CITY OF HOUSTON

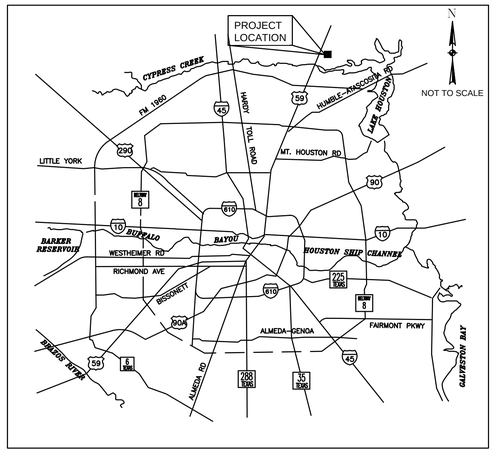
HOUSTON PUBLIC WORKS

CAPITAL PROJECTS

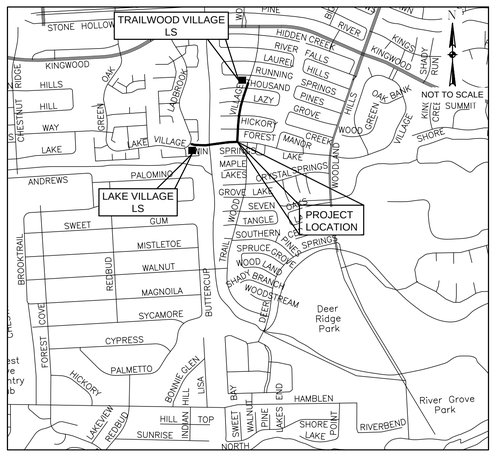
GRAVITY SEWER FROM TRAILWOOD VILLAGE LIFT STATION TO LAKE VILLAGE LIFT STATION

WBS NO. R-000267-178A-3

60% SUBMITTAL



LOCATION MAP



VICINITY MAP
KEY MAP NO 336B & 336C
COUNCIL DISTRICT B

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
ALEJANDRA SALINAS — POSITION 4
SALLIE ALCORN — POSITION 5

RPS A TETRA TECH COMPANY
Texas PE Firm Reg. #F-929
575 N. Dairy Ashford, Suite 700, Houston, Texas 77079
T +1 281 589 7257 E usinfrastructure@rpsgroup.com

SURVEYED BY: KUO INC
FB NO. F–4578

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Jeremy Austin, P.E.
Texas P.E. No. 116816
02/16/2026

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PARKS–FORESTRY DEPT.

METRO

HOUSTON WATER

TRANSPORTATION & DRAINAGE OPERATIONS

CAPITAL PROJECTS

SURVEY

CITY ENGINEER DATE

DIRECTOR OF HOUSTON PUBLIC WORKS DATE

FOR CITY OF HOUSTON USE ONLY

SHEET NO 1 OF 125 SHEETS

SHEET NO.	SHEET TITLE
GENERAL	
1	COVER
2	SHEET INDEX
3	HARRIS COUNTY ENGINEERING DEPARTMENT REVIEW SHEET
4	HARRIS COUNTY FLOOD CONTROL EXPRESS REVIEW SHEET
5	ABBREVIATIONS
6	SYMBOLS
7–8	GENERAL NOTES
9–12	SURVEY DATA
SITE PREPARATION	
13	FIRMETTE – TRAILWOOD VILLAGE LS
14	EXISTING & DEMOLITION SITE PLAN – TRAILWOOD VILLAGE LS
15	FIRMETTE – LAKE VILLAGE LS
16	EXISTING SITE PLAN – LAKE VILLAGE LS
17	GRADING & DRAINAGE PLAN – LAKE VILLAGE LS
18	PROPOSED SITE PLAN – LAKE VILLAGE LS
19	LAKE VILLAGE LIFT STATION – PLAN STA. 1+00 TO 2+00 BASELINE–A
20	LAKE VILLAGE LIFT STATION – PROFILE STA. 1+00 TO 2+00 BASELINE–A
21	TRAILWOOD GRAVITY DIVERSION PLAN STA. 1+00 TO STA. 5+00
22	TRAILWOOD GRAVITY DIVERSION PROFILE STA. 1+00 TO STA. 5+00
23	TRAILWOOD GRAVITY DIVERSION PLAN STA. 5+00 TO STA. 9+00
24	TRAILWOOD GRAVITY DIVERSION PROFILE STA. 5+00 TO STA. 9+00
25	TRAILWOOD GRAVITY DIVERSION PLAN STA. 9+00 TO STA. 13+00
26	TRAILWOOD GRAVITY DIVERSION PROFILE STA. 9+00 TO STA. 13+00
27	TRAILWOOD GRAVITY DIVERSION PLAN STA. 14+00 TO STA. 18+00
28	TRAILWOOD GRAVITY DIVERSION PROFILE STA. 14+00 TO STA. 18+00
29	TRAILWOOD GRAVITY DIVERSION PLAN STA. 18+00 TO STA. 22+00
30	TRAILWOOD GRAVITY DIVERSION PROFILE STA. 18+00 TO STA. 22+00
31	TRAILWOOD GRAVITY DIVERSION PLAN STA. 22+00 TO STA. 26+00
32	TRAILWOOD GRAVITY DIVERSION PROFILE STA. 22+00 TO STA. 26+00
33	TRAILWOOD GRAVITY DIVERSION PLAN STA. 26+00 TO STA. 28+50
34	TRAILWOOD GRAVITY DIVERSION PROFILE STA. 26+00 TO STA. 28+50
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125	LAKE VILLAGE LIFT STATION PUMP NO.3 CONTROL WIRING DIAGRAM

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E usinfrastructure@rpsgroup.com

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION COH LIFT STATIONS

SHEET INDEX

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R–000267–00178A–3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 2 OF 125	

FILE PATH: C:\Users\andres.martinezjr\DC\ACCDocs\Tetra Tech Inc\200–317106–24001 COH LS Rehab Design\Project Files\CAD\R–000267–00178A–3_SYS_Index 1.dwg PLOTTED: 2/16/2026 11:11 AM

1. PAVING

(FOR EXISTING OR PROPOSED HC PUBLIC R.O.W.)

CONCRETE

DESIGN THICKNESS OF PAVING	STABILIZED SUBGRADE DEPTH	DESIGN STRENGTH OF CONCRETE	STEEL SPACING		REINFORCE STEEL SIZE
			LONG.	TRANS.	
(IN.)	(IN.)	(PSI)	(IN.)	(IN.)	(#4 MIN.)
6	6	4000	12	12	#4

ASPHALT

DESIGN SURFACE COURSE THICKNESS	DESIGN SURFACE COURSE TYPE	DESIGN BASE COURSE THICKNESS	DESIGN BASE COURSE TYPE	STABILIZED SUBGRADE DEPTH	STABILIZED SUBGRADE TYPE
(IN.)	(MATERIAL)	(IN.)	(MATERIAL)	(IN.)	(MATERIAL)

DRIVEWAYS (IN EXISTING OR PROPOSED HC PUBLIC R.O.W.)

I. NUMBER OF DRIVEWAY APPROACHES PROPOSED INCLUDING WIDENING OR REPAVING EXISTING DRIVEWAYS

DRWY	WIDTH	MATERIAL	CULVERT (Y/N)	CULVERT LENGTH	NEAREST CROSS-STREET	DISTANCE TO CROSS-STREET
1						
2						
3						
4						
5						

II. HARRIS COUNTY STANDARD DRIVEWAY DETAIL APPEARS ON SHEET(S): _____

III. ADDITIONAL DRIVEWAY TABLE (AS APPLICABLE) APPEARS ON SHEET(S): _____

FIRE APPARATUS ACCESS ROAD

☐ REQUIRED AND SHOWN ON SHEET(S): _____
☐ NOT REQUIRED DUE TO: _____

CURBING

☒ STANDARD 6" CURBING PROPOSED
☐ 4" x 12" CURBING PROPOSED EXCEPT AT MEDIANS AND ISLANDS

2. TRAFFIC

I. MEDIAN CUTS
☐ MEDIAN MODIFICATIONS ARE SHOWN ON SHEET(S): _____
☒ NO MEDIAN CUT OR RELOCATION IS PROPOSED

II. LEFT / RIGHT TURN LANE
☐ LEFT / RIGHT TURN LANE IS SHOWN ON SHEET(S): _____
☒ NO LEFT / RIGHT TURN LANE IS PROPOSED

III. TRAFFIC CONTROL PLAN
☒ TRAFFIC CONTROL SHOWN ON SHEET(S): _____
☐ NO WORK IN HC RIGHT OF WAY

IV. TRAFFIC SIGNAL
☐ EXISTING TRAFFIC SIGNAL DEVICES (BOXES AND LOOPS) SHOWN ON SHEET(S): _____
☐ NEW ☐ REBUILT ☐ MODIFIED TRAFFIC SIGNAL SHOWN ON SHEET(S): _____
☐ HC FIBER PRESENT
☒ NO TRAFFIC SIGNAL

V. TRAFFIC IMPACT ANALYSIS
☐ TRAFFIC IMPACT ANALYSIS APPROVED ON DATE: _____ PROJECT NO.:
☒ NO TRAFFIC IMPACT ANALYSIS REQUIRED AND HC APPROVED
☐ NO NEW TRIPS GENERATED

VI. TRAFFIC VARIANCE
☐ TRAFFIC VARIANCE APPROVED ON DATE: _____ PROJECT NO.: _____

3. DESCRIPTION OF PROPERTY

I. LEGAL DESCRIPTION
A. ACREAGE: 0.04
B. ☒ SUBDIVISION: KINGWOOD PLACE SECTION 18
☐ SURVEY & ABSTRACT: _____
C. ADJACENT ROADS: LAKE VILLAGE DR & WESTWOOD LAKE DR

II. PLATTING
A. SUBDIVISION PLAT (CHECK APPLICABLE)
☐ PROPOSED PLAT / REPLAT
☒ RECORDED PLAT / REPLAT
PLAT NAME: RESTRICTED RESERVE "C", REPLAT OF KINGWOOD PLACE SECTION 18

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

NOTE: FINAL CPC101 REQUIRED FOR PLAN APPROVAL, RECORDED PLAT REQUIRED FOR FINAL INSPECTION.

III. JURISDICTIONS
☒ CITY OF HOUSTON
☐ ETJ, CITY OF HOUSTON
☐ ETJ, CITY OF _____
☐ NO ETJ

IV. HCAD ACCOUNT NOS. (ALL)

V. UNOBSTRUCTED VISIBILITY EASEMENT (U.V.E.)
☐ REQUIRED PER PLANNING COMMISSION / HC REGULATIONS SHOWN ON SHEET(S): _____
☒ NOT REQUIRED PER PLANNING COMMISSION / HC REGULATIONS

4. RESIDENTIAL / SUBDIVISION / STREET DEDICATION DRAINAGE

I. PROPOSED DRAINAGE SYSTEM TYPE
☐ STORM SEWER
☐ ROADSIDE DITCH
☐ LOW IMPACT DEVELOPMENT (LID)

II. DESIGN METHOD USED
☐ CITY OF HOUSTON _____ YEAR FREQUENCY
☐ OTHER: _____

III. DRAINAGE SYSTEM OUTFALLS DIRECTLY TO EXISTING
☐ DETENTION BASIN (APPROVED HC PROJECT NO.): _____
DETENTION BASIN MAINTAINED BY: _____
☐ HCFCD DRAINAGE DITCH UNIT NO.: _____
☐ HC ROADSIDE DITCH (ROAD NAME): _____
☐ HC STORM SEWER (APPROVED HC PROJECT NO.): _____

IV. HC OUTFALL CALCULATIONS
☐ ROADSIDE DITCH OUTFALL:
ALLOWABLE OUTFALL RATE: 0.0027 x _____ LF FRONTAGE = _____ (CFS)
PROPOSED OUTFALL RATE: _____ (CFS), CALCULATIONS PROVIDED ON SHEET(S): _____
☐ STORM SEWER OUTFALL
CAPACITY ALLOCATED TO TRACT FROM D. A. MAP: _____ (CFS)
FROM DRAINAGE AREA MAP DATED: _____
PREPARED BY: _____
APPROVED HC PROJECT NO.: _____
ACTUAL OUTFALL RATE: _____ (CFS), CALCULATIONS PROVIDED ON SHEET(S): _____

V. DETENTION PROVIDED BY
☐ DETENTION BASIN IS PART THIS PLAN SET. SERVICE AREA MAP IS ON SHEET(S): _____
☐ REGIONAL DETENTION BASIN SYSTEM (APPROVED HC PROJECT NO.): _____
PROPOSED STORM SEWER IS SUBMERGED (AGREEMENT MUST BE PROVIDED).
STATIC W.S.E. @ OUTFALL IS _____.

5. COMMERCIAL / OTHER SITE DRAINAGE

I. PROPOSED DRAINAGE AREA
☐ NEW DEVELOPMENT AREA: _____
☐ RE-DEVELOPMENT AREA (NET NEW DEVELOPED AREA): _____
☐ LOW IMPACT DEVELOPMENT (LID)

II. DETENTION VOLUME
NEW AREA _____ X * = _____ ACRE FEET DETENTION REQUIRED
*☐ .65 (CHANNEL)
*☐ .75 (STM SWR)
*☐ 1.00 (RD. DITCH)
*☐ OTHER:
PROPOSED DETENTION VOLUME = _____ ACRE FEET
PROPOSED DETENTION VOLUME CALCULATIONS ARE SHOWN ON SHEET(S): _____
DETENTION VOLUME PROVIDED BY EXISTING DETENTION BASIN
APPROVED HC PROJECT NO.: _____
DETENTION BASIN SERVICE AREA MAP IS PROVIDED ON SHEET(S): _____

III. OUTFALL
OUTFALL TO ☐ HC ROADSIDE DITCH ☐ EXISTING HC STORM SEWER ☐ OTHER _____
☐ HC ROADSIDE DITCH OUTFALL:
PROPOSED OUTFALL RATE: _____ (CFS), CALCULATIONS PROVIDED ON SHEET(S): _____
ALLOWABLE OUTFALL RATE: 0.0027 x _____ LF FRONTAGE = _____ (CFS)
☐ HC STORM SEWER OUTFALL:
CAPACITY ALLOCATED TO TRACT FROM D. A. MAP: _____ (CFS)
FROM DRAINAGE AREA MAP DATED: _____
PREPARED BY: _____
APPROVED HC PROJECT NO.: _____
ACTUAL OUTFALL RATE: _____ (CFS), CALCULATIONS PROVIDED ON SHEET(S): _____

IV. PUMPED DETENTION FACILITIES
VOLUME THAT GRAVITY FLOWS: _____ ACRE FEET
VOLUME THAT IS PUMPED: _____ ACRE FEET
ENTRANCE VELOCITY INTO ROADSIDE DITCH OR STORM SEWER: _____
PUMP SPECIFICATIONS AND AUTOMATIC SHUTOFF PLAN FOR ROADSIDE DITCH & STORM SEWER OUTFALLS APPEAR ON SHEET(S): _____

V. FLOW RESTRICTOR SIZE
OUTFALL PIPE SIZE: _____
RESTRICTOR PIPE SIZE: _____
ON SHEET(S): _____

6. OFFSITE SHEET FLOW (100 YEAR)

OFFSITE SHEET FLOW MAPPING, TOTAL DISCHARGE CALCULATIONS, AND DESIGN ACCOMMODATIONS ARE SHOWN ON SHEET(S): _____

TOTAL ACREAGE = _____ (AC.)
TOTAL DISCHARGE = _____ (CFS)

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

7. STORMWATER QUALITY

I. SWPPP: CONSTRUCTION MEASURES (COMPLETE FOR ALL PROJECTS)
NUMBER OF ACRES DISTURBED: _____
☐ DISTURBS >1AC. SITE PLAN & DETAILS ON SHEET(S): _____
☒ DISTURBS <1AC. N/A

II. APPLICABILITY FOR PERMANENT FEATURES (COMPLETE FOR ALL PROJECTS)
EXEMPT NEW DEVELOPMENT:
☐ PROJECT IS ON A PARCEL, WITHIN A LARGER COMMON PLAN OF DEVELOPMENT OR SALE, LESS THAN 5 ACRES.
THIS EXEMPTION IS VERIFIED WITH THE PLAT AND/OR GENERAL PLAN ON THE PROPERTY.

EXEMPT REDEVELOPMENT:
☐ THE INCREASE IN THE TOTAL AMOUNT OF IMPERVIOUS SURFACE, CURRENT PROJECT AND ANY SINCE 10/01/2001, ON A PREVIOUSLY DEVELOPED 5 ACRE OR LARGER PARCEL, INDIVIDUALLY AND/OR CONTIGUOUSLY OWNED, IS LESS THAN 1 ACRE.
NEW IMPERVIOUS:

CURRENT PROJECT	PREVIOUS PROJECT(S) TOTAL	TOTAL (CURRENT+PREVIOUS)

EXEMPT GRANDFATHERED:
☐ DRAINAGE FROM THIS PROJECT OUTFALLS DIRECTLY INTO AN EXISTING AND APPROVED DRAINAGE SYSTEM PRIOR TO 10/01/2001 WITH NO NEW DETENTION REQUIREMENT. INCLUDE THE ORIGINAL DRAINAGE AREA MAP OF THAT SYSTEM FOR VERIFICATION.
D.A. MAP NAME: _____ DATE: _____ APPROVED HC PROJECT NO.: _____

III. GENERAL
☒ PROJECT'S SWQ REQUIREMENTS FALL WITHIN THE JURISDICTION OF: CITY OF HOUSTON (ONLY COMPLETE IF OUTSIDE OF UNINCORPORATED HARRIS COUNTY)
☐ STORMWATER QUALITY PERMIT REQUIREMENT IS COVERED BY:
☐ EXISTING SWQMP
PROJECT TITLE: _____
HC PROJECT NO.: _____ HC SWQ PERMIT NO.: _____
SWQ SERVICE AREA MAP INCLUDED ON SHEET(S): _____
☐ INDUSTRIAL PERMITTING. (IAC AND SUPPORTING DOCUMENTATION MUST BE SUBMITTED)
PERMIT NO: _____

IF THE PROJECT IS NOT EXEMPT, OUTSIDE OF HARRIS COUNTY'S JURISDICTION, OR COVERED BY AN EXISTING SWQMP, A STORMWATER QUALITY MANAGEMENT PLAN IS REQUIRED.

IV. PERMANENT SWQ FEATURES (COMPLETE IF NOT EXEMPT)
☐ SITE PLAN ON SHEET(S): _____
☐ VEGETATIVE CONTROLS USED: (FILTER STRIP, GRASSY SWALE, URBAN FORESTRY, LID)
DETAILS AND CALCULATIONS APPEAR ON SHEET(S): _____
☐ BASIN STRUCTURE USED (WET, DRY, WETLANDS)
STRUCTURAL CONTROL IN BASIN: _____
DETAILS/CALCULATIONS ON SHEET(S): _____
☐ HYDRODYNAMIC TYPE SEPARATOR MODEL: _____
DETAILS/CALCULATIONS ON SHEET(S): _____
☐ OTHER(S):
STRUCTURAL CONTROL(S): _____
DETAILS/CALCULATIONS ON SHEET(S): _____

8. FLOODPLAIN STATUS

I. GENERAL INFORMATION
FIRM PANEL(S) FOR PROPERTY: 48201C0315L
FIRM PANEL(S) DATE: 6/18/2007
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(S): _____

II. 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.) ELEV. 74.46 FT (NAVD 1988, 2001 ADJ.)
ELEV. 74.05 FT (NAVD 1988, (GEOID '18))

III. FLOODPLAIN DETERMINATION BASED ON GROUND ELEVATION
☐ PROPERTY LIES ENTIRELY ABOVE THE 1% BASE FLOOD LEVEL AND IN SHADED ZONE X
☐ PROPERTY LIES PARTIALLY OR ENTIRELY BELOW THE 1% BASE FLOOD LEVEL

IV. FLOODPLAIN STORAGE SUMMARY (APPLIES ONLY TO PORTION OF LAND LOCATED WITHIN FLOODPLAIN AS DELINEATED BY FIRM PANEL)
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
C. FILL AREA & VOLUME CALCULATIONS ARE SHOWN ON SHEET(S): _____

9. WATER AND WASTEWATER

I. COMMERCIAL PROJECTS
DOES THE PROPERTY HAVE UTILITIES?
☐ PROPOSED ☐ EXISTING ☐ NO
CHECK APPLICABLE
☐ PUBLIC WATER & SANITARY
☐ PRIVATE WATER WELL & SEPTIC SYSTEM
☐ PUBLIC WATER & PRIVATE SEPTIC SYSTEM
☐ PRIVATE WATER WELL & PUBLIC SANITARY
☐ LETTER FROM THE DISTRICT / MUNICIPALITY AUTHORIZING MUNICIPALITY AUTHORIZING SERVICE & CONNECTION.
UTILITY DISTRICT / MUNICIPALITY NAME: _____
☐ PROPOSED OR EXISTING SEPTIC TANK(S) AND DISPOSAL AREA(S) SHOWN ON SHEET(S): _____
☐ ALL EXISTING AND PROPOSED UTILITIES ACCURATELY SHOWN & LABELED ON THE SITE PLANS.

NOTE: SEPTIC SYSTEMS REQUIRE HC WASTEWATER REVIEW
HC SEPTIC PERMIT/REQUEST NO. _____

NOTE: DEDICATED UNDERGROUND FIRE LINES MUST BE SUBMITTED TO THE HARRIS COUNTY FIRE PROTECTION GROUP FOR REVIEW AND PERMITTING BY THE UNDERGROUND FIRE LINE CONTRACTOR. CIVIL REVIEW DOES ***NOT*** REVIEW OR APPROVE UNDERGROUND FIRE LINES FOR THE FIRE PROTECTION SYSTEMS.

WASTEWATER TREATMENT PLANTS

HC WWTP REVIEW:
☐ NEW WWTP SITE OR REHAB / EXPANSION OF AN EXISTING WWTP SITE
☐ HARRIS COUNTY DOMESTIC WASTEWATER TREATMENT PLANT EXPRESS REVIEW SHEET ATTACHED AND COMPLETED ACCORDING TO INSTRUCTIONS

10. SIDEWALKS

☐ SIDEWALKS ARE PROPOSED IN THIS DEVELOPMENT
☐ NO SIDEWALKS ARE PROPOSED IN THIS DEVELOPMENT

11. LANDSCAPING

☐ COMMERCIAL BUILDING(S) PROPOSED AND LANDSCAPING SHOWN ON SHEET(S): _____
☒ NO COMMERCIAL BUILDING(S) PROPOSED

12. PERMITS REQUIRED

☐ STORM WATER QUALITY
☐ ORIGINAL ☐ AMENDMENT TO PERMIT NO.: _____
☐ SEPTIC (EXISTING) ☐ SEPTIC (PROPOSED)
☐ CIVIL SITE WORK (PHASE II PERMIT CLASS I (UNSHADED X ZONE))
☐ CIVIL SITE WORK (PHASE II PERMIT CLASS II (ALL OTHER ZONES))
☐ DRIVEWAY WITH CULVERT ☐ DRIVEWAY WITH CURB AND GUTTER
☐ BUILDING(S) IS A CRITICAL FACILITY
☐ BUILDING PERMITS (NO. OF BUILDINGS = _____)
☐ SUBDIVISION INFRASTRUCTURE PHASE II (NO. OF LOTS = _____)
☐ NOTICE OF DETENTION AFFIDAVIT REQUIRED
☐ MUD MAINTENANCE AGREEMENT REQUIRED
☐ STREET DEDICATION

WORK IN HARRIS COUNTY R.O.W.
☐ UTILITY WORK _____
☐ TURN LANE _____
☐ OTHER CONSTRUCTION _____

VIOLATIONS
☐ EXISTING VIOLATIONS ON PROPERTY
VIOLATION NUMBER(S): _____

NOTES:
A PERMIT IS REQUIRED FOR EACH SCOPE OF WORK ON SITE.
A R.O.W. NOTIFICATION IS REQUIRED FOR EACH SCOPE OF WORK IN HC OR HCFCD R.O.W.

BENCHMARK REQUIREMENTS FOR PROPOSED BRIDGES AND OR NEW RESIDENTIAL SUBIDIVSIONS

When the County Engineer has determined that a new benchmark will be required to be established for the proposed project, the developer shall be required to install a benchmark per section 8.0, part 2 of the Harris County Infrastructure Regulations.

Is a new Benchmark required for this project? (*to be determined by Harris County*) [__] yes [__] no

If a new Benchmark is required, the proposed benchmark information is shown on sheet(s): ____

FOR PROJECTS LOCATED IN ANY FLOODPLAIN

Development constructed or placed in accordance with these plans will comply with all provisions of the Regulations of Harris County, Texas for Floodplain Management.

No net fill is allowed in the flood plain and no fill is allowed in the floodway.

FOUNDATION NOTES: (*Applies to only buildings or building additions requiring a class II permit*)

All water heaters, furnaces, air conditioning units, electrical distribution panels, and any other mechanical or electrical equipment must be elevated in accordance with Section 4.05 of Harris County Floodplain regulations.

Any electrical circuit serving a light switch or outlet located below the base (100-year) flood elevation shall be dropped from above and be on a separate breaker.

All materials used below the (100-year) base flood elevation are on approved FEMA Technical Bulletin 2-08 as Class 5 water-resistant, and approved in accordance with FEMA Technical Bulletin 1-08 for foundation openings.

Critical facilities located in the 0.2% or 500yr floodplain or 1% or 100yr floodplain shall have the lowest floor elevated to 3 feet or more above the 0.2% flood elevation, or 24 inches above the crown of the adjacent road, which ever results in a higher elevation.

Floodproofing and sealing measures must be taken to ensure that toxic substances will not be displaced by or released into floodwaters.

Access routes elevated to or above the level of the base flood shall be provided to all critical facilities to the extent possible.

A completed as-built certificate must be submitted after the structure is complete and before it is occupied.

The County Engineer's Office will post a final inspection notice on the structure once all requirements have been met.

No fill may be used to elevate structures in the 1% or 100yr flood plain. Structures may be constructed on an open foundation, such as piers, or on continuous foundation walls with properly sized and located openings. All foundations are required to be designed by a registered professional engineer.

All structures shall be designed to withstand a three second gust basic wind speed of 120mph.

*Completed **Elevation Certificates** to be submitted: one at permitting, a second after the slab is poured or sub-floor is installed and before the framing starts, and a third is required once construction is finished. *(PER CURRENT FIRM PANEL)*

HARRIS COUNTY OFFICE OF THE COUNTY ENGINEER - PERMIT OFFICE NOTE:

THE PERMIT MANAGER SIGNATURE REPRESENTS THE FOLLOWING:
- THE COMPLETION OF REVIEW OF THESE PLANS
- INTERPOSE NO OBJECTION TO THE PROPOSED DESIGN ON PRIVATE PROPERTY
- APPROVAL OF WORK IN HARRIS COUNTY MAINTAINED RIGHT OF WAY
- APPROVAL OF WORK IN PROPOSED HARRIS COUNTY RIGHT OF WAY THAT IS TO BE ACCEPTED BY THE COUNTY

HCOCE SIGNATURE BLOCK:

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, _____, 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. I CERTIFY TO THE BEST OF MY KNOWLEDGE THAT THE PLANS IN THEIR ENTIRETY ARE DESIGNED PER THE HARRIS COUNTY ENGINEERING STANDARDS, REGULATIONS, AND GUIDELINES UNLESS PROVIDED A VARIANCE BY THE COUNTY ENGINEER OR HIS DESIGNEE. SHOULD IT BE DEEMED BY HCED STAFF, THAT THE PLANS DO NOT MEET THE COUNTY'S STANDARDS, REGULATIONS AND GUIDELINES AND DID NOT RECEIVE AN APPROVED VARIANCE, THE APPROVAL OF SAID PLANS BECOMES NULL AND VOID AND THE DESIGN PLANS MUST BE CORRECTED AT NO CHARGE TO THE COUNTY.

SEAL

THE COMPLETED PROJECT CONSISTS OF DRAWING SHEETS 1 THRU 125

SIGNATURE _____ DATE _____

REVISIONS

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

REV. NO.	DATE	SHEET NO.	DESCRIPTION	P.E. INITIAL	HC APPROVED DATE	HC INITIAL

HC PROJECT NO. | HCFCD PROJECT NO. | SHEET NUMBER 3 OF 125

HARRIS COUNTY
OFFICE OF THE COUNTY ENGINEER
REVIEW SHEET

VERSION 21.0 FEBRUARY 18, 2025

1. PROPERTY DESCRIPTION

I. LOCATION INFORMATION

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

B. KEY MAP: 336B

C. ADDRESS: 1802 LAKE VILLAGE DR

II. LEGAL DESCRIPTION

A. ACREAGE: 0.04

B. ☒ SUBDIVISION: KINGWOOD PLACE SECTION 18

☐ SURVEY & ABSTRACT: _____

C. ADJACENT ROADS: LAKE VILLAGE DR & WESTWOOD LAKE DR

III. PLATTING

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

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

PLAT NAME:
RESTRICTED RESERVE "C", REPLAT OF KINGWOOD PLACE SECTION 18

IV. JURISDICTIONS

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

V. HCAD ACCOUNT NOS. (ALL)

_____
_____
_____

2. SITE DETENTION DRAINAGE

I. PROPOSED DRAINAGE AREA

☐ NEW DEVELOPMENT AREA: _____
☒ RE-DEVELOPMENT AREA (AMOUNT INCREASED IMPERVIOUS AREA): _____
☐ 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.) _____
☐ .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 _____ OF THESE PLANS.

DETENTION BASIN SERVICE AREA		acres	
STORM EVENT	50% EXCEEDANCE (2-YEAR)	10% EXCEEDANCE (10-YEAR)	1% EXCEEDANCE (100-YEAR)
MAXIMUM ALLOWABLE OUTFLOW (PRE-DEVELOPMENT PEAK FLOW)			
MAXIMUM OUTFLOW PROVIDED (PEAK FLOW FROM BASIN)			
LOWEST NATURAL/FINISHED GROUND OR FINISHED FLOOR ELEVATION ESTIMATE			
DESIGN WATER SURFACE ELEVATION			
MINIMUM STORAGE REQUIRED (ac-ft)			
DETENTION STORAGE PROVIDED (ac-ft)			
STORAGE RATE PROVIDED (ac-ft/ac)			
OUTFLOW VELOCITY INTO CHANNEL (ft/sec)			
DRAIN TIME – 1% ONLY (hours)			
EMERGENCY OVERFLOW (TYPE, SIZE, ELEVATION, ETC.)			

B. DETENTION BASIN TO BE MAINTAINED BY _____

C. DETENTION SERVICE AREA MAP ON SHEET _____

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: _____
RESTRICTOR PIPE SIZE: _____
RESTRICTOR PLATE DIMENSION: _____

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 _____.

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) _____
☒ 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) _____
☐ HYDRODYNAMIC TYPE SEPARATOR MODEL: _____
☐ OTHER(S): _____

4. FLOOD PLAIN STATUS

I. GENERAL INFORMATION

FIRM PANEL(S) FOR PROPERTY: 48201C0315L
FIRM PANEL(S) DATE: 6/18/2007
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.)* ELEV. 74.46 FT (NAVD 1988, 2001 ADJ.)

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.) 0 CUBIC YARDS 0

B. TOTAL VOLUME OF MATERIAL PROPOSED TO BE REMOVED FROM THE FIRM DELINEATED FLOODPLAIN:
BELOW 0.2% BASE FLOOD ELEVATION (2001 ADJ.) 0 CUBIC YARDS 0
INCLUDING CALCULATIONS)

C. FILL AREA & VOLUME CALCULATIONS ARE SHOWN ON SHEET N/A

5. WORK IN HCFCD RIGHT-OF-WAY

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

A. BOND/NOTIFICATION INFORMATION
☐ HCFCD WATERSHED _____
☐ HCFCD UNIT No. _____
☐ NUMBER OF OUTFALLS _____
☒ UTILITY CROSSING
☐ ROADWAY BRIDGE/CULVERT CROSSING
☐ FILL ACTIVITY
☐ REHABILITATION OF CHANNEL
☐ MAINTENANCE
☐ TEMPORARY CROSSING
☐ TRAIL (LENGTH) _____
☐ OTHER _____
COST OF WORK IN HCFCD ROW _____

II. USACE ENVIRONMENTAL PERMIT

☒ US ARMY CORPS OF ENGINEERS NATIONWIDE PERMIT NUMBER(S) _____
☐ US ARMY CORPS OF ENGINEERS INDIVIDUAL PERMITS
☐ OTHER
☐ NO PERMITS REQUIRED
EXPLAIN:
_____
_____
_____

III. REFERENCE / BASIS OF DETERMINATION

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

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 _____ OF THESE PLANS.

V. HCFCD STANDARD DETAILS: SEE SHEET _____ OF THESE PLANS.

VI. HCFCD ACCESS PLAN: SEE SHEET _____ OF THESE PLANS.

VII. REFER TO THE FOLLOWING PLAN SHEETS: _____
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 _____
HCFCD PROJECT #_____
ENGINEERING FIRM _____
REPORT ACCEPTANCE DATE _____

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: _____

ADDRESS: _____

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

APPROVED:

BY_____
FOR ITEMS LOCATED WITHIN EXISTING HCFCD RIGHT-OF-WAY

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, _____ , 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 1 THRU 125 .

SIGNATURE _____ DATE _____

SEAL

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

HARRIS COUNTY FLOOD CONTROL PROJECT NO.

SHEET NUMBER 4 OF 125

HARRIS COUNTY
FLOOD CONTROL DISTRICT
REVIEW SHEET

VERSION 1.0 OCTOBER 2019

ABBREVIATIONS:

&	AND
@	AT
AB	ALL BELL
AC	ACRE / ASBESTOS CEMENT
AI/VR	AIR INLET / VACUUM RELIEF
APPROX	APPROXIMATELY
ASPH	ASPHALT
AVE	AVENUE
℄	BASELINE
B/B	BACK TO BACK
BC	BACK OF CURB
BFV	BUTTERFLY VALVE
BL	BUILDING LINE
BLDG	BUILDING
BLVD	BOULEVARD
℄	CENTER LINE
C/C	CENTER TO CENTER
CGMP	CORRUGATED GALVANIZED METAL PIPE
CMP	CORRUGATED METAL PIPE
CIP	CAST IRON PIPE
CLR	CLEARANCE
CO	CLEAN OUT
COH	CITY OF HOUSTON
CONC	CONCRETE
CONSTR	CONSTRUCTION
CPEE	CENTERPOINT ENERGY ELECTRIC
CPEG	CENTERPOINT ENERGY GAS
DIA	DIAMETER
DIP	DUCTILE IRON PIPE
DR	DRIVE
DWG	DRAWING
DWY	DRIVEWAY
E	EAST
EL	ELEVATION
EP	EDGE OF PAVEMENT
E/R	END OF RADIUS
ESMT	EASEMENT
EXST	EXISTING
FC	FACE OF CURB
F/F	FACE TO FACE
FH	FIRE HYDRANT
℄	FLOW LINE
FM	FORCE MAIN
FT	FEET
GPS	GLOBAL POSITIONING SYSTEM
GV	GATE VALVE
GV&B	GATE VALVE AND BOX
HCFCD	HARRIS COUNTY FLOOD CONTROL DISTRICT
HDPE	HIGH-DENSITY POLYETHYLENE
HGL	HYDRAULIC GRADE LINE
HP	HIGH PRESSURE
INV EL	INVERT ELEVATION
IP	INTERMEDIATE PRESSURE
IR	IRON ROD

ABBREVIATIONS:

J-BOX	JUNCTION BOX
JT	JOINT
JUNCT	JUNCTION
LF	LINEAR FEET
LN	LANE
LPT	LOW POINT
LT	LEFT
LS	LIFT STATION
MAX	MAXIMUM
METRO	METROPOLITAN TRANSIT AUTHORITY
MH	MANHOLE
MIN	MINIMUM
MON	MONUMENT
N	NORTH
NA	NOT APPLICABLE
NAVD	NORTH AMERICAN VERTICAL DATUM
NG	NATURAL GROUND
NO	NUMBER
NTS	NOT TO SCALE
OCC	ZERO CURB CUT
OS	OFFSET
OH	OVERHEAD
PC	POINT OF CURVE
PCC	POINT OF COMPOUND CURVATURE
PCCP	PRESTRESSED CONCRETE CYLINDER PIPE
PERM	PERMANENT
PGL	PROFILE GRADE LINE
PI	POINT OF INTERSECTION
PL	PROPERTY LINE
PNT	POINT
PPCA	POTENTIALLY PETROLEUM CONTAMINATED AREA
PRC	POINT OF REVERSE
PROP	PROPOSED
PSI	POUND PER SQUARE INCH
PT	POINT OF TANGENCY
PVC	POLYVINYL CHLORIDE PIPE / POINT OF VERTICAL CURVATURE
PVMT	PAVEMENT
PVI	POINT OF VERTICAL INTERSECTION
PVT	POINT OF VERTICAL TANGENCY

ABBREVIATIONS:

(R)	RECORD DRAWING
R	RADIUS
RCB	REINFORCED CONCRETE BOX
RCP	REINFORCED CONCRETE PIPE
RD	ROAD
REINF	REINFORCED
REM	REMOVABLE
RJ	RESTRAINED JOINT
ROW	RIGHT OF WAY
RR	RAILROAD
RRPM	REFLECTIVE REMOVABLE PAVEMENT MARKERS
RT	RIGHT
S	SOUTH
SAN	SANITARY
SCHED	SCHEDULE
SF	SQUARE FEET
SHT	SHEET
SSE	SANITARY SEWER EASEMENT
ST	STREET
STA	STATION
STD	STANDARD
STL	STEEL
STM	STORM
SWBT	SOUTHWESTERN BELL TELEPHONE
SWR	SEWER
SY	SQUARE YARD
TAN	TANGENT
TBM	TEMPORARY BENCHMARK
TEMP	TEMPORARY
TOB	TOP OF BANK
TOC	TOP OF CURB
TOP	TOP OF PAVEMENT
TOS	TOP OF STACK
TS&V	TAPPING SLEEVE AND VALVE
TXDOT	TEXAS DEPARTMENT OF TRANSPORTATION
TYP	TYPICAL
UE	UTILITY EASEMENT
UGND	UNDERGROUND
VC	VERTICAL CURVE
VPI	VERTICAL POINT OF INTERSECTION
W	WEST
W/	WITH
WL	WATER LINE
WLE	WATER LINE EASEMENT
WM	WATER METER
WP	WOOD POLE
WSEL	WATER SURFACE ELEVATION
WV	WATER VALVE
WWTP	WASTE WATER TREATMENT PLANT

NO.	DATE	REVISION	APP.
	MM/DD/YY	BRIEF DESCRIPTION	XXX
	MM/DD/YY	BRIEF DESCRIPTION	XXX
	MM/DD/YY	BRIEF DESCRIPTION	XXX

TETRA TECH COMPANY
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E usinfrastructure@rpsgroup.com

SURVEYED BY: KUO Inc.
FB NO. F-4578

This document is released for the purposes of interim review only under the authority of:

Jeremy Austin, P.E. EAL
Texas P.E. No. 116816
02/16/2026

It is not to be used for bidding, construction, or permitting purposes.

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

ABBREVIATIONS

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 5 OF 125	

FILE PATH: C:\Users\andres.martinezjr\DC\ACCDocs\Tetra Tech Inc\200-317106-24001 COH LS Rehab Design\Project Files\CAD\R-000267-00178A-3_ABBREVIATIONS.dwgPLOTTED: 2/16/2026 11:11 AM

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EXISTING PLAN VIEW

- WATER METER
- WATER VALVE (GATE)
- WATER VALVE (BUTTERFLY)
- FIRE HYDRANT/FLUSHING VALVE
- TAPPING SLEEVE & VALVE
- REDUCER
- ROUND CONNECTION
- SANITARY SEWER CLEANOUT & MANHOLE
- STORM SEWER MANHOLE
- STORM SEWER INLETS
- CULVERT PIPE AND HEADWALL
- TOP OF CURB ELEVATION
- GUTTER ELEVATION
- 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
- DIMENSION LINE
- AERIAL POWER LINE
- UNDERGROUND POWER LINE
- GAS LINE
- UNKNOWN UNDERGROUND LINE
- OIL PIPELINE
- UNDERGROUND TELECOMM LINE W/VAULT
- AERIAL TELECOMM LINE
- RAILROAD LINE
- WATER LINE
- SANITARY SEWER LINE
- STORM SEWER LINE
- SANITARY SEWER FORCE MAIN
- RECLAIMED WATER LINE
- NON–POTABLE WATER LINE
- GAS METER
- GAS VALVE
- PROPANE LINE
- STEAM LINE
- MISC UNDERGROUND PIPELINE LABLE

PROPOSED PLAN VIEW

- WATER METER
- WATER VALVE (GATE)
- WATER VALVE (BUTTERFLY)
- FIRE HYDRANT/FLUSHING VALVE
- TAPPING SLEEVE & VALVE
- REDUCER
- ROUND CONNECTION
- SANITARY SEWER CLEANOUT & MANHOLE
- STORM SEWER MANHOLE
- STORM SEWER INLETS
- CULVERT PIPE AND HEADWALL
- TOP OF CURB ELEVATION
- GUTTER ELEVATION
- 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
- DIMENSION LINE
- AERIAL POWER LINE
- UNDERGROUND POWER LINE
- GAS LINE
- UNKNOWN UNDERGROUND LINE
- OIL PIPELINE
- UNDERGROUND TELECOMM LINE W/ VAULT
- AERIAL TELECOMM LINE
- RAILROAD LINE
- WATER LINE
- SANITARY SEWER LINE
- STORM SEWER LINE
- SANITARY SEWER FORCE MAIN
- RECLAIMED WATER LINE
- NON–POTABLE WATER LINE
- GAS METER
- GAS VALVE
- PROPANE LINE
- STEAM LINE
- MISC UNDERGROUND PIPELINE LABLE
- MATCH LINE

EXISTING PLAN VIEW

- PAVING HEADER
- BUILDING, RESIDENTIAL
- BUILDING, COMMERCIAL
- TREE
- HEDGE
- IRON PIPE OR IRON ROD MONUMENT
- POINT OF INTERSECTION (PI)
- POINT OF CURVE (PC)
- POINT OF TANGENCY (PT)
- POWER POLE
- 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
- NORTH OR EAST CULVERT
- SOUTH OR WEST CULVERT
- CENTERLINE OF ROW
- CENTERPOINT ENERGY CONDUIT
- GAS LINE
- WESTERN UNION
- AT&T CONDUIT
- WATER LINE
- SANITARY SEWER LINE
- STORM SEWER LINE
- SANITARY SEWER FORCE MAIN
- RECLAIMED WATER LINE
- NON–POTABLE WATER LINE
- CENTERPOINT ENERGY MANHOLE
- AT&T MANHOLE
- WATER LINE MANHOLE
- SANITARY SEWER MANHOLE & CLEANOUT
- STORM SEWER MANHOLE
- STORM SEWER INLET

PROPOSED PLAN VIEW

- PAVING HEADER
- BUILDING, RESIDENTIAL
- BUILDING, COMMERCIAL
- CASING PIPE
- TREE
- HEDGE
- IRON PIPE OR IRON ROD MONUMENT
- POINT OF INTERSECTION (PI)
- POINT OF CURVE (PC)
- POINT OF TANGENCY (PT)
- POWER POLE
- POWER POLE W/DOWN GUY

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
- NORTH OR EAST CULVERT
- SOUTH OR WEST CULVERT
- CASING PIPE
- CENTERLINE OF ROW
- CENTERPOINT ENERGY CONDUIT
- GAS LINE
- WESTERN UNION
- AT&T CONDUIT
- WATER LINE
- SANITARY SEWER LINE
- STORM SEWER LINE
- SANITARY SEWER FORCE MAIN
- RECLAIMED WATER LINE
- NON–POTABLE WATER LINE
- CENTERPOINT ENERGY MANHOLE
- AT&T MANHOLE
- WATER LINE MANHOLE
- SANITARY SEWER MANHOLE & CLEANOUT
- STORM SEWER MANHOLE
- STORM SEWER INLET

MISC STANDARD ELEMENTS

- COH NORTH ARROW
- COH BAR SCALE
- REVISION CLOUD/DELTA
- DETAIL/SECTION TITLE
- SECTION CALLOUT
- DETAIL CALLOUT

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Jeremy Austin, P.E.
Texas P.E. No. 116816
02/16/2026

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION COH LIFT STATIONS

ABBREVIATIONS

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R–000267–00178A–3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 6 OF 125	

GENERAL CONSTRUCTION NOTES

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:
HTTPS: 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. 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 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 DRAINAGE 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 SYSTEMS, 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, ADDENDA, AND AMENDMENTS THERETO, AT NO ADDITIONAL COST TO THE OWNING AUTHORITY.
5. CONTRACTOR SHALL NOTIFY THE OFFICE OF THE CITY ENGINEER, HOUSTON PUBLIC WORKS IN WRITING 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 AND TO THE SATISFACTION OF THE OWNING AUTHORITY.
7. CONTRACTOR SHALL COMPLY WITH LATEST EDITION OF OSHA REGULATIONS AND THE STATE OF TEXAS LAWS CONCERNING EXCAVATION.
8. CONTRACTOR SHALL TAKE NECESSARY PRECAUTIONS TO PROTECT ROOT SYSTEMS OF SHRUBS, PLANTS AND TREES ALONG THE AREA OF EXCAVATION.
9. 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.
10. THE CONTRACTOR SHALL CONFINE ALL CONSTRUCTION ACTIVITIES STRICTLY WITHIN THE LIMITS OF THE CONSTRUCTION EASEMENT AND WATER LINE EASEMENT.
11. THE TEMPORARY CONSTRUCTION EASEMENT LOCATED IN FRONT OF THE BUSINESS SHALL BE USED FOR TEMPORARY MATERIAL AND EQUIPMENT STORAGE DURING ACTIVE CONSTRUCTION ON THE ADJACENT SECTION OF THE WATER LINE (WL).
12. THE CONTRACTOR SHALL ALWAYS MAINTAIN CONTINUOUS AND UNOBSTRUCTED ACCESS TO ALL BUSINESSES WITHIN THE AFFECTED AREA.

STORM SEWER CONSTRUCTION NOTES

1. STORM SEWER SHALL BE REINFORCED CONCRETE PIPE (C-76, CLASS III), AND SHALL BE INSTALLED, BEDDED, AND BACKFILLED IN ACCORDANCE WITH THE CITY OF HOUSTON DRAWING NOS. 02317-02, 02317-03, 02317-05, 02317-06, AND 02317-07 (OCT. 2002) AS APPLICABLE UNLESS OTHERWISE SHOWN ON THE DRAWINGS.
2. ALL STORM SEWER CONSTRUCTED IN SIDELOT EASEMENT SHALL BE R.C.P. (C-76, CLASS III) 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. STABILIZED 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 MECHANICALLY 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. 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 18-INCHES FROM EXTERIOR OF THE STORM PIPE OR BOX TO THE EXTERIOR OF THE EXISTING OR PROPOSED PUBLIC OR PRIVATE UTILITY AND OTHER APPURTENANCES.
7. ADJUST MANHOLE COVERS TO GRADE CONFORMING TO REQUIREMENTS OF SECTION 02086-ADJUSTING MANHOLES, INLETS, AND VALVE BOXES TO GRADE.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING, MAINTAINING, AND RESTORING ANY BACK SLOPE DRAINAGE SYSTEM DISTURBED AS A RESULT OF THIS WORK.
9. 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.
10. ALL DRIVEWAYS WILL BE LOCATED TO AVOID EXISTING CURB INLET STRUCTURES.

WATER LINE CONSTRUCTION NOTES

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" FITTINGS 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 PIPES 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.
13. PLACE 1 FULL SECTION (MIN 18 FT) OF SANITARY SEWER CENTERED AT WATER LINE CROSSING. PROVIDE RESTRAINED JOINTS ON SANITARY SEWER, SPACED AT LEAST 9 FT HORIZONTALLY FROM CENTERLINE OF WATERLINE.
14. REPLACE ONE FULL SECTION OF EXISTING SANITARY SEWER WITH PRESSURE-RATED DUCTILE IRON PIPE. EMBED SANITARY SEWER WITH CEMENT STABILIZED SAND FOR THE TOTAL LENGTH OF ONE PIPE SEGMENT PLUS ONE FOOT BEYOND THE JOINT ON EACH END.
15. WATER LINE TO BE DUCTILE IRON PIPE AT SANITARY SEWER CROSSING.

GRADING NOTES

1. GENERAL CONTRACTOR AND ALL SUBCONTRACTORS SHALL VERIFY THE SUITABILITY OF ALL EXISTING AND PROPOSED SITE CONDITIONS INCLUDING GRADES AND DIMENSIONS BEFORE STARTING CONSTRUCTION. THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCIES.
2. BEFORE STARTING CONSTRUCTION, CONTRACTOR SHALL VERIFY BENCHMARK ELEVATION AND NOTIFY ENGINEER IF ANY DISCREPANCY AND/OR CONFLICT IS FOUND.
3. CONTRACTOR SHALL ENSURE THERE IS POSITIVE DRAINAGE FROM THE PROPOSED BUILDINGS AND NO PONDING IN PAVED AREAS, AND SHALL NOTIFY ENGINEER IF ANY GRADING DISCREPANCIES ARE FOUND IN THE EXISTING AND PROPOSED GRADES PRIOR TO PLACEMENT OF PAVEMENT OR UTILITIES.
4. CONTRACTOR SHALL PROTECT ALL MANHOLE COVERS, VALVE COVERS, VAULT LIDS, FIRE HYDRANTS, POWER POLES, GUY WIRES, AND TELEPHONE BOXES THAT ARE TO REMAIN IN PLACE AND UNDISTURBED DURING CONSTRUCTION.
5. ALL EXISTING CONCRETE PAVING, SIDEWALK, AND CURB DEMOLITION SHALL BE REMOVED AND DISPOSED OF BY CONTRACTOR. DISPOSAL SHALL BE AT AN APPROVED OFF-SITE, LAWFUL LOCATION, UNLESS DIRECTED OTHERWISE BY THE OWNER.

SWPPP CONSTRUCTION NOTES

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 PLANS (SWPPP) 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.
4. 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.
5. 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.
6. CONTRACTOR SHALL REMOVE AND/OR REPLACE INLET PROTECTION BARRIER BEFORE AND AFTER A SEVERE WEATHER EVENT AT THE REQUEST OF THE CITY OF HOUSTON.

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 PROPERTY MANAGEMENT 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.

CONTRACTOR WORK ZONE NOTES

1. DRIVEWAY ACCESS WILL BE MAINTAINED OPEN AFTER WORKING HOURS. A MINIMUM OF ONE DRIVEWAY ACCESS WILL BE MAINTAINED OPEN AT ALL TIMES TO COMMERCIAL, APARTMENTS, AND/OR NON-RESIDENTIAL DEVELOPMENTS.
2. THE LENGTH OF THE WORK ZONE MUST BE MINIMIZED WITHIN THE HARRIS COUNTY ROW OR EASEMENTS. THERE SHALL NOT BE MORE THAN 200-FEET OF TRENCH OPEN AT ANY ONE TIME. THE CONSTRUCTION ZONE WILL BE A ROLLING CONSTRUCTION ZONE WITH APPROPRIATE TRANSITIONS ON EACH END UNLESS OTHERWISE SHOWN IN PLANS AND SPECIFICATIONS.
3. SIGNALIZED INTERSECTIONS: LANES WILL NOT BE CLOSED AT A SIGNALIZED INTERSECTION, UNLESS APPROVED BY THE COUNTY ENGINEER AND SHOWN IN THE PLANS AND SPECIFICATIONS.
4. TEMPORARY PAVEMENT MARKERS: TEMPORARY EPOXY-GLUED BOTTONS OR "CONSTRUCTION GRADE" TAPE PAVEMENT MARKERS SHOULD BE USED ON PERMANENT PAVEMENT TO ELIMINATE GRINDING AND SCARRING OF THE SURFACE.
5. PEDESTRIAN TRAFFIC: CARE SHALL BE TAKEN TO PROVIDE FOR TEMPORARY PEDESTRIAN TRAFFIC AND CROSSING AT AREAS SUCH AS SCHOOLS, PARKS, AND SHOPPING AREAS.

SANITARY SEWERS CONSTRUCTION NOTES

1. ALL SEWERS SHALL 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 THE LATEST 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 NEW SANITARY SEWERS CROSSING WATER LINES WITH A CLEARANCE BETWEEN 12 INCHES AND 9 FEET SHALL HAVE A MINIMUM OF ONE 18 JOINT OF 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:

6 340 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 7.693(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 (VALCOUN, 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.

STANDARD HARRIS COUNTY NOTES FOR PLANS

1. AUTHORIZATION NOTICE ISSUED BY HARRIS COUNTY PUBLIC INFRASTRUCTURE ENGINEERING DEPARTMENT PERMIT OFFICE REQUIRED PRIOR TO CONSTRUCTION OF UTILITIES OR LEFT TURN LANES WITHIN HARRIS COUNTY RIGHTS-OF-WAY. CONTACT HARRIS COUNTY PERMIT OFFICE (713)956-3000.
2. AUTHORIZATION NOTICES ISSUED BY HARRIS COUNTY PUBLIC INFRSTRUCTURE ENGINEEERING DEPARTMENT PERMIT OFFICE REQUIRED PRIOR TO CONSTRUCTION WITHIN HARRIS COUNTY FLOOD CONTROL RIGHT-OF-WAY. CONTACT HARRIS COUNTY PERMIT OFFICE (713)956-3000.
3. VENT PIPES WITHIN HARRIS COUNTY RIGHT-OF-WAY SHALL BE BREAKAWAY, PER DETAILS, UNESS OTHERWIDE INDICATED ON DRAWINGS AND APPROVED NY HARRIS COUNTY PUBLIC INFRASTRUCTURE ENGINEERING DEPARTMENT.
4. CONTRACTOR IS FULLY RESPONSIBLE FOR OBTAINING ALL PERMIT REQUIRED BY THE "REGULATIONS OF HARRIS COUNTY, TEXAS FOR FLOOD PLAIN MANAGEMENT" PRIOR TO START OF CONSTRUCTION.

HARRIS COUNTY APPENDIX D NOTES

1. WATER LINES, WASTEWATER COLLECTION SYSTEMS, AND STORM DRAINAGE SYSTEMS SHALL BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH THE CITY OF HOUSTON'S, DEPARTMENT OF PUBLIC WORKS AND ENGINEERING DESIGN MANUAL, STANDARD CONSTRUCTION SPECIFICATIONS, AND DETAILS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE AND STREET PAVING .
2. ALL STORM SEWER WILL BE REINFORCED CONCRETE (C76 CLASS III) AND SHALL BE INSTALLED, BEDDED AND BACKFILLED IN ACCORDANCE WITH THE CITY OF HOUSTON'S DRAWINGS 02317-02, 02317-03, 02317-05, 02317-06 AND 02317-07 AS APPLICABLE.
3. ALL STORM SEWERS CONSTRUCTED IN SIDE LOT EASEMENTS SHALL BE R.C.P., MINIMUM TWENTY (20) FOOT WIDE EASEMENTS SHALL BE PROVIDED.
4. AN ALTERNATIVE TO CEMENT STABILIZED SAND MAY BE USED AS BACKFILL FOR PIPES FIFTY-FOUR (54) INCH AND LARGER, FROM 1-FOOT ABOVE THE TOP OF THE PIPE TO THE BOTTOM OF THE SUBGRADE. CONTRACTOR MAY BACKFILL WITH SUITABLE MATERIAL, PROVIDED THE BACKFILL MATERIAL IS PLACED IN EIGHT (8) INCH LIFTS AND MECHANICALLY COMPACTED TO NINETY-FIVE (95)% STANDARD PROCTOR DENSITY. TESTS SHALL BE TAKEN AT ONE HUNDRED (100) FOOT INTERVALS ON EACH LIFT. BEDDING AND BACKFILL TO ONE (1) FOOT ABOVE THE TOP OF THE PIPE SHALL BE CEMENT-STABILIZED SAND.
5. ALL PROPOSED PIPE STUB-OUTS FROM MANHOLES/JUNCTION BOXES OR INLETS ARE TO BE PLUGGED WITH EIGHT (8) INCH BRICK WALLS UNLESS OTHERWISE NOTED.
6. THE CONTRACTOR(S) SHALL NOTIFY HARRIS COUNTY ENGINEERING DEPARTMENT PERMIT OFFICE TWENTY-FOUR (24) HOURS IN ADVANCE OF COMMENCING UTILITY AND/OR PAVING CONSTRUCTION AT (713) 274-3931 AND WRITTEN NOTIFICATION FORTY-EIGHT (48) HOURS IN ADVANCE OF COMMENCING CONSTRUCTION AT 1111 FANNIN STREET 8TH FLOOR, HOUSTON, TEXAS, 77022.
7. PAVING SHALL BE IN ACCORDANCE WITH THE REGULATIONS OF HARRIS COUNTY, TEXAS FOR THE APPROVAL AND ACCEPTANCE OF INFRASTRUCTURE AND/OR AMENDMENTS OF THE SAME.
8. GUIDELINES SET FORTH IN THE LATEST EDITION OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, TMUCD WITH REVISIONS SHALL BE OBSERVED.
9. OWNER OR OWNER'S AGENT TO OBTAIN ALL PERMITS REQUIRED BY THE REGULATIONS OF HARRIS COUNTY, TEXAS FOR FLOODPLAIN MANAGEMENT PRIOR TO STARTING CONSTRUCTION.
10. OWNER OR OWNER'S AGENT TO OBTAIN ALL NOTIFICATIONS REQUIRED BY HARRIS COUNTY, TEXAS PRIOR TO STARTING CONSTRUCTION OF UTILITIES AND/OR CULVERTS WITHIN HARRIS COUNTY AND HARRIS COUNTY FLOOD CONTROL DISTRICT RIGHTS-OF-WAY.

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

UTILITY NOTES

CENTERPOINT ENERGY

CAUTION: UNDERGROUND GAS FACILITIES

THE CONTRACTOR SHALL CONTACT THE UTILITY COORDINATING 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 PIPE LINE 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 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 THE FACILITIES TO PREVENT EXCESSIVE STRESS ON THE PIPING.
- FOR EMERGENCIES REGARDING GAS LINES CALL (713) 659-2111 OR (713) 207-4200.

THE CONTRACTOR IS FULLY RESPONSIBLE FOR ANY DAMAGES CAUSED BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE THESE UNDERGROUND FACILITIES.

WARNING: OVERHEAD ELECTRICAL LINES:

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.

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

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 AND RIGHT OF WAY DIVISION AT (713) 207-6348 OR (713) 207-5769.

WARNING: UNDERGROUND ELECTRICAL UTILITIES:

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

- ALL INFORMATION CONCERNING TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. THE CONTRACTORS ARE RESPONSIBLE MAKING THEIR OWN DETERMINATIONS AS TO TYPE AND LOCATION OF UNDERGROUND UTILITIES AS MAY BE NECESSARY TO AVOID DAMAGE THERETO. THE CONTRACTOR SHALL VERIFY LOCATION OF UNDERGROUND PIPELINES, CONDUITS, AND STRUCTURES BY CONTACTING OWNERS OF UNDERGROUND UTILITIES OR BY EXCAVATING IN ADVANCE OF CONSTRUCTION.
- THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE EXACT LOCATION OF ALL UTILITIES WHEN AND WHERE THEY FALL IN THE PATH OF CONSTRUCTION.
- THE CONTRACTOR IS ALSO RESPONSIBLE FOR CONTACTING THE UTILITY COORDINATING COMMITTEE AT (713) 223-4567 AND TEXAS ONE CALL AT 1-800-245-4545, FORTY-EIGHT (48) HOURS PRIOR TO ANY CONSTRUCTION.
- THE LOCATION OF ANY CENTERPOINT ENERGY UTILITIES ARE SHOWN IN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION BEFORE COMMENCING WORK. THEY AGREE TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THIS FAILURE TO EXACTLY LOCATE AND PRESERVE THESE UNDERGROUND UTILITIES.
- ALL PROPOSED FACILITIES SHALL MAINTAIN 12" CLEAR FROM ALL EXISTING UTILITIES.

COMCAST

1. THE LOCATION OF COMCAST CABLE FACILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY. THE CONTRACTOR WILL DETERMINE THE EXACT LOCATION BEFORE COMMENCING WORK. CONTRACTOR AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES, WHICH MIGHT BE OCCASIONED BY THIS FAILURE TO EXACTLY LOCATE AND PRESERVE THESE UNDERGROUND LINES FIELD LOCATED.
2. THE CONTRACTOR WILL CALL TEXAS ONE-CALL AT 1-800-245-4545 A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION TO HAVE UNDERGROUND LINES FIELD LOCATED.
3. WHEN EXCAVATING WITHIN EIGHTEEN INCHES (18") OF THE INDICATED LOCATION OF COMCAST CABLE FACILITIES, ALL EXCAVATION MUST BE ACCOMPANIED USING NON-MECHANIZED EXCAVATION PROCEDURES. WHEN BORING, THE CONTRACTOR SHALL EXPOSE THE COMCAST CABLE FACILITIES.
4. WHEN COMCAST CABLE FACILITIES ARE EXPOSED, THE CONTRACTOR WILL PROVIDE SUPPORT TO PREVENT DAMAGE TO THE CONDUIT DUCTS OR CABLES. WHEN EXCAVATING NEAR TELEPHONE POLES, THE CONTRACTOR WILL BRACE THE POLE FOR SUPPORT.
5. THE CONTRACTOR WILL DETERMINE THE EXACT LOCATION OF THE UNDERGROUND FACILITIES BEFORE COMMENCING WORK AND AGREES TO BE FULLY RESPONSIBLE FOR ALL DAMAGES CAUSED BY THIS FAILURE TO EXACTLY LOCATE AND PRESERVE ALL UNDERGROUND FACILITIES.

AT&T TEXAS/SWBT FACILITIES

1. THE LOCATIONS OF AT&T TEXAS/SWBT FACILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION BEFORE COMMENCING WORK. HE AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THIS FAILURE TO EXACTLY LOCATE AND PRESERVE THESE UNDERGROUND UTILITIES.
2. THE CONTRACTOR SHALL CALL 1-800-344-8377 (TEXAS 811) A MINIMUM OF 48 HOURS PRIOR TO CONSTRUCTION TO HAVE UNDERGROUND LINES FIELD LOCATED.
3. WHEN EXCAVATING WITHIN EIGHTEEN INCHES (18") OF THE INDICATED LOCATION OF AT&T TEXAS/SWBT FACILITIES, ALL EXCAVATIONS MUST BE ACCOMPLISHED USING NON-MECHANIZED EXCAVATION PROCEDURES. WHEN BORING, THE CONTRACTOR SHALL EXPOSE THE AT&T TEXAS/SWBT FACILITIES.
4. WHEN AT&T TEXAS/SWBT FACILITIES ARE EXPOSED, THE CONTRACTOR WILL PROVIDE SUPPORT TO PREVENT DAMAGE TO THE CONDUIT DUCTS OR CABLES. WHEN EXCAVATING NEAR TELEPHONE POLES THE CONTRACTOR SHALL BRACE THE POLE FOR SUPPORT.
5. THE PRESENCE OR ABSENCE OF AT&T TEXAS/SWBT UNDERGROUND CONDUIT FACILITIES OR BURIED CABLE FACILITIES SHOWN ON THESE PLANS DOES NOT MEAN THAT THERE ARE NO DIRECT BURIED CABLES OR OTHER CABLES IN CONDUIT IN THE AREA.
6. PLEASE CONTACT THE AT&T TEXAS DAMAGE PREVENTION MANAGER KEVIN RAY AT (713) 614-1983 OR E-MAIL HIM AT kr7896@att.com, IF CABLE LOCATE REQUESTS ARE NOT COMPLETED FOR AT&T TEXAS/SWBT FACILITIES.

UTILITY COORDINATION

1. CENTERPOINT GAS AND ELECTRIC:
   - CONTRACTOR SHALL CONTACT CYNTHIA MARTINEZ AT CINDY.MARTINEZ@CENTERPOINTENERGY.COM AT LEAST 72 HOURS PRIOR TO CONSTRUCTION AROUND CENTERPOINT GAS AND ELECTRIC UTILITIES.
2. VERIZON:
   - CONTRACTOR SHALL CONTACT – MICHAEL MABE AT 832-917-7790 AND MICHAEL.MABE@VERIZON.COM AT LEAST 72 HOURS PRIOR TO CONSTRUCTION AROUND VERIZON FIBER/CABLE UTILITIES.
3. AT&T:
   - CONTRACTOR SHALL CONTACT KATHY TINNEY AT 713-485-8128 AND KT145J@ATT.COM AT LEAST 72 HOURS PRIOR TO CONSTRUCTION AROUND AT&T FIBER/CABLE UTILITIES.
4. COMCAST:
   - CONTRACTOR SHALL CONTACT CORY THOMAS AT CORY.THOMAS@COMCAST.COM AT LEAST 72 HOURS PRIOR TO CONSTRUCTION AROUND COMCAST FIBER/CABLE UTILITIES.

HCED GENERAL NOTES

1. PRIOR TO CONSTRUCTION THE CONTRACTOR SHALL SECURE "TRACK ALLOCATION PERMITS" ISSUED BY METRO RAIL OPERATIONS. CONTACT EDDIE ESPINOSA (EDDIE.ESPINOSA@RIDEMETRO.ORG, 832-392-0758) FOR TRACK ALLOCATION REQUESTS AND TRACK ACCESS PROCEDURES.
2. THE CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS BEFORE BEGINNING CONSTRUCTION.
3. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING SECURITY TO PROTECT THE PROJECT SITE, CONTRACTOR PROPERTY, EQUIPMENT, AND WORK.
4. THE CONTRACTOR IS RESPONSIBLE FOR CLEANING STREETS OF CONSTRUCTION DIRT AND DEBRIS AT CLOSE OF EACH WORK DAY.
5. THE CONDITION OF THE ROAD AND/OR RIGHT-OF-WAY, UPON COMPLETION OF THE JOB SHALL BE AS GOOD AS OR BETTER THAN PRIOR TO STARTING WORK.
6. PRIOR TO CONSTRUCTION, THE CONTRACTOR, ALONG WITH CONCURRENCE FROM THE FIELD ENGINEER, SHALL DETERMINE HIS/HER LAY-DOWN AND/OR STAGING AREA LOCATIONS.
7. THE CONTRACTOR SHALL NOTIFY ALL PROPERTY OWNERS A MINIMUM OF 24 HOURS PRIOR TO BLOCKING DRIVEWAYS OR ENTERING UTILITY EASEMENTS.
8. TRAFFIC INGRESS AND EGRESS FOR DRIVEWAYS AND PEDESTRIAN ACCESS FACILITIES SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION.
9. THE CONTRACTOR SHALL REMOVE ANY FENCES, POSTS, MAILBOXES, PLANTERS, PERMANENT TRASH CONTAINERS, CULVERTS, ETC. OR SECTIONS THEREOF, THAT ENCROACH WITHIN THE COUNTY'S RIGHT-OF-WAY. NOTE: PRIOR TO CONSTRUCTION, THE PROPERTY OWNER WAS PAID TO RELOCATE OR REPLACE THESE ITEMS OUTSIDE OF THE COUNTY'S RIGHT-OF-WAY. IF THE OWNER HAS FAILED TO DO SO, THE CONTRACTOR WILL REPLACE THEM WITH THE MINIMUM LEVEL OF QUALITY NEEDED TO SECURE THE PROPERTY AND/OR MAINTAIN MAIL DELIVERY. IN THAT CASE, PAYMENT FOR THESE INSTALLATIONS WILL BE INCLUDED AS EXTRA WORK ITEMS OR AS OVERRUNS TO EXISTING PAY ITEMS.
10. ANY DAMAGE CAUSED BY THE CONTRACTOR TO SUCH ITEMS LOCATED OUTSIDE OF THE COUNTY'S RIGHT-OF-WAY, SHALL BE REPLACED WITH LIKE-KIND OR BETTER AT THE CONTRACTOR'S EXPENSE.
11. ALSO, IF THESE ITEMS ARE LOCATED WITHIN THE PROJECT RIGHT-OF-WAY AND ARE DESIGNATED TO REMAIN, ANY DAMAGE CAUSED BY THE CONTRACTOR TO SUCH ITEMS, SHALL BE REPLACED WITH LIKE-KIND OR BETTER AT THE CONTRACTOR'S EXPENSE.
12. TREES, BUSHES, SHRUBBERY AND OTHER DAMAGED PLANTINGS DESIGNATED TO REMAIN SHALL BE REPLACED WITHIN 72 HOURS OF REMOVAL AND ARE TO BE THOROUGHLY WATERED-IN. NO SEPARATE PAY.
13. PAVED SURFACES, PAVEMENT MARKERS AND MARKINGS SHALL BE PROTECTED FROM DAMAGE BY TRACKED EQUIPMENT.
14. IRON RODS DISTURBED DURING CONSTRUCTION ARE TO BE REPLACED BY A REGISTERED PROFESSIONAL LAND SURVEYOR FOR THE ORIGINAL PROPERTY OWNER AT NO SEPARATE PAY.
15. CONSTRUCTION STAKING WILL BE PROVIDED BY THE CONTRACTOR. TWO COPIES OF STAKING NOTES TO BE PROVIDED TO THE ENGINEER PRIOR TO CONSTRUCTION.
16. THE COUNTY OR THE COUNTY'S SURVEYOR SHALL PROVIDE A BENCHMARK OR TEMPORARY BENCHMARK AND SURVEY CONTROLS.
17. THE CONTRACTOR SHALL MAINTAIN UPDATED RED-LINED RECORD DRAWINGS ON SITE FOR INSPECTION BY THE ENGINEER.
18. MOWING, MAINTENANCE, AND CLEAN-UP OF THE PROJECT SHALL MEET THE REQUIREMENT OF STANDARD SPECIFICATION ITEM 560 (NO SEPARATE PAY). MOWING, MAINTENANCE, AND CLEAN-UP IS REQUIRED FOR THE PROJECT LIMITS AND DURATION, REGARDLESS OF THE CONTRACTOR'S SCOPE OF ACTIVITIES WITHIN THE PROJECT LIMITS.
19. THE REMOVAL OF ANY ABANDONED UTILITIES REQUIRED TO COMPLETE THE WORK SHALL BE INCIDENTAL AND NO SEPARATE PAYMENT SHALL BE MADE.
20. IT IS THE CONTRACTOR'S RESPONSIBILITY TO STOCKPILE NECESSARY MATERIAL ON-SITE OR AT A SECURED OFF-SITE LOCATION AT NO ADDITIONAL EXPENSE TO HARRIS COUNTY. ANY SUITABLE EXCAVATED MATERIAL ON THE PROJECT WHICH IS AVAILABLE AT THE TIME OF NEED; WHETHER FROM STORM SEWER, ROADWAY, AND/OR CHANNEL EXCAVATION, SHALL BE USED BEFORE BORROW IS BROUGHT ON-SITE.
21. MANHOLES, JUNCTION BOXES, INLETS, AND RISERS ARE TO BE PRECAST OR CAST-IN-PLACE.

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.

A TETRA TECH COMPANY
Texas PE Firm Reg. #F-929
575 N. Dairy Ashford, Suite 700,
Houston, Texas 77079
T +1 281 589 7257
E usinfrastructure@rpsgroup.com

SURVEYED BY: KUO Inc.
FB NO. F-4578

This document is released for the purposes of interim review only under the authority of:

Jeremy Austin, P.E.
Texas P.E. No. 116816
02/16/2026

It is not to be used for bidding, construction, or permitting purposes.

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

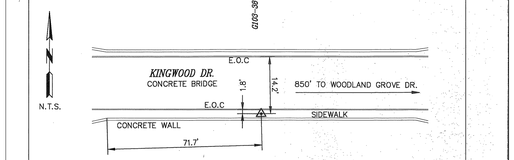
GENERAL NOTES
(SHEET 2 OF 2)

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 8 OF 125	

FILE PATH: C:\Users\andres.martinezjr\DC\ACCDocs\Tetra Tech Inc\200-317106-24001 COH LS Rehab Design\Project Files\CAD\R-000267-00178A-3-GEN-NOTES (SHEETED: 02/20/2026 11:11 AM

CITY OF HOUSTON

CITY SURVEY 5770
SITE CONTROL MONUMENT 7302



Project WBS# R-000267-0174-3
Texas Coordinate System of 1983,
South Central Zone, U. S. Survey Feet
X= 3,161,996.30
Y= 13,948,952.06
Lat.= 30° 03' 03.54562" (N)
Lon.= 95° 13' 36.96007" (W)
Reference Frame Used: NAD '83 (2011) (EPOCH: 2010)
Vertical Adjustment used: NAVD '88
General Location: ON SOUTH SIDEWALK ON KINGWOOD DR BRIDGE(EASTBOUND) ABOUT 850' EAST OF LADBROOK DR.
Date Set: 10-30-2002 Type of Mark: ALUM DISC (HC FLOODPLAIN RM 070265)
3 Nearest project control points (bearings and distances stated below):
1 S 26° 10' 19" W 998.13'
2 S 21° 17' 14" W 1422.25'
3 S 19° 54' 23" W 1741.56'

Keymap Page: 336C
Orthometric Elevation =74.05 FEET
Ellipsoid Height= -15.9458 FEET
Geoid: GEOID '18
Datum Source & Adjustment: GPS STATIC (OBSERVED ON 03-18-2025)

NOTE:
1. Bearings are grid bearings.
2. Scale Factor = (S.F. 0.999870017).
3. Surface= Grid / S.F.

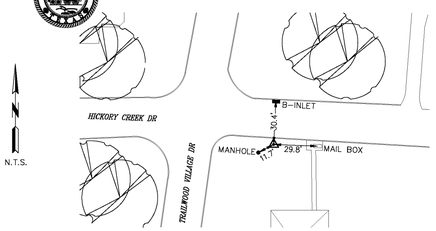
Surveyed By: Kuo & Associates, LLC
10300 Westoffice Dr., Suite 800
Houston, TX 77042

STATE OF TEXAS — REGISTERED — KUTUBUL A. A. MAINUDDIN — 6404 — LICENSED PROFESSIONAL LAND SURVEYOR

Date Revised: 03-18-2025
City of Houston, Harris County, Texas

CITY OF HOUSTON

CITY SURVEY
SITE CONTROL MONUMENT



Project WBS# R-000267-0178-3
Texas Coordinate System of 1983,
South Central Zone, U. S. Survey Feet
X= 3,162,769.3752
Y= 13,946,987.7096
Lat.= 30° 02' 43.86354" (N)
Lon.= 95° 13' 28.88932" (W)
Reference Frame Used: NAD '83 (2011) (EPOCH: 2010)
Vertical Adjustment used: NAVD '88
General Location: ON THE SOUTH EAST SIDE OF HICKORY CREEK DR AND TRAILWOOD VILLAGE DR INTERSECTION
Date Set: 10-17-25 Type of Mark: 4A
3 Nearest project control points (bearings and distances stated below):
1 N 08° 04' 16" E 594.56'
2 N 12° 35' 17" E 939.63'

Keymap Page: 336C
Orthometric Elevation =72.20 FEET
Ellipsoid Height= -17.7906 FEET
Geoid: GEOID '18
Datum Source & Adjustment: CONVENTIONAL (TIED TO MONUMENT 5770-7302)

NOTE:
1. Coordinates are grid coordinates.
2. Scale Factor = (S.F. 0.999870017).
3. Surface= Grid / S.F.

Surveyed By: Kuo & Associates, LLC
10300 Westoffice Dr., Suite 800
Houston, TX 77042

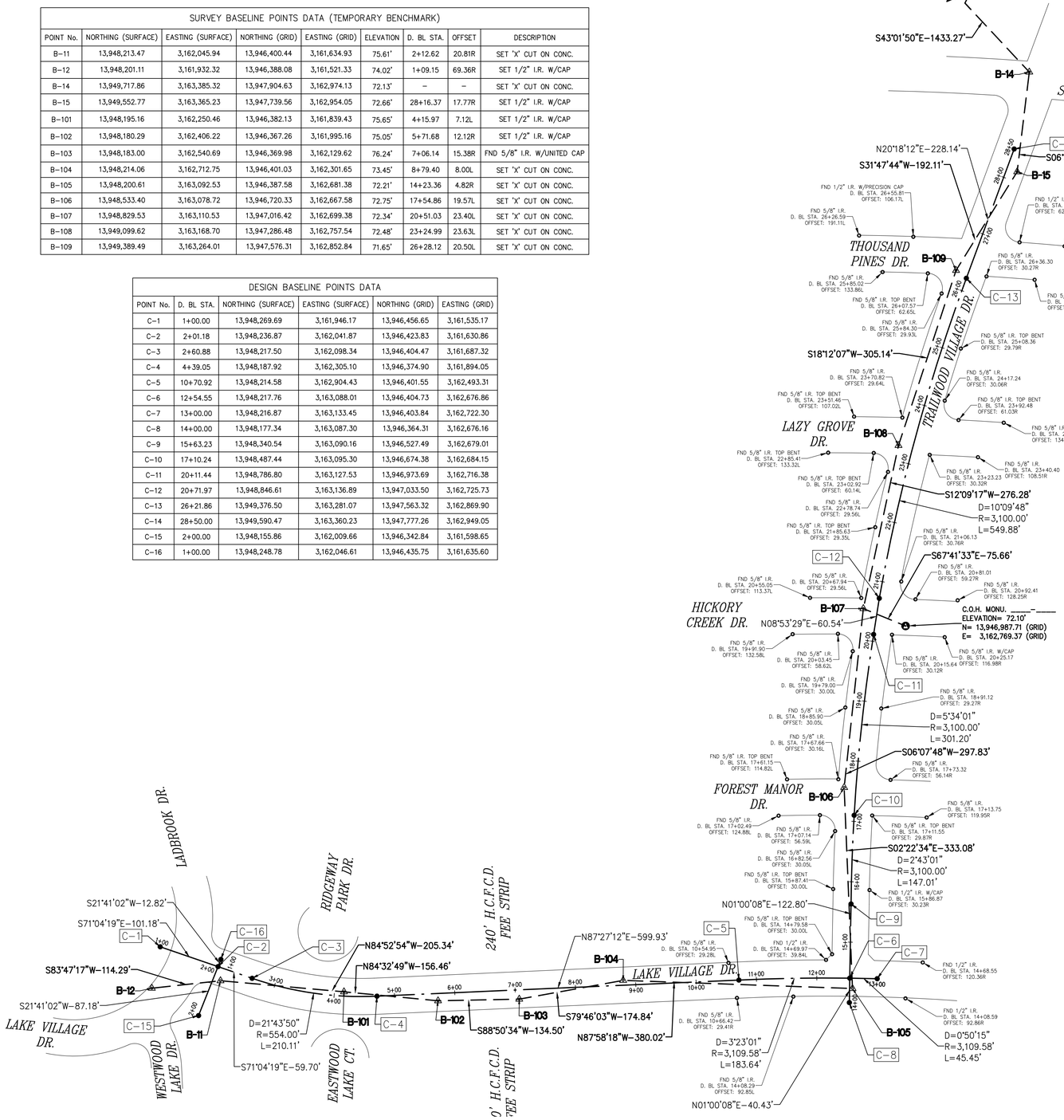
Date Revised: 10-17-2025
City of Houston, Harris County, Texas

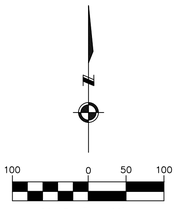
SURVEY BASELINE POINTS DATA (TEMPORARY BENCHMARK)

POINT No.	NORTHING (SURFACE)	EASTING (SURFACE)	NORTHING (GRID)	EASTING (GRID)	ELEVATION	D. BL STA.	OFFSET	DESCRIPTION
B-11	13,948,213.47	3,162,045.94	13,946,400.44	3,161,634.93	75.61'	2+12.62	20.81R	SET 'X' CUT ON CONC.
B-12	13,948,201.11	3,161,932.32	13,946,388.08	3,161,521.33	74.02'	1+09.15	69.36R	SET 1/2" I.R. W/CAP
B-14	13,949,717.86	3,163,385.32	13,947,904.63	3,162,974.13	72.13'	–	–	SET 'X' CUT ON CONC.
B-15	13,949,552.77	3,163,365.23	13,947,739.56	3,162,954.05	72.66'	28+16.37	17.77R	SET 1/2" I.R. W/CAP
B-101	13,948,195.16	3,162,250.46	13,946,382.13	3,161,839.43	75.65'	4+15.97	7.12L	SET 1/2" I.R. W/CAP
B-102	13,948,180.29	3,162,406.22	13,946,367.26	3,161,995.16	75.05'	5+71.68	12.12R	SET 1/2" I.R. W/CAP
B-103	13,948,183.00	3,162,540.69	13,946,369.98	3,162,129.62	76.24'	7+06.14	15.38R	FND 5/8" I.R. W/UNITED CAP
B-104	13,948,214.06	3,162,712.75	13,946,401.03	3,162,301.65	73.45'	8+79.40	8.00L	SET 'X' CUT ON CONC.
B-105	13,948,200.61	3,163,092.53	13,946,387.58	3,162,681.38	72.21'	14+23.36	4.82R	SET 'X' CUT ON CONC.
B-106	13,948,533.40	3,163,078.72	13,946,720.33	3,162,667.58	72.75'	17+54.86	19.57L	SET 'X' CUT ON CONC.
B-107	13,948,829.53	3,163,110.53	13,947,016.42	3,162,699.38	72.34'	20+51.03	23.40L	SET 'X' CUT ON CONC.
B-108	13,949,099.62	3,163,168.70	13,947,286.48	3,162,757.54	72.48'	23+24.99	23.63L	SET 'X' CUT ON CONC.
B-109	13,949,389.49	3,163,264.01	13,947,576.31	3,162,852.84	71.65'	26+28.12	20.50L	SET 'X' CUT ON CONC.

DESIGN BASELINE POINTS DATA

POINT No.	D. BL STA.	NORTHING (SURFACE)	EASTING (SURFACE)	NORTHING (GRID)	EASTING (GRID)
C-1	1+00.00	13,948,269.69	3,161,946.17	13,946,456.65	3,161,535.17
C-2	2+01.18	13,948,236.87	3,162,041.87	13,946,423.83	3,161,630.86
C-3	2+60.88	13,948,217.50	3,162,098.34	13,946,404.47	3,161,687.32
C-4	4+39.05	13,948,187.92	3,162,305.10	13,946,374.90	3,161,894.05
C-5	10+70.92	13,948,214.58	3,162,904.43	13,946,401.55	3,162,493.31
C-6	12+54.55	13,948,217.76	3,163,088.01	13,946,404.73	3,162,676.86
C-7	13+00.00	13,948,216.87	3,163,133.45	13,946,403.84	3,162,722.30
C-8	14+00.00	13,948,177.34	3,163,087.30	13,946,364.31	3,162,676.16
C-9	15+63.23	13,948,340.54	3,163,090.16	13,946,527.49	3,162,679.01
C-10	17+10.24	13,948,487.44	3,163,095.30	13,946,674.38	3,162,684.15
C-11	20+11.44	13,948,786.80	3,163,127.53	13,946,973.69	3,162,716.38
C-12	20+71.97	13,948,846.61	3,163,136.89	13,947,033.50	3,162,725.73
C-13	26+21.86	13,949,376.50	3,163,281.07	13,947,563.32	3,162,869.90
C-14	28+50.00	13,949,590.47	3,163,360.23	13,947,777.26	3,162,949.05
C-15	2+00.00	13,948,155.86	3,162,009.66	13,946,342.84	3,161,598.65
C-16	1+00.00	13,948,248.78	3,162,046.61	13,946,435.75	3,161,635.60





NO.	DATE	REVISION	APP.

BENCHMARK:

CITY OF HOUSTON MONUMENT 5770-7302 (ALSO FLOODPLAIN REFERENCE MARK NUMBER 070265) IS AN ALUMINUM DISK STAMPED G 103-38 BM 01 LOCATED ON SOUTH SIDEWALK ON KINGWOOD DRIVE EASTBOUND BRIDGE APPROXIMATELY 1.5 MILES EAST FROM THE INTERSECTION OF US 59 IN KEYMAP 336C IN THE SAN JACINTO RIVER WATERSHED

ELEV. 74.46 FEET NAVD 1988, 2001 ADJUSTMENT (PROJECT DATUM)
ELEV. 74.05 FEET NAVD 1988, (GEOID '18)*

* OBSERVED BY GPS SURVEYING AND PROCESSED IN REFERENCE TO THE CORS DATED MARCH 18, 2025

VERTICAL DATUM ADJUSTMENT:

THE ELEVATION DIFFERENCE IN BETWEEN THE FLOODPLAIN REFERENCE MARK'S (RM 070265)PUBLISHED DATUM NAVD 1988, 2001 ADJUSTMENT AND DATUM NAVD 1988, (GEOID '18) IS 0.41'.

NAVD 1988, 2001 ADJ. ELEVATION
= NAVD 1988 (GEOID '18) ELEVATION + 0.41 FT

NOTE:

ALL BEARINGS AND DISTANCES ARE BASED ON TEXAS STATE PLANE COORDINATE SYSTEM, SOUTH CENTRAL ZONE, NAD83. ALL DISTANCES ARE IN SURFACE.

THE COORDINATES SHOWN HEREON ARE TEXAS SOUTH CENTRAL ZONE NO. 4204 STATE PLANE GRID COORDINATES (NAD83) AND MAY BE BROUGHT TO SURFACE BY DIVIDING BY THE COMBINED SCALE FACTOR 0.999870017.

LEGEND:

B-X	SURVEY CONTROL POINT NUMBER
C-X	DESIGN BASELINE POINT NUMBER
⚠	SURVEY CONTROL POINT
•	DESIGN BASELINE POINT
✪	CITY OF HOUSTON MONUMENT
D. BL:	DESIGN BASELINE
S. BL:	SURVEY BASELINE

rps A TETRA TECH COMPANY
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E usinfrastructure@rpsgroup.com

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ENGINEERING + SURVEYING
10300 Westoffice Dr., Suite 800, Houston, Texas 77042
Tel: 713-975-8769, Fax: 713-975-0920, www.kuoassociates.com
TBPELS Firm Registration No. F-4578
TBPELS Firm Registration No. 1007560

THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW UNDER THE AUTHORITY OF
KUTUBUL A. MAINUDDIN, R.P.L.S.
TEXAS REG. NO.: 6404
ON 02/03/2026
IT IS NOT TO BE USED FOR PERMIT, BIDDING OR CONSTRUCTION PURPOSES

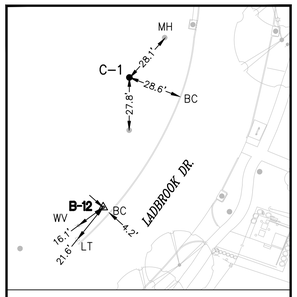
SURVEYED BY: KUO & ASSOC.
FB NO.

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

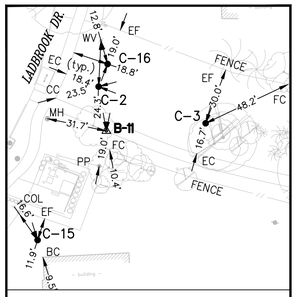
RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS
TRAILWOOD DR GRAVITY ROUTE

SURVEY CONTROL MAP
(SHEET 1 OF 2)

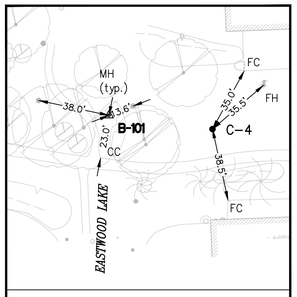
WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
1"=100'	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 9 OF 125	



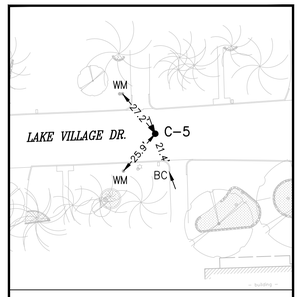
C-1 & T.B.M. B-12



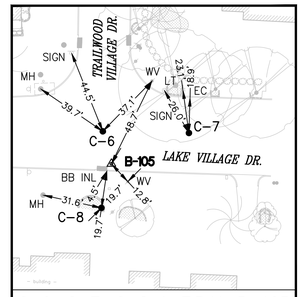
C-2, C-3, C-15, C-16 & T.B.M. B-11



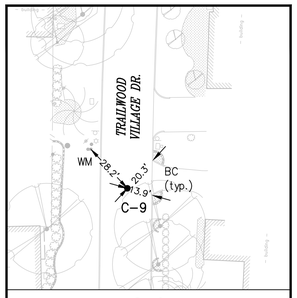
C-4 & T.B.M. B-101



C-5



C-6, C-7, C-8 & T.B.M. B-105



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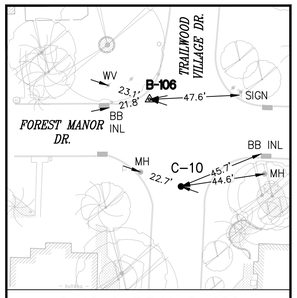
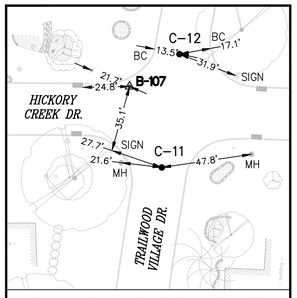
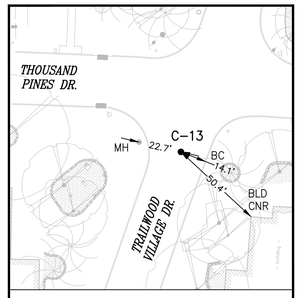


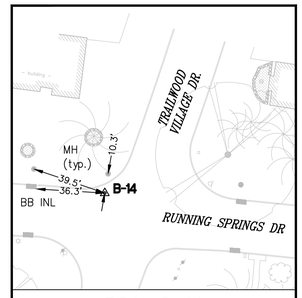
C-10 & T.B.M. B-106



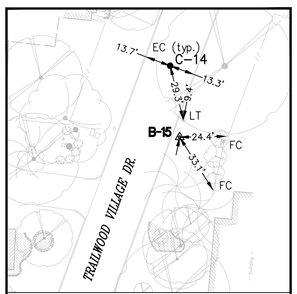
C-11, C-12 & T.B.M. B-107



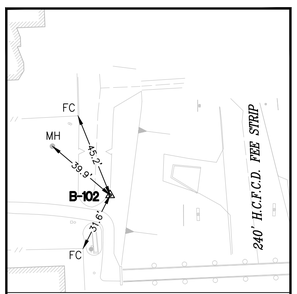
C-13



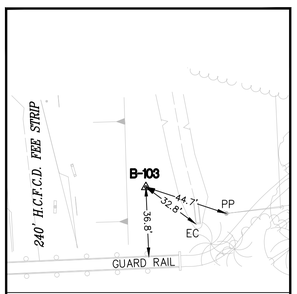
T.B.M. B-14



C-14 & T.B.M. B-15



T.B.M. B-102



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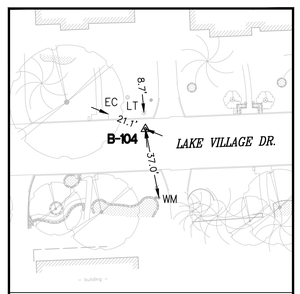

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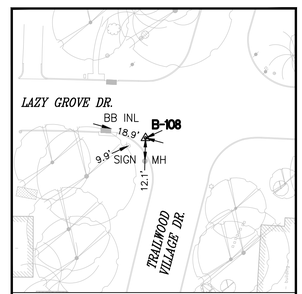

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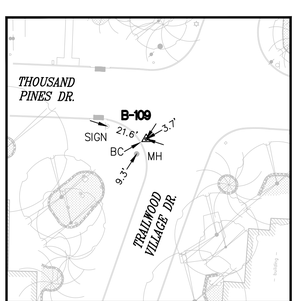
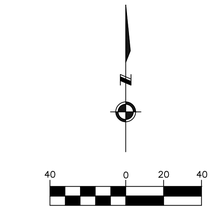


T.B.M. B-109



NO.	DATE	REVISION	APP.

EXIST. TOPOGRAPHIC LEGEND

- ASPHALT SYMBOL
- B OR BB INLET
- BUSH
- C INLET
- CLEANOUT
- brick column
- DOWN GUY
- E INLET
- ELEC MANHOLE
- FIRE HYDRANT
- GAS METER
- GAS VALVE
- GATE
- GRATE INLET
- GRATE INLET
- MAIL BOX
- STORM MANHOLE
- SANITARY MANHOLE
- PLANTER
- POWER POLE
- POWER POLE W/LT.
- SIGN
- SIGNAL POLE
- SPRINKLER VALVE
- SPRINKLER HEAD
- STREET LIGHT/FLOOD LIGHT
- STREET LIGHT/PARKING LIGHT
- TREE
- TREE STUMP
- TREE-CREPE MYRTLE
- TREE-PINE
- WATER METER
- WATER VALVE
- IRRIGATION CONTROL VALVE

ABBREVIATIONS

BC – BACK OF CURB
EA – EDGE OF ASPHALT
EC – EDGE OF CONCRETE
EG – EDGE OF GRAVEL
EF – EDGE OF FENCE
FH – FIRE HYDRANT
FC – FENCE CORNER
CC – CONCRETE CORNER
LT – LIGHT POLE
MB – MAIL BOX
MH – MANHOLE
PP – POWER POLE
PP/LIGHT – POWER POLE W/LIGHT
STLT – STREET LIGHT
TRLT – TRAFFIC LIGHT
WM – WATER METER
WV – WATER VALVE
COL – COLUMN

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E usinfrastructure@rpsgroup.com

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ENGINEERING + SURVEYING
10300 Westoffice Dr., Suite 800, Houston, Texas 77042
Tel: 713-975-8769, Fax: 713-975-0920, www.kuoassociates.com
TBPELS Firm Registration No. F-4578
TBPELS Firm Registration No. 1007560

SURVEYED BY: KUO & ASSOC.
FB NO.

THIS DOCUMENT IS RELEASED FOR THE PURPOSE OF INTERIM REVIEW UNDER THE AUTHORITY OF
KUTUBUL A. MAINUDDIN, R.P.L.S.
TEXAS REG. NO.: 6404
ON 02/03/2026
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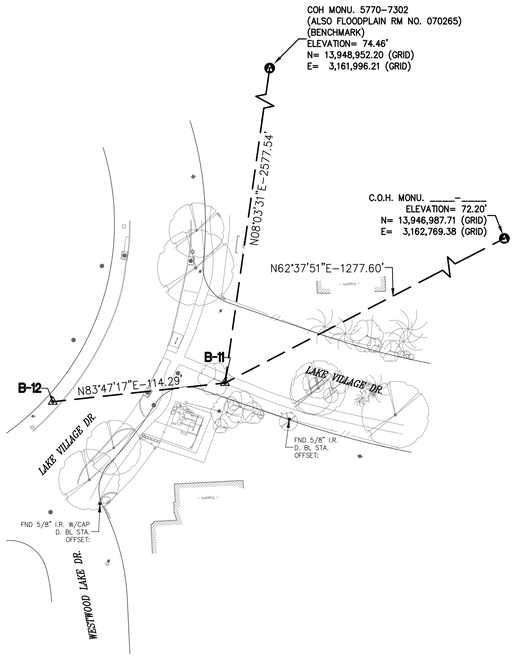
CITY OF HOUSTON

HOUSTON PUBLIC WORKS

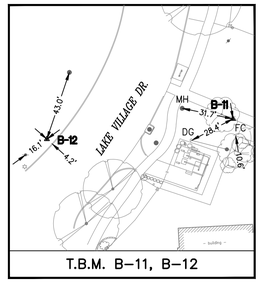
RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS
TRAILWOOD DR GRAVITY ROUTE

SURVEY CONTROL MAP
(SHEET 2 OF 2)

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
1"=40'	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 10 OF 125	



SURVEY BASELINE POINTS DATA (TEMPORARY BENCHMARK)						
POINT No.	NORTHING (SURFACE)	EASTING (SURFACE)	NORTHING (GRID)	EASTING (GRID)	ELEVATION	DESCRIPTION
B-11	13,948,213.47	3,162,045.94	13,946,400.44	3,161,634.93	75.61'	SET 'X' CUT ON CONC.
B-12	13,948,201.11	3,161,932.32	13,946,388.08	3,161,521.33	74.02'	SET 1/2" I.R. W/CAP

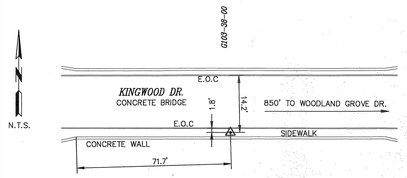


T.B.M. B-11, B-12

N.T.S.

