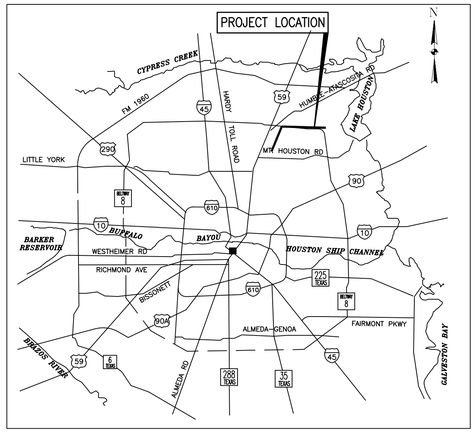
CITY OF HOUSTON

HOUSTON PUBLIC WORKS

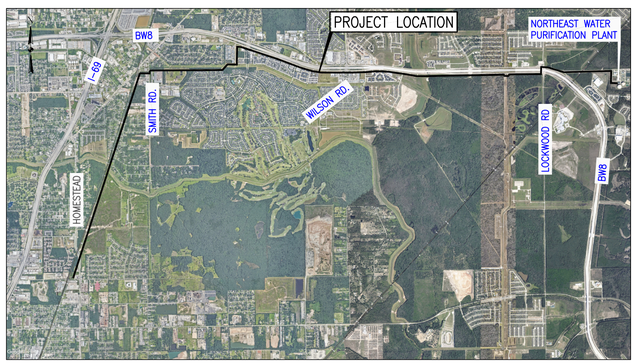
CAPITAL PROJECTS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT
FROM THE NORTHEAST WATER PURIFICATION PLANT TO SMITH RD

WBS NO. S-000901-0015-4



LOCATION MAP (NTS)
COUNCIL DISTRICTS: B, E



VICINITY MAP (NTS)
KEY MAP GRID(S): 377 S & W;
376 S, T, U, V, W, X Y & Z
375 S, T, U, V, W, X Y & Z
414 H & M; 415 A & E

TDLR EABPR N/A

MAYOR
JOHN WHITMIRE

CONTROLLER
CHRIS HOLLINS

DISTRICT COUNCIL MEMBERS

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

COUNCIL MEMBERS AT–LARGE

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

LAN

SURVEYED BY: MBCO ENGINEERING, INC.
FB NO. N/A

INTERIM REVIEW ONLY
Document incomplete: not intended for permit, bidding or construction.
Engineer: WILLIAM BYLAND, P.E.
P.E. Serial No. 142061
Firm: LOCKWOOD, ANDREWS, & NEWNAM INC.
Firm No.: F-2614
Date:

PARKS–FORESTRY DEPT.

METRO

HOUSTON WATER

TRANSPORTATION & DRAINAGE OPERATIONS

CAPITAL PROJECTS

SURVEY

CITY ENGINEER DATE

DIRECTOR OF HOUSTON PUBLIC WORKS DATE

SHEET NO 1 OF 102 SHEETS

FOR CITY OF HOUSTON USE ONLY

P:\130\10667-401\4-0-Production-Working\4-1-BIM-CAD\General\10667-401_01-COVER_SHEET.dwg plotted on May 28, 2025 - 5:39pm

SHEET NO.	DRAWING TITLE
1	COVER SHEET AND VICINITY MAP
2	INDEX OF SHEETS
3	LEGEND AND ABBREVIATIONS
4	GENERAL CONSTRUCTION NOTES
5	UTILITY SPECIAL NOTES
6	SURVEY CONTROL MAP-42-INCH WATER LINE (SHEET 1 OF 2)
6A	SURVEY CONTROL MAP-42-INCH WATER LINE (SHEET 2 OF 2)
6B	SURVEY CONTROL MAP-NEWPP (SHEET 1 OF 2)
6C	SURVEY CONTROL MAP-NEWPP (SHEET 1 OF 2)
7	SHEET LAYOUT (1 OF 3)
8	SHEET LAYOUT (2 OF 3)
9	SHEET LAYOUT (3 OF 3)
10	FLOODPLAIN MAPS
11	LIMITS CLEARING & GRUBBING (1 OF 4)
12	LIMITS CLEARING & GRUBBING (2 OF 4)
13	LIMITS CLEARING & GRUBBING (3 OF 4)
14	LIMITS CLEARING & GRUBBING (4 OF 4)
15	MOTOR OPERATED VALVE SITE (1 OF 2)
16	MOTOR OPERATED VALVE SITE (2 OF 2)
	WATER LINE PLAN AND PROFILE SHEETS
17	PLAN & PROFILE #1 STA. 1+00 TO STA. 11+00
18	PLAN & PROFILE #2 STA. 11+00 TO STA. 23+00
19	PLAN & PROFILE #3 STA. 23+00 TO STA. 33+00
20	PLAN & PROFILE #4 STA. 33+00 TO STA. 42+00
21	PLAN & PROFILE #5 STA. 42+00 TO STA. 50+00
22	PLAN & PROFILE #6 STA. 50+00 TO STA. 56+50
23	PLAN & PROFILE #7 STA. 56+50 TO STA. 66+50
24	PLAN & PROFILE #8 STA. 66+50 TO STA. 78+00
25	PLAN & PROFILE #9 STA. 78+00 TO STA. 90+50
26	PLAN & PROFILE #10 STA. 90+50 TO STA. 103+00
27	PLAN & PROFILE #11 STA. 103+00 TO STA. 115+50
28	PLAN & PROFILE #12 STA. 115+50 TO STA. 128+50
29	PLAN & PROFILE #13 STA. 128+50 TO STA. 141+00
30	PLAN & PROFILE #14 STA. 141+00 TO STA. 153+00
31	PLAN & PROFILE #15 STA. 153+00 TO STA. 166+00
32	PLAN & PROFILE #16 STA. 166+00 TO STA. 178+50
33	PLAN & PROFILE #17 STA. 178+50 TO STA. 191+00
34	PLAN & PROFILE #18 STA. 191+00 TO STA. 204+00
35	PLAN & PROFILE #19 STA. 204+00 TO STA. 216+00
36	PLAN & PROFILE #20 STA. 216+00 TO STA. 229+00
37	PLAN & PROFILE #21 STA. 229+00 TO STA. 241+00
38	PLAN & PROFILE #22 STA. 241+00 TO STA. 254+00
39	PLAN & PROFILE #23 STA. 254+00 TO STA. 259+50
40	PLAN & PROFILE #24 STA. 259+50 TO STA. 270+00
41	PLAN & PROFILE #25 STA. 270+00 TO STA. 282+00
42	PLAN & PROFILE #26 STA. 282+00 TO STA. 294+00
43	PLAN & PROFILE #27 STA. 294+00 TO STA. 305+40
44	PLAN & PROFILE #28 STA. 305+40 TO STA. 313+00
45	30" WATER LINE INTERCONNECT
	WATER LINE & PAVEMENT DETAILS
46	PROJECT SIGN (1 OF 2)
47	PROJECT SIGN (2 OF 2)
48	EXISTING CONDITIONS HAWC 84-INCH WATER LINE (1 OF 4)
49	EXISTING CONDITIONS HAWC 84-INCH WATER LINE (2 OF 4)
50	EXISTING CONDITIONS HAWC 84-INCH WATER LINE (3 OF 4)
51	EXISTING CONDITIONS HAWC 84-INCH WATER LINE (4 OF 4)
52	WATER LINE MARKER
53	STORM WATER POLLUTION PREVENTION PLAN DETAILS
54	TREE PROTECTION DETAIL
55	LDWL STEEL PIPE DETAILS
56	LDWL ISOLATION VALVE DETAILS
57	LDWL DRAINLINE VALVE DETAILS
58	LDWL MANHOLE DETAILS
59	LDWL AIR VALVE IN SERVICE MANHOLE DETAILS
60	LDWL TUNNEL AND CASING DETAILS
61	EXCAVATION, BEDDING & BACKFILL DETAILS
62	STANDARD LDWL CP DETAILS FOR JOINT BONDING
63	STANDARD LDWL CP DETAILS FOR TEST STATIONS
64	STANDARD LDWL CP DETAILS FOR TEST STATIONS & ANODES
65	STANDARD LDWL CP DETAILS FOR RECTIFIER & DEEP ANODE GROUND BED
66	STANDARD PAVEMENT DETAILS (1 OF 2)
67	STANDARD PAVEMENT DETAILS (2 OF 2)
68	PAVEMENT REPAIR AND STREET CUT DETAILS
69	REPAIR OF DAMAGED PIPE
70	OUTLET REINFORCEMENT DETAILS
71	EXISTING 42" WATERLINE INTERCONNECTION DETAILS
72	STRUCTURAL GENERAL NOTES
73	STRUCTURAL TYPICAL DETAILS
74	MOTOR OPERATED VALVE VAULT STRUCTURAL DETAILS
75	STRUCTURAL PLAN FOR ELECTRICAL EQUIPMENT PAD
76	ELECTRICAL SITE PLAN - SMITH RD
77	ENLARGED ELECTRICAL PLAN
78	ELECTRICAL SITE PLAN - NEWPP
79	ELECTRICAL ONE-LINE DIAGRAM & SCADA ARCHITECTURE DIAGRAMS
80	ELECTRICAL DETAILS
81	ELECTRICAL SCHEMATICS
82	ELECTRICAL SCHEDULES
83	MOTOR OPERATED VALVE AND SUMP PUMP DETAILS
84	30" INTERCONNECT SECTION VIEW & PIPE PROTECTION
85	30"x 36" TS&V
86	108"x 84" INTERCONNECT - PIPING PLAN AND SECTIONS
	TRAFFIC CONTROL PLAN
87	TRAFFIC CONTROL PLAN (1 OF 11)
88	TRAFFIC CONTROL PLAN (2 OF 11)
89	TRAFFIC CONTROL PLAN (3 OF 11)
90	TRAFFIC CONTROL PLAN (4 OF 11)
91	TRAFFIC CONTROL PLAN (5 OF 11)
92	TRAFFIC CONTROL PLAN (6 OF 11)
93	TRAFFIC CONTROL PLAN (7 OF 11)
94	TRAFFIC CONTROL PLAN (8 OF 11)
95	TRAFFIC CONTROL PLAN (9 OF 11)
96	TRAFFIC CONTROL PLAN (10 OF 11)
97	TRAFFIC CONTROL PLAN (11 OF 11)
98	TRAFFIC CONTROL PLAN - GENERAL NOTES
99	TRAFFIC CONTROL PLAN - ONE LANE CLOSURE

NO.	DATE	REVISION	APP.

Surface Water Transmission Program

LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

INTERIM REVIEW ONLY
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Engineer: WILLIAM BYLAND, P.E.
P.E. Serial No.: 142061
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F-2614
Date:

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

INDEX OF SHEETS

WBS NO.
S-000901-0015-4

DRAWING SCALE
NONE

CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.

SHEET NO. 2 OF 102

P:\130\130-10667-401\4-0-Production-Working\4-1-BIM-CAD\General\10667-401_02-INDEX.dwg plotted on May 12, 2025 - 1:23pm

LEGEND

EXISTING PLAN LEGEND

- SHRUB OR BUSH
- TREE
- SAN MANHOLE, STORM MANHOLE
- AT & T MANHOLE
- CLEANOUT
- GAS METER
- GAS VALVE
- FIRE HYDRANT
- WATER METER
- WATER VALVE
- POWER POLE, TELEPHONE & ELEC. POLE
- DOWN GUY
- STORM INLETS; B, BB, C, C-1, AND C-2A
- STORM INLET, GRATE
- TRAFFIC SIGNAL, SIGNAL POLE
- IRON ROD/POLE
- WOOD POST, BRICK COLUMN, BRICK PILLAR
- TRAFFIC, METRO, BUSINESS, STOP SIGNS
- SBC PEDESTAL, HISTORICAL MARKER
- C.O.H. SURVEY MARKER, MONUMENT MARKER
- SOIL BORING LOCATION
- SOIL BORING & PIEZOMETER LOCATION
- MAILBOX
- METAL POST
- LIGHT STANDARD
- ELECTRICAL BOX

- HEDGE
- CURB LINE
- ROW LINE
- LOT LINES
- EASEMENT LINE
- EDGE OF ASPHALT
- CULVERT PIPE
- BASELINE
- CHAIN LINK, WOOD FENCE, HOG WIRE
- BARBED WIRE
- GAS LINE OR PIPELINE
- AT & T CONDUIT
- CENTERPOINT ENERGY ELECTRICAL CONDUIT
- CENTERPOINT ENERGY OVERHEAD ELECTRICAL LINES
- EDGE OF DITCH
- CENTER LINE OF DITCH
- SAN SEWER LINE 24" DIA. & SMALLER
- SAN SEWER LINE 30" DIA. & LARGER
- STM SEWER LINE 24" DIA. & SMALLER
- STM SEWER LINE 30" DIA & LARGER
- WATER LINE 20" DIA. & SMALLER
- WATER LINE 24" DIA & LARGER

EXISTING PROFILE LEGEND

- CENTER LINE OF RIGHT-OF-WAY
- R.O.W. LINE N & E
- R.O.W. S & W
- DITCH OR CURB LINE N & E
- DITCH OR CURB LINE S & W
- 24" AND SMALLER SAN SEWER LINE
- 30" AND LARGER SAN SEWER LINE
- 24" AND SMALLER STORM SEWER LINE
- 30" AND LARGER STORM SEWER LINE
- WATER LINE 20" DIA. & SMALLER
- WATER LINE 24" DIA & LARGER
- AT & T CONDUIT
- GAS LINE (GAS / GAS LINE / GAS)
- INFORMATION OBTAINED FROM RECORD DRAWINGS. NOT FIELD VERIFIED.

PROPOSED PLAN LEGEND

- LIMIT OF EXCAVATION
- T.S.V. & BOX
- BUTTERFLY VALVE W/ OPERATOR MANHOLE
- GATE VALVE
- STORM "BB" INLET
- PB — INLET PROTECTION BARRIERS
- ACCESS MANWAY W/ OPERATOR MANHOLE
- CUT AND PLUG
- FIRE HYDRANT
- R — CATHODIC PROTECTION RECTIFIER AND DEEP ANODE
- AIR VENT W/ THREE BOLLARDS
- AIR VENT W/ ONE BOLLARD
- PTS — POTENTIAL TEST STATION
- ITS — FLANGE ISOLATION TEST STATION

- SAN SEWER LINE 24" DIA. & SMALLER
- SAN SEWER LINE 30" DIA. & LARGER
- SANITARY SEWER REPLACEMENT
- STM SEWER LINE 24" DIA. & SMALLER
- STM SEWER LINE 30" DIA & LARGER
- WATER LINE 20" DIA. & SMALLER
- WATER LINE 24" DIA & LARGER

PROPOSED PROFILE LEGEND

- TOP OF CURB
- CENTERLINE FOR OPEN DITCH PAVING
- 24" AND SMALLER SAN SEWER LINE
- 30" AND LARGER SAN SEWER LINE
- 24" AND SMALLER STORM SEWER LINE
- 30" AND LARGER STORM SEWER LINE
- WATER LINE 20" DIA. & SMALLER
- WATER LINE 20" DIA. & SMALLER RESTRAINED JOINT SECTION
- WATER LINE 20" DIA. & SMALLER ONE FULL SECTION RESTRAINED JOINTS CENTERED OVER/UNDER SAN SWR
- WATER LINE 24" DIA & LARGER
- WATER LINE 24" DIA & LARGER IN TUNNEL
- WATER LINE 24" DIA. & LARGER ONE FULL SECTION RESTRAINED JOINTS CENTERED OVER/UNDER SAN SWR

ABBREVIATIONS :

&	AND
@	AT
ABAND.	ABANDONED
ATS	ANODE TEST STATION
AVE	AVENUE
℄	BASELINE
BC	BEHIND CURB
BFV	BUTTERFLY VALVE
BH	BORE HOLE
BLVD	BOULEVARD
CAV	COMBINATION AIR VALVE
CI	CAST IRON
CIP	CAST IRON PIPE
℄	CENTERLINE
CLR	CLEAR/CLEARANCE
CMP	CORRUGATED METAL PIPE
COH	CITY OF HOUSTON
CONC	CONCRETE
CONSTR	CONSTRUCTION
CPE	CENTERPOINT ENERGY
DIA	DIAMETER
DR	DRIVE
DWG	DRAWING
E	EAST
EL OR ELEV	ELEVATION
EOP	EDGE OF PAVEMENT
E/R	END OF CURB RETURN
ESM'T	EASEMENT
EXIST	EXISTING
FC	FACE OF CURB
F-F	FACE-TO-FACE
FH	FIRE HYDRANT
℄	FLOWLINE
FT	FEET
GV w/ BOX	GATE VALVE WITH BOX
HCFCD	HARRIS COUNTY FLOOD CONTROL DISTRICT
HL & P	HOUSTON LIGHTING AND POWER
HMAC	HOT MIXED ASPHALTIC CONCRETE
HPS	HIGH-PRESSURE SODIUM
HWY	HIGHWAY
ID	INSIDE DIAMETER
IE	INVERT ELEVATION
IP	IRON PIPE
IR	IRON ROD
JT	JOINT
JUNCT	JUNCTION
LF	LINEAR FEET
LN	LANE
LT	LEFT
MAX	MAXIMUM
METRO	METROPOLITAN TRANSIT AUTHORITY
MH	MANHOLE
MIN	MINIMUM
MON	MONUMENT
N	NORTH
NO	NUMBER
NTS	NOT TO SCALE
OCEL	ON CURVE ELEVATION
OFS	OFFSET
OH	OVERHEAD
PC	POINT OF CURVATURE
PCC	POINT OF COMPOUND CURVATURE
PERM	PERMANENT
PI	POINT OF INTERSECTION
PROP	PROPOSED
PT	POINT
PT	POINT OF TANGENCY
PVC	POINT OF VERTICAL CURVATURE, POLYVINYL CHLORIDE PIPE
PVI	POINT OF VERTICAL INTERSECTION
PVM'T	PAVEMENT
PVT	POINT OF VERTICAL TANGENCY
Ⓡ	RECORD DRAWING
R	RADIUS OF CIRCULAR CURVE
RCB	REINFORCED CONCRETE BOX
RCP	REINFORCED CONCRETE PIPE
REINF	REINFORCED
REMOV	REMOVABLE
ROW	RIGHT OF WAY
RD	ROAD
RRPM	REFLECTIVE REMOVABLE PAVEMENT MARKERS
RT	RIGHT
RJ	RESTRAINED JOINT
RW	RETAINING WALL
S	SOUTH
SAN	SANITARY
SHT	SHEET
ST	STREET
STA	STATION ALONG BASELINE OR CENTERLINE
STM	STORM
SWR	SEWER
T	TANGENT
TBM	TEMPORARY BENCH MARK
TOC OR TC	TOP OF CURB
TEMP	TEMPORARY
TP	TOP OF PAVEMENT
TS & V	
TYP	TYPICAL
UG	UNDERGROUND
VC	VERTICAL CURVE
W	WEST
W/	WITH
WL	WATER LINE
WP	WOOD POLE
WV	WATER VALVE

NO.	DATE	REVISION	APP.

SWTP
Surface Water Transmission Program

LAN
LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

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Engineer: WILLIAM RYLAND, P.E.
P.E. Serial No. 142061
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No. F-2614
Date:

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84–INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

LEGENDS AND ABBREVIATIONS

WBS NO. S–000901–0015–4	
DRAWING SCALE	
NONE	
CITY OF HOUSTON PM	
RAM CHAKRADHAR, P.E.	
SHEET NO. 3 OF 102	

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GENERAL CONSTRUCTION NOTES

1. CONSTRUCT WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE AND STREET PAVING IN ACCORDANCE WITH THE LATEST EDITION OF THE PUBLICATIONS STANDARD CONSTRUCTION SPECIFICATIONS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE, AND STREET PAVING AND STANDARD CONSTRUCTION DETAILS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE, AND STREET PAVING PUBLISHED BY HOUSTON PUBLIC WORKS.

2. UTILITIES PRESENTED ON THESE DRAWINGS ARE SHOWN BASED ON THE BEST AVAILABLE FORMATION.CONTRACTOR SHALL VERIFY THE EXACT LOCATIONS IN THE FIELD PRIOR TO COMMENCING CONSTRUCTION.
CONTRACTOR SHALL NOTIFY TEXAS ONE CALL AT 713-223-4567/811 OR 800-344-8377 AND LONE STAR NOTIFICATION CENTER AT 800-669-8344 AT LEAST 48 HOURS BEFORE PROCEEDING WITH ANY EXCAVATION. UTILITIES MARKED WITHIN THE PUBLIC RIGHT OF WAY OR IN EASEMENTS SHALL COMPLY WITH TAC TITLE 16, PART 1. CHAPTER 18, RULE 18.6 AND THE AMERICAN PUBLIC WORKS ADMINISTRATION (APWA) UNIFORM COLOR CODE.

3. CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGES TO EXISTING WATER, WASTEWATER, STORM WATER LINES AND TRAFFIC CONTROL DEVICES. DAMAGES SHALL BE REPAIRED IN ACCORDANCE WITH HOUSTON PUBLIC WORKS, STANDARD CONSTRUCTION SPECIFICATIONS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE, AND STREET PAVING AND STANDARD CONSTRUCTION DETAILS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE, AND STREET PAVING, REFERENCED ABOVE, AT NO ADDITIONAL COST.

4. 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.

5. CONTRACTOR SHALL COMPLY WITH WITH LATEST EDITION OF OSHA REGULATIONS AND THE STATE OF TEXAS LAW CONCERNING EXCAVATION.

6. CONTRACTOR SHALL TAKE NECESSARY PRECAUTIONS TO PROTECT ROOT SYSTEMS OF SHRUBS, PLANTS AND TREES ALONG THE AREA OF EXCAVATION.

7. CONTRACTOR SHALL MAINTAIN A SET OF REDLINE DRAWINGS RECORDING AS-BUILT CONDITIONS DURING CONSTRUCTION. THESE REDLINE MARKED UP DRAWINGS WILL BE SUBMITTED TO THE DESIGN CONSULTANT WHO WILL MAKE THE CHANGES ON THE ORIGINAL TRACINGS, LABELING EACH SHEET IN THE SET AS "RECORD DRAWINGS", AND RETURNING IT TO THE CITY ENGINEER.

8. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING, RESTORING, REPLACING, ALL SIGNAL INFRASTRUCTURE AND EXISTING DETECTION SYSTEMS AT SIGNALIZED INTERSECTIONS CURRENTLY IN PLACE FOR ALL APPROACHES IF DAMAGED DURING CONSTRUCTION. THE CONTRACTOR SHALL ALSO MAINTAIN EXISTING COMMUNICATION. THE CONTRACTOR SHALL ALSO MAINTAIN PEDESTRIAN ACCESSIBILITY TO PUSH BUTTONS AND PROPER SIGNAL ALIGNMENT TROUGH OUT TCP STAGES, OTHERWISE BAG PEDESTRIAN SIGNAL HEADS AND INSTALL CROSSWALK CLOSED SIGNS TIMING MODIFICATIONS AT LEAST 72 HOURS PRIOR TO IMPLEMENTING THE TCP STAGES. THIS NOTE APPLIES TO ALL CONSTRUCTION PHASES AND STAGES. IN NORMAL OPERATION OF TRAFFIC SIGNAL AT ANY INTERSECTION IS AFFECTED BY LANE CLOSURE OR TRAFFIC DIVERSION AS A RESULT OF THE PROPOSED IMPROVEMENTS. THEREFOR SHALL SUBMIT TRAFFIC CONTROL PLANS THAT INCLUDES TEMPORARY TRAFFIC SIGNALS TO ACCOMMODATE THE NEW TRAFFIC OPERATION AT THE INTERSECTION.

STANDARD NOTES FOR CONSTRUCTION DRAWINGS (HCFCD):

1. OBTAIN AND COMPLY WITH ALL APPLICABLE CITY, COUNTY, STATE, AND FEDERAL PERMITS AND APPROVALS, WITH ASSISTANCE FROM ENGINEER, IF NECESSARY. OBTAIN PERMIT (CERTIFICATION) FROM HARRIS COUNTY ENGINEER TO ENTER HARRIS COUNTY FLOOD CONTROL DISTRICT 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, IF APPLICABLE, TO HCFCD, 9900 NORTHWEST FREEWAY, HOUSTON, TEXAS 77092, ATTN: PROPERTY MANAGEMENT DEPT. BY HAND DELIVERY, 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 PROPERTY MANAGEMENT DEPARTMENT 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. BACKFILL IN ACCORDANCE WITH THE HARRIS COUNTY FLOOD CONTROL DISTRICT STANDARD SPECIFICATION, SECTION 02315 – EXCAVATING AND BACKFILLING, OR EQUIVALENT.

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.

SWPPP

CONTRACTOR SHALL REMOVE AND/OR REPLACE EXISTING INLET PROTECTION BARRIERS BEFORE AND AFTER A SEVERE WEATHER EVENT PER REQUEST BY THE CITY.

CITY OF HOUSTON GENERAL NOTES

1. LARGE DIAMETER WATER LINES SHALL BE EITHER PCCP, BAR WRAPPED, OR STEEL PIPE AS INDICATED ON DRAWINGS.

2. CONSTRUCT WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE AND STREET PAVING IN ACCORDANCE WITH THE LATEST EDITION OF THE PUBLICATIONS STANDARD CONSTRUCTION SPECIFICATIONS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE AND STREET PAVING, AND STANDARD CONSTRUCTION DETAILS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE AND STREET PAVING PUBLISHED BY HOUSTON PUBLIC WORKS.

3. THE GEOTECHNICAL INVESTIGATION FOR THIS PROJECT WAS CONDUCTED IN ACCORDANCE WITH CHAPTER 11 OF THE LATEST EDITION OF THE PUBLICATION INFRASTRUCTURE DESIGN MANUAL, PUBLISHED BY HOUSTON PUBLIC WORKS. SOIL REPORT WAS PREPARED BY HVJ ASSOCIATES REPORT NO. HG2410095, DATED SEPTEMBER 20, 2024.

4. UTILITIES PRESENTED ON THESE DRAWINGS ARE SHOWN BASED ON THE BEST AVAILABLE INFORMATION. CONTRACTOR SHALL VERIFY THE EXACT LOCATIONS IN THE FIELD PRIOR TO COMMENCING CONSTRUCTION. CONTRACTOR SHALL NOTIFY TEXAS ONE CALL AT 713.223.4567/811 OR 800.344.8377 AND LONE STAR NOTIFICATION CENTER AT 800.669.8344 AT LEAST 48 HOURS BEFORE PROCEEDING ANY EXCAVATION. UTILITIES MARKED WITHIN THE PUBLIC RIGHT OF WAY OR EASEMENTS SHALL COMPLY WITH TAC TITLE 16, PART 1, CHAPTER 18, RULE 18.6 AND THE AMERICAN PUBLIC WORKS ADMINISTRATION (APWA) UNIFORM COLOR CODE.

5. CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGES TO EXISTING WATER, WASTEWATER, STORM WATERE LINES AND TRAFFIC CONTROL DEVICES. DAMAGES SHALL BE REPAIRED IN ACCORDANCE WITH THER HOUSTON PUBLIC WORKS, STANDARD CONSTRUCTION SPECIFICATIONS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE AND STREET PAVING, AND STANDARD CONSTRUCTION DETAILS FOR WASTEWATER COLLECTION SYSTEMS, WATER LINES, STORM DRAINAGE AND STREET PAVING REFERENCED ABOVE, AT NO ADDITIONAL COST.

6. CONTRACTOR SHALL NOTIFY THE OFFICE OF THE CITY ENGINEER, HOUSTON PUBLIC WORKS AT 832.394.9098 OF VIA FAX AT 832.395.4424 FOR INSPECTION AT LEAST 48 HOURS PRIOR TO COMMENCING CONSTRUCTION.

7. ADEQUATE DRAINAGE SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION AND ANY DRAINAGE DITCH OR STRUCTURE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO EXISTING CONDITIONS OR BETTER.

8. CONTRACTOR SHALL TAKE NECESSARY PRECAUTIONS TO PROTECT ROOT SYSTEMS OF SHRUBS, PLANTS AND TREES ALONG THE AREA OF EXCAVATION.

9. CONTRACTOR SHALL COMPLY WITH WITH LATEST EDITION OF OSHA REGULATIONS AND THE STATE OF TEXAS LAWS CONCERNING EXCAVATION.

10. CONTRACTOR SHALL MAINTAIN A SET OF REDLINE DRAWINGS AND RECORD AS-BUILT CONDITIONS DURING CONSTRUCTION. THESE REDLINE MARKED UP 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.

OTHER NOTES

COMPLY WITH REQUIREMENTS OF THE MIGRATORY BIRD TREATY ACT AND THE BIRD AND GOLDEN EAGLE PROTECTION ACT, REFER TO SPEC 01565 FOR ADDITIONAL INFORMATION.

DETAILS

CITY OF HOUSTON STANDARD DETAILS FOR WASTEWATER COLLECTION SYSTEMS,WATERLINES, STORM DRAINAGE, AND STREET PAVING ARE INCORPORATED IN PLANS BY REFERENCE AS IF COPIED VERBATIM. STANDARD DETAILS ARE AVAILABLE FOR DOWNLOAD AT THE FOLLOWING WEB ADDRESS:
http://houstonpermittingcenter.org/office-city-engineer/design-and-construction-standards

DETAILS INCLUDED IN PLAN SET SUPERSEDE RELATED COH STANDARD DETAILS.

NO.	DATE	REVISION	APP.

Surface Water Transmission Program

LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

INTERIM REVIEW ONLY
Document Incomplete: not intended for permit, bidding or construction.
Engineer: WILLIAM BYLAND, P.E.
P.E. Serial No.: 142061
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F-2614
Date:

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

GENERAL CONSTRUCTION NOTES

WBS NO. S-000901-0015-4	
DRAWING SCALE	
NONE	
CITY OF HOUSTON PM	
RAM CHAKRADHAR, P.E.	
SHEET NO. 4 OF 102	

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PRIVATE UTILITY NOTES:

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 ROOSEVELT LEE JR. AT (713) 567-4552 OR EMAIL HIM AT RL7259@ATT.COM, IF THERE ARE QUESTIONS ABOUT BORING OR EXCAVATING NEAR OUR AT&T TEXAS/SWBT FACILITIES.

CENTERPOINT ENERGY NOTES:

CAUTION: UNDERGROUND GAS FACILITIES

1. 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 713-945-8036 OR 713-945-8037 (7:00 AM TO 4:30 PM) 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 713-659-3552 OR 713-207-4200

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

WARNING: OVERHEAD ELECTRICAL LINES:

1. OVERHEAD LINES MAY EXIST ON THE PROPERTY. THE LOCATION OF OVERHEAD LINES HAS NOT BEEN SHOWN ON THESE DRAWINGS AS THE LINES ARE CLEARLY VISIBLE, BUT YOU SHOULD LOCATE THEM PRIOR TO BEGINNING ANY CONSTRUCTION. TEXAS LAW, SECTION 752, HEALTH & SAFETY CODE FORBIDS ACTIVITIES THAT OCCUR IN CLOSE PROXIMITY TO HIGH VOLTAGE LINES, SPECIFICALLY:
   - -ANY ACTIVITY WHERE PERSONS OR THINGS MAY COME WITHIN SIX (6) FEET OF LIVE OVERHEAD HIGH VOLTAGE LINES; AND
   - -OPERATING A CRANE, DERRICK, POWER SHOVEL, DRILLING RIG, PILE DRIVER, HOISTING EQUIPMENT, OR SIMILAR APPARATUS WITHIN 10 FEET OF LIVE OVERHEAD HIGH VOLTAGE LINES.

2. PARTIES RESPONSIBLE FOR THE WORK, INCLUDING CONTRACTORS, ARE LEGALLY RESPONSIBLE FOR THE SAFETY OF CONSTRUCTION WORKERS UNDER THIS LAW. THIS LAW CARRIES BOTH CRIMINAL AND CIVIL LIABILITY. TO ARRANGE FOR LINES TO BE TURNED OFF OR REMOVED CALL CENTERPOINT ENERGY AT 713-207-2222.

ACTIVITIES ON/OR ACROSS CENTERPOINT ENERGY FEE OR EASEMENT PROPERTY

1. NO APPROVAL TO USE, CROSS, OR OCCUPY NO 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

GENERAL NOTES - METRO:

1. CONTRACTOR SHALL NOTIFY METRO AT 713-615-6195 TWO WEEKS PRIOR TO DISTURBING EXISTING BUS STOPS.

2. CONTRACTOR SHALL COORDINATE WITH METRO TO REMOVE EXISTING AMENITIES.

3. BUS STOPS SHALL CONSTRUCTED PER CITY OF HOUSTON INFRASTRUCTURE DESIGN MANUAL AND MEET CURRENT ADA REQUIREMENTS

EXISTING UTILITY NOTE:

EXISTING UNDERGROUND UTILITY INFORMATION (TYPE, SIZE & OWNERSHIP) ARE SHOWN APPROXIMATELY BASED 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 713-223-4567, AT LEAST 48 HOURS PRIOR TO EXCAVATING IN THE STREET RIGHT-OF-WAY.

NO.	DATE	REVISION	APP.

Surface Water Transmission Program

LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

INTERIM REVIEW ONLY
Document incomplete, not intended for permit, bidding or construction.
Engineer: WILLIAM BYLAND, P.E.
P.E. Serial No. 142921
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F-2614
Date:

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

UTILITY SPECIAL NOTES

WBS NO. S-000901-0015-4	
DRAWING SCALE	
NONE	
CITY OF HOUSTON PM	
RAM CHAKRADHAR, P.E.	
SHEET NO. 5 OF 102	

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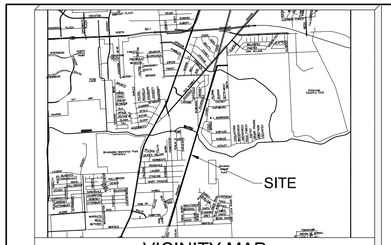

VICINITY MAP
(NOT TO SCALE)

GRAPHIC SCALE

300 0 150 300

1 inch = 300 ft.

CONTROL TABLE

POINT NUMBER	DESCRIPTION	GRID NORTHING	GRID EASTING	SURFACE NORTHING	SURFACE EASTING	ELEVATION	STATION/OFFSET
CP 10	SET 5/8" IR WITH GREEN PLASTIC CAP "MBCO CONTROL"	13893062.30	3139644.77	13894343.31	3139954.26	64.89	N/A
CP 11	SET 5/8" IR WITH GREEN PLASTIC CAP "MBCO CONTROL"	13897627.33	3140987.75	13898908.76	3141277.37	65.11	229+78.25 103.01' LT
CP 12	SET 5/8" IR WITH GREEN PLASTIC CAP "MBCO CONTROL"	13902660.26	3142647.26	13903942.15	3142937.03	65.11	282+73.03 23.06' RT
CP 13	SET 5/8" IR WITH GREEN PLASTIC CAP "MBCO CONTROL"	13905513.45	3144182.79	13906795.61	3144472.70	63.72	N/A
CP 14	SET 60D NAIL	13902764.28	3142634.43	13904046.18	3142924.20	63.59	282+74.82 17.13' LT
CP 15	SET 60D NAIL	13902995.77	3142708.03	13904277.70	3142997.80	63.94	286+17.57 17.57' LT

NOTES:

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2. ANY FUTURE DEVELOPMENT OF THIS TRACT IS SUBJECT TO REQUIREMENTS PER CITY OF HOUSTON ORDINANCE NUMBER 99-262, WHICH STIPULATES PLATTING AND SETBACKS CONSTRAINTS. PROPOSED USAGE OF THIS TRACT WILL DETERMINE ACTUAL BUILDING SETBACK LINE(S) ALONG ANY ADJOINING STREETS. REFER TO CITY OF HOUSTON BUILDING CODES TO ESTABLISH MINIMUM PUBLISHED SETBACK REQUIREMENTS. ULTIMATELY THE CITY OF HOUSTON PLANNING COMMISSION WILL DETERMINE REQUIRED SETBACKS UPON REVIEW OF PLANS OR PLATS SUBMITTED TO SAID COMMISSION. THIS TRACT MAY REQUIRE PLATTING AS A CONDITION FOR RECEIVING BUILDING PERMITS.
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8. ALL BEARINGS SHOWN HEREON ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM OF 1983, SOUTH CENTRAL ZONE NO. 4204.
9. ALL DISTANCES ARE SURFACE VALUES.
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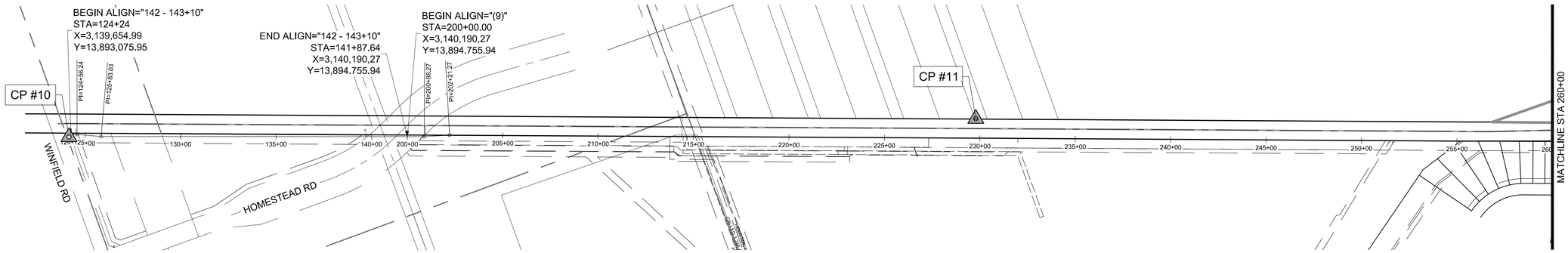
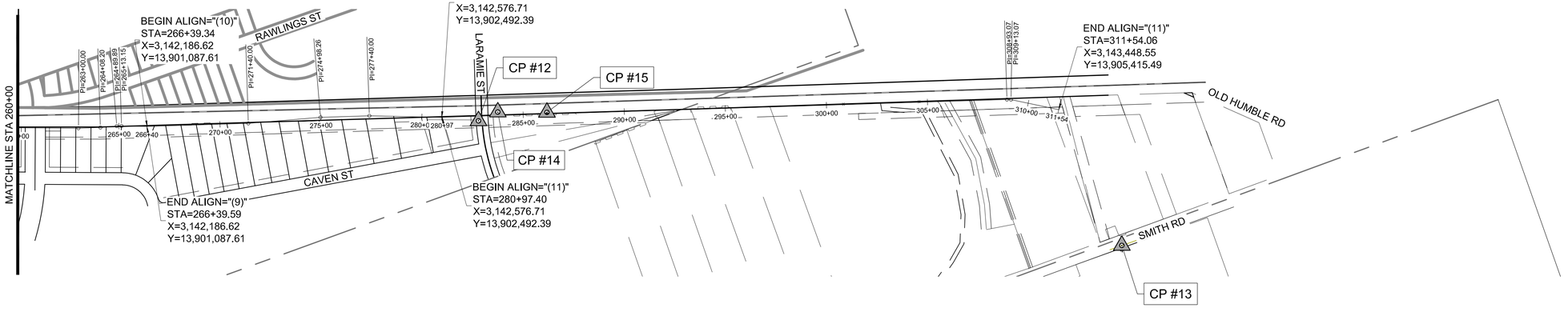
NO.	DATE	REVISION	APP.





SYMBOL LEGEND

⚠	CONTROL POINT

LINETYPE LEGEND

—○—○—	CHAIN LINK FENCE
—x—x—	WIRE FENCE
—//—//—	WOOD FENCE
~~	METAL FENCE
——— — ———	CENTER RAIL TRACK
———	RAILROAD TRACK
———	R.O.W.

ABBREVIATION LEGEND

VOL. - VOLUME
PG. - PAGE
H.C.C.F. - HARRIS COUNTY CLERK'S FILE
H.C.M.R. - HARRIS COUNTY MAP RECORDS
H.C.D.R. - HARRIS COUNTY DEED RECORDS
H.C.O.P.R.R.P. - HARRIS COUNTY OFFICIAL PUBLIC RECORDS OF REAL PROPERTY
R.P.R.H.C.T. - REAL PROPERTY RECORDS OF HARRIS COUNTY, TEXAS
O.P.R.H.C. - OFFICIAL PUBLIC RECORDS OF HARRIS COUNTY
R.O.W. - RIGHT OF WAY
A.K.A. - ALSO KNOWN AS
CO. - COMPANY
H.E. & W.T.R. - HOUSTON EAST & WEST TEXAS RAILWAY
FND. - FOUND
I.R. - IRON ROD
I.P. - IRON PIPE

STATE OF TEXAS
REGISTERED
BRIAN D. SCOTT
5280
PROFESSIONAL
LAND SURVEYOR

4/21/25

I HEREBY CERTIFY THAT THIS PLAT CORRECTLY REPRESENTS A SURVEY MADE ON THE GROUND ON 03/31/2025 AND THAT THIS SURVEY SUBSTANTIALLY COMPLIES WITH THE CURRENT TEXAS SOCIETY OF PROFESSIONAL SURVEYORS MANUAL OF PRACTICE REQUIREMENTS FOR A CATEGORY 6, CONDITION I TOPOGRAPHIC SURVEY.

BRIAN D. SCOTT
REGISTERED PROFESSIONAL
LAND SURVEYOR
TEXAS REGISTRATION NO. 5280

Surface Water Transmission Program

LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

MBCO ENGINEERING + SURVEYING
14811 St. Marys Lane, Suite 152
Houston, Texas 77079
281.760.1656
MBCOEngineering.com
SBE/WBE/DBE/HUB
TBPELS Engineering Firm No. F-16850
Land Surveying Firm No. 10194810

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84–INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

WBS NO.
S–000901–0015–4

DRAWING SCALE

CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.

SHEET NO. 6 OF 102

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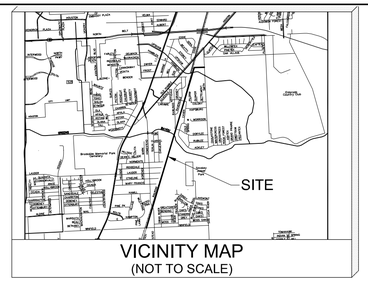

VICINITY MAP
(NOT TO SCALE)

GRAPHIC SCALE

10 0 5 10

1 inch = 10 ft.

CONTROL TABLE							
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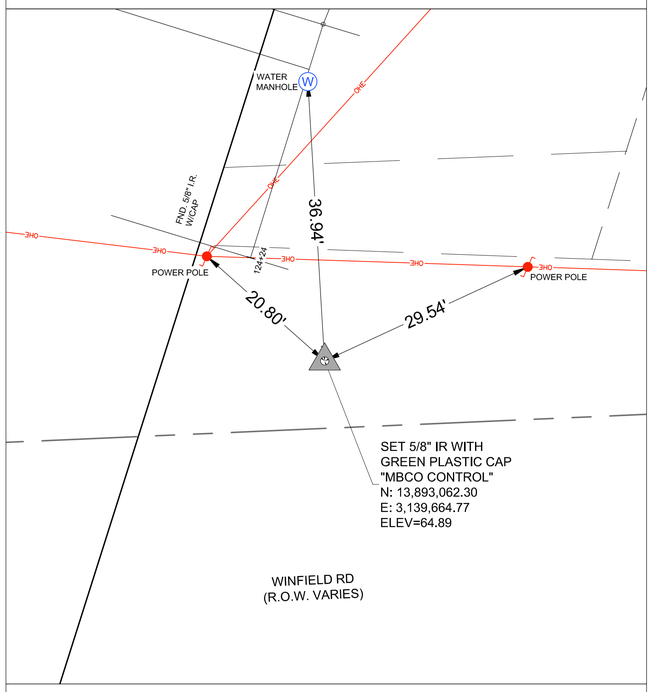
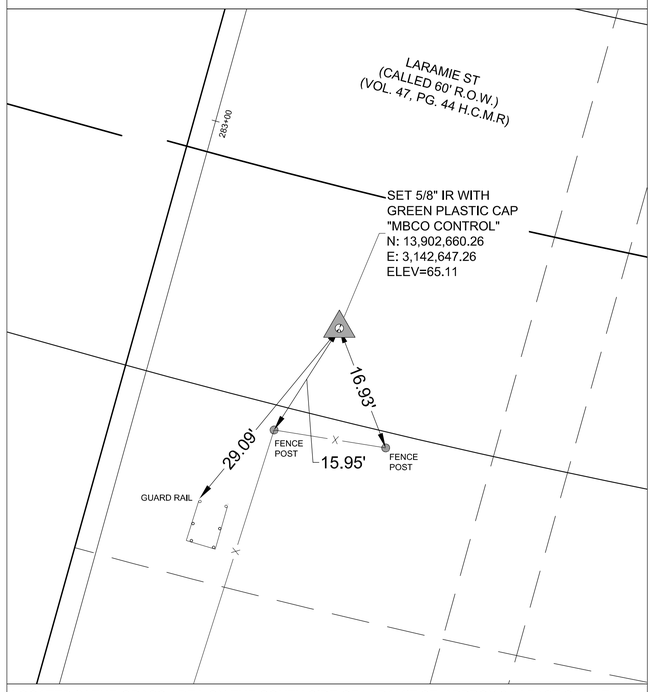
NO.	DATE	REVISION	APP.

CONTROL POINT 10



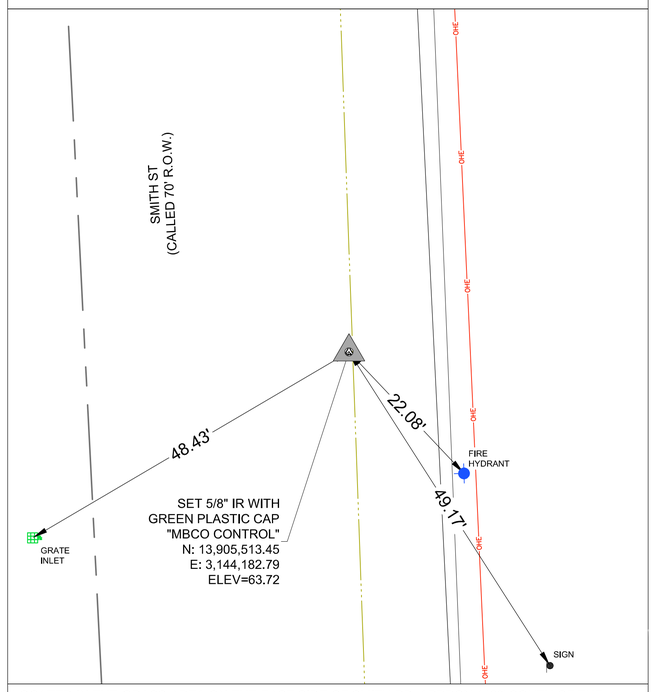
LOCATED IN THE GRASS AREA ON THE NORTH SIDE OF WINFIELD RD, APPROX 675' WEST OF THE INTERSECTION OF WINFIELD RD AND HOMESTEAD RD.

CONTROL POINT 12



LOCATED IN THE GRASS AREA ON THE SOUTH SIDE OF LARAMIE ST, APPROX 275' EAST OF THE INTERSECTION OF LARAMIE ST AND RAVENDALE RD.

CONTROL POINT 13



LOCATED IN THE GRASS AREA ON THE EAST SIDE OF SMITH RD, APPROX 1160' SOUTH OF THE INTERSECTION OF SMITH RD AND OLD HUMBLE RD.

SYMBOL LEGEND

- CONTROL POINT
- FENCE POST
- CABLE MARKER
- CATHODIC PROTECTION STA
- ELEC JUN BOX
- FIRE HYDRANT
- GAS METER
- GENERIC VALVE
- GENERIC VENT
- GRATE INLET
- GUY ANCHOR
- HAND HOLE COMM
- IRON ROD FOUND
- IRON ROD SET
- METER POLE
- PIPELINE MARKER
- POWER POLE
- PIPE RISER
- RAIL ROAD SIGNAL
- SANITARY MANHOLE
- SIGN
- TELEPHONE PED
- WATER MANHOLE
- WATER VALVE

LINETYPE LEGEND

- CHAIN LINK FENCE
- WIRE FENCE
- WOOD FENCE
- METAL FENCE
- UNDERGROUND WATER LINES
- OVERHEAD UTILITY LINES
- UNDERGROUND GAS LINES
- TREE LINE
- CENTER RAIL TRACK
- RAILROAD TRACK

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STATE OF TEXAS REGISTERED BRIAN D. SCOTT 5280 PROFESSIONAL LAND SURVEYOR

4/21/25

I HEREBY CERTIFY THAT THIS PLAT CORRECTLY REPRESENTS A SURVEY MADE ON THE GROUND ON 03/31/2025 AND THAT THIS SURVEY SUBSTANTIALLY COMPLIES WITH THE CURRENT TEXAS SOCIETY OF PROFESSIONAL SURVEYORS MANUAL OF PRACTICE REQUIREMENTS FOR A CATEGORY 6, CONDITION I TOPOGRAPHIC SURVEY.

BRIAN D. SCOTT
REGISTERED PROFESSIONAL
LAND SURVEYOR
TEXAS REGISTRATION NO. 5280

SWTP
Surface Water Transmission Program

LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

MBCO ENGINEERING + SURVEYING
14811 St. Marys Lane, Suite 152
Houston, Texas 77079
281.760.1656
MBCOEngineering.com
SBE/WBE/DBE/HUB
TBPELS Engineering Firm No. F-16850
Land Surveying Firm No. 10194810

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84–INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

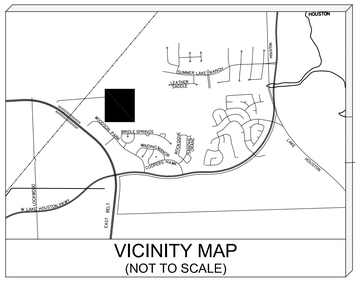
WBS NO. S-000901-0015-4

DRAWING SCALE

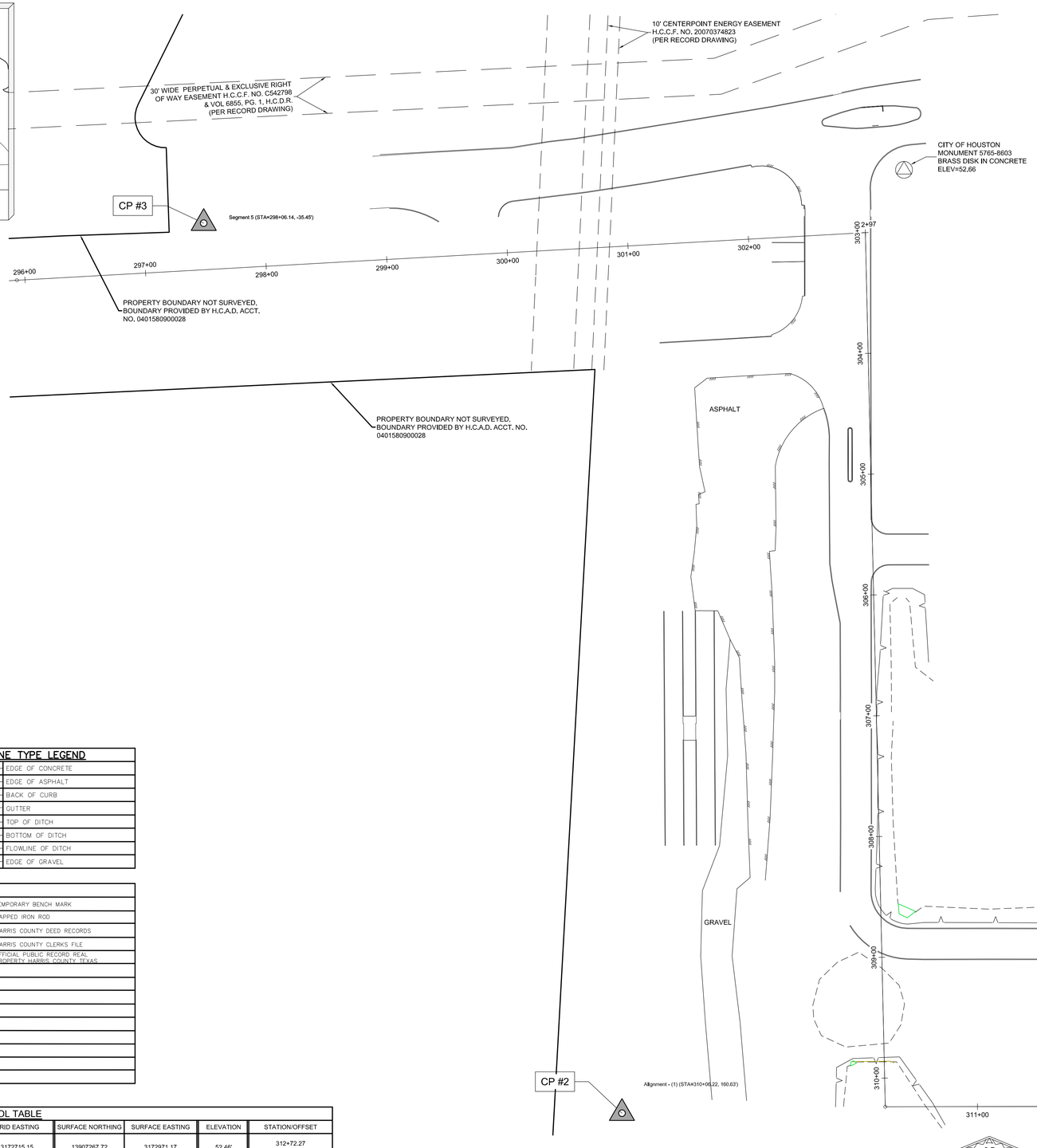
CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.

SHEET NO. 6A OF 102

C:\Users\ARivera\OneDrive - LEO A DALY\External Shares\HWWC\042120251\84in WL Easement Overall Control Sheet.dwg plotted on Apr 21, 2025 - 4:09pm



VICINITY MAP
(NOT TO SCALE)



GRAPHIC SCALE

50 0 25 50

1 inch = 50 ft.

NO.	DATE	REVISION	APP.

NOTES:

TOPOGRAPHIC MISC. NOTE

THE FOLLOWING TOPOGRAPHIC SURVEY WAS COMPLETED WHILE THE SITE WAS UNDER CONSTRUCTION, THE ABOVE GROUND APPURTANCES ARE CERTIFIED TO THE FOLLOWING DATE OF JUNE 5, 2023.

COMBINED SCALE FACTOR NOTE:

COORDINATE REFERENCED HEREON ARE GRID VALUES AND MAY BE CONVERTED TO SURFACE VALUES BY APPLYING THE FOLLOWING COMBINED SCALE FACTOR OF 1.00013.

SITE BENCHMARK:

CITY OF HOUSTON MONUMENT BRASS DISK STAMPED "5765-8603" LOCATED IN GRASS AT NW CORNER OF PARKING LOT FOR MAIN BUILDING INSIDE HOUSTON NORTHEAST WATER PURIFICATION PLANT.
DATUM SOURCE & ADJUSTMENT NAD 83' (CORS 96)
ELEVATION = 52.66 FEET NAVD 1988, 2001 ADJ.

SYMBOL LEGEND

	CONTROL POINT
	MONUMENT

LINE TYPE LEGEND

	EDGE OF CONCRETE
	EDGE OF ASPHALT
	BACK OF CURB
	GUTTER
	TOP OF DITCH
	BOTTOM OF DITCH
	FLOWLINE OF DITCH
	EDGE OF GRAVEL

ABBREVIATION LEGEND

H.C.M.R.	HARRIS COUNTY MAP RECORDS	TBM	TEMPORARY BENCH MARK
FL	FLOW LINE	C.I.R	CAPPED IRON ROD
RCP	REINFORCED CONCRETE PIPE	H.C.D.R.	HARRIS COUNTY DEED RECORDS
PVC	POLYVINYL CHLORIDE PIPE	H.C.C.F.	HARRIS COUNTY CLERKS FILE
CM	CONTROLLING MONUMETNT	O.P.R.R.P.H.C.T.	OFFICIAL PUBLIC RECORD REAL PROPERTY HARRIS COUNTY TEXAS
VOL.	VOLUME		
PG.	PAGE		
NO.	NUMBER		
R.O.W	RIGHT OF WAY		
C.F.	CLERKS FILE		
REF.	REFERENCE		
F.C. NO	FILM CODE NUMBER		
I.R.	IRON ROD		
CP	CONTROL POINT		

CONTROL TABLE

POINT NUMBER	DESCRIPTION	GRID NORTHING	GRID EASTING	SURFACE NORTHING	SURFACE EASTING	ELEVATION	STATION/OFFSET
CP 1	SET 5/8" IR WITH GREEN PLASTIC CAP "MBCO CONTROL"	13906145.57	3172715.15	13907267.72	3172971.17	52.46'	312+72.27 103.62' LT
CP 2	SET 5/8" IR WITH GREEN PLASTIC CAP "MBCO CONTROL"	13906036.17	3172304.53	13907158.31	3172560.52	53.25	N/A
CP 3	SET 5/8" IR WITH GREEN PLASTIC CAP "MBCO CONTROL"	13906772.94	3171958.25	13907895.13	3172214.21	51.99	298+06.14 35.45' LT

STATE OF TEXAS
REGISTERED
BRIAN D. SCOTT
5280
PROFESSIONAL
LAND SURVEYOR

4/21/25

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

WBS NO. S-000901-0015-4	
DRAWING SCALE	
CITY OF HOUSTON PM	
RAM CHAKRADHAR, P.E.	
SHEET NO. 6B OF 102	

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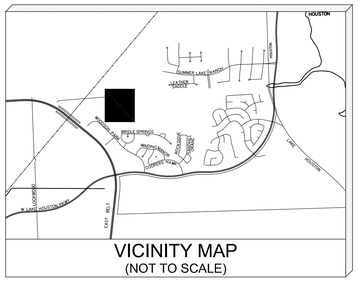

VICINITY MAP
(NOT TO SCALE)

CONTROL TABLE							
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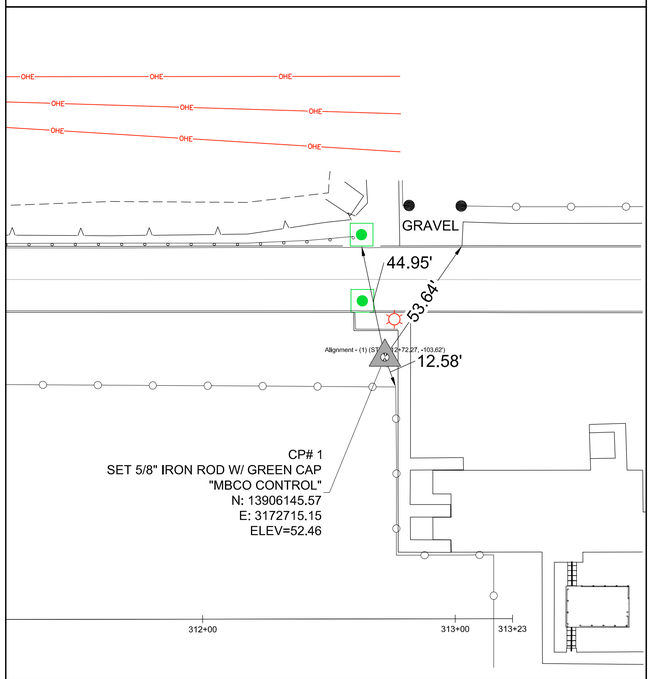
GRAPHIC SCALE

30 0 15 30

1 inch = 30 ft.

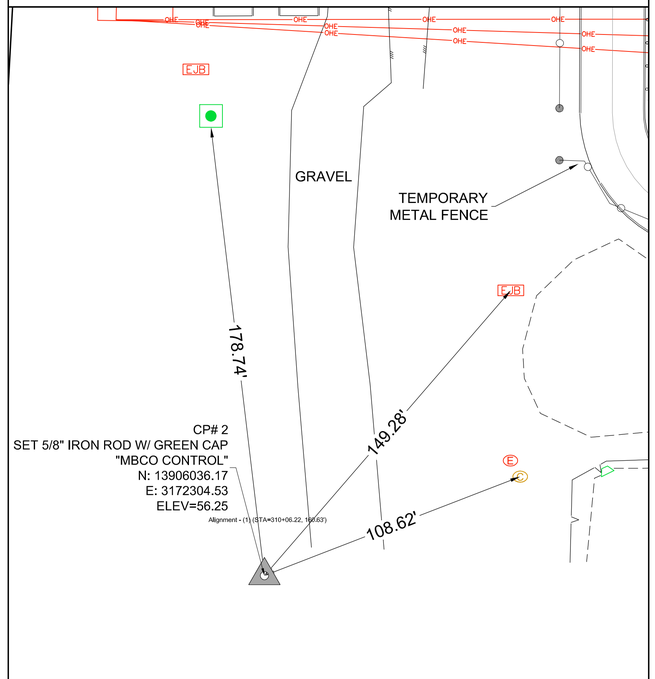
NO.	DATE	REVISION	APP.

CONTROL POINT 1



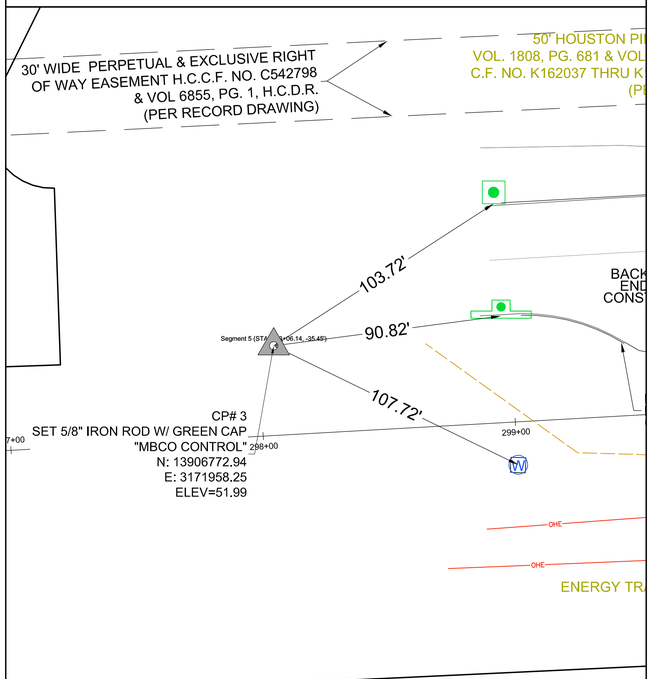
LOCATED 260' FROM THE SW CORNER OF WATER WORKS WAY, HEADING EAST, IN THE GRASSY AREA ON THE SOUTH SIDE OF WATER WORKS WAY.

CONTROL POINT 2



LOCATED 760' SOUTH OF WATER WORKS WAY IN GRASSY AREA ON THE WEST SIDE OF THE FIRST PRIVATE DRIVE HEADING SOUTH

CONTROL POINT 3



LOCATED IN THE GRASSY AREA ON THE SOUTH SIDE OF WATER WORKS BLVD 500' EAST OF THE MAIN ENTRANCE GUARD SHACK.

NOTES:

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ELEVATION = 52.66 FEET NAVD 1988, 2001 ADJ.

SYMBOL LEGEND			
	CONTROL POINT	E	ELECTRIC PEDESTAL
	BENCHMARK		LIGHT STANDARD
	MONUMENT	UV	UNDERGROND VAULT
CP	CATHODIC PROTECTION STATION	P	PIPELINE MARKER
C	HAND HOLE COMM		PIN FLAG MARKER
E	HAND HOLE ELEC		POST
BB	ELECTRICAL BREAKER BOX		BOLLARD
EJB	ELECTRICAL JUNCTION BOX		GUY ANCHOR
GB	GATE CONTROL BOX	T	TELECOM PEDESTAL
A/C	AIR CONDITION UNIT		TELECOM MANHOLE
	DUAL POST SIGN		SANITARY CLEANOUT
	SIGN POST	S	SANITARY MANHOLE
W	WATER VAULT	D	STORM MANHOLE
	WATER VALVE		C INLET
W	WATER MANHOLE		C2 INLET
	TREE		
J	JUNCTION BOX		

LINE TYPE LEGEND			
OHE	OVERHEAD ELECTRIC		FLOWLINE OF DITCH
	CHAIN LINK FENCE		
	GUARD RAIL		
	METAL FENCE		
	EDGE OF CONCRETE		
	EDGE OF ASPHALT		
	STORM DRAINAGE LINES		
	EDGE OF WOOD LINE		
	BACK OF CURB		
	GUTTER		
	RIGHT OF WAY LINE		
	WATER LINE		
	GAS LINE		
	SANITARY SEWER LINES		
	TOP OF DITCH		
	BOTTOM OF DITCH		

ABBREVIATION LEGEND			
H.C.M.R.	HARRIS COUNTY MAP RECORDS	TBM	TEMPORARY BENCH MARK
FL	FLOW LINE	C.I.R	CAPPED IRON ROD
RCP	REINFORCED CONCRETE PIPE	H.C.D.R.	HARRIS COUNTY DEED RECORDS
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CP	CONTROL POINT		

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

WBS NO. S-000901-0015-4	
DRAWING SCALE	
CITY OF HOUSTON PM	
RAM CHAKRADHAR, P.E.	
SHEET NO. 6C OF 102	

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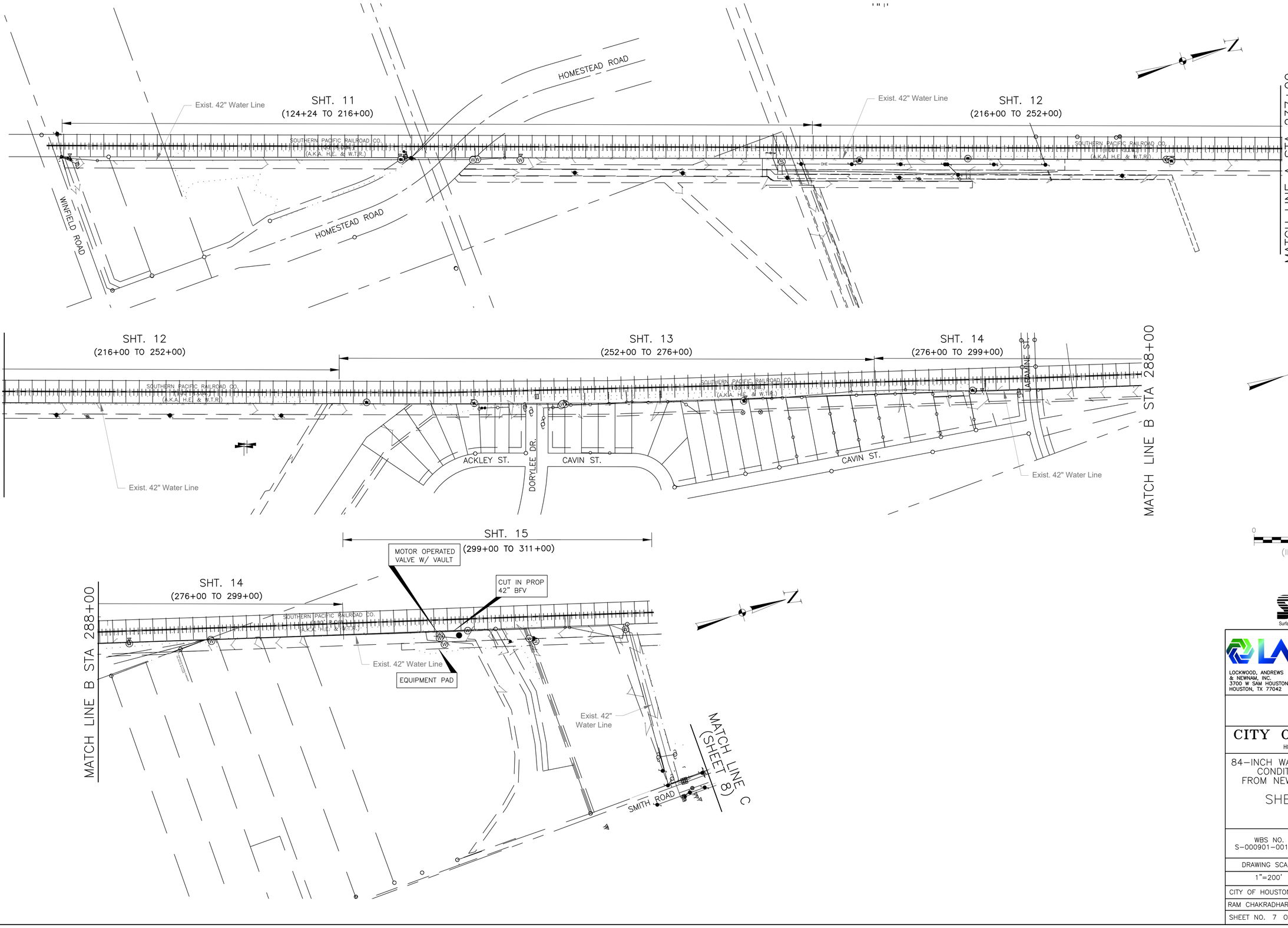

NO.	DATE	REVISION	APP.

SWTP
Surface Water Transmission Program

LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

INTERIM REVIEW ONLY
Document incomplete, not intended for permit, bidding or construction.
Engineer: WILLIAM RYLAND, P.E.
P.E. Serial No.: 142561
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F-2614
Date:

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

SHEET LAYOUT
(1 OF 3)

WBS NO. S-000901-0015-4	
DRAWING SCALE	
1"=200'	
CITY OF HOUSTON PM	
RAM CHAKRADHAR, P.E.	
SHEET NO. 7 OF 102	

P:\130\130-10667-401\4-0-Production-Working\4-1-BIM-CAD\General\10667-401_07-SHT LAYOUT-7.dwg plotted on Mar 03, 2025 - 4:05pm

MATCH LINE STA 59+00

SHT. 17 (1+00 TO 11+00)

SHT. 18 (11+00 TO 23+00)

SHT. 19 (23+00 TO 33+00)

SHT. 20 (33+00 TO 42+00)

SHT. 21 (42+00 TO 50+00)

SHT. 22 (50+00 TO 56+50)

BEGIN PROJECT

STA. 1+84
REMOVE/REPLACE EX. MH
REMOVE/REPLACE CAV
REINFORCE 24" MW OUTLET

STA. 11+15
REMOVE/REPLACE EX. MH
REINFORCE 12" DRAINLINE

STA. 14+09
PROPOSED
EXCAVATION
LOCATION

STA. 25+64
REMOVE/REPLACE EX. MH
REMOVE/REPLACE CAV
REINFORCE 24" MW OUTLET

EXIST. 84" WATER LINE
REPAIR AND CONDITION
ASSESSMENT

STA. 28+99
REMOVE/REPLACE EX. MH
REINFORCE 12" DRAINLINE

STA. 40+75
REMOVE/REPLACE EX. MH
REMOVE/REPLACE CAV
REINFORCE 24" MW OUTLET

STA. 51+95
REMOVE/REPLACE EX. MH
REMOVE/REPLACE CAV
REINFORCE 24" MW OUTLET

STA. 52+05
INSPECT BFV
FOR REHAB

STA. 52+15
REMOVE/REPLACE EX. MH
REINFORCE 12"DRAINLINE

STA. 48+82
REMOVE/REPLACE EX. MH
REINFORCE 12"DRAINLINE

Exist. 108" Water Line

Exist. 42" Water Line

SMITH ROAD

RAVEN HOLLOW LN.

OPAL HILL LN.

ARBOR TRACE LN.

MATCH LINE C
(SHEET 7)

MATCH LINE STA 59+00

SHT. 23 (56+50 TO 66+50)

SHT. 24 (66+50 TO 78+00)

SHT. 25 (78+00 TO 90+50)

SHT. 26 (90+50 TO 103+00)

STA. 66+54
REMOVE EX. 24" BFV
REPLACE W/ 24 GV

STA. 66+73
REMOVE/REPLACE EX. MH
REMOVE/REPLACE CAV
REINFORCE 24" MW OUTLET

STA. 71+61
PROPOSED
EXCAVATION
LOCATION

STA. 76+37
REMOVE/REPLACE EX. MH
REINFORCE 12"DRAINLINE

STA. 84+63
REMOVE/REPLACE EX. MH
REMOVE/REPLACE CAV
REINFORCE 24" MW OUTLET

STA. 88+56
EXIST. 84" WATER LINE
REPAIR AND CONDITION
ASSESSMENT

STA. 100+90
INSPECT BFV
ACTUATOR AND SEAT
FOR POT. REHAB.

STA. 100+74
REMOVE/REPLACE EX. MH
REINFORCE 12"DRAINLINE

STA. 101+00
REMOVE/REPLACE EX. MH
REMOVE/REPLACE CAV
REINFORCE 24" MW OUTLET

NORTH SAM HOUSTON PKWY.

MESA ROAD

136.6'

462.7'

355.6'

Exist. 108" Water Line

MATCH LINE STA 103+00

SHT. 27 (103+00 TO 115+50)

SHT. 28 (115+50 TO 128+50)

SHT. 29 (128+50 TO 141+00)

MATCH LINE STA 141+00

STA. 116+78
REMOVE/REPLACE EX. MH
REMOVE/REPLACE CAV
REINFORCE 24" MW OUTLET

EXIST. 84" WATER LINE
REPAIR AND CONDITION
ASSESSMENT

STA. 123+47
PROPOSED
EXCAVATION
LOCATION

STA. 131+95
REMOVE/REPLACE EX. MH
REMOVE/REPLACE CAV
REINFORCE 24" MW OUTLET

STA. 132+07
REMOVE 84" DHP
INSPECT BFV FOR REHAB.

STA. 133+56
REMOVE/REPLACE EX. MH
REINFORCE 12"DRAINLINE

STA. 138+42
PROPOSED
EXCAVATION
LOCATION

STA. 139+50
REMOVE/REPLACE EX. MH
REMOVE/REPLACE CAV
REINFORCE 24" MW OUTLET

Exist. 108" Water Line

NORTH SAM HOUSTON PKWY.

BELLOWS FALLS LANE

WILSON ROAD

N

0 200 400
(IN FEET)

NO.	DATE	REVISION	APP.

SWTP
Surface Water Transmission Program

LAN

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& NEWNAM, INC.
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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

SHEET LAYOUT
(2 OF 3)

WBS NO. S-000901-0015-4	
DRAWING SCALE	
1"=200'	
CITY OF HOUSTON PM	
RAM CHAKRADHAR, P.E.	
SHEET NO. 8 OF 102	

P:\130\10667-401\4-0-Production-Working\4-1-BIM-CAD\General\10667-401_09-SHT LAYOUT.dwg plotted on Mar 03, 2025 - 7:42pm

NO.	DATE	REVISION	APP.

MATCH LINE STA 141+00

SHT. 30
(141+00 TO 153+00)

SHT. 31
(153+00 TO 166+00)

SHT. 32
(166+00 TO 178+50)

SHT. 33
(178+50 TO 191+00)

MATCH LINE STA 191+00

NORTH SAM HOUSTON PKWY.

FALL CREEK VIEW DRIVE

FALL CREEK PRESERVE DR.

GARNERS BAYOU

Exist. 42" Water Line

Exist. 108" Water Line

145+00 150+00 155+00 160+00 165+00 170+00 175+00 180+00 185+00 190+00

STA. 147+02
REMOVE/REPLACE EX. MH
REINFORCE 12" DRAINLINE

STA. 150+82
INSPECT BFV
FOR REHAB

STA. 150+70
REMOVE/REPLACE EX. MH
REMOVE/REPLACE CAV
REINFORCE 24" MW OUTLET

EXIST. 84" WATER LINE
REPAIR AND CONDITION
ASSESSMENT

STA. 166+61
REMOVE/REPLACE EX. MH
REMOVE/REPLACE CAV
REINFORCE 24" MW OUTLET

STA. 168+13
PROPOSED
EXCAVATION
LOCATION

STA. 183+80
REMOVE/REPLACE EX. MH
REMOVE/REPLACE CAV
REINFORCE 24" MW OUTLET

STA. 188+04
REMOVE/REPLACE EX. MH
REINFORCE 12" DRAINLINE

N

MATCH LINE STA 191+00

SHT. 34
(191+00 TO 204+00)

SHT. 35
(204+00 TO 216+00)

SHT. 36
(216+00 TO 229+00)

SHT. 37
(229+00 TO 241+00)

SHT. 38
(241+00 TO 254+00)

MATCH LINE STA 247+00

NORTH SAM HOUSTON PKWY.

RALSTON ROAD

Exist. 42" Water Line

Exist. 108" Water Line

195+00 200+00 205+00 210+00 215+00 220+00 225+00 230+00 235+00 240+00 245+00

STA. 197+99
REMOVE/REPLACE EX. MH
REMOVE/REPLACE CAV
REINFORCE 24" MW OUTLET

STA. 198+10
INSPECT BFV
FOR REHAB

STA.204+40
PROPOSED
EXCAVATION
LOCATION

STA. 210+48
REMOVE/REPLACE EX. MH
REINFORCE 12" DRAINLINE

STA. 212+37
REMOVE EX. 24" BFV
REPLACE W/ 24" GV

STA. 217+50
REMOVE/REPLACE EX. MH
REMOVE/REPLACE CAV
REINFORCE 24" MW OUTLET

STA. 227+74
REMOVE/REPLACE EX. MH
REMOVE/REPLACE CAV
REINFORCE 24" MW OUTLET

EXIST. 84" WATER LINE
REPAIR AND CONDITION
ASSESSMENT

STA. 232+33
REMOVE/REPLACE EX. MH
REINFORCE 12" DRAINLINE

STA. 235+74
REMOVE/REPLACE EX. MH
REMOVE/REPLACE CAV
REINFORCE 24" MW OUTLET

STA. 246+90
INSPECT BFV
FOR REHAB

STA. 246+80
REMOVE/REPLACE EX. MH
REMOVE/REPLACE CAV
REINFORCE 24" MW OUTLET

N

MATCH LINE STA 247+00

SHT. 38
(241+00 TO 254+00)

SHT. 39
(254+00 TO 259+50)

SHT. 40
(259+50 TO 270+00)

SHT. 41
(270+00 TO 282+00)

SHT. 42
(282+00 TO 294+00)

SHT. 43
(294+00 TO 305+40)

SHT. 44
(305+40 TO 313+00)

WOODLAND HILLS DR.
(VOL. 586 PG. 22
H.C.M.R.)

S. LOCKWOOD DR.

RAMP

UPRR

WATER WORKS BLVD.

250+00 255+00 260+00 265+00 270+00 275+00 280+00 285+00 290+00 295+00 300+00

STA. 258+99
REMOVE/REPLACE EX. MH
REMOVE/REPLACE CAV
REINFORCE 24" MW OUTLET

STA. 262+52
PROPOSED
EXCAVATION
LOCATION

STA. 282+80
REMOVE/REPLACE EX. MH
REMOVE/REPLACE CAV
REINFORCE 24" MW OUTLET

STA. 284+96
REMOVE/REPLACE EX. MH
REINFORCE 12" DRAINLINE

STA. 285+50
REMOVE/REPLACE EX. MH
REMOVE/REPLACE CAV
REINFORCE 24" MW OUTLET

STA. 299+39
PROPOSED
EXCAVATION
LOCATION

PROP. 50 LF
30" WL IN TUNNEL

PROP. 30"X36" TS&V

CUT-IN 36" GV

Exist. 108" Water Line

Exist. 42" Water Line

EXIST. 84" WATER LINE
REPAIR AND CONDITION
ASSESSMENT

STA. 283+19
PROPOSED
EXCAVATION
LOCATION

96" Stub Out

STA. 292+54
PROPOSED
EXCAVATION
LOCATION

Exist. 120" Water Line

STA. 299+14
PROP. 30" WL INTERCONNECT
CONNECT TO EX. 30" GV

STA. 300+80
REMOVE/REPLACE EX. MH
REINFORCE 12" DRAINLINE

NEWPP

END PROJECT

N

0 200 400
(IN FEET)

SWTP
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LAN

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& NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

INTERIM REVIEW ONLY
Document Incomplete; not intended for permit, bidding or construction.
Engineer: WILLIAM BYLAND, P.E.
P.E. Serial No.: 142061
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F-2614
Date:

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

SHEET LAYOUT
(3 OF 3)

WBS NO.
S-000901-0015-4

DRAWING SCALE
1"=200'

CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.

SHEET NO. 9 OF 102

P:\130\130-10667-4014-0-Production-Working\4-1-BIM-CAD\General\10667-401_09-SHT LAYOUT.dwg plotted on Mar 03, 2025 - 7:44pm

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0 North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction, and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures in this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (Zone 15). The **horizontal datum** was NAD83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, NNGS23
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit their website at www.ngs.noaa.gov.

Base map information shown on this FIRM was provided in digital format by the Harris Galveston Area Council and was revised and enhanced by Harris County.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been shifted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

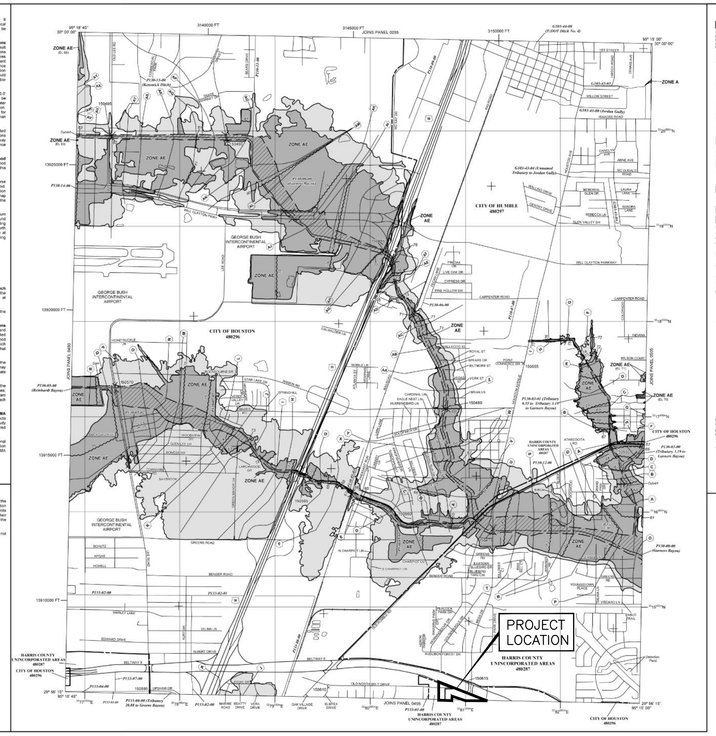
For information on available products associated with this FIRM visit the **FEMA Map Service Center** (MSC) website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the MSC website.

If you have **questions about this map**, how to order products or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange (FMIX) at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip.

Vertical Datum Adjustment due to subsidence is the 2001 adjustment.

Benchmarks shown on this map were provided by either Harris County or the National Geodetic Survey. To obtain elevation, description, and location information for benchmarks provided by Harris County, please contact the Permits Office of the Public Infrastructure Department at (713) 868-3900 or visit their website at http://www.eng.hctx.net/permits. For information regarding the benchmarks provided by the National Geodetic Survey, please see note above.

Some bridges and other structures shown on the detailed studied streams are not labeled. See corresponding flood profile for appropriate name.



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water surface elevation of the 1% annual chance flood.

ZONE A — No Base Flood Elevations determined.
ZONE AE — Base Flood Elevations determined.
ZONE AH — Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO — Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR — Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99 — Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V — Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE — Coastal flood zone with velocity hazard (wave action); Base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- Floodplain Boundary
- Floodway Boundary
- Zone D Boundary
- CBRS and OPA Boundary
- Boundary dividing Special Flood Hazard Areas Zones and boundary dividing Special Flood Hazard Areas and areas of minimal flood hazard
- Base Flood Elevation line and value; elevation in feet*
- Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

- Cross-Section Line
- Transect line
- Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 1000-meter Universal Transverse Mercator grid values, zone 15
- 5000-foot grid ticks
- Bench mark (see explanation in Notes to Users section of this FIRM panel)
- River Mile

MAP REPOSITORY
Refer to Repositories listing on Index Map

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
SEPTEMBER 30, 2009

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
SEPTEMBER 30, 2009
NOVEMBER 4, 1992
JUNE 15, 1987
JUNE 20, 1997
JUNE 5, 2014

For the community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'
0 500 1000 2000 FEET
0 150 300 600 METERS

PANEL 0485M

FIRM
FLOOD INSURANCE RATE MAP
HARRIS COUNTY, TEXAS AND INCORPORATED AREAS
PANEL 485 OF 1150
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
HARRIS COUNTY UNINCORPORATED AREAS	480287	0485	M
HUMBLE, CITY OF	480297	0485	M

Notice to User: The **Map Number** shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
48201C0485M
MAP REVISED
JUNE 5, 2014

Federal Emergency Management Agency

HARRIS FLOOD CONTROL DISTRICT NOTES:

1. OBTAIN AND COMPLY WITH ALL APPLICABLE CITY, COUNTY STATE AND FEDERAL PERMITS AND APPROVALS, WITH ASSISTANCE FROM ENGINEER, IF NECESSARY. OBTAIN PERMIT CERTIFICATE FROM 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-CONSTRCUTION NOTIFICATION FORM, A COPY OF THE APPROVED CONSTRUCTION DRAWINGS, AND A COPY OF THE CORPS OF ENGINEERS INDIVIDUAL SECTION 404 PERMIT, IF APPLICABLE, TO HCFCD, 9900 NORTHWEST FREEWAY, HOUSTON, TEXAS 77092, ATTN: PROPERTY MANAGEMENT DEPT. BY HAND DELIVERY, 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 PROPERTY MANAGEMENT DEPARTMENT 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 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 OTHER EROSION OR RILLS DEEPER THAN 4"
7. BACKFILL IN ACCORDANCE WITH THE HARRIS COUNTY FLOOD CONTROL DISTRICT STANDARD SPECIFICATION, SECTION 02315 – EXCAVATING AND BACKFILLING, OR EQUIVALENT.
8. EXCAVATE CHANNEL FLOWLINE TO DESIGN ELEVATIONS 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 NOT 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 FIRSTS OBTAINING A FILL PERMIT FORM THE APPROPRIATE JURISDICTIONAL AUTHORITY.
11. CONTRACTOR TO CONTACT HCFCD MITIGATION BANK MANAGER ANDREW NEWMAN AT 713-316-3752 TO COORDINATE ACCESS TO EASEMENT AND GATE AT JOHN RALSTON ROAD.

NO.	DATE	REVISION	APP.

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

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NGS Information Services
NOAA, NNGS23
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

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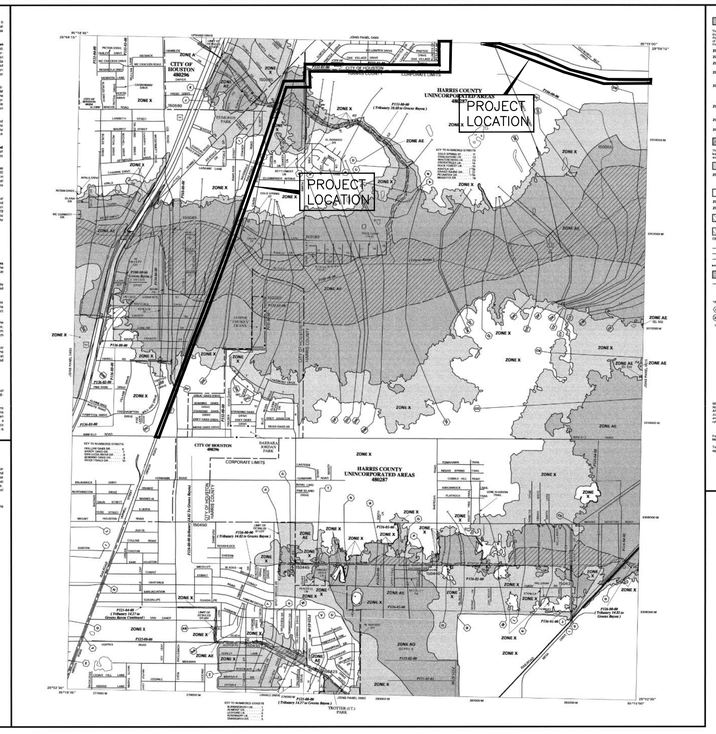
Vertical Datum Adjustment due to subsidence is the 2001 adjustment.

Benchmarks shown on this map were provided by either Harris County or the National Geodetic Survey. To obtain elevation, description, and location information for benchmarks provided by Harris County, please contact the Permits Office of the Public Infrastructure Department at (713) 868-3900 or visit their website at http://www.eng.hctx.net/permits. For information regarding the benchmarks provided by the National Geodetic Survey, please see note above.

Some bridges and other structures shown on the detailed studied streams are not labeled. See corresponding flood profile for appropriate name.



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water surface elevation of the 1% annual chance flood.

ZONE A — No Base Flood Elevations determined.
ZONE AE — Base Flood Elevations determined.
ZONE AH — Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO — Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR — Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99 — Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V — Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE — Coastal flood zone with velocity hazard (wave action); Base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- Floodplain Boundary
- Floodway Boundary
- Zone D Boundary
- CBRS and OPA Boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas and areas of minimal flood hazard
- Base Flood Elevation line and value; elevation in feet*
- Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

- Cross-Section Line
- Transect line
- Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 1000-meter Universal Transverse Mercator grid values, zone 15
- 5000-foot grid ticks
- Bench mark (see explanation in Notes to Users section of this FIRM panel)
- River Mile

MAP REPOSITORY
Refer to Repositories listing on Index Map

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
SEPTEMBER 30, 2009

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
SEPTEMBER 30, 2009
APRIL 23, 2010
JUNE 18, 2007
JUNE 5, 2014

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MAP SCALE 1" = 1000'
0 500 1000 2000 FEET
0 150 300 600 METERS

PANEL 0495L

FIRM
FLOOD INSURANCE RATE MAP
HARRIS COUNTY, TEXAS AND INCORPORATED AREAS
PANEL 495 OF 1150
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

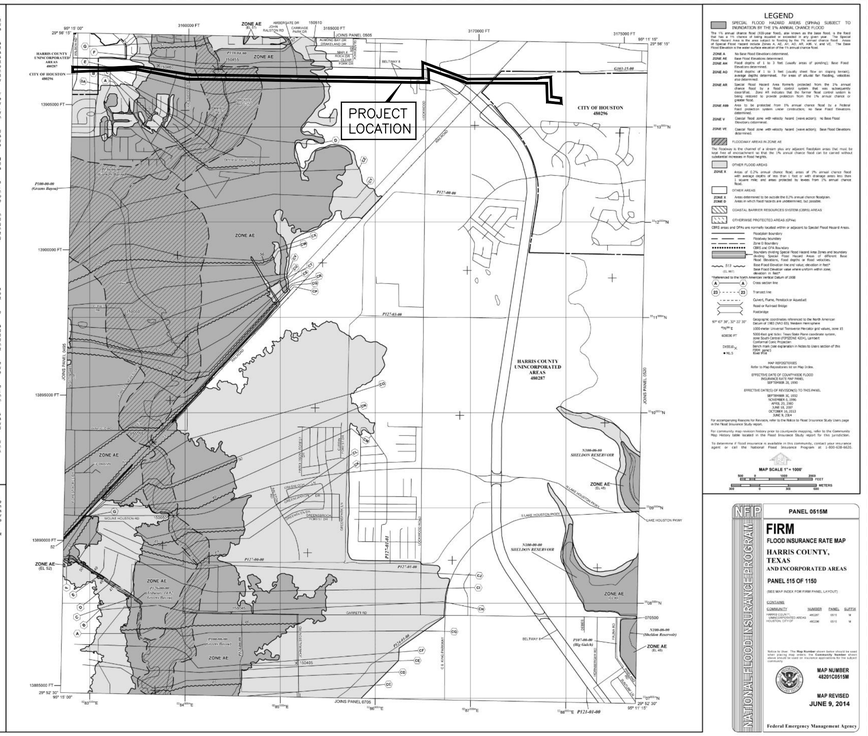
CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
HARRIS COUNTY UNINCORPORATED AREAS	480287	0495	L
HOUSTON, CITY OF	480296	0495	L

Notice to User: The **Map Number** shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
48201C0495L
MAP REVISED:
JUNE 18, 2007

Federal Emergency Management Agency



LEGEND

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ZONE V — Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE — Coastal flood zone with velocity hazard (wave action); Base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

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OTHER FLOOD AREAS

ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

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- Base Flood Elevation line and value; elevation in feet*
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- Transect line
- Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 1000-meter Universal Transverse Mercator grid values, zone 15
- 5000-foot grid ticks
- Bench mark (see explanation in Notes to Users section of this FIRM panel)
- River Mile

MAP REPOSITORY
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
SEPTEMBER 30, 2009

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
SEPTEMBER 30, 2009
APRIL 23, 2010
JUNE 18, 2007
JUNE 5, 2014

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MAP SCALE 1" = 1000'
0 500 1000 2000 FEET
0 150 300 600 METERS

PANEL 0515M

FIRM
FLOOD INSURANCE RATE MAP
HARRIS COUNTY, TEXAS AND INCORPORATED AREAS
PANEL 515 OF 1150
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
HARRIS COUNTY UNINCORPORATED AREAS	480287	0515	M
HOUSTON, CITY OF	480296	0515	M

Notice to User: The **Map Number** shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
48201C0515M
MAP REVISED
JUNE 9, 2014

Federal Emergency Management Agency

Surface Water Transmission Program

LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

INTERIM REVIEW ONLY
Document incomplete; not intended for permit, bidding or construction.

