APPENDIX G 30% DESIGN DRAWINGS

CAMBRIDGE DEPARTMENT OF PUBLIC WORKS

SHERMAN CSO TANK

30% DESIGN SUBMITTAL

SEPTEMBER 2026

STANTEC JOB NO. 195151145

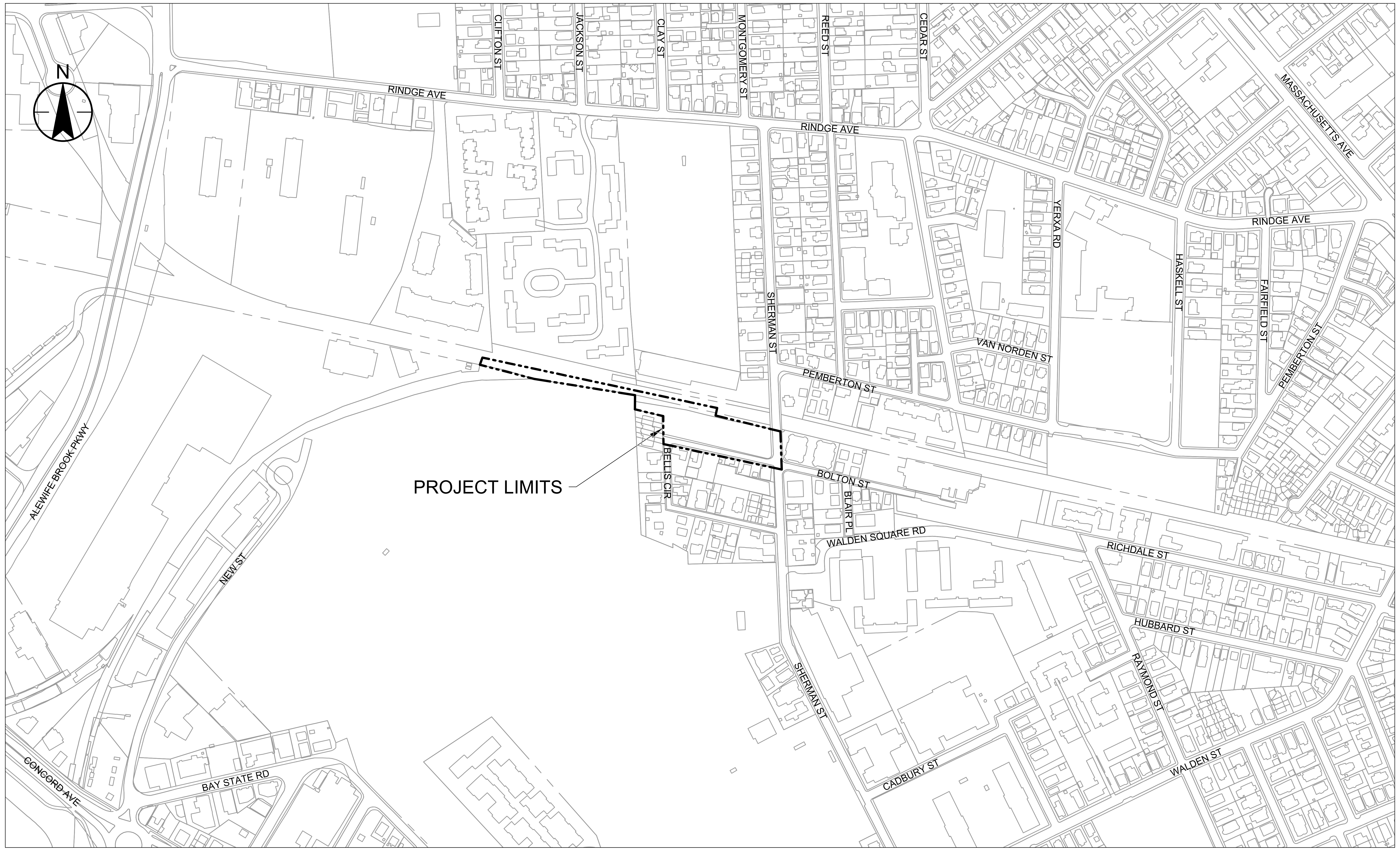
PREPARED FOR:

THE WORKS
CAMBRIDGE DEPARTMENT OF PUBLIC

PREPARED BY:

Stantec

KLEINFELDER
Bright People. Right Solutions.



LOCATION MAP
SCALE: 1"=300'

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Revision	By	Appd	YYYY.MM.DD
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Issued	By	Appd	YYYY.MM.DD
30% DESIGN SUBMITTAL			

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Client/Project
CITY OF CAMBRIDGE
SHERMAN CSO TANK
CAMBRIDGE, MASSACHUSETTS

Project No.: 195151145
File Name: 51145G-2.DWG
Scale: #" = ##'

SB	SB	EO	2026.09.28
Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Title
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Drawing No.
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ORIGINAL SHEET - ANSI D

EXISTING LEGEND

SBDH ■	STONE BOUND WITH DRILL HOLE
SB ■	STONE BOUND
DHF◉	DRILL HOLE FOUND
◎	DISK
IPF ●	IRON PIPE FOUND
IRF ●	IRON ROD FOUND
○	BASKETBALL HOOP
AC	AIR CONDITIONER
⋈ D	DRAIN GATE
●	AREA DRAIN
▦	CATCH BASIN
Ⓓ	DRAIN MANHOLE
○	NO LABEL MANHOLE
☐	NO LABEL MANHOLE (SQUARE)
●	ROOF DRAIN
S ▣	SEWER HANDHOLE
Ⓢ	SEWER MANHOLE
C	CABLE BOX
©	CABLE MANHOLE
☒	ELECTRIC BOX
E	ELECTRIC HANDHOLE
E	ELECTRIC METER
Ⓔ	ELECTRIC MANHOLE
▣ F	FIRE BOX
○ FDC	FIRE DEPARTMENT CONNECTION
✲	FIRE HYDRANT
GAS	GAS RISER
G	GAS METER
⋈	GAS VALVE
ICV ●	IRRIGATION CONTROL VALVE
⌀	T-POLE
T	TELEPHONE BOX
Ⓣ	TELEPHONE MANHOLE
▣TS	TRAFFIC SIGNAL
	TREE STUMP
⌀	UTILITY POLE
⋈	WATER GATE
▣WHH	WATER HANDHOLE
▣LH	LAMPHOLE
⊕	SOIL BORING
WSO	WATER SHUT OFF VALVE

☼–⌀	UTILITY POLE WITH LIGHT
☼–Ⓡ	UTILITY POLE WITH LIGHT AND RISER
☼–R/T	UTILITY POLE WITH LIGHT, RISER AND TRANSFORMER
Ⓣ	UTILITY POLE WITH TRANSFORMER
R/T	UTILITY WITH RISER AND TRANSFORMER
	DECIDUOUS TREE
✹	CONIFER TREE
	SHRUB
–o–	SIGN (SINGLE POSTED)
BIKE	BIKE POST
⊕	BOLLARD
☼	LIGHT POLE
	MAILBOX
∘	POST
◆—	PIPE MATERIAL CHANGE
— — R/W — —	RIGHT-OF-WAY
—□——□—	CHAIN LINK FENCE
————	WOOD FENCE
—x——x—	METAL/WIRE FENCE
————	TREE LINE
————	HEDGE
—S——S—	SEWER LINE
——S&D——	SEWER AND DRAIN LINE
—D——D—	DRAIN LINE
——G——	GAS LINE
—G——G—	ABANDONED GAS LINE
—W——W—	WATER LINE
—w——w—	ABANDONED WATER LINE
—OHE——OHE— —E——E—	OVERHEAD WIRES/ELECTRIC LINE
—T——T—	TELEPHONE LINE
—C——C—	CABLE LINE
——61'——	INTERMEDIATE CONTOURS
——60'——	INDEX CONTOURS
▨	LANDSCAPED AREA
▨	VEGETATION AREA

PROPOSED LEGEND

═══	SANITARY SEWER
═══	STORM DRAIN
—— D ——	DRAIN SERVICE LATERAL
—— S ——	SANITARY SERVICE LATERAL
—— P ——	PERFORATED UNDERDRAIN
—— W ——	WATER LINE
—— G ——	GAS LINE
◩	TEST PIT
⊗	CONDITION ASSESSMENT TEST PIT
⊠	TYPE 1 CATCH BASIN
◫	TYPE 2 CATCH BASIN
▣	TYPE 3 CATCH BASIN
◫	TYPE 4 CATCH BASIN
▣	TYPE 5 CATCH BASIN
HYD	FIRE HYDRANT
⋈	WATER GATE
◀	REDUCER
⊏⊐	FLEX COUPLING
Ⓓ	DRAIN MANHOLE
Ⓢ	SANITARY MANHOLE
[	CUT/CAP EXIST. PIPE

ABBREVIATIONS

ABND	ABANDONED
AC	ASBESTOS CONCRETE
AG	ABOVE GRADE
APPROX	APPROXIMATE
AVE	AVENUE
BC	BITUMINOUS CURB
BIT	BITUMINOUS PAVEMENT
BOT	BOTTOM
BW	BOTTOM OF WALL
BRW	BRICK RETAINING WALL
CB	CATCH BASIN
CC	CONCRETE CURB
CDF	CONTROLLED DENSITY FILL
CI	CAST IRON
CIPP	CURED IN PLACE PIPE
CL	CENTERLINE OF TROUGH
CLF	CHAIN LINK FENCE
CO	CLEAN OUT
CONC	CONCRETE
CRW	CONCRETE RETAINING WALL
CS	COMBINED SEWER
CSU	CONCRETE SEGMENTS (UNBOLTED)
CTE	CONNECT TO EXISTING
CTV	CABLE TELEVISION
CU	COPPER
DI	DUCTILE IRON
DMH	DRAIN MANHOLE
EG	EXISTING GRADE
ELEV	ELEVATION
EMH	ELECTRIC MANHOLE
EXIST	EXISTING
FA	FIRE ALARM
FB	FIRE BOX
FG	FINISHED GRADE
FM	FORCE MAIN
FP	FLAG POLE
FS	FLAG STONE
GC	GRANITE CURB
GG	GAS GATE
GM	GAS METER
GRAN	GRANITE
GV	GATE VALVE
GW	GROUND WATER
H	HORIZONTAL
HDPE	HIGH-DENSITY POLYETHYLENE
HH	HAND HOLE
HP	HIGH POINT
HYD	HYDRANT
I	INVERT
ID	INSIDE DIAMETER
IB	INFILTRATION BASIN
LD	LEAD
LN	LANE
LP	LIGHT POST
LPH	LAMPHOLE
NO	NUMBER
NVO	NO VISIBLE OUTLET
OD	OUTSIDE DIAMETER
P	POST
PC	POINT OF CURVATURE
PM	PARKING METER
PROP	PROPOSED
PT	POINT OF TANGENT
PVC	POLYVINYL CHLORIDE
R	RIM
RCP	REINFORCED CONCRETE PIPE
RD	ROAD
REQ'D	REQUIRED
RL	ROOF LEADER
R&R	REMOVE AND REPLACE
RWS	RETAINING WALL STONE
RWCN	RETAINING WALL CONCRETE
S	SIGN
SD	STORM DRAIN
SMH	SEWER MANHOLE
SRW	STONE RETAINING WALL
SS	SANITARY SEWER
SST	STAINLESS STEEL
ST	STREET
STA	STATION
TBM	TEMPORARY BENCH MARK
TC	TOP OF CURB
TCB	TRAFFIC CONTROL BOX
TELE	TELEPHONE
THRESH	THRESHOLD
TL	TRAFFIC LIGHT
TOH	TOP OF HOOD
TS	TOP OF STEP
TW	TOP OF WATER
TYP	TYPICAL
UNK	UNKNOWN
UP	UTILITY POLE
V	VERTICAL
VC	VITRIFIED CLAY
VGC	VERTICAL GRANITE CURB
W	WATER ELEVATION
W/	WITH
WD	WOOD
WG	WATER GATE
WL	WATER LEVEL
WMH	WATER MANHOLE
WRW	WOOD RETAINING WALL
WW	WINDOW WELL

GENERAL NOTES

1. EXACT DEPTHS OF EXISTING PAVEMENT BASES ARE NOT KNOWN AND SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR. APPROXIMATE DEPTHS OF EXISTING PAVEMENT BASES AND SURFACE COURSES ARE INDICATED.

2. DIVERSION, BYPASS, AND CONTROL OF SANITARY SEWER, STORM DRAIN AND DEWATERING FLOWS ARE THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR'S INTENDED DIVERSION, BYPASS, AND CONTROL, AND DEWATERING PLANS SHALL BE SUBMITTED TO THE OWNER AND ENGINEER FOR REVIEW AT LEAST 7 DAYS PRIOR TO ANY EXCAVATION. WHEN PERFORMING DEWATERING, THE CONTRACTOR SHALL ADHERE TO THE REQUIREMENTS OF SECTION 02210, SECTION 01500, SECTION 02140, AND ALL DEWATERING PERMITS.

3. THE CONTRACTOR SHALL TEMPORARILY MATCH EXISTING GRADES AND CONDITIONS WITHIN THE CONSTRUCTION AREA UNTIL FINAL RESTORATION IS COMPLETE.

4. CONTRACTOR SHALL CAP OPENINGS IN EXISTING CATCH BASINS AND MANHOLES WHEN DRAWINGS INDICATE THAT PIPES ARE TO BE REMOVED OR ABANDONED. EXISTING CATCH BASIN LATERALS WHICH ARE NOT RECONNECTED SHALL BE ABANDONED BY CAPPING BOTH ENDS. CAP SHALL BE WATERTIGHT. ABANDONMENT SHALL BE CARRIED OUT IN ACCORDANCE WITH SPEC. SECTION 02051.

5. CONTRACTOR SHALL CUT OPENINGS IN EXISTING CATCH BASINS AND MANHOLES FOR NEW PIPES WHEN EXISTING STRUCTURES ARE TO BE INCLUDED IN THE PROPOSED COLLECTION SYSTEM. NEW CONNECTIONS SHALL BE SEALED WATERTIGHT. ALL NEW PENETRATIONS SHALL BE CIRCULAR CORED OPENINGS. SAW CUT OR HAMMERED NON-CIRCULAR OPENINGS ARE NOT ALLOWED.

6. ALL EXTERIOR SURFACES OF CONCRETE STRUCTURES SHALL BE COATED IN ACCORDANCE WITH SPECIFICATION SECTION 07160.

7. CONTRACTOR SHALL REFER TO THE CAMBRIDGE WATER DEPARTMENT, CONSTRUCTION AND OPERATING PRACTICES IN THE CONTRACT SPECIFICATION FOR ADDITIONAL CONSTRUCTION DETAILS.

8. PRIOR TO EXCAVATION, THE CONTRACTOR SHALL FIELD VERIFY THE FUNCTION (SEWER OR DRAIN) OF ALL EXISTING SERVICES, WHETHER KNOWN OR UNKNOWN, AND SHALL THEN CONNECT EACH SERVICE TO THE APPROPRIATE SANITARY SEWER OR STORM DRAIN. VERIFICATION OF "POTENTIAL ILLICIT " LATERALS, DRAIN LATERALS AND UNKNOWN LATERALS SHALL BE CONDUCTED IN ACCORDANCE WITH SECTION 02535.

9. THE LOCATION OF EXISTING UNDERGROUND PIPES, CABLES, CONDUITS AND STRUCTURES AS SHOWN HAS BEEN COLLECTED FROM THE BEST AVAILABLE SOURCES AND THE OWNER TOGETHER WITH ITS AGENTS DOES NOT IMPLY OR GUARANTEE THE DATA AND INFORMATION IN CONNECTION WITH THE UNDERGROUND PIPES, CABLES, CONDUITS, STRUCTURES AND SUCH OTHER PARTS AS TO THEIR COMPLETENESS NOR THEIR LOCATIONS AS INDICATED. THE CONTRACTOR SHALL CONTACT UTILITY OWNERS AND REQUEST MARKING LOCATION OF ALL THEIR LINES IN THE WORK AREAS. PRIOR TO EXCAVATION THE CONTRACTOR SHALL ASSUME THAT THERE ARE EXISTING WATER, GAS, AND OTHER UTILITY CONNECTIONS TO EACH AND EVERY BUILDING ENROUTE, WHETHER THEY APPEAR ON THE PLANS OR NOT. ANY EXPENSE AND/OR DELAY OCCASIONED BY THESE UTILITIES AND STRUCTURES OR DAMAGE THERETO, INCLUDING THOSE NOT SHOWN, SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND AT NO ADDITIONAL EXPENSE TO THE OWNER. (SEE SPECIAL CONDITIONS).

10. FOUNDATIONS AND LINES FOR SERVICES, POLICE AND FIRE ALARM BOXES, STREET LIGHTS, AND TRAFFIC SIGNALS ARE NOT SHOWN ON THE PLANS. THE APPROPRIATE UTILITY COMPANIES OR AUTHORITIES SHOULD BE CONTACTED AND CONSULTED FOR LOCATIONS OF THE ABOVE PRIOR TO EXCAVATION.

11. THE CONTRACTOR SHALL PREMARK THE EXCAVATION AREA IN WHITE AND NOTIFY THE DIG SAFE CENTER (TEL. NO. 1-888-DIG-SAFE) AT LEAST 72 BUSINESS HOURS PRIOR TO ANY EXCAVATION WORK. IN ADDITION, NOTIFICATION SHALL ALSO BE GIVEN TO ALL AFFECTED PRIVATE AND/OR PUBLIC UTILITIES TO PERMIT STREET MARKING OF THEIR LINES.

12. ALL EXISTING MANHOLE FRAMES, COVERS, CATCH BASIN FRAMES AND GRATES REMOVED SHALL REMAIN THE PROPERTY OF THE OWNER AND THEN LATER BE SELECTED BY THE OWNER AND DELIVERED BY THE CONTRACTOR TO A LOCATION DESIGNATED BY THE OWNER. ALL REMAINING FRAMES, COVERS AND GRATES NOT SELECTED BY AND DELIVERED TO THE OWNER SHALL BE DISPOSED OF BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER. ALL HISTORIC COVERS SHALL BE PROVIDED TO THE OWNER OR REUSED.