CITY OF HOUSTON

CITY SURVEY 5770
SITE CONTROL MONUMENT 7302



Project WBS# R-000267-0174-3
Texas Coordinate System of 1983,
South Central Zone, U. S. Survey Feet
X= 3,161,996.30
Y= 13,948,952.06
Lat.= 30° 03' 03.54562" (N)
Lon.= 95° 13' 36.96007" (W)
Reference Frame Used: NAD '83 (2011) (EPOCH: 2010)
Vertical Adjustment used: NAVD '88
General Location: ON SOUTH SIDEWALK ON KINGWOOD DR BRIDGE(EASTBOUND) ABOUT 850' EAST OF LADBROOK DR.
Date Set: 10-30-2002 Type of Mark: ALUM. DISC (HC FLOODPLAIN RM 070265)
3 Nearest project control points (bearings and distances stated below):
1 S 26° 10' 19" W 998.13'
2 S 21° 17' 14" W 1422.25'
3 S 19° 54' 23" W 1741.56'
NOTE:
1. Bearings are grid bearings.
2. Scale Factor = (S.F. 0.999870017).
3. Surface= Grid / S.F.
Surveyed By: Kuo & Associates, LLC
10300 Westoffice Dr., Suite 800
Houston, TX 77042

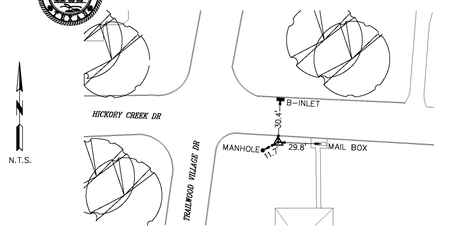
Keymap Page: 336C
Orthometric Elevation =74.05 FEET
Ellipsoid Height= -15.9458 FEET
Geoid: GEOID '18
Datum Source & Adjustment:
GPS STATIC
(OBSERVED ON 03-18-2025)

STATE OF TEXAS
REGISTERED
KUTUBUL A. M. MAINUDDIN
6404
PROFESSIONAL
LAND SURVEYOR

Date Revised: 03-18-2025
City of Houston, Harris County, Texas

CITY OF HOUSTON

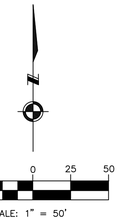
CITY SURVEY
SITE CONTROL MONUMENT



Project WBS# R-000267-0178-3
Texas Coordinate System of 1983,
South Central Zone, U. S. Survey Feet
X= 3,162,769.3752
Y= 13,946,987.7096
Lat.= 30° 02' 43.86354" (N)
Lon.= 95° 13' 28.88932" (W)
Reference Frame Used: NAD '83 (2011) (EPOCH: 2010)
Vertical Adjustment used: NAVD '88
General Location: ON THE SOUTH EAST SIDE OF HICKORY CREEK DR AND TRAILWOOD VILLAGE DR INTERSECTION
Date Set: 10-17-25 Type of Mark: 4A
3 Nearest project control points (bearings and distances stated below):
1 N 08° 04' 16" E 594.56'
2 N 12° 35' 17" E 939.63'
NOTE:
1. Coordinates are grid coordinates.
2. Scale Factor = (S.F. 0.999870017).
3. Surface= Grid / S.F.
Surveyed By: Kuo & Associates, LLC
10300 Westoffice Dr., Suite 800
Houston, TX 77042

Keymap Page: 336C
Orthometric Elevation =72.20 FEET
Ellipsoid Height= -17.7906 FEET
Geoid: GEOID '18
Datum Source & Adjustment:
CONVENTIONAL
(TIED TO MONUMENT 5770-7302)

Date Revised: 10-17-2025
City of Houston, Harris County, Texas



NO.	DATE	REVISION	APP.

BENCHMARK:

CITY OF HOUSTON MONUMENT 5770-7302 (ALSO FLOODPLAIN REFERENCE MARK NUMBER 070265) IS AN ALUMINUM DISK STAMPED G 103-38 BM 01 LOCATED ON SOUTH SIDEWALK ON KINGWOOD DRIVE EASTBOUND BRIDGE APPROXIMATELY 1.5 MILES EAST FROM THE INTERSECTION OF US 59 IN KEYMAP 336C IN THE SAN JACINTO RIVER WATERSHED

ELEV. 74.46 FEET NAVD 1988, 2001 ADJUSTMENT (PROJECT DATUM)
ELEV. 74.05 FEET NAVD 1988, (GEOID '18)*

* OBSERVED BY GPS SURVEYING AND PROCESSED IN REFERENCE TO THE CORS DATED MARCH 18, 2025

VERTICAL DATU ADJUSTMENT:

THE ELEVATION DIFFERENCE IN BETWEEN THE FLOODPLAIN REFERENCE MARK'S (RM 070265)PUBLISHED DATUM NAVD 1988, 2001 ADJUSTMENT AND DATUM NAVD 1988, (GEOID '18) IS 0.41'.

NAVD 1988, 2001 ADJ. ELEVATION
=NAVD 1988 (GEOID '18) ELEVATION + 0.41 FT

NOTE:

ALL BEARINGS AND DISTANCES ARE BASED ON TEXAS STATE PLANE COORDINATE SYSTEM, SOUTH CENTRAL ZONE NO. 4204, NAD83. ALL DISTANCES ARE IN SURFACE.

THE COORDINATES SHOWN HEREON ARE TEXAS SOUTH CENTRAL ZONE NO. 4204 STATE PLANE GRID COORDINATES (NAD83) AND MAY BE BROUGHT TO SURFACE BY DIVIDING BY THE COMBINED SCALE FACTOR 0.999870017.

LEGEND:

B-X	SURVEY CONTROL POINT NUMBER
C-X	DESIGN BASELINE POINT NUMBER
⚠	SURVEY CONTROL POINT
●	DESIGN BASELINE POINT
Ⓐ	CITY OF HOUSTON MONUMENT
S. BL:	SURVEY BASELINE

RPS
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Texas PE Firm Reg. #F-929
575 N. Dairy Ashford, Suite 700,
Houston, Texas 77079
T +1 281 589 7257
E usinfrastructure@rpsgroup.com

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10300 Westoffice Dr., Suite 800, Houston, Texas 77042
Tel: 713-975-8769, Fax: 713-975-0920, www.kuoassociates.com
TBPELS Firm Registration No. F-4578
TBPELS Firm Registration No. 1007560

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KUTUBUL A. MAINUDDIN, R.P.L.S.
TEXAS REG. NO.: 6404
ON 01/02/2026
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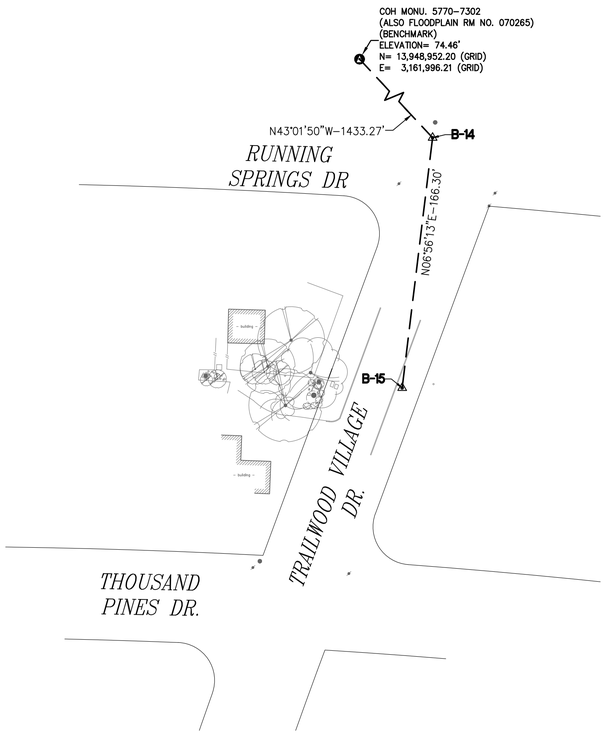
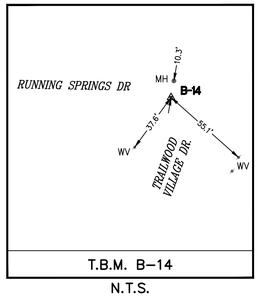
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

COH LS RENEWAL AND REPLACEMENT
LAKE VILLAGE LS
SURVEY CONTROL MAP

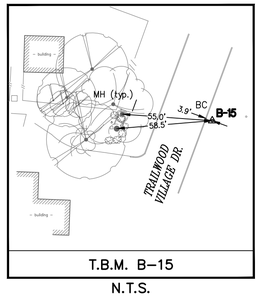
WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
1"=100'	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 11 OF 125	



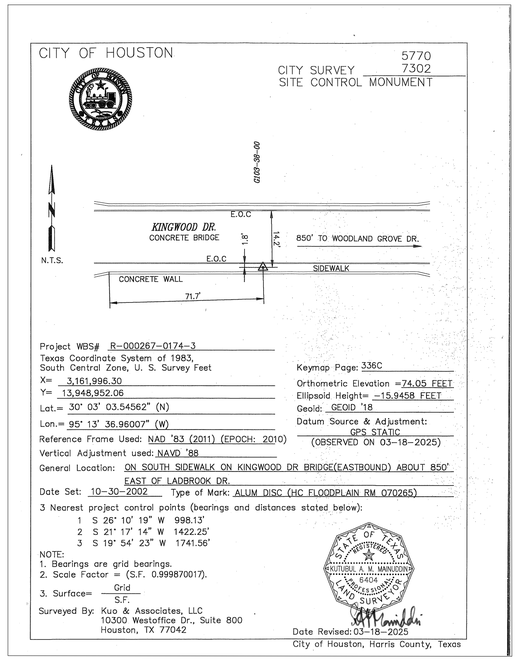
SURVEY BASELINE POINTS DATA (TEMPORARY BENCHMARK)						
POINT No.	NORTHING (SURFACE)	EASTING (SURFACE)	NORTHING (GRID)	EASTING (GRID)	ELEVATION	DESCRIPTION
B-14	13,949,717.86	3,163,385.32	13,947,904.63	3,162,974.13	72.13'	SET 'X' CUT ON CONC.
B-15	13,949,552.77	3,163,365.23	13,947,739.56	3,162,954.05	72.66'	SET 1/2" I.R. W/CAP

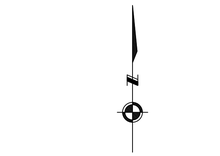


T.B.M. B-14
N.T.S.



T.B.M. B-15
N.T.S.





NO.	DATE	REVISION	APP.

BENCHMARK:

CITY OF HOUSTON MONUMENT 5770-7302 (ALSO FLOODPLAIN REFERENCE MARK NUMBER 070265) IS AN ALUMINUM DISK STAMPED G 103-38 BM 01 LOCATED ON SOUTH SIDEWALK ON KINGWOOD DRIVE EASTBOUND BRIDGE APPROXIMATELY 1.5 MILES EAST FROM THE INTERSECTION OF US 59 IN KEYMAP 336C IN THE SAN JACINTO RIVER WATERSHED

ELEV. 74.46 FEET NAVD 1988, 2001 ADJUSTMENT (PROJECT DATUM)
ELEV. 74.05 FEET NAVD 1988, (GEOID '18)*

* OBSERVED BY GPS SURVEYING AND PROCESSED IN REFERENCE TO THE CORS DATED MARCH 18, 2025

VERTICAL DATU ADJUSTMENT:

THE ELEVATION DIFFERENCE IN BETWEEN THE FLOODPLAIN REFERENCE MARK'S (RM 070265)PUBLISHED DATUM NAVD 1988, 2001 ADJUSTMENT AND DATUM NAVD 1988, (GEOID '18) IS 0.41'.

NAVD 1988, 2001 ADJ. ELEVATION
=NAVD 1988 (GEOID '18) ELEVATION + 0.41 FT

NOTE:

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LEGEND:

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C-X	DESIGN BASELINE POINT NUMBER
⚠	SURVEY CONTROL POINT
●	DESIGN BASELINE POINT
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S. BL:	SURVEY BASELINE — — —

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

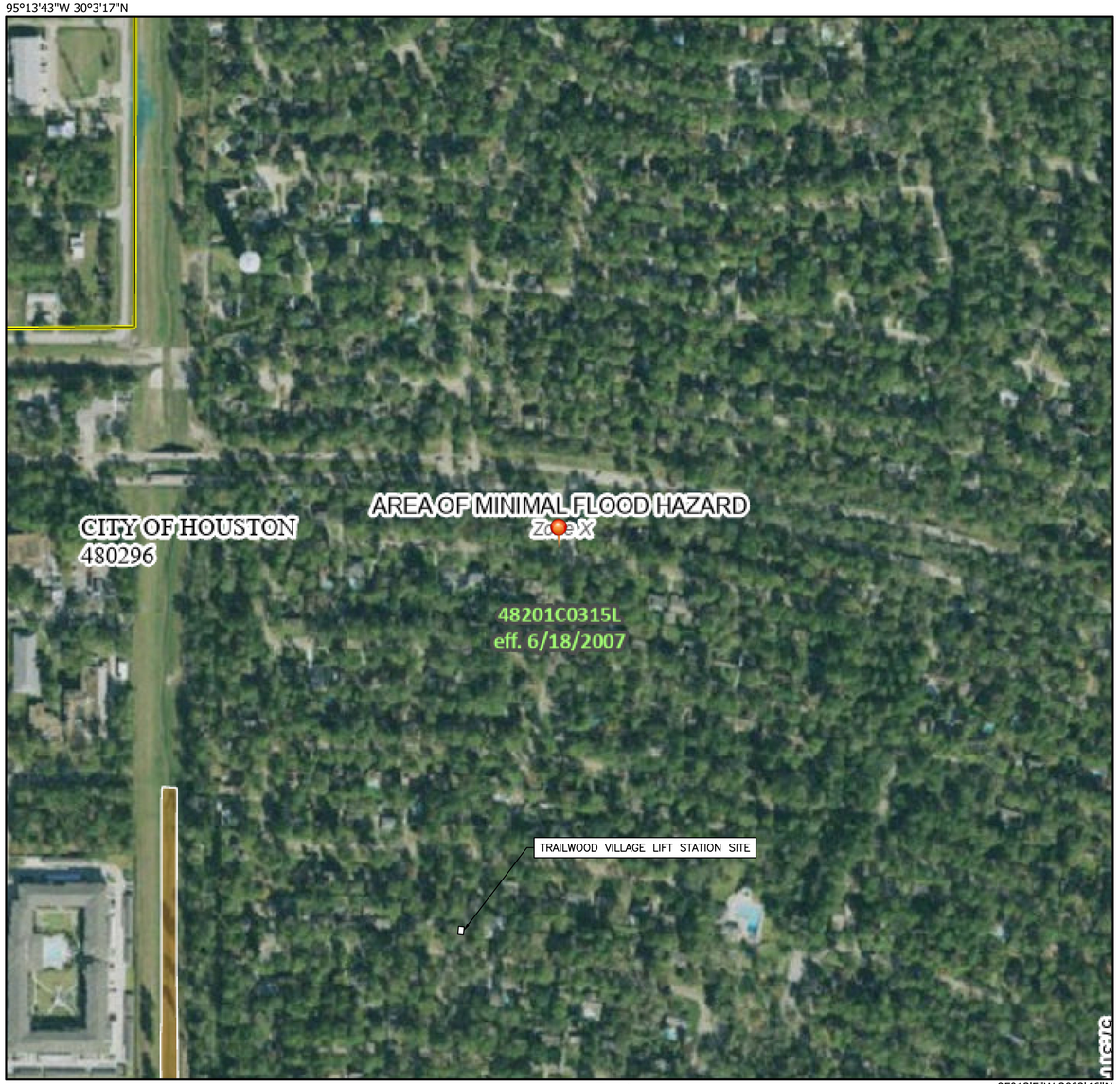
COH LS RENEWAL AND REPLACEMENT
TRAILWOOD LS
SURVEY CONTROL MAP

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
1"=100'	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 12 OF 125	

National Flood Hazard Layer FIRMette

FEMA

95°13'43"W 30°3'17"N



95°13'5"W 30°2'46"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

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This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

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E usinfrastructure@rpsgroup.com

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FB NO. F-4578

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Neha Raval, P.E.
Texas P.E. No. 141506
02/16/2026

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

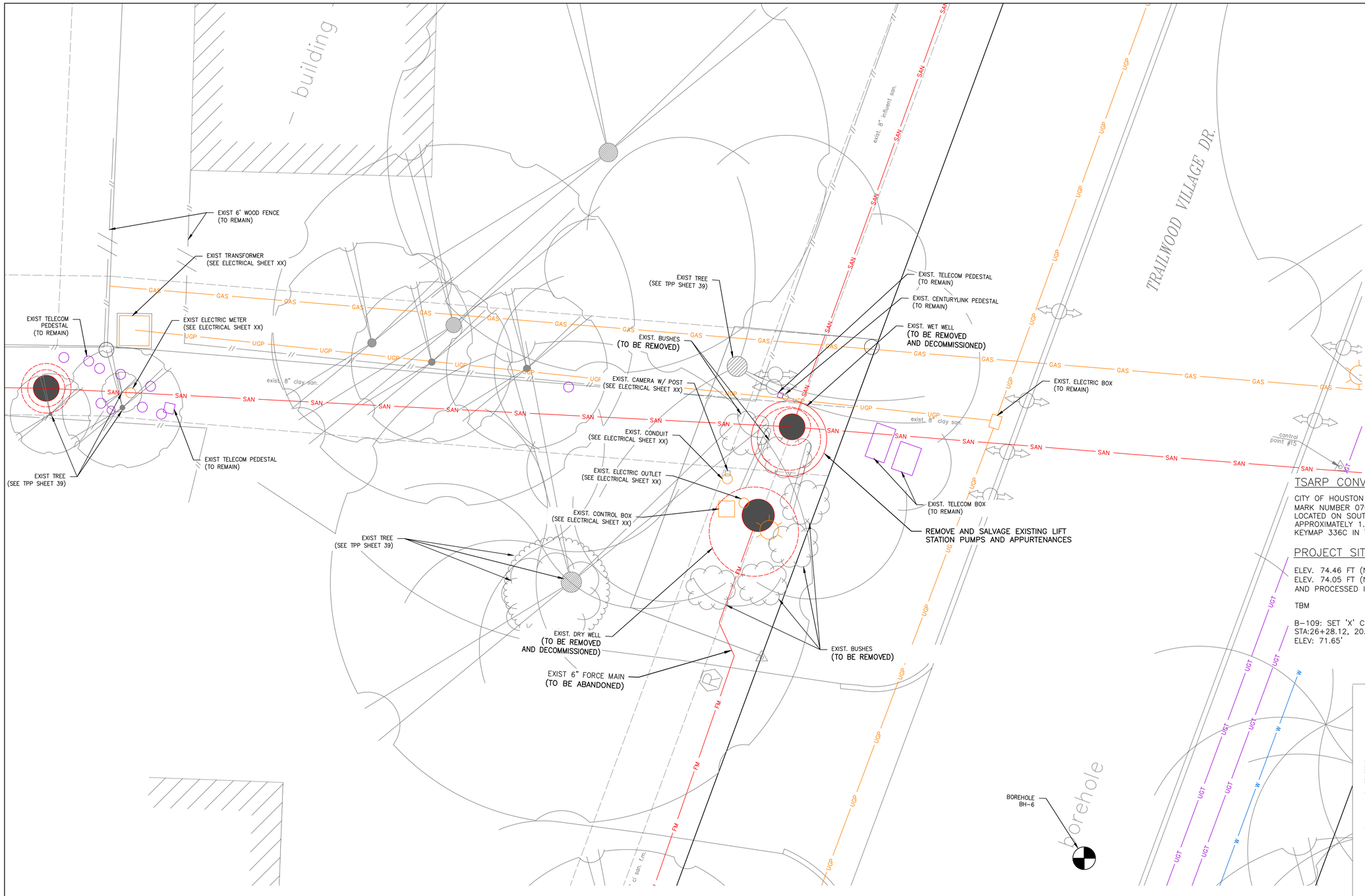
RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

FIRMETTE

TRAILWOOD VILLAGE LIFT STATION
NATIONAL FLOOD HAZARD
LAYER FIRMETTE MAP

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 13 OF 125	

FILE PATH: C:\Users\andres.martinezjr\DC\ACCDocs\Tetra Tech Inc\200-317106-24001 COH LS Rehab Design\Project Files\CAD\R-000267-00178A-3_STYLE_Firmette.dwg PLOTTED: 2/16/2026 11:12 AM



NOTES:
1. CONTRACTOR TO PREPARE BYPASS PLAN AND SUBMIT FOR REVIEW.
2. CONTRACTOR TO REMOVE AND SALVAGE ALL THE EXISTING PUMP, VALVES AND APPURENTANACES.
3. CONTRACTOR TO FIELD VERITY EXISTING CONDITIONS PRIOR TO ANY DEMOLITION WORK, REPORT ANY DISCREPANCIES TO THE ENGINEER.
4. CONSULT WITH ENGINEER FOR PHASES OR SEQUENCES OF DEMOLITION.
5. REMOVE AND SALVAGE EXISTING PUMPS, MOTORS, VALVES, PIPING, AND FITTINGS. SALVAGED ITEMS SHALL BE DELIVERED AS DIRECTED BY THE CITY OF HOUSTON MAINTENANCE OFFICE.
6. WET WELL SHALL BE DEMOLISHED AT LEAST 4 FT. BELOW FINISHED GRADE AS SHOWN. DEMOLISHED WET WELL SHALL BE COMPLETELY FILLED WITH ACCEPTABLE FLOWABLE FILL APPROVED BY THE ENGINEER.
7. CLEAN EXISTING WET WELL OF ACCUMULATED SLUDGE. CONTRACTOR SHALL DISPOSE ALL DEMOLISHED DEBRIS AND SLUDGE IN ACCORDANCE WITH THE CITY OF HOUSTON STANDARDS.

TSARP CONVERSION REFERENCE MONUMENT

CITY OF HOUSTON MONUMENT 5770-7302 (ALSO FLOODPLAIN REFERENCE MARK NUMBER 070265) IS AN ALUMINUM DISK STAMPED G 103-38 BM 01 LOCATED ON SOUTH SIDEWALK ON KINGWOOD DRIVE EASTBOUND BRIDGE APPROXIMATELY 1.5 MILES EAST FROM THE INTERSECTION OF US 59 IN KEYMAP 336C IN THE SAN JACINTO RIVER WATERSHED.

PROJECT SITE MONUMENT

ELEV. 74.46 FT (NAVD 1988, 2001 ADJ. – PROJECT DATUM)
ELEV. 74.05 FT (NAVD 1988, (GEOID '18) – OBSERVED BY GPS SURVEYING AND PROCESSED IN REFERENCE TO THE CORS DATED MARCH 18, 2025)

TBM

B-109: SET 'X' CUT ON CONC.,
STA:26+28.12, 20.50LT
ELEV: 71.65'

EXISTING UTILITY NOTE:

EXISTING UNDERGROUND UTILITY INFORMATION (TYPE. SIZE & OWNERSHIP) ARE APPROXIMATELY BASE ON THE AVAILABLE RECORD DRAWINGS AND FIELD VERIFICATION (WHERE FEASIBLE) WITHOUT PROBING AND EXCAVATION. NO WARRANTY IS MADE AS TO THE ACCURACY OR COMPLETENESS OF UTILITY LOCATION SHOWN ON THE DRAWING. CAUTION SHOULD BE EXERCISED WHEN EXCAVATING OR BORE AND JACKING IN THE VICINITY OF UNDERGROUND UTILITIES. OWNERS OF THE UTILITIES SHOULD BE NOTIFIED PRIOR TO SUCH ACTIVITIES. CALL UTILITY COORDINATING COMMITTEE AT 713-2223-4567. AT LEAST 48 HOURS PRIOR TO EXCAVATING IN THE STREET RIGHT-OF-WAY.

DEMOLITION NOTE:

WHEN MEASURED FROM THE PROPERTY LINE OF ANY NEARBY RESIDENTIAL PROPERTY. ANY SOUND PRODUCED BY THE ERECTION, EXCAVATION, CONSTRUCTION, OR DEMOLITION OF ANY STRUCTURE. INCLUDING THE USE OF TOOLS OR EQUIPMENT (CONDUCTED BETWEEN THE HOURS OF 7 A.M. ABD 8 P.M. SHALL NOT EXCEED 85 DB(A).

RIGHT OF REFUSAL NOTE:

SALVAGED MATERIAL AND EQUIPMENT LISTED HEREINAFTER SHALL BECOME THE PROPERTY OF THE CITY OF HOUSTON UNLESS OTHERWISE DESIGNATED IN WRITING. THE CITY OF HOUSTON SHALL HAVE FIRST REFUSAL RIGHTS TO RETAIN ALL ITEMS SHOWN TO BE DEMOLISHED AND/OR REMOVED IN THE DRAWINGS PRIOR TO INITIATING DEMOLITION. THE CONTRACTOR AND THE CITY OF HOUSTON PROJECT MANAGER SHALL MAKE A JOINT INSPECTION TO IDENTITY ALL ITEMS TO BE RETAINED BY THE CITY OF HOUSTON. THE CONTRACTOR SHALL RELOCATED AND STORE ITEMS, TO BE RETAINED BY THE CITY OF HOUSTON, WHERE DIRECTED ONSITE OR OFFSITE.

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TBPLS FIRM NO. F-4578

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02/16/2026

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

EXISTING & DEMOLITION SITE PLAN
– TRAILWOOD VILLAGE LS

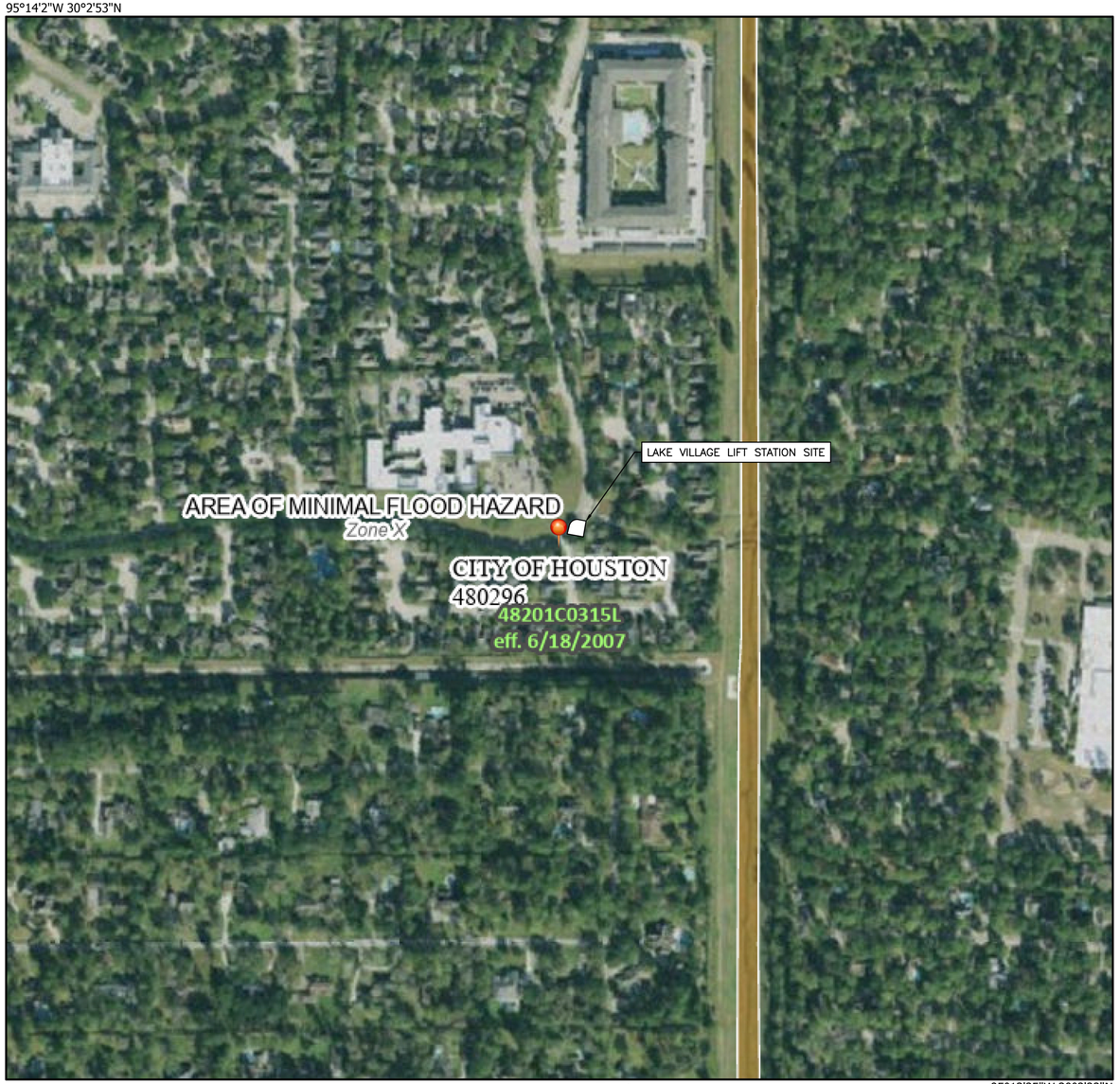
WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 14 OF 125	

FILE PATH: C:\Users\andres.martinezjr\DC\ACCDocs\Tetra Tech Inc\200-317106-24001 COH LS Rehab Design\Project Files\CAD\R-000267-01078A-3_EXISTING & DEMOLITION SITE PLAN - TRAILWOOD VILLAGE LS.dwg

National Flood Hazard Layer FIRMette

FEMA

95°14'2"W 30°2'53"N



95°13'25"W 30°2'22"N

Feet

0 250 500 1,000 1,500 2,000

1:6,000

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN — Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 — Cross Sections with 1% Annual Chance
- 17.5 — Water Surface Elevation
- Coastal Transect
- 513 — Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

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HOUSTON PUBLIC WORKS

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LAYER FIRMETTE MAP

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R-000267-00178A-3	
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CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 15 OF 125	

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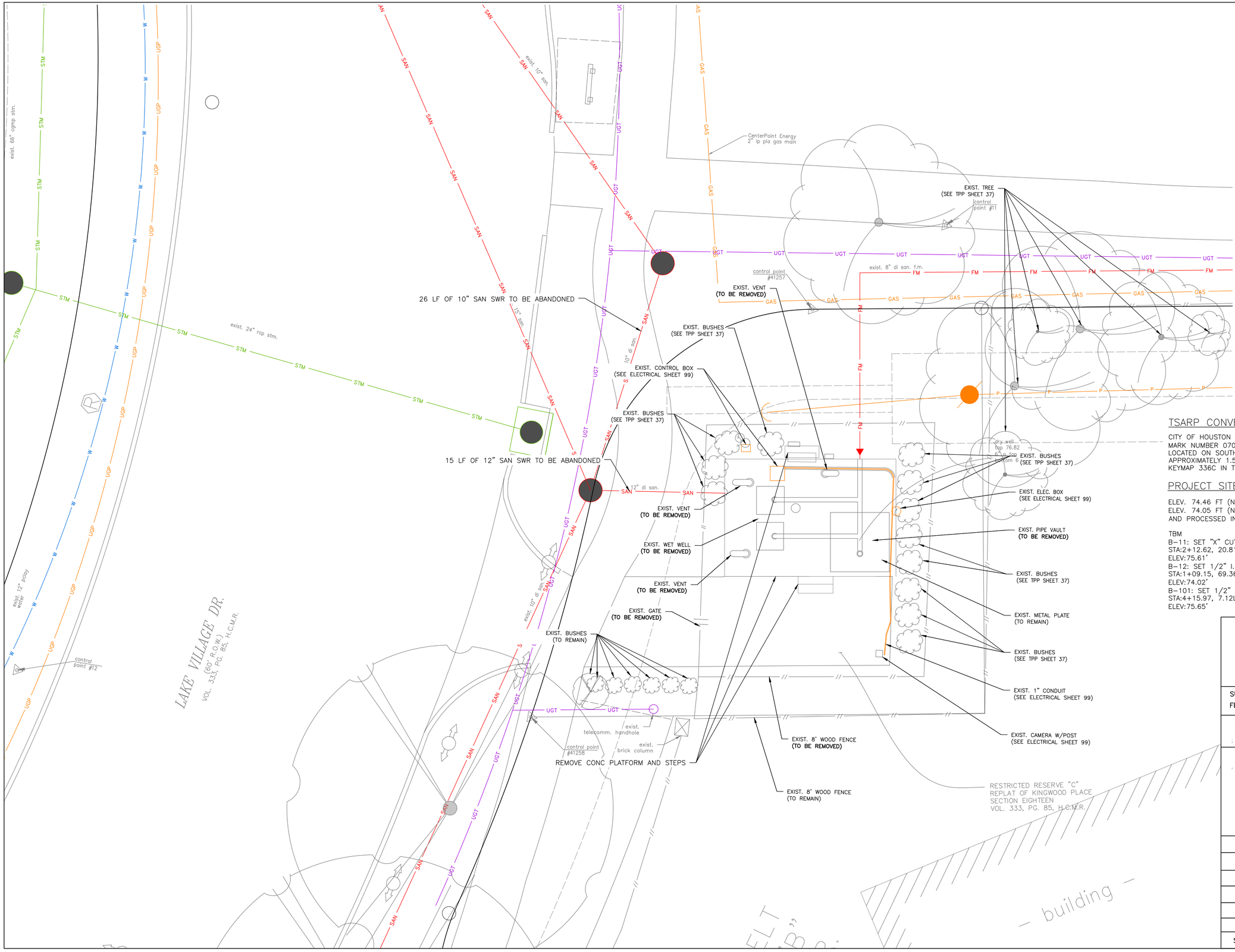

N

0' 5' 10'

SCALE: 1"=5'

NOTES:
1. CONTRACTOR TO PREPARE BYPASS PLAN AND SUBMIT FOR REVIEW BEFORE DEMOLITION.
2. CONTRACTOR TO REMOVE AND SALVAGE ALL THE EXISTING PUMP, VALVES AND APPURENTANACES.

TSARP CONVERSION REFERENCE MONUMENT

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PROJECT SITE MONUMENT

ELEV. 74.46 FT (NAVD 1988, 2001 ADJ. – PROJECT DATUM)
ELEV. 74.05 FT (NAVD 1988, (GEOID '18) – OBSERVED BY GPS SURVEYING AND PROCESSED IN REFERENCE TO THE CORS DATED MARCH 18, 2025)

TBM
B-11: SET "X" CUT ON CONC,
STA:2+12.62, 20.81RT
ELEV:75.61'
B-12: SET 1/2" I.R. W/CAP,
STA:1+09.15, 69.36RT
ELEV:74.02'
B-101: SET 1/2" I.R. W/CAP,
STA:4+15.97, 7.12LT
ELEV:75.65'

rps
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CITY OF HOUSTON

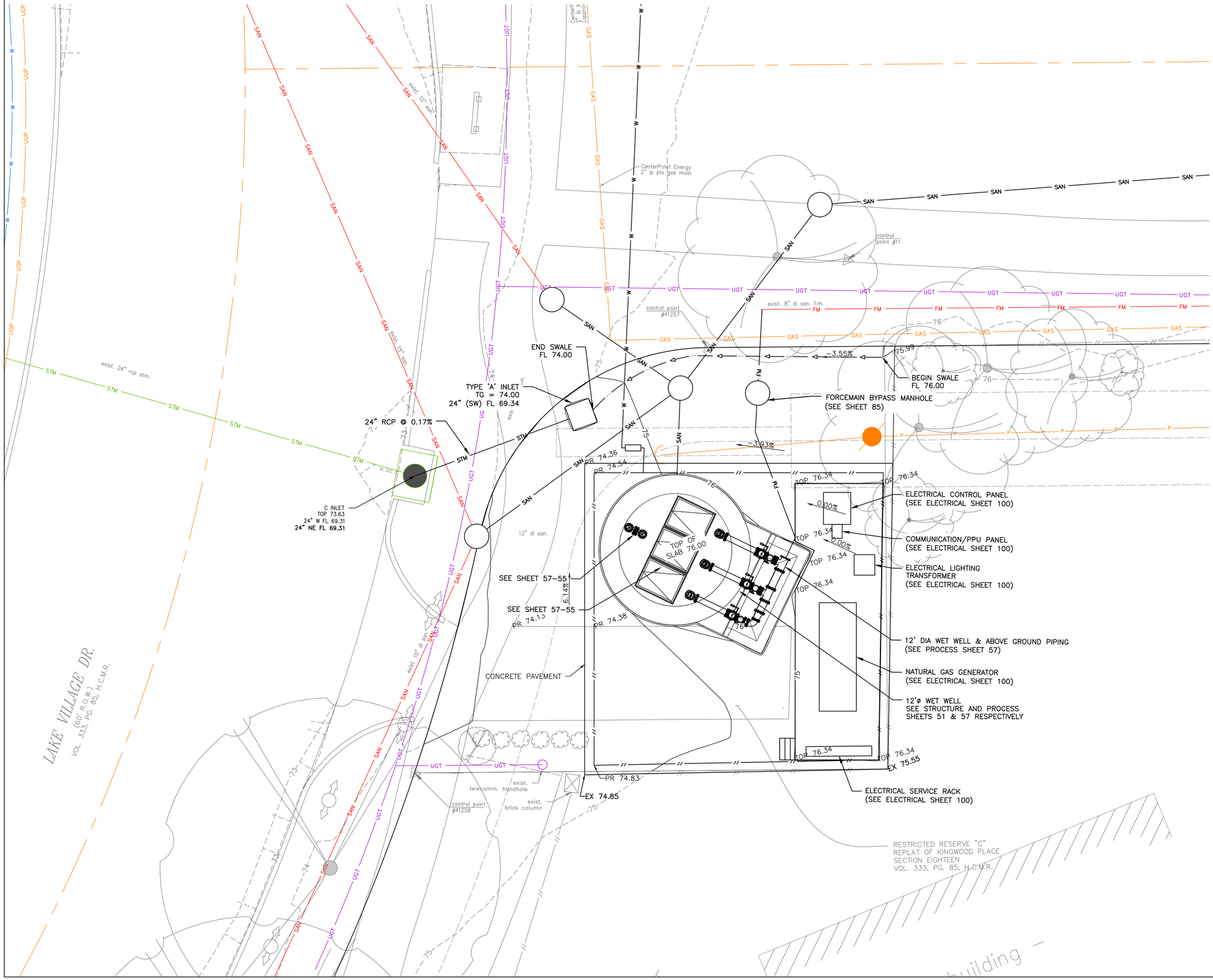
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

EXISTING SITE PLAN –
LAKE VILLAGE LS

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 16 OF 125	

FILE PATH: C:\Users\andres.martinezjr\DC\ACCDocs\Tetra Tech Inc\200-317106-24001 COH LS Rehab Design\Project Files\CAD\R-000267-00178A-3_EXISTING SITE PLAN_LAKE VILLAGE LS.dwg 2/16/2026 11:12 AM



NOTES:
1. CONTRACTOR TO MAINTAIN POSITIVE DRAINAGE.

LEGEND	
EX XX.XX	EXISTING GRADE
PR XX.XX	PROPOSED GRADE
TOP XX.XX	TOP OF PAVEMENT
XX.XX%	DRAINAGE ARROW

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ELEV:75.61'
B-12: SET 1/2" I.R. W/CAP,
STA:1+09.15, 69.36RT
ELEV:74.02'
B-101: SET 1/2" I.R. W/CAP,
STA:4+15.97, 7.12LT
ELEV:75.65'

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COH LIFT STATIONS

GRADING & DRAINAGE PLAN
– LAKE VILLAGE LS

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TAHA LOTIA	
SHEET NO. 17 OF 125	

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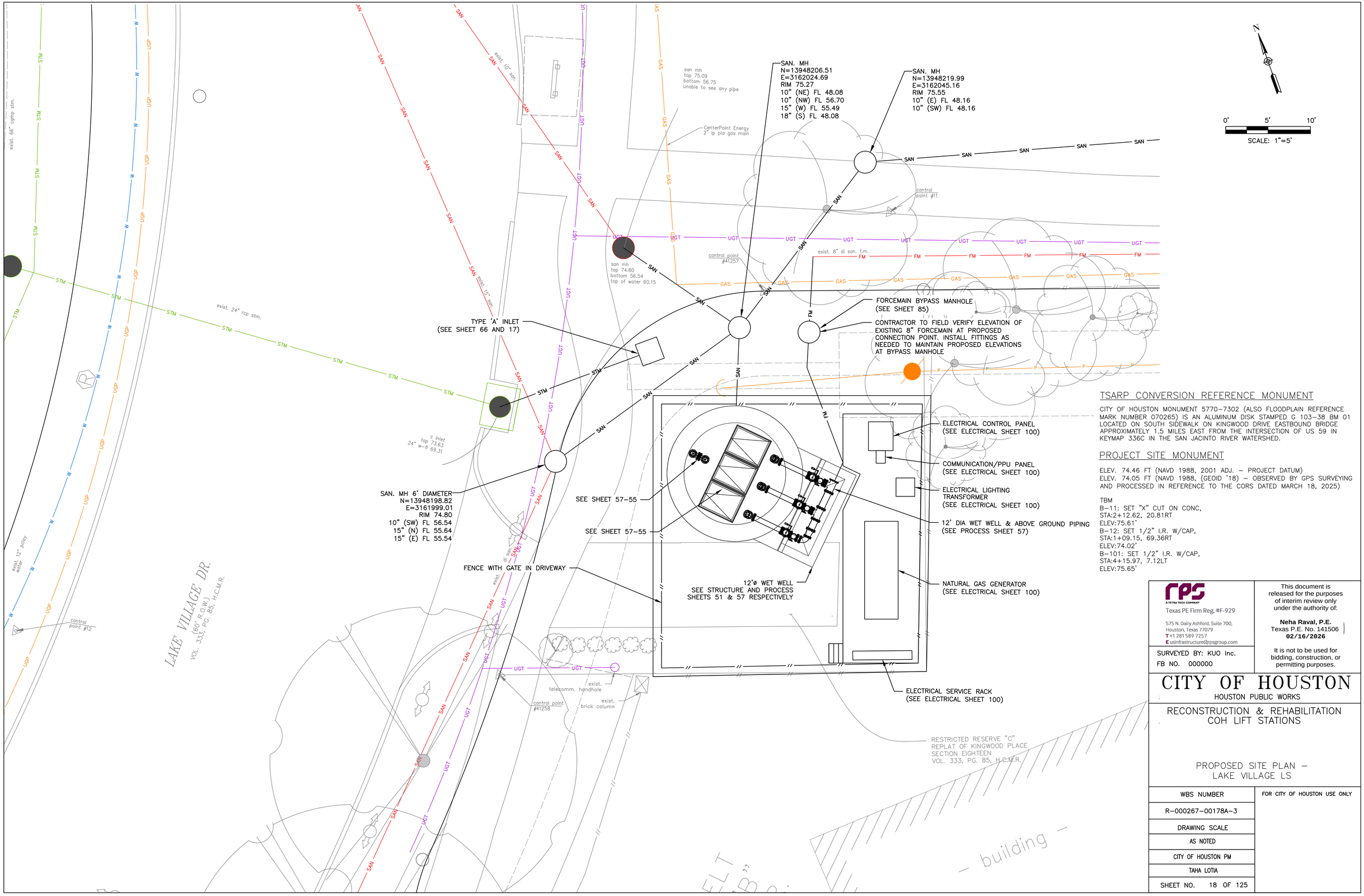

TSARP CONVERSION REFERENCE MONUMENT

CITY OF HOUSTON MONUMENT 5770-7302 (ALSO FLOODPLAIN REFERENCE MARK NUMBER 070265) IS AN ALUMINUM DISK STAMPED G 103-38 BM 01 LOCATED ON SOUTH SIDEWALK ON KINGWOOD DRIVE EASTBOUND BRIDGE APPROXIMATELY 1.5 MILES EAST FROM THE INTERSECTION OF US 59 IN KEYMAP 336C IN THE SAN JACINTO RIVER WATERSHED.

PROJECT SITE MONUMENT

ELEV. 74.46 FT (NAVD 1988, 2001 ADJ. – PROJECT DATUM)
ELEV. 74.05 FT (NAVD 1988, (GEOID '18) – OBSERVED BY GPS SURVEYING AND PROCESSED IN REFERENCE TO THE CORS DATED MARCH 18, 2025)

TBM
B-11: SET "X" CUT ON CONC,
STA:2+12.62, 20.81RT
ELEV:75.61'
B-12: SET 1/2" I.R. W/CAP,
STA:1+09.15, 69.36RT
ELEV:74.02'
B-101: SET 1/2" I.R. W/CAP,
STA:4+15.97, 7.12LT
ELEV:75.65'

RPS
A TETRA TECH COMPANY
Texas PE Firm Reg. #F-929
575 N. Dairy Ashford, Suite 700,
Houston, Texas 77079
T +1 281 589 7257
E usinfrastructure@rpsgroup.com

SURVEYED BY: KUO Inc.
FB NO. 000000

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Neha Raval, P.E.
Texas P.E. No. 141506
02/16/2026

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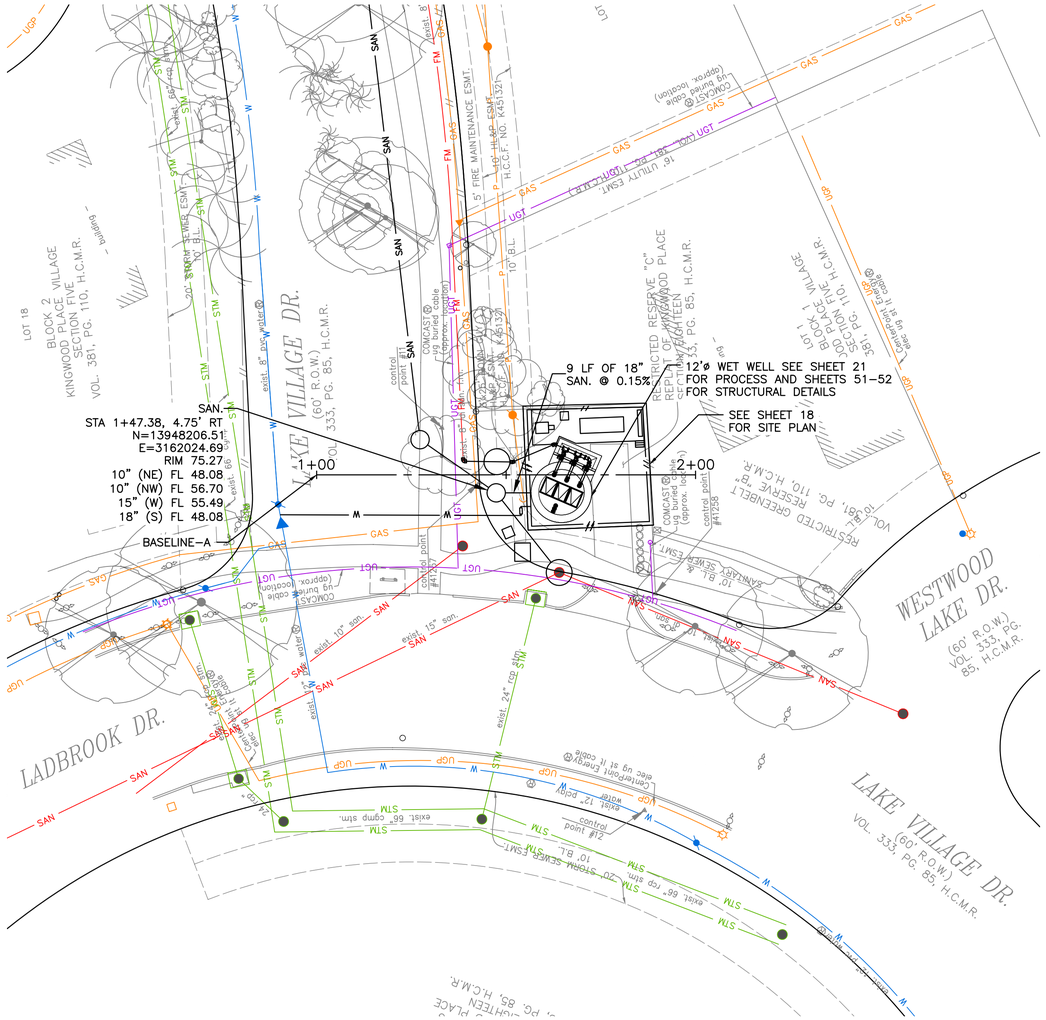
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

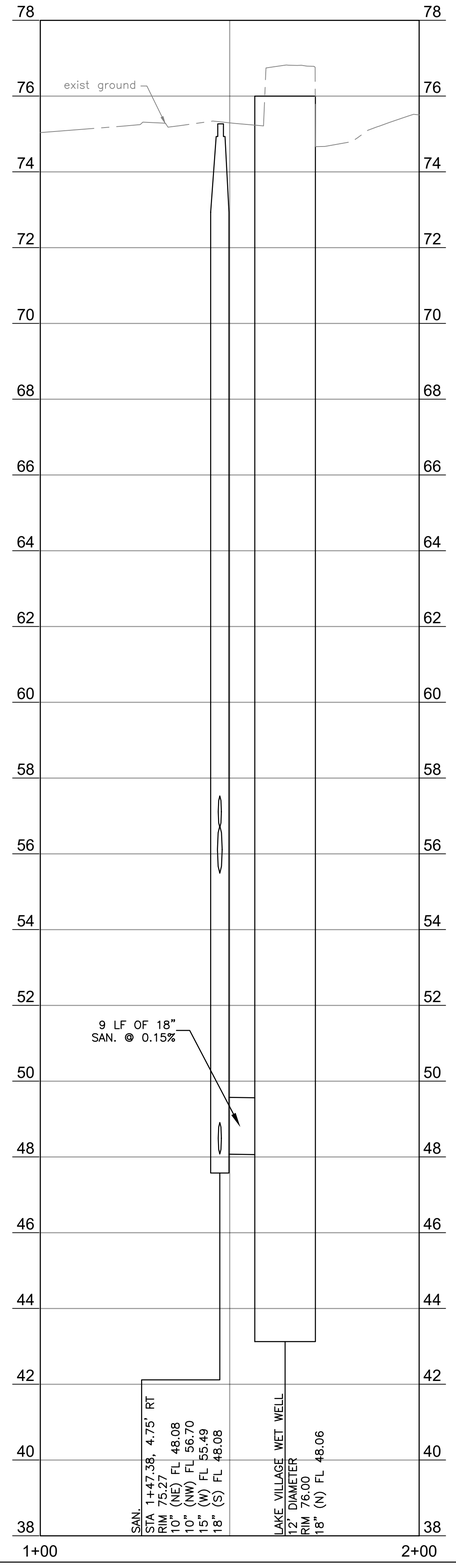
RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

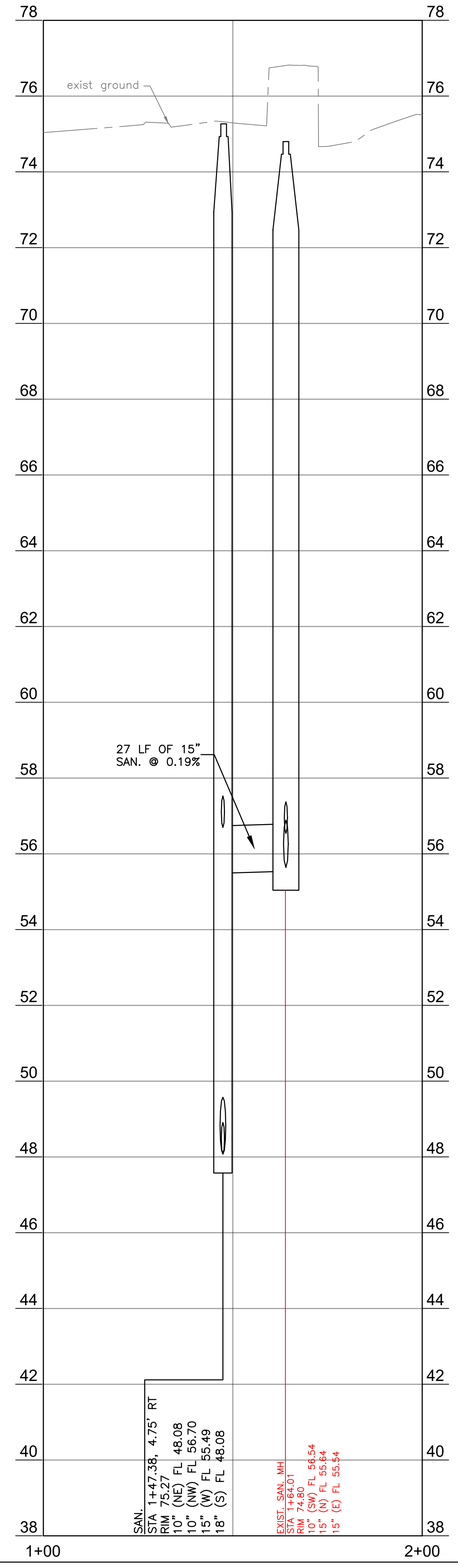
PROPOSED SITE PLAN –
LAKE VILLAGE LS

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 18 OF 125	

FILE PATH: C:\Users\andres.martinezjr\DC\ACCDocs\Tetra Tech Inc\200-317106-24001 COH LS Rehab Design\Project Files\CAD\R-000267-00178A-3_LAKE VILLAGE LS_PROPOSED SITE PLAN_2026.dwg 12 AM


9 LF OF 18" SAN. @ 0.15%
12'ø WET WELL SEE SHEET 21 FOR PROCESS AND SHEETS 51-52 FOR STRUCTURAL DETAILS
SEE SHEET 18 FOR SITE PLAN
SAN.
STA 1+47.38, 4.75' RT
N=13948206.51
E=3162024.69
RIM 75.27
10" (NE) FL 48.08
10" (NW) FL 56.70
15" (W) FL 55.49
18" (S) FL 48.08
1+00
2+00
BASELINE-A
LAKE VILLAGE DR.
(60' R.O.W.)
VOL. 333, PG. 85, H.C.M.R.
WESTWOOD LAKE DR.
(60' R.O.W.)
VOL. 333, PG. 85, H.C.M.R.
LADBROOK DR.
LOT 18
BLOCK 2 VILLAGE
KINGWOOD PLACE
SECTION FIVE
VOL. 351, PG. 110, H.C.M.R.
RESTRICTED RESERVE "C"
KINGWOOD PLACE
REPLAT OF
KINGWOOD PLACE
SECTION EIGHTEEN
VOL. 351, PG. 85, H.C.M.R.
RESTRICTED GREENBELT RESERVE "B"
VOL. 351, PG. 110, H.C.M.R.
5' FIRE MAINTENANCE ESMT.
10' B.L.
15' UTILITY ESMT.
H.C.C.F. NO. K451521
exist. 8" pvmt.
exist. 10" san.
exist. 15" san.
exist. 24" rcp sto.
exist. 66" comp stm.
exist. 12" poly water
control point #12
control point #1258
COMCAST @ ug buried cable (approx. location)
CenterPoint Energy @ exist. ug st. lt. cable
ug buried cable
exist. 8" water
exist. 6" water
exist. 4" water
exist. 2" water
exist. 4" gas
exist. 6" gas
exist. 8" gas
exist. 12" gas
exist. 2" gas
exist. 3" gas





0' 10' 20' 40'
SCALE: 1"=20'

0' 1' 2' 4'
V SCALE: 1"=2'

A TETRA TECH COMPANY
Texas PE Firm Reg. #F-929
575 N. Dairy Ashford, Suite 700,
Houston, Texas 77079
T +1 281 589 7257
E usinfrastructure@rpsgroup.com

SURVEYED BY: KUO Inc.
FB NO. F-4578

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02/16/2026

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

LAKE VILLAGE LIFT STATION – PROFILE
STA. 1+00 TO 2+00
BASELINE–A

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 20 OF 125	

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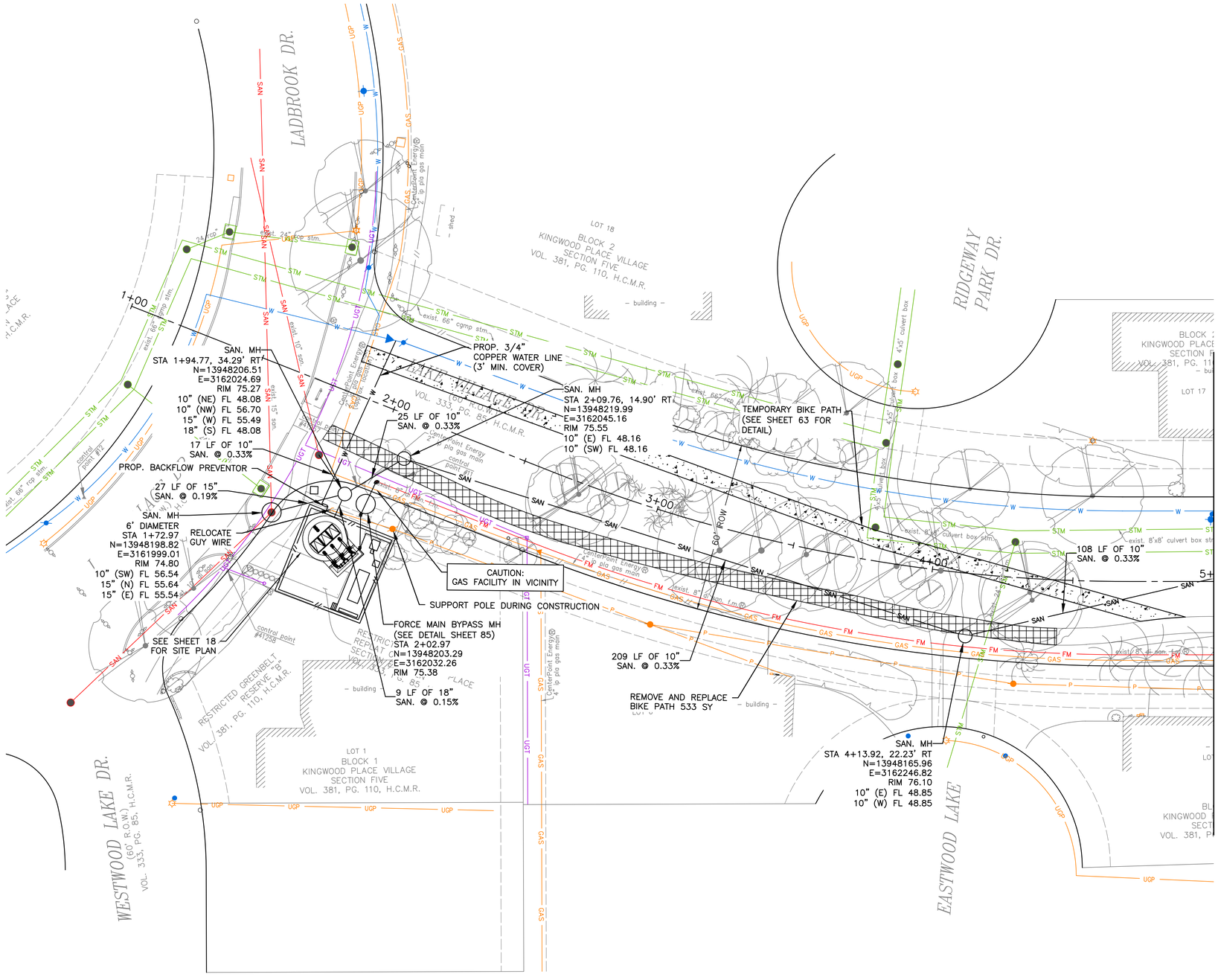

N

0' 10' 20' 40'

SCALE: 1"=20'

NOTES:
1. WASTE WATER LINE SHOWN ON THIS PLAN SHALL BE CONSTRUCTED BY MEANS OF OPEN CUT CONSTRUCTION UNLESS OTHERWISE STATED.
2. REFER TO TREE PROTECTION PLANS SHEET 37 TO 40 FOR APPROPROATE PROTECTION MEASURES. TREES OUTSIDE OF THE PROJECT LIMITS ARE TO BE PROTECTED AND REMAIN IN PLACE.
3. CONTRACTOR TO PROTECT AND REPLACE DAMAGED PAVEMENT AND CURB DURING SITE RESTORATION.
4. ALL NEW SANITARY MANHOLES SHALL BE 4 FEET DIAMETER MANHOLES, UNLESS SPECIFIED OTHERWISE.

TSARP CONVERSION REFERENCE MONUMENT

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PROJECT SITE MONUMENT

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ELEV. 74.05 FT (NAVD 1988, (GEOID '18) – OBSERVED BY GPS SURVEYING AND PROCESSED IN REFERENCE TO THE CORS DATED MARCH 18, 2025)

TBM
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STA:2+12.62, 20.81RT
ELEV:75.61'
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STA:1+09.15, 69.36RT
ELEV:74.02'
B-101: SET 1/2" I.R. W/CAP,
STA:4+15.97, 7.12LT
ELEV:75.65'

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

TRAILWOOD GRAVITY
DIVERSION PLAN STA.
1+00 TO STA. 5+00

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 21 OF 125	

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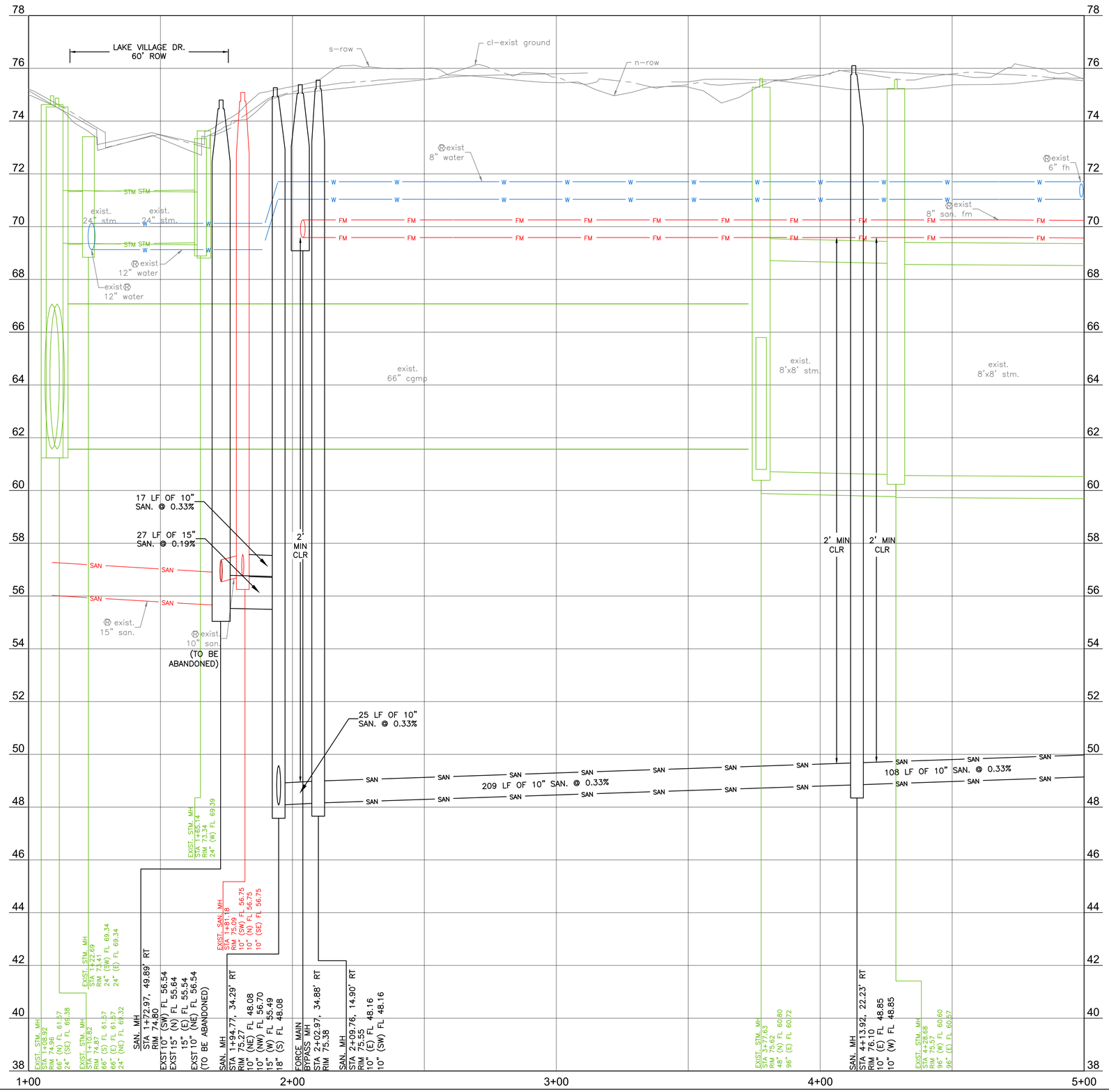

0' 10' 20' 40'
SCALE: 1"=20'

0' 1' 2' 4'
V SCALE: 1"=2'

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HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

TRAILWOOD GRAVITY
DIVERSION PROFILE STA.
1+00 TO STA. 5+00

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 22 OF 125	

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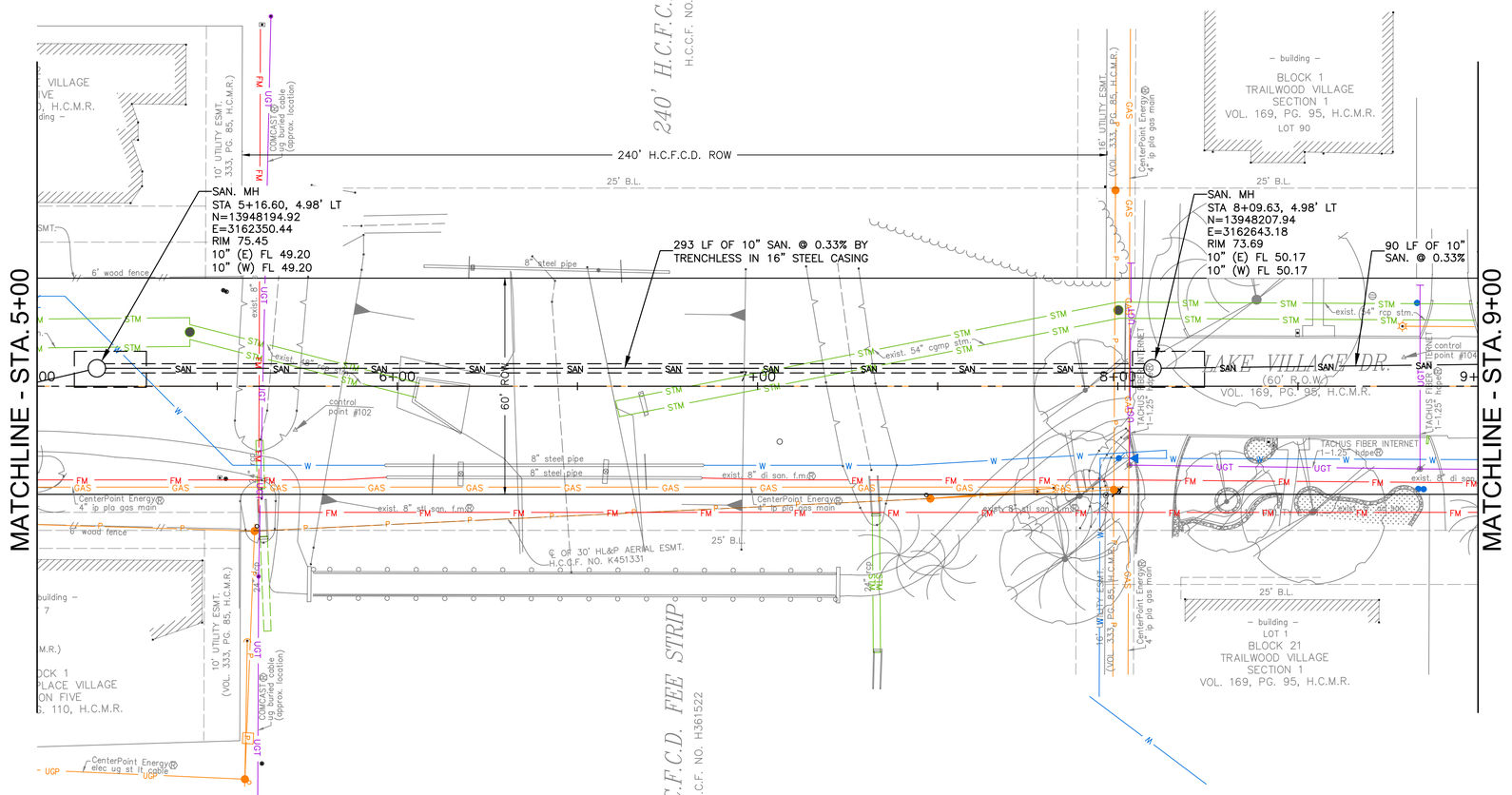

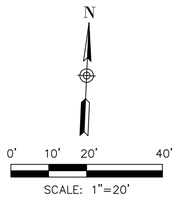

NOTES:
1. WASTE WATER LINE SHOWN ON THIS PLAN SHALL BE CONSTRUCTED BY MEANS OF OPEN CUT CONSTRUCTION UNLESS OTHERWISE STATED.
2. REFER TO TREE PROTECTION PLANS SHEET 37 TO 40 FOR APPROPROATE PROTECTION MEASURES. TREES OUTSIDE OF THE PROJECT LIMITS ARE TO BE PROTECTED AND REMAIN IN PLACE.
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PROJECT SITE MONUMENT

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ELEV. 74.05 FT (NAVD 1988, (GEOID '18) – OBSERVED BY GPS SURVEYING AND PROCESSED IN REFERENCE TO THE CORS DATED MARCH 18, 2025)

TBM

B-101: SET 1/2" I.R. W/CAP,
STA:4+15.97, 7.12LT
ELEV:75.65'
B-102: FND 5/8" I.R. W/UNITED CAP
STA:5+71.68, 12.12RT
ELEV:75.05'
B-103: SET 'X' CUT ON CONC.,
STA:7+06.14, 15.38RT
ELEV:76.24'
B-104: SET 'X' CUT ON CONC.,
STA:8+79.40, 8.00LT
ELEV:73.45'

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A TETRA TECH COMPANY
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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

TRAILWOOD GRAVITY
DIVERSION PLAN STA.
5+00 TO STA. 9+00

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 23 OF 125	

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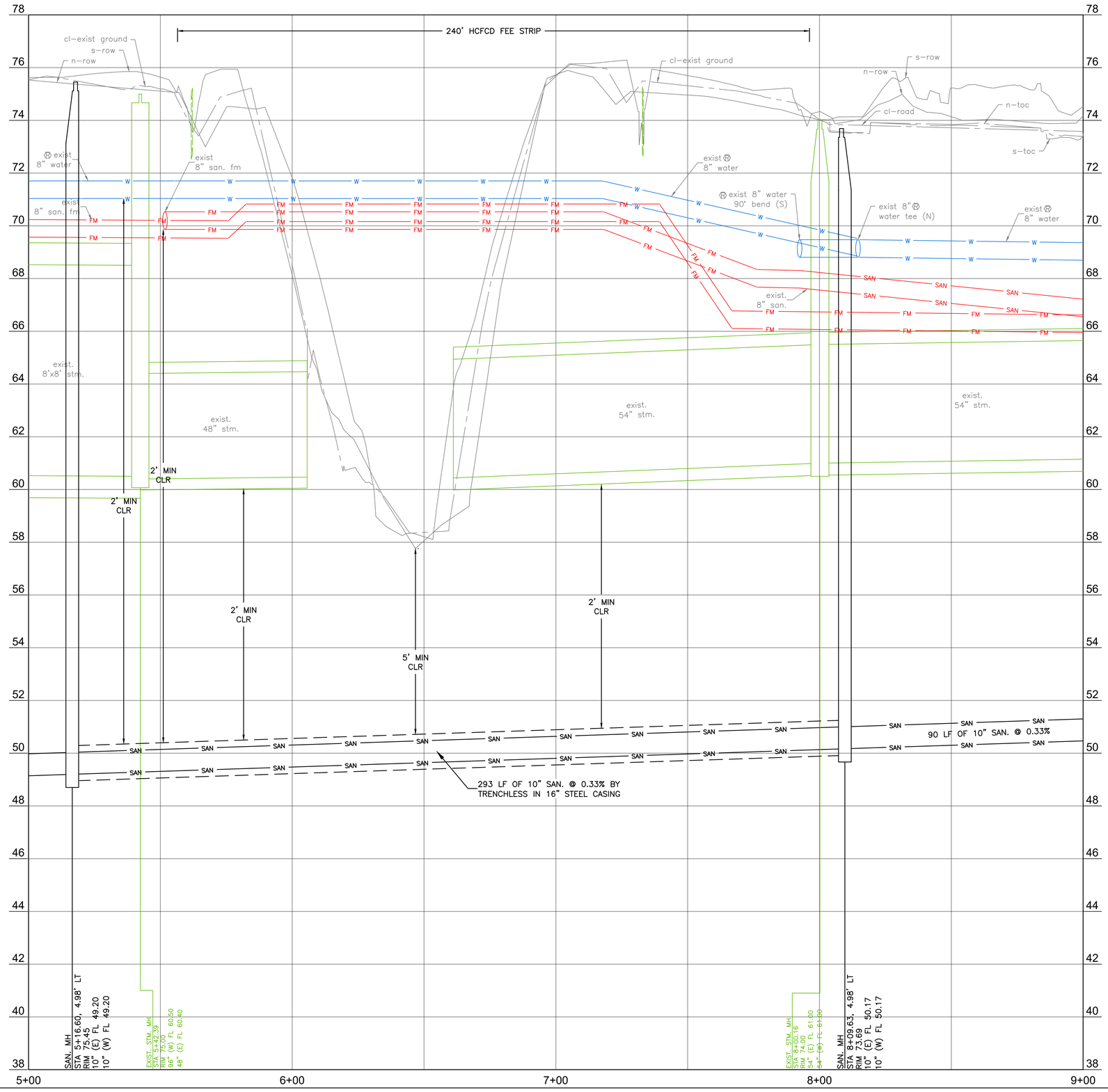

0' 10' 20' 40'
SCALE: 1"=20'

0' 1' 2' 4'
V SCALE: 1"=2'

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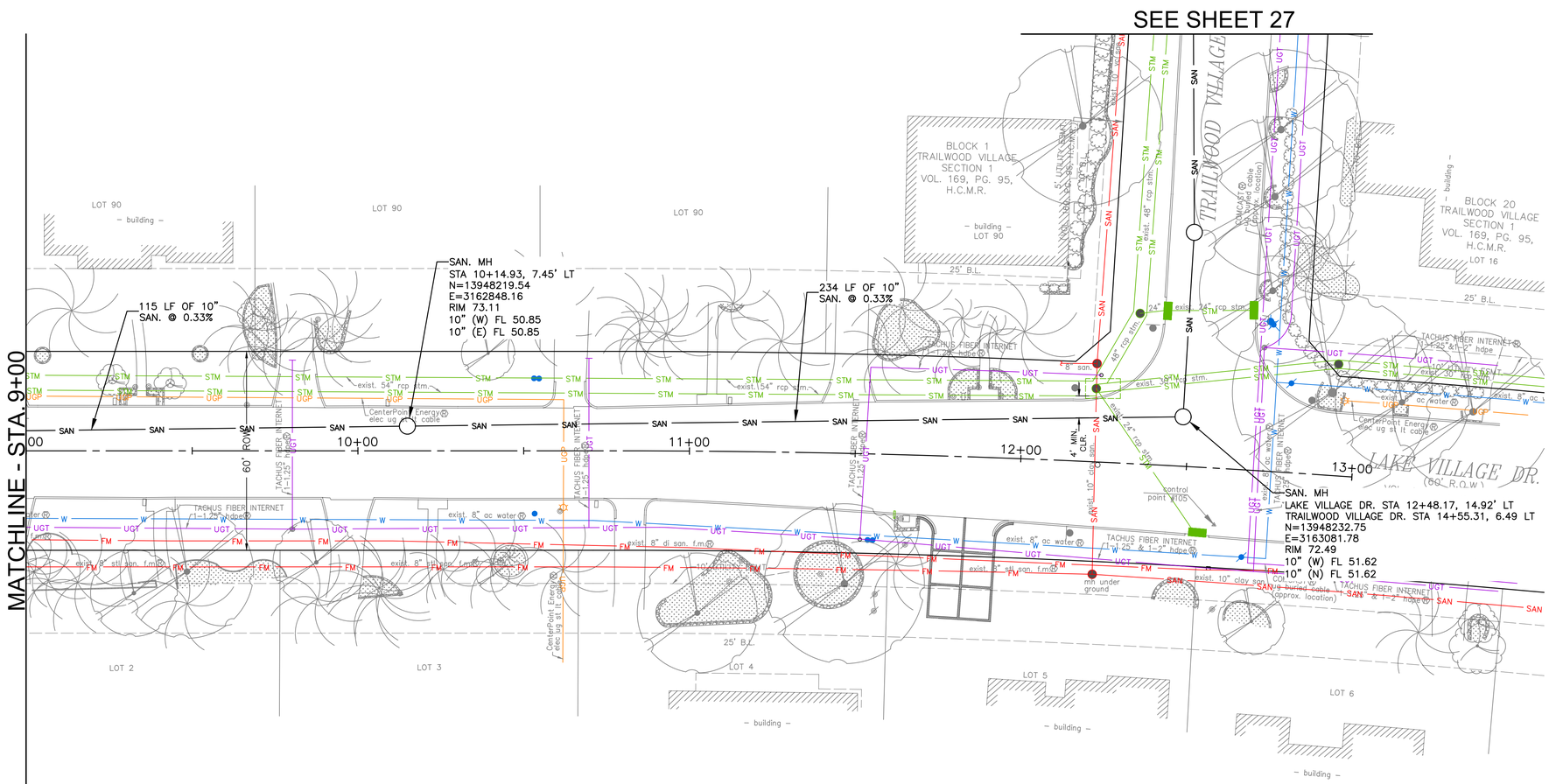
RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

TRAILWOOD GRAVITY
DIVERSION PROFILE STA.
5+00 TO STA. 9+00

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 24 OF 125	

FILE PATH: C:\Users\andres.martinezjr\DC\ACCDocs\Tetra Tech Inc\200-317106-24001 COH LS Rehab Design\Project Files\CAD\R-000267-00178A-3_TRAILWOOD GRAVITY DIVERSION PROFILE STA. 9+00.dwg



0' 10' 20' 40'

SCALE: 1"=20'

NOTES:
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PROJECT SITE MONUMENT

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ELEV. 74.05 FT (NAVD 1988, (GEOID '18) – OBSERVED BY GPS SURVEYING AND PROCESSED IN REFERENCE TO THE CORS DATED MARCH 18, 2025)

TBM

B-105: SET 'X' CUT ON CONC.,
STA:14+23.36, 4.82RT
ELEV:72.21'

RPS A TETRA TECH COMPANY
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575 N. Dairy Ashford, Suite 700,
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E usinfrastructure@rpsgroup.com

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

TRAILWOOD GRAVITY
DIVERSION PLAN STA.
9+00 TO STA. 13+00

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 25 OF 125	

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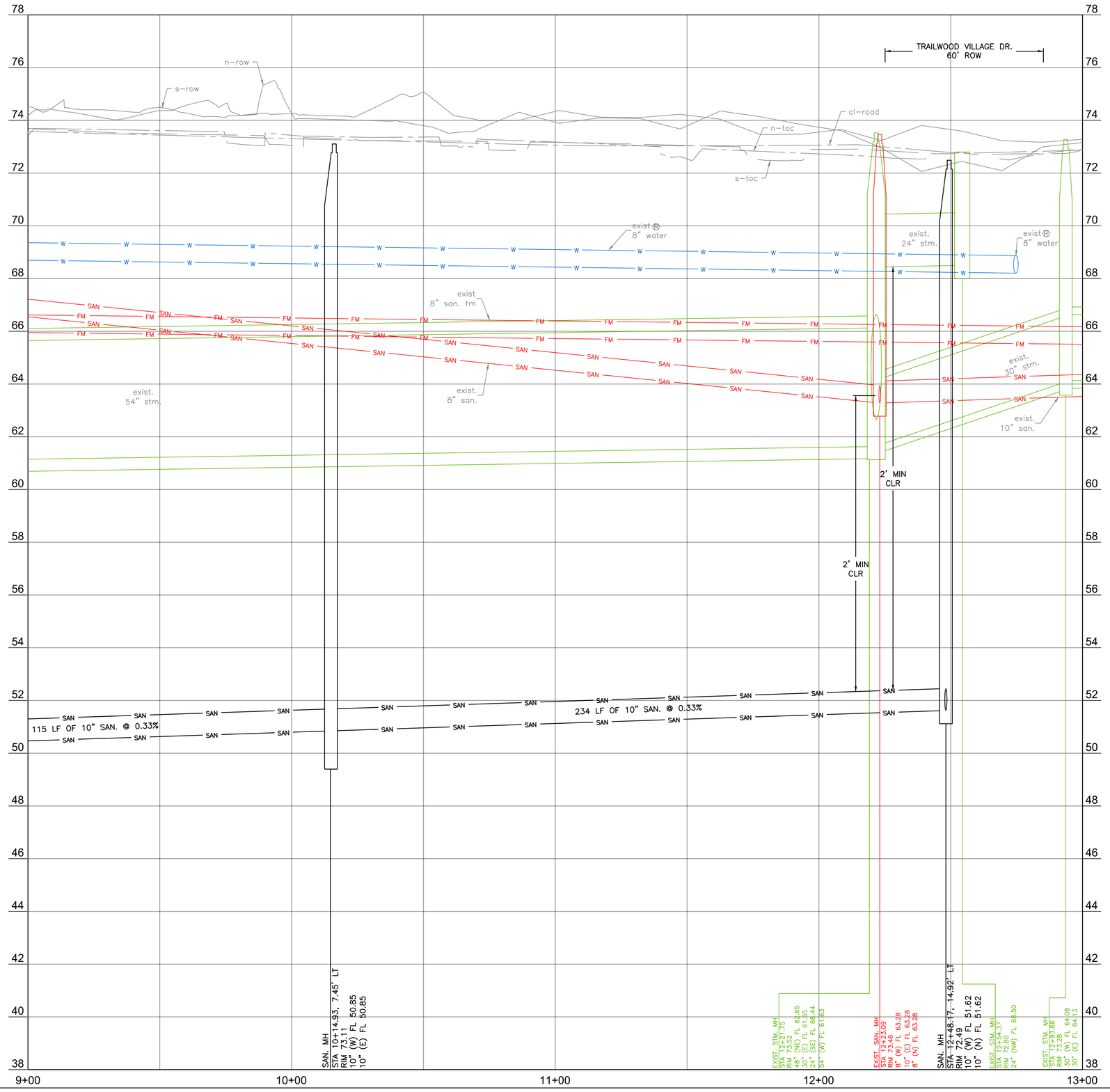

0' 10' 20' 40'
SCALE: 1"=20'
0' 1' 2' 4'
V SCALE: 1"=2'

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RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

TRAILWOOD GRAVITY
DIVERSION PROFILE STA.
9+00 TO STA. 13+00

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 26 OF 125	

FILE PATH: C:\Users\andres.martinezjr\DC\ACCDocs\Tetra Tech Inc\200-317106-24001 COH LS Rehab Design\Project Files\CAD\R-000267-00178A-3_TRAILWOOD GRAVITY DIVERSION PROFILE STA. 13+00.dwg
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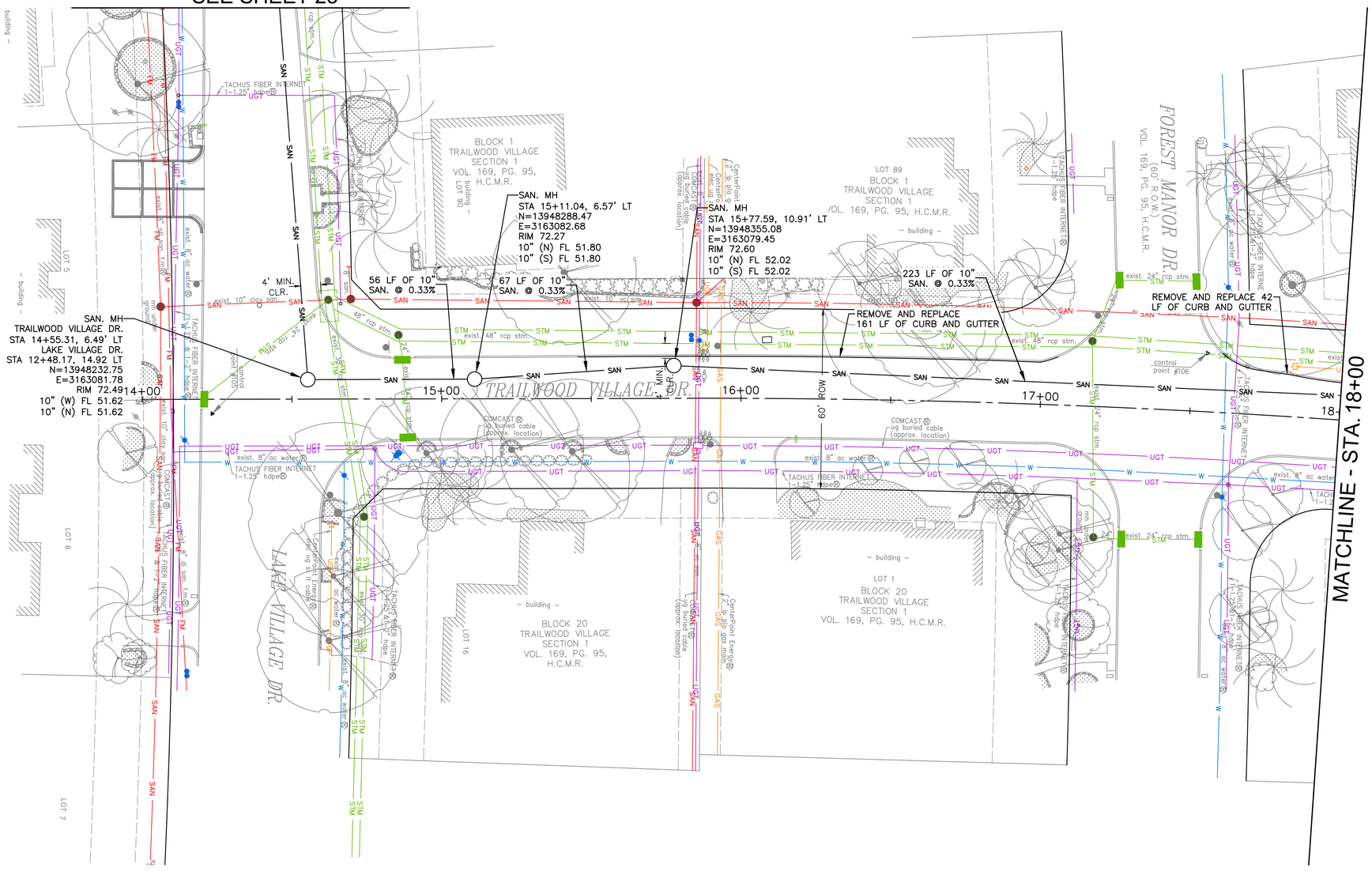

0' 10' 20' 40'

SCALE: 1"=20'

NOTES:
1. WASTE WATER LINE SHOWN ON THIS PLAN SHALL BE CONSTRUCTED BY MEANS OF OPEN CUT CONSTRUCTION UNLESS OTHERWISE STATED.
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ELEV. 74.05 FT (NAVD 1988, (GEOID '18) – OBSERVED BY GPS SURVEYING AND PROCESSED IN REFERENCE TO THE CORS DATED MARCH 18, 2025)

TBM

B-105: SET 'X' CUT ON CONC.,
STA:14+23.36, 4.82RT
ELEV:72.21'
B-106: SET 'X' CUT ON CONC.,
STA:17+54.86, 19.57RT
ELEV:72.75'

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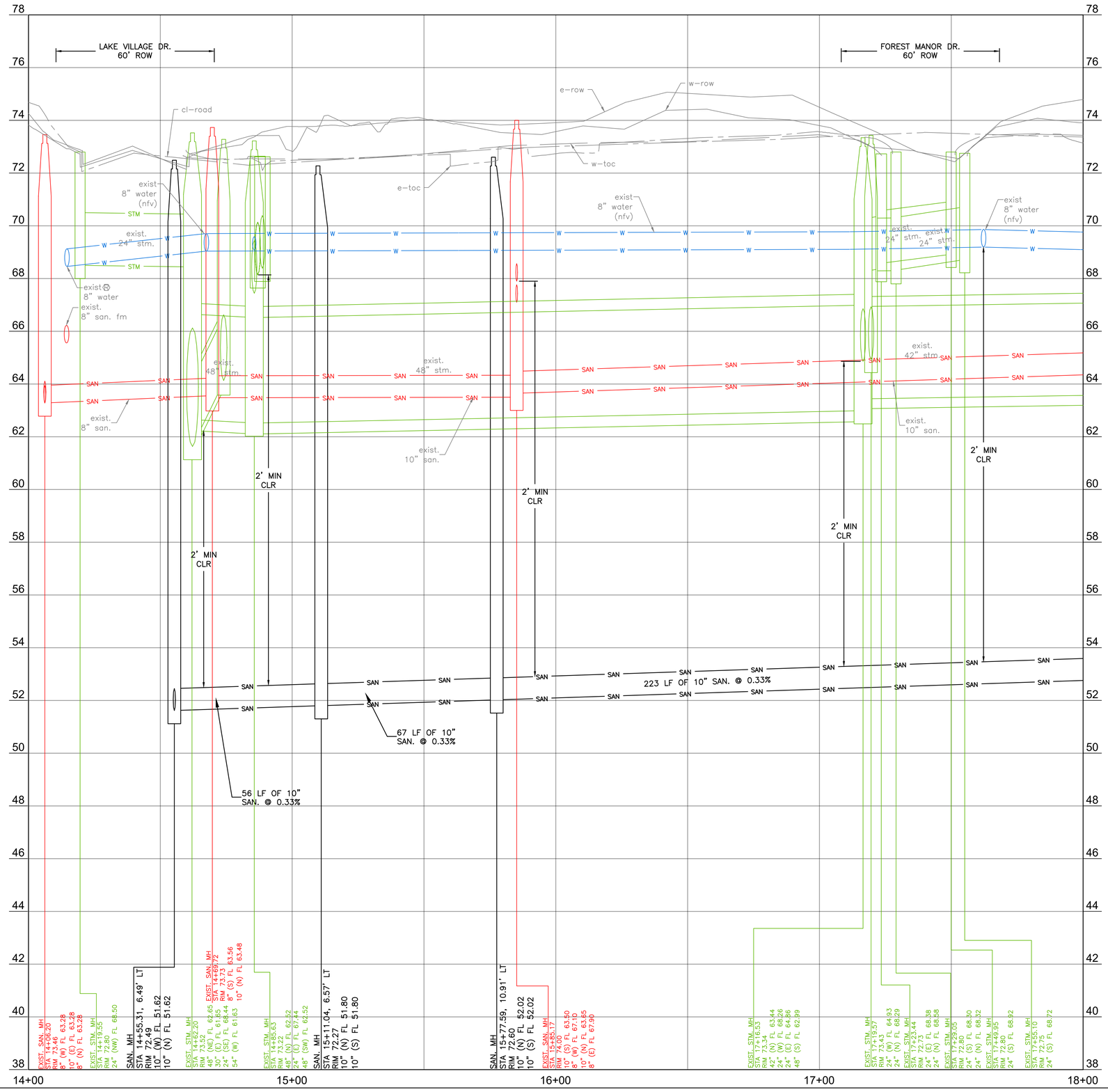
RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

TRAILWOOD GRAVITY DIVERSION PLAN
STA. 14+00 TO STA. 18+00

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 27 OF 125	

FILE PATH: C:\Users\andres.martinez\DC\ACCDocs\Tetra Tech Inc\200-317106-24001 COH LS Rehab Design\Project Files\CAD\R-000267-00178A-3_TRAILWOOD GRAVITY DIVERSION PLAN STA. 14+00.dwg



0' 10' 20' 40'
SCALE: 1"=20'
0' 1' 2' 4'
V SCALE: 1"=2'

RPS A TETRA TECH COMPANY
Texas PE Firm Reg. #F-929
575 N. Dairy Ashford, Suite 700,
Houston, Texas 77079
T +1 281 589 7257
E usinfrastructure@rpsgroup.com

SURVEYED BY: KUO Inc.
FB NO. F-4578

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Neha Raval, P.E.
Texas P.E. No. 141506
02/16/2026

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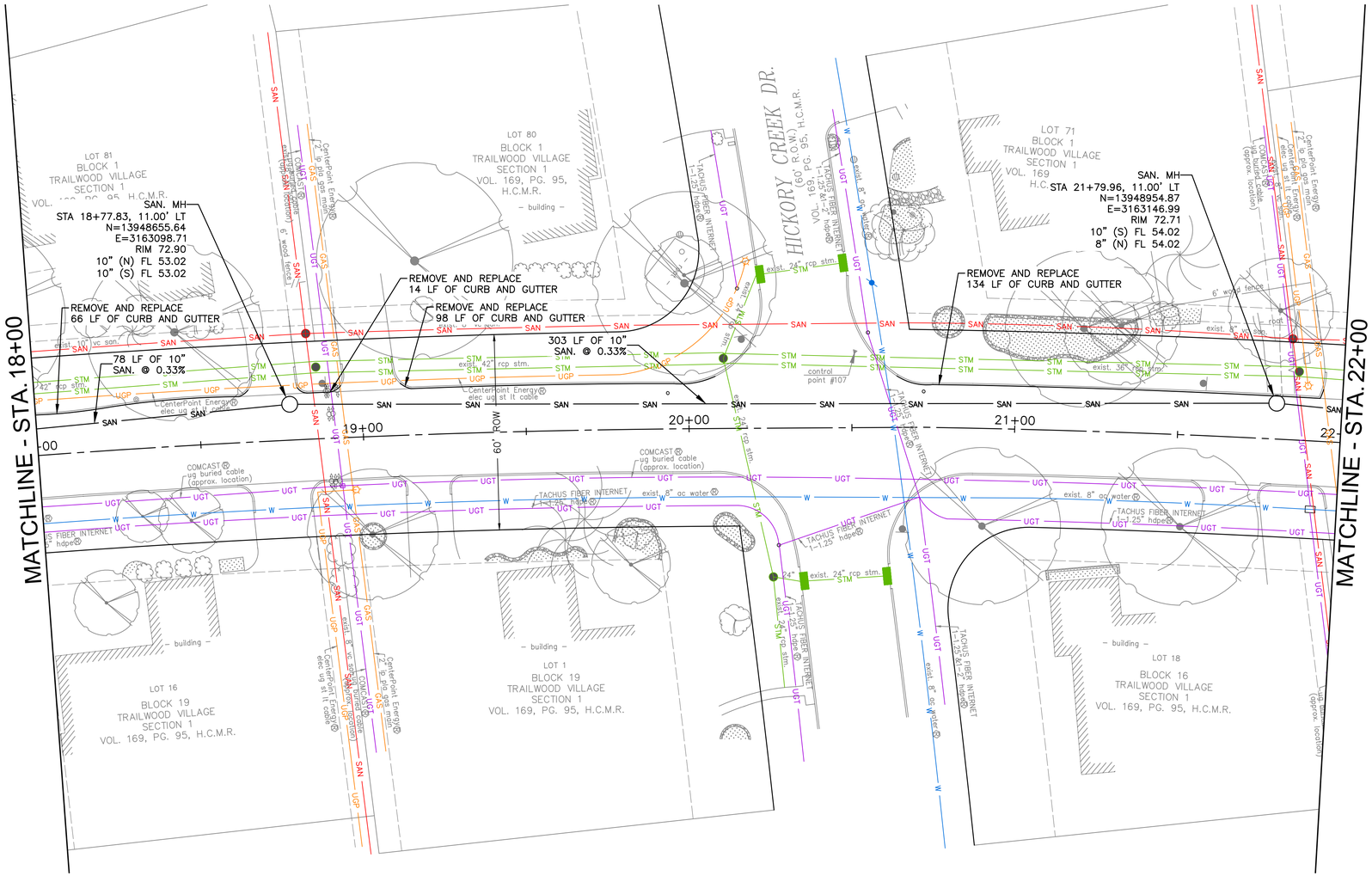
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

TRAILWOOD GRAVITY DIVERSION
PROFILE STA. 14+00 TO STA. 18+00

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 28 OF 125	

FILE PATH: C:\Users\andres.martinezjr\DC\ACCDocs\Tetra Tech Inc\200-317106-24001 COH LS Rehab Design\Project Files\CAD\R-000267-00178A-3_TRAILWOOD GRAVITY DIVERSION 2/16/2026 11:16:09 AM STA. 18+00.dwg



NOTES:
1. WASTE WATER LINE SHOWN ON THIS PLAN SHALL BE CONSTRUCTED BY MEANS OF OPEN CUT CONSTRUCTION UNLESS OTHERWISE STATED.
2. REFER TO TREE PROTECTION PLANS SHEET 37 TO 40 FOR APPROPROATE PROTECTION MEASURES. TREES OUTSIDE OF THE PROJECT LIMITS ARE TO BE PROTECTED AND REMAIN IN PLACE.
3. CONTRACTOR TO PROTECT AND REPLACE DAMAGED PAVEMENT AND CURB DURING SITE RESTORATION.
4. ALL NEW SANITARY MANHOLES SHALL BE 4 FEET DIAMETER MANHOLES, UNLESS SPECIFIED OTHERWISE.

