2024 ARPA NEW JOHNSONVILLE COLLECTION SYSTEM REHABILITATION

THE CITY OF NEW JOHNSONVILLE, TENNESSEE

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LARRY BRADFORD - VICE MAYOR
KRYSTAL BEASLEY - COUNCIL MEMBER
RON GINGERICH - COUNCIL MEMBER
JAMES CORBITT - COUNCIL MEMBER
CHRIS BROWNING - COUNCIL MEMBER
CODY KESLINGER - COUNCIL MEMBER
MICHAEL U. KING - CITY ATTORNEY
BRANDY VANN - CITY RECORDER

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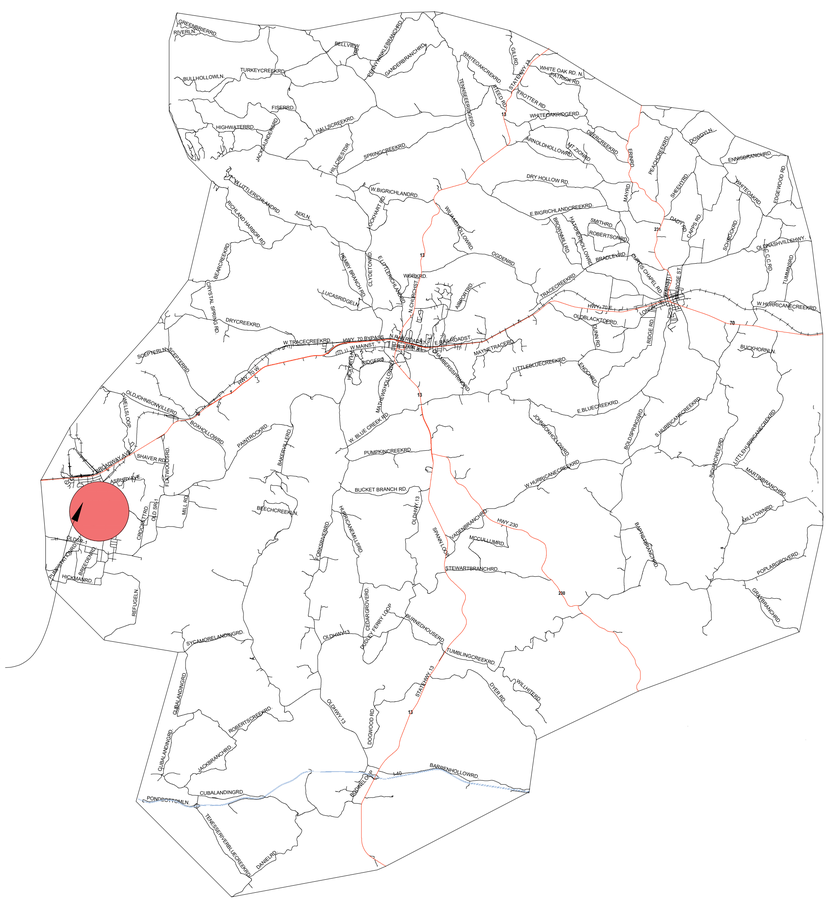
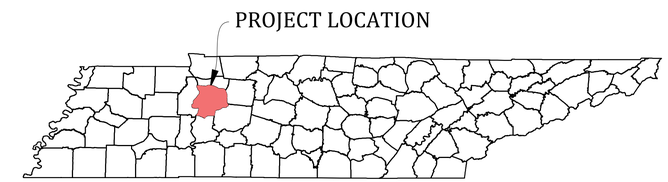
HUMPHREYS COUNTY, TENNESSEE





PHILLIPS ENGINEERING, INC.
Phone: (731) 885-9532
Fax: (731) 885-2106
Email: pei@phillipsengr.com
P.O. Box 585 - 617 S. First Street - Union City, TN 38261

RYE ENGINEERING PLC
CONSULTING ENGINEERS & SYSTEM OPERATORS
4210 W MAIN STREET, ERIN TN 37061
OFFICE (931) 289-2300 FAX (931) 289-2313

JAMES D. PHILLIPS
REGISTERED ENGINEER
AGRICULTURE COMMERCE
NO. 016318
STATE OF TENNESSEE

DATE: 4/15/2025

SETH W. RYE
REGISTERED ENGINEER
COMMERCE
NO. 108604
STATE OF TENNESSEE

DATE: 4/15/2025

GENERAL NOTES:

1. THE CONTRACTOR SHALL COMPLY WITH ALL LOCAL CODES, OBTAIN ALL PERMITS, AND PAY ALL PERMIT AND TAP FEES PRIOR TO BEGINNING WORK.

2. ALL CONSTRUCTION SHALL BE MADE IN ACCORDANCE WITH THE SPECIFICATIONS AND DETAILS INCLUDED IN THE CONSTRUCTION PLANS AND PROJECT MANUAL. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE CONSTRUCTION WITH THE CITY OF NEW JOHNSONVILLE AND THE ENGINEER.

3. THE CONTRACTOR SHALL NOTIFY THE TENNESSEE ONE-CALL SYSTEM AND ANY NON ONE-CALL UTILITIES INDIVIDUALLY, AT LEAST THREE WORKING DAYS PRIOR TO ANY EXCAVATION AND/OR DEMOLITION.

4. UNDERGROUND STRUCTURES AND UTILITIES SHOWN ARE STRICTLY APPROXIMATE IN LOCATION AND DEPTH, AND MAY NOT BE THE ONLY UTILITIES PRESENT. THE CONTRACTOR SHALL VERIFY FIELD SIZES, LOCATIONS, AND ELEVATIONS OF EXISTING UNDERGROUND UTILITIES, PRIOR TO BEGINNING WORK. NOTIFY ENGINEER OF ANY DISCREPANCIES. IT IS THE CONTRACTORS RESPONSIBILITY TO RELOCATE ANY INTERFERING UTILITIES.

5. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO REPAIR ANY DAMAGE TO PROPERTY OF ADJOINING PROPERTIES DURING CONSTRUCTION.

6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING, MAINTAINING, AND RESTORING ALL EXISTING DRAINAGE SYSTEMS.

7. THE CONTRACTOR SHALL PROTECT THE PUBLIC FROM WORK AT ALL TIMES. WHEN THE WORK AREA IS IN AN AREA OF DIRECT PUBLIC ACCESS, THE WORK AREA BARRICADED AND ILLUMINATED DARKNESS AND PERIODS OF ACTIVITY.

8. CONTRACTOR SHALL PROVIDE TRAFFIC CONTROL FOR ALL WORK IN PUBLIC RIGHT-OF-WAYS. TRAFFIC CONTROL SHALL BE IN ACCORDANCE WITH FEDERAL AND STATE MANUALS OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) CURRENT EDITION.

9. CONTRACTOR SHALL ALLOW FULL ACCESS TO PROPERTIES AFFECTED BY UTILITY CONSTRUCTION.

10. CONTRACTOR SHALL PROVIDE SHEETING, SHORING, AND BRACING AS NECESSARY, TO PROTECT WORKMEN AND EXISTING UTILITIES DURING ALL PHASES OF CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE A TRENCH SAFETY SYSTEM MEET ALL APPROPRIATE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION REGULATIONS.

11. THE CONTRACTOR SHALL MAKE A PHYSICAL INSPECTION OF THE SITE BEFORE SUBMITTING A PROPOSAL FOR THE PROJECT. IT IS ASSUMED THAT THE CONTRACTOR HAS EXAMINED THE, PLANS SPECIFICATIONS AND THE SITE BEFORE SUBMITTING A PROPOSAL. ANY ITEMS THAT WOULD BE REASONABLY REQUIRED FOR CONSTRUCTION, WHETHER OR NOT SPECIFICALLY DENOTED IN THE PLANS SHALL BE PROVIDED BY THE CONTRACTOR.

12. MAINTAIN ONE SET ONE SET OF AS-BUILT DRAWINGS ON THE JOB SITE FOR DISTRIBUTION TO THE ENGINEER UPON COMPLETION. AS-BUILTS SHALL INCLUDE LOCATIONS AND ELEVATIONS OF ALL SEWER INFRASTRUCTURE, APPURTENANCES, AND STRUCTURES ON SITE.

13. CONTINUOUSLY CLEAN-UP AND REMOVE WASTE MATERIALS FROM SITE. DO NOT ALLOW MATERIALS TO ACCUMULATE ON SITE.

14. SEWER SYSTEM SHALL BE INSTALLED, TESTED, AND CLEARED FOR SERVICE IN STRICT ACCORDANCE WITH ALL STATE AND LOCAL CODES, SPECIFICATIONS, AND REGULATIONS.

15. ROUTE OF NEW UTILITIES IS SHOWN AS APPROXIMATE. ADJUSTMENTS TO ALIGNMENT SHALL BE MADE IN THE FIELD, IF FIELD CONDITIONS VARY FROM THE PLANS. NO CHANGE ORDERS SHALL BE ISSUED FOR MINOR ALIGNMENT CHANGES FOR EXPLORATORY DIGGING. ANY AND ALL ADJUSTMENTS TO THE ALIGNMENT SHALL BE APPROVED BY THE ENGINEER PRIOR TO WORKING.

16. CONTRACTOR SHALL RESTORE ALL AFFECTED STRUCTURES AND PROPERTY DURING CONSTRUCTION, TO A CONDITION THAT IS EQUAL OR BETTER THAN THE PRE-CONSTRUCTION CONDITIONS, AND/OR CONDITION THAT IS SATISFACTORY TO THE PROPERTY OWNER AND THE CITY OF NEW JOHNSONVILLE.

17. THE CONTRACTOR IS REQUIRED TO PROVIDE AND INSTALL TRACER WIRE AND DETECTOR TAPE.

18. THE CONTRACTOR SHALL LANDSCAPE DISTRIBUTED AREAS IMMEDIATELY AFTER CONSTRUCTION TO WITHIN 0.3 FEET OF EXISTING GRADE

19. ALL PAVED SURFACES SHALL BE RESTORED TO EXISTING OR BETTER CONDITION.

20. THE COLLECTION SYSTEM SHALL REMAIN IN OPERATION THE ENTIRE DURATION OF CONSTRUCTION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE FLOW DOES NOT CEASE. BYPASS PUMPING METHODS SHALL BE INCLUDED IN CONTRACTOR'S BID

21. NO SOIL TESTS OR CORING HAVE BEEN PERFORMED. IT IS THE CONTRACTOR'S RESPONSIBILITY TO JUDGE IF ROCK EXCAVATION MAY BE REQUIRED, AND NOTIFY ENGINEER IMMEDIATELY. CONTRACTOR MAY PERFORM SPOT DIGS ALONG THE ALIGNMENT, AFTER OBTAININ PERMISSION FROM THE ENGINEER, CITY, AND LANDOWNER.

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CITY OF NEW JOHNSONVILLE

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GENERAL NOTES

G 0.01

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SETH W. RYE
REGISTERED ENGINEER
No. 109294
COMMERCIAL
STATE OF TENNESSEE

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SHEET INDEX

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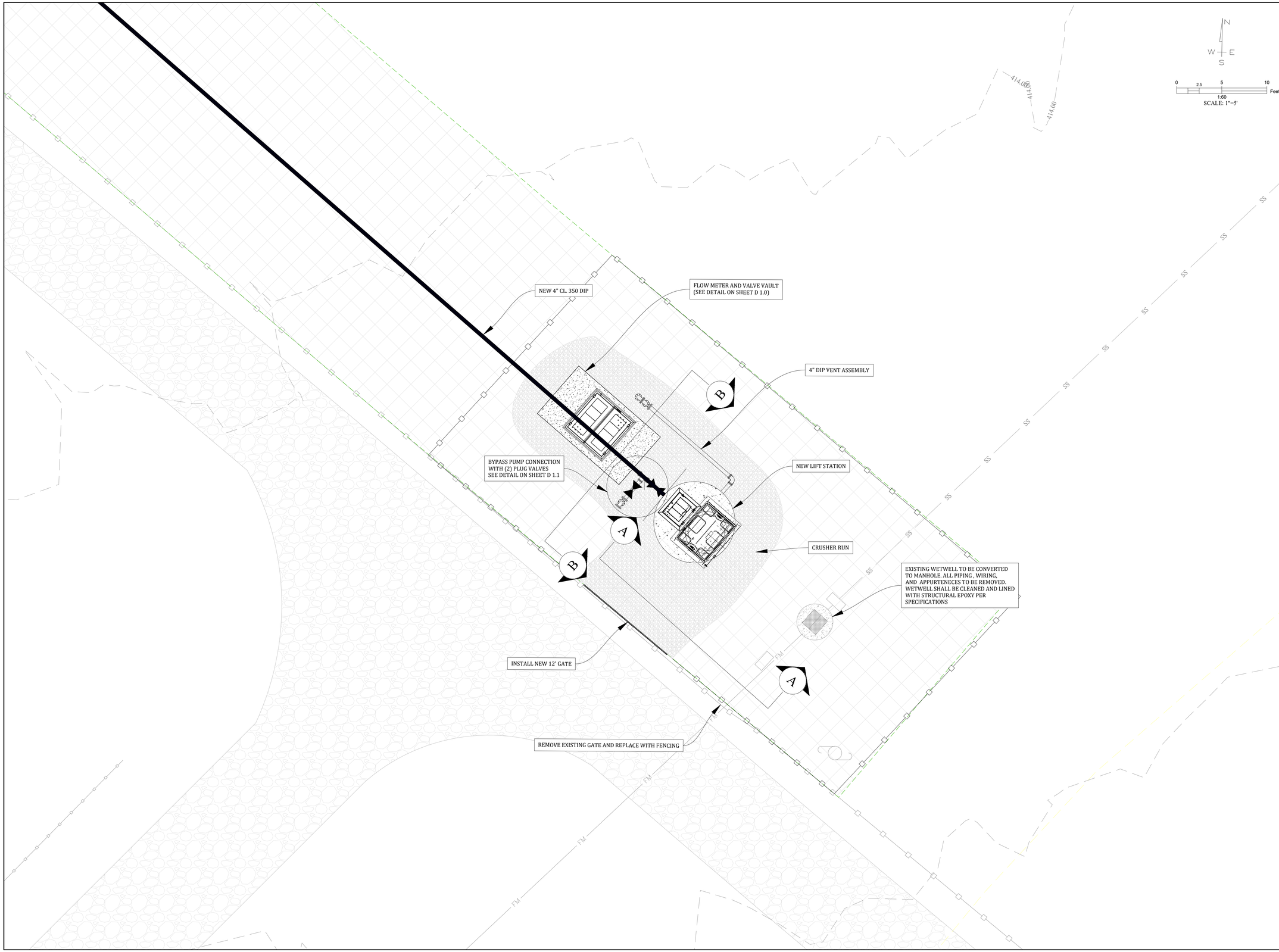