Engineer: WILLIAM BYLAND, P.E.
P.E. Serial No. 142621
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F-2614
Date:

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

FLOODPLAIN MAPS

WBS NO.
S-000901-0015-4

DRAWING SCALE
NOT TO SCALE
CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.
SHEET NO. 10 OF 102

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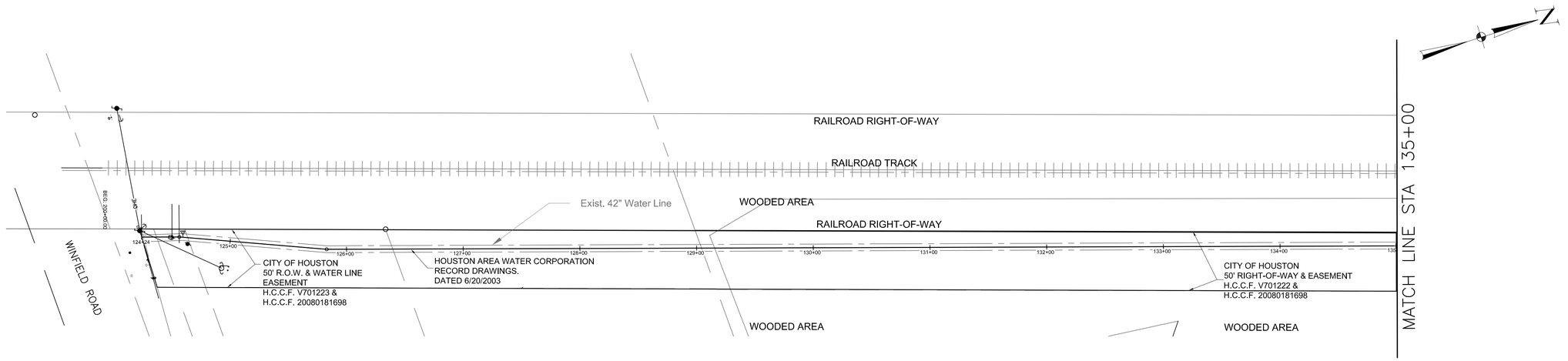
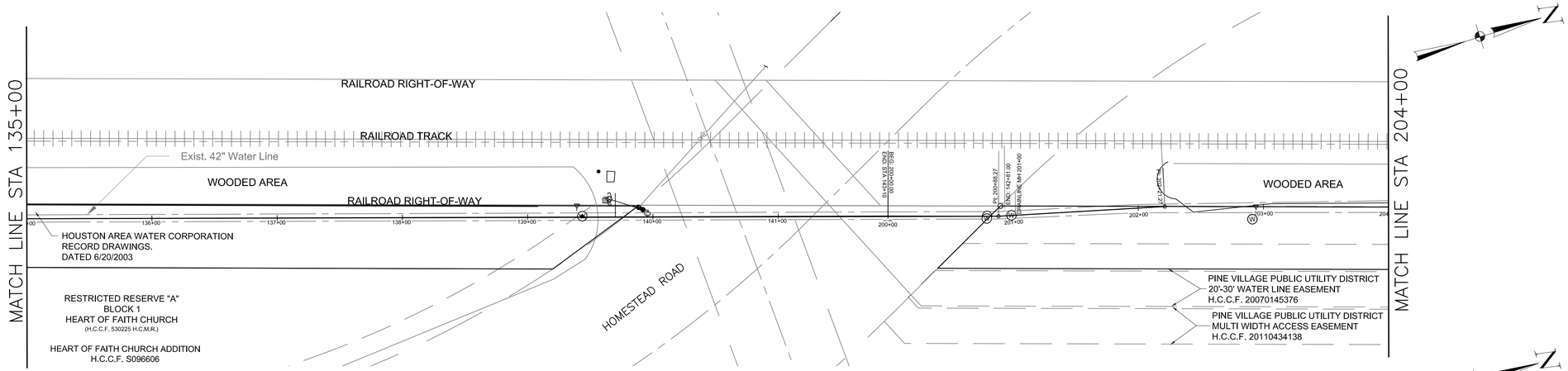
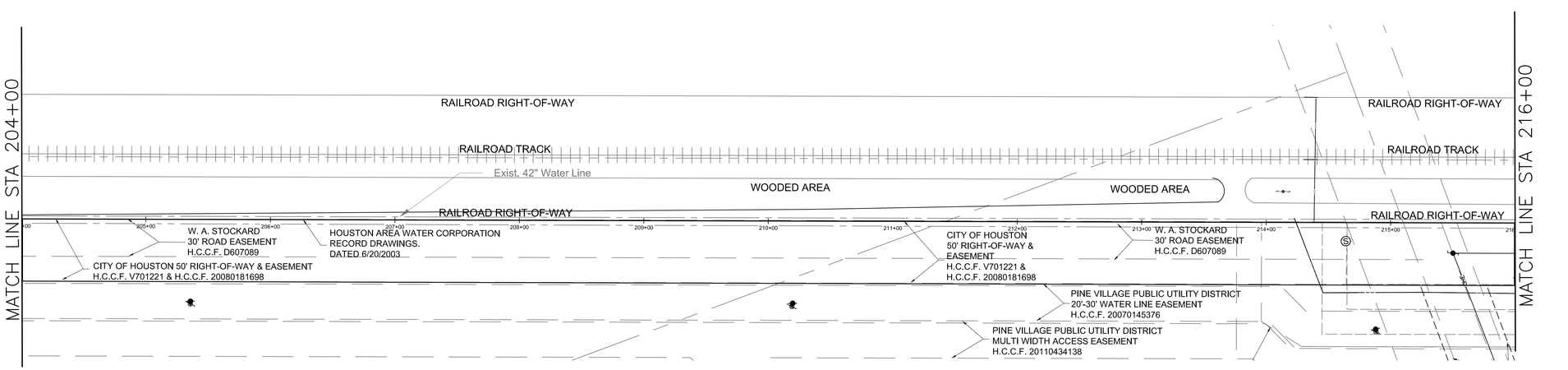






NOTES:

1. THE CONTRACTOR SHALL CLEAR AND GRUB WITHIN LIMITS OF COH PERMANENT WATERLINE EASEMENT AND/OR TEMPORARY CONSTRUCTION EASEMENT.
2. THE CONTRACTOR SHALL MAINTAIN EXISTING DRAINAGE DURING ALL CLEARING.
3. CLEARING AND GRUBBING THIS SHEET 3.49 ACRES TOTAL PROJECT AREA = 13.9 ACRES.

0 50 100
(IN FEET)

NO.	DATE	REVISION	APP.

SWTP
Surface Water Transmission Program

LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

INTERIM REVIEW ONLY
Document incomplete; not intended for permit, bidding or construction.
Engineer: WILLIAM BYLAND, P.E.
P.E. Serial No.: 142061
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F-2614
Date:

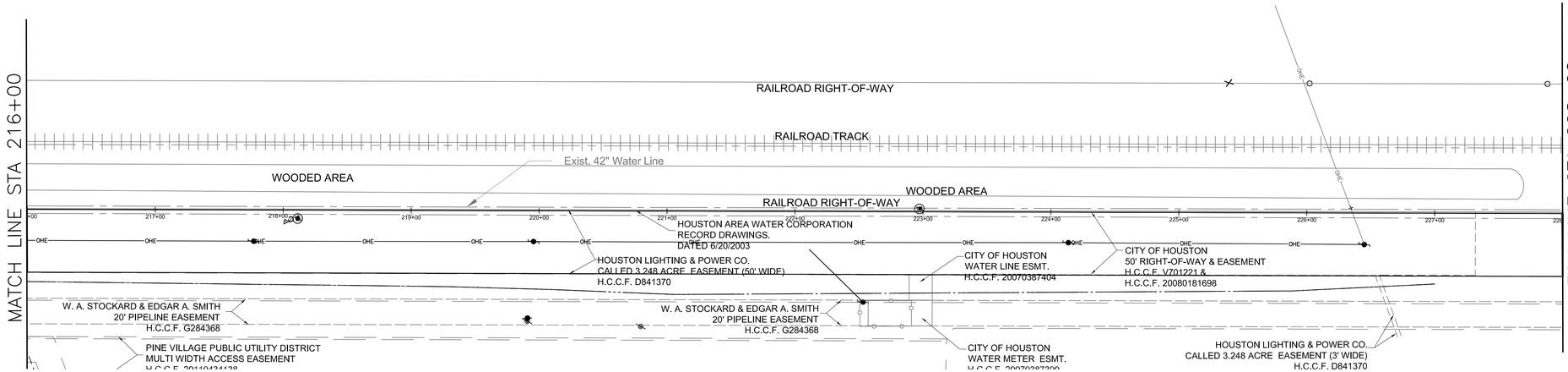
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

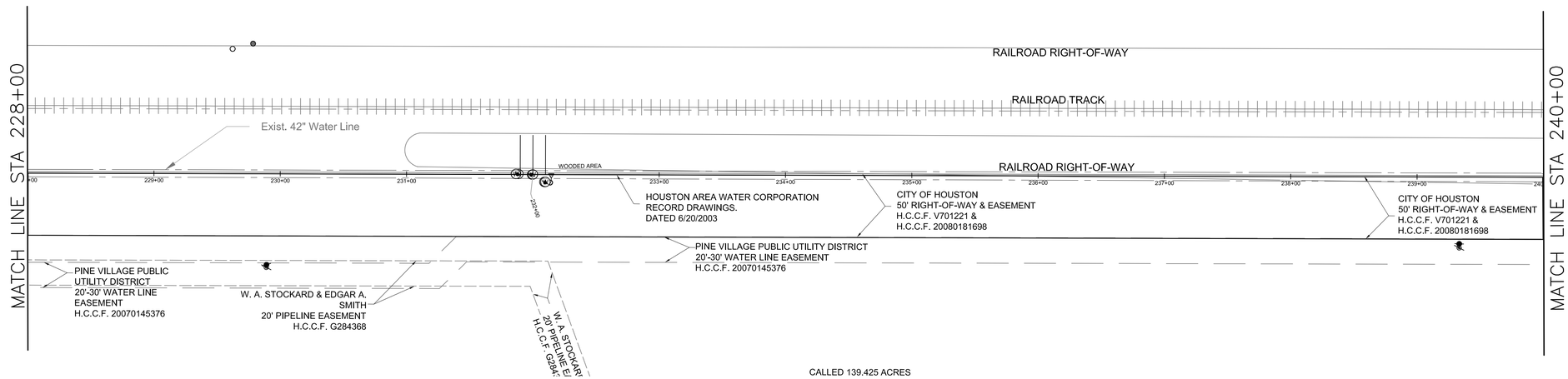
84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

CLEARING & GRUBBING
(1 OF 4)

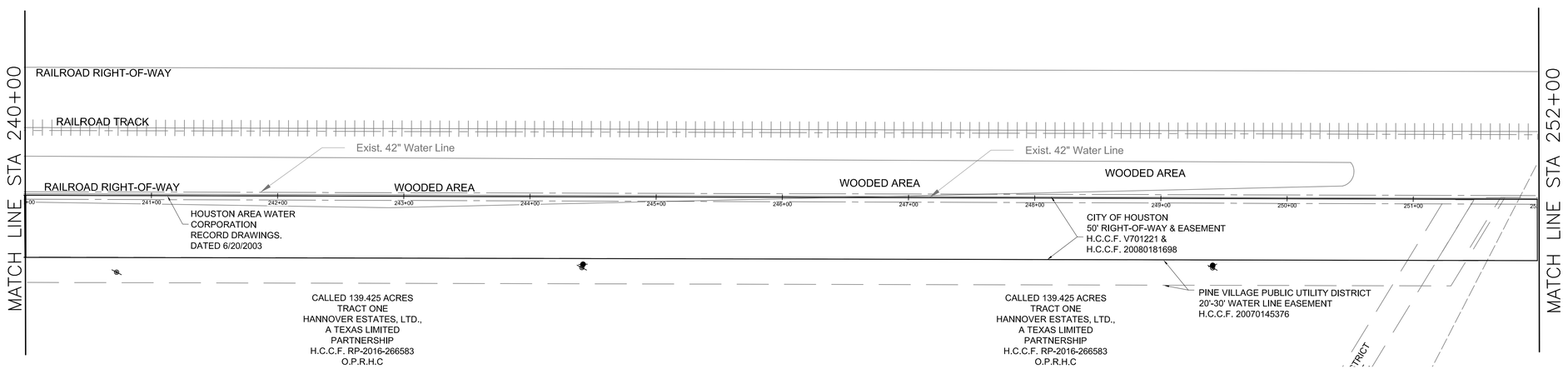
WBS NO. S-000901-0015-4
DRAWING SCALE
1"=50'
CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.
SHEET NO. 11 OF 102

P:\130-10667-401\4-0-Production-Working\4-1-BIM-CAD\General\10667-401_9-CLEARING & GRUBBING 50-SHT 4 of 4.dwg plotted on Mar 03, 2025 - 8:40pm





CALLED 139.425 ACRES



NO.	DATE	REVISION	APP.

NOTES:

1. THE CONTRACTOR SHALL CLEAR AND GRUB WITHIN LIMITS OF COH PERMANENT WATERLINE EASEMENT AND/OR TEMPORARY CONSTRUCTION EASEMENT.
2. THE CONTRACTOR SHALL MAINTAIN EXISTING DRAINAGE DURING ALL CLEARING.
3. CLEARING AND GRUBBING THIS SHEET 4.12 ACRES TOTAL PROJECT AREA = 13.9 ACRES.

0 50 100
(IN FEET)

SWTP
Surface Water Transmission Program

LOCKWOOD, ANDREWS
& NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

INTERIM REVIEW ONLY
Document incomplete; not intended for permit, bidding or construction.
Engineer: WILLIAM BYLAND, P.E.
P.E. Serial No.: 142061
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F-2614
Date:

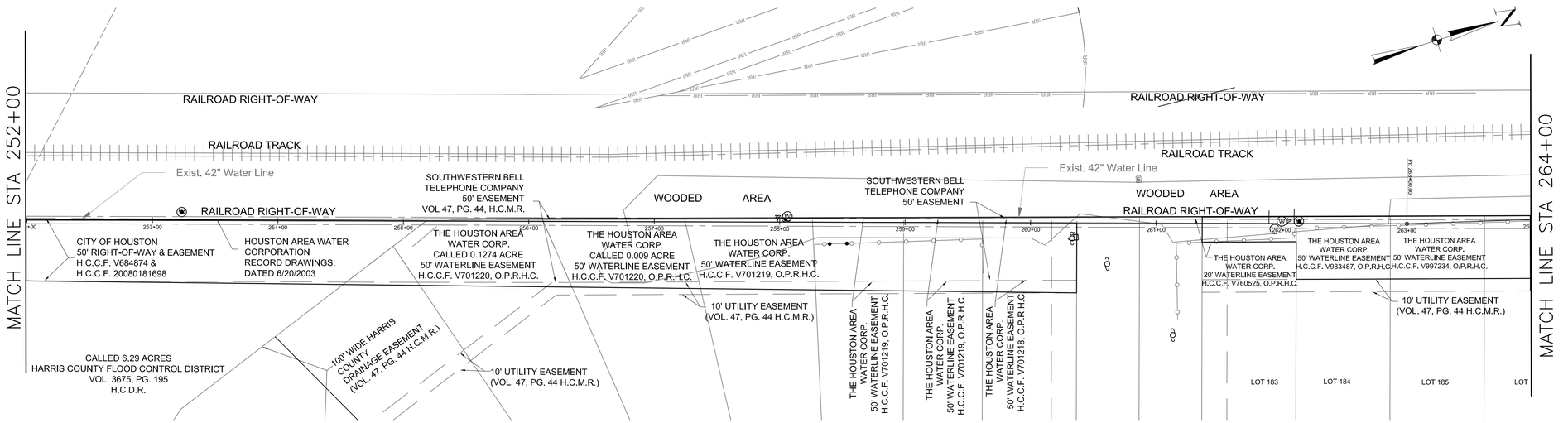
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

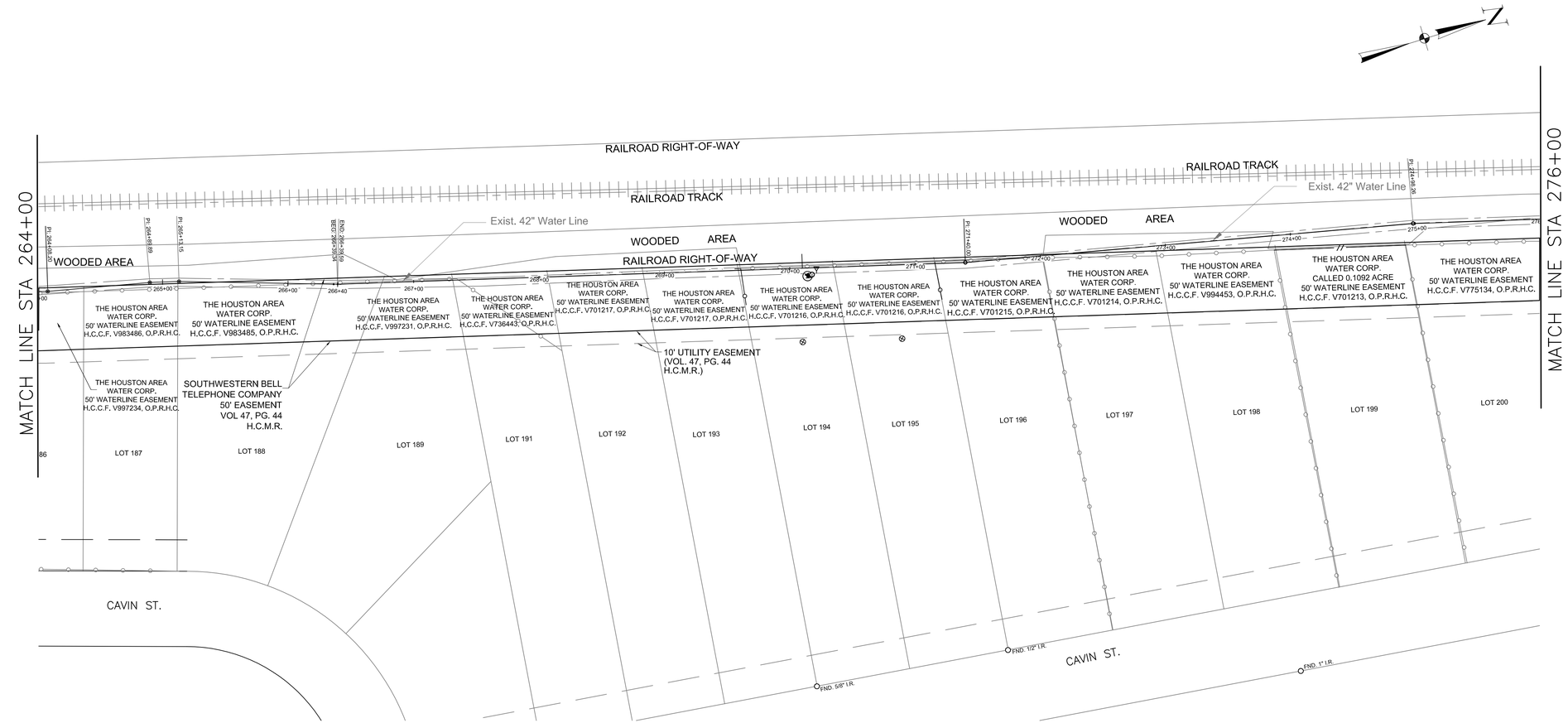
84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

CLEARING & GRUBBING (2 OF 4)

WBS NO. S-000901-0015-4
DRAWING SCALE
1"=50'
CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.
SHEET NO. 12 OF 102

P:\130_10667-401\4-0-Production-Working\4-1-BIM-CAD\General\10667-401_9-CLEARING & GRUBBING 50-SHT 4 of 4.dwg plotted on Mar 03, 2025 - 8:43pm





NOTES:

1. THE CONTRACTOR SHALL CLEAR AND GRUB WITHIN LIMITS OF COH PERMANENT WATERLINE EASEMENT AND/OR TEMPORARY CONSTRUCTION EASEMENT.
2. THE CONTRACTOR SHALL MAINTAIN EXISTING DRAINAGE DURING ALL CLEARING.
3. CLEARING AND GRUBBING THIS SHEET 2.60 ACRES TOTAL PROJECT AREA = 13.9 ACRES.

0 50 100
(IN FEET)

NO.	DATE	REVISION	APP.

SWTP
Surface Water Transmission Program

LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

INTERIM REVIEW ONLY
Document incomplete; not intended for permit, bidding or construction.
Engineer: WILLIAM BYLAND, P.E.
P.E. Serial No.: 142061
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F-2614
Date:

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

CLEARING & GRUBBING (3 OF 4)

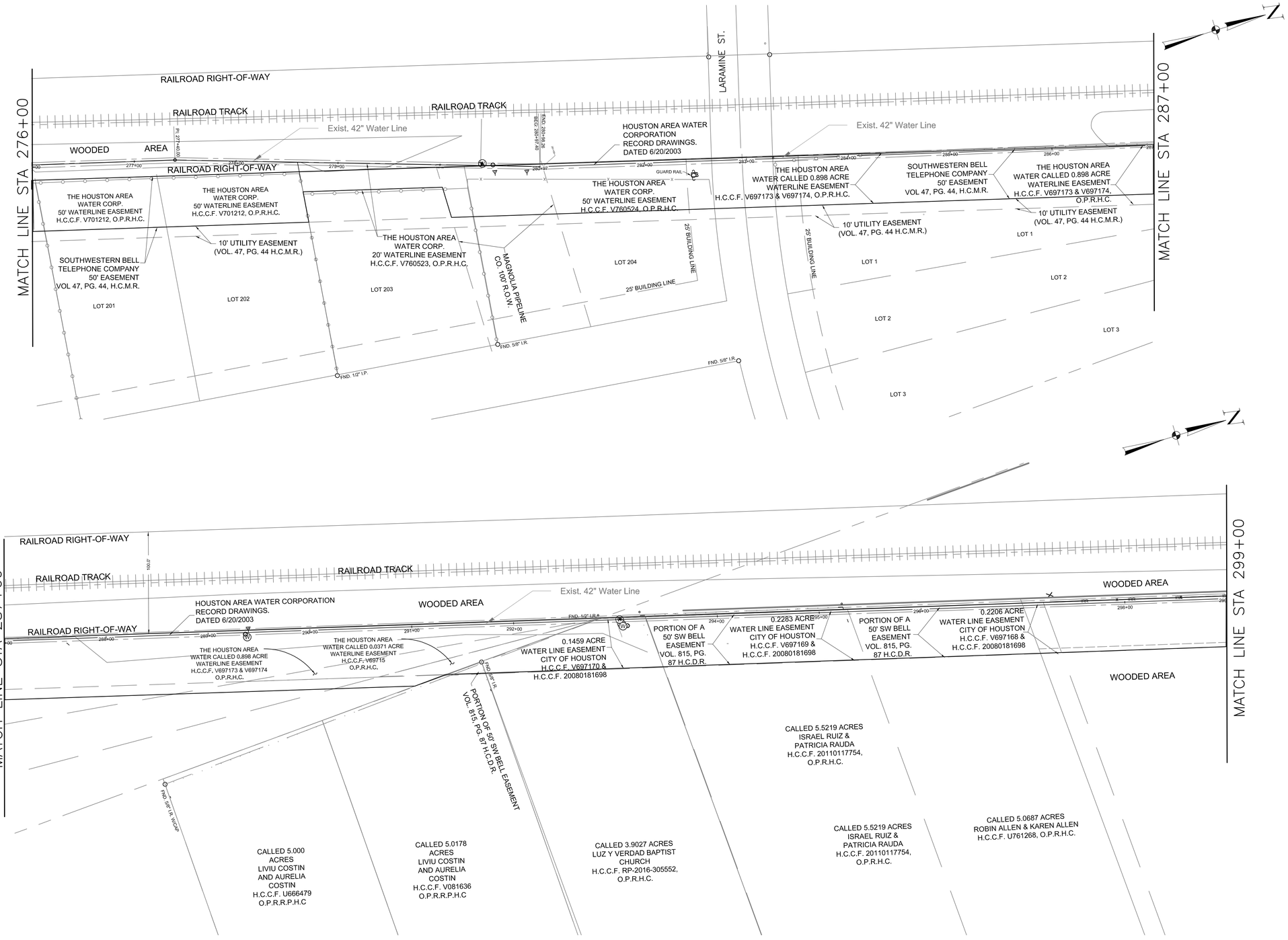
WBS NO. S-000901-0015-4

DRAWING SCALE
1"=50'

CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.

SHEET NO. 13 OF 102

P:\130\130-10667-401\4-0-Production-Working\4-1-BIM-CAD\General\10667-401_9-CLEARING & GRUBBING 50-SHT 4 of 4.dwg plotted on Mar 03, 2025 - 8:50pm



NO.	DATE	REVISION	APP.

NOTES:

1. THE CONTRACTOR SHALL CLEAR AND GRUB WITHIN LIMITS OF COH PERMANENT WATERLINE EASEMENT AND/OR TEMPORARY CONSTRUCTION EASEMENT.
2. THE CONTRACTOR SHALL MAINTAIN EXISTING DRAINAGE DURING ALL CLEARING.
3. CLEARING AND GRUBBING THIS SHEET 2.65 ACRES TOTAL PROJECT AREA = 13.9 ACRES.

0 50 100
(IN FEET)

SWTP
Surface Water Transmission Program

LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

INTERIM REVIEW ONLY
Document incomplete; not intended for permit, bidding or construction.
Engineer: WILLIAM BYLAND, P.E.
P.E. Serial No.: 142061
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F-2614
Date:

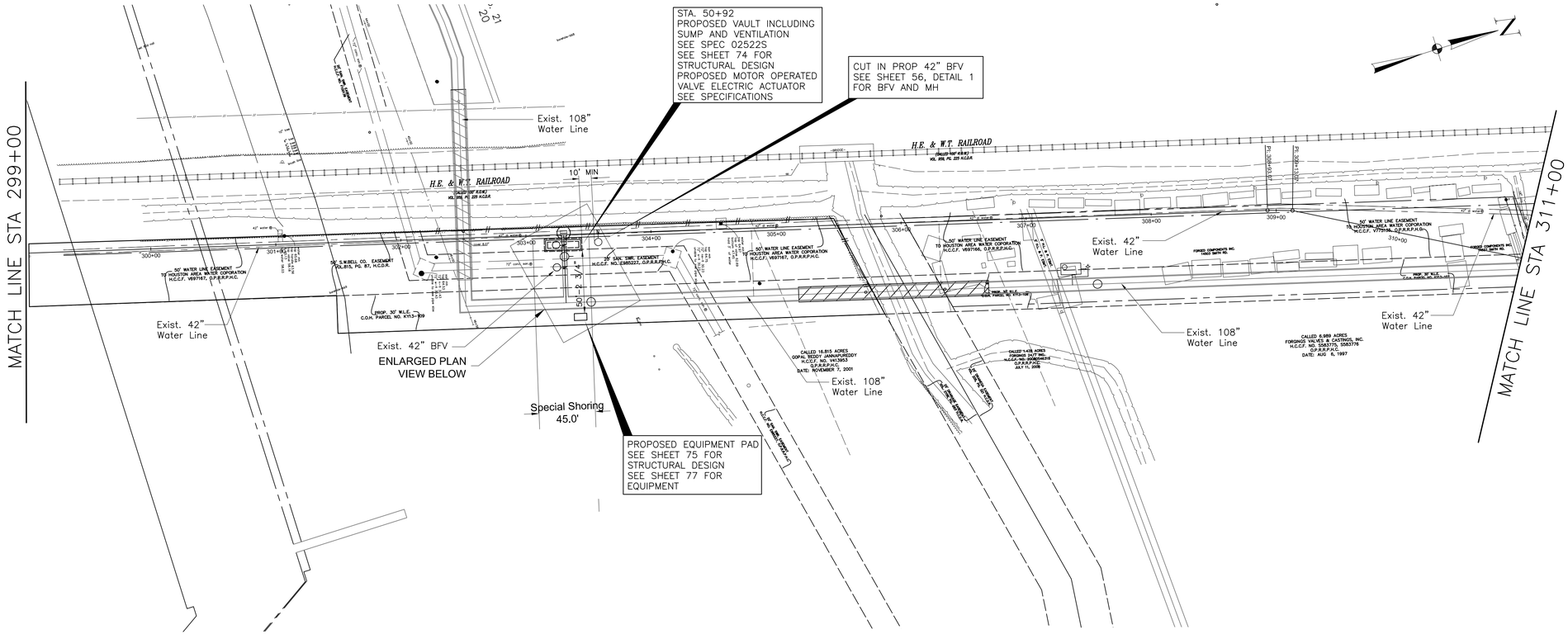
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

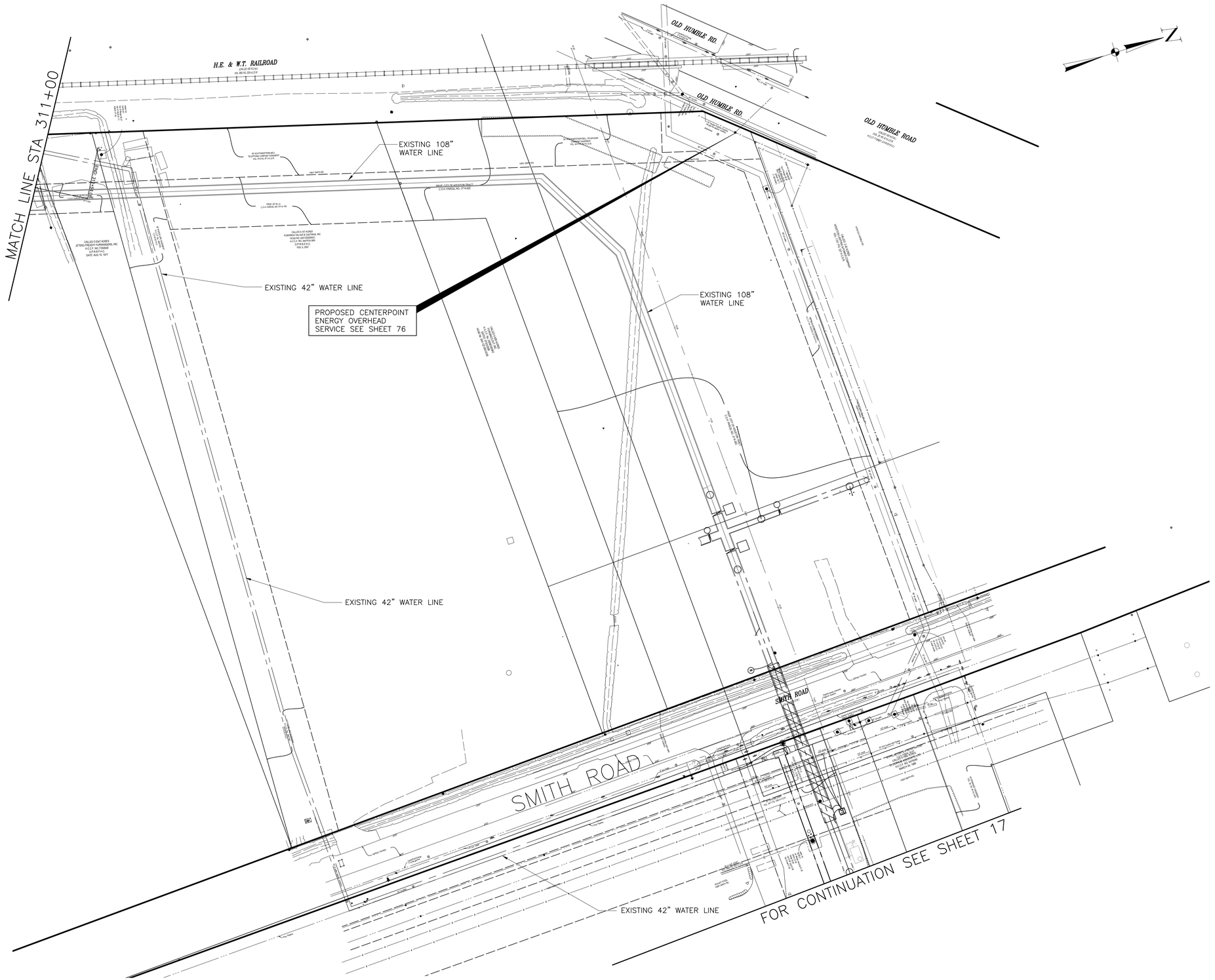
84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

CLEARING & GRUBBING (4 OF 4)

WBS NO. S-000901-0015-4
DRAWING SCALE
1"=50'
CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.
SHEET NO. 14 OF 102

P:\130\10667-401\4-0-Production-Working\4-1-BIM-CAD\General\10667-401_9-CLEARING & GRUBBING 50-SHT 4 of 4.dwg plotted on Mar 03, 2025 - 8:56pm


MATCH LINE STA 299+00
MATCH LINE STA 311+00
STA. 50+92
PROPOSED VAULT INCLUDING SUMP AND VENTILATION
SEE SPEC 02522S
SEE SHEET 74 FOR STRUCTURAL DESIGN
PROPOSED MOTOR OPERATED VALVE ELECTRIC ACTUATOR
SEE SPECIFICATIONS
CUT IN PROP 42" BFV
SEE SHEET 56, DETAIL 1
FOR BFV AND MH
Exist. 108" Water Line
H.E. & W.T. RAILROAD
10' MIN
Exist. 42" Water Line
Exist. 42" BFV
ENLARGED PLAN VIEW BELOW
Special Shoring 45.0'
PROPOSED EQUIPMENT PAD
SEE SHEET 75 FOR STRUCTURAL DESIGN
SEE SHEET 77 FOR EQUIPMENT
Exist. 108" Water Line
Exist. 42" Water Line
Exist. 42" Water Line
50' WATER LINE EASEMENT TO HOUSTON AREA WATER CORPORATION H.C.C.F. 20070166, O.P.R.R.P.H.C.
50' WATER LINE EASEMENT TO HOUSTON AREA WATER CORPORATION H.C.C.F. V777934, O.P.R.P.H.C.
50' WATER LINE EASEMENT TO HOUSTON AREA WATER CORPORATION H.C.C.F. V697167, O.P.R.P.H.C.
50' WATER LINE EASEMENT TO HOUSTON AREA WATER CORPORATION H.C.C.F. V697166, O.P.R.P.H.C.
20' SAN. SWR. EASEMENT H.C.C.F. NO.Z380227, O.P.R.R.P.H.C.
PROP. 30" W.L.E. C.O.H. PARCEL NO. K113-109
PROP. 30" W.L.E. C.O.H. PARCEL NO. K113-107
CALLED 10.915 ACRES GOPAL MEDDY & SANDEEP MEDDY VOL. 5001, PG. 2 O.P.R.R.P.H.C. DATE: NOVEMBER 7, 2001
CALLED 1.478 ACRES FORGING COMPONENTS INC. H.C.C.F. NO. 20070166 O.P.R.R.P.H.C. JULY 11, 2008
CALLED 6.989 ACRES FORGINGS VALVES & CASTINGS, INC. H.C.C.F. NO. S563775, S563776 O.P.R.R.P.H.C. DATE: AUG. 6, 1997
FORGED COMPONENTS INC. 10602 BAYPORT RD.
FORGED COMPONENTS INC. 10602 BAYPORT RD.
PROP. 30" W.L.E. C.O.H. PARCEL NO. K113-107
8" SANITARY SEWER
12" WATER LINE
Exist. 42" Water Line
Exist. 108" Water Line
Exist. 42" Water Line
Exist. 42" Water Line
Exist. 108" Water Line
Exist. 42" Water Line
Exist. 42" Water Line
Exist. 42



NO.	DATE	REVISION	APP.

0 50 100
(IN FEET)

SWTP
Surface Water Transmission Program

LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

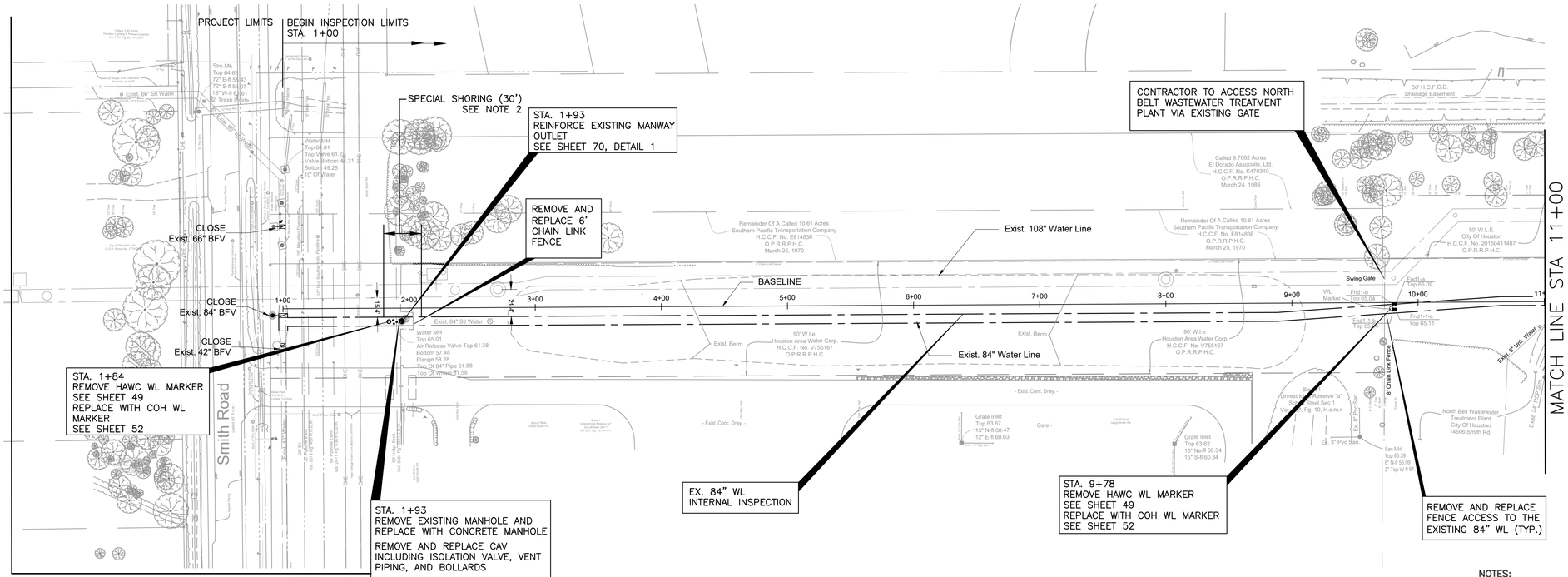
INTERIM REVIEW ONLY
Document incomplete, not intended for permit, bidding or construction.
Engineer: WILLIAM RYLAND, P.E.
P.E. Serial No.: 142841
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F-2614
Date:

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84–INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD
MOTOR OPERATED VALVE POWER SOURCE SITE (2 OF 2)

WBS NO. S–000901–0015–4	
DRAWING SCALE	
1"=50'	
CITY OF HOUSTON PM	
RAM CHAKRADHAR, P.E.	
SHEET NO. 16 OF 102	

P:\130\130-10667-401\4-0-Production-Working\4-1-BIM-CAD\General\10667-401_15-MOV SITE.dwg plotted on Feb 27, 2025 - 1:24pm



FOR CONTINUATION SEE SHEET 16

VERTICAL DATUM ADJUSTMENT:
THE ELEVATION DIFFERENCE IN BETWEEN THE FLOODPLAIN REFERENCE MARK'S (RM150585) PUBLISHED DATUM NAVD 1988, 2001 ADJUSTMENT AND DATUM NAVD 1988, (CORS96) IS 0.21'. NAVD88, (CORS96) ELEVATION=NAVD88, 2001 ADJ. ELEVATION – 0.21 FEET.

HORIZONTAL DATUM:
ALL HORIZONTAL COORDINATES ARE BASED ON TEXAS STATE PLANE COORDINATE SYSTEM, SOUTH CENTRAL ZONE, NAD83. THE COORDINATES & DISTANCES SHOWN ARE SURFACE AND MAY BE CONVERTED TO GRID BY MULTIPLYING BY A SCALE FACTOR OF 0.999870017.

BENCHMARK:
CITY OF HOUSTON MONUMENT 5765–8303, A BRASS DISK ON CONCRETE ON THE SOUTH SIDE OF WATER WORKS BOULEVARD APPROXIMATELY 0.25 MILES EAST OF NORTH SAM HOUSTON PARKWAY (WESTBOUND FRONTAGE ROAD). ELEV. 54.37 FEET NAV 1988 (CORS96) (GEOID'12a)

NO.	DATE	REVISION	APP.

N

0 50 100 HORIZONTAL
0 5 10 VERTICAL
(IN FEET)

NOTES:
1. 108–INCH WATER LINE TO REMAIN IN SERVICE AT ALL TIMES. CONTRACTOR TO PROTECT 108–INCH WATERLINE AND ITS APPURTENANCES. REFER TO SPEC SECTION 02317 FOR ADDITIONAL INFORMATION.
2. SPECIAL SHORING TO PROTECT EXISTING 108–INCH WATER LINE AND APPURTENANCES. NO EXCAVATION OR BENCHING AND PROTECTED STRUCTURE. REFER TO SPEC SECTION 02464 FOR SPECIAL SHORING REQUIREMENTS.

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.

SWTP
Surface Water Transmission Program

LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

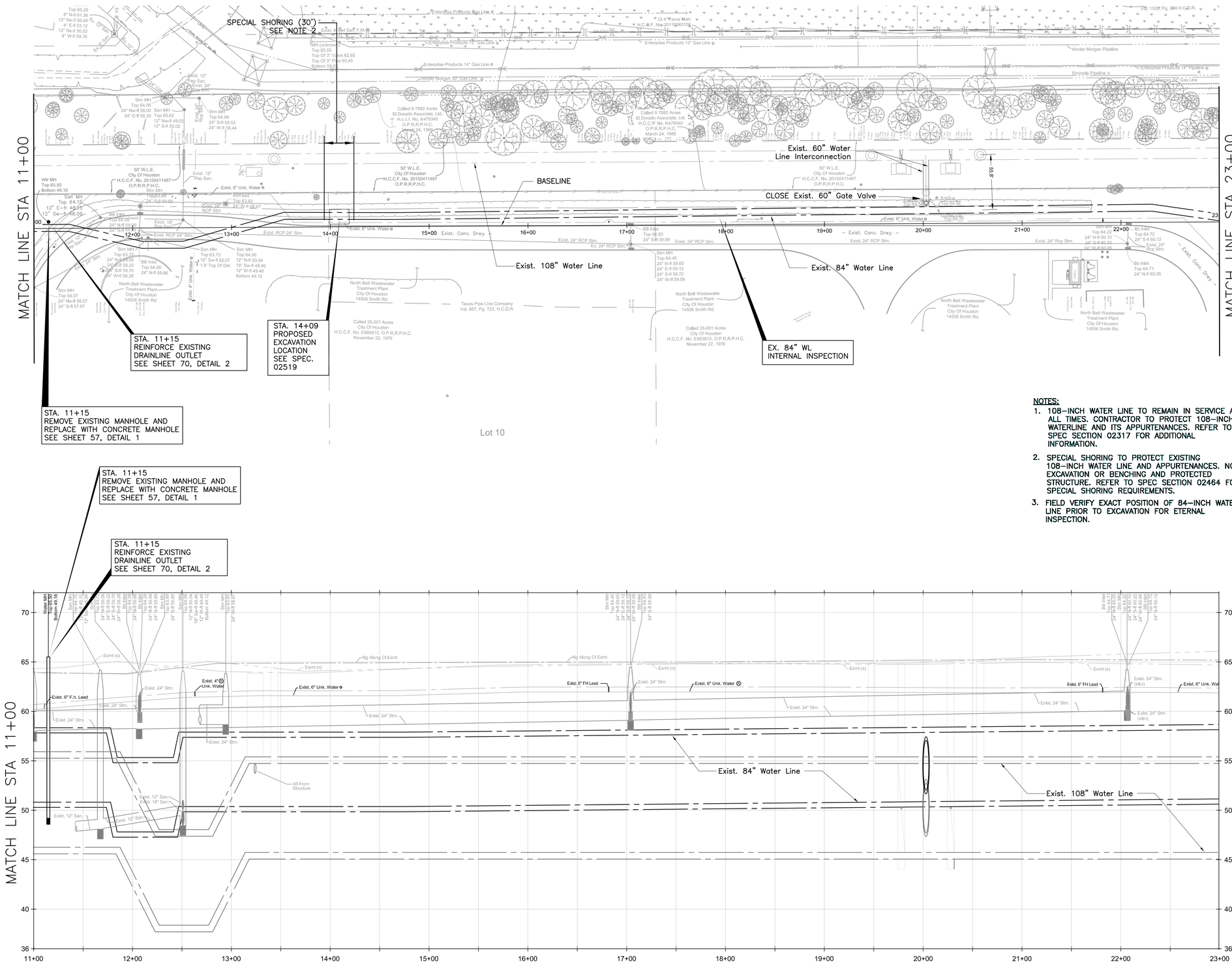
INTERIM REVIEW ONLY
Document incomplete; not intended for permit, bidding or construction.
Engineer: WILLIAM BYLAND, P.E.
P.E. Serial No.: 142061
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F–2614
Date:

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84–INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD
PLAN & PROFILE
STA. 1+00 TO STA. 11+00
(1 OF 28)

WBS NO. S–000901–0015–4	
DRAWING SCALE	
1"=50' H, 1"=5' V	
CITY OF HOUSTON PM	
RAM CHAKRADHAR, P.E.	
SHEET NO. 17 OF 102	

P:\130\10667-401\4-0-Production-Working\4-1-BIM-CAD\Civil\Sheets\10667-401_12_P&P Sheets_PETE_copy – Copy.dwg plotted on Mar 03, 2025 – 4:47pm



VERTICAL DATUM ADJUSTMENT:
THE ELEVATION DIFFERENCE IN BETWEEN THE FLOODPLAIN REFERENCE MARK'S (RM150585) PUBLISHED DATUM NAVD 1988, 2001 ADJUSTMENT AND DATUM NAVD 1988, (CORS96) IS 0.21'. NAVD88, (CORS96) ELEVATION=NAVD88, 2001 ADJ. ELEVATION – 0.21 FEET.

HORIZONTAL DATUM:
ALL HORIZONTAL COORDINATES ARE BASED ON TEXAS STATE PLANE COORDINATE SYSTEM, SOUTH CENTRAL ZONE, NAD83. THE COORDINATES & DISTANCES SHOWN ARE SURFACE AND MAY BE CONVERTED TO GRID BY MULTIPLYING BY A SCALE FACTOR OF 0.999870017.

BENCHMARK:
CITY OF HOUSTON MONUMENT 5765–8303, A BRASS DISK ON CONCRETE ON THE SOUTH SIDE OF WATER WORKS BOULEVARD APPROXIMATELY 0.25 MILES EAST OF NORTH SAM HOUSTON PARKWAY (WESTBOUND FRONTAGE ROAD). ELEV. 54.37 FEET NAV 1988 (CORS96) (GEOID'12a)

NO.	DATE	REVISION	APP.

N

0 50 100 HORIZONTAL
0 5 10 VERTICAL
(IN FEET)

NOTES:

1. 108–INCH WATER LINE TO REMAIN IN SERVICE AT ALL TIMES. CONTRACTOR TO PROTECT 108–INCH WATERLINE AND ITS APPURTENANCES. REFER TO SPEC SECTION 02317 FOR ADDITIONAL INFORMATION.
2. SPECIAL SHORING TO PROTECT EXISTING 108–INCH WATER LINE AND APPURTENANCES. NO EXCAVATION OR BENCHING AND PROTECTED STRUCTURE. REFER TO SPEC SECTION 02464 FOR SPECIAL SHORING REQUIREMENTS.
3. FIELD VERIFY EXACT POSITION OF 84–INCH WATER LINE PRIOR TO EXCAVATION FOR ETERNAL INSPECTION.

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.

SWTP
Surface Water Transmission Program

LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

INTERIM REVIEW ONLY
Document incomplete; not intended for permit, bidding or construction.
Engineer: WILLIAM RYLAND, P.E.
P.E. Serial No.: 142061
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F–2614
Date:

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

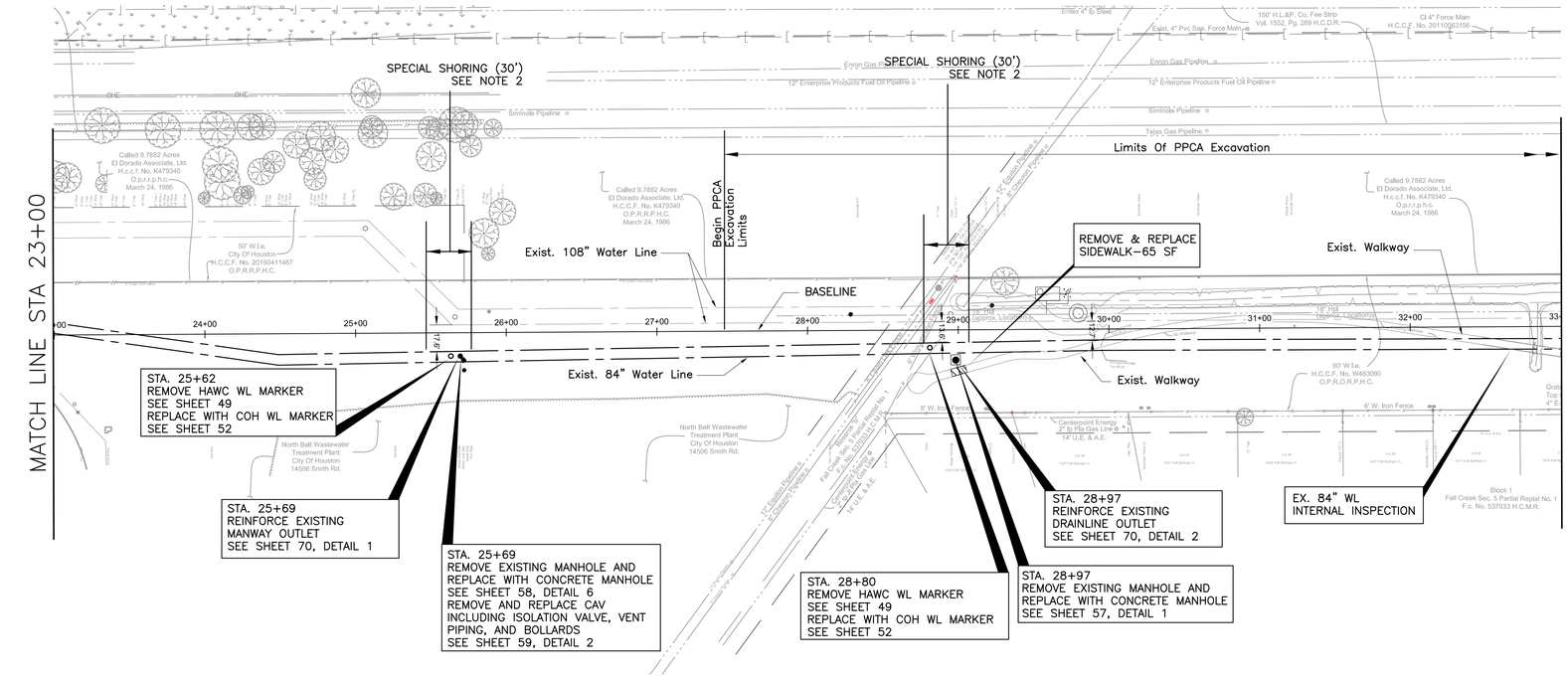
84–INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

PLAN & PROFILE

STA. 11+00 TO STA. 23+00
(2 OF 28)

WBS NO. S–000901–0015–4	
DRAWING SCALE	
1"=50' H, 1"=5' V	
CITY OF HOUSTON PM	
RAM CHAKRADHAR, P.E.	
SHEET NO. 18 OF 102	

P:\130\130-10667-401\4-0-Production-Working\4-1-BIM-CAD\Civil\Sheets\10667-401_12_P&P Sheets_PETE_copy.dwg plotted on Mar 03, 2025 – 6:17pm



VERTICAL DATUM ADJUSTMENT:
THE ELEVATION DIFFERENCE IN BETWEEN THE FLOODPLAIN REFERENCE MARK'S (RM150585) PUBLISHED DATUM NAVD 1988, 2001 ADJUSTMENT AND DATUM NAVD 1988, (CORS96) IS 0.21'. NAVD88, (CORS96) ELEVATION=NAVD88, 2001 ADJ. ELEVATION – 0.21 FEET.

HORIZONTAL DATUM:
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BENCHMARK:
CITY OF HOUSTON MONUMENT 5765–8303, A BRASS DISK ON CONCRETE ON THE SOUTH SIDE OF WATER WORKS BOULEVARD APPROXIMATELY 0.25 MILES EAST OF NORTH SAM HOUSTON PARKWAY (WESTBOUND FRONTAGE ROAD).
ELEV. 54.37 FEET NAV 1988 (CORS96) (GEOID'12a)

NO.	DATE	REVISION	APP.

NOTES:

1. **108–INCH WATER LINE TO REMAIN IN SERVICE AT ALL TIMES. CONTRACTOR TO PROTECT 108–INCH WATERLINE AND ITS APPURTENANCES. REFER TO SPEC SECTION 02317 FOR ADDITIONAL INFORMATION.**
2. **SPECIAL SHORING TO PROTECT EXISTING 108–INCH WATER LINE AND APPURTENANCES. NO EXCAVATION OR BENCHING AND PROTECTED STRUCTURE. REFER TO SPEC SECTION 02464 FOR SPECIAL SHORING REQUIREMENTS.**

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

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SWTP
Surface Water Transmission Program

LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

INTERIM REVIEW ONLY
Document incomplete; not intended for permit, bidding or construction.
Engineer: WILLIAM BYLAND, P.E.
P.E. Serial No.: 142061
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F–2614
Date:

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84–INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

PLAN & PROFILE

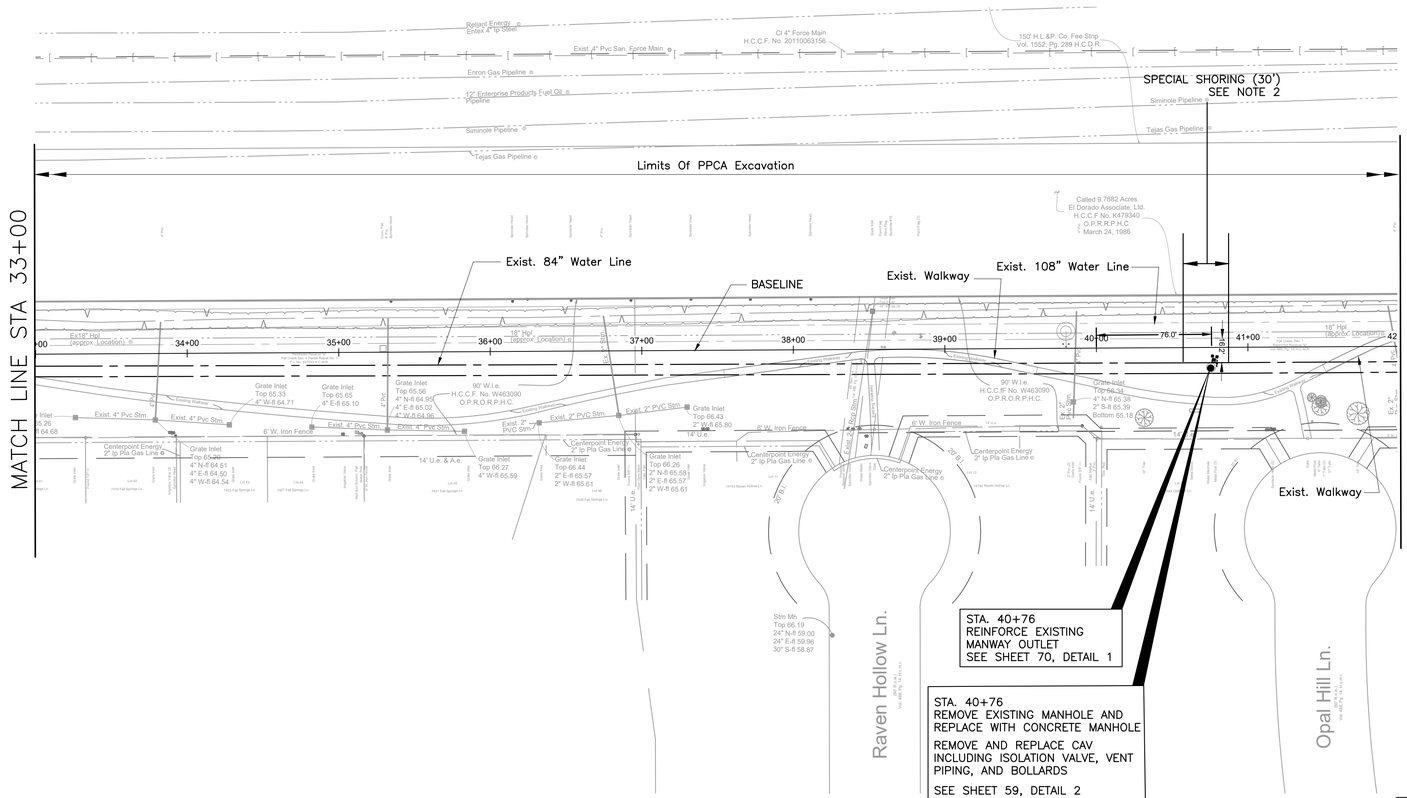
STA. 23+00 TO STA. 33+00
(3 OF 28)

WBS NO.
S–000901–0015–4

DRAWING SCALE
1"=50' H, 1"=5' V

CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.
SHEET NO. 19 OF 102

P:\130\10667-401\4-0-Production-Working\4-1-BIM-CAD\Civil\Sheets\10667-401_12_P&P Sheets (2).dwg plotted on May 28, 2025 – 5:07pm



VERTICAL DATUM ADJUSTMENT:
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BENCHMARK:
CITY OF HOUSTON MONUMENT 5765–8303, A BRASS DISK ON CONCRETE ON THE SOUTH SIDE OF WATER WORKS BOULEVARD APPROXIMATELY 0.25 MILES EAST OF NORTH SAM HOUSTON PARKWAY (WESTBOUND FRONTAGE ROAD). ELEV. 54.37 FEET NAV 1988 (CORS96) (GEOID'12a)

NO.	DATE	REVISION	APP.

NOTES:
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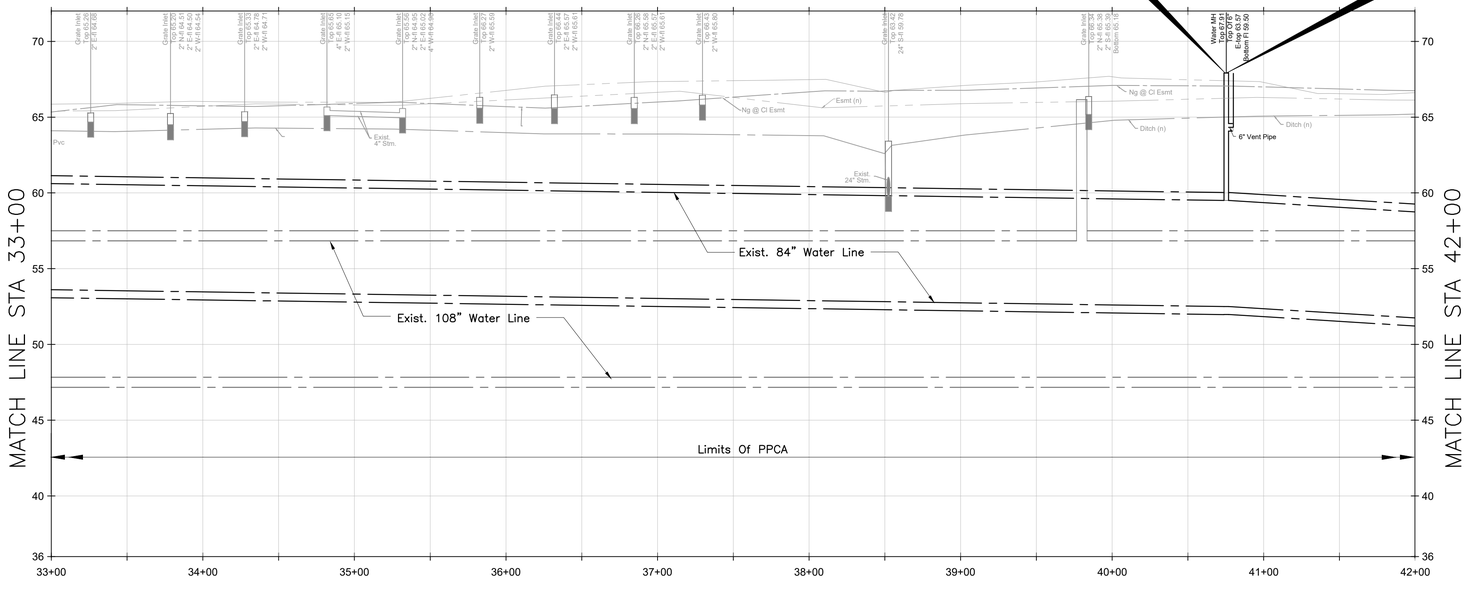
N

0 50 100 HORIZONTAL
0 5 10 VERTICAL
(IN FEET)



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Signature valid for six months.

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Signature valid for one year.

SWTP
Surface Water Transmission Program

LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

INTERIM REVIEW ONLY
Document incomplete; not intended for permit, bidding or construction.
Engineer: WILLIAM BYLAND, P.E.
P.E. Serial No.: 142061
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F–2614
Date:

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84–INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD
PLAN & PROFILE
STA. 33+00 TO STA. 42+00
(4 OF 28)

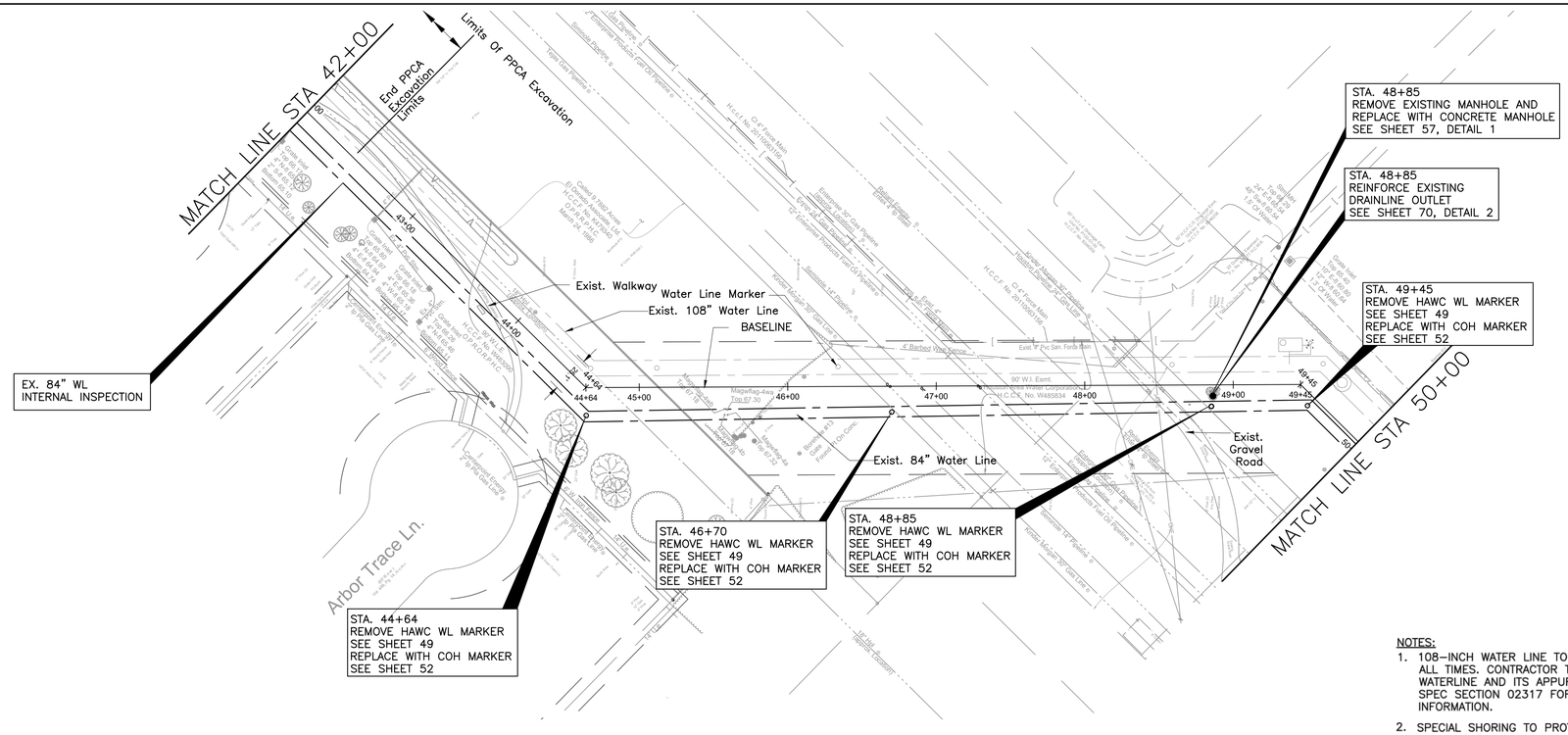
WBS NO.
S–000901–0015–4

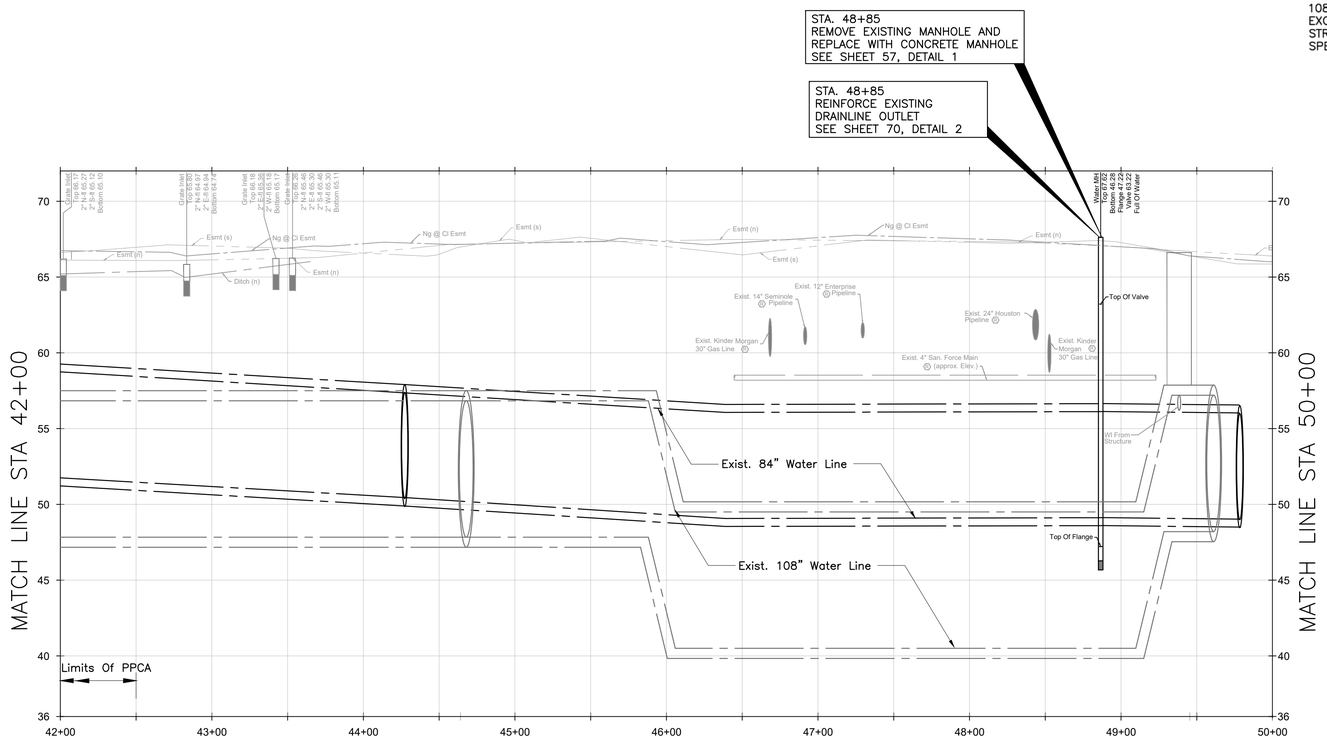
DRAWING SCALE
1"=50' H, 1"=5' V

CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.

SHEET NO. 20 OF 102

P:\130\10667-401\4-0-Production-Working\4-1-BIM-CAD\Civil\Sheets\10667-401_12_P&P Sheets_PETE_copy - Copy.dwg plotted on Mar 03, 2025 - 4:53pm





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0 50 100 HORIZONTAL
0 5 10 VERTICAL
(IN FEET)

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SWTP
Surface Water Transmission Program

LAN
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HOUSTON, TX 77042

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Firm No.: F–2614
Date:

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84–INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

PLAN & PROFILE

STA. 42+00 TO STA. 50+00
(5 OF 28)

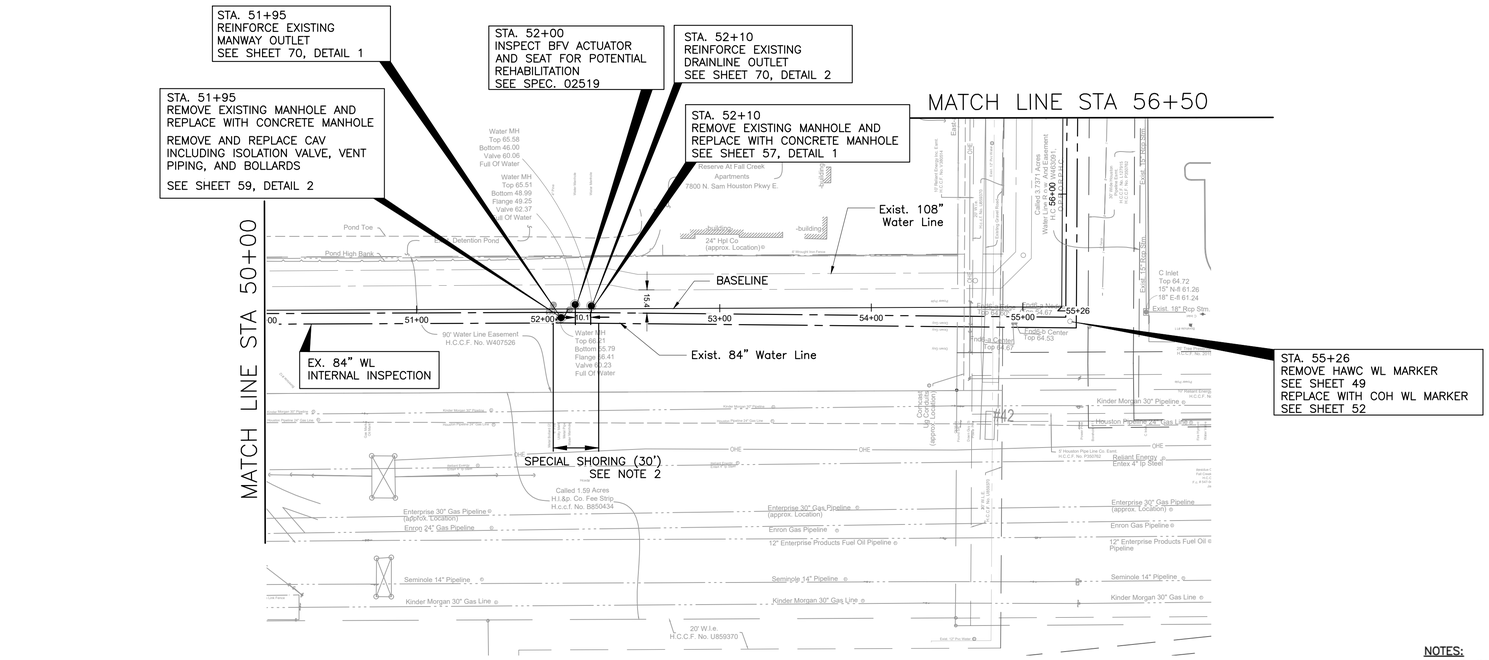
WBS NO.
S–000901–0015–4

DRAWING SCALE
1"=50' H, 1"=5' V

CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.

SHEET NO. 21 OF 102

P:\130\10667-401\4-0-Production-Working\4-1-BIM-CAD\Civil\Sheets\10667-401_12_P&P Sheets_PETE_copy.dwg plotted on Mar 03, 2025 - 4:17pm



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ELEV. 54.37 FEET NAV 1988 (CORS96) (GEOID'12a)

NO.	DATE	REVISION	APP.

N

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84–INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

PLAN & PROFILE

STA. 50+00 TO STA. 56+50
(6 OF 28)

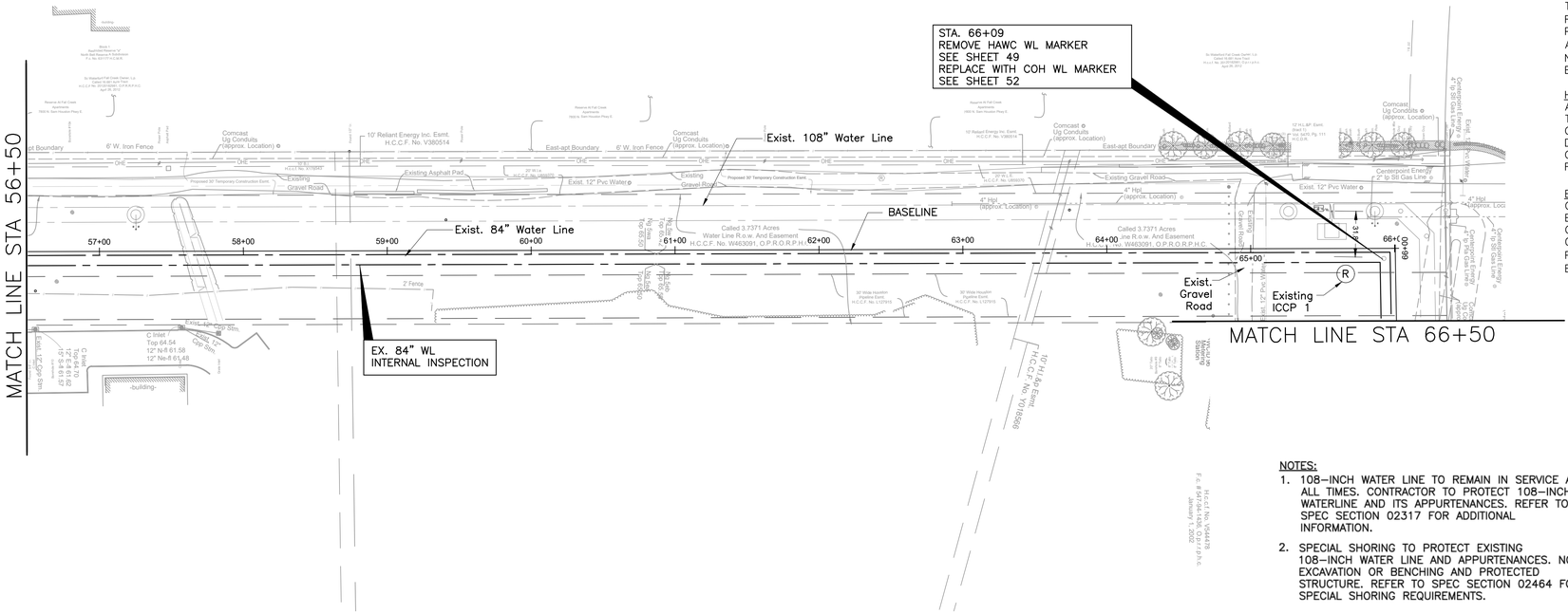
WBS NO.
S–000901–0015–4

DRAWING SCALE
1"=50' H, 1"=5' V

CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.

SHEET NO. 22 OF 102

P:\130\130-10667-401\4-0-Production-Working\4-1-BIM-CAD\Civil\Sheets\10667-401_12_P&P Sheets_PETE_copy - Copy.dwg plotted on Mar 03, 2025 - 4:56pm



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0 50 100 HORIZONTAL
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Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F–2614
Date:

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84–INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

PLAN & PROFILE

STA. 56+50 TO STA. 66+50
(7 OF 28)

WBS NO. S–000901–0015–4	
DRAWING SCALE	
1"=50' H, 1"=5' V	
CITY OF HOUSTON PM	
RAM CHAKRADHAR, P.E.	
SHEET NO. 23 OF 102	

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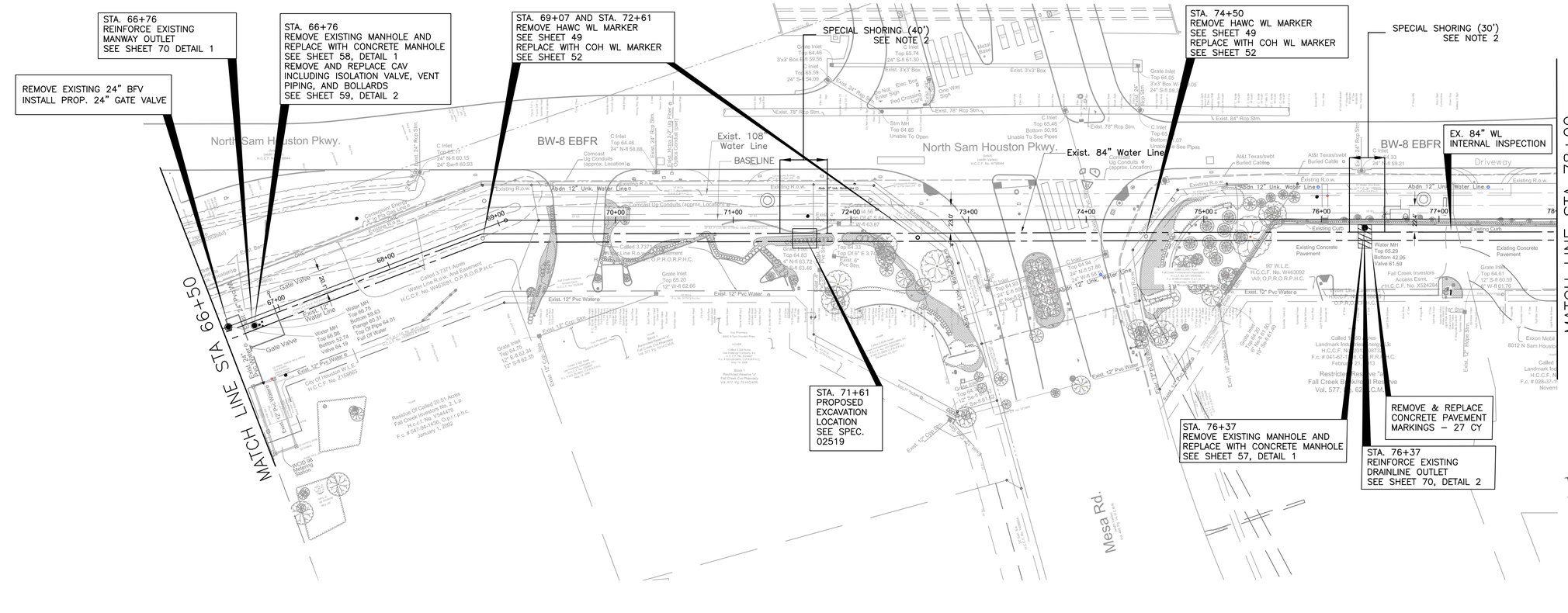

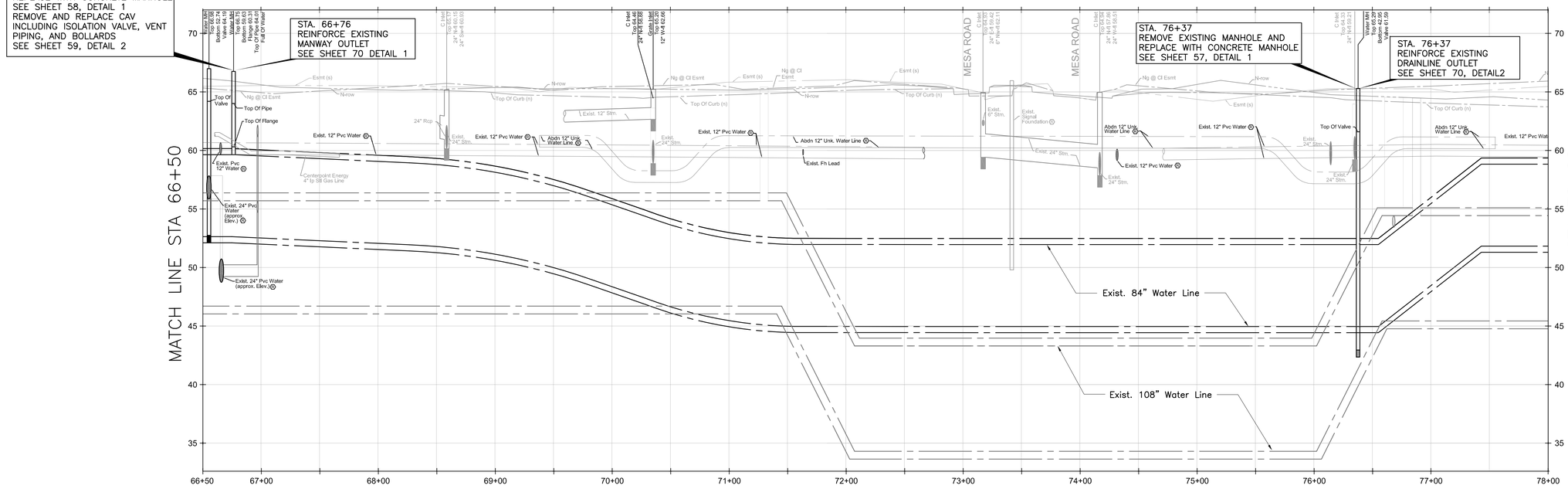

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NO.	DATE	REVISION	APP.

0 50 100 HORIZONTAL
0 5 10 VERTICAL
(IN FEET)

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3. **FIELD VERIFY EXACT POSITION OF 84–INCH WATER LINE PRIOR TO EXCAVATION FOR EXTERNAL INSPECTION.**
4. **TRANSFER SERVICE TO TAKE POINT LOCATED EAST OF WILSON ROAD PRIOR TO REPLACEMENT OF 24–INCH VALVE.**

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SWTP
Surface Water Transmission Program

LAN
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3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

INTERIM REVIEW ONLY
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Engineer: WILLIAM BYLAND, P.E.
P.E. Serial No.: 142061
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F–2614
Date:

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84–INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

PLAN & PROFILE

STA. 66+50 TO STA. 78+00

(8 OF 28)

WBS NO. S–000901–0015–4	
DRAWING SCALE	
1"=50' H, 1"=5' V	
CITY OF HOUSTON PM	
RAM CHAKRADHAR, P.E.	
SHEET NO. 24 OF 102	

P:\130–10667–401\4–0–Production–Working\4–1–BIM–CAD\Civil\Sheets\10667–401_12_P&P Sheets (2).dwg plotted on May 28, 2025 – 5:12pm

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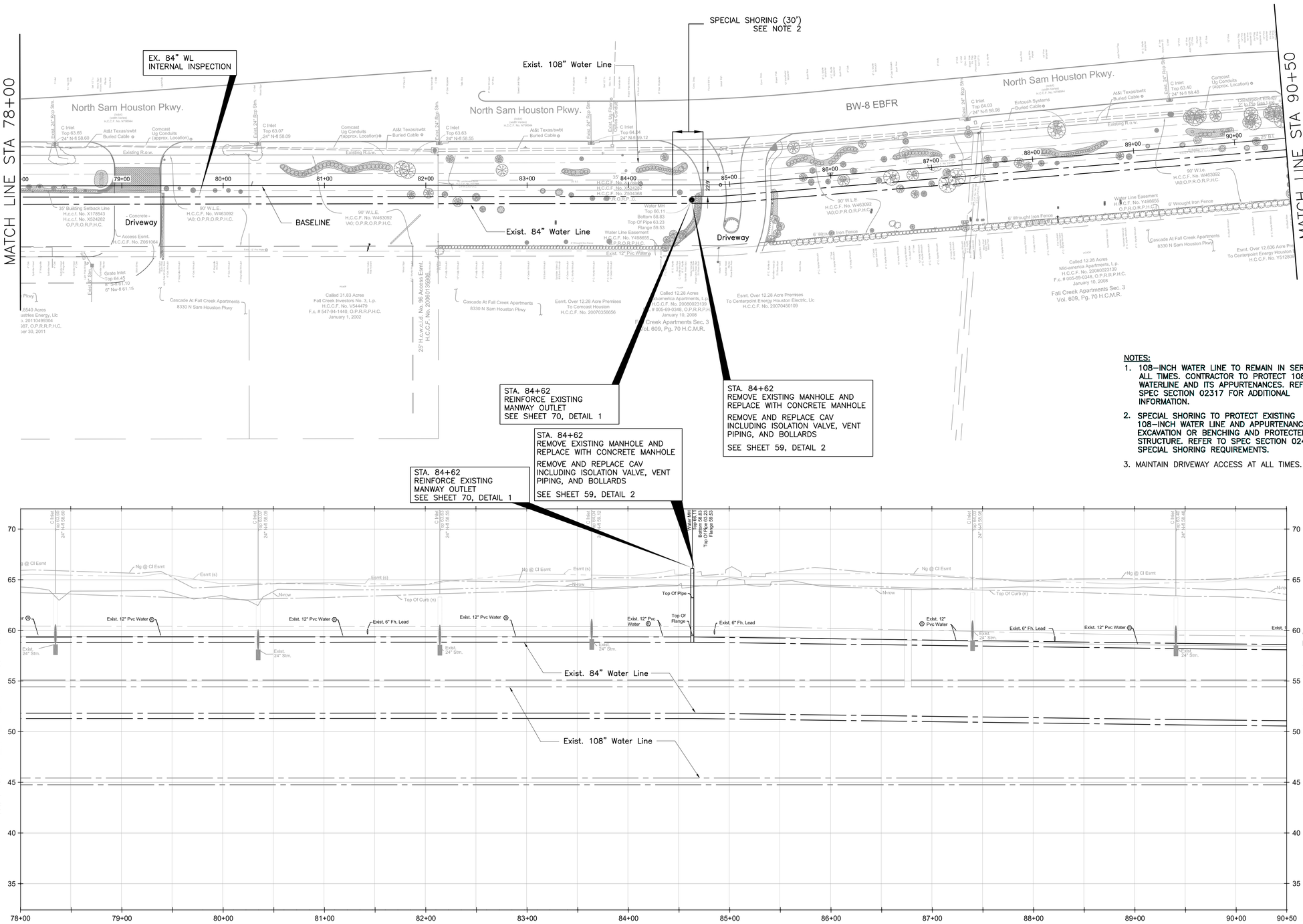
NO.	DATE	REVISION	APP.



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3. MAINTAIN DRIVEWAY ACCESS AT ALL TIMES.

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84–INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

PLAN & PROFILE

STA. 78+00 TO STA. 90+50

(9 OF 28)

WBS NO.
S–000901–0015–4

DRAWING SCALE
1"=50' H, 1"=5' V

CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.