TSARP CONVERSION REFERENCE MONUMENT

CITY OF HOUSTON MONUMENT 5770-7302 (ALSO FLOODPLAIN REFERENCE MARK NUMBER 070265) IS AN ALUMINUM DISK STAMPED G 103-38 BM 01 LOCATED ON SOUTH SIDEWALK ON KINGWOOD DRIVE EASTBOUND BRIDGE APPROXIMATELY 1.5 MILES EAST FROM THE INTERSECTION OF US 59 IN KEYMAP 336C IN THE SAN JACINTO RIVER WATERSHED.

PROJECT SITE MONUMENT

ELEV. 74.46 FT (NAVD 1988, 2001 ADJ. – PROJECT DATUM)
ELEV. 74.05 FT (NAVD 1988, (GEOID '18) – OBSERVED BY GPS SURVEYING AND PROCESSED IN REFERENCE TO THE CORS DATED MARCH 18, 2025)

TBM

B-107: SET 'X' CUT ON CONC.,
STA:20+51.03, 23.40LT
ELEV:72.34'

0' 10' 20' 40'
SCALE: 1"=20'

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E usinfrastructure@rpsgroup.com

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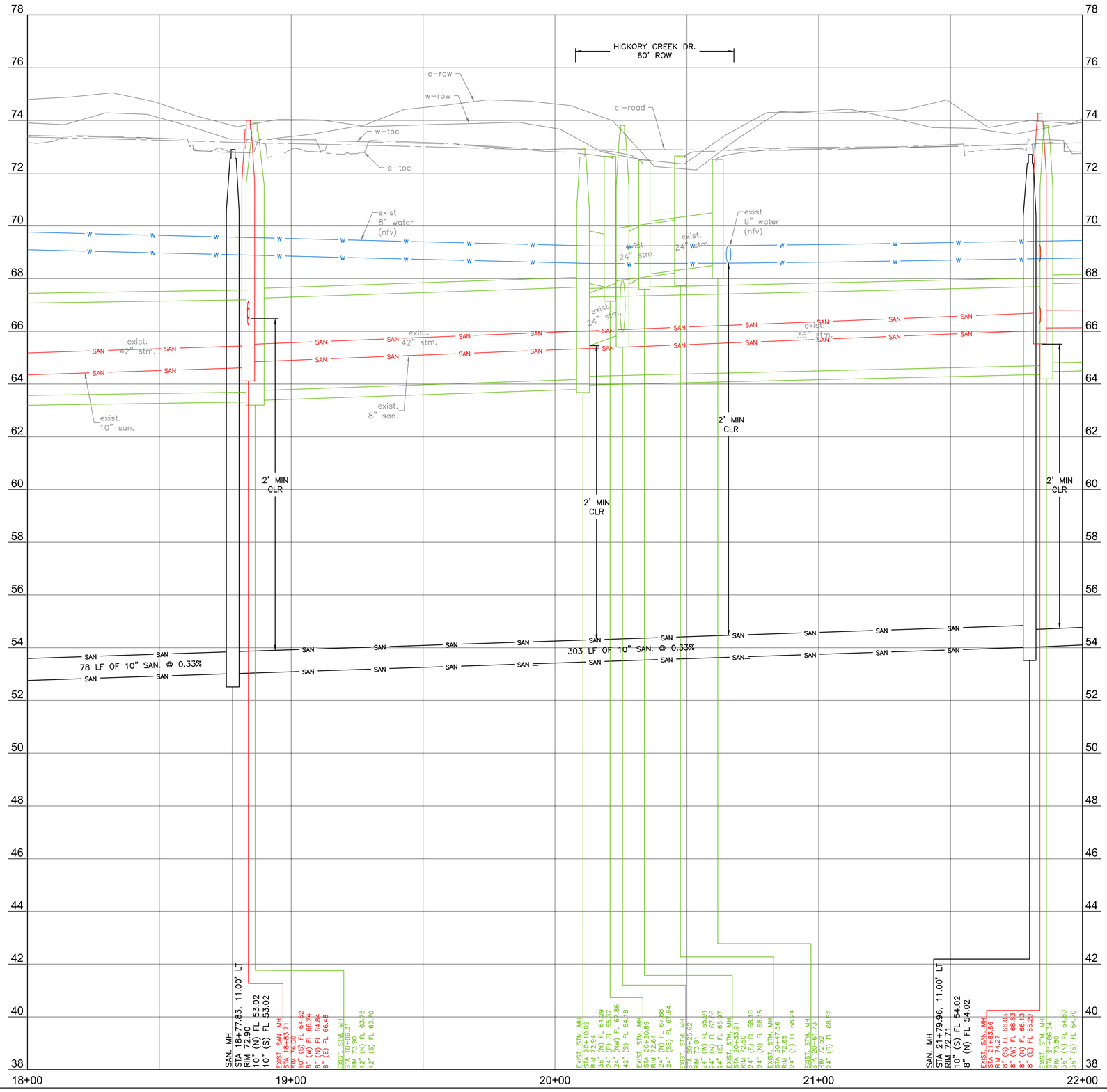
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

TRAILWOOD GRAVITY DIVERSION
PLAN STA. 18+00 TO STA. 22+00

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 29 OF 125	

FILE PATH: C:\Users\andres.martinezjr\DC\ACCDocs\Tetra Tech Inc\200-317106-24001 COH LS Rehab Design\Project Files\CAD\R-000267-00178A-3_TRAILWOOD GRAVITY DIVERSION PLAN STA. 22+00.dwg



0' 10' 20' 40'
SCALE: 1"=20'
0' 1' 2' 4'
V SCALE: 1"=2'

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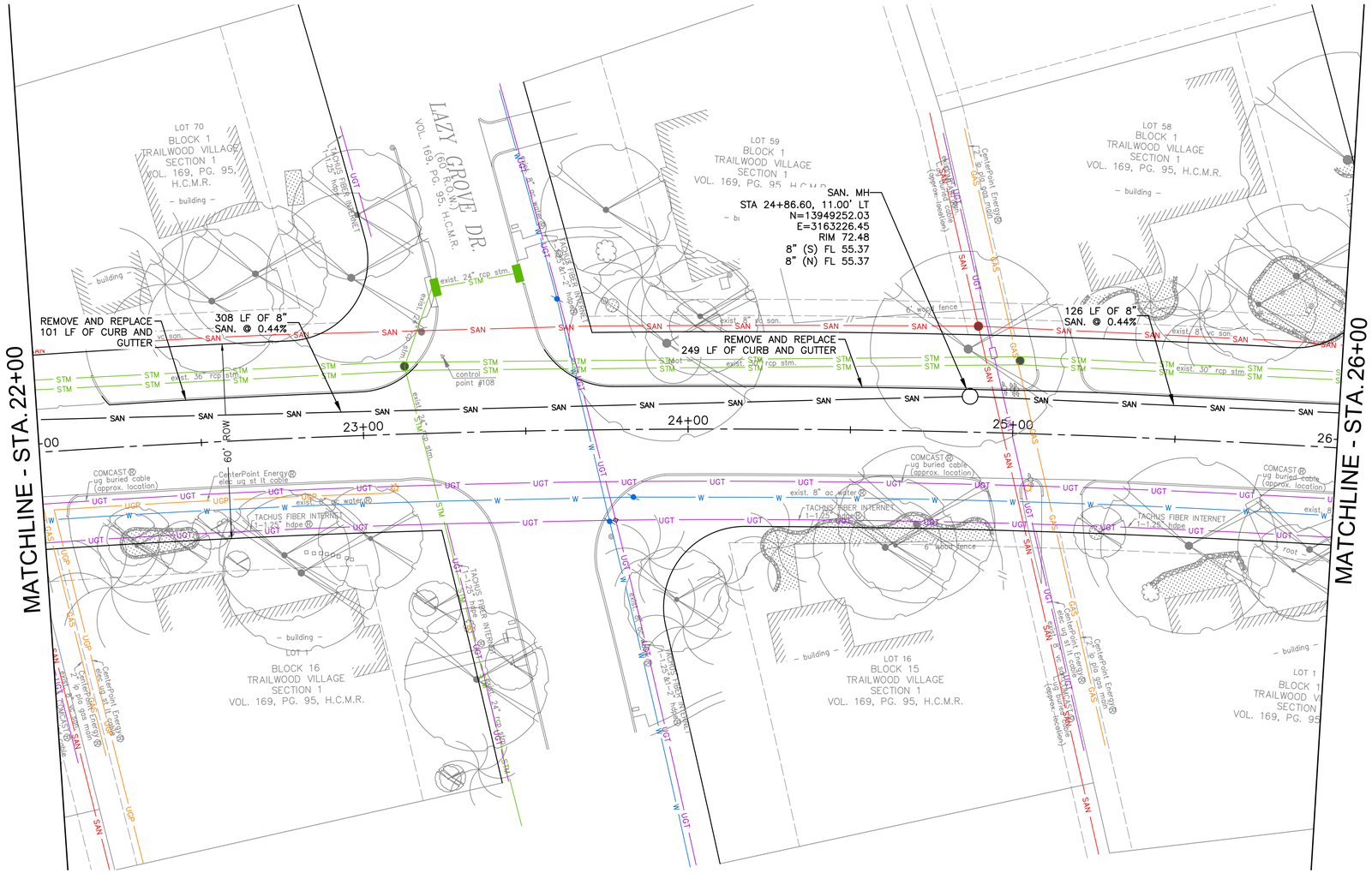
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

TRAILWOOD GRAVITY DIVERSION
PROFILE STA. 18+00 TO STA. 22+00

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 30 OF 125	

FILE PATH: C:\Users\andres.martinezjr\DC\ACCDocs\Tetra Tech Inc\200-317106-24001 COH LS Rehab Design\Project Files\CAD\R-000267-00178A-3-TRAILWOOD GRAVITY DIVERSION 2/16/2026 10:09 AM STA. 22+00.dwg



0' 10' 20' 40'

SCALE: 1"=20'

NOTES:
1. WASTE WATER LINE SHOWN ON THIS PLAN SHALL BE CONSTRUCTED BY MEANS OF OPEN CUT CONSTRUCTION UNLESS OTHERWISE STATED.
2. REFER TO TREE PROTECTION PLANS SHEET 37 TO 40 FOR APPROPROATE PROTECTION MEASURES. TREES OUTSIDE OF THE PROJECT LIMITS ARE TO BE PROTECTED AND REMAIN IN PLACE.
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PROJECT SITE MONUMENT

ELEV. 74.46 FT (NAVD 1988, 2001 ADJ. – PROJECT DATUM)
ELEV. 74.05 FT (NAVD 1988, (GEOID '18) – OBSERVED BY GPS SURVEYING AND PROCESSED IN REFERENCE TO THE CORS DATED MARCH 18, 2025)

TBM

B-108: SET 'X' CUT ON CONC.,
STA:23+24.99, 23.63LT
ELEV:72.48'

RPS
A TETRA TECH COMPANY
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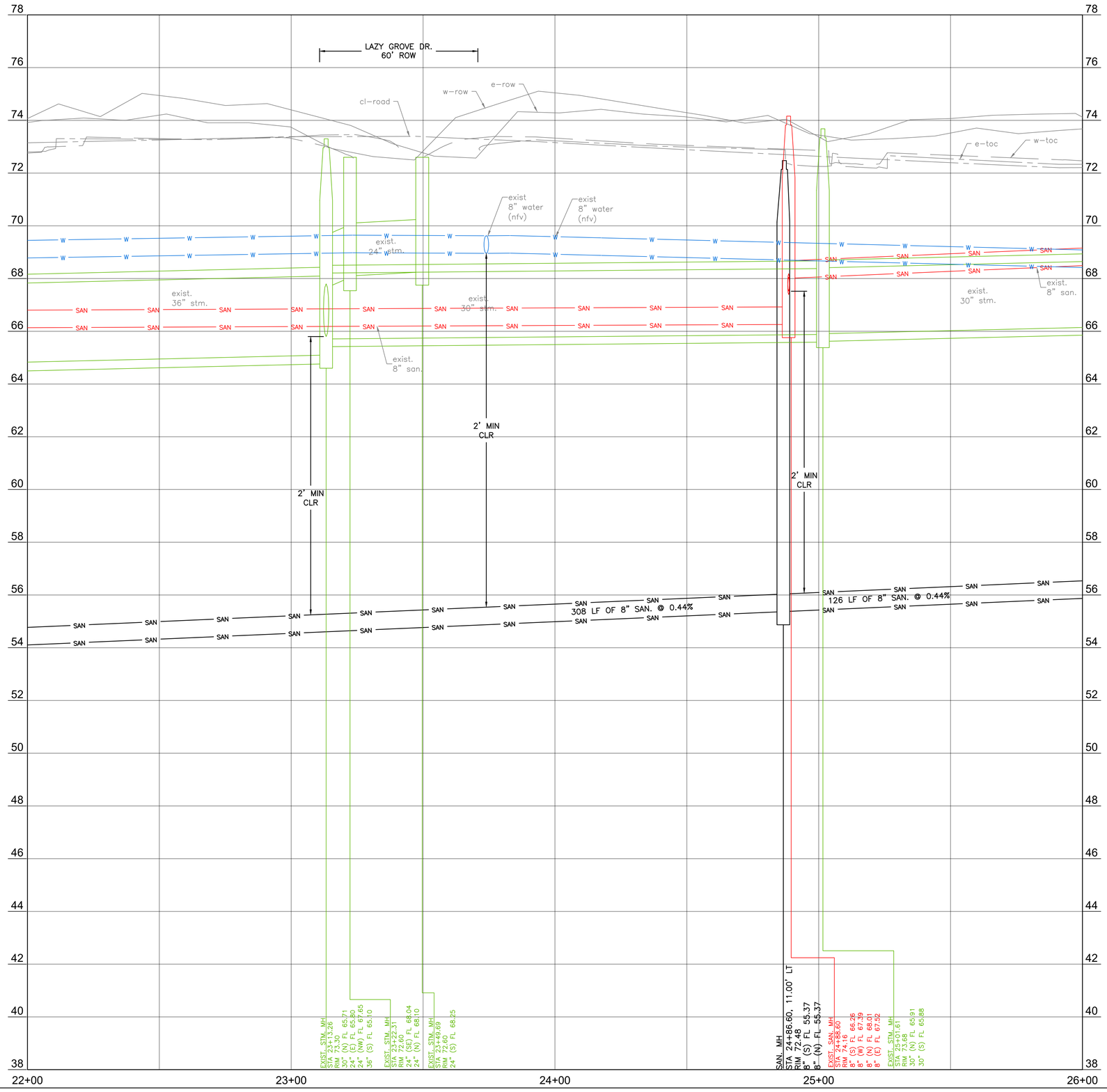
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

TRAILWOOD GRAVITY DIVERSION
PLAN STA. 22+00 TO STA. 26+00

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 31 OF 125	

FILE PATH: C:\Users\andres.martinezjr\DC\ACCDocs\Tetra Tech Inc\200-317106-24001 COH LS Rehab Design\Project Files\CAD\R-000267-00178A-3_TRAILWOOD GRAVITY DIVERSION PLAN STA. 22+00 TO STA. 26+00.dwg



0' 10' 20' 40'
SCALE: 1"=20'
0' 1' 2' 4'
V SCALE: 1"=2'

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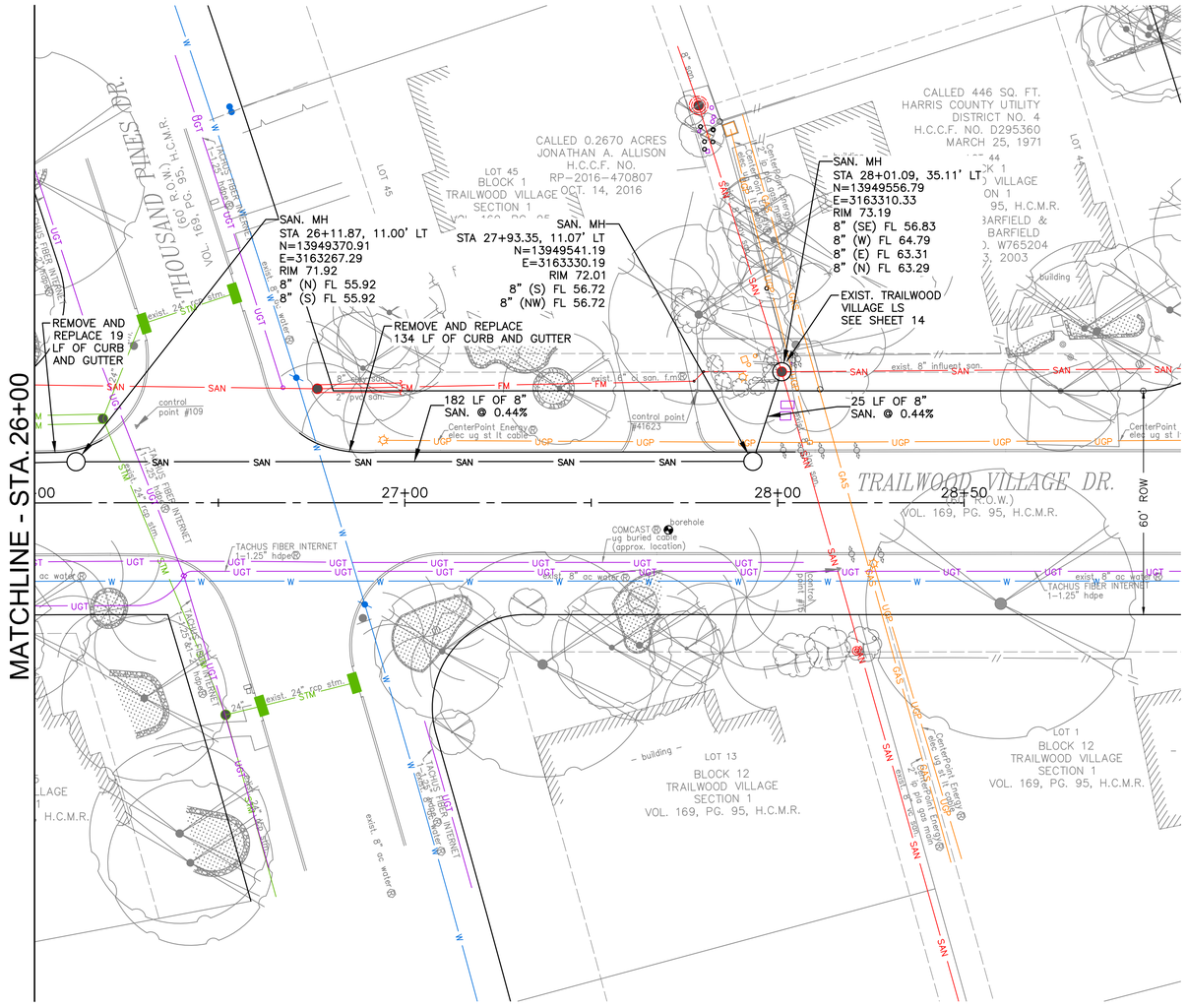
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

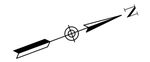
RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

TRAILWOOD GRAVITY DIVERSION
PROFILE STA. 22+00 TO STA. 26+00

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 32 OF 125	

FILE PATH: C:\Users\andres.martinezjr\DC\ACCDocs\Tetra Tech Inc\200-317106-24001 COH LS Rehab Design\Project Files\CAD\R-000267-00178A-3_TRAILWOOD GRAVITY DIVERSION_PLOT STA. 26+00.dwg





NOTES:
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PROJECT SITE MONUMENT

ELEV. 74.46 FT (NAVD 1988, 2001 ADJ. – PROJECT DATUM)
ELEV. 74.05 FT (NAVD 1988, (GEOID '18) – OBSERVED BY GPS SURVEYING AND PROCESSED IN REFERENCE TO THE CORS DATED MARCH 18, 2025)

TBM

B-109: SET 'X' CUT ON CONC.,
STA:26+28.12, 20.50LT
ELEV:71.65'

Texas PE Firm Reg. #F-929
575 N. Dairy Ashford, Suite 700,
Houston, Texas 77079
T +1 281 589 7257
E usinfrastructure@rpsgroup.com

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02/16/2026

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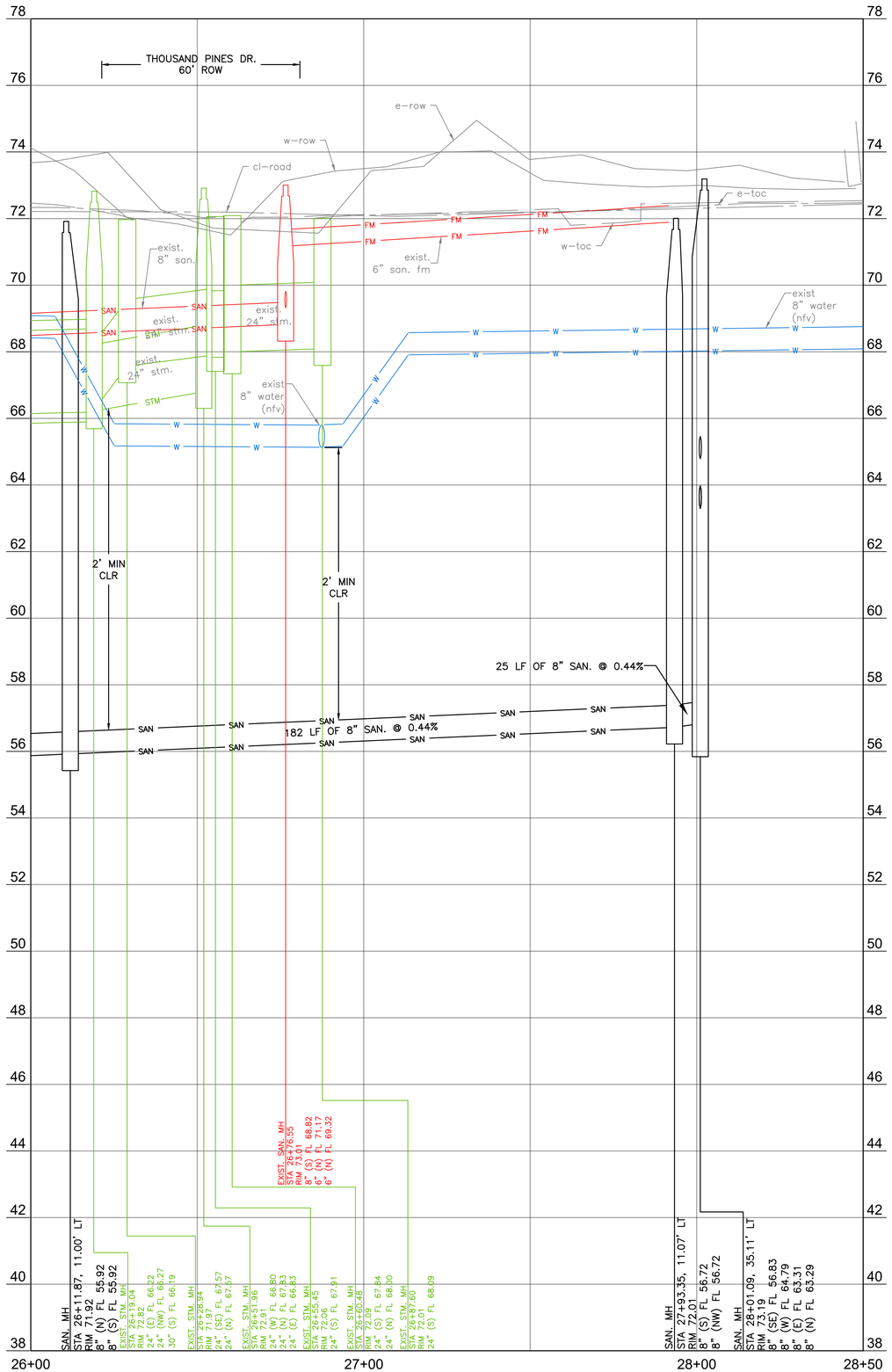
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

TRAILWOOD GRAVITY DIVERSION
PLAN STA. 26+00 TO STA. 28+50

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 33 OF 125	

FILE PATH: C:\Users\andres.martinezjr\DC\ACCDocs\Tetra Tech Inc\200-317106-24001 COH LS Rehab Design\Project Files\CAD\R-000267-00178A-3_TRAILWOOD GRAVITY DIVERSION_PLAN STA. 26+00 TO STA. 28+50.dwg



0' 10' 20' 40'
SCALE: 1"=20'

0' 1' 2' 4'
V SCALE: 1"=2'

A TETRA TECH COMPANY
Texas PE Firm Reg. #F-929
575 N. Dairy Ashford, Suite 700,
Houston, Texas 77079
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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

TRAILWOOD GRAVITY DIVERSION
PROFILE STA. 26+00 TO STA. 28+50

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 34 OF 125	

FILE PATH: C:\Users\andres.martinezjr\DC\ACCDocs\Tetra Tech Inc\200-317106-24001 COH LS Rehab Design\Project Files\CAD\R-000267-00178A-3_TRAILWOOD GRAVITY DIVERSION PROFILE STA. 28+50.dwg

NOTES:
1. REFER TO SHEET 65 FOR SWPPP NEAR HCFCD CHANNEL.

LEGEND

- RFB — REINFORCED FILTER FABRIC BARRIER
- IPB — INLET PROTECTION BARRIER
- SCA — STABILIZED CONSTRUCTION ACCESS
- CTW — CONCRETE TRUCK WASHOUT AREA

RPS A TETRA TECH COMPANY
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575 N. Dairy Ashford, Suite 700,
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Jeremy Austin, P.E.
Texas P.E. No. 116816
02/16/2026

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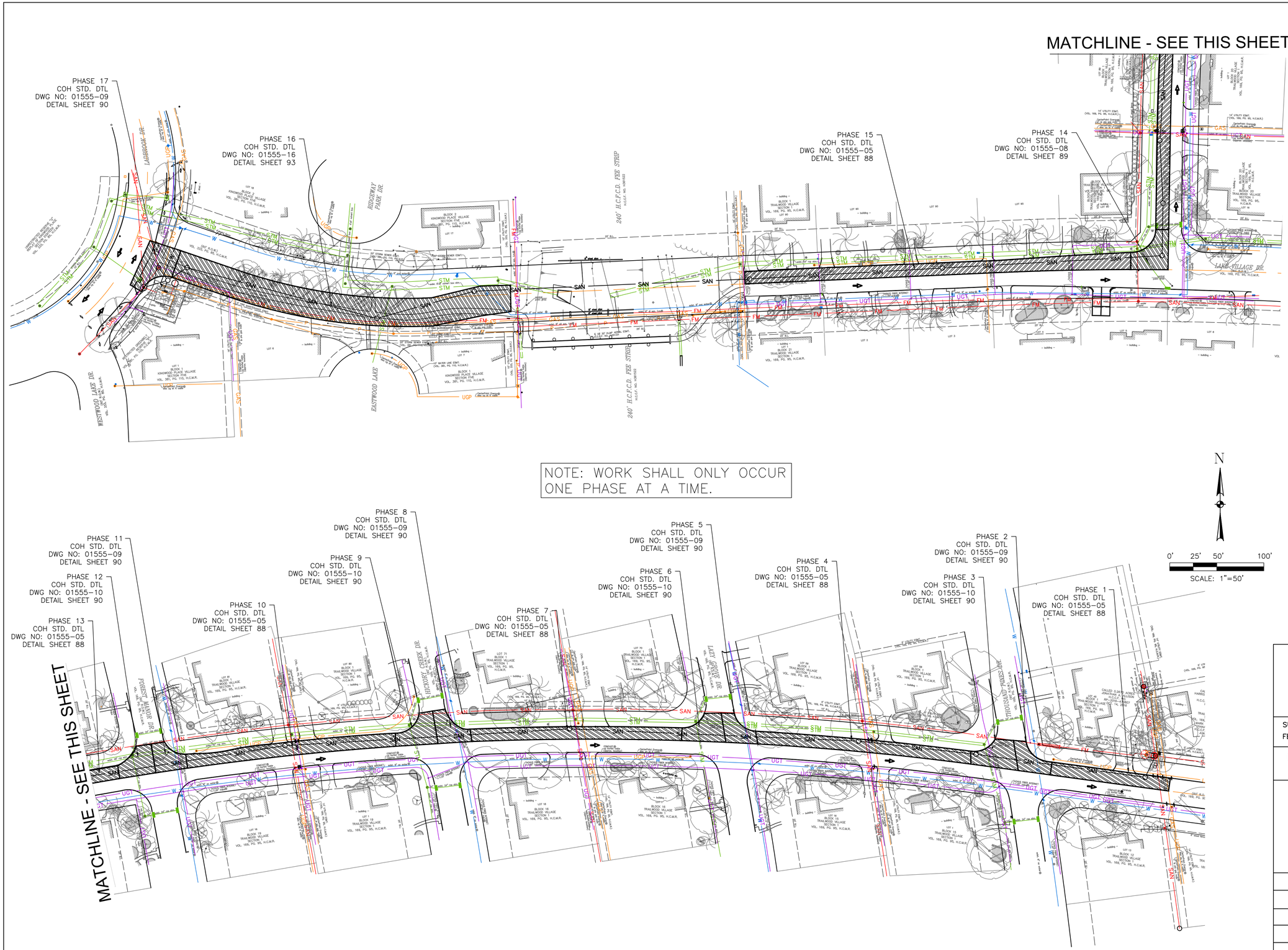
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

STORM WATER POLLUTION PREVENTION PLAN (SWPPP)

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 35 OF 125	

FILE PATH: C:\Users\andres.martinezjr\DC\ACCDocs\Tetra Tech Inc\200-317106-24001 COH LS Rehab Design\Project Files\CAD\R-000267-00178A-3_SWPPP.dwg



N

0' 25' 50' 100'

SCALE: 1"=50'

LEGEND:

WORK ZONE

NOTES:

1. CONTRACTOR TO COORDINATE DRIVEWAY CLOSURES WITH EACH PROPERTY OWNER.
2. ALL DRIVEWAYS TO BE OPEN BY END OF EACH DAY.
3. CONTRACTOR TO ONLY CONSTRUCT ONE PHASE AT A TIME
4. CONTRACTOR TO MAINTAIN A MINIMUM OF 20' OF ROADWAY OPEN AT ALL TIMES.
5. CONTRACTOR TO COORDINATE PEDESTRIAN DETOURS WITH AFFECTED PROPERTY OWNERS.

NO.	DATE	REVISION	APP.
	MM/DD/YY	BRIEF DESCRIPTION	XXX
	MM/DD/YY	BRIEF DESCRIPTION	XXX
	MM/DD/YY	BRIEF DESCRIPTION	XXX

Texas PE Firm Reg. #F-929

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CITY OF HOUSTON

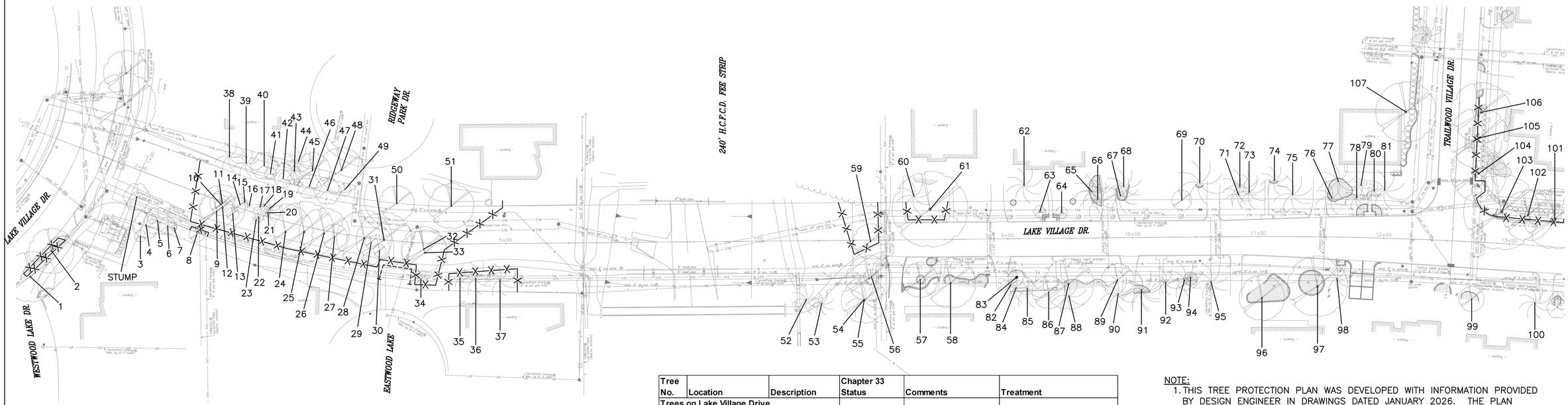
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION COH LIFT STATIONS

PHASING PLAN

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 36 OF 125	

FILE PATH: C:\Users\andres.martinezjr\DC\ACCDocs\Tetra Tech Inc\200-317106-24001 COH LS Rehab Design\Project Files\CAD\R-000267-00178A-3\Phasing\R-000267-00178A-3 Phasing.dwg PLOTTED: 2/16/2026 11:15 AM



Tree No.	Location	Description	Chapter 33 Status	Comments	Treatment
Trees on Lake Village Drive					
1	1802 Ladbrook	20" Live Oak	Protected		Fence
2	1802 Ladbrook	23" Live Oak	Protected	30% dieback	Fence
3	1802 1/2 Lake Village	12" Crepe Myrtle	Not protected	Topped	
4	1802 1/2 Lake Village	12" Crepe Myrtle	Not protected	Topped	
5	1802 1/2 Lake Village	12" Crepe Myrtle	Not protected	Topped	
6	1802 1/2 Lake Village	12" Crepe Myrtle	Not protected	Topped	
7	1802 1/2 Lake Village	12" Crepe Myrtle	Not protected	Topped	
8	1802 1/2 Lake Village	5" Water Oak	Protected		Fence
9	Public Right of Way	15" Sweet Gum	Protected		Trenchless construction, Fence
10	Public Right of Way	12" Sweet Gum	Protected		Trenchless construction, Fence
11	Public Right of Way	14" Sweet Gum	Protected		Trenchless construction, Fence
12	Not used				Trenchless construction, Fence
13	Public Right of Way	5" Winged Elm	Protected		Trenchless construction, Fence
14	Public Right of Way	5" Water Oak	Protected		Trenchless construction, Fence
15	Public Right of Way	4" Pine	Protected		Trenchless construction, Fence
16	Public Right of Way	4" Pine	Protected		Trenchless construction, Fence
17	Public Right of Way	9" Pine	Protected		Trenchless construction, Fence
18	Public Right of Way	11" Pine	Protected		Trenchless construction, Fence
19	Public Right of Way	14" Pine	Protected		Trenchless construction, Fence
20	Public Right of Way	3" Pine	Protected		Trenchless construction, Fence
21	Public Right of Way	3" Pine	Protected		Trenchless construction, Fence
22	Public Right of Way	8" Pine	Protected		Trenchless construction, Fence
23	Public Right of Way	6" Pine	Protected		Trenchless construction, Fence
24	Public Right of Way	13" Hawthorn	Protected		Trenchless construction, Fence
25	Public Right of Way	17" Tallow	Not protected		
26	Public Right of Way	17" Water Oak	Protected		Trenchless construction, Fence
27	Public Right of Way	10" Water Oak	Protected		Trenchless construction, Fence
28	Public Right of Way	18" Water Oak	Protected		Trenchless construction, Fence
29	Public Right of Way	5" Water Oak	Protected		Trenchless construction, Fence
30	Public Right of Way	5" Tallow	Not protected		
31	Public Right of Way	19" Willow Oak	Protected		Fence, Root prune
32	Public Right of Way	15" Willow Oak	Protected		Fence, Root prune
33	Public Right of Way	17" Willow Oak	Protected		Fence, Root prune
34	1914 Eastwood	13" Pine	Protected	Pruned by CPE	Fence
35	1914 Eastwood	13" Pine	Protected	Pruned by CPE	Fence
36	1914 Eastwood	18" Pine	Protected	Pruned by CPE	Fence
37	1914 Eastwood	17" Pine	Protected	Pruned by CPE	Fence
38	2003 Ridgeway Park	19" Pine	Not protected	Private tree	
39	2003 Ridgeway Park	16" Pine	Not protected	Private tree	
40	2003 Ridgeway Park	15" Crepe Myrtle	Not protected	Topped, Private tree	
41	2003 Ridgeway Park	3" Crepe Myrtle	Not protected	Topped, Private tree	
42	2003 Ridgeway Park	10" Crepe Myrtle	Not protected	Topped, Private tree	
43	2003 Ridgeway Park	19" Pine	Not protected	Private tree	
44	2003 Ridgeway Park	18" Pine	Not protected	Private tree	
45	2003 Ridgeway Park	11" Tallow	Not protected	Private tree	
46	2003 Ridgeway Park	8" Crepe Myrtle	Not protected	Private tree	
47	2003 Ridgeway Park	8" Crepe Myrtle	Not protected	Private tree	
48	2003 Ridgeway Park	16" Green Ash	Protected	Not impacted	
49	2003 Ridgeway Park	6" Live Oak	Protected	70% dieback, Not impacted	
50	2002 Ridgeway Park	12" Willow Oak	Protected		Fence

Tree No.	Location	Description	Chapter 33 Status	Comments	Treatment
Trees on Lake Village Drive					
51	2002 Ridgeway Park	15" Willow Oak	Protected		Fence
52	HCCF No. H361522	18" Pine	Not protected	Not impacted	
53	HCCF No. H361522	14" Pine	Not protected	Not impacted	
54	HCCF No. H361522	24" Pine	Not protected	Topped by CPE	
55	HCCF No. H361522	14" Willow Oak	Not protected	Not impacted	
56	HCCF No. H361522	8" Yaupon	Not protected	Not impacted	
57	1902 Lake Village	14" Big Tooth Maple	Not protected	Private tree	
58	1902 Lake Village	17" Bald Cypress	Not protected	Private tree	
59	HCCF No. H361522	13" Pine	Not protected	Pruned by CPE	Trenchless construction, Fence
60	1903 Lake Village	23" Pine	Protected	Corridor Tree	Fence
61	1903 Lake Village	32" Willow Oak	Protected		Fence
62	1907 Lake Village	23" Pine	Protected	Corridor tree, Not impacted	
63	1907 Lake Village	5" Crepe Myrtle	Not protected	Topped	
64	1907 Lake Village	5" Crepe Myrtle	Not protected	Topped	
65	1907 Lake Village	21" Pine	Protected	Corridor tree, Not impacted	
66	1911 Lake Village	22" Pine	Protected	Corridor tree, Not impacted	
67	1911 Lake Village	24" Pine	Protected	Corridor tree, Not impacted	
68	1911 Lake Village	20" Pine	Protected	Corridor tree, Not impacted	
69	1911 Lake Village	7" Red Maple	Not protected	Private tree	
70	1911 Lake Village	25" Pine	Protected	Corridor tree, Not impacted	
71	1915 Lake Village	16" Pine	Not protected	Private tree	
72	1915 Lake Village	23" Pine	Protected	Corridor tree, Not impacted	
73	1915 Lake Village	20" Pine	Protected	Corridor tree, Not impacted	
74	1915 Lake Village	18" Pine	Not protected	Private tree	
75	1915 Lake Village	23" Pine	Protected	Corridor tree, Not impacted	
76	1919 Lake Village	20" Pine	Protected	Corridor tree, Not impacted	
77	1919 Lake Village	22" Pine	Protected	Corridor tree, Not impacted	
78	1919 Lake Village	17" Pine	Not protected	Private tree	
79	1919 Lake Village	11" Pine	Not protected	Private tree	
80	1919 Lake Village	11" Pine	Not protected	Private tree	
81	1919 Lake Village	25" Pine	Protected	Corridor tree, Not impacted	
82	1906 Lake Village	14" Pine	Not protected	Private tree	
83	1906 Lake Village	5" Crepe Myrtle	Not protected	Private tree	
84	1906 Lake Village	16" Pine	Not protected	Private tree	
85	1906 Lake Village	24" Pine	Protected	Corridor tree, Not impacted	
86	1906 Lake Village	13" Magnolia	Not protected	Private tree	
87	1906 Lake Village	18" Water Oak	Not protected	Private tree	
88	1906 Lake Village	25" Pine	Protected	Corridor tree, Not impacted	
89	1910 Lake Village	13" Willow Oak	Not protected	Private tree	
90	1910 Lake Village	17" Pine	Not protected	Private tree	
91	1910 Lake Village	26" Pine	Protected	Corridor tree, Not impacted	
92	1910 Lake Village	18" Pine	Not protected	Private tree	
93	1910 Lake Village	21" Pine	Protected	Corridor tree, Not impacted	
94	1910 Lake Village	3' Sago	Not protected	Private tree	
95	1910 Lake Village	18" Pine	Not protected	Private tree	
96	1914 Lake Village	21" Magnolia	Protected	Corridor tree, Not impacted	
97	1914 Lake Village	20" Live Oak	Protected	Corridor tree, Not impacted	
98	1918 Lake Village	21" Pine	Protected	Corridor tree, Not impacted	
99	2002 Lake Village	8" Ligustrum	Not protected	Private tree	
100	2002 Lake Village	22" Pine	Protected	Corridor tree, Not impacted	
101	2002 Lake Village	22" Live Oak	Protected		Fence
102	2003 Lake Village	17" Live Oak	Protected		Fence
103	2003 Lake Village	28" Live Oak	Protected		Clearance prune, Fence

NOTE:

1. THIS TREE PROTECTION PLAN WAS DEVELOPED WITH INFORMATION PROVIDED BY DESIGN ENGINEER IN DRAWINGS DATED JANUARY 2026. THE PLAN CONSIDERS ALL FITTINGS, VERTICAL OFFSETS AND AREAS OF NECESSARY EXCAVATION. CHANGES MADE TO DESIGN MAY COMPROMISE THE TREE PROTECTION PLAN. REFER SPECIFICATIONS 01562 AND 02915.
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TREE PRESERVATION PLAN LEGEND

- 1 — TREE NUMBER/LOCATION
- (1) — TREE TO BE REMOVED
- —X— TREE PROTECTION FENCE
- ⊢----⊣ ROOT PRUNING TRENCH

N

40 0 40 80

SCALE: 1"=40'

NO.	DATE	REVISION	APP.

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

TREE PROTECTION PLAN

SHEET 1 OF 4

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 37 OF 125	

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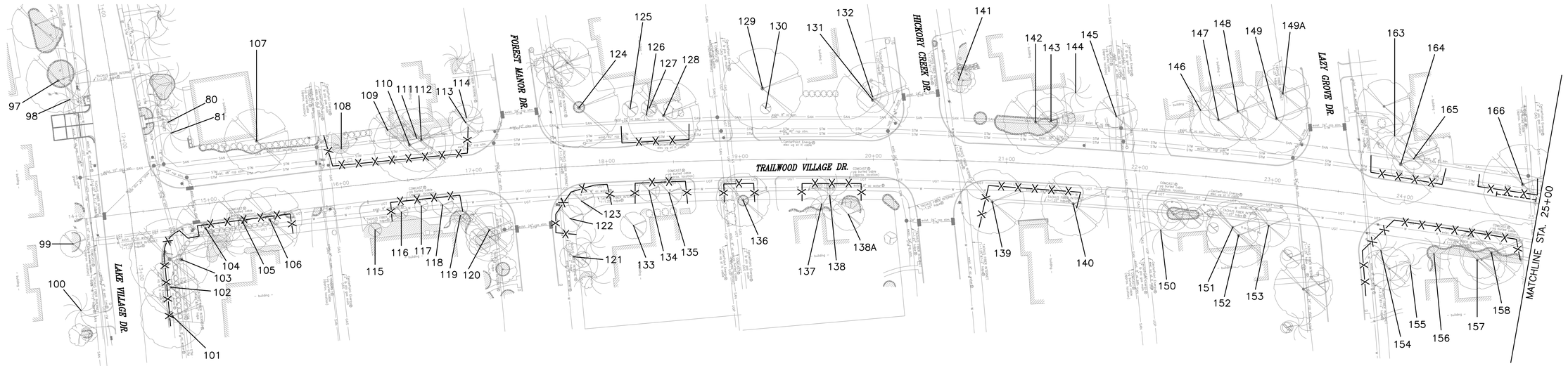

Tree No.	Location	Description	Chapter 33 Status	Comments	Treatment
Trees on Trailwood Village Drive					
104	2003 Lake Village	20" Live Oak	Protected		Clearance prune, Fence
105	2003 Lake Village	20" Live Oak	Protected		Clearance prune, Fence
106	2003 Lake Village	21" Live Oak	Protected		Fence
107	1919 Lake Village	21" Water Oak	Protected	Corridor tree, Not impacted	
108	1918 Forest Manor	22" Pine	Protected		Fence
109	1918 Forest Manor	14" Cherrybark Oak	Not protected	Private tree	
110	1918 Forest Manor	27" Arizona Ash	Protected	Trunk decay	Clearance prune, Fence
111	1918 Forest Manor	10" Cherrybark Oak	Protected		Fence
112	1918 Forest Manor	23" Water Oak	Protected		Fence
113	1918 Forest Manor	15" Water Oak	Not protected	Private tree	
114	1918 Forest Manor	24" Pine	Protected	Corridor Tree	Fence
115	2002 Forest Manor	5" Magnolia	Not protected	Private tree	
116	2002 Forest Manor	5" Sweetgum	Protected		Fence
117	2002 Forest Manor	5" Sweetgum	Protected		Fence
118	2002 Forest Manor	9" Water Oak	Protected		Fence
119	2002 Forest Manor	21" Pine	Protected	Corridor Tree	Fence
120	2002 Forest Manor	18" Sweetgum	Not protected	Private tree	
121	2003 Forest Manor	10" Arizona Ash	Not protected		
122	2003 Forest Manor	9" Shumard Oak	Protected		Fence
123	2003 Forest Manor	11" Shumard Oak	Protected		Fence
124	1919 Forest Manor	25" Cherrybark Oak	Protected	Corridor tree, Not impacted	
125	1919 Forest Manor	3" Vitex	Not protected	Private tree	
126	1919 Forest Manor	4' Sago	Not protected	Private tree	
127	1919 Forest Manor	5" Yaupon	Not protected	Private tree	
128	1919 Forest Manor	24" Willow Oak	Protected	Corridor Tree	Clearance prune, Fence
129	1918 Hickory Creek	27" Cherrybark oak	Protected	Corridor tree, Not impacted	
130	1918 Hickory Creek	2" Citrus	Not protected	Private tree	
131	1918 Hickory Creek	25" Sweetgum	Protected	Corridor tree, Not impacted	
132	1918 Hickory Creek	11" Winged Elm	Not protected	Private tree	
133	2003 Forest Manor	10" Live Oak	Not protected	Private tree	

Tree No.	Location	Description	Chapter 33 Status	Comments	Treatment
Trees on Trailwood Village Drive					
134	2003 Forest Manor	9" Hackberry	Not protected		
135	2003 Forest Manor	10" Cherrybark Oak	Protected		Fence
136	2002 Hickory Creek	15" Post Oak	Protected	Trunk cavity	Fence
137	2002 Hickory Creek	19" Pine	Not protected	Private tree	
138	2002 Hickory Creek	22" Pine	Protected		Fence
138A	2002 Hickory Creek	12" Post Oak	Not protected	Private tree	
139	2003 Hickory Creek	22" Post Oak	Protected	40% dieback	Fence
140	2003 Hickory Creek	22" Cherrybark Oak	Protected		Clearance prune, Fence
141	1919 Hickory Creek	5" Crepe Myrtle	Not protected		
142	1919 Hickory Creek	22" Willow Oak	Protected	Corridor tree, Not impacted	
143	1919 Hickory Creek	16" Bradford Pear	Not protected	Private tree	
144	1919 Hickory Creek	20" Pine	Protected	Corridor tree, Not impacted	
145	1919 Hickory Creek	14" Sweetgum	Not protected	Private tree	
146	1922 Lazy Grove	30" Pine	Protected	Corridor tree, Not impacted	
147	1922 Lazy Grove	22" Sweetgum	Protected	Corridor tree, Not impacted	
148	1922 Lazy Grove	18" Cherrybark Oak	Protected	Corridor tree, Not impacted	
149	1922 Lazy Grove	23" Sweetgum	Protected	Corridor tree, Not impacted	
149A	1922 Lazy Grove	17" Live Oak	Protected	Not impacted	
150	2002 Lazy Grove	24" Pine	Protected	Corridor tree, Not impacted	
151	2002 Lazy Grove	19" Water Oak	Not protected	Private tree	
152	2002 Lazy Grove	22" Cherrybark Oak	Protected	Corridor tree, Not impacted	
153	2002 Lazy Grove	16" Sweetgum	Not protected	Private tree	
154	2003 Lazy Grove	19" Pine	Protected		Fence
155	2003 Lazy Grove	12" Pine	Not protected	Private tree	
156	2003 Lazy Grove	20" Pine	Protected	Corridor Tree	Fence
157	2003 Lazy Grove	18" Post Oak	Not protected	Private tree	
158	2003 Lazy Grove	24" Post Oak	Protected	Corridor Tree	Fence
163	1923 Lazy Grove	24" Pine	Protected	Corridor tree, Not impacted	
164	1923 Lazy Grove	23" Water Oak	Protected		Fence
165	1923 Lazy Grove	9" Magnolia	Protected		Fence
166	1923 Lazy Grove	25" Cherrybark Oak	Protected		Clearance prune

TREE PRESERVATION PLAN LEGEND

- 1 — TREE NUMBER/LOCATION
- (1) — TREE TO BE REMOVED
- —X— TREE PROTECTION FENCE
- ROOT PRUNING TRENCH

NOTE:

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N

40 0 40 80

SCALE: 1"=40'

NO.	DATE	REVISION	APP.

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SURVEYED BY: KUO Inc.
FB NO. 000000

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

TREE PROTECTION PLAN

SHEET 2 OF 4

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 38 OF 125	

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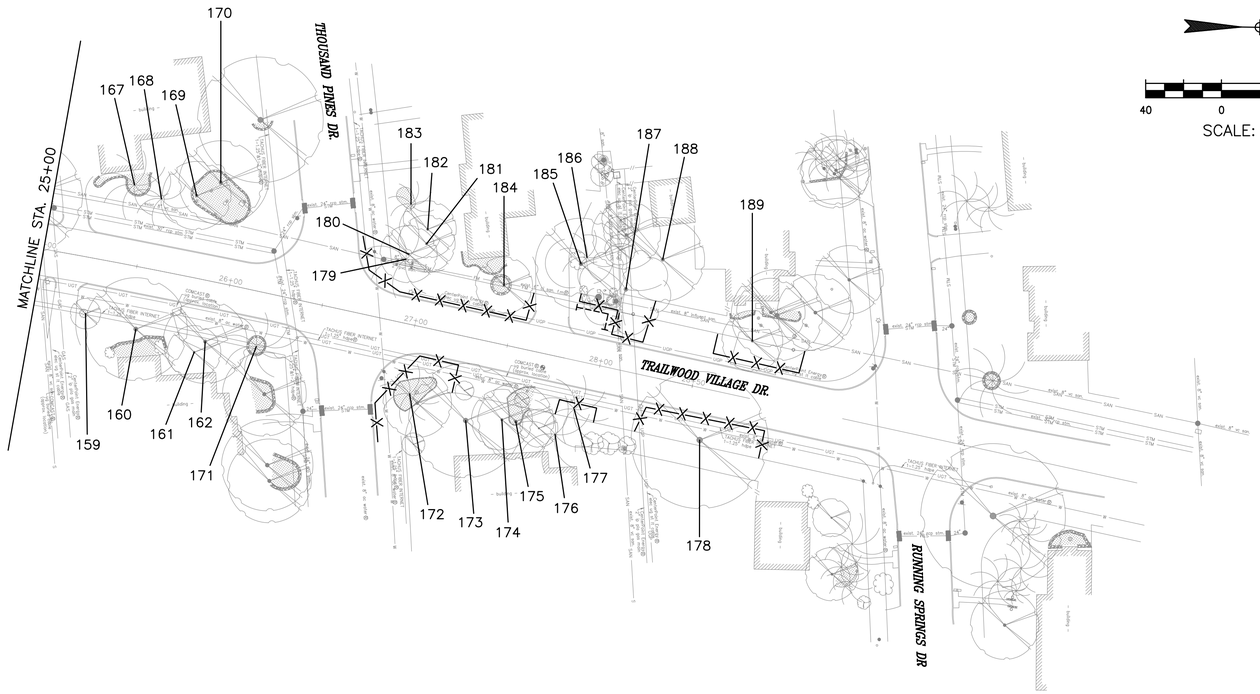

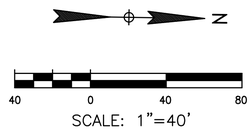

TREE PRESERVATION PLAN LEGEND

1	TREE NUMBER/LOCATION
(1)	TREE TO BE REMOVED
—X—	TREE PROTECTION FENCE
⊢----⊣	ROOT PRUNING TRENCH

NOTE:

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Tree No.	Location	Description	Chapter 33 Status	Comments	Treatment
Trees on Trailwood Village Drive					
159	2002 Thousand Pines	3" Citrus	Not protected		
160	2002 Thousand Pines	23" Post Oak	Protected	Corridor tree, Not impacted	
161	2002 Thousand Pines	12" Sweetgum	Not protected	Private tree	
162	2002 Thousand Pines	18" Sweetgum	Not protected	Private tree, Broken top	
167	1926 Thousand Pines	28" Pine	Protected	Private tree, Heart rot	
168	1926 Thousand Pines	24" Pine	Protected	Corridor tree, Not impacted	
169	1926 Thousand Pines	18" Cherrybark Oak	Not protected	Private tree	
170	1926 Thousand Pines	21" Cherrybark Oak	Protected	Corridor tree, Not impacted	
171	2002 Thousand Pines	23" Pine	Protected	Not impacted	
172	2003 Thousand Pines	22" Pine	Protected		Fence
173	2003 Thousand Pines	24" Cherrybark Oak	Protected	Corridor tree, Not impacted	
174	2003 Thousand Pines	14" Sweetgum	Not protected	Private tree	
175	2003 Thousand Pines	19" Sweetgum	Not protected	Private tree	
176	2003 Thousand Pines	29" Pine	Protected	Private tree, Heart rot	
177	2003 Thousand Pines	2" Pine	Protected		Fence
178	2002 Running Springs	33" Willow Oak	Protected	Broken top	Fence
179	1927 Thousand Pines	27" Pine	Protected	Corridor Tree	Trenchless construction, Fence
180	1927 Thousand Pines	15" Sweetgum	Not protected	Private tree	Trenchless construction, Fence
181	1927 Thousand Pines	16" Sweetgum	Not protected	Private tree	Trenchless construction, Fence
182	1927 Thousand Pines	19" Sweetgum	Not protected	Private tree	Trenchless construction, Fence
183	1927 Thousand Pines	21" Pine	Protected	Corridor tree, Not impacted	
184	1927 Thousand Pines	16" Magnolia	Not protected	Private tree	Trenchless construction, Fence
185	1927 Thousand Pines	28" Post Oak	Protected	Corridor Tree	Clearance prune
186	1927 Thousand Pines	24" Pine	Protected	Corridor Tree	Root prune for manhole, Fence
187	2451 Trailwood Village	22" Crepe Myrtle	Not protected	Private tree	Root prune for manhole, Fence
188	2451 Trailwood Village	22" Live Oak	Protected	Corridor tree, Not impacted	
189	2451 Trailwood Village	15" Live Oak	Protected		Fence

NO.	DATE	REVISION	APP.

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SURVEYED BY: KUO Inc.
FB NO. 000000

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

TREE PROTECTION PLAN

SHEET 3 OF 4

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 39 OF 125	

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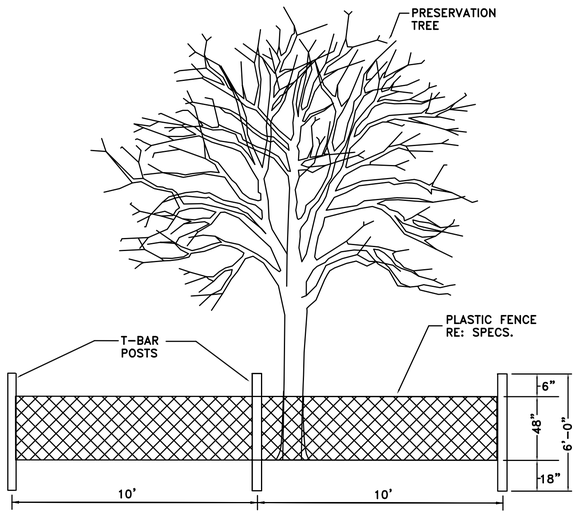
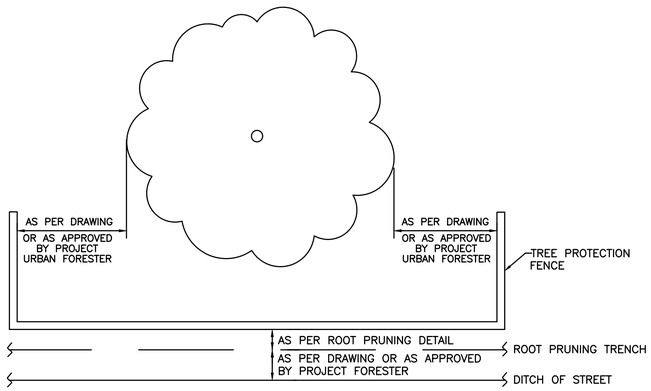
Arboriculturally Significant Tree List

Tree No.	Location	Description
54	HCCF No. H361522	24" Pine
61	1903 Lake Village	32" Willow Oak
67	1911 Lake Village	24" Pine
70	1911 Lake Village	25" Pine
81	1919 Lake Village	25" Pine
85	1906 Lake Village	24" Pine
88	1906 Lake Village	25" Pine
91	1910 Lake Village	26" Pine
103	2003 Lake Village	28" Live Oak
114	1918 Forest Manor	24" Pine
124	1919 Forest Manor	25" Cherrybark Oak
128	1919 Forest Manor	24" Willow Oak
129	1918 Hickory Creek	27" Cherrybark oak
131	1918 Hickory Creek	25" Sweetgum
146	1922 Lazy Grove	30" Pine
150	2002 Lazy Grove	24" Pine
158	2003 Lazy Grove	24" Post Oak
163	1923 Lazy Grove	24" Pine
166	1923 Lazy Grove	25" Cherrybark Oak
167	1926 Thousand Pines	28" Pine
168	1926 Thousand Pines	24" Pine
173	2003 Thousand Pines	24" Cherrybark Oak
176	2003 Thousand Pines	29" Pine
178	2002 Running Springs	33" Willow Oak
179	1927 Thousand Pines	27" Pine
185	1927 Thousand Pines	28" Post Oak
186	1927 Thousand Pines	24" Pine

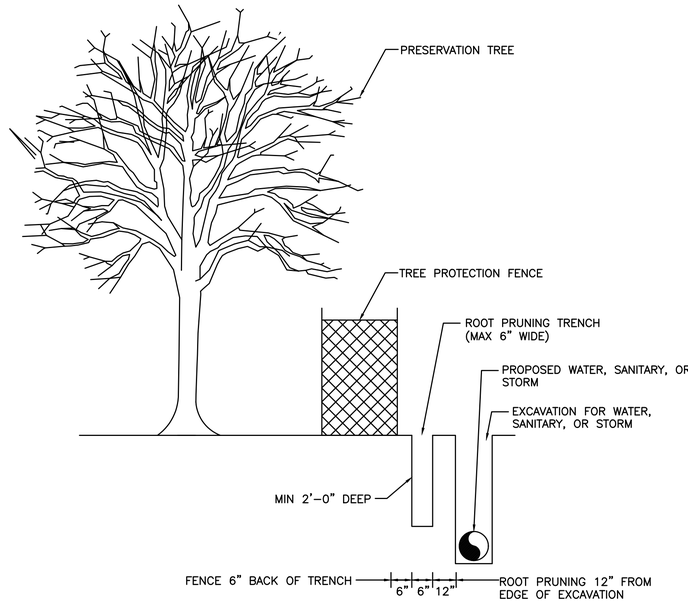
Trees Identified by City of Houston Forestry/Parks & Recreation Department as Arboriculturally Significant are identified here and/or in treatment schedule included on TPP sheets. Arboriculturally Significant trees are to be pruned under direct supervision of City of Houston Forestry. Minimal pruning will be allowed for construction equipment access, and in some cases no pruning will be allowed. Contractor must review conditions around and/or under the canopy of Arboriculturally Significant trees and consider restrictions when preparing cost estimate and planning construction equipment that will be necessary to accomplish design installation with minimal to no tree pruning.



TREE PROTECTION FENCING DETAIL A
NOT TO SCALE



TREE PROTECTION FENCING DETAIL B
NOT TO SCALE



ROOT PRUNE FOR WATER, SANITARY, OR STORM LINE
NOT TO SCALE

NO.	DATE	REVISION	APP.

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TREE PROTECTION PLAN

SHEET 4 OF 4

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MECHANICAL LEGEND

- 20x12 SA — DUCT SIZE & SYSTEM ABBREVIATION FIRST FIGURE IS DIMENSION SHOWN ON PLAN
- DUCT SECTION, POSITIVE PRESSURE
- DUCT SECTION, NEGATIVE PRESSURE
- NEW DUCTWORK
- FLEXIBLE DUCTWORK
- DUCT TRANSITION
- RECT. TO ROUND TRANSITION
- BRANCH DUCTWORK
- TURNING VANES
- CEILING DIFFUSER - SUPPLY
- CEILING DIFFUSER - RETURN
- CEILING DIFFUSER - EXHAUST
- CEILING DIFFUSER - ROUND
- LINEAR SLOT DIFFUSER (DOUBLE SLOT)
- LOUVER AND SCREEN
- FIRE DAMPER, PROVIDE ACCESS DOOR
- VOLUME DAMPER
- BD — BACKDRAFT DAMPER
- SUPPLY/INTAKE AIRFLOW DIRECTION
- EXHAUST AIRFLOW DIRECTION
- GRILLE OR REGISTER, SIDEWALL
- PIPE CAP
- PIPE CONNECTION, BOTTOM
- PIPE CONNECTION, TOP
- PIPE ELBOW, TURNED UP
- PIPE ELBOW, TURNED DOWN
- PIPE TEE
- ANCHOR, INTERMEDIATE
- BUTTERFLY VALVE
- GATE VALVE
- BALL VALVE
- CHECK VALVE
- STRAINER VALVE
- THREE-WAY CONTROL VALVE
- TWO-WAY CONTROL VALVE
- PRESSURE GAUGE
- ·U· — DOOR UNDERCUT
- Ø — DIAMETER

- MANUAL AIR VENT
- AUTOMATIC AIR VENT
- PUMP (SCHEMATIC)
- (T) — THERMOSTAT
- CO_2 — CARBON DIOXIDE SENSOR
- CO — CARBON MONOXIDE SENSOR
- (M) — MOTORIZED DAMPER
- (A) — PNEUMATIC DAMPER
- (S) — EMERGENCY SHUTDOWN SWITCH
- DP — DIFFERENTIAL PRESSURE SENSOR
- SD — DUCT SMOKE DETECTOR
- (M) — MASTER EMERGENCY SHUTDOWN SWITCH
- (H) — HUMIDISTAT
- HVAC - # — EQUIPMENT TAG
- BOD: 4' - 7" — BOTTOM OF DUCT ELEVATION TAG
- POINT OF DISCONNECTION
- POINT OF CONNECTION
- (#) — KEYED NOTE
- CD-A W X H ### — AIR TERMINAL AND AIRFLOW TAG
  - AIR QUANTITY DELIVERED BY DEVICE IN CFM
  - AIR TERMINAL NECK SIZE (IN.)
  - AIR TERMINAL MARK AS INDICATED IN SCHEDULE
- OR
- SAD-# ### CFM — AIR TERMINAL MARK AS INDICATED IN SCHEDULE; AIR QUANTITY DELIVERED BY DEVICE
- AREA OUT OF SCOPE
- AREA OF DEMOLITION

NOTES:

1. THIS LEGEND IS FOR REFERENCE ONLY.
2. ALL SYMBOLS WITHIN THIS LEGEND MAY NOT APPLY TO THIS PROJECT.

MECHANICAL ABBREVIATIONS

(D)	DEMOLITION
(E)	EXISTING
(R)	RELOCATED
AAV	AUTOMATIC AIR VENT
ABS	ABSOLUTE
AD	ACCESS DOOR
ADJ	ADJUSTABLE
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AHU	AIR HANDLING UNIT
AP	ACCESS PANEL
APD	AIR PRESSURE DROP
APPROX	APPROXIMATE
BFF	BELOW FINISHED FLOOR
BHP	BRAKE HORSEPOWER
CAP	CAPACITY
CHWR	CHILLED WATER RETURN
CHWS	CHILLED WATER SUPPLY
CONC	CONCRETE
COND	CONDENSATE
CONN	CONNECTION
CONT	CONTINUATION
CP-1	CONTROL PANEL WITH DESIGNATION
CU	CONDENSING UNIT
CW	CHILLED WATER
DB	DRY BULB
DEG	DEGREES
DEMO	DEMOLITION
DIA	DIAMETER
DN	DOWN
DWG	DRAWING
EA	EXHAUST AIR
EAG	EXHAUST AIR GRILLE
EAT	ENTERING AIR TEMPERATURE
EF	EXHAUST FAN
EMCS	EMERGENCY MANAGEMENT AND CONTROL SYSTEM
ENT	ENTERING
ERV	ENERGY RECOVERY VENTILATOR
ESP	EXTERNAL STATIC PRESSURE
ET	EXPANSION TANK
EUH	ELECTRIC UNIT HEATER
EWT	ENETERING WATER TEMPERATURE
EXH	EXHAUST
F	FAHRENHEIT
FCU	FAN COIL UNIT
FD	FIRE DAMPER
FH	FIRE HYDRANT
FLEX	FLEXIBLE
FM	FLOW METER
FPM	FEET PER MINUTE
GAL	GALLONS
GH	GRAVITY HOOD
GM	GAS METER
GPM	GALLONS PER MINUTE
GUH	GAS UNIT HEATER
HP	HORSEPOWER
HWR	HOT WATER RETURN
HWS	HOT WATER SUPPLY
ID	INSIDE DIAMETER/DIMENSION
IE	INVERT ELEVATION
IN	INCH
L	LOUVER
LAT	LEAVING AIR TEMPERATURE
LP	LOUVERED PENTHOUSE
LVL	LEVEL
LWT	LEAVING WATER TEMPERATURE
M	METER
MAX	MAXIMUM
MEZZ	MEZZANINE
MFR	MANUFACTURER
MIN	MINIMUM
MISC	MISCELLANEOUS
N/A	NOT APPLICABLE
NG	NATURAL GAS
NTS	NOT TO SCALE
OA	OUTDOOR AIR
OD	OUTSIDE DIAMETER
OED	OPEN ENDED DUCT
PD	PRESSURE DROP
PSI	POUNDS PER SQUARE INCH
R	RADIUS
RA	RETURN AIR
RAG	RETURN AIR GRILLE
REFRIG	REFRIGERANT
RH	RADIANT HEATER
RL	REFRIGERANT LIQUID LINE
RPM	REVOLUTIONS PER MINUTE
RS	REFRIGERANT SUCTION LINE
SA	SUPPLY AIR
SAG	SUPPLY AIR GRILLE
SB	SECURITY BARS
SF	SUPPLY FAN
SPEC	SPECIFICATION
STD	STANDARD
T	THERMOMETER
TA	TRANSFER AIR
TBD	TO BE DETERMINED
TEMP	TEMPERATURE
TSP	TOTAL STATIC PRESSURE
TSTAT	THERMOSTAT
TYP	TYPICAL
UH	UNIT HEATER
VAV	VARIABLE AIR VOLUME
VFD	VARIABLE FREQUENCY DRIVE
VIF	VERIFY IN FIELD
VRF	VARIABLE REFRIGERANT FLOW
W	WATT
WB	WET BULB
WMS	WIRE MESH SCREEN
WS	WASTE STACK

APPLICABLE CODES AND STANDARDS

HOUSTON BUILDING CODE	HBC 2021 (IBC 2021)
HOUSTON BUILDING CODE, EXISTING BLDG	HEBC 2021 (IEBC 2021)
HOUSTON PLUMBING CODE	HPC 2021 (UPC 2021)
TEXAS IHB FUEL GAS CODE	TFGC 2021 (IFGC 2021)
HOUSTON ELECTRICAL CODE	HEC 2023 (NFPA 70 2023)
OCCUPATIONAL SAFETY AND HEALTH ACT	OSHA
COH DPW&E ENGINEERING DESIGN MANUAL FOR SUBMERSIBLE LIFT STATIONS	COH DPW&E 2016

NOTE: ALL APPLICABLE BUILDING CODES AND STANDARDS NOT SPECIFIED HEREIN.

DESIGN CONDITIONS FOR LOAD CALCULATIONS

SEASON	OUTDOOR DESIGN CONDITIONS	ELEV. (FT)	INDOOR CONDITIONS / ROOM TYPE
			DRY WELL
SUMMER (1.)	99.5 °F	227	105 °F
SUMMER (2.)	76.7 °F	227	105 °F
WINTER (99% DB)	35.9 °F	229	35.9 °F

NOTE:
1. BASED ON ASHRAE 0.4% DB
2. BASED ON ASHRAE 0.4% MCWB

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CITY OF HOUSTON

HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

ABBREVIATIONS, LEGENDS, & NOTES

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 41 OF 125	

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MECHANICAL GENERAL NOTES

GENERAL NOTES

1. THESE GENERAL NOTES APPLY TO ALL SHEETS. REFER TO INDIVIDUAL SHEETS FOR SHEET SPECIFIC NOTES.
2. CONTRACT DOCUMENT DRAWINGS ARE DIAGRAMMATIC AND ARE INTENDED TO CONVEY SCOPE AND GENERAL ARRANGEMENT ONLY. DO NOT SCALE FOR MATERIAL QUANTITIES. ALL SCALING SHOULD BE REFERENCED TO ARCHITECTURAL PLANS ONLY.
3. COORDINATE CONSTRUCTION OF ALL MECHANICAL WORK WITH ALL OTHER DISCIPLINES AND AS SHOWN ON OTHER CONTRACT DRAWINGS.
4. CONTRACTOR SHALL VISIT SITE AND VERIFY ALL EXISTING CONDITIONS AND CONNECTIONS TO EXISTING WORK PRIOR TO BIDDING AND CONSTRUCTION.
5. COORDINATE CUTTING AND PATCHING WITH GENERAL CONTRACTOR AND OTHER DISCIPLINES. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CUTTING AND PATCHING RELATED TO THEIR WORK.
6. ALL ATTACHMENTS TO THE BUILDING STRUCTURE SHALL BE COORDINATED WITH THE STRUCTURAL DESIGN. ALL BRACING AND MOUNTING OF PIPES AND DUCTS SHALL MEET THE MINIMUM REQUIREMENTS OF THE MOST RECENT SMACNA HVAC DUCT CONSTRUCTION STANDARDS-METAL AND FLEXIBLE. CONTRACTOR SHALL MAINTAIN ONE COPY OF THIS MANUAL ON SITE AT ALL TIMES.
7. FOR SEISMIC ZONES REFER TO STRUCTURAL DESIGN FOR SEISMIC ATTACHMENT REQUIREMENTS PER THE BUILDING CODE. ALL SEISMIC RESTRAINTS OF PIPES AND DUCTS SHALL MEET THE MINIMUM REQUIREMENTS OF THE MOST RECENT SMACNA SEISMIC RESTRAINT MANUAL. CONTRACTOR SHALL MAINTAIN ONE COPY ON SITE AT ALL TIMES.
8. PROVIDE FLASHING AND COUNTERFLASHING FOR ALL PENETRATIONS THROUGH WALLS OR ROOF TO MAKE WATERPROOF INSTALLATION.
9. MAINTAIN A MINIMUM OF 6'-8" CLEARANCE TO UNDERSIDE OF PIPES, DUCTS, CONDUITS, SUSPENDED EQUIPMENT, ETC., THROUGHOUT ACCESS ROUTES IN MECHANICAL ROOMS.
10. CONCRETE HOUSEKEEPING PADS FOR MECHANICAL EQUIPMENT SHALL HAVE A MINIMUM PAD THICKNESS OF 6 INCHES. PAD SHALL EXTEND BEYOND THE EQUIPMENT A MINIMUM OF 6 INCHES ON EACH SIDE. CONCRETE HOUSEKEEPING PADS SHALL BE PROVIDED BY THE GENERAL CONTRACTOR.
11. ALL MISCELLANEOUS STEEL REQUIRED TO ENSURE PROPER INSTALLATION AND AS SHOWN IN THE DETAILS FOR PIPING, DUCTWORK, AND EQUIPMENT (UNLESS OTHERWISE NOTED) SHALL BE FURNISHED AND INSTALLED BY THE MECHANICAL CONTRACTOR.
12. ALL TESTS SHALL BE COMPLETED BEFORE ANY MECHANICAL EQUIPMENT OR PIPING INSULATION IS APPLIED.
13. BALANCE AIR FLOW AT ALL AIR INLETS AND OUTLETS TO AIR QUANTITIES SHOWN. BALANCING CONTRACTOR SHALL BE INDEPENDENT OF THE INSTALLING CONTRACTORS AND CERTIFIED BY THE NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB) OR ASSOCIATED AIR BALANCE COUNCIL (AABC).
14. ALL EXPOSED PIPE, PIPE SUPPORTS, DUCTWORK, UNFINISHED EQUIPMENT AND DUCT SUPPORTS SHALL MATCH ADJACENT FINISHES AS REQUIRED BY PAINTING SPECIFICATION AND ARCHITECTURAL DRAWINGS.
15. AT COMPLETION OF CONSTRUCTION, CONTRACTOR SHALL PROVIDE COPIES OF BOUND OPERATIONS AND MAINTENANCE MANUALS.
16. AT THE TIME OF ROUGH INSTALLATION AND DURING STORAGE ON THE CONSTRUCTION SITE UNTIL FINAL STARTUP OF THE HEATING, COOLING AND VENTILATING EQUIPMENT, ALL DUCT AND OTHER RELATED AIR DISTRIBUTION COMPONENT OPENINGS SHALL BE COVERED WITH TAPE, PLASTIC, SHEET METAL OR OTHER METHODS ACCEPTABLE TO THE ENFORCING AGENCY TO REDUCE THE AMOUNT OF DUST, WATER AND DEBRIS WHICH MAY ENTER THE SYSTEM.

EQUIPMENT NOTES

1. INSTALL ALL MECHANICAL EQUIPMENT AND APPURTENANCES IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS, CONTRACT DOCUMENTS, AND APPLICABLE CODES AND REGULATIONS.
2. WHERE TWO OR MORE ITEMS OF THE SAME TYPE OF EQUIPMENT ARE REQUIRED, THE PRODUCT OF ONE MANUFACTURER SHALL BE USED.
3. IDENTIFY ALL NEW MECHANICAL EQUIPMENT WITH NAMEPLATES PERMANENTLY ENGRAVED PER SPECIFICATIONS.
4. MOTOR STARTERS AND VARIABLE FREQUENCY DRIVES, WHERE REQUIRED, SHALL BE PROVIDED AND MOUNTED BY THE MECHANICAL INSTALLER. CONDUIT AND WIRING SHALL BE PROVIDED BY ELECTRICAL INSTALLER.
5. PROVIDE FLEXIBLE CONNECTIONS IN ALL DUCTWORK SYSTEMS (SUPPLY, RETURN, AND EXHAUST) CONNECTED TO AIR HANDLING UNITS AND FANS. FLEXIBLE CONNECTIONS SHALL BE PROVIDED AT THE POINT OF CONNECTION TO THE EQUIPMENT UNLESS OTHERWISE INDICATED.
6. ALL ROOF MOUNTED EQUIPMENT CURBS FOR EQUIPMENT PROVIDED BY THE MECHANICAL CONTRACTOR SHALL BE FURNISHED BY THE MECHANICAL CONTRACTOR AND INSTALLED BY THE GENERAL CONTRACTOR.
7. EQUIPMENT AND APPLIANCES SHALL BE ACCESSIBLE FOR SERVICE, INSPECTION, REPAIR AND REPLACEMENT WITHOUT REMOVING PERMANENT CONSTRUCTION. SUFFICIENT CLEARANCE SHALL BE MAINTAINED TO PERMIT CLEANING, REPLACEMENT OF FILTERS, BLOWERS, MOTORS, CONTROLS AND LUBRICATION OF MOVING PARTS.

DUCTWORK NOTES

1. ALL SUPPLY AND RETURN AIR DUCTWORK SHALL BE INSULATED WITH NOT LESS THAN THE AMOUNT OF INSULATION INDICATED IN ACCORDANCE WITH THE SPECIFICATIONS, APPLICABLE MECHANICAL CODE AND BUILDING ENERGY EFFICIENCY CODE. ALL DUCTWORK MOUNTED EXTERIOR TO THE BUILDING ENVELOPE SHALL BE SANDWICHED INSULATION WITH DOUBLE WALL SHEET METAL CONSTRUCTION.
2. ALL DUCT HANGERS AND SUPPORTS SHALL COMPLY WITH THE MECHANICAL CODE AND THE "SMACNA HVAC DUCT CONSTRUCTION STANDARDS-METAL AND FLEXIBLE".
3. DIMENSIONS AND SHAPE OF THE DUCT MAY BE ALTERED, AS LONG AS THE SAME AIR VELOCITY AND FLOW RATE ARE MAINTAINED, TO AVOID INTERFERENCES AND MAINTAIN ADEQUATE CLEARANCES.
4. ALL DUCTWORK DIMENSIONS SHOWN ON THE DRAWINGS ARE INTERNAL CLEAR
5. SEAL ALL DUCT JOINTS, INCLUDING LONGITUDINAL JOINTS, WITH WATER BASED SEALANT. MAXIMUM ALLOWABLE DUCTWORK LEAKAGE SHALL NOT EXCEED 5% AND AS DEFINED ELSEWHERE IN DOCUMENTS.
6. INSTALL VOLUME DAMPERS WHERE SHOWN AND AS REQUIRED FOR PROPER BALANCING OF EACH DIFFUSER/GRILLE/REGISTER, INCLUDING DEVICES WITH OPPOSED BLADE DAMPERS. VOLUME DAMPERS SHALL BE MOUNTED IMMEDIATELY DOWNSTREAM OF BRANCH CONNECTIONS. PROVIDE EXTENDED REGULATORS, WITH CONCEALED COVER PLATES, TO OPERATE DAMPERS LOCATED ABOVE INACCESSIBLE CEILINGS.
7. OUTSIDE AIR FOR A HEATING OR COOLING SYSTEM SHALL NOT BE TAKEN FROM CLOSER THAN TEN (10) FEET FROM AN APPLIANCE VENT OUTLET, VENT OPENING OF A PLUMBING SYSTEM, OR THE DISCHARGE OUTLET OF EXHAUST FAN, UNLESS THE OUTLET IS THREE (3) FEET ABOVE THE OUTSIDE AIR INLET.
8. ALL DUCTWORK SHALL BE COORDINATED WITH ALL TRADES INVOLVED. OFFSETS IN DUCTS, INCLUDING DIVIDED DUCTS AND TRANSITIONS AROUND OBSTRUCTIONS, SHALL BE PROVIDED AT NO ADDITIONAL COST.

ANCHORAGE NOTES

1. ALL MECHANICAL EQUIPMENT SHALL BE ANCHORED OR BRACED TO MEET THE HORIZONTAL AND VERTICAL FORCES PRESCRIBED IN CHAPTER 13 OF ASCE 7-16, IBC 2108 SECTION 1613, AND AS MODIFIED BY CHAPTER 2 OF UFC 3-301-01.
2. THE ATTACHMENT OF THE FOLLOWING ITEMS SHALL RESIST THE ASSIGNED FORCES BUT NEED NOT BE DETAILED ON THE PLANS. THE INSPECTOR SHALL VERIFY THAT THESE EQUIPMENT AND DISTRIBUTION SYSTEMS HAVE BEEN ANCHORED.
   - TEMPORARY OR MOVABLE EQUIPMENT WITH FLEXIBLE CONNECTION TO POWER OR UTILITIES.
   - EQUIPMENT WEIGHING 20 LB OR LESS OR IN CASE OF DISTRIBUTED SYSTEM 5 LB/FT OR LESS.
3. INSTALLATION OF THE COMPONENTS NOT SPECIFICALLY DETAILED ON THE PLANS SHALL BE SUBJECT TO THE APPROVAL OF THE OWNER'S REPRESENTATIVE AND/OR STRUCTURAL ENGINEER.
4. PROVIDE CALCULATIONS AND DETAILS FOR THE SUPPORTS, ATTACHMENTS, AND BRACING OF ALL PIPES, DUCTS, AND CONDUITS.
5. A LICENSED PROFESSIONAL ENGINEER SHALL VERIFY THE ADEQUACY OF STRUCTURE FOR SUPPORT AND ANCHORAGE OF THE EQUIPMENT.

CONTROL NOTES

1. PROVIDE ALL DEVICES, CONTROLLERS, SENSORS, CONDUIT, WIRING AND LABOR TO PROVIDE A COMPLETE AND OPERATIONAL SYSTEM TO MEET THE OWNERS PROJECT REQUIREMENTS AND THE DESIGN INDICATED ON THESE DRAWINGS AND SPECIFICATIONS.
2. ALL CONTROL CONDUIT AND WIRING SHALL COMPLY WITH THE ELECTRICAL CODE AND THE SPECIFICATIONS.
3. THE CONTROLS CONTRACTOR IS RESPONSIBLE FOR POWER CIRCUITS AND WIRING TO ALL CONTROL PANELS.

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

GENERAL NOTES

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 42 OF 125	

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KEYNOTE

1 PROVIDE PASSIVE GOOSENECK VENT FOR LIFT STATION WET WELL. COORDINATE WITH STRUCTURAL FOR PIPE PENETRATION THROUGH SLAB. ENSURE VENT LOCATION DOES NOT CLASH WITH ACCESS HATCH OPENING. VENT PIPE IS TO BE OF CORROSIVE RESISTANT CONSTRUCTION. PROVIDE REPLACEABLE STAINLESS STEEL INSECT SCREEN OVER VENT INLET/OUTLET.

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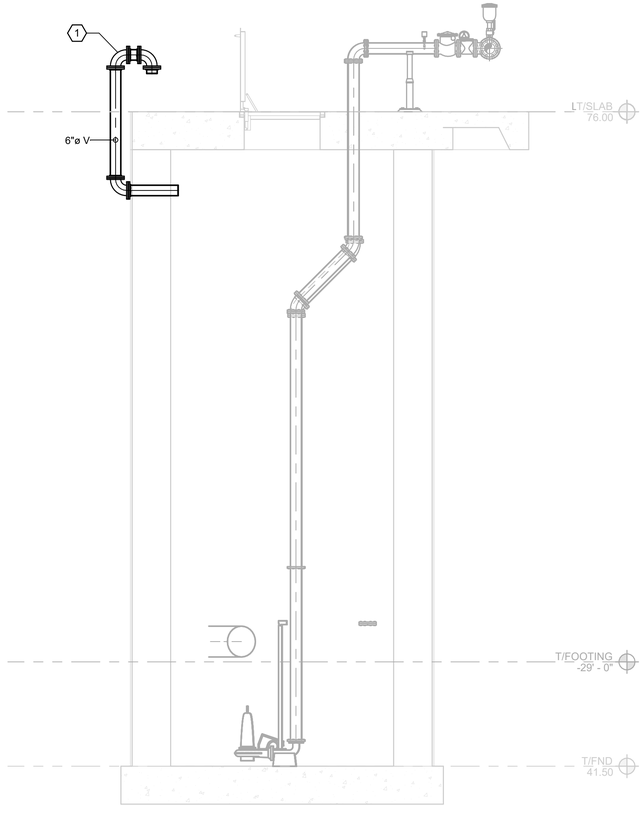
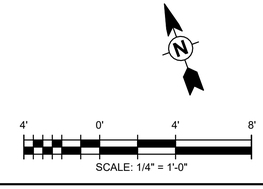
LAKE VILLAGE LIFT STATION MECHANICAL PLAN
SCALE: 1/4" = 1'-0"



A M-101 LAKE VILLAGE LIFT STATION MECHANICAL SECTION
SCALE: 1/4" = 1'-0"



SCALE: 1/4" = 1'-0"

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CITY OF HOUSTON
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RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

LAKE VILLAGE LS MECHANICAL PLANS AND SECTION

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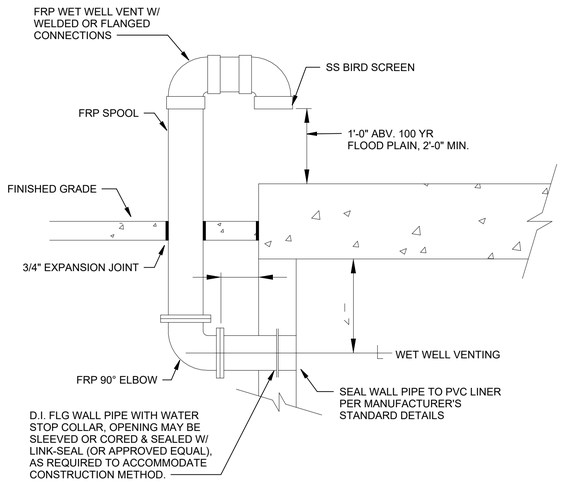
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 43 OF 125	

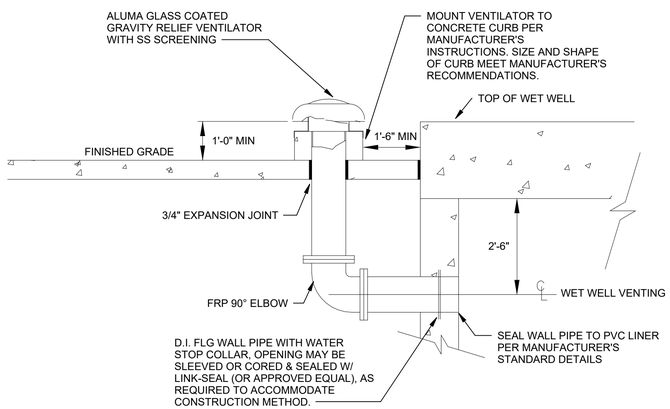
1 TYPICAL WET WELL GOOSENECK VENT DETAIL

SCALE: 12" = 1'-0"



2 WET WELL LOW PROFILE VENT DETAIL

SCALE: 12" = 1'-0"



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CITY OF HOUSTON

HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

STANDARD MECHANICAL DETAILS

WBS NUMBER
R-000267-00178A-3
DRAWING SCALE
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PLUMBING LEGEND

- SANITARY SEWER PIPING
- COLD WATER PIPING
- HOT WATER PIPING
- HOT WATER RECIRCULATION PIPING
- VENT PIPING
- STORM PIPING
- HIDDEN / UNDERGROUND PIPING

- VENT THROUGH ROOF
- CLEAN OUT, EXPOSED
- CLEAN OUT
- DOUBLE YARD CLEANOUT
- FLOOR DRAIN
- TRAP PRIMER LINE (TPL)
- HOSE BIBB W/INTEGRAL VACUUM BREAKER (INTERIOR SURFACE) (HB)
- WALL HYDRANT W/INTEGRAL VACUUM BREAKER (EXTERIOR SURFACE) (WH)
- PIPE CAP
- PIPE CONNECTION, BOTTOM
- PIPE CONNECTION, TOP
- PIPE ELBOW, TURNED UP
- PIPE ELBOW, TURNED DOWN
- PIPE TEE
- ANCHOR, INTERMEDIATE
- BUTTERFLY VALVE
- GATE VALVE
- BALL VALVE
- CHECK VALVE
- STRAINER VALVE
- STRAINER (BLOW-OFF)
- GAS COCK/GAS STOP
- THERMOMETER
- BALANCING VALVE
- THERMOSTATIC MIXING VALVE
- SOLENOID VALVE
- PRESSURE REGULATOR
- RELIEF VALVE
- WATER HAMMER ARRESTER/SHOCK ABSORBER
- UNION
- PUMP (SCHEMATIC)
- WATER METER (W)
- BACK FLOW PREVENTER (BFP)
- GAS METER (M)
- DIAMETER (Ø)

- SK - # — FIXTURE TAG
- LIMIT OF DEMOLITION
- CONNECT TO EXISTING
- KEYED NOTE
- 3/4"ø HW — PIPE SIZE AND SYSTEM TAG
- AREA OUT OF SCOPE
- AREA OF DEMOLITION

NOTES:

1. THIS LEGEND IS FOR REFERENCE ONLY.
2. ALL SYMBOLS WITHIN THIS LEGEND MAY NOT APPLY TO THIS PROJECT.

PLUMBING ABBREVIATIONS

(D)	DEMOLITION
(E)	EXISTING
(R)	RELOCATED
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
APPROX	APPROXIMATE
BFF	BELOW FINISHED FLOOR
BFP	BACKFLOW PREVENTER
CA	COMPRESSED AIR
CAP	CAPACITY
CO	CLEAN OUT
COND	CONDENSATE
CONN	CONNECTION
CONT	CONTINUATION
D	DRAIN
DCW	DOMESTIC COLD WATER
DEG	DEGREES
DEMO	DEMOLITION
DIA	DIAMETER
DN	DOWN
DS	DOWNSPOUT
DWG	DRAWING
EA	EACH
EEW	EMERGENCY EYE/FACE WASH
ENT	ENTERING
ESS	EMERGENCY SAFETY SHOWER
ET	EXPANSION TANK
F	FAHRENHEIT
FCO	FLOOR CLEAN OUT
FD	FLOOR DRAIN
FH	FIRE HYDRANT
FM	FLOW METER
FPH	FREEZE PROOF HYDRANT
FPM	FEET PER MINUTE
GAL	GALLONS
GD	GARBAGE DISPOSAL
GM	GAS METER
GPM	GALLONS PER MINUTE
GWH	GAS WATER HEATER
HB	HOSE BIBB
HD	HEAD
HO	HUB OUTLET
HP	HORSEPOWER
HW	HOT WATER
HWR	HOT WATER RETURN
ID	INSIDE DIAMETER/DIMENSION
IE	INVERT ELEVATION
IMVB	ICE MAKER VALVE BOX
IN	INCH
IW	INDUSTRIAL WASTE
IWH	INSTANTANEOUS WATER HEATER
LAV	LAVATORY
M	METER
MAX	MAXIMUM
MEZZ	MEZZANINE
MFR	MANUFACTURER
MIN	MINIMUM
MISC	MISCELLANEOUS
N/A	NOT APPLICABLE
NG	NATURAL GAS
NPW	NON-POTABLE WATER
NTS	NOT TO SCALE
OD	OUTSIDE DIAMETER
PCV	PRESSURE CONTROL VALVE
PD	PRESSURE DROP
PG	PRESSURE GAUGE
PRV	PRESSURE REDUCING VALVE
PSI	POUNDS PER SQUARE INCH
PVC	POLYVINYL CHLORIDE
PW	POTABLE WATER
R	RADIUS
RD	ROOF DRAIN
RP	RECIRCULATION PUMP
RPBP	REDUCED PRESSURE BACKFLOW PREVENTER
RPM	REVOLUTIONS PER MINUTE
SAN	SANITARY SEWER PIPING
SK	SINK
SP	SUMP PUMP
SPEC	SPECIFICATION
STD	STANDARD
STO	STORM
SW	SERVICE WATER
TBD	TO BE DETERMINED
TCV	TEMPERING VALVE
TD	TRENCH DRAIN
TEMP	TEMPERATURE
TMV	THERMOSTATIC MIXING VALVE
TP	TRAP PRIMER
TW	TEPID WATER
TYP	TYPICAL
UR	URINAL
V	VENT
VIF	VERIFY IN FIELD
VS	VENT STACK
VTR	VENT THRU ROOF
WB	WASHER BOX
WC	WATER CLOSET
WCO	WALL CLEAN OUT
WG	WATER GAUGE
WPD	WATER PRESSURE DROP
YH	YARD HYDRANT

PLUMBING GENERAL NOTES

APPLICABLE CODES AND STANDARDS	
HOUSTON BUILDING CODE	HBC 2021 (IBC 2021)
HOUSTON BUILDING CODE, EXISTING BLDG	HEBC 2021 (IEBC 2021)
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3. ALL EQUIPMENT AND PIPING SHALL BE INSTALLED IN COMPLIANCE WITH THE CODES LISTED IN THE TABLE ABOVE.
4. ALL INTERIOR FLOOR DRAINS AND OPEN RECEPTACLES WITH TRAPS SHALL BE PROTECTED BY A TRAP PRIMER.
5. WATER LINES SHALL NOT BE ROUTED ABOVE ANY ELECTRICAL ROOMS, ELECTRICAL PANELS, OR TELEPHONE ROOMS.
6. CONTRACTOR IS RESPONSIBLE FOR COORDINATION WITH OTHER TRADES TO MINIMIZE SPATIAL CONFLICTS.
7. CONTRACTOR SHALL VERIFY ALL FIELD CONDITIONS AND DIMENSIONS BEFORE CONSTRUCTION BEGINS.
8. PROVIDE ISOLATION VALVES AT ALL PIPE CONNECTIONS TO EQUIPMENT.
9. COORDINATE NEW WATER METER LOCATION WITH LOCAL UTILITY AUTHORITY.