13. GEOTECHNICAL INFORMATION IN THE CONTRACT DOCUMENTS WAS OBTAINED FOR THE PURPOSE OF DESIGN AND INDICATE CONDITIONS AT THE LOCATION OF THE BORING EXPLORATIONS ONLY. SUBSURFACE CONDITIONS ENCOUNTERED DURING CONSTRUCTION MAY VARY FROM THE GEOTECHNICAL INFORMATION PROVIDED IN THE CONTRACT DOCUMENTS. GROUNDWATER LEVELS INDICATED IN THE BORING LOGS ARE THOSE EXISTING AT THE TIME SUBSURFACE INVESTIGATIONS WERE MADE AND DO NOT REPRESENT PERMANENT GROUNDWATER LEVELS. FOR BORING LOGS, SEE THE SPECIFICATIONS.

14. TEST PITS SHALL BE EXCAVATED AT THOSE LOCATIONS INDICATED ON THE DRAWINGS AND TEST PIT SCHEDULE AND WHERE ORDERED OR APPROVED BY THE CITY. ALL TEST PIT EXCAVATIONS SHALL BE MADE TO DETERMINE THE LOCATIONS OF EXISTING UTILITIES OR STRUCTURES AND PERFORMED 30 DAYS IN ADVANCE OF CONSTRUCTION OPERATIONS SO THAT ANY CHANGES IN ALIGNMENT AND/OR GRADE OF THE PROPOSED WORK OR UTILITY LOCATIONS MAY BE DETERMINED. ALL DECISIONS RELATIVE TO UTILITY CONFLICTS AND RELOCATION REQUIREMENTS WILL BE MADE BY THE UTILITY OWNER. AT THOSE LOCATIONS WHERE EXPLORATORY TEST PITS ARE REQUIRED TO DETERMINE THE LOCATION OF EXISTING UTILITIES, THE CONTRACTOR SHALL NOTIFY THE UTILITY COMPANIES INVOLVED AT LEAST 72 HOURS PRIOR TO EXCAVATION OF THE TEST PITS.

15. WHERE TEMPORARY OR PERMANENT UTILITY RELOCATION IS REQUIRED, THE CONTRACTOR SHALL NOTIFY THE AFFECTED UTILITY COMPANY 120 DAYS IN ADVANCE OF CONSTRUCTION AND SHALL COORDINATE THE NEW WORK WITH THE UTILITY RELOCATION.

16. THE CONTRACTOR SHALL COORDINATE THE RELOCATION OF WATER MAINS WITH THE ENGINEER AND THE CITY WATER DEPARTMENT.

17. LOCATIONS OF NEW WATER, SANITARY, AND DRAINAGE SERVICE CONNECTIONS SHALL BE DETERMINED DURING CONSTRUCTION, IN CONSULTATION WITH PROPERTY OWNER AND CITY.

18. THE LIMITS OF BELOW GRADE EXCAVATIONS FOR NEW PIPELINES OR STRUCTURES ARE APPROXIMATE. ACTUAL HORIZONTAL AND VERTICAL LIMITS INCLUDING MEASUREMENT FOR THE NEW WORK SHALL BE APPROVED BY THE ENGINEER DURING CONSTRUCTION.

19. INTERRUPTIONS OF SERVICES SHALL NOT BE PERMITTED. THE CONTRACTOR SHALL COORDINATE WITH ALL UTILITIES AND PROVIDE ALL TEMPORARY UTILITIES AND CONNECTIONS TO AVOID INTERRUPTIONS OF WATER, SANITARY, DRAINAGE, ELECTRIC, PHONE, GAS, FIBEROPTICS, AND CABLE SERVICES.

20. PRIOR TO BEGINNING WORK THE CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS INFORMATION AND REPORT ANY DISCREPANCIES BETWEEN THE PLANS AND THE ACTUAL CONDITIONS TO THE ENGINEER.

21. THE CONTRACTOR SHALL PROVIDE ALL EROSION AND SEDIMENT CONTROL DEVICES, AND SHALL NOT COMMENCE CONSTRUCTION UNTIL THESE MEASURES HAVE BEEN INSTALLED AND APPROVED BY THE ENGINEER.

22. THE CONTRACTOR SHALL PROTECT ALL TRAVELED WAYS AND PROJECT AREA FROM DUST AND CONSTRUCTION DEBRIS AT ALL TIMES.

23. UNLESS OTHERWISE INDICATED ON THE DRAWINGS ALL AREAS ADJACENT TO THE LIMITS OF CONSTRUCTION WHICH ARE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED BY THE CONTRACTOR TO THEIR ORIGINAL CONDITION AT NO ADDITIONAL COST TO THE OWNER.

24. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF ALL DEMOLISHED MATERIALS, RUBBISH, EXCAVATED MATERIAL AND DEBRIS, UNLESS OTHERWISE NOTED, AND IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL REQUIREMENTS HAVING JURISDICTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING AND PAYING FOR ALL DISPOSAL PERMITS AT NO ADDITIONAL COST TO THE OWNER. SEE SPECIFICATION SECTION 02080.

25. THE CONTRACTOR MAY BE ASKED BY THE OWNER TO SUSPEND CONSTRUCTION OPERATIONS TEMPORARILY TO AVOID CONFLICTS WITH LARGE PUBLIC EVENTS OR LARGE STORM EVENTS. THE CONTRACTOR SHALL NOT BE COMPENSATED FOR COSTS RELATING TO SHUTDOWNS FOR THESE REASONS.

26. THE CONTRACTOR SHALL NOT BLOCK ACCESS TO STREET AND PRIVATE PARKING IN THE VICINITY OF THE LIMITS OF CONSTRUCTION AFTER WORK HOURS AND ON WEEKENDS.

27. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SNOW PLOWING AND SNOW REMOVAL FROM ALL AREAS WHERE HIS PRESENCE IS MAINTAINED INCLUDING BUT NOT LIMITED TO, UNPAVED SURFACES, PARKED EQUIPMENT AREAS OR ANY CONSTRUCTION ACTIVITY. THE CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR STREET SWEEPING, SNOW REMOVAL FROM SIDEWALKS, TRASH REMOVAL, AND RECYCLABLE MATERIALS FROM ALL AREAS WHERE CONSTRUCTION RESTRICTS VEHICULAR OR PEDESTRIAN ACCESS TO STREETS OR SIDEWALKS AND WHERE CONTRACTOR'S PRESENCE INTERFERES WITH MUNICIPAL TRASH REMOVAL, STREET SWEEPING, OR SNOW PLOWING AND REMOVAL.

28. AREAS WITHIN THIS CONTRACT ARE SUBJECT TO THE UTILITY RELATED ABATEMENT MEASURE REGULATIONS OF THE MASSACHUSETTS CONTINGENCY PLAN 310 CMR 40.00 AND SECTIONS 02010, 02080, 02095 OF THE SPECIFICATIONS. THE CONTRACTOR'S ATTENTION IS SPECIFICALLY DIRECTED TO ENVIRONMENTAL DATA (SOIL AND GROUND WATER) FROM BORINGS AND MONITORING WELLS AS REPRESENTATIVE OF SUBSURFACE CONDITIONS IN URBAN AREAS. THE ENVIRONMENTAL DATA ARE APPENDED TO THE SPECIFICATIONS.

29. THE CONTRACTOR SHALL NOT BE PERMITTED TO STARTUP OR OPERATE EQUIPMENT BEFORE OR AFTER ESTABLISHED WORKING HOURS OF 7:00 AM TO 4:00 PM, MONDAY THROUGH FRIDAY WITHOUT WRITTEN APPROVAL OF THE OWNER, UNLESS NOTED OTHERWISE.

30. EXISTING CONDITIONS ARE SHOWN SCREENED. ALL EXISTING SEWER AND DRAIN PIPE SIZES AND MATERIALS SHALL BE DICTATED BY PROFILE OVER PLAN ANNOTATION.

31. ALL REPLACEMENT WATER SERVICE CONNECTIONS TO BE 1-INCH COPPER UNLESS OTHERWISE NOTED.

32. ALL EXISTING SEWER AND DRAIN PIPE REPLACED BY PROPOSED SEWER AND DRAIN PIPE SHALL BE REMOVED AND DISPOSED, UNLESS OTHERWISE INDICATED ON THE DRAWINGS TO BE ABANDONED.

33. CONTROLLED DENSITY FILL (CDF) SHALL BE REQUIRED FOR ALL UTILITY CROSSINGS WITH CLEARANCE LESS THAN 12 INCHES.

34. STRUCTURAL REPAIRS TO EXISTING PIPES SHALL BE COMPLETED PRIOR TO INSTALLATION OF NEW SEWER OR DRAIN AND NEW OR REPLACEMENT LATERAL CONNECTIONS TO THE EXISTING MAIN.

35. WHERE NEW SYSTEMS ARE TO BE LAID INTO EXISTING SYSTEMS, WHICH ARE REQUIRED TO BE SHUTDOWN TO MAKE THE TIE-IN, THE NEW SYSTEM SHALL BE FULLY PREPARED IN ANTICIPATION OF THE TIE-IN TO MINIMIZE DOWNTIME OF THE EXISTING SYSTEM. THE NEW SYSTEM SHALL BE FULLY TESTED TO THE MAXIMUM EXTENT POSSIBLE PRIOR TO THE TIE-IN. MEASUREMENTS SHALL BE TAKEN TO ENSURE THAT THE NEW SYSTEM IS OF THE CORRECT SIZE, LENGTH AND ALIGNMENT TO COMPLETE THE TIE-IN.

36. ALL STREET EXCAVATIONS SHALL BE COMPLETELY CLOSED AT THE END OF EACH WORKING DAY BY BACKFILLING AND TEMPORARY PAVING OR BY COVERING WITH STEEL PLATES WHEN APPROVED BY THE OWNER.

37. EXISTING UTILITY POLES WITHIN 5 FEET OF THE PROPOSED EDGE OF TRENCH SHALL BE SUPPORTED BY THE UTILITY OWNER DURING EXCAVATION OF THE TRENCH. CONTRACTOR SHALL COORDINATE SUPPORT AND BE RESPONSIBLE FOR COSTS AND FEES. WHERE EXISTING GAS, ELECTRIC AND TELECOM UTILITIES CROSS THE PROPOSED TRENCH LIMITS, CONTRACTOR SHALL COORDINATE WITH THE UTILITY OWNER TO SUPPORT AND BE RESPONSIBLE FOR COSTS AND FEES. CONTRACTOR SHALL BE RESPONSIBLE FOR SUPPORTING THE EXISTING UTILITY IN ACCORDANCE WITH THE UTILITY OWNER'S REQUIREMENTS.

38. CONTROLLED DENSITY FILL (CDF) SHALL NOT BE USED AROUND WATER VALVES OR VALVE BOXES. PROVIDE ACCEPTABLE PROTECTIVE LAYER BETWEEN DUCTILE IRON AND CONTROLLED LOW STRENGTH MATERIAL OR USE A NON-FLY ASH MATERIAL APPROVED BY THE ENGINEER.

39. REFER TO SPECIFICATION SECTION 01063 FOR CONSTRUCTION SEQUENCING.

40. ALL UTILITY COMPANIES, PUBLIC AND PRIVATE, MUST BE NOTIFIED, INCLUDING THOSE IN CONTROL OF UTILITIES NOT SHOWN ON THIS PLAN, (SEE CHAPTER 370, ACTS OF 1963, MASSACHUSETTS) PRIOR TO EXCAVATING, INSTALLING, BACKFILLING, GRADING, PAVEMENT RESTORING OR REPAVING.

SURVEYING NOTES

1. RECORD UTILITY INFORMATION FROM THE VARIOUS UTILITY COMPANIES AND PUBLIC AGENCIES, ARE APPROXIMATE ONLY AND ACTUAL LOCATIONS SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR.

2. THE OWNER AND ENGINEER ASSUME NO RESPONSIBILITY FOR DAMAGES INCURRED AS A RESULT OF UTILITIES OMITTED OR INACCURATELY SHOWN.

3. PROPERTY LINES OF PRIVATE OWNERSHIP HAVE BEEN TAKEN FROM CITY OF CAMBRIDGE ASSESSOR MAPS AND SHOULD BE CONSIDERED APPROXIMATE.

4. REFER TO BENCHMARK NOTES ON CONSTRUCTION BASELINE SHEETS FOR SURVEY DATES, HORIZONTAL DATUM AND VERTICAL DATUM.

SPECIAL NOTES FOR TREE PROTECTION

1. REFER TO "CITY OF CAMBRIDGE DEPARTMENT OF PUBLIC WORKS-DIVISION OF URBAN FORESTRY, TREE PROTECTION DURING CONSTRUCTION" IN THE CONTRACT DOCUMENTS. ALL WORK SHALL BE CARRIED OUT IN ACCORDANCE WITH MASSACHUSETTS STATE LAW CHAPTER 87, SECTION 12.

2. A MASSACHUSETTS OR INTERNATIONAL (ISA) CERTIFIED ARBORIST SHALL BE SUB-CONTRACTED BY THE CONTRACTOR TO PROVIDE A TREE PROTECTION PLAN AND PERFORM SPECIFIED WORK.

3. ALL TREES NOT IDENTIFIED FOR REMOVAL SHALL BE PROTECTED AGAINST CONSTRUCTION AND TRUCKING RELATED DAMAGE TO THEIR TRUNKS, ROOTS, AND LIMBS. TREE TRUNKS SHALL BE WRAPPED AND/OR BARRICADED FOR PROTECTION IF NECESSARY. TREE LIMBS SHALL BE TEMPORARILY SUPPORTED TO AVOID DAMAGE AND/OR PROFESSIONALLY PRUNED IF THEY CAN NOT BE AVOIDED. BREAKAGE OF THE LIMBS SHALL NOT BE PERMITTED. IN ADDITION TO THE "CONSTRUCTION PRUNING" SPECIFICALLY IDENTIFIED, ALL TREES WITHIN THE PROJECT AREA AND ALONG TRUCK ROUTE, SHALL BE PROTECTED FROM DAMAGE OR PROFESSIONALLY PRUNED. "CONSTRUCTION PRUNING" SHALL CONSIST OF SQUARELY CUTTING LIMBS ONLY WHERE THEY CANNOT BE AVOIDED BY TRUCKS OR EQUIPMENT (RAISE PRUNING).

4. ALL TREE PROTECTION MEASURES AND OPERATIONS AND ALL ROOT PRUNING, TREE REMOVAL, AND TREE PRUNING SHALL BE SUBJECT TO REVIEW, APPROVAL OR CHANGE BY THE CITY ARBORIST.

5. AT THE OWNER'S DISCRETION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL OF ANY TREE DAMAGED BY CONSTRUCTION OR TRUCKING OPERATIONS, REMOVAL OF THE STUMP, AND REPLACEMENT OF THE TREE IN KIND AT NO ADDITIONAL COST TO THE OWNER. ADDITIONAL FINES MAY ALSO BE IMPOSED FOR DAMAGE AS PER CONTRACT SPECIFICATIONS.

6. BREAKAGE OF TREE ROOTS SHALL NOT BE PERMITTED AND ROOT PRUNING SHALL BE MINIMIZED. TREE ROOTS THAT CANNOT BE AVOIDED DURING CONSTRUCTION SHALL BE PRUNED IN ACCORDANCE WITH THE SPECIFICATIONS AND UNDER SUPERVISION OF THE CITY ARBORIST, INCLUDING ROOT TREATMENT IF REQUIRED.

7. THE CONTRACTOR SHALL COORDINATE WITH DIG SAFE PRIOR TO REMOVING ANY STUMPS. DAMAGE TO EXISTING SIDEWALKS AND UTILITIES SHALL BE REPAIRED AS SPECIFIED AFTER REMOVING STUMPS.

8. TREES AND STUMPS REMOVED DURING CONSTRUCTION SHALL BE REPLACED WITH NEW TREES AS DIRECTED. STUMP REMOVAL SHALL BE SUFFICIENT TO ALLOW PLANTING OF NEW TREE.