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CITY OF NEW JOHNSONVILLE

SETH W. RYE
REGISTERED ENGINEER
No. 120824
COMMERCIAL AGRICULTURAL
STATE OF TENNESSEE

DATE: 4/15/2025

LEGEND

	PROPOSED 4" CL. 350 DIP
	30' PERMANENT SEWER EASEMENT
	FENCELINE
--SS--	SANITARY SEWER
--FM--	FORCE MAIN

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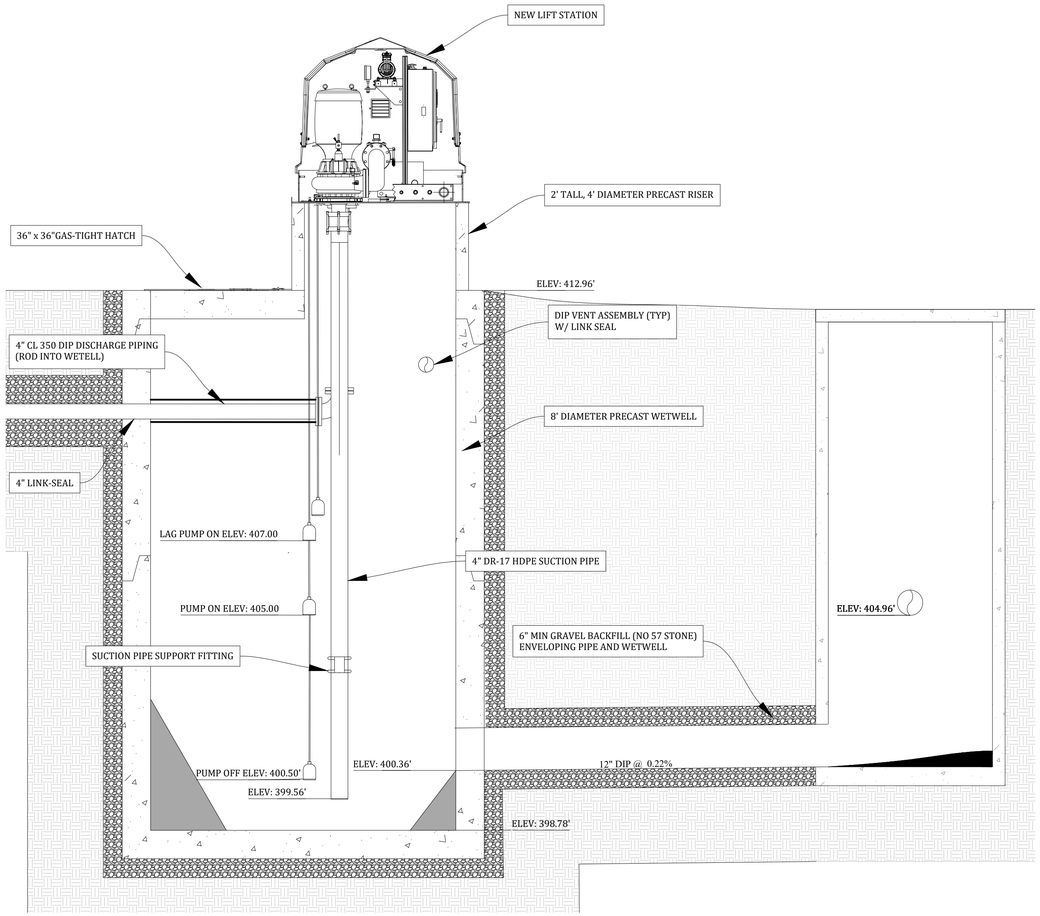
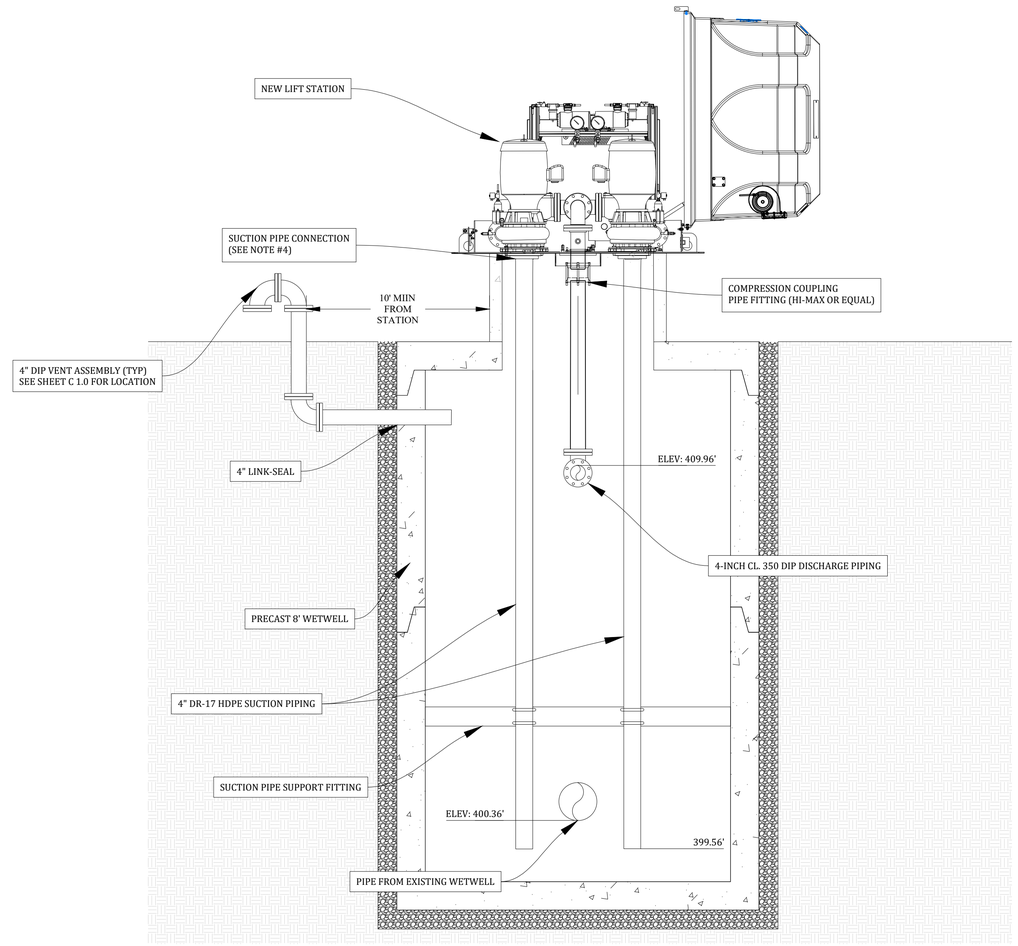
LIFT STATION SITE PLAN

C 1.0



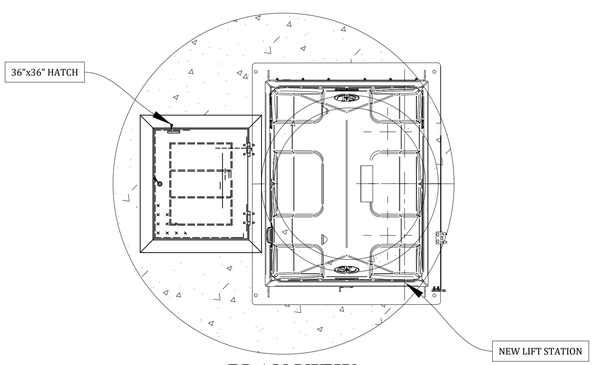
SECTION A-A

SCALE 1"= 2'



SECTION B-B

SCALE 1"= 2'



PLAN VIEW

SCALE 1"= 2'

NOTES:

1. GENERAL WETWELL COMMENTS
   THE WETWELL SHOULD BE INSTALLED SO THE TOP REMAINS AS LEVEL AS POSSIBLE. CONTRACTOR IS TO INSTALL SLOPES AROUND THE INTERIOR BOTTOM CORNER OF THE WETWELL.
2. GROUTING STATION TO WET WELL
   PRIOR TO SETTING THE STATION ON TOP OF THE WET WELL, APPLY A LAYER OF NON-SHRINK OR EPOXY GROUT ON THE TOP SURFACE OF THE WET WELL. THE STATION WILL THEN BED DOWN IN THE GROUT, GIVING THE STATION FIRM SUPPORT AND REDUCING NOISE TRANSMISSIONS. THE BASE PLATE SHOULD BE LEVEL IN ALL DIRECTIONS WHEN COMPLETE.
3. ANCHORING DISCHARGE CONNECTION
   THE DISCHARGE IS TO BE ORIENTED IN ACCORDANCE WITH THE ENGINEER'S PLAN. GENERALLY, SMITH & LOVELESS ®, INC. WILL PROVIDE A COMPRESSION TYPE COUPLING TO JOIN THE FORCE MAIN TO THE STATION DISCHARGE PIPE. COMPRESSION TYPE COUPLINGS DO NOT PROVIDE PIPE END RESTRAINT. TWO LUGS ARE ALSO PROVIDED (ONE ON EITHER SIDE OF THE DISCHARGE) ON THE UNDERSIDE OF THE BASEPLATE FOR SECURING THE VERTICAL SECTION OF THE DISCHARGE PIPE FROM SEPARATING IN THE COUPLING. TIE THE DISCHARGE PIPE TO THE STATION TO PREVENT SEPARATION FROM THE COUPLING IN THE VERTICAL DIRECTION BY USING AN ALL-THREADED ROD, CABLE OR CHAIN (NOT SUPPLIED BY S&L). THE CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE ADEQUATE RESTRAINT AGAINST ANY HORIZONTAL THRUST DEVELOPED. THE RESTRAINT SHALL BE TIED TO THE STRUCTURE, AS THE STATION BASEPLATE IS NOT DESIGNED TO WITHSTAND HORIZONTAL THRUST FORCES. ALL DISCHARGE PIPES SHOULD BE SECURED.
4. SUCTION PIPE CONNECTION
   USE GASKETS AND SEALANT PROVIDED WITH STATION FOR A TIGHT CONNECTION. SEE O&M MANUAL FOR DETAILS.

DESIGN TABLE	
PUMP BASIS OF DESIGN	S&L MODEL 4B2D*1
MOTOR SIZE	7.5 HP
MOTOR SPEED	1760 RPM
FLOW RATE	150 GPM
TOTAL DYNAMIC HEAD (TDH)	50 FT
FORCE MAIN SIZE (EXISTING)	4 IN
FORCE MAIN VELOCITY	3.83 FPS

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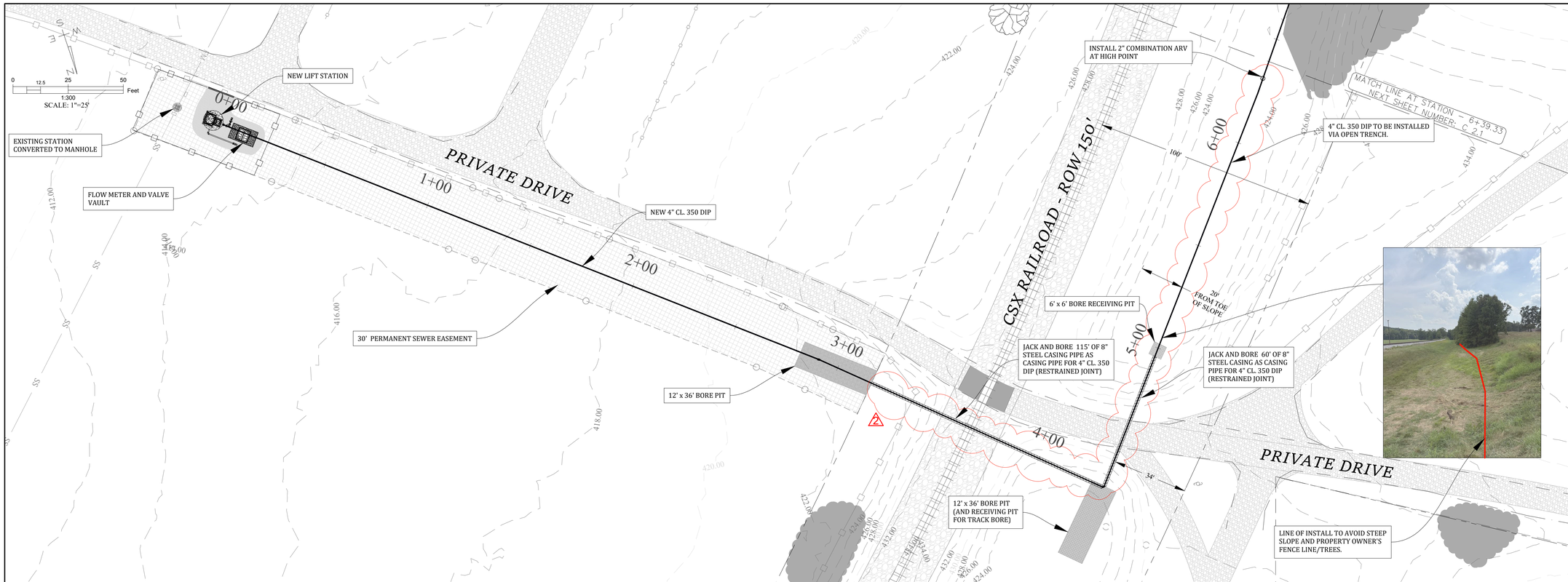
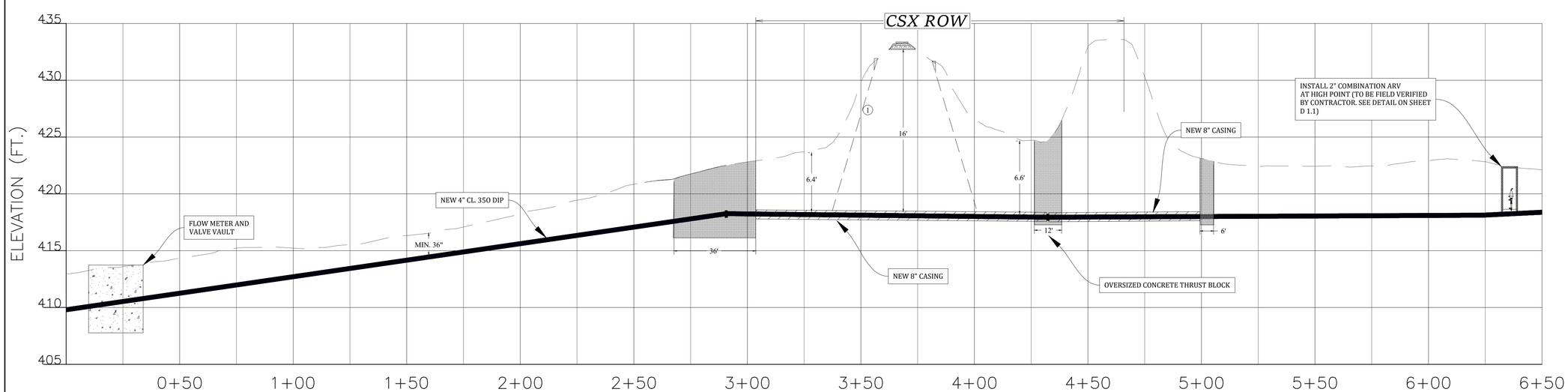
LIFT STATION SECTION VIEWS

C 1.1



NOTES:

1) TREL STARTING 12' FROM CL OF RAILROAD WITH A SLOPE OF 1.5' OVER 1'.



TONY WALLACE NEW FM PROFILE

SCALE H:1"= 25'; V:1"= 5'

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COMMERCIAL AGRICULTURAL
STATE OF TENNESSEE

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LEGEND

- PROPOSED 4" CL. 350 DIP
- 30' PERMANENT SEWER EASEMENT
- FENCELINE
- 20' PERMANENT SEWER EASEMENT

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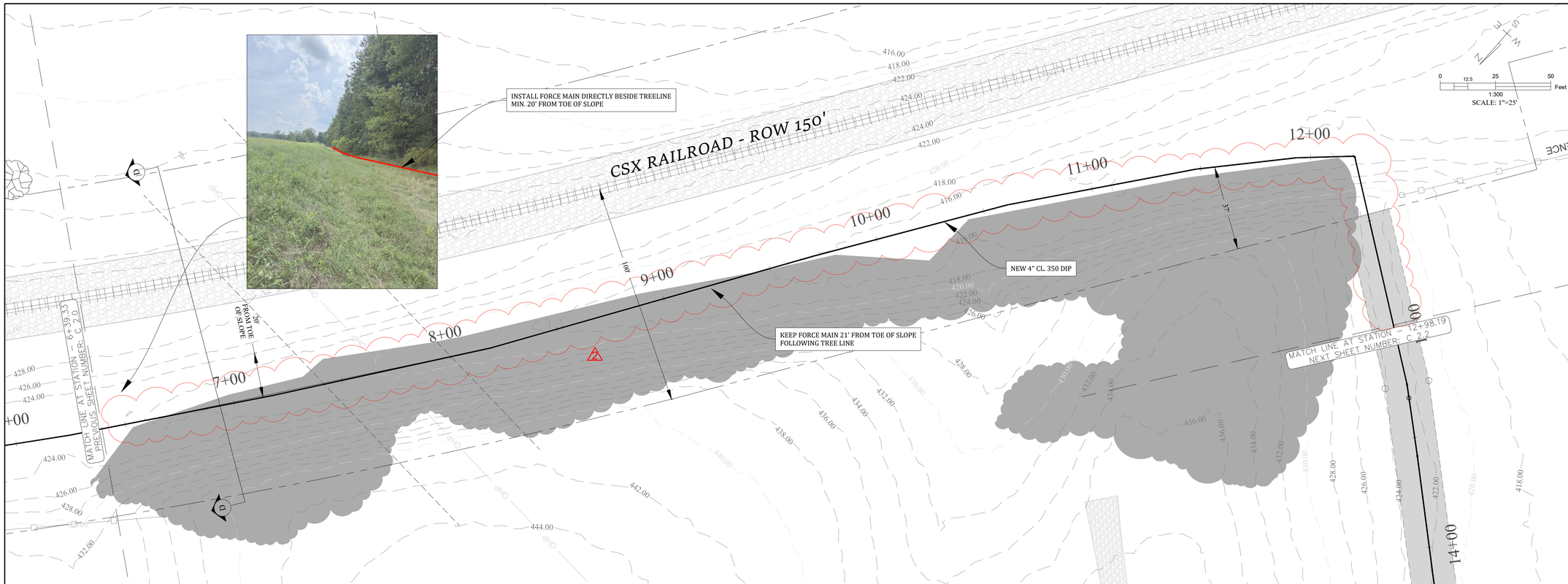
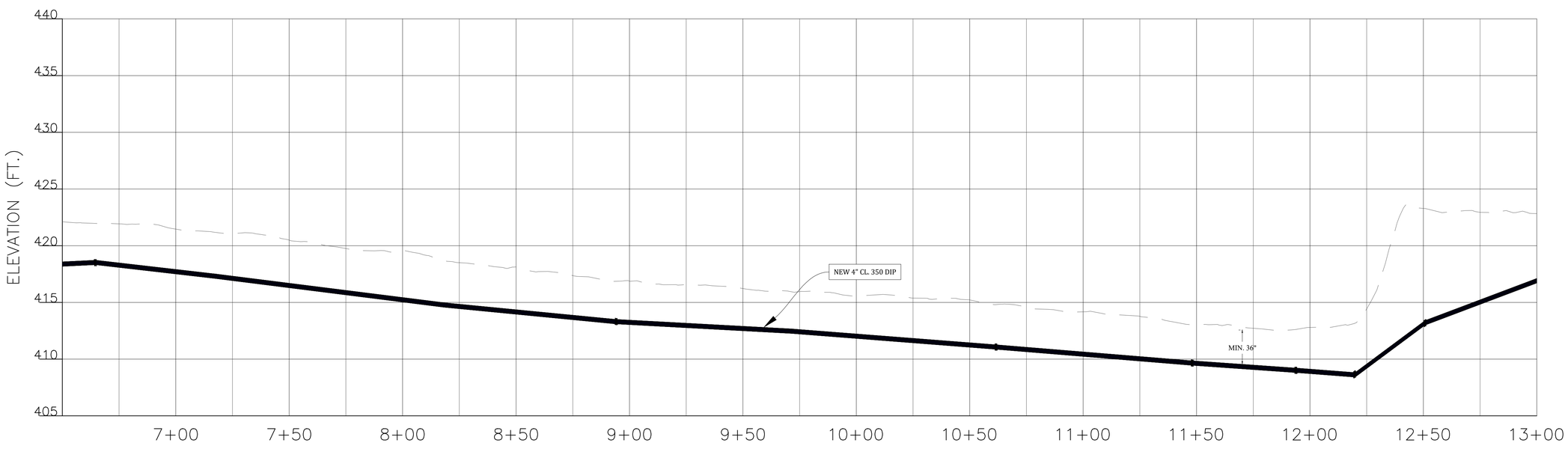
FORCE MAIN PLAN AND PROFILE
STA: 0+00 - 6+50