NATURAL GAS PIPING NOTES

1. ALL GAS PIPING SHALL BE PAINTED AND LABELED IN ACCORDANCE WITH APPLICABLE CODES AND SPECIFICATIONS.
2. COORDINATE NEW METER LOCATION FOR BUILDING WITH LOCAL UTILITIES.
3. ALL GAS PIPING SHALL BE LABELED AT BEGINNING, ALL ENDS, AND AT 6' INTERVALS DESIGNATING GAS & PRESSURE. LABELS SHALL BE PER SPECIFICATIONS.

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2/16/26

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

ABBREVIATIONS, LEGENDS, & NOTES

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 45 OF 125	

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KEYNOTE

#	
1	REFER TO CIVIL PLANS FOR YARD PIPING CONTINUATION.
2	PROVIDE DOMESTIC COLD WATER SERVICE PIPING TO LIFT STATION SITE. COORDINATE WITH CIVIL FOR SERVICE CONNECTION TO WATER MAIN. TRANSITION PIPING TO ABOVE GRADE REDUCED PRESSURE ZONE BACKFLOW PREVENTER. COORDINATE WITH LOCAL UTILITY TO PROVIDE NEW WATER METER. PROVIDE VANDAL-PROOF, INSULATED ENCLOSURE FOR BACKFLOW PREVENTER.
3	PROVIDE NATURAL GAS SERVICE PIPING TO LIFT STATION SITE. COORDINATE WITH LOCAL UTILITY FOR NATURAL GAS SERVICE CONNECTION TO MAIN. CONTRACTOR TO COORDINATE WITH LOCAL UTILITY TO PROVIDE NEW NATURAL GAS METER AND PRESSURE REDUCING VALVE FOR SERVICE.
4	REFER TO ELECTRICAL DRAWINGS AND GENERATOR MANUFACTURER SPECIFICATIONS FOR FINAL NATURAL GAS PIPING CONNECTION LOCATION. PROVIDE SHUT OFF VALVE FOR ISOLATION AND FLEXIBLE CONNECTION AT GENERATOR.

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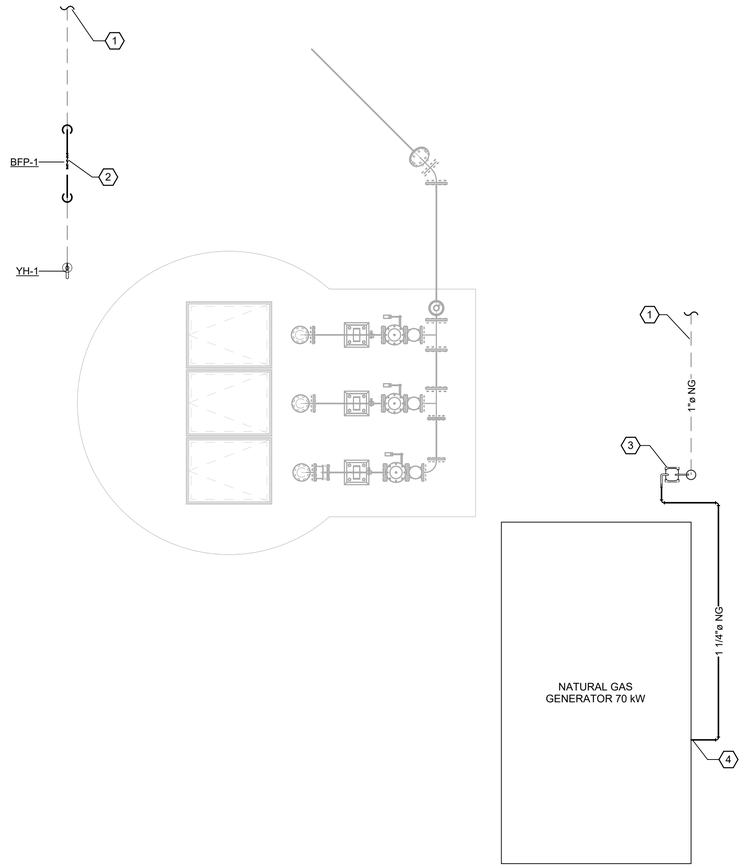
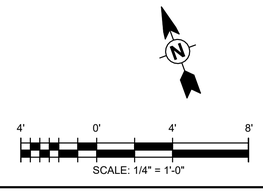


LAKE VILLAGE LIFT STATION PLUMBING PLAN

SCALE: 1/4" = 1'-0"



SCALE: 1/4" = 1'-0"

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LAKE VILLAGE LS PLUMBING PLANS

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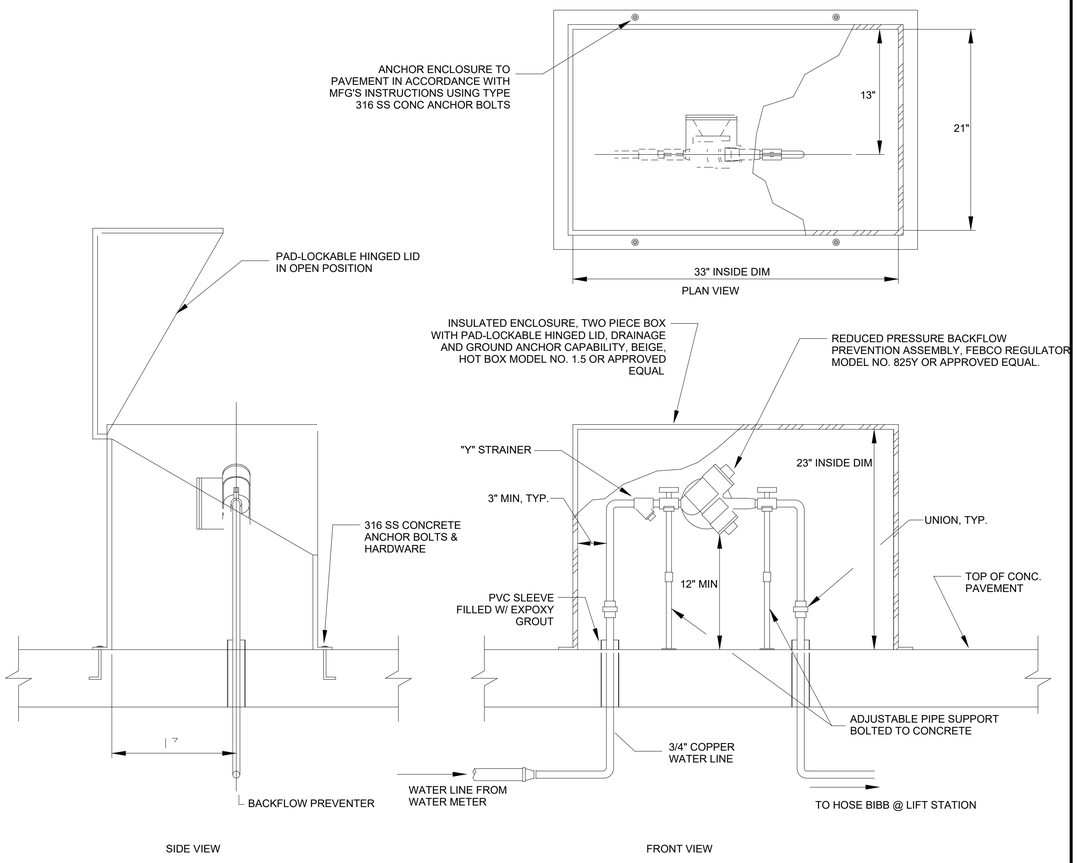
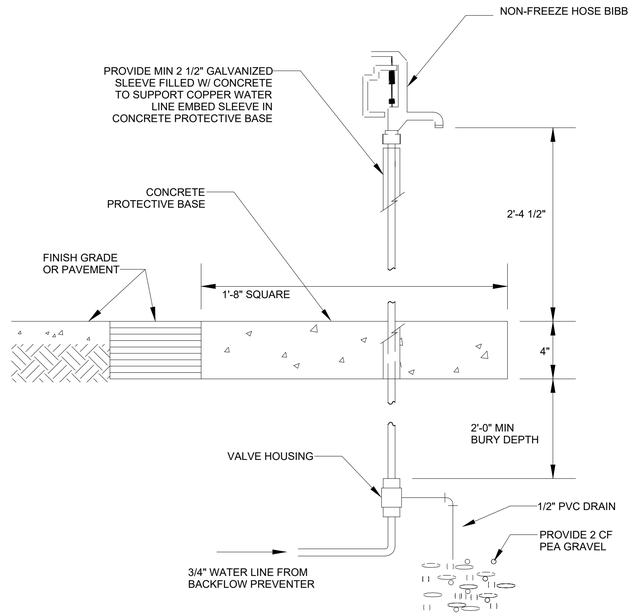
1 REDUCED PRESSURE BACKFLOW PREVENTER DETAIL

SCALE: N.T.S.



2 TYPICAL NON-FREEZE YARD HYDRANT DETAIL

SCALE: N.T.S.



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STANDARD PLUMBING DETAILS

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PLUMBING FIXTURE SCHEDULE

MARK	DESCRIPTION	CONNECTION SIZE (IN)				MANUFACTURER	MODEL	NOTES
		CW	HW	WASTE	VENT			
YH-1	FREEZE-PROOF YARD HYDRANT	3/4"	-	-	-	ZURN	Z1395XL	-

LAKE VILLAGE BACKFLOW PREVENTER SCHEDULE

MARK	DESCRIPTION	LOCATION	SIZE (IN)	FLOW (GPM)	MAXIMUM OPERATING PRESSURE (PSIG)	MAXIMUM INLET TEMPERATURE (°F)	PRESSURE LOSS AT RATED FLOW (PSIG)	MANUFACTURER	MODEL	NOTES
BFP-1	REDUCED PRESSURE ZONE BACKFLOW PREVENTER	LAKE VILLAGE	3/4"	10	175	180	13.0	WATTS	LF009-QT-S	1

NOTES:
1. PROVIDE WITH BALL VALVES FOR SHUT OFF, STRAINER, INSULATED VANDAL-PROOF ENCLOSURE (HOT BOX TYPE OR APPROVED EQUAL)

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PLUMBING SCHEDULES

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STRUCTURAL GENERAL NOTES

1. THESE GENERAL NOTES PRESENT AND/OR SUMMARIZE KEY PROJECT INFORMATION FOR THE DRAWING READER'S CONVENIENCE. SEE ALSO INDIVIDUAL DRAWING NOTES AND PROJECT SPECIFICATIONS FOR FURTHER DETAILS AND REQUIREMENTS.
2. ALL REFERENCED STANDARDS HEREIN ARE TO MOST RECENT ISSUE IN EFFECT AS OF THE DATE OF THESE DOCUMENTS, UNLESS NOTED OTHERWISE IN PROJECT SPECIFICATIONS OR ON THE DRAWING.
3. ALL ELEVATIONS ARE TO BE VERIFIED WITH CIVIL DRAWINGS.
4. ALL EXISTING DIMENSIONS SHOWN WITH THE ± SYMBOL ARE APPROXIMATE AND SHALL BE FIELD VERIFIED BY THE CONTRACTOR BEFORE FABRICATION AND CONSTRUCTION.
5. DIMENSIONS MARKED WITH A "X" SHALL BE DETERMINED BY EQUIPMENT MANUFACTURER AND COORDINATED BY CONTRACTOR
6. SUBMIT SHOP DRAWINGS, PROJECT DATA AND SAMPLES AS SPECIFIED IN PROJECT SPECIFICATIONS.
7. ABBREVIATIONS:

ADD'L	ADDITIONAL	FLG.	FLANGE	PERF	PERFORATED
AISC	AMERICAN INSTITUTE OF STEEL CONSTRUCTION	FLR	FLOOR	PERP	PERPENDICULAR
ALUM.	ALUMINUM	FND.	FOUNDATION	PL	PLATE
APPROX.	APPROXIMATE	FRMG	FRAMING	PLF	POUNDS PER LINEAR FOOT
ARCH.	ARCHITECT(URAL)	FT	FOOT	PRCST	PRECAST
B.M.	BEAM	FTG	FOOTING	PREFAB	PREFABRICATED
B.O.F	BOTTOM OF FOOTING	GA	GAGE, GAUGE	PSF	POUNDS PER SQUARE FOOT
B.O.S.	BOTTOM OF STEEL	GALV	GALVANIZED	PSI	POUNDS PER SQUARE INCH
BLDG.	BUILDING	GR.	GRADE	QTY	QUANTITY
BOT.	BOTTOM	GRTG	GRATING	R	RISER
BRG.	BEARING	H.P.	HIGH POINT	RAD.	RADIUS
BTWN	BETWEEN	H.R.	HAND RAIL	REF	REFERENCE
CCJ	CRACK CONTROL JOINT	HK	HOOK	REINF.	REINFORCEMENT
CJ	CONSTRUCTION JOINT	HORIZ	HORIZONTAL	REQ/REQ'D	REQUIRED
CL	CENTER LINE	HT	HEIGHT	REV	REVISION
CLR	CLEAR	HVAC	HEATING VENTILATION AND AIR CONDITIONING	RO	ROUGH OPENING
COH	CITY OF HOUSTON	I.D.	INSIDE DIAMETER	SCHED	SCHEDULE
COL	COLUMN	I.F.	INSIDE FACE	SF	SQUARE FOOT
CONC	CONCRETE	I.J.	ISOLATION JOINT	SHT.	SHEET
CONST	CONSTRUCTION	IN.	INCH	SIM.	SIMILAR
CONT	CONTINUOUS	INSUL	INSULATION	SPA.	SPACE
COORD	COORDINATE	L	ANGLE	SPEC	SPECIFICATIONS
CTR	CENTER	L.P.	LOW POINT	SQ	SQUARE
DBA	DEFORMED BAR ANCHOR	LBS	POUNDS	SS	STAINLESS STEEL
DEMO	DEMOLISH	LF	LINEAR FOOT (FEET)	STAG.	STAGGER
DIA	DIAMETER	LLH	LONG LEG HORIZONTAL	STD	STANDARD
DIM	DIMENSION	LLV	LONG LEG VERTICAL	STL	STEEL
DIST	DISTANCE	LOC	LOCATION	STRUCT	STRUCTURE(AL)
DN	DOWN	MATL	MATERIAL	SYM	SYMMETRICAL
DTL.	DETAIL	MAX	MAXIMUM	T	TREAD
DWG(S)	DRAWING(S)	MECH	MECHANICAL	T/	TOP OF
DWL	DOWEL	MFR	MANUFACTURER	TEMP	TEMPORARY
E/EX/EXIST.	EXISTING	MID	MIDDLE / MIDPOINT	THK	THICKNESS
EA	EACH	MIN	MINIMUM, MINUTE	TOF	TOP OF FOOTING
EF	EACH FACE	MISC.	MISCELLANEOUS	TOS	TOP OF SLAB
EJ	EXPANSION JOINT	MTL	METAL	TRANSV.	TRANSVERE
EL / ELEV.	ELEVATION	N	NEW	TYP	TYPICAL
ELEC	ELECTRIC(AL)	N.S.	NEAR SIDE	UNO	UNLESS NOTED OTHERWISE
ENGR	ENGINEER	N.T.S.	NOT TO SCALE	V.I.F.	VERIFY IN FIELD
EQ	EQUAL	NA	NOT APPLICABLE	VERT	VERTICAL
EQUIP	EQUIPMENT	NO	NUMBER	W.P.	WORK POINT
EW	EACH WAY	NOM	NOMINAL	W/	WITH
EXP	EXPANSION	O.C.	ON CENTER	W/O	WITHOUT
F.S.	FAR SIDE	O.D.	OUTSIDE DIAMETER	WS	WATER STOP
F.V.	FIELD VERIFY	OPH	OPPOSITE HAND	WWF	WELDED WIRE FABRIC
FD	FLOOR DRAIN	OPNG	OPENING		
FFE	FINISH FLOOR ELEVATION	OPP	OPPOSITE		
FIN	FINISH (ED)	ORIG	ORIGINAL		

FOUNDATIONS

1. **(GEOTECH REPORT - PENDING)** SEE GEOTECHNICAL/SUBSURFACE INVESTIGATION REPORT BY **XXXXXXXXXX**, DATED **XXXX**. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE WHETHER OR NOT ADDITIONAL GEOTECHNICAL INFORMATION IS REQUIRED AND TO PROVIDE SUCH INFORMATION AS THE CONTRACTOR DEEMS NECESSARY AT NO ADDITIONAL COST TO THE OWNER.
2. ALLOWABLE BEARING PRESSURES AS FOLLOWS:

   A. WET WELL MAT FOUNDATIONS: **XXXXX** PSF
   B. SHALLOW FOUNDATIONS: **XXXXX** PSF (BEARING NEAR GRADE)

3. GEOTECHNICAL ENGINEER SHALL BE RETAINED BY THE CONTRACTOR TO PROVIDE OBSERVATION AND TESTING SERVICES DURING THE GRADING AND FOUNDATION PHASE OF CONSTRUCTION. INSPECTION AND TESTING REPORTS SHALL BE SUBMITTED TO THE STRUCTURAL ENGINEER.
4. SUBGRADE PREPARATION: **(REQUIREMENTS PENDING GEOTECH REPORT)**
5. PRIOR TO PLACING ENGINEERED FILL, THE SITE SHALL BE STRIPPED AND PROOF ROLLED. ANY SOFT SPOTS ENCOUNTERED SHALL BE REMOVED AND REPLACED WITH ENGINEERED FILL. REFER TO EARTHWORK SPECIFICATION FOR ADDITIONAL INFORMATION.
6. FOR STRUCTURES WITH CONCRETE TOP SLABS, THERE SHALL BE NO BACKFILLING OPERATIONS UNTIL THE TOP SLAB IS IN PLACE, HAS BEEN CURED A MINIMUM OF 7 DAYS, AND HAS REACHED 70% OF ITS 28 DAY DESIGN STRENGTH, UNLESS NOTED OTHERWISE OR APPROVED BY THE ENGINEER.
7. THERE SHALL BE NO BACKFILLING OPERATIONS UNTIL THE CONCRETE WALLS HAVE REACHED THEIR 28 DAY DESIGN STRENGTH, UNLESS NOTED OTHERWISE OR APPROVED BY THE ENGINEER IN WRITING.
8. HEAVY EQUIPMENT OR WHEELED/TRACKED VEHICLES EXCEEDING 20 PSF CONTACT PRESSURE ARE NOT ALLOWED ON ELEVATED SLABS, ROOFS, OR WITHIN 10 FT OF EARTH RETAINING WALLS UNLESS NOTED OTHERWISE ON PLANS OR APPROVED BY STRUCTURAL ENGINEER OF RECORD PRIOR TO CONSTRUCTION.

DESIGN CRITERIA

1. REFERENCES:

   A. ICC INTERNATIONAL BUILDING CODE, 2021 EDITION, RISK CATEGORY III IN ACCORDANCE WITH TABLE 1604.5
   B. ASCE/SEI 7-16 - MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES
   C. CITY OF HOUSTON DEPARTMENT OF PUBLIC WORKS AND ENGINEERING, ENGINEERING DESIGN MANUAL FOR SUBMERSIBLE LIFT STATIONS.

2. DEAD LOADS: = (SELF WEIGHT)
3. LIVE LOADS (U.N.O.):

ELEVATED TOP SLABS	= 300 PSF
STAIRS, WALKWAYS, OR PLATFORMS	= 100 PSF
PROCESS FLOORS	= 200 PSF

4. FROST DEPTH = 6" (PENDING GEOTECH CONFIRMATION)
5. ROOF SNOW LOAD: = 0 (NOT APPLICABLE)
6. WIND LOAD:

BASIC DESIGN WIND SPEED, V	= 145 MPH
NOMINAL DESIGN WIND SPEED, Vasd	= 113 (Vult*√0.6) MPH
RISK CATEGORY	= III
WIND EXPOSURE CATEGORY	= C
DIRECTIONALITY FACTOR, Kd	= 0.85
TOPOGRAPHIC FACTOR, Kzt	= 1.0
INTERNAL PRESSURE COEFFICIENT, GCpi	= N/A
BUILDING ENCLOSURE CLASSIFICATION	= N/A

7. SEISMIC DESIGN DATA:

RISK CATEGORY	= III
SEISMIC IMPORTANCE FACTOR, Ie	= 1.25
SDS	= 0.072
SD1	= 0.062
SS	= 0.068
S1	= 0.039
SITE CLASS	= D (PENDING GEOTECH CONFIRMATION)
SEISMIC DESIGN CATEGORY	= A (PENDING GEOTECH CONFIRMATION)
RESPONSE MODIFICATION FACTOR, R	= 4
BASIC SEISMIC FORCE RESISTING SYSTEM	= ORDINARY REINFORCED CONCRETE WALLS
SEISMIC RESPONSE COEFFICIENT, Cs	= 0.023
DESIGN BASE SHEAR:	= 0.01*W KIPS
ANALYSIS PROCEDURE:	= NOTIONAL LOADS (ASCE 7-16, 1.4)

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CONCRETE

1. REFERENCES

   A. ACI 318-19 BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE
   B. ACI 350-06 CODE REQUIREMENTS FOR ENVIRONMENTAL ENGINEERING CONCRETE STRUCTURES
   C. ACI SP-66 ACI DETAILING MANUAL
   D. ACI 301-16 SPECIFICATION FOR STRUCTURAL CONCRETE
   E. ACI 117-10 SPECIFICATION FOR TOLERANCES FOR CONCRETE CONSTRUCTION AND MATERIALS
   F. CRSI MSP-2-01 MANUAL OF STANDARD PRACTICE
   G. CRSI REINFORCING BAR DETAILING
   H. CRSI PLACING REINFORCING BARS

2. MATERIALS

   A. STRUCTURAL CONCRETE

      a. MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS (f'c): 4,500 PSI
      b. UNLESS NOTED OTHERWISE ON THE PLANS, ALL CONCRETE TO HAVE THE FOLLOWING EXPOSURE CLASSIFICATION AS DEFINED IN ACI 318-19, CHAPTER 19: F2, S0, W2, C1
      c. ALL CONCRETE EXPOSED TO THE ELEMENTS SHALL BE AIR-ENTRAINED IN ACCORDANCE WITH ASTM C260. SEE SPECIFICATIONS.
      d. ALL CONCRETE AGGREGATE SHALL COMPLY WITH ASTM C33 (NORMAL WEIGHT).
      e. WATER TO CEMENT RATIO (MAX) = 0.44
      f. WATER-REDUCING ADMIXTURE: ASTM C 494, TYPE A.
      g. PROHIBITED ADMIXTURES: CALCIUM CHLORIDE THYOCYANATES OR ADMIXTURES CONTAINING MORE THAN 0.1 PERCENT CHLORIDE IONS.

   B. REINFORCEMENT

      a. REINFORCING BARS: ASTM A615, GRADE 60

   C. CAST-IN-PLACE ANCHOR RODS

      a. SHALL BE GALVANIZED, FURNISHED WITH CHAMFERED ENDS, AND SHALL MEET STRENGTH AND DUCTILITY REQUIREMENTS EQUIVALENT ASTM F1554, GR 55 WELDABLE MATERIAL.

   D. GROUT: HIGH STRENGTH, NON-SHRINK STRUCTURAL GROUT. SEE SPECIFICATIONS.

3. REINFORCEMENT DETAILING

   A. ALL REINFORCING STEEL DETAILS SHALL BE IN ACCORDANCE WITH THE ACI CODE REQUIREMENTS (ACI 350 - CURRENT EDITION).
   B. REINFORCING STEEL PLACING DRAWINGS AND BAR LISTS SHALL CONFORM TO THE ACI OR CRSI DETAILING MANUALS. ALL BAR SUPPORTS MUST BE CLEARLY DETAILED
   C. CONCRETE COVER FOR REINFORCING SHALL BE INDICATED ON THE APPLICABLE REINFORCING STEEL SHOP DRAWINGS. HOWEVER, NO REINFORCING IN AREAS EXPOSED TO EARTH, WEATHER ,SEWAGE OR WATER SHALL HAVE COVER LESS THAN TWO INCHES.
   D. SPECIFIED COVER FOR REINFORCING PER ACI 350 (WATER CONTAINMENT STRUCTURES):

FOOTINGS (BOTTOM)	3.0"
FOOTINGS (TOP)	2.0"
BEAMS (PRIMARY REINF)	2.5"
BEAMS (STIRRUPS/ TIES)	2.0"
WALLS	2.0"
SUSPENDED SLABS (BOTTOM)	2.0"
SUSPENDED SLABS (TOP)	2.0"
SLAB-ON-GRADE (REBAR)	2" FROM TOP OF SLAB (U.N.O.)

   E. REINFORCEMENT IN WALLS SHALL BE CONTINUOUS. HORIZONTAL BAR LAP SPLICES SHALL BE STAGGERED
   F. PROVIDE CORNER BARS AT ALL WALL AND FOUNDATION CORNERS, AND LAP WITH THE HORIZONTAL BARS. CORNER BARS ARE TO MATCH THE HORIZONTAL BARS IN SIZE, GRADE AND SPACING UNLESS OTHERWISE SHOWN.
   G. HOOKS AND BENDS SHALL MEET ACI STANDARD UNLESS OTHERWISE INDICATED.
   H. SPLICES: CONTINUOUS REINFORCING BARS SHALL BE FURNISHED WITH CLASS 'B' TENSION LAPS SPLICES INCLUDING CORNER BARS, UNLESS NOTED OTHERWISE.
   I. MECHANICAL SPLICES SHALL NOT BE PERMITTED UNLESS SHOWN ON THE DRAWINGS OR APPROVED BY THE ENGINEER
   J. REINFORCING STEEL FABRICATION AND PLACEMENT SHALL BE IN ACCORDANCE WITH CRSI MANUAL OF STANDARD PRACTICE AND CRSI PLACING REINFORCING BARS (LATEST EDITIONS).
   K. REINFORCING STEEL IN FOOTINGS SHALL BE ASSEMBLED IN MAT GRILLES EQUALLY SPACED AND SECURELY WIRED TOGETHER BEFORE THE CONCRETE IS POURED.
   L. WALL FOOTING DOWELS ARE TO HAVE A FULL TENSION LAP SPLICE WITH THE WALL STEEL UNLESS NOTED OTHERWISE.
   M. PIER REINFORCEMENT SHALL BE DOWELED TO THE FOOTING. PROVIDE DOWELS EQUAL IN SIZE, NUMBER AND GRADE TO THE PIER REINFORCEMENT UNLESS OTHERWISE INDICATED. DOWELS SHALL BE HOOKED 90 DEGREES AT THE BOTTOM LEVEL OF FOOTING REINFORCEMENT. DOWELS SHALL BE LAPPED WITH THE PIER REINFORCEMENT
   N. SPREAD BARS AROUND SMALL OPENINGS AND SLEEVES IN SLABS AND WALLS WHERE POSSIBLE AND WHERE BAR SPACING WILL NOT EXCEED 1.5 TIMES THE NORMAL SPACING. DISCONTINUE BARS AT LARGE OPENINGS WHERE NECESSARY AND PROVIDE AN AREA OF REINFORCEMENT EQUAL TO THE INTERRUPTED REINFORCEMENT DISTRIBUTING ONE-HALF OF THIS REINFORCEMENT EACH SIDE OF THE OPENING (TENSION LAP SPLICED). HOLES LARGER THAN 12 INCHES IN ANY DIRECTION SHALL HAVE (2) #6 X 4'-0" DIAGONAL BARS IN BOTH FACES AT EACH CORNER
   O. ALL REINFORCING SHALL BE HELD SECURELY IN POSITION WITH STANDARD ACCESSORIES IN CONCRETE
   P. NO REINFORCING STEEL SHALL BE FIELD BENT WITHOUT THE APPROVAL OF THE STRUCTURAL ENGINEER. FIELD BENDING OF PLAIN REINFORCEMENT, IF PERMITTED, SHALL BE PERFORMED USING AN APPROVED AND APPROPRIATE SIZED PORTABLE HYDRAULIC DEVICE THAT MAKES ACI STANDARD RADIUS BENDS. NO OTHER FIELD BENDING METHOD SHALL BE PERMITTED.
   Q. WELDING, INCLUDING TACK WELDING, FOR REINFORCING STEEL IS PROHIBITED. WELDING OF REINFORCING STEEL AND HIGH STRENGTH BOLTS, IE. A36, F1554, WILL BE PERMITTED ONLY BY WRITTEN APPROVAL OF THE ENGINEER.
   R. ALL OPENINGS THROUGH WALLS, SLABS OR OTHER STRUCTURAL ELEMENTS NOT DETAILED ON THE STRUCTURAL DRAWINGS MUST BE LOCATED BY THE CONTRACTOR AND SHOWN ON THE APPLICABLE REINFORCING STEEL SHOP DRAWINGS. THE FINAL LOCATION OF ALL OPENINGS MUST BE REVIEWED BY THE ENGINEER BEFORE THE CONCRETE IS POURED.
   S. MODIFICATION AND REPAIR TO EXISTING CONCRETE:

      a. SEE CONCRETE SPECIFICATIONS FOR COMPLETE EXPLANATION.
      b. CONNECTION METHODS:

         1. METHOD A - BONDING TO SATURATED SURFACE
         2. METHOD B - BONDING BY USING BONDING AGENT
         3. METHOD C - DOWELS USING EPOXY BONDING AGENT

CONCRETE - (CONTINUED)

4. FORMWORK

   A. SEE SPECIFICATIONS
   B. CAMBER: PROVIDE CAMBER TO COMPENSATE FOR DISPLACEMENT OF FORMS (SEE ALSO SPECS.) AND TO PROVIDE AS-CAST MEMBER CAMBER AS NOTED ON DRAWINGS.
   C. RUSTICATION STRIPS, CHAMFERS, DRIPS, MISC. EMBEDS, ETC. SEE DRAWINGS AND/OR ARCHITECTURAL DRAWINGS.
   D. PROVIDE 3/4" CHAMFER AT ALL EXPOSED CORNERS OF BEAMS, WALLS ETC. UNLESS OTHERWISE NOTED.
   E. OPENINGS FOR MEP TRADES ARE TO BE INCLUDED IN THE BID. ALL HOLES FOR OTHER TRADES WHICH MUST BE CUT OR FORMED AND WHICH ARE NOT SHOWN ON THE STRUCTURAL DESIGN DRAWINGS SHALL BE SUBMITTED TO THE STRUCTURAL ENGINEER FOR REVIEW AND APPROVAL. ANY STRENGTHENING OR ADDITIONAL REINFORCEMENT REQUIRED SHALL BE FURNISHED BY THE CONTRACTOR WITHOUT ADDITIONAL COST TO THE OWNER.

5. CONCRETE FINISHES: SEE SPECIFICATIONS

   A. FORMED SURFACES:

      a. EXPOSED TO VIEW: RUBBED FINISH
      b. COVERED OR AS NOTED ON PLANS: AS-CAST (PATCH TIE HOLES, SEE SPECS)

   B. FLATWORK:

      a. EXPOSED TO VIEW: TROWELED
      b. STAIRS OR RAMPS: BROOMED
      c. TOP SLABS, SIDEWALKS, DRIVEWAYS: BROOMED

6. CURING AND PROTECTION: SEE SPECIFICATIONS.

7. SEE THE MECHANICAL, ELECTRICAL AND SUPPLIERS DRAWINGS AND THE SPECIFICATIONS FOR THE LOCATIONS OF SPECIAL ANCHORS, CHAMFERS, SLEEVES, PIPES, CONDUITS AND OTHER DETAILS NOT SHOWN ON THE STRUCTURAL DRAWINGS.

8. EMBEDDED PIPES OR CONDUIT. MAXIMUM DIAMETER ONE THIRD x SLAB OR WALL THICKNESS, SPACED MINIMUM OF 3 TIMES DIAMETER ON CENTER. ALL EMBEDDED PIPES OR CONDUITS SHALL BE APPROVED BY ENGINEER OF RECORD PRIOR TO INSTALLING

9. SIZE AND LOCATION OF EQUIPMENT PADS AND ANCHOR BOLTS SHALL BE AS REQUIRED BY THE EQUIPMENT MANUFACTURER. ALL CONDUIT PLACED IN SLAB SHALL BE APPROVED BY STRUCTURAL ENGINEER OF RECORD PRIOR TO INSTALLING CONDUIT AND POURING SLAB.

10. ANY CONSTRUCTION JOINTS IN STRUCTURES WHERE WATERSTOPS ARE USED SHALL BE PROTECTED BY WATERSTOP UNLESS OTHERWISE NOTED. CONTRACTOR SHALL SUBMIT A CONSTRUCTION JOINT LAYOUT PLAN FOR APPROVAL BY THE ENGINEER OF RECORD PRIOR TO CONSTRUCTION.

11. CONTRACTOR SHALL DESIGN, FURNISH, INSTALL, TEST, OPERATE, MONITOR, AND MAINTAIN A DEWATERING SYSTEM TO CONTROL HYDROSTATIC PRESSURE AND GROUND WATER ENTERING THE EXCAVATION.

12. SUBMITTALS

   A. CONTRACTOR SHALL BE RESPONSIBLE FOR SUBMITTING THE FOLLOWING DOCUMENTS TO THE ENGINEER OF RECORD:

      a. CONCRETE MIX DESIGN
      b. CONCRETE REINFORCING DRAWINGS

CONCRETE POST-INSTALLED ANCHORS

1. MECHANICAL (TORQUE-CONTROLLED) ANCHORS

   A. APPROVED SYSTEMS INCLUDE HILTI KWIK BOLT TZ (ICC ESR 1917) OR HILTI KWIK HUS-EZ (ICC ESR 3027) OR EQUAL CONSIDERING LOAD RESISTANCE. MECHANICAL ANCHORS SHALL BE APPROVED FOR USE WITH CRACKED CONCRETE PER AC 193. CURRENT ICC-ESR SHALL BE SUBMITTED. ALL PERSONNEL INSTALLING ANCHORS SHALL BE TRAINED BY THE MANUFACTURER ON PROPER INSTALLATION TECHNIQUE. TRAINING DOCUMENTATION FROM THE MANUFACTURER SHALL BE AVAILABLE ON REQUEST

2. ADHESIVE ANCHORS

   A. APPROVED SYSTEMS INCLUDE HILTI HIT-RE 500 V3 (ICC ESR 3814) OR HILTI HIT-HY 200 ADHESIVE WITH HAS/HIT-V THREADED ROD WITH SAFESET TECHNOLOGY (ICC ESR 3187) OR EQUAL CONSIDERING LOAD RESISTANCE, IN-SERVICE AND INSTALLATION TEMPERATURE, AVAILABILITY OR COMPREHENSIVE INSTALLATION INSTRUCTIONS, AND CREEP. ADHESIVE ANCHORS SHALL BE APPROVED FOR USE WITH CRACKED CONCRETE PER AC 308. CURRENT ICC-ESR SHALL BE SUBMITTED.
   B. ALL PERSONNEL INSTALLING ANCHORS SHALL BE TRAINED BY THE MANUFACTURER ON PROPER INSTALLATION TECHNIQUE. TRAINING DOCUMENTATION FROM THE MANUFACTURER SHALL BE AVAILABLE ON REQUEST.
   C. HOLE SIZES AND INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS (MPII)
   D. ADHESIVE FOR REBAR AND ANCHORS SHALL HAVE BEEN TESTED IN ACCORDANCE WITH ACI 355.4 AND ICC-ES AC308 FOR CRACKED CONCRETE AND SEISMIC APPLICATIONS. DESIGN ADHESIVE BOND STRENGTH SHALL BE BASED ON ACI 355.4 TEMPERATURE CATEGORY C WITH INSTALLATIONS INTO DRY HOLES DRILLED USING A CARBIDE DRILL BIT INTO CONCRETE THAT HAS BEEN CURED FOR AT LEAST 21 DAYS.
   E. ANY ADHESIVE ANCHOR INSTALLED HORIZONTALLY OR IN A VERTICALLY INCLINED PLANE SHALL BE INSTALLED BY CERTIFIED ADHESIVE ANCHOR INSTALLER, PER ACI 318-19 17.8.2.2, AND SHALL BE INSPECTED PER ACI 318-19 17.8.2.4.
   F. FILL IN ALL ABANDONED HOLES WITHIN 2" OF NEW ANCHOR LOCATIONS.
   G. WHERE REQUIRED, A PROGRAM FOR ON-SITE PROOF LOADING, THAT IS, PROOF LOADING PROGRAM, TO BE CONDUCTED AS PART OF THE SPECIAL INSPECTION AND SHALL BE ESTABLISHED BY THE ENGINEER OR DESIGN PROFESSIONAL OF RECORD AND SHALL CONFORM TO THE FOLLOWING MINIMUM REQUIREMENTS:

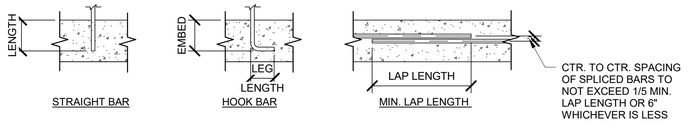
      a. FREQUENCY OF PROOF LOADING BASED ON ANCHOR TYPE, DIAMETER, AND EMBEDMENT.
      b. PROOF LOADS BY ANCHOR TYPE, DIAMETER, EMBEDMENT, AND LOCATION.
      c. ACCEPTABLE DISPLACEMENTS AT PROOF LOAD.
      d. REMEDIAL ACTION IN THE EVENT OF FAILURE TO ACHIEVE PROOF LOAD OR EXCESSIVE DISPLACEMENT.

      UNLESS OTHERWISE DIRECTED BY THE ENGINEER OR DESIGN PROFESSIONAL OF RECORD, PROOF LOADS SHALL BE APPLIED AS CONFINED TENSION TESTS (4.7.2.3). PROOF LOADS LEVELS SHALL NOT EXCEED THE LESSER OF 50 PERCENT OF THE EXPECTED PEAK LOAD BASED ON ADHESIVE BOND STRENGTH, OR 80 PERCENT OF THE ANCHOR YIELD STRENGTH. MAINTAIN THE PROOF LOAD AT THE REQUIRED LOAD LEVEL FOR A MINIMUM OF 10 SECONDS.

3. EQUIPMENT ANCHORS:
   A. SIZE, LENGTH, AND LOCATION OF EQUIPMENT ANCHORS SHALL BE PROVIDED BY EQUIPMENT MANUFACTURER.

TENSION DEVELOPMENT / LAP SPLICE SCHEDULE (UNCOATED BARS)

BAR SIZE	DEVELOPMENT / LAP SPLICE LENGTH IN CONCRETE (f'c = 4500 PSI)						
	DEVELOPMENT LENGTH (IN)		CLASS 'B' LAP SPLICE LENGTH (IN)		STD 90 DEG. HOOK (IN)		
	BAR TYPE 1	BAR TYPE 2	BAR TYPE 1	BAR TYPE 2	EMBED	LEG LENGTH	BEND DIA.
4	18	27	24	35	9	8	3
5	23	34	30	44	12	10	3 3/4
6	27	41	35	53	14	12	4 1/2
7	40	59	51	77	16	14	5 1/4
8	45	67	59	88	18	16	6
9	51	76	66	99	21	20	9 1/2
10	57	86	74	111	23	22	10 1/4



STRAIGHT BAR | HOOK BAR | MIN. LAP LENGTH

BAR TYPE 1 - CLEAR SPACING OF BARS BEING DEVELOPED OR SPLICED NOT LESS THAN Db, CLEAR COVER NOT LESS THAN Db, AND STIRRUPS OR TIES THROUGHOUT Ld NOT LESS THAN CODE MINIMUM

OR

CLEAR SPACING OF BARS BEING DEVELOPED OR SPLICED NOT LESS THAN 2*Db AND CLEAR COVER NOT LESS THAN Db.

BAR TYPE 2 - TOP BARS WITH MORE THAN 12" OF FRESH CONCRETE CAST BELOW **AND** OTHER CASES

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RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

STRUCTURAL GENERAL NOTES

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TAHA LOTIA, P.E.	
SHEET NO. 50 OF 125	

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PLAN NOTES:

1. SEE SHEETS 49 THROUGH 50 FOR GENERAL NOTES AND DESIGN CRITERIA.
2. REFER TO CIVIL FOR STRUCTURE LOCATION, FINAL ELEVATIONS, AND ORIENTATION ON SITE.
3. COORDINATE ALL PIPE LOCATIONS, PENETRATIONS, AND ELEVATIONS WITH PROCESS, MECHANICAL, AND CIVIL DRAWINGS.
4. PROVIDE ADDITIONAL REINFORCEMENT AROUND CONCRETE OPENINGS PER TYPICAL DETAIL 1 / 53 .
5. ALUMINUM ACCESS HATCHES SHALL BE FLOODTIGHT, RATED FOR 625 PSF MINIMUM UNIFORM LIVE LOAD (10 FT HEAD OF WATER), AND INCLUDE SAFETY GRATING. CONTRACTOR SHALL CONFIRM SIZE AND LOCATION OF ACCESS HATCH OPENINGS ACCORDING TO THE SELECTED HATCH AND PUMP MANUFACTURERS' REQUIREMENTS. REFER TO SPEC "08310 - ACCESS HATCHES" FOR ADDITIONAL REQUIREMENTS.
6. WALLS MAY BE BACKFILLED AND LEAK TEST PERFORMED PRIOR TO CONSTRUCTION OF TOP SLAB.

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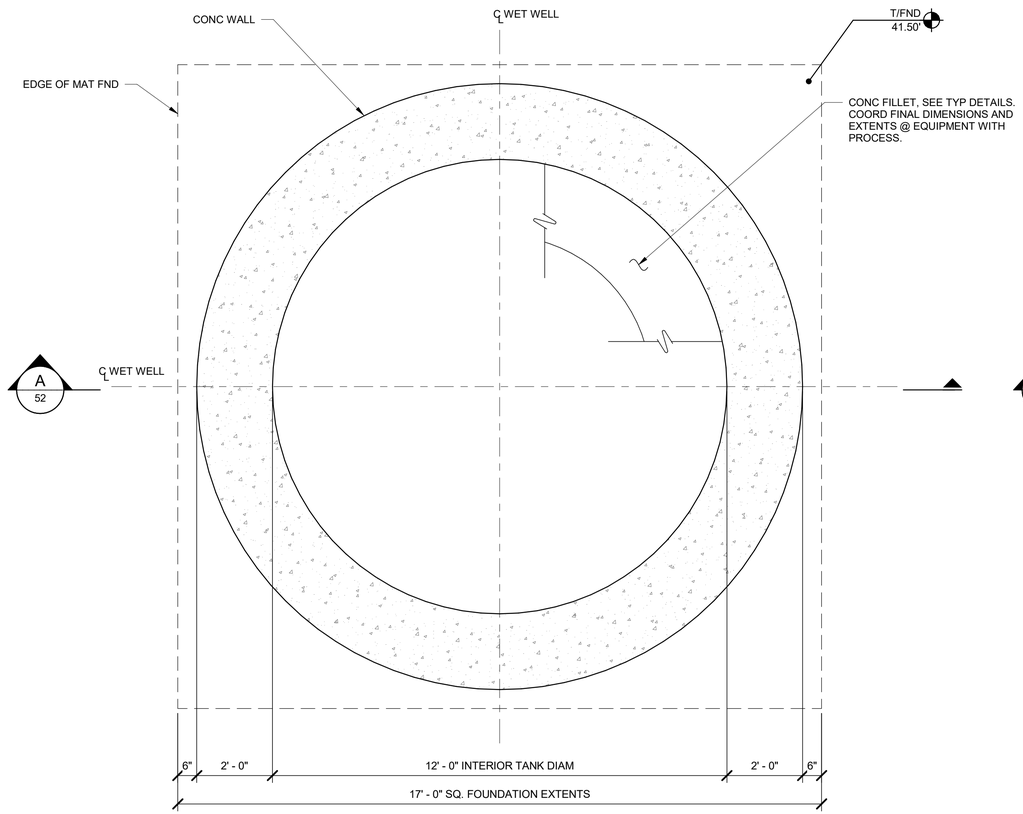
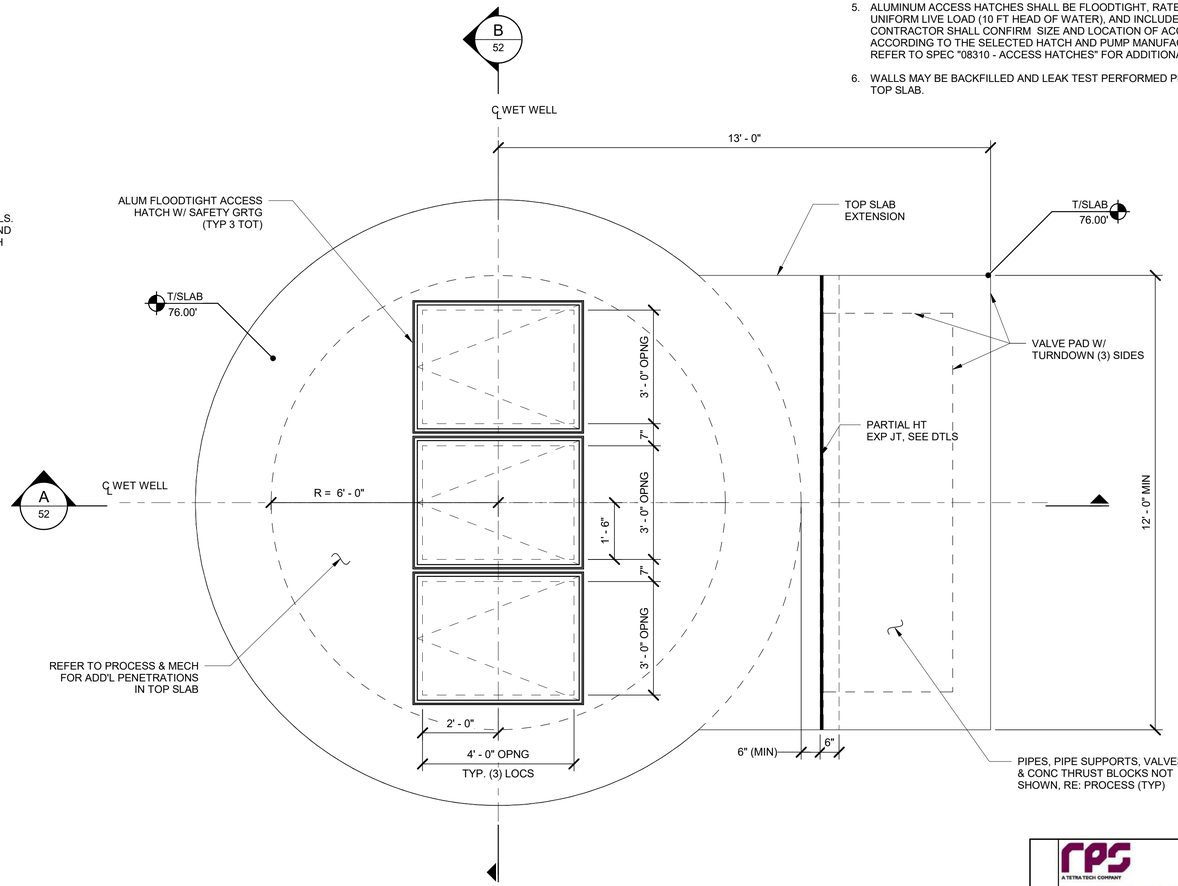


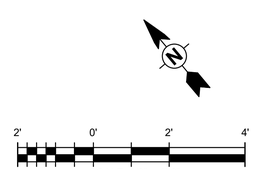
LAKE VILLAGE FND PLAN

SCALE: 1/2" = 1'-0"



LAKE VILLAGE TOP SLAB PLAN

SCALE: 1/2" = 1'-0"



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LAKE VILLAGE LS STRUCTURAL PLANS

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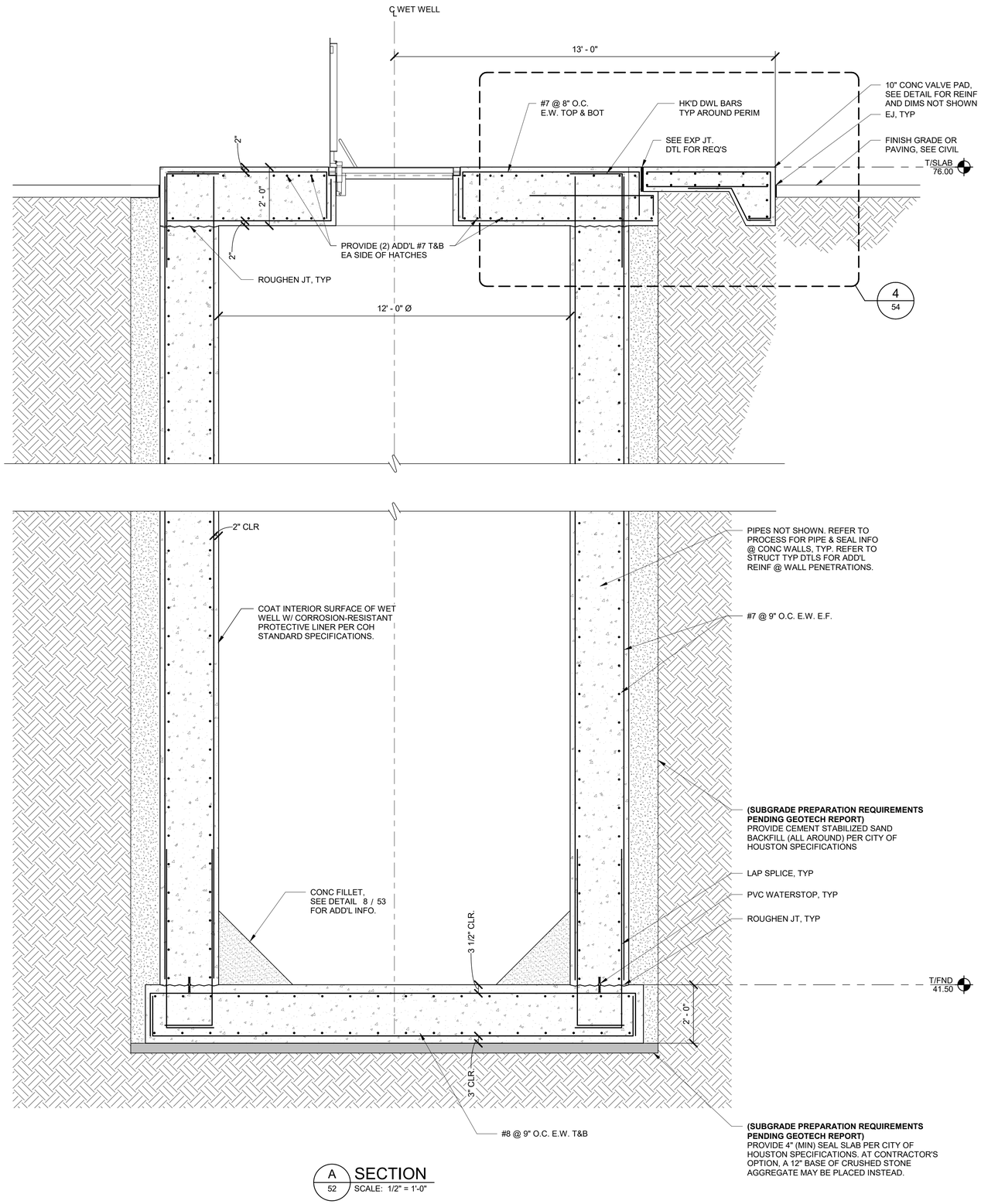

A 52 SECTION
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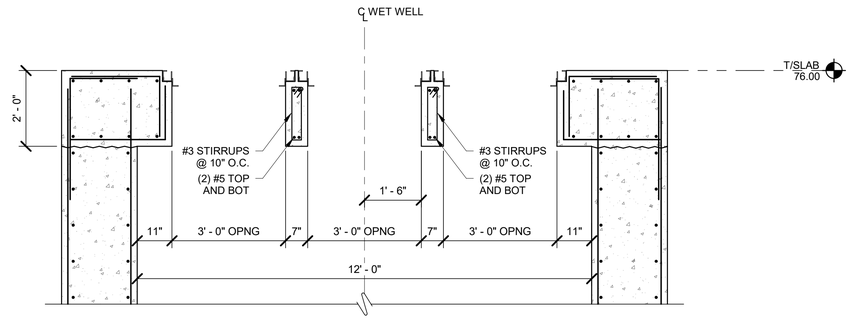

B 52 SECTION
SCALE: 1/2" = 1'-0"

2' 0' 2' 4'
SCALE: 1/2" = 1'-0"

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LAKE VILLAGE LS STRUCTURAL SECTIONS

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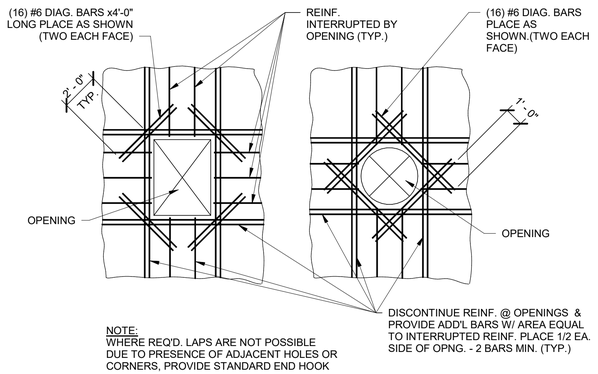

1 / 53 REINF. STEEL @ OPENING
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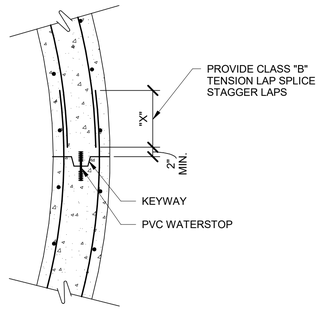
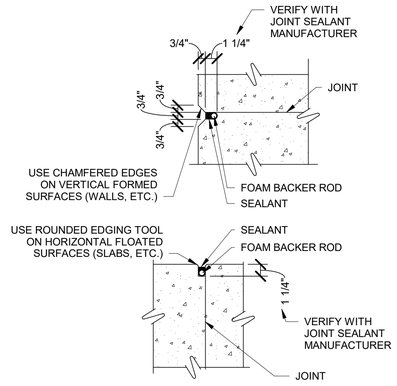


2 / 53 WALL JOINT
SCALE: NTS



3 / 53 CONTROL JOINT SEALANT
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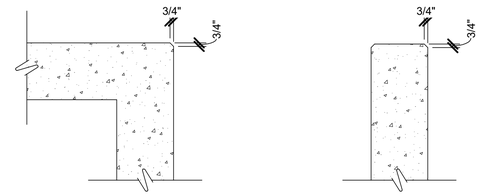

4 / 53 CHAMFER DETAILS
SCALE: NTS

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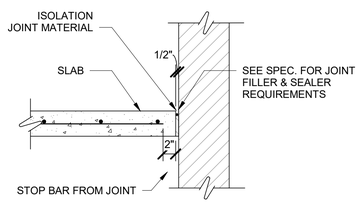
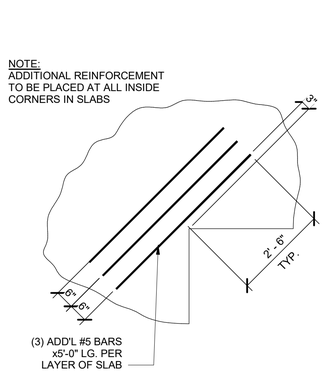
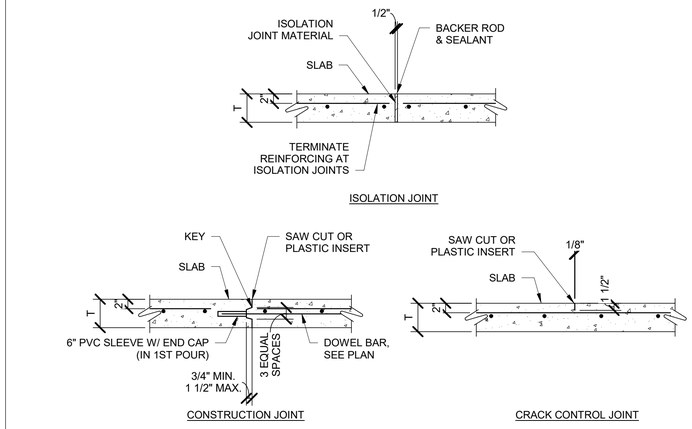


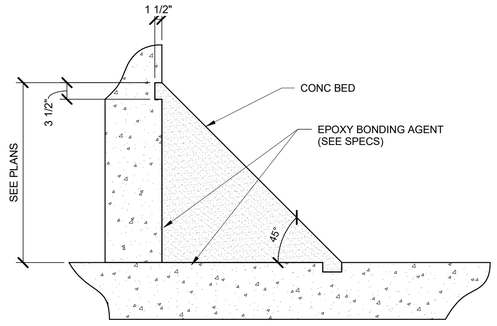
5 / 53 SLAB TO WALL ISOLATION JOINT
SCALE: NTS



6 / 53 REINF. SLAB RE-ENTRANT CORNER
SCALE: NTS



7 / 53 TYP. REINF SLAB DETAILS
SCALE: NTS



8 / 53 CONCRETE FILLET DETAIL
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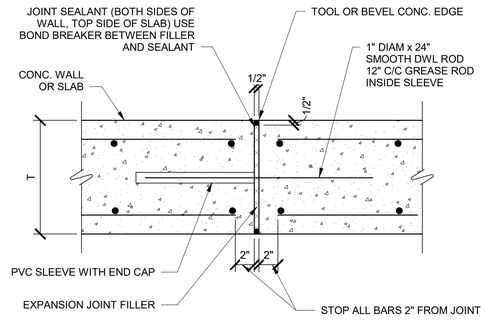
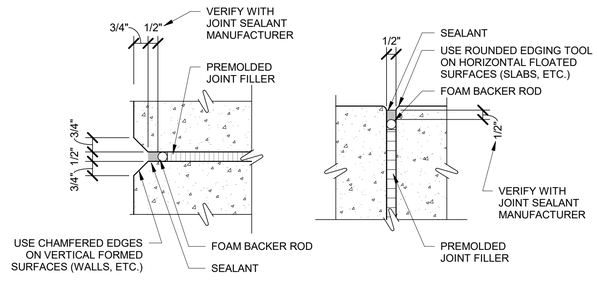


9 / 53 EXPANSION JOINT
SCALE: NTS



10 / 53 EXPANSION JOINT SEALANT DETAIL
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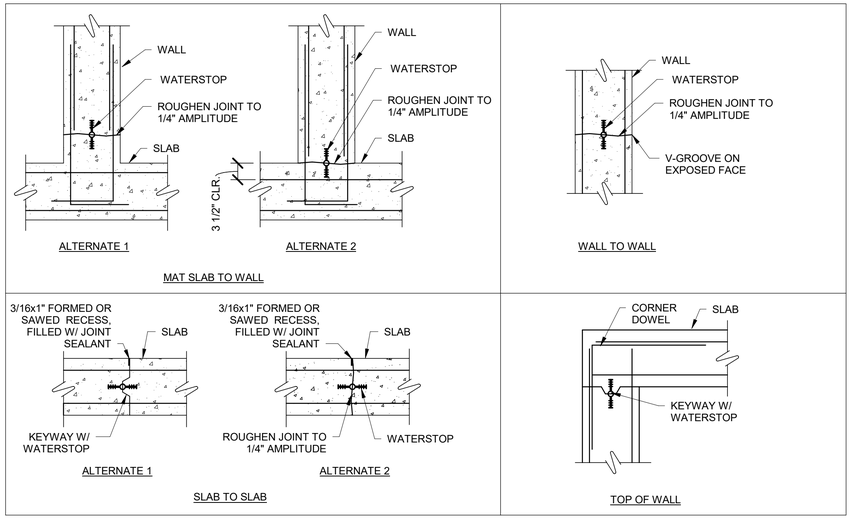
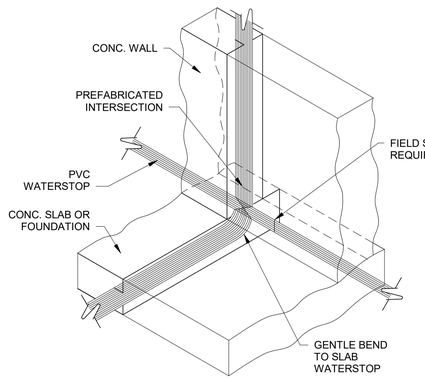


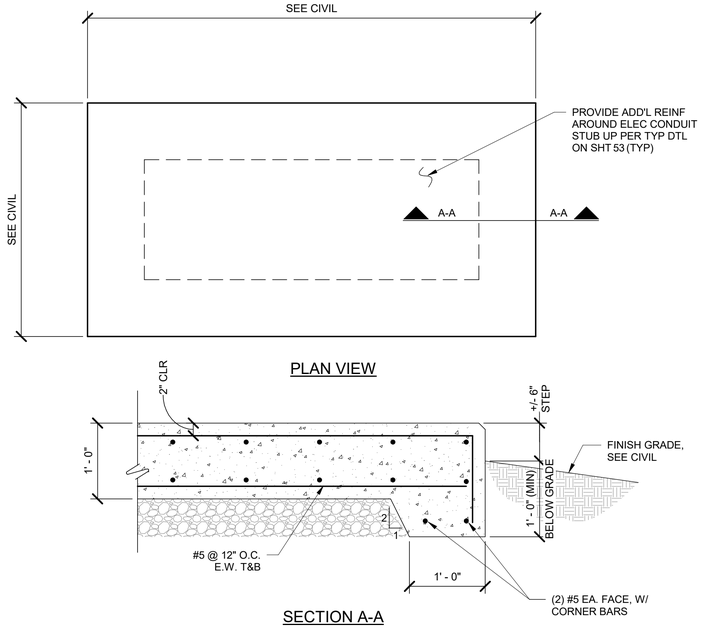
WATERTIGHT CONSTRUCTION JOINTS
6"x3/8" PVC WATERSTOP (SIKA GREEN STREAK PROFILE NO. 732) SHALL BE USED ALL LOCATIONS.

1 WATERSTOP CONSTRUCTION JOINTS
54 SCALE: NTS



TYP. WATERSTOP AT SLAB AND WALL

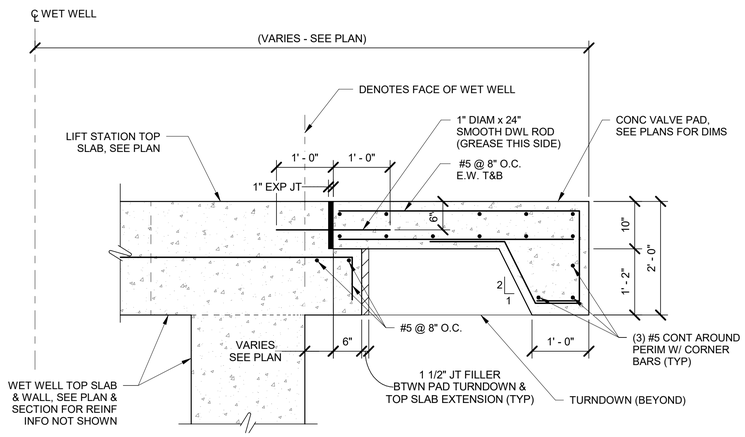
2 WATERSTOP AT SLAB & WALL
54 SCALE: NTS



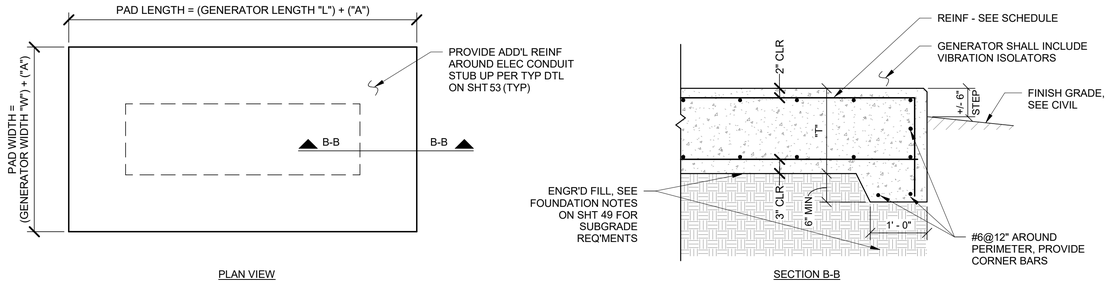
NOTES:
1. SEE CIVIL FOR PAD SIZES, LOCATIONS, ELEVATIONS, AND SLOPE REQUIREMENTS.
2. COORDINATE EQUIPMENT REQUIREMENTS WITH MECHANICAL AND ELECTRICAL.
3. PROVIDE A BROOM FINISH TO TOP CONCRETE SURFACE.
4. THIS DETAIL SHALL NOT BE USED FOR GENERATORS - SEE OTHER DETAIL THIS SHEET.

3 TYPICAL EQUIPMENT PAD DETAIL (NON-GENERATOR)
54 SCALE: NTS

NO.	DATE	REVISION	APP.



4 TYP NEW VALVE PAD DTL @ NEW WET WELL
54 SCALE: NTS



NOTES:
1. SEE CIVIL FOR PAD LOCATION ON SITE.
2. COORDINATE PAD WIDTH AND LENGTH WITH GENERATOR MFR AND CONTRACT DRAWINGS. PROVIDE SCHEDULED CLEARANCE AROUND THE PERIMETER BETWEEN THE OUTSIDE EDGE OF PAD AND OUTERMOST PORTION OF GENERATOR.
3. COORDINATE SIZE AND LOCATION OF REQ'D OPENINGS W/ GENERATOR MFR.
4. PROVIDE A BROOM FINISH TO TOP CONCRETE SURFACE.
5. ANCHOR GENERATOR TO CONC PER MFR RECOMMENDATIONS.
6. COORD DRAIN AND CONC SLOPE REQUIREMENTS

GENERATOR PAD SCHEDULE

SITE LOCATION	"A"	"W"	"L"	"T"	REINFORCEMENT	MODEL	MAX OPERATING WEIGHT
LAKE VILLAGE	2'-8"	3'-4"	11'-4"	1'-6"	#6 @ 10" EW, T&B	-	3,500 LB
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-

5 TYPICAL GENERATOR PAD DETAIL
54 SCALE: NTS

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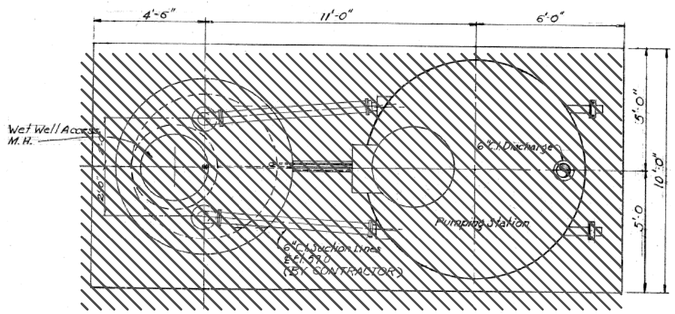
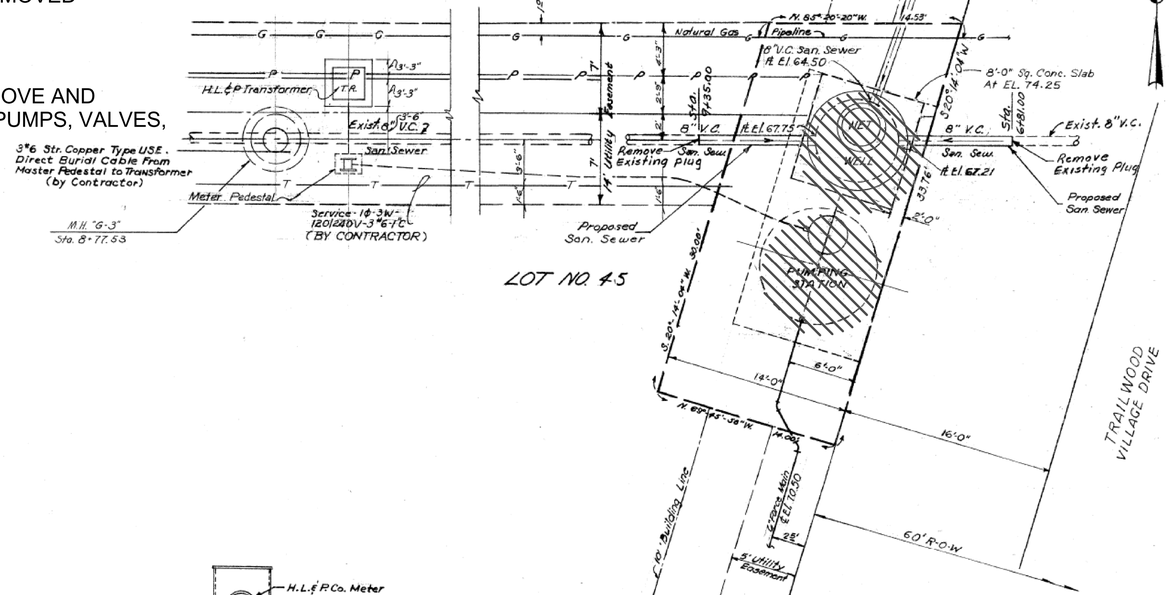
-ITEMS TO BE REMOVED

NOTES:

1. CONTRACTOR TO REMOVE AND SALVAGE ALL EXISTING PUMPS, VALVES, AND APPURTENANCES

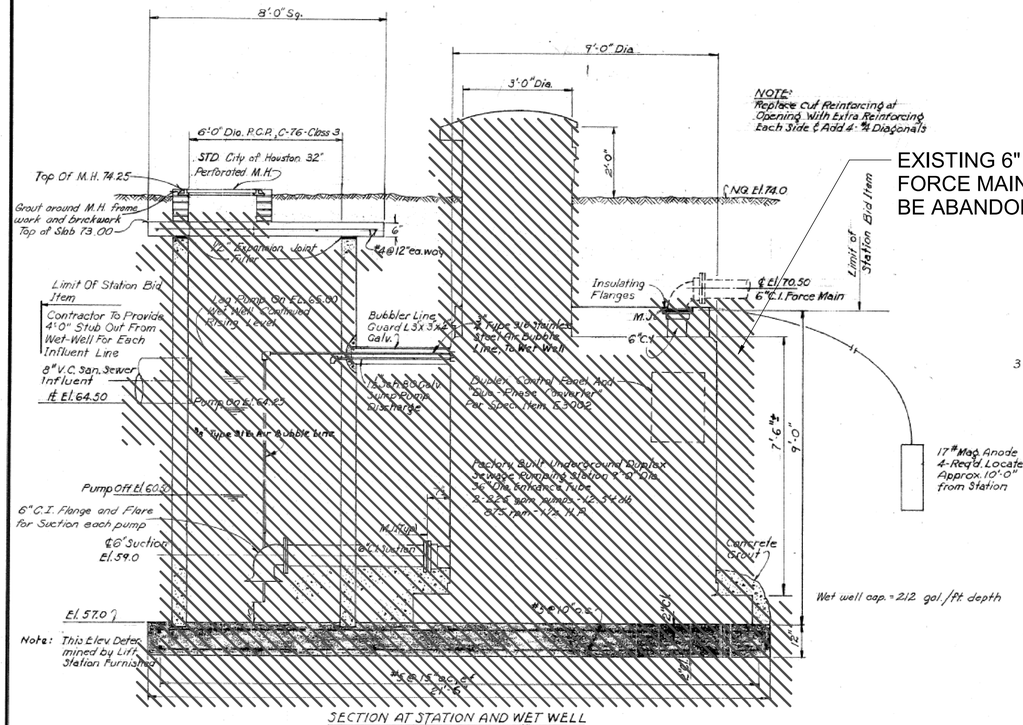


PLAN ON SLAB AT EL 57.0
Scale: 3/8"=1'-0"



LIFT STATION PLOT PLAN
1" = 5'-0"

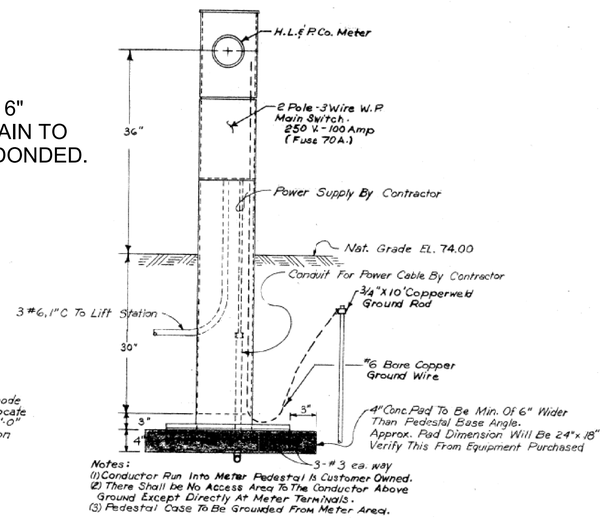
NOTE:
ALL External C.I. Pipe To Be ASA A21.10 Cast Iron Pipe, Thickness Class 22, MJ. Connections.



NOTE:
Replace Cut Reinforcing at Opening With Extra Reinforcing Each Side & Add 4-#4 Diagonals

EXISTING 6" FORCE MAIN TO BE ABANDONDED.

SECTION AT STATION AND WET WELL
N.T.S.



Notes:
(1) Conductor Run Into Meter Pedestal Is Customer Owned.
(2) There Shall be No Access Area To The Conductor Above Ground Except Directly At Meter Terminals.
(3) Pedestal Case To Be Grounded From Meter Area.

SELF STANDING METER PEDESTAL
H.L.&P.CO. STANDARD
As M'frd. By DUNCAN OR Milbank
Hot Dip. Galv.
(BY CONTRACTOR)

8' 0' 8' 16'
SCALE: 1/8" = 1'-0"

NO.	DATE	REVISION	APP.

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

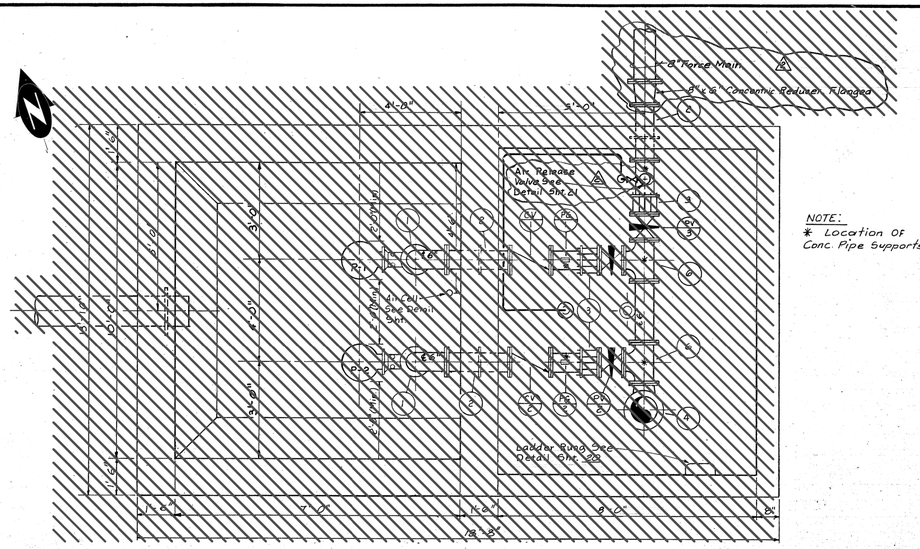
RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

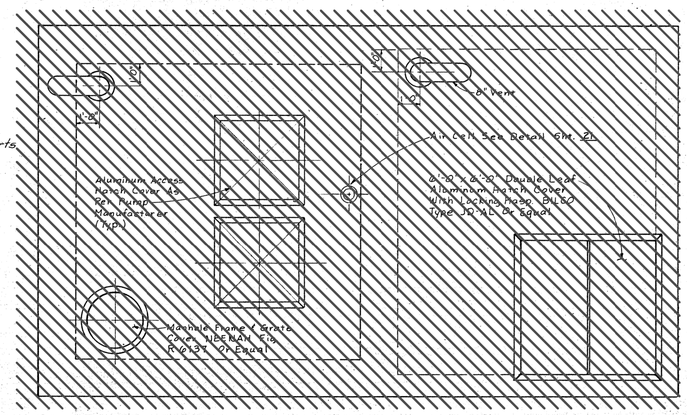
TRAILWOOD LIFT STATION DEMOLITION
PLAN

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 55 OF 125	

PLOT STYLE:
PLOTTED: 2/13/2026 1:35:35 PM
Autodesk Docs://200-317106-24001 COH LS Rehab Design/D-LIFT STATIONS-200-317106-24001_v25.rvt

NO	DATE	REVISION	APP.





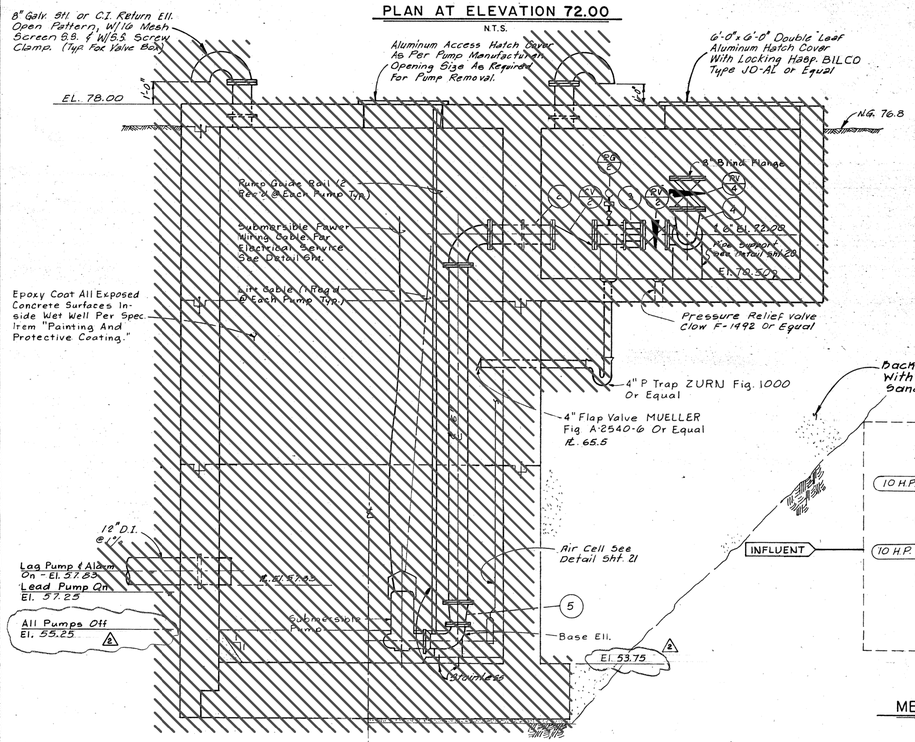
MECHANICAL NOTES:

1. Furnish and install Duplex Pump System as shown on PLANS per specification "Lift Station Submersible Nonclog Pumps." Pump Units to be identical performance and dimensions, each rated as follows:

   Flow: 430 GPM. Static Head 16.75' (Max.)
   TDH: 44' 14.75' (Min.)
   Speed: 1750 RPM
   HP: 10
   Power: 230/460 VAC, 3 Phase, 60 Hz

2. Pumps shown on PLANS are Flygt 4" H.H. CP 3127. If other pumps are approved, contractor to adapt piping to suit pumps. (No separate pay)
3. Contractor to use Pump Manufacturer's Approved Certified Shop Drawings to finalize Lift Station arrangement.
4. Wet Well capacity is 523.6 gallons per foot.
5. All Lift Station Piping to be Flanged Ductile Iron, Fittings to be Flanged Ductile Iron, Short Body as per specification "Cast Iron and Ductile Iron Pipe and Fittings," unless otherwise noted.
6. All piping in Wet Well, Surface Preparation and Seal Coat to be as per specification "Painting and Protective Coating" paragraph 3.03C. Finish Coat as per specification "Painting and Protective Coating."
7. Make Buried Flanged Connections with Epoxy Coated Nuts, Bolts and Washers. (No separate pay)
8. Polyethylene wrap and sand enclose Ductile Iron Lines outside structure. (No separate pay)
9. All Bends will have Lateral or Bottom Concrete Thrust Blocking poured in place against the undisturbed portion of excavation surface.
10. Discharge Piping service pressure is 75 PSI.
11. Contractor to provide hasp for locks on Lift Station Access Panels and Electrical Control Boxes; Owner will furnish locks and keys.
12. Extend reinforcing where Slab is continuous.
13. See Sheet 20 for Structural Notes.
14. Contractor to provide temporary construction plug on influent and discharge piping if Sanitary Sewer and Force Main construction is not concurrent with Lift Station construction. Otherwise make connection. (No separate pay)

PLAN AT ELEVATION 72.00
N.T.S.



SECTIONAL ELEVATION
N.T.S.

PLAN AT ELEVATION 78.00
N.T.S.

VALVE AND FITTING SCHEDULE

MARK	ITEM	MANUFACTURER/REMARKS
CV	Check Valve	Flanged with Outside Lever & Weight
PV	Plug Valve	Flanged; Handwheel Operator
PG	Pressure Gauge Assemply	See Detail Sheet 21
1	90° Long Radius Ell. (6")	Flanged
2	Wall Pipe (6")	Flanged/Flanged with Wall Collar
3	Flexible Coupling (6")	Rockwell Smith-Blair Type 912 with Anchor Studs
4	90° Reducing Base Ell. (8"x6")	Flanged
5	Concentric Reducer (6"x4")	Flanged
6	Tee (6")	Flanged

EQUAL SIZE PUMPS AND INDIVIDUAL PUMP PIPING LINES' PUMPS INFORMATION AND APPROVAL CONDITION TABLE

Single Pump Data with 1 Pump Operation Single Speed Pumps	
Min. GPM (C=100) Per Pump	365
Max. GPM (C-140) Per Pump	575
TDH (C=100)	48.5
TDH (C=140) ⚠2	40.0
Static Head	16.75
R.P.M.	1750
Max. H.P.	10

MECHANICAL SCHEMATIC
N.T.S.

▨ -ITEMS TO BE REMOVED

NOTES:

1. CONTRACTOR TO REMOVE AND SALVAGE ALL EXISTING PUMPS, VALVES, AND APPURTENANCES

8' 0' 8' 16'
SCALE: 1/8" = 1'-0"

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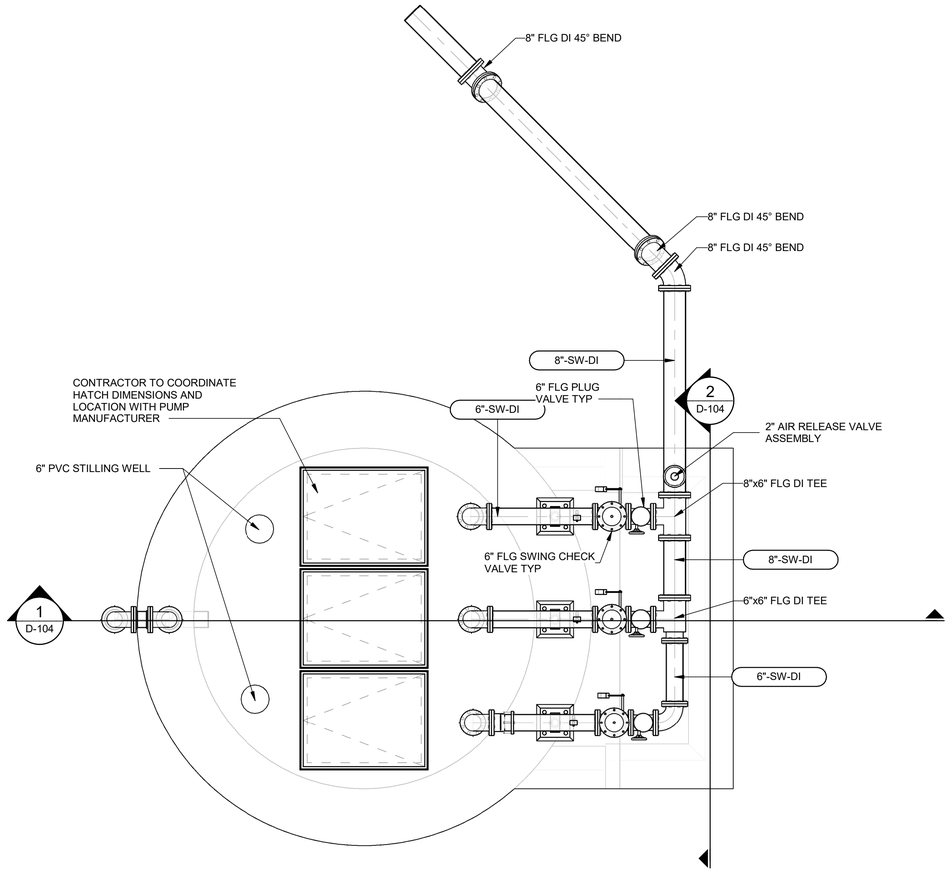
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

LAKE VILLAGE LIFT STATION DEMOLITION PLAN

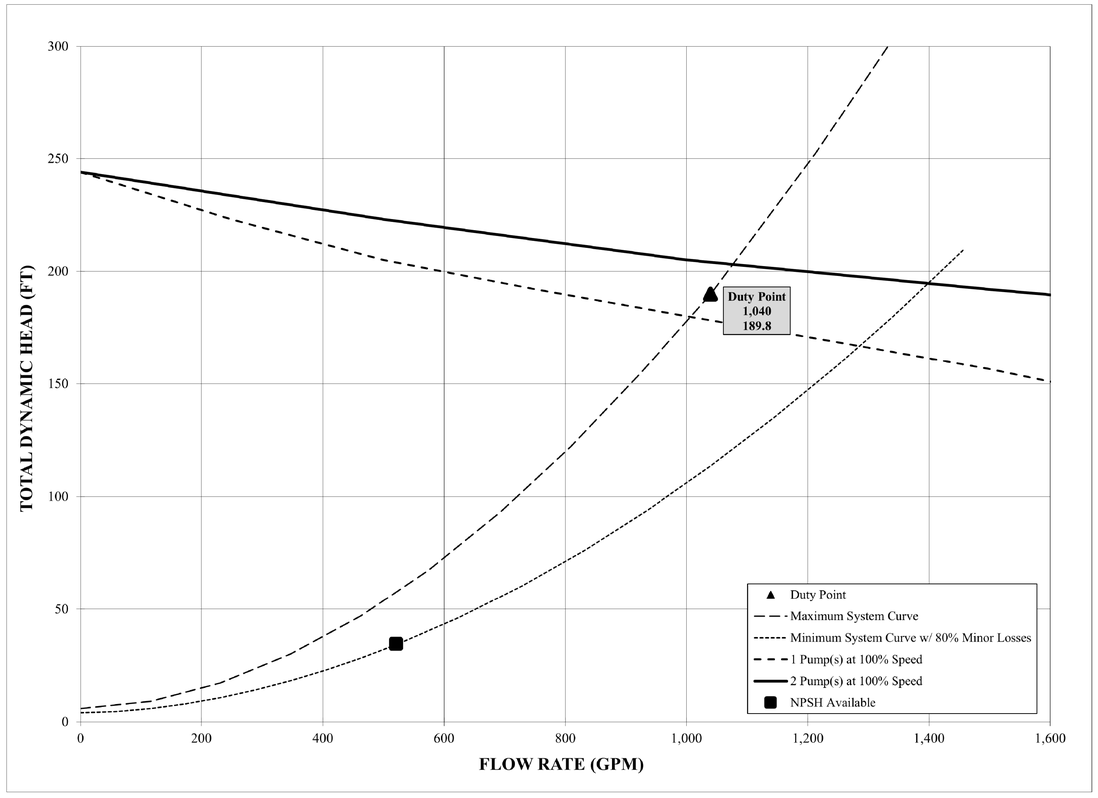
WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 56 OF 125	

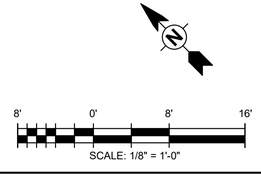
NOTES:
1. SEE DETAIL AND STRUCTURAL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOW.
2. ALL PIPING TO BE FLANGED, NO FLANGED COUPLING ADAPTERS OR VICTAULIC STYLE COUPLINGS PERMITTED.
3. DIMENSIONS NOTED ARE RELATIVE TO THE PUMP SIZE AND MANUFACTURER SELECTED. CONTRACTOR SHALL VERIFY.
4. INSTALL PLUG VALVES TO OPEN UPWARD AND CLOSE TO A SEATED POSITION.
5. INSTALL CHECK VALVES SO THAT THE WEIGHT LEVER POSITION IS APPROXIMATELY 45 DEGREES BELOW THE VALVE HORIZONTAL CENTER LINE IN THE CLOSED POSITION; AND APPROXIMATELY 45 DEGREES ABOVE THE VALVE HORIZONTAL CENTER LINE IN THE FULL OPEN POSITION.
6. LABEL HATCHES WITH THE CORRESPONDING PUMP NUMBER USING A 12-INCH BY 12-INCH 316SS PLATE ENGRAVED WITH 6-INCH LETTERING WELDED TO THE HATCH.



1 LAKE VILLAGE PLAN VIEW
SCALE: 3/8" = 1'-0"

SYSTEM HEAD CURVE NOTES:
1. MAXIMUM SYSTEM CURVE C=140
2. MINIMUM SYSTEM CURVE C=100





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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

LAKE VILLAGE LS PLANS

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 57 OF 125	

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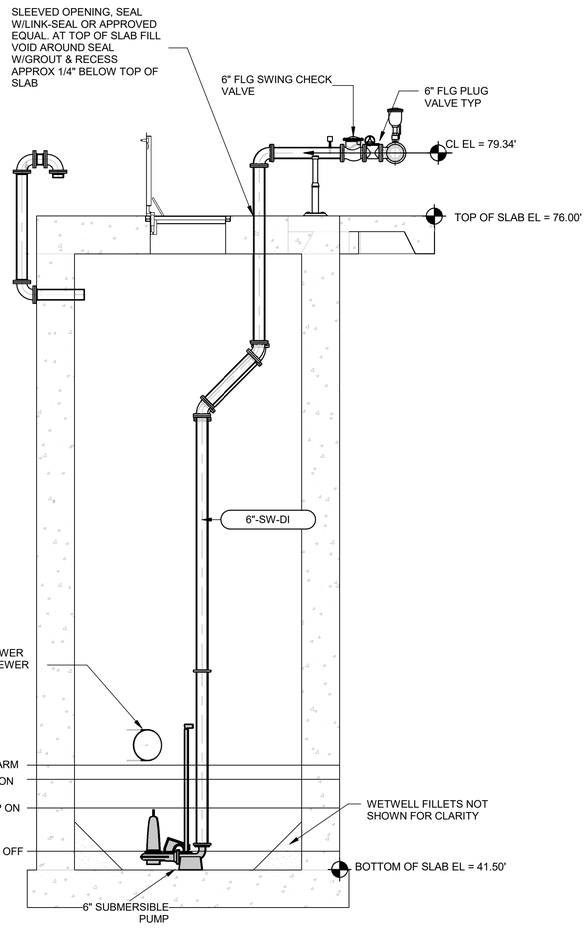
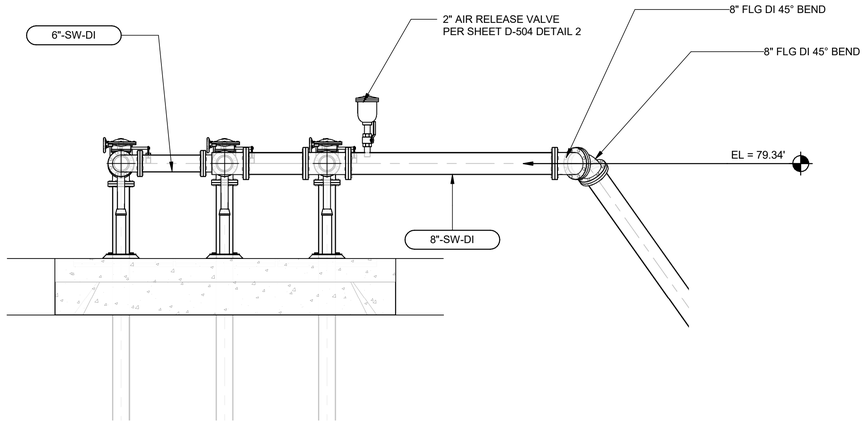


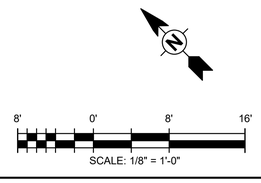
1 Section 1
SCALE: 1/4" = 1'-0"



2 Section 2
SCALE: 3/8" = 1'-0"

RISING LEVEL CYCLE			
WATER LEVEL DEPTH	WATER LEVEL ELEVATION	ACTION	PUMP(S) IN OPERATION
1.00	42.50	PUMPS OFF - NO ACTION	ALL PUMPS OFF
3.26	44.76	LEAD PUMP TURNS ON	LEAD PUMP ON
4.81	46.31	LAG PUMP TURNS ON	LEAD & LAG PUMP ON
5.50	47.00	HIGH WATER LEVEL ALARM ON	HIGH WATER LEVEL ALARM SOUND
FALLING LEVEL CYCLE			
WATER LEVEL DEPTH	WATER LEVEL ELEVATION	ACTION	PUMP(S) IN OPERATION
5.50	47.00	HIGH WATER LEVEL ALARM OFF	LEAD & LAG PUMPS ON
4.81	46.31	LEAD PUMP TURNS OFF	LAG PUMP ON
3.26	44.76	LAG PUMP TURNS OFF	ALL PUMPS STOPPED - STANDBY PUMP SWITCHES TO LEAD PUMP

NOTES:
1. SEE DETAIL AND STRUCTURAL DRAWINGS FOR DIMENSIONS AND INFORMATION NOT SHOWN.
2. ALL PIPING TO BE FLANGED, NO FLANGED COUPLING ADAPTERS OR VICTAULIC STYLE COUPLINGS PERMITTED.
3. DIMENSIONS NOTED ARE RELATIVE TO THE PUMP SIZE AND MANUFACTURER SELECTED. CONTRACTOR SHALL VERIFY.
4. INSTALL PLUG VALVES SO THAT THE WEIGHT LEVER POSITION IS APPROXIMATELY 45 DEGREES BELOW THE VALVE HORIZONTAL CENTER LINE IN THE CLOSED POSITION; AND APPROXIMATELY 45 DEGREES ABOVE THE VALVE HORIZONTAL CENTER LINE IN THE FULL OPEN POSITION.
5. PUMP ANCHOR BOLDS ARE TO BE ADHESIVE TYPE, AND EMBEDDED IN CONCRETE SLAB. CONTRACTOR TO SUBMIT DESIGN OF PUMP ANCHOR BOLDS AND PATTERN, INCLUDING CALCULATIONS, DURING SHOP DRAWING SUBMISSION.