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Client/Project
CITY OF CAMBRIDGE
SHERMAN CSO TANK
CAMBRIDGE, MASSACHUSETTS

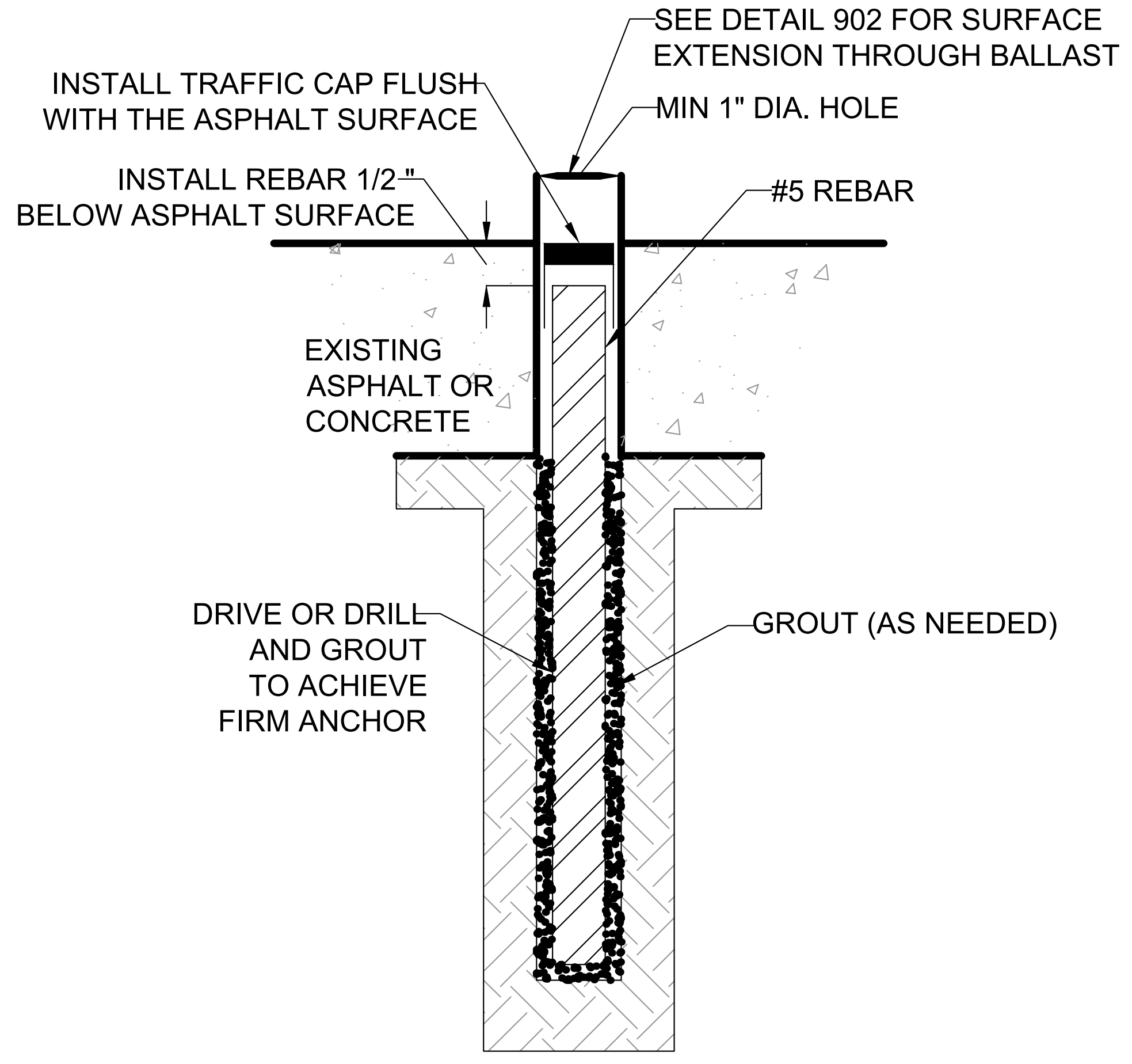
Project No.: 195151145
File Name: 51145G-3.DWG
Scale: #" = ##'

SB	BB	EO	2026.09.28
Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Title
GENERAL LEGEND, NOTES
AND ABBREVIATIONS

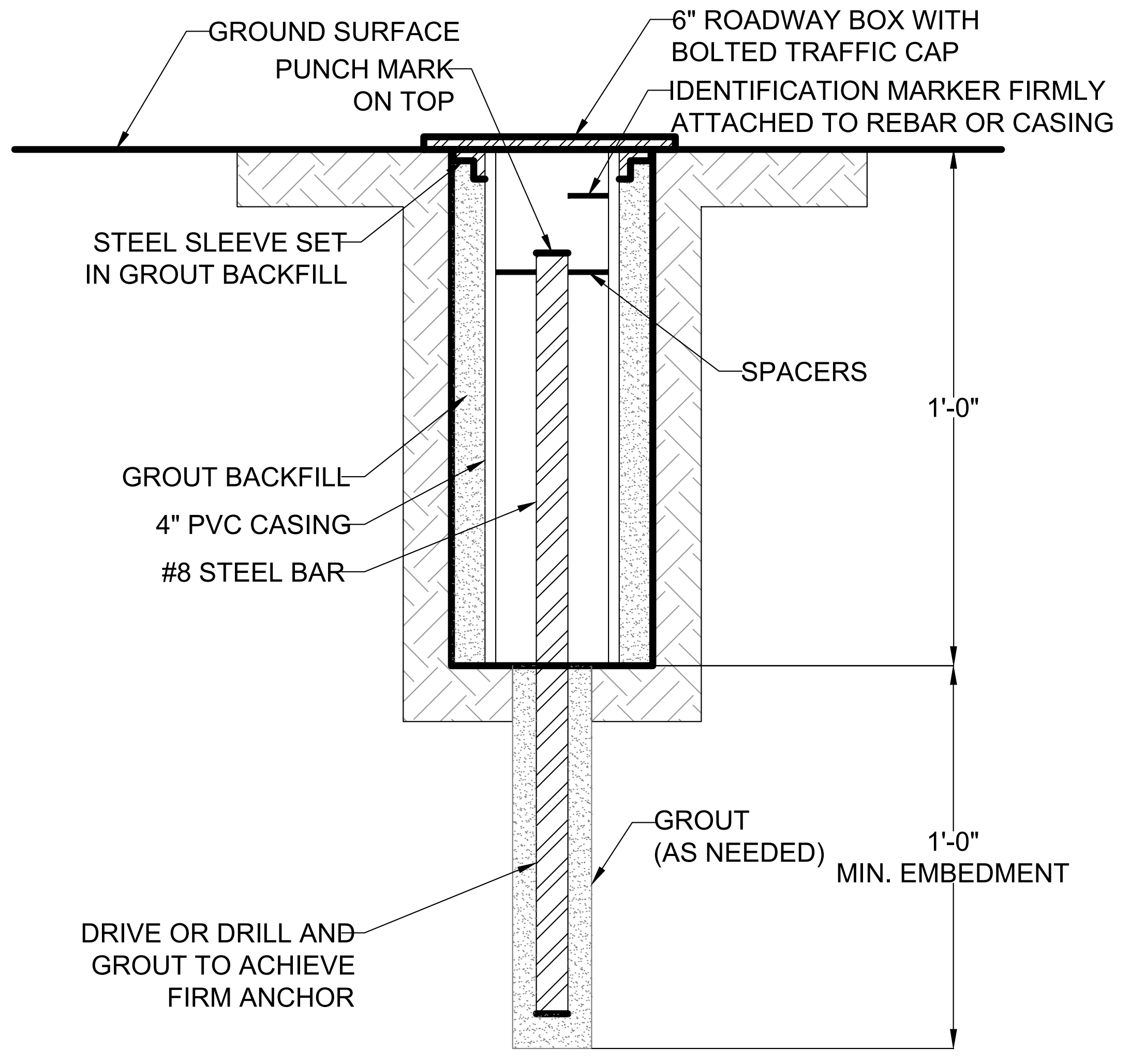
Revision: Sheet: X of XX
Drawing No.
G-3

ORIGINAL SHEET - ANSI D


SEE DETAIL 902 FOR SURFACE EXTENSION THROUGH BALLAST
INSTALL TRAFFIC CAP FLUSH WITH THE ASPHALT SURFACE
MIN 1" DIA. HOLE
INSTALL REBAR 1/2" BELOW ASPHALT SURFACE
#5 REBAR
EXISTING ASPHALT OR CONCRETE
DRIVE OR DRILL AND GROUT TO ACHIEVE FIRM ANCHOR
GROUT (AS NEEDED)

SETTLEMENT MONITORING POINTS BELOW ASPHALT OR CONCRETE

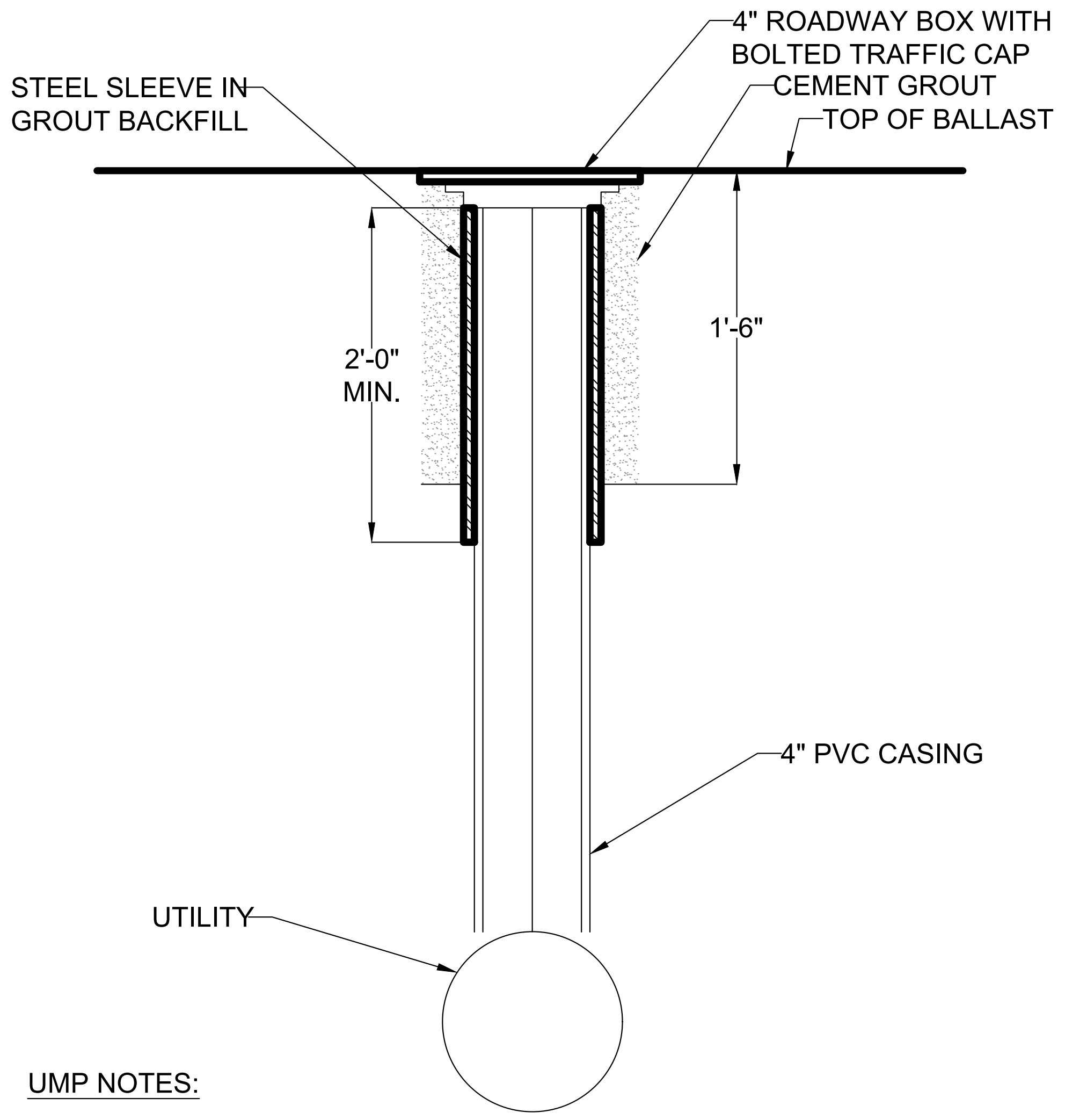
C-901


GROUND SURFACE
PUNCH MARK ON TOP
6" ROADWAY BOX WITH BOLTED TRAFFIC CAP
IDENTIFICATION MARKER FIRMLY ATTACHED TO REBAR OR CASING
STEEL SLEEVE SET IN GROUT BACKFILL
SPACERS
1'-0"
GROUT BACKFILL
4" PVC CASING
#8 STEEL BAR
GROUT (AS NEEDED)
1'-0" MIN. EMBEDMENT
DRIVE OR DRILL AND GROUT TO ACHIEVE FIRM ANCHOR

SURFACE SURVEY POINTS IN SOIL

SETTLEMENT MONITORING POINTS IN SOIL

C-902

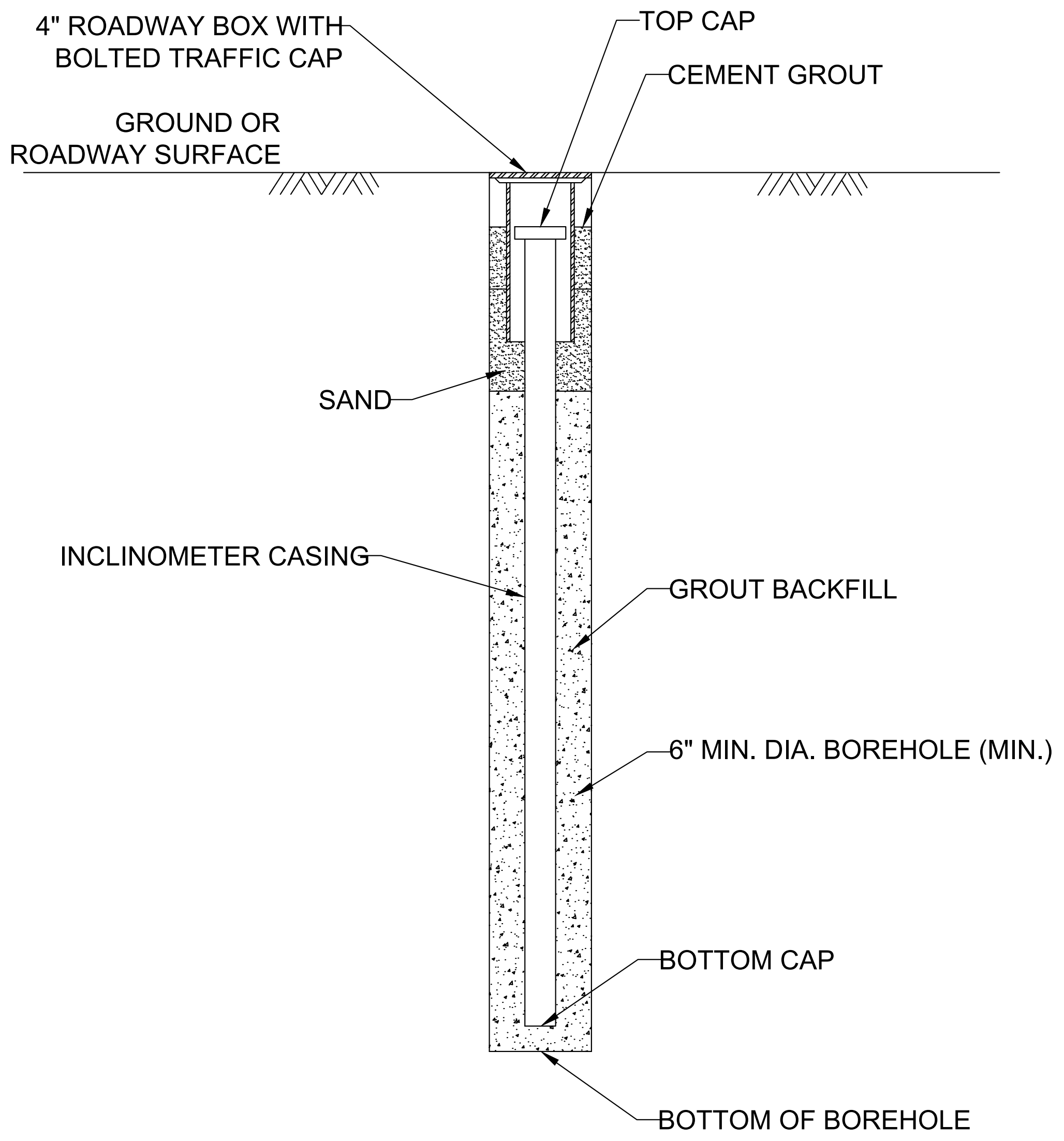

STEEL SLEEVE IN GROUT BACKFILL
4" ROADWAY BOX WITH BOLTED TRAFFIC CAP
CEMENT GROUT
TOP OF BALLAST
2'-0" MIN.
1'-6"
4" PVC CASING
UTILITY

UMP NOTES:

1. EXPOSE UTILITY TO ALLOW DIRECT ACCESS FOR SURVEY ROD USING VACUUM EXTRACTION OF SOILS OR OTHER NON-DESTRUCTIVE METHOD.
2. PROTECT ACCESS HOLE FROM SOIL WITH PVC CASING.
3. PVC CASING SHALL NOT COME IN DIRECT CONTACT WITH EXPOSED UTILITY.