C 2.0





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SETH W. RYE
REGISTERED ENGINEER
COMMERCIAL
NO. 103631
STATE OF TENNESSEE

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LEGEND

- PROPOSED 4" CL. 350 DIP
- 20' PERMANENT SEWER EASEMENT
- --OHP-- OVERHEAD POWER

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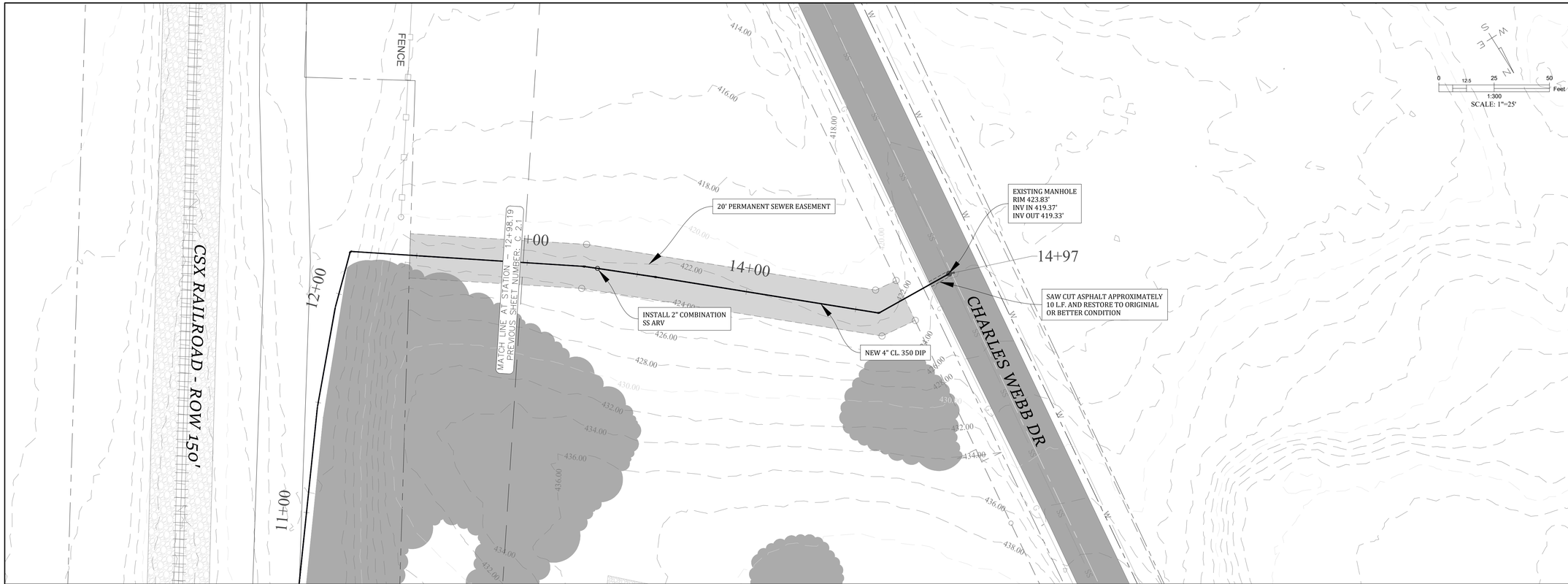
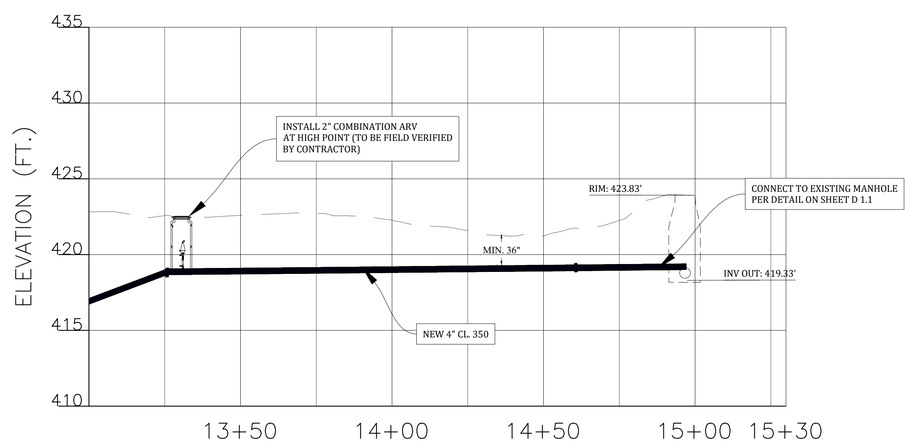
FORCE MAIN PLAN AND PROFILE
STA: 6+50 - 13+00

C 2.1





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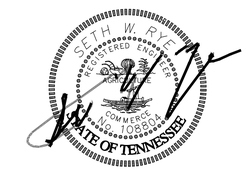

DATE: 4/15/2025

LEGEND

	PROPOSED 4" CL. 350 DIP
	20' PERMANENT SEWER EASEMENT
--SS--	EXISTING SANITARY SEWER
--G--	EXISTING GAS
--W--	EXISTING WATER MAIN

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FORCE MAIN PLAN AND PROFILE
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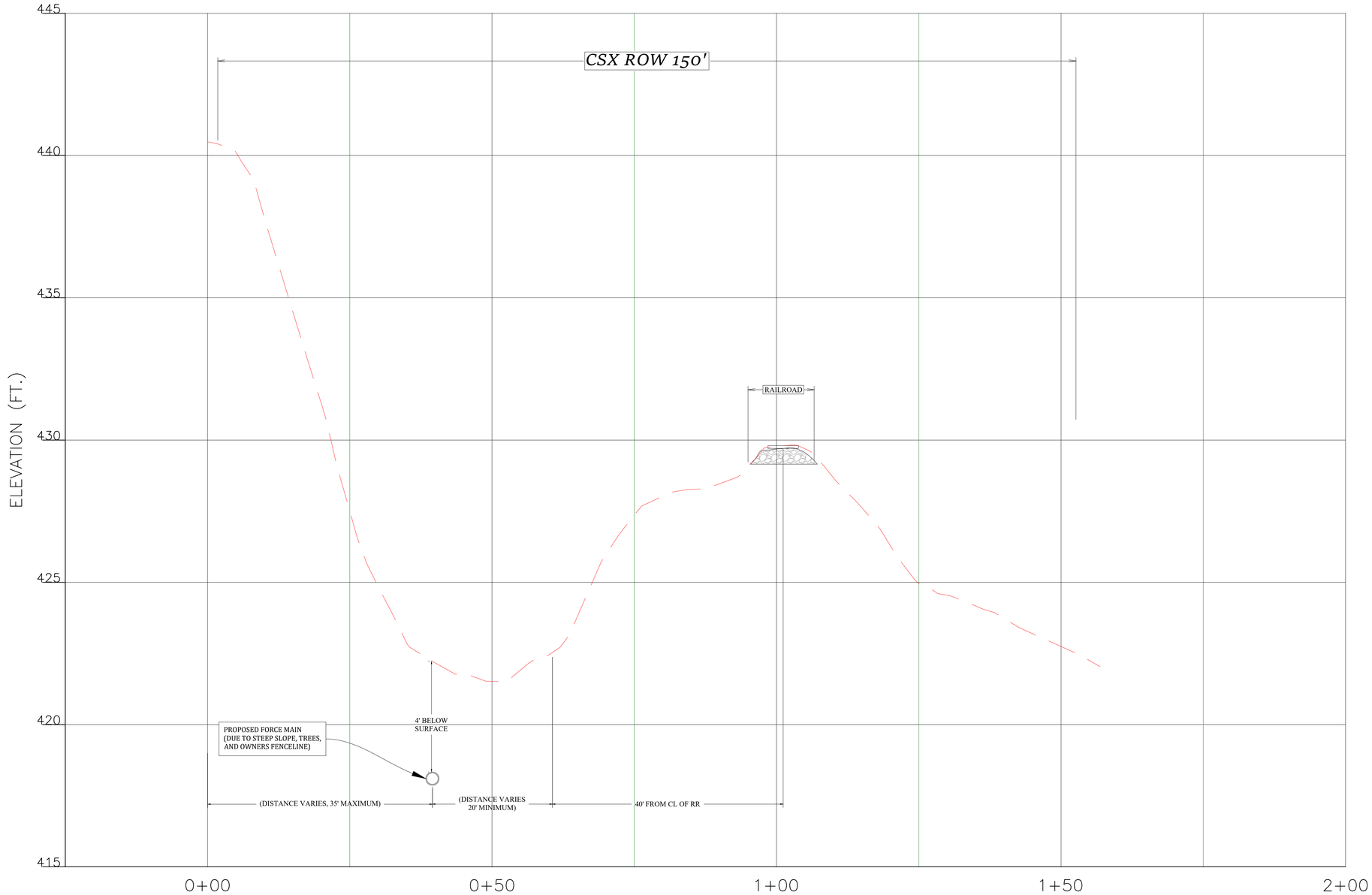
C 2.2



CROSS SECTION D-D VIEW

SCALE H:1"= 10'; V:1"= 10'

NOTES:

1. REFER TO ENGINEERING SPECIFICATIONS IN THE APPLICATION PACKAGE FOR ADDITIONAL INFORMATION AND GUIDANCE.
2. FOR JACK AND BORE INSTALLATIONS THE FOLLOWING NOTE IS REQUIRED ON THE DRAWING: "THE FRONT OF THE CASING PIPE SHALL BE PROVIDED WITH MECHANICAL ARRANGEMENTS OR DEVICES THAT WILL POSITIVELY PREVENT THE AUGER FROM LEADING THE PIPE SO THAT NO UNSUPPORTED EXCAVATION IS AHEAD OF THE PIPE."
3. LOCATE CSX'S SIGNAL FACILITIES AND/OR WARNING DEVICES AT PROPOSED FACILITY CROSSING LOCATION, I.E. CANTILEVERS, FLASHERS, GATES AND SHOW CLEARANCES.
4. CASING PIPE ENDS MUST BE SEALED.

PIPELINE CONTENT DETAILS	
COMMODITY DESCRIPTION	SANITARY SEWER
MAXIMUM OPERATING PRESSURE	21 PSI
IS COMMODITY FLAMMABLE	NO

CARRIER/CASING PIPE DETAILS		
	CARRIER PIPE	CASING PIPE
PIPE MATERIAL	PVC	STEEL
MATERIAL SPECIFICATION AND GRADE	SDR-21	ASTM 252
SPECIFIED MINIMUM YIELD STRENGTH	200 PSI	35000 PSI
NOMINAL SIZE OUTSIDE DIAMETER	4.5 IN.	8.25 IN.
WALL THICKNESS	0.237 IN.	0.25 IN.
TYPE OF SEAM	SEAMLESS	WELDED
TYPE OF JOINTS	GASKET	WELDED
TUNNEL LINER PLATES REQUIRED	NO	
CATHODIC PROTECTION	NO	
PROTECTIVE COATING	NO	
TEMP,TRACK SUPPORT, OR RIP-RAP REQ.	NO	

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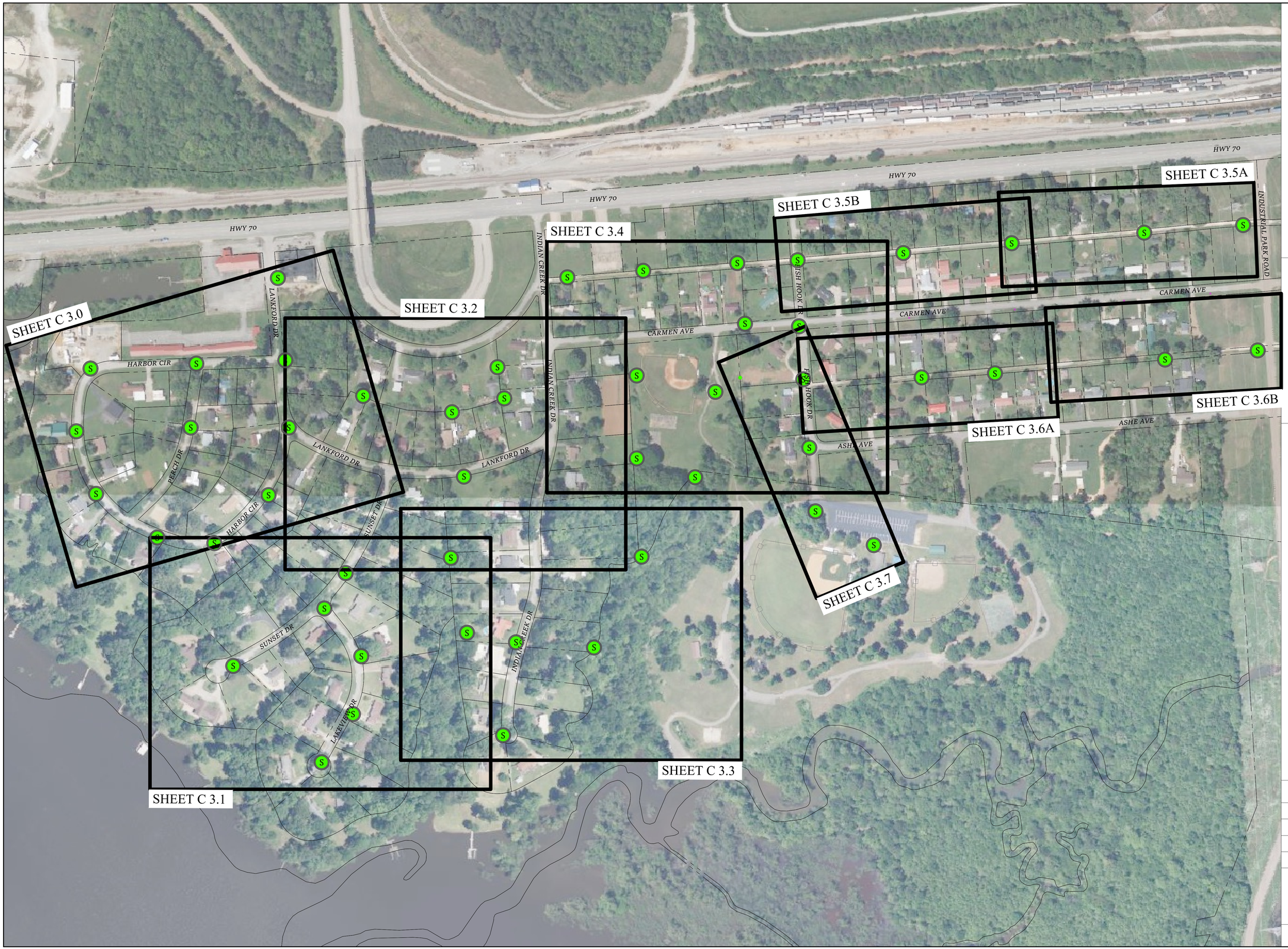
CSX RAILROAD CROSS SECTION D-D

C 2.3



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2024 ARPA NEW JOHNSONVILLE SEWER SYSTEM IMPROVEMENTS -MANHOLE LINING-

THE CITY OF NEW JOHNSONVILLE

SETH W. RYE
REGISTERED ENGINEER
COMMERCE AND TORBIA
STATE OF TENNESSEE

DATE: 4/15/2025

LEGEND

S — EXISTING MANHOLES TO BE LINED

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MANHOLE LINING
SHEET INDEX

G 0.03

MANHOLE SCHEDULE

MANHOLE	DEPTH
A1	6'-0"
A2	10'-0"
A3	11'-0"
A4	5'-6"
A5	8'-0"
A6	7'-6"
A7	13'-0"
A8	17'-0"
A9	21'-0"
A10	19'-0"
A11	8'-0"

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THE CITY OF NEW JOHNSONVILLE

SETH W. RYE
REGISTERED ENGINEER
COMMERCE AND TORRIA
STATE OF TENNESSEE

DATE: 4/15/2025

LEGEND

- (S) EXISTING MANHOLES
- --SS-- EXISTING SANITARY SEWER

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MANHOLE LINING

C 3.0

MANHOLE SCHEDULE

MANHOLE	DEPTH
B1	22'-0"
B2	14'-0"
B3	9'-0"
B4	11'-0"
B5	11'-0"
B6	10'-0"

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THE CITY OF NEW JOHNSONVILLE