SCALE: 1/8" = 1'-0"

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RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

LAKEVILLAGE LS SECTIONS

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
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DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 58 OF 125	

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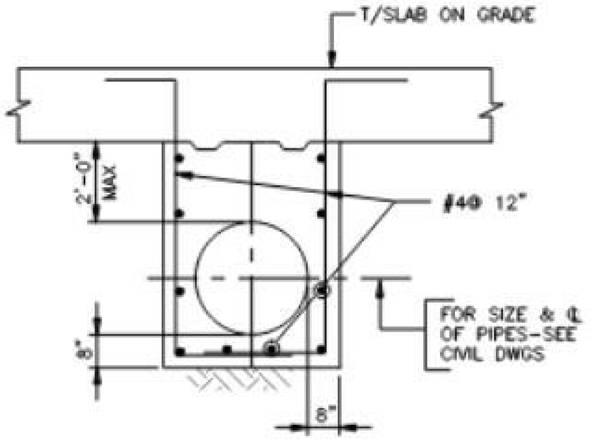
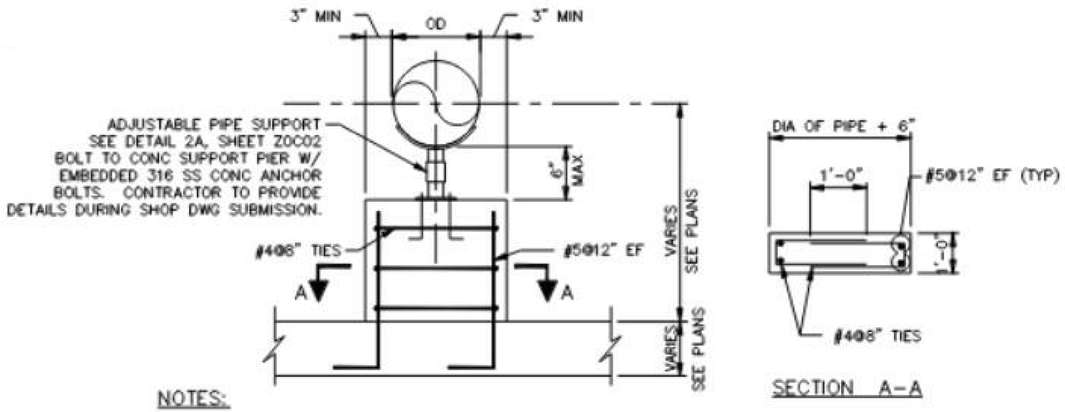


SLAB CONNECTED

1 PIPE ENCASEMENT DETAILS
NTS

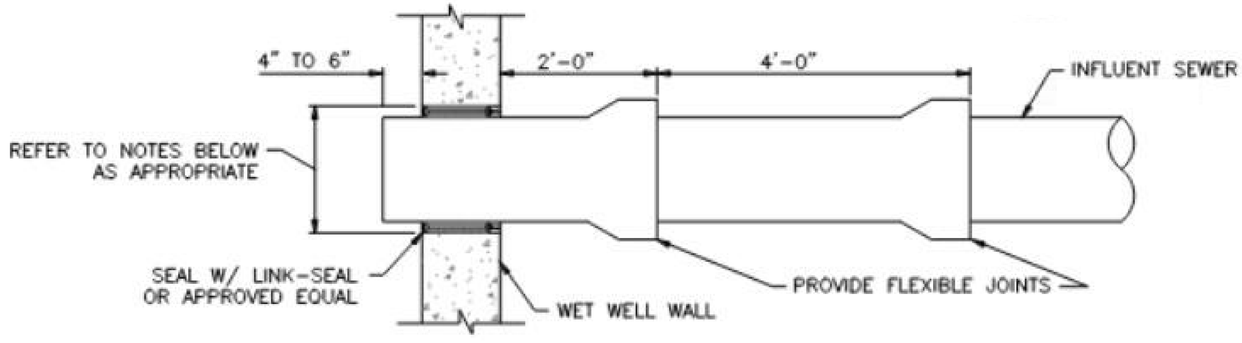


SECTION A-A

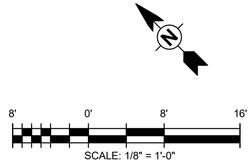
NOTES:

1. CONCRETE SUPPORT PIER IS NOT A THRUST BLOCK AND IS NOT INTENDED TO REPLACE THRUST BLOCK PROVIDED AT OTHER LOCATIONS.
2. PLACE SUPPORT PIER APPROX 9" TO 24" FROM CHECK VALVE, SEE CIVIL DRAWINGS. DO NOT PLACE SUPPORT PIER ON TOP OF EXPANSION JOINT.

2 TYPICAL CONC PIPE SUPPORT PIER DETAIL
NTS



3 TYP INFLUENT SEWER ENTRY DETAIL
NTS



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COH LIFT STATIONS

PROCESS DETAILS (SHEET 1 of 4)

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SHEET NO. 59 OF 125	

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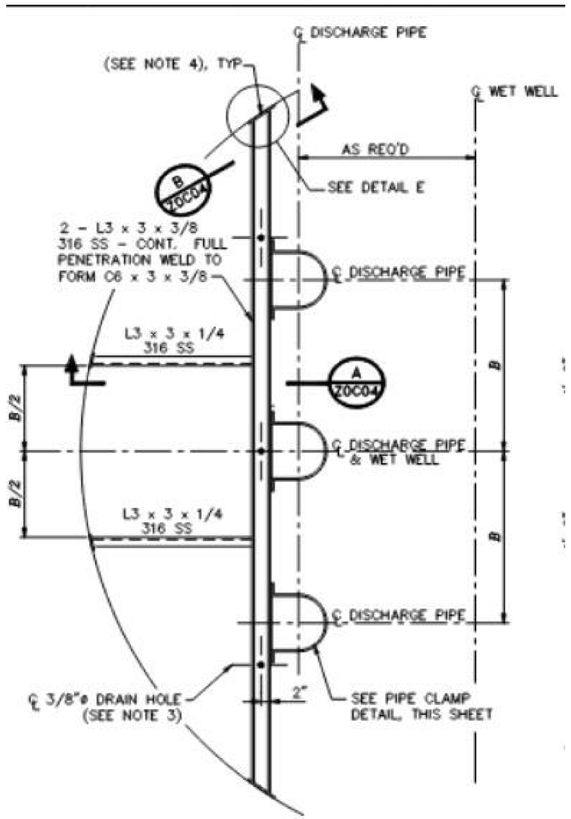
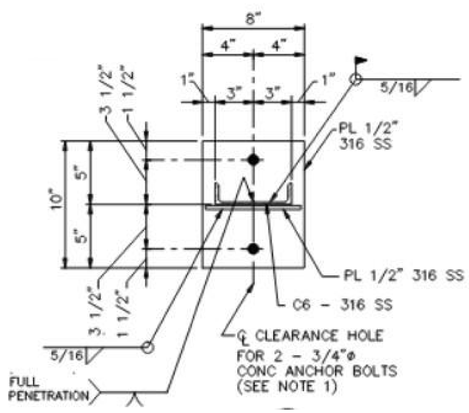
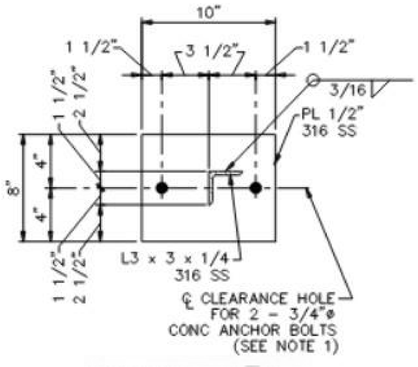


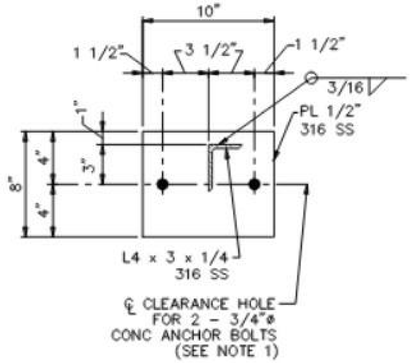
1 TYP DISCHARGE PIPING SUPPLY PLAN FOR 3 PUMPS
NTS



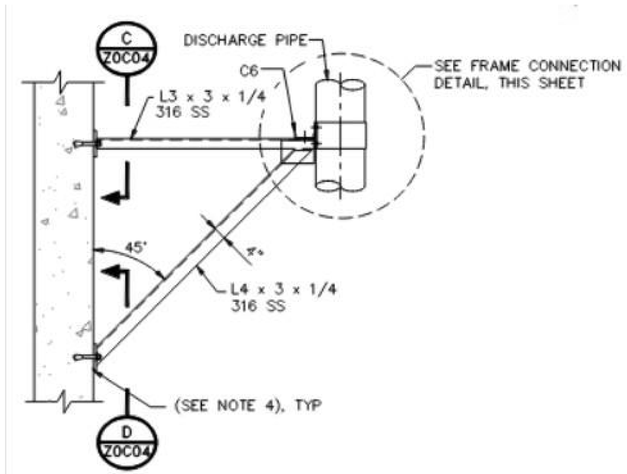
2 SECTION B
NTS



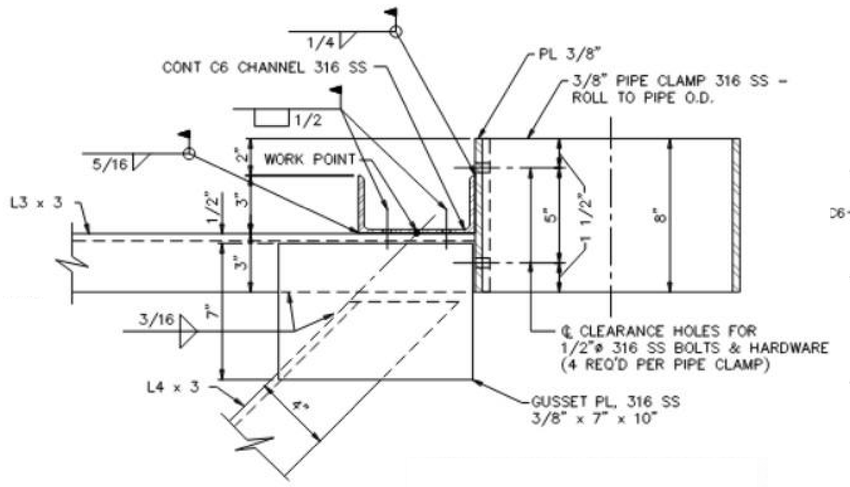
3 SECTION C
NTS



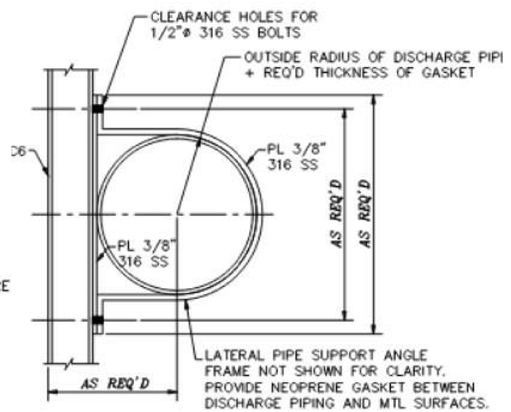
4 SECTION D
NTS



5 TYP LATERAL PIPE SUPPORT FRAME
NTS



6 FRAME CONNECTION DETAIL
NTS



8 PIPE CLAMP DETAIL
NTS

8' 0' 8' 16'
SCALE: 1/8" = 1'-0"

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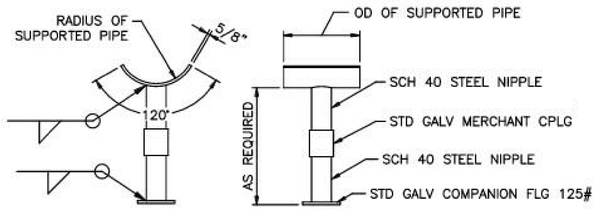
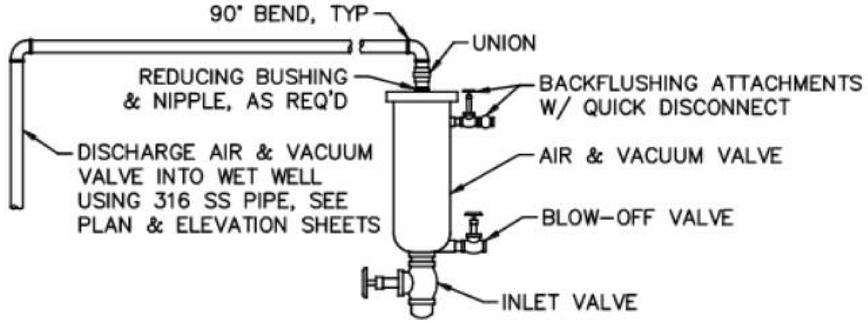
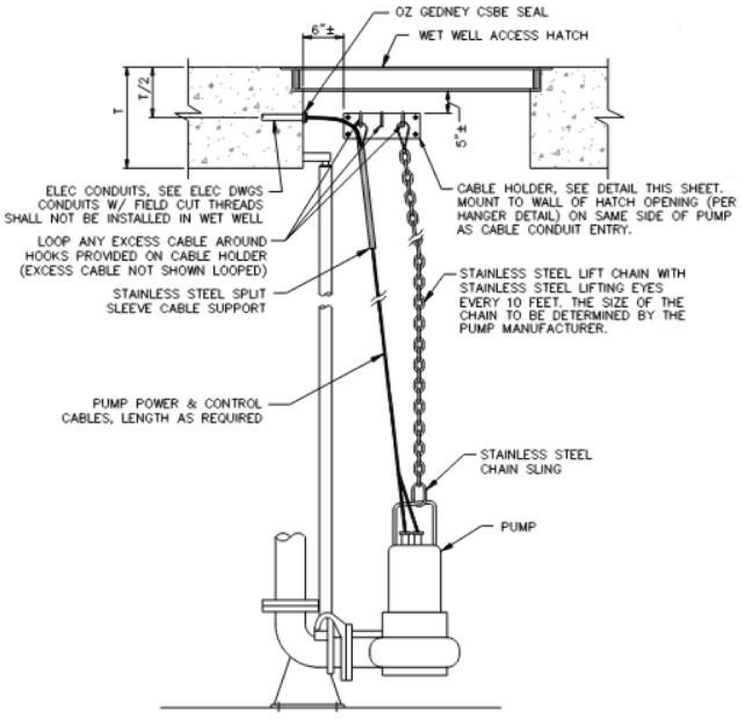


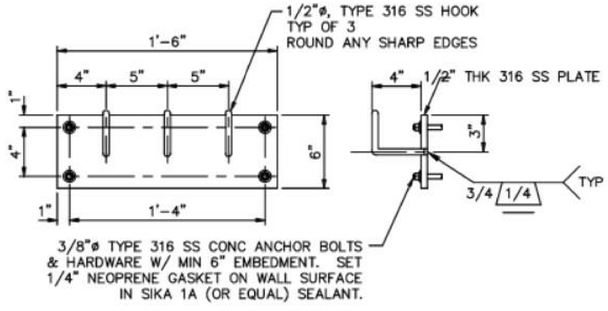
1 TYP ADJUSTABLE PIPE SUPPORT
NTS



2 TYPICAL AIR & VACUUM VALVE ASSY
NTS



5 TYP PUMP LIFTING & CABLING DETAIL
NTS



4 TYPICAL CABLE HOLDER ASSY
NTS

NO.	DATE	REVISION	APP.

RPS A TETRA TECH COMPANY
Texas PE Firm Reg. #F-929
575 N. Dairy Ashford, Suite 700, Houston, Texas 77079
T +1 281 589 7257
E usinfrastructure@rpsgroup.com

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FB NO.

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Jeremy Austin, P.E.
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02/16/2026

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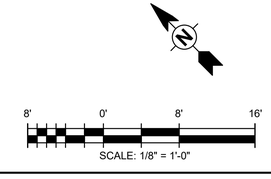
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

PROCESS DETAILS (SHEET 3 of 4)

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 61 OF 125	



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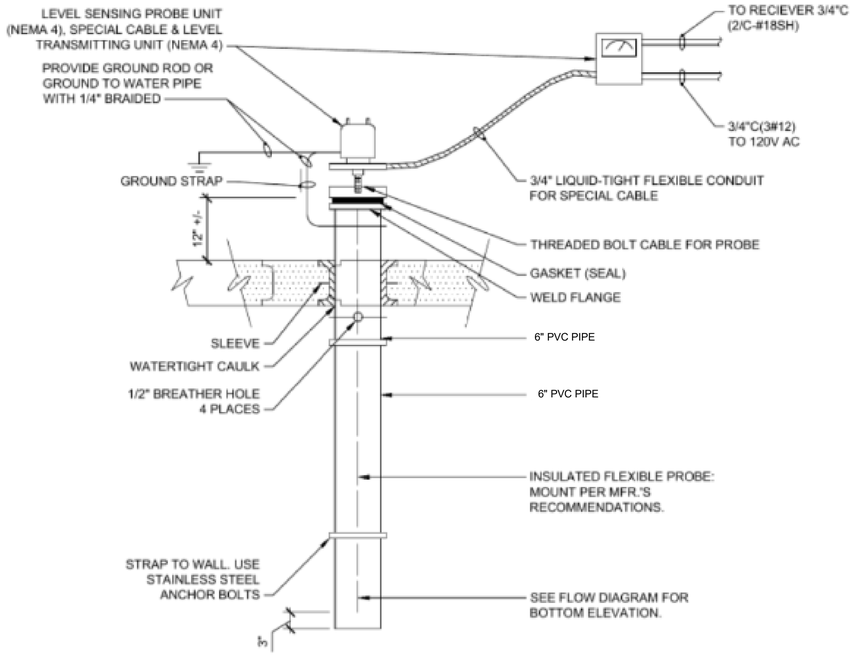
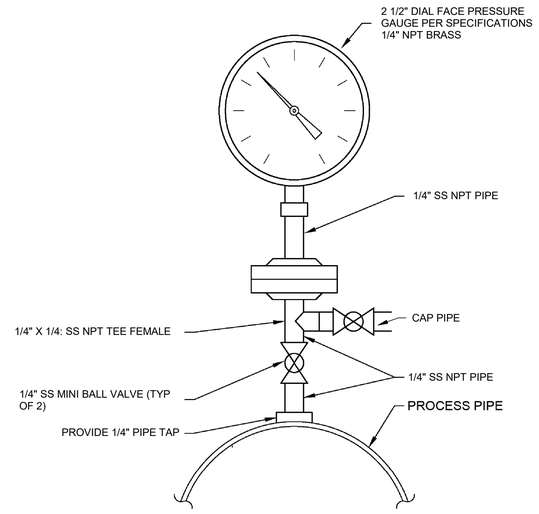
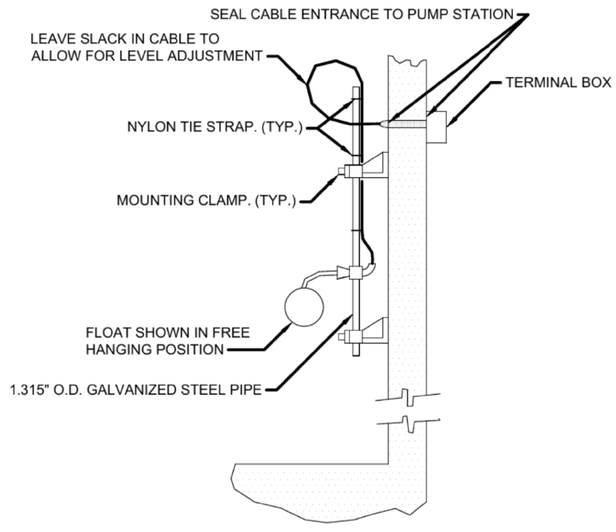


1 LEVEL SENSOR STILLING WELL
NTS



NOTES:
1. USE TYPE 316 SST FITTINGS AND VALVES

2 TYP PRESSURE GAUGE DETAIL
NTS



3 CORD TYPE- DOUBLE FLOAT SWITCH
NTS

8' 0' 8' 16'
SCALE: 1/8" = 1'-0"

NO.	DATE	REVISION	APP.

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Houston, Texas 77079
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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

PROCESS DETAILS (SHEET 4 of 4)

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 62 OF 125	

PLOT STYLE:
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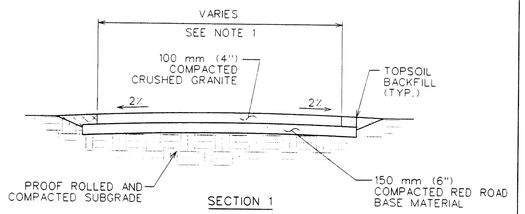
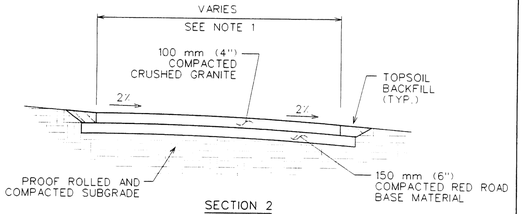
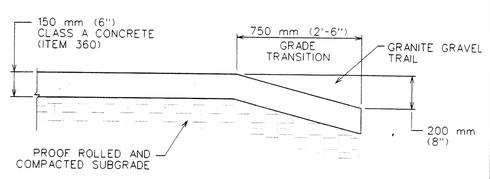


SECTION 1



SECTION 2



150 mm (6") CONCRETE TRANSITION

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS	GRANITE GRAVEL HIKE AND BIKE TRAILS	
Bill Gardner 8/16/04 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 1301S-1 1 OF 2

NOTES:

1. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH ENGINEERING DRAWINGS.
2. EXISTING TREES, PROPERTY AND PUBLIC RIGHT-OF WAYS SHALL BE PROTECTED FROM DAMAGE BY TRUCKS AND/OR EQUIPMENT.
3. THE GRANITE GRAVEL WEARING COURSE SHALL BE 100 mm (4"), COMPACTED.
4. THE WEARING MATERIAL SHALL BE COMPRISED OF UNWASHED GRANITE AGGREGATE AND RED CLAY FINES THAT CONFORM TO STANDARD SPECIFICATION ITEM SECTIO 1301S.3, "MATERIAL".
5. UPON COMPLETION OF TRAIL CONSTRUCTION, ALL GRANITE GRAVEL SHALL BE REMOVED FROM ADJOINING HARD SUFACES (I.E RETAINING CURB/WALL, SIDEWALKS, RUBBER SAFETY SURFACES, PLAYSCAPE DECKS OR RAMPS).
6. ALL ADJACENT HARD SURFACES, SUCH AS CURBS OR WALKS, SHALL BE INSTALLED PRIOR TO INSTALLATION OF GRANITE GRAVEL.

CITY OF AUSTIN DEPARTMENT OF PUBLIC WORKS	GRANITE GRAVEL HILE AND BIKE TRAILS	
Bill Gardner 8/16/04 ADOPTED	THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.	STANDARD NO. 1301S-1 2 OF 2

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CITY OF HOUSTON

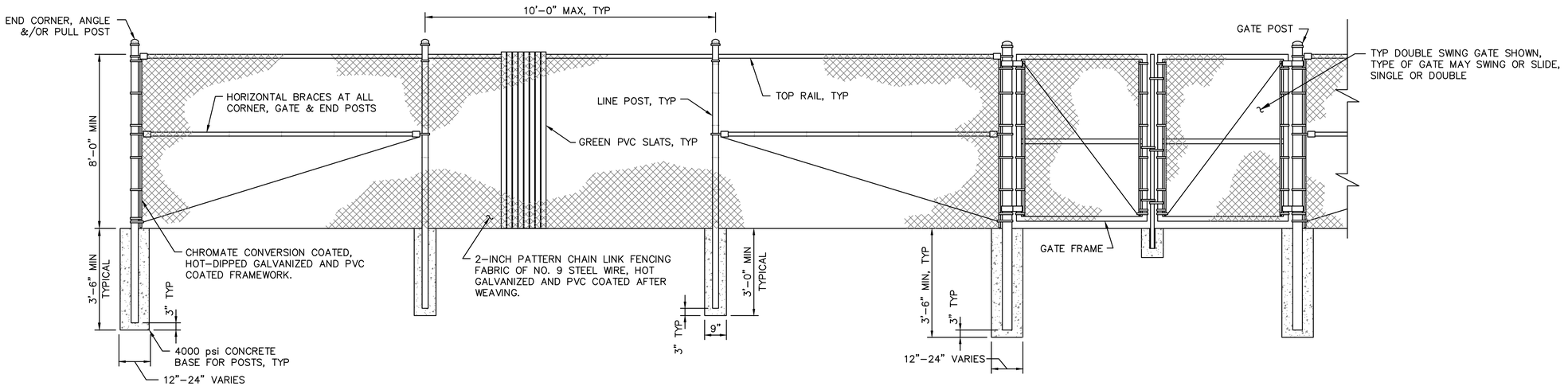
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

BIKE LANE DETAILS

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 63 OF 125	

FILE PATH: C:\Users\andres.martinezjr\DC\ACCDocs\Tetra Tech Inc\200-317106-24001 COH LS Rehab Design\Project Files\CAD\R-000267-01078A-3_BIKE LANE DETAILS.dwg PLOTTED: 2/16/2026 11:17 AM



NOTES:

1. PROVIDE FULL-PERIMETER SECURITY FENCE: 6' HIGH TOPPED WITH (3) STRANDS BARBED WIRE OR PROVIDE 8' HIGH FENCE.
2. PROVIDE (1) 16' WIDE DOUBLE-LEAF INWARD-OPENING SWING GATE, SECURED WITH CHAIN AND PADLOCK.
3. PROVIDE (1) PEDESTRIAN GATE, ACCESSIBLE FROM ENTRANCE DRIVE, SECURED WITH SAME CHAIN AND PADLOCK.
4. PREFERRED FENCE: GREEN PVC-COATED CYCLONE/CHAIN LINK; MINIMUM NO. 9 GAUGE GALVANIZED WOVEN WIRE, 6' FABRIC, 2" DIAMOND MESH, WITH GREEN PVC SLATS, TOPPED WITH (3) STRANDS BARBED WIRE.
5. IF MATCHING NEIGHBORHOOD AESTHETICS IS REQUIRED, ADD EXTERIOR DECORATIVE MATCHING MATERIAL (IF APPLICABLE).
6. IF SUBSIDENCE/SOILS REQUIRE: CONCRETE GRADE BEAM, 24" DEEP MIN, POSTS SET IN BEAM WITH 6' LONG CONCRETE SUPPORT PILES @ ≤16' O.C.

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

FENCE DETAILS

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 64 OF 125	

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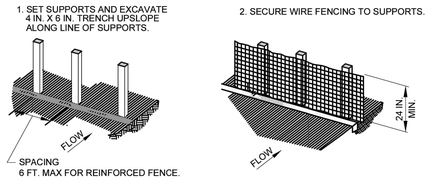
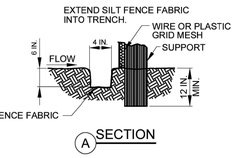


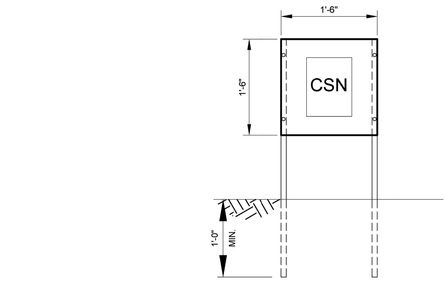


NOTE:

1. SEE SPECIFICATION SECTION NO. 02361-SILT FENCES.

SYMBOL — REINFORCED SILT FENCE

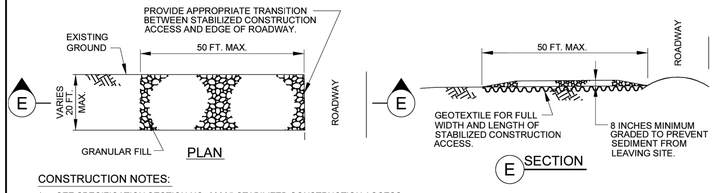
REINFORCED SILT FENCE



NOTE:
CONSTRUCT IN ACCORDANCE WITH HCFCD SPECIFICATION SECTION 01580 - PROJECT SIGNS.

CSN HOLDER

SWPPP / BMP SIGN AND CONSTRUCTION SITE NOTICE HOLDER DETAILS

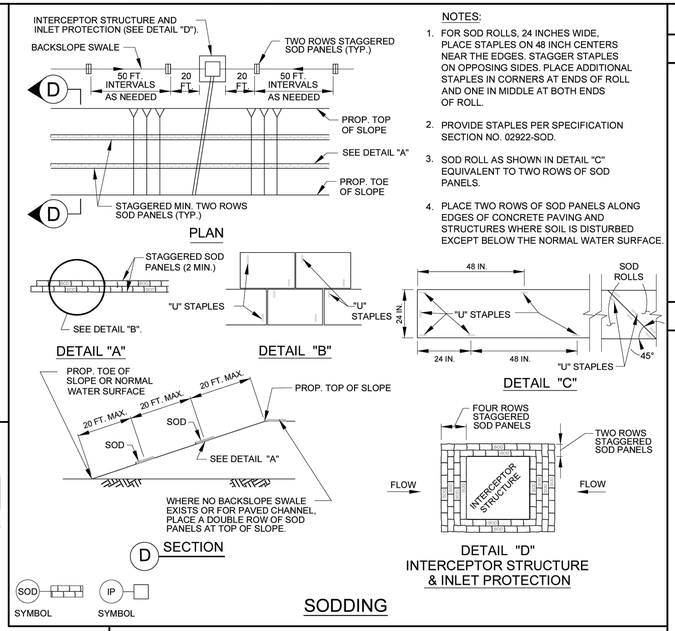


CONSTRUCTION NOTES:

1. SEE SPECIFICATION SECTION NO. 02365-STABILIZED CONSTRUCTION ACCESS.

STABILIZED CONSTRUCTION ACCESS

SCA — SYMBOL



NOTES:

1. FOR SOD ROLLS, 24 INCHES WIDE, PLACE STAPLES ON 48 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.

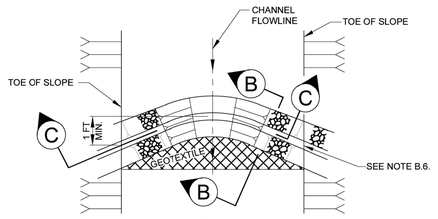
SOD — SYMBOL
IP — SYMBOL

SODDING

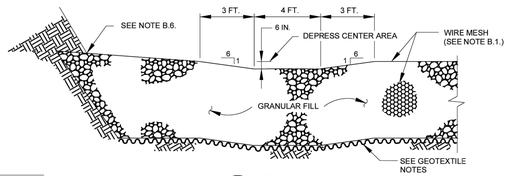
FILTER DAM NOTES:

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. 3-5 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 AT UPSTREAM 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.

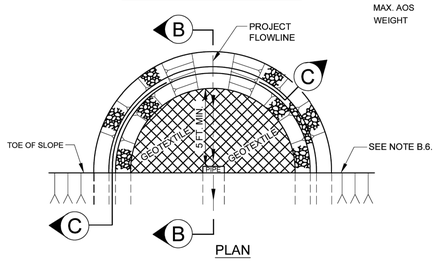


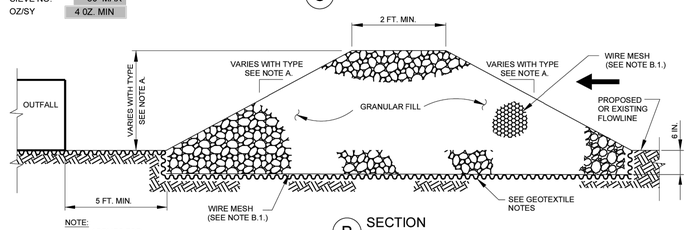
IN-CHANNEL FILTER DAM



GEOTEXTILE NOTES:

MIN. AOS	SIEVE NO.	120 MIN
MAX. AOS	SIEVE NO.	50 MAX
WEIGHT	OZ/SY	4 OZ. MIN





NOTE:
ONLY APPLIES FOR DETENTION BASIN OUTFALL PIPE PROTECTION.

FILTER DAM AT DETENTION BASIN OUTFALL PIPE

FILTER DAM

FD-TYPE — SYMBOL

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 - CONFIRM, CHANGE, OR FILL IN.

REV	DESCRIPTION	DATE	APPR

PROJECT ID#

PROJECT TITLE

STORMWATER POLLUTION PREVENTION 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: NTS

SHEET NUMBER
OF

RPS A TETRA TECH COMPANY
Texas PE Firm Reg. #F-929
575 N. Dairy Ashford, Suite 700, Houston, Texas 77079
T +1 281 589 7257
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HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

STORM WATER POLLUTION
PREVENTION PLAN DETAILS

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
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SHEET NO. 65 OF 125	

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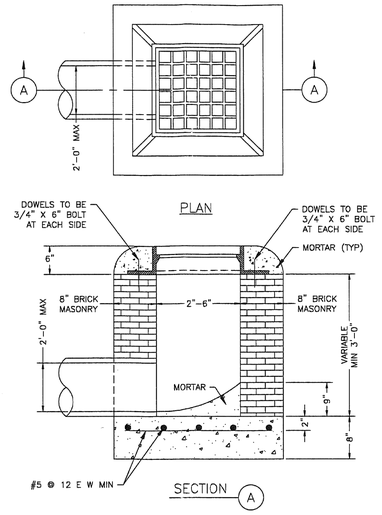
S:\Operation\PROJECTS\2020 Standard Detail Sheets\STORMWATER POPULATION PREVENTION DETAILS\Stormwater Pollution Prevention Details.dwg

02632-01

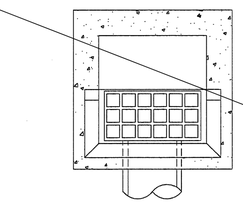
COH IS PHASING OUT BRICK. NEW DETAILS TO BE POSTED END OF 2019



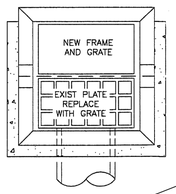
STORM SEWER TYPE "A" GRATE INLET
NTS

02632-03

STEP 1: EXIST TYPE "B" INLET

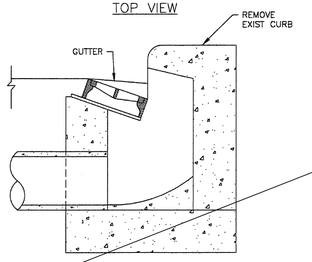


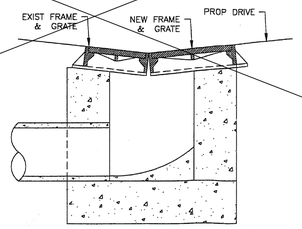
STEP 2:



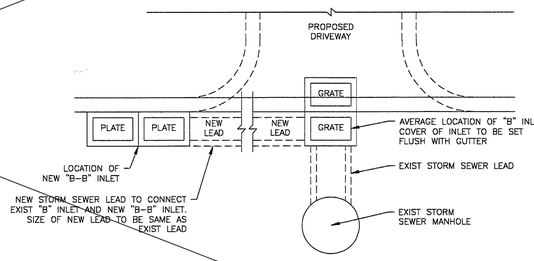
NOTES:

1. AFTER REMOVING EXIST CURB, RAISE EXIST FRAME TO GUTTER GRADE.
2. REPLACE EXIST PLATE WITH A GRATE.
3. ADD NEW FRAME AND GRATE NEXT TO EXIST FRAME.
4. 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 ENGINEERNG

EFFECTIVE DATE: JUL-01-2019

FOR CITY OF HOUSTON USE ONLY

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

STORM SEWER DETAILS

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 66 OF 125	

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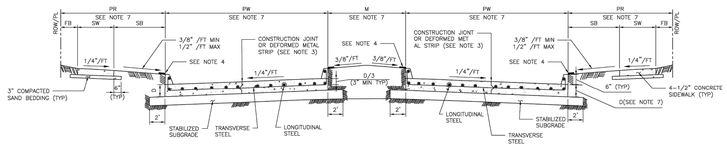
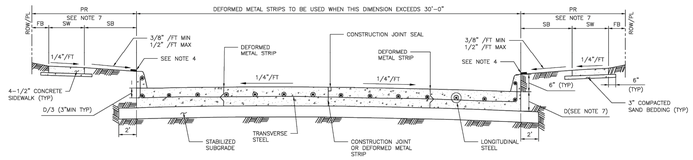


TYPICAL DOUBLE ROADWAY SECTION FOR CONCRETE PAVEMENT WITH CURBS



TYPICAL SINGLE ROADWAY SECTION FOR CONCRETE PAVEMENT WITH CURBS

TABLE 1

REINFORCING STEEL BAR SIZES AND SPACINGS FOR VARIOUS PAVEMENT THICKNESSES (D) WITH: MAXIMUM TRANSVERSE CONTROL JOINT SPACING = 20'-0"
MAXIMUM EXPANSION JOINT SPACING = 80'-0"
f'_c = 4,000 PSI/28 DAYS AND FY = 60,000 PSI

PAVEMENT THICKNESS 'D' (IN)	PAVEMENT WIDTH 'PW' (FT)	LONGITUDINAL STEEL									TRAVERSE STEEL		
		#4 BARS			#5 BARS			#6 BARS			#4 BARS	#5 BARS	#6 BARS
		NUMBER OF BARS	SPACING (IN)	END BAR SPACING (IN)	NUMBER OF BARS	SPACING (IN)	END BAR SPACING (IN)	NUMBER OF BARS	SPACING (IN)	END BAR SPACING (IN)	SPACING (IN)	SPACING (IN)	SPACING (IN)
6	28	17	20.50	4.00	–	–	–	–	–	–	36	–	–
7	25	17	18.25	4.00	–	–	–	–	–	–	36	–	–
7	35	24	18.00	3.00	–	–	–	–	–	–	36	–	–
7	36	25	17.75	3.00	–	–	–	–	–	–	36	–	–
7	37	25	18.25	3.00	–	–	–	–	–	–	36	–	–
7	41	28	18.00	3.00	–	–	–	–	–	–	36	–	–
7	45	31	17.75	3.75	–	–	–	–	–	–	36	–	–
8	25	20	15.50	2.75	13	24.50	3.0	–	–	–	36	36	–
8	34	27	15.50	2.50	17	25.00	4.0	–	–	–	36	36	–
8	35	27	16.00	2.00	18	24.25	4.0	–	–	–	36	36	–
8	36	28	15.75	3.25	18	25.00	3.0	–	–	–	30	36	–
8	44	24	15.75	4.00	22	24.75	4.0	–	–	–	30	36	–
8	45	35	15.75	2.25	23	24.25	3.0	–	–	–	30	36	–
9	25	22	14.00	3.00	14	22.50	4.0	–	–	–	36	36	–
9	34	31	13.50	2.00	19	22.25	3.5	–	–	–	30	36	–
9	35	31	13.75	3.75	20	21.75	3.5	–	–	–	30	36	–
9	36	32	13.75	3.00	21	21.25	3.5	–	–	–	30	36	–
9	44	39	13.75	2.75	25	21.75	3.0	–	–	–	24	36	–
9	45	39	14.00	4.00	26	21.25	4.5	–	–	–	24	36	–
10	25	24	12.75	3.50	17	18.25	4.0	–	–	–	36	36	36
10	34	33	12.50	4.00	21	20.00	4.0	–	–	–	30	36	36
10	35	34	12.50	3.75	23	18.75	4.0	–	–	–	30	36	36
10	36	35	12.50	3.50	24	18.50	3.0	–	–	–	30	36	36
10	44	44	12.00	4.00	29	18.50	4.5	–	–	–	24	36	36
10	45	44	12.50	3.00	29	19.00	3.0	–	–	–	24	36	36
11	25	27	11.25	3.00	17	18.25	4.0	12	26.75	3	36	36	36
11	34	36	11.50	2.75	24	17.50	2.5	17	25.00	4	24	36	36
11	35	37	11.50	3.00	24	18.00	3.0	17	25.75	4	24	36	36
11	36	40	11.00	2.00	25	17.75	3.0	17	26.50	4	24	36	36
11	44	48	11.125	2.50	30	18.00	3.0	21	26.00	4	24	36	36
11	45	49	11.125	3.00	31	17.75	4.0	22	25.50	3	24	36	36
12	25	–	–	–	19	16.25	4.0	13	24.50	3	36	36	36
12	34	–	–	–	26	16.00	4.0	18	23.50	4	24	36	36
12	35	–	–	–	26	16.50	4.0	19	23.00	3	24	36	36
12	36	–	–	–	27	16.25	4.5	20	22.25	4.5	24	36	36
12	44	–	–	–	33	16.25	4.0	24	22.50	5	24	30	36
12	45	–	–	–	35	15.75	3.0	25	22.25	3	24	30	36

MINIMUM LAP LENGTH (LJ):
A. # 4 BARS ; L = 22 INCHES
B. # 5 BARS ; L = 27 INCHES
C. # 6 BARS ; L = 32 INCHES

NOTES:

1. THE MAXIMUM WIDTH BETWEEN LONGITUDINAL JOINTS SHALL NOT EXCEED 15'-0".
2. ALL EARTHEN AREAS ARE TO BE HYDROMULCHED UNLESS SHOWN OTHERWISE ON DRAWINGS.
3. CONTRACTOR MAY SAW CUT IN LIEU OF DEFORMED METAL STRIP.
4. USE STRIP OF SOD GRASS TO PREVENT EROSION UNTIL STAND OF GRASS IS ESTABLISHED.
5. AN EQUAL OR LARGER AREA OF WELDED REINFORCEMENT BAR CONFORMING TO ASTM A497, MAY BE SUBSTITUTED FOR REBARS LISTED IN TABLE 1.
6. IF AVAILABLE ROW IS NOT SUFFICIENT TO ACCOMMODATE SIDEWALK WIDTH (SW) ACCORDING TO IDM REQUIREMENTS, ENGINEER SHALL OBTAIN A VARIANCE FROM THE CITY ENGINEER.
7. REFER TO CONTRACT DRAWINGS FOR PAVEMENT WIDTH (PW) AND PAVEMENT THICKNESS (D), MEDIAN (M), PEDESTRIAN REALM (PR), SIDEWALK (SW), FRONTAGE BUFFER (FB), AND SAFETY BUFFER (SB) WIDTHS.

APPROVED BY:	APPROVED BY:
Signed/Approved by: Sukut Kanwar	Signed/Approved by: HANG NGUYEN
CITY ENGINEER	CITY TRAFFIC ENGINEER
APPROVED BY: Signed/Approved by: Carl Hetherbell	
DIRECTOR OF HOUSTON PUBLIC WORKS	
EFF DATE: NOV-27-2023	DWG NO: 02751-01

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

CONCRETE PAVEMENT DETAILS

FOR CITY OF HOUSTON USE ONLY

DRAWING SCALE
NOT TO SCALE

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 ITS USE. THE ENGINEER PREPARING CONSTRUCTION PLANS UTILIZING THIS STANDARD IS RESPONSIBLE FOR THE CORRECT DESIGN AND PROPER INCORPORATION OF THIS STANDARD INTO THE PLANS. IN ADDITION, ENGINEER PREPARING PLANS UTILIZING THIS STANDARD SHALL DETERMINE THE APPROPRIATENESS OF THE STANDARD FOR EACH SPECIFIC APPLICATION. THE CITY OF HOUSTON ACCEPTS NO RESPONSIBILITY FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.

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SURVEYED BY: KUO Inc.
FB NO. F-4578

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Jeremy Austin, P.E.
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02/16/2026

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

PAVEMENT DETAILS
(SHEET 1 OF 11)

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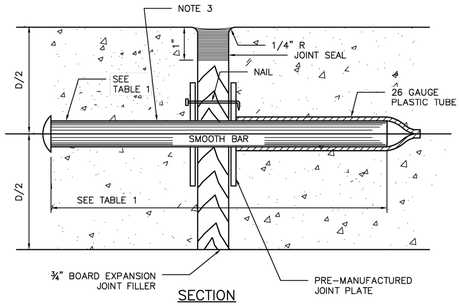
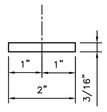


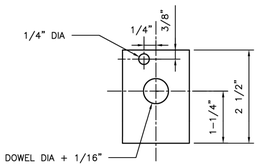
SECTION

DOWEL TYPE EXPANSION JOINT



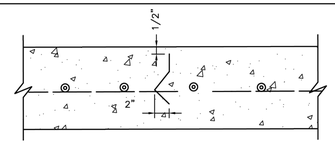
PLAN VIEW

JOINT PLATE



ELEVATION VIEW

JOINT PLATE



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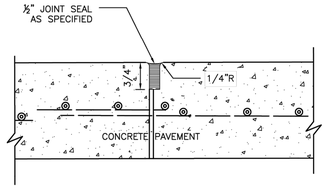

SECTION

CONSTRUCTION JOINT SEAL

TABLE 1

PAVEMENT THICKNESS (IN)	DOWEL SIZES AND SPACINGS		
	DIAMETER (IN)	LENGTH (IN)	SPACING (IN)
6	3/4	18	12
7	1	18	12
8	1	18	12
9	1 1/4	18	12
10	1 1/4	18	12
11	1 1/4	18	12
12	1 1/4	18	12

NOTES:

1. STEEL TO MEET ASTM STANDARD SPECIFICATIONS FOR CONCRETE REINFORCING BARS. UNITS TO BE SPACED 12" CENTER ON CENTER.
2. EXPANSION JOINT TO BE PLACED AT THE END OF EACH CURB RADIUS.
3. CENTER DOWEL HORIZONTALLY ON JOINT.
4. CENTER DOWEL VERTICALLY IN CONCRETE BASE. EXTEND THICKENED CONCRETE AS NEEDED TO MAINTAIN 3" MIN COVER.
5. CITY OF HOUSTON APPROVED PRODUCTS MAY BE USED AS JOINT PLATE ALTERNATIVE.

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

PAVEMENT EXPANSION AND CONSTRUCTION JOINT DETAILS

(SCALE: NOT TO SCALE)

APPROVED BY:

DocuSigned by: Sulad Kunwar — CITY ENGINEER

DocuSigned by: Carl Haddock — DIRECTOR OF HPW

DocuSigned by: KHANG NGUYEN — CITY TRAFFIC ENGINEER

EFF DATE: NOV-27-2023 | DWG NO: 02752-01

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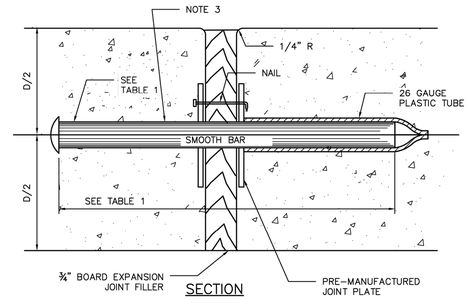
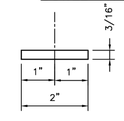


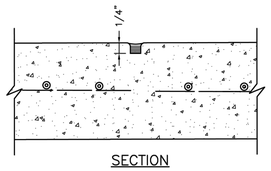
SECTION

DOWEL TYPE EXPANSION JOINT



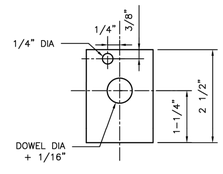
PLAN VIEW

JOINT PLATE



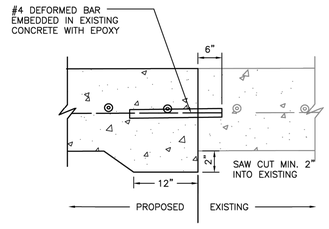
SECTION

CONTROL JOINT



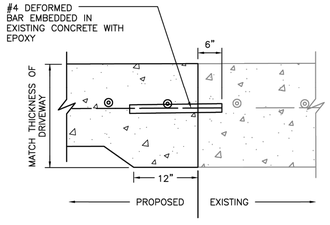
ELEVATION VIEW

JOINT PLATE



SECTION

SIDEWALK TO EXISTING SIDEWALK



SECTION

SIDEWALK TO EXISTING DRIVEWAY

TABLE 1

PAVEMENT THICKNESS (IN)	DOWEL SIZES AND SPACINGS		
	DIAMETER (IN)	LENGTH (IN)	SPACING (IN)
4 1/2	1/2	18	12
5	1/2	18	12
6	3/4	18	12
7	1	18	12

NOTES:

1. STEEL TO MEET ASTM STANDARD SPECIFICATIONS FOR CONCRETE REINFORCING BARS.
2. EXPANSION JOINT TO BE PLACED AT THE END OF EACH CURB RADIUS AND SPACED AT A MAXIMUM DISTANCE OF 3 FEET MAXIMUM SPACING FOR CONTROL JOINTS SHALL BE 5 FEET.
3. CENTER DOWEL HORIZONTALLY ON JOINT.
4. CENTER DOWEL VERTICALLY IN CONCRETE AS NEEDED TO MAINTAIN A 2 INCH MINIMUM COVER.

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

SIDEWALK EXPANSION AND CONSTRUCTION JOINT DETAILS

(SCALE: NOT TO SCALE)

APPROVED BY:

DocuSigned by: Sulad Kunwar — CITY ENGINEER

DocuSigned by: Carl Haddock — DIRECTOR OF HPW

DocuSigned by: KHANG NGUYEN — CITY TRAFFIC ENGINEER

EFF DATE: NOV-27-2023 | DWG NO: 02752-02

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HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
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PAVEMENT DETAILS
(SHEET 2 OF 11)

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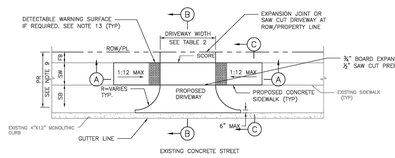
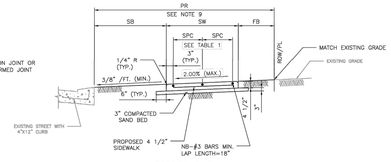


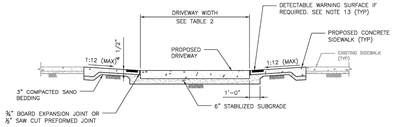
PLAN VIEW
DRIVEWAY



SECTION C–C
TYPICAL SIDEWALK SECTION

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. IF AVAILABLE ROW IS NOT SUFFICIENT TO ACCOMMODATE DRIVEWAY WIDTH AS ACCORDING TO IDM REQUIREMENTS, ENGINEER SHALL OBTAIN A VARIANCE FROM THE CITY ENGINEER.
4. DRIVEWAYS SHALL BE 6" THICK FOR SINGLE FAMILY OR DUPLEXES.
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. THE OUTER DOWEL BARS ARE TO BE LOCATED 12" FROM END OF PROPOSED EDGE OF DRIVEWAY RETURN; EXTEND DOWEL 3" INCHES INTO PROPOSED DRIVEWAY AND BEND REMAINING BAR TO EXTEND TO RADIUS RETURN BOTH SIDES.
7. TROWEL GROOVE SEALANT SHALL BE LOW MODULUS SILICONE OR POLYURETHANE SEALANT.
8. ALL JOINTS ALONG THE SIDEWALK SHALL BE CONSTRUCTED ACCORDING TO DRAWING 02752-02 AND SPECIFICATION 02752.
9. REFER TO CONTRACT DRAWINGS FOR PEDESTRIAN REALM (PR), SIDEWALK (SW), FRONTAGE BUFFER (FB), AND SAFETY BUFFER (SB) WIDTHS.
10. CEMENT STABILIZED SAND 1.5 SACKS OF CEMENT PER TON OF DRY SAND.
11. 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.
12. CURB RAMPS THAT ARE STEEPER THAN A 1:12 MAX SLOPE WILL NOT BE ACCEPTED BY THE CITY OF HOUSTON.
13. DETECTABLE WARNING SURFACES:
    - 13.1. SIDEWALK SHALL HAVE A DETECTABLE WARNING SURFACE WHERE:
      - 13.1.1. SIDEWALK INTERSECTS TYPE C DRIVEWAYS (COMMERCIAL DRIVEWAYS) THAT ARE STOP, YIELD OR TRAFFIC SIGNAL CONTROLLED; OR
      - 13.1.2. SIDEWALK SLOPE IS GREATER THAN 1:20 AND INTERSECTS A TYPE C DRIVEWAY (COMMERCIAL DRIVEWAY)
    - 13.2. 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).
    - 13.3. REFER TO STANDARD DETAILS 02775-06 TO 02775-07 FOR DETECTABLE WARNING SURFACE STANDARDS.

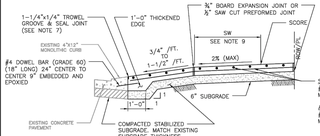


SECTION A–A
PROPOSED SIDEWALK THROUGH DRIVEWAY WITH EXCESSIVE GRADES

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			TRANSVERSE STEEL #3 BARS SPACING (IN)
		#3 BARS			
		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(3)	16(3)	4(3)	10(3)	15	20	10	20
TWO-WAY	10(3)	24(4)	4	10	18(3)	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.

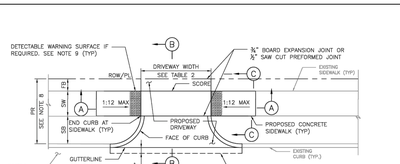
APPROVED BY:	APPROVED BY:
Signed/Signed by: Sahak Kaviani	Signed/Signed by: HERNG HSIEH
CITY ENGINEER	CITY TRAFFIC ENGINEER
APPROVED BY: Signed/Signed by: Carol Haddock	
DIRECTOR OF HOUSTON PUBLIC WORKS	
EFF DATE: NOV-27-2023	DWG NO: 02754-01A

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

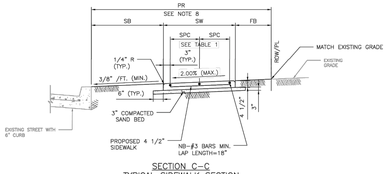
DRIVEWAY DETAIL WITH 4"x12" CURB FOR LOCAL RESIDENTIAL STREETS

FOR CITY OF HOUSTON USE ONLY

DRAWING SCALE
NOT TO SCALE



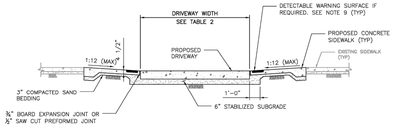
PLAN VIEW
DRIVEWAY



SECTION C–C
TYPICAL SIDEWALK SECTION

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.

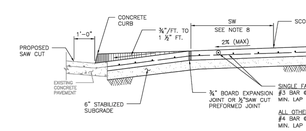


SECTION A–A
PROPOSED SIDEWALK THROUGH DRIVEWAY WITH EXCESSIVE ELEVATION DIFFERENCE WITH EXISTING SIDEWALK

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			TRANSVERSE STEEL #3 BARS SPACING (IN)
		#3 BARS			
		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(3)	16(3)	4(3)	10(3)	15	20	10	20
TWO-WAY	10(3)	24(4)	4	10	18	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.
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APPROVED BY:	APPROVED BY:
Signed/Signed by: Sahak Kaviani	Signed/Signed by: HERNG HSIEH
CITY ENGINEER	CITY TRAFFIC ENGINEER
APPROVED BY: Signed/Signed by: Carol Haddock	
DIRECTOR OF HOUSTON PUBLIC WORKS	
EFF DATE: NOV-27-2023	DWG NO: 02754-01B

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

DRIVEWAY DETAIL WITH 6" CURBED STREETS

FOR CITY OF HOUSTON USE ONLY

DRAWING SCALE
NOT TO SCALE

RPS
A TETRA TECH COMPANY
Texas PE Firm Reg. #F-929
575 N. Dairy Ashford, Suite 700,
Houston, Texas 77079
T +1 281 589 7257
E usinfrastructure@rpsgroup.com

SURVEYED BY: KUO Inc.
FB NO. F-4578

This document is released for the purposes of interim review only under the authority of:

Jeremy Austin, P.E.
Texas P.E. No. 116816
02/16/2026

It is not to be used for bidding, construction, or permitting purposes.

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

PAVEMENT DETAILS
(SHEET 3 OF 11)

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 69 OF 125	

DISCLAIMER:
THE USE OF THIS STANDARD IS GOVERNED BY THE TEXAS ENGINEERING PRACTICE ACT. THE SEVEN REQUIREMENTS ON THIS STANDARD DO NOT PURPORT TO ADDRESS ALL OF THE SAFETY CONCERNS ASSOCIATED WITH THEIR USE. IT IS THE DUTY AND RESPONSIBILITY OF THE ENGINEER TO DESIGN THE FACILITIES COVERED BY CONSTRUCTION DOCUMENTS IN ACCORDANCE WITH SOUND ENGINEERING PRACTICE AND TO COMPLY WITH ALL LAWS AND REGULATIONS WHICH GOVERN THE DESIGN OF THE FACILITIES. ACCEPTANCE OF PLANS BY THE CITY OF HOUSTON DOES NOT RELIEVE THE ENGINEER OF RECORD (EOR) OF HIS RESPONSIBILITY FOR PROPER DESIGN. THE CITY OF HOUSTON, IN APPROVING THESE PLANS, ASSUMES NO RESPONSIBILITY OR LIABILITY FOR ANY ENGINEERING DESIGN EMBODIED IN THE PLANS. THE ENGINEER OF RECORD, BY AFFIXING HIS SEAL TO THESE PLANS, ACCEPTS RESPONSIBILITY FOR PROFESSIONAL ENGINEERING DESIGN ASSOCIATED WITH THE PREPARATION OF THESE PLANS AND ASSUMES ALL DUTIES, RESPONSIBILITY AND LIABILITY FOR THE ENGINEERING DESIGN ASSOCIATED WITH THESE PLANS. REVIEW, ACCEPTANCE AND APPROVAL OF THE PLANS BY THE CITY OF HOUSTON SHALL NOT BE CONSTRUED IN ANY WAY AS RELIEVING THE ENGINEER OF RESPONSIBILITY FOR ENGINEERING DESIGN EMBODIED IN THE PLANS. THE CITY OF HOUSTON ASSUMES NO RESPONSIBILITY FOR ENGINEERING DESIGN OR CONSTRUCTION DETAILS NOT EXPRESSLY SHOWN ON THE PLANS REVIEWED AND APPROVED BY THE CITY OF HOUSTON. THE APPROVAL OF PLANS BY THE CITY OF HOUSTON SHALL NOT BE CONSTRUED AS A WARRANTY OF ANY KIND WHATSOEVER BY THE CITY OF HOUSTON, AND THE CITY OF HOUSTON SHALL NOT BE RESPONSIBLE FOR ANY LOSSES INCURRED BY ANY PERSON OR ENTITY RELYING THEREON. ANY PERSON OR ENTITY MAKING USE OF THESE PLANS DOES SO AT HIS OR HER SOLE RISK AND HEREBY RELEASES THE CITY OF HOUSTON FROM ANY AND ALL LIABILITY ARISING FROM SUCH USE. ACCEPTANCE OF PLANS BY THE CITY OF HOUSTON DOES NOT GIVE ANY PERSON OR ENTITY ANY RIGHT TO CONSTRUCT ANY FACILITY IN THE PROPOSED LOCATION SHOWN ON THE PLANS. THE CITY OF HOUSTON ASSUMES NO RESPONSIBILITY FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.

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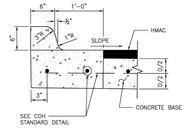
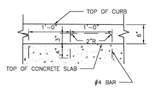
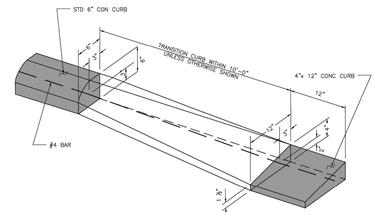


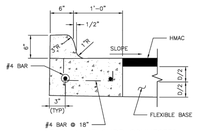
ESPLANADE CURB CONNECTED TO CONCRETE BASE



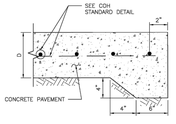
ALTERNATE CONCRETE CURB REINFORCEMENT



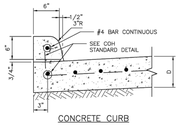
CURB TRANSITION
(SEE NOTES)



ESPLANADE CURB CONNECTED TO FLEXIBLE BASE

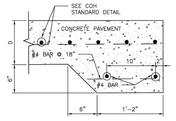


STANDARD CONCRETE PAVING HEADER

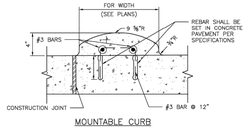


CONCRETE CURB

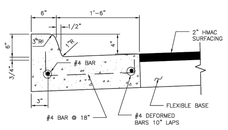
WHEN CONCRETE CURB IS TO BE PLACED EXISTING CONCRETE USE BASE #4 BAR @ 18x10" LONG, DOWELED AND SET IN EPOXY GROUT. SET #4 DOWEL BARS, 25" LONG AT 12" C-C WHEN PAVEMENT SECTION POURED.



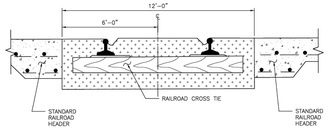
STANDARD RAILROAD HEADER



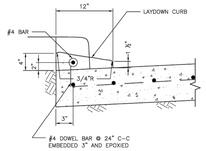
MOUNTABLE CURB



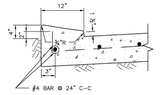
MONOLITHIC CURB AND GUTTER



STANDARD RAILROAD CROSSING – SINGLE TRACK



4-INCH x 12-INCH TRANSITION CURB
(SEE NOTES)



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:
Developed by: Salud Iturraga	Developed by: Hang Nguyen
CITY ENGINEER	CITY TRAFFIC ENGINEER
APPROVED BY: Developed by: Carl Hatlebak	
DIRECTOR OF HOUSTON PUBLIC WORKS	
EFF DATE: NOV-27-2023	DWG NO: 02771-01

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

CURB, CURB AND GUTTER AND HEADER DETAILS

	FOR CITY OF HOUSTON USE ONLY
DRAWING SCALE	
NOT TO SCALE	

DISCLAIMER:
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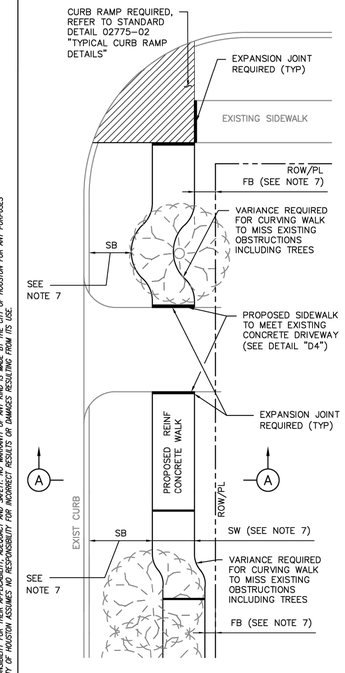
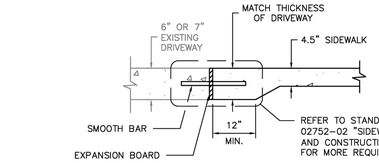


PLAN VIEW

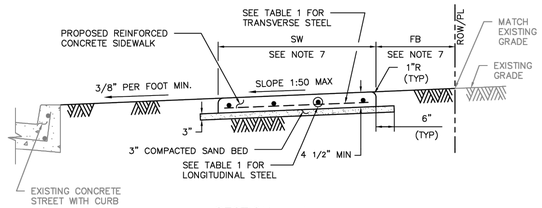


DETAIL D4
DRIVEWAY/SIDEWALK HEADER

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 #3 BARS			TRANSVERSE STEEL #3 BARS SPACING (IN)
		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.

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

TYPICAL SIDEWALK LAYOUT AND DETAILS FOR STREETS WITH CURBS
(SCALE: NOT TO SCALE)

APPROVED BY:	
Developed by: Salud Iturraga — CITY ENGINEER	Developed by: Carl Hatlebak — DIRECTOR OF HPW
Developed by: Hang Nguyen — CITY TRAFFIC ENGINEER	
EFF DATE: NOV-27-2023	DWG NO: 02775-01

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SURVEYED BY: KUO Inc.
FB NO. F-4578

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Jeremy Austin, P.E.
Texas P.E. No. 116816
02/16/2026

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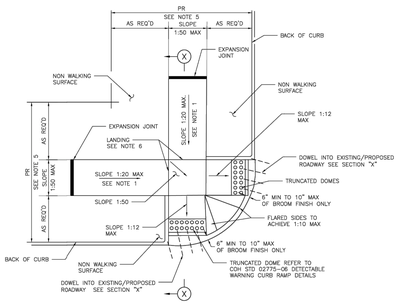
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

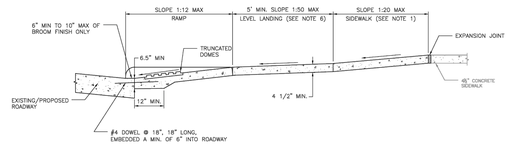
RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

PAVEMENT DETAILS
(SHEET 4 OF 11)

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 70 OF 125	



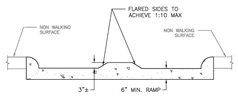
STREETS WITH NON– WALKING SURFACE BEHIND CURB
SEE NOTE–7



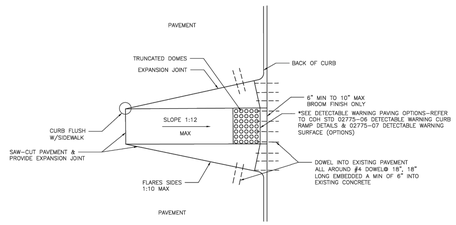
SECTION X–X

NOTES:

1. REPLACE EXISTING SIDEWALK FROM LEVEL LANDING AS NECESSARY TO ACHIEVE 1:20 SLOPE.
2. BROOM FINISH IS MEASURED FROM FACE OF CURB.
3. 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.
4. CURB RAMPS THAT ARE STEEPER THAN A 1:12 MAX SLOPE WILL NOT BE ACCEPTED BY THE CITY OF HOUSTON UNLESS NOTED OTHERWISE.
5. REFER TO CONTRACT DRAWINGS FOR PEDESTRIAN REALM (PR) WIDTH.
6. MINIMUM 5'x5' LANDING PAD ACCORDING TO ADA REQUIREMENTS. WHEN THE APPROACHING SIDEWALK IS WIDER THAN 5', THE LANDING PAD AND RAMP WIDTH MUST MATCH THE SIDEWALK WIDTH.
7. FOR STREETS WITH WALKABLE SURFACES IMMEDIATELY BEHIND THE CURB A FLARE IS REQUIRED ON BOTH SIDES OF THE RAMP.



ELEVATION
LOOKING UP RAMP



CURB RAMP CONSTRUCTION FOR EXISTING PAVEMENT

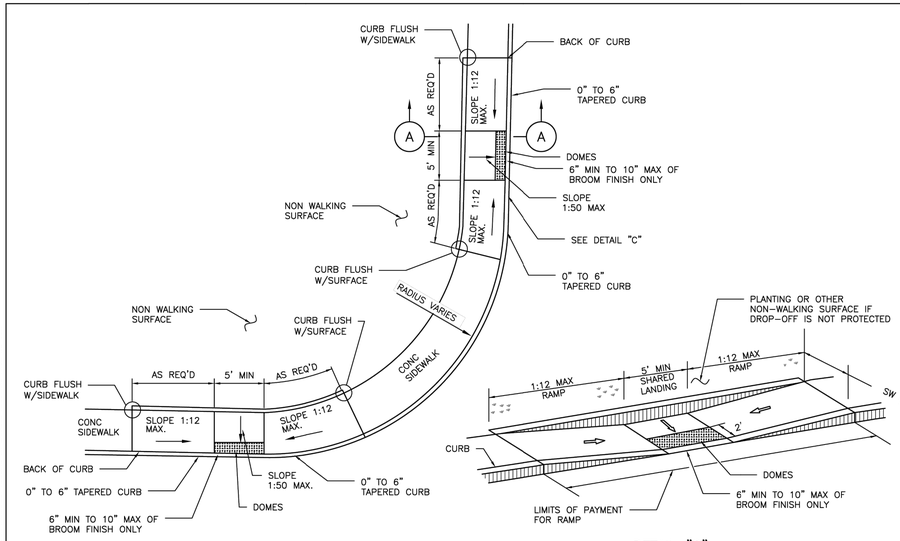
APPROVED BY:	APPROVED BY:
DocuSigned by: Sukat Kanwar	DocuSigned by: KHANG NGUYEN
CITY ENGINEER	CITY TRAFFIC ENGINEER
APPROVED BY: DocuSigned by: Carl Haddock	
DIRECTOR OF HOUSTON PUBLIC WORKS	
EFF DATE: NOV–27–2023	DWG NO: 02775–02

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

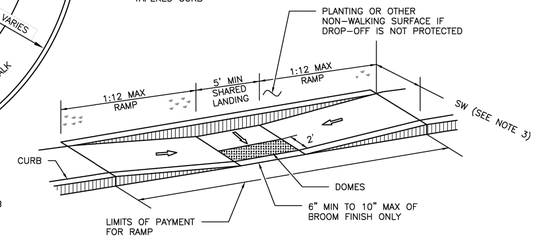
TYPICAL CURB RAMP DETAILS

	FOR CITY OF HOUSTON USE ONLY
DRAWING SCALE	
NOT TO SCALE	

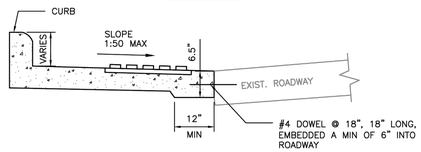
DISCLAIMER:
THE USE OF THIS STANDARD IS GOVERNED BY THE TEXAS ENGINEERING PRACTICE ACT. THE DESIGN REQUIREMENTS ON THIS STANDARD DO NOT PURPORT TO ADDRESS ALL OF THE SAFETY CONCERNS ASSOCIATED WITH THEIR USE. THE ENGINEER OF RECORD (EOR) IS TO REVIEW THESE DESIGN REQUIREMENTS AND BE RESPONSIBLE FOR ADDRESSING THEM AS APPROPRIATE FOR EACH SPECIFIC PROJECT. ANY MODIFICATIONS TO THESE DESIGN REQUIREMENTS BY THE EOR SHOULD BE NOTED AND SIGNED AND SEALED BY THE EOR. THE CITY OF HOUSTON REVIEWS AND APPROVES SPECIFIC PROJECTS BUT DOES NOT MANDATE SPECIFIC DESIGNS. HOWEVER, THE CITY OF HOUSTON ASSUMES NO RESPONSIBILITY FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.



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.

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

PARALLEL CURB RAMP

(SCALE: NOT TO SCALE)

APPROVED BY:	
DocuSigned by: Sukat 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

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Jeremy Austin, P.E.
Texas P.E. No. 116816
02/16/2026

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FB NO. F–4578

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

PAVEMENT DETAILS
(SHEET 5 OF 11)

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
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DRAWING SCALE	
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CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 71 OF 125	

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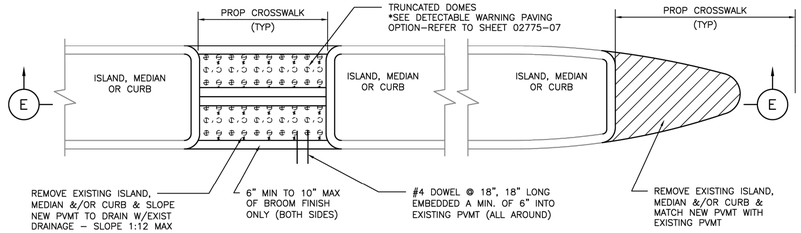

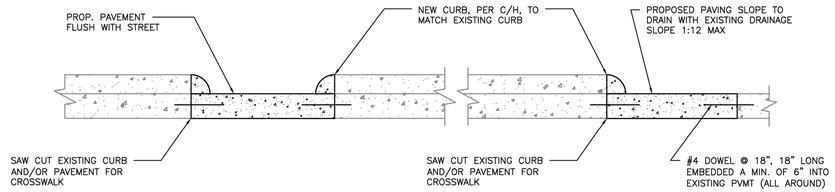

SECTION E–E
FOR ISLAND, MEDIAN, OR CURB MODIFICATIONS FOR CROSSWALKS

NOTES:

1. SEE COH STANDARD DETAIL FOR PAVEMENT MARKING DETAILS.
2. 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.
3. CURB RAMPS THAT ARE STEEPER THAN A 1:12 MAX SLOPE WILL NOT BE ACCEPTED BY THE CITY OF HOUSTON.

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

CURB MODIFICATION FOR CURB RAMPS & CROSSWALKS

(SCALE: NOT TO SCALE)

APPROVED BY:

DocuSigned by: Sukal Kanwar — CITY ENGINEER
DocuSigned by: HANG NGUYEN — CITY TRAFFIC ENGINEER
DocuSigned by: Carl Haddock — DIRECTOR OF HPW

EFF DATE: NOV–27–2023 | DWG NO: 02775–04

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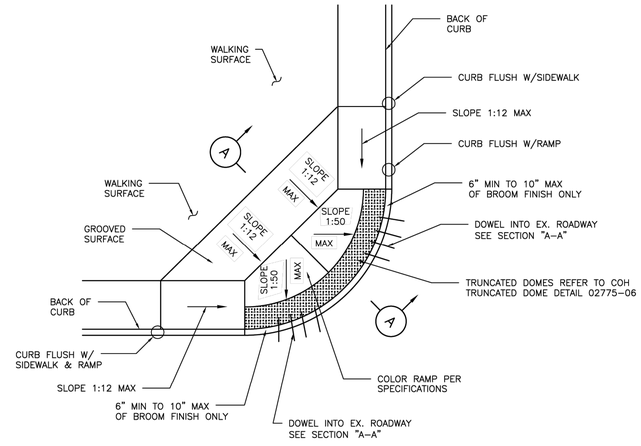
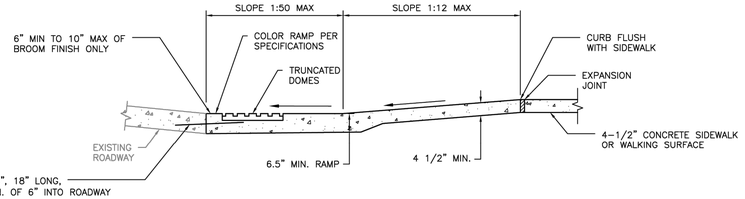


PLAN



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. THIS STANDARD DETAIL SHALL BE USED ONLY IF THE ROADWAY GEOMETRIC DOESN'T ALLOW STANDARD DETAILS 02775–02, 02775–03, AND 02775–09 TO BE USED.
4. THIS STANDARD DETAIL SHALL NOT BE USED IN LIEU OF STANDARD DETAILS 02775–02, 02775–03, AND 02775–09 UNLESS APPROVED BY THE CITY.

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

COMMERCIAL & HIGH DENSITY CONDITIONS CURB RAMP DETAILS

(SCALE: NOT TO SCALE)

APPROVED BY:

DocuSigned by: Sukal Kanwar — CITY ENGINEER
DocuSigned by: HANG NGUYEN — CITY TRAFFIC ENGINEER
DocuSigned by: Carl Haddock — DIRECTOR OF HPW

EFF DATE: NOV–27–2023 | DWG NO: 02775–05

RPS — A TETRA TECH COMPANY
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SURVEYED BY: KUO Inc.
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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
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PAVEMENT DETAILS
(SHEET 6 OF 11)

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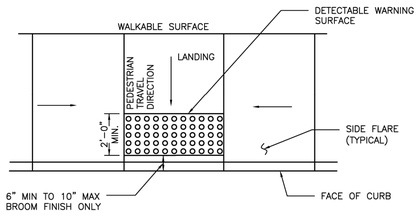
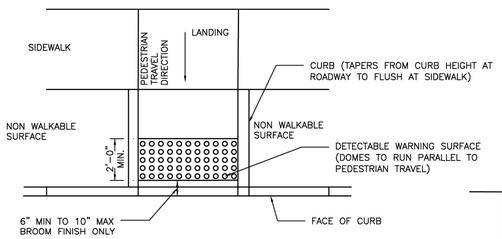
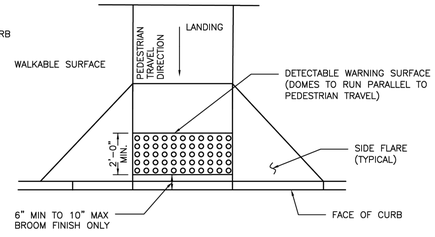


TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON LANDING AT STREET EDGE





TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN

GENERAL NOTES FOR DETECTABLE WARNINGS:

1. DETECTABLE WARNING SURFACES MUST BE FULLY ADA COMPLIANT.
2. ALL NEW CURB RAMPS MUST CONTAIN A DETECTABLE WARNING SURFACE THAT CONSISTS OF RAISED TRUNCATED DOMES. THE SURFACE MUST CONTRAST VISUALLY WITH ADJOINING SURFACE, INCLUDING SIDE FLARES. FURNISH DARK BROWN OR DARK RED DETECTABLE WARNING SURFACE ADJACENT TO UNCOLORED CONCRETE, UNLESS SPECIFIED ELSEWHERE IN THE PLANS.
3. DETECTABLE WARNING SURFACES MUST MAINTAIN A SLIP RESISTANCE WITH FA-VALUE OF EQUAL TO OR GREATER THAN 0.8.
4. DETECTABLE WARNING SURFACES MUST MAINTAIN A WATER ABSORPTION RATE OF LESS THAN 1%, DETECTABLE WARNING SHALL NOT ALLOW WATER TO ACCUMULATE.
5. DETECTABLE WARNINGS INSTALLED INTO FRESH CONCRETE SHALL BE WITHOUT VOIDS AND UTILIZING AN ACCEPTABLE ANCHORING SYSTEM.
6. ALIGN TRUNCATED DOMES IN THE DIRECTION OF PEDESTRIAN TRAVEL WHEN ENTERING THE STREET.
7. DETECTABLE WARNING SURFACES SHALL BE A MINIMUM OF 24" IN DEPTH IN THE DIRECTION OF PEDESTRIAN TRAVEL, AND EXTEND THE FULL WIDTH OF THE CURB RAMP OR LANDING WHERE THE PEDESTRIAN ACCESS ROUTE ENTERS THE STREET.
8. DETECTABLE WARNING SURFACES SHALL BE LOCATED SO THAT THE EDGE NEAREST THE CURB LINE IS 6" MIN TO 10" MAX FROM THE DETECTABLE WARNING SURFACES MAY BE CURVED ALONG THE CORNER RADIUS.
9. 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.
10. CURB RAMPS THAT ARE STEEPER THAN A 1:12 MAX SLOPE WILL NOT BE ACCEPTED BY THE CITY OF HOUSTON.

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

DETECTABLE WARNING CURB RAMP DETAILS

(SCALE: NOT TO SCALE)

APPROVED BY:

DocuSigned by: Sukut Kanwar — CITY ENGINEER
DocuSigned by: THANG NGUYEN — CITY TRAFFIC ENGINEER
DocuSigned by: Carl Haddock — DIRECTOR OF HPW

EFF DATE: NOV-27-2023 | DWG NO: 02775-06

DISCLAIMER:
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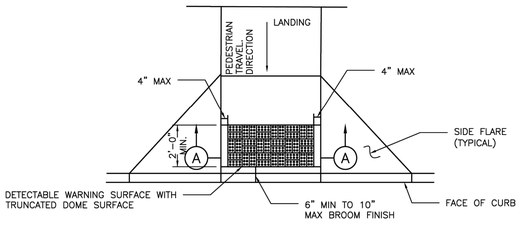
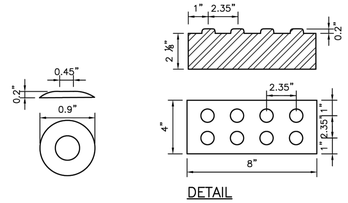


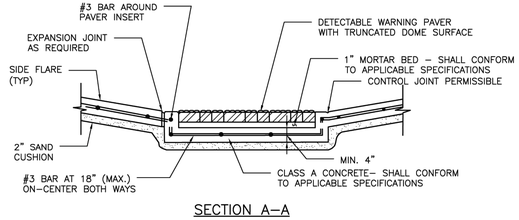
PLAN VIEW

DETECTABLE WARNING SURFACE



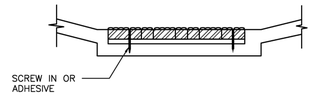
DETAIL

DETECTABLE WARNING PAVER



SECTION A–A

PAVER



DETAIL A–5

NOTES:

GENERAL 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.

PAVERS

1. FURNISH DETECTABLE WARNING SURFACE UNITS MEETING ALL REQUIREMENTS OF ASTM C-936, C-33. LAY IN A TWO BY TWO UNIT BASKET WEAVE PATTERN OR AS DIRECTED.
2. LAY FULL-SIZE UNITS FIRST FOLLOWED BY CLOSURE UNITS CONSISTING OF AT LEAST 25 PERCENT OF A FULL UNIT. CUT DETECTABLE WARNING POWER UNITS USING A POWER SAW.

POLYMER CONCRETE

1. DETECTABLE WARNING TILES SHALL BE MADE OF POLYMER CONCRETE MATERIALS.
2. DETECTABLE WARNING TILES SHALL BE INSTALLED INTO FRESH CONCRETE (CAST-IN-PLACE) UTILIZING AN ANCHORING SYSTEM.
3. DETECTABLE WARNING TILES SHALL BE OF TERRACOTTA (BRICK-RED) COLOR AND COLORED THROUGHOUT TO GUARANTEE THE ADA REQUIRED COLOR CONTRAST.
4. DETECTABLE WARNING TILES SHALL MEET OR EXCEED THE FOLLOWING ASTM-BASED "STANDARDS" FOR CONCRETE MATERIALS.
   A. COMPRESSION STRENGTH > 12,500 PSI PER ASTM C 39-04
   B. WATER ABSORPTION < 0.25% PER ASTM C 97-09

PADS

1. FURNISH REQUIREMENTS OF ADAAG (MARCH 2003).
2. OTHER MATERIALS MAY BE USED IF APPROVED BY THE CITY ENGINEER

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

DETECTABLE WARNING SURFACE (OPTIONS)

(SCALE: NOT TO SCALE)

APPROVED BY:

DocuSigned by: Sukut Kanwar — CITY ENGINEER
DocuSigned by: THANG NGUYEN — CITY TRAFFIC ENGINEER
DocuSigned by: Carl Haddock — DIRECTOR OF HPW

EFF DATE: NOV-27-2023 | DWG NO: 02775-07

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SURVEYED BY: KUO Inc.
FB NO. F-4578

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Jeremy Austin, P.E.
Texas P.E. No. 116816
02/16/2026

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

PAVEMENT DETAILS
(SHEET 7 OF 11)

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 73 OF 125	

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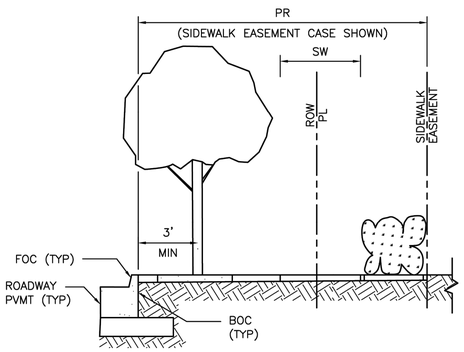

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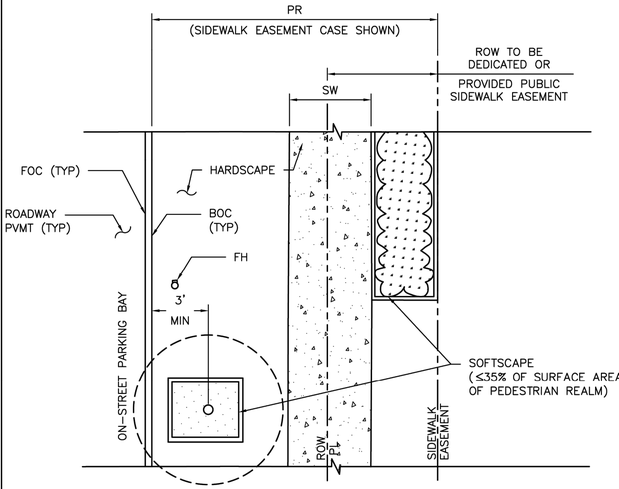
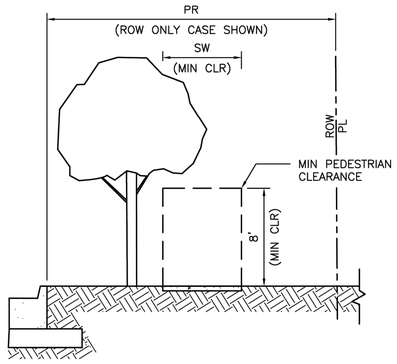


PLAN
PEDESTRIAN REALM PERFORMANCE STANDARD



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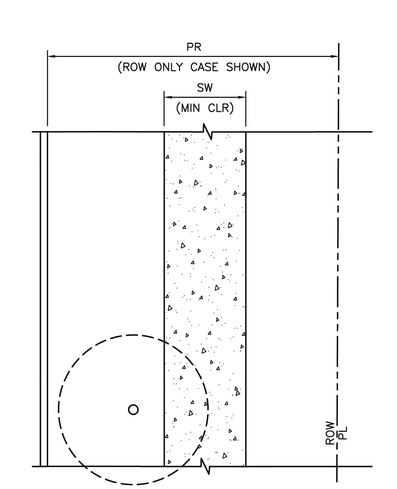

PLAN
SIDEWALK & CLEAR PEDESTRIAN ZONE
MANDATORY MINIMUM REQUIREMENT

NOTES

1. REFER TO CONTRACT DRAWINGS FOR PEDESTRIAN REALM (PR), AND SIDEWALK (SW) WIDTHS.
2. THE MINIMUM UNOBSTRUCTED VERTICAL CLEARANCE OF A SIDEWALK IS EIGHT (8) FEET AS MEASURED VERTICALLY FROM THE SURFACE OF THE SIDEWALK. FOR VERTICAL CLEARANCE TO IMPROVEMENTS CONSTRUCTED OVER A SIDEWALK WITHIN THE PEDESTRIAN REALM, REFER TO THE CONTRACT DRAWINGS.
3. FOR PEDESTRIAN REALM DESIGN BACKGROUND, REFER TO CHAPTER 42 OF THE CODE OF ORDINANCES, ARTICLE IV – ENHANCED PEDESTRIAN REALM STANDARDS AND THE USERS' GUIDE FOR WALKABLE PLACES AND TRANSIT–ORIENTED DEVELOPMENT.
4. FOR ADDITIONAL PLANTING REQUIREMENTS, REFER TO CHAPTER 33 OF THE CODE OF ORDINANCES, SECTION 129 – GENERAL PLANTING STANDARDS.

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

SIDEWALK AND CLEAR ZONE
TRANSIT CORRIDOR STREET

(SCALE: NOT TO SCALE)

APPROVED BY:

DocuSigned by: Suhail Kanwar — CITY ENGINEER
DocuSigned by: KHANG NGUYEN — CITY TRAFFIC ENGINEER
DocuSigned by: Carol Haddock — DIRECTOR OF HPW

EFF DATE: NOV–27–2023 | DWG NO: 02775–08

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SURVEYED BY: KUO Inc.
FB NO. F–4578

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02/16/2026
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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

PAVEMENT DETAILS
(SHEET 8 OF 11)

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
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AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 74 OF 125	

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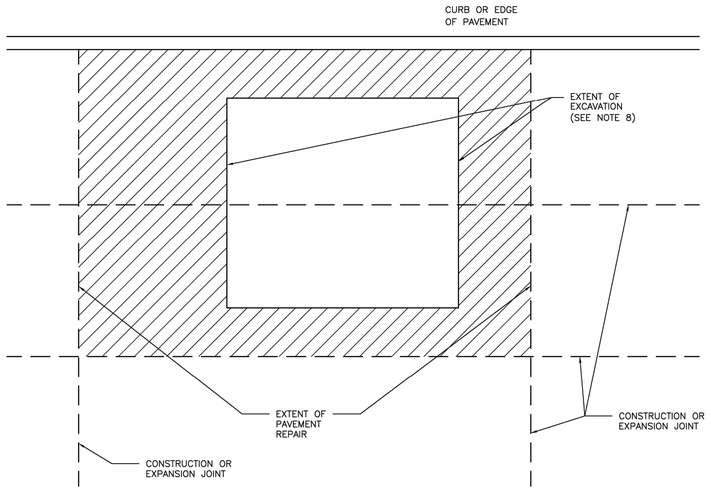

NOTES:

1. EXTENT OF PAVEMENT REPAIR SHALL BE PERPENDICULAR AND PARALLEL TO TRAVEL WAY.
2. REPLACE ENTIRE PANEL WIDTH AND LENGTH TO NEAREST CONSTRUCTION OR EXPANSION JOINT BEYOND EDGE OF EXCAVATION.
3. SAW CUT AND EXPOSE 15" OF REINFORCING STEEL WITHIN EXISTING PAVEMENT. PROVIDE HORIZONTAL DOWELS (PER SPECIFICATION SECTION 02951—PAVEMENT REPAIR AND RESTORATION) IF EXISTING REINFORCING IS BROKEN OFF.
4. REPLACE CURB WHEN ADJACENT LANE IS REPLACED.
5. MAINTAIN EXPANSION JOINTS AT EXISTING LOCATIONS UNLESS OTHERWISE DIRECTED BY CITY ENGINEER.
6. SPECIALTY PAVEMENTS (IE: BRICK PAVERS) TO BE REPLACED WITH MATCHING PAVEMENT IN ALL CASES.
7. REPLACE PAVEMENT MARKINGS IN ACCORDANCE WITH CITY OF HOUSTON STANDARD SPECIFICATIONS 02764—RAISED PAVEMENT MARKERS AND 02767—THERMOPLASTIC PAVEMENT MARKINGS.
8. EXTENT OF EXCAVATION INCLUDES 18" OVERCUT AS SHOWN ON STANDARD DETAIL 02951—04 PAVEMENT REPAIR DETAIL FOR STREET CUTS (FLEX—BASE PAVEMENT & CONCRETE PAVEMENT).

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

STREET CUT FOR CONCRETE PAVEMENT REPLACEMENT/RESTORATION AGE OF PAVEMENT ≤ 5YRS
(SCALE: NOT TO SCALE)

APPROVED BY:

DocuSigned by: Sukul Tanwar — CITY ENGINEER
DocuSigned by: KHANG NGUYEN — CITY TRAFFIC ENGINEER
DocuSigned by: Carl Haddock — DIRECTOR OF HPW

EFF DATE: NOV—27—2023 | DWG NO: 02951—01

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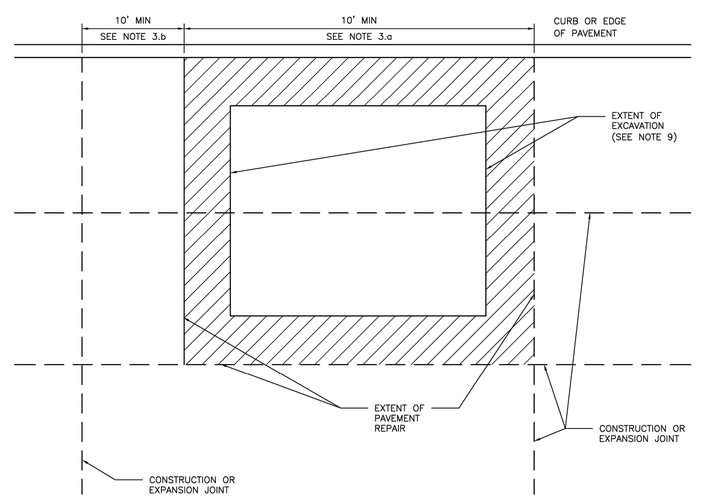

NOTES:

1. EXTENT OF PAVEMENT REPAIR SHALL BE PERPENDICULAR AND PARALLEL TO TRAVEL WAY.
2. WIDTH:
   REPLACE PANEL WIDTH TO NEAREST CONSTRUCTION OR EXPANSION JOINT BEYOND EDGE OF EXCAVATION.
3. LENGTH:
   a. MINIMUM LENGTH OF PAVEMENT REPAIR ALONG TRAVEL WAY IS 10' FROM THE NEAREST JOINT.
   b. IF EXTENT OF PAVEMENT REPAIR IS LESS THAN 10' FROM EXISTING CONSTRUCTION OR EXPANSION JOINT, EXTEND PAVEMENT REPAIR TO EXISTING JOINT.
4. SAW CUT AND EXPOSE 15" OF REINFORCING STEEL AROUND EDGE OF PANEL REPLACEMENT. PROVIDE HORIZONTAL DOWELS (PER SPECIFICATION SECTION 02951—PAVEMENT REPAIR AND RESTORATION) IF REINFORCING IS BROKEN OFF OR DOES NOT EXIST.
5. REPLACE CURB WHEN ADJACENT LANE IS REPLACED.
6. MAINTAIN EXPANSION JOINTS AT EXISTING LOCATIONS UNLESS OTHERWISE DIRECTED BY CITY ENGINEER.
7. SPECIALTY PAVEMENTS (IE: BRICK PAVERS) TO BE REPLACED WITH MATCHING PAVEMENT IN ALL CASES.
8. REPLACE PAVEMENT MARKINGS IN ACCORDANCE WITH CITY OF HOUSTON STANDARD SPECIFICATIONS 02764—RAISED PAVEMENT MARKERS AND 02767—THERMOPLASTIC PAVEMENT MARKINGS.
9. EXTENT OF EXCAVATION INCLUDES 18" OVERCUT AS SHOWN ON STANDARD DETAIL 02951—04 PAVEMENT REPAIR DETAIL FOR STREET CUTS (FLEX—BASE PAVEMENT & CONCRETE PAVEMENT).