SHEET NO. 25 OF 102

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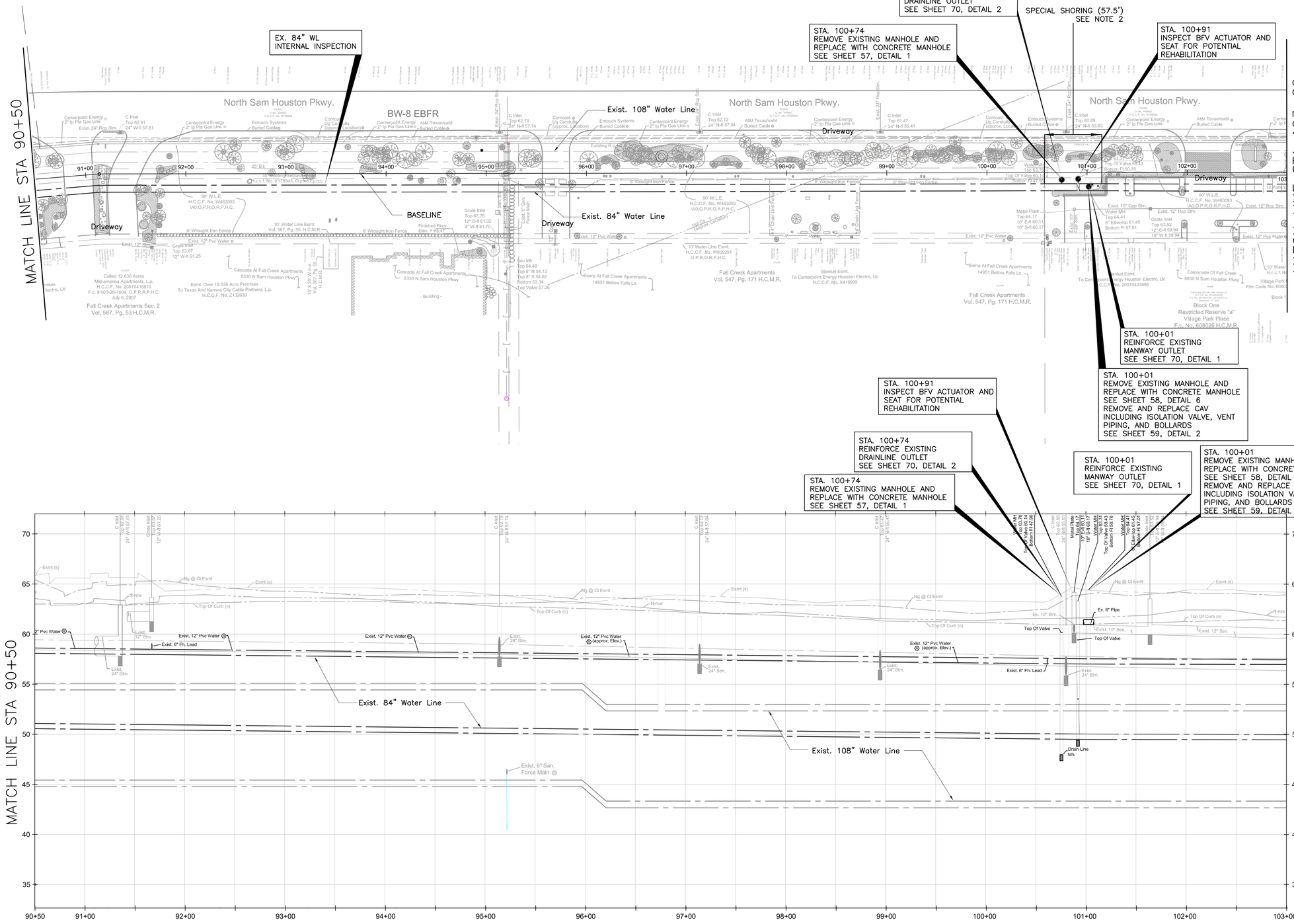

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HOUSTON, TX 77042

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Document incomplete; not intended for permit, bidding or construction.
Engineer: WILLIAM RYLAND, P.E.
P.E. Serial No.: 142061
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F–2614
Date:

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84–INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

PLAN & PROFILE

STA. 90+50 TO STA. 103+00

(10 OF 28)

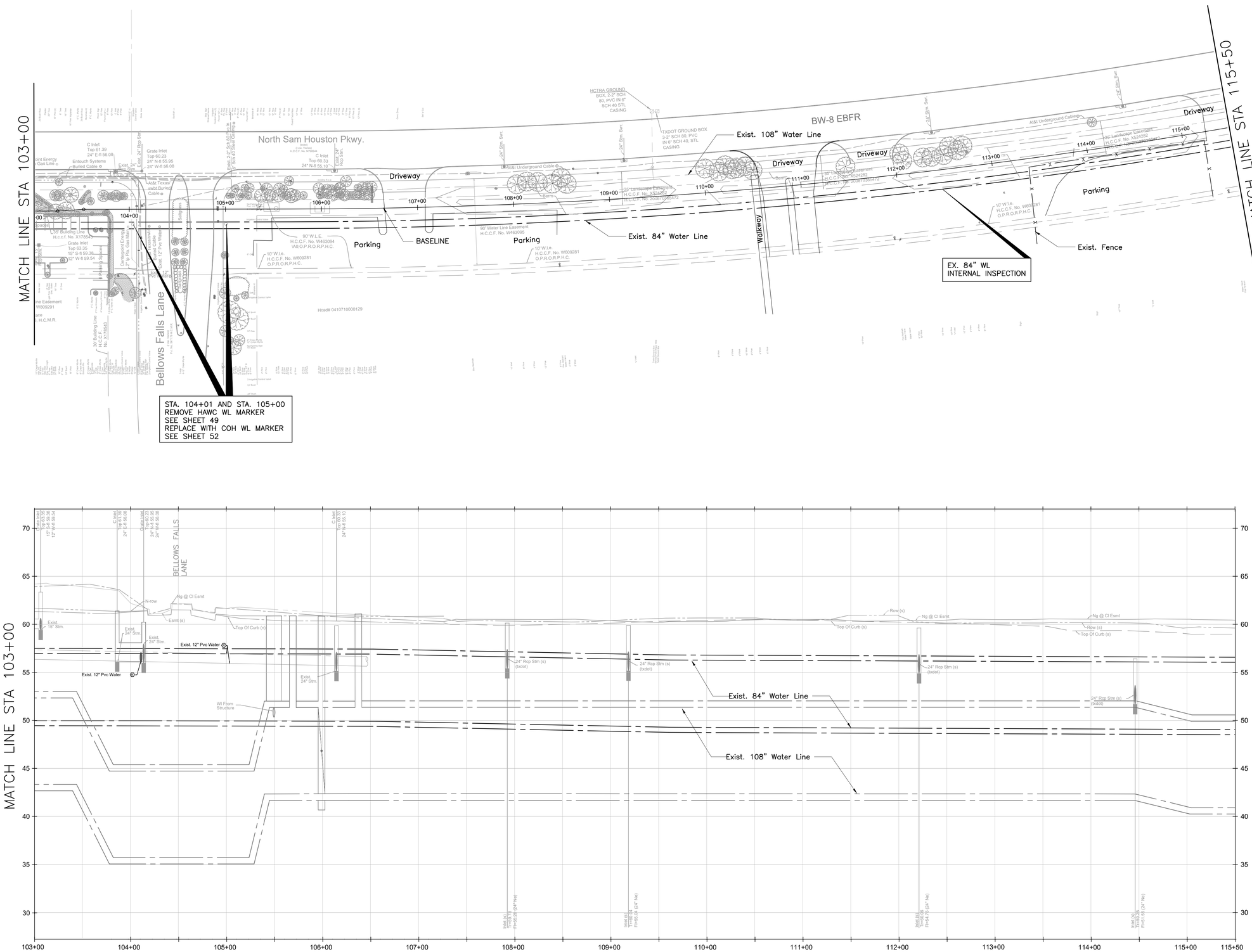
WBS NO.
S–000901–0015–4

DRAWING SCALE
1"=50' H, 1"=5' V

CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.

SHEET NO. 26 OF 102

P:\130\10667-401\4-0-Production-Working\4-1-BIM-CAD\Civil\Sheets\10667-401_12_P&P Sheets (2).dwg plotted on May 28, 2025 – 5:30pm



VERTICAL DATUM ADJUSTMENT:
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BENCHMARK:
CITY OF HOUSTON MONUMENT 5765–8303, A BRASS DISK ON CONCRETE ON THE SOUTH SIDE OF WATER WORKS BOULEVARD APPROXIMATELY 0.25 MILES EAST OF NORTH SAM HOUSTON PARKWAY (WESTBOUND FRONTAGE ROAD). ELEV. 54.37 FEET NAV 1988 (CORS96) (GEOID'12a)

NO.	DATE	REVISION	APP.

0 50 100 HORIZONTAL
0 5 10 VERTICAL
(IN FEET)

NOTICE:
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VERIFICATION OF PRIVATE UTILITY LINES

Date

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Signature valid for six months.

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SWTP
Surface Water Transmission Program

LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

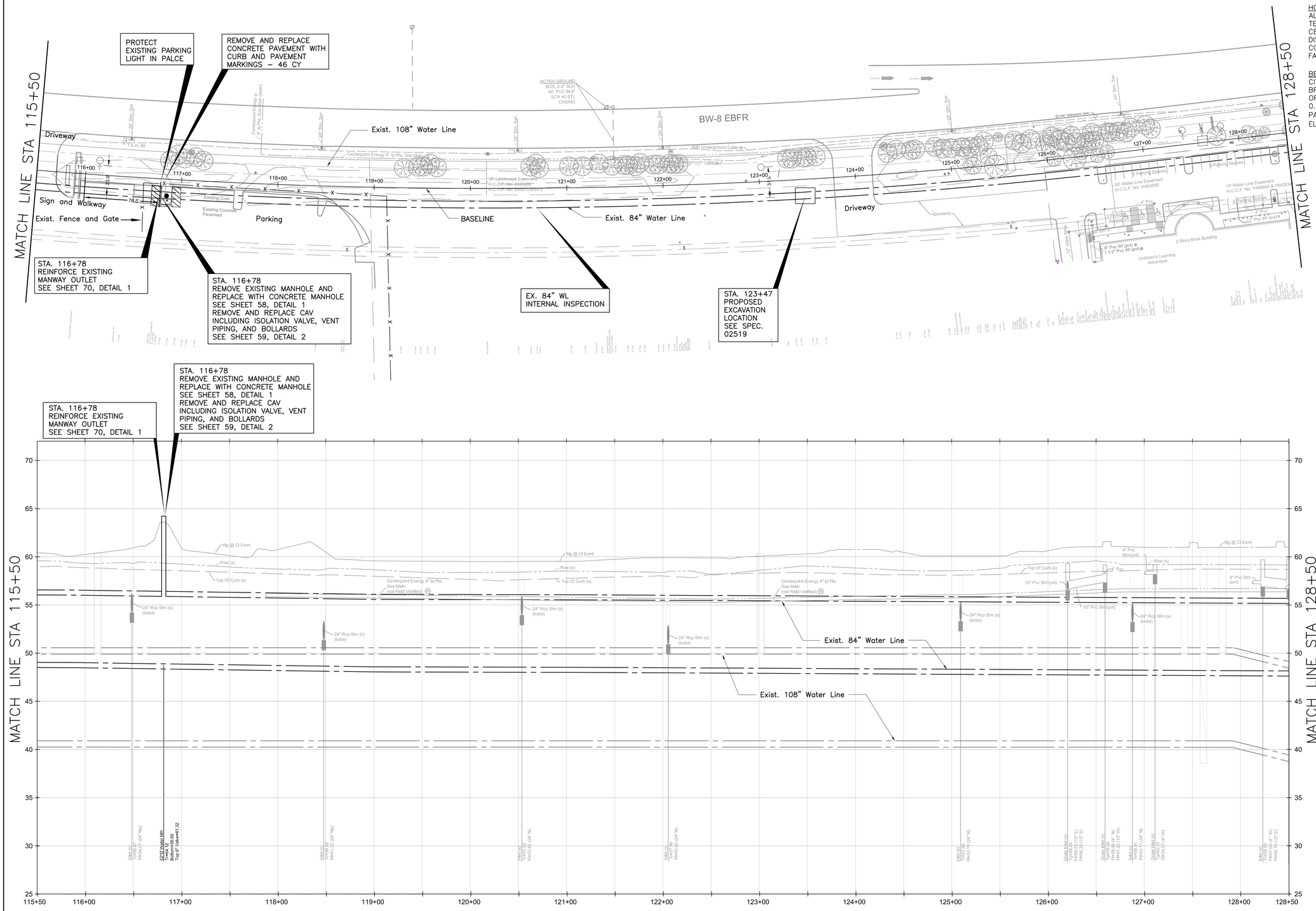
84–INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

PLAN & PROFILE

STA. 103+00 TO STA. 115+50
(11 OF 28)

WBS NO. S-000901-0015-4	
DRAWING SCALE	
1"=50' H, 1"=5' V	
CITY OF HOUSTON PM	
RAM CHAKRADHAR, P.E.	
SHEET NO. 27 OF 102	

P:\130\10667-401\4-0-Production-Working\4-1-BIM-CAD\Civil\Sheets\10667-401_12_P&P Sheets_PETE_copy - Copy.dwg plotted on Mar 03, 2025 - 5:46pm



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NO.	DATE	REVISION	APP.

N

0 50 100 HORIZONTAL
0 5 10 VERTICAL
(IN FEET)

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Surface Water Transmission Program

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Firm No.: F–2614
Date:

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84–INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

PLAN & PROFILE

STA. 115+50 TO STA. 128+50
(12 OF 28)

WBS NO. S–000901–0015–4	
DRAWING SCALE	
1"=50' H, 1"=5' V	
CITY OF HOUSTON PM	
RAM CHAKRADHAR, P.E.	
SHEET NO. 28 OF 102	

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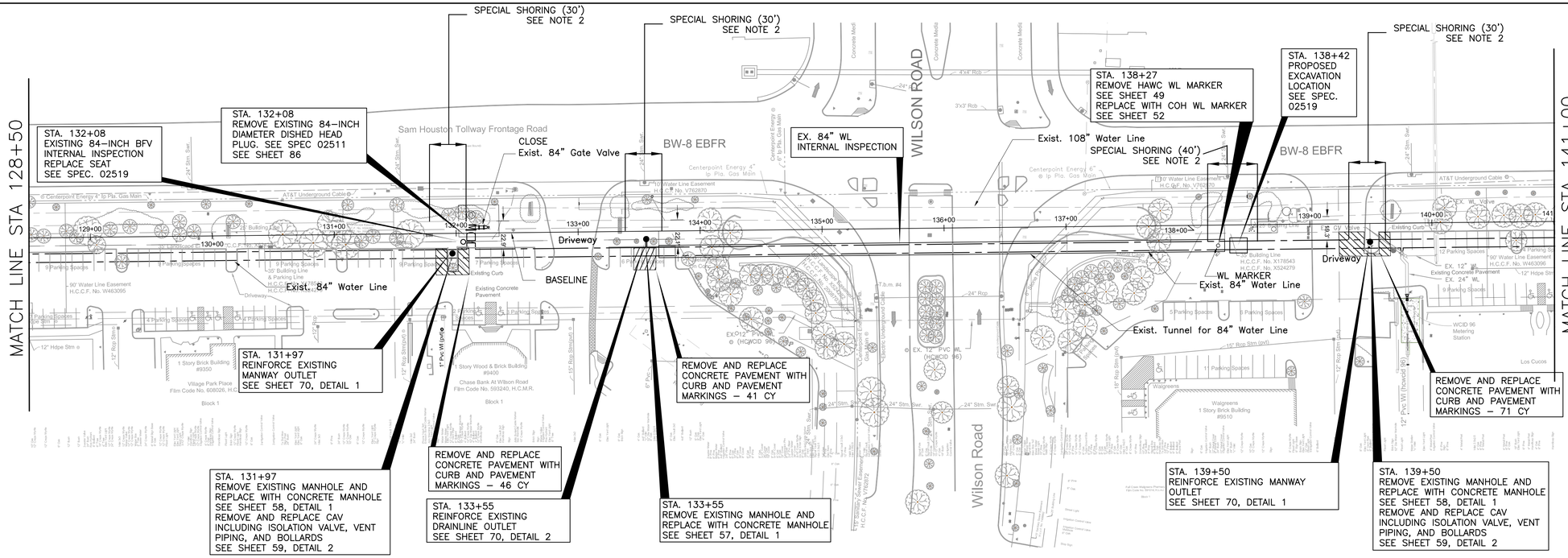

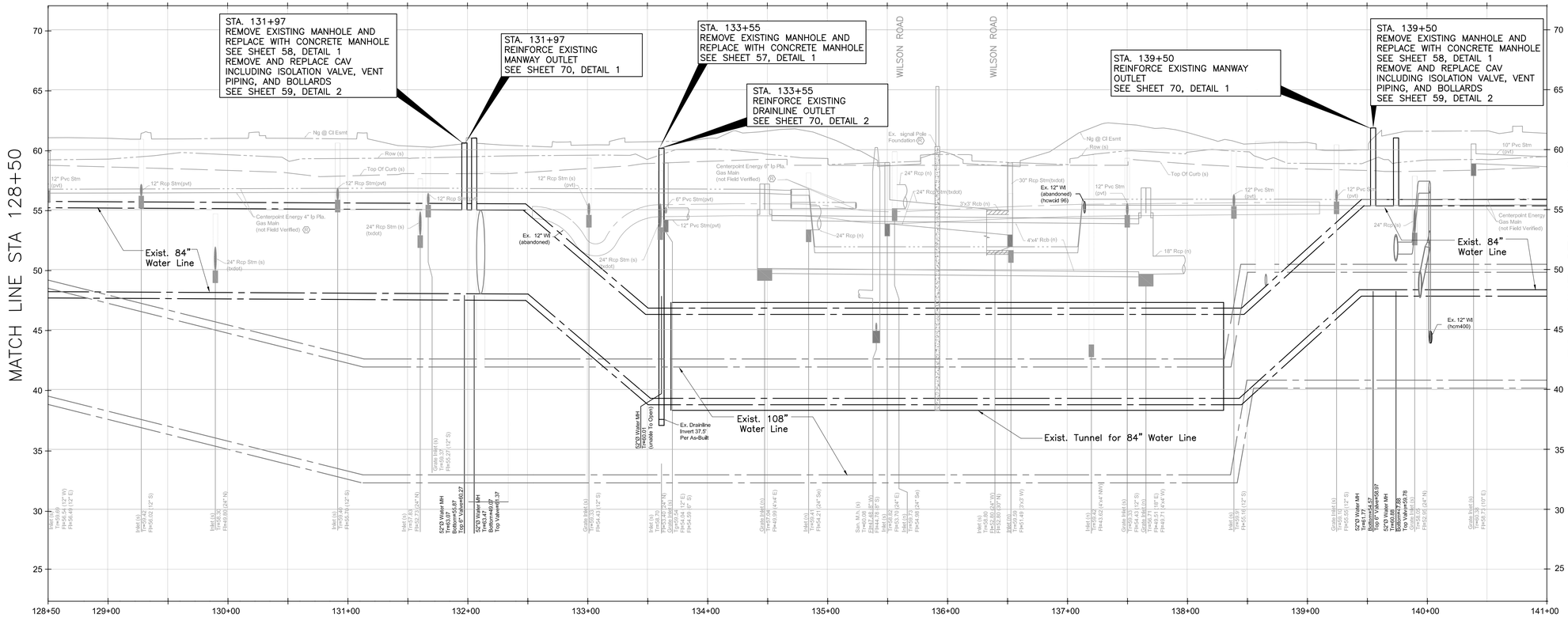

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NO.	DATE	REVISION	APP.

N

0 50 100 HORIZONTAL
0 5 10 VERTICAL
(IN FEET)

NOTES:

1. 108–INCH WATER LINE TO REMAIN IN SERVICE AT ALL TIMES. CONTRACTOR TO PROTECT 108–INCH WATERLINE AND ITS APPURTENANCES. REFER TO SPEC SECTION 02317 FOR ADDITIONAL INFORMATION.
2. SPECIAL SHORING TO PROTECT EXISTING 108–INCH WATER LINE AND APPURTENANCES. NO EXCAVATION OR BENCHING AND PROTECTED STRUCTURE. REFER TO SPEC SECTION 02464 FOR SPECIAL SHORING REQUIREMENTS.
3. FIELD VERIFY EXACT POSITION OF 84–INCH WATER LINE PRIOR TO EXCAVATION FOR EXTERNAL INSPECTION.

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SWTP
Surface Water Transmission Program

LOCKWOOD, ANDREWS & NEWNAM, INC.
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HOUSTON, TX 77042

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P.E. Serial No. 142061
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F–2614
Date:

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84–INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

PLAN & PROFILE

STA. 128+50 TO STA. 141+00

(13 OF 28)

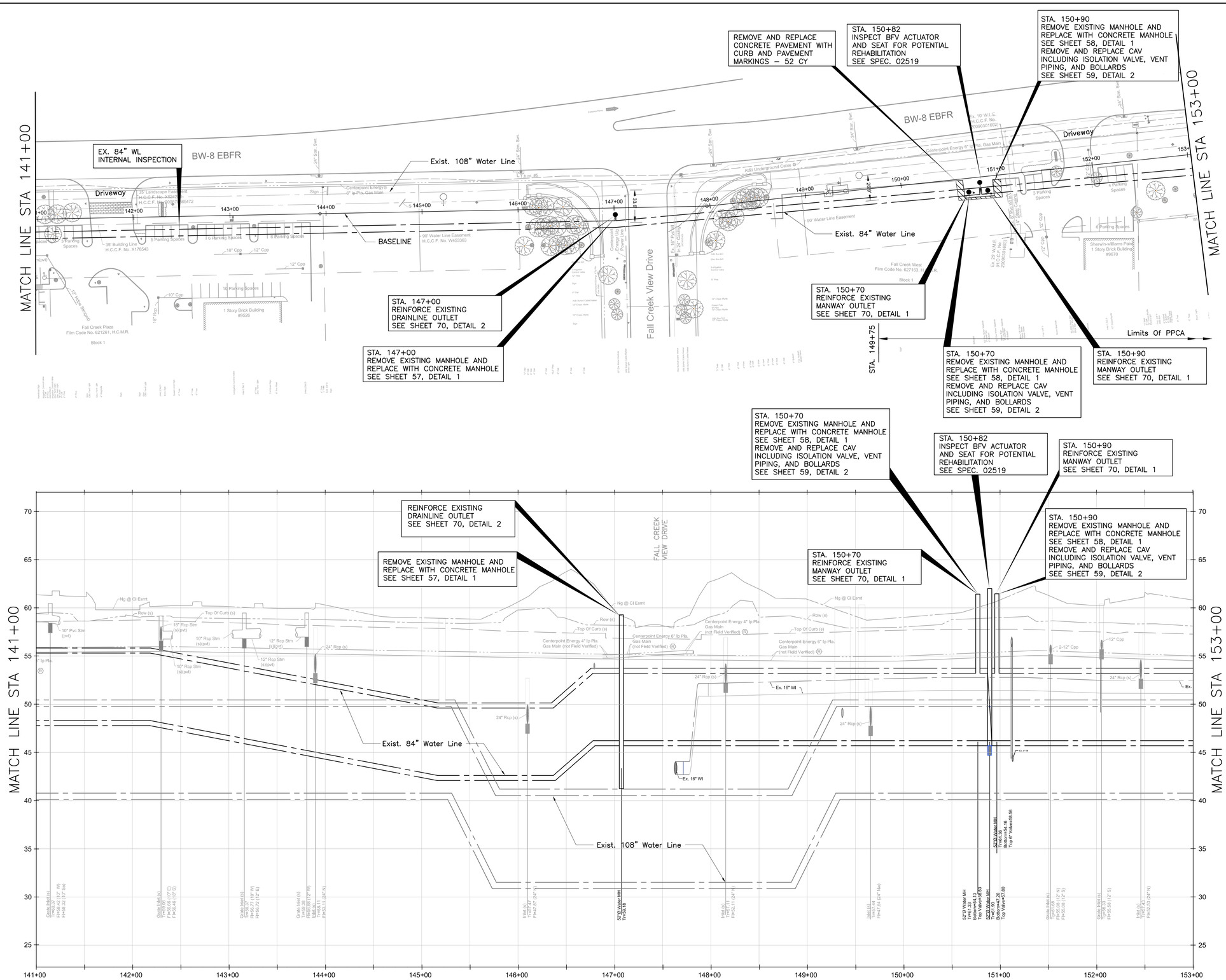
WBS NO.
S–000901–0015–4

DRAWING SCALE
1"=50' H, 1"=5' V

CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.

SHEET NO. 29 OF 102

P:\130\30-10667-401\4-0-Production-Working\4-1-BIM-CAD\Civil\Sheets\10667-401_12_P&P Sheets (2).dwg plotted on May 28, 2025 - 5:22pm



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NO.	DATE	REVISION	APP.

N

0 50 100 HORIZONTAL
0 5 10 VERTICAL
(IN FEET)

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3. MAINTAIN ACCESS TO FALL CREEK VIEW DRIVE AT ALL TIMES.

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84–INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

PLAN & PROFILE

STA. 141+00 TO STA. 153+00
(14 OF 28)

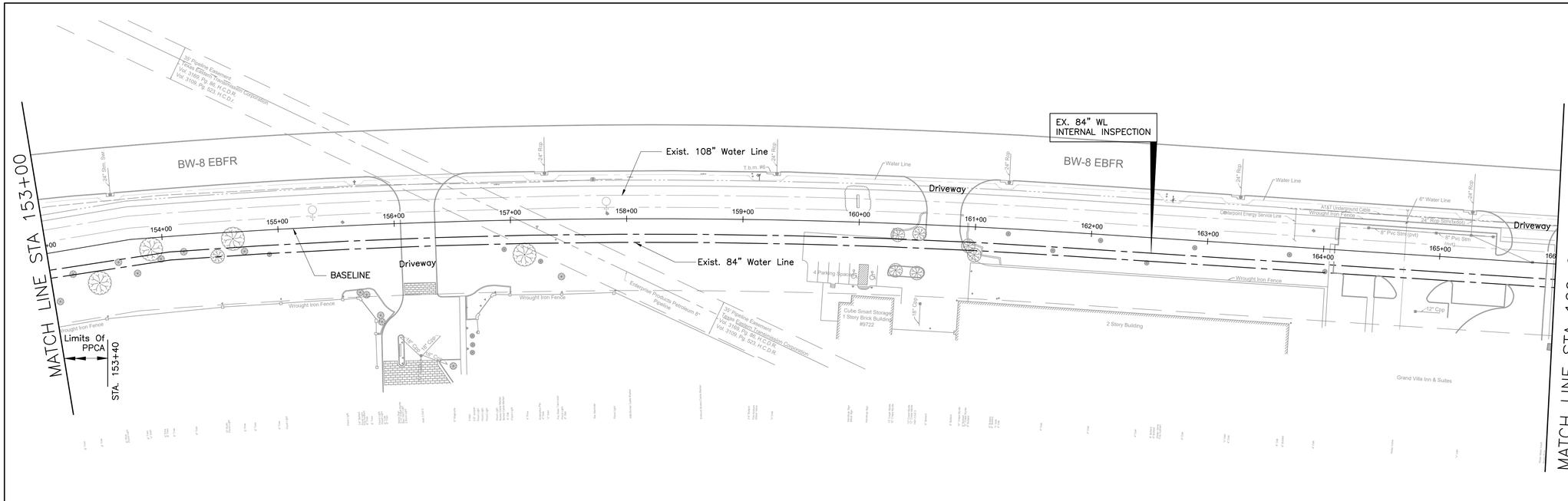
WBS NO.
S–000901–0015–4

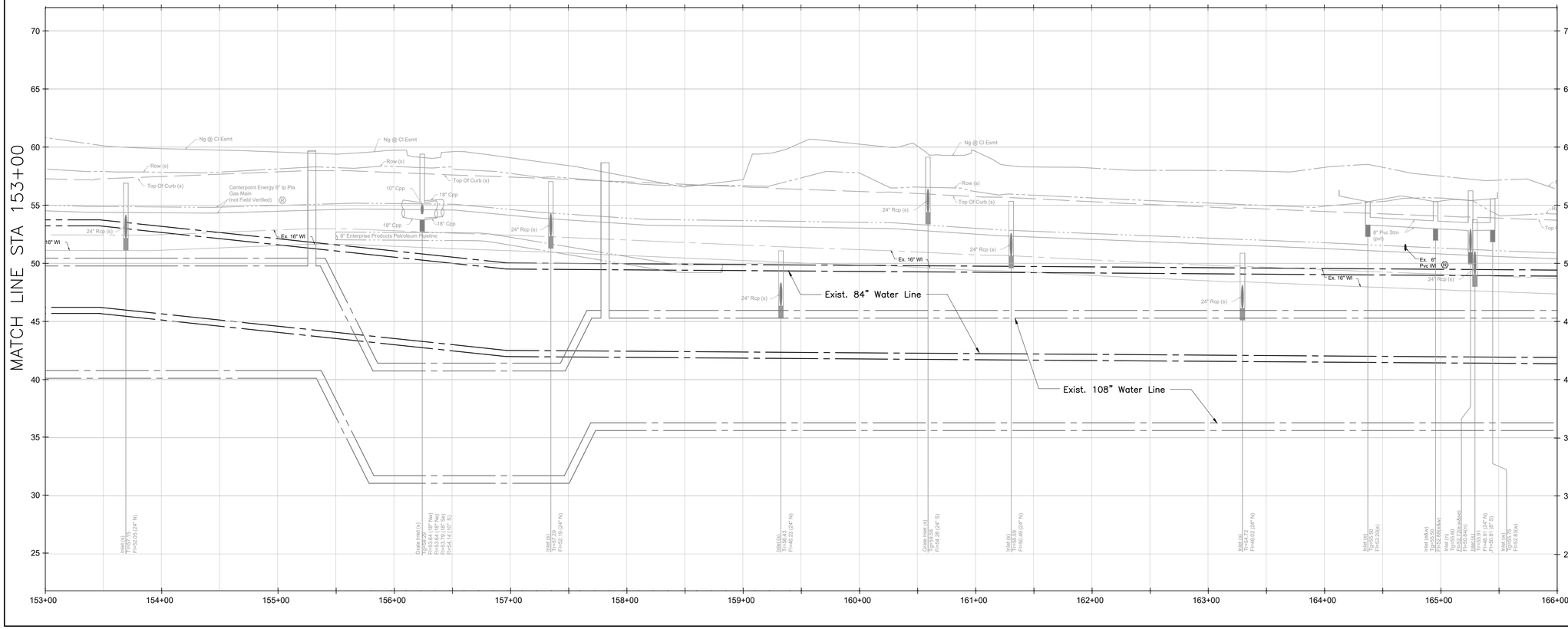
DRAWING SCALE
1"=50' H, 1"=5' V

CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.

SHEET NO. 30 OF 102

P:\130\130-10667-401\4-0-Production-Working\4-1-BIM-CAD\Civil\Sheets\10667-401_12_P&P Sheets (2).dwg plotted on May 28, 2025 – 5:27pm





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NO.	DATE	REVISION	APP.

N

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0 5 10 VERTICAL
(IN FEET)

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84–INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

PLAN & PROFILE

STA. 153+00 TO STA. 166+00
(15 OF 28)

WBS NO.
S–000901–0015–4

DRAWING SCALE
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CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.

SHEET NO. 31 OF 102

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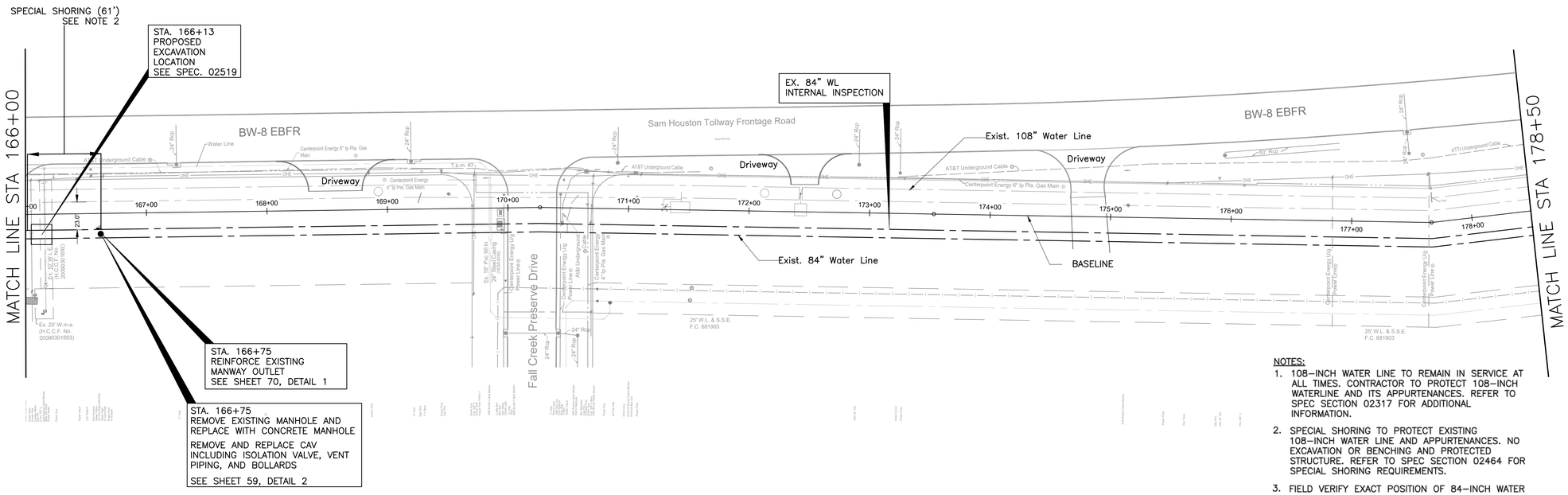

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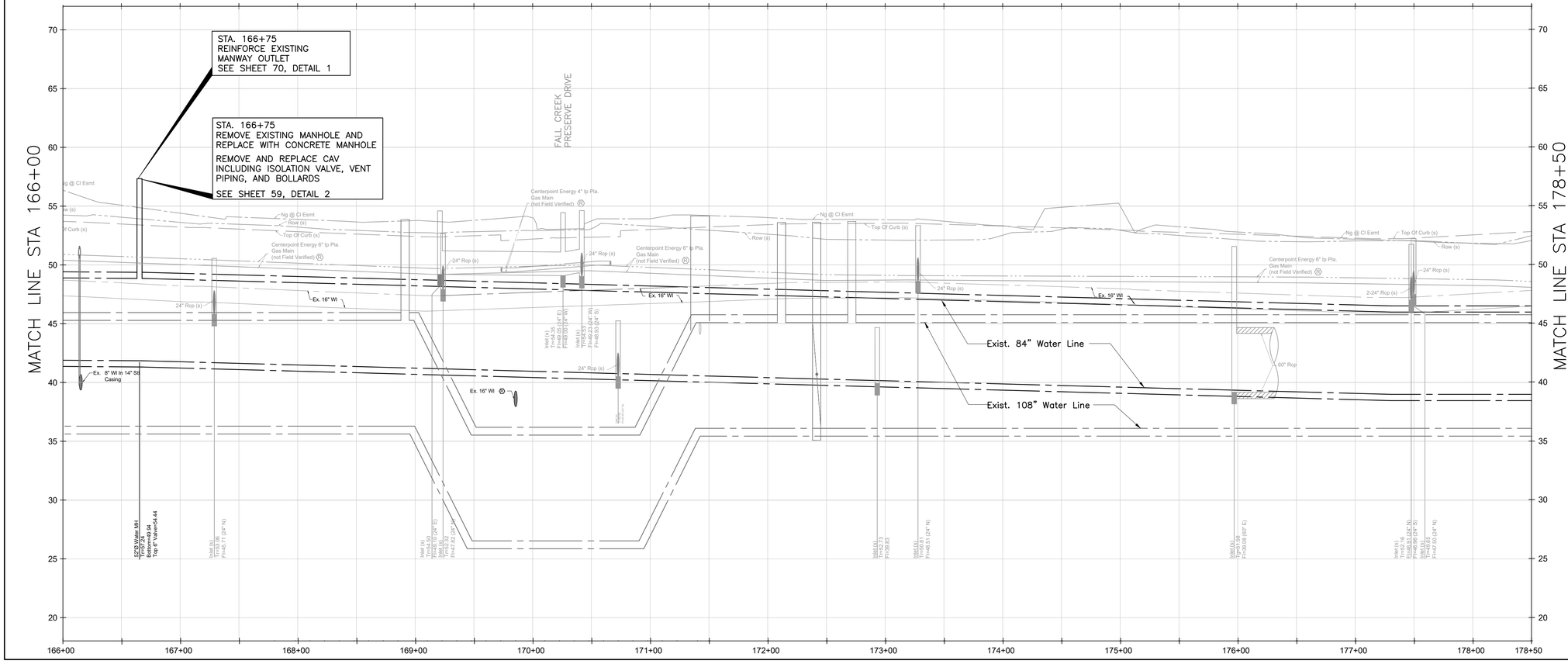

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NO.	DATE	REVISION	APP.

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84–INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

PLAN & PROFILE

STA. 166+00 TO STA. 178+50
(16 OF 28)

WBS NO.
S–000901–0015–4

DRAWING SCALE
1"=50' H, 1"=5' V

CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.

SHEET NO. 32 OF 102

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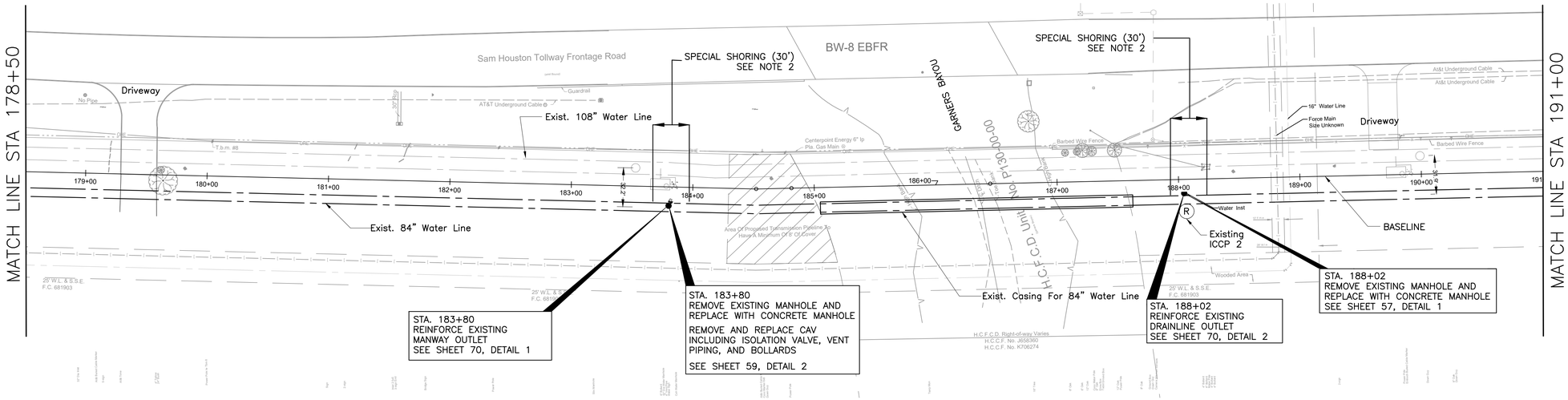

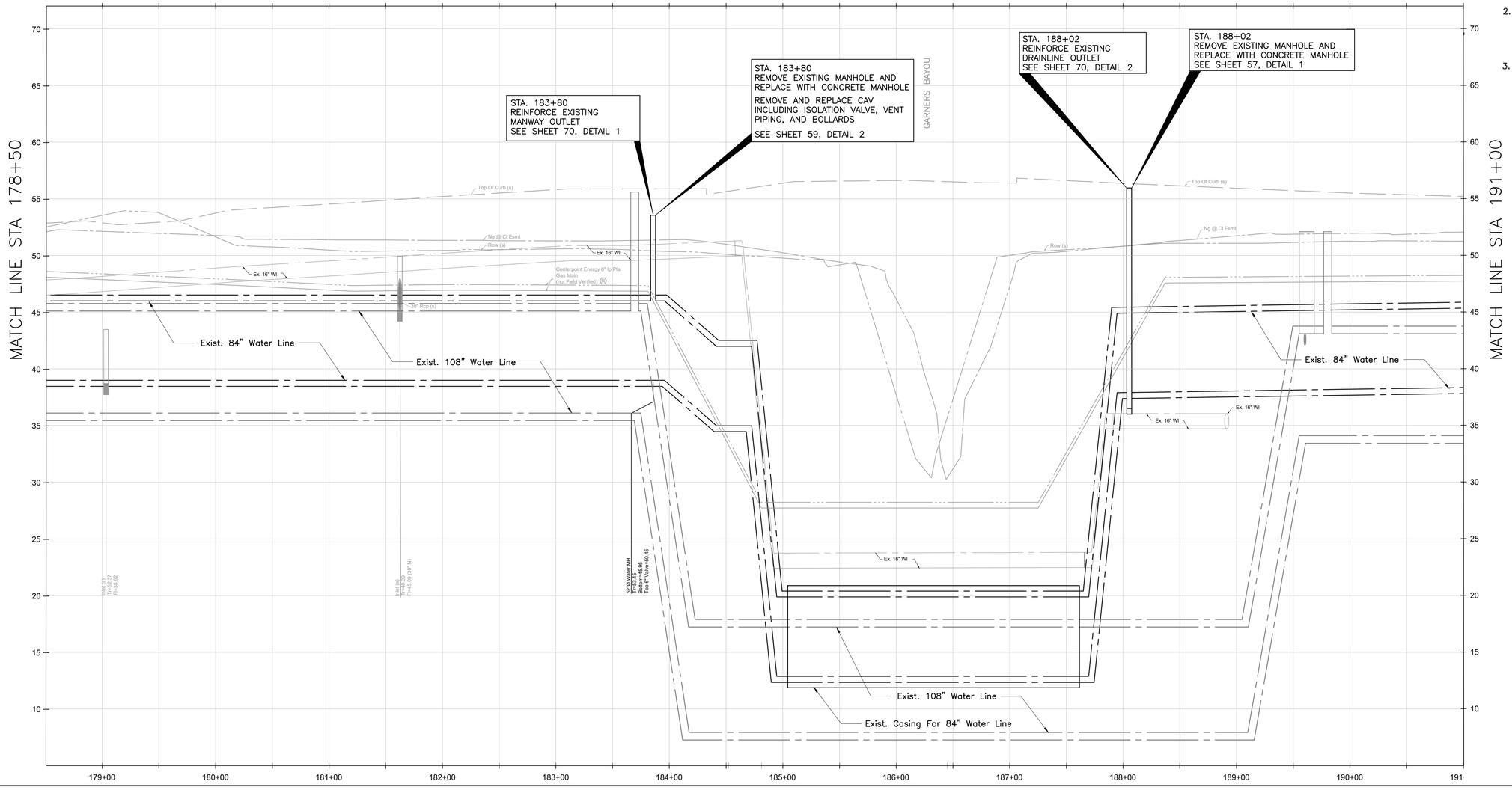

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ELEV. 54.37 FEET NAV 1988 (CORS96) (GEOID'12a)

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0 5 10 VERTICAL
(IN FEET)

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

SWTP
Surface Water Transmission Program

LAN
LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

INTERIM REVIEW ONLY
Document incomplete; not intended for permit, bidding or construction.
Engineer: WILLIAM BYLAND, P.E.
P.E. Serial No.: 142061
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F–2614
Date:

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84–INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD
PLAN & PROFILE
STA. 178+50 TO STA. 191+00
(17 OF 28)

WBS NO.
S–000901–0015–4

DRAWING SCALE
1"=50' H, 1"=5' V

CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.

SHEET NO. 33 OF 102

NO.	DATE	REVISION	APP.

P:\130\130–10667–401\4–0–Production–Working\4–1–BIM–CAD\Civil\Sheets\10667–401_12_P&P Sheets_PETE_copy.dwg plotted on Mar 03, 2025 – 6:20pm

MATCH LINE STA 191+00

MATCH LINE STA 204+00

Sam Houston Tollway Frontage Road

BW-8 EBFR

SPECIAL SHORING (49.5')
SEE NOTE 2

STA. 198+10
INSPECT BFV ACTUATOR
AND SEAT FOR POTENTIAL
REHABILITATION
SEE SPEC. 02519

Exist. 108" Water Line

Exist. 84" Water Line

BASELINE

STA. 198+00
REINFORCE EXISTING
MANWAY OUTLET
SEE SHEET 70, DETAIL 1

STA. 198+00
REMOVE EXISTING MANHOLE AND
REPLACE WITH CONCRETE MANHOLE

REMOVE AND REPLACE CAV
INCLUDING ISOLATION VALVE, VENT
PIPING, AND BOLLARDS

SEE SHEET 59, DETAIL 2

STA. 198+20
REINFORCE EXISTING
MANWAY OUTLET
SEE SHEET 70, DETAIL 1

STA. 198+20
REMOVE EXISTING MANHOLE AND
REPLACE WITH CONCRETE MANHOLE

REMOVE AND REPLACE CAV
INCLUDING ISOLATION VALVE, VENT
PIPING, AND BOLLARDS

SEE SHEET 59, DETAIL 2

Wooded Area

Barbed Wire Fence

Centerpoint Energy 6" lp Pla. Gas Main ®

T.b.m. #9

T.b.m. #10

24" Rcp

30" Rcp

192+00 193+00 194+00 195+00 196+00 197+00 198+00 199+00 200+00 201+00 202+00 203+00

NOTES:

1. 108–INCH WATER LINE TO REMAIN IN SERVICE AT ALL TIMES. CONTRACTOR TO PROTECT 108–INCH WATERLINE AND ITS APPURTENANCES. REFER TO SPEC SECTION 02317 FOR ADDITIONAL INFORMATION.
2. SPECIAL SHORING TO PROTECT EXISTING 108–INCH WATER LINE AND APPURTENANCES. NO EXCAVATION OR BENCHING AND PROTECTED STRUCTURE. REFER TO SPEC SECTION 02464 FOR SPECIAL SHORING REQUIREMENTS.
3. GREENS BAYOU WETLAND MITIGATION BANK. DO NOT DISCHARGE ANY CHLORINATED WATER. ALL DISCHARGED WATER TO BE DIRECTED INTO TXDOT STORM SEWER.

VERTICAL DATUM ADJUSTMENT:
THE ELEVATION DIFFERENCE IN BETWEEN THE FLOODPLAIN REFERENCE MARK'S (RM150585) PUBLISHED DATUM NAVD 1988, 2001 ADJUSTMENT AND DATUM NAVD 1988, (CORS96) IS 0.21'. NAVD88, (CORS96) ELEVATION=NAVD88, 2001 ADJ. ELEVATION – 0.21 FEET.

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ALL HORIZONTAL COORDINATES ARE BASED ON TEXAS STATE PLANE COORDINATE SYSTEM, SOUTH CENTRAL ZONE, NAD83. THE COORDINATES & DISTANCES SHOWN ARE SURFACE AND MAY BE CONVERTED TO GRID BY MULTIPLYING BY A SCALE FACTOR OF 0.999870017.

BENCHMARK:
CITY OF HOUSTON MONUMENT 5765–8303, A BRASS DISK ON CONCRETE ON THE SOUTH SIDE OF WATER WORKS BOULEVARD APPROXIMATELY 0.25 MILES EAST OF NORTH SAM HOUSTON PARKWAY (WESTBOUND FRONTAGE ROAD).
ELEV. 54.37 FEET NAV 1988 (CORS96) (GEOID'12a)

N

0 50 100 HORIZONTAL
0 5 10 VERTICAL
(IN FEET)

NO.	DATE	REVISION	APP.

MATCH LINE STA 191+00

MATCH LINE STA 204+00

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SEE SPEC. 02519

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SEE SHEET 59, DETAIL 2

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REPLACE WITH CONCRETE MANHOLE

REMOVE AND REPLACE CAV
INCLUDING ISOLATION VALVE, VENT
PIPING, AND BOLLARDS

SEE SHEET 59, DETAIL 2

Top Of Curb (s)
Ng @ Cl Esmt
Row (s)
Centerpoint Energy 6" lp Pla. Gas Main (Not Field Verified) ®
30" Rcp (s)
24" Rcp (s)
2-24" Rcp (s)
Exist. 84" Water Line
Exist. 108" Water Line

Inlet (s)
T=45.18
I=40.18
P=45.31 (30" N)

Inlet (s)
T=50.08
I=45.08
P=45.21 (24" N)

Inlet (s)
T=53.50
I=48.50
P=44.65 (24" N)

ST"S" Water MH
T=52.38
Bottom=48.35
Thru Water=50.55
ST"S" Water MH
T=48.41
Bottom=44.41
Thru Water=50.01
Inlet (s)
T=49.73
I=44.73
Top 8" Valve=53.63

Inlet (s)
T=52.07
I=47.07
P=44.57 (30" N)

Inlet (s)
T=52.66
I=47.66
P=44.66 (24" N)

70 65 60 55 50 45 40 35 30 25 20

191+00 192+00 193+00 194+00 195+00 196+00 197+00 198+00 199+00 200+00 201+00 202+00 203+00 204+00

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Surface Water Transmission Program

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P.E. Serial No.: 142061
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Firm No.: F–2614
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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84–INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

PLAN & PROFILE

STA. 191+00 TO STA. 204+00
(18 OF 28)

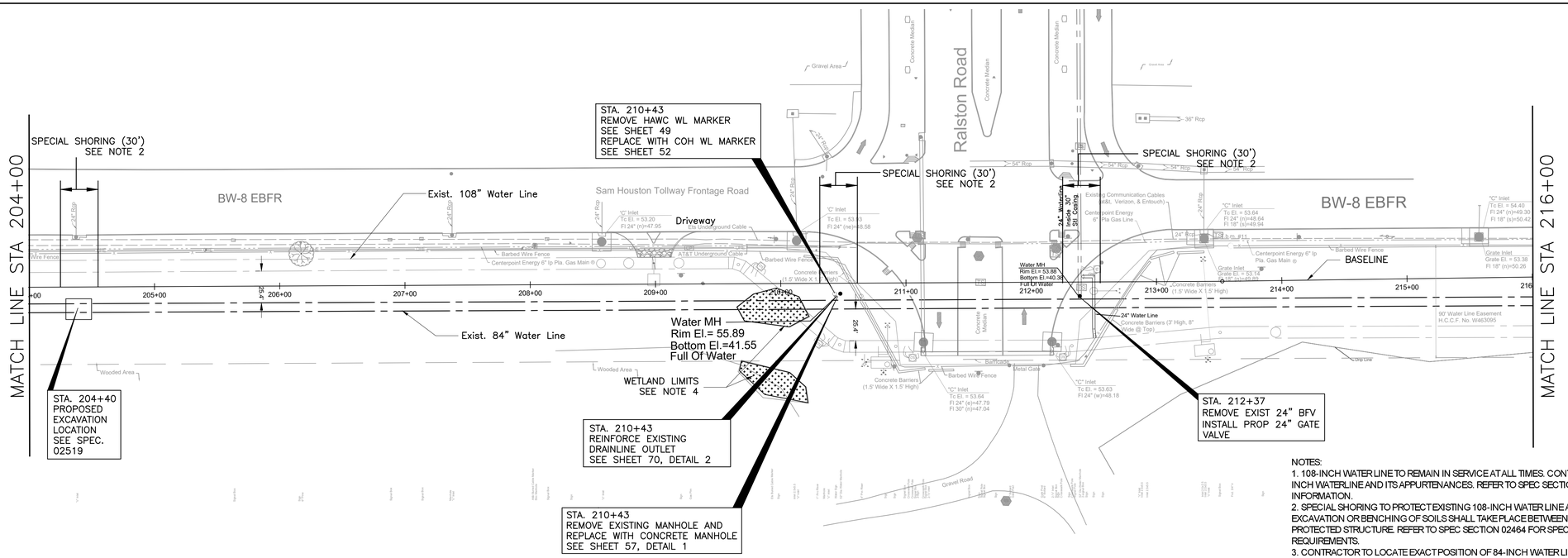
WBS NO.
S–000901–0015–4

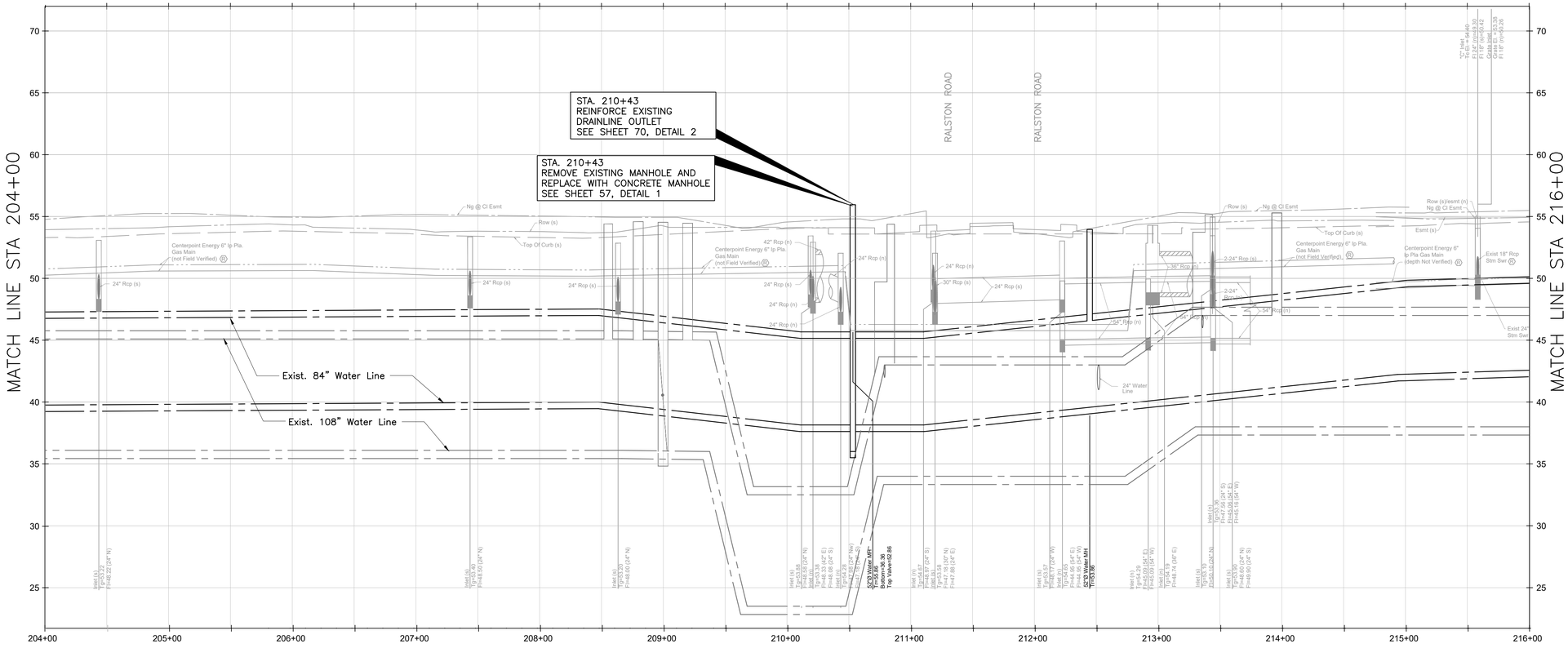
DRAWING SCALE
1"=50' H, 1"=5' V

CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.

SHEET NO. 34 OF 102

P:\130\130–10667–4014–0–Production–Working\4–1–BIM–CAD\Civil\Sheets\10667–4014_12_P&P Sheets_PETE_copy.dwg plotted on Mar 03, 2025 – 6:22pm





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NO.	DATE	REVISION	APP.

N

0 50 100 HORIZONTAL
0 5 10 VERTICAL
(IN FEET)

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3. CONTRACTOR TO LOCATE EXACT POSITION OF 84-INCH WATER LINE PRIOR TO EXCAVATION FOR EXTERNAL INSPECTION.
4. GREENS BAYOU WETLAND MITIGATION BANK. DO NOT DISCHARGE ANY CHLORINATED WATER. ALL DISCHARGED WATER TO BE DIRECTED INTO TXDOT STORM SEWER.
5. WETLANDS SHALL NOT BE DISTURBED AT ALL TIMES.
6. TRANSFER SERVICE TO TAKE POINT LOCATED EAST OF WILSON ROAD PRIOR TO REPLACEMENT OF 24-INCH VALVE.

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Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F-2614
Date:

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

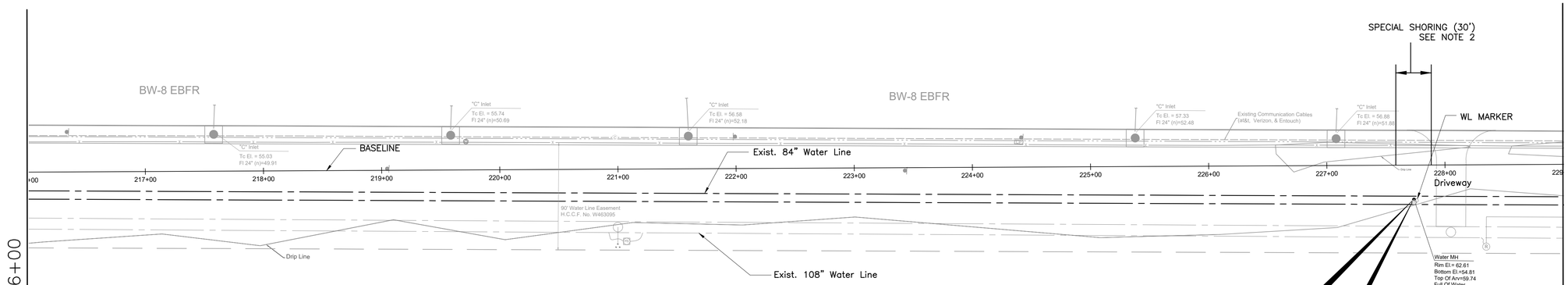
84–INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

PLAN & PROFILE

STA. 204+00 TO STA. 216+00
(19 OF 28)

WBS NO. S–000901–0015–4	
DRAWING SCALE	
1"=50' H, 1"=5' V	
CITY OF HOUSTON PM	
RAM CHAKRADHAR, P.E.	
SHEET NO. 35 OF 102	

P:\130\30-10667-401\4-0-Production-Working\4-1-BIM-CAD\Civil\Sheets\10667-401_12_P&P Sheets_PETE_copy.dwg plotted on Mar 03, 2025 - 6:24pm



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ELEV. 54.37 FEET NAV 1988 (CORS96) (GEOID'12a)

NO.	DATE	REVISION	APP.

N

0 50 100 HORIZONTAL
0 5 10 VERTICAL
(IN FEET)

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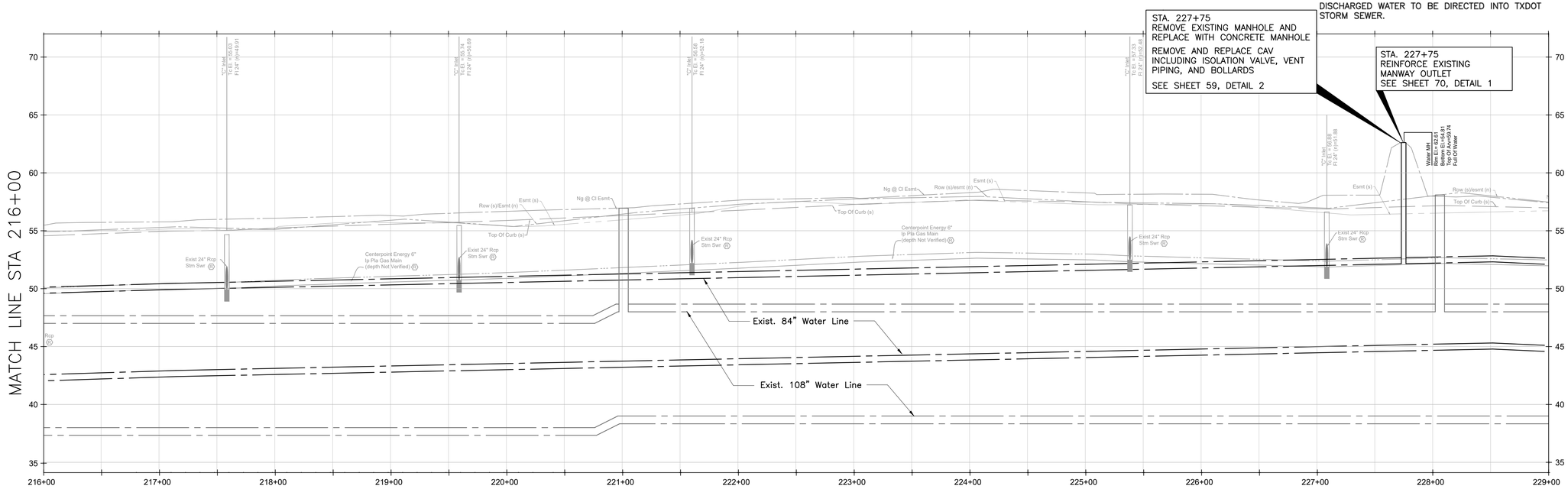

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84–INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

PLAN & PROFILE

STA. 216+00 TO STA. 229+00
(20 OF 28)

WBS NO. S–000901–0015–4	
DRAWING SCALE	
1"=50' H, 1"=5' V	
CITY OF HOUSTON PM	
RAM CHAKRADHAR, P.E.	
SHEET NO. 36 OF 102	

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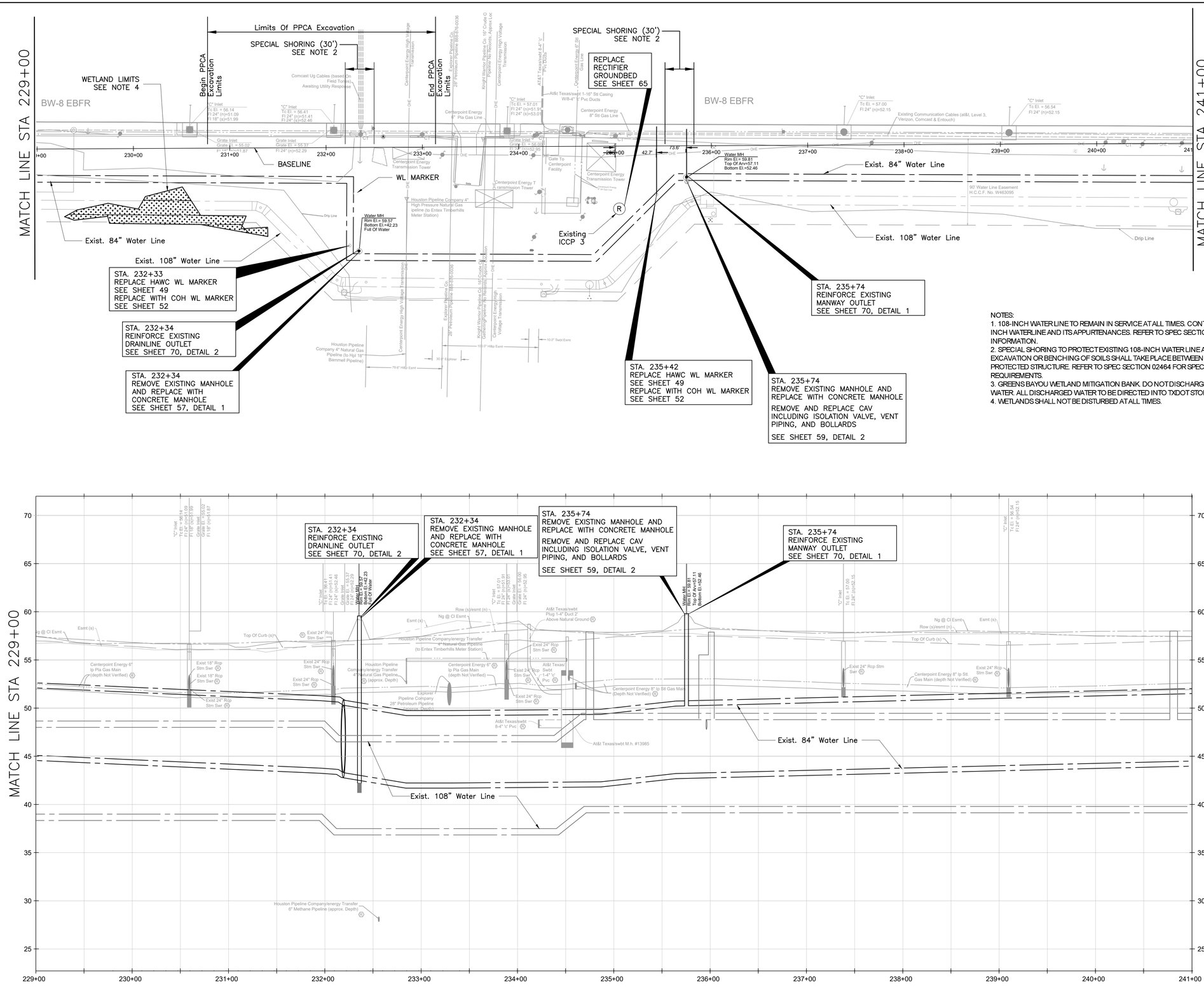
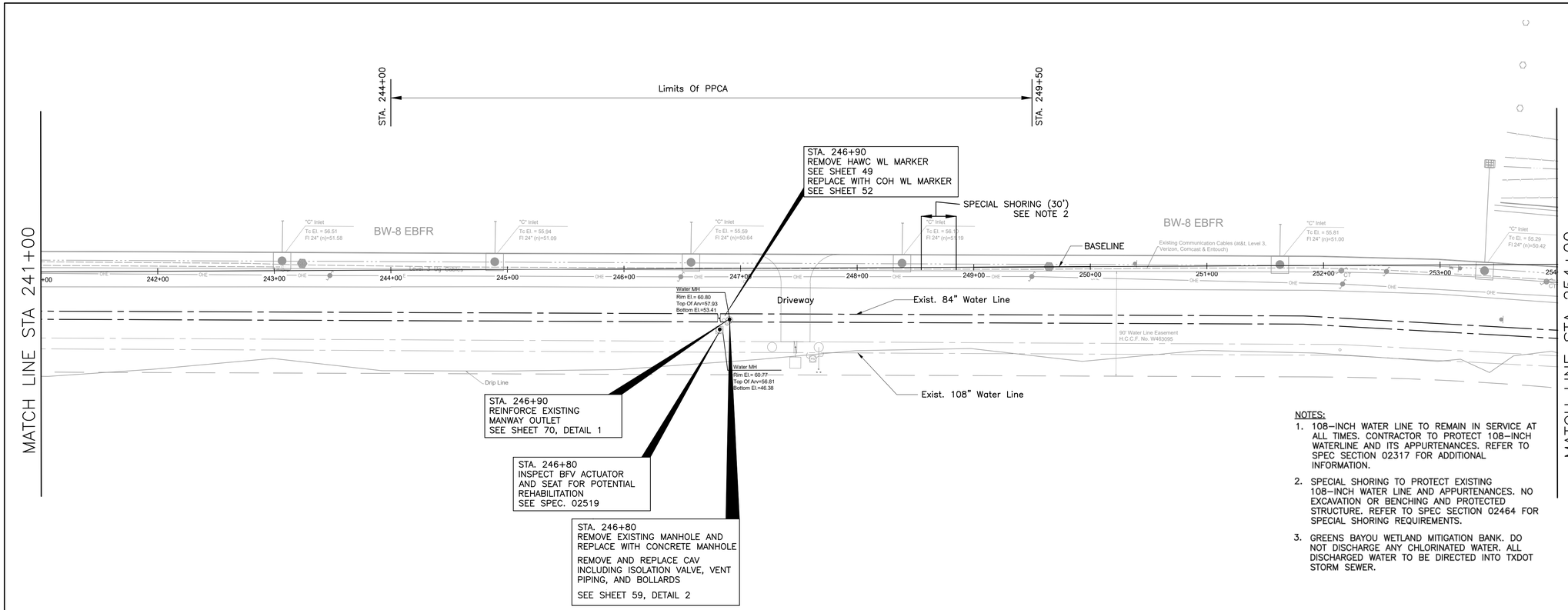
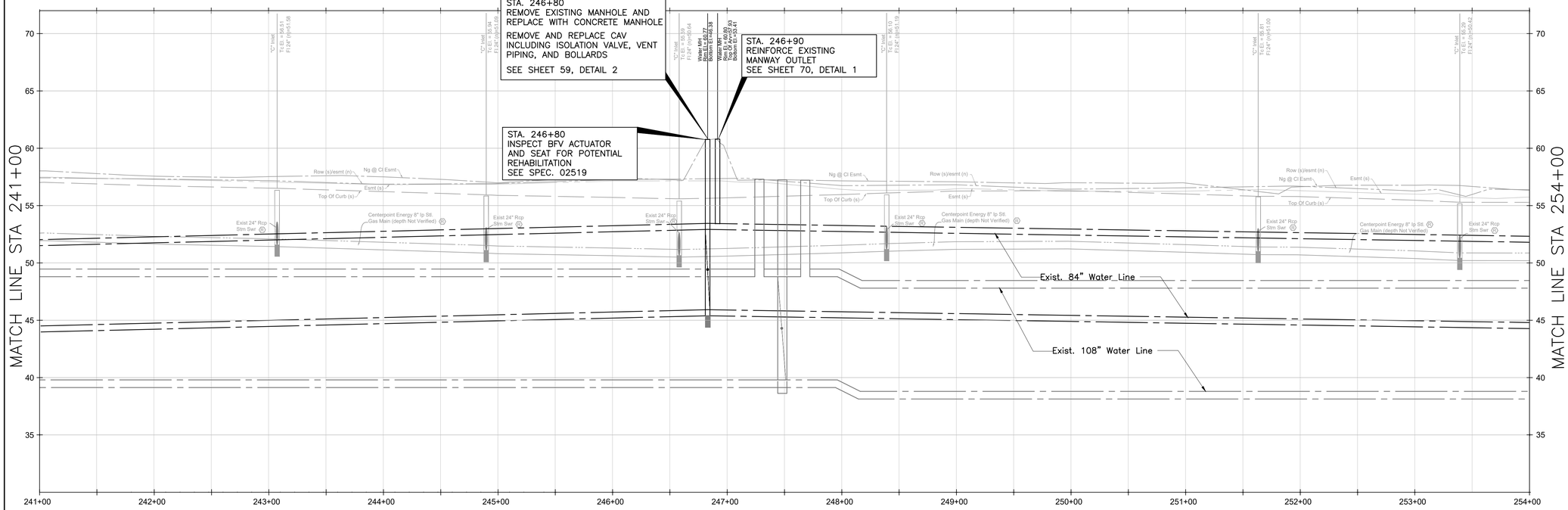

MATCH LINE STA 229+00
MATCH LINE STA 241+00
Limits Of PPCA Excavation
SPECIAL SHORING (30') SEE NOTE 2
SPECIAL SHORING (30') SEE NOTE 2
REPLACE RECTIFIER GROUNDBED SEE SHEET 65
WETLAND LIMITS SEE NOTE 4
Begin PPCA Excavation Limits
End PPCA Excavation Limits
BW-8 EBFR
BW-8 EBFR
BASELINE
WL MARKER
Exist. 84" Water Line
Exist. 108" Water Line
Exist. 84" Water Line
Exist. 108" Water Line
Existing ICCP 3
Water MH Rim El = 59.57 Bottom El=42.23 Full Of Water
Water MH Rim El = 59.81 Top Of Arv=57.11 Bottom El =52.46
STA. 232+33 REPLACE HAWC WL MARKER SEE SHEET 49 REPLACE WITH COH WL MARKER SEE SHEET 52
STA. 232+34 REINFORCE EXISTING DRAINLINE OUTLET SEE SHEET 70, DETAIL 2
STA. 232+34 REMOVE EXISTING MANHOLE AND REPLACE WITH CONCRETE MANHOLE SEE SHEET 57, DETAIL 1
STA. 235+42 REPLACE HAWC WL MARKER SEE SHEET 49 REPLACE WITH COH WL MARKER SEE SHEET 52
STA. 235+74 REINFORCE EXISTING MANWAY OUTLET SEE SHEET 70, DETAIL 1
STA. 235+74 REMOVE EXISTING MANHOLE AND REPLACE WITH CONCRETE MANHOLE
REMOVE AND REPLACE CAV INCLUDING ISOLATION VALVE, VENT PIPING, AND BOLLARDS
SEE SHEET 59, DETAIL 2
90' Water Line Easement H.C.C.F. No. W463095
Existing Communication Cables (at&t, Level 3, Verizon, Comcast & Entouch)
Centerpoint Energy 8" Stl Gas Line
Centerpoint Energy 6" Ip Pla Gas Line
Centerpoint Energy Transmission Tower
Houston Pipeline Company 4" High Pressure Natural Gas Ipeline (to Entex Timberhills Meter Station)
Houston Pipeline Company Pipeline (to Hpl 18" Bammell Pipeline)
Explorer Pipeline Co. 26" Petroleum Pipeline 888-BTK-0036
Knight Warrior Pipeline Co. 16" Crude O GatheringPipeline (to Nustar Approx Location)
AT&T Texas/swbt 8-4" "c" Pvc Ducts
At&t Texas/swbt 1-10" Stl Casing W/8-4" "c" Pvc Ducts
Gate To Centerpoint Facility
Drip Line
Exist 24" Rcp Stm Swr
Exist 18" Rcp Stm Swr
Exist 24" Rcp Swbt
Exist 24" Rcp Stm Swr
Exist 24" Rcp Stm Swr
Exist 24" Rcp Stm Swr





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BENCHMARK:
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NO.	DATE	REVISION	APP.

N

0 50 100 HORIZONTAL
0 5 10 VERTICAL
(IN FEET)

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(22 OF 28)

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1"=50' H, 1"=5' V

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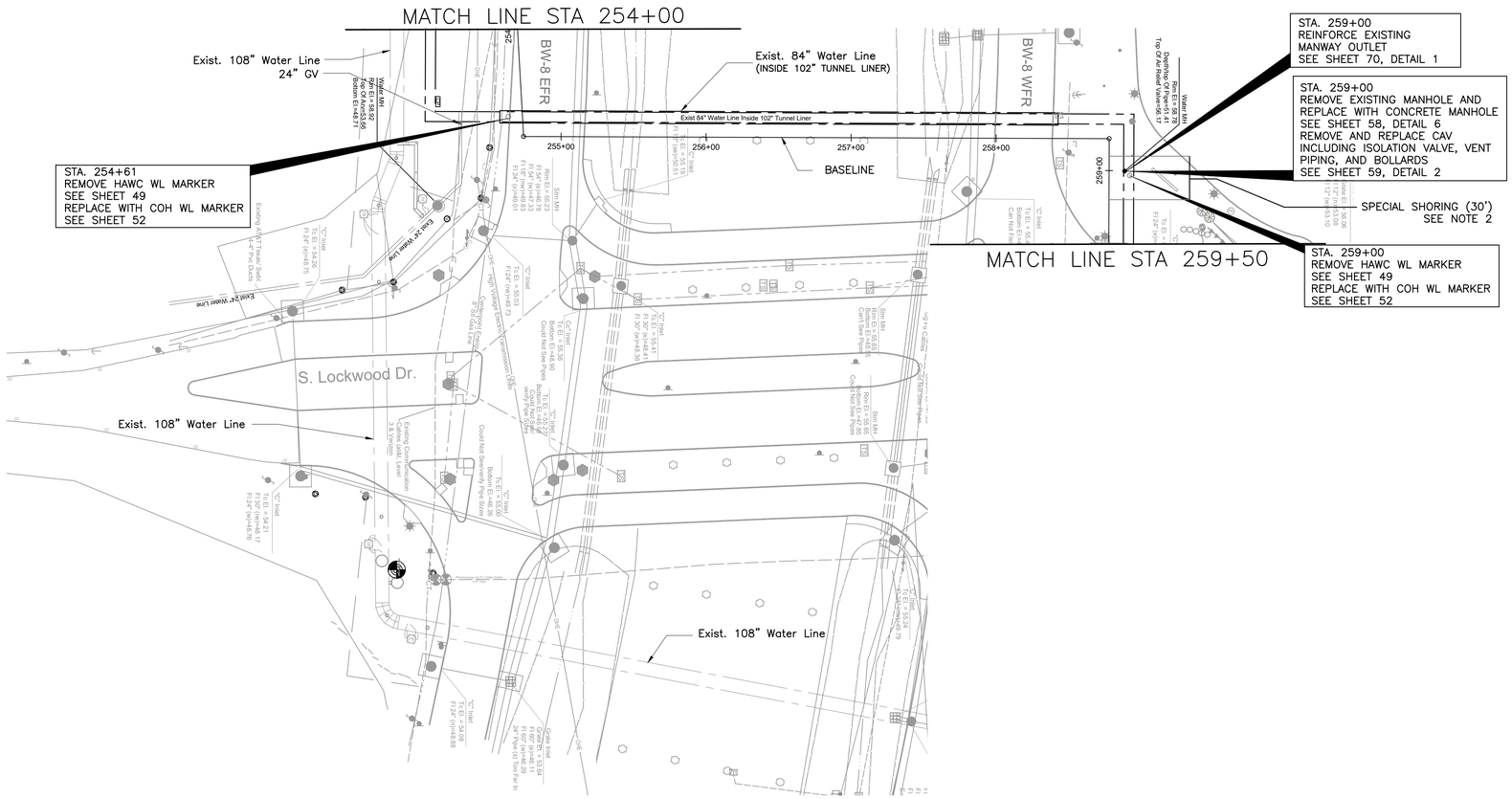

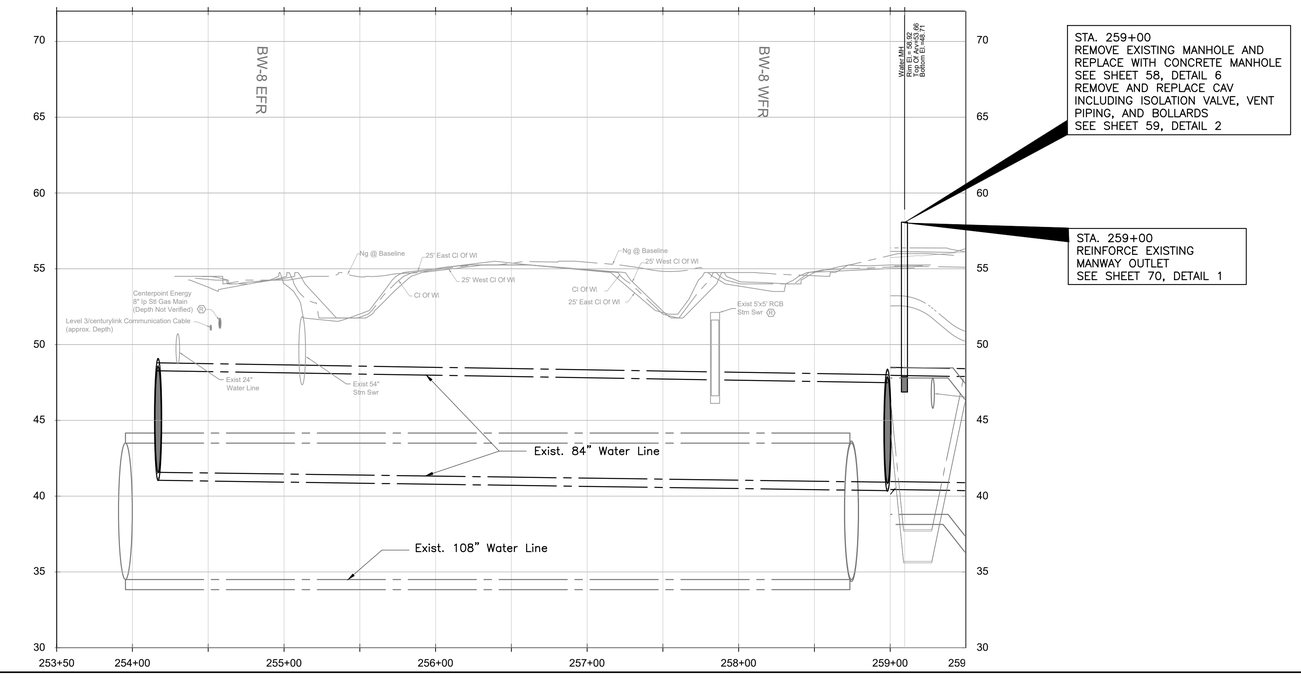

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(IN FEET)

NOTES:
1. 108–INCH WATER LINE TO REMAIN IN SERVICE AT ALL TIMES. CONTRACTOR TO PROTECT 108–INCH WATERLINE AND ITS APPURTENANCES. REFER TO SPEC SECTION 02317 FOR ADDITIONAL INFORMATION.
2. SPECIAL SHORING TO PROTECT EXISTING 108–INCH WATER LINE AND APPURTENANCES. NO EXCAVATION OR BENCHING AND PROTECTED STRUCTURE. REFER TO SPEC SECTION 02464 FOR SPECIAL SHORING REQUIREMENTS.

NOTICE:
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VERIFICATION OF PRIVATE UTILITY LINES

Date

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SWTP
Surface Water Transmission Program

LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

INTERIM REVIEW ONLY
Document incomplete, not intended for permit, bidding or construction.
Engineer: WILLIAM BYLAND, P.E.
P.E. Serial No: 142841
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F-2614
Date:

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84–INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

PLAN & PROFILE

STA. 254+00 TO STA. 259+50
(23 OF 28)

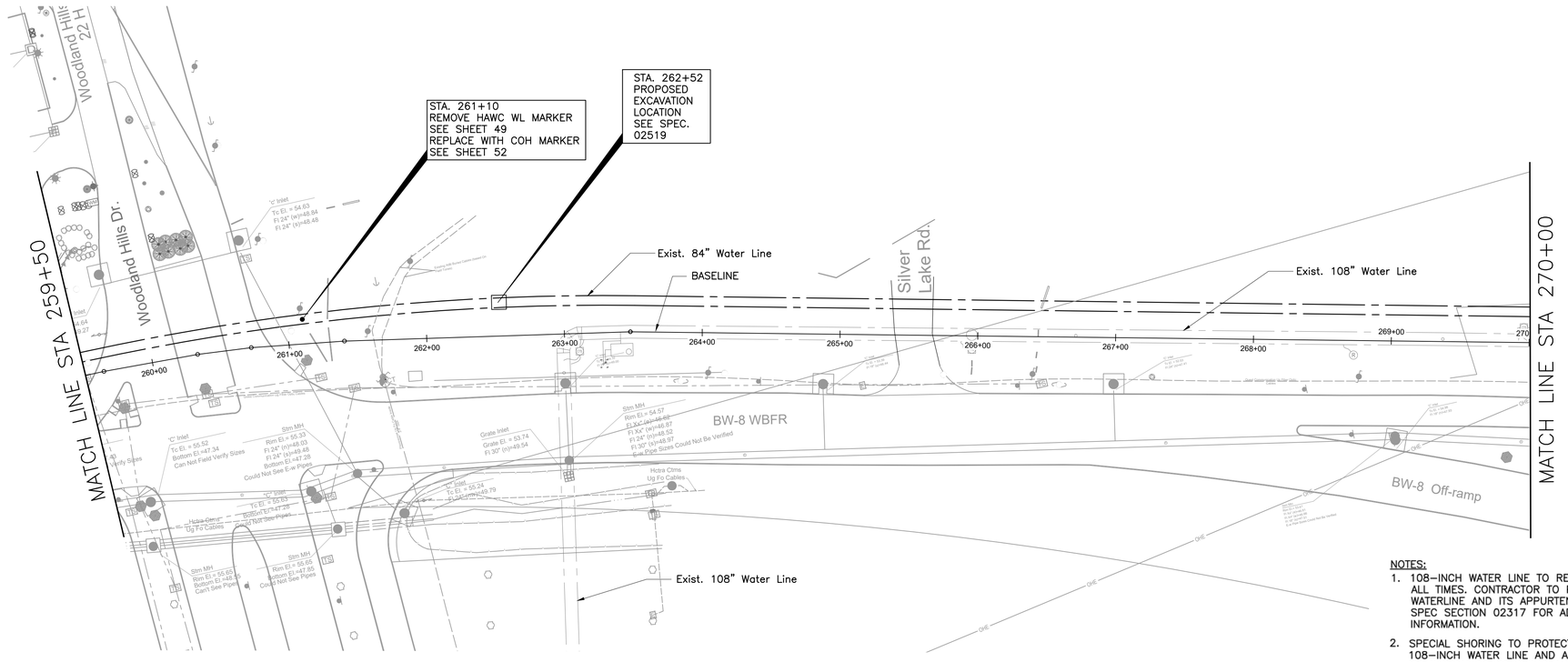
WBS NO.
S–000901–0015–4

DRAWING SCALE
1"=50' H, 1"=5' V

CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.

SHEET NO. 39 OF 102

P:\130\10667-401\4-0-Production-Working\4-1-BIM-CAD\Civil\Sheets\10667-401_12_P&P Sheets (2).dwg plotted on May 28, 2025 – 1:23pm



VERTICAL DATUM ADJUSTMENT:
THE ELEVATION DIFFERENCE IN BETWEEN THE FLOODPLAIN REFERENCE MARK'S (RM150585) PUBLISHED DATUM NAVD 1988, 2001 ADJUSTMENT AND DATUM NAVD 1988, (CORS96) IS 0.21'. NAVD88, (CORS96) ELEVATION=NAVD88, 2001 ADJ. ELEVATION – 0.21 FEET.

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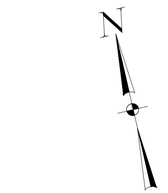
BENCHMARK:
CITY OF HOUSTON MONUMENT 5765–8303, A BRASS DISK ON CONCRETE ON THE SOUTH SIDE OF WATER WORKS BOULEVARD APPROXIMATELY 0.25 MILES EAST OF NORTH SAM HOUSTON PARKWAY (WESTBOUND FRONTAGE ROAD). ELEV. 54.37 FEET NAV 1988 (CORS96) (GEOID'12a)

NO.	DATE	REVISION	APP.



0 50 100 HORIZONTAL
0 5 10 VERTICAL
(IN FEET)

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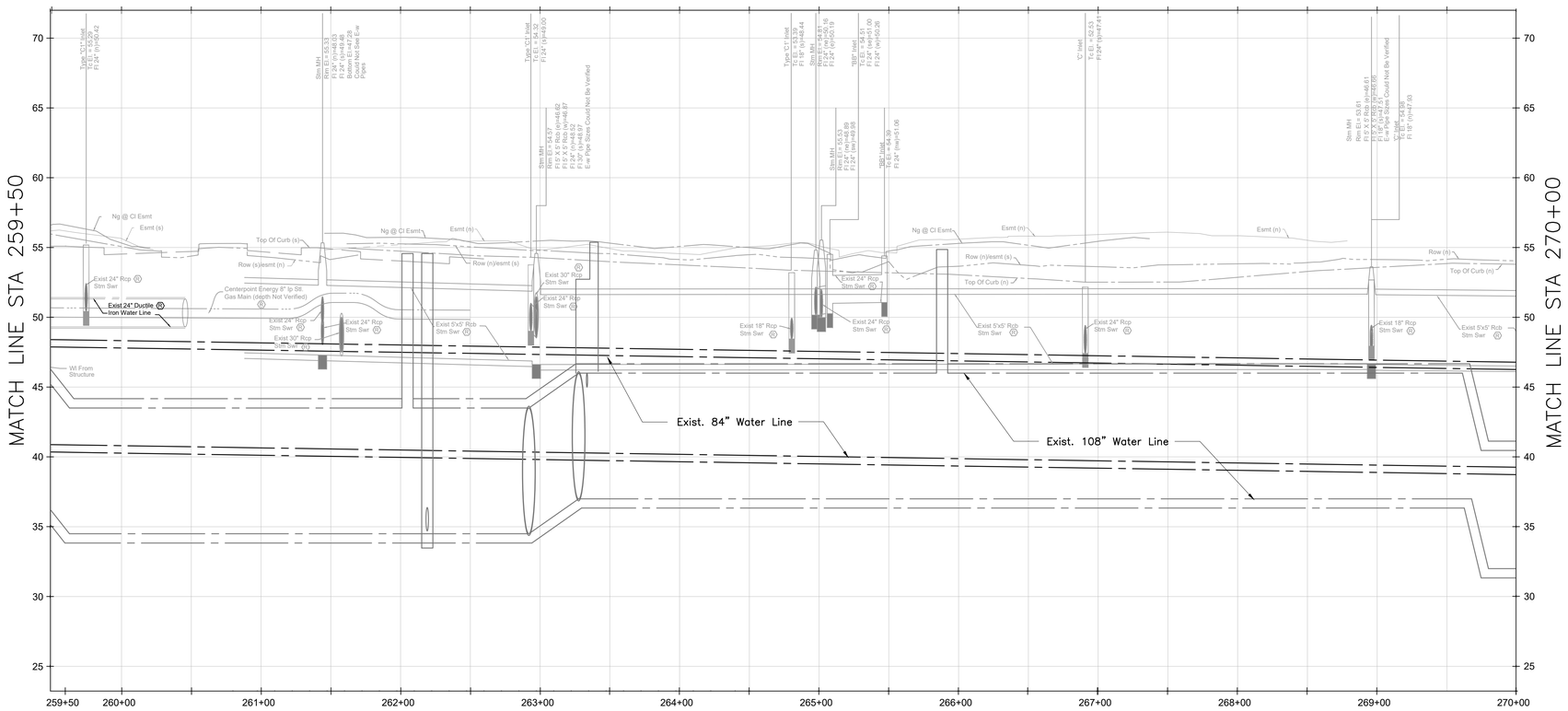

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Engineer: WILLIAM BYLAND, P.E.
P.E. Serial No.: 142061
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F–2614
Date:

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84–INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

PLAN & PROFILE

STA. 259+50 TO STA. 270+00
(24 OF 28)

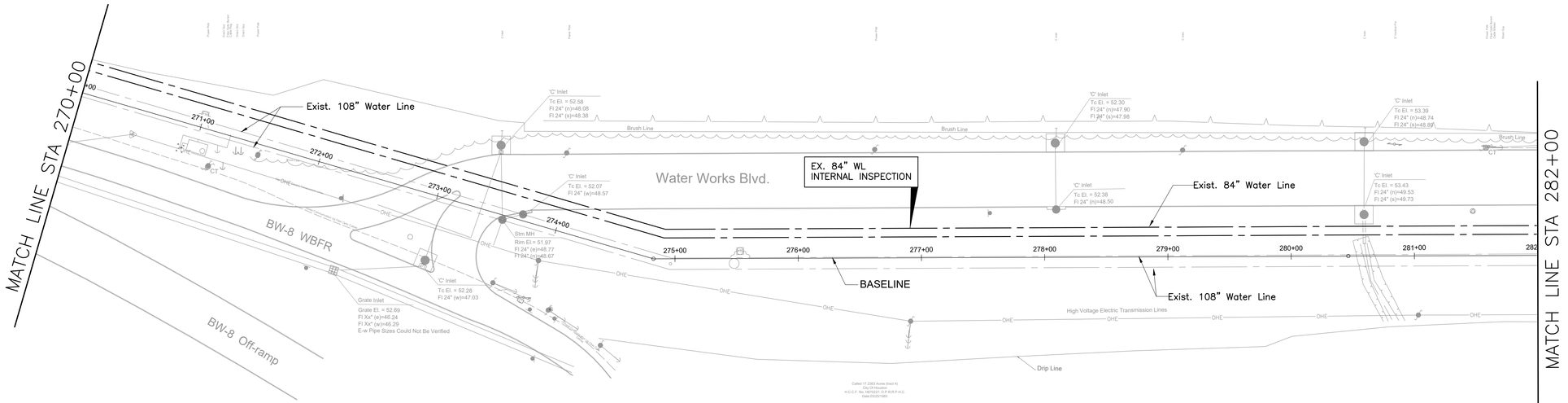
WBS NO.
S–000901–0015–4

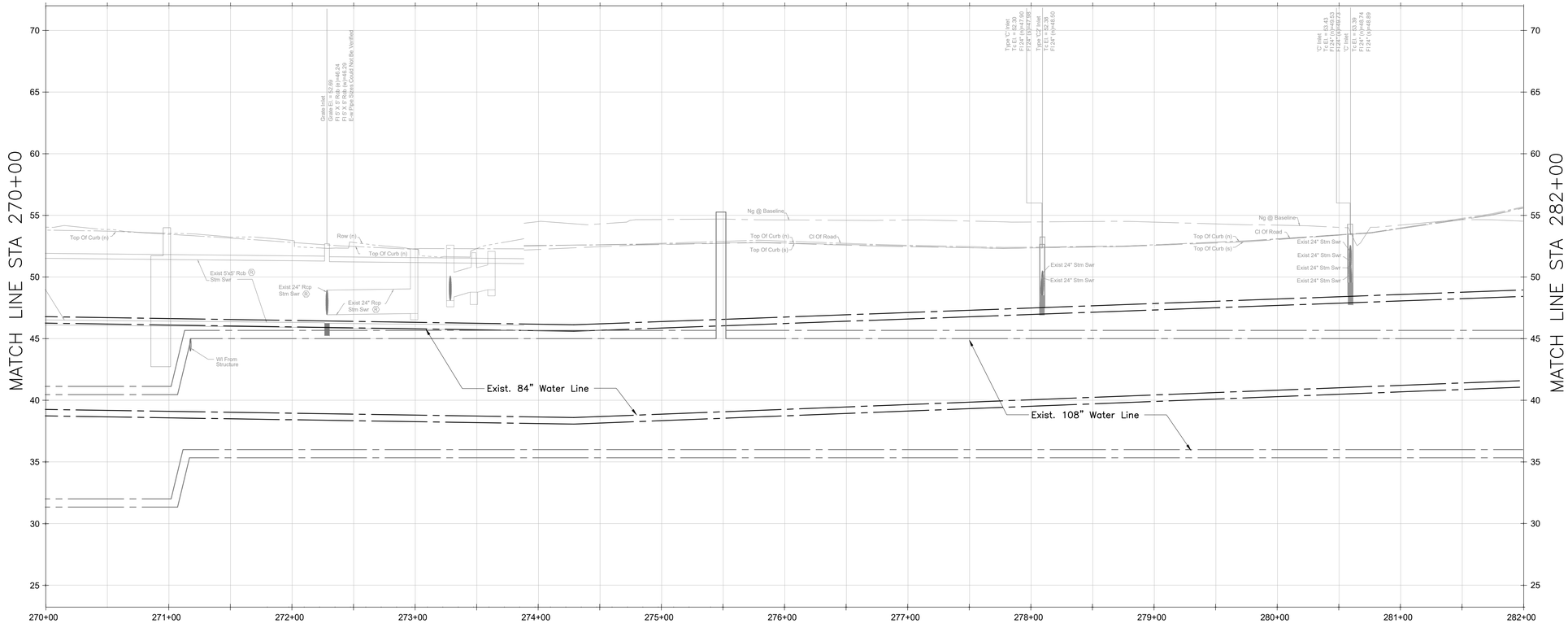
DRAWING SCALE
1"=50' H, 1"=5' V

CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.

