HCFCD48-hr Pre-Construction Notice
Bothare required prior toentering or working within HarrisCounty Flood Control District right-of-way The HCFCD Right-of-Way Notification and 48-hour notice must be provided toHCFCD at dcid@hcfcd.hctx.net
To apply for the HCFCD Right-of-Way Notification pleasego to http://epcs.harriscountytx.gov/EPermits and apply for the HCFCD ROW under ROW Notification
Failure to provide both items could result in project delays.
N
0
20'
40'
AREA 1
AREA 4
AREA 7
AREA 2
AREA 5
AREA 8
AREA 3
AREA 6
AREA 9
KEY MAP
NOTES
1. THIS AREA HAS NOT BEEN SURVEYED FOR THIS PROJECT, GRADING IS BASED ON RECORD DRAWINGS.
2. ALL PROP WALKWAYS ARE 5' AND 4.5" THICK WIDE UNLESS OTHERWISE NOTED.
3. SEE YARD PIPING FOR INFORMATION ON ALL OTHER UTILITIES NOT SHOWN.
4. SEE PLAN & PROFILES FOR MORE DETAILED GRADING INFORMATION ON PROP ACCESS ROAD & DITCHES.
* SEE VOLUME 1 FOR PREVIOUS PAVING, DRAINAGE PIPE AND DETENTION DESIGN.
GUNDA CORPORATION
BLACK & VEATCH
GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531
SURVEYED BY: UNITED ENGINEERS, INC. FB NO. P-6182
DANIEL KEHRER 143574 LICENSED PROFESSIONAL ENGINEER 07-01-25
CITY OF HOUSTON
HOUSTON PUBLIC WORKS
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION-DISINFECTION REDESIGN AMENDMENT
GRADING & DRAINAGE PLAN AREA-6
WBS NUMBER
R-00265-0147-4
DRAWING SCALE
1"=20'
CITY OF HOUSTON PM
SHAHIDUR RAHMAN, P.E.
SHEET NO. 14 OF 173
FOR CITY OF HOUSTON USE ONLY
80367
C-10-108
GUNDA CORPORATION
C:\Users\vtran\DC\ACCDocs\vtaurro, inc\20010-02\Project Files\03-Prod\03-Dwgs\SHEETS\004 GRADING - with GUNDA BASE.dwg Jul 01, 2025-3:22pm vtran


MATCH LINE SEE AREA-8 VOL. 1 C-10-110
MATCH LINE SEE AREA-6 C-10-108
PROP FG=79.66
PROP CONCRETE SLOPE PAVING
PROP FG=78.25
PROP COH TY E INLET ET
N=1,461.01
E=2,066.75
THROAT=78.05
24" FL IN=74.22(NW)
30" FL OUT=73.05(E)
PROP FG=78.25
PROP FG=79.91
PROP CONCRETE SLOPE PAVING
PROP FG=78.16
SIDESLOPE VARIES (4:1 MAX)
PROP 48 LF 15" PVC @ 0.45%
PROP 48 LF 15" PVC @ 0.45%
PROP FG=82.20
PROP FG=82.00
PROP FG=80.20
PROP FL=78.43
SEE NOTE 3
PROP FL=78.51
PROP 59LF @ 0.10%
PROP FG=80.13
PROP FL=78.57
ACCESS ROAD EXTENSION*
PROP FG=78.16
PROP FG=78.15
PROP FG=78.5
PROP FG=79.96
PROP FL=78.21
PROP FG=80.00
END PROP BERM
LIMITS OF SITE GRADING (SEE VOL.1)
TOP OF BANK
E OF DITCH
PC, FG=80.27
SEE VOL. 1 FOR CONTINUATION
PC, FG=81
SEE VOL. 1 FOR CONTINUATION
SEE PROP DETENTION BASIN SHEETS VOL. 1 C-11 FOR MORE INFORMATION ON RE-GRADING SWALE & FINISHED GROUND ELEVATIONS IN THIS AREA
SEE PROP DETENTION BASIN SHEETS C-11 FOR MORE INFORMATION ON RE-GRADING SWALE & FINISHED GROUND ELEVATIONS IN THIS AREA
HCFCD UNIT NO P140-00-00
WOOD LIMIT
FLOW
FLOW
120 LF 30" RCP @ 1.20%*
FL=71.61(W)*
*Construction in Harris County Flood Control District Right-of-Way requires
Site plans must be approved prior to obtaining the required HCFCD Right-of-Way Notification. Be advised thatthe HCFCD Right-of-Way Notification is separate from the site development permit package
1.) HCFCD Right-of-Way Notification (permit)
2.) HCFCD 48-hr Pre-Construction Notice
Both are required priorto entering or working within Harris County Flood Control District right-of-way. The HCFCD Right-of-Way Notification and 48-hour notice must be provided to HCFCD at
eicid@hcfcd.hctx.net.
To apply for the HCFCD Right-of-Way Notification please go to
http://apps.harriscountytx.gov/EPermits and apply for the HCFCD ROW under ROW Notification.
Failure to provide both itemscould result inprojectdelays
N
0
20'
40'
AREA 1
AREA 4
AREA 7
AREA 2
AREA 5
AREA 8
AREA 3
AREA 6
AREA 9
KEY MAP
NOTES
1. ALL PROP WALKWAYS ARE 5' WIDE UNLESS OTHERWISE NOTED.
2. SEE YARD PIPING FOR INFORMATION ON ALL OTHER UTILITIES NOT SHOWN.
3. SEE PLAN & PROFILES FOR MORE DETAILED GRADING INFORMATION ON PROP ACCESS ROAD & DITCHES
*SEE VOLUME 1 FOR PREVIOUS PAVING, DRAINAGE PIPE AND DETENTION DESIGN.
GUNDA CORPORATION
BLACK & VEATCH
GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531
SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182
STATE OF TEXAS
DANIEL KEHRER
143574
LICENSED
PROFESSIONAL ENGINEER
07-01-25
CITY OF HOUSTON
HOUSTON PUBLIC WORKS
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT
GRADING & DRAINAGE PLAN
AREA–9
WBS NUMBER
R-00265-0147-4
DRAWING SCALE
1"=20'
CITY OF HOUSTON PM
SHAHIDUR RAHMAN, P.E.
SHEET NO. 15 OF 173
FOR CITY OF HOUSTON USE ONLY
PUBLIC WORKS
80367
REGISTERED
ENGINEER
HOUSTON, TEXAS
C-10-111
GUNDA CORPORATION
C:\Users\jmcdonald\Documents\ACCDocs\Arcadis, Inc\20010-02\Project Files\03-Prod\03-Dwgs\SHEETS\004 GRADING - with GUNDA BASE.dwg Jul 01, 2025-3:22pm ctroo



EXISTING PLANT FACILITIES

12 HCFCD OUTFALL
14 ACCESS ROAD
20 INFLUENT LIFT STATION
30 HEADWORKS FACILITY
31 GRIT FACILITY
36 BLOWER FACILITY
38 CLARIFIER WALKWAY
39 MLSS CHANNEL
40 AERATION/DIGESTION BASINS
41 CLARIFIERS
42 SCUM FACILITIES
44 CHLORINE CONTACT BASIN
45 RAS FACILITY
46 WAS FACILITY
50 CHEMICAL FEED FACILITIES
51 NPW (NON POTABLE WATER) SYSTEM
62 FLOW MEASURING, ANALYZER, PUMP, PLC BUILDING
63 BLOWER ELECTRICAL BUILDING
64 SHOP BUILDING
65 OPERATIONS BUILDING
66 ELECTRICAL SUB-STATION
67 LIFT STATION ELECTRICAL BUILDING NO 1
68 STORAGE BUILDING NO 1
69 STORAGE BUILDING NO 2
70 SODIUM BISULFITE PROCESS

VOL. 1 (PREVIOUS PACKAGE) IMPROVEMENTS*

A LIFT STATION IMPROVEMENTS
B HEADWORKS IMPROVEMENTS
C AERATION/DIGESTION BASIN PIPING & DIFFUSER IMPROVEMENTS
D CLARIFIER NO. 3
F GRIT BASIN IMPROVEMENTS
G ADMINISTRATION BUILDING (BY OTHERS)
H DE-WATERING FACILITY (BY OTHERS)
J FLOW MEASURING IMPROVEMENTS
K GRIT DEWATERING FACILITY
L ACCESS ROAD EXTENSION
M DETENTION POND
O IMPROVEMENTS TO EXISTING LIFT STATION ELECTRICAL BUILDING
P SCUM PUMP FACILITY IMPROVEMENTS
Q LIFT STATION ELECTRICAL BUILDING
S RAS FACILITY IMPROVEMENTS
T WALKWAY FOR CLARIFIER
U DETENTION POND OUTFALL TO HCFCD DITCH
Y MLSS CHANNEL IMPROVEMENTS

VOL. 2 (THIS PACKAGE) IMPROVEMENTS

BUILDING DESIGNATIONS
BLD N SODIUM HYPOCHLORITE CHEMICAL FEED BLDG* (AA)
BLD O SODIUM BISULFITE CHEMICAL FEED BLDG* (AB)
BLD P BLOWER CANOPY* (AC)
BLD Q CHLORINE CONTACT BASIN ELECTRICAL BUILDING* (AD)
* CONTRACTOR DELEGATED DESIGN AND PERMITTING.
BA GENERATOR
BB CHEMICAL FEED TRENCHES
BC TRANSFORMER
BD SANITARY JUNCTION STRUCTURE
BE NPW (NON POTABLE WATER) SYSTEM
BF ACCESS ROAD EXTENSION REGRADING
BG CHLORINE CONTACT BASIN

NOTES

1. LOCATION OF EXISTING UNDERGROUND FACILITIES & UTILITIES ARE BASED ON CONSTRUCTION PLANS OF PREVIOUS WORK. VERIFY ALL EXISTING UNDERGROUND FACILITIES & UTILITIES IN THE VICINITY OF PROPOSED WORK. NOTIFY CONSTRUCTION MANAGER OF ANY CONFLICTS PRIOR TO COMMENCING WORK.
2. REFER TO MECHANICAL DRAWINGS FOR ADDITIONAL PIPING PLAN AND SECTION DETAILS.
3. CONTRACTOR TO REMOVE THE CAP FROM THE EXISTING 3" POTABLE WATER LINE AND CONNECT THE PROPOSED 3" PVC WATER LINE WITH A WET CONNECTION. CONTRACTOR TO LOCATE THE EXISTING 3" WATER LINE PRIOR TO CONSTRUCTION OF THE PROP. 3" WATER LINE. INSTALL WATER LINE A MINIMUM OF 48 INCHES DEEP.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

DANIEL KEHRER 143574 LICENSED PROFESSIONAL ENGINEER 07-01-25

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT
OVERALL YARD PIPING IMPROVEMENTS PLAN

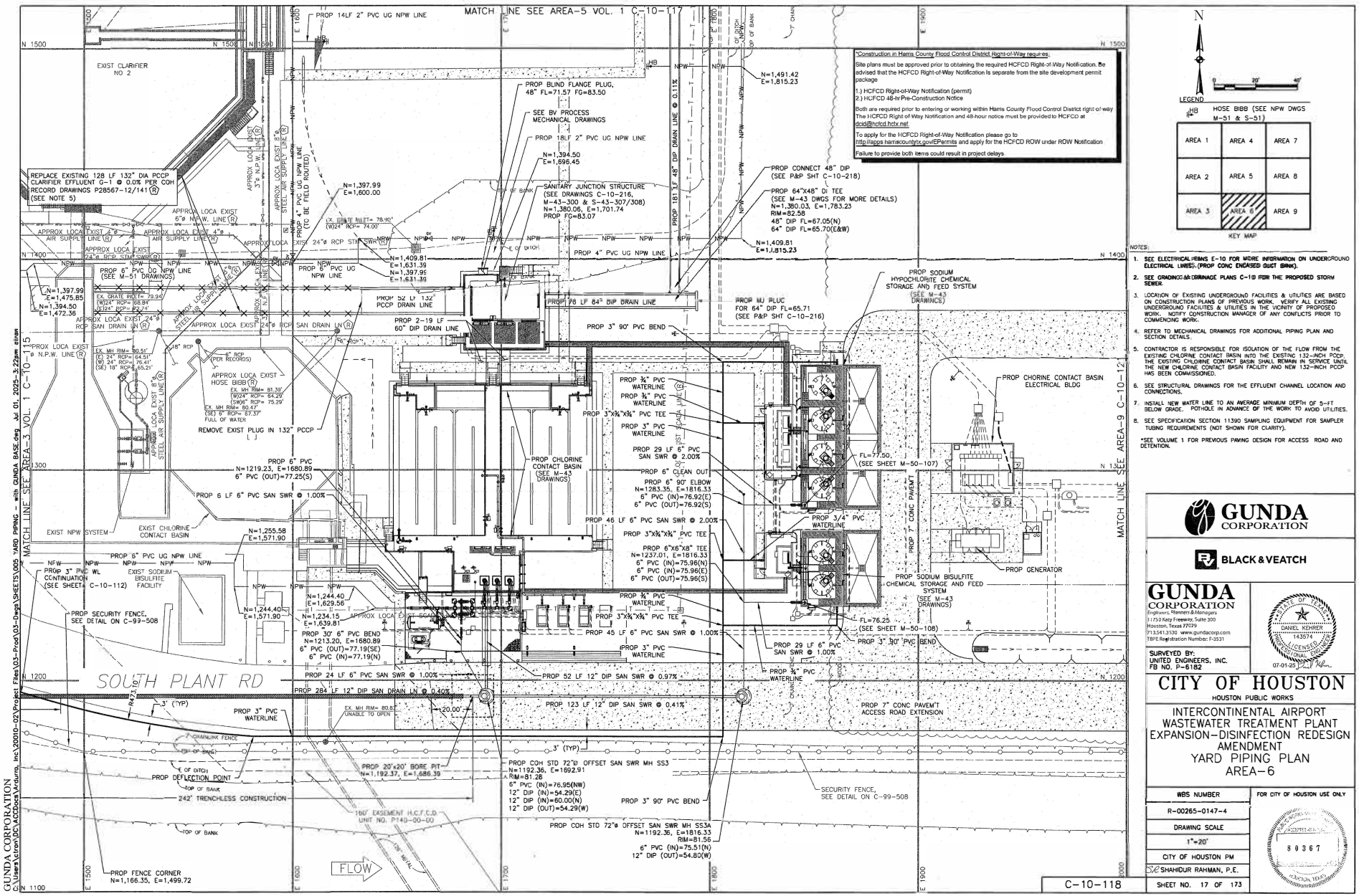
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	1"=60'
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	16 OF 173

FOR CITY OF HOUSTON USE ONLY

80367 REGISTERED PROFESSIONAL ENGINEER

C-10-112

GUNDA CORPORATION
C:\Users\cron\DC\ACCDocs\Vaduro, Inc\20010-021\Project Files\03-Prod\03-Dwgs\SHEETS\005 YARD PIPING - with GUNDA BASE.dwg Jul 01, 2025-3:22pm cron



*Construction in Harris County Flood Control District Right-of-Way requires:

Site plans must be approved prior to obtaining the required HCFCD Right-of-Way Notification. Be advised that the HCFCD Right-of-Way Notification is separate from the site development permit package

1.) HCFCD Right-of-Way Notification (permit)
2.) HCFCD 48-hr Pre-Construction Notice

Both are required prior to entering or working within Harris County Flood Control District right-of-way The HCFCD Right-of-Way Notification and 48-hour notice must be provided to HCFCD at doid@hcfcd.hctx.net

To apply for the HCFCD Right-of-Way Notification please go to http://apps.harriscountytx.gov/EPermits and apply for the HCFCD ROW under ROW Notification

*Failure to provide both items could result in project delays.

N

0 20' 40'

LEGEND

HB HOSE BIBB (SEE NPW DWGS M-51 & S-51)

AREA 1	AREA 4	AREA 7
AREA 2	AREA 5	AREA 8
AREA 3	AREA 6	AREA 9

KEY MAP

NOTES:

1. SEE ELECTRICAL PLANS E-10 FOR MORE INFORMATION ON UNDERGROUND ELECTRICAL LINES. (PROP CONC ENCASED DUCT BANK).
2. SEE GRADING & DRAINAGE PLANS C-10 FOR THE PROPOSED STORM SEWER.
3. LOCATION OF EXISTING UNDERGROUND FACILITIES & UTILITIES ARE BASED ON CONSTRUCTION PLANS OF PREVIOUS WORK. VERIFY ALL EXISTING UNDERGROUND FACILITIES & UTILITIES IN THE VICINITY OF PROPOSED WORK. NOTIFY CONSTRUCTION MANAGER OF ANY CONFLICTS PRIOR TO COMMENCING WORK.
4. REFER TO MECHANICAL DRAWINGS FOR ADDITIONAL PIPING PLAN AND SECTION DETAILS.
5. CONTRACTOR IS RESPONSIBLE FOR ISOLATION OF THE FLOW FROM THE EXISTING CHLORINE CONTACT BASIN INTO THE EXISTING 132-INCH PCCP. THE EXISTING CHLORINE CONTACT BASIN SHALL REMAIN IN SERVICE UNTIL THE NEW CHLORINE CONTACT BASIN FACILITY AND NEW 132-INCH PCCP HAS BEEN COMMISSIONED.
6. SEE STRUCTURAL DRAWINGS FOR THE EFFLUENT CHANNEL LOCATION AND CONNECTIONS.
7. INSTALL NEW WATER LINE TO AN AVERAGE MINIMUM DEPTH OF 5-FT BELOW GRADE. POTHOLE IN ADVANCE OF THE WORK TO AVOID UTILITIES.
8. SEE SPECIFICATION SECTION 11390 SAMPLING EQUIPMENT FOR SAMPLER TUBING REQUIREMENTS (NOT SHOWN FOR CLARITY).

*SEE VOLUME 1 FOR PREVIOUS PAVING DESIGN FOR ACCESS ROAD AND DETENTION.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.2530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS DANIEL KERRER 143574 LICENSED PROFESSIONAL ENGINEER 07-01-25

SURVEYED BY: UNITED ENGINEERS, INC. FB NO. P-6182

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

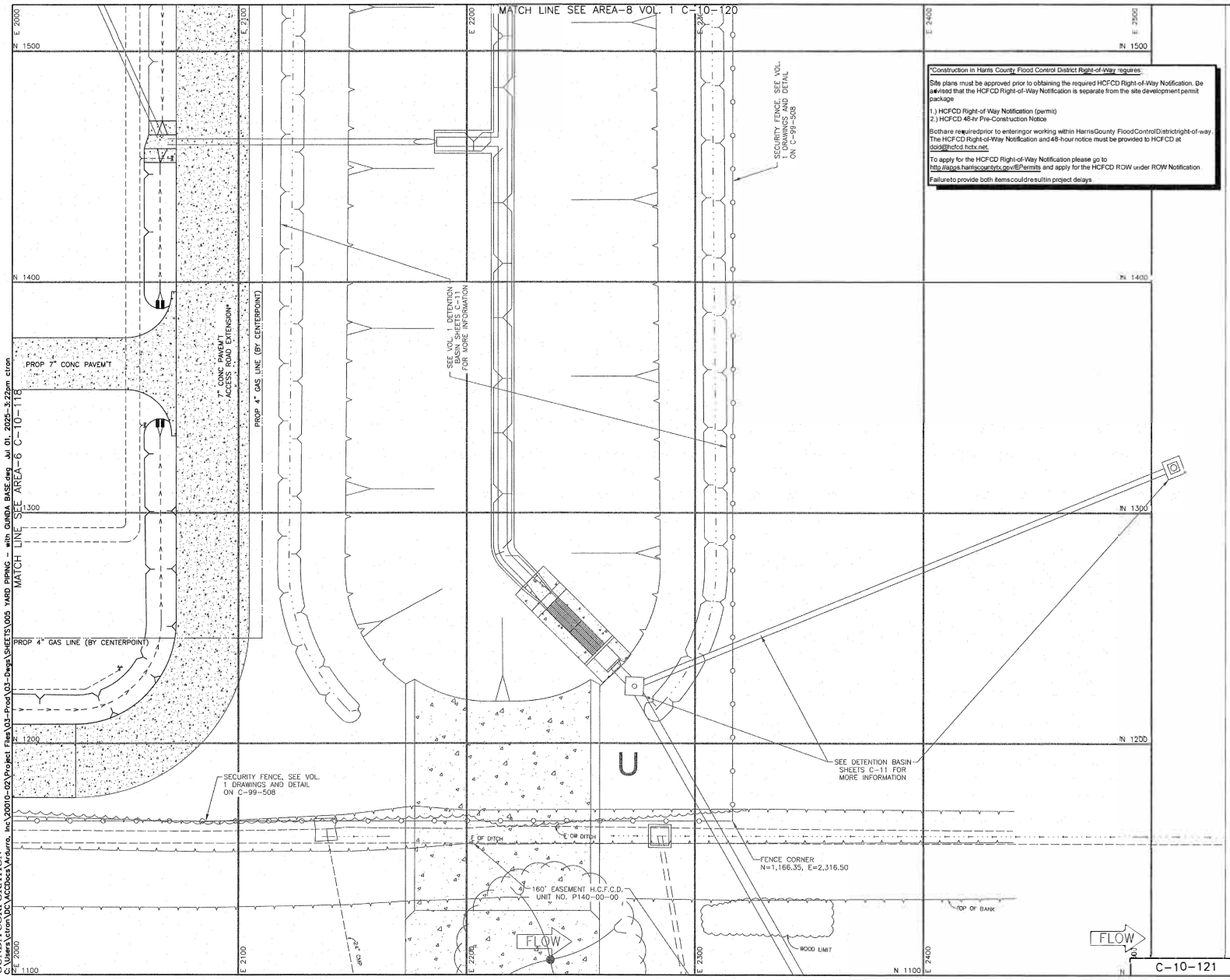
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION-DISINFECTION REDESIGN AMENDMENT YARD PIPING PLAN AREA-6

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
1"=20'	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 17 OF 173	

STATE OF TEXAS 80367 REGISTERED ENGINEER

C-10-118

GUNDA CORPORATION
C:\Users\tcron\DCACDocs\Arduino_Inc\V2010-02\Project Files\03-Prod\03-Dwgs\SHEETS\005 YARD PIPING - with GUNDA BASE.dwg Jul 01, 2025-3:22pm ctron



*Construction in Harris County Flood Control District Right-of-Way requires.

Site plans must be approved prior to obtaining the required HCFCD Right-of-Way Notification. Be advised that the HCFCD Right-of-Way Notification is separate from the site development permit package

1.) HCFCD Right-of Way Notification (permit)
2.) HCFCD 48-hr Pre-Construction Notice

Bothare requiredprior to enteringor working within HarrisCounty FloodControlDistrictright-of-way. The HCFCD Right-of-Way Notification and48-hour notice must be provided to HCFCD at dod@hcfcd.hctx.net.

To apply for the HCFCD Right-of-Way Notification please go to http://apps.harriscountytx.gov/EPermits and apply for the HCFCD ROW under ROW Notification

Failureto provide both itemscouldresultin project delays

N

0 20' 40'

AREA 1	AREA 4	AREA 7
AREA 2	AREA 5	AREA 8
AREA 3	AREA 6	AREA 9

KEY MAP

NOTES:

1. SEE ELECTRICAL PLANS E-10 FOR MORE INFORMATION ON UNDERGROUND ELECTRICAL LINES, (PROP CONC ENCASED DUCT BANK).
2. SEE GRADING & DRAINAGE PLANS C-10 FOR THE PROPOSED STORM SEWER.
3. LOCATION OF EXISTING UNDERGROUND FACILITIES & UTILITIES ARE BASED ON CONSTRUCTION PLANS OF PREVIOUS WORK. VERIFY ALL EXISTING UNDERGROUND FACILITIES & UTILITIES IN THE VICINITY OF PROPOSED WORK. NOTIFY CONSTRUCTION MANAGER OF ANY CONFLICTS PRIOR TO COMMENCING WORK.
4. REFER TO MECHANICAL DRAWINGS FOR ADDITIONAL PIPING PLAN AND SECTION DETAILS.

* SEE VOLUME 1 FOR PREVIOUS PAVING DESIGN FOR ACCESS ROAD AND DETENTION.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED
PROFESSIONAL ENGINEER

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

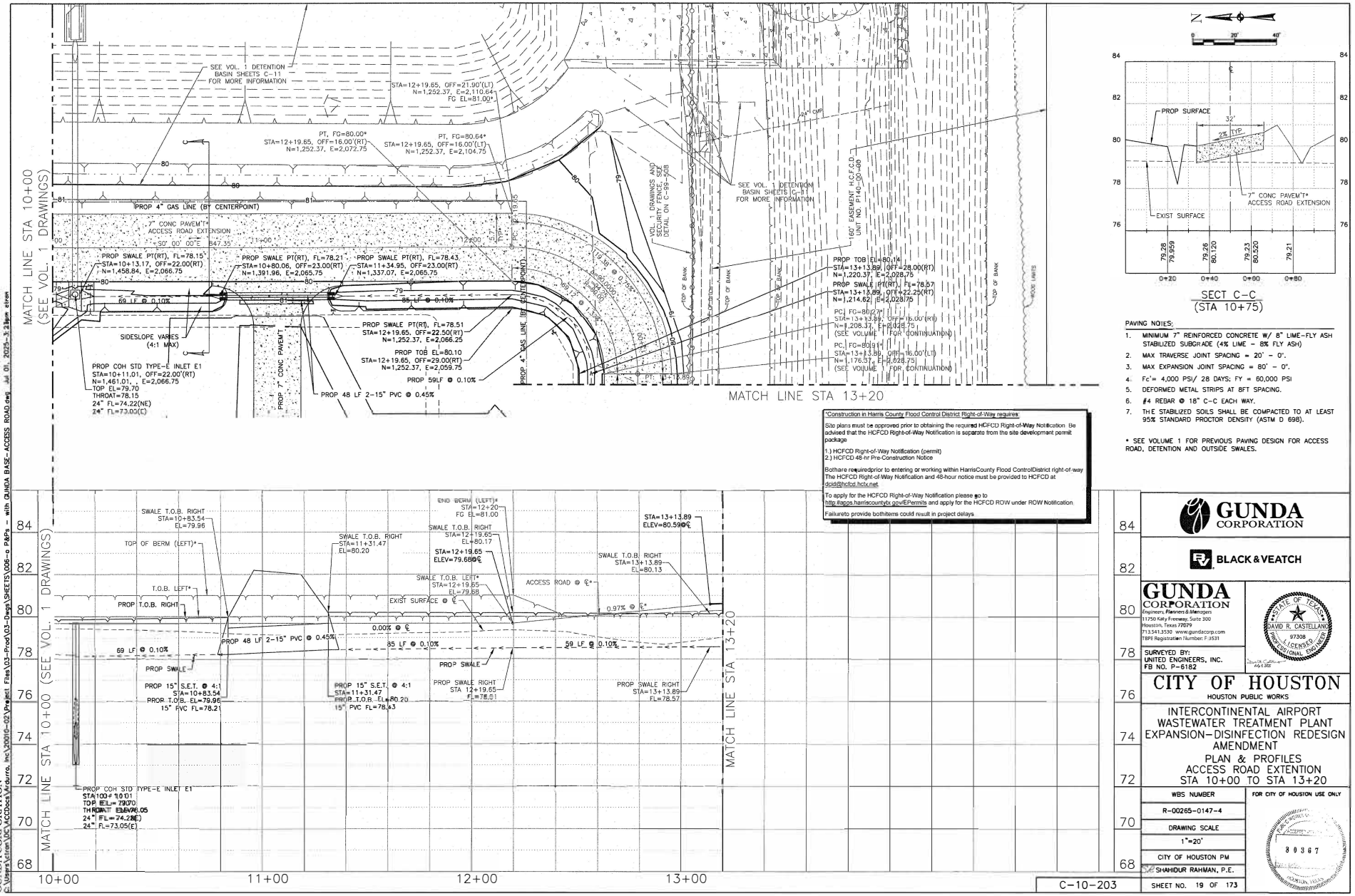
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION-DISINFECTION REDESIGN AMENDMENT
YARD PIPING PLAN AREA-9

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
1"=20'	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 18 OF 173	

ACCEPTED
80367

C-10-121

GUNDA CORPORATION
C:\Users\vtron\DCVACDocs\Arduino, Inc\20010-021\Project Files\03-Prod\03-Dwgs\SHEETS\005 YARD PIPING - with GUNDA BASE.dwg Jul 01, 2025 - 3:22pm ctron



*Construction in Harris County Flood Control District Right-of-Way requires:

Site plans must be approved prior to obtaining the required HCFCD Right-of-Way Notification. Be advised that the HCFCD Right-of-Way Notification is separate from the site development permit package.

1.) HCFCD Right-of-Way Notification (permit)
2.) HCFCD 48-hr Pre-Construction Notice

Both are required prior to entering or working within Harris County Flood Control District right-of-way. The HCFCD Right-of-Way Notification and 48-hour notice must be provided to HCFCD at dcid@hcfcd.hctx.net.

To apply for the HCFCD Right-of-Way Notification please go to http://apps.harriscountytx.gov/EPermits and apply for the HCFCD ROW under ROW Notification.

Failure to provide both items could result in project delays.

PAVING NOTES:

1. MINIMUM 7" REINFORCED CONCRETE W/ 8" LIME-FLY ASH STABILIZED SUBGRADE (4% LIME - 8% FLY ASH)
2. MAX TRAVERSE JOINT SPACING = 20' - 0".
3. MAX EXPANSION JOINT SPACING = 80' - 0".
4. Fc'= 4,000 PSI/ 28 DAYS; FY = 60,000 PSI
5. DEFORMED METAL STRIPS AT 8FT SPACING.
6. #4 REBAR @ 18" C-C EACH WAY.
7. THE STABILIZED SOILS SHALL BE COMPACTED TO AT LEAST 95% STANDARD PROCTOR DENSITY (ASTM D 698).

* SEE VOLUME 1 FOR PREVIOUS PAVING DESIGN FOR ACCESS ROAD, DETENTION AND OUTSIDE SWALES.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANOS
97308
LICENSED PROFESSIONAL ENGINEER
Aug 1, 2025

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION-DISINFECTION REDESIGN AMENDMENT
PLAN & PROFILES ACCESS ROAD EXTENTION STA 10+00 TO STA 13+20

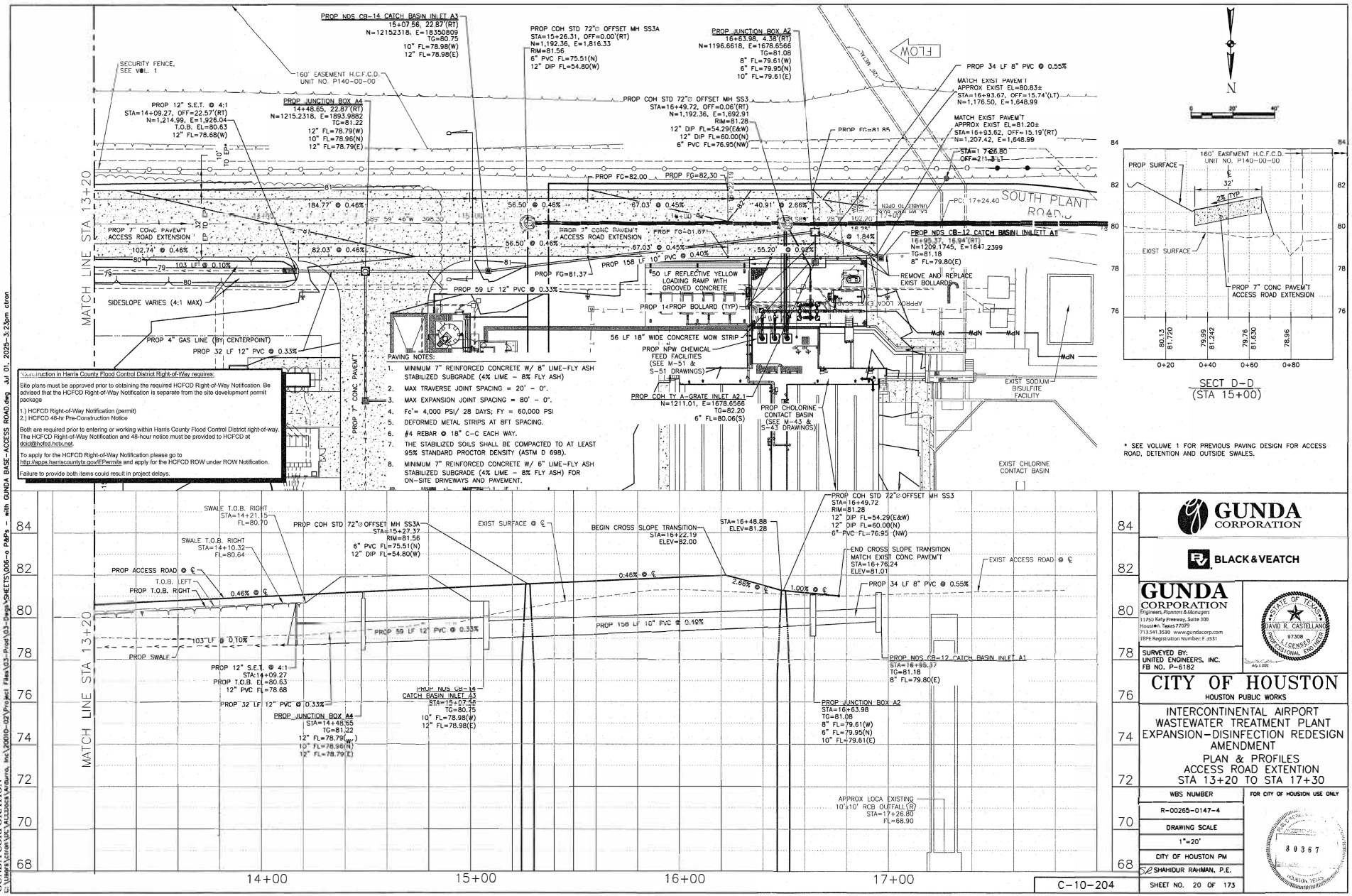
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	1"=20'
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	19 OF 173

FOR CITY OF HOUSTON USE ONLY

ACCEPTED
80367
PROFESSIONAL ENGINEER

C-10-203

GUNDA CORPORATION
E:\Users\cfran\DCVACCDocs\Arduino_Inc\20010-021\Project Files\03-Prod\03-Dwgs\SHEETS\006-a P&Ps - with GUNDA BASE- ACCESS ROAD.dwg Jul 01, 2025 - 5:23pm cfran



GUNDA CORPORATION

GUNDA CORPORATION
BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-2531
DAVID R. CASTELLANO
97308
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS
SURVEYED BY: UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

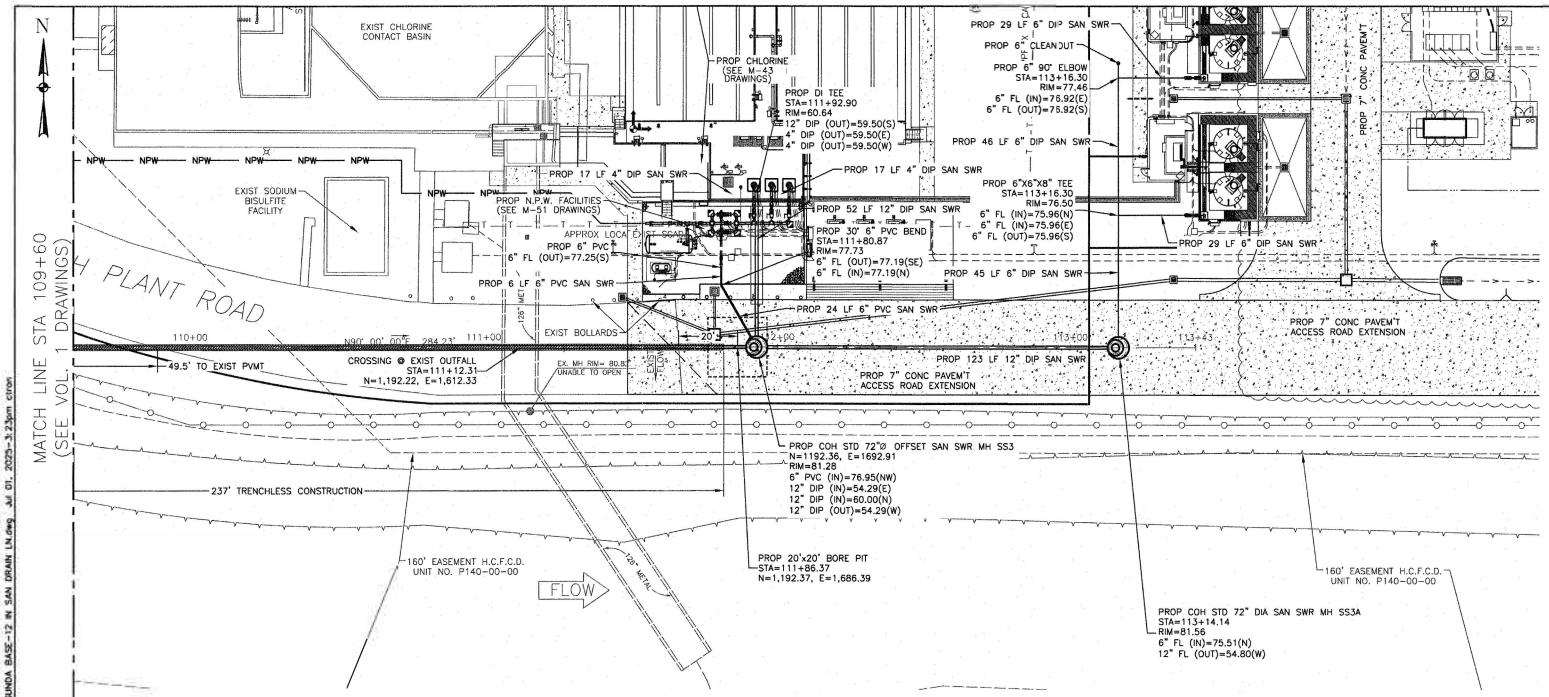
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION-DISINFECTION REDESIGN AMENDMENT
PLAN & PROFILES ACCESS ROAD EXTENTION STA 13+20 TO STA 17+30

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
1"=20'	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 20 OF 173	

80367

C-10-204

GUNDA CORPORATION
C:\Users\Vetran VA\ACCDocs\Veterans, Inc\20010-02\Project Files\03-Prod\03-Dwg\SHEETS\006-a PRPs - with GUNDA BASE-ACCESS ROAD.dwg Jul 01, 2025-3:23pm ctron



NOTE:
TRENCHLESS CONSTRUCTION OF 12" DIP SANITARY TO INCLUDE APPURTENANCES NECESSARY FOR CONSTRUCTION, INCLUDING ANNULAR GROUT, NO SEPARATE PAY.

*Construction in Harris County Flood Control District Right-of-Way requires:

Site plans must be approved prior to obtaining the required HCFCD Right-of-Way Notification. Be advised that the HCFCD Right-of-Way Notification is separate from the site development permit package

1.) HCFCD Right-of-Way Notification (permit)
2.) HCFCD 48-hr Pre-Construction Notice

Both are required prior to entering or working within Harris County Flood Control District right-of-way The HCFCD Right-of-Way Notification and 48-hour notice must be provided to HCFCD at dcid@hcfcd.hctx.net.

To apply for the HCFCD Right-of-Way Notification please go to http://apps.harriscountytx.gov/EPermits and apply for the HCFCD ROW under ROW Notification

Failure to provide both items could result in project delays

SEE NEXT SHEET FOR PROFILE

* SEE VOLUME 1 FOR PREVIOUS PAVING DESIGN FOR ACCESS ROAD, DETENTION AND OUTSIDE SWALES.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.641.3330 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED
PROFESSIONAL ENGINEER

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT

PROP SAN DRAIN LINE (PLAN)
STA 109+60 TO STA 114+00

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	1"=20'
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.

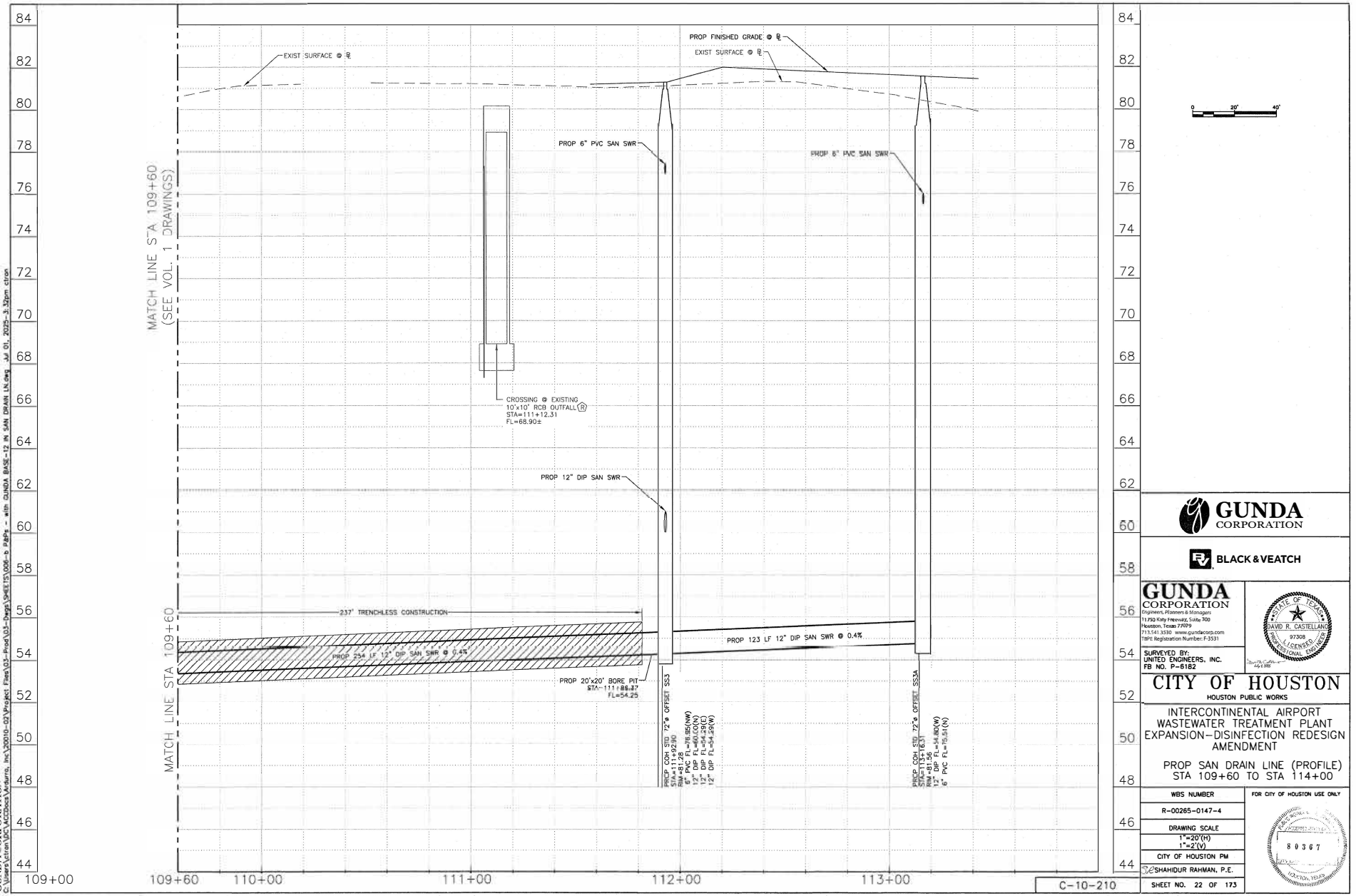
FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
80367
REGISTERED
PROFESSIONAL ENGINEER

C-10-209

SHEET NO. 21 OF 173

GUNDA CORPORATION
C:\Users\cfroh\DC\ACCDocs\Mcduro, Inc\20010-02\Project Files\03-Prod\03-Dwgs\SHEETS\006-p P&Ps - with GUNDA BASE-12 IN SAN DRAIN LN.dwg Jul 01, 2025-3:23pm cfroh



GUNDA CORPORATION
C:\Users\shahidur.rahman_hrs\3D010-02\Project Files\02-Prod\03-Dwgs\SHEETS\006-b P&Ps - with GUNDA BASE-12 IN SAN DRAIN LN.dwg Jul 01, 2025-3:32pm ctran

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED
PROFESSIONAL ENGINEER

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

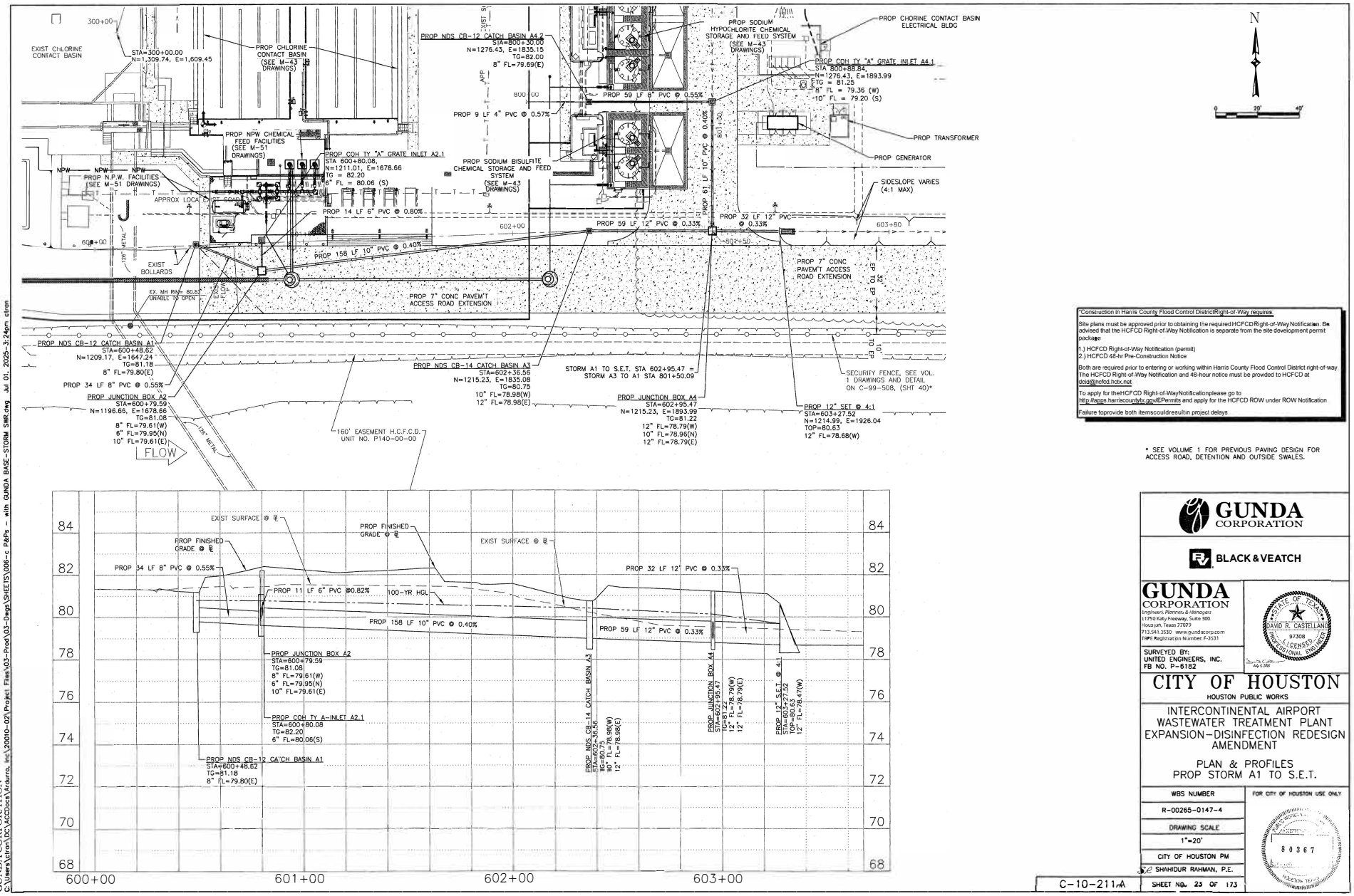
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT

PROP SAN DRAIN LINE (PROFILE) STA 109+60 TO STA 114+00

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
1"=20'(H) 1"=2'(V)	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 22 OF 173	

STATE OF TEXAS
80367
LICENSED
PROFESSIONAL ENGINEER
HOUSTON, TEXAS



*Construction in Harris County Flood Control DistrictRight-of-Way requires.

Site plans must be approved prior to obtaining the required HCFCD Right-of-Way Notification. Be advised that the HCFCD Right-of-Way Notification is separate from the site development permit package

1.) HCFCD Right-of-Way Notification (permit)
2.) HCFCD 48-hr Pre-Construction Notice

Both are required prior to entering or working within Harris County Flood Control District right-of-way The HCFCD Right-of-Way Notification and 48-hour notice must be provided to HCFCD at dold@hcfcd.hctx.net

To apply for theHCFCD Right-of-WayNotificationplease go to http://apps.harriscountytx.gov/EPermits and apply for the HCFCD ROW under ROW Notification

Failure toprovide both itemscouldresultin project delays

* SEE VOLUME 1 FOR PREVIOUS PAVING DESIGN FOR ACCESS ROAD, DETENTION AND OUTSIDE SWALES.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.461.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED PROFESSIONAL ENGINEER

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT

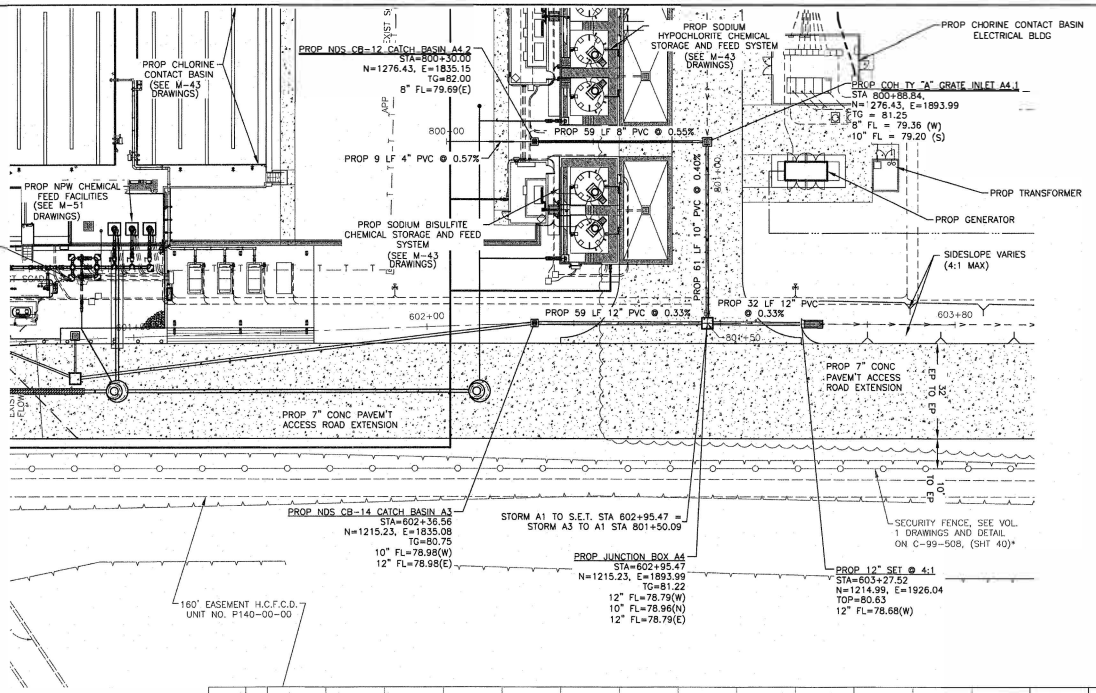
PLAN & PROFILES PROP STORM A1 TO S.E.T.

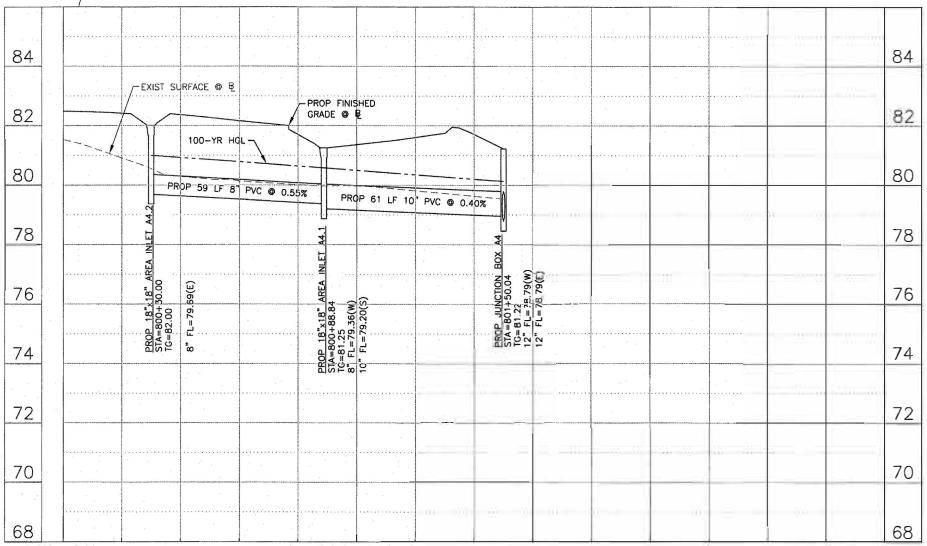
WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
1"=20'	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 23 OF 173	

80367

C-10-211-A

GUNDA CORPORATION
C:\Users\ctron\DCVACDocs\Mauro, Inc\20010-02\Project Files\03-Prod\03-Dwgs\SHEETS\006-c P&Ps - with GUNDA BASE-STORM SWR.dwg Jul 01, 2025-3:24pm ctron





*Construction in Harris County Flood Control District Right-of-Way requires:

Site plans must be approved prior to obtaining the required HCFCD Right-of-Way Notification. Be advised that the HCFCD Right-of-Way Notification is separate from the site development permit package

1.) HCFCD Right-of-Way Notification (permit)
2.) HCFCD 48-hr Pre-Construction Notice

Bothare required prior to enteringor working within Harris County Flood Control Districtright-of-way The HCFCD Right-of-Way Notification and 48-hour notice must be provided to HCFCD at dold@hcfcd.hctx.net

To apply for the HCFCD Right-of-Way Notification please go to http://apps.harriscountyfc.gov/ePermits and apply for the HCFCD ROW under ROW Notification.

Failureto provide both items could resultin project delays.

* SEE VOLUME 1 FOR PREVIOUS PAVING DESIGN FOR ACCESS ROAD, DETENTION AND OUTSIDE SWALES.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3539 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANOS
97308
LICENSED
PROFESSIONAL ENGINEER

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT

PLAN & PROFILES PROP STORM A4.2 TO A4

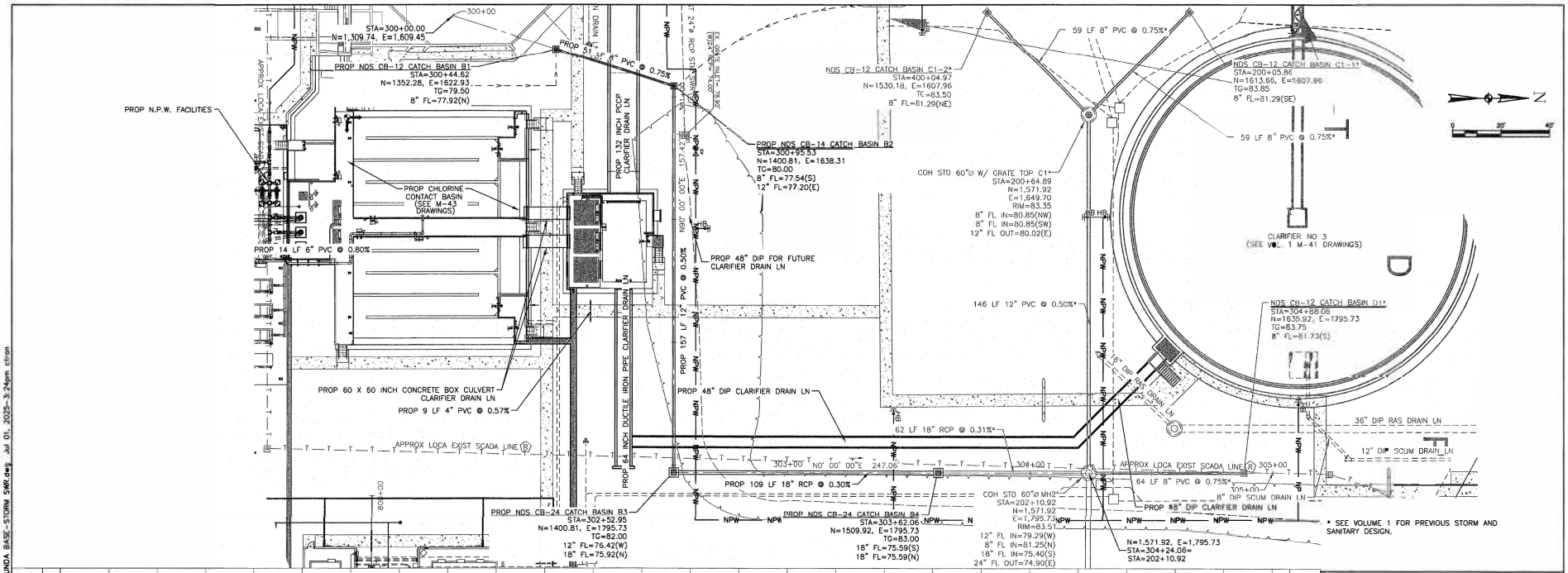
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	1"=20'
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	24 OF 173

FOR CITY OF HOUSTON USE ONLY

80367
SHAHIDUR RAHMAN
HOUSTON, TEXAS

C-10-211B

GUNDA CORPORATION
C:\Users\cron\DC\ACCDocs\MrBurro, Inc\20010-021\Project Files\03-Prod\03-Dwgs\SHEETS\006-c P&Ps - with GUNDA BASE STORM SWR.dwg Jul 01, 2025-3:24pm cron



GUNDA CORPORATION
C:\Users\cron\DC\ACCDocs\Arduro, Inc\20010-02\Project Files\03-Prod\03-Dwgs\SHEETS\006-c P&Ps - with GUNDA BASE-STORM SWR.dwg Jul 01, 2025 - 3:24pm cron

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED
PROFESSIONAL ENGINEER

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT

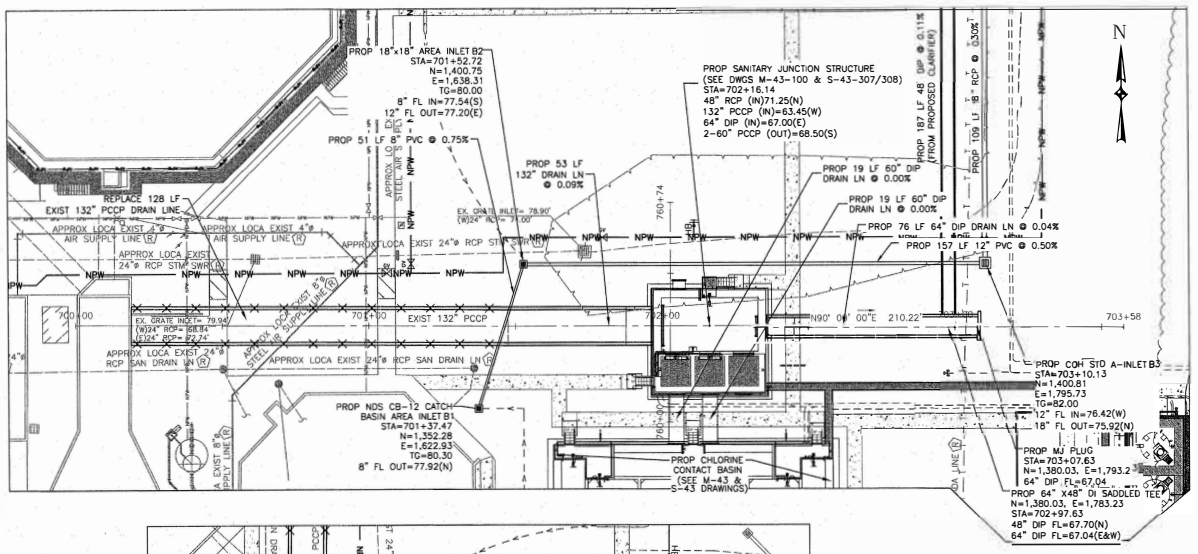
PLAN & PROFILES PROP STORM B1 TO D1

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	1"=20'(H) 1"=2' (V)
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	25 OF 173

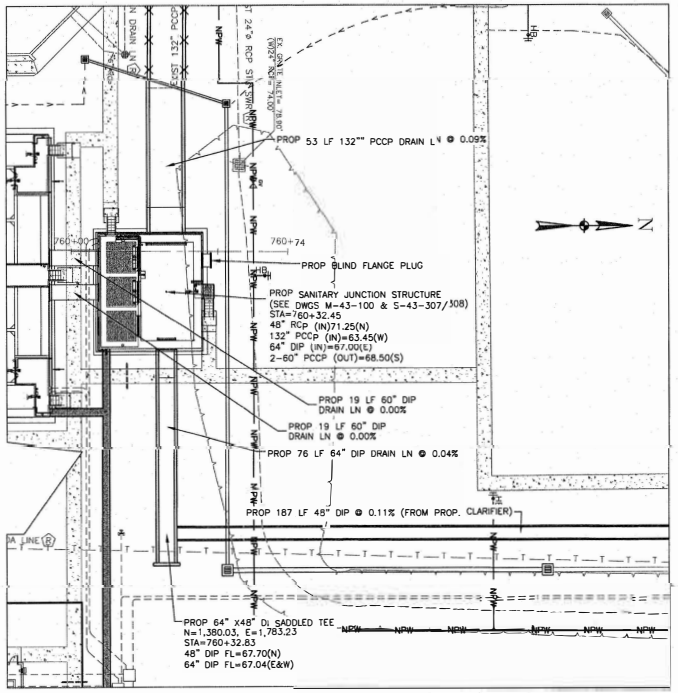
FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
80367
REGISTERED
ENGINEER

C-10-212



SEE NEXT SHEET FOR PROFILE



SEE NEXT SHEET FOR PROFILE

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3550 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANOS
97308
LICENSED
PROFESSIONAL ENGINEER

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

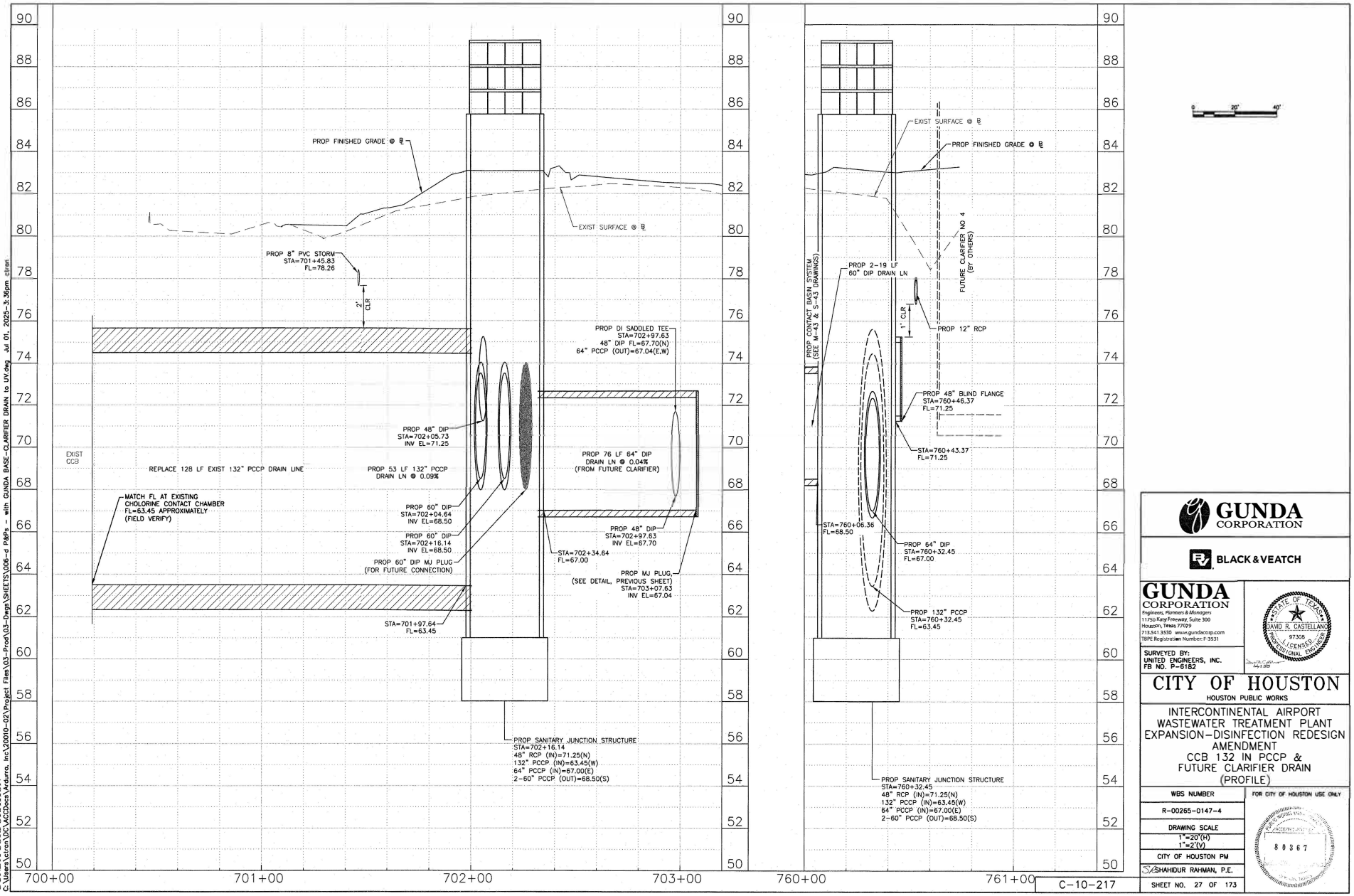
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT
CCB 132 IN PCCP & FUTURE CLARIFIER DRAIN
(PLAN)

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
1"=20'(H) 1"=2' (V)	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 26 OF 173	

PUBLIC WORKS
80367
REGISTERED
ENGINEER

C-10-216

GUNDA CORPORATION
C:\Users\ctron\DC\ACCDocs\Arduino, Inc\20010-021\Project Files\03-Prod\03-Dwgs\SHEETS\008-d P&Ps -- with GUNDA BASE-CLARIFIER DRAIN to UV.dwg Jul 01, 2025 - 3:25pm ctron



GUNDA CORPORATION
C:\Users\ctron\DCVACCDocs\Arcturus, Inc\20010-021\Project Files\03-Prod\03-Dwgs\SHEETS\006-d P&Ps - with GUNDA BASE-CLARIFIER DRAIN to UV.dwg Jul 01, 2025-3:36pm ctron

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED
PROFESSIONAL ENGINEER

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

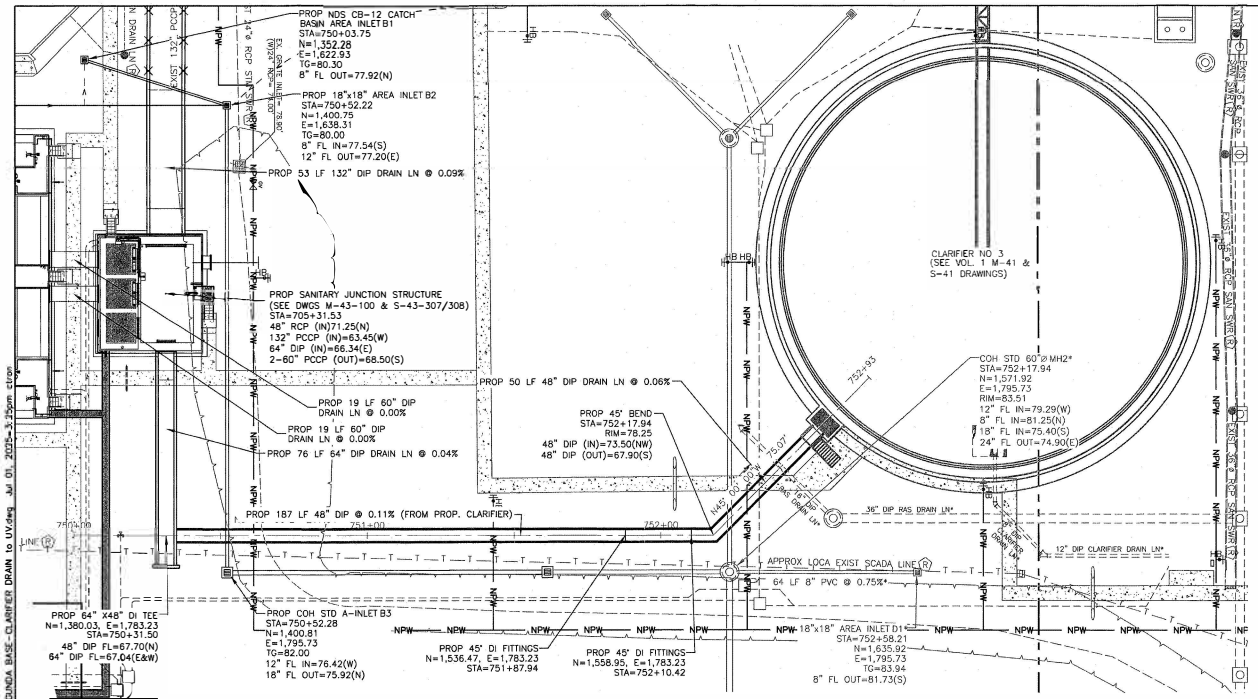
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT
CCB 132 IN PCCP & FUTURE CLARIFIER DRAIN
(PROFILE)

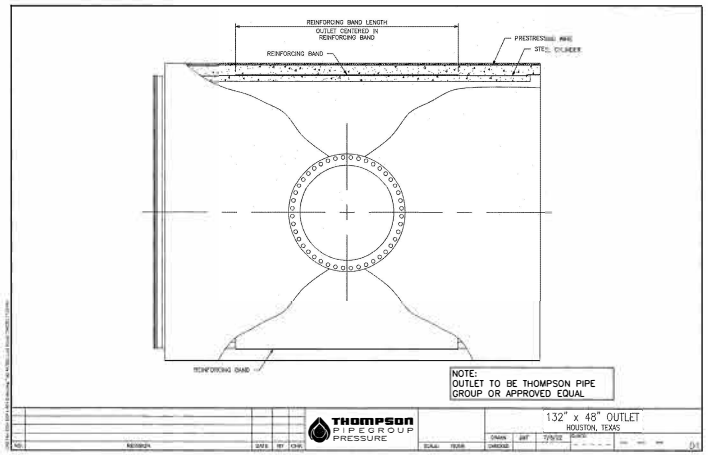
WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
1"=20'(H) 1"=2'(V)	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 27 OF 173	

STATE OF TEXAS
LICENSED
PROFESSIONAL ENGINEER
80367

C-10-217



SEE NEXT SHEET FOR PROFILE



* SEE VOLUME 1 FOR PREVIOUS STORM AND SANITARY DESIGN.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3539 www.gundacorp.com
TBPE Registration Number: F-3331

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED PROFESSIONAL ENGINEER

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT

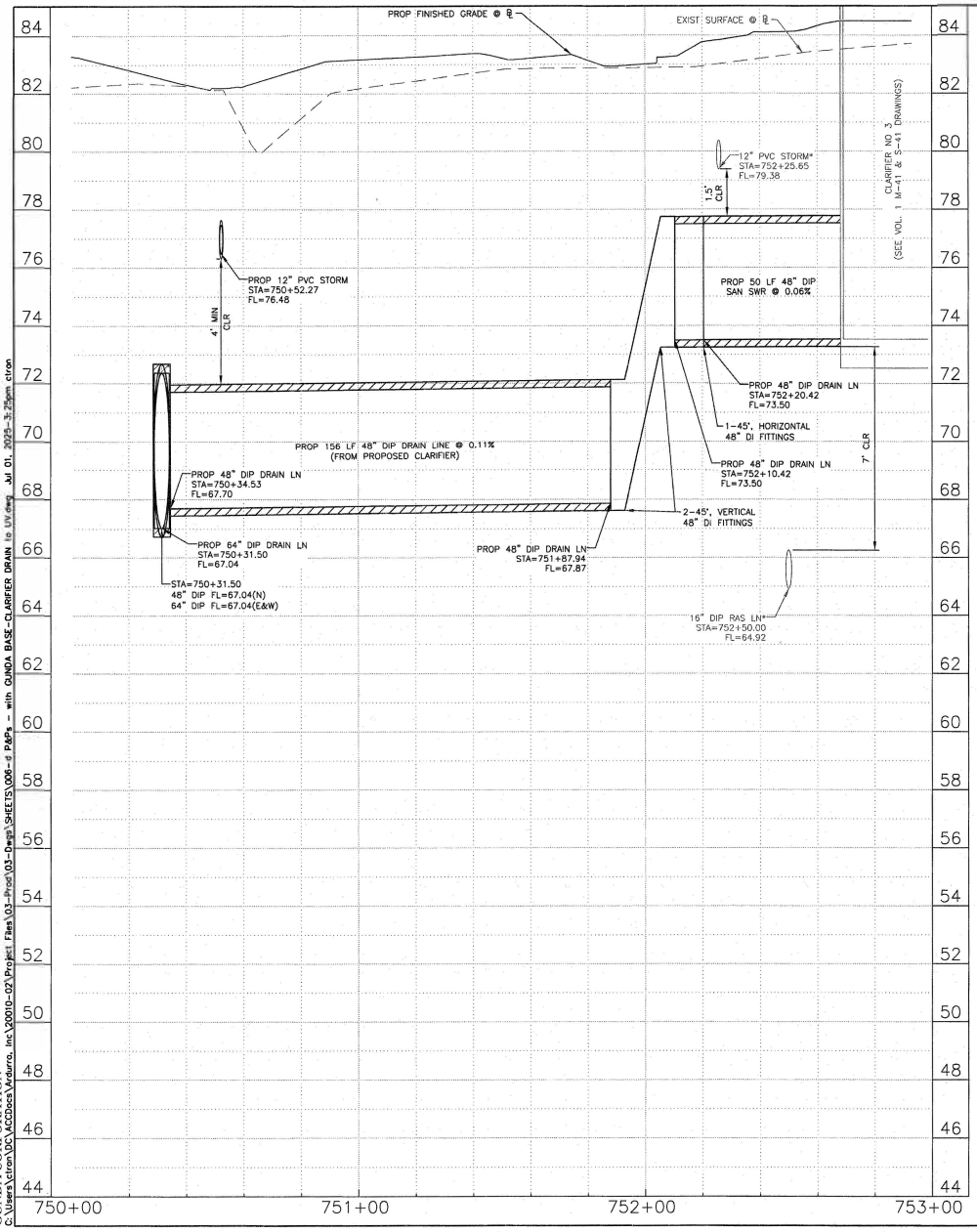
CLARIFIER–3 48 IN DIP DRAIN (PLAN)

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
1"=20'(H) 1"=2' (V)	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 28 OF 173	

STATE OF TEXAS
80367
REGISTERED PROFESSIONAL ENGINEER
HOUSTON, TEXAS

C-10-218

GUNDA CORPORATION
C:\Users\tcram\DC\ACCDocs\Arcadis, Inc\20010-021\Project Files\03-Proj\01-Dwgs\SHEETS\006-3 P&P's - with GUNDA BASE-CLARIFIER DRAIN to UV.dwg Jul 01, 2025-3:25pm ctran



0 20' 40'

* SEE VOLUME 1 FOR PREVIOUS STORM AND SANITARY DESIGN.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED
PROFESSIONAL ENGINEER

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION–DISINFECTION REDESIGN
AMENDMENT

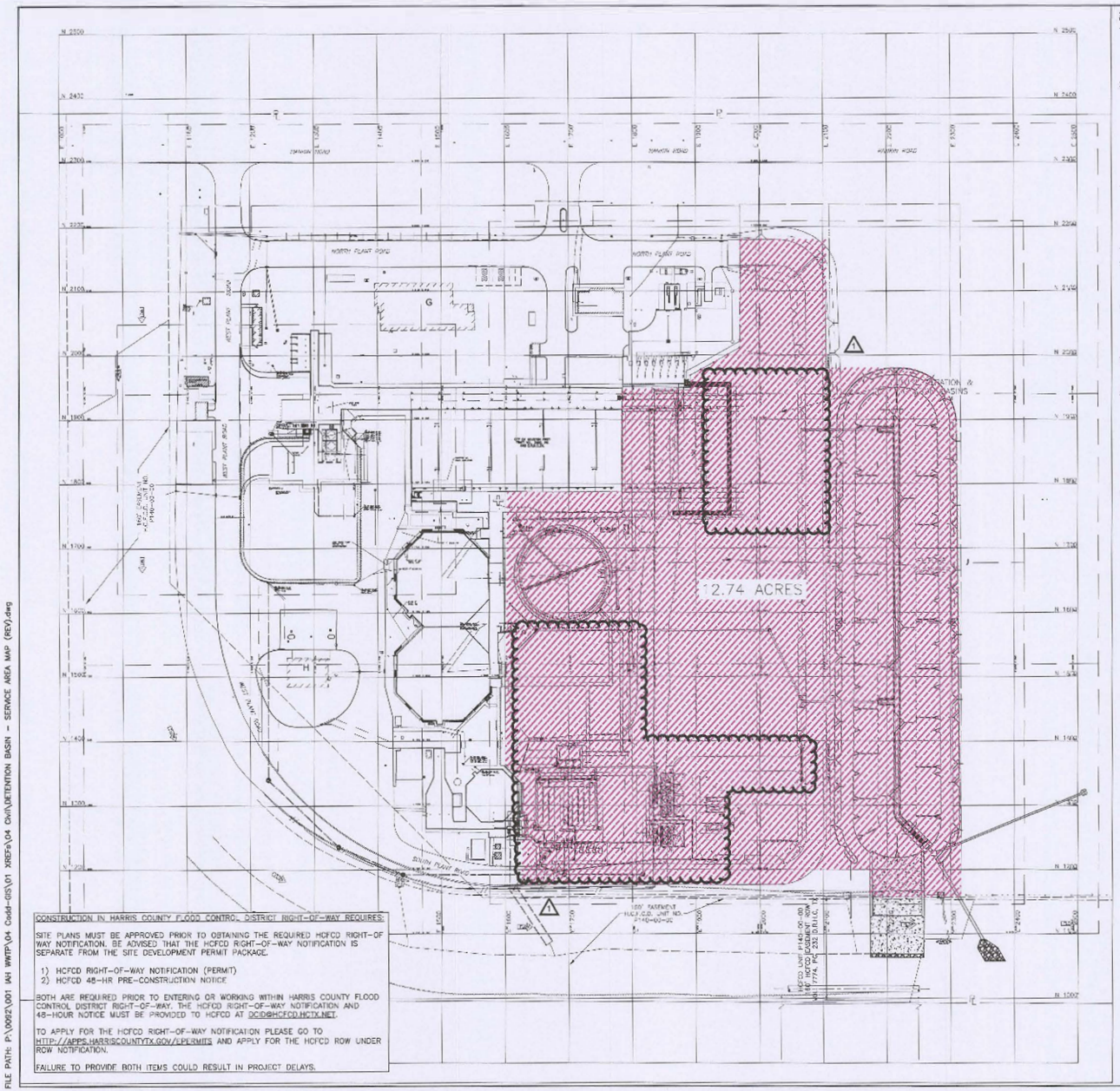
CLARIFIER–3 48 IN DIP DRAIN
(PROFILE)

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
1"=20'(H) 1"=2'(V)	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 29 OF 173	

80367

C-10-219

GUNDA CORPORATION
C:\Users\ctron\OC\ACCDocs\Mburro, Inc\20010-02\Project Files\03-Final\03-Dwgs\SHEETS\008-a P&Ps - with GUNDA BASE-CLARIFIER DRAIN to UV.dwg Jul 01, 2025-3:25pm ctron



STANDARD HCFCD NOTES FOR CONSTRUCTION DRAWINGS

1. OBTAIN AND COMPLY WITH ALL APPLICABLE CITY, COUNTY, STATE, AND FEDERAL PERMITS AND APPROVALS, WITH ASSISTANCE FROM ENGINEER. IF NECESSARY, OBTAIN PERMIT (CERTIFICATION) FROM HARRIS COUNTY ENGINEER TO ENTER HARRIS COUNTY FLOOD CONTROL DISTRICT RIGHT-OF-WAY.
2. NOTIFY THE HARRIS COUNTY FLOOD CONTROL DISTRICT'S DEVELOPMENT COORDINATION AND INSPECTION DEPARTMENT IN WRITING AT LEAST 48 HOURS PRIOR TO CONSTRUCTION. SUBMIT THE HCFCD 48 HOUR PRE-CONSTRUCTION NOTIFICATION FORM, A COPY OF THE APPROVED CONSTRUCTION DRAWINGS, AND A COPY OF THE CORPS OF ENGINEERS INDIVIDUAL SECTION 404 PERMIT OR COMPLIANCE WITH NATIONWIDE PERMIT, IF APPLICABLE, TO HCFCD, 9900 NORTHWEST FREEWAY, HOUSTON, TEXAS 77092, ATTN: DEVELOPMENT COORDINATION AND INSPECTION DEPT. BY HAND DELIVERY, BY EMAIL DCID@HCFCD.ORG, OR FAX TO 713-684-4129 (FAX NUMBER).
3. ENGINEER SHALL SUBMIT CERTIFICATION LETTER AND RECORD DRAWINGS TO THE HARRIS COUNTY FLOOD CONTROL DISTRICT'S DEVELOPMENT COORDINATION AND INSPECTION SECTION REQUESTING INSPECTION OF ITEMS CONSTRUCTED IN HARRIS COUNTY FLOOD CONTROL DISTRICT RIGHT-OF-WAY. PRIOR TO REQUESTING INSPECTION, THE DRAINAGE RIGHT-OF-WAY AND/OR EASEMENTS SHALL BE STAKED AND FLAGGED.
4. PROTECT, MAINTAIN, AND RESTORE EXISTING BACKSLOPE DRAINAGE SYSTEMS.
5. BACKSLOPE SWALE AND INTERCEPTOR STRUCTURE ELEVATIONS AND LOCATIONS SHOWN ON PLANS ARE APPROXIMATE. FINAL ELEVATIONS AND LOCATIONS SHALL BE FIELD VERIFIED BY THE ENGINEER PRIOR TO INSTALLATION.
6. ESTABLISH TURF GRASS ON ALL DISTURBED AREAS WITHIN THE CHANNEL OR DETENTION RIGHT-OF-WAY, EXCEPT THE CHANNEL BOTTOM AND WHERE STRUCTURAL EROSION MEASURES ARE USED. MINIMUM ACCEPTANCE CRITERIA ARE 75% COVERAGE OF LIVE BERMUDA GRASS AND NO EROSION OR RILLS DEEPER THAN 4".
7. PERFORM ALL ACTIVITIES WITHIN HARRIS COUNTY FLOOD CONTROL DISTRICT RIGHT-OF-WAY IN ACCORDANCE WITH THE MOST RECENT HARRIS COUNTY FLOOD CONTROL DISTRICT STANDARD SPECIFICATIONS BOOK.
8. EXCAVATE CHANNEL FLOWLINE TO DESIGN ELEVATION AS SHOWN ON PLANS AND DOWNSTREAM, AS NECESSARY, TO ENSURE NO WATER REMAINS IN THE FACILITY (STORM SEWER, LATERAL CHANNEL, OR DRY BOTTOM DETENTION BASIN) DURING NORMAL WATER SURFACE CONDITIONS IN THE CHANNEL, SO THE FACILITY WILL FUNCTION AS INTENDED. FOR WET BOTTOM DETENTION BASINS, ENSURE NO WATER IS ABOVE THE DESIGN LEVEL IN THE WET BOTTOM DURING NORMAL WATER SURFACE CONDITIONS IN THE CHANNEL.
9. MAINTAIN FLOW IN CHANNEL DURING CONSTRUCTION AND RESTORE CHANNEL TO ORIGINAL CONDITION.
10. REMOVE ALL EXCAVATED MATERIAL FROM THE HARRIS COUNTY FLOOD CONTROL DISTRICT OR DRAINAGE RIGHT-OF-WAY. NO FILL IS TO BE PLACED WITHIN A DESIGNATED FLOOD PLAIN AREA WITHOUT FIRST OBTAINING A FILL PERMIT FROM THE APPROPRIATE JURISDICTIONAL AUTHORITY.

N

0' 40' 80' 160'
SCALE: 1"=80'

CONSTRUCTION IN HARRIS COUNTY FLOOD CONTROL DISTRICT RIGHT-OF-WAY REQUIRES:

SITE PLANS MUST BE APPROVED PRIOR TO OBTAINING THE REQUIRED HCFCD RIGHT-OF WAY NOTIFICATION. BE ADVISED THAT THE HCFCD RIGHT-OF-WAY NOTIFICATION IS SEPARATE FROM THE SITE DEVELOPMENT PERMIT PACKAGE.

1) HCFCD RIGHT-OF-WAY NOTIFICATION (PERMIT)
2) HCFCD 48-HR PRE-CONSTRUCTION NOTICE

BOTH ARE REQUIRED PRIOR TO ENTERING OR WORKING WITHIN HARRIS COUNTY FLOOD CONTROL DISTRICT RIGHT-OF-WAY. THE HCFCD RIGHT-OF-WAY NOTIFICATION AND 48-HOUR NOTICE MUST BE PROVIDED TO HCFCD AT DCID@HCFCD.HCTX.NET.

TO APPLY FOR THE HCFCD RIGHT-OF-WAY NOTIFICATION PLEASE GO TO HTTP://APPS.HARRISCOUNTYTX.GOV/LPERMITS AND APPLY FOR THE HCFCD ROW UNDER ROW NOTIFICATION.

FAILURE TO PROVIDE BOTH ITEMS COULD RESULT IN PROJECT DELAYS.

LEGEND:
SERVICE AREA

NO	DATE	REVISION	APP
1	10/24/2024	DISINFECTION REDESIGN AMENDMENT	PAB

5engineering

BLACK & VEATCH

5ENGINEERING, LLC
11200 WESTHEIMER ROAD
SUITE 353
HOUSTON, TX 77042
(832) 800-3483
TX FIRM NUMBER F-13748

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
PIERO BATTISTINI
104895
LICENSED PROFESSIONAL ENGINEER
10/24/2024

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION-DISINFECTION REDESIGN AMENDMENT
CIVIL

DETENTION BASIN SERVICE AREA MAP

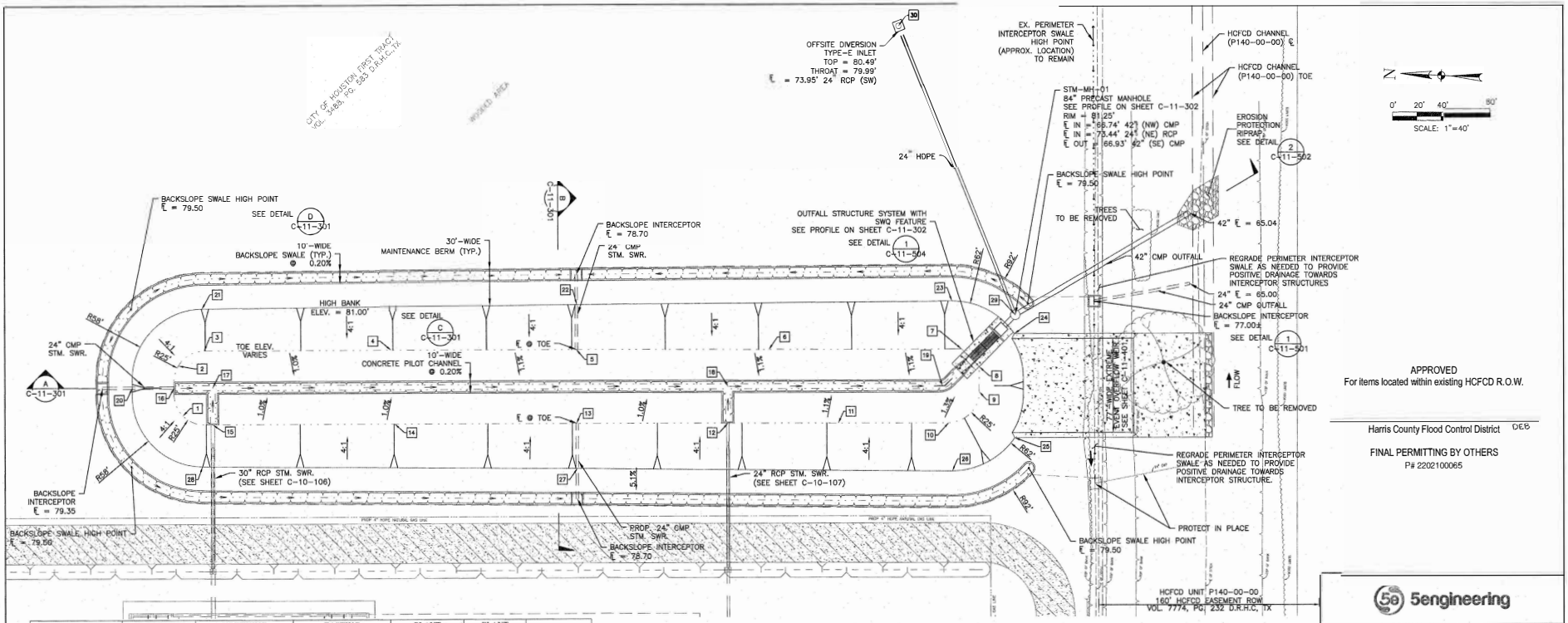
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	29A OF 173

FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
SHAHIDUR RAHMAN
80367
LICENSED PROFESSIONAL ENGINEER
HOUSTON, TEXAS

C-11-101

FILE PATH: P:\0092\001 IAH WWTP\04 Cadd-GIS\01 XREFs\04 Civil\DETENTION BASIN - SERVICE AREA MAP (REV).dwg



POINT DESCRIPTION	COGO POINT NUMBER	NORTHING	EASTING	PLANT NORTHING	PLANT EASTING	ELEVATION
TOE	1	13,917,316.15	3,123,358.77	2,193.21	1,907.97	72.68'
TOE	2	13,917,321.73	3,123,399.24	2,238.47	1,908.00	72.48'
TOE	3	13,917,300.97	3,123,412.22	2,245.97	1,890.35	72.45'
TOE	4	13,917,148.02	3,123,419.43	2,245.91	1,736.59	72.15'
TOE	5	13,916,995.92	3,123,426.60	2,245.86	1,584.80	71.85'
TOE	6	13,916,838.16	3,123,434.07	2,245.81	1,429.96	71.55'
TOE	7	13,916,680.40	3,123,441.48	2,245.76	1,269.09	70.92'
TOE	8	13,916,665.21	3,123,427.66	2,231.24	1,254.58	70.92'
TOE	9	13,916,664.25	3,123,407.20	2,210.75	1,254.58	70.92'
TOE	10	13,916,688.04	3,123,381.05	2,185.76	1,279.59	71.25'
TOE	11	13,916,778.61	3,123,376.79	2,185.79	1,367.76	71.43'
TOE/PILOT CHANNEL	12	13,916,869.17	3,123,372.54	2,185.75	1,460.92	71.61'
TOE	13	13,916,993.09	3,123,366.67	2,185.86	1,584.58	71.85'
TOE	14	13,917,142.20	3,123,359.65	2,185.91	1,734.85	72.14'
TOE/PILOT CHANNEL	15	13,917,291.31	3,123,352.64	2,185.77	1,883.53	72.44'
TOE/PILOT CHANNEL	16	13,917,324.52	3,123,381.08	2,215.75	1,915.36	72.45'
PILOT CHANNEL	17	13,917,292.72	3,123,382.58	2,215.75	1,883.52	71.19'
PILOT CHANNEL	18	13,916,870.58	3,123,402.48	2,215.75	1,460.92	70.34'
PILOT CHANNEL	19	13,916,694.61	3,123,410.78	2,215.74	1,286.56	69.99'
TOB	20	13,917,358.67	3,123,379.47	2,215.98	1,949.54	81.00'
TOB	21	13,917,304.26	3,123,446.29	2,280.15	1,892.02	81.00'
TOB	22	13,916,997.07	3,123,463.19	2,282.46	1,584.38	81.00'
TOB	23	13,916,689.82	3,123,480.09	2,284.77	1,276.74	81.00'
TOB	24	13,916,637.31	3,123,456.02	2,258.25	1,225.42	81.00'
TOB	25	13,916,633.36	3,123,371.12	2,173.25	1,225.44	81.00'
TOB	26	13,916,683.39	3,123,342.20	2,146.74	1,276.78	81.00'
TOB	27	13,916,990.82	3,123,330.13	2,149.26	1,584.42	81.00'
TOB	28	13,917,298.22	3,123,318.06	2,151.78	1,892.06	81.00'
OUTFALL MH-01 (RIM)	29	13,916,637.35	3,123,471.28	2,273.48	1,224.71	81.25'
TYPE-E INLET (TOP)	30	13,916,743.38	3,123,702.82	2,509.77	1,319.71	80.49'

TSARP CONVERSION REFERENCE (TSARP)

HARRIS COUNTY FLOODPLAIN REFERENCE MARKERS

FLOOD PLAIN REFERENCE MARK BRASS DISK STAMPED 150670. FROM THE INTERSECTION OF GREENS ROAD AND GREENVIEW DRIVE, TRAVEL NORTH ON GREENVIEW APPROXIMATELY 0.31 MILE TO DEAD END. TRAVEL EAST ALONG DRAINAGE EASEMENT 240 FEET TO BEND IN DITCH. MONUMENT IS LOCATED NEAR TOP OF BANK AT THE END OF BEND. PUBLISHED ELEV= 80.70' (NAVD 1988, 2001 ADJUSTMENT) OBSERVED ELEV= 80.08' (NAVD 1988, COMPUTED USING GEOID 12A)

FLOOD PLAIN REFERENCE MARK, BRASS DISK STAMPED 150675 FROM THE INTERSECTION OF RANKIN ROAD AND AIR CENTER BOULEVARD, MONUMENT IS LOCATED IN THE MEDIAN OF RANKIN ROAD. PUBLISHED ELEV= 83.51' (NAVD 1988, 2001 ADJUSTMENT) OBSERVED ELEV= 83.01' (NAVD 1988, COMPUTED USING GEOID 12A)

THE NORTHING & EASTING COORDINATES SHOWN ARE GRID COORDINATES AND MAY BE BROUGHT TO SURFACE BY APPLYING THE FOLLOWING COMBINED SCALE FACTOR: 0.99992388387.

PLANT COORDINATES ARE NOT SCALED.

STORM WATER DRAINAGE DESIGN REPORT

REPORT TITLED: INTERCONTINENTAL AIRPORT WWTP EXPANSION DRAINAGE IMPACT ANALYSIS

DATE: 06/22/2022 BY: 5ENGINEERING, LLC

FLOODPLAIN INFORMATION

AREA DETERMINED TO BE OUTSIDE THE 500-YEAR FLOODPLAIN (ZONE-X) BASED ON F.I.R.M. #48201C0480M, PANEL #480 OF #1150 (REF. JUNE 9, 2014). 100 YEAR BASE FLOOD ELEV. @ S.E. CNR = 75.7 FEET 500 YEAR BASE FLOOD ELEVATION @ S.E. CNR. = 77.0 FEET

CONSTRUCTION IN HARRIS COUNTY FLOOD CONTROL DISTRICT RIGHT-OF-WAY REQUIRES:

SITE PLANS MUST BE APPROVED PRIOR TO OBTAINING THE REQUIRED HCFCD RIGHT-OF-WAY NOTIFICATION. BE ADVISED THAT THE HCFCD RIGHT-OF-WAY NOTIFICATION IS SEPARATE FROM THE SITE DEVELOPMENT PERMIT PACKAGE

1) HCFCD RIGHT-OF-WAY NOTIFICATION (PERMIT)
2) HCFCD 48-HR PRE-CONSTRUCTION NOTICE

BOTH ARE REQUIRED PRIOR TO ENTERING OR WORKING WITHIN HARRIS COUNTY FLOOD CONTROL DISTRICT RIGHT-OF-WAY. THE HCFCD RIGHT-OF-WAY NOTIFICATION AND 48-HOUR NOTICE MUST BE PROVIDED TO HCFCD AT DOD@HCFCD.HCTX.NET.

TO APPLY FOR THE HCFCD RIGHT-OF-WAY NOTIFICATION PLEASE GO TO HTTP://APPS.HARRISCOUNTYTX.GOV/SPERMITS AND APPLY FOR THE HCFCD ROW UNDER ROW NOTIFICATION.

FAILURE TO PROVIDE BOTH ITEMS COULD RESULT IN PROJECT DELAYS

ALL DIMENSIONS IN FEET UNLESS OTHERWISE NOTED

APPROVED
For items located within existing HCFCD R.O.W.

Harris County Flood Control District DCB

FINAL PERMITTING BY OTHERS
P# 2202100065

5engineering

BLACK & VEATCH

5ENGINEERING, LLC
11200 WESTHEIMER ROAD
SUITE 353
HOUSTON, TX 77042
(832) 800-3483
TX FIRM NUMBER F-13748

STATE OF TEXAS PIERO BATTISTINI 104895 LICENSED PROFESSIONAL ENGINEER 05/10/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

CIVIL

DETENTION BASIN LAYOUT

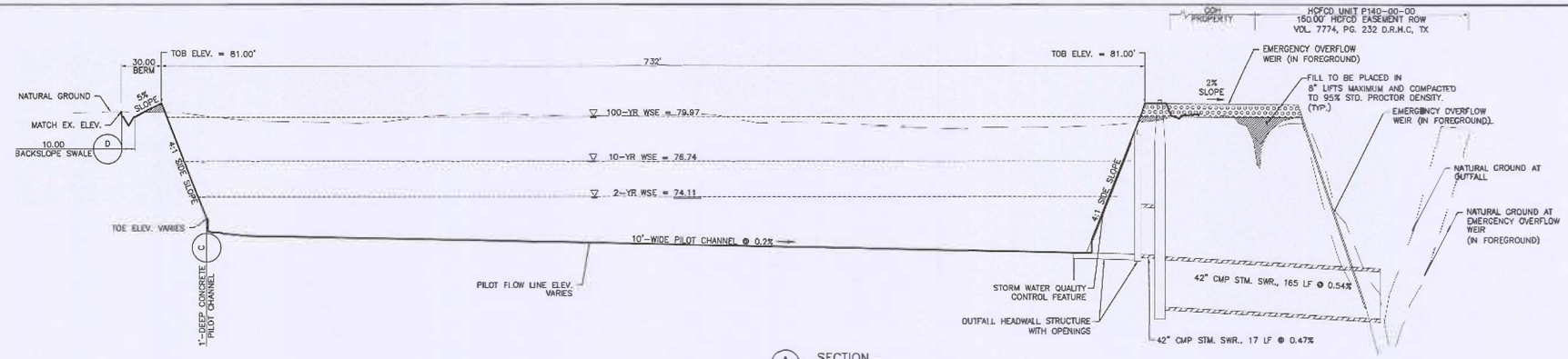
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	29B OF 173

FOR CITY OF HOUSTON USE ONLY

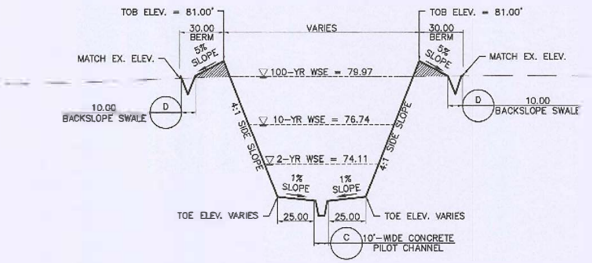
STATE OF TEXAS SHAHIDUR RAHMAN 80367 REGISTERED PROFESSIONAL ENGINEER HOUSTON, TEXAS

C-11-102

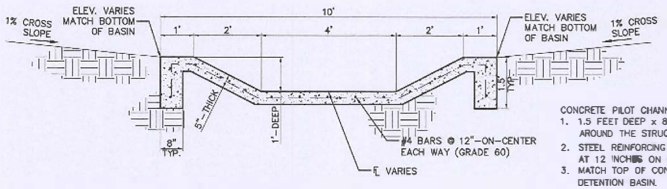
FILE PATH: P:\0092\001\04 Cadd-GIS\02 SHEETS\11 - DETENTION\C-11-102 DETENTION BASIN - LAYOUT.dwg



A SECTION
HORZ. 1" = 40'
VERT. 1" = 4'

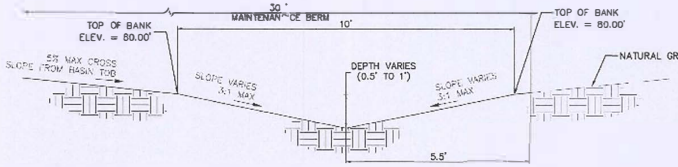


B SECTION
HORZ. 1" = 40'
VERT. 1" = 4'



C PILOT CHANNEL
NTS

CONCRETE PILOT CHANNEL NOTES:
1. 1.5 FEET DEEP x 8-INCH WIDE TOE ALL AROUND THE STRUCTURE.
2. STEEL REINFORCING - #4 BARS (GRADE 60) AT 12 INCHES ON CENTER EACH WAY.
3. MATCH TOP OF CONCRETE WITH BOTTOM OF DETENTION BASIN.



D BACKSLOPE INTERCEPTOR SWALE
NTS

BACKSLOPE INTERCEPTOR SWALE NOTES:
1. SEE DETAIL ON C-11-501 FOR INTERCEPTOR CONCRETE STRUCTURE DETAIL INCLUDING PIPING TO POND.

DETENTION SUMMARY

	Project Name: IAH WWTP Expansion		Date:	07/01/2021
	Gross Detention Area (acres)		62.76	
	Effective Drainage Area (acres)		57.34	
	Runoff Coefficient	Pre-Development	Post-Development	Fully Developed
	Developing Condition	0.40	0.61	0.66
Flow (cfs)	Post-development Inflow (based on contributing area)	89	89	166
	Maximum Allowable Outflow (pre-development peak flow)	89	89	89
	Maximum Outflow Provided (peak flow from basin)	89	89	89
Elevation (USGS NGVD 1929 Datum)	Lowest National or Finished Ground Elevation Entrance	86	86	86
	Maximum Allowable Water Surface Elevation (WSE)		88	
	Basis of Maximum WSE	Lowest Finished Ground Elevation		
	Design Water Surface Elevation	74.11	76.74	79.97
	Water Surface Elevation Calculated	74.11	76.74	79.97
Storage	Minimum Storage Required (ac-ft)		9.41	
	Detention Storage Provided (ac-ft)	4.65	8.47	14.51
	Storage Ratio Provided (ac ft/acre)	0.81	0.86	1.52
Outflow Structure	Restrictor Size, if applicable (ft or ft²)		1.0' Circular Restrictor @ elev. 76.52 1.00'(H) open Rectangular @ 76.52	
	Outflow Pipe Size (ft or ft²)		3.0 ft	
	Outflow Velocity into Channel (fps)	2.0	7.3	8.0
	Weir Description, if applicable (type, size, elevation, etc.)		N/A	
	Drain Time - Gravity (hours)		24.00 Hours (24 Hours ≤ 72 Hours)	
	Emergency Overflow (type, size, elevation, etc.)		Trapezoidal concrete-lined weir (W = 97.00 ft, SS = 5.0, h = 79.97')	

*TABLE FROM DRAINAGE IMPACT ANALYSIS REPORT

TSARP CONVERSION REFERENCE (TSARP)

HARRIS COUNTY FLOODPLAIN REFERENCE MARKERS
FLOOD PLAIN REFERENCE MARK BRASS DISK STAMPED 150670. FROM THE INTERSECTION OF GREENS ROAD AND GREENVIEW DRIVE, TRAVEL NORTH ON GREENVIEW APPROXIMATELY 0.31 MILE TO DEAD END. TRAVEL EAST ALONG DRAINAGE EASEMENT 240 FEET TO BEND IN DITCH. MONUMENT IS LOCATED NEAR TOP OF BANK AT THE END OF BEND. PUBLISHED ELEV= 80.70' (NAVD 1988, 2001 ADJUSTMENT) OBSERVED ELEV= 80.08' (NAVD 1988, COMPUTED USING GEOID 12A)

FLOOD PLAIN REFERENCE MARK, BRASS DISK STAMPED 150675. FROM THE INTERSECTION OF RANKIN ROAD AND AIR CENTER BOULEVARD, MONUMENT IS LOCATED IN THE MEDIAN OF RANKIN ROAD. PUBLISHED ELEV= 83.51' (NAVD 1988, 2001 ADJUSTMENT) OBSERVED ELEV= 83.01' (NAVD 1988, COMPUTED USING GEOID 12A)

CONSTRUCTION IN HAR

SITE PLANS MUST BE APPROVED PRIOR TO OBTAINING THE REQUIRED HCFCD RIGHT-OF WAY NOTIFICATION. BE ADVISED THAT THE HCFCD RIGHT-OF-WAY NOTIFICATION IS SEPARATE FROM THE SITE DEVELOPMENT PERMIT PACKAGE.

1) HCFCD RIGHT-OF-WAY NOTIFICATION (PERMIT)
2) HCFCD 48-HR PRE-CONSTRUCTION NOTICE

BOTH ARE REQUIRED PRIOR TO ENTERING OR WORKING WITHIN HARRIS COUNTY FLOOD CONTROL DISTRICT RIGHT-OF-WAY. THE HCFCD RIGHT-OF-WAY NOTIFICATION AND 48-HOUR NOTICE MUST BE PROVIDED TO HCFCD AT DOIC@HCFCD.HCTX.NET.

TO APPLY FOR THE HCFCD RIGHT-OF-WAY NOTIFICATION PLEASE GO TO HTTP://APPS.HARRISCOUNTYTX.GOV/EPERMITS AND APPLY FOR THE HCFCD ROW UNDER ROW NOTIFICATION.

FAILURE TO PROVIDE BOTH ITEMS COULD RESULT IN PROJECT DELAYS.

FLOODPLAIN INFORMATION

AREA DETERMINED TO BE OUTSIDE THE 500-YEAR FLOODPLAIN (ZONE-X) BASED ON F.I.R.M. #48201C0480M, PANEL #480 OF #1150 (REF. JUNE 9, 2014). 100 YEAR BASE FLOOD ELEV. @ S.E. CNR = 75.7 FEET 500 YEAR BASE FLOOD ELEVATION @ S.E. CNR. = 77.0 FEET

ALL DIMENSIONS IN FEET UNLESS OTHERWISE NOTED

C-11-301

5engineering

BLACK & VEATCH

5ENGINEERING, LLC
11200 WESTHEIMER ROAD
SUITE 353
HOUSTON, TX 77042
(832) 800-3483
TX FIRM NUMBER F-13748

STATE OF TEXAS
PEDRO BATTISTINI
104895
LICENSED PROFESSIONAL ENGINEER
08/10/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION

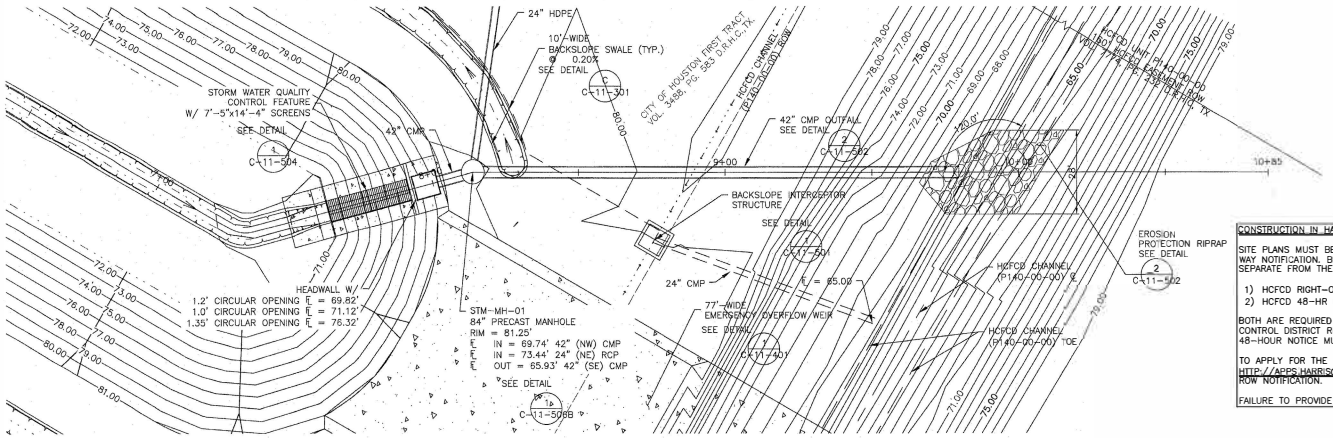
CIVIL

DETENTION BASIN SECTIONS

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 29C OF 173	

STATE OF TEXAS
80367
REGISTERED
PROFESSIONAL
ENGINEER

FILE PATH: P:\0092\001\04 Cadd-GIS\02 SHEETS\11 - DETENTION\C-11-301 DETENTION BASIN - SECTIONS.dwg



CONSTRUCTION IN HARRIS COUNTY FLOOD CONTROL DISTRICT RIGHT-OF-WAY REQUIRES:

SITE PLANS MUST BE APPROVED PRIOR TO OBTAINING THE REQUIRED HCFCD RIGHT-OF WAY NOTIFICATION. BE ADVISED THAT THE HCFCD RIGHT-OF-WAY NOTIFICATION IS SEPARATE FROM THE SITE DEVELOPMENT PERMIT PACKAGE.

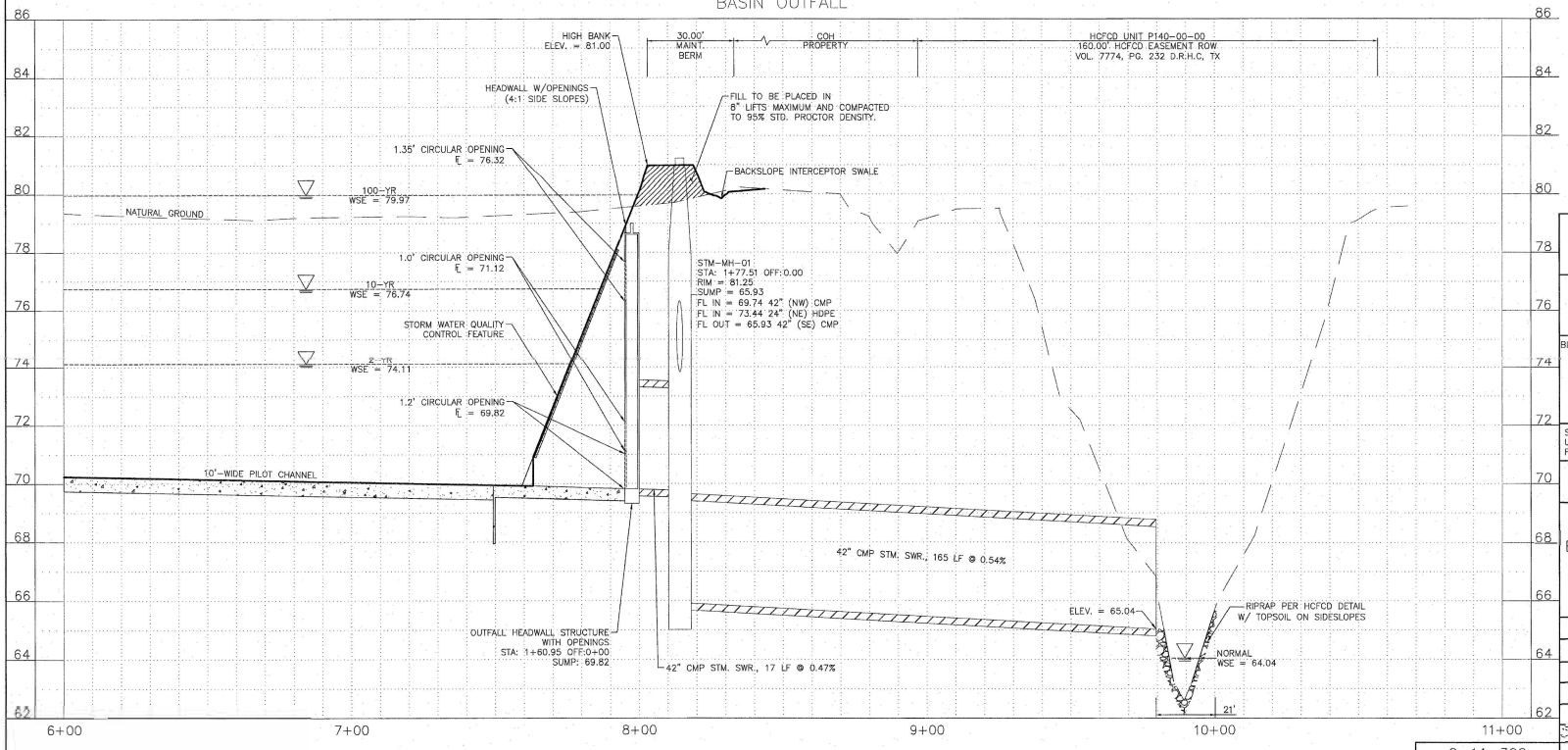
1) HCFCD RIGHT-OF-WAY NOTIFICATION (PERMIT)
2) HCFCD 48-HR PRE-CONSTRUCTION NOTICE

BOTH ARE REQUIRED PRIOR TO ENTERING OR WORKING WITHIN HARRIS COUNTY FLOOD CONTROL DISTRICT RIGHT-OF-WAY. THE HCFCD RIGHT-OF-WAY NOTIFICATION AND 48-HOUR NOTICE MUST BE PROVIDED TO HCFCD AT DCID@HCFCD.HCTX.NET.

TO APPLY FOR THE HCFCD RIGHT-OF-WAY NOTIFICATION PLEASE GO TO HTTP://APPS.HARRISCOUNTYTX.GOV/EPERMITS AND APPLY FOR THE HCFCD ROW UNDER ROW NOTIFICATION.

FAILURE TO PROVIDE BOTH ITEMS COULD RESULT IN PROJECT DELAYS.

BASIN OUTFALL



C-11-302

MAINTENANCE NOTES:

ALL DRAINAGE FACILITIES INCLUDING PIPE OUTFALL SHALL BE MAINTAINED BY THE CITY OF HOUSTON.

SUBSURFACE DRAINAGE SYSTEMS ARE REQUIRED TO BE DRAINED IN 48 HOURS.

ALL DIMENSIONS IN FEET UNLESS OTHERWISE NOTED

5engineering

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS — PIERO BATTISTINI — 104895 — LICENSED PROFESSIONAL ENGINEER — 06/24/2025

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT

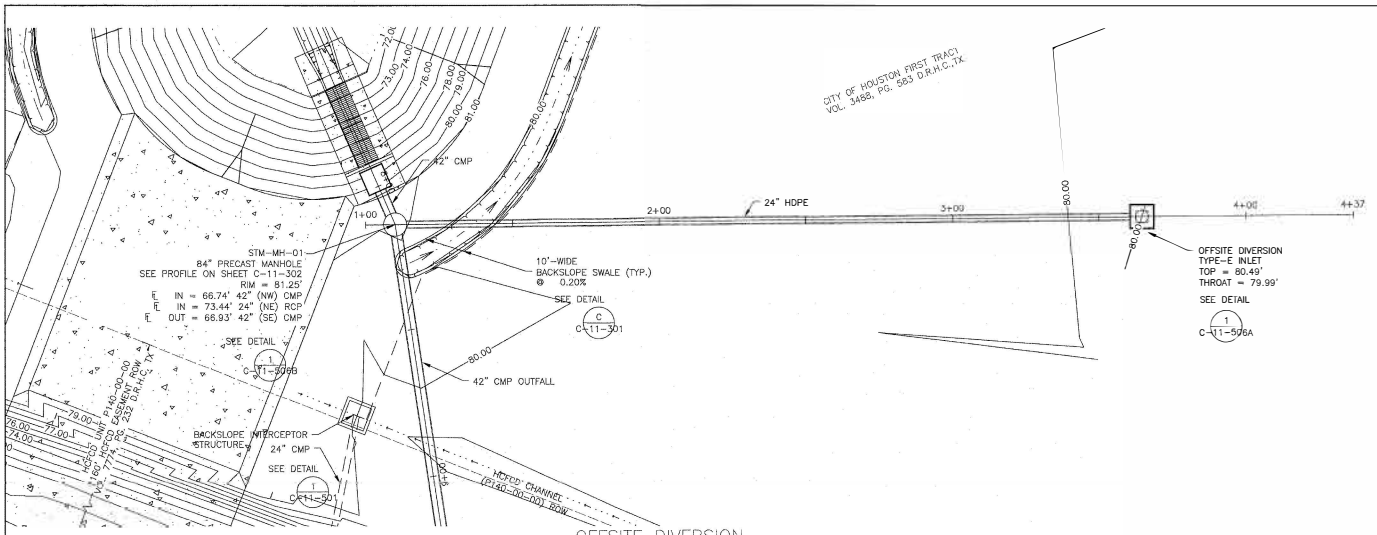
DETENTION BASIN OUTFALL PLAN & PROFILE

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	29D OF 173

FOR CITY OF HOUSTON USE ONLY

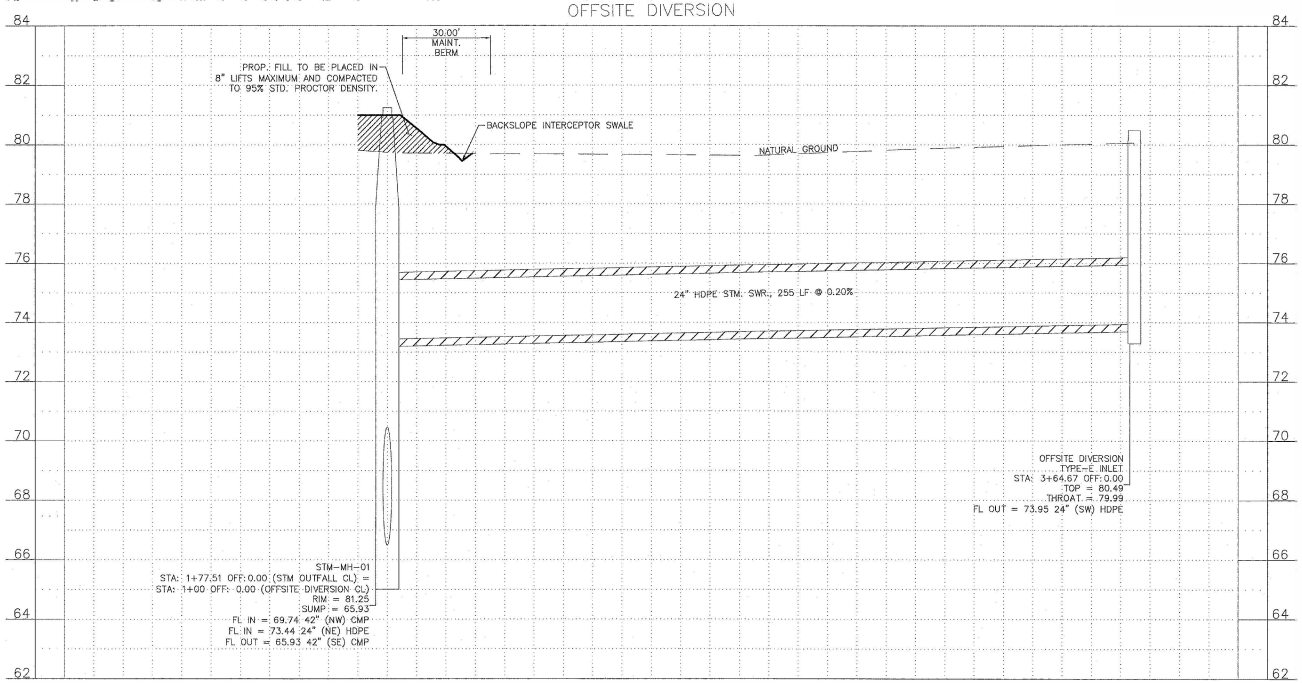
ACCEPTED — P.E. No. 80367 — REGISTERED ENGINEER — STATE OF TEXAS

FILE PATH: P:\0092\001 IAH WWTP\04 Cadd-GIS\02 SHEETS\11 - DETENTION\C-11-302 DETENTION BASIN - OUTFALL PLAN & PROFILE.dwg





OFFSITE DIVERSION



ALL DIMENSIONS IN FEET UNLESS OTHERWISE NOTED

CONSTRUCTION IN HARRIS COUNTY FLOOD CONTROL DISTRICT RIGHT-OF-WAY REQUIRES:

SITE PLANS MUST BE APPROVED PRIOR TO OBTAINING THE REQUIRED HCFCD RIGHT-OF WAY NOTIFICATION. BE ADVISED THAT THE HCFCD RIGHT-OF-WAY NOTIFICATION IS SEPARATE FROM THE SITE DEVELOPMENT PERMIT PACKAGE.

1) HCFCD RIGHT-OF-WAY NOTIFICATION (PERMIT)
2) HCFCD 48-HR PRE-CONSTRUCTION NOTICE

BOTH ARE REQUIRED PRIOR TO ENTERING OR WORKING WITHIN HARRIS COUNTY FLOOD CONTROL DISTRICT RIGHT-OF-WAY. THE HCFCD RIGHT-OF-WAY NOTIFICATION AND 48-HOUR NOTICE MUST BE PROVIDED TO HCFCD AT DOD@HCFCD.HSTX.NET.

TO APPLY FOR THE HCFCD RIGHT-OF-WAY NOTIFICATION PLEASE GO TO HTTP://APPS.HARRISCOUNTYTX.GOV/EPERMITS AND APPLY FOR THE HCFCD ROW UNDER ROW NOTIFICATION.

FAILURE TO PROVIDE BOTH ITEMS COULD RESULT IN PROJECT DELAYS.

5engineering

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
PIERO BATTISTINI
104895
LICENSED
PROFESSIONAL
ENGINEER
06/24/2025

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION-DISINFECTION REDESIGN AMENDMENT

DETENTION BASIN OFFSITE DIVERSION PLAN & PROFILE

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.

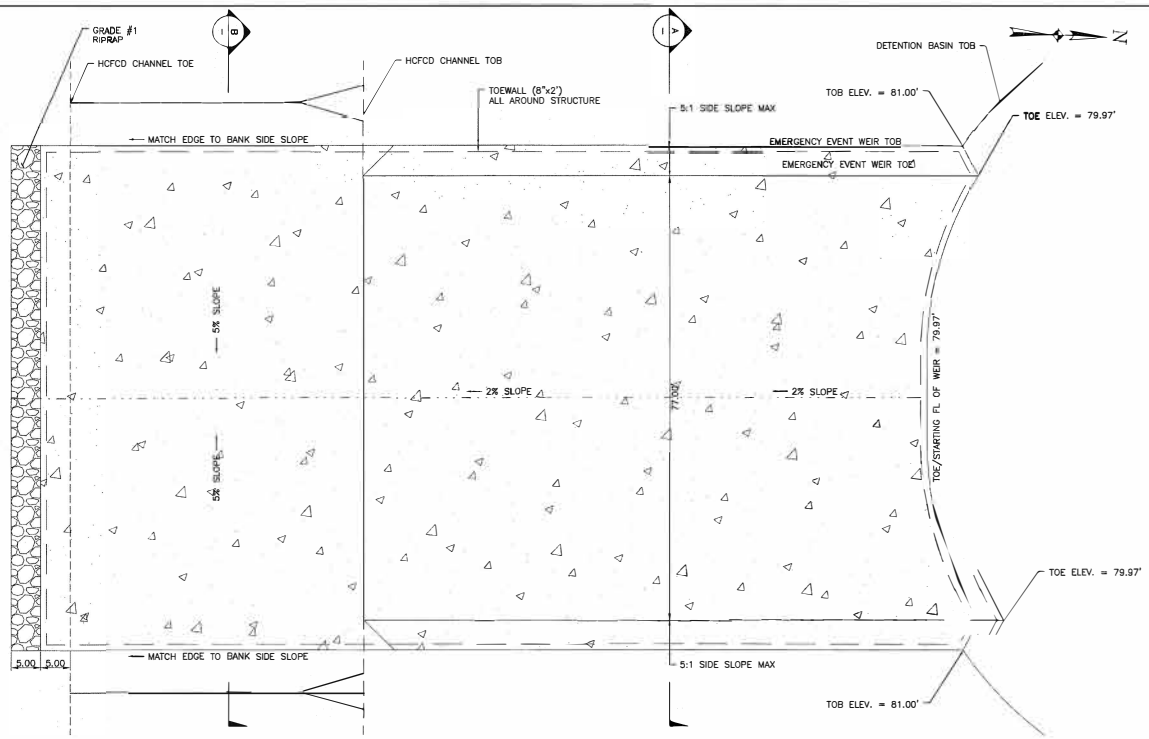
FOR CITY OF HOUSTON USE ONLY

80367

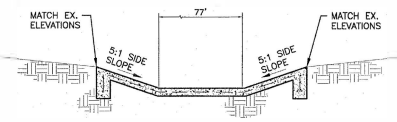
C-11-303

SHEET NO. 29E OF 173

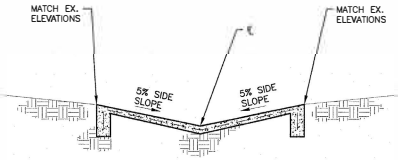
FILE PATH: P:\00921_001 IAH WWTP\04 Cad-GIS\02 SHEETS\11 - DETENTION\C-11-303 DETENTION BASIN - OFFSITE DIVERSION PLAN & PROFILE.dwg



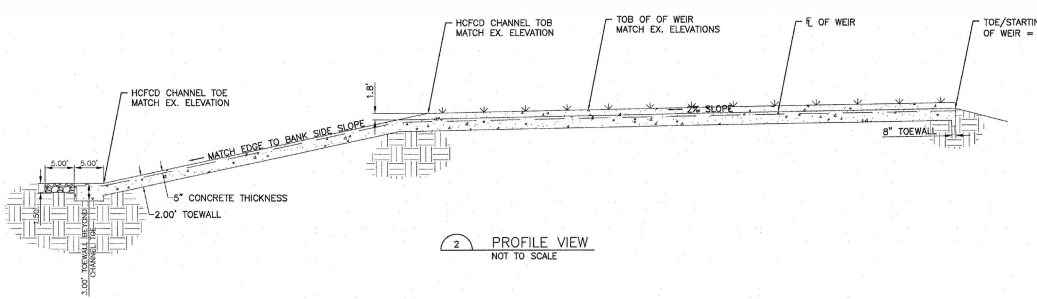
1 PLAN VIEW
NOT TO SCALE



A SECTION
NOT TO SCALE



B SECTION
NOT TO SCALE



2 PROFILE VIEW
NOT TO SCALE

EMERGENCY OVERFLOW WEIR NOTES:
1. 2 FEET DEEP x 8-INCH WIDE TOE ALL AROUND THE STRUCTURE UNLESS OTHERWISE SPECIFIED.
2. STEEL REINFORCING – #4 BARS (GRADE 60) AT 12 INCHES ON CENTER EACH WAY.
3. MATCH TOP OF CONCRETE WITH ELEVATIONS AS SHOWN.

CONSTRUCTION IN HARRIS COUNTY FLOOD CONTROL DISTRICT RIGHT-OF-WAY REQUIRES:

SITE PLANS MUST BE APPROVED PRIOR TO OBTAINING THE REQUIRED HCFCD RIGHT-OF WAY NOTIFICATION. BE ADVISED THAT THE HCFCD RIGHT-OF-WAY NOTIFICATION IS SEPARATE FROM THE SITE DEVELOPMENT PERMIT PACKAGE.

1) HCFCD RIGHT-OF-WAY NOTIFICATION (PERMIT)
2) HCFCD 48-HR PRE-CONSTRUCTION NOTICE

BOTH ARE REQUIRED PRIOR TO ENTERING OR WORKING WITHIN HARRIS COUNTY FLOOD CONTROL DISTRICT RIGHT-OF-WAY. THE HCFCD RIGHT-OF-WAY NOTIFICATION AND 48-HOUR NOTICE MUST BE PROVIDED TO HCFCD AT DOD@HCFCD.HCTX.NET.

TO APPLY FOR THE HCFCD RIGHT-OF-WAY NOTIFICATION PLEASE GO TO HTTP://APPS.HARRISCOUNTYTX.GOV/EPERMITS AND APPLY FOR THE HCFCD ROW UNDER ROW NOTIFICATION.

FAILURE TO PROVIDE BOTH ITEMS COULD RESULT IN PROJECT DELAYS.

C-11-401

5engineering

BLACK & VEATCH

5ENGINEERING, LLC
11200 WESTHEIMER ROAD
SUITE 353
HOUSTON, TX 77042
(832) 800-3483
TX FIRM NUMBER F-13748

STATE OF TEXAS
PIERO BATTISTINI
104895
LICENSED PROFESSIONAL ENGINEER
08/10/2022

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION
CIVIL
DETENTION BASIN EMERGENCY OVERFLOW WEIR

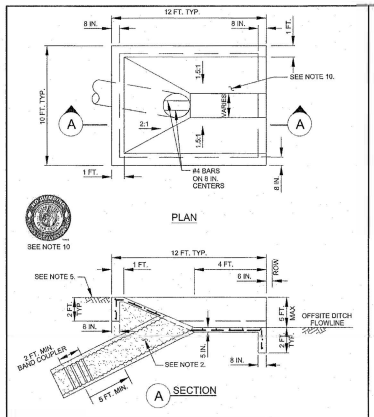
WBS NUMBER
R-00265-0147-4
DRAWING SCALE
AS NOTED
CITY OF HOUSTON PM
SHAHIDUR RAHMAN, P.E.
SHEET NO. 29F OF 173

FOR CITY OF HOUSTON USE ONLY

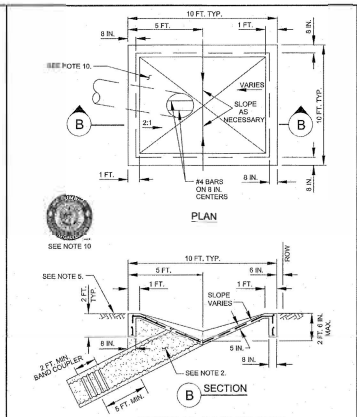
PROFESSIONAL ENGINEER
80367
HOUSTON, TEXAS

FILE PATH: P:\0092\001\04 Cadd-GIS\02 SHEETS\11 - DETENTION\C-11-401 DETENTION BASIN - EMERGENCY OVERFLOW WEIR.dwg

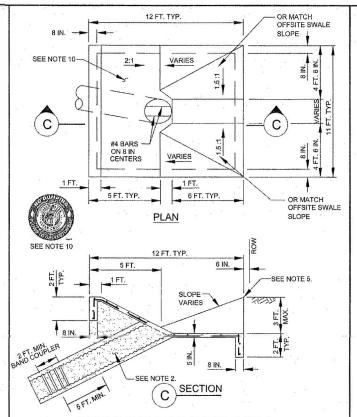
NOTE:
ALL DETAILS OBTAINED FROM HCFCD INTERIM PCPM 2019 APPENDIX D.



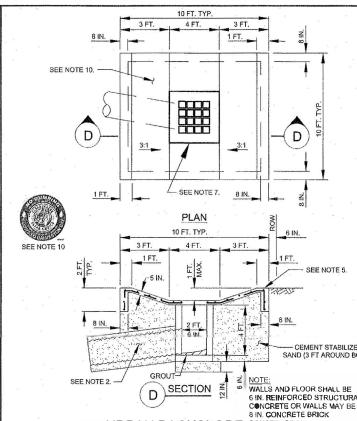
TYPICAL OFFSITE DITCH INTERCEPTOR STRUCTURE
(42 INCH MAX.)



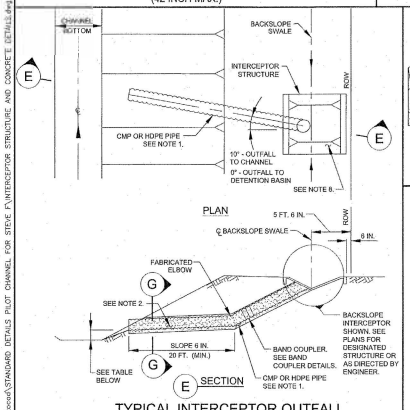
TYPICAL BACKSLOPE INTERCEPTOR STRUCTURE
(24 INCH & 30 INCH ONLY)



COMBINATION BACKSLOPE & OFFSITE DITCH INTERCEPTOR STRUCTURE
(42 INCH MAX.)



URBAN BACKSLOPE INTERCEPTOR STRUCTURE
(24 INCH ONLY)



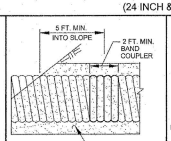
TYPICAL INTERCEPTOR OUTFALL STRUCTURE LAYOUT

PIPE OUTFALL IN CHANNELS

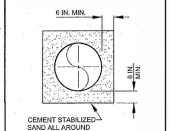
BOTTOM WIDTH	PIPE OUTLET INVERT
6 FEET ≤ BW ≤ 20 FT	1 FOOT ABOVE FLOWLINE *
20 FEET < BW ≤ 60 FT	AT TOE OF SLOPE *
BW > 60 FT	AT TOE OF SLOPE *

* OR 1 FOOT ABOVE NORMAL WATER LEVEL, WHICHEVER IS HIGHER

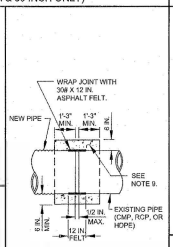
PIPE OUTFALL IN DETENTION BASINS
AT TOE OF SLOPE

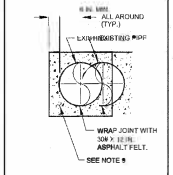


CMP BAND COUPLER DETAIL

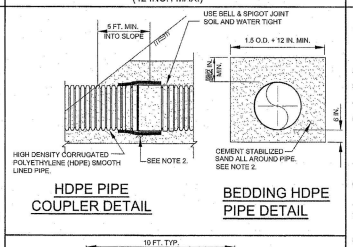


BEDDING CMP DETAIL



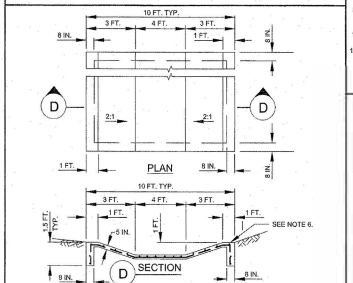


CONCRETE COLLAR DETAIL



HDPE PIPE COUPLER DETAIL

BEDDING HDPE PIPE DETAIL



CONCRETE PILOT CHANNEL - DETENTION BASIN

NOTES:
1. INTERCEPTOR OUTFALL PIPES WITHIN THE HCFCD RIGHT-OF-WAY SHALL BE CMP OR HDPE PIPE IN ACCORDANCE WITH SPECIFICATION SECTION 02642- CORRUGATED METAL PIPE, HIGH DENSITY POLYETHYLENE (HDPE) PIPE IN ACCORDANCE WITH SPECIFICATION SECTION 2005-HIGH DENSITY POLYETHYLENE, OR APPROVED EQUAL. USE TABLE ON STORM SEWER AND RIPRAP DETAILS SHEET FOR CORRUGATED GALVANIZED STEEL PIPE THICKNESS.
2. PROVIDE AND PLACE CEMENT STABILIZED SAND IN ACCORDANCE WITH SPECIFICATION SECTION 02321-CEMENT STABILIZED SAND AND SECTION 02316 - STRUCTURAL EXCAVATING.
3. EXCAVATION, FILL AND BACKFILL FOR INTERCEPTOR OUTFALLS SHALL BE IN ACCORDANCE WITH SPECIFICATION SECTION 02316-STRUCTURAL EXCAVATING AND BACKFILLING.
4. CONCRETE SHALL BE STRUCTURAL CONCRETE IN ACCORDANCE WITH SPECIFICATION SECTION 03310-CONCRETE.
5. INTERCEPTOR STRUCTURES:
   a. ADJUST LENGTH AND WIDTH IN FIELD AS NECESSARY.
   b. 2-FEET DEEP X 6-INCH WIDE TOE ALL AROUND THE STRUCTURE.
   c. STEEL REINFORCING-#4 BARS (GRADE 60) AT 12 INCHES ON CENTER EACH WAY.
   d. ANY INTERCEPTOR OUTFALL PIPE LARGER THAN MAXIMUM SIZE INDICATED REQUIRES A SEPARATE DETAIL.
   e. MATCH TOP OF CONCRETE WITH NATURAL GROUND.
6. CONCRETE PILOT CHANNEL
   a. 1.5 FEET DEEP X 6-INCH WIDE TOE ALL AROUND THE STRUCTURE.
   b. STEEL REINFORCING - #4 BARS (GRADE 60) AT 12 INCHES ON CENTER EACH WAY.
   c. MATCH TOP OF CONCRETE WITH BOTTOM OF DETENTION BASIN.
7. CONCRETE PAD AROUND URBAN BACKSLOPE INTERCEPTOR: PAID FOR AS CONCRETE INTERCEPTOR STRUCTURE PER UNIT PRICE SCHEDULE. TYPE "A" INLET BOX, COH DWG. NO. 2084-08 WITH GRATE TOP, VULCAN FOUNDRY COMPANY, V-4880-1 OR APPROVED EQUAL, APPROX. 473 SQ.IN. OPENING. PAID 2632-05
8. BACKSLOPE SWALE AND INTERCEPTOR STRUCTURE ELEVATIONS AND LOCATIONS SHOWN ON THE PLANS ARE APPROXIMATE. FINAL ELEVATIONS AND LOCATIONS SHALL BE FIELD VERIFIED BY THE ENGINEER PRIOR TO INSTALLATION.
9. STRUCTURAL CONCRETE WITH #4 BARS (GRADE 60) 12 INCH O.C. EACH WAY, 3 ROWS MIN. EACH WAY. - FOR COLLARS ONLY, WAIT A MINIMUM OF 24 HOURS AFTER PLACING CONCRETE TO BACKFILL.
10. EPOXY "CLEAN WATER CLEAR CHOICE" LOGO BUTTON ON INTERCEPTORS. LOCATION TO BE DETERMINED BY THE ENGINEER.

THIS DETAIL SHEET HAS BEEN PREPARED FOR USE ONHCFCD PROJECTS OR PROJECTS TO BE MAINTAINED BY THE HCFCD WHEN COMPLETED BY OTHERS. AN ENGINEER WHO INCORPORATES THE DETAILS ON THIS SHEET BECOMES RESPONSIBLE FOR ITSUSE IN THEEND PRODUCT IN ACCORDANCE WITHRULE 137.33 (b) AND (c) OF THE TEXAS BOARD OF PROFESSIONAL ENGINEERS

P.E. SEAL AND SIGNATURE

DATE	APPR
DESCRIPTION	
NO.	

PROJECT ID #:

PROJECT TITLE:
INTERCEPTOR STRUCTURE AND CONCRETE PILOT CHANNEL DETAILS

PREPARED:
CHECKED:
APPROVED:

COMPANY INFORMATION AND LOGO GOES HERE

HARRIS COUNTY FLOOD CONTROL DISTRICT
9900 Northwest Freeway
Houston, Texas 77092

DATE: 10-23-2018
SCALE: AS NOTED
SHEET NUMBER
OF

5engineering

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
PEDRO BATTISTINI
104895
LICENSED PROFESSIONAL ENGINEER
06/24/2025

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION-DISINFECTION REDESIGN AMENDMENT
DETENTION BASIN - DETAILS 1 OF 8

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 29G OF 173	

80367
REGISTERED PROFESSIONAL ENGINEER
HOUSTON, TEXAS

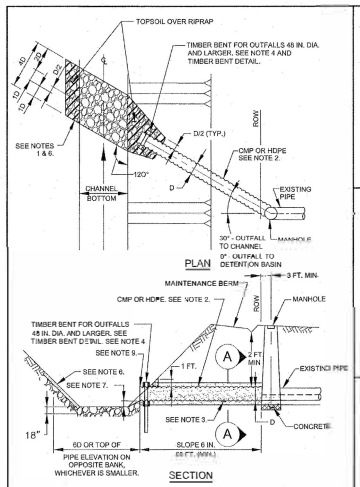
1 INTERCEPTOR STRUCTURE AND CONC. PILOT CHANNEL DETAILS
NOT TO SCALE

C-11-501

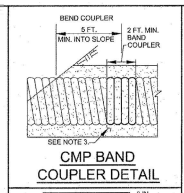
FILE PATH: P:\00925\001 I&H WWTP\04 Cadd-GIS\02 SHEETS\1 - DETENTION\C-11-501 DETENTION BASIN - DETAILS 1 Of 6.dwg
S:\Operations\Engdv\MEV\AE Autocad\STANDARD DETAILS PILOT CHANNEL FOR STEVE P\INTERCEPTOR STRUCTURE AND CONCRETE DETAILS.dwg

USE RIPRAP GRADIATION No. 2 PER HCFCD SPEC 02378

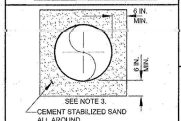
NOTE:
ALL DETAILS OBTAINED FROM HCFCD INTERIM PCPM 2019 APPENDIX D.



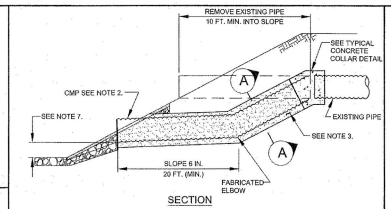
TYPICAL STORM SEWER OUTFALL STRUCTURE LAYOUT



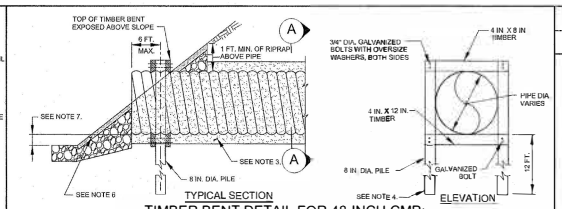
CMP BAND COUPLER DETAIL



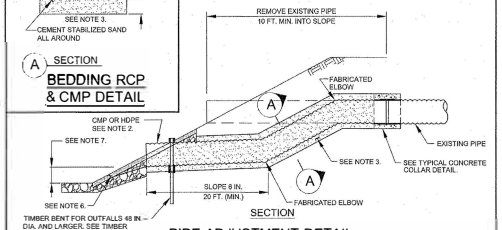
BEDDING RCP & CMP DETAIL



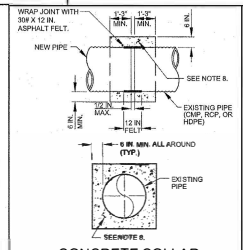
PIPE ADJUSTMENT DETAIL 24-INCH TO 42-INCH DIAMETER



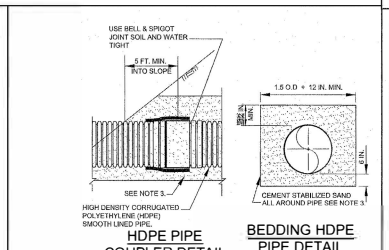
TIMBER BENT DETAIL FOR 48-INCH CMP; 36-INCH HDPE AND LARGER OUTFALLS



PIPE ADJUSTMENT DETAIL 48-INCH AND LARGER DIAMETER



CONCRETE COLLAR DETAIL



HDPE PIPE COUPLER DETAIL

BEDDING HDPE PIPE DETAIL

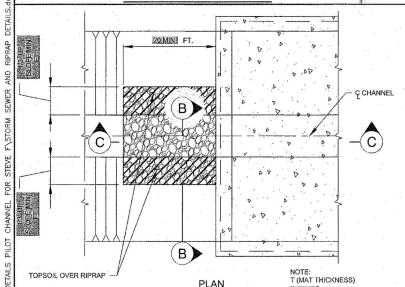
PROJECT ID#

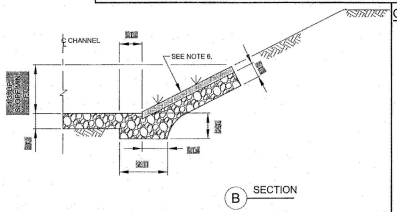
PROJECT TITLE

STORM SEWER AND RIPRAP DETAILS

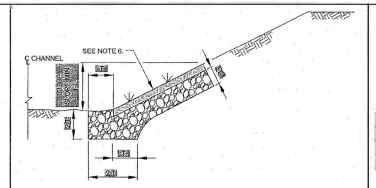
DATE | MM/YR | DESCRIPTION | NO.

PREPARED | CHECKED | APPROVED





TYPICAL RIPRAP AT CONCRETE CHANNEL LINING



TYPICAL RIPRAP LINING DETAIL-SIDE SLOPE ONLY

PIPE OUTFALL IN CHANNELS

BOTTOM WIDTH	PIPE OUTLET INVERT
6 FEET ≤ BW ≤ 20 FT	1 FOOT ABOVE FLOWLINE *
20 FEET < BW ≤ 60 FT	AT TOE OF SLOPE *
3W > 60 FT	AT TOE OF SLOPE *

* OR 1 FOOT ABOVENORMAL WATER LEVEL, WHICHEVER IS HIGHER

NOTES:

1. INSTALL RIPRAP EROSION PROTECTION IN GRASS LINED CHANNELS ANDDETENTION BASINS FOR ANY SIZE STORM SEWER PIPE AND TREATMENT PLANT OUTFALL. DIMENSIONED AS SHOWN IN "TYPICAL STORM SEWER OUTFALL STRUCTURE LAYOUT."
2. STORM SEWER OUTFALL PIPES WITHIN THE HCFCD RIGHT-OF-WAY SHALL BE CMP OR HDPE IN ACCORDANCE WITH SPECIFICATION SECTION 02642-CORRUGATED METAL PIPE, HIGH DENSITY POLYETHYLENE PIPE (HDPE) IN ACCORDANCE WITH SPECIFICATION SECTION 02605-HIGH DENSITY POLYETHYLENE PIPE, OR APPROVED EQUAL. USE TABLE BELOW FOR CORRUGATED GALVANIZED STEEL PIPE.
3. PROVIDE AND PLACE CEMENT STABILIZED SAND IN ACCORDANCE WITH SPECIFICATION SECTION NO. 02321-CEMENT STABILIZED SAND.
4. TIMBER BENTS SHALL BE IN ACCORDANCE WITH SPECIFICATION SECTION 02484-TIMBER BENTS.
5. EXCAVATION, FILL, AND BACKFILL FOR STORM SEWER OUTFALLS SHALL BE IN ACCORDANCE WITH SPECIFICATION SECTION 02316- STRUCTURAL EXCAVATING AND BACKFILLING.
6. RIPRAP SHALL BE PLACED IN ACCORDANCE WITH SPECIFICATION SECTION 02378-RIPRAP AND GRANULAR FILL. FILL RIPRAP VOIDS AND BURY RIPRAP A MINIMUM OF 6 INCHES WITH TOPSOIL ON SIDE SLOPE AS DIRECTED BY THE ENGINEER.
7. IN DETENTION BASINS, SET FLOWLINE OF OUTFALL AT TOE OF THE SLOPE OR FLOWLINE OF PILOT CHANNEL, IN CHANNEL, USE ELEVATION INDICATED IN THE PIPE OUTFALL IN CHANNELS TABLE.
8. STRUCTURAL CONCRETE #4 BARS (GRADE 40) 12 INCH O.C. EACH WAY - FOR COLLARS ONLY. WAIT A MINIMUM OF 24 HOURS AFTER PLACING CONCRETE TO BACKFILL.
9. FOR RCP OUTFALL IN GRASS LINED CHANNELS AND DETENTION BASINS, USE HEADWALL/ WINGWALL/APRON DETAIL ON SHEET [illegible] FOR RCP OUTFALL IN CONCRETE LINED CHANNEL AND DETENTION BASINS, SEE HCFCD CONCRETE CHANNEL LINING DETAILS.