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

STREET CUT FOR CONCRETE PAVEMENT REPLACEMENT/RESTORATION AGE OF PAVEMENT > 5YRS
(SCALE: NOT TO SCALE)

APPROVED BY:

DocuSigned by: Sukul Tanwar — CITY ENGINEER
DocuSigned by: KHANG NGUYEN — CITY TRAFFIC ENGINEER
DocuSigned by: Carl Haddock — DIRECTOR OF HPW

EFF DATE: NOV—27—2023 | DWG NO: 02951—02

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02/16/2026

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

PAVEMENT DETAILS
(SHEET 9 OF 11)

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R—000267—00178A—3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 75 OF 125	

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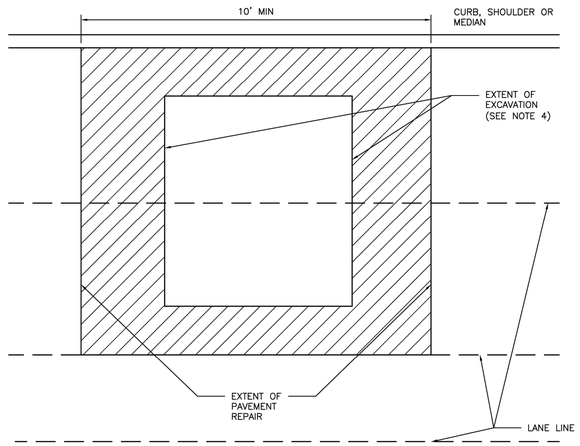

NOTES:

1. EXTENT OF PAVEMENT REPAIR SHALL BE PERPENDICULAR AND PARALLEL TO TRAVEL WAY.
2. FLEXIBLE BASE: REPLACE BASE TO SAME THICKNESS PLUS TWO INCHES (2") FOR EXTENT OF EXCAVATION. USE APPROVED BASE MATERIAL TYPE.*
3. SURFACE COURSE:
   - 3.1. WIDTH: SURFACE MILL AND OVERLAY FULL WIDTH OF LANE(S) TO NEAREST LANE DIVIDER BEYOND EDGE OF EXCAVATION.
   - 3.2. LENGTH: MINIMUM LENGTH OF SURFACE MILL ALONG TRAVEL WAY IS 10'.
   - 3.3. REPLACE PAVEMENT MARKINGS IN ACCORDANCE WITH CITY OF HOUSTON STANDARD SPECIFICATIONS 02764–RAISED PAVEMENT MARKERS AND 02767–THERMOPLASTIC PAVEMENT MARKINGS.
4. EXTENT OF EXCAVATION INCLUDES 18" OVER CUT AS SHOWN ON STANDARD DETAIL 02951–04 PAVEMENT REPAIR DETAIL FOR STREET CUTS (FLEX–BASE PAVEMENT AND CONCRETE PAVEMENT).
5. ADDITIONAL REQUIREMENTS FOR ASPHALT OVERLAY ON CONCRETE PAVEMENT:
   - 5.1. REPLACE CONCRETE FOR EXTENT OF EXCAVATION. REPLACE TO SAME THICKNESS PLUS TWO INCHES (2").
   - 5.2. WIDTH:
     - 5.2.1. IF EXCAVATION EXTENDS MORE THAN HALF OF A LANE, REPLACE ENTIRE LANE OF CONCRETE. OTHERWISE USE STANDARD DETAIL 02951–04 THROUGH 05.
   - 5.3. SAW CUT AND EXPOSE 15" OF REINFORCING STEEL AROUND EDGE OF CONCRETE REPLACEMENT. IF NO REINFORCING STEEL EXISTS, USE HORIZONTAL DOWELS PER CITY OF HOUSTON STANDARD SPECIFICATION SECTION 02951–PAVEMENT REPAIR AND RESTORATION.
   - 5.4. REPLACE CURB WHEN ADJACENT LANE IS REPLACED.
   - 5.5. MAINTAIN CONCRETE EXPANSION JOINTS AT EXISTING LOCATIONS UNLESS OTHERWISE APPROVED BY CITY ENGINEER.

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

STREET CUT FOR ASPHALT PAVEMENT REPLACEMENT/RESTORATION FOR PAVEMENT OF ALL AGES
(SCALE: NOT TO SCALE)

APPROVED BY:

Docusigned by: Sulail Tanwar — CITY ENGINEER
Docusigned by: KHANG NGUYEN — CITY TRAFFIC ENGINEER
Docusigned by: Carl Haddock — DIRECTOR OF HPW

EFF DATE: NOV–27–2023 | DWG NO: 02951–03

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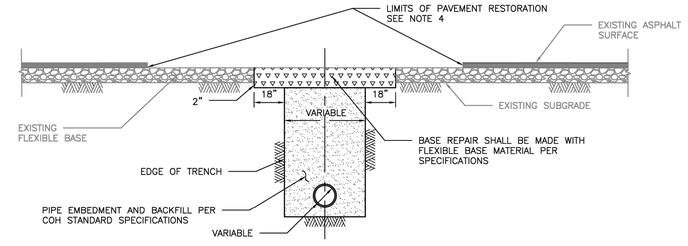
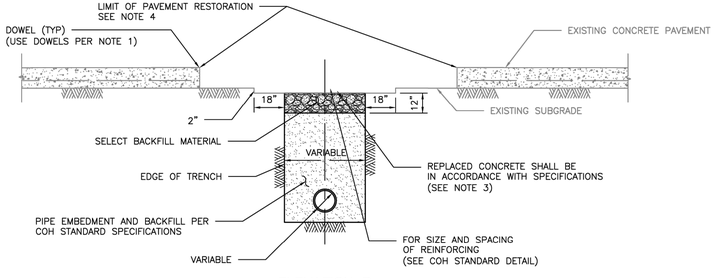


ELEVATION A
REPAIR OF FLEXIBLE BASE PAVEMENT



ELEVATION B
REPAIR OF REINFORCED CONCRETE PAVEMENT

NOTES:

1. EXPOSE 15" OF REINFORCING STEEL AT PROPOSED SAWED JOINT. IF NO REINFORCING STEEL EXISTS, USE HORIZONTAL DOWELS. HORIZONTAL DOWELS SHALL BE #6 BAR, 24" LONG, 24" C–C, DRILLED AND EMBEDDED 8" INTO THE CENTER OF THE EXISTING SLAB. WITH "PO ROC" OR EQUAL.
2. IF REINFORCED CONCRETE IS OVERLAYED WITH ASPHALT, REPLACE WITH 2" MIN HMAC SURFACING.
3. REFER TO STANDARD DETAIL 02751–01 FOR REINFORCING STEEL REQUIREMENTS.
4. REFER TO STANDARD DETAIL 02951–01 THROUGH 03 FOR PAVEMENT RESTORATION LIMITS.

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

PAVEMENT REPAIR DETAIL FOR STREET CUTS
(FLEX–BASE PAVEMENT & CONCRETE PAVEMENT)
(SCALE: NOT TO SCALE)

APPROVED BY:

Docusigned by: Sulail Tanwar — CITY ENGINEER
Docusigned by: KHANG NGUYEN — CITY TRAFFIC ENGINEER
Docusigned by: Carl Haddock — DIRECTOR OF HPW

EFF DATE: NOV–27–2023 | DWG NO: 02951–04

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HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

PAVEMENT DETAILS
(SHEET 10 OF 11)

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CITY OF HOUSTON PM	
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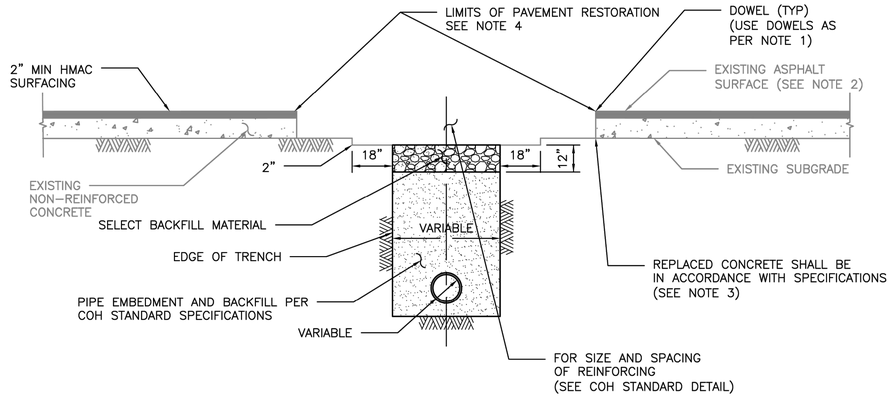
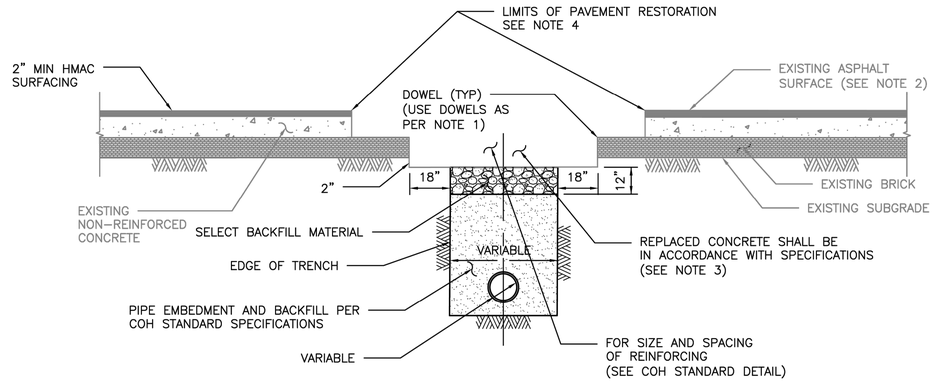


ELEVATION C
REPAIR OF NON-REINFORCED CONCRETE PAVEMENT



ELEVATION D
REPAIR OF NON-REINFORCED CONCRETE PAVEMENT WITH BRICK

NOTES:

1. EXPOSE 15" OF REINFORCING STEEL AT PROPOSED SAWED JOINT. IF NO REINFORCING STEEL EXISTS, USE HORIZONTAL DOWELS. HORIZONTAL DOWELS SHALL BE #6 BAR, 24" LONG, 24" C-C, DRILLED AND EMBEDDED 8" INTO THE CENTER OF THE EXISTING SLAB. WITH "PO ROC" OR EQUAL.
2. IF REINFORCED CONCRETE IS OVERLAYED REPLACE WITH SAME THICKNESS OF HMAC SURFACING.
3. REFER TO STANDARD DETAIL 02751-01 FOR REINFORCING STEEL REQUIREMENT
4. REFER TO STANDARD DETAILS 02951-01 THROUGH 03 FOR PAVEMENT RESTORATION LIMITS.

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

PAVEMENT REPAIR DETAIL
FOR STREET CUTS
(NON-REINFORCED CONCRETE & BRICK PAVEMENT)
(SCALE: NOT TO SCALE)

APPROVED BY:

DocuSigned by: Sukait Tanwar 9EFB80C841F5478...
CITY ENGINEER

DocuSigned by: THANG NGUYEN 95A29EFDA75B4CD...
CITY TRAFFIC ENGINEER

DocuSigned by: Carol Haddock A93C41087283453...
DIRECTOR OF HPW

EFF DATE: NOV-27-2023 | DWG NO: 02951-05

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RECONSTRUCTION & REHABILITATION
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PAVEMENT DETAILS
(SHEET 11 OF 11)

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
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DRAWING SCALE	
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CITY OF HOUSTON PM	
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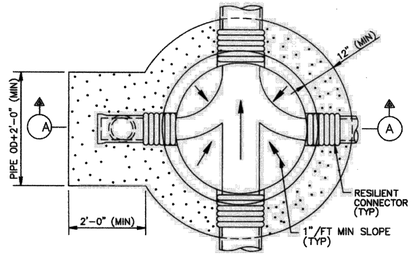
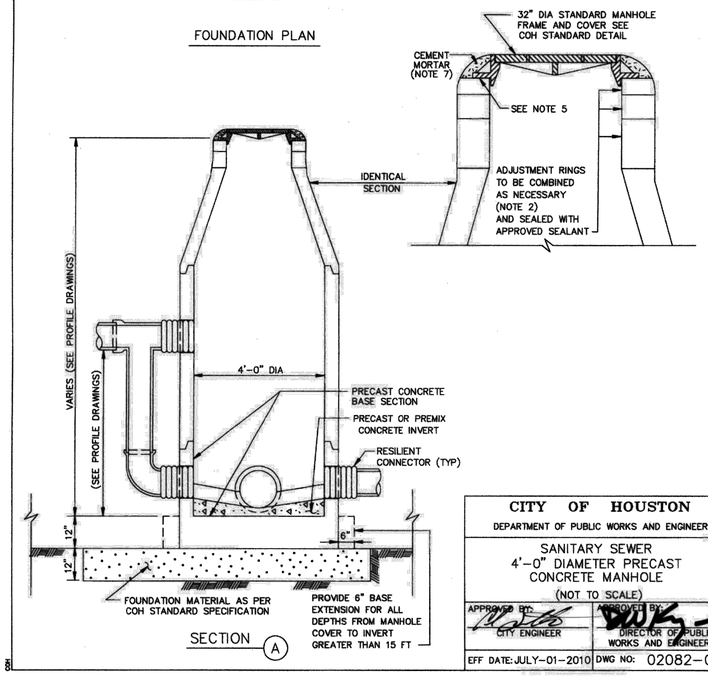


FOUNDATION PLAN

NOTES:

1. DEPTH OF MANHOLE DETERMINES SECTIONS REQUIRED.
2. PRECAST CONCRETE RINGS SHALL BE PROVIDED FOR A COMBINED ADJUSTMENT HEIGHT OF AT LEAST 12". THE TOTAL HEIGHT OF THE ADJUSTMENT RINGS SHALL NOT EXCEED 1'-8".
3. MANHOLE WALL THICKNESS FOR DEPTH EXCEEDING 12'-0" SHALL BE DETERMINED TO MEET LOADING CONDITIONS. MIN THICKNESS 5".
4. MANHOLE DROP AND INTERSECTING PIPES SHALL BE INSTALLED ONLY WHEN CALLED FOR IN PLAN AND PROFILE DRAWING.
5. SEAT MANHOLE FRAME IN SEALANT PER COH STANDARD SPECIFICATION.
6. ECCENTRIC PRECAST CONCRETE MANHOLE MAY BE USED.
7. OMIT CEMENT MORTAR WHEN MANHOLE IS LOCATED IN PAVED AREAS.
8. MIN REINFORCING IN THE PRECAST CONCRETE BASE SHALL BE # 5 @ 8 EW.



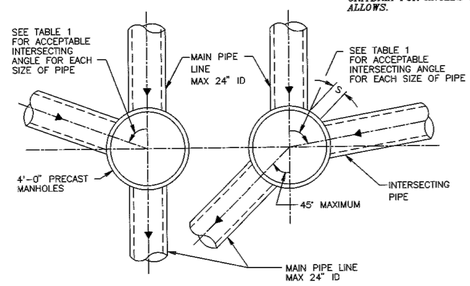
SECTION (A)

CITY OF HOUSTON	
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING	
SANITARY SEWER 4'-0" DIAMETER PRECAST CONCRETE MANHOLE (NOT TO SCALE)	
APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JULY-01-2010	DWG NO: 02082-02

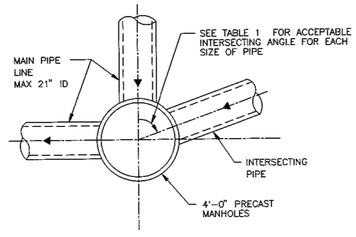
NOTES ON USE OF STANDARD DETAIL 02082-02

NOTES TO SPECIFIER:

1. *"-" INDICATES THAT A SPECIAL DESIGN OR THE NEXT LARGER MANHOLE SIZE SHALL BE USED.*
2. *TABLE 1 IS BASED ON A MIN SEPARATION DISTANCE "S" OF 15.5" OR INTERSECTION PIPE OD/2, WHICHEVER IS GREATER, BETWEEN MAIN AND INTERSECTING PIPES ALONG THE MANHOLE INSIDE WALL ARC.*
3. *PIPE WALL THICKNESS USED IN TABLE 1 ARE BASED ON RCP. THE DESIGN ENGINEER MAY CALCULATE TO SEE IF THINNER WALL PIPES CAN MEET THE SEPARATION CRITERIA FOR ANGLES SMALLER THAN THE TABLE ALLOWS.*



MAX 24" ID MAIN PIPE ALLOWED FOR STRAIGHT THROUGH TO 45° DEFLECTION



MAX 21" ID MAIN PIPE ALLOWED FOR 45° TO 90° DEFLECTION

TABLE 1

MIN ANGLE AND INTERSECTING PIPE SIZES FOR A 4'-0" DIA MANHOLE

INTERSECTING PIPE SIZE (INCHES)	MIN INTERSECTING ANGLE IN DEGREES FOR FOR VARIOUS MAIN PIPE SIZES IN INCHES							
	6"	8"	10"	12"	15"	18"	21"	24"
6	55	58	60	65	70	75	80	85
8		60	63	68	73	77	82	87
10			66	71	75	80	85	90
12				76	80	85	90	–
15					85	90	–	–
18						–	–	–
21							–	–
24								–

NOT APPLICABLE UNLESS HYDRAULICS DICTATE (INTERSECTING PIPE > MAIN PIPE)

CITY OF HOUSTON	
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING ENGINEERING, CONSTRUCTION AND REAL ESTATE DIVISION	
SANITARY SEWER 4'-0" DIAMETER PRECAST CONCRETE MANHOLE NOTES (NOT TO SCALE)	
APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002	DWG NO: 02082N-02

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SURVEYED BY: KUO Inc.
FB NO. F-4578

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02/16/2026

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

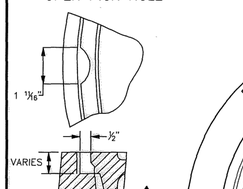
RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

WASTEWATER DETAILS
(SHEET 1 OF 5)

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 78 OF 125	

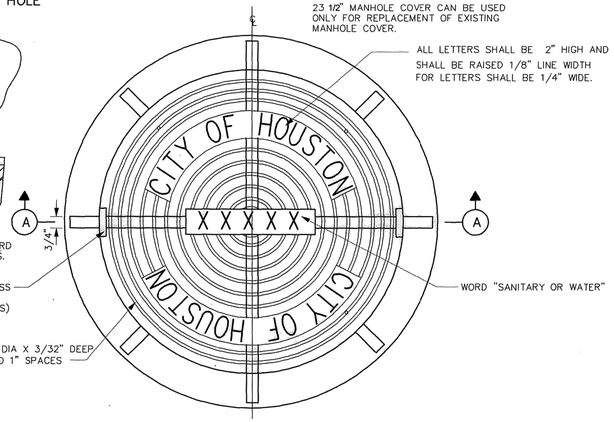
FILE PATH: C:\Users\andres.martinezjr\DC\ACCDocs\Tetra Tech Inc\200-317106-24001 COH LS Rehab Design\Project Files\CAD\R-000267-01DGN.dgn
DGN: R-000267-01DGN -STYLE: Engineering Standard.ctb WORKSET: Standard DETAILS PLOTTED: 22/Feb/2026 11:19 AM

TYPE 1
OPEN PICK HOLE



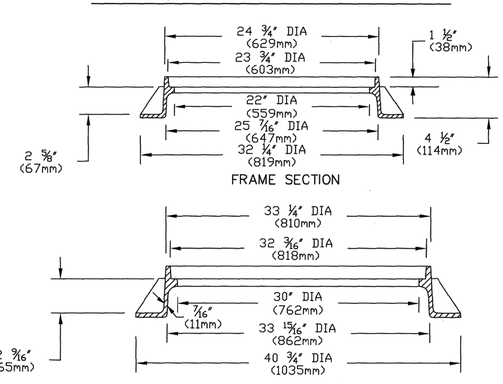
OTHER OPEN PICK HOLES ARE STANDARD ON CERTAIN COVERS.

NOTE:
23 1/2" MANHOLE COVER CAN BE USED ONLY FOR REPLACEMENT OF EXISTING MANHOLE COVER.



PLAN

23 1/2" MANHOLE COVER WITH FRAME



SECTION (A)

32" MANHOLE COVER WITH FRAME

1) NOTE: APPROXIMATE WEIGHTS.
FRAME- 170 LBS 77 kg
COVER- 270 LBS 123 kg
UNIT- 440 LBS 200 kg

2) MATERIAL- GRAY IRON ASTM A48 CL35B

3) CASTING TO MEET M306 PROOF LOAD SPECIFICATION

4) MODEL V-14240 ASY OR APPROVED EQUAL

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

SANITARY SEWER AND WATER MANHOLE FRAME AND COVER

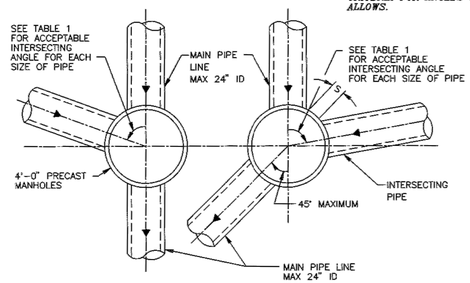
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JUL-01-2016	DWG NO: 02090-01

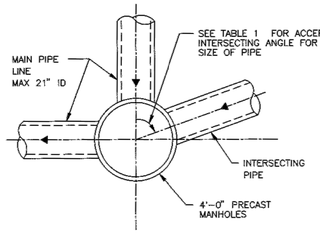
NOTES ON USE OF STANDARD DETAIL 02082-02

NOTES TO SPECIFIER:

1. *"-" INDICATES THAT A SPECIAL DESIGN OR THE NEXT LARGER MANHOLE SIZE SHALL BE USED.*
2. *TABLE 1 IS BASED ON A MIN SEPARATION DISTANCE "S" OF 15.5" OR INTERSECTION PIPE OD/2, WHICHEVER IS GREATER, BETWEEN MAIN AND INTERSECTING PIPES ALONG THE MANHOLE INSIDE WALL ARC.*
3. *PIPE WALL THICKNESS USED IN TABLE 1 ARE BASED ON RCP. THE DESIGN ENGINEER MAY CALCULATE TO SEE IF THINNER WALL PIPES CAN MEET THE SEPARATION CRITERIA FOR ANGLES SMALLER THAN THE TABLE ALLOWS.*



MAX 24" ID MAIN PIPE ALLOWED FOR STRAIGHT THROUGH TO 45° DEFLECTION



MAX 21" ID MAIN PIPE ALLOWED FOR 45° TO 90° DEFLECTION

TABLE 1

MIN ANGLE AND INTERSECTING PIPE SIZES FOR A 4'-0" DIA MANHOLE

INTERSECTING PIPE SIZE (INCHES)	MIN INTERSECTING ANGLE IN DEGREES FOR FOR VARIOUS MAIN PIPE SIZES IN INCHES							
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12				76	80	85	90	–
15					85	90	–	–
18						–	–	–
21							–	–
24								–

NOT APPLICABLE UNLESS HYDRAULICS DICTATE (INTERSECTING PIPE > MAIN PIPE)

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING, CONSTRUCTION AND REAL ESTATE DIVISION

SANITARY SEWER
4'-0" DIAMETER PRECAST
CONCRETE MANHOLE NOTES
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002	DWG NO: 02082N-02

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E usinfrastructure@rpsgroup.com

SURVEYED BY: KUO Inc.
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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

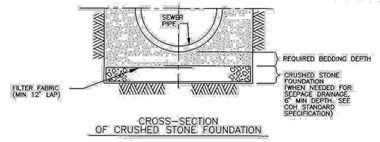
RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

WASTEWATER DETAILS
(SHEET 2 OF 5)

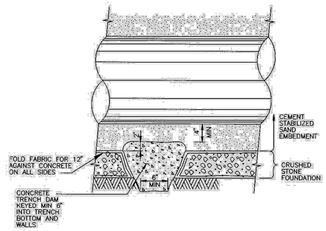
WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 79 OF 125	

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; OR OTHER CLASS II EMBEDMENT, IN WET STABLE TRENCH CONDITIONS.
3. PLACE TRENCH DAMS IN CLASS I EMBEDMENTS AT THE MIDPOINT OF PIPE SEGMENTS LONGER THAN 100 FEET BETWEEN MANHOLES.



CROSS-SECTION
OF CRUSHED STONE FOUNDATION



LONGITUDINAL SECTION ALONG PIPE ℄
AT FOUNDATION TRENCH DAM

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING, CONSTRUCTION AND REAL ESTATE DIVISION

SANITARY OR STORM SEWER
CRUSHED STONE FOUNDATION
FOR WET STABLE TRENCH
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER
APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING

EFF. DATE: OCT-01-2002 DWG NO.: 02317-02

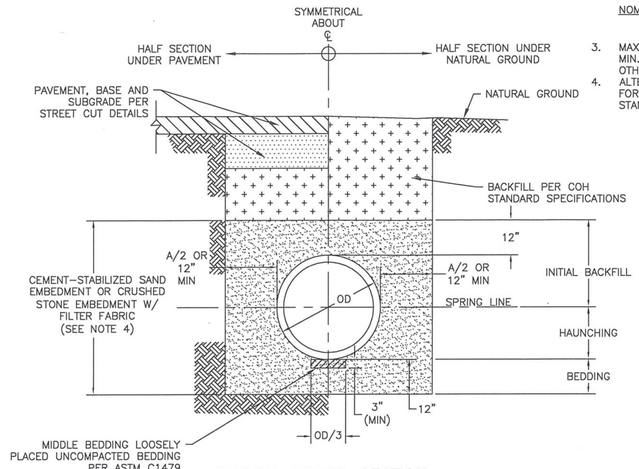
02317-03

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 BACKFILL 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

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02/16/2026

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

WASTEWATER DETAILS
(SHEET 3 OF 5)

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
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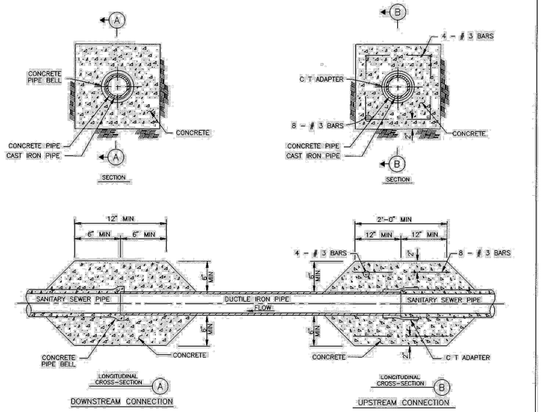
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 80 OF 125	

FILE PATH: C:\Users\andres.martinezjr\DC\ACCDocs\Tetra Tech Inc\200-317106-24001 COH LS Rehab Design\Project Files\CAD\R-000267-00178A-3_DETAILS.dwg PLOTTED: 5/20/2026 11:19 AM

FILE PATH: C:\Users\andres.martinezjr\DC\ACCDocs\Tetra Tech Inc\200-317106-24001 COH LS Rehab Design\Project Files\CAD\R-000267-01078A-STY(Estándar).dwg, WASTEWATER DETAILS (SHEET 4 OF 5), 62/2016/2026 11:19 AM

NOTE:
1. THE CONTRACTOR SHALL CENTER A MINIMUM OF 18 FOOT JOINT OF DUCTILE IRON PIPE OR C900 PVC PIPE ACROSS THE CENTER OF THE PROPOSED STORM SEWER.

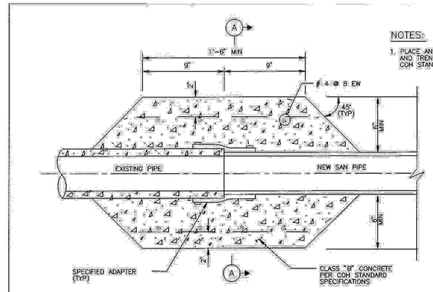


CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING, CONSTRUCTION AND REAL ESTATE DIVISION

SANITARY SEWER
DUCTILE IRON PIPE
STORM SEWER CROSSING
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002	DWG NO: 02531-03

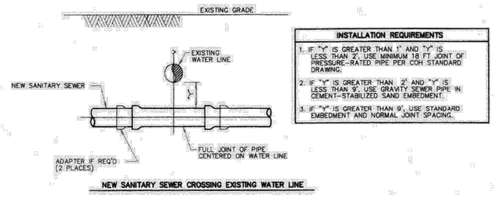
NOTES:
1. PLACE AND COMPACT EMBEDMENT AND TRENCH ZONE BACKFILL PER COH STANDARD SPECIFICATIONS.



CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING, CONSTRUCTION AND REAL ESTATE DIVISION

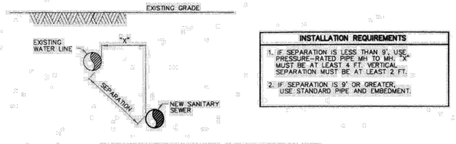
SANITARY SEWER
PIPE TRANSITION FOR 36" SEWER AND SMALLER
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002	DWG NO: 02531-04



INSTALLATION REQUIREMENTS
1. IF "X" IS GREATER THAN 1' AND "Y" IS LESS THAN 2', USE MINIMUM 18 FT JOINT OF PRESSURE-RATED PIPE PER COH STANDARD DRAWING.
2. IF "X" IS GREATER THAN 2' AND "Y" IS LESS THAN 9', USE GRAVITY SEWER PIPE IN CEMENT-STABILIZED SAND EMBEDMENT.
3. IF "Y" IS GREATER THAN 9', USE STANDARD EMBEDMENT AND NORMAL JOINT SPACING.

NEW SANITARY SEWER CROSSING EXISTING WATER LINE



INSTALLATION REQUIREMENTS
1. IF SEPARATION IS LESS THAN 9', USE PRESSURE-RATED PIPE. MH TO MH MUST BE AT LEAST 4 FT. VERTICAL SEPARATION MUST BE AT LEAST 2 FT.
2. IF SEPARATION IS 9' OR GREATER, USE STANDARD PIPE AND EMBEDMENT.

NEW SANITARY SEWER PARALLEL TO EXISTING WATER LINE

INSTALLING SANITARY SEWERS CROSSING OR PARALLEL TO WATER LINES

NOTES:
1. SANITARY SEWER MUST BE BELOW WATER LINE WHEREVER POSSIBLE. WHEN WATERLINE IS BELOW THE SANITARY SEWER PROVIDE MINIMUM 2 FT SEPARATION. AND INSTALL PIPE IN ACCORDANCE TO CHAPTER 7 TABLE 7.3 OF COH DESIGN MANUAL.
2. WHEN PRESSURE-RATED PIPE IS REQUIRED, PROVIDE PIPE WITH MINIMUM 150 psi PRESSURE RATING.
3. ADAPTERS MUST BE FACTORY-MOLDED OR FABRICATED, WITH RING STIFFNES AT LEAST EQUAL TO THE ADJOINING SANITARY SEWER PIPE, AND USING RESILIENT GASKET OR SEAL MATERIAL. FLEXIBLE RUBBER "BOOT" TYPE ADAPTERS WILL NOT BE ACCEPTED.
4. INSTALL FORCE MAINS SAME AS FOR GRAVITY SEWER, USING SPECIFIED PRESSURE PIPE.
5. "Y" MUST ALWAYS BE GREATER THAN OR EQUAL TO 1 FT FOR PRESSURE RATED SS AND 2 FT FOR NON-PRESSURE RATED SS.
6. "X" MUST BE GREATER THAN OR EQUAL TO 4 FT.
7. ALTERNATIVES MAY BE SHOWN ON THE DRAWINGS OR DESCRIBED IN THE SPECIFICATIONS.
8. SEPARATION REQUIREMENTS SHOWN HERE DO NOT APPLY TO SERVICE CONNECTIONS – REFER TO PLUMBING CODE FOR APPLICABLE REQUIREMENTS.

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

SANITARY SEWER
INSTALLING SANITARY SEWERS CROSSING OR PARALLEL TO WATER LINES
(NOT TO SCALE)

APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JUL-01-2010	DWG NO: 02531-05

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SURVEYED BY: KUO Inc.
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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

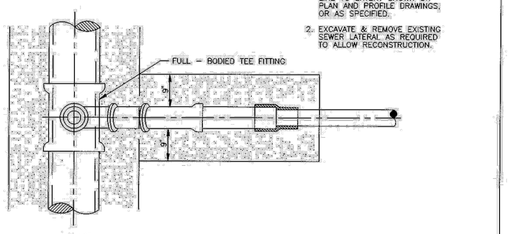
RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

WASTEWATER DETAILS
(SHEET 4 OF 5)

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 81 OF 125	

NOTES:

1. REPLACE EXISTING SERVICE LINE TO EXTENT SHOWN ON PLAN AND PROFILE DRAWINGS, OR AS SPECIFIED.
2. EXCAVATE & REMOVE EXISTING SEWER LATERAL AS REQUIRED TO ALLOW RECONSTRUCTION.

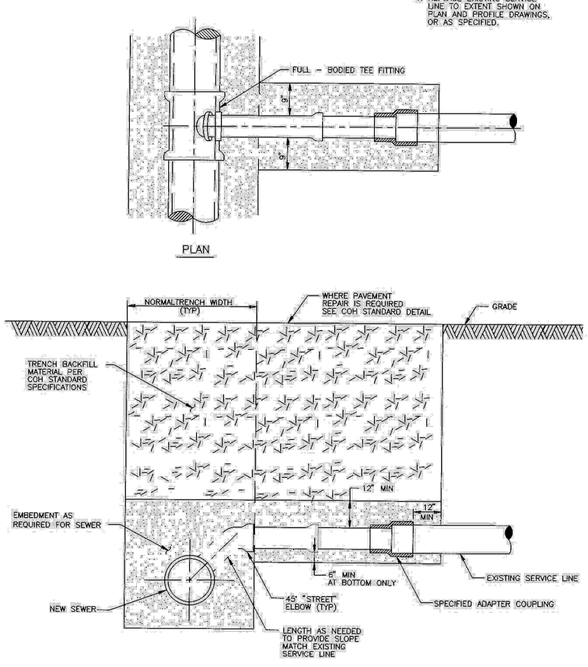


CROSS–SECTION OF SEWER AT SERVICE CONNECTION

CITY OF HOUSTON DEPARTMENT OF PUBLIC WORKS AND ENGINEERING ENGINEERING, CONSTRUCTION AND REAL ESTATE DIVISION	
SANITARY SEWER SERVICE RECONNECTION WITH STACK ON NEW OR REPLACEMENT SEWER (NOT TO SCALE)	
APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT–01–2002	DWG NO: 02534–02

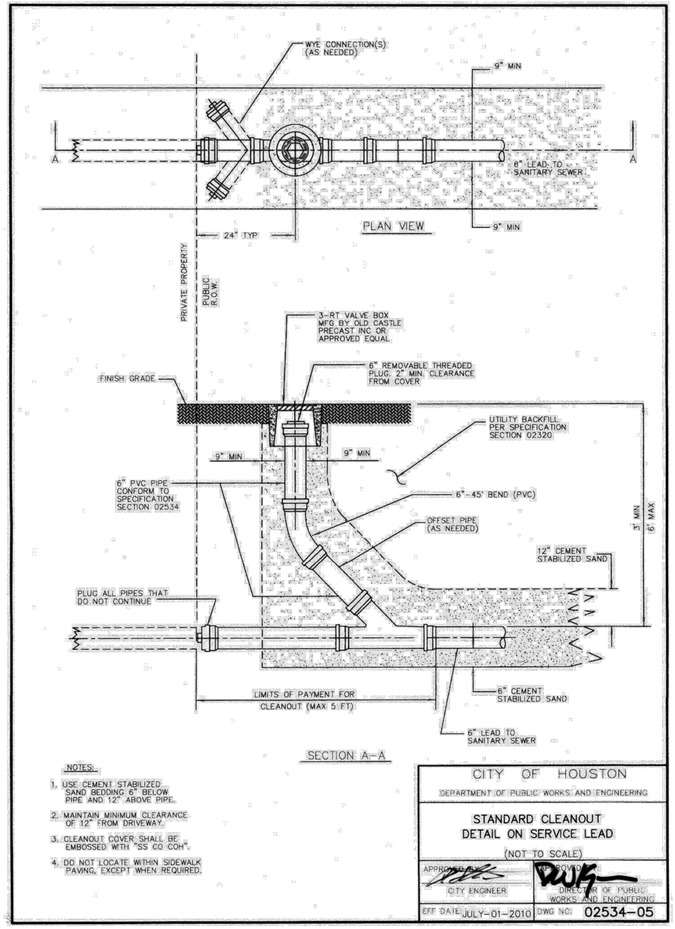
NOTE:

1. REPLACE EXISTING SERVICE LINE TO EXTENT SHOWN ON PLAN AND PROFILE DRAWINGS, OR AS SPECIFIED.



CROSS–SECTION OF SEWER AT SERVICE CONNECTION

CITY OF HOUSTON DEPARTMENT OF PUBLIC WORKS AND ENGINEERING ENGINEERING, CONSTRUCTION AND REAL ESTATE DIVISION	
SANITARY SEWER SERVICE RECONNECTION ON NEW OR REPLACEMENT SEWER (NOT TO SCALE)	
APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT–01–2002	DWG NO: 02534–04



SECTION A–A

NOTES:

1. USE CEMENT STABILIZED SAND BEDDING 6" BELOW PIPE AND 12" ABOVE PIPE.
2. MAINTAIN MINIMUM CLEARANCE OF 12" FROM DRIVEWAY.
3. CLEANOUT COVER SHALL BE EMBOSSED WITH "SS CO COH".
4. DO NOT LOCATE WITHIN SIDEWALK PAVING, EXCEPT WHEN REQUIRED.

CITY OF HOUSTON DEPARTMENT OF PUBLIC WORKS AND ENGINEERING	
STANDARD CLEANOUT DETAIL ON SERVICE LEAD (NOT TO SCALE)	
APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JULY–01–2010	DWG NO: 02534–05

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RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

WASTEWATER DETAILS
(SHEET 5 OF 5)

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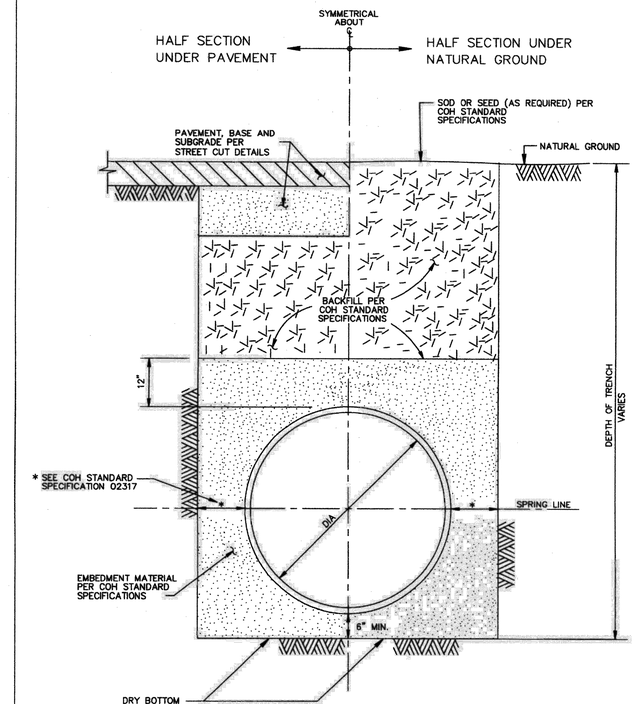
TAHA LOTIA	
SHEET NO. 82 OF 125	

FILE PATH: C:\Users\andres.martinezjr\DC\ACCDocs\Tetra Tech Inc\200–317106–24001 COH LS Rehab Design\Project Files\CAD\R–000267–00178A–3\DETAILS PLOTTED: 2/16/2026 11:20 AM



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 BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JUL-01-2010	DWG NO: 02317-04

RPS
A TETRA TECH COMPANY
Texas PE Firm Reg. #F-929
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E usinfrastructure@rpsgroup.com

SURVEYED BY: KUO Inc.
FB NO. F-4578

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Jeremy Austin, P.E.
Texas P.E. No. 116816
02/16/2026

It is not to be used for bidding, construction, or permitting purposes.

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

FORCE MAIN DETAILS
(SHEET 1 OF 3)

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 83 OF 125	

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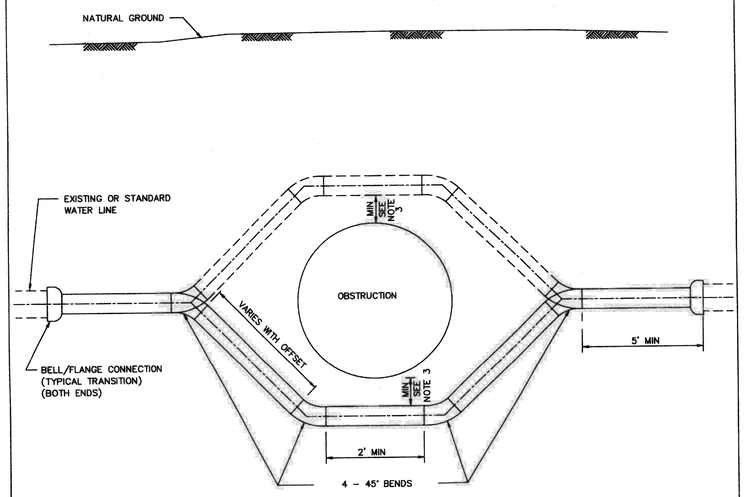
NOTE:

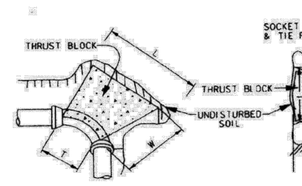
1. MATERIALS AND COATINGS TO BE IN ACCORDANCE WITH WATER LINE STANDARD SPECIFICATIONS.
2. RESTRAIN EXISTING PIPING BEYOND STEEL SECTION AS REQUIRED TO PREVENT MOVEMENT.
3. AS PER DESIGN GUIDELINE.



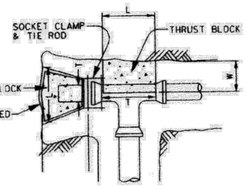
PIPE OFFSET ALTERNATES

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 ACCORDANCE WITH CITY STANDARD SPECIFICATIONS.

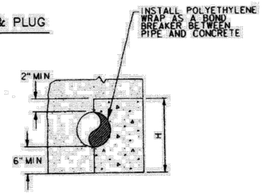
CITY OF HOUSTON DEPARTMENT OF PUBLIC WORKS AND ENGINEERING	
TYPICAL STEEL PIPE OFFSET SECTION FOR WATER LINES (NOT TO SCALE)	
APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JULY-01-2010	DWG NO: 02511-01



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 BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JULY-01-2010	DWG NO: 02511-02

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

FORCE MAIN DETAILS
(SHEET 2 OF 3)

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 84 OF 125	

FILE PATH: C:\Users\andres.martinezjr\DC\ACCDocs\Tetra Tech Inc\200-317106-24001 COH LS Rehab Design\Project Files\CAD\R-000267-01078A-3\DETAILS P[3]SHEET: 22/0F6/2/2026 11:20 AM

FILE PATH: C:\Users\andres.martinezjr\DC\ACCDocs\Tetra Tech Inc\200-317106-24001 COH LS Rehab Design\Project Files\CAD\R-000267-00178A-3\DETAILS P(3).dwg PLOTTED: 12/16/2025 11:20 AM

3" DROP FORGED "D" RING

2" DIAMETER STEEL PLATE 1/8" THICKNESS

2 1/2" DIAMETER STEEL PLATE 3/16" THICKNESS

⅛"

¼"

SIDE VIEW

9"

6"

PLAN VIEW

CB SERIES FALL PROTECTION CB-1B BOLT ANCHORED

DETAIL 1 ZOC10 — NTS

NOTES:

STEEL BASE PLATE SHALL BE ¼" HOT ROLLED STEEL PLATE THAT MEETS ASTM A-570 SPECIFICATIONS.

2 ¼" DIAMETER STEEL PLATE, ⅜" THICK ATTACHED TO BASE PLATE USING ¼" FILLET WELD.

2" DIAMETER FORMED STEEL PLATE, ⅜" THICK USED TO ATTACHED "D" RING TO THE 2 ½" DIAMETER STEEL PLATE USING A ⅜" FILLET WELD.

BASE PLATE CAN BE BOLTED TO CONCRETE, STEEL, OR WOOD AS NEEDED PER APPLICATION.

ANCHOR BOLTS SHALL BE ½" DIAMETER ANCHOR BOLTS.

ANCHOR BOLTS SHALL SUSTAIN A MINIMUM ULTIMATE PULL-OUT LOAD OF AT LEAST 6,000 POUNDS.

WELDING SHALL BE PERFORMED BY A CERIFIIED WELDER USING E-70XX ROD OR WIRE FEED.

ANCHOR ENCLOSURE TO PAVEMENT IN ACCORDANCE WITH MFG'S INSTRUCTIONS USING TYPE 316 SS CONC ANCHOR BOLTS

INSIDE DIM

6 1/2" INSIDE DIM

46" INSIDE DIM

PLAN VIEW

EXPANDED METAL (TYP)

1 1/2" ROUND TUBING (TYP)

16 1/2"

13"

ø9/16"

316 SS CONCRETE ANCHOR BOLTS & HARDWARE

SEE STRUCTURAL SHEETS FOR REINFORCEMENT DETAILS EL. XX.XX

℄ BACKFLOW PREVENTOR

SIDE VIEW

REDUCED PRESSURE BACKFLOW PREVENTER ASS'Y. FEBCO REGULATOR MODEL NO. 825Y OR APPROVED EQUAL

METAL CAGE BACKFLOW ENCLOSURE PAINT EXTERIOR SURFACE GREEN. SEE NOTE 3.

46"

"Y" STRAINER

30 1/2"

3" MIN. TYP (NTS)

12" MIN

UNION, TYP

PVC SLEEVE FILLED w/ EPOXY GROUT (TYP)

TOP OF CONC PAVEMENT EL XX.XX

ADJUSTABLE PIPE SUPPORT BOLTED TO CONCRETE SEE DETAIL 1 OR 2, SHEET ZOC02

REDUCER IF REQ'D

WATER LINE FROM WATER METER SEE DETAIL 15, THIS SHEET ZOC08

3/4" COPPER WATER LINE

FRONT VIEW

TO HOSE BIB @ LIFT STATION SEE DETAIL 15, SHEET ZOC07 & SITE PLAN

REDUCED PRESSURE BACKFLOW PREVENTOR INSTALLATION DETAIL

DETAIL 2 ZOC10

MIN 2.0 CLR OPENING PAD-LOCKABLE ALUMINUM ACCESS HATCH: HALLIDAY SERIES R1R MODEL NO. R1R72; U.S.F. FABRICATION MODEL BPC; OR APPROVED EQUAL. (SEE SHEET 12(X))

6" MIN/12" MAX CLEARANCE

PROP XX" PLUG VALVE

PROPOSED BYPASS MANHOLE

PROP XX" TEE

FLOW FROM LIFT STATION

WX

XX" BLIND FLANGE

℄

TOP OF SLAB ELEV = XX.XX

NEW XX" D.I. PIPE FORCE MAIN PIPING

NEW XX" DIA. PVC (C-900) FORCE MAIN PIPE

4'-0" MIN

VARIES (SEE NOTE 1)

TRANSITION POINT

RESILIENT CONNECTOR PER ASTM C923 (TYP)

STD COH PRECAST MH SECTION (INCLUDING FOUNDATION) SEE COH STANDARD SPECIFICATION

GROUT BOTTOM TO DRAIN TO OPENING

12"

12" MIN.

#4@12" E.W.

12" THICKNESS 1.5" TO 2" WASHED BANK RUN GRAVEL

12" DIAMETER OPENING @ 12" OFF CENTER EACH WAY TO EDGE OF OPENING, FILL OPENING W/ GRAVEL

NOTE:
1. VERIFY BYPASS MANHOLE DIAMETER WITH COH PM. MINIMUM DIAMETER SIZE EQUAL TO 6 FEET.

BYPASS MANHOLE DETAIL

DETAIL 4 ZOC10 — SCALE: ½"=1'

NOTES TO DESIGN ENGINEER:

A. THESE LIFT STATION DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF CITY OF HOUSTON WASTEWATER SUBMERSIBLE LIFT STATIONS. THEIR INTENDED USE IS AS A FRAMEWORK FOR THE CONTRACTED DESIGN ENGINEER IN DEVELOPING SPECIFIC LIFT STATION DESIGNS.

IT IS THE RESPONSIBILITY OF THE CONTRACTED DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO SPECIFIC SITE REQUIREMENTS.

B. THE DESIGN ENGINEER SHALL DETERMINE SIZE OF WATER LINES, VALVES, METERS, AND BACKFLOW PREVENTERS PER SPECIFIC SITE REQUIREMENTS.

C. DESIGN ENGINEER TO REVISE NOTE NO. 2 TO CONTRACTOR BY SELECTING THE APPROPRIATE COLOR OF FENCING AND SLATS. DO NOT LEAVE SELECTIONS IN "ITALIC" TEXT. SELECTION OF COLOR TO BE DETERMINED DURING PROJECT REVIEW.

D. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCING ACCORDINGLY.

E. THE DESIGN ENGINEER SHALL CONSULT THE CITY OF HOUSTON DESIGN GUIDELINES MANUAL, THE STANDARD SPECIFICATIONS, AND THE MASTER SPECIFICATIONS FOR FURTHER INSTRUCTIONS AND INFORMATION PERTINENT TO THESE STANDARD DESIGN GUIDELINE DRAWINGS.

F. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES; ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE LIFT STATION DESIGN.

NOTE:

1. VERIFY BYPASS MANHOLE DIAMETER WITH COH PM. MINIMUM DIAMETER SIZE EQUAL TO 6 FEET.

TYPICAL SITE DETAILS

PROJECT NO. R-0267-02-2

TITLE CITY OF HOUSTON
DESIGN GUIDELINE DRAWINGS
FOR SUBMERSIBLE LIFT STATIONS

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING, CONSTRUCTION AND REAL ESTATE GROUP

APPROVALS

WATER DESIGN | TRAFFIC AND SIGNAL DESIGN

STORM SEWER DESIGN | STREET, BRIDGE & R.O.W.

WASTEWATER DESIGN | CONSTRUCTION

OTHER REVIEWS

PLANNING AND DEVELOPMENT

CITY ENGINEER | DATE

SCALE: NONE | DESIGNED BY:
SUBMITTED: | DRAWN BY:
DATE: DECEMBER, 1996 | SHEET NO. OF SHEETS
SURVEY BY: | DWG. NO. ZOC10
FIELD BOOK NO.

REV. NO.	DESCRIPTION	APP'D	DATE

SEAL:

CADD DWG. FILE NO. ZOC08.DWG (Scale: 1=8)

COHSTD.BDR

0 1 2 3 ORIGINAL SCALE IN INCHES FOR REDUCED PLANS

COVER HINGED THIS SIDE

SAFETY GRATE HINGED THIS SIDE

SAFETY GRATE HINGED THIS SIDE

SAFETY GRATE LIFT HANDLE

GRATE 9

SLAM LOCK 7

LIFT HANDLE 8

B-1

{ COVER NOT SHOWN FOR CLARITY }

O-1

A-1

DETAIL B

DETAIL A

REMOVABLE TEE HANDLE

Inside Turn Handle

STAINLESS STEEL SLAM LOCK

NOTE:
T.O.C. @ 46.20

ANCHOR PLATES

LIFTING HANDLE

PADLOCK BAR

71" OPENING

77" OVERALL (TYP)

48" OPENING

1/4" (7 MM) THICK DIAMOND PATTERN ALUM. COVER PLATE

S.STL. & ALUM. POSITIVE LOCKING HOLD OPEN ARM

T-316 STAINLESS STEEL HINGES WITH TAMPER PROOF FASTENERS

(COVER SHOWN IN OPEN POSITION)

RECESSED TYPE LOCK BOX

PRIMER REQUIRED

CONCRETE APPLICATION

71" OPENING

OMIT ANCHOR PLATES FOR FIBERGLASS APPLICATION

SECTION

NOTE:

1. ALL HATCH COVERS MUST HAVE A RECESSED MECHANISM FOR A PADLOCK

PATTERN NO.	DIMENSIONS IN INCHES		UNOBSTRUCTED CLEAR OPENING	HEIGHT	DIAGONAL
ALUMINUM	A x A1	B x B1	O x O1	C	D
FLED-AOSH	PER MANUFACTURER	PER MANUFACTURER	MATCH EXISTING	PER MANUFACTURER	PER MANUFACTURER

1.) MATERIAL SHALL BE 6061-T6 ALUMINUM FOR BARS, ANGLES, AND EXTRUSIONS. 1/4" DIAMOND PLATE SHALL BE 5086 ALUMINUM. EXTERIOR OF FRAME WHICH COMES IN CONTACT WITH CONCRETE SHALL HAVE ONE COAT FOREST GREEN PAINT.

2.) UNIT DESIGNED PEDESTRIAN RATED FOR A MINIMUM LIVE LOAD OF 300 LBS./SQ.FT.

3.) DOOR SHALL BE EQUIPPED WITH A HOLD OPEN ARM. DOOR SHALL LOCK OPEN IN THE 90 DEGREE POSITION. HOLD OPEN ARM SHALL BE FASTENED TO THE FRAME WITH A 1/2" GRADE 316 STAINLESS STEEL BOLT.

4. ANGLE FRAME SHALL BE OF EXTRUDED ALUMINUM, WITH A CONTINUOUS 1-1/2" ANCHOR FLANGE.

5.) COVER HINGES SHALL BE OF HEAVY DUTY DESIGN. MATERIAL SHALL BE GRADE 316 STAINLESS STEEL. EACH HINGE SHALL HAVE A GRADE 316 STAINLESS STEEL 3/8" DIAMETER HINGE PIN. HINGE SHALL BE FASTENED TO ANGLE AND DIAMOND PLATE WITH GRADE 316 STAINLESS STEEL BOLTS AND NY-LOCK NUTS.

6.) ALL HARDWARE SHALL BE STAINLESS STEEL.

7 EACH HATCH SHALL BE SUPPLIED WITH A GRADE 316 STAINLESS STEEL SLAM LOCK, WITH KEY WAY PROTECTED BY A THREADED PLUG. PLUG SHALL BE FLUSH WITH THE TOP OF THE 1/4" DIAMOND PLATE. SLAM LOCK SHALL BE FASTENED WITH FOUR GRADE 316 STAINLESS STEEL BOLTS AND WASHERS.

8 EACH HATCH SHALL BE EQUIPPED WITH AN ALUMINUM LIFT HANDLE. THE LIFT HANDLE SHALL BE FLUSH WITH THE TOP OF THE 1/4" DIAMOND PLATE.

9 UNITS SHALL BE SUPPLIED WITH A HINGED SAFETY GRATES (SAFETY YELLOW) TO PROVIDE PROTECTION AGAINST FALL THROUGH AND TO CONTROL ACCESS TO THE CONFINED SPACE. (SEE SAFETY GRATE SPECIFICATIONS ON SEPARATE PAGE.)

10.) HATCH COVERS SHALL BE PAINTED FOREST GREEN TO DEMARCATE AND PREVENT VANDALISM.

STANDARD FEATURES:

- AUTO-LOCK T-316 STAINLESS STEEL
- HOLD OPEN ARM WITH RELEASE HANDLE
- 316 SS STAINLESS STEEL HINGES AND ATTACHING HARDWARE
- NON-CORROSIVE, LOCKING BAR
- SINGLE LEAF CONSTRUCTION FOR MAXIMUM ACCESS
- 300 LBS. PER SQ. FT. LOAD RATING (1464 KG. PER SQ. METER LOAD RATING)
- EXTRUDED ALUMINUM FRAME
- RECESSED LIFTING HANDLE
- ANCHOR PLATES (ORDER WITHOUT FOR FIBERGLASS OR DROP-IN INSTALLATIONS)
- LIFETIME GUARANTEE
- COVERED FRAME PAINTED FOREST GREEN
- PROVIDE ACCESS HATCH DOOR WITH RECESSED (PATENTAL) TYPE PADLOCK CLIPS. EXPOSED PADLOCK CLIP NOT ALLOWED.

STANDARD SIZES

QTY.	MODEL NO.	A DIM. INCHES (MM)	B DIM. INCHES (MM)	C DIM. INCHES (MM)	UNIT WT. LBS. (KG.)
1	R1R72	48 (1216)	71 (1803)	77 (1956)	175 (79)

FORCE MAIN BYPASS MANHOLE HATCH

SOURCE: HALLIDAY PRODUCTS
PHONE: 1 (800) 298-1027

LIFT STATION WET WELL AND SPLITTER BOX HATCHES

SOURCE: ITT/FLYGT

NOTES TO DESIGN ENGINEER:

A. THESE LIFT STATION DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF CITY OF HOUSTON WASTEWATER SUBMERSIBLE LIFT STATIONS. THEIR INTENDED USE IS AS A FRAMEWORK FOR THE CONTRACTED DESIGN ENGINEER IN DEVELOPING SPECIFIC LIFT STATION DESIGNS.

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TYPICAL SITE DETAILS

PROJECT NO. R-0267-02-2

TITLE CITY OF HOUSTON
DESIGN GUIDELINE DRAWINGS
FOR SUBMERSIBLE LIFT STATIONS

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING, CONSTRUCTION AND REAL ESTATE GROUP

APPROVALS

WATER DESIGN | TRAFFIC AND SIGNAL DESIGN

STORM SEWER DESIGN | STREET, BRIDGE & R.O.W.

WASTEWATER DESIGN | CONSTRUCTION

OTHER REVIEWS

PLANNING AND DEVELOPMENT

CITY ENGINEER | DATE

SCALE: NONE | DESIGNED BY:
SUBMITTED: | DRAWN BY:
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02/16/2026

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION COH LIFT STATIONS

FORCE MAIN DETAILS (SHEET 3 OF 3)

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 85 OF 125	

GENERAL NOTES

1. THE CONTRACTOR SHALL PROVIDE AND INSTALL TRAFFIC CONTROL DEVICES IN CONFORMANCE WITH PART VI OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) LATEST EDITION WITH REVISIONS DURING THE ENTIRE CONSTRUCTION PERIOD.
2. ALL SIGNS AND TRAFFIC CONTROL DEVICES SHALL CONFORM THE LATEST VERSION OF THE TMUTCD.
3. NO LANES SHALL BE CLOSED DURING THE HOURS OF 7:00 AM TO 9:00 AM AND 4:00 PM TO 6:00 PM MONDAY THRU FRIDAY WITHOUT APPROVAL OF THE CITY TRAFFIC ENGINEER.
4. NO WORK SHALL BE PERFORMED IN RESIDENTIAL AREAS FROM 7:00 PM TO 7:00 AM.
5. CONTRACTOR SHALL MAINTAIN APPROVED NUMBER OF THROUGH LANES OF TRAFFIC IN EACH DIRECTION DURING CONSTRUCTION WORKING HOURS. TRAFFIC CONTROL PLANS SHALL INCLUDE ONE-WAY AND/OR DETOUR PLANS. CONTRACTOR SHALL MAINTAIN ADA COMPLIANT PEDESTRIAN ACCESS TO BUS STOPS AND ADEQUATE BUS ACCESS TO ALL THE BUS STOPS.
6. CONTRACTOR SHALL MAINTAIN TRAFFIC LANES AND DETOURS ACCORDING TO TRAFFIC CONTROL PLANS DURING WORKING HOURS.
7. CONTRACTOR SHALL COVER OPEN PAVEMENT EXCAVATIONS FOR MINOR UTILITY WORK WITH ANCHORED STEEL PLATES DURING NON-WORKING HOURS, AND OPEN LANES FOR NORMAL TRAFFIC FLOW WHEN FEASIBLE.
8. IF THE CONTRACTOR CHOOSES TO USE A DIFFERENT METHOD OF "TRAFFIC CONTROL PLANS" DURING THE CONSTRUCTION THAN WHAT IS OUTLINED IN THE CONTRACT DRAWINGS, THE CONTRACTOR SHALL BE RESPONSIBLE TO PREPARE AND SUBMIT AN ALTERNATE SET OF TRAFFIC CONTROL PLANS TO THE CITY OF HOUSTON PROJECT MANAGER FOR APPROVAL TEN WORKING DAYS PRIOR TO IMPLEMENTATION. THESE PLANS SHALL BE DRAWN TO SCALE ON REPRODUCIBLE MYLARS AND SHALL BE SEALED BY A LICENSED ENGINEER IN THE STATE OF TEXAS. OFFICE OF THE CITY ENGINEER, MOBILITY PERMITS SECTION REPRESENTATIVE APPROVAL IS REQUIRED TO ACCEPT THE PROPOSED CHANGES.
9. CONTRACTOR SHALL SECURE LANE/SIDEWALK/BICYCLE FACILITY CLOSURE PERMITS FROM OFFICE OF CITY ENGINEER (MOBILITY PERMIT SECTION AT https://pwtrub.houstontx.gov) BEFORE IMPLEMENTING THE TRAFFIC CONTROL PLAN. THE APPLICATION MUST BE SUBMITTED AT LEAST TEN DAYS PRIOR TO THE IMPLEMENTATION OF THE TRAFFIC CONTROL PLAN AND/OR BEGINNING CONSTRUCTION WORK. THE CONTRACTOR SHALL PROVIDE TRAFFIC CONTROL PLANS, CONSTRUCTION SEQUENCING, AND CONSTRUCTION SCHEDULE WITH THE APPLICATION.
10. CONTRACTOR SHALL HAVE APPROVED TRAFFIC CONTROL PLAN AND PERMIT AT THE JOB SITE FOR INSPECTION AT ALL TIMES.
11. DURING PAVEMENT SURFACE RESTORATION PROJECTS; THE CONTRACTOR SHALL NOT OPEN CLOSED LANES UNTIL THE PAVEMENT SURFACE HAS CURED ENOUGH TO ALLOW VEHICULAR TRAFFIC ACCORDING TO CITY OF HOUSTON STANDARD SPECIFICATIONS.
12. THE CONTRACTOR IS RESPONSIBLE FOR SCHEDULING AND COORDINATING ALL CONSTRUCTION ACTIVITIES WITH STAKE HOLDERS IN THE VICINITY INCLUDING EMERGENCY RESPONSE AGENCIES SUCH AS HOUSTON POLICE DEPARTMENT, HOUSTON FIRE DEPARTMENT, AND METROPOLITAN TRANSIT AUTHORITY.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR ISSUING ALL WORK DIRECTIVES TO ALL SUB-CONTRACTORS, UTILITY COMPANIES, AND ALL OTHER ENTITIES PERFORMING CONSTRUCTION WORK ASSOCIATED WITH THE PROJECT.
14. NOTHING IN THESE NOTES OR PLANS SHALL RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT; INCLUDING SAFETY OF ALL MODES OF TRANSPORTATION, PERSONS, AND PROPERTY, AND THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO WORKING HOURS.
15. THE OFFICE OF CITY ENGINEER (MOBILITY PERMITS GROUP) PER THE DIRECTION OF THE CITY TRAFFIC ENGINEER HAVE THE RIGHT TO DEMAND THE INSTALLATION OF ADDITIONAL TRAFFIC CONTROL DEVICES OR MODIFICATIONS OF THESE PLANS AND NOTES, AS DEEMED NECESSARY TO PROMOTE THE SAFE AND EFFICIENT FLOW OF TRAFFIC, INCLUDING PEDESTRIANS AND BICYCLES, THROUGH THE CONSTRUCTION WORK ZONE. THE CONTRACTOR SHALL COMPLY WITH THESE ADDITIONAL REQUESTS OR MODIFICATIONS WITH DUE DILIGENCE.
16. ALL EXISTING TRAFFIC CONTROL SIGNS AND PAVEMENT MARKINGS SHALL BE MAINTAINED IN VISIBLE LOCATIONS DURING CONSTRUCTION UNLESS PRIOR WRITTEN APPROVAL IS OBTAINED FROM CITY OF HOUSTON PROJECT MANAGER. THE CONTRACTOR SHALL RESTORE OR REPLACE (AT THE DISCRETION OF THE CITY TRAFFIC ENGINEER) ANY PAVEMENT MARKING OR SIGNING DAMAGE DURING CONSTRUCTION OPERATIONS, INCLUDING RAISED PAVEMENT MARKERS (RPMS).
17. WHEN ENTERING OR LEAVING ROADWAYS CARRYING PUBLIC TRAFFIC, THE CONTRACTOR'S EQUIPMENT, WHETHER EMPTY OR LOADED SHALL IN ALL CASES YIELD TO PUBLIC TRAFFIC WITH THE ASSISTANCE OF CONTRACTOR PROVIDED CERTIFIED FLAGGER/PEACE OFFICER.
18. ACCESS TO DRIVEWAYS ADJACENT TO THE CONSTRUCTION WORK ZONE SHALL BE MAINTAINED AT ALL TIMES AS MUCH AS POSSIBLE. ADDITIONAL CONES AND/OR DELINEATORS MAY BE REQUIRED TO DELINEATE THE DRIVEWAY ACCESS ROUTE THROUGH THE CONSTRUCTION WORK ZONE. A DRIVEWAY MAY BE CLOSED FOR A SHORT PERIOD OF TIME DURING NON-WORKING HOURS, UNLESS PRIOR WRITTEN APPROVAL IS OBTAINED FROM CITY OF HOUSTON PROJECT MANAGER.
19. SPILLAGE RESULTING FROM HAULING OPERATIONS ALONG OR ACROSS ANY PUBLIC TRAVELED WAY SHALL BE REMOVED IMMEDIATELY BY THE CONTRACTOR.
20. THE CONTRACTOR SHALL SUBMIT AN APPLICATION FOR TEMPORARY PARKING RESTRICTIONS IF THERE ARE PARKING METERS LOCATED AT THE PROPOSED LANE CLOSURES FROM PARKING MANAGEMENT (PARKING@HOUSTONTX.GOV OR 832-393-8690) AT LEAST TEN BUSINESS DAYS BEFORE IMPLEMENTATION OF LANE CLOSURES. IN ADDITION, TEMPORARY NO PARKING SIGNS SHALL BE POSTED 24 HOURS PRIOR TO COMMENCEMENT OF WORK.
21. ADDITIONAL OFF DUTY OFFICERS/FLAGGERS MAY BE REQUESTED TO DIRECT TRAFFIC WHEN LANES ARE BLOCKED AT THE DISCRETION OF THE CITY PROJECT MANAGER EVEN IF THEY ARE NOT SPECIFICALLY IDENTIFIED ON THE PROJECT PLANS.
22. THE CONTRACTOR SHALL REPLACE WITHIN 72 HOURS, ALL TRAFFIC SIGNAL LOOP DETECTORS DAMAGED DURING CONSTRUCTION.
23. IN GENERAL, A SOLAR POWERED FLASHING ARROW BOARD SHALL BE REQUIRED ON ALL MAJOR THOROUGHFARE LANES CLOSURES. EXCEPTIONS TO FLASHING ARROW BOARDS AND/OR IMPLEMENTATION ON RESIDENTIAL LANE CLOSURES SHALL BE APPROVED BY CITY TRAFFIC ENGINEER.
24. APPROVED TRAFFIC CONTROL PLAN SHALL BE IN PLACE BEFORE STARTING ANY EXCAVATION.
25. WATER FILLED BARRIERS CAN BE USED AS INSTRUCTED BY THE ENGINEER AND APPROVED BY THE CITY FOR PROJECTS WHERE SPACE IS LIMITED AND HEAVY EQUIPMENT TO PLACE CONCRETE BARRIERS IS NOT FEASIBLE. WATER FILLED BARRIERS SHALL NOT BE USED ON ROADWAYS WITH A POSTED SPEED LIMIT MORE THAN 45 MPH.
26. WATER FILLED BARRIERS MUST BE INSTALLED AND MAINTAINED PER THE MANUFACTURER'S REQUIREMENTS AND ROUTINELY INSPECTED FOR DEFECTS.
27. IF WATER FILLED BARRIER IS PROVIDED, USE ENVIRONMENTALLY SAFE ANTI-FREEZING AGENT IN THE WATER WHEN IT IS APPLICABLE PER MANUFACTURER SPECIFICATIONS AND RECOVER AGENT WHEN THE BARRIER IS DRAINED.
28. DISPOSE OF WATER AND AGENT PROPERLY. DO NOT DRAIN WATER FILLED BARRIER INTO OR ACROSS AN EXISTING TRAVEL LANE.
29. PROVIDE BARRIER UNITS THAT ARE CAPABLE OF BEING LIFTED AND MOVED WHEN FILLED IF DRAINING IS NOT POSSIBLE.
30. PROVIDE WATER FILLED BARRIER THAT ACTS AS ITS OWN FREE STANDING, NON-REDIRECTIVE END TREATMENT.
31. WHEN WATER FILLED BARRIERS ARE USED TO CHANNELIZE PEDESTRIANS, THEY MUST HAVE A CONTINUOUS DETECTABLE BOTTOM FOR USERS OF LONG CANES AND THE TOP OF THE UNIT SHALL NOT BE LESS THAN 32 INCHES IN HEIGHT.
32. ANY CLOSURE OF A PEDESTRIAN OR BICYCLE FACILITY SHALL REQUIRE THE SHORTEST DETOUR THAT MAINTAINS THE SAFETY OF PEDESTRIAN AND/OR BICYCLISTS.

SPACING FOR CHANNELIZING DEVICES

A. PLASTIC DRUMS ON MERGING TAPER @ 30' C – C WITH CHEVRON SIGN @ 60' C – C AND WARNING LIGHTS FOR OVERNIGHT CLOSURE.

B. PLASTIC DRUMS ON DOWNSTREAM TAPER @ 30' C – C (RETURN TAPER AND BARRICADE ARE OPTIONAL AND DIVIDED ROADWAY SECTION)

C. PLASTIC DRUMS ON RADII @ 35' C –C.

D. PLASTIC DRUMS ON TANGENT @ 35' C – C WITH VERTICAL PANEL AT 70' C – C AND APPROVED WARNING LIGHT @ 70' C – C (FOR OVERNIGHT CLOSURE).

E. PLASTIC DRUMS IN FRONT OF CONSTRUCTION ZONE @ 20' C – C WITH VERTICAL PANEL AT 40' C – C AND APPROVED WARNING LIGHT @ 40' C – C (FOR OVERNIGHT CLOSURE).

F. CONCRETE TRAFFIC BARRIER (CTB) OR LOW PROFILE CONCRETE TRAFFIC BARRIER (LPCTB) WITH APPROVED REFLECTORS @ 10' C – C IF PAVEMENT DROP IS GREATER THAN 1 FOOT.

G. PLASTIC DRUMS W/GUARD RAIL MOUNTED.

H. SELF– RIGHTING VERTICAL PANEL SPACING.
– 4 LANES TO 2 LANES UNDIVIDED ROADWAY SECTION @ 20' C – C.
– 4 LANES DIVIDED ROADWAY TO ONE SIDE TWO WAY ROADWAY @ 20' C – C.
– LEFT LANE AND RIGHT LANE STORAGE BAYS @ 15' C – C.

I. SPACING SHOWN ON TRAFFIC CONTROL SHALL SUPERSEDE THE ABOVE SPACING.

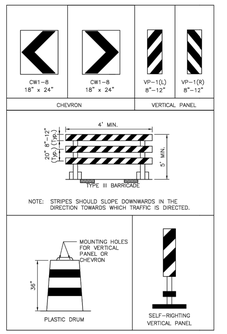
J. SPACING MAY BE ADJUSTED TO PROVIDE DRIVEWAYS, INTERSECTIONS AND /OR MEDIAN OPENINGS.

TABLE C3 – TYPICAL SIGN SPACING, TAPER LENGTHS, AND SUGGESTED SPACING OF CHANNELIZATION DEVICES

POSTED SPEED (MPH)	SIGN SPACING "X" (FEET)	MIN. DESIRABLE TAPER LENGTH "L"			SUGGESTED MAXIMUM SPACING OF DEVICE	
		10' OFFSET	11' OFFSET	12' OFFSET	ON A TAPER	ON A TANGENT
30	120'	150'	165'	180'	30'	60'–75'
35	160'	205'	225'	245'	35'	70'–90'
40	240'	265'	295'	320'	40'	80'–100'
45	320'	450'	495'	540'	45'	90'–110'
50	400'	500'	550'	600'	50'	100'–125'
55	500'	550'	605'	660'	55'	110'–140'

TABLE C4 – STOPPING SIGHT DISTANCE AS A FUNCTION OF SPEED

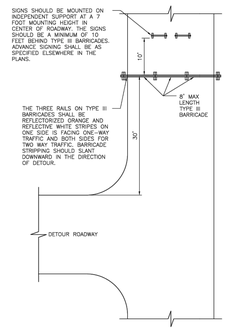
POSTED SPEED (MPH)	DISTANCE "D" (FEET)
30	200
35	250
40	305
45	360
50	425
55	495



CHANNELIZATION AND BARRICADES

LEGEND:

- SIGN
- FLAGGER
- APPROVED CHANNELIZATION DEVICE
- BARRICADE
- FLASHING ARROW PANEL
- AREA UNDER CONSTRUCTION
- EXISTING TRAVEL WAY
- TRAFFIC CONTROL PLAN DETOUR TRAVEL WAY



PLAN VIEW
TYPE III BARRICADE (POST AND SKID)
TYPICAL APPLICATION

APPROVED BY:	APPROVED BY:
CITY ENGINEER	CITY TRAFFIC ENGINEER
APPROVED BY:	
DIRECTOR OF HOUSTON PUBLIC WORKS	
EFF DATE: NOV–27–2023	DWG NO: 01555–01

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

TCP NOTES CHANNELIZING DEVICES AND BARRICADES

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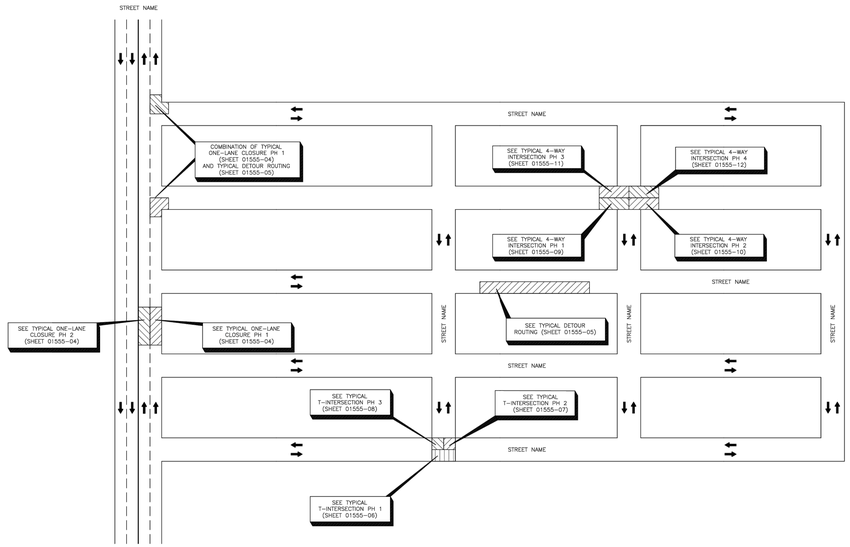

APPROVED BY:	APPROVED BY:
CITY ENGINEER	CITY TRAFFIC ENGINEER
APPROVED BY:	
DIRECTOR OF HOUSTON PUBLIC WORKS	
EFF DATE: NOV–27–2023	DWG NO: 01555–02

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

TCP OVERALL TRAFFIC CONTROL LAYOUT

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E usinfrastructure@rpsgroup.com

SURVEYED BY: KUO Inc.
FB NO. F–4578

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Texas P.E. No. 116816
02/16/2026

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION COH LIFT STATIONS

TRAFFIC CONTROL DETAILS
(SHEET 1 OF 10)

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TAHA LOTIA	
SHEET NO. 86 OF 125	

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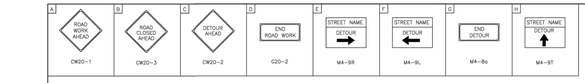

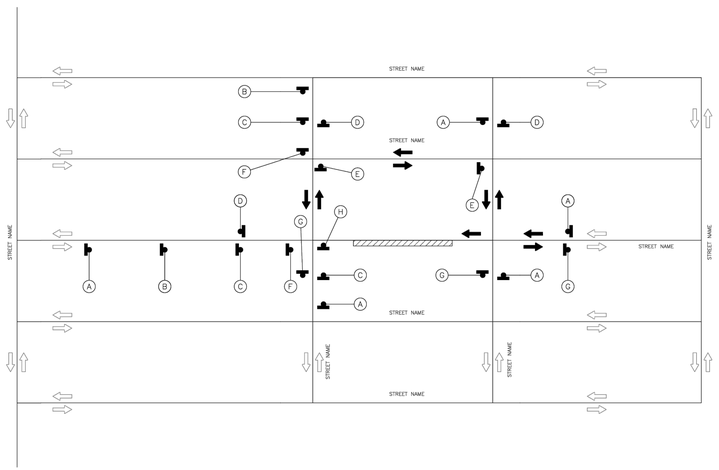

LEGEND:

- SIGN
- FLAGGER
- APPROVED CHANNELIZATION DEVICE
- BARRICADE
- FLASHING ARROW PANEL
- AREA UNDER CONSTRUCTION
- EXISTING TRAVEL WAY
- TRAFFIC CONTROL PLAN DETOUR TRAVEL WAY

APPROVED BY:	APPROVED BY:
Salud Ibarzar	Hieng Nguyen
CITY ENGINEER	CITY TRAFFIC ENGINEER
APPROVED BY: Carl Haddock	
DIRECTOR OF HOUSTON PUBLIC WORKS	
EFF DATE: NOV-27-2023	DWG NO: 01555-03

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

TRAFFIC CONTROL LAYOUT

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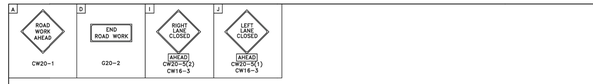
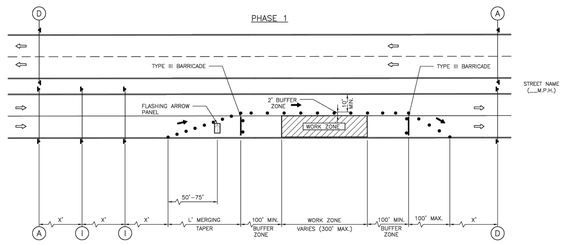


PHASE 1



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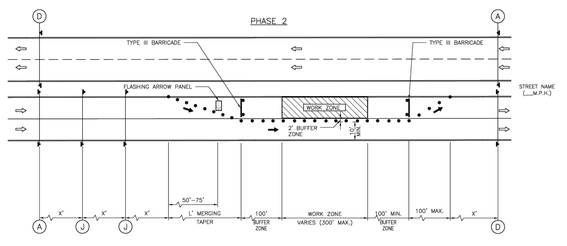

LEGEND:

- SIGN
- FLAGGER
- APPROVED CHANNELIZATION DEVICE
- BARRICADE
- FLASHING ARROW PANEL
- AREA UNDER CONSTRUCTION
- EXISTING TRAVEL WAY
- TRAFFIC CONTROL PLAN DETOUR TRAVEL WAY

NOTES:

1. RETURN TAPERS AND DOWNSTREAM BARRICADES ARE OPTIONAL ON A DIVIDED ROADWAY SECTION.
2. DOUBLE SIGNS SHALL BE USED ONLY ON ROADWAYS WITH MEDIANS.
3. FOR DIMENSIONS REFER TO SHEET 01555-01.
4. INSTALL FLASHERS ON DRUMS WHERE REQUIRED AND APPROVED BY CITY TRAFFIC ENGINEER.

APPROVED BY:	APPROVED BY:
Salud Ibarzar	Hieng Nguyen
CITY ENGINEER	CITY TRAFFIC ENGINEER
APPROVED BY: Carl Haddock	
DIRECTOR OF HOUSTON PUBLIC WORKS	
EFF DATE: NOV-27-2023	DWG NO: 01555-04

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

TCP ONE LANE CLOSURE
PHASE 1 & 2

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Texas P.E. No. 116816
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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

TRAFFIC CONTROL DETAILS
(SHEET 2 OF 10)

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
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TAHA LOTIA	
SHEET NO. 87 OF 125	

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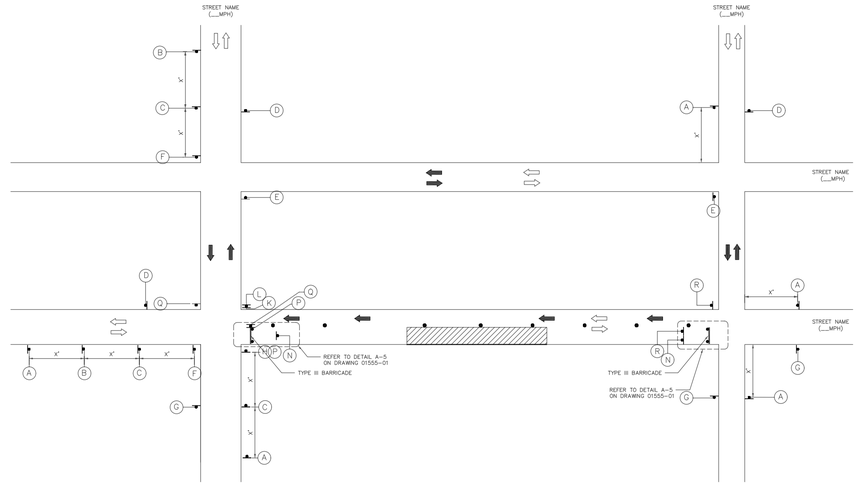
A	B	C	D	E	F	G	H	J	J
ROAD WORK AHEAD	ROAD CLOSED AHEAD	DETOUR AHEAD	END ROAD WORK	STREET NAME DETOUR	STREET NAME DETOUR	END DETOUR	STREET NAME DETOUR	RIGHT LANE CLOSED AHEAD	LEFT LANE CLOSED AHEAD
CW20-1	CW20-3	CW20-2	G20-2	M4-9R	M4-9L	M4-8o	M4-9T	CW20-5(2) CW16-3	CW20-5(1) CW16-3

K	L	M	N	O	P	Q	R
ONE WAY	ONE WAY	DO NOT ENTER	ROAD CLOSED	WORK			BEGIN ONE WAY
R6-2(L)	R6-2(R)	R5-1	R11-2	M4-10(L)	R3-1	R3-2	R6-6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STREET NAME (___MPH)
STREET NAME (___MPH)
STREET NAME (___MPH)
REFER TO DETAIL A-5 ON DRAWING 01555-01
TYPE III BARRICADE
REFER TO DETAIL A-5 ON DRAWING 01555-01
TYPE III BARRICADE
REFER TO DETAIL A-5 ON DRAWING 01555-01
X'
X'
X'

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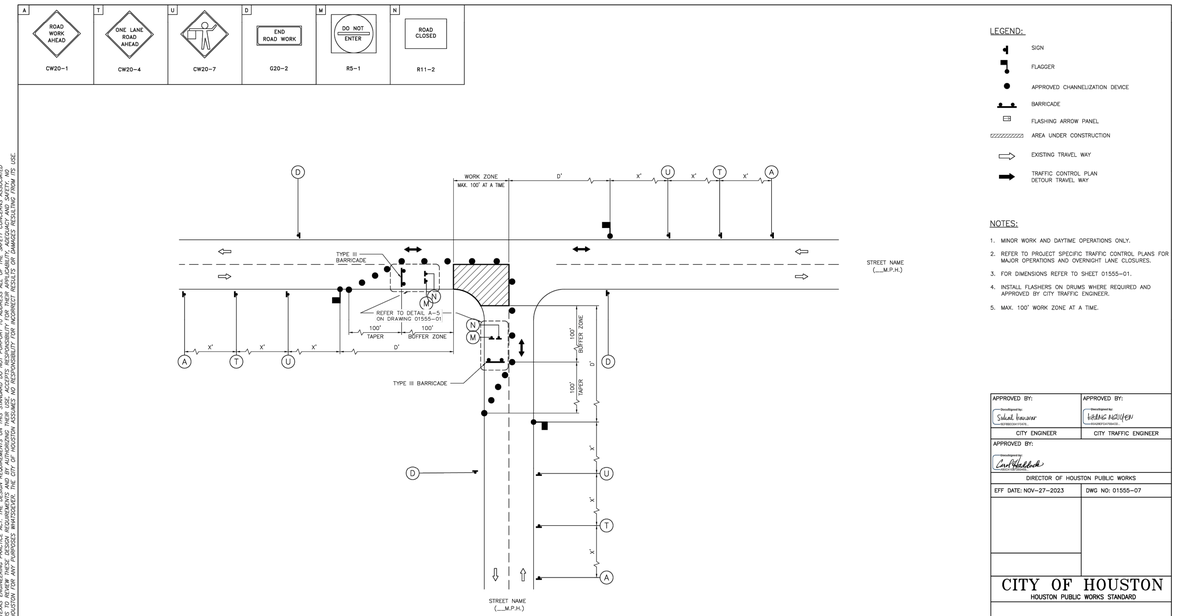

LEGEND:

- SIGN
- FLAGGER
- APPROVED CHANNELIZATION DEVICE
- BARRICADE
- FLASHING ARROW PANEL
- AREA UNDER CONSTRUCTION
- EXISTING TRAVEL WAY
- TRAFFIC CONTROL PLAN DETOUR TRAVEL WAY

NOTES:

1. MINOR WORK AND DAYTIME OPERATIONS ONLY.
2. REFER TO PROJECT SPECIFIC TRAFFIC CONTROL PLANS FOR MAJOR OPERATIONS AND OVERNIGHT LANE CLOSURES.
3. FOR DIMENSIONS REFER TO SHEET 01555-01.
4. INSTALL FLASHERS ON DRUMS WHERE REQUIRED AND APPROVED BY CITY TRAFFIC ENGINEER.
5. MAX. 100' WORK ZONE AT A TIME.

APPROVED BY:	APPROVED BY:
Sukut Bhushan	Ludwig Hatzfeld
CITY ENGINEER	CITY TRAFFIC ENGINEER

APPROVED BY:
Carol Haddock
DIRECTOR OF HOUSTON PUBLIC WORKS

EFF DATE: NOV-27-2023	DWG NO: 01555-07

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

TCP TYPICAL CONSTRUCTION ZONE AT A T-INTERSECTION PHASE 2 OF 3

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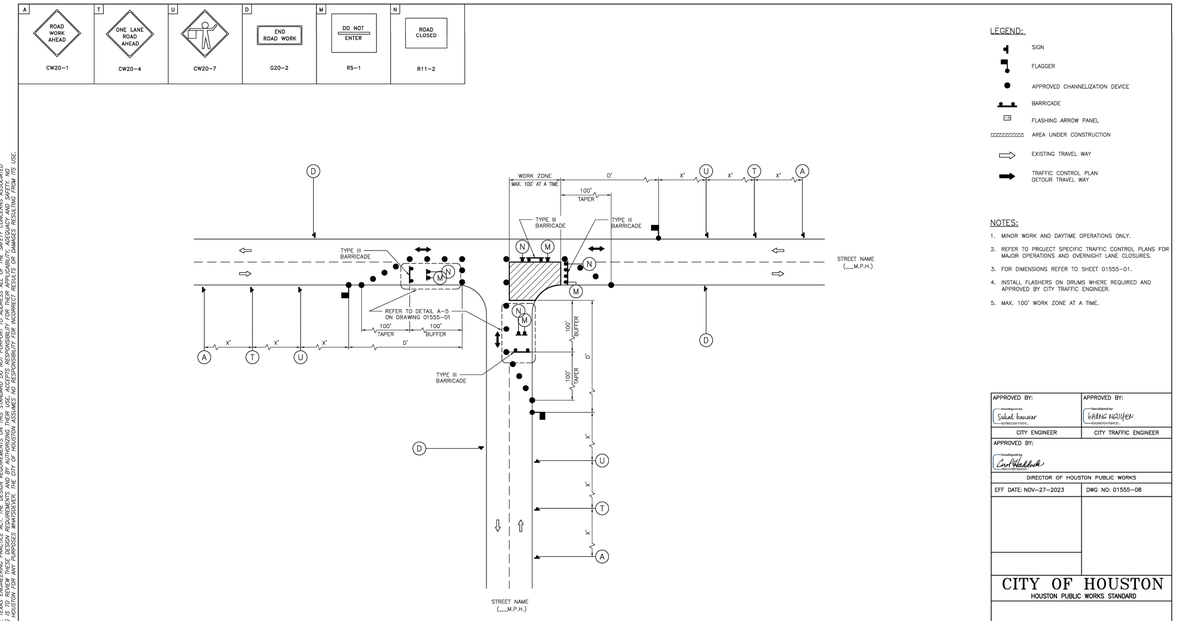

LEGEND:

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4. INSTALL FLASHERS ON DRUMS WHERE REQUIRED AND APPROVED BY CITY TRAFFIC ENGINEER.
5. MAX. 100' WORK ZONE AT A TIME.