SHEET NO. 40 OF 102

P:\130\10667-401\4-0-Production-Working\4-1-BIM-CAD\Civil\Sheets\10667-401_12_P&P Sheets_PETE_copy.dwg plotted on Mar 03, 2025 – 6:34pm





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BENCHMARK:
CITY OF HOUSTON MONUMENT 5765–8303, A BRASS DISK ON CONCRETE ON THE SOUTH SIDE OF WATER WORKS BOULEVARD APPROXIMATELY 0.25 MILES EAST OF NORTH SAM HOUSTON PARKWAY (WESTBOUND FRONTAGE ROAD). ELEV. 54.37 FEET NAV 1988 (CORS96) (GEOID'12a)

NO.	DATE	REVISION	APP.

N

0 50 100 HORIZONTAL
0 5 10 VERTICAL
(IN FEET)

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

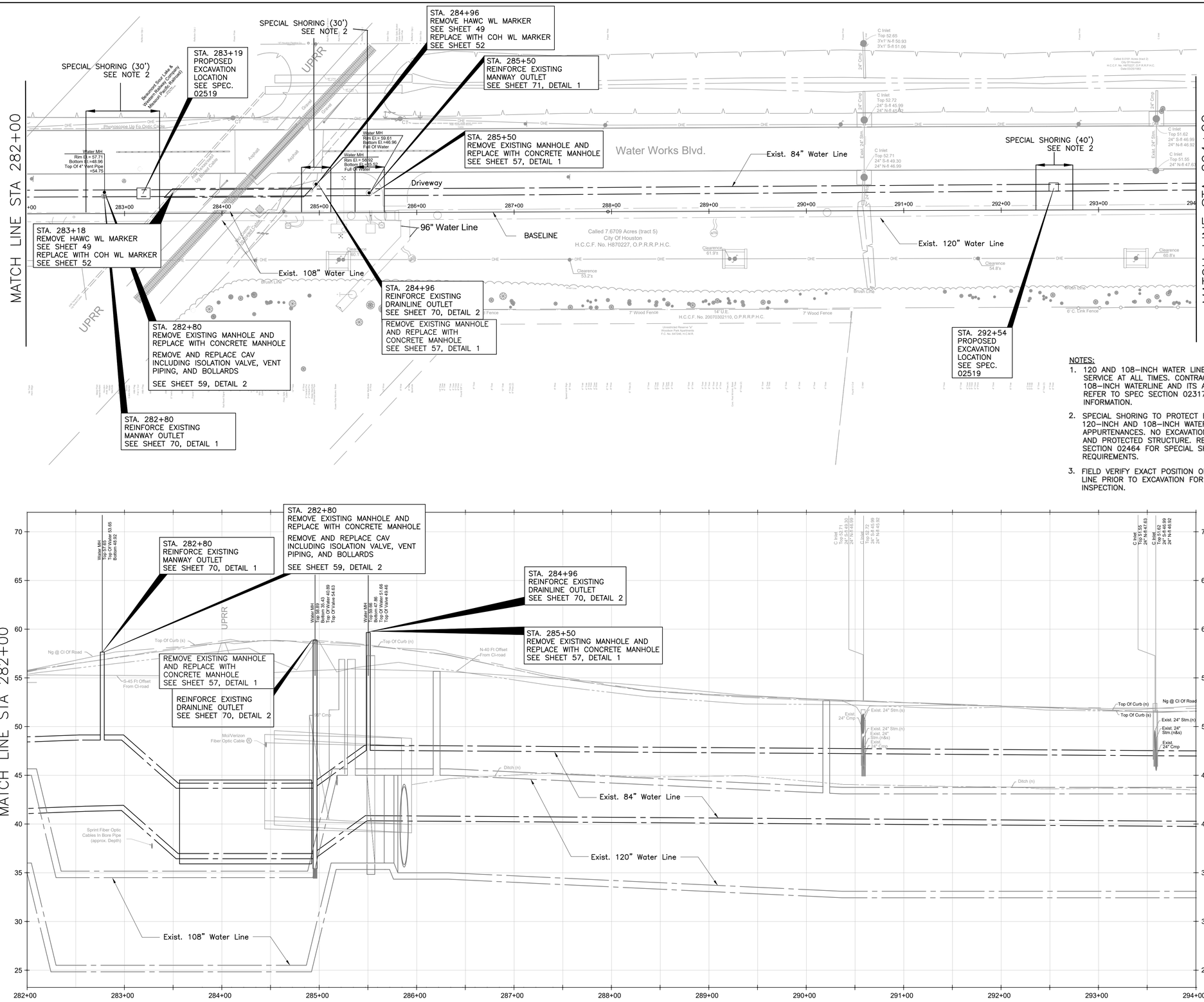
84–INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

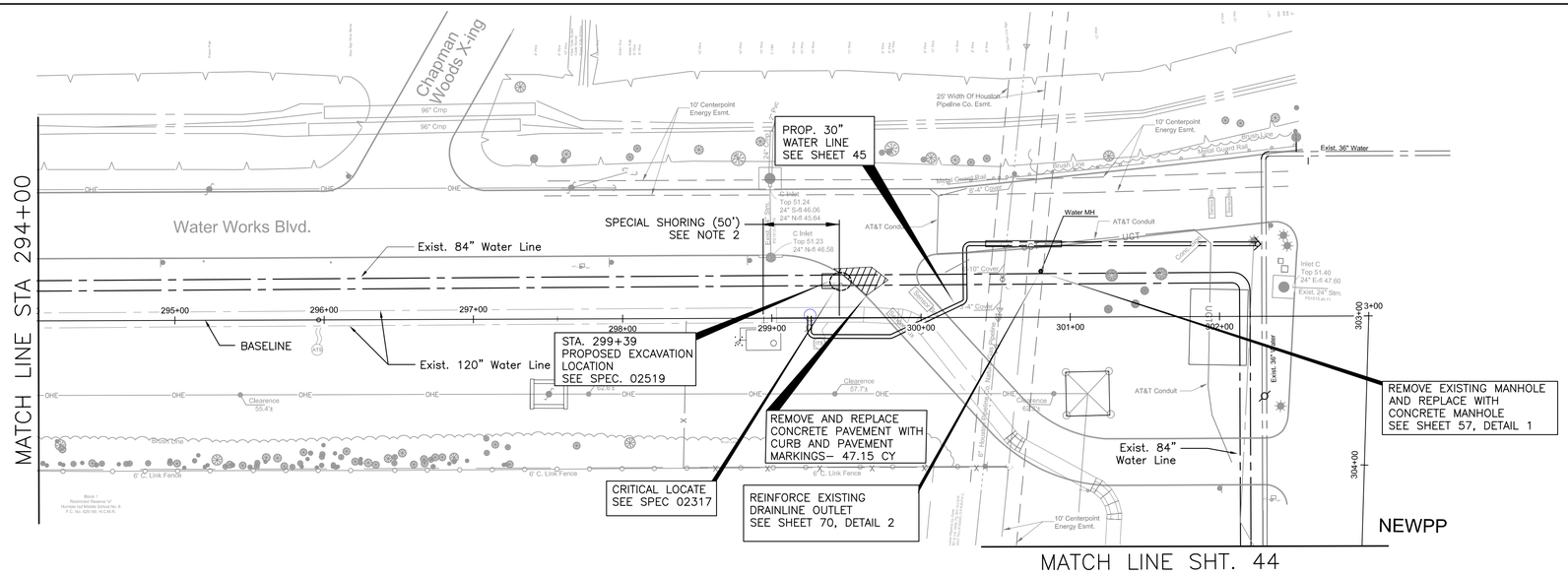
PLAN & PROFILE

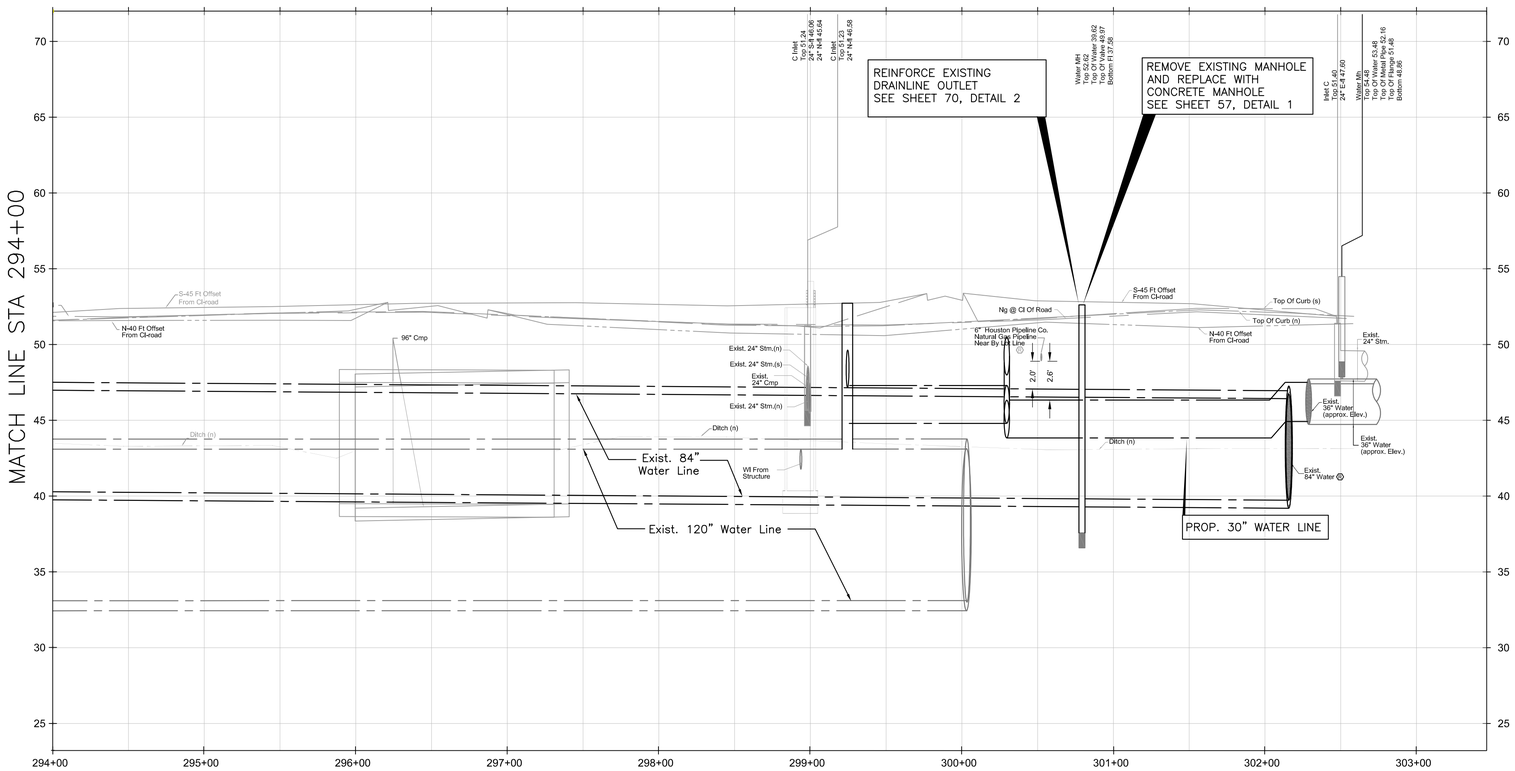
STA. 270+00 TO STA. 282+00
(25 OF 28)

WBS NO. S–000901–0015–4	
DRAWING SCALE	
1"=50' H, 1"=5' V	
CITY OF HOUSTON PM	
RAM CHAKRADHAR, P.E.	
SHEET NO. 41 OF 102	

P:\130\30-10667-401\4-0-Production-Working\4-1-BIM-CAD\Civil Sheets\10667-401_12_P&P Sheets.dwg plotted on Oct 21, 2024 - 5:42pm


MATCH LINE STA 282+00
MATCH LINE STA 294+00
SPECIAL SHORING (30')
SEE NOTE 2
STA. 283+19
PROPOSED
EXCAVATION
LOCATION
SEE SPEC.
02519
STA. 284+96
REMOVE HAWC WL MARKER
SEE SHEET 49
REPLACE WITH COH WL MARKER
SEE SHEET 52
STA. 285+50
REINFORCE EXISTING
MANWAY OUTLET
SEE SHEET 71, DETAIL 1
STA. 285+50
REMOVE EXISTING MANHOLE AND
REPLACE WITH CONCRETE MANHOLE
SEE SHEET 57, DETAIL 1
Water Works Blvd.
Exist. 84" Water Line
SPECIAL SHORING (40')
SEE NOTE 2
Driveway
96" Water Line
BASELINE
Exist. 120" Water Line
Exist. 108" Water Line
STA. 283+18
REMOVE HAWC WL MARKER
SEE SHEET 49
REPLACE WITH COH WL MARKER
SEE SHEET 52
STA. 284+96
REINFORCE EXISTING
DRAINLINE OUTLET
SEE SHEET 70, DETAIL 2
REMOVE EXISTING MANHOLE
AND REPLACE WITH
CONCRETE MANHOLE
SEE SHEET 57, DETAIL 1
STA. 282+80
REMOVE EXISTING MANHOLE AND
REPLACE WITH CONCRETE MANHOLE
REMOVE AND REPLACE CAV
INCLUDING ISOLATION VALVE, VENT
PIPING, AND BOLLARDS
SEE SHEET 59, DETAIL 2
STA. 282+80
REINFORCE EXISTING
MANWAY OUTLET
SEE SHEET 70, DETAIL 1
STA. 292+54
PROPOSED
EXCAVATION
LOCATION
SEE SPEC.
02519
UPRR
Called 7.6709 Acres (tract 5)
City Of Houston
H.C.C.F. No. H870227, O.P.R.R.P.H.C.
H.C.C.F. No. 20070302110, O.P.R.R.P.H.C.
Unrestricted Reserve "A"
Woodson Park Apartments
F.C. No. 647048, H.C.M.R.
Water MH
Rim El = 57.71
Bottom El =48.96
Top Of 4" Vent Pipe
=54.75
Water MH
Rim El = 59.61
Bottom El =46.96
Felt Of Water
Water MH
Rim El = 58.92
Bottom El =45.52
Full Of Water
Phonoscope Up Fo Optic Cable
Beaumont Sour Lake & Western (Kansas City Southern)
Missouri Pacific (Railroad)
Asphalt
Gravel
Brush Line
7' Wood Fence
6' C. Link Fence
Clearance 53.2'±
Clearance 61.9'±
Clearance 54.8'±
Clearance 60.8'±
C Inlet
Top 52.65
3'x1' N-I 50.93
3'x1' S-I 51.06
24" Cmp
C Inlet
Top 52.72
24" S-R 45.99
24" N-R 45.92
C Inlet
Top 52.71
24" S-R 49.30
24" N-R 46.99
Exist. 24" Strm
C Inlet
Top 51.62
24" S-R 46.99
24" N-R 46.92
C Inlet
Top 51.55
24" N-R 47.63
Exist. 24" Strm
Exist. 24" Strm
Exist. 24" Strm





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ELEV. 54.37 FEET NAV 1988 (CORS96) (GEOID'12a)

NO.	DATE	REVISION	APP.

N

0 50 100 HORIZONTAL
0 5 10 VERTICAL
(IN FEET)

NOTES:
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3. FIELD VERIFY EXACT POSITION OF 84-INCH WATER LINE PRIOR TO EXCAVATION FOR EXTERNAL INSPECTION.

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Surface Water Transmission Program

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Engineer: WILLIAM BYLAND, P.E.
P.E. Serial No.: 142061
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Firm No.: F-2614
Date:

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84–INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

PLAN & PROFILE

STA. 294+00 TO STA. 305+50
(27 OF 28)

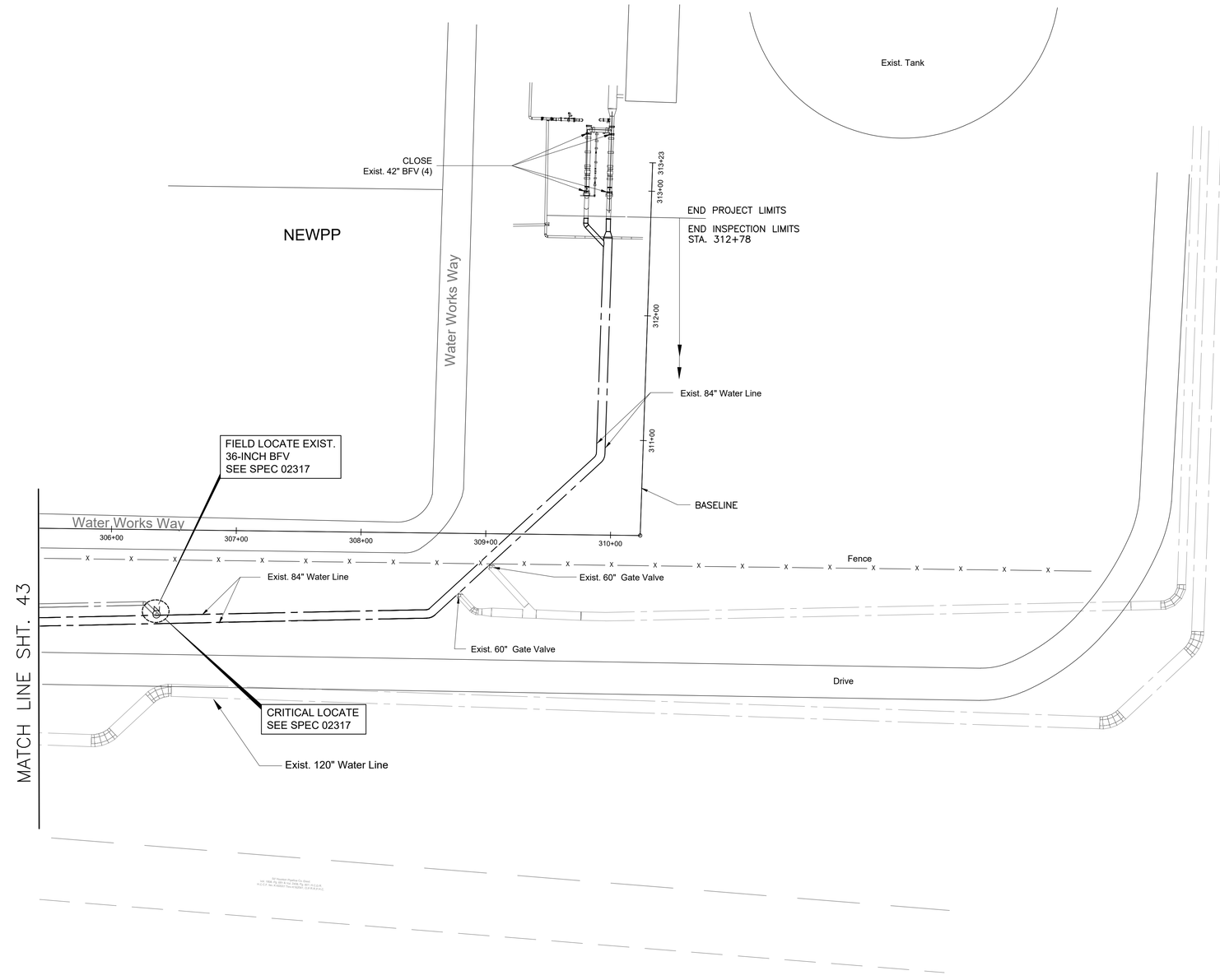
WBS NO.
S–000901–0015–4

DRAWING SCALE
1"=50' H, 1"=5' V

CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.

SHEET NO. 43 OF 102

P:\130\10667-401\4-0-Production-Working\4-1-BIM-CAD\Civil\Sheets\10667-401_12_P&P Sheets (2).dwg plotted on May 28, 2025 - 5:34pm



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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84–INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

PLAN & PROFILE

STA. 305+40 TO STA. 313+00
(28 OF 28)

WBS NO.
S–000901–0015–4

DRAWING SCALE
1"=50' H, 1"=5' V

CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.

SHEET NO. 44 OF 102

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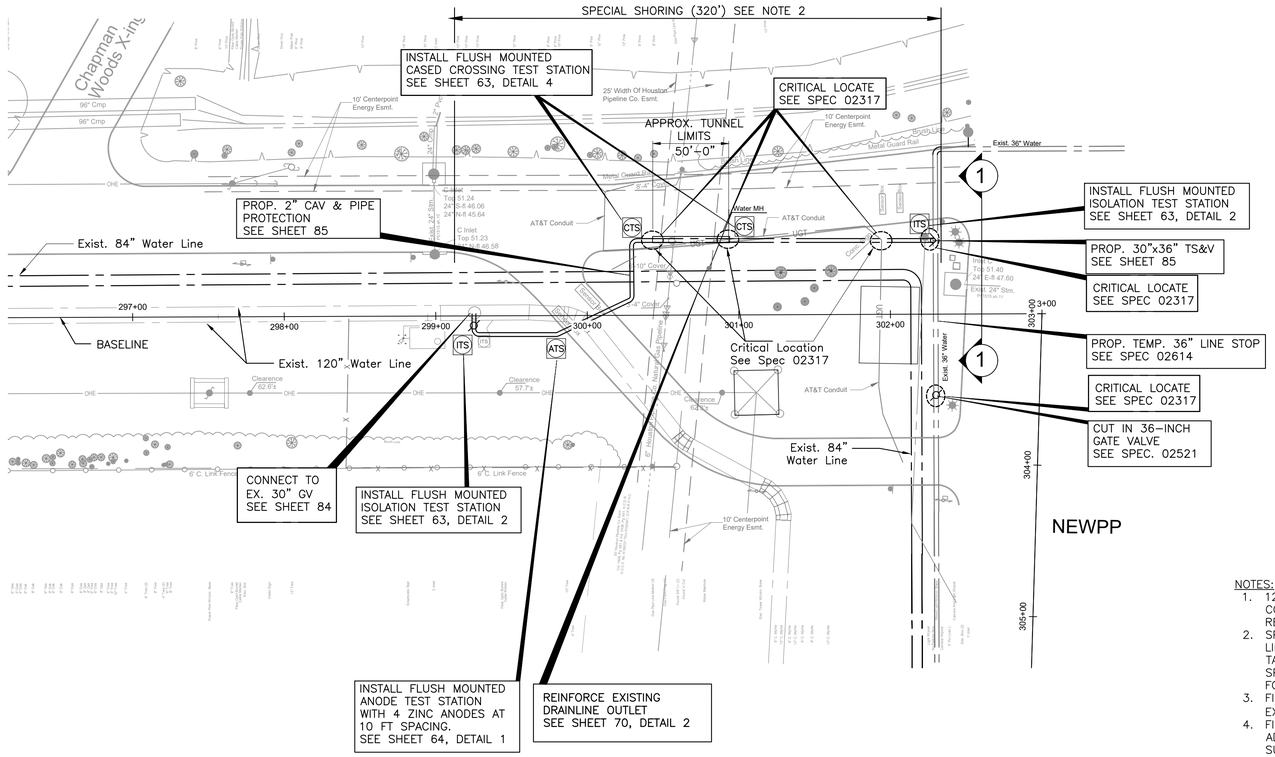

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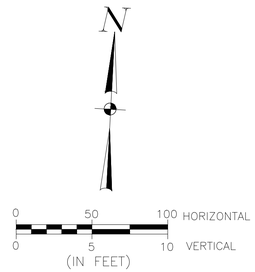

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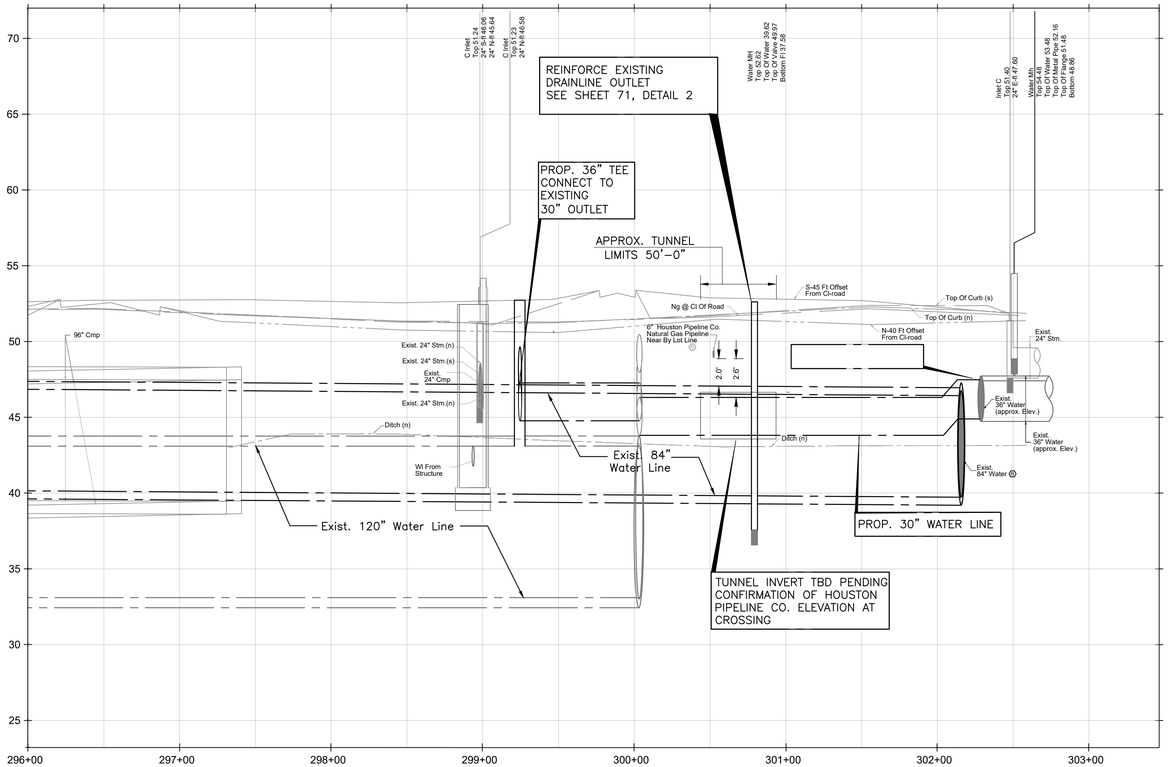
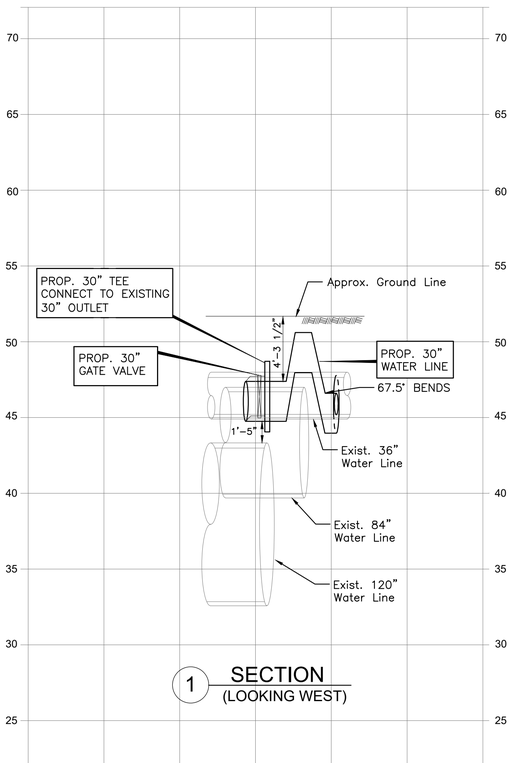
3. FIELD VERIFY EXACT POSITION OF 36–INCH WATER LINE PRIOR TO EXCAVATION FOR TAPPING, LINE STOP, AND/OR GATE VALVE.
4. FIELD VERIFY LOCATION OF 30–INCH GATE VALVE AND MAKE NECESSARY ADJUSTMENT TO LINE AND GRADE TO ENSURE PROPER TIE–IN BEFORE SUBMITTING PIPE LAY SCHEDULE.





1 SECTION (LOOKING WEST)

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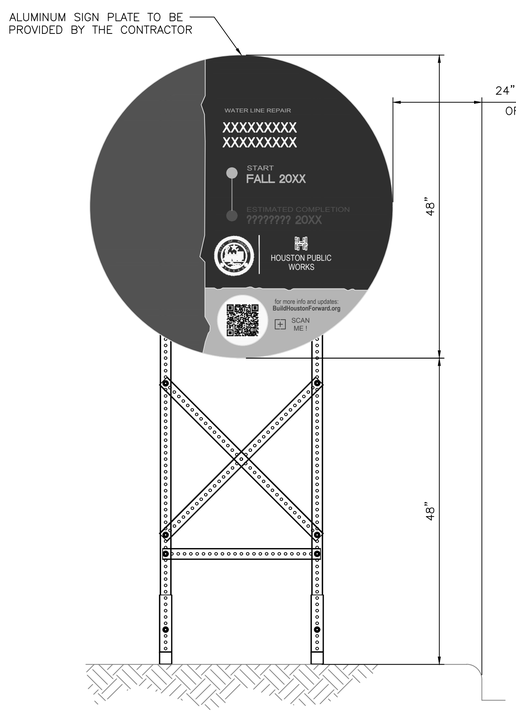
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84–INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

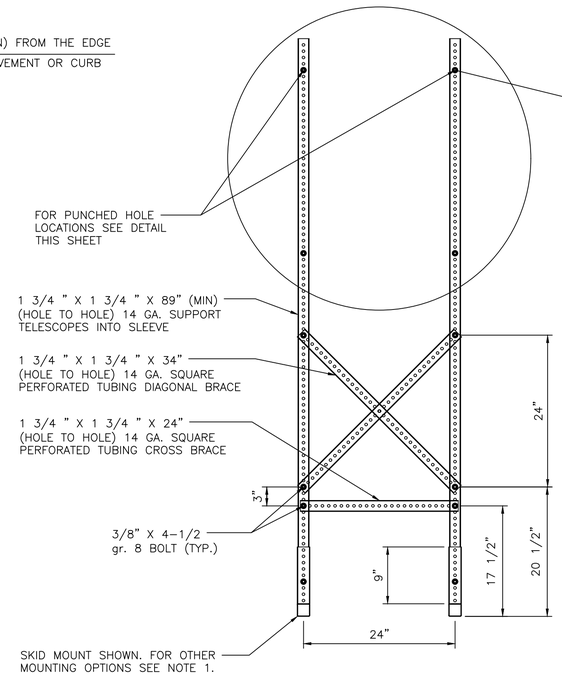
30 INCH WATERLINE INTERCONNECTION

WBS NO.	S–000901–0015–4
DRAWING SCALE	1"=50' H, 1"=5' V
CITY OF HOUSTON PM	RAM CHAKRADHAR, P.E.
SHEET NO.	45 OF 102

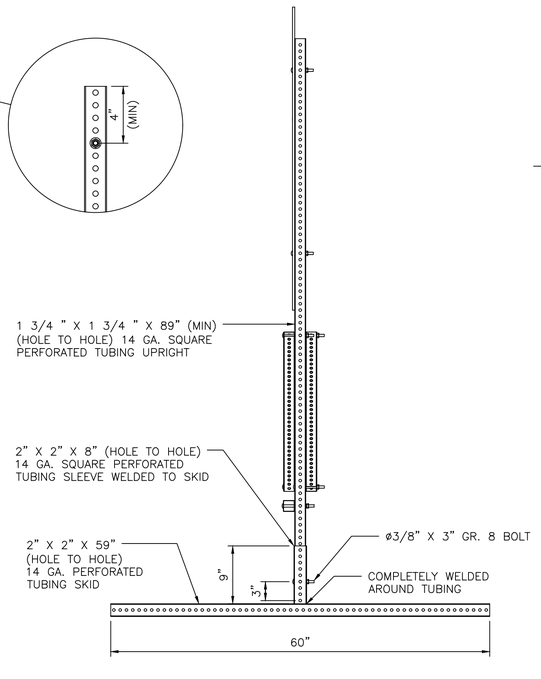
P:\130\10667-401\4-0-Production-Working\4-1-BIM-CAD\Civil\Sheets\10667-401_45_30 INCH WL INTERCONNECTION.dwg plotted on Mar 03, 2025 – 6:47pm



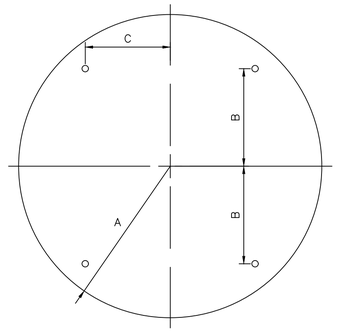
FRONT VIEW



FRONT VIEW



SIDE VIEW



CIRCLE

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

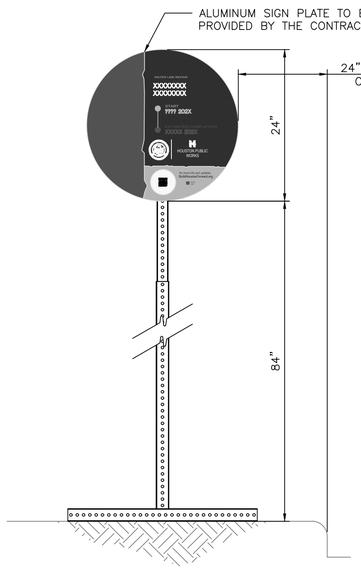
48" SIGN PLATE HOLE DETAIL

NOTES:

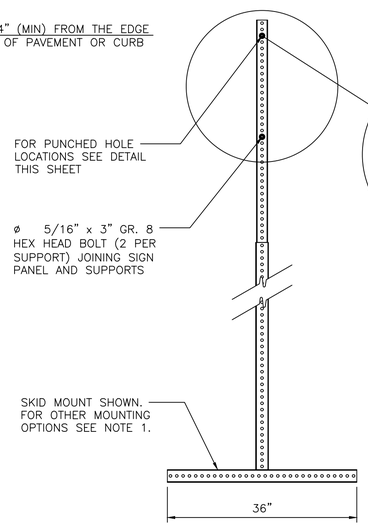
1. ALLOWABLE POST INSTALLATION METHODS ARE: CONCRETE FOOTING, SURFACE MOUNTING, SKID MOUNTING AND PILE DRIVEN POSTS.
2. FOR POST INSTALLATION WITH CONCRETE FOOTING, REFER TO DETAIL 01554-01.
3. FOR SURFACE MOUNTED POST INSTALLATION, REFER TO DETAIL 01554-02.
4. FOR SKID MOUNTING REQUIREMENTS REFER TO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

PROJECT SIGN – 48"

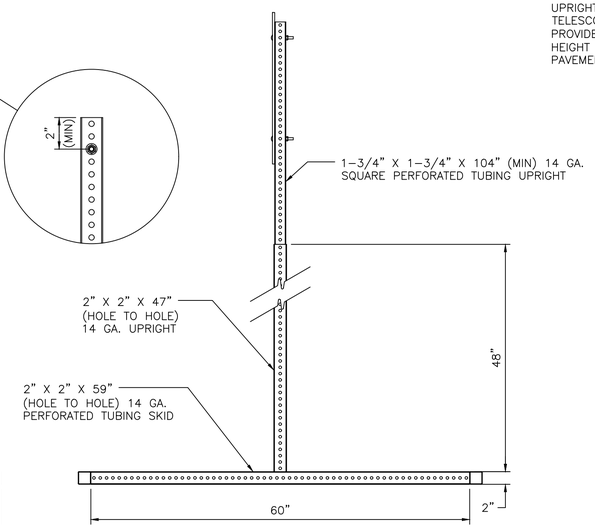
SKID MOUNTED SUPPORTS FOR 48" PROJECT SIGN



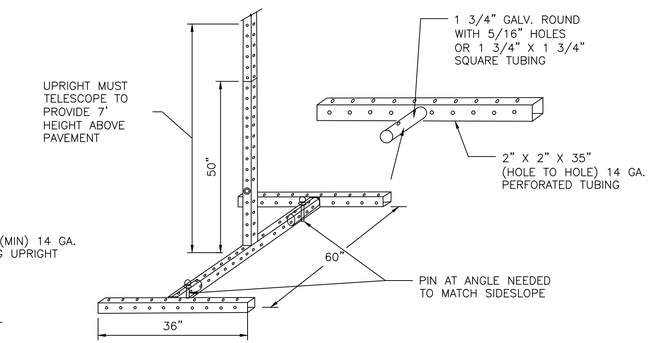
FRONT VIEW



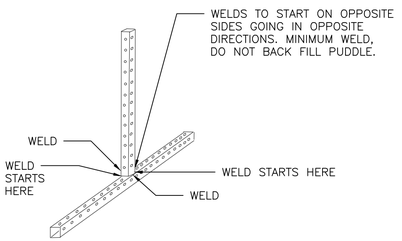
FRONT VIEW



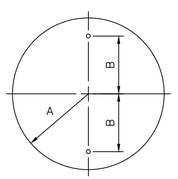
SIDE VIEW



ISO VIEW



ISO VIEW



A	B	C
12"	8"	0.080"

24" SIGN PLATE HOLE DETAIL

PROJECT SIGN – 24"

SKID MOUNTED SUPPORTS FOR 24" PROJECT SIGN

NO.	DATE	REVISION	APP.

Surface Water Transmission Program

LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

INTERIM REVIEW ONLY
Document Incomplete: not intended for permit, bidding or construction.
Engineer: WILLIAM BYLAND, P.E.
P.E. Serial No.: 142061
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F-2614
Date:

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

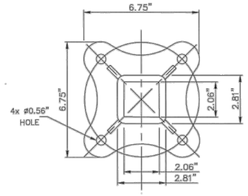
PROJECT SIGN (1 OF 2)

WBS NO.	S-000901-0015-4
DRAWING SCALE	NOT TO SCALE
CITY OF HOUSTON PM	RAM CHAKRADHAR, P.E.
SHEET NO.	46 OF 102

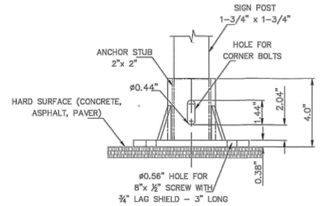
P:\130\10667-401\4-0-Production-Working\4-1-BIM-CAD\Details\10667-401_46-PROJECT SIGN (1 OF 2).dwg plotted on Oct 21, 2024 - 10:15am

TYPICAL HARD SURFACE INSTALLATION GALVANIZED SIGN BASE

TOP VIEW

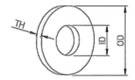


SIDE VIEW



NOTES:
1. MATERIAL: ASTM A-536 GRADE 65-45-12 DUCTILE IRON
2. HOT DIP GALVANIZE PER ASTM A-153
3. ALL DIMENSIONS ARE IN INCHES

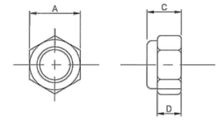
1/2" FLAT WASHERS, LOW CARBON, SAE, ZINC PLATED



SAE FLAT WASHERS									
	ID			OD			THICKNESS-TH		
SIZE	BASIC	TOLERANCE PLUS	TOLERANCE MINUS	BASIC	TOLERANCE PLUS	TOLERANCE MINUS	BASIC	PLUS	MINUS
1/2"	0.515"	0.015"	0.005"	1.062"	0.030"	0.007"	0.095"	0.121"	0.074"

DIMENSIONS: ASME B18.21.1, TYPE A PLAIN WASHERS
MATERIAL: CARBON STEEL
FINISH: Fe/Zn 3AT PER ASTM F1941

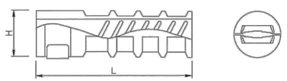
HEX NYLON INSERT LOCKNUTS (NE), GRADE 8, YELLOW ZINC PLATED



SIZE	C THICKNESS MAX	C THICKNESS Min	A WIDTH ACROSS FLATS MAX	A WIDTH ACROSS FLATS Min	D HEX HEIGHT Min
5/16"	0.359"	0.329"	0.502"	0.489"	0.250"

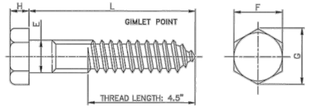
DIMENSIONS: ASME B18.16.6
MATERIAL: CARBON STEEL, GRADE 8 PER ASME B18.16.6, NYLON 6/6
THREAD REQUIREMENTS: ASME B1.1 UNC& UNF CLASS 2B

ANCHOR LAG SHIELD - ZINC ALLOY



TH	L		H
LAG THREAD SIZE	LENGTH NOMINAL		DRILLED HOLE SIZE
1/2"	2"	3"	3/4"

8" HEX LAG SCREWS, HOT DIPPED GALVANIZED



DIAMETER	E BODY DIAMETER MAX.	E BODY DIAMETER MIN.	F WIDTH ACROSS FLATS MAX.	F WIDTH ACROSS FLATS MIN.	G WIDTH ACROSS CORNERS MAX.	G WIDTH ACROSS CORNERS MIN.	H HEIGHT MAX.	H HEIGHT MIN.	L LENGTH
1/2"	0.515"	0.482"	0.750"	0.725"	0.866"	0.826"	0.364"	0.302"	8"

MATERIAL: PER A307 GRADE A
COATING: HOT DIP ZINC PER ASTM F2329 OR IN ACCORDANCE WITH CLASS C OF ASTM A153 AND CLASS D FOR 3/8" DIAMETER AND LESS

CITY OF HOUSTON HOUSTON PUBLIC WORKS	
SIGN BASE MOUNTING DETAILS (NOT TO SCALE)	
CITY TRAFFIC ENGINEER CITY ENGINEER	DIRECTOR OF HOUSTON PUBLIC WORKS
EFF DATE: JULY-29-2019	DWG NO: 01509-01A

GENERAL NOTES

1. THE EXISTING SIGNS LOCATED ON PUBLIC CONSTRUCTION SITE ARE THE PROPERTY OF THE CITY OF HOUSTON. THROUGHOUT THE PERIOD OF THE CONTRACT, THE CONTRACTOR SHALL PROTECT THESE SIGNS SUCH THAT THEY ARE NOT DAMAGED IN THE COURSE OF CONSTRUCTION ACTIVITY. SUCH PROTECTION SHALL INCLUDE THE PERIOD AFTER SIGNS ARE REMOVED FROM INSTALLATION AND STORED BY THE CONTRACTOR OR DELIVERED TO THE TRAFFIC OPERATIONS CENTER (2200 PATTERSON). THE GENERAL TRAFFIC SUPERINTENDENT (832-395-6728/6756) MUST BE NOTIFIED 48 HOURS IN ADVANCE PRIOR TO DELIVERY.
2. AFTER SIGNS ARE REMOVED FROM INSTALLATION AND ARE BEING STORED BY THE CONTRACTOR, THE CONTRACTOR SHALL CONTACT THE TRAFFIC OPERATIONS DIVISION OF THE PUBLIC WORKS AND ENGINEERING DEPARTMENT (832-395-6728/6756) AND ARRANGE FOR A CONVENIENT TIME TO DELIVER ONLY CITY SIGNS AND POSTS IDENTIFIED BY TRAFFIC OPERATIONS DIVISION TO 2200 PATTERSON.
3. PRIOR TO THE START OF CONSTRUCTION, ALL EXISTING SIGNS WITHIN THE AREA OF CONSTRUCTION WILL BE INVENTORIED AND DOCUMENTED JOINTLY BY THE CITY INSPECTOR AND THE CONTRACTOR. THIS DOCUMENT WILL BE JOINTLY SIGNED BY BOTH PARTIES REFLECTING THE SIGN TYPE, SIGN SIZE, SIGN CONDITION, SIGN LOCATION, REFLECTIVITY ADEQUACY, ETC. THE CONTRACTOR IS HELD ACCOUNTABLE FOR THESE SIGNS THROUGHOUT THE PROJECT AND AT THE PROJECTS COMPLETION.
4. ALL GROUND MOUNTED STOP SIGNS, WARNING SIGNS, AND OTHER REGULATORY SIGNS SHALL USE AT A MINIMUM HIGH INTENSITY PRISMATIC REFLECTIVE SHEETING.
5. ALL OVERHEAD SIGNS SHALL USE DIAMOND GRADE REFLECTIVE SHEETING.
6. ALL OTHER SIGNS SHALL USE SUPER ENGINEER GRADE SHEETING.
7. ALL BLANKS TO BE INSTALLED SHALL BE OF THE 3000, 5000 OR 6000 SERIES ALUMINUM WITH A YEILD STRENGTH OF 3003-H14 ALLOY.
8. "T" DENOTES THICKNESS OF SIGN BLANKS.
9. ALL HOLES SHALL BE 3/8" DIAMETER DRILLED OR PUNCHED AS SHOWN ON EACH BLANK DETAIL AND SHALL BE FREE OF BURRS AND / OR ROUGH EDGES.
10. SIGN BLANK CORNERS TO BE ROUNDED AS SHOWN ON EACH DETAIL ON SHEET 01509-03.
11. ALL SIGN BLANK ARE TO BE ETCHED, DEGREASED, AND HAVE AN ALODINE FINISH PRIOR TO APPLICATION OF LEGENDS.
12. ALL DETAILS ARE NOT TO SCALE.
13. ALL SIGNS SHALL BE MANUFACTURED AND INSTALLED IN CONFORMANCE TO THE LATEST TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) AND STANDARD HIGHWAY SIGNS LATEST EDITION.
14. REINSTALLATION OF PREVIOUSLY EXISTING SIGNS, WHERE REQUIRED PER PLANS, SHALL BE AT THE CONTRACTOR'S EXPENSE.

TYPICAL GROUND SIGN INSTALLATION PERFORATED SQUARE METAL TUBING

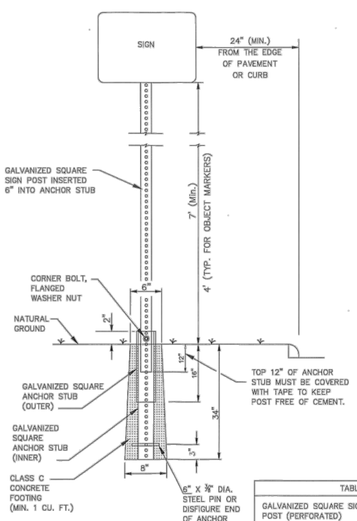
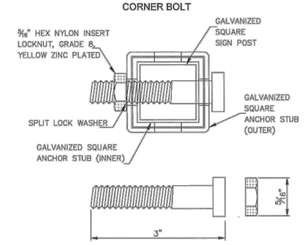
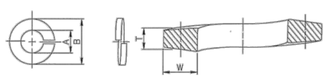


TABLE A	
GALVANIZED SQUARE SIGN POST (PERFORATED)	1-3/4" x 1-3/4" (14 GAUGE)
GALVANIZED SQUARE ANCHOR STUB (PERFORATED) (INNER)	2" x 2" x 36" (14 GAUGE)
GALVANIZED SQUARE ANCHOR STUB (PERFORATED) (OUTER)	2½" x 2½" x 18" (14 GAUGE)

CORNER BOLT



5/16" SPLIT LOCK WASHER, HIGH ALLOY MECHANICAL DEPOSITED YELLOW SINK



NOMINAL WASHER SIZE	A INSIDE DIAMETER MAX	A INSIDE DIAMETER MIN	B OUTSIDE DIAMETER MAX	T MEAN SECTION (Thickness)	W SECTION WIDTH
5/16"	0.322"	0.314"	0.583"	0.078"	0.125"

DIMENSIONS: ASME B18.21.1
MATERIAL: ALLOY STEEL PER ASME B18.211
FINISH: MECHANICAL ZINC PER ASME B695, CLASS 5, TYPE 2 (YELLOW)

CITY OF HOUSTON HOUSTON PUBLIC WORKS	
GENERAL NOTES AND GROUND MOUNTING SIGN (NOT TO SCALE)	
CITY TRAFFIC ENGINEER CITY ENGINEER	DIRECTOR OF HOUSTON PUBLIC WORKS
EFF DATE: JUL-29-2019	DWG NO: 01509-01

NO.	DATE	REVISION	APP.

SWTP
Surface Water Transmission Program

LAN
LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

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Engineer: WILLIAM BYLAND, P.E.
P.E. Serial No.: 142061
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F-2614
Date:

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

PROJECT SIGN
(2 OF 2)

WBS NO. S-000901-0015-4
DRAWING SCALE
NOT TO SCALE
CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.
SHEET NO. 47 OF 102

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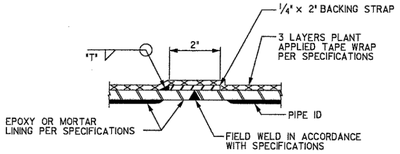
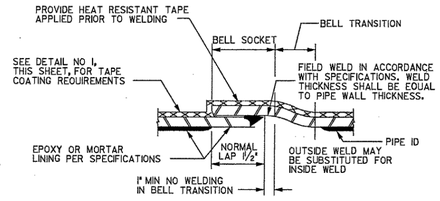
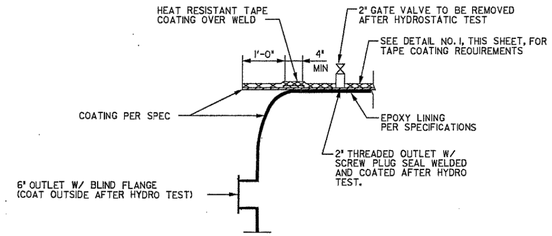


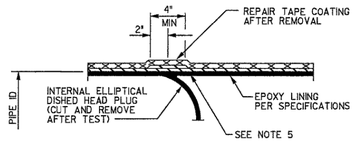
BUTT WELD FIELD JOINT - STEEL PIPE (TAPE COATED) 1



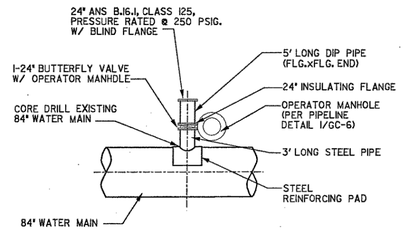
LAP-WELD FIELD JOINT - STEEL PIPE 2



INTERNAL ELLIPTICAL DISHED HEAD PLUG STEEL PIPE 3



INTERNAL ELLIPTICAL DISHED HEAD PLUG REMOVAL STEEL PIPE 4



24" FLANGED OUTLET - DETAIL 5

NOTES:

1. T = STEEL PIPE WALL THICKNESS AND SIZE OF FILLET ATTACHMENT WELD.
2. ALL REFERENCES TO PIPE DIAMETER FOR THIS PROJECT SHALL SIGNIFY SIZE MEASURED TO INSIDE DIAMETER OF THE LINED PIPE.
3. INSTALL 6 INCH FLANGED OUTLETS ON EITHER SIDE OF THE DISHED HEAD PLUG.
4. DISHED HEAD PLUGS SHALL BE CAPABLE OF WITHSTANDING THE HYDROSTATIC TEST PRESSURE FROM EITHER SIDE, WITH THE OPPOSITE SIDE EMPTY OF WATER.
5. SEE SPECIFICATIONS FOR REPAIR OF EPOXY LINING

RECORD DRAWING

This record drawing has been prepared, entirely or in part on the basis of unverified information compiled and furnished by others to the preparer who is not responsible for any inaccuracies, errors or omissions which may have been incorporated into the document as a result

Binkley & Barfield, Inc.
Consulting Engineers
1710 Seamist Drive Houston, Texas 77008

THE ORIGINAL DRAWING WAS SEALED AND SIGNED BY WILLIAM DAVIS WILKINSON, PE 85626 ON 4/1/2002
RECORD DRAWINGS AUTHORIZED BY CHRISTOPHER G. CANONICO, PE 90104 ON 6/25/2003

STATE OF TEXAS · CHRISTOPHER G. CANONICO · 90104 · REGISTERED PROFESSIONAL ENGINEER

REV	DATE	BY	DESCRIPTION
1	4/23/02	TRL	ISSUED FOR CONSTRUCTION
0	2/1/02	WDW	For Permit Approval

SCALE: NO SCALE

WARNING: 0 1/2 1" — IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

DESIGNED
DRAWN R DUNKERLEY
CHECKED

SUBMITTED BY
(PROJECT MANAGER'S NAME) LICENSE NO. DATE
(COMPANY OFFICER'S NAME) LICENSE NO. DATE

MWH
MONTGOMERY WATSON HARZA
5100 Westheimer, Suite 580
Houston, TX 77056

Houston Area Water Corporation

NORTHEAST WATER PURIFICATION SYSTEM

STEEL PIPE DETAILS

SHEET GC-1

SWTP
Surface Water Transmission Program

LAN
LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

INTERIM REVIEW ONLY
Document Incomplete: not intended for permit, bidding or construction.
Engineer: WILLIAM BYLAND, P.E.
P.E. Serial No. 142061
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F-2614
Date:

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD
EXISTING CONDITIONS OF HAWC 84 WATERLINE
(1 OF 4)

WBS NO. S-000901-0015-4

DRAWING SCALE
NONE

CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.

SHEET NO. 48 OF 102

Job No. 1652228
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User: dtillborne
Plot Date: 09/27/2004
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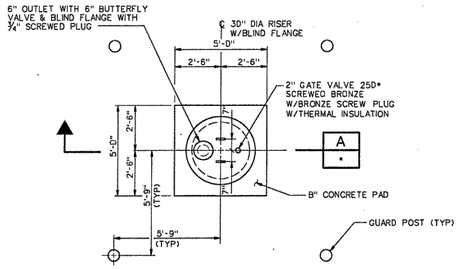
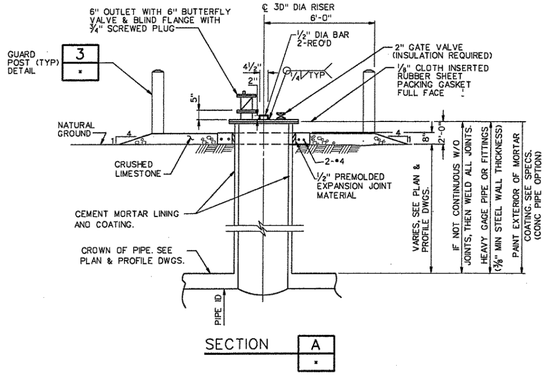
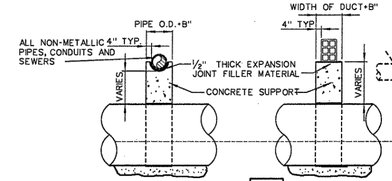
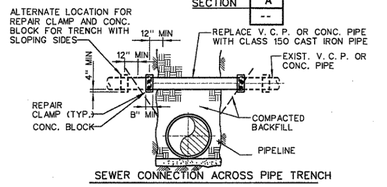


ABOVE GRADE ACCESS INLET (TYPE A) 1

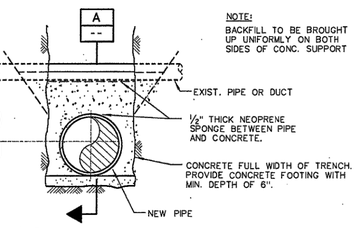


SECTION A





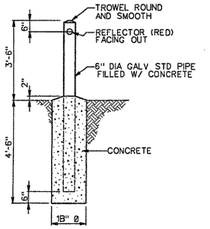
SEWER CONNECTION ACROSS PIPE TRENCH



NOTE:
BACKFILL TO BE BROUGHT UP UNIFORMLY ON BOTH SIDES OF CONC. SUPPORT

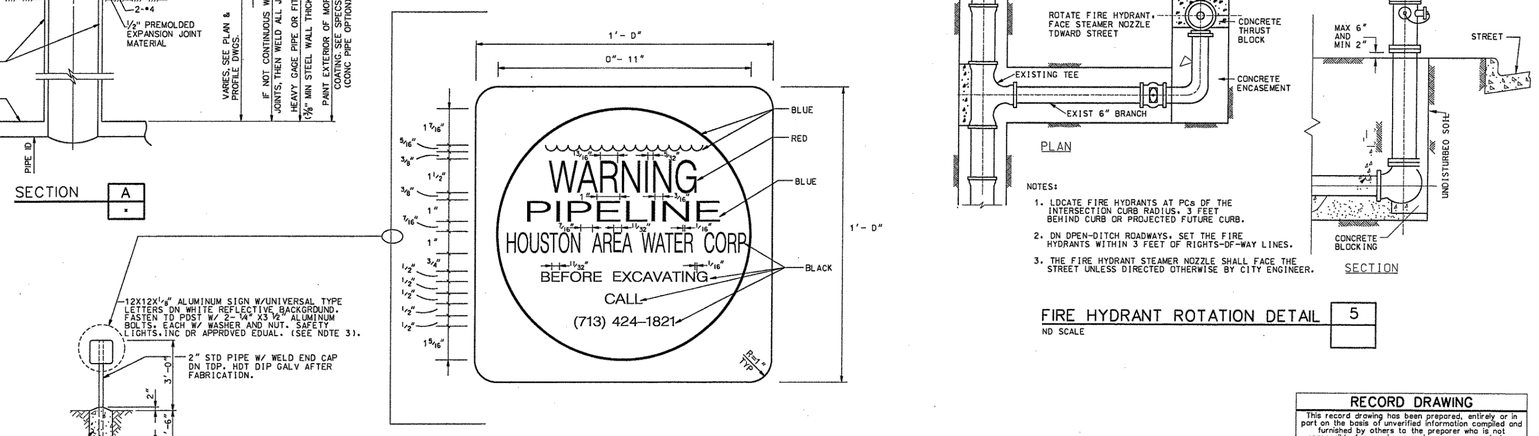
NOTES:
1. UNDERGROUND UTILITY SUPPORTS ARE TO BE PROVIDED WHEN MINIMUM CLEARANCE OF 12 INCHES CANNOT BE PROVIDED.
2. EXISTING PIPE OR DUCT SHALL BE FIRMLY SUPPORTED DURING INSTALLATION OF NEW PIPE AND SUPPORT.

UNDERGROUND UTILITY SUPPORT 2
NOT TO SCALE



GUARD POST 3

NOTES:
1. MARKER POSTS SHALL BE INSTALLED AT EACH LOCATION OF A TYPE 1 AIR/VACUUM VALVE ASSEMBLY AND TYPE A ABOVE GRADE ACCESS INLET AS DIRECTED BY THE ENGINEER AND ONE (1) FOOT INSIDE HAWC ROW ON BOTH SIDES OF EACH STREET AND HIGHWAY CROSSING AND AS SHOWN ON THE DRAWINGS.
2. CONTRACTOR SHALL SUBMIT SAMPLE OF SIGN SHOWING FONT TYPE, SIZE, COLOR, AND BACKGROUND FOR APPROVAL. ALL TO BE IN ACCORDANCE WITH SIGN BY SAFETY LIGHTS, INC. OR APPROVED EQUAL.



MARKER POST DETAIL 4

PLAN

SECTION

NOTES:
1. LOCATE FIRE HYDRANTS AT PCs OF THE INTERSECTION CURB RADIUS, 3 FEET BEHIND CURB OR PROJECTED FUTURE CURB.
2. ON OPEN-DITCH ROADWAYS, SET THE FIRE HYDRANTS WITHIN 3 FEET OF RIGHTS-OF-WAY LINES.
3. THE FIRE HYDRANT STEAMER NOZZLE SHALL FACE THE STREET UNLESS DIRECTED OTHERWISE BY CITY ENGINEER.

FIRE HYDRANT ROTATION DETAIL 5
NO SCALE

RECORD DRAWING

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Binkley & Barfield, Inc.
Consulting Engineers
1710 Seamist Drive Houston, Texas 77008

THE ORIGINAL DRAWING WAS SEALED AND SIGNED BY WILLIAM DAVIS WILKINSON, PE 85626 ON 4/1/2002
RECORD DRAWINGS AUTHORIZED BY CHRISTOPHER G. CANONICO, PE 90104 ON 6/20/2003

STATE OF TEXAS · CHRISTOPHER G. CANONICO · 90104 · REGISTERED PROFESSIONAL ENGINEER

REV	DATE	BY	DESCRIPTION
1	4/23/02	TRL	ISSUED FOR CONSTRUCTION
D	2/1/02	WDW	For Permit Approval

SCALE: NO SCALE
WARNING: D ½ 1 (IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE)
DESIGNED
DRAWN R DUNKERLEY
CHECKED
SUBMITTED BY
(PROJECT MANAGER'S NAME) LICENSE NO. DATE
(COMPANY OFFICER'S NAME) LICENSE NO. DATE

MWH
MONTGOMERY WATSON HARZA
5100 Westheimer, Suite 580
Houston, TX 77056

Houston Area Water Corporation

NORTHEAST WATER PURIFICATION SYSTEM
ACCESS INLET/SERVICE OUTLET DETAILS

SHEET GC-5

SWTP
Surface Water Transmission Program

LAN
LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

INTERIM REVIEW ONLY
Document Incomplete; not intended for permit, bidding or construction.
Engineer: WILLIAM BYLAND, P.E.
P.E. Serial No.: 142061
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F-2614
Date:

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD
EXISTING CONDITIONS OF HAWC 84 WATERLINE
(2 OF 4)

WBS NO. S-000901-0015-4
DRAWING SCALE: NONE
CITY OF HOUSTON PM: RAM CHAKRADHAR, P.E.
SHEET NO. 49 OF 102

Job No: 1950228
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User: BBBrew
Plot Date: 08/20/2003
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Plot Date: 08/07/2003
User: SKBthew
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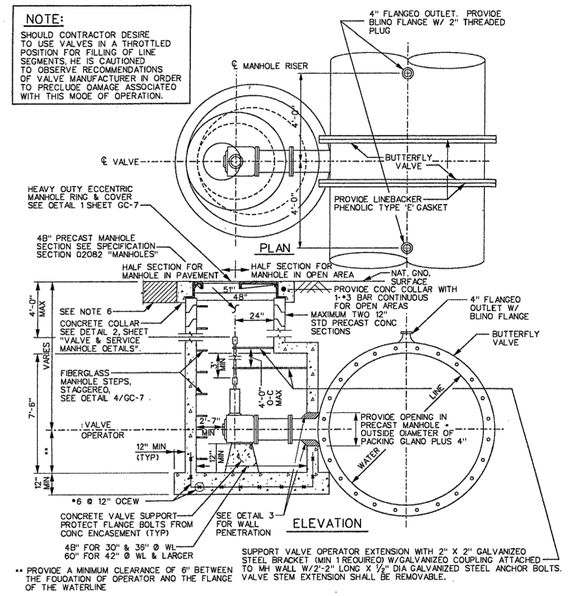
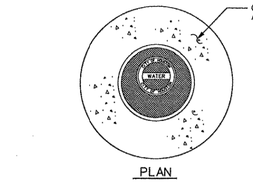
Job No. 1650228

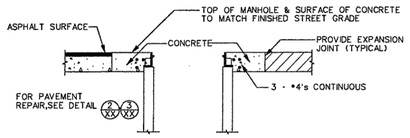
NOTE:
SHOULD CONTRACTOR DESIRE TO USE VALVES IN A THROTTLED POSITION FOR FILLING OF LINE SEGMENTS, HE IS CAUTIONED TO OBSERVE RECOMMENDATIONS OF VALVE MANUFACTURER IN ORDER TO PRECLUDE DAMAGE ASSOCIATED WITH THIS MODE OF OPERATION.



OPERATOR MANHOLE DETAILS FOR MAINLINE VALVES — 1
(FOR WATER LINES 30-INCHES AND LARGER IN DIAMETER)



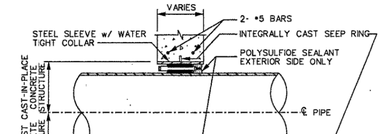
PLAN



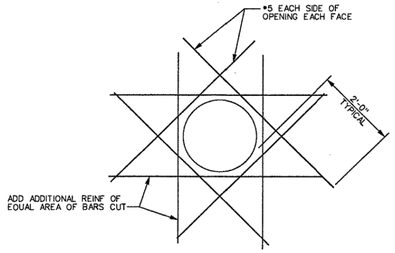
SECTION

NOTES:
1. CONSTRUCT THE FINAL TWO FEET OF THE MANHOLE AND PLACE CONCRETE WITHIN BLOCKOUT AFTER THE STREET PAVEMENT HAS BEEN INSTALLED.
2. FOR HEAVY DUTY MANHOLE RING, SEE DETAIL 1 SHEET GC-7.
3. FOR MANHOLE STEP DETAIL, SEE DETAIL 4 SHEET GC-7.

MANHOLE IN PAVEMENT — 2

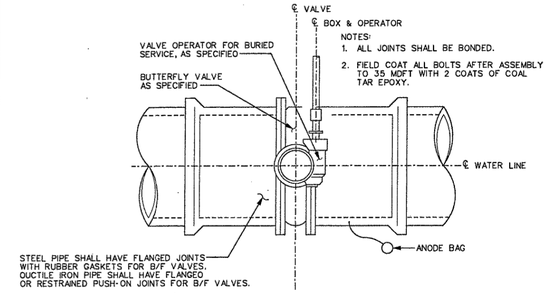


TYPICAL WALL PENETRATION DETAIL — 3

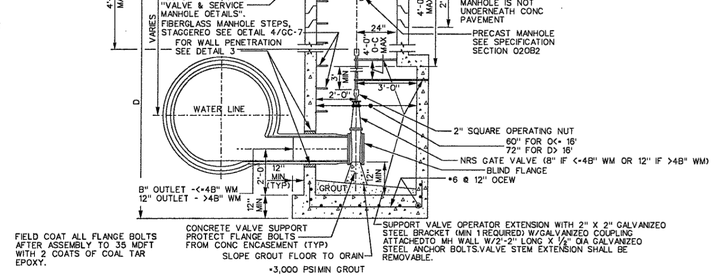


SERVICE MANHOLE REINFORCEMENT DETAIL — 6

NOTES:
1. PROVIDE RAMNEK OR APPROVED EQUAL BETWEEN PRECAST SEGMENTS OF THE MANHOLE.
2. ALL JOINTS SHALL BE BONDED, SEE THE CATHODIC PROTECTION DETAILS.
3. FIELD COAT ALL FLANGE BOLTS, FLANGE COUPLING, FLANGE COUPLING ADAPTER AND THRUST TIE ASSEMBLIES AFTER ASSEMBLY TO 35 MDFT W/ 2 COATS OF COAL TAR EPOXY.
4. PLACE MANHOLE ON NEW COMPACTED (95% S.P.O.) BOTTOM.
5. 2" OPERATING NUT ON LARGE DIAMETER BUTTERFLY VALVES SHALL TURN CLOCKWISE TO OPEN VALVE.
6. FOR PAVEMENT REPAIR, SEE SHEET "EXCAVATION, BEDDING, BACKFILL AND PAVEMENT REPAIR DETAILS".
7. FOR MANHOLES DEEPER THAN 20 FEET, PROVIDE SAFETY CLIMBING RAIL (SAF-T-CLIMB, OR EQUAL)



ISOLATION VALVE ASSEMBLY — 4



SERVICE MANHOLE DETAIL FOR DRAIN LINE VALVE CONNECTION — 5

RECORD DRAWING
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THE ORIGINAL DRAWING WAS SEALED AND SIGNED BY WILLIAM DAVIS WILKINSON, PE 85828 ON 4/1/2002
RECORD DRAWINGS AUTHORIZED BY CHRISTOPHER G. CANONICO, PE 90104 ON 6/20/2003

STATE OF TEXAS — CHRISTOPHER G. CANONICO — 90104 — REGISTERED PROFESSIONAL ENGINEER

REV	DATE	BY	DESCRIPTION
1	4/23/02	TRL	ISSUED FOR CONSTRUCTION
0	2/1/02	WDW	For Permit Approval

SCALE: NO SCALE
WARNING: 0 ½ 1 — IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE
DESIGNED
DRAWN R DUNKERLEY
CHECKED
SUBMITTED BY
(PROJECT MANAGER'S NAME) LICENSE NO. DATE
(COMPANY OFFICER'S NAME) LICENSE NO. DATE

Binkley & Barfield, Inc.
Consulting Engineers
1710 Seamist Drive Houston, Texas 77008

MWH
MONTGOMERY WATSON HARZA
5100 Westheimer, Suite 580
Houston, TX 77056

Houston Area Water Corporation

NORTHEAST WATER PURIFICATION SYSTEM
VALVE AND SERVICE MANHOLE DETAILS

SHEET GC-6

SWTP
Surface Water Transmission Program

LAN
LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

INTERIM REVIEW ONLY
Document Incomplete: not intended for permit, bidding or construction.
Engineer: WILLIAM EYLAND, P.E.
P.E. Serial No. 142061
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F-2614
Date:

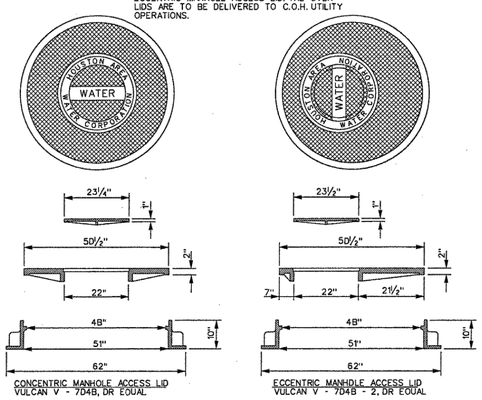
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD
EXISTING CONDITIONS OF HAWC 84 WATERLINE (3 OF 4)

WBS NO. S-000901-0015-4
DRAWING SCALE: NONE
CITY OF HOUSTON PM: RAM CHAKRADHAR, P.E.
SHEET NO. 50 OF 102

P:\130\10667-401\4-0-Production-Working\4-1-BIM-CAD\Details\10667-401_50 EXIST COND HAWC 84 1-4.dwg plotted on Oct 21, 2024 - 10:21am

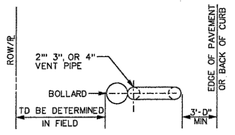
NOTE:
PROVIDE THREE (3) EXTRA CENTER LIDS FOR ECCENTRIC MANHOLE ACCESS LID. THE OVER LIDS ARE TO BE DELIVERED TO C.O.H. UTILITY OPERATIONS.



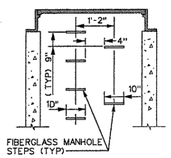
CONCENTRIC MANHOLE ACCESS LID
VULCAN V - 7048, OR EQUAL

ECCENTRIC MANHOLE ACCESS LID
VULCAN V - 7048 - 2, OR EQUAL

HEAVY DUTY MANHOLE RING AND COVER — 1



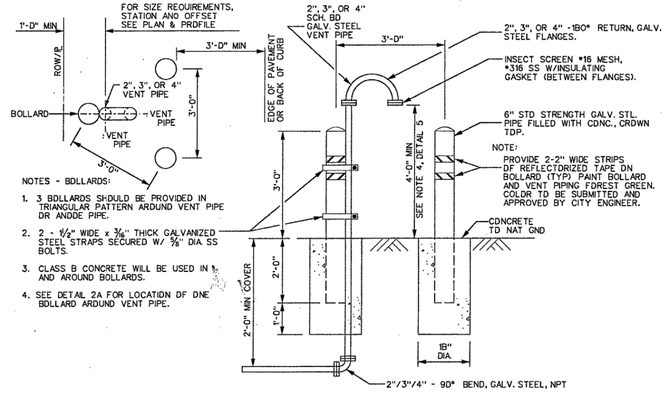
VENT PIPE WITH 1 BOLLARD DETAIL — 3



NOTES - MANHOLE STEPS:

1. PROVIDE MODEL PSI-PF STEPS AS MANUFACTURED BY M.A. INDUSTRIES INC. OR APPROVED EQUAL.
2. BOTTOM MANHOLE STEP SHALL BE NO HIGHER THAN 12" ABOVE MANHOLE INVERT.

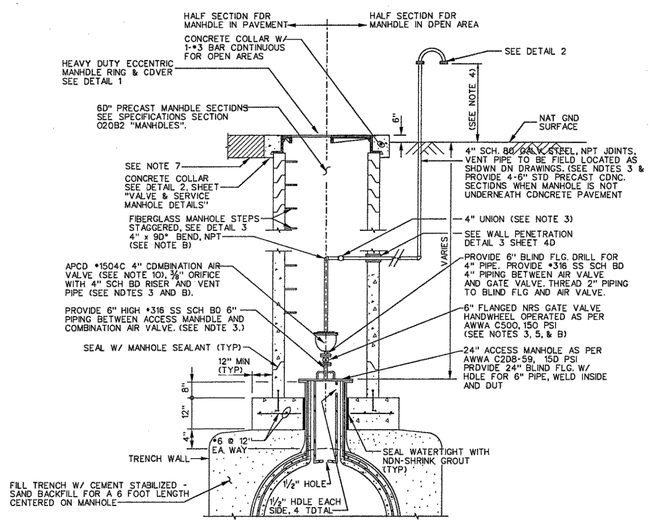
MANHOLE STEP DETAIL — 4



NOTES - BOLLARDS:

1. 3 BOLLARDS SHOULD BE PROVIDED IN TRIANGULAR PATTERN AROUND VENT PIPE OR ANODE PIPE.
2. 2 - 1½" WIDE x ⅜" THICK GALVANIZED STEEL STRAPS SECURED W/ ⅝" DIA SS BOLTS.
3. CLASS B CONCRETE WILL BE USED IN & AROUND BOLLARDS.
4. SEE DETAIL 2A FOR LOCATION OF ONE BOLLARD AROUND VENT PIPE.

VENT PIPE WITH 3 BOLLARDS DETAIL — 2

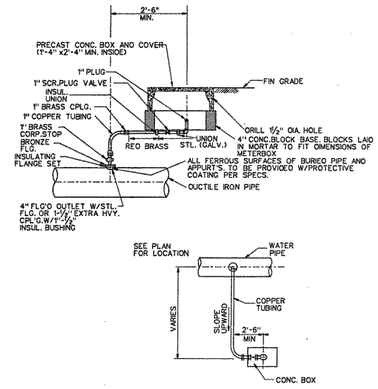


COMBINATION AIR VALVE ASSEMBLY WITH SERVICE MANHOLE — 5

(FOR WATER LINES LARGER THAN 30-INCHES IN DIAMETER)

NOTES:

1. PROVIDE RAMNEK OR APPROVED EQUAL BETWEEN PRECAST SEGMENTS OF THE MANHOLE.
2. FOR MANHOLES DEEPER THAN 20 FEET, SAFETY CLIMBING RAIL MUST BE PROVIDED (SAF-T-CLIMB OR APPROVED EQUAL).
3. IF 3" COMBINATION AIR VALVE IS CALLED FOR, THEN PROVIDE APCO #147C OR 1503C AIR VALVE. ALL OTHER PIPING AND APPURTENANCES SHOWN TO BE 4" DIAMETER SHALL BE 3" IN DIAMETER, AND SHALL BE CONSTRUCTED OF THE SAME MATERIAL AND CLASS.
4. VERIFY THAT LOCATION OF SCREEN IS 4 FEET ABOVE 100-YEAR FLOOD PLAIN ELEVATION OR 4 FEET ABOVE NATURAL GROUND WHICHEVER IS HIGHER.
5. WHEN ONLY ACCESS MANHOLE IS CALLED OUT ON PLAN AND PROFILE, DELETE REQUIREMENTS FOR AIR VALVE, VENT PIPING, AND BOLLARDS. PROVIDE 6" FLANGED GATE VALVE: HANDWHEEL OPERATED W/BLIND FLANGE.
6. REFER TO PLAN AND PROFILE SHEETS FOR LOCATIONS OF COMBINATION AIR VALVES.
7. FOR PAVEMENT REPAIR, SEE SHEET "EXCAVATION, BEDDING, BACKFILL AND PAVEMENT REPAIR DETAILS".
8. ALL PIPING AND APPURTENANCES SHOWN TO BE 4" DIAMETER SHALL MATCH THE VALVE DIAMETER, AND SHALL BE CONSTRUCTED OF THE SAME MATERIAL AND CLASS.
9. PROVIDE AN APPROVED PETROLEUM BASED TAPE ENCAPSULATING ALL BOLTS IN ACCESS MANHOLE.
10. PROVIDE 4" COMBINATION AIR VALVE FOR 84" WATER MAIN AND 42" WATER MAIN UNLESS OTHERWISE SHOWN.



1" CONNECTION DETAIL — 6

NOT TO SCALE

RECORD DRAWING

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REV	DATE	BY	DESCRIPTION
1	4/23/02	TRL	ISSUED FOR CONSTRUCTION
0	2/1/02	WOW	For Permit Approval

SCALE: NO SCALE

WARNING: IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

DESIGNED ____ DRAWN R DUNKERLEY CHECKED ____

SUBMITTED BY ____ (PROJECT MANAGER'S NAME) LICENSE NO. DATE ____ (COMPANY OFFICER'S NAME) LICENSE NO. DATE

MWH — MONTGOMERY WATSON HARZA
5100 Westheimer, Suite 580
Houston, TX 77056

Houston Area Water Corporation

NORTHEAST WATER PURIFICATION SYSTEM

COMBINATION AIR VALVE AND DETAILS

SHEET: GC-7

Binkley & Barfield, Inc.
Consulting Engineers
1710 Seamist Drive Houston, Texas 77088

THE ORIGINAL DRAWING WAS SEALED AND SIGNED BY WILLIAM DAVE WILKINSON, PE 85826 ON 4/1/2002
RECORD DRAWINGS AUTHORIZED BY CHRISTOPHER G. CANONICO, PE 90104 ON 6/20/2003

STATE OF TEXAS — CHRISTOPHER G. CANONICO — 90104 — REGISTERED PROFESSIONAL ENGINEER

SWTP — Surface Water Transmission Program

LAN
LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

INTERIM REVIEW ONLY
Document Incomplete; not intended for permit, bidding or construction.
Engineer: WILLIAM BYLAND, P.E.
P.E. Serial No.: 142061
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F-2614
Date:

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD
EXISTING CONDITIONS OF HAWC 84 WATERLINE
(4 OF 4)

WBS NO. S-000901-0015-4

DRAWING SCALE: NONE

CITY OF HOUSTON PM: RAM CHAKRADHAR, P.E.

SHEET NO. 51 OF 102

Job No: 1650228
File: ##8888\&&&\WORK\Drawings\VecGC7.dgn
User: GREthew
Plot Date: 08/07/2003

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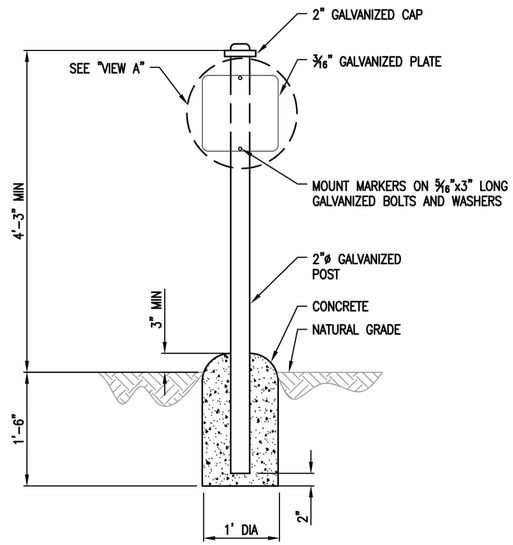
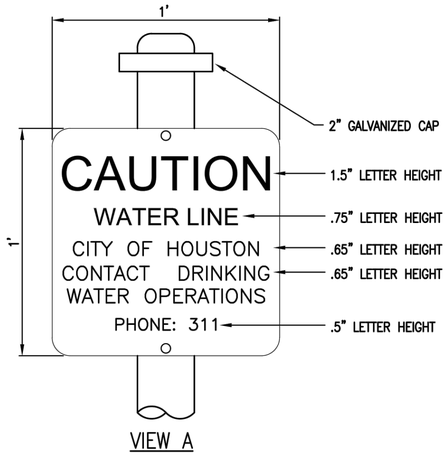


1 WATER LINE MARKER INSTALLATION
NOT TO SCALE



VIEW A

NOTES:

1. WATER LINE MARKER TO BE INSTALLED 1' INSIDE ROW OR EASEMENT OVER THE CENTER OF THE WATER LINE AS IDENTIFIED ON THE PLAN DRAWINGS.
2. VERIFY LABELING ON THE SIGN PRIOR TO MANUFACTURING.
3. SIGN TO BE BLUE BACKGROUND WITH BLACK LETTERING. USE BAKED ENAMEL PAINT.

NO.	DATE	REVISION	APP.

SWTP
Surface Water Transmission Program

LAN
LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

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Engineer: WILLIAM BYLAND, P.E.
P.E. Serial No.: 142061
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F-2614
Date:

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

WATER LINE MARKER

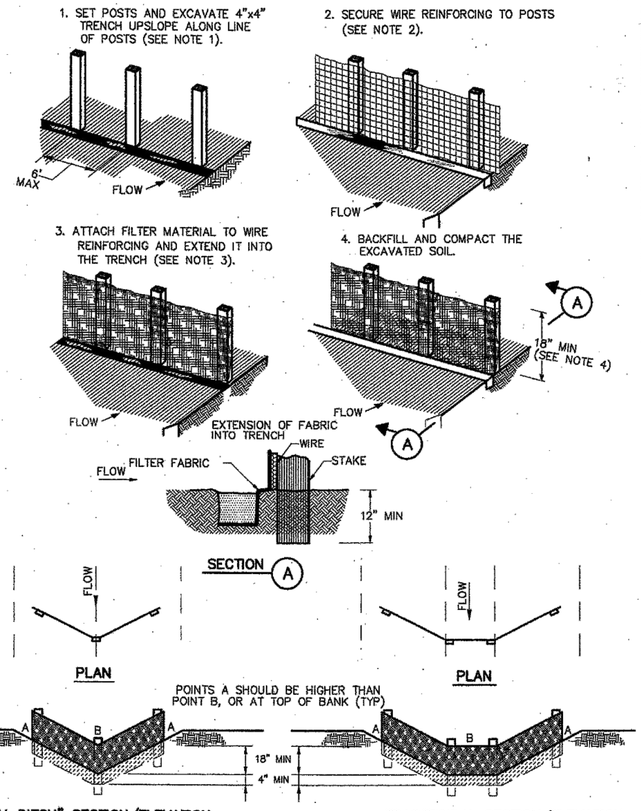
WBS NO. S-000901-0015-4

DRAWING SCALE
NONE

CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.

SHEET NO. 52 OF 102

P:\130\10667-401\4-0-Production-Working\4-1-BIM-CAD\Details\10667-401_52 WATER LINE MARKER.dwg plotted on Oct 21, 2024 - 10:24am

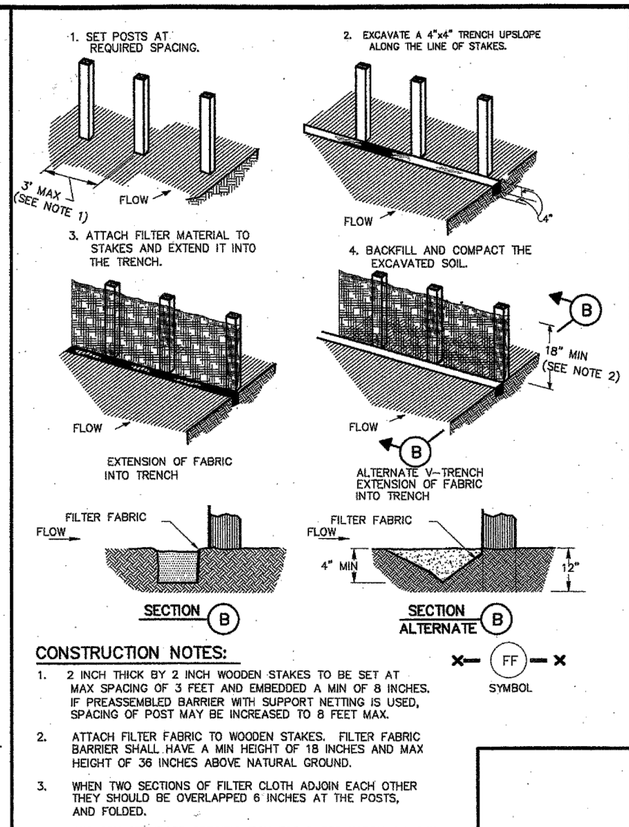


CONSTRUCTION NOTES:

1. SET 2 INCH BY 2 INCH WOODEN STAKES SPACED A MAX OF 6 FEET APART AND EMBEDDED A MIN OF 12 INCHES.
2. WOVEN WIRE REINFORCING TO BE FASTENED SECURELY TO BARRIER POSTS WITH STAPLES.
3. FILTER CLOTH TO BE FASTENED SECURELY TO WOVEN WIRE REINFORCING, WITH TIES SPACED EVERY 24 INCHES AT TOP AND MIDSECTION.
4. MINIMUM HEIGHT OF FILTER SHOULD BE 18 INCHES AND A MAXIMUM OF 36 INCHES ABOVE NATURAL GROUND.
5. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED 6 INCHES AT THE POSTS, AND FOLDED.
6. SEE COH STANDARD SPECIFICATION FOR FILTER FABRIC BARRIER.

RFB SYMBOL

REINFORCED FILTER FABRIC BARRIER

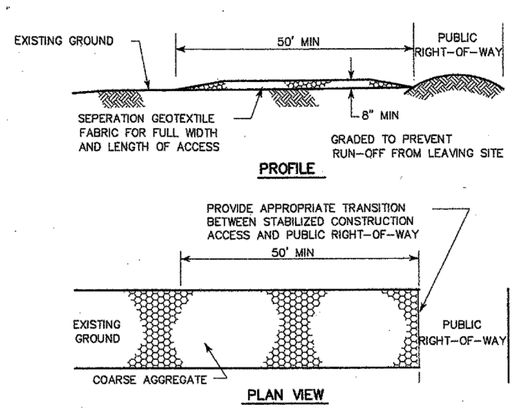


CONSTRUCTION NOTES:

1. 2 INCH THICK BY 2 INCH WOODEN STAKES TO BE SET AT MAX SPACING OF 3 FEET AND EMBEDDED A MIN OF 8 INCHES. IF PREASSEMBLED BARRIER WITH SUPPORT NETTING IS USED, SPACING OF POST MAY BE INCREASED TO 8 FEET MAX.
2. ATTACH FILTER FABRIC TO WOODEN STAKES. FILTER FABRIC BARRIER SHALL HAVE A MIN HEIGHT OF 18 INCHES AND MAX HEIGHT OF 36 INCHES ABOVE NATURAL GROUND.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHOULD BE OVERLAPPED 6 INCHES AT THE POSTS, AND FOLDED.
4. SEE COH STANDARD SPECIFICATION FOR FILTER FABRIC BARRIER.

FF SYMBOL

FILTER FABRIC BARRIER

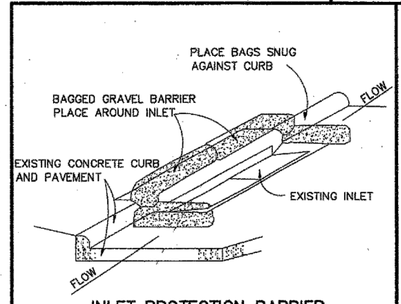


CONSTRUCTION NOTES:

1. LENGTH SHALL BE AS SHOWN ON THE CONSTRUCTION DRAWINGS, BUT NOT LESS THAN 50 FEET.
2. THICKNESS SHALL BE NOT LESS THAN 8 INCHES.
3. WIDTH SHALL BE NOT LESS THAN FULL WIDTH OF ALL POINTS OF INGRESS OR EGRESS.
4. STABILIZATION FOR OTHER AREAS SHALL HAVE THE SAME AGGREGATE THICKNESS AND WIDTH REQUIREMENTS AS THE STABILIZED CONSTRUCTION ACCESS, UNLESS OTHERWISE SHOWN ON THE CONSTRUCTION DRAWINGS.
5. STABILIZED AREA MAY BE WIDENED OR LENGTHENED TO ACCOMODATE A WASHING AREA. AN OUTLET SEDIMENT TRAP MUST BE PROVIDED FOR THE WASHING AREA.
6. COH STANDARD SPECIFICATION FOR STABILIZED CONSTRUCTION ACCESS.
7. STABILIZED CONSTRUCTION ACCESS SHALL BE MAINTAINED FREE OF SEDIMENT FOR THE DURATION OF THE PROJECT.

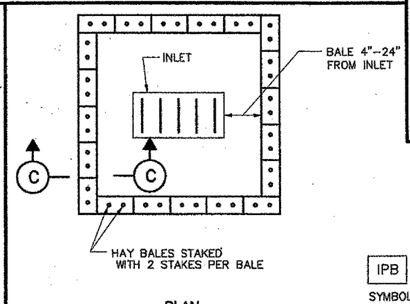
SC SYMBOL

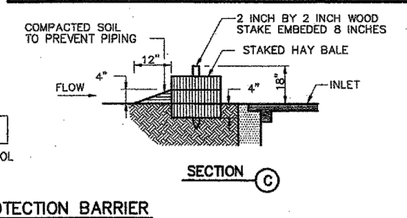
STABILIZED CONSTRUCTION ACCESS



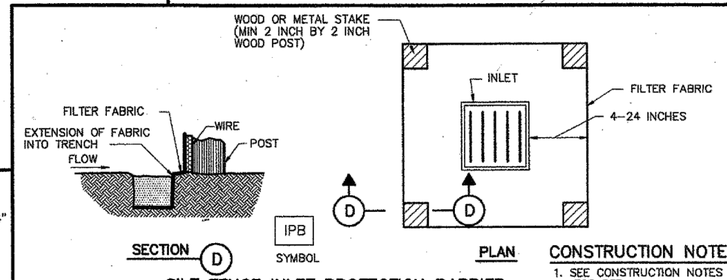
INLET PROTECTION BARRIER

(FOR STAGE II INLETS)
BAGGED GRAVEL BARRIER





HAY BALE INLET PROTECTION BARRIER



CONSTRUCTION NOTE:

1. SEE CONSTRUCTION NOTES FOR RFB.

SILT FENCE INLET PROTECTION BARRIER

SWTP
Surface Water Transmission Program

LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

INTERIM REVIEW ONLY
Document Incomplete; not intended for permit, bidding or construction.
Engineer: WILLIAM BYLAND, P.E.
P.E. Serial No.: 142061
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F-2614
Date:

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

STORM WATER POLLUTION PREVENTION PLAN DETAILS

(NOT TO SCALE)

APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JULY-01-2010	DWG NO: 01571-01

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

STORM WATER POLLUTION PREVENTION PLAN DETAILS

WBS NO. S-000901-0015-4	
DRAWING SCALE	
NONE	
CITY OF HOUSTON PM	
RAM CHAKRADHAR, P.E.	
SHEET NO. 53 OF 102	

NO.	DATE	REVISION	APP.