CORRUGATED GALVANIZED STEEL PIPE (TYPE I)

2-2/3" X 1/2" CORRUGATION					3" X 1" & 5" X 1" CORRUGATION			
PIPE DIA. (in.)	MIN. FILL* (in.)	SHEET THICKNESS gage	(in.)	(mm)	MIN. FILL* (in.)	SHEET THICKNESS gage	(in.)	(mm)
24	12	16	.064	1.63	-	-	-	-
30	12	16	.064	1.63	-	-	-	-
36	12	16	.064	1.63	-	-	-	-
42	12	16	.064	1.63	12	16	.064	1.63
48	12	16	.064	1.63	12	16	.064	1.63
54	12	14	.079	2.01	12	16	.064	1.63
60	15	12	.109	2.77	12	16	.064	1.63
66	15	12	.109	2.77	15	16	.064	1.63
72	18	10	.138	3.51	15	16	.064	1.63
78	18	8	.168	4.27	18	16	.064	1.63
84	18	8	.168	4.27	18	14	.079	2.01
90	-	-	-	-	18	14	.079	2.01
96	-	-	-	-	18	14	.079	2.01

* MINIMUM DEPTH OF COVER ABOVE TOP OF PIPE.
MAXIMUM DEPTH OF COVER ABOVE TOP OF PIPE IS 20 FEET.

THIS DETAIL SHEET HAS BEEN PREPARED FOR USE ON HCFCD PROJECTS OR PROJECTS TO BE MAINTAINED BY THE HCFCD WHEN COMPLETED BY OTHERS. AN ENGINEER WHO INCORPORATES THE DETAILS ON THIS SHEET BECOMES RESPONSIBLE FOR ITS USE IN THE END PRODUCT IN ACCORDANCE WITH RULE 137.33 (b) AND (c) OF THE TEXAS BOARD OF PROFESSIONAL ENGINEERS.

P.E. SEAL AND SIGNATURE

ENGINEER'S CONSENT IS REQUIRED FOR ANY CHANGES OR EDITING

COMPANY INFORMATION AND LOGO GOES HERE

HARRIS COUNTY FLOOD CONTROL DISTRICT

9900 Northwest Freeway
Houston, Texas 77092

DATE: 10-23-2018
SCALE: NTS

SHEET NUMBER
29 OF 29

1 STORM SEWER AND RIPRAP DETAILS
NOT TO SCALE

C-11-502

5engineering

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

STATE OF TEXAS · PRENO BATTISTINI · 104895 · LICENSED PROFESSIONAL ENGINEER

06/24/2025

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT

DETENTION BASIN – DETAILS 2 OF 8

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	29H OF 175

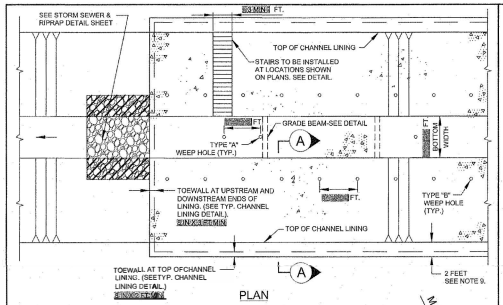
FOR CITY OF HOUSTON USE ONLY

PUBLIC WORKS · ACCEPTED · 80367 · HOUSTON, TEXAS

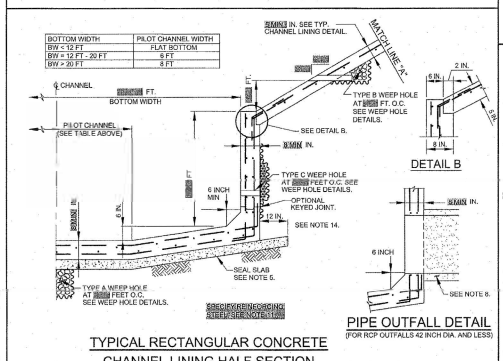
FILE PATH: P:\0092\001 IAH WWTP\04 Cadd-GIS\02 SHEETS\11 - DETENTION\C-11-502 DETENTION BASIN - DETAILS 2 OF 6.dwg

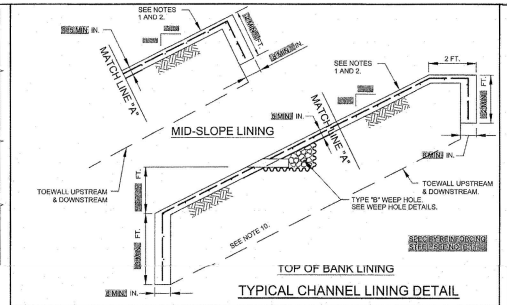
S:\Operations\Eng&Const\MEDIUM Autocad\STANDARD DETAILS PILOT CHANNEL FOR STEVE F\STORM SEWER AND RIPRAP DETAILS.dwg

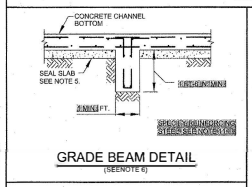
NOTE:
ALL DETAILS OBTAINED FROM HCFCD INTERIM PCPM 2019 APPENDIX D.

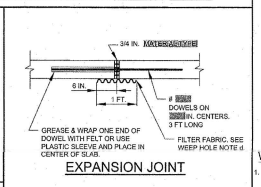


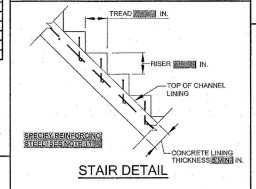
BAR SIZE #	MINIMUM LAP - SPLICE - LENGTHS
4	1 FT. 9 IN.
5	2 FT. 2 IN.
6	2 FT. 7 IN.
7	3 FT. 5 IN.
8	4 FT. 0 IN.
9	5 FT. 8 IN.
10	7 FT. 3 IN.

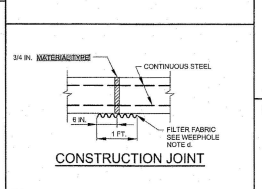


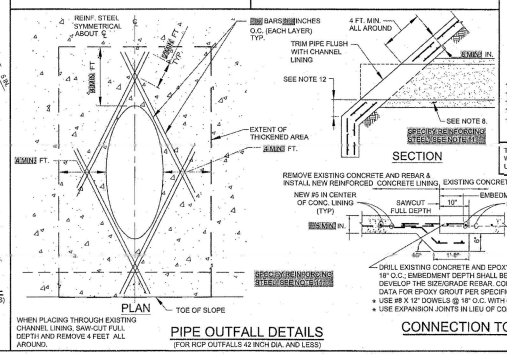


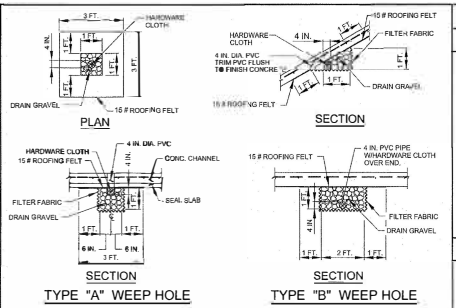


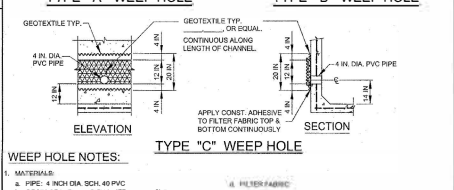












WEEP HOLE NOTES:

1. MATERIALS:
   a. PIPE: 4 INCH DIA. SCH. 40 PVC
   b. DRAIN GRAVEL: SIEVE SIZE / % FINER (SEE NOTE 14)
   c. HARDWARECLOTH: MIN. OPEN 1/8 IN / MAX. OPEN 1/4 IN.
   d. FILTER FABRIC: NON-WOVENG EOTEXTILE
2. CUT WEEP HOLE PIPE FLUSH WITH CONCRETE SURFACE.
3. TYPE "A" AND "C" WEEP HOLES FOR TYPICAL RECTANGULAR CONCRETE CHANNEL LINING. TO BESTAGGERED.

WEEP HOLE DETAILS

NOTES:

1. STRUCTURAL CONCRETE FOR CONCRETE CHANNEL LINING AND NONSTRUCTURAL CONCRETE FOR SEAL SLAB SHALL BE IN ACCORDANCE WITH SPECIFICATION SECTION NO. 03310-CONCRETE.
2. REINFORCING STEEL SHALL BE IN ACCORDANCE WITH SPECIFICATION SECTION NO. 03310-CONCRETE.
3. EXCAVATION AND BACKFILL FOR CONCRETE CHANNEL LINING SHALL BE IN ACCORDANCE WITH SPECIFICATION SECTION NO. 02316-STRUCTURAL EXCAVATING AND BACKFILLING.
4. RIPRAP SHALL BE IN ACCORDANCE WITH SPECIFICATION SECTION NO. 02375-RIPRAP AND GRANULAR FILL.
5. A NON-REINFORCED 6 INCH MINIMUM NONSTRUCTURAL CONCRETE SEAL SLAB IS REQUIRED BENEATH THE BOTTOM OF CONCRETE CHANNELS.
6. STRUCTURAL CONCRETE GRADE BEAMS SHALL BE INSTALLED TRANSVERSELY AT 20 FEET MAX CENTERS ON CONCRETE LINED CHANNELS WITH BOTTOM WIDTHS EQUAL TO OR GREATER THAN 20 FEET.
7. JOINTS:
   A. PLACE CONSTRUCTION JOINT IN CONCRETE LOW-FLOW, TRAPEZOIDAL BOTTOM SECTIONS AND SLOPES AT 20 FEET MAX SPACING CONTINUOUSLY THROUGH CHANNEL LINING.
   B. PLACE EXPANSION JOINT IN CONCRETE LOW-FLOW, TRAPEZOIDAL BOTTOM SECTIONS, AND SLOPES AT 80 FEET MAX SPACING CONTINUOUSLY THROUGH CHANNEL LINING.
8. CEMENT STABILIZED SAND SHALL BE PROVIDED AND PLACED IN ACCORDANCE WITH SPECIFICATION SECTION NO. 02321 -CEMENT STABILIZED SAND.
9. DELETE 2 FT FLAT EDGE WHEN LINING IS BELOW TOP OF BANK, SEE MID-SLOPE LINING DETAIL.
10. UPSTREAM AND DOWNSTREAM TOE WALL SPECIFY REQUIRED AT BOTTOM OF SLOPE AND 8 INCHES THICK.
11. MINIMUM #4 BASTRGRADE STATIC INCHES ON CENTER EACHWAY.
12. VARIES BASED ON SIDE SLOPE, MINIMUM 1 FOOT VERTICAL AT TOE OF SLOPE.
13. FOR RCP OUTFALLS 48 INCHES DIA. AND LARGER, USE HEADWALL/WINGWALL DETAIL ON SHEET SPECIFY
14. FOR STRUCTURAL BACKFILL MATERIAL PER SPECIFICATION SECTION 2316, USE CONCRETE COARSE AGGREGATE ASTM C33 SIZE NO. 467. LIMESTONE AND RECYCLED CONCRETE NOT ALLOWED.

THIS DETAIL SHEET HAS BEEN PREPARED FOR USE ON HCFC PROJECTS OR PROJECTS TO BE MAINTAINED BY THE HCFCD. WHEN COMPLETED BY OTHERS, AN ENGINEER WHO INCORPORATES THE DETAILS ON THIS SHEET BECOMES RESPONSIBLE FOR ITS USE IN THE END PRODUCT IN ACCORDANCE WITH RULE 137.33 (6) AND (c) OF THE TEXAS BOARD OF PROFESSIONAL ENGINEERS.

P.E. SEAL AND SIGNATURE

ENGINEER'S CONTINUING RESPONSIBILITY

1 CONCRETE CHANNEL LINING DETAILS
NOT TO SCALE

NO.	DESCRIPTION	DATE	APP'D

PROJECT ID#

PROJECT TITLE

CONCRETE CHANNEL LINING DETAILS

PREPARED: | CHECKED: | APPROVED:

COMPANY INFORMATION AND LOGO GOES HERE

5engineering

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS — PIERO BATTISTINI — LICENSED PROFESSIONAL ENGINEER — 104895 — 06/24/2025

HARRIS COUNTY FLOOD CONTROL DISTRICT
9900 Northwest Freeway
Houston, Texas 77092

DATE: 10-23-2018
SCALE: NTS

SHEET NUMBER
291 OF 293

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT
DETENTION BASIN – DETAILS 3 OF 8

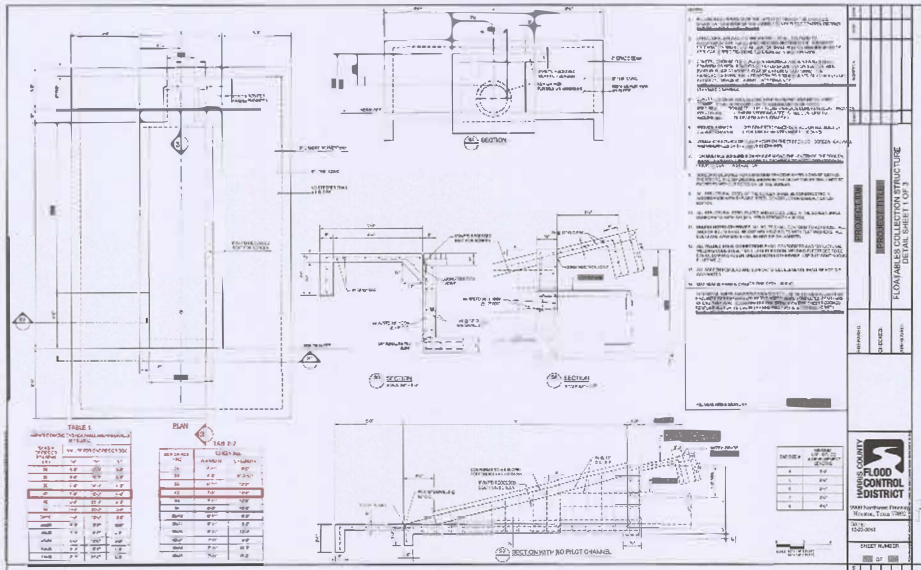
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	291 OF 173

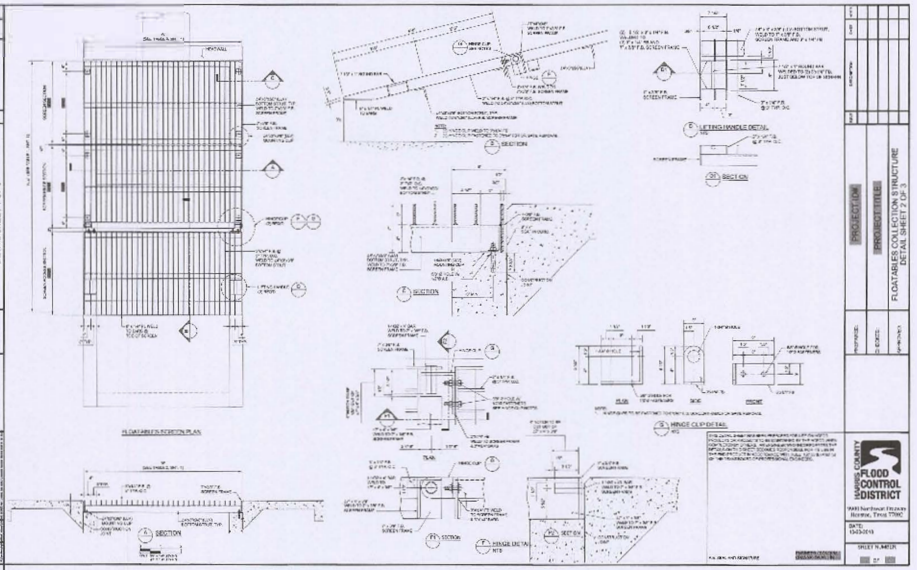
FOR CITY OF HOUSTON USE ONLY

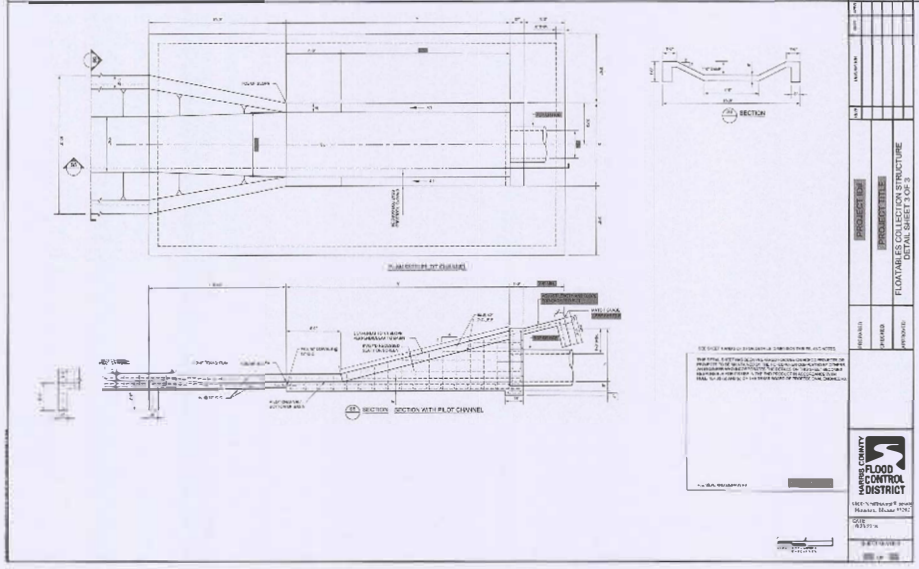
STATE OF TEXAS — SHAHIDUR RAHMAN — 80367 — REGISTERED PROFESSIONAL ENGINEER — HOUSTON, TEXAS

C-11-503

FILE PATH: P:\0092\001 IAH WWTP\04 Cadd-GIS\02 SHEETS\11 - DETENTION\C-11-503 DETENTION BASIN - DETAILS 3 OF 8.dwg
S:\Operations\EngDiv\MED\ME Autocad\STANDARD DETAILS PILOT CHANNEL FOR STEVE F\CONCRETE CHANNEL LINING DETAILS.dwg







SCREEN SIZE CALCULATION:

MINIMUM OPEN SCREEN AREA (SQFT) = 67 CFS ÷ 0.92 FT/S
(ACCOUNTS FOR BARS)
= 72.83 SQFT

PROVIDED AREA = 7.42 FT × 14.33 FT
= 106.33 SQFT

PROVIDED OPEN AREA = 0.92 × 106.33 SQFT
= 97.82 SQFT

TOTAL OPEN AREA = 97.82 SQFT > MINIMUM OPEN SCREEN AREA

NOTE:
ALL DETAILS OBTAINED FROM HCFCD INTERIM PCPM 2019 APPENDIX D

1 FLOATABLES COLLECTION STRUCTURE
NOT TO SCALE

5engineering

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-5182

STATE OF TEXAL
PEDRO BATTISTINI
104895
LICENSED
PROFESSIONAL ENGINEER
06/24/2025

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT
DETENTION BASIN – DETAILS 4 OF 8

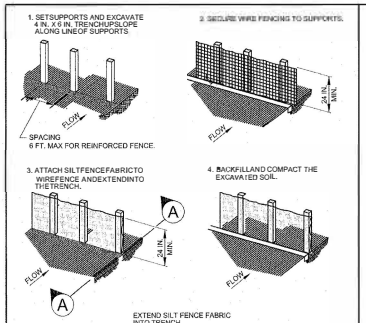
WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 29J OF 173	

80367

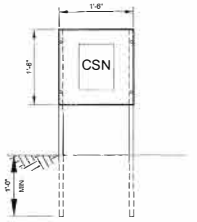
C-11-504

FILE PATH: P:\0092\001 WH WWTP\04 Civil-GIS\02 SHEETS\11 - DETENTION\C-11-504 DETENTION BASIN - DETAILS 4 OF 8.dwg

NOTE:
ALL DETAILS OBTAINED FROM HCFCD INTERIM PCPM 2019 APPENDIX D.



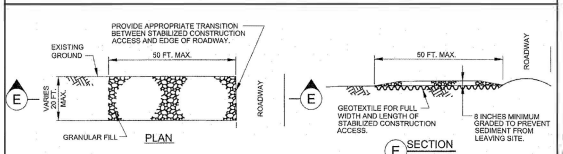
REINFORCED SILT FENCE



CSN HOLDER

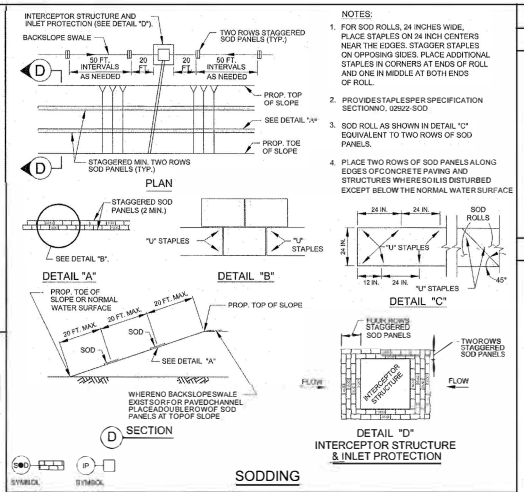
NOTE:
CONSTRUCT IN ACCORDANCE WITH HCFCD SPECIFICATION SECTION 01580 - PROJECT SIGNS.

SWPPP / BMP SIGN AND CONSTRUCTION SITE NOTICE HOLDER DETAILS



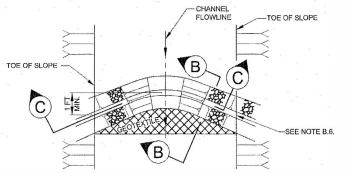
CONSTRUCTION NOTES:
1. SEE SPECIFICATION SECTION NO. 02305 - STABILIZED CONSTRUCTION ACCESS.

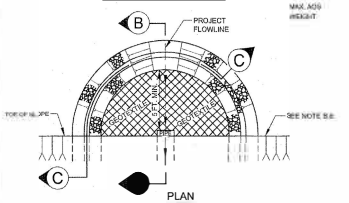
STABILIZED CONSTRUCTION ACCESS



NOTES:
1. FOR SOD ROLLS, 24 INCHES WIDE, PLACE STAPLES ON 24 INCH CENTERS NEAR THE EDGES. STAGGER STAPLES ON OPPOSING SIDES. PLACE ADDITIONAL STAPLES IN CORNERS AT ENDS OF ROLL AND ONE IN MIDDLE AT BOTH ENDS OF ROLL.
2. PROVIDE STAPLES PER SPECIFICATION SECTION NO. 02922-SOD
3. SOD ROLL AS SHOWN IN DETAIL "C" EQUIVALENT TO TWO ROWS OF SOD PANELS.
4. PLACE TWO ROWS OF SOD PANELS ALONG EDGES OF CONCRETE PAVING AND STRUCTURES WHERE SOIL IS DISTURBED EXCEPT BELOW THE NORMAL WATER SURFACE

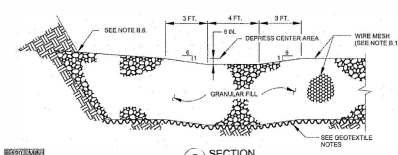
SODDING

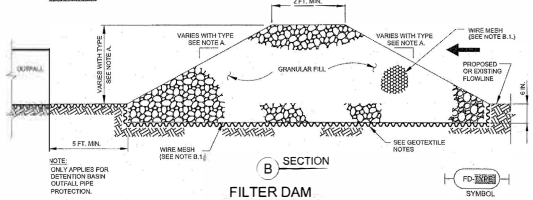




GEOTEXTILE NOTES:

MIN. AOS	SIEVE NO.	#50 STANDARD
MAX. AOS	SIEVE NO.	#30 STANDARD
PERMITTIVITY	0.2/SEC	0.1/SEC MINIMUM





FILTER DAM

FILTER DAM NOTES:

A. TYPES OF FILTER DAMS
1. TYPE 1 - NOT USED BY HCFCD
2. TYPE 2 (REINFORCED)
   a. HEIGHT - 18-36 INCHES. MEASURE VERTICALLY FROM EXISTING GROUND TO TOP OF FILTER DAM.
   b. TOP WIDTH - 2 FEET (MINIMUM).
   c. SLOPES - 2:1 (MAXIMUM).
3. TYPE 3 - NOT USED BY HCFCD
4. TYPE 4 (GABION)
   a. HEIGHT - 30 INCHES (MINIMUM). MEASURE VERTICALLY FROM EXISTING GROUND TO TOP OF FILTER DAM.
   b. TOP WIDTH - 2 FEET (MINIMUM).
5. TYPE 5. AS SHOWN ON THE PLANS.

B. CONSTRUCT FILTER DAMS ACCORDING TO THE FOLLOWING CRITERIA UNLESS SHOWN OTHERWISE ON THE PLANS.
1. TYPE 2 AND 3 FILTER DAMS: SECURE WITH 20 GAUGE GALVANIZED WOVEN WIRE MESH WITH 1 INCH DIAMETER HEXAGONAL OPENINGS.
2. GRANULAR FILL:
   a. PLACE ON MESH TO HEIGHT AND SLOPES SHOWN ON PLANS OR AS SPECIFIED BY THE ENGINEER.
   b. 3-6 INCHES FOR ROCK FILTER DAM TYPES 2, AND 4.
   REFER TO GRANULAR FILL IN SPECIFICATION SECTION NO. 02378-RIPRAP AND GRANULAR FILL.
3. WIRE MESH: FOLD ATUPSTREAM SIDE OVER GRANULAR FILL AND TIGHTLY SECURE TO ITSELF ON THE DOWNSTREAM SIDE USING WIRE TIES OR HOG RINGS.
4. IN STREAMS, SECURE OR STAKE MESH TO STREAM BED PRIOR TO AGGREGATE PLACEMENT.
5. SEE SPECIFICATION SECTION NO. 02364 - FILTER DAMS.
6. EMBED ONE FOOT MINIMUM INTO SLOPE AND AT SLOPE RAISE ONE FOOT HIGHER THAN CENTER OF DEPRESSED AREA.

THIS DETAIL SHEET HAS BEEN PREPARED FOR USE ON HCFCD PROJECTS OR PROJECTS TO BE MAINTAINED BY THE HCFCD. WHEN COMPLETED BY OTHERS, AN ENGINEER WHO INCORPORATES THE DETAILS ON THIS SHEET BECOMES RESPONSIBLE FOR ITS USE IN THE END PRODUCT IN ACCORDANCE WITH RULE 137.33 (b) AND (c) OF THE TEXAS BOARD OF PROFESSIONAL ENGINEERS.

P.E. SEAL AND SIGNATURE

ENGINEER'S CONTACT CHANGES TO BE ENTERED BY HCFCD

DATE	APPR.	DESCRIPTION	REV.

PROJECT ID#

PROJECT TITLE

STORMWATER POLLUTION PREVENTION DETAILS

PREPARED: CHECKED: APPROVED:

STORMWATER POLLUTION PREVENTION DETAILS

HARRIS COUNTY FLOOD CONTROL DISTRICT
9900 Northwest Freeway
Houston, Texas 77092

DATE: 10-23-2018
SCALE: NTS

SHEET NUMBER
29 OF 29

5engineering

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

STATE OF TEXAS
PERRY BATTISTINI
104895
LICENSED PROFESSIONAL ENGINEER
06/24/2025

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION - DISINFECTION REDESIGN AMENDMENT

DETENTION BASIN - DETAILS 5 OF 8

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00263-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 29K OF 17 3	

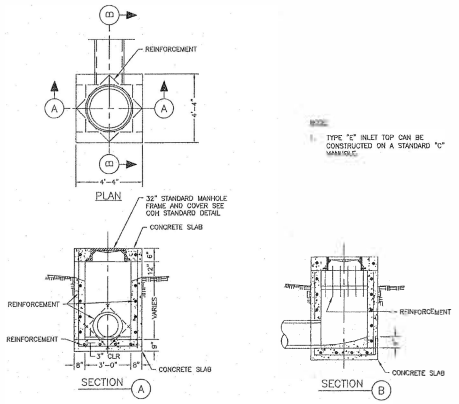
STATE OF TEXAS
80367
REGISTERED
PROFESSIONAL
ENGINEER
AUSTIN, TEXAS

C-11-505

1 STORM WATER POLLUTION PREVENTION DETAILS
NOT TO SCALE

FILE PATH: P:\0092\001 IAH WW1\04 Cadd-GIS\02 SHEETS\11 - DETENTION\C-11-505 DETENTION BASIN - DETAILS 5 OF 8.dwg

02632-09

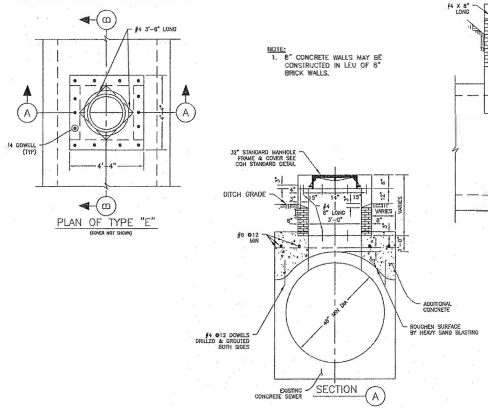


NOTE:
1. TYPE "E" INLET TOP CAN BE CONSTRUCTED ON A STANDARD "C" MANHOLE.

STORM SEWER TYPE "E" INLET
NTS

02632-10

COH IS PHASING OUT BRICK. NEW DETAILS TO BE POSTED END OF 2019



STORM SEWER TYPE "E" INLET ON EXIST MONOLITHIC CONC SEWERS OF 48" DIA & GREATER
NTS

FIRM INFORMATION | ENGINEER'S SEAL

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

STORM SEWER
02632-09
AND 02632-10

APPROVED BY: CITY ENGINEER
APPROVED BY: DEPUTY DIRECTOR
APPROVED BY: DIRECTOR
EFFECTIVE DATE: JUL-01-2019
FOR CITY OF HOUSTON USE ONLY

SHEET NO.

1 TYPE-E INLET
NOT TO SCALE

NOTE:
ALL DETAILS OBTAIN FROM CITY OF HOUSTON DESIGN AND CONSTRUCTION STANDARDS SITE, AND HCED STANDARD CIVIL DRAWINGS SITE. ACCESSED JANUARY 2022

5engineering

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 900
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

STATE OF TEXAS
PIERO BATTISTINI
104895
LICENSED PROFESSIONAL ENGINEER
06/24/2025

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT
DETENTION BASIN - DETAILS 6 OF 8

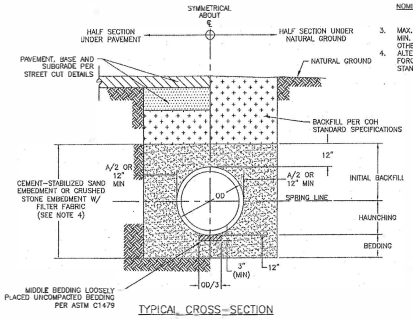
WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 29L OF 173	

PROFESSIONAL ENGINEER
80367
SHAHIDUR RAHMAN
06/24/2025

C-11-506

FILE PATH: P:\0092\001 IAH WWTP\04 Cadd-GIS\02 SHEETS\11 - DETENTION\C-11-506 DETENTION BASIN - DETAILS 6 OF 8.dwg

02317-03



TYPICAL CROSS-SECTION

NOTES:

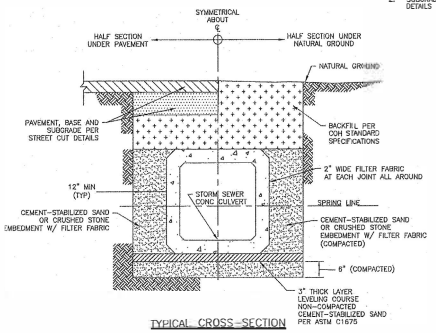
1. THIS DETAIL MAY BE USED ONLY FOR DRY STABLE TRENCH CONDITIONS PER COH STANDARD. SEE COH STANDARD SPECIFICATION FOR REQUIREMENTS IN OTHER CONDITIONS.
2. MIN. TRENCH WIDTH SHALL BE PIPE OD PLUS AN ALLOWANCE "A" FOR THE NOMINAL PIPE SIZE:

NOMINAL PIPE SIZE	"A"
18" TO 30"	24"
OVER 30"	36"

3. MAX. TRENCH WIDTH SHALL BE NOT GREATER THAN MIN. TRENCH WIDTH PLUS 24 INCHES, UNLESS OTHERWISE NOTED.
4. ALTERNATIVE EMBEDMENT BACKFILL MATERIALS FOR FORCE MAINS MAY BE ALLOWED. SEE COH STANDARD SPECIFICATIONS.

SANITARY OR STORM SEWER BEDDING AND BACKFILL FOR DRY STABLE TRENCH
NTS

02317-05



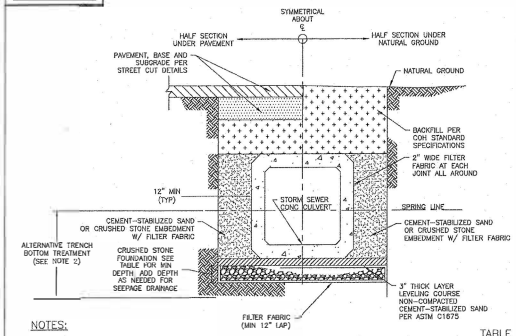
TYPICAL CROSS-SECTION

NOTES:

1. WHERE MULTIPLE BOX SEWER ARE USED IN THE SAME TRENCH, MIN. OUTSIDE TO OUTSIDE BOX SEWER SEPERATION SHALL BE 6".
2. SUBGRADE AND PAVEMENT FOR STREET CUT DETAILS – 02951.

PRECAST CONCRETE BOX STORM SEWER BEDDING AND BACKFILL FOR DRY STABLE TRENCH
NTS

02317-06



NOTES:

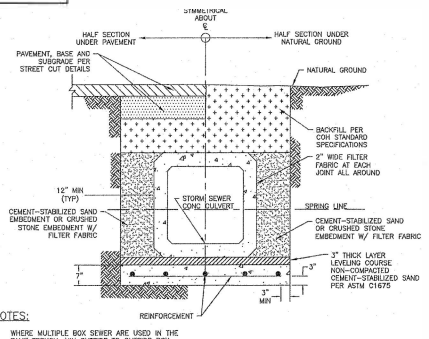
1. WHERE MULTIPLE BOX SEWER ARE USED IN THE SAME TRENCH, MIN. OUTSIDE TO OUTSIDE BOX SEWER SEPERATION SHALL BE 6".
2. ALTERNATIVE TRENCH BOTTOM TREATMENT MAY BE USED AS APPROVED BY THE CITY OF ENGINEERS AND AS PAID FOR IN THE PROPOSAL.

TABLE

CULVERT SIZE (FT)	FOUNDATION DEPTH (INCHES)
3' X 3' TO 6' X 6'	12
6' X 8' AND LARGER	18

PRECAST CONCRETE BOX STORM SEWER BEDDING AND BACKFILL FOR WET STABLE TRENCH
NTS

02317-07



NOTES:

1. WHERE MULTIPLE BOX SEWER ARE USED IN THE SAME TRENCH, MIN OUTSIDE TO OUTSIDE BOX SEWER SEPERATION SHALL BE 6".
2. REINFORCED CONCRETE SLAB PIPE BEDDING TO BE PLACED IN DRY TRENCH ONLY.
3. CONCRETE IN SLAB TO REACH MIN COMPRESSIVE STRENGTH OF 1000 PSI BASED ON MAX DESIGN BEFORE PIPE IS LAID.
4. PRECAST SEAL SLAB MAYBE USED AS APPROVED BY CITY ENGINEER.

PRECAST CONCRETE BOX STORM SEWER BEDDING AND BACKFILL WITH SEAL SLAB
NTS

1 STORM SEWER BEDDING AND BACKFILL DETAIL
NOT TO SCALE

NOTE:
ALL DETAILS OBTAIN FROM CITY OF HOUSTON DESIGN AND CONSTRUCTION STANDARDS SITE, AND HCED STANDARD CIVIL DRAWINGS SITE. ACCESSED JANUARY 2022

FIRM INFORMATION | ENGINEER'S SEAL

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

STORM SEWER
02317-03 THROUGH 07

APPROVED BY: CITY ENGINEER | APPROVED BY: DEPUTY DIRECTOR
APPROVED BY: DIRECTOR
EFFECTIVE DATE: JUL-01-2019
FOR CITY OF HOUSTON USE ONLY

SHEET NO.

5engineering
BLACK & VEATCH
BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258
SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS · PIERO BATTISTINI · 104895 · LICENSED PROFESSIONAL ENGINEER · 06/24/2025

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT
DETENTION BASIN – DETAILS 7 OF 8

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 29M OF 173	

80367 · REGISTERED · PROFESSIONAL · ENGINEER · HOUSTON, TEXAS

C-11-506A

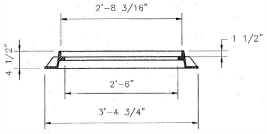
FILE PATH: P:\0092\001 WH WWTP\04 Cadd-GIS\02 SHEETS\11 - DETENTION\C-11-506 DETENTION BASIN - DETAILS 6 OF 8.dwg



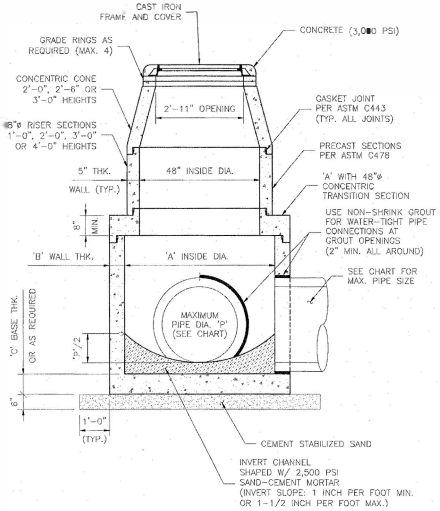
PLAN VIEW
FRAME AND COVER
SCALE: 1" = 1'-0"



COVER SECTION A-A
SCALE: 1" = 1'-0"

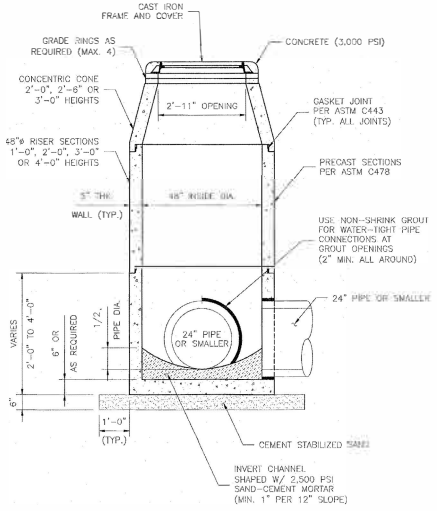


FRAME SECTION A-A
SCALE: 1" = 1'-0"



PRECAST CONCENTRIC MANHOLE
FOR PIPE SIZES GREATER THAN 24"
SCALE: 1" = 1'-6"

MAXIMUM PIPE DIA. 'P'	INSIDE DIA. 'A'	MIN. WALL THICKNESS 'B'	MIN. BASE THICKNESS 'C'
30"	60"	6"	8"
42"	72"	7"	8"
54"	84"	8"	10"
60"	96"	9"	10"



48"ø PRECAST CONCENTRIC MANHOLE
FOR PIPE SIZES 24" OR SMALLER
SCALE: 1" = 1'-6"

GENERAL NOTES:

1. CONSTRUCTION AND MATERIALS SHALL MEET REQUIREMENTS OF ITEM 471 "PRECAST CONCRETE MANHOLES".
2. CONCRETE FOR MANHOLE: MINIMUM 4,000 PSI IN 28 DAYS.
3. HL-93 LOADING MANHOLE DESIGN SHALL MEET OR EXCEED ASTM C478 REQUIREMENTS.
4. GASKET JOINT PER ASTM C443.
5. FRAME AND COVER SHALL BE EAST JORDAN IRON WORKS MODEL V-1420 OR APPROVED EQUAL.
6. SHOP DRAWINGS WITH MANUFACTURER'S CERTIFICATION SHALL BE SUBMITTED FOR ENGINEER'S APPROVAL.

NOTE:
ALL DETAILS OBTAIN FROM CITY OF HOUSTON DESIGN AND CONSTRUCTION STANDARDS SITE, AND HCED STANDARD CIVIL DRAWINGS SITE. ACCESSED JANUARY 2022

NO.	REVISIONS	DATE	NAME

HARRIS COUNTY
ENGINEERING DEPARTMENT

FOR INTERIM REVIEW ONLY
DOCUMENT INCOMPLETE; NOT INTENDED FOR CONSTRUCTION, BIDDING, OR PERMIT PURPOSES
ENGINEER: NAME
P.E. SERIAL No. NUMBER
DATE: / /

PROJECT TITLE:

		CIVIL STANDARD
SHEET DESCRIPTION	PRECAST CONCRETE STORM SEWER	PMH
DRAWN BY: JDZ	MANHOLE DETAILS	DATE: 8/15/17
DESIGN BY: PDG	SCALE: AS NOTED	SHEET NO. 7

5engineering

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

STATE OF TEXAS
PIERO BATTISTINI
104895
LICENSED PROFESSIONAL ENGINEER
06/24/2025

SURVEYED BY:
LINITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT
DETENTION BASIN - DETAILS 8 OF 8

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	29 N OF 173

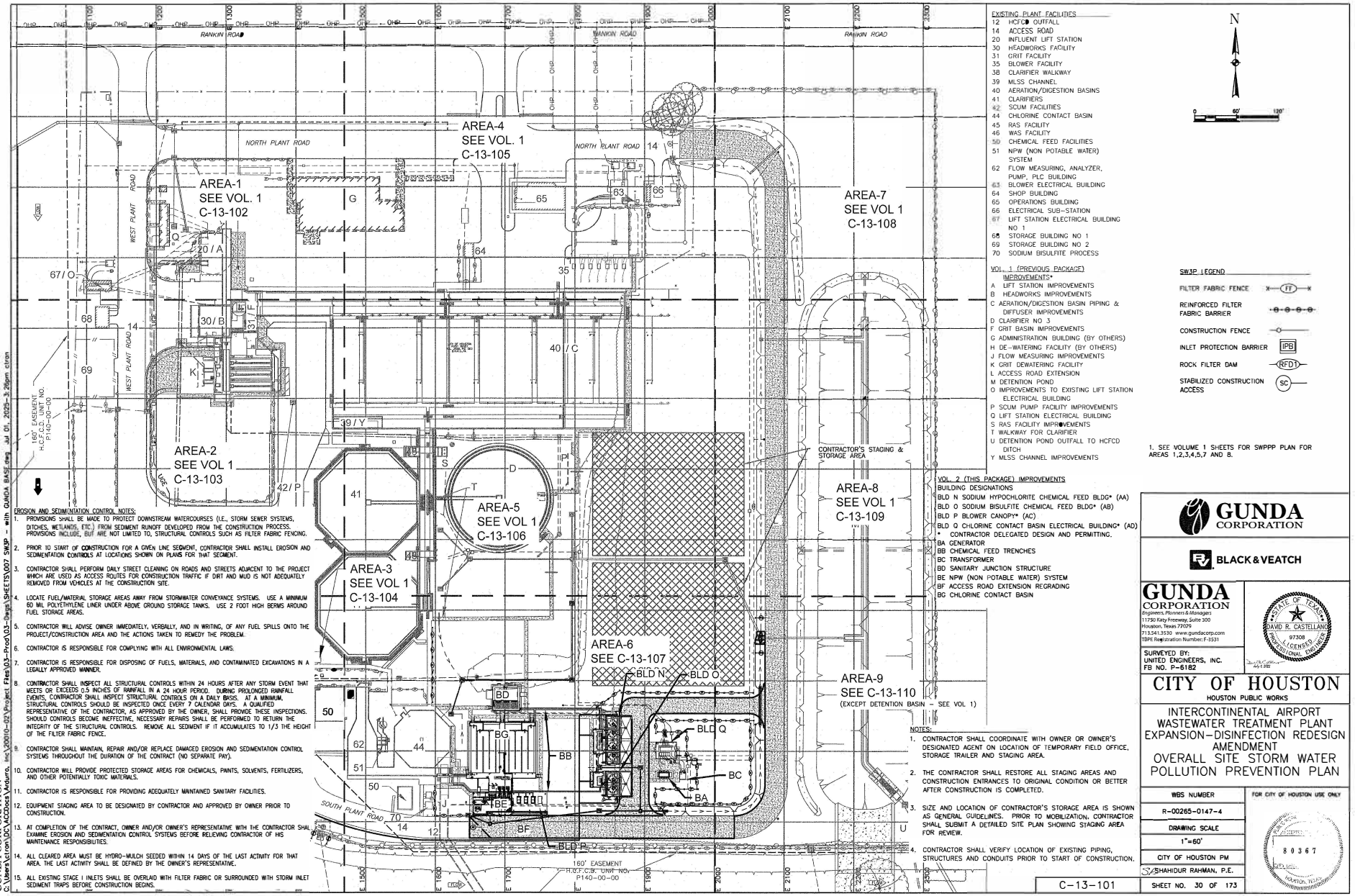
FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
80367
REGISTERED
HOUSTON, TEXAS

C-11-506B

FILE PATH: P:\0092\001 IAH WWTP\04 Cadd-GIS\02 SHEETS\11 - DETENTION\C-11-506 DETENTION BASIN - DETAILS 7.dwg

J:\Engineering Specs\Harris County Standard Civil Drawings- Master File\8-16-2017 CIVIL STANDARD DRAWINGS\STORM SEWER\PMH.dwg



EXISTING PLANT FACILITIES

12 HCFCD OUTFALL
14 ACCESS ROAD
20 INFLUENT LIFT STATION
30 HEADWORKS FACILITY
31 GRIT FACILITY
35 BLOWER FACILITY
38 CLARIFIER WALKWAY
39 MLSS CHANNEL
40 AERATION/DIGESTION BASINS
41 CLARIFIERS
42 SCUM FACILITIES
44 CHLORINE CONTACT BASIN
45 RAS FACILITY
46 WAS FACILITY
50 CHEMICAL FEED FACILITIES
51 NPW (NON POTABLE WATER) SYSTEM
62 FLOW MEASURING, ANALYZER, PUMP, PLC BUILDING
63 BLOWER ELECTRICAL BUILDING
64 SHOP BUILDING
65 OPERATIONS BUILDING
66 ELECTRICAL SUB-STATION
67 LIFT STATION ELECTRICAL BUILDING NO 1
68 STORAGE BUILDING NO 1
69 STORAGE BUILDING NO 2
70 SODIUM BISULFITE PROCESS

VOL. 1 (PREVIOUS PACKAGE) IMPROVEMENTS*

A LIFT STATION IMPROVEMENTS
B HEADWORKS IMPROVEMENTS
C AERATION/DIGESTION BASIN PIPING & DIFFUSER IMPROVEMENTS
D CLARIFIER NO 3
F GRIT BASIN IMPROVEMENTS
G ADMINISTRATION BUILDING (BY OTHERS)
H DE-WATERING FACILITY (BY OTHERS)
J FLOW MEASURING IMPROVEMENTS
K GRIT DEWATERING FACILITY
L ACCESS ROAD EXTENSION
M DETENTION POND
O IMPROVEMENTS TO EXISTING LIFT STATION ELECTRICAL BUILDING
P SCUM PUMP FACILITY IMPROVEMENTS
Q LIFT STATION ELECTRICAL BUILDING
S RAS FACILITY IMPROVEMENTS
T WALKWAY FOR CLARIFIER
U DETENTION POND OUTFALL TO HCFCD DITCH
Y MLSS CHANNEL IMPROVEMENTS

SW3P LEGEND

FILTER FABRIC FENCE (FF)
REINFORCED FILTER FABRIC BARRIER
CONSTRUCTION FENCE
INLET PROTECTION BARRIER (IPB)
ROCK FILTER DAM (RFD1)
STABILIZED CONSTRUCTION ACCESS (SC)

1. SEE VOLUME 1 SHEETS FOR SWPPP PLAN FOR AREAS 1,2,3,4,5,7 AND 8.

VOL. 2 (THIS PACKAGE) IMPROVEMENTS

BUILDING DESIGNATIONS
BLD N SODIUM HYPOCHLORITE CHEMICAL FEED BLDG* (AA)
BLD O SODIUM BISULFITE CHEMICAL FEED BLDG* (AB)
BLD P BLOWER CANOPY* (AC)
BLD Q CHLORINE CONTACT BASIN ELECTRICAL BUILDING* (AD)
* CONTRACTOR DELEGATED DESIGN AND PERMITTING.
BA GENERATOR
BB CHEMICAL FEED TRENCHES
BC TRANSFORMER
BD SANITARY JUNCTION STRUCTURE
BE NPW (NON POTABLE WATER) SYSTEM
BF ACCESS ROAD EXTENSION REGRADING
BG CHLORINE CONTACT BASIN

NOTES:

1. CONTRACTOR SHALL COORDINATE WITH OWNER OR OWNER'S DESIGNATED AGENT ON LOCATION OF TEMPORARY FIELD OFFICE, STORAGE TRAILER AND STAGING AREA.
2. THE CONTRACTOR SHALL RESTORE ALL STAGING AREAS AND CONSTRUCTION ENTRANCES TO ORIGINAL CONDITION OR BETTER AFTER CONSTRUCTION IS COMPLETED.
3. SIZE AND LOCATION OF CONTRACTOR'S STORAGE AREA IS SHOWN AS GENERAL GUIDELINES. PRIOR TO MOBILIZATION, CONTRACTOR SHALL SUBMIT A DETAILED SITE PLAN SHOWING STAGING AREA FOR REVIEW.
4. CONTRACTOR SHALL VERIFY LOCATION OF EXISTING PIPING, STRUCTURES AND CONDUITS PRIOR TO START OF CONSTRUCTION.

EROSION AND SEDIMENTATION CONTROL NOTES:

1. PROVISIONS SHALL BE MADE TO PROTECT DOWNSTREAM WATERCOURSES (I.E., STORM SEWER SYSTEMS, DITCHES, WETLANDS, ETC.) FROM SEDIMENT RUNOFF DEVELOPED FROM THE CONSTRUCTION PROCESS. PROVISIONS INCLUDE, BUT ARE NOT LIMITED TO, STRUCTURAL CONTROLS SUCH AS FILTER FABRIC FENCING.
2. PRIOR TO START OF CONSTRUCTION FOR A GIVEN LINE SEGMENT, CONTRACTOR SHALL INSTALL EROSION AND SEDIMENTATION CONTROLS AT LOCATIONS SHOWN ON PLANS FOR THAT SEGMENT.
3. CONTRACTOR SHALL PERFORM DAILY STREET CLEANING ON ROADS AND STREETS ADJACENT TO THE PROJECT WHICH ARE USED AS ACCESS ROUTES FOR CONSTRUCTION TRAFFIC IF DIRT AND MUD IS NOT ADEQUATELY REMOVED FROM VEHICLES AT THE CONSTRUCTION SITE.
4. LOCATE FUEL/MATERIAL STORAGE AREAS AWAY FROM STORMWATER CONVEYANCE SYSTEMS. USE A MINIMUM 60 MIL POLYETHYLENE LINER UNDER ABOVE GROUND STORAGE TANKS. USE 2 FOOT HIGH BERMS AROUND FUEL STORAGE AREAS.
5. CONTRACTOR WILL ADVISE OWNER IMMEDIATELY, VERBALLY, AND IN WRITING, OF ANY FUEL SPILLS ONTO THE PROJECT/CONSTRUCTION AREA AND THE ACTIONS TAKEN TO REMEDY THE PROBLEM.
6. CONTRACTOR IS RESPONSIBLE FOR COMPLYING WITH ALL ENVIRONMENTAL LAWS.
7. CONTRACTOR IS RESPONSIBLE FOR DISPOSING OF FUELS, MATERIALS, AND CONTAMINATED EXCAVATIONS IN A LEGALLY APPROVED MANNER.
8. CONTRACTOR SHALL INSPECT ALL STRUCTURAL CONTROLS WITHIN 24 HOURS AFTER ANY STORM EVENT THAT MEETS OR EXCEEDS 0.5 INCHES OF RAINFALL IN A 24 HOUR PERIOD. DURING PROLONGED RAINFALL EVENTS, CONTRACTOR SHALL INSPECT STRUCTURAL CONTROLS ON A DAILY BASIS. AT A MINIMUM, STRUCTURAL CONTROLS SHOULD BE INSPECTED ONCE EVERY 7 CALENDAR DAYS. A QUALIFIED REPRESENTATIVE OF THE CONTRACTOR, AS APPROVED BY THE OWNER, SHALL PROVIDE THESE INSPECTIONS. SHOULD CONTROLS BECOME INEFFECTIVE, NECESSARY REPAIRS SHALL BE PERFORMED TO RETURN THE INTEGRITY OF THE STRUCTURAL CONTROLS. REMOVE ALL SEDIMENT IF IT ACCUMULATES TO 1/3 THE HEIGHT OF THE FILTER FABRIC FENCE.
9. CONTRACTOR SHALL MAINTAIN, REPAIR AND/OR REPLACE DAMAGED EROSION AND SEDIMENTATION CONTROL SYSTEMS THROUGHOUT THE DURATION OF THE CONTRACT (NO SEPARATE PAY).
10. CONTRACTOR WILL PROVIDE PROTECTED STORAGE AREAS FOR CHEMICALS, PAINTS, SOLVENTS, FERTILIZERS, AND OTHER POTENTIALLY TOXIC MATERIALS.
11. CONTRACTOR IS RESPONSIBLE FOR PROVIDING ADEQUATELY MAINTAINED SANITARY FACILITIES.
12. EQUIPMENT STAGING AREA TO BE DESIGNATED BY CONTRACTOR AND APPROVED BY OWNER PRIOR TO CONSTRUCTION.
13. AT COMPLETION OF THE CONTRACT, OWNER AND/OR OWNER'S REPRESENTATIVE WITH THE CONTRACTOR SHALL EXAMINE EROSION AND SEDIMENTATION CONTROL SYSTEMS BEFORE RELIEVING CONTRACTOR OF HIS MAINTENANCE RESPONSIBILITIES.
14. ALL CLEARED AREA MUST BE HYDRO-MULCH SEEDED WITHIN 14 DAYS OF THE LAST ACTIVITY FOR THAT AREA. THE LAST ACTIVITY SHALL BE DEFINED BY THE OWNER'S REPRESENTATIVE.
15. ALL EXISTING STAGE I INLETS SHALL BE OVERLAID WITH FILTER FABRIC OR SURROUNDED WITH STORM INLET SEDIMENT TRAPS BEFORE CONSTRUCTION BEGINS.

GUNDA CORPORATION
BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED PROFESSIONAL ENGINEER
Aug 1, 2025

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION-DISINFECTION REDESIGN AMENDMENT
OVERALL SITE STORM WATER POLLUTION PREVENTION PLAN

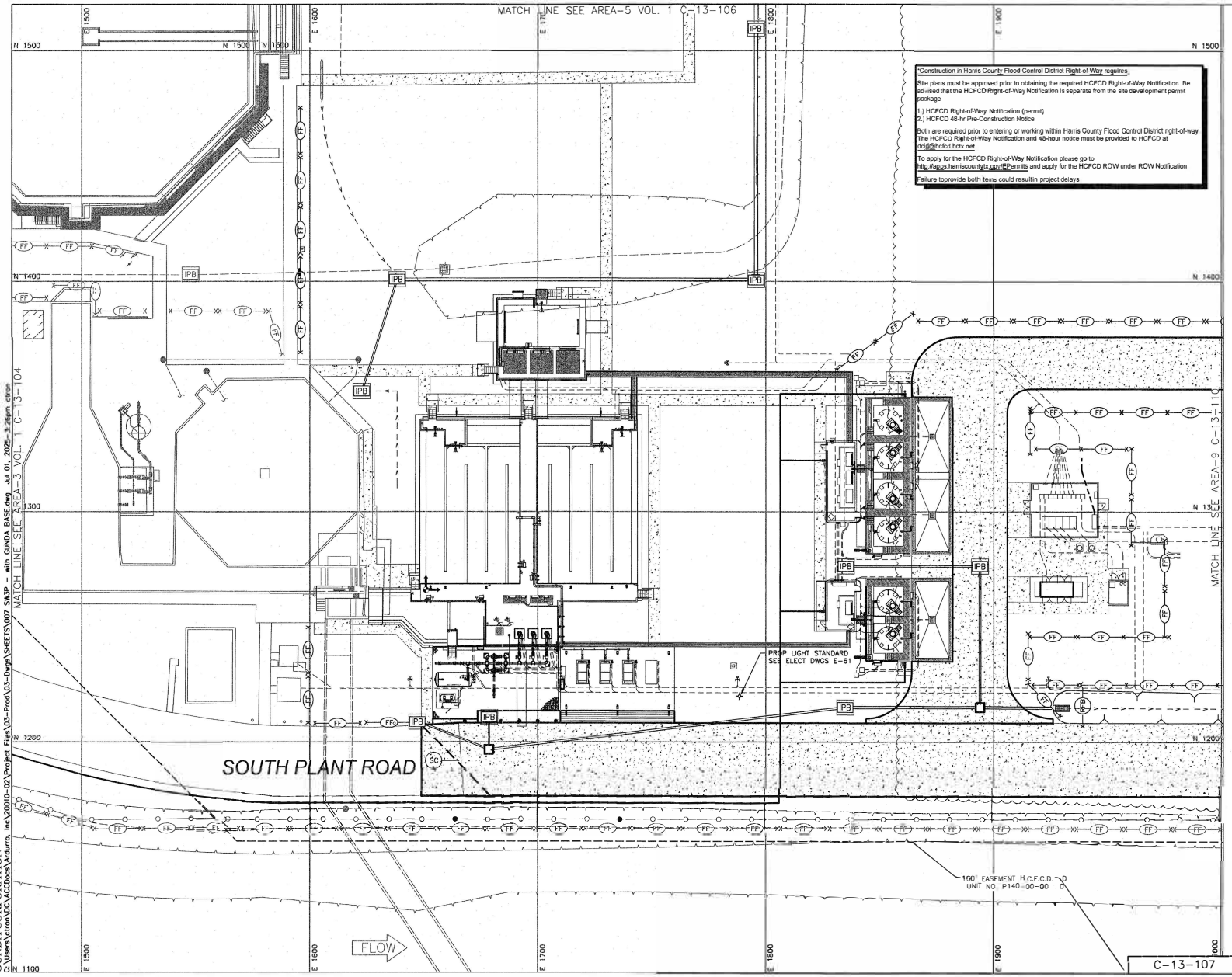
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	1"=60'
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	30 OF 173

FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
80367
SHAHIDUR RAHMAN
HOUSTON, TEXAS

C-13-101

GUNDA CORPORATION
C:\Users\ctron\DC\ACCDocs\Aduro, Inc\20010-02\Project Files\03-Prod\03-Dwgs\SHEETS\007 SW3P - with GUNDA BASE.dwg Jul 01, 2025 - 3:26pm ctron



*Construction in Harris County Flood Control District Right-of-Way requires.

Site plans must be approved prior to obtaining the required HCFCD Right-of-Way Notification. Be advised that the HCFCD Right-of-Way Notification is separate from the site development permit package

1.) HCFCD Right-of-Way Notification (permit)
2.) HCFCD 48-hr Pre-Construction Notice

Both are required prior to entering or working within Harris County Flood Control District right-of-way. The HCFCD Right-of-Way Notification and 48-hour notice must be provided to HCFCD at dcd@hcfcd.hctx.net

To apply for the HCFCD Right-of-Way Notification please go to http://apps.harriscountytx.gov/EPermits and apply for the HCFCD ROW under ROW Notification

*Failure toprovide both items could resultin project delays

N

0 20' 40'

AREA 1	AREA 4	AREA 7
AREA 2	AREA 5	AREA 8
AREA 3	AREA 6	AREA 9

KEY MAP

SWPP LEGEND

- FILTER FABRIC FENCE — FF
- REINFORCED FILTER FABRIC BARRIER — RFB
- CONSTRUCTION FENCE
- INLET PROTECTION BARRIER — IPB
- ROCK FILTER DAM — RFD1
- STABILIZED CONSTRUCTION ACCESS — SC

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED
PROFESSIONAL ENGINEER

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

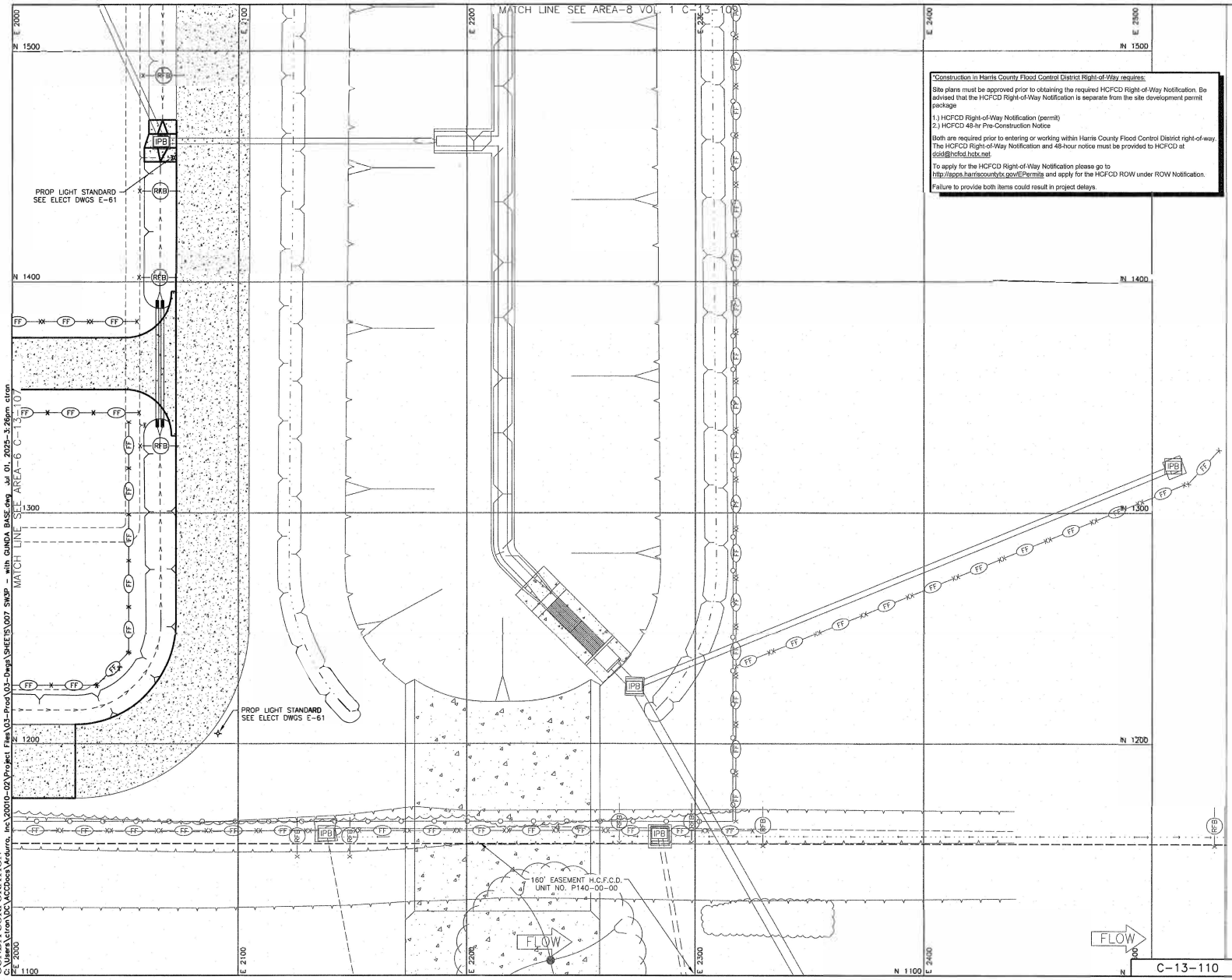
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT
STORM WATER POLLUTION PREVENTION PLAN AREA-6

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	1"=20'
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	31 OF 173

FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
80367
PUBLIC WORKS
HOUSTON, TX

GUNDA CORPORATION
C:\Users\cron\DCVACDocs\Mzduroq, Inc\20010-02\Project Files\03-Prod\03-Dwgs\SHEETS\007 SWPP - with GUNDA BASE.dwg Jul 01, 2025 - 3:26pm cron



*Construction in Harris County Flood Control District Right-of-Way requires:

Site plans must be approved prior to obtaining the required HCFCD Right-of-Way Notification. Be advised that the HCFCD Right-of-Way Notification is separate from the site development permit package

1.) HCFCD Right-of-Way Notification (permit)
2.) HCFCD 48-hr Pre-Construction Notice

Both are required prior to entering or working within Harris County Flood Control District right-of-way. The HCFCD Right-of-Way Notification and 48-hour notice must be provided to HCFCD at dcid@hcfcd.hctx.net.

To apply for the HCFCD Right-of-Way Notification please go to http://apps.harriscountytx.gov/EPermits and apply for the HCFCD ROW under ROW Notification.

Failure to provide both items could result in project delays.

N

0 20' 40'

AREA 1	AREA 4	AREA 7
AREA 2	AREA 5	AREA 8
AREA 3	AREA 6	AREA 9

KEY MAP

SW3P LEGEND

FILTER FABRIC FENCE — FF
REINFORCED FILTER FABRIC BARRIER — RFB
CONSTRUCTION FENCE
INLET PROTECTION BARRIER — IPB
ROCK FILTER DAM — RFD
STABILIZED CONSTRUCTION ACCESS — SC

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED PROFESSIONAL ENGINEER
July 1, 2025

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT
STORM WATER POLLUTION PREVENTION PLAN AREA-9

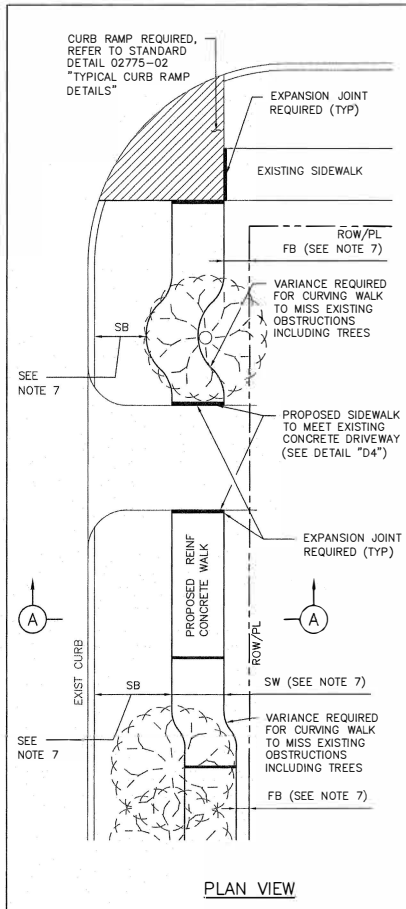
WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
1"=20'	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 32 OF 173	

ACCEPTED NOTED
80387
APPROVED

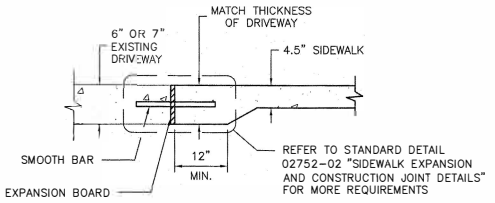
C-13-110

GUNDA CORPORATION
C:\Users\cfron\DCVACDocs\Arduro, Inc\20010-02\Project Files\03-Prod\03-Dwgs\SHEETS\007 SW3P - with GUNDA BASE.dwg Jul 01, 2025 - 3:26pm cfron

DocuSign Envelope ID: 9B122261-CF05-457B-9A65-2650F40B66D5



PLAN VIEW

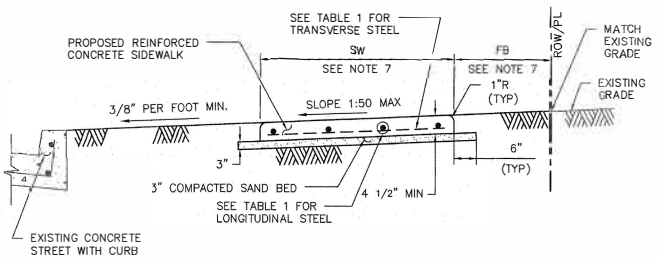


DETAIL D4
DRIVEWAY/SIDEWALK HEADER

TABLE 1

REINFORCING STEEL INFORMATION
FOR 4 ½ " THICK SIDEWALKS
EXPANSION JOINT SPACING = 40 FT
fc' = 3,500 PSI AND fy = 60,000 PSI
REFER TO CONTRACT DRAWINGS FOR SIDEWALKS WIDER THAN 6 FEET.

SIDEWALK THICKNESS (IN)	SIDEWALK WIDTH (FT)	LONGITUDINAL STEEL			TRANSVERSE STEEL #3 BARS SPACING (IN)
		#3 BARS			
		NO. OF BARS	SPACING (IN)	END BAR SPACING (IN)	
4.5	5	3	27	3	48
4.5	6	4	22	3	48



SECTION A–A

NOTES:

1. 6X6 – W2.9XW2.9 WELDED WIRE FABRIC MAY BE USED IN LIEU OF THE REINFORCING STEEL GIVEN IN TABLE 1.
2. REINFORCED CONCRETE SIDEWALKS THRU DRIVEWAYS OPENINGS SHALL BE EITHER 6" THICK OR 7" THICK AS SPECIFIED ON 6" STABILIZED SUBGRADE. FOR THE REINFORCING STEEL REQUIREMENTS, SEE CITY OF HOUSTON STANDARD DETAILS 02754-01A, 02754-01B, 02754-03, AND 02754-04.
3. MAXIMUM SPACING FOR EXPANSION JOINTS SHALL BE 40 FEET.
4. CONTRACTOR SHALL CONSTRUCT SIDEWALK IN A MANNER NOT TO BLOCK THE NATURAL DRAINAGE FROM ADJACENT PROPERTY.
5. ALL RAMPS AND SIDEWALKS/WALKWAYS SHALL BE CONSTRUCTED IN ACCORDANCE WITH HOUSTON PUBLIC WORKS STANDARDS, TEXAS ACCESSIBILITY STANDARDS (TAS) AND AMERICANS WITH DISABILITIES ACT (ADA) REQUIREMENTS. IF THERE IS A CONFLICT IN THE REQUIREMENTS, THE STRICTEST REQUIREMENTS SHALL GOVERN.
6. CURB RAMPS THAT ARE STEEPER THAN A 1:12 MAX SLOPE WILL NOT BE ACCEPTED BY THE CITY OF HOUSTON UNLESS NOTED OTHERWISE.
7. REFER TO CONTRACT DRAWINGS FOR SIDEWALK (SW), FRONTAGE BUFFER (FB), AND SAFETY BUFFER (SB) WIDTHS.

1. HOUSTON PUBLIC WORKS 'STANDARD CONSTRUCTION SPECIFICATIONS' AND 'STANDARD CONSTRUCTION DETAILS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE, AND STREET PAVING' UNLESS OTHERWISE NOTED AND APPROVED ON THESE PLANS, THE DESIGN IS CONSISTENT WITH THE MINIMUM STANDARDS ESTABLISHED IN THE 'INFRASTRUCTURE DESIGN MANUAL' REFERENCED AT: HTTPS://WWW.HOUSTONPERMITTINGCENTER.ORG/MEDIA/2276/DOWNLOAD
2. FILL AREAS ON PLANS SHALL BE FILLED IN LAYERS NOT EXCEEDING 8" IN DEPTH AND EACH COMPACTED TO NOT LESS THAN 95% STANDARD PROCTOR DENSITY PRIOR TO INSTALLATION OF WATER LINE AND FILL AREA SHALL BE SEEDED AND FERTILIZED WITHIN 10 WORKING DAYS.
3. UTILITY CONTRACTOR SHALL PROVIDE TEMPORARY SILT BARRIER FENCE ON ALL NON-CURBED INLETS WHICH WILL REMAIN IN PLACE AFTER UNDERGROUND CONTRACT IS COMPLETE.
4. CONTRACTOR SHALL PROVIDE SILT BARRIER FENCE ON ALL STAGE 1 CURB INLETS.
5. EXISTING PAVEMENTS, CURBS, DRIVEWAYS, AND SIDEWALKS DAMAGED OR REMOVED DURING CONSTRUCTION SHALL BE REPLACED TO CITY OF HOUSTON STANDARDS, WITH LATEST ADDENDA AND AMENDMENTS THERETO.
6. CONDITION OF THE ROAD AND/OR RIGHT-OF-WAY UPON COMPLETION OF JOB SHALL BE AS GOOD AS OR BETTER THAN PRIOR TO STARTING WORK.
7. ADEQUATE DRAINAGE SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION AND ANY DRAINAGE DITCH OR STRUCTURE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO SATISFACTION OF THE OWNING AUTHORITY.
8. EXPOSED 15' OF REINFORCING STEEL AT PROPOSED SAWED JOINT IF NO REINFORCING STEEL EXISTS. USE HORIZONTAL DOWELS. HORIZONTAL DOWELS SHALL BE #6 BARS 24" LONG 24" C-C DRILLED AND EMBEDDED 8" INTO THE CENTER OF THE EXISTING SLAB WITH 'PO ROC' OR EQUAL.
9. CONTRACTOR TO TAKE NECESSARY PRECAUTIONS TO PROTECT ROOT SYSTEMS OF SHRUBS, PLANTS AN D TREES ALONG AREAS OF EXCAVATION.
10. CONTRACTOR SHALL COMPLY WITH OSHA REGULATIONS AND STATE OF TEXAS LAWS CONCERNING EXCAVATION, TRENCHING AND SHORING AS SPECIFIED IN CITY OF HOUSTON ORDINANCE #87-1457.
11. WHEEL CHAIR RAMPS SHALL BE INSTALLED IN ACCORDANCE WITH CITY OF HOUSTON STANDARDS AT ALL INTERSECTIONS WHERE SIDEWALKS EXIST AND THE EXISTING CURB OR SIDEWALK IS DAMAGED OR REMOVED DURING CONSTRUCTION.
12. WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE AND STREET PAVING SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE HOUSTON PUBLIC WORKS 'STANDARD CONSTRUCTION SPECIFICATIONS' AND 'STANDARD CONSTRUCTION DETAILS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE AND STREET PAVING' UNLESS OTHERWISE NOTED AND APPROVED ON THESE PLANS. THE DESIGN SHOULD BE CONSISTENT WITH THE MINIMUM STANDARD ESTABLISHED IN THE 'DESIGN MANUAL FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORMS DRAINAGE AND STREET PAVING'.
13. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY DAMAGES TO EXISTING WATER, WASTEWATER, STORM SEWER AND TRAFFIC SIGNAL CONDUITS. ALL DAMAGES SHALL BE REPAIRED IN ACCORDANCE WITH THE HOUSTON PUBLIC WORKS 'STANDARD CONSTRUCTION SPECIFICATIONS' WITH LATEST ADDENDA AND AMENDMENTS THERETO, AT NO COST TO THE CITY OF HOUSTON.
14. PRIOR TO STREET CONSTRUCTION, THE CONTRACTOR SHALL CONTACT HOUSTON PUBLIC WORKS AT (PHONE) 832-394-9578 AND COMPLY WITH ALL REQUIREMENTS FOR THE ISSUANCE OF NECESSARY PERMITS/WORK ORDERS FOR STREET CONSTRUCTION.
15. DOUBLE REFLECTORIZED BLUE TRAFFIC MARKERS SHALL BE PLACED 6-INCHES OFFSET OF THE CENTERLINE OF ALL FIRE HYDRANT LOCATIONS BY THE PAVING CONTRACTOR. HYDRANTS LOCATED AT INTERSECTIONS SHALL HAVE A BUTTON PLACED ON EACH STREET.

DISCLAIMER:
THE USE OF THIS STANDARD IS GOVERNED BY THE TEXAS ENGINEERING PRACTICE ACT. THE DESIGN REQUIREMENTS ON THIS STANDARD DO NOT PURPORT TO ADDRESS ALL OF THE SAFETY CONCERNS ASSOCIATED WITH THEIR USE. THE ENGINEER OF RECORD (EOR) IS TO REVIEW THESE DESIGN REQUIREMENTS AND BY AUTHORIZING THEIR USE IS ASSUMING RESPONSIBILITY FOR PROPER DESIGN FOR THE INTENDED USE. NEITHER THE EOR NOR THE CITY OF HOUSTON IS LIABLE TO ANY PARTY FOR ANY LOSS WHATSOEVER. THE CITY OF HOUSTON ASSUMES NO RESPONSIBILITY FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

TYPICAL SIDEWALK LAYOUT AND DETAILS FOR STREETS WITH CURBS
(SCALE: NOT TO SCALE)

APPROVED BY:

DocuSigned by: Sukul Kanwar — CITY ENGINEER
DocuSigned by: Binh Nguyen — CITY TRAFFIC ENGINEER
DocuSigned by: Carol Haddock — DIRECTOR OF HPW

EFF DATE: NOV-27-2023 | DWG NO: 02775-01

GUNDA CORPORATION
BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS — DAVID R. CASTELLANO — 97308 — LICENSED PROFESSIONAL ENGINEER

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION-DISINFECTION REDESIGN AMENDMENT
SITE PAVING, DRIVEWAY & SIDEWALK DETAILS (1 OF 2)

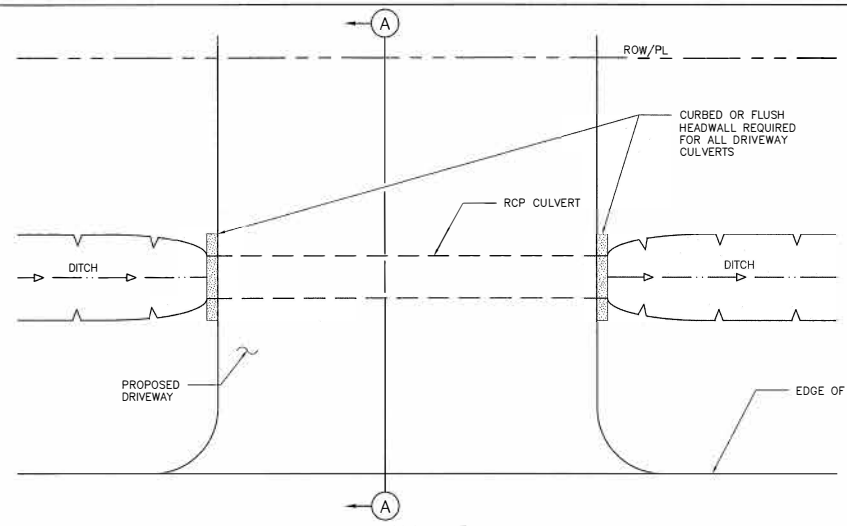
WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 33A OF 173	

STATE OF TEXAS — 80367 — REGISTERED PROFESSIONAL ENGINEER — HOUSTON, TEXAS

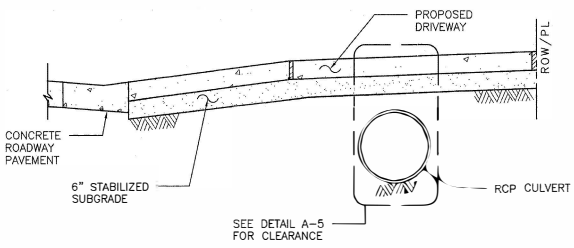
C-99-501A

GUNDA CORPORATION
C:\Users\cron\DC\ACCDocs\Vidurra, Inc\20010-02\Project Files\03-Prod\03-Dwgs\SHEETS\00B DETAILS - with GUNDA BASE.dwg Jul 01, 2025 - 3:43pm cron

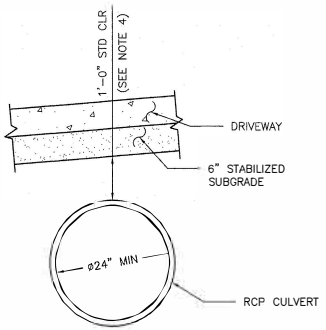
DocuSign Envelope ID: 9B122261-CF05-457B-9A65-2650F40B66D5



PLAN VIEW
STANDARD OPEN DITCH DRIVEWAY



SECTION A–A
STANDARD PIPE CULVERT CLEARANCE



DETAIL A–5
CULVERT CLEARANCE

NOTES:

1. PIPE CULVERTS SHALL CONFORM TO CHAPTER 9 DESIGN REQUIREMENTS OF THE INFRASTRUCTURE DESIGN MANUAL AND MATERIAL REQUIREMENTS OF STANDARD CONSTRUCTION SPECIFICATION SECTION 02631.
2. RCP CULVERT SIZE WILL BE APPROVED BY CITY ENGINEER WITH 24" DIAMETER MINIMUM.
3. DRIVEWAY MATERIAL WITHIN THE RIGHT OF WAY SHALL BE CONCRETE OR ASPHALT.
4. WHERE STANDARD 1'–0" CLEARANCE IS NOT FEASIBLE, MINIMUM CLEARANCE OF 6" IS ALLOWED WHEN APPROVED BY THE OFFICE OF THE CITY ENGINEER (OCE).
5. DITCH FLOW LINE DIRECTION DEPICTED IS SHOWN AS AN EXAMPLE AND MAY NOT MATCH SITE SPECIFIC CONDITIONS. REFER TO CONTRACT DRAWINGS FOR FLOW LINE DIRECTION AND ELEVATIONS.

1. HOUSTON PUBLIC WORKS STANDARD CONSTRUCTION SPECIFICATIONS" AND "STANDARD CONSTRUCTION DETAILS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE, AND STREET PAVING" UNLESS OTHERWISE NOTED AND APPROVED ON THESE PLANS. THE DESIGN IS CONSISTENT WITH THE MINIMUM STANDARDS ESTABLISHED IN THE "INFRASTRUCTURE DESIGN MANUAL" REFERENCED AT: HTTPS://WWW.HOUSTONPERMITTINGCENTER.ORG/WCM/2279/DOWNLOAD
2. FILL AREAS ON PLANS SHALL BE FILLED IN LAYERS NOT EXCEEDING 8" IN DEPTH AND EACH COMPACTED TO NOT LESS THAN 95% STANDARD PROCTOR DENSITY PRIOR TO INSTALLATION OF WATER LINE AND FILL AREA SHALL BE SEEDED AND FERTILIZED WITHIN 10 WORKING DAYS.
3. UTILITY CONTRACTOR SHALL PROVIDE TEMPORARY SILT BARRIER FENCE ON ALL NON-CURBED INLETS WHICH WILL REMAIN IN PLACE AFTER UNDERGROUND CONTRACT IS COMPLETE.
4. CONTRACTOR SHALL PROVIDE SILT BARRIER FENCE ON ALL STAGE 1 CURB INLETS.
5. EXISTING PAVEMENTS, CURBS, DRIVEWAYS, AND SIDEWALKS DAMAGED OR REMOVED DURING CONSTRUCTION SHALL BE REPLACED TO CITY OF HOUSTON STANDARDS, WITH LATEST ADDENDA AND AMENDMENTS THERETO.
6. CONDITION OF THE ROAD AND/OR RIGHT-OF-WAY UPON COMPLETION OF JOB SHALL BE AS GOOD AS OR BETTER THAN PRIOR TO STARTING WORK.
7. ADEQUATE DRAINAGE SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION AND ANY DRAINAGE DITCH OR STRUCTURE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO SATISFACTION OF THE OWNING AUTHORITY.
8. EXPOSED 15 " OF REINFORCING STEEL AT PROPOSED SAWED JOINT IF NO REINFORCING STEEL EXISTS, USE HORIZONTAL DOWELS. HORIZONAL DOWELS SHALL BE #6 BARS 24 " LONG 24 " C-DRILLED AND EMBEDDED 8 " INTO THE CENTER OF THE EXISTING SLAB WITH "PO ROC" OR EQUAL.
9. CONTRACTOR TO TAKE NECESSARY PRECAUTIONS TO PROTECT ROOT SYSTEMS OF SHRUBS, PLANTS AND TREES ALONG AREAS OF EXCAVATION.
10. CONTRACTOR SHALL COMPLY WITH OSHA REGULATIONS AND STATE OF TEXAS LAWS CONCERNING EXCAVATION, TRENCHING AND SHORING AS SPECIFIED IN CITY OF HOUSTON ORDINANCE #87-14 57.
11. WHEEL CHAIR RAMPS SHALL BE INSTALLED IN ACCORDANCE WITH CITY OF HOUSTON STANDARDS AT ALL INTERSECTIONS WHERE SIDEWALKS EXIST AND THE EXISTING CURB OR SIDEWALK IS DAMAGED OR REMOVED DURING CONSTRUCTION.
12. WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE AND STREET PAVING SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE HOUSTON PUBLIC WORKS "STANDARD CONSTRUCTION SPECIFICATIONS" AND "STANDARD CONSTRUCTION DETAILS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE AND STREET PAVING" UNLESS OTHERWISE NOTED AND APPROVED ON THESE PLANS. THE DESIGN SHOULD BE CONSISTENT WITH THE MINIMUM STANDARD ESTABLISHED IN THE "DESIGN MANUAL FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORMS DRAINAGE AND STREET PAVING".
13. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY DAMAGES TO EXISTING WATER, WASTEWATER, STORM SEWER AND TRAFFIC SIGNAL CONDUITS, ALL DAMAGES SHALL BE REPAIRED IN ACCORDANCE WITH THE HOUSTON PUBLIC WORKS "STANDARD CONSTRUCTION SPECIFICATIONS" WITH LATEST ADDENDA AND AMENDMENTS THERETO, AT NO COST TO THE CITY OF HOUSTON.
14. PRIOR TO STREET CONSTRUCTION, THE CONTRACTOR SHALL CONTACT HOUSTON PUBLIC WORKS AT (PHONE) 832-394-9578 AND COMPLY WITH ALL REQUIREMENTS FOR THE ISSUANCE OF NECESSARY PERMITS/WORK ORDERS FOR STREET CONSTRUCTION.
15. DOUBLE REFLECTORIZED BLUE TRAFFIC MARKERS SHALL BE PLACED 6–INCHES OFFSET OF THE CENTERLINE OF ALL FIRE HYDRANT LOCATIONS BY THE PAVING CONTRACTOR. HYDRANTS LOCATED AT INTERSECTIONS SHALL HAVE A BUTTON PLACED ON EACH STREET.

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

DRIVEWAYS WITH CULVERTS ON OPEN DITCH TYPE STREETS

(SCALE: NOT TO SCALE)

APPROVED BY:

DocuSigned by: Sukat kanwar — CITY ENGINEER
DocuSigned by: KHANG NGUYEN — CITY TRAFFIC ENGINEER
DocuSigned by: Carl Haddock — DIRECTOR OF HPW

EFF DATE: NOV-27-2023 | DWG NO: 02754-02

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS — DAVID R. CASTELLANO — 97308 — LICENSED PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT
SITE PAVING DRIVEWAY & SIDEWALK DETAILS (2 OF 2)

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 338 OF 173	

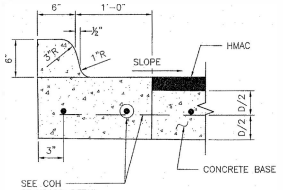
STATE OF TEXAS — 89367 — SHAHIDUR RAHMAN — HOUSTON, TEXAS

C-99-501B

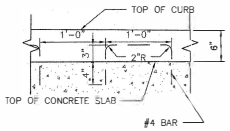
DISCLAIMER:
THE USE OF THIS STANDARD IS GOVERNED BY THE TEXAS ENGINEERING PRACTICE ACT. THE DESIGN REQUIREMENTS ON THIS STANDARD DO NOT PURPORT TO ADDRESS ALL OF THE SITE CONDITIONS THAT MAY BE ENCOUNTERED. IT IS RECOMMENDED THAT A QUALIFIED ENGINEER BE RETAINED TO REVIEW THESE DESIGN REQUIREMENTS AND BY AUTHORIZING THEIR USE, ACCEPTS RESPONSIBILITY FOR THEIR APPLICABILITY, ADEQUACY AND SAFETY. NO WARRANTY OF ANY KIND IS MADE BY THE CITY OF HOUSTON FOR ANY PURPOSES WHATSOEVER. THE CITY OF HOUSTON ASSUMES NO RESPONSIBILITY FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.

GUNDA CORPORATION
C:\Users\cIron\DC\ACCDocs\Acturo, Inc\V2010-02\Project Files\03-Prod\03-Dwgs\SHEETS\008 DETAILS - with GUNDA BASE.dwg, Jul 01, 2025 - 3:45pm, cIron

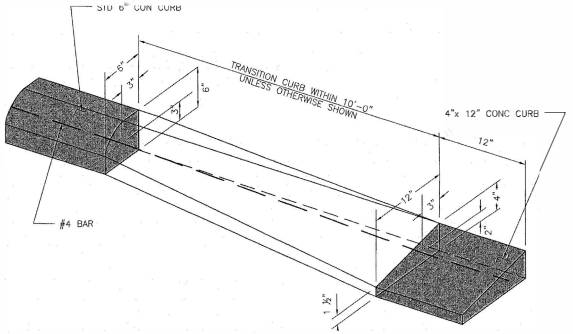
DocuSign Envelope ID: 9B122261-CF05-457B-9A65-2650F40B6B05



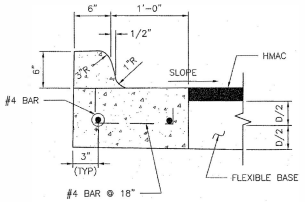
ESPLANADE CURB CONNECTED TO CONCRETE BASE



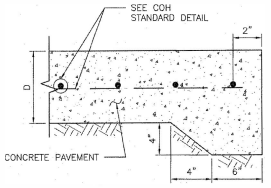
ALTERNATE CONCRETE CURB REINFORCEMENT



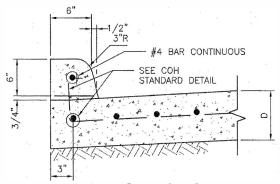
CURB TRANSITION
(SEE NOTES)



ESPLANADE CURB CONNECTED TO FLEXIBLE BASE

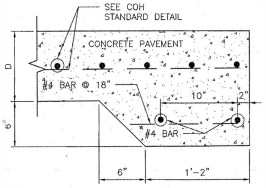


STANDARD CONCRETE PAVING HEADER

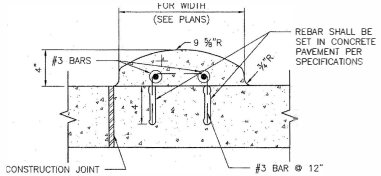


CONCRETE CURB

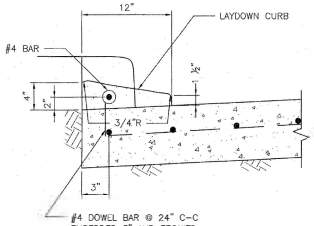
WHEN CONCRETE CURB IS TO BE PLACED EXISTING CONCRETE USE BASE #4 BAR @ 18x10" LONG, DOWELED AND SET IN EPOXY GROUT. SET #4 DOWEL BARS, 25" LONG AT 12" C-C WHEN PAVEMENT SECTION POURED.



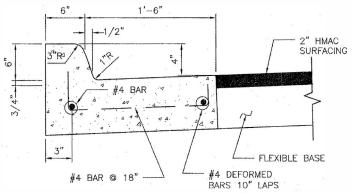
STANDARD RAILROAD HEADER



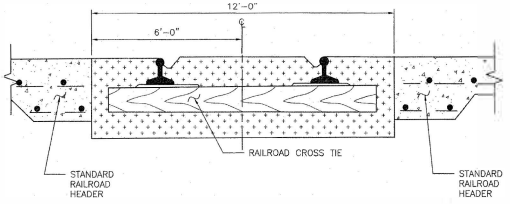
MOUNTABLE CURB



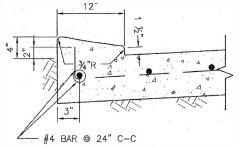
4-INCH x 12-INCH TRANSITION CURB
(SEE NOTES)



MONOLITHIC CURB AND GUTTER



STANDARD RAILROAD CROSSING – SINGLE TRACK



4-INCH x 12-INCH MONOLITHIC CURB
(SEE NOTES)

4"x12" MONOLITHIC AND TRANSITION CURB NOTES:

1. 6-INCH CONCRETE CURB TO BE CONSTRUCTED ON ALL ESPLANADES, ISLANDS, NON-RESIDENTIAL STREETS, AND RESIDENTIAL STREETS.
2. TRANSITIONS FROM 6- INCH CONCRETE CURB TO 4-INCH x 12-INCH CONCRETE CURB TO BE ACCOMPLISHED WITHIN 10 FEET, UNLESS OTHERWISE SHOWN. IF THIS 10-FEET TRANSITION CURB IS NOT POURED MONOLITHICALLY WITH THE PAVEMENT, THEN REINFORCING STEEL AS SHOWN IN "4-INCH x 12-INCH TRANSITION CURB" IS TO BE INSTALLED.

APPROVED BY:	APPROVED BY:
CITY ENGINEER	CITY TRAFFIC ENGINEER
APPROVED BY:	
DIRECTOR OF HOUSTON PUBLIC WORKS	
EFF DATE: NOV-27-2023	DWG NO: 02771-01

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

DAVID R. CASTELLANO — 97308 — LICENSED PROFESSIONAL ENGINEER — STATE OF TEXAS

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

CURB, CURB AND GUTTER AND HEADER DETAILS

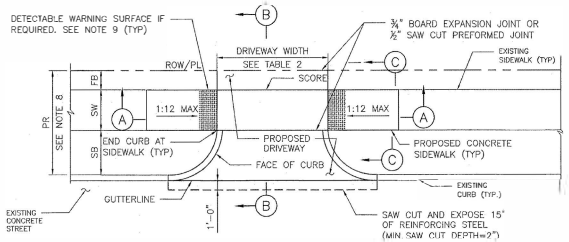
WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
NOT TO SCALE	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 33C OF 173	

80367 — LICENSED PROFESSIONAL ENGINEER — STATE OF TEXAS

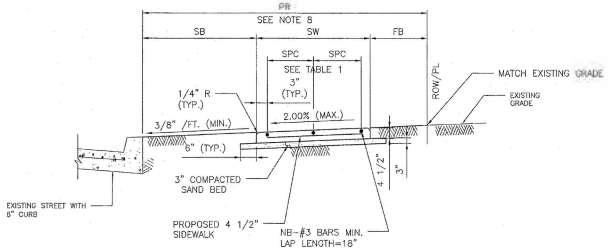
C-99-501C

DISCLAIMER:
THE USE OF THIS STANDARD IS GOVERNED BY THE TEXAS ENGINEERING PRACTICE ACT. THE DESIGN REQUIREMENTS ON THIS STANDARD DO NOT PURPORT TO ADDRESS ALL OF THE SAFETY CONCERNS ASSOCIATED WITH THEIR USE. THE ENGINEER OF RECORD (EOR) IS TO REVIEW THESE DESIGN REQUIREMENTS AND BY AUTHORIZING THEIR USE, ACCEPTS RESPONSIBILITY FOR THEIR APPLICABILITY, ADEQUACY AND SAFETY. NO WARRANTY OF ANY KIND IS MADE BY THE CITY OF HOUSTON FOR ANY PURPOSES WHATSOEVER. THE CITY OF HOUSTON ASSUMES NO RESPONSIBILITY FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.

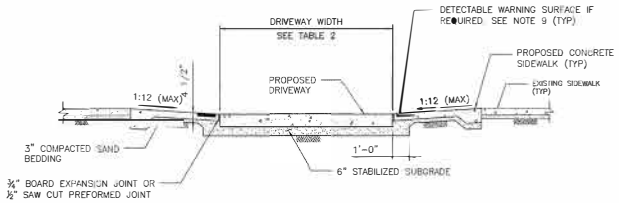
DISCLAIMER:
THE USE OF THIS STANDARD IS GOVERNED BY THE TEXAS ENGINEERING PRACTICE ACT. THE DESIGN REQUIREMENTS ON THIS STANDARD DO NOT PURPORT TO ADDRESS ALL OF THE SAFETY CONCERNS ASSOCIATED WITH THEIR USE. THE ENGINEER OF RECORD (EOR) IS TO REVIEW THESE DESIGN REQUIREMENTS AND BY AUTHORIZING THEIR USE, ACCEPTS RESPONSIBILITY FOR THEIR APPLICABILITY, ADEQUACY AND SAFETY. NO WARRANTY OF ANY KIND IS MADE BY THE CITY OF HOUSTON FOR ANY PURPOSES WHATSOEVER. THE CITY OF HOUSTON ASSUMES NO RESPONSIBILITY FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.



PLAN VIEW
DRIVEWAY



SECTION C-C
TYPICAL SIDEWALK SECTION

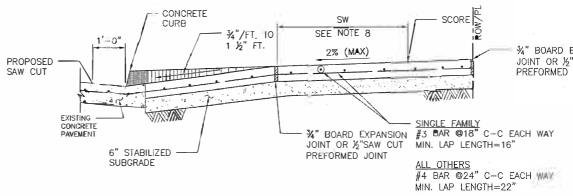


SECTION A-A
PROPOSED SIDEWALK THROUGH DRIVEWAY
WITH EXCESSIVE ELEVATION DIFFERENCE
WITH EXISTING SIDEWALK

TABLE 1

REINFORCING STEEL INFORMATION
FOR 4 ½ " THICK SIDEWALKS
EXPANSION JOINT SPACING = 40 FT
f_c' = 3,500 PSI AND fy = 60,000 PSI
REFER TO CONTRACT DRAWINGS FOR SIDEWALKS WIDER THAN 6 FEET.

SIDEWALK THICKNESS (IN)	SIDEWALK WIDTH (FT)	LONGITUDINAL STEEL #3 BARS			TRANSVERSE STEEL #3 BARS SPACING (IN)
		NO. OF BARS "NB"	SPACING "SPC" (IN)	END BAR SPACING (IN)	
4.5	5	3	27	3	48
4.5	6	4	22	3	48



SECTION B-B
TYPICAL DRIVEWAY SECTION

TABLE 2

DRIVEWAY DESIGN CRITERIA (1)(2)

TRAFFIC TYPE	TYPE A DRIVEWAY (FOR SINGLE FAMILY RESIDENTIAL HOUSES OR DUPLEXES)				TYPE B DRIVEWAY (SHARED ACCESS/SHARED DRIVEWAY)				TYPE C DRIVEWAY (COMMERCIAL DRIVEWAY)			
	WIDTH (FT)		RADIUS (FT)		WIDTH (FT)		RADIUS (FT)		WIDTH (FT)		RADIUS (FT)	
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
ONE-WAY	10	12	4	10	12(6)	16(6)	4(3)	10(5)	15	20	10	20
TWO-WAY	10(3)	24(4)	4	10	16(6)	24	4	10	24	35	10	20

(1) REFER TO INFRASTRUCTURE DESIGN MANUAL ARTICLE 15.2.07.C.1.F FOR DRIVEWAYS THAT REQUIRE A VEHICLE SWEPT PATH ANALYSIS.
(2) REFER TO INFRASTRUCTURE DESIGN MANUAL ARTICLES 15.2.07.C.1.G.(1) AND 15.2.07.C.1.G.(2) FOR TYPE 1 PAE AND TYPE 2 PAE REQUIREMENTS.
(3) THE MINIMUM WIDTH FOR JOINT ACCESS DRIVEWAY IS 12 FT.
(4) REFER TO CHAPTER 42 OF THE CODE OF ORDINANCES FOR DRIVEWAY WIDTHS FOR NARROW LOTS.
(5) ONLY MURS AND COURTYARD STYLE DEVELOPMENTS ON CORNER LOTS CAN HAVE ONE-WAY DRIVEWAYS.
(6) REFER TO CHAPTER 42, SECTION 42-146 OF THE CODE OF ORDINANCES FOR EXCEPTIONS TO THE MINIMUM DRIVEWAY WIDTH FOR SHARED DRIVEWAYS.

NOTES:

1. REPAIR, RECONSTRUCTION OR REPLACEMENT OF SIDEWALKS SHALL MEET PERMITTING REQUIREMENTS OF CODE OF ORDINANCES SECTION 40-552.
2. FOR REPAIR, RECONSTRUCTION, OR REPLACEMENT OF EXISTING SIDEWALKS:
   - 2.1. EXISTING SIDEWALKS LESS THAN OR EQUAL TO 20 FEET IN TOTAL LENGTH:
     - 2.1.1. THE PROPOSED SIDEWALK WIDTH WILL BE ALLOWED TO MATCH THE EXISTING SIDEWALK.
   - 2.2. EXISTING SIDEWALKS GREATER THAN 20 FEET IN TOTAL LENGTH:
     - 2.2.1. THE SIDEWALK WIDTH FOR THE ENTIRE PROPERTY WIDTH SHALL BE IMPROVED TO MEET WIDTH REQUIREMENTS ACCORDING TO THE LATEST INFRASTRUCTURE DESIGN MANUAL.
   - 2.3. 20 FOOT TOTAL LENGTH IS DEFINED AS:
     - 2.3.1. UP TO 10 FEET ON BOTH SIDES OF THE DRIVEWAY; OR
     - 2.3.2. UP TO 20 FEET WHEN SIDEWALK AFFECTED IS LOCATED ONLY ON ONE SIDE OF THE DRIVEWAY.
3. ALL JOINTS ALONG THE SIDEWALK SHALL BE CONSTRUCTED ACCORDING TO DRAWING 02752-02 AND SPECIFICATION 02752.
4. DRIVEWAYS SHALL BE MINIMUM 6" THICK FOR SINGLE FAMILY AND DUPLEXES. DRIVEWAYS SHALL BE MINIMUM 7" THICK FOR ALL OTHERS (I.E. COMMERCIAL, INDUSTRIAL, ETC.)
5. DRIVEWAYS AND SIDEWALKS SHALL BE CONSTRUCTED WITH PORTLAND CEMENT CONCRETE AND INCLUDE 5 1/2 SACKS OF CEMENT PER CUBIC YARD OF CONCRETE.
6. ALL RAMPS AND SIDEWALKS/WALKWAYS SHALL BE CONSTRUCTED IN ACCORDANCE WITH HOUSTON PUBLIC WORKS STANDARDS, TEXAS ACCESSIBILITY STANDARDS (TAS) AND AMERICANS WITH DISABILITIES ACT (ADA) REQUIREMENTS. IF THERE IS A CONFLICT IN THE REQUIREMENTS, THE STRICTEST REQUIREMENTS SHALL GOVERN.
7. CURB RAMPS THAT ARE STEEPER THAN A 1:12 MAX SLOPE WILL NOT BE ACCEPTED BY THE CITY OF HOUSTON.
8. REFER TO CONTRACT DRAWINGS FOR PEDESTRIAN REALM (PR), SIDEWALK (SW), FRONTAGE BUFFER (FB), AND SAFETY BUFFER (SB) WIDTHS.
9. DETECTABLE WARNING SURFACES:
   - 9.1. SIDEWALK SHALL HAVE A DETECTABLE WARNING SURFACE WHERE:
     - 9.1.1. SIDEWALK INTERSECTS TYPE C DRIVEWAYS (COMMERCIAL DRIVEWAYS) THAT ARE STOP, YIELD, OR TRAFFIC SIGNAL CONTROLLED; OR
     - 9.1.2. SIDEWALK SLOPE IS GREATER THAN 1:20 AND INTERSECTS A TYPE C DRIVEWAY (COMMERCIAL DRIVEWAY)
   - 9.2. DETECTABLE WARNING SURFACES ARE OPTIONAL WHERE SIDEWALKS INTERSECT TYPE A DRIVEWAYS (SINGLE FAMILY RESIDENTIAL HOUSES OR DUPLEXES) OR TYPE B DRIVEWAYS (SHARED ACCESS/SHARED DRIVEWAYS).
   - 9.3. REFER TO STANDARD DETAILS 02775-06 TO 02775-07 FOR DETECTABLE WARNING SURFACE STANDARDS.

APPROVED BY:	APPROVED BY:
Signed by: Sohail Faruqui	DocuSigned by: LHUNG NGUYEN
CITY ENGINEER	CITY TRAFFIC ENGINEER
APPROVED BY: DocuSigned by: Carol Haddock	
DIRECTOR OF HOUSTON PUBLIC WORKS	
EFF DATE: NOV-27-2023	DWG NO: 02754-01B

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97305
LICENSED PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

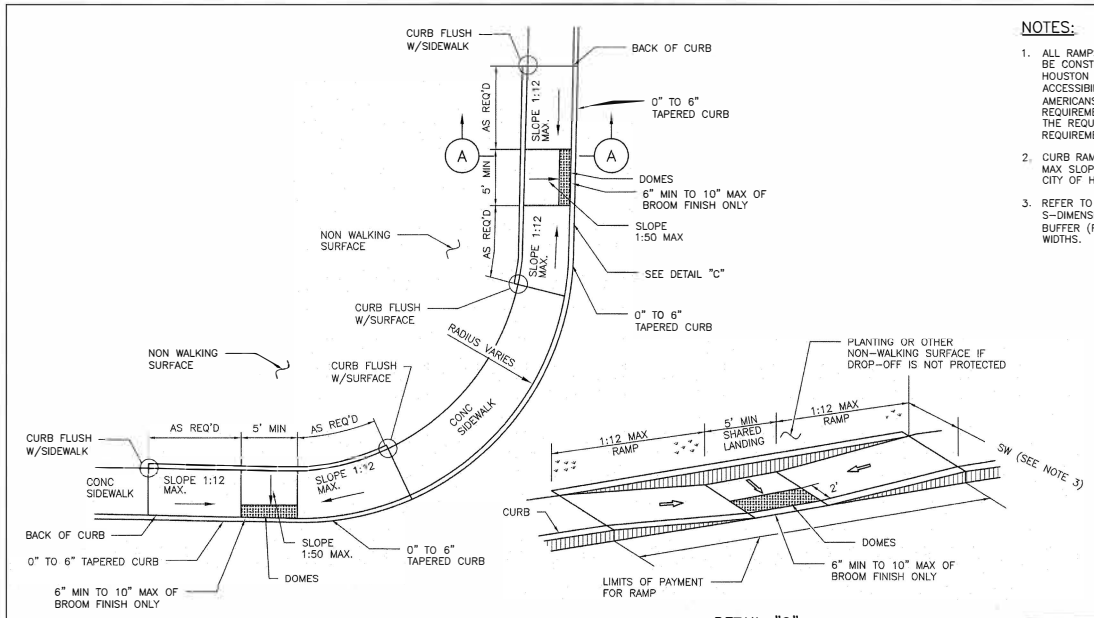
DRIVEWAY DETAIL WITH 6" CURBED STREETS

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
NOT TO SCALE	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 330 OF 173	

80367

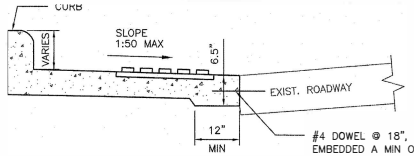
C-99-501D

DocuSign Envelope ID: 9B122261-CF05-457B-9A65-2650F40B66D5



SIDEWALK ON BACK OF CURB

DETAIL "C"



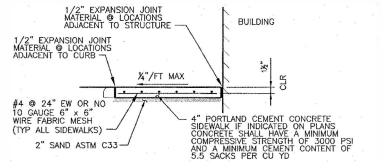
SECTION A-A

NOTES:

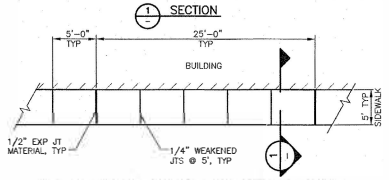
1. ALL RAMPS AND SIDEWALKS/WALKWAYS SHALL BE CONSTRUCTED IN ACCORDANCE WITH HOUSTON PUBLIC WORKS STANDARDS, TEXAS ACCESSIBILITY STANDARDS (TAS) AND AMERICANS WITH DISABILITIES ACT (ADA) REQUIREMENTS. IF THERE IS A CONFLICT IN THE REQUIREMENTS, THE STRICTEST REQUIREMENTS SHALL GOVERN.
2. CURB RAMPS THAT ARE STEEPER THAN A 1:12 MAX SLOPE WILL NOT BE ACCEPTED BY THE CITY OF HOUSTON.
3. REFER TO CONTRACT DRAWINGS FOR S-DIMENSION (S), SIDEWALK (SW), FRONTAGE BUFFER (FB), AND SAFETY BUFFER (SB) WIDTHS.

DISCLAIMER:
THE USE OF THIS STANDARD IS GOVERNED BY THE TEXAS ENGINEERING PRACTICE ACT. THE DESIGN REQUIREMENTS ON THIS STANDARD DO NOT PURPORT TO ADDRESS ALL SAFETY CONCERNS, CODE REQUIREMENTS, OR SPECIAL DESIGN CONSIDERATIONS REQUIRED FOR ANY PARTICULAR USE. BY REFERENCING THIS STANDARD, THE USER ASSUMES ALL RISKS, LIABILITY AND RESPONSIBILITY FOR THE SUITABILITY OF ANY DESIGN FOR ITS INTENDED USE. ACCEPTS RESPONSIBILITY FOR THEIR APPLICABILITY, ADEQUACY AND SAFETY. NO WARRANTY OF ANY KIND IS MADE BY THE CITY OF HOUSTON FOR ANY PURPOSES WHATSOEVER. THE CITY OF HOUSTON ASSUMES NO RESPONSIBILITY FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.

CITY OF HOUSTON HOUSTON PUBLIC WORKS STANDARD	
PARALLEL CURB RAMP (SCALE: NOT TO SCALE)	
APPROVED BY:	
DocuSigned by: Sukait Kanwar CITY ENGINEER	DocuSigned by: Carl Haddock DIRECTOR OF HPW
DocuSigned by: KHANG NGUYEN CITY TRAFFIC ENGINEER	
EFF DATE: NOV-27-2023	DWG NO: 02775-03



1 SECTION



NOTE: SIDEWALK WIDTH SHALL BE 5' UNLESS NOTED OTHERWISE ON THE DRAWINGS.

A REINFORCED CONCRETE SIDEWALK
NTS

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED
PROFESSIONAL ENGINEER

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

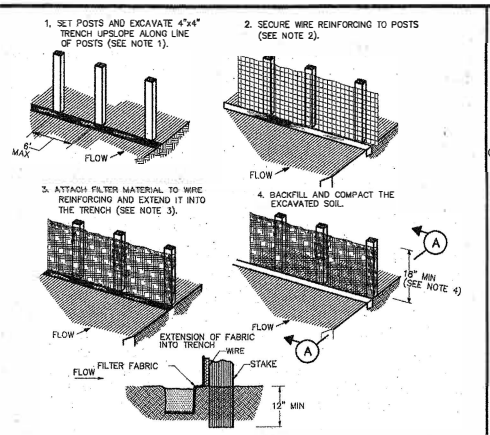
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION-DISINFECTION REDESIGN AMENDMENT

SITE ADA ACCESS DETAILS

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	ACCEPTED WORKS
DRAWING SCALE	
AS NOTED	80367
CITY OF HOUSTON PM	
SHAHIOUR RAHMAN, P.E.	
SHEET NO. 34 OF 173	

C-99-502

GUNDA CORPORATION
C:\Users\vtron\DC\ACCDocs\Mauro, Inc\20010-02\Project Files\03-Prod\03-Dwgs\SHEETS\008 DETAILS - with GUNDA BASE.dwg Jul 01, 2025 - 3:46pm ctron

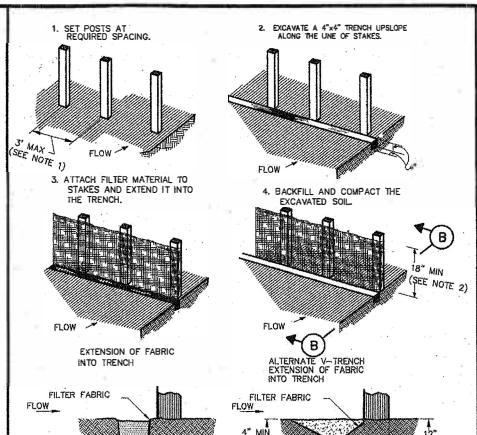


CONSTRUCTION NOTES:

1. SET 2 INCH BY 2 INCH WOODEN STAKES SPACED A MAX OF 6 FEET APART AND EMBEDDED A MIN OF 12 INCHES.
2. WOVEN WIRE REINFORCING TO BE FASTENED SECURELY TO BARRIER POSTS WITH STAPLES.
3. FILTER CLOTH TO BE FASTENED SECURELY TO WOVEN WIRE REINFORCING, WITH TIES SPACED EVERY 24 INCHES AT TOP AND MIDSECTION.
4. MINIMUM HEIGHT OF FILTER SHOULD BE 18 INCHES AND A MAXIMUM OF 36 INCHES ABOVE NATURAL GROUND.
5. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED 6 INCHES AT THE POSTS, AND FOLDED.
6. SEE COH STANDARD SPECIFICATION FOR FILTER FABRIC BARRIER.

SYMBOL

REINFORCED FILTER FABRIC BARRIER

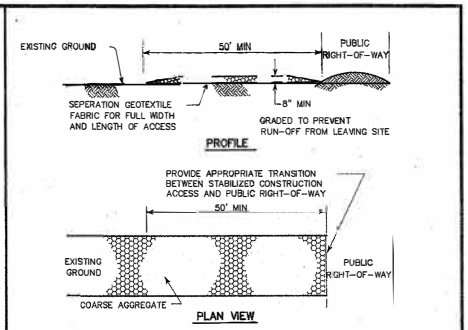


CONSTRUCTION NOTES:

1. 2 INCH THICK BY 2 INCH WOODEN STAKES TO BE SET AT MAX SPACING OF 3 FEET AND EMBEDDED A MIN OF 8 INCHES. IF PREASSEMBLED BARRIER WITH SUPPORT NETTING IS USED, SPACING OF POST MAY BE INCREASED TO 8 FEET MAX.
2. ATTACH FILTER FABRIC TO WOODEN STAKES. FILTER FABRIC BARRIER SHALL HAVE A MIN HEIGHT OF 18 INCHES AND MAX HEIGHT OF 36 INCHES ABOVE NATURAL GROUND.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHOULD BE OVERLAPPED 6 INCHES AT THE POSTS, AND FOLDED.
4. SEE COH STANDARD SPECIFICATION FOR FILTER FABRIC BARRIER.

SYMBOL

FILTER FABRIC BARRIER

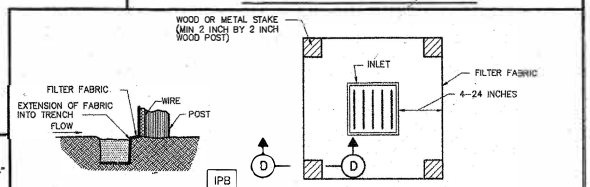


CONSTRUCTION NOTES:

1. LENGTH SHALL BE AS SHOWN ON THE CONSTRUCTION DRAWINGS, BUT NOT LESS THAN 50 FEET.
2. THICKNESS SHALL BE NOT LESS THAN 8 INCHES.
3. WIDTH SHALL BE NOT LESS THAN FULL WIDTH OF ALL POINTS OF INGRESS OR EGRESS.
4. STABILIZATION FOR OTHER AREAS SHALL HAVE THE SAME AGGREGATE THICKNESS AND WIDTH REQUIREMENTS AS THE STABILIZED CONSTRUCTION ACCESS, UNLESS OTHERWISE SHOWN ON THE CONSTRUCTION DRAWINGS.
5. STABILIZED AREA MAY BE WIDENED OR LENGTHENED TO ACCOMODATE A WASHING AREA. AN OUTLET SEDIMENT TRAP MUST BE PROVIDED FOR THE WASHING AREA.
6. COH STANDARD SPECIFICATION FOR STABILIZED CONSTRUCTION ACCESS.
7. STABILIZED CONSTRUCTION ACCESS SHALL BE MAINTAINED FREE OF SEDIMENT FOR THE DURATION OF THE PROJECT.

SC SYMBOL

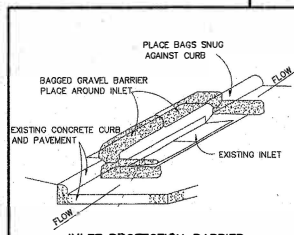
STABILIZED CONSTRUCTION ACCESS



SILT FENCE INLET PROTECTION BARRIER

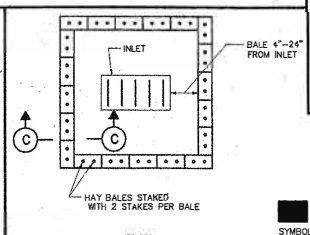
CONSTRUCTION NOTE:

1. SEE CONSTRUCTION NOTES FOR RFB.

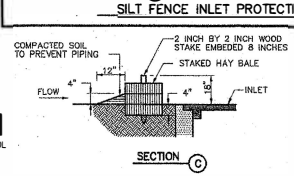


INLET PROTECTION BARRIER

(FOR STAGE II INLETS)
BAGGED GRAVEL BARRIER



SYMBOL



HAY BALE INLET PROTECTION BARRIER

1. CONTRACTOR SHALL IMPLEMENT INLET PROTECTION DEVICES AND REINFORCED FILTER FABRIC BARRIER ALONG ROAD AND SIDE DITCHES AT LOCATIONS SHOWN ON THE TYPICAL STORM WATER POLLUTION PREVENTION (SWPP) PLANS TO KEEP SILT AND OR EXCAVATED MATERIALS FROM ENTERING INTO THE STORM WATER INLETS AND DITCHES EVENTUALLY POLLUTING THE RECEIVING STORM.
2. DURING THE EXCAVATION PHASE OF THE PROJECT, CONTRACTOR SHALL SCHEDULE THE WORK IN SHORT SEGMENTS SO THAT EXCAVATION MATERIAL CAN BE QUICKLY HAULED AWAY FROM THE SITE AND TO PREVENT IT FROM STAYING UNCOLLECTED ON THE EXISTING PAVEMENT. ANY LOOSE EXCAVATED MATERIAL WHICH FALLS ON PAVEMENTS OR DRIVEWAYS SHALL BE SWEPT BACK INTO THE EXCAVATED AREA.
3. CONTRACTOR SHALL CLEAN UP THE EXISTING STREET INTERSECTIONS AND DRIVEWAYS DAILY, AS NECESSARY, TO REMOVE ANY EXCESS MUD, SILT OR ROCK TRACKED FORM THE EXCAVATED AREA.
4. CONTRACTOR SHALL FOLLOW GOOD HOUSEKEEPING PRACTICES DURING THE CONSTRUCTION OF THE PROJECT, ALWAYS CLEANING UP DIRT AND LOOSE MATERIAL AS CONSTRUCTION PROGRESSES.
5. CONTRACTOR TO INSPECT AND MAINTAIN THE AREAS LISTED BELOW AT LEAST ONCE EVERY FOURTEEN (14) CALENDAR DAYS AND WITHIN 24 HOURS OF THE END OF A STORM EVENT OF 0.5 INCHES OR GREATER.

   DISTURBED AREAS OF THE CONSTRUCTION SITE THAT HAVE NOT BEEN FINALLY STABILIZED.

   AREAS USED FOR STORAGE OF MATERIALS THAT ARE EXPOSED TO PRECIPITATION.

   STRUCTURAL CONTROL MEASURES.

   LOCATIONS WHERE VEHICLES ENTER OR EXIT THE SITE.
6. CONTRACTOR TO BE RESPONSIBLE TO MAINTAIN EXISTING DITCHES AND OR CULVERTS FOR UNOBSTRUCTED DRAINAGE AT ALL TIMES. WHERE SODDING IS DISTURBED BY EXCAVATION ON BACKFILLING OPERATIONS, SUCH AREAS SHALL BE REPLACED BY SEEDING OR SODDING. SLOPES 4:1 OR STEEPER SHALL BE REPLACED BY BLOCK SODDING.

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

STORM WATER POLLUTION PREVENTION PLAN DETAILS
(NOT TO SCALE)

APPROVED — CITY ENGINEER
APPROVED — DIRECTOR OF PUBLIC WORKS AND ENGINEERING

EFF DATE: JULY-01-2010
DWG NO: 01571-01

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-5531

STATE OF TEXAS — DAVID R. CASTELLANO — 97308 — LICENSED PROFESSIONAL ENGINEER

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-5182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT
ON-SITE STORM WATER POLLUTION
PREVENTION PLAN DETAILS

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	S. SHAHIDUR RAHMAN, P.E.
SHEET NO.	35 OF 173

FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS — 80367 — REGISTERED — HOUSTON, TEXAS

C-99-503

GUNDA CORPORATION
C:\Users\ctron\DC\ACCDocs\Mauro, Inc\2010-02\Project Files\03-Prod\03-Dwgs\SHEETS\008 DETAILS - with GUNDA BASE.dwg Jul 01, 2025 - 5:45pm ctron

DocuSign Envelope ID: 8B122261-CF05-457B-9A66-3050F4388B05

DESCRIPTION AND APPLICATION OF PAVEMENT MARKING LINES

LINE SERIES	COLOR	DESCRIPTION	WIDTH (INCHES)	TYPICAL APPLICATIONS
WB	WHITE	BROKEN (10' STRIPE W/30' GAP)	4"	LANE LINES BETWEEN TRAVEL LANES IN THE SAME DIRECTION WHERE CHANGING OF LANES IS PERMITTED.
WS	WHITE	SOLID	4"	EDGE LINES TO DELINEATE THE RIGHT EDGE OF THE ROADWAY.
			6"	LEFT EDGE OF BICYCLE LANE AND LANE LINES BETWEEN TRAVEL LANES IN THE SAME DIRECTION WHERE CHANGING OF LANES IS DISCOURAGED.
			12"	PERPENDICULAR CROSSWALK LINES.
			24"	STOP BARS AT INTERSECTIONS (SIGNALIZED AND UNSIGNALIZED).
				HATCHING AT HIGH VISIBILITY CROSSWALKS.
			12", 24"	DIAGONAL HATCHING USED IN GORES BETWEEN SAME DIRECTION OF TRAVEL LANES.
WG	WHITE	GUIDE (2' STRIPE W/6' GAP)	6"	GUIDE LINES THROUGH INTERSECTIONS.
				TAPER LINES FOR TURN LANES.
				GUIDE LINES FOR BICYCLE LANES.
YS	YELLOW	SOLID	4"	EDGE LINES TO DELINEATE THE LEFT EDGE OF A DIVIDED ROADWAY, A ONE-WAY ROAD, OR RAMP.
			6"	BIDIRECTIONAL BICYCLE LANE PAVEMENT MARKING.
			12", 24"	DIAGONAL HATCHING USED IN GORES BETWEEN OPPOSING DIRECTION OF TRAVEL LANES.
YDS	YELLOW	DOUBLE SOLID	4" – (4") – 4" (GAP)	CENTERLINE THAT SEPARATES OPPOSING TRAVEL LANES AND DELINEATION OF MEDIAN ISLANDS.
YDB	YELLOW	DOUBLE BROKEN	4" – (4") – 4" (GAP)	DEFINES THE EDGES OF CENTER REVERSIBLE LANES THAT ARE USED AS TWLTLS DURING INTERMITTENT PERIODS.
YB	YELLOW	BROKEN (10' STRIPE W/30' GAP)	4"	SEPARATES TRAVEL LANES IN OPPOSITE DIRECTIONS WHERE PASSING IS PERMITTED IN BOTH DIRECTIONS OF TRAVEL.
YB (BIKE)	YELLOW	BROKEN (3' STRIPE W/9' GAP)	4"	SEPARATES BICYCLE TRAVEL LANES IN OPPOSITE DIRECTIONS WHERE PASSING IS PERMITTED IN BOTH DIRECTIONS OF TRAVEL.
YSB	YELLOW	SOLID & BROKEN BROKEN (10' STRIPE W/30' GAP)	4" – (4") – 4" (GAP)	SEPARATES TRAVEL LANES IN OPPOSITE DIRECTIONS WHERE PASSING IS PERMITTED IN ONE DIRECTION AND PROHIBITED IN THE OPPOSITE DIRECTION.
				USED FOR EDGE OF TWO-WAY LEFT TURN LANES (TWLTL).
BICYCLE GREEN	GREEN	SOLID COLORED PAVEMENT	VARIES	PED/BIKE CROSSING
				VEHICLE / BIKE/ CONFLICT AREA
YIELD LINE	WHITE	TRIANGLE	16" x 24"	MID-BLOCK CROSSING.

DESCRIPTION AND APPLICATION OF REFLECTIVE RAISED PAVEMENT MARKERS (RPM)

RRPM TYPES	COLOR	COH SPEC. SEC. 02764 EQUIVALENT	DESCRIPTION
C	CLEAR	TYPE I-C	APPROACH FACE THAT REFLECTS WHITE LIGHT, AND THE OTHER SIDE DOES NOT REFLECT.
R	CLEAR & RED	TYPE II-C-R	APPROACH FACE THAT REFLECTS WHITE LIGHT, AND THE OTHER SIDE REFLECTS RED LIGHT.
A	AMBER & AMBER	TYPE II-A-A	APPROACH FACE AND THE OTHER SIDE BOTH REFLECT AMBER LIGHT.

LINE STYLE DESIGNATION : YSB4 – A4●/A40

- COLOR
- PATTERN
- WIDTH OF STRIPE
- RPM SPACING
- RPM TYPE
- RPM SPACING
- RPM TYPE

GENERAL PAVEMENT MARKING NOTES:

1. PRIOR TO START OF CONSTRUCTION, ALL EXISTING PAVEMENT MARKINGS WITHIN THE AREA OF CONSTRUCTION SHALL BE INVENTORIED AND DOCUMENTED JOINTLY BY THE CITY INSPECTOR AND THE CONTRACTOR. THIS DOCUMENT WILL BE JOINTLY SIGNED BY BOTH PARTIES REFLECTING ALL EXISTING PAVEMENT MARKINGS AND LANE CONFIGURATIONS WILL BE DUPLICATED AGAIN. THIS REVIEW CAN BE DONE IN CONJUNCTION WITH SIGN INVENTORY. THE CONTRACTOR IS HELD ACCOUNTABLE FOR EXISTING AND TEMPORARY CONSTRUCTION PAVEMENT MARKINGS THROUGHOUT THE PROJECT AND AT THE PROJECT'S COMPLETION.
2. ALL PAVEMENT MARKINGS SHALL CONFORM TO CITY OF HOUSTON STANDARDS AND SPECIFICATIONS AND GENERAL GUIDELINES OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD).
3. THE PERMANENT PAVEMENT MARKINGS MAY BE MODIFIED AS DIRECTED BY THE CITY TRAFFIC ENGINEER.
4. THE DESIGN SPEED FOR THE ROAD IS: _____. THE POSTED SPEED LIMIT IS: _____
5. ALL LANE DIMENSIONS ARE FROM CENTER OF LANE LINE, CENTER OF DOUBLE LANE LINE, FACE OF CURB, OR EDGE OF PAVEMENT UNLESS OTHERWISE NOTED.
6. THE PAVEMENT MARKING DRAWINGS ARE SCHEMATIC ONLY. THE CONTRACTOR SHALL FOLLOW ALL DIMENSIONS, DETAILS, AND STANDARDS WHEN INSTALLING PAVEMENT MARKINGS AND SYMBOLS.
7. THE FINAL LONGITUDINAL STRIPINGS SHALL BE 60 MIL (0.060") THICK HOT-SPRAYED THERMOPLASTIC PLACED OVER THE TEMPORARY STRIPING WITHIN 14 TO 30 CALENDAR DAYS AFTER COMPLETION OF THE FINAL PAVEMENT SURFACE, OR AS DIRECTED BY THE CITY TRAFFIC ENGINEER. ALL OTHER PAVEMENT MARKINGS SHALL BE APPLIED AT THE SAME TIME. TEMPORARY STRIPING SHALL BE WATER BASED PAINT.
8. ALL FINAL TRANSVERSE MARKINGS SHALL BE 90 MIL (0.090") HOT-SPRAYED THERMOPLASTIC. ALL PAVEMENT ARROWS AND LEGENDS SHALL ALSO BE 90 MIL (0.090") HOT-SPRAYED THERMOPLASTIC. PREFORMED THERMOPLASTIC APPLICATIONS MAY BE USED IF ONLY APPROVED BY THE CITY TRAFFIC ENGINEER.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE LAYOUT AND INSTALLATION OF PAVEMENT MARKINGS OF FINAL SURFACE COURSE FOLLOWING CONTROL POINTS THAT HAVE BEEN SET NO MORE THAN 50 FEET APART ALONG THE LINES TO BE IMPLEMENTED. IN TANGENT SECTIONS OF A ROAD WHERE THE PAVEMENT MARKING PATTERN DOES NOT CHANGE, CONTROL POINTS CAN BE SET AT 200 FEET SPACING. THE LAYOUT AND INSPECTION OF ALL PAVEMENT MARKINGS SHALL BE APPROVED BY CITY OF HOUSTON REPRESENTATIVE PRIOR TO THE APPLICATION OF MATERIALS.
10. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT THE FINAL SURFACE COURSE IS PLACED SO THAT THE STRIPING IS OFFSET NO MORE THAN ONE FOOT CLEAR OF THE CONSTRUCTION JOINT, UNLESS OTHERWISE DIRECTED BY THE CITY TRAFFIC ENGINEER.
11. ALL RAISED PAVEMENT MARKERS (RPMS) SHALL BE INSTALLED SO THAT THE REFLECTIVE FACE OF EACH MARKER IS FACING THE DIRECTION OF TRAFFIC AND IS PERPENDICULAR TO THE DIRECTION OF TRAFFIC FLOW. TYPE C PAVEMENT MARKERS SHALL BE INSTALLED SO THAT THE CLEAR FACE OF EACH MARKER IS FACING THE APPROACHING TRAFFIC FLOW AND PERPENDICULAR TO THE DIRECTION OF TRAFFIC FLOW.
12. ALL REMOVAL OF EXISTING PAVEMENT MARKINGS SHALL BE ACCOMPLISHED IN ACCORDANCE TO CITY OF HOUSTON STANDARD SPECIFICATION 02762. APPLYING OVER EXISTING PAVEMENT MARKINGS DOES NOT CONSTITUTE AS APPROVED OBLITERATION METHOD.
13. THE ENGINEER OF RECORD SHALL BE REQUIRED TO PRODUCE AS-BUILT OF PAVEMENT MARKING PLANS WITHIN 30 DAYS AFTER COMPLETION OF PAVEMENT MARKING IMPLEMENTATION.
14. BLUE RPMS MAY BE PLACED ADJACENT TO FIRE HYDRANTS WITH THE APPROVAL OF THE CITY TRAFFIC ENGINEER.
15. FOR ALL CONSTRUCTION, ALL PAVEMENT MARKINGS AND SIGNING SHALL BE INSTALLED AND SHALL BE PAID BY THE PROJECT OWNER/DEVELOPER.
16. FINAL INSPECTION AND ACCEPTANCE OF PAVEMENT MARKINGS SHALL BE PERFORMED BY TRANSPORTATION & DRAINAGE OPERATION REPRESENTATIVE (713-803-3054).

APPROVED BY:	APPROVED BY:
Signed by: Sohail Kaunar	Signed by: LONG NGUYEN
CITY ENGINEER	CITY TRAFFIC ENGINEER
APPROVED BY: Signed by: Carl Haddock	
DIRECTOR OF HOUSTON PUBLIC WORKS	
EFF DATE: NOV-27-2023	DWG NO: 02760-01

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3536 www.gundacorp.com
TBPE Registration Number F-3531

STATE OF TEXAS · DAVID R. CASTELLANO · 97308 · LICENSED · PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

PAVEMENT MARKINGS GENERAL NOTES AND LEGENDS

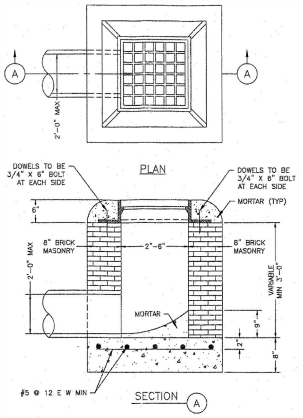
WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE: NOT TO SCALE	80367
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 36 OF 173	

C-99-504

DISCLAIMER:
THE USE OF THIS STANDARD IS GOVERNED BY THE TEXAS ENGINEERING PRACTICE ACT. THE DESIGN REQUIREMENTS ON THIS STANDARD DO NOT PURPORT TO ADDRESS ALL OF THE SAFETY CONCERNS ASSOCIATED WITH THEIR USE. THE ENGINEER OF RECORD (EOR) IS TO REVIEW THESE DESIGN REQUIREMENTS AND BY AUTHORIZING THEIR USE ACCEPTS RESPONSIBILITY FOR THEIR APPLICABILITY, ADEQUACY AND SAFETY. NO WARRANTY OF ANY KIND IS MADE BY THE CITY OF HOUSTON FOR ANY PURPOSES WHATSOEVER. THE CITY OF HOUSTON ASSUMES NO RESPONSIBILITY FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.

02632-01

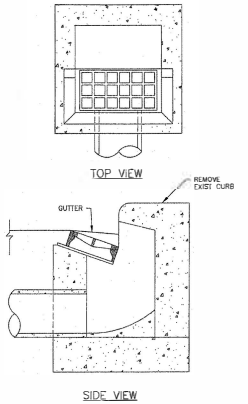
COH IS PHASING OUT BRICK. NEW DETAILS TO BE POSTED END OF 2019



STORM SEWER TYPE "A" GRATE INLET
NTS

02632-03

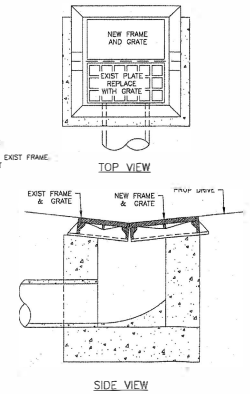
STEP 1: EXIST TYPE "B" INLET



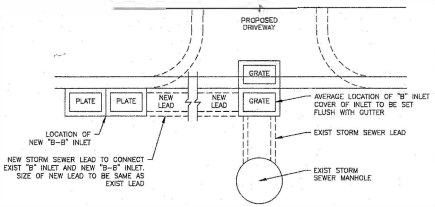
STEP 2:

NOTES:

1. AFTER REMOVING EXIST CURB, RAISE EXIST FRAME TO GUTTER GRADE. REPLACE EXIST PLATE WITH A GRATE.
2. ADD NEW FRAME AND GRATE NEXT TO EXIST FRAME.
3. BACKFILL INLET TO A POINT ONE FOOT BEHIND THE CURB WITH 1 SACK/TON CEMENT STABILIZED SAND.



STEP 3: CONSTRUCT NEW TYPE "B-B" INLET ON CURB RETURN OF PROPOSED DRIVEWAY



STORM SEWER TYPE "B" INLET RELOCATION
NTS

FIRM INFORMATION | ENGINEER'S SEAL

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

STORM SEWER
02632-01 AND 03

APPROVED BY: CITY ENGINEER
APPROVED BY: DEPUTY DIRECTOR
APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING

EFFECTIVE DATE: JUL-01-2019

FOR CITY OF HOUSTON USE ONLY

SHEET NO. XX OF XX

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3539 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED
PROFESSIONAL ENGINEER

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT

SITE STORM DETAILS (1 OF 7)

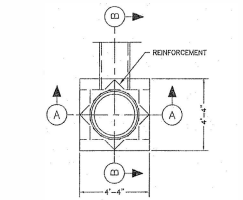
WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 37A OF 173	

80367

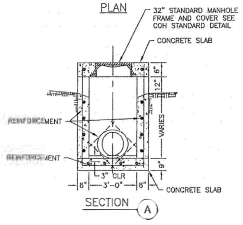
C-99-505A

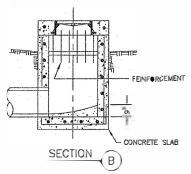
GUNDA CORPORATION
C:\Users\ctron\OneDrive - Gunda Corporation\Documents\Projects\20010-02\Project Files\03-Prod\03-Engr\SHEETS\008 DETAILS -- with GUNDA BASE.dwg Jul 01, 2025 - 3:46pm ctron

02632-09



NOTE:
1. TYPE "E" INLET TOP CAN BE CONSTRUCTED ON A STANDARD "C" MANHOLE.

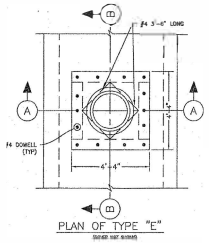




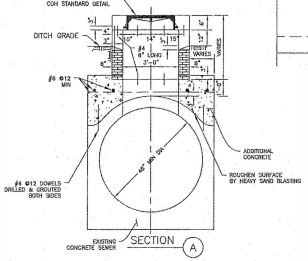
STORM SEWER TYPE "E" INLET
NTS

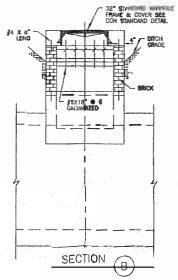
02632-10

COH IS PHASING OUT BRICK. NEW DETAILS TO BE POSTED END OF 2019



NOTE:
1. 8" CONCRETE WALLS MAY BE CONSTRUCTED IN LEU OF 8" BRICK WALLS.





STORM SEWER TYPE "E" INLET ON EXIST MONOLITHIC CONC SEWERS OF 48" DIA & GREATER
NTS

FIRM INFORMATION | ENGINEER'S SEAL

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

STORM SEWER
02632-09
AND 02632-10

APPROVED BY: CITY ENGINEER | APPROVED BY: DEPUTY DIRECTOR
APPROVED BY: DIRECTOR
EFFECTIVE DATE: JUL-01-2019
FOR CITY OF HOUSTON USE ONLY

SHEET NO.

GUNDA CORPORATION
BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F 3531

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

DAVID R. CASTELLANOS
97308
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT

SITE STORM DETAILS (2 OF 7)

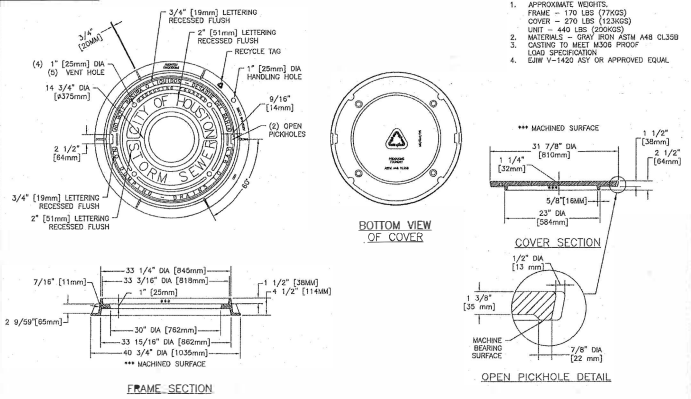
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	378 OF 173

FOR CITY OF HOUSTON USE ONLY
ACCEPTED
80367

C-99-505B

GUNDA CORPORATION
C:\Users\ctroxell\OC\ACCDocs\Arduino, Inc\20010-02\Project Files\03-Prod\03-Dsgn\SHEETS\008 DETAILS - - with GUNDA BASE.dwg Jul 01, 2025 - 3:47pm ctroxell

02084-02

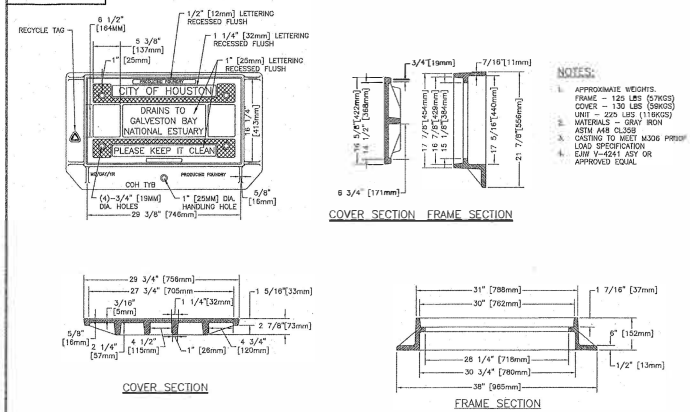


NOTES:

1. APPROXIMATE WEIGHTS.
   FRAME – 170 LBS (77KGS)
   COVER – 270 LBS (123KGS)
   UNIT – 440 LBS (200KGS)
2. MATERIALS – GRAY IRON ASTM A48 CL35B
3. CASTING TO MEET M306 PROOF LOAD SPECIFICATION
4. EJIW V-1420 ASY OR APPROVED EQUAL

STORM SEWER MANHOLE FRAME AND COVER
NTS

02084-03

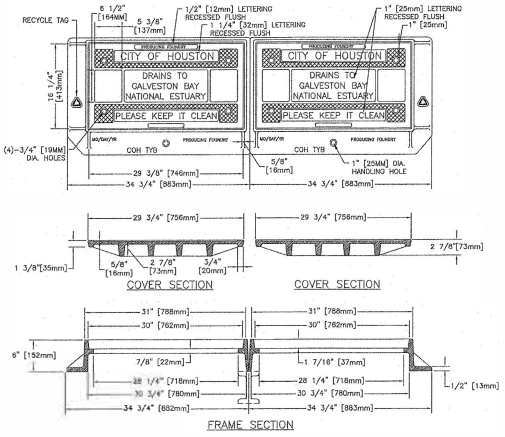


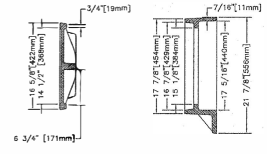
NOTES:

1. APPROXIMATE WEIGHTS.
   FRAME – 125 LBS (57KGS)
   COVER – 130 LBS (59KGS)
   UNIT – 225 LBS (118KGS)
2. MATERIALS – GRAY IRON ASTM A48 CL30B
3. CASTING TO MEET M306 PROOF LOAD SPECIFICATION
4. EJIW V-4241 ASY OR APPROVED EQUAL

STORM SEWER TYPE "B" INLET ASSEMBLY
NTS

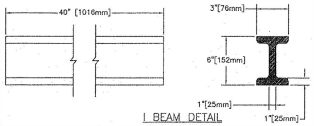
02084-04





NOTES:

1. APPROXIMATE WEIGHTS.
   FRAME – 125 LBS (57KGS)
   COVER – 120 LBS (55KGS)
   I BEAM – 107 LBS (49KGS)
   UNIT – 597 LBS (271KGS)
2. MATERIALS – GRAY IRON ASTM A48 CL35B
3. CASTING TO MEET M306 PROOF LOAD SPECIFICATION
4. EJIW V-4243 ASY OR APPROVED EQUAL



STORM SEWER TYPE "BB" INLET DOUBLE ASSEMBLY
NTS

FIRM INFORMATION | ENGINEER'S SEAL

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

STORM SEWER
02084-02 THROUGH 04

APPROVED BY: CITY ENGINEER | APPROVED BY: DEPUTY DIRECTOR

APPROVED BY: DIRECTOR

EFFECTIVE DATE: JUL-01-2019

FOR CITY OF HOUSTON USE ONLY

SHEET NO.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11250 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number F-3531

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
97308
DAVID R. CASTELLANO
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT

SITE STORM DETAILS (3 OF 7)

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	37C OF 173

FOR CITY OF HOUSTON USE ONLY

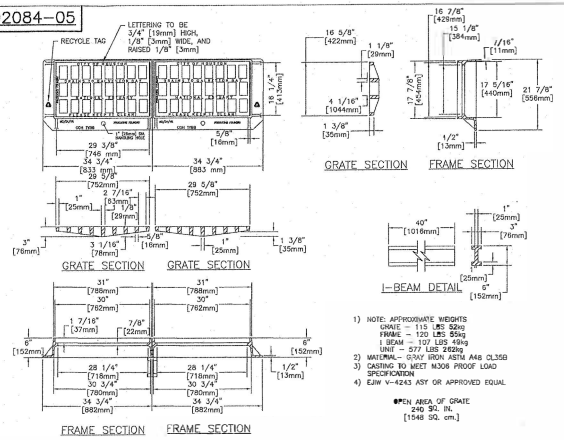
STATE OF TEXAS
80367
LICENSED
PROFESSIONAL ENGINEER

C-99-505C

GUNDA CORPORATION
C:\Users\ctron\DC\ACCDocs\Ardurra, Inc\20010-02\Project Files\03-Prod\03-Dwgs\SHEETS\008 DETAILS - with GUNDA BASE.dwg Jul 01, 2025-3:47pm ctron

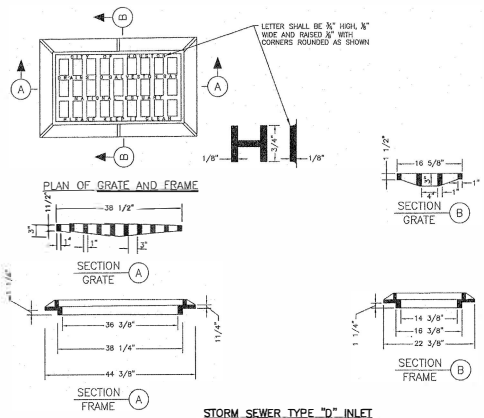
GUNDA CORPORATION
C:\Users\ctran\DC\ACCDocs\Kaburro, Inc\20010-02\Project Files\03-Prod\03-Dwgs\SHEETS\008 DETAILS - with GUNDA BASE.dwg Jul 01, 2025 - 3:47pm ctran

02084-05



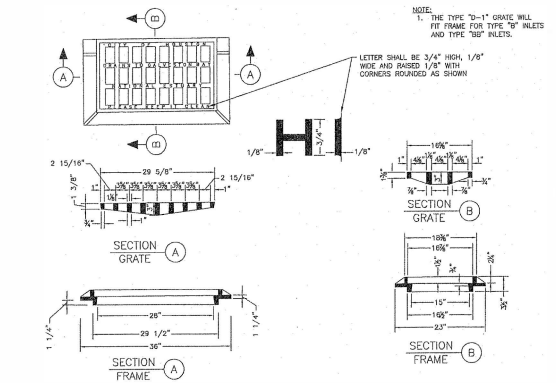
STORM SEWER FRAME AND GRATE
FOR TYPE B-B INLET DOUBLE ASSEMBLY
NTS

02084-06



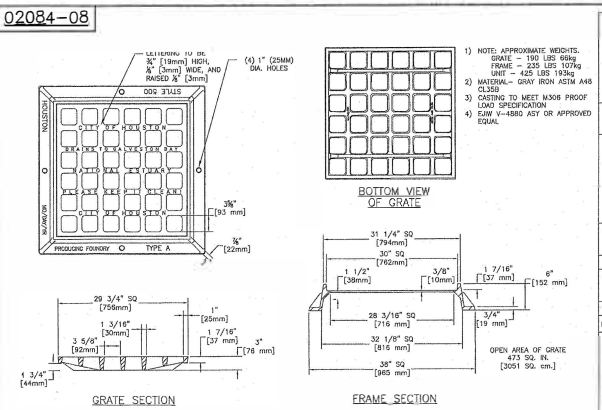
STORM SEWER TYPE "D" INLET
GRATE AND FRAME
NTS

02084-07



STORM SEWER TYPE "D-1" INLET
GRATE AND FRAME
NTS

02084-08



STORM SEWER TYPE "A"
INLET GRATE AND FRAME
NTS

FIRM INFORMATION

ENGINEER'S SEAL

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

STORM SEWER
02084-05 THROUGH 08

APPROVED BY: CITY ENGINEER

APPROVED BY: DEPUTY DIRECTOR

APPROVED BY: DIRECTOR

EFFECTIVE DATE: JUL-01-2019

FOR CITY OF HOUSTON USE ONLY

SHEET NO.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11753 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

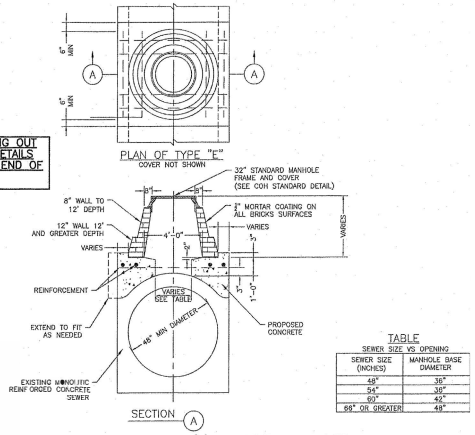
INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT

SITE STORM DETAILS (4 OF 7)

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
	80367
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 37D OF 173	

C-99-505D

02081-05



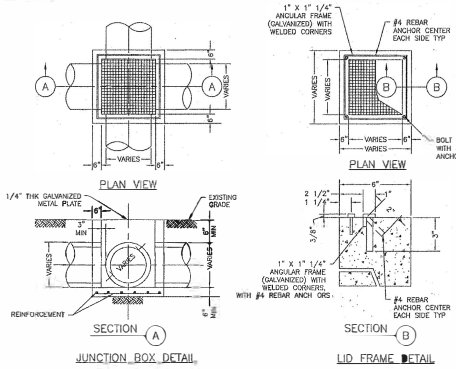
COH IS PHASING OUT BRICK, NEW DETAILS TO BE POSTED END OF 2019

TABLE
SEWER SIZE VS OPENING

SEWER SIZE (INCHES)	MANHOLE BASE DIAMETER
48"	36"
54"	36"
60"	42"
66" OR GREATER	48"

STORM SEWER MANHOLE TYPE 'E' FOR EXISTING MONOLITIC REINFORCED CONCRETE 48" DIAMETER AND GREATER
NTS

02081-06

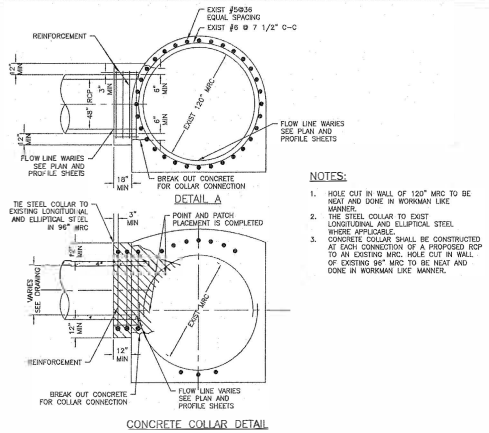


NOTES:
1. DETAIL TO BE USED WHERE STORM SEWER SIZE IS 24" DIA OR LESS. FOR SEWER GREATER 24" DIA USE TYPE 'C' MANHOLE.