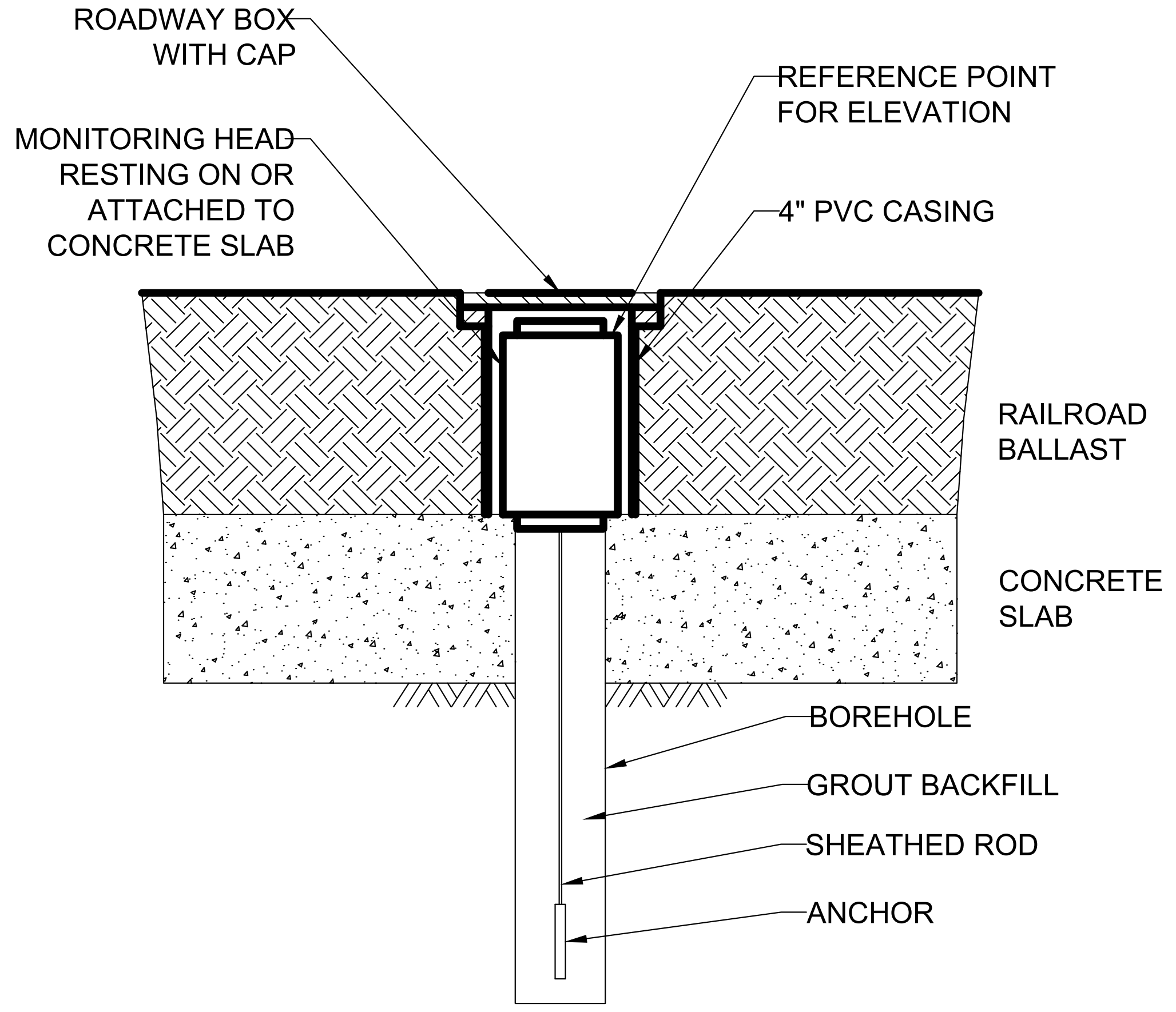
UTILITY MONITORING POINT

C-903


4" ROADWAY BOX WITH BOLTED TRAFFIC CAP
TOP CAP
CEMENT GROUT
GROUND OR ROADWAY SURFACE
SAND
INCLINOMETER CASING
GROUT BACKFILL
6" MIN. DIA. BOREHOLE (MIN.)
BOTTOM CAP
BOTTOM OF BOREHOLE

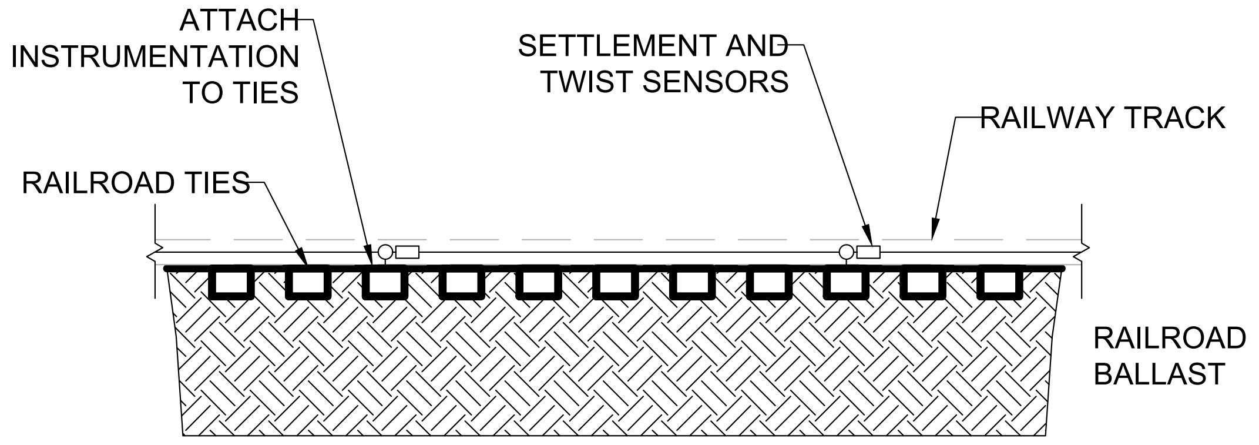
INCLINOMETER

C-904



EXTENSOMETER EXTENSION THROUGH BALLAST

C-905



TRACK MONITOR

C-906

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SHERMAN CSO TANK

CAMBRIDGE, MASSACHUSETTS

Project No.: 195151145
File Name: 51145G-6.DWG
Scale: #" = ##'

SB	SB	SP	2026.09.28
Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Title
STANDARD DETAILS - GEOTECH INSTRUMENTATION & TEMP CONTROLS

Revision: Sheet: X of XX

Drawing No.
G-6

1 2 3 4 5

D

C

B

A

PROPOSED LEGEND

═══════	PROP DRAIN PIPE
Ⓓ	PROP DRAIN MANHOLE
◙	PROP CATCH BASIN
Ⓢ	PROP SEWER MANHOLE
⊗	PROP AREA DRAIN
○	PROP BASIN DRAIN
— — SS — —	PROP SEWER PIPE
— — STM — — —	PROP DRAIN PIPE
▪—	PROP DRAIN BOX WITH PVC UNDERDRAIN
□—	PROP BIORETENTION STRUCTURE WITH PVC UNDERDRAIN
o—	PROP CLEANOUT WITH PVC UNDERDRAIN
Y	PROP FIRE HYDRANT
⋈	PROP WATER VALVE
▮ ⊥ ⊓	PROP WATER FITTINGS
——— W ———	PROP WATER MAIN
— — G — —	PROP GAS MAIN (BY OTHERS)
— — E — — —	PROP ELECTRICAL DUCTBANK

▪	PROP HANDHOLE
→	FLOW ARROW
◤	PROP TEST PIT
▯	EXIST MANHOLE (IN PROFILE)
▯	PROP MANHOLE (IN PROFILE)

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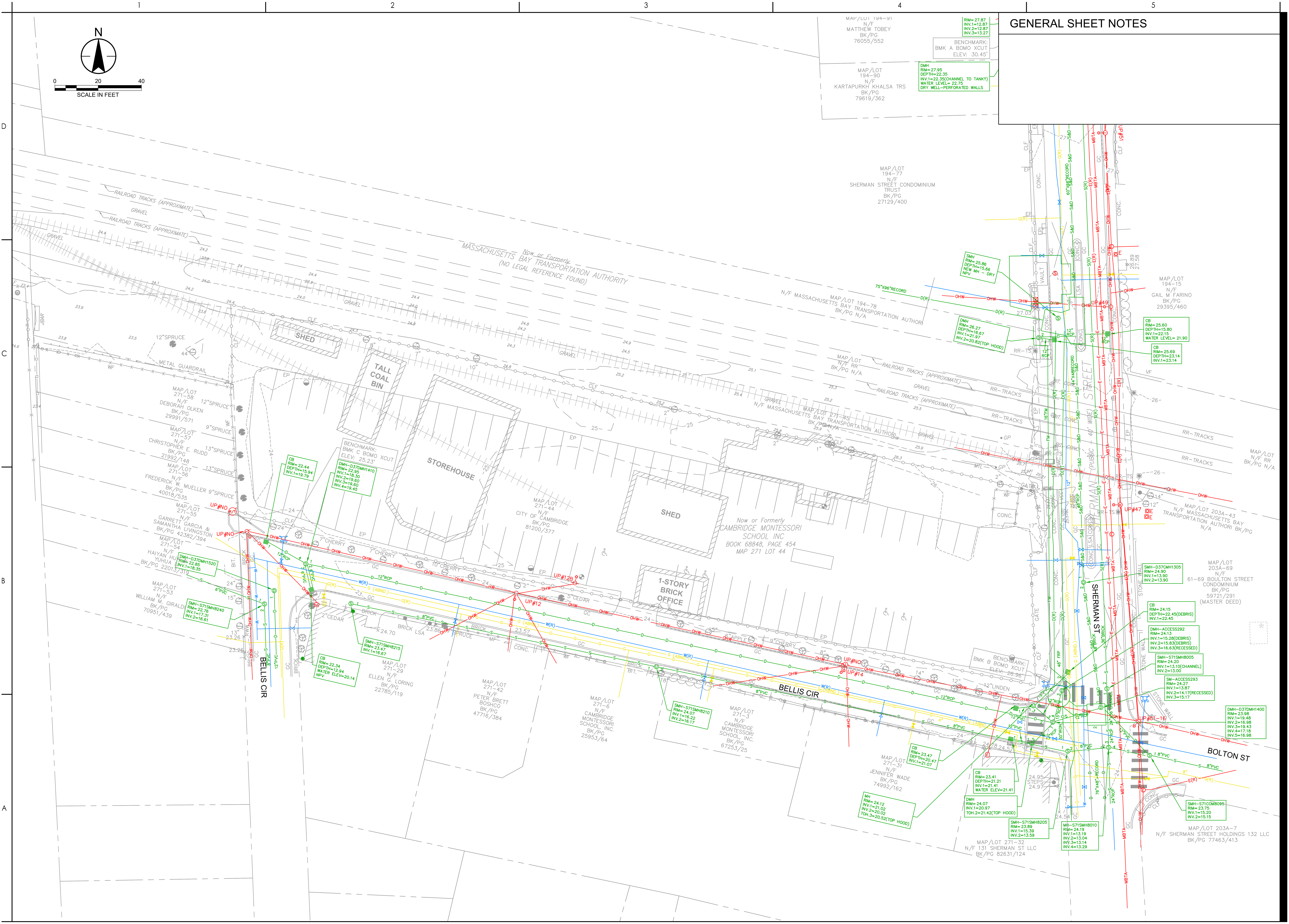
CAMBRIDGE, MASSACHUSETTS

Project No.: 195151145
File Name: 51145C-1.DWG
Scale: NO SCALE

SB	SP	SP	2026.09.28
Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Title
CIVIL LEGEND, NOTES AND ABBREVIATIONS

Revision: Sheet: VALUE of XX
Drawing No.
C-1


N
0
20
40
SCALE IN FEET
RAILROAD TRACKS (APPROXIMATE)
GRAVEL
MASSACHUSETTS BAY TRANSPORTATION AUTHORITY Now or Formerly
(NO LEGAL REFERENCE FOUND)
SHED
TALL COAL BIN
STOREHOUSE
SHED
1-STORY BRICK OFFICE
METAL GUARDRAIL
12"SPRUCE
9"SPRUCE
13"SPRUCE
7"CHERRY
5"CEDAR
2"CEDAR
6"APPLE
9"CHERRY
BENCHMARK: BMK A BOMO XCUT ELEV: 30.45'
BENCHMARK: BMK C BOMO XCUT ELEV: 25.23'
BENCHMARK: BMK B BOMO XCUT ELEV: 26.96'
RIM= 27.87 INV.1=12.87 INV.2=12.87 INV.3=13.27
DMH RIM= 27.95 DEPTH=22.35 INV.1=22.35(CHANNEL TO TANK?) WATER LEVEL= 22.75 DRY WELL–PERFORATED WALLS
SMH RIM= 25.86 DEPTH=15.66 NEW MH – DRY NPV
DMH RIM= 26.27 DEPTH=16.67 INV.1=21.97 INV.2=20.82(TOP HOOD)
CB RIM= 25.60 DEPTH=15.80 INV.1=22.15 WATER LEVEL= 21.90
CB RIM= 25.69 DEPTH=23.14 INV.1=23.14
SMH–D37CMH1305 RIM= 24.90 INV.1=13.90 INV.2=13.90
CB RIM= 24.15 DEPTH=22.45(DEBRIS) INV.1=22.45
DMH–ACCESS292 RIM= 24.13 INV.1=15.28(DEBRIS) INV.2=15.83(DEBRIS) INV.3=16.63(RECESSED)
SMH–S71SMH8005 RIM= 24.20 INV.1=13.10(CHANNEL) INV.2=13.00
SM–ACCESS293 RIM= 24.27 INV.1=13.87 INV.2=14.17(RECESSED) INV.3=15.17
DMH–D37DMH1400 RIM= 23.98 INV.1=19.48 INV.2=16.98 INV.3=19.43 INV.4=17.18 INV.5=16.98
SMH–S71COM8095 RIM= 23.75 INV.1=15.20 INV.2=15.15
MH–S71SMH8010 RIM= 24.19 INV.1=13.19 INV.2=13.04 INV.3=13.14 INV.4=13.29
SMH–S71SMH8205 RIM= 23.89 INV.1=15.39 INV.2=13.59
DMH RIM= 24.07 INV.1=20.97 TOH.2=21.42(TOP HOOD)
CB RIM= 23.41 DEPTH=21.21 INV.1=21.41 WATER ELEV=21.41
MH RIM= 24.12 INV.1=21.02 INV.2=20.02 TOH.3=20.52(TOP HOOD)
CB RIM= 23.47 DEPTH=20.47 INV.1=21.07
SMH–S71SMH8210 RIM= 24.07 INV.1=16.22 INV.2=16.17
SMH–S71SMH8215 RIM= 23.47 INV.1=16.67
CB RIM= 22.34 DEPTH=12.94 WATER ELEV=20.14 NPV
SMH–S71SMH8240 RIM= 22.76 INV.1=17.31 INV.2=16.61
DMH–D37DMH1520 RIM= 22.85 INV.1=18.35
CB RIM= 22.44 DEPTH=15.94 INV.1=19.79
DMH–D37DMH1410 RIM= 22.95 INV.1=18.30 INV.2=19.60 INV.3=19.60 INV.4=19.45
MAP/LOT 194–91 N/F MATTHEW TOBEY BK/PG 76055/552
MAP/LOT 194–90 N/F KARTAPURKH KHALSA TRS BK/PG 79619/362
MAP/LOT 194–77 N/F SHERMAN STREET CONDOMINIUM TRUST BK/PG 27129/400
N/F MASSACHUSETTS BAY TRANSPORTATION AUTHORI MAP/LOT 194–78 BK/PG N/A
MAP/LOT N/F RR BK/PG N/A
MAP/LOT 194–15 N/F GAIL M FARINO BK/PG 29395/460
N/F MASSACHUSETTS BAY TRANSPORTATION AUTHORI MAP/LOT 271–45 BK/PG N/A
MAP/LOT 203A–43 N/F MASSACHUSETTS BAY TRANSPORTATION AUTHORI BK/PG N/A
MAP/LOT 203A–69 N/F 61–69 BOULTON STREET CONDOMINIUM BK/PG 59721/291 (MASTER DEED)
MAP/LOT 203A–7 N/F SHERMAN STREET HOLDINGS 132 LLC BK/PG 77463/413
MAP/LOT 271–32 N/F 131 SHERMAN ST LLC BK/PG 82631/124
MAP/LOT 271–31 N/F JENNIFER WADE BK/PG 74992/162
MAP/LOT 271–3 N/F CAMBRIDGE MONTESSORI SCHOOL, INC. BK/PG 67253/25
MAP/LOT 271–6 N/F CAMBRIDGE MONTESSORI SCHOOL, INC. BK/PG 25953/64
MAP/LOT 271–42 N/F PETER BRETT BOSHCO BK/PG 47716/384
MAP/LOT 271–29 N/F ELLEN G. LORING BK/PG 22785/119
MAP/LOT 271–44 N/F CITY OF CAMBRIDGE BK/PG 81200/377
Now or Formerly CAMBRIDGE MONTESSORI SCHOOL INC BOOK 68848, PAGE 454 MAP 271 LOT 44
MAP/LOT 271–58 N/F DEBORAH OLKEN BK/PG 29991/571
MAP/LOT 271–57 N/F CHRISTOPHER E. RUDD BK/PG 21992/148
MAP/LOT 271–56 N/F FREDERICK W. MUELLER BK/PG 40018/535
MAP/LOT 271–55 N/F GARRETT GARCIA & SAMANTHA LIVINGSTON BK/PG 42382/394
MAP/LOT 271–54 N/F HAIYAN HUA & YUHUA LI BK/PG 22013/319
MAP/LOT 271–53 N/F WILLIAM M. GIRALDI BK/PG 70951/439
MAP/LOT N/F RR BK/PG N/A
UP#NO
UP#12
UP#14
UP#12B
UP#49
UP#47
UP#81–16
BELLIS CIR
SHERMAN ST
STREET
BOLTON ST
STONE WALL
VAULT
LSA
CONC.
RR–TRACKS
12"RCP
8"PVC
6"PVC
12"PVC
24"RCP
30"IRON
76"X48"RECORD
44"X48"RECORD
60"X48"RECORD
75"X96"RECORD
24"X36"CHANNEL
16"FM
G (ABND.)
W(R)
G(R)
D(R)
S(R)
E(R)
OHW
MBTA
S&D
24.95 STEPS 24.97

GENERAL SHEET NOTES

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CAMBRIDGE, MASSACHUSETTS

Project No.: 195151145
File Name: 51145C-2.DWG
Scale: 1" = 20'