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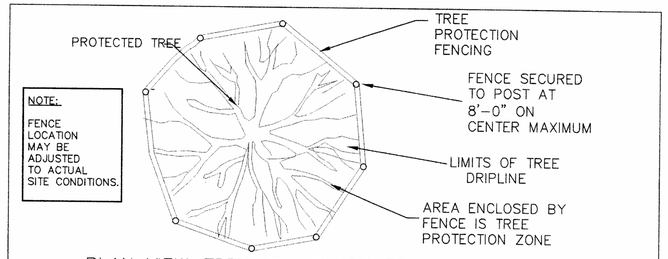
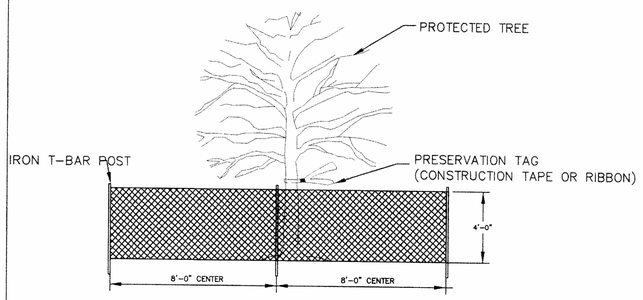
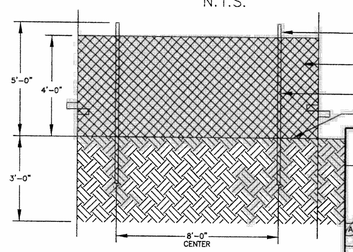


PLAN VIEW–TREE PROTECTION FENCING DETAIL
N.T.S.



FRONT VIEW–TREE PROTECTION FENCING DETAIL
N.T.S.



PROTECTIVE PLASTIC MESH FENCE
N.T.S.

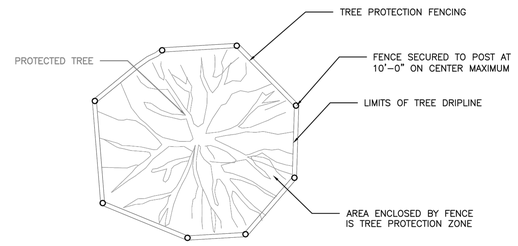
CITY OF HOUSTON DEPARTMENT OF PUBLIC WORKS AND ENGINEERING ENGINEERING, CONSTRUCTION AND REAL ESTATE DIVISION	
TREE PROTECTION GENERAL REQUIREMENTS (NOT TO SCALE)	
APPROVED: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: JULY–01–2009	DWG NO: 01562–01

DocuSign Envelope ID: CB71C116-B716-4899-A5EE-0D2F2CC55AF6

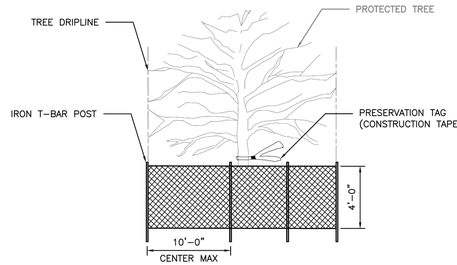
DISCLAIMER:
THE USE OF THIS STANDARD IS GOVERNED BY THE TEXAS ENGINEERING PRACTICE ACT. THE DESIGN REQUIREMENTS ON THIS STANDARD DO NOT PURPORT TO ADDRESS ALL OF THE SAFETY CONCERNS ASSOCIATED WITH ITS USE. THE ENGINEER OF RECORD (EOR) IS TO REVIEW THESE DESIGN REQUIREMENTS AND BY AUTHORING THEIR USE ASSUMES RESPONSIBILITY FOR ADDRESSING ALL SAFETY CONCERNS ASSOCIATED WITH THEIR USE. ANY MODIFICATIONS MADE BY THE EOR TO THESE DESIGN REQUIREMENTS SHALL BE SIGNED AND SEALED BY A REGISTERED PROFESSIONAL ENGINEER. THE CITY OF HOUSTON (COH) IS PROVIDING THIS STANDARD "AS IS" AND NO WARRANTY IS MADE, EITHER EXPRESSED OR IMPLIED, AS TO ITS ACCURACY, COMPLETENESS OR FITNESS FOR ANY PURPOSES WHATSOEVER. THE CITY OF HOUSTON ASSUMES NO RESPONSIBILITY FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.

NOTES:

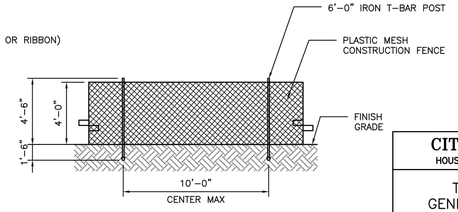
FENCE LOCATION MAY BE ADJUSTED TO ACTUAL SITE CONDITIONS.



PLAN VIEW
TREE PROTECTION FENCING DETAIL



FRONT VIEW
TREE PROTECTION FENCING DETAIL



DETAIL B–4
PROTECTIVE PLASTIC MESH FENCE

CITY OF HOUSTON HOUSTON PUBLIC WORKS STANDARD	
TREE PROTECTION GENERAL REQUIREMENTS (SCALE: NOT TO SCALE)	
APPROVED BY:	
DocuSigned by: Suhail Irainwar CITY ENGINEER	DocuSigned by: Carl Haddock DIRECTOR OF HPW
EFF DATE: NOV–27–2023	DWG NO: 01562–01

NO.	DATE	REVISION	APP.

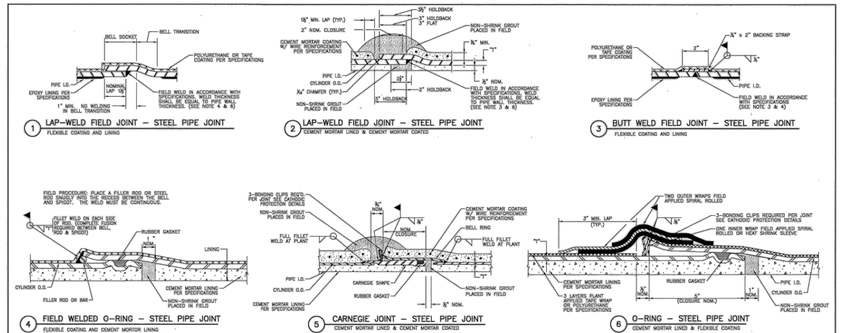
Surface Water Transmission Program

LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

INTERIM REVIEW ONLY
Document incomplete; not intended for permit, bidding or construction.
Engineer: WILLIAM BYLAND, P.E.
P.E. Serial No. 142921
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F-2614
Date:

CITY OF HOUSTON HOUSTON PUBLIC WORKS	
84–INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD TREE PROTECTION DETAIL	
WBS NO. S–000901–0015–4	
DRAWING SCALE	
NONE	
CITY OF HOUSTON PM	
RAM CHAKRADHAR, P.E.	
SHEET NO. 54 OF 102	

P:\130\130-10667-4014-0-Production-Working\4-1-BIM-CAD\Details\10667-401_54-TREE PROTECTION.dwg plotted on Feb 21, 2025 - 2:55pm


BELL SOCKET
BELL TRANSITION
POLYURETHANE OR TAPE COATING PER SPECIFICATIONS
PIPE I.D.
NONSTD LAP "B"
EPOXY LINING PER SPECIFICATIONS
FIELD WELD IN ACCORDANCE WITH SPECIFICATIONS. WELD THICKNESS SHALL BE EQUAL TO PIPE WALL THICKNESS. (SEE NOTE 4 & 6)
1" MIN. NO WELDING IN BELL TRANSITION
1/8" MIN. LAP (TYP.)
2" NOM. CLOSURE
CEMENT MORTAR COATING W/ WIRE REINFORCEMENT PER SPECIFICATIONS
PIPE I.D.
CYLINDER O.D.
1/4" CHAMFER (TYP.)
NON-SHRINK GROUT PLACED IN FIELD
3/8" HOLDBACK
1" HOLDBACK
3" HOLDBACK
NON-SHRINK GROUT PLACED IN FIELD
1/2" MIN.
1" NOM.
FIELD WELD IN ACCORDANCE WITH SPECIFICATIONS. WELD THICKNESS SHALL BE EQUAL TO PIPE WALL THICKNESS. (SEE NOTE 3 & 6)
POLYURETHANE OR TAPE COATING PER SPECIFICATIONS
EPOXY LINING PER SPECIFICATIONS
3/4" x 2" BACKING STRAP
PIPE I.D.
FIELD WELD IN ACCORDANCE WITH SPECIFICATIONS (SEE NOTE 3 & 6)
FIELD PROCEDURE: PLACE A FILLER ROD OR STEEL ROD SNUGLY INTO THE RECESS BETWEEN THE BELL AND SPIGOT. THE WELD MUST BE CONTINUOUS.
FILLET WELD ON EACH SIDE OF ROD, COMPLETELY FILLING RECESS BETWEEN BELL AND SPIGOT (SEE NOTE 1)
RUBBER GASKET
LINING
CEMENT MORTAR LINING PER SPECIFICATIONS
NON-SHRINK GROUT PLACED IN FIELD
FILLER ROD OR BAR
CYLINDER O.D.
3-BONDING CLIPS REQ'D PER JOINT SEE CATHODIC PROTECTION DETAILS
NON-SHRINK GROUT PLACED IN FIELD
FULL FILLET WELD AT PLANT
CEMENT MORTAR COATING W/ WIRE REINFORCEMENT PER SPECIFICATIONS
BELL RING
GARNEGIE SHAPE
PIPE I.D.
CYLINDER O.D.
RUBBER GASKET
CEMENT MORTAR LINING PER SPECIFICATIONS
NON-SHRINK GROUT PLACED IN FIELD
TWO OUTER WRAPS FIELD APPLIED SPIRAL ROLLED
3" MIN. LAP (TYP.)
3-BONDING CLIPS REQUIRED PER JOINT SEE CATHODIC PROTECTION DETAILS
ONE INNER WRAP FIELD APPLIED SPIRAL ROLLED OR HIGH SHRINK SLEEVE
CEMENT MORTAR LINING PER SPECIFICATIONS
3 LAYERS PLANT APPLIED TAPE WRAP PER MANUFACTURER'S SPECIFICATIONS
RUBBER GASKET
PIPE I.D.
CYLINDER O.D.
NON-SHRINK GROUT PLACED IN FIELD
1 LAYER PLANT APPLIED TAPE WRAP PER MANUFACTURER'S SPECIFICATIONS
NOTES:
1. T = STEEL CYLINDER THICKNESS AND SIZE OF FILLET ATTACHMENT WELD.
2. ALL REFERENCES TO PIPE DIAMETER FOR THIS SHEET SHOWING PIPE BELL MEASURED TO INSIDE DIAMETER OF THE LINED PIPE.
3. DETAILS 1 AND 2 SHOW EPOXY LINING. CEMENT MORTAR LINING TO BE SIMILAR TO DETAILS ON THIS SHEET SHOWING CEMENT MORTAR LINED PIPE, AS APPROVED BY PROGRAM MANAGER.
4. SEE SPECIFICATIONS FOR REPAIR OF EPOXY LINING.
5. WHEN CEMENT MORTAR COATING IS USED FOR STEEL PIPE, FLEXIBLE MASTIC SEALER SHALL BE APPLIED TO THE EXTERIOR OF THE JOINT PRIOR TO JOINT ENCAPSULATION WHERE PIPE IS INSTALLED IN A TUNNEL OR ENCASEMENT PIPE.
6. OUTSIDE WELD MAY BE SUBSTITUTED FOR INSIDE WELD. INTERIOR WELDING IS NOT RECOMMENDED FOR 30" DIAMETER PIPE AND SMALLER.
CITY OF HOUSTON
HOUSTON PUBLIC WORKS
STANDARD LDWL
STEEL PIPE DETAILS
(SHEET 1 OF 2)
(NOT TO SCALE)
APPROVED BY: ACTING CITY ENGINEER
APPROVED BY: DIRECTOR OF HOUSTON PUBLIC WORKS
EFF DATE: MAR-20-2018
DWG NO. 02510-01
JOINT – EMBEDDED CYLINDER PIPE
FIELD PROCEDURE: WITH THE JOINT ENGAGED THE INSIDE WELD WILL BE MADE BY ACCESS THROUGH THE PIPE. THE JOINT GROUT SHALL THEN BE PLACED AS SHOWN.
WELDED JOINT WITH TRIMMED SPIGOT – EMBEDDED CYLINDER PIPE
JOINT – LINED CYLINDER PIPE
WELDED JOINT – LINED CYLINDER PIPE
(INTERIOR WELD FOR WATERLINES 36-INCHES DIAMETER AND LARGER)
FIELD PROCEDURE: WITH THE JOINT ENGAGED THE INSIDE WELD WILL BE MADE BY ACCESS THROUGH THE PIPE. THE JOINT GROUT SHALL THEN BE PLACED AS SHOWN.
WELDED JOINT – LINED CYLINDER PIPE
(EXTERIOR WELD FOR WATER LINES LESS THAN 36-INCHES IN DIAMETER)
FIELD PROCEDURE: PLACE STEEL ROD SNUGLY INTO THE RECESS BETWEEN THE BELL AND SPIGOT. THE WELD MUST BE CONTINUOUS.
CITY OF HOUSTON
HOUSTON PUBLIC WORKS
STANDARD LDWL
PRESTRESSED CONCRETE
CYLINDER PIPE DETAILS
(NOT TO SCALE)
APPROVED BY: ACTING CITY ENGINEER
APPROVED BY: DIRECTOR OF HOUSTON PUBLIC WORKS
EFF DATE: MAR-20-2310
DWG NO. 02507-01
4" OVERLAP, (TYP.)
"T" x 12" WIDE MIN. SPLICE PLATE UNLESS APPROVED BY PROGRAM MANAGER
FIELD APPLIED NON-SHRINK GROUT
DETAIL 1 - NOTE:
1. WELD SIZE SHALL MATCH THICKNESS OF BUTT STRAP AND CARRIER PIPE, AS RECOMMENDED BY THE PIPE MANUFACTURER.
2. INTERNAL WELD NOT RECOMMENDED FOR 30" DIAMETER PIPE AND SMALLER.
3. NO ANGULAR DEFLECTION ALLOWED.
CLOSURE PIECE
FOR STEEL PIPE WITH CEMENT MORTAR LINED AND CEMENT MORTAR COATED (SIMILAR FOR FLEXIBLE COATING AND LINING)
CEMENT MORTAR COATING W/ WIRE REINFORCEMENT PER SPECIFICATIONS
CEMENT MORTAR LINING PER SPECIFICATIONS
COATING PER SPEC.
6" OUTLET W/ BLIND FLANGE
DETAIL 2 - NOTE:
1. DISHED HEAD PLUGS SHALL BE CAPABLE OF WITHSTANDING THE HYDROSTATIC TEST PRESSURE FROM EITHER SIDE, WITH THE OPPOSITE SIDE EMPTY OF WATER.
INTERNAL ELLIPTICAL DISHED HEAD PLUG
FOR STEEL PIPE WITH CEMENT MORTAR LINED AND CEMENT MORTAR COATED STEEL PIPE SPECIAL
3/4" MAX.
FLAME CUT IN FIELD
PLACE 2"x6"x13 GA WELDED WIRE MESH IN OPENING AND PACK WITH NON-SHRINK GROUT AFTER TEST PLUG IS REMOVED.
INTERNAL ELLIPTICAL DISHED HEAD PLUG REMOVAL
FOR STEEL PIPE WITH CEMENT MORTAR LINED AND CEMENT MORTAR COATED STEEL PIPE SPECIAL
4" MIN.
2" MIN.
EPOXY LINING PER SPECIFICATIONS (SEE NOTE 3)
INTERNAL ELLIPTICAL DISHED HEAD PLUG (CUT AND REMOVE AFTER TEST)
INTERNAL ELLIPTICAL DISHED HEAD PLUG REMOVAL
FOR STEEL PIPE WITH FLEXIBLE COATING AND LINING
HEAT RESISTANT TAPE COATING CENTERED OVER WELD
1" MIN.
COATING PER SPEC.
EPOXY LINING PER SPECIFICATIONS
6" OUTLET W/ BLIND FLANGE
DETAIL 5 - NOTE:
1. DISHED HEAD PLUGS SHALL BE CAPABLE OF WITHSTANDING THE HYDROSTATIC TEST PRESSURE FROM EITHER SIDE, WITH THE OPPOSITE SIDE EMPTY OF WATER.
INTERNAL ELLIPTICAL DISHED HEAD PLUG
FOR STEEL PIPE WITH FLEXIBLE COATING AND LINING
STEEL FILLER RING AS REQUIRED SEE NOTE 8
MIN. 12" L STEEL CLOSURE RING, 0.500" THK. FIELD CUT TO FIT AS NECESSARY SEE NOTE 8
EXISTING PCCP-SPIGOT, SEE NOTE 10
FIELD APPLIED JOINT DIAPER
EXISTING PCCP-BELL SEE NOTE 10
SEAL WELD
1" MORTAR COATING
SLOT WELD
FIELD APPLIED NON-SHRINK GROUT
3/4" CML
STEEL PIPE, MIN. 0.288" THK.
3/4" CML
FIELD APPLIED NON-SHRINK GROUT
WELD TO ENSURE WATER TIGHTNESS
CONNECTION PIECE DETAIL STEEL-TO-PCCP BELL/SPIGOT
(OPTION 1: IF EXISTING PIPE JOINT IS NOT WELDED)
FIELD APPLIED JOINT DIAPER
EXISTING PCCP-BELL SEE NOTE 10
MIN. 12" L STEEL CLOSURE RING, 0.500" THK. FIELD CUT TO FIT AS NECESSARY. SEE NOTE 8.
NOTES:
1. T = STEEL CYLINDER THICKNESS AND SIZE OF FILLET ATTACHMENT WELD.
2. ALL REFERENCES TO PIPE DIAMETER FOR THIS SHEET SHOWING PIPE BELL MEASURED TO INSIDE DIAMETER OF THE LINED PIPE.
3. DETAILS 4 AND 5 SHOW EPOXY LINING. CEMENT MORTAR LINING TO BE SIMILAR TO DETAILS ON THIS SHEET SHOWING CEMENT MORTAR LINED PIPE, AS APPROVED BY PROGRAM MANAGER.
4. SEE SPECIFICATIONS FOR REPAIR OF EPOXY LINING.
5. WHEN CEMENT MORTAR COATING IS USED FOR STEEL PIPE, FLEXIBLE MASTIC SEALER SHALL BE APPLIED TO THE EXTERIOR OF THE JOINT PRIOR TO JOINT ENCAPSULATION WHERE PIPE IS INSTALLED IN A TUNNEL OR ENCASEMENT PIPE.
6. OUTSIDE WELD MAY BE SUBSTITUTED FOR INSIDE WELD. INTERIOR WELDING IS NOT RECOMMENDED FOR 30" DIAMETER PIPE AND SMALLER.
7. FIELD VERIFY INSIDE DIAMETER OF JOINT RING.
8. RING THICKNESS TO BE DETERMINED BASED ON FIELD VERIFIED JOINT DIMENSIONS.
9. COATINGS ON PROPOSED PIPE TO BE SIMILAR TO EXISTING PIPE.
10. PROTECT EXISTING PIPE SECTIONS TO REMAIN IN PLACE. NOTIFY ENGINEER IF ANY SUSPECTED DAMAGE OCCURS.
CONNECTION PIECE DETAIL STEEL-TO-PCCP BELL/SPIGOT
(OPTION 2: IF EXISTING PIPE JOINT IS WELDED)
CITY OF HOUSTON
HOUSTON PUBLIC WORKS
STANDARD LDWL
STEEL PIPE DETAILS
(SHEET 2 OF 2)
(NOT TO SCALE)
APPROVED BY: ACTING CITY ENGINEER
APPROVED BY: DIRECTOR OF HOUSTON PUBLIC WORKS
EFF DATE: MAR-20-2018
DWG NO. 02510-02
SWTP
Surface Water Transmission Program
LAN
LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042
INTERIM REVIEW ONLY
Document Incomplete; not intended for permit, bidding or construction.
Engineer: WILLIAM BYLAND, P.E.
P.E. Serial No.: 142061
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F-2614
Date:
CITY OF HOUSTON
HOUSTON PUBLIC WORKS
84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD
LDWL STEEL PIPE DETAILS
WBS NO. S-000901-0015-4
DRAWING SCALE
NONE
CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.
SHEET NO. 55 OF 102
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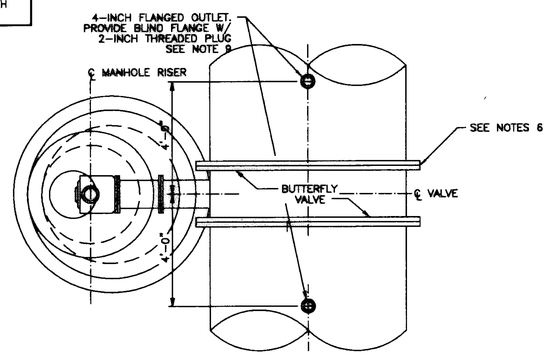
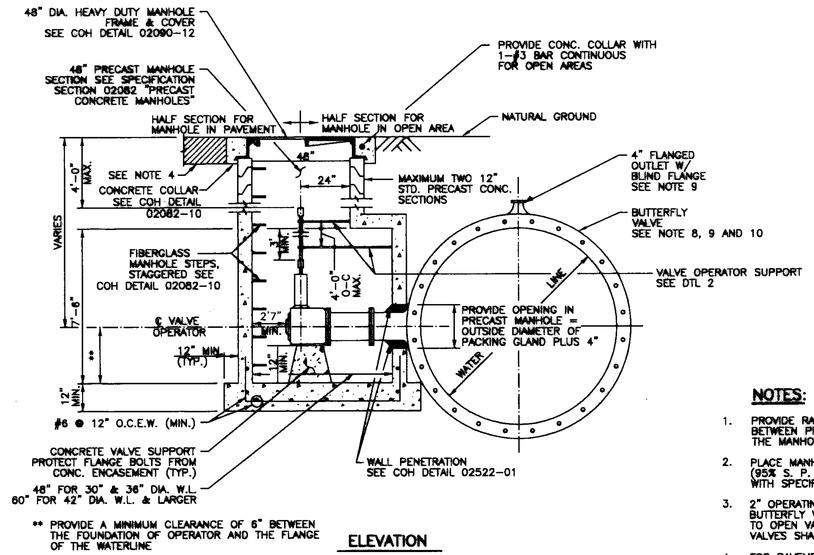
NOTE:
SHOULD CONTRACTOR DESIRE TO USE VALVES IN A THROTTLED POSITION FOR FILLING OF LINE SEGMENTS, CONTRACTOR IS CAUTIONED TO OBSERVE RECOMMENDATIONS OF VALVE MANUFACTURER IN ORDER TO PRECLUDE DAMAGE ASSOCIATED WITH THIS MODE OF OPERATION.



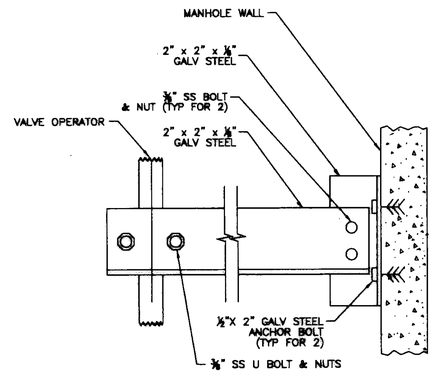
PLAN



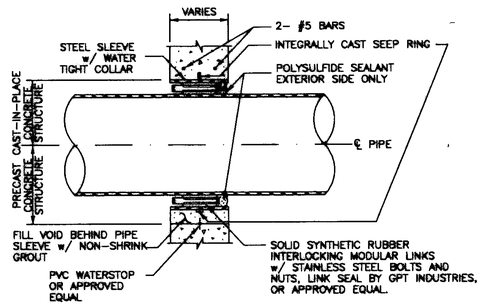
** PROVIDE A MINIMUM CLEARANCE OF 6" BETWEEN THE FOUNDATION OF OPERATOR AND THE FLANGE OF THE WATERLINE

ELEVATION

1 BUTTERFLY VALVE AND OPERATOR MANHOLE DETAIL
(FOR WATER LINES 30-INCHES TO 96-INCH IN DIAMETER)



2 VALVE OPERATOR SUPPORT



3 TYPICAL WALL PENETRATION DETAIL

NOTES:

1. PROVIDE RAMNEK OR APPROVED EQUAL BETWEEN PRECAST SEGMENTS OF THE MANHOLE.
2. PLACE MANHOLE ON NEW COMPACTED (95% S. P. D.) BOTTOM IN ACCORDANCE WITH SPECIFICATION 02316.
3. 2" OPERATING NUT ON LARGE DIAMETER BUTTERFLY VALVES SHALL TURN CLOCKWISE TO OPEN VALVE. ABOVE-GROUND AND PLANT VALVES SHALL OPEN COUNTERCLOCKWISE.
4. FOR PAVEMENT REPAIR, SEE COH DETAILS 02902-01 & 02902-02.
5. FOR MANHOLES DEEPER THAN 20 FEET, PROVIDE SAFETY CLIMBING RAIL (SAF-T-CLIMB OR EQUAL)
6. FOR JOINT BONDING DETAILS AT BUTTERFLY VALVES SEE COH DETAIL 15640-02.
7. ADJUST MANHOLE AND MANHOLE OPENING TO ALIGN WITH VALVE OPERATOR NUT FOR EASE OF OPERATION
8. FOR VALVES GREATER THAN OR EQUAL TO 24-INCH DIAMETER, BACKFILL USING CONTROLLED LOW STRENGTH MATERIAL (CLSM, 100 P.S.I. MIN.) EXTENDING FROM THE VALVE CENTERLINE TO 7-FEET UPSTREAM AND DOWNSTREAM OF THE VALVE CENTERLINE FROM THE BOTTOM OF THE TRENCH TO 12-INCH MIN. ABOVE THE TOP OF PIPE. PROVIDE BUOYANCY CONTROL.
9. ADJUST FLANGED OUTLET LOCATION TO 9-FEET FROM VALVE CENTER LINE FOR VALVES GREATER THAN OR EQUAL TO 54-INCH DIAMETER.
10. USE ENCAPSULATED BOLTS AND POLYETHYLENE WRAP AS A BOND BREAKER BETWEEN PIPE, VALVE AND CLSM. ENSURE CLSM IS PROPERLY FILLED IN PIPE HAUNCHES. FOUR CLSM IN LIFTS.

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

STANDARD LDWL BUTTERFLY VALVE AND OPERATOR MANHOLE DETAILS

(NOT TO SCALE)

APPROVED BY:	APPROVED BY:
ACTING CITY ENGINEER	DIRECTOR OF HOUSTON PUBLIC WORKS
EFF DATE: MAR-20-2018	DWG NO: 02522-01

NO.	DATE	REVISION	APP.

SWTP
Surface Water Transmission Program

LAN
LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

INTERIM REVIEW ONLY
Document Incomplete; not intended for permit, bidding or construction.
Engineer: WILLIAM BYLAND, P.E.
P.E. Serial No.: 142061
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F-2614
Date:

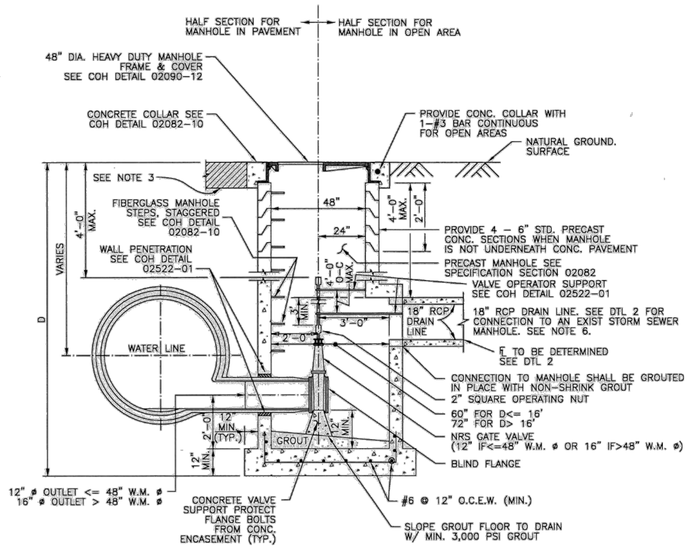
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

LDWL ISOLATION VALVE DETAILS

WBS NO. S-000901-0015-4
DRAWING SCALE
NONE
CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.
SHEET NO. 56 OF 102

P:\130\10687-401\4-0-Production-Working\4-1-BIM-CAD\Details\10687-401_56-ISOLATION VALVE DETAIL.dwg plotted on Oct 18, 2024 - 12:33pm

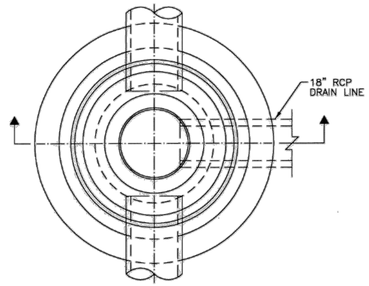


SERVICE MANHOLE FOR DRAINLINE VALVE CONNECTION

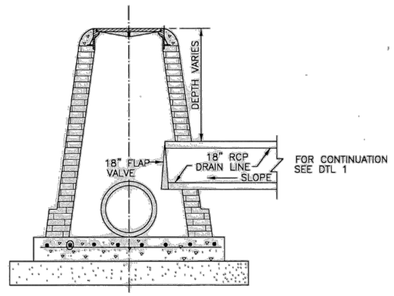
1

NOTES:

1. PROVIDE RAMNEK OR APPROVED EQUAL BETWEEN PRECAST SEGMENTS OF THE MANHOLE.
2. PLACE MANHOLE ON NEW COMPACTED (95% S. P. D.) BOTTOM IN ACCORDANCE WITH SPECIFICATION 02316.
3. FOR PAVEMENT REPAIR, SEE COH DETAILS 02902-01 & 02902-02.
4. FOR MANHOLES DEEPER THAN 20 FEET, PROVIDE SAFETY CLIMBING RAIL (SAF-T-CLIMB OR EQUAL). SEE COH DETAIL 02082-11.
5. ADJUST MANHOLE AND MANHOLE OPENING TO ALIGN WITH VALVE OPERATOR NUT FOR EASE OF OPERATION.
6. IF PROPOSED STORM SEWER MANHOLE IS CALLED OUT IN PLANS, SEE COH DETAILS 02081-01 OR 02081-02.



PLAN
(COVER NOT SHOWN)



SECTION

DRAIN LINE CONNECTION TO EXISTING STORM SEWER MANHOLE

2

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

STANDARD LDWL
DRAIN LINE VALVE DETAILS

(NOT TO SCALE)

APPROVED BY:	APPROVED BY:
ACTING CITY ENGINEER	DIRECTOR OF HOUSTON PUBLIC WORKS
EFF DATE: MAR-20-2018	DWG NO: 02511-03

NO.	DATE	REVISION	APP.

SWTP
Surface Water Transmission Program

LAN
LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

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Document Incomplete: not intended for permit, bidding or construction.
Engineer: WILLIAM BYLAND, P.E.
P.E. Serial No.: 142061
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F-2614
Date:

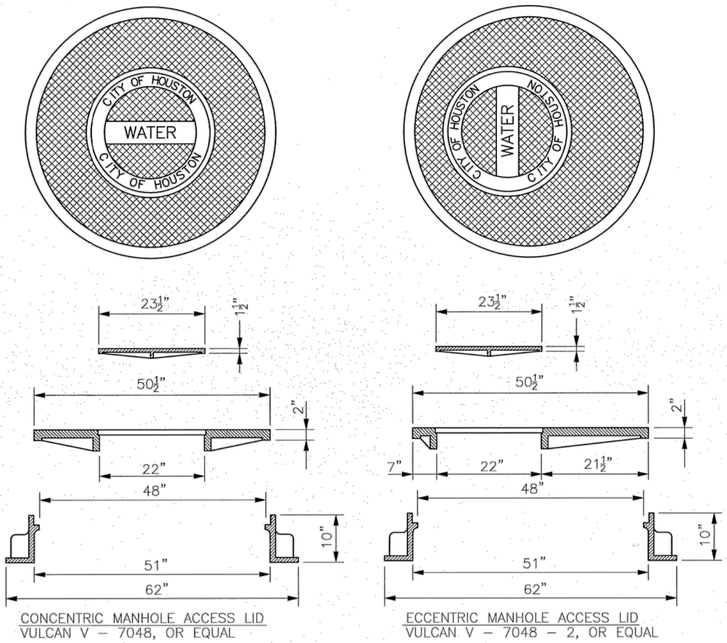
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

DRAINLINE VALVE DETAILS

WBS NO. S-000901-0015-4
DRAWING SCALE
NONE
CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.
SHEET NO. 57 OF 102

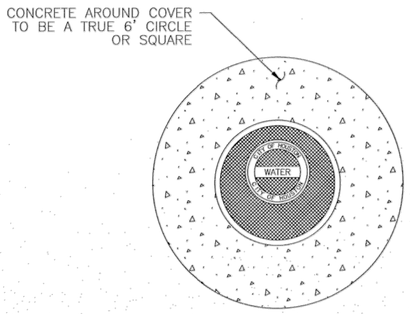
P:\130\10667-401\4-0-Production-Working\4-1-BIM-CAD\Details\10667-401_57 DRAINLINE VALVE DETAILS.dwg plotted on Oct 21, 2024 - 10:30am



CONCENTRIC MANHOLE ACCESS LID
VULCAN V – 7048, OR EQUAL

ECCENTRIC MANHOLE ACCESS LID
VULCAN V – 7048 – 2, OR EQUAL

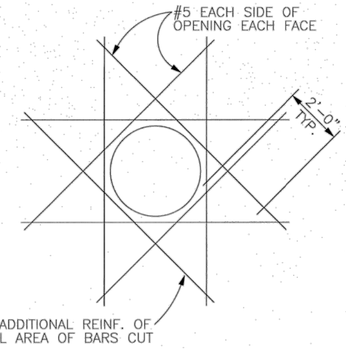
1 HEAVY DUTY MANHOLE RING AND COVER



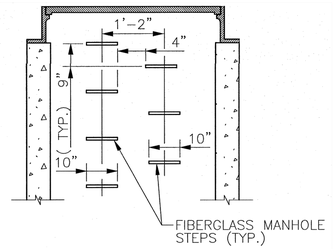
NOTES:

1. CONSTRUCT THE FINAL TWO FEET OF THE MANHOLE AND PLACE CONCRETE WITHIN BLOCKOUT AFTER THE STREET PAVEMENT HAS BEEN INSTALLED.

2 MANHOLE CONCRETE COLLAR DETAIL



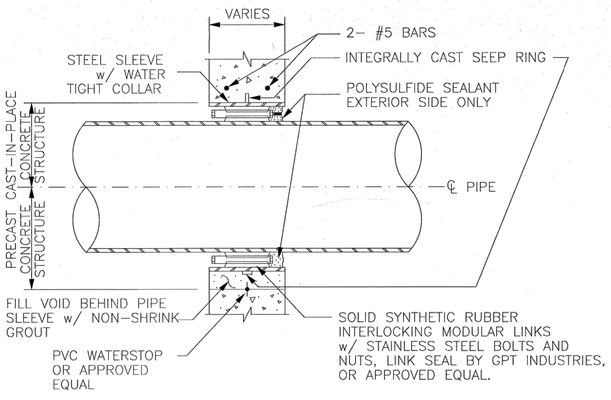
3 SERVICE MANHOLE REINFORCEMENT DETAIL



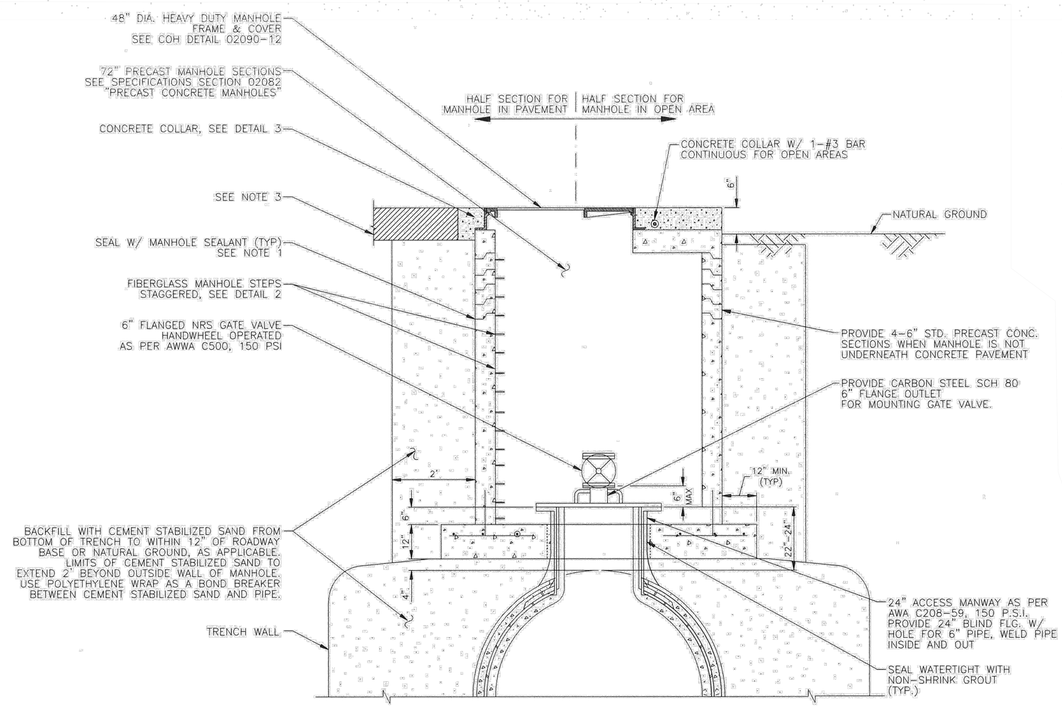
NOTES – MANHOLE STEPS:

1. PROVIDE MODEL PS1–PF STEPS AS MANUFACTURED BY M.A. INDUSTRIES INC. OR APPROVED EQUAL.
2. BOTTOM MANHOLE STEP SHALL BE NO HIGHER THAN 12" ABOVE MANHOLE INVERT.

4 MANHOLE STEP DETAIL



5 TYPICAL WALL PENETRATION DETAIL



6 ACCESS MANWAY IN ACCESS MANHOLE

(FOR WATER LINES 36–INCH TO 96–INCH DIAMETER)

DETAIL 6 – NOTES:

1. PROVIDE RAM–NEK OR APPROVED EQUAL BETWEEN PRECAST SEGMENTS OF THE MANHOLE.
2. FOR MANHOLE DEEPER THAN 20 FEET, SAFETY CLIMBING RAIL MUST BE PROVIDED (SAF–T–CLIMB OR APPROVED EQUAL)
3. FOR PAVEMENT REPAIR, SEE COH STANDARD DETAILS 02902–01 & 02902–02.
4. PROVIDE AN APPROVED PETROLATUM BASED TAPE ENCAPSULATING ALL BOLTS IN ACCESS MANHOLE.

NO.	DATE	REVISION	APP.

SWP
Surface Water Transmission Program

LAN
LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

INTERIM REVIEW ONLY
Document Incomplete; not intended for permit, bidding or construction.
Engineer: WILLIAM BYLAND, P.E.
P.E. Serial No.: 142061
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F–2614
Date:

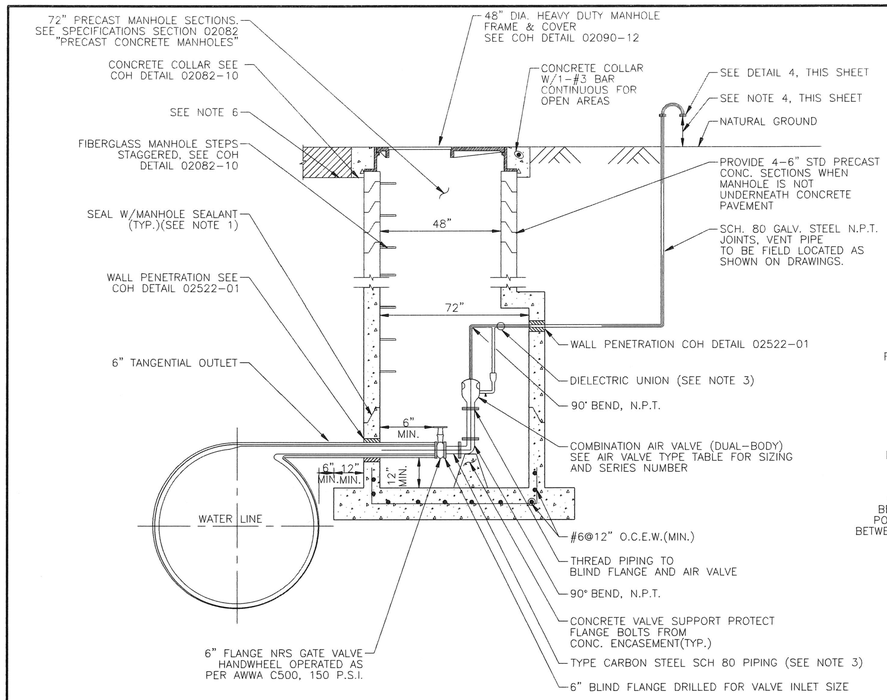
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84–INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

LDWL MANHOLE DETAILS

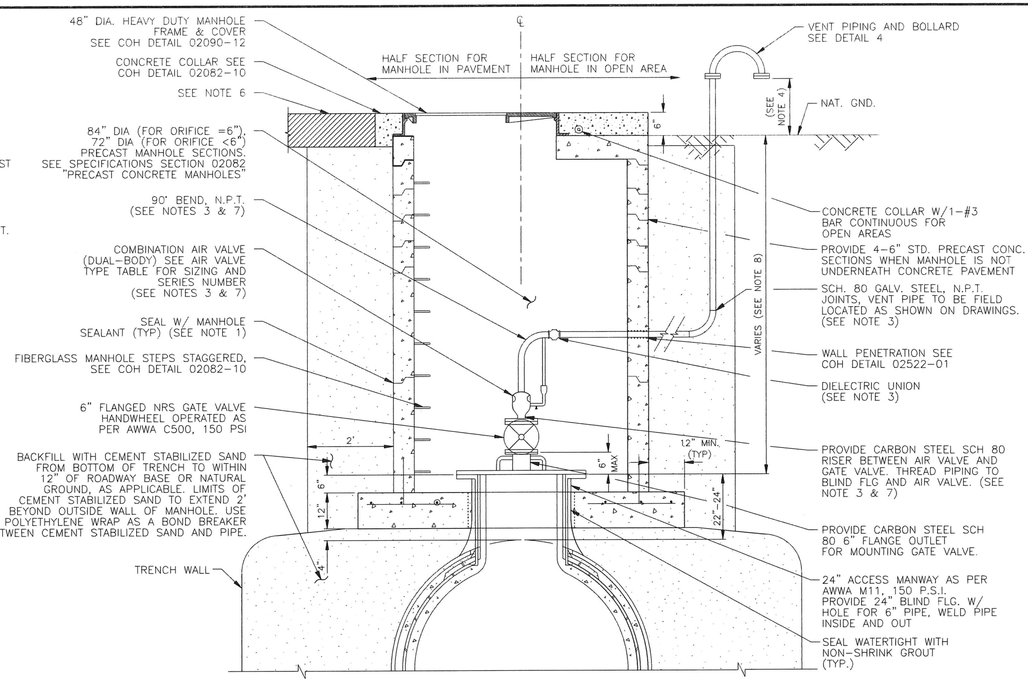
WBS NO. S–000901–0015–4	
DRAWING SCALE	
NONE	
CITY OF HOUSTON PM	
RAM CHAKRADHAR, P.E.	
SHEET NO. 58 OF 102	

P:\130\10667-401\4-0-Production-Working\4-1-BIM-CAD\Details\10667-401_58 LDWL MANHOLE DETAILS.dwg plotted on Oct 18, 2024 - 12:35pm



1 LOW PROFILE AIR VALVE ASSEMBLY

(FOR WATER LINES 36-INCH TO 96-INCH DIAMETER, ONLY IF SPECIFIED IN PLAN AND PROFILE SHEETS)

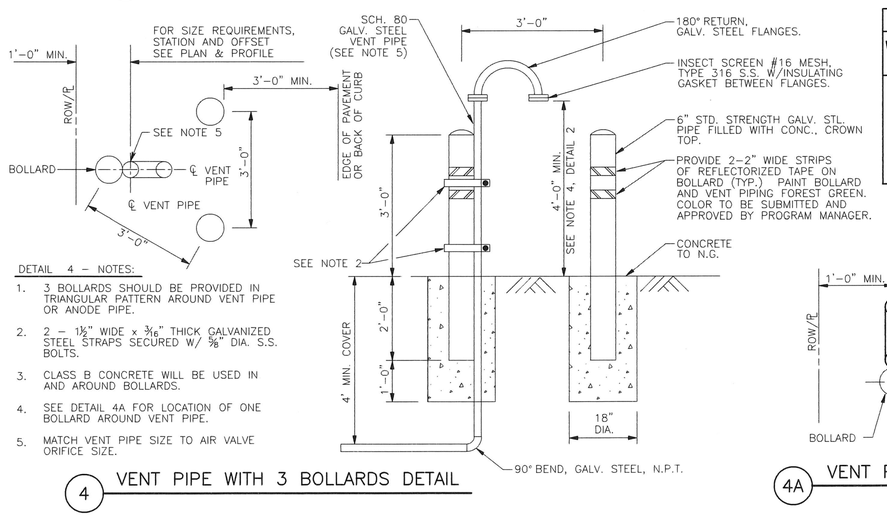


2 AIR VALVE ASSEMBLY WITH ACCESS MANWAY IN SERVICE MANHOLE

(FOR WATER LINES 36-INCH TO 96-INCH DIAMETER)

DETAILS 1 & 2 – NOTES:

1. PROVIDE RAM-NEK OR APPROVED EQUAL BETWEEN PRECAST SEGMENTS OF THE MANHOLE.
2. FOR MANHOLES DEEPER THAN 20 FEET, SAFETY CLIMBING RAIL MUST BE PROVIDED (SAF-T-CLIMB OR APPROVED EQUAL). SEE COH DETAIL 02082-11.
3. PIPING AND APPURTENANCES OF THE SAME DIAMETER AND CONSTRUCTED OF THE SAME MATERIAL AND CLASS.
4. VERIFY THAT LOCATION OF VENT PIPE SCREEN IS 1 FOOT ABOVE 100-YEAR FLOOD PLAIN ELEVATION OR 4 FEET ABOVE NATURAL GROUND WHICHEVER IS HIGHER.
5. REFER TO PLAN AND PROFILE SHEETS FOR LOCATIONS OF AIR VALVES.
6. FOR PAVEMENT REPAIR, SEE COH DETAILS 02902-01 & 02902-02.
7. PROVIDE AN APPROVED PETROLATUM BASED TAPE ENCAPSULATING ALL BOLTS IN ACCESS MANHOLE.
8. USE "LOW PROFILE AIR VALVE ASSEMBLY DETAIL" ONLY IF SPECIFIED IN PLAN AND PROFILE SHEETS.
9. NATIONAL PIPE THREAD IS ABBREVIATED AS N.P.T. ON THIS DRAWING



DETAIL 4 – NOTES:

1. 3 BOLLARDS SHOULD BE PROVIDED IN TRIANGULAR PATTERN AROUND VENT PIPE OR ANODE PIPE.
2. 2 – 1½" WIDE x 3/16" THICK GALVANIZED STEEL STRAPS SECURED W/ ⅝" DIA. S.S. BOLTS.
3. CLASS B CONCRETE WILL BE USED IN AND AROUND BOLLARDS.
4. SEE DETAIL 4A FOR LOCATION OF ONE BOLLARD AROUND VENT PIPE.
5. MATCH VENT PIPE SIZE TO AIR VALVE ORIFICE SIZE.

4 VENT PIPE WITH 3 BOLLARDS DETAIL

WATER MAIN DIAMETER	MANUFACTURER (1)	VACUUM (AI/VR) SERIES	VACUUM (AI/VR) ORIFICE SIZE	AIR RELEASE SERIES	AIR RELEASE INLET SIZE (NPT)	AIR RELEASE ORIFICE SIZE (2)
>=36" <=96"	APCO	1500C		200A	1"	
	CLAVAL	38VB		34AR-C	1"	
	PRATT	WAVVB		WAR 02	1"	

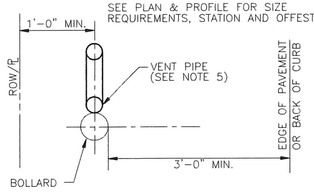
3 AIR VALVE & TYPE TABLE

(FOR WATER LINES 36" TO 96" DIAMETER)

DETAILS 3 – NOTES:

(1) OR APPROVED EQUAL.

(2) MINIMUM ORIFICE SIZE REQUIRED. TO BE UPDATED FOR EACH PROJECT BASED ON TRANSIENT ANALYSIS.



4A VENT PIPE WITH 1 BOLLARD DETAIL

COMBINATION AIR VALVE				
WATER MAIN DIAMETER	MANUFACTURER (1)	SERIES	INLET SIZE (NPT)	ORIFICE SIZE (2)
30"	APCO PRATT	145C WAR02	2"	3/16"

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

LDWL
AIR VALVE ASSEMBLY IN SERVICE MANHOLE DETAIL

(NOT TO SCALE)

APPROVED BY:	APPROVED BY:
Ershad Kamwar, CITY ENGINEER	DIRECTOR OF HOUSTON PUBLIC WORKS
EFF DATE: JUL - 01 - 2021	DWG NO: 02524-03

SWTP
Surface Water Transmission Program

LAN
LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

INTERIM REVIEW ONLY
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Engineer:
P.E. Serial No.:
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F-2614
Date:

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

LDWL AIR VALVE IN SERVICE MANHOLE DETAILS

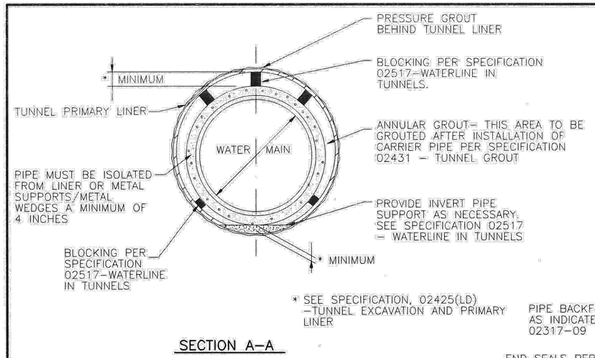
WBS NO. S-000901-0015-4

DRAWING SCALE
NONE

CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.

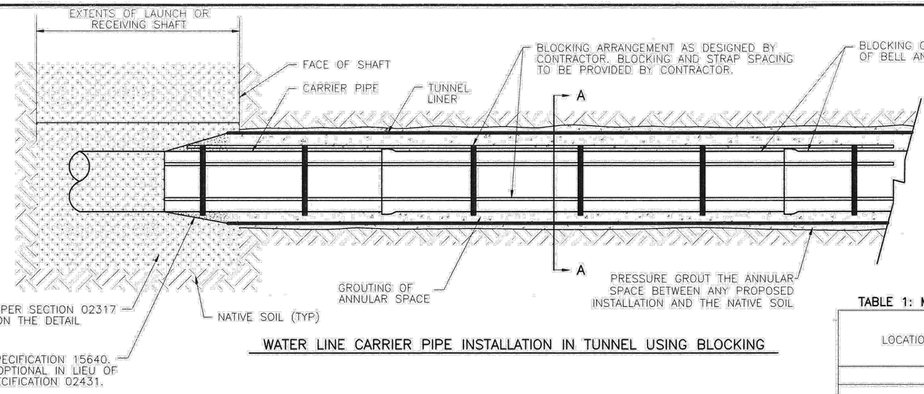
SHEET NO. 59 OF 102

P:\130\10667-401\4-0-Production-Working\4-1-BIM-CAD\Details\10667-401_59-AIR VALVE DETAILS.dwg plotted on May 28, 2025 - 6:08pm



SECTION A–A

1 WATER LINE CARRIER PIPE INSTALLATION IN TUNNEL USING BLOCKING



WATER LINE CARRIER PIPE INSTALLATION IN TUNNEL USING BLOCKING

GENERAL NOTES:

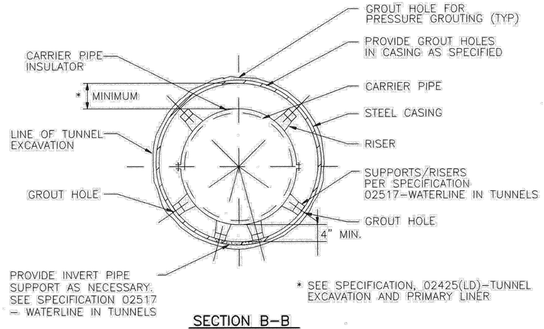
1. DETAIL IS FOR PRESTRESSED CONCRETE CYLINDER PIPE (BAR WRAPPED STEEL CYLINDER PIPE, STEEL PIPE AND D.I.P. ALTERNATE SIMILAR).
2. MINIMUM CLEARANCES SHOWN ON THE PLAN & PROFILE DRAWINGS ARE TO THE O.D. OF TUNNEL LINER. ADJUST PROFILE AS REQUIRED TO MAINTAIN CLEARANCES IDENTIFIED. NO SEPARATE PAY.
3. DIAMETERS INDICATED ON PLANS ARE NOMINAL DIAMETERS.

TABLE 1: MINIMUM TUNNEL LINER / CASING SIZES AND THICKNESS

LOCATION	WATER MAIN DIA.	PIPE MATERIAL	NOMINAL DIA[1](.IN)(CASING O.D.)/ WALL THICKNESS (IN.)		
			2–FLANGE[2] LINER PLATE	4–FLANGE LINER PLATE	STEEL CASING

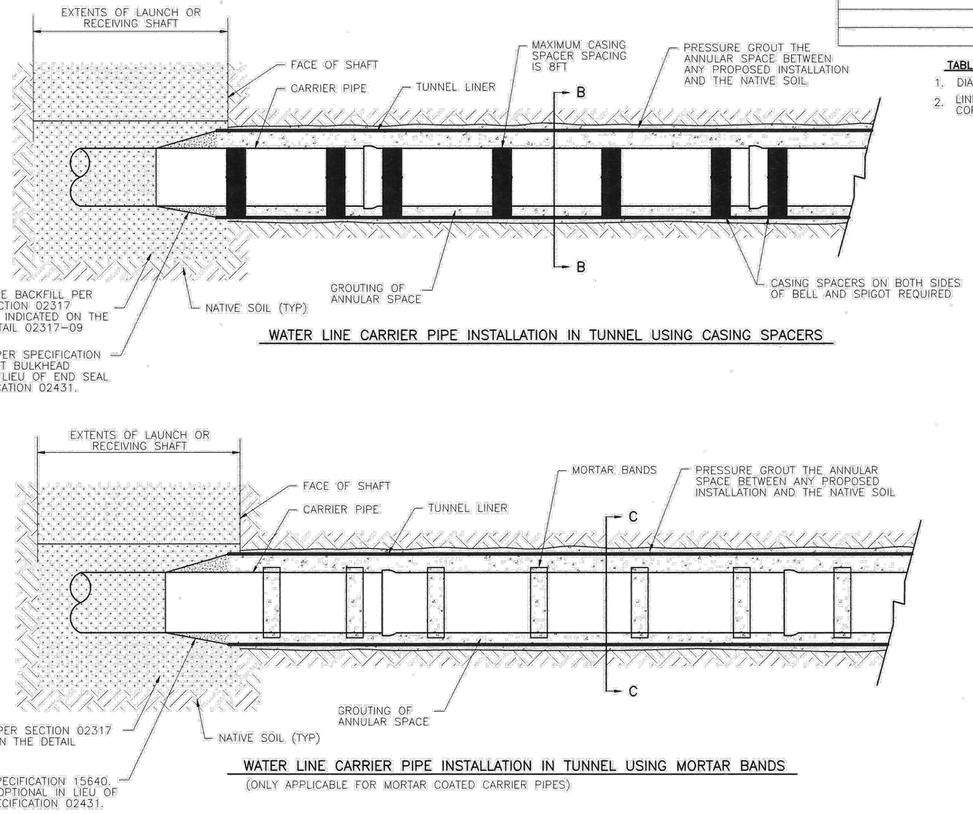
TABLE 1 – NOTES:

1. DIAMETER OF LINER PLATE IS AT NEUTRAL AXIS.
2. LINER PLATE IS TWO FLANGE AND NOMINALLY 2–INCH CORRUGATION BY 6–INCH PROFILE.

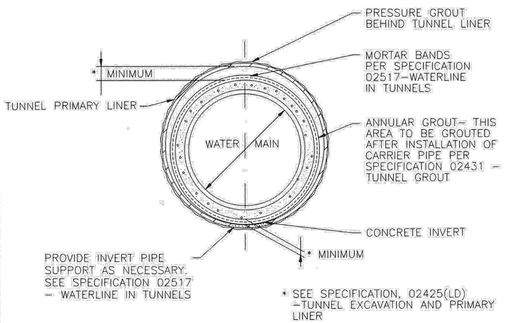


SECTION B–B

2 WATER LINE CARRIER PIPE INSTALLATION IN TUNNEL USING CASING SPACERS



WATER LINE CARRIER PIPE INSTALLATION IN TUNNEL USING CASING SPACERS



SECTION C–C

3 WATER LINE CARRIER PIPE INSTALLATION IN TUNNEL USING MORTAR BANDS

WATER LINE CARRIER PIPE INSTALLATION IN TUNNEL USING MORTAR BANDS
(ONLY APPLICABLE FOR MORTAR COATED CARRIER PIPES)

LOCATION	WATER MAIN DIA.	PIPE MATERIAL	NOMINAL DIA[1](.IN)(CASING O.D.)/ WALL THICKNESS (IN.)		
			2–FLANGE[2] LINER PLATE	4–FLANGE LINER PLATE	STEEL CASING
30-inch Waterline Interconnection	30-inch	STEEL	48	48	42

CITY OF HOUSTON *HOUSTON PUBLIC WORKS*	
LDWL TUNNEL AND CASING DETAILS FOR WATER LINES 24-INCH AND LARGER (NOT TO SCALE)	
APPROVED BY: Suhail Kanwar CITY ENGINEER	APPROVED BY: Carol Haddock DIRECTOR OF HOUSTON PUBLIC WORKS
EFF DATE: JUL - 01 - 2021	DWG NO: **02517-01**

NO.	DATE	REVISION	APP.

SWTP
Surface Water Transmission Program

LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

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Document Incomplete; not intended for permit, bidding or construction.
Engineer: WILLIAM BYLAND, P.E.
P.E. Serial No.: 142061
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F–2614
Date:

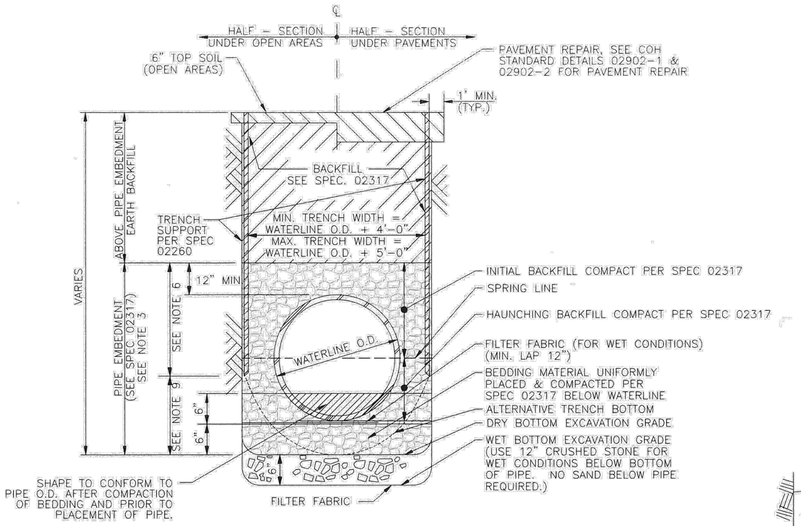
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84–INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

LDWL TUNNEL AND CASING DETAILS

WBS NO. S–000901–0015–4	
DRAWING SCALE	
NONE	
CITY OF HOUSTON PM	
RAM CHAKRADHAR, P.E.	
SHEET NO. 60 OF 102	

P:\130\10667-401\4-0-Production-Working\4-1-BIM-CAD\Details\10667-401_60 LDWL TUNNEL AND CASING DETAILS.dwg plotted on Oct 18, 2024 - 12:39pm



1 EXCAVATION & BACKFILL DETAIL

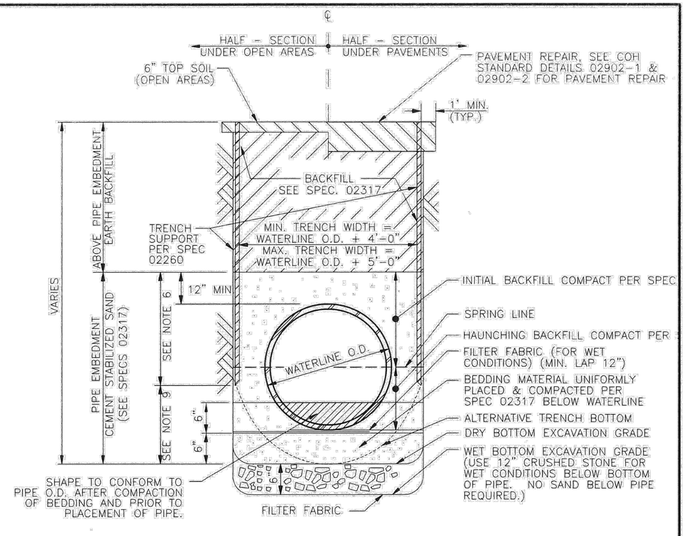
NO SCALE

DETAIL APPLICABLE IN FOLLOWING LIMITS:

– WATER MAIN WITH DEPTH OF COVER LESS THAN 16 FT

DETAILS 1 & 2 – NOTES:

1. SEE TRENCH SAFETY SYSTEM SPECIFICATIONS.
2. FOR WET BOTTOM EXCAVATION LIMITS OF CRUSHED STONE, EXTEND AS SHOWN.
3. PLACEMENT OF TRENCH DAM WITH A MINIMUM OF 12 INCHES INTO TRENCH BOTTOM AND WALLS.
4. TRENCH DAM MAY BE FORMED OR UNFORMED, ACTUAL SHAPE OF TRENCH DAM CROSS SECTION MAY BE DETERMINED BY CONTRACTOR IN FIELD, MEETING 12–INCH MINIMUM THICKNESS AND 12–INCH KEY DEPTH REQUIREMENTS.
5. TRENCH DAM SHALL BE PLACED AT LEAST 5 FT. AWAY FROM ANY PIPELINE STRUCTURE (EACH SIDE). SEE SECTION 02317 FOR OTHER REQUIREMENTS.
6. THIS PORTION OF PIPE EMBEDMENT ZONE MUST BE RECOMPACTED TO PROPER DENSITIES AFTER MOVING SUPPORT SYSTEM FORWARD.
7. USE FILTER FABRIC AS A BOND BREAKER IN PPCA LIMITS AND USE POLYETHYLENE WRAP AS A BOND BREAKER AT OTHER LOCATIONS BETWEEN CEMENT STABILIZED SAND AND PIPE.
8. REFER TO SPEC 02317 FOR GEOTEXTILE REQUIREMENTS AROUND EMBEDMENT.
9. ADJUST HEIGHT OF UNSUPPORTED TRENCH AS NEEDED FOR SAFE CONDITIONS.



2 EXCAVATION & BACKFILL DETAIL

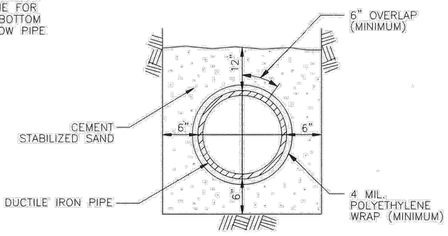
NO SCALE

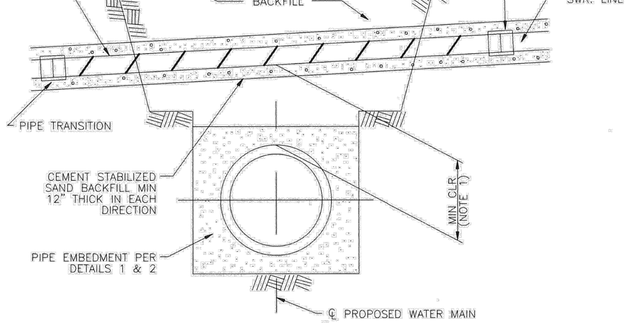
DETAIL APPLICABLE IN FOLLOWING LIMITS:

– WATER MAIN WITH DEPTH OF COVER GREATER THAN 16 FT

– TUNNEL SHAFT LIMITS

– PPCA LIMITS





3 EXISTING SANITARY CROSSING OVER/UNDER PROPOSED WATER LINE

NO SCALE

DETAIL 3 – NOTES:

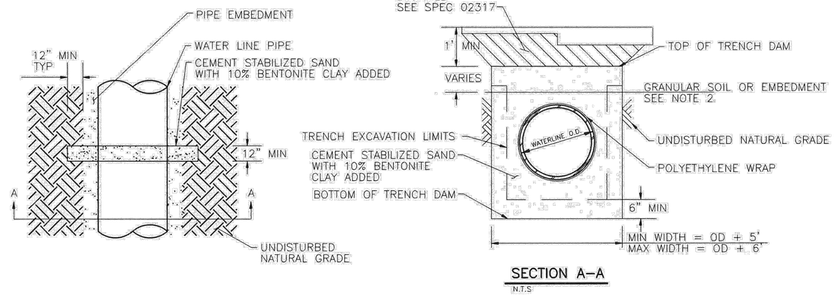
1. REFER TO MINIMUM CLEARANCE REQUIRED IN DRAWINGS.

4 EMBEDMENT AND CORROSION PROTECTION FOR SANITARY SEWER DUCTILE IRON PIPE

NO SCALE

DETAIL 4 – NOTES:

1. FOLLOWING EXCAVATION OF TRENCH, PLACE A 6" LAYER OF CEMENT STAB. SAND AT BOTTOM OF TRENCH. LAY POLYETHYLENE WRAP IN TRENCH, AND LAY PIPE ON TOP OF WRAP. FOLD WRAP AROUND PIPE WITH A 6" OVERLAP (MIN.) AND TIE AROUND PIPE WITH HEAVY BINDER TWINE, OR EQUAL, ON 6" CENTERS. PROVIDE A 12" OVERLAP (MIN.) AND TIE WITH HEAVY BINDER TWINE END LAPS. PLACE ADDITIONAL CEMENT SAND UP TO 12" ABOVE.
2. ALL DUCTILE IRON PIPE SHALL HAVE A POLYETHYLENE "WRAP" OF 4 MIL. THICKNESS (MINIMUM) EXCEPT AS NOTED BELOW.
3. WHERE PIPE IS PLACED IN AN AUGER OR TUNNEL OR IN A CASING, PIPE IS TO HAVE A DOUBLE WRAP OF 4 MIL POLYETHYLENE AND SHALL BE BONDED ON 12" CENTERS WITH ½" STAINLESS STEEL BANDS. END LAPS TO BE AS SPECIFIED FOR TRENCH SECTIONS.
4. REFER TO SPECIFICATION SECTION 02528 – POLYETHYLENE ENCASEMENT/WRAP.



5 TRENCH DAM DETAIL

NO SCALE

DETAIL 5 – NOTES:

1. REFER TO SPEC 02317 FOR INSTALLATION REQUIREMENTS.
2. EXTEND TRENCH DAM 5 FEET MIN ABOVE TOP OF SURROUNDING GRANULAR SOIL LAYERS OR TOP OF GRANULAR EMBEDMENT MATERIAL, WHICHEVER IS HIGHEST.

SECTION A–A

N.T.S.

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

STANDARD LDWL EXCAVATION AND BACKFILL DETAIL
(NOT TO SCALE)

APPROVED BY:	APPROVED BY:
Sushail Kanwar, CITY ENGINEER	DIRECTOR OF HOUSTON PUBLIC WORKS
EFF DATE: JUL - 01 - 2021	DWG NO: 02317-09

SWTP
Surface Water Transmission Program

LAN
LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

INTERIM REVIEW ONLY
Document Incomplete: not intended for permit, bidding or construction.
Engineer: WILLIAM BYLAND, P.E.
P.E. Serial No.: 142061
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F–2614
Date:

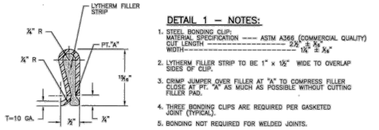
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84–INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

STANDARD LDWL EXCAVATION AND BACKFILL DETAIL

WBS NO. S–000901–0015–4	
DRAWING SCALE	
NONE	
CITY OF HOUSTON PM	
RAM CHAKRADHAR, P.E.	
SHEET NO. 61 OF 102	

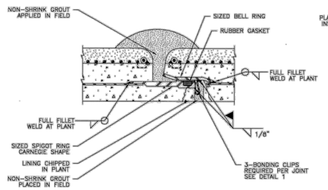
P:\130\10667-401\4-0-Production-Working\4-1-BIM-CAD\Details\10667-401_61-STANDARD LDWL EXCAVATION & BACKFILL DETAIL.dwg plotted on Oct 21, 2024 – 10:32am



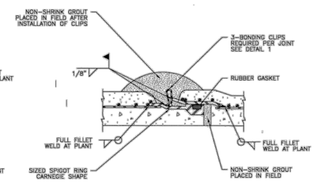
DETAIL 1 – NOTES:

1. STEEL BONDING CLIP: SPECIFICATION ——— ASTM A366 (COMMERCIAL QUALITY)
   CUT LENGTH ——————— 2½" ± ¼"
   WIDTH ——————— 1⅝" ± ¼"
2. LYTHERM FILLER STRIP TO BE 1" x 1⅝" WIDE TO OVERLAP SIDES OF CLIP.
3. CRIMP JUMPER OVER FILLER AT "A" TO COMPRESS FILLER CLOSE AT PT. "A" AS MUCH AS POSSIBLE WITHOUT CUTTING FILLER PAD.
4. THREE BONDING CLIPS ARE REQUIRED PER GASKETED JOINT (TYPICAL).
5. BONDING NOT REQUIRED FOR WELDED JOINTS.

1 STEEL BONDING CLIP DETAIL

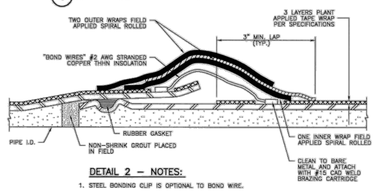


2 BONDED JOINT – EMBEDDED CYLINDER PIPE



3 BONDED JOINT – BAR WRAPPED CYLINDER PIPE

(SIMILAR FOR LINED CYLINDER PIPE)

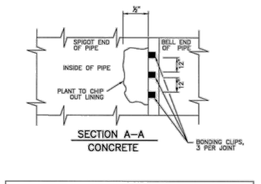


DETAIL 2 – NOTES:

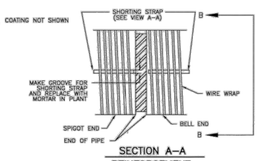
1. STEEL BONDING CLIP IS OPTIONAL TO BOND WIRE.
2. A MINIMUM OF TWO BOND WIRES OR THREE BONDING CLIPS ARE REQUIRED FOR RUBBER GASKETED STEEL PIPE. CLIPS ARE TO BE PROVIDED IN ACCORDANCE WITH DETAILS.
3. BONDING NOT REQUIRED FOR WELDED JOINTS.

4 O-RING STEEL PIPE JOINT DETAIL

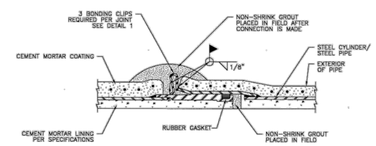
(CEMENT MORTAR LINED & TAPE WRAPPED SHOWN. FLEXIBLE LINING SIMILAR)



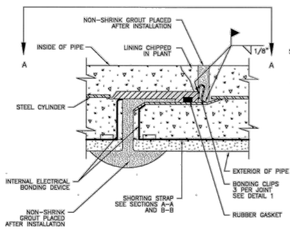
SECTION A–A CONCRETE



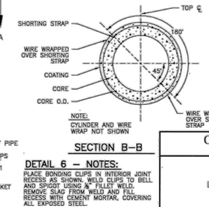
SECTION A–A REINFORCEMENT



5 BONDED JOINT – MORTAR COATED STEEL PIPE



6 ELECTRICAL CONTINUITY BONDING OF EMBEDDED CYLINDER PIPE

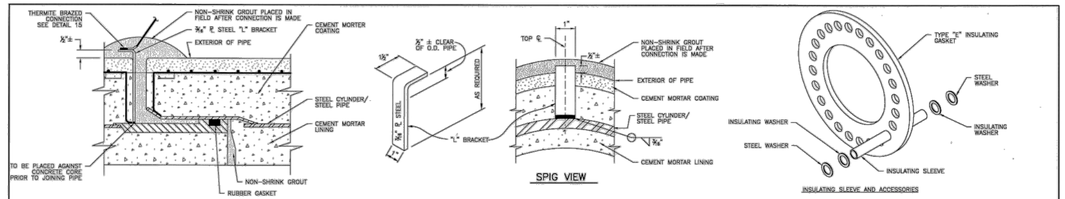


SECTION B–B

DETAIL 6 – NOTES:

PLACE BONDING CLIPS IN INTERIOR JOINT RECESS AS SHOWN. WELD CLIPS TO BELL AND SPIGOT USING ⅛" FILLET WELD. PROTECT WELDS WITH COAL TAR EPOXY AND RECESS WITH CEMENT MORTAR, COVERING ALL EXPOSED STEEL.

CITY OF HOUSTON HOUSTON PUBLIC WORKS	
STANDARD LDWL CATHODIC PROTECTION DETAILS FOR JOINT BONDING (SHEET 1 OF 2) (NOT TO SCALE)	
APPROVED BY: ACTING CITY ENGINEER	APPROVED BY: DIRECTOR HOUSTON PUBLIC WORKS
EFF DATE: MAR-30-2018	DWG NO: 15840-01



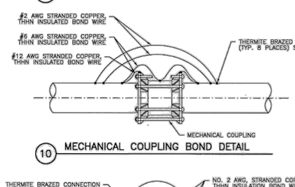
7 TEST LEAD CONNECTION DETAIL

SPIG VIEW

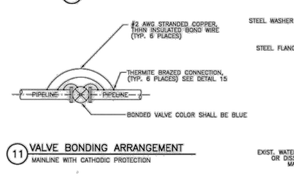
8 "L" BRACKET DETAIL

9 ISOLATION FLANGE ASSEMBLY

SEE AWWA M11 FOR FLANGE BOLT TIGHTENING SEQUENCE

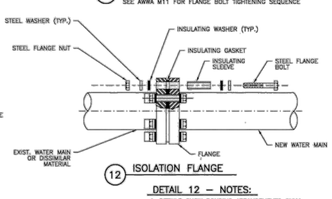


10 MECHANICAL COUPLING BOND DETAIL



11 VALVE BONDING ARRANGEMENT

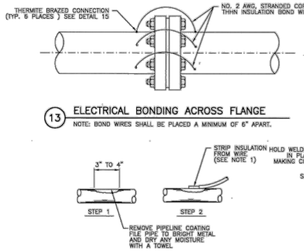
MAINLINE WITH CATHODIC PROTECTION



12 ISOLATION FLANGE

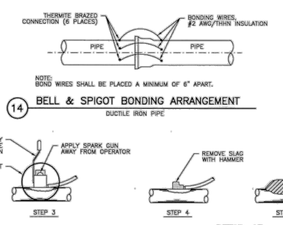
DETAIL 12 – NOTES:

1. DETAILS SHOW BONDING ARRANGEMENTS ONLY. SEE JOINT DETAIL FOR PIPE JOINT REQUIREMENTS.



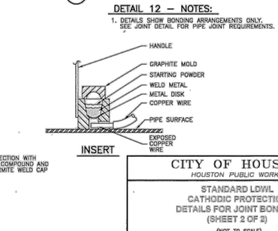
13 ELECTRICAL BONDING ACROSS FLANGE

NOTE: BOND WIRES SHALL BE PLACED A MINIMUM OF 6" APART.



14 BELL & SPIGOT BONDING ARRANGEMENT

DUCTILE IRON PIPE



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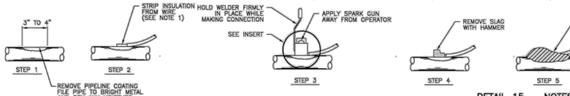


15 THERMITE BRAZED CONNECTION DETAIL

DETAIL 15 – NOTES:

1. WHEN #14 SOLID TO #10 SOLID WIRE IS USED, IT WILL BE NECESSARY TO INSTALL A COPPER SLEEVE OF ADEQUATE SIZE OVER BARE SECTION OF WIRE BEFORE CONNECTION IS ATTEMPTED.
2. THERMITE WELD PROCEDURES SIMILAR FOR "L" BRACKETS.
3. REPAIR ALL DAMAGE TO COATING AND LINING IN ACCORDANCE WITH MFG. RECOMMENDATIONS.

CITY OF HOUSTON HOUSTON PUBLIC WORKS	
STANDARD LDWL CATHODIC PROTECTION DETAILS FOR JOINT BONDING (SHEET 2 OF 2) (NOT TO SCALE)	
APPROVED BY: ACTING CITY ENGINEER	APPROVED BY: DIRECTOR HOUSTON PUBLIC WORKS
EFF DATE: MAR-30-2018	DWG NO: 15840-02

NO.	DATE	REVISION	APP.

Surface Water Transmission Program

LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

INTERIM REVIEW ONLY
Document Incomplete; not intended for permit, bidding or construction.
Engineer: WILLIAM BYLAND, P.E.
P.E. Serial No.: 142061
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F-2614
Date:

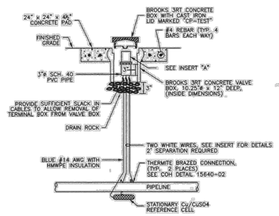
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84–INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

STANDARD LDWL CP DETAILS JOINT BONDING

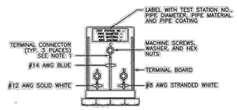
WBS NO. S–000901–0015–4	
DRAWING SCALE	
NONE	
CITY OF HOUSTON PM	
RAM CHAKRADHAR, P.E.	
SHEET NO. 62 OF 102	

P:\130\10667-401\4-0-Production-Working\4-1-BIM-CAD\Details\10667-401_62 CP DETAILS JOINT BONDING.dwg plotted on Oct 21, 2024 - 10:34am



1 FLUSH MOUNTED POTENTIAL TEST STATION

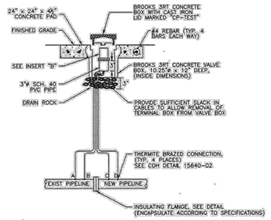
WIRE CODING:
* WIRES A & B ARE WHITE, WIRE C IS BLUE
* WIRE A IS #12 AWG TW SOLID SINGLE CONDUCTOR WIRE
* WIRE B IS #8 AWG TW STRANDED SINGLE CONDUCTOR
* WIRES C IS #14 AWG WITH HMWPE INSULATION



INSERT A – NOTES:

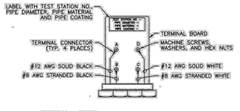
1. TERMINAL CONNECTORS SHALL BE RING TONGUE, BRAZED, COPPER, NON-INSULATED WITH ¼" STUD SIZE

INSERT "A"



2 FLUSH MOUNTED FLANGE ISOLATION TEST STATION

WIRE CODING:
* WIRES A, B & D ARE BLACK, WIRES C & D ARE WHITE
* WIRES A & D ARE #12 AWG TW SOLID SINGLE CONDUCTOR WIRE
* WIRES B & C ARE #8 AWG TW STRANDED SINGLE CONDUCTOR
* BLACK WIRES ATTACHED TO UNPROTECTED OR EXISTING PIPE
* WHITE WIRES ATTACHED TO PROTECTED OR NEW PIPE

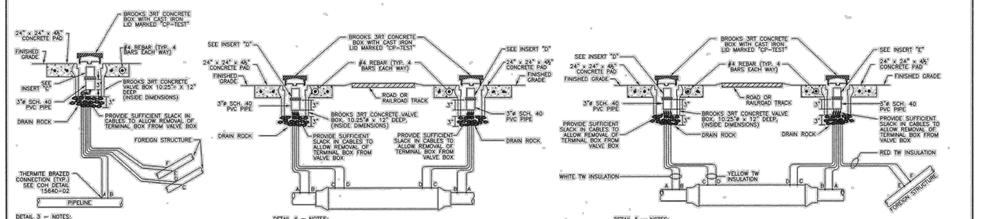


INSERT B – NOTES:

1. TERMINAL CONNECTORS SHALL BE RING TONGUE, BRAZED, COPPER, NON-INSULATED WITH ¼" STUD SIZE

INSERT "B"

CITY OF HOUSTON HOUSTON PUBLIC WORKS	
STANDARD LDWL CATHODIC PROTECTION DETAILS FOR TEST STATIONS (SHEET 1 OF 3) (NOT TO SCALE)	
APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF HOUSTON PUBLIC WORKS
EFF DATE: JUL-01-2021	DWG NO: 15641-01



DETAIL 3 – NOTES:

1. TEST STATION SHALL BE MOUNTED DIRECTLY ABOVE THE NEW WATER LINE.
2. FOR MORE THAN TWO (2) FOREIGN LINES, INSTALL A COTBOX TYPE TEST STATION. (UP TO 20 TERMINALS)

DETAIL 4 – NOTES:

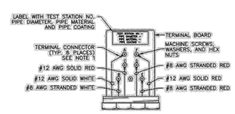
1. FOR PARALLEL CASED CROSSINGS, INSTALL A COTBOX TYPE TEST STATION. (UP TO 20 TERMINALS)

DETAIL 5 – NOTES:

1. TEST STATION SHALL BE MOUNTED DIRECTLY ABOVE THE NEW WATER LINE.
2. FOR MORE THAN ONE (1) FOREIGN LINE, INSTALL A COTBOX TYPE TEST STATION. (UP TO 20 TERMINALS)

3 FLUSH MOUNTED FOREIGN LINE TEST STATION

WIRING CODE:
* WIRES A & B ARE WHITE
* WIRES C, D, E, F ARE RED
* WIRES C, D, E ARE #12 AWG TW SOLID COPPER WIRE
* WIRES B, D, E ARE #8 AWG TW STRANDED COPPER WIRE
* RED WIRES ATTACHED TO FOREIGN OWNED PIPE
* WHITE WIRES ATTACHED TO NEW PIPE



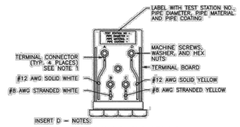
INSERT C – NOTES:

1. TERMINAL CONNECTORS SHALL BE RING TONGUE, BRAZED, COPPER, NON-INSULATED WITH ¼" STUD SIZE.

INSERT "C"

4 FLUSH MOUNTED CASED CROSSING TEST STATION

WIRE CODING:
* WIRES A & B ARE WHITE, WIRES C & D ARE YELLOW
* WIRES A & C ARE #12 AWG TW SOLID SINGLE CONDUCTOR WIRE
* WIRES B & C ARE #8 AWG TW STRANDED SINGLE CONDUCTOR
* YELLOW WIRES ATTACHED TO CASING
* WHITE WIRES ATTACHED TO PROTECTED OR NEW PIPE



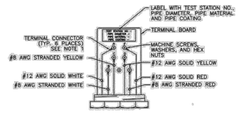
INSERT D – NOTES:

1. TERMINAL CONNECTORS SHALL BE RING TONGUE, BRAZED, COPPER, NON-INSULATED WITH ¼" STUD SIZE.

INSERT "D"

5 FLUSH MOUNTED CASED CROSSING AND FOREIGN LINE TEST STATION

WIRE CODING:
* WIRES A & B ARE WHITE, WIRES C & D ARE YELLOW
* WIRES A & B ARE #12 AWG TW SOLID SINGLE CONDUCTOR WIRE
* WIRES B, C, D & E ARE #8 AWG TW STRANDED SINGLE CONDUCTOR
* WHITE WIRES ATTACHED TO PROTECTED OR NEW PIPE
* YELLOW WIRES ATTACHED TO CASING
* RED WIRES ATTACHED TO FOREIGN OWNED PIPE

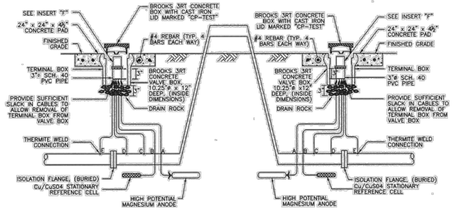


INSERT E – NOTES:

1. TERMINAL CONNECTORS SHALL BE RING TONGUE, BRAZED, COPPER, NON-INSULATED WITH ¼" STUD SIZE.

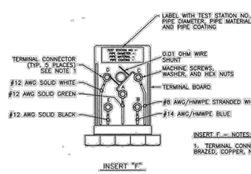
INSERT "E"

CITY OF HOUSTON HOUSTON PUBLIC WORKS	
STANDARD LDWL CATHODIC PROTECTION DETAILS FOR TEST STATIONS (SHEET 2 OF 3) (NOT TO SCALE)	
APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF HOUSTON PUBLIC WORKS
EFF DATE: JUL-01-2021	DWG NO: 15641-02



6 ABOVE GROUND CROSSING FLUSH MOUNTED FLANGE ISOLATION AND ANODE INSTALLATION TEST STATION

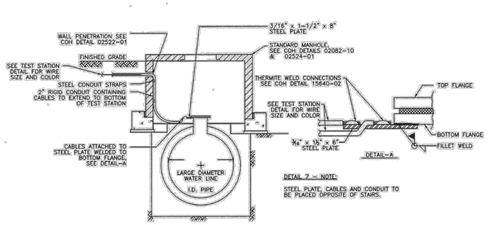
WIRE CODING:
* WIRES C & D ARE WHITE, WIRE E IS BLACK
* WIRES D & E ARE #12 AWG TW SOLID SINGLE CONDUCTOR WIRE
* WIRE C IS #8 AWG/HMWPE STRANDED SINGLE CONDUCTOR WIRE
* WIRE A IS GREEN #12 AWG ANODE LEAD WIRE TO 48 LB. MAGNESIUM
* WIRE B IS BLUE #14 AWG/HMWPE LEAD WIRE TO REFERENCE CELL



INSERT F – NOTES:

1. TERMINAL CONNECTORS SHALL BE RING TONGUE, BRAZED, COPPER, NON-INSULATED WITH ¼" STUD SIZE

INSERT "F"



7 TEST STATION INSTALLATION IN MANHOLE

DETAIL 7 – NOTE:

STEEL PLATE, CABLES AND CONDUIT TO BE PLACED OPPOSITE OF STAIRS.

CITY OF HOUSTON HOUSTON PUBLIC WORKS	
STANDARD LDWL CATHODIC PROTECTION DETAILS FOR TEST STATIONS (SHEET 3 OF 3) (NOT TO SCALE)	
APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF HOUSTON PUBLIC WORKS

NO.	DATE	REVISION	APP.

SWTP
Surface Water Transmission Program

LAN
LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

INTERIM REVIEW ONLY
Document Incomplete; not intended for permit, bidding or construction.

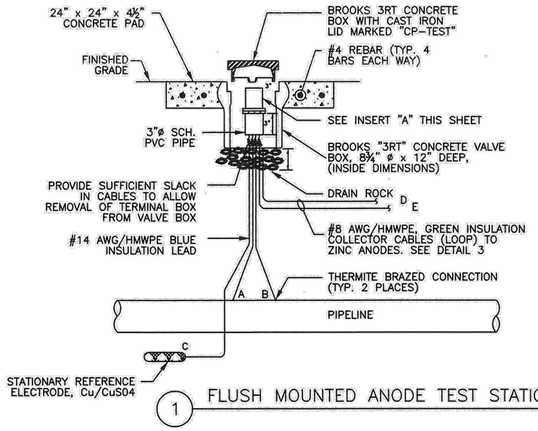
Engineer: WILLIAM BYLAND, P.E.
P.E. Serial No.: 142061
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F-2614
Date:

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD
STANDARD LDWL CP DETAILS TEST STATIONS

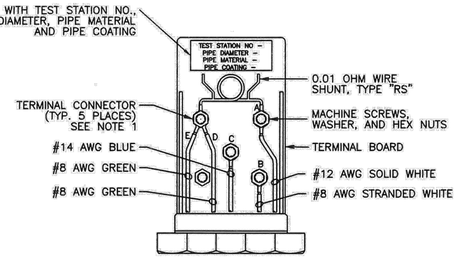
WBS NO. S-000901-0015-4	
DRAWING SCALE	
NONE	
CITY OF HOUSTON PM	
RAM CHAKRADHAR, P.E.	
SHEET NO. 63 OF 102	

P:\130\10667-401\4-0-Production-Working\4-1-BIM-CAD\Details\10667-401_63 CP DETAILS TEST STATION.dwg plotted on Oct 21, 2024 - 10:35am



1 FLUSH MOUNTED ANODE TEST STATION

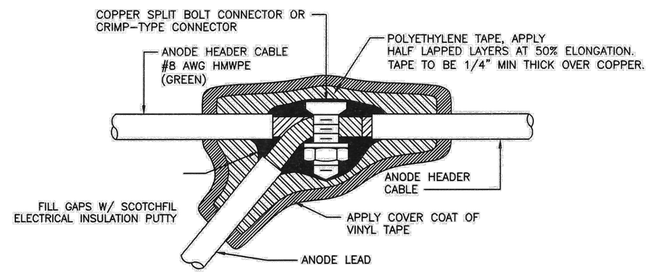
WIRE CODING:
* WIRES A & B ARE WHITE
* WIRE A IS #12 AWG TW SOLID SINGLE CONDUCTOR WIRE
* WIRE B IS #8 AWG TW STRANDED SINGLE CONDUCTOR WIRE
* WIRE C IS BLUE #14 AWG/HMWPE LEAD WIRE TO REFERENCE ELECTRODE
* WIRES D & E ARE GREEN #8 AWG ANODE LEAD WIRE TO ANODE GROUND BED



INSERT A – NOTES:

1. TERMINAL CONNECTORS SHALL BE RING TONGUE, BRAZED, COPPER, NON–INSULATED WITH ," ¼" STUD SIZE

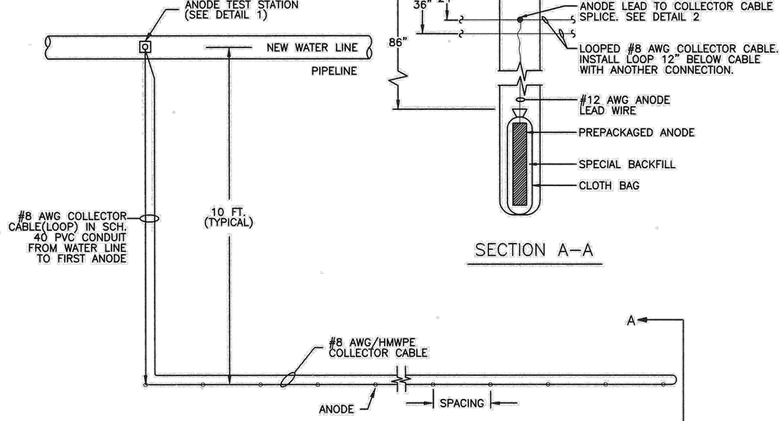
INSERT "A"



DETAIL 2 – NOTES:

1. MAKE SPLICE WATERPROOF
   A. SMOOTH ALL IRREGULAR SURFACES WITH ELECTRICAL INSULATION PUTTY.
   B. APPLY 2 LAYERS OF HALF LAPPED RUBBER SPLICING TAPE.
   C. APPLY 2 LAYERS OF HALF LAPPED VINYL ELECTRICAL TAPE.
2. NUMBER OF WIRES MAY VARY PER SPLICE

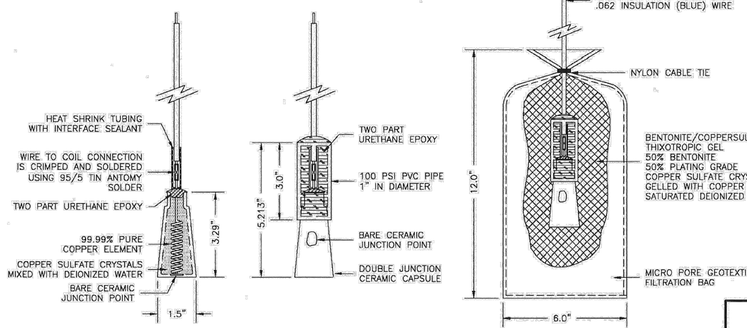
2 SPLICE DETAIL



SECTION A–A

3 ANODE TEST STATION PLAN

ANODE SIZE AND SPACING REQUIREMENT PER DESIGN DRAWINGS



4 Cu/CuSO4 PERMACELL PLUS STATIONARY REFERENCE CELL

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

STANDARD LDWL CATHODIC PROTECTION DETAILS FOR TEST STATIONS & ANODES

(NOT TO SCALE)

APPROVED BY:	APPROVED BY:
CITY ENGINEER	DIRECTOR OF HOUSTON PUBLIC WORKS
EFF DATE: JUL - 01 - 2021	DWG NO: 16640-01

STEEL PIPE MATERIAL - OPTION 1 (STANDARD ZINC SACRIFICIAL ANODE)

TEST STATION	STATION NO.	SEGMENT	TYPE OF TEST STATION	ANODE SPACING (FT)	NO. OF ANODES	ANODE MODEL
1	299+80	WATER WORKS BLVD	FLUSH MOUNTED ANODE	10	6	ZUR-48

STANDARD TEST STATIONS

TEST STATION	STATION NO.	SEGMENT	TYPE OF TEST STATION	STRUCTURE
1	299+25	WATER WORKS BLVD	FLUSH MOUNTED ISOLATION	30-IN INTERCONNECT
2	299+80	WATER WORKS BLVD	FLUSH MOUNTED ANODE	30-IN INTERCONNECT
3	300+35	WATER WORKS BLVD	FLUSH MOUNTED CASED CROSSING	30-IN INTERCONNECT
4	301+00	WATER WORKS BLVD	FLUSH MOUNTED CASED CROSSING	30-IN INTERCONNECT
5	302+25	WATER WORKS BLVD	FLUSH MOUNTED ISOLATION	30-IN INTERCONNECT

NO.	DATE	REVISION	APP.