NOTES TO SPECIFIER:
1. WALL TO BE 6" CONCRETE
2. NOT TO BE USED IN STREET. FOR AREA BETWEEN CI JRBWAD PROPERTY LINE ONLY.

STORM SEWER
JUNCTION BOX WITH LID OR GRATE TOP
FOR MAXIMUM OF 24" DIAMETER STORM SEWER
NTS

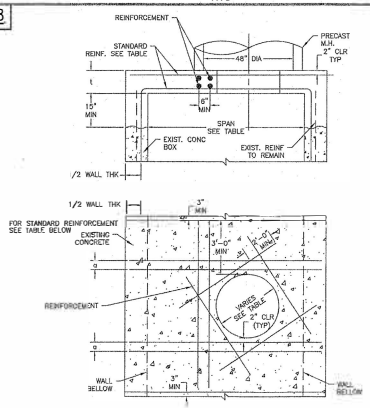
02081-07



NOTES:
1. HOLE CUT IN WALL OF 120" MRC TO BE NEAT AND DONE IN WORKMAN LIKE MANNER.
2. THE STEEL COLLAR TO EXIST LONGITUDINAL AND ELLIPTICAL STEEL WHERE APPLICABLE.
3. CONCRETE COLLAR SHALL BE CONSTRUCTED AT EACH CONNECTION OF A PROPOSED RCP TO AN EXISTING MRC. HOLE CUT IN WALL OF EXISTING 96" MRC TO BE NEAT AND DONE IN WORKMAN LIKE MANNER.

LATERAL CONNECTION TO EXISTING MONOLITHIC REINFORCED CONCRETE STORM SEWER
NTS

02081-08



PROPOSED MANHOLE ON EXISTING BOX STORM SEWER
NTS

FIRM INFORMATION | ENGINEER'S SEAL

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

STORM SEWER
02081-05 THROUGH 08

APPROVED BY: CITY ENGINEER | APPROVED BY: DEPUTY DIRECTOR
APPROVED BY: DIRECTOR
EFFECTIVE DATE: JUL-01-2019
FOR CITY OF HOUSTON USE ONLY

SHEET NO.

GUNDA CORPORATION
BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 500
Houston, Texas 77079
713.541.3330 www.gundacorp.com
TBPE Registration Number: F-3531

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
DAVID R. CASTELLANOS
97308
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION-DISINFECTION REDESIGN AMENDMENT

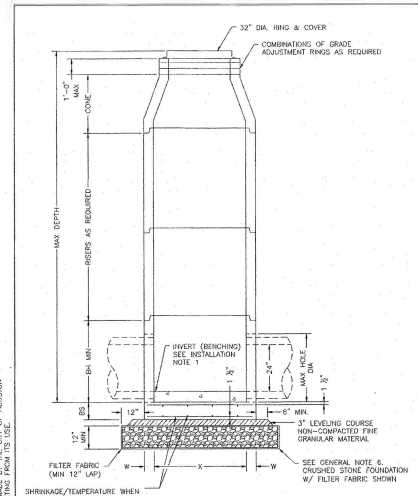
SITE STORM DETAILS (5 OF 7)

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 37E OF 173	

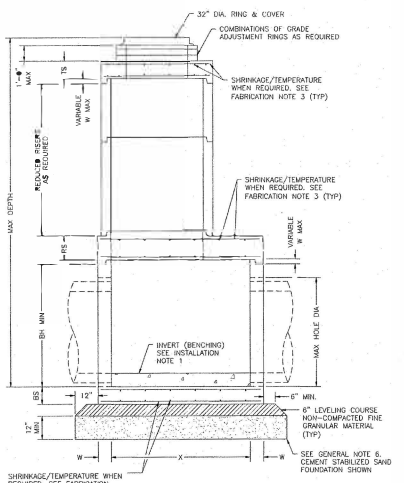
REGISTERED
80367
PROFESSIONAL ENGINEER
STATE OF TEXAS

C-99-505E

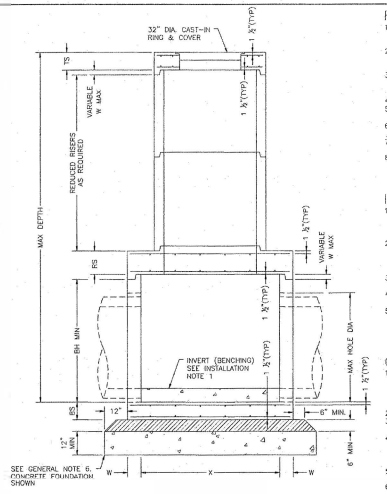
GUNDA CORPORATION
C:\Users\tetran\DCS\ACCDocs\Arcuris, Inc\20010-02\Project Files\03-Prof\03-Dwgs\SHEETS\008 DETAILS - with GUNDA BASE.dwg Jul 01, 2025 - 3:47pm ctran



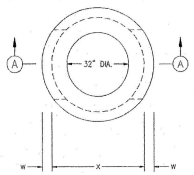
ELEVATION A–A
CONE TOP WITH SHIP LOOSE RING & COVER OPTION



ELEVATION B–B
FLAT SLAB TOP WITH SHIP LOOSE RING & COVER OPTION

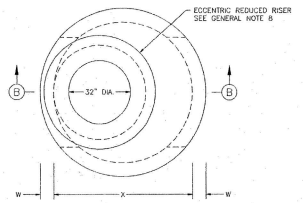


ELEVATION C–C
FLAT SLAB TOP WITH INVERTED RING & COVER OPTION



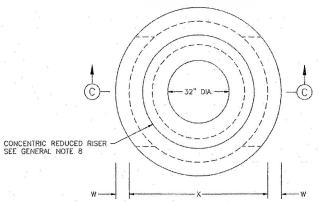
PLAN VIEW A
COVER NOT SHOWN

4–FT DIA MANHOLE



PLAN VIEW B
COVER NOT SHOWN

5–FT & 6–FT DIA MANHOLE
ECCENTRIC MANHOLE
(PREFERRED CONFIGURATION)



PLAN VIEW C
COVER NOT SHOWN

5–FT & 6–FT DIA MANHOLE
CONCENTRIC MANHOLE
(ALTERNATE CONFIGURATION)

TABLE 1
PRECAST ROUND MANHOLE (PRM) MINIMUM REQUIREMENTS FOR 24 IN. TO 42 IN. INTERNAL DIA STORM SEWER PIPES

	MANHOLE DIA (ID) IN	MIN. BASE SLAB THICKNESS IN	MIN. WALL THICKNESS IN	REDUCED RISER DIA IN	REDUCED RISER WALL THICKNESS IN	MIN. TOP SLAB THICKNESS IN	MAX. DEPTH FROM TOP OF BASE SLAB TO INVERT FT	MIN. HEIGHT OF CONE IN	MAX. HOLE DIA IN
PRM	4	9	5	–	–	9	25	42	35
	5	9	5	48	8	9	25	42	47
	6	9	7	48/60*	12	9	25	42	56

(*) 60-IN REDUCED RISER IS TO BE USED WHEN DEEMED NECESSARY TO SATISFY WALL PENETRATION SPACING REQUIREMENTS.

FABRICATION NOTES:

1. PROVIDE CLASS "H" CONCRETE IN ACCORDANCE WITH TEXAS DEPARTMENT OF TRANSPORTATION ITEM 421 AND HAVING A MINIMUM COMPRESSIVE STRENGTH OF 5,000 PSI.
2. PROVIDE GRADE 60 REINFORCING STEEL OR EQUIVALENT AREA OF WWR. PROVIDE CIRCUMFERENTIAL REINFORCING STEEL IN VERTICAL WALLS OF BASE, RISER AND CONE IN ACCORDANCE WITH ASTM C478.
3. SLABS WITH A THICKNESS OF 8" OR GREATER REQUIRE SHRINKAGE AND TEMPERATURE REINFORCING STEEL. PROVIDE STEEL AREA = 0.11 IN^2/FT EACH WAY.
4. MANUFACTURE BASE AND RISERS TO NEAREST 3" INCREMENT.
5. DESIGN TONGUE AND GROOVE JOINTS FOR FULL CLOSURE ON BOTH SHOULDERS. MINIMUM SPIGOT DEPTH IS ¾".
6. PROVIDE LIFTING DEVICES IN CONFORMANCE WITH MANUFACTURER'S RECOMMENDATIONS.
7. PROVIDE CAST IRON SOLID COVER, UNLESS NOTED OTHERWISE ELSEWHERE IN THE PLANS.
8. THREE DIFFERENT OPTIONS FOR CAPPING THE MANHOLE RISER NEAR THE FINISHED GRADE ARE SHOWN. CONES CAN BE USED WHEN COVER IS SUFFICIENT TO ALLOW FOR PROPER PLACEMENT. FLAT LIDS ARE TO BE USED WHERE COVER IS LIMITED.

INSTALLATION NOTES:

1. IF REQUIRED ELSEWHERE, INVERTS (BENCHING) TO BE PROVIDED BY CONTRACTOR. CONCRETE OR MORTAR USED FOR INVERT IS SUBSIDIARY TO THIS ITEM. REFER TO CITY OF HOUSTON SPECIFICATION SECTION 02082 FOR INVERT (BENCHING) REQUIREMENTS.
2. SEAL TONGUE AND GROOVE JOINTS WITH PREFORMED OR BULK MASTIC IN CONFORMANCE WITH MANUFACTURER'S RECOMMENDATIONS. TONGUE AND GROOVE JOINTS MAY BE GROUTED NO MORE THAN 1" BETWEEN EACH SECTION, OR ½ THE JOINT DEPTH, WHICHEVER IS GREATER.
3. DO NOT GROUT RUBBER GASKET JOINTS WITHOUT MANUFACTURER'S RECOMMENDATION.
4. INITIAL INSTALLATION OF GRADE ADJUSTMENT RINGS IS LIMITED TO 1'–0" MAX AS SHOWN.
5. GRADE ADJUSTMENT RINGS MAY BE INCREASED TO 1'–6" MAX WHEN FUTURE CONSTRUCTION AFFECTS FINAL GRADE OF STRUCTURE. MAKE ADJUSTMENTS GREATER THAN 1'–6" WITH ADDITIONAL RISERS. ADJUSTMENTS MAY BE MADE UP TO THE MAX DEPTH OF 25'–0". STRUCTURE MUST BE EVALUATED IF MAX DEPTH WILL BE EXCEEDED.

GENERAL NOTES:

1. SEE TABLE 1 FOR MINIMUM DESIGN REQUIREMENTS. CONCENTRIC RISER WITH RESPECT TO BASE (ALTERNATIVE CONFIGURATION) FALLS OUTSIDE THE SCOPE OF REQUIREMENTS PROVIDED. ENGINEER OF RECORD ACCEPTS RESPONSIBILITY FOR SAFETY AND ADEQUACY OF MANHOLE IF THE ALTERNATIVE CONFIGURATION IS USED.
2. DESIGNED ACCORDING TO ASTM C478.
3. PAYMENT FOR PRECAST MANHOLE PER SECTION 02082 "PRECAST CONCRETE MANHOLES".
4. PIPE OD + PLACEMENT TOLERANCE MUST BE EQUAL OR LESS THAN MAX HOLE DIA. FOR RIGID PIPE, PLACEMENT TOLERANCE IS 4" MAX, 2" MIN. FOR FLEXIBLE PIPE, CONSULT BOOT/SEAL MANUFACTURER'S SPECIFICATION FOR PLACEMENT TOLERANCE.
5. STORM WATER SEWER PIPE INTERNAL DIA SHALL NOT BE LESS THAN 24".
6. FOUNDATION/SUBGRADE TO BE DESIGNED BY ENGINEER AND MEET MINIMUM REQUIREMENTS ACCORDING TO SECTION 02082.
7. ALL STORM WATER MANHOLES ARE TO BE PRECAST CONCRETE, UNLESS OTHERWISE NOTED ELSEWHERE IN THE PLANS.
8. ECCENTRIC REDUCED RISER WITH RESPECT TO BASE IS THE PREFERRED MANHOLE CONFIGURATION. CONCENTRIC REDUCED RISER WITH RESPECT TO BASE MANHOLE CONFIGURATION IS AN ALTERNATIVE DESIGN THAT WILL BE ACCEPTED BASED ON THE NEEDS OF THE CITY OF HOUSTON.
9. CONES MAY BE CONCENTRIC OR ECCENTRIC. REDUCTION CONES ARE ACCEPTABLE. REFER TO MANUFACTURER FOR CONE DIMENSIONS.
10. MANHOLE SIZE SHALL CONSIDER ENGINEERING ECONOMY. THIS DETAIL IS NOT APPLICABLE TO ROUND MANHOLES LARGER THAN 6-FOOT DIA.

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

STORM SEWER TYPE 'C'
PRECAST ROUND MANHOLE

(NOT TO SCALE)

APPROVED BY:	APPROVED BY:
Suhail Kanwar	Carol Haddock
CITY ENGINEER	DIRECTOR OF HOUSTON PUBLIC WORKS
EFF DATE: JUL-01-2021	DWG NO: 02082-12

C-99-505F

DISCLAIMER:
THE USE OF THIS STANDARD IS GOVERNED BY THE TEXAS ENGINEERING PRACTICE ACT. THE DESIGN REQUIREMENTS ON THIS STANDARD DO NOT PURPORT TO ADDRESS ALL OF THE SAFETY CONCERNS ASSOCIATED WITH THEIR USE. THE ENGINEER OF RECORD (EOR) IS TO REVIEW THESE DESIGN REQUIREMENTS AND BY THE USE OF THIS STANDARD ACCEPTS RESPONSIBILITY FOR THE SAFETY AND ADEQUACY OF THE DESIGN. THE EOR IS RESPONSIBLE FOR ANY DEVIATIONS FROM THIS STANDARD AND ASSUMES ALL RESPONSIBILITY FOR ANY PURPOSES WHATSOEVER. THE CITY OF HOUSTON ASSUMES NO RESPONSIBILITY FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.

GUNDA CORPORATION
C:\Users\Victor.VICTOR\Docs\Arburo, Inc\20010-02\Project Files\03-Prod\03-Dwgs\SHEETS\008 DETAILS - - with GUNDA BASE.dwg Jul 01, 2025 - 3:47pm ctron

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.2530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED PROFESSIONAL ENGINEER
4/4/2025

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

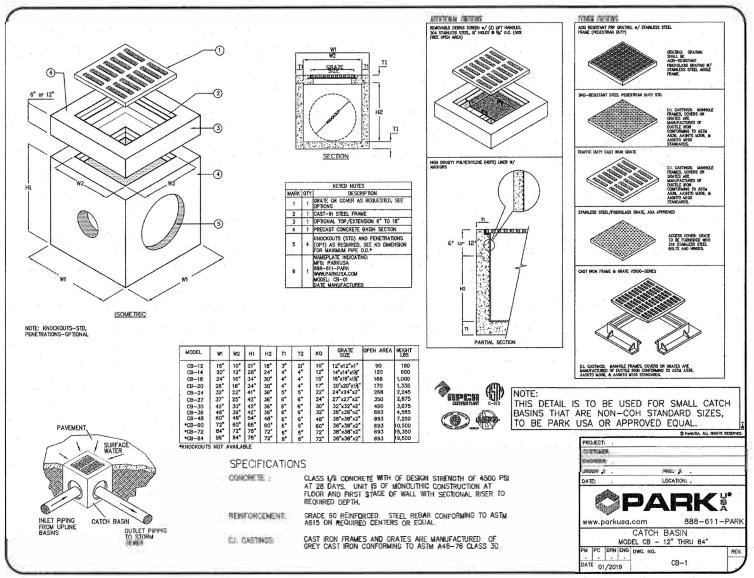
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT

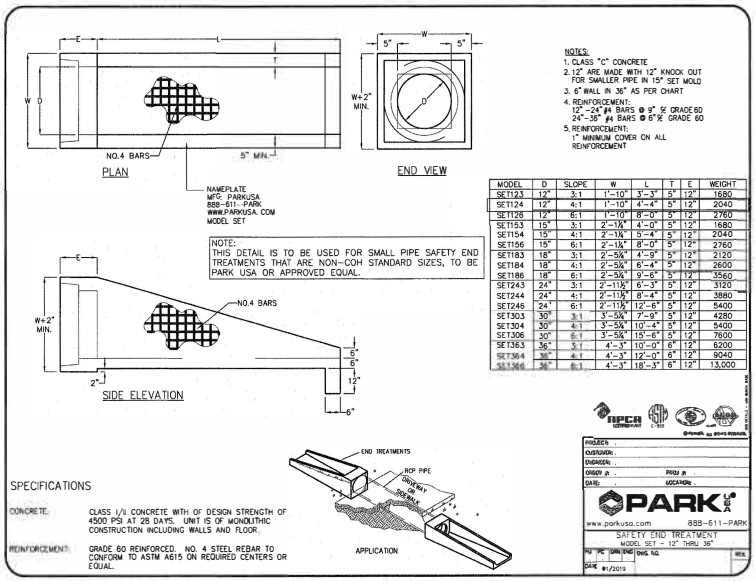
SITE STORM DETAILS (6 OF 7)

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	37F OF 173

FOR CITY OF HOUSTON USE ONLY

VICTOR ORLANDO CASTELLANO
80367
LICENSED PROFESSIONAL ENGINEER
HOUSTON, TEXAS





MODEL	D	SLOPE	W	L	T	E	WEIGHT
SET123	12"	3:1	1'-10"	3'-3"	5"	12"	1680
SET124	12"	4:1	1'-10"	4'-4"	5"	12"	2040
SET126	12"	6:1	1'-10"	8'-0"	5"	12"	2760
SET153	15"	3:1	2'-1¾"	4'-0"	5"	12"	1680
SET154	15"	4:1	2'-1¾"	5'-4"	5"	12"	2040
SET156	15"	6:1	2'-1¾"	8'-0"	5"	12"	2760
SET183	18"	3:1	2'-5⅝"	4'-9"	5"	12"	2120
SET184	18"	4:1	2'-5⅝"	6'-4"	5"	12"	2600
SET186	18"	6:1	2'-5⅝"	9'-6"	5"	12"	3560
SET243	24"	3:1	2'-11½"	6'-3"	5"	12"	3120
SET244	24"	4:1	2'-11½"	8'-4"	5"	12"	3880
SET246	24"	6:1	2'-11½"	12'-6"	5"	12"	5400
SET303	30"	3:1	3'-5⅜"	7'-9"	5"	12"	4280
SET304	30"	4:1	3'-5⅜"	10'-4"	5"	12"	5400
SET306	30"	6:1	3'-5⅜"	15'-6"	5"	12"	7600
SET363	36"	3:1	4'-3"	10'-0"	6"	12"	6200
SET364	36"	4:1	4'-3"	12'-0"	6"	12"	9040
SET366	36"	6:1	4'-3"	18'-3"	6"	12"	13,000

NOTES:
1. CLASS "C" CONCRETE
2. 12" ARE MADE WITH 12" KNOCK OUT FOR SMALLER PIPE IN 15" SET MOLD
3. 6" WALL IN 36" AS PER CHART
4. REINFORCEMENT: 12"-24" #4 BARS @ 9" ℄ GRADE 60; 24"-36" #4 BARS @ 6" ℄ GRADE 60
5. REINFORCEMENT: 1" MINIMUM COVER ON ALL REINFORCEMENT

GUNDA CORPORATION
BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANOS
97308
LICENSED
PROFESSIONAL ENGINEER

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT

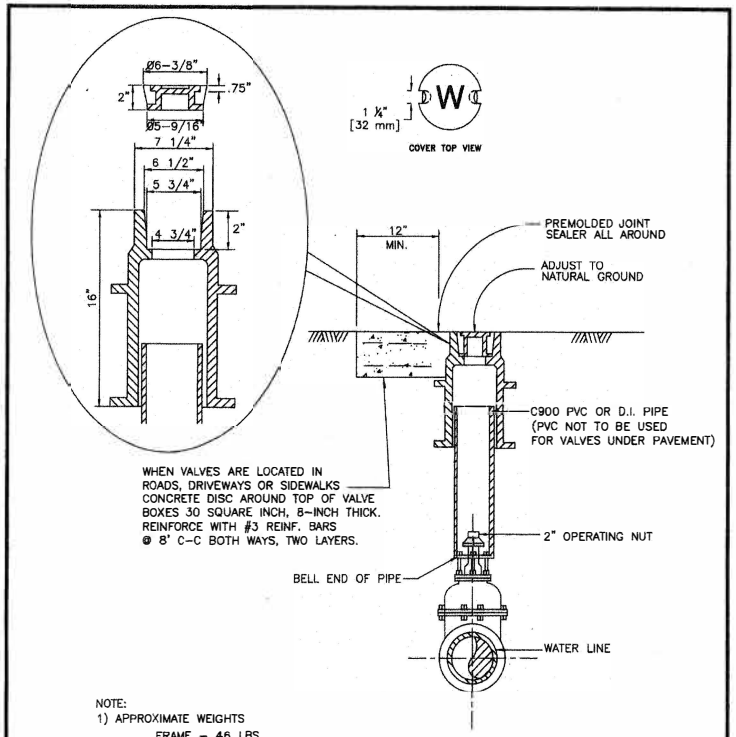
SITE STORM DETAILS
(7 OF 7)

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 38 OF 173	

STATE OF TEXAS
80367
LICENSED
PROFESSIONAL ENGINEER
HOUSTON, TEXAS

C-99-506

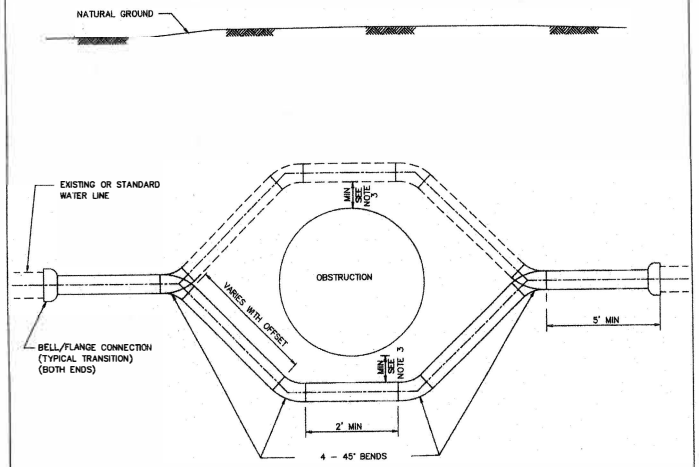
GUNDA CORPORATION
C:\Users\ctran\DC\ACCDocs\Arduinis, Inc\20010-02\Project Files\03-Prod\03-Dwgs\SHEETS\008 DETAILS - - with GUNDA BASE.dwg Jul 01, 2025 - 5:47pm ctran



NOTE:
1) APPROXIMATE WEIGHTS
FRAME – 46 LBS
COVER – 10 LBS
2) MATERIAL – GRAY IRON ASTM A48 CL35B

CITY OF HOUSTON DEPARTMENT OF PUBLIC WORKS AND ENGINEERING	
VALVE BOX DETAIL (NOT TO SCALE)	
APPROVED BY: CITY ENGINEER	APPROVED: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF. DATE: JULY 01, 2010	DWG. NO: 02065-03

NOTE:
1. MATERIALS AND COATINGS TO BE IN ACCORDANCE WITH WATER LINE STANDARD SPECIFICATIONS.
2. RESTRAIN EXISTING PIPING BEYOND STEEL SECTION AS REQUIRED TO PREVENT MOVEMENT.
3. AS PER DESIGN GUIDELINE.



PIPE OFFSET ALTERNATES

1. DUCTILE IRON PIPE PRESSURE 250 PSI WITH APPROVED RESTRAINED JOINTS.
2. PVC PIPE WITH INTEGRAL RESTRAINED JOINT SYSTEM, OR DUCTILE – IRON RESTRINED JOINT FITTINGS, EPOXY LINED AND COATED. USE 250 PSI AWWA C900 DR 14 FOR PVC RESTRAINED JOINTS.
3. PVC NOT ALLOWED FOR GREATER THAN 20 FT OF COVER OR FOR DIAMETER LARGER THAN 20 IN.
4. USE ONLY DUCTILE IRON AND PVC PRODUCTS LISTED ON OCE DIVISION APPROVED PRODUCTS LIST AND IN ACCOROANCE WITH CITY STANDARD SPECIFICATIONS.

CITY OF HOUSTON DEPARTMENT OF PUBLIC WORKS AND ENGINEERING	
TYPICAL STEEL PIPE OFFSET SECTION FOR WATER LINES (NOT TO SCALE)	
APPROVED BY: CITY ENGINEER	APPROVED: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JULY-01-2010	DWG NO: 02511-01

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED
PROFESSIONAL ENGINEER

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT

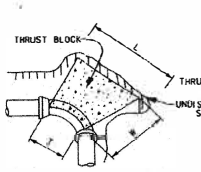
SITE WATER DETAILS (1 OF 3)

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHA HOUR RAH MAN , P.E.	
SHEET NO. 39A OF 173	

80367

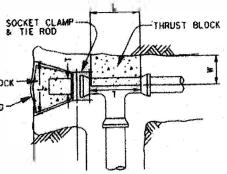
C-99-507A

GUNDA CORPORATION
C:\Users\ctron\DCVACCDocs\Arduino, Inc\20010-02\Project Files\03-Prod\03-Dwgs\SHEETS\008 DETAILS - with GUNDA BASE.dwg Jul 01, 2025 - 3:47pm ctron

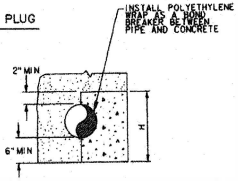


90° BEND

(45° BENDS SIMILAR)



TEE & PLUG



PIPE
CROSS SECTION

MINIMUM BLOCKING DIMENSION IN INCHES												
PIPE SIZE	90° BEND				45° BEND				TEE/PLUG			
	W	H	L	T	W	H	L	T	W	H	L	T
4"	6	12	14	10	6	8	11	8	6	10	12	12
6"	8	14	26	12	8	14	14	12	8	14	19	19
8"	10	16	40	16	10	18	20	16	10	18	26	26
10"	12	24	42	18	12	22	25	18	12	24	30	30
12"	14	36	40	30	14	26	30	22	14	26	40	40

CORRECTION FACTORS		
SOIL TYPE	SOIL BEARING STRENGTH S_b (lb/ft²)	MULTIPLY "L" AND "H" BY
SOFT CLAY	1000	1.73
SILT	1500	1.41
SANDY SILT	3000	1.00
SAND	4000	0.87
SANDY CLAY	6000	0.71
HARD CLAY	9000	0.58

NOTES:

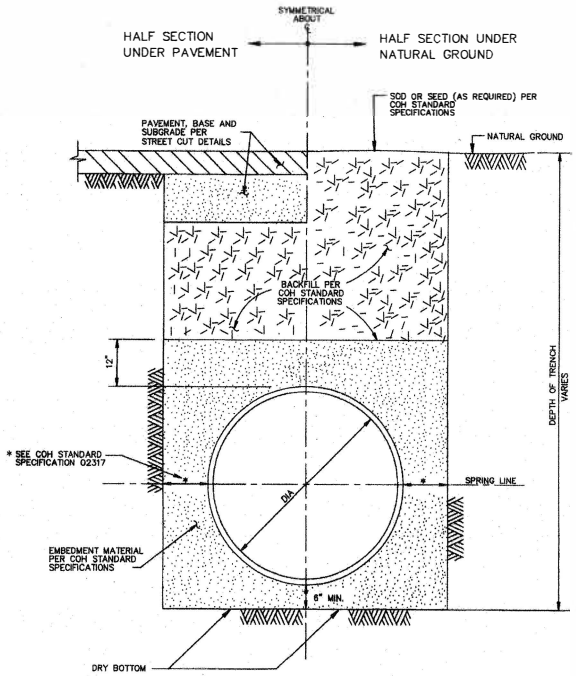
1. DEPTH "W" MAY BE GREATER THAN SPECIFIED TO ALLOW WORKING SPACE.
2. BLOCKING MUST BE PLACED AGAINST UNDISTURBED EARTH. WHERE THIS IS NOT POSSIBLE, THE FILL BETWEEN THE BEARING SURFACE AND UNDISTURBED SOIL MUST BE COMPACTED TO AT LEAST 90% STANDARD PROCTOR DENSITY.
3. PROVIDE CONCRETE IN ACCORDANCE WITH STANDARD SPECIFICATION SECTION 03315 – CONCRETE FOR UTILITY CONSTRUCTION.
4. BLOCKING DIMENSIONS SHOWN ARE BASED ON 3000 PSI SOIL BEARING STRENGTH AND 125 PSI INTERNAL WATER PRESSURE. FOR OTHER SOIL CONDITIONS, MULTIPLY DIMENSIONS "L" AND "H" BY THE APPROPRIATE CORRECTION FACTOR.

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

THRUST BLOCK DETAIL
FOR WATER LINES
(4-INCH TO 12 INCH)
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER
APPROVED: DIRECTOR OF PUBLIC WORKS AND ENGINEERING

EFF DATE: JULY-01-2010 DWG NO: 02511-02



CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER DISTRIBUTION MAIN
BEDDING AND BACKFILL FOR
OPEN CUT TRENCHES
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER
APPROVED: DIRECTOR OF PUBLIC WORKS AND ENGINEERING

EFF DATE: JUL-01-2010 DWG NO: 02317-04

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.941.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED
PROFESSIONAL ENGINEER

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION–DISINFECTION REDESIGN
AMENDMENT

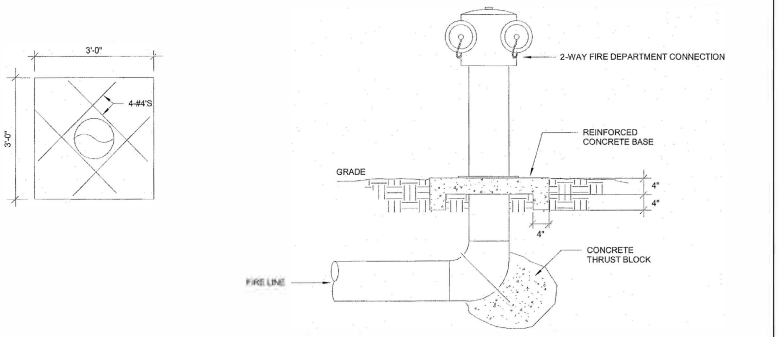
SITE WATER DETAILS (2 OF 3)

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHI DUR RAH MAN, P.E.	
SHEET NO. 398 OF 737	

STATE OF TEXAS
80367
REGISTERED
PROFESSIONAL ENGINEER
HOUSTON, TEXAS

C-99-507B

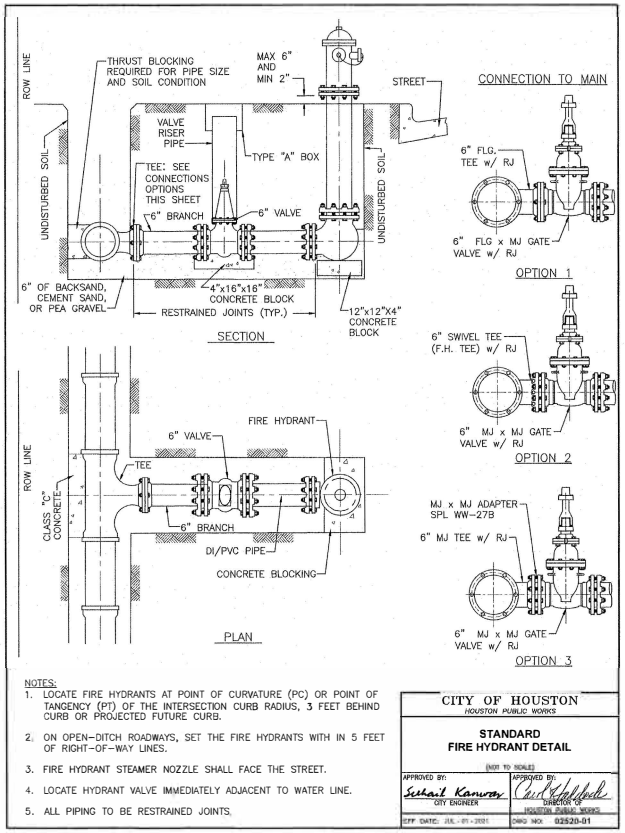
GUNDA CORPORATION
C:\Users\cron\DC\ACDocs\Vaduro, Inc\20010-02\Project Files\03-Prod\03-Dwgs\SHEETS\008 DETAILS - with GUNDA BASE.dwg Jul 01, 2025-3:47pm cron



07P212

FIRE DEPARTMENT REMOTE CONNECTION

XX



NOTES:

1. LOCATE FIRE HYDRANTS AT POINT OF CURVATURE (PC) OR POINT OF TANGENCY (PT) OF THE INTERSECTION CURB RADIUS, 3 FEET BEHIND CURB OR PROJECTED FUTURE CURB.
2. ON OPEN-DITCH ROADWAYS, SET THE FIRE HYDRANTS WITH IN 5 FEET OF RIGHT-OF-WAY LINES.
3. FIRE HYDRANT STEAMER NOZZLE SHALL FACE THE STREET.
4. LOCATE HYDRANT VALVE IMMEDIATELY ADJACENT TO WATER LINE.
5. ALL PIPING TO BE RESTRAINED JOINTS.

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

STANDARD FIRE HYDRANT DETAIL

(NOT TO SCALE)

APPROVED BY: Suhail Kanwar, CITY ENGINEER
APPROVED BY: Carol Haddock, DIRECTOR OF HOUSTON PUBLIC WORKS

EFF DATE: JUL - 01 - 2021
DWG NO: 02520-01

1) WATER LINES SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE LATEST CITY OF HOUSTON INFRASTRUCTURE DESIGN MANUAL, STANDARD SPECIFICATION, AND CONSTRUCTION DETAILS.

2) ALL 4" THROUGH 12" WATER LINE TO BE AWWA C-900 PVC DR-18 BLUE PRESSURE RATED WATER MAIN WITH 2" AND SMALLER WATER SERVICE LINE TO BE CONTINUOUS TYPE K COPPER TUBING PER COH STANDARD SPECIFICATION SECTION 02503. ALL 4" THRU 54" DI PIPE WATER LINES SHALL BE AWWA C151 WITH INSIDE LINING WITH AWWA C104 AND DOUBLE WRAPPED WITH 8-MIL POLYETHYLENE SHEETS.

3) CONCRETE THRUST BLOCKS SHALL BE PROVIDED AS NECESSARY TO PREVENT PIPE MOVEMENT. USE RESTRAINED JOINTS WHERE PREVENTING MOVEMENT OF 16" OR GREATER PIPE IS NECESSARY DUE TO THRUST.

4) ALL WATER LINES UNDER PROPOSED OR FUTURE PAVING AND TO A POINT OF ONE (1) FOOT BACK OF ALL PROPOSED OR FUTURE CURBS SHALL BE ENCASED IN BANK SAND TO 12" OVER PIPE AND BACKFILLED WITH CEMENT STABILIZED SAND TO WITHIN ONE (1) FOOT OF SUBGRADE.

5) ALL WATER LINE AND SEWER LINE CROSSINGS SHALL BE CONSTRUCTED PER CITY OF HOUSTON AND TCEQ REGULATIONS.

6) ALL WATER VALVES SHALL BE SUPPLIED AND INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OF AWWA C-500 AND SHALL BE OF THE RESILIENT SEAT TYPE.

7) ALL WATER LINES TO BE DISINFECTED IN CONFORMANCE WITH AWWA C-651 AND THE TEXAS STATE DEPARTMENT OF HEALTH. AT LEAST ONE BACTERIOLOGICAL SAMPLE SHALL BE COLLECTED FOR EVERY 1,000 LINEAR FEET OF WATER LINE AND SHALL BE REPEATED IF CONTAMINATION PERSISTS.

8) ALL BELOW GRADE VALVES SHALL BE GASKETED, HUB-END GATE VALVES WITH A CAST IRON BOX, EXCEPT WHERE FLANGES ARE CALLED OUT ON THE PLANS.

9) 4" THRU 12" FIT TINGS SHALL BE CEMENT MORTAR LINED COMPACT DUCTILE IRON PRESSURE FITTINGS PER ANSI A21.53, OR PUSH ON FITTINGS PER ANSI A21.10 PRESSURE RATED AT 250 PSIG.

10) HYDROSTATIC TESTING: ALL WATER PIPE SHALL BE TESTED FOR LEAKAGE IN ACCORDANCE WITH THE LATEST CITY OF HOUSTON STANDARD CONSTRUCTION SPECIFICATIONS. TESTS ARE TO BE PERFORMED ON THE ENTIRE FOOTAGE OF WATER PIPE LINE INCLUDED IN THE PROJECT.

11) ALL WATER LINES TO HAVE 4' MINIMUM COVER TO FINISHED GRADE AND MINIMUM 12" CLEARANCE TO OTHER UTILITIES AT CROSSING UNLESS OTHERWISE NOTED ON PLANS. ALL WATER LINE INSTALLED OVER 8' DEEP SHALL UTILIZE RESTRAINED JOINT FITTINGS.

12) CONTRACTOR SHALL KEEP WATER PIPE CLEAN AND CAPPED (OR OTHERWISE EFFECTIVELY COVERED) OPEN PIPE ENDS TO EXCLUDE INSECTS, ANIMALS OR OTHER SOURCES OF CONTAMINATION FROM UNFINISHED PIPE LINES AT TIMES WHEN CONSTRUCTION IS NOT IN PROGRESS.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED
PROFESSIONAL ENGINEER

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION-DISINFECTION REDESIGN AMENDMENT

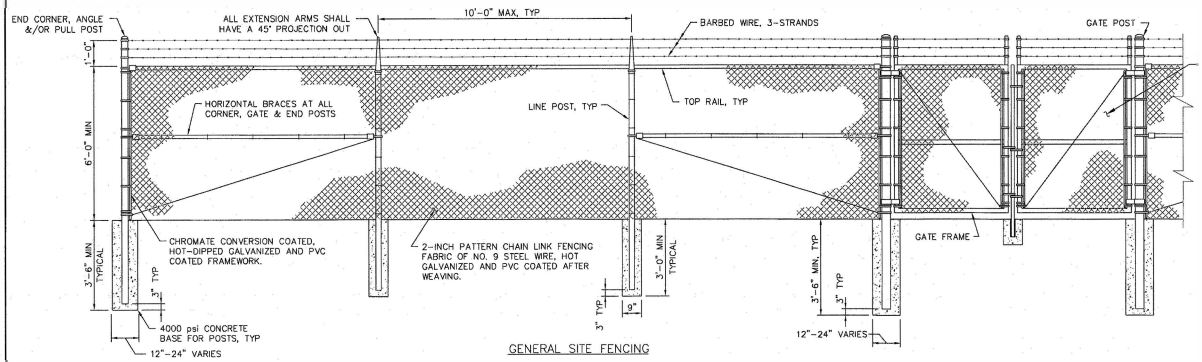
SITE WATER DETAILS (3 OF 3)

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 39C OF 173	

ACCEPTED
80387

C-99-507C

GUNDA CORPORATION
C:\Users\cfron\DCWCDocs\Arturo, Inc\20010-02\Project Files\03-Prod\03-Dwgs\SHEETS\008 DETAILS - with GUNDA BASE.dwg Jul 01, 2025 - 3:48pm cfron

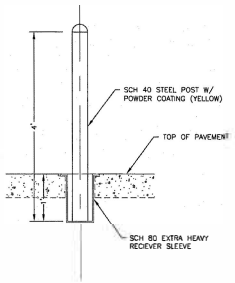


GENERAL SITE FENCING

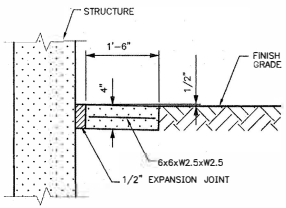
TYP DOUBLE SWING GATE SHOWN, TYPE OF GATE MAY SWING OR SLIDE, SINGLE OR DOUBLE

NOTES:

1. ALL FENCING SHALL BE MANUFACTURED AND INSTALLED PER CITY OF HOUSTON STANDARDS AND SPECIFICATIONS.
2. PROVIDE GREEN PVC COATED CYCLONE-TYPE FENCE WITH GREEN PVC FENCE SLATS.
3. 16' WIDE, (2-8' WIDE GATES), DOUBLE LEAF, INWARD-OPENING SWING GATE SECURED WITH A CHAIN AND PADLOCK ARE PROPOSED.
4. THIS DETAIL TAKEN FROM CITY OF HOUSTON STANDARD DETAIL ZOCOB.



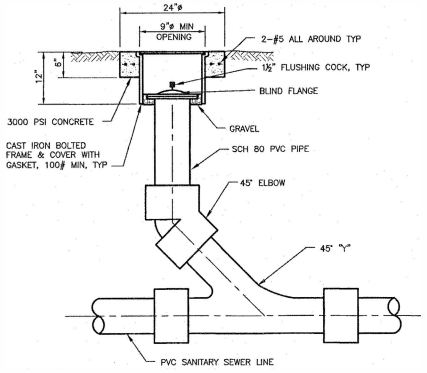
REMOVABLE BOLLARD DETAIL



NOTES:

1. A 1'-6" MOW STRIP SHALL BE CONSTRUCTED AROUND THE PERIMETER OF ALL STRUCTURES EXCEPT AT LOCATIONS OF ADJACENT PAVING OR SIDEWALKS OR OTHERWISE NOTED ON PLANS.
2. PROVIDE SAWED DUMMY JOINT AS PER STANDARD CIVIL DETAILS. THE JOINT SPACING SHALL BE AT 5'-0" O.C.
3. PROVIDE 1 1/2" EXPANSION JOINT AT 25'-0" O.C.

MOW STRIP DETAIL



YARD CLEANOUT DETAIL

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Surveyors
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED PROFESSIONAL ENGINEER
4/4/2025

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION-DISINFECTION REDESIGN AMENDMENT

SITE MISCL DETAILS

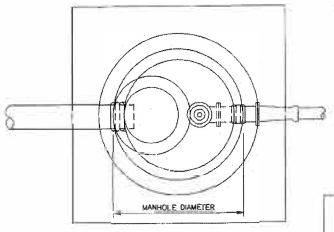
WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	

PROFESSIONAL ENGINEER
80887
4/4/2025

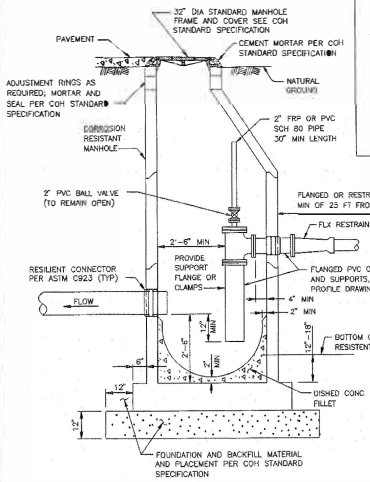
C-99-508

SHEET NO. 40 OF 173

GUNDA CORPORATION
C:\Users\cfran\DC\ACCDocs\Arcadis, Inc\20010-02\Project Files\03-Prod\03-Dwgs\SHEETS\008 DETAILS - with GUNDA BASE.dwg Jul 01, 2025 - 3:45pm cfran



PLAN VIEW



ELEVATION VIEW

NOTES:

1. SEAT MANHOLE FRAME IN SEALANT PER COH STANDARD SPECIFICATION
2. IF FORCE MAIN HAS BENDS WITHIN 25 FT OF MANHOLE, EXTEND RESTRAINED JOINTS TO 25 FT MINIMUM UPSTREAM OF BEND
3. GMT CEMENT MORTAR WHEN MANHOLE IS LOCATED IN PAVED AREA
4. MINIMUM REINFORCING IN BASE SHALL BE S @ 8 E W.
5. PRECAST RINGS SHALL BE PROVIDED FOR A COMBINED ADJUSTMENT HEIGHT OF AT LEAST 12". THE TOTAL HEIGHT OF THE ADJUSTMENT RINGS SHALL NOT EXCEED 1'-6".

NOTES TO SPECIFIER:

1. *INDICATE SIZE OF FORCE MAIN, INCREASER AND DISCHARGE EITHER ON THIS DETAIL OR ON PLAN AND PROFILE.*
2. *PROVIDE INVERT ELEVATIONS OF FORCE MAIN AND SEWER CONNECTIONS TO MH, ON THIS DETAIL OR PLAN AND PROFILE.*
3. *THIS DETAIL IS TO BE USED ONLY WHEN THERE ARE NO INTERSECTING GRAVITY SEWERS.*
4. *DETAIL MAY BE REVISED TO ORIENT INCOMING FORCE MAIN AT OTHER ANGLES RELATIVE TO GRAVITY SEWER*
5. *IF LENGTH OF DISCHARGE DROP BELOW FLANGED TEE FITTING EXCEEDS 7 TIMES DISCHARGE DIAMETER, PROVIDE STAINLESS STEEL OR FRP PIPE SUPPORT.*

TABLE 02082-07

MANHOLE DIAMETER	4'-0"	5'-0"	6'-0"
MAX DISCHARGE SIZE	6"	14"	24"

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING, CONSTRUCTION AND REAL ESTATE DIVISION

SANITARY SEWER
CORROSION RESISTANT MANHOLE
FOR FORCE MAIN DISCHARGE
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER — APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING

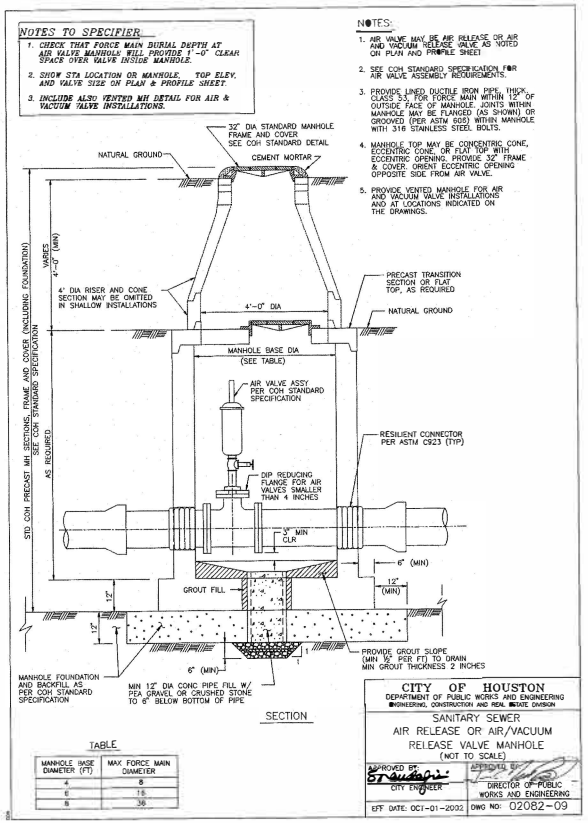
EFF DATE: OCT-01-2002 — DWG NO: 02082-07

NOTES TO SPECIFIER:

1. *CHECK THAT FORCE MAIN BURIAL DEPTH AT AIR VALVE MANHOLE WILL PROVIDE 1'-0" CLEAR SPACE OVER VALVE INSIDE MANHOLE.*
2. *SHOW STA LOCATION OR MANHOLE, TOP ELEV, AND VALVE SIZE ON PLAN & PROFILE SHEET.*
3. *INCLUDE ALSO: VENTED MH DETAIL FOR AIR & VACUUM VALVE INSTALLATIONS.*

NOTES:

1. AIR VALVE MAY BE AIR RELEASE OR AIR AND VACUUM RELEASE VALVE AS NOTED ON PLAN AND PROFILE SHEET
2. SEE COH STANDARD SPECIFICATION FOR AIR VALVE ASSEMBLY REQUIREMENTS.
3. PROVIDE LINED DUCTILE IRON PIPE, THICK CLASS 3.4 FOR FORCE MAIN WITHIN 12" OF OUTSIDE FACE OF MANHOLE. JOINTS WITHIN MANHOLE MAY BE FLANGED (AS SHOWN) OR GROOVED (PER ASTM 606) WITHIN MANHOLE WITH 316 STAINLESS STEEL BOLTS.
4. MANHOLE TOP MAY BE CONCENTRIC CONE, ECCENTRIC CONE, OR FLAT TOP WITH ECCENTRIC OPENING. PROVIDE 32" FRAME & COVER ORIENT ECCENTRIC OPENING OPPOSITE SIDE FROM AIR VALVE.
5. PROVIDE VENTED MANHOLE FOR AIR AND VACUUM VALVE INSTALLATIONS AND AT LOCATIONS INDICATED ON THE DRAWINGS.



SECTION

TABLE

MANHOLE BASE DIAMETER (FT)	MAX FORCE MAIN DIAMETER
4	8
6	16
8	36

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING, CONSTRUCTION AND REAL ESTATE DIVISION

SANITARY SEWER
AIR RELEASE OR AIR/VACUUM
RELEASE VALVE MANHOLE
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER — APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING

EFF DATE: OCT-01-2002 — DWG NO: 02082-09

1. ALL SEWERS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CITY OF HOUSTON 'STANDARD CONSTRUCTION SPECIFICATIONS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE, STREET PAVING, AND TRAFFIC' AND ALL CURRENT AMENDMENTS THERETO AND BE SUBJECT TO A STANDARD EXFILTRATION TEST. TESTS ARE TO BE PERFORMED ON THE TOTAL FOOTAGE OF SEWER LINE INCLUDED IN THE PROJECT. REQUIREMENTS OF TEXAS ADMINISTRATIVE CODE, TITLE 30 CHAPTER 217, 'DESIGN CRITERIA FOR DOMESTIC WASTEWATER SYSTEMS' SHALL GOVERN WHERE CONFLICTS EXIST EXCEPT WHERE CITY REQUIREMENTS ARE MORE STRINGENT.
2. ALL MANHOLES ARE TO BE PER CITY OF HOUSTON STANDARD DETAILS DRAWING NUMBERS 02082-01, 02082-02, 02082N-02, 02082-03, AND 02082N-03 UNLESS OTHERWISE NOTED. USE 2019 VERSION AS APPLICABLE.
3. SANITARY SEWER MANHOLES WILL HAVE BEDDING AND BACKFILL PER CITY OF HOUSTON STANDARD DETAILS DRAWING NO. 02317-08 UNLESS OTHERWISE NOTED.
4. THE SANITARY SEWER PVC PIPE SHALL BE ASTM D 3034 TYPE PSM SDR 26 GRAVITY SEWER PIPE, ASTM D2241 SDR 26 PRESSURE RATED SEWER PIPE OR AWWA C-900 DR-18 GREEN PVC PRESSURE RATED SEWER PIPE BASED ON CONSTRUCTION CONDITION REQUIREMENT AND CONFORMING TO ASTM D1784 AND CITY OF HOUSTON STANDARD SPECIFICATION SECTION 02508 POLYVINYL CHLORIDE PIPE.
5. WHEN SS PRESSURE RATED PVC PIPE IS USED ON WATERLINE (WL) CROSSING UNDER CONDITION 1 OF COH IDM TABLE 7.3, THE SAME TYPE OF D2241 SDR 26 PVC PIPE OR C-900 GREEN DR-18 PVC GREEN PRESSURED TO BE UTILIZING IN-BETWEEN TWO SS MH'S, OR TO UTILIZE A DI TRANSITION ADAPTER FOR THE CONNECTING OF ASTM D-3034 PVC GRAVITY PIPE TO D-00 AWWA C-900 PVC PIPE CENTERED AT WL WHEN CONNECTING TWO DIFFERENT TYPES OF PVC PIPES FOR SEWER CONSTRUCTION.
6. AWWA C-900 DR-18 PVC PIPE USES EITHER AWWA C900 DR-18 PVC FITTINGS OR DIP FITTINGS.
7. ALL SANITARY SEWER LINES UNDER PROPOSED OR FUTURE PAVEMENT AND TO A POINT ONE (1) FOOT BACK OF ALL PROPOSED OR FUTURE CURBS SHALL HAVE BEDDING PER CITY OF HOUSTON STANDARD DETAILS DRAWING NUMBERS 02317-01, 02317-02, OR 02317-08 AS APPLICABLE, WITH 1 ½ SACK CEMENT/CY STABILIZED SAND BACKFILL UP TO THE BOTTOM OF THE PAVEMENT SUBGRADE. 100 PSI PERFORMANCE RESULTS ARE STILL REQUIRED.
8. ALL SANITARY SEWERS CROSSING WATER LINES WITH A CLEARANCE BETWEEN 12 INCHES AND 9 FEET SHALL HAVE A MINIMUM OF ONE 18' JOINT OF 150 PSI DUCTILE IRON OR (GREEN) C900 PVC PIPE MEETING ASTM SPECIFICATION D2241 CENTERED ON WATER LINE. WHEN WATER LINE IS BELOW SANITARY SEWER, PROVIDE MINIMUM 2 FOOT SEPARATION.
9. CONTRACTOR SHALL PROVIDE A MINIMUM HORIZONTAL CLEARANCE OF 9' FEET BETWEEN WATER LINES AND SANITARY SEWER MANHOLES AND LINES.
10. SANITARY SEWER MANHOLE RIMS OUTSIDE OF PROPOSED PAVING WILL BE SET 3" - 6" ABOVE THE SURROUNDING LEVEL FINISHED GRADE AFTER PAVING WITH SLOPED BACKFILL ADDED FOR STORM WATER TO DRAIN AWAY FROM MANHOLE RIM.
11. IN WET STABLE TRENCH AREAS USE BEDDING PER CITY OF HOUSTON STANDARD DETAILS DRAWING NUMBER 02317-02.
12. DEFLECTION TEST: DEFLECTION TESTS SHALL BE PERFORMED ON ALL FLEXIBLE AND SEMI-RIGID SEWER PIPE. THE TEST SHALL BE CONDUCTED AFTER THE FINAL BACKFILL HAS BEEN IN PLACE AT LEAST 30 DAYS. NO PIPE SHALL EXCEED A DEFLECTION OF 5% IF THE DEFLECTION TEST IS TO BE RUN USING A RIGID MANDREL. IT SHALL HAVE A DIAMETER EQUAL TO 95% OF THE INSIDE DIAMETER OF THE PIPE. THE TEST SHALL BE PERFORMED AS PER 30 TAC 217.57 LATEST AMENDMENT AND WITHOUT MECHANICAL PULLING DEVICES. NO BALL-TYPE MANDREL IS ALLOWED.
13. INFILTRATION, EXFILTRATION OR LOW-PRESSURE AIR TEST: EITHER OF THE FOLLOWING TESTS SHALL BE PERFORMED AS PER TAC, TITLE 30 217.57 WITHIN THE SPECIFIED TOLERANCES ON ALL GRAVITY SEWERS.
    A. INFILTRATION OR EXFILTRATION TEST: TOTAL LEAKAGE AS DETERMINED BY A HYDROSTATIC HEAD TEST SHALL NOT EXCEED 50 GALLONS PER INCH DIAMETER PER MILE OF PIPE PER 24 HOURS AT A MINIMUM TEST HEAD OF TWO (2) FEET.
    B. LOW-PRESSURE AIR TEST: PERFORM TEST ACCORDING TO UNI-B-6-90 OR OTHER APPROPRIATE PROCEDURES, FOR SECTIONS OF PIPE LESS THAN 36" (INCH) AVERAGE INSIDE DIAMETER, THE MINIMUM ALLOWABLE TIME FOR PRESSURE DROP FROM 3.5 P.S.I.G. TO 2.5 P.S.I.G. SHALL BE AS FOLLOWS:
        8" 340 SECONDS OR 0.85S(L) FOR TEST LENGTHS GREATER THAN 398'
        8" 454 SECONDS OR 1.520(L) FOR TEST LENGTHS GREATER THAN 298'
        10" 567 SECONDS OR 2.374(L) FOR TEST LENGTHS GREATER THAN 239'
        12" 680 SECONDS OR 3.419(L) FOR TEST LENGTHS GREATER THAN 199'
        15" 850 SECONDS OR 5.342(L) FOR TEST LENGTHS GREATER THAN 159'
        18" 1020 SECONDS OR 7.693(L) FOR TEST LENGTHS GREATER THAN 133'
        WHERE L = LENGTH OF LINE OF SAME PIPE SIZE IN FEET.
14. 'SAN. S. E.' INDICATES 'SANITARY SEWER EASEMENT'
15. FOR SANITARY MANHOLE (MH) RIMS SET INSIDE OF OR @ CURB & GUTTER PAVEMENT AND/OR BELOW T.C., MH RIMS WILL BE SET FLUSHED WITH AN ABUTTING PAVED SURFACE. THE (VALCUN, NEENAH OR EQUAL) HEAVY DUTY BOLTED SOLID MH COVER SHALL BE PROPERLY (AND SECURELY) ATTACHED AND SEALED TO ITS COMPATIBLE GASKETED FRAME BY USING BOTH A NEOPRENE GASKET AND (AT LEAST) 4 COUNTER-SUNK HEX-HEAD COARSE THREADED ½"-13 UNC STAINLESS STEEL BOLTS. THE HEAVY DUTY FRAME MH COVER SHALL BE SOLID (NO AIR HOLES). SAID FRAME SHALL BE BOTH EMBEDDED INTO THE MH'S TOP ALSO SECURELY ANCHORED TO THE UNDERLYING MH STRUCTURE WITH EITHER SECURELY ATTACHED EMBEDDED ANCHOR BOLTS OR THE CONCRETE MH'S EXPOSED REBARS WELDED TO THE FRAME OR OTHER EQUALLY SECURED METHODS TO PREVENT MH COVER/FRAME BLOW-OFFS/EJECTIONS.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3570 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED PROFESSIONAL ENGINEER
Aug 1, 2025

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

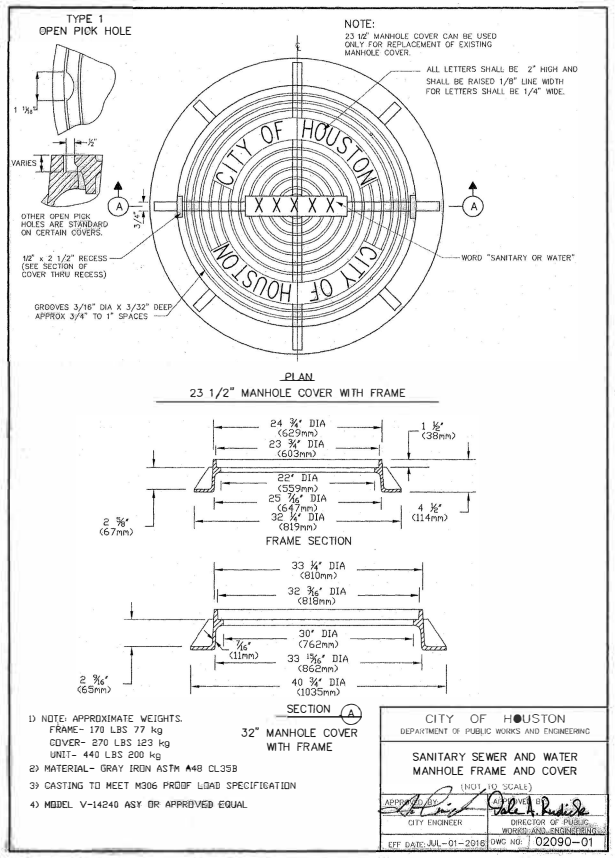
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT
SITE SANITARY DETAILS (1 OF 3)

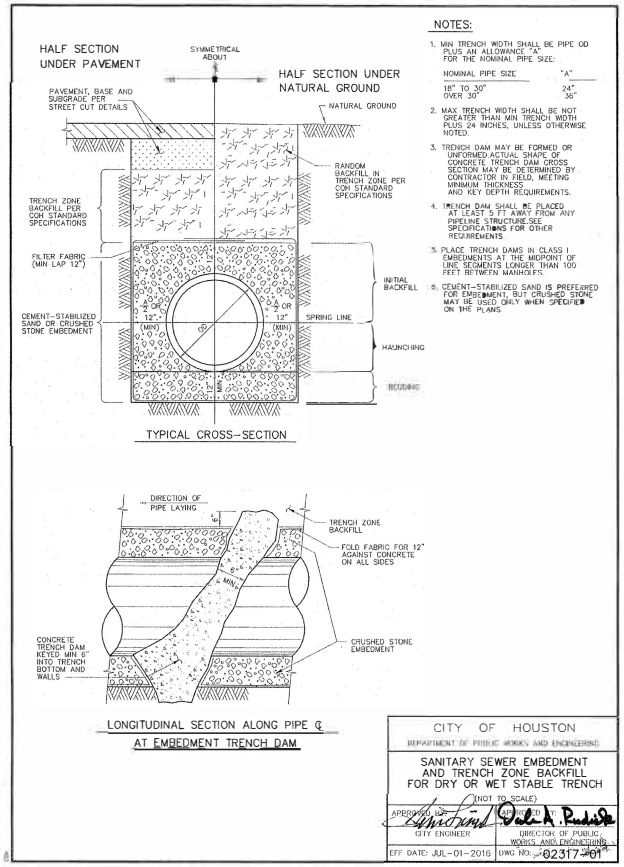
WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 41A OF 173	

LICENSED PROFESSIONAL ENGINEER
80367
SHAHIDUR RAHMAN, P.E.

C-99-509A

GUNDA CORPORATION
C:\Users\shrah\DC\ACCDocs\ArAurns, inc\20010-02\Project Files\03-Prod\03-Dwgs\SHEETS\008 DETAILS - with GUNDA BASE.dwg Jul 01, 2025 - 5:48pm shrah





CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
SANITARY SEWER EMBEDMENT AND TRENCH ZONE BACKFILL FOR DRY OR WET STABLE TRENCH
(NOT TO SCALE)
APPROVED BY
CITY ENGINEER
APPROVED BY
DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JUL-01-2016
DWG NO. 02317-01

1. ALL SEWERS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CITY OF HOUSTON "STANDARD CONSTRUCTION SPECIFICATIONS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE, STREET PAVING, AND TRAFFIC" AND ALL CURRENT AMENDMENTS THERETO AND BE SUBJECT TO A STANDARD EXFILTRATION TEST. TESTS ARE TO BE PERFORMED ON THE TOTAL FOOTAGE OF SEWER LINE INCLUDED IN THE PROJECT. REQUIREMENTS OF TEXAS ADMINISTRATIVE CODE, TITLE 30 CHAPTER 217, DESIGN CRITERIA FOR DOMESTIC WASTEWATER SYSTEMS; SHALL GOVERN WHERE CONFLICTS EXIST EXCEPT WHERE CITY REQUIREMENTS ARE MORE STRINGENT.
2. ALL MANHOLES ARE TO BE PER CITY OF HOUSTON STANDARD DETAILS DRAWING NUMBERS 02082-01, 02082-02, 02082N-02, 02082-03, AND 02082N-03 UNLESS OTHERWISE NOTED. USE 2019 VERSION AS APPLICABLE.
3. SANITARY SEWER MANHOLES WILL HAVE BEDDING AND BACKFILL PER CITY OF HOUSTON STANDARD DETAILS DRAWING NO. 02317-08 UNLESS OTHERWISE NOTED.
4. THE SANITARY SEWER PVC PIPE SHALL BE ASTM D 3034 TYPE PSM SDR 26 GRAVITY SEWER PIPE, ASTM D2241 SDR 26 PRESSURE RATED SEWER PIPE OR AWWA C-900 DR-18 GREEN PVC PRESSURE RATED SEWER PIPE BASED ON CONSTRUCTION CONDITION REQUIREMENT AND CONFORMING TO ASTM D1784 AND CITY OF HOUSTON STANDARD SPECIFICATION SECTION 02506 POLYVINYL CHLORIDE PIPE.
5. WHEN SS PRESSURE RATED PVC PIPE IS USED ON WATERLINE (WL) CROSSING UNDER CONDITION 1 OF COH IDM TABLE 7.3, THE SAME TYPE OF D2241 SDR 26 PVC PIPE OR C-900 GREEN DR-18 PVC GREEN PRESSURED TO BE UTILIZING IN-BETWEEN TWO SS MH'S, OR TO UTILIZE A DI TRANSITION ADAPTER FOR THE CONNECTING OF ASTM D-3034 PVC GRAVITY PIPE TO DI-OD AWWA C-900 PVC PIPE CENTERED AT WL WHEN CONNECTING TWO DIFFERENT TYPES OF PVC PIPES FOR SEWER CONSTRUCTION.
6. AWWA C-900 DR-18 PVC PIPE USES EITHER AWWA C900 DR-18 PVC FITTINGS OR DIP FITTINGS.
7. ALL SANITARY SEWER LINES UNDER PROPOSED OR FUTURE PAVEMENT AND TO A POINT ONE (1) FOOT BACK OF ALL PROPOSED OR FUTURE CURBS SHALL HAVE BEDDING PER CITY OF HOUSTON STANDARD DETAILS DRAWING NUMBERS 02317-01, 02317-02, OR 02317-03 AS APPLICABLE, WITH 1 ½ SACK CEMENT/CY STABILIZED SAND BACKFILL UP TO THE BOTTOM OF THE PAVEMENT SUBGRADE. 100 PSI PERFORMANCE RESULTS ARE STILL REQUIRED.
8. ALL SANITARY SEWERS CROSSING WATER LINES WITH A CLEARANCE BETWEEN 12 INCHES AND 9 FEET SHALL HAVE A MINIMUM OF ONE 18' JOINT OF 150 PSI DUCTILE IRON OR (GREEN) C900 PVC PIPE MEETING ASTM SPECIFICATION D2241 CENTERED ON WATER LINE. WHEN WATER LINE IS BELOW SANITARY SEWER, PROVIDE MINIMUM 2 FOOT SEPARATION.
9. CONTRACTOR SHALL PROVIDE A MINIMUM HORIZONTAL CLEARANCE OF 9' FEET BETWEEN WATER LINES AND SANITARY SEWER MANHOLES AND LINES.
10. SANITARY SEWER MANHOLE RIMS OUTSIDE OF PROPOSED PAVING WILL BE SET 3' – 6" ABOVE THE SURROUNDING LEVEL FINISHED GRADE AFTER PAVING WITH SLOPED BACKFILL ADDED FOR STORM WATER TO DRAIN AWAY FROM MANHOLE RIM.
11. IN WET STABLE TRENCH AREAS USE BEDDING PER CITY OF HOUSTON STANDARD DETAILS DRAWIN GNUMBER 02317-02.
12. DEFLECTION TEST: DEFLECTION TESTS SHALL BE PERFORMED ON ALL FLEXIBLE AND SEMI-RIGID SEWER PIPE. THE TEST SHALL BE CONDUCTED AFTER THE FINAL BACKFILL HAS BEEN IN PLACE AT LEAST 30 DAYS. NO PIPE SHALL EXCEED A DEFLECTION OF 5% IF THE DEFLECTION TEST IS TO BE RUN USING A RIGID MANDREL. IT SHALL HAVE A DIAMETER EQUAL TO 95% OF THE INSIDE DIAMETER OF THE PIPE. THE TEST SHALL BE PERFORMED AS PER 30 TAC 217.57 LATEST AMENDMENT AND WITHOUT MECHANICAL PULLING DEVICES. NO BALL-TYPE MANDREL IS ALLOWED.
13. INFILTRATION, EXFILTRATION OR LOW-PRESSURE AIR TEST: EITHER OF THE FOLLOWING TESTS SHALL BE PERFORMED AS PER TAC, TITLE 30 217.57 WITHIN THE SPECIFIED TOLERANCES ON ALL GRAVITY SEWERS.
   A. INFILTRATION OR EXFILTRATION TEST: TOTAL LEAKAGE AS DETERMINED BY A HYDROSTATIC HEAD TEST SHALL NOT EXCEED 50 GALLONS PER INCH DIAMETER PER MILE OF PIPE PER 24 HOURS AT A MINIMUM TEST HEAD OF TWO (2) FEET.
   B. LOW-PRESSURE AIR TEST: PERFORM TEST ACCORDING TO UNI-B-6-90 OR OTHER APPROPRIATE PROCEDURES. FOR SECTIONS OF PIPE LESS THAN 36" (NOM) AVERAGE INSIDE DIAMETER. THE MINIMUM ALLOWABLE TIME FOR PRESSURE DROP FROM 3.5 P.S.I.G. TO 2.5 P.S.I.G. SHALL BE AS FOLLOWS:
      8" 340 SECONDS OR 0.855(L) FOR TEST LENGTHS GREATER THAN 398'
      8" 454 SECONDS OR 1.520(L) FOR TEST LENGTHS GREATER THAN 298'
      10" 567 SECONDS OR 2.374(L) FOR TEST LENGTHS GREATER THAN 239'
      12" 680 SECONDS OR 3.419(L) FOR TEST LENGTHS GREATER THAN 199'
      15" 850 SECONDS OR 5.342(L) FOR TEST LENGTHS GREATER THAN 159'
      18" 1020 SECONDS OR 7.893(L) FOR TEST LENGTHS GREATER THAN 133'
      WHERE L = LENGTH OF LINE OF SAME PIPE SIZE IN FEET.
14. "SAN. S. E." INDICATES 'SANITARY SEWER EASEMENT'
15. FOR SANITARY MANHOLE (MH) RIMS SET INSIDE OF OR @ CURB & GUTTER PAVEMENT AND/OR BELOW T.C., MH RIMS WILL BE SET FLUSHED WITH AN ABUTTING PAVED SURFACE. THE (VALCUN, NEENAH OR EQUAL) HEAVY DUTY BOLTED SOLID MH COVER SHALL BE PROPERLY (AND SECURELY) ATTACHED AND SEALED TO ITS COMPATIBLE GASKETED FRAME BY USING BOTH A NEOPRENE GASKET AND (AT LEAST) 4 COUNTER-SUNK HEX-HEAD COARSE THREADED ⅝"-13 UNC STAINLESS STEEL BOLTS. THE HEAVY DUTY FRAME MH COVER SHALL BE SOLID (NO AIR HOLES). SAID FRAME SHALL BE BOTH EMBEDDED INTO THE MH'S TOP ALSO SECURELY ANCHORED TO THE UNDERLYING MH STRUCTURE WITH EITHER SECURELY ATTACHED EMBEDDED ANCHOR BOLTS OR THE CONCRETE MH'S EXPOSED REBARS WELDED TO THE FRAME OR OTHER EQUALLY SECURED METHODS TO PREVENT MH COVER/FRAME BLOW-OFFS/EJECTIONS.

GUNDA CORPORATION
BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED PROFESSIONAL ENGINEER
04.1.2025

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

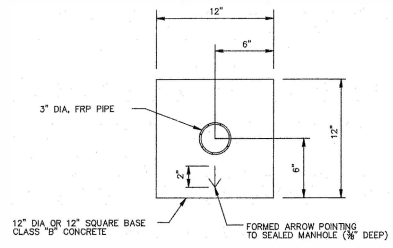
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT
SITE SANITARY DETAILS (2 OF 3)

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO. 41B OF 173	

FOR CITY OF HOUSTON USE ONLY
ACCEPTED
80367
REGISTERED ENGINEER

C-99-509B

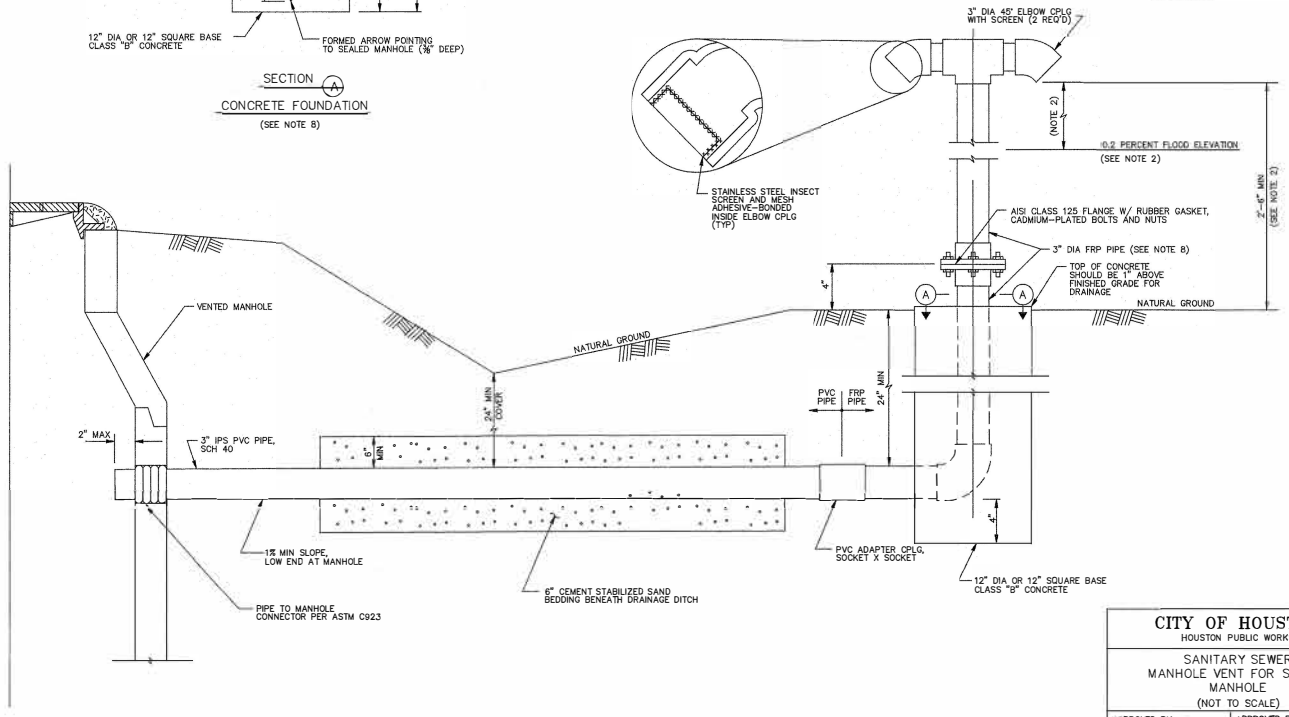
GUNDA CORPORATION
C:\Users\cross\OC\ACCDocs\Maduro, Inc\20010-02\Project Files\03-Prod\03-Dwgs\SHEETS\008 DETAILS - with GUNDA BASE.dwg Jul 01, 2025 - 3:48pm cross



SECTION (A)
CONCRETE FOUNDATION
(SEE NOTE 8)

NOTES:

1. INSTALL AT LOCATION AND BASED ON 0.2 PERCENT FLOOD ELEVATION SHOWN ON PLAN AND PROFILE DWGS.
2. MINIMUM VENT HEIGHT ELEVATION IS TO BE 2'-6" ABOVE THE NATURAL GROUND OR AS REQUIRED BY CHAPTER 19 SECTION 19-33 OF THE CITY OF HOUSTON CODE OF ORDINANCES, WHICHEVER IS HIGHER.
3. WHEN FLOODPROOFED VENTS ARE SPECIFIED BY THE EOR, REFER TO THE CONTRACT DOCUMENTS FOR CONSTRUCTION REQUIREMENTS.
4. DRAIN TO VENTED (ADJACENT) MH AT MIN 1% SLOPE. CONNECT TO MANHOLE WITH SPECIFIED CONNECTOR.
5. WHEN VENT CROSSES DRAINAGE DITCH, PROVIDE CEMENT STABILIZED SAND BEDDING
6. THE VENT IS TO BE INSTALLED WITHIN THE RIGHT OF WAY.
7. SEE COH STANDARD SPECIFICATIONS FOR PROTECTIVE COATING REQUIREMENTS FOR EXPOSED FRP PIPE.
8. THIS STANDARD DETAIL SETS THE MINIMUM REQUIREMENTS FOR THE MANHOLE VENT'S CONCRETE FOUNDATION AND VENT PIPE SIZE. THE EOR IS RESPONSIBLE FOR THE ADEQUACY AND DESIGN OF THE CONCRETE FOUNDATION AND VENT PIPE SIZE AND SHALL PROVIDE CONSTRUCTION DETAILS IN THE DRAWINGS.



CITY OF HOUSTON HOUSTON PUBLIC WORKS	
SANITARY SEWER MANHOLE VENT FOR SEALED MANHOLE (NOT TO SCALE)	
APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF HOUSTON PUBLIC WORKS
EFF DATE: JUL-01-2021	DWG NO: 02082-06

C-99-509C

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED
PROFESSIONAL ENGINEER
July 2, 2025

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT
SITE SANITARY DETAILS
(3 OF 3)

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 41C OF 173	

STATE OF TEXAS
80367
REGISTERED
PROFESSIONAL ENGINEER
HOUSTON, TEXAS

GUNDA CORPORATION
C:\Users\ctron\DC\ACCDocs\Arcadis, Inc\20010-02\Project Files\03-Prod\03-Dwgs\SHEETS\008 DETAILS - with GUNDA BASE.dwg Jul 01, 2025 - 3:48pm ctron

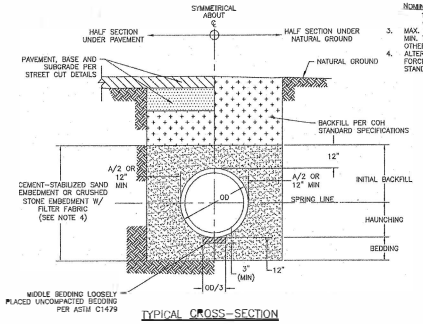
02317-03

NOTES:

1. THIS DETAIL MAY BE USED ONLY FOR DRY STABLE TRENCH CONDITIONS PER COH STANDARD. SEE COH STANDARD SPECIFICATION FOR REQUIREMENTS IN OTHER CONDITIONS.
2. MIN. TRENCH WIDTH SHALL BE PIPE OD PLUS AN ALLOWANCE "A" FOR THE NOMINAL PIPE SIZE:

NOMINAL PIPE SIZE	"A"
18" TO 30"	24"
OVER 30"	36"

3. MAX. TRENCH WIDTH SHALL BE NOT GREATER THAN MIN. TRENCH WIDTH PLUS 24 INCHES, UNLESS OTHERWISE NOTED.
4. ALTERNATIVE EMBEDMENT BACK FILL MATERIALS FOR FORCE MAINS MAY BE ALLOWED. SEE COH STANDARD SPECIFICATIONS



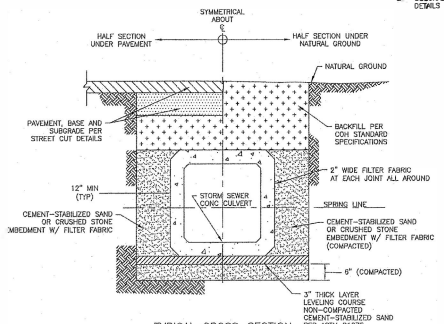
TYPICAL CROSS-SECTION

SANITARY OR STORM SEWER BEDDING AND BACKFILL FOR DRY STABLE TRENCH
NTS

02317-05

NOTES:

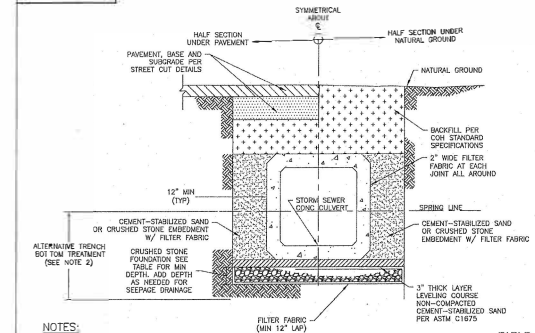
1. WHERE MULTI PLE BOX SEWERARE USED IN THE SAME TRENCH, MIN. OUTSIDE TO OUTSIDE BOX SEWER SEPERATION SHALL BE 9"
2. SUBGRADE AND PAVEMENT FOR STREET CUT DETAILS – 02951.



TYPICAL CROSS-SECTION

PRECAST CONCRETE BOX STORM SEWER BEDDING AND BACKFILL FOR DRY STABLE TRENCH
NTS

02317-06



NOTES:

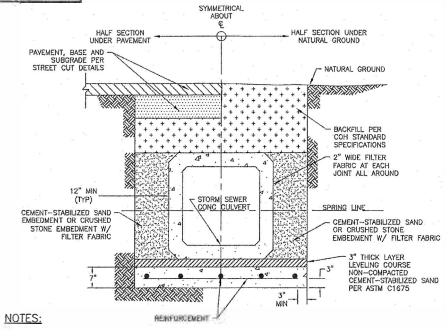
1. WHERE MULTIPLE BOX SEWER ARE USED IN THE SAME TRENCH, MIN. OUTSIDE TO OUTSIDE BOX SEWER SEPERATION SHALL BE 6".
2. ALTERNATIVE TRENCH BOTTOM TREATMENT MAY BE USED AS APPROVED BY THE CITY OF ENGINEERS AND AS PAID FOR IN THE PROPOSAL.

TABLE

CULVERT SIZE (FT)	FOUNDATION DEPTH(INCHES)
3' X 2' TO 6' X 6'	12
6' X 6' AND LARGER	18

PRECAST CONCRETE BOX STORM SEWER BEDDING AND BACKFILL FOR WET STABLE TRENCH
NTS

02317-07



NOTES:

1. WHERE MULTIPLE BOX SEWER ARE USED IN THE SAME TRENCH, MIN OUTSIDE TO OUTSIDE BOX SEWER SEPERATION SHALL BE 6"
2. REINFORCED CONCRETE SLAB PIPE BEDDING TO BE PLACED IN DRY TRENCH ONLY.
3. CONCRETE IN SLAB TO REACH MIN COMPRESSIVE STRENGTH OF 1000 PSI BASED ON MAX DESIGN BEFORE PIPE IS LAID.
4. PRECAST SEAL SLAB MAYBE USED AS APPROVED BY CITY ENGINEER.

PRECAST CONCRETE BOX STORM SEWER BEDDING AND BACKFILL WITH SEAL SLAB
NTS

FIRM INFORMATION | ENGINEER'S SEAL

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

STORM SEWER
02317-03 THROUGH 07

APPROVED BY: CITY ENGINEER | APPROVED BY: DEPUTY DIRECTOR

APPROVED BY: Carol Haddock
DIRECTOR

EFFECTIVE DATE: JUL-01-2019

FOR CITY OF HOUSTON USE ONLY

SHEET NO.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED
PROFESSIONAL ENGINEER

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT
BEDDING & BACKFILL DETAILS (1 OF 2)

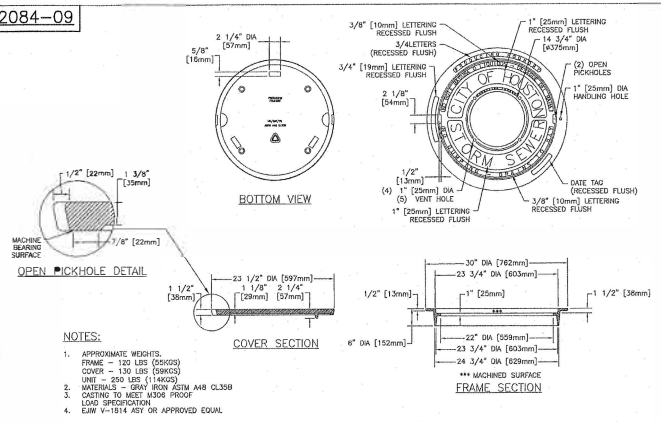
WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 42A OF 173	

ACCEPTED
80367
HOUSTON, TEXAS

C-99-510A

GUNDA CORPORATION
C:\Users\vtron\DC\ACCDocs\Arduro, Inc\20010-02\Project Files\03-Prod\03-Dwgs\SHEETS\006 DETAILS - with GUNDA BASE.dwg Jul 01, 2025 - 3:48pm ctron

02084-09

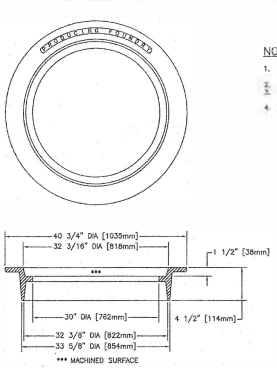


NOTES:

1. APPROXIMATE WEIGHTS.
   FRAME – 120 LBS (55KGS)
   COVER – 130 LBS (59KGS)
   UNIT – 250 LBS (114KGS)
2. MATERIALS – GRAY IRON ASTM A48 CL35B
3. CASTING TO MEET M306 PROOF LOAD SPECIFICATION
4. EJIW V-1814 ASY OR APPROVED EQUAL

STORM SEWER TYPE "C-1, C-2, C-2A" AND "H-2" INLET FRAME AND COVER
NTS

02084-10

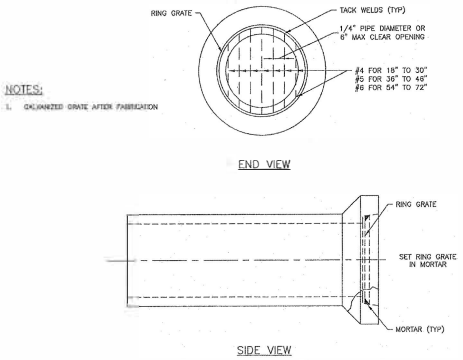


NOTES:

1. APPROXIMATE WEIGHTS.
   FRAME +- 190 LBS (86KGS)
2. MATERIALS – GRAY IRON ASTM A48 CL35B
3. CASTING TO MEET M306 PROOF LOAD SPECIFICATION
4. EJIW V-1818 ASY OR APPROVED EQUAL

32" INVERTED MANHOLE FRAME
NTS

02084-11

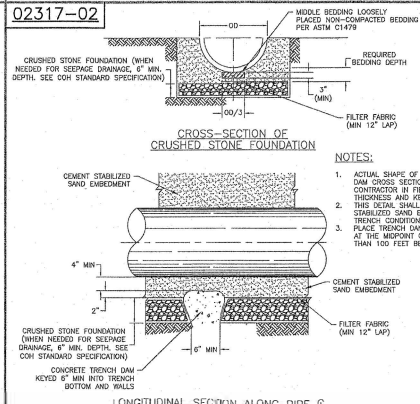


NOTES:

1. GALVANIZED GRATE AFTER FABRICATION

STORM SEWER RING GRATE FOR OPEN END OF 18" TO 72" RCP STUBS TO DITCH
NTS

02317-02



NOTES:

1. ACTUAL SHAPE OF CONCRETE TRENCH DAM CROSS SECTION MAY BE DETERMINED BY CONTRACTOR IN FIELD, MEETING MINIMUM THICKNESS AND KEY DEPTH REQUIREMENTS.
2. THIS DETAIL SHALL BE USED WITH CEMENT STABILIZED SAND EMBEDMENT, IN WET STABLE TRENCH CONDITIONS.
3. PLACE TRENCH DAMS IN CLASS I EMBEDMENTS AT THE MIDPOINT OF LINE SEGMENTS LONGER THAN 100 FEET BETWEEN MANHOLES.

SANITARY OR STORM SEWER CRUSHED STONE FOUNDATION FOR WET STABLE TRENCH
NTS

FIRM INFORMATION | ENGINEER'S SEAL

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

STORM SEWER
02084-09 THROUGH 11
AND 02317-02

APPROVED BY: CITY ENGINEER | APPROVED BY: DEPUTY DIRECTOR
APPROVED BY: DIRECTOR
EFFECTIVE DATE: JUL-01-2019
FOR CITY OF HOUSTON USE ONLY

SHEET NO.

GUNDA CORPORATION

BLACK & VEATCH

GUNDA CORPORATION
Engineers, Planners & Managers
11750 Katy Freeway, Suite 300
Houston, Texas 77079
713.541.3530 www.gundacorp.com
TBPE Registration Number: F-3531

STATE OF TEXAS
DAVID R. CASTELLANO
97308
LICENSED
PROFESSIONAL ENGINEER

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION–DISINFECTION REDESIGN
AMENDMENT
BEDDING & BACKFILL
DETAILS (2 OF 2)

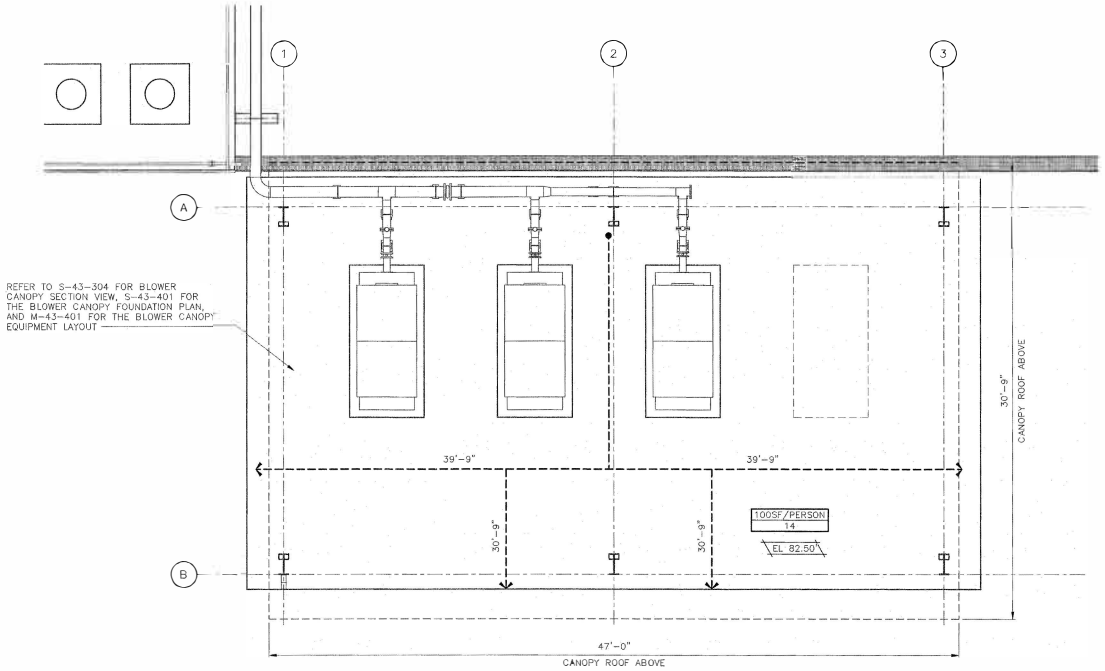
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO. 428 OF 173	

FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
80367
REGISTERED
PROFESSIONAL ENGINEER
HOUSTON, TEXAS

C-99-510B

GUNDA CORPORATION
C:\Users\ctron\DC\ACCDocs\Arduino, Inc\20010-027\Project Files\03-Prod\03-3wgs\SHEETS\008 DETAILS - with GUNDA BASE.dwg Jul 01, 2025 - 3:49pm ctron



LIFE SAFETY PLAN
1/4" = 1'-0"

N

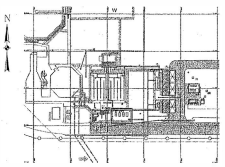
1/4" = 1'-0"

BUILDING CODE ANALYSIS

APPLICABLE CODES:	2021 INTERNATIONAL BUILDING CODE (WITH HOUSTON AMENDMENTS) 2021 INTERNATIONAL FIRE CODE (WITH HOUSTON AMENDMENTS)
BUILDING NAME : BLOWER CANOPY	
OCCUPANCY TYPE	F-1
CONSTRUCTION TYPE	II-B
ALLOWABLE AREA	15,500 SF PER STORY
ACTUAL FLOOR AREA	1,387 SF
ALLOWABLE HEIGHT	2 STORIES (55 FT)
ACTUAL HEIGHT	19'-8" FT
DESIGN OCCUPANT LOAD	14 PERSONS
REQ'D NO. OF EXITS	1
ACTUAL NO. OF EXITS	N/A - OPEN STRUCTURE
EXIT ACCESS TRAVEL DISTANCE	200 FT
ADA ACCESSIBILITY	NOT REQUIRED PER TEXAS ACCESSIBILITY STANDARDS 203.5 MACHINERY SPACES
OCCUPANCY SEPARATION	NOT REQUIRED
FIRE SPRINKLERS	NOT REQUIRED

LIFE SAFETY LEGEND

	FIRE EXTINGUISHER (FE)
X'-X"	PATH OF EGRESS TRAVEL
100SF/PERSON / 14	OCCUPANTS PER SF OCCUPANT LOAD
1	CUMULATIVE OCCUPANT LOAD
	EXIT



KEY PLAN
NO SCALE

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 256

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

REGISTERED ARCHITECT
STATE OF TEXAS

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION-DISINFECTION REDESIGN AMENDMENT

ARCHITECTURAL

BLOWER CANOPY LIFE SAFETY PLAN AND CODE ANALYSIS

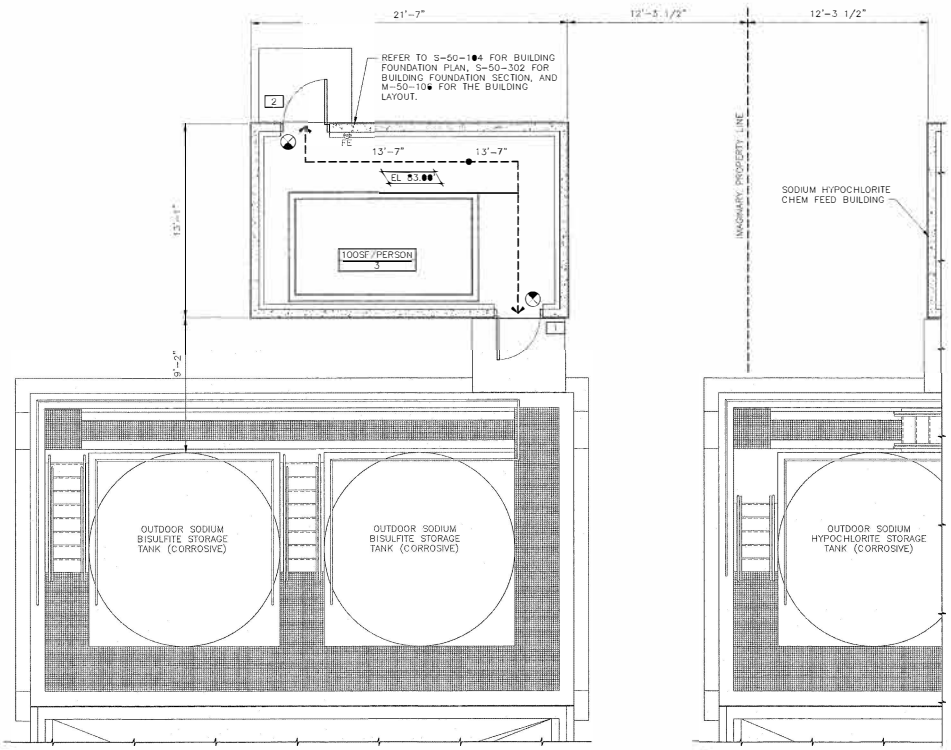
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	43 OF 173

FOR CITY OF HOUSTON USE ONLY

80367

A-43-101

FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-43-CCR-BV.rvt



SODIUM BISULFITE CHEM FEED BUILDING - LIFE SAFETY PLAN

1/4" = 1'-0"

4' 2' 0' 4' 8'

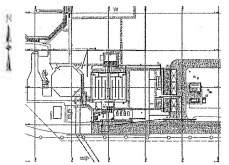
1/4" = 1'-0"

BUILDING CODE ANALYSIS

APPLICABLE CODES:	2021 INTERNATIONAL BUILDING CODE (WITH HOUSTON AMENDMENTS) 2021 INTERNATIONAL FIRE CODE (WITH HOUSTON AMENDMENTS)
BUILDING NAME : SODIUM BISULFITE CHEM FEED BUILDING	
OCCUPANCY TYPE	F-1
CONSTRUCTION TYPE	II-B
ALLOWABLE AREA	15,500 SF PER STORY
ACTUAL FLOOR AREA	280 SF
ALLOWABLE HEIGHT	2 STORIES (55 FT)
ACTUAL HEIGHT	9 FT
DESIGN OCCUPANT LOAD	3 PERSONS
REQ'D NO. OF EXITS	1 EXIT
ACTUAL NO. OF EXITS	2 EXITS
EXIT ACCESS TRAVEL DISTANCE	200 FT
ADA ACCESSIBILITY	NOT REQUIRED PER TEXAS ACCESSIBILITY STANDARDS 203.5 MACHINERY SPACES
OCCUPANCY SEPARATION	NOT REQUIRED
FIRE SPRINKLERS	NOT REQUIRED
EXTERIOR SEPARATION DISTANCE	12'3 1/2", COMPLIES WITH IBC TABLE 705.5 (10'-0" MIN.)
CORROSIVE MATERIAL	OUTDOOR STORAGE COMPLIES WITH IFC SECTION 5404.2.2: CHEM FEED BUILDING IS ASSOCIATED WITH DISTRIBUTION OF CHEMICAL

LIFE SAFETY LEGEND

FE	FIRE EXTINGUISHER (FE)
X'-X"	PATH OF EGRESS TRAVEL
100SF/PERSON / 3	OCCUPANTS PER SF OCCUPANT LOAD
1	CUMULATIVE OCCUPANT LOAD
	EXIT



KEY PLAN
NO SCALE

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

REGISTERED ARCHITECT SHAHIDUR RAHMAN STATE OF TEXAS

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT

ARCHITECTURAL

LIFE SAFETY PLAN & CODE ANALYSIS

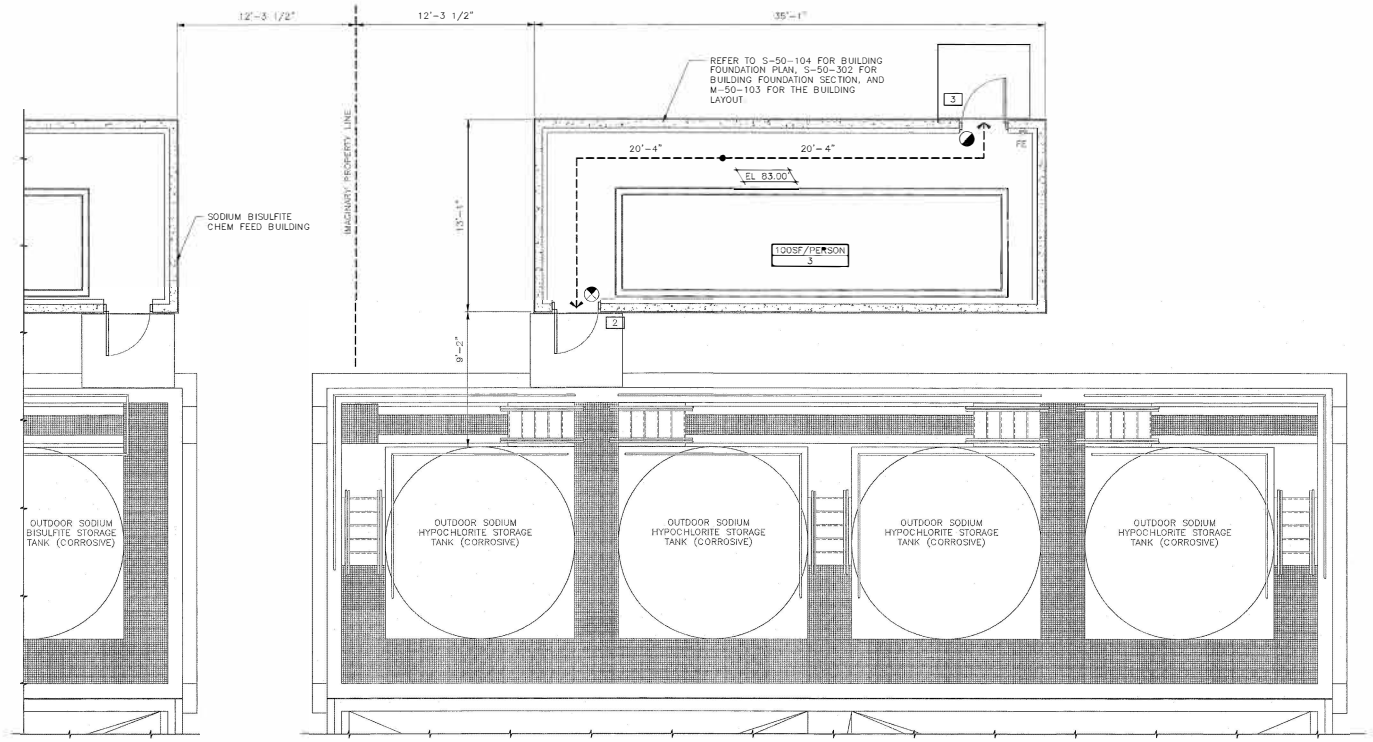
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	44 OF 173

FOR CITY OF HOUSTON USE ONLY

80367

A-50-101

FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-50-CHEM_STOR-BV.rvt



SODIUM HYPOCHLORITE CHEM FEED BUILDING - LIFE SAFETY PLAN

1/4" = 1'-0"

N

4' 2' 0' 4' 8'

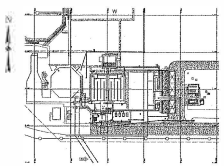
1/4" = 1'-0"

BUILDING CODE ANALYSIS

APPLICABLE CODES:	2021 INTERNATIONAL BUILDING CODE (WITH HOUSTON AMENDMENTS) 2021 INTERNATIONAL FIRE CODE (WITH HOUSTON AMENDMENTS)
BUILDING NAME	SODIUM HYPOCHLORITE CHEM FEED BUILDING
OCCUPANCY TYPE	F-1
CONSTRUCTION TYPE	II-B
ALLOWABLE AREA	15,500 SF PER STORY
ACTUAL FLOOR AREA	455 SF
ALLOWABLE HEIGHT	2 STORIES (55 FT)
ACTUAL HEIGHT	9 FT
DESIGN OCCUPANT LOAD	5 PERSONS
REQ'D NO. OF EXITS	1 EXIT
ACTUAL NO. OF EXITS	2 EXITS
EXIT ACCESS TRAVEL DISTANCE	200 FT
ADA ACCESSIBILITY	NOT REQUIRED PER TEXAS ACCESSIBILITY STANDARDS 203.5 MACHINERY SPACES
OCCUPANCY SEPARATION	NOT REQUIRED
FIRE SPRINKLERS	NOT REQUIRED
EXTERIOR SEPARATION DISTANCE	12' 3 1/2", COMPLIES WITH IBC TABLE 705.5 (10'-0" MIN.)
CORROSIVE MATERIAL	OUTDOOR STORAGE COMPLIES WITH IFC SECTION 5404.2.2: CHEM FEED BUILDING IS ASSOCIATED WITH DISTRIBUTION OF CHEMICAL

LIFE SAFETY LEGEND

FE	FIRE EXTINGUISHER (FE)
X'-X"	PATH OF EGRESS TRAVEL
100SF/PERSON / 3	OCCUPANTS PER SF OCCUPANT LOAD
1	CUMULATIVE OCCUPANT LOAD
	EXIT



KEY PLAN
NO SCALE

A-50-102

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

REGISTERED ARCHITECT
SHAHIDUR RAHMAN
STATE OF TEXAS

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT

ARCHITECTURAL

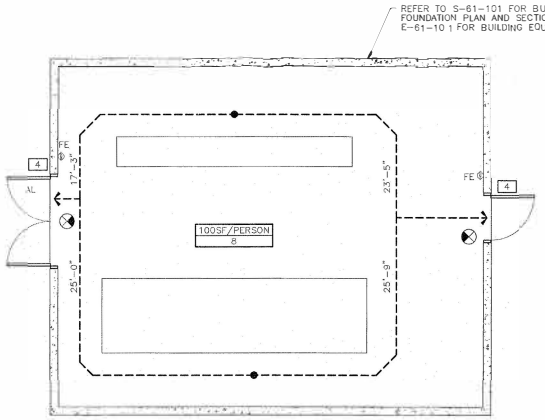
LIFE SAFETY PLAN & CODE ANALYSIS

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	45 OF 173

FOR CITY OF HOUSTON USE ONLY

REGISTERED ARCHITECT
80367
STATE OF TEXAS

FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-50-C-HEM_STRM-ebv.rvt



LIFE SAFETY PLAN

1/4" = 1'-0"

N

4' 2' 0' 4' 8'

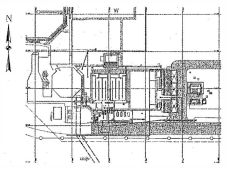
1/4" = 1'-0"

BUILDING CODE ANALYSIS

APPLICABLE CODES:	2021 INTERNATIONAL BUILDING CODE (WITH HOUSTON AMENDMENTS) 2021 INTERNATIONAL FIRE CODE (WITH HOUSTON AMENDMENTS)
BUILDING NAME : CCB ELECTRICAL BUILDING	
OCCUPANCY TYPE	F-1
CONSTRUCTION TYPE	II-B
ALLOWABLE AREA	15,500 SF PER STORY
ACTUAL FLOOR AREA	720 SF
ALLOWABLE HEIGHT	2 STORIES (55 FT)
ACTUAL HEIGHT	15 FT
DESIGN OCCUPANT LOAD	8 PERSONS
REQ'D NO. OF EXITS	2 EXITS (PER NEC 110.26.C)
ACTUAL NO. OF EXITS	2 EXITS
EXIT ACCESS TRAVEL DISTANCE	200 FT
ADA ACCESSIBILITY	NOT REQUIRED PER TEXAS ACCESSIBILITY STANDARDS 203.5 MACHINERY SPACES
OCCUPANCY SEPARATION	NOT REQUIRED
FIRE SPRINKLERS	NOT REQUIRED

LIFE SAFETY LEGEND

AL	ACTIVE LEAF
FE	FIRE EXTINGUISHER (FE)
X'-X"	PATH OF EGRESS TRAVEL
100SF/PERSON / 8	OCCUPANTS PER SF OCCUPANT LOAD
1	CUMULATIVE OCCUPANT LOAD
	EXIT



KEY PLAN
NO SCALE

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

REGISTERED ARCHITECT
STATE OF TEXAS

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT

ARCHITECTURAL

CCB ELECTRICAL BUILDING LIFE SAFETY PLAN AND CODE ANALYSIS

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	46 OF 173

FOR CITY OF HOUSTON USE ONLY

80367

A-61-101

FILE PATH: BIM 360://4●2500 - COH Intercontinental Airport WWTP Improvements/402500-61-CC_ELEC_BLDG-BIM.rvt

STRUCTURAL NOTES

GENERAL

1. THE APPLICABLE BUILDING CODE IS INDICATED ON THE LOADING CRITERIA DRAWING.
2. THE REQUIREMENTS INDICATED ON THIS SHEET ARE INTENDED AS A BASIC SUMMARY OF THE MATERIAL AND CONSTRUCTION REQUIREMENTS FOR THE PROJECT. ADDITIONAL, MORE STRINGENT REQUIREMENTS ARE GIVEN IN THE PROJECT DETAIL DRAWINGS AND SPECIFICATIONS.
3. ALL STRUCTURAL RELATED SHOP DRAWINGS SHALL BE REVIEWED BY THE ENGINEER PRIOR TO CONSTRUCTION.
4. STRUCTURES MAY BE BUOYANT WHEN EMPTY DURING CONSTRUCTION. CONTRACTOR SHALL PROTECT STRUCTURES AGAINST FLOTATION UNTIL CONSTRUCTION IS COMPLETE.
5. STRUCTURES MAY BE UNSTABLE UNTIL THEY ARE CONSTRUCTED IN THEIR ENTIRETY. CONTRACTOR IS RESPONSIBLE FOR DESIGNING TEMPORARY STRUCTURAL SUPPORTS TO RESIST WIND LOADS, CONSTRUCTION LOADS, AND ANY OTHER TEMPORARY CONDITIONS THAT MAY OCCUR DURING CONSTRUCTION, IN ORDER TO MAINTAIN STABILITY OF THE CONSTRUCTION WORK. ANCHORS FOR CONTRACTOR'S TEMPORARY SUPPORT SYSTEMS THAT ATTACH TO CONCRETE OR MASONRY SHALL BE LOCATED TO AVOID DAMAGING EMBEDDED REINFORCEMENT OR UTILITIES.

CAST-IN-PLACE CONCRETE

1. A MINIMUM 28 DAY COMPRESSIVE STRENGTH (f'c) OF 4,000 PSI WAS UTILIZED IN THE DESIGN OF STRUCTURAL REINFORCED CONCRETE. SEE SPECIFICATIONS FOR CONSTRUCTION STRENGTH REQUIREMENTS.
2. THE LOCATION OF ALL CONSTRUCTION JOINTS AND OTHER TYPES OF JOINTS, OTHER THAN THOSE SPECIFIED OR SHOWN ON THE PLANS, SHALL BE ACCEPTABLE TO THE ENGINEER PRIOR TO PLACING CONCRETE.

REINFORCING STEEL

1. ALL REINFORCING BAR SHALL BE GRADE 60, DEFORMED, ASTM A615, UNLESS NOTED OTHERWISE.
2. DIMENSIONS TO REINFORCING BARS ARE TO BAR CENTERLINES, UNLESS NOTED OTHERWISE. BAR COVER IS THE CLEAR DISTANCE BETWEEN THE BAR AND THE CONCRETE SURFACE.
3. NO WELDING OF REINFORCING BARS SHALL BE PERMITTED UNLESS APPROVAL IS OBTAINED FROM THE ENGINEER PRIOR TO CONSTRUCTION.
4. FOR CONCRETE SLABS THAT HAVE A SLOPING TOP FACE, THE TOP LAYERS OF REINFORCEMENT SHALL BE PLACED ON A SIMILAR SLOPE SO THAT SPECIFIED COVER IS MAINTAINED.

POST-INSTALLED ANCHORS

1. POST-INSTALLED ANCHORS SHALL INCLUDE ADHESIVE ANCHORS (THREADED RODS, BOLTS OR REINFORCING BARS), EXPANSION ANCHORS, AND UNDERCUT ANCHORS INSTALLED INTO HARDENED CONCRETE OR MASONRY. SEE THE ANCHORAGE IN CONCRETE AND MASONRY SPECIFICATION SECTION FOR ADDITIONAL REQUIREMENTS.
2. POST-INSTALLED ANCHORS SHALL ONLY BE USED WHERE INDICATED ON THE DRAWINGS. CONTRACTOR SHALL OBTAIN APPROVAL FROM ENGINEER PRIOR TO USING POST-INSTALLED ANCHORS FOR MISSING OR MISPLACED CAST-IN-PLACE ANCHORS.
3. CARE SHALL BE TAKEN TO AVOID CONFLICTS WITH EXISTING REINFORCING STEEL AND OTHER EMBEDDED ITEMS WHEN DRILLING HOLES. REINFORCING BARS SHALL NOT BE DAMAGED DURING DRILLING OR ANCHOR INSTALLATION. HOLES SHALL BE DRILLED AND CLEANED PER THE PRODUCT MANUFACTURER'S INSTRUCTIONS. ANCHORS SHALL BE INSTALLED PER THE PRODUCT MANUFACTURER'S INSTRUCTIONS AT NOT LESS THAN MINIMUM EDGE DISTANCES AND/OR SPACING INDICATED IN THE MANUFACTURER'S LITERATURE.
4. SUBSTITUTION REQUESTS FOR PRODUCTS OTHER THAN THOSE LISTED IN THE SPECIFICATION OR INDICATED ON THE DRAWINGS SHALL BE SUBMITTED TO ENGINEER FOR REVIEW AND APPROVAL. PRODUCT ICC-ESR EVALUATION REPORTS SHALL BE INCLUDED WITH THE SUBMITTAL PACKAGE. IF REQUESTED, CALCULATIONS PREPARED BY A REGISTERED PROFESSIONAL ENGINEER USING METHODS AND PROCEDURES REQUIRED BY THE BUILDING CODE MAY BE REQUIRED AS PART OF THE SUBMITTAL PACKAGE.
5. UNLESS NOTED OTHERWISE, THE MINIMUM EMBEDMENT PROVIDED FOR ADHESIVE ANCHORED REINFORCING BARS SHALL DEVELOP THE FULL TENSILE STRENGTH OF THE BAR.
6. SPECIAL INSPECTION WILL BE PROVIDED FOR ALL POST-INSTALLED ANCHORS.

STAINLESS STEEL

1. STAINLESS STEEL BOLTS SHALL CONFORM TO ASTM F593, ALLOY GROUP 1 OR 2, UNLESS NOTED OTHERWISE. MINIMUM YIELD STRENGTH SHALL BE 45 KSI.
2. STAINLESS STEEL PLATES SHALL CONFORM TO ASTM A240, TYPE 316L.
3. STAINLESS STEEL STRUCTURAL SHAPES SHALL CONFORM TO ASTM A1069 OR ASTM A276, TYPE 316L.

ALUMINUM

1. UNLESS NOTED OTHERWISE, ALUMINUM ALLOY IN ALL ALUMINUM STRUCTURAL MATERIALS SHALL BE 6061-T6. PIPE AND TUBING FOR GUARDRAIL AND HANDRAIL SHALL BE ALLOY 6061-T6 OR 6005A-T61.
2. ALL ALUMINUM SURFACES IN CONTACT WITH CONCRETE OR DISSIMILAR METALS SHALL BE COATED OR COVERED WITH A HEAVY COAT OF BITUMINOUS PAINT TO PREVENT ALUMINUM-CONCRETE REACTION OR ELECTROLYTIC ACTION.

STRUCTURAL STEEL

1. ROLLED WIDE FLANGE SHAPES SHALL HAVE A MINIMUM YIELD STRENGTH OF 50 KSI;
   CHANNELS, PLATES, AND ANGLES A MINIMUM OF 36 KSI;
   STRUCTURAL PIPES A MINIMUM OF 35 KSI;
   ROUND STRUCTURAL TUBES A MINIMUM OF 46 KSI;
   RECTANGULAR STRUCTURAL TUBES A MINIMUM OF 50 KSI.
2. WELDING SHALL BE DONE WITH A FILLER MATERIAL HAVING A MINIMUM TENSILE STRENGTH OF 70 KSI.
3. BOLTED CONNECTIONS SHALL USE 3/4" DIA ASTM F3125, GRADE A325 BOLTS OR GRADE F1852 TWIST-OFF BOLTS, WITH THE THREADS EXCLUDED FROM THE SHEAR PLANE, UNLESS NOTED OTHERWISE.
4. CARBON STEEL OR GALVANIZED STEEL ANCHOR RODS AND ANCHOR BOLTS SHALL CONFORM TO ASTM F1554 GRADE 36.
5. HOLES FOR ANCHOR RODS AND ANCHOR BOLTS IN COLUMN BASE PLATES USING ASTM F844 OR F436 FLAT CIRCULAR WASHERS SHALL BE AS FOLLOWS:

   BOLTS/RODS 3/4" TO 1" – 5/16" OVERSIZE
   BOLTS/RODS 1" TO 2" – 1/2" OVERSIZE
   BOLTS/RODS OVER 2" – 1" OVERSIZE

   AT THE CONTRACTORS OPTION, OVERSIZE HOLES LARGER THAN THOSE LISTED ABOVE MAY BE USED, PROVIDED THAT 3/8" PLATE WASHERS ARE USED WITH STANDARD HOLES AND FIELD WELDED WITH A 5/16" FILLET WELD TO THE BASE PLATE ALONG A MIN OF 3 SIDES.
5. STEEL LEGEND

   INDICATES TWO BOLT ATTACHMENT OF HORIZONTAL BRACING TO UNDERSIDE OF BEAM. SHIM AS REQUIRED

   INDICATES ANGLE OR PLATE TO BE WELDED ON THREE SIDES

   INDICATES FOUR BOLT ATTACHMENT OF MONORAIL TO UNDERSIDE OF SUPPORT BEAM. SPACER OR STANDOFF DETAIL AS REQUIRED

   (1) INDICATES NONSTANDARD FRAMING CONNECTION

   XXX INDICATES HORIZONTAL OR VERTICAL BRACING CONNECTION DETAIL

   INDICATES MOMENT CONNECTION

   VERTICAL BRACING IS SHOWN ON PLAN THUS:

   EXTENDING UP FROM THE ELEVATION INDICATED

   EXTENDING DOWN FROM THE ELEVATION INDICATED

   EXTENDING UP AND DOWN FROM THE ELEVATION INDICATED

EXCAVATION, BACKFILL, AND FOUNDATIONS

1. FOUNDATION CONSTRUCTION SHALL NOT BEGIN UNTIL ANY REQUIRED SPECIAL INSPECTION HAS BEEN COMPLETED AND THE CONTRACTOR NOTIFIED TO PROCEED.
2. TO FACILITATE SCHEDULING, AT LEAST 48 HOURS ADVANCE NOTICE SHALL BE GIVEN TO THE ENGINEER PRIOR TO THE REQUIRED INSPECTIONS.
3. UNLESS NOTED OTHERWISE, BACKFILL SHALL NOT BE PLACED AGAINST WALLS WHICH SUPPORT A CONCRETE SLAB OR WALKWAY UNTIL THE TOP SLAB OR WALKWAY HAS BEEN PLACED IN ITS ENTIRETY AND ALL CONCRETE HAS REACHED THE SPECIFIED DESIGN STRENGTH.
4. OVER-EXCAVATION OF SOIL, OR OVER-BREAKING OF ROCK, THAT WOULD RESULT IN A STRUCTURAL CONCRETE THICKNESS GREATER THAN INDICATED ON THE DRAWINGS SHALL BE CLASSIFIED AS UNAUTHORIZED EXCAVATION. CONTRACTOR SHALL SELECT ONE OF TWO METHODS TO ADDRESS UNAUTHORIZED EXCAVATION.

   REPLACE UNAUTHORIZED EXCAVATION MATERIAL WITH LEAN CONCRETE THAT IS PLACED SEPARATELY FROM THE STRUCTURAL CONCRETE INDICATED ON THE DRAWINGS. CONTRACTOR WILL RECEIVE NO ADDITIONAL PAYMENT FOR THE LEAN CONCRETE.

   REPLACE UNAUTHORIZED EXCAVATION MATERIAL WITH STRUCTURAL CONCRETE THAT IS PLACED MONOLITHICALLY WITH THE STRUCTURAL CONCRETE INDICATED ON THE DRAWINGS, CREATING AN ENLARGED SECTION. CONTRACTOR SHALL NOTIFY ENGINEER FOR DIRECTION PRIOR TO PERFORMING THIS WORK. THE INCREASED CONCRETE THICKNESS MAY REQUIRE ADDITIONAL REINFORCEMENT AND/OR OTHER DESIGN MODIFICATIONS. IF THE INCREASED CONCRETE THICKNESS EXCEEDS 36 INCHES, ENGINEER MAY REQUIRE CONTRACTOR TO IMPLEMENT MASS CONCRETE HEAT MITIGATION PROCEDURES. CONTRACTOR WILL RECEIVE NO ADDITIONAL PAYMENT FOR EXTRA STRUCTURAL CONCRETE, ADDITIONAL REINFORCEMENT, OTHER DESIGN MODIFICATIONS, OR MASS CONCRETING PROCEDURES.
5. THE FOLLOWING BEARING CAPACITIES WERE UTILIZED IN THE DESIGN OF THE FOUNDATIONS.

   CHEMICAL CONTAINMENT STRUCTURES.....3000 PSF NET ALLOWABLE
   CHEMICAL FEED BUILDING FOUNDATIONS.....3000 PSF NET ALLOWABLE
   ELECTRICAL BUILDING FOUNDATION.....3000 PSF NET ALLOWABLE
   INFLUENT JUNCTION BOX MAT FOUNDATION.....3500 PSF NET ALLOWABLE
   CHLORINE CONTACT BASIN.....3500 PSF NET ALLOWABLE

6. FOUNDATION DESIGN IS BASED ON THE GEOTECHNICAL REPORT FOR THIS PROJECT BY GEOTECHNICAL ENGINEERING AND TESTING DATED JANUARY 5TH, 2022 AND SEALED BY SHAILESH "JAMES" NAMEKAR ON FEBRUARY 10TH, 2022.

EXISTING STRUCTURES

1. THE DRAWINGS DEPICT WORK AT EXISTING STRUCTURES. ALL DIMENSIONS AND ALL DEPICTIONS SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO ORDERING MATERIALS, STARTING FABRICATION, OR STARTING CONSTRUCTION.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE, REPAIRS OR STRUCTURAL MODIFICATIONS THAT ARE REQUIRED DUE TO DEMOLITION BEYOND THE LIMITS IDENTIFIED IN THE DRAWINGS.
3. REINFORCEMENT FOR ANY EXISTING CONCRETE OR MASONRY ELEMENT SHALL NOT BE DAMAGED UNLESS THE ELEMENT IS TO BE DEMOLISHED. WHEN LOCATING EXISTING REINFORCEMENT IS REQUIRED, IT SHALL BE LOCATED USING NON-DESTRUCTIVE METHODS. REINFORCING STRANDS IN EXISTING PRESTRESSED CONCRETE SHALL NOT BE CUT UNLESS INDICATED ON THE DRAWINGS OR OTHERWISE AUTHORIZED BY THE ENGINEER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE, REPAIRS OR STRUCTURAL MODIFICATIONS THAT ARE REQUIRED DUE TO DAMAGE OF CONCRETE, MASONRY OR REINFORCEMENT THAT HAS BEEN IDENTIFIED ON THE DRAWINGS TO REQUIRE FIELD VERIFICATION.
4. CORE DRILLING AND SAW CUTTING SHALL NOT BE PERFORMED UNLESS INDICATED ON THE DRAWINGS OR APPROVED BY ENGINEER.
5. EXPOSED CONCRETE SURFACES THAT REMAIN AFTER DEMOLITION SHALL BE REPAIRED TO MATCH ADJACENT CONCRETE SURFACES.
6. UNLESS OTHERWISE INDICATED ON THE DRAWINGS, EXPOSED CONCRETE SURFACES WITH REINFORCEMENT, ANCHOR BOLTS, HANGER RODS, OR OTHER EXPOSED METAL EMBEDMENTS SHALL BE REPAIRED BY CUTTING OFF THE METAL AT THE FACE OF THE CONCRETE, GRINDING SMOOTH, AND COATING. COATING SHALL EXTEND A MINIMUM OF 1" BEYOND THE EDGE OF ANY EXPOSED METAL.

SPECIAL INSPECTIONS

1. CODE REQUIRED SPECIAL INSPECTIONS AND TESTS WILL BE CONDUCTED BY APPROVED AGENCIES EMPLOYED BY THE OWNER IN ACCORDANCE WITH THE APPLICABLE BUILDING CODE.
2. THE STATEMENT OF SPECIAL INSPECTIONS WILL BE PREPARED BY THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE DURING CONSTRUCTION.
3. EACH CONTRACTOR RESPONSIBLE FOR THE CONSTRUCTION OF A MAIN WIND OR SEISMIC FORCE RESISTING SYSTEM, DESIGNATED SEISMIC SYSTEM OR A WIND OR SEISMIC RESISTING COMPONENT LISTED IN THE STATEMENT OF SPECIAL INSPECTIONS SHALL SUBMIT A WRITTEN STATEMENT OF RESPONSIBILITY TO THE BUILDING OFFICIAL AND OWNER PRIOR TO COMMENCEMENT OF WORK ON THE SYSTEM OR COMPONENT.
4. SEE THE QUALITY CONTROL SECTION AND THE CODE REQUIRED SPECIAL INSPECTIONS AND PROCEDURES SECTION OF THE SPECIFICATIONS FOR FURTHER CLARIFICATION OF RESPONSIBILITIES.

DELEGATED DESIGN

1. THE FOLLOWING ITEMS ARE IDENTIFIED IN THE DRAWINGS AND SPECIFICATIONS AS BEING DESIGNED AND SEALED BY OTHERS. SUBMITTALS FOR THESE ITEMS SHALL BE PREPARED BY THE SUPPLIERS AND SUBMITTED TO ENGINEER AND CODE OFFICIAL FOR REVIEW.

   SECTION 01612 – EQUIPMENT AND NON-STRUCTURAL COMPONENTS.
   SECTION 05520 – METAL RAILINGS.
   SECTION 05550 – EQUIPMENT ANCHORAGE.
   SECTION 05590 – METAL STAIRS.
   SECTION 13120 – PRECAST SEGMENTAL CONCRETE BUILDING.
   SECTION 13122 – METAL BUILDING SYSTEMS.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER: 258

SURVEYED BY:
UNITED ENGINEERS, INC
FB NO. P-6182

STATE OF TEXAS – JEFFREY C. WOOD – 116686 – LICENSED – PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT

STRUCTURAL
STRUCTURAL NOTES

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	47 OF 173

FOR CITY OF HOUSTON USE ONLY

ACCEPTED NOTED – 80367 – HOUSTON, TEXAS

S-00-001

FILE PATH: BIM 360://402500 - CON Intercontinental Airport WWTP Improvements/402500-GENERAL_V2019.rvt

BASIC LOADING CRITERIA

THE APPLICABLE BUILDING CODE IS THE 2021 INTERNATIONAL BUILDING CODE (IBC)

1. DEAD LOAD ..... CALCULATED

2. LIVE LOADS:
   - OPERATING AND PROCESS FLOORS ..... 150 PSF
   - STAIRS, SERVICE PLATFORMS & LANDINGS ..... 100 PSF
   - ELECTRICAL AND CONTROL ROOM FLOORS ..... 250 PSF
   - CHEMICAL STORAGE ROOMS ..... 250 PSF
   - STORAGE ..... 250 PSF
   - ALL FLOORS NOT INDICATED ..... 100 PSF
   - ROOF ..... 20 PSF(UNREDUCED)

3. LATERAL EARTH PRESSURE (EQUIVALENT FLUID PRESSURE)
   - NON-SATURATED ..... 90 PSF/FT
   - SATURATED ..... 95 PSF/FT

4. LATERAL SURCHARGE ..... EQUIVALENT TO 2 FEET OF SOIL WHERE ADJACENT TO A ROADWAY

5. COMPACTIVE SURCHARGE LOAD ..... 400 PSF AT FINISH GRADE ELEVATION DECREASING LINEARLY AT SAME RATE AS BACKFILL LOAD INCREASES. FOR WALLS 8 FEET OR LESS IN HEIGHT, USE CRITERIA 4 ABOVE AS COMPACTIVE SURCHARGE



6. HYDROSTATIC FLUID PRESSURE ..... 63 PSF/FT

7. SNOW LOAD:
   - GROUND SNOW LOAD (P_g) ..... 5 PSF
   - SNOW EXPOSURE FACTOR (C_e) 1.0

8. SEISMIC LOAD:
   - MAPPED MCE SHORT PERIOD SPECTRAL RESPONSE ACCELERATION (S_S) 0.069g
   - MAPPED MCE ONE SECOND PERIOD SPECTRAL RESPONSE ACCELERATION (S_1) 0.040g
   - DESIGN SPECTRAL RESPONSE ACCELERATION AT SHORT PERIODS (S_{DS}) 0.074g
   - DESIGN SPECTRAL RESPONSE ACCELERATION AT ONE SECOND PERIOD (S_{D1}) 0.064g
   - SITE CLASS ..... D

9. WIND LOAD:
   - ULTIMATE DESIGN WIND SPEED ..... 141 MPH
   - NOMINAL DESIGN WIND SPEED ..... 109 MPH
   - EXPOSURE C

10. 500 YEAR FLOOD ELEVATION ..... EL 79.00 USGS

NOTE: FOR GUARDRAIL LOADINGS REFER TO DRAWINGS S-98-506 AND THE METAL RAILINGS SPECIFICATION. FOR STAIR LOADINGS REFER TO S-99-505 AND THE STRUCTURAL METALS SPECIFICATION.

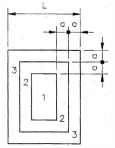
SNOW LOADING CRITERIA FOR BUILDINGS	
RISK CATEGORY	III
FLAT-ROOF SNOW LOAD (PF), PSF	5.5
SNOW DRIFT SURCHARGE LOAD (Pd), PSF	11.7
SNOW DRIFT WIDTH (W), FEET	3.19
SNOW IMPORTANCE FACTOR (Is)	1.1
THERMAL FACTOR (C_t)	1.2

SEISMIC LOADING CRITERIA FOR BUILDINGS	
RISK CATEGORY	III
SEISMIC IMPORTANCE FACTOR	1.25
SEISMIC DESIGN CATEGORY	A

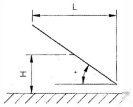
SEISMIC LOAD DOES NOT GOVERN WIND LOAD CONTROLS

BLOWER CANOPY				
INTERNAL PRESSURE COEFFICIENT		NOT APPLICABLE		
DIMENSION "a"		3 FT		
ROOF TYPE		MONOSLOPE FREE ROOF		
COMPONENT AND CLADDING WIND PRESSURES, PSF				
EFFECTIVE WIND AREA (SQR FT) →		≤=a²	≥a², ≤4.0a²	≥4.0a²
ROOF INTERIOR ZONE	(+)	66.0	66.0	66.0
	(-)	-77.0	-77.0	-77.0
ROOF EDGE ZONE	(+)	99.0	99.0	66.0
	(-)	-187.0	-118.0	-77.0
ROOF CORNER ZONE	(+)	132.0	99.0	66.0
	(-)	-154.0	-118.0	-77.0

1. POSITIVE PRESSURES ACT TOWARDS THE SURFACE. NEGATIVE PRESSURES ACT AWAY FROM THE SURFACE.
2. LINEARLY INTERPOLATE PRESSURES FOR EFFECTIVE WIND AREAS BETWEEN THOSE SCHEDULED OR USE PRESSURES FOR THE SMALLER EFFECTIVE WIND AREA.
3. ALL ROOF OVERHANG PRESSURES ACT UPWARD.
4. SOFFITS BELOW ROOF OVERHANGS ARE DESIGNED FOR THE WINDWARD PRESSURE ON THE WALL BELOW THE SOFFIT.