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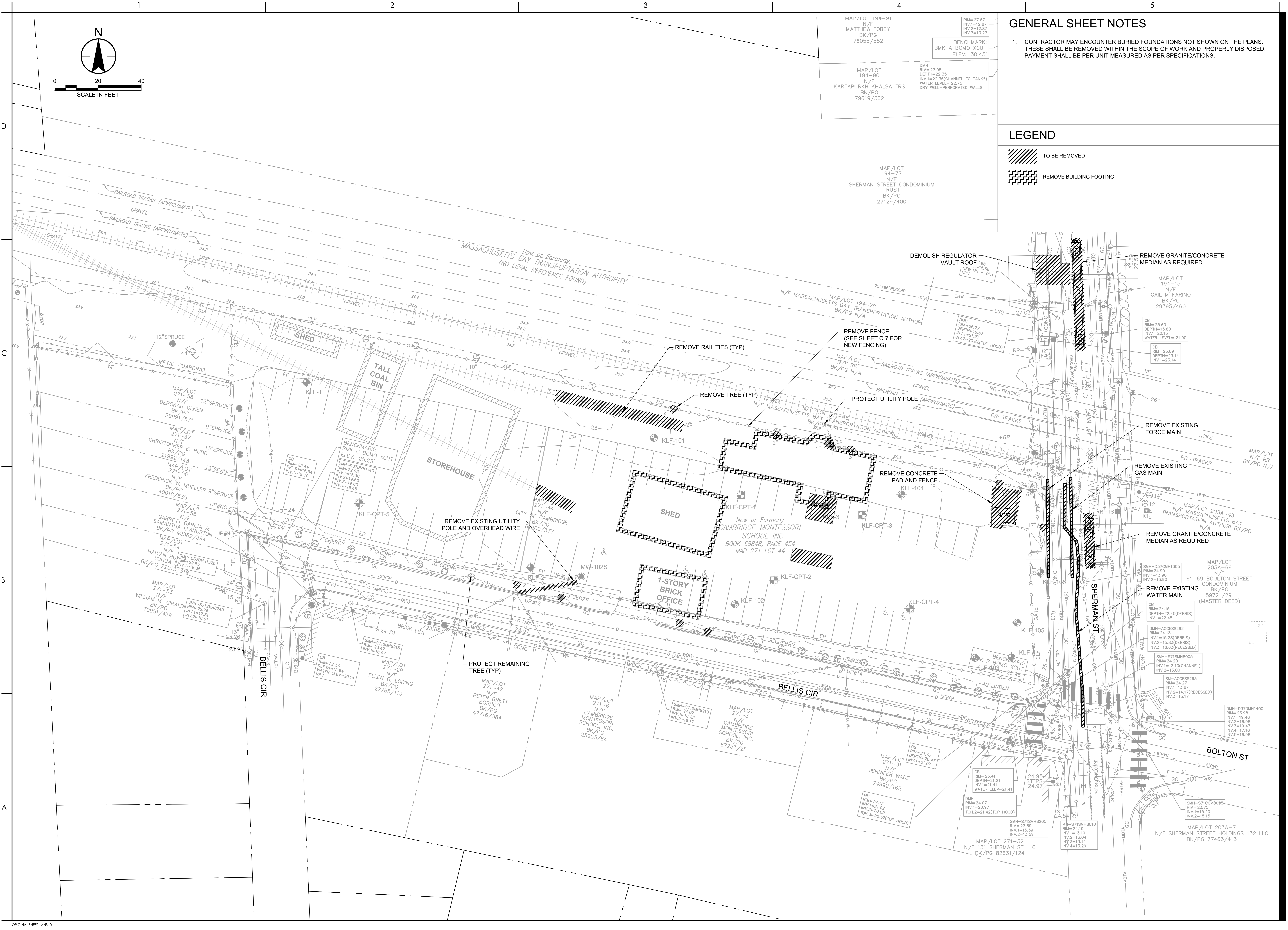
Title
EXISTING CONDITIONS PLAN

Revision: SheeVALUE of XX

Drawing No.
C-2

ORIGINAL SHEET - ANSI D


N
0 20 40
SCALE IN FEET
RAILROAD TRACKS (APPROXIMATE)
MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
Now or Formerly
(NO LEGAL REFERENCE FOUND)
SHED
TALL COAL BIN
STOREHOUSE
SHED
1-STORY BRICK OFFICE
Now or Formerly
CAMBRIDGE MONTESSORI SCHOOL INC
BOOK 68848, PAGE 454
MAP 271 LOT 44
REMOVE RAIL TIES (TYP)
REMOVE TREE (TYP)
REMOVE FENCE (SEE SHEET C-7 FOR NEW FENCING)
PROTECT UTILITY POLE
DEMOLISH REGULATOR VAULT ROOF
REMOVE GRANITE/CONCRETE MEDIAN AS REQUIRED
REMOVE EXISTING FORCE MAIN
REMOVE EXISTING GAS MAIN
REMOVE CONCRETE PAD AND FENCE
REMOVE GRANITE/CONCRETE MEDIAN AS REQUIRED
REMOVE EXISTING WATER MAIN
REMOVE EXISTING UTILITY POLE AND OVERHEAD WIRE
PROTECT REMAINING TREE (TYP)
BELLIS CIR
BELLIS CIR
SHERMAN ST
BOLTON ST
SHERMAN STREET
KLF-1
KLF-101
KLF-102
KLF-104
KLF-105
KLF-CPT-1
KLF-CPT-2
KLF-CPT-3
KLF-CPT-4
KLF-CPT-5
MW-102S
BENCHMARK: BMK A BOMO XCUT ELEV: 30.45'
BENCHMARK: BMK C BOMO XCUT ELEV. 25.23'
1
2
3
4
5
A
B
C
D

GENERAL SHEET NOTES

1. CONTRACTOR MAY ENCOUNTER BURIED FOUNDATIONS NOT SHOWN ON THE PLANS. THESE SHALL BE REMOVED WITHIN THE SCOPE OF WORK AND PROPERLY DISPOSED. PAYMENT SHALL BE PER UNIT MEASURED AS PER SPECIFICATIONS.

LEGEND

▨	TO BE REMOVED
▦	REMOVE BUILDING FOOTING

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SHERMAN CSO TANK
CAMBRIDGE, MASSACHUSETTS

Project No.: 195151145
File Name: 51145C-3.DWG
Scale: 1" = 20'

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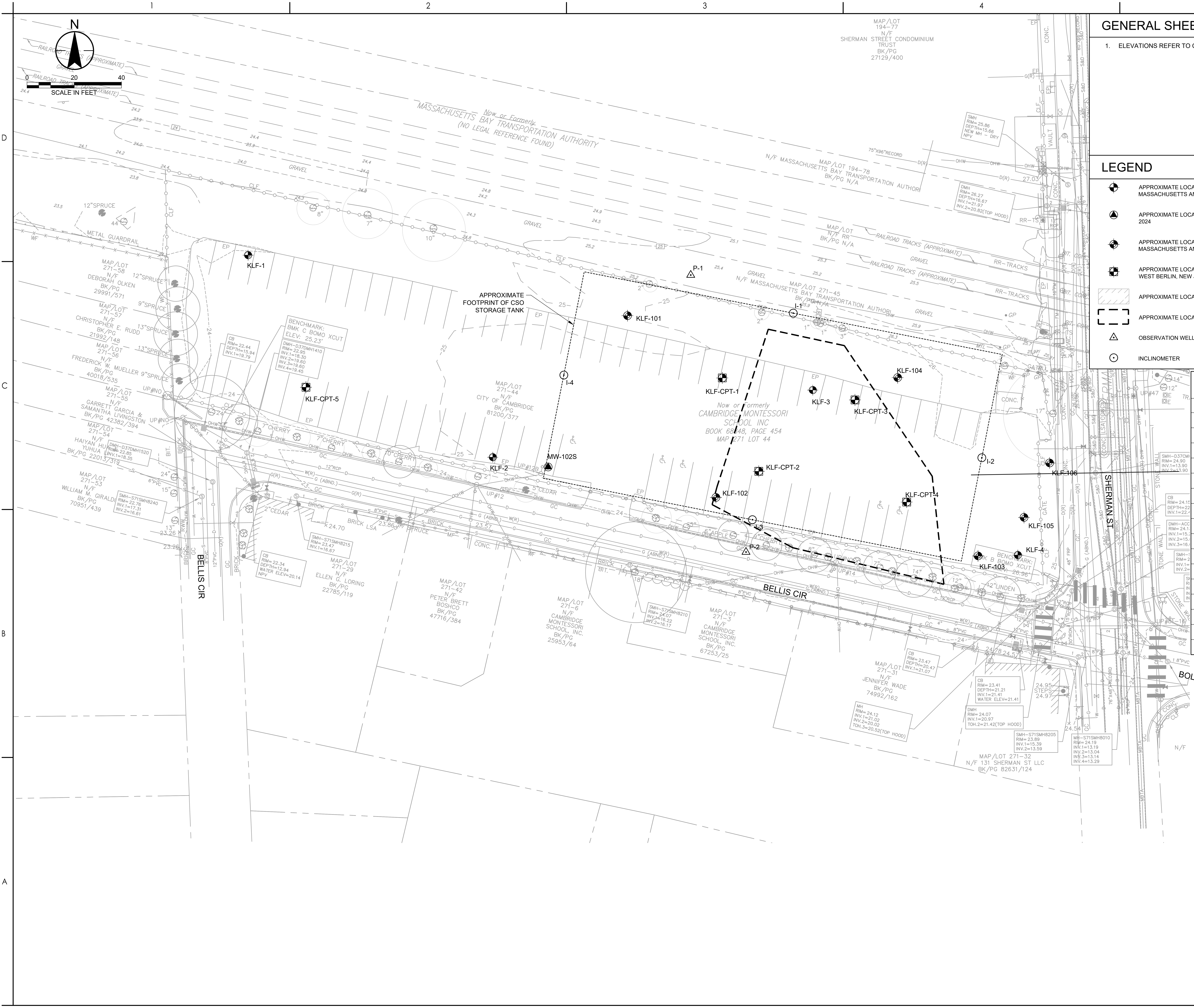
Title
DEMOLITION PLAN

Revision: SheetVALUE of XX
Drawing No.
C-3

ORIGINAL SHEET - ANSI D


N
0
20
40
SCALE IN FEET
MASSACHUSETTS BAY TRANSPORTATION AUTHORITY (NO LEGAL REFERENCE FOUND)
N/F MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
RAILROAD TRACKS (APPROXIMATE)
KLF-1
KLF-2
KLF-3
KLF-4
KLF-101
KLF-102
KLF-103
KLF-104
KLF-105
KLF-106
KLF-CPT-1
KLF-CPT-2
KLF-CPT-3
KLF-CPT-4
KLF-CPT-5
MW-102S
P-1
P-2
I-1
I-2
I-4
APPROXIMATE FOOTPRINT OF CSO STORAGE TANK
BENCHMARK: BMK C BOMO XCUT ELEV: 25.23'
MAP/LOT 271-44 N/F CITY OF CAMBRIDGE BK/PG 81200/377
Now or Formerly CAMBRIDGE MONTESSORI SCHOOL INC BOOK 68148, PAGE 454 MAP 271 LOT 44
BELLIS CIR
SHERMAN ST
BOLTON ST

GENERAL SHEET NOTES

1. ELEVATIONS REFER TO CAMBRIDGE CITY BASE.

LEGEND

◕	APPROXIMATE LOCATION OF SOIL BORINGS PERFORMED BY SOIL X CORP. OF LEOMINSTER, MASSACHUSETTS AND OBSERVED BY KLEINFELDER APRIL 2025
▲	APPROXIMATE LOCATION OF HISTORICAL BORINGS COMPLETED BY CDM SMITH IN MARCH 2024
◕	APPROXIMATE LOCATION OF SOIL BORINGS PERFORMED BY SOIL X CORP. OF LEOMINSTER, MASSACHUSETTS AND OBSERVED BY KLEINFELDER BETWEEN MARCH TO APRIL 2026
▣	APPROXIMATE LOCATION OF CONE PENETRATION TEST PERFORMED BY CONETEC INC. OF WEST BERLIN, NEW JERSEY AND OBSERVED BY KLEINFELDER IN MARCH 2026
▨	APPROXIMATE LOCATION OF HISTORICAL STRUCTURES
⬚	APPROXIMATE LOCATION OF DISPOSAL SITE BOUNDARY
△	OBSERVATION WELL
⊙	INCLINOMETER

BORING COORDINATES

BORING ID	NORTHING	EASTING
KLF-1	2,967,624.5113	755,022.7975
KLF-2	2,967,538.9614	755,126.3763
KLF-3	2,967,567.3761	755,261.8291
KLF-4	2,967,497.5141	755,348.6628
KLF-101	2,967,598.8853	755,183.4083
KLF-102	2,967,521.9299	755,220.8567
KLF-103	2,967,497.1529	755,331.8120
KLF-104	2,967,572.6444	755,297.7751
KLF-105	2,967,513.4537	755,351.2699
KLF-106	2,967,536.5139	755,362.0869
KLF-CPT-1	2,967,572.5322	755,223.5437
KLF-CPT-2	2,967,532.9899	755,238.9956
KLF-CPT-3	2,967,563.2137	755,279.7187
KLF-CPT-4	2,967,519.9750	755,301.6090
KLF-CPT-5	2,967,568.5856	755,047.2994
MW-102S	2,967,534.8215	755,149.8302

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Client/Project
CITY OF CAMBRIDGE
SHERMAN CSO TANK
CAMBRIDGE, MASSACHUSETTS

Project No.: 195151145
File Name: 51145C-5.DWG
Scale: 1" = 20'

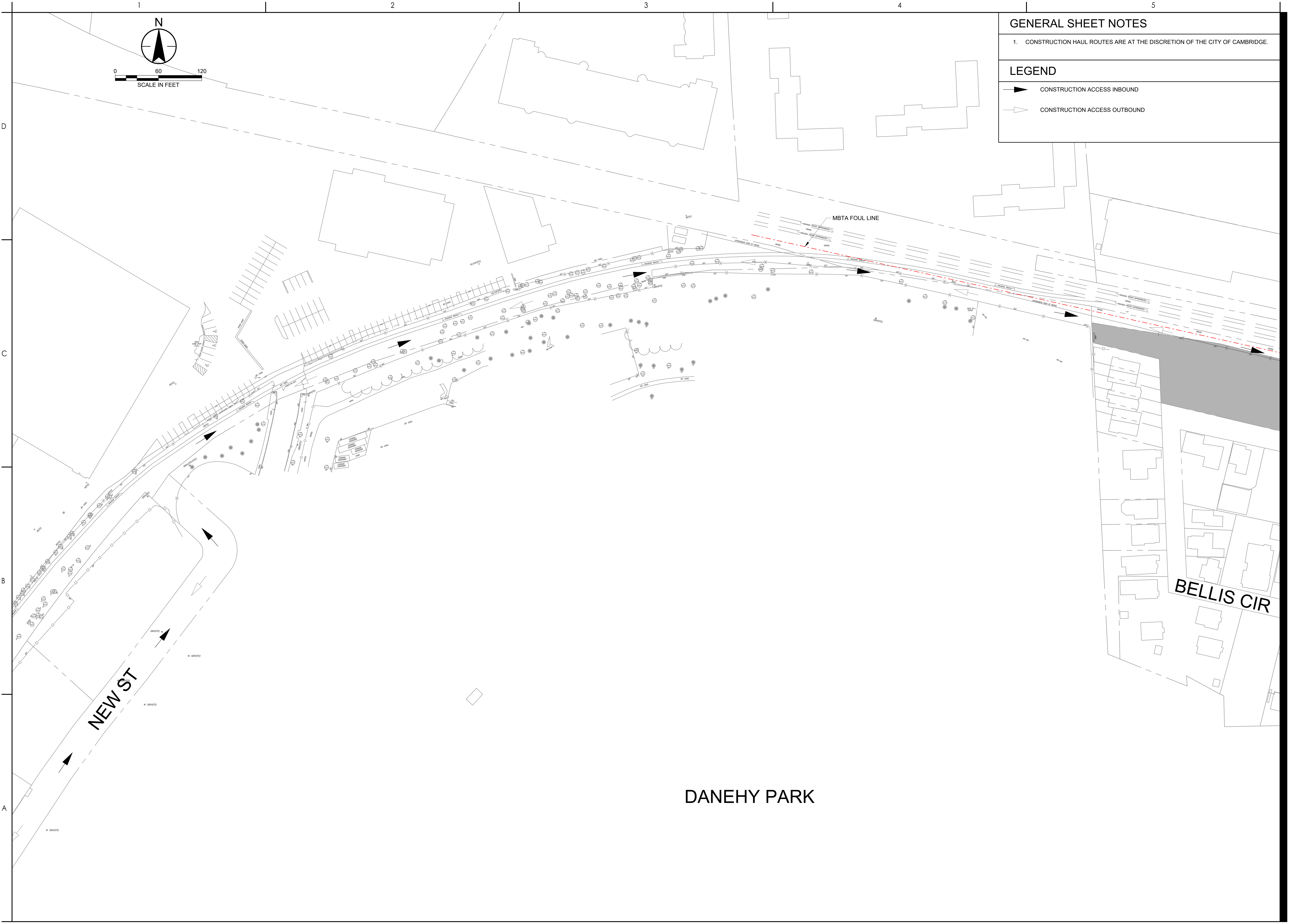
LH	SP	SP	2026.09.28
Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Title
BORINGS, GEOTECH INSTRUMENTATION AND MONITORING

Revision: Sheet: X of XX

Drawing No.
C-5

ORIGINAL SHEET - ANSI D



GENERAL SHEET NOTES

1. CONSTRUCTION HAUL ROUTES ARE AT THE DISCRETION OF THE CITY OF CAMBRIDGE.

LEGEND

➤	CONSTRUCTION ACCESS INBOUND
▷	CONSTRUCTION ACCESS OUTBOUND

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SHERMAN CSO TANK
CAMBRIDGE, MASSACHUSETTS

Project No.: 195151145
File Name: 51145C-6.DWG
Scale: 1" = 20'

SB	SB	SP	2026.09.28
Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Title
CONSTRUCTION HAULING ROUTE