SETH W. RYE REGISTERED ENGINEER COMMERCE AND TORRIA STATE OF TENNESSEE

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(S)	EXISTING MANHOLES
--SS--	EXISTING SANITARY SEWER

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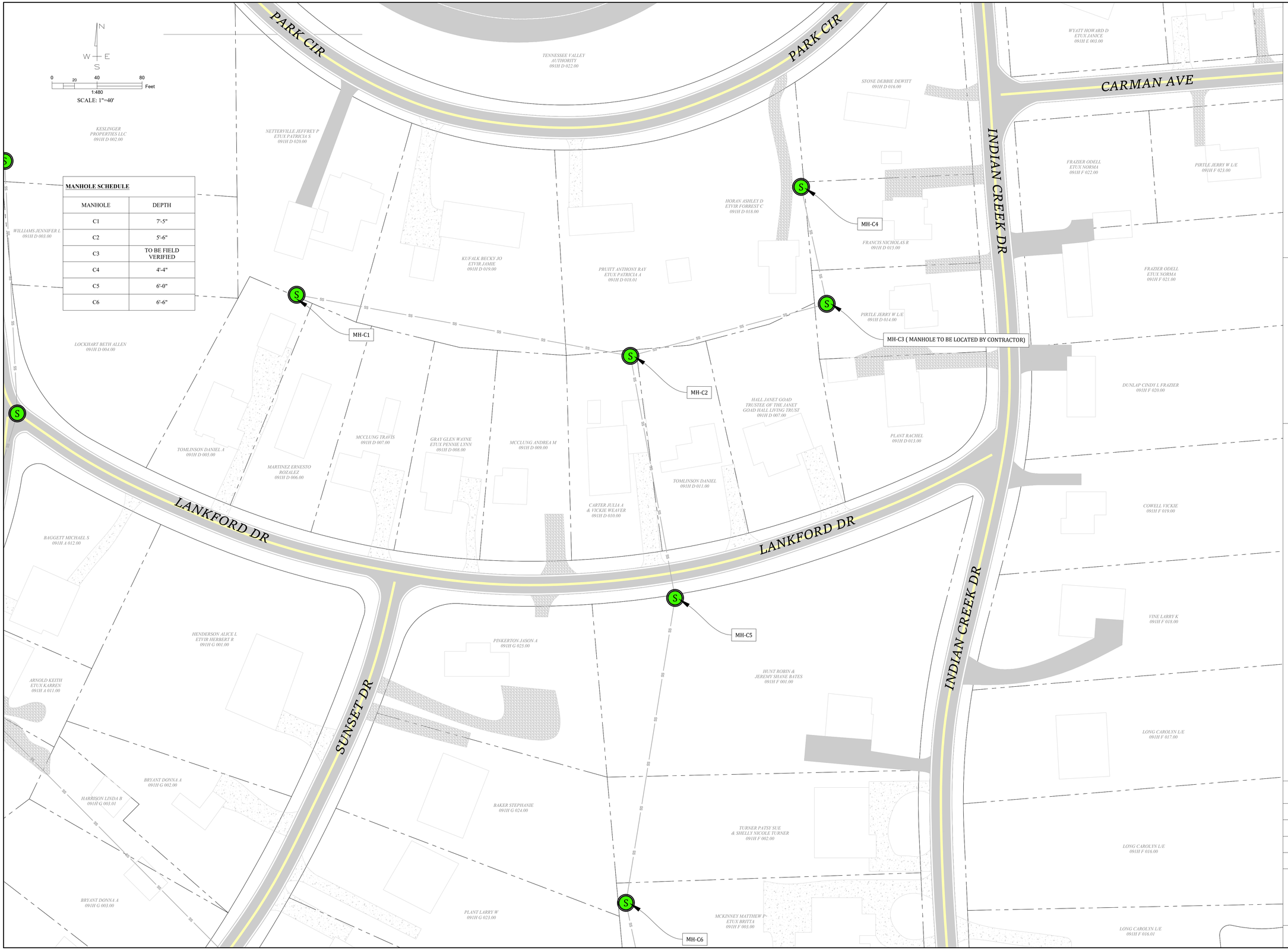
MANHOLE LINING

C 3.1



MANHOLE SCHEDULE

MANHOLE	DEPTH
C1	7'-5"
C2	5'-6"
C3	TO BE FIELD VERIFIED
C4	4'-4"
C5	6'-0"
C6	6'-6"

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THE CITY OF NEW JOHNSONVILLE

SETH W. RYE REGISTERED ENGINEER COMMERCE AND TORRIA STATE OF TENNESSEE

DATE: 4/15/2025

LEGEND

(S)	EXISTING MANHOLES
--SS--	EXISTING SANITARY SEWER

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MANHOLE LINING

C 3.2

MANHOLE SCHEDULE

MANHOLE	DEPTH
C7	7'-6"
C8	19'-0"
C9	9'-7"
C10	6'-0"
C11	7'-1"

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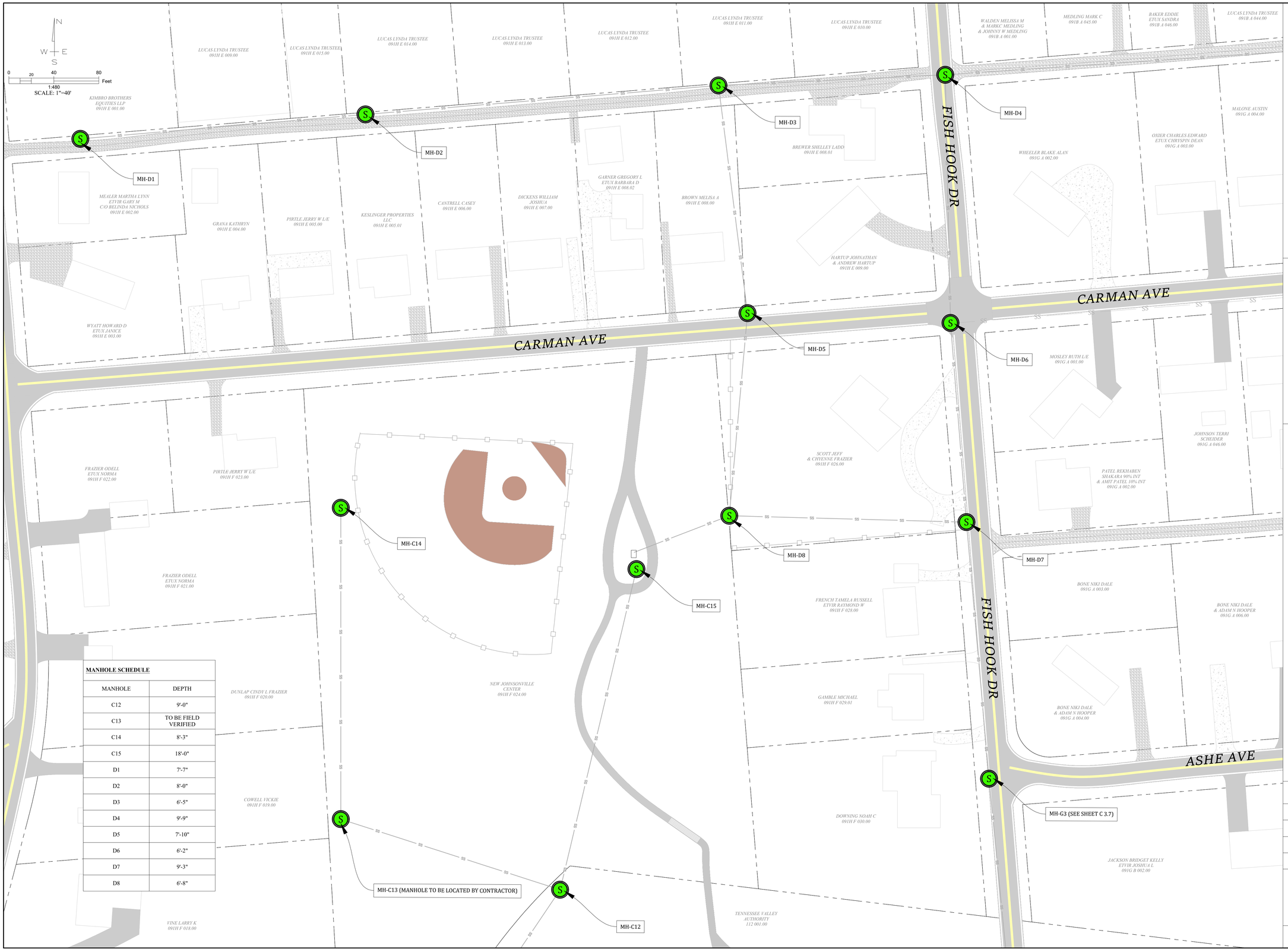
MANHOLE LINING

C 3.3



MANHOLE SCHEDULE

MANHOLE	DEPTH
C12	9'-0"
C13	TO BE FIELD VERIFIED
C14	8'-3"
C15	18'-0"
D1	7'-7"
D2	8'-0"
D3	6'-5"
D4	9'-9"
D5	7'-10"
D6	6'-2"
D7	9'-3"
D8	6'-8"

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LEGEND

S — EXISTING MANHOLES

--SS-- EXISTING SANITARY SEWER

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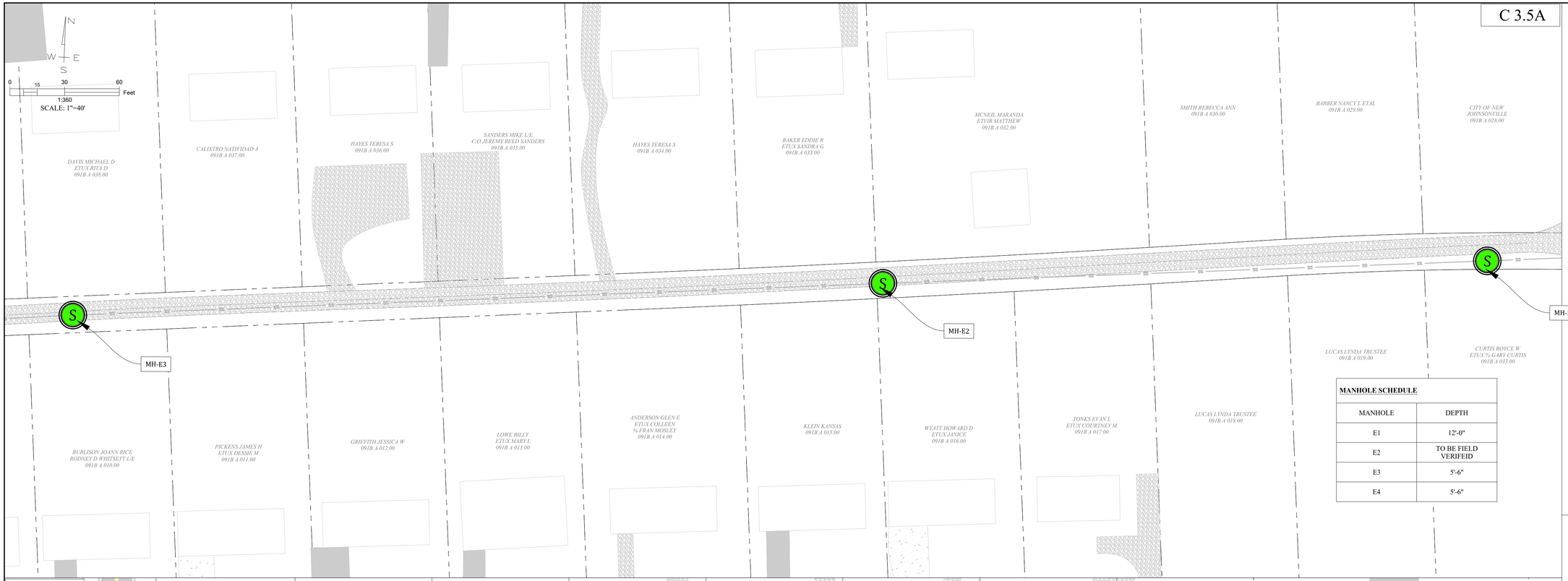
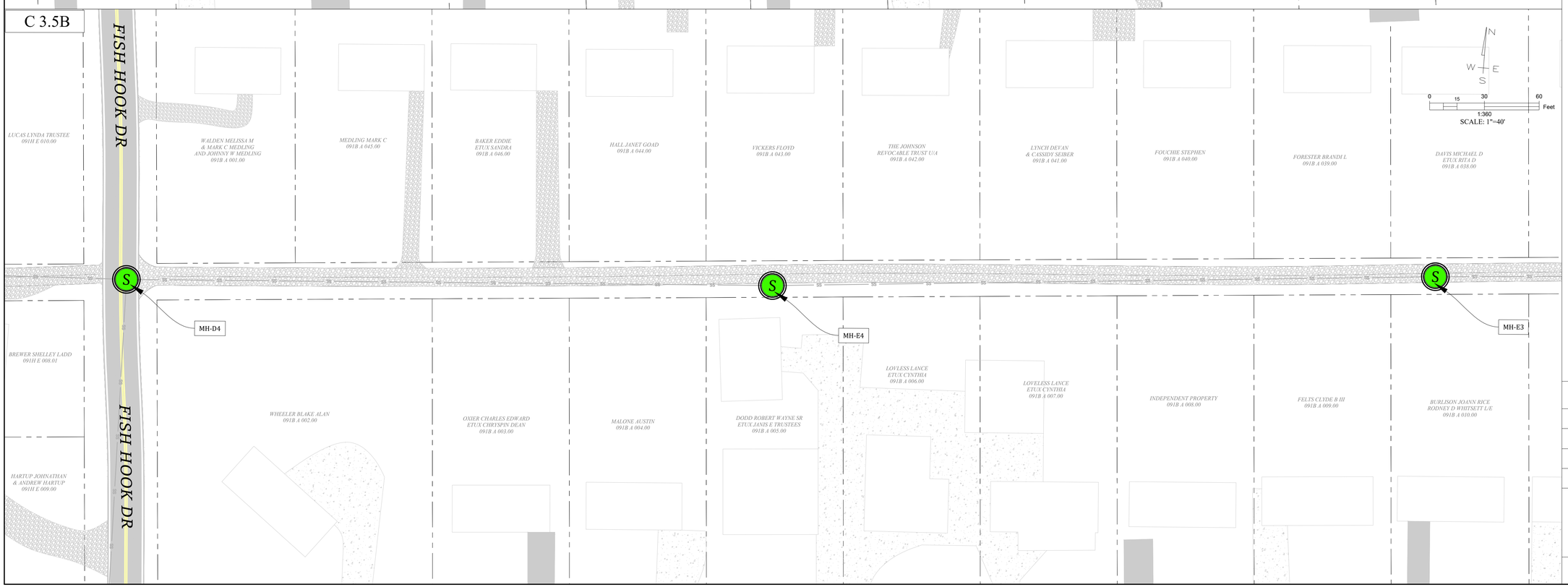
MANHOLE LINING

C 3.4



MANHOLE SCHEDULE

MANHOLE	DEPTH
E1	12'-0"
E2	TO BE FIELD VERIFEID
E3	5'-6"
E4	5'-6"



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LEGEND

(S)	EXISTING MANHOLES
--SS--	EXISTING SANITARY SEWER

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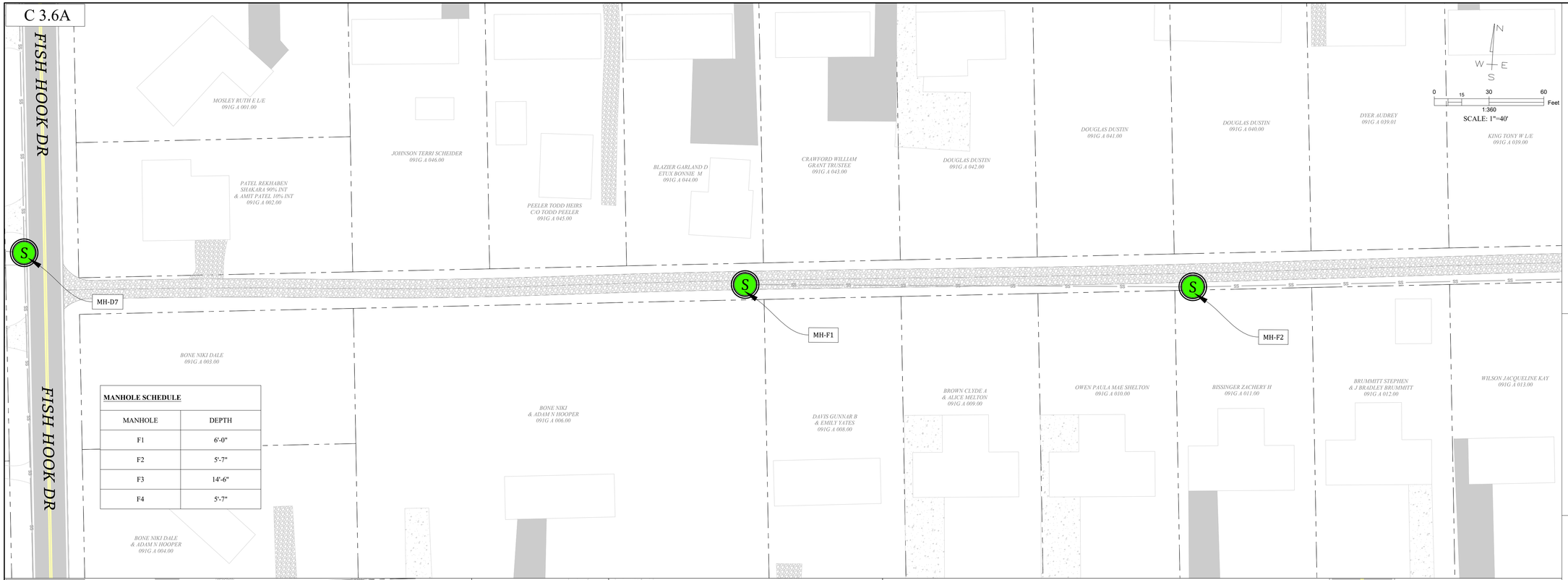
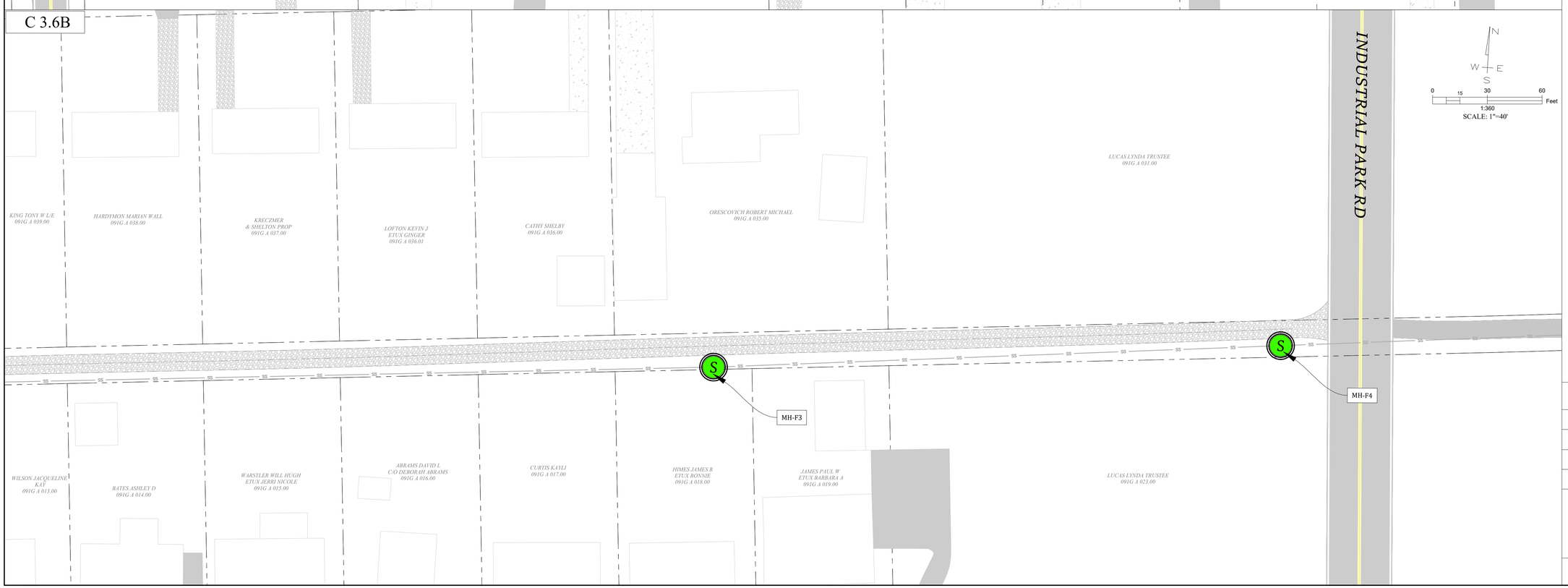
MANHOLE LINING