ROOF PLAN
(MONOSLOPE FREE ROOF)



ROOF ELEVATION

COMPONENTS AND CLADDING WIND LOAD CRITERIA FOR BUILDINGS

NO SCALE

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 951-1100
TX FIRM NUMBER 256

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS — JEFFREY A. BOSS — 116686 — LICENSED PROFESSIONAL ENGINEER

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT

STRUCTURAL

STRUCTURAL LOADING CRITERIA

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	48 OF 173

FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS — 80367 — REGISTERED — HOUSTON, TEXAS

S-00-002

FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-GENERAL_V0.2.rvt

STRUCTURAL ABBREVIATIONS

A

ADDL	ADDITIONAL
AFF	ABOVE FINISH FLOOR
AHR	ANCHOR
ALT	ALTERNATE
ALUM	ALUMINUM
APPROX	APPROXIMATE
ARCH	ARCHITECTURAL
AROD	ANCHOR ROD
ASSY	ASSEMBLY
AWG	AMERICAN WIRE GAUGE

B

BLDG	BUILDING
BM	BENCHMARK, BEAM
BO	BOTTOM OF
BOT	BOTTOM
BRDG	BRIDGING
BRG	BEARING
BTWN	BETWEEN

C

C	CAMBER
CANTIL	CANTILEVER
CHKD	CHECKERED
CHKDPL	CHECKERED PLATE
CIP	CAST-IN-PLACE
CJ	CONTRACTION JOINT
CJP	COMPLETE JOINT PENETRATION
CL	CENTERLINE
CLR	CLEAR
CMU	CONCRETE MASONRY UNIT
COL	COLUMN
CONC	CONCRETE
CONN	CONNECTION
CONSTR	CONSTRUCTION
CONT	CONTINUOUS,CONTINUATION, CONTROL
COORD	COORDINATE
COV	COVER
CRNR	CORNER
CSJ	CONSTRUCTION JOINT
CTRD	CENTERED
CTRS	CENTERS

D

db	BAR DIAMETER
DBA	DEFORMED BAR ANCHOR
DET	DETAIL
DIA	DIAMETER
DIAG	DIAGONAL
DIM	DIMENSION
DN	DOWN
DWA	DEFORMED WIRE ANCHOR
DWG(S)	DRAWING, DRAWINGS
DWL(S)	DOWEL, DOWELS

E

E	EAST
EA	EACH
EE	EACH END
EF	EACH FACE
EJ	EXPANSION JOINT
EL	ELEVATION
EMBED	EMBEDMENT
EMER	EMERGENCY
ENGR	ENGINEER
EQ	EQUAL
EQUIP	EQUIPMENT
EQUIV	EQUIVALENT
EW	EACH WAY
EXIST	EXISTING
EXP	EXPANSION
EXT	EXTERIOR

F

FAB	FABRICATE
f'c	28 DAY CONCRETE STRENGTH =
FD	FLOOR DRAIN
FDN	FOUNDATION
FIN	FINISH(ED)
FLR	FLOOR
FLT	FLAT
FS	FAR SIDE
FT	FOOT
FTG	FOOTING
FUT	FUTURE
FV	FIELD VERIFY
Fy	STRUCTURAL STEEL YIELD STRENGTH =
fy	REINFORCING STEEL YIELD STRENGTH =

G

GA	GAUGE
GALV	GALVANIZED
GEN	GENERAL
GR	GRADE

H

H	HORIZONTAL REACTION
HC	HOLLOW CORE
HCA	HEADED CONCRETE ANCHOR
HEX	HEXAGONAL
HGR	HANGER
HORIZ	HORIZONTAL
HP	HIGH POINT
HSS	HOLLOW STRUCTURAL SECTION

I

ID	INSIDE DIAMETER
IF	INSIDE FACE
IN	INCHES
INT	INTERIOR, INTERNAL
INV	INVERT

J

JT	JOINT

K

K	KIPS (1000 LBS)
KSF	KIPS PER SQUARE FOOT
KSI	KIPS PER SQUARE INCH

L

L	LENGTH, ANGLE
LAB	LABORATORY
LB(S)	POUND, POUNDS
ld	DEVELOPMENT LENGTH
LE	LEFT END
LIN	LINES
LLBB	LONG LEG BACK TO BACK
LLH	LONG LEG HORIZONTAL
LLV	LONG LEG VERTICAL
LONG	LONGITUDINAL
LP	LOW POINT
LSH	LONG SIDE HORIZONTAL
LSHP	LONG SLOTTED HOLE PARALLEL
LSLT	LONG SLOTTED HOLE TRANSVERSE
LSV	LONG SIDE VERTICAL
LWC	LIGHTWEIGHT CONCRETE

M

M	MOMENT
MAS	MASONRY
MATL	MATERIAL
MAX	MAXIMUM
MC	MOMENT CONNECTION, MECHANICAL COUPLING
MECH	MECHANICAL
MEZZ	MEZZANINE
MFR	MANUFACTURE(R)
MIN	MINIMUM
MISC	MISCELLANEOUS
MTL	METAL

N

N	NORTH
N/A	NOT APPLICABLE
NIC	NOT IN CONTRACT
NO.	NUMBER
NOM	NOMINAL
NS	NEAR SIDE
NTS	NOT TO SCALE
NWC	NORMAL WEIGHT CONCRETE

O

OC	ON CENTER
OD	OUTSIDE DIAMETER
OF	OUTSIDE FACE
OPER	OPERATING
OPH	OPPOSITE HAND
OPNG	OPENING
OPP	OPPOSITE
OVS	OVERSIZED HOLE
OZ	OUNCE

P

P	AXIAL LOAD
PAF	POWDER ACTUATED FASTENER
PAR	PARALLEL
PCC	PRECAST CONCRETE
PCF	POUNDS PER CUBIC FOOT
PEMB	PRE-ENGINEERED METAL BUILDING
PERP	PERPENDICULAR
PJP	PARTIAL JOINT PENETRATION
PL	PLATE
PLCS	PLACES
PLF	POUNDS PER LINEAR FOOT
PR	PAIR
PRELIM	PRELIMINARY
PROJ	PROJECTION
PROP	PROPERTY
PRV	PRESSURE RELEASE VALVE
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PT	POST TENSIONED

Q

QTY	QUANTITY

R

R	RADIUS, RISER, REMAINDER
RCP	REINFORCED CONCRETE PIPE
RD	ROOF DRAIN
RECT	RECTANGULAR
REF	REFERENCE
REINF	REINFORCEMENT
REQD	REQUIRED
REV	REVISION
RO	ROUGH OPENING

S

S	SOUTH
SC	SLIP CRITICAL, SHEAR CONNECTOR
SCHED	SCHEDULE
SECT	SECTION
SF	SIDE FACE
SH	SHEET
SIM	SIMILAR
SJ	SAW JOINT
SLBB	SHORT LEG BACK TO BACK
SPA	SPACING
SPEC	SPECIFICATION
SPRT	SUPPORT
SQ	SQUARE
SS	STAINLESS STEEL
SSHP	SHORT SLOTTED HOLE PARALLEL
SSHT	SHORT SLOTTED HOLE TRANSVERSE
STD	STANDARD
STIF	STIFFENER
STIR	STIRRUP
STL	STEEL
STR	STRUCTURE, STRUCTURAL
SYM	SYMMETRICAL

T

T	TREAD, SCHEDULED PLATE THICKNESS, TOP
T&B	TOP & BOTTOM
TAN	TANGENT
TEMP	TEMPERATURE
THD	THREADED
THK	THICK, THICKNESS
TO	TOP OF
TOC	TOP OF CONCRETE
TOF	TOP OF FOOTING
TOM	TOP OF MASONRY
TOS	TOP OF STEEL
TOW	TOP OF WALL
TYP	TYPICAL

U

UNO	UNLESS NOTED OTHERWISE
USGS	UNITED STATES GEOLOGICAL SURVEY

V

VERT	VERTICAL
VNR	VENEER

W

W	WEST
W/	WITH
W/O	WITHOUT
WF	WIDE FLANGE
WP	WORK POINT
WS	WATERSTOP
WT	WEIGHT
WWR	WELDED WIRE REINFORCEMENT

X

x	BY, TIMES
XS	EXTRA STRONG
XXS	DOUBLE EXTRA STRONG

Y

NOT USED

Z

NOT USED

SPECIAL CHARACTERS

@	AT
&	AND
ø	DIAMETER
#	NUMBER
%	PERCENT

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 900
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS — JEFFREY L. BOOS — 116686 — LICENSED — PROFESSIONAL ENGINEER

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION–DISINFECTION REDESIGN
AMENDMENT

STRUCTURAL

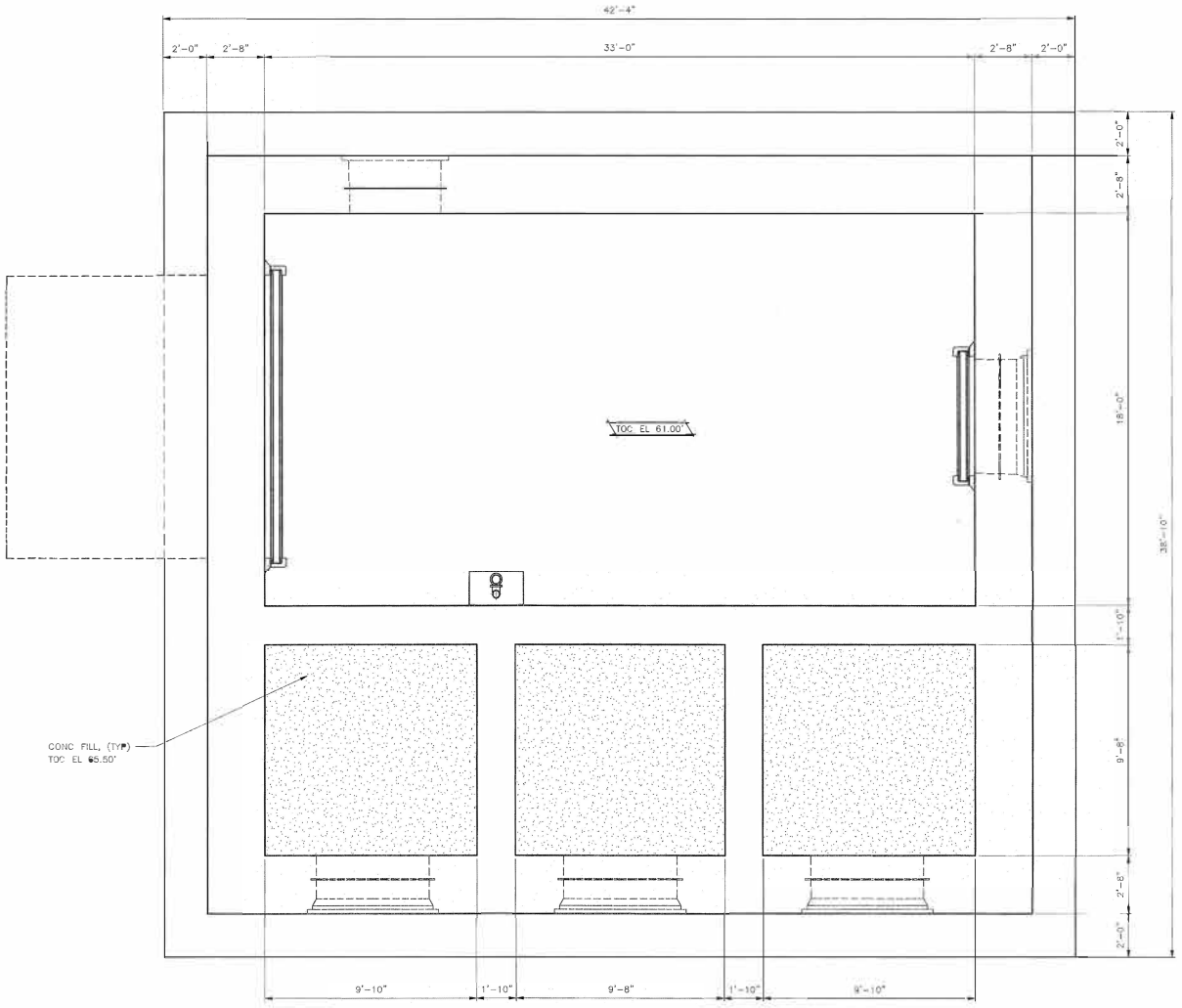
STRUCTURAL ABBREVIATIONS

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00285-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 49 OF 173	

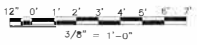
REGISTERED — 80987 — PROFESSIONAL ENGINEER — HOUSTON, TEXAS

S-00-003

FILE PATH: BIM 360://4001500 - COH Intercontinental Airport WWTP Improvements/4001500-GENERAL_V20.rvt



FOUNDATION PLAN
3/8" = 1'-0"





FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-43-CCB-BV.rvt

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182



CITY OF HOUSTON
HOUSTON PUBLIC WORKS

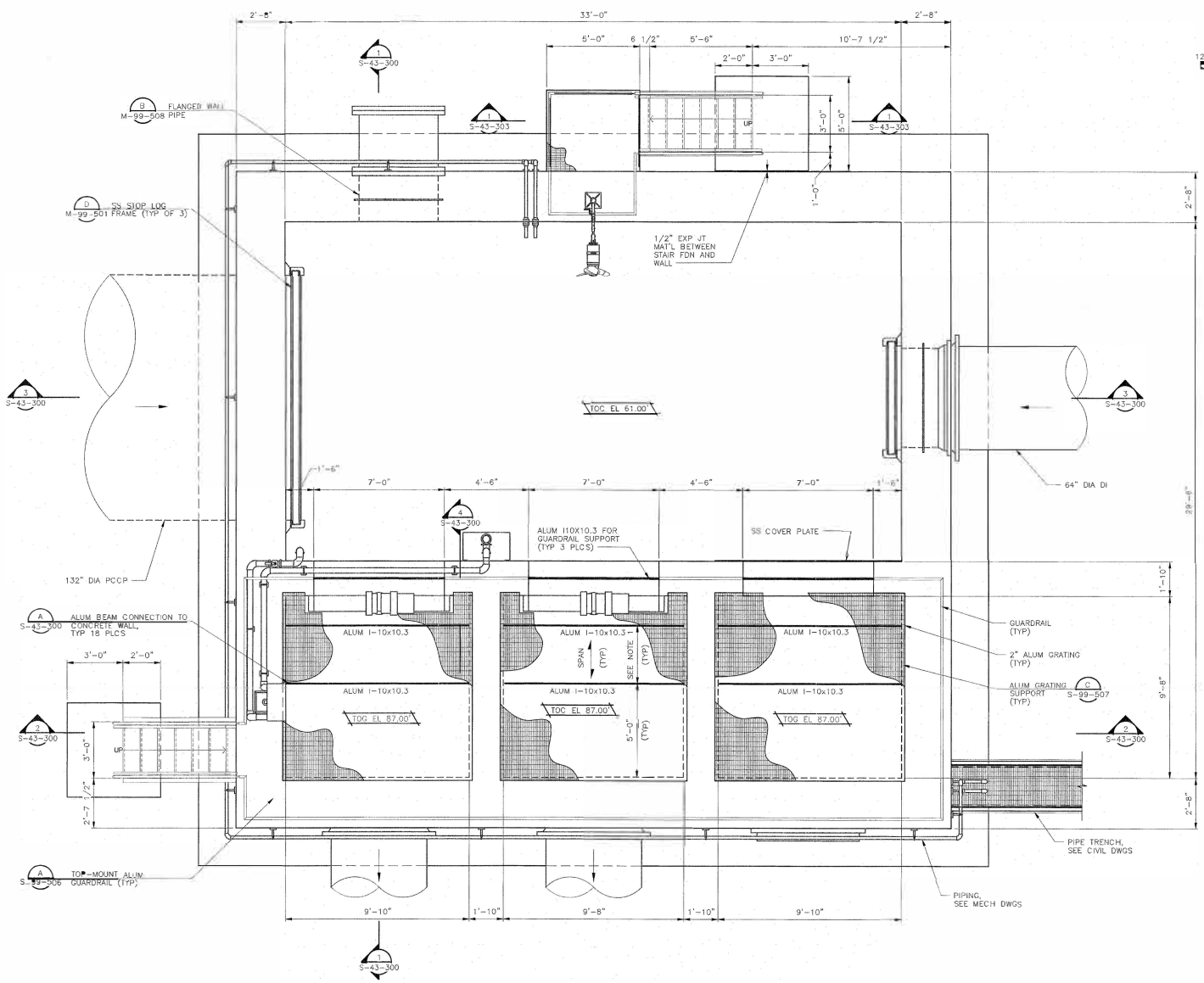
INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT

STRUCTURAL
CHLORINE CONTACT BASIN JUNCTION BOX FOUNDATION PLAN

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 50 OF 173	



S-43-100



TOP PLAN
3/8" = 1'-0"

NOTES:

1 **CONTRACTOR SHALL COORDINATE LOCATION OF BEAM AND EDGE OF GRATING WITH FURNISHED SLIDE GATE. EDGE OF** BEAM TO BE 6-INCHES CLEAR OF EXTENTS OF GATE FRAME AND EDGE OF GRATING TO BE 1-INCH CLEAR OF GATE FRAME. GRATING SHALL INCLUDE A KICKPLATE ON ALL SIDES ADJACENT TO OPENING FOR GATE.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 256

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY J. BOOS
116686
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT

STRUCTURAL

CHLORINE CONTACT BASIN JUNCTION BOX OPERATING LEVEL PLAN

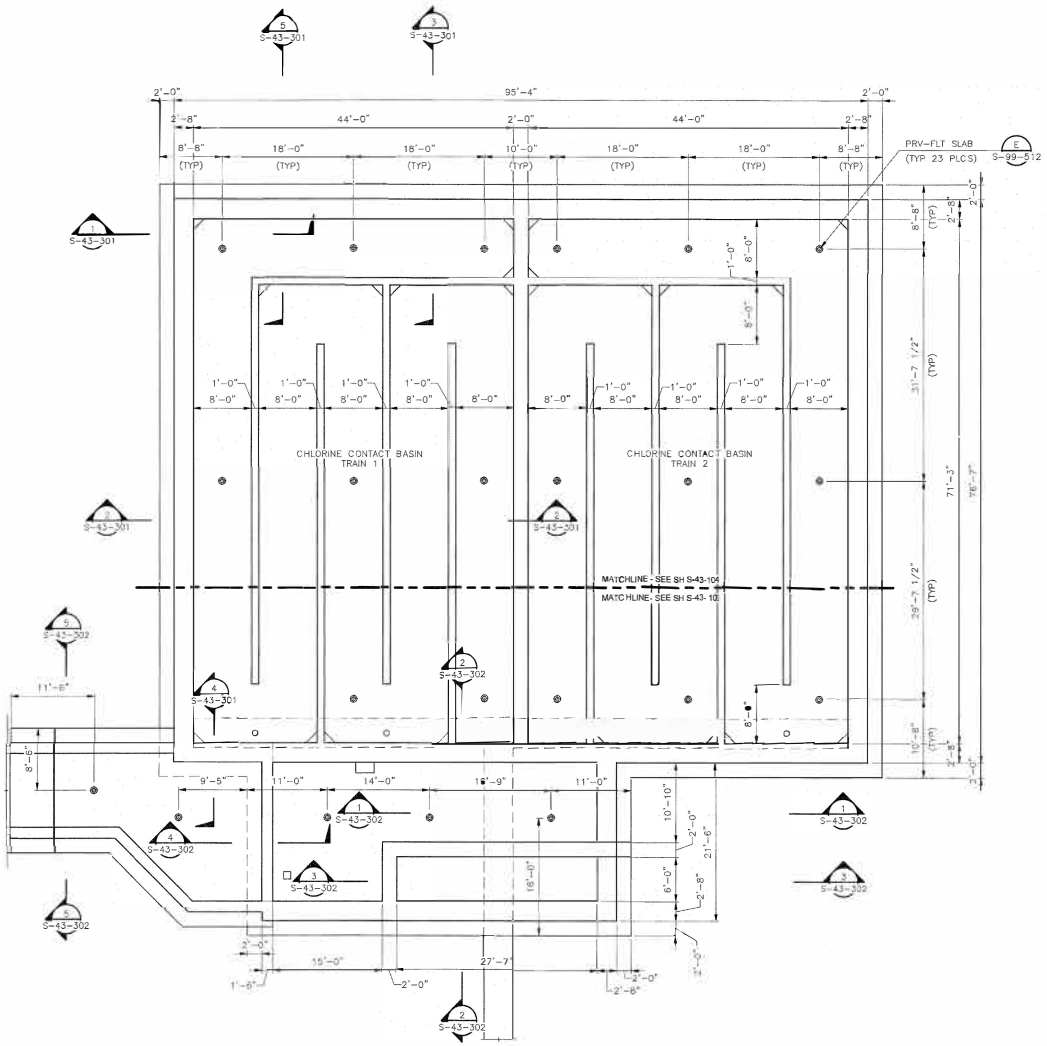
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	51 OF 173

FOR CITY OF HOUSTON USE ONLY

80367

S-43-101

FILE PATH: BIM 360://402500 - CoH Intercontinental Airport WWTF Improvements/402500-43-CCB-BVH.rvt



LOWER LEVEL – STRUCTURAL PLAN
1/8" = 1'-0"

8' 4' 0' 8' 16'
1/8" = 1'-0"

N

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT

STRUCTURAL

CHLORINE CONTACT BASIN OVERALL FOUNDATION PLAN

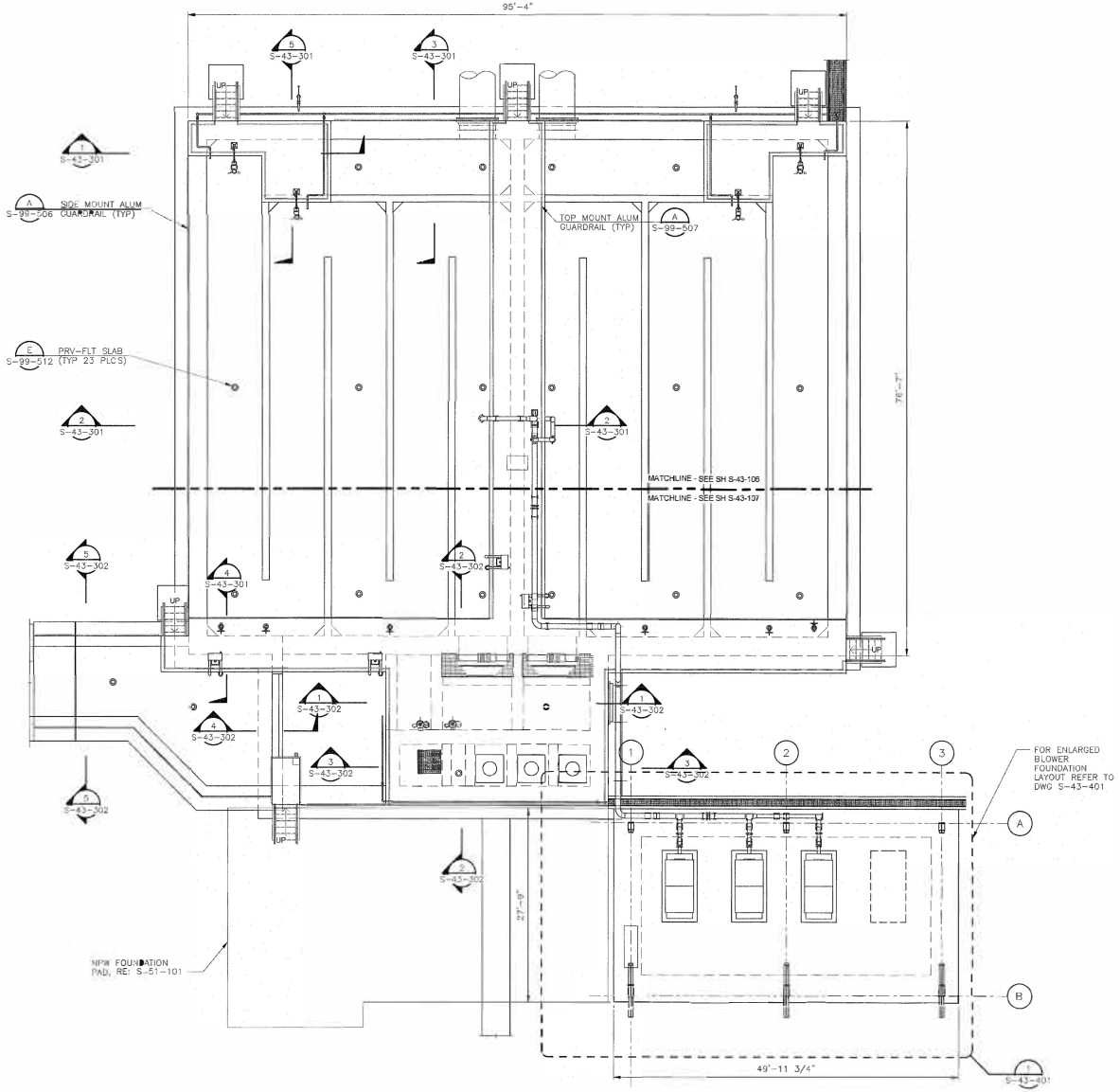
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	52 OF 173

FOR CITY OF HOUSTON USE ONLY

P.E. 80367 CIVIL HOUSTON, TEXAS

S-43-102

FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-43-CCB-BIM.rvt



OPERATING LEVEL PLAN
1/8" = 1'-0"

8' 4' 0' 8' 16'
1/8" = 1'-0"

N

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT

STRUCTURAL

CHLORINE CONTACT BASIN OVERALL TOP PLAN

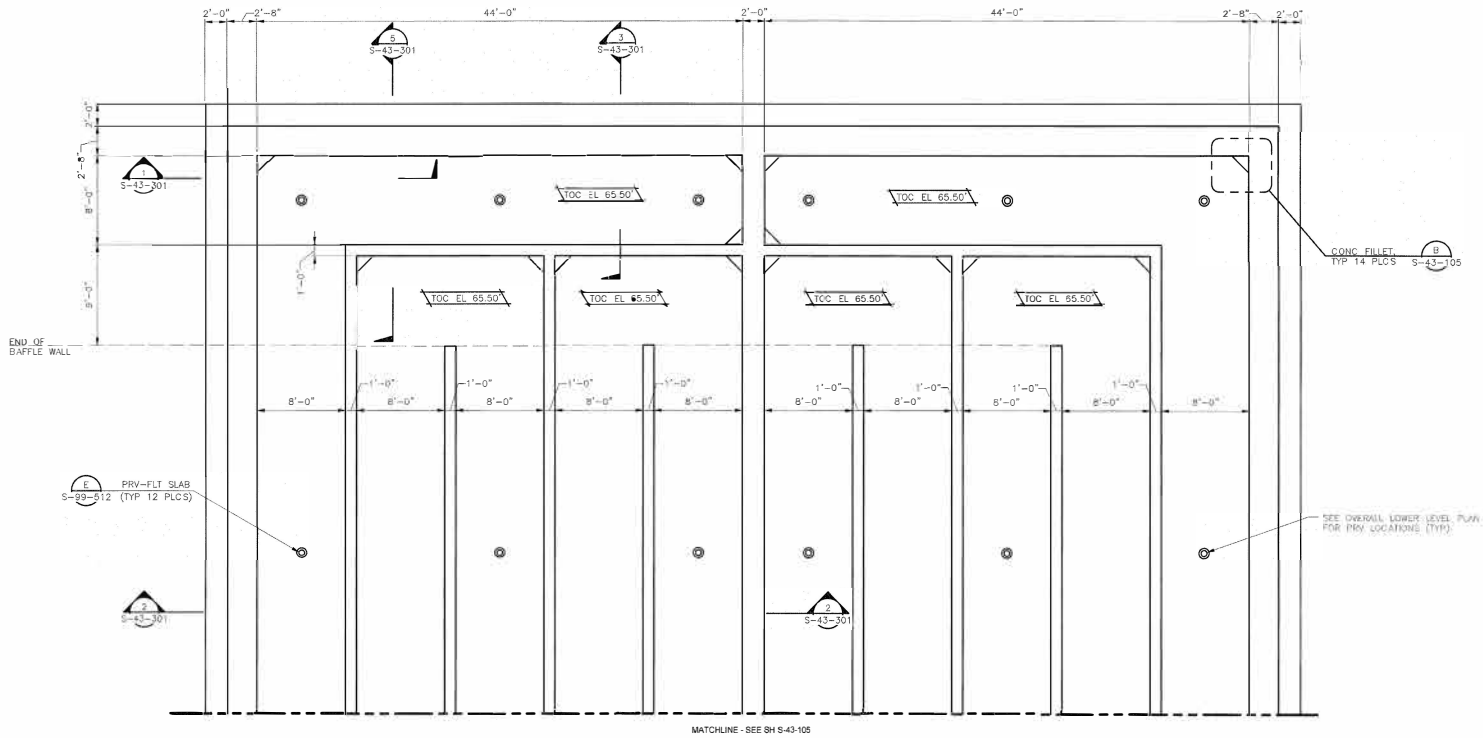
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	53 OF 173

FOR CITY OF HOUSTON USE ONLY

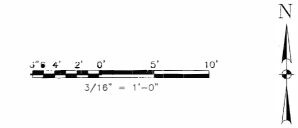
REGISTERED ARCHITECT
80367
REGISTERED ENGINEER

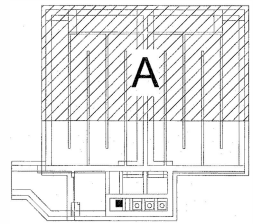
S-43-103

FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-43-CCB-BV.rvt



LOWER LEVEL – STRUCTURAL ENLARGED PLAN AREA A
3/16" = 1'-0"





KEY PLAN – LOWER LEVEL
NO SCALE

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY L. BOOS
116686
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT

STRUCTURAL

CHLORINE CONTACT BASIN ENLARGED FOUNDATION PLAN AREA A

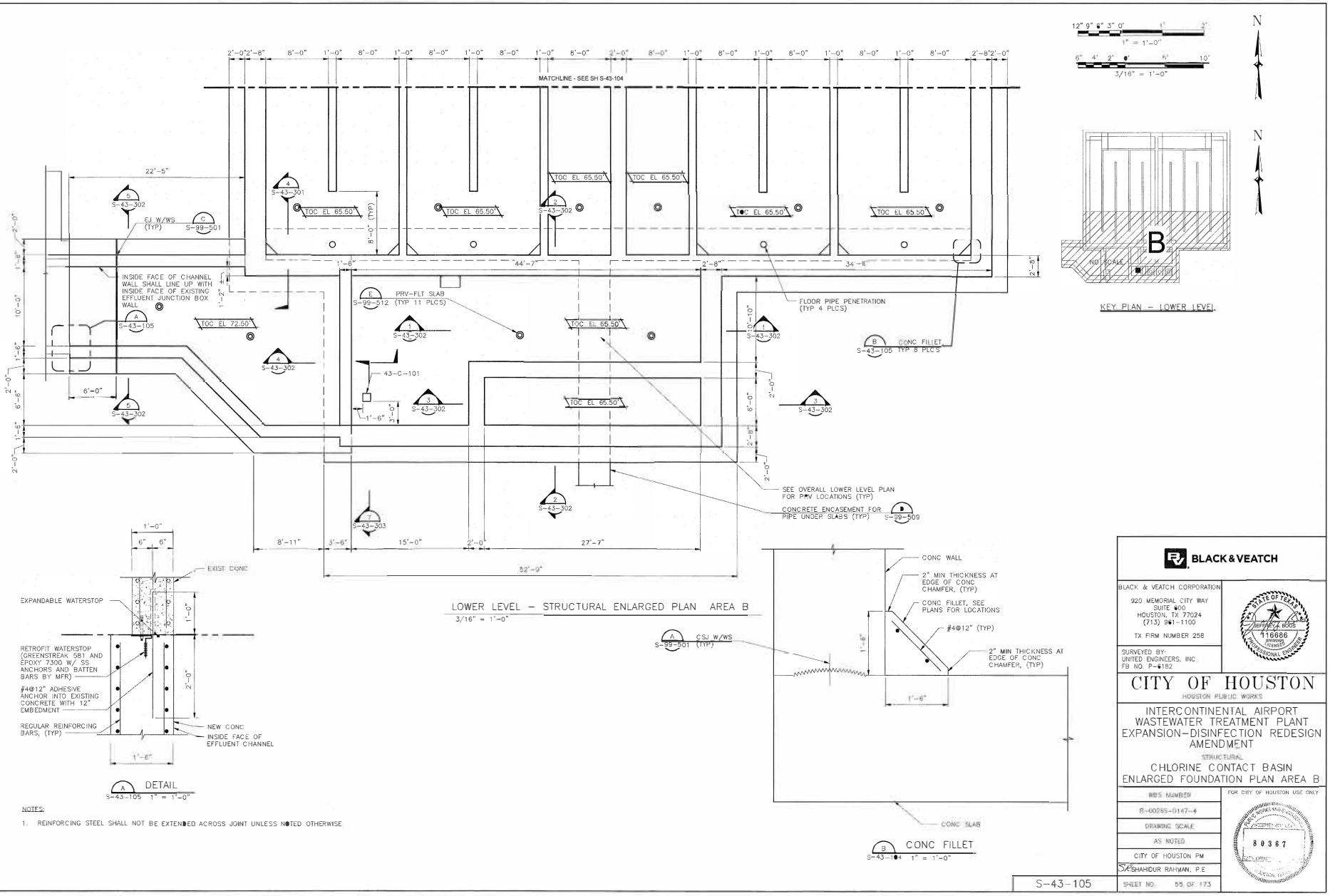
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	54 OF 173

FOR CITY OF HOUSTON USE ONLY

80367

S-43-104

FILE PATH: BIM 360://402500 – COH Intercontinental Airport WWTF Improvements/402500-43-CCB-BV.rvt



NOTES:

1. REINFORCING STEEL SHALL NOT BE EXTENDED ACROSS JOINT UNLESS NOTED OTHERWISE.

S-43-105

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

JEFFREY A. BOOS 116686 LICENSED PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION–DISINFECTION REDESIGN
AMENDMENT

STRUCTURAL

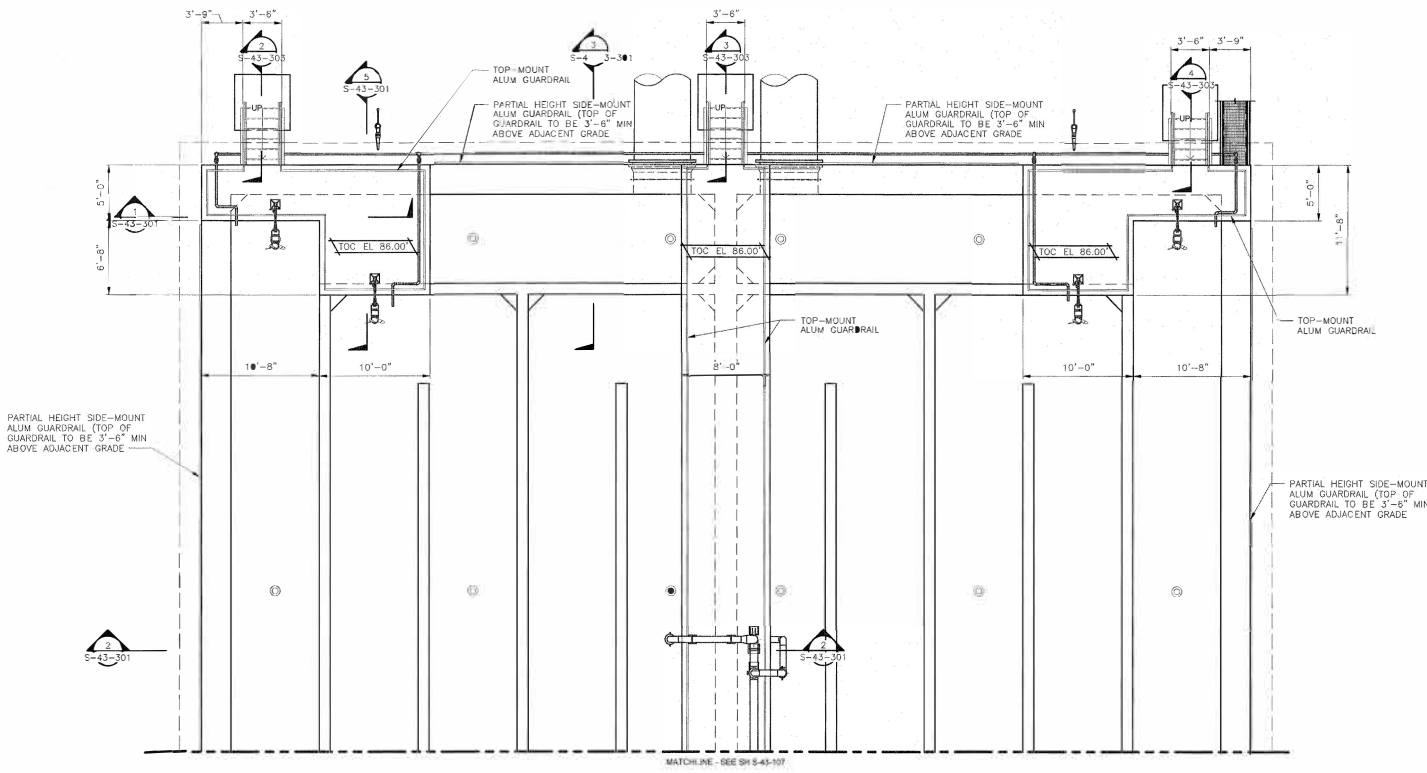
CHLORINE CONTACT BASIN
ENLARGED FOUNDATION PLAN AREA B

IBES NUMBER	R-00785-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	55 OF 173

FOR CITY OF HOUSTON USE ONLY

80367

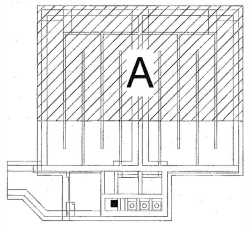
FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-43-CCB-BVnt



OPERATING LEVEL – ENLARGED PLAN AREA A
3/16" = 1'-0"

6" 4" 2" 0" 5" 10"
3/16" = 1'-0"

N



KEY PLAN – OPERATING LEVEL
NO SCALE

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY J. BOOS
116686
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION–DISINFECTION REDESIGN
AMENDMENT

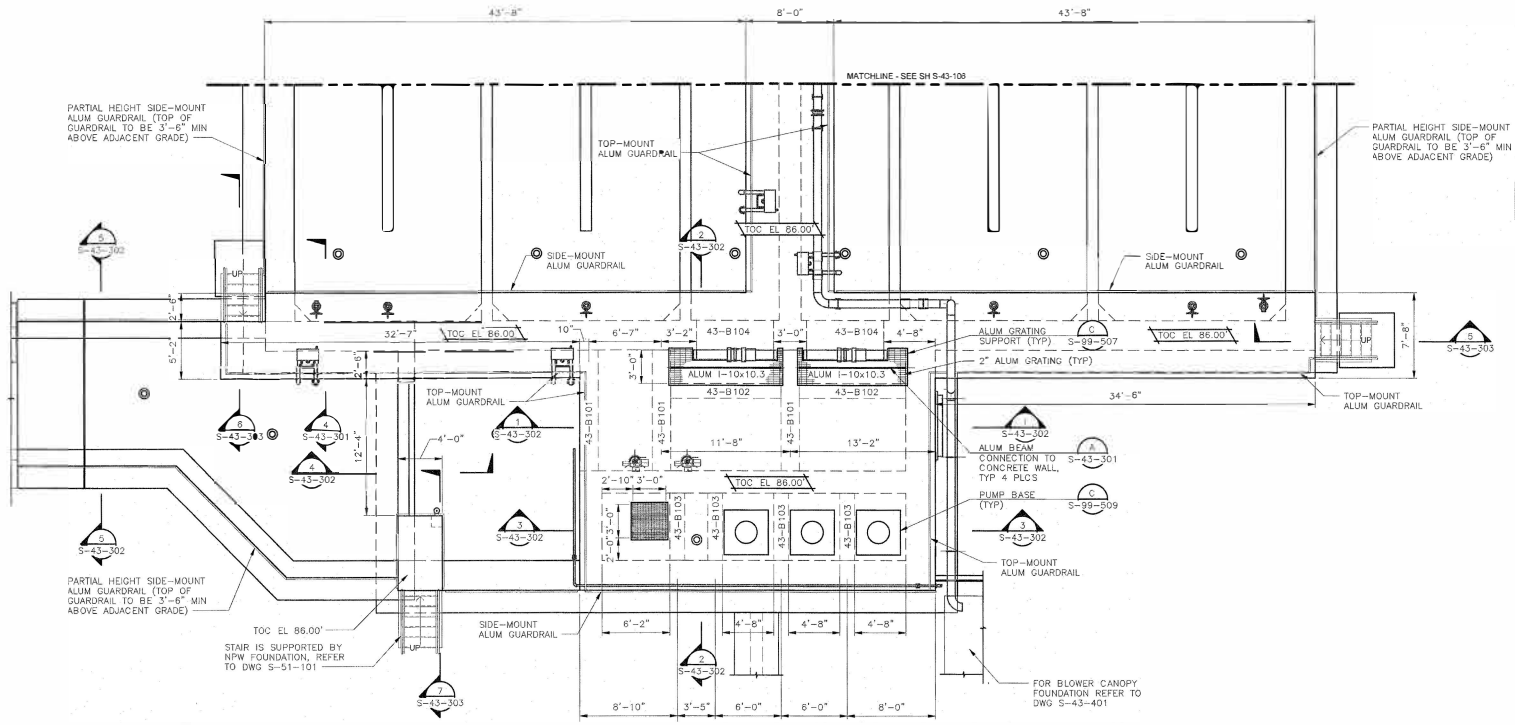
STRUCTURAL
CHLORINE CONTACT BASIN
ENLARGED TOP PLAN AREA A

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 56 OF 173	

PUBLIC WORKS
80367
REGISTERED
ENGINEER

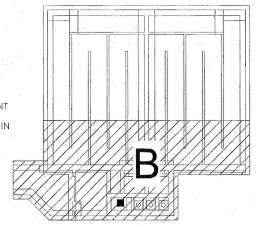
S-43-106

FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-43-CCB-BIV.rvt



OPERATING LEVEL – ENLARGED PLAN AREA B

3/16" = 1'-0"



KEY PLAN – OPERATING LEVEL
NO SCALE

GENERAL NOTES:

1. ENLARGED BLOWER CANOPY FOUNDATION NOT SHOWN FOR CLARITY, REFER TO DRAWING S-43-401 FOR ENLARGED PLAN.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. WOOD
116686
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION–DISINFECTION REDESIGN
AMENDMENT

STRUCTURAL

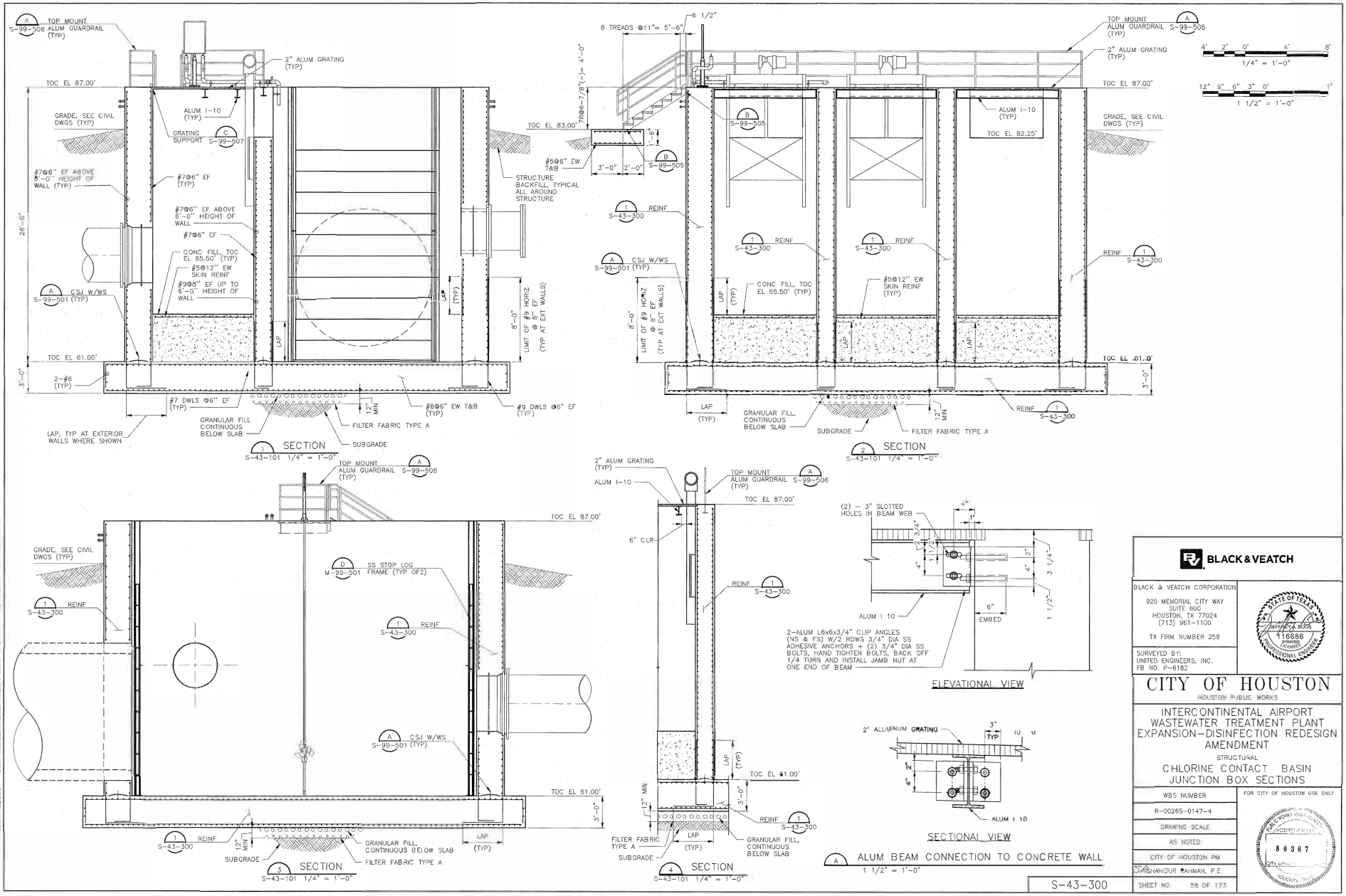
CHLORINE CONTACT BASIN
ENLARGED TOP PLAN AREA B

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 57 OF 173	

APPROVED
89367
CITY ENGINEER
HOUSTON, TEXAS

S-43-107

FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-43-CCB-BW.rvt



FILE PATH: BIM 360://402500 - GCH Intercontinental Airport WWTP Improvements/402500-43-CCB-BV.rvt

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY L. BOOS
116686
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT

STRUCTURAL

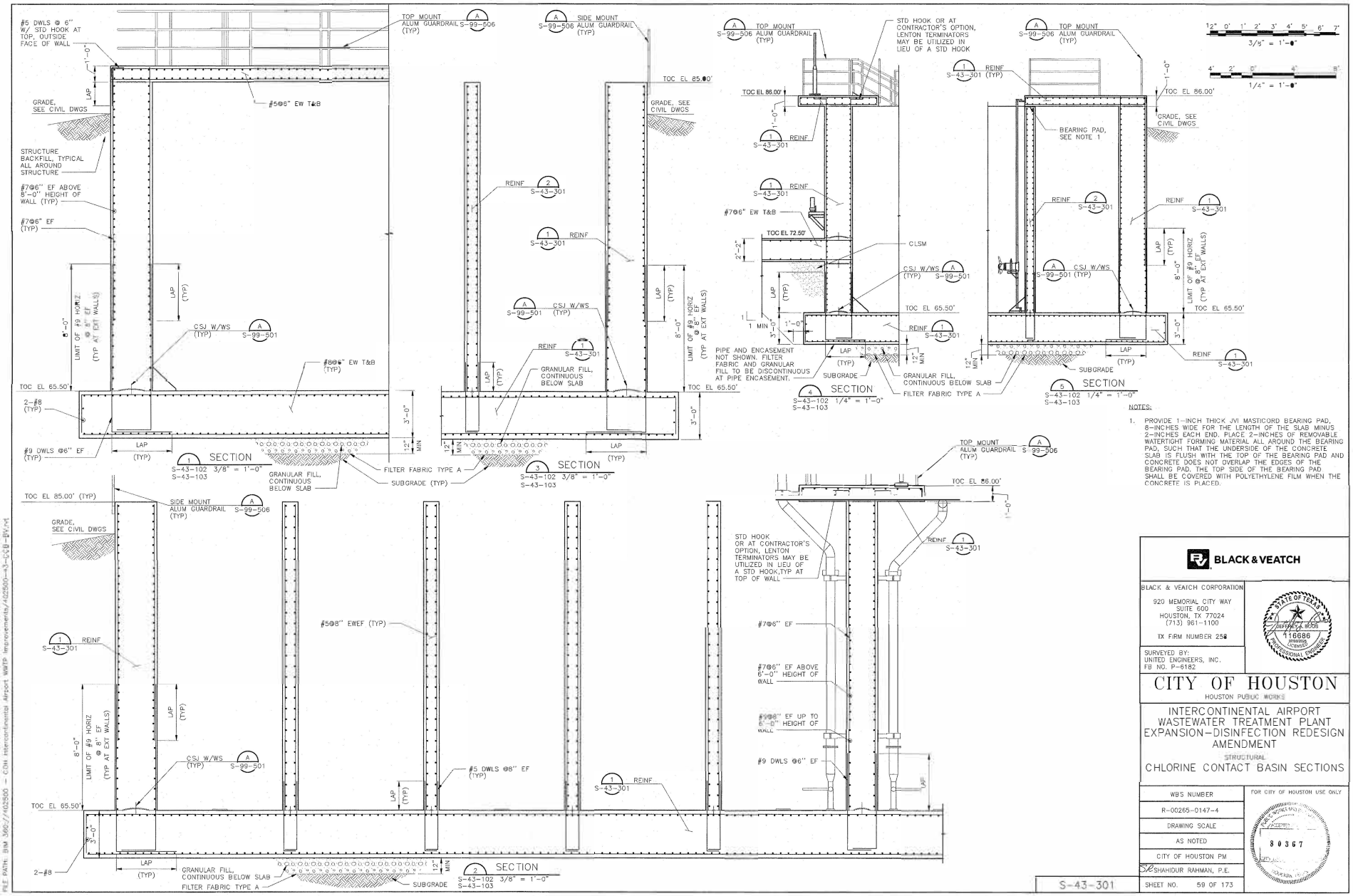
CHLORINE CONTACT BASIN JUNCTION BOX SECTIONS

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	58 OF 173

FOR CITY OF HOUSTON USE ONLY

80367

S-43-300



NOTES:

1. PROVIDE 1-INCH THICK JVI MASTICORD BEARING PAD, 8-INCHES WIDE FOR THE LENGTH OF THE SLAB MINUS 2-INCHES EACH END. PLACE 2-INCHES OF REMOVABLE WATERTIGHT FORMING MATERIAL ALL AROUND THE BEARING PAD, SUCH THAT THE UNDERSIDE OF THE CONCRETE SLAB IS FLUSH WITH THE TOP OF THE BEARING PAD AND CONCRETE DOES NOT OVERLAP THE EDGES OF THE BEARING PAD. THE TOP SIDE OF THE BEARING PAD SHALL BE COVERED WITH POLYETHYLENE FILM WHEN THE CONCRETE IS PLACED.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY: UNITED ENGINEERS, INC. FB NO. P-6182

JEFFREY A. BOOS 116686 LICENSED PROFESSIONAL ENGINEER

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT

STRUCTURAL

CHLORINE CONTACT BASIN SECTIONS

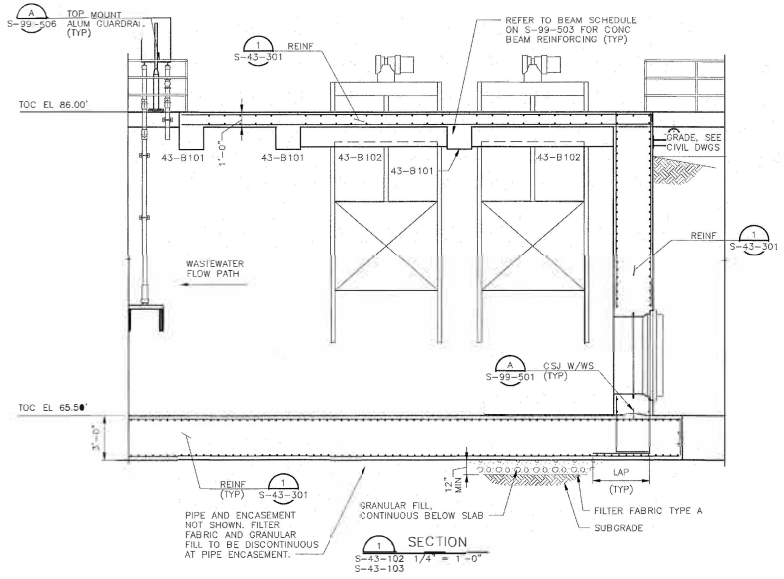
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	59 OF 173

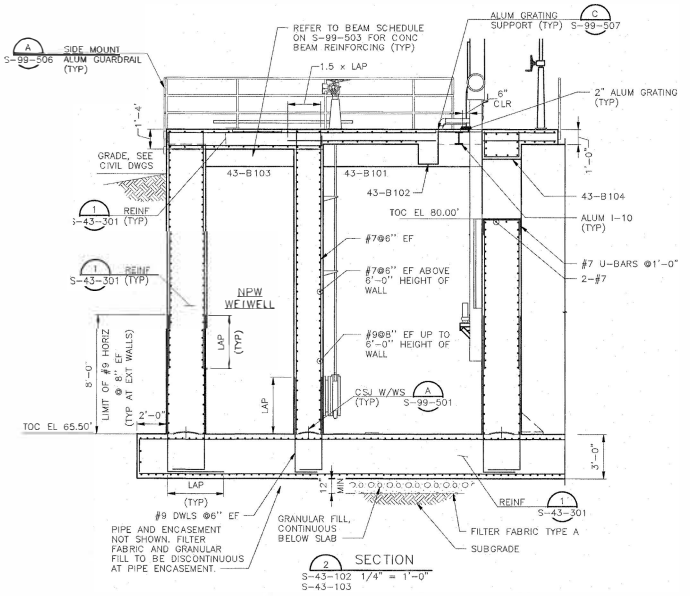
FOR CITY OF HOUSTON USE ONLY

ACCEPTED 80367

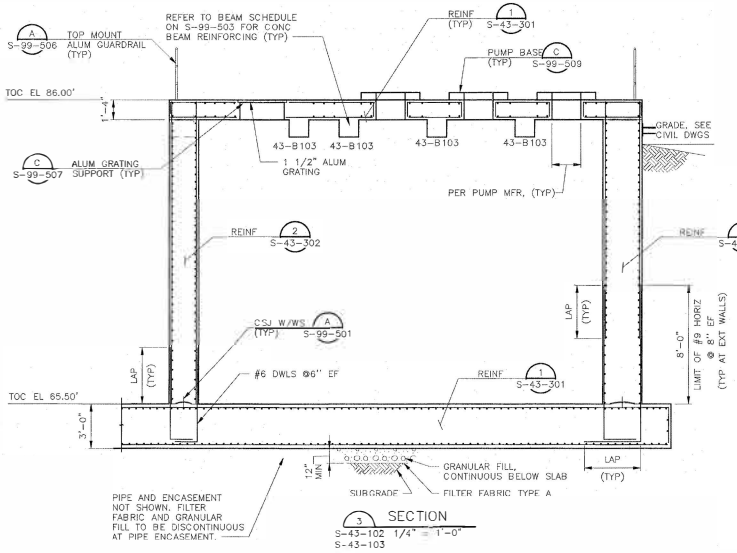
S-43-301

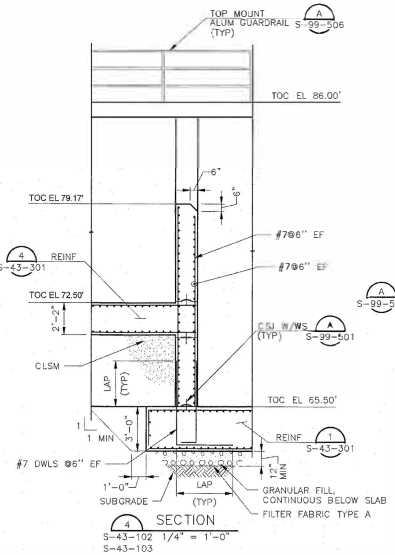
FILE PATH: BIM 360://402580 - CDH Intercontinental Airport WWTP Improvements/402580-43-CCB-BV.rvt

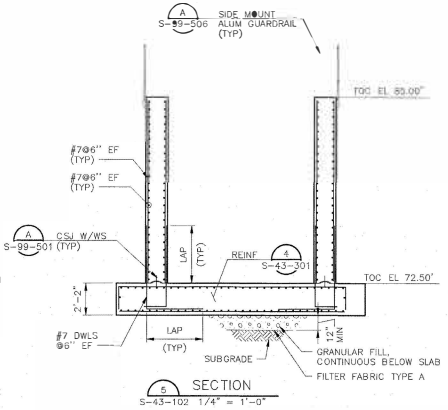




4' 2' 0' 4' 8'
1/4" = 1'-0"







BLACK & VEATCH

BLACK & VEATCH CORPORATION
910 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 256

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

JEFFREY A. WOOD
116686
LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT

STRUCTURAL

CHLORINE CONTACT BASIN SECTIONS

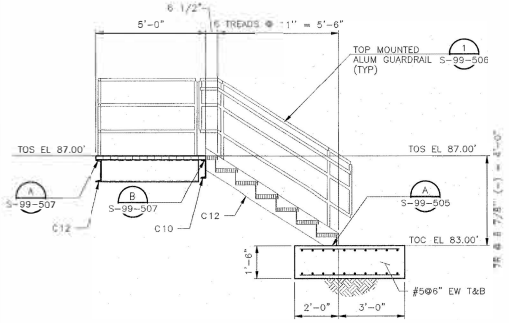
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	80 OF 173

FOR CITY OF HOUSTON USE ONLY

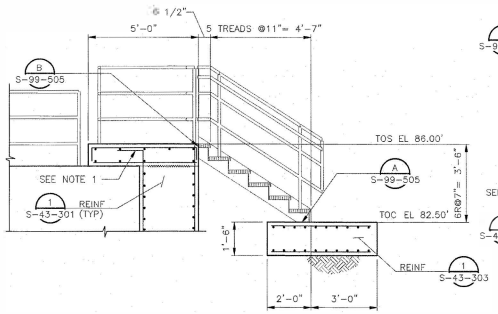
JEFFREY A. WOOD
80367
LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS

S-43-302

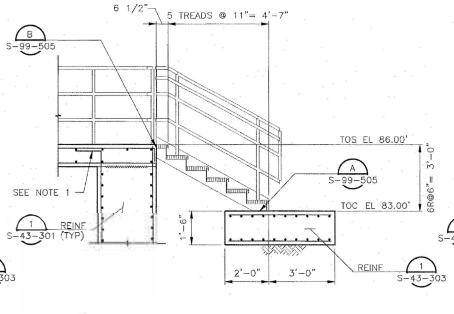
FILE PATH: BIM 360://402506 – Civil Intercontinental Airport WWTP Improvements/402506-43-CCB-BIM.rvt



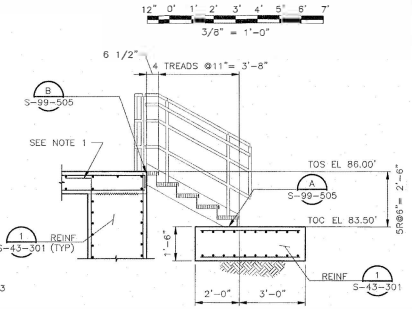
1 SECTION
S-43-101 3/8" = 1'-0"



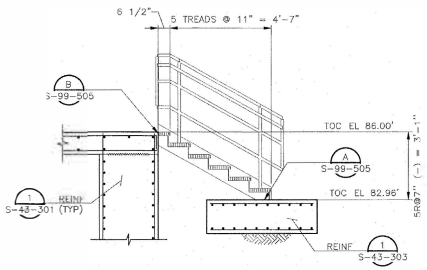
2 SECTION
S-43-106 3/8" = 1'-0"



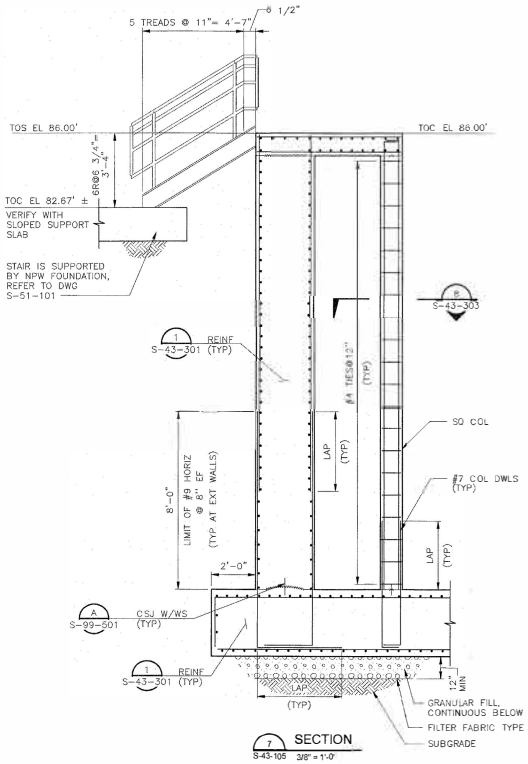
3 SECTION
S-43-106 3/8" = 1'-0"



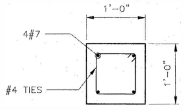
4 SECTION
S-43-106 3/8" = 1'-0"



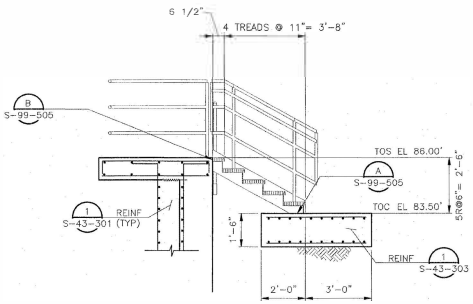
5 SECTION
S-43-107 3/8" = 1'-0"



7 SECTION
S-43-106 3/8" = 1'-0"



8 SECTION
S-43-303 1" = 1'-0"



6 SECTION
S-43-107 3/8" = 1'-0"

NOTES:

1. STD HOOK OR AT CONTRACTOR'S OPTION, LENTON TERMINATORS MAY BE UTILIZED IN LIEU OF A STD HOOK, TYP AT TOP OF WALL.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

JEFFREY L. WOOD
116686
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT

STRUCTURAL

CHLORINE CONTACT BASIN STAIR SECTIONS

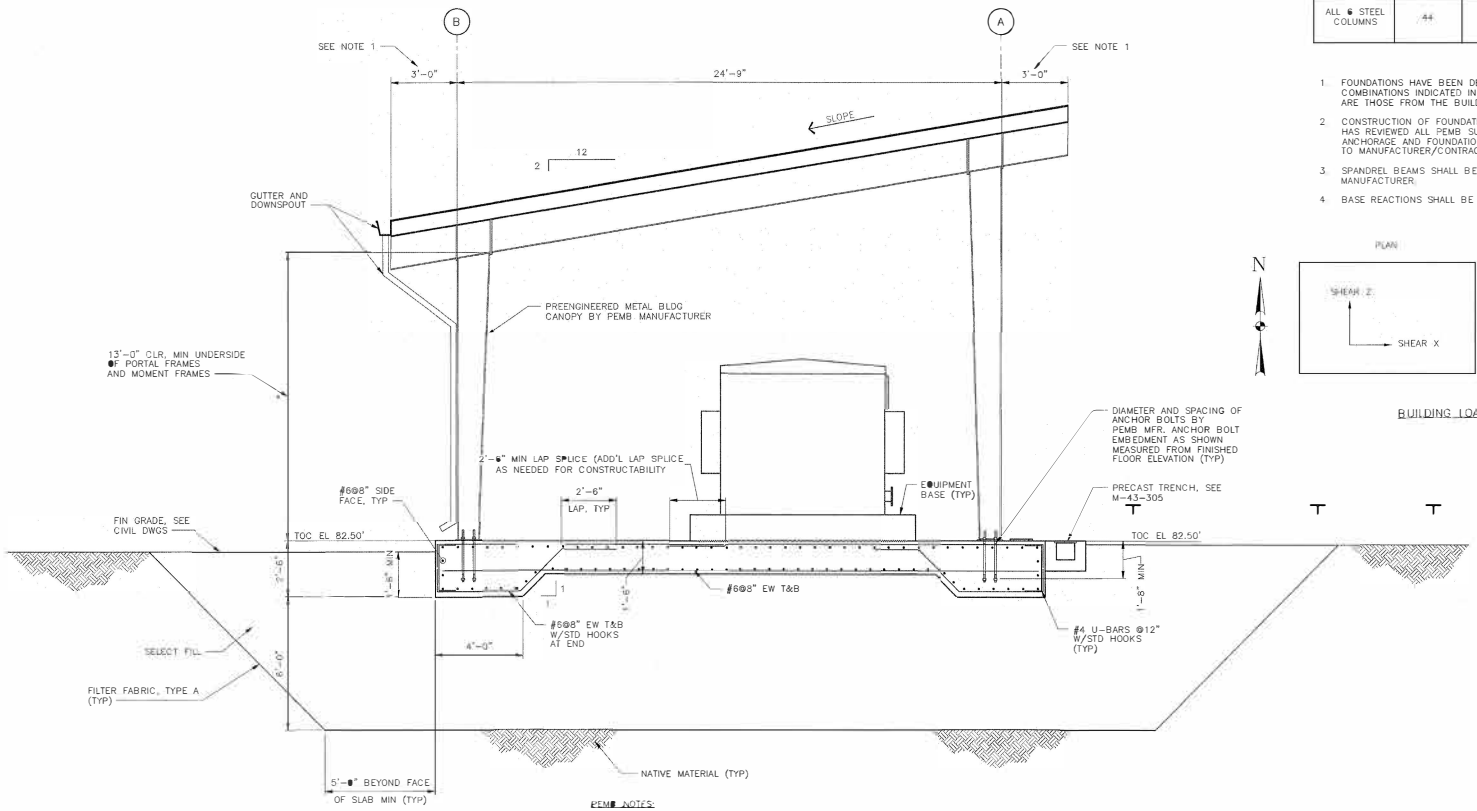
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	61 OF 173

FOR CITY OF HOUSTON USE ONLY

ACCEPTED
80367
CITY DATA
HOUSTON, TEXAS

S-43-303

FILE PATH: BIM 360://432500 - COH Intercontinental Airport WWTP Improvements/402500-43-CCB_BV.rvt



PEMB NOTES:

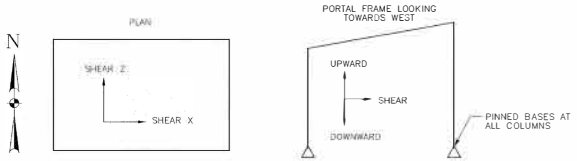
1. PROVIDE 3'-0" RAKE EACH END OF CANOPY.
2. COLUMN LINES AT A AND B ARE TO THE OUTSIDE FACE OF THE COLUMN.

1 S-43-401 SECTION 3/8" = 1'-0"

12" 0' 1' 2' 3' 4' 5' 6' 7'
3/8" = 1'-0"

BUILDING LOADS TO FOUNDATION				
COLUMN LOCATION	DOWNWARD (KIPS)	UPWARD (KIPS)	SHEAR X E/W (KIPS)	SHEAR Z E/W (KIPS)
ALL 6 STEEL COLUMNS	44	-20	±4	±5

1. FOUNDATIONS HAVE BEEN DESIGNED FOR THE SERVICE LOAD COMBINATIONS INDICATED IN THE TABLE. THE INDICATED LOADS ARE THOSE FROM THE BUILDING TO THE FOUNDATION.
2. CONSTRUCTION OF FOUNDATIONS SHALL NOT BEGIN UNTIL ENGINEER HAS REVIEWED ALL PEMB SUBMITTAL DRAWINGS AND ANY ANCHORAGE AND FOUNDATION MODIFICATIONS HAVE BEEN PROVIDED TO MANUFACTURER/CONTRACTOR.
3. SPANDREL BEAMS SHALL BE DESIGNED BY THE PEMB MANUFACTURER.
4. BASE REACTIONS SHALL BE DESIGNED AS A PINNED BASE.



BUILDING LOADS TO FOUNDATION

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 800
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOSS
116686
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

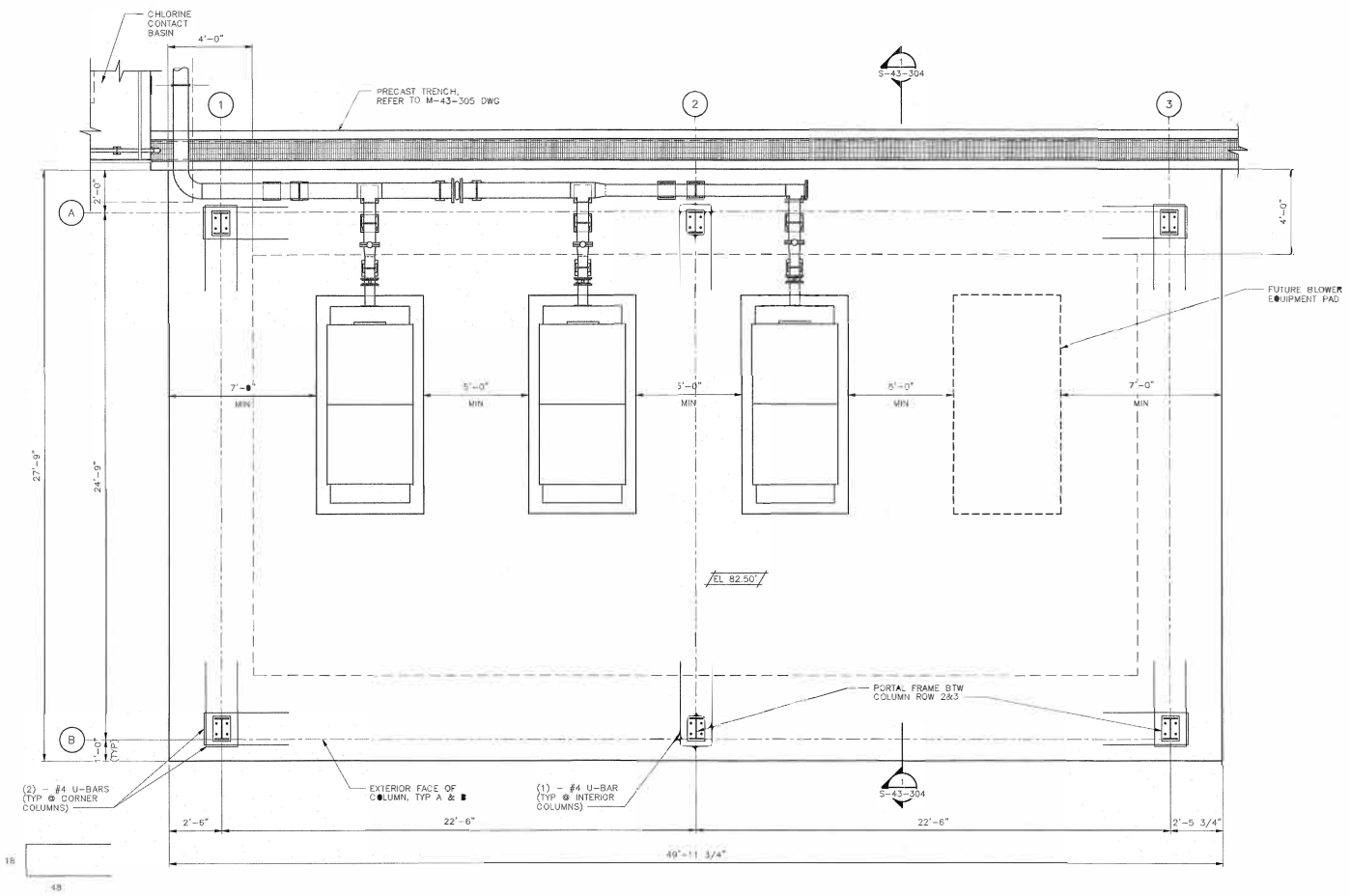
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION-DISINFECTION REDESIGN AMENDMENT
STRUCTURAL
BLOWER FOUNDATION SECTION

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 62 OF 173	

PUBLIC WORKS & ENGINEERING
ACCEPTED
80367
CITY CLERK
HOUSTON, TEXAS

S-43-304

FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-43-CCB-BV.rvt



BLOWER CANOPY ENLARGED FOUNDATION PLAN
3/8" = 1'-0"

12" 0' 1' 2' 3' 4' 5' 6' 7"
3/8" = 1'-0"

N

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100

TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT

STRUCTURAL
BLOWER CANOPY ENLARGED FOUNDATION PLAN

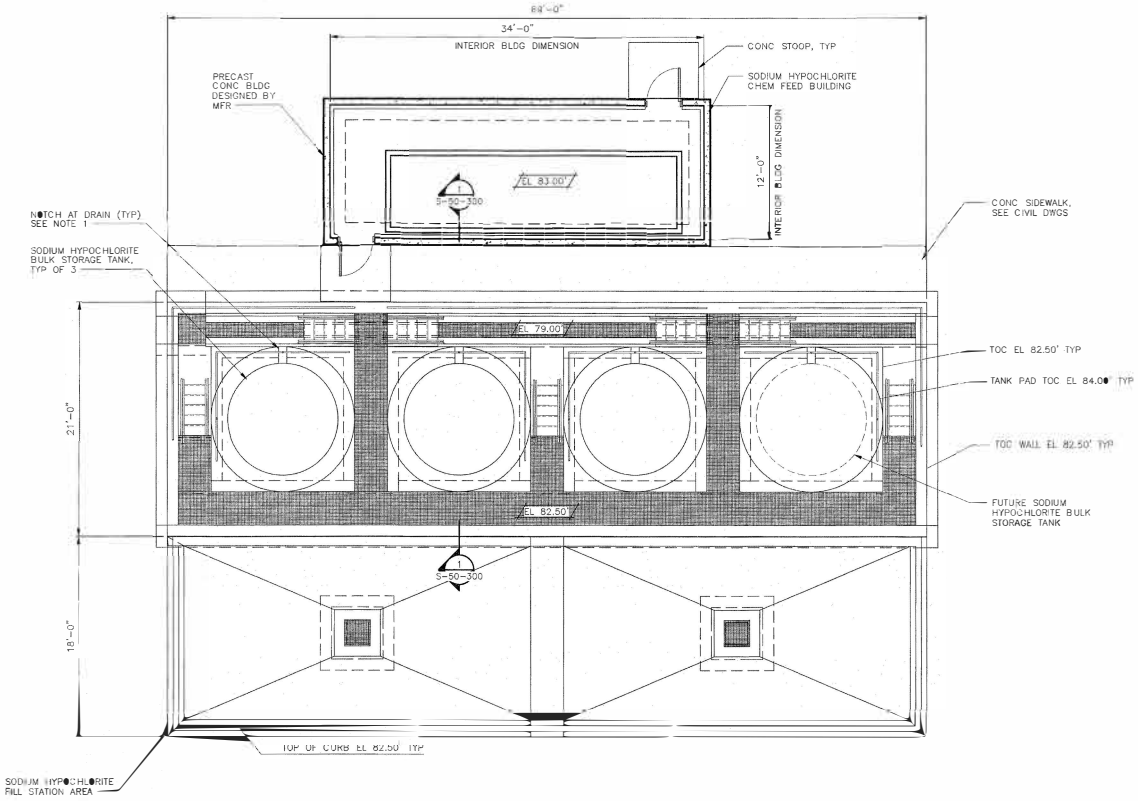
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	63 OF 173

FOR CITY OF HOUSTON USE ONLY

80367

S-43-401

FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-43-ICCB-BV.rvt



SODIUM HYPOCHLORITE OVERALL PLAN

3/16" = 1'-0"

6" 4' 2' 0' 5' 10'

3/16" = 1'-0"

NOTE:

1. PROVIDE CONCRETE NOTCH AT CHEMICAL TANK DRAIN. NOTCH SHALL PROVIDE 3-INCHES CLEAR ALL AROUND PIPE AND APPURTENANCES AND SHALL ALSO BE COORDINATED WITH THE TANK MANUFACTURER. THE REINFORCING INTERRUPTED BY THE NOTCH SHALL BE SPLICED WITH ADDITIONAL REINFORCING MATCHING THE SAME BAR SIZE AND LAP SPLICED WITH ADJACENT REINFORCING. THE FINAL NOTCH DIMENSIONS SHALL BE ACCEPTABLE TO THE ENGINEER PRIOR TO CONSTRUCTION.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY L. SIMS
116686
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT

STRUCTURAL

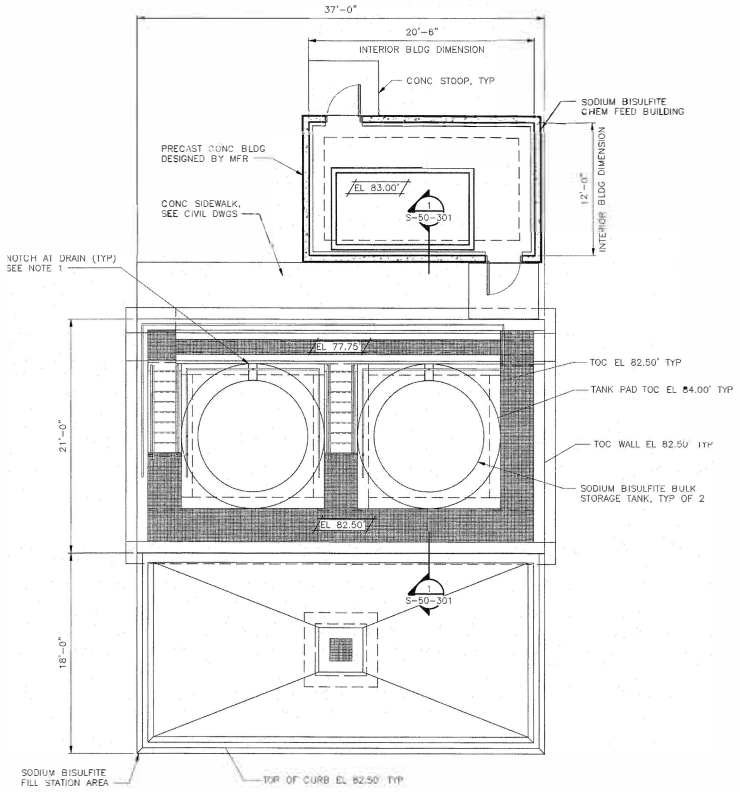
SODIUM HYPOCHLORITE OVERALL PLAN

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 64 OF 173	

ACCEPTED
80367

S-50-100

FILE PATH: BIM 360://400503 – COH Intercontinental Airport WWTP Improvements/400503-50-CHEM_STOR-R21.rvt



SODIUM BISULFITE OVERALL TOP PLAN

3/16" = 1'-0"

N

0" 1' 2' 3' 6' 10'

3/16" = 1'-0"

NOTE:

1. PROVIDE CONCRETE NOTCH AT CHEMICAL TANK DRAIN. NOTCH SHALL PROVIDE 3-INCHES CLEAR ALL AROUND PIPE AND APPURTENANCES AND SHALL ALSO BE COORDINATED WITH THE TANK MANUFACTURER. THE REINFORCING INTERRUPTED BY THE NOTCH SHALL BE SPLICED WITH ADDITIONAL REINFORCING MATCHING THE SAME BAR SIZE AND LAP SPLICED WITH ADJACENT REINFORCING. THE FINAL NOTCH DIMENSIONS SHALL BE ACCEPTABLE TO THE ENGINEER PRIOR TO CONSTRUCTION.

FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-50-CHEM_301R-BV.rvt

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
DEEPAK A. BOSE
116686
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION-DISINFECTION REDESIGN AMENDMENT

STRUCTURAL

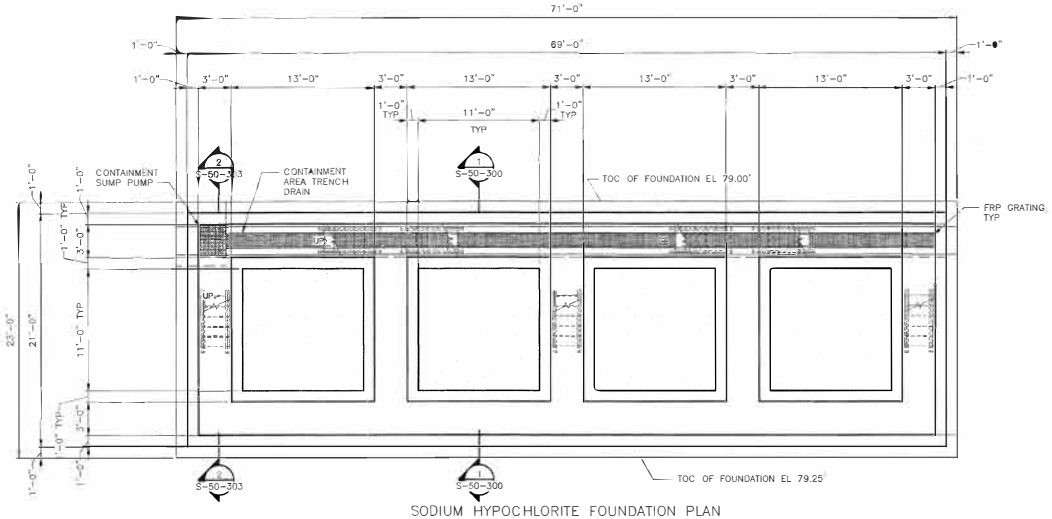
SODIUM BISULFITE OVERALL PLAN

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E
SHEET NO.	65 OF 173

FOR CITY OF HOUSTON USE ONLY

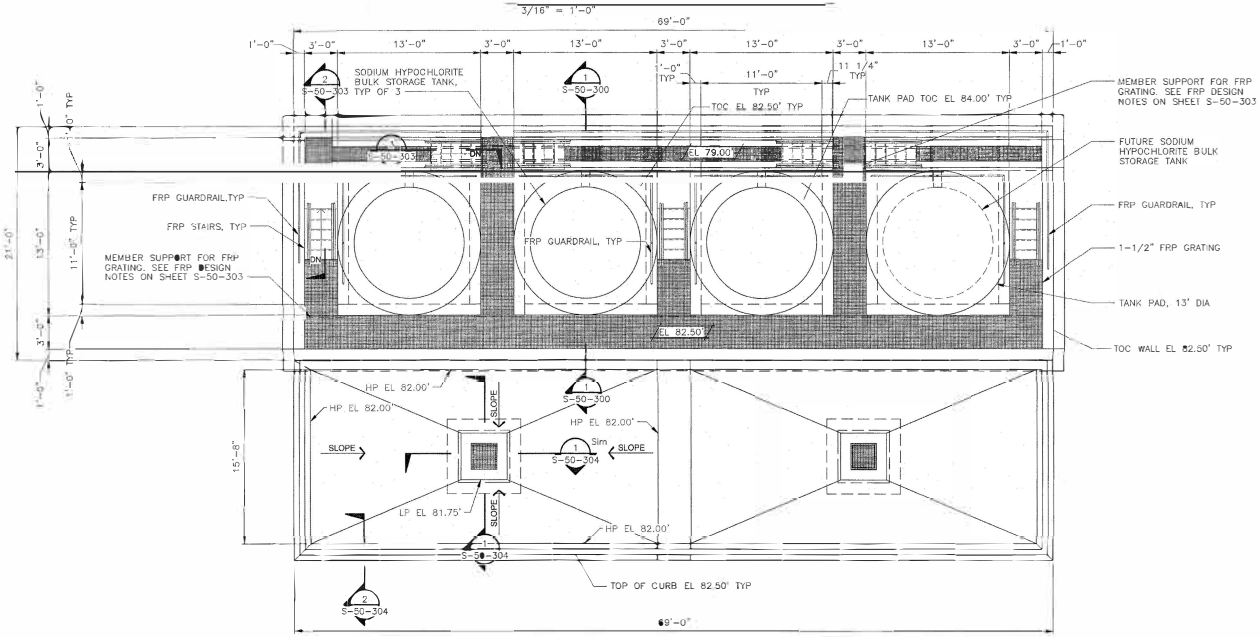
PROFESSIONAL ENGINEER
80367
HOUSTON, TEXAS

S-50-101



SODIUM HYPOCHLORITE FOUNDATION PLAN

3/16" = 1'-0"



SODIUM HYPOCHLORITE BULK STORAGE TOP PLAN

3/16" = 1'-0"

6" 4' 2' 0' 5' 10'

3/16" = 1'-0"

BULK STORAGE TANK LOADS		
TANK TYPE	DEAD LOAD (KIPS)	WIND LOAD (KIPS)
SODIUM HYPOCHLORITE TANK	110	6

NOTES:

1 FOUNDATIONS HAVE BEEN DESIGNED FOR THE SERVICE LOAD COMBINATIONS INDICATED IN THE TABLE.

2 CONSTRUCTION OF FOUNDATIONS, INCLUDING FABRICATION OF REINFORCING, SHALL NOT BEGIN UNTIL ENGINEER HAS REVIEWED AND ACCEPTED THE CHEMICAL TANK SUBMITTAL INCLUDING ANCHORAGE DESIGN BY THE TANK SUPPLIER.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC
FB NO. P-6192

JEFFREY A. BOOS 116686 LICENSED PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION-DISINFECTION REDESIGN AMENDMENT

STRUCTURAL

SODIUM HYPOCHLORITE BULK STORAGE FOUNDATION AND TOP PLAN

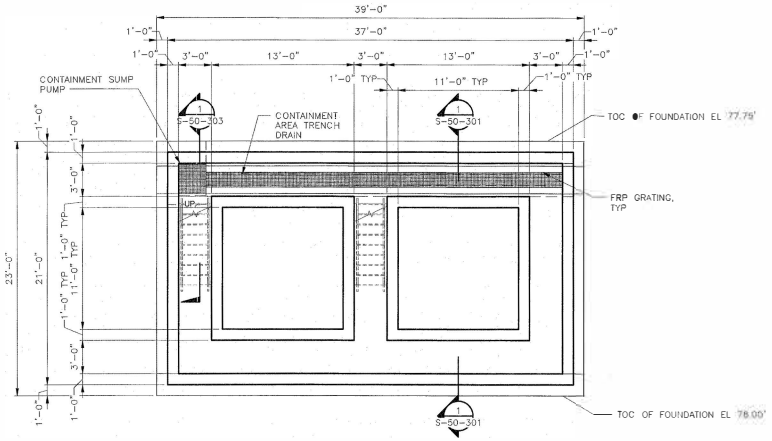
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO	66 OF 173

FOR CITY OF HOUSTON USE ONLY

80367 REGISTERED PROFESSIONAL ENGINEER HOUSTON, TEXAS

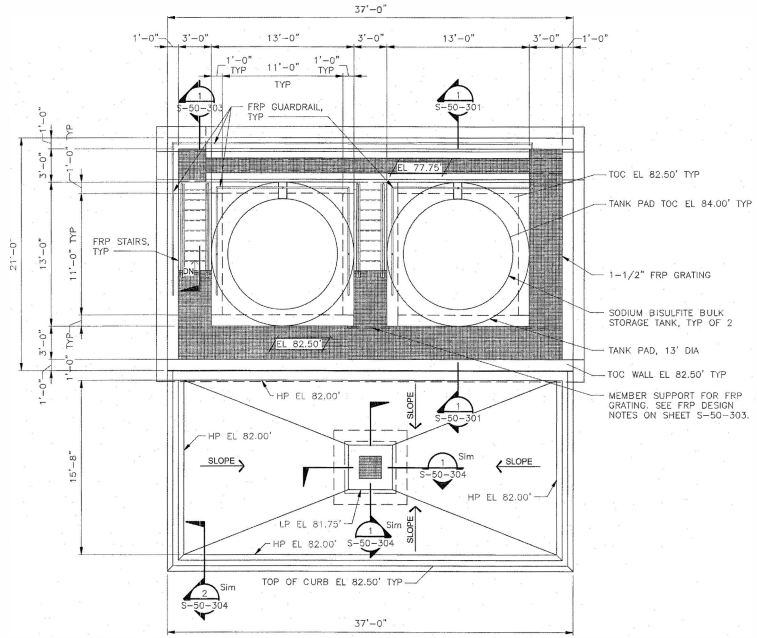
S-50-102

FILE PATH: Bim 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-50-CIVIL_STOR-R5V.rvt



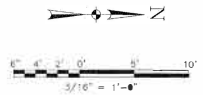
SODIUM BISULFITE BULK STORAGE FOUNDATION PLAN

3/16" = 1'-0"



SODIUM BISULFITE BULK STORAGE TOP PLAN

3/16" = 1'-0"



BULK STORAGE TANK LOADS		
TANK TYPE	DEAD LOAD (KIPS)	WIND LOAD (KIPS)
SODIUM BISULFITE TANK	110	6

NOTES:

1. FOUNDATIONS HAVE BEEN DESIGNED FOR THE SERVICE LOAD COMBINATIONS INDICATED IN THE TABLE.
2. CONSTRUCTION OF FOUNDATIONS, INCLUDING FABRICATION OF REINFORCING, SHALL NOT BEGIN UNTIL ENGINEER HAS REVIEWED AND ACCEPTED THE CHEMICAL TANK SUBMITTAL INCLUDING ANCHORAGE DESIGN BY THE TANK SUPPLIER.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY C. GOOS
116686
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION–DISINFECTION REDESIGN
AMENDMENT

STRUCTURAL

SODIUM BISULFITE BULK STORAGE FOUNDATION AND TOP PLAN

WBS NUMBER	R-0026-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.

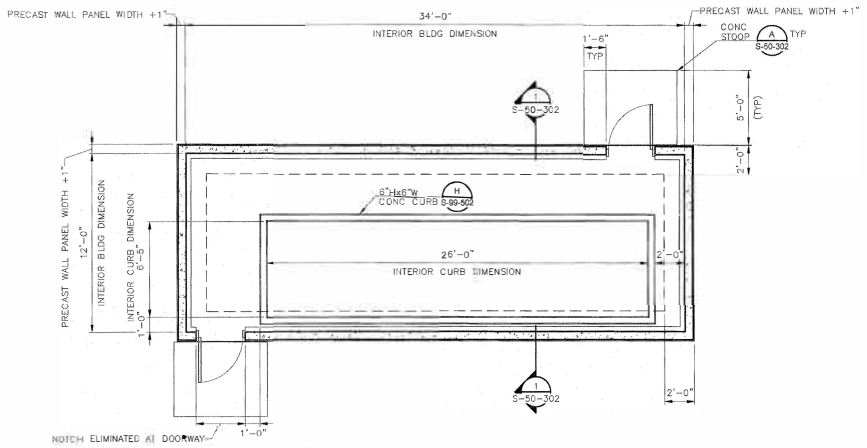
FOR CITY OF HOUSTON USE ONLY

80367

S-50-103

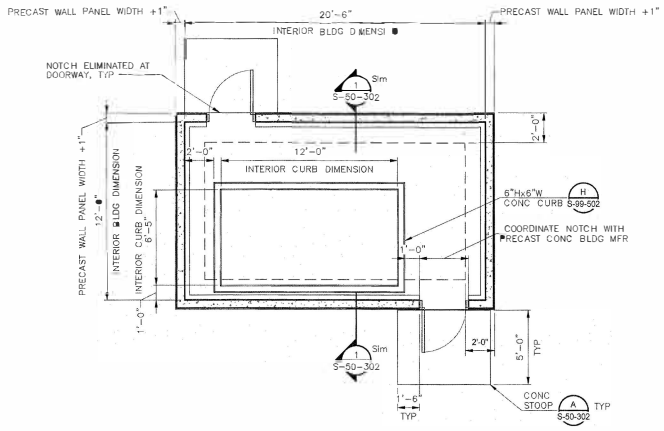
SHEET NO 67 OF 173

FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-50-CHEM_STOR-RV.rvt



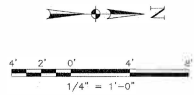
SODIUM HYPOCHLORITE CHEM FEED BUILDING FOUNDATION PLAN

1/4" = 1'-0"



SODIUM BISULFITE CHEM FEED BUILDING FOUNDATION PLAN

1/4" = 1'-0"



BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS — JEFFREY L. BOOS — 116686 — LICENSED PROFESSIONAL ENGINEER

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT

STRUCTURAL

CHEM FEED BUILDING FOUNDATION PLANS

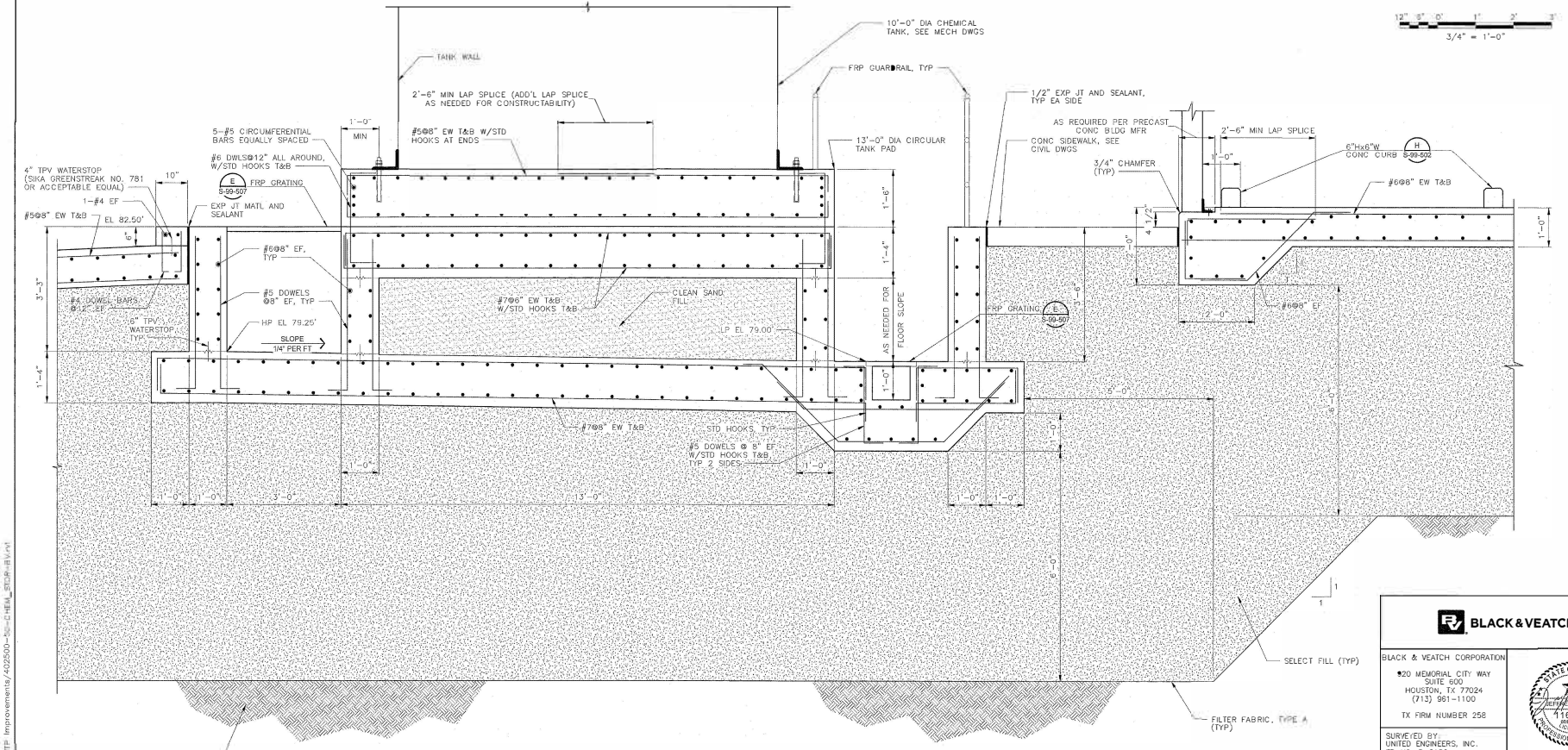
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	68 OF 173

FOR CITY OF HOUSTON USE ONLY

80367

S-50-104

FILE PATH: BIM 360:///402500 - COH Intercontinental Airport WWTP Improvements/402500-50-C-HEM_STOR-BLV.rvt



1 SECTION
S-50-100 3/4" = 1'-0"
S-50-102

FILE PATH: RVT 360L://402500 - COH Intercontinental Airport WWTP Improvements/402500-Str-CHEM_STOR-R18.rvt

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT

STRUCTURAL

SODIUM HYPOCHLORITE STORAGE
SECTION

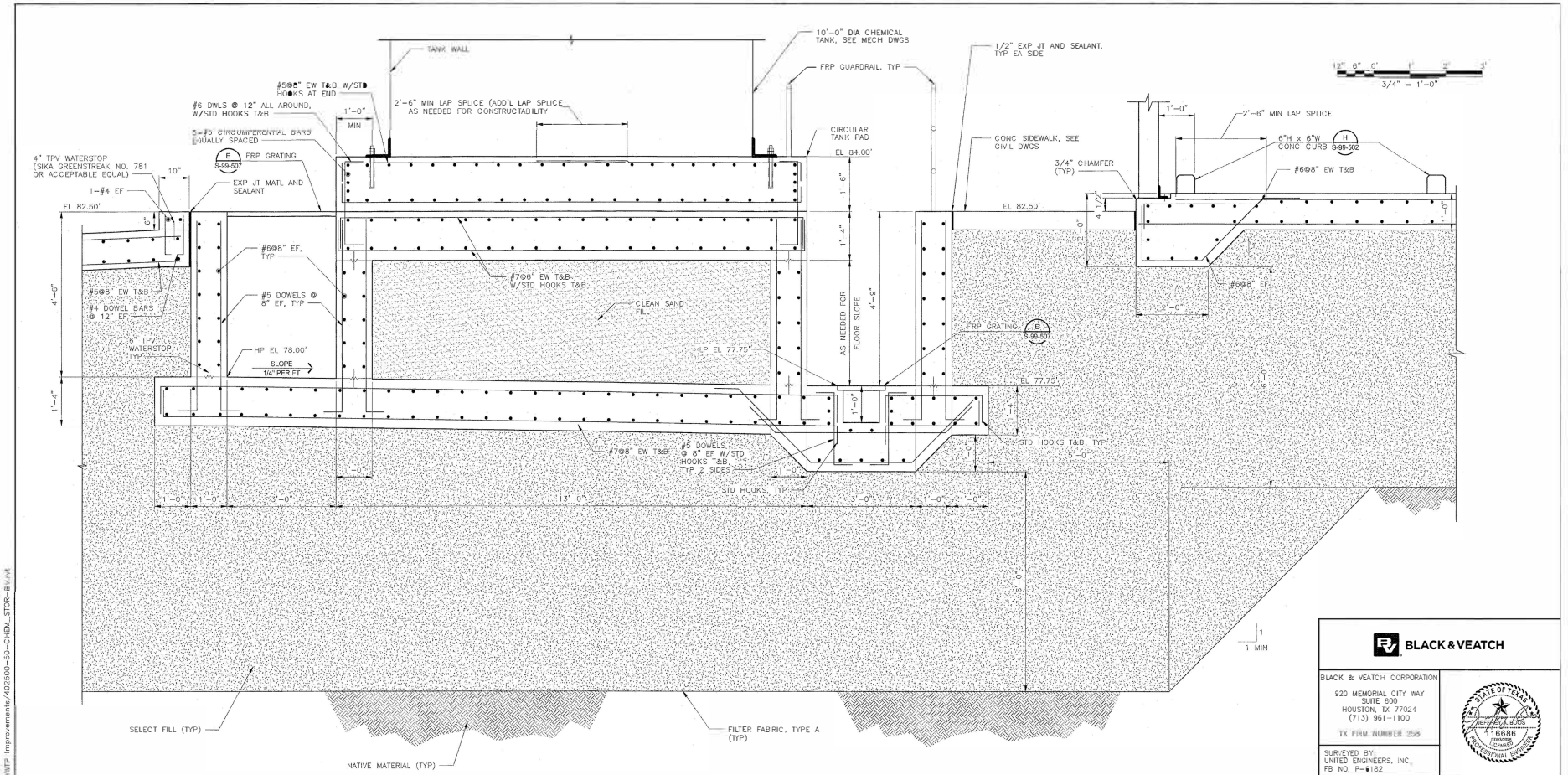
WBS NUMBER	R-00255-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIBUR RAHMAN, P.E.

FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
SHAHIBUR RAHMAN
80367
LICENSED
PROFESSIONAL ENGINEER

S-50-300

SHEET NO. 69 OF 173



1 SECTION
S-50-101 3/4" = 1'-0"
S-50-103

FILE PATH: RM 365://402500 - COH intercontinental Airport WWTP Improvements/402500-50-CHEM_STOR-BV.rvt

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

JEFFREY A. BOOS 116686 LICENSED PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT

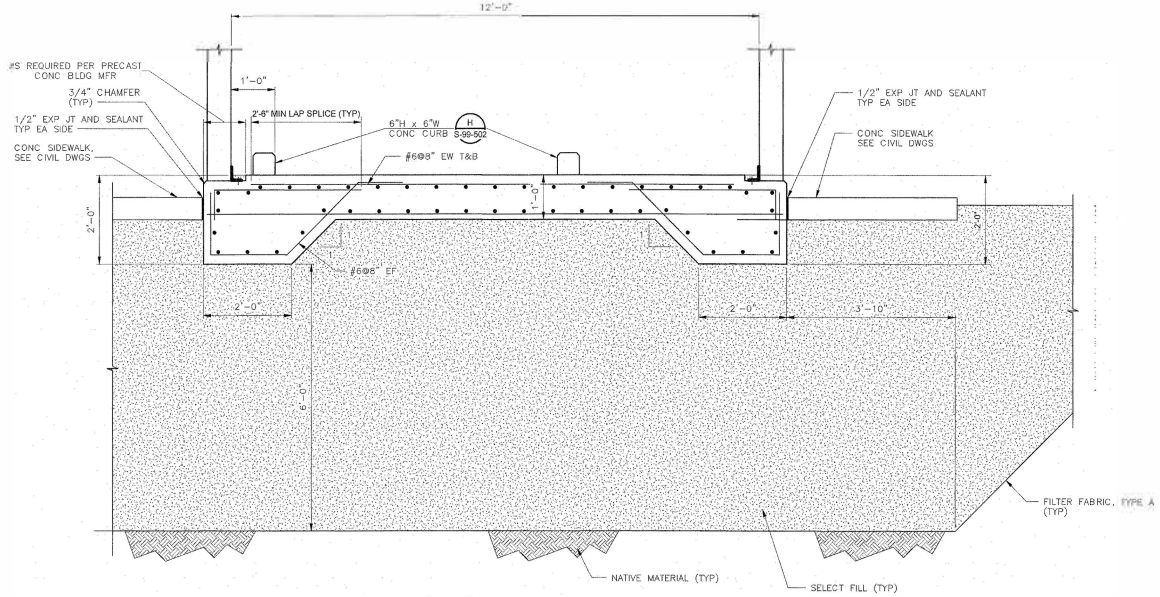
STRUCTURAL

SODIUM BISULFITE STORAGE SECTION

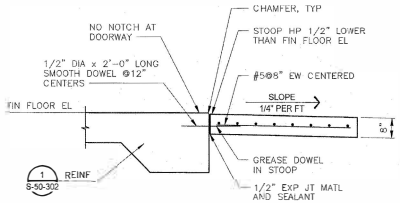
NBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 10 OF 173	

S-50-301

ACCEPTED 80367



1 SECTION
S-50-104 3/4" = 1'-0"



A CONCRETE STOOP DETAIL
S-50-104 1/2" = 1'-0"

12" 6" 0" 1' 2' 3'
3/4" = 1'-0"

12' 6" 0' 1' 2' 3' 4' 5'
1/2" = 1'-0"

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY J. BOOS
116686
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT

STRUCTURAL

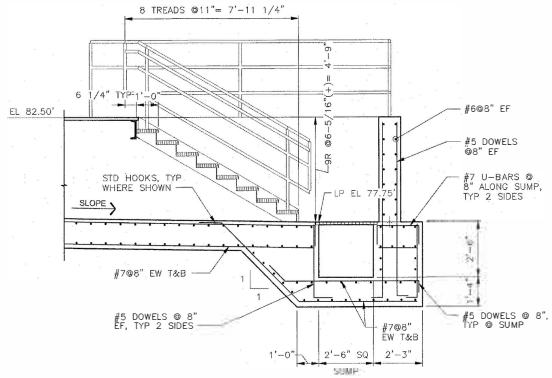
CHEM FEED BUILDING SECTION

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 71 OF 173	

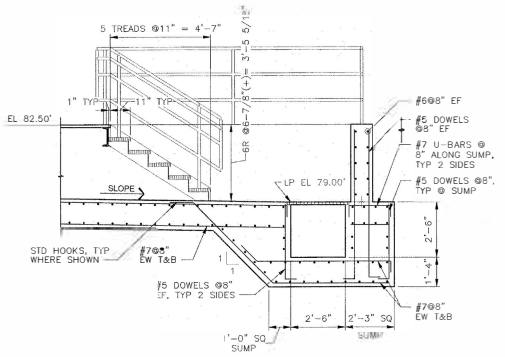
80367

S-50-302

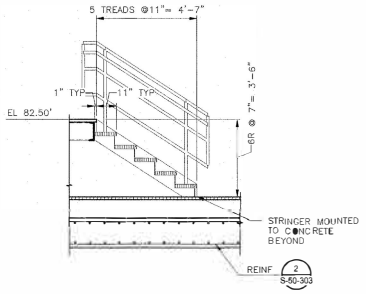
FILE PATH: BIM 360://402590 - CDH Intercontinental Airport WWTP Improvements/402590-S6-CHEM_STOR-BV.rvt



1 SECTION
S-50-103 3/8" = 1'-0"



2 SECTION
S-50-102 3/8" = 1'-0"



3 SECTION
S-50-102 3/8" = 1'-0"

12" 0' 1' 2' 3' 4' 5' 6' 7'
3/8" = 1'-0"

FRP STAIR, GRATING, AND GUARDRAIL DESIGN NOTES:

1. STAIRS, GRATING, AND GUARDRAIL SHALL BE DESIGNED BY THE FRP SUPPLIER IN GENERAL ACCORDANCE WITH THE DETAILS AND LAYOUT INDICATED ON THE DESIGN DRAWINGS. THE DESIGN SHALL COMPLY WITH ALL APPLICABLE PROVISIONS OF THE LOCAL BUILDING CODE AND OSHA.
2. THE SHOP DRAWINGS SHALL BE SEALED BY AN ENGINEER REGISTERED IN THE STATE OF TEXAS AND SUBMITTED FOR REVIEW PRIOR TO FABRICATION. IF REQUESTED, SEALED CALCULATIONS ARE TO BE SUBMITTED FOR REVIEW.
3. ALL BEAMS, RAILINGS, AND GRATING SHALL BE FIBERGLASS AS MANUFACTURED BY FIBERGRATE OR APPROVED EQUAL. SYSTEM DESIGN SHALL BE BY MANUFACTURER, INDICATED MEMBER SIZES SHALL BE MINIMUMS.
4. THE COMPLETED STAIR FABRICATIONS SHALL SUPPORT A UNIFORM LIVE LOAD OF 100 LBS PER SQUARE FOOT OR A 300 LB CONCENTRATED LIVE LOAD APPLIED ON AN AREA OF 4 SQUARE INCHES. VERTICAL DEFLECTIONS UNDER FULL LIVE LOAD SHALL BE LIMITED TO SPAN/240. STAIRS AND LANDINGS SHALL BE BRACED OR OTHERWISE DESIGNED TO AVOID NOTICEABLE SIDESWAY.
5. AT A MINIMUM, GUARDRAILING AND HANDRAILING SHALL BE DESIGNED TO WITHSTAND A UNIFORM LOAD OF 50 LBS PER FOOT APPLIED IN ANY DIRECTION AT THE TOP, AND A CONCENTRATED LOAD OF 200 LBS APPLIED IN ANY DIRECTION AT ANY POINT ALONG THE TOP. THE UNIFORM LOAD AND THE CONCENTRATED LOAD NEED NOT BE ASSUMED TO ACT CONCURRENTLY. THE DESIGN LOAD SHALL BE TRANSFERRED THROUGH THE ENTIRE RAILING SYSTEM AND ITS SUPPORT TO THE STRUCTURE. AN ALLOWABLE STRESS INCREASE OF 1/3 SHALL NOT BE INCORPORATED INTO THE DESIGN OF ANY PART OF THE RAILING SYSTEM.
6. THE STAIR DESIGN AND DETAILS SHALL BE COORDINATED WITH THE HANDRAILING AND GUARDRAILING SUPPLIED. STAIR MEMBERS SHALL BE ADEQUATE TO ACCEPT LOADS FROM THE RAIL POSTS BASED UPON THE CRITERIA INDICATED IN THE DESIGN NOTES.
7. CONNECTIONS TO THE SUPPORTING STRUCTURE SHALL BE ADEQUATE TO TRANSFER ALL LOADINGS, AND SHALL BE DESIGNED IN ACCORDANCE WITH ALL APPLICABLE PROVISIONS OF ACI 318. THE NUMBER AND TYPE OF CONNECTIONS SHALL COMPLY AT A MINIMUM, WITH THESE DESIGN DRAWINGS. ALL NECESSARY BRACKETS, BOLTS, AND ANCHORS SHALL BE PROVIDED.
8. ALL FASTENERS SHALL BE TYPE 316 STAINLESS STEEL.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC
FB NO. P-6182

STATE OF TEXAS
REGISTERED
JEFFREY A. BOOS
116686
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT

STRUCTURAL

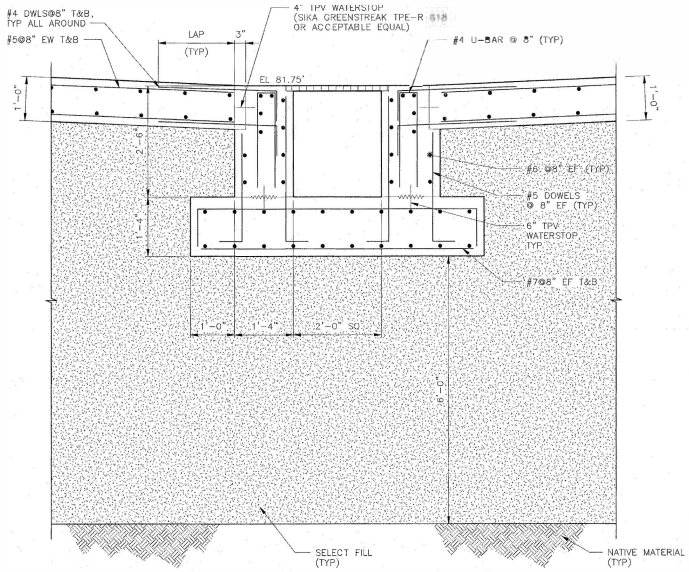
STAIR CASE SECTIONS

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	72 OF 173

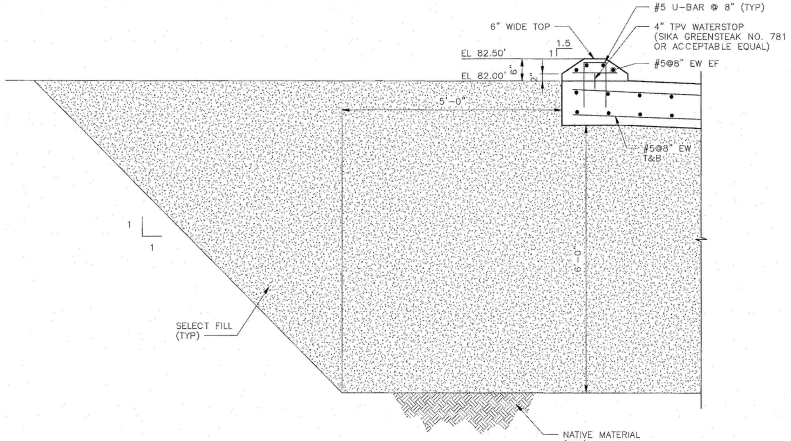
FOR CITY OF HOUSTON USE ONLY
ACCEPTED
80367
HOUSTON, TEXAS

S-50-303

FILE PATH: P:\Houston\IAH 350\402500 - CH4 Intercontinental Airport WWTP Improvements\402500-50-CHEM_STOR-BV.rvt



1 SECTION
S-50-102 3/4" = 1'-0"
S-50-103



2 SECTION
S-50-102 3/4" = 1'-0"
S-50-103

3/4" = 1'-0"

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT

STRUCTURAL

FILL STATION SUMP AND CONTAINMENT CURB

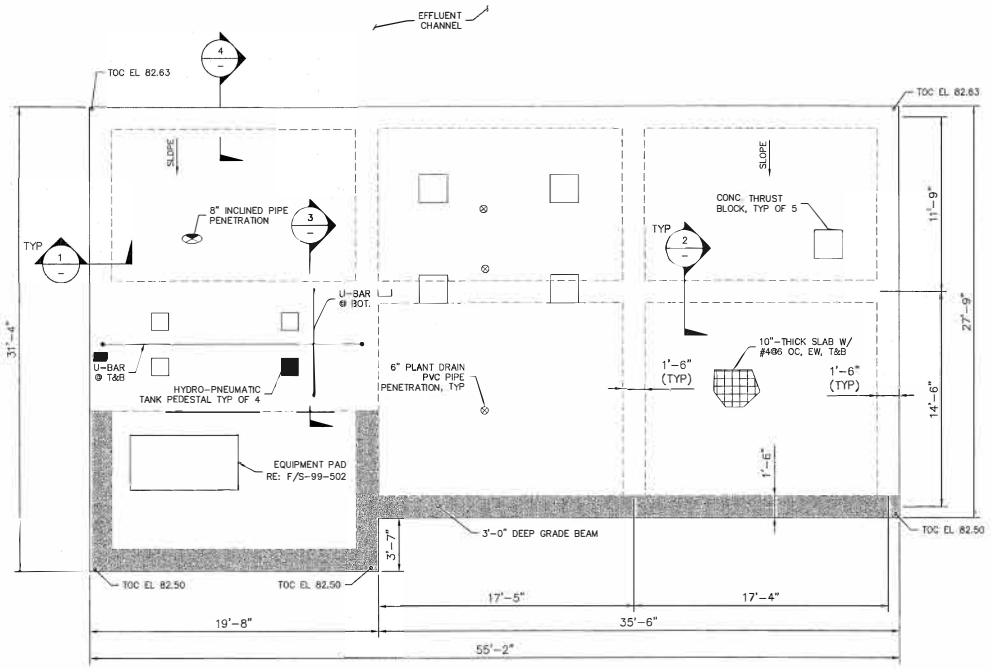
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	73 OF 173

FOR CITY OF HOUSTON USE ONLY

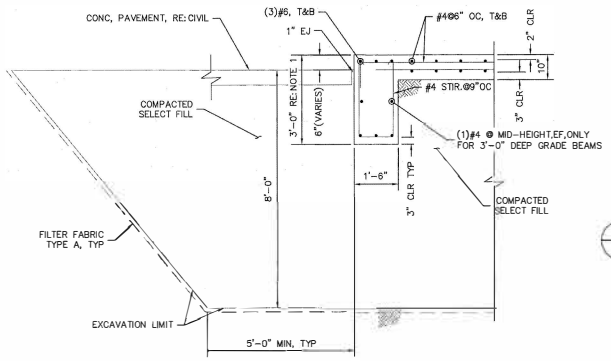
PUBLIC WORKS
80367
REGISTERED
ENGINEER
STATE OF TEXAS

S-50-304

FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-50-CivEVa_STOR-EV.rvt

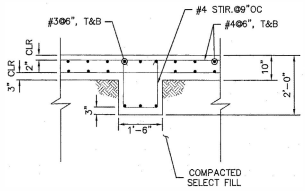


NPW STATION PAD
1/4" = 1'-0"



SECTION NOTES:
1. GRADE BEAMS MARKED IN GRAY IN PLAN HAS DEPTH OF 3'-0". THE REST IS 2'-0"

1 TYPICAL EXTERIOR GRADE BEAM SECTION
1/2" = 1'-0"

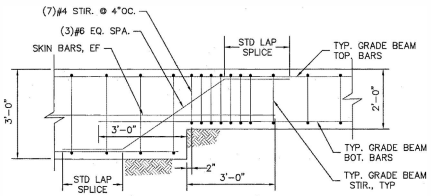


2 TYPICAL INTERIOR GRADE BEAM SECTION
1/2" = 1'-0"

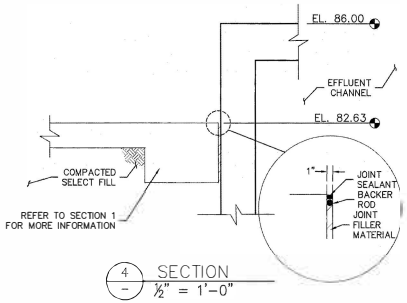
NOTES BY SYMBOL (X)
1. IF REQUIRED, THE DIMENSIONS OF THE HYDRO-PNEUMATIC TANK PAD MAY BE ADJUSTED TO ALLOW FOR ADEQUATE SPACING FOR THE FOUR PEDESTAL SUPPORTS.

N

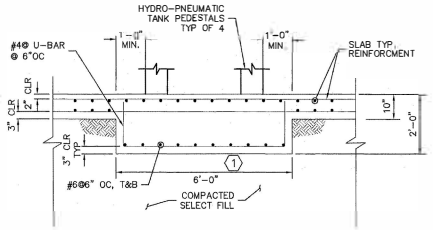
4' 2' 0' 4'
3/8"=1'-0"



5 STEPPED GRADE BEAM DETAIL
1/2" = 1'-0"



4 SECTION
1/2" = 1'-0"



3 SECTION
1/2" = 1'-0"

SHEET NOTES:

1. FOUNDATION DESIGN IS IN ACCORDANCE WITH SUBSURFACE EXPLORATION BY GEOTECH ENGINEERING AND TESTING, HOUSTON TEXAS, JOB NUMBER 19-01E DATED NOVEMBER 24, 2021. COPIES OF THE REPORT MAY BE OBTAINED FROM THE OWNER. ALL BIDDERS MUST BECOME FAMILIAR WITH THE CONTENTS OF THIS REPORT. THE FOLLOWING INFORMATION IS PROVIDED TO ASSIST IN THE LEVEL OF UNDERSTANDING OF THE SUBSURFACE CONDITIONS BUT SHALL NOT BE CONSIDERED TO COMPLETELY DESCRIBE ALL CONDITIONS PRESENT AND RELEVANT TO THE FOUNDATION CONSTRUCTION.
2. SITE CONDITIONS AT THE NPW PAD, B-2, GENERALLY CONSIST OF THE FOLLOWING:
   0'-2' FILL: LEAN CLAY (CL)
   2'-14' LEAN CLAY (CL)
   14'-33' FAT CLAY (CH)
3. AT THE TIME OF TESTING, GROUNDWATER WAS ENCOUNTERED AT A DEPTH OF 21 FT. GROUNDWATER LEVELS MAY BE DIFFERENT DURING CONSTRUCTION.
4. A FOUNDATION HAS BEEN DESIGNED FOR BEARING INTO SOIL AT A MINIMUM OF 1'-6" BELOW FINAL GRADE. THE GRADE BEAMS HAVE BEEN DESIGNED FOR A NET ALLOWABLE SOIL BEARING PRESSURE OF 2500 PSF.
5. REMOVE UPPER 3 FT OF EXISTING SOILS FROM FOOTING AND REPLACE WITH COMPACTED SELECT STRUCTURAL FILL. THE SELECT STRUCTURAL FILL SHALL EXTEND 5 FT BEYOND THE STRUCTURE PERIMETER. THESE SOILS SHALL BE PLACED IN LOOSE LIFTS NOT EXCEEDING 8" AND COMPACTED TO 95% OF MAXIMUM STANDARD DENSITY (ASTM D-698) AND THE MOISTURE CONTENT ADJUSTED OPTIMUM AND 3%.
6. PROPER DRAINAGE SHALL BE MAINTAINED AT ALL TIMES BOTH UNDER AND ADJACENT TO FOUNDATIONS. EXCAVATIONS SHALL AT NO TIME BE ALLOWED TO RETAIN WATER. IF EXCAVATIONS BECOME WET, THE WET MATERIALS SHALL BE REMOVED TO DRY, SOUND MATERIAL AND THE TESTING LABORATORY SHALL PERFORM TESTS TO CONFIRM APPROPRIATE DENSITY PRIOR TO PLACEMENT OF CONCRETE.

GENERAL NOTES:

1. REFER TO CIVIL, MECHANICAL, AND ELECTRICAL SHEETS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
2. SEE STRUCTURAL GENERAL NOTES, STANDARD DETAILS, AND PROJECT SPECIFICATIONS FOR ADDITIONAL INFORMATION NOT SHOWN.
3. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS PRIOR TO CONSTRUCTION OR ORDERING MATERIALS.
4. CONDUIT AND PIPE PENETRATIONS SHALL AVOID STUBBING THROUGH GRADE BEAMS. ADDITIONALLY, GRADE BEAM AND SLAB REINFORCEMENT SHALL NOT BE CUT TO ACCOMMODATE CONDUIT. SEE STRUCTURAL STANDARD DETAILS FOR SLAB REINFORCEMENT TREATMENT AT PENETRATIONS AND BLOCKOUTS.

CP&Y, INC.
TEXAS REGISTERED ENGINEERING FIRM F-1741

BLACK & VEATCH

CP&Y, INC.
11757 KATY FREEWAY
SUITE 1540
HOUSTON, TX 77079
(713) 532-1730
TX FIRM NUMBER F-1741

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
MASOUD CHAHREMAN
134629
LICENSED PROFESSIONAL ENGINEER
7/2/2025

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION-DISINFECTION REDESIGN AMENDMENT
STRUCTURAL

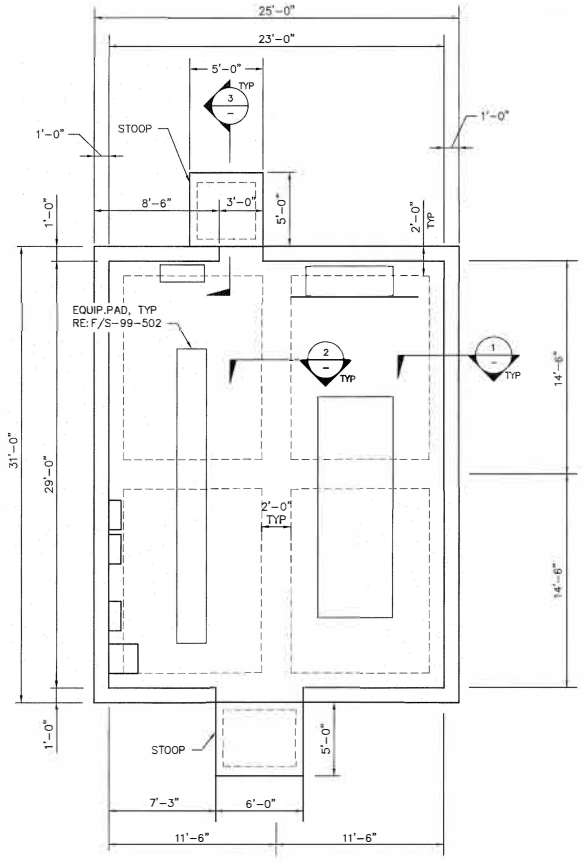
NPW PAD PLAN AND SECTION

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 74 OF 173	

80367

S-51-101

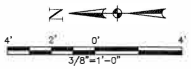
FILE PATH: C:\pwworking\stv\pw_stv\d103924\S-51-101A.dwg

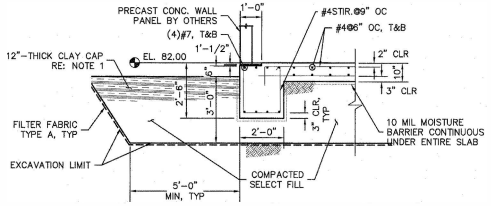


PLAN NOTES

1. THE CONNECTION DETAILS FOR THE PRECAST CONCRETE WALL PANEL TO FOUNDATION SHALL BE REVIEWED AND APPROVED BY THE ENGINEER OF RECORD PRIOR TO CONSTRUCTION.
2. 12" WIDE LEDGE SHOWN AROUND THE FOUNDATION MAY CHANGE PER PRECAST CONCRETE WALL PANEL THICKNESS AND CONNECTION DETAILS.
3. INTERNAL WALL-TO-WALL DIMENSION OF THE BUILDING SHALL BE 29'X23'.
4. COORDINATE OPENINGS SIZE AND LOCATION ON THE WALL PANELS FOR HVAC DUCT WITH MECHANICAL PRIOR TO CONSTRUCTION.
5. PRIOR TO FABRICATION OR CONSTRUCTION COORDINATE ALL FOUNDATION DIMENSIONS INCLUDING DOOR LOCATIONS AND LEDGE DIMENSIONS WITH BUILDING MANUFACTURER.
6. REFER TO SPECIFICATION 13120 "PRE-CAST SEGMENTAL CONCRETE BUILDING" FOR DESIGN AND PERFORMANCE REQUIREMENTS.

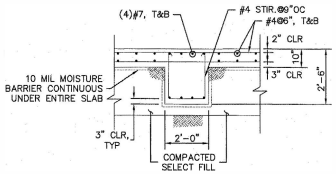
DISINFECTION ELECTRICAL BUILDING FOUNDATION PLAN
1/4" = 1'-0"



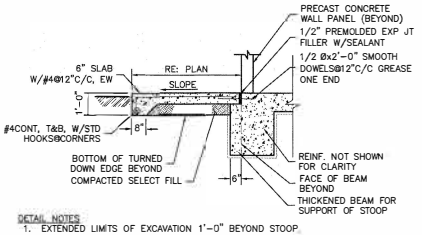


SECTION NOTES:
1. DO NOT PLACE 12"-THICK CLAY CAP WHERE THERE IS A CONCRETE PAVEMENT ADJACENT TO THE STRUCTURE.

1 — TYPICAL EXTERIOR GRADE BEAM SECTION
3/8" = 1'-0"



2 — TYPICAL INTERIOR GRADE BEAM SECTION
3/8" = 1'-0"



DETAIL NOTES
1. EXTENDED LIMITS OF EXCAVATION 1'-0" BEYOND STOOP.

3 — STOOP SECTION
NOT TO SCALE

GENERAL NOTES FOR FOUNDATION AND SUBGRADE PREPARATION

1. FOUNDATION DESIGN IS IN ACCORDANCE WITH SUBSURFACE EXPLORATION MEMORANDUM BY GEOTECH ENGINEERING AND TESTING, HOUSTON, TEXAS, JOB NUMBER 19-061E, DATE, NOVEMBER 24, 2021. COPIES OF THE REPORT MAY BE OBTAINED FROM THE OWNER. ALL BIDDERS MUST BECOME FAMILIAR WITH THE CONTENTS OF THIS REPORT. THE FOLLOWING INFORMATION IS PROVIDED TO ASSIST IN THE LEVEL OF UNDERSTANDING OF THE SUBSURFACE CONDITIONS BUT SHALL NOT BE CONSIDERED TO COMPLETELY DESCRIBE ALL CONDITIONS PRESENT AND RELEVANT TO THE FOUNDATION CONSTRUCTION.
2. SITE CONDITIONS AT THE UV ELECTRICAL BUILDING, B-5, GENERALLY CONSIST OF THE FOLLOWING:

   0' – 2' FILL: LEAN CLAY (CL)
   2' – 12' LEAN CLAY (CL)
   12' – 40' FAT CLAY (CH)

3. AT THE TIME OF TESTING, GROUNDWATER WAS ENCOUNTERED AT A DEPTH OF 28.3 FT. GROUNDWATER LEVELS MAY BE DIFFERENT DURING CONSTRUCTION.
4. A FOUNDATION HAS BEEN DESIGNED FOR BEARING INTO SOIL AT A MINIMUM DEPTH OF 24" BELOW THE FINAL GRADE ELEVATION. THE GRADE BEAMS HAVE BEEN DESIGNED FOR A NET ALLOWABLE SOIL BEARING PRESSURE OF 2500 PSF.
5. REMOVE UPPER 3 FT OF EXISTING SOILS FROM FOOTING AND REPLACE WITH COMPACTED SELECT STRUCTURAL FILL. THE SELECT STRUCTURAL FILL SHALL EXTEND 5 FT BEYOND THE STRUCTURE PERIMETER. THESE SOILS SHALL BE PLACED IN LOOSE LIFTS NOT EXCEEDING 8" AND COMPACTED TO 95% OF MAXIMUM STANDARD DENSITY (ASTM D-698) AND THE MOISTURE CONTENT ADJUSTED OPTIMUM AND 3%.
6. AT THE TIME OF EXCAVATION, THE OWNER'S TESTING LABORATORY AND THE ENGINEER SHALL BE NOTIFIED TO OBSERVE FOUNDATION CONSTRUCTION TO ENSURE A DESIRABLE STRATUM HAS BEEN REACHED.

GENERAL NOTES

1. REFER TO CIVIL, MECHANICAL, AND ELECTRICAL SHEETS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
2. SEE STRUCTURAL GENERAL NOTES, STANDARD DETAILS, AND PROJECT SPECIFICATIONS FOR ADDITIONAL INFORMATION NOT SHOWN.
3. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS PRIOR TO CONSTRUCTION OR ORDERING MATERIALS.
4. CONDUIT AND PIPE PENETRATIONS SHALL AVOID STUBBING THROUGH GRADE BEAMS. ADDITIONALLY, GRADE BEAM AND SLAB REINFORCEMENT SHALL NOT BE CUT TO ACCOMMODATE CONDUIT. SEE STRUCTURAL STANDARD DETAILS FOR SLAB REINFORCEMENT TREATMENT AT PENETRATIONS AND BLOCKOUTS.

CP&Y, INC.
TEXAS REGISTERED ENGINEERING FIRM F-1741

BLACK & VEATCH

CP&Y, INC.
11757 KATY FREEWAY
SUITE 1540
HOUSTON, TX 77079
(713) 532-1730
TX FIRM NUMBER F-1741

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
MASOUD GHAHREMAN
134629
LICENSED
PROFESSIONAL ENGINEER
7/2/2025

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT
STRUCTURAL

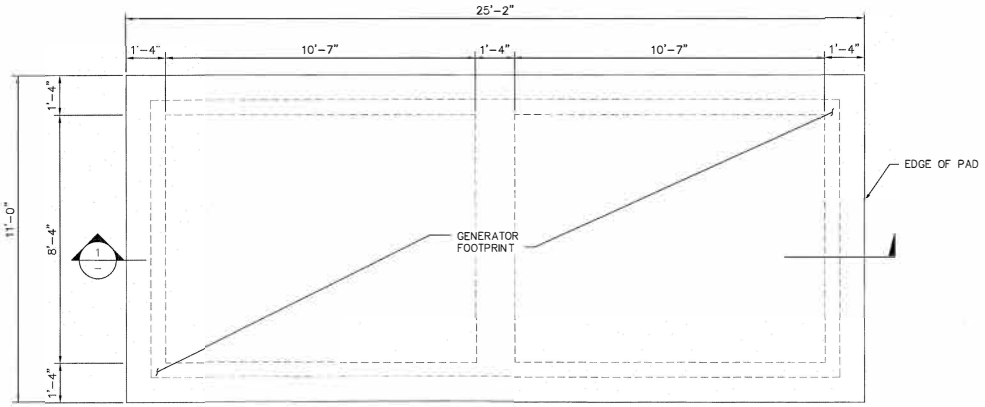
DISINFECTION ELECTRICAL BUILDING FOUNDATION PLAN AND SECTIONS

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 75 OF 173	

PROFESSIONAL ENGINEER
80367
12/31/2026

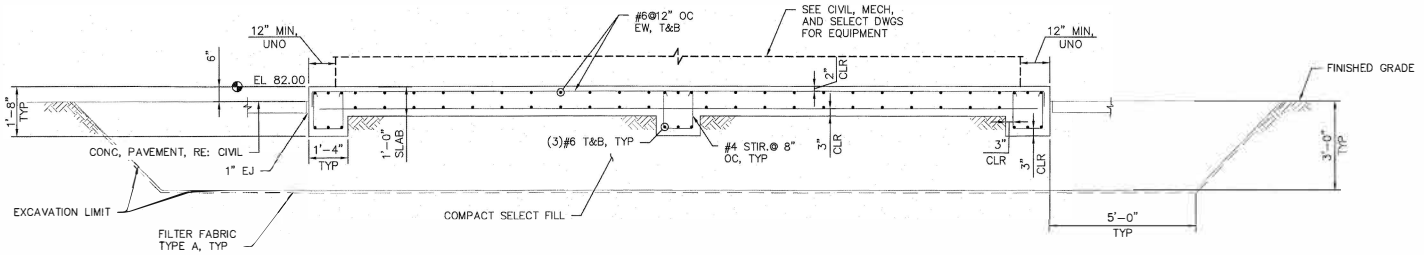
S-61-101

FILE PATH: C:\pwworking\str\pw_str\d1039924\S-61-101A.dwg

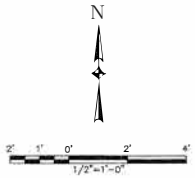


PLAN NOTES:
1. COORDINATE CONDUITS PENETRATION THROUGH SLAB WITH ELECTRICAL DRAWINGS. NO VERTICAL PENETRATIONS THROUGH GRADE BEAMS IS ALLOWED.
2. COORDINATE SLAB DIMENSIONS WITH GENERATOR'S MANUFACTURER PRIOR TO CONSTRUCTION.

DISINFECTION ENGINE GENERATOR PAD PLAN
1/2" = 1'-0"



1 SECTION
1/2" = 1'-0"



GENERAL NOTES FOR FOUNDATION AND SUBGRADE PREPARATION

1. FOUNDATION DESIGN IS IN ACCORDANCE WITH SUBSURFACE EXPLORATION MEMORANDUM BY GEOTECH ENGINEERING AND TESTING, HOUSTON, TEXAS, JOB NUMBER 19-061E, DATE, NOVEMBER 24, 2021. COPIES OF THE REPORT MAY BE OBTAINED FROM THE OWNER. ALL BIDDERS MUST BECOME FAMILIAR WITH THE CONTENTS OF THIS REPORT. THE FOLLOWING INFORMATION IS PROVIDED TO ASSIST IN THE LEVEL OF UNDERSTANDING OF THE SUBSURFACE CONDITIONS BUT SHALL NOT BE CONSIDERED TO COMPLETELY DESCRIBE ALL CONDITIONS PRESENT AND RELEVANT TO THE FOUNDATION CONSTRUCTION.
2. SITE CONDITIONS AT THE UV ENGINE GENERATOR PAD, B-5, GENERALLY CONSIST OF THE FOLLOWING:
   0' – 2' FILL: LEAN CLAY (CL)
   2' – 12' LEAN CLAY (CL)
   12' – 40' FAT CLAY (CH)
3. AT THE TIME OF TESTING, GROUNDWATER WAS ENCOUNTERED AT A DEPTH OF 28.3 FT. GROUNDWATER LEVELS MAY BE DIFFERENT DURING CONSTRUCTION.
4. A FOUNDATION HAS BEEN DESIGNED FOR BEARING INTO SOIL AT A MINIMUM DEPTH OF 14" BELOW THE FINAL GRADE ELEVATION. THE GRADE BEAMS HAVE BEEN DESIGNED FOR A NET ALLOWABLE SOIL BEARING PRESSURE OF 2500 PSF.
5. REMOVE UPPER 3 FT OF EXISTING SOILS FROM FOOTING AND REPLACE WITH COMPACTED SELECT STRUCTURAL FILL. THE SELECT STRUCTURAL FILL SHALL EXTEND 5 FT BEYOND THE STRUCTURE PERIMETER. THESE SOILS SHALL BE PLACED IN LOOSE LIFTS NOT EXCEEDING 8" AND COMPACTED TO 95% OF MAXIMUM STANDARD DENSITY (ASTM D-698) AND THE MOISTURE CONTENT ADJUSTED OPTIMUM AND 3%.
6. AT THE TIME OF EXCAVATION, THE OWNER'S TESTING LABORATORY AND THE ENGINEER SHALL BE NOTIFIED TO OBSERVE FOUNDATION CONSTRUCTION TO ENSURE A DESIRABLE STRATUM HAS BEEN REACHED.

GENERAL NOTES

1. REFER TO CIVIL, MECHANICAL, AND ELECTRICAL SHEETS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
2. SEE STRUCTURAL GENERAL NOTES, STANDARD DETAILS, AND PROJECT SPECIFICATIONS FOR ADDITIONAL INFORMATION NOT SHOWN.
3. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS PRIOR TO CONSTRUCTION OR ORDERING MATERIALS.
4. CONDUIT AND PIPE PENETRATIONS SHALL AVOID STUBBING THROUGH GRADE BEAMS. ADDITIONALLY, GRADE BEAM AND SLAB REINFORCEMENT SHALL NOT BE CUT TO ACCOMMODATE CONDUIT. SEE STRUCTURAL STANDARD DETAILS FOR SLAB REINFORCEMENT TREATMENT AT PENETRATIONS AND BLOCKOUTS.

CP&Y, INC.
TEXAS REGISTERED ENGINEERING FIRM F-1741

BLACK & VEATCH

CP&Y, INC.
11757 KATY FREEWAY
SUITE 1540
HOUSTON, TX 77079
(713) 532-1730
TX FIRM NUMBER F-1741

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
MASOUD GHAHREMAN
134629
LICENSED
PROFESSIONAL ENGINEER
7/2/2025

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT
STRUCTURAL

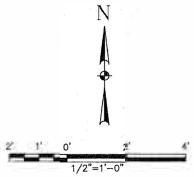
DISINFECTION ENGINE GENERATOR PAD PLAN AND SECTION

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 76 OF 173	

80367
REGISTERED
PROFESSIONAL
ENGINEER

S-61-102

FILE PATH: C:\pwworking\sth\pw_sth\d1039924\S-61-102A.dwg



GENERAL NOTES FOR FOUNDATION AND SUBGRADE PREPARATION

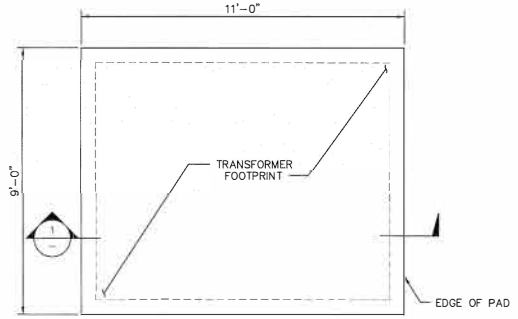
1. FOUNDATION DESIGN IS IN ACCORDANCE WITH SUBSURFACE EXPLORATION MEMORANDUM BY GEOTECH ENGINEERING AND TESTING, HOUSTON, TEXAS, JOB NUMBER 19-061E, DATE, NOVEMBER 24, 2021. COPIES OF THE REPORT MAY BE OBTAINED FROM THE OWNER. ALL BIDDERS MUST BECOME FAMILIAR WITH THE CONTENTS OF THIS REPORT. THE FOLLOWING INFORMATION IS PROVIDED TO ASSIST IN THE LEVEL OF UNDERSTANDING OF THE SUBSURFACE CONDITIONS BUT SHALL NOT BE CONSIDERED TO COMPLETELY DESCRIBE ALL CONDITIONS PRESENT AND RELEVANT TO THE FOUNDATION CONSTRUCTION.
2. SITE CONDITIONS AT THE UV ELECTRICAL BUILDING TRANSFORMER PAD, B-5, GENERALLY CONSIST OF THE FOLLOWING:

   0' – 2' FILL: LEAN CLAY (CL)
   2' – 12' LEAN CLAY (CL)
   12' – 40' FAT CLAY (CH)

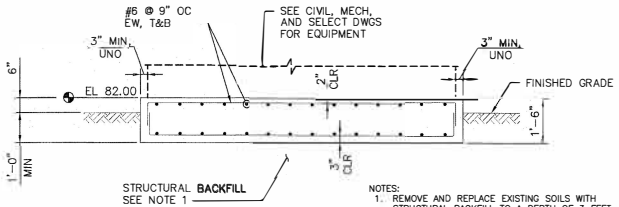
3. AT THE TIME OF TESTING, GROUNDWATER WAS ENCOUNTERED AT A DEPTH OF 28.3 FT. GROUNDWATER LEVELS MAY BE DIFFERENT DURING CONSTRUCTION.
4. A FOUNDATION HAS BEEN DESIGNED FOR BEARING INTO SOIL AT A MINIMUM DEPTH OF 12" BELOW THE FINAL GRADE ELEVATION. THE GRADE BEAMS HAVE BEEN DESIGNED FOR A NET ALLOWABLE SOIL BEARING PRESSURE OF 2500 PSF.
5. THE SELECT STRUCTURAL FILL SHALL EXTEND 5 FT BEYOND THE STRUCTURE PERIMETER. THESE SOILS SHALL BE PLACED IN LOOSE LIFTS NOT EXCEEDING 8" AND COMPACTED TO 95% OF MAXIMUM STANDARD DENSITY (ASTM D-698) AND THE MOISTURE CONTENT ADJUSTED OPTIMUM AND 3%.
6. AT THE TIME OF EXCAVATION, THE OWNER'S TESTING LABORATORY AND THE ENGINEER SHALL BE NOTIFIED TO OBSERVE FOUNDATION CONSTRUCTION TO ENSURE A DESIRABLE STRATUM HAS BEEN REACHED.

GENERAL NOTES

1. REFER TO CIVIL, MECHANICAL, AND ELECTRICAL SHEETS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
2. SEE STRUCTURAL GENERAL NOTES, STANDARD DETAILS, AND PROJECT SPECIFICATIONS FOR ADDITIONAL INFORMATION NOT SHOWN.
3. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS PRIOR TO CONSTRUCTION OR ORDERING MATERIALS.



DISINFECTION ELECTRICAL BUILDING TRANSFORMER PAD PLAN
1/2" = 1'-0"



NOTES:
1. REMOVE AND REPLACE EXISTING SOILS WITH STRUCTURAL BACKFILL TO A DEPTH OF 3 FEET BELOW FOUNDATION AND EXTENDING 2 FEET, EACH SIDE, BEYOND THE FOOTPRINT OF THE FOUNDATION.
2. COORDINATE CONDUITS PENETRATION THROUGH SLAB WITH ELECTRICAL DRAWINGS.
3. COORDINATE SLAB DIMENSIONS WITH TRANSFORMER'S MANUFACTURER PRIOR TO CONSTRUCTION.

1 — SECTION
1/2" = 1'-0"

CP&Y, INC.
TEXAS REGISTERED ENGINEERING FIRM F-1741

BLACK & VEATCH

CP&Y, INC.
11757 KATY FREEWAY
SUITE 1540
HOUSTON, TX 77079
(713) 532-1730
TX FIRM NUMBER F-1741

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
MASOUD GHAHREMAN
134629
LICENSED PROFESSIONAL ENGINEER
7/2/2025

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT
STRUCTURAL

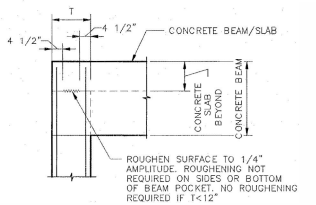
DISINFECTION ELECTRICAL BUILDING TRANSFORMER PAD PLAN AND SECTION

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 77 OF 173	

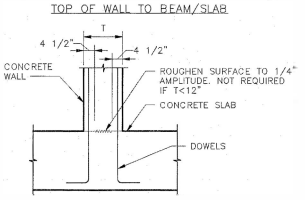
PROFESSIONAL ENGINEER
80367
HOUSTON, TEXAS

S-61-103

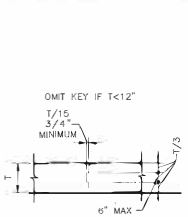
FILE PATH: C:\pwworking\atv\pw_atv\d1039924\S-61-103A.dwg



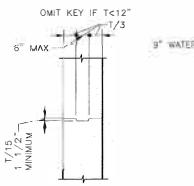
TOP OF WALL TO BEAM/SLAB



SLAB TO BOTTOM OF WALL

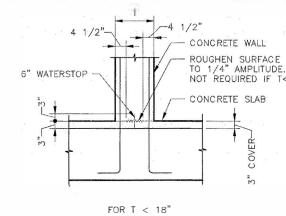


SLAB TO SLAB

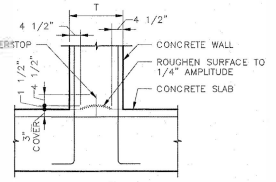


WALL TO WALL

JOINTS WITHOUT WATERSTOPS

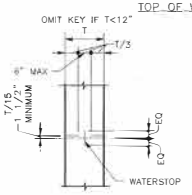


FOR T < 18"



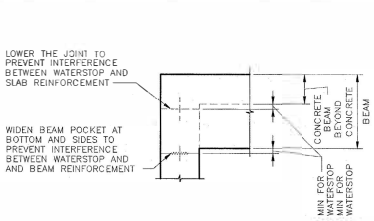
FOR T >= 18"

SLAB TO BOTTOM OF WALL

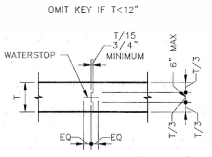


WALL TO WALL

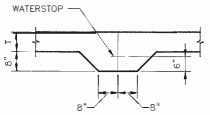
JOINTS WITH WATERSTOPS



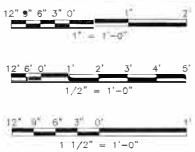
TOP OF WALL TO BEAM/SLAB



SLAB TO SLAB (T>=12")



SLAB TO SLAB (T<12")



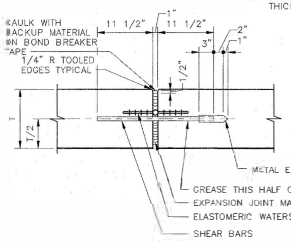
GENERAL NOTES:

1. DETAILS ON THIS DRAWING APPLY TO ALL DRAWINGS UNLESS NOTED OTHERWISE.
2. WORK THIS DRAWING WITH THE STANDARD CONCRETE REINFORCEMENT DETAILS.
3. AT WALL JOINTS AND AT WALL BASE JOINTS, SECURE ALL ELASTOMERIC WATERSTOPS IN THE CORRECT POSITION USING HOG RINGS OR GROMMETS SPACED AT 12 INCHES ALONG THE LENGTH OF THE WATERSTOP AND WIRE TIE TO ADJACENT REINFORCING STEEL.
4. AT SLAB JOINTS AND FOOTING JOINTS, ENSURE SPACE BENEATH AND AROUND WATERSTOP IS COMPLETELY FILLED WITH CONSOLIDATED CONCRETE. DURING OPERATION, MAKE VISUAL INSPECTION OF ENTIRE WATERSTOP AREA. LIMIT CONCRETE PLACEMENT TO ELEVATION OF WATERSTOP IN FIRST LIFT. RAISE ELASTOMERIC WATERSTOPS TO CONFIRM FULL CONSOLIDATION WITHOUT VOIDS. PLACE REMAINING CONCRETE TO FULL DEPTH OF SLAB.

NOTES:

1. REINFORCEMENT STEEL IS CONTINUOUS THROUGH ALL CONSTRUCTION JOINTS.
2. "CSJ W/ WS" – CONSTRUCTION JOINT WITH WATERSTOP.
3. "CSJ" – CONSTRUCTION JOINT WITHOUT WATERSTOP.
4. UNLESS NOTED OTHERWISE, WATERSTOPS MAY BE STEEL OR PVC.
5. WATERSTOP SIZE SHALL BE 6" FOR WALLS AND SLABS 18" OR LESS IN THICKNESS, AND SHALL BE 9" FOR WALLS AND SLABS THICKER THAN 18".

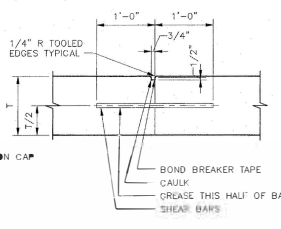
A TYPICAL CONSTRUCTION JOINTS
1/2" = 1'-0"



SLABS

EXPANSION JOINTS

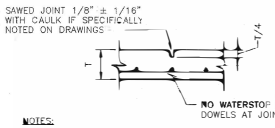
NOTE:
"EJ W/ WS" – EXPANSION JOINT WITH ELASTOMERIC WATERSTOP
"EJ" – EXPANSION JOINT WITHOUT WATERSTOP



SLABS

CONTRACTION JOINTS

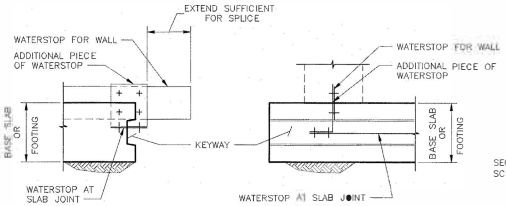
NOTE:
"CJ" – CONTRACTION JOINT WITHOUT WATERSTOP



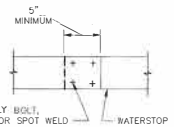
NOTES:

1. TYPICAL CONTROL JOINT NOTES NOT APPLICABLE FOR SAWED CONTRACTION JOINT.
2. "SJ" SAWED JOINT WITH NO WATERSTOP.
3. JOINT FORMED WITH TOOL OR INSERT STRIP MAY BE SUBSTITUTED FOR SAWED TYPE ONLY WITH PRIOR ACCEPTANCE BY THE ENGINEER.
4. IF SINGLE LAYER REINFORCEMENT, EVERY OTHER BAR IS DISCONTINUOUS AT JOINT. IF 2 LAYER REINFORCEMENT, TOP LAYER IS COMPLETELY DISCONTINUOUS AT JOINT.

SAWED CONTRACTION JOINT SLAB ON GRADE

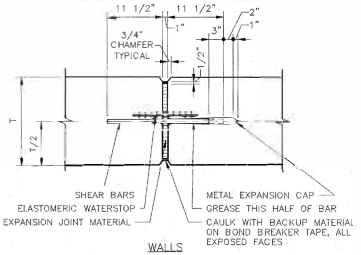


METAL WATERSTOP INTERSECTION AT BASE SLAB CONSTRUCTION JOINT



METAL WATERSTOP SPLICE

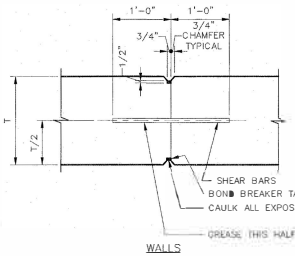
B METAL WATERSTOPS
1 1/2" = 1'-0"



WALLS

EXPANSION JOINTS

NOTE:
"EJ W/ WS" – EXPANSION JOINT WITH ELASTOMERIC WATERSTOP
"EJ" – EXPANSION JOINT WITHOUT WATERSTOP



WALLS

CONTRACTION JOINTS

NOTE:
"CJ" – CONTRACTION JOINT WITHOUT WATERSTOP

C TYPICAL CONTROL JOINTS
1" = 1'-0"

NOTES:

1. PROVIDE 3/4" SHEAR BARS @ 1'-6" CENTERS ACROSS JOINT UNLESS NOTED OTHERWISE.
2. REINFORCING STEEL SHALL NOT BE EXTENDED ACROSS JOINT UNLESS NOTED OTHERWISE. SHEAR BARS SHALL BE SMOOTH FREE FROM RUST OR SCALE, AND GREASED TO PREVENT BOND (ONE HALF BAR ONLY).
3. WATERSTOP SIZE SHALL BE 6" FOR WALLS AND SLABS LESS THAN 18" IN THICKNESS, AND SHALL BE 9" FOR WALLS AND SLABS THICKER THAN 18".

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
DEFFREY A. GOSS
116686
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION–DISINFECTION REDESIGN
AMENDMENT

STRUCTURAL

TYPICAL CONCRETE JOINT DETAILS

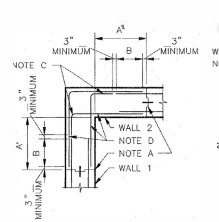
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	S/ SHAHIDUR RAHMAN, P.E.
SHEET NO.	78 OF 173

FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
80367
REGISTERED
ENGINEER
HOUSTON, TEXAS

S-99-501

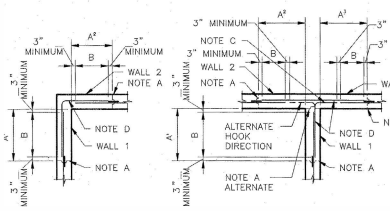
FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-GENERAL_V013.rvt



A = VERTICAL CONSTRUCTION JOINT NEAREST TO WALL CORNER.

A (ALTERNATE) = ALTERNATE VERTICAL CONSTRUCTION JOINT NEAREST TO WALL CORNER IN T WALL JOINT WHICH DOES NOT REQUIRE WATERSTOP.

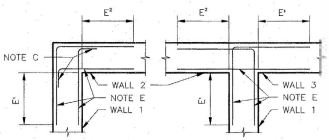
A^X = DISTANCE FROM INSIDE CORNER FACE TO NEAREST VERTICAL CONSTRUCTION JOINT IN SIMILARLY NUMBERED WALL. A^X SHALL NOT BE LESS THAN DIMENSIONS INDICATED BY THESE DETAILS; NOR GREATER THAN INDICATED ON PLAN DRAWINGS; BUT IN ANY CASE SHALL NOT EXCEED 30 FEET IN LIQUID CONTAINMENT STRUCTURES OR 40 FEET IN OTHER STRUCTURES. IN T WALL JOINTS WHICH DO NOT REQUIRE WATERSTOP, A1 MAY BE ZERO.



B = OPTIONAL SPLICE LOCATION UNLESS SPECIFICALLY NOTED ON PLAN DRAWINGS. SPLICE LENGTH SHALL NOT BE LESS THAN THAT REQUIRED FOR TOP BARS AS SHOWN IN TABLE ON THIS SHEET. USE SPLICE LENGTH FOR THE SMALLER OF THE TWO BARS BEING SPLICED.

C = STANDARD HOOK

D = TYPICAL CORNER REINFORCEMENT. SIZE SHALL MATCH LARGEST ADJACENT WALL HORIZONTAL REINFORCEMENT; SPACING SHALL MATCH MINIMUM ADJACENT WALL HORIZONTAL REINFORCEMENT SPACING.



E = WHERE SPECIFICALLY NOTED ON THE DRAWINGS, ADDITIONAL CORNER REINFORCEMENT SHALL BE PLACED IN BOTH FACES OF THE INDICATED CORNER OVER THE FULL HEIGHT. ADDITIONAL CORNER REINFORCEMENT SHALL BE OF THE SAME SIZE AND SPACING AS THE MAIN CORNER REINFORCEMENT. PLACE ADDITIONAL REINFORCEMENT ALTERNATELY WITH, AND EQUAL DISTANCE BETWEEN, MAIN CORNER REINFORCEMENT.

E^X = DISTANCE FROM INSIDE CORNER FACE TO TERMINATION OF ADDITIONAL CORNER REINFORCEMENT IN SIMILARLY NUMBERED WALL. E^X SHALL NOT BE LESS THAN 0.20 THE CLEAR SPAN DISTANCE MEASURED HORIZONTALLY BETWEEN THIS CORNER AND THE NEXT OR 0.40 THE CLEAR SPAN DISTANCE OR CANTILEVERED DISTANCE MEASURED VERTICALLY, WHICHEVER IS SMALLER, BUT NOT LESS THAN 3'-0".

CONTRACTORS OPTION: E BAR TAILS MAY BE SPLICED USING LAPPED SPLICE LENGTHS FOR TOP BARS. SPLICES SHALL NOT BE LOCATED IN THE CORNER AREA COMMON TO BOTH WALLS AND SHALL CLEAR HOOK ENDS BY 3" MINIMUM.

ADDITIONAL REINFORCEMENT WHERE SPECIFICALLY NOTED ON THE DRAWINGS

B STANDARD CONCRETE REINFORCMENT DETAILS
NO SCALE

GENERAL NOTES:

1. DETAILS ON THIS DRAWING APPLY TO ALL DRAWINGS UNLESS OTHERWISE NOTED.
2. WORK THIS DRAWING WITH THE STANDARD CONCRETE JOINT DETAILS.

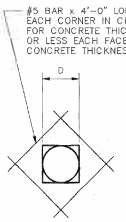
12" 9" 6" 3" 0"
1" = 1'-0"

MAIN REINFORCEMENT FOR ALL STRUCTURES

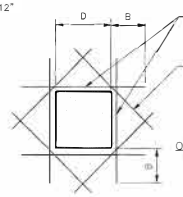
NOTES:

1. VERTICAL REINFORCEMENT IS NOT SHOWN.
2. THESE DETAILS SHALL BE APPLICABLE TO ALL WALL CORNERS UNLESS NOTED OTHERWISE ON THE DRAWINGS.

A STANDARD CONCRETE REINFORCMENT DETAILS
NO SCALE



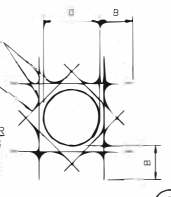
FOR OPENINGS 12" < = D < = 21"



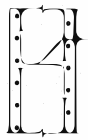
THICKNESS OF CONCRETE	DIAGONAL BAR SIZE	DIAGONAL BAR LENGTH RECTANGULAR OPENING	DIAGONAL BAR LENGTH CIRCULAR OPENING
< 12"	#4	3'-0"	D+12"
12" TO 18"	#5	3'-0"	D+12"
> 18"	#6	3'-0"	D+12"

FOR RECTANGULAR OPENINGS 21" < D < = 54"

B = THE REQUIRED LENGTH FOR LAPPED SPLICE FOR TOP BARS AS SHOWN ON THIS SHEET



FOR CIRCULAR OPENINGS 21" < D < = 54"

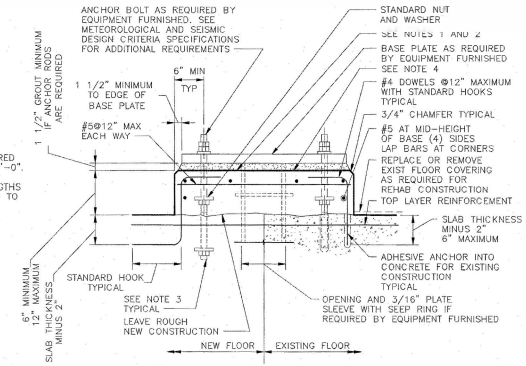


D SPACERS FOR WALL REINFORCEMENT
NO SCALE

E TYPICAL EXTRA REINFORCEMENT AT ISOLATED RE-ENTRANT CORNERS
NO SCALE

NOTE:

TYPICAL REQUIRED UNLESS ADDITIONAL REINFORCEMENT SPECIFICALLY INDICATED AT OPENINGS ON DRAWINGS



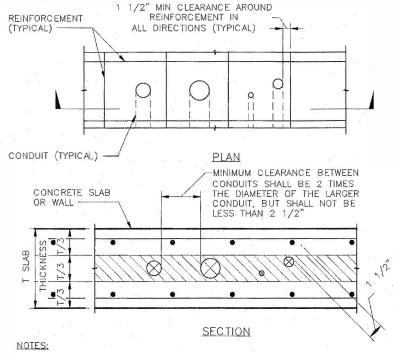
NOTES:

1. EQUIPMENT MANUFACTURER TO INDICATE REQUIRED FLATNESS WHERE NO GROUT IS SPECIFIED. TOLERANCES SHALL BE IN CONFORMANCE WITH ACI 117 – SPECIFICATION FOR TOLERANCES FOR CONCRETE CONSTRUCTION.
2. CONTRACTOR AND SUPPLIER SHALL COORDINATE FINAL LOCATION AND SIZE OF PADS WITH EQUIPMENT FURNISHED. COORDINATE ANCHOR BOLT REQUIREMENTS FOR REQUIRED EMBEDMENT DEPTHS AND CONCRETE EDGE DISTANCES.
3. WHERE THE DESIGN ANCHOR BOLT EMBEDMENT IS GREATER THAN THE CONCRETE EQUIPMENT BASE THICKNESS, THEN THE REQUIRED DEPTH OF EMBEDMENT SHALL BE MEASURED FROM THE TOP OF STRUCTURAL SLAB AND NOT THE TOP OF THE EQUIPMENT BASE.
4. EQUIPMENT BASE SHALL USE STRUCTURAL CONCRETE AS INDICATED IN THE CAST-IN-PLACE CONCRETE SPECIFICATION.
5. ANCHOR BOLTS AND REINFORCING WILL BE INSPECTED IN ACCORDANCE WITH THE CODE REQUIRED SPECIAL INSPECTIONS AND PROCEDURES SPECIFICATION.