Revision: Sheet: VALUE of XX

Drawing No.
C-6

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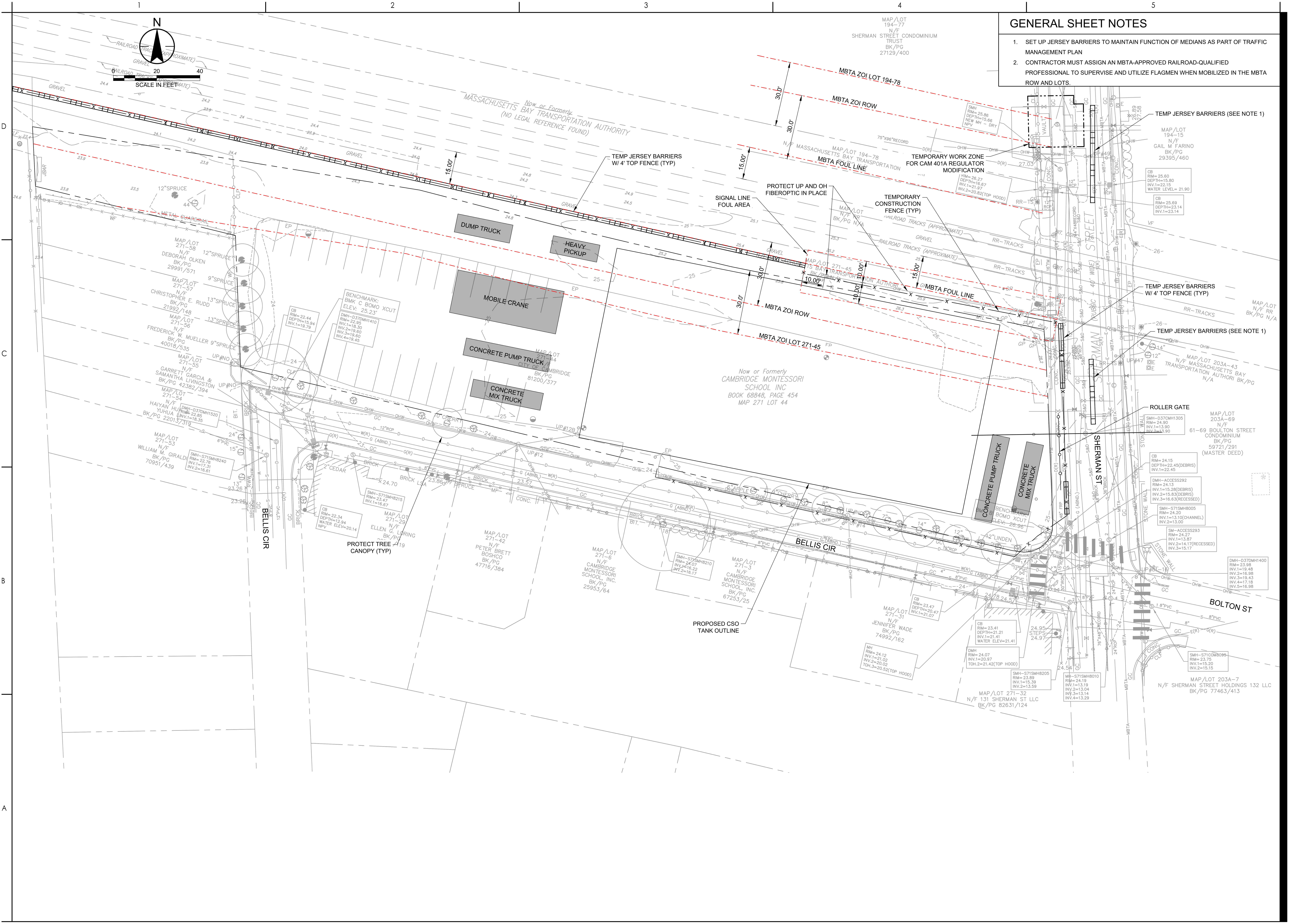
ORIGINAL SHEET - ANSI D

GENERAL SHEET NOTES

1. SET UP JERSEY BARRIERS TO MAINTAIN FUNCTION OF MEDIANS AS PART OF TRAFFIC MANAGEMENT PLAN
2. CONTRACTOR MUST ASSIGN AN MBTA-APPROVED RAILROAD-QUALIFIED PROFESSIONAL TO SUPERVISE AND UTILIZE FLAGMEN WHEN MOBILIZED IN THE MBTA ROW AND LOTS.



N
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SCALE IN FEET
1
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D
C
B
A
MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
Now or Formerly
(NO LEGAL REFERENCE FOUND)
MAP/LOT 194-77
N/F
SHERMAN STREET CONDOMINIUM TRUST
BK/PG 27129/400
MBTA ZOI LOT 194-78
MBTA ZOI ROW
MBTA FOUL LINE
MBTA ZOI LOT 271-45
N/F MASSACHUSETTS BAY TRANSPORTATION
MAP/LOT 194-78
30.0'
15.00'
10.00'
TEMP JERSEY BARRIERS W/ 4' TOP FENCE (TYP)
SIGNAL LINE FOUL AREA
PROTECT UP AND OH FIBEROPTIC IN PLACE
TEMPORARY WORK ZONE FOR CAM 401A REGULATOR MODIFICATION
TEMPORARY CONSTRUCTION FENCE (TYP)
TEMP JERSEY BARRIERS (SEE NOTE 1)
TEMP JERSEY BARRIERS W/ 4' TOP FENCE (TYP)
TEMP JERSEY BARRIERS (SEE NOTE 1)
ROLLER GATE
DUMP TRUCK
HEAVY PICKUP
MOBILE CRANE
CONCRETE PUMP TRUCK
CONCRETE MIX TRUCK
CONCRETE PUMP TRUCK
CONCRETE MIX TRUCK
Now or Formerly
CAMBRIDGE MONTESSORI SCHOOL INC
BOOK 68848, PAGE 454
MAP 271 LOT 44
PROTECT TREE CANOPY (TYP)
PROPOSED CSO TANK OUTLINE
BELLIS CIR
BELLIS CIR
SHERMAN ST
BOLTON ST
RAILROAD TRACKS (APPROXIMATE)
RR-TRACKS
GRAVEL
METAL GUARDRAIL
BENCHMARK: BMK C BOMO XCUT ELEV. 25.23'
MAP/LOT 271-58 N/F DEBORAH OLKEN BK/PG 29991/571
MAP/LOT 271-57 N/F CHRISTOPHER E. RUDD BK/PG 21992/148
MAP/LOT 271-56 N/F FREDERICK W. MUELLER BK/PG 40018/535
MAP/LOT 271-55 N/F GARRETT GARCIA & SAMANTHA LIVINGSTON BK/PG 42382/394
MAP/LOT 271-54 N/F HAIYAN HU & YUHUA BK/PG 22013/319
MAP/LOT 271-53 N/F WILLIAM M. GIRALDI BK/PG 70951/439
MAP/LOT 271-44 CITY OF CAMBRIDGE BK/PG 81200/377
MAP/LOT 271-29 N/F ELLEN G. LORING BK/PG
MAP/LOT 271-42 N/F PETER BRETT BOSHCO BK/PG 47716/384
MAP/LOT 271-6 N/F CAMBRIDGE MONTESSORI SCHOOL, INC. BK/PG 25953/64
MAP/LOT 271-3 N/F CAMBRIDGE MONTESSORI SCHOOL, INC. BK/PG 67253/25
MAP/LOT 271-31 N/F JENNIFER WADE BK/PG 74992/162
MAP/LOT 271-32 N/F 131 SHERMAN ST LLC BK/PG 82631/124
MAP/LOT 194-15 N/F GAIL M FARINO BK/PG 29395/460
MAP/LOT 203A-43 N/F MASSACHUSETTS BAY TRANSPORTATION AUTHORI BK/PG N/A
MAP/LOT N/F RR BK/PG N/A
MAP/LOT 203A-69 N/F 61-69 BOULTON STREET CONDOMINIUM BK/PG 59721/291 (MASTER DEED)
MAP/LOT 203A-7 N/F SHERMAN STREET HOLDINGS 132 LLC BK/PG 77463/413

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Client/Project
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SHERMAN CSO TANK
CAMBRIDGE, MASSACHUSETTS

Project No.: 195151145
File Name: 51145C-7.DWG
Scale: 1" = 20'

SB	SB	SP	2026.09.28
Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Title
CONSTRUCTION STAGING PLAN

Revision: Sheet: X of XX

Drawing No.
C-7

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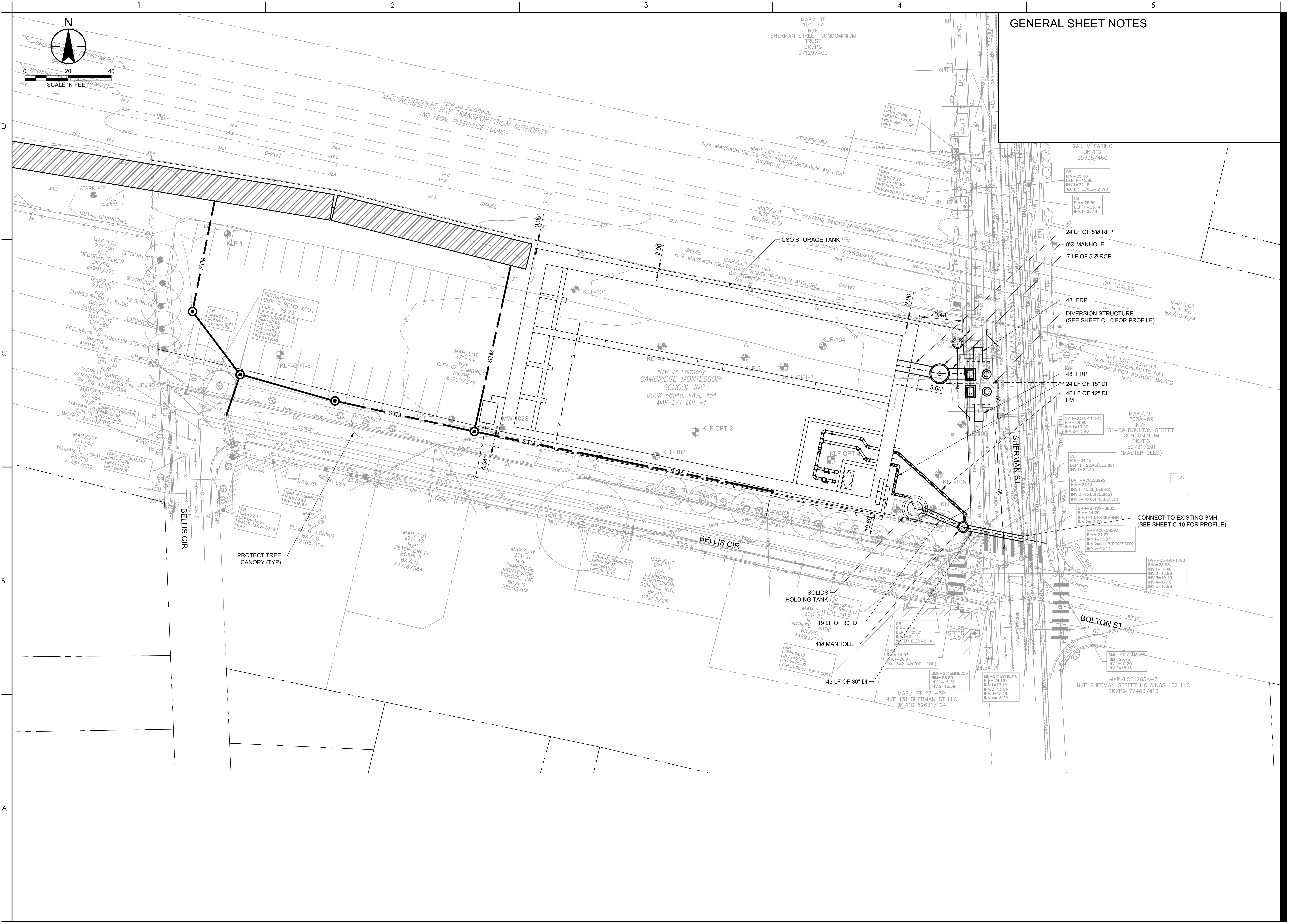
ORIGINAL SHEET - ANSI D

GENERAL SHEET NOTES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C
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SCALE IN FEET
MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
Now or Formerly
(NO LEGAL REFERENCE FOUND)
MAP/LOT 194-77
N/F
SHERMAN STREET CONDOMINIUM TRUST
BK/PG 27129/400
N/F MASSACHUSETTS BAY TRANSPORTATION AUTHORI
MAP/LOT 194-78
BK/PG N/A
RAILROAD TRACKS (APPROXIMATE)
RR-TRACKS
GRAVEL
METAL GUARDRAIL
12"SPRUCE
CSO STORAGE TANK
MAP/LOT 271-45
N/F MASSACHUSETTS BAY TRANSPORTATION AUTHORI
BENCHMARK:
BMK C BOMO XCUT
ELEV: 25.23'
STM
KLF-1
KLF-101
KLF-104
KLF-CPT-1
KLF-CPT-3
KLF-CPT-5
KLF-3
KLF-CPT-2
KLF-102
KLF-105
KLF-106
MW-102S
MAP/LOT 271-44
N/F
CITY OF CAMBRIDGE
BK/PG 81200/377
Now or Formerly
CAMBRIDGE MONTESSORI SCHOOL INC
BOOK 68848, PAGE 454
MAP 271 LOT 44
3.89'
2.00'
2.00'
20.48'
5.00'
4.54'
10.86'
24 LF OF 5'Ø RFP
8'Ø MANHOLE
7 LF OF 5'Ø RCP
48" FRP
DIVERSION STRUCTURE
(SEE SHEET C-10 FOR PROFILE)
48" FRP
24 LF OF 15" DI
46 LF OF 12" DI FM
CONNECT TO EXISTING SMH
(SEE SHEET C-10 FOR PROFILE)
SOLIDS HOLDING TANK
19 LF OF 30" DI
4'Ø MANHOLE
43 LF OF 30" DI
PROTECT TREE CANOPY (TYP)
SHERMAN ST
BELLIS CIR
BOLTON ST
MAP/LOT 271-58
N/F
DEBORAH OLKEN
BK/PG 29991/571
MAP/LOT 271-57
N/F
CHRISTOPHER E. RUDD
BK/PG 21992/148
MAP/LOT 271-56
N/F
FREDERICK W. MUELLER
BK/PG 40018/535
MAP/LOT 271-55
N/F
GARRETT GARCIA & SAMANTHA LIVINGSTON
BK/PG 42382/394
MAP/LOT 271-54
N/F
HAIYAN HU & YUHUA
BK/PG 22013/319
MAP/LOT 271-53
N/F
WILLIAM M. GIRALDI
BK/PG 70951/439
MAP/LOT 271-29
N/F
ELLEN G. LORING
BK/PG 22785/119
MAP/LOT 271-42
N/F
PETER BRETT BOSHCO
BK/PG 47716/384
MAP/LOT 271-6
N/F
CAMBRIDGE MONTESSORI SCHOOL, INC.
BK/PG 25953/64
MAP/LOT 271-3
N/F
CAMBRIDGE MONTESSORI SCHOOL, INC.
BK/PG 67253/25
MAP/LOT 271-31
N/F
JENNIFER WADE
BK/PG 74992/162
MAP/LOT 271-32
N/F 131 SHERMAN ST LLC
BK/PG 82631/124
MAP/LOT 203A-7
N/F SHERMAN STREET HOLDINGS 132 LLC
BK/PG 77463/413
MAP/LOT 203A-69
N/F
61-69 BOULTON STREET CONDOMINIUM
BK/PG 59721/291
(MASTER DEED)
MAP/LOT 203A-43
N/F MASSACHUSETTS BAY TRANSPORTATION AUTHORI BK/PG N/A
MAP/LOT N/F RR BK/PG N/A
GAIL M FARINO
BK/PG 29395/460
SMH-D37CMH1305 RIM= 24.90 INV.1=13.90 INV.2=13.90
CB RIM= 24.15 DEPTH=22.45(DEBRIS) INV.1=22.45
DMH-ACCESS292 RIM= 24.13 INV.1=15.28(DEBRIS) INV.2=15.83(DEBRIS) INV.3=16.63(RECESSED)
SMH-S71SMH8005 RIM= 24.20 INV.1=13.10(CHANNEL) INV.2=13.00
SM-ACCESS293 RIM= 24.27 INV.1=13.87 INV.2=14.17(RECESSED) INV.3=15.17
DMH-D37DMH1400 RIM= 23.98 INV.1=19.48 INV.2=16.98 INV.3=19.43 INV.4=17.18 INV.5=16.98
SMH-S71COM8095 RIM= 23.75 INV.1=15.20 INV.2=15.15
MH-S71SMH8010 RIM= 24.19 INV.1=13.19 INV.2=13.04 INV.3=13.14 INV.4=13.29
SMH-S71SMH8205 RIM= 23.89 INV.1=15.39 INV.2=13.59
DMH RIM= 24.07 INV.1=20.97 TOH.2=21.42(TOP HOOD)
CB RIM= 23.41 DEPTH= 21.21 INV.1=21.41 WATER ELEV=21.41
MH RIM= 24.12 INV.1=21.02 INV.2=20.02 TOH.3=20.52(TOP HOOD)
CB RIM= 23.47 DEPTH=20.47 INV.1=21.07
CB RIM= 25.60 DEPTH=15.80 INV.1=22.15 WATER LEVEL= 21.90
CB RIM= 25.69 DEPTH=23.14 INV.1=23.14
DMH RIM= 26.27 DEPTH=16.67 INV.1=21.97 INV.2=20.82(TOP HOOD)
SMH RIM= 25.86 DEPTH=15.66 NEW MH - DRY NPV
CB RIM= 22.44 DEPTH=15.94 INV.1=19.79
DMH-D370MH1410 RIM= 22.95 INV.1=18.30 INV.2=19.60 INV.3=19.60 INV.4=19.45
DMH-D370MH1520 RIM= 22.85 INV.1=18.35
SMH-S71SMH8240 RIM= 22.76 INV.1=17.31 INV.2=16.61
CB RIM= 22.34 DEPTH=12.94 WATER ELEV=20.14 NPV
SMH-S71SMH8215 RIM= 23.47 INV.1=16.67
SMH-S71SMH8210 RIM= 24.07 INV.1=16.22 INV.2=16.17
STEPS
STONE WALL
75"x96"RECORD
76"x48"RECORD

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Client/Project
CITY OF CAMBRIDGE
SHERMAN CSO TANK
CAMBRIDGE, MASSACHUSETTS

Project No.: 195151145
File Name: 51145C-8.DWG
Scale: 1" = 20'

LH	SP	SP	2026.09.28
Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Title
YARD PIPING PLAN