C 3.5



MANHOLE SCHEDULE

MANHOLE	DEPTH
F1	6'-0"
F2	5'-7"
F3	14'-6"
F4	5'-7"



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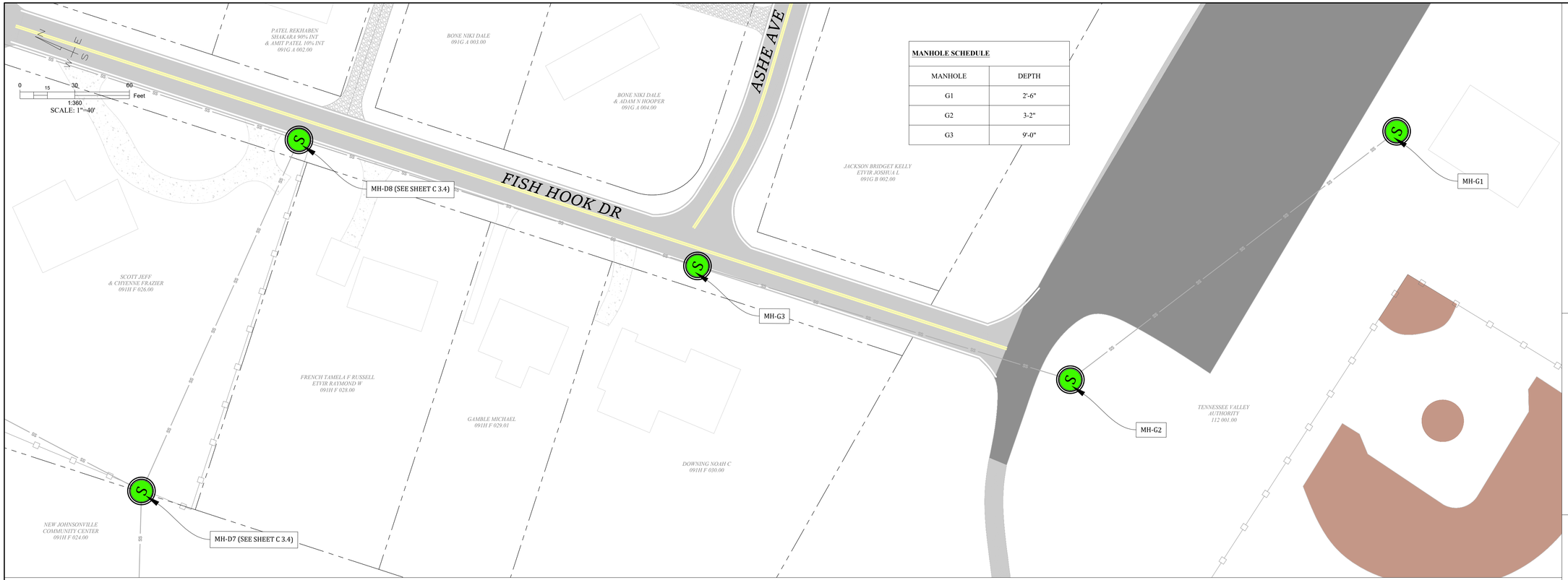
MANHOLE LINING

C 3.6



MANHOLE SCHEDULE

MANHOLE	DEPTH
G1	2'-6"
G2	3-2"
G3	9'-0"

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LEGEND

(S)	EXISTING MANHOLES
--SS--	EXISTING SANITARY SEWER

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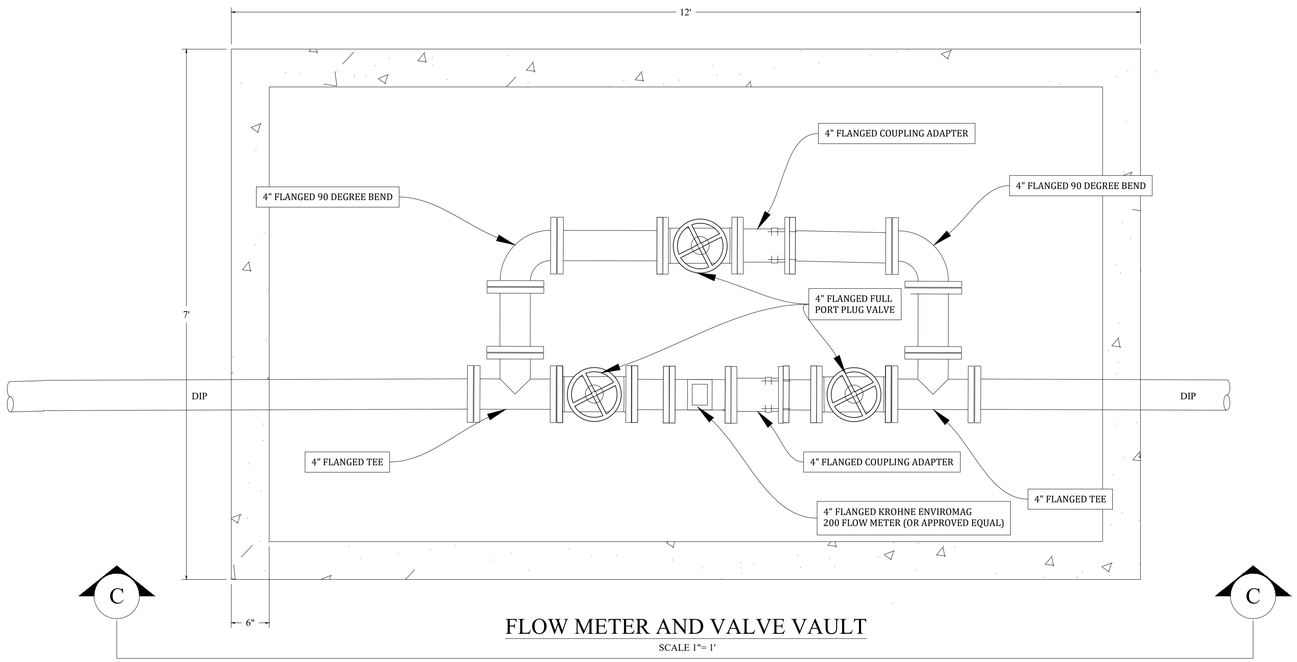
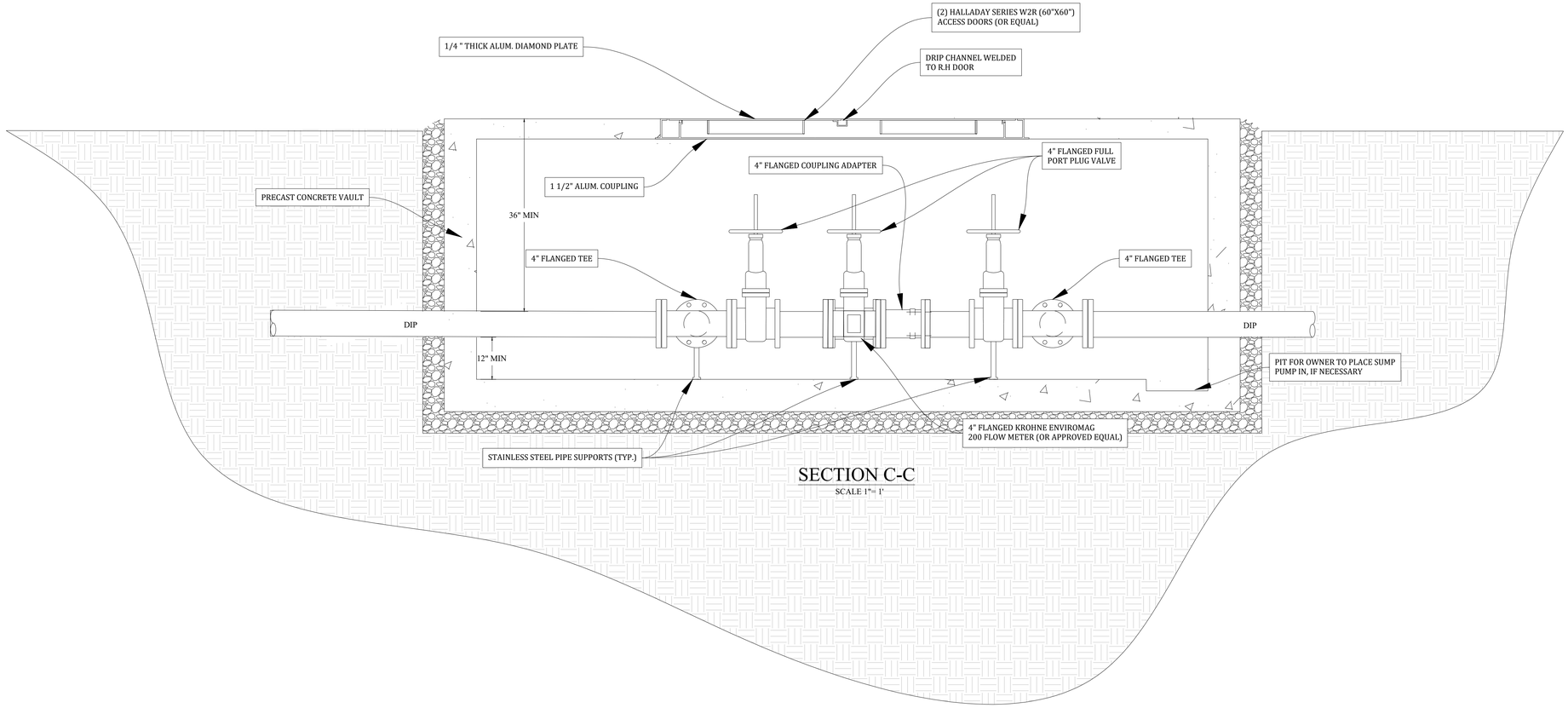
MANHOLE LINING

C 3.7



FLOW METER AND VALVE VAULT

SCALE 1"= 1'



SECTION C-C

SCALE 1"= 1'

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CITY OF NEW JOHNSONVILLE

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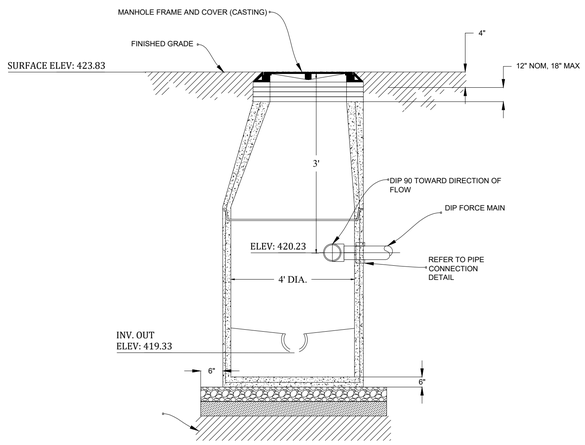
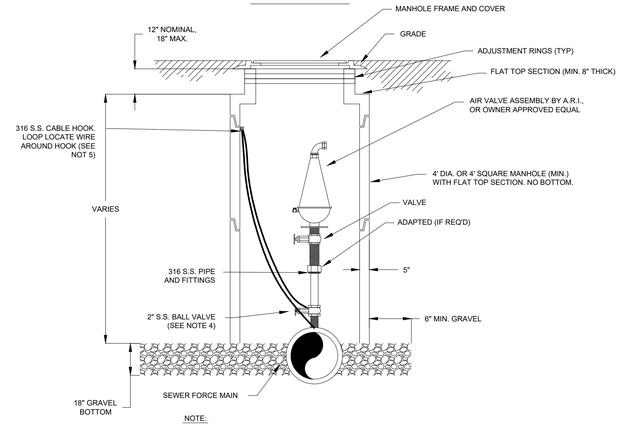
FLOW METER AND VALVE VAULT DETAIL

D 1.0

MANHOLE CONNECTION CHARLES WEBB DRIVE



TYPICAL AIR VALVE ASSEMBLY



NOTE:

1. PRECAST CONCRETE SHALL BE CAST WITH THE XYPEX ADMIXTURE. APPLICATION AND DOSAGE RATES SHALL BE PER THE MANUFACTURER'S RECOMMENDATIONS.

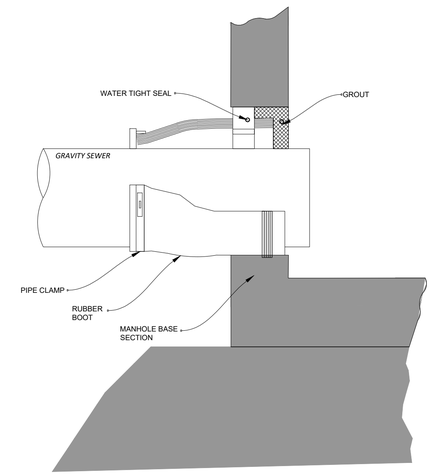
2. THE COVER SHALL HAVE NO GASKET TO ALLOW AIR TO EXIT VAULT. THE COVER WHEN FLIPPED OPEN MUST BE CLEAR OF THE AIR VALVE ASSEMBLY AT ALL TIMES OR SQUARE TOP WITH ALUMINUM DOOR SHALL BE PROVIDED.

3. FOR PIPE SIZES 3" OR SMALLER, PROVIDE A STAINLESS STEEL BALL VALVE (2" MIN.) FOR PIPE SIZES 4" OR LARGER, PROVIDE A FLANGE PLUG VALVE WITH WHEEL OPERATOR.

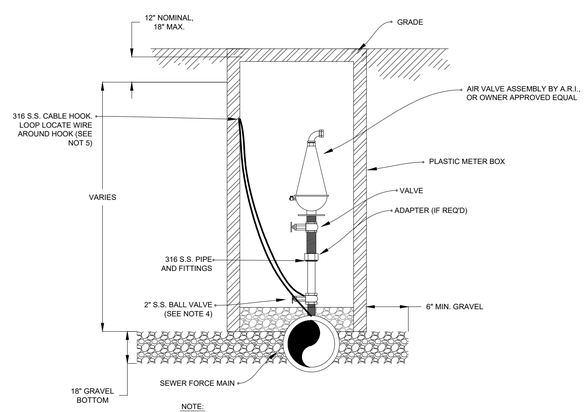
4. FOR A 2" AIR VALVE, PROVIDE A 2" STAINLESS STEEL BALL VALVE AT THE MAIN. FOR AIR VALVES LARGER, THAN 2" SIZE PROVIDE A TAPPING SLEEVE OR DUCTILE IRON TEE FITTING.

5. LOCATE WIRE SHALL HAVE ENOUGH SLACK TO REACH 4' ABOVE GRADE.

RUBBER BOOT FOR PIPE CONNECTION AT MANHOLE



AIR VALVE ASSEMBLY CSX ROW



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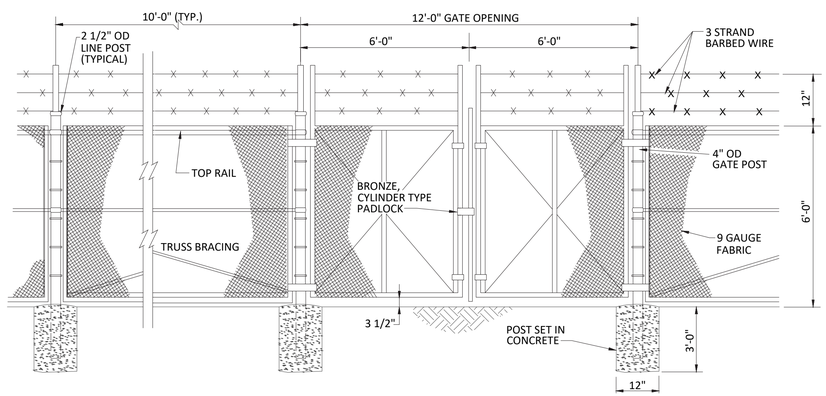
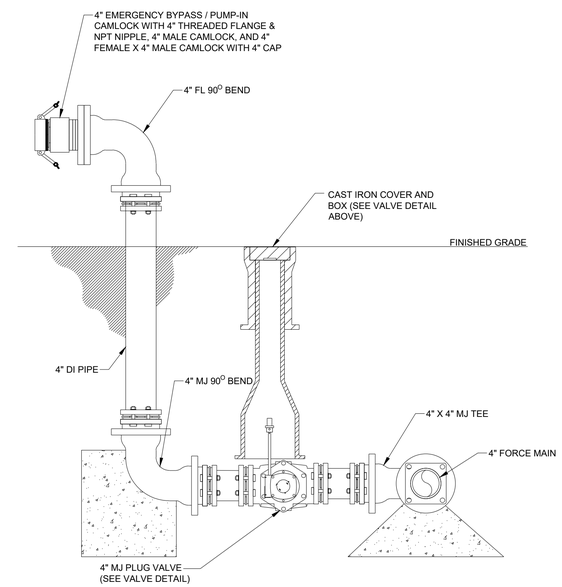
4. LOCATE WIRE SHALL HAVE ENOUGH SLACK TO REACH 4' ABOVE GRADE.