F EQUIPMENT BASE DETAIL
1" = 1'-0"

TYPICAL REQUIRED UNLESS ADDITIONAL REINFORCEMENT SPECIFICALLY INDICATED AT OPENINGS ON DRAWINGS

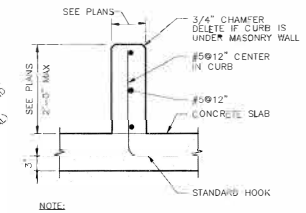
C TYPICAL EXTRA REINFORCEMENT AT OPENINGS 12" TO < = 54"
NO SCALE



NOTES:

1. PLACE CONDUIT ONLY IN SHADED AREA.
2. FOR CONDUIT REQUIREMENTS SEE THE ELECTRICAL DRAWINGS AND SPECIFICATIONS.
3. CONDUIT THAT IS TOO LARGE OR CONGESTED TO FIT WITHIN THE SLAB AND REINFORCEMENT AS INDICATED SHALL BE ROUTED BELOW THE SLAB AS INDICATED IN THE ELECTRICAL SPECIFICATIONS OR ON THE DRAWINGS.

G CONDUIT PLACING DETAIL
1" = 1'-0"



NOTE:

WHEN CURB WIDTH EXCEEDS 8", PROVIDE ABOVE REINFORCEMENT IN EACH FACE OF CURB

H TYPICAL CONCRETE CURB DETAIL
1" = 1'-0"

LENGTH OF LAPPED SPLICES FOR REINFORCEMENT (INCHES)

UNLESS NOTED OTHERWISE ON THE DRAWINGS

BAR SIZE *	BEAMS & COLUMNS **TOP BARS	BEAMS & COLUMNS OTHERS	WALLS & SLABS **TOP BARS	WALLS & SLABS OTHERS	BAR SIZE *
#3	16	16	16	16	#3
#4	19	16	19	16	#4
#5	24	18	24	18	#5
#6	33	26	29	22	#6
#7	55	42	48	37	#7
#8	69	53	60	46	#8
#9	84	65	74	57	#9
#10	103	79	91	70	#10
#11	122	94	108	83	#11

* LAP SPLICE LENGTH FOR BARS OF DIFFERENT SIZES SHALL BE THE GREATER OF THE SMALL BAR LAP LENGTH OR 0.75x THE LARGER BAR LAP LENGTH.

** TOP BARS ARE HORIZONTAL BARS SO PLACED THAT MORE THAN 12" OF CONCRETE IS CAST IN THE MEMBER BELOW THE BAR. HORIZONTAL BARS IN WALLS ARE TO BE PROVIDED WITH LAP LENGTHS AS REQUIRED FOR TOP BARS. VERTICAL BARS MAY BE CONSIDERED AS OTHER BARS.

CONCRETE COVER FOR REINFORCEMENT

UNLESS NOTED OTHERWISE ON THE DRAWINGS

LOCATION	SPECIFIED COVER
UNFORMED SURFACES ADJACENT TO EXCAVATION	3"
SURFACES INSIDE OF OZONE CONTACTORS EXPOSED TO OZONE IN WATER OR AIR	3"
TOP SURFACES OF SLABS THAT ARE SUBMERGED	3"
FORMED SURFACES THAT ARE SUBMERGED, AND FORMED OR TOP SURFACES EXPOSED TO WEATHER, SATURATED AIR, OR EARTH	2"
OTHER LOCATIONS:	
BEAMS AND GIRDERS	1 1/2"
SLABS, WALLS AND JOISTS: #6 AND LARGER	1 1/2"
#5 AND SMALLER	1"

NOTES:

1. COVER IS MEASURED TO NEAREST BAR, STIRRUP, TIE, OR SPIRAL, AS APPLICABLE.
2. TOLERANCES FOR CONCRETE COVER AND THE FABRICATION AND PLACING OF REINFORCEMENT SHALL CONFORM TO ACI 117.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS — REGISTERED — 116686 — ENGINEER — PROFESSIONAL ENGINEER

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT

STRUCTURAL

TYPICAL CONCRETE REINFORCING DETAILS

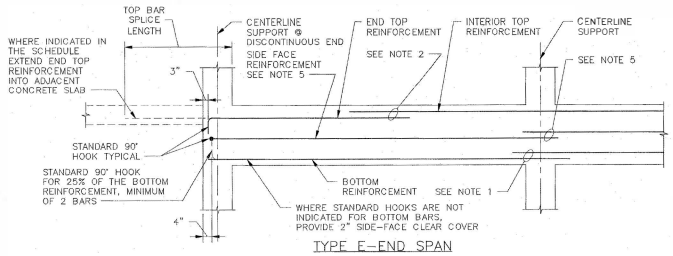
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	79 OF 173

FOR CITY OF HOUSTON USE ONLY

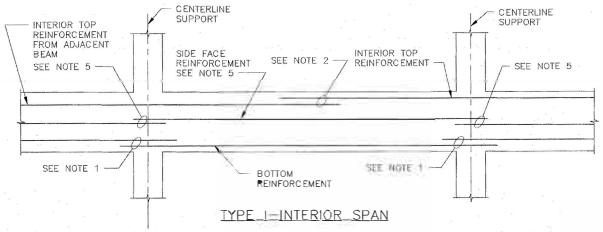
STATE OF TEXAS — 80367 — SHAHIDUR RAHMAN — HOUSTON, TEXAS

S-99-502

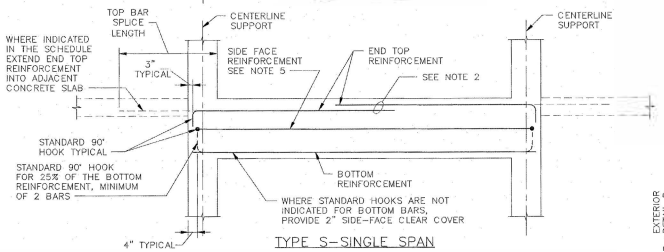
FILE Path: BIM 360://422500 - COH Intercontinental Airport WWTP Improvements/422500-GENERAL_Vol3.rvt



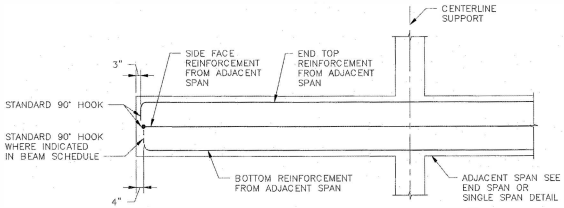
TYPE E-END SPAN



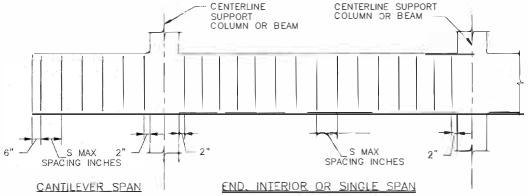
TYPE I-INTERIOR SPAN



TYPE S-SINGLE SPAN

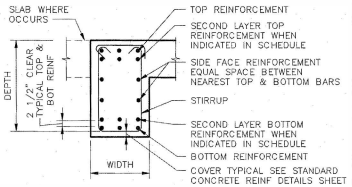


TYPE C-CANTILEVER SPAN

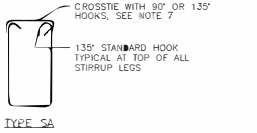


CANTILEVER SPAN — END, INTERIOR OR SINGLE SPAN

STIRRUP SPACING LAYOUT



TYPICAL BEAM SECTION



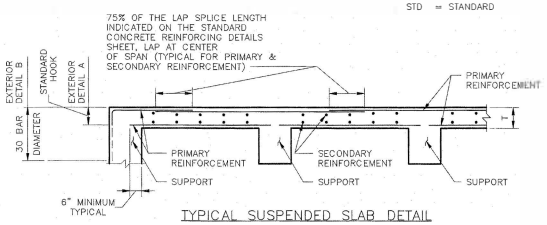
STIRRUP DETAILS

BEAM SCHEDULE

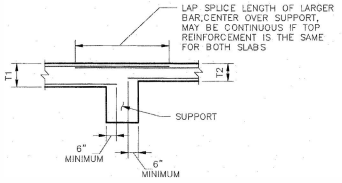
MARK	TYPE	BEAM SIZE WIDTH	BEAM SIZE DEPTH	BOTTOM REINF	END TOP REINF	INT TOP REINF	SIDE FACE REINF EF	STIRRUPS TYPE	STIRRUPS SIZE	STIRRUPS S	REMARKS
CHLORINE CONTACT BASIN											
43-B101	S	1'-0"	1'-6"	2-#8 T&B	2-#8 T&B	2-#8 T&B	1-#8	SA	#4	6"	
43-B102	S	1'-0"	1'-4"	2-#7 T&B	2-#7 T&B	2-#7 T&B	-	SA	#4	6"	PROVIDE 3" CLEAR COVER AT TOP OF BEAM
43-B103	S	1'-4"	1'-4"	3-#5	3-#5	3-#5	-	SA	#4	8"	
43-B104	S	2'-8"	1'-6"	6-#5	6-#5	6-#5	2-#5	SA	#4	8"	TOP & BOTTOM SINGLE LAYER

BEAM SCHEDULE NOTES:

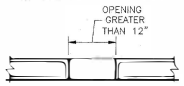
1. UNLESS INDICATED OTHERWISE IN BEAM SCHEDULE, BOTTOM REINFORCEMENT SHALL HAVE LAP SPLICES CENTERED ON THE CENTERLINE OF THE SUPPORT USING THE LAP SPLICE LENGTH INDICATED ON THE STANDARD CONCRETE REINFORCING DETAILS SHEET. USE THE LAP SPLICE REQUIREMENT OF THE SMALLER BOTTOM BAR IF BAR SIZES IN ADJACENT SPANS DIFFER. AT THE CONTRACTOR'S OPTION, BOTTOM REINFORCEMENT MAY BE MADE CONTINUOUS, WITHOUT SPLICING, ACROSS THE SUPPORT IF BARS IN THEADJACENT SPAN ARE EQUAL IN SIZE AND QUANTITY.
2. END AND INTERIOR TOP REINFORCEMENT SHALL BE LAPPED AT MID SPAN BETWEEN SUPPORTS USING THE LAP SPLICE LENGTH INDICATED ON THE STANDARD CONCRETE REINFORCING DETAILS SHEET. USE THE LAP SPLICE REQUIREMENT OF THE SMALLER TOP BAR, IF THE BAR SIZES EACH SIDE OF MID SPAN DIFFER. AT THE CONTRACTOR'S OPTION, TOP REINFORCEMENT MAY BE MADE CONTINUOUS, WITHOUT SPLICING, IF THE TOP BARS EACH SIDE OF MID SPAN ARE EQUAL IN SIZE AND QUANTITY.
3. TOP AND BOTTOM BARS SHALL BE PLACED IN THE BEAM SECTION SUCH THAT ONE OF THE BARS IS LOCATED IN EACH CORNER OF THE BEAM STIRRUPS.
4. ALL TOP AND BOTTOM BARS SHALL BE PLACED IN ONE LAYER UNLESS INDICATED OTHERWISE. WHERE MORE THAN ONE LAYER IS NOTED, PROVIDE 2.5 INCHES CLEAR BETWEEN LAYERS, AND PLACE HALF OF THE BARS IN EACH LAYER.
5. SIDE FACE REINFORCEMENT SHALL BE CONTINUOUS WITH LAP SPLICES CENTERED AT THE CENTERLINE OF THE SUPPORT. A 90° STANDARD HOOK SHALL BE PROVIDED AT THE EXTERIOR ENDS OF END SPANS AND AT BOTH ENDS OF SINGLE SPANS. SIDE FACE REINFORCEMENT SHALL BE SPACED EQUALLY ON EACH FACE.
6. PROVIDE MINIMUM #5 STIRRUP SUPPORT BARS IN ALL CORNERS OF STIRRUPS WHEN TOP OR BOTTOM BARS ARE NOT PRESENT. LAP #5 BARS 1'-8" MINIMUM TO SCHEDULED REINFORCEMENT.
7. UNLESS INDICATED OTHERWISE, CONSECUTIVE STIRRUP CROSSTIES SHALL HAVE THEIR 90° HOOK PLACED ON OPPOSITE SIDES. IN THE EVENT THAT A SLAB FRAMES INTO ONLY ONE SIDE OF A BEAM, THEN THE 90 DEGREE HOOK SHALL BE PLACED ON THE SLAB SIDE CONSISTENTLY. IN THE EVENT A BEAM IS NOT CONFINED BY A SLAB ON EITHER SIDE, THE STIRRUP CROSSTIE SHALL HAVE TWO 135° HOOKS AND NO 90° HOOK.
8. HEADED REINFORCEMENT IN ACCORDANCE WITH ACI 318 MAY BE USED INSTEAD OF STD. HOOKS.
9. ABBREVIATIONS USED:
   CL = CENTERLINE
   EF = EACH FACE
   INT = INTERIOR
   STD = STANDARD
   DEG = DEGREE
   EQ = EQUAL
   REINF = REINFORCEMENT
   TYP = TYPICAL



TYPICAL SUSPENDED SLAB DETAIL



SLAB INTERACTION DETAIL



NOTE:
FOR ADDITIONAL REINFORCING AROUND OPENING - SEE THE STANDARD CONCRETE REINFORCING DETAILS SHEET

DETAIL AT OPENINGS

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY
UNITED ENGINEERS, INC.
FB NO. P-6182

JEFFREY L. BOOS
116686
LICENSED
PROFESSIONAL ENGINEER
STATE OF TEXAS

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION-DISINFECTION REDESIGN AMENDMENT

STRUCTURAL

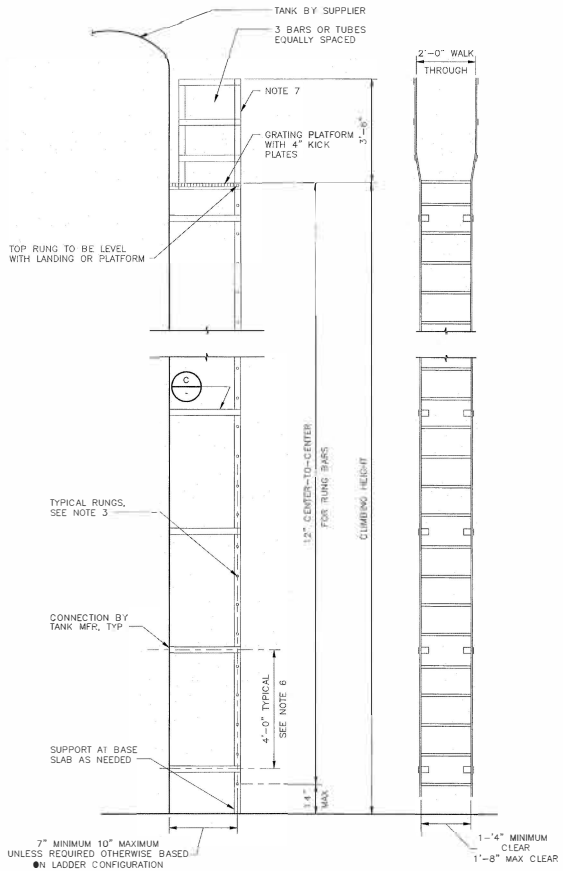
STANDARD CONCRETE BEAM AND SLAB SCHEDULE AND DETAILS

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
IX-002595-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E	
SHEET NO. 80 OF 173	

SHAHIDUR RAHMAN
80367
LICENSED
PROFESSIONAL ENGINEER
HOUSTON, TEXAS

S-99-503

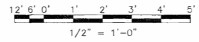
RIS PATH: BIM 360://4402500 - CDH Intercontinental Airport WWTP Improvements/4402500-GENERAL_V20.rvt



1 TYPICAL LADDER
1/2" = 1'-0"

NOTES:

1. ALL LADDERS AND FALL PROTECTION SAFETY SYSTEM SHALL BE DESIGNED AND FABRICATED BY THE LADDER SUPPLIER IN CONFORMANCE WITH THE LATEST ISSUE OF OSHA/ANSI A14.3, SECTION 1910.27 APPLICABLE BUILDING CODE STANDARDS FOR FIXED WALL LADDERS, AND THE REQUIREMENTS OF THE CONTRACT DRAWINGS AND SPECIFICATIONS. GENERAL CONFIGURATION AND DETAILS SHALL CONFORM WITH THIS DRAWING.
2. LADDER AND ALL APPURTENANCES TO BE MATERIAL AS NOTED ON DRAWINGS. COORDINATE MATERIALS AND FABRICATION WITH THE SPECIFICATIONS FOR METAL FABRICATIONS AND FIBERGLASS, AS APPLICABLE.
   STEEL (PAINTED) – ASTM A36, SHOP PRIME PAINTED.
   STEEL (GALVANIZED) – ASTM A36, ZINC COATED IN ACCORDANCE WITH ASTM A123.
   ALUMINUM – ASTM A6061-T6 ALLOY WITH MILL FINISH UNLESS NOTED OTHERWISE.
   STAINLESS STEEL – ASTM TYPE 316L.
   FIBERGLASS – FIBERGLASS REINFORCED PULTRUDED TUBE, UV PROTECTED.
3. LADDER RUNGS TO BE MIN 1" DIAMETER BARS OR PREFABRICATED FLAT TOP LADDER TREADS WITH MINIMUM 1" WIDE SLIP RESISTANT SURFACES. SPACE RUNGS AT 12". LADDER SIDE RAILS SHALL BE FLAT STOCK.
4. FURNISH LADDERS IN CONFIGURATIONS REQUIRED TO FIT THE LOCATIONS INDICATED ON THE DESIGN DRAWINGS. CONTRACTOR SHALL VERIFY FINAL DIMENSIONS BEFORE FABRICATION.
5. LADDER SHOP DRAWINGS SHALL BE SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF THE PROJECT. IF REQUESTED, CALCULATIONS OR TEST REPORTS VERIFYING THE LADDERS COMPLIANCE WITH APPLICABLE STANDARDS SHALL BE SUBMITTED, AND SHALL BE SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF THE PROJECT.
6. IF A LADDER CONFIGURATION INDICATED ON THE DRAWINGS REQUIRES THAT THE LADDER SPAN A GREATER DISTANCE BETWEEN SUPPORTS THAN INDICATED ON THE TYPICAL DETAILS, THE LADDER SUPPLIER SHALL DESIGN THE LADDER, THE LADDER BRACKET, AND THE LADDER BRACKET CONNECTIONS FOR THE INDICATED SPAN IN ACCORDANCE WITH NOTE 1 ABOVE. THE BRACKET CONNECTIONS SHALL BE AT LEAST EQUAL TO THE TYPICAL CONNECTIONS INDICATED.
7. IF INTERRUPTION OF GUARDRAIL IS REQUIRED, SEE SELF-CLOSING SWING GATE DETAIL ON STANDARD GUARDRAIL DRAWING. SELF-CLOSING GATES SHALL BE UTILIZED AT ALL LADDER ENTRANCES EXCEPT LANDING (REST) PLATFORMS FOR CONTINUOUS LADDER CLIMBS.



1/2" = 1'-0"

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY L. BOOS
116686
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION–DISINFECTION REDESIGN
AMENDMENT

STRUCTURAL

LADDER AND MISCELLANEOUS DETAILS

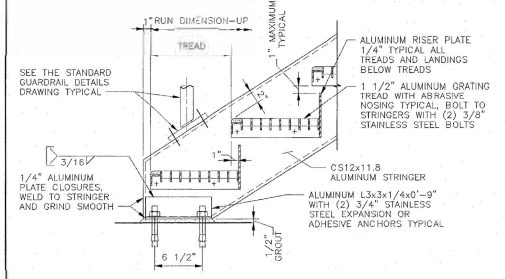
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	81 OF 173

FOR CITY OF HOUSTON USE ONLY

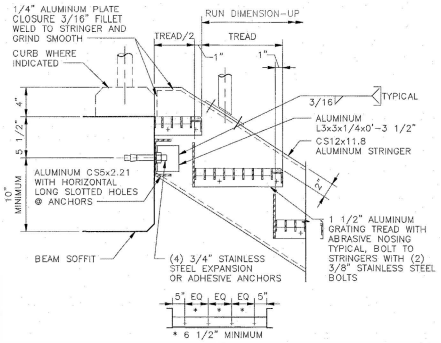
80367

S-99-504

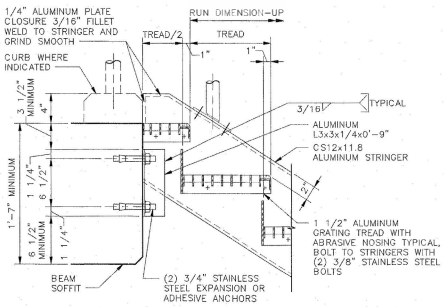
FILE PATH: BIM 360://402500 - CIH Intercontinental Airport WWTP Improvements/402500-GENERAL_V19.2.rvt



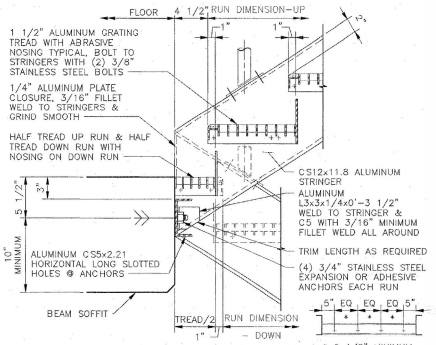
A DETAIL
1 1/2" = 1'-0"



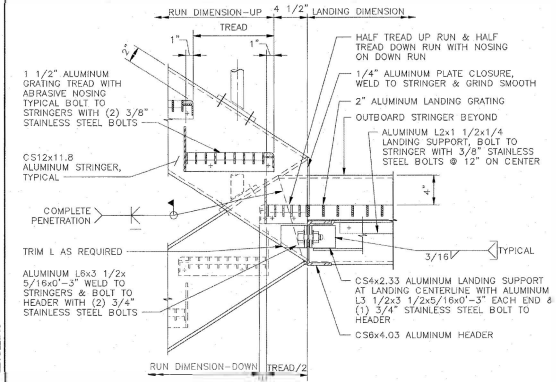
B DETAIL
1 1/2" = 1'-0"



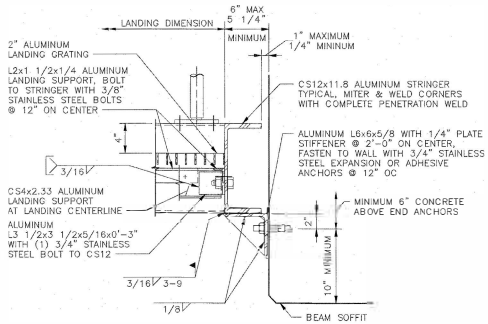
BB ALTERNATE DETAIL
1 1/2" = 1'-0"



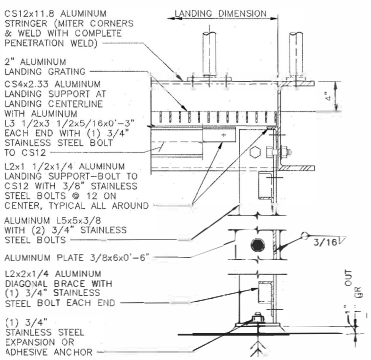
C DETAIL
1 1/2" = 1'-0"



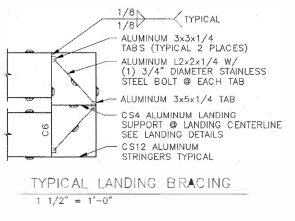
D DETAIL
1 1/2" = 1'-0"



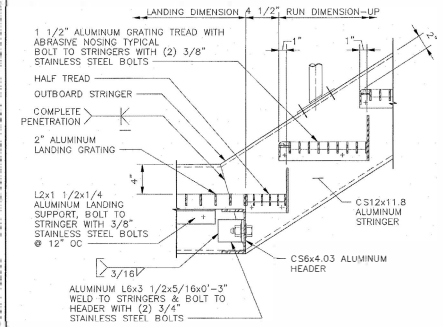
E DETAIL
1 1/2" = 1'-0"



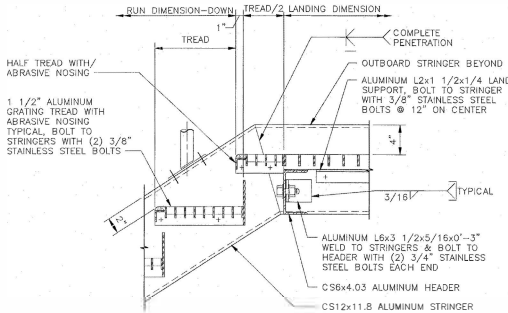
F DETAIL
1 1/2" = 1'-0"



TYPICAL LANDING BRACING
1 1/2" = 1'-0"



G DETAIL
1 1/2" = 1'-0"



H DETAIL
1 1/2" = 1'-0"

ALUMINUM GRATING STAIR NOTES:

1. ALL ALUMINUM SHAPES SHALL BE ALUMINUM ASSOCIATION STANDARD STRUCTURAL SHAPES.
2. DESIGNATION LEGEND FOR ALUMINUM SHAPES:

CHANNEL	CS 12 x 11.8	ANGLE	L 5 x 5 x 3/8
DEPTH		LEG LENGTH	
MEMBER WEIGHT LB/FT		LEG LENGTH	
		LEG THICKNESS	

3. WELDS NOT DIMENSIONED ON THE DRAWINGS SHALL BE SIZED TO DEVELOP THE FULL STRENGTH OF THE LEAST STRENGTH COMPONENT OF THE CONNECTION.

STAIR DESIGN NOTES:

1. STAIRS SHALL BE DESIGNED BY THE SUPPLIER IN GENERAL ACCORDANCE WITH DETAILS INDICATED ON THESE DESIGN DRAWINGS. THE DESIGN SHALL COMPLY WITH ALL APPLICABLE PROVISIONS OF THE LOCAL BUILDING CODE, ANSI A117.1 AND OSHA.
2. THE SHOP DRAWINGS SHALL BE SEALED BY AN ENGINEER REGISTERED IN THE STATE OF THE PROJECT. IF REQUESTED, SEALED CALCULATIONS SHALL BE SUBMITTED FOR REVIEW.
3. THE COMPLETED FABRICATIONS SHALL SUPPORT A UNIFORM LIVE LOAD OF 100 LBS PER SQUARE FOOT AND A CONCENTRATED LOAD OF 300 LBS APPLIED AT THE CENTER OF THE SPAN. INDIVIDUAL TREADS AND PLATFORMS SHALL BE DESIGNED TO SUPPORT A UNIFORM LIVE LOAD OF 100 LBS PER SQUARE FOOT OR A 300 LB CONCENTRATED LIVE LOAD APPLIED ON AN AREA OF 4 SQUARE INCHES. FOR ADDITIONAL LOADS AND DEFLECTION CRITERIA REFER TO THE STRUCTURAL METALS SPECIFICATION.
4. THE STAIR DESIGN AND DETAILS SHALL BE COORDINATED WITH THE HANDRAILING AND GUARDRAILING SUPPLIED. STAIR MEMBERS SHALL BE ADEQUATE TO ACCEPT LOADS FROM THE RAIL POSTS BASED UPON THE CRITERIA INDICATED IN THE RAILING SPECIFICATIONS.
5. CONNECTIONS TO THE SUPPORTING STRUCTURE SHALL BE ADEQUATE TO TRANSFER ALL LOADINGS, AND SHALL BE DESIGNED IN ACCORDANCE WITH ALL APPLICABLE PROVISIONS OF THE AISC MANUAL AND ACI 318. THE NUMBER AND TYPE OF CONNECTIONS SHALL COMPLY AT A MINIMUM, WITH THESE DESIGN DRAWINGS. ALL NECESSARY BRACKETS, BOLTS, AND ANCHORS SHALL BE PROVIDED.

S-99-505

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT

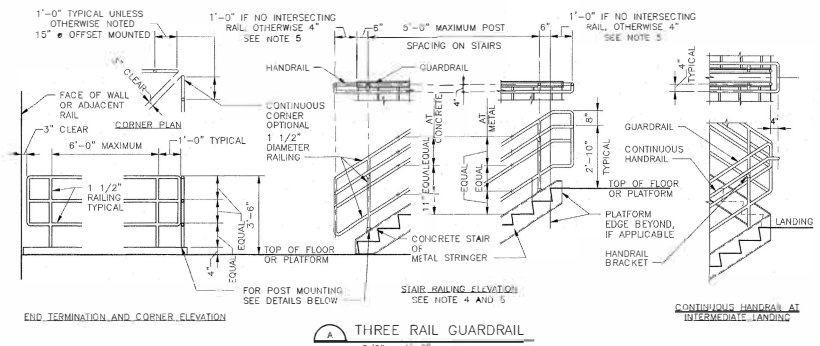
STRUCTURAL
TYPICAL ALUMINUM GRATING STAIR DETAILS

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	82 OF 173

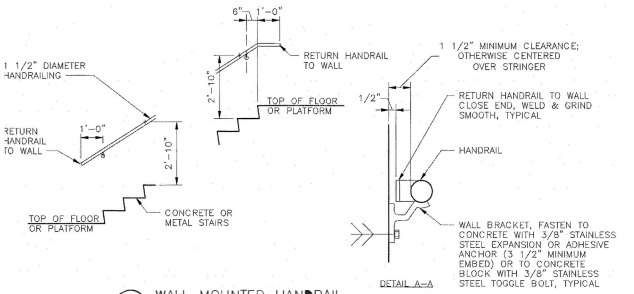
FOR CITY OF HOUSTON USE ONLY

80367

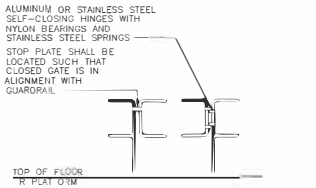
FILE PATH: BIM 360/402500 - CoH Intercontinental Airport WWTP Improvements/402500-ICENERAL_V14.rvt



A THREE RAIL GUARDRAIL
3/8" = 1'-0"



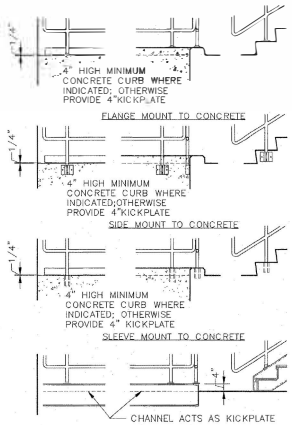
B WALL MOUNTED HANDRAIL
3/8" = 1'-0"

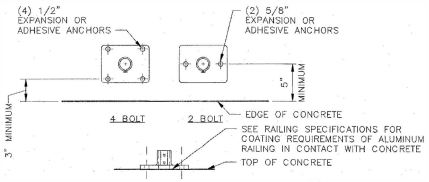


C SELF-CLOSING SWING GATE
3/8" = 1'-0"

NOTES:

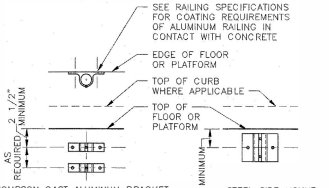
1. RAILING MATERIAL AND FABRICATION SHALL BE AS INDICATED ON THE DESIGN DRAWINGS AND IN THE PROJECT SPECIFICATIONS FOR METAL RAILINGS. AT A MINIMUM, GUARDRAILING AND HANDRAILING SHALL BE DESIGNED TO WITHSTAND A UNIFORM LOAD OF 50 LBS PER FT APPLIED IN ANY DIRECTION, AND A CONCENTRATED LOAD OF 200 LBS APPLIED IN ANY DIRECTION AT ANY POINT ALONG THE TOP. THE UNIFORM LOAD AND THE CONCENTRATED LOAD NEED NOT BE ASSUMED TO ACT CONCURRENTLY. THE DESIGN LOAD SHALL BE TRANSFERRED THROUGH THE ENTIRE RAILING SYSTEM AND ITS ATTACHMENT TO THE STRUCTURE.
2. ALL RAILING AND MOUNTINGS SHALL BE DESIGNED AND FABRICATED IN COMPLIANCE WITH THE MOST STRINGENT REQUIREMENTS OF THE RAILING SPECIFICATIONS, THE APPLICABLE LOCAL BUILDING CODE AND ALL PERTINENT OSHA AND LOCAL SAFETY REGULATIONS. THE SHOP DRAWINGS SHALL BE SEALED BY AN ENGINEER REGISTERED IN THE STATE OF THE PROJECT.
3. GUARDRAIL AND HANDRAIL SHALL BE DESIGNED AND FABRICATED IN CONFIGURATIONS REQUIRED TO FIT THE LOCATIONS INDICATED ON THE DESIGN DRAWINGS. CONTRACTOR SHALL VERIFY FINAL DIMENSIONS BEFORE FABRICATION.
4. GUARDRAIL MAY BE REPLACED WITH WALL MOUNTED HANDRAIL AT STAIR EDGES AND STRINGERS LOCATED ADJACENT TO WALLS. IF THE OUTSIDE EDGE OF THE STAIR STRINGER IS MORE THAN 3" FROM THE WALL FACE, GUARDRAIL SHALL BE USED.
5. THE INBOARD HANDRAILING AT SWITCHBACK STAIR LANDINGS MUST BE CONTINUOUS FROM ONE STAIR RUN TO THE NEXT. ADJUST INDICATED DIMENSION AS REQUIRED TO ALIGN AND CONNECT RAILINGS OVER THE LANDING EDGE.
6. AT LOCATIONS SPECIFICALLY INDICATED AS REMOVABLE RAILING, GUARDRAILING AND MOUNTING DETAILS SHALL BE MODIFIED AS FOLLOWS:
   - RAILING SHALL BE DETAILED IN SHORT LENGTHS THAT WEIGH NO MORE THAN 50 LBS. EACH PIECE SHALL INCLUDE AT LEAST 2, BUT NOT MORE THAN 3 POSTS. RAIL ENDS SHALL BE TERMINATED SIMILAR TO THE END TERMINATION DETAILS THIS SHEET.
   - MOUNTING DETAILS SHALL BE MODIFIED TO PERMIT RAILING PIECES TO BE REMOVED AND REINSTALLED WITHOUT USE OF TOOLS.





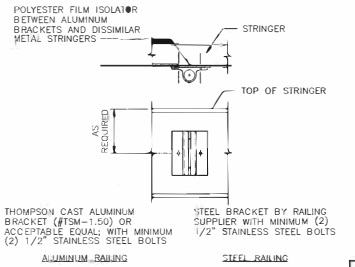
NOTE: USE SIDE-MOUNTED DETAILS UNLESS NOT FEASIBLE TO INSTALL.

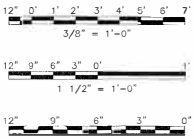
D BASE FLANGE MOUNT
1 1/2" = 1'-0"



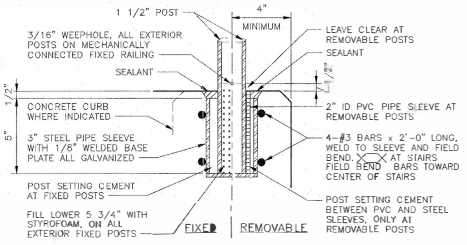
NOTE: USE SIDE-MOUNTED DETAILS UNLESS NOT FEASIBLE TO INSTALL.

E SIDE MOUNT
1 1/2" = 1'-0"





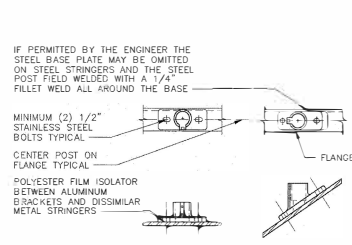
H SIDE MOUNT
1 1/2" = 1'-0"



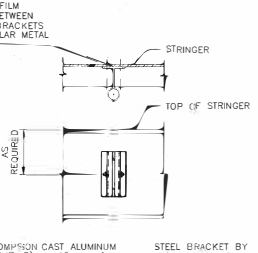
NOTES:

1. FIXED AND REMOVABLE DETAILS SIMILAR EXCEPT AS NOTED.
2. THE REMOVABLE SLEEVE MOUNT DETAIL SHALL NOT BE USED IN WET LOCATIONS SUBJECT TO FREEZING. SUBSTITUTE A REMOVABLE BASE FLANGE OR SIDE MOUNT DETAIL.

F SLEEVE MOUNT
3" = 1'-0"



G BASE FLANGE MOUNT
1 1/2" = 1'-0"



J OFFSET SIDE MOUNT
1 1/2" = 1'-0"

POST MOUNTED TO METAL

BLACK & VEATCH
BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258
SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182
STATE OF TEXAS
JEFFREY A. WOOD
116686
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT

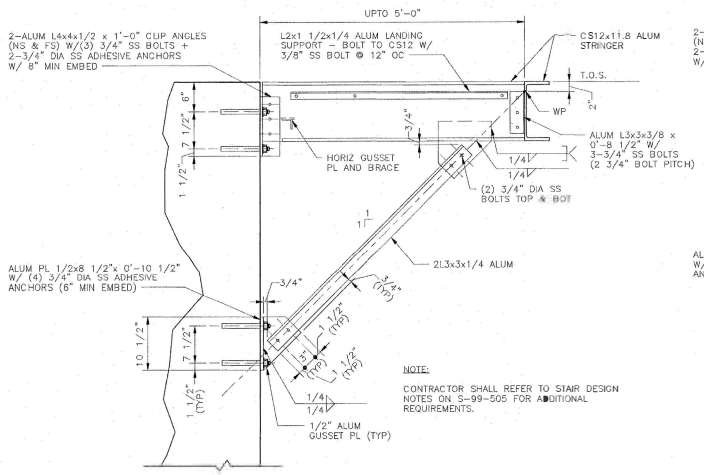
STRUCTURAL
TYPICAL HANDRAIL & GUARDRAIL DETAILS

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	83 OF 173

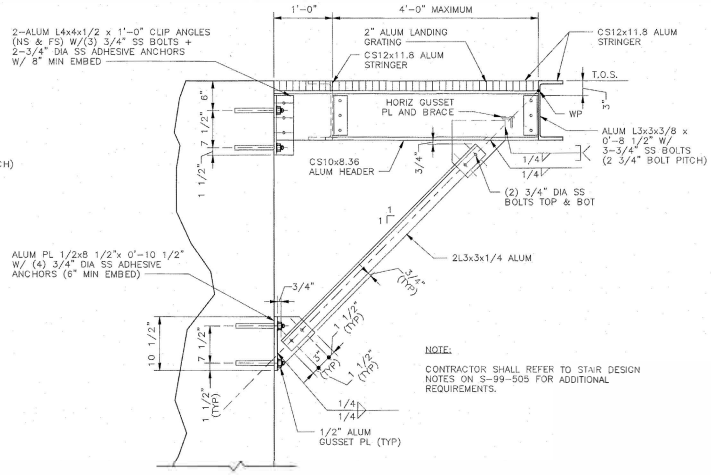
FOR CITY OF HOUSTON USE ONLY
ACCEPTED
80367
CITY OF HOUSTON, TEXAS

S-99-506

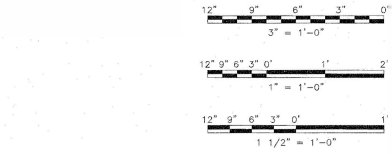
FILE PATH: R:\M 365\1402506 - CDH Intercontinental Airport WWTP Improvements\1402506-GENERAL_V01.2.rvt

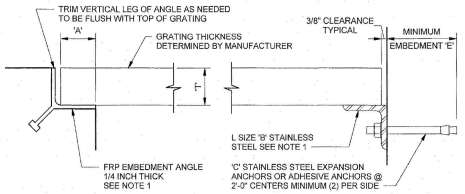


A STAIR LANDING SUPPORT DETAIL
1" = 1'-0"



B STAIR LANDING SUPPORT DETAIL
1" = 1'-0"





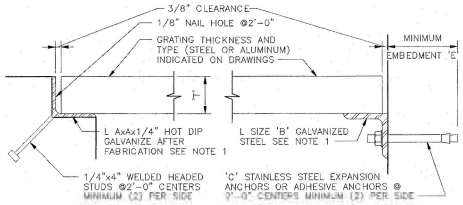
GRATING THICKNESS 'T'	MINIMUM BEARING 'A' INCHES*	L SIZE 'B' INCHES	'C' ANCHOR DIA	'C' ANCHOR MIN 'E'
1"	1	2 1/2x2 1/2x1/4	1/2"	3 1/4"
1 1/4"	1	2 1/2x2 1/2x1/4	1/2"	3 1/4"
1 1/2"	1	2 1/2x2 1/2x1/4	1/2"	3 1/4"
1 3/4"	1 1/4	3x3x3/8	3/4"	4 3/4"
2"	1 1/2	3x3x3/8	3/4"	4 3/4"
2 1/4"	1 3/4	3x3x3/8	3/4"	4 3/4"
2 1/2"	2	3x3x3/8	3/4"	4 3/4"

* BEARING SHALL BE LONGER IF REQUIRED BY GRATING MANUFACTURER

NOTE:

1. ALL GRATING SUPPORTED ON CONCRETE SHALL HAVE AN EMBEDDED ANGLE RECESSED AS SHOWN UNLESS NOTED OTHERWISE. GRATING SUPPORTED BY THE FACE MOUNTED ANGLE SHALL BE USED WHERE THE CONCRETE EXTENDS ABOVE THE TOP OF THE GRATING OR AT EXISTING STRUCTURES.

E FRP GRATING SUPPORT
3" = 1'-0"



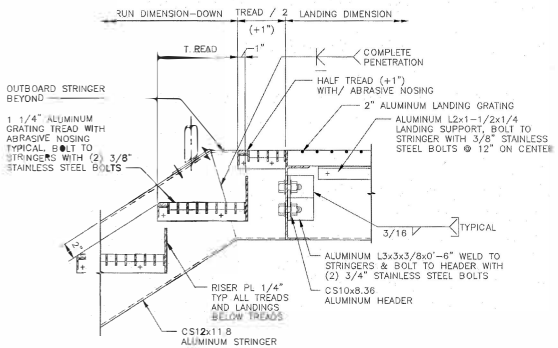
GRATING THICKNESS 'T'	L SIZE AxAx1/4 INCHES	L SIZE 'B' INCHES	'C' ANCHOR DIA	'C' ANCHOR MIN 'E'
1"	1 3/4 x 1 3/4*	2 1/2x2 1/2x1/4	1/2"	3 1/4"
1 1/4"	1 3/4 x 1 3/4*	2 1/2x2 1/2x1/4	1/2"	3 1/4"
1 1/2"	1 3/4 x 1 3/4	2 1/2x2 1/2x1/4	1/2"	3 1/4"
1 3/4"	2x2	3x3x3/8	3/4"	4 3/4"
2"	2 1/2x2 1/2*	3x3x3/8	3/4"	4 3/4"
2 1/4"	2 1/2x2 1/2	3x3x3/8	3/4"	4 3/4"
2 1/2"	3x3*	3x3x3/8	3/4"	4 3/4"

* TRIM AND BEVEL UPSTANDING LEG TO FIT

NOTE:

1. ALL GRATING SUPPORTED ON CONCRETE SHALL HAVE AN EMBEDDED ANGLE RECESSED AS SHOWN UNLESS NOTED OTHERWISE. GRATING SUPPORTED BY THE FACE MOUNTED ANGLE SHALL BE USED WHERE THE CONCRETE EXTENDS ABOVE THE TOP OF THE GRATING OR AT EXISTING STRUCTURES.

C GRATING SUPPORT
NO SCALE



D DETAIL
1 1/2" = 1'-0"

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

JEFFREY A. BOOS
116686
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION-DISINFECTION REDESIGN AMENDMENT

STRUCTURAL

MISCELLANEOUS DETAILS

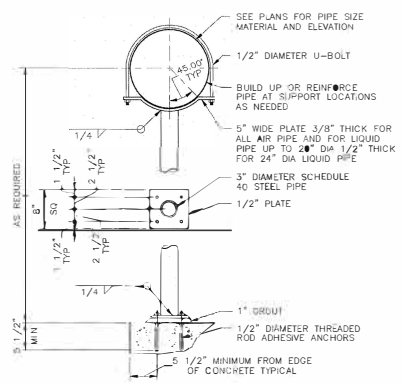
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	84 OF 173

FOR CITY OF HOUSTON USE ONLY

RICHARD A. JASSERETTE
80367
REGISTERED
PROFESSIONAL ENGINEER
STATE OF TEXAS

S-99-507

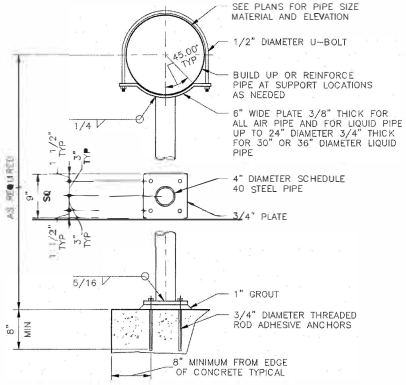
FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-GENERAL_V0L2.rvt



NOTE:

ALL STEEL MATERIALS SHALL BE HOT-DIP GALVANIZED FOR EXTERIOR LOCATIONS. VENT HOLES FOR GALVANIZING SHALL BE THE MINIMUM SIZE NECESSARY. HOLES SHALL BE LOCATED IN THE BOTTOM BASEPLATE AND ALSO LOCATED IN THE TOP OF THE PIPE, ADJACENT TO THE CURVED PLATE.

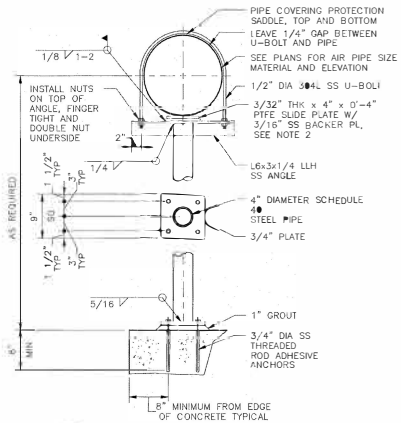
A 3 INCH DIAMETER STEEL COLUMN PIPE SUPPORT
1" = 1'-0"



NOTE:

ALL STEEL MATERIALS SHALL BE HOT-DIP GALVANIZED FOR EXTERIOR LOCATIONS. VENT HOLES FOR GALVANIZING SHALL BE THE MINIMUM SIZE NECESSARY. HOLES SHALL BE LOCATED IN THE BOTTOM BASEPLATE AND ALSO LOCATED IN THE TOP OF THE PIPE, ADJACENT TO THE CURVED PLATE.

B 4 INCH DIAMETER STEEL COLUMN PIPE SUPPORT
1" = 1'-0"

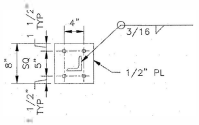


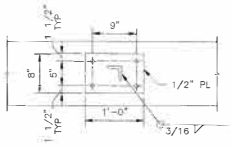
NOTE:

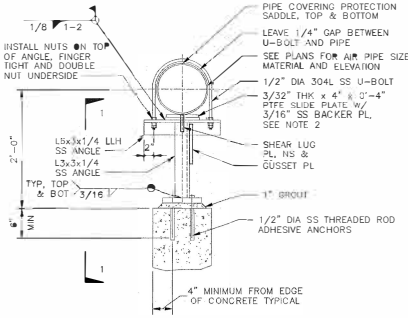
ALL STEEL MATERIALS SHALL BE STAINLESS STEEL FOR EXTERIOR LOCATIONS.

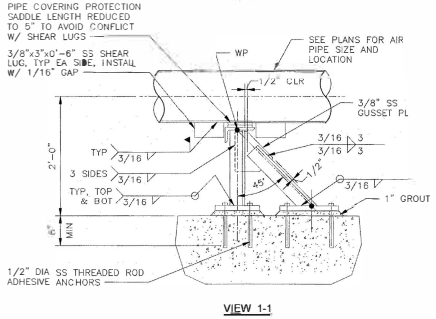
C STEEL COLUMN PIPE SUPPORT
1" = 1'-0"





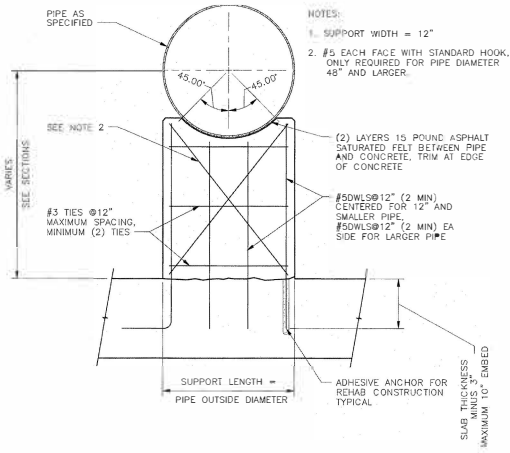






VIEW 1-1

D ANGLE GUIDE SUPPORT WITH VERTICAL SINGLE BRACE
1" = 1'-0"



E CONCRETE SADDLE PIPE SUPPORT
1" = 1'-0"

GENERAL NOTES:

1. PIPE COVERING PROTECTION SADDLES SHALL BE FIELD WELDED TO PIPE WITH 1/8-INCH THICK CONTINUOUS FILLET WELD AT BOTH SIDES OF SADDLE.
2. SLIDE PLATES SHALL BE 25% GLASS-FILLED WITH SS BACKER PLATE THAT IS 1/4-INCH LARGER ALL AROUND. SLIDE PLATES TO BE FURNISHED BY PIPING TECHNOLOGY OR ACCEPTABLE EQUAL.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
9201 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT

STRUCTURAL

PIPE SUPPORT DETAILS

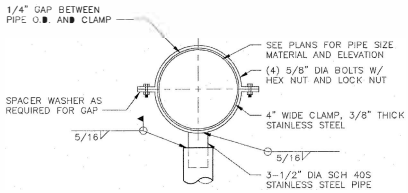
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	85 OF 173

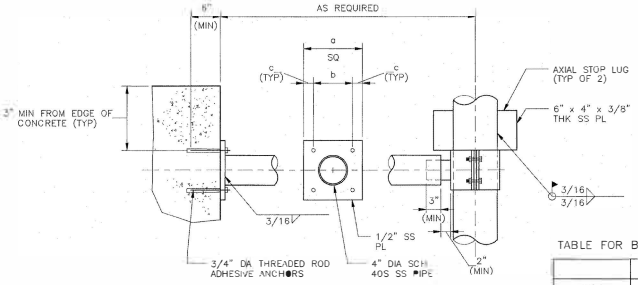
FOR CITY OF HOUSTON USE ONLY

JEFFREY A. BOOS
80367
LICENSED
PROFESSIONAL ENGINEER
HOUSTON, TEXAS

S-99-508

FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-GENERAL_V20.2.rvt

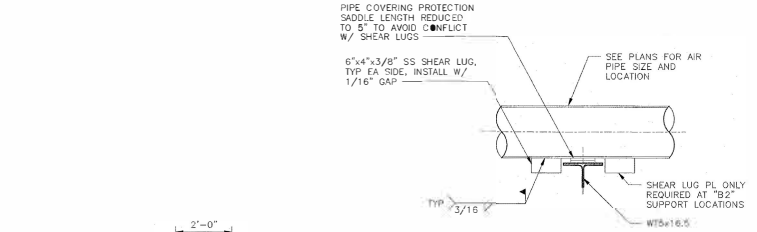




A BASIN VERTICAL SUPPORT GUIDE
NO SCALE

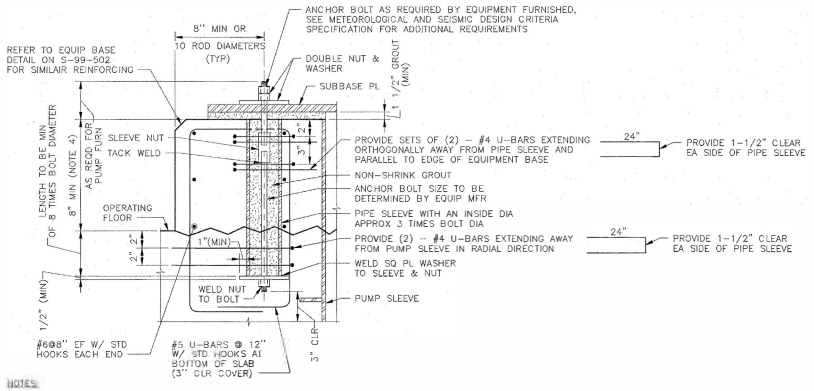
TABLE FOR BASE PLATE AND ANCHORS

	a	b	c	REMARK
A1	12"	8"	2"	–
A2	9"	6"	1 1/2"	AXIAL STOP LUG IS NOT REQUIRED



	REMARK
B1	SUPPORT WITHOUT SHEAR LUG PLATE
B2	SUPPORT WITH SHEAR LUG PLATE

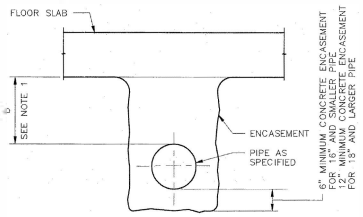
B CANTILEVER PIPE SUPPORT
NO SCALE



NOTES:

1. THE ANCHOR BOLTS SHALL BE COVERED WITH A NON-BINDING MATERIAL, SUCH AS GREASE, PUTTY, OR TAPE GROUTING IN SLEEVE, TO FACILITATE STRETCH.
2. SLEEVE NUT SHALL BE TAPPERED AND SHALL HAVE ULTIMATE STRETCH EQUAL TO OR GREATER THAN THE ANCHOR ROD STRETCH.
3. AFTER FINAL ASSEMBLY OF THE PUMP, ALL ANCHOR BOLTS SHALL BE PRETENSIONED (TIGHTENED) AS RECOMMENDED BY THE PUMP MANUFACTURER.
4. DIMENSIONS TO BE DETERMINED BY THE CONTRACTOR'S PROPOSED PUMP SELECTION.
5. FOR FUTURE PUMP, INSTALL PIPE SLEEVES AS SHOWN AND PROVIDE 3/8-INCH ALUM CHECKERED PLATE BOLTED TO TOP OF EQUIPMENT PAD USING PIPE SLEEVES AND FUTURE EQUIPMENT ANCHORS. PROVIDE 1/8-INCH DURO 50 ASTM D2000 SHEET ADHERED TO UNDERSIDE OF ALUMINUM PLATE FOR ISOLATION OF ALUMINUM TO CONCRETE.

C VERTICAL DIFFUSION PUMP BASE ANCHOR BOLT DETAIL
NO SCALE



NOTE:
1. IF D IS LESS THAN 1'-6", PROVIDE ENCASEMENT CONTINUOUS TO SLAB. IF D IS GREATER THAN 1'-6", ENCASEMENT MAY BE SEPARATED FROM SLAB.

D CONCRETE ENCASEMENT FOR PIPE UNDER SLABS
NO SCALE

GENERAL NOTES:

1. PIPE COVERING PROTECTION SADDLES SHALL BE FIELD WELDED TO PIPE WITH 1/8-INCH THICK CONTINUOUS FILLET WELD AT BOTH SIDES OF SADDLE.
2. SLIDE PLATES SHALL BE 25% GLASS-FILLED WITH SS BACKER PLATE THAT IS 1/4-INCH LARGER ALL AROUND. SLIDE PLATES TO BE FURNISHED BY PIPING TECHNOLOGY OR ACCEPTABLE EQUAL.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 900
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-5182

STATE OF TEXAS
JEFFREY L. BOSS
116686
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION–DISINFECTION REDESIGN
AMENDMENT

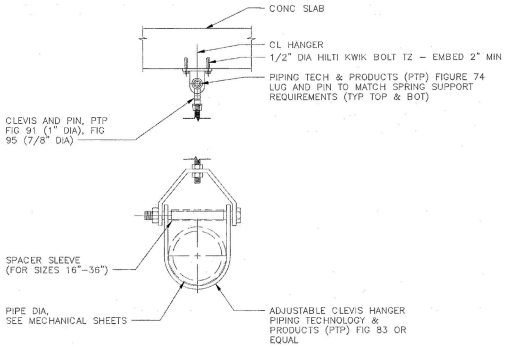
STRUCTURAL
MISCELLANEOUS DETAILS

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO 86 OF 173	

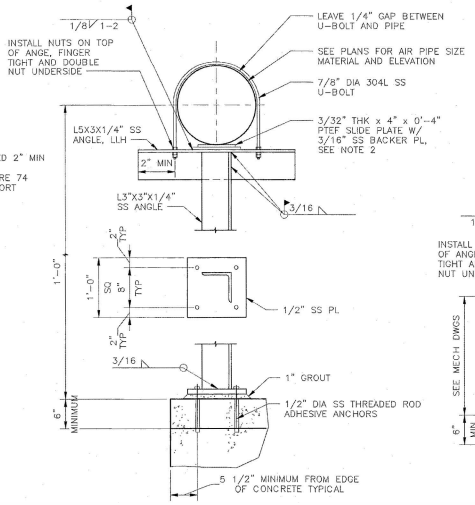
STATE OF TEXAS
80367
REGISTERED
SHAHIDUR RAHMAN
ENGINEER
HOUSTON, TEXAS

S-99-509

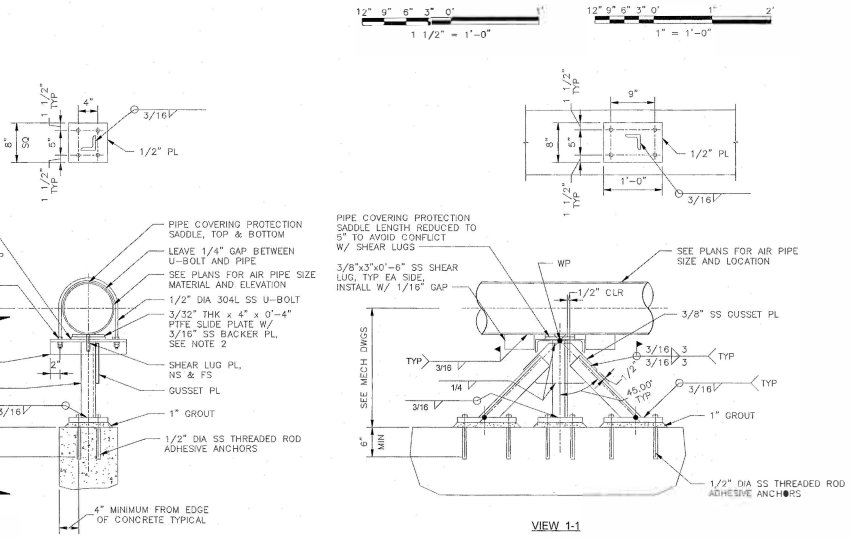
FILE PATH: BIM 360://422500 - IAH Intercontinental Airport WWTP Improvements/422500-GENERAL_V2L2.rvt



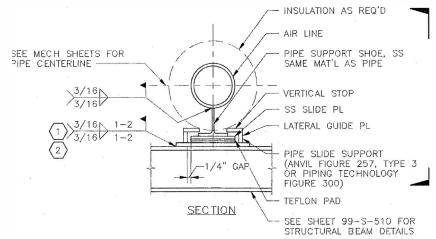
A CLEVIS HANGER (CONCRETE) SUPPORT
NO SCALE

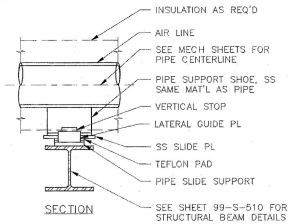


B ANGLE GUIDE SUPPORT
NO SCALE



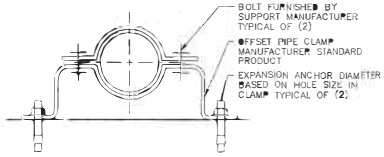
C ANGLE GUIDE SUPPORT WITH VERTICAL DOUBLE BRACE
1" = 1'-0"





NOTE:
PIPE SUPPORTS SHALL BE STAINLESS STEEL EXCEPT WHERE NOTED

D GUIDE SUPPORT
1 1/2" = 1'-0"



NOTE:
CLAMP, BOLTS AND EXPANSION ANCHORS SHALL BE SIMILAR MATERIALS.

E OFFSET PIPE CLAMP
NO SCALE

GENERAL NOTES:

1. PIPE COVERING PROTECTION SADDLES SHALL BE FIELD WELDED TO PIPE WITH 1/8-INCH THICK CONTINUOUS FILLET WELD AT BOTH SIDES OF SADDLE.
2. SLIDE PLATES SHALL BE 25% GLASS-FILLED WITH SS BACKER PLATE THAT IS 1/4-INCH LARGER ALL AROUND. SLIDE PLATES TO BE FURNISHED BY PIPING TECHNOLOGY OR ACCEPTABLE EQUAL.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS — JEFFREY A. BOOS — 116686 — LICENSED — PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT
STRUCTURAL

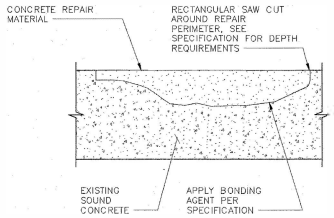
MISCELLANEOUS DETAILS

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	87 OF 173

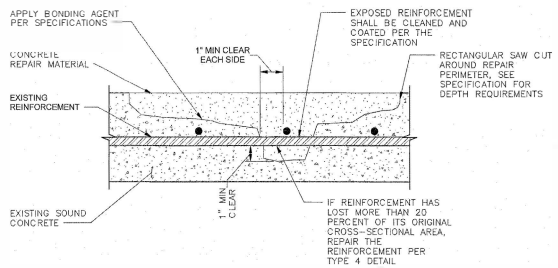
FOR CITY OF HOUSTON USE ONLY
80367 — REGISTERED — PROFESSIONAL ENGINEER — HOUSTON, TEXAS

S-99-510

FILE PATH: BIM 360://4025008 - COH Intercontinental Airport WWTP improvements/402500-GENERAL_VOL2.rvt



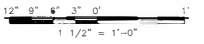
TYPE 1 – NO EXPOSED REINFORCEMENT

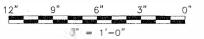


TYPE 2 – MINOR EXPOSED REINFORCEMENT

GENERAL REPAIR NOTES

1. REPAIR PRODUCTS SHALL BE AS INDICATED IN THE PROJECT SPECIFICATIONS.
2. REPAIR ACTIVITIES SUCH AS CLEANING, SURFACE PREPARATION, PRODUCT APPLICATION, AND CURING SHALL BE AS INDICATED IN THE PROJECT SPECIFICATIONS.
3. THE CONCRETE SURFACE REPAIR DETAILS ARE APPLICABLE TO EXISTING CONCRETE THAT IS DAMAGED. SURFACE DEFECTS IN NEW CONCRETE CONSTRUCTED AS PART OF THIS PROJECT SHALL BE REPAIRED IN ACCORDANCE WITH THE CAST-IN-PLACE CONCRETE SPECIFICATIONS.
4. SURFACE REPAIR AREAS LESS THAN 2 FEET APART SHALL BE COMBINED INTO ONE LARGER RECTANGULAR REPAIR AREA WITH NO IRREGULAR SHAPES. SEE FIGURE.
5. IF CRACK REPAIR AND SURFACE REPAIR ARE REQUIRED IN A COMMON AREA, THE CRACK REPAIR PROCEDURE SHALL BE PERFORMED FIRST.





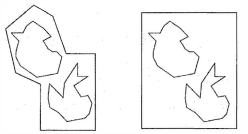
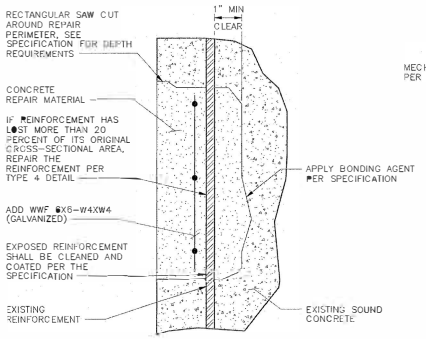
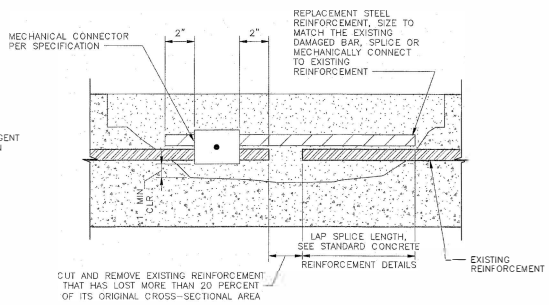


FIGURE
3" = 1'-0"

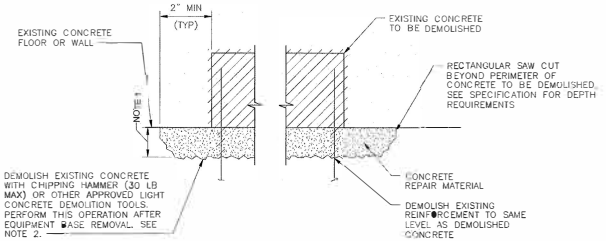


TYPE 3 – MAJOR EXPOSED REINFORCEMENT



FOR CLARITY, THE NEW BAR IS SHOWN ABOVE THE EXISTING BAR. FOR ACTUAL INSTALLATION, THE NEW BAR SHALL BE PLACED BESIDE THE EXISTING BAR SO BOTH HAVE THE SAME CONCRETE COVER.

TYPE 4 – REINFORCEMENT REPAIR

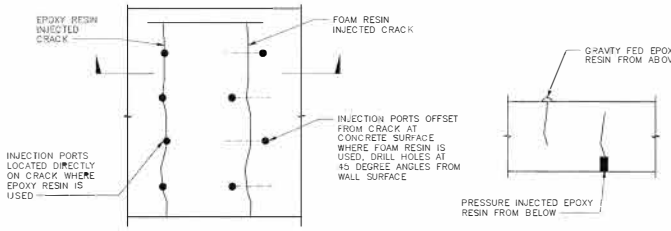


NOTES:

1. DEPTH OF CONCRETE DEMOLITION SHALL BE THE LESSER OF 2" OR THE DEPTH OF CONCRETE COVER OVER THE EXISTING REINFORCEMENT. DO NOT DAMAGE EXISTING REINFORCEMENT PARALLEL TO REPAIRED SURFACE.
2. CARE SHALL BE TAKEN TO AVOID DAMAGING CONCRETE SUBSTRATE DURING CHIPPING OPERATION.

B CONCRETE FLOOR OR WALL REPAIR FOLLOWING DEMOLITION
3" = 1'-0"

A CONCRETE SURFACE REPAIR
3" = 1'-0"



WALL ELEVATION SLAB SECTION

INJECTION PORT SPACING AND ARRANGEMENT SHALL BE AS RECOMMENDED BY THE MATERIAL MANUFACTURER.

C CONCRETE CRACK REPAIR
1 1/2" = 1'-0"

EFFLORESCENCE REPAIR NOTES:

1. EFFLORESCENCE IS DEFINED AS A GENERALLY WHITE DEPOSIT FORMED WHEN WATER-SOLUBLE COMPOUNDS EMERGE IN SOLUTION FROM CONCRETE OR MASONRY AND PRECIPITATE BY REACTION SUCH AS CARBONATION OR CRYSTALLIZE BY EVAPORATION.
2. EFFLORESCENCE SALTS SHALL BE REMOVED WITH A STIFF BRUSH, WIRE BRUSH OR SCRAPER. IF THE EFFLORESCENCE IS SLIGHT, BRUSHING WITH WATER MAY REMOVE IT. IF NOT, BRUSHING WITH DILUTE ACID SUCH AS MURIATIC OR SULFAMIC ACID IS RECOMMENDED. IF THE CONCRETE IS PIGMENTED, IT IS RECOMMENDED THAT SULFAMIC ACID IN THE 5 TO 10% CONCENTRATION RANGE SHALL BE USED. NOTE THAT STRONGER ACIDS MAY ALTER THE COLOR.
3. A PRESSURE WASHER SHALL NOT BE USED FOR REMOVING THE EFFLORESCENCE SALTS.

CRAZING REPAIR NOTES:

1. CRAZING IS DEFINED AS A PATTERN OF FINE RANDOM CRACKS OCCURRED ON A CONCRETE SURFACE.
2. ROUGHEN THE CRAZING AREA ON THE CONCRETE SURFACE TO A 1/4" AMPLITUDE AND APPLY AN APPROVED SURFACE REPAIR MORTAR.
3. SURFACE PREPARATION, MIXING, APPLICATION AND CURING SHALL BE PERFORMED PER MANUFACTURER'S RECOMMENDATIONS.

D TYPICAL MISCELLANEOUS REPAIR NOTES
NO SCALE

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100

TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC
FB NO. P-6152

STATE OF TEXAS
JEFFREY A. BOOS
116686
LICENSED PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT

STRUCTURAL

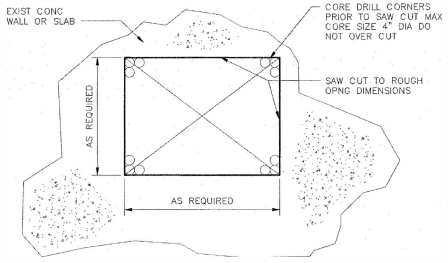
TYPICAL CONCRETE CRACK AND SURFACE REPAIR DETAILS & NOTES

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 88 OF 173	

PUBLIC WORKS ACCEPTED 80367 CITY OF HOUSTON TEXAS

S-99-511

FILE PATH: R:\M 360\1402500 - COH Intercontinental Airport WWTP Improvements\1402500-GENERAL_100.2.rvt

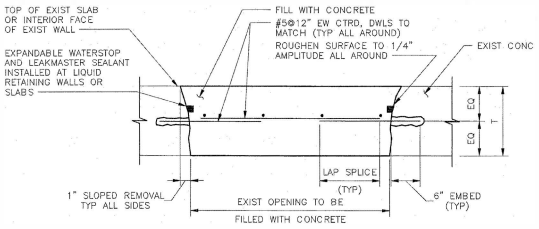


NOTES:

1. SIZES AND LOCATIONS OF ALL OPENINGS MUST BE APPROVED BY ENGINEER PRIOR TO BEGINNING CORING OR CUTTING OPERATIONS.
2. UNLESS NOTED OTHERWISE, EXPOSED METAL EMBEDMENTS SHALL BE REPAIRED BY CUTTING OFF THE METAL AT THE FACE OF THE CONCRETE, GRINDING SMOOTH AND COATING. COATING SHALL EXTEND A MINIMUM OF 1" BEYOND THE EDGE OF THE EXPOSED METAL.

A PROCEDURE FOR CUTTING OR ENLARGING OPENINGS IN EXISTING CONCRETE SLABS OR WALLS

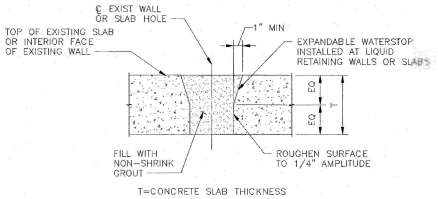
NO SCALE



NOTE: FIELD VERIFY OPNG SIZE PRIOR TO REBAR FABRICATION

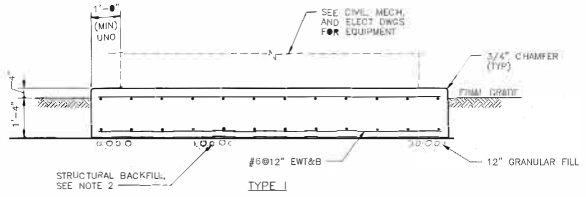
B INFILL DETAIL FOR EXISTING WALL OR SLAB OPENING GREATER THAN 12"

NO SCALE

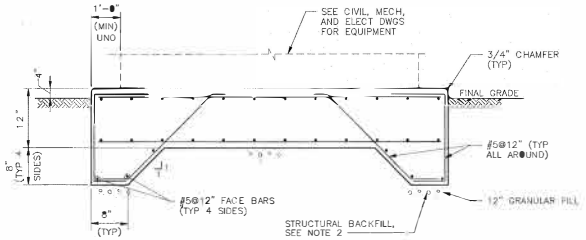


C INFILL DETAIL WALL AND SLAB OPENINGS LESS THAN 12"

NO SCALE



TYPE I



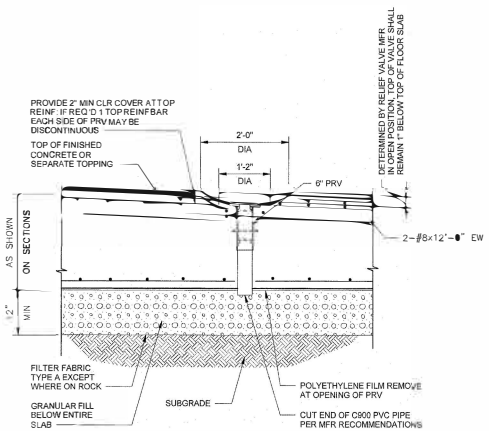
NOTES:

1. PAD DIMENSIONS DETERMINED BY EQUIPMENT FURNISHED FOR EQUIPMENT PADS LESS THAN 10FT IN WIDTH, PROVIDE TYPE I EQUIPMENT PAD
2. REMOVE AND REPLACE EXISTING SOILS WITH STRUCTURE BACKFILL TO A DEPTH OF 6'-0" BELOW FOUNDATION AND EXTENDING 5'-0", EACH SIDE, BEYOND THE FOOTPRINT OF THE FOUNDATION AND SLOPING UP TOWARDS GRADE AT A 1 TO 1 SLOPE. PROVIDE FILTER FABRIC TYPE A BELOW STRUCTURE BACKFILL.

TYPE II

D EXTERIOR EQUIPMENT PAD FOUNDATION

NO SCALE



E PRESSURE RELIEF VALVE - FLAT SLAB

NO SCALE

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC
FB NO. P-6182

STATE OF TEXAS
JEFFREY A. BOSS
116686
LICENSED
PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT

STRUCTURAL

MISCELLANEOUS DETAILS

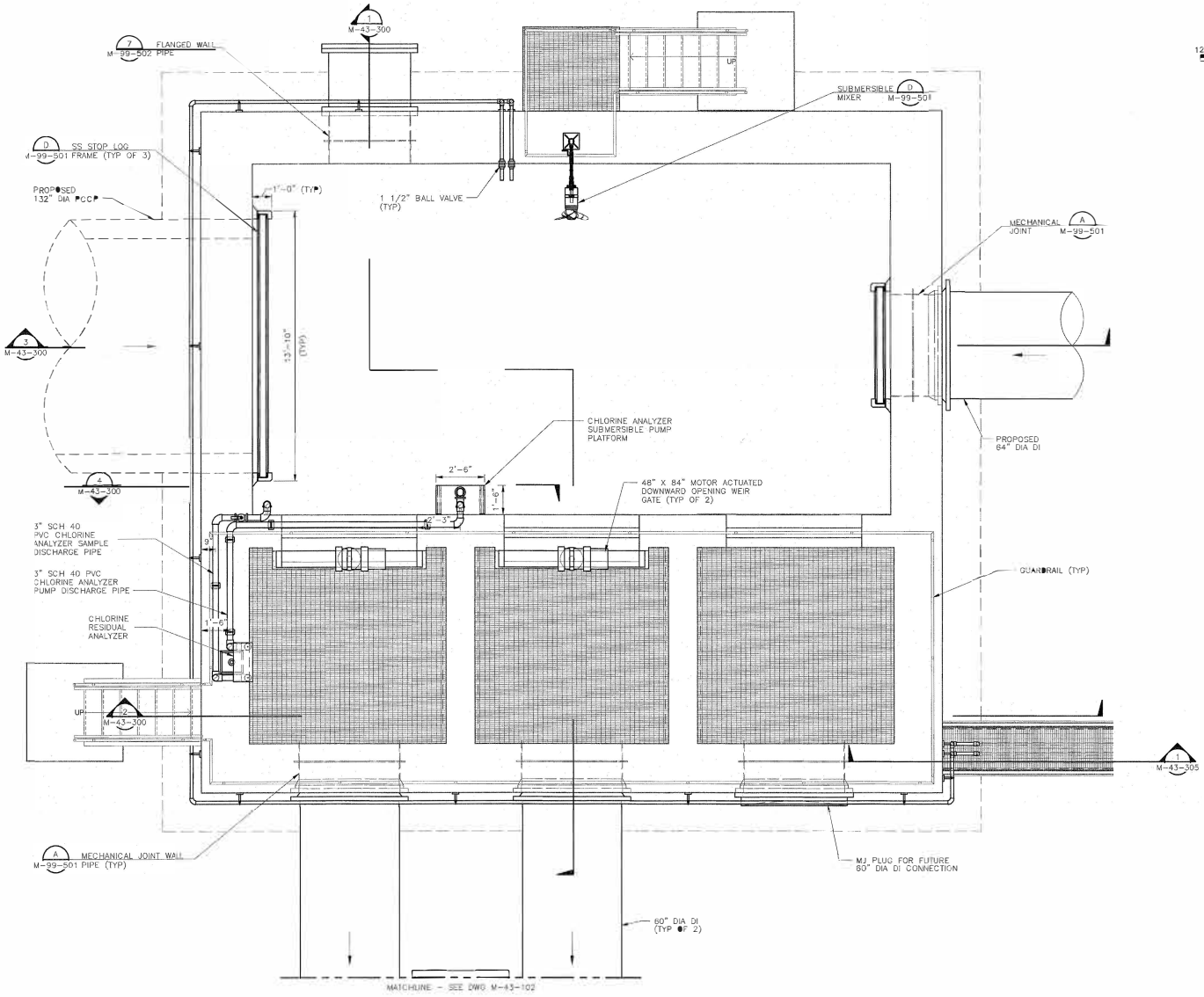
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	S/SHAHIDUR RAHMAN, P.E.
SHEET NO.	89 OF 173

FOR CITY OF HOUSTON USE ONLY

P.E. 80367 LICENSED PROFESSIONAL ENGINEER

S-99-512

FILE PATH: BIM 360://4402500 - COH intercontinental Airport WWTP Improvements/4402500-dETAIL_V5.2.rvt



TOP PLAN
3/8" = 1'-0"

12" 0' 1' 2' 3' 4' 5' 6'
3/8" = 1'-0"

N

GENERAL NOTES:

1. CHLORINE ANALYZER PIPING CONFIGURATION FOR GUIDANCE ONLY. CONTRACTOR SHALL FIELD ROUTE ANALYZER PIPING TO ALTERNATE ROUTING IF NEEDED.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

STATE OF TEXAS
BOBBY FRANK LANE JR.
126582
LICENSED
PROFESSIONAL ENGINEER
7/1/25

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT

PROCESS MECHANICAL

CHLORINE CONTACT BASIN JUNCTION BOX PLAN

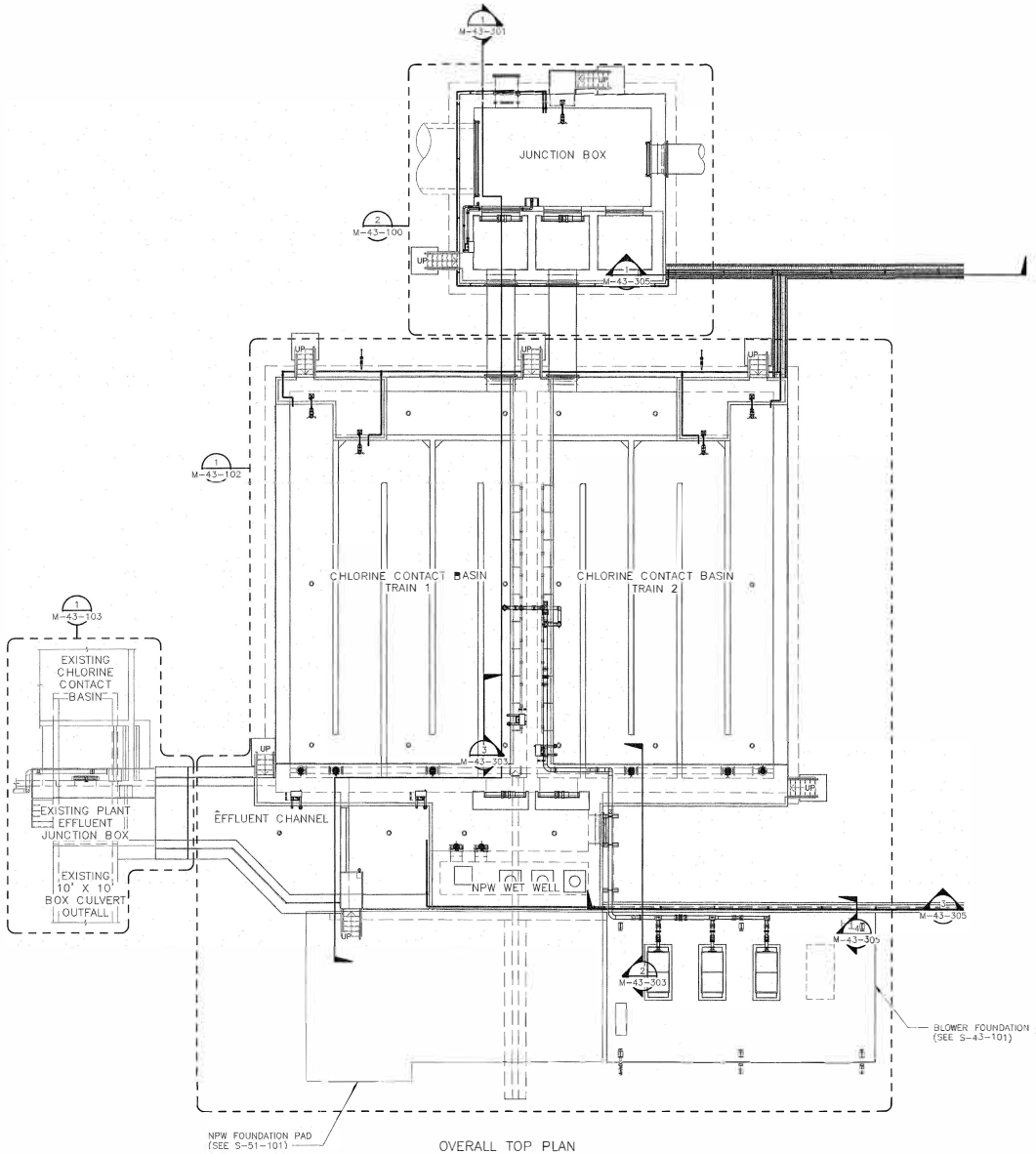
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	90 OF 173

FOR CITY OF HOUSTON USE ONLY

80367
REGISTERED
PROFESSIONAL
ENGINEER
HOUSTON, TEXAS

M-43-100

FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-43-CCB-BV.rvt



OVERALL TOP PLAN
3/32" = 1'-0"

12' 8' 4' 0' 10' 20'
3/32" = 1'-0"

N

GENERAL NOTES:

1. CONTRACTOR SHALL COORDINATE CONSTRUCTION ACTIVITIES AND TIE-INS WITH WASTEWATER OPS PER CONSTRUCTION SEQUENCING DOCUMENT.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
BOBBY FRANK LANE JR.
76582
LICENSED
PROFESSIONAL ENGINEER
7/1/05

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT

PROCESS MECHANICAL

CHLORINE CONTACT BASIN OVERALL TOP PLAN

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.

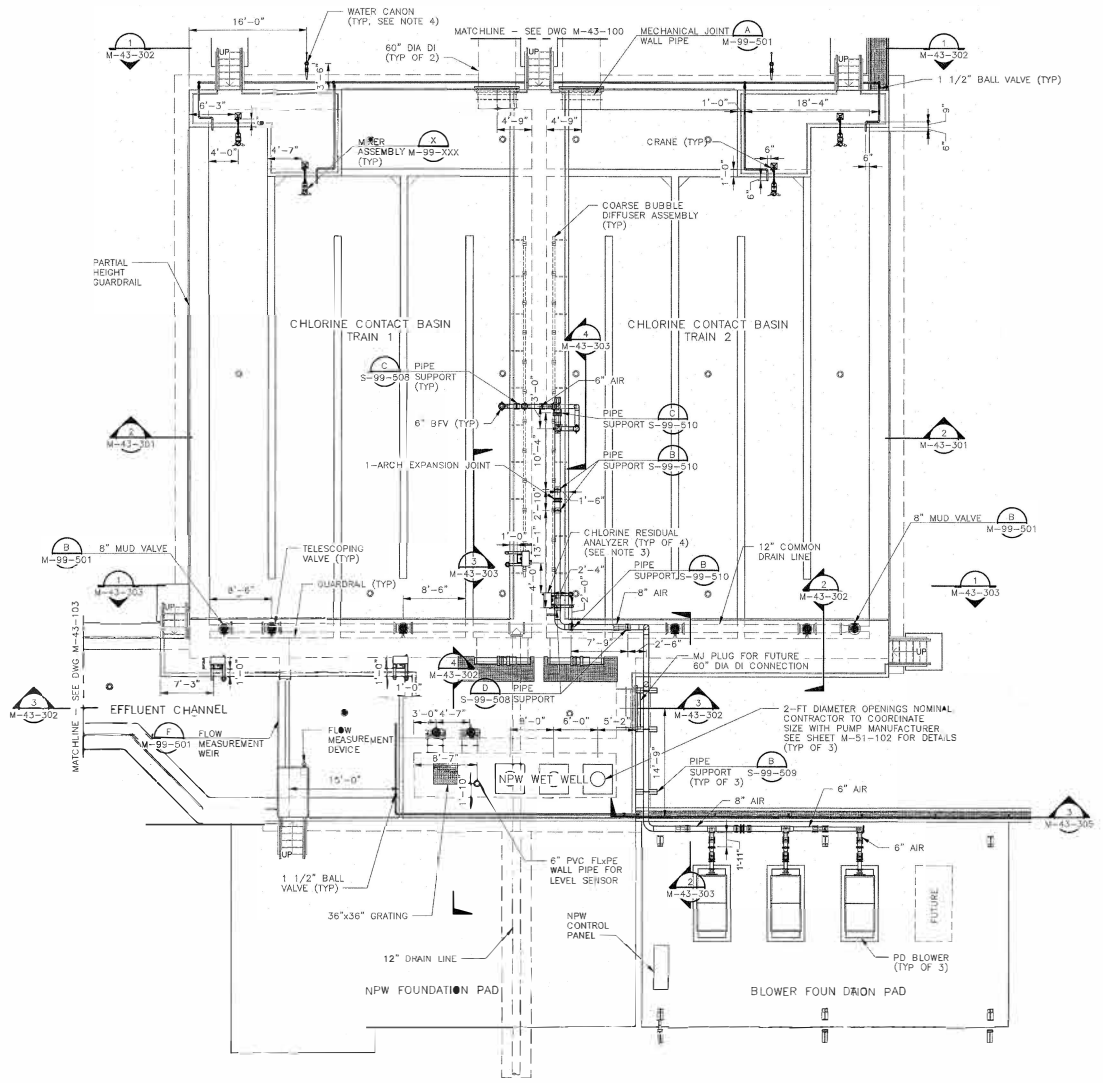
FOR CITY OF HOUSTON USE ONLY

REGISTERED
80367
PROFESSIONAL ENGINEER

M-43-101

SHEET NO. 91 OF 173

FILE PATH: Bill 350 // A02500 - COH Intercontinental Airport WWTP Improvements/A02500-43-CCB-BV.rvt



TOP PLAN
1/8" = 1'-0"

1/8" = 1'-0"

GENERAL NOTES:

1. CONTRACTOR SHALL INSTALL EFFLUENT FLOW MEASUREMENT AND SAMPLING EQUIPMENT REQUIRED BY TCEQ AND CURRENT CITY STANDARDS AND FIELD ROUTE ASSOCIATED PIPING. THE RECOMMENDED LOCATION IS THE SODIUM BISULFITE BUILDING. SAMPLING EQUIPMENT SPECIFICATION SECTION 11390 FOR MORE DETAILS.
2. REFER TO STRUCTURAL DRAWINGS AND DETAIL SHEETS FOR AIR PIPING SUPPORTS.
3. CHLORINE ANALYZER SAMPLE PUMP AND PIPING ASSEMBLY IS SIMILAR FOR ALL (4) CHLORINE CONTACT FACILITY CHLORINE ANALYZERS. REFER TO SECTION 3 ON DRAWING M-43-303 FOR ASSEMBLY DETAILS.
4. WATER CANONS SHALL BE CONNECTED TO NPW PIPING SYSTEM. SEE M-51-101 FOR NPW PIPING SCHEMATIC AND PIPE SIZING.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC
FB NO. P-6182

STATE OF TEXAS
BOBBY FRANK LANE JR.
126582
LICENSED
PROFESSIONAL ENGINEER
7/1/05

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT

PROCESS MECHANICAL

CHLORINE CONTACT BASIN PLAN

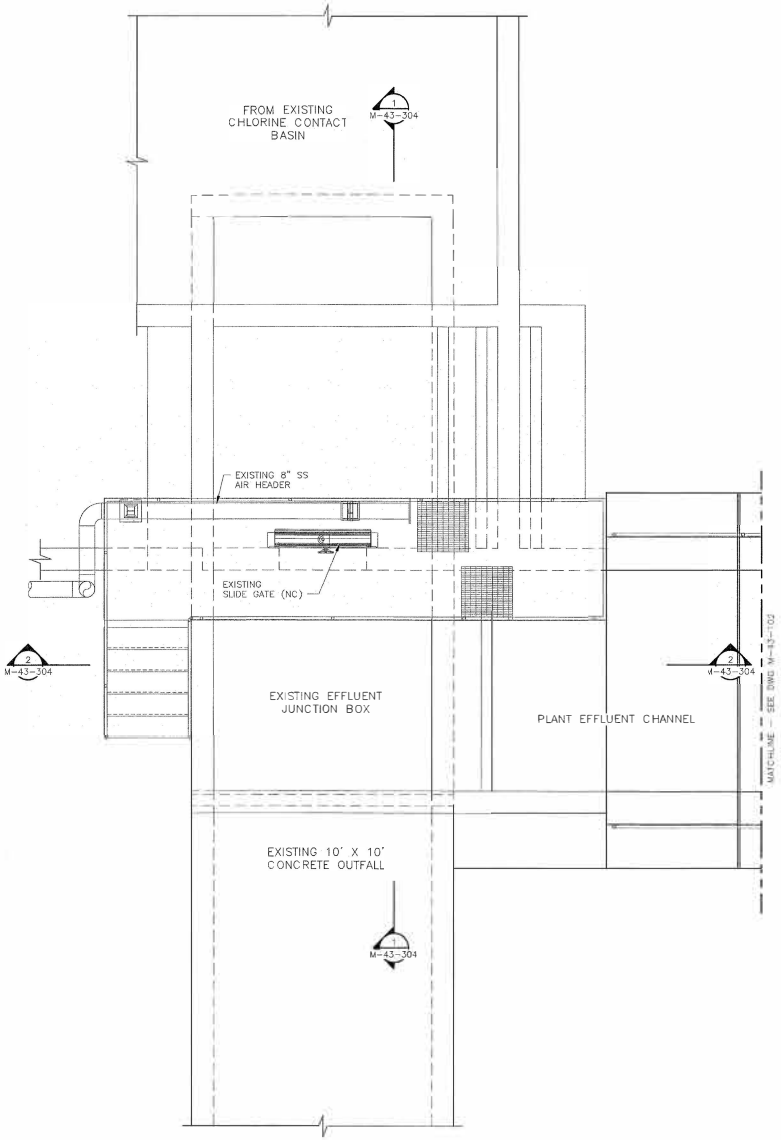
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	
	SHAHIDUR RAHMAN, P.E.
SHEET NO.	92 OF 173

FOR CITY OF HOUSTON USE ONLY

ACCEPTED
80367
CITY ENGINEER

M-43-102

FILE PATH: DW 360//402500 – COH Intercontinental Airport WWTP Improvements/402500-43-CCB-BN.rvt



TOP PLAN
3/8" = 1'-0"

12" 0" 1' 2' 3' 4' 5' 6' 7'
3/8" = 1'-0"

N

GENERAL NOTES:

1. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING STRUCTURES AND ELEVATIONS.
2. CONTRACTOR SHALL COORDINATE CONNECTION TO EXISTING OUTFALL STRUCTURE WITH STRUCTURAL DRAWINGS.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
BOBBY FRANK LANE JR.
126582
LICENSED
PROFESSIONAL ENGINEER
7/1/05

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT

PROCESS MECHANICAL

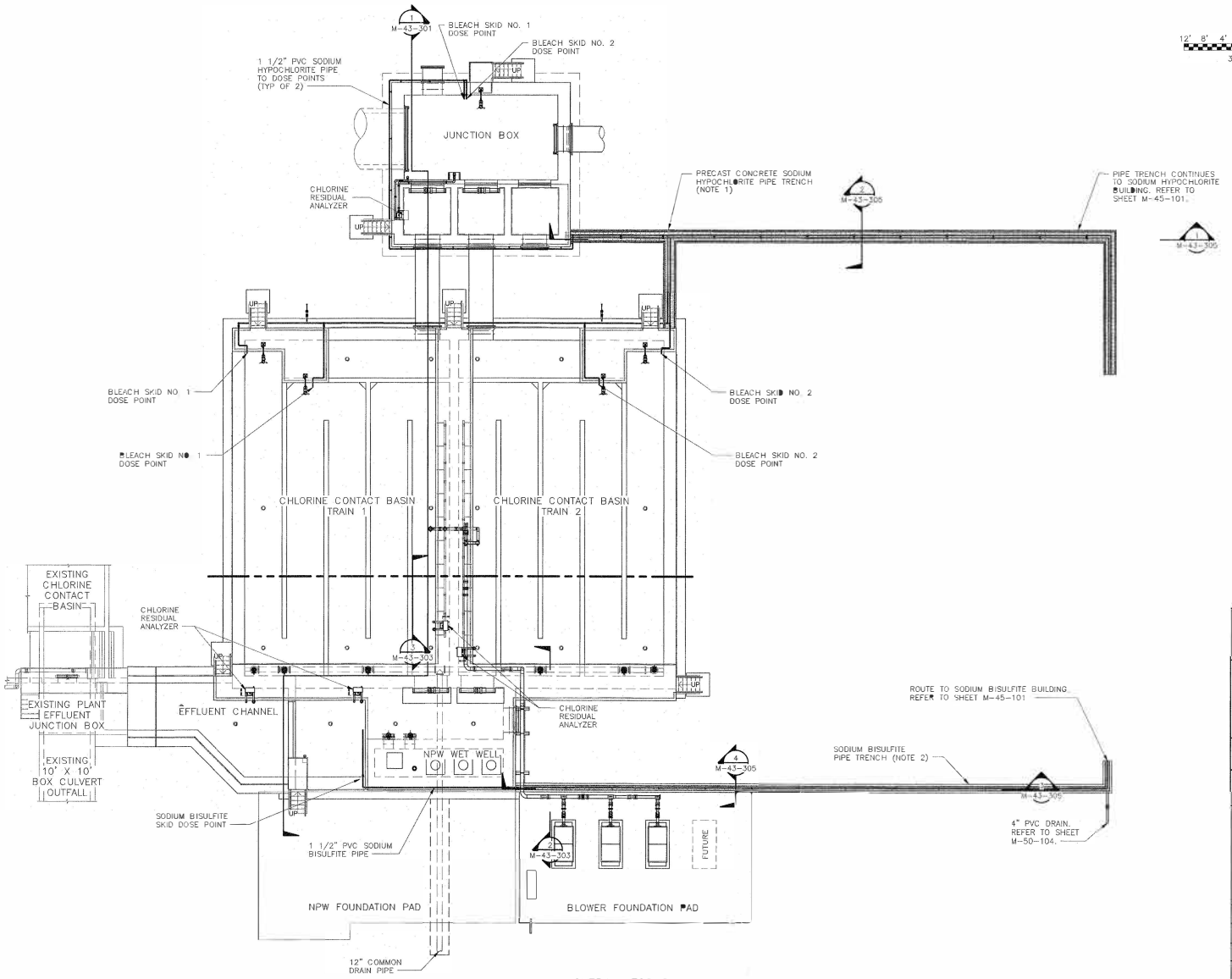
PLANT EFFLUENT JUNCTION BOX
PLAN

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 93 OF 173	

ACCEPTED
80367

M-43-103

FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-43-CCB-BV.rvt



CONSTRUCTION NOTES:

1. CONTRACTOR TO INSTALL 36" WIDE PRECAST CONCRETE PIPE TRENCH FOR SODIUM HYPOCHLORITE PIPES. TRENCH SHALL BE PROVIDED BY HAMPTON, 2'X2' BIG TRENCH, OR APPROVAL EQUAL. DIMENSIONS TO BE SUBJECT TO MANUFACTURER'S RECOMMENDATIONS.
2. CONTRACTOR TO INSTALL A 24" WIDE PRECAST CONCRETE PIPE TRENCH FOR SODIUM BISULFITE PIPE. TRENCH SHALL BE PROVIDED BY HAMPTON MODEL #PR-22, OR APPROVED EQUAL. DIMENSIONS TO BE SUBJECT TO MANUFACTURER'S RECOMMENDATIONS.
3. CONTRACTOR TO INSTALL TRAFFIC-RATED (H-20 OR HIGHER) TRENCH COVER AND FRAME, PROVIDED BY HAMPTON MODEL #PRI-23 OR APPROVED EQUAL.

GENERAL NOTES:

1. CONTRACTOR SHALL COORDINATE CONSTRUCTION ACTIVITIES AND TIE-INS WITH WASTEWATER OPS PER CONSTRUCTION SEQUENCING DOCUMENT.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
BOBBY FRANK LANE JR.
126582
LICENSED
PROFESSIONAL ENGINEER
7/9/25

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION-DISINFECTION REDESIGN AMENDMENT

PROCESS MECHANICAL

CHEMICAL FEED PIPE TRENCH AND DOSE POINT LOCATIONS

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHDUR RAHMAN, P.E.

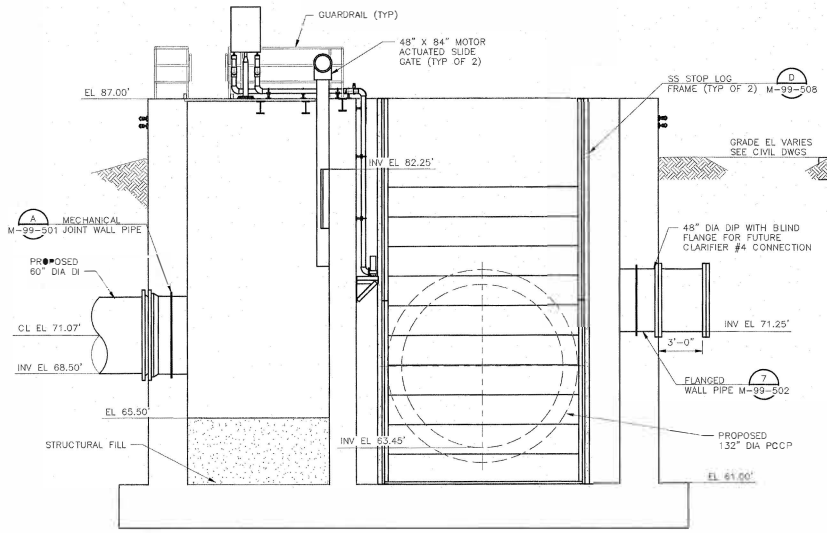
FOR CITY OF HOUSTON USE ONLY

80867

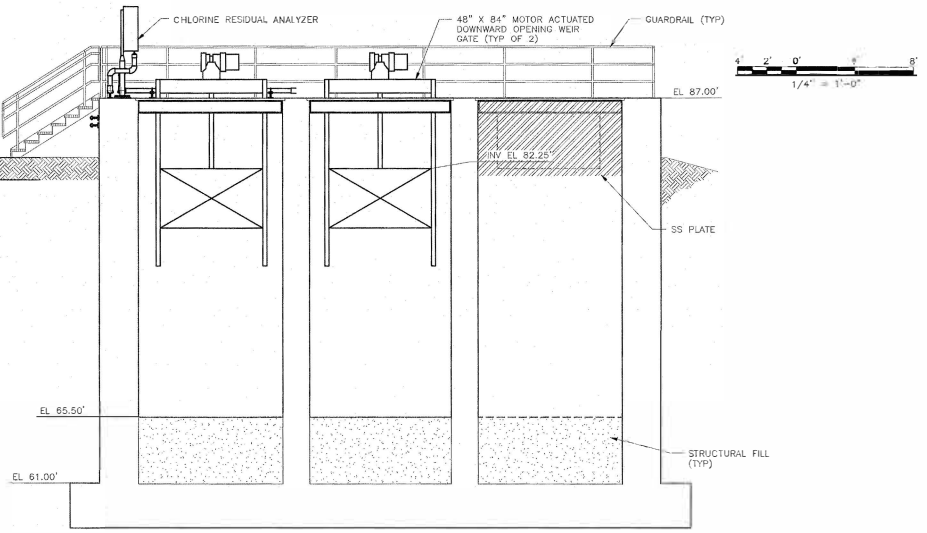
M-43-104

SHEET NO. 94 OF 173

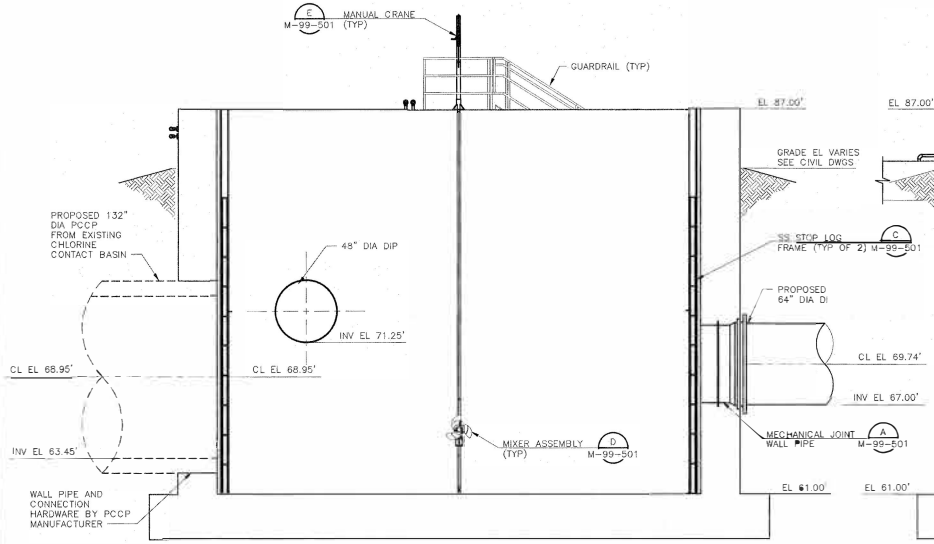
FILE PATH: BIM 360://402500 - CDH Intercontinental Airport WWTF Improvements/402500-43-CCB_BV.rvt



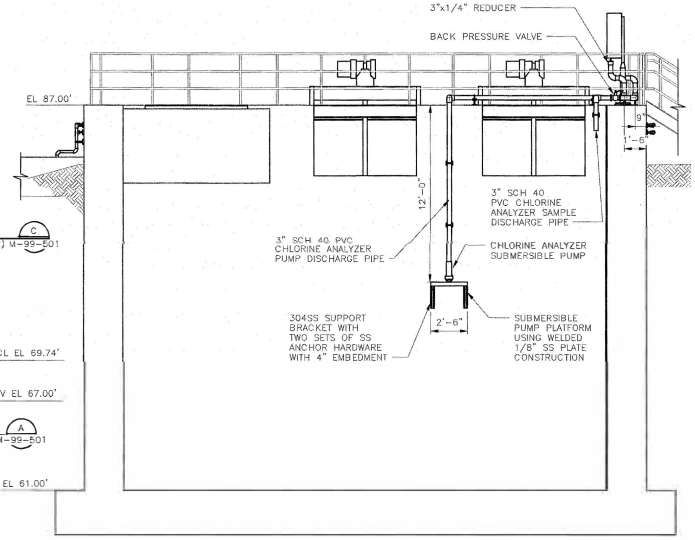
1 SECTION
M-43-100 1/4" = 1'-0"



2 SECTION
M-43-100 1/4" = 1'-0"



3 SECTION
M-43-100 1/4" = 1'-0"



4 SECTION
M-43-100 1/4" = 1'-0"

GENERAL NOTES:

1. CONTRACTOR TO PROVIDE STOP LOG FRAMES AT THE JUNCTION BOX FOR ALL 132" AND 64" DIAMETER PIPE ENTRANCES.
2. CHLORINE ANALYZER PIPING CONFIGURATION FOR GUIDANCE ONLY. CONTRACTOR SHALL FIELD ROUTE ANALYZER PIPING TO ALTERNATE ROUTING IF NEEDED.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
BOBBY FRANK LANE JR.
126682
LICENSED
PROFESSIONAL ENGINEER
7/1/05

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT

PROCESS MECHANICAL

CHLORINE CONTACT BASIN JUNCTION BOX SECTIONS

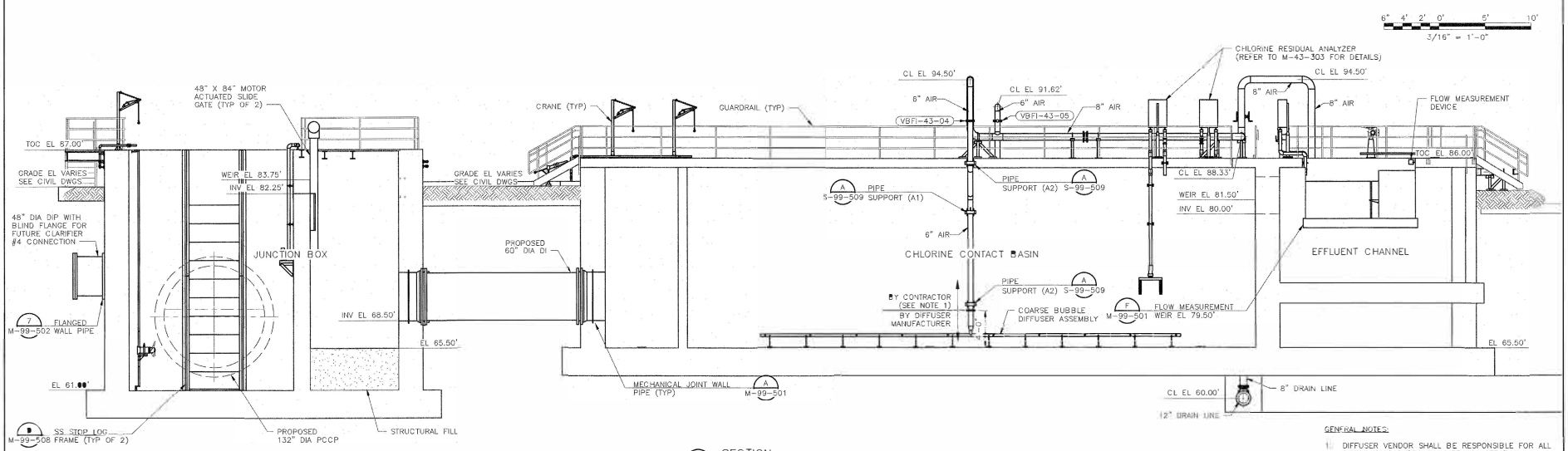
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	95 OF 173

FOR CITY OF HOUSTON USE ONLY

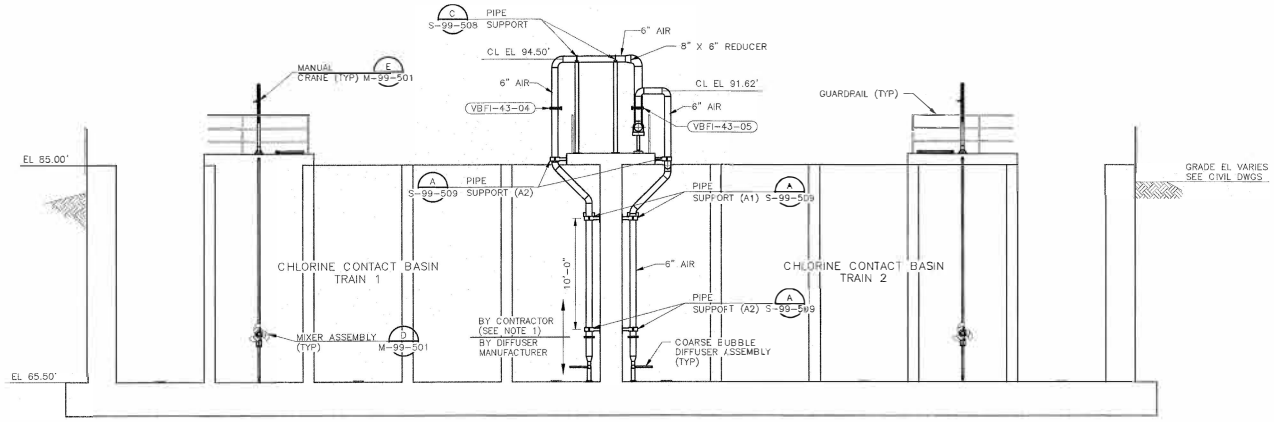
ACCEPTED 10/27/05
80367

M-43-300

FILE PATH= BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-43-CCB-BV.rvt



1 SECTION
M-43-101 3/16" = 1'-0"



2 SECTION
M-43-102 3/16" = 1'-0"

GENERAL NOTES:

1. DIFFUSER VENDOR SHALL BE RESPONSIBLE FOR ALL PIPING, PIPE SUPPORTS, DIFFUSED AERATION EQUIPMENT AND ACCESSORIES DOWNSTREAM OF THE CONTRACTOR PROVIDED FLANGED CONNECTION PER SECTION 11572 – COARSE BUBBLE DIFFUSERS.
2. PIPE SUPPORTS 12" AND SMALLER (EXCLUDING AIR PIPING SHALL BE DESIGNED BY THE CONTRACTOR. REFER TO SPECIFICATION 15140.
3. PROVIDE CONCRETE ENCASEMENT FOR PIPING UNDER THE CHLORINE CONTACT BASIN.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
BOBBY FRANK LANE JR.
125582
LICENSED
PROFESSIONAL ENGINEER
1/1/25

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT

PROCESS MECHANICAL

CHLORINE CONTACT BASIN SECTIONS 1 OF 3

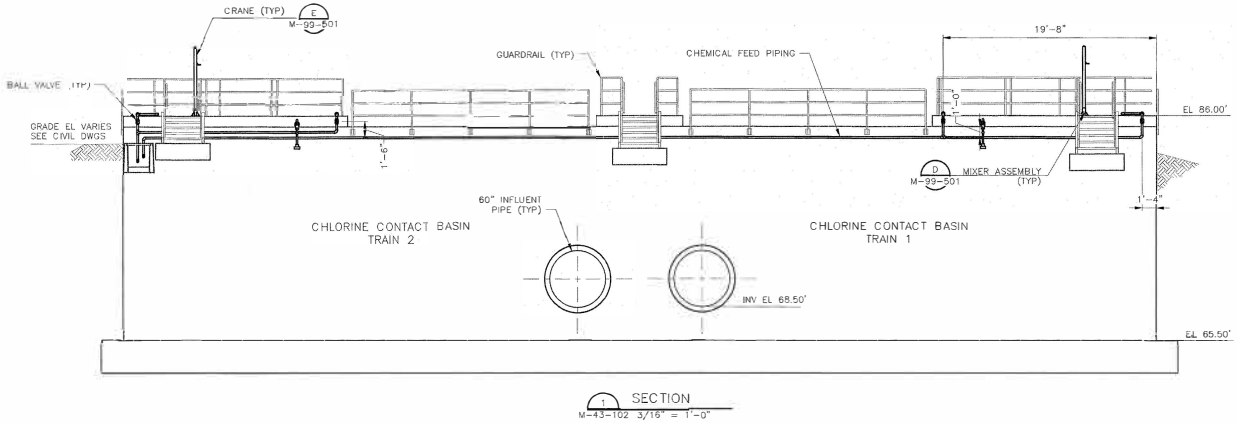
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	96 OF 173

FOR CITY OF HOUSTON USE ONLY

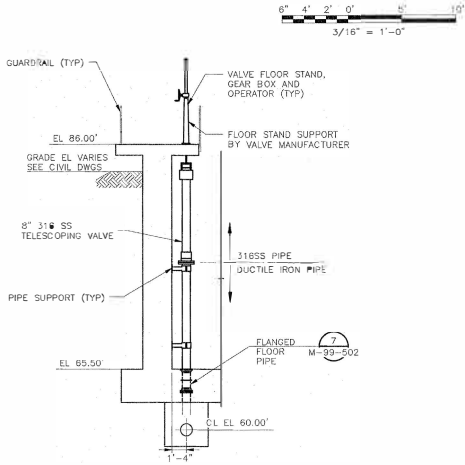
PROFESSIONAL ENGINEER
80367
STATE OF TEXAS

M-43-301

FILE PATH: R:\W_WBS_J\402500 - COH Intercontinental Airport WWTP Improvements\402500-43-CC3-Bryn1



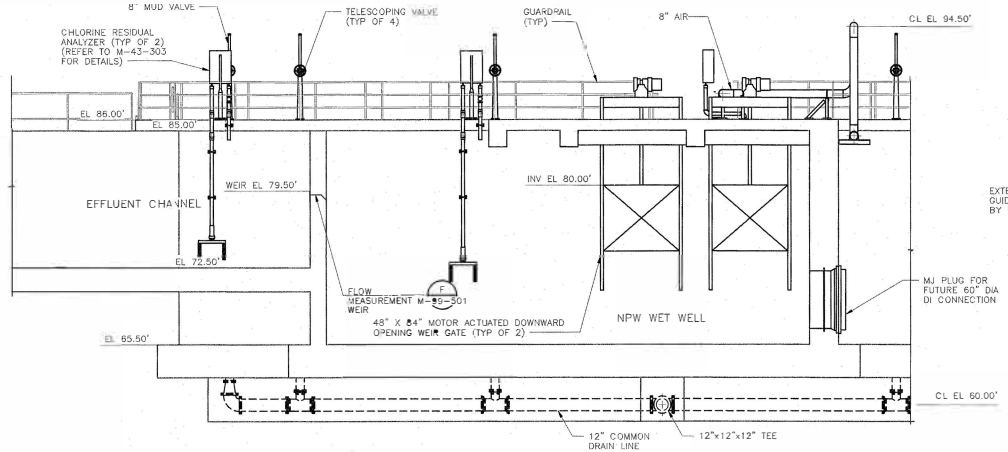
1 SECTION
M-43-102 3/16" = 1'-0"



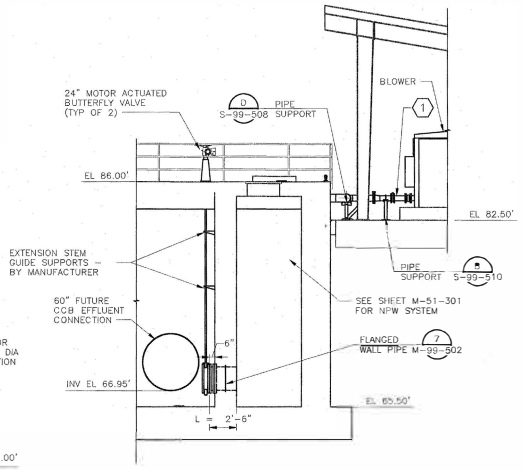
2 SECTION
M-43-102 3/16" = 1'-0"

NOTES BY SYMBOL:

1. CENTERLINE ELEVATION OF BLOWER DISCHARGE CAN VARY WITH EQUIPMENT MANUFACTURER. CENTERLINE ELEVATION OF BLOWER AIR PIPING SHALL BE BETWEEN 85' AND 86', TO NOT EXCEED 86'. BLOWER EQUIPMENT PAD THICKNESS SHALL BE ADJUSTED TO MEET THE CENTERLINE ELEVATION WITHIN RANGE AND WITH MANUFACTURER'S RECOMMENDATION.



3 SECTION
M-43-102 3/16" = 1'-0"



4 SECTION
M-43-102 3/16" = 1'-0"

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
BOBBY FRANK LANE JR.
126582
LICENSED
PROFESSIONAL ENGINEER
7/9/25

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT

PROCESS MECHANICAL

CHLORINE CONTACT BASIN SECTIONS 2 OF 3

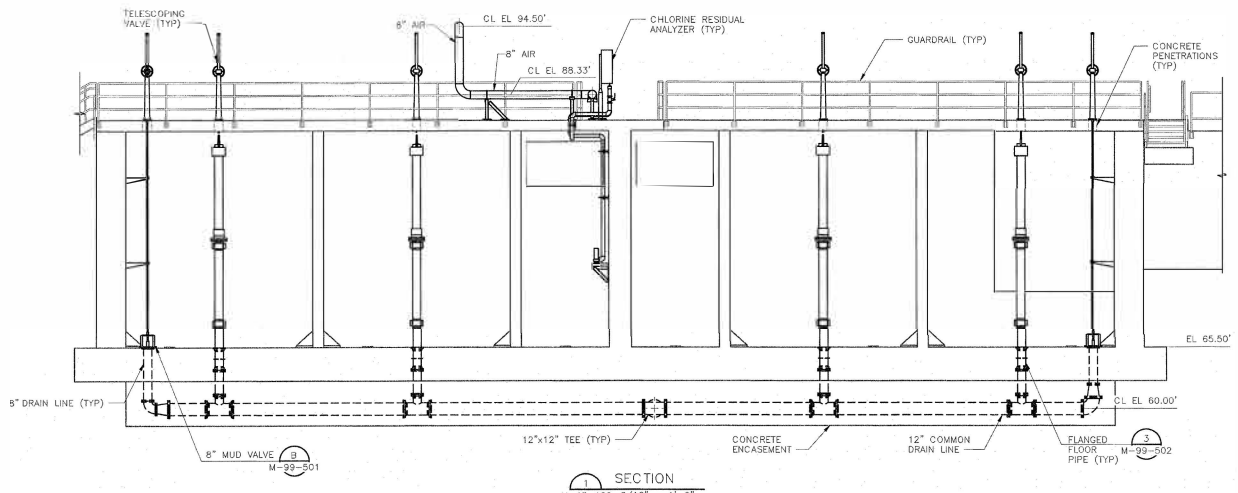
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	97 OF 173

FOR CITY OF HOUSTON USE ONLY

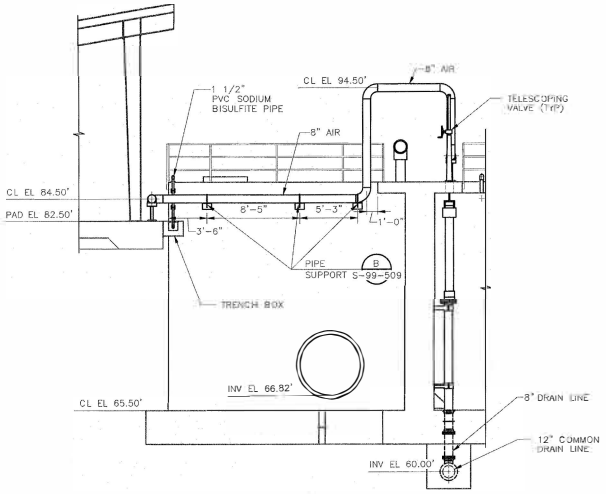
ACCEPTED
80387

M-43-302

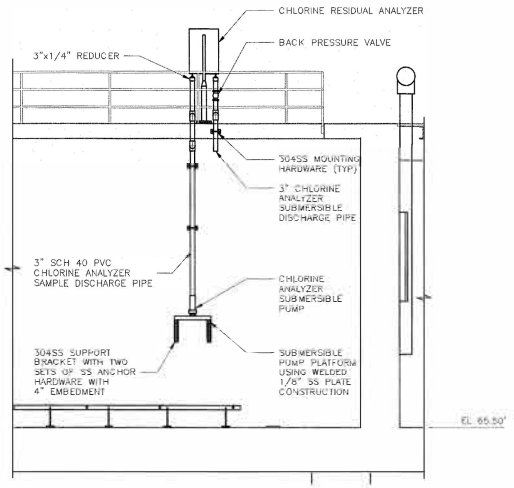
FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-43-CCB-BV.rvt



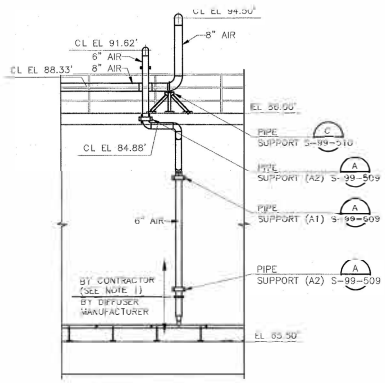
1 SECTION
M-43-102 3/16" = 1'-0"



2 SECTION
M-43-101 3/16" = 1'-0"



3 SECTION
M-43-101 1/4" = 1'-0"



4 SECTION
M-43-102 3/16" = 1'-0"

6" 4' 2' 0' 5' 10'
3/16" = 1'-0"

12" 0" 1' 2' 3" 4' 5' 6' 7'
3/8" = 1'-0"

GENERAL NOTES:

1. DIFFUSER VENDOR SHALL BE RESPONSIBLE FOR ALL PIPING, PIPE SUPPORTS, DIFFUSED AERATION EQUIPMENT AND ACCESSORIES DOWNSTREAM OF THE CONTRACTOR PROVIDED FLANGED CONNECTION PER SECTION 11572 – COARSE BUBBLE DIFFUSERS.
2. PIPE SUPPORTS 12" AND SMALLER (EXCLUDING AIR PIPING SHALL BE DESIGNED BY THE CONTRACTOR. REFER TO SPECIFICATION 15140.
3. CHLORINE ANALYZER ASSEMBLY IS TYPICAL FOR ALL 4 CHLORINE ANALYZER INSTALLATIONS AT THE CCB. REFER TO SECTION 3 ON THIS SHEET FOR DETAILS RELATED TO CHLORINE ANALYZER INSTALLATIONS ON ALL OTHER SHEETS WHERE CHLORINE ANALYZER IS CALLED OUT.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
9200 MEMORIAL CITY WAY
SUITE 500
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 298

SURVEYED BY:
UNITED ENGINEERS, INC.
TB NO. P-6182

STATE OF TEXAS
92887 FRANK LANE JR.
126582
LICENSED
PROFESSIONAL ENGINEER
5/3/05

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION–DISINFECTION REDESIGN
AMENDMENT

PROCESS MECHANICAL

CHLORINE CONTACT BASIN
SECTIONS 3 OF 3

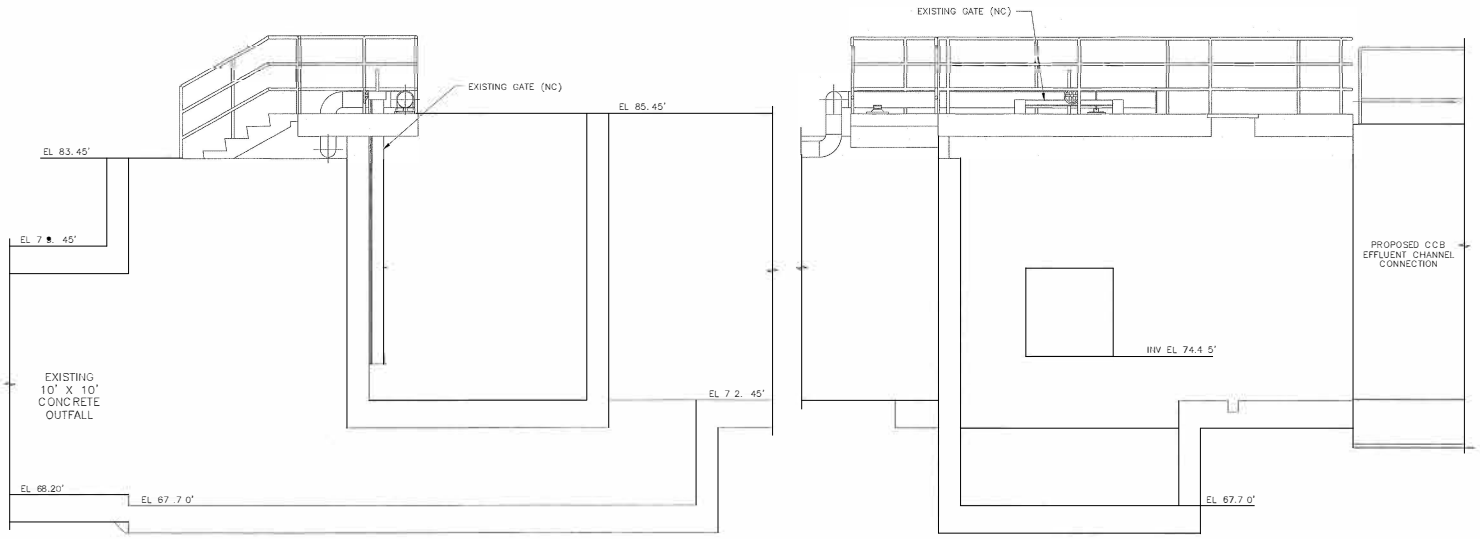
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	96 OF 173

FOR CITY OF HOUSTON USE ONLY

80367
REGISTERED
PROFESSIONAL ENGINEER
HOUSTON, TEXAS

M-43-303

FILE PATH: BIM 360://402500 – COH Intercontinental Airport WWTP Improvements/402500-43-CCB-BV.rvt



1 SECTION
M-43-103 3/8" = 1'-0"

2 SECTION
M-43-103 3/8" = 1'-0"

12" 0" 1' 2' 3' 4' 5' 6' 7'
3/8" = 1'-0"

GENERAL NOTES:

1. CONTRACTOR SHALL VERIFY ALL EXISTING STRUCTURES AND ELEVATIONS.
2. CONTRACTOR SHALL COORDINATE CONNECTION TO EXISTING OUTFALL STRUCTURE WITH WASTEWATER OPS.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
BOBBY FRANK LANE JR.
128582
LICENSED
PROFESSIONAL ENGINEER
7/9/15

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT

PROCESS MECHANICAL

PLANT EFFLUENT JUNCTION BOX
SECTIONS

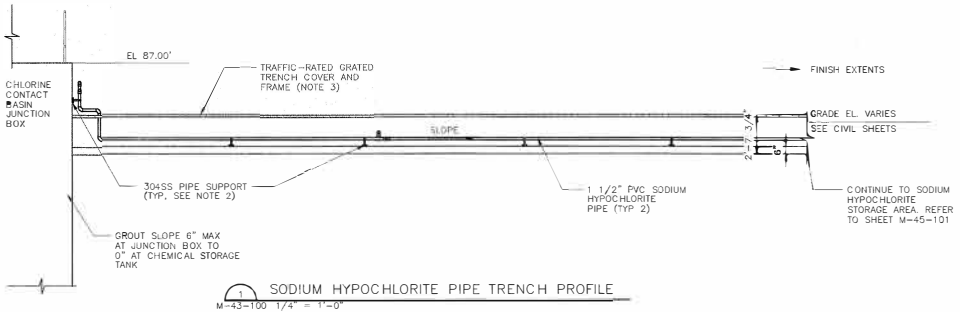
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	99 OF 173

FOR CITY OF HOUSTON USE ONLY

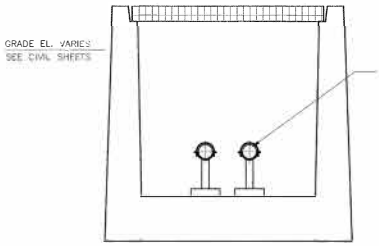
80367

M-43-304

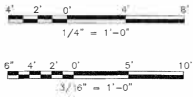
FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-43-CCB-BV.rvt



1 SODIUM HYPOCHLORITE PIPE TRENCH PROFILE
M-43-100 1/4" = 1'-0"



2 SODIUM HYPOCHLORITE PIPE TRENCH SECTION 2
M-43-104 1 1/2" = 1'-0"

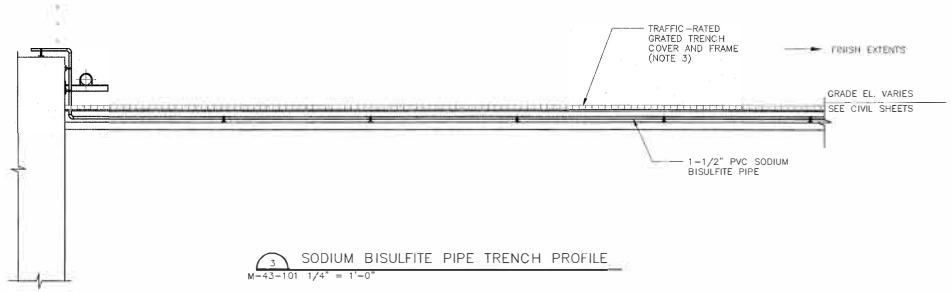


CONSTRUCTION NOTES:

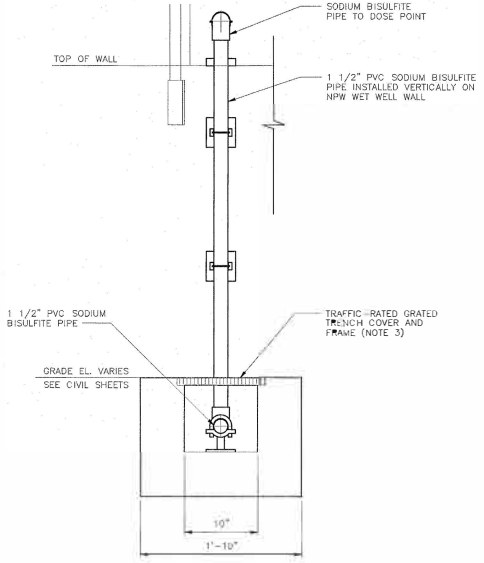
1. CONTRACTOR TO INSTALL 36" WIDE PRECAST CONCRETE PIPE TRENCH FOR SODIUM HYPOCHLORITE PIPES. TRENCH SHALL BE PROVIDED BY HAMPTON, 2'X2' BIG TRENCH, OR APPROVAL EQUAL. DIMENSIONS TO BE SUBJECT TO MANUFACTURER'S RECOMMENDATIONS.
2. CONTRACTOR TO INSTALL A 24" WIDE PRECAST CONCRETE PIPE TRENCH FOR SODIUM BISULFITE PIPE. TRENCH SHALL BE PROVIDED BY HAMPTON MODEL #PR-22, OR APPROVED EQUAL. DIMENSIONS TO BE SUBJECT TO MANUFACTURER'S RECOMMENDATIONS.
3. CONTRACTOR TO INSTALL TRAFFIC-RATED (H-20 OR HIGHER) TRENCH COVER AND FRAME, PROVIDED BY HAMPTON MODEL #PRI-23 OR APPROVED EQUAL
4. REMOVE AND REPLACE EXISTING SOILS WITH STRUCTURE BACKFILL TO A DEPTH OF 6'-0" BELOW FOUNDATION AND EXTENDING 5'-0", EACH SIDE, BEYOND THE FOOTPRINT OF THE FOUNDATION AND SLOPING UP TOWARDS GRADE AT A 1 TO 1 SLOPE. PROVIDE FILTER FABRIC TYPE A BELOW STRUCTURE BACKFILL.
5. PROVIDE A GROUT SLOPE TO CHEMICAL STORAGE AREA STARTING WITH A DEPTH OF 3-INCHES (NOT SHOWN FOR CLARITY).

GENERAL NOTES:

1. CONTRACTOR SHALL COORDINATE CONSTRUCTION ACTIVITIES AND TIE-INS WITH WASTEWATER OPS PER CONSTRUCTION SEQUENCING DOCUMENT.
2. PIPE SUPPORTS 12" AND SMALLER (EXCLUDING AIR PIPING SHALL BE DESIGNED BY THE CONTRACTOR. REFER TO SPECIFICATION 15140.
3. PROVIDE K-FLEX INSULATION FOR THE SODIUM BISULFITE PIPING (NOT SHOWN FOR CLARITY). K-FLEX INSULATION SHALL BE BUNA-N RUBBER/PVC, SLIT WITH ACRYLIC ADHESIVE AND FLAP.
4. CONTRACTOR SHALL FIELD CUT PORTS FOR TEES AND BENDS AS REQUIRED FOR AN OPERATIONAL PIPING TRENCH. CONTRACTOR SHALL CONNECT END PIECES TOGETHER WITH MASTIC JOINTS AND GROUT CAP. ENDCAPS, CORNERS, AND TEES SHALL BE PRECAST, OR ENGINEER APPROVED EQUAL.
5. MANUFACTURER SHALL PROVIDE A TRENCH SYSTEM THAT IS FULLY RESISTANT TO BUOYANCY WITH AN EXTERIOR WATER SURFACE UP TO THE FULL HEIGHT OF THE TRENCH. MANUFACTURER MAY USE ADDITIONAL WEIGHT, ADDITIONAL (ATTACHED) FOUNDATIONS, OR A FLARED BOTTOM SECTION TO OVERCOME BUOYANCY.



3 SODIUM BISULFITE PIPE TRENCH PROFILE
M-43-101 1/4" = 1'-0"



4 SODIUM BISULFITE PIPE TRENCH SECTION 2
M-43-101 1 1/2" = 1'-0"

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
BOBBY FRANK LANE JR.
126582
LICENSED
PROFESSIONAL ENGINEER
7/1/05

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION-DISINFECTION REDESIGN AMENDMENT

PROCESS MECHANICAL

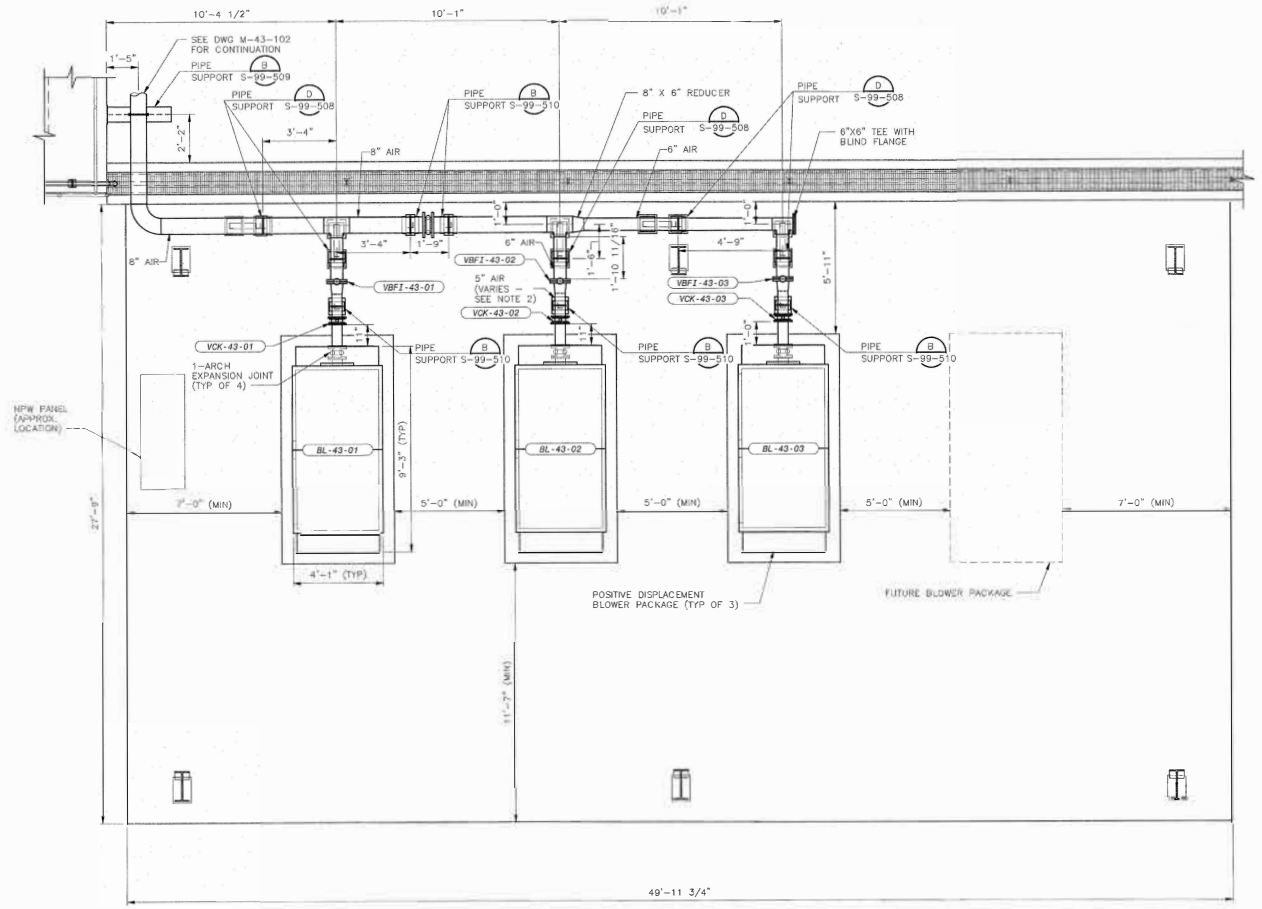
CHEMCICAL FEED PIPE TRENCH AND DOSE POINT LOCATIONS

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	100 OF 173

FOR CITY OF HOUSTON USE ONLY
80367

M-43-305

FILE PATH: S:\M 3800\4402500 - COH Intercontinental Airport WWTP Improvements\4402500-43-CCB-SV.mxl



ENLARGED PLAN
3/8" = 1'-0"

12" 0' 1' 2' 3' 4' 5' 6' 7"
3/8" = 1'-0"

N

GENERAL NOTES:

1. BLOWER PACKAGE DIMENSIONS MAY VARY WITH VENDOR. MAXIMUM DIMENSIONS ARE SHOWN.
2. BLOWER DISCHARGE CONNECTION SIZES MAY VARY WITH BLOWER VENDOR. DISCHARGE FLEXIBLE CONNECTION AND CHECK VALVES SIZES SHALL MATCH THE BLOWER DISCHARGE CONNECTION SIZE.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
BOBBY FRANK LANE JR.
126582
LICENSED
PROFESSIONAL ENGINEER
7/3/25

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT

PROCESS MECHANICAL
BLOWER PAD ENLARGED PLAN

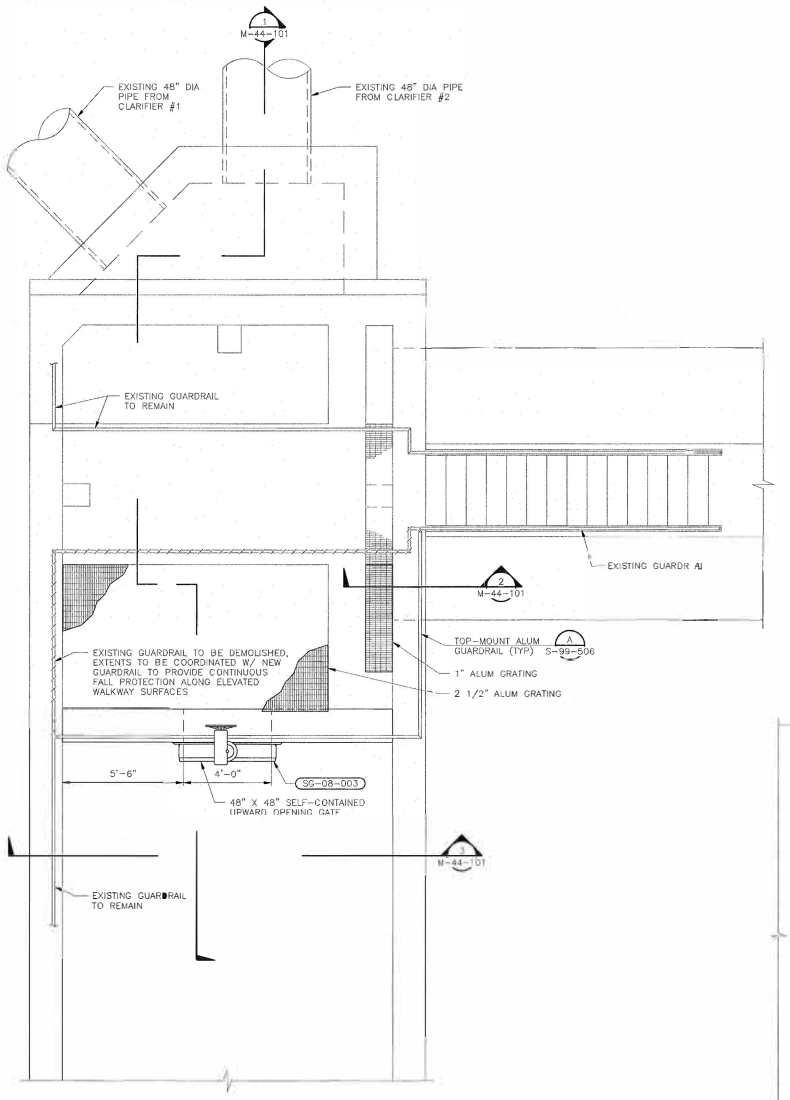
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	101 OF 173

FOR CITY OF HOUSTON USE ONLY

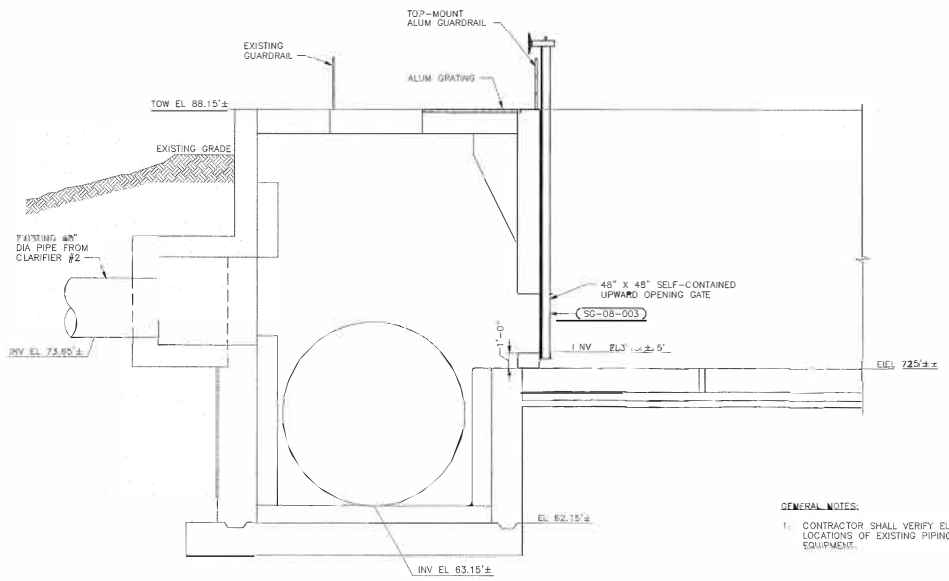
80367
REGISTERED
PROFESSIONAL
ENGINEER
STATE OF TEXAS

M-43-401

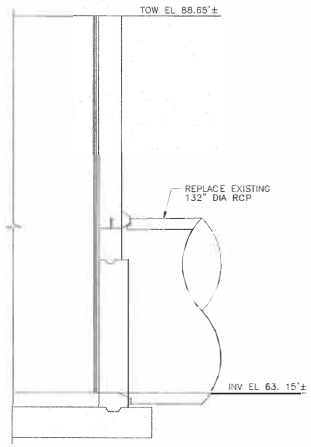
FILE PATH: BIM 360://402500 - COH Intercontinental Airport WWTP Improvements/402500-43-CCB-BV.rvt



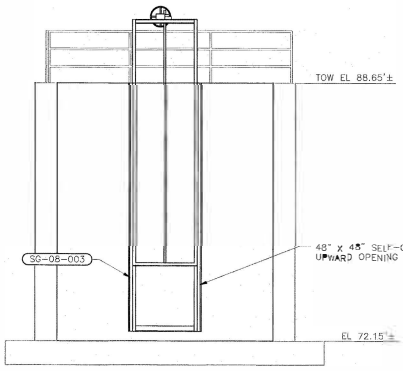
EXISTING CCB INFLUENT CHAMBER PLAN
3/88 = 1'-0"



1 SECTION
M-44-101 1/4" = 1'-0"



2 SECTION
M-44-101 1/4" = 1'-0"



3 SECTION
M-44-101 1/4" = 1'-0"

3/8" = 1'-0"
1/4" = 1'-0"

N

GENERAL NOTES:

1. CONTRACTOR SHALL VERIFY ELEVATIONS AND LOCATIONS OF EXISTING PIPING, STRUCTURES AND EQUIPMENT.

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
BOBBY FRANK LANE JR.
126582
LICENSED PROFESSIONAL ENGINEER
7/1/05

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT

PROCESS MECHANICAL

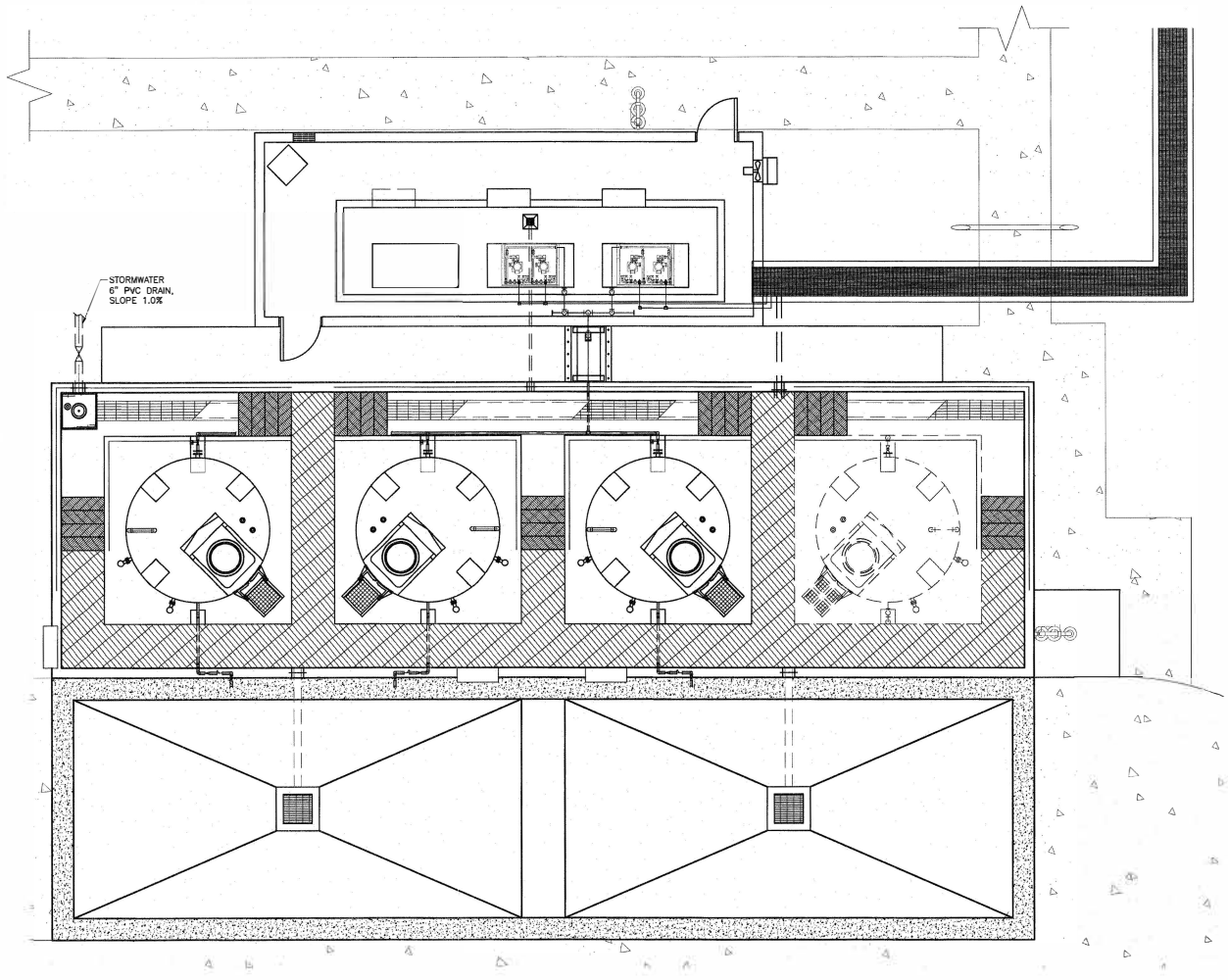
EXISTING CCB INFLUENT CHAMBER
PLAN AND SECTIONS

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	102 OF 173

FOR CITY OF HOUSTON USE ONLY
ACCEPTED
80367
HOUSTON, TEXAS

M-44-010

FILE PATH: BW 3621//402500 - COH Intercontinental Airport WWTP Improvements/402500-43-CCB-BW.rvt



0 1' 2' 4' 8'
1/4"=1'-0"

M-50-101

5engineering

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

STATE OF TEXAS
FRANK L. STEPHENS
104104
LICENSED
PROFESSIONAL
ENGINEER
07/03/25

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

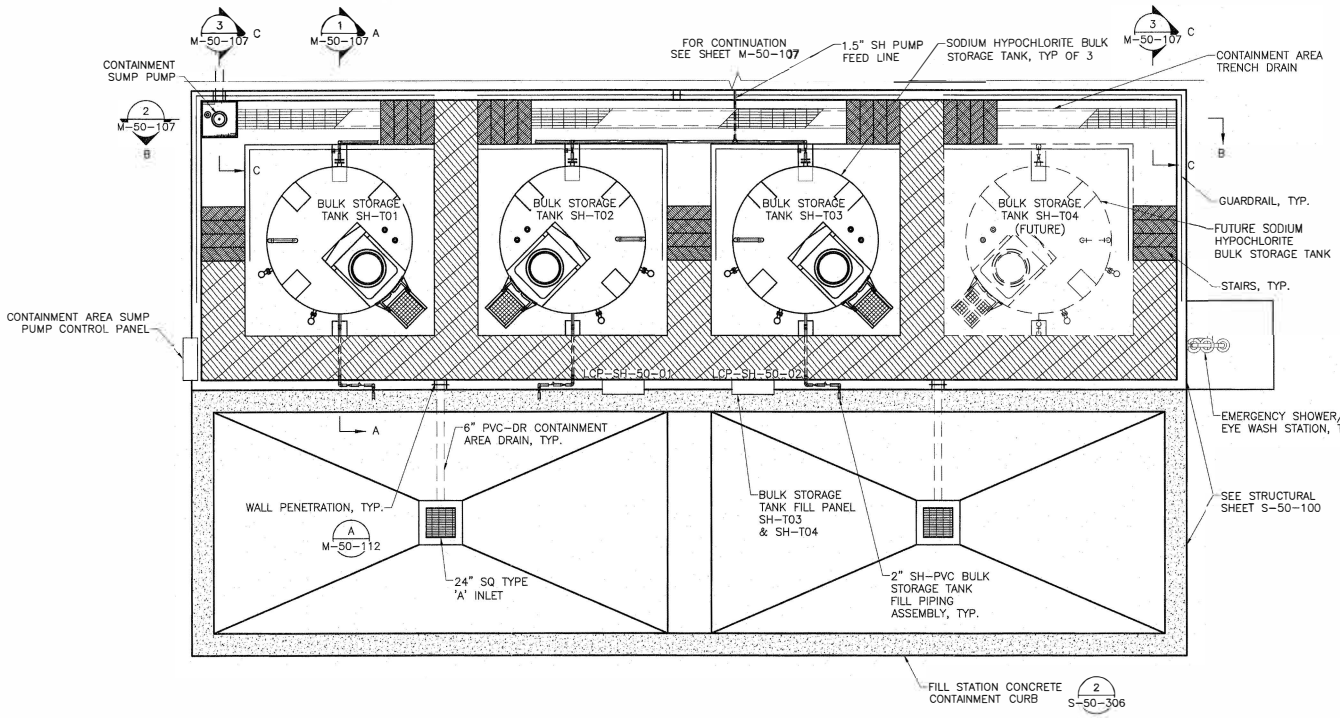
INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION-DISINFECTION REDESIGN AMENDMENT

SODIUM HYPOCHLORITE PLAN

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 103 OF 173	

ACCEPTED
80367
HOUSTON, TEXAS

FILE PATH: P:\0092\001 IAH WWTP\04 Cadd-GIS\02 SHEETS\45 - CHEMICAL FEED SYSTEM\M-45-131 OVERALL DISINFECTION SYSTEM HYPOCHLORITE PLAN.dwg



SODIUM HYPOCHLORITE SITE PLAN

SCALE 1/4"=1'-0"

NOTES:
1. ALL EXPOSED CONCRETE SURFACES INCLUDING FLOORS AND WALLS, SHALL BE COATED WITH A CHEMICALLY RESISTANT COATING SYSTEM.
2. EXTERIOR PIPE SUPPORTS SHALL BE UV RESISTANT, FRP AND RESISTANT TO THE CHEMICALS IN USE
3. THE LAYOUT OF THE CHEMICAL PIPING IS CONCEPTUALLY SHOW, CONTRACTOR SHALL ROUTE PIPE TO MAINTAIN ACCESS TO EQUIPMENT AND TO AVOID TRIP HAZARDS.
4. ALL VALVES FOR SODIUM HYPOCHLORITE SERVICES SHALL BE VENTED TYPE.
5. PROVIDE FRP ELEVATED WALKWAY AND FRAMEWORK BY FIBERGRATE COMPOSITES OR EQUAL.