Revision: Sheet: X of XX
Drawing No.
C-8

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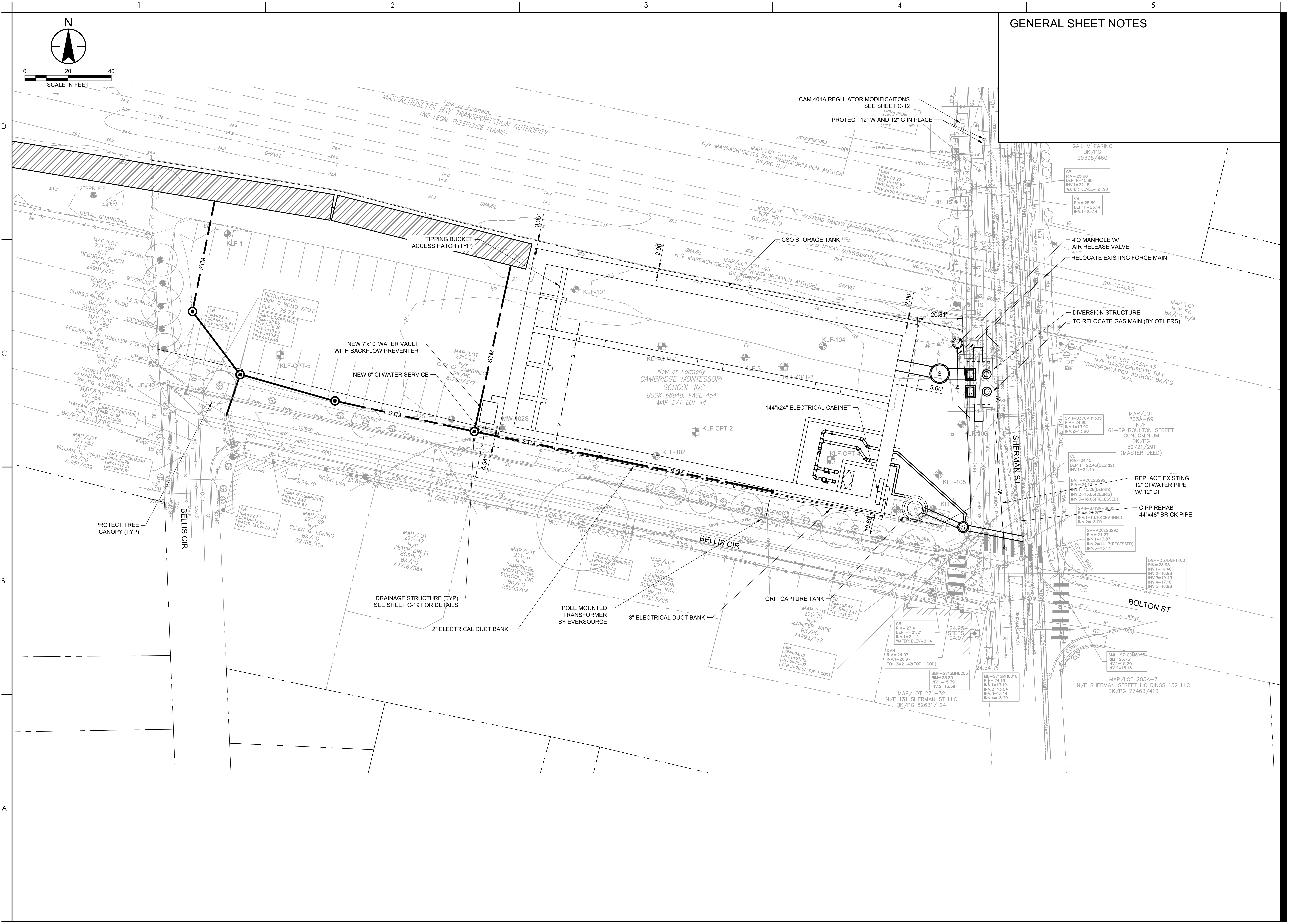
ORIGINAL SHEET - ANSI D

GENERAL SHEET NOTES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SCALE IN FEET
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C
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A
CAM 401A REGULATOR MODIFICAITONS SEE SHEET C-12
PROTECT 12" W AND 12" G IN PLACE
TIPPING BUCKET ACCESS HATCH (TYP)
CSO STORAGE TANK
4'Ø MANHOLE W/ AIR RELEASE VALVE
RELOCATE EXISTING FORCE MAIN
DIVERSION STRUCTURE
TO RELOCATE GAS MAIN (BY OTHERS)
NEW 7'x10' WATER VAULT WITH BACKFLOW PREVENTER
NEW 6" CI WATER SERVICE
144"x24" ELECTRICAL CABINET
REPLACE EXISTING 12" CI WATER PIPE W/ 12" DI
CIPP REHAB 44"x48" BRICK PIPE
PROTECT TREE CANOPY (TYP)
DRAINAGE STRUCTURE (TYP) SEE SHEET C-19 FOR DETAILS
2" ELECTRICAL DUCT BANK
POLE MOUNTED TRANSFORMER BY EVERSOURCE
3" ELECTRICAL DUCT BANK
GRIT CAPTURE TANK
MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
CAMBRIDGE MONTESSORI SCHOOL INC
BOOK 68848, PAGE 454
MAP 271 LOT 44
BELLIS CIR
SHERMAN ST
BOLTON ST
STM
20.81'
5.00'
2.00'
3.89'
4.54'
0.88'
KLF-1
KLF-101
KLF-102
KLF-104
KLF-105
KLF-CPT-1
KLF-CPT-2
KLF-CPT-3
KLF-CPT-5
KLF-3
BENCHMARK: BMK C BOMO XCUT ELEV: 25.23'

ORIGINAL SHEET - ANSI D

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CAMBRIDGE, MASSACHUSETTS

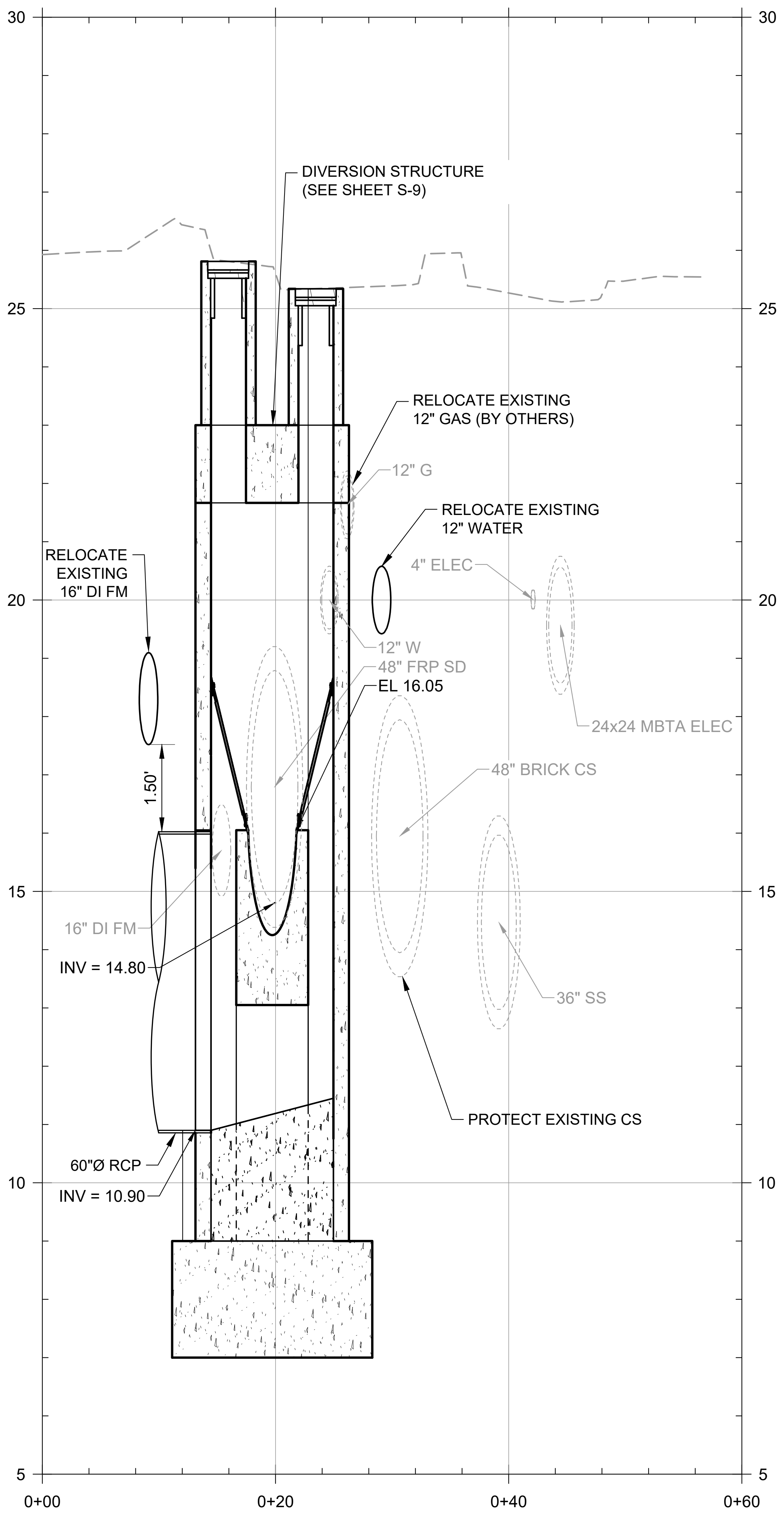
Project No.: 195151145
File Name: 51145C-9.DWG
Scale: 1" = 20'

LH	SP	SP	2026.09.28
Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Title
UTILITIES PLAN

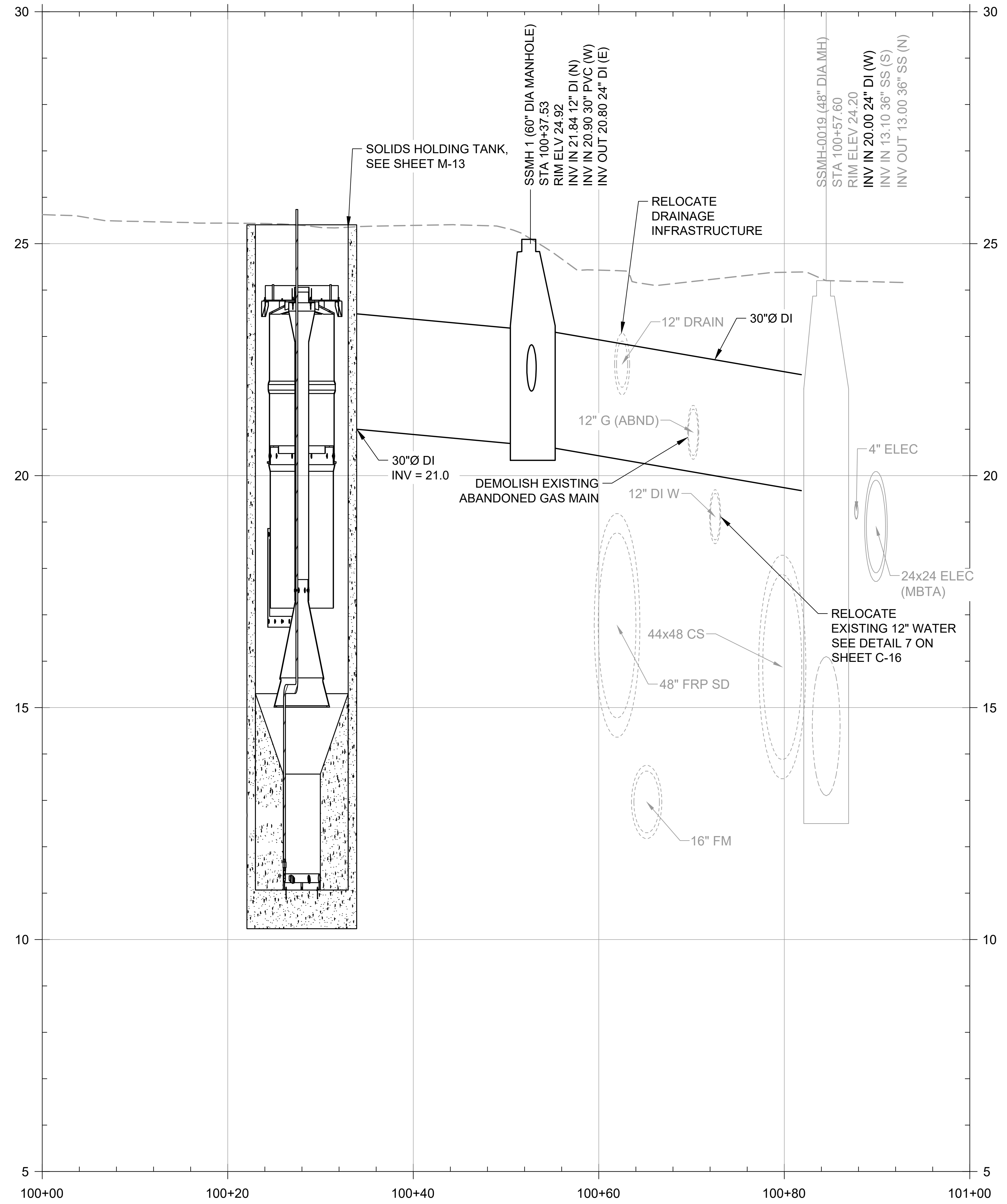
Revision: Sheet: X of XX

Drawing No.
C-9



PROFILE - DIVERSION STRUCTURE

HORIZONTAL SCALE:1"=10'
VERTICAL SCALE:1"=2'



PROFILE - SOLIDS HOLDING TANK

HORIZONTAL SCALE:1"=10'
VERTICAL SCALE:1"=2'

GENERAL SHEET NOTES

SCALE IN FEET

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CITY OF CAMBRIDGE

SHERMAN CSO TANK

CAMBRIDGE, MASSACHUSETTS

Project No.: 195151145
File Name: 51145C-10.DWG
Scale: AS SHOWN

LH	SP	SP	2026.09.28
Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Title
PROFILE - DIVERSION AND
DISCHARGE SEWERS

Revision: Sheet: VALUE of XX

Drawing No.
C-10

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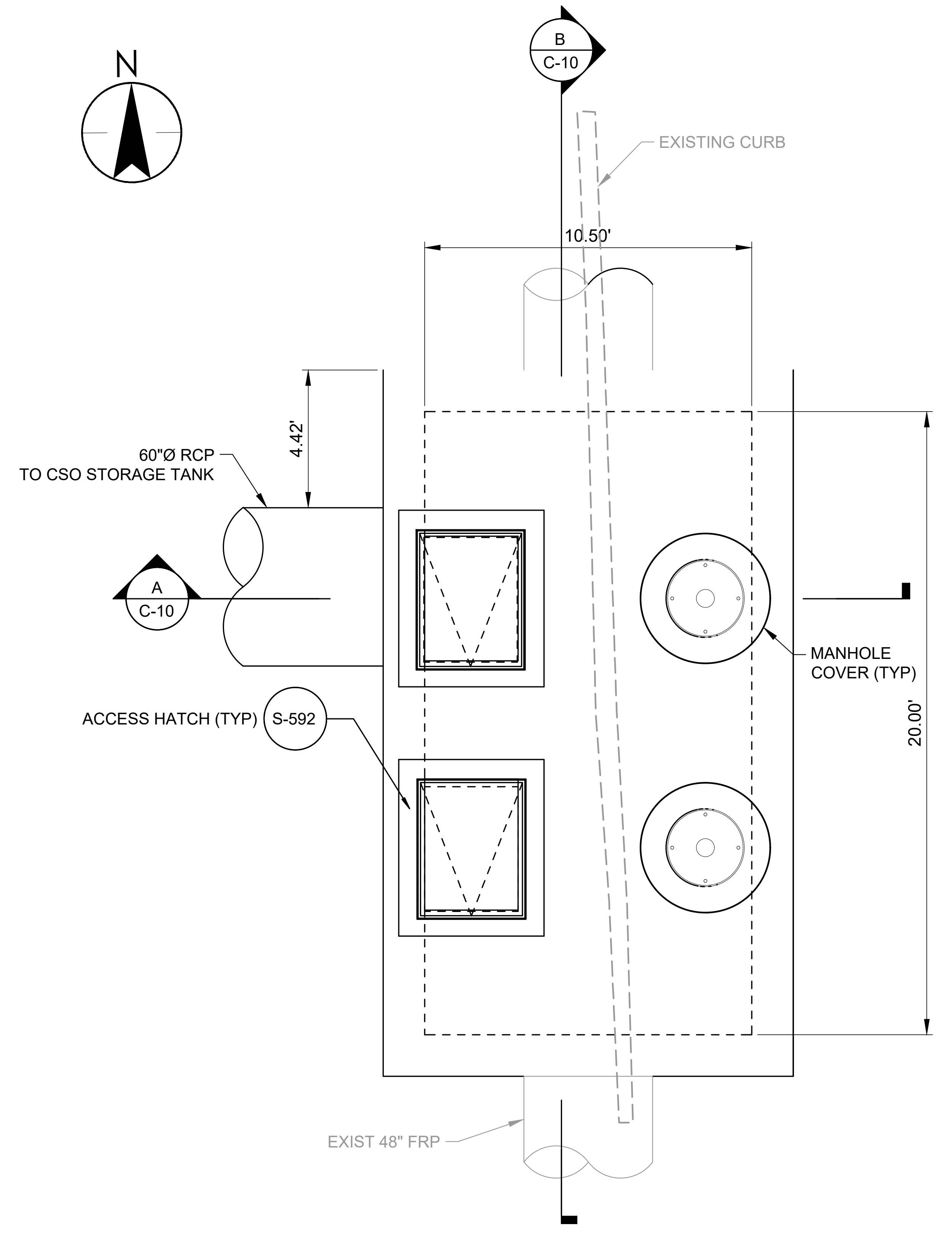
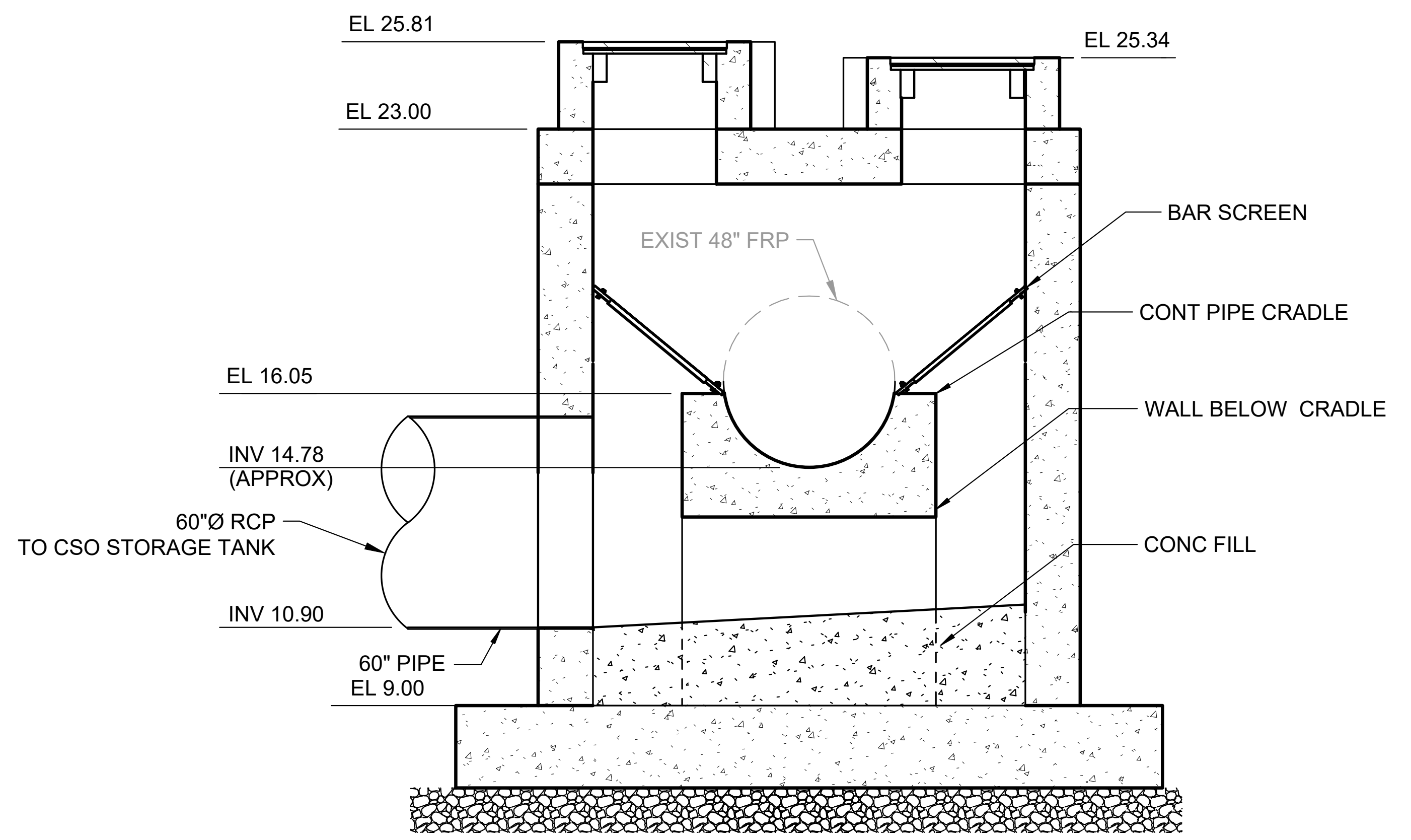
ORIGINAL SHEET - ANSI D