CHAIN LINK FENCE AND GATE

NOTE: VINYL FENCING SHALL BE BLACK, VINYL COATED FENCING COMPOSED OF 9 GAUGE STEEL WIRE WOVEN IN A DIAMOND MESH PATTERN AS MANUFACTURED BY DIAMOND FENCE CO. INC., AMERISTAR PERIMETER SECURITY, OR EQUAL.



SEWER BYPASS CONNECTION



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CITY OF NEW JOHNSONVILLE

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DETAILS

D 1.1

REDUCER

LENGTH (L) TO BE RESTRAINED

NOMINAL PIPE SIZE	HORIZONTAL BENDS				VERTICAL OFFSETS 45 BENDS (SEE NOTE 4)		VALVES OR DEAD ENDS
	90° BENDS	45° BENDS	22.5° BENDS	11.25° BENDS	UPPER	LOWER	
4"	21'	9'	5'	3'	17'	3'	47'
6"	30'	13'	6'	3'	23'	4'	66'
8"	38'	16'	8'	4'	30'	6'	86'
10"	45'	19'	9'	5'	36'	7'	103'
12"	53'	22'	11'	6'	43'	8'	121'
14"	61'	26'	13'	6'	50'	9'	140'
16"	66'	28'	14'	7'	55'	10'	154'
18"	73'	30'	15'	8'	60'	11'	170'
20"	79'	33'	16'	8'	66'	12'	186'
24"	79'	33'	16'	8'	77'	15'	204'
30"	93'	39'	19'	10'	97'	17'	222'
36"	106'	39'	21'	11'	107'	20'	257'
42"	117'	49'	24'	12'	120'	24'	289'
48"	144'	53'	26'	13'	133'	26'	321'

REDUCERS

SIZE	L
6X4	34'
8X6	36'
8X4	62'
10X8	35'
10X6	63'
12X10	36'
12X8	64'
16X12	66'
16X10	92'
20X18	35'
20X16	66'
20X12	117'
24X20	56'
24X18	80'
24X16	101'
30X24	78'
30X20	121'
36X30	78'
36X24	142'
42X36	75'
42X30	140'
48X42	75'
48X36	139'

TEES

(SEE NOTE 5)

RUN	BRANCH	L
4"	4"	F.O.
4"	6"	10'
	6">	F.O.
8"	8"	29'
	8">	F.O.
10"	10"	45'
	8"	13'
	8">	F.O.
12"	12"	63'
	10"	32'
	8">	F.O.
16"	16"	94'
	12"	39'
	10"	5'
	10">	F.O.
20"	20"	125'
	16"	76'
	12"	14'
	12">	F.O.
24"	24"	124'
	20"	84'
	16"	36'
	16">	F.O.
30"	30"	159'
	24"	104'
	20"	60'
	16"	5'
	16">	F.O.
36"	36"	192'
	30"	142'
	24"	83'
	20"	33'
	20">	F.O.
42"	42"	223'
	36"	178'
	30"	124'
	24"	59'
	20"	5'
	20">	F.O.
48"	48"	253'
	42"	209'
	36"	162'
	30"	104'
	24"	34'
	24">'	F.O.

NOTE:

1. THIS SCALE SHALL BE USED ON ALL WATER, AND SEWER FORCE MAIN SYSTEMS. ALL FITTINGS SHALL BE RESTRAINED TO THE LENGTHS INDICATED ON THE ABOVE SCHEDULE AT A MINIMUM.

2. ASSUMPTIONS: PVC PIPE, SAFETY FACTOR =1.5, TEST PRESSURE =150PSI, SOIL =GM OR SM, TRENCH TYPE 3, DEPTH OF COVER =30 INCHES FOR 20" AND SMALLER PIPE SIZE OR 36 INCHES FOR 24" AND LARGER PIPE SIZE.

3. BENDS AND VALVES: SHALL BE RESTRAINED ON EACH SIDE.

4. VERTICAL OFFSETS: ARE APPROX. 3 FEET COVER ON TOP AND APPROX. 8 FEET COVER ON BOTTOM. PER THE DETAILS, Lu IS RESTRAINED LENGTH FOR UPPER (TOP) LEVEL. Ll IS THE RESTRAINED LENGTH FOR THE LOWER (DEEPER) LEVEL. ASSUME 45 DEGREE BENDS.

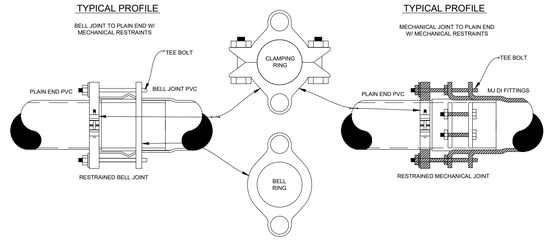
5. TEES: TOTAL LENGTH BETWEEN FIRST JOINTS OR RESTRAINED LENGTH ON EITHER SIDE OF TEE (RUN) SHALL BE A TOTAL DISTANCE OF 30 FEET (MIN). SEE SCHEDULE FOR RESTRAINT LENGTH ON TEE "BRANCH" LINE.

6. HDPE TO PVC TRANSITIONS: THE PVC PIPE SIDE SHALL BE RESTRAINED 35 FT. (MIN).

7. THE INSTALLATION OF BELL HARNESS RESTRAINTS AT PVC JOINTS (DR-18 AND DR-25 PIPE) SHALL BE COMPLETED PER THE MANUFACTURER'S RECOMMENDATION, WHICH INCLUDES NOT OVER TIGHTENING THE PARALLEL RODS/NUTS. THESE NUTS SHOULD ONLY BE SNUG TIGHT. THE HOMEMARKS ON THE PIPE SHOULD ALWAYS BE VISIBLE AFTER THE RESTRAINT IS INSTALLED. OVERHOMMING THE JOINT MAY CAUSE A FAILURE AT THE BELL RESULTING IN A SERVICE OUTAGE.

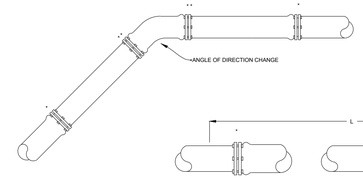
MECHANICAL RESTRAINTS

TYPICAL PROFILE

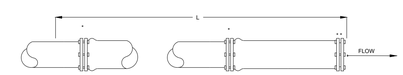


TYPICAL PROFILE

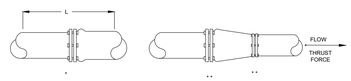
HORIZONTAL BEND



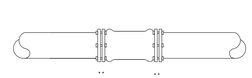
DEAD END

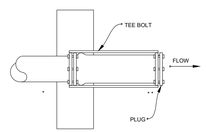


REDUCER



MECHANICAL JOINT SLEEVES





DEAD-END THRUST COLLAR ANCHOR

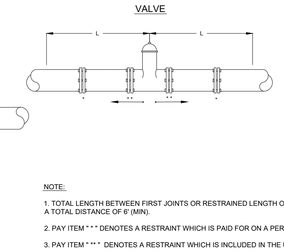
3" - 8"	DIAMETER OF MAIN = 2 TIE RODS REQUIRED PER JOINT (3/4" ROD)
10" - 12"	DIAMETER OF MAIN = 4 TIE RODS REQUIRED PER JOINT (3/4" ROD)
14" - 16"	DIAMETER OF MAIN = 6 TIE RODS REQUIRED PER JOINT (3/4" ROD)
18" - 20"	DIAMETER OF MAIN = 8 TIE RODS REQUIRED PER JOINT (3/4" ROD)
24"	DIAMETER OF MAIN = 12 TIE RODS REQUIRED PER JOINT (3/4" ROD)
30" - 36"	DIAMETER OF MAIN = 14 TIE RODS REQUIRED PER JOINT (1" ROD)
42" - 48"	DIAMETER OF MAIN = 16 TIE RODS REQUIRED PER JOINT (1-1/4" ROD)
54"	DIAMETER OF MAIN = 18 TIE RODS REQUIRED PER JOINT (1-1/4" ROD)

NOTE:

1. PAY ITEM * * * DENOTES A RESTRAINT WHICH IS PAID FOR ON A PER EACH BASIS.

2. PAY ITEM * * * DENOTES A RESTRAINT WHICH IS INCLUDED IN THE UNIT PRICE BID FOR FITTINGS OR VALVE.

VALVE



TEE

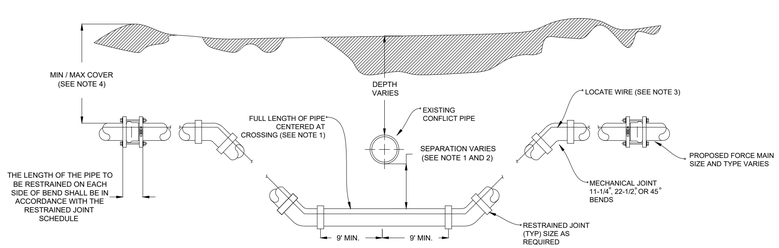
NOTE:

1. TOTAL LENGTH BETWEEN FIRST JOINTS OR RESTRAINED LENGTH ON EITHER SIDE OF TEE (RUN) SHALL BE A TOTAL DISTANCE OF 6' (MIN).

2. PAY ITEM * * * DENOTES A RESTRAINT WHICH IS PAID FOR ON A PER EACH BASIS.

3. PAY ITEM * * * DENOTES A RESTRAINT WHICH IS INCLUDED IN THE UNIT PRICE BID FOR FITTINGS OR VALVE.

ADJUSTMENT UNDER EXISTING UTILITIES MECHANICAL RESTRAINTS



NOTE:

1. IF EXISTING CONFLICT PIPE IS A WATER MAIN, 18-INCHES OF SEPARATION IS REQUIRED. A FULL LENGTH OF PIPE SHALL BE CENTERED OVER EXISTING UTILITY MAIN TO PROVIDE MAXIMUM JOINT SPACING FOR ALL CROSSINGS.

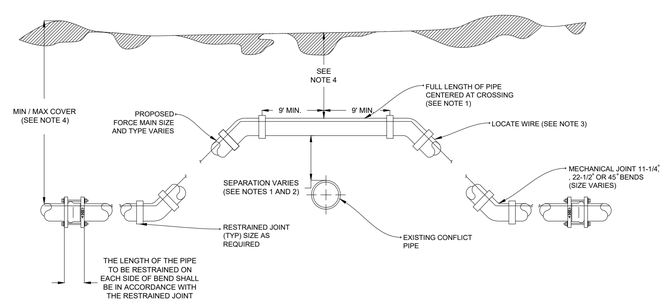
2. IF EXISTING CONFLICT IS SEWER MAIN A WATERTIGHT CASING SHALL BE REQUIRED.

3. LOCATOR WIRE REQUIRED

4. THE COVER FOR PIPING LESS THAN 24" SIZE SHALL BE 30" (MIN) IN UNPAVED AREAS, 36" (MIN) IN PAVED AREAS, AND A MAXIMUM OF 60", UNLESS APPROVED BY OWNER. THE COVER FOR PIPING 24" SIZE AND LARGER SHALL BE 36" (MIN) IN PAVED AND UNPAVED AREAS AND A MAXIMUM COVER OF 84", UNLESS APPROVED BY OWNER.

5. THE SOLIDS BETWEEN THE MAIN AND THE CONFLICT PIPE SHALL BE COMPACTED TO 98% OF THE MAXIMUM DENSITY AS DETERMINED BY THE LABORATORY MODIFIED PROCTOR TEST ASTM D 1557.

ADJUSTMENT OVER EXISTING UTILITIES MECHANICAL RESTRAINTS



NOTE:

1. IF EXISTING CONFLICT PIPE IS A WATER MAIN, 18-INCHES OF SEPARATION. A FULL LENGTH OF PIPE SHALL BE CENTERED OVER EXISTING UTILITY MAIN TO PROVIDE MAXIMUM JOINT SPACING FOR ALL CROSSINGS.

2. IF EXISTING CONFLICT PIPE IS WATER MAIN AND PROPOSED PIPING IS SEWER MAIN A WATERTIGHT CASING SHALL BE REQUIRED.

3. LOCATOR WIRE REQUIRED.

4. THE COVER OF LESS THAN 24" SIZE SHALL BE 30" (MIN) IN PAVED AREAS, 36" MIN. IN PAVED AREAS AND A MAXIMUM COVER OF 60", UNLESS APPROVED BY OWNER. THE COVER FOR PIPING 24" SIZE AND LARGER SHALL BE 36" (MIN) IN PAVED AND UNPAVED AREAS AND A MAXIMUM COVER OF 84", UNLESS APPROVED BY OWNER.

5. THE SOLIDS BETWEEN THE MAIN AND THE CONFLICT PIPE SHALL BE COMPACTED 98% OF THE MAXIMUM DENSITY AS DETERMINED BY THE LABORATORY MODIFY PROCTOR TEST ASTM D 1557.

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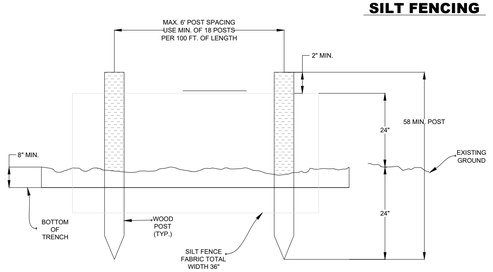
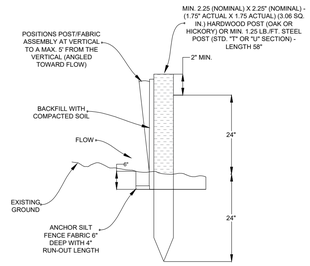
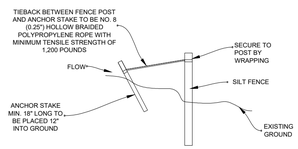
SILT FENCING



ELEVATION VIEW

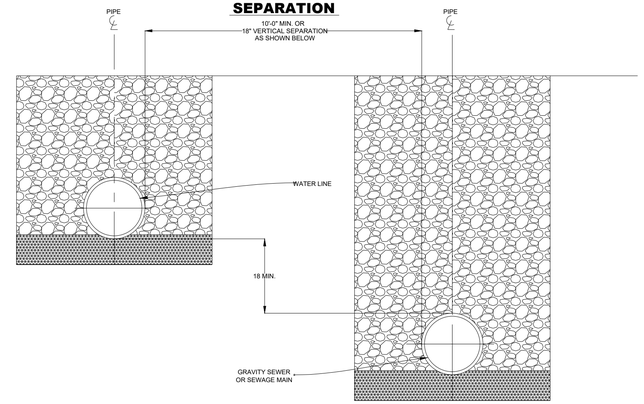


SECTION VIEW

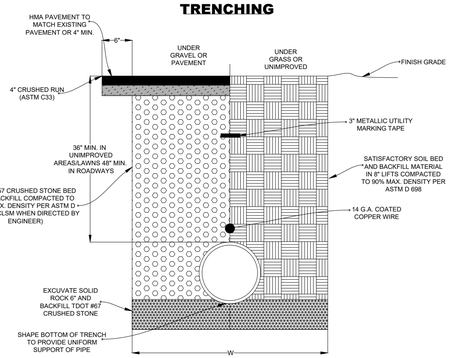


SILT TIEBACK
FOR STEEL POSTS OR WOOD POSTS

UTILITY SEPARATION



TRENCHING

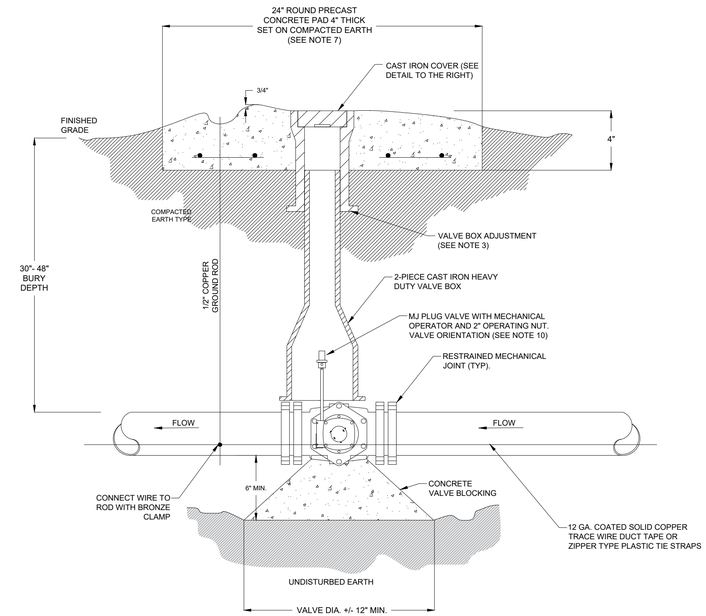


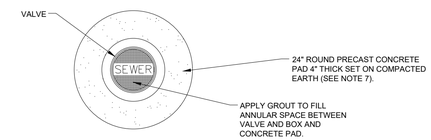
PIPE NOMINAL DIAMETER	TRENCH WIDTH (W)	
	MIN.	MAX.
4"	4"	48"
6"	6"	48"
8"	8"	48"
10"	10"	48"
12"	12"	48"
16"	16"	48"
18"	18"	54"
24"	24"	60"
30"	30"	74"
36"	36"	80"
42"	42"	86"
48"	48"	92"
54"	54"	98"
60"	60"	104"
72"	72"	116"

W= TRENCH WIDTH AT BOTTOM OF PIPE. TRENCH SIDE SLOPES SHALL BE IN ACCORDANCE WITH OSHA REQUIREMENTS

TRENCH NOTES:
COMPACTED BACKFILL SHALL BE LACED TO ONE FOOT MIN. DEPTH OF COVER. THE INITIAL BACKFILL SHALL BE A MATERIAL FREE FROM ROCKS GREATER THAN 1/2" DIA., SOIL CLODS, OR FROZEN MATERIAL. WHEN AUTOMATIC TAMPERS ARE USED, CARE SHALL BE EXERCISED TO AVOID DAMAGE TO THE PIPE.