0 1' 2' 4' 8'
1/4"=1'-0"

M-50-102

5engineering

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

STATE OF TEXAS FRANK L. STEPHENS 104104 LICENSED PROFESSIONAL ENGINEER

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

07/03/25

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

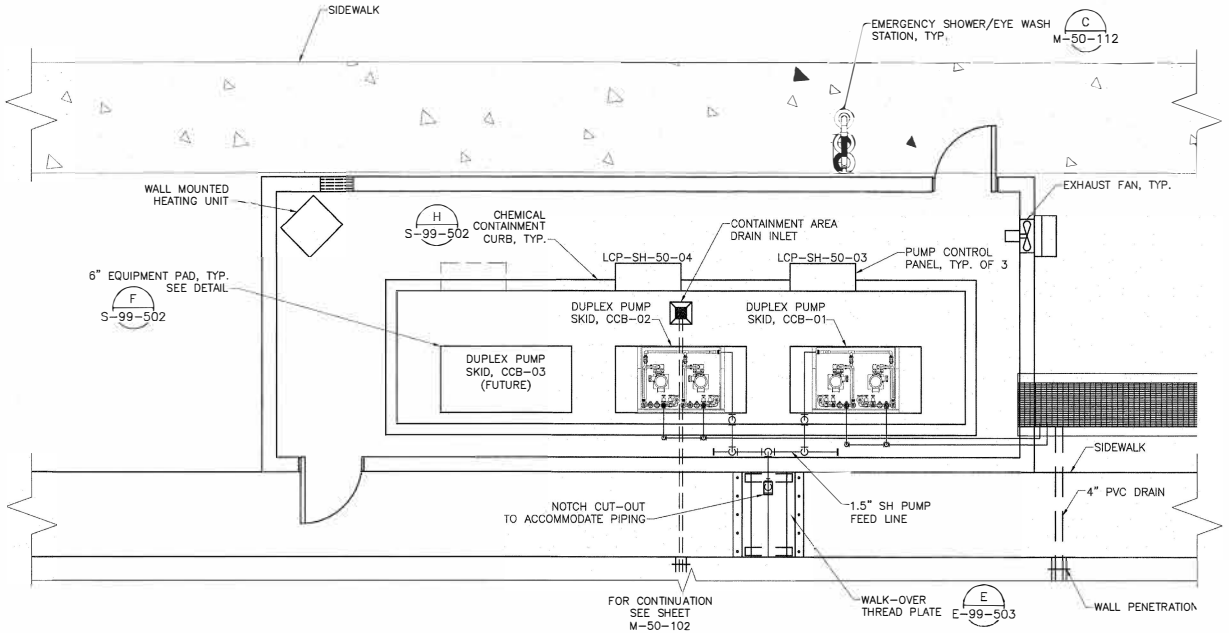
INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT
SODIUM HYPOCHLORITE
BULK STORAGE PLAN

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 104 OF 173	

PUBLIC WORKS & ENGINEERING 80367 REGISTERED

FILE PATH: P:\0092\001 IAH WWTP\04 Cadd-GIS\02 SHEETS\45 - CHEMICAL FEED SYSTEM\M-45-102 SODIUM HYPOCHLORITE BULK STORAGE PLAN.dwg

NOTES:
1. ALL EXPOSED CONCRETE SURFACES INCLUDING FLOORS AND WALLS, SHALL BE COATED WITH A CHEMICALLY RESISTANT COATING SYSTEM.
2. INTERIOR ROOM WALLS SHALL BE COATED UP TO TOP OF STARTER WALL OR SECOND COURSE OF MASONRY. INTERIOR CONTAINMENT CURBS SHALL BE COMPLETELY COATED.
3. EXTERIOR PIPE SUPPORTS SHALL BE UV RESISTANT, FRP AND RESISTANT TO THE CHEMICALS IN USE.
4. THE LAYOUT OF CHEMICAL PIPING IS CONCEPTUALLY SHOWN, CONTRACTOR SHALL ROUTE PIPE TO MAINTAIN ACCESS TO EQUIPMENT AND TO AVOID TRIP HAZARDS.



0 1' 2' 4'
3/8"=1'-0"

M-50-103

5engineering

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

STATE OF TEXAS
FRANK L. STEPHENS
104104
LICENSED
PROFESSIONAL
ENGINEER
07/03/25

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

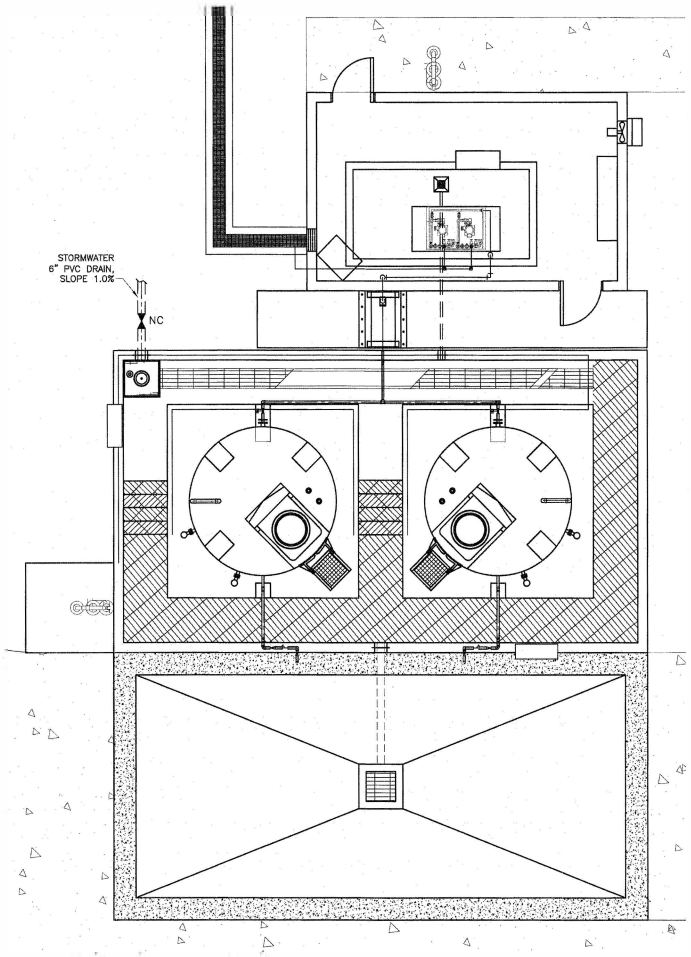
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT
SODIUM HYPOCHLORITE CHEMICAL
FEED BUILDING

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SR SHAHIDUR RAHMAN, P.E.	
SHEET NO. 105 OF 173	

ACCEPTED
80367
CITY OF HOUSTON, TEXAS

FILE PATH: P:\0092\001 IAH WWTP\04 Cadd-GIS\02 SHEETS\45 - CHEMICAL FEED SYSTEM\M-45-103 SODIUM HYPOCHLORITE CHEMICAL FEED PLAN.dwg



NOTES:

1. ALL EXPOSED CONCRETE SURFACES INCLUDING FLOORS AND WALLS, SHALL BE COATED WITH A CHEMICALLY RESISTANT COATING SYSTEM.
2. EXTERIOR PIPE SUPPORTS SHALL BE UV RESISTANT, FRP AND RESISTANT TO THE CHEMICALS IN USE.
3. THE LAYOUT OF CHEMICAL PIPING IS CONCEPTUALLY SHOWN, CONTRACTOR SHALL ROUTE PIPE TO MAINTAIN ACCESS TO EQUIPMENT AND TO AVOID TRIP HAZARDS.
4. ALL VALVES FOR SODIUM HYPOCHLORITE SERVICES SHALL BE VENTED TYPE.
5. PROVIDE FRP ELEVATED WALKWAY AND FRAMEWORK BY FIBERGRATE COMPOSITES OR EQUAL.
6. INSULATE AND JACKET CHEMICAL METERING PUMP SUCTION PIPING FROM THE TANK TO THE BUILDING. PROVIDE K-FLEX INSULATION BUNA N RUBBER/PVC WITH ACRYLIC ADHESIVE.

5engineering

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
FRANK L. SISTERHEN
104104
LICENSED PROFESSIONAL ENGINEER
07/03/25

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT

SODIUM BISULFITE PLAN

WBS NUMBER
R-00265-0147-4
DRAWING SCALE
AS NOTED
CITY OF HOUSTON PM
SHAHIDUR RAHMAN, P.E.
SHEET NO. 106 OF 173

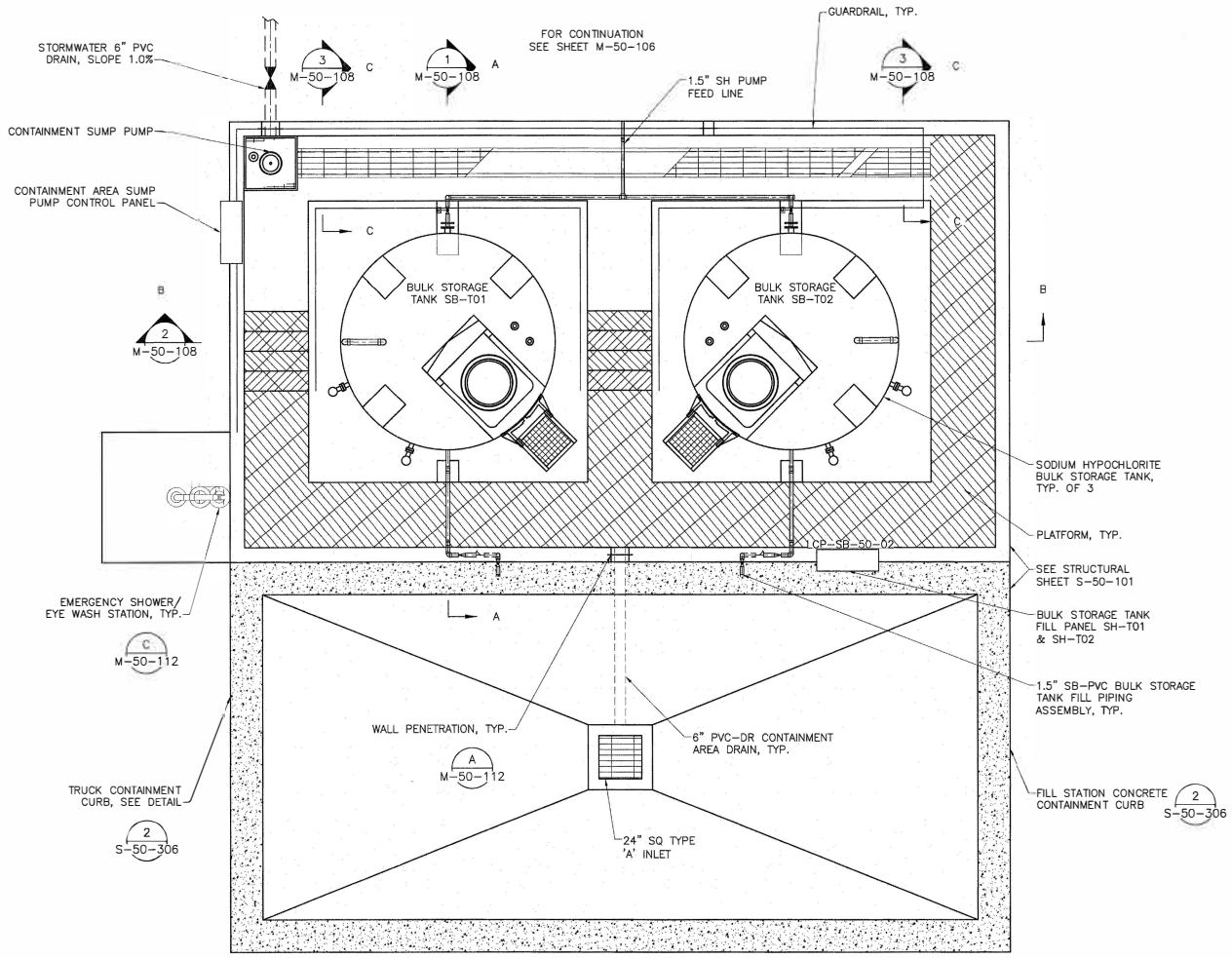
FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
80367
REGISTERED
PROFESSIONAL ENGINEER
HOUSTON, TEXAS

0 1' 2' 4' 8'
1/4"=1'-0"

M-50-104

FILE PATH: P:\0092\001 IAH WWTP\04 Cadd-GIS\02 SHEETS\45 - CHEMICAL FEED SYSTEM\M-45-104 OVERALL DISINFECTION SYSTEM BISULFITE PLAN.dwg



SODIUM BISULFITE SITE PLAN
SCALE 3/8" = 1'-0"

NOTES:
1. ALL EXPOSED CONCRETE SURFACES ,INCLUDING FLOORS AND WALLS, SHALL BE COATED WITH A CHEMICALLY RESISTANT COATING SYSTEM.
2. EXTERIOR PIPE SUPPORTS SHALL BE UV RESISTANT FRP AND RESISTANT TO THE CHEMICALS IN USE
3. THE LAYOUT OF THE CHEMICAL PIPING IS CONCEPTUALLY SHOW, CONTRACTOR SHALL ROUITE PIPE TO MAINTAIN ACCESS TO EQUIPMENT AND TO AVOID TRIP HAZARDS.
4. ALL VALVES FOR SODIUM HYPOCHLORITE SERVICES SHALL BE VENTED TYPE.
5. PROVIDE FRP ELEVATED WALKWAY AND FRAMEWORK BY FIBERGRATE COMPOSITES OR EQUAL.
6. PROVIDE KFLEX INSULATION ON THE SODIUM BISULFITE PIPING. COORDINATE INSULATION WITH HEAT TRACE ON THE DISCHARGE PIPING ONLY.

0 1' 2' 4'
3/8"=1'-0

M-50-105

5engineering

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
TRAVIS L. DEPPERT
104104
LICENSED PROFESSIONAL ENGINEER
07/03/25

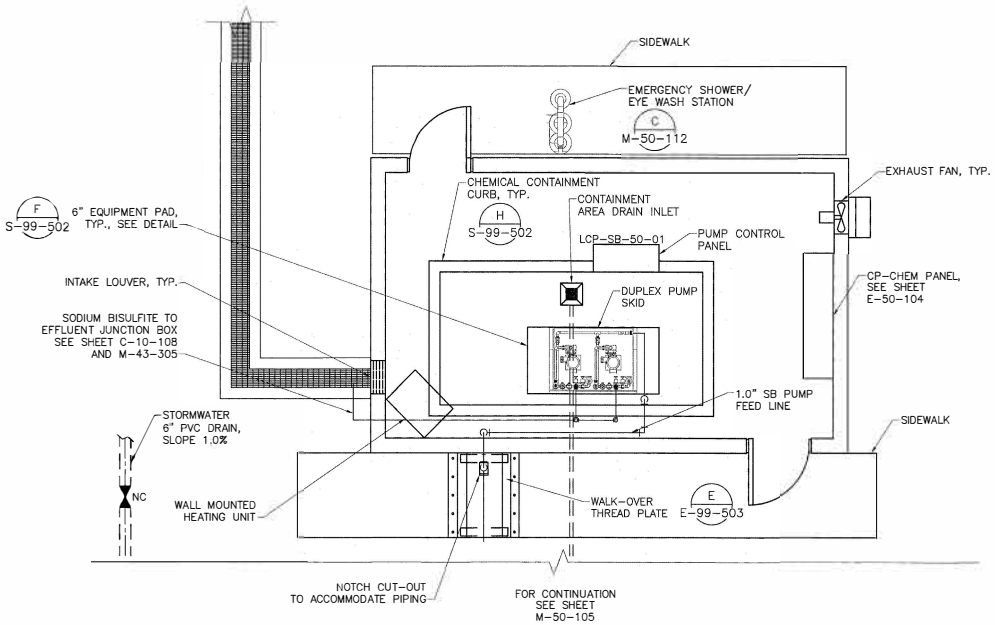
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION-DISINFECTION REDESIGN AMENDMENT
SODIUM BISULFITE BULK STORAGE PLAN

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 107 OF 173	

STATE OF TEXAS
80367
REGISTERED
07/03/25

FILE PATH: P:\0092\001 IAH WWTP\04 Cadd-GIS\02 SHEETS\45 - CHEMICAL FEED SYSTEM\M-45-105 SODIUM BISULFITE BULK STORAGE PLAN.dwg



NOTES:
1. ALL EXPOSED CONCRETE SURFACES INCLUDING FLOORS AND WALLS, SHALL BE COATED WITH A CHEMICALLY RESISTANT COATING SYSTEM.
2. INTERIOR ROOM WALLS SHALL BE COATED UP TO TOP OF STARTER WALL OR SECOND COURSE OF MASONRY. INTERIOR CONTAINMENT CURBS SHALL BE COMPLETELY COATED.
3. EXTERIOR PIPE SUPPORTS SHALL BE UV RESISTANT, FRP AND RESISTANT TO THE CHEMICALS IN USE.
4. THE LAYOUT OF CHEMICAL PIPING IS CONCEPTUALLY SHOWN, CONTRACTOR SHALL ROUTE PIPE TO MAINTAIN ACCESS TO EQUIPMENT AND TO AVOID TRIP HAZARDS.

1' 2' 4'
3/8"=1'-0

M-50-106

5engineering

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

STATE OF TEXAS
FRANK L. STEPHENS
104104
LICENSED
PROFESSIONAL ENGINEER
07/03/25

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION-DISINFECTION REDESIGN AMENDMENT

SODIUM BISULFITE CHEMICAL FEED PLAN & SECTION

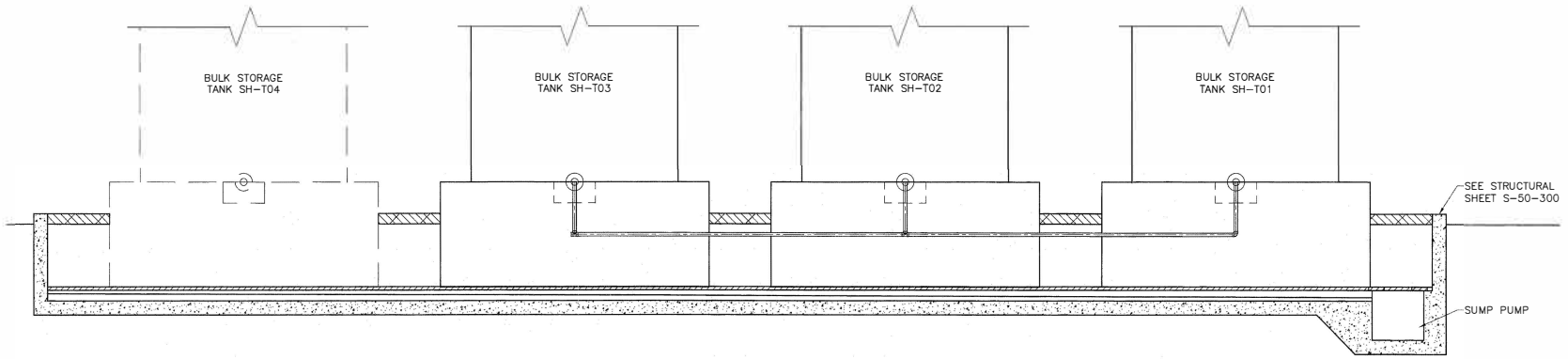
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO. 108 OF 173	

FOR CITY OF HOUSTON USE ONLY

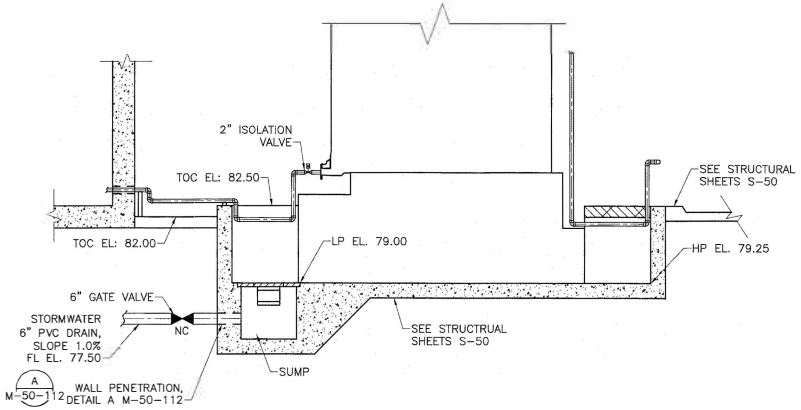
STATE OF TEXAS
80367
REGISTERED
PROFESSIONAL ENGINEER
HOUSTON, TEXAS

FILE PATH: P:\0082\001 IAH WWTP\04 Cadd-GIS\02 SHEETS\45 - CHEMICAL FEED SYSTEM\M-45-106 SODIUM BISULFITE CHEMICAL FEED PLAN.dwg

NOTES:
1. ALL EXPOSED CONCRETE SURFACES INCLUDING FLOORS AND WALLS, SHALL BE COATED WITH A CHEMICALLY RESISTANT COATING SYSTEM.
2. EXTERIOR PIPE SUPPORTS SHALL BE UV RESISTANT, FRP AND RESISTANT TO THE CHEMICALS IN USE.
3. THE LAYOUT OF THE CHEMICAL PIPING IS CONCEPTUALLY SHOW, CONTRACTOR SHALL ROUTE PIPE TO MAINTAIN ACCESS TO EQUIPMENT AND TO AVOID TRIP HAZARDS.
4. ALL VALVES FOR SODIUM HYPOCHLORITE SERVICES SHALL BE VENTED TYPE.
5. PROVIDE FRP ELEVATED WALKWAY AND FRAMEWORK BY FIBERGRATE COMPOSITES OR EQUAL.



B SECTION
M-50-102 3/8" = 1'-0"



A SECTION
M-50-102 3/8" = 1'-0"

SODIUM HYPOCHLORITE SECTION VIEW
SCALE 3/8" = 1'-0"

0 1' 2' 4'
3/8" = 1'-0

M-50-107

5engineering

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
FRANK L. STEPHENS
104104
LICENSED PROFESSIONAL ENGINEER
07/03/25

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION-DISINFECTION REDESIGN AMENDMENT

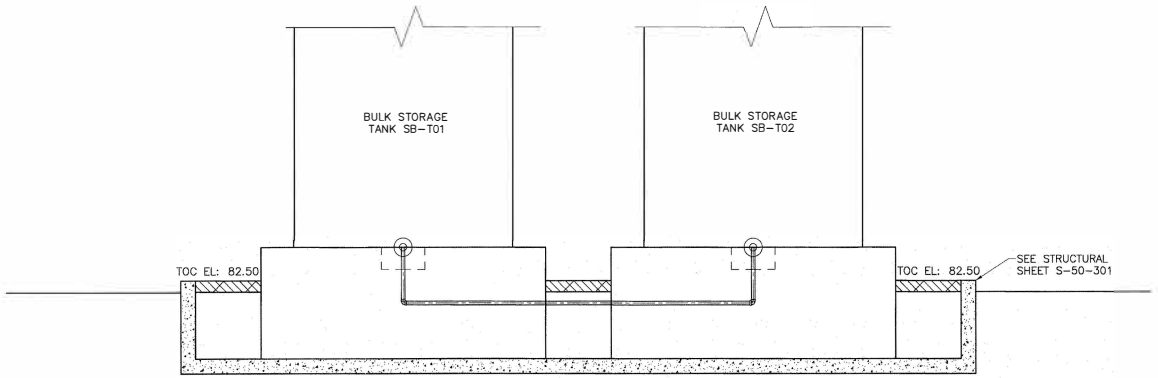
SODIUM HYPOCHLORITE BULK STORAGE TANK SECTIONS

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	10 9 OF 173

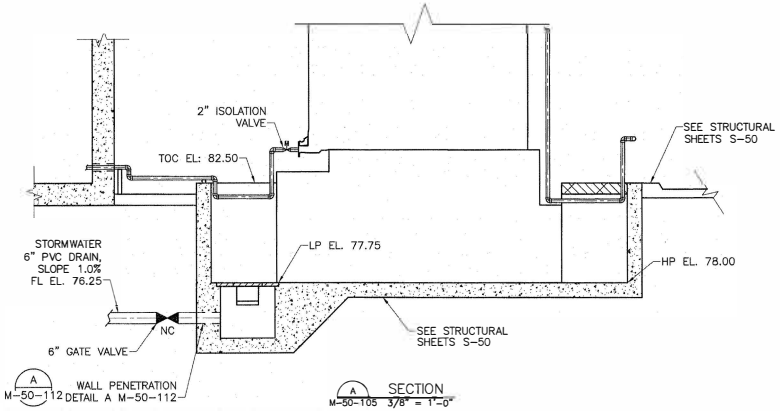
FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
80367
LICENSED PROFESSIONAL ENGINEER

FILE PATH: P:\0092\001 IAH WWTP\04 Cadd-GIS\02 SHEETS\45 - CHEMICAL FEED SYSTEM\M-45-107 SODIUM HYPO BULK STORAGE TANK SECTIONS.dwg



B M-50-105 SECTION 3/8" = 1'-0"



SODIUM BISULFITE SECTION VIEW

SCALE 3/8" = 1'-0"

NOTES:
1. ALL EXPOSED CONCRETE SURFACES INCLUDING FLOORS AND WALLS, SHALL BE COATED WITH A CHEMICALLY RESISTANT COATING SYSTEM.
2. EXTERIOR PIPE SUPPORTS SHALL BE UV RESISTANT, FRP AND RESISTANT TO THE CHEMICALS IN USE.
3. THE LAYOUT OF THE CHEMICAL PIPING IS CONCEPTUALLY SHOW, CONTRACTOR SHALL ROUTE PIPE TO MAINTAIN ACCESS TO EQUIPMENT AND TO AVOID TRIP HAZARDS.
4. ALL VALVES FOR SODIUM HYPOCHLORITE SERVICES SHALL BE VENTED TYPE.
5. PROVIDE FRP ELEVATED WALKWAY AND FRAMEWORK BY FIBERGRATE COMPOSITES OR EQUAL.

0 1' 2' 4'
3/8"=1'-0

M-50-108

5engineering

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
FRANK L. STEPHENS
104104
LICENSED
PROFESSIONAL ENGINEER
07/03/25

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

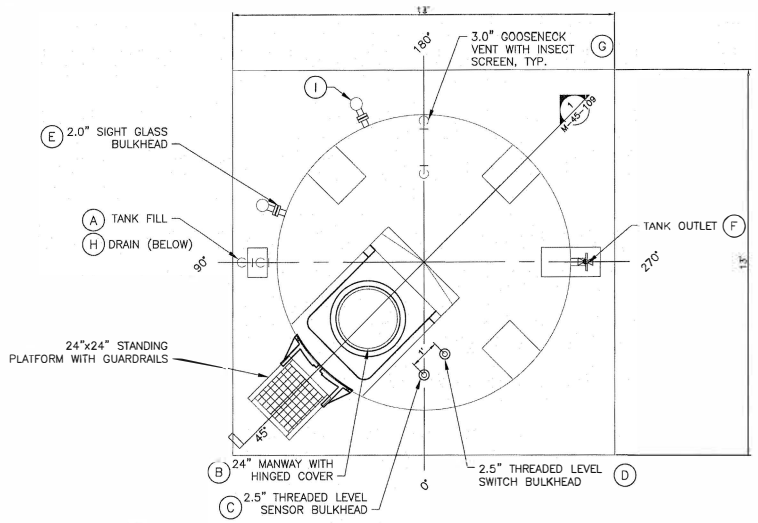
INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT

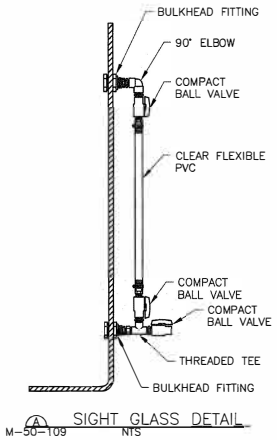
SODIUM BISULFITE BULK STORAGE
TANK SECTIONS

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 110 OF 173	

REGISTERED
80367
HOUSTON, TEXAS

FILE PATH: P:\0092\001 WH WWTP\04 Cadd-GIS\02 SHEETS\45 - CHEMICAL FEED SYSTEM\M-45-108 SODIUM BISULFITE BULK STORAGE TANK SECTIONS.dwg



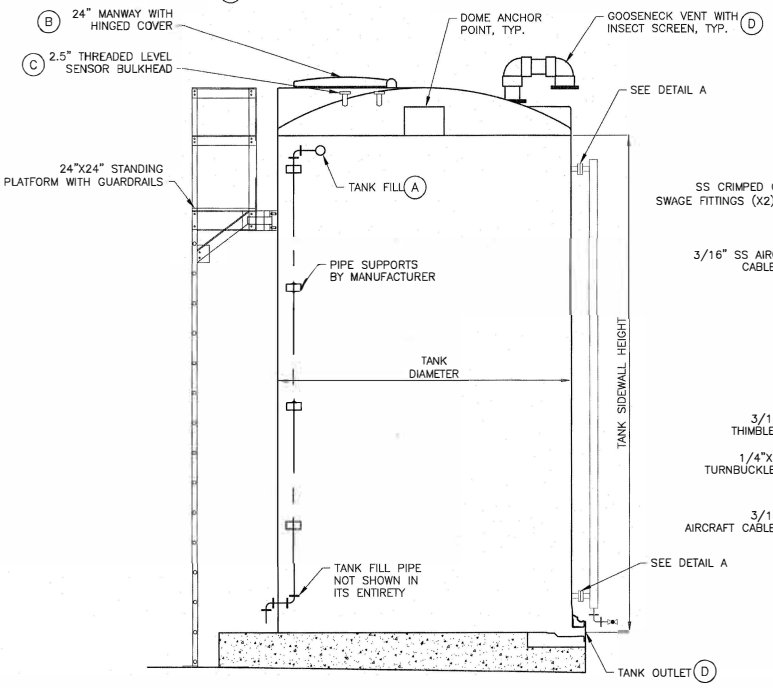


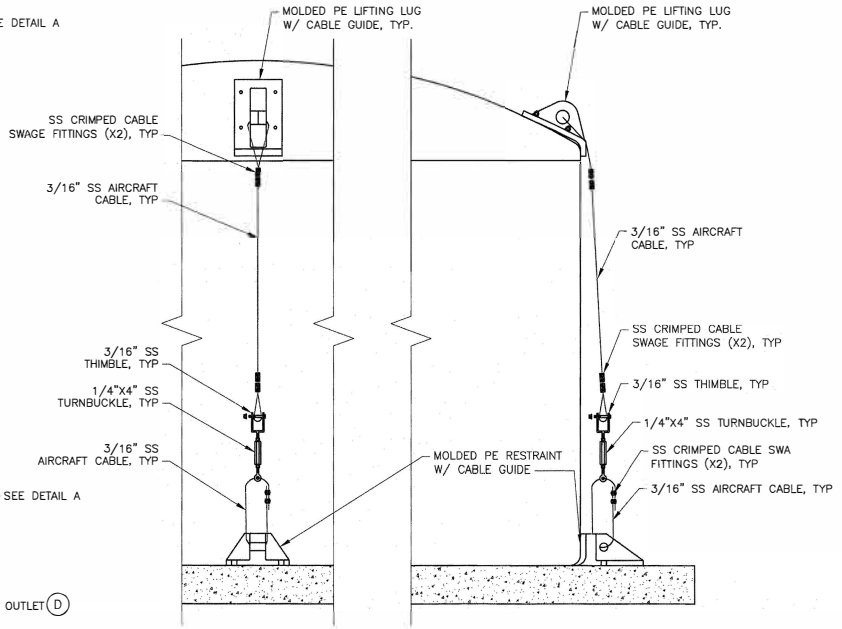
A SIGHT GLASS DETAIL
M-50-109 NTS

BULK STORAGE TANK PIPE & APPURTENANCE SIZES		
	BLEACH	SODIUM BISULFITE
A. TANK FILL	1.5"	1.0"
B. MANWAY	24"	24"
C. LEVEL SENSOR BULKHEAD	2.5"	2.5"
D. LEVEL SWITCH BULKHEAD	2.5"	2.5"
E. SIGHT GLASS BULKHEAD	2.0"	2.0"
F. TANK OUTLET	1.5"	1.0"
G. GOOSENECK VENT	3.0"	3.0"
H. DRAIN	1.5"	1.5"
I. OVERFLOW	2.0"	2.0"

NOTES

1. ALL EXPOSED CONCRETE SURFACES, INCLUDING FLOORS AND WALLS SHALL BE COATED WITH A CHEMICALLY RESISTANT COATING SYSTEM.
2. EXTERIOR PIPE SUPPORTS SHALL BE UV RESISTANT FRP RESISTANT TO THE CHEMICALS IN USE.
3. THE LAYOUT OF CHEMICAL PIPING IS CONCEPTUALLY SHOWN, CONTRACTOR SHALL ROUTE PIPE TO MAINTAIN ACCESS TO EQUIPMENT AND TO AVOID TRIP HAZARDS.
4. COORDINATE TANK DETAILS, INCLUDING ACCESS LADDER SAFETY REQUIREMENTS, WITH SPECIFICATION SECTION 43 41 43 SINGLE WALL HDXLPE STORAGE TANKS.





5engineering

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

STATE OF TEXAS
FRANK L. STEPHENS
104104
LICENSED PROFESSIONAL ENGINEER
07/03/25

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT

STORAGE TANK TYPICAL DETAILS

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.

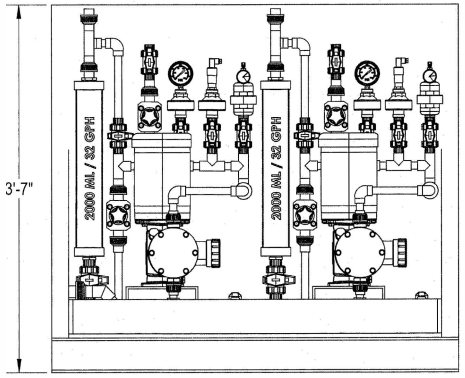
FOR CITY OF HOUSTON USE ONLY

ACCEPTED
80367

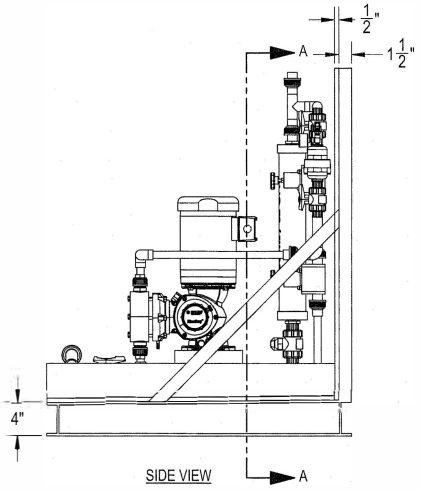
M-50-109

SHEET NO 111 OF 173

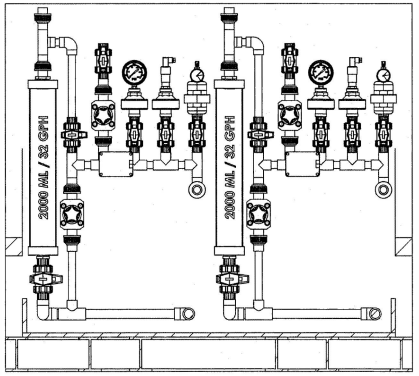
FILE PATH: P:\0092\001 IAH WWTP\04 Cadd-GIS\02 SHEETS\45 - CHEMICAL FEED SYSTEM\M-45-109 FACILITIES BULK STORAGE DETAILS.dwg



FRONT VIEW



SIDE VIEW



A TYPICAL METERING PUMP DETAILS
NTS

METERING PUMP NOTES

1. THE METERING PUMP ASSEMBLY SHOWN IS FOR A PERISTALTIC HOSE PUMP. TUBE PUMPS WILL HAVE SIMILAR PIPING AND APPURTENANCES. COORDINATE SPECIFIC PUMP LAYOUTS WITH PLANS AND SECTIONS. FOR PUMP INSTALLATIONS WITH THREE PUMPS THE INSTALLATION WILL BE SIMILAR
2. SUPPORT ALL VALVES AND APPURTENANCES FROM UNISTRUT FRAME OR BY A DEDICATED SUPPORT. VALVES OR APPURTENANCES SUPPORTED FROM PIPE ARE UNACCEPTABLE. CONTRACTOR SHALL COORDINATE SUPPORT OF ALL VALVES, PIPING, AND APPURTENANCES ON PUMP TABLE.
3. ALL PIPE SUPPORTS AND TABLE SHALL BE COMPATIBLE WITH THE CHEMICALS IN USE.

METERING PUMP PIPE & APPURTENANCE SIZES			
APPURTENANCE	BLEACH	SODIUM BISULFITE	
A: VENT	1.0"	0.5"	
B: SUCTION MANIFOLD	2.5"	0.5"	
C: PUMP SUCTION	1.0"	0.5"	
D: PUMP DISCHARGE	1.0"	0.5"	
E: DISCHARGE MANIFOLD	2.0"	0.5"	

5engineering

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
FRANK L. STEPHENS
104104
LICENSED
PROFESSIONAL ENGINEER
07/03/25

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION–DISINFECTION REDESIGN
AMENDMENT

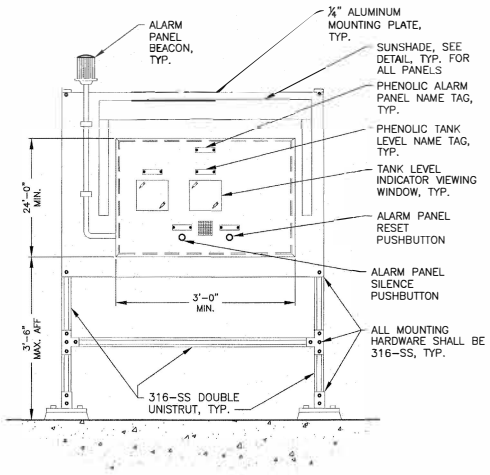
TYPICAL METERING
PUMP DETAILS

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 112 OF 173	

REGISTERED
PROFESSIONAL
ENGINEER
80367
HOUSTON, TEXAS

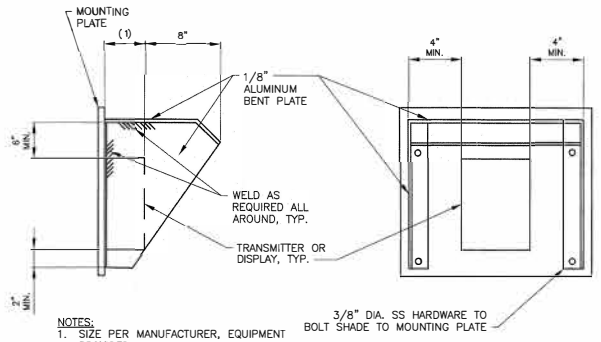
M-50-110

FILE PATH: P:\0092\001 IAH WWTP\04 Cadd-GIS\02 SHEETS\45 - CHEMICAL FEED SYSTEM\M-45-110 FACILITIES TYPICAL METERING PUMP DETAILS.dwg



A TYPICAL TANK FILL ALARM PANEL

NTS



NOTES:
1. SIZE PER MANUFACTURER, EQUIPMENT PROVIDED.
2. ALL METAL EDGES SHALL BE DEBURRED, ROUNDED, AND GROUND SMOOTH.

B SUNSHADE DETAIL

NTS

FILE PATH: P:\0092\001 IAH WWTP\04 Cadd-GIS\02 SHEETS\45 - CHEMICAL FEED SYSTEM\M-45-111 FACILITES STANDARD DETAILS-I.dwg

5engineering

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

STATE OF TEXAS
FRANK L. STEPHENS
104104
LICENSED PROFESSIONAL ENGINEER
07/03/25

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

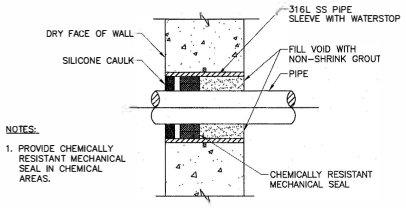
INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT
FACILITIES
STANDARD DETAILS-I

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	

80367

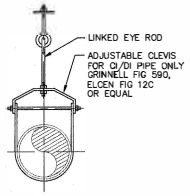
M-50--111

SHEET NO. 113 OF 173



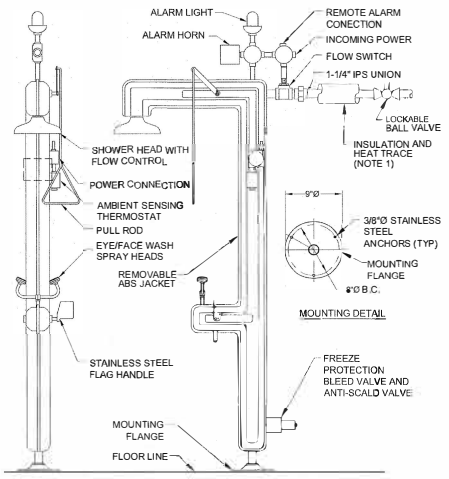
A SLEEVED WALL PENETRATION (WATER-TIGHT)

PIPE HANGER RODS & SUPPORT SPACING					
PIPE DIA (INCHES)	ROD DIA (INCHES)	MAX SUPPORT SPACING (FEET) STL PIPE	MAX SUPPORT SPACING (FEET) C/DI PIPE	WEIGHT LIMIT (LBS) TYPE 'A'	WEIGHT LIMIT (LBS) TYPE 'B'
1 & SMALLER	3/8	5	MIN. 1 HANGER PER PIPE LENGTH AND FITT MAX SPACING 5 FEET- LOCATE HANGER CLOSE TO FITT. NOT OVER 2 FT. FROM CONNECTION	610	—
1 TO 2	3/8	5		610	—
2 TO 3	1/2	10		1130	—
4 TO 5	5/8	10		1430	—
6	3/4	10		1430	3800
8,10,12	7/8	10		—	3800
14,16	1	10		—	3800

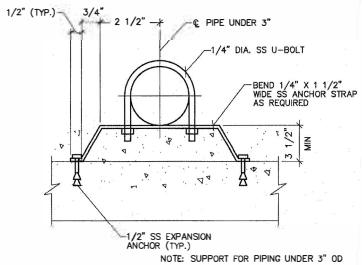


NOTES:
1. SUPPORTS SHALL BE ATTACHED TO ROOF STRUCTURAL SUPPORT MEMBERS OR TO INTERMEDIATE SUPPORT MEMBERS. ALL INTERMEDIATE SUPPORT MEMBERS SHALL BE DESIGNED FURNISHED AND INSTALLED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
2. PROVIDE LAYOUT OF BUILDING SUPPORTS WITH PIPING LAYOUT DRAWINGS

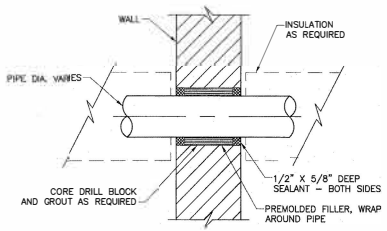
B HANGER SUPPORT



C EMERGENCY SHOWER EYEWASH - OUTDOOR TYPE



E FLOOR PIPE SUPPORT



F INSTALLATION OF PIPE THRU WALL

5engineering

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
FRANK L. STEPHENS
104104
LICENSED PROFESSIONAL ENGINEER
07/03/25

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT
FACILITIES
STANDARD DETAILS-II

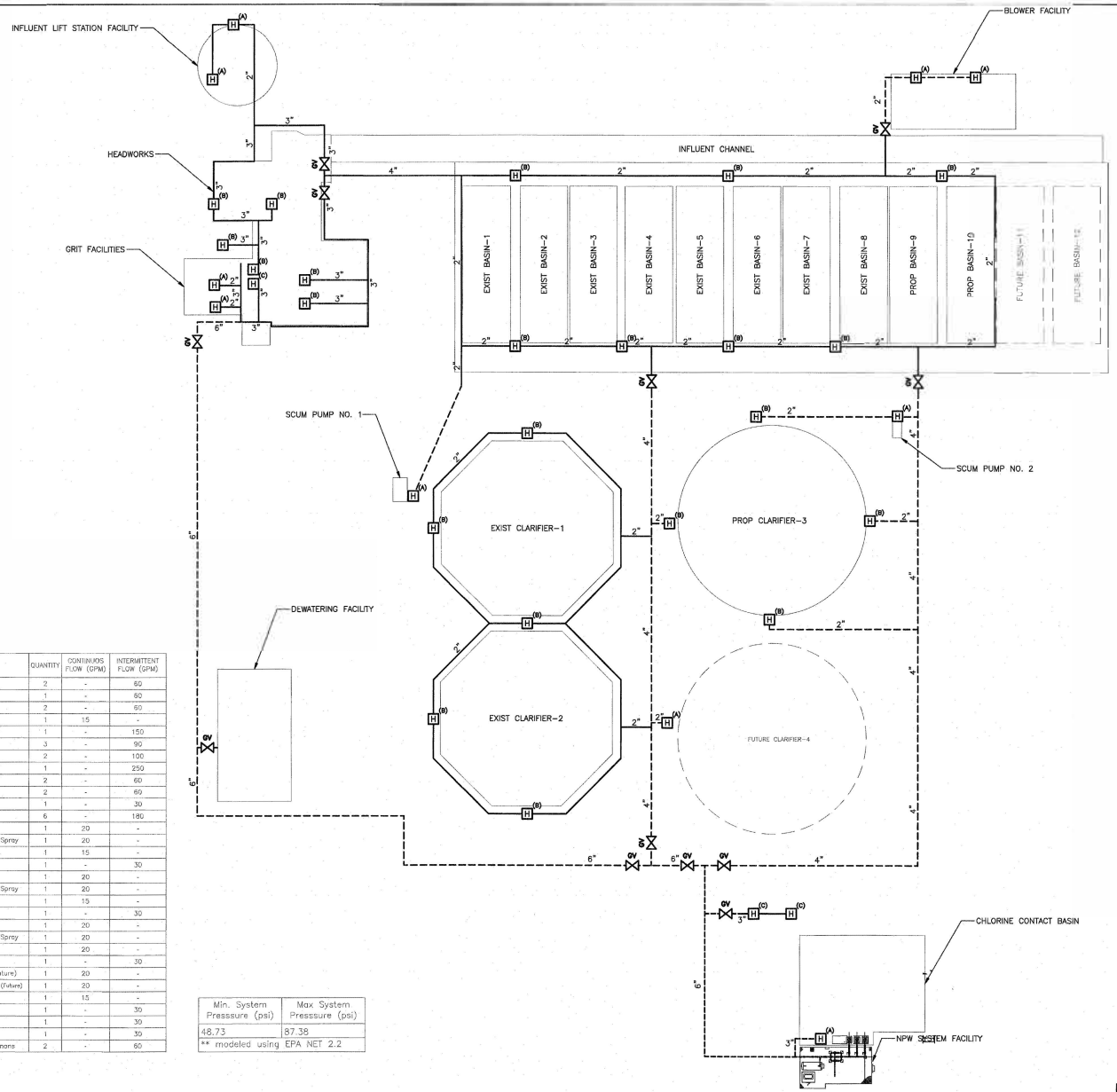
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO. 114 OF 173	

FOR CITY OF HOUSTON USE ONLY

PUBLIC WORKS & ENGINEERING
CONCEPTION
80367
HOUSTON, TEXAS

M-50-112

FILE PATH: P:\0092\001 IAH WWTP\04 Cadd-GIS\02 SHEETS\45 - CHEMICAL FEED SYSTEM\M-45-112 FACILITIES STANDARD DETAILS- II.dwg



N

LEGEND:

- EXPOSED NPW
- BURIED NPW
- HOSE BIB (HOSE STATION TYPE)
- GATE ISOLATION VALVE

SHEET NOTES:

1. EXISTING STRUCTURES, EQUIPMENT, ELEVATIONS, AND DETAILS SHOWN ARE NOT GUARANTEED TO BE ACCURATE AND ALL INCLUSIVE. EXISTING INFORMATION SHOWN IS APPROXIMATE, BASED ON AVAILABLE RECORD DRAWINGS, AND SHOULD BE VERIFIED BY CONTRACTOR PRIOR TO START OF CONSTRUCTION.
2. CONTRACTOR SHALL COORDINATE LAYOUT OF PROPOSED PIPING AND PUMPS WITH EXISTING HARD PIPE CONNECTIONS. COORDINATE FIELD CHANGES WITH THE ENGINEER OF RECORD IF WORKS DEVIATE SUBSTANTIALLY FROM THE PROPOSED DESIGN.
3. CONTRACTOR SHALL VERIFY EXACT LOCATIONS, ROUTING, AND DEPTH OF ALL ON-SITE EXISTING UTILITIES BEFORE COMMENCEMENT OF CONSTRUCTION ACTIVITIES. NOTIFY CONSTRUCTION MANAGER IF SIGNIFICANT DISCREPANCIES ARE DISCOVERED FROM ITEMS SHOWN IN DRAWINGS.
4. CONTRACTOR SHALL COORDINATE ALL SHUT DOWNS AND SHUT DOWN ACTIVITIES WITH CITY OPERATIONS STAFF AS NEEDED.

SYSTEM	QUANTITY	CONTINUOUS FLOW (GPM)	INTERMITTENT FLOW (GPM)
Influent Pump Station Washdown	2	-	60
Headworks Bar Screens	1	-	60
Headworks Washdown	2	-	60
Grit Pump Seal Water	1	15	-
Grit Fluidizer	1	-	150
Grit Facilities Washdown	3	-	90
Grit Cannon	2	-	100
Dewatering Centrifuges (Future)	1	-	250
Dewatering Washdown (Future)	2	-	60
Blower Washdown	2	-	60
Influent Channel Washdown	1	-	30
Aeration Basins Washdown	6	-	180
Clarifier 1 Scum Beach Spray	1	20	-
Clarifier 1 Surface Foam Control Spray	1	20	-
Clarifier 1 Scum Spray	1	15	-
Clarifier 1 Washdown	1	-	30
Clarifier 2 Scum Beach Spray	1	20	-
Clarifier 2 Surface Foam Control Spray	1	20	-
Clarifier 2 Scum Spray	1	15	-
Clarifier 2 Washdown	1	-	30
Clarifier 3 Scum Beach Spray	1	20	-
Clarifier 3 Surface Foam Control Spray	1	20	-
Clarifier 3 Scum Spray	1	20	-
Clarifier 3 Washdown	1	-	30
Clarifier 4 Scum Beach Spray (Future)	1	20	-
Clarifier 4 Surface Foam Control Spray (Future)	1	20	-
Clarifier 4 Scum Spray (Future)	1	15	-
Clarifier 4 Washdown (Future)	1	-	30
Scum Pump Station 1 Washdown	1	-	30
Scum Pump Station 2 Washdown	1	-	30
Chlorine Contact Basin Water Cannons	2	-	60

Min. System Presssure (psi)	Max System Presssure (psi)
48.73	87.38

** modeled using EPA NET 2.2

5engineering

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
PIERO BATTISTINI
104895
LICENSED PROFESSIONAL ENGINEER
07/02/2025

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT

PROCESS MECHANICAL

NPW SYSTEM PLANT LAYOUT SCHEMATIC

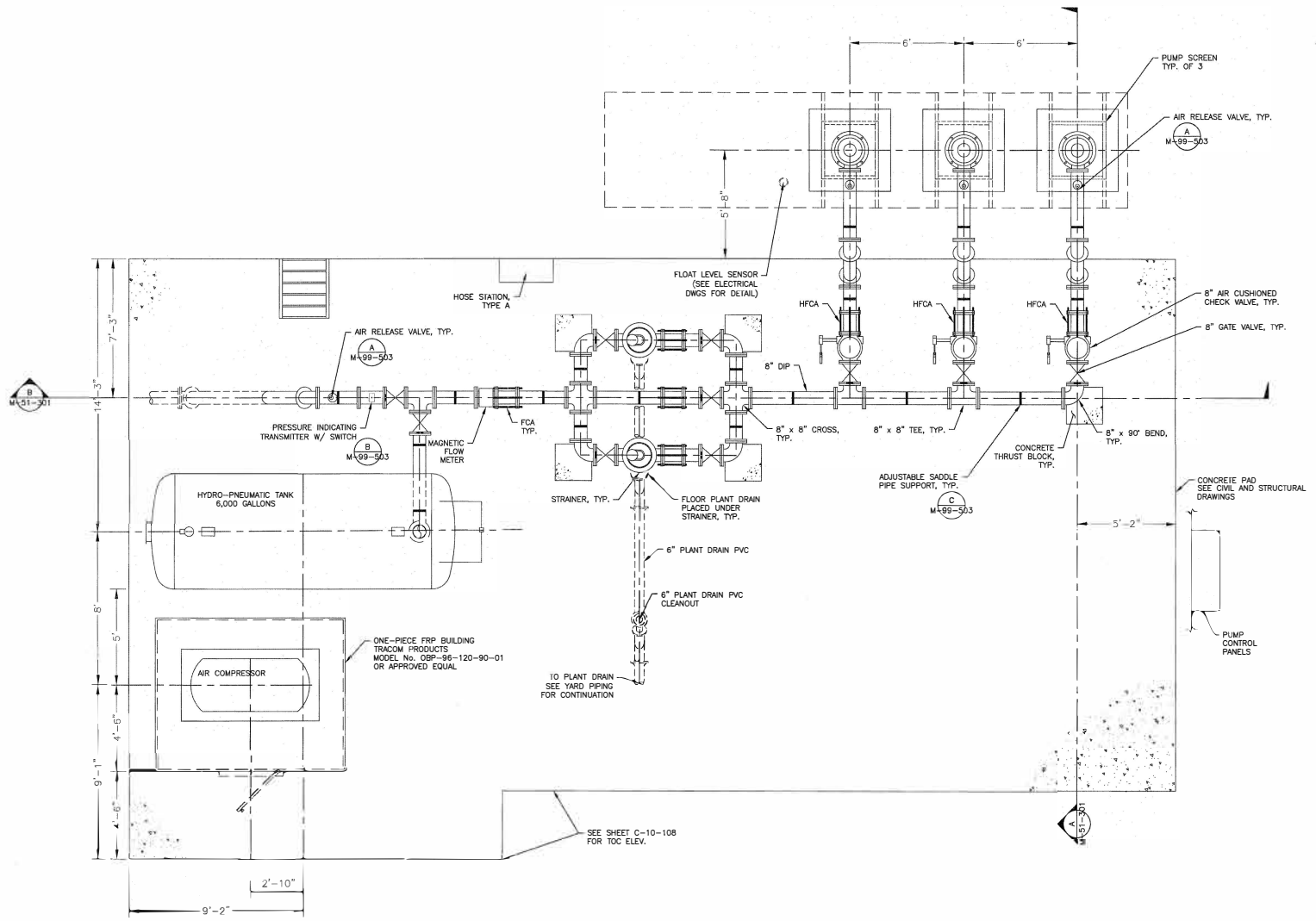
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO. 115 OF 173	

FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
80367
REGISTERED
PROFESSIONAL ENGINEER
HOUSTON, TEXAS

M-51-101

FILE PATH: P:\0092\001 IAH WWTP\04 Cadd-GIS\02 SHEETS\51 - NPW SYSTEM\M-51-101 NPW SYSTEM - PLANT LAYOUT SCHEMATIC.dwg



PLAN
3/8" = 1'-0"

NOTES:

1. EXISTING STRUCTURES, EQUIPMENT, ELEVATIONS, AND DETAILS SHOWN ARE NOT GUARANTEED TO BE ACCURATE AND ALL INCLUSIVE. EXISTING INFORMATION SHOWN IS APPROXIMATE, BASED ON AVAILABLE RECORD DRAWINGS, AND SHOULD BE VERIFIED BY CONTRACTOR PRIOR TO START OF CONSTRUCTION.
2. CONTRACTOR SHALL COORDINATE LAYOUT OF PROPOSED PIPING AND PUMPS WITH EXISTING HARD PIPE CONNECTIONS. COORDINATE FIELD CHANGES WITH THE ENGINEER OF RECORD IF WORKS DEVIATE SUBSTANTIALLY FROM THE PROPOSED DESIGN.
3. CONTRACTOR SHALL VERIFY EXACT LOCATIONS, ROUTING, AND DEPTH OF ALL ON-SITE EXISTING UTILITIES BEFORE COMMENCEMENT OF CONSTRUCTION ACTIVITIES. NOTIFY CONSTRUCTION MANAGER IF SIGNIFICANT DISCREPANCIES ARE DISCOVERED FROM ITEMS SHOWN IN DRAWINGS.
4. CONTRACTOR SHALL COORDINATE ALL SHUT DOWNS AND SHUT DOWN ACTIVITIES WITH CITY OPERATIONS STAFF AS NEEDED.
5. SEE STRUCTURAL DRAWINGS FOR DIMENSIONS NOT SHOWN.
6. INSTALL CHECK VALVES SO THAT THE WEIGHT LEVER POSITION IS APPROXIMATELY 45° BELOW THE VALVE HORIZONTAL CENTER LINE IN THE CLOSED POSITION; AND APPROXIMATELY 45° ABOVE THE VALVE HORIZONTAL CENTER LINE IN THE FULL OPEN POSITION.
7. CONTRACTOR TO MAINTAIN 4.5' MINIMUM COVER FOR NON-POTABLE WATER SYSTEM.
8. LAYOUT OF THE NPW SYSTEM PIPING IS BASED ON THE SELF-BACKWASHING STRAINER (SBS) AS MANUFACTURER BY EATON MODEL 2596. CHANGES MADE TO ACCOMMODATE ANOTHER APPROVED MANUFACTURER INCLUDING PIPING, VALVES, ELECTRICAL, INSTRUMENTATION, APPURTENANCES AND ENGINEERING WILL BE PROVIDED COMPLETE AND OPERATIONAL BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE CITY.
9. DRAIN LINE TO MAINTAIN MINIMUM 1/4" PER FOOT SLOPE.
10. CONTRACTOR TO INSTALL AIR RELEASE VALVE PIPING TO FLOOR DRAIN.

5engineering

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS — HEIDI DAVIDSON — 104895 — LICENSED PROFESSIONAL ENGINEER — 07/02/2025

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT

PROCESS MECHANICAL

NPW SYSTEM
PLAN

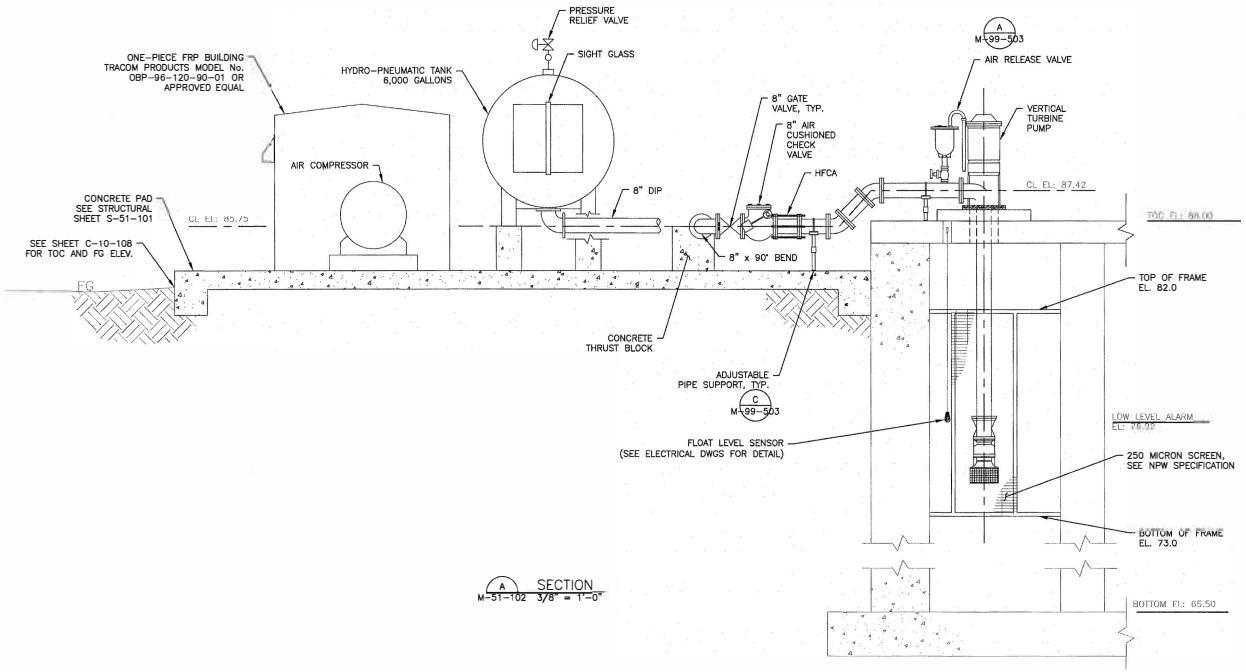
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO: 116 OF 173	

FOR CITY OF HOUSTON USE ONLY

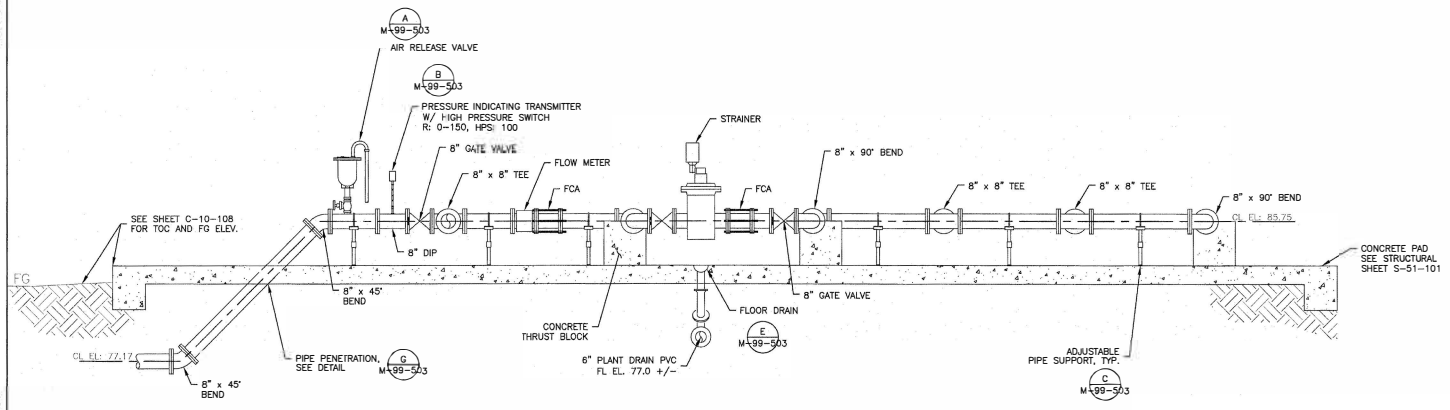
STATE OF TEXAS — 80367 — REGISTERED PROFESSIONAL ENGINEER

M-51-102

FILE PATH: P:\0092\001 IAH WWTP\04 Cadd-GIS\02 SHEETS\51 - NPW SYSTEM\M-51-102 NPW SYSTEM - PLAN.dwg



A SECTION
M-51-102 3/8" = 1'-0"



B SECTION
M-51-102 3/8" = 1'-0"

3/8" = 1' - 0"

SHEET NOTES:

1. EXISTING STRUCTURES, EQUIPMENT, ELEVATIONS, AND DETAILS SHOWN ARE NOT GUARANTEED TO BE ACCURATE AND ALL INCLUSIVE. EXISTING INFORMATION SHOWN IS APPROXIMATE, BASED ON AVAILABLE RECORD DRAWINGS, AND SHOULD BE VERIFIED BY CONTRACTOR PRIOR TO START OF CONSTRUCTION.
2. CONTRACTOR SHALL COORDINATE LAYOUT OF PROPOSED PIPING AND PUMPS WITH EXISTING HARD PIPE CONNECTIONS, COORDINATE FIELD CHANGES WITH THE ENGINEER OF RECORD IF WORKS DEVIATE SUBSTANTIALLY FROM THE PROPOSED DESIGN.
3. CONTRACTOR SHALL VERIFY EXACT LOCATIONS, ROUTING, AND DEPTH OF ALL ON-SITE EXISTING UTILITIES BEFORE COMMENCEMENT OF CONSTRUCTION ACTIVITIES. NOTIFY CONSTRUCTION MANAGER IF SIGNIFICANT DISCREPANCIES ARE DISCOVERED FROM ITEMS SHOWN IN DRAWINGS.
4. CONTRACTOR SHALL COORDINATE ALL SHUT DOWNS AND SHUT DOWN ACTIVITIES WITH CITY OPERATIONS STAFF AS NEEDED.
5. SEE STRUCTURAL DRAWINGS FOR DIMENSIONS NOT SHOWN.
6. INSTALL CHECK VALVES SO THAT THE WEIGHT LEVER POSITION IS APPROXIMATELY 45° BELOW THE VALVE HORIZONTAL CENTER LINE IN THE CLOSED POSITION; AND APPROXIMATELY 45° ABOVE THE VALVE HORIZONTAL CENTER LINE IN THE FULL OPEN POSITION.
7. CONTRACTOR TO MAINTAIN 4.5' MINIMUM COVER FOR NON-POTABLE WATER SYSTEM.
8. LAYOUT OF SELF-BACKWASHING STRAINER (SBS) PIPING IS TYPICAL FOR THE EATON COMPONENT REQUIREMENTS, BUT VARIES FOR EACH MANUFACTURER. CHANGES MADE TO ACCOMMODATE SPECIFIC SELF-BACKWASHING STRAINERS, INCLUDING PIPING, VALVES, APPURTENANCES, ELECTRICAL, INSTRUMENTATION, & ENGINEERING WILL BE PROVIDED COMPLETE AND OPERATIONAL AT NO ADDITIONAL COST TO THE CITY.
9. DRAIN LINE TO MAINTAIN MINIMUM 1/4" PER FOOT SLOPE.
10. CONTRACTOR TO INSTALL AIR RELEASE VALVE PIPING TO FLOOR DRAIN.

5engineering

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
PIERO BATTISTINI
104895
LICENSED PROFESSIONAL ENGINEER
07/02/2025

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION-DISINFECTION REDESIGN AMENDMENT

PROCESS MECHANICAL

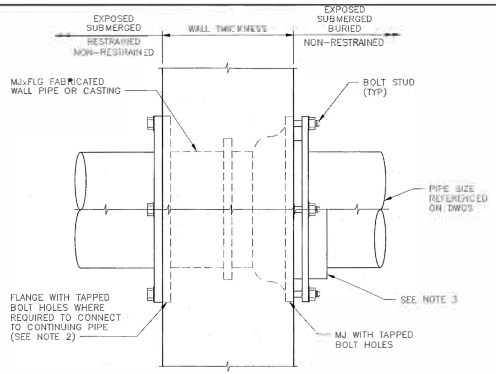
NPW SECTIONS

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 117 OF 173	

STATE OF TEXAS
80367
LICENSED PROFESSIONAL ENGINEER
HOUSTON, TEXAS

M-51-301

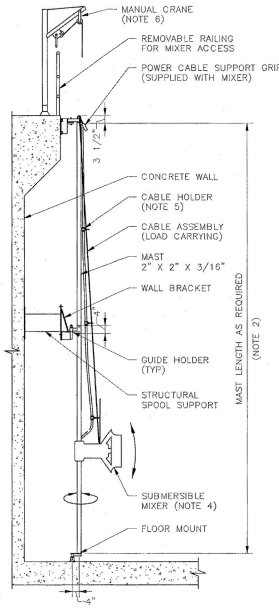
FILE PATH: P:\0092\001 WH WWTP\04 Cadd-GIS\02 SHEETS\51 - NPW SYSTEM\m-51-301 NPW SECTIONS.dwg



NOTES:

1. WALL PIPE SHALL BE ORIENTED SO THAT THE BOLT HOLES STRADDLE THE TOP CENTERLINE.
2. WHERE PIPE IS REQUIRED ON ONE SIDE ONLY, PROVIDE MJxPE WALL PIPE.
3. FOR STEEL PIPE APPLICATIONS BUILD UP END OF STEEL PIPE TO FIT MJ WALL PIPE.
4. FOR BURIED PIPING, CONTRACTOR SHALL PROVIDE AN ADDITIONAL FIELD JOINT AS CLOSE AS PRACTICAL TO FACE OF WALL, BUT NO MORE THAN 5 FEET.
5. USE WAX TAPE TO PROTECT ALL BURIED FERROUS SURFACES, INCLUDING PAINTED SURFACES. FOR PROTECTION OF ADJACENT PIPE BARREL SURFACES, SHRINK WRAP MAY BE USED IN LIEU OF WAX TAPE. SEE SPECIFICATIONS.

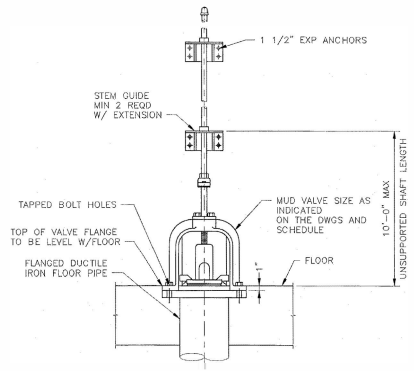
A FLANGED – MECHANICAL JOINT WALL PIPE
NO SCALE



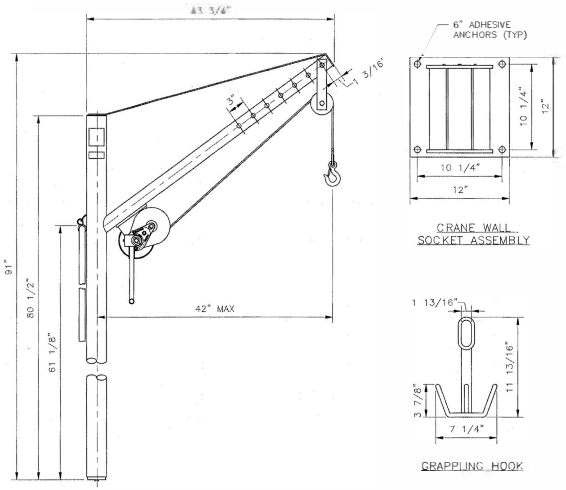
NOTES:

1. MAST TUBING 2" X 2" X 3/16" WALL THICKNESS TO BE SUPPLIED AND CUT TO APPROPRIATE LENGTH BY CONTRACTOR.
2. CONSULT MIXER MATRIX CHART IN ACCESSORY SECTION TO DETERMINE HOW MANY INTERMEDIATE SUPPORTS ARE NECESSARY, DEPENDING UPON LENGTH AND MIXER SELECTED
3. POWER CABLE TO BE CLEAR OF ALL SHARP SURFACES.
4. SEE MIXER DRAWINGS FOR WEIGHTS, DIMENSIONS, AND ANGLE SETTINGS.
5. PLACE CABLE HOLDERS EVERY 5 FT.
6. SEE SPECIFICATION SECTION 11515 FOR CRANE SELECTION.

D SUBMERSIBLE MIXER
NO SCALE



B MUD VALVE
NO SCALE

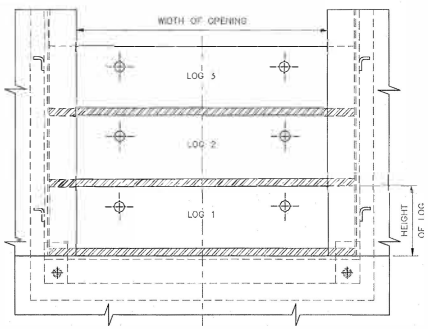


CRANE

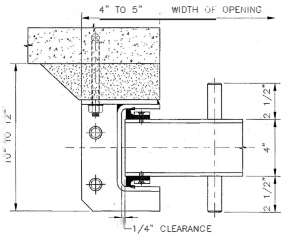
E MANUAL CRANE
NO SCALE

CRANE WALL SOCKET ASSEMBLY

GRAPPLING HOOK

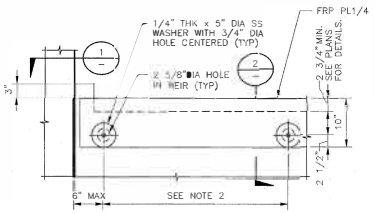


FRONT VIEW

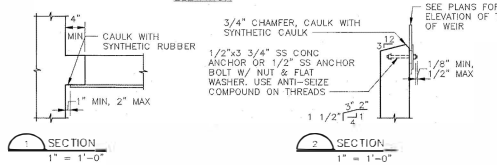


LOG MOUNTED SEALING ARRANGEMENT

C SS STOP LOG DETAIL
NO SCALE



ELEVATION



1 SECTION
1" = 1'-0"

2 SECTION
1" = 1'-0"

NOTES:

1. ALL EDGES, VOIDS, AND SPLICES SHALL BE SEALED WATER TIGHT WITH SYNTHETIC RUBBER.
2. ANCHOR BOLT SPACING – 12"OC FOR STRAIGHT WEIRS AND 2'-0" FOR CIRCULAR WEIRS
3. WEIR TO BE SET LEVEL TO PROVIDE UNIFORM DISCHARGE AND ALL ADJACENT WEIRS SHALL BE SET AT THE INDICATED ELEVATION WITH ZERO TOLERANCE.

F SHARP CRESTED WEIR
NO SCALE

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
BOBBY FRANK LANE JR.
126582
LICENSED
PROFESSIONAL ENGINEER
7/1/05

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT

PROCESS MECHANICAL

MISCELLANEOUS DETAILS 1 OF 2

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-00265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 118 OF 173	

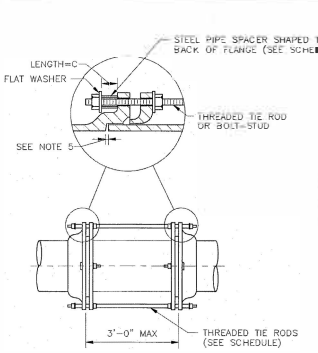
REGISTERED ENGINEER
80367

M-99-501

FILE PATH: R:\M\2\265\00\dgn\265-00-GENERAL_VOL2.dgn

MECHANICAL TIE ROD SCHEDULE

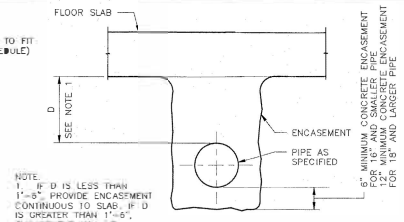
PIPE SIZE (INCHES)	MINIMUM PRESSURE (PSI) (NOTE 1)	TIE RODS		PIPE SPACERS		
		NO. OF RODS (NOTE 2)	DIA OF RODS (INCHES)	DIA OF SPACERS (INCHES)	LENGTH=C (INCHES)	PIPE SCHEDULE
4	350 OR LESS	2	3/4	1	2 1/2	40
6	200 OR LESS 350	2 4	3/4	1	2 1/2	40
8	150 OR LESS 300 350	2 4 6	3/4	1	2 1/2	40
10	200 OR LESS 350	2 4	3/4	1	2 1/2	80
12	150 OR LESS 300 350	2 4 6	3/4	1	2 1/2	80
14	100 OR LESS 200 350	2 4 6	3/4	1	3 1/2	80
16	150 OR LESS 250 350	4 6 8	3/4	1	3 1/2	80
18	150 OR LESS 200 300 350	4 6 8 10	3/4	1	3 1/2	80
20	100 OR LESS 150 200 300 350	4 6 8 10 12	3/4	1	3 1/2	80
24	100 OR LESS 150 200 250 300 350	6 8 10 12 14 16	3/4	1	3 1/2	80
30	100 OR LESS 150 200 250	8 10 12 16	1	1 1/4	4	80
36	100 OR LESS 150 200 250	8 12 18 22	1	1 1/4	4	80
42	100 OR LESS 150 200 250	8 12 16 20	1 1/4	1 1/2	4	80
48	100 OR LESS 150 200 250	12 16 22 26	1 1/4	1 1/2	4	80



NOTES:

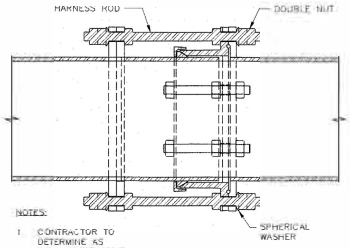
1. PRESSURE SHALL BE THE PRESSURE AT WHICH THE PIPE IS HYDROSTATICALLY TESTED, OR IF THERE IS NO HYDROSTATIC FIELD TEST, IT SHALL BE THE SPECIFIED SHOP TEST PRESSURE.
2. UNLESS OTHERWISE INDICATED, TIE RODS SHALL BE SPACED UNIFORMLY AROUND THE PIPE, BEGINNING WITH THE FIRST TWO AT THE HORIZONTAL CENTERLINE OF THE PIPE, SUBJECT TO THE APPROVAL OF THE ENGINEER.
3. EXCEPT WHERE TIE RODS ARE REQUIRED, BOLTS FOR FOLLOWER RINGS SHALL BE TEE HEAD BOLTS.
4. AT CONTRACTOR'S OPTION, 4" THROUGH 48" MAY BE FURNISHED AS MECHANICAL JOINT STYLE WITH TIE RODS, OR POSITIVE LOCKING SEGMENTS AND/OR RINGS SUCH AS AMERICAN PIPE 14" THROUGH 36" SIZE MAY BE FURNISHED AS FLEX RING STYLE RESTRAINED JOINTS AND 42" THROUGH 64" SIZE MAY BE FURNISHED AS LOC RING STYLE RESTRAINED JOINTS, OR U.S. PIPE "TR-FLEX", OR GRIFFIN PIPE "SNAP-LOCK".
5. FOR PIPING FLEXIBILITY, PROVIDE GAP LARGE ENOUGH TO FACILITATE PIPE ASSEMBLY AND DISASSEMBLY AT ASSOCIATED FLANGED PIPE JOINTS.

1 DIP MECHANICAL JOINT COUPLING WITH TIE RODS
NO SCALE



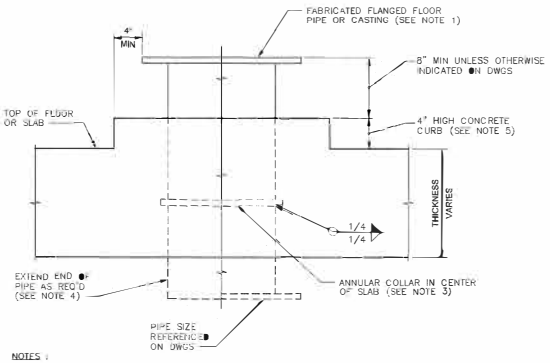
NOTE:
1. IF D IS LESS THAN 1'-6", PROVIDE ENCASEMENT CONTINUOUS TO SLAB. IF D IS GREATER THAN 1'-6", ENCASEMENT MAY BE SEPARATED FROM SLAB.

2 CONCRETE PIPE ENCASEMENT
NO SCALE



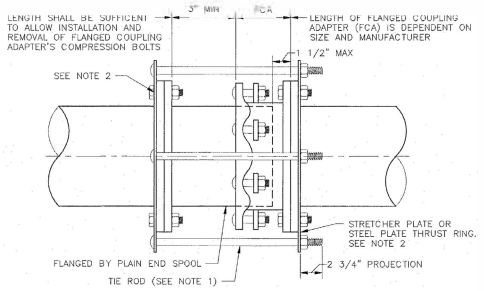
NOTES:
1. CONTRACTOR TO DETERMINE AS DISMANTLING JOINT, DRESSER COUPLING, VICTAULIC COUPLING, OR SIMILAR.

3 DISMANTLING JOINT
NO SCALE



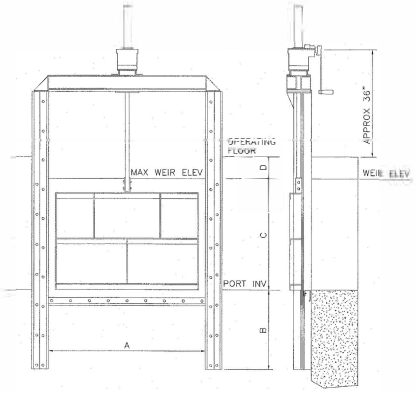
NOTES:
1. FLOOR PIPE MATERIAL SHALL BE DUCTILE IRON, STEEL, OR AS INDICATED ON DRAWINGS. STEEL PIPE SHALL BE SCHEDULE 40 FOR PIPE 20" AND SMALLER, 3/8" FOR PIPE LARGER THAN 20", AND COATINGS SAME AS CONNECTING PIPE.
2. IF CONNECTING STEEL PIPE THICKNESS IS GREATER THAN 3/8", STEEL FLOOR PIPE THICKNESS SHALL BE INCREASED TO MATCH CONNECTING PIPE.
3. ANNULAR COLLAR SHALL BE SAME MATERIAL AS PIPE AND SHALL BE 1/4"x2" FOR PIPE 20" AND SMALLER, AND 3/8"x3" FOR PIPE LARGER THAN 20".
4. FLOOR PIPE MAY BE FLUSH WITH FLOOR OR SLAB OR EXTENDED WITH END AS REQUIRED OR INDICATED ON DRAWINGS.
5. CURB MAY BE ROUND OR HEXAGONAL AT CONTRACTOR'S OPTION.
6. ORIENTATION OF FLOOR PIPE SHALL BE COORDINATED WITH CONNECTING PIPE.

4 FLANGED FLOOR PIPE
NO SCALE



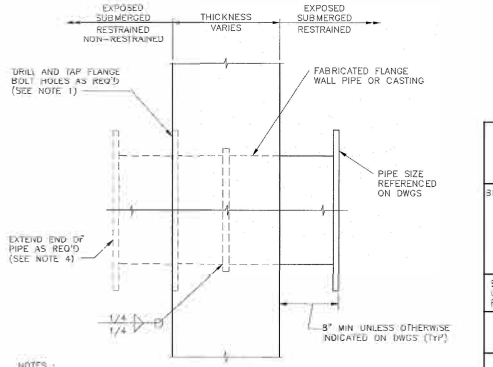
NOTES:
1. PROVIDE NUMBER AND DIAMETER OF TIE RODS PER AWWA MANUAL M-11 REQUIREMENTS. EVENLY SPACE INSTALLATION OF THE TIE RODS. LENGTH OF THE TIE RODS TO BE DETERMINED BY THE CONTRACTOR BASED ON SIZE AND FLANGED COUPLING ADAPTER AND FINAL LENGTH OF SPOOL PIECE.
2. PROVIDE STRETCHER PLATE FOR ATTACHMENT OF TIE RODS. FOR SIZE SEE AWWA M-11 MANUAL.

5 FLANGED COUPLING ADAPTER
NO SCALE



NOTES:
1. ELECTRIC ACTUATOR NOT SHOWN FOR CLARITY.

6 DOWNWARD OPENING WEIR GATE
NO SCALE



NOTES:
1. WALL PIPE MATERIAL SHALL BE DUCTILE IRON, STEEL OR AS INDICATED ON THE DRAWINGS. STEEL PIPE SHALL BE SCHEDULE 40 FOR PIPE 20 INCHES AND SMALLER, 3/8" FOR PIPE LARGER THAN 20", AND COATINGS SAME AS CONNECTING PIPE.
2. IF CONNECTING STEEL PIPE THICKNESS IS GREATER THAN 3/8", STEEL WALL PIPE THICKNESS SHALL BE INCREASED TO MATCH CONNECTING PIPE.
3. ANNULAR COLLAR SHALL BE SAME MATERIAL AS PIPE, 1/4" X 2" FOR PIPE 20" AND SMALLER, AND 3/8" X 3" FOR PIPE LARGER THAN 20".
4. WALL PIPE MAY BE FLUSH WITH FACE OF WALL OR EXTENDED WITH END AS REQUIRED OR INDICATED ON DRAWINGS.
5. WALL PIPE SHALL BE ORIENTED SO THAT THE BOLT HOLES STRADDLE THE TOP CENTERLINE.

7 FLANGED WALL PIPE
NO SCALE

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 800
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS REGISTERED BOBBY FRANK LANE JR. 126582 LICENSED PROFESSIONAL ENGINEER 7/1/05

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

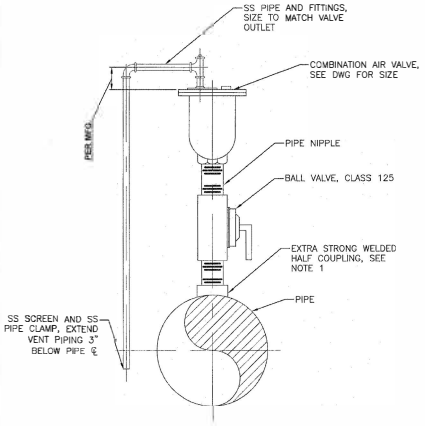
INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT
PROCESS MECHANICAL
MISCELLANEOUS
DETAILS 2 OF 2

WBS NUMBER	M-00265-3147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHDUR RAHMAN, P.E.
SHEET NO.	119 OF 173

FOR CITY OF HOUSTON USE ONLY
ACCEPTED: 80367 DATE OF ACCEPTANCE: ROSENTHAL, HOUSTON, TEXAS

M-99-502

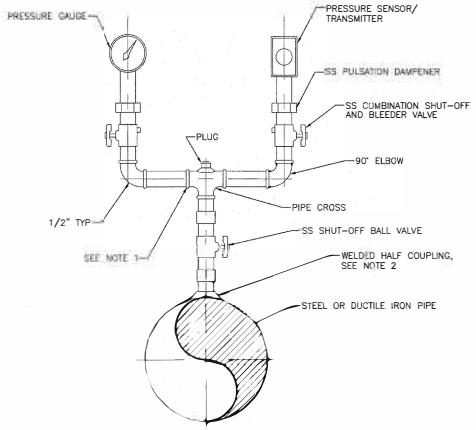
FILE PATH: BIM 360://4005600 - 2014 Intercontinental Airport WWTP Improvements/4005600-GENERAL_V2.2.rvt



NOTES:

1. USE SCH40 SS FOR ALL PIPE AND FITTINGS.
2. USE SERVICE SADDLE AT DI PIPE.
3. USE FLANGED PIPING AND BUTTERFLY VALVE FOR 4" AND LARGER COMBINATION AIR VALVES.
4. USE TEE FITTING FOR PVC PIPING.

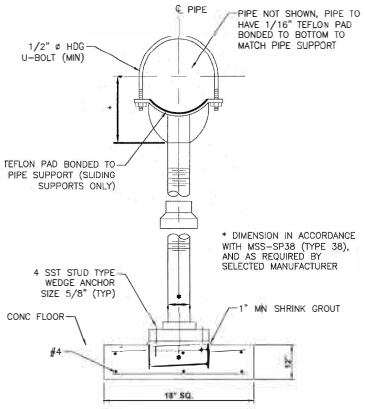
A COMBINATION AIR VALVE
NTS



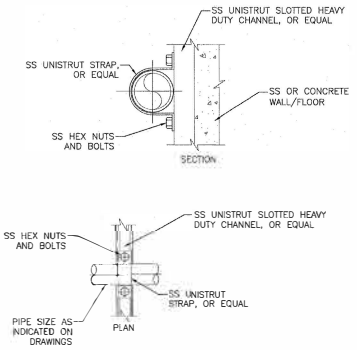
NOTES:

1. USE SCH40 SS FOR ALL PIPE AND FITTINGS.
2. USE SERVICE SADDLE AT DI PIPE.
3. PROVIDE A DIAPHRAGM SEAL FOR GAUGES ON ALL PIPING OTHER THAN POTABLE WATER INCLUDING OZONE GAS AND AIR PIPING.

B PRESSURE GAUGE AND SENSOR MOUNTING
NTS



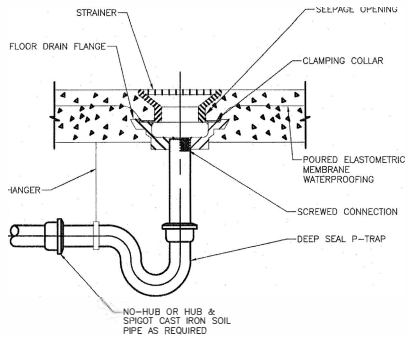
C ADJUSTABLE SADDLE SUPPORT
NTS



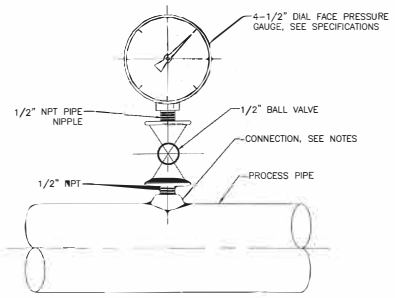
NOTES:

1. FOR MULTIPLE PIPES, EXTEND LENGTH OF STAINLESS STEEL CHANNEL AND PROVIDE 6" MIN. BETWEEN EACH CONDUIT.

D PIPE SUPPORT 1/2" THROUGH 6"
NTS



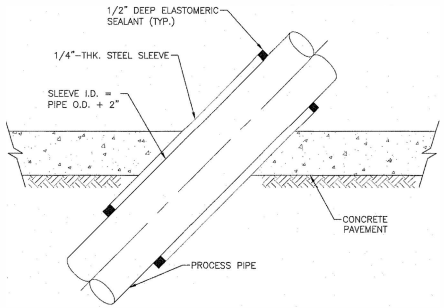
E PROCESS FLOOR DRAIN
NTS



NOTES:

1. FOR STEEL GALV AND PVC 2-1/2" AND SMALLER USE A BUSHING IN A TEE.
2. FOR ALL DI PIPE SIZES, USE PIPE SADDLE WITH A BUSHING.
3. FOR STEEL AND SS PIPES 3" AND LARGER, AND PRESSURE VESSELS, USE THRED-O-LET AS SHOWN.
4. PROVIDE SNUBBER FOR POSITIVE DISPLACEMENT PUMP INSTALLATIONS.
5. ALL GAUGE PIPING SHALL BE SCH40 SS.
6. FOR GAUGES ON ALL PIPING OTHER THAN POTABLE WATER, INCLUDING OZONE GAS OR AIR PIPING, A DIAPHRAM SEAL SHALL BE PROVIDED.

F PRESSURE GAUGE TOP MOUNTED
NTS



NOTES:

1. EXTEND SLEEVE 6-INCHES ABOVE CONCRETE AND 1.0-FT BELOW BOTTOM OF CONCRETE.
2. PIPE SHALL NOT BE RESTING OR SUPPORTED BY THE SLEEVE OR CONCRETE PAVEMENT.

G PIPE PENETRATION THROUGH PAVEMENT
NTS

5engineering

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS — BRIAN BATTISTINI — 104895 — LICENSED PROFESSIONAL ENGINEER — 07/02/2025

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT
PROCESS MECHANICAL
DETAILS 1

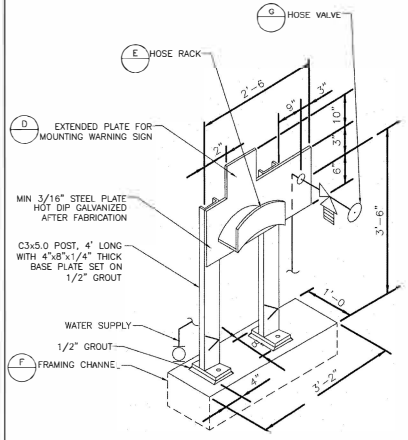
WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO. 120 OF 173	

FOR CITY OF HOUSTON USE ONLY

APPROVED — 80367

M- 99-503

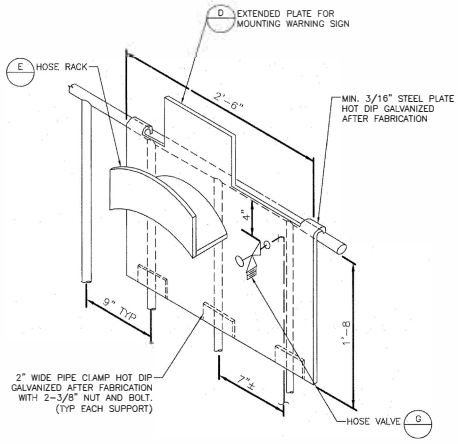
FILE PATH: P:\0092\001 IAH WWTP\04 Cadd-GIS\02 SHEETS\51 - NPW SYSTEM\M-99-505 DETAILS 2.dwg



NOTES:

1. HOOK ANCHOR BOLTS UNDER REINFORCING STEEL OR INTO BASE SLAB.
2. LOCATE WATER NEXT TO HOSE RACK.

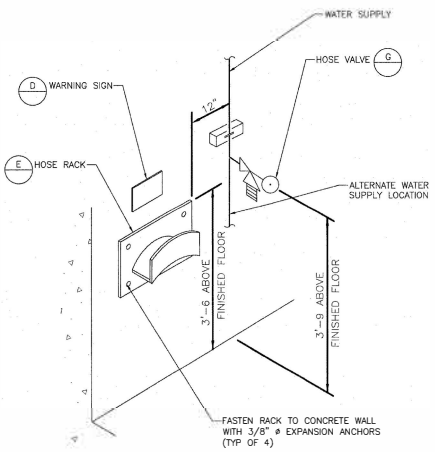
A TYPE A YARD MOUNTED UTILITY STATION
NTS



NOTES:

1. PROVIDE 1/4" NEOPRENE GASKET BETWEEN STEEL PLATE AND ALUMINUM GUARD RAIL.
2. LOCATE WATER NEXT TO HOSE RACK.

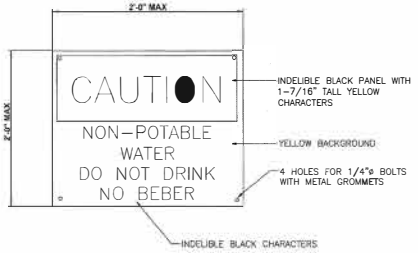
B TYPE B POST MOUNTED UTILITY STATION
NTS



NOTES:

1. LOCATE WATER NEXT TO HOSE RACK.

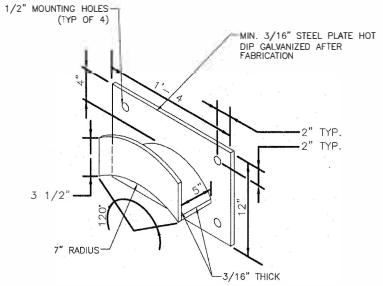
C TYPE C WALL MOUNTED UTILITY STATION
NTS



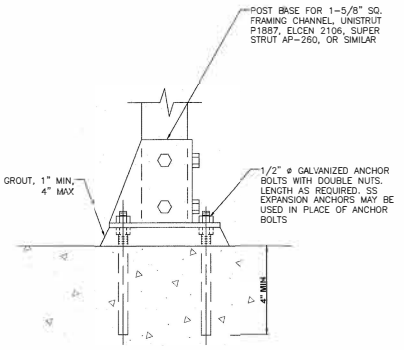
NOTES:

1. MATERIAL TO BE SEMI-RIGID BUTYRATE AS MANUFACTURED BY SETON NAME PLATE CORP., NEW HAVEN CT. 06505, W.H. BRADY CO., MILWAUKEE, WI 43201 OR APPROVED EQUAL.
2. COLORS AND LETTER SIZES PER OSHA STANDARDS.
3. PROVIDE THIS SIGN AT ALL HOSE BIBB LOCATIONS WHERE WATER IS NON-POTABLE OR DOWNSTREAM OF A BACKFLOW PREVENTER

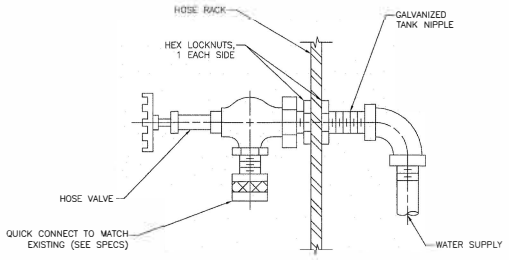
D NON-POTABLE WATER WARNING SIGN
NTS



E HOSE RACK
NTS



F FRAMING CHANNEL POST BASE
NTS



NOTES:

1. HOSE VALVE SHALL BE SELF-DRAINING, FREEZE PROOF TYPE. SEE HOSE VALVE/BIBB SPECIFICATIONS.
2. PROVIDE VACUUM BREAKER ON HOSE BIBBS.

G WATER HOSE VALVE
NTS

5engineering

BLACK & VEATCH

BLACK & VEATCH CORPORATION
920 MEMORIAL CITY WAY
SUITE 600
HOUSTON, TX 77024
(713) 961-1100
TX FIRM NUMBER 258

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

07/07/2015

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT

PROCESS MECHANICAL

DETAILS 2

WBS NUMBER	R-00265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	121 OF 173

FOR CITY OF HOUSTON USE ONLY

80367

M-99-504

FILE PATH: P:\0092\001 IAH WWTP\04 Cadd-GIS\02 SHEETS\51 - NPW SYSTEM\M-99-504 DETAILS 1.dwg

PLAN SYMBOLS

SYMBOL	DESCRIPTION
	LINEAR LIGHT FIXTURE
3	BRACKET MOUNTED INCANDESCENT OR LED
	POLE OR HIGH BAY LIGHT FIXTURE
	WALL PACK OR FLOOD LIGHT FIXTURE
	BATTERY BACKUP LIGHT FIXTURE
	BRACKET MOUNTED EXIT FIXTURE
	SINGLE CONVENIENCE RECEPTACLE
WP	DUPLEX CONVENIENCE RECEPTACLE (WP INDICATES CAST WEATHER PROOF OUTLET BOX & COVER)
A	SINGLE SPECIAL PURPOSE RECEPTACLE (LETTER INDICATES TYPE PER SCHEDULE)
	240V AC, 20 AMP RECEPTACLE
	TELEPHONE UTILITY SYSTEM OUTLET
	UNFUSED SAFETY SWITCH – 3P, 30A, 600V UNLESS OTHERWISE INDICATED
30	FUSED SAFETY SWITCH – 3P, 600V, 30A MINIMUM OR AS REQUIRED TO ACCOMODATE FUSE SIZE INDICATED
	OUTLET, PULL OR JUNCTION BOX
	COMBINATION PROTECTIVE DEVICE & MAGNETIC STARTER
	SINGLE UNIT PUSHBUTTON STATION
	2–UNIT PUSHBUTTON STATION
	3–UNIT PUSHBUTTON STATION
(5)	ELECTRIC MOTOR – NUMBER INDICATES HORSEPOWER
LS	LIMIT SWITCH
FS	FLOW SWITCH
PS	PRESSURE SWITCH
TS	TEMPERATURE SENSOR
DS	MAGNETIC REED DOOR SWITCH
TB	TERMINAL BOX

SYMBOL	DESCRIPTION
PC	PHOTO CELL
FS	FLOAT SWITCH
EP	ELECTRO–PNEUMATIC VALVE
S	SOLENOID VALVE
T	ELECTRIC THERMOSTAT
T	TEMPERATURE ACTUATED DEVICE
$	SINGLE POLE TOGGLE SWITCH
$2	DOUBLE POLE TOGGLE SWITCH
$3	3 – WAY SWITCH
$M	MOTOR RATED TOGGLE SWITCH
$T	MANUAL ROTARY TIMER LIGHT SWITCH
	ELECTRIC UNIT HEATER
	CLASS 1, DIV I, CONDUIT SEAL
	EXPOSED CONDUIT
	EXPOSED PUMP CABLE
	CONDUIT CONCEALED IN FLOOR SLAB OR UNDERGROUND (CONDUITS 1–1/2" OR LARGER SHALL BE INSTALLED INSTALLED UNDER FLOOR SLAB). SEE NOTE 2
	HOMERUN TO PANEL OR MCC AS NOTED
	AIR TERMINAL
	3/4"x20' GROUND ROD
	3/4"x20' GROUND ROD & TEST WELL
G	4/0 BARE COPPER GROUND LOOP AT 24" BELOW GRADE
XXX	CONDUIT TAG
GND	GROUND BUS
OH	OVERHEAD ELECTRICAL LINE
	RADIO ANTENNA
	CAMERA
H-O-A	HAND–OFF–AUTO SWITCH

DRAWING NOTES:

A. EXISTING FACILITIES AND OTHER DISCIPLINE'S NEW WORK IS SHOWN LIGHT IN THESE ELECTRICAL DRAWINGS. NEW ELECTRICAL WORK IS SHOWN DARK IN THESE ELECTRICAL DRAWINGS.

B. FOR CLARITY NOT ALL CONDUITS REQUIRED IN THIS PROJECT ARE ILLUSTRATED IN THESE ELECTRICAL DRAWINGS.

C. PLAN DRAWINGS DO NOT ILLUSTRATES ALL ASPECTS OF ELECTRICAL REQUIREMENTS.SEE SPECIFICATIONS, DIAGRAMS, DETAILS AND SCHEDULES FOR COMPLETE WORK SCOPE.

CONDUIT SYSTEM NOTES

1. ANY CONDUIT WITHOUT TAG OR DESIGNATION SHALL BE 1" AND CONTAIN 3–#10, #12 GND.
2. CONDUITS IMBEDDED IN STRUCTURAL CONCRETE (FLOOR SLABS, ETC.) SHALL BE SO LOCATED AS NOT TO UNDULY IMPAIR THE STRENGTH OF THE CONSTRUCTION AND SHALL BE SPACED NOT LESS THAN TWO TIMES THE CONDUIT OD BETWEEN ADJACENT CONDUITS, EXCEPT WHERE CROSSING OR OTHERWISE APPROVED BY THE ENGINEER.
3. WIRING FOR LIGHTING, RECEPTACLES AND OTHER MISCELLANEOUS CIRCUITS SHALL CONFORM TO THE CIRCUITING INDICATED ON THE DRAWINGS WITH FIELD ARRANGEMENT AND ROUTING AS REQUIRED.
4. THE WIRING SHALL BE INSTALLED WITH NO MORE THAN 6 CURRENT CARRYING CONDUCTORS IN A CONDUIT.
5. CONDUIT AND CIRCUITS ORIGINATING FROM DIFFERENT SOURCES SHALL BE INSTALLED IN SEPARATE RACEWAYS.

LEGEND

—— (DARK)
REMOVE EXISTING – EXISTING PLANS
PROPOSED – PROPOSED PLANS

—— (LIGHT)
EXISTING TO REMAIN – ALL PLANS

TEXT SHOWN LIGHT IN ITALICS REPRESENTS EXISTING INFORMATION – COLOR LEGEND APPLIES TO TEXT AS WELL AS LINES

ALL OTHER TEXT IS SHOWN IN NORMAL FORMAT

BASIC ELECTRICAL MATERIAL NOTES:

A. ALL OUTDOOR CONDUIT SHALL BE PVC COATED RIGID ALUMINUM. CONDUIT BODIES SHALL BE FORM 9 FERROUS FREE ALUMINUM WITH CAPTIVE 316SS SCREWS AND GASKETS. ALL INDOOR CONDUIT SHALL BE RIGID ALUMINUM CONDUIT. SEE SPECIFICATION 16111 FOR MORE.

B. ALL FINAL CONNECTIONS SHALL BE FLEXIBLE METALLIC ALUMINUM CONDUIT, WITH SUNLIGHT RESISTANT JACKET AND ALUMINUM WOUND CORE. FLEXIBLE FINAL CONNECTIONS SHALL BE NO LONGER THAN 3'–0" (36" MAX) IN LENGTH WITHOUT SPECIAL PERMISSION. ALL FLEX FITTINGS 1" TRADE SIZE AND SMALLER SHALL BE 316SS. ALL FLEX FITTINGS 1 1/4" TRADE SIZE AND LARGER MAY BE FERROUS FREE ALUMINUM OR 316SS.

C. MEDIUM VOLTAGE CABLE FOR THIS PROJECT SHALL BE EPR, MV–105, 15KV RATED. ALL 600V RATED POWER AND CONTROL CONDUCTORS, ROUTED IN CONDUIT, SHALL BE DESIGNATED XHHW–2 TYPE. ALL CONTROL WIRING, ROUTED WITHIN CABINETS, SHALL BE MTW TYPE.

C. ALL OUTDOOR PULL, JUNCTION AND TERMINATION BOXES SHALL BE NEMA 4X, 316SS PER SPECIFICATIONS.

B. ALL STRUT AND STRUT FITTINGS SHALL BE 316SS. ALL ANCHORS, HARDWARE AND CONDUIT STRAPS SHALL BE 316SS.

DIAGRAM SYMBOLS

SYMBOL	DESCRIPTION
	CONTACT, NORMALLY OPEN
	CONTACT, NORMALLY CLOSED
	PUSHBUTTON, NORMALLY CLOSED
	PUSHBUTTON, NORMALLY OPEN
	SELECTOR SWITCH
OLS X2	OVERLOADS
	FUSE
	PILOT LIGHT, PUSH TO TEST
M	AUXILIARY STARTER CONTACTS
	PRESSURE SWITCH, OPENS ON RISE
	PRESSURE SWITCH, CLOSES ON RISE
	LIMIT SWITCH, NORMALLY CLOSED
	LIMIT SWITCH, NORMALLY OPEN
	TEMPERATURE ACTUATED SWITCH, OPENS ON RISE
	TEMPERATURE ACTUATED SWITCH, CLOSES ON RISE
	VACUUM SWITCH, OPENS ON RISE
	VACUUM SWITCH, CLOSES ON RISE
	THERMAL OVERLOAD
	EQUIPMENT SPACE HEATER
	GROUND CONNECTION
	SOLENOID
G	MOTORIZED TIME DELAY RELAY
TD	TIME DELAY RELAY
	TIME DELAY CONTACT (●=●PEN, x=CLOSED, DESIGNATION INDICATES CONTACT POSITION WHEN RELAY IS RESET–TIMING–TIMED OUT)
R	AUXILIARY RELAY
ETM	ELAPSED TIME METER
	CONTROL POWER TRANSFORMER
M	MOTOR STARTER OPERATING COIL
	SEPARABLE CONTACTS
	CIRCUIT BREAKER
	COMBINATION MOTOR STARTER
V	VOLTMETER
VS	VOLTMETER SWITCH
A	AMMETER
AS	AMMETER SWITCH
300/5	CURRENT TRANSFORMER (CT) DESIGNATION INDICATES QUANTITY & RATIO
	POTENTIAL TRANSFORMER
	POWER TRANSFORMER
	POWER FACTOR CORRECTION CAPACITOR
47	PHASE FAILURE/UNDERVOLTAGE MONITOR RELAY
	FUSED DISCONNECT SWITCH
	SURGE PROTECTIVE DEVICE
	FUSED CUTOUT

ABBREVIATIONS

A	AMP
ACL	ACROSS LINE STARTER
ADJ	ADJUSTABLE
AFF	ABOVE FINISHED FLOOR
AI	ANALOG INPUT
ALT	ALTERNATOR
AO	ANALOG OUTPUT
ASD	ADJUSTABLE SPEED DRIVE
C	CONDUIT
CA	CABLE
CAB	CABINET
CAT	CATALOG
CB	CIRCUIT BREAKER
CKT	CIRCUIT
CNP	CENTERPOINT ENERGY
CNTR	CONTROL
COMM	COMMUNICATIONS
CONT	CONTINUED
CP	CONTROL PANEL
CPT	CONTROL POWER TRANSFORMER
CPU	CENTRAL PROCESSING UNIT
CT	CURRENT TRANSFORMER
CU	COPPER
DC	DIRECT CURRENT
DI	DISCRETE INPUT
DIREC	DIRECTIONAL
DIV	DIVISION
DO	DISCRETE OUTPUT
DWG	DRAWING
ETM	ELAPSED TIME METER
FLA	FULL LOAD AMPS
FM	FLOWMETER
FO	FIBER OPTIC
FOC	FIBER OPTIC CABLE
GFCI	GROUND FAULT CIRCUIT INTERRUPT
GND	GROUND
HOA	HAND OFF AUTO
HYD	HYDRAULIC
IC	INTERMEDIATE CLASS
JB	JUNCTION BOX
KA SYM	THOUSAND AMPS SYMMETRICAL
KS	KEY SWITCH
KVA	KILO–VOLT–AMPS
LPI	LIGHTNING PROTECTION INSTITUTE
LS	LIMIT SWITCH
LV	LOW VOLTAGE
M	MOTOR RUN CONTACT
MA	MILLIAMPERE
MADC	MILLIAMPERE DIRECT CURRENT
MCC	MOTOR CONTROL CENTER
MCP	MOTOR CIRCUIT PROTECTOR
MIN	MINUTES
MOR	MOTOR OVERLOAD RELAY
MPC	MINI–POWER CENTER
MV	MEDIUM VOLTAGE
mS	MILLISECOND
N	NEUTRAL
NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRICAL CODE
NEUT	NEUTRAL
NO	NORMALLY OPEN
NTS	NOT TO SCALE
OL	OVERLOAD
OD	OUTER DIAMETER
OH	OVERHEAD
P	POLE
PFCC	POWER FACTOR CORRECTION CAPACITOR
PLC	PROGRAMMABLE LOGIC CONTROLLER
POS	POSITION
PS	PRESSURE SWITCH
PVC	POLYVINYL CHLORIDE
PVC RGS	PVC COATED RIGID GALV STEEL CONDUIT
PWR	POWER
R	RELAY
RAC	RIGID ALUMINUM CONDUIT
RALM	PUMP ALARM RELAY
REE	ELEC BLDG ENTRY AUX RELAY
RGS	RIGID GALVANIZED STEEL CONDUIT
RHLA	HIGH LEVEL ALARM RELAY
RM	PUMP RUN AUX RELAY
RMOR	MOTOR OVERLOAD AUX RELAY
R.O.W.	RIGHT OF WAY
RPLC	PLC MODE AUX RELAY
RPLCOR	PLC OVERRIDE
RPLM	PLC PUMP RUN RELAY
RPLMP	BACKUP SYSTEM RUN RELAY
RR	REMOTE RMJIO
RRST	PUMP RESET AUX RELAY
RTAH	TEMPERATURE ALARM AUX RELAY
RTD	REMOTE THERMAL DETECTOR
RUV	UNDERVOLTAGE AUX RELAY
RVSS	REDUCED VOLTAGE SOLID STATE STARTER
RWD	WATCHDOG RELAY
SE	SERVICE ENTRANCE
SEC	SECONDS
SL	SEAL–IN LAW
SN	SOLID NEUTRAL
SPD	SURGE PROTECTIVE DEVICE
SPST	SINGLE POLE SINGLE THROW
SS	STAINLESS STEEL
SW	SWITCH
SWGR	SWITCHGEAR
TB	TERMINAL BOX
TEMP	TEMPERATURE
TD	TIME DELAY RELAY
TDLP	LOSS OF POWER TIME DELAY RELAY
TDRM	PUMP TIME DELAY RELAY
TRANS	TRANSITION
TSP	TWISTED SHIELDED PAIR
TST	TWISTED SHIELDED TRIAD
TYP	TYPICAL
UC	UNDERGROUND
UPS	UNINTERRUPTIBLE POWER SUPPLY
V	VOLTS
VA	VOLT–AMP
VAC	VOLTS ALTERNATING CURRENT
VDC	VOLTS DIRECT CURRENT
VFD	VARIABLE FREQUENCY DRIVE
VT	VOLTAGE TRANSFORMER
W	WATT OR WIRE

NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	ZS
1	10/21/24	PERMITTING SET	ZS

KGI — Kalluri Group, Inc.
TBPE Registration No. F–665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)–365–9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365–9288
TX FIRM NUMBER F–665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P–6182

STATE OF TEXAS — Z.M. SIDDIQUI — 77702 — REGISTERED PROFESSIONAL ENGINEER — 7/31/26

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

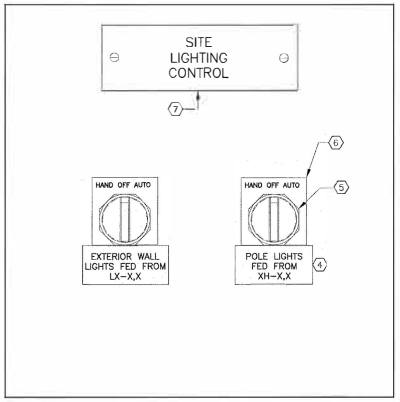
INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION–DISINFECTION REDESIGN
AMENDMENT
ELECTRICAL
SYMBOLS, ABBREVIATIONS
AND CONDUIT NOTES

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R–000265–0147–4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHDUR RAHMAN, P.E.	

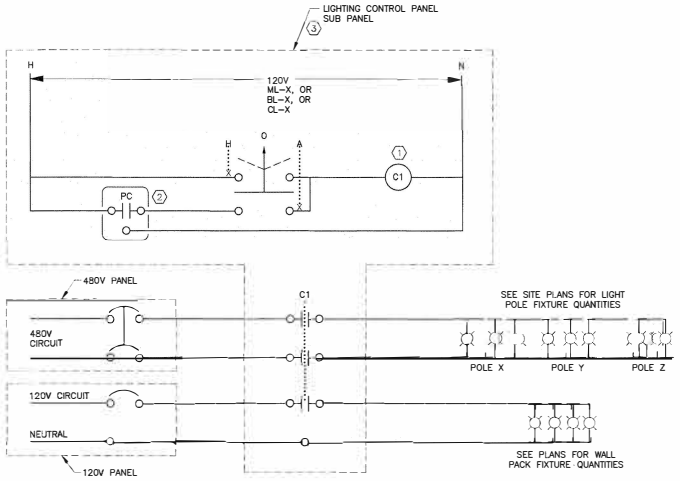
PROFESSIONAL ENGINEER — 80367 — 7/31/26

E–00–001 | SHEET NO. 122 OF 173

FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI – Documents\1160–BV (Atl Imp Pkg 2)\CCB Redesign\Drawings\E–00–001 Symbols Abbreviations And Conduit Notes.dwg



TYPICAL LIGHTING CONTROL PANEL
FRONT



TYPICAL LIGHTING CONTROL PANEL
WIRING SCHEMATIC

NOTES:

1. PROVIDE EATON "CN3S SERIES" (OR EQUAL) ELECTRICALLY HELD LIGHTING CONTACTOR, WITH MINIMUM OF TWO SPARE CONTACTS PER CONTACTOR.
2. PROVIDE PHOTOCELL 4' MINIMUM ABOVE ROOF LINE LOCATED WITH NORTHERN EXPOSURE AND PROVEN FUNCTIONAL FOR SUNSET TO SUNRISE OPERATION.
3. INSTALL COMPONENTS ON SUB PANEL; PROVIDE FIELD WIRING AND RAIL MOUNTED TERMINAL BLOCKS (30A MIN.). ALL CONDUCTORS TO/FROM CONTROL PANEL SHALL PASS THROUGH TERMINAL BLOCKS BEFORE CONNECTION TO DEVICE WITHIN THE PANEL. PANEL WIRING SHOP DRAWING SHALL BE SUBMITTED FOR ENGINEER APPROVAL AND A PERMANENT COPY OF APPROVED DRAWING SHALL BE PROVIDE IN POCKET INSIDE ON PANEL DOOR.
4. PHENOLIC THREE LAYER NAMEPLATE WITH 3/16" BLACK LETTERS ON WHITE BACKGROUND, INDICATE CIRCUIT NUMBERS FOR EACH CIRCUIT. SEE PANEL SCHEDULES FOR RELATED CIRCUITS.
5. 3 POSITION SELECTOR SWITCH WITH SEALED MAINTAINED CONTACTS.
6. FACTORY LEGEND PLATE WITH 3/16" BLACK TEXT ON WHITE LABELED AS SHOWN.
7. PHENOLIC THREE LAYER NAMEPLATE WITH 3/8" BLACK LETTERS ON WHITE BACKGROUND.

LIGHT FIXTURE SCHEDULE

TYPE	CATALOG NUMBER	DESCRIPTION	LAMPS	INPUT VOLTAGE	INPUT WATTS	REMARKS
A	LITHONIA CLX-L48-7000LM-HEF-WDL-MVOLT-GZ10-50K-80CRI-WH-A268	WHITE LINEAR 48" LED FIXTURE WITH WIDE DIFFUSE LENS AND HIGH EFFICIENCY PACKAGE	LED	120	45	INSTALL SUSPENDED FIXTURE ROWS ON CONTINUOUS TYPE 316 S.S. 1⅝" X 1⅝" STRUT SUSPENDED BY ¼" TYPE 316 S.S. THREADED RODS. SINGLE FIXTURES TO BE INSTALLED SIMILAR TO THAT DESCRIBED FOR FIXTURE ROWS.
AS	LITHONIA CSVT-L4B-5000LM-MVOLT-SWW3-80CRI	VAPOR TIGHT LED STRIP LIGHT FIXTURE USED FOR OUTDOOR AND CANOPIES.	LED	120	42	INSTALL FIXTURE UNDER THE CANOPIES.
B	LITHONIA WST-LED-P3-50K-VF-MVOLT-E20WC-DDBXD-A268	DARK BRONZE ALUMINUM WALL PACK LED FIXTURE WITH 90 MINUTE EMERGENCY BATTERY PACK.	LED	120	50	INSTALL FIXTURE WITH TOP AT ONE FOOT BELOW ROOF.
C	LITHONIA ELT24-W-MT-H-A268 WITH ELAMSTS MOUNTING SHELF. PAINT SHELF WHITE.	EMERGENCY FIXTURE WITH TWO HEADS AND SEALED LEAD ACID 90 MINUTE BATTERY.	HALOGEN	120	20	INSTALL FIXTURE WITH BOTTOM OF FIXTURE AT 10'-0" ABOVE THE FLOOR. ADD A CORD WITH PLUG TO THE FIXTURE AND PLUG THE CORD INTO A RECEPTACLE MOUNTED TO THE SIDE OF THE FIXTURE.
X	LITHONIA LQM-S-W-3-R-120/277-ELN	WHITE LED EXIT SIGN FIXTURE IN A THERMOPLASTIC HOUSING WITH RED LETTERS AND NICKEL CADMIUM BATTERY	LED	120	1	INSTALL A FIXTURE ABOVE EACH EXIT DOOR.
S	EATON EVLEDJ4C701	STANCHION LED FIXTURE	LED	120	53	INSTALL STANCHION LIGHT FIXTURE TO THE POLE MOUNTED TO THE HANDRAIL.
P	LITHONIA DSXF3-LED-6-P2-50K-WFL-480-IS-ODF-DNAXD-A268	SITE LIGHTING	LED	480	138	INSTALL ON TOP OF CONCRETE LIGHTING POLE.

NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	ZS
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
Z.M. SIDDIQUI
77702
REGISTERED
PROFESSIONAL
ENGINEER
10/21/24

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT

ELECTRICAL

LIGHT FIXTURE SCHEDULE
AND CONTROL DIAGRAM

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 123 OF 173	

ACCEPTED
80367

E-00-601

FILE PATH: C:\Users\howard\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\OCB Redesign\Drawings\E-00-601 Light Fixture Schedule And Control Diagram.dwg

CONDUIT TAG	DESCRIPTION	ROUTING		CONDUIT & WIRE SIZES	COMMENTS
		FROM	TO		
CCB-MXR1-P	CCB MIXER NO.1 POWER	MCC-CCB	CCB MIXER NO.1	1 "C, 3-#10, #10 GND	
CCB-MXR1-C	CCB MIXER NO.1 CONTROL	CHLORINE CONTACT BASIN PLC-CCB	CCB MIXER NO.1 LOCAL CONTROL STATION	1 "C, 10-#14, #12 GND	
CCB-MXR2-P	CCB MIXER NO.2 POWER	MCC-CCB	CCB MIXER NO.2	1 "C, 3-#10, #10 GND	
CCB-MXR2-C	CCB MIXER NO.2 CONTROL	CHLORINE CONTACT BASIN PLC-CCB	CCB MIXER NO.2 LOCAL CONTROL STATION	1 "C, 10-#14, #12 GND	
CCB-MXR3-P	CCB MIXER NO.3 POWER	MCC-CCB	CCB MIXER NO.3	1 "C, 3-#10, #10 GND	
CCB-MXR3-C	CCB MIXER NO.3 CONTROL	CHLORINE CONTACT BASIN PLC-CCB	CCB MIXER NO.3 LOCAL CONTROL STATION	1 "C, 10-#14, #12 GND	
CCB-MXR4-P	CCB MIXER NO.4 POWER	MCC-CCB	CCB MIXER NO.4	1 "C, 3-#10, #10 GND	
CCB-MXR4-C	CCB MIXER NO.4 CONTROL	CHLORINE CONTACT BASIN PLC-CCB	CCB MIXER NO.4 LOCAL CONTROL STATION	1 "C, 10-#14, #12 GND	
CCB-MXR5-P	CCB MIXER NO.5 POWER	MCC-CCB	CCB MIXER NO.5	1 "C, 3-#10, #10 GND	
CCB-MXR5-C	CCB MIXER NO.5 CONTROL	CHLORINE CONTACT BASIN PLC-CCB	CCB MIXER NO.5 LOCAL CONTROL STATION	1 "C, 10-#14, #12 GND	
CCB-MXR6-P	CCB MIXER NO.6 POWER	MCC-CCB	CCB MIXER NO.6	1 "C, 1-JET LINE	FUTURE CCB MIXER
CCB-MXR6-C	CCB MIXER NO.6 CONTROL	CHLORINE CONTACT BASIN PLC-CCB	CCB MIXER NO.6 LOCAL CONTROL STATION	1 "C, 1-JET LINE	FUTURE CCB MIXER
CCB-MXR7-P	CCB MIXER NO.7 POWER	MCC-CCB	CCB MIXER NO.7	1 "C, 1-JET LINE	FUTURE CCB MIXER
CCB-MXR7-C	CCB MIXER NO.7 CONTROL	CHLORINE CONTACT BASIN PLC-CCB	CCB MIXER NO.7 LOCAL CONTROL STATION	1 "C, 1-JET LINE	FUTURE CCB MIXER
WG-1-C	WEIR GATE NO.1 CONTROL	CHLORINE CONTACT BASIN PLC-CCB	CCB WEIR GATE NO.1 LOCAL CONTROL STATION	1 "C, 10-#14, #12 GND	
WG-2-C	WEIR GATE NO.2 CONTROL	CHLORINE CONTACT BASIN PLC-CCB	CCB WEIR GATE NO.2 LOCAL CONTROL STATION	1 "C, 10-#14, #12 GND	
WG-3-C	WEIR GATE NO.3 CONTROL	CHLORINE CONTACT BASIN PLC-CCB	CCB WEIR GATE NO.3 LOCAL CONTROL STATION	1 "C, 10-#14, #12 GND	
WG-4-C	WEIR GATE NO.4 CONTROL	CHLORINE CONTACT BASIN PLC-CCB	CCB WEIR GATE NO.4 LOCAL CONTROL STATION	1 "C, 10-#14, #12 GND	
BV-1-C	ACTUATED GATE NO.1 CONTROL	CHLORINE CONTACT BASIN PLC-CCB	CCB ACTUATED GATE NO.1 CONTROL	1 "C, 10-#14, #12 GND	
BV-2-C	ACTUATED GATE NO.2 CONTROL	CHLORINE CONTACT BASIN PLC-CCB	CCB ACTUATED GATE NO.2 CONTROL	1 "C, 10-#14, #12 GND	
AIT-1-A	CCB J-CHAMBER CHLORINE ANALYZER SIGNAL	CHLORINE CONTACT BASIN PLC-CCB	CCB J-CHAMBER CL2 ANALYZER CONTROLLER	1 "C, 1-#16 TSP	
CBB-A	CBB ANALOG SIGNALS	CHLORINE CONTACT BASIN PLC-CCB	CCB CONTROL AND COMM JUNCTION BOX	1 1/2 "C, 5-#16 TSP	1-#16 TSP SPARE
AIT-2-A	CHLORINE ANALYZER SIGNAL	CCB CONTROL AND COMM JUNCTION BOX	CCB TRAIN 1 CL2 ANALYZER CONTROLLER	3/4 "C, 1-#16 TSP	
AIT-3-A	CHLORINE ANALYZER SIGNAL	CCB CONTROL AND COMM JUNCTION BOX	CCB TRAIN 2 CL2 ANALYZER CONTROLLER	3/4 "C, 1-#16 TSP	
AIT-4-A	POST CHLORINE ANALYZER SIGNAL	CCB CONTROL AND COMM JUNCTION BOX	CCB POST CL2 ANALYZER CONTROLLER	3/4 "C, 1-#16 TSP	
AIT-5-A	PRE CHLORINE ANALYZER SIGNAL	CCB CONTROL AND COMM JUNCTION BOX	CCB PRE CL2 ANALYZER CONTROLLER	3/4 "C, 1-#16 TSP	
FIT-43-1-A	FLOW METER SIGNAL	CCB CONTROL AND COMM JUNCTION BOX	EFFLUENT FLOW METER TRANSMITTER	3/4 "C, 1-#16 TSP	
SP-1-C	CCB J-CHAMBER SAMPLE PUMP NO.1 CONTROLS	CHLORINE CONTACT BASIN PLC-CCB	CCB SAMPLE PUMP NO.1 LOCAL CONTROL	1 "C, 2-#14, #14 GND	
CBB-SP-C	CBB SAMPLE PUMP CONTROLS	CHLORINE CONTACT BASIN PLC-CCB	CCB CONTROL AND COMM JUNCTION BOX	1 "C, 8-#14, #14 GND	
SP-2-C	SAMPLE PUMP NO.2 CONTROLS	CCB CONTROL AND COMM JUNCTION BOX	CCB SAMPLE PUMP NO.2 LOCAL CONTROL	3/4 "C, 2-#14, #14 GND	
SP-3-C	SAMPLE PUMP NO.3 CONTROLS	CCB CONTROL AND COMM JUNCTION BOX	CCB SAMPLE PUMP NO.3 LOCAL CONTROL	3/4 "C, 2-#14, #14 GND	
SP-4-C	SAMPLE PUMP NO.4 CONTROLS	CCB CONTROL AND COMM JUNCTION BOX	CCB SAMPLE PUMP NO.4 LOCAL CONTROL	3/4 "C, 2-#14, #14 GND	
SP-5-C	SAMPLE PUMP NO.5 CONTROLS	CCB CONTROL AND COMM JUNCTION BOX	CCB SAMPLE PUMP NO.5 LOCAL CONTROL	3/4 "C, 2-#14, #14 GND	
T-CHEM-P	TRANSFORMER "T-CHEM" POWER	MCC-CCB	TRANSFORMER "T-CHEM"	1 "C, 2-#6, #8 GND	
CHEM-P	CCB CHEMICAL BUILDING PANEL "CCB-CHEM" POWER	TRANSFORMER "T-CHEM"	PANELBOARD "CCB-CHEM"	1 1/2"C, 3-#1, #6 GND	
CHEM-C	CCB CHEMICAL BUILDINGS CONTROL	CCB "CP-CCB"	CHEMICAL SYSTEM PANEL "CP-CHEM"	1 "C, 2-#CAT6	
CHEM-SP	CCB CHEMICAL BUILDINGS SPARE CONDUIT	CCB "CP-CCB"	SODIUM BISULFITE BUILDING EXTERIOR WALL	1 "C, 1-JET LINE	
SUMP-SH-C	SODIUM HYPOCHLORITE AREA SUMP PUMP CONTROL	CP-CHEM	SODIUM HYPO SUMP PUMP CTRL PANEL	1 "C, 2-#14, 1-#16 TSP	
SUMP-SB-C	SODIUM BISULFITE AREA SUMP PUMP CONTROL	CP-CHEM	SODIUM BISULFITE SUMP PUMP CTRL PANEL	1 "C, 2-#14, 1-#16 TSP	
SH-FP1-C	STORAGE TANK FILL PANEL LCP-SH-50-01 CONTROL	CP-CHEM	PANEL LCP-SH-50-01	1 "C, 4-#14, 2-#16 TSP	
SH-FP2-C	STORAGE TANK FILL PANEL LCP-SH-50-02 CONTROL	CP-CHEM	PANEL LCP-SH-50-02	1 "C, 4-#14, 2-#16 TSP	
SH-CP1-C	CHEMICAL PUMP SKID PANEL LCP-SH-50-03 CONTROL	CP-CHEM	PANEL LCP-SH-50-03	1 1/4"C, 14-#14, 2-#16 TSP	
SH-CP2-C	CHEMICAL PUMP SKID PANEL LCP-SH-50-04 CONTROL	CP-CHEM	PANEL LCP-SH-50-04	1 1/4"C, 14-#14, 2-#16 TSP	
SH-ST1-A	TANK SH-T01 LEVEL SENSOR SIGNAL	CP-CHEM	LIT-50-01	1 "C, 1-#16 TSP	
SH-ST2-A	TANK SH-T02 LEVEL SENSOR SIGNAL	CP-CHEM	LIT-50-02	1 "C, 1-#16 TSP	
SH-ST3-A	TANK SH-T03 LEVEL SENSOR SIGNAL	CP-CHEM	LIT-50-03	1 "C, 1-#16 TSP	
SH-ST4-A	TANK SH-T04 LEVEL SENSOR SIGNAL	CP-CHEM	LIT-50-04	1 "C, 1-#16 TSP	FUTURE SODIUM HYPO STORAGE TANK LEVEL SENSOR
SH-LS1-C	TANK SH-T01 LEVEL SWITCH	CP-CHEM	TANK SH-T01	3/4 "C, 4-#14	
SH-LS2-C	TANK SH-T02 LEVEL SWITCH	CP-CHEM	TANK SH-T02	3/4 "C, 4-#14	
SH-LS3-C	TANK SH-T03 LEVEL SWITCH	CP-CHEM	TANK SH-T03	3/4 "C, 4-#14	
SH-LS4-C	TANK SH-T04 LEVEL SWITCH	CP-CHEM	TANK SH-T04	3/4 "C, 4-#14	FUTURE SODIUM HYPO STORAGE TANK LEVEL SWITCH
FIT-50-1-A	SH FIT-50-1 FLOW SIGNAL	CP-CHEM	FIT-50-01	3/4 "C, 1-#16 TSP	
FIT-50-2-A	SH FIT-50-2 FLOW SIGNAL	CP-CHEM	FIT-50-02	3/4 "C, 1-#16 TSP	
SB-FP-C	STORAGE TANK FILL PANEL LCP-SB-50-01 CONTROL	CP-CHEM	PANEL LCP-SB-50-01	1 "C, 4-#14, 2-#16 TSP	
SB-CP-C	CHEMICAL PUMP SKID PANEL LCP-SB-50-02 CONTROL	CP-CHEM	PANEL LCP-SB-50-02	1 1/4"C, 14-#14, 2-#16 TSP	
SB-ST1-A	TANK SB-T01 LEVEL SENSOR SIGNAL	CP-CHEM	LIT-50-05	1 "C, 1-#16 TSP	
SB-ST2-A	TANK SB-T02 LEVEL SENSOR SIGNAL	CP-CHEM	LIT-50-06	1 "C, 1-#16 TSP	
SB-LS1-C	TANK SB-T01 LEVEL SWITCH	CP-CHEM	TANK SB-T01	3/4 "C, 4-#14	
SB-LS2-C	TANK SB-T02 LEVEL SWITCH	CP-CHEM	TANK SB-T02	3/4 "C, 4-#14	
FIT-50-3-A	SB FIT-50-03 FLOW SIGNAL	CP-CHEM	FIT-50-03	3/4 "C, 1-#16 TSP	
MOV-1-C	SH STORAGE TANK MOTOR OPERATED VALVE CONTROLS	CP-CHEM	CP-MOV-50-1	3/4 "C, 8-#14, 1-#14 GND	
MOV-2-C	SH STORAGE TANK MOTOR OPERATED VALVE CONTROLS	CP-CHEM	CP-MOV-50-2	3/4 "C, 8-#14, 1-#14 GND	
MOV-3-C	SH STORAGE TANK MOTOR OPERATED VALVE CONTROLS	CP-CHEM	CP-MOV-50-3	3/4 "C, 8-#14, 1-#14 GND	
MOV-4-C	SH STORAGE TANK MOTOR OPERATED VALVE CONTROLS	CP-CHEM	CP-MOV-50-4	3/4 "C, 8-#14, 1-#14 GND	FUTURE SODIUM HYPO STORAGE TANK MOV
MOV-5-C	SB STORAGE TANK MOTOR OPERATED VALVE CONTROLS	CP-CHEM	CP-MOV-50-5	3/4 "C, 8-#14, 1-#14 GND	
MOV-6-C	SB STORAGE TANK MOTOR OPERATED VALVE CONTROLS	CP-CHEM	CP-MOV-50-6	3/4 "C, 8-#14, 1-#14 GND	

GENERAL NOTES:

A. ALL OUTDOOR CONDUIT SHALL BE PVC COATED RIGID ALUMINUM. CONDUIT BODIES SHALL BE FORM 9 FERROUS FREE ALUMINUM WITH CAPTIVE 316SS SCREWS AND GASKETS. ALL INDOOR CONDUIT SHALL BE RIGID ALUMINUM CONDUIT.

B. ALL FINAL CONNECTIONS SHALL BE FLEXIBLE METALLIC ALUMINUM CONDUIT, WITH SUNLIGHT RESISTANT JACKET AND ALUMINUM WOUND CORE. FLEXIBLE FINAL CONNECTIONS SHALL BE NO LONGER THAN 3'-0" (36" MAX) IN LENGTH WITHOUT SPECIAL PERMISSION. ALL FLEX FITTINGS 1" TRADE SIZE AND SMALLER SHALL BE 316SS. ALL FLEX FITTINGS 1 1/4" TRADE SIZE AND LARGER MAY BE FERROUS FREE ALUMINUM OR 316SS.