APPROVED BY:	APPROVED BY:
Sukut Bhushan	Ludwig Hatzfeld
CITY ENGINEER	CITY TRAFFIC ENGINEER

APPROVED BY:
Carol Haddock
DIRECTOR OF HOUSTON PUBLIC WORKS

EFF DATE: NOV-27-2023	DWG NO: 01555-08

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

TCP TYPICAL CONSTRUCTION ZONE AT A T-INTERSECTION PHASE 3 OF 3

FOR CITY OF HOUSTON USE ONLY

DRAWING SCALE
NOT TO SCALE

A TETRA TECH COMPANY
Texas PE Firm Reg. #F-929
575 N. Dairy Ashford, Suite 700,
Houston, Texas 77079
T +1 281 589 7257
E usinfrastructure@rpsgroup.com

SURVEYED BY: KUO Inc.
FB NO. F-4578

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Jeremy Austin, P.E.
Texas P.E. No. 116816
02/16/2026

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION COH LIFT STATIONS

TRAFFIC CONTROL DETAILS
(SHEET 4 OF 10)

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
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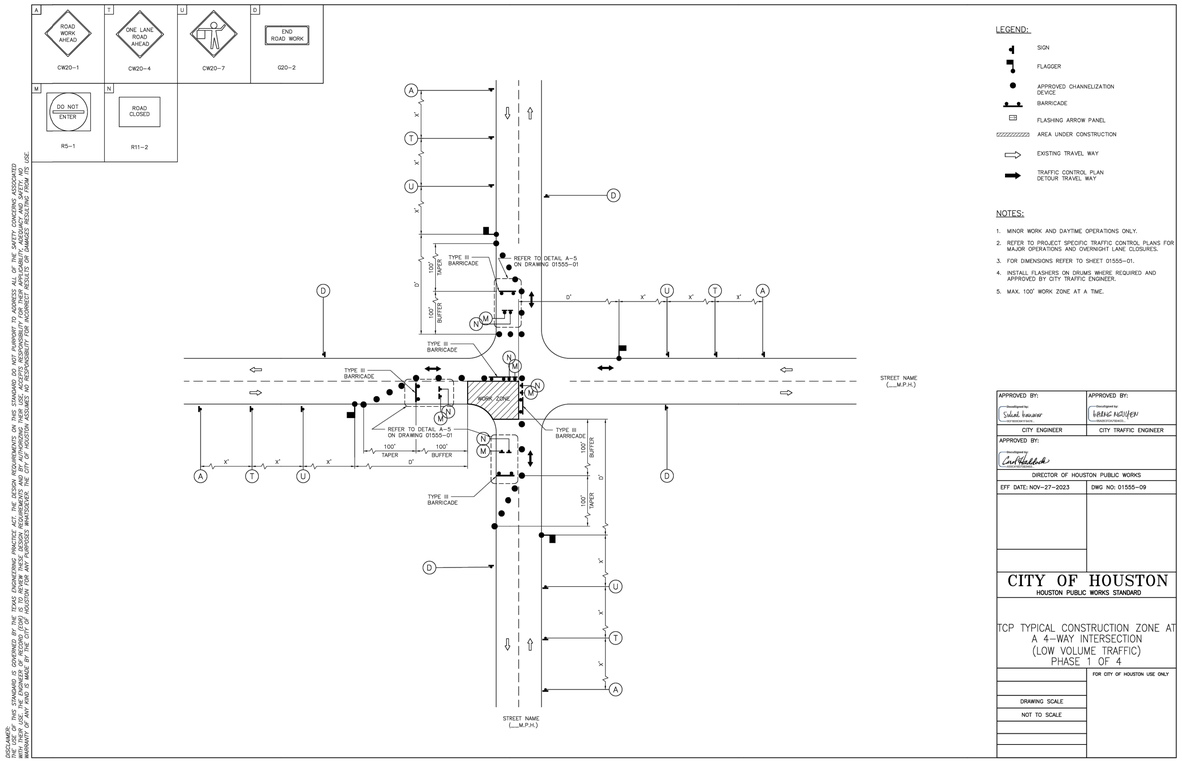
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 89 OF 125	



LEGEND:

- SIGN
- FLAGGER
- APPROVED CHANNELIZATION DEVICE
- BARRICADE
- FLASHING ARROW PANEL
- AREA UNDER CONSTRUCTION
- EXISTING TRAVEL WAY
- TRAFFIC CONTROL PLAN DETOUR TRAVEL WAY

NOTES:

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APPROVED BY:	APPROVED BY:
Salud Ibarra	Ubong Nguyen
CITY ENGINEER	CITY TRAFFIC ENGINEER
APPROVED BY: Carol Haddock	
DIRECTOR OF HOUSTON PUBLIC WORKS	
EFF DATE: NOV-27-2023	DWG NO: 01555-09

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

TCP TYPICAL CONSTRUCTION ZONE AT A 4-WAY INTERSECTION (LOW VOLUME TRAFFIC) PHASE 1 OF 4

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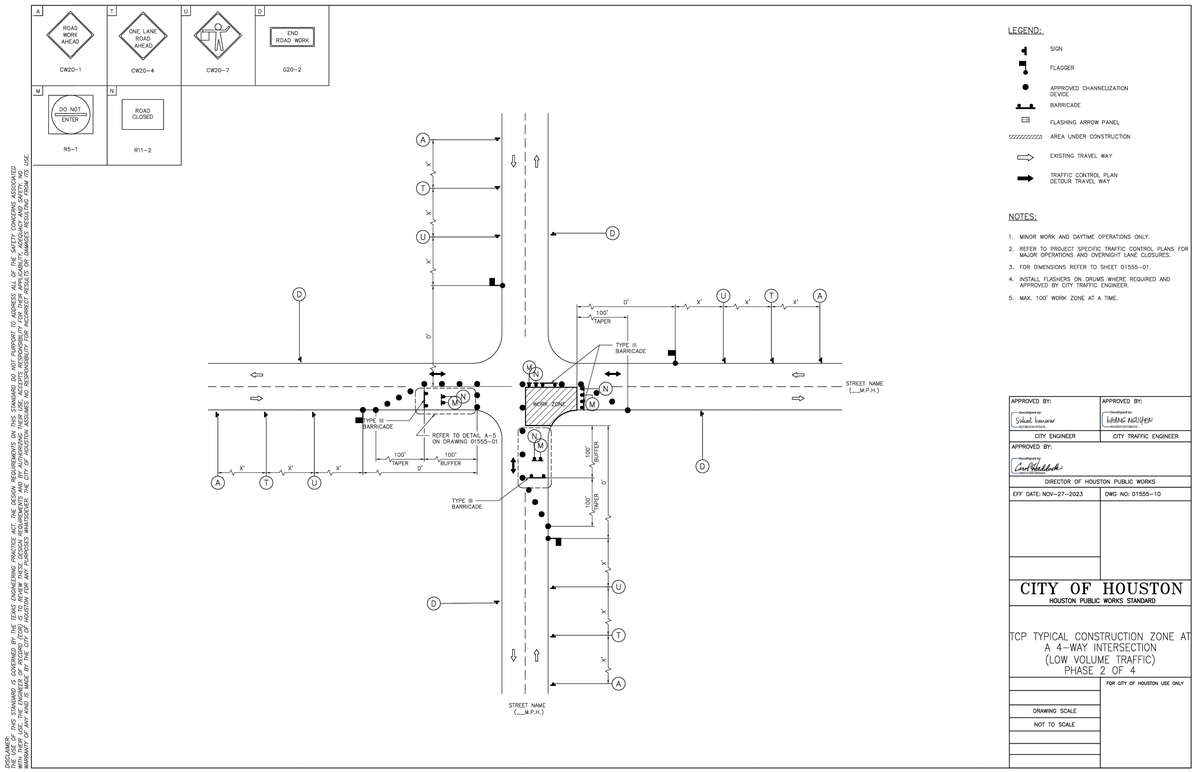

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APPROVED BY:	APPROVED BY:
Salud Ibarra	Ubong Nguyen
CITY ENGINEER	CITY TRAFFIC ENGINEER
APPROVED BY: Carol Haddock	
DIRECTOR OF HOUSTON PUBLIC WORKS	
EFF DATE: NOV-27-2023	DWG NO: 01555-10

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

TCP TYPICAL CONSTRUCTION ZONE AT A 4-WAY INTERSECTION (LOW VOLUME TRAFFIC) PHASE 2 OF 4

	FOR CITY OF HOUSTON USE ONLY
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RPS
A TETRA TECH COMPANY
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E usinfrastructure@rpsgroup.com

SURVEYED BY: KUO Inc.
FB NO. F-4578

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Texas P.E. No. 116816
02/16/2026

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

TRAFFIC CONTROL DETAILS
(SHEET 5 OF 10)

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
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DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 90 OF 125	

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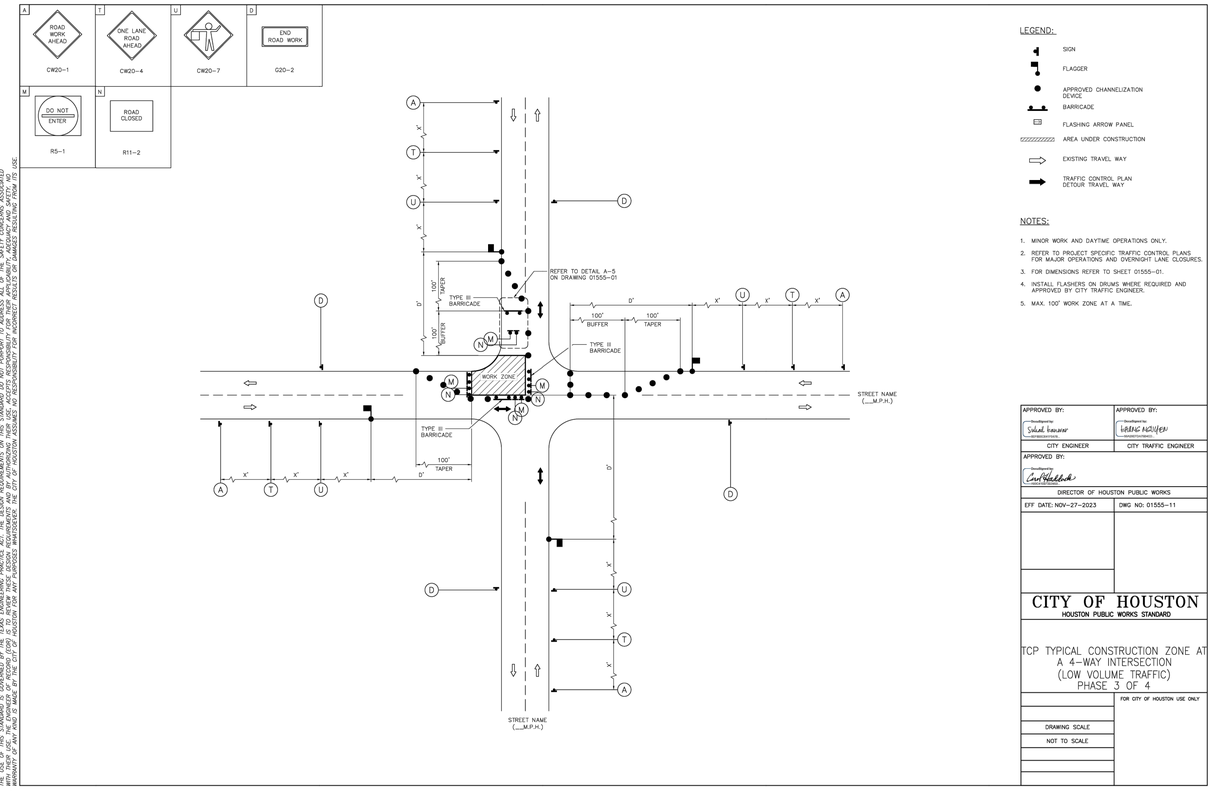

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APPROVED BY:	APPROVED BY:
Salud Ibarra	Hiang Nguyen
CITY ENGINEER	CITY TRAFFIC ENGINEER

APPROVED BY:

Carol Haddock

DIRECTOR OF HOUSTON PUBLIC WORKS

EFF DATE: NOV-27-2023	DWG NO: 01555-11

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

TCP TYPICAL CONSTRUCTION ZONE AT A 4-WAY INTERSECTION (LOW VOLUME TRAFFIC) PHASE 3 OF 4

	FOR CITY OF HOUSTON USE ONLY
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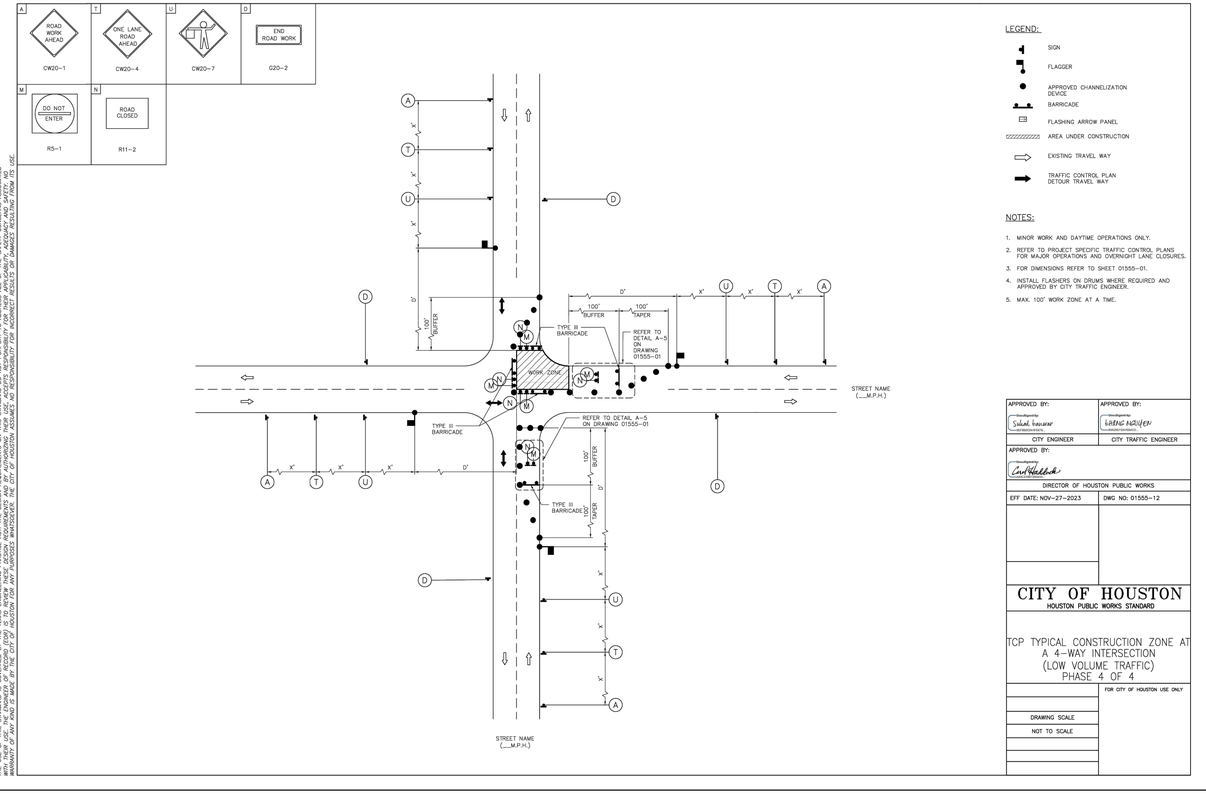

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APPROVED BY:	APPROVED BY:
Salud Ibarra	Hiang Nguyen
CITY ENGINEER	CITY TRAFFIC ENGINEER

APPROVED BY:

Carol Haddock

DIRECTOR OF HOUSTON PUBLIC WORKS

EFF DATE: NOV-27-2023	DWG NO: 01555-12

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

TCP TYPICAL CONSTRUCTION ZONE AT A 4-WAY INTERSECTION (LOW VOLUME TRAFFIC) PHASE 4 OF 4

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION COH LIFT STATIONS

TRAFFIC CONTROL DETAILS
(SHEET 6 OF 10)

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
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DRAWING SCALE	
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CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 91 OF 125	

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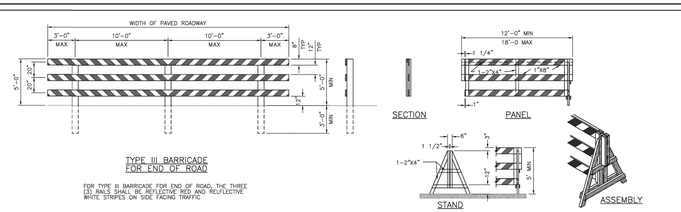
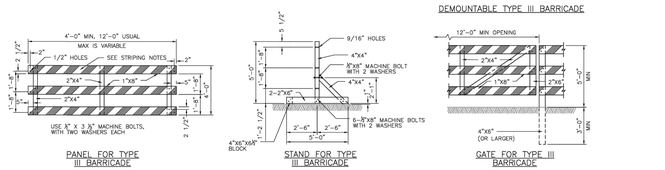


TYPE III BARRICADE
FOR END OF ROAD

FOR TYPE III BARRICADE FOR END OF ROAD, THE THREE (3) RAILS SHALL BE REFLECTIVE RED AND REFLECTIVE WHITE STRIPES ON SIDE FACING TRAFFIC

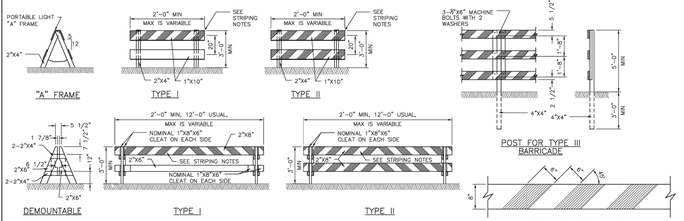
DEMOUNTABLE TYPE III BARRICADE

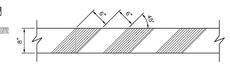


PANEL FOR TYPE III BARRICADE

STAND FOR TYPE III BARRICADE

GATE FOR TYPE III BARRICADE





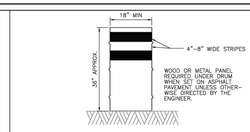
STRIPING FOR BARRICADE

BARRICADE NOTES:

1. THE MOST RECENT EDITION OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, AND IT'S REVISIONS, SHALL GOVERN THE CONSTRUCTION AND USE OF ALL ITEMS HEREIN DESCRIBED.
2. CHANNELIZATION DEVICES OTHER THAN BARRICADES SHOULD NORMALLY BE USED FOR CHANNELIZATION PURPOSES.
3. BARRICADES SHOULD NORMALLY BE PLACED PERPENDICULAR TO THE TRAFFIC FLOW. OTHER CHANNELIZING DEVICES, SUCH AS DRUMS, VERTICAL PANELS OR PORTABLE BARRIERS, SHOULD BE USED WHERE NEEDED TO SEPARATE TRAFFIC FROM THE WORK AREA IN ALL CASES, THE BARRICADES SHOULD BE SO PLACED AS TO MOST ADVANTAGEOUSLY WARN AND DIRECT TRAFFIC.
4. BARRICADES MAY BE DESIGNED AND CONSTRUCTED FROM WOOD OR ANY OTHER SUITABLE MATERIAL APPROVED BY THE TMUTCD. THE DETAILS SHOWN ON THIS STANDARD FOR TYPE I AND II ARE SUGGESTED DETAILS FOR WOOD SUPPORT SYSTEMS FOR BARRICADES. THE DETAILS OF RAIL WIDTH AND STRIPING, NUMBER AND SPACING OF RAILS, MINIMUM LENGTH AND HEIGHT (ABOVE PAVEMENT) OF RAILS MUST BE ADHERED TO WHEN ALTERNATE DESIGNS ARE USED.
5. BARRICADES ARE TO BE CONSTRUCTED OF CLEAN SOUND MATERIAL. ALL SURFACES ABOVE GROUND, WHICH ARE NOT STRIPED, SHALL BE WHITE EXCEPT THE UNPAINTED GALVANIZED METAL PARTS. ALL SURFACES OF WOOD OR METAL COMPONENTS MADE OF LUMBER SHALL BE PAINTED WITH A MINIMUM OF TWO COATS OF AN APPROVED BRAND OF WHITE PAINT TO SECURE THOROUGH COVERAGE AND A UNIFORM WHITE COLOR.
6. THE REFLECTORIZED WHITE AND REFLECTORIZED ORANGE (REFLECTORIZED RED) STRIPES FOR BARRICADES, DRUMS AND VERTICAL PANELS SHALL BE CONSTRUCTED OF HIGH INTENSITY SHEETING AND SHALL BE MAINTAINED TO MEET THE PERFORMANCE, COLOR AND REFLECTIVITY REQUIREMENTS SET BY DOT.
7. THE CONTRACTOR SHALL MAINTAIN EACH BARRICADE IN A CLEAN AND GOOD CONDITION.
8. BARRICADES SHALL BE REMOVED UPON COMPLETION OF THE WORK AND/OR THE ELIMINATION OF THE HAZARD ON ANY SECTION.

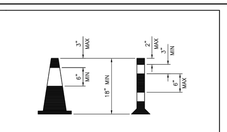
STRIPING NOTES:

1. FOR ALL TYPES OF BARRICADES WITH RAILS LESS THAN 3'-0" LONG, STRIPES 4" WIDE SHALL BE USED. IDENTIFICATION MARKINGS MAY BE SHOWN ONLY ON BACK SIDE OF BARRICADE RAILS.
2. STRIPING SHOULD COVER THE FULL WIDTH OF THE RAIL. STRIPING OF RAILS, PANELS, ETC. SHOULD SLOPE DOWNWARD AT AN ANGLE OF 45° DEGREES IN DIRECTIONS TRAFFIC IS TO PASS.
3. WHERE A BARRICADE EXTENDS ENTIRELY ACROSS A ROADWAY, IT IS DESIRABLE THAT THE STRIPES SLOPE DOWNWARD IN THE DIRECTION TOWARD WHICH TRAFFIC MUST TURN IN DETOURING. WHEN BOTH RIGHT AND LEFT TURNS ARE PROVIDED FOR, THE CHEVRON STRIPING MAY SLOPE DOWNWARD IN BOTH DIRECTIONS FROM THE CENTER OF THE BARRICADE.



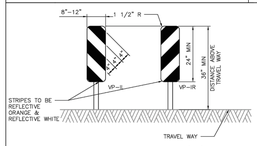
DRUMS

1. DRUMS, SET ON END, AND USED FOR TRAFFIC WARNING OR CHANNELIZATION SHALL BE APPROX. 36" IN HEIGHT AND A MIN OF 18" IN DIAMETER. THE CONTRACTOR, AT HIS OPTION, MAY USE DRUMS MADE FROM STEEL BARRELS OR BLACK POLYETHYLENE PLASTIC DRUM LINERS WEIGHING APPROX EIGHT POUNDS EACH. THE MARKINGS ON DRUMS SHALL BE HORIZONTAL, CIRCUMFERENTIAL, REFLECTORIZED ORANGE AND REFLECTORIZED WHITE STRIPES 4" TO 8" WIDE WITH 4" TO 8" SPACING BETWEEN STRIPES. THERE SHALL BE AT LEAST TWO (2) INCHES OF THE TOP OF THE DRUM THERE SHALL BE AT LEAST TWO ORANGE, AND TWO WHITE STRIPES ON EACH DRUM. IF THERE ARE NON-REFLECTORIZED SPACES BETWEEN THE REFLECTORIZED STRIPES, THEY SHALL BE NO MORE, NO LESS THAN 2 INCHES WIDE. WHITE DRUMS SHALL BE PAINTED BLACK OR ORANGE BEFORE REFLECTORIZED STRIPES ARE ADDED. ALL DRUMS ON PROJECT WILL BE THE SAME COLOR. WHEN DRUMS ARE PLACED IN THE ROADWAY TO CHANNELIZE TRAFFIC, WARNING LIGHTS SHALL BE PLACED ON ALTERNATE DRUMS. WARNING LIGHTS SHALL NOT BE PLACED ON DRUMS USED SINGLY AS A WARNING DEVICE. STEADY BURN ELECTRIC LIGHTS OR DELINEATORS SHOULD BE PLACED ON DRUMS USED IN SERIES FOR TRAFFIC CHANNELIZATION. DRUMS SHALL BE WEIGHTED WITH SAND TO THE EXTENT INDICATED IN THE PLANS.
2. CW1-8 CHEVRON SIGNS, CW1-6A ARROW SIGNS OR VP-1 VERTICAL PANELS MOUNTED ABOVE DRUMS MAY BE USED AS SUPPLEMENTS TO DRUM DELINEATION.



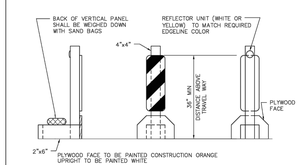
CONES

1. TRAFFIC CONES AND TUBULAR MARKERS SHALL BE A MIN OF 18" INCHES IN HEIGHT WITH 4 BROADENED BASE AND MAY BE MADE OF VARIOUS MATERIALS TO WITHSTAND IMPACT WITHOUT DAMAGE TO THEMSELVES OR TO VEHICLES. LARGER SIZES SHOULD BE USED ON FREEWAYS AND OTHER ROADWAYS WHERE SPEED ARE RELATIVELY HIGH. ORANGE WHITE EVER MORE CONSPICUOUS. PROVISION IS NECESSARY THAT SHALL BE MADE FOR THE RETENTION OF ROAD CONES AND TUBULAR MARKERS. THEY SHOULD BE KEPT CLEAN AND BRIGHT FOR MAX TARGET VALUE. FOR NIGHT TIME USE THEY SHALL BE REFLECTORIZED OR EQUIPPED WITH LIGHTING DEVICES FOR MAX VISIBILITY. REFLECTORIZED MATERIAL SHALL HAVE A SMOOTH, SEALED OUTER SURFACE WHICH WILL DISPLAY THE SAME APPROX COLOR DAY AND NIGHT.
2. REFLECTORIZATION OF TUBULAR MARKERS SHALL BE A MIN OF TWO 6" WIDE BANDS PLACED A MAX OF 2" FROM THE TOP AND A MAX OF 4" FROM THE BOTTOM. REFLECTORIZED BANDS ON CONES SHALL BE PROVIDED BY A MIN 6" BAND PLACED A MAX OF 3" FROM THE TOP.
3. CONES OR TUBULAR MARKERS ARE GENERALLY ONLY SUITABLE FOR TEMPORARY USAGE (UP TO 8 HOURS) WITH OTHER CHANNELIZATION DEVICES SUCH AS VERTICAL PANELS OR BARRICADES PREFERRED FOR LONGER TERM USAGE. CARE SHOULD BE TAKEN TO INSURE THAT THEY REMAIN IN THEIR PROPER LOCATION AND IN AN UPRIGHT POSITION.



VERTICAL PANELS (VP)

VERTICAL PANELS ARE NORMALLY USED AS CHANNELIZING DEVICES TO INDICATE TANGENT OR NEARLY TANGENT ROADWAY ALIGNMENT WHERE GOOD TARGET VALUE OF A DEVICE IS NEEDED IN DAYTIME AS WELL AS THE NIGHTTIME. IN ADDITION, VERTICAL PANELS SHOULD BE USED AT THE EDGE OF SHOULDER DROP-OFFS AND OTHER SUCH AREAS AS LANE TRANSITIONS WHERE POSITIVE DAY AND NIGHT DELINEATION MAY BE REQUIRED. VERTICAL PANELS SHOULD BE PLACED AT THE EDGE OF THE SHOULDER OR OUTSIDE OF THE SHOULDER ON ALL TYPES OF ROADWAYS. STRIPES SHOULD ALWAYS SLOPE DOWNWARD TOWARD THE TRAVELED WAY.



TYPICAL PORTABLE VERTICAL PANEL OR DELINEATOR

OTHER SIMILAR SUPPORTS MAY BE USED WHEN APPROVED BY TMUTCD AND DIRECTED BY THE CITY OF HOUSTON.

APPROVED BY:	APPROVED BY:
DocuSigned by: Suhail Kanwar	DocuSigned by: Kuang Nguyen
CITY ENGINEER	CITY TRAFFIC ENGINEER

APPROVED BY:
DocuSigned by: Carl Haddock
DIRECTOR OF HOUSTON PUBLIC WORKS

EFF DATE: NOV-27-2023	DWG NO: 01555-14

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

BARRICADE AND CHANNELIZING DEVICES

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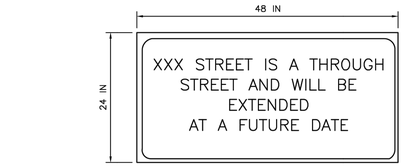
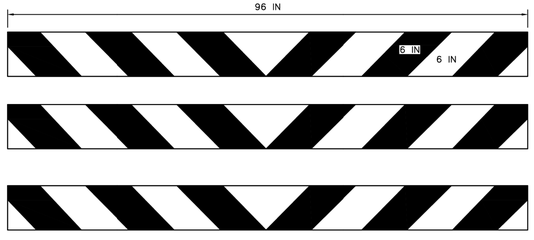
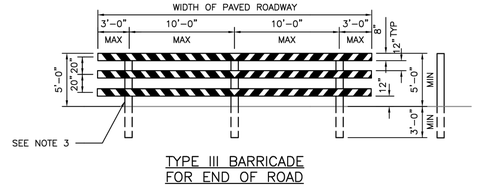




TYPE III BARRICADE
TYPICAL END OF ROAD BARRICADE



TYPE III BARRICADE
FOR END OF ROAD

NOTES:

1. FONT SHALL BE HWY GOTHIC C, 4 INCH HEIGHT.
2. REFER TO STANDARD DETAIL NO. 01555-14 FOR TYPE III BARRICADE DETAIL.
3. FOR TYPE III BARRICADE FOR END OF ROAD, THE THREE (3) RAILS SHALL BE REFLECTIVE RED AND REFLECTIVE WHITE STRIPES ON SIDE FACING TRAFFIC.

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

END OF STREET SIGN

(SCALE: NOT TO SCALE)

APPROVED BY:	
DocuSigned by: Suhail Kanwar — CITY ENGINEER	DocuSigned by: Carl Haddock — DIRECTOR OF HPW
DocuSigned by: Kuang Nguyen — CITY TRAFFIC ENGINEER	

EFF DATE: NOV-27-2023	DWG NO: 01555-15

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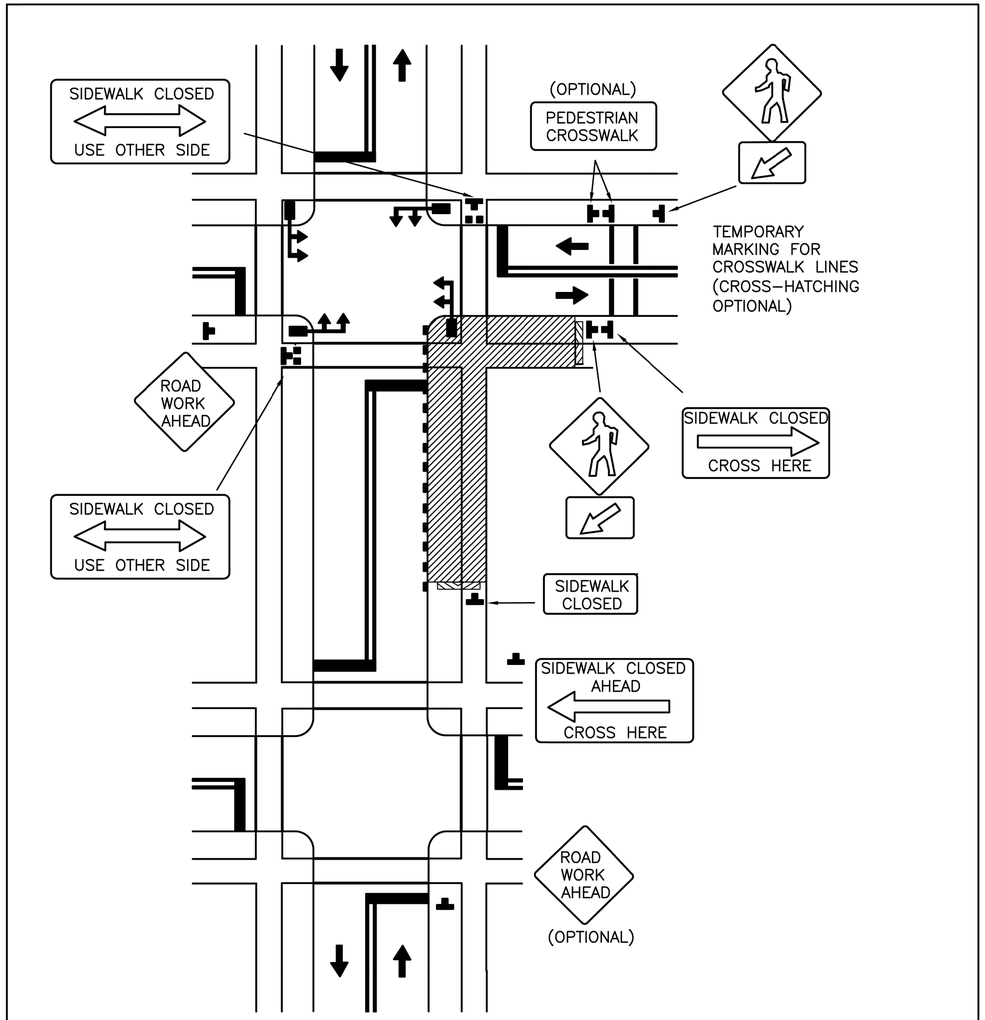
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

TRAFFIC CONTROL DETAILS
(SHEET 7 OF 10)

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 92 OF 125	

FILE PATH: C:\Users\andres.martinezjr\DC\ACCDocs\Tetra Tech Inc\200-317106-24001 COH LS Rehab Design\Project Files\CAD\R-000267-00178A-3_TRAFFIC CONTROL DETAILS.dwg



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APPROVED BY:

CITY ENGINEER	CITY TRAFFIC ENGINEER	DIRECTOR OF HPW
DocuSigned by: Suhail Kanwar 9EF8B0C641F5478...	DocuSigned by: KHANG NGUYEN 95A29EFDA75B4CD...	DocuSigned by: Carol Haddock A93C410B72B3453...

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

CROSSWALK CLOSURES AND PEDESTRIAN DETOURS

(SCALE: NOT TO SCALE)

EFF DATE: NOV–27–2023 | DWG NO: 01555–16

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

TRAFFIC CONTROL DETAILS
(SHEET 8 OF 10)

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
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DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 93 OF 125	

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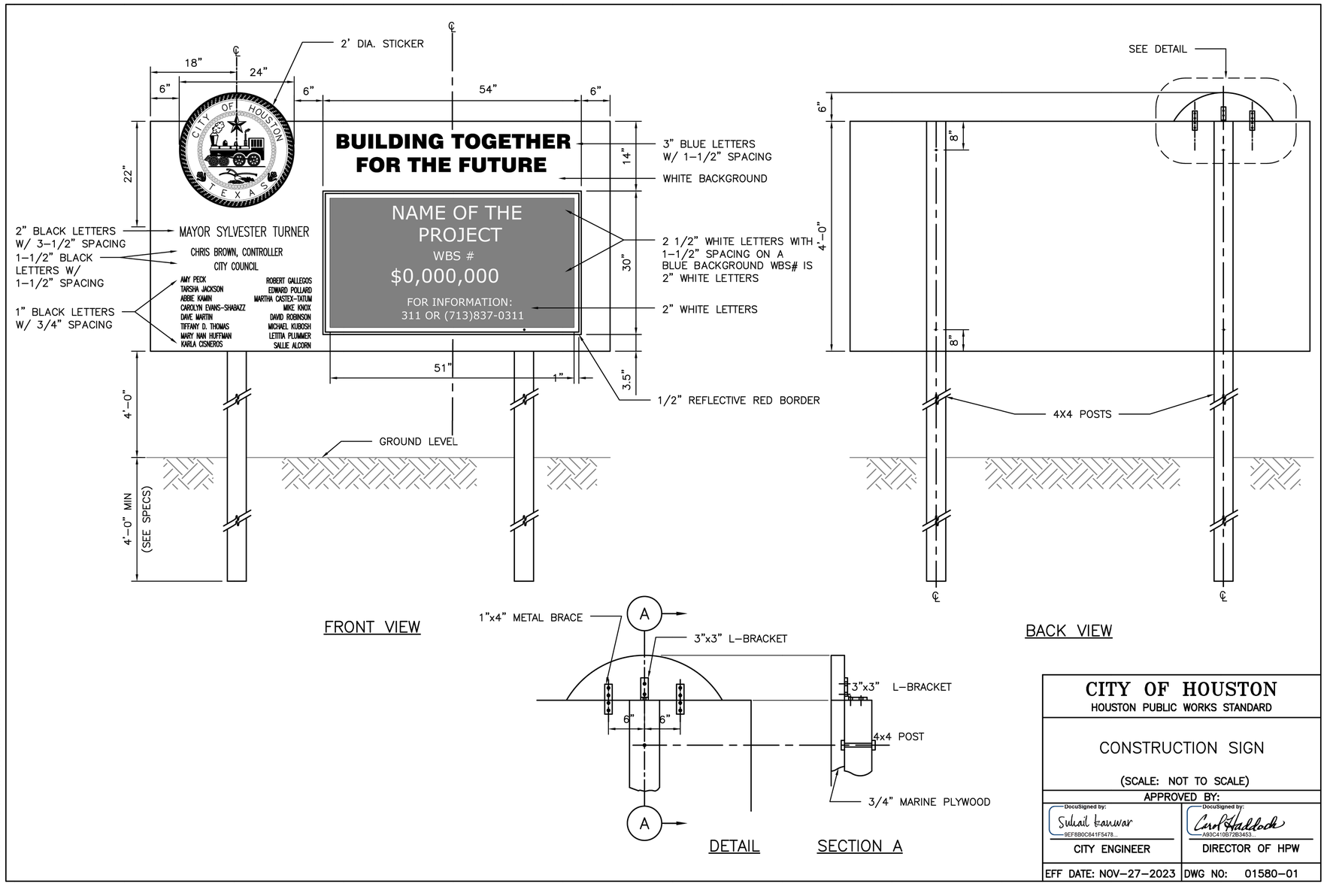

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

CONSTRUCTION SIGN

(SCALE: NOT TO SCALE)

APPROVED BY:

CITY ENGINEER	DIRECTOR OF HPW
DocuSigned by: Suhail Kanwar 9EF8B0C841F5478...	DocuSigned by: Carol Haddock A93C410B72B3453...
EFF DATE: NOV–27–2023	DWG NO: 01580–01

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

TRAFFIC CONTROL DETAILS
(SHEET 9 OF 10)

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
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DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 94 OF 125	

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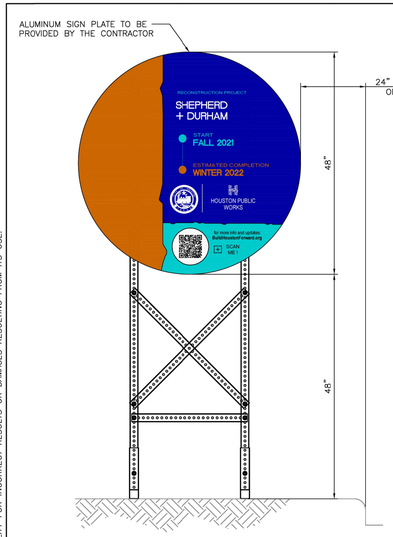
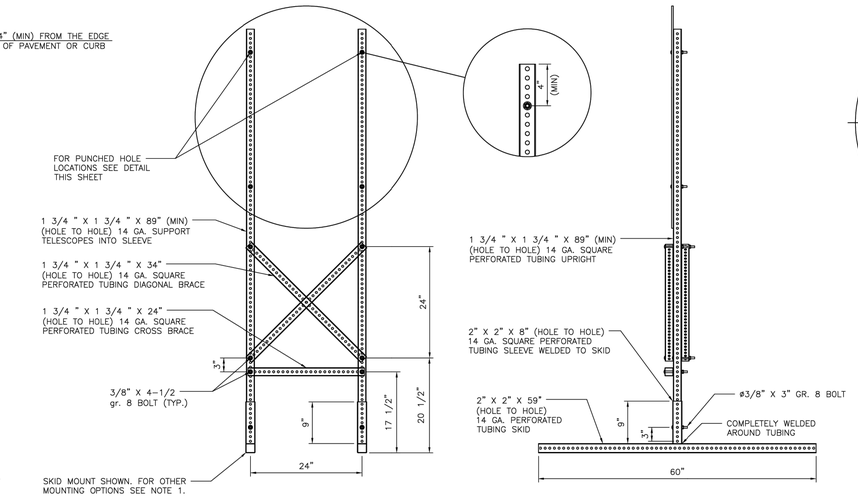


FRONT VIEW

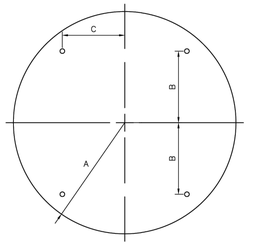
PROJECT SIGN – 48"



FRONT VIEW

SIDE VIEW

SKID MOUNTED SUPPORTS FOR 48" PROJECT SIGN



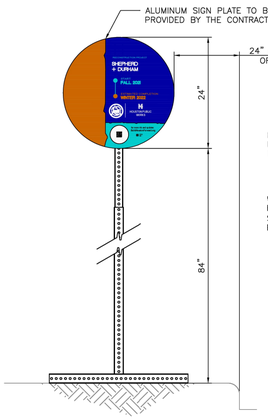
CIRCLE

A	B	C	T
24"	15"	12"	0.080"

48" SIGN PLATE HOLE DETAIL

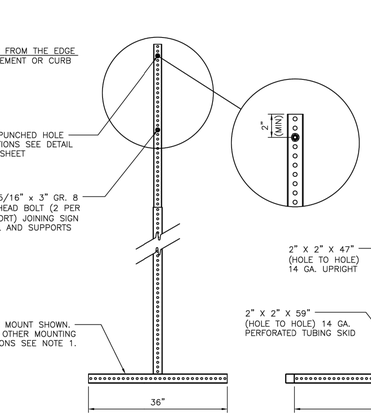
NOTES:

1. ALLOWABLE POST INSTALLATION METHODS ARE: CONCRETE FOOTING, SURFACE MOUNTING, SKID MOUNTING AND PILE DRIVEN POSTS.
2. FOR POST INSTALLATION WITH CONCRETE FOOTING, REFER TO DETAIL 01554–01.
3. FOR SURFACE MOUNTED POST INSTALLATION, REFER TO DETAIL 01554–02.
4. FOR SKID MOUNTING REQUIREMENTS REFER TO 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.

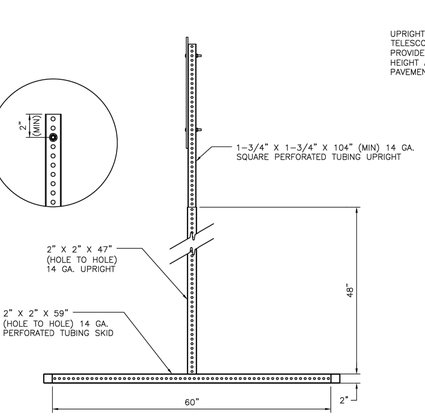


FRONT VIEW

PROJECT SIGN – 24"

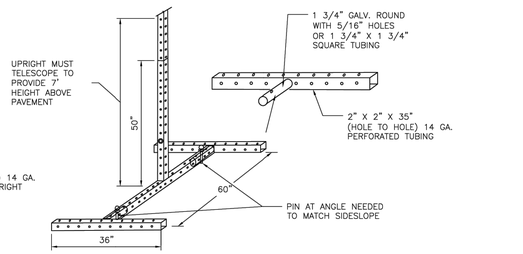


FRONT VIEW

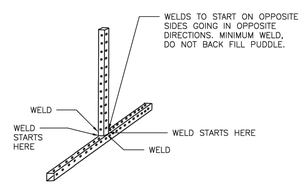


SIDE VIEW

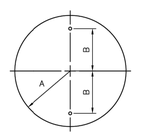
SKID MOUNTED SUPPORTS FOR 24" PROJECT SIGN



ISO VIEW



ISO VIEW



A	B	C
12"	8"	0.080"

24" SIGN PLATE HOLE DETAIL

APPROVED BY:	APPROVED BY:
DocuSigned by: Sukat Kanwar	DocuSigned by: Carl Wallbrecht
CITY ENGINEER	DIRECTOR OF HOUSTON PUBLIC WORKS
EFF DATE: NOV–27–2023	DWG NO: 01582–01

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

CONSTRUCTION SIGN BUILD HOUSTON FORWARD

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

TRAFFIC CONTROL DETAILS
(SHEET 10 OF 10)

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
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DRAWING SCALE	
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CITY OF HOUSTON PM	
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SHEET NO. 95 OF 125	

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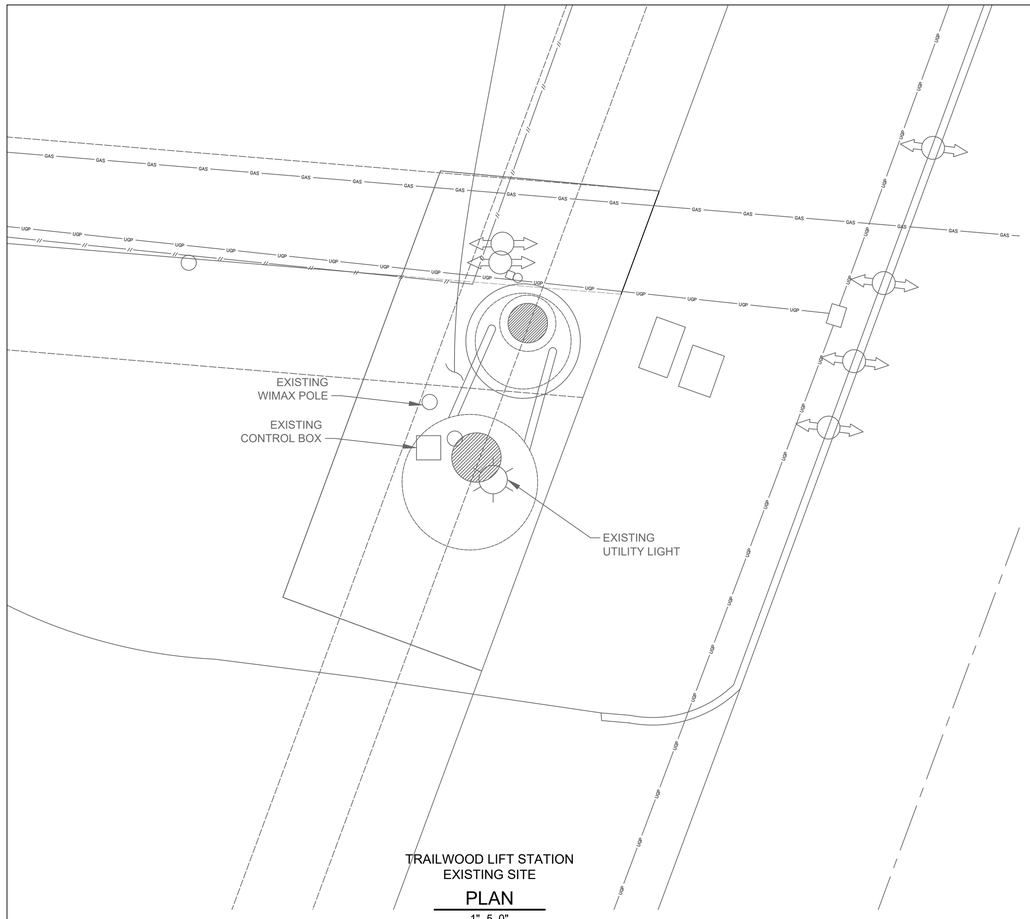
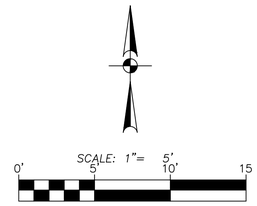


TRAILWOOD LIFT STATION
EXISTING SITE

PLAN

1" 5'-0"



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	MM/DD/YY	BRIEF DESCRIPTION	XXX
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ENGINEER:
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02/03/2026

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

TRAILWOOD LIFT STATION
EXISTING SITE PLAN

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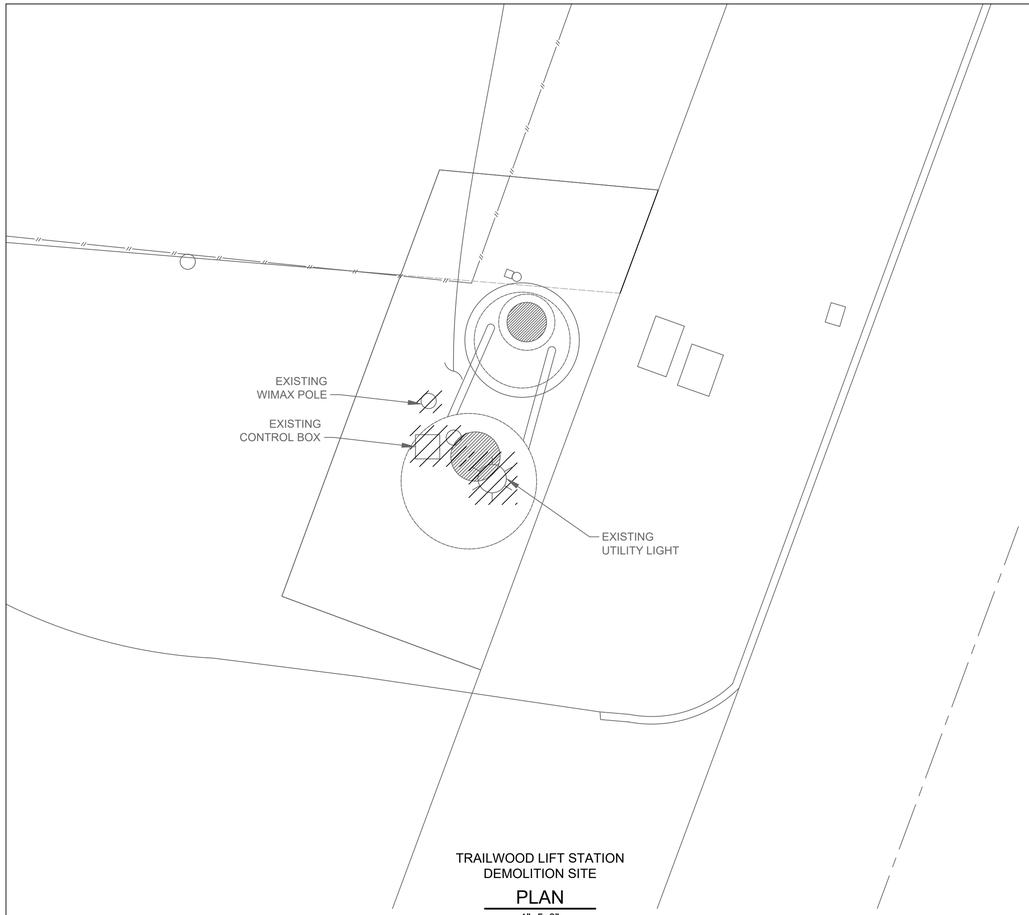
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 96 OF 125	

FILE PATH: O:\H8109_Lift Station Rehabilitation And Reconstruction (Tetratech)\6 Drawings\Electrical\Working\Trailwood\Trailwood_E-01.dwg PLOT STYLE: COH.ctb PLOTTED: 2/13/2026 2:38 PM



TRAILWOOD LIFT STATION
DEMOLITION SITE

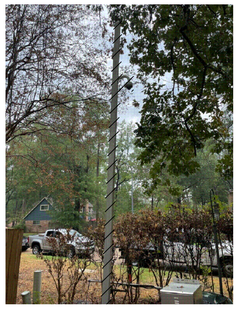
PLAN

1" 5-0"

EXISTING CONTROL
BOX

PHOTOGRAPH A - 2

NTS



EXISTING WIMAX
POLE

PHOTOGRAPH B - 2

NTS

EXISTING UTILITY
LIGHT

PHOTOGRAPH C - 3

NTS

EXISTING CONTROL PANEL
& OVERHEAD LIGHT

PHOTOGRAPH D - 4

NTS

NOTES BY SYMBOL "⬡":

1. EXISTING WIMAX POLE TO BE DEMOLISHED AND REMOVED.
2. EXISTING CONTROL BOX TO BE DEMOLISHED AND REMOVED.
3. EXISTING UTILITY LIGHT TO BE DEMOLISHED AND REMOVED.
4. EXISTING CONTROL PANEL & OVERHEAD LIGHT INSIDE VAULT TO BE DEMOLISHED AND REMOVED.

NO.	DATE	REVISION	BRIEF DESCRIPTION	APP.
	MM/DD/YY	BRIEF DESCRIPTION	XXX	
	MM/DD/YY	BRIEF DESCRIPTION	XXX	
	MM/DD/YY	BRIEF DESCRIPTION	XXX	

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ENGINEER:
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P.E. SERIAL NO.77748
02/03/2026

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CITY OF HOUSTON

HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

TRAILWOOD LIFT STATION DEMOLITION SITE PLAN

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TAHA LOTIA	
SHEET NO. 97 OF 125	

PLOTTED: 2/13/2026 2:38 PM

PLOT STYLE: GAI.ctb

FILE PATH: O:\H8109_Lift Station Rehabilitation And Reconstruction (Tetratech)\6 Drawings\Electrical\Working\Trailwood\Trailwood_E-02.dwg

DEMOLITION NOTES

1. CONTRACTOR SHALL COORDINATE DEMOLITION OF THE ELECTRICAL CONDUIT, WIRE, EQUIPMENT AND DEVICES WITH GENERAL DEMOLITION AND SCHEDULE. DRAWINGS ARE INTENDED TO CONVEY THE GENERAL NATURE AND SCOPE OF DEMOLITION WORK. EVERY ITEM TO BE DEMOLISHED MAY NOT BE SHOWN. FIELD VERIFY WITH OWNER PRIOR TO BID, AND INCLUDE ALL DEMOLITION WORK IN THE CONTRACT PRICE.

2. ALL CONDUCTORS BEING DEMOLISHED SHALL BE DISCONNECTED AND REMOVED FROM THE LOAD TO THE SOURCE. SURFACE MOUNTED CONDUITS AND MOUNTING HARDWARE SHALL BE REMOVED. UNDERGROUND CONDUITS WHICH ARE NOT BEING REMOVED OR OTHERWISE NOT BEING MADE UNUSABLE SHALL BE CUT AND FILLED WITH CONCRETE MATERIAL.

3. THE OWNER HAS THE RIGHT OF FIRST REFUSAL TO THE EQUIPMENT BEING REMOVED. CONTRACTOR SHALL DELIVER THE EQUIPMENT WHICH OWNER WISHES TO KEEP AT LOCATION DESIGNATED BY THE OWNER. SEE SPECIFICATIONS SECTION FOR ELECTRICAL DEMOLITION. ALL EQUIPMENT SHOWN PER DETAIL A-F TO BE TRANSMITTED TO WASTEWATER OPERATIONS FOR REUSE.

4. THE CONTRACTOR SHALL NOT MAKE ANY MODIFICATIONS TO THE EXISTING ELECTRICAL EQUIPMENT UNTIL THE FOLLOWING HAS BEEN DONE:

   A. A FORM SHALL BE GENERATED BY THE CONTRACTOR TO RECORD THE OBSERVATIONS. BOTH PARTIES SHALL SIGN ON THE FORM. INSTRUCTIONS SHALL BE PROVIDED FOR CONTRACTOR TO COORDINATE WITH CITY PROJECT ENGINEER FOR DEMOLITION AND REMOVAL OF ELECTRICAL SERVICE THROUGH GSD DEPARTMENT (REFER TO ELECTRICAL DEMOLITION SPECIFICATION FOR DETAIL).

NO.	DATE	REVISION	BRIEF DESCRIPTION	APP.
	MM/DD/YY	BRIEF DESCRIPTION	XXX	
	MM/DD/YY	BRIEF DESCRIPTION	XXX	
	MM/DD/YY	BRIEF DESCRIPTION	XXX	

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02/03/2026

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

TRAILWOOD LIFT STATION DEMOLITION NOTES

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TAHA LOTIA	
SHEET NO. 98 OF 125	

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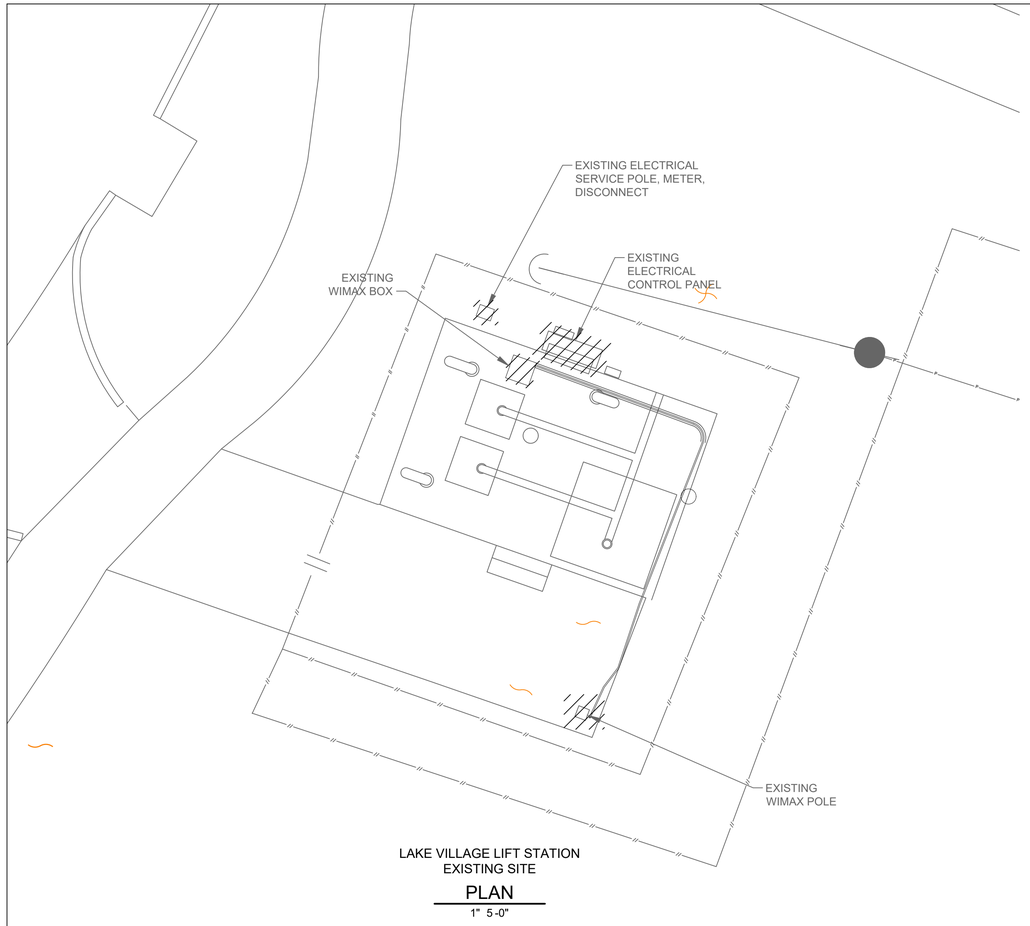
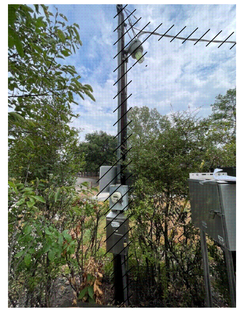


LAKE VILLAGE LIFT STATION
EXISTING SITE

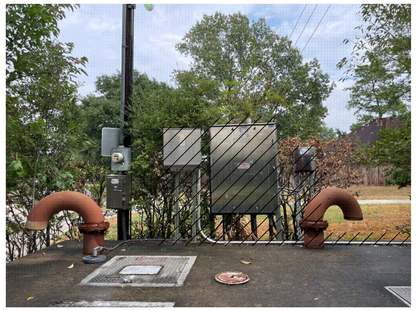
PLAN

1" 5'-0"



EXISTING SERVICE POLE
& METER DISCONNECT

PHOTOGRAPH A - NTS (1)

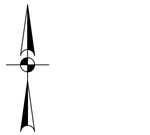


EXISTING CONTROL PANEL
& WIMAX BOX & LEVEL TRANSMITTER

PHOTOGRAPH B - NTS (2)

EXISTING WIMAX
POLE

PHOTOGRAPH C - NTS (3)



NOTES BY SYMBOL "⬡":

1. EXISTING ELECTRICAL SERVICE POLE & METER DISCONNECT TO BE DEMOLISHED AND REMOVED.
2. EXISTING CONTROL PANEL, WIMAX BOX, & LEVEL TRANSMITTER TO BE DEMOLISHED AND REMOVED.
3. EXISTING WIMAX POLE TO BE DEMOLISHED AND REMOVED.

NO.	DATE	REVISION	APP.
	MM/DD/YY	BRIEF DESCRIPTION	XXX
	MM/DD/YY	BRIEF DESCRIPTION	XXX
	MM/DD/YY	BRIEF DESCRIPTION	XXX

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ENGINEER:
HOSS FOROUZAN
P.E. SERIAL NO.77748
02/13/2026

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

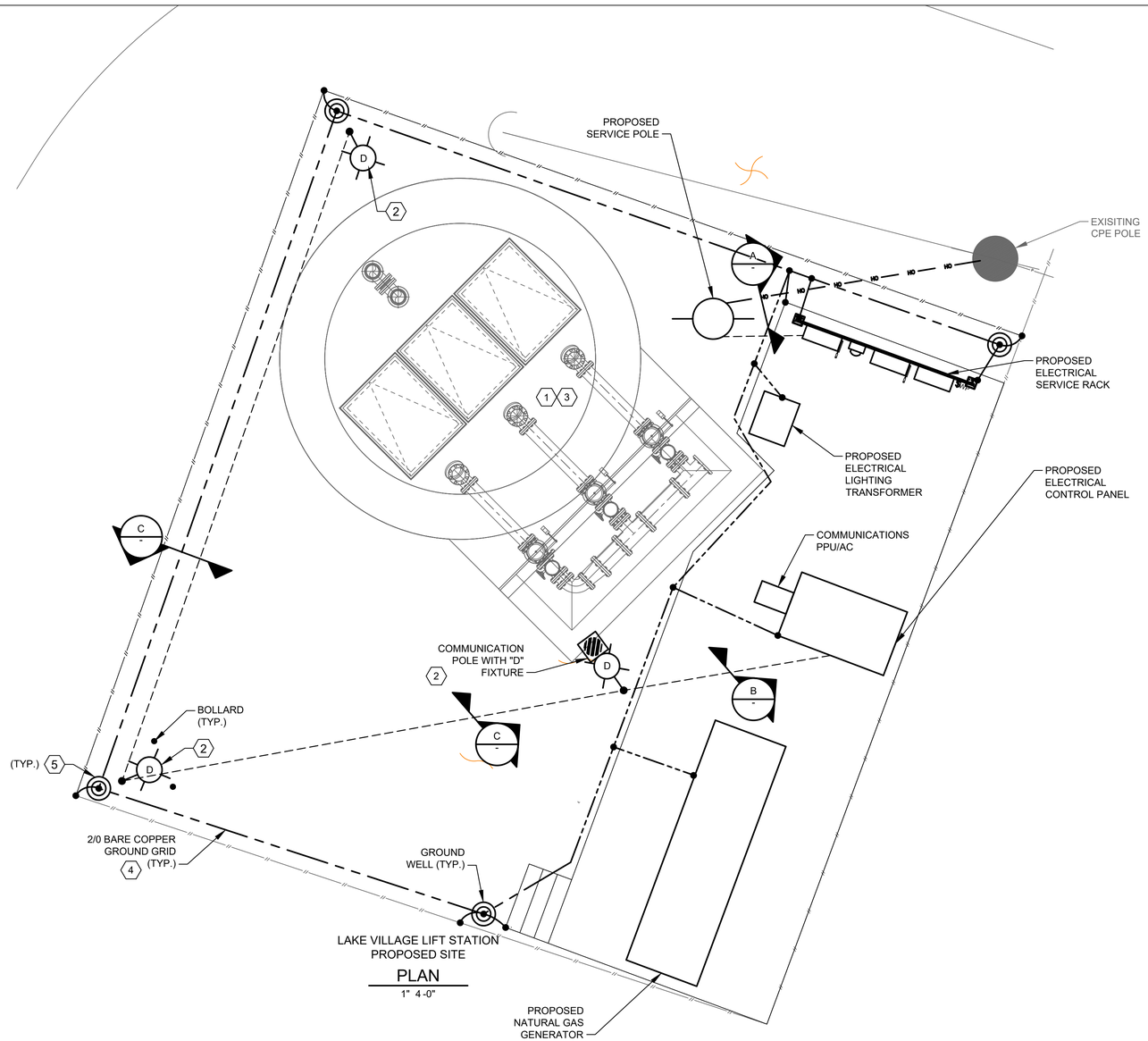
RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

LAKE VILLAGE LIFT STATION DEMOLITION SITE PLAN

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 99 OF 125	

PLOTTED: 2/13/2026 2:34 PM

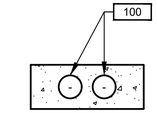
FILE PATH: O:\H8109_Lift Station Rehabilitation And Reconstruction (Tetratech)\6 Drawings\Electrical\Working\Lake Village\Lake Village_E-01.dwg DOT STYLE: COH.ctb



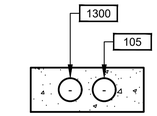
NOTES BY SYMBOL "⬡":

1. THE ELECTRICAL INSTALLATION IN THE WET WELL SHALL BE EXPLOSION PROOF, IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE FOR CLASS I, DIVISION 1 LOCATIONS.
2. YARD LIGHT CONTROLLED BY LIGHTING SWITCH.
3. INSIDE WETWELL RATED NEMA CLASS 1, DIV. 1. OUSIDE ABOVE GROUND, AROUND WETWELL RATED CLASS 1, DIV. 2 ACCORDING TO NFPA 820.
4. GROUNDING LOOP SHALL BE BURIED 30" BELOW FINISHED GRADE.
5. 2/0 BARE COPPER GROUND TO BE BONDED TO FENCE POST.

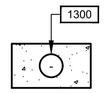
SCALE: 1"= 4'
0' 4' 8' 12'



DUCTBANK
SECTION A
NTS



DUCTBANK
SECTION B
NTS



DUCTBANK
SECTION C
NTS

NO.	DATE	REVISION	APP.
	MM/DD/YY	BRIEF DESCRIPTION	XXX
	MM/DD/YY	BRIEF DESCRIPTION	XXX
	MM/DD/YY	BRIEF DESCRIPTION	XXX

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

LAKE VILLAGE LIFT STATION PROPOSED SITE PLAN

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 100 OF 125	

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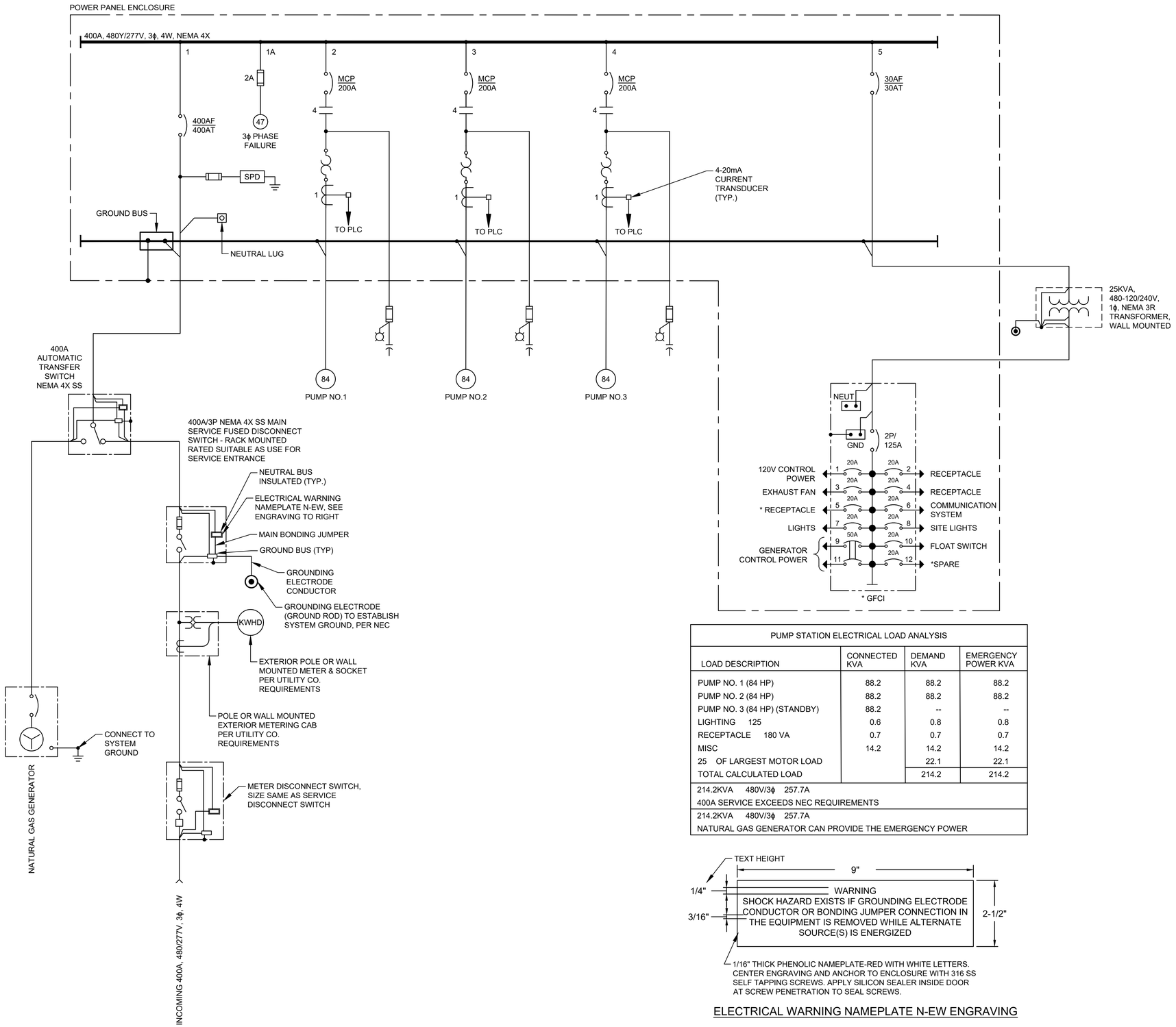

PUMP STATION ELECTRICAL LOAD ANALYSIS			
LOAD DESCRIPTION	CONNECTED KVA	DEMAND KVA	EMERGENCY POWER KVA
PUMP NO. 1 (84 HP)	88.2	88.2	88.2
PUMP NO. 2 (84 HP)	88.2	88.2	88.2
PUMP NO. 3 (84 HP) (STANDBY)	88.2	--	--
LIGHTING 125	0.6	0.8	0.8
RECEPTACLE 180 VA	0.7	0.7	0.7
MISC	14.2	14.2	14.2
25 OF LARGEST MOTOR LOAD		22.1	22.1
TOTAL CALCULATED LOAD		214.2	214.2
214.2KVA 480V/3ϕ 257.7A			
400A SERVICE EXCEEDS NEC REQUIREMENTS			
214.2KVA 480V/3ϕ 257.7A			
NATURAL GAS GENERATOR CAN PROVIDE THE EMERGENCY POWER			

1/16" THICK PHENOLIC NAMEPLATE-RED WITH WHITE LETTERS. CENTER ENGRAVING AND ANCHOR TO ENCLOSURE WITH 316 SS SELF TAPPING SCREWS. APPLY SILICON SEALER INSIDE DOOR AT SCREW PENETRATION TO SEAL SCREWS.

ELECTRICAL WARNING NAMEPLATE N-EW ENGRAVING

NO.	DATE	REVISION	APP.
	MM/DD/YY	BRIEF DESCRIPTION	XXX
	MM/DD/YY	BRIEF DESCRIPTION	XXX
	MM/DD/YY	BRIEF DESCRIPTION	XXX

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CITY OF HOUSTON
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RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

LAKE VILLAGE LIFT STATION SINGLE LINE DIAGRAM

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 101 OF 125	

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FILE PATH: O:\H8109_Lift Station Rehabilitation And Reconstruction (Tetratech)\6 Drawings\Electrical\Working\Lake Village\Lake Village_E-03.dwg
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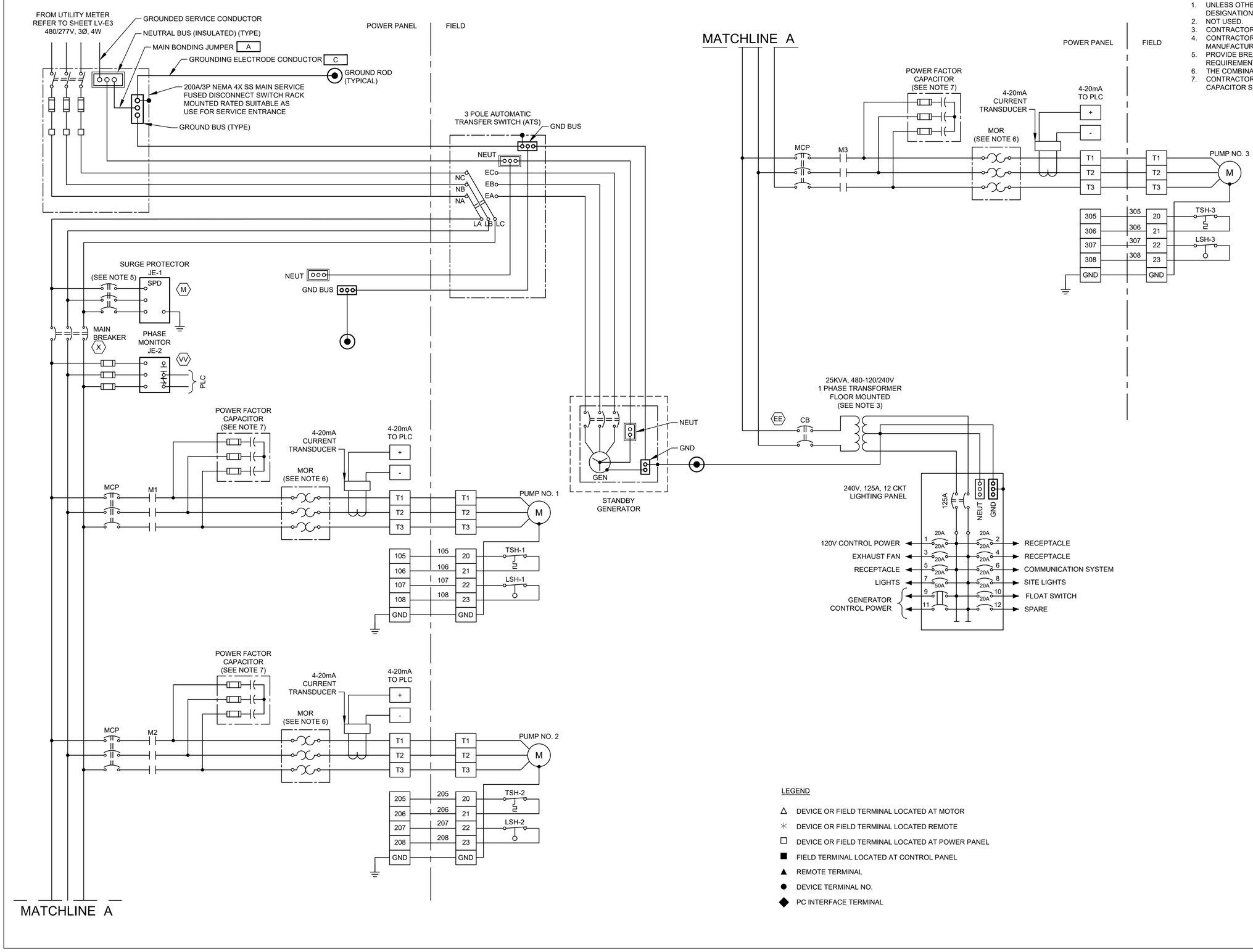

NOTES:

1. UNLESS OTHERWISE INDICATED, ALL DEVICES WITHOUT FURTHER DESIGNATION ARE LOCATED AT THE CONTROL PANEL.
2. NOT USED.
3. CONTRACTOR TO REVISE DWG. BASED ON MANUFACTURE AND SIZE.
4. CONTRACTOR SHALL TERMINATE POWER & CONTROL WIRES PER MANUFACTURER S REQUIREMENTS.
5. PROVIDE BREAKER SIZE ACCORDING TO MANUFACTURER S REQUIREMENTS.
6. THE COMBINATION OF CT AND MOTOR OVERLOAD RELAY IF REQUIRED.
7. CONTRACTOR TO COORDINATE POWER FACTOR CORRECTION CAPACITOR SIZE WITH PUMP MANUFACTURER.

LEGEND

- △ DEVICE OR FIELD TERMINAL LOCATED AT MOTOR
- ✳ DEVICE OR FIELD TERMINAL LOCATED REMOTE
- □ DEVICE OR FIELD TERMINAL LOCATED AT POWER PANEL
- ■ FIELD TERMINAL LOCATED AT CONTROL PANEL
- ▲ REMOTE TERMINAL
- ● DEVICE TERMINAL NO.
- ◆ PC INTERFACE TERMINAL

NO.	DATE	REVISION	APP.
	MM/DD/YY	BRIEF DESCRIPTION	XXX
	MM/DD/YY	BRIEF DESCRIPTION	XXX
	MM/DD/YY	BRIEF DESCRIPTION	XXX

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02/13/2026

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

LAKE VILLAGE LIFT STATION THREE LINE DIAGRAM

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 102 OF 125	

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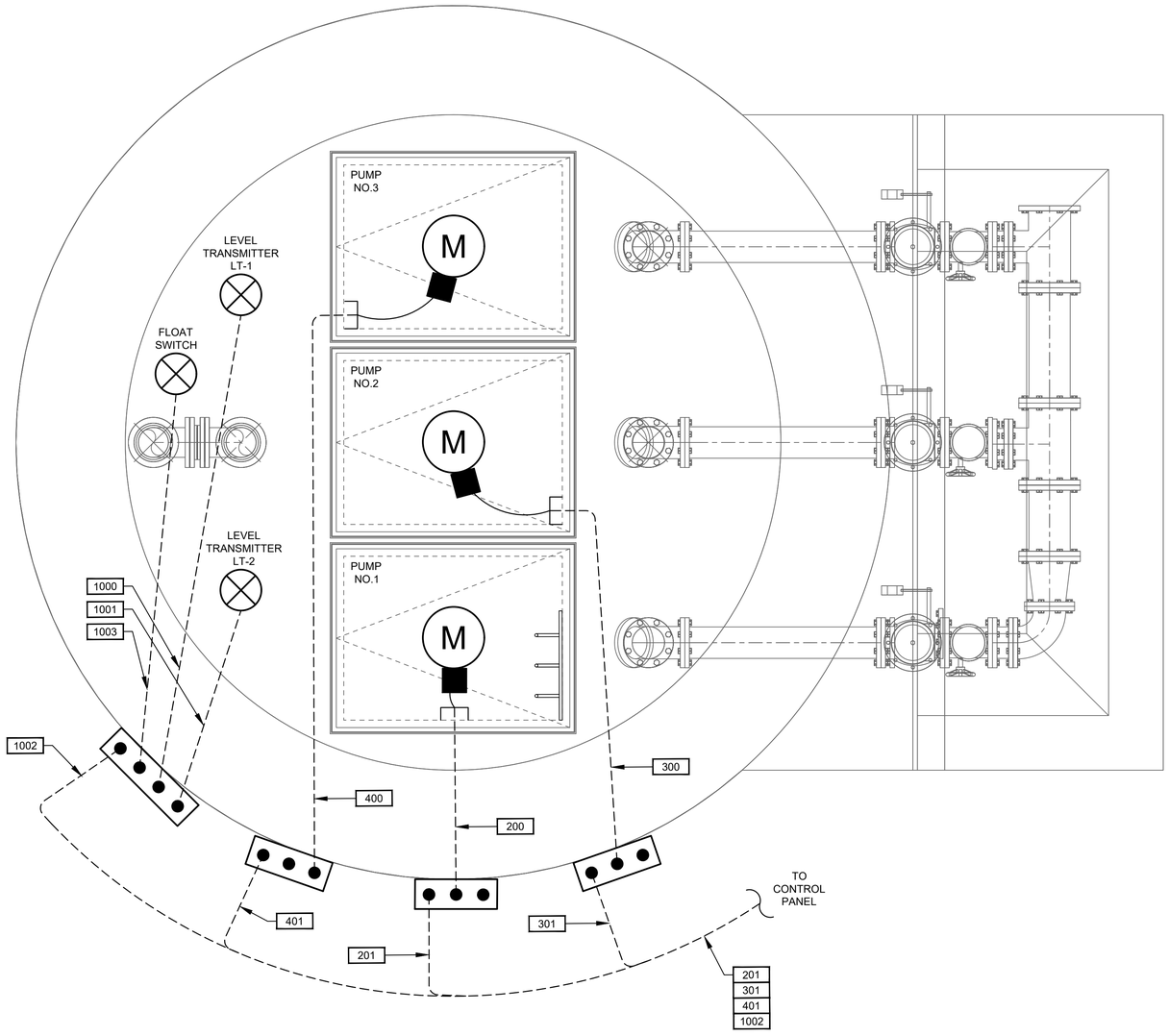

LAKE VILLAGE LIFT STATION
ENLARGED PLAN

PLAN

1/2" 1 -0"

NO.	DATE	REVISION	APP.
	MM/DD/YY	BRIEF DESCRIPTION	XXX
	MM/DD/YY	BRIEF DESCRIPTION	XXX
	MM/DD/YY	BRIEF DESCRIPTION	XXX

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CITY OF HOUSTON
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RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

LAKE VILLAGE LIFT STATION ENLARGED ELECTRICAL LIFT STATION PLAN

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
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DRAWING SCALE	
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CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 103 OF 125	

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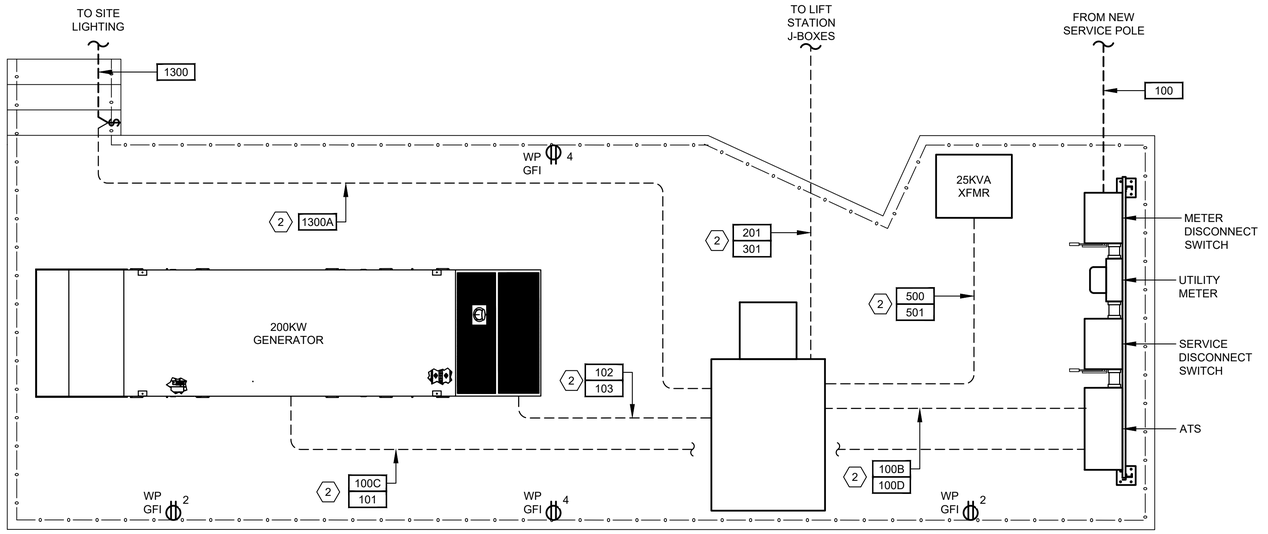
PLOT STYLE: GAI.ctb
PLOTTED: 2/13/2026 2:35 PM

NOTES BY SYMBOL "⬡":

1. REFER TO STRUCTURAL DRAWINGS FOR PLATFORM DETAILS.
2. CONDUIT TO BE INSTALLED BELOW PLATFORM.
3. GENERATOR NOISE LEVEL SHALL MEET LOCAL NOISE REQUIREMENTS AT 65dBA DAYTIME AND 58 dBA NIGHTTIME.



PROPOSED ELECTRICAL PLATFORM LAYOUT

DETAIL 1 (⬡1 ⬡3)

1" 2'-0"

NO.	DATE	REVISION	APP.
	MM/DD/YY	BRIEF DESCRIPTION	XXX
	MM/DD/YY	BRIEF DESCRIPTION	XXX
	MM/DD/YY	BRIEF DESCRIPTION	XXX

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RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

LAKE VILLAGE LIFT STATION PROPOSED ELECTRICAL PLATFORM LAYOUT

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SHEET NO. 104 OF 125	

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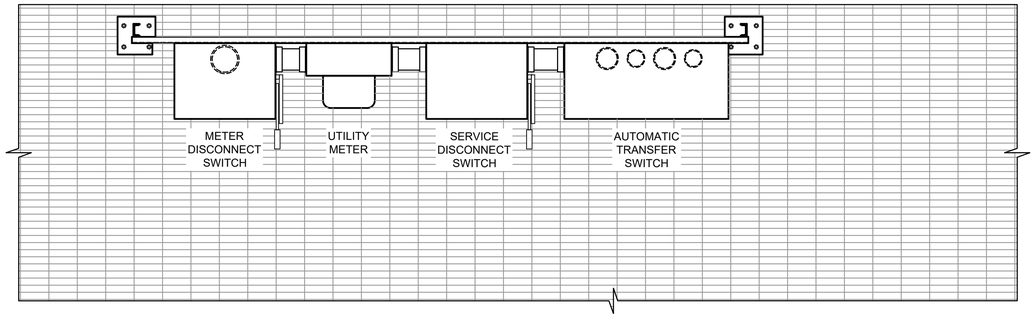
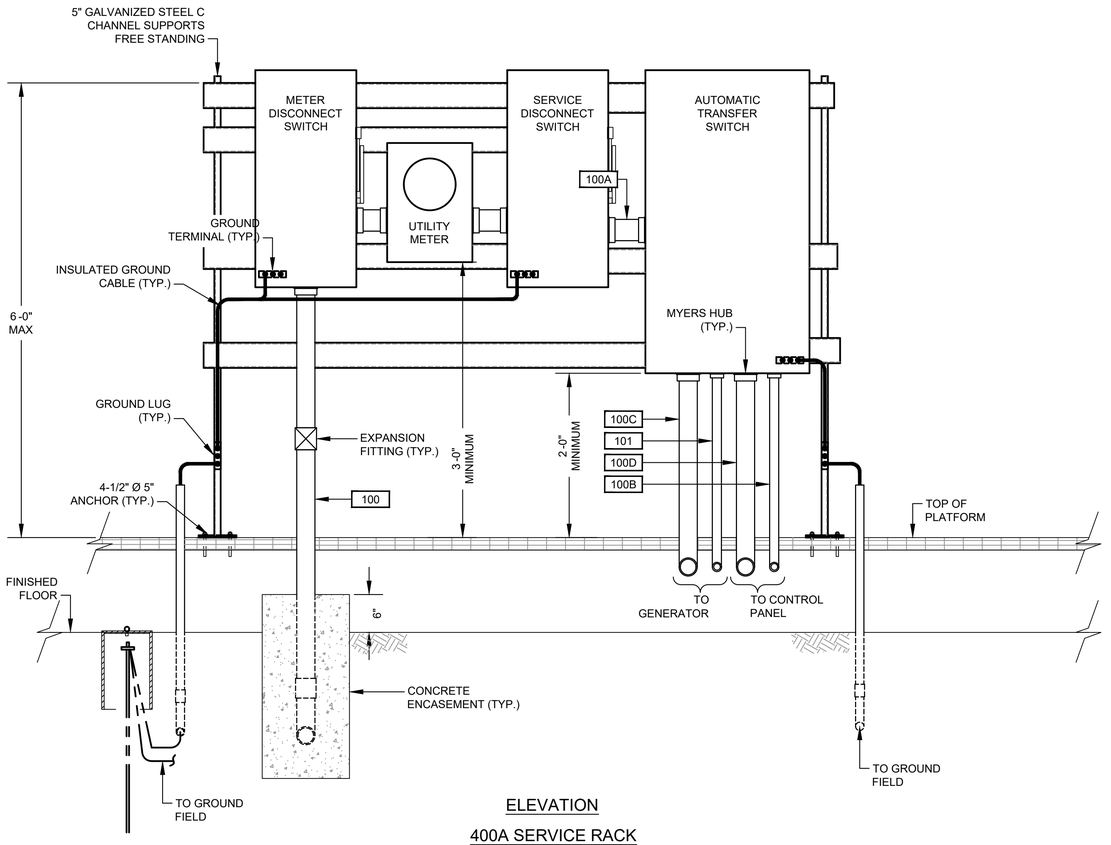


PLAN VIEW



ELEVATION

400A SERVICE RACK

NO.	DATE	REVISION	APP.
	MM/DD/YY	BRIEF DESCRIPTION	XXX
	MM/DD/YY	BRIEF DESCRIPTION	XXX
	MM/DD/YY	BRIEF DESCRIPTION	XXX

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RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

LAKE VILLAGE LIFT STATION SERVICE RACK DETAIL

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SHEET NO. 105 OF 125	

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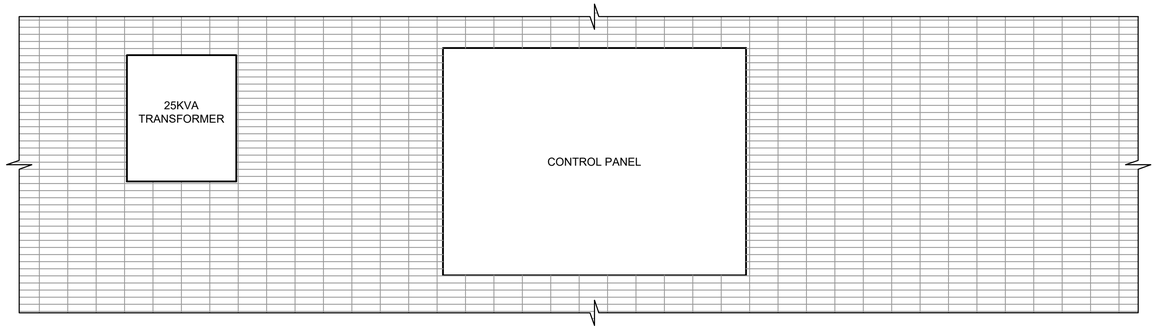
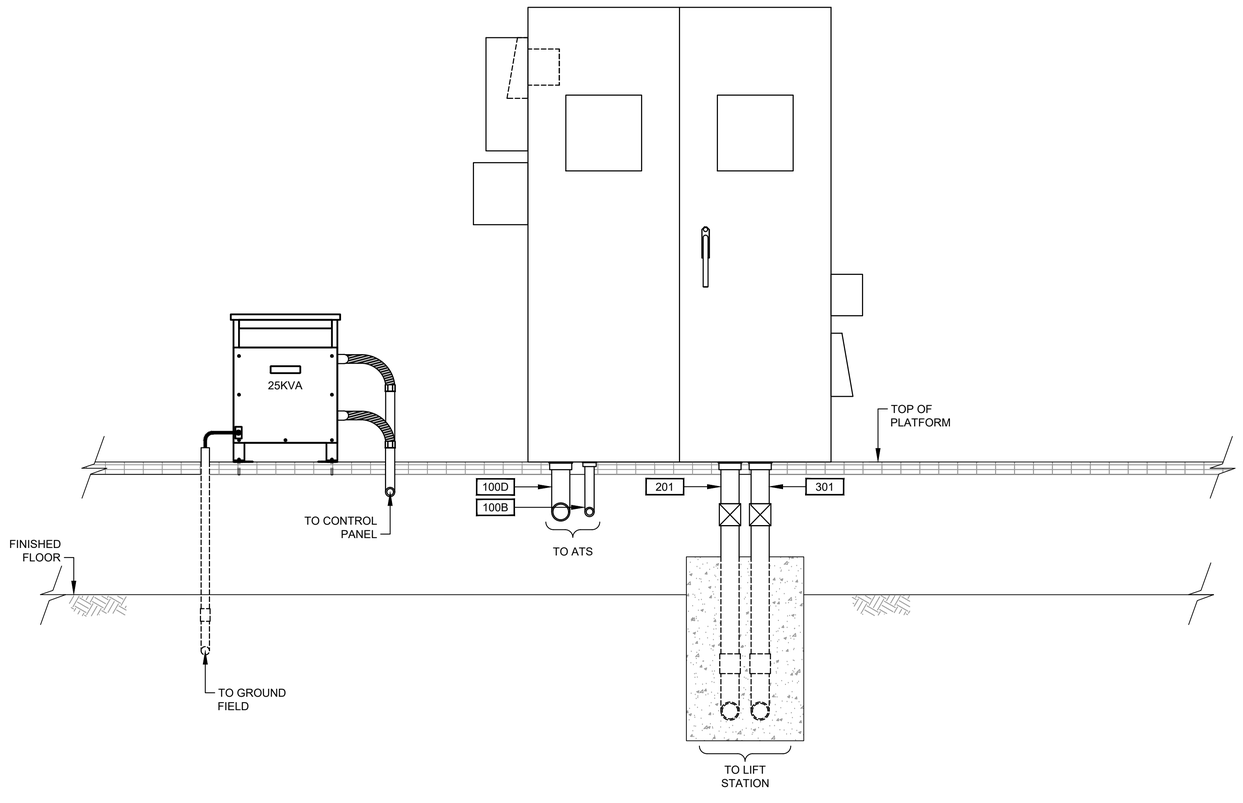


PLAN VIEW

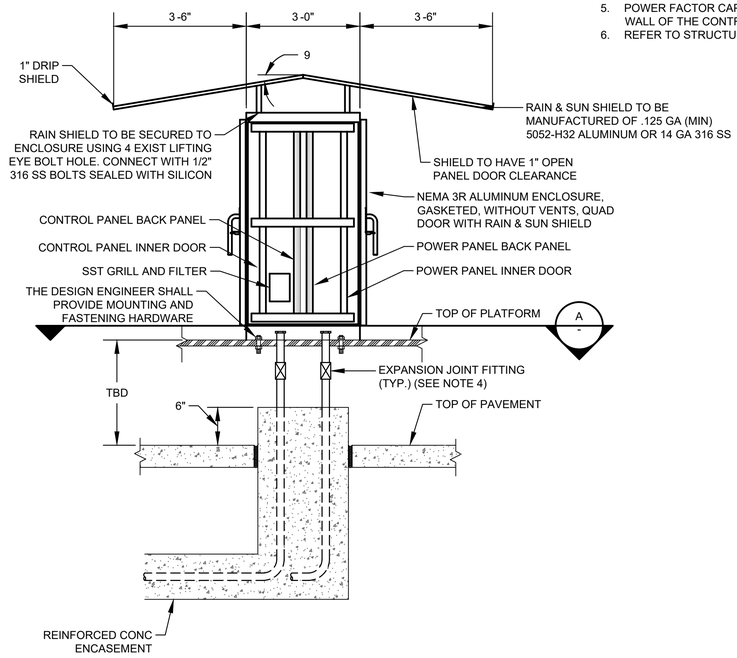


CONTROL PANEL
ELEVATION

DETAIL 1
NTS

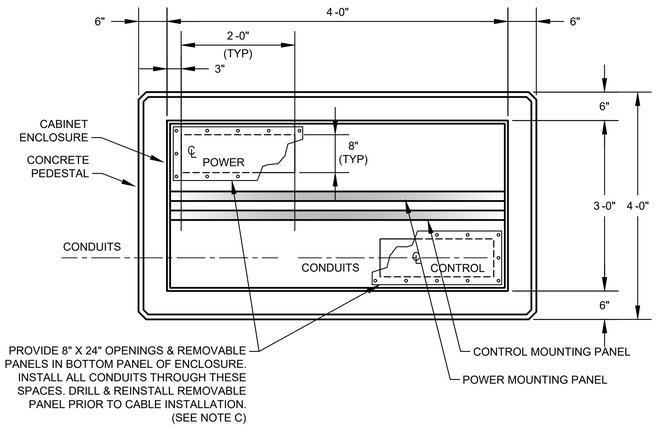
GENERAL NOTES:

1. REFER TO SPECIFICATION SECTION 13325 PROCESS CONTROL SYSTEMS CONTROL PANELS FOR PANEL DIMENSIONS.
2. COMMUNICATION PANEL TO BE INSTALLED ABOVE SERVICE RACK ELEVATION.
3. EXPANSION JOINT FITTINGS AS REQUIRED.
4. REFER TO SERVICE RACK FOR DETAIL.
5. POWER FACTOR CAPACITOR TO BE MOUNTED OUTSIDE SIDE WALL OF THE CONTROL CABINET.
6. REFER TO STRUCTURAL DRAWINGS FOR PLATFORM DETAIL.



CONTROL CABINET ENCLOSURE WITH PLATFORM
(SEE NOTE 6)

DETAIL 2
NTS



SECTION A
NTS

NO.	DATE	REVISION	APP.
	MM/DD/YY	BRIEF DESCRIPTION	XXX
	MM/DD/YY	BRIEF DESCRIPTION	XXX
	MM/DD/YY	BRIEF DESCRIPTION	XXX

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RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

LAKE VILLAGE LIFT STATION CONTROL CABINET ENCLOSURE DETAIL

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SHEET NO. 106 OF 125	

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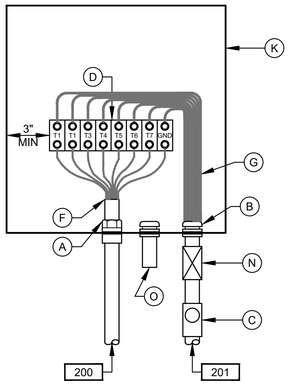
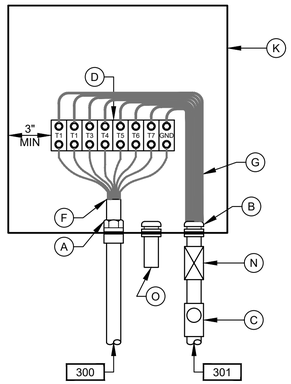


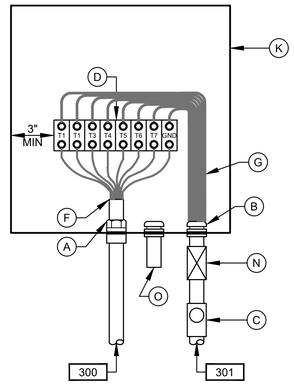
JUNCTION BOX NO.1

DETAIL 2
NTS
(SEE NOTE & 7)



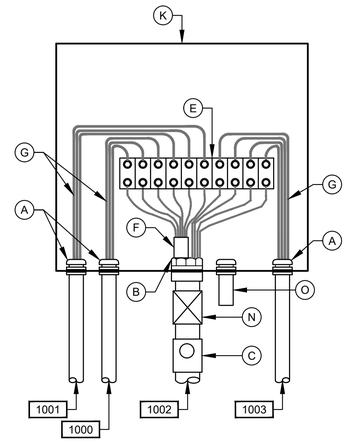
JUNCTION BOX NO.2

DETAIL 3
NTS
(SEE NOTE & 7)



JUNCTION BOX NO.5

DETAIL 4
NTS
(SEE NOTE & 7)



LEVEL TRANSMITTER
JUNCTION BOX

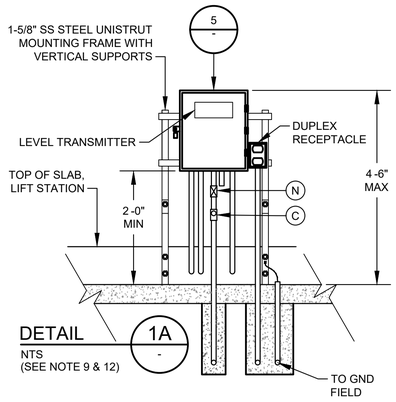
DETAIL 5
NTS
(SEE NOTE & 7)

NOTES:

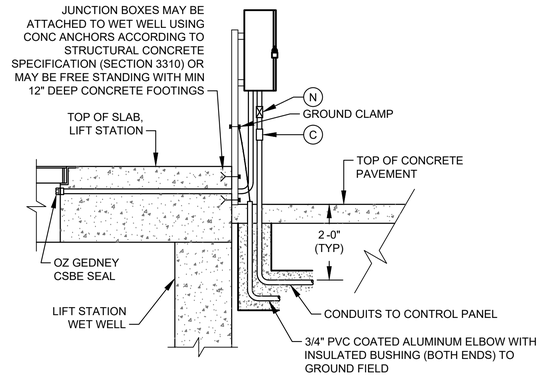
1. NAMEPLATES SHALL BE MOUNTED TO JUNCTION BOXES USING 316 STAINLESS STEEL HARDWARE.
2. MAINTAIN MINIMUM SEPARATION REQUIRED UNDER NEC ARTICLE 504, BETWEEN INTRINSICALLY SAFE CONTROL WIRING AND NON INTRINSICALLY SAFE MOTOR FEEDER WIRING.
3. UNLESS OTHERWISE NOTED, ALL EXTERIOR EXPOSED CONDUITS SHALL BE PVC COATED ALUMINUM.
4. UNLESS OTHERWISE NOTED, ALL NUTS, BOLTS, SCREWS WASHERS, ETC SHALL BE TYPE 316 STAINLESS STEEL.
5. ALL UNDERGROUND CONDUITS TO BE ENCASED IN REINFORCED CONCRETE DUCTBANK.
6. PROVIDE ANTI-CORROSIVE SPRAY ON ANY BARE METAL PARTS OR EXPOSED WIRE.
7. SEE WIRING SCHEMATICS FOR TERMINALS AND WIRE NUMBERS.
8. ANY CONDUIT REQUIRING A CSBE SEAL, SHALL BE A MINIMUM SIZE OF 2 1/2" PER CABLE.
9. DETAIL SHOWN MAY BE MODIFIED PER SITE SITUATION.
10. COORDINATE WITH WASTE WATER OPERATIONS ELECTRICAL ORGANIZATION FOR THE OPENING OF JUNCTION BOXES TO THE SIDE OF WET WELL IF REQUIRED DURING CONSTRUCTION.
11. THE ENCLOSURES WITH ELECTRICAL CIRCUITS SHALL BE A MINIMUM OF 5 FEET FROM ANY CLASSIFIED AREA, OTHERWISE EXPLOSION PROOF TYPE ENCLOSURES SHALL BE USED.
12. THE RECEPTACLES SHALL BE EXPLOSION PROOF TYPE IF INSTALLED WITHIN 5 FEET OF CLASSIFIED AREA, SHALL BE FIELD VERIFIED.