ALL WATER LINE TRENCHES AND BORE PIT AREAS SHALL BE MECHANICALLY COMPACTED.





NOTE:

1. FOR UNPAVED LOCATIONS, A PRECAST CONCRETE VALVE PAD SHALL BE PROVIDED AND INSTALLED FLUSH WITH GRADE. CONCRETE PAD IS NOT REQUIRED FOR VALVES LOCATED IN THE ROADWAY, UNLESS SHOWN OR NOTED OTHERWISE.

2. LOCATING WIRE IS REQUIRED ON ALL PRESSURE PIPING.

3. IN PAVED AREAS INSTALL VALVE AT A DEPTH TO ALLOW 12" MIN. DISTANCE BETWEEN THE VALVE COVER PLATE AND THE TOP OF THE VALVE OPERATING NUT. OUTSIDE OF PAVED AREAS (GRASS), INSTALL VALVE AT A DEPTH TO ALLOW A 6" MINIMUM DISTANCE BETWEEN THE VALVE COVER AND THE TOP OF A VALVE OPERATING NUT. OPERATING NUT/STEM EXTENSION SHALL BE PROVIDED (WHERE APPLICABLE) SO THAT THE OPERATING NUT WILL BE NO MORE THAN 30 INCHES BELOW FINISHED GRADE.

4. FOR NEW CONSTRUCTION THE VALVE BOX SHALL BE ADJUSTED TO MIDRANGE TO ALLOW FOR THE FUTURE BOX ADJUSTMENTS. ROUTE LOCATE WIRES THRU A "V" CUT IN THE TOP OF THE 6" PVC RISER PIPE FOR LOCATE WIRE ACCESS INTO VALVE BOX. THE LOCATE WIRES WITH 24" LONG PIG TAILS AT THE TOP SHALL BE CONNECTED TOGETHER WITH A WIRE NUT.

5. BRASS IDENTIFICATION TAG INDICATING "SEWER", VALVE SIZE, DIRECTION AND TURNS TO THE OPEN VALVE TYPE. PROVIDE A 1/4" HOLE IN BRASS TAG AND ATTACH TAG (TWIST WIRE AROUND TAG) TO THE END OF THE LOCATE WIRE.

6. IN LIEU OR PRECAST CONCRETE PAD, A 6" THICK X 24" (ROUND OR SQUARE) POURED CONCRETE PAD 2-#4 REBAR AROUND PERIMETER, MAY BE USED.

7. GRAVEL SHALL BE PROVIDED UNDER ALL VALVES 20" AND LARGER, THE MINIMUM VERTICAL LIMIT OF GRAVEL IS 12" UNDER THE VALVE UP TO 1/3 THE OVERALL HEIGHT OF THE VALVE.

8. FOR VALVES 12" AND SMALLER, PROVIDE A WHITE OR BLACK PLASTIC DEBRIS SHIELD WHICH INSTALLS BELOW THE OPERATING NUT. THE SHIELD SHALL CENTER THE RISER PIPE BOX OVER THE OPERATING NUT AND MINIMIZE INFILTRATION. SHIELD SHALL BE BY AFC, BOXLOK, OR APPROVED EQUAL.

9. ALL VALVES SHALL BE INSTALLED WITH AN ELECTRIC LOCATE MARKER. MARKER SHALL BE 4" DIA. COLOR CODED BALL MARKER (3M-1404XR FOR SEWER).

10. INSTALL ALL PLUG VALVES WITH THE FLOW AGAINST THE FACE OF THE PLUG IN THE CLOSED POSITION AND THE VALVE ON ITS SIDE (90 deg.) WITH A MECHANICAL OPERATOR, THE PLUG SHOULD ROTATE UP TOWARDS THE TOP OF THE PIPELINE AND REST AT THE TOP OF THE PIPE WHEN IN THE OPEN POSITION.

SEWER VALVE

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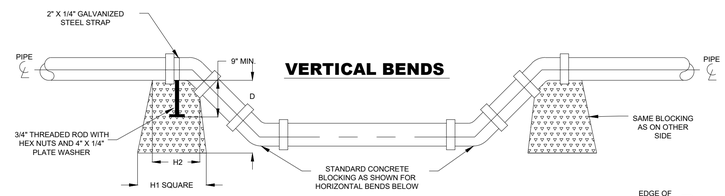
TABLE OF DIMENSIONS FOR CONCRETE THRUST BLOCKS

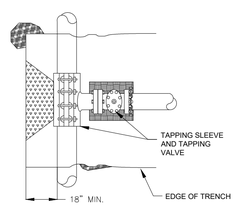
PIPE SIZE	TEES, CROSSES, PLUGS					90° BENDS					45° BENDS					22-1/2° BENDS					11-1/4° BENDS					PIPE SIZE
	H1	H2	V	D	C.F.	H1	H2	V	D	C.F.	H1	H2	V	D	C.F.	H1	H2	V	D	C.F.	H1	H2	V	D	C.F.	
2",2-1/4"	18"	10"	12"	18"	1.90	18"	10"	12"	18"	1.90	18"	6"	12"	18"	1.50	18"	6"	12"	18"	1.50	18"	6"	12"	18"	1.50	2",2-1/4"
3",4"	24"	12"	12"	18"	2.25	24"	12"	12"	18"	2.25	18"	8"	12"	18"	1.60	18"	8"	12"	18"	1.60	18"	8"	12"	18"	1.60	3",4"
6"	24"	16"	18"	18"	3.50	30"	16"	18"	18"	4.05	24"	10"	16"	18"	3.20	24"	10"	16"	18"	3.20	24"	10"	16"	18"	3.20	6"
8"	36"	18"	18"	18"	5.05	39"	18"	24"	18"	7.30	30"	11"	18"	18"	3.95	30"	11"	18"	18"	3.95	24"	11"	16"	18"	3.40	8"
10"	48"	24"	18"	24"	7.15	54"	32"	24"	24"	10.25	24"	18"	21"	18"	4.60	24"	18"	21"	18"	4.60	24"	18"	21"	18"	4.60	10"
12"	54"	30"	24"	24"	13.40	54"	32"	36"	24"	18.15	42"	18"	24"	24"	9.60	24"	18"	24"	24"	6.60	24"	18"	21"	24"	6.10	12"
14"	60"	32"	30"	24"	17.90	60"	40"	42"	24"	25.00	44"	24"	30"	24"	13.20	30"	24"	24"	24"	9.20	27"	21"	24"	24"	7.90	14"
16"	66"	34"	36"	24"	22.50	69"	48"	48"	24"	29.00	48"	30"	36"	24"	17.00	36"	30"	27"	24"	11.80	27"	24"	27"	24"	9.10	16"
18"	66"	36"	40"	24"	27.50	69"	48"	48"	24"	33.00	48"	30"	36"	24"	17.00	36"	30"	29"	24"	13.00	27"	30"	29"	24"	11.00	18"

NOTES:
1. DO NOT COVER BELLS OR FLANGES WITH CONCRETE.
2. WRAP ALL FITTINGS WITH POLYETHYLENE PLASTIC SHEETING.
3. BACK ALL TEES ACCORDING TO SIZE OF BRANCH.
4. BACKING FUTURE LINE EXTENSIONS SHALL BE THAT LATER REMOVAL IS POSSIBLE
5. ALL BENDS WHERE FITTINGS ARE USED, BOTH HORIZONTAL AND VERTICAL SHALL BE BACKED.
6. REACTION BACKING TABLE IS BASED ON UTILITY MAIN PRESSURE OF 2,500 LB. / SQ. FT. ADDITIONAL BACKING MAY BE REQUIRED IN SOME AREAS AS DIRECTED BY ENGINEERS.
7. ALL CONCRETE SHALL BE 2500 P.S.I. MINIMUM.
8. 18" AND LARGER REQUIRES ANTI-THRUST DESIGN.
9. ALL 90 DEGREES BENDS ON PVC SERVICE LINES (INCLUDING 1"-2" LINES) SHALL BE BACKED WITH CONCRETE.

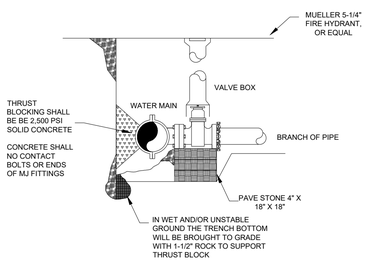
VERTICAL BENDS



TAPPING SLEEVE AND VALVE

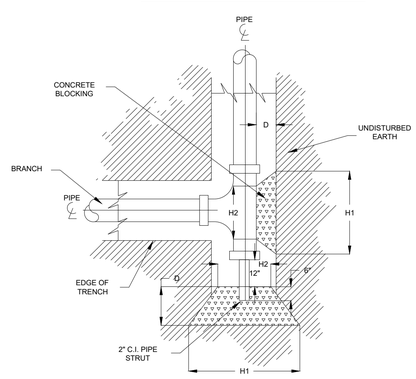


ABOVE VIEW



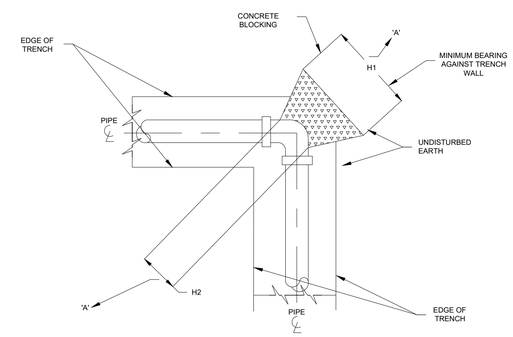
PROFILE

TEES, CROSSES,PLUGS

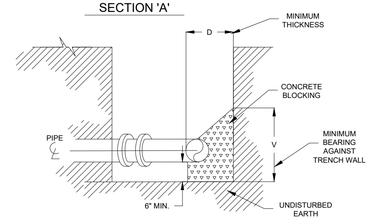


NOTE:
DIMENSIONS ARE CONTROLLED BY DIAMETER OF BRANCH MAIN.

HORIZONTAL BENDS



SECTION 'A'



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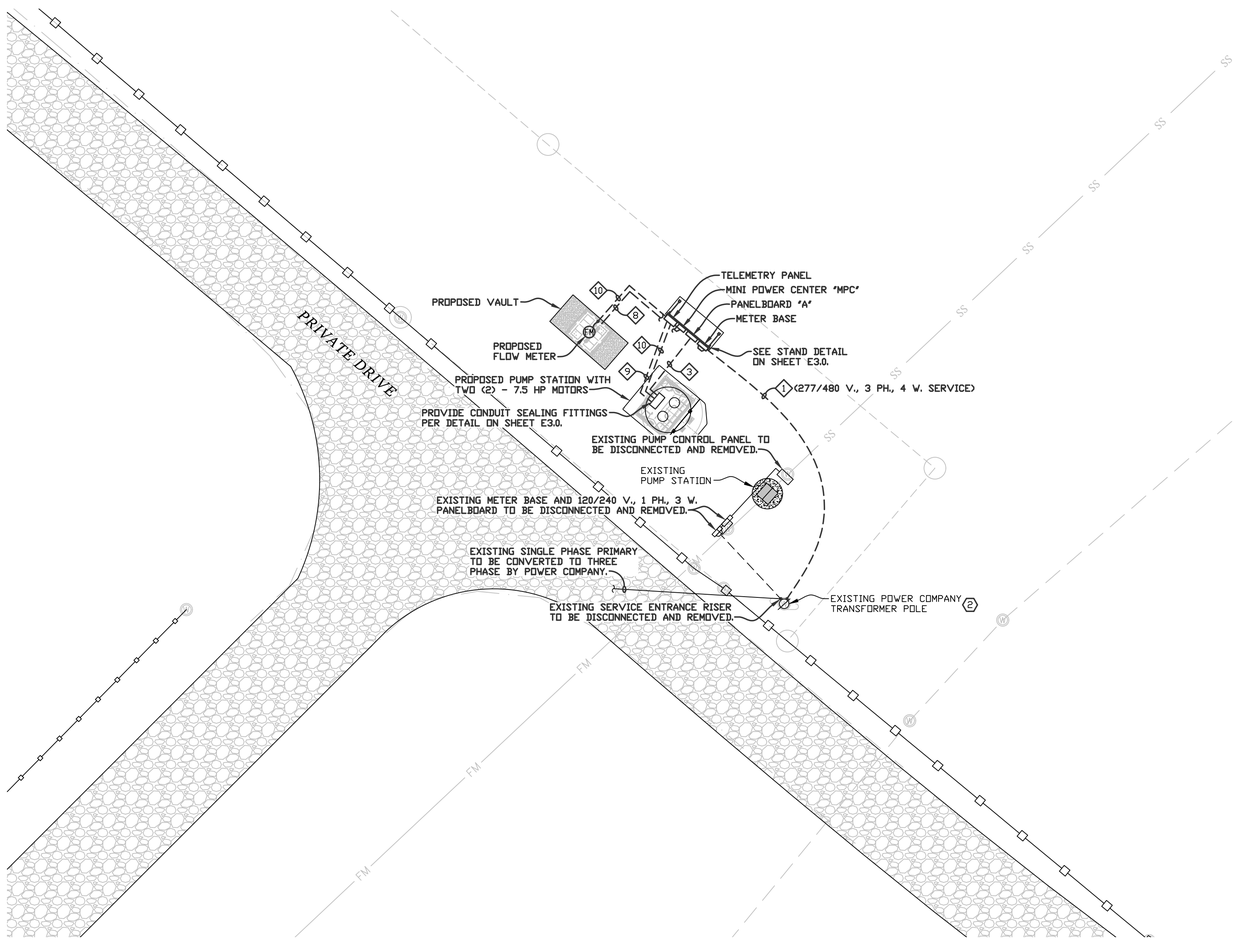

SITE ELECTRICAL PLAN

Scale: 1" = 10'

N
W E
S

0 5 10 20 Feet
1:10

NOTES:

1. THE EXACT AIC RATING OF ALL PANELBOARDS SHALL BE COORDINATED WITH THE POWER COMPANY'S AVAILABLE FAULT CURRENT AND ADJUSTED ACCORDINGLY.
2. THE CONTRACTOR IS TO CONFIRM ALL SERVICE ENTRANCE INSTALLATIONS WITH THE LOCAL POWER COMPANY AND COMPLY WITH ALL NECESSARY REQUIREMENTS.
3. ALL ELECTRICAL INSTALLATIONS SHALL BE PERFORMED IN ACCORDANCE WITH THE 2017 EDITION OF THE NATIONAL ELECTRICAL CODE AND THE 2012 INTERNATIONAL BUILDING CODE.
4. ALL ELECTRICAL INSTALLATIONS SHALL CONFORM TO SEISMIC INSTALLATION STANDARDS PER 2012 EDITION OF INTERNATIONAL BUILDING CODE AND ALL STATE AND LOCAL CODES.
5. FURNISH AND INSTALL AN INTERSYSTEM BONDING TERMINATION ADJACENT TO THE SERVICE ENTRANCE EQUIPMENT PER NEC ARTICLE 250.94.
6. ALL FASTENERS USED TO SECURE ELECTRICAL DEVICES SHALL BE 316 STAINLESS.
7. PROVIDE SEALING FITTINGS AS REQUIRED BY THE NATIONAL ELECTRICAL CODE FOR CLASS I, DIVISION 2 INSTALLATIONS.
8. ALL WIRING METHODS AND ELECTRICAL INSTALLATIONS SHALL CONFORM TO NFPA 820 - STANDARD FOR FIRE PROTECTION IN WASTEWATER TREATMENT AND COLLECTION FACILITIES.

PHILLIPS ENGINEERING, INC.
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Email: pei@phillipsengr.com
P.O. Box 585 - 617 S. First Street - Union City, TN 38261

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SITE ELECTRICAL PLAN

E 1.0

TYPE: _____
SERVICE: 277/480 V., 3 PH., 4 W.
POLES: 3
LOCATION: EQUIP. STAND
☒ SURFACE ☐ FLUSH

PANEL "A"

(SERVICE ENTRANCE RATED)

* UNLESS OTHERWISE NOTED, SIZE CONDUITS PER NEC. BASE ON TYPE THHN.