C. MEDIUM VOLTAGE CABLE FOR THIS PROJECT SHALL BE EPR, MV-105, 15KV RATED.

D. ALL 600V RATED POWER AND CONTROL CONDUCTORS, ROUTED IN CONDUIT, SHALL BE XHHW-2 TYPE.

E. ALL CONTROL WIRING, ROUTED WITHIN CABINETS, SHALL BE MTW TYPE.

C. ALL OUTDOOR PULL, JUNCTION AND TERMINATION BOXES SHALL BE NEMA 4X, 316SS PER SPECIFICATION.

B. ALL STRUT AND STRUT FITTINGS SHALL BE 316SS. ALL ANCHORS, HARDWARE AND CONDUIT STRAPS SHALL BE 316SS.

NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	ZS
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
Z.M. SIDDIQUI
77702
REGISTERED
PROFESSIONAL
ENGINEER
10/21/24

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT
ELECTRICAL
CONDUIT AND CONDUCTOR
SCHEDULE SHEET 1

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO.: 124 OF 173	

PROFESSIONAL ENGINEER
80367
10/21/24

E-00-602

FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160-DV (IAH Imp Pkg 2)\CCB Redesign\Drawings\E-00-602 Conduit And Conductor Schedule Sheet 1.dwg

CONDUIT TAG	DESCRIPTION	ROUTING		CONDUIT & WIRE SIZES	COMMENTS
		FROM	TO		
MVS-CCB	SWITCHGEAR MVS-CCB FEEDER	SWITCHGEAR MVS-1	MVS-CCB INCOMING SECTION	4"C, WITH 3-250 KCMIL 15KV, #4 GND 600V	4.16 KV MEDIUM VOLTAGE CIRCUIT
T-CCB	TRANSFORMER T-CCB FEEDER	SWITCHGEAR MVS-CCB	TRANSFORMER T-CCB PRIMARY	4"C, 3-#1/0 15KV, #4 GND 600V	4.16 KV MEDIUM VOLTAGE CIRCUIT
MCC-CCB	MCC-CCB FEEDER	TRANSFORMER T-CCB SECONDARY	MCC-CCB INCOMING SECTION	(5) 4"C, (4) WITH 3-400 KCMIL, 400 KCMIL NEUT, 4/0 GND	
GEN-CCB	GENERATOR FEEDER TO MCC-CCB	GENERATOR OUTPUT BREAKER	MCC-CCB GENERATOR FEEDER BREAKER	(5) 4"C, (3) WITH 3-400 KCMIL, 400 KCMIL NEUT, 4/0 GND	
MVS-CCB-SP1	FUTURE FEEDER TO FILTER FACILITY	SWITCHGEAR MVS-CCB	FUTURE FILTER AREA STUB OUT	EMPTY 4"C, 1-JET LINE	
MVS-CCB-SP2	FUTURE FEEDER TO EXPANSION	SWITCHGEAR MVS-CCB	FUTURE EXPANSION STUB OUT	EMPTY 4"C, 1-JET LINE	
H-CCB	PANELBOARD H-CCB FEEDER	MCC-CCB	PANEL H-CCB MAIN LUGS	2 1/2"C, WITH 3-4/0, 1/0 GND	
NPW-P	NPW POWER	MCC-CCB	NPW CONTROL PANEL	(2) 2 1/2"C, EA WITH 3-250 KCMIL, 1/0 GND	
NPW-C	NPW CONTROLS	CP-CCB	NPW CONTROL PANEL	1 "C, 1-#CAT6E	
CCB-AC2-P	CCB AC 2	MCC-CCB	HVAC PKG 2	1 1/4"C, 3-#4, #8 GND	
CCB-AC1-P	CCB AC 1	MCC-CCB	HVAC PKG 1	1 1/4"C, 3-#4, #8 GND	
CCB-SP-1	CCB SPARE 1	MCC-CCB	SPARE	2"C, WITH A PULL STRING	
CCB-SP-2	CCB SPARE 2	MCC-CCB	SPARE	2"C, WITH A PULL STRING	
CCB-SP-3	CCB SPARE 3	MCC-CCB	SPARE	2"C, WITH A PULL STRING	
CCB-SP-4	CCB SPARE 4	MCC-CCB	SPARE	2"C, WITH A PULL STRING	
CCB-SP-5	CCB SPARE 5	MCC-CCB	SPARE	2"C, WITH A PULL STRING	
CCB-SP-6	CCB SPARE 6	MCC-CCB	SPARE	2"C, WITH A PULL STRING	
CCB-SP-7	CCB SPARE 7	MCC-CCB	SPARE	2"C, WITH A PULL STRING	
CCB-SP-8	CCB SPARE 8	MCC-CCB	SPARE	2 1/2"C, WITH A PULL STRING	
CCB-SP-9	CCB SPARE 9	MCC-CCB	SPARE	(2) 2 1/2"C, WITH A PULL STRING	
GEN-C	GENERATOR CONTROLS	MCC-CCB AUTOMATIC TRANSFER CONTROLLER	GENERATOR CONTROL PANEL	2"C, GENERATOR MANUFACTURER FACTORY CABLE	
GEN-COM	GENERATOR COMMUNICATION	MCC-CCB AUTOMATIC TRANSFER CONTROLLER	CCB BLDG SCADA CONTROL PANEL	1"C, AUTOMATIC TRANSFER CONTROLLER COMM CABLE	
AIR COMP-C	AIR COMPRESSOR CONTROL	NPW CONTROL PANEL	AIR COMPRESSOR CONTROL PANEL	1"C, 8- #14, 2- #16 TSP	
AIR COMP-P	AIR COMPRESSOR POWER	PANEL H-CCB	AIR COMPRESSOR CONTROL PANEL	1"C, 3- #10, #10 GND	
LCP-STR-P	STRAINER CONTROL PANEL POWER	PANEL H-CCB	STRAINER CONTROL PANEL LCP-STR-51	1"C, 3- #10, #10 GND	
LCP-STR-C	STRAINER CONTROL PANEL CONTROL	NPW CONTROL PANEL	STRAINER CONTROL PANEL LCP-STR-51	1 1/2"C, 30-#14, 2-#16 TSP	
BS1-DP	BASKET STRAINER 1 DIFFERENTIAL PRESSURE SIGNAL	STRAINER 1 PRESSURE TRANSMITTER	STRAINER CONTROL PANEL LCP-STR-51	1"C, 4- #14, 1- #16 TSP	
BS2-DP	BASKET STRAINER 2 DIFFERENTIAL PRESSURE SIGNAL	STRAINER 2 PRESSURE TRANSMITTER	STRAINER CONTROL PANEL LCP-STR-51	1"C, 4- #14, 1- #16 TSP	
BS1-FV-P	BASKET STRAINER 1 FLUSH VALVE POWER	STRAINER CONTROL PANEL LCP-STR-51	BASKET STRAINER 1 FLUSH VALVE	1"C, 3- #10, #10 GND	
BS2-FV-P	BASKET STRAINER 2 FLUSH VALVE POWER	STRAINER CONTROL PANEL LCP-STR-51	BASKET STRAINER 2 FLUSH VALVE	1"C, 3- #10, #10 GND	
HPT-A	HYDRO-PNEUMATIC TANK LEVEL SIGNAL	DIFFERENTIAL PRESSURE TRANSMITTER	NPW CONTROL PANEL	1"C, 2- #16 TSP	
HPT-C	HYDRO-PNEUMATIC TANK LEVEL PROBE SWITCH	PROBE SWITCH	NPW CONTROL PANEL	1"C, 8- #14, #10 GND	
HPT-P	HYDRO-PNEUMATIC TANK	NPW CONTROL PANEL	HYDRO TANK INSTRUMENT BOX POWER	1"C, 4- #12, 2- #12 NEUT, #10 GND	
NPW-COM	NPW CONTROL PANEL COMMUNICATIONS	CCB BLDG SCADA CONTROL PANEL	NPW CONTROL PANEL	1"C, 2- CAT 6, 2- #16 TSP	
NPW-SP	NPW CONTROL PANEL TO PLC SPARE	CCB BLDG SCADA CONTROL PANEL	NPW CONTROL PANEL	1"C, JET LINE	
NPW-P1-PT	NPW PUMP 1 PRESSURE TRANSMITTER	NPW PUMP 1 TRANSMITTER	NPW CONTROL PANEL	1"C, 2- #16 TSP	
NPW-P1-P	NPW PUMP 1 POWER FEEDER	NPW CONTROL PANEL	NPW PUMP 1 CABLE TERMINAL BOX	2"C, WITH 3-3/0, 1/0 GND	
NPW-P1-C	NPW PUMP 1 CONTROLS	NPW CONTROL PANEL	NPW PUMP 1 CABLE TERMINAL BOX	1"C, 8- #14, #10 GND	
NPW-P2-PT	NPW PUMP 2 PRESSURE TRANSMITTER	NPW PUMP 2 TRANSMITTER	NPW CONTROL PANEL	1"C, 2- #16 TSP	
NPW-P2-P	NPW PUMP 2 POWER FEEDER	NPW CONTROL PANEL	NPW PUMP 1 CABLE TERMINAL BOX	2"C, WITH 3-3/0, 1/0 GND	
NPW-P2-C	NPW PUMP 2 CONTROLS	NPW CONTROL PANEL	NPW PUMP 1 CABLE TERMINAL BOX	1"C, 8- #14, #10 GND	
NPW-P3-PT	NPW PUMP 3 PRESSURE TRANSMITTER	NPW PUMP 3 TRANSMITTER STUB UP	NPW CONTROL PANEL	1"C, JET LINE	
NPW-P2-P	NPW PUMP 3 POWER FEEDER	NPW CONTROL PANEL	NPW PUMP 1 CABLE TERMINAL BOX STUB UP	2"C, WITH 3-3/0, 1/0 GND	
NPW-P2-C	NPW PUMP 3 CONTROLS	NPW CONTROL PANEL	NPW PUMP 1 CABLE TERMINAL BOX STUB UP	1"C, 8- #14, #10 GND	
NPW-FM-P	NPW FLOW METER POWER	NPW CONTROL PANEL	FLOW METER POWER INPUT	1"C, 2- #14, #12 GND	
NPW-FM-S	NPW FLOW METER POWER	FLOW METER SIGNAL	NPW CONTROL PANEL	1"C, 1- #16 TSP	
NPW-LVL	NPW LOW LEVEL SHUT DOWN	NPW LEVEL INSTRUMENT	NPW CONTROL PANEL	1"C, 1- #16 TSP	
CCB-BL1-P	CCB BLOWER NO.1 POWER	MCC-CCB	CCB BLOWER NO.1	1 1/2"C, 3-#2, #6 GND	
CCB-BL1-C	CCB BLOWER NO.1 CONTROL	CHLORINE CONTACT BASIN PLC-CCB	CCB BLOWER NO.1 LOCAL CONTROL STATION	1 "C, 16-#14, #14 GND	
BL1-LCP-C	CCB BLOWER NO.1 LOCAL CONTROL PANEL CONTROLS	CCB BLOWER NO.1 LOCAL CONTROL STATION	CCB BLOWER NO.1	1 "C, 10-#14, #14 GND	
BL1-LCP-A	CCB BLOWER NO.1 LOCAL CONTROL PANEL ANALOGS	CCB BLOWER NO.1 LOCAL CONTROL STATION	CCB BLOWER NO.1	1 "C, 2-#16 TSP	
CCB-BL2-P	CCB BLOWER NO.2 POWER	MCC-CCB	CCB BLOWER NO.2	1 1/2"C, 3-#2, #6 GND	
CCB-BL2-C	CCB BLOWER NO.2 CONTROL	CHLORINE CONTACT BASIN PLC-CCB	CCB BLOWER NO.2 LOCAL CONTROL STATION	1 "C, 16-#14, #14 GND	
BL2-LCP-C	CCB BLOWER NO.2 LOCAL CONTROL PANEL CONTROLS	CCB BLOWER NO.2 LOCAL CONTROL STATION	CCB BLOWER NO.2	1 "C, 10-#14, #14 GND	
BL2-LCP-A	CCB BLOWER NO.2 LOCAL CONTROL PANEL ANALOGS	CCB BLOWER NO.2 LOCAL CONTROL STATION	CCB BLOWER NO.2	1 "C, 2-#16 TSP	
CCB-BL3-P	CCB BLOWER NO.3 POWER	MCC-CCB	CCB BLOWER NO.3	1 1/2"C, 3-#2, #6 GND	
CCB-BL3-C	CCB BLOWER NO.3 CONTROL	CHLORINE CONTACT BASIN PLC-CCB	CCB BLOWER NO.3 LOCAL CONTROL STATION	1 "C, 16-#14, #14 GND	
BL3-LCP-C	CCB BLOWER NO.3 LOCAL CONTROL PANEL CONTROLS	CCB BLOWER NO.3 LOCAL CONTROL STATION	CCB BLOWER NO.3	1 "C, 10-#14, #14 GND	
BL3-LCP-A	CCB BLOWER NO.3 LOCAL CONTROL PANEL ANALOGS	CCB BLOWER NO.3 LOCAL CONTROL STATION	CCB BLOWER NO.3	1 "C, 2-#16 TSP	
CCB-BL4-P	CCB BLOWER NO.4 POWER	MCC-CCB	CCB BLOWER NO.4	1 1/2"C, 1-JET LINE	FUTURE CCB BLOWER
CCB-BL4-C	CCB BLOWER NO.4 CONTROL	CHLORINE CONTACT BASIN PLC-CCB	CCB BLOWER NO.4 LOCAL CONTROL STATION	1 "C, 1-JET LINE	FUTURE CCB BLOWER
BL4-LCP-C	CCB BLOWER NO.4 LOCAL CONTROL PANEL CONTROLS	CCB BLOWER NO.1 LOCAL CONTROL STATION	CCB BLOWER NO.4	1 "C, 1-JET LINE	FUTURE CCB BLOWER
BL4-LCP-A	CCB BLOWER NO.4 LOCAL CONTROL PANEL ANALOGS	CCB BLOWER NO.1 LOCAL CONTROL STATION	CCB BLOWER NO.4	1 "C, 1-JET LINE	FUTURE CCB BLOWER
EW1-50-C	EYEWASH CONTROL STATION NO.1 CONTROLS	CP-CHEM	EYEWASH CONTROL STATION NO.1	1 "C, 2-#14, #14 GND	
EW2-50-C	EYEWASH CONTROL STATION NO.2 CONTROLS	CP-CHEM	EYEWASH CONTROL STATION NO.2	1 "C, 2-#14, #14 GND	
EW3-50-C	EYEWASH CONTROL STATION NO.3 CONTROLS	CP-CHEM	EYEWASH CONTROL STATION NO.3	1 "C, 2-#14, #14 GND	
EW4-50-C	EYEWASH CONTROL STATION NO.4 CONTROLS	CP-CHEM	EYEWASH CONTROL STATION NO.4	1 "C, 2-#14, #14 GND	
S-101	SAMPLER S-101 PLC CONNECTION	SAMPLER S-101	EXISTING SODIUM BISULFITE PLC	1 "C, 1-#16 TSP, #14 GND	
S-102	SAMPLER S-102 PLC CONNECTION	SAMPLER S-102	EXISTING SODIUM BISULFITE PLC	1 "C, 1-#16 TSP, #14 GND	

GENERAL NOTES:

A. ALL OUTDOOR CONDUIT SHALL BE PVC COATED RIGID ALUMINUM. CONDUIT BODIES SHALL BE FORM 9 FERROUS FREE ALUMINUM WITH CAPTIVE 316SS SCREWS AND GASKETS. ALL INDOOR CONDUIT SHALL BE RIGID ALUMINUM CONDUIT.

B. ALL FINAL CONNECTIONS SHALL BE FLEXIBLE METALLIC ALUMINUM CONDUIT, WITH SUNLIGHT RESISTANT JACKET AND ALUMINUM WOUND CORE. FLEXIBLE FINAL CONNECTIONS SHALL BE NO LONGER THAN 3'-0" (36" MAX) IN LENGTH WITHOUT SPECIAL PERMISSION. ALL FLEX FITTINGS 1" TRADE SIZE AND SMALLER SHALL BE 316SS. ALL FLEX FITTINGS 1 1/4" TRADE SIZE AND LARGER MAY BE FERROUS FREE ALUMINUM OR 316SS.

C MEDIUM VOLTAGE CABLE FOR THIS PROJECT SHALL BE EPR, MV-105, 15KV RATED. SPECIFICATION 16123 HAS FULL MV CABLE REQUIREMENTS.

D. ALL 600V INSULATION RATED POWER AND CONTROL CONDUCTORS, ROUTED IN CONDUIT, SHALL BE XHHW-2 TYPE. SEE 16120 FOR MORE.

E. ALL CONTROL WIRING, ROUTED WITHIN CABINETS, SHALL BE MTW TYPE.

NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	ZS
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
Z.M. SIDDIQUI
77702
REGISTERED
PROFESSIONAL ENGINEER
10/21/24

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT
ELECTRICAL
CONDUIT AND CONDUCTOR
SCHEDULE SHEET 2

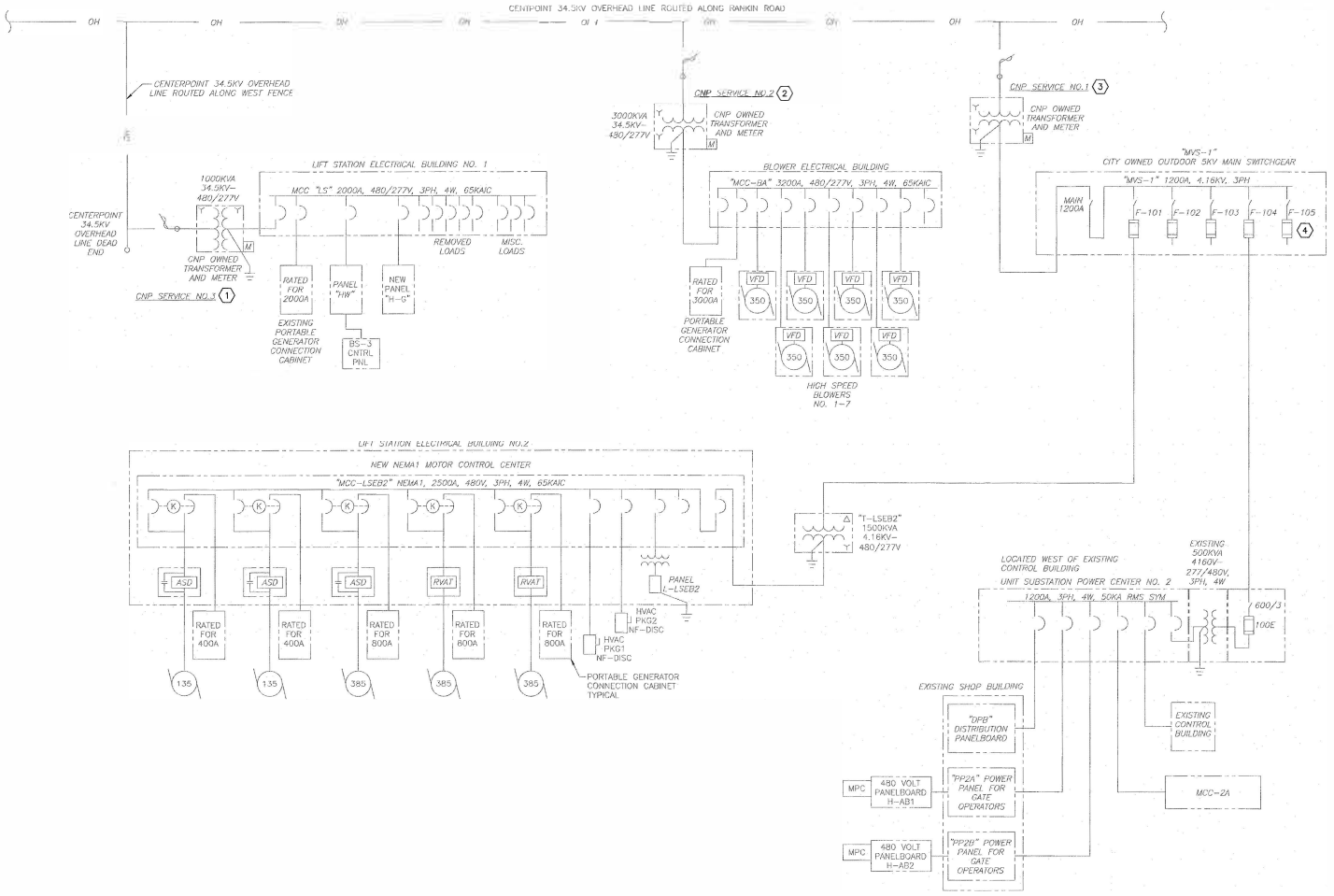
WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO. 125 OF 173	

FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
80867
REGISTERED
PROFESSIONAL ENGINEER

E-00-603

FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160-BV (4H imp Pkg 2)\CCB Redesign\Drawings\E-00-603 Conduit And Conductor Schedule Sheet 2.dwg



EXISTING OVERALL ONE LINE
DIAGRAM
NTS

KEYED NOTES:

(1) CNP SERVICE NO.3 SHALL REMAIN IN SERVICE WITH NO CHANGES IN THIS PROJECT.

(2) CNP SERVICE NO.2 SHALL REMAIN IN SERVICE WITH NO CHANGES IN THIS PROJECT.

(3) CNP SERVICE NO.1 IS TO HAVE NEW LOAD ADDED TO IT. SEE DRAWING E-00-703 FOR LOAD ANALYSIS.

(4) THE PROPOSED CHLORINE CONTACT BASIN (CCB) 5KV SWITCHGEAR MVS-CCB FEEDER SHALL BE CONNECTED TO THE EXISTING MVS-1 MAIN SWITCHGEAR ON F-105. SEE DRAWING E-00-702 FOR GENERAL PROPOSED EQUIPMENT ARRANGEMENT AND DRAWING E-66-701 FOR EXISTING MVS-1 MAIN SWITCHGEAR MODIFICATION.

GENERAL NOTES:

A. THIS SIMPLIFIED ONE LINE DIAGRAM DRAWING IS PROVIDED TO ILLUSTRATE THE THREE EXISTING ELECTRIC UTILITY SERVICES AND OVERALL PLANT POWER DISTRIBUTION SYSTEMS. WORK IS GENERALLY DESCRIBED ON THIS DRAWING AND DETAILED ON PLAN AND ONE LINE DRAWINGS RELATED TO THE WORK.

B. ALL TEMPORARY FACILITIES SHALL BE INSTALLED IN ACCORDANCE WITH 2023 NATIONAL ELECTRICAL CODE ARTICLE 590.

C. CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS REQUIRED TO PROTECT THE EXISTING FACILITIES FROM DAMAGE. ANY DAMAGE TO EXISTING FACILITIES INCURRED AS A RESULT OF CONSTRUCTION SHALL BE CORRECTED BY THE CONTRACTOR AT THE CONTRACTORS EXPENSE.

D. CONTRACTOR SHALL GIVE WRITTEN NOTICE TO THE CITY CONSTRUCTION REPRESENTATIVE PRIOR TO COMMENCEMENT OF ANY EQUIPMENT REMOVAL WORK.

E. THE INFORMATION CONTAINED IN THIS DRAWING SET, RELATED TO EXISTING EQUIPMENT, IS BASED ON RECORD DRAWINGS AND DATA COLLECTED FROM SITE. ITS ACCURACY IS NOT GUARANTEED AND ITS USE IN NO WAY RELIEVES THE CONTRACTOR OF ANY RESPONSIBILITY FOR LOSS DUE TO INACCURACIES. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO STARTING TASKS.

NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	ZS
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
Z.M. SIDDIQUI
77702
REGISTERED PROFESSIONAL ENGINEER
10/21/24

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT
ELECTRICAL
EXISTING OVERALL
ONE LINE DIAGRAM

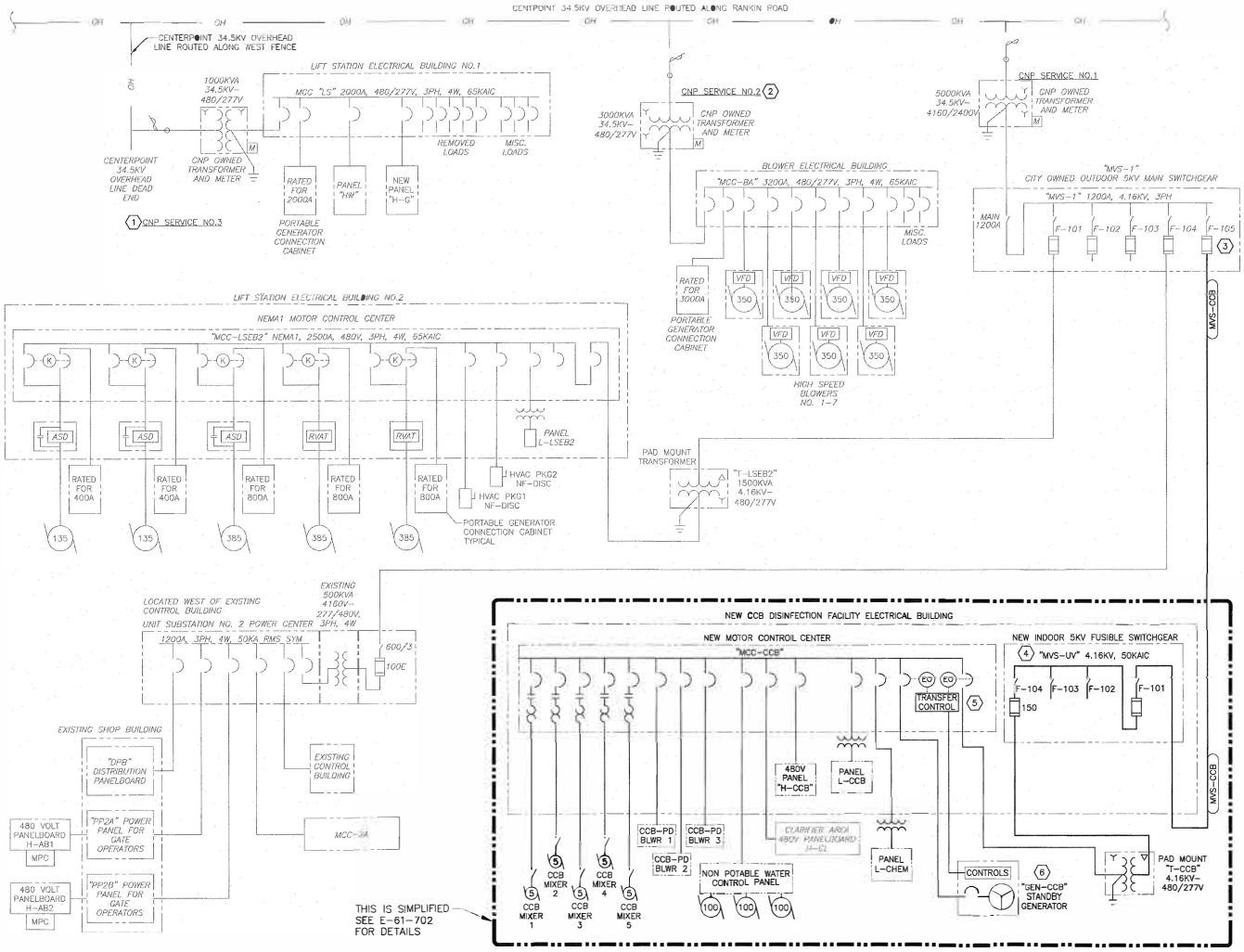
WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	

PROFESSIONAL ENGINEER
80367
HOUSTON, TEXAS

E-00-701

SHEET NO. 126 OF 173

FILE PATH: C:\Users\howard\Kalluri Group, Inc\KGI - Documents\41160-BV (WH Imp Pkg 2)\CCB Redesign\Drawings\E-00-701 Existing Overall One Line Diagram.dwg



MODIFIED OVERALL ONE LINE DIAGRAM

KEYED NOTES:

1. CNP SERVICE NO.3 SHALL REMAIN IN SERVICE WITH NO CHANGES IN THIS PROJECT.
2. CNP SERVICE NO.2 SHALL REMAIN IN SERVICE WITH NO CHANGES IN THIS PROJECT.
3. THE PROPOSED CHLORINE CONTACT BASIN (CCB) 5KV SWITCHGEAR MVS-CCB FEEDER INSTALLATION SHALL BE COORDINATED BY THE CONTRACTOR WITH PROJECT MANAGEMENT, FOR AN OUTAGE TO TEST AND CONNECT FEEDER CABLES. SEE DRAWING E-66-701 FOR EXISTING SWITCHGEAR MODIFICATION DETAILS.
4. NEW MVS-CCB, 5KV INDOOR METAL ENCLOSED FUSIBLE SWITCHGEAR IS DETAILED ON DRAWING E-61-701. THE SWITCHGEAR SHALL BE PROVIDED WITH SPACE AND ADDITIONAL CAPACITY FOR FUTURE PLANT EXPANSION. SPARE DUCT BANK CONDUITS SHALL BE STUBBED OUT TO THE EAST.
5. NEW MCC-CCB SHALL BE EQUIPPED WITH AUTOMATIC TRANSFER CONTROLS TO TRANSFER LOAD FROM NORMAL TO EMERGENCY SOURCE UPON LOSS OF NORMAL POWER AND RETURN TO NORMAL SOURCE UPON RESTORATION OF NORMAL POWER. ALL TRANSFER BETWEEN NORMAL AND EMERGENCY SOURCES SHALL BE OPEN TRANSITION. SEE DRAWING E-61-702 FOR MORE INFORMATION.
6. THE STANDBY GENERATOR SHALL BE NATURAL GAS AND PROVIDED IN AN ALL WEATHER ENCLOSURE. SEE MCC-CCB DRAWING FOR MORE INFORMATION.

GENERAL NOTES:

A. THIS SIMPLIFIED ONE LINE DIAGRAM DRAWING IS PROVIDED TO ILLUSTRATE THE UTILITY SERVICES AND DESCRIBE THE OVERALL PROPOSED PLANT POWER DISTRIBUTION MODIFICATIONS. THE EQUIPMENT IS GENERALLY DESCRIBED ON THIS DRAWING, AND DETAILED ON DRAWINGS RELATED TO THE LOADS, SEE CALLOUTS.

B. COORDINATE REMOVAL OF TEMPORARY POWER, INSTRUMENTATION, AND COMMUNICATIONS UPON COMPLETION OF NEW WORK.

NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	ZS
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS — Z.M. SIDDIQUI — 77702 — REGISTERED PROFESSIONAL ENGINEER — 10/21/24

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT
ELECTRICAL

MODIFIED OVERALL
ONE LINE DIAGRAM

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SR SHAHIDUR RAHMAN, P.E.
SHEET NO. 127 OF 173	

FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS — 80367 — LICENSED PROFESSIONAL ENGINEER

E-00-702

FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\CCB Redesign\Drawings\E-00-702 Modified Overall One Line Diagram.dwg

EXISTING SERVICE 1 LOAD ALAYSIS

EXISTING MVS–1 LOAD CALCULATIONS	
LOAD	KVA
UNIT SUBSTATION 2 POWER CENTER	
DISTRIBUTION PANEL DPB	130
PANEL PP2A	20
PANEL PP2B	100
EXISTING CONTROL BUILDING	27
MCC–2A	118
MCC–LSEB2	
PUMP 1 – 135 HP	127
PUMP 2 – 135HP	127
PUMP 3 – 385HP	372
PUMP 4 – 385HP	372
PUMP 5 – 385HP	372
MISC LOADS	91
CONNECTED SUBTOTAL	1,856
25% OF LARGEST MOTOR LOAD	93
CALCULATED LOAD	1,949

MODIFIED SERVICE 1 LOAD ALAYSIS

MODIFIED MVS–1 LOAD CALCULATIONS	
LOAD	KVA
EXISTING LOAD	
UNIT SUBSTATION 2 POWER CENTER	
DISTRIBUTION PANEL DPB	130
PANEL PP2A	20
PANEL PP2B	100
EXISTING CONTROL BUILDING	27
MCC–2A	118
MCC–LSEB2	
PUMP 1 – 135 HP	127
PUMP 2 – 135 HP	127
PUMP 3 – 385 HP	372
PUMP 4 – 385 HP	372
PUMP 5 – 385 HP	372
MISC LOADS	91
ADDED LOAD	
MCC–CCB	
MOTOR LOADS	420
MISC LOADS	82
CONNECTED SUBTOTAL	2,358
25% OF LARGEST MOTOR LOAD	93
CALCULATED LOAD	2,451

2,451 KVA AT 4,160 VOLTS = 340 AMPS
2 SETS OF 3–500 KCMIL MV–105 CU IS RATED 1060 AMPS AND IS SUFFICIENT FOR THE SERVICE

NEW MCC–CCB LOAD CALCULATIONS	CONNECTED	GENERATOR
LOAD	KVA	KVA
MIXER 1,2,3,4,5 – 5 HP EACH (DUTY)	36	36
CCB BLOWERS 1,2,3 – 40 HP EACH (2 DUTY, 1 STANDBY)	130	86
NPW PUMPS 1,2,3 – 100 HP EACH (2 DUTY, 1 STANDBY)	309	204
PANEL H–CL (DUTY)	25	25
PANEL H–CCB (DUTY)	27	27
TRANS T–CHEM – PANEL L–CHEM (DUTY)	15	15
TRANS T–CCB – PANEL L–CCB (DUTY)	15	15
CONNECTED LOAD TOTAL	557	
GENERATOR LOAD TOTAL		408

TRANSFORMER T–CCB IS RATED 750 KVA AND IS ADEQUATE TO SERVE THE MCC–CCB CONNECTED LOAD.

THE CONNECTED 557 KVA AT 480 VOLTS = 670 AMPS, THE MCC–CCB FEEDER IS 2 SETS OF 3–500 KCMIL CU RATED FOR 760 AMPS AND IS SUFFICIENT FOR THE SERVICE.

THE 500KW GENERATOR OUTPUT IS RATED 601 AMPS, THE GENERATOR MAXIMUM RUNNING LOAD IS 408 KVA AT 480 VOLTS = 490 AMPS, THE GENERATOR IS ADEQUATELY SIZED FOR THE RUNNING LOAD.

UTILITY & GENERATOR POWER SHORT CIRCUIT ANALYSIS

CENTERPOINT ENERGY PROVIDED AN AVAILABLE SHORT CIRCUIT CURRENT VALUE OF 13,100 AMPS, AT THE SERVICE 1 MAIN 5KV SWITCHGEAR MVS–1.

EXISTING MVS–1 BRACING IS RATED 50,000 KAIC AND ADEQUATE FOR THE EXISTING MVS–1 AND NEW MV SWITCHGEAR MVS–CCB.

BASED ON THE 750KVA T–CCB 4160V PRIMARY AND 480V SECONDARY WITH Z VALUE OF 5.3% THE TRANSFORMER CAN PROVIDE A MAXIMUM SHORT CIRCUIT CURRENT OF 14,801 AMPS. MCC–CCB HAS BRACING RATED AT 65 KAIC AND IT IS ADEQUATE FOR THE AVAILABLE SHORT CIRCUIT CURRENT.

THE NEW GENERATOR CAN PRODUCE A MAXIMUM SHORT CIRCUIT OF 9,400 AMPS. THE CURENT VALUE IS LESS THAN THE UTILITY AND THE EQUIPMENT IS ADEQUATELY RATED.

MODIFIED LOAD
ANALYSIS
NTS

NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	ZS
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F–665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)–365–9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365–9288
TX FIRM NUMBER F–665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P–6182

STATE OF TEXAS
Z.M. SIDIQUI
77702
REGISTERED
PROFESSIONAL ENGINEER
10/21/24

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

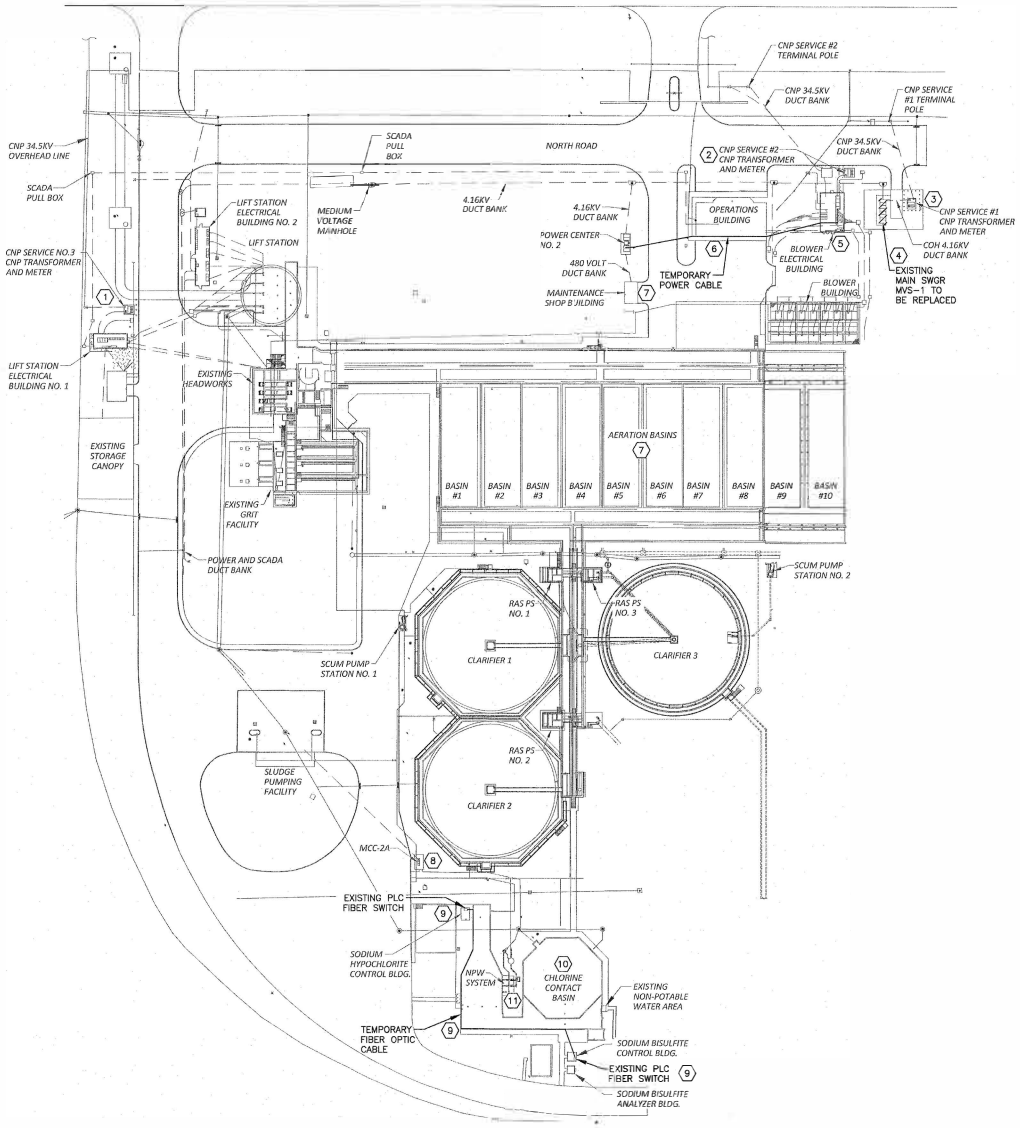
INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION–DISINFECTION REDESIGN
AMENDMENT
ELECTRICAL
MODIFIED
LOAD ANALYSIS

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R–000265–0147–4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 1 28 OF 73	

80367
REGISTERED
PROFESSIONAL ENGINEER

E–00–703

FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160–BV (IAH Imp. Pkg 2)\CCB Redesign\Drawings\E–00–703 Modified Overall Load Analysis.dwg



EXISTING OVERALL
SITE PLAN
1"-0" = 60'

N

0' 30' 60' 120'

SCALE: 1"=60'

ELECTRICAL TASKS NOTES:

1. THERE IS NO WORK ON CENTERPOINT ENERGY SERVICE NO. 3 EQUIPMENT IN PACKAGE 2 WORK.
2. THERE IS NO WORK ON CENTERPOINT ENERGY SERVICE NO. 2 EQUIPMENT IN PACKAGE 2 WORK.
3. THE EXISTING CENTERPOINT ENERGY, SERVICE NO. 1, TRANSFORMER AND REVENUE METER ARE TO REMAIN. THE TRANSFORMER FEEDS MEDIUM VOLTAGE TO THE CITY OWNED MAIN SWITCHGEAR MVS-1.
4. THE MAIN SWITCHGEAR AND FEEDER CABLES FROM THE CNP TRANSFORMER ARE TO BE REMOVED AND REPLACED, IN PACKAGE 2 WORK. SEE ONE LINE DIAGRAM FOR DETAILED INFORMATION ON THE EXISTING AND PROPOSED SWITCHGEAR.
5. DURING REMOVAL AND REPLACEMENT OF MVS-1 THE EXISTING BLOWER ELECTRICAL BUILDING, MCC-BA, MAY BE UTILIZED TO FEED TEMPORARY POWER TO THE 480 VOLT SIDE OF POWER CENTER 2. A TEMPORARY, 400 AMP MINIMUM, BREAKER SHALL BE PROVIDED AND REMOVED UPON END OF SERVICE.
6. TEMPORARY OVERHEAD FREE AIR SERVICE ENTRANCE RATED ALUMINUM QUADRAPLEX MAY BE ROUTED BETWEEN THE BLOWER ELECTRICAL BUILDING AND POWER CENTER NO. 2. TEMPORARY PROVISIONS SHALL BE COMPLIANT WITH THE NEC ARTICLE 590 REQUIREMENTS,
7. POWER CENTER 2 AND THE MAINTENANCE BUILDING ELECTRICAL EQUIPMENT SERVE THE PLANT PROCESS EQUIPMENT, OPERATIONS BUILDING, AND BASINS. TEMPORARY POWER IS TO BE CONNECTED TO THE 480 VOLT SIDE OF THE POWER CENTER NO. 2 EQUIPMENT IS REQUIRED. TEMPORARY FACILITIES ARE TO BE INCLUDED IN BASE BID PRICE. THE AERATION BASIN'S INSTRUMENTATION IS CONNECTED TO THE MAINTENANCE SHOP BUILDING PLC CABINET. THE PLC IS REQUIRED TO STAY IN SERVICE DURING THE ENTIRE PROJECT.
8. MCC-2A IS AVAILABLE FOR TEMPORARY POWER TO PROCESS EQUIPMENT RELATED TASKS. SOME LOADS INVOLVED IN THIS PROJECT ARE FED FROM MCC-2A. THE MCC SHALL BE KEPT CLOSED AND OPERATIONAL THROUGHOUT THE PROJECT.
9. DURING PACKAGE 1 CONSTRUCTION A TEMPORARY FIBER IS TO BE INSTALLED FROM THE SODIUM HYPOCHLORITE CONTROL BUILDING TO THE SODIUM BISULFITE CONTROL BUILDING PLC CABINET. UPON COMPLETION OF THE NEW DISINFECTION SYSTEMS THE TEMPORARY FIBER CABLE AND ALL SUPPORTS ARE TO BE REMOVED. THE SODIUM BISULFITE BUILDINGS ARE TO REMAIN IN SERVICE AND BE UTILIZED TO SERVE PACKAGE 2 EQUIPMENT.
10. THE CHLORINE CONTACT BASIN TO BE TAKEN OUT OF SERVICE WHEN THE NEW DISINFECTION FACILITY IS ACCEPTED FOR OPERATION. INSTRUMENTS ARE TO BE REMOVED AND RETURNED TO THE OWNER.
11. THE NPW SYSTEM IS TO BE REPLACED AND THE EXISTING SYSTEM REMOVED FROM SERVICE.

GENERAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE THE EXISTING PLANT, DESCRIBE TEMPORARY WORK AND EQUIPMENT TO BE REMOVED OR REPLACED IN THIS PROJECT.

B. CONTRACTOR SHALL BE PERFORMING TASKS IN THIS PROJECT IN NEAR PROXIMITY TO OVERHEAD POWER LINES. CONTRACTOR SHALL FOLLOW NEC AND CNP STANDARDS FOR SAFE WORKING DISTANCE, TEMPORARY SIGNAGE AND PROCEDURES.

C. THE ONSITE LIFT STATION AND GRIT FACILITY HAVE AREAS THAT ARE CLASSIFIED. PROPER MATERIALS AND METHODS ARE REQUIRED. CONTRACTOR SHALL FOLLOW 2023 NEC AND CITY OF HOUSTON STANDARDS FOR SAFE WORKING DISTANCE, TEMPORARY SIGNAGE AND PROCEDURES.

TEMPORARY POWER AND EQUIPMENT REMOVAL NOTES:

1. CONTRACTOR SHALL DOCUMENT THE OPERATIONAL STATUS OF ALL EQUIPMENT TO BE PROVIDED TEMPORARY OR REMOVED PRIOR TO SCHEDULING REMOVAL. THE STATUS, SOURCE AND PATH OF POWER, CONTROL AND SCADA CIRCUITS SHALL BE CONFIRMED PRIOR TO INSTALLATION OF TEMPORARY OR REMOVAL FROM AVAILABILITY. "AS FOUND" CONDITIONS DETERMINE TEMPORARY POWER REQUIREMENT. EQUIPMENT THAT IS NOT FUNCTIONAL MAY NOT REQUIRE TEMPORARY FACILITIES FOR CONSTRUCTION. INCLUDING AERATION BASIN'S INSTRUMENTATION AND DEVICES.
2. CONTRACTOR SHALL NOTIFY THE CITY CONSTRUCTION REPRESENTATIVE UPON DISCOVERY OF ALL DEVIATIONS FROM THE DRAWINGS PRIOR TO BEGINNING WORK.

NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	ZS
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-565
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
Z.M. SIDDIQUI
77702
REGISTERED PROFESSIONAL ENGINEER
10/21/24

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

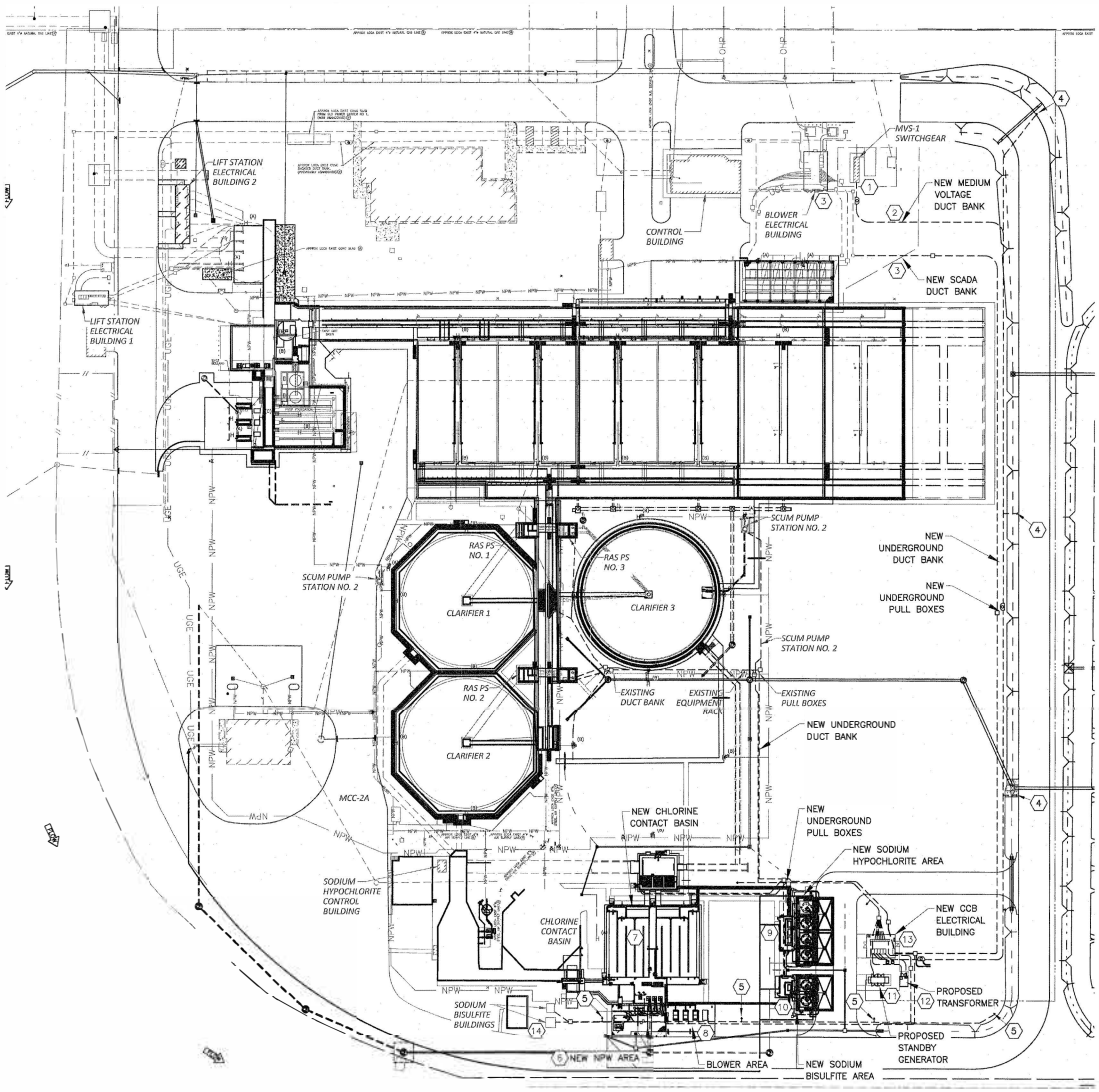
INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION–DISINFECTION REDESIGN
AMENDMENT
ELECTRICAL
EXISTING OVERALL
SITE PLAN

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SR SHAHIDUR RAHMAN, P.E.	
SHEET NO. 129 OF 173	

ACCEPTED
80367

E-10-101

FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\CCB Redesign\Drawings\E-10-101 Existing Overall Site Plan.dwg



OVERALL PROPOSED
SITE PLAN
1"-0" = 60'

N

0' 30' 60' 120'
SCALE: 1"=60'

ELECTRICAL TASKS NOTES:

1. THE EXISTING CNP SERVICE 1 5KV MAIN SWITCHGEAR "MVS-1" IS TO BE UTILIZED TO SERVE THE PROPOSED SWITCHGEAR MVS-CCB. COORDINATE WITH PROJECT MANAGEMENT IF AN OUTAGE IS REQUIRED FOR THE MEDIUM VOLTAGE CABLE CONNECTION AND TESTING. FOR CONTINUOUS PLANT OPERATIONS, IF NEEDED, TEMPORARY POWER MUST BE SUPPLIED TO UNIT SUBSTATION POWER CENTER NO. 2 480 VOLT LOADS.
2. THE NEW MEDIUM VOLTAGE POWER CIRCUIT IS TO BE ROUTED, IN DUCT BANK, FROM THE EXISTING MVS-1 SWITCHGEAR TO THE NEW DISINFECTION AREA CCB ELECTRICAL BUILDING MVS-CCB SWITCHGEAR. SEE DRAWING E-10-103 FOR ENLARGED DISINFECTION AREA PLAN.
3. NEW SCADA COMMUNICATIONS IS TO BE ROUTED FROM THE BLOWER ELECTRICAL BUILDING FIBER OPTIC CABLE PATCH PANEL, IN DUCT BANK, TO THE NEW DISINFECTION AREA CCB ELECTRICAL BUILDING AREA SCADA CONTROL PANEL FIBER PATCH PANEL. SEE DRAWING I-99-602 FOR MODIFIED NETWORK DIAGRAM.
4. STREET LIGHTS, WITH TWO FIXTURES EACH, ARE TO BE PROVIDE FOR ROADWAY LIGHTING LOCATIONS.
5. THREE FIXTURE LIGHT POLES ARE TO BE INSTALLED WHERE PLANT ROAD AND OR AREA SITE LIGHTING IS SHOWN.
6. SEE DRAWING E-51-101 FOR THE NEW NPW AREA. THE SYSTEM SHALL INCLUDE BUT NOT BE LIMITED TO A NEW NPW CONTROL PANEL, PUMP CABLE TERMINATION BOXES, HYDROPNEUMATIC PRESSURE TANK, AIR COMPRESSOR, AND INSTRUMENTATION ALL TO BE CONNECTED TO PROVIDE A COMPLETE AND WORKING SYSTEM. THE CONTRACTOR SHALL COORDINATE REMOVAL OF EXISTING NPW FACILITIES.
7. SEE DRAWING E-43-101 FOR NEW CHLORINE CONTACT BASIN AREA ENLARGED PLAN.
8. NEW CCB BLOWER AREA SHALL BE PROVIDED WITH THREE NEW BLOWERS AND THE PROVISION FOR THE FOURTH BLOWER IN THE FUTURE. SEE DRAWING E-43-401 FOR NEW BLOWER AREA ENLARGED PLAN.
9. PROVIDE A NEW SODIUM HYPOCHLORITE SYSTEM WITH NEW SODIUM HYPOCHLORITE BUILDING, THREE HYPOCHLORITE BULK STORAGE TANKS AND THE PROVISION FOR THE FORTH HYPOCHLORITE TANK IN THE FUTURE. SEE DRAWING E-50-102 FOR SODIUM HYPOCHLORITE ARE ENLARGE PLAN.
10. PROVIDE A NEW SODIUM BISULFITE SYSTEM WITH NEW SODIUM BISULFITE BUILDING WITH TWO SODIUM BISULFITE BULK STORAGE TANKS. SEE DRAWING E-50-104 FOR SODIUM BISULFITE AREA ENLARGED PLAN.
11. PROVIDE A NEW NATURAL GAS ENGINE GENERATOR SEE SPECIFICATION 166661 FOR REQUIREMENTS.
12. PROVIDE A PAD MOUNTED TRANSFORMER, SEE SPECIFICATION 16430 FOR REQUIREMENTS.
13. PROVIDE NEW CCB ELECTRICAL BUILDING SEE E-61-100 SERIES DRAWINGS FOR BUILDING DETAILS.
14. EXISTING SODIUM BISULFITE/ANALYZER BUILDINGS AT THE OUTFALL ARE TO REMAIN AND BE UTILIZED.

GENERAL ELECTRICAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE THE LOCATION AND GENERAL DESCRIPTION OF THE MAJOR ELECTRICAL TASKS IN THIS PROJECT.

B. INFORMATION IS SUBJECT TO THE SPECIFIC MECHANICAL AND ELECTRICAL EQUIPMENT CHOSEN BY THE CONTRACTOR AND APPROVED FOR SUPPLY.

C. ALL PROPOSED ANCHORS, HARDWARE, STRUT, CONDUIT FITTINGS AND CONDUIT STRAPS SHALL BE 316 STAINLESS STEEL ON THIS PROJECT. EXCEPTION AREA BEING CHEMICAL AREAS DESCRIBED IN THE DRAWINGS.

TEMPORARY POWER AND EQUIPMENT REMOVAL NOTES:

1. CONTRACTOR SHALL DOCUMENT THE OPERATIONAL STATUS OF ALL EQUIPMENT TO BE PROVIDED TEMPORARY OR REMOVED PRIOR TO SCHEDULING REMOVAL. THE STATUS, SOURCE AND PATH OF POWER, CONTROL AND SCADA CIRCUITS SHALL BE CONFIRMED PRIOR TO INSTALLATION OF TEMPORARY OR REMOVAL FROM AVAILABILITY, "AS FOUND" CONDITIONS DETERMINE TEMPORARY POWER REQUIREMENT. EQUIPMENT THAT IS NOT FUNCTIONAL MAY NOT REQUIRE TEMPORARY FACILITIES FOR CONSTRUCTION. INCLUDING AERATION BASIN'S INSTRUMENTATION AND DEVICES.
2. CONTRACTOR SHALL NOTIFY THE CITY CONSTRUCTION REPRESENTATIVE UPON DISCOVERY OF ALL DEVIATIONS FROM THE DRAWINGS PRIOR TO BEGINNING WORK.

NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	ZS
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
Z.M. SHOKOUH
77702
REGISTERED
PROFESSIONAL ENGINEER
10/24/24

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT
ELECTRICAL
OVERALL PROPOSED
SITE PLAN

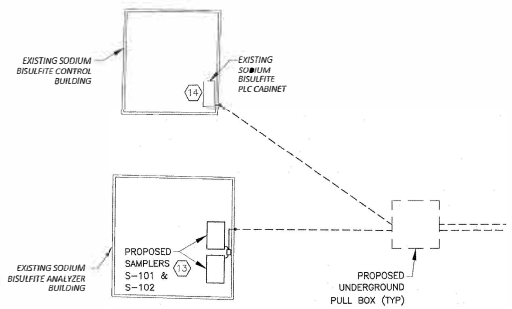
WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SR SHAHIDUR RAHMAN, P.E.
SHEET NO. 130 OF 173	

FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
80367
LICENSED
PROFESSIONAL
ENGINEER

E-10-102

FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\CCB Redesign\Drawings\E-10-102 Proposed Overall Site Plan.dwg



EXISTING SODIUM BISULFITE / ANALYZER BUILDINGS ENLARGED PLAN
NTS

ELECTRICAL TASKS NOTES:

1. THE MEDIUM VOLTAGE (4.16KV) CIRCUIT IS ROUTED FROM THE MAIN SWITCHGEAR. FED FROM CNP SERVICE NO.1.
2. SCADA AND INSTRUMENTATION DUCT BANK IS ROUTED FROM THE BLOWER BUILDING AREA. FIBER WILL BE ROUTED TO THE ELECTRICAL BUILDING. INSTRUMENTATION DUCTS FOR NEW AND FUTURE USAGE ARE INCLUDED.
3. THE MEDIUM VOLTAGE SWITCHGEAR SHALL CONTAIN ADDITIONAL CAPACITY AND SPACE FOR FUTURE EXPANSION. A SPARE AND A FUTURE DUCT WILL BE STUBBED OUT THE EAST OF THE NEW DUCT BANKS.
4. THE PAD MOUNTED TRANSFORMER SHALL BE PROVIDED A STRUCTURAL FOUNDATION AND SIDEWALK ACCESS.
5. THE NEW MCC SHALL BE PROVIDED A HOUSEKEEPING PAD. MCC BREAKERS SHALL BE CONFIGURED A AUTOMATICALLY TRANSFER SWITCH FROM UTILITY SOURCE TO THE NATURAL GAS GENERATOR TO ENSURE THE CONTINUOUS DISINFECTION.
6. THE NATURAL GAS GENERATOR SHALL BE PROVIDED A STRUCTURAL FOUNDATION AND SIDEWALK ACCESS ALL AROUND IT. A TWO STEP LOAD BANK AND PROVISIONS FOR AUTOMATIC EXERCISE. THE GENERATOR SHALL PROVIDE TO ALL LOADS CONNECTED TO THE MCC.
7. THE NEW NPW SYSTEM SHALL INCLUDE A NEW CONTROL PANEL, PUMP CABLE TERMINATION BOXES, HYDROPNEUMATIC PRESSURE TANK, AIR COMPRESSOR, AND INSTRUMENT ALL TO BE CONNECTED. THE CONTRACTOR SHALL REMOVE EXISTING NPW FACILITIES WHEN NEW NPW IS ACCEPTED FOR OPERATION. SEE DRAWING E-51-101 FOR NEW NPW AREA ENLARGED PLAN.

ELECTRICAL TASKS NOTES (CONT.):

8. PROPOSED CHLORINE CONTACT BASIN SHALL CONTAIN ONE CHLORINE JUNCTION CHAMBER AND TWO CONTACT BASIN TRAINS. CHLORINE MIXERS AND CHLORINE ANALYZERS SHALL BE PROVIDED AND INSTALLED. SEE DRAWING E-43-101 FOR NEW CHLORINE CONTACT BASIN AREA ENLARGED PLAN.
9. NEW BLOWER AREA SHALL BE PROVIDED WITH THREE NEW BLOWERS AND THE PROVISION FOR THE FOURTH BLOWER IN THE FUTURE. SEE DRAWING E-43-401 FOR NEW BLOWER AREA ENLARGED PLAN.
10. PROVIDE A NEW SODIUM HYPOCHLORITE SYSTEM WITH NEW SODIUM HYPOCHLORITE BUILDING, THREE HYPOCHLORITE BULK STORAGE TANKS AND THE PROVISION FOR THE FOURTH HYPOCHLORITE TANK IN THE FUTURE. SEE DRAWING E-50-102 FOR SODIUM HYPOCHLORITE ARE ENLARGE PLAN.
11. PROVIDE A NEW SODIUM BISULFITE SYSTEM WITH NEW SODIUM BISULFITE BUILDING WITH TWO SODIUM BISULFITE BULK STORAGE TANKS. SEE DRAWING E-50-104 FOR SODIUM BISULFITE AREA ENLARGED PLAN.
12. STUB OUT MEDIUM VOLTAGE DUCT BANK, LOW VOLTAGE AND SCADA DUCT BANK FOR FUTURE PLANT EXPANSION.
13. NEW EQUIPMENT SHALL BE PROVIDED POWER FROM THE EXISTING RECEPTACLES IN THE ROOM.
14. NEW EQUIPMENT SIGNALS SHALL BE CONNECTED TO THE EXISTING PLC IN THE SODIUM BISULFITE CONTROL BUILDING.

N

0' 10' 20' 40'

SCALE: 1"=20'

GENERAL ELECTRICAL NOTES:

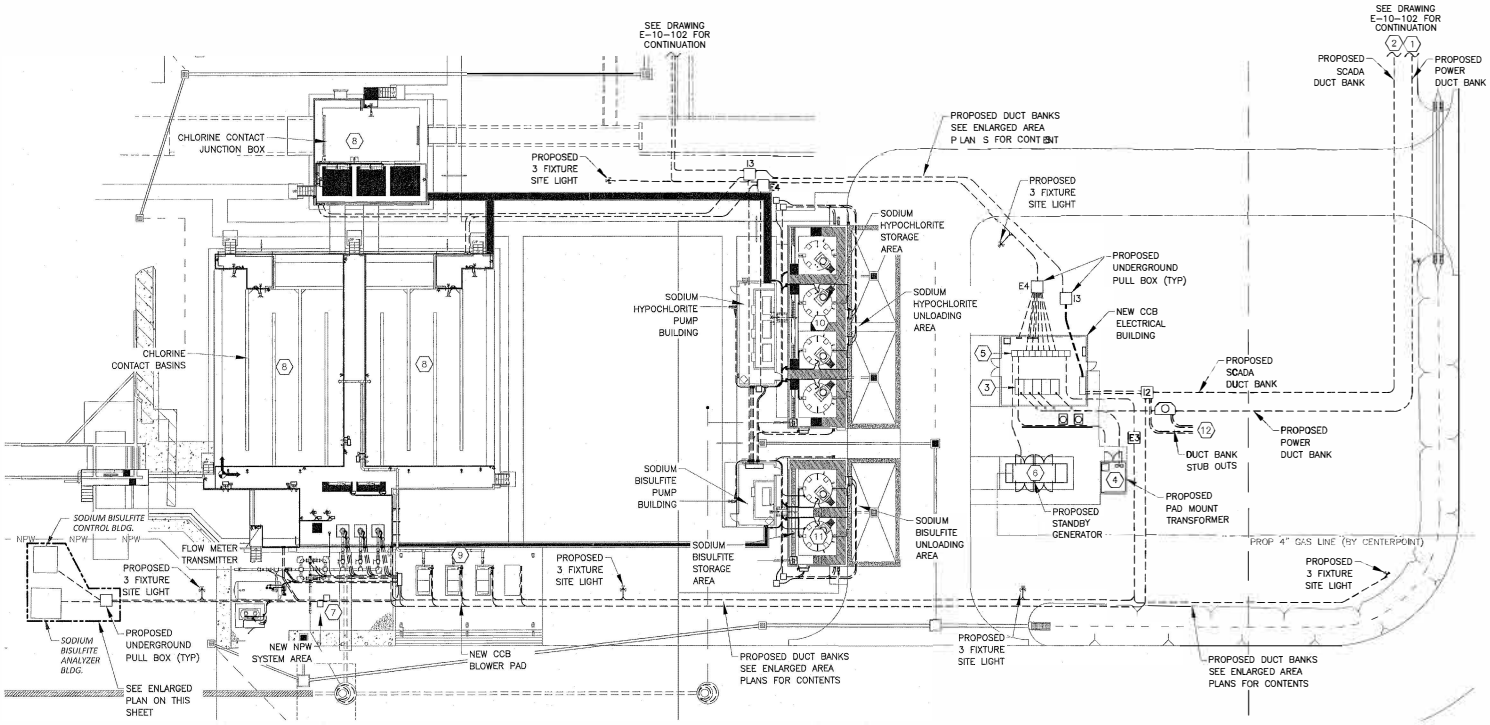
A. THIS DRAWING IS PROVIDED TO ILLUSTRATE THE LOCATION AND GENERAL DESCRIPTION OF THE MAJOR ELECTRICAL TASKS IN THIS PROJECT.

B. INFORMATION IS SUBJECT TO THE SPECIFIC MECHANICAL AND ELECTRICAL EQUIPMENT CHOSEN BY THE CONTRACTOR AND APPROVED FOR SUPPLY.

C. ALL PROPOSED ANCHORS, HARDWARE, STRUT, CONDUIT FITTINGS AND CONDUIT STRAPS SHALL BE 316 STAINLESS STEEL ON THIS PROJECT. EXCEPTION AREA BEING CHEMICAL AREAS DESCRIBED IN THE DRAWINGS.

TEMPORARY POWER AND EQUIPMENT REMOVAL NOTES:

1. CONTRACTOR SHALL DOCUMENT THE OPERATIONAL STATUS OF ALL EQUIPMENT TO BE PROVIDED TEMPORARY OR REMOVED PRIOR TO SCHEDULING REMOVAL. THE STATUS, SOURCE AND PATH OF POWER, CONTROL AND SCADA CIRCUITS SHALL BE CONFIRMED PRIOR TO INSTALLATION OF TEMPORARY OR REMOVAL FROM AVAILABILITY. "AS FOUND" CONDITIONS DETERMINE TEMPORARY POWER REQUIREMENT. EQUIPMENT THAT IS NOT FUNCTIONAL MAY NOT REQUIRE TEMPORARY FACILITIES FOR CONSTRUCTION. INCLUDING AERATION BASIN'S INSTRUMENTATION AND DEVICES.
2. CONTRACTOR SHALL NOTIFY THE CITY CONSTRUCTION REPRESENTATIVE UPON DISCOVERY OF ALL DEVIATIONS FROM THE DRAWINGS PRIOR TO BEGINNING WORK.



PROPOSED ENLARGED SITE PLAN
1" = 20'-0"

NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	ZS
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
6300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
Z.M. SIDDIQUI
77702
REGISTERED
PROFESSIONAL
ENGINEER
9/9/24

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT
ELECTRICAL

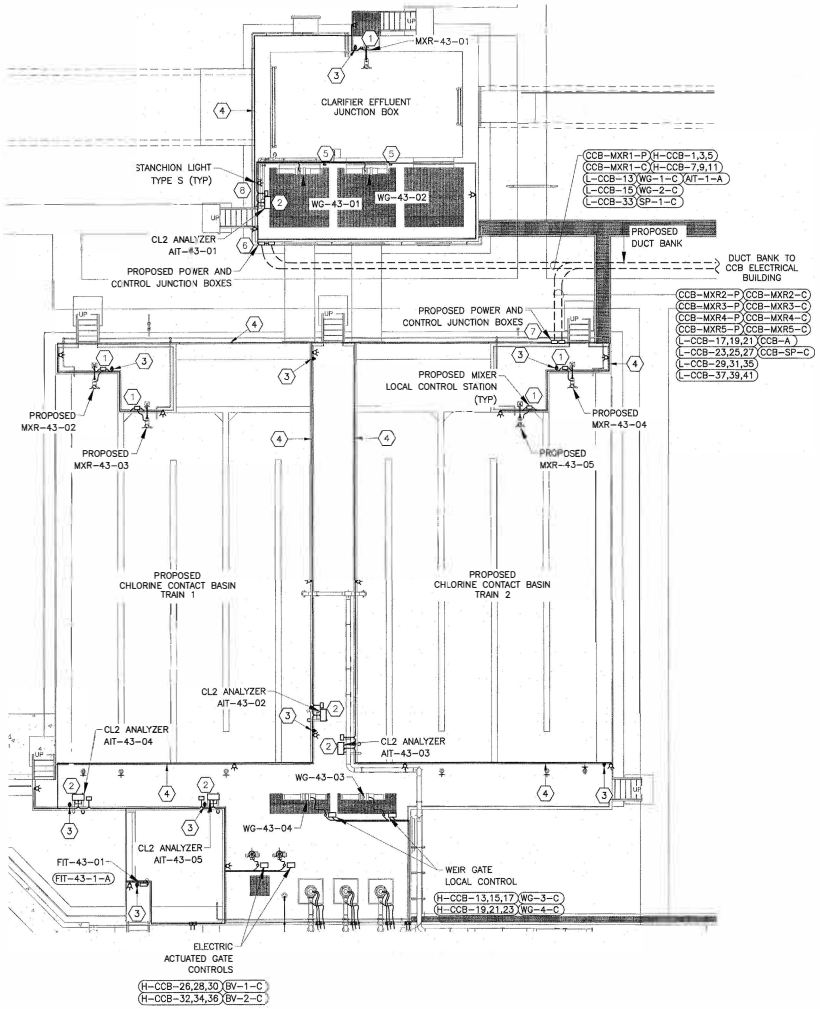
PROPOSED ENLARGED SITE PLAN

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SR SHAHIDUR RAHMAN, P.E.	
SHEET NO 131 OF 173	

STATE OF TEXAS
80367
REGISTERED
PROFESSIONAL
ENGINEER
9/9/24

E-10-103

FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\CCB Redesign\Drawings\E-10-103 Proposed Enlarged Site Plan.dwg



PROPOSED CHLORINE CONTACT BASIN AREA

PLAN

1"-0" = 10'

N

0' 30' 60' 120'

SCALE: 1"=60'

ELECTRICAL TASKS NOTES:

1. PROVIDE AND INSTALL LOCAL CONTROL STATION AT EACH CHLORINE MIXER. THE CONTROL STATION SHALL BE MOUNTED TO THE HANDRAIL.
2. PROPOSED CHLORINE ANALYZERS SHALL BE INSTALLED INSIDE AN ENCLOSURE. SEE DETAIL DRAWINGS FOR MORE INFORMATION. SAMPLE PUMP CONTROL STATIONS SHALL BE PROVIDED AND INSTALLED ADJACENT TO CHLORINE ANALYZER CONTROL PANELS
- PROVIDE GFCI RECEPTACLE WITH WEATHERPROOF IN-USE COVER.
4. EXPOSED CONDUIT ROUTED AROUND STRUCTURE SHALL BE ON VERTICAL SUPPORTS AND MAY REQUIRE DOUBLE STRUT TO CLEAR OBSTACLES.
5. WEIR GATE LOCAL CONTROL STATION AT CHLORINE CONTACT BASIN JUNCTION BOX SHALL BE MOUNTED TO THE HANDRAIL.
6. PROVIDE A NEMA 4X, 16" X 16" X 6" MINIMUM JUNCTION BOX FOR POWER CABLES CONNECTION AND A NEMA 4X, 8" X 8" X 6" MINIMUM JUNCTION BOX FOR CONTROL CABLES.
7. PROVIDE A NEMA 4X, 16" X 16" X 6" MINIMUM JUNCTION BOX FOR POWER CABLES CONNECTION AND A NEMA 4X, 12" X 12" X 6" MINIMUM JUNCTION BOX FOR CONTROL CABLES CONNECTION.
8. STANCHION LIGHT FIXTURES SHALL BE PROVIDED AND MOUNTED TO THE CHLORINE CONTACT BASIN HANDRAILS. POWER TO STANCHION LIGHT FIXTURES SHALL BE FED FROM PANEL L-CCB. SEE PANELBOARD SCHEDULE AND DETAIL DRAWINGS FOR MORE INFORMATION.

GENERAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE THE LOCATION OF CHLORINE CONTACT BASIN AND THE LOADS TO BE ADDED AT THIS AREA.

B. EACH CONDUIT SHALL BE TAGGED WITH THE PANEL DESIGNATOR AND CIRCUIT NUMBERS THAT ARE IN THE CONDUIT AT EACH BOX, STUB UP, TRANSITION THRU WALL AND END OF CIRCUIT.

C. ALL ANCHORS, STRUT, STRUT FITTINGS, AND HARDWARE SHALL BE 316 STAINLESS STEEL.

D. ROUTE CONDUIT SUCH THAT THERE NO CONNECTIONS IN CONDUIT FITTINGS. IF CONNECTIONS ARE REQUIRED A BOX SIZED ACCORDINGLY SHALL BE PROVIDED.

NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	ZS
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
Z.M. SIDDIQUI
77702
REGISTERED PROFESSIONAL ENGINEER
10/21/24

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT

ELECTRICAL

NEW CHLORINE CONTACT BASIN SITE PLAN

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SR SHAHIDUR RAHMAN, P.E.

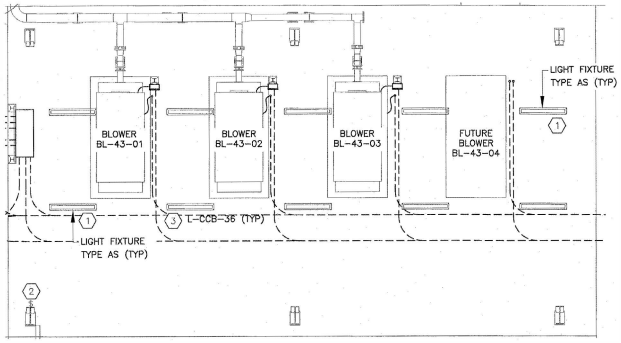
FOR CITY OF HOUSTON USE ONLY

PUBLIC WORKS APPROVED EXCEPTIONS TAKEN 80367 REVIEWED NOT REVIEWED

E-43-101

SHEET NO. 132 OF 173

FILE PATH: C:\Users\howard\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\CCB Redesign\Drawings\E-43-101 Proposed Chlorine Contact Basin Plan.dwg



PROPOSED BLOWER PAD AREA LIGHTING PLAN
1" = 5'-0"

ELECTRICAL TASKS NOTES:

1. PROVIDE AND INSTALL LED STRIP LIGHT FIXTURES UNDER THE CANOPY. SEE LIGHT FIXTURE SCHEDULE FOR MORE INFORMATION.
2. LIGHT SWITCH SHALL BE INSTALL ON A CANOPY METAL COLUMN SUPPORT AT 5 FEET ABOVE THE FINISHED GRADE.
3. POWER TO THE NEW UNDER CANOPY LIGHT FIXTURES SHALL BE FED FROM PANEL "L-CCB". SEE PANELBOARD SCHEDULE FOR MORE INFORMATION.

N

0' 1/4' 1/2' 1'

SCALE: 1/2"=1'

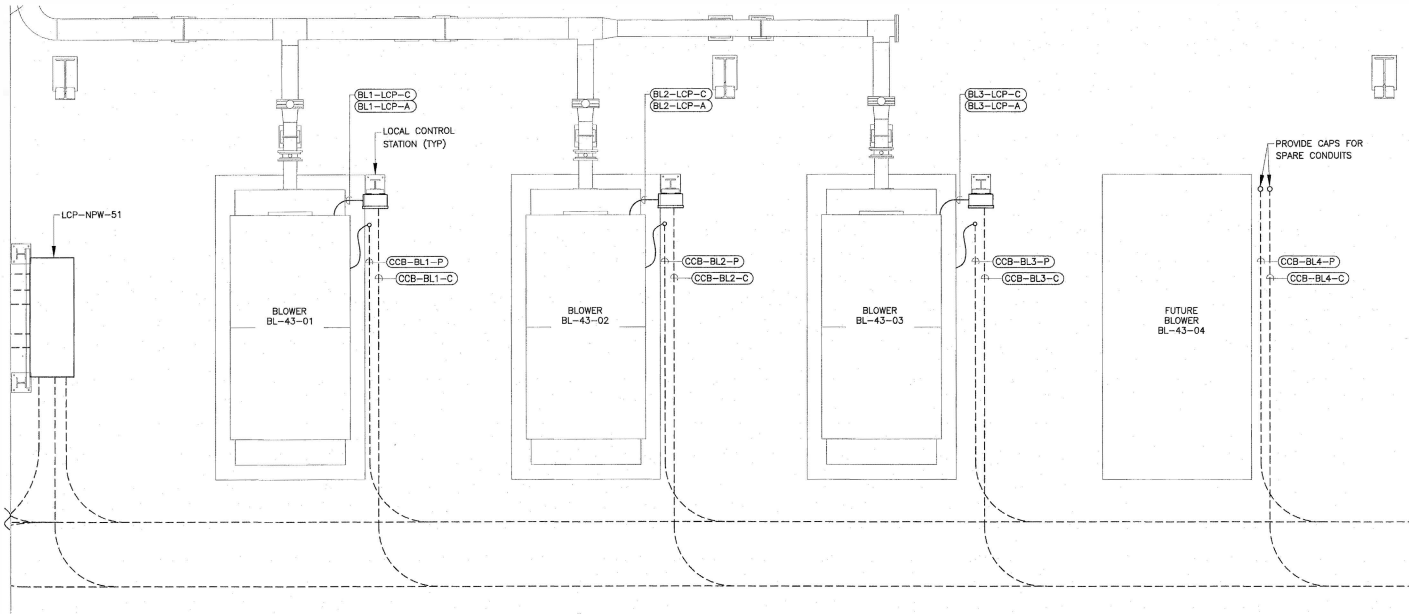
GENERAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE THE BLOWER PAD AREA AND RELATED ELECTRICAL EQUIPMENT.

B. EACH CONDUIT SHALL BE TAGGED WITH THE PANEL DESIGNATOR AND CIRCUIT NUMBERS THAT ARE IN THE CONDUIT AT EACH BOX, STUB UP, TRANSITION THRU WALL AND END OF CIRCUIT.

C. ALL ANCHORS, STRUT, STRUT FITTINGS, AND HARDWARE SHALL BE 316 STAINLESS STEEL.

D. ROUTE CONDUIT SUCH THAT THERE NO CONNECTIONS IN CONDUIT FITTINGS. IF CONNECTIONS ARE REQUIRED A BOX SIZED ACCORDINGLY SHALL BE PROVIDED.



PROPOSED BLOWER PAD AREA PLAN
1/2" = 1'-0"

NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	ZS
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
Z.M. SIDDIQUI
77702
REGISTERED
PROFESSIONAL
ENGINEER
10/21/24

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION–DISINFECTION REDESIGN
AMENDMENT
ELECTRICAL

PROPOSED BLOWER PAD AREA PLAN

WBS NUMBER
R-000265-0147-4
DRAWING SCALE
AS NOTED
CITY OF HOUSTON PM
SHAHIDUR RAHMAN, P.E.

FOR CITY OF HOUSTON USE ONLY

PUBLIC WORKS
80367

E-43-401

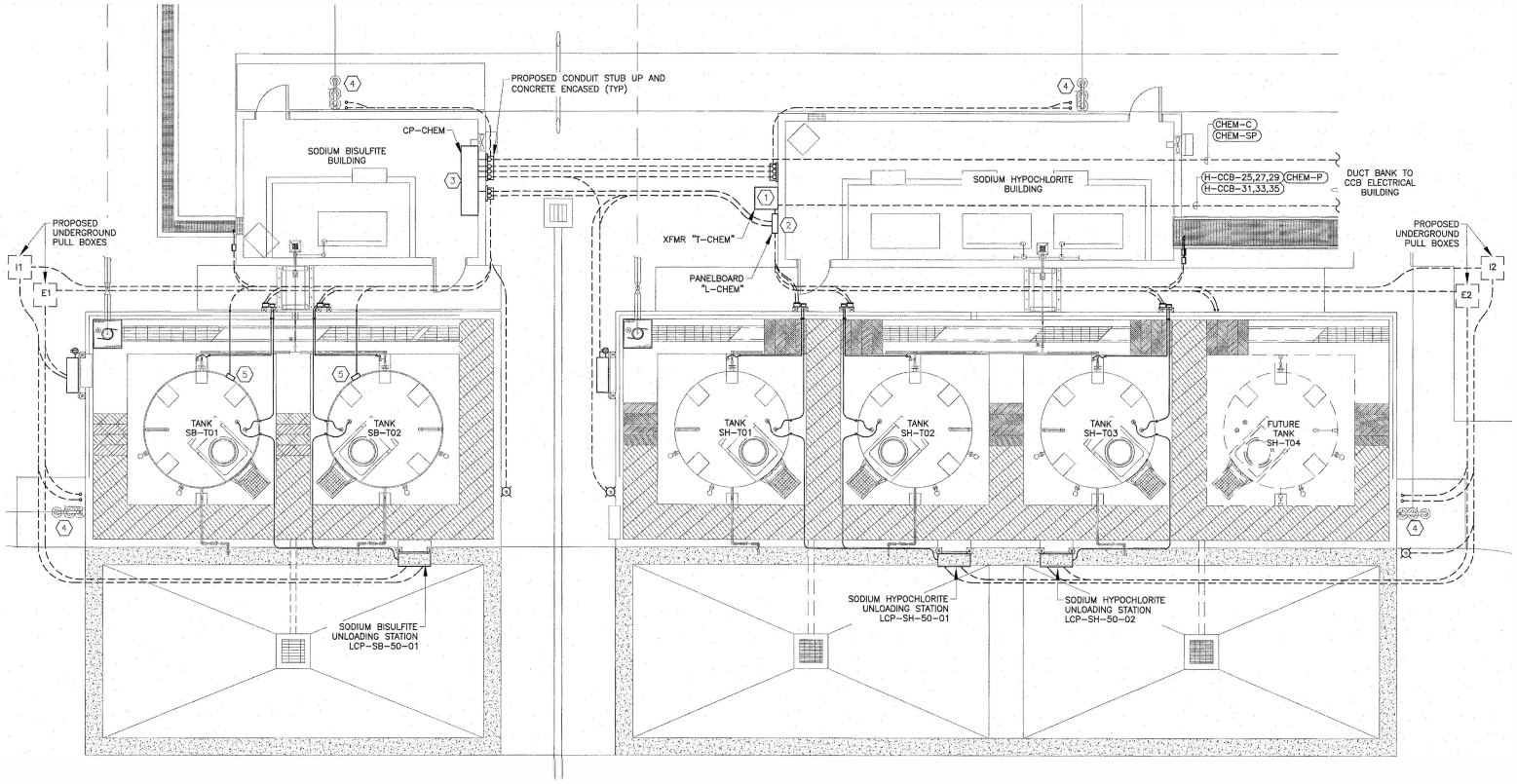
SHEET NO 133 OF 173

FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\CCB Redesign\Drawings\E-43-401 Proposed Blower Pad Area Plan.dwg

KEYED NOTES:

1. PROPOSED TRANSFORMER "T-CHEM" SHALL BE FED FROM "MCC-CC" AND TO BE INSTALLED ON THE WEST WALL OF SODIUM HYPOCHLORITE BUILDING. SEE ONE LINE DIAGRAM AND DIVISION 16 SPECIFICATIONS FOR MORE INFORMATION.
2. PANEL "L-CHEM" SHALL BE FED FROM TRANSFORMER "T-CHEM". PANEL "L-CHEM" SHALL PROVIDE POWER TO ALL OF ELECTRICAL EQUIPMENT AT CHEMICAL AREA. SEE ONE LINE DIAGRAM AND PANELBOARD SCHEDULE FOR MORE INFORMATION.
3. PROVIDE AND INSTALL NEW CHEMICAL PLC LOCATED INSIDE SODIUM BISULFITE BUILDING. CHEMICAL PLC SHALL BE CONNECTED TO CCB PLC LOCATED IN CHLORINE CONTACT BASIN ELECTRICAL BUILDING. SEE DIVISION 13 SPECIFICATIONS FOR PLC AND CONTROL PANEL REQUIREMENTS.
4. EMERGENCY SHOWER AND EYEWASH STATIONS SHALL BE PROVIDED AND INSTALLED AT CHEMICAL AREA. PROVIDE A WATER FLOW SWITCH AT THE EYEWASH CONNECTION TO ALARM CONTROL PANEL WITH A BEACON AND HORN FOR ALARMING. SEE DIVISION 15 SPECIFICATIONS FOR ALARM CONTROL PANEL REQUIREMENTS.
5. HEAT TRACE SHALL BE INSTALLED AT SODIUM BISULFITE CHEMICAL TANKS TO PREVENT FROM FREEZING. HEAT TRACE SHALL NOT BE REQUIRED AT SODIUM HYPOCHORITE CHEMICAL TANKS.

N



PROPOSED CHEMICAL FEED FACILITIES
PLAN
1" = 5'-0"

GENERAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE THE CHEMICAL AREA INCLUDING SODIUM HYPOCHLORITE AND SODIUM BISULFITE SYSTEMS AND RELATED ELECTRICAL EQUIPMENT.

B. CONDUIT IN CHEMICAL ROOM SHALL BE SCHEDULE 80 PVC, SUPPORTED EVERY 4' MAXIMUM, AND CONDUIT FITTING SHALL BE PVC.

C. CONDUITS INSTALLED OUTDOORS SHALL BE PVC COATED RIGID ALUMINUM WITH PVC COATED CONDUIT FITTINGS.

D. ALL ANCHORS, STRUT, STRUT FITTINGS, AND HARDWARE SHALL BE 316 STAINLESS STEEL.

E. ROUTE CONDUIT SUCH THAT THERE NO CONNECTIONS IN CONDUIT FITTINGS. IF CONNECTIONS ARE REQUIRED A BOX SIZED ACCORDINGLY SHALL BE PROVIDED.

F. EACH CONDUIT SHALL BE TAGGED WITH THE PANEL DESIGNATOR AND CIRCUIT NUMBERS THAT ARE IN THE CONDUIT AT EACH BOX, STUB UP, TRANSITION THRU WALL AND END OF CIRCUIT.

NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	ZS
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

ZIA M. SIDDIQUI
77702
REGISTERED
PROFESSIONAL ENGINEER
10/21/24

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT
ELECTRICAL

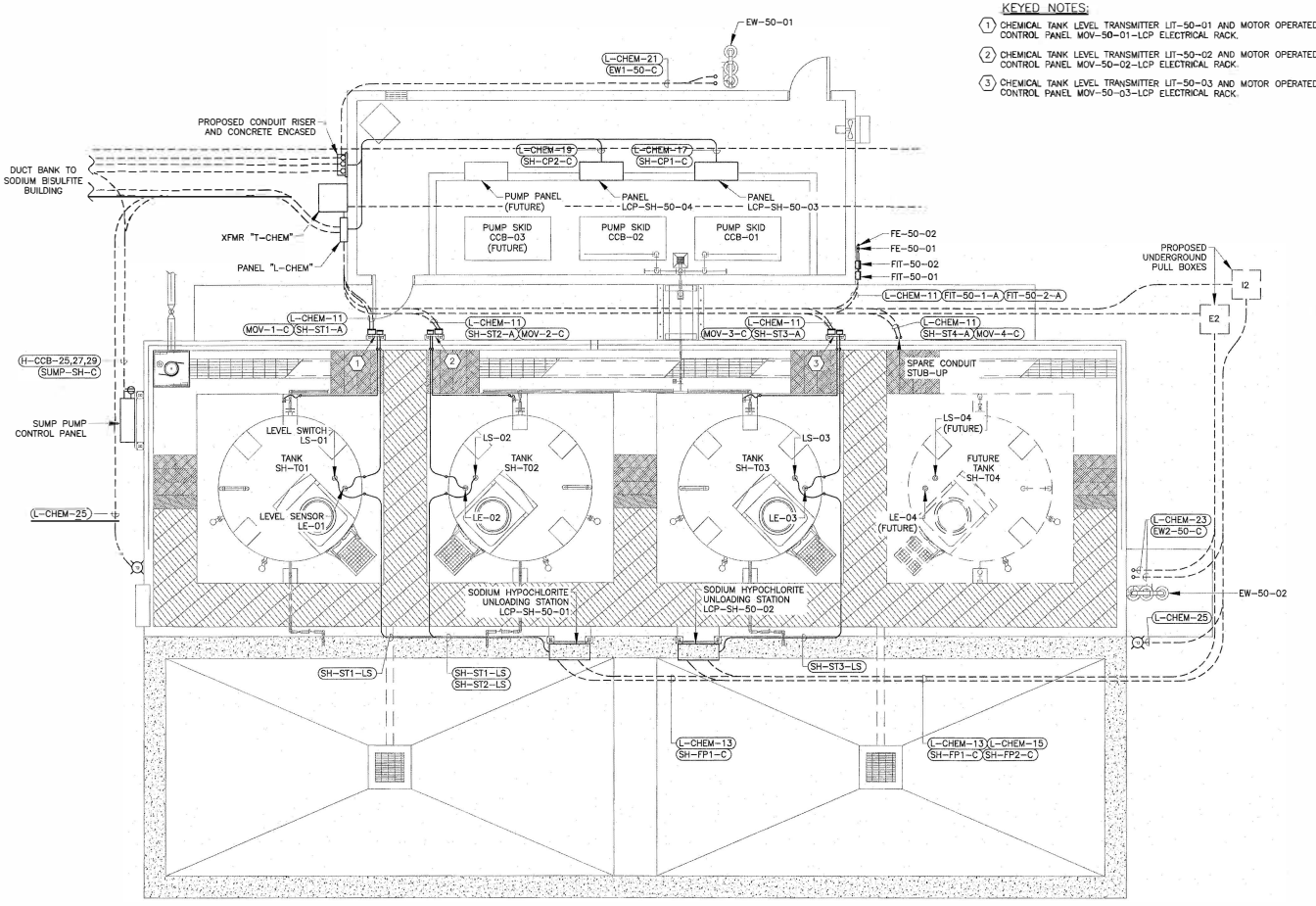
PROPOSED CHEMICAL FEED
FACILITIES PLAN

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 134 OF 173	

ACCEPTED AS NOTED
80367
SEP 2025
HOUSTON, TEXAS

E-50-101.

FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\CCB Redesign\Drawings\E-50-101 Proposed Chemical Feed Facilities Plan.dwg



PROPOSED SODIUM HYPOCHLORITE AREA

PLAN

1/4" = 1'-0"

KEYED NOTES:

1. CHEMICAL TANK LEVEL TRANSMITTER LIT-50-01 AND MOTOR OPERATED VALVE LOCAL CONTROL PANEL MOV-50-01-LCP ELECTRICAL RACK.
2. CHEMICAL TANK LEVEL TRANSMITTER LIT-50-02 AND MOTOR OPERATED VALVE LOCAL CONTROL PANEL MOV-50-02-LCP ELECTRICAL RACK.
3. CHEMICAL TANK LEVEL TRANSMITTER LIT-50-03 AND MOTOR OPERATED VALVE LOCAL CONTROL PANEL MOV-50-03-LCP ELECTRICAL RACK.

GENERAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE THE CHEMICAL AREA INCLUDING SODIUM HYPOCHLORITE AND SODIUM BISULFITE SYSTEMS AND RELATED ELECTRICAL EQUIPMENT.

B. CONDUIT IN CHEMICAL ROOM SHALL BE SCHEDULE 80 PVC, SUPPORTED EVERY 4' MAXIMUM, AND CONDUIT FITTING SHALL BE PVC.

C. CONDUITS INSTALLED OUTDOORS SHALL BE PVC COATED RIGID ALUMINUM WITH PVC COATED CONDUIT FITTINGS.

D. ALL ANCHORS, STRUT, STRUT FITTINGS, AND HARDWARE SHALL BE 316 STAINLESS STEEL.

E. ROUTE CONDUIT SUCH THAT THERE NO CONNECTIONS IN CONDUIT FITTINGS. IF CONNECTIONS ARE REQUIRED A BOX SIZED ACCORDINGLY SHALL BE PROVIDED.

F. EACH CONDUIT SHALL BE TAGGED WITH THE PANEL DESIGNATOR AND CIRCUIT NUMBERS THAT ARE IN THE CONDUIT AT EACH BOX, STUB UP, TRANSITION THRU WALL AND END OF CIRCUIT.

NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	ZS
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
Z.M. SIDDIQUI
77702
REGISTERED
PROFESSIONAL ENGINEER
10/21/24

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT
ELECTRICAL

PROPOSED
SODIUM HYPOCHLORITE AREA
PLAN

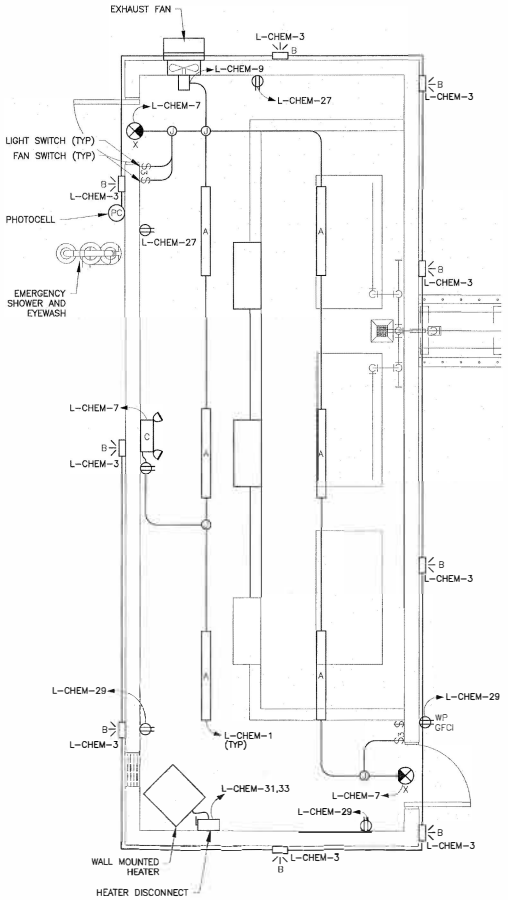
WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SR SHAHIDUR RAHMAN, P.E.

FOR CITY OF HOUSTON USE ONLY
RECOMMENDED FOR ACCEPTANCE
80367

E-50-102

SHEET NO. 135 OF 173

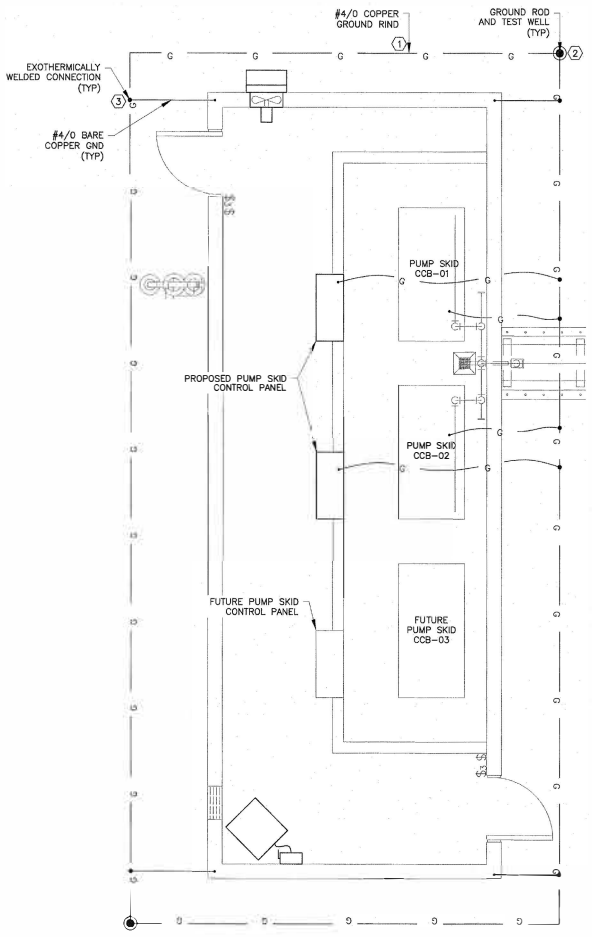
FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\CCB Redesign\Drawings\E-50-102 Proposed Sodium Hypochlorite Area Plan.dwg



SODIUM HYPOCHLORITE BUILDING POWER AND LIGHTING

PLAN

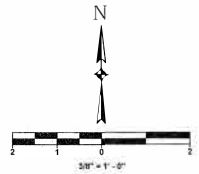
3/8" = 1'-0"



SODIUM HYPOCHLORITE BUILDING GROUNDING

PLAN

3/8" = 1'-0"



KEYED NOTES:

1. 4/0 COPPER GROUND RING AT 24" MINIMUM BELOW GRADE.
2. 3/4"X20' GROUND ROD WITH EXOTHERMIC CONNECTIONS TO GROUND RING.
3. EXOTHERMICALLY WELDED CONNECTION, SEE SPECIFICATIONS FOR REQUIREMENTS.
4. PROVIDE A #4/0 COPPER GROUNDING CONDUCTOR, TO MEDIUM VOLTAGE EQUIPMENT GROUND BAR AND ENCLOSURE STRUCTURE FRAME.

GENERAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE THE NEW SODIUM HYPOCHLORITE BUILDING LIGHTING, POWER, AND GROUNDING PROVISIONS.

B. CONTRACTOR SHALL COORDINATE WITH GENERAL PRIOR TO THE BID TO INCLUDE ALL PROVISIONS REQUIRED FOR THE PROPOSED APPROVED SYSTEM.

C. ELECTRICAL EQUIPMENT, STRUCTURAL STEEL, FOUNDATION REBAR FOUNDATION AND DUCT BANK SYSTEM SHALL BE CONNECTED TO THE GROUND RING.

D. ENSURE FIXTURE PROVIDED IS VAPOR TIGHT AND RATED FOR CORROSIVE ENVIRONMENT.

E. CONDUITS IN CHEMICAL ROOMS SHALL BE PLASTIC PVC SCH 80 AND ARE TO BE ROUTED HIGH ALONG THE WALL WITH INDIVIDUAL DROPS TO DEVICES.

F. CONDUITS AT CHEMICAL AREA SHALL BE CONNECTED TO PLASTIC PVC JUNCTION BOXES, RECEPTACLE BOXES, USING PVC PLASTIC CONDUIT FITTINGS. ALL CONDUIT STRAPS SHALL BE 2 HOLE, 316 SS, FASTENED WITH 316 SS SHEET METAL SCREWS USING PLASTIC ANCHORS. ALL CONDUIT SHALL BE STRAPPED ON 36 INCH SPACING MAXIMUM.

NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	ZS
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
Z.M. SIDDIQUI
77702
REGISTERED
PROFESSIONAL ENGINEER
10/21/24

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

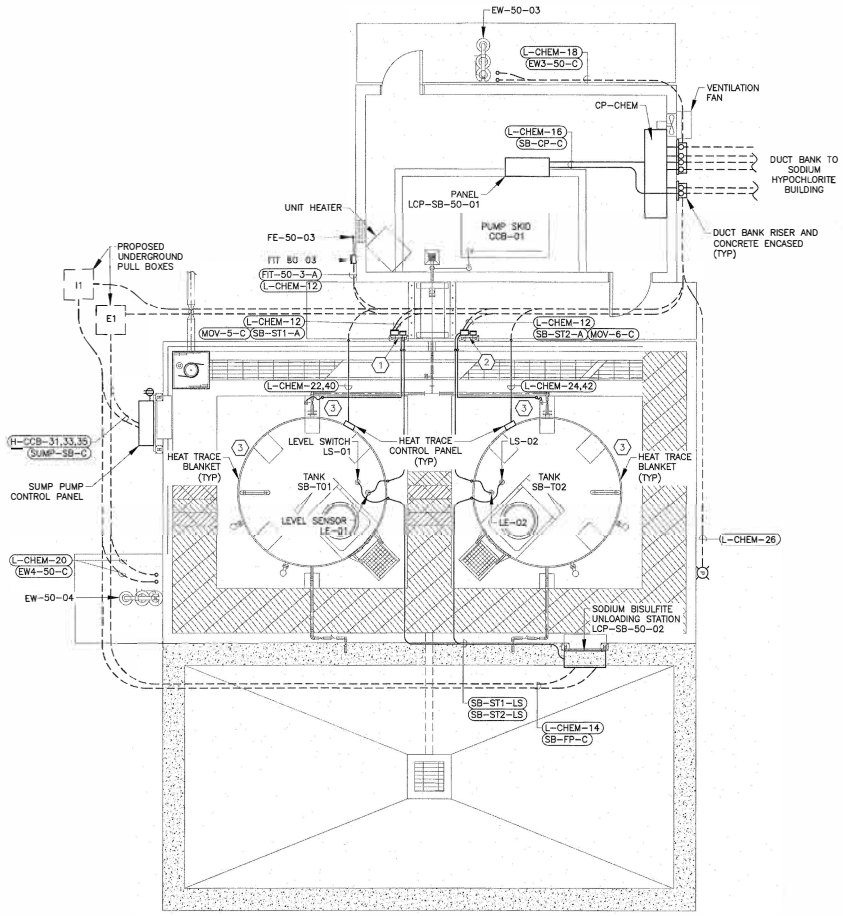
INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION–DISINFECTION REDESIGN
AMENDMENT
ELECTRICAL

PROPOSED SODIUM HYPOCHLORITE BUILDING PLANS

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUST ON PM	
Se SHAHIDUR RAHMAN, P.E.	
E-50-103	SHEET NO. 136 OF 173

PUBLIC WORKS & ENGINEERING
REGISTERED
80367
HOUSTON, TEXAS

FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\CCB Redesign\Drawings\E-50-103 Proposed Sodium Hypochlorite Building Plans.dwg



PROPOSED SODIUM BISULFITE AREA
PLAN
1/4" = 1'-0"

KEYED NOTES:

1. CHEMICAL TANK LEVEL TRANSMITTER LIT-50-05 AND MOTOR OPERATED VALVE LOCAL CONTROL PANEL MOV-50-05-LCP ELECTRICAL RACK.
2. CHEMICAL TANK LEVEL TRANSMITTER LIT-50-06 AND MOTOR OPERATED VALVE LOCAL CONTROL PANEL MOV-50-06-LCP ELECTRICAL RACK.
3. HEAT TRACE SHALL BE INSTALLED ON THE SODIUM BISULFITE STORAGE TANKS AND PIPING.

N

0' 30' 60' 120'

SCALE: 1/2"=1'

GENERAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE THE CHEMICAL AREA INCLUDING SODIUM HYPOCHLORITE AND SODIUM BISULFITE SYSTEMS AND RELATED ELECTRICAL EQUIPMENT.

B. CONDUIT IN CHEMICAL ROOM SHALL BE SCHEDULE 80 PVC, SUPPORTED EVERY 4' MAXIMUM, AND CONDUIT FITTING SHALL BE PVC.

C. CONDUITS INSTALLED OUTDOORS SHALL BE PVC COATED RIGID ALUMINUM WITH PVC COATED CONDUIT FITTINGS.

D. ALL ANCHORS, STRUT, STRUT FITTINGS, AND HARDWARE SHALL BE 316 STAINLESS STEEL.

E. ROUTE CONDUIT SUCH THAT THERE NO CONNECTIONS IN CONDUIT FITTINGS. IF CONNECTIONS ARE REQUIRED A BOX SIZED ACCORDINGLY SHALL BE PROVIDED.

F. EACH CONDUIT SHALL BE TAGGED WITH THE PANEL DESIGNATOR AND CIRCUIT NUMBERS THAT ARE IN THE CONDUIT AT EACH BOX, STUB UP, TRANSITION THRU WALL AND END OF CIRCUIT.

NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	ZS
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

ZIA SHIOU 77702 REGISTERED PROFESSIONAL ENGINEER 10/21/24

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION–DISINFECTION REDESIGN
AMENDMENT
ELECTRICAL

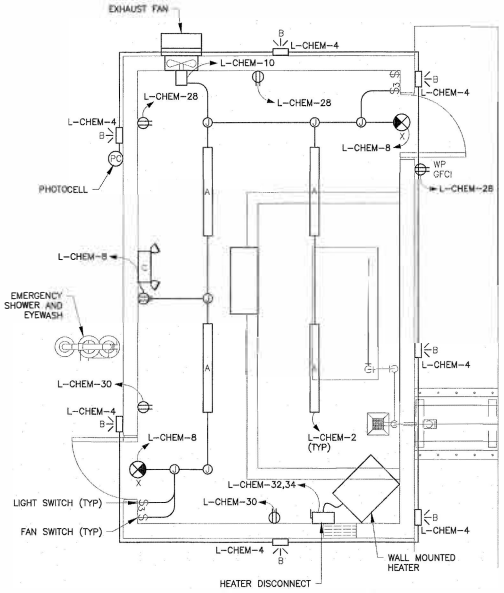
PROPOSED
SODIUM BISULFITE AREA
PLAN

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 137 OF 173	

80367 REGISTERED PROFESSIONAL ENGINEER HOUSTON, TEXAS

E-50-104

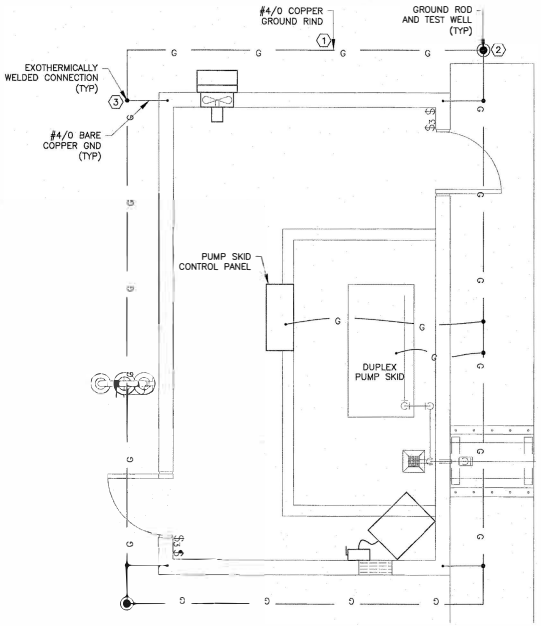
FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\CCB Redesign\Drawings\E-50-104 Proposed Sodium Bisulfite Area Plan.dwg



SODIUM BISULFITE BUILDING POWER AND LIGHTING

PLAN

3/8" = 1'-0"



SODIUM BISULFITE BUILDING GROUNDING

PLAN

3/8" = 1'-0"

KEYED NOTES:

1. 4/0 COPPER GROUND RING AT 24" MINIMUM BELOW GRADE.
2. 3/4"X20' GROUND ROD WITH EXOTHERMIC CONNECTIONS TO GROUND RING.
3. EXOTHERMICALLY WELDED CONNECTION, SEE SPECIFICATIONS FOR REQUIREMENTS.

GENERAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE THE NEW SODIUM BISULFITE BUILDING LIGHTING, POWER, AND GROUNDING PROVISIONS.

B. CONTRACTOR SHALL COORDINATE WITH GENERAL PRIOR TO THE BID TO INCLUDE ALL PROVISIONS REQUIRED FOR THE PROPOSED APPROVED SYSTEM.

C. ELECTRICAL EQUIPMENT, STRUCTURAL STEEL, FOUNDATION REBAR FOUNDATION AND DUCT BANK SYSTEM SHALL BE CONNECTED TO THE GROUND RING.

D. ENSURE FIXTURE PROVIDED IS VAPOR TIGHT AND RATED FOR CORROSIVE ENVIRONMENT.

E. CONDUITS IN CHEMICAL ROOMS SHALL BE PLASTIC PVC SCH 80 AND ARE TO BE ROUTED HIGH ALONG THE WALL WITH INDIVIDUAL DROPS TO DEVICES.

F. CONDUITS AT CHEMICAL AREA SHALL BE CONNECTED TO PLASTIC PVC JUNCTION BOXES, RECEPTACLE BOXES, USING PVC PLASTIC CONDUIT FITTINGS. ALL CONDUIT STRAPS SHALL BE 2 HOLE, 316 SS, FASTENED WITH 316 SS SHEET METAL SCREWS USING PLASTIC ANCHORS. ALL CONDUIT SHALL BE STRAPPED ON 36 INCH SPACING MAXIMUM.

N

2 1 0 2

3/8" = 1'-0"

NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	ZS
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-565
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
Z.M. SIDIQUI
PMP
REGISTERED PROFESSIONAL ENGINEER
10/21/24

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION–DISINFECTION REDESIGN
AMENDMENT
ELECTRICAL

PROPOSED SODIUM
BISULFITE BUILDING
PLANS

WBS NUMBER
R-000265-0147-4
DRAWING SCALE
AS NOTED
CITY OF HOUSTON PM
SHAHIDUR RAHMAN, P.E.

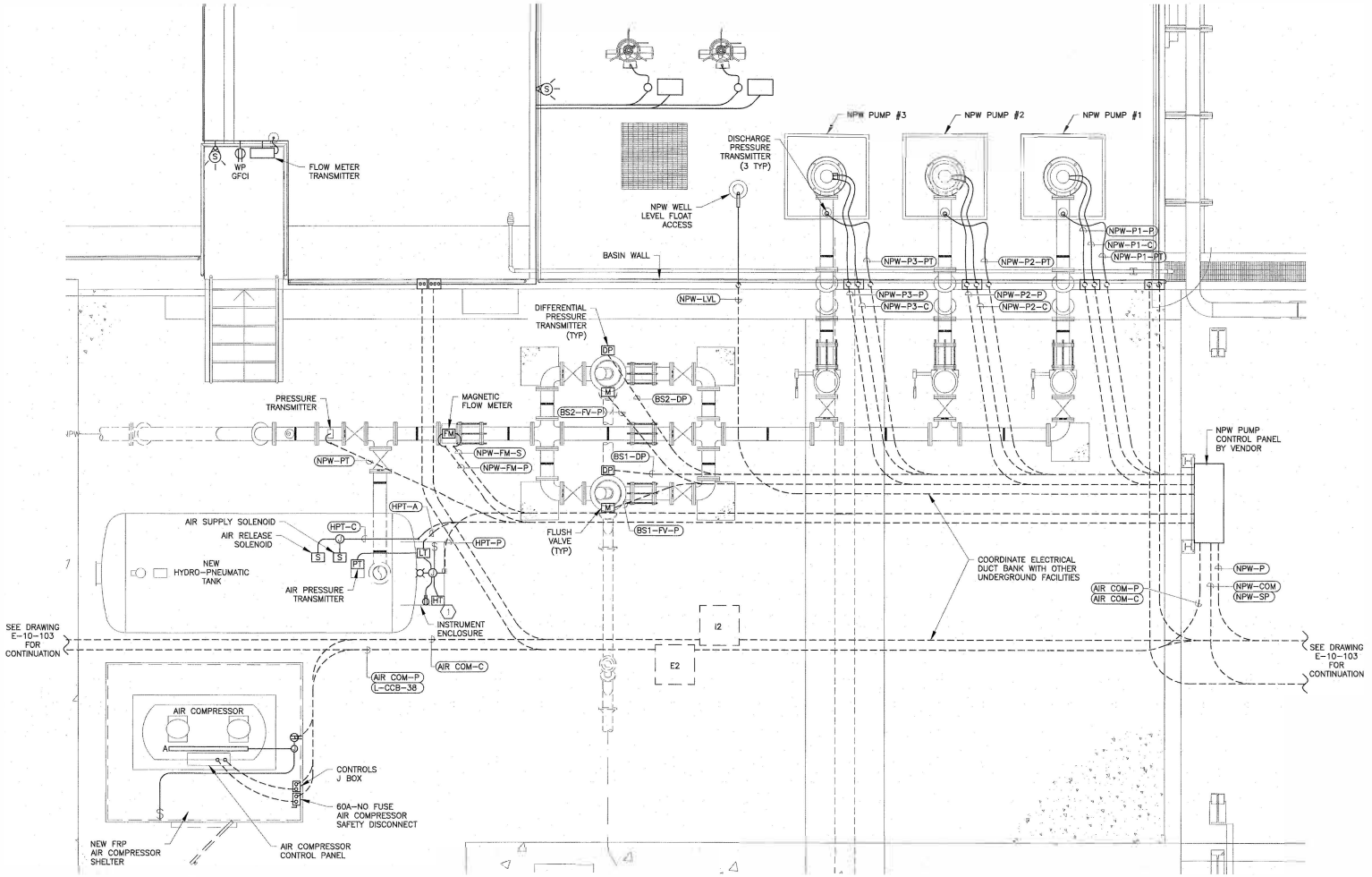
FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
80367
REGISTERED
HOUSTON, TX

E-50-105

SHEET NO. 138 OF 173

FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160-BV (AH Imp Pkg 2)\CCB Redesign\Drawings\E-50-105 Proposed Sodium Bisulfite Building Plans.dwg



PROPOSED NPW SYSTEM AREA PLAN
3/8" = 1'-0"

N

0' 30' 60' 120'
SCALE: 1"=60'

KEYED NOTES:

(1) PROVIDE AND INSTALL A LIGHT FIXTURE, HEAT TRACE, AND OUTLET INSIDE HPT INSTRUMENT CABINET.

GENERAL ELECTRICAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE THE NPW SYSTEM EQUIPMENT AND RELATED ELECTRICAL.

B. INFORMATION IS SUBJECT TO THE SPECIFIC MECHANICAL AND ELECTRICAL EQUIPMENT CHOSEN BY THE CONTRACTOR AND APPROVED FOR SUPPLY.

C. CONTRACTOR SHALL COORDINATE WITH GENERAL PRIOR TO THE BID TO INCLUDE ALL PROVISIONS REQUIRED FOR THE PROPOSED APPROVED SYSTEM.

D. ALL PROPOSED ANCHORS, HARDWARE, STRUT, CONDUIT FITTINGS AND CONDUIT STRAPS SHALL BE 316 STAINLESS STEEL ON THIS PROJECT. EXCEPTION AREA BEING CHEMICAL AREAS DESCRIBED IN THE DRAWINGS.

NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	ZS
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
Z.M. SIDDIQUI
77702
REGISTERED
PROFESSIONAL ENGINEER
10/21/24

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT
ELECTRICAL

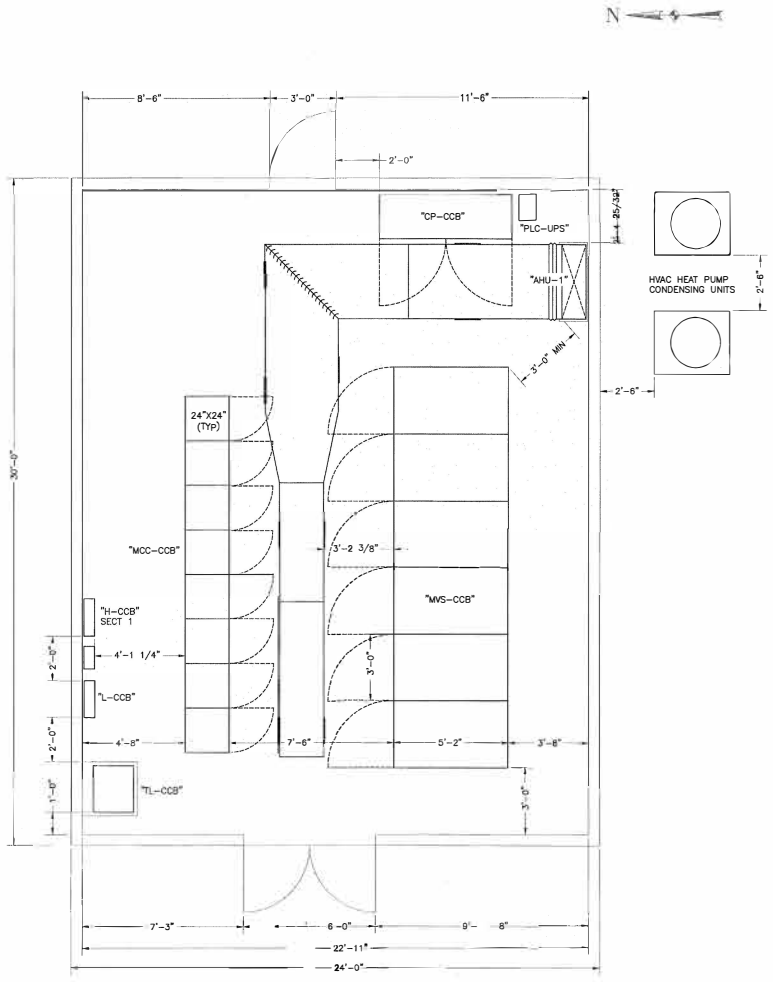
PROPOSED NPW SYSTEM AREA PLAN

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
Se SHAHIDUR RAHMAN, P.E.	
SHEET NO. 139 OF 173	

PROFESSIONAL ENGINEER
90367
STATE OF TEXAS
HOUSTON, TEXAS

E-51-101

FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\CCB Redesign\Drawings\E-51-101 Proposed NPW System Area Plan.dwg



PROPOSED CCB ELECTRICAL BUILDING EQUIPMENT PLAN
3/8" = 1'-0"

EQUIPMENT	WEIGHT & HEAT LOAD	
MVS-CCB – 5 SECTIONS	= 680LB EACH	= 2.7KW
MCC-CCB – 10 SECTIONS	= 500LB EACH	= 2.4KW
TL-CCB 1-45 KVA TRANSFORMER	= 600LB	= 2.2KW
PLC-CCB CONTROL PANEL	= 800LB	= 420W
PLC-UPS CP UPS	= 130LB	= 250W
H-CCB – 2 SECTIONS – 480V PANEL	= 100LB EACH	= 200W
L-CCB – 240/120V PANEL	= 100LB	= 100W
LIGHTING PKG	= 630LB	= 280W

GENERAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE THE GENERAL ARRANGEMENT OF ELECTRICAL EQUIPMENT IN THE CHLORINE CONTACT BASIN DISINFECTION ELECTRICAL BUILDING.

B. DIMENSIONS ARE SUBJECT TO THE NEW BUILDING DIMENSIONS, NEW ELECTRICAL EQUIPMENT DIMENSIONS AND SHALL BE APPROVED PRIOR TO UNDERGROUND INSTALLATIONS.

NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	ZS
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
Z.M. SIDDIQUI
77702
REGISTERED
PROFESSIONAL ENGINEER
10/21/24

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT
ELECTRICAL
PROPOSED CCB ELECTRICAL BUILDING EQUIPMENT PLAN

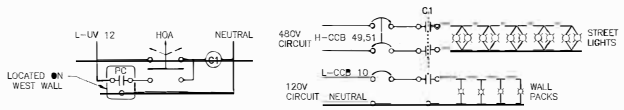
WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	

REGISTERED PROFESSIONAL ENGINEER
80367
CITY OF HOUSTON
HOUSTON, TEXAS

E-61-101

SHEET NO. 140 OF 173

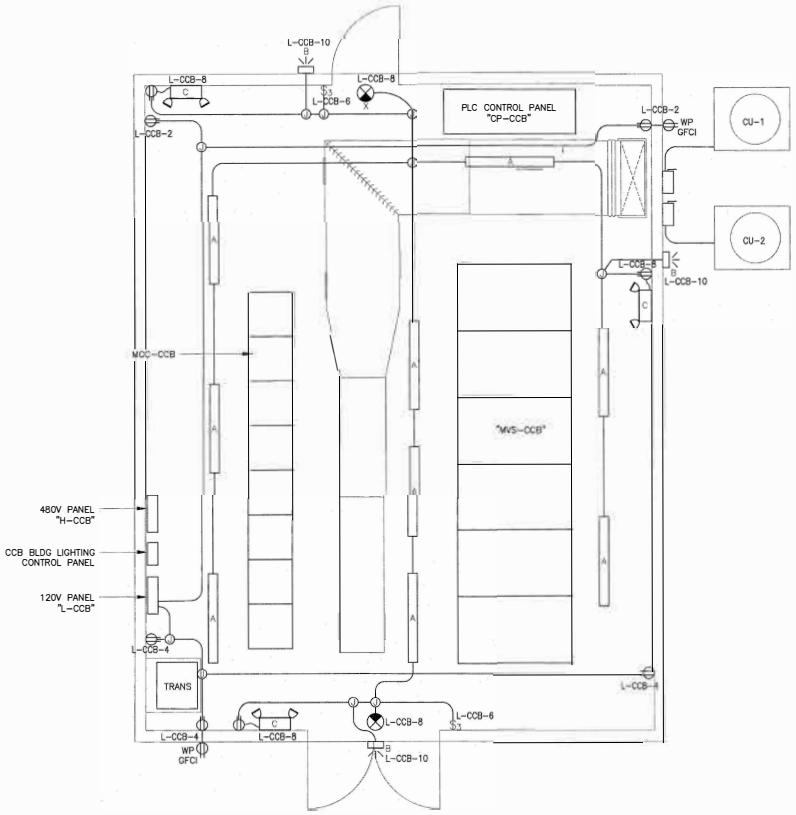
FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160-BV (AH inc. Pkg 2)\CCB Redesign\Drawings\E-61-100s CCB Electrical Building Plans.dwg



NOTE E

CHLORINE CONTACT BASIN ELECTRICAL BUILDING SIMPLIFIED LIGHTING CONTROL SCHEMATIC

NTS



PROPOSED CCB ELECTRICAL BUILDING POWER AND LIGHTING PLAN

3/8" = 1'-0"



GENERAL NOTES:

A. ROUTE CONDUITS UNDERGROUND IF POSSIBLE. IF CONDUITS MUST BE ROUTED OVERHEAD, ROUTE CONDUITS ON STRUT, ATTACHED TO STRUCTURE OR ON TRAPEZE TYPE HANGERS.

B. ALL ANCHORS, STRUT, STRUT FITTINGS, STRAPS AND HARDWARE SHALL BE 316 STAINLESS STEEL.

C. PROVIDE NEMA 4X, 316SS ENCLOSED, FUSED DISCONNECTS FOR THE A/C UNITS. COORDINATE EXACT FUSE SIZE WITH PROPOSED EQUIPMENT. A/C UNIT FEEDERS MAY BE ROUTED UNDER THE SLAB.

D. PROVIDE CONDUIT AND PULL STRING FOR HVAC THERMOSTATS, COORDINATE LOCATIONS WITH HVAC.

E. SEE LIGHT FIXTURE SCHEDULE FOR LIGHT FIXTURE CATALOG NUMBERS, FIXTURE DESCRIPTIONS AND INSTALLATION INSTRUCTIONS. SEE E-00-601 FOR LIGHTING CONTROL PANEL REQUIREMENTS.

F. ROUTE CONDUIT SUCH THAT THERE ARE NO CONNECTIONS IN CONDUIT FITTINGS. IF CONNECTIONS ARE REQUIRED A BOX SIZED ACCORDINGLY SHALL BE PROVIDED.

G. PROVIDE RED DOT "CODE KEEPER TYPE (OR APPROVED EQUAL) METALLIC "IN-USE" GFCI COVER, INSTALLED AT 2'-0" ABOVE GRADE.

H. INSTALL RECEPTACLES 2'-0" ABOVE FINISHED FLOOR OR FINISHED GRADE. INSTALL LIGHT SWITCHES 3'-6" ABOVE FINISHED FLOOR.

I. SEE MCC-CCB ONE LINE AND CONDUCTOR SCHEDULE FOR LARGE EQUIPMENT FEEDER INFORMATION.

NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	ZS
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC
FB NO. P-6182

Z.M. SIDDIQUI
80367
REGISTERED PROFESSIONAL ENGINEER
STATE OF TEXAS

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION-DISINFECTION REDESIGN AMENDMENT

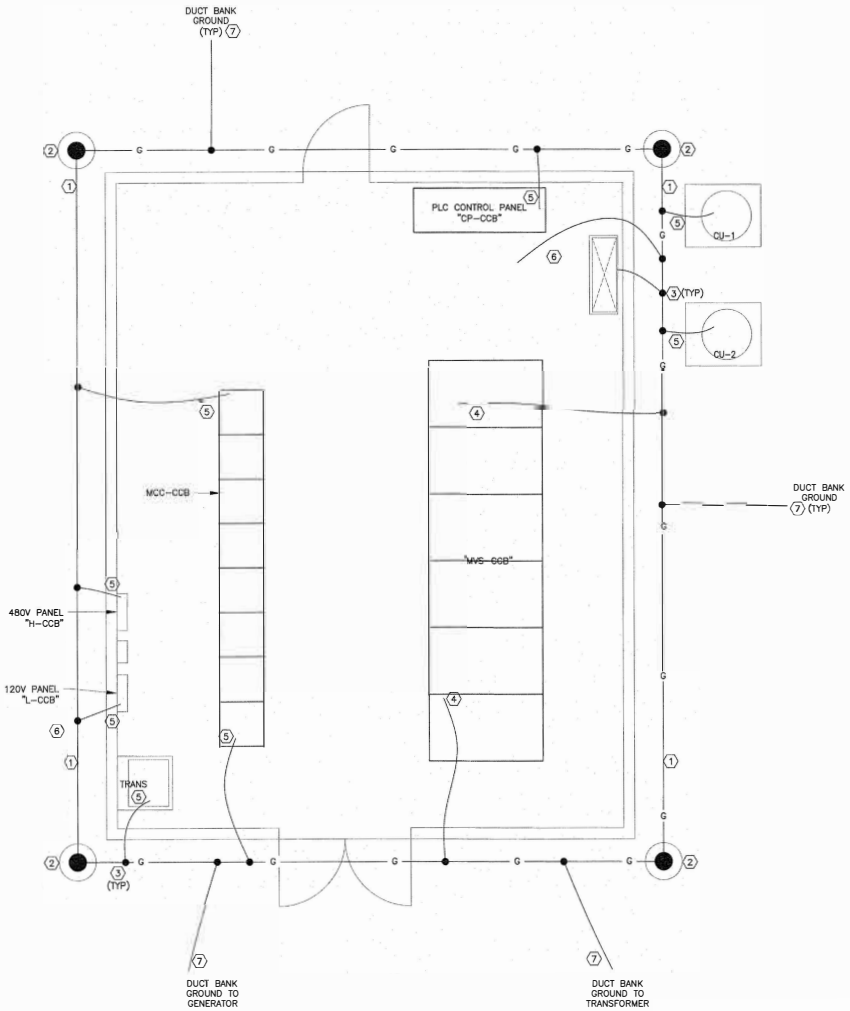
ELECTRICAL

PROPOSED CCB ELECTRICAL BUILDING POWER AND LIGHTING PLAN

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 141 OF 173	

E-61-102

FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4-160-BV (IAH Imp Prg 2)\CCB Redesign\Drawings\E-01-102e CCB Electrical Building Plan.dwg



PROPOSED CCB ELECTRICAL BUILDING GROUNDING PLAN
3/8" = 1'-0"

KEYED NOTES:

1. 4/0 COPPER GROUND RING AT 24" MINIMUM BELOW GRADE.
2. 3/4"X20' GROUND ROD WITH EXOTHERMIC CONNECTIONS TO GROUND RING.
3. EXOTHERMICALLY WELDED CONNECTION, SEE SPECIFICATIONS FOR REQUIREMENTS.
4. PROVIDE A 4/0 COPPER GROUNDING CONDUCTOR, TO MEDIUM VOLTAGE EQUIPMENT GROUND BAR AND ENCLOSURE STRUCTURE FRAME.
5. PROVIDE A #2 COPPER GROUNDING CONDUCTOR, TO EACH 480V FED MISCELLANEOUS EQUIPMENT ENCLOSURE.
6. PROVIDE UFFER GROUND IN SLAB OF BUILDING.
7. ALL DUCT BANK GROUNDS ARE REQUIRED TO BE 4/0.

N

0' 1' 2'-0"
SCALE: 3/8"=1'

GENERAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE THE NEW CHLORINE CONTACT SYSTEM ELECTRICAL BUILDING GROUNDING, LIGHTNING PROTECTION AND UNDER SLAB PROVISIONS.

B. ELECTRICAL EQUIPMENT, STRUCTURAL STEEL, FOUNDATION REBAR AND DUCT BANK SYSTEM SHALL ALL BE CONNECTED TO THE GROUND RING.

NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	ZS
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-5182

STATE OF TEXAS
Z.M. SIDDIQUI
77702
REGISTERED PROFESSIONAL ENGINEER
10/21/24

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT
ELECTRICAL

PROPOSED CCB ELECTRICAL BUILDING GROUNDING PLAN

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SR SHAHIDUR RAHMAN, P.E.	
SHEET NO. 142 OF 173	

ACCEPTED
80367

E-61-103

FILE PATH: (C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\41851-01 (Main Proj 2)\CCB Redesign\Drawings\E-61-103a CCB Electrical Building Plan.dwg)

NEW PANELBOARD "H-CCB" IS TO BE LOCATED IN THE NEW CCB ELECTRICAL BUILDING

PANEL "H-CCB"

BUS AMPS 225
MLO YES
VOLTS 480 KAIC 35
PHASE 3 WIRE 3

NOTES
1. BREAKERS 3P/20A UNLESS MARKED OTHERWISE
2. ADJ. CKTS. TO BAL. PNL.
3. SURFACE MOUNT, NEMA 1.
4. BOLT IN BREAKERS
5. ALL BUS SHALL BE COPPER

CKT. DESCRIPTION	WIRE	LOAD	BKR.			BKR.	LOAD	WIRE	CKT. DESCRIPTION
WEIR GATE WG-43-01	10	800	20	1	2	30	1856	12	HVAC COND UNIT
	10			3	4			12	CU-09-001
	10			5	6			12	
WEIR GATE WG-43-02	10	800	20	7	8	30	1856	12	HVAC COND UNIT
	10			9	10			12	CU-09-002
	10			11	12			12	
WEIR GATE WG-43-03	10	800	20	13	14	30	5000	12	HVAC AH UNIT
	10			15	16			12	AH-09-002
	10			17	18			12	
WEIR GATE WG-43-04	10	800	20	19	20	30	3730	10	NPW AIR COMPRESSOR
	10			21	22			10	AC-43-01
	10			23	24			10	
SH SUMP PUMP	10	1500	20	25	26	20	1200	10	ACTUATED VALVE
	10			27	28			10	BV-43-01
	10			29	30			10	
SB SUMP PUMP	10	1500	20	31	32	20	1200	10	ACTUATED VALVE
	10			33	34			10	BV-43-02
	10			35	36			10	
STRAINER LCP-STR-51	10	2000	20	37	38	20			SPARE
	10			39	40				
	10			41	42				
SPARE	–	–	20	43	44	30			SPARE
	–			45	46				
	–			47	48	45			SPARE
	6			49	50				
SITE LIGHTING	6	1270	30	51	52	45	1500	8	MINI-POWER CENTER
	6			53	54			8	MPC-GEN
		10,470					16,342		

TOTAL VA = 26,812
26,812 VA ÷ 480 = 32.3 AMPS AT 480 VOLTS
32.3 X 125% = 40.3 AMPS
THE PANEL, BREAKERS, AND FEEDERS ARE RATED FOR THE LOAD

NEW PANELBOARD "L-CCB" IS TO BE LOCATED IN THE NEW CCB ELECTRICAL BUILDING

PANEL "L-CCB"

BUS AMPS 150
MAIN BRKR 125A WIRE SIZE #1 AWG
VOLTS 120/240 AIC 10 KAIC
PHASE 1 WIRE 3 SN YES

125

NOTES
1. BREAKERS 1P/20A UNLESS MARKED OTHERWISE.
2. ADJ. CKTS. TO BAL. PNL.
3. SURFACE MOUNT, NEMA 1.
4. BOLT IN BREAKERS
5. ALL BUS SHALL BE COPPER

CKT. DESCRIPTION	WIRE	LOAD	BKR.	A	B	BKR.	LOAD	WIRE	CKT. DESCRIPTION	
PLC-CCB CABINET UPS	12	300	20	1	2	20	360	12	CCB ELECTRICAL BLDG NORTH OUTLETS	
PLC-CCB CABINET CONVENIENCE OUTLET	12	360	20	3	4	20	360	12	CCB ELECTRICAL BLDG SOUTH OUTLETS	
SPARE	–	–	20	5	6	20	280	12	CCB ELECTRICAL BLDG LIGHTS	
SPARE	–	–	20	7	8	20	210	12	CCB BLDG EMER & EXIT LIGHTS	(1)
SPARE	–	–	20	9	10	20	100	12	CCB BLDG EXTERIOR WALL PACK LIGHTS	
SPARE	–	–	20	11	12	20	60	12	CCB BLDG LIGHTING CONTROL PANEL	
CCB J-CHAMBER AIT-43-01	10	160	20	13	14	20	–	–	SPARE	
CCB J-CHAMBER LIGHTS & RECEPT.	10	330	20	15	16	20	–	–	SPARE	
CCB TRAIN 1 LIGHTS	10	300	20	17	18	20	–	–	SPARE	
CCB TRAIN 2 LIGHTS	10	250	20	19	20	20	–	–	SPARE	
CCB EAST OUTLETS	10	720	20	21	22	20	360	12	STORAGE ROOM OUTLETS	
CCB WEST OUTLETS	10	360	20	23	24	20	360	12	STORAGE ROOM OUTLETS	
CCB EFFLUENT CHANNEL LIGHTS	10	120	20	25	26	20	360	12	EFFLUENT ROOM OUTLETS	
CCB AIT-43-02, AIT-43-03	10	160	20	27	28	20	360	12	EFFLUENT ROOM OUTLETS	
CCB AIT-43-04, AIT-43-05	10	160	20	29	30	20	100	12	EFFLUENT ROOM INSTRUMENT POWER	
CCB FIT-43-01	10	80	20	31	32	20	100	12	EFFLUENT ROOM INSTRUMENT POWER	
CCB J-CHAMBER SAMPLE PUMP NO.1	10	1500	30	33	34	20	160	12	STORAGE & EFFLUENT ROOM LIGHTS	
CCB SAMPLE PUMP NO.2	10	1500	30	35	36	20	520	10	BLOWER AND CANOLY LIGHTS	
CCB SAMPLE PUMP NO.3	10	1500	30	37	38	20	300	10	AIR COMPRESSOR SYSTEM MISC.	
CCB SAMPLE PUMP NO.4	10	1500	30	39	40	20	–	–	SPARE	
CCB SAMPLE PUMP NO.5	10	1500	30	41	42	20	–	–	SPARE	
		10,800					3,990			

TOTAL VA = 14,490
14,490 VA ÷ 60.4 AMPS AT 240 VOLTS
60.4 AMPS X 125% = 75.5 AMPS
THE PANEL, BREAKERS AND FEEDERS ARE RATED FOR THE LOAD

NEW MINI-POWER CENTER "MPC-GEN-CCB" IS TO BE LOCATED IN THE NEW UV GENERATOR ENCLOSURE

PANEL "MPC-GEN-CCB"

MAIN BRKR. AMPS 50
TRANSFORMER 15KVA
VOLTS 120/240 AIC 18 KA
PHASE 1 WIRE 2 SN ✓

50
80

NOTES
1. BREAKERS 1P/20A UNLESS MARKED OTHERWISE.
2. ADJ. CKTS. TO BAL. PNL.
3. SURFACE MOUNT, NEMA 3R SS
4. MOUNT MINI POWER CENTER WITH PANEL COVER HINGE AT 72" AFF.

CKT. DESCRIPTION	WIRE	LOAD	BKR.			BKR.	LOAD	WIRE	CKT. DESCRIPTION
GENSET BATTERY CHARGER	12	200	20	1	2	20	400	12	ENCLOSURE LIGHTING
CONTROLS	12	150	20	3	4	20	400	12	ENCOSURE OUTLETS
SPARE			20	5	6	20			CONTROLS
SPARE			20	7	8	20			SPARE
SPARE			20	9	10	20			SPARE
SPARE			20	11	12	20			SPARE
SPARE			20	13	14	20			SPARE
SPARE			20	15	16	20			SPARE
SPARE			20	17	18	20			SPARE
SPARE			20	19	20	30	400	10	WATER JACKET HEATER
SPARE			20	21	22			10	
SPARE			20	23	24	30			SPARE
SPARE			20	25	26				
		350					1,200		

TOTAL VA = 1,550
1,550 VA AT 240V = 6.5 AMPS
THE CONDUCTORS, PANEL, AND MAIN BREAKER ARE ALL RATED PROPERLY TO SERVE THE LOAD

NEW PANELBOARD "L-CHEM" IS TO BE LOCATED IN BETWEEN THE NEW CHEMICAL PUMP BUILDINGS

PANEL "L-CHEM"

BUS AMPS 150A
MAIN BRKR 125A WIRE SIZE #1 AWG
VOLTS 120/240 AIC 22 KAIC
PHASE 1 WIRE 3 SN YES

125A

NOTES
1. BREAKERS 1P/20A UNLESS MARKED OTHERWISE.
2. ADJ. CKTS. TO BAL. PNL.
3. SURFACE MOUNT, NEMA 3R SS.
4. BOLT IN BREAKERS
5. ALL BUS SHALL BE COPPER

CKT. DESCRIPTION	WIRE	LOAD	BKR.	A	B	BKR.	LOAD	WIRE	CKT. DESCRIPTION	
SH BLDG INSIDE LIGHTS	12	360	20	1	2	20	180	12	SB BLDG INSIDE LIGHTS	
SH BLDG OUTSIDE LIGHTS	12	240	20	3	4	20	220	12	SB BLDG OUTSIDE LIGHTS	
SH TANKS OPERATED VALVES CP	12	480	20	5	6	20	240	12	SB TANKS OPERATED VALVES CP	
SH EMER & EXIT LIGHTS	12	60	20	7	8	20	60	12	SB EMER & EXIT LIGHTS	(1)
SH EXHAUST FAN	10	850	20	9	10	20	850	10	SB EXHAUST FAN	
SH LIT-50-01, 02, 03, 04	12	240	20	11	12	20	160	12	SB LIT-50-05, 06	
SH TANK FILL PANEL SH-50-01	12	360	20	13	14	20	360	12	SB TANK FILL PANEL SB-50-01	
SH TANK FILL PANEL SH-50-02	12	360	20	15	16	20	360	12	SB PUMP SKID PANEL SB-50-02	
SH PUMP SKID PANEL SH-50-03	12	360	20	17	18	20	720	12	ESEW 3 PANEL AND HEATER	
SH PUMP SKID PANEL SH-50-04	12	360	20	19	20	20	720	12	ESEW 4 PANEL AND HEATER	
ESEW 1 PANEL AND HEATER	12	720	20	21	22	20	600	10	SB CHEM TANK 1 HEAT TRACE	(2)
ESEW 2 PANEL AND HEATER	12	720	20	23	24	20	600	12	SB TANK 1 PIPING HEAT TRACE	
SH SITE LIGHTING	12	350	20	25	26	20	160	12	SB SITE LIGHTING	
SH RECEPTACLES – NORTH	12	540	20	27	28	20	720	12	SB RECEPTACLES – NORTH	
SH RECEPTACLES – SOUTH	12	720	20	29	30	20	540	12	SB RECEPTACLES – SOUTH	
SH BLDG HEATER	10	1500	20	31	32	30	1500	10	SB BLDG HEATER	
	10			33	34			10		
SPARE	–	–	20	35	36	20	–	–	SPARE	
SPARE	–	–	20	37	38	20	–	–	SPARE	
SPARE	–	–	20	39	40	20	400	10	SB CHEM TANK 2 HEAT TRACE	(2)
SPARE	–	–	20	41	42	20	400	12	SB TANK 2 PIPING HEAT TRACE	
		7,740					7,300			

TOTAL VA = 15,040
15,040 VA ÷ 62.67 AMPS AT 240 VOLTS
62.67 AMPS X 125% = 78.3 AMPS
THE PANEL, TRANSFORMER AND FEEDER ARE RATED FOR THE LOAD

PROPOSED CCB PANELBOARD SCHEDULES
NTS

KEYED NOTES:

(1) EMERGENCY LIGHTING CIRCUIT BREAKERS SHALL BE PROVIDED WITH A LOCK ON PROVISION.

(2) HEAT TRACE CIRCUIT BREAKERS SHALL BE GFPE RATED BREAKERS.

GENERAL NOTES:

A. EACH CIRCUIT SHALL BE PROVIDED A DEDICATED NEUTRAL, IDENTIFIED WITH CORRESPONDING CIRCUIT NUMBER.

B. EACH CONDUIT SHALL BE TAGGED WITH THE PANEL DESIGNATOR AND CIRCUIT NUMBERS THAT ARE IN THE CONDUIT AT EACH BOX, STUB UP, TRANSITION THRU WALL AND END OF CIRCUIT.

C. INSTALL PANELBOARDS 6'-0" ABOVE FINISHED FLOOR TO THE TOP OF ENCLOSURE.

D. INSTALL MINI-POWER CENTERS WITH PANELBOARD COVER HINGE AT 6'-0" ABOVE FINISH FLOOR OR GRADE

NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	ZS
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
Z.M. SHOROUR
77702
REGISTERED
PROFESSIONAL
ENGINEER
10/21/24

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION–DISINFECTION REDESIGN
AMENDMENT
ELECTRICAL

PROPOSED CCB PANELBOARD SCHEDULES

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHDUR RAHMAN, P.E.

FOR CITY OF HOUSTON USE ONLY

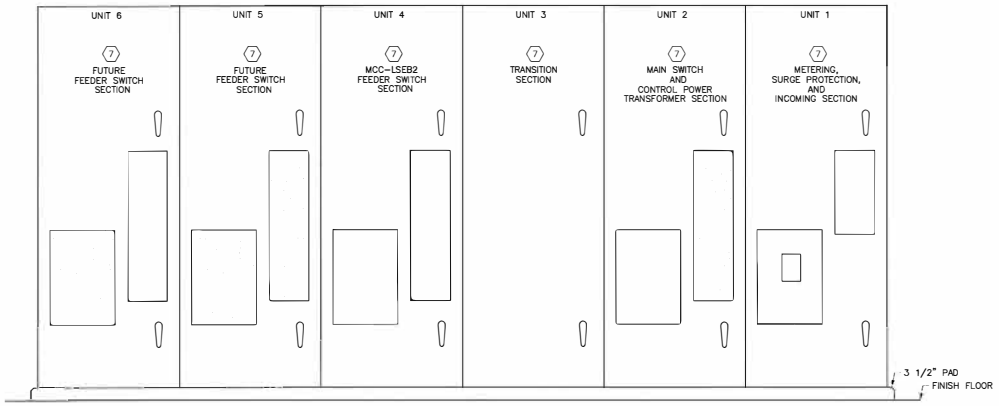
PROFESSIONAL ENGINEER
89367
SHAHDUR RAHMAN
HOUSTON, TEXAS

E-61-601

SHEET NO. 143 OF 173

FILE PATH: C:\Users\Vivienne\Kalluri Group, Inc\KGI - Documents\4160-BV (WH Proj 2)\CCB Redesign\Drawings\E-61-601 Proposed CCB Panelboard Schedules.dwg

NEW SWITCHGEAR MVS-CCB, INDOOR METAL-ENCLOSED, 5 KV LOAD INTERRUPTER SWITCHGEAR



NEW MVS-CCB SWITCHGEAR

ELEVATION

NTS

KEYED NOTES:

1. FEEDER ROUTED THROUGH EXISTING AND PROPOSED UNDERGROUND DUCT BANK. SEE SITE PLAN E-10-102 FOR OVERALL ROUTE
2. PROVIDE OHMIC TYPE RESISTIVE VOLTAGE DIVIDER SENSING SYSTEM, AMPLIFIER AND POWER METER. PT STYLE VOLTAGE SENSING IS NOT ACCEPTABLE.
3. MANUFACTURER SHALL CONFIRM SIZING AND PROVIDE METAL OXIDE SURGE ARRESTER PROTECTION.
4. PROVIDE CPT FOR LIGHTS, HEATERS AND AUXILIARY POWER REQUIRED. MANUFACTURER SHALL CONFIRM SIZE AND LOCATION OF CPT.
5. MANUFACTURER SHALL EQUIP AND PROVIDE ALL COMPONENTS, HARDWARE AND WIRING REQUIRED TO PREPARE SECTION FOR FUSE INSTALLATION AND OPERATION.
6. MANUFACTURER SHALL PROVIDE FACTORY INSTALLED SECTION HEATERS, AND LIGHTING ON DOOR OR TOGGLE SWITCH, COORDINATE OWNER PREFERENCE AND BRAND STANDARD CONSTRUCTION.
7. SEE SPECIFICATION SECTION 16195 FOR GEAR IDENTIFICATION REQUIREMENTS, PROVIDE LARGE PHENOLIC NAMEPLATES FOR EXTERIOR DOORS.

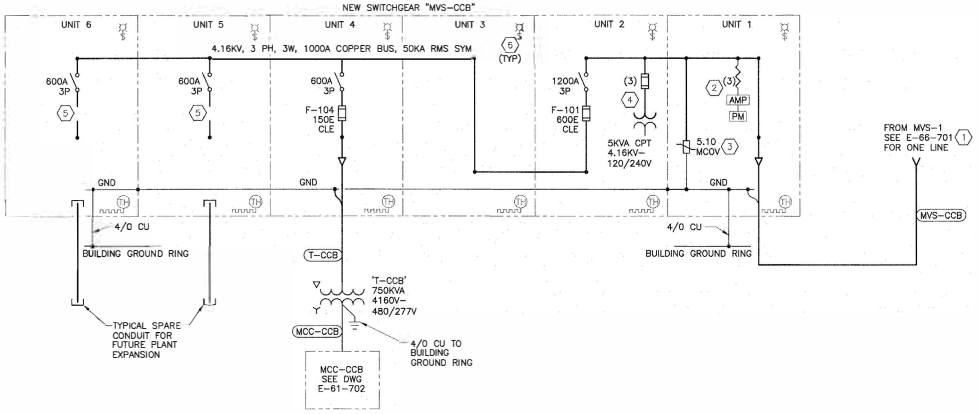
GENERAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE THE NEW CCB FACILITY 5KV SWITCHGEAR. CONTRACTOR SHALL COORDINATE PRIOR TO SHOP DRAWING CREATION TO CONFIRM LAYOUT OF PROPOSED SWITCHGEAR CONFIGURATION.

B. CONTRACTOR SHALL GIVE WRITTEN NOTICE TO THE CITY CONSTRUCTION REPRESENTATIVE PRIOR TO COMMENCEMENT OF ANY EQUIPMENT REMOVAL WORK.

C. INFORMATION CONTAINED IN THIS ONE LINE WAS GREATED BASED ON RECORD DRAWINGS AND INFORMATION COLLECTED. ITS ACCURACY IS NOT GUARANTEED AND ITS USE IN NO WAY RELIEVES THE CONTRACTOR OF ANY RESPONSIBILITY FOR LOSS DUE TO INACCURACIES.

NEW SWITCHGEAR "MVS-CCB"



PROPOSED MVS-CCB SWITCHGEAR ONE LINE

DIAGRAM

NTS

NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	ZS
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT

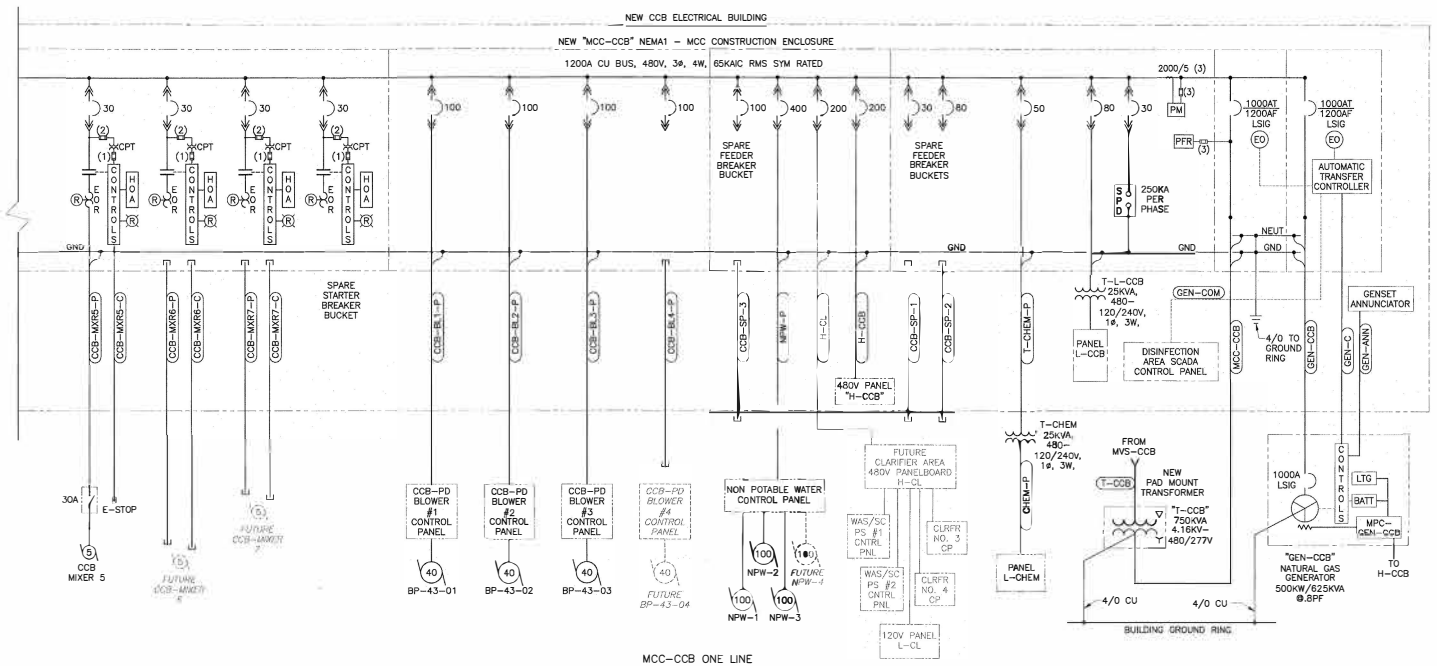
ELECTRICAL

PROPOSED MVS-CCB
SWITCHGEAR ONE LINE
DIAGRAM

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SR SHAHIDUR RAHMAN, P.E.	
SHEET NO. 144 OF 173	

E-61-701

FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\CCB Redesign\Drawings\E-61-701 Proposed MVS-CCB Switchgear One Line Diagram.dwg



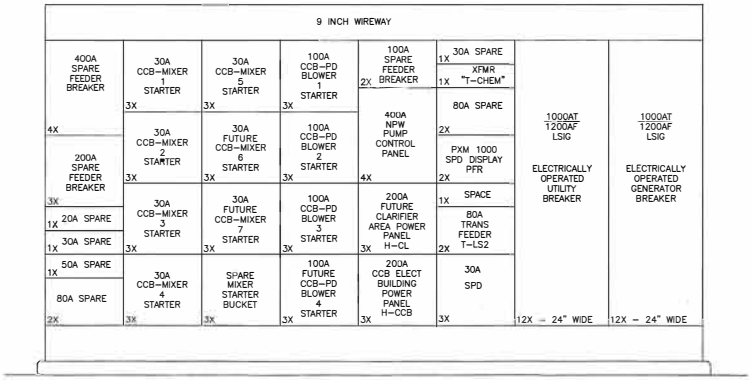
MCC-CCB ONE LINE
DIAGRAM
NTS

GENERAL NOTES:

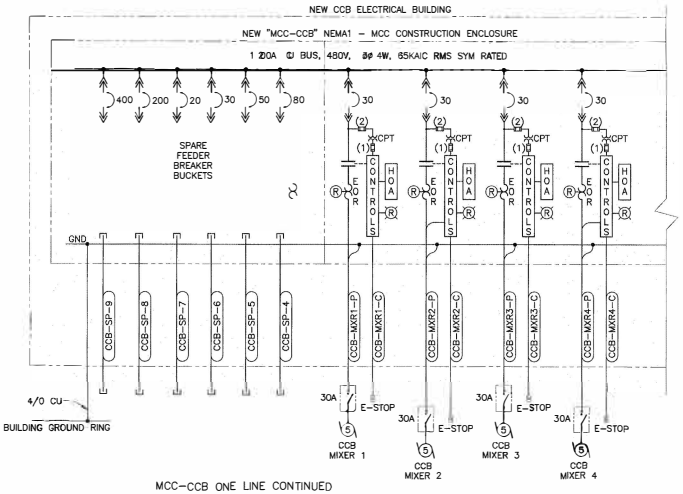
A. THIS DRAWING IS PROVIDED TO ILLUSTRATE THE DISINFECTION AREA MOTOR CONTROL CENTER MCC-UV. WORK DESCRIBED ON THIS DRAWING WILL REQUIRE COORDINATION BETWEEN THE GENERATOR MANUFACTURER AND THE MCC MANUFACTURER.

B. COORDINATE INSTRUMENTATION, AND POWER TRANSFER CONTROLS WITH SYSTEM INTEGRATOR IN SPECIFICATION 13300 COORDINATION MEETINGS.

C. ALL STRUT, HARDWARE, STRAPS AND ANCHORS SHALL BE 316 STAINLESS STEEL, WITHOUT EXCEPTION.



MCC-CCB
ELEVATION
NTS



MCC-CCB ONE LINE CONTINUED
DIAGRAM
NTS

NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	ZS
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT
ELECTRICAL

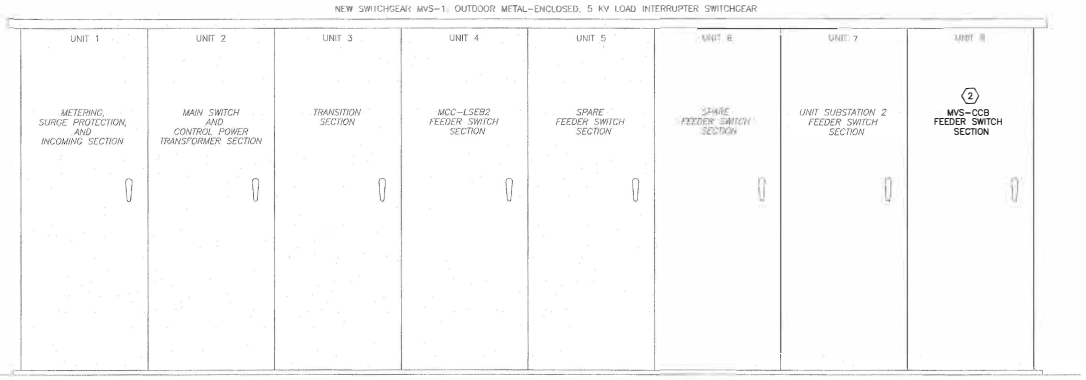
PROPOSED MCC-CCB
ONE LINE
DIAGRAM

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	145 OF 173

FOR CITY OF HOUSTON USE ONLY

E-61-702

FILE PATH: C:\Users\howard\Kalluri Group, Inc\KGI - Documents\4160-BW (WH Imp Pkg 2)\CCB Redesign\Drawings\E-61-702 Proposed MCC-CCB One Line Diagram.dwg



MVS-1 SWITCHGEAR
ELEVATION
NTS

KEYED NOTES:

(1) FOR CENTERPOINT ENERGY (CNP) SERVICE NO.1, CONTRACTOR SHALL COORDINATE WITH CNP FOR OUTAGE TO REPLACE THE OUTDOOR 5KV MEDIUM VOLTAGE METAL-ENCLOSED (4.16KV) MAIN SWITCHGEAR. SEE DRAWING E 00-701 FOR EXISTING ONE LINE DIAGRAM.