SWTP
Surface Water Transmission Program

LAN
LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

INTERIM REVIEW ONLY
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Engineer: WILLIAM BYLAND, P.E.
P.E. Serial No.: 142061
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F–2614
Date:

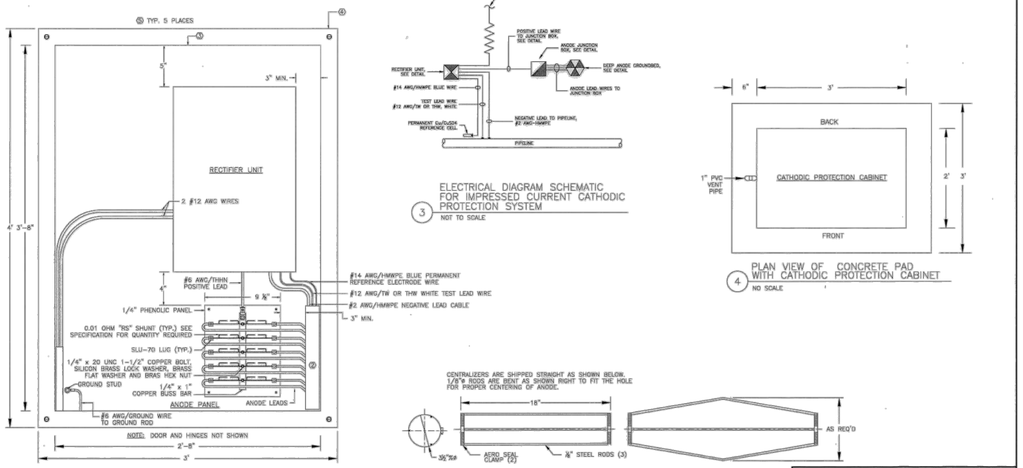
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84–INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

STANDARD LDWL CP DETAILS TEST STATIONS & ANODES

WBS NO. S–000901–0015–4	
DRAWING SCALE	
NONE	
CITY OF HOUSTON PM	
RAM CHAKRADHAR, P.E.	
SHEET NO. 64 OF 102	

P:\130\130-10667-401\4-0-Production-Working\4-1-BIM-CAD\Details\10667-401_64 CP DETAILS TEST STATION ANODES.dwg plotted on Oct 21, 2024 – 10:37am



1 CATHODIC PROTECTION CABINET
NO SCALE

FOR ○ NOTES, SEE COH DETAIL 16640-03.

3 ELECTRICAL DIAGRAM SCHEMATIC FOR IMPRESSED CURRENT CATHODIC PROTECTION SYSTEM
NOT TO SCALE

4 PLAN VIEW OF CONCRETE PAD WITH CATHODIC PROTECTION CABINET
NO SCALE

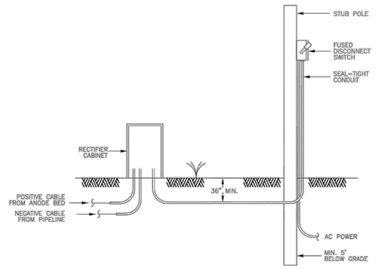
2 ANODE CENTRALIZER
NO SCALE

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

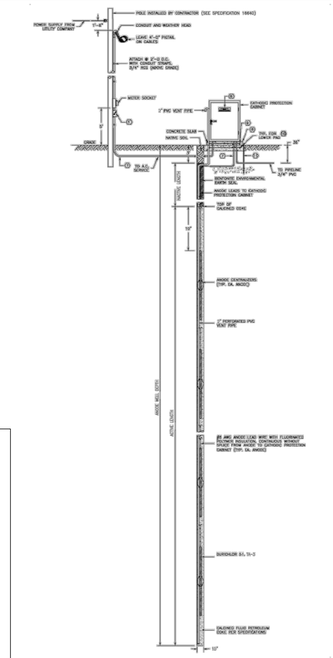
STANDARD LDWL
CATHODIC PROTECTION RECTIFIER & DEEP ANODE GROUND BED DETAILS
(SHEET 1 OF 2)
(NOT TO SCALE)

APPROVED BY: ACTING CITY ENGINEER
APPROVED BY: DIRECTOR OF HOUSTON PUBLIC WORKS

EFF DATE: MAR-20-2018 DWG NO: 16640-02



5 AC SERVICE FOR RECTIFIER
NO SCALE



KEYED NOTES:

1. FUSED DISCONNECT SWITCH IN A NEMA 1 ENCLOSURE WITH 1-30A FUSED DISCONNECT SWITCH.
2. PLASTIC MARKER POST (PARAPOST DR) (EQUAL) 2" W. x 4" H. (MIN.) LENGTH AS REQUIRED. FURNISH WITH ETCHER.
3. BACK PANEL LOCATED INSIDE OF ENCLOSURE.
4. ENCLOSURE SHALL BE 4'-3"-8" H. x 2'-8" W. x 12" D., TYPE 304 S.S. 16 GA. MIN. SINGLE DOOR, PAD MOUNTED, PROVISIONS TO PADLOCK UNIT, LIFTING EYES AND GROUNDING STUD ON DOOR. PROVIDE LOUVERED DOOR TO VENTILATE RECTIFIER UNIT. PROVIDE DRIP SHIELD AND INSIDE SCREEN TO REPEL INSECTS.
5. PLACE STICKERS THAT READ:

   "DANGER
   HIGH VOLTAGE
   KEEP OUT"

   ON ALL FOUR SIDES AND TOP OF ENCLOSURE.
6. PROVIDE PERMANENT ENGRAVED NAME PLATE (BLACK LETTERS ON WHITE BACKGROUND) THAT READS "CATHODIC PROTECTION CABINET PROPERTY OF CITY OF HOUSTON, IN CASE OF EMERGENCY CALL 311"
7. MAKE TRANSITION FROM PVC CONDUIT UNDERGROUND TO RGS CONDUIT ABOVE GROUND.
8. COORDINATE SIZE OF CONCRETE PAD WITH SIZE OF CABINET THE CONCRETE PEDESTAL THAT THE CABINET RESTS ON TO BE 3" WIDER THAN THE CABINET ON ALL SIDES.
9. #4 GRADE 60 REBAR @12" OC BOTH WAYS.
10. #5 GRADE 60 REBAR @12" OC BOTH WAYS.
11. 3/4ø x 10' GROUND ROD AND #6 COPPER GROUND CABLE.

6 TYPICAL DEEP ANODE GROUND BED AND A.C. SERVICE FOR CATHODIC PROTECTION CABINET
NO SCALE (SEE SPECIFICATION 16640 FOR DETAILS)

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

STANDARD LDWL
CATHODIC PROTECTION RECTIFIER & DEEP ANODE GROUND BED DETAILS
(SHEET 2 OF 2)
(NOT TO SCALE)

REVISED ON: _____
REVISED BY: _____

EFF DATE: MAR-20-2018 DWG NO: 16640-03

NO.	DATE	REVISION	APP.

RECTIFIER INFORMATION

NUMBER	STA.	SEGMENT	SIZE OF RECTIFIER		ANODE SIZE	NO. OF ANODES	ACTIVE DEPTH	INACTIVE DEPTH	TOTAL WELL
			VOLTS	AMPS					
1	240+00	84" HAWC LINE	30	15	Durichlor 51 - TA3	10	110	90	200

Surface Water Transmission Program

LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

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Engineer: WILLIAM BYLAND, P.E.
P.E. Serial No.: 142061
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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

STANDARD LDWL CP DETAILS RECTIFIERS & DEEP ANODE

WBS NO. S-000901-0015-4

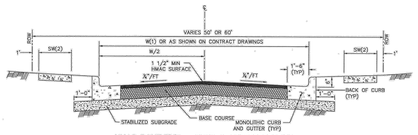
DRAWING SCALE
NONE

CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.

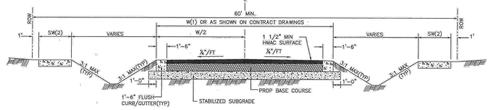
SHEET NO. 65 OF 102

P:\130\130-10667-401\4-0-Production-Working\4-1-BIM-CAD\Details\10667-401_65 CP RECTIFIER & DEEP ANODE 1.dwg plotted on Oct 21, 2024 - 10:38am

02741–01



HMAC PAVEMENT – CURB & GUTTER SECTION
(NOT APPLICABLE TO ETJ OF CITY OF HOUSTON)



HMAC PAVEMENT – DITCH SECTION
(NOT APPLICABLE TO ETJ OF CITY OF HOUSTON)

HOT–MIX ASPHALTIC CONCRETE PAVEMENT DETAILS
NTS

NOTES:
1. FOR TRAVEL WAY WIDTH (W) REFER TO IDM SECTION 10.3.03.A
2. FOR SIDEWALK (SW) DESIGN GUIDANCE REFER TO IDM SECTION 17.06; PEDESTRIAN DESIGN REQUIREMENTS.
3. BASE COURSE SHALL BE:
ALTERNATES: A) 6" (MIN) HOT MIX ASPHALTIC CONCRETE.
B) 8" (MIN) CRUSHED CONCRETE.

02741–04

PUBLIC USE ALLEY REMOVED
ANY PUBLIC USE ALLEY ROW SHOULD MEET CITY ROADWAY STANDARDS

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

STREET PAVING AND SIDEWALK
02632–11 THROUGH 02741–04

APPROVED BY: CITY ENGINEER — APPROVED BY: DEPUTY DIRECTOR

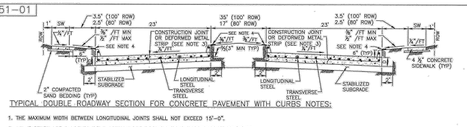
APPROVED BY: DIRECTOR OF HOUSTON PUBLIC WORKS

EFFECTIVE DATE: JUL–01–2020

FOR CITY OF HOUSTON USE ONLY

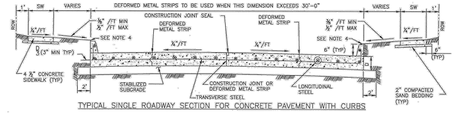
SHEET NO.

02751–01



TYPICAL DOUBLE ROADWAY SECTION FOR CONCRETE PAVEMENT WITH CURBS 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.



TYPICAL SINGLE ROADWAY SECTION FOR CONCRETE PAVEMENT WITH CURBS

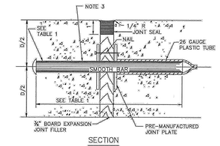
TABLE 1
REINFORCING STEEL BAR SIZES AND SPACINGS FOR VARIOUS PAVEMENT THICKNESSES (t) WITH:
MAXIMUM TRANSVERSE CONTROL JOINT SPACING = 20'–0"
MAXIMUM EXPANSION JOINT SPACING = 80'–0"
f'c = 4,000 PSI/28 DAYS AND FY = 60,000 PSI

PAVEMENT THICKNESS (t) (IN)	PAVEMENT WIDTH (YT)	LONGITUDINAL STEEL # 4 BARS NUMBER OF BARS	# 4 BARS SPACING (IN)	# 4 BARS END BAR SPACING (IN)	# 5 BARS NUMBER OF BARS	# 5 BARS SPACING (IN)	# 5 BARS END BAR SPACING (IN)	# 6 BARS NUMBER OF BARS	# 6 BARS SPACING (IN)	# 6 BARS END BAR SPACING (IN)	TRANSVERSE STEEL # 4 BARS SPACING (IN)	# 5 BARS SPACING (IN)	# 6 BARS SPACING (IN)
6	28	17	20.50	4	–	–	–	–	–	–	36	–	–
7	25	17	18.25	4	–	–	–	–	–	–	36	–	–
7	35	24	18.00	3	–	–	–	–	–	–	36	–	–
7	36	25	17.75	3	–	–	–	–	–	–	36	–	–
7	37	25	18.25	3	–	–	–	–	–	–	36	–	–
7	41	28	18.00	3	–	–	–	–	–	–	36	–	–
7	45	31	17.75	3.75	–	–	–	–	–	–	36	–	–
8	25	20	15.50	2.75	13	24.50	3	–	–	–	36	36	–
8	34	27	15.50	2.50	17	25.00	4	–	–	–	36	36	–
8	35	27	16.00	2	18	24.25	4	–	–	–	36	36	–
8	36	28	15.75	3.25	18	25.00	3	–	–	–	30	36	–
8	44	24	15.75	4	22	24.75	4	–	–	–	30	36	–
8	45	35	15.75	2.25	23	24.25	3	–	–	–	30	36	–
9	25	22	14.00	3	14	22.50	4	–	–	–	36	36	–
9	34	31	13.50	2	19	22.25	3.50	–	–	–	30	36	–
9	35	31	13.75	3.75	20	21.75	3.50	–	–	–	30	36	–
9	36	32	13.75	3	21	21.25	3.50	–	–	–	30	36	–
9	44	39	13.75	2.75	25	21.75	3	–	–	–	24	36	–
9	45	39	14.00	4	26	21.25	4.50	–	–	–	24	36	–
10	25	24	12.75	3.5	17	18.25	4	–	–	–	36	36	36
10	34	33	12.50	4	21	20.00	4	–	–	–	30	36	36
10	35	34	12.50	3.75	23	18.75	4	–	–	–	30	36	36
10	36	35	12.50	3.5	24	18.50	3	–	–	–	30	36	36
10	44	44	12.00	4	29	18.50	4.00	–	–	–	24	36	36
10	45	44	12.50	3	29	19.00	3	–	–	–	24	36	36
11	25	27	11.25	3	17	18.25	4	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	24	18.00	3	17	25.75	4	24	36	36
11	36	40	11.00	2	25	17.75	3	17	26.50	4	24	36	36
11	44	48	11.125	2.5	30	18.00	3	21	26.00	4	24	36	36
11	45	49	11.125	3	31	17.75	4	22	25.50	3	24	36	36
12	29	–	–	–	19	16.25	4	13	24.50	3	36	36	36
12	34	–	–	–	20	16.00	4	18	23.50	4	24	36	36
12	35	–	–	–	26	18.50	4	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	24	22.50	5	24	30	36
12	45	–	–	–	35	15.75	3	25	22.25	3	24	30	36

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

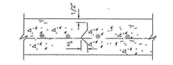
CONCRETE PAVEMENT DETAILS
NTS

02752–01

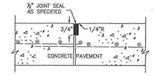


SECTION
DOWEL TYPE EXPANSION JOINT
N.T.S.

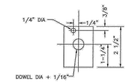
PLAN – JOINT PLATE



SECTION
DEFORMED METAL STRIP
N.T.S.



SECTION
CONSTRUCTION JOINT SEAL
N.T.S.



ELEVATION – JOINT PLATE
N.T.S.

NOTES:
1. STEEL TO MEET ASTM STANDARD SPECIFICATIONS FOR CONCRETE REINFORCING BARS. UNITS TO BE SPACED ON 12" CENTRS.
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.

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

PAVEMENT EXPANSION AND CONSTRUCTION JOINT DETAILS
NTS

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

STREET PAVING AND SIDEWALK
02751–01 THROUGH 02752–01

APPROVED BY: CITY ENGINEER — APPROVED BY: DEPUTY DIRECTOR

APPROVED BY: DIRECTOR OF HOUSTON PUBLIC WORKS

EFFECTIVE DATE: JUL–01–2020

FOR CITY OF HOUSTON USE ONLY

SHEET NO.

SWTP
Surface Water Transmission Program

LAN
LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

INTERIM REVIEW ONLY
Document incomplete; not intended for permit, bidding or construction.
Engineer: WILLIAM BYLAND, P.E.
P.E. Serial No.: 142061
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F–2614
Date:

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84–INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

STANDARD PAVEMENT DETAILS
(1 OF 2)

WBS NO.
S–000901–0015–4

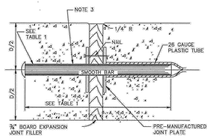
DRAWING SCALE
NONE

CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.

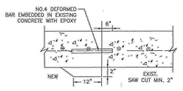
SHEET NO. 66 OF 102

P:\130\130–10667–401\4–0–Production–Working\4–1–BIM–CAD\Details\10667–401_66–STANDARD PAVEMENT DETAILS.dwg plotted on Oct 21, 2024 – 10:39am

02752–02

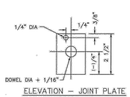


SECTION
DOWEL TYPE EXPANSION JOINT
N.T.S



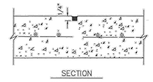
SECTION
SIDEWALK TO EXISTING SIDEWALK
N.T.S

SECTION
SIDEWALK TO EXISTING DRIVEWAY
N.T.S.



ELEVATION – JOINT PLATE
N.T.S.

PLAN – JOINT PLATE
N.T.S.



SECTION
CONTROL JOINT
N.T.S.

NOTES:

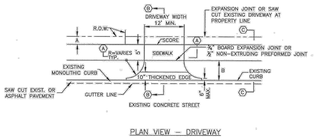
1. STEEL TO MEET ASTM STANDARD SPECIFICATIONS FOR CONCRETE REINFORCING BARS.
2. EXPANSION JOINT TO BE PLACED AT THE END OF EACH CURB RADIUS AND SPACED AT A MAXIMUM DISTANCE OF 3 FEET MAXIMUM SPACING FOR CONTROL JOINTS SHALL BE 5 FEET.
3. CENTER DOWEL HORIZONTALLY ON JOINT.
4. CENTER DOWEL VERTICALLY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

TABLE 1

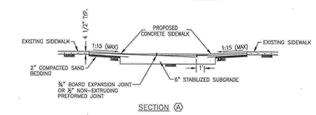
PAVEMENT THICKNESS (IN)	DOWEL SIZES AND SPACINGS		
	DIAMETER (IN)	LENGTH (IN)	SPACING (IN)
4 1/2	1/2	18	12
5	1/2	18	12
6	3/4	18	12
7	1	18	12

SIDEWALK EXPANSION AND CONSTRUCTION JOINT DETAILS
NTS

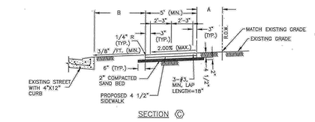
02754–01A



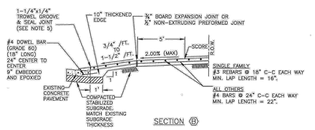
PLAN VIEW – DRIVEWAY



SECTION Ⓐ
PROPOSED SIDEWALK, THROUGH DRIVEWAY WITH EXCESSIVE GRADES
N.T.S.



SECTION Ⓒ
TYPICAL SIDEWALKS SECTION
N.T.S.



SECTION Ⓑ
TYPICAL DRIVEWAY SECTION
N.T.S.

NOTES:

1. IF AVAILABLE ROW IS NOT SUFFICIENT TO ACCOMMODATE SIDEWALK WIDTH (SW) ACCORDING TO IDM REQUIREMENT, ENGINEER SHALL OBTAIN A VARIANCE FROM THE CITY ENGINEER.
2. DRIVEWAYS SHALL BE 6" THICK FOR SINGLE FAMILY.
3. DRIVEWAYS AND SIDEWALKS SHALL BE CONSTRUCTED WITH PORTLAND CEMENT CONCRETE AND INCLUDE 5 1/2 SACKS OF CEMENT PER CUBIC YARD OF CONCRETE.
4. THE OUTER DOWEL BARS ARE TO BE LOCATED 12" FROM END OF PROPOSED EDGE OF DRIVEWAY RETURN. EXTEND DOWELS 18 INCHES INTO EXISTING CONCRETE AND BEND REMAINING BAR TO EXTEND TO RADIUS RETURN BOTH SIDES.
5. TROWEL GROOVE SEALANT SHALL BE LOW MODULUS SILICONE OR POLYURETHANE SEALANT.
6. EXPANSION & CONSTRUCTION JOINTS ALONG SIDEWALK SHALL BE ACCORDING TO DRAWING No. 02752–02.
7. REFER CHAPTER 17 DESIGN REQUIREMENTS FOR A AND B.
8. CEMENT STABILIZED SAND 1.5 SACKS OF CEMENT PER TON OF DRY SAND.
9. ALL RAMPS AND SIDEWALKS/WALKWAYS SHALL BE CONSTRUCTED IN ACCORDANCE WITH AGENCY STANDARD DETAILS, TEXAS ACCESSIBILITY STANDARDS (TAS) AND ANSI/ICC/A117.1. WHERE THERE IS A CONFLICT IN THE REQUIREMENTS, THE STRICTEST REQUIREMENTS SHALL GOVERN.
10. CURB RAMPS THAT ARE STEEPER THAN A 1:15 MAX SLOPE WILL NOT BE ACCEPTED BY THE CITY OF HOUSTON

DRIVEWAY / LOCAL RESIDENTIAL STREETS
NTS

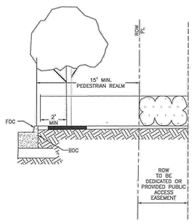
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

STREET PAVING AND SIDEWALK
02752–02 THROUGH 02754–01A

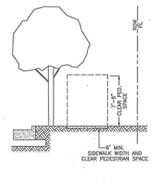
APPROVED BY: CITY ENGINEER — APPROVED BY: DEPUTY DIRECTOR
APPROVED BY: DIRECTOR OF HOUSTON PUBLIC WORKS
EFFECTIVE DATE: JUL–01–2020
FOR CITY OF HOUSTON USE ONLY

SHEET NO.

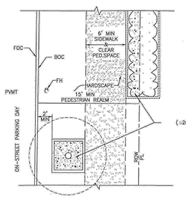
02775–08



ELEVATION

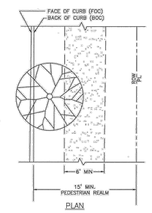


ELEVATION



PLAN

PEDESTRIAN REALM PERFORMANCE STANDARD



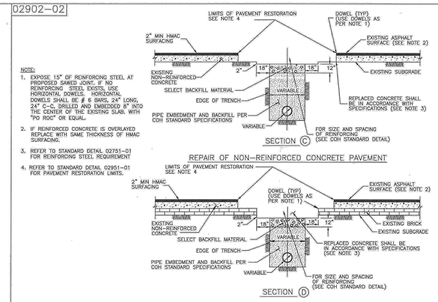
PLAN

SIDEWALK & CLEAR PEDESTRIAN ZONE MANDATORY MINIMUM REQUIREMENT

NOTES
1. REFER TO CHAPTER 42 OF THE CODE OF ORDINANCES, ARTICLE IV – TRANSIT CORRIDOR DEVELOPMENT.

SIDEWALKS AND CLEAR ZONE TRANSIT CORRIDOR STREET
NTS

02902–02



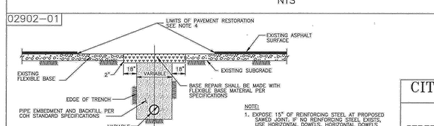
NOTE:
1. EXPOSE 15" OF REINFORCING STEEL AT PROPOSED SAWCUT JOINT. IF NO REINFORCING STEEL EXISTS, USE HORIZONTAL DOWELS. HORIZONTAL DOWELS SHALL BE #4 BARS, 24" LONG, EQUALLY SPACED AND EMBEDDED 8" INTO THE CENTER OF THE EXISTING SLAB. WITH "PO ROC" OR EQUAL.
2. IF REINFORCED CONCRETE IS OVERLAYED WITH ASPHALT, REPLACE WITH SAME THICKNESS OF HMAC SURFACING.
3. REFER TO STANDARD DETAIL 02751–01 FOR REINFORCING STEEL REQUIREMENT
4. REFER TO STANDARD DETAIL 02951–01 FOR PAVEMENT RESTORATION LIMITS.

SECTION Ⓒ
REPAIR OF NON–REINFORCED CONCRETE PAVEMENT

SECTION Ⓓ
REPAIR OF NON–REINFORCED CONCRETE PAVEMENT WITH BRICK

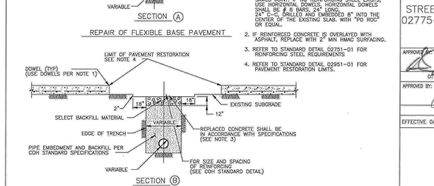
PAVEMENT REPAIR DETAILS FOR STREET CUTS – NON REINFORCED CONCRETE AND BRICK PAVEMENT
NTS

02902–01



SECTION Ⓐ
REPAIR OF FLEXIBLE BASE PAVEMENT

NOTE:
1. EXPOSE 15" OF REINFORCING STEEL AT PROPOSED SAWCUT JOINT. IF NO REINFORCING STEEL EXISTS, USE HORIZONTAL DOWELS. HORIZONTAL DOWELS SHALL BE #4 BARS, 24" LONG, EQUALLY SPACED 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 FOR PAVEMENT RESTORATION LIMITS.



SECTION Ⓑ
REPAIR OF REINFORCED CONCRETE PAVEMENT

PAVEMENT REPAIR DETAILS FOR STREET CUTS
NTS

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

STREET PAVING AND SIDEWALK
02775–08 THROUGH 02902–02

APPROVED BY: CITY ENGINEER — APPROVED BY: DEPUTY DIRECTOR
APPROVED BY: DIRECTOR OF HOUSTON PUBLIC WORKS
EFFECTIVE DATE: JUL–01–2020
FOR CITY OF HOUSTON USE ONLY

SHEET NO.

SWTP
Surface Water Transmission Program

LAN
LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

INTERIM REVIEW ONLY
Document Incomplete: not intended for permit, bidding or construction.
Engineer: WILLIAM BYLAND, P.E.
P.E. Serial No. 142061
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F–2614
Date:

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84–INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

STANDARD PAVEMENT DETAILS (2 OF 2)

WBS NO. S–000901–0015–4
DRAWING SCALE
NONE
CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.
SHEET NO. 67 OF 102

P:\130\130–10667–401\4–0–Production–Working\4–1–BIM–CAD\Details\10667–401_67–STANDARD PAVEMENT DETAILS–2.dwg plotted on Oct 21, 2024 – 10:40am

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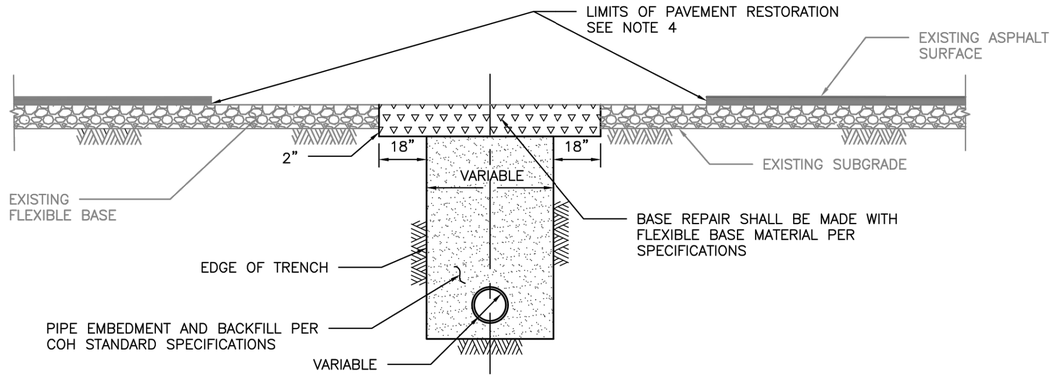
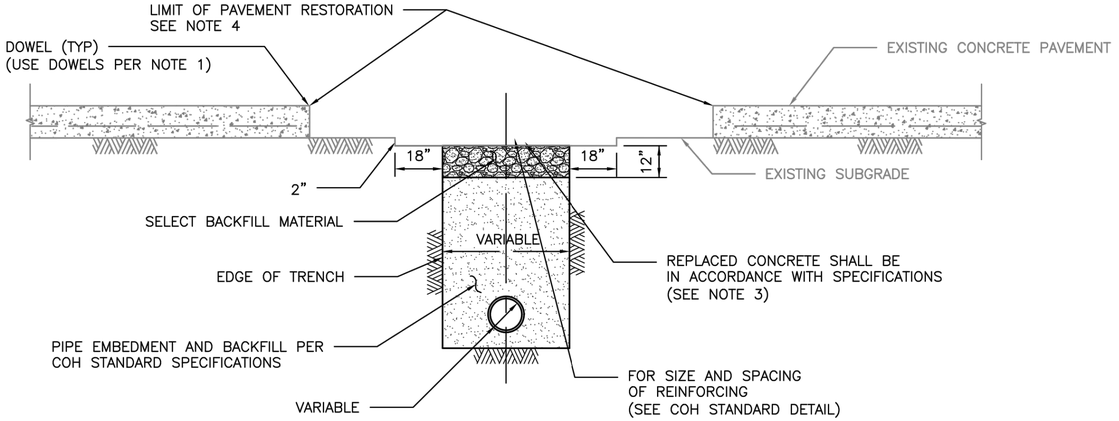


ELEVATION A
REPAIR OF FLEXIBLE BASE PAVEMENT



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: Suhail Kanwar — 9EF8B0C841F5478...
CITY ENGINEER

DocuSigned by: Carol Haddock — A93C410B726345...
DIRECTOR OF HPW

DocuSigned by: KHANG NGUYEN — 95A29EFDA75B4CD...
CITY TRAFFIC ENGINEER

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

SWTP
Surface Water Transmission Program

LAN
LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

INTERIM REVIEW ONLY
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Engineer: WILLIAM BYLAND, P.E.
P.E. Serial No.: 142061
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F–2614
Date:

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

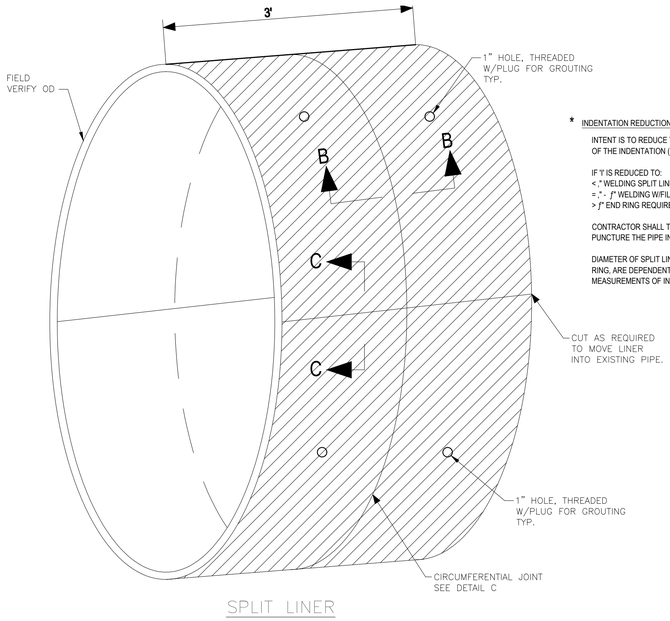
84–INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

PAVEMENT REPAIR AND STREET CUT DETAILS

WBS NO. S–000901–0015–4
DRAWING SCALE
NONE
CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.
SHEET NO. 68 OF 102

DISCLAIMER:
THE USE OF THIS STANDARD IS GOVERNED BY THE TEXAS ENGINEERING PRACTICE ACT. THE DESIGN REQUIREMENTS ON THIS STANDARD DO NOT PURPORT TO ADDRESS ALL OF THE SAFETY CONCERNS ASSOCIATED WITH THEIR USE. THE ENGINEER OF RECORD (EOR) IS TO REVIEW THESE DESIGN REQUIREMENTS AND BY AUTHORIZING THEIR USE, ACCEPTS RESPONSIBILITY FOR THEIR APPLICABILITY, ADEQUACY AND SAFETY. NO WARRANTY OF ANY KIND IS MADE BY THE CITY OF HOUSTON FOR ANY PURPOSES WHATSOEVER. THE CITY OF HOUSTON ASSUMES NO RESPONSIBILITY FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.

P:\130\130-10667-401\4-0-Production-Working\4-1-BIM-CAD\Details\10667-401_68-PAVEMENT REPAIR AND STREET CUT DETAILS.dwg plotted on Oct 21, 2024 - 10:43am



SPLIT LINER

* INDENTATION REDUCTION NOTES:

INTENT IS TO REDUCE THE HEIGHT OF THE INDENTATION (I).

IF 'I' IS REDUCED TO:
< ¼" WELDING SPLIT LINER OK.
= ¼" - ½" WELDING W/FILLER ROD REQUIRED.
> ½" END RING REQUIRED.

CONTRACTOR SHALL TAKE PRECAUTIONS TO NOT PUNCTURE THE PIPE INVERT DURING OPERATIONS.

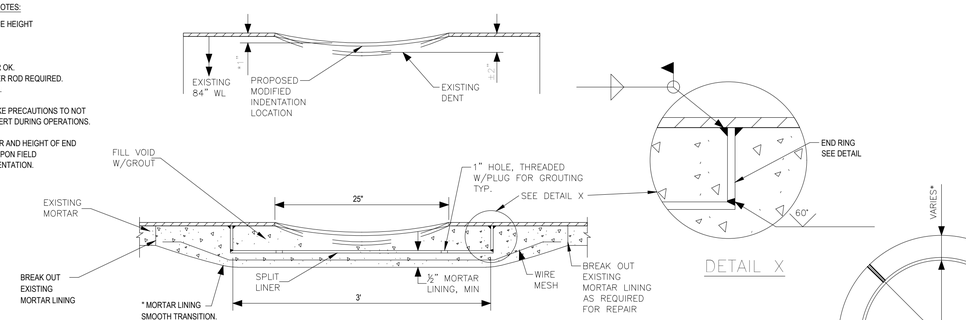
DIAMETER OF SPLIT LINER AND HEIGHT OF END RING, ARE DEPENDENT UPON FIELD MEASUREMENTS OF INDENTATION.

1 INTERNAL REPAIR OF DAMAGED PIPE

(FOR ADJUSTMENTS ONLY AS APPROVED BY ENGINEER AND PIPE MANUFACTURER)

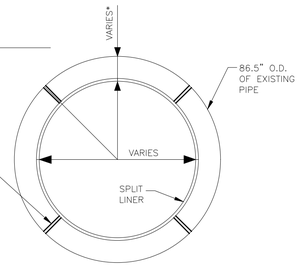
NOTES:

1. CONTRACTOR TO FIELD VERIFY INSIDE DIAMETER OF PIPE.
2. WELD THICKNESS TO MATCH PLATE THICKNESS. IF DIFFERENT THICKNESSES THEN PROVIDE WELD THICKNESS EQUAL TO GREATER OF THE TWO.

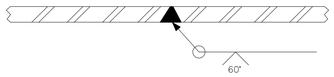


DAMAGED PIPE LOCATION

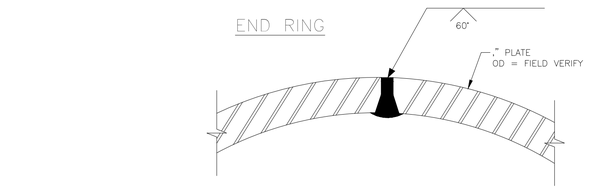
DETAIL X



A OPTION #1 – PIPE REPAIR

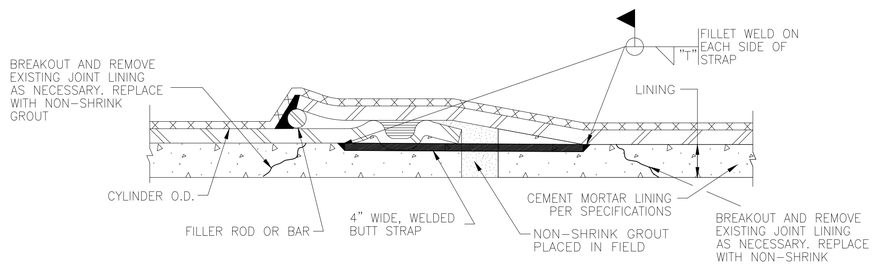


B SPLIT LINER SECTION CIRCUMFERENTIAL JOINTS



END RING

C SPLIT SEAM BEVEL SECTION LONGITUDINAL JOINTS

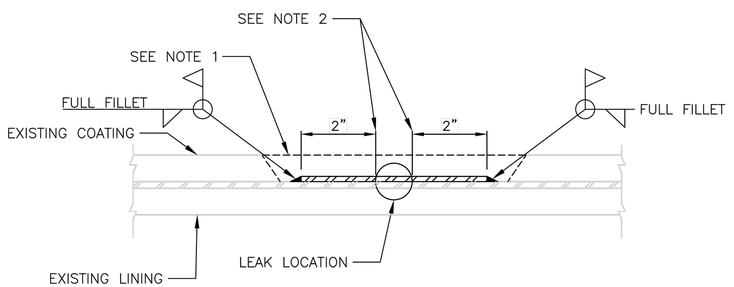


2 FIELD WELDED O–RING – STEEL PIPE JOINT

FLEXIBLE COATING AND CEMENT MORTOR LINING
(FOR ADJUSTMENTS ONLY AS APPROVED BY ENGINEER AND PIPE MANUFACTURER.)

NOTES:

1. BREAKOUT AND REMOVE JOINT LINING FOR ASSESSMENT BY PROJECT MANAGER OR ENGINEER.
2. INSTALL 4" WIDE, BUTT-STRAP ON JOINTS WHERE DIRECTED BY PROJECT MANAGER AND ENGINEER.
3. AFTER ASSESSMENT AND REPAIR, REPLACE NON-SHRINK GROUT REMOVED FOR ASSESSMENT.



NOTE:

1. REMOVE EXISTING COATING TO EXPOSE STEEL CYLINDER.
2. BUTT–STRAP WIDTH, 2–INCHES BEYOND LEAK OR TO COMPETENT STEEL WHICHEVER IS GREATER.

3 STEEL PIPE BUTT–STRAP REPAIR DETAIL

(FOR ADJUSTMENTS ONLY AS APPROVED BY ENGINEER AND PIPE MANUFACTURER)

NO.	DATE	REVISION	APP.

SWTP
Surface Water Transmission Program

LAN
LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

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Firm No.: F–2614
Date:

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

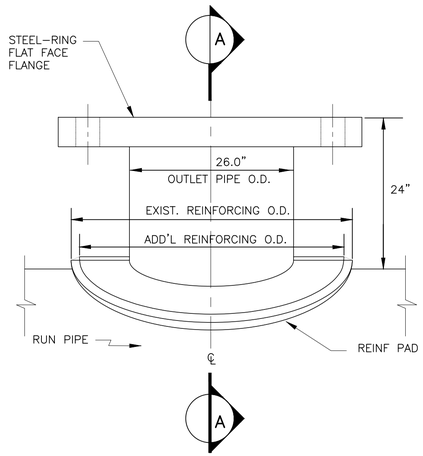
84–INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

REPAIR OF DAMAGED PIPE

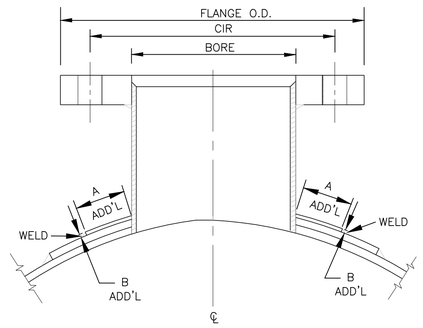
WBS NO. S–000901–0015–4	
DRAWING SCALE	
NONE	
CITY OF HOUSTON PM	
RAM CHAKRADHAR, P.E.	
SHEET NO. 69 OF 102	

P:\130\10667-401\4-0-Production-Working\4-1-BIM-CAD\Details\10667-401_69-REPAIR OF DAMAGED PIPE.dwg plotted on Oct 18, 2024 - 12:31pm

84" x 24" Outlet Detail																
	Run Pipe		Outlet Pipe			Reinforcing			AWWA C207 - CL "D-2"					Bolt Holes		
	O.D	T	O.D	t	H	A	O.D.	B	Nom. Dia	FLG Class	Bore	O.D	THK	CIR	NO	DIA
Existing	86.500	0.423	26.000	0.250	24.000	8.750	43.500	0.188	24.000	D-2	26.125	32.000	1.250	29.500	20.000	1.375
Additional						7.5	41	0.313								



PLAN

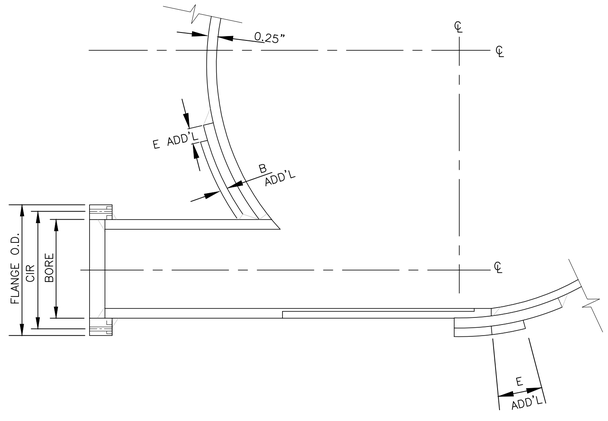


SECTION A–A

DETAIL 1

84" x 12" Outlet Detail																
	Run Pipe		Outlet Pipe			Reinforcing			AWWA C207 - CL "D-2"					Bolt Holes		
	O.D	T	O.D	t	L	E	O.D.	B	Nom. Dia	FLG Class	Bore	O.D	THK	CIR	NO	DIA
Existing	86.500	0.423	12.750	0.250	58.583	6.375	25.500	0.625	12.000	D-2	12.850	19.000	0.812	17.000	12.000	1.000
Additional						5.250	23.250	0.125								

PLAN



SECTION B–B

DETAIL 2

NO.	DATE	REVISION	APP.

Surface Water Transmission Program

LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

INTERIM REVIEW ONLY
Document Incomplete: not intended for permit, bidding or construction.
Engineer: WILLIAM BYLAND, P.E.
P.E. Serial No.: 142061
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F-2614
Date:

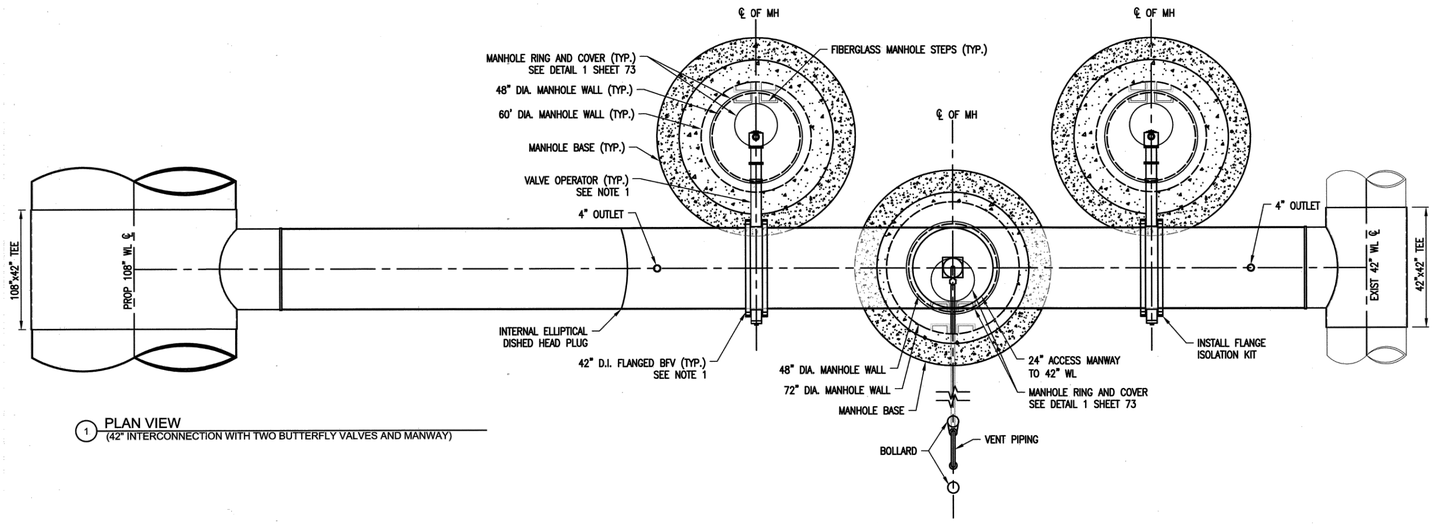
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84–INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

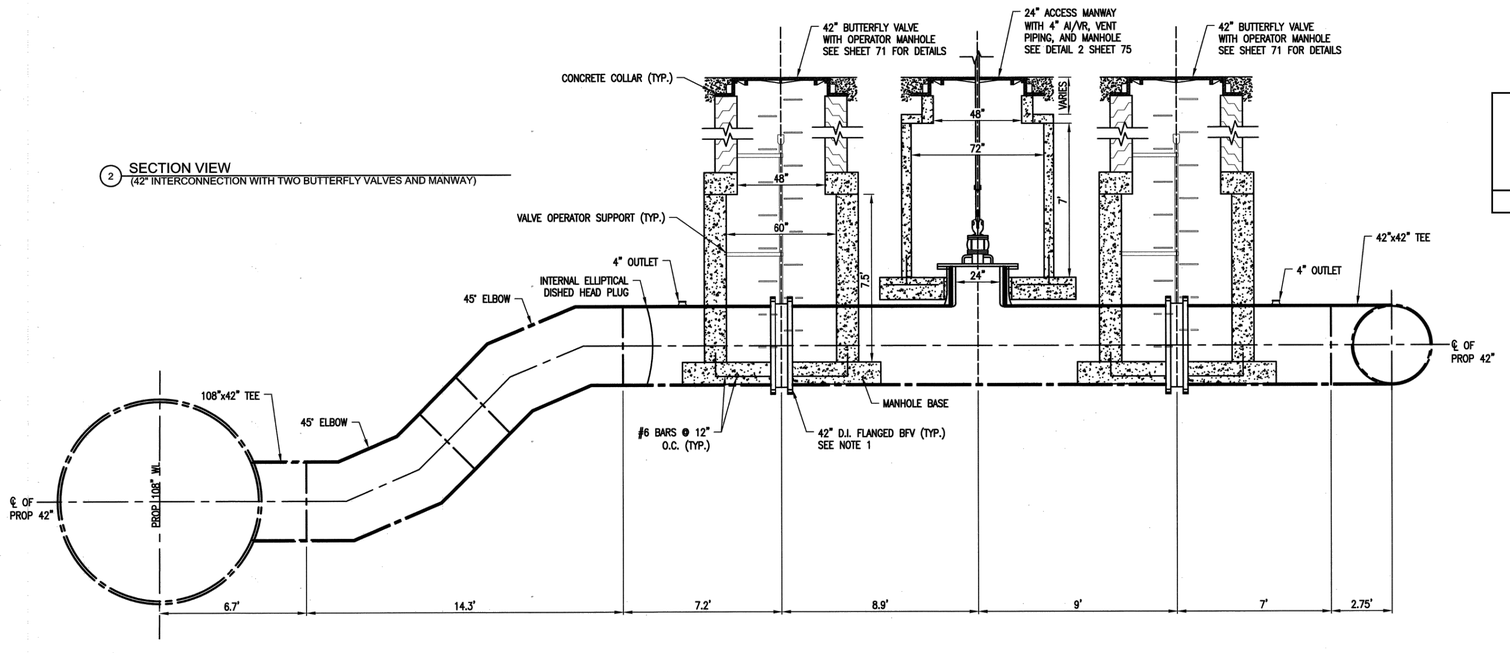
OUTLET REINFORCEMENT 84"x24"/84"x12" DETAILS

WBS NO. S–000901–0015–4	
DRAWING SCALE	
1"=1'	
CITY OF HOUSTON PM	
RAM CHAKRADHAR, P.E.	
SHEET NO. 70 OF 102	

P:\130\10667-401\4-0-Production-Working\4-1-BIM-CAD\Details\10667-401_70-OUTLET REINF.dwg plotted on Oct 18, 2024 - 12:30pm



1 PLAN VIEW
(42" INTERCONNECTION WITH TWO BUTTERFLY VALVES AND MANWAY)



2 SECTION VIEW
(42" INTERCONNECTION WITH TWO BUTTERFLY VALVES AND MANWAY)

NOTES:

1. LENGTH VARIES WITH BUTTERFLY VALVE MANUFACTURER.
2. USE CEMENT STABILIZED SAND AS 42" PIPELINE EMBEDMENT MATERIAL. REFER TO DETAIL 2 SHEET 69A. PROVIDE ENCAPSULATED BOLTS ON FLANGES WITHIN LIMITS OF CEMENT STABILIZED SAND.
3. SEE SHEET 37 FOR PIPELINE MATERIAL AND LIMITS OF RESTRAINED JOINTS.

No.	Date	Revisions	Appd.

RECORD DRAWINGS
DO NOT MODIFY

LOCKWOOD, ANDREWS & NEWNAM, INC.

SWTP
Surface Water Transmission Program

Lockwood, Andrews & Newnam, Inc.
A LAN A RAY COMPANY
2925 BRIARPARK DR., SUITE 600, HOUSTON, TX 77042
T: (713) 266-6900 F: (713) 266-2089
WWW.LAN-INC.COM

SURVEYED BY:
KUO & ASSOCIATES, INC.
C.O.H. FIELD BOOK P-5904

STATE OF TEXAS
MICHAEL V. LIGA
117599
LICENSED PROFESSIONAL ENGINEER
9/29/17
Lockwood, Andrews & Newnam, Inc.
Texas Registered Engineering Firm F-2614

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

108-INCH WATER LINE ALONG CITY EASEMENTS FROM SMITH ROAD TO LEE ROAD

42-INCH INTERCONNECTION DETAILS

WBS NO. S-000900-0126-4	
DRAWING SCALE	
3/8" = 1'-0"	
CITY OF HOUSTON PM	
ARTHUR C. MORRIS, P.E.	
SHEET NO. 66 OF 148	

57370
LICENSED PROFESSIONAL ENGINEER
HOUSTON, TEXAS

SWTP
Surface Water Transmission Program

LAN
LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

INTERIM REVIEW ONLY
Document Incomplete: not intended for permit, bidding or construction.
Engineer: WILLIAM BYLAND, P.E.
P.E. Serial No.: 142061
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F-2614
Date:

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

EXISTING 42" INTERCONNECTION DETAILS

WBS NO. S-000901-0015-4	
DRAWING SCALE	
NONE	
CITY OF HOUSTON PM	
RAM CHAKRADHAR, P.E.	
SHEET NO. 71 OF 102	

FILE PATH: P:\130\130-10667-4011\4-0-Production-Working\4-1-BIM-CAD\Details\10667-401_71 42 INCH INTERCONNECTION DETAILS.dwg

USER NAME: Lunsford, Natasha

PLOTTED: 10/18/2017 11:23 AM

P:\130\130-10667-4011\4-0-Production-Working\4-1-BIM-CAD\Details\10667-401_71 42 WATER LINE INTERCONNECT P AND P.dwg plotted on Oct 18, 2024 - 12:27pm

ABBREVIATIONS

ABOVE FINISH FLOOR	-	A.F.F.
ADDITIONAL	-	ADDN'L.
ADJACENT	-	ADJ.
AGGREGATE	-	AGGR.
ALTERNATE	-	ALT.
ANCHOR BOLT	-	A.B.
AND	-	&
ANGLE	-	L.
APPROVED	-	APPD.
APPROXIMATE	-	APPROX.
ARCHITECT	-	ARCH.
ARCHITECTURAL	-	ARCH'L
AT	-	@
AIR CONDITIONER	-	A/C
AIR HANDLING UNIT	-	AHU
BACK TO BACK	-	BTB
BEAM	-	BM.
BEARING	-	BRG.
BELOW FINISH FLOOR	-	B.F.F.
BETWEEN	-	BTWN.
BEVEL (ED)	-	BEV ('D)
BOTTOM	-	BOT.
BRACKET	-	BRKT.
CANTILEVER	-	CANT.
CAST-IN-PLACE	-	C.I.P.
CENTER LINE	-	CL.
CENTER OF GRAVITY	-	C.G.
CENTER TO CENTER	-	C. TO C.
CLEAR OR CLEARANCE	-	CLR.
COLUMN	-	COL.
COMPRESSION	-	C OR COMP.
CONCRETE	-	CONC.
CONCRETE MASONRY UNIT	-	CMU
CONNECTION (S)	-	CONNX(S)
CONTINUOUS	-	CONT.
CONTROL JOINT	-	CONTR. JT. OR C.T.J
CONSTRUCTION	-	CONST.
CONSTRUCTION JOINT	-	CONST. JT. OR C.J.
DEAD LOAD	-	D.L.
DIAGONAL	-	DIAG.
DIAMETER	-	DIA. OR Ø
DIMENSION(S)	-	DIM(S).
DOUBLE TEE	-	D.T.
DRAWING(S)	-	DWG(S).
DOWEL(S)	-	DWL(S).
EACH	-	EA.
EACH FACE	-	E.F.
EACH WAY	-	E.W.
ELEVATION	-	ELEV.
ENGINEER	-	ENGR.
ENTRANCE	-	ENT.
EQUAL	-	EQ.
EQUIPMENT	-	EQUIP.
EXPANSION	-	EXP.
EXPANSION JOINT	-	E.J.
EXISTING	-	EXIST.
FACE TO FACE	-	F.T.F.
FABRICATOR	-	FABR.
FAR SIDE	-	F.S.
FINISH (ED)	-	FIN.
FINISHED FLOOR	-	FIN. FL.
FOUNDATION	-	FDN.
FOOTING	-	FTG.
GAGE OR GAUGE	-	GA.
GALVANIZED	-	GALV.
GENERAL	-	GEN.
GOVERNMENT	-	GOVT.
HIGH STRENGTH	-	H.S.
HORIZONTAL	-	HORIZ.
INFORMATION	-	INFO.
INSIDE DIAMETER	-	I.D.
INSIDE FACE	-	I.F.
INTERMEDIATE	-	INTERM.
JOINT	-	JT.
JOIST(S)	-	JST(S)
KIPS (1000 LBS)	-	K.
KIP PER LINEAR FOOT	-	K.L.F.
KIP PER SQUARE FOOT	-	K.S.F.
LIGHTWEIGHT CONCRETE	-	LWT. CONC.
LIVE LOAD	-	L.L.
LONGITUDINAL	-	LONG.
LONG LEG HORIZONTAL	-	LLH
LONG LEG VERTICAL	-	LLV
MANUFACTURE(R)	-	MFR.
MATERIAL	-	MAT'L.
MAXIMUM	-	MAX.
MECHANICAL	-	MECH.
MEZZANINE	-	MEZZ.
MIDDLE	-	MID.
MINIMUM	-	MIN.
MISCELLANEOUS	-	MISC.
MOMENT	-	M
MOMENT CONNECTION(S)	-	MC
NEAR FACE	-	N.F.
NEAR SIDE	-	N.S.
NOMINAL	-	NOM.
NOT TO SCALE	-	N.T.S.
NUMBER	-	NO. OR #
ON CENTER	-	O.C.
OPENING(S)	-	OPNG(S).
OPPOSITE	-	OPP.
OUTSIDE DIAMETER	-	O.D.
PLATE	-	PL
POUNDS PER SQUARE FOOT	-	P.S.F.
POUNDS PER SQUARE INCH	-	P.S.I.
PROJECTION	-	PROJ.
RADIUS	-	R
REINFORCE (ING)(MENT)	-	REINF.
REMAINDER	-	REM.
REQUIRE	-	REQ.
REQUIRED	-	REQ'D.
SECTION	-	SECT.
SHEAR	-	V
SIMILAR	-	SIM.
SPACE	-	SPA.
SPECIFICATION(S)	-	SPEC(S).
SPECIFIED	-	SPEC'D
SQUARE FOOT (FEET)	-	S.F.
STANDARD	-	STD.
STEEL	-	STL.
STIFFENER	-	STIFF.
STIRRUPS	-	STIR.
STRUCTURE	-	STRUCT.
STRUCTURAL	-	STRUCT'L.
SYMMETRICAL	-	SYM.
SUBCONTRACTOR	-	SUBCONTR.
TEMPERATURE	-	TEMP.
TENSION	-	T
THICK	-	THK.
TOP AND BOTTOM	-	T & B
TOP OF BEAM	-	T.O.B.M.
TOP OF FOOTING	-	T.O.F.
TOP OF PIER	-	T.O.P.
TOP OF STEEL	-	T.O.S.
TOP OF CONCRETE	-	T.O.C.
TYPICAL	-	TYP.
UNLESS NOTED OTHERWISE	-	U.N.O.
VERTICAL	-	VERT.
WATERPROOFING	-	WPFG.
WIND LOAD	-	W.L.
WITH	-	W/
WORK POINT	-	W.P.

GENERAL REQUIREMENTS AND DESIGN CRITERIA

1. THESE STRUCTURAL GENERAL NOTES APPLY TO ALL WORK. REFER TO THE SPECIFICATIONS FOR ADDITIONAL INFORMATION NOT FULLY ADDRESSED IN THESE NOTES.
2. TYPICALLY, THE LATEST EDITION OF CONSTRUCTION STANDARDS SHALL BE UTILIZED, AS APPROVED BY THE AUTHORITY HAVING JURISDICTION. BUILDING CODE AND SELECT REFERENCED STANDARDS:

   A. INTERNATIONAL BUILDING CODE (IBC), 2021 EDITION, INTERNATIONAL CODE COUNCIL
   B. ASCE 7-16, STANDARD, MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES
   C. ACI 318-19, BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE AND COMMENTARY
   D. AISC MANUAL OF STEEL CONSTRUCTION, 15TH EDITION
   E. AISC 303-16, CODE OF STANDARD PRACTICE FOR STRUCTURAL STEEL BUILDING AND BRIDGES
   F. AISC 360-16, SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS
   G. ANSI/AWS D1.1, STRUCTURAL WELDING CODE - STEEL

3. THE PROVISIONS OF THE REFERENCED BUILDING CODE AND ALL REFERENCED STANDARDS THEREIN SHALL APPLY TO THIS PROJECT. WHERE THERE IS A CONFLICT BETWEEN A GENERAL REQUIREMENT AND A SPECIFIC REQUIREMENT, THE SPECIFIC REQUIREMENT SHALL BE APPLICABLE. GENERAL REQUIREMENTS NOT SHOWN IN THE DETAILS ARE NOT CONSIDERED CONFLICTS AND ARE STILL REQUIRED, AS APPLICABLE.
4. WHERE A DETAIL, TYPICAL DETAIL, SECTION, TYPICAL SECTION OR NOTE IS SHOWN FOR ONE CONDITION, IT SHALL APPLY FOR ALL LIKE OR SIMILAR CONDITIONS UNLESS OTHERWISE NOTED. IF THERE ARE QUESTIONS REGARDING THE APPLICABILITY OF A DETAIL, TYPICAL DETAIL, SECTION, TYPICAL SECTION, CONTACT THE ENGINEER IN WRITING REQUESTING A CLARIFICATION. THE CONTRACTOR SHALL NOT BE RELIEVED OF THE RESPONSIBILITY OF SUPPLYING AND INSTALLING REQUIRED ITEMS OR PERFORMING OTHER REQUIRED WORK DUE TO ANY MISINTERPRETATION OF THE PROJECT DRAWINGS.
5. DESIGN LOADS

   A. LIVE LOADS

      1) PLATFORMS 100 PSF
      2) VAULT TOP DECK HL-93

   B. WIND (PER ASCE 7-16, WIND LOADS ARE ULTIMATE; SERVICE LOADS MAY BE DETERMINED BY DIVIDING THE LOADS IDENTIFIED ON THE COMPONENTS AND CLADDING DIAGRAMS BY 1.67):

      1) BASIC WIND SPEED, V = 143 MPH (3-SECOND GUST)
      2) EXPOSURE CATEGORY: C
      3) OCCUPANCY CATEGORY: III

   C. SEISMIC:

      1) RISK CATEGORY III
      2) SEISMIC IMPORTANCE FACTOR, Ie: 1.25
      3) MAPPED SPECTRAL ACCELERATION (SHORT PERIOD), Ss: 0.069g
      4) MAPPED SPECTRAL ACCELERATION (1-SECOND PERIOD), S1: 0.040g
      5) SITE SOIL CLASS: D
      6) SITE COEFFICIENT: Fa: 1.6
      7) SITE COEFFICIENT: Fv: 2.4
      8) MAXIMUM CONSIDERED EARTHQUAKE SPECTRAL RESPONSE ACCELERATION (SHORT PERIOD), Sms: 0.111g
      9) MAXIMUM CONSIDERED EARTHQUAKE SPECTRAL RESPONSE ACCELERATION (1-SECOND PERIOD), Sm1: 0.097g
      10) DESIGN SPECTRAL RESPONSE ACCELERATION (SHORT PERIOD), Sds: 0.074g
      11) DESIGN SPECTRAL RESPONSE ACCELERATION (1-SECOND PERIOD), Sd1: 0.065g
      12) SEISMIC DESIGN CATEGORY: A

6. CONTRACTOR RESPONSIBILITIES

   A. THE STRUCTURAL DRAWINGS DEPICT THE STRUCTURE IN ITS FINAL CONSTRUCTED CONFIGURATION. NEITHER CONSTRUCTION MEANS AND METHODS NOR CONSTRUCTION SAFETY ARE PART OF THE STRUCTURAL ENGINEER'S EXPERTISE OR SCOPE OF WORK. THE GENERAL CONTRACTOR AND HIS SUBCONTRACTORS ARE FULLY RESPONSIBLE FOR THE MEANS AND METHODS USED TO CONSTRUCT THE STRUCTURE AND FOR FULL COMPLIANCE WITH ALL JOB SAFETY RELATED REGULATIONS AND CONDITIONS AT THE SITE. LIMITED SITE VISITS IF ANY BY THE STRUCTURAL ENGINEER ARE SOLELY TO OBSERVE COMPLETED PARTS OF THE STRUCTURE. THE STRUCTURAL ENGINEER IS NEITHER QUALIFIED TO OBSERVE NOR COMMENT ON CONSTRUCTION MEANS AND METHODS AND JOB SITE SAFETY.
   B. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS BEFORE STARTING WORK OR FABRICATING OR INSTALLING ANY REINFORCING STEEL, STRUCTURAL STEEL, OR MASONRY. THE ENGINEER SHALL BE IMMEDIATELY NOTIFIED OF ANY DISCREPANCIES FOUND.
   C. THE CONTRACTOR SHALL DISSEMINATE ALL CONSTRUCTION DOCUMENTS AND ADDENDA TO ALL SUBCONTRACTORS AND MATERIAL SUPPLIERS PRIOR TO THE SUBMITTAL OF SHOP DRAWINGS, FABRICATION OF REINFORCING STEEL OR PRECAST CONCRETE COMPONENTS, AND CONSTRUCTION.
   D. THE CONTRACTOR SHALL COMPARE THE CIVIL, STRUCTURAL, MECHANICAL, AND ELECTRICAL DRAWINGS AND REPORT ANY DISCREPANCY TO THE ENGINEER PRIOR TO FABRICATION AND INSTALLATION OF ANY STRUCTURAL MEMBERS.
   E. NO CORE DRILLING SHALL BE ALLOWED WITHOUT APPROVAL BY THE ENGINEER. BEFORE CORE DRILLING ANY HOLES, LOCATE THE REINFORCING STEEL IN EXISTING CONCRETE USING AN R-METER OR OTHER NON-DESTRUCTIVE METHODS. AN EXAMPLE OF SUCH A DEVICE IS HILTI'S PS 300 FERROSCAN SYSTEM.
   F. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE ADEQUATE SHORING AND BRACING OF THE STRUCTURE FOR ALL LOADS THAT MAY BE IMPOSED DURING CONSTRUCTION. THE DESIGN AND PROVISION FOR ALL TEMPORARY SUPPORTS SUCH AS GUYS, BRACES, SUPPORTS AND ANCHORS FOR SAFETY LINES, CRIBBING OR OTHER TEMPORARY ELEMENTS REQUIRED FOR THE EXECUTION OF THE CONTRACT ARE NOT INCLUDED IN THE DRAWINGS AND SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. TEMPORARY SUPPORTS SHALL NOT RESULT IN OVERSTRESS OR DAMAGE TO THE ELEMENTS TO BE BRACED NOR ANY ELEMENTS USED AS BRACE SUPPORTS.
   G. WHEN CUTTING A NEW OPENING IN EXISTING CONCRETE, THE CONTRACTOR SHALL NOT OVER CUT AT CORNERS. CORE-DRILL, CHIP AND GRIND AS REQUIRED AT CORNERS. A LAYOUT OF ALL PROPOSED OPENINGS SHALL BE REVIEWED BY THE STRUCTURAL ENGINEER PRIOR TO SAWCUTTING OR CORING.
   H. THE CONTRACTOR SHALL ENSURE NO STRUCTURAL MEMBERS OR ELEMENTS ARE DAMAGED OR ALTERED BY OTHER TRADES. ANY SUCH DAMAGE THAT DOES OCCUR SHALL BE BROUGHT TO THE ATTENTION OF THE STRUCTURAL ENGINEER AND SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
   I. THE USE OR REPRODUCTIONS OF THESE CONTRACT DRAWINGS BY ANY CONTRACTOR, SUBCONTRACTOR, ERECTOR, FABRICATOR, OR MATERIAL SUPPLIER IN LIEU OF PREPARATION OF SHOP DRAWINGS SIGNIFIES HIS ACCEPTANCE OF ALL INFORMATION SHOWN HEREON AS CORRECT, AND OBLIGATES HIMSELF TO ANY JOB EXPENSE, REAL OR IMPLIED, ARISING DUE TO ANY ERRORS THAT MAY OCCUR HEREON.
   J. WORK AREAS SHALL BE KEPT, AT ALL TIMES, FREE OF DEBRIS AND NON-HAZARDOUS MATERIAL TO THE SATISFACTION OF THE OWNER. ALL EXISTING PIPING AND CONDUITS SHALL HAVE TEMPORARY PROTECTION DURING CONSTRUCTION. THE CONTRACTOR SHALL COORDINATE STORAGE OF MATERIALS, PARKING OF VEHICLES, AND RESTRICTIONS OF WORK WITH THE OWNER. AFTER PROJECT COMPLETION, THE SITE SHALL BE CLEANED UP TO ITS CONDITION PRIOR TO THE START OF THE PROJECT TO THE SATISFACTION OF THE OWNER.
   K. THE CONTRACTOR SHALL DISPOSE OF ALL MATERIALS REMOVED WHICH ARE NOT TO BE REINSTALLED OR SALVAGED ON THE PROJECT. DISPOSAL OF MATERIALS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
   L. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL UNDERGROUND UTILITIES IN THE AREA OF CONSTRUCTION THAT MIGHT BE AFFECTED BY OR OTHERWISE INTERFERE WITH INSTALLATION OF NEW WORK. THIS INCLUDES THOSE THAT MIGHT BE DAMAGED BY NEW FOUNDATIONS OR OTHER WORK, AND THOSE WHOSE PRESENCE MIGHT LEAD TO DAMAGE TO THE NEW WORK (SUCH AS DIFFERENTIAL SETTLEMENT, ETC.).

7. PRINCIPAL OPENINGS ARE SHOWN ON THESE DRAWINGS. THE CONTRACTOR SHALL EXAMINE THE PROCESS, ARCHITECTURAL, ELECTRICAL, AND MECHANICAL DRAWINGS FOR REQUIRED OPENINGS TO BE PROVIDED, WHETHER SHOWN ON THESE DRAWINGS OR NOT. VERIFY SIZE AND LOCATION OF ALL OPENINGS WITH EQUIPMENT MANUFACTURERS.

GENERAL REQUIREMENTS AND DESIGN CRITERIA (CONT.)

8. SEE PROCESS, ARCHITECTURAL, AND CIVIL DRAWINGS FOR FLOOR ELEVATIONS, SLOPES, LOCATION OF DEPRESSED FLOOR AREAS, FLOOR FINISHES, WALKS, CURBS, TOPPING SLABS, ETC. ALL SLAB RECESSES SHALL BE PROVIDED BY THE CONTRACTOR WHETHER SHOWN ON THESE DRAWINGS OR NOT.
9. STRUCTURAL MEMBERS HAVE BEEN SPACED TO ACCOMMODATE THE EQUIPMENT SPECIFIED. ANY REQUIRED CHANGES TO THE STRUCTURAL DRAWINGS DUE TO THE ACCEPTANCE OF ALTERNATES AND/OR SUBSTITUTIONS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. CALCULATIONS SHALL ACCOMPANY REVISED DRAWINGS PREPARED AND SUBMITTED BY THE CONTRACTOR AND THEY SHALL BE SIGNED AND SEALED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF TEXAS.
10. THE STRUCTURAL DRAWINGS ARE NOT TO BE SCALED FOR DETERMINATION OF QUANTITIES, LENGTHS, OR FIT OF MATERIALS.

STRUCTURAL EXCAVATION, BACKFILL AND COMPACTION NOTES

1. REFER TO GEOTECHNICAL REPORT *NUMBER* DATED *DATE* PREPARED BY *NAME AND ADDRESS*. THE REPORT IS INCLUDED IN THE CONTRACT DOCUMENTS.
2. BEFORE THE START OF EARTHWORK OPERATIONS, ADEQUATELY PROTECT EXISTING STRUCTURES, UTILITIES, AND OTHER PERMANENT OBJECTS FROM DAMAGE. THE CONTRACTOR IS RESPONSIBLE FOR THE REPAIR OR REPLACEMENT OF ALL DAMAGED ELEMENTS, AT NO ADDITIONAL COST TO THE OWNER.
3. EXCAVATION WORK SHALL BE NEAT AND FREE OF DEBRIS AND LOOSE MATERIAL. REFER TO THE SPECIFICATIONS FOR PROTECTION OF EXCAVATIONS.
4. EXCAVATIONS SHALL NOT BE MADE DURING INCLEMENT WEATHER. WATER ACCUMULATION IN EXCAVATIONS EXCEEDING 1 INCH SHALL BE PUMPED OUT BEFORE THE CONCRETE IS PLACED.
5. ALL EXCAVATIONS AND BACKFILL OPERATIONS SHALL BE IN ACCORDANCE WITH THE LATEST OSHA EXCAVATION SAFETY STANDARDS.
6. LIGHTWEIGHT FLOWABLE FILL SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 2000 PSI AND A MAXIMUM DENSITY OF 70 PCF.
7. A 2-INCH SAND LAYER MAY BE PLACED UNDER ALL SLABS ON GRADE FOR LEVELING PURPOSES.

FOUNDATION NOTES

1. PRIOR TO PLACEMENT OF ANY FILL SOILS, THE EXPOSED SUBGRADE SHOULD BE EVALUATED BY PROOFROLLING. REFER TO THE GEOTECHNICAL REPORT FOR ADDITIONAL INFORMATION.
2. BACKFILLING OF WALLS SHALL BE PLACED SUCH THAT SYMMETRICAL LOADING SHALL BE MAINTAINED ON BOTH SIDES. WHERE DESIGN CONDITIONS REQUIRE BACKFILLING EACH SIDE TO UNEQUAL HEIGHTS, THEN WALLS SHALL BE FIRMLY SHORED IN POSITION, AND SHORING SHALL REMAIN UNTIL FLOORS OR OTHER PERMANENT BRACING ELEMENTS ARE PLACED AND PROPERLY SET TO PROVIDE FULL SUPPORT.
3. PROVIDE POSITIVE DRAINAGE AWAY FROM THE BUILDING AREAS DURING CONSTRUCTION AND AFTER PROJECT COMPLETION.
4. DO NOT ALLOW STORED EXCAVATION MATERIAL TO DISRUPT PROPER DRAINAGE OF AREA.
5. MAINTAIN STABILITY OF EXCAVATIONS UNTIL PROPERLY BACKFILLED. KEEP EXCAVATIONS FREE OF ANY LOOSE MATERIAL. DEWATER EXCAVATIONS AND REMOVE ANY WET MATERIAL PRIOR TO THE PLACING OF CONCRETE.
6. HEAVY EQUIPMENT FOR SPREADING AND COMPACTING BACKFILL SHALL NOT BE OPERATED CLOSER TO WALL, GRADE BEAM, ETC., THAN A DISTANCE EQUAL TO THE HEIGHT OF BACKFILL ABOVE TOP OF WALL FOOTING AND BOTTOM OF GRADE BEAM, ETC. THE AREA REMAINING SHALL BE COMPACTED BY HAND TAMPERS.
7. FOUNDATIONS HAVE BEEN DESIGNED FOR THE FOLLOWING ALLOWABLE BEARING PRESSURES:
   SHALLOW/STRIP FOOTINGS: XXXX PSF DEAD PLUS SUSTAINED LIVE LOAD AND XXXX PSF TOTAL LOADS
8. SOIL BELOW FOUNDATIONS SHALL BE PREPARED AND COMPACTED PER GEOTECHNICAL REPORT.
9. BOTTOM OF FOOTING ELEVATIONS GIVEN ARE FOR PURPOSES OF CONTRACT AND SHALL BE ADJUSTED AT THE TIME OF EXCAVATION TO MEET SOIL CONDITIONS IF SO REQUIRED.

CAST-IN-PLACE CONCRETE NOTES

1. CONCRETE CONSTRUCTION SHALL BE IN ACCORDANCE WITH ACI 318: "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE."
2. DETAILING, FABRICATION AND ERECTION OF REINFORCING BARS SHALL COMPLY WITH ACI 315R "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES."
3. NORMAL WEIGHT CONCRETE SHALL NOT WEIGHT MORE THAN 150 PCF.
4. ALL CAST-IN-PLACE STRUCTURAL CONCRETE SHALL BE NORMAL WEIGHT CLASS A CONCRETE AND SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 POUNDS PER SQUARE INCH AT 28 DAYS UNLESS NOTED OTHERWISE.
5. REINFORCING STEEL SHALL BE NEW DEFORMED BILLET STEEL, CONFORMING TO ASTM A 615 WITH SUPPLEMENTARY REQUIREMENTS S1, GRADE 60. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185, GRADE 60 AND SHALL BE SUPPLIED IN FLAT SHEETS ONLY.
6. PROVIDE LAP SPLICES IN CONFORMANCE WITH TABLE 7 ON SHEET XX, UNLESS OTHERWISE INDICATED. FOLLOW RESTRICTIONS ON LOCATIONS OF SPLICES AS INDICATED IN THE DETAILS, NOTES, OR SPECIFICATIONS. STAGGER ALL LAP SPLICES IN ADJACENT BARS 3'-6" MINIMUM.
7. PROVIDE TWO NO. 4 x 4'-0" BARS AT ALL RE-ENTRANT CORNERS, PLACED ON THE DIAGONAL @ 3" O.C., WITH 1 INCH CLEARANCE FROM CORNER AND TOP OF SLAB.
8. PROVIDE PLASTIC CHAIRS AND SPACERS AT 5'-0" O.C. MAX. FOR ALL SLABS AND BEAMS ABOVE GRADE.
9. TERMINATE DISCONTINUOUS BEAM REINFORCEMENT WITH STANDARD 90 DEGREE HOOKS U.N.O.
10. UNLESS NOTED OTHERWISE, ALL 90, 135 AND 180 DEGREE HOOKS SHOWN ON THE DRAWINGS SHALL BE STANDARD ACI HOOKS.
11. FIELD CUTTING OF REINFORCING BARS SHALL BE BY SHEARING OR SAWING. FIELD CUTTING BY CUTTING TORCH IS NOT ALLOWED.
12. PROVIDE NO. 4 HORIZONTAL AT 12 INCHES O.C. MAXIMUM IN EACH FACE OF BEAMS EXCEEDING 21 INCHES IN DEPTH U.N.O.
13. MINIMUM REINFORCING STEEL COVERAGE SHALL BE AS FOLLOWS, U.N.O.:

SLABS ABOVE GRADE	1"
BEAMS/COLUMNS ABOVE GRADE	1 1/2"
CONCRETE CAST PERMANENTLY AGAINST EARTH	3"
CONCRETE EXPOSED TO EARTH AND WEATHER BUT NOT CAST AGAINST EARTH	2"
ALL LIQUID CONTAINING CONCRETE	2"

14. EPOXY COAT ENDS OF ANY REBAR LEFT EXPOSED IN THE COMPLETE STRUCTURE.
15. WHERE REINFORCING STEEL IN TENSION IS REQUIRED TO BE MECHANICALLY SPLICED, MECHANICAL SPLICES SHALL BE DESIGNED FOR 125% OF THE SPECIFIED YIELD STRENGTH OF THE LARGER BAR BEING SPLICED.
16. CONSTRUCTION JOINTS SHALL BE LOCATED AS SHOWN ON THE DRAWINGS. ADDITIONAL CONSTRUCTION JOITS SHALL BE LOCATED AS SPECIFIED IN SECTION 03150 OF THE CONTRACT DOCUMENTS. THE LOCATION OF CONSTRUCTION JOINTS SHALL BE APPROVED BY THE STRUCTURAL ENGINEER. CONSTRUCTION JOINTS SHALL BE MADE IN THE CENTER OF SPANS WITH VERTICAL BULKHEADS U.N.O. THERE SHALL BE NO HORIZONTAL CONSTRUCTION JOINTS IN CONCRETE POURS U.N.O.
17. REFER TO CIVIL, ELECTRICAL, AND VENDOR'S DRAWINGS FOR SLEEVES, EMBEDDED ITEMS, ACCESSORIES, ETC. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING AND PLACING ALL SUCH ITEMS.
18. DO NOT PLACE PIPES OR SLEEVES THROUGH FOOTINGS UNLESS SPECIFICALLY NOTED ON STRUCTURAL DRAWINGS.
19. UNLESS SHOWN ON THE STRUCTURAL DRAWINGS, OPENINGS IN SLABS OR WALLS LARGER THAN 12"x12" SHALL NOT BE CONSTRUCTED. PIPES, DUCTS, AND SLEEVES SHALL NOT EXCEED 1/3 OF SLAB OR WALL THICKNESS UNLESS SPECIFICALLY NOTED ON THE STRUCTURAL DRAWINGS. APPROVALS MUST BE OBTAINED FROM THE STRUCTURAL ENGINEER PRIOR TO FABRICATION OF STEEL AND PLACEMENT OF CONCRETE.
20. PROVIDE A 3/4-INCH CHAMFER AT ALL EXPOSED EDGES OF CONCRETE UNLESS DETAILED OTHERWISE.

STRUCTURAL STEEL FRAMING

1. STRUCTURAL STEEL DETAILING, FABRICATION, AND ERECTION SHALL BE IN ACCORDANCE WITH THE FOURTEENTH EDITION OF THE "MANUAL OF STEEL CONSTRUCTION" (LRFD PROVISIONS) OF THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION AND SHALL CONFORM TO THE LATEST OSHA REQUIREMENTS.
2. SUBMIT SHOP DRAWINGS FOR FABRICATION AND ERECTION OF ALL STEEL MEMBERS. SHOP DRAWINGS SHALL GIVE COMPLETE WELDING INFORMATION, BOTH SHOP AND FIELD, USING AWS SYMBOLS.
3. MATERIAL REQUIREMENTS, U.N.O.:

   A. ALL STRUCTURAL STEEL W SHAPES SHALL BE ASTM A992, GRADE 50.
   B. ALL RECTANGULAR OR SQUARE HOLLOW STRUCTURAL STEEL SECTIONS SHALL BE ASTM A500, GRADE B AND MINIMUM YIELD STRENGTH OF 58,000 PSI.
   C. STRUCTURAL STEEL FOR CHANNELS, ANGLES BARS AND PLATES MAY CONFORM TO ASTM A36 IN LIEU OF ASTM A992, GRADE 50.
   D. STRUCTURAL STEEL TUBING SHALL CONFORM TO ASTM A500, GRADE B WITH A MINIMUM YIELD STRENGTH OF 58,000 PSI.
   E. ALL OTHER STRUCTURAL STEEL SHALL CONFORM TO ASTM A992.
   F. GROUT BELOW BASE PLATES SHALL BE NON-SHRINK, HIGH-STRENGTH, NON-METALLIC GROUT, WITH A MINIMUM (28) DAY COMPRESSIVE STRENGTH OF 6,000 PSI.
   G. UNLESS OTHERWISE RECOMMENDED BY AWS. WELDING ELECTRODES SHALL CONFORM TO AWS A5.1 OR A5.5 E-70XX (LOW-HYDROGEN FOR SMAW WELDING). ALL WELDING PROCEDURES SHALL BE LOW-HYDROGEN PROCESSES. ELECTRODES SHALL BE STORED AFTER OPENING TO MAINTAIN HYDROGEN CONTENTS.

4. DETAILING, FABRICATION, AND ERECTION OF STRUCTURAL STEEL SHALL COMPLY WITH AISC "SPECIFICATION FOR DETAILING, FABRICATION, AND ERECTION OF STRUCTURAL STEEL", AISC "CODE OF STANDARD PRACTICE", AND ALL UPDATING PUBLICATIONS.
5. STRUCTURAL STEEL HAS BEEN DESIGNED IN ACCORDANCE WITH AISC "SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS," 2016. LOAD AND RESISTANCE FACTOR DESIGN.
6. GENERAL CONTRACTOR SHALL REMOVE EARTH OR DEBRIS FROM TOP OF FOUNDATION AS REQUIRED TO INSTALL COLUMNS.
7. PRE-GROUTING OF BASE PLATES IS PROHIBITED.
8. COLUMNS SHALL BE FINISHED TO PROVIDE FULL BEARING CONTACT WITH BASE PLATE (AND CAP PLATE IF REQUIRED BY LOAD TRANSFER). BASE PLATES AND CAP PLATES SHALL BE FINISHED IN ACCORDANCE WITH SECTION M2.8 OF THE AISC SPECIFICATION.
9. ALL ANCHOR RODS SHALL BE ASTM F1554, GRADE 55 UNLESS NOTED OTHERWISE. ANCHOR RODS IN AREAS EXPOSED TO THE WEATHER SHALL BE HOT-DIP GALVANIZED. ANCHOR BOLTS SHALL BE SET USING REIGID TEMPLATES.
10. UNLESS SHOWN OTHERWISE ON THE DRAWINGS, CONNECTIONS SHALL BE SHOP WELDED AND FIELD BOLTED USING 3/4-INCH DIAMETER HIGH-STRENGTH ASTM A325 BOLTS (BEARING TYPE CONNECTION). BOLTS IN AREAS EXPOSED TO THE WEATHER SHALL BE HOT-DIP GALVANIZED. BOLTS SHALL BE TIGHTENED IN CONFORMANCE WITH "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS" RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS OF THE ENGINEERING FOUNDATION.
11. ALL MISCELLANEOUS WELDS SHALL BE 3/16" MINIMUM SIZE FILLET WELD ALL AROUND. INCREASE WELD SIZE TO MEET AISC REQUIREMENTS. WELDING OF CONTINUOUS MEMBERS SHALL BE A MINIMUM OF 2 INCHES OF 3/16-INCH FILLET WELD AT 12 INCHES O.C., STAGGERED EACH SIDE, UNLESS NOTED OTHERWISE. COLUMN BASE PLATES, COLUMN CAP PLATES AND STIFFENER PLATES SHALL BE WELDED ALL AROUND.
12. QUALIFY WELDING PROCESSES AND WELDING OPERATORS IN ACCORDANCE WITH AWS STANDARD QUALIFICATION PROCEDURE. OPERATORS SHALL CARRY PROOF OF QUALIFICATIONS ON THEIR PERSONS.
13. WELDED CONNECTIONS SHALL CONFORM TO AWS D1.1. TESTING AGENCY SHALL INSPECT ALL COMPLETE PENETRATION WELDS AND ALL BUTT WELDS MADE BY FABRICATOR. PERFORM ULTRASONIC OR RADIOGRAPHIC INSPECTIONS OF ALL FULL PENETRATION WELDS MADE IN THE FIELD. IF THE FABRICATOR USES THE FULL VALUE FOR FILLET WELDS, AS SPECIFIED IN THE REFERENCES, INSPECT 15% OF THESE WELDS. VISUALLY INSPECT ALL (100%) FIELD WELDS.
14. ALL RE-ENTRANT CORNERS OF BEAM COPES AND PLATE CUTS MUST BE SHAPED NOTCH-FREE PER AWS D1.1 TO A RADIUS OF APPROXIMATELY 1/2 INCH MINIMUM.
15. SPLICING OF STRUCTURAL STEEL MEMBERS IS PROHIBITED WITHOUT THE APPROVAL OF THE STRUCTURAL ENGINEER. ANY MEMBER HAVING A SPLICE NOT SPECIFICALLY APPROVED BY THE ENGINEER ON THE SHOP DRAWINGS WILL BE REJECTED.
16. SINGLE SHEAR PLATES SHALL BE 3/8" MINIMUM.
17. STRUCTURAL STEEL SHALL BE PUNCHED FOR WOOD BLOCKING AND NAILERS IN ACCORDANCE WITH THE ARCHITECTURAL DETAILS.
18. BURNING OF HOLES IN STRUCTURAL STEEL IS PROHIBITED. ANY MEMBER WITH BURNED HOLES SHALL BE REJECTED.
19. ALL STRUCTURAL SHALL BE HOT-DIPPED GALVANIZED IN ACCORDANCE WITH ASTM A 123, "SPECIFICATION FOR ZINC (HOT-DIP GALVANIZED) COATINGS ON IRON AND STEEL PRODUCTS." STEEL SHALL BE PRE-CLEANED UTILIZING A CAUSTIC BATH, ACID PICKLE, AND FLUX. ZINC COATING FOR THREADED PRODUCTS SHALL CONFORM TO ASTM A153, CLASS C. AREAS TO BE FIELD-WELDED SHALL BE MASKED IN ORDER TO ACCOMMODATE WELDING OPERATIONS.
20. FIELD REPAIR OF GALVANIZING SHALL BE DONE WITH "ZRC COLD GALVANIZING COMPOUND." MANUFACTURED BY ZRC WORLDWIDE, MARSHFIELD, MASSACHUSETTS, OR APPROVED EQUAL.
21. PROVIDE DIELECTRIC ISOLATION KITS AT ALL CONNECTIONS BETWEEN DISSIMILAR METALS.

NO.	DATE	REVISION	APP.

SWTP
Surface Water Transmission Program

LAN
LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

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Engineer: JENNIFER N. SAVAGE, P.E.
P.E. Serial No. 111686
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F-2614
Date:

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84–INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

STRUCTURAL GENERAL NOTES

WBS NO. S–000901–0015–4

DRAWING SCALE
NONE

CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.

SHEET NO. 72 OF 102

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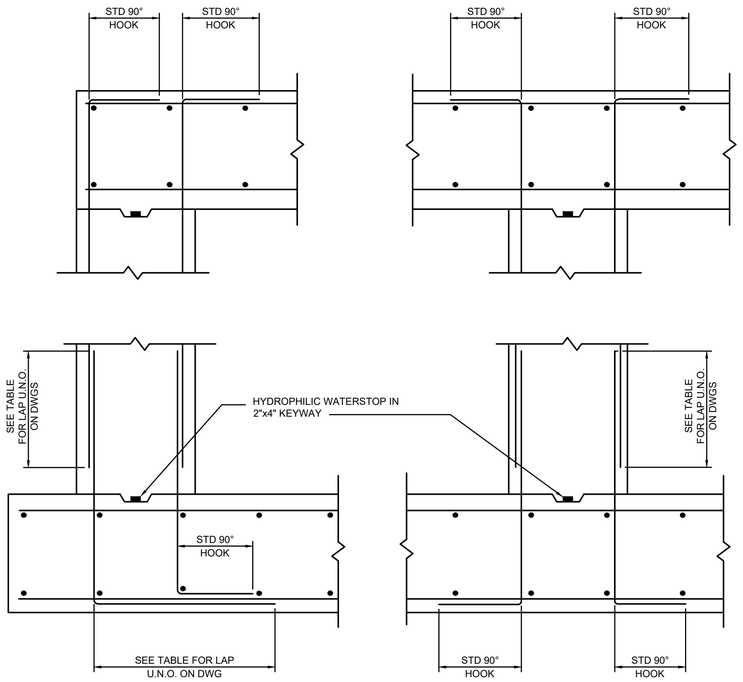
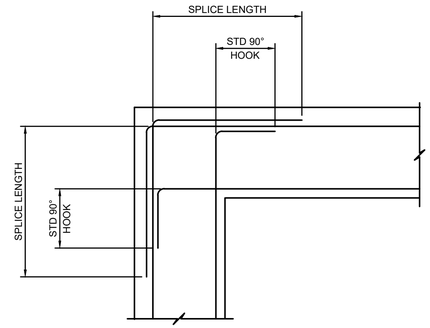


NOTE:
REINFORCING SHALL BE CONTINUOUS THROUGH JOINT. WATERSTOP REQUIRED ONLY IF JOINT IS BELOW MAX. WATER SURFACE OR BELOW FINISHED GRADE.