JUNCTION BOX EQUIPMENT SCHEDULE

- A - OZ GEDNEY CSBE SEAL
- B - WATERTIGHT CONDUIT HUB WITH INSULATED BUSHING
- C - CLASS I, DIV 1, EXPLOSION 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
- K - NEMA 4X STAINLESS STEEL JUNCTION BOX WITH GASKETED FRONT COVER, SINGLE QUARTER TURN, OIL-TIGHT LATCH AND PADLOCKING PROVISIONS, HOFFMAN D-3L16H1206 SS LF OR EQUAL. MINIMUM SIZE: 12"W X 16"H X 6"D
- L - NAMEPLATE, SEE SPECIFICATIONES (SEE NAMEPLATE SCHEDULE)
- M - MOTOR RATED SWITCH
- N - EXPANSION FITTING
- O - DRAIN VENT

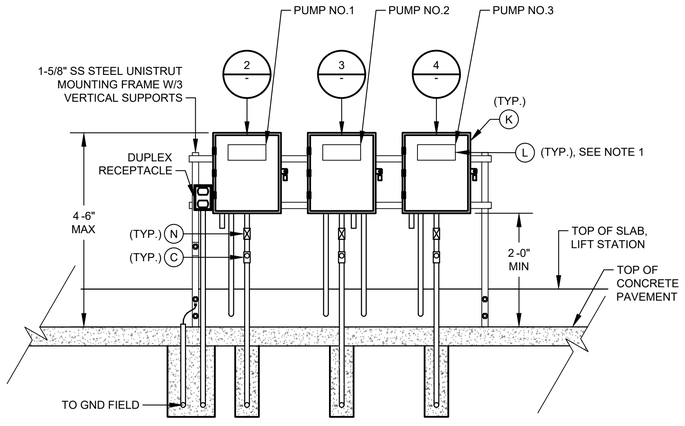


DETAIL 1A
NTS
(SEE NOTE 9 & 12)



TYP SIDE VIEW FOR DETAIL 1

(SEE NOTE 10)



DETAIL 1
NTS
(SEE NOTE 9)

NO.	DATE	REVISION	APP.
	MM/DD/YY	BRIEF DESCRIPTION	XXX
	MM/DD/YY	BRIEF DESCRIPTION	XXX
	MM/DD/YY	BRIEF DESCRIPTION	XXX

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02/13/2026

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

LAKE VILLAGE LIFT STATION ELECTRICAL JUNCTION BOX DETAIL

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 107 OF 125	

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FILE PATH: O:\H8109_Lift Station Rehabilitation And Reconstruction (Tetratech)\6 Drawings\Electrical\Working\Lake Village\Lake Village_E-09.dwg
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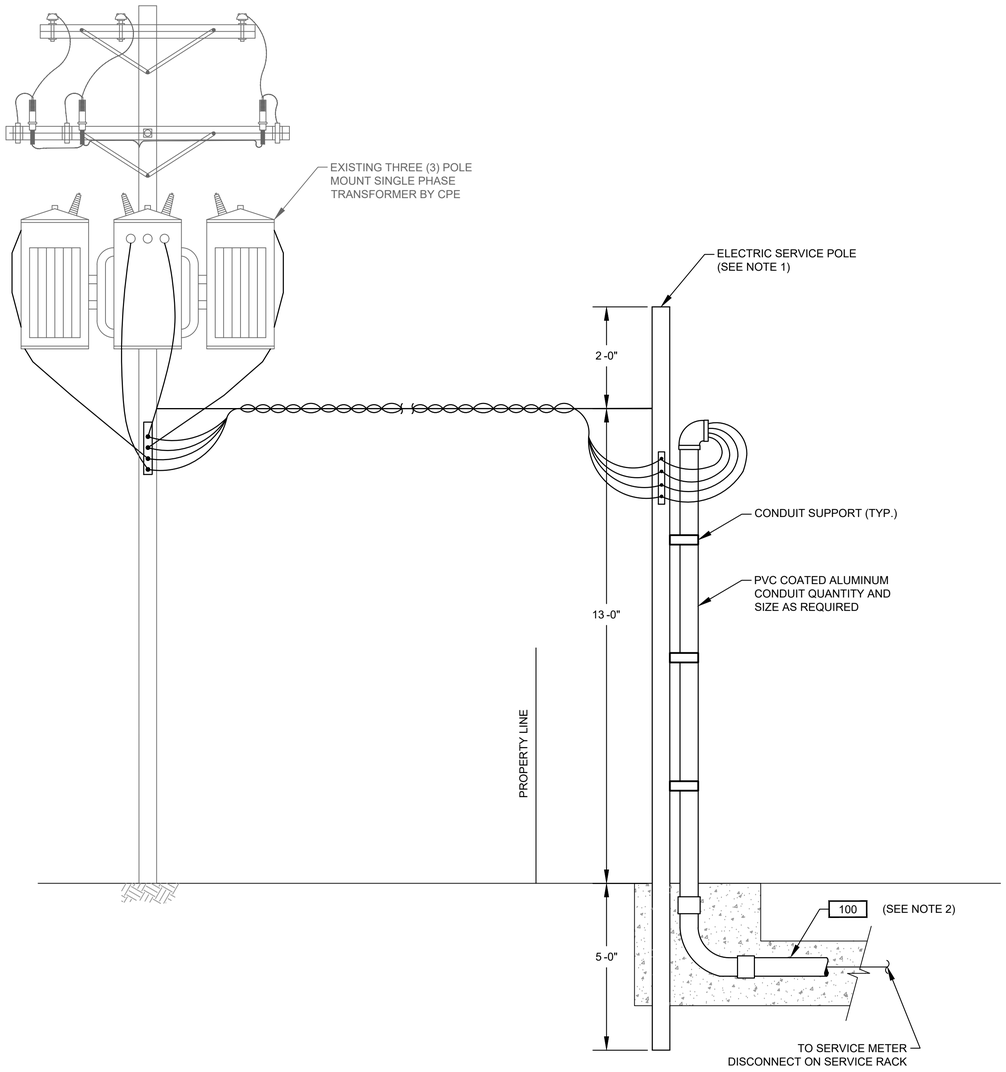

TYPICAL ELECTRICAL SERVICE ENTRANCE
FOR POWER SUPPLY BELOW 500KVA

DETAIL 1
NTS. -

NOTES:

1. WOODEN POLE 20 LONG. TOP DIAMETER 6", BOTTOM DIAMETER 8" PROVIDED AND INSTALLED BY ELECTRICAL CONTRACTOR.
2. ELECTRICAL SERVICE FEEDER PROVIDED AND INSTALLED BY ELECTRICAL CONTRACTOR. COORDINATE WITH CPE FOR THE REQUIREMENTS OF THE INSTALLATION.

NO.	DATE	REVISION	APP.
	MM/DD/YY	BRIEF DESCRIPTION	XXX
	MM/DD/YY	BRIEF DESCRIPTION	XXX
	MM/DD/YY	BRIEF DESCRIPTION	XXX

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COH LIFT STATIONS

LAKE VILLAGE LIFT STATION ELECTRICAL SERVICE POLE DETAIL

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DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 108 OF 125	

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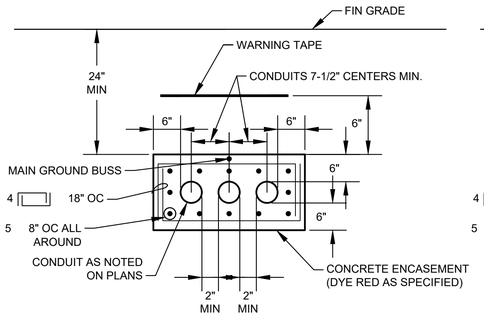
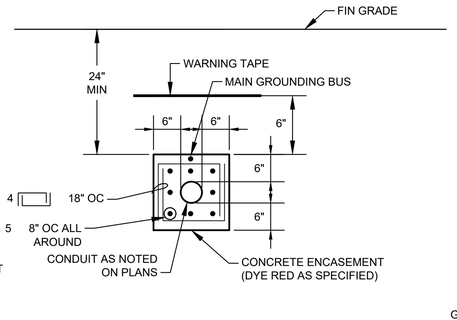


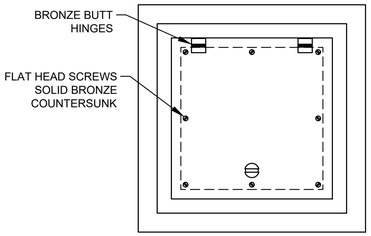
TYP MULTI-CONDUIT DUCTBANK SECTION

NOTE: TIE MAIN GROUNDING BUS TO REBAR AT A MAXIMUM INTERVAL OF EVERY 20 FEET.

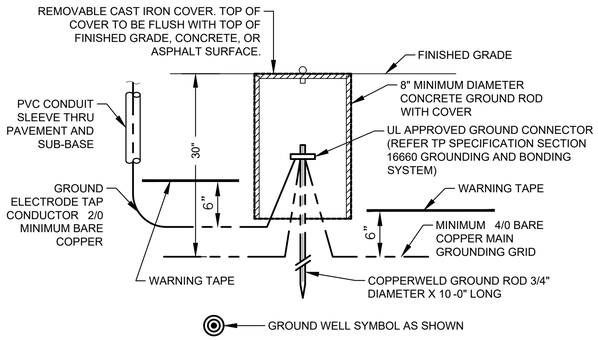
DETAIL 1 / - NTS



TYP SINGLE-CONDUIT DUCTBANK SECTION



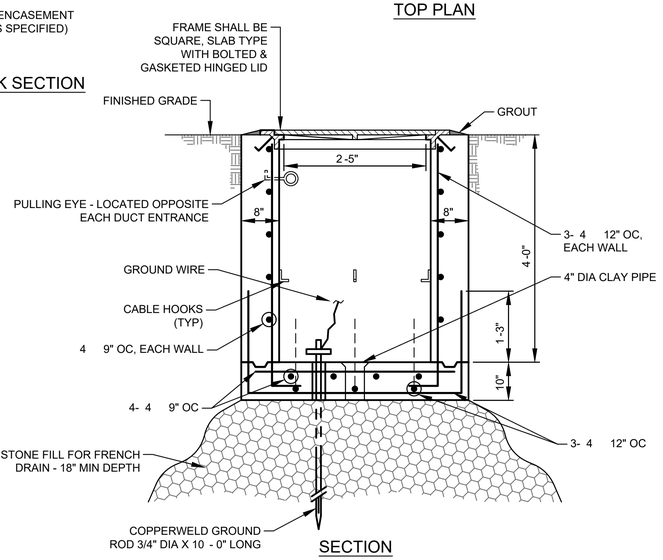
TOP PLAN



TYPICAL GROUND ROD AND WELL INSTALLATION

DETAIL 3 / - NTS

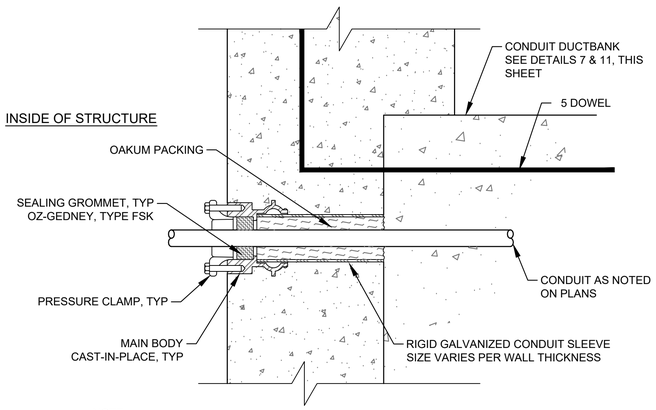
GROUND CONNECTOR SCHEDULE	
WIRE SIZE	BURNDY
2 AWG	GAR 6426
2/0 AWG	GAR 6426
4/0 AWG	GAR 6429
500 m	GAR 6434



SECTION

TYPICAL ELECTRICAL HANDHOLE CONSTRUCTION

DETAIL 2 / - NTS

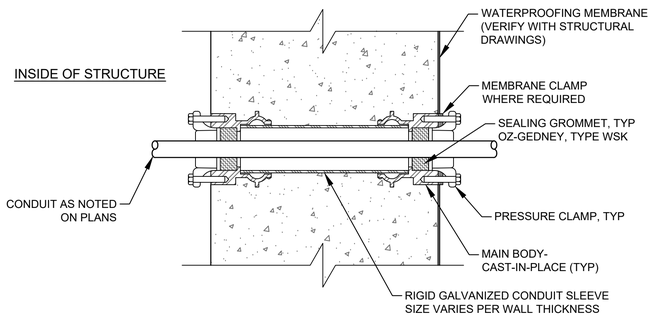


NOTE:

WALL SEAL SHOWN IS TYPICAL FOR EACH CONDUIT IN DUCTBANK.

SINGLE ENDED TYPE

FOR USE WHERE CONDUIT OUTSIDE THE STRUCTURE IS ENCASED IN CONCRETE

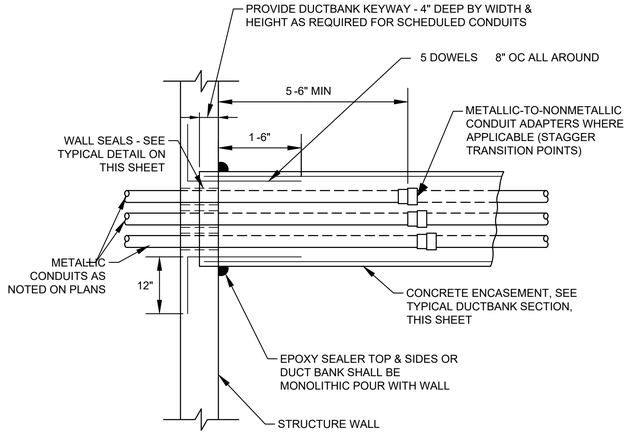


DOUBLE ENDED TYPE WITH MEMBRANE

FOR USE WHERE CONDUIT OUTSIDE THE STRUCTURE IS ENCASED IN CONCRETE

TYPICAL CONDUIT SEALS

DETAIL 4 / - NTS



PLAN

TYPICAL DUCTBANK ENTRANCE AT STRUCTURE WALL

DETAIL 5 / - NTS

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	MM/DD/YY	BRIEF DESCRIPTION	XXX
	MM/DD/YY	BRIEF DESCRIPTION	XXX

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02/13/2026

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RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

LAKE VILLAGE LIFT STATION ELECTRICAL TYPICAL DETAILS

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
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DRAWING SCALE	
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CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 109 OF 125	

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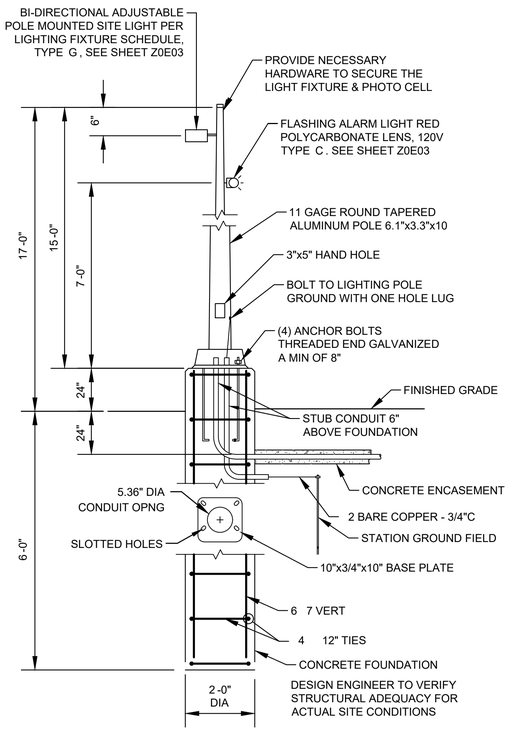
PLOT STYLE: GAI.ctb

NOTES:

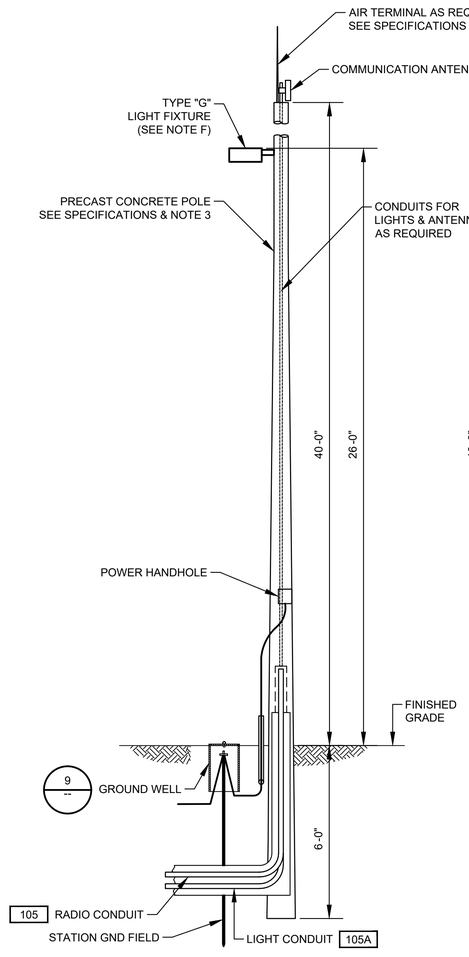
1. ON GROUND WIRE TERMINATION S, ALL PAINTED OR COATED METAL SURFACES SHALL BE REMOVED AND CLEANED TO BARE METAL. TO OBTAIN A SOUND GROUND CONNECTION. ONCE INSTALLED APPLY PROTECTIVE COATING ON BARE METAL AREAS PER MANUFACTURER REQUIREMENTS.
2. PRECAST CONCRETE POLE TO MOUNT THE RADIO RECEIVER.
3. 1" CONDUIT TO EXTEND TO THE TOP OF POLE FOR ETHERNET CABLE FOR RADIO.

NO.	DATE	REVISION	APP.
	MM/DD/YY	BRIEF DESCRIPTION	XXX
	MM/DD/YY	BRIEF DESCRIPTION	XXX
	MM/DD/YY	BRIEF DESCRIPTION	XXX



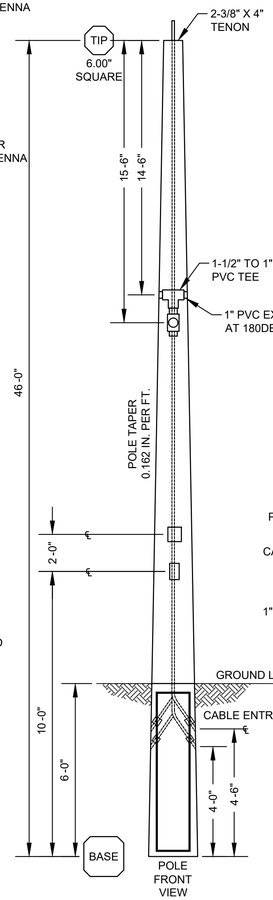
TYPICAL YARD LIGHT

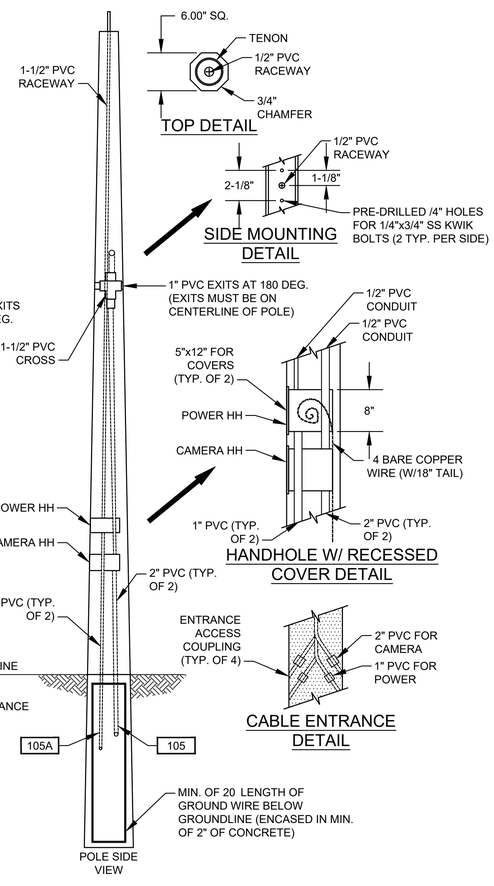
DETAIL 1
NTS



COMMUNICATION POLE MOUNTING DETAIL

DETAIL 2
NTS





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LAKE VILLAGE LIFT STATION ELECTRICAL YARD LIGHT/ COMM. POLE DETAILS

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DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 110 OF 125	

	DESCRIPTION	SERVICE		ROUTING			CONDUIT & WIRE SIZE
		VOLTAGE	AMPS OR HP	FROM	TO	VIA	
A	MAIN BONDING JUMPER	--	--	MAIN FUSED DISCONNECT NEUTRAL	MAIN FUSED DISCONNECT GROUND	--	6 CU GND.
B	EQUIPMENT BONDING JUMPER	--	--	MCC/POWER PANEL ENCLOSURE	POWER/CONTROL PANEL & EQUIPMENT	--	6 CU GND.
C	GROUNDED ELECTRODE CONDUCTOR	--	--	GROUNDING ELECTRODE	MAIN SERVICE FUSED DISCONNECT GROUNDING	--	6 CU GND.
100	SERVICE ENTRANCE	480V	200A	UTILITY POWER SERVICE	METER DISCONNECT		3 3/0 AWG, 6 NEUT. 6 GND. 2-1/2"C.
100A	SERVICE POWER	480V	200A	SERVICE DISCONNECT	ATS	--	3 3/0 AWG, 6 NEUT. 6 GND. 2-1/2"C.
100B	NORMAL/EMERGENCY POWER	24VDC	--	ATS	CONTROL PANEL	--	4 14 AWG, 1"C.
100C	EMERGENCY POWER	480V	200A	ATS	GENERATOR	--	3 3/0 AWG, 6 NEUT. 6 GND. 2-1/2"C.
100D	ELECTRIC POWER	480V	200A	ATS	CONTROL PANEL	--	3 3/0 AWG, 6 NEUT. 6 GND. 2-1/2"C.
101	GENERATOR CONTROL	120V	--	ATS	GENERATOR	--	6 14, 12 GND. 1"C.
102	ANNUNCIATION	--	--	GENERATOR	CONTROL PANEL	--	MANUFACTURER S CABLE IN 2"C
103	GENERATOR AUX. POWER	208/120V	--	GENERATOR	LIGHTING PANEL	--	3 4 AWG, 6 GND. 1-1/2"C.
105	COMMUNICATION	--	--	COMMUNICATION POLE	PPU-AC	--	POE CABLE IN 1"C.
200	PUMP NO. 1 POWER	480V	12 HP	PUMP NO. 1	PUMP NO. 1 JUNCTION BOX	--	MANUFACTURER S CABLE IN 2-1/2" CONDUIT
201	PUMP NO. 1 POWER AND CONTROLS	480V	12 HP	PUMP NO. 1 JUNCTION BOX	CONTROL PANEL	--	3 8 AWG, 4 14, 10 GND. 1-1/2"C.
300	PUMP NO. 2 POWER	480V	12 HP	PUMP NO. 2	PUMP NO. 2 JUNCTION BOX	--	MANUFACTURER S CABLE IN 2-1/2" CONDUIT
301	PUMP NO. 2 POWER AND CONTROLS	480V	12 HP	PUMP NO. 2 JUNCTION BOX	CONTROL PANEL	--	3 8 AWG, 4 14, 10 GND. 1-1/2"C.
400	PUMP NO. 3 POWER	480V	12 HP	PUMP NO. 2	PUMP NO. 2 JUNCTION BOX	--	MANUFACTURER S CABLE IN 2-1/2" CONDUIT
401	PUMP NO. 3 POWER AND CONTROLS	480V	12 HP	PUMP NO. 2 JUNCTION BOX	CONTROL PANEL	--	3 8 AWG, 4 14, 10 GND. 1-1/2"C.
500	LIGHTING TRANSFORMER PRIMARY FEEDER	480V	50A	CONTROL PANEL	LIGHTING TRANSFORMER PRIMARY	--	3 4 AWG, 8 GND. 1"C.
501	LIGHTING TRANSFORMER SECONDARY FEEDER	208/120V	--	LIGHTING TRANSFORMER SECONDARY	LIGHTING PANEL	--	3 1 AWG, 6 GND. 1-1/2"C.
1000	LEVEL TRANSMITTER	24VDC	--	LEVEL TRANSMITTER LT-1	TRANSMITTER JUNCTION BOX	--	MANUFACTURER S CABLE IN 2-1/2" CONDUIT
1001	LEVEL TRANSMITTER	24VDC	--	LEVEL TRANSMITTER LT-2	TRANSMITTER JUNCTION BOX	--	MANUFACTURER S CABLE IN 2-1/2" CONDUIT
1002	COMBINED LEVEL TRANSMITTERS & FLOAT SWITCH	24VDC	--	CONTROL PANEL	TRANSMITTER JUNCTION BOX	--	2 TRIAD 16, 4 14 AWG, 1"C.
1003	WELL FLOAT SWITCHES	120V	--	TRANSMITTER JUNCTION BOX	FLOAT SWITCH NO.1 THROUGH NO.7	--	MANUFACTURER S CABLE IN 2-1/2"C
1004	FIT-01 CONTROL	24VDC	--	FLOW METER TRANSMITTER FIT-01	CONTROL PANEL	--	1 TRIAD 16 AWG, 1"C.
1005	FIT-01 POWER	120V	--	FLOW METER TRANSMITTER FIT-01	CONTROL PANEL	--	2 12 AWG, 12 GND. 1"C.
1100	120VAC FOR RECEPTACLE	--	--	LIGHTING PANEL	RECEPTACLE ON PLATFORM	--	2 12 AWG, 12 GND, 3/4"C.
1200	120VAC FOR RECEPTACLE	120V	--	LIGHTING PANEL	RECEPTACLE ON PLATFORM	--	2 12 AWG, 12 GND. 1"C.
1300	SITE LIGHTING	120V	--	SITE LIGHTING SWITCH	SITE LIGHTING	--	2 12 AWG, 12 GND. 1"C.
1300A	SITE LIGHTING	120V	--	LIGHTING PANEL	SITE LIGHTING SWITCH	--	2 12 AWG, 12 GND. 1"C.
1400	PPU BOX POWER	120V/24VDC	--	CONTROL PANEL	PPU BOX	--	4 12 AWG, 12 GND. 3/4"C.
1401	PPU BOX COMMUNICATION	24VDC	--	PPU BOX	CONTROL PANEL	--	CAT.5E IN 3/4"C.

NOTES BY SYMBOL "⬡":

⬡1 REFER TO SPEC SECTION 16120 FOR CONDUCTOR COLOR CODE.

NO.	DATE	REVISION	APP.
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	MM/DD/YY	BRIEF DESCRIPTION	XXX
	MM/DD/YY	BRIEF DESCRIPTION	XXX

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COH LIFT STATIONS

LAKE VILLAGE LIFT STATION CONDUIT SCHEDULE

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CITY OF HOUSTON PM	
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SHEET NO. 111 OF 125	

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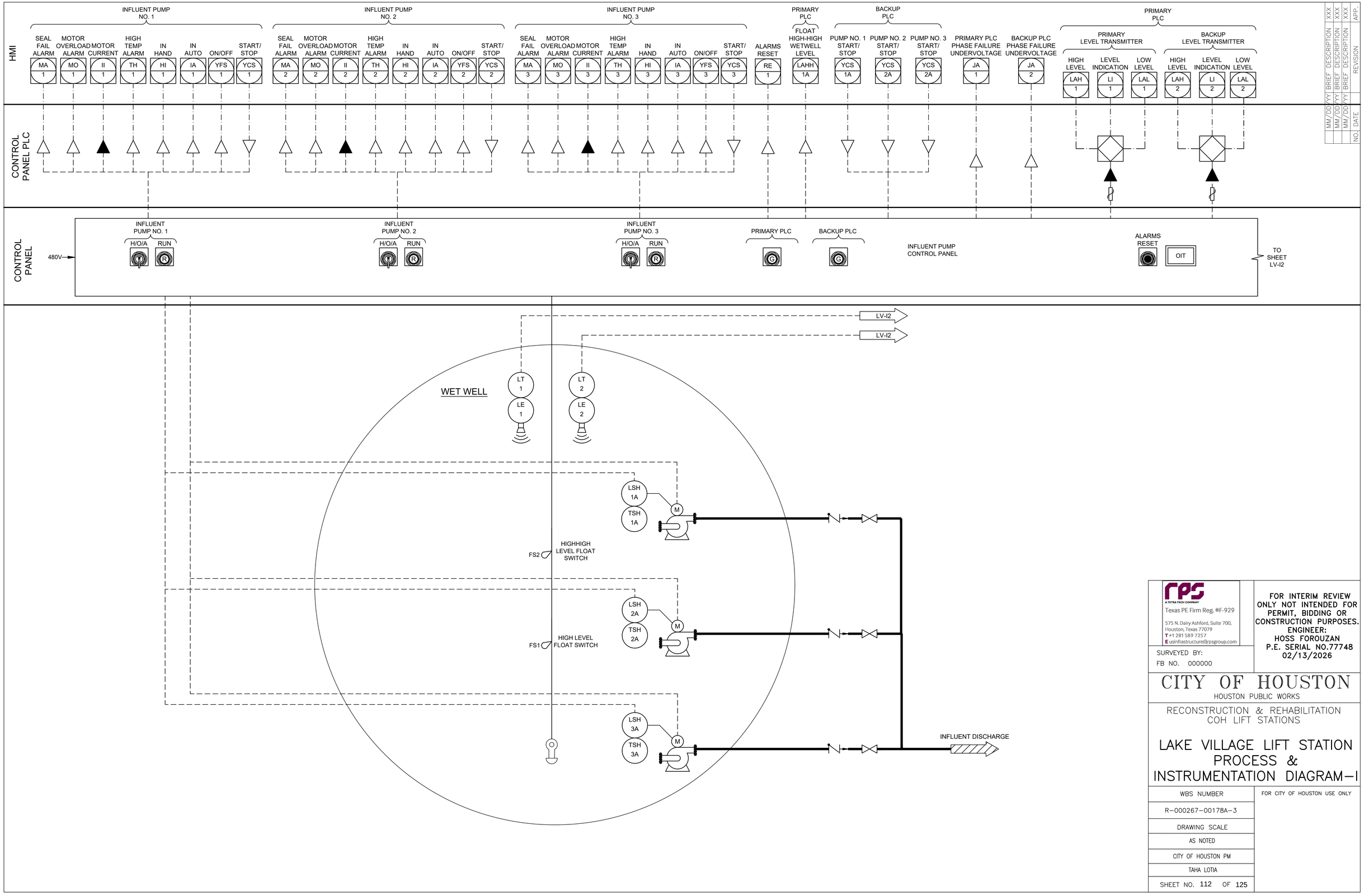

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COH LIFT STATIONS

LAKE VILLAGE LIFT STATION PROCESS & INSTRUMENTATION DIAGRAM–I

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TAHA LOTIA	
SHEET NO. 112 OF 125	

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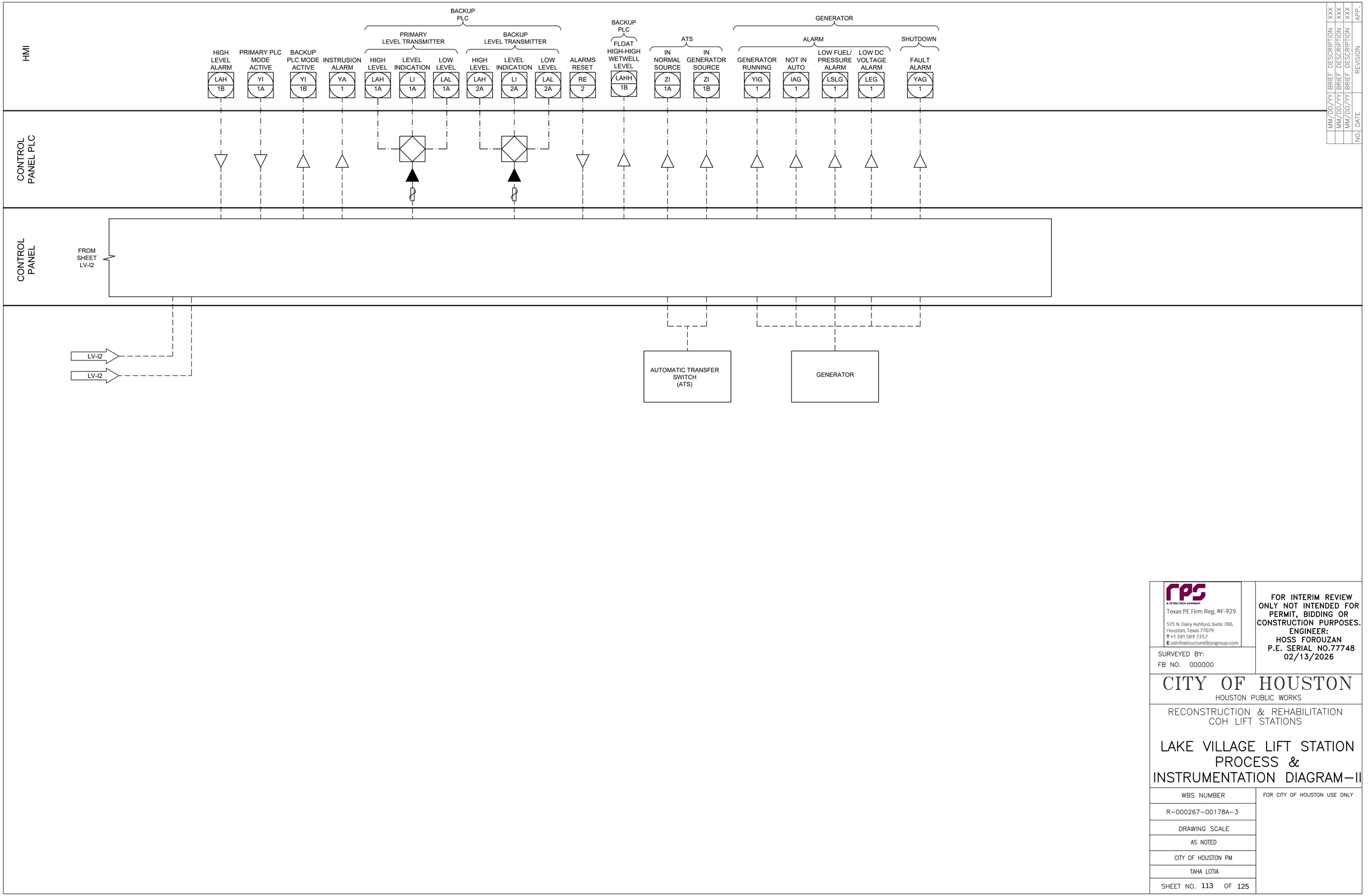

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	MM/DD/YY	BRIEF DESCRIPTION	XXX

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LAKE VILLAGE LIFT STATION PROCESS & INSTRUMENTATION DIAGRAM–II

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SHEET NO. 113 OF 125	

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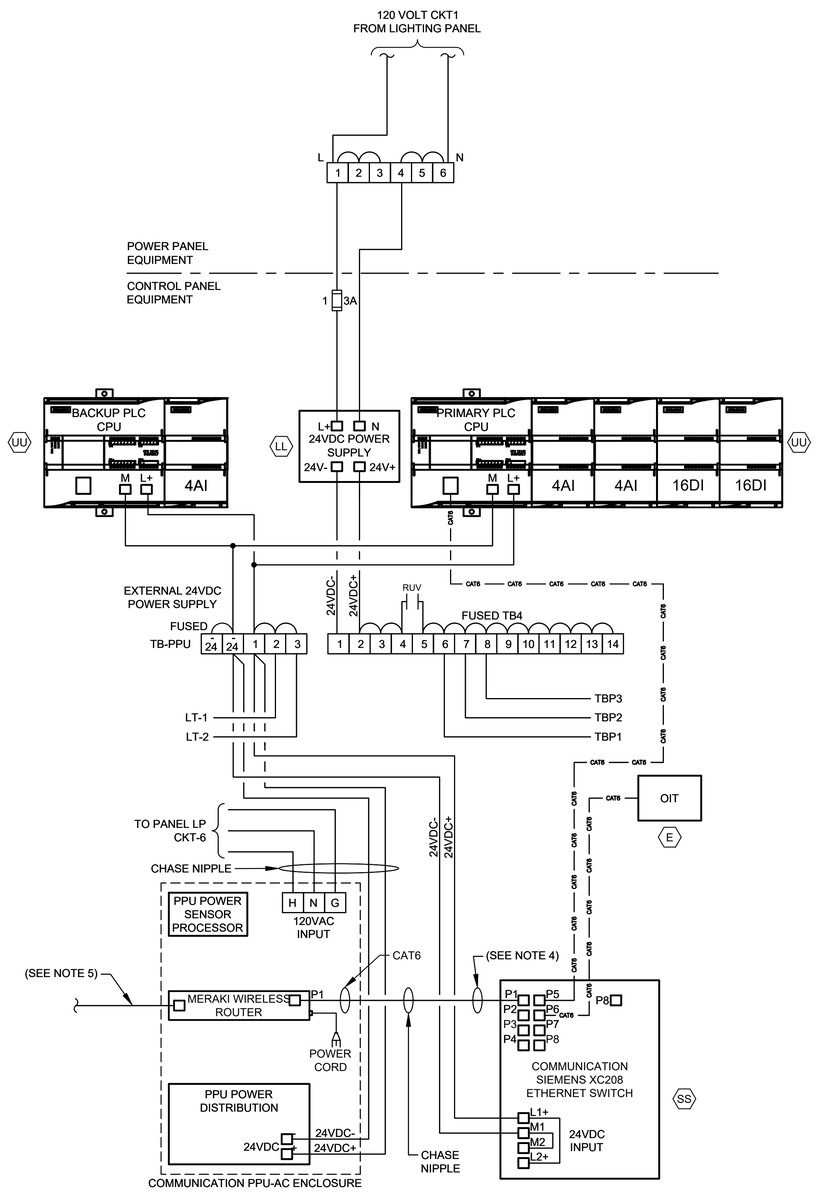
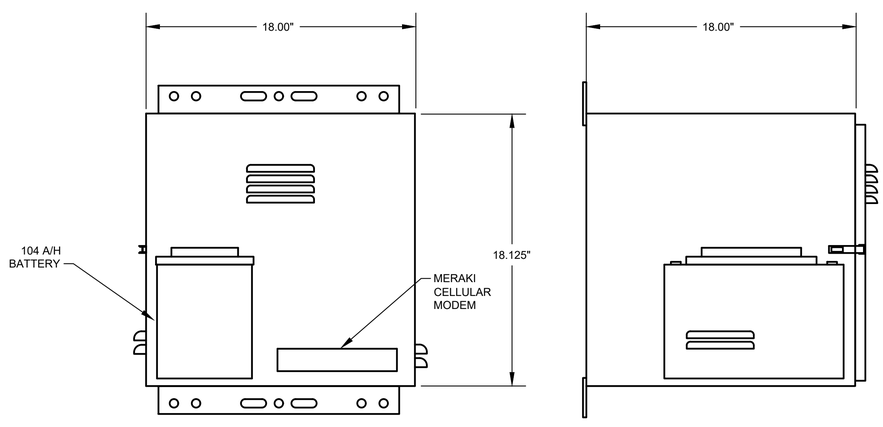


CONTROL POWER & COMMUNICATIONS WIRING

DIAGRAM

NTS

(SEE NOTE 2 & 6)



PPU-AC ENCLOSURE FRONT VIEW

PPU-AC ENCLOSURE SIDE VIEW

PPU-AC CONTROL ENCLOSURE

ELEVATION

NTS

(SEE NOTE 7)

NOTES:

1. FOR DESCRIPTION AND RATINGS OF ITEMS INDICATED WITH ITEM TAG, SEE DEVICE RATINGS SCHEDULE.
2. REFER TO SPEC SECTION 16120 FOR CONDUCTOR COLOR CODE.
3. THE PLC POWER SUPPLY SHALL FEED THE 24VDC I/O.
4. CAT6 ETHERNET CABLE FOR MERAKI CELLULAR ROUTER (P1).
5. CAT6 POE CABLE TO RADIO.
6. COMMUNICATION PPU-AC & SCADA SHALL BE PROVIDED BY CONTRACTOR INCLUDING TO RUN CONDUITS & WIRES.
7. COORDINATE WITH VENDOR TO PROVIDE PROPER VENTILATION WHERE APPLICABLE.

NO.	DATE	REVISION	APP.
	MM/DD/YY	BRIEF DESCRIPTION	XXX
	MM/DD/YY	BRIEF DESCRIPTION	XXX
	MM/DD/YY	BRIEF DESCRIPTION	XXX

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P.E. SERIAL NO.77748
02/13/2026

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

LAKE VILLAGE LIFT STATION COMMUNICATION DIAGRAM

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 114 OF 125	

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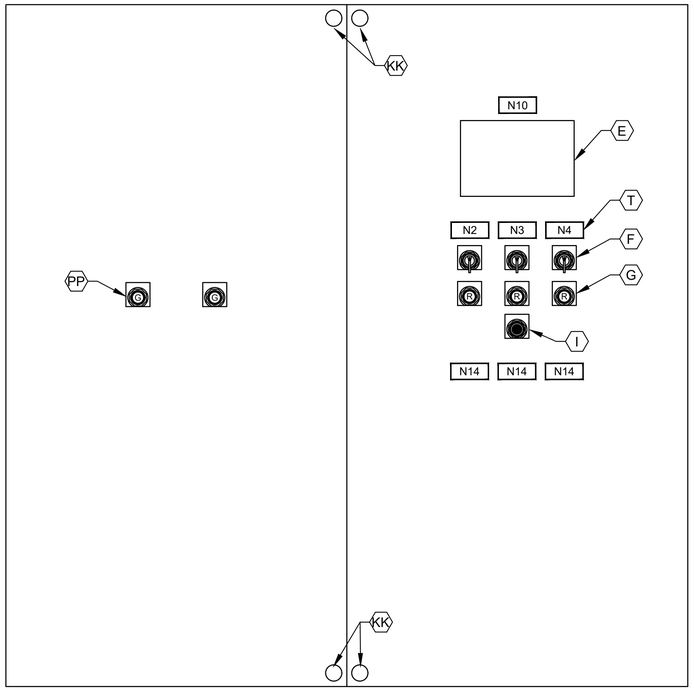
EQUIPMENT AND DEVICE SCHEDULE

ITEM	QUANTITY	DESCRIPTION
A	1	PANEL BOARD, 120/240V, 1 PHASE, 3 WIRE, 100A, 12 CKTS
B	2	FULL VOLTAGE, NON-REVERSING, SINGLE SPEED, AUTOMATIC MOTOR STARTER W/120 VOLT CONTROL COIL, NEMA SIZE AS SCHEDULED.
C	2	TIME DELAY RELAY WITH THREE FORM C CONTACTS, 120VAC COIL AND 11 PIN SOCKET BASE.
D	1	SINGLE CHANNEL INTRINSICALLY SAFE RELAY
E	1	PROGRAMMING SCREEN (OIT)
F	3	HAND-OFF-AUTO SWITCH, 3 POSITION, HEAVY-DUTY, OILTIGHT WITH 2 SETS OF CONTACT BLOCKS (PUMP CONTROL)
G	3	INDICATING LIGHT, HEAVY DUTY, OILTIGHT, RED, 24 VDC, LED, WITH "RUN" LEGEND
H	1	PERPETUAL POWER UNIT (PPU)
I	1	PUMP ALARM RESET PUSHBUTTON
J	2	SWITCH FOR CABINET LIGHT, 120V, 20A, SPST
K	3	DUPLEX RECEPTACLE, 120V, 20A, 2 WIRE, GROUNDED
L	2	24" LED STRIP LIGHT 120V SUITABLE FOR ZERO DEGREE OPERATION.
M	1	SURGE PROTECTOR - INCOMING POWER
N	*	NOT USED.
P	2	CURRENT TRANSFORMER, RATIO AS SCHEDULED W/4-20mA OUTPUT.
Q	12	TERMINAL BLOCKS, SIZED FOR MOTOR POWER REQUIREMENTS
R	*	RELAY WITH THREE FORM C CONTACTS, AND 11 PIN SOCKET BASE
S	*	NOT USED.
T	*	NAMEPLATES, SEE SPECIFICATIONS (SEE NAMEPLATE SCHEDULE)
U	2	SOLID STATE MOTOR OVERLOAD RELAY
V	6	FUSE HOLDER & FUSES - PHASE FAILURE
W	1	NEMA 3R GASKETED ALUMINUM ENCLOSURE WITHOUT VENTS 72"H x 60"W x 36"D
X	1	DOOR MOUNTED ROTARY HANDLE DISCONNECT SWITCH (SUITABLE FOR ENVIRONMENT)
Y	1	THERMAL-MAGNETIC MOLDED CASE MAIN CIRCUIT BREAKER, SIZE AS SCHEDULED
Z	2	ADJUSTABLE INSTANTENOUS TRIP MOTOR CIRCUIT PROTECTOR, SIZE AS SCHEDULED
AA	*	TERMINAL BLOCKS
BB	2	EXTERNAL OVERLOAD RESET PUSHBUTTON MECHANISM
CC	3	ANALOG I/O SURGE SUPPRESSOR
DD	1	WIRE DUCT 2" WIDE x 2" DEEP MINIMUM
EE	1	THERMAL-MAGNETIC MODLED CASE CIRCUIT BREAKER FOR LIGHTING TRANSFORMER, SIZE AS SCHEDULED
FF	1	GROUND BUS
GG	1	25 KVA, 480 - 240/120V,1ϕ, 3W DRY TYPE NEMA 3R ENCLOSURE TRANSFORMER (PAD MOUNTED)
HH	*	NOT USED.
II	1	120VAC - 24VAC POWER SUPPLY (AS REQUIRED)
JJ	11	CARTRIDGE FUSES & FUSE HOLDER
KK	8	QUARTER TURN CAPTIVE DOOR CLOSURE
LL	1	120VAC - 24VDC PLC POWER SUPPLY 5A
MM	2	MOTION SWITCH
NN	*	NOT USED
PP	2	INDICATING LED LIGHT, HEAVY DUTY, OILTIGHT, GREEN, 24 VDC, LED WITH " PRIMARY PLC" & "BACKUP PLC" LEGEND
QQ	*	NOT USED
RR	*	NOT USED
SS	1	COMMUNICATION ETHERNET SWITCH
TT	1	POWER SURGE PROTECTOR - CONTROL POWER
UU	2	PROGRAMMABLE LOGIC CONTROLLER WITH EXPANSION UNIT
VV	1	PHASE AND UNDER VOLTAGE MONITOR
WW	*	FUSED TERMINAL BLOCKS
XX	2	PUMP PROTECTION MODULE RATED FOR CLASS I, DIVISION I
YY	2	ANALOG SIGNAL ISOLATOR
ZZ	3	POWER FACTOR CORRECTION CAPACITOR NEMA 3R STAINLESS STEEL
AB	-	NOT USED.
AC	1	POWER DISTRIBUTION BLOCK
AD	1	NEUTRAL LUG
AE	1	6" EXHAUST FAN, 120V, STAINLESS FILTERS & GRILL PACKAGE W/BUG GUARD
AF	1	T-STAT FOR EXHAUST FAN

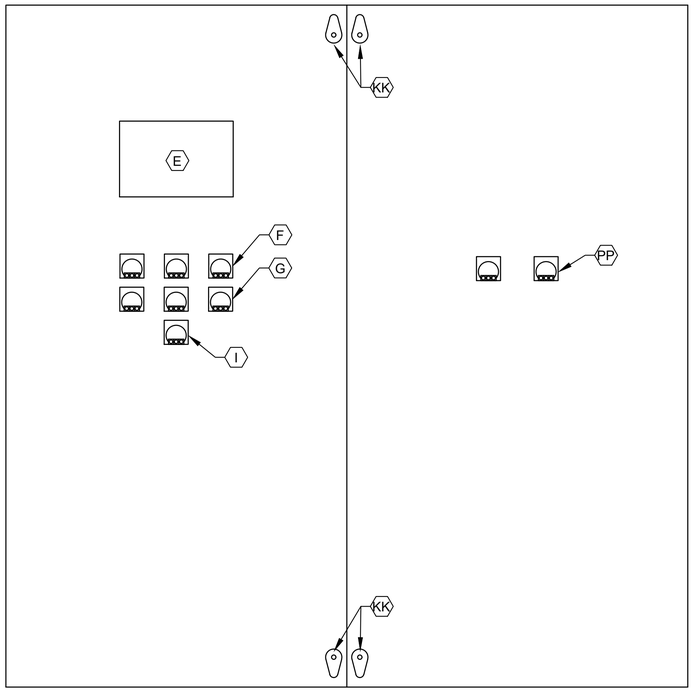
* - AS SCHEDULED



CONTROL PANEL FRONT INNER DOOR

ELEVATION

NTS



CONTROL PANEL BACK INNER DOOR

ELEVATION

NTS

NOTES:

1. NAMEPLATES SHALL BE MOUNTED TO PANELS USING STAINLESS STEEL HARDWARE.
2. REFER SPECIFICATIONS FOR ALL PANEL COMPONENTS.

NO.	DATE	REVISION	APP.
	MM/DD/YY	BRIEF DESCRIPTION	XXX
	MM/DD/YY	BRIEF DESCRIPTION	XXX
	MM/DD/YY	BRIEF DESCRIPTION	XXX

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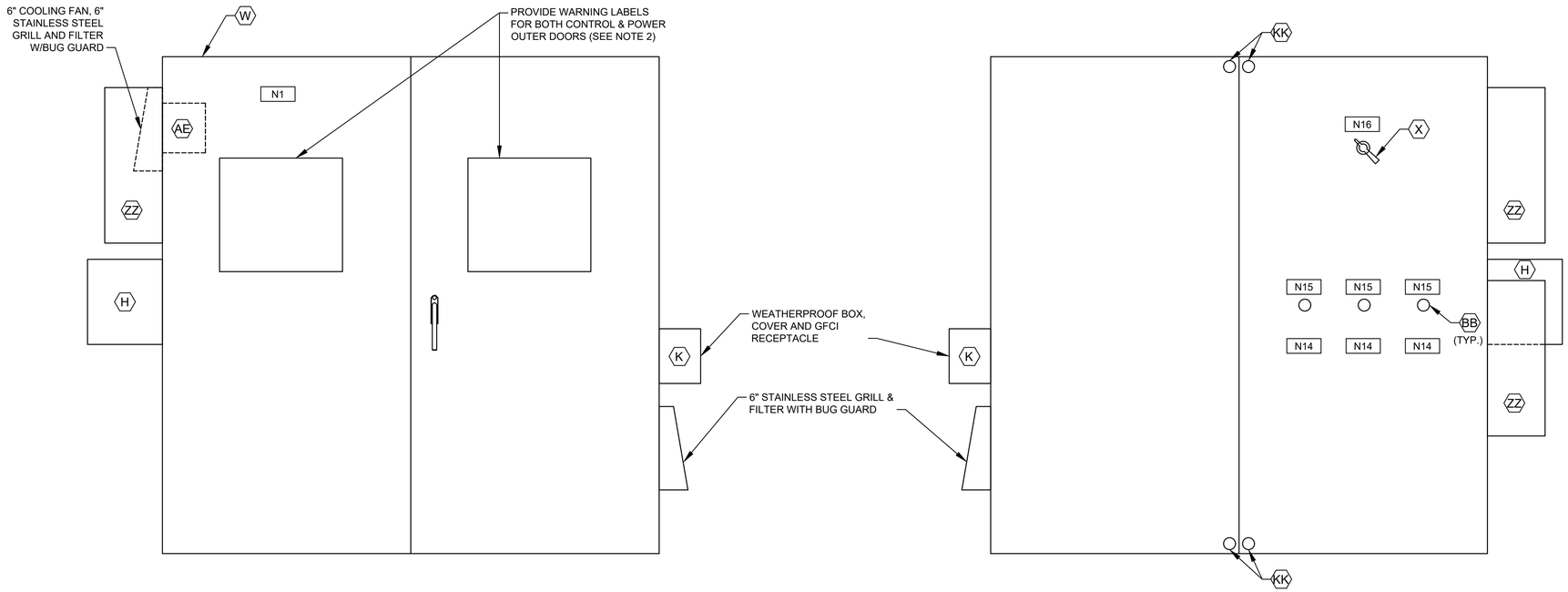
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

LAKE VILLAGE LIFT STATION CONTROL CABINET EQUIPMENT LAYOUT & SCHEDULE

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 115 OF 125	



CONTROL CABINET (CONTROL SIDE)
OUTER DOOR

ELEVATION

NTS

CONTROL CABINET (POWER SIDE)
INNER DOOR

ELEVATION

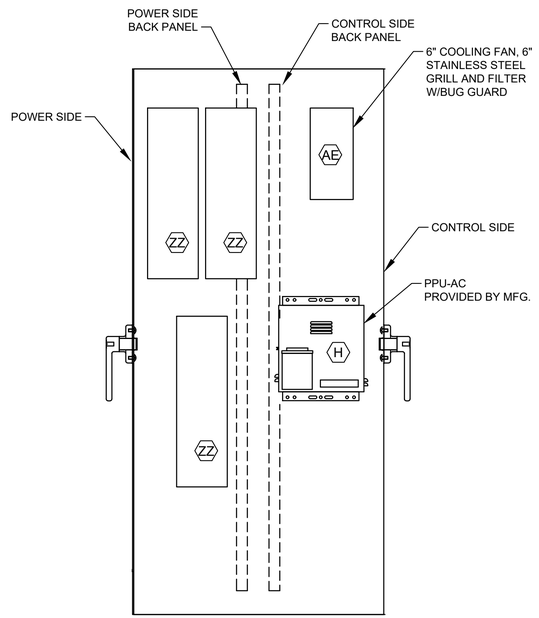
NTS
(SEE NOTE 1)

NOTES:

1. SEE SHEET I-104 FOR EQUIPMENT SCHEDULE.
2. REFER TO NEC SECTIONS 110.16 & 110.21

NAMEPLATE SCHEDULE

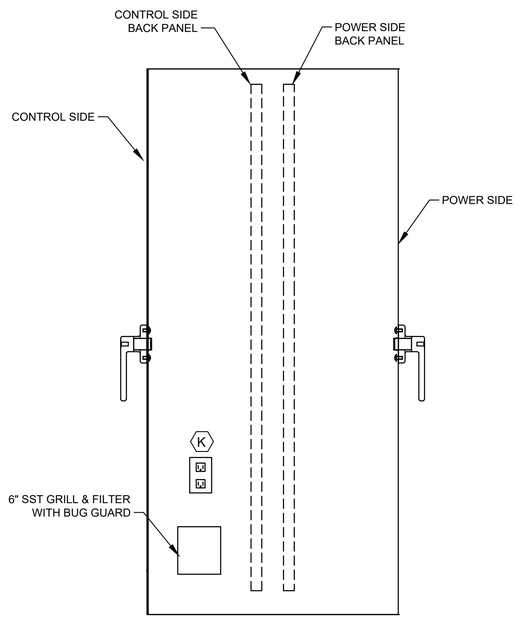
DESIGNATION	ENGRAVED	DESIGNATION	ENGRAVED
N1	PUMP STATION DESIGNATION	N8	NOT USED.
N2	PUMP NO. 1	N9	NOT USED.
N3	PUMP NO. 2	N10	PROGRAMMING SCREEN
N4	PUMP NO. 3	N11	NOT USED.
N5	NOT USED.	N12	PRIMARY PLC
N6	NOT USED.	N13	BACKUP PLC
N7	NOT USED.	N14	MOTOR DATA HORSEPOWER (OUTPUT) ---------- RPM AT FULL LOAD ---------- TIME RATING ---------- FREQUENCY ---------- NUMBER OF PHASES ---------- MODEL NUMBER ---------- RATED VOLTAGE ---------- SERVICE FACTOR ---------- FULL LOAD AMPS ---------- INSULATION CLAS ---------- NEMA DESIGN LETTER ---------- TEMPERATURE RISE ---------- NEMA FRAME SIZE ---------- DATE OF MANUFACTURE ---------- THERMO PROTECTION (IF REQUIRED) -- MOISTURE PROTECTION (IF REQUIRED)-
		N15	EXTERNAL OVERLOAD RESET PUSH BUTTON MECHANISM
		N16	MAIN BREAKER



CONTROL CABINET (LEFT SIDE VIEW)

ELEVATION

NTS



CONTROL CABINET (RIGHT SIDE VIEW)

ELEVATION

NTS

NO.	DATE	REVISION	APP.
	MM/DD/YY	BRIEF DESCRIPTION	XXX
	MM/DD/YY	BRIEF DESCRIPTION	XXX
	MM/DD/YY	BRIEF DESCRIPTION	XXX

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

LAKE VILLAGE LIFT STATION CONTROL CABINET EQUIPMENT LAYOUT–I

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SHEET NO. 116 OF 125	

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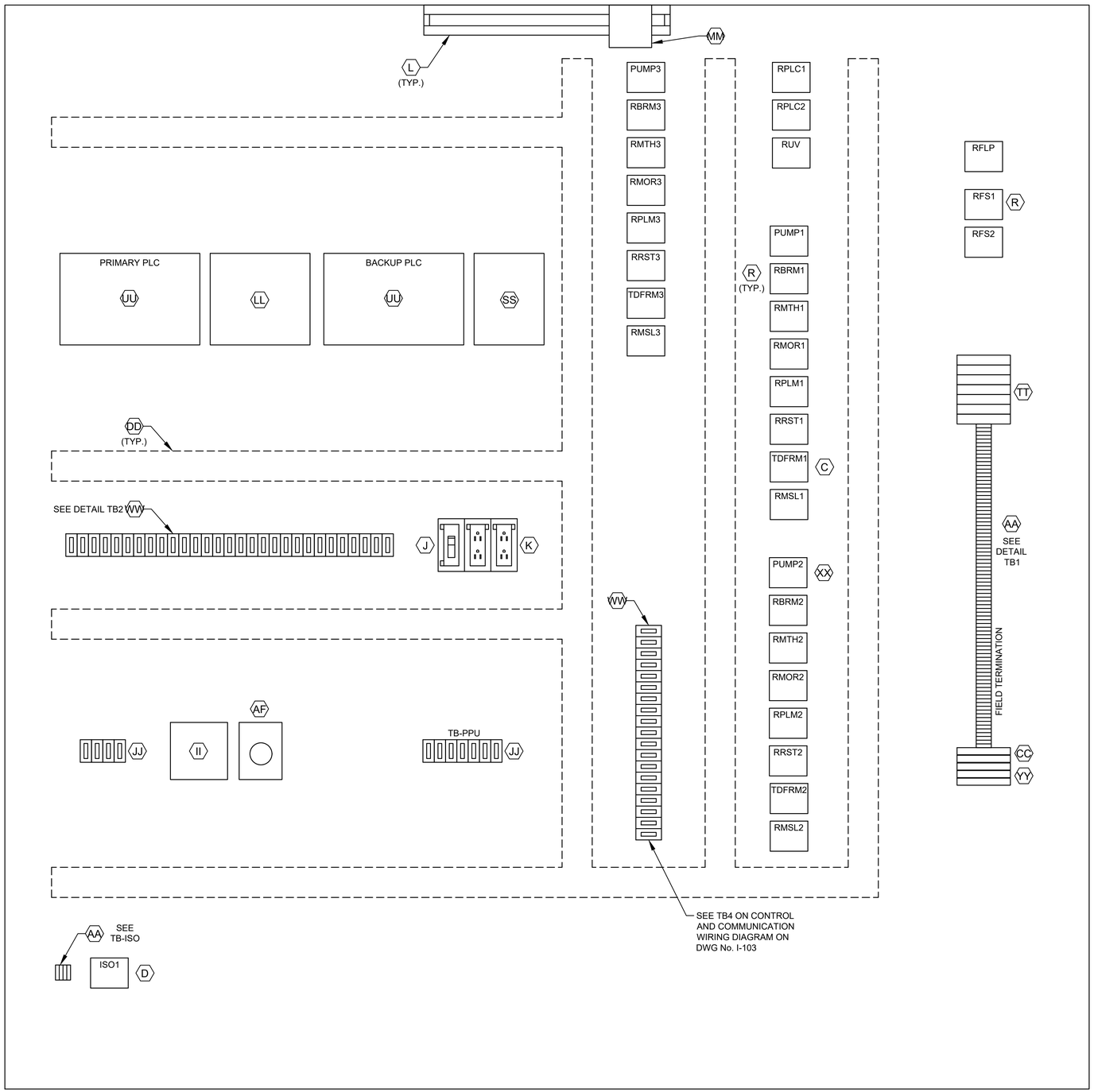


CONTROL PANEL
ELEVATION

L1A
L1N
SPARE
3
3N
49
50
51
52
53
54
1004
1
24V-
24V-
1002
2
11
1001
1001A
12
1003
1003A
1002
1004
18
3N
19
20
36
36N
41
42
43
44
SPARE
L1A
L1N
103
104
105
106
107
108
110
113
115
116
119
SPARE
203
204
205
206
207
208
210
213
215
216
219

DETAIL TB1

ALL L AND N FOR EACH PUMP CONTROL TO BE FUSED

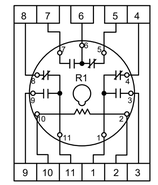
303
304
305
306
307
308
310
313
315
316
319
36A
37A
50
52
54
52A
54A
L+
M
35B
38B
41B
47B
13B
13AB
13GB
L+
M
14B
14AB
14GB
L+
M
13
13A
13G
14
14A
14G
SPARE
18
SPARE
28
29
32
35B
33
42
44
SPARE
103
104
115
109
110
118
120
121
122
123
SPARE
209
210
211
218
220
222
223

DETAIL TB2

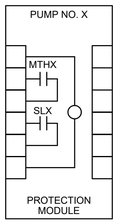
1500
1501
1503
1504

DETAIL TB-ISO

LEGEND	
TAG	DESCRIPTION
RMTH	MOTOR HIGH TEMPERATURE ALARM RELAY
RPLM	PLC PUMP RUN RELAY
RRST	PUMP RESET AUX RELAY
RPLC	PLC MODE AUX RELAY
RMOR	MOTOR OVERLOAD ALARM RELAY
RBRM	BACKUP SYSTEM RUN RELAY
RUV	UNDER VOLTAGE RELAY
ISO	INTRINSICALLY SAFE RELAY
RFS	PUMP RUN FLOAT SWITCH RELAY
TDFRM	TIMER FLOAT SWITCH RUN RELAY
RMSL	MOTOR SEAL LEAK ALARM RELAY
RFLP	FLOAT LOCKOUT PUMP RELAY



RELAY DETAIL
ITEM R



PUMP PROTECTION MODULE
DETAIL, ITEM XX

NOTE: REPLACE "X" WITH APPROPRIATE PUMP NO.

NOTES:

1. SEE SHEET I-104 FOR EQUIPMENT SCHEDULE.

NO.	DATE	REVISION	APP.
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RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

LAKE VILLAGE LIFT STATION CONTROL CABINET EQUIPMENT LAYOUT–II

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SHEET NO. 117 OF 125	

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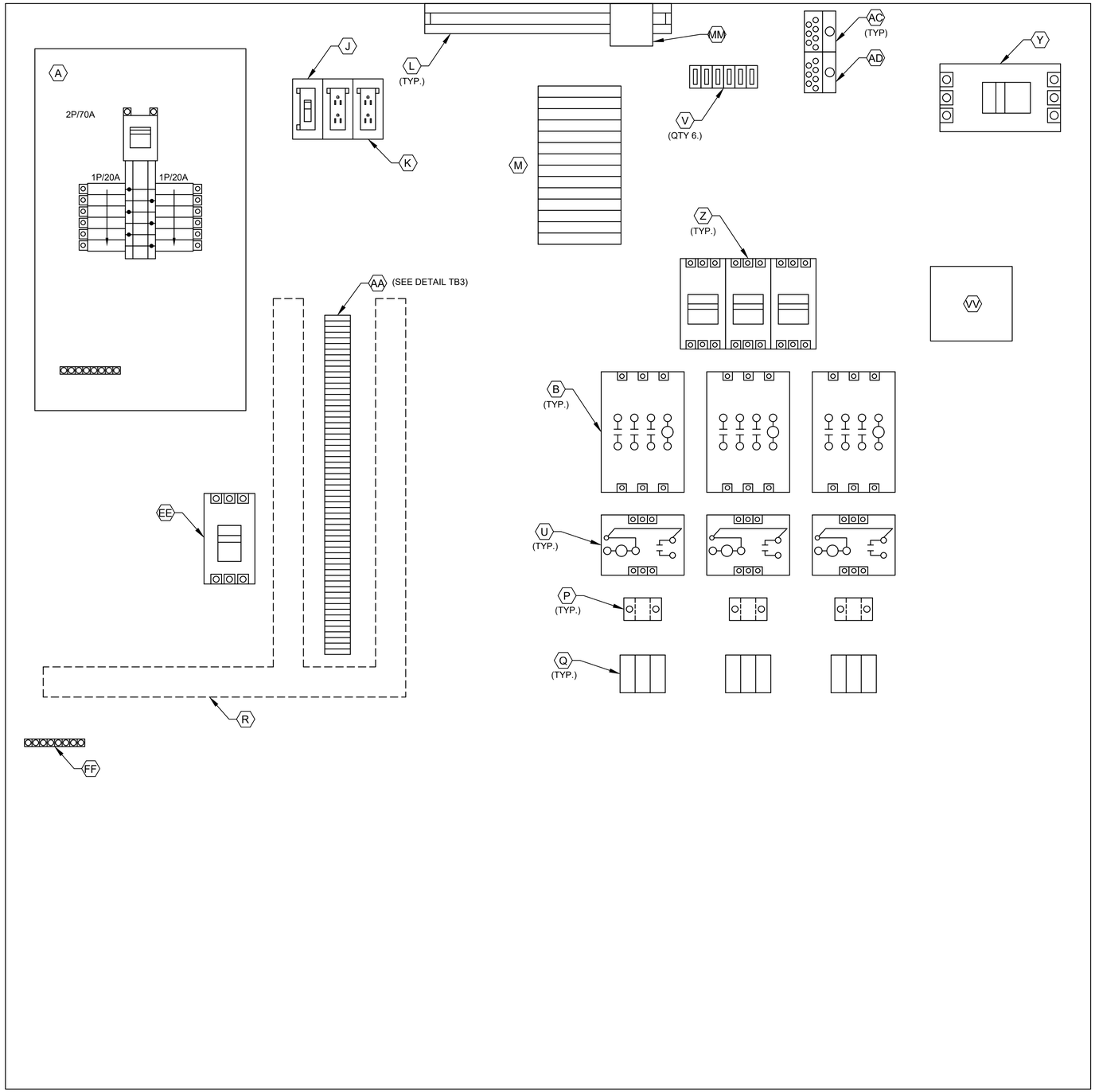

POWER PANEL
ELEVATION

3
18
L1A
L1N
SPARE
SPARE
103
104
105
106
107
108
110
113
115
116
119
SPARE
203
204
205
206
207
208
210
213
215
216
216
219
SPARE
303
304
305
306
307
308
310
313
315
316
316
319
SPARE
SPARE
SPARE
SPARE
SPARE
SPARE
SPARE
SPARE
SPARE
SPARE
SPARE

DETAIL TB3

NOTES:

1. SEE SHEET I-104 FOR EQUIPMENT SCHEDULE.

NO.	DATE	REVISION	APP.
	MM/DD/YY	BRIEF DESCRIPTION	XXX
	MM/DD/YY	BRIEF DESCRIPTION	XXX
	MM/DD/YY	BRIEF DESCRIPTION	XXX

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RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

LAKE VILLAGE LIFT STATION CONTROL CABINET EQUIPMENT LAYOUT–III

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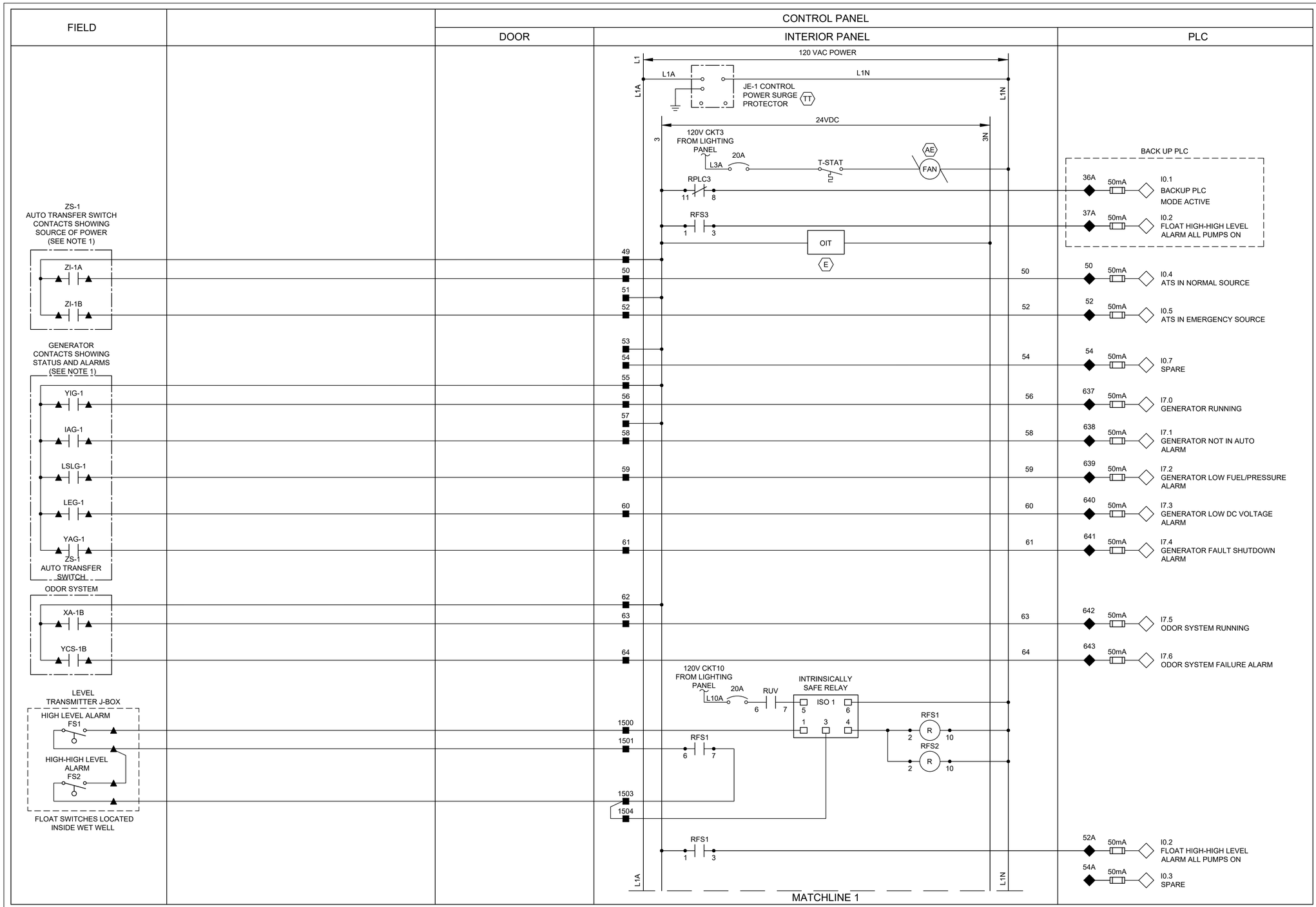

NOTES:

1. PROVIDE AUTO TRANSFER SWITCH DRY CONTACT.
2. ALL FLOAT CONTROL CIRCUIT WIRES COLOR SHALL BE YELLOW.

LEGEND

- △ DEVICE OR FIELD TERMINAL LOCATED AT MOTOR
- ✳ DEVICE OR FIELD TERMINAL LOCATED REMOTE
- □ DEVICE OR FIELD TERMINAL LOCATED AT MCC/POWER PANEL
- ■ FIELD TERMINAL LOCATED AT CONTROL PANEL
- ▲ REMOTE TERMINAL
- ● DEVICE TERMINAL NO.
- ◆ PLC INTERFACE TERMINAL

NO.	DATE	REVISION	APP.
	MM/DD/YY	BRIEF DESCRIPTION	XXX
	MM/DD/YY	BRIEF DESCRIPTION	XXX
	MM/DD/YY	BRIEF DESCRIPTION	XXX

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CITY OF HOUSTON
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RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

LAKE VILLAGE LIFT STATION CONTROL PANEL CONTROL WIRING DIAGRAM–I

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FIELD		CONTROL PANEL		
		DOOR	INTERIOR PANEL	PLC

MATCHLINE 1

120 VAC POWER

24VDC

L1A 3

3N L1N

RADAR LEVEL TRANSMITTER JUNCTION BOX

MFG. CABLE

PRIMARY RADAR LEVEL TRANSMITTER

LT-1

MFG. CABLE

BACK UP RADAR LEVEL TRANSMITTER

LT-2

11

1001

1001A

12

1003

1003A

1004

1002

24-

24V-

2

ANALOG ISOLATOR (YY)

ANALOG I/O SURGE SUPPRESSOR (CC)

24V+

1001B

24V+

1003B

RBRM1 — 5 — R — 2 — 10

RBRM2 — 6 — R — 2 — 10

RBRM3 — 6 — R — 2 — 10

BACK UP PLC

L+		CPU POWER
M		CPU COMMON
35B	1A	QO.0 PUMP NO.1 CALL TO RUN
38B	1A	QO.1 PUMP NO.2 CALL TO RUN
41B	1A	QO.2 PUMP NO.3 CALL TO RUN
44B	1A	QO.3 SPARE
47B	1A	QO.4 SPARE
13B	50mA	AIO.0 PRIMARY WET WELL LEVEL TRANSMITTER
13AB		
13GB		
L+		CPU POWER
M		CPU COMMON
14B	50mA	AIO.2 BACKUP WET WELL LEVEL TRANSMITTER
14AB		
14GB		
L+		CPU POWER
M		CPU COMMON
13	50mA	AI0.0 PRIMARY WET WELL LEVEL TRANSMITTER
13A		
13G		
14	50mA	AI0.2 BACKUP WET WELL LEVEL TRANSMITTER
14A		
14G		

MATCHLINE 2

LEGEND

- △ DEVICE OR FIELD TERMINAL LOCATED AT MOTOR
- ✳ DEVICE OR FIELD TERMINAL LOCATED REMOTE
- □ DEVICE OR FIELD TERMINAL LOCATED AT MCC/POWER PANEL
- ■ FIELD TERMINAL LOCATED AT CONTROL PANEL
- ▲ REMOTE TERMINAL
- ● DEVICE TERMINAL NO.
- ◆ PLC INTERFACE TERMINAL

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COH LIFT STATIONS

LAKE VILLAGE LIFT STATION CONTROL PANEL CONTROL WIRING DIAGRAM–II

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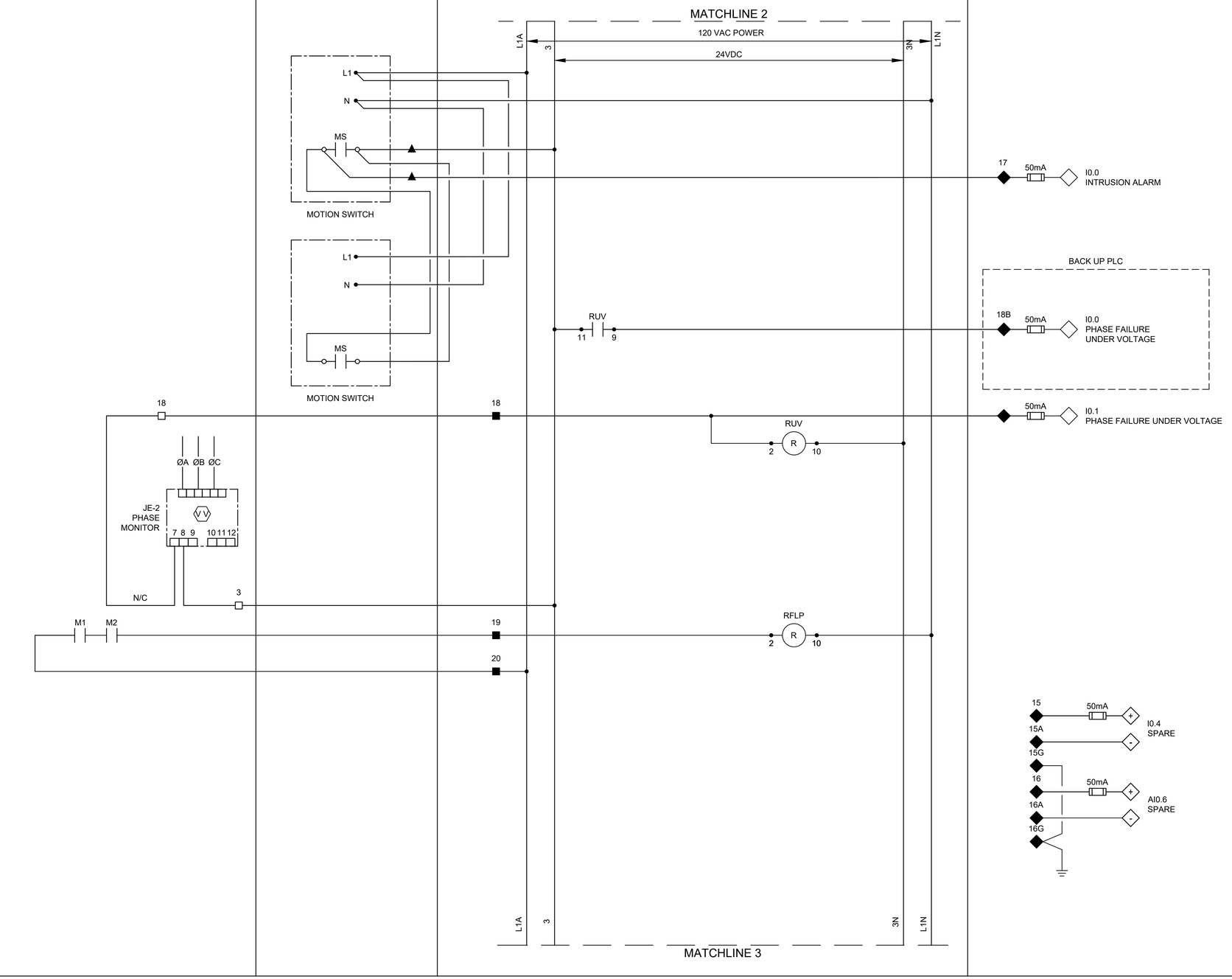
FIELD	POWER PANEL	CONTROL PANEL		
		DOOR	INTERIOR PANEL	PLC



NOTES:

1. PROVIDE ONE LIMIT SWITCH PER EXTERIOR CONTROL PANEL AND POWER PANEL DOOR, WIRED IN PARALLEL.

LEGEND

- △ DEVICE OR FIELD TERMINAL LOCATED AT MOTOR
- ✳ DEVICE OR FIELD TERMINAL LOCATED REMOTE
- □ DEVICE OR FIELD TERMINAL LOCATED AT MCC/POWER PANEL
- ■ FIELD TERMINAL LOCATED AT CONTROL PANEL
- ▲ REMOTE TERMINAL
- ● DEVICE TERMINAL NO.
- ◆ PLC INTERFACE TERMINAL

NO.	DATE	REVISION	APP.
	MM/DD/YY	BRIEF DESCRIPTION	XXX
	MM/DD/YY	BRIEF DESCRIPTION	XXX
	MM/DD/YY	BRIEF DESCRIPTION	XXX

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02/13/2026

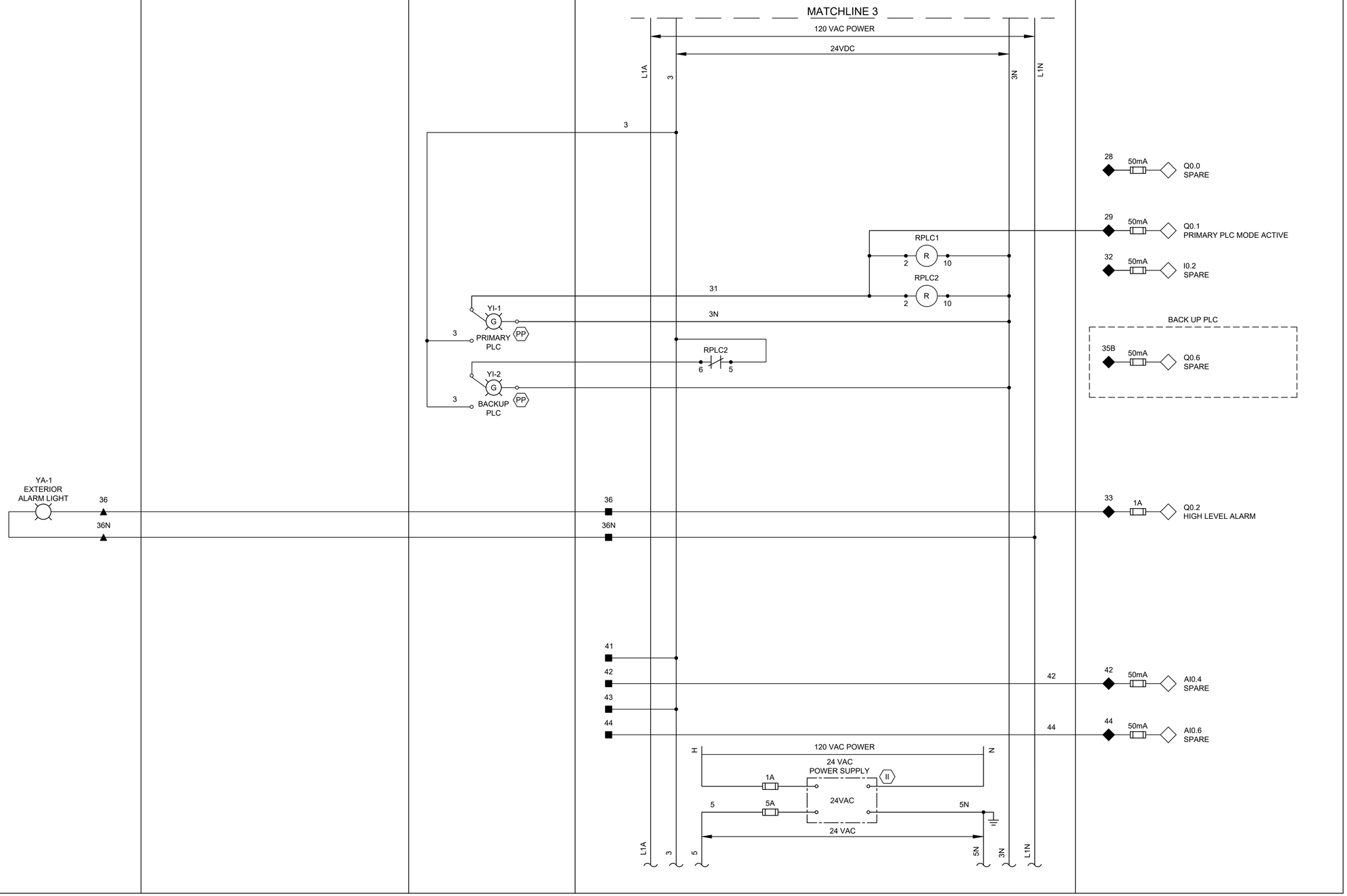
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

LAKE VILLAGE LIFT STATION CONTROL PANEL CONTROL WIRING DIAGRAM–III

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 121 OF 125	

FIELD	POWER PANEL	CONTROL PANEL		
		DOOR	INTERIOR PANEL	PLC



LEGEND

- △ DEVICE OR FIELD TERMINAL LOCATED AT MOTOR
- ✳ DEVICE OR FIELD TERMINAL LOCATED REMOTE
- □ DEVICE OR FIELD TERMINAL LOCATED AT MCC/POWER PANEL
- ■ FIELD TERMINAL LOCATED AT CONTROL PANEL
- ▲ REMOTE TERMINAL
- ● DEVICE TERMINAL NO.
- ◆ PLC INTERFACE TERMINAL

NO.	DATE	REVISION	APP.
	MM/DD/YY	BRIEF DESCRIPTION	XXX
	MM/DD/YY	BRIEF DESCRIPTION	XXX
	MM/DD/YY	BRIEF DESCRIPTION	XXX

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CITY OF HOUSTON
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RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

LAKE VILLAGE LIFT STATION CONTROL PANEL CONTROL WIRING DIAGRAM–IV

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 122 OF 125	

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FILE PATH: O:\H8109_Lift Station Rehabilitation And Reconstruction (Tetratech)\6 Drawings\Instrumentation And Control\Working\Lake Village\H8109_STY-LE-120.dwg
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FIELD | POWER PANEL | CONTROL PANEL — DOOR | INTERIOR PANEL | PLC

120 VAC POWER
24 VDC
24 VAC
L1A
L1N
JE-2
TBP1 SEE NOTE 2
HS-1A RESET
TO SHEET I-113
RRST1
TO SHEET I-113
TSH-1 MOTOR TEMP SWITCH
LSH-1 SEAL LEAK DETECTOR
PUMP NO. 1 PROTECTION MODULE
LAH-1 SL1
TAH-1 MTH1
PUMP NO.1
TERMINAL JUNCTION BOX
REFER TO SHEET LV-E4
M1
MOR1
RMSL1
RMTH1
TDFRM1
RFS1
RMOR1
RPLC1
RBRM1
RPLM1
HS-1 H-O-A
YI-1 RUN
B M1 MOR1 ZS-1
4-20mA CURRENT TRANSDUCER
IE-1 MOTOR OVERLOAD RELAY (MOR) (SEE NOTE 1)

PLC outputs:
- 103 — 1A — Q0.4 ALARM RESET
- 104 — 50mA — I0.6 ALARM RESET
- 109 — 50mA — I1.1 PUMP NO.1 HIGH TEMP ALARM
- 122 — 50mA — AI0.8 PUMP NO.1 MOTOR CURRENT
- 123 — 50mA — I3.3 PUMP NO.1 MOTOR OVERLOAD
- 115 — 50mA — I3.0 PUMP NO.1 IN HAND
- 121 — 50mA — I3.1 PUMP NO.1 IN AUTO
- 118 — 1A — Q0.7 PUMP NO.1 PLC START/STOP
- 120 — 50mA — I1.0 PUMP NO.1 RUN
- 110 — 50mA — I3.2 PUMP NO.1 SEAL FAILURE ALARM

NOTES:

1. MOTOR OVERLOAD RELAY OUTPUT CONTACT SHOWN IS NORMALLY CLOSED WHEN RELAY IS DE-ENERGIZED, OPEN WHEN ENERGIZED, AND CLOSED WHEN IN ALARM. VERIFY OPERATION OF RELAY PROVIDED AND ADJUST CONNECTION OF RMOR AUXILIARY RELAYS.
2. FUSED TERMINAL ON TERMINAL BLOCK TB4 SEE CONTROL POWER AND COMMUNICATION WIRING DIAGRAM DRAWING NO. I-104.
3. ALL FLOAT CONTROL CIRCUIT WIRES COLOR SHALL BE YELLOW.

LEGEND

- △ DEVICE OR FIELD TERMINAL LOCATED AT MOTOR
- ✳ DEVICE OR FIELD TERMINAL LOCATED REMOTE
- □ DEVICE OR FIELD TERMINAL LOCATED AT MCC/POWER PANEL
- ■ FIELD TERMINAL LOCATED AT CONTROL PANEL
- ▲ REMOTE TERMINAL
- ● DEVICE TERMINAL NO.
- ◆ PLC INTERFACE TERMINAL

NO.	DATE	REVISION	APP.
	MM/DD/YY	BRIEF DESCRIPTION	XXX
	MM/DD/YY	BRIEF DESCRIPTION	XXX
	MM/DD/YY	BRIEF DESCRIPTION	XXX

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

LAKE VILLAGE LIFT STATION PUMP NO.1 CONTROL WIRING DIAGRAM

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 123 OF 125	

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FIELD | POWER PANEL | CONTROL PANEL — DOOR | INTERIOR PANEL | PLC

120 VAC POWER
24 VDC
24 VAC
15
15N
L1A
3
7
TBP2 SEE NOTE 2
3N
5N
L1N
200

FROM SHEET I-112
HS-1A RESET (I)
TO SHEET I-114
201
202
RRST2 1 3
FROM SHEET I-112
2
R
10
RRST2
TO SHEET I-114

M2
203
204
205
206
207
208

TSH-2 MOTOR TEMP SWITCH △
20
21
22
23
LSH-2 SEAL△ LEAK DETECTOR

PUMP NO. 2 PROTECTION MODULE
5
LAH-2 SL2
TAH-2 MTH2
XX
5N

PUMP NO.2
M
T1 T2 T3 G
CT
T1 T2 T3 M1
REFER TO SHEET LV-E4
TERMINAL JUNCTION BOX

3P2
RMSL2 R 2 10
RMTH2 R 2 10 (221)
RMTH2 6 7
209 50mA AI.3 PUMP NO.2 HIGH TEMP ALARM

U
MOR2
RFS2 1 3
TDFRM2 TD 2 10

215
216
210
222 50mA AI.0 PUMP NO.2 MOTOR CURRENT

4-20mA CURRENT TRANSDUCER
15
IE-2 MOTOR OVERLOAD RELAY (MOR) (SEE NOTE 1)
RMOR2 R 2 10
RMOR2 6 7
223 50mA AI.7 PUMP NO.2 MOTOR OVERLOAD ALARM

212
RMTH2 1 4 (211) RMSL2 1 4
HS-2 H-O-A (F)
213
214
220
RPLC1 6 5 215 RBRM2 1 3
RPLC1 6 7 216 RPLM2 1 3
TDFRM2 1 3
210 50mA AI.5 PUMP NO.2 IN HAND
211 50mA AI.4 PUMP NO.2 IN AUTO

B
M2 M MOR2
ZS-2
213
218 1A Q1.0 PUMP NO.2 PLC START/STOP
RPLM2 R 2 10

15
M2
ZS-2
219
220 50mA AI.2 PUMP NO.2 RUN

YI-2 R G
RUN
3N
RMSL2 6 7
210 50mA AI.6 PUMP NO.2 SEAL FAILURE ALARM

L1A 15 | 15N L1N | L1A 3 | 3N L1N

LEGEND

△ DEVICE OR FIELD TERMINAL LOCATED AT MOTOR
✳ DEVICE OR FIELD TERMINAL LOCATED REMOTE
□ DEVICE OR FIELD TERMINAL LOCATED AT MCC/POWER PANEL
■ FIELD TERMINAL LOCATED AT CONTROL PANEL
▲ REMOTE TERMINAL
● DEVICE TERMINAL NO.
◆ PLC INTERFACE TERMINAL

NOTES:

1. MOTOR OVERLOAD RELAY OUTPUT CONTACT SHOWN IS NORMALLY CLOSED WHEN RELAY IS DE-ENERGIZED, OPEN WHEN ENERGIZED, AND CLOSED WHEN IN ALARM. VERIFY OPERATION OF RELAY PROVIDED AND ADJUST CONNECTION OF RMOR AUXILIARY RELAYS.
2. FUSED TERMINAL ON TERMINAL BLOCK TB4 SEE CONTROL POWER AND COMMUNICATION WIRING DIAGRAM DRAWING NO. I-104.
3. ALL FLOAT CONTROL CIRCUIT WIRES COLOR SHALL BE YELLOW.

NO.	DATE	REVISION	APP.
	MM/DD/YY	BRIEF DESCRIPTION	XXX
	MM/DD/YY	BRIEF DESCRIPTION	XXX
	MM/DD/YY	BRIEF DESCRIPTION	XXX

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02/13/2026

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

LAKE VILLAGE LIFT STATION PUMP NO.2 CONTROL WIRING DIAGRAM

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
R-000267-00178A-3	
DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 124 OF 125	

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FIELD | POWER PANEL | CONTROL PANEL — DOOR | INTERIOR PANEL | PLC

120 VAC POWER
24 VDC
15
15N
M3
303
304
305
306
307
308
TSH-3 MOTOR TEMP SWITCH
20
21
22
23
LSH-3 SEAL LEAK DETECTOR
PUMP NO.3
M
T1
T2
T3
G
TERMINAL JUNCTION BOX
REFER TO SHEET LV-E4
U
MOR3
315
316
310
4-20mA CURRENT TRANSDUCER
15
IE-3 MOTOR OVERLOAD RELAY (MOR) (SEE NOTE 1)
313
319
15
M3
ZS-3
B
M3
MOR3
ZS-3
L1A
15
15N
L1N

HS-1A RESET
I
FROM SHEET I-113
120 VAC POWER
24 VDC
24 VAC
L1A
3
TBP3 SEE NOTE 2
9
3N
5N
L1N
FROM SHEET I-113
301
302
RRST3
1
3
RRST3
R
2
10
303
304
305
306
307
308
PUMP NO. 3 PROTECTION MODULE
5
LAH-3
SL3
TAH-3
MTH3
5N
3P3
309
RMSL3
R
2
10
3P3
321
RMTH3
R
2
10
3P3
RMTH3
6
7
309
50mA
I1.5
PUMP NO. 3
HIGH TEMPERATURE
ALARM
RFS2
6
7
TDFRM3
TD
2
10
322
50mA
AI1.2
PUMP NO. 3
MOTOR CURRENT
315
316
310
310
RMOR3
R
2
10
312
3P3
RMOR3
6
7
323
50mA
I4.3
PUMP NO. 3
MOTOR OVERLOAD
ALARM
L1A
RMTH3
311
RMSL3
1
4
1
4
HS-3
H-O-A
F
H
O
A
313
313
314
320
RPLC2
315
RBRM3
1
4
1
3
RPLC2
316
RPLM3
1
3
1
3
TDFRM3
321
RFLP
1
3
1
4
316
50mA
I4.1
PUMP NO.3
IN HAND
317
50mA
I4.0
PUMP NO.3
IN AUTO
318
1A
Q1.1
PUMP NO.3
PLC
START/STOP
313
313
313
RPLM3
R
2
10
318
319
319
YI-3
G
R
RUN
3N
3P3
RMSL3
6
7
320
50mA
I1.4
PUMP NO. 3
RUN
310
50mA
I4.2
PUMP NO. 3
SEAL FAILURE
L1A
3
3N
L1N

LEGEND

- △ DEVICE OR FIELD TERMINAL LOCATED AT MOTOR
- ✳ DEVICE OR FIELD TERMINAL LOCATED REMOTE
- □ DEVICE OR FIELD TERMINAL LOCATED AT MCC/POWER PANEL
- ■ FIELD TERMINAL LOCATED AT CONTROL PANEL
- ▲ REMOTE TERMINAL
- ● DEVICE TERMINAL NO.
- ◆ PLC INTERFACE TERMINAL

NOTES:

1. MOTOR OVERLOAD RELAY OUTPUT CONTACT SHOWN NORMALLY CLOSED WHEN RELAY IS DE-ENERGIZED, OPEN WHEN ENERGIZED, AND CLOSED WHEN IN ALARM. VERIFY OPERATION OF RELAY PROVIDED AND ADJUST CONNECTION OF RMOR AUXILIARY RELAYS.
2. FUSED TERMINAL ON TERMINAL BLOCK TB4 SEE CONTROL POWER AND COMMUNICATION WIRING DIAGRAM. DRAWING NO. I-104.
3. ALL FLOAT CONTROL CIRCUIT WIRES COLOR SHALL BE YELLOW.

NO.	DATE	REVISION	APP.
	MM/DD/YY	BRIEF DESCRIPTION	XXX
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RECONSTRUCTION & REHABILITATION
COH LIFT STATIONS

LAKE VILLAGE LIFT STATION PUMP NO.3 CONTROL WIRING DIAGRAM

WBS NUMBER	FOR CITY OF HOUSTON USE ONLY
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DRAWING SCALE	
AS NOTED	
CITY OF HOUSTON PM	
TAHA LOTIA	
SHEET NO. 125 OF 125	