(2) SEE SPECIFICATION SECTION 16195 FOR GEAR IDENTIFICATION REQUIREMENTS. PROVIDE LARGE PHENOLIC NAMEPLATES FOR EXTERIOR DOORS.

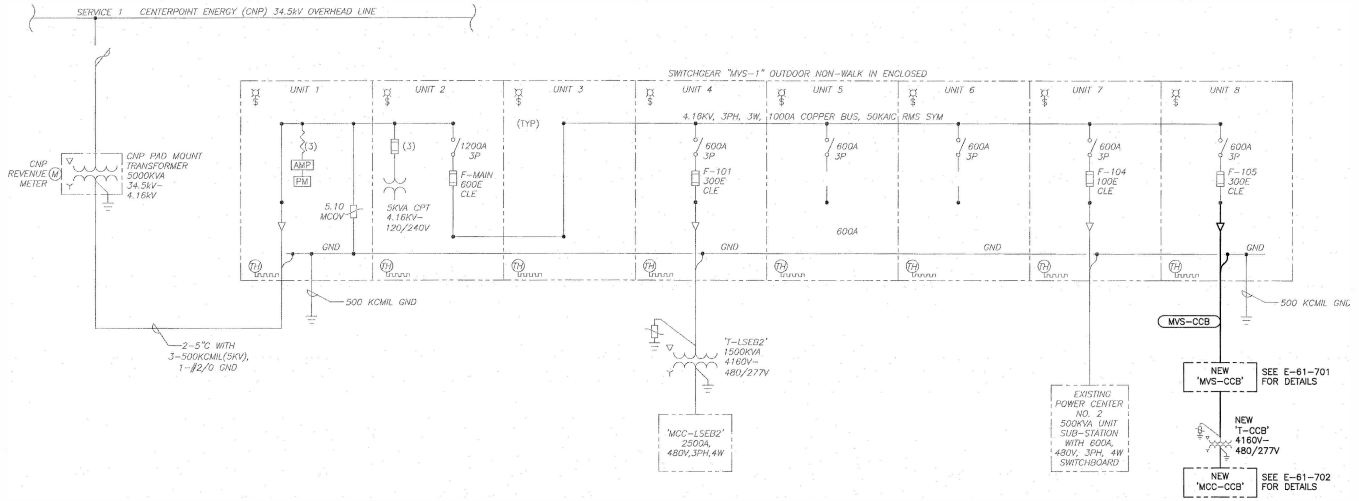
GENERAL NOTES:

A. THIS DRAWING IS PROVIDED TO ILLUSTRATE THE MVS-CCB FEEDER CONNECTION TO THE MAIN SWITCHGEAR MVS-1.

B. CONTRACTOR SHALL GIVE WRITTEN NOTICE TO THE CITY CONSTRUCTION REPRESENTATIVE PRIOR TO COMMENCEMENT OF ANY EQUIPMENT MODIFICATION WORK.

C. INFORMATION CONTAINED IN THIS ONE LINE WAS CREATED BASED ON RECORD DRAWINGS AND INFORMATION COLLECTED. ITS ACCURACY IS NOT GUARANTEED AND ITS USE IN NO WAY RELIEVES THE CONTRACTOR OF ANY RESPONSIBILITY FOR LOSS DUE TO INACCURACIES.

D. SEE DRAWINGS E-00-602 AND E-00-603 FOR CONDUIT AND CONDUCTOR SCHEDULES.



MODIFIED MVS-1 SWITCHGEAR ONE LINE
DIAGRAM
NTS

NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	ZS
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

Z.M. SIDDIQUI 77702 REGISTERED PROFESSIONAL ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION-DISINFECTION REDESIGN AMENDMENT

ELECTRICAL

MODIFIED MVS-1 SWITCHGEAR ONE LINE DIAGRAM

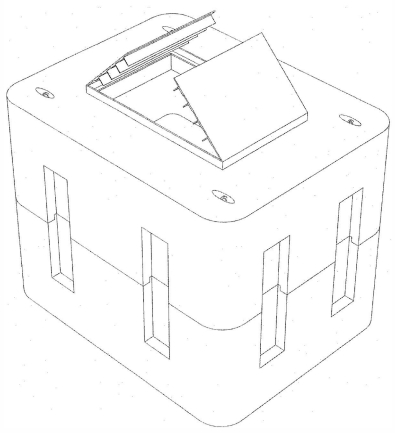
WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
	CITY OF HOUSTON PM
	SHAHIDUR RAHMAN, P.E.
SHEET NO.	146 OF 173

FOR CITY OF HOUSTON USE ONLY

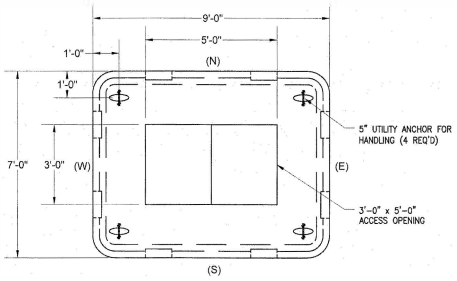
30367 REGISTERED PROFESSIONAL ENGINEER

E-66-701

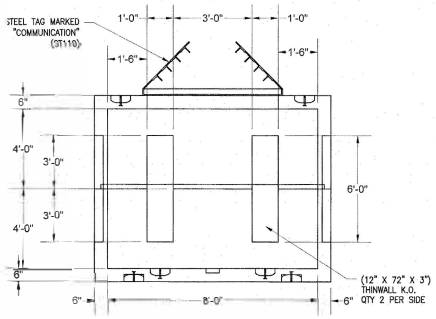
FILE PATH: C:\Users\hkarim\Kalluri Group, Inc\KGI - Documents\4160-BV (JAH Imp Pkg 2)\CCB Redesign\Drawings\E-66-701 Modified MVS-1 Switchgear One Line Diagram.dwg



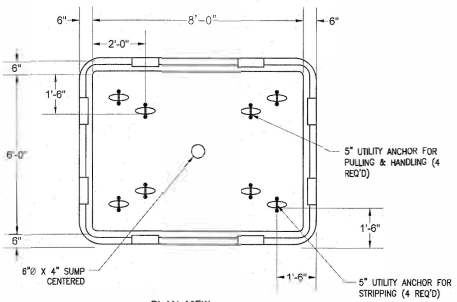
ISOMETRIC VIEW



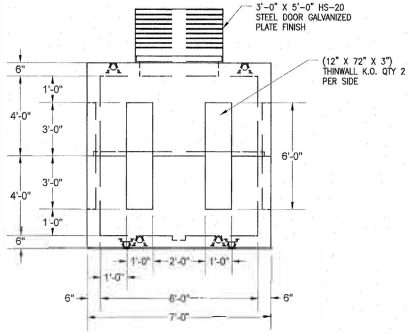
PLAN VIEW
(TOP BASE)



VIEW LOOKING NORTH
ELEVATION VIEW



PLAN VIEW
(BASE BASE)



VIEW LOOKING WEST
ELEVATION VIEW

MEDIUM VOLTAGE UNDERGROUND PULLBOX – TYPE E6

A DETAIL
NTS

NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	ZS
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
Z.M. SIDDIQUI
77702
REGISTERED
PROFESSIONAL ENGINEER
10/21/24

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION–DISINFECTION REDESIGN
AMENDMENT
ELECTRICAL

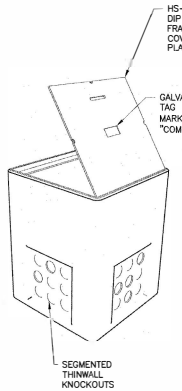
DETAILS 1 OF 8

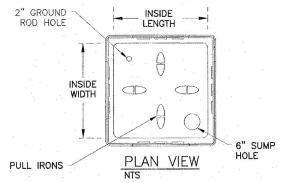
WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 147 OF 173	

PROFESSIONAL ENGINEER
80367
STATE OF TEXAS

E-99-501

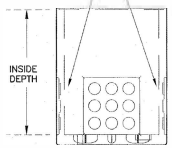
FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160-BV (AH Imp Pkg 2)\CCB Redesign\Drawings\E-99-501 Details 1.dwg





PLAN VIEW
NTS

ATTACH STAMPED STAINLESS STEEL IDENTIFICATION TAGS TO CABLES AT EACH LOCATION WHERE CABLES ENTER THE PULL BOX. ATTACH TAGS WITH STAINLESS STEEL WIRE. TAGS TO LIST CONDUIT NUMBER IN 3/16" LETTERS.



LOCKE SOLUTIONS PRECAST CONCRETE PULL BOX

ELEVATION
NTS

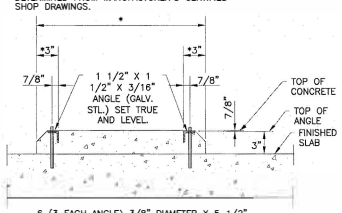
PULL BOX SIZES			
DESIGNATION	INSIDE WIDTH (W)	INSIDE LENGTH (L)	INSIDE DEPTH (D)
E1	12"	24"	22"
E2	24"	24"	42"
E3	36"	36"	48"
E4	48"	48"	48"
E6	72"	96"	72"
I1	12"	24"	22"
I2	24"	24"	42"
I3	36"	36"	48"
I4	48"	48"	48"

NOTES:
1. PRECAST CONCRETE PULL BOX DESIGNED FOR HS-20 LOADING.
2. COVERS FOR ALL PULL BOXES TO BE HOT-DIP GALVANIZED AND DESIGNED FOR AASHTO HS-20 LOADING.
3. "E" PULL BOXES TO HAVE "ELECTRICAL" TAG ON THE COVER.
4. "I" PULL BOXES TO HAVE "INSTRUMENT" TAG ON THE COVER.

TYPICAL UNDERGROUND PULL BOX

A DETAIL NTS

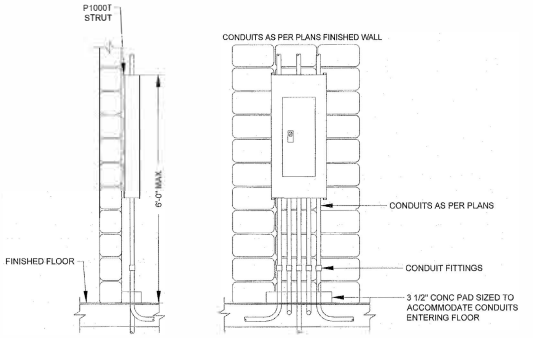
* ACTUAL DIMENSIONS INCLUDING LENGTH TO BE DETERMINED FROM MANUFACTURER'S CERTIFIED SHOP DRAWINGS.



6 (3 EACH ANGLE) 3/8" DIAMETER X 5 1/2" DROP-IN ANCHOR BOLTS ZINC PLATED WITH 2 NUTS. CUT BOLTS OFF FLUSH WITH TOP OF ANGLE BEFORE SETTING EQUIPMENT.

MEDIUM VOLTAGE EQUIPMENT PAD

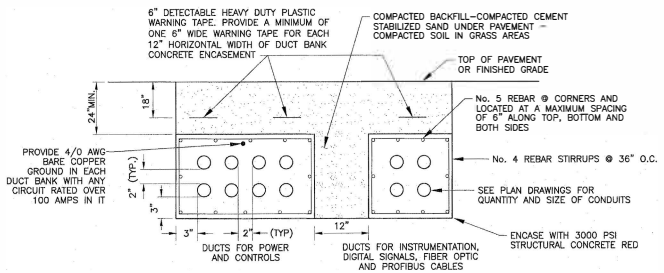
B DETAIL NTS



TYPICAL PANELBOARD INSTALLATION

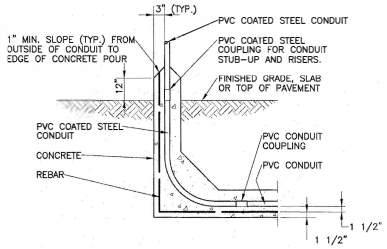
DETAIL 2 NTS

DUCT BANK CONCRETE ENCASEMENT SHALL BE CONTINUOUS AND DUCT BANK REINFORCEMENT REBAR SHALL BE CONNECTED TO THE DESTINATION. FOR PULL BOX ENTRY OR RISING NEXT TO A STRUCTURE DRILL BOX OR STRUCTURE AND PROVIDE #5 DOWELS 4 INCHES DEEP. FOR ENTRY TO STRUCTURE SLAB OR FOUNDATIONS CONNECT BOTH REINFORCEMENT REBAR SYSTEMS WITH 6 INCH OVERLAP DOUBLE TIED.



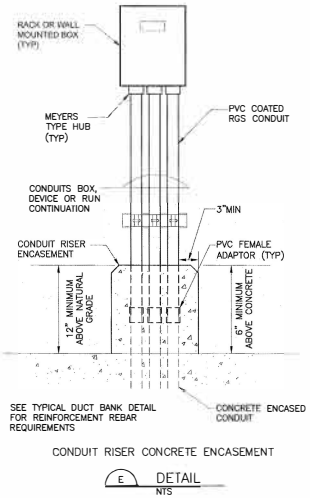
TYPICAL DUCT BANK INSTALLATION

C DETAIL NTS



TYPICAL SINGLE CONDUIT STUB-UP

D DETAIL NTS



CONDUIT RISER CONCRETE ENCASEMENT

E DETAIL NTS

NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	ZS
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
Z.M. SIDIQUI
77702
REGISTERED
PROFESSIONAL ENGINEER
10/21/24

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

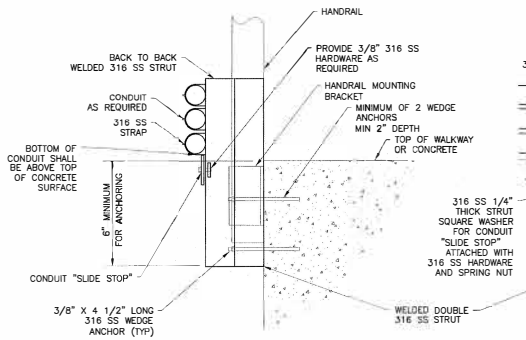
INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT
ELECTRICAL
DETAILS 2 OF 8

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 148 OF 173	

STATE OF TEXAS
80367
SHAHIDUR RAHMAN
REGISTERED
PROFESSIONAL ENGINEER

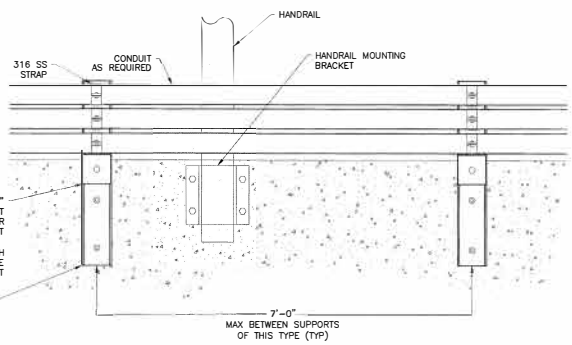
E-99-502

FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\CCB Redesign\Drawings\E-99-502 Details 2.dwg



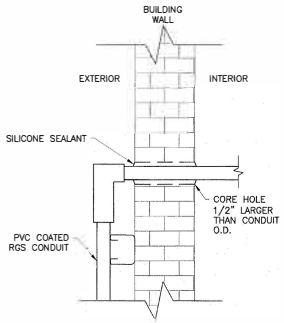
SIDE VIEW
EDGE OF STRUCTURE CONDUIT SUPPORT

A DETAIL NTS



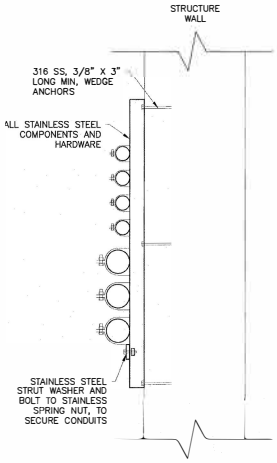
ELEVATION
EDGE OF STRUCTURE CONDUIT SUPPORT

B DETAIL NTS



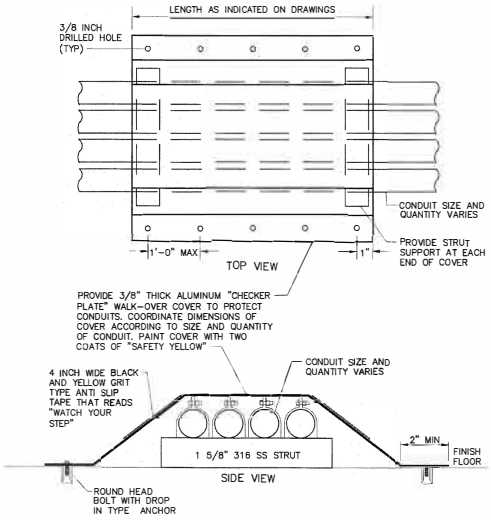
TYPICAL WALL PENETRATION

C DETAIL NTS



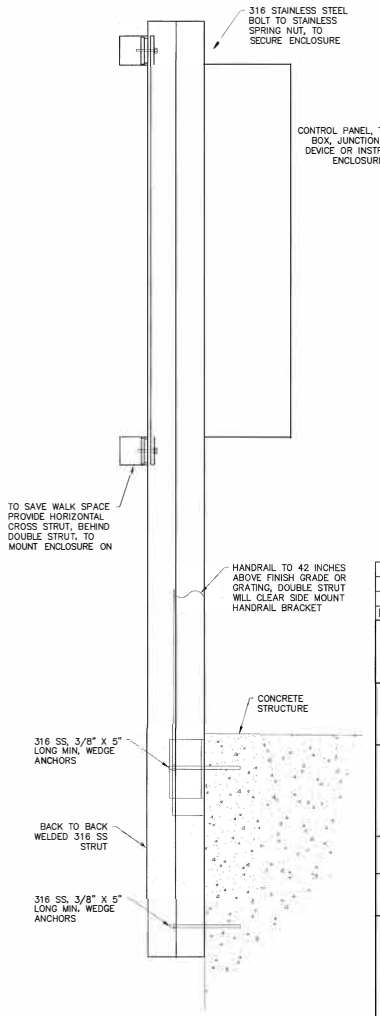
TYPICAL VERTICAL WALL RACK

D DETAIL NTS



TYPICAL WALK-OVER TREAD PLATE

E DETAIL NTS



EDGE OF STRUCTURE PANEL SUPPORT

F DETAIL NTS

NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	ZS
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
Z.M. SHUDEJU
10/21/24

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT
ELECTRICAL
DETAILS 3 OF 8

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	

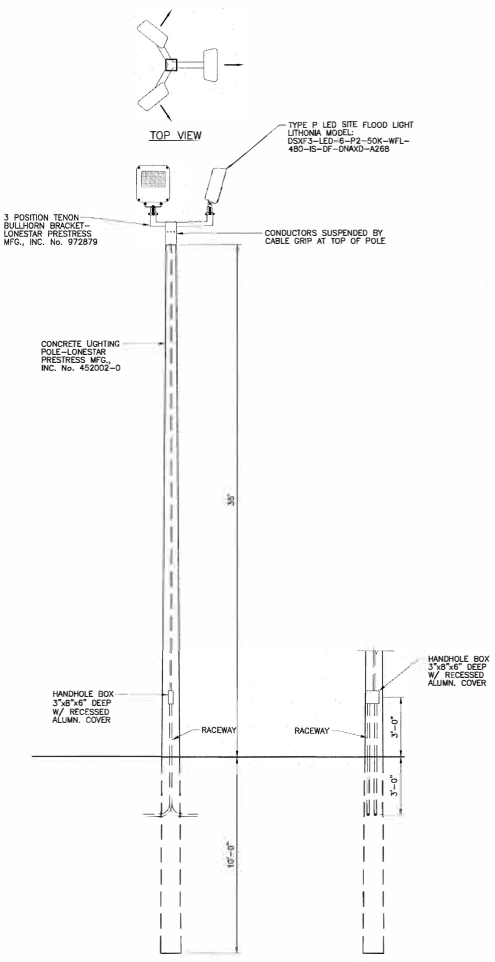
FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
80367
REGISTERED
PROFESSIONAL ENGINEER

E-99-503

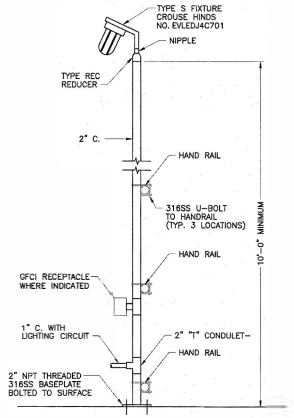
SHEET NO. 149 OF 173

FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Plg 2)\CCB Redesign\Drawings\E-99-503 Details 3.dwg



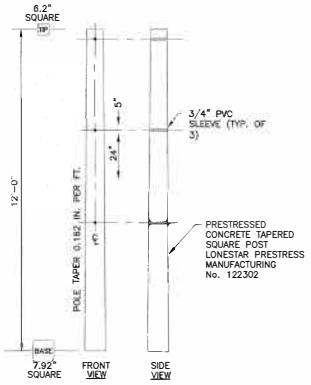
SITE LIGHT

A DETAIL NTS



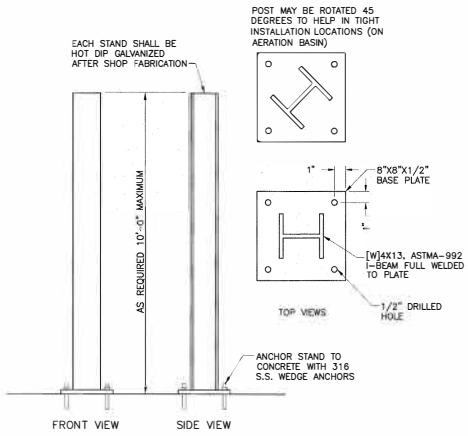
CONDUIT MOUNTED STANCHION LIGHT FIXTURE

B DETAIL NTS



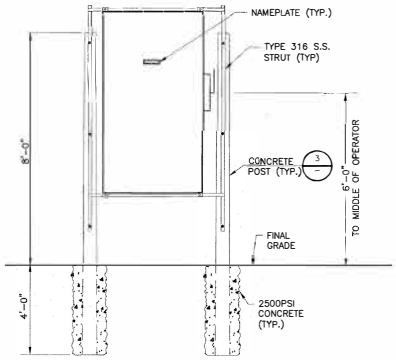
CONCRETE POST DETAIL

C DETAIL NTS



VERTICAL SUPPORT

D DETAIL NTS



MOBILE GENERATOR CONNECTION CABINET SUPPORT

E DETAIL NTS

NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	ZS
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
Z.M. SIDDIQUI
77702
REGISTERED
PROFESSIONAL ENGINEER
10/21/24

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT
ELECTRICAL
DETAILS 4 OF 8

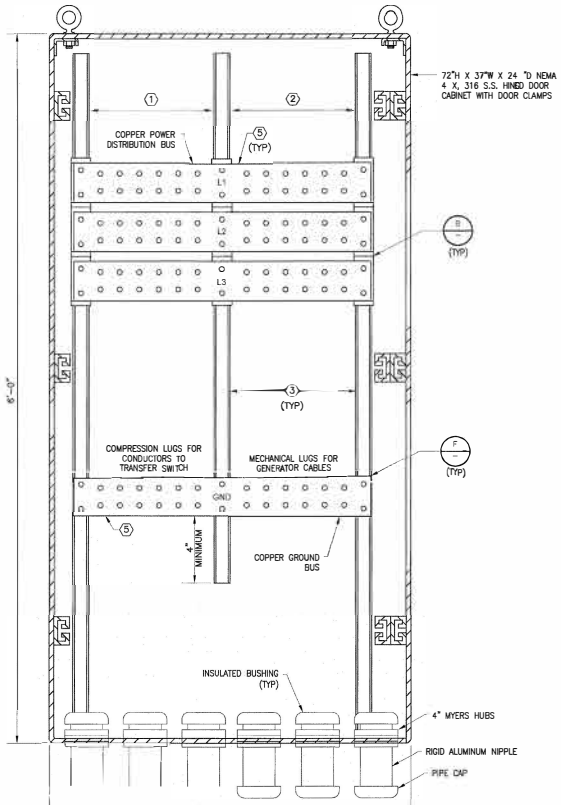
WBS NUMBER
R-000265-0147-4
DRAWING SCALE
AS NOTED
CITY OF HOUSTON PM
SHAHIDUR RAHMAN, P.E.
SHEET NO. 150 OF 173

FOR CITY OF HOUSTON USE ONLY

80367
REGISTERED
PROFESSIONAL ENGINEER
HOUSTON, TEXAS

E-99-504

FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\CCB Redesign\Drawings\E-99-504 Details 4.dwg

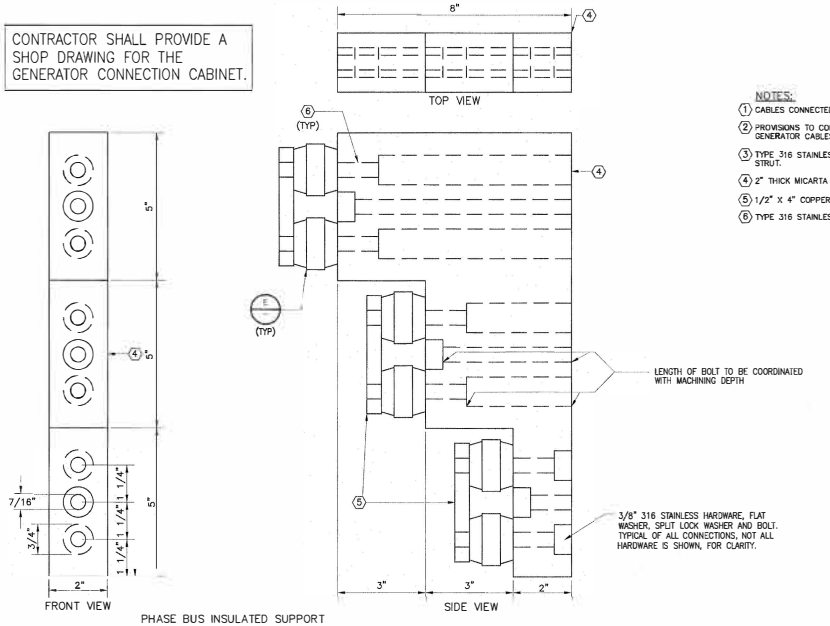


MOBILE GENERATOR CONNECTION CABINET ELEVATION

MOBILE GENERATOR CONNECTION CABINET BOTTOM VIEW

A DETAIL NTS

CONTRACTOR SHALL PROVIDE A SHOP DRAWING FOR THE GENERATOR CONNECTION CABINET.

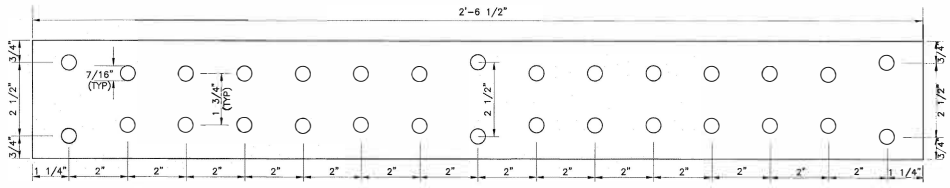


NOTES:

1. CABLES CONNECTED TO TRANSFER SWITCH.
2. PROVISIONS TO CONNECT PORTABLE GENERATOR CABLES.
3. TYPE 316 STAINLESS STEEL 1 5/8" 12 GAUGE STRUT.
4. 2" THICK MICARTA INSULATING BOARD.
5. 1/2" X 4" COPPER BAR.
6. TYPE 316 STAINLESS STEEL BOLTS.

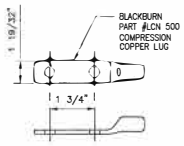
PHASE BUS INSULATED SUPPORT

B DETAIL NTS



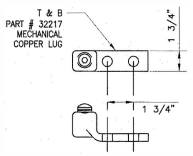
TYPICAL BUS HOLE LAYOUT

C DETAIL NTS



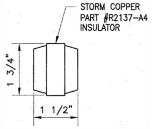
LUGS FOR CABLES TO TRANSFER SWITCH

D DETAIL NTS



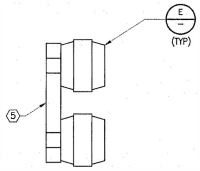
LUGS FOR CABLES TO PORTABLE GENERATOR

E DETAIL NTS



INSULATOR

F DETAIL NTS



GROUND BUS INSULATED SUPPORT

G DETAIL NTS

NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	ZS
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

Z.M. SHOKOUH 77702 REGISTERED PROFESSIONAL ENGINEER 10/21/24

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT WASTEWATER TREATMENT PLANT EXPANSION–DISINFECTION REDESIGN AMENDMENT

ELECTRICAL

DETAILS 5 OF 8

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.

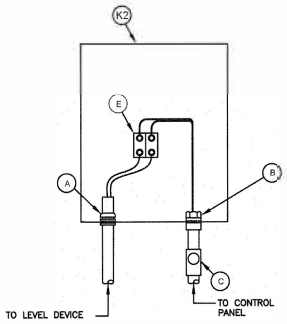
FOR CITY OF HOUSTON USE ONLY

ACCEPTED 80867

E-99-505

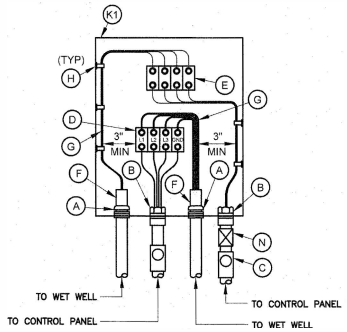
SHEET NO. 151 OF 173

FILE PATH: C:\Users\howard\Kalluri Group, Inc\KGI - Documents\4160-BV (WH Imp Pkg 2)\OCB Redesign\Drawings\E-99-505 Details 5.dwg



LEVEL SIGNAL JUNCTION BOX

A DETAIL NTS



PUMP CABLE JUNCTION BOX

B DETAIL NTS

JUNCTION BOX EQUIPMENT SCHEDULE

A – OZ GEDNEY CSBE SEAL WITH 316 S.S. PRESSURE PLATES AND HARDWARE
B – WATERTIGHT CONDUIT HUB WITH INSULATED BUSHING
C – CLASS I, DIV 1, EXLOSION PROOF SEAL INSTALLED PER NEC DIV 501
D – POWER TERMINAL BLOCK W/SCREW DOWN BOX LUGS
E – CONTROL TERM BLOCK W/SCREW DOWN BOX LUGS
F – MULTI-CONDUCTOR CABLE, REMOVE OUTER JACKET AS SHOWN
G – WIRING AS SCHEDULED
H – WIRING HARNESS PERMANENTLY AFFIXED
I – PUMP CONTROL WIRING FROM PUMPS 2; 2 & 3; 4; OR D2, AS APPLICABLE
J – 1 1/2" PVC COATED CONDUIT NIPPLE
K1 – NEMA 4X 316 STAINLESS STEEL JUNCTION BOX WITH GASKETED FRONT COVER, SINGLE QUARTER TURN, OIL-TIGHT LATCH AND PADLOCKING PROVISIONS, HOFFMAN A24H201OSS6LP OR EQUAL. MINIMUM SIZE: 20"W X 24"H X 10"D
K2 – NEMA 4X 316 STAINLESS STEEL JUNCTION BOX WITH GASKETED FRONT COVER, SINGLE QUARTER TURN, OIL-TIGHT LATCH AND PADLOCKING PROVISIONS, HOFFMAN A16H120SSS6LP OR EQUAL. MINIMUM SIZE: 12"W X 16"H X 6"D
L – NAMEPLATE, 3/8" HIGH LETTERS IN WHITE ON BLACK BAKELIGHT (SEE NAMEPLATE SCHEDULE)
M – TRANSDUCER BREATHER PERMANENTLY AFFIXED
N – EXPANSION JOINT/SLEEVES

GENERAL NOTES:

A. NAMEPLATES SHALL BE MOUNTED TO JUNCTION BOXES USING 316 STAINLESS STEEL HARDWARE.

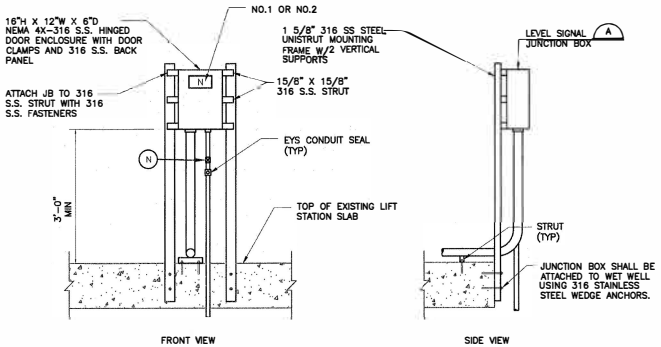
B. MAINTAIN MINIMUM SEPARATION REQUIRED UNDER NEC ARTICLE 504, BETWEEN INTRINSICALLY SAFE CONTROL WIRING AND NON-INTRINSICALLY SAFE MOTOR FEEDER WIRING.

D. UNLESS OTHERWISE NOTED, ALL EXPOSED CONDUITS SHALL BE PVC COATED RIGID GALVANIZED STEEL.

E. UNLESS OTHERWISE NOTED, ALL NUTS, BOLTS, SCREWS WASHERS, ETC SHALL BE TYPE 316 STAINLESS STEEL.

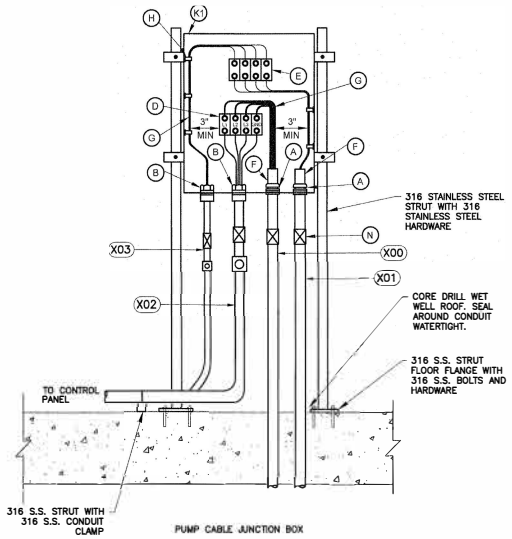
F. ALL UNDERGROUND CONDUITS TO BE ENCASED IN REINFORCED CONCRETE DUCT BANK.

G. PROVIDE ANTI-CORROSIVE SPRAY ON ANY BARE METAL PARTS OR EXPOSED WIRE.



LEVEL SIGNAL JUNCTION BOX ELEVATION

C DETAIL NTS



PUMP CABLE JUNCTION BOX

D DETAIL NTS

NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	ZS
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
Z.M. SIDIQUI
77702
REGISTERED
PROFESSIONAL
ENGINEER

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION–DISINFECTION REDESIGN
AMENDMENT
ELECTRICAL

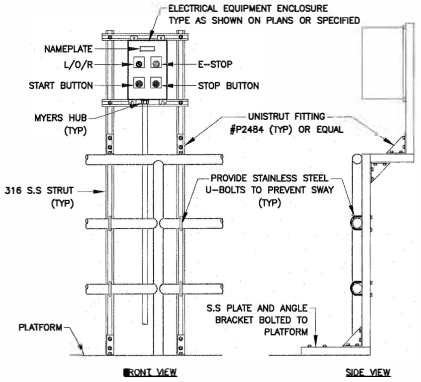
DETAILS 6 OF 8

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SE SHAHIDUR RAHMAN, P.E.	
SHEET NO. 152 OF 173	

ACCEPTED
80367
CITY OF HOUSTON
HOUSTON, TEXAS

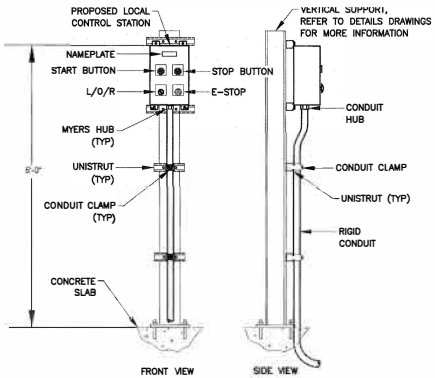
E-99-506

FILE PATH: C:\Users\Vowens\Kalluri Group, Inc\KGI - Documents\4160-BV (WH Imp Pkg 2)\CCB Redesign\Drawings\E-99-506 Details 6.dwg



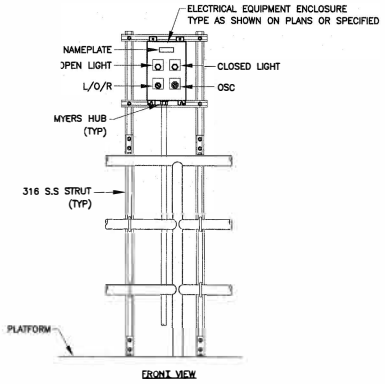
MIXER LOCAL CONTROL PANEL HANDRAIL MOUNTED

A DETAIL NTS



BLOWER LOCAL CONTROL PANEL

C DETAIL NTS



WEIR GATE LOCAL CONTROL PANEL HANDRAIL MOUNTED

B DETAIL NTS

GENERAL NOTES:

A. NAMEPLATES SHALL BE MOUNTED TO JUNCTION BOXES USING 316 STAINLESS STEEL HARDWARE.

B. MAINTAIN MINIMUM SEPARATION REQUIRED UNDER NEC ARTICLE 504, BETWEEN INTRINSICALLY SAFE CONTROL WIRING AND NON-INTRINSICALLY SAFE MOTOR FEEDER WIRING.

D. UNLESS OTHERWISE NOTED, ALL EXPOSED CONDUITS SHALL BE PVC COATED RIGID GALVANIZED STEEL.

E. UNLESS OTHERWISE NOTED, ALL NUTS, BOLTS, SCREWS WASHERS, ETC SHALL BE TYPE 316 STAINLESS STEEL.

F. ALL UNDERGROUND CONDUITS TO BE ENCASED IN REINFORCED CONCRETE DUCT BANK.

G. PROVIDE ANTI-CORROSIVE SPRAY ON ANY BARE METAL PARTS OR EXPOSED WIRE.

NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	ZS
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
Z.M. SIDDIQUI
77702
REGISTERED
PROFESSIONAL
ENGINEER
11/21/24

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

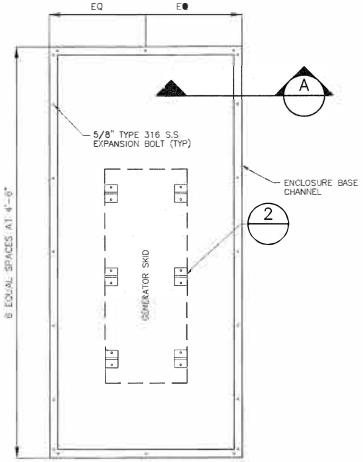
INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT
ELECTRICAL
DETAILS 7 OF 8

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
Sje SHAHIDUR RAHMAN, P.E.	
SHEET NO. 153 OF 173	

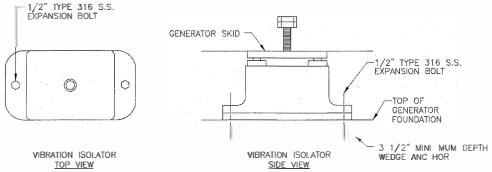
PROFESSIONAL ENGINEER
80367
SHAHIDUR RAHMAN
HOUSTON, TEXAS

E-99-507

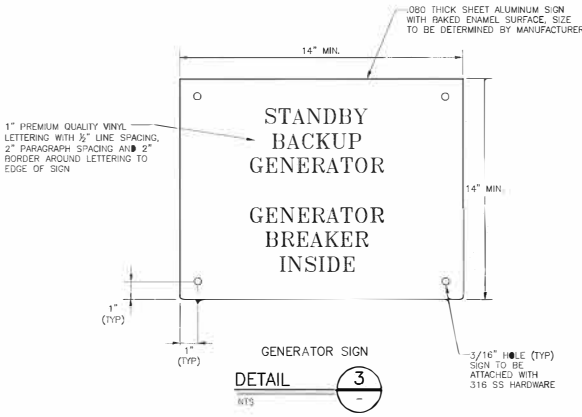
FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160-BW (AH Imp Pkg 2)\CCB Redesign\Drawings\E-99-507 Details 7.dwg



ENCLOSURE INTERFACE
DETAIL 1
N.T.S.

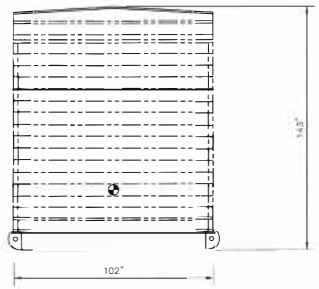


ANCHORING DETAIL FOR GENERATOR SKID
DETAIL 2
N.T.S.

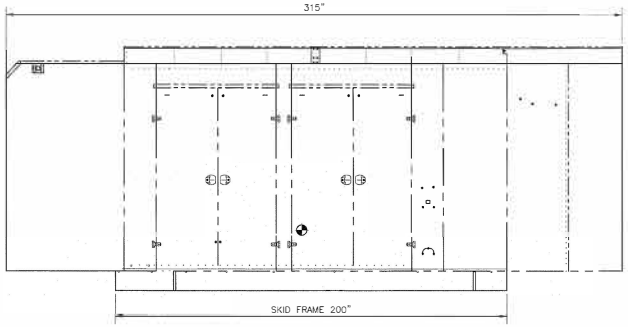


GENERATOR SIGN
DETAIL 3
N.T.S.

GENERATOR CONCEPT AND DIMENSIONS ARE APPROXIMATE, COORDINATE GENERATOR FOUNDATION AND ITS INSTALLATION WITH THE CONTRACTOR'S PROPOSED GENERATOR SHOP DRAWING INFORMATION, PROVIDED BY THE GENERATOR AND ENCLOSURE MANUFACTURER'S VENDOR



ENCLOSURE END VIEW
ELEVATION 1
N.T.S.



ENCLOSURE SIDE VIEW
ELEVATION 2
N.T.S.

NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	ZS
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
Z.M. SIDDIQUI
77702
REGISTERED
PROFESSIONAL
ENGINEER
10/21/24

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION–DISINFECTION REDESIGN
AMENDMENT
ELECTRICAL
DETAILS 8 OF 8

WBS NUMBER
R-000265-0147-4
DRAWING SCALE
AS NOTED
CITY OF HOUSTON PM
SHAHIDUR RAHMAN, P.E.
SHEET NO. 154 OF 173

FOR CITY OF HOUSTON USE ONLY
ACCEPTED
80367

E-99-508

FILE PATH: C:\Users\Vtoward\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\CCB Redesign\Drawings\E-99-508 Details 8.dwg

GENERAL INSTRUMENT OR FUNCTION SYMBOLS

SHARED DISPLAY/ SHARED CONTROL				
PRIMARY CHOICE	SECONDARY CHOICE	COMPUTER SOFTWARE	DISCRETE	LOCATION AND ACCESSIBILITY
				FIELD MOUNTED AND NORMALLY OPERATOR ACCESSIBLE
				PRIMARY CONTROL PANEL MOUNTED AND NORMALLY OPERATOR ACCESSIBLE
				PRIMARY CONTROL PANEL MOUNTED AND NOT NORMALLY OPERATOR ACCESSIBLE
				SECONDARY CONTROL PANEL MOUNTED AND NORMALLY OPERATOR ACCESSIBLE
				SECONDARY CONTROL PANEL MOUNTED AND NOT NORMALLY OPERATOR ACCESSIBLE

INSTRUMENTS SHARING COMMON HOUSING

PILOT LIGHT

MISCELLANEOUS SYMBOLS

MOTOR

VARIABLE FREQUENCY DRIVE

INDICATES INTERLOCK OR LOGIC IN A MOTOR CONTROL CENTER

INDICATES GENERAL OR MISCELLANEOUS HARDWIRED INTERLOCK

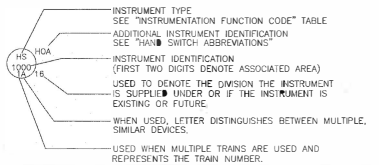
MOTOR STARTER

SILICONE CONTROL RECTIFIER

VARIABLE FREQUENCY DRIVE

PURGE OR FLUSHING DEVICE

TYPICAL TAG NUMBERS & DESIGNATION



INSTRUMENT TYPE
SEE "INSTRUMENTATION FUNCTION CODE" TABLE

ADDITIONAL INSTRUMENT IDENTIFICATION
SEE "HAND SWITCH ABBREVIATIONS"

INSTRUMENT IDENTIFICATION
(FIRST TWO DIGITS DENOTE ASSOCIATED AREA)

USED TO DENOTE THE DIVISION THE INSTRUMENT IS SUPPLIED UNDER OR IF THE INSTRUMENT IS EXISTING OR FUTURE.

WHEN USED, LETTER DISTINGUISHES BETWEEN MULTIPLE, SIMILAR DEVICES.

USED WHEN MULTIPLE TRAINS ARE USED AND REPRESENTS THE TRAIN NUMBER.

HAND SWITCH ABBREVIATIONS

AO = AUTO/OFF
AM = AUTO/MANUAL
CM = COMPUTER/MANUAL
CL = COMPUTER/LOCAL
E-STOP = EMERGENCY STOP
FR = FORWARD/REVERSE
FOR = FORWARD/OFF/REVERSE
FS = FAST SLOW
FOS = FAST/OFF/SLOW
HOA = HAND/OFF/AUTO
LLS = LEAD/LAG/STANDBY
LOC = LOCAL/OFF/COMPUTER
LOR = LOCAL/OFF/REMOTE
LOS = LOCKOUT/STOP
LA = LOCAL/AUTO
LR = LOCAL/REMOTE
OC = OPEN/CLOSE
OCA = OPEN/CLOSE/AUTO
OO = ON/OFF
OOA = ON/OFF/AUTO
OSC = OPEN/STOP/CLOSE
RSL = RAISE/STOP/LOWER
SS = START/STOP
SOR = START/OFF/RESET

INSTRUMENTATION FUNCTION CODE

	FIRST LETTERS		SUCCEEDING LETTERS		
	COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5
	MEASURED/INITIATING VARIABLE	VARIABLE MODIFIER	READOUT/PASSIVE FUNCTION	OUTPUT/ACTIVE FUNCTION	FUNCTION MODIFIER
A	ANALYSIS		ALARM		
B	BURNER, COMBUSTION		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
C	USER'S CHOICE			CONTROL	CLOSED
D	USER'S CHOICE	DIFFERENCE, DIFFERENTIAL			DEVIATION
E	VOLTAGE		SENSOR, PRIMARY ELEMENT		
F	FLOW, FLOW RATE	RATIO			
G	USER'S CHOICE		GLASS, GAUGE, VIEWING DEVICE		
H	HAND				HIGH
I	CURRENT		INDICATE		
J	POWER		SCAN		
K	TIME, SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L	LEVEL		LIGHT		LOW
M	MOISTURE				MIDDLE, INTERMEDIATE
N	USER'S CHOICE		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
O	USER'S CHOICE		ORIFICE, RESTRICTION		OPEN
P	PRESSURE		POINT (TEST CONNECTION)		
Q	QUANTITY	INTEGRATE, TOTALIZE	INTEGRATE, TOTALIZE		
R	RADIATION		RECORD		RUN
S	SPEED, FREQUENCY	SAFETY		SWITCH	STOP
T	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION	
V	VIBRATION, MECHANICAL, ANALYSIS			VALVE, DAMPER, LOUVER	
W	WEIGHT, FORCE		WELL, PROBE		
X	UNCLASSIFIED (1)	X-AXIS	ACCESSORY DEVICES, UNCLASSIFIED (1)	UNCLASSIFIED (1)	UNCLASSIFIED (1)
Y	EVENT, STATE, PRESENCE	Y-AXIS		AUXILIARY DEVICES	
Z	POSITION, DIMENSION	Z-AXIS, SAFETY INSTRUMENT SYSTEM		DRIVER, ACTUATOR, UNCLASSIFIED, FINAL CONTROL ELEMENT	

TABLE NOTES:
(1) WHEN USED SYMBOL OR SIGNAL LINE IS ANNOTATED

INSTRUMENT LINE SYMBOLS

ELECTRICAL SIGNAL

TELEPHONE SIGNAL

ELECTROMAGNETIC OR SONIC SIGNAL (GUIDED)

ELECTROMAGNETIC OR SONIC SIGNAL (UNGUIDED)

PNEUMATIC SIGNAL

CAPILLARY TUBE

HYDRAULIC SUPPLY

VENDOR SUPPLIED CABLE

COMMUNICATION LINK – COPPER (HARDWIRED)

COMMUNICATION LINK – FIBER OPTICS

COMMUNICATION LINK – SERIAL

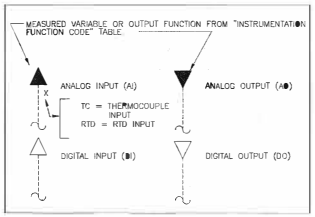
ELECTRICAL / AIR SOURCES

UPS – – – ► UPS POWERED ELECTRICAL SOURCE
ES – – – – ► ELECTRICAL SOURCE
IA ——— ► INSTRUMENT AIR SOURCE

GENERAL NOTES

1. LIGHTER WEIGHT LINES, SHOWN AS ———, INDICATE EQUIPMENT, INSTRUMENTS OR PIPING THAT ARE EXISTING. WEIGHTED LINES, SHOWN AS ———, INDICATE EQUIPMENT, INSTRUMENTS OR PIPING THAT ARE NEW. DASHED WEIGHTED LINES, SHOWN AS – – – – INDICATED EQUIPMENT, INSTRUMENTS OR PIPING THAT ARE GROUPED AS A PACKAGE.

I/O SIGNALS



GENERAL ABBREVIATIONS

AI	ANALOG IN
AO	ANALOG OUT
ASD	ADJUSTABLE SPEED DRIVE
CPU	CENTRAL PROCESSOR UNIT
DI	DIGITAL OR DISCRETE INPUT
DO	DIGITAL OUTPUT
FC	FAIL CLOSED
FO	FAIL OPEN OR FIBER OPTIC
HMI	HUMAN MACHINE INTERFACE
MCC	MOTOR CONTROL CENTER
NC	NORMALLY CLOSED
NPW	NON-POTABLE WATER
NO	NORMALLY OPEN
PLC	PROGRAMMABLE LOGIC CONTROLLER
PW	PLANT WATER
RIO	REMOTE INPUT/OUTPUT
UPS	UNINTERRUPTIBLE POWER SUPPLY
OC	OPEN/CLOSE

PRIMARY ELEMENTS

MAGNETIC FLOW METER

TURBINE OR PROPELLER FLOW METER

AVERAGING PITOT TUBE

ULTRASONIC FLOW METER

ROTAMETER

WEIR

ORIFICE PLATE

VENTURI TUBE

FLUME

GENERAL INSERTION FLOW METER
IM=INSERT MAG

THERMAL MASS FLOW METER

PRESSURE SENSOR

FLOAT SWITCH

ULTRASONIC LEVEL SENSOR

RADAR LEVEL SENSOR

CAPACITANCE LEVEL SENSOR

PRESSURE GAUGE

DIFFERENTIAL PRESSURE GAUGE

TEMPERATURE GAUGE

GENERAL ANALYZER
pH=pH
DO=DISSOLVED OXYGEN
H2S=HYDROGEN SULFIDE
LEL=% LOWER EXPLOSIVE LIMIT
O2=OXYGEN
O3=OZONE
NH3=NITRATE
TUR=TURBIDITY
FL=FLUORIDE
CL2=CHLORIDE
UVT=ULTRAVIOLET TRANSMITTANCE
UVI= ULTRAVIOLET INTENSITY

GENERAL NOTES:

1. THIS LEGEND APPLIES TO P&IDS ONLY AND MAY DIFFER FROM LEGENDS FOR OTHER SHEETS.
2. IN GENERAL THIS LEGEND SHEET AND THE P&IDS ARE BASED ON THE INTERNATIONAL SOCIETY OF AUTOMATION (ISA) STANDARDS AND RECOMMENDED PRACTICES FOR INSTRUMENTS AND CONTROL. SOME MODIFICATIONS, ADDITIONS AND ALTERATIONS HAVE BEEN MADE AS REQUIRED TO ACCOMMODATE PROJECT REQUIREMENTS.
3. SOME PROCESS ITEMS SUCH AS EQUIPMENT ISOLATION VALVES, BYPASS LINES, ETC., WHICH ARE NOT CRITICAL FOR AN UNDERSTANDING OF THE INSTRUMENTATION FUNCTIONS ARE NOT SHOWN ON THE P&IDS.
4. SEE ELECTRICAL AND MECHANICAL SHEETS AND SPECIFICATIONS FOR ADDITIONAL CONTROL AND INTERLOCK REQUIREMENTS.
5. LIGHTER WEIGHT LINES, SHOWN AS———, INDICATE EQUIPMENT, INSTRUMENT OR PIPING, THAT ARE EXISTING. WEIGHTED LINES, SHOWN AS OR HEAVIER ———, INDICATE EQUIPMENT, INSTRUMENTS OR PIPING THAT ARE NEW. DASHED WEIGHTED LINES, SHOWN AS – – – INDICATED EQUIPMENT, INSTRUMENTS OR PIPING THAT ARE GROUPED AS A PACKAGE.
6. HATCHED INSTRUMENTS ARE PROVIDED BY EQUIPMENT SUPPLIER PER SPECIFICATIONS.
7. P&IDS ARE NOT INTENDED TO SHOW ALL DETAILS OF PIPING, JOINTS, SUPPORTS, ETC. CONTRACTOR SHALL INSTALL A COMPLETE SYSTEM PER THE CONTRACT DOCUMENTS AND AS REQUIRED TO PROVIDE A FULLY FUNCTIONING SYSTEM.

NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	RK
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
RAMESH KALLURI
86078
LICENSED PROFESSIONAL ENGINEER
2/11/2025

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION–DISINFECTION REDESIGN
AMENDMENT
INSTRUMENTATION
SYMBOLS AND ABBREVIATIONS
SHEET 1 OF 2

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	155 OF 173

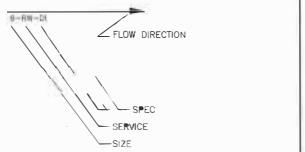
FOR CITY OF HOUSTON USE ONLY

APPROVED
90367
SIGNATURE DATE

I-00-001

FILE PATH: C:\Users\rkhera\Kalluri Group, Inc\KG - Documents\4146-Bay (JAH Imp Pkg 2)\CDB Redesign\Drawings\I-00-001 Symbols & Abbreviations 1 Of 2.dwg

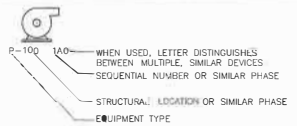
TYPICAL PIPE TAG NUMBERS & DESIGNATION



PIPE LINE SYMBOLS

- PIPE UNION
- FLEXIBLE BELLOWS TYPE COUPLING
- FLEXIBLE COUPLING (GENERAL SYMBOL)
- QUICK CONNECT TYPE COUPLING
- HOSE CONNECTION
- Y-STRAINER
- REDUCER/ENLARGER
- BLIND FLANGE
- CONTINUED PIPE
- CONCENTRIC FLANGE MOUNTED DIAPHRAGM SEAL
- THREADED DIAPHRAGM SEAL
- OPEN EQUIPMENT DRAIN
- DIFFUSER
- BASKET STRAINER
- FILTER
- PULSATION DAMPNER
- MAJOR PROCESS LINE
- MINOR PROCESS LINE
- DOUBLE WALLED PIPE
- E (S) — ELECTRIC (OR STEAM) TRACING
- PROCESS FLUID / DWG NO. / TO/FROM LOCATION — DRAWING CONTINUATION
- SIGNAL LINE / DWG NO. / TO/FROM LOCATION — DRAWING CONTINUATION

TYPICAL EQUIPMENT TAG NUMBERS & DESIGNATION



GATE SYMBOLS

- HEAVY DUTY CAST IRON SLIDE (SLUICE) GATE
- SLIDE GATE (SG)
- WEIR SLIDE GATE (WSG)
- BUTTERFLY GATE
- BULK HEAD GATE/STOP LOG

VALVE ACTUATORS

- HAND (MANUALLY) OPERATED
- DIAPHRAGM, SPRING OPPOSED
- DIAPHRAGM, PRESSURE-BALANCED
- ROTARY MOTOR. (SHOWN TYPICALLY WITH ELECTRIC SIGNAL. MAY BE HYDRAULIC OR PNEUMATIC)
- SOLENOID
- ELECTROHYDRAULIC
- CYLINDER, SINGLE-ACTING, SPRING OPPOSED WITHOUT POSITIONER OR PILOT.
- CYLINDER, DOUBLE ACTING, WITHOUT POSITIONER OR PILOT
- EXAMPLE OF CYLINDER WITH POSITIONER
- ANY CYLINDER THAT IS ASSEMBLED WITH A PILOT SO THAT ASSEMBLY IS ACTUATED BY ONE CONTROLLED INPUT. PILOT MAY BE POSITIONER, SOLENOID VALVE, SIGNAL CONVERTER, etc.
- FLOAT ACTUATOR

SERVICE LEGEND

DESIGNATION	SERVICE
DR	DRAIN
GR	GRIT
MLSS	MIXED LIQUOR SUSPENDED SOLIDS
NPW	NON-POTABLE WATER
PA	PROCESS AIR
RAS	RETURN ACTIVATED SLUDGE
RW	RAW WATER
SC	SCUM
SCE	SECONDARY CLARIFIER EFFLUENT
WAS	WASTE ACTIVATED SLUDGE

VALVE SYMBOLS

- GATE VALVE (GV)
- PLUG VALVE (PV)
- BUTTERFLY VALVE (BFV)
- BALL VALVE (BV)
- GLOBE VALVE (GLV)
- PINCH VALVE (PCHV)
- DIAPHRAGM VALVE (DV)
- SWING CHECK VALVE (CV)
- BALL CHECK VALVE (BCV)
- SOLENOID VALVE (SV)
- NEEDLE VALVE (NV)
- KNIFE VALVE (KNV)
- MUD VALVE (MV)
- PRESSURE REGULATING VALVE (PREGV)
- BACK PRESSURE REGULATING VALVE (BPV)
- DIFFERENTIAL PRESSURE REGULATING VALVE WITH EXTERIOR TAPS
- SELF-CONTAINED DIFFERENTIAL PRESSURE REGULATING VALVE
- SELF-CONTAINED DIFFERENTIAL PRESSURE REGULATING VALVE (SOLENOID OPERATED)
- PRESSURE RELIEF VALVE (PRV)
- VACUUM RELIEF VALVE (VRV)
- AIR-VACUUM RELEASE VALVE (AVRV)

PIPE SPEC LEGEND

DESIGNATION	PIPE MATERIALS
ABS	ACRYLONITRILE - BUTADIENE - STYRENE
BS	BLACK STEEL
CI	CAST IRON
CIS	CAST IRON - SOIL
CM	CORRUGATED METAL
CPVC	CHLORINATED POLYVINYL CHLORIDE
CS	CARBON STEEL
CU	COPPER
DI	DUCTILE IRON
FRP	FIBER REINFORCED PLASTIC
GCS	GALVANIZED CARBON STEEL
PE	POLYETHLENE
PP	POLYPROPYLENE
PVC	POLYVINYL CHLORIDE
PVCI	POLYVINYL CHLORIDE (DOUBLED WALLED PIPE)
RBH	RUBBER HOSE
RC	REINFORCED CONCRETE
RCC	REINFORCED CONCRETE CYLINDER
SS	STAINLESS STEEL
STL	STEEL (CARBON)
VC	VITRIFIED CLAY

PROCESS EQUIPMENT

PARTIAL LIST - ADDITIONAL SYMBOLS MAY BE SHOWN ON THE FLOW DIAGRAMS

- CENTRIFUGAL PUMP
- SUBMERSIBLE PUMP
- PLUNGER / POSITIVE
- PROGRESSING CAVITY PUMP
- DIAPHRAGM METERING PUMP
- AIR OPERATED DIAPHRAGM PUMP
- ROTARY PUMP
- CENTRIFUGAL BLOWER
- BELT CONVEYOR
- SCREW CONVEYOR
- GRINDER
- MIXER
- ROTARY BLOWER
- VERTICAL PUMP
- STATIC MIXER
- MANUAL SCREEN
- MECHANICAL SCREEN
- CALIBRATION COLUMN
- CLARIFIER

NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	RK
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS — RAMESH KALLURI — 68078 — REGISTERED PROFESSIONAL ENGINEER — 2/11/2025

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT
INSTRUMENTATION

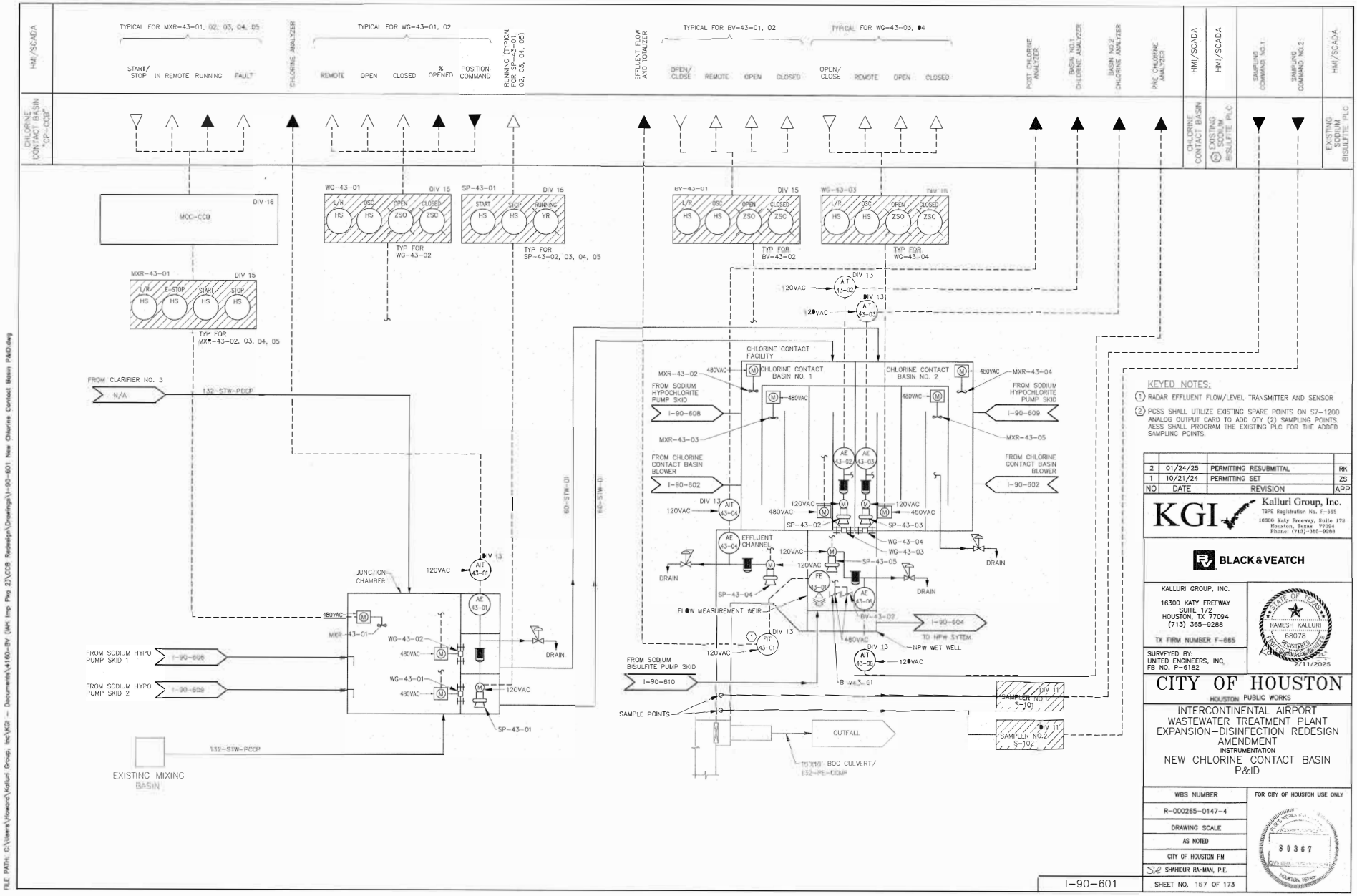
SYMBOLS AND ABBREVIATIONS
SHEET 2 OF 2

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 156 OF 173	

ACCEPTED — 80367 — CITY OF HOUSTON, TEXAS

I-00-002

FILE PATH: C:\Users\Howard.Kalluri.Group\Desktop\Projects\AIRPORT\Working\Drawings\I-00-002 Symbols & Abbreviations 2 OF 2.dwg



KEYED NOTES:

1. RADAR EFFLUENT FLOW/LEVEL TRANSMITTER AND SENSOR
2. PCSS SHALL UTILIZE EXISTING SPARE POINTS ON S7-1200 ANALOG OUTPUT CARD TO ADD QTY (2) SAMPLING POINTS. AESS SHALL PROGRAM THE EXISTING PLC FOR THE ADDED SAMPLING POINTS.

NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	RK
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
RAMESH KALLURI
68078
REGISTERED PROFESSIONAL ENGINEER
2/11/2025

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION–DISINFECTION REDESIGN
AMENDMENT
INSTRUMENTATION

NEW CHLORINE CONTACT BASIN
P&ID

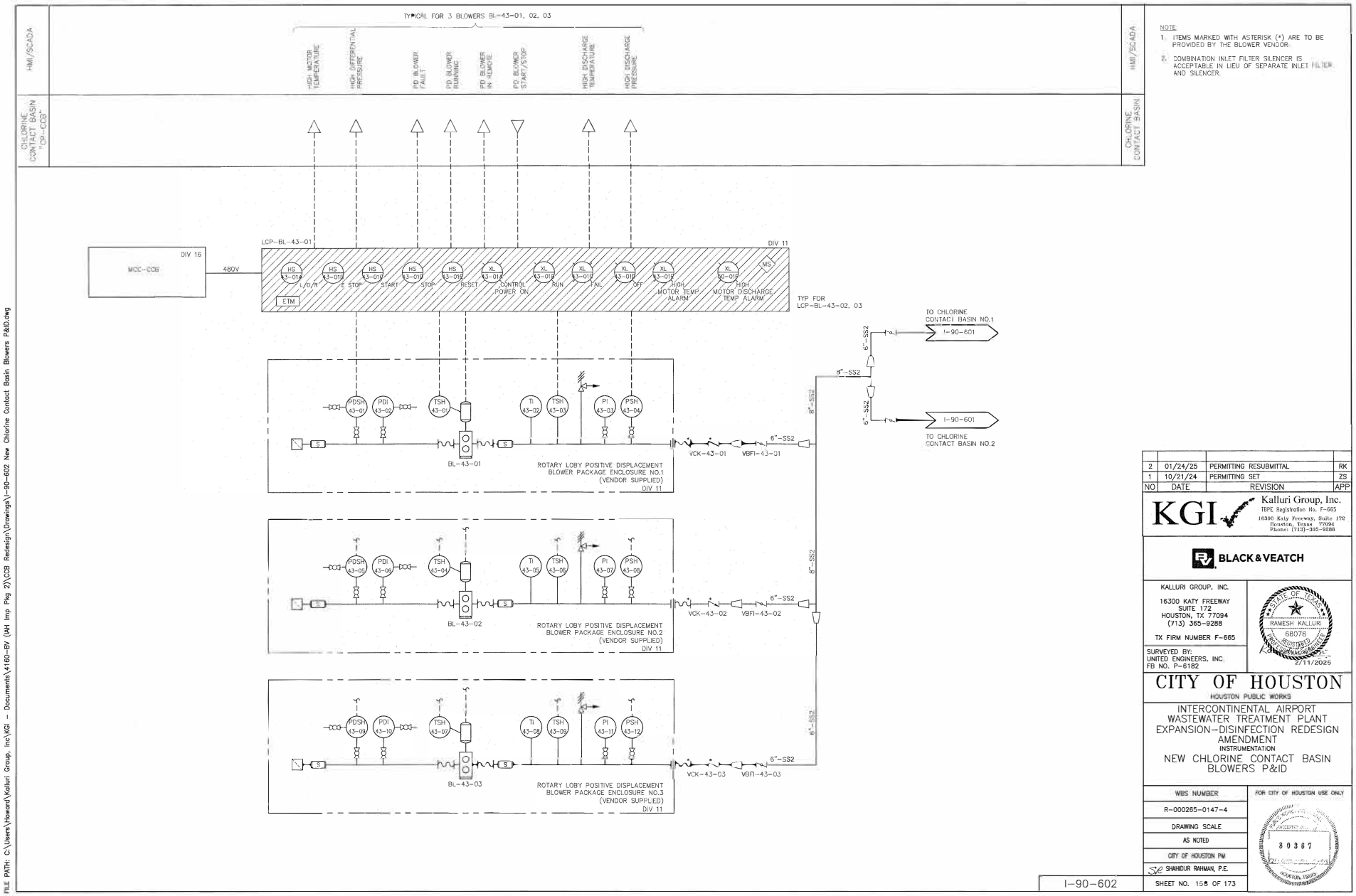
WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SR SHAHIDUR RAHMAN, P.E.
SHEET NO.	157 OF 173

FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
80367
REGISTERED
HOUSTON, TEXAS

I-90-601

FILE PATH: C:\Users\Howorx\Kalluri Group, Inc\KGI - Documents\4160-BV (Art Imp Proj 2)\CCB Redesign\Drawings\I-90-601 New Chlorine Contact Basin P&ID.dwg



NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	RK
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
RAMESH KALLURI
68078
REGISTERED
PROFESSIONAL
ENGINEER
2/11/2025

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION–DISINFECTION REDESIGN
AMENDMENT
INSTRUMENTATION

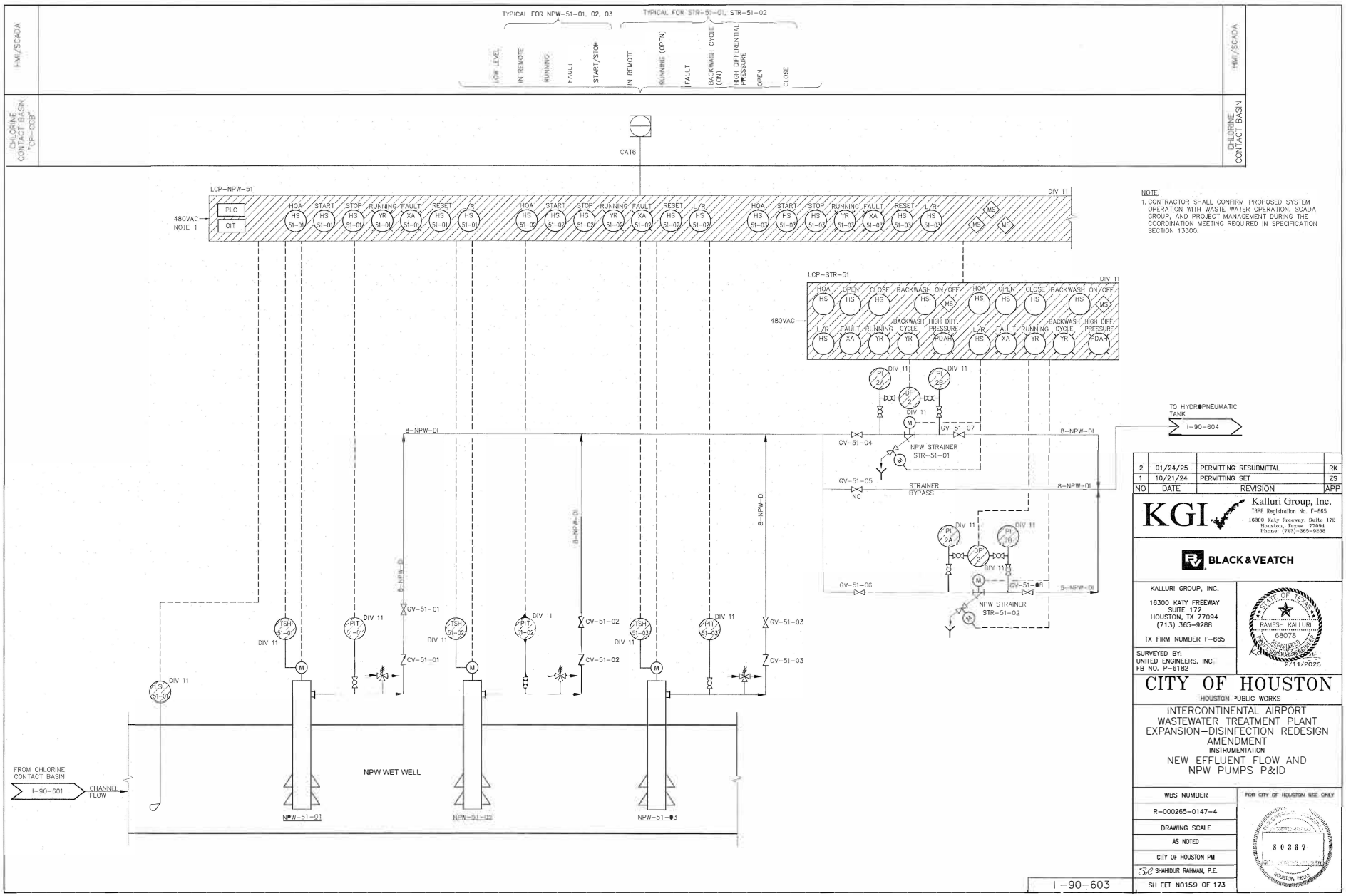
NEW CHLORINE CONTACT BASIN BLOWERS P&ID

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	155 OF 173

FOR CITY OF HOUSTON USE ONLY
ACCEPTED
80367

I-90-602

FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\CCB Redesign\Drawings\I-90-602 New Chlorine Contact Basin Blowers P&ID.dwg



NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	RK
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-565
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
RAMESH KALLURI
68078
REGISTERED
PROFESSIONAL
ENGINEER
2/11/2025

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION–DISINFECTION REDESIGN
AMENDMENT
INSTRUMENTATION

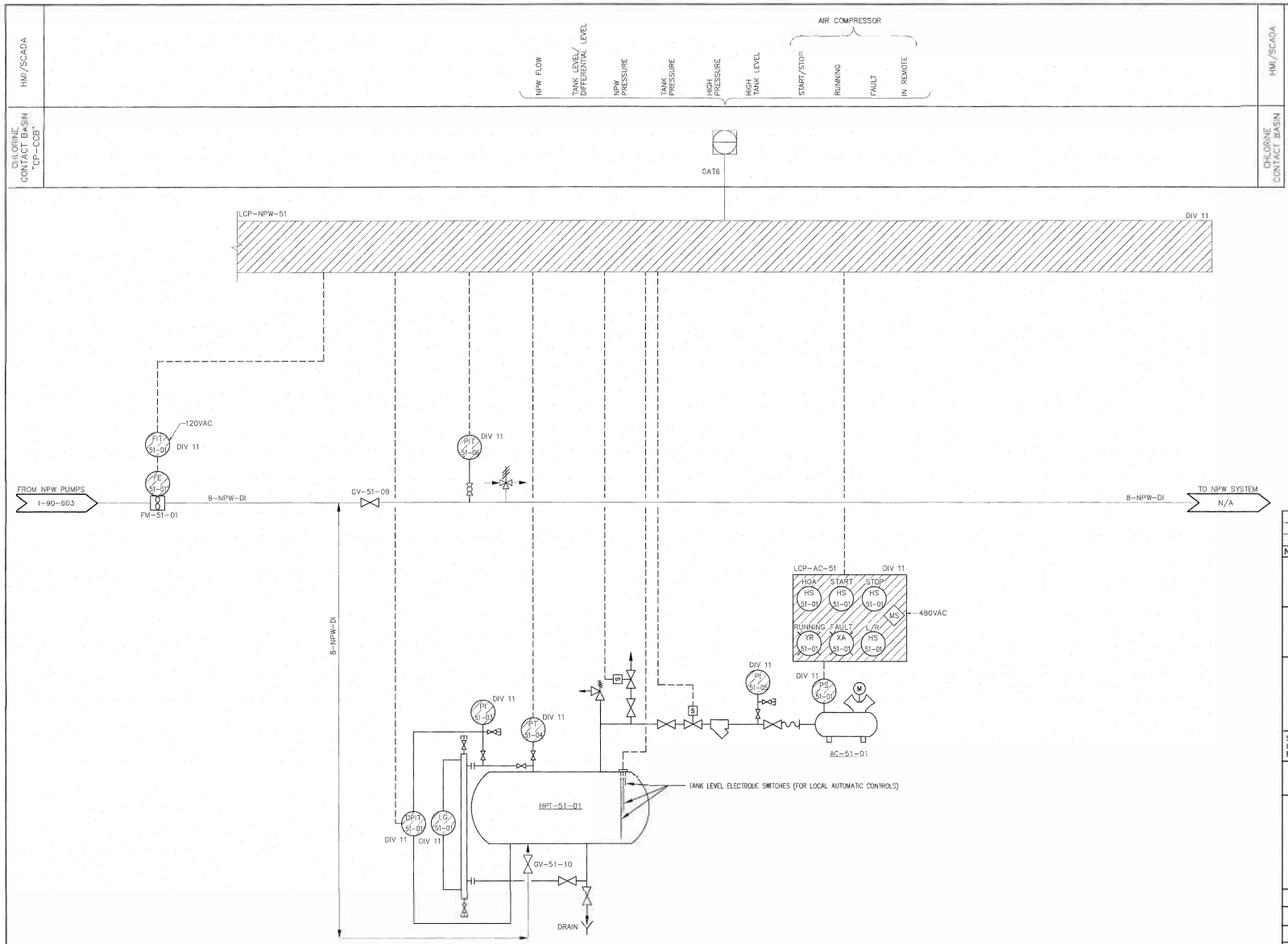
NEW EFFLUENT FLOW AND NPW PUMPS P&ID

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO	159 OF 173

FOR CITY OF HOUSTON USE ONLY
80367
REGISTERED
PROFESSIONAL
ENGINEER
HOUSTON, TEXAS

I-90-603

FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\CCB Redesign\Drawings\I-90-603 New Effluent Flow And NPW Pumps P&ID.dwg



GENERAL NOTES:

1. CONTRACTOR SHALL CONFIRM PROPOSED SYSTEM OPERATION WITH WASTE WATER OPERATION, SCADA GROUP, AND PROJECT MANAGEMENT DURING THE COORDINATION MEETING REQUIRED IN SPECIFICATION SECTION 13300.
2. HYDROTANK SUPPLIER AND CONTRACTOR TO COORDINATE WITH INSTRUMENTATION DIV 13, TO ENSURE ALL ANCILLARY EQUIPMENT REQUIRED FOR SAFE OPERATIONS OF THE HYDROTANK ARE PROVIDED.

NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	RK
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
RAMESH KALLURI
68078
LICENSED PROFESSIONAL ENGINEER
2/11/2025

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT
INSTRUMENTATION

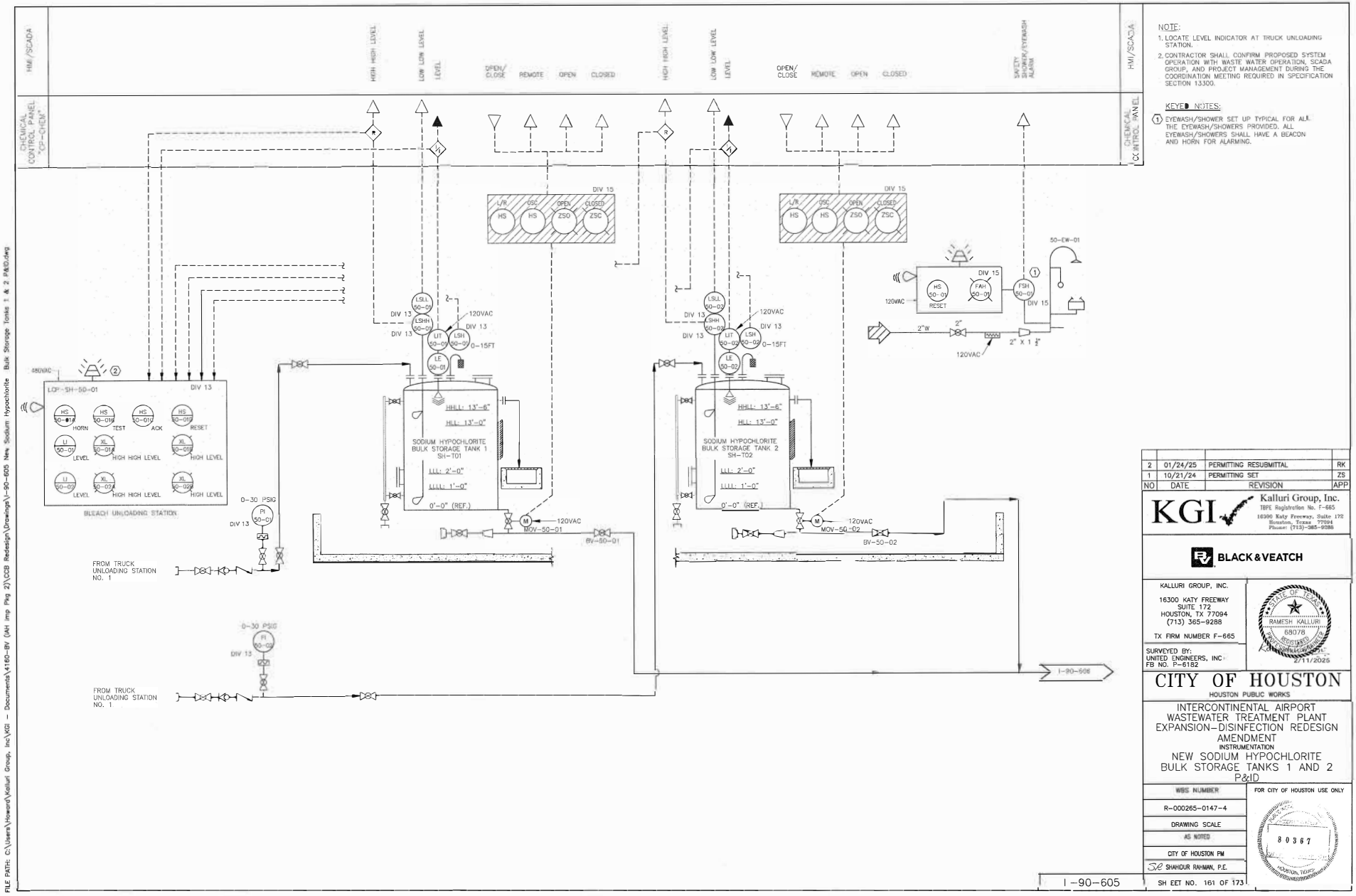
NEW NPW HYDROPNEUMATIC TANK
P&ID

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 160 OF 173	

RECOMMENDED
80367
REGISTERED
PROFESSIONAL ENGINEER
HOUSTON, TEXAS

I-90-604

FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\CCB Redesign\Drawings\I-90-604 New NPW Hydropneumatic Tank P&ID.dwg



NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	RK
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC
FB NO. P-6182

RAMESH KALLURI
68078
LICENSED PROFESSIONAL ENGINEER
2/11/2025

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

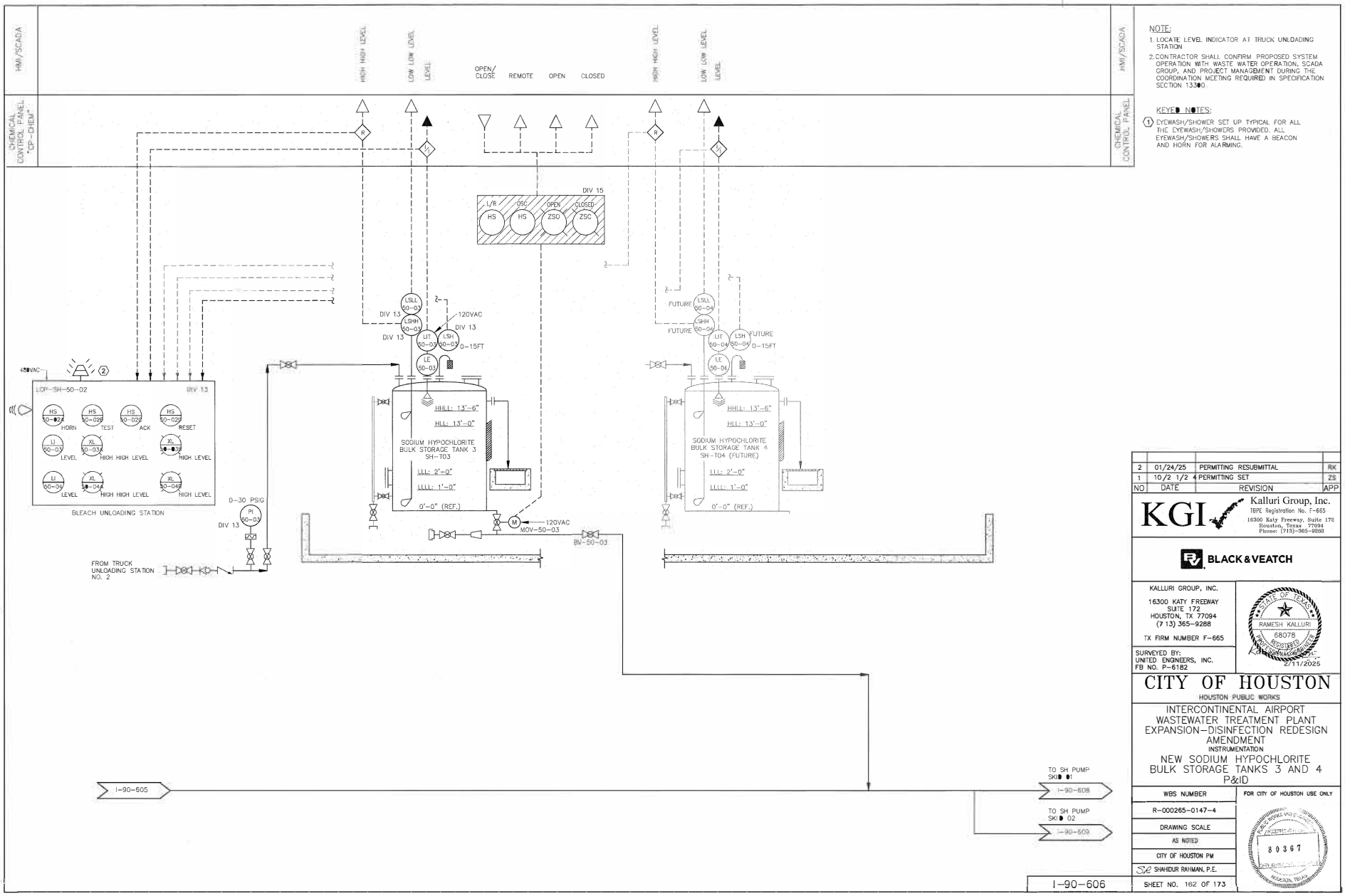
INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION–DISINFECTION REDESIGN
AMENDMENT
INSTRUMENTATION

NEW SODIUM HYPOCHLORITE
BULK STORAGE TANKS 1 AND 2
P&ID

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 161 OF 173	

80367

FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160-BV (JAH Proj 2)\CCB Redesign\Drawings\I-90-605 New Sodium Hypochlorite Bulk Storage Tanks 1 & 2 P&ID.dwg



NOTE:

1. LOCATE LEVEL INDICATOR AT TRUCK UNLOADING STATION
2. CONTRACTOR SHALL CONFIRM PROPOSED SYSTEM OPERATION WITH WASTE WATER OPERATION, SCADA GROUP, AND PROJECT MANAGEMENT DURING THE COORDINATION MEETING REQUIRED IN SPECIFICATION SECTION 13300.

KEYED NOTES:

(1) EYEWASH/SHOWER SET UP TYPICAL FOR ALL THE EYEWASH/SHOWERS PROVIDED. ALL EYEWASH/SHOWERS SHALL HAVE A BEACON AND HORN FOR ALARMING.

NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	RK
1	10/2 1/2 4	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
RAMESH KALLURI
68078
REGISTERED PROFESSIONAL ENGINEER
2/11/2025

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION–DISINFECTION REDESIGN
AMENDMENT
INSTRUMENTATION

NEW SODIUM HYPOCHLORITE BULK STORAGE TANKS 3 AND 4 P&ID

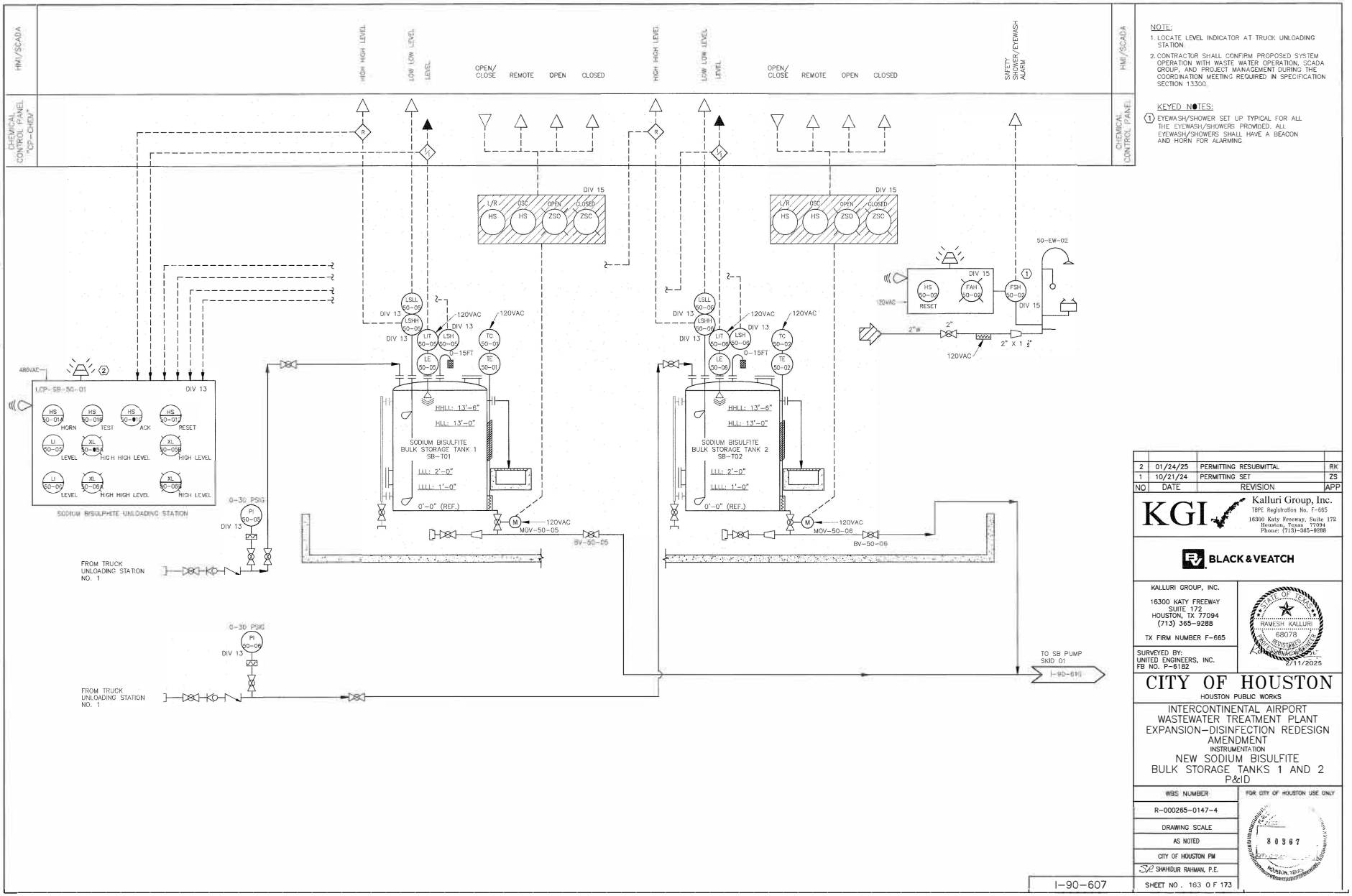
WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	

PROFESSIONAL ENGINEER
80367
STATE OF TEXAS
HOUSTON, TEXAS

I-90-606

SHEET NO. 162 OF 173

FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\CCB Redesign\Drawings\I-90-606 New Sodium Hypochlorite Bulk Storage Tanks 3 & 4 P&ID.dwg



NOTE:

1. LOCATE LEVEL INDICATOR AT TRUCK UNLOADING STATION.
2. CONTRACTOR SHALL CONFIRM PROPOSED SYSTEM OPERATION WITH WASTE WATER OPERATION, SCADA GROUP, AND PROJECT MANAGEMENT DURING THE COORDINATION MEETING REQUIRED IN SPECIFICATION SECTION 13300.

KEYED NOTES:

(1) EYEWASH/SHOWER SET UP TYPICAL FOR ALL THE EYEWASH/SHOWERS PROVIDED. ALL EYEWASH/SHOWERS SHALL HAVE A BEACON AND HORN FOR ALARMING.

NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	RK
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

STATE OF TEXAS
RAMESH KALLURI
68078
REGISTERED PROFESSIONAL ENGINEER
2/11/2025

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION–DISINFECTION REDESIGN
AMENDMENT
INSTRUMENTATION

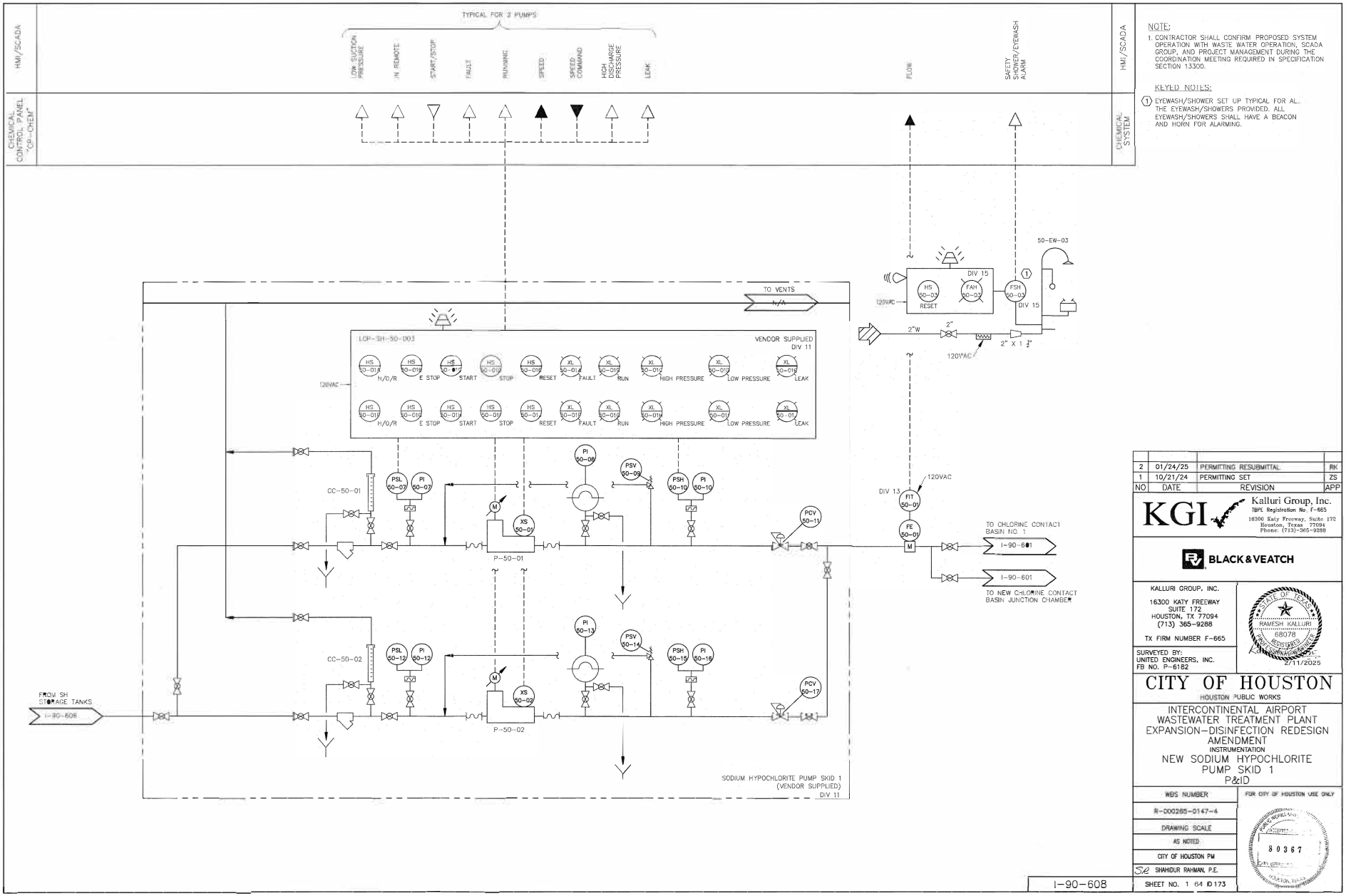
NEW SODIUM BISULFITE
BULK STORAGE TANKS 1 AND 2
P&ID

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 163 OF 173	

STATE OF TEXAS
80367
REGISTERED
PROFESSIONAL ENGINEER
HOUSTON, TEXAS

I-90-607

FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\CCB Redesign\Drawings\I-90-607 New Sodium Bisulfite Bulk Storage Tanks 1 & 2 P&ID.dwg



NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	RK
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
RAMESH KALLURI
68078
REGISTERED
PROFESSIONAL ENGINEER
2/11/2025

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

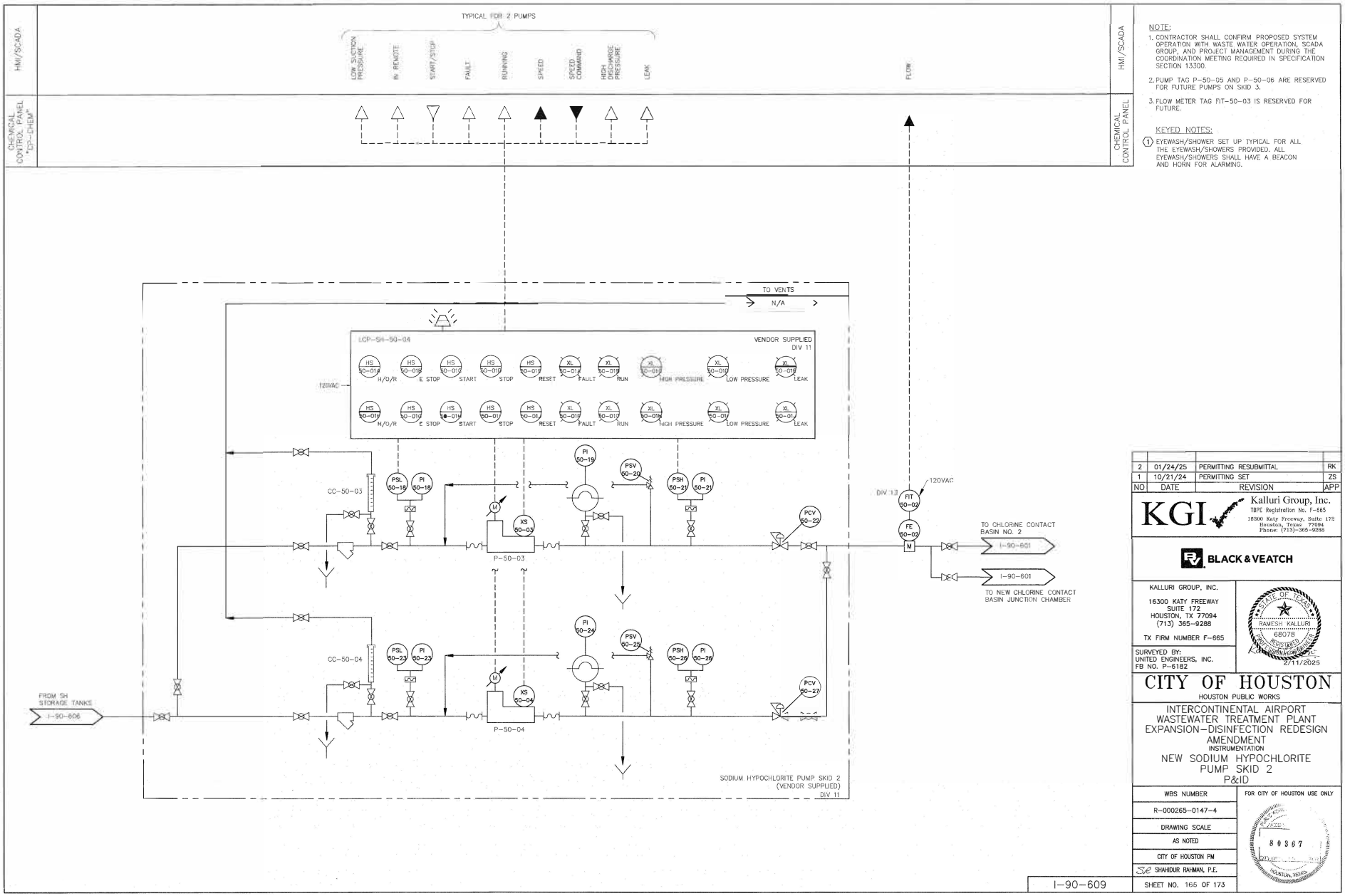
INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION–DISINFECTION REDESIGN
AMENDMENT
INSTRUMENTATION
NEW SODIUM HYPOCHLORITE
PUMP SKID 1
P&ID

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 1 64 ID 173	

80367
REGISTERED
PROFESSIONAL ENGINEER
HOUSTON, TEXAS

I-90-608

FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\CCB Redesign\Drawings\I-90-608 New Sodium Hypochlorite Pump Skid 01 P&ID.dwg



NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	RK
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
RAMESH KALLURI
68078
REGISTERED PROFESSIONAL ENGINEER
2/11/2025

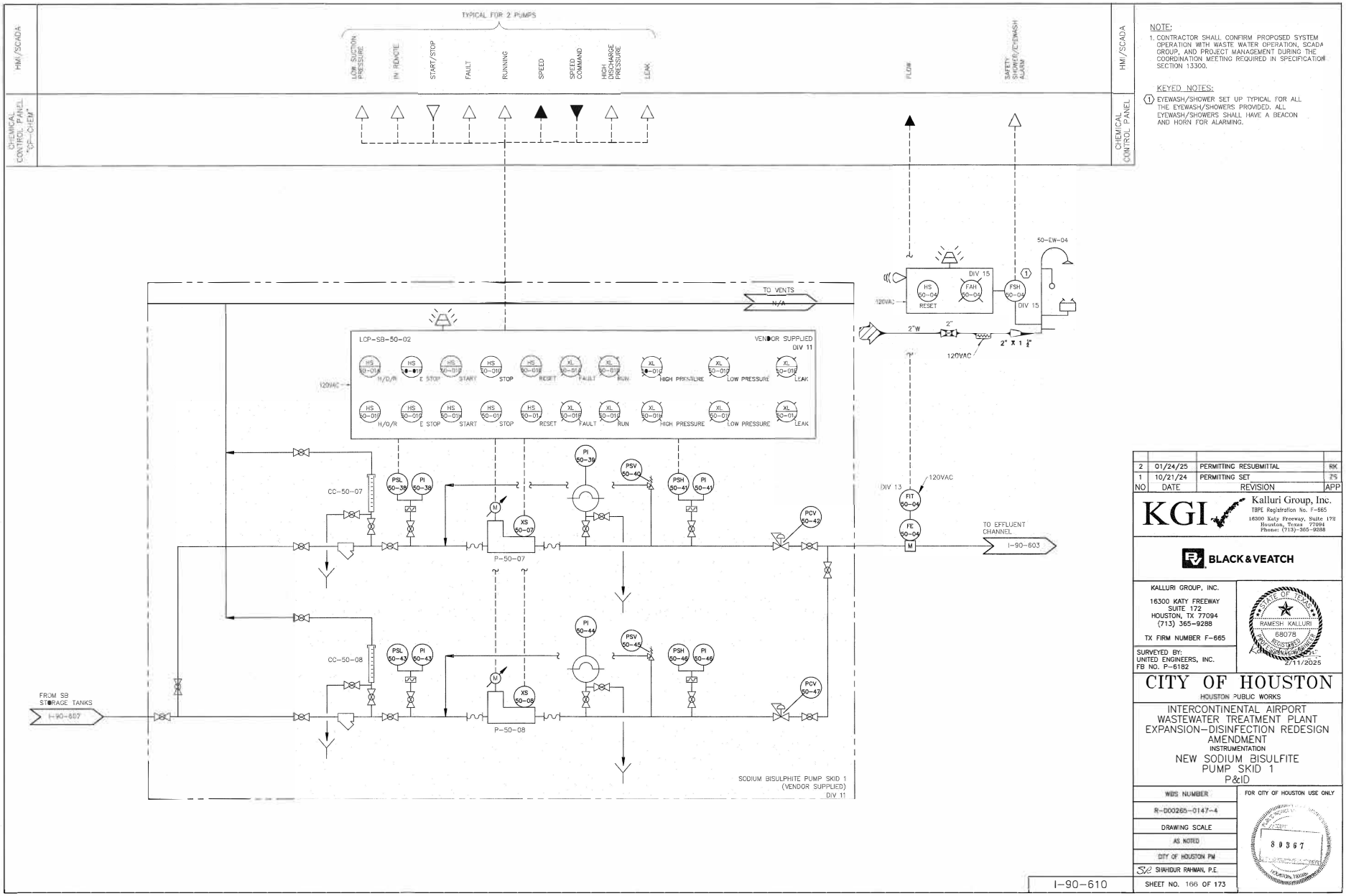
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION–DISINFECTION REDESIGN
AMENDMENT
INSTRUMENTATION
NEW SODIUM HYPOCHLORITE
PUMP SKID 2
P&ID

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 165 OF 173	

I-90-609

FILE PATH: C:\Users\Vloward\Kalluri Group, Inc\KGI - Documents\4160-BV (AH Imp Pkg 2)\CCB Redesign\Drawings\I-90-609 New Sodium Hypochlorite Pump Skid 02 P&ID.dwg



NOTE:

1. CONTRACTOR SHALL CONFIRM PROPOSED SYSTEM OPERATION WITH WASTE WATER OPERATION, SCADA GROUP, AND PROJECT MANAGEMENT DURING THE COORDINATION MEETING REQUIRED IN SPECIFICATION SECTION 13300.

KEYED NOTES:

(1) EYEWASH/SHOWER SET UP TYPICAL FOR ALL THE EYEWASH/SHOWERS PROVIDED. ALL EYEWASH/SHOWERS SHALL HAVE A BEACON AND HORN FOR ALARMING.

NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	RK
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
RAMESH KALLURI
68078
REGISTERED
PROFESSIONAL
ENGINEER
2/11/2025

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION–DISINFECTION REDESIGN
AMENDMENT
INSTRUMENTATION

NEW SODIUM BISULFITE
PUMP SKID 1
P&ID

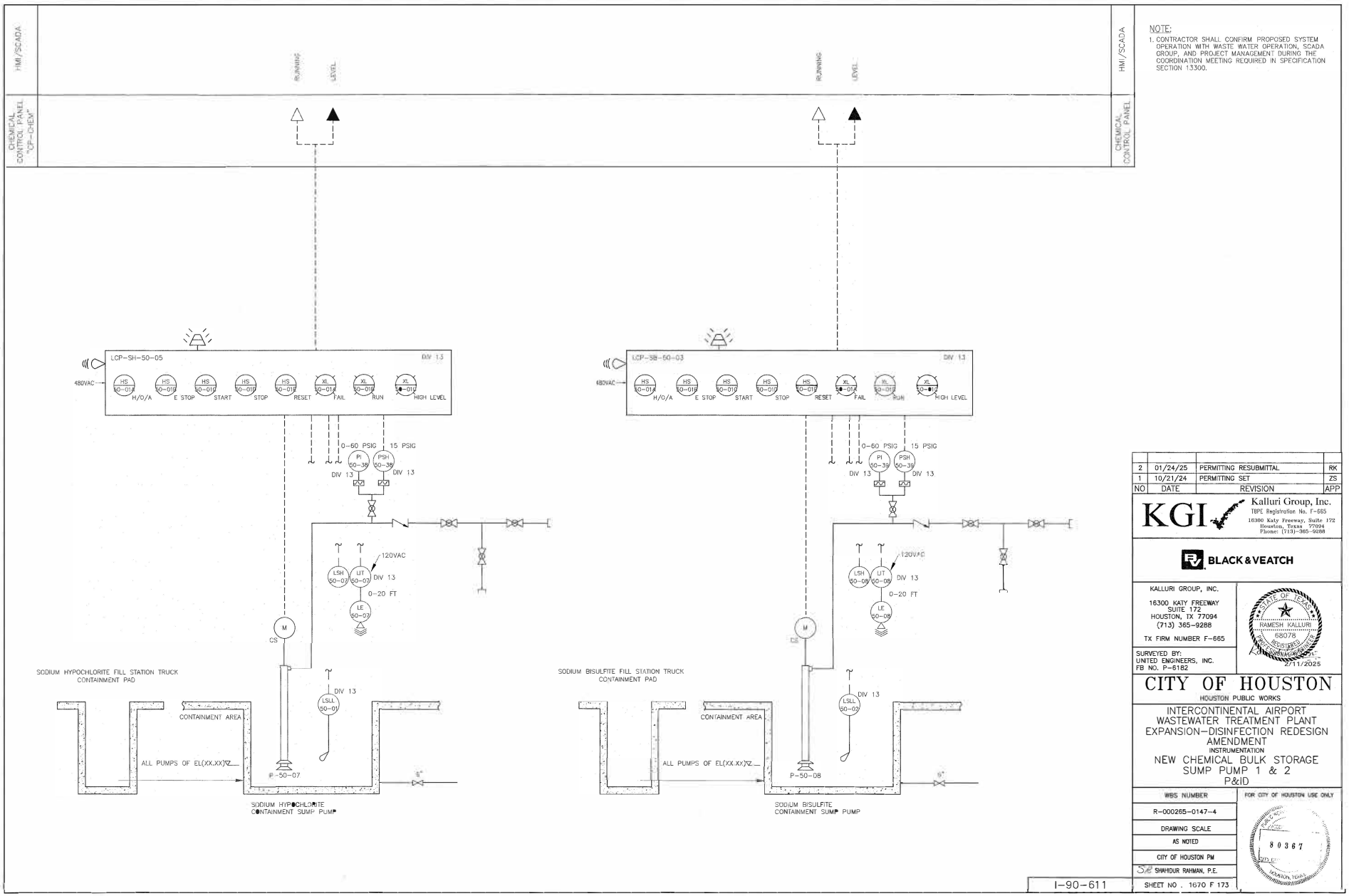
WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.
SHEET NO.	166 OF 173

FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
SHAHIDUR RAHMAN
89367
LICENSED
PROFESSIONAL
ENGINEER

I-90-610

FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\CCB Redesign\Drawings\I-90-610 New Sodium Bisulfite Pump Skid 01 P&ID.dwg



NOTE:

1. CONTRACTOR SHALL CONFIRM PROPOSED SYSTEM OPERATION WITH WASTE WATER OPERATION, SCADA GROUP, AND PROJECT MANAGEMENT DURING THE COORDINATION MEETING REQUIRED IN SPECIFICATION SECTION 13300.

NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	RK
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
RAMESH KALLURI
68078
LICENSED PROFESSIONAL ENGINEER
2/11/2025

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION–DISINFECTION REDESIGN
AMENDMENT

INSTRUMENTATION

NEW CHEMICAL BULK STORAGE SUMP PUMP 1 & 2 P&ID

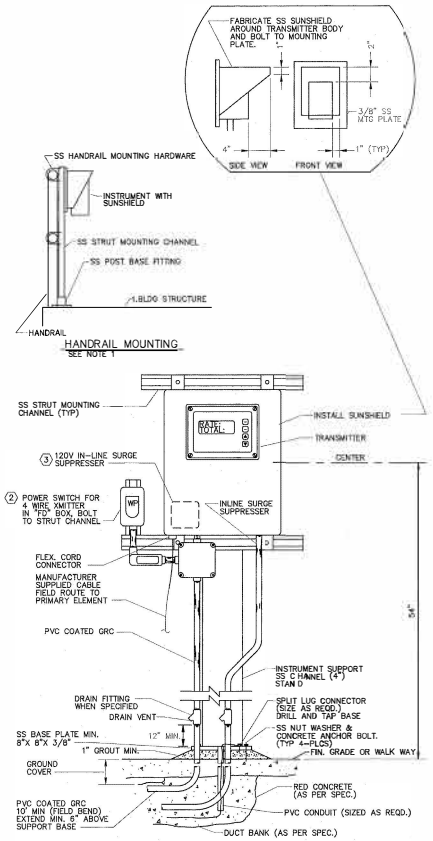
WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	

STATE OF TEXAS
80367
SHAHIDUR RAHMAN
REGISTERED
PROFESSIONAL ENGINEER
HOUSTON, TEXAS

I-90-611

SHEET NO . 1670 F 173

FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\CCB Redesign\Drawings\I-90-611 New Chemical Bulk Storage Sump Pumps 1 & 2 P&ID.dwg

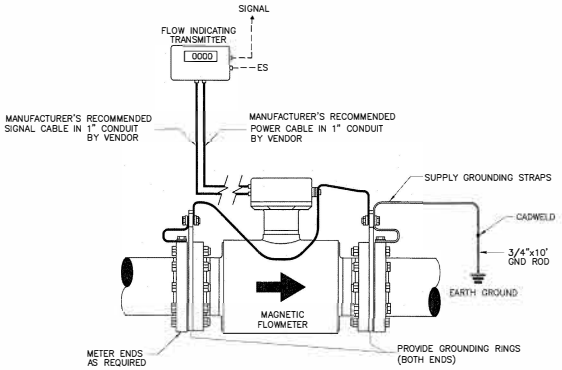


KEYED NOTES:

1. THIS DETAIL IS APPLICABLE FOR HANDRAIL MOUNTING. CONTRACTOR TO MODIFY INSTALLATION AS REQUIRED BY SITE CONDITIONS.
2. SWITCH REQUIRED WHEN UNIT IS REMOTE MOUNTED, OUT OF SIGHT OF CONTROLLING CIRCUIT BREAKER.
3. DIN RAIL MOUNTED SILICON DIODE TYPE SUPPRESSOR FOR REMOTE UNITS MOUNTED OUTSIDE ONLY.

TYPICAL INSTRUMENTATION INSTALLATION

A DETAIL
NTS

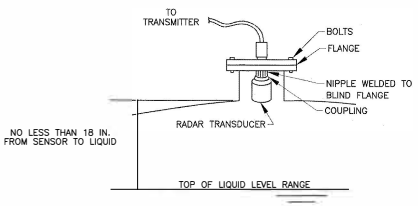


MAGNETIC FLOW METER INSTALLATION

B DETAIL
NTS

KEYED NOTES:

1. POWER SUPPLY TO MAGNETIC METER PRIMARY DEVICE AND TRANSMITTER TO BE FROM SAME SOURCE WITH RESPECT TO VOLTAGE, FREQUENCY AND PHASE.
2. INSTALLATION OF METERS SHALL PROVIDE FOR 6 PIPE DIAMETERS UPSTREAM AND 6 PIPE DIAMETERS DOWNSTREAM AND PER MANUFACTURERS RECOMMENDATION.
- METER MUST HAVE ULTRASONIC SELF-CLEANING ELECTRODES.
4. METER SHALL BE INSTALLED SO THAT IT CAN BE TAKEN OUT OF SERVICE FOR CALIBRATION AND/OR MAINTENANCE WITHOUT DISRUPTING ASSOCIATED PROCESS.
5. METER SHALL NOT BE LOCATED NEAR HEAVY INDUCTION EQUIPMENT (MIN 20 FEET) AND PER MANUFACTURERS RECOMMENDATION.
6. ORIENT THE METER SO THAT THE ELECTRODES LIE IN PLANE PARALLEL TO FLOOR.
7. WALL MOUNT THE TRANSMITTER WITHIN SITE OF METER.
8. INSTALL AIR BLEED VALVES FOR METER MOUNTED HORIZONTALLY.
9. REFER DETAIL A AND G FOR GENERAL INSTALLATION DETAILS AND TRANSMITTER SUNSHIELD INSTALLATION.



NOTES:

1. CONTRACTOR TO CONSULT THE ENGINEER AND FINALIZE THE LOCATION FOR INSTALLATION.
2. PROVIDE TEMPERATURE COMPENSATION FOR SENSOR PER MANUFACTURER RECOMMENDATIONS.
3. PROVIDE AN AIR PURGE OR HEATER TO PREVENT CONDENSATION.
4. MODIFY THE MOUNTING FOR FLANGED INSTALLATION ACCORDING TO SITE CONDITION.

RADAR LEVEL(ON CLOSED TANK OR WETWELL)

C DETAIL
NTS

NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	RK
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
RAMESH KALLURI
68078
REGISTERED
PROFESSIONAL
ENGINEER
2/11/2025

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

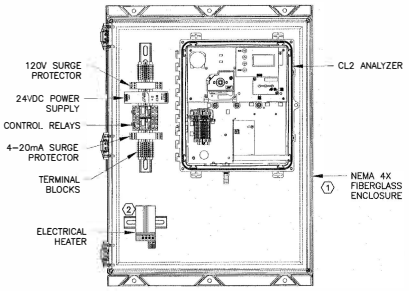
INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT
INSTRUMENTATION
DETAILS 1 OF 4

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000285-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHIDUR RAHMAN, P.E.	
SHEET NO. 168 OF 173	

STATE OF TEXAS
80997
LICENSED
PROFESSIONAL
ENGINEER

I-99-501

FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160-BV (AH Imp Pkg 2)\CCB Redesign\Drawings\I-99-501 Details 1.dwg

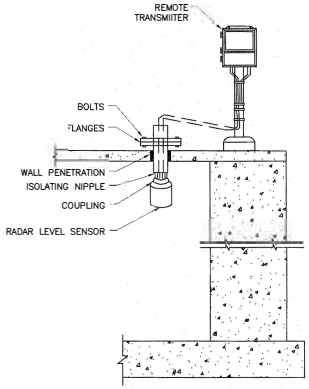


KEYED NOTES:

1. THE NEMA 4X FIBERGLASS ENCLOSURE SHALL BE 30" HEIGHT, 24" WIDTH, AND 12" DEPTH MINIMUM.
2. THE DIN RAIL MOUNTED HEATER SHALL HAS INTEGRATED THERMOSTAT.

CHLORINE ANALYZER TRANSMITTER INSTALLATION

A DETAIL NTS



KEYED NOTES:

1. CONTRACTOR TO INSTALL PER MANUFACTURE RECOMMENDATION.
2. CONTRACTOR SHALL COORDINATE WITH ENGINEER TO FINALIZE THE CORE DRILL LOCATIONS
3. REFER TO DETAIL G FOR TRANSMITTER SUNSHIELD.

RADAR LEVEL SENSOR MOUNT

B DETAIL NTS

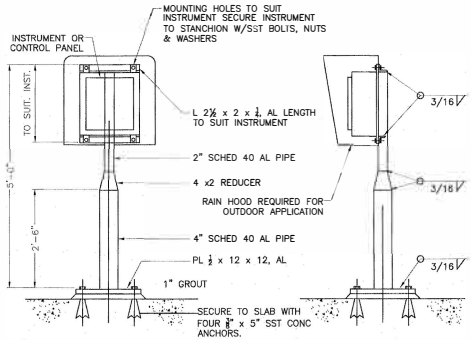


NOTES:

1. THE INSTRUMENT TAG IS TO HAVE THE PROCESS AREA, INSTRUMENT NUMBER,AND PROCESS DESCRIPTION LISTED ON THE TAG.
2. ALL TAG INFORMATION IS TO BE IN STANDARD ISA FORMAT.
3. THE INSTRUMENT TAG WILL BE SIZED IN A 3X2 RATIO.THE EXAMPLE IS 3 INCHES X 2 INCHES.ALL LETTERING WILL BE 3/16" IN HEIGHT.
4. INSTRUMENT TAG TO BE AFFIXED IN A LOCATION ADJACENT TO THE INSTRUMENT WITH EITHER SELF TAPPING STAINLESS STEEL SCREWS,STAINLESS STEEL WIRE OR CHAIN.

INSTRUMENT TAG

C DETAIL NTS

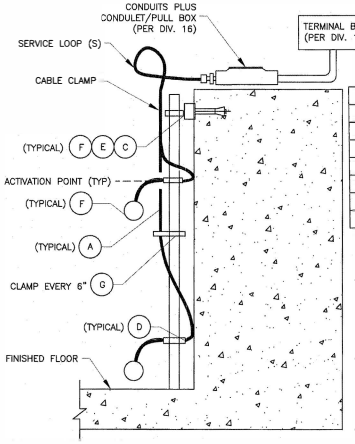


KEYED NOTES:

1. ROUND OFF ALL EXPOSED EDGES AND CORNERS.
2. PAINT ALUMINUM IN CONTACT WITH CONCRETE ACCORDING TO SPECIFICATIONS FOR PAINTING.

STANCHION SUPPORT FOR CASE MOUNTED INSTRUMENTS

D DETAIL NTS



ITEM	DESCRIPTION	MATERIAL
A	FLOAT SWITCH	SEE 13729
B	1" RIGID PIPE	316SS
C	PIPE WALL MOUNTING BRACKET	316SS
D	PIPE MOUNTING CLIP	316SS
E	NEOPRENE SHEET	N/A
F	1/2" DIA. EXPANSION BOLTS	316SS
G	CABLE CLAMP	316SS

KEYED NOTES:

1. FLOAT SWITCHES SHALL BE POSITIONED TO AVOID OBSTRUCTIONS FROM THE WALL, PROCESS EQUIPMENT OR OTHER FLOATS. ALL FLOAT SWITCHES MUST BE AT MINIMUM 45 DEGREES FROM ANY WALL AND REQUIRE AT LEAST 12 INCHES OF CLEARANCE IN THE HORIZONTAL AND VERTICAL AXIS.
2. FOR INSTALLATIONS WHERE MULTIPLE FLOAT SWITCHES ARE INSTALLED WITHIN THE 12 INCHES OF EACH OTHER, OFFSET THE SWITCHES AT 90 DEGREES FROM THE ADJACENT FLOAT WHILE STILL REMAINING THE CLEARANCE LIMITATIONS IN NOTE 1.
3. FOR THROUGH SLAB INSTALLATION (NOT SHOWN) PROVIDE A 6" FL X PE PVC SLEEVE FOR SLAB PENETRATION PURPOSES.

FLOAT SWITCH (OPEN CHANNEL/POLE MOUNTED)

E DETAIL NTS

NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	RK
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
RAMESH KALLURI
68078
REGISTERED
PROFESSIONAL ENGINEER
2/11/2025

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT
INSTRUMENTATION

DETAILS 2 OF 4

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	
SR SHAHIDUR RAHMAN, P.E.	

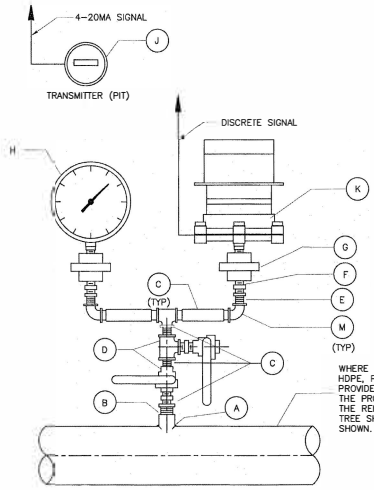
FOR CITY OF HOUSTON USE ONLY

STATE OF TEXAS
80367
SHAHIDUR RAHMAN
REGISTERED
PROFESSIONAL ENGINEER
10/28/2025

I-99-502

SHEET NO. 169 OF 173

FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\CCB Redesign\Drawings\I-99-502 Details 2.dwg



	ITEM	DESCRIPTION	MATERIAL
*	A	1 1/2" PROCESS CONNECTION	MATCH PIPE
*	B	1 1/2" X 3/4" BUSHING	304SS
*	C	3/4" NIPPLE	304SS
*	D	3/4" BALL VALVE	304SS
*	E	3/4" X 1/2" BUSHING	304SS
*	F	1/2" NIPPLE	304SS
*	G	THREADED DIAPHRAGM SEAL	REFER SPEC
*	H	PRESSURE GAUGE (PG)	REFER SPEC
*	J	PRESSURE TRANSMITTER (PIT)	REFER SPEC
*	K	PRESSURE SWITCH (PSH/PSL)	REFER SPEC
*	L	3/4" TEE	304SS
*	M	3/4" ELBOW	304SS

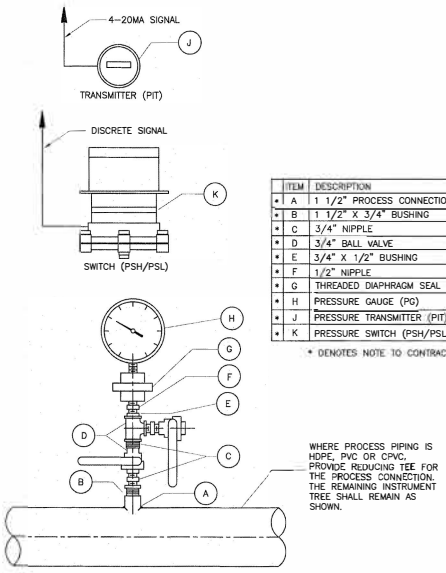
* DENOTES NOTE TO CONTRACTOR

KEYED NOTES:

1. PROVIDE PROCESS CONNECTION (ITEM A) ACCORDING TO MECHANICAL DETAILS.
2. COMBINATION BLOCK AND BLEED MANIFOLD MAY BE INSTALLED IN PLACE OF BALL VALVES (ITEM D).
3. PROVIDE THREADED DIAPHRAGM SEAL WHERE INDICATED ON DRAWINGS. REFER TO SPECS FOR GUIDANCE.
4. WHEN DIAPHRAGM SEAL IS INSTALLED, EVACUATE SECTION BETWEEN DIAPHRAGM AND INSTRUMENT OF AIR AND SEAL WITH SILICONE FILL FLUID UNLESS SPECIFIED OTHERWISE.
5. PROVIDE PRESSURE DEVICE (ITEM H, J, OR K) WHERE INDICATED ON THE DRAWINGS. REFER TO SPECS FOR GUIDANCE.
6. ROUTE FIELD WIRES FROM DEVICE TO JUNCTION BOX IN FLEXIBLE CONDUIT.
7. SPACE PRESSURE DEVICES TO PROMOTE SERVICING DEVICE WITHOUT INTERFERENCE.

PRESSURE DEVICE (DOUBLE TREE) STANDARD SERVICE TAP

A DETAIL
NTS



	ITEM	DESCRIPTION	MATERIAL
*	A	1 1/2" PROCESS CONNECTION	MATCH PIPE
*	B	1 1/2" X 3/4" BUSHING	304SS
*	C	3/4" NIPPLE	304SS
*	D	3/4" BALL VALVE	304SS
*	E	3/4" X 1/2" BUSHING	304SS
*	F	1/2" NIPPLE	304SS
*	G	THREADED DIAPHRAGM SEAL	REFER SPEC
*	H	PRESSURE GAUGE (PG)	REFER SPEC
*	J	PRESSURE TRANSMITTER (PIT)	REFER SPEC
*	K	PRESSURE SWITCH (PSH/PSL)	REFER SPEC

* DENOTES NOTE TO CONTRACTOR

KEYED NOTES:

1. PROVIDE PROCESS CONNECTION (ITEM A) ACCORDING TO MECHANICAL DETAILS.
2. COMBINATION BLOCK AND BLEED MANIFOLD MAY BE INSTALLED IN PLACE OF BALL VALVES (ITEM D).
3. PROVIDE THREADED DIAPHRAGM SEAL WHERE INDICATED ON DRAWINGS. REFER TO SPECS FOR GUIDANCE.
4. WHEN DIAPHRAGM SEAL IS INSTALLED, EVACUATE SECTION BETWEEN DIAPHRAGM AND INSTRUMENT OF AIR AND SEAL WITH SILICONE FILL FLUID UNLESS SPECIFIED OTHERWISE.
5. PROVIDE PRESSURE DEVICE (ITEM H, J, OR K) WHERE INDICATED ON THE DRAWINGS. REFER TO SPECS FOR GUIDANCE.
6. ROUTE FIELD WIRES FROM DEVICE TO JUNCTION BOX IN FLEXIBLE CONDUIT.

PRESSURE DEVICE (SINGLE TREE) STANDARD SERVICE TAP

B DETAIL
NTS

NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	RK
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
RAMESH KALLURI
68078
REGISTERED
PROFESSIONAL ENGINEER
2/11/2025

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

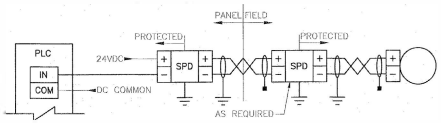
INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT
INSTRUMENTATION
DETAILS 3 OF 4

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SR SHAHIDUR RAHMAN, P.E.
SHEET NO.	170 OF 173

FOR CITY OF HOUSTON USE ONLY
PUBLIC WORKS & ENGINEERING
ACCEPTED
89367
HOUSTON, TEXAS

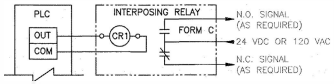
I-99-503

FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\CCB Redesign\Drawings\I-99-503 Details 3.dwg



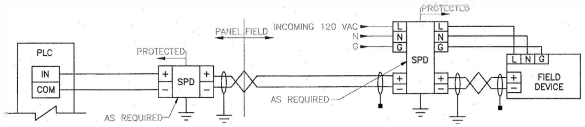
TYPICAL TRANSMITTER LOOP (LOOP POWERED: 2 WIRE)

A DETAIL NTS



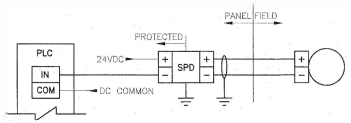
TYPICAL DISCRETE OUTPUT LOOP

B DETAIL NTS



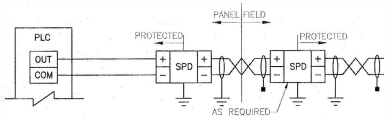
TYPICAL TRANSMITTER LOOP (LOOP POWERED: 4 WIRE)

C DETAIL NTS



TYPICAL DSCRETE INPUT LOOP

D DETAIL NTS



TYPICAL ANALOG OUTPUT LOOP

E DETAIL NTS

KEYED NOTES:

1. TERMINATE SPD DIRECTLY TO GROUND BUS. DO NOT DAISY CHAIN.
2. TERMINATE SHIELD/DRAIN WIRE DIRECTLY TO SHIELD BUS/GROUND. DO NOT DAISY CHAIN.
3. TAPE BACK SHIELD/DRAIN WIRE WHERE INDICATED.
4. WHERE SPD ARE REQUIRED IN THE FIELD, INSTALL SURGE PROTECTION AS CLOSE TO FIELD DEVICE AS POSSIBLE.
5. ALL CIRCUITS TO BE FUSED PROTECTED.

NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	RK
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16 300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6 182

STATE OF TEXAS
RAMESH KALLURI
88078
REGISTERED
PROFESSIONAL ENGINEER
2/11/2025

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

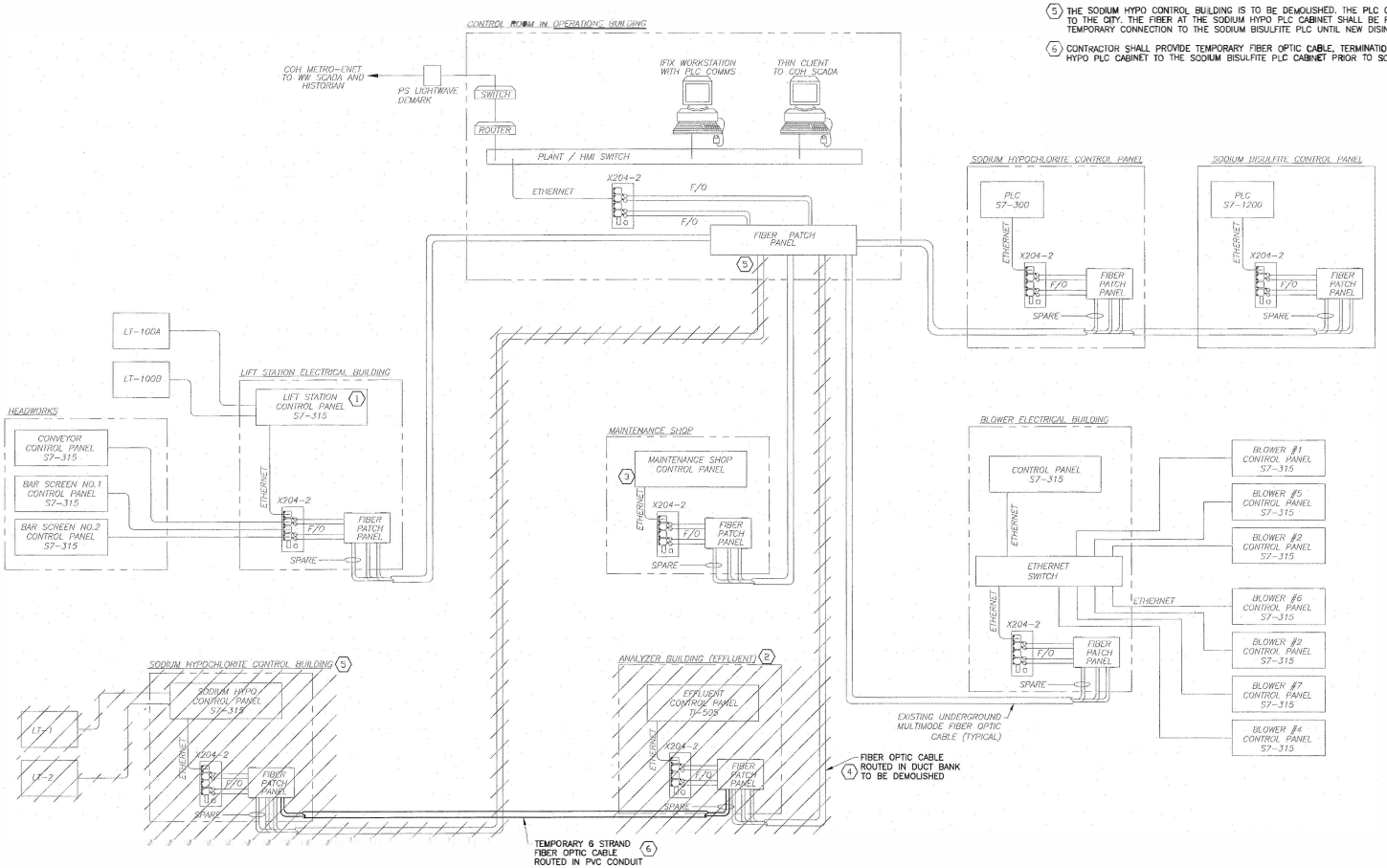
INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION–DISINFECTION REDESIGN
AMENDMENT
INSTRUMENTATION
DETAILS 4 OF 4

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000265-0147-4	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
SHAHDUR RAHMAN, P.E.	
SHEET NO. 171 OF 173	

STATE OF TEXAS
80367
REGISTERED
PROFESSIONAL ENGINEER
HOUSTON, TEXAS

1-99-504

FILE PATH: C:\Users\howard\Kalluri Group, Inc\KGI - Documents\4160-BV (WH Imp Phg 2)\CCB Redesign\Drawings\1-99-504 Details 4.dwg



EXISTING SCADA NETWORK DIAGRAM

MTS

NOTES:

1. THE INFLUENT LIFT STATION AND HEADWORKS IS TO HAVE PROGRAMMING AND GRAPHICS MODIFIED TO REPRESENT NEW FACILITIES AND CONTROL PHILOSOPHY. THE EXISTING PLC IS TO HAVE NAMEPLATE AND WIRING TAGS RELEVANT TO LIFT STATION PUMPS, EXISTING HEADWORKS GRIT SYSTEM AND INSTRUMENTATION REMOVED REPLACED WITH APPROPRIATE NAMEPLATES AND TAGS.
2. THE EXISTING CHLORINE CONTACT BASINS, FLOW MEASURING, NPW AND POST TREATMENT CHEMICAL FACILITY ARE TO BE REMOVED AND REPLACED IN THIS PROJECT. THE CONTRACTOR SHALL PROVIDE ANY TEMPORARY FIBER OPTIC CABLE REQUIRED TO KEEP THE DISINFECTION AND FLOW MONITORING EQUIPMENT IN OPERATION, UNTIL NEW UV FACILITIES ARE IN SERVICE, INCLUDING ALL TEMPORARY CONDUIT AND CONDUCTORS REQUIRED.
3. THE TI-500 PLC HAS BEEN REMOVED FROM SERVICE. THE ENCLOSURE IS TO REMAIN AND BE IMPROVED. RESEARCH OF EXISTING INSTRUMENTATION AND COMMUNICATION WIRING IS REQUIRED TO ACCOMPLISH THE PLC REPLACEMENT AND EXPANSION.
4. THIS DUCT BANK MUST BE REMOVED FOR CONSTRUCTION OF NEW FACILITIES. COORDINATE WITH ELECTRICAL AND WASTEWATER SCADA GROUP TO CONNECT A TEMPORARY FIBER OPTIC CABLE TO THE PLANT NETWORK AND ENSURE FULL PLANT OPERATION.
5. THE SODIUM HYPO CONTROL BUILDING IS TO BE DEMOLISHED. THE PLC CABINET IS TO BE CAREFULLY REMOVED AND RETURNED TO THE CITY. THE FIBER AT THE SODIUM HYPO PLC CABINET SHALL BE RECONNECTED AT THE OPERATIONS BUILDING TO ALLOW TEMPORARY CONNECTION TO THE SODIUM BISULFITE PLC UNTIL NEW DISINFECTION FACILITY IS ONLINE.
6. CONTRACTOR SHALL PROVIDE TEMPORARY FIBER OPTIC CABLE, TERMINATIONS, TESTING AND CROSS CONNECTION FROM THE SODIUM HYPO PLC CABINET TO THE SODIUM BISULFITE PLC CABINET PRIOR TO SCADA DUCT BANK REMOVAL.

EQUIPMENT REMOVAL NOTES:

A. THIS DRAWING ILLUSTRATES AND DESCRIBES EQUIPMENT TO BE REMOVED IN THIS PROJECT.

B. CONTRACTOR SHALL DOCUMENT THE OPERATIONAL STATUS OF ALL EQUIPMENT TO BE REMOVED PRIOR TO SCHEDULING REMOVAL. THE STATUS, SOURCE, PATH OF SIGNALS, CONTROL AND SCADA CIRCUITS SHALL BE CONFIRMED.

C. CONTRACTOR SHALL NOTIFY THE CITY CONSTRUCTION REPRESENTATIVE UPON DISCOVERY OF ANY DEVIATIONS FROM THE DRAWINGS.

D. ALL EQUIPMENT SHALL CAREFULLY REMOVED, SAFELY STORED IN DRY FACILITY TO BE RETURNED TO THE CITY THROUGH TRANSMITTAL PROCESS.

GENERAL NOTES:

1. THE EXISTING OPERATIONS BUILDING AND CONTROL ROOMS ARE TO REMAIN IN SERVICE THROUGH THIS PROJECT. THERE ARE CHANGES TO ETHERNET CONNECTIONS AND SOFTWARE IN THIS PROJECT.

NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	RK
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365- 9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
RAMESH KALLURI
68078
REGISTERED
PROFESSIONAL ENGINEER
2/11/2025

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION–DISINFECTION REDESIGN
AMENDMENT
INSTRUMENTATION

EXISTING SCADA NETWORK DIAGRAM

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	SHAHIDUR RAHMAN, P.E.

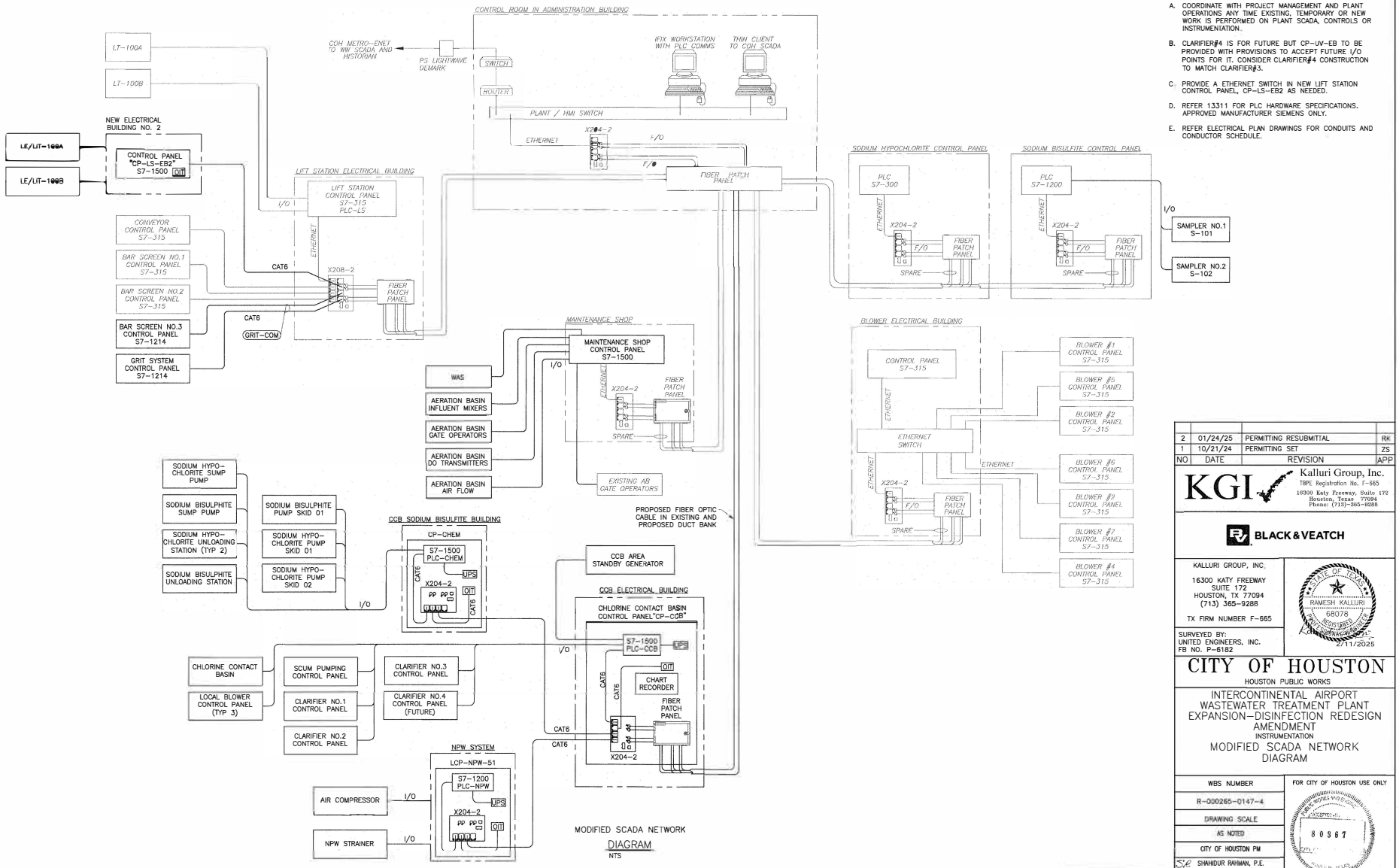
FOR CITY OF HOUSTON USE ONLY

80367
REGISTERED
PROFESSIONAL
ENGINEER
HOUSTON, TEXAS

I -99-601

SHEET NO. 172 OF 173

FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160-BV (JH Imp Pkg 2)\CCB Redesign\Drawings\I-99-601 Existing Scada Network Diagram.dwg



GENERAL NOTES:

A. COORDINATE WITH PROJECT MANAGEMENT AND PLANT OPERATIONS ANY TIME EXISTING, TEMPORARY OR NEW WORK IS PERFORMED ON PLANT SCADA, CONTROLS OR INSTRUMENTATION.

B. CLARIFIER #4 IS FOR FUTURE BUT CP-UV-EB TO BE PROVIDED WITH PROVISIONS TO ACCEPT FUTURE I/O POINTS FOR IT. CONSIDER CLARIFIER #4 CONSTRUCTION TO MATCH CLARIFIER #3.

C. PROVIDE A ETHERNET SWITCH IN NEW LIFT STATION CONTROL PANEL, CP-LS-EB2 AS NEEDED.

D. REFER 13311 FOR PLC HARDWARE SPECIFICATIONS. APPROVED MANUFACTURER SIEMENS ONLY.

E. REFER ELECTRICAL PLAN DRAWINGS FOR CONDUITS AND CONDUCTOR SCHEDULE.

NO	DATE	REVISION	APP
2	01/24/25	PERMITTING RESUBMITTAL	RK
1	10/21/24	PERMITTING SET	ZS

KGI Kalluri Group, Inc.
TBPE Registration No. F-665
16300 Katy Freeway, Suite 172
Houston, Texas 77094
Phone: (713)-365-9288

BLACK & VEATCH

KALLURI GROUP, INC.
16300 KATY FREEWAY
SUITE 172
HOUSTON, TX 77094
(713) 365-9288
TX FIRM NUMBER F-665

SURVEYED BY:
UNITED ENGINEERS, INC.
FB NO. P-6182

STATE OF TEXAS
RAMESH KALLURI
68078
REGISTERED
PROFESSIONAL ENGINEER
2/11/2025

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

INTERCONTINENTAL AIRPORT
WASTEWATER TREATMENT PLANT
EXPANSION-DISINFECTION REDESIGN
AMENDMENT
INSTRUMENTATION
MODIFIED SCADA NETWORK DIAGRAM

WBS NUMBER	R-000265-0147-4
DRAWING SCALE	AS NOTED
CITY OF HOUSTON PM	
	SHAHIDUR RAHMAN, P.E.
SHEET NO.	173 OF 173

FOR CITY OF HOUSTON USE ONLY
ACCEPTED
80367
CITY OF HOUSTON, TEXAS

I-99-602

FILE PATH: C:\Users\Howard\Kalluri Group, Inc\KGI - Documents\4160-BV (IAH Imp Pkg 2)\CCB Redesign\Drawings\I-99-602 Modified Scada Network Diagram.dwg