1 CONSTRUCTION JOINTS AT WALLS

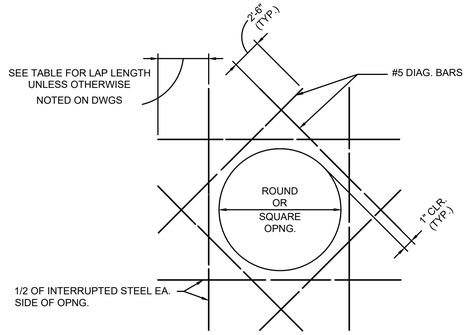
SCALE: NONE

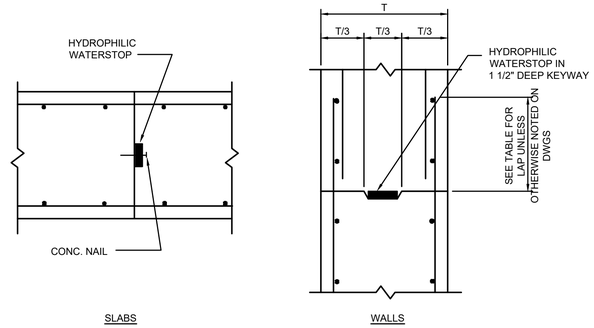


NOTE: SPLICE LENGTH- SEE REINFORCING LAP SPLICE AND EMBEDMENT TABLES UNLESS NOTED OTHERWISE ON DRAWINGS.

2 CORNER REINFORCING AT WALLS OR GRADE BEAMS

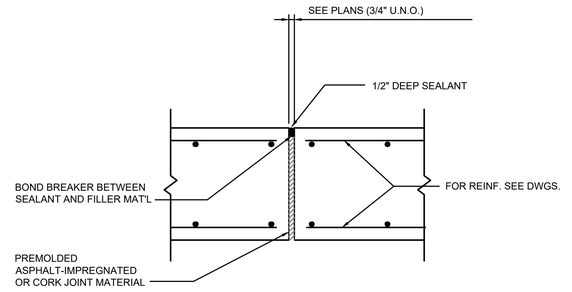
SCALE: NONE





3 CONSTRUCTION JOINT AT SLABS AND WALLS

SCALE: NONE

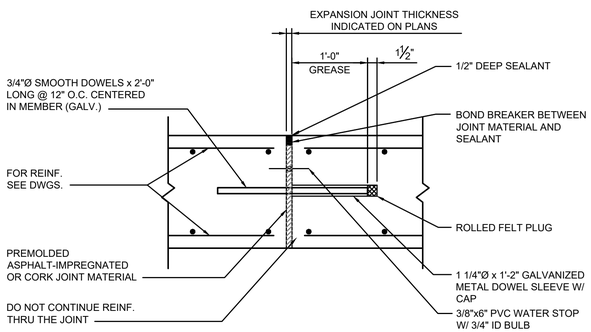


4 REINFORCING AT OPENINGS 8" OR LARGER

SCALE: NONE

5 ISOLATION OR EXPANSION JOINT WITHOUT DOWELS

SCALE: NONE

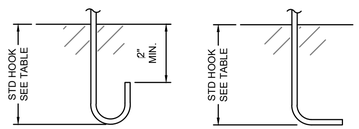


6 DOWELED EXPANSION JOINT

SCALE: NONE

REINFORCING LAP SPLICE & EMBEDMENT SCHEDULE					
BAR SIZE	MIN LAP LENGTH (IN)		MIN EMBEDMENT LENGTH (IN)		
	TOP BARS	OTHER BARS	TOP BARS	OTHER BARS	STD HOOK
3	24	18	18	14	7
4	32	24	25	19	9
5	40	31	31	24	12
6	48	37	37	28	14
7	70	54	54	42	17
8	80	62	62	47	19
9	90	70	70	54	21
10	102	78	78	60	24
11	113	87	87	67	27

1. LAP SPLICES AND EMBEDMENT LENGTHS NOT SHOWN ON THE DRAWINGS SHALL CONFORM TO THE TABLE AT LEFT.
2. TOP BARS ARE HORIZONTAL BARS WITH MORE THAN 12 INCHES DEPTH OF CONCRETE CAST BELOW THE REINFORCING BAR.
3. EMBEDMENT LENGTHS OF STANDARD HOOKS
4. TABLE LENGTHS BASED ON F'c=4000 PSI AND GRADE 60 REINF.



7 REINFORCING SCHEDULE

SCALE: NONE

NO.	DATE	REVISION	APP.

Surface Water Transmission Program

LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

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Engineer: JENNIFER N. SAVAGE, P.E.
P.E. Serial No. 111686
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F-2614
Date:

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

STRUCTURAL TYPICAL DETAILS

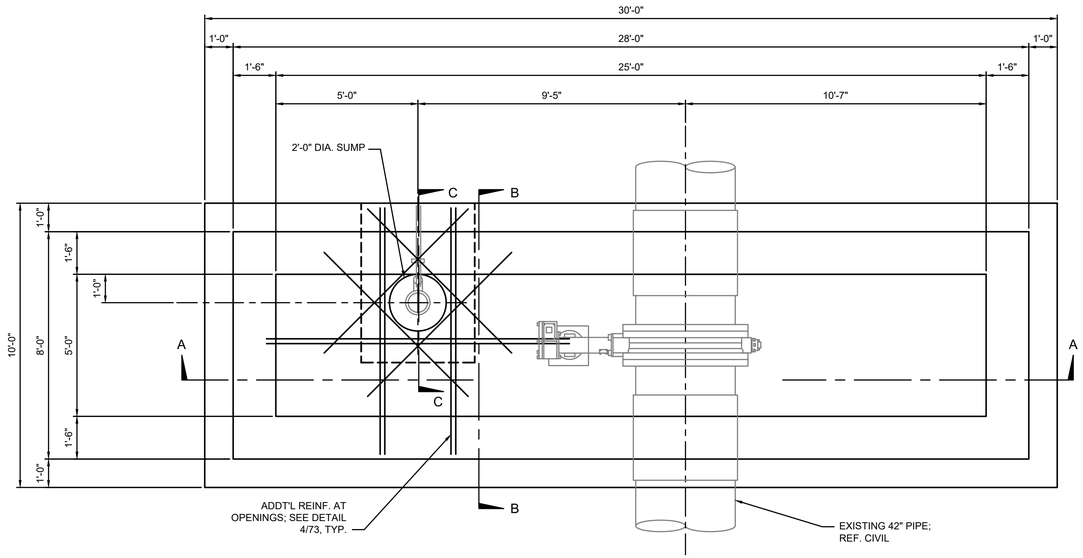
WBS NO. S-000901-0015-4

DRAWING SCALE
NONE

CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.

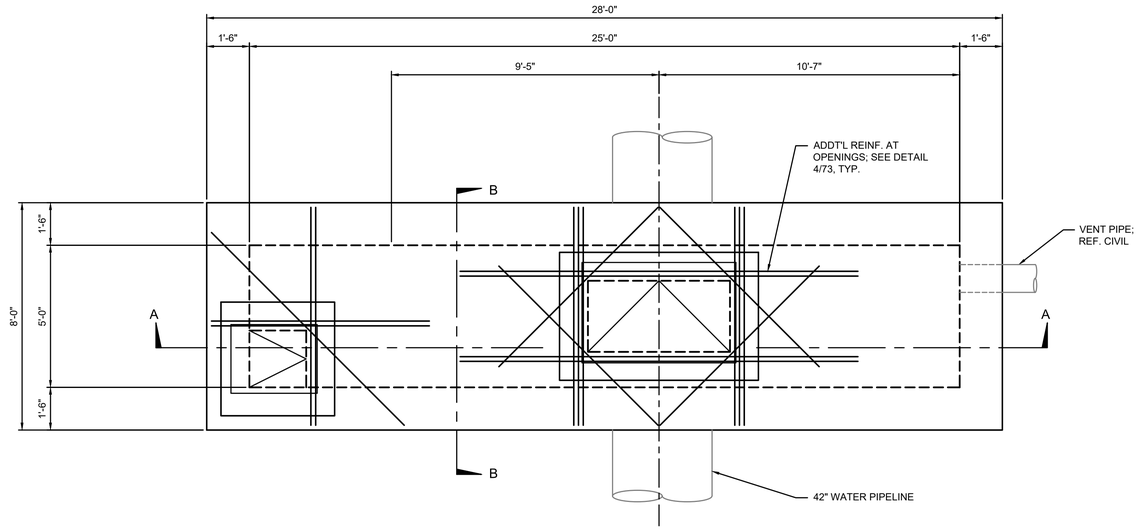
SHEET NO. 73 OF 102

P:\130\10667-401\4-0-Production-Working\4-1-BIM-CAD\Structural\10667-401_73-S2-STRUCT TYP DET.dwg plotted on Oct 14, 2024 - 3:52pm



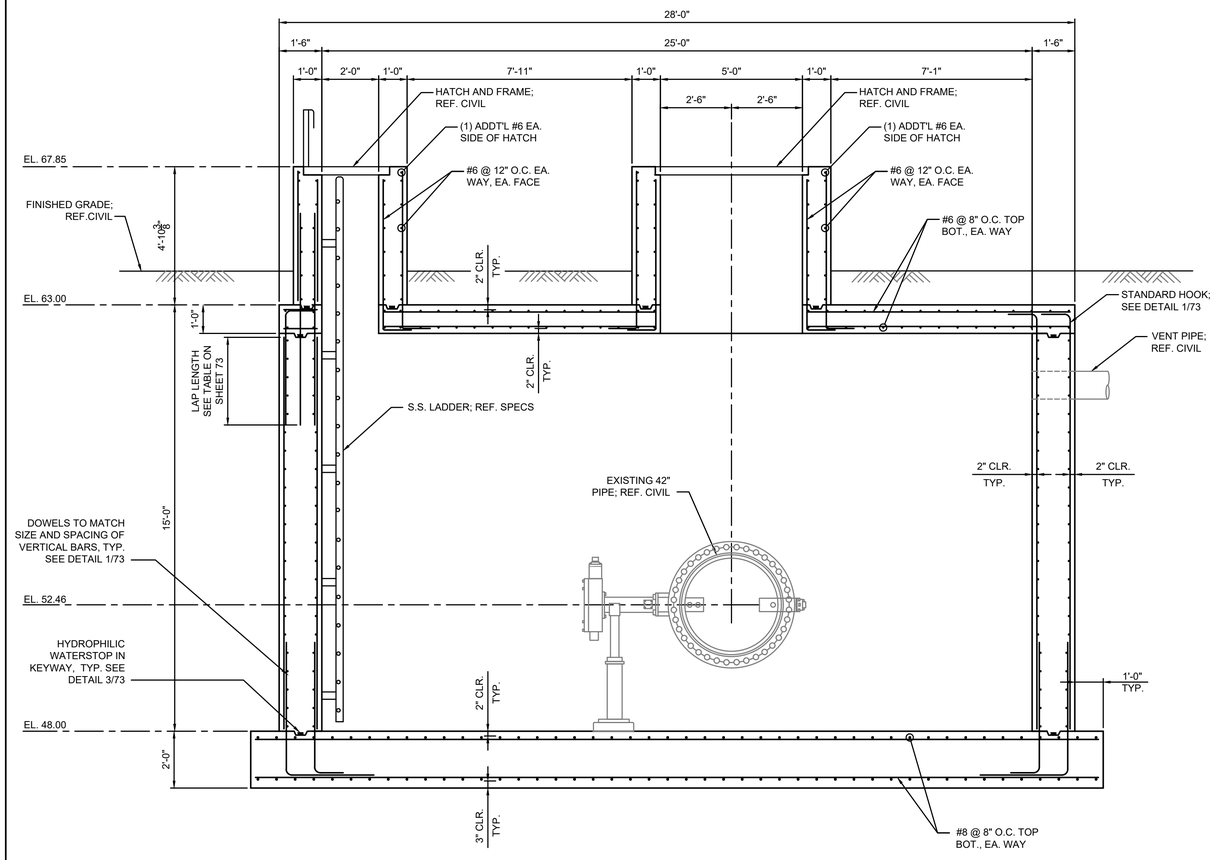
1 BASE SLAB PLAN

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



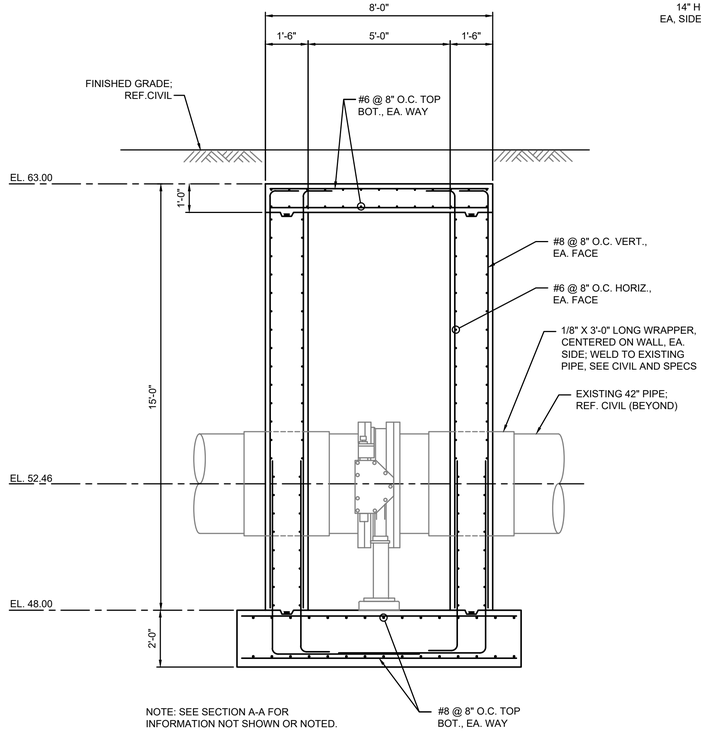
2 TOP SLAB PLAN

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



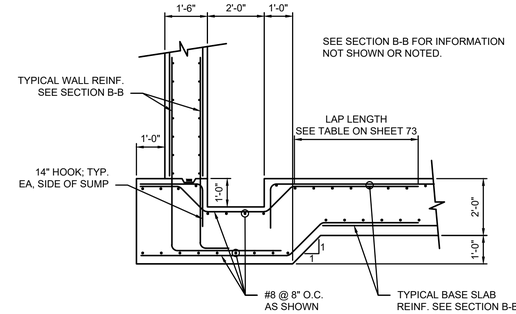
A SECTION A-A

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



B SECTION B-B

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



C SECTION C-C

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

NO.	DATE	REVISION	APP.

SWTP
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HOUSTON, TX 77042

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Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F-2614
Date:

CITY OF HOUSTON

HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

STRUCTURAL VALVE VAULT PLAN AND SECTIONS

WBS NO. S-000901-0015-4	
DRAWING SCALE	
3/8"=1'-0"	
CITY OF HOUSTON PM	
RAM CHAKRADHAR, P.E.	
SHEET NO. 74 OF 102	

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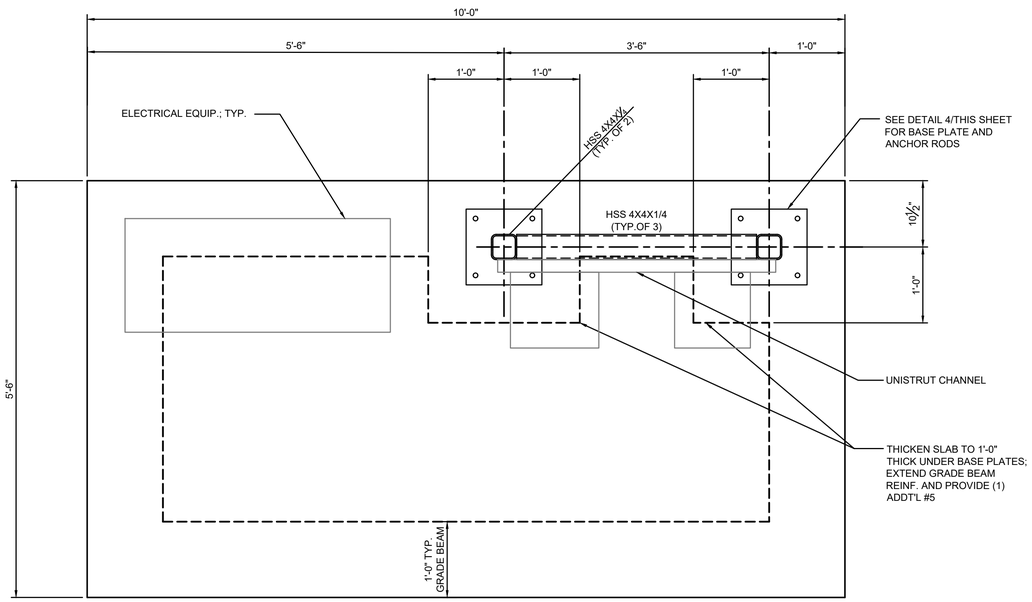
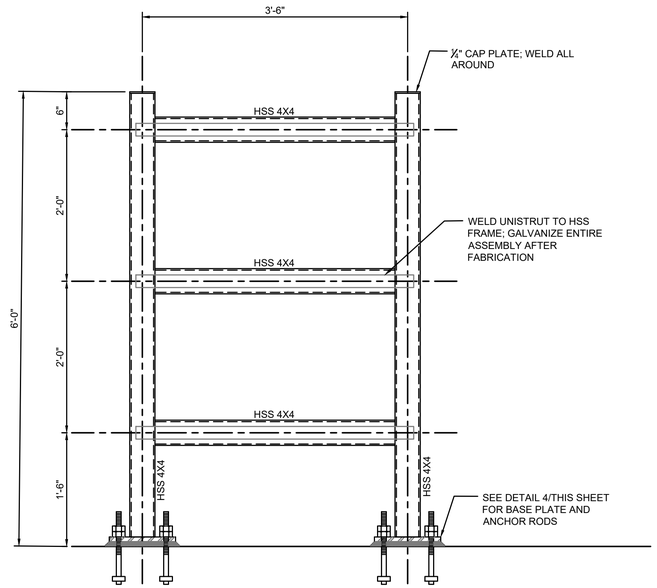


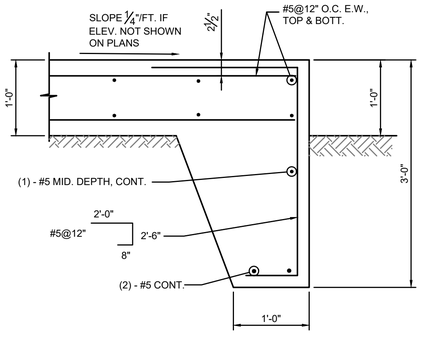
1 PLAN

SCALE: 1" = 1' - 0"



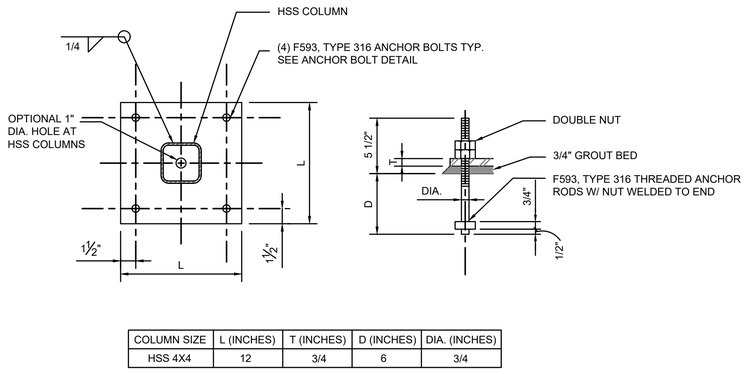
2 ELEVATION - EQUIPMENT RACK

SCALE: 1" = 1'-0"



3 TYPICAL EXTERIOR PAD

SCALE: 1" = 1'-0"



COLUMN SIZE	L (INCHES)	T (INCHES)	D (INCHES)	DIA. (INCHES)
HSS 4X4	12	3/4	6	3/4

4 BASE PLATE DETAILS

SCALE: NTS

NO.	DATE	REVISION	APP.

SWIP
Surface Water Transmission Program

LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

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P.E. Serial No.: 111686
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F-2614
Date:

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

STRUCTURAL PLAN
ELECTRICAL EQUIPMENT PAD

WBS NO. S-000901-0015-4

DRAWING SCALE
NONE

CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.

SHEET NO. 75 OF 102

P:\130\130-10667-401\4-0-Production-Working\4-1-BIM-CAD\Structural\10667-401_75-S4-EQUIP PAD.dwg plotted on Oct 14, 2024 - 3:54pm

1 ELECTRICAL SITE PLAN
SCALE: 1" = 80'-0"

GENERAL NOTES:

1. REFER TO ELECTRICAL SCHEDULES SHEET FOR THE CONDUIT AND PANEL SCHEDULES.
2. CONDUIT ROUTING IS DIAGRAMMATIC IN NATURE. COORDINATE ROUTING WITH EXISTING BELOW GRADE UTILITIES AND WITH OTHER TRADES

KEYED NOTES: (#)

1. PROPOSED CENTERPOINT ENERGY OVERHEAD SERVICE TRANSFORMERS. PROVIDE WEATHERHEAD, SERVICE LATERAL CONDUIT, CONDUIT STAND OFF BRACKETS, AND SERVICE LATERAL CONDUCTORS PER CENTERPOINT ENERGY STANDARDS. COORDINATE FINAL LOCATION AND POINT OF DELIVERY WITH CENTERPOINT ENERGY.
2. REFER TO ENLARGED ELECTRICAL SITE PLAN SHEET.

LEGEND:

- 30A/3P DISCONNECT UON
- F — 60A/3P FUSED DISC UON
- CONDUIT UP
- CONDUIT DOWN
- INSTRUMENTATION DEVICE
- TERMINATION POINT
- 3/4" x 10'-0" COPPER CLAD GROUND ROD
- XXX — CONDUIT/CONDUCTOR TAG
- J — PULL BOX
- STANCHION MOUNTED FIXTURE
- GFCI WP — DUPLEX RECEPTACLE AS DESCRIBED ABOVE WITH GROUND FAULT CIRCUIT INTERRUPTER AND WHILE IN USE WEATHERPROOF COVER.
- BRANCH CIRCUIT OR FEEDER BELOW SLAB OR UNDERGROUND

NO.	DATE	REVISION	APP.

N

0 80
(IN FEET)

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Firm No.: F-2614
Date:

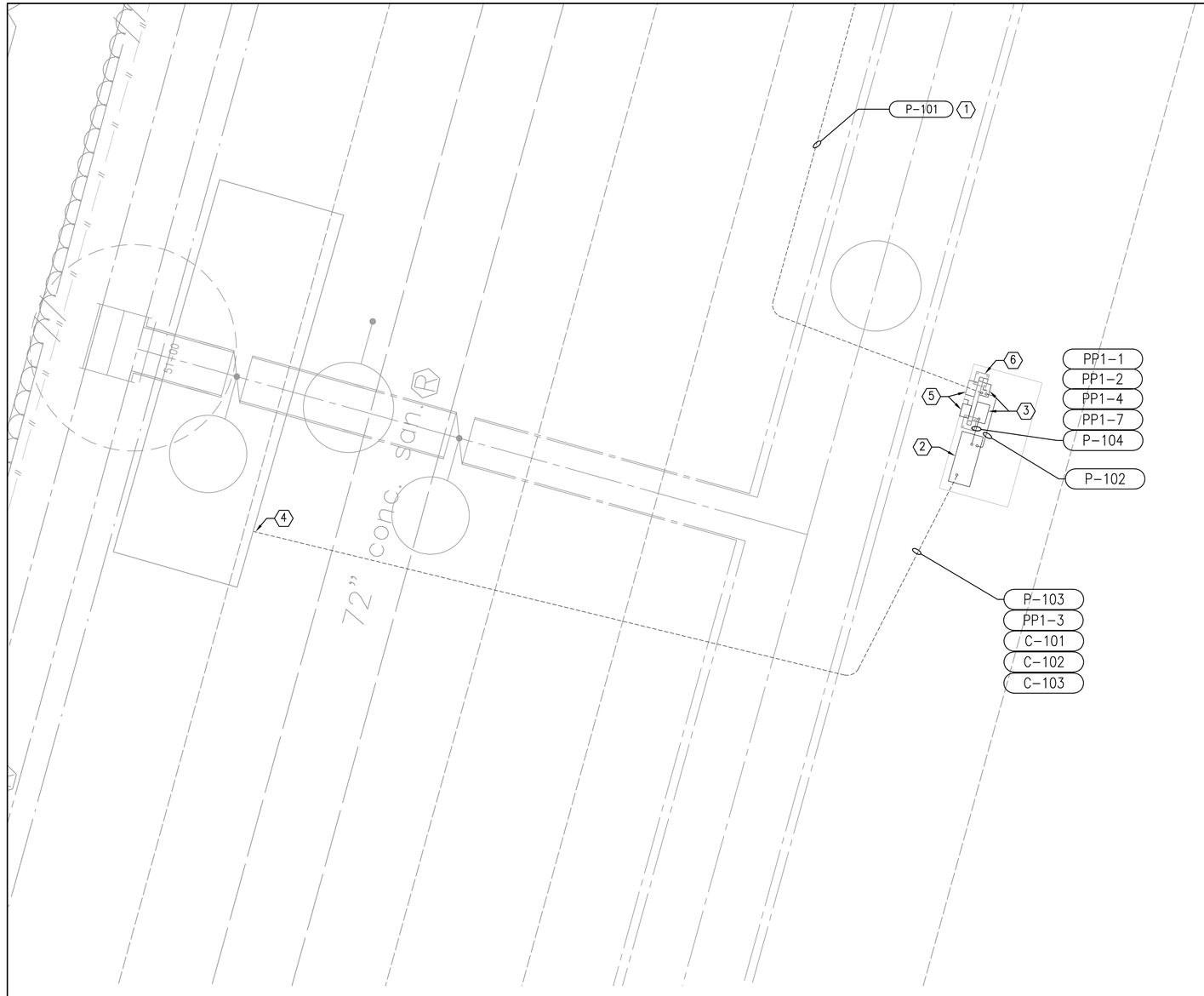
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

ELECTRICAL SITE PLAN – SMITH RD

WBS NO. S-000901-0015-4	
DRAWING SCALE	
1" = 80'-0"	
CITY OF HOUSTON PM	
RAM CHAKRADHAR, P.E.	
SHEET NO. 76 OF 102	

P:\130\130-10687-401\4-0-Production-Working\4-1-BIM-CAD\Electrical\10687-401-ES-101.dwg plotted on Oct 14, 2024 - 10:40am



1 ENLARGED ELECTRICAL SITE PLAN
SCALE: 1" = 5'-0"

GENERAL NOTES:

1. REFER TO ELECTRICAL SCHEDULES SHEET FOR THE CONDUIT AND PANEL SCHEDULES.
2. CONDUIT ROUTING IS DIAGRAMMATIC IN NATURE. COORDINATE ROUTING WITH EXISTING BELOW GRADE UTILITIES AND WITH OTHER TRADES. CONTROL CONDUITS (C-101 THRU 103) MAY BE CONSOLIDATED INTO FEWER CONDUITS PER DISCRETION OF INSTALLER AND IN ACCORDANCE WITH NEC CONDUIT FILL REQUIREMENTS.

KEYED NOTES: (#)

1. PROPOSED UNDERGROUND SERVICE LATERAL. SEE ELECTRICAL SITE PLAN SHEET FOR CONTINUATION TO CENTERPOINT ENERGY OVERHEAD SERVICE TRANSFORMERS.
2. PROVIDE CONTROL PANEL MOUNTED ON EQUIPMENT PAD. REFER TO ELECTRICAL ONE-LINE & SCADA ARCHITECTURE DIAGRAMS SHEET FOR PANEL SPECIFICATIONS. REFER TO STRUCTURAL DRAWINGS FOR EQUIPMENT PAD DETAILS.
3. PROVIDE MINI POWER ZONE (PP1) AND SERVICE DISCONNECT. MOUNT EQUIPMENT ON METAL FRAME RACK. REFER TO ELECTRICAL ONE-LINE & SCADA ARCHITECTURE DIAGRAMS SHEET FOR PP1 AND DISCONNECT SWITCH SPECIFICATIONS.
4. PROVIDE MANHOLE VAULT HATCH OPEN ALARMS (YS-01,02), SUMP PUMP ALARM (LSL-01), AND FLOAT HIGH LEVEL ALARM (LSH-01) IN MANHOLE VAULT. PROVIDE WATERTIGHT CONDUIT PENETRATIONS FOR POWER AND CONTROL CONDUITS. MANHOLE VAULT, MANHOLE SUMP PUMP, AND MOTOR OPERATED CONTROL VALVE (BFV-01) PROVIDED BY OTHER TRADES.
5. PROVIDE UTILITY METER, UTILITY METER/CT ENCLOSURE, AND UTILITY METER DISCONNECT PER UTILITY STANDARDS. MOUNT EQUIPMENT ON METAL FRAME RACK.
6. METAL FRAME RACK INSTALLED ON EQUIPMENT PAD. REFER TO STRUCTURAL DRAWINGS FOR METAL FRAME RACK DETAILS.

LEGEND:

- 30A/3P DISCONNECT UON
- F — 30A/3P FUSED DISC UON
- CONDUIT UP
- CONDUIT DOWN
- INSTRUMENTATION DEVICE
- TERMINATION POINT
- 3/4" x 10'-0" COPPER CLAD GROUND ROD
- XXX — CONDUIT/CONDUCTOR TAG
- J — PULL BOX
- STANCHION MOUNTED FIXTURE
- GFCI WP — DUPLEX RECEPTACLE AS DESCRIBED ABOVE WITH GROUND FAULT CIRCUIT INTERRUPTER AND WHILE IN USE WEATHERPROOF COVER.
- BRANCH CIRCUIT OR FEEDER BELOW SLAB OR UNDERGROUND

NO	DATE	REVISION	APP.

N

0 5
(IN FEET)

SWTP
Surface Water Transmission Program

LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

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Engineer: GASPAR G. GARCIA, P.E.
P.E. Serial No.: 104970
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F-2614
Date:

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

ENLARGED ELECTRICAL SITE PLAN

WBS NO. S-000901-0015-4	
DRAWING SCALE	
1" = 5'-0"	
CITY OF HOUSTON PM	
RAM CHAKRADHAR, P.E.	
SHEET NO. 77 OF 102	

P:\130\130-10667-401\4-0-Production-Working\4-1-BIM-CAD\Electrical\10667-401-ES-102.dwg plotted on Oct 14, 2024 - 4:14pm

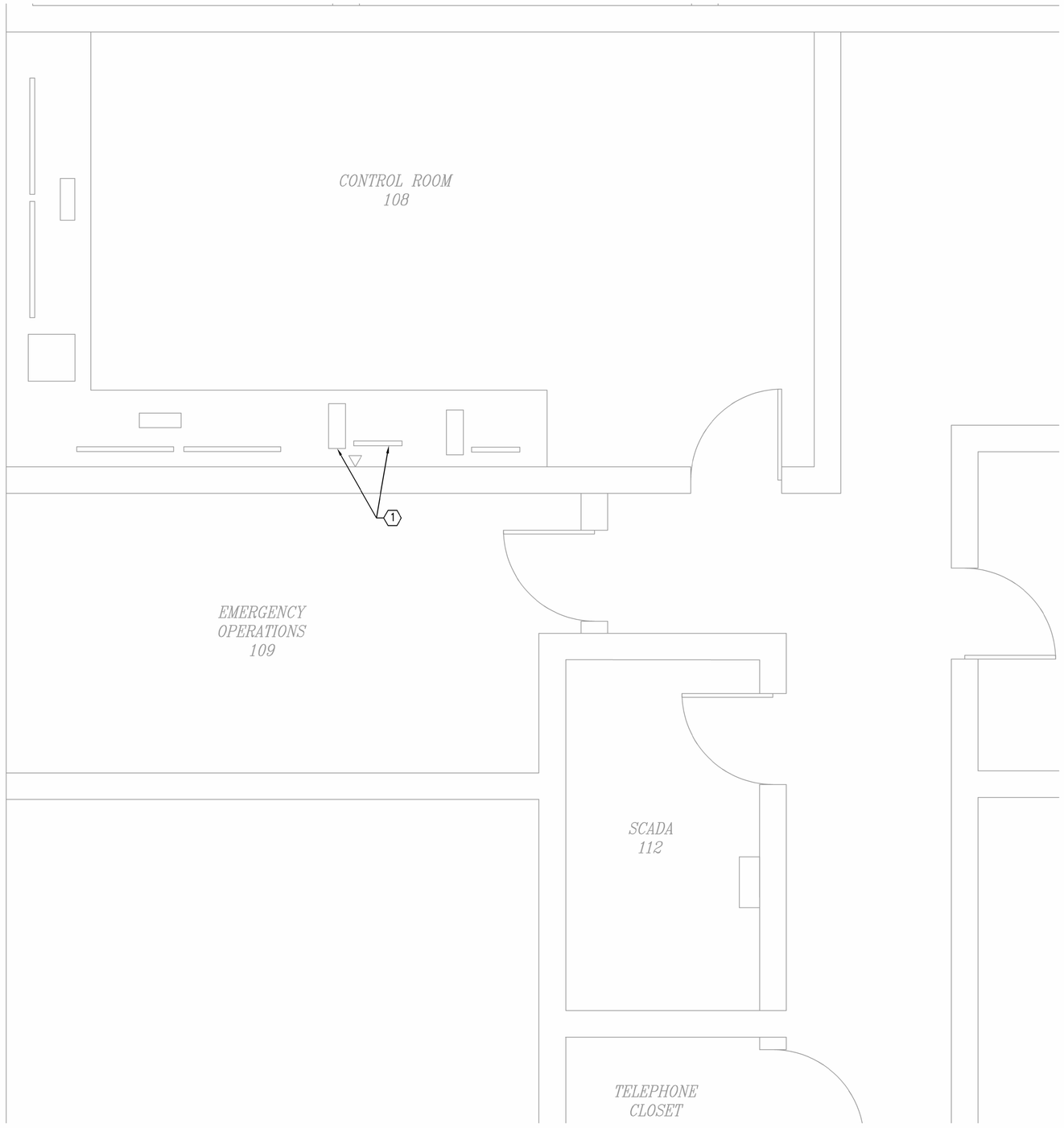
GENERAL NOTES:

1. EXISTING EQUIPMENT TO REMAIN SHOWN BY SOLID SCREENED LINES.

KEYED NOTES:

1. EXISTING STAND ALONE OPERATOR WORK STATION LOCATED AT CITY OF HOUSTON NEWPP. OPERATOR WORKSTATION MONITORS MOTOR OPERATED VALVE LOCATED AT HIRSCH ROAD. PROVIDE CELLULAR HARDWARE EQUIPMENT REQUIRED TO COMMUNICATE WITH MOTOR OPERATED VALVE CONTROL PANEL INDICATED IN THESE DRAWINGS. COMMUNICATION SYSTEM SHALL PERMIT TWO WAY COMMUNICATION WITH SUITABLE SAFEGUARDS TO PREVENT UNAUTHORIZED ACCESS. COORDINATE SECURITY REQUIREMENTS WITH CITY OF HOUSTON NEWPP OPERATIONS AND THE CITY OF HOUSTON IT WIRELESS BROADBAND PUBLIC WORKS & ENGINEERING.

NO.	DATE	REVISION	APP.



1 ELECTRICAL CONTROL ROOM PLAN – NEWPP
SCALE: 1/2" = 1'–0"

N

0 2
(IN FEET)

SWTP
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3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

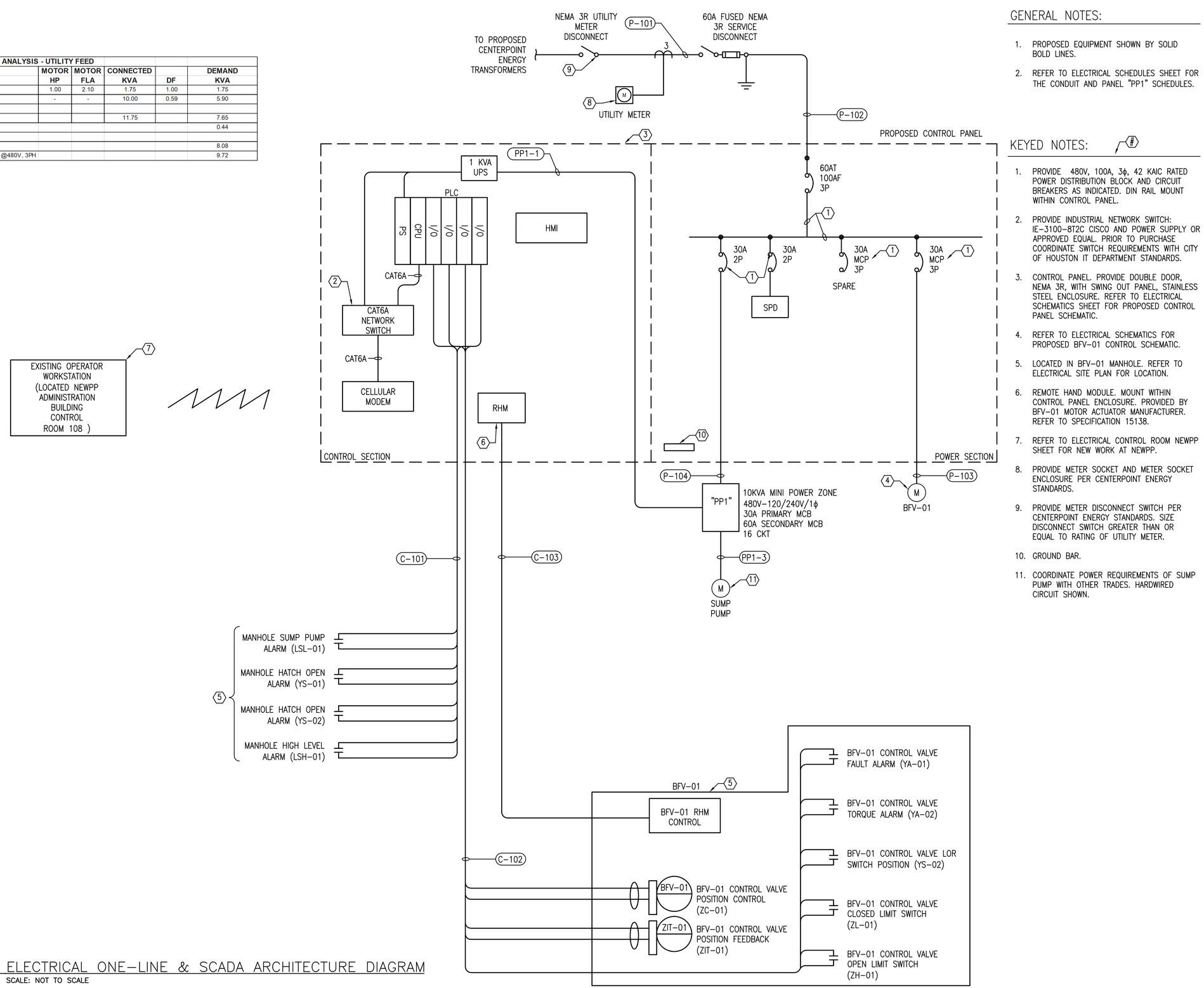
84–INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

ELECTRICAL CONTROL ROOM PLAN
NEWPP

WBS NO. S–000901–0015–4	
DRAWING SCALE	
1/2" = 1'–0"	
CITY OF HOUSTON PM	
RAM CHAKRADHAR, P.E.	
SHEET NO. 78 OF 102	

P:\130\130-10687-401\4-0-Production-Working\4-1-BIM-CAD\Electrical\10687-401-ES-103.dwg plotted on Oct 14, 2024 - 10:46am

ELECTRICAL LOAD ANALYSIS - UTILITY FEED					
	MOTOR HP	MOTOR FLA	CONNECTED KVA	DF	DEMAND KVA
BFV-01	1.00	2.10	1.75	1.00	1.75
PP1 XFMR	-	-	10.00	0.59	5.90
SUB-TOTAL			11.75		7.65
25% LARGEST MOTOR					0.44
TOTAL:					8.08
DEMAND LOAD IN AMPS @480V, 3PH					9.72



1 ELECTRICAL ONE-LINE & SCADA ARCHITECTURE DIAGRAM
SCALE: NOT TO SCALE

GENERAL NOTES:

1. PROPOSED EQUIPMENT SHOWN BY SOLID BOLD LINES.
2. REFER TO ELECTRICAL SCHEDULES SHEET FOR THE CONDUIT AND PANEL "PP1" SCHEDULES.

KEYED NOTES: (#)

1. PROVIDE 480V, 100A, 3ϕ, 42 KAIC RATED POWER DISTRIBUTION BLOCK AND CIRCUIT BREAKERS AS INDICATED. DIN RAIL MOUNT WITHIN CONTROL PANEL.
2. PROVIDE INDUSTRIAL NETWORK SWITCH: IE-3100-8T2C CISCO AND POWER SUPPLY OR APPROVED EQUAL. PRIOR TO PURCHASE COORDINATE SWITCH REQUIREMENTS WITH CITY OF HOUSTON IT DEPARTMENT STANDARDS.
3. CONTROL PANEL. PROVIDE DOUBLE DOOR, NEMA 3R, WITH SWING OUT PANEL, STAINLESS STEEL ENCLOSURE. REFER TO ELECTRICAL SCHEMATICS SHEET FOR PROPOSED CONTROL PANEL SCHEMATIC.
4. REFER TO ELECTRICAL SCHEMATICS FOR PROPOSED BFV-01 CONTROL SCHEMATIC.
5. LOCATED IN BFV-01 MANHOLE. REFER TO ELECTRICAL SITE PLAN FOR LOCATION.
6. REMOTE HAND MODULE. MOUNT WITHIN CONTROL PANEL ENCLOSURE. PROVIDED BY BFV-01 MOTOR ACTUATOR MANUFACTURER. REFER TO SPECIFICATION 15138.
7. REFER TO ELECTRICAL CONTROL ROOM NEWPP SHEET FOR NEW WORK AT NEWPP.
8. PROVIDE METER SOCKET AND METER SOCKET ENCLOSURE PER CENTERPOINT ENERGY STANDARDS.
9. PROVIDE METER DISCONNECT SWITCH PER CENTERPOINT ENERGY STANDARDS. SIZE DISCONNECT SWITCH GREATER THAN OR EQUAL TO RATING OF UTILITY METER.
10. GROUND BAR.
11. COORDINATE POWER REQUIREMENTS OF SUMP PUMP WITH OTHER TRADES. HARDWIRED CIRCUIT SHOWN.

NO.	DATE	REVISION	APP.

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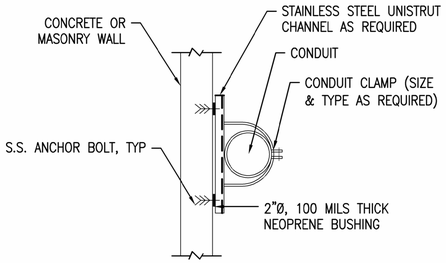
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

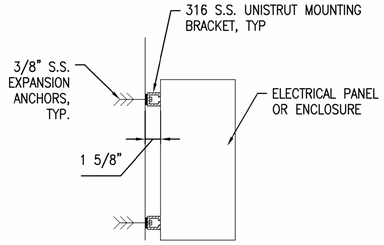
ELECTRICAL ONE-LINE & SCADA ARCHITECTURE DIAGRAMS

WBS NO. S-000901-0015-4	
DRAWING SCALE	
NOT TO SCALE	
CITY OF HOUSTON PM	
RAM CHAKRADHAR, P.E.	
SHEET NO. 79 OF 102	

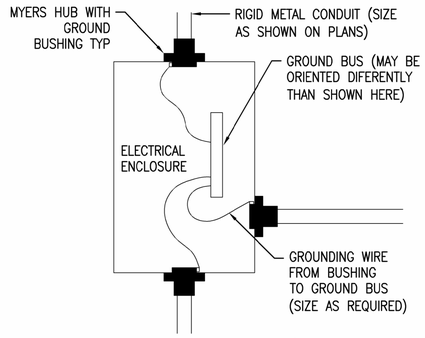
P:\130\130-10667-401\4-0-Production-Working\4-1-BIM-CAD\Electrical\10667-401-E-601.dwg plotted on Oct 14, 2024 - 3:09pm



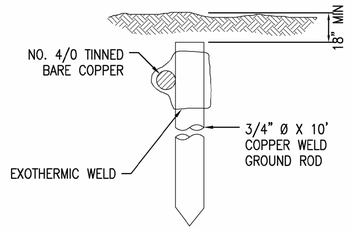
1 CONDUIT SUPPORT
SCALE: NOT TO SCALE



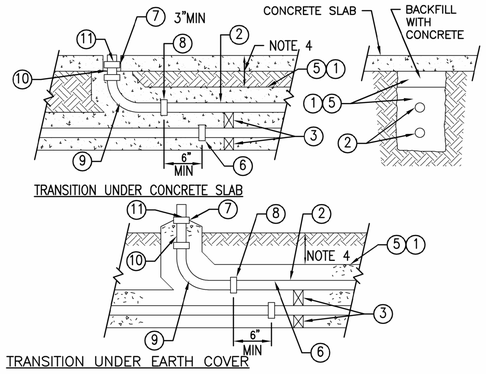
2 EQUIPMENT MOUNTING DETAIL
SCALE: NOT TO SCALE



3 ENCLOSURE/CONDUIT GROUNDING DETAIL
SCALE: NOT TO SCALE

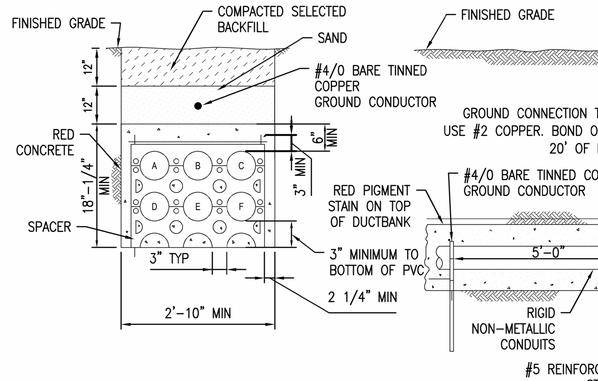


4 GROUNDING ROD
SCALE: NOT TO SCALE



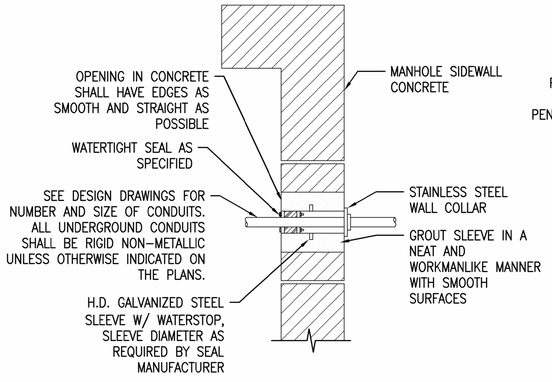
NOTES:
1. ALL STRUCTURAL CONCRETE SHALL BE NORMAL WEIGHT CONCRETE AND HAVE A 28 DAY COMPRESSIVE STRENGTH OF 2500 PSI.
2. SEE DESIGN DRAWINGS FOR NUMBER AND SIZE OF CONDUITS. ALL UNDERGROUND CONDUITS SHALL BE RIGID NON-METALLIC UNLESS OTHERWISE INDICATED ON THE PLANS.
3. SPACERS SHALL BE JOHNS MANVILLE PLASTIC SPACERS OR EQUIVALENT. SPACED 5'-0" O.C.
4. COVER SHALL BE 2'-0" MINIMUM BELOW SOIL SURFACE AND 1'-0" MINIMUM BELOW CONCRETE SLABS, OR AS SHOWN ON PLANS.
5. UNDERGROUND CONDUIT SHALL BE ENCASED IN AN ENVELOPE OF CONCRETE WITH RED PIGMENT STAIN ON THE TOP OF THE DUCTBANK.
6. COUPLING
7. PROTECT EXPOSED CONDUIT ENDS DURING CONSTRUCTION WITH PIPE PLUG OR CAPS. FUTURE AND SPARE CONDUIT ENDS SHALL HAVE PIPE PLUGS OR CAPS.
8. ADAPTOR FROM NON-METALLIC CONDUIT AS REQUIRED.
9. PVC COATED RIGID METALLIC CONDUIT BENDS.
10. PVC COATED RIGID METALLIC CONDUIT SIZE AND TYPE AS REQUIRED EXTEND THIS CONDUIT A MINIMUM OF 6" INTO CONCRETE.
11. CONDUIT TERMINATING IN AN ENCLOSURE CONTAINING A GROUND BUS SHALL HAVE A GROUNDING BUSHING WITH A GROUND WIRE TO THE GROUND BUS.

5 UNDERGROUND CONDUIT INSTALLATION
SCALE: NOT TO SCALE

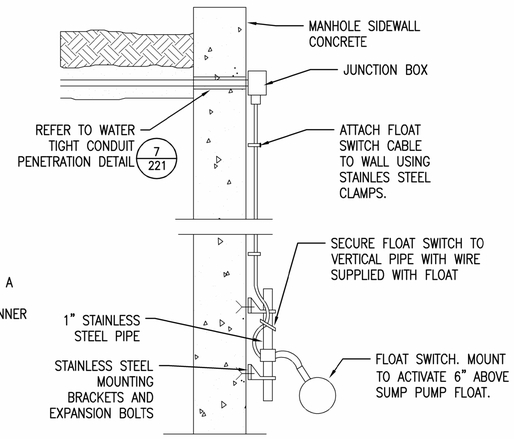


NOTES:
1. DUCTBANK DETAIL IS TYPICAL REPRESENTATION OF A 6-CONDUIT DUCT BANK. ENVELOPE DIMENSIONS 18-1/4" X 2'-10" ARE APPLICABLE ONLY TO THE CONDUIT CONFIGURATION AS SHOWN. ALL DUCT BANKS SHALL MAINTAIN AT A MINIMUM 3" SEPARATION BETWEEN CONDUITS AND A 2-1/4" ENVELOPE ON EACH SIDE OF DUCTBANK. TOP OF DUCT BANK A MINIMUM OF 6" OF CONCRETE TO FIRST ROW OF CONDUITS.
2. CONDUIT TO BE RIGID NON-METALLIC TYPE FOR CONCRETE ENCASEMENT, SIZE AND NUMBER AS INDICATED ON DRAWINGS, SECTION DETAILS, AND CONDUIT SCHEDULE.
3. CONCRETE ENCASEMENT: ALL CONCRETE TO HAVE COMPRESSIVE STRENGTH OF 2500 P.S.I. AT 28 DAYS. NO AGGREGATE LARGER THAN 3/4".
4. INSTALL SPACERS EVERY 5 FEET. ALL SPACERS TO PROVIDE 3" VERTICAL AND HORIZONTAL SEPARATION BETWEEN CONDUITS.
5. SUBGRADE SHALL BE COMPACTED TO 90% DENSITY AND WITH +3% TO -3% OF OPTIMUM MOISTURE STANDARD ASTMD698. COMPACT BACKFILL IN 6 INCH LIFTS.

6 ELECTRICAL CONDUIT SPACING FOR UNDERGROUND DUCTBANKS
SCALE: NOT TO SCALE



7 WATERTIGHT CONDUIT PENETRATION
SCALE: NOT TO SCALE



8 MANHOLE FLOAT SWICTH
SCALE: NOT TO SCALE

NO.	DATE	REVISION	APP.

SWTP
Surface Water Transmission Program

LOCKWOOD, ANDREWS & NEWNAM, INC.
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HOUSTON, TX 77042

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Engineer: GASPAR G. GARCIA P.E.
P.E. Serial No.: 104970
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F-2614
Date:

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

ELECTRICAL DETAILS

WBS NO. S-000901-0015-4	
DRAWING SCALE	
NOT TO SCALE	
CITY OF HOUSTON PM	
RAM CHAKRADHAR, P.E.	
SHEET NO. 80 OF 102	

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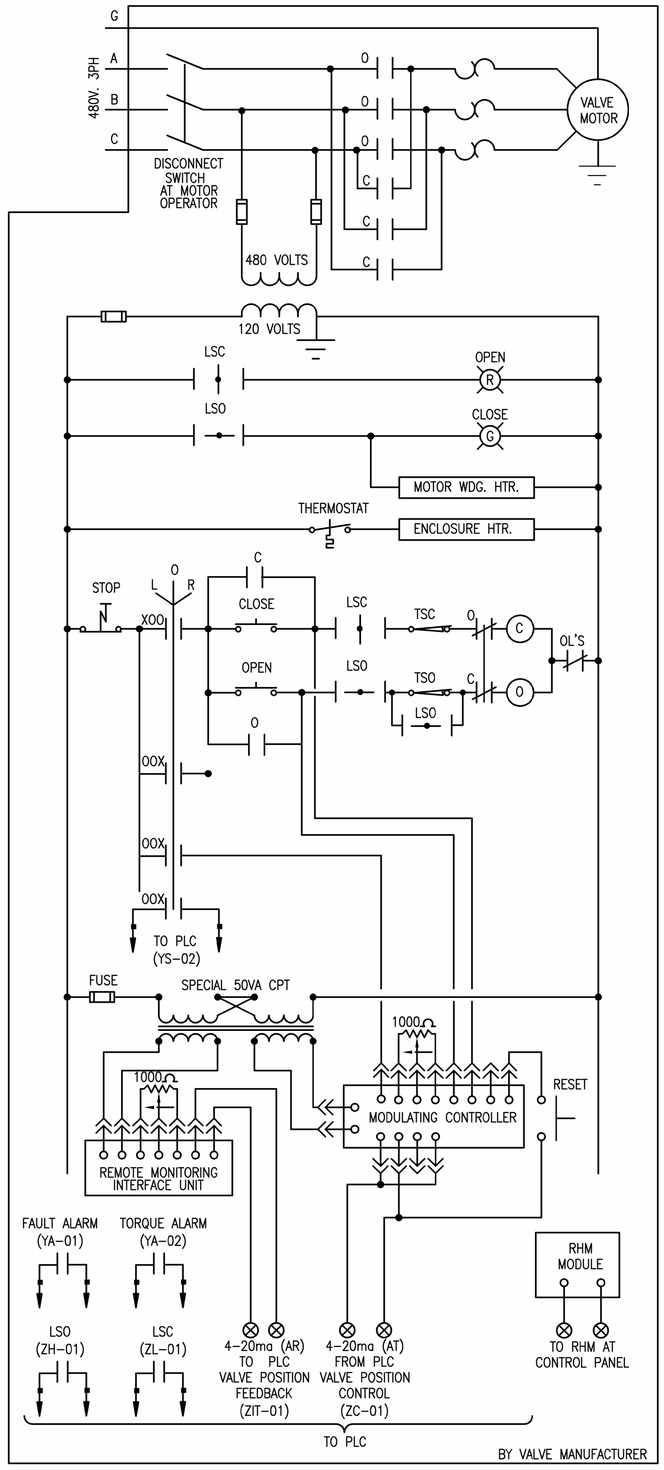
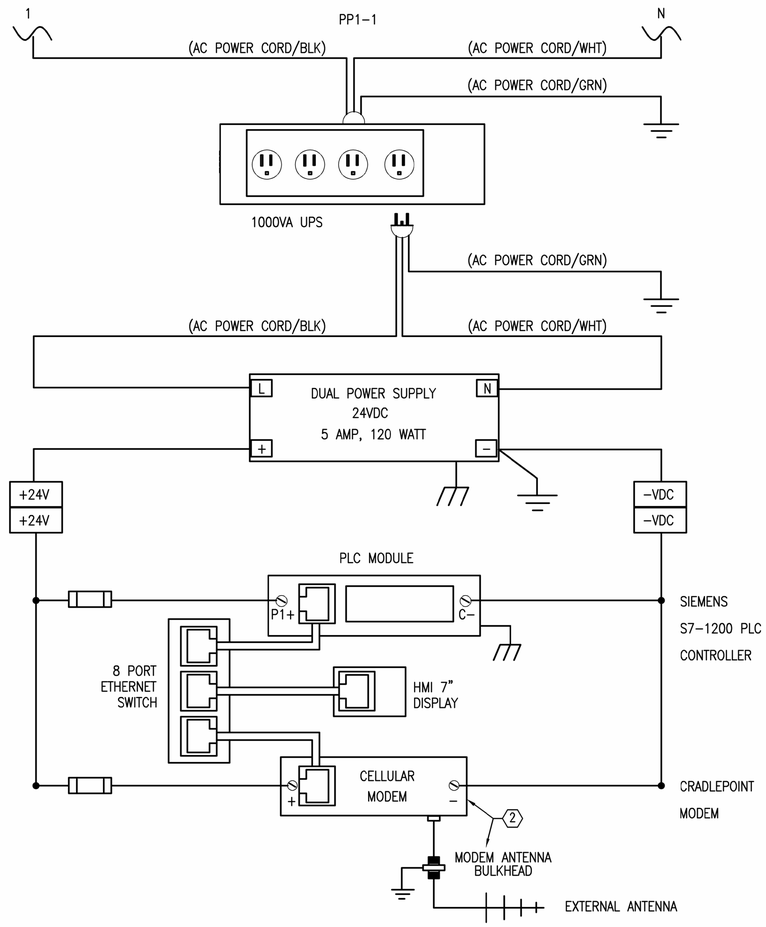
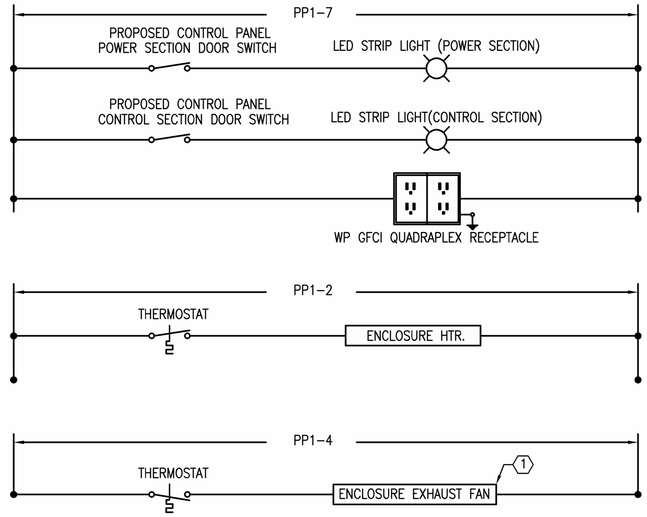


1 BFV-01, VALVE CONTROL SCHEMATIC
SCALE: NOT TO SCALE





2 CONTROL PANEL SCHEMATIC
SCALE: NOT TO SCALE

GENERAL NOTES:

1. REFER ELECTRICAL SCHEDULES SHEET FOR THE CONDUIT AND PANEL "PP1" SCHEDULES.

KEYED NOTES:

1. PROVIDE CABINET WITH INLET AIR VENTILATION OPENING IN THE CABINET DOOR OF ADEQUATE SIZE TO PROVIDE SUFFICIENT AIR CIRCULATION WITHIN THE CABINET. PROVIDE DISPOSABLE AIR FILTER WITHIN CABINET. PROVIDE THERMOSTATICALLY CONTROLLED VENTILATING EXHAUST FAN. THE THERMOSTAT SHALL BE MANUALLY ADJUSTABLE FROM 70°F TO 100°F. MOUNT THE EXHAUST FAN INTERNALLY AT THE TOP AND TOWARD THE FRONT OF THE CABINET TO EXHAUST OUT OF THE CONTROLLER CABINET. LOCATE THERMOSTAT WITHIN 6 INCHES OF THE FAN.
2. PROVIDE CRADLEPOINT CELLULAR IBR-1700 ROUTER /MODEM OR APPROVED EQUAL. CRADLEPOINT SERVICE CONTRACT SHALL BE ENACTED BETWEEN CITY OF HOUSTON CELLULAR SERVICE CARRIER OR CARRIERS CHOSEN BY THE CITY.

NO.	DATE	REVISION	APP.

SWTP
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LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

ELECTRICAL SCHEMATICS

WBS NO. S-000901-0015-4	
DRAWING SCALE	
NOT TO SCALE	
CITY OF HOUSTON PM	
RAM CHAKRADHAR, P.E.	
SHEET NO. 81 OF 102	

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PANEL NO.	PP1		TYPE	MINI POWER ZONE		LOCATION	EQUIPMENT PAD
SERVICE VOLTAGE	240/120V 1PH 3W		PHASE BUS RATING	100 AMPS		MOUNTING	METAL FRAME RACK
MAIN BREAKER SIZE	60 AMP MCB		NEUTRAL BUS RATING	100 AMPS		DRAWING NO.	E-603
			SHORT CIRCUIT RATING	18000 AIC			

DESCRIPTION	LOAD AMP	BREAKER POLE	BREAKER AMP	VOLT AMPS A	VOLT AMPS B	CKT. NO.		CKT. NO.	VOLT AMPS A	VOLT AMPS B	BREAKER POLE	BREAKER AMP	LOAD AMP	DESCRIPTION
UPS	8.3	1	20	1000		1		2	2000		1	25	16.7	CONTROL PNL HEATER
SUMP PUMP	9.0	1	20		1080	3		4		500	1	20	4.2	CONTROL PNL EXHAUST FAN
SPARE	0.0	1	20			5		6				--	0.0	SPACE
LIGHT & RECEPTACLE	6.8	1	20		820	7		8				--	0.0	SPACE
SPARE	0.0	1	20			9		10				--	0.0	SPACE
SPARE	0.0	1	20			11		12				--	0.0	SPACE
--	0.0	1	--			13		14				--	0.0	SPACE
--	0.0	1	--			15		16				--	0.0	SPACE

TOTAL PHASE A:	3000 VOLT-AMPS	TOTAL CONNECTED LOAD:	5.4 KVA
TOTAL PHASE B:	2400 VOLT-AMPS	ESTIMATED DEMAND LOAD:	5.9 KVA
AVERAGE PHASE LOAD:	22.5 AMPS	ESTIMATED DEMAND LOAD:	24.5 AMPS

Note: FOR EACH CIRCUIT SHOWN ,PROVIDE 2#12, #12 GND UNLESS OTHERWISE NOTED. ROUTE CONDUCTORS WITHIN CONTROL PANEL WIRE-WAYS.
PROVIDE 2#12, #12 GND FOR UPS CIRCUIT PP1-1. ROUTE CONDUCTORS WITHIN CONTROL PANEL WIRE-WAYS.
PROVIDE 2#10, #10 GND FOR SUMP PUMP CIRCUIT PP1-3. ROUTE IN 1" CONDUIT.

CONDUIT SCHEDULE

CONDUIT TAG	FROM	TO	WIRE SIZE/TYPE	CONDUIT SIZE	COMMENTS
P-101	UTILITY SERVICE	SERVICE DISCONNECT	(3)#2, #8 GND.	1-1/2"	PROVIDE CONDUIT TYPE PER UTILITY STANDARDS
P-102	SERVICE DISCONNECT	CONTROL PANEL	(4)#2, #8 GND.	1-1/2"	PROVIDE CONDUIT TYPE PER UTILITY STANDARDS
P-103	CONTROL PANEL	BFV-01	(3)#10, #10 GND.	1"	
P-104	CONTROL PANEL	10KVA MINI POWER ZONE	(2)#8 #10 GND.	1"	
C-101	CONTROL PANEL	YS-01,YS-02,LSL-01, LSH-01	(2) 4PR, #16 TP	2"	MANHOLE HATCHES OPEN ALARMS, MANHOLE HIGH LEVEL FLOAT ALARM, AND SUMP PUMP ALARM
C-102	CONTROL PANEL	BFV-01	(1) 6PR, #16 TSP	2-1/2"	VALVE POSTION CONTROL & VALVE POSITION FEEDBACK
		YA-01, YA-02, YS-02, ZL-01, ZH-01	(1) 12PR, #16 TP		VALVE TORQUE ALARM, VALVE FAULT ALARM, VALVE LOR SWITCH STATUS, VALVE OPEN AND CLOSED LIMIT SWITCHES
C-103	CONTROL PANEL, RHM	BFV-01	BELDEN 3084A MULTI-CONDUCTOR	1"	REMOTE HAND MODULE VALVE CONTROL

NO.	DATE	REVISION	APP.

Surface Water Transmission Program

LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

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HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

ELECTRICAL SCHEDULES

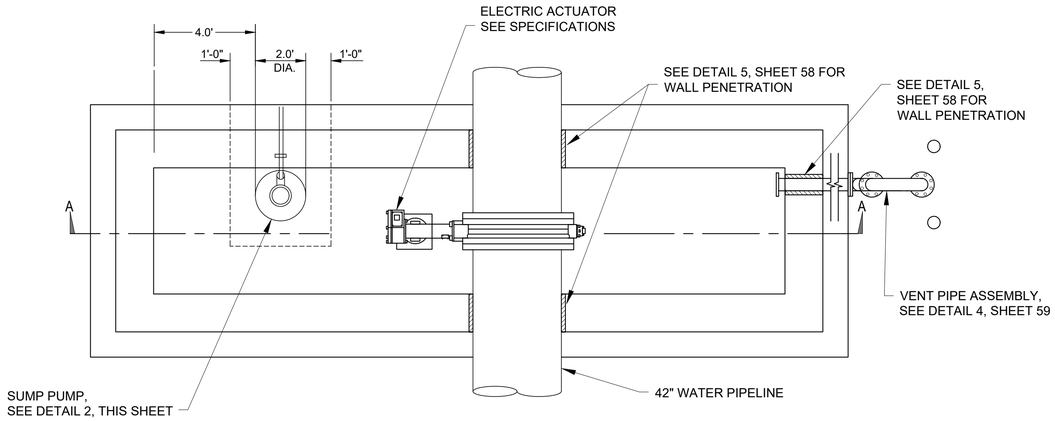
WBS NO. S-000901-0015-4

DRAWING SCALE
NOT TO SCALE

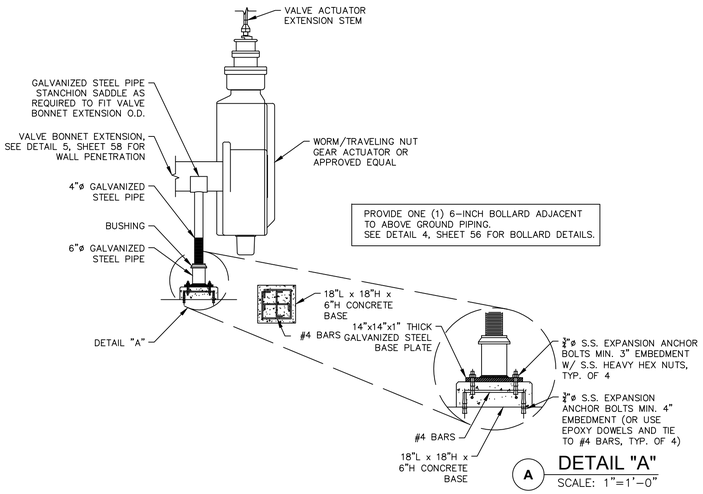
CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.

SHEET NO. 82 OF 102

P:\130\130-10667-401\4-0-Production-Working\4-1-BIM-CAD\Electrical\10667-401-E-603.dwg plotted on Oct 14, 2024 - 12:04pm

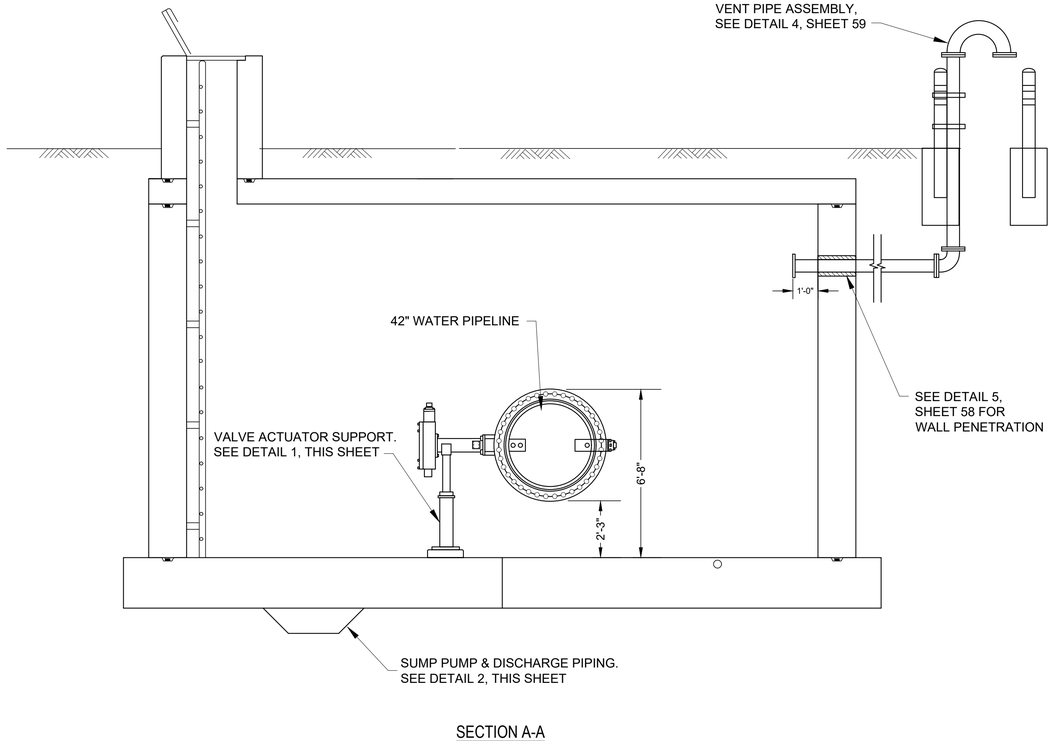


BASE SLAB PLAN



1 VALVE ACTUATOR SUPPORT DETAIL

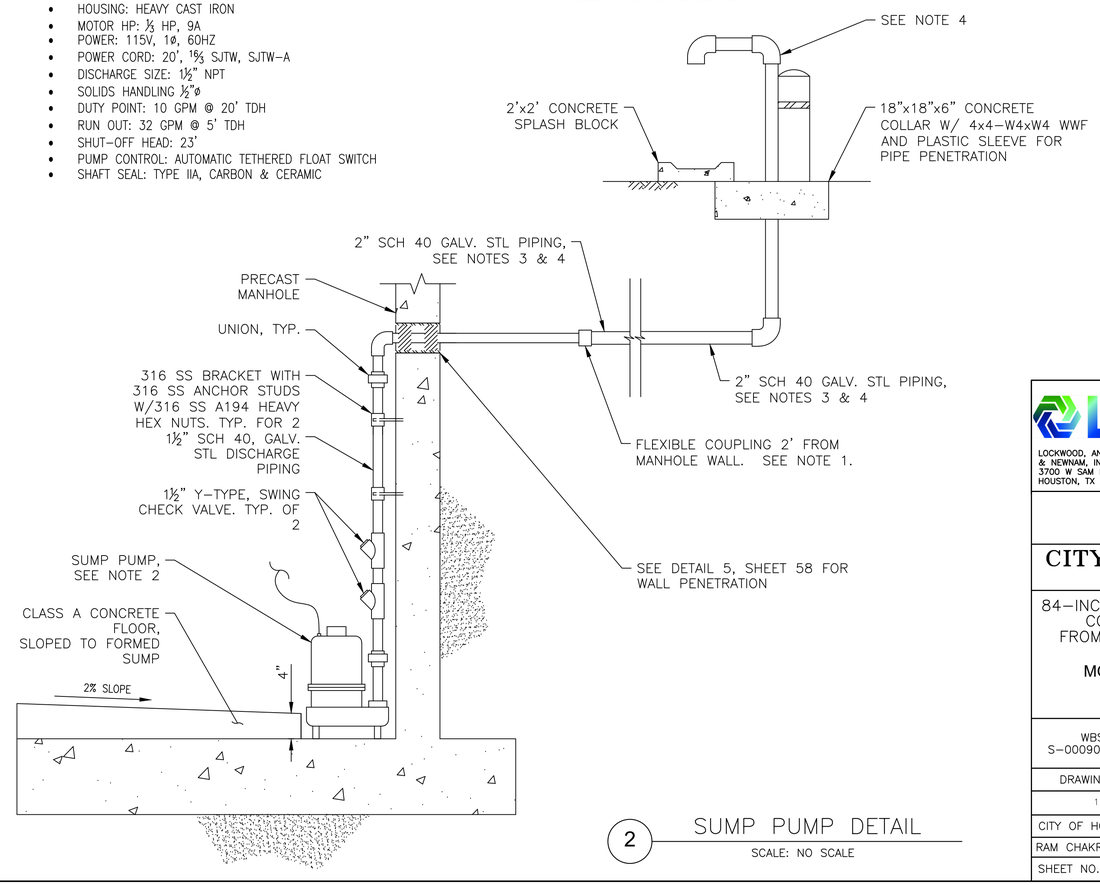
SCALE: 1/2"=1'-0"



SECTION A-A

SUMP PUMP NOTES

1. FLEXIBLE COUPLING SHALL BE ROMAC STYLE 501, 511, OR APPROVED EQUAL.
2. SUMP PUMP SHALL BE MODEL SSM33I AS MANUFACTURED BY F.E. MYERS, OR APPROVED EQUAL. SUMP PUMP SHALL MEET THE FOLLOWING REQUIREMENTS:
   - HOUSING: HEAVY CAST IRON
   - MOTOR HP: ⅓ HP, 9A
   - POWER: 115V, 1ø, 60HZ
   - POWER CORD: 20', ¹⁶⁄₃ SJTW, SJTW-A
   - DISCHARGE SIZE: 1½" NPT
   - SOLIDS HANDLING ½"ø
   - DUTY POINT: 10 GPM @ 20' TDH
   - RUN OUT: 32 GPM @ 5' TDH
   - SHUT-OFF HEAD: 23'
   - PUMP CONTROL: AUTOMATIC TETHERED FLOAT SWITCH
   - SHAFT SEAL: TYPE IIA, CARBON & CERAMIC
3. PROVIDE MIN. 4 FT BURY DEPTH FOR DISCHARGE PIPING.
4. PROVIDE ONE (1) 6-INCH BOLLARD ADJACENT TO ABOVE GROUND PIPING. SEE DETAIL 4, SHEET 56 FOR BOLLARD DETAILS.
5. ELECTRICAL CONDUITS NOT SHOWN. SEE SHEETS 219 & 221 FOR LOCATION OF PROPOSED CONDUITS AND DETAILS.



2 SUMP PUMP DETAIL

SCALE: NO SCALE

NO.	DATE	REVISION	APP.

SWTP
Surface Water Transmission Program

LAN
LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

INTERIM REVIEW ONLY
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Engineer: WILLIAM BYLAND, P.E.
P.E. Serial No.: 142061
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F-2614
Date:

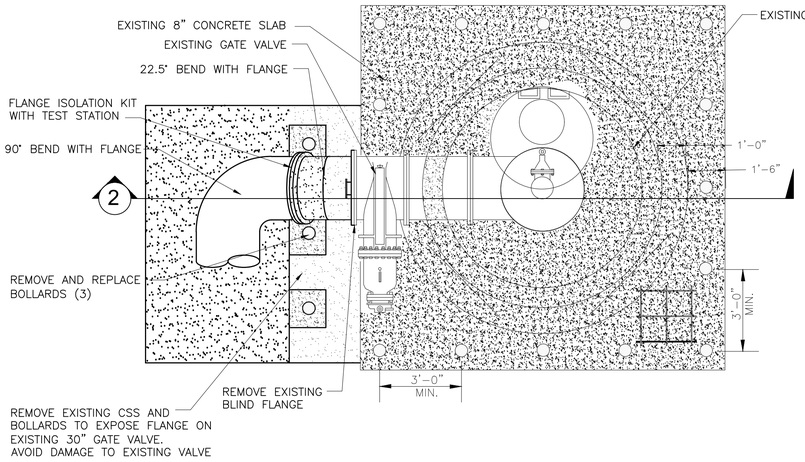
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

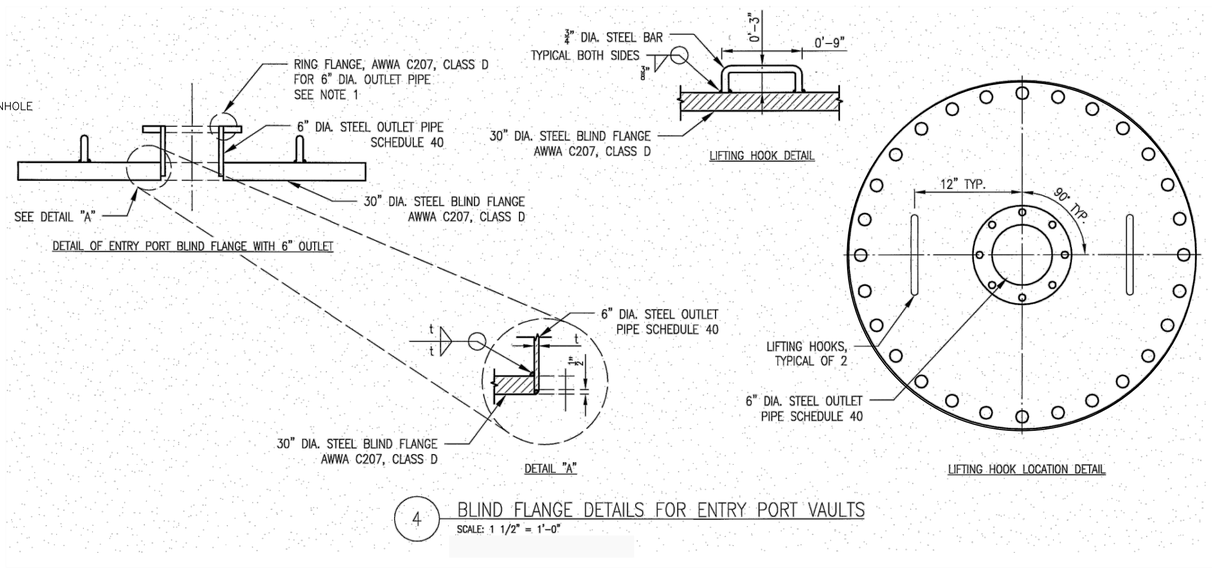
MOTOR OPERATED VALVE DETAILS

WBS NO. S-000901-0015-4	
DRAWING SCALE	
1"=3'	
CITY OF HOUSTON PM	
RAM CHAKRADHAR, P.E.	
SHEET NO. 83 OF 102	

P:\130\130-10667-401\4-0-Production-Working\4-1-BIM-CAD\Details\10667-401_83 MOTOR OPERATED VALVE DETAILS.dwg plotted on Oct 21, 2024 - 9:39am



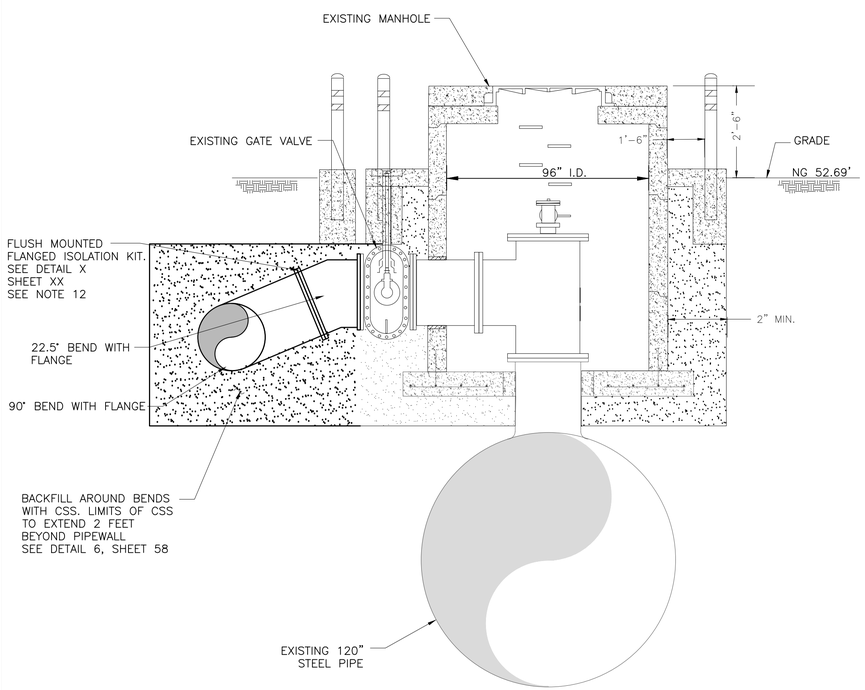
1 PLAN
SCALE: 1"=3'



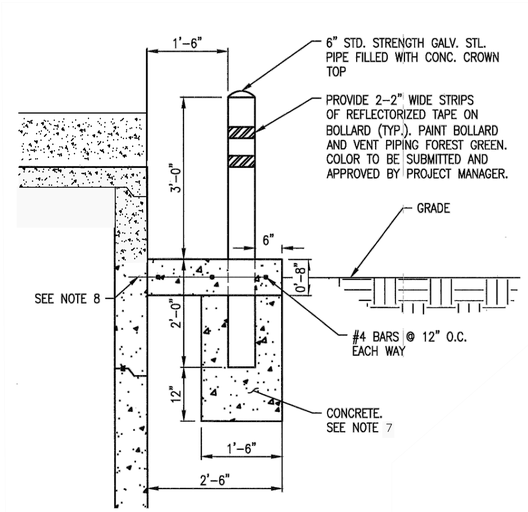
4 BLIND FLANGE DETAILS FOR ENTRY PORT VAULTS
SCALE: 1 1/2" = 1'-0"

NOTES:

1. SEE AWWA C207, FOR METHOD OF ATTACHMENT FOR RING FLANGE TO OUTLET PIPE.
2. PROVIDE RAM-NEK OR APPROVED EQUAL BETWEEN PRECAST SEGMENTS OF THE MANHOLE.
3. PROVIDE AND APPROVED PETROLATUM BASED TAPE ENCAPSULATING ALL BOLTS IN ACCESS MANHOLE.
4. COATINGS FOR EXPOSED DUCTILE IRON AND STEEL PIPE AND FITTINGS IN VAULT SHALL CONFORM TO SPECIFICATION 02518.
5. ALL STRUCTURAL CONCRETE TO HAVE MIN. COMPRESSIVE STRENGTH OF 4,500 P.S.I. AS SPECIFIED IN SECTION 03314-CONCRETE FOR UTILITY CONSTRUCTION.
6. PIPING AND APPURTENANCES OF THE SAME DIAMETER SHALL BE CONSTRUCTED OF THE SAME MATERIAL AND CLASS.
7. CLASS B CONCRETE SHALL BE USED IN AND AROUND BOLLARDS.
8. DRILL 3/4" DIAMETER HOLES 4" DEEP INTO PRECAST MANHOLE FOR REBAR. GROUT IN #4 REBAR IN PLACE.
9. DO NOT DISTURB EXISTING 120" WATER PIPE EMBEDMENT UNLESS A PIPE LEAK REPAIR IS REQUIRED. EXCAVATE 2-FEET BELOW PROPOSED MH FOUNDATIONS AND PLACE ADDITIONAL CEMENT STABILIZED SAND.
10. FIELD VERIFY OUTLET DIMENSION PRIOR TO PIPE MANUFACTURING.
11. SEE AWWA C651 FOR METHOD OF DISINFECTION.
12. INSTALL ISOLATION FLANGE ASSEMBLY, DO NOT INSTALL BOND WIRES ACROSS ISOLATION FLANGE.



2 ACCESS MANHOLE & MANWAY SECTION
SCALE: 1"=3'



5 BOLLARD DETAIL
SCALE: 3/4"=1'-0"

NO.	DATE	REVISION	APP.

Surface Water Transmission Program

LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

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Engineer: WILLIAM RYLAND, P.E.
P.E. Serial No.: 142841
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F-2614
Date:

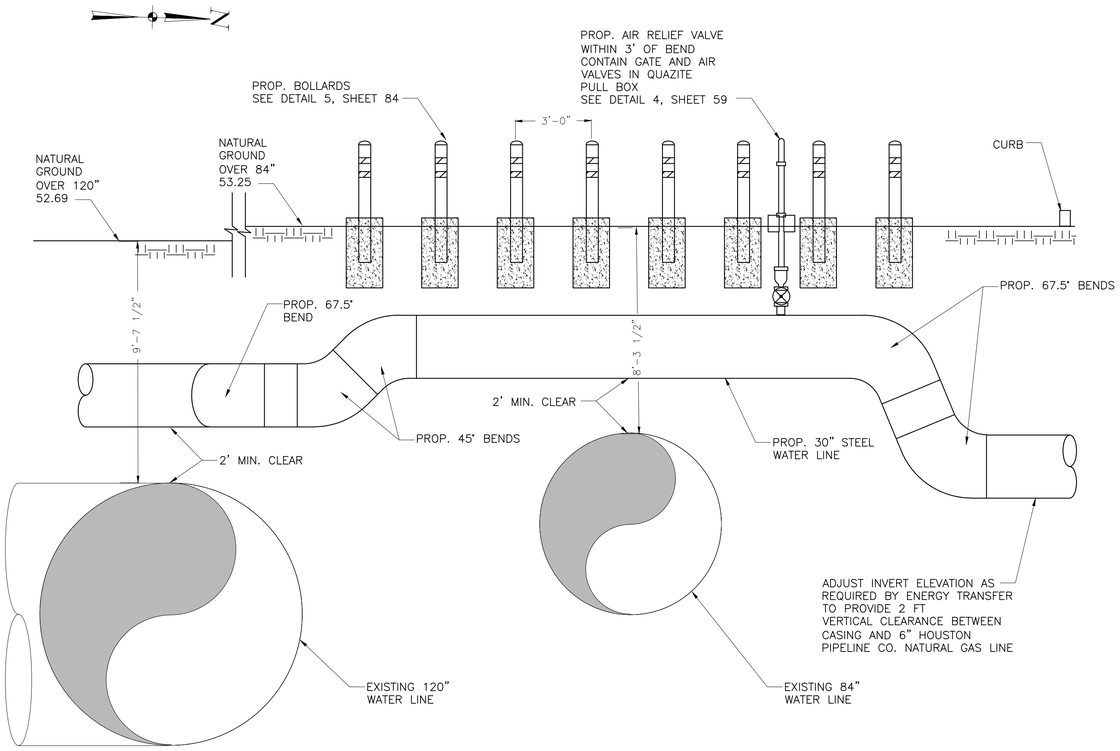
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

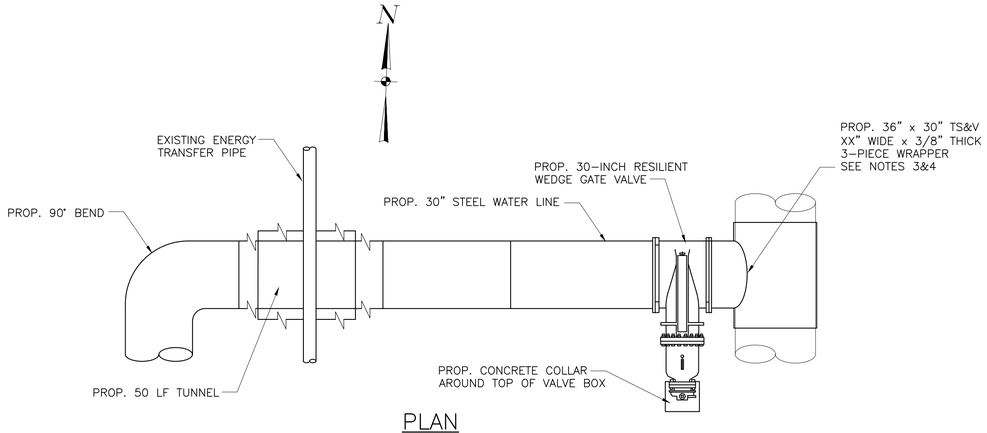
30-IN TEE WITH 30-IN GATE VALVE MANHOLE DETAILS

WBS NO. S-000901-0015-4	
DRAWING SCALE	
VARIES	
CITY OF HOUSTON PM	
RAM CHAKRADHAR, P.E.	
SHEET NO. 84 OF 102	

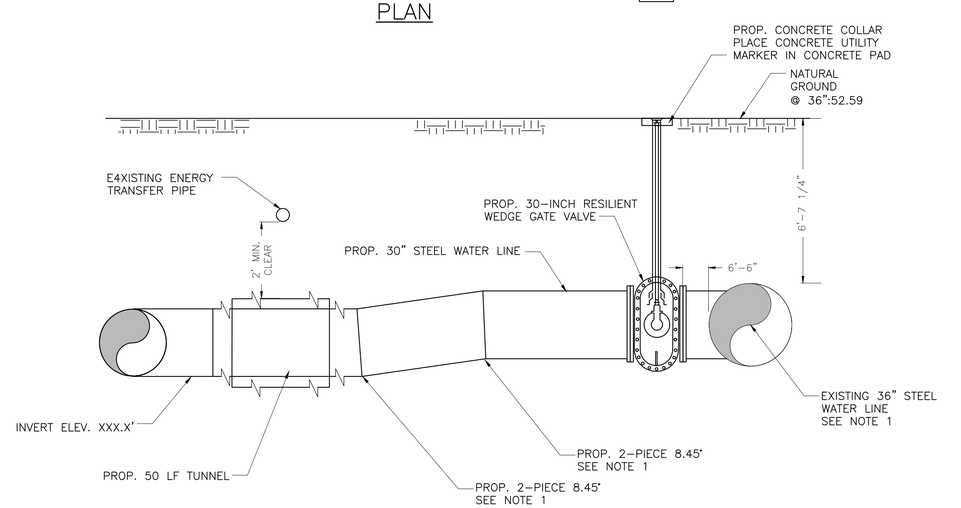
P:\130\10667-401\4-0-Production-Working\4-1-BIM-CAD\30 INCH TEE\10667-401_84 30 INCH TEE WITH 30 INCH GV MH DETAILS.dwg plotted on Feb 27, 2025 - 2:00pm



PROFILE



PLAN



NOTES:

1. CRITICALLY LOCATE 36-INCH WATER LINE. ADJUST ANGLE OF BEND AS NEEDED, AS APPROVED BY PROJECT MANAGER.

2. CLOSURE PEICE MAY BE SHIFTED WEST TO FACILITATE CONTRACTOR'S WORK. SUBMIT PROPOSED LOCATION TO PROJECT MANAGER FOR APPROVAL.

3. PROVIDE REMOVED COUPON FROM TAPPING OPERATIONS TO PROJECT MANAGER FOR VERIFICATION TAP WAS SUCCESSFULLY PERFORMED.

4. DESIGNS TO SUPPORT EXISTING 36-INCH TO PREVENT DEFLECTION MUST BE PROVIDED ANY TIME MORE THAN 15 FEET OF 84-INCH WATER LINE IS EXPOSED. DESIGNS SHALL BE SIGNED AND SEALED BY A TEXAS PROFESSIONAL ENGINEER AND SUBMITTED TO PROJECT MANAGER FOR APPROVAL.

NO.	DATE	REVISION	APP.