BUS AMPACITY: 150 A.
MAINS: 150 A.
NEUTRAL: FULL
SHORT CIRCUIT RATING: 22,000 (1)
☐ NEMA 1 ☒ NEMA 3R

CKT. KVA ϕA	CKT. KVA ϕB	CKT. KVA ϕC	CB TRIP	* CONDUIT	WIRE	LOAD NAME			LOAD NAME	WIRE	* CONDUIT	CB TRIP	CKT. KVA ϕA	CKT. KVA ϕB	CKT. KVA ϕC
5.2	—	—	40/3	1"	#8	PUMPING STATION CONTROL PANEL	1	2	MINI POWER CENTER "MPC"	#10	3/4	20/2	0.2	—	—
—	5.2	—			#8	PUMPING STATION CONTROL PANEL	3	4	MINI POWER CENTER "MPC"	#10			—	0.5	—
—	—	5.2			#8	PUMPING STATION CONTROL PANEL	5	6	SPARE			20/2	—	—	
	—	—	40/3			SPARE	7	8	SPARE					—	—
—		—				SPARE	9	10	SPACE				—		—
—	—					SPARE	11	12	SPACE				—	—	
	—	—				SPACE	13	14	SPACE					—	—
—		—				SPACE	15	16	SPACE				—		—
—	—					SPACE	17	18	SPACE				—	—	
	—	—				SPACE	19	20	SURGE PROTECTION DEVICE			60/3		—	—
—		—				SPACE	21	22	SURGE PROTECTION DEVICE				—		—
—	—					SPACE	23	24	SURGE PROTECTION DEVICE				—	—	
5.2	5.2	5.2	TOTAL CONNECTED KVA: 16.3										0.2	0.5	0.0

NOTE: (1) PROVIDE CIRCUIT BREAKER LOCKING MECHANISM ON CKT. NOS.
(2) PROVIDE SWITCHING DUTY CIRCUIT BREAKERS AS REQUIRED.
(3) PROVIDE H.I.D. RATED CIRCUIT BREAKERS AS REQUIRED.
(4) PROVIDE GFCI PROTECTED CIRCUIT BREAKERS AS REQUIRED.
(5) PROVIDE HACR RATED CIRCUIT BREAKERS AS REQUIRED.
(6) PROVIDE SHUNT TRIP CIRCUIT BREAKERS AS REQUIRED.

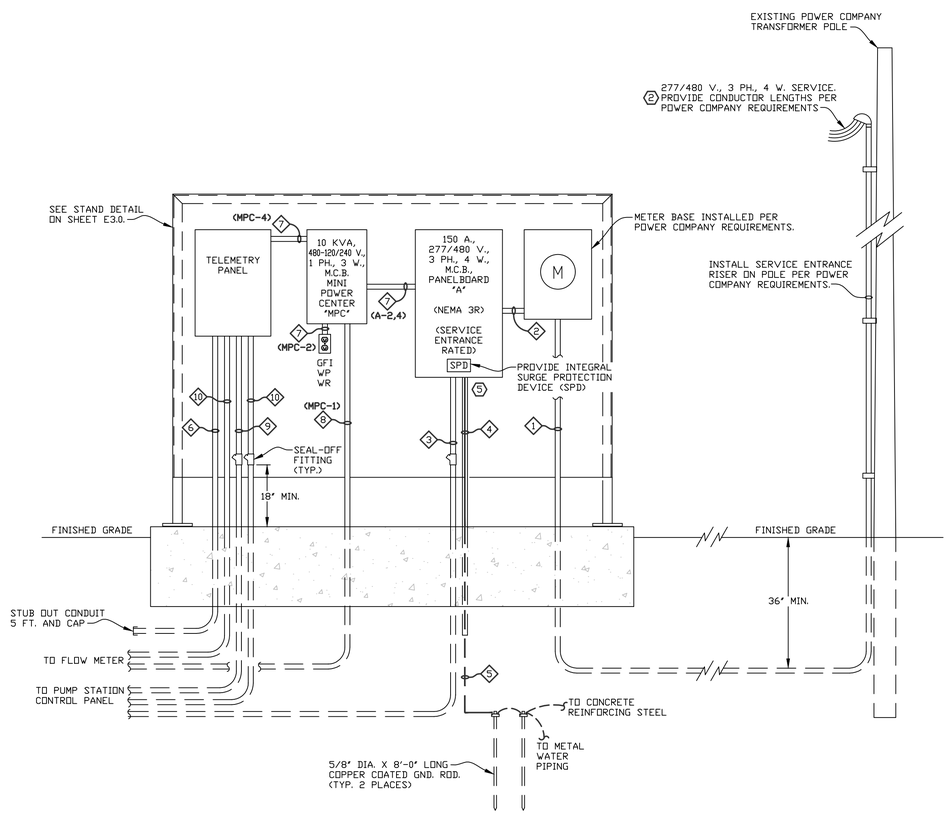
TYPE: _____
SERVICE: 120/240 V., 1 PH., 3 W.
POLES: 2
LOCATION: MINI POWER CENTER
☒ SURFACE ☐ FLUSH

PANEL "MPC"

* UNLESS OTHERWISE NOTED, SIZE CONDUITS PER NEC. BASE ON TYPE THHN.

BUS AMPACITY: 100 A.
MAINS: 40 A.
NEUTRAL: FULL
SHORT CIRCUIT RATING: 10,000
☐ NEMA 1 ☒ NEMA 3R

CKT. KVA ϕA	CKT. KVA ϕB	CB TRIP	* CONDUIT	WIRE	LOAD NAME			LOAD NAME	WIRE	* CONDUIT	CB TRIP	CKT. KVA ϕA	CKT. KVA ϕB
0.2	—	20/1	1"	#10	FLOW METER	1	2	STAND RECPT.	#10	3/4	20/1	0.2	—
—		20/1			SPARE	3	4	TELEMETRY PANEL	#10	3/4	20/1	—	0.5
	—	20/1			SPARE	5	6	SPARE			20/1		—
—					SPACE	7	8	SPARE			20/1	—	
					SPACE	9	10	SPACE					
					SPACE	11	12	SPACE					
0.2	0.0	TOTAL CONNECTED KVA: 0.9										0.2	0.5



RISER DIAGRAM

Scale: NONE

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8. ALL WIRING METHODS AND ELECTRICAL INSTALLATIONS SHALL CONFORM TO NFPA 820 - STANDARD FOR FIRE PROTECTION IN WASTEWATER TREATMENT AND COLLECTION FACILITIES.

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2024 ARPA NEW JOHNSONVILLE COLLECTION SYSTEM REHABILITATION

CITY OF NEW JOHNSONVILLE

JAMES D. PHILLIPS
REGISTERED ENGINEER
AGRICULTURE
COMMERCE
NO. 016398
STATE OF TENNESSEE

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ELECTRICAL PANEL SCHEDULES AND RISER DIAGRAM

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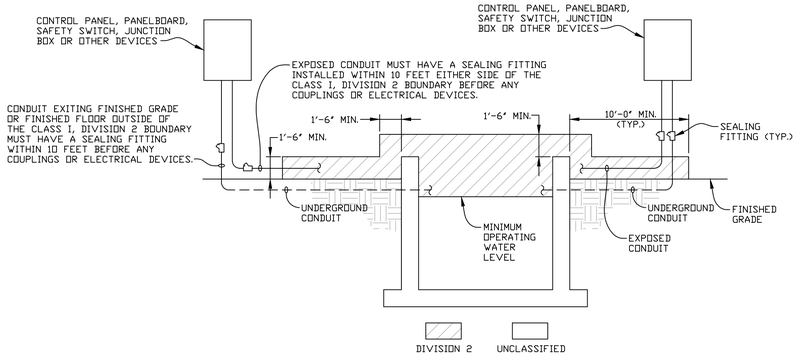


TYPICAL CLASS I, DIVISION 2 INSTALLATION DETAIL

Scale: NONE

NOTE:

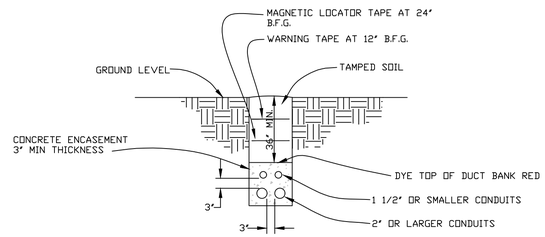
1. ALL EQUIPMENT, DEVICES, WIRING METHODS AND ELECTRICAL INSTALLATIONS SHALL CONFORM TO NFPA 820 - STANDARD FOR FIRE PROTECTION IN WASTEWATER TREATMENT AND COLLECTION FACILITIES. REFER TO NFPA TABLES 4.2.2, 5.2.2 AND 6.2.2.
2. ALL EQUIPMENT, DEVICES, WIRING METHODS AND ELECTRICAL INSTALLATIONS SHALL CONFORM TO NATIONAL ELECTRICAL CODE CLASS I, DIVISION 1 OR 2, HAZARDOUS LOCATIONS PER ARTICLE 501.
3. ALL ELECTRICAL DEVICES AND INSTALLATIONS LOCATED WITHIN A 10 FOOT ENVELOPE AROUND EQUIPMENT AND OPEN CHANNEL SHALL BE INSTALLED HIGH ENOUGH FOR A SEALING FITTING TO BE MOUNTED IN THE RACEWAY HIGHER THAN 18 INCHES ABOVE FINISHED GRADE OR FINISHED FLOOR PER NFPA 820 TABLES 4.2.2, 5.2.2 AND 6.2.2. NO UNION, COUPLING, BOX OR OTHER FITTING SHALL BE INSTALLED BETWEEN THE HAZARDOUS LOCATION AND THE SEALING FITTING.

CONDUIT & WIRE DESIGNATION SCHEDULE

DESIG.	DESCRIPTION
1	2" C., 4-#1/0 THHN/THWN CU.
2	2" C., 4-#1/0 THHN/THWN CU. & 1-#6 THHN/THWN CU. GND.
3	1" C., 4-#8 THHN/THWN CU. & 1-#10 THHN/THWN CU. GND.
4	3/4" C., (SCH. 80 PVC) 1-#6 BARE CU GND.
5	#6 BARE CU GND.
6	1 1/4" C., EMPTY W/PULLWIRE
7	3/4" C., 2-#10 THHN/THWN CU. & 1-#10 THHN/THWN CU. GND.
8	1" C., 2-#10 THHN/THWN CU. & 1-#10 THHN/THWN CU. GND.
9	1" C., 8-#14 THHN/THWN CU. & 1-#12 THHN/THWN CU. GND.
10	1" C., 2 EA. - 2/C-#16 AWG TWISTED PAIR, SHIELDED CABLES & 1-#12 THHN/THWN CU. GND.

ELECTRICAL LEGEND

SYMBOL	DESCRIPTION
	CONDUIT CONCEALED IN WALL OR CEILING
	CONDUIT CONCEALED IN FLOOR SLAB OR UNDERGROUND
	CONDUIT EXPOSED ON WALL OR CEILING
	CAPPED CONDUIT
	FLEXIBLE CONDUIT
	WEATHERPROOF CABLE
J	JUNCTION BOX
P	PULL BOX
S	SINGLE POLE SWITCH, 20 AMP, MTD. HT. PER SPECS.
S3	SWITCH - 3 WAY, 20 AMP, MTD. HT. PER SPECS.
S4	SWITCH - 4 WAY, 20 AMP, MTD. HT. PER SPECS.
S DP	DOUBLE POLE, SINGLE THROW SWITCH, 20 AMP, MTD. HT. PER SPECS.
S WP	WEATHERPROOF SWITCH, MTD. HT. PER SPECS.
S MS	MANUAL MOTOR SWITCH W/ THERMAL PROTECTION
DS	CEILING MTD. OCCUPANCY SENSOR
DH	CEILING MTD. DAYLIGHT HARVESTER
PC	PHOTOELECTRIC CELL
HOA	HAND - OFF - AUTO SELECTOR SWITCH
	START - STOP PUSHBUTTON STATIONS
T	THERMOSTAT
	SINGLE RECEPTACLE - 20 AMP.
	DUPLEX RECEPTACLE - MTD. HT. PER SPECS.
	DOUBLE DUPLEX RECEPTACLE - MTD. HT. PER SPECS.
WP	WEATHERPROOF DUPLEX RECEPTACLE
GFI	DUPLEX RECEPTACLE, GROUND FAULT INTERRUPTER TYPE
	DUPLEX RECEPTACLE, MTD. ABOVE COUNTER
	DOUBLE DUPLEX RECEPTACLE, MTD. ABOVE COUNTER
	208/230 VOLT RECEPTACLE, VOLTAGE, POLES AS INDICATED
	DUPLEX RECEPTACLE - HALF HOT, HALF SWITCHED
IG	DUPLEX RECEPTACLE - ISOLATED GROUND
	WELDING RECEPTACLE. - 60 AMP, VOLTAGE, POLES AS INDICATED
R	FLOOR RECEPTACLE
T	FLOOR TYPE TELEPHONE OUTLET
DC	FLOOR TYPE DATA/COMM. OUTLET
	TELEPHONE OUTLET - MTG. HT. & CONDUIT SIZE PER SPECS.
	TELEPHONE OUTLET - MTD. ABOVE COUNTER, COND. SIZE PER SPECS.
W	TELEPHONE OUTLET - WALL MOUNTED, CONDUIT SIZE PER SPECS.
TV	TELEVISION SYSTEM ANTENNA OUTLET, 3/4" C. TO ACCESSIBLE CEILING SPACE
TV	TELEVISION ANTENNA JACK
C	COMPUTER TERMINAL OUTLET, 3/4" C. TO ACCESSIBLE CEILING SPACE
C	DATA/COMM. OUTLET, 2 GANG BOX, SINGLE PLASTER RING, 3/4" C.
A	SURFACE MOUNTED FIXTURE W/IDENTIFICATION, INCAND., PL FLUOR., OR H.I.D.
	WALL BRACKET FIXTURE, INCANDESCENT OR PL FLUOR.
	RECESSED FIXTURE, INCANDESCENT, PL TYPE FLUOR., OR H.I.D..
	FLUORESCENT FIXTURE, SURFACE OR RECESSED, 2X2, 1X4, 2X4
	FLUORESCENT FIXTURE, OPEN TUBE STRIP, SURFACE MTD.
30/3	DISCONNECT SWITCH, FUSIBLE, 30 AMP / 3 POLE
30/3	DISCONNECT SWITCH, NON-FUSIBLE, 30 AMP / 3 POLE
30/3 RT	DISCONNECT SWITCH, NON-FUSIBLE, RAINTIGHT, 30 AMP / 3 POLE
EF	EXHAUST FAN
	DISTRIBUTION PANEL
	LIGHTING OR BRANCH CIRCUIT PANELBOARD
	EMERGENCY LIGHT
	EMERGENCY LIGHT / EXIT LIGHT COMBINATION
	EXIT LIGHT
	OUTSIDE LIGHTING FIXTURE, POLE TYPE
	MOTOR CONTROLLER OR STARTER, MAGNETIC
M	MOTOR CONTROLLER OR STARTER, MANUAL
	COMBINATION STARTER AND DISCONNECT
3	MOTOR W/ APPROXIMATE HORSEPOWER
	METAL, ALUMINUM, OR STEEL POLE
	WOOD POLE
A	DESIGNATES HEATER TYPE
7	DESIGNATES NOTE NUMBER
	DESIGNATES CONDUIT & WIRE DESCRIPTION PER SCHEDULE
	GROUNDING ELECTRODE AND CONDUCTOR SYSTEM
	GROUNDING ELECTRODE SYSTEM
PS	PRESSURE SWITCH
FT	FLOW TRANSMITTER
SV	SOLENOID VALVE
BV	ELECTRICALLY ACTUATED BALL VALVE W/POSITION INDICATION
FS	FLOAT SWITCH
PT	PRESSURE TRANSMITTER
LS	LIMIT SWITCH
ROF	RATE OF FLOW CONTROLLER
M	MOTOR OPERATED VALVE
LOH	LOSS OF HEAD TRANSMITTER
LT	LEVEL TRANSMITTER

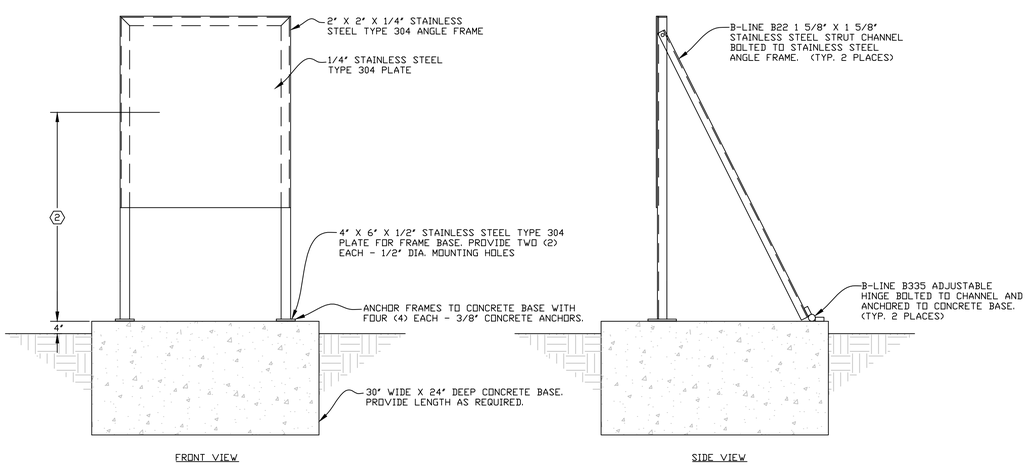


UNDERGROUND CONDUIT INSTALLATION DETAIL

Scale: NONE

NOTE:

1. CONTACT ENGINEER FOR INSTALLATION DEPTH VARIATION IN AREAS CONTAINING BURIED PIPING AND OTHER STRUCTURES.
2. CONDUIT SEPARATION SHALL BE MAINTAINED BY USE OF PVC CONDUIT SPACERS.



STAND DETAIL

Scale: NONE

NOTE:

1. ALL FASTENERS USED TO SECURE ELECTRICAL DEVICES TO FRAMES AND ANCHOR BOLTS SHALL BE 316 STAINLESS.
2. ELECTRICAL EQUIPMENT SHALL BE MOUNTED 4'-0" MINIMUM TO CENTERLINE OF ELECTRICAL EQUIPMENT.

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ELECTRICAL SCHEDULE, DETAILS AND LEGEND

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