SWTP
Surface Water Transmission Program

LOCKWOOD, ANDREWS
& NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

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Engineer: WILLIAM RYLAND, P.E.
P.E. Serial No. 142061
Firm LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No. F-2614
Date

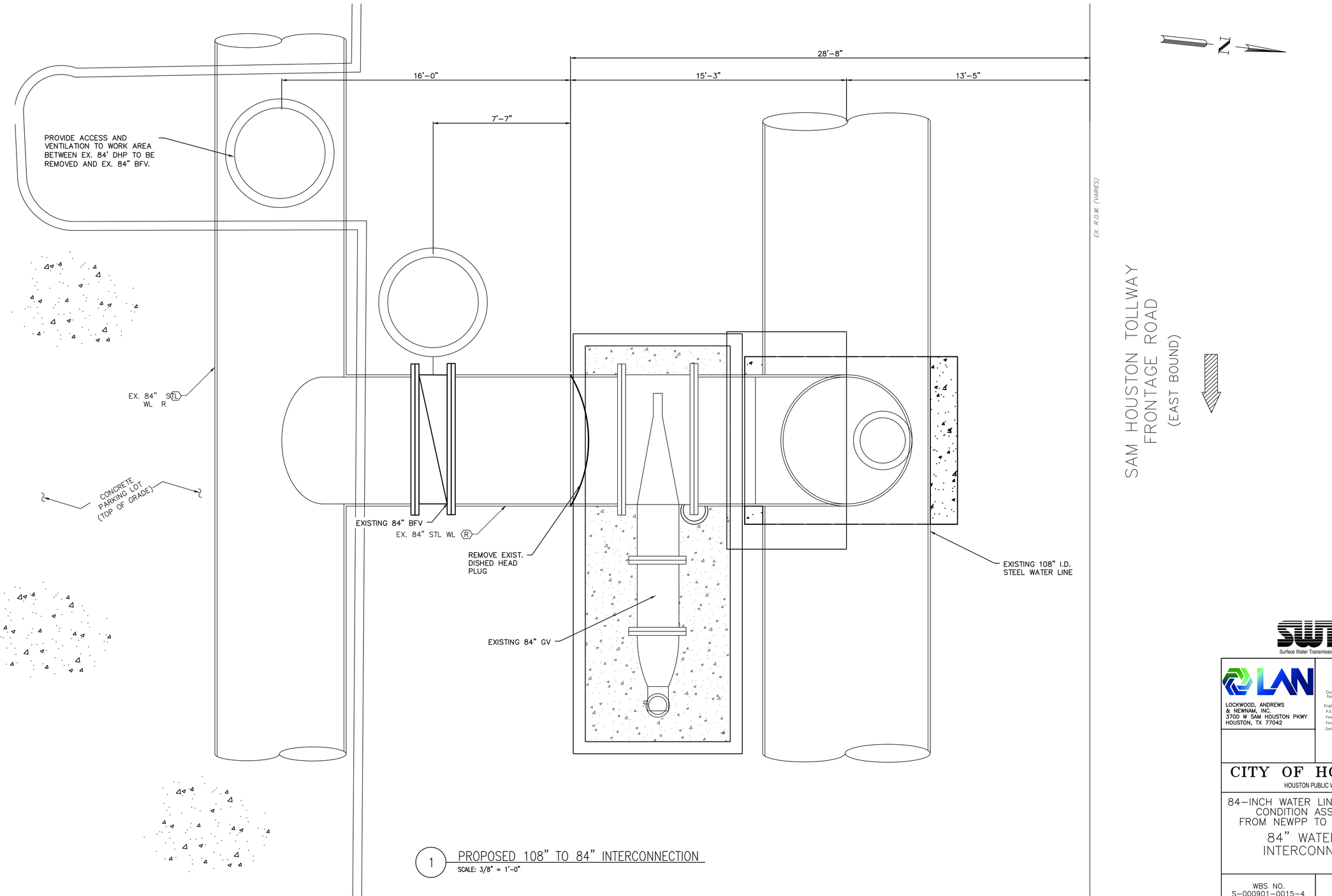
CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT
FROM NEWPP TO SMITH ROAD

30"x36" TS&V

WBS NO. S-000901-0015-4
DRAWING SCALE
1"=3'
CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.
SHEET NO. 85 OF 102

P:\130\10667-401\4-0-Production-Working\4-1-BIM-CAD\Details\10667-401_85 30 X36 TS&V.dwg plotted on Feb 27, 2025 - 2:27pm



1 PROPOSED 108" TO 84" INTERCONNECTION
SCALE: 3/8" = 1'-0"

NO.	DATE	REVISION	APP.

Surface Water Transmission Program

LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

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Engineer: WILLIAM BYLAND, P.E.
P.E. Serial No.: 142061
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F-2614
Date:

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

84" WATER LINE INTERCONNECTION

WBS NO. S-000901-0015-4	
DRAWING SCALE	
3/8" = 1'-0"	
CITY OF HOUSTON PM	
RAM CHAKRADHAR, P.E.	
SHEET NO. 86 OF 102	

P:\130\10667-401\4-0-Production-Working\4-1-BIM-CAD\Details\10667-401_86 LAN-COH_99a_WL INTERCONNECT_FULL.dwg plotted on Oct 21, 2024 - 10:10am

STA. 67+00
USE TEXAS MUTCD
FIGURE 6H-33
STATIONARY LANE CLOSURE
ON A DIVIDED HIGHWAY
SEE SHEET 100-TYPICAL APPLICATION 33

STA. 76+50
USE TEXAS MUTCD
FIGURE 6H-33
STATIONARY LANE CLOSURE
ON A DIVIDED HIGHWAY
SEE SHEET 100-TYPICAL APPLICATION 33

REINFORCE EXISTING
MANWAY OUTLET
SEE SHEET ##, DETAIL ##

REMOVE AND REPLACE
WATER LINE MANHOLE
SEE SHEET ##, DETAIL ##
REMOVE AND REPLACE CAV
SEE SHEET ##, DETAIL ##

REMOVE AND REPLACE
WATER LINE MANHOLE
SEE SHEET ##, DETAIL ##

REINFORCE EXISTING
DRAINLINE OUTLET
SEE SHEET ##, DETAIL ##

NORTH SAM HOUSTON PKWY.

Exist. 108" Water Line

Exist. 84" Water Line

BW-8 EBFR

MESA ROAD

CALLED 3.7371 ACRES
WATER LINE R.O.W. AND EASEMENT
H.C.C.F. NO. W463091, O.P.R.O.R.P.H.C.

90' W.L.E.
H.C.C.F. NO.
W463092
O.P.R.O.R.P.H.C.

EXIST. 12" PVC WATER

What is this?

120'

CW1-6
24"X12"
RIGHT
LANE
CLOSED
CW20-5R
CW16-3
AHEAD
CW1-6
24"X12"
UTILITY
CONSTRUCTION
AHEAD
CW1-6
24"X12"
CW21-7D
48"X48"

WORK ZONE

TYPICAL SECTION

N

0 50 100

CONSTRUCTION LEGEND

- WORK ZONE
- TRAFFIC ARROW
- CONSTRUCTION DRUMS
- LOW PROFILE BARRIER
- TRAFFIC CONTROL SIGN
- BARRICADE TY III
- FLAGGER

NOTES:

1. CONTRACTOR SHALL USE FLAGGING OPERATION AS PER LATEST TEXAS MUTCD FOR INGRESS AND EGRESS OF CONSTRUCTION VEHICLES FROM CONSTRUCTION AREA.
2. CONTRACTOR SHALL MAINTAIN ACCESS TO DRIVEWAYS AND SIDE STREETS AT ALL TIMES DURING CONSTRUCTION.
3. FOR ONE LANE CLOSURE, SEE STANDARD DETAILS FOR INFORMATION.
4. SEE TRAFFIC CONTROL NOTES FOR SIGN SPACING.
5. OPEN THE LANE AT THE END OF WORKDAY.

POSTED SPEED = 50 MPH
SIGN SPACING = 400 FT

SWTP
Surface Water Transmission Program

ZARINKELK ENGINEERING SERVICES, INC.
617 Caroline St.
Houston, TX 77002
Phone (832) 242-2426
FAX (832) 242-2445
TEXAS REGISTRATION NO: F-4270

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HOSSEIN ZANDI-ATASHBAR
Engineer
98753
Registration Number
11/11/2022
Date

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

TRAFFIC CONTROL PLAN
(1 OF 11)

WBS NO. S-000901-0015-3
DRAWING SCALE
1"=50' H, 1"=5' V
CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.
SHEET NO. 87 OF 102

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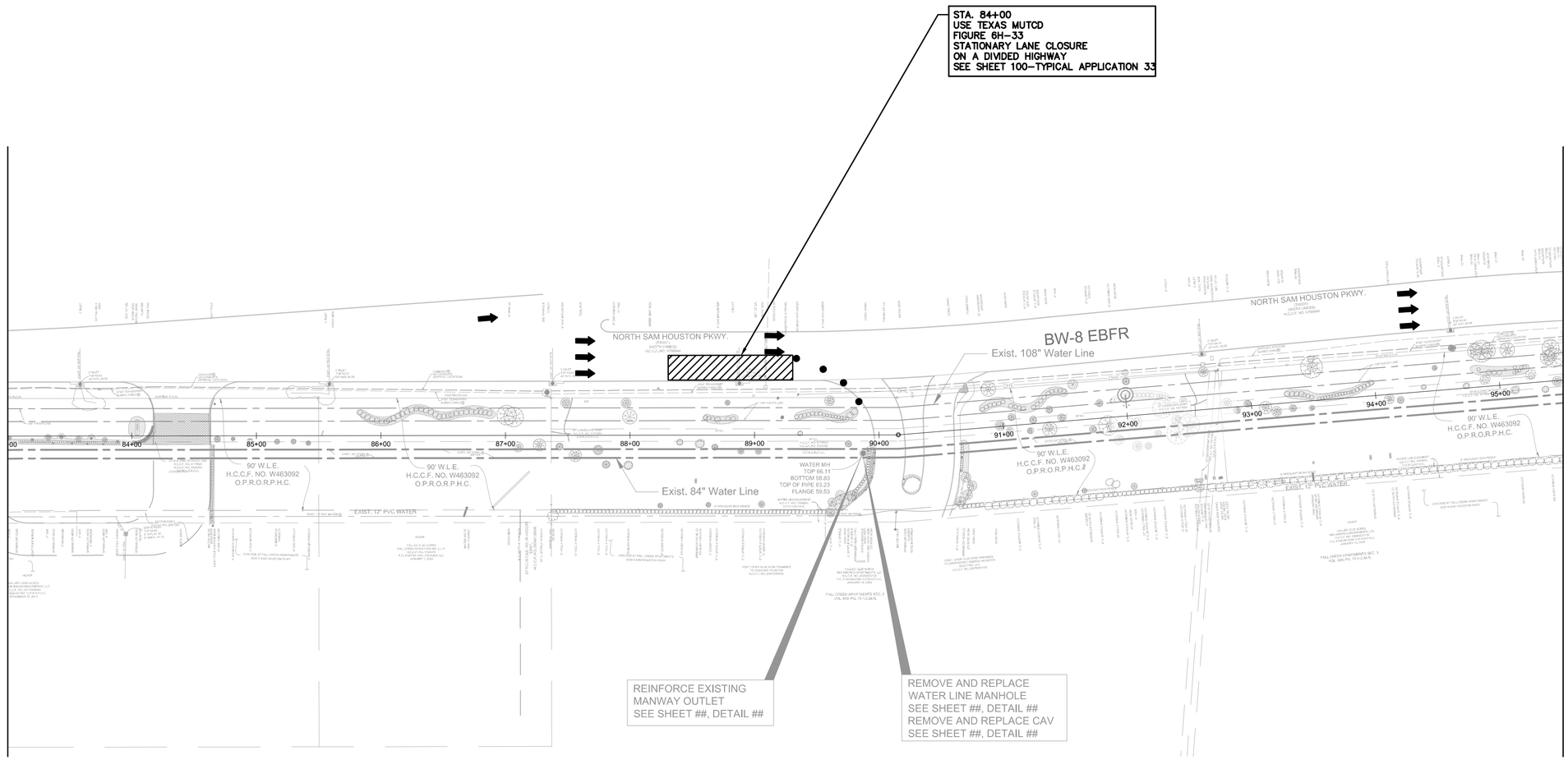

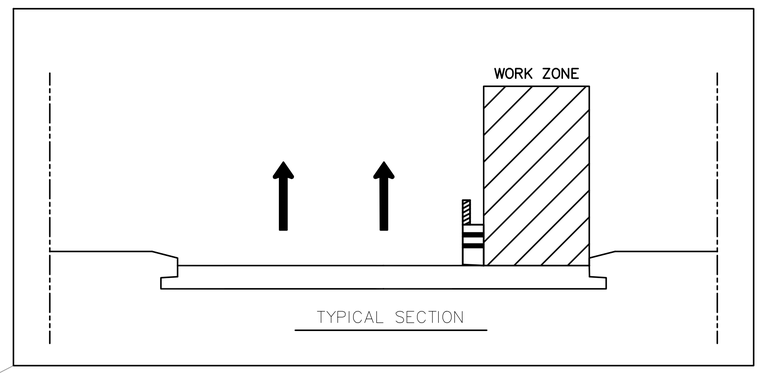

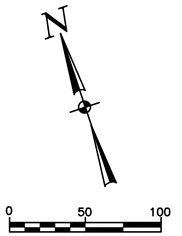

CONSTRUCTION LEGEND

- WORK ZONE
- TRAFFIC ARROW
- CONSTRUCTION DRUMS
- LOW PROFILE BARRIER
- TRAFFIC CONTROL SIGN
- BARRICADE TY III
- FLAGGER

NOTES:

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2. CONTRACTOR SHALL MAINTAIN ACCESS TO DRIVEWAYS AND SIDE STREETS AT ALL TIMES DURING CONSTRUCTION.
3. FOR ONE LANE CLOSURE, SEE STANDARD DETAILS FOR INFORMATION.
4. SEE TRAFFIC CONTROL NOTES FOR SIGN SPACING.
5. OPEN THE LANE AT THE END OF WORKDAY.

POSTED SPEED = 50 MPH
SIGN SPACING = 400 FT

SWTP
Surface Water Transmission Program

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617 Caroline St.
Houston, TX 77002
Phone (832) 242-2426
FAX (832) 242-2445
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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

TRAFFIC CONTROL PLAN
(2 OF 11)

WBS NO. S-000901-0015-3	
DRAWING SCALE	
1"=50' H, 1"=5' V	
CITY OF HOUSTON PM	
RAM CHAKRADHAR, P.E.	
SHEET NO. 88 OF 102	

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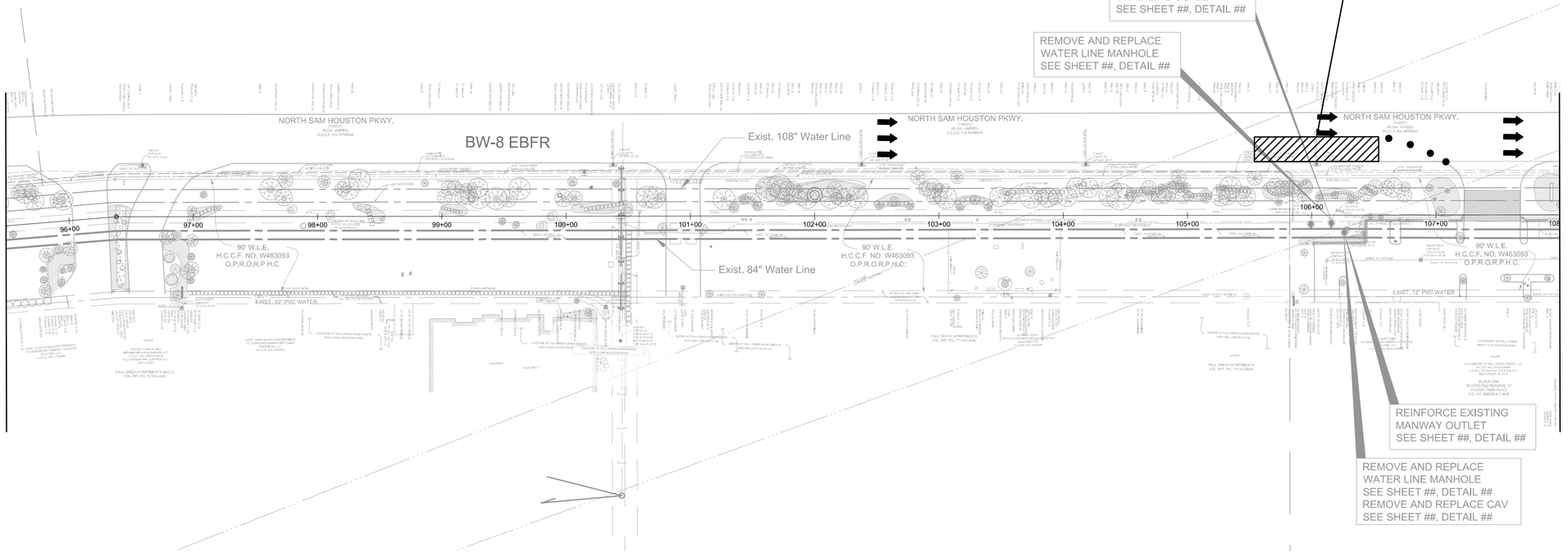

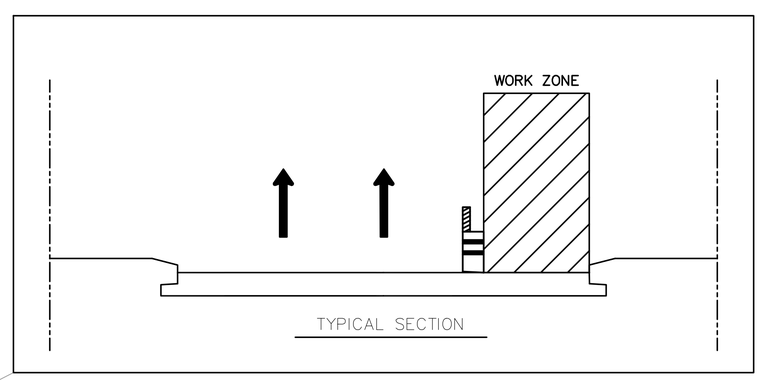

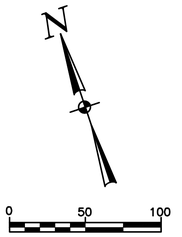

CONSTRUCTION LEGEND

- WORK ZONE
- TRAFFIC ARROW
- CONSTRUCTION DRUMS
- LOW PROFILE BARRIER
- TRAFFIC CONTROL SIGN
- BARRICADE TY III
- FLAGGER

NOTES:

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2. CONTRACTOR SHALL MAINTAIN ACCESS TO DRIVEWAYS AND SIDE STREETS AT ALL TIMES DURING CONSTRUCTION.
3. FOR ONE LANE CLOSURE, SEE STANDARD DETAILS FOR INFORMATION.
4. SEE TRAFFIC CONTROL NOTES FOR SIGN SPACING.
5. OPEN THE LANE AT THE END OF WORKDAY.

POSTED SPEED = 50 MPH
SIGN SPACING = 400 FT

SWTP
Surface Water Transmission Program

ZARINKELK ENGINEERING SERVICES, INC.
617 Caroline St.
Houston, TX 77002
Phone (832) 242-2426
FAX (832) 242-2445
TEXAS REGISTRATION NO: F-4270

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98753
Registration Number
11/11/2022
Date

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

TRAFFIC CONTROL PLAN

(3 OF 11)

WBS NO. S-000901-0015-3	
DRAWING SCALE	
1"=50' H, 1"=5' V	
CITY OF HOUSTON PM	
RAM CHAKRADHAR, P.E.	
SHEET NO. 89 OF 102	

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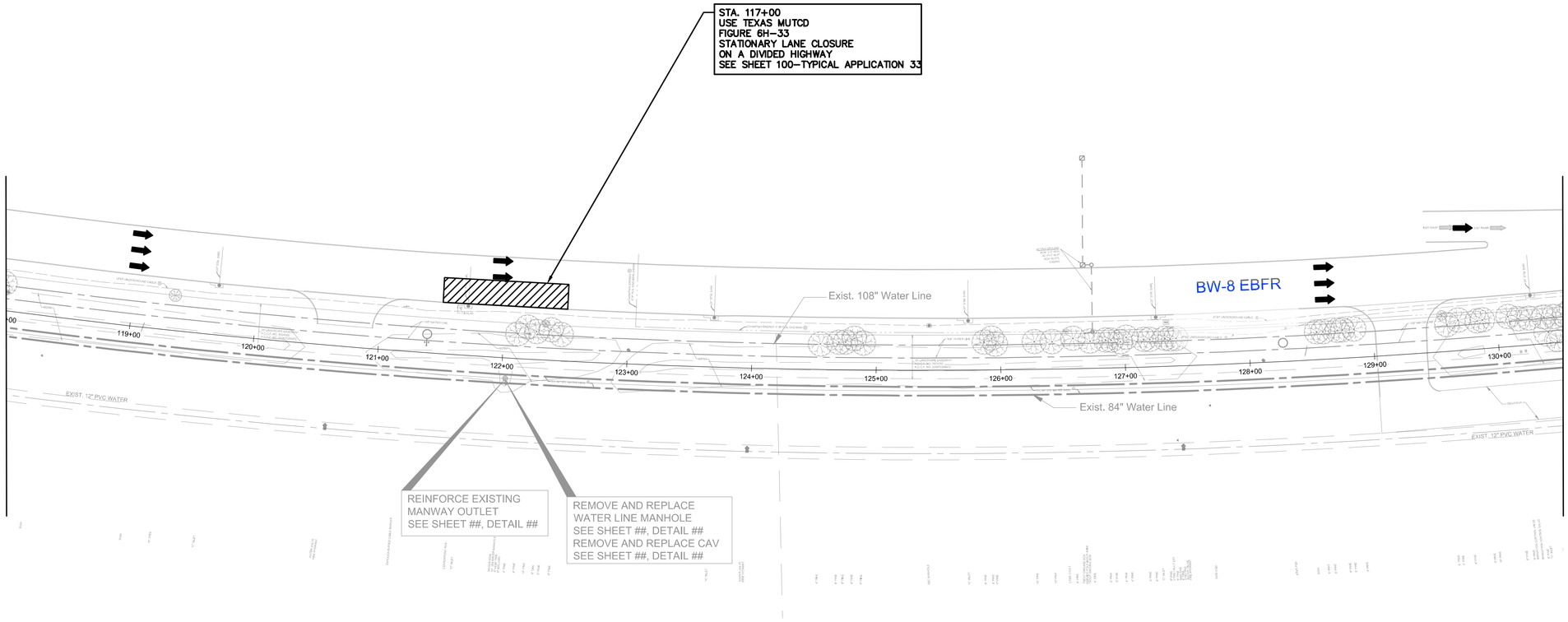

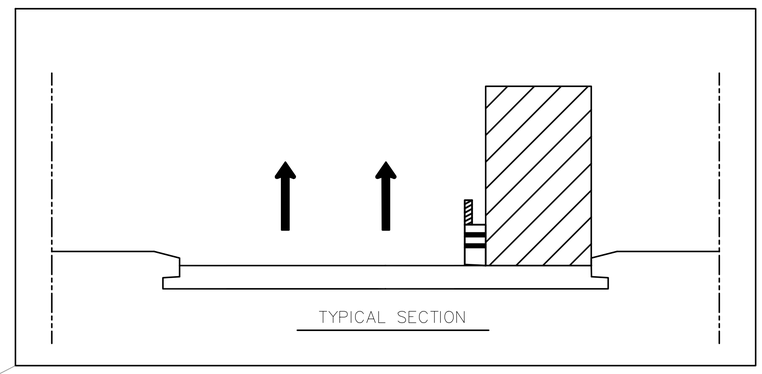

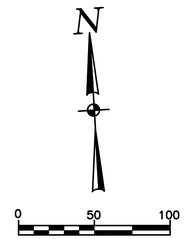

CONSTRUCTION LEGEND

- WORK ZONE
- TRAFFIC ARROW
- CONSTRUCTION DRUMS
- LOW PROFILE BARRIER
- TRAFFIC CONTROL SIGN
- BARRICADE TY III
- FLAGGER

NOTES:

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3. FOR ONE LANE CLOSURE, SEE STANDARD DETAILS FOR INFORMATION.
4. SEE TRAFFIC CONTROL NOTES FOR SIGN SPACING.
5. OPEN THE LANE AT THE END OF WORKDAY.

POSTED SPEED = 50 MPH
SIGN SPACING = 400 FT

SWTP
Surface Water Transmission Program

ZARINKELK ENGINEERING SERVICES, INC.
617 Caroline St.
Houston, TX 77002
Phone (832) 242-2426
FAX (832) 242-2445
TEXAS REGISTRATION NO: F-4270

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HOSSEIN ZANDI-ATASHBAR
Registered Engineer
98753
Registration Number
11/11/2022
Date

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

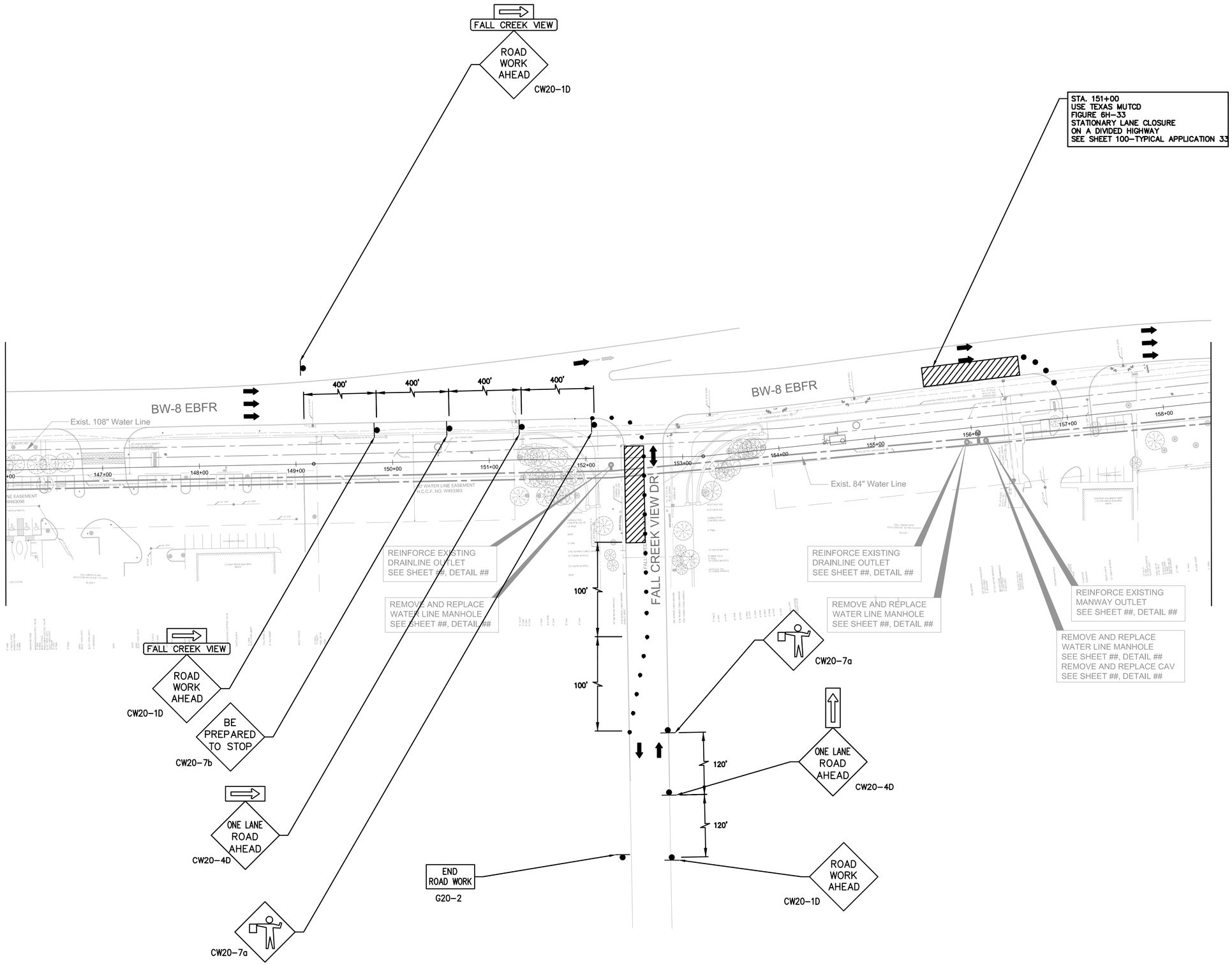
84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

TRAFFIC CONTROL PLAN

(4 OF 11)

WBS NO. S-000901-0015-3
DRAWING SCALE
1"=50' H, 1"=5' V
CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.
SHEET NO. 90 OF 102

Z:\City of Houston projects\COH LAN HAWC 84\04 CAD\87-97 C-001-001.dwg plotted on Oct 16, 2024 - 4:21pm



CONSTRUCTION LEGEND

- WORK ZONE
- TRAFFIC ARROW
- CONSTRUCTION DRUMS
- LOW PROFILE BARRIER
- TRAFFIC CONTROL SIGN
- BARRICADE TY III
- FLAGGER

NOTES:

1. CONTRACTOR SHALL USE FLAGGING OPERATION AS PER LATEST TEXAS MUTCD FOR INGRESS AND EGRESS OF CONSTRUCTION VEHICLES FROM CONSTRUCTION AREA.
2. CONTRACTOR SHALL MAINTAIN ACCESS TO DRIVEWAYS AND SIDE STREETS AT ALL TIMES DURING CONSTRUCTION.
3. FOR ONE LANE CLOSURE, SEE STANDARD DETAILS FOR INFORMATION.
4. SEE TRAFFIC CONTROL NOTES FOR SIGN SPACING.
5. OPEN THE LANE AT THE END OF WORKDAY.

POSTED SPEED = 50 MPH
SIGN SPACING = 400 FT

SWTP
Surface Water Transmission Program

ZARINKELK ENGINEERING SERVICES, INC.
617 Caroline St.
Houston, TX 77002
Phone (832) 242-2426
FAX (832) 242-2445
TEXAS REGISTRATION NO: F-4270

INTERIM REVIEW ONLY
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HOSSEIN ZANDI-ATASHBAR
Registered Professional Engineer
98753
Registration Number
11/11/2022
Date

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

TRAFFIC CONTROL PLAN

(5 OF 11)

WBS NO. S-000901-0015-3	
DRAWING SCALE	
1"=50' H, 1"=5' V	
CITY OF HOUSTON PM	
RAM CHAKRADHAR, P.E.	
SHEET NO. 91 OF 102	

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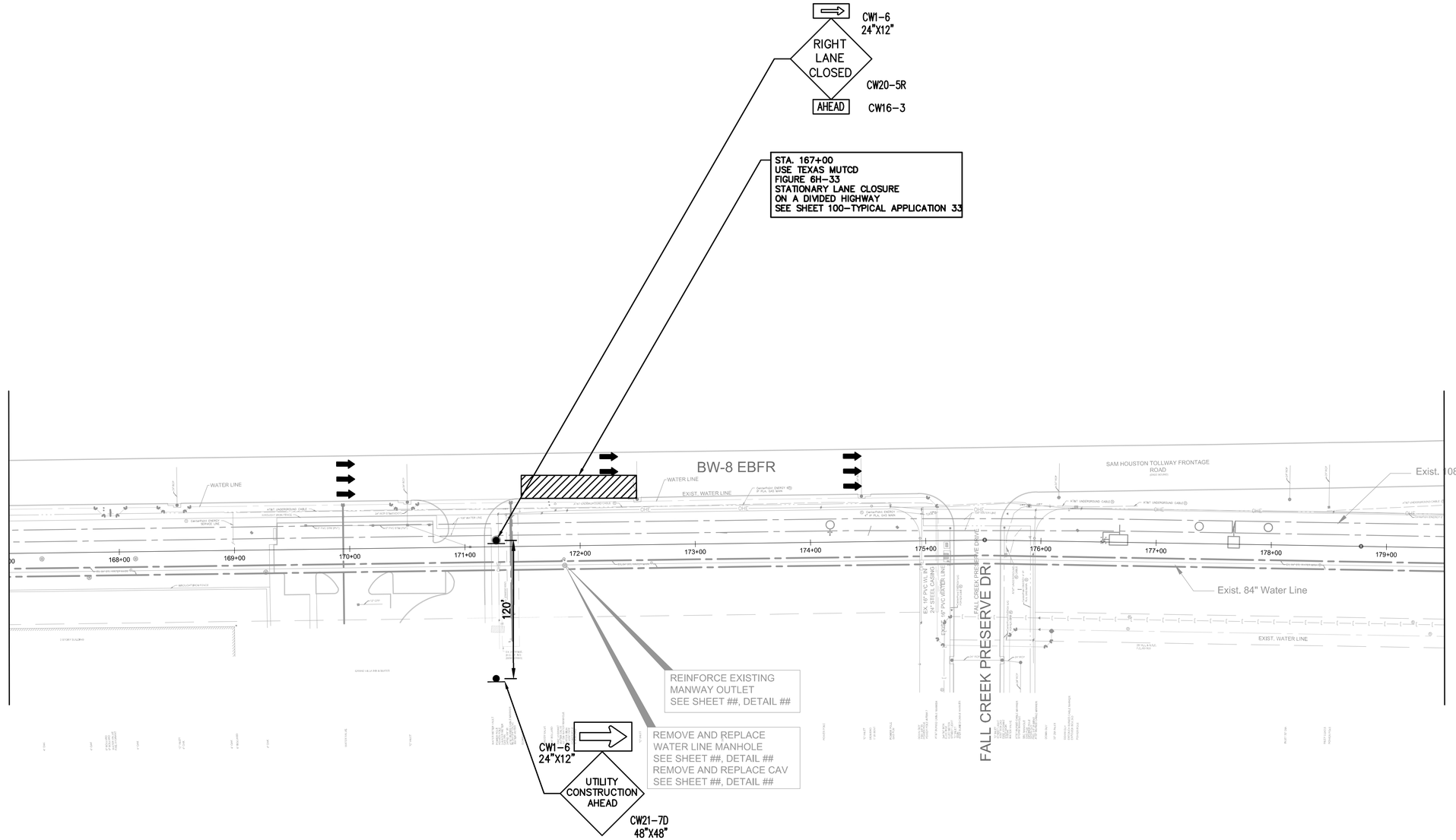

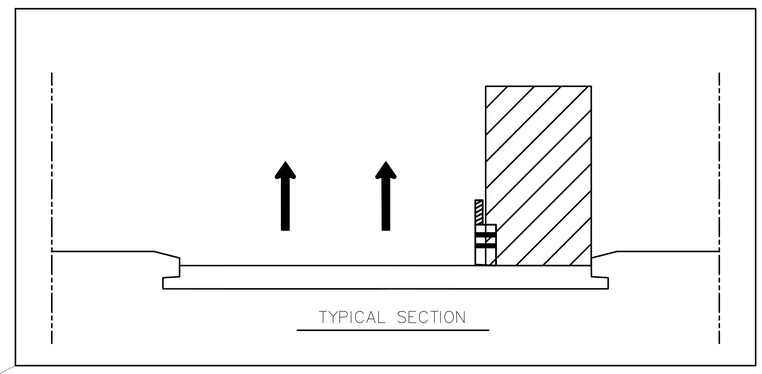

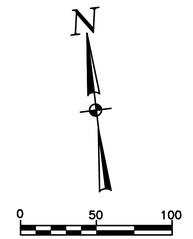

CONSTRUCTION LEGEND

- WORK ZONE
- TRAFFIC ARROW
- CONSTRUCTION DRUMS
- LOW PROFILE BARRIER
- TRAFFIC CONTROL SIGN
- BARRICADE TY III
- FLAGGER

NOTES:

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4. SEE TRAFFIC CONTROL NOTES FOR SIGN SPACING.
5. OPEN THE LANE AT THE END OF WORKDAY.

POSTED SPEED = 50 MPH
SIGN SPACING = 400 FT

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Engineer
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Registration Number
11/11/2022
Date

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

TRAFFIC CONTROL PLAN

(6 OF 11)

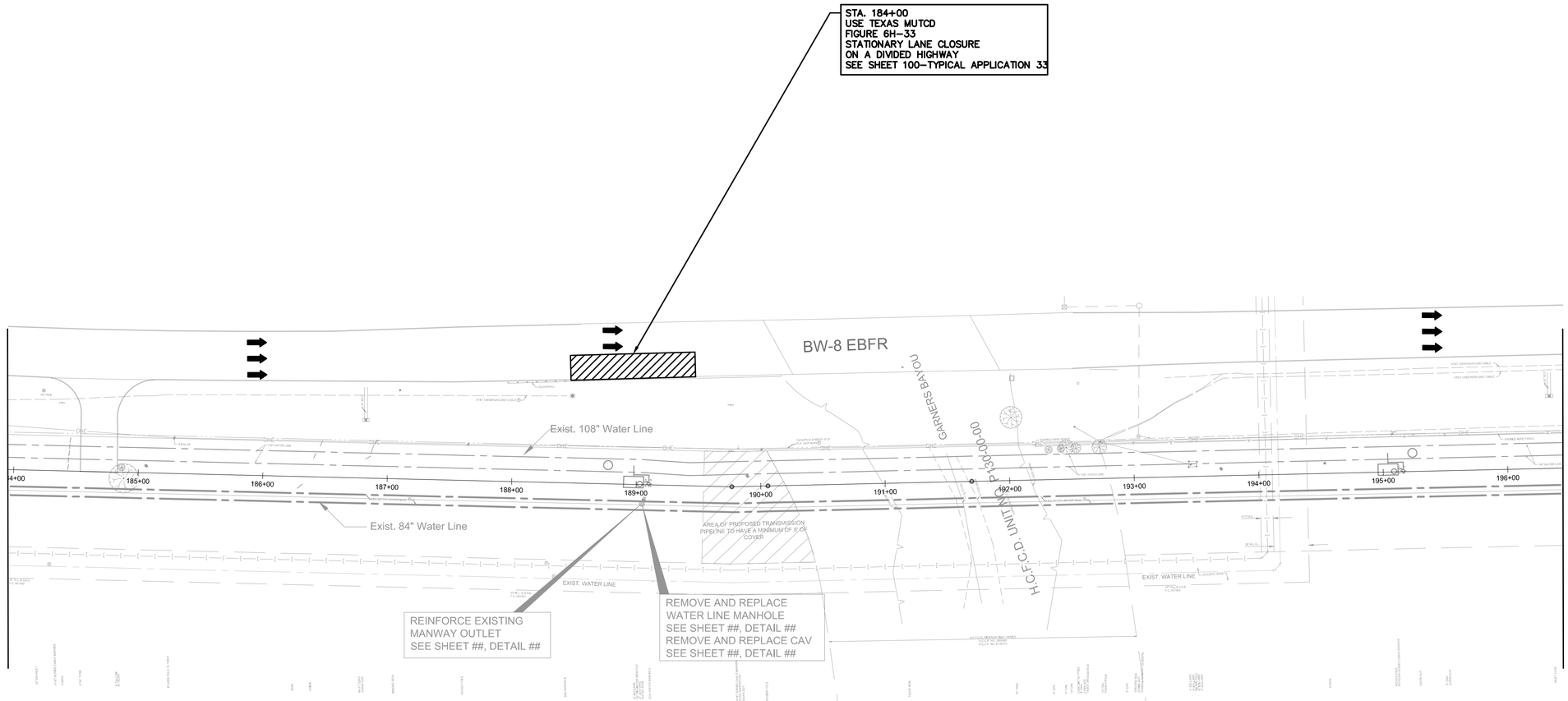
WBS NO.
S-000901-0015-3

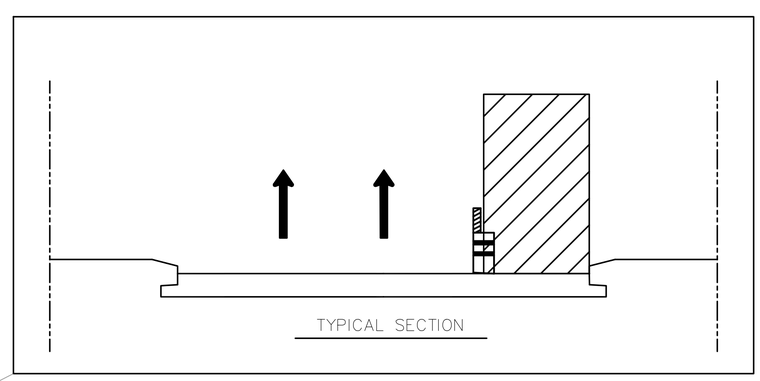
DRAWING SCALE
1"=50' H, 1"=5' V

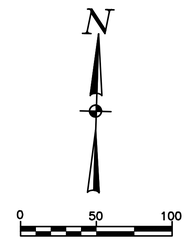
CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.

SHEET NO. 92 OF 102

Z:\City of Houston projects\COH LAN HAWC 84\04 CAD\87-97 C-001-001.dwg plotted on Oct 16, 2024 - 4:24pm







CONSTRUCTION LEGEND

- WORK ZONE
- TRAFFIC ARROW
- CONSTRUCTION DRUMS
- LOW PROFILE BARRIER
- TRAFFIC CONTROL SIGN
- BARRICADE TY III
- FLAGGER

NOTES:

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4. SEE TRAFFIC CONTROL NOTES FOR SIGN SPACING.
5. OPEN THE LANE AT THE END OF WORKDAY.

POSTED SPEED = 50 MPH
SIGN SPACING = 400 FT

SWTP
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Registered Engineer
11/11/2022
Date

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

TRAFFIC CONTROL PLAN

(7 OF 11)

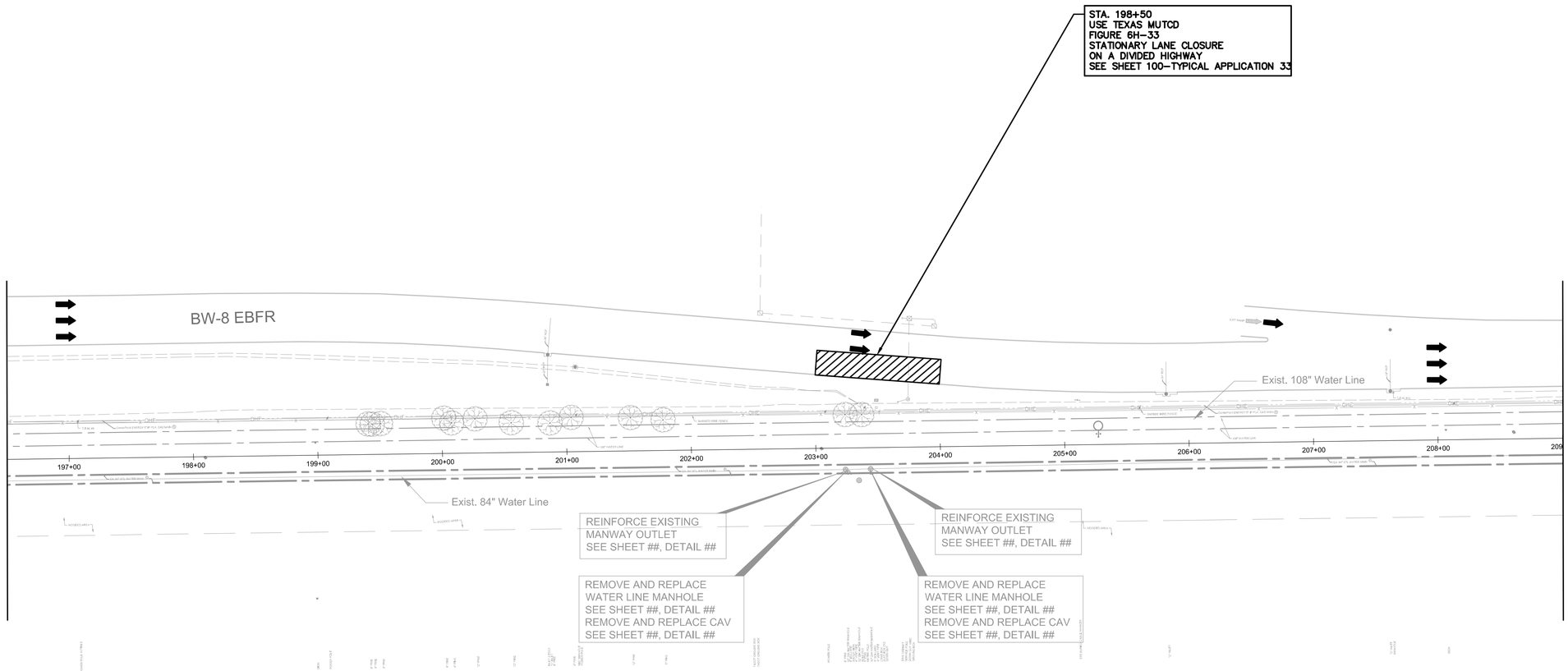
WBS NO.
S-000901-0015-3

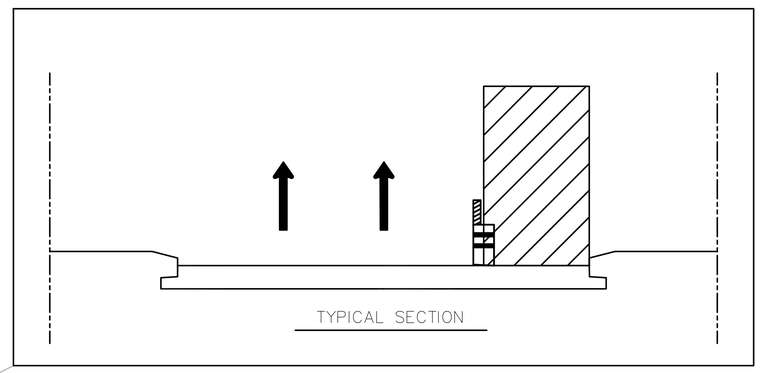
DRAWING SCALE
1"=50' H, 1"=5' V

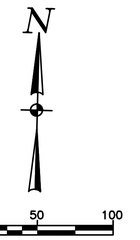
CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.

SHEET NO. 93 OF 102

Z:\City of Houston projects\COH LAN HWC 84\04 CAD\87-97 C-001-001.dwg plotted on Oct 16, 2024 - 4:25pm







CONSTRUCTION LEGEND

- WORK ZONE
- TRAFFIC ARROW
- CONSTRUCTION DRUMS
- LOW PROFILE BARRIER
- TRAFFIC CONTROL SIGN
- BARRICADE TY III
- FLAGGER

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5. OPEN THE LANE AT THE END OF WORKDAY.

POSTED SPEED = 50 MPH
SIGN SPACING = 400 FT

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Date

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

TRAFFIC CONTROL PLAN

(8 OF 11)

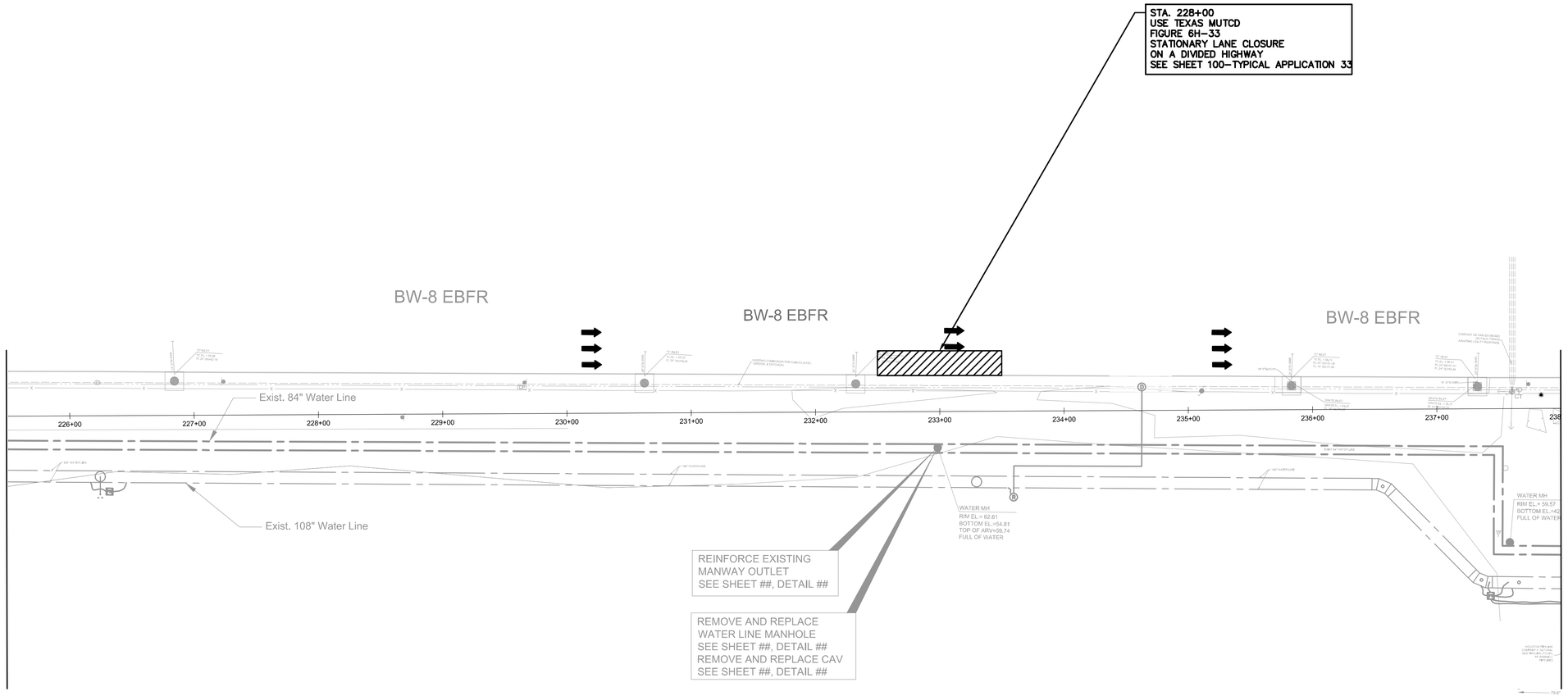
WBS NO.
S-000901-0015-3

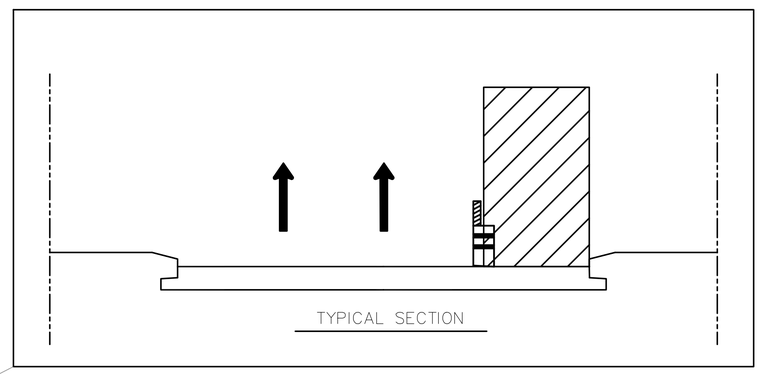
DRAWING SCALE
1"=50' H, 1"=5' V

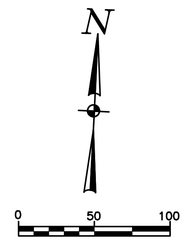
CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.

SHEET NO. 94 OF 102

Z:\City of Houston projects\COH LAN HAWC 84\04 CAD\87-97 C-001-001.dwg plotted on Oct 16, 2024 - 4:25pm







CONSTRUCTION LEGEND

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POSTED SPEED = 50 MPH
SIGN SPACING = 400 FT

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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

TRAFFIC CONTROL PLAN

(9 OF 11)

WBS NO. S-000901-0015-3
DRAWING SCALE
1"=50' H, 1"=5' V
CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.
SHEET NO. 95 OF 102

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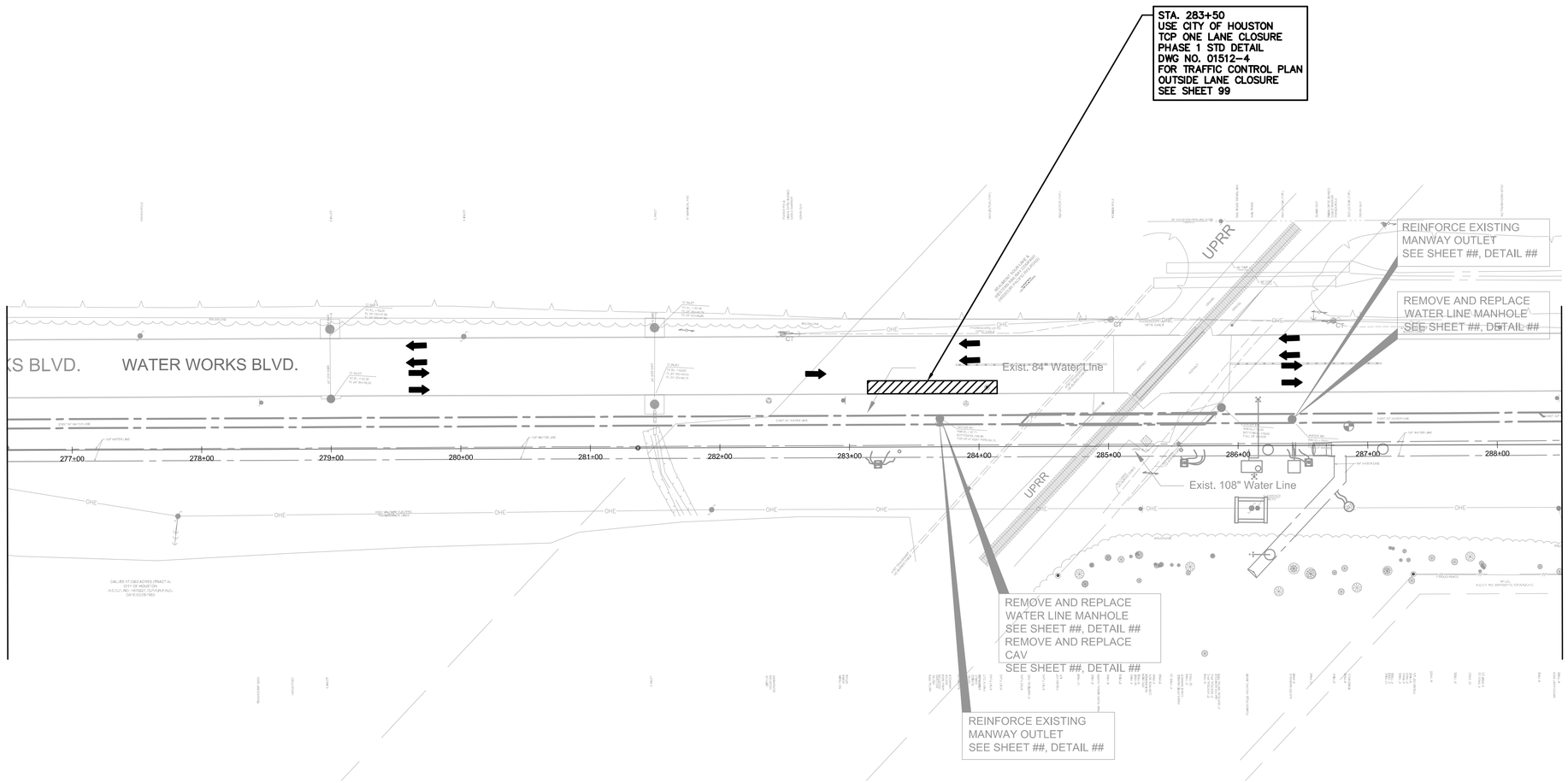

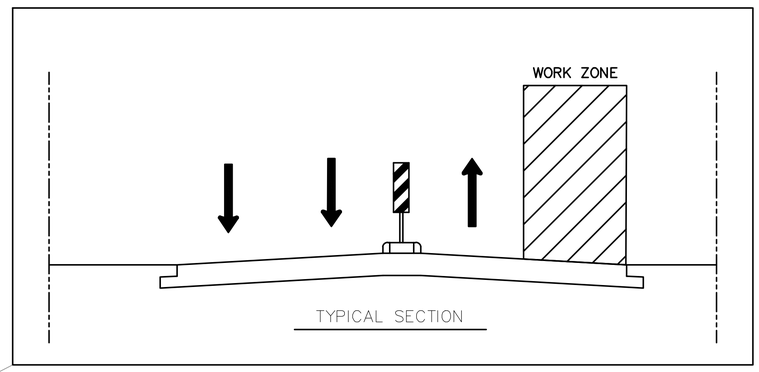

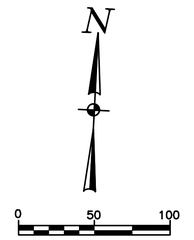

CONSTRUCTION LEGEND

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5. OPEN THE LANE AT THE END OF WORKDAY.

POSTED SPEED = 25 MPH
SIGN SPACING = 120 FT

SWTP
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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

TRAFFIC CONTROL PLAN

(10 OF 11)

WBS NO. S-000901-0015-3
DRAWING SCALE
1"=50' H, 1"=5' V
CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.
SHEET NO. 96 OF 102

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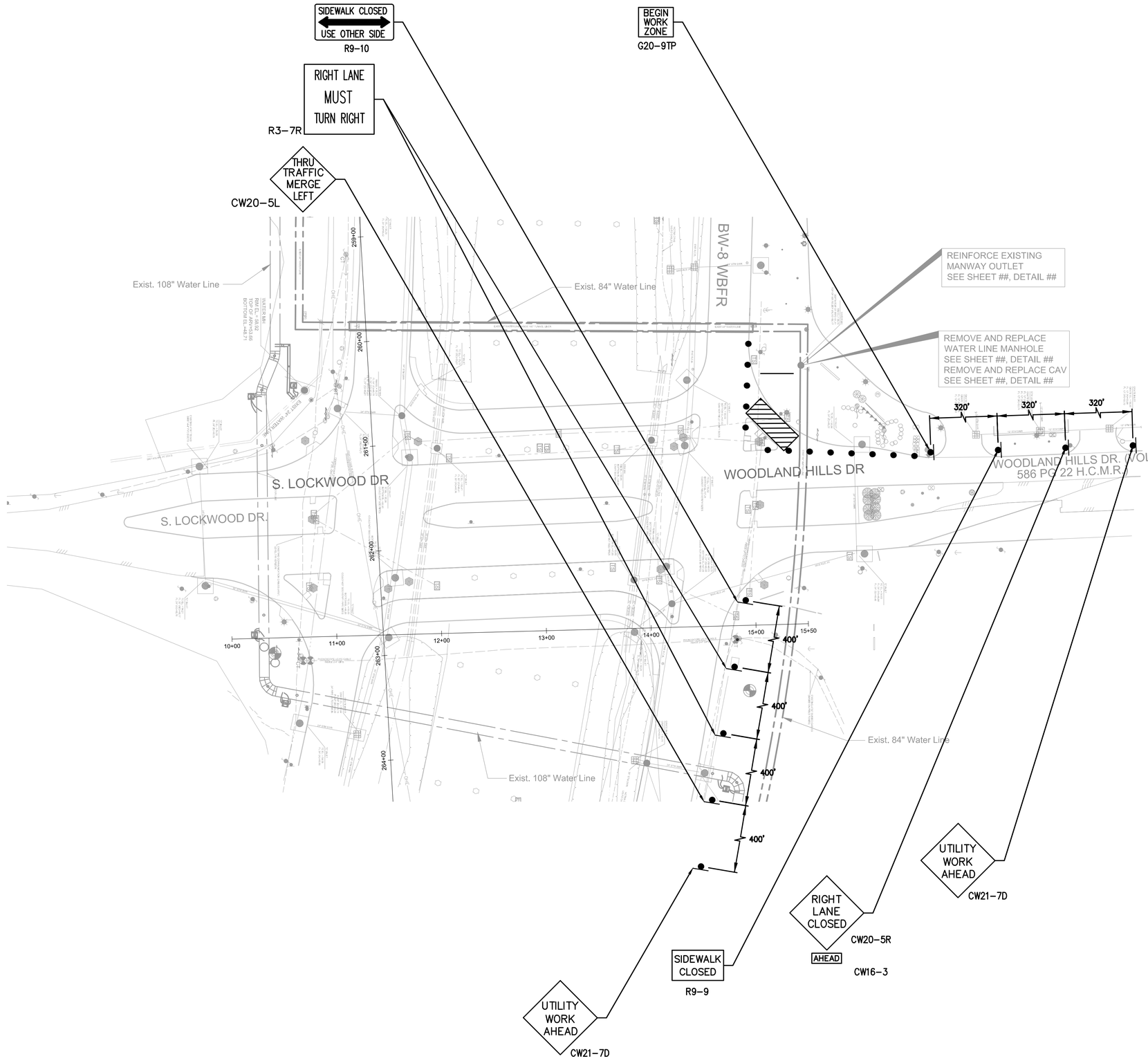

N

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CONSTRUCTION LEGEND

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84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

TRAFFIC CONTROL PLAN

(11 OF 11)

WBS NO. S-000901-0015-3
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CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.
SHEET NO. 97 OF 102

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GENERAL NOTES

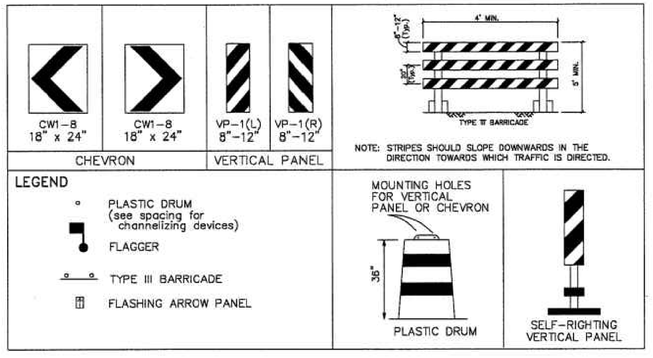
1. The Contractor shall provide and install traffic control devices in conformance with Part VI of the Texas Manual on Traffic Control Devices (TMUTCD)
2. All signs and traffic control devices shall conform the latest version of the TMUTCD
3. No lanes shall be closed during the hours of 7:00 AM to 9:00 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 plate 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 for 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 and reproducible in mylars and shall be sealed by a Licensed Engineer in the State of Texas. Transportation & Drainage Operations representative approval is required to accept the proposed changes.
9. Contractor shall secure lane/sidewalk/bicycle facility closure permits from Transportation & Drainage Operations (Mobility Permit Section at http://www.gims.houstontx.gov/portalWS/MainPortal.aspx) before implementing the 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 Transportation & Drainage Operations (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 orderly 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 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 delineators may be required to delineate the driveway access route through the construction zone. A minimum of a travel lane shall be maintained across the driveways, 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 Division (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.

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.

CHANNELIZATION AND BARRICADES



TYPICAL SIGN SPACING, TAPER LENGTHS, AND SUGGESTED SPACING OF CHANNELIZATION DEVICES

Posted Speed (mph)	Sign Spacing "X"	Min. Desirable Taper Length "L" 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing Of Device 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'

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

TCP NOTES
CHANNELIZING DEVICES
AND BARRICADES
(NOT TO SCALE)

CITY TRAFFIC ENGINEER
CITY ENGINEER

DIRECTOR OF
HOUSTON PUBLIC WORKS

EFF DATE: JUL–01–2018

DWG NO: 01512–01

0 50 100

CONSTRUCTION LEGEND

WORK ZONE
TRAFFIC ARROW
CONSTRUCTION DRUMS
LOW PROFILE BARRIER
TRAFFIC CONTROL SIGN
BARRICADE TY III
FLAGGER

Surface Water Transmission Program

ZARINKELK ENGINEERING SERVICES, INC.
617 Caroline St.
Houston, TX 77002
Phone (832) 242-2426
FAX (832) 242-2445
TEXAS REGISTRATION NO: F-4270

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HOSSEIN ZANDI-ATASHBAR
Registered Professional Engineer
98753
License Number
11/11/2022
Date

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84–INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

TRAFFIC CONTROL PLAN

GENERAL NOTES

WBS NO. S–000901–0015–3

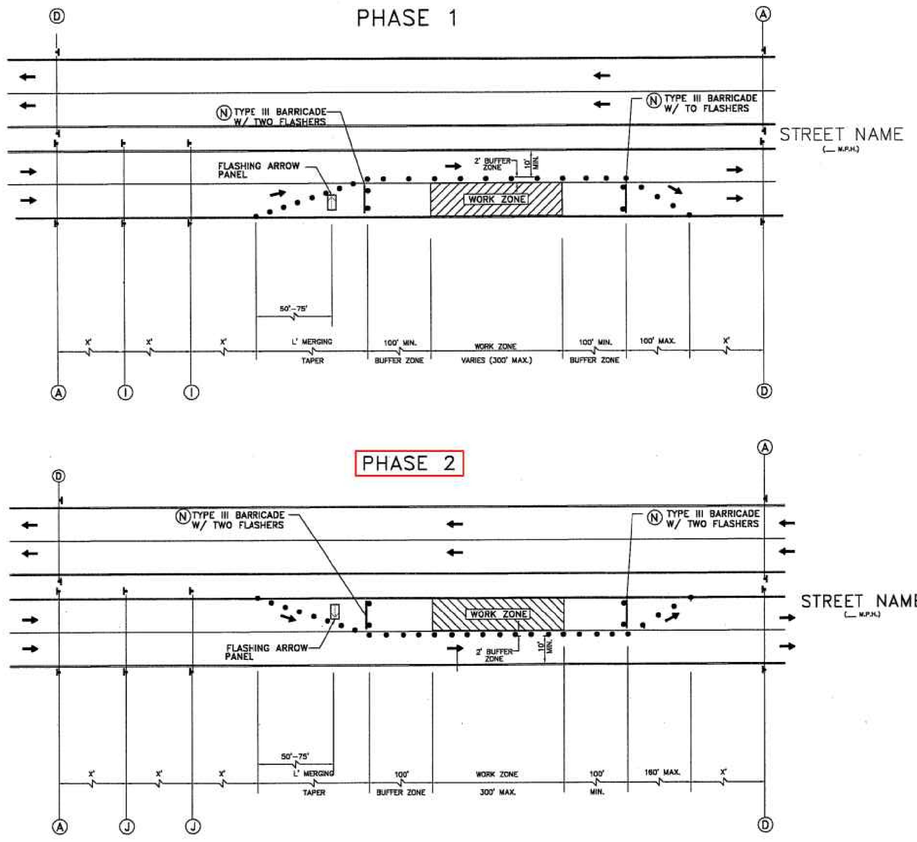
DRAWING SCALE
1"=50' H, 1"=5' V

CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.

SHEET NO. 98 OF 102

Z:\City of Houston projects\COH LAN HAWC 84\04 CAD\98 TCP DETAIL NO 01512–01 – general notes.dwg plotted on Oct 16, 2024 – 4:29pm

A	D	I	J	N
ROAD WORK AHEAD	END ROAD WORK	RIGHT LANE CLOSED	LEFT LANE CLOSED	ROAD CLOSED
CW20-1	G20-2	AHEAD CW20-5(2) CW16-3	AHEAD CW20-5(1) CW16-3	R11-2



LEGEND

- SIGN
- FLAGGER
- APPROVED CHANNELIZATION DEVICE
- TRAFFIC FLOW
- CONSTRUCTION AREA

NOTE:

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 01512-01.

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

TCP ONE LANE CLOSURE
PHASE 1 & 2
(NOT TO SCALE)

CITY TRAFFIC ENGINEER / CITY ENGINEER	DIRECTOR OF HOUSTON PUBLIC WORKS
EFF DATE: JUL-01-2018	DWG NO: 01512-04

0 50 100

CONSTRUCTION LEGEND

- WORK ZONE
- TRAFFIC ARROW
- CONSTRUCTION DRUMS
- LOW PROFILE BARRIER
- TRAFFIC CONTROL SIGN
- BARRICADE TY III
- FLAGGER

SWTP
Surface Water Transmission Program

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Date

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

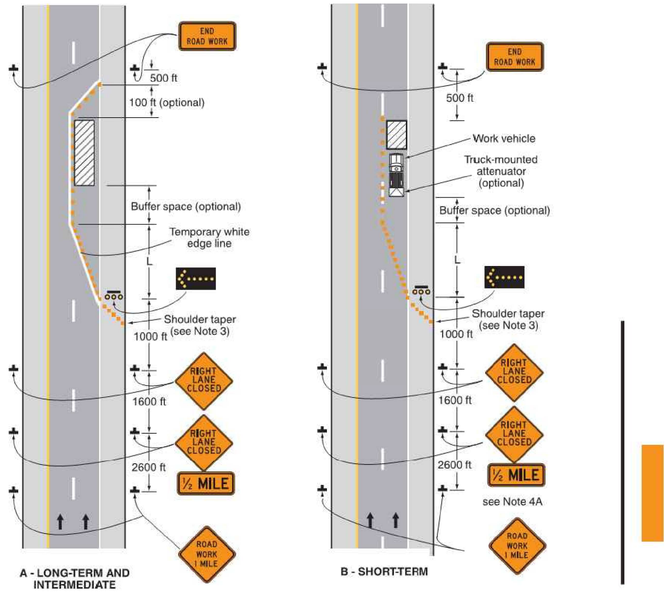
TRAFFIC CONTROL PLAN

ONE LANE CLOSURE

WBS NO. S-000901-0015-3	
DRAWING SCALE	
1"=50' H, 1"=5' V	
CITY OF HOUSTON PM	
RAM CHAKRADHAR, P.E.	
SHEET NO. 99 OF 102	

Z:\City of Houston projects\COH LAN HAWC 84\04 CAD\99 TCP DETAIL NO 01512-04 - one lane closure.dwg plotted on Oct 16, 2024 - 4:29pm

Figure 6H-33. Stationary Lane Closure on a Divided Highway (TA-33)



Note: See Tables 6H-2, 6H-3 and 6H-4 for the meaning of the symbols and/or letter codes used in this figure.

Typical Application 33

Table 6H-2. Meaning of Symbols on Typical Application Diagrams

Arrow board	Shadow vehicle
Arrow board support or trailer (shown facing down)	Sign (shown facing left)
Changeable message sign or support trailer	Surveyor
Channelizing device	Temporary barrier
Crash cushion	Temporary barrier with warning light
Direction of temporary traffic detour	Traffic or pedestrian signal
Direction of traffic	Truck-mounted attenuator
Flagger	Type 3 barricade
High-level warning device (Flag tree)	Warning light
Longitudinal channelizing device	Work space
Luminaire	Work vehicle
Pavement markings that should be removed for a long-term project	

0 50 100

CONSTRUCTION LEGEND

WORK ZONE
TRAFFIC ARROW
CONSTRUCTION DRUMS
LOW PROFILE BARRIER
TRAFFIC CONTROL SIGN
BARRICADE TY III
FLAGGER

Table 6H-4. Merging Taper Lengths and Spacing of Channelizing Devices

		* Minimum Desirable Taper Lengths			Suggested maximum Spacing of Channelizing Devices	
Posted Speed	Formula	10' Offset	11' Offset	12' Offset	On a taper	On a tangent
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'
35		205'	225'	245'	35'	70'
40		265'	295'	320'	40'	80'
45	L = WS	450'	495'	540'	45'	90'
50		500'	550'	600'	50'	100'
55		550'	605'	660'	55'	110'
60		600'	660'	720'	60'	120'
65		650'	715'	780'	65'	130'
70		700'	770'	840'	70'	140'
75		750'	825'	900'	75'	150'
80		800'	880'	960'	80'	160'

* Taper lenghts have been rounded off.
L = Length of Taper (Feet) W = Width of Offset (Feet) S = Posted Speed (MPH)

Table 6H-3. Suggested Advance Warning Sign Spacing

Road Classification	Posted Speed (MPH)	Sign Spacing "X" (Feet)
Conventional Highway	25	100
	30	120
	35	160
	40	240
	45	320
	50	400
	55*	500
	60*	600
	65*	700
	70*	800
	75*	900
	80*	1000
Expressway or Freeway	All Speeds	See Typical Applications **

* Distance between signs should be increased to have 1500 feet advance warning. (See Section 6C.04.07)

** Distance between signs should be increased to have 1/2 mile or more advance warning (See Section 6C.04.05)

SWTP
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CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84–INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

TRAFFIC CONTROL PLAN

DETAILS

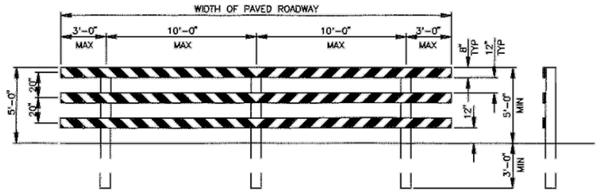
WBS NO. S–000901–0015–3

DRAWING SCALE
1"=50' H, 1"=5' V

CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.

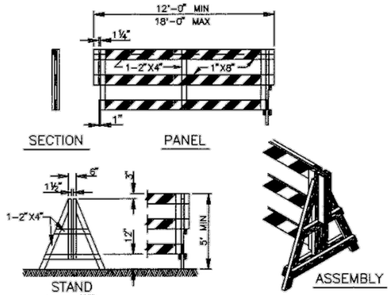
SHEET NO. 100 OF 102

Z:\City of Houston projects\COH LAN HAWC 84\04 CAD\100 TCP DETAIL TxDot Detail.dwg plotted on Oct 17, 2024 - 4:08pm



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

BARRICADE NOTES

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.

CHANNELIZATION DEVICES OTHER THAN BARRICADES SHOULD NORMALLY BE USED FOR CHANNELIZATION PURPOSES.

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 LOCATED AS TO MOST ADVANTAGEOUSLY WARN AND DIRECT TRAFFIC.

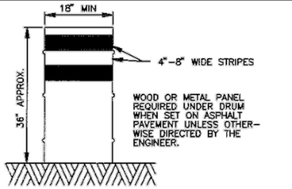
BARRICADES MAY BE DESIGNED AND CONSTRUCTED FROM WOOD OR ANY OTHER SUITABLE MATERIAL IN A MANNER APPROVED BY THE DEPARTMENT OF TRAFFIC AND TRANSPORTATION. THE CONSTRUCTION DETAILS SHOWN HEREON ARE TYPICAL AND ARE SUGGESTED DETAILS FOR WOOD SUPPORT SYSTEMS FOR BARRICADES. THE DETAILS OF RAIL WIDTH AND STRIPING, NUMBER AND SPACING OF RAILS, MINIMUM LENGTH AND HEIGHT (ABOVE PAVEMENT) OF RAILS MUST BE ADHERED TO WHEN ALTERNATE DESIGNS ARE USED.

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 OR ALUMINUM COMPONENTS MAY BE USED.
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.

THE REFLECTORIZED WHITE AND REFLECTORIZED ORANGE (REFLECTORIZED RED) STRIPES FOR BARRICADES, DRUMS AND VERTICAL PANELS SHALL BE CONSTRUCTED OF "HIGH INTESITY SHEETING AND SHALL BE MAINTAINED TO MEET THE APPEARANCE, COLOR AND REFLECTIVITY REQUIREMENTS SET BY DOTT.

THE CONTRACTOR SHALL MAINTAIN EACH BARRICADE IN A CLEAN AND GOOD CONDITION.

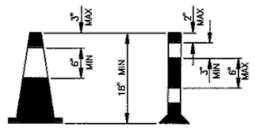
BARRICADES SHALL BE REMOVED UPON COMPLETION OF THE WORK AND/OR THE ELIMINATION OF THE HAZARD ON ANY SECTION.



DRUMS

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 INCHES WIDE. THE FIRST REFLECTORIZED STRIPE SHOULD START WITHIN 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 HORIZONTAL ORANGE AND WHITE STRIPES, THEY SHALL BE NO MORE THAN 2 INCHES WIDE. METAL 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, APPROPIATE WARNING SIGNS SHOULD BE USED. DURING HOURS OF DARKNESS, A FLASHING WARNING LIGHT SHOULD 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.

CWI-8 CHEVRON SIGNS, CWI-6A ARROW SIGNS OR VP-1 VERTICAL PANELS MOUNTED ABOVE DRUMS MAY BE USED AS SUPPLEMENTS TO DRUM DELINEATION.

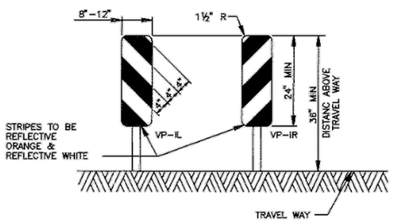


CONES

TRAFFIC CONES AND TUBULAR MARKERS SHALL BE A MIN OF 18" INCHES IN HEIGHT WITH A 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 OR WHERE EVER MORE CONSPICUOUS GUIDANCE IS NEEDED. ORANGE SHALL BE THE PREDOMINANT COLOR ON CONES AND TUBULAR MARKERS. THEY SHOULD BE KEPT CLEAN AND BRIGHT FOR MAX TARGET VALUE. FOR NIGHTTIME 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.

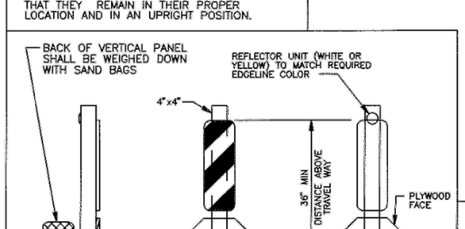
REFLECTORIZATION OF TUBULAR MARKERS SHALL BE A MIN OF TWO THREE-INCH BANDS PLACED A MAX OF 2" FROM THE TOP WITH A MAX OF 6" BETWEEN THE BANDS. REFLECTORIZATION OF CONES SHALL BE PROVIDED BY A MIN 6" BAND PLACED A MAX OF 3" FROM THE TOP.

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.



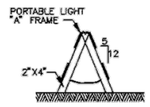
VERTICAL PANELS (VP)

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 MOUNTED BACK TO BACK IF USED AT THE EDGE OF CUTS ADJACENT TO TWO-WAY TWO LANE ROADWAYS. STRIPES SHOULD ALWAYS SLOPE DOWNWARD TOWARD THE TRAVELED WAY.

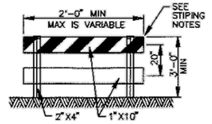


TYPICAL PORTABLE VERTICAL PANEL
OR DELINEATOR

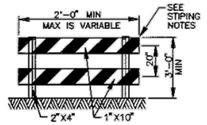
OTHER SIMILAR SUPPORTS MAY BE USED WHEN APPROVED OR DIRECTED BY THE COH DEPT OF TRAFFIC AND TRANSPORTATION



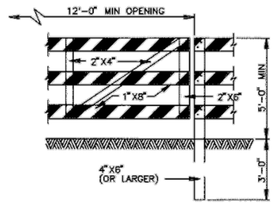
"A" FRAME



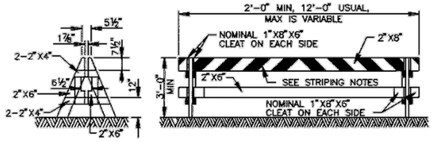
TYPE I



TYPE II

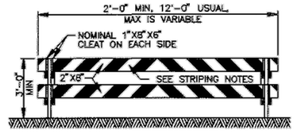


GATE FOR
TYPE III BARRICADE

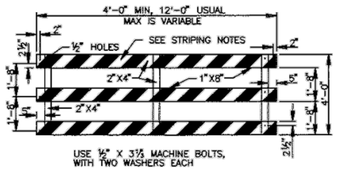


DEMOUNTABLE

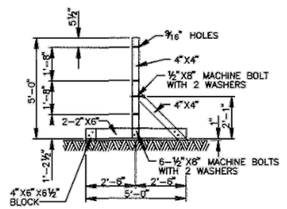
TYPE I



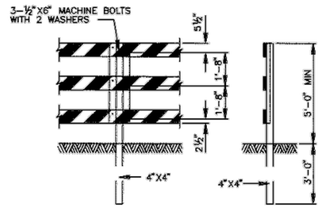
TYPE II



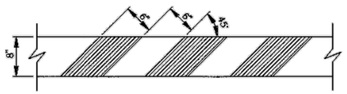
PANEL FOR
TYPE III BARRICADE



STAND FOR
TYPE III BARRICADE



POST FOR
TYPE III BARRICADE



STRIPING FOR BARRICADE

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.

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.

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.

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

BARRICADE STANDARD

(NOT TO SCALE)

APPROVED BY: CITY ENGINEER	APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING
EFF DATE: OCT-01-2002	DWG NO: 01580-01

NO.	DATE	REVISION	APP.

Surface Water Transmission Program

LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

INTERIM REVIEW ONLY
Document incomplete, not intended for permit, bidding or construction.
Engineer: WILLIAM BYLAND, P.E.
P.E. Serial No: 142301
Firm: LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: F-2514
Date:

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

TCP-BARRICADE DETAILS

WBS NO. S-000901-0015-4
DRAWING SCALE
NONE
CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.
SHEET NO. 101 OF 102

P:\130\10667-401\4-0-Production-Working\4-1-BIM-CAD\TCP\10667-401_69-TCP BARRICADE DETAILS.dwg plotted on Oct 21, 2024 - 5:13pm

1. PAVING

(FOR H.C. PUBLIC R.O.W. ONLY)

CONCRETE

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

ASPHALT

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

DRIVEWAYS (in H.C. ROW only)

I. NUMBER OF DRIVEWAY APPROACHES PROPOSED INCLUDE WIDENING OR REPAVING EXISTING DRIVEWAYS AS WELL AS NEW DRIVEWAYS

DRWY	WIDTH	MATERIAL	CULVERT?	CULVERT LENGTH	NEAREST X-STREET	DIST. TO X-STREET
1						
2						
3						
4						
5						

II. HARRIS COUNTY STANDARD DRIVEWAY DETAIL APPEARS ON SHEET _____

FIRE APPARATUS ACCESS ROAD

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

CURBING

I. ISLANDS, MEDIANS AND ALL AREAS NOT TAKING DIRECT DRIVEWAY ACCESS REQUIRES STANDARD 6" CURBING

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

TRAFFIC CONSIDERATIONS

I. MEDIAN CUTS
☐ NO MEDIAN CUT OR RELOCATION IS PROPOSED
☐ MEDIAN MODIFICATIONS ARE SHOWN ON SHEET _____

II. LEFT / RIGHT TURN LANE
☐ NO LEFT / RIGHT TURN LANE IS PROPOSED
☐ LEFT / RIGHT TURN LANE IS SHOWN ON SHEET _____

III. TRAFFIC CONTROL PLAN
☐ NO WORK IN THE RIGHT OF WAY IS PROPOSED THAT WOULD INTERFERE WITH TRAFFIC FLOW
☐ TRAFFIC CONTROL SHOWN ON SHEET _____

IV. TRAFFIC SIGNAL
☐ NO TRAFFIC SIGNAL IS EXISTING / PROPOSED
☐ EXISTING TRAFFIC SIGNAL DEVICES (T.C. BOXES AND LOOPS) SHOWN ON SHEET _____
☐ PROPOSED TRAFFIC SIGNAL (BY OTHERS)

V. TRAFFIC IMPACT ANALYSIS
☐ NO TRAFFIC IMPACT ANALYSIS IS REQUIRED
☐ TRAFFIC IMPACT ANALYSIS HAS BEEN APPROVED ON DATE:_____
PLAN TITLE: _____
HCPID PROJECT NO.: _____

5. DESCRIPTION OF PROPERTY

I. LEGAL DESCRIPTION
A. ACREAGE: _____
B. ☐ SUBDIVISION: _____
☐ SURVEY & ABSTRACT: _____
C. ADJACENT ROADS: _____

II. PLATTING
A. SUBDIVISION PLAT
☐ PROPOSED PLAT / REPLAT
☐ RECORDED PLAT / REPLAT
PLAT NAME: _____
B. STREETS PROPOSED
☐ PUBLIC
☐ PRIVATE
☐ PUBLIC & PRIVATE
☐ NONE

III. JURISDICTIONS
☐ CITY OF_____
☐ ETJ, CITY OF HOUSTON
☐ ETJ, CITY OF_____
☐ NO ETJ

IV. HCAD ACCOUNT NOS. (ALL) KEY MAP PAGE _____

V. UNOBSTRUCTED VISIBILITY EASEMENT (U.V.E.)
☐ REQUIRED AND SHOWN ON SHEET(S) _____
☐ NOT REQUIRED

NOTE: ALL APPROVED, FINAL PLATS AND ASSOCIATED CPC101 FORMS MUST BE INCLUDED WITH PLAN SUBMITTAL

☐ CONFORMING SUBDIVISION
☐ NON-CONFORMING SUBDIVISION
☐ PARTIALLY NON-CONFORMING SUBDIVISION

2. RESIDENTIAL / SUBDIVISION 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 POND (APPROVED H.C. PRJ NO.): _____
DETENTION POND MAINTAINED BY: _____
☐ HCFCD DRAINAGE DITCH UNIT NO.: _____
☐ H.C. ROADSIDE DITCH (ROAD NAME): _____
☐ H.C. STORM SEWER (APPROVED H.C. PRJ NO.): _____

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

V. DETENTION PROVIDED BY
☐ DETENTION BASIN IS PART THIS PLAN SET. SERVICE AREA MAP IS ON SHEET ____
☐ REGIONAL DETENTION BASIN SYSTEM (APPROVED H.C. PRJ NO.): _____

PROPOSED STORM SEWER IS SUBMERGED (AGREEMENT MUST BE PROVIDED).
STATIC W.S.E. @ OUTFALL IS _____.

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.

6. STORMWATER QUALITY

I. SWPPP: CONSTRUCTION MEASURES. (Complete for ALL projects)
☐ DISTURBS >1AC. SITE PLAN & DETAILS ON SHEET(S)_____
☐ DISTURBS <1AC. N/A

II. APPLICABILITY FOR PERMANENT FEATURES. (must be completed on all projects)
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: _____
☐ 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 CALCULATIONS APPEAR ON SHEET(S) _____
☐ HYDRODYNAMIC TYPE SEPARATOR MODEL: _____
☐ OTHER(S): _____

3. 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 _____
DETENTION VOLUME PROVIDED BY EXISTING DETENTION POND APPROVED H.C. PROJECT NO.:
DETENTION POND SERVICE AREA MAP IS PROVIDED ON SHEET ____

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

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 _____

V. FLOW RESTRICTOR SIZE
OUTFALL PIPE SIZE: _____
RESTRICTOR PIPE SIZE: _____

NOTE: ALL ROADSIDE DITCH OUTFALLS REQUIRE EROSION CONTROL MEASURES. RIPRAP IS NOT ALLOWED AS AN EROSION CONTROL MEASURE IN HARRIS COUNTY ROW. ALL PUMPED DETENTION OUTFALLS TO ROADSIDE DITCHES REQUIRE MANHOLE W/ LEADS.

8. CURB RAMPS

A. ARE CURB RAMPS THAT CONNECT TO PUBLIC STREETS PROPOSED IN THIS SET OF PLANS? [ ] YES [ ] NO

9. LANDSCAPING

☐ REQUIRED AND SHOWN ON SHEET(S) _____
☐ NOT REQUIRED

7. FLOOD PLAIN STATUS

I. GENERAL INFORMATION
FIRM PANEL(S) FOR PROPERTY: _____
FIRM PANEL(S) DATE: _____
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.)* _____

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 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 _____

IV. ☐ LOMR REQUIRED ☐ CLOMR REQUIRED VERIFIED BY: _____

4. WATER AND WASTEWATER

I. COMMERCIAL PROJECTS

DOES PROPERTY HAVE EXISTING AND/OR PROPOSED UTILITIES?
☐ YES ☐ NO

IF YES, CHECK THE BOX THAT APPLIES TO THIS PROJECT
☐ PUBLIC WATER & SANITARY
☐ PRIVATE WATER WELL & SEPTIC SYSTEM
☐ PUBLIC WATER & PRIVATE SEPTIC SYSTEM
☐ PRIVATE WATER WELL & PUBLIC SANITARY

NOTE: PUBLIC UTILITIES REQUIRE A LETTER FROM THE DISTRICT/ MUNICIPALITY AUTHORIZING SERVICE & CONNECTION. THIS IS REQUIRED FOR PLAN APPROVAL.

UTILITY DISTRICT/MUNICIPALITY NAME: _____

NOTE: SEPTIC SYSTEMS REQUIRE H.C. WASTE WATER REVIEW
H.C. SEPTIC PERMIT/REQUEST NO. _____

NOTE: ALL EXISTING AND PROPOSED UTILITIES MUST BE ACCURATELY SHOWN & LABELED ON THE SITE PLANS.

II. SUBDIVISION PROJECTS

☐ UTILITY DISTRICT/MUNICIPALITY NAME: _____
☐ PRIVATE WATER & WASTE WATER SYSTEMS
☐ PRIVATE WATER & INDIVIDUAL OSSF
☐ INDIVIDUAL WATER WELL & OSSF

NOTE: A COPY OF TCEQ APPROVAL FOR PRIVATE WATER & WASTE WATER SYSTEMS IS REQUIRED FOR PLAN APPROVAL.

*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 REIVEW DOES **NOT** REVIEW OR APPROVE UNDERGROUND FIRE LINES FOR THE FIRE PROTECTION SYSTEMS.*

WASTEWATER TREATMENT PLANTS

H.C. WWTP REVIEW:

IS THE PROPOSED PROJECT A NEW WWTP SITE OR A REHAB/EXPANSION OF AN EXISTING WWTP SITE? *YES* ☐ *NO* ☐

IF YES, IS A HARRIS COUNTY DOMESTIC WASTEWATER TREATMENT PLANT EXPRES REVIEW SHEET ATTACHED AND COMPLETED ACCORDING TO INSTRUCTIONS? *YES* ☐ *NO* ☐

REFER TO:
WWW.ENG.HCTX.NET/PERMITS/WASTEWATER/REGULATIONS-STANDARDS-DETAILS FOR DOMESTIC WWTP ERS FORM

10. PERMITS REQUIRED

DOES THE PROPERTY HAVE ANY VIOLATIONS? IF SO PLEASE PROVIDE ALL VIOLATION NUMBERS. _____

☐ STORM WATER QUALITY
☐ SEPTIC (EXISTING) ☐ SEPTIC (PROPOSED)
☐ CIVIL SITE WORK (PHASE II PERMIT CLASS I (non-floodplain))
☐ CIVIL SITE WORK (PHASE II PERMIT CLASS II (floodplain))
☐ DRIVEWAY WITH CULVERT _____ CURB AND GUTTER _____
☐ BUILDING PERMITS (NO. OF BUILDINGS = _____) ☐ CRITICAL FACILITY
☐ SUBDIVISION INFRASTRUCTURE PHASE II (NO. OF LOTS = _____)
☐ NOTICE OF DETENTION AFFIDAVIT REQUIRED
☐ MUD MAINTENANCE AGREEMENT REQUIRED
NOTES: _____

WORK IN HARRIS COUNTY R.O.W.

☐ UTILITY WORK _____
☐ TURN LANE _____
☐ OTHER CONSTRUCTION _____

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 ROW.
REFER TO www.eng.hctx.net/permits FOR EACH SCOPE OF WORK IN HC OR IN HCFCD ROW.

BENCHMARK REQUIREMENTS FOR PROPOSED BRIDGES AND OR NEW RESIDENTIAL SUBDIVISIONS

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 sheets ____

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) to the Harris County Engineering Department, 10555 Northwest Freeway, Suite 120, Houston, TX 77092*

HARRIS COUNTY ENGINEERING DEPARTMENT - 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

HCED 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.

THE COMPLETED PROJECT CONSISTS OF DRAWING SHEETS _____ THRU _____

SEAL

SIGNATURE _____ DATE _____

REVISIONS

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

DATE	SHEET NO.	DESCRIPTION	P.E. INITIAL	H.C. APPROVED DATE

HC PROJECT NO. | HCFCD PROJECT NO. | SHEET NUMBER ___ OF ___

HARRIS COUNTY
ENGINEERING DEPARTMENT
REVIEW SHEET

VERSION 20.0 MAY 27, 2020

NO.	DATE	REVISION	APP.

SWTP
Surface Water Transmission Program

LOCKWOOD, ANDREWS & NEWNAM, INC.
3700 W SAM HOUSTON PKWY
HOUSTON, TX 77042

INTERIM REVIEW ONLY
Document Incomplete: not intended for permit, bidding or construction.
Engineer: _____ WILLIAM BYLAND, P.E.
P.E. Serial No. _____ 142061
Firm: _____ LOCKWOOD, ANDREWS & NEWNAM, INC.
Firm No.: _____ F-2614
Date: _____

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

84-INCH WATER LINE REPAIR AND CONDITION ASSESSMENT FROM NEWPP TO SMITH ROAD

HARRIS COUNTY REVIEW SHEET

WBS NO. S-000901-0015-4

DRAWING SCALE
NONE

CITY OF HOUSTON PM
RAM CHAKRADHAR, P.E.

SHEET NO. 102 OF 102

P:\130\130-10667-401\4-0-Production-Working\4-1-BIM-CAD\General\10667-401-102-HARRIS COUNTY REVIEW SHEET.dwg plotted on Oct 18, 2024 - 12:19pm