GENERAL SHEET NOTES

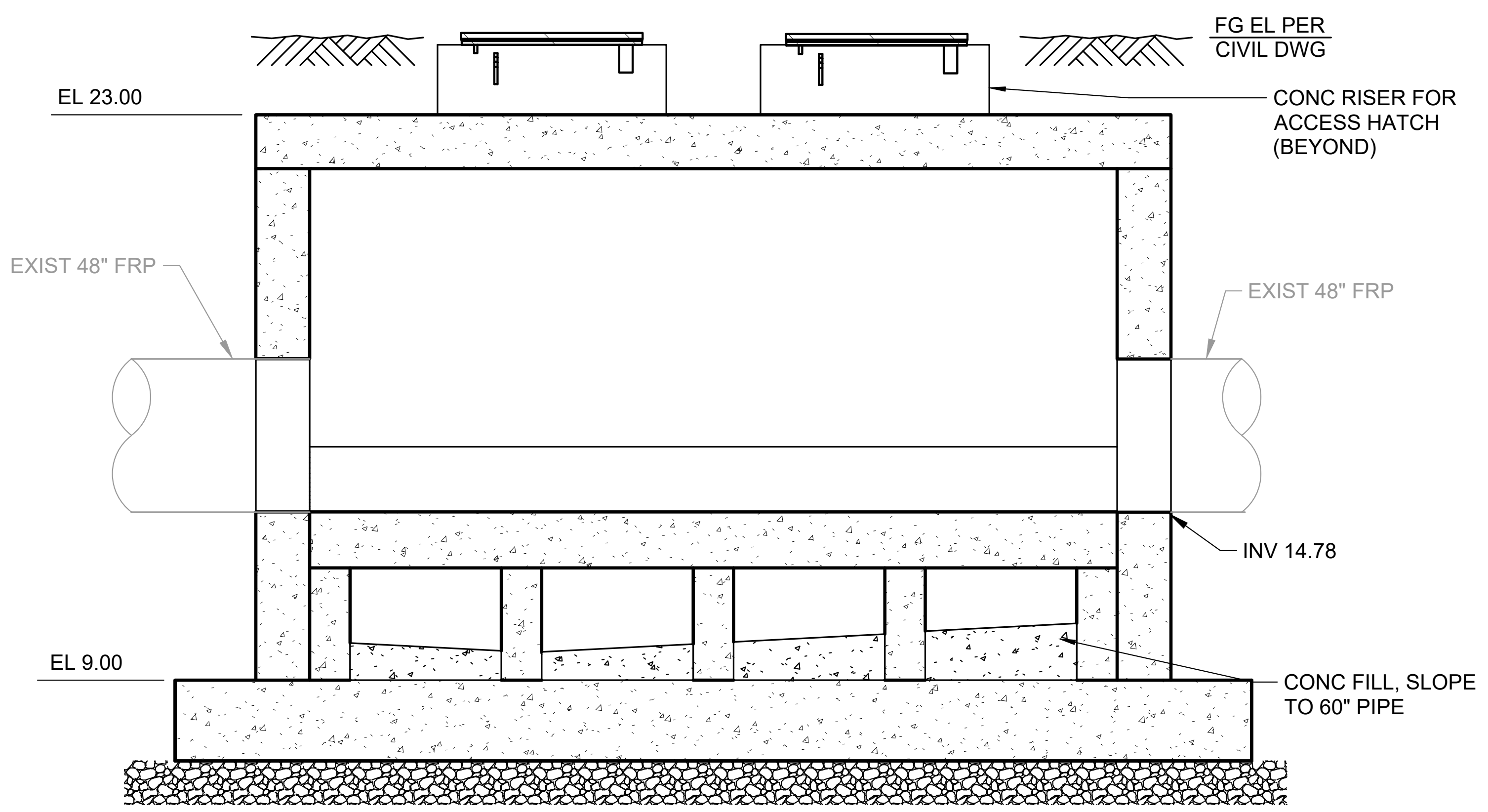
1. SEE STRUCTURAL SHEETS FOR DETAILS



TOP PLAN
SCALE 1/4" = 1'-0"



A
C-10
SECTION
SCALE: 1/4" = 1'-0"



B
C-10
SECTION
SCALE: 1/4" = 1'-0"

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Issued	By	Appd	YYYY.MM.DD
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Client/Project
CITY OF CAMBRIDGE

SHERMAN CSO TANK

CAMBRIDGE, MASSACHUSETTS

Project No.: 195151145
File Name: 51145C-11.DWG
Scale: 1/4" = 1'-0"

SB	JM	SP	2026.09.28
Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Title
CUSTOM DETAILS -
DIVERSION STRUCTURE

Revision: Sheet VALUE of XX
Drawing No.
C-11

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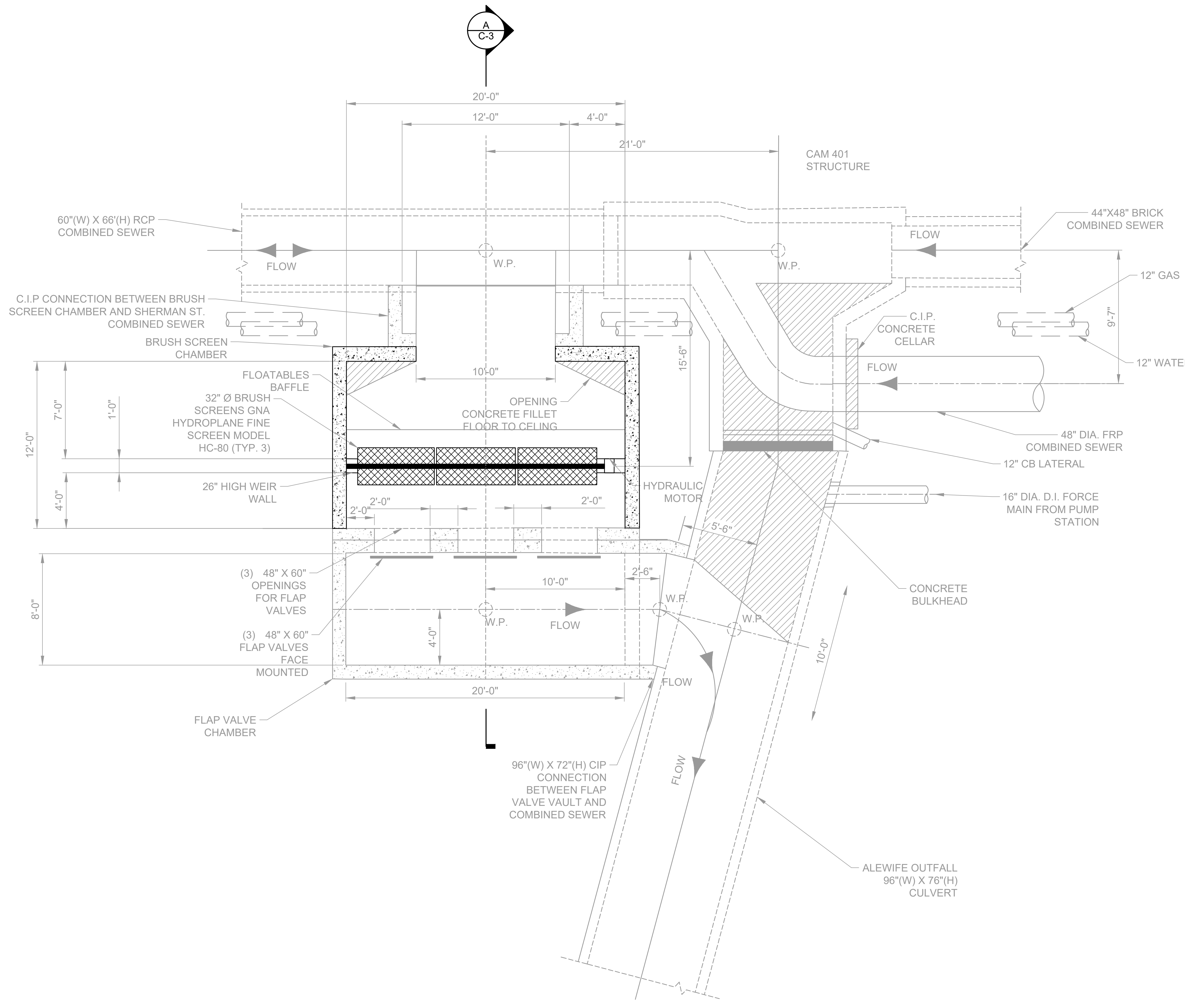
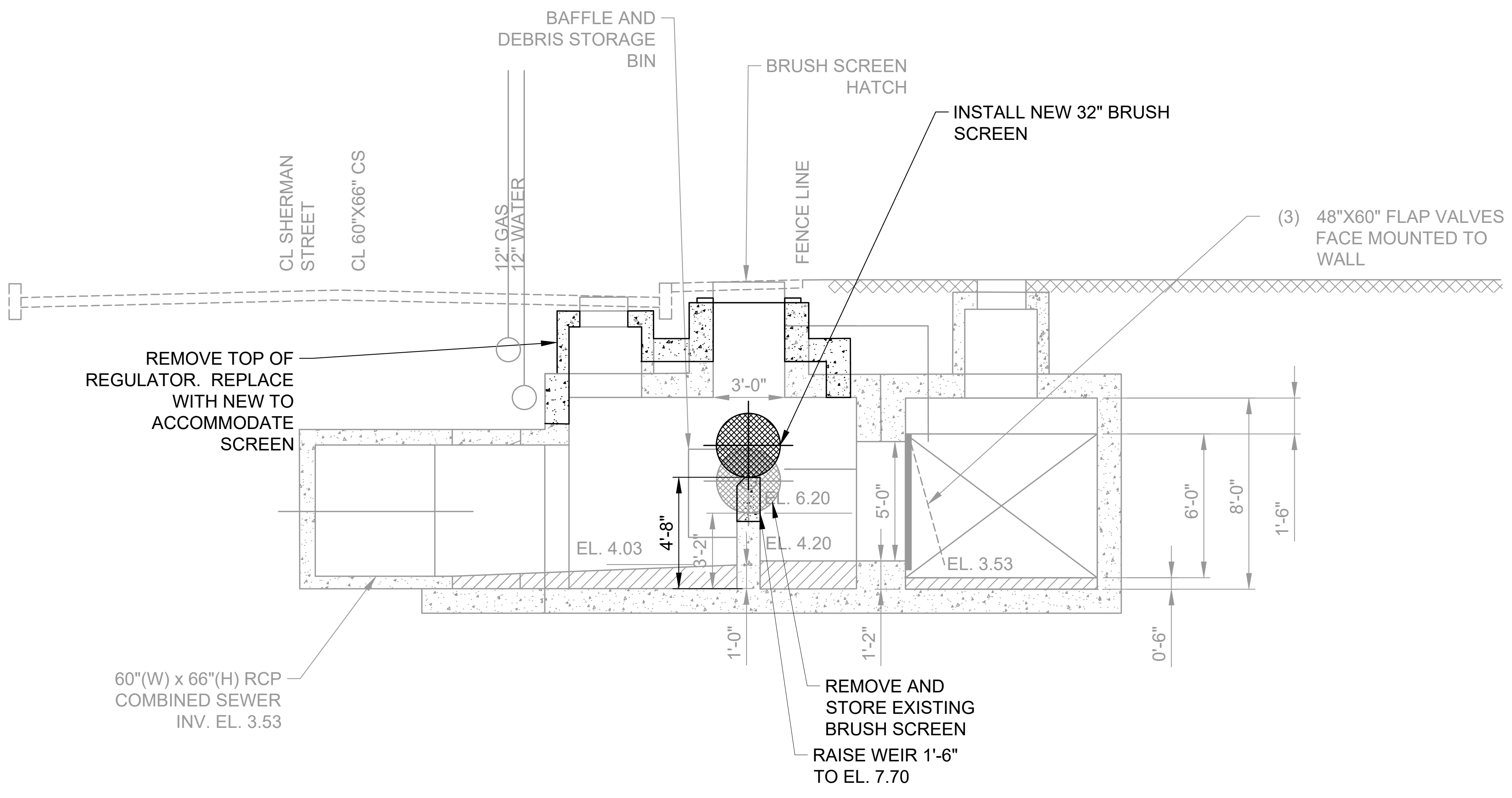
2026.09.28 11:45:18 AM

ORIGINAL SHEET - ANSI D


A
C-3
20'-0"
12'-0"
4'-0"
21'-0"
CAM 401 STRUCTURE
60"(W) X 66'(H) RCP COMBINED SEWER
FLOW
W.P.
44"X48" BRICK COMBINED SEWER
12" GAS
9'-7"
12" WATER
C.I.P CONNECTION BETWEEN BRUSH SCREEN CHAMBER AND SHERMAN ST. COMBINED SEWER
BRUSH SCREEN CHAMBER
C.I.P. CONCRETE CELLAR
15'-6"
FLOATABLES BAFFLE
10'-0"
OPENING CONCRETE FILLET FLOOR TO CELING
32" Ø BRUSH SCREENS GNA HYDROPLANE FINE SCREEN MODEL HC-80 (TYP. 3)
48" DIA. FRP COMBINED SEWER
12" CB LATERAL
12'-0"
7'-0"
1'-0"
4'-0"
26" HIGH WEIR WALL
HYDRAULIC MOTOR
16" DIA. D.I. FORCE MAIN FROM PUMP STATION
2'-0"
5'-6"
(3) 48" X 60" OPENINGS FOR FLAP VALVES
2'-6"
CONCRETE BULKHEAD
8'-0"
(3) 48" X 60" FLAP VALVES FACE MOUNTED
4'-0"
10'-0"
20'-0"
FLAP VALVE CHAMBER
96"(W) X 72"(H) CIP CONNECTION BETWEEN FLAP VALVE VAULT AND COMBINED SEWER
ALEWIFE OUTFALL 96"(W) X 76"(H) CULVERT

LOWER LEVEL-PLAN FLOATABLE CONTROL STRUCTURE (CAM401A)

SCALE 3/16" = 1'


BAFFLE AND DEBRIS STORAGE BIN
BRUSH SCREEN HATCH
INSTALL NEW 32" BRUSH SCREEN
CL SHERMAN STREET
CL 60"X66" CS
12" GAS
12" WATER
FENCE LINE
(3) 48"X60" FLAP VALVES FACE MOUNTED TO WALL
REMOVE TOP OF REGULATOR. REPLACE WITH NEW TO ACCOMMODATE SCREEN
3'-0"
EL. 6.20
EL. 4.03
EL. 4.20
EL. 3.53
4'-8"
3'-2"
5'-0"
6'-0"
8'-0"
1'-6"
1'-0"
1'-2"
0'-6"
60"(W) x 66"(H) RCP COMBINED SEWER INV. EL. 3.53
REMOVE AND STORE EXISTING BRUSH SCREEN
RAISE WEIR 1'-6" TO EL. 7.70

A C-3 SECTION - FLOATABLE CONTROL STRUCTURE (CAM401A)

SCALE 3/16" = 1'

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CAMBRIDGE, MASSACHUSETTS

Project No.: 195151145
File Name: 51145C-12.DWG
Scale: AS SHOWN

PS	VALUE	VALUE	2026.09.28
Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Title
CUSTOM DETAILS - 401A
REGULATOR
MODIFICATIONS

Revision: Sheet: -- of XX

Drawing No.
C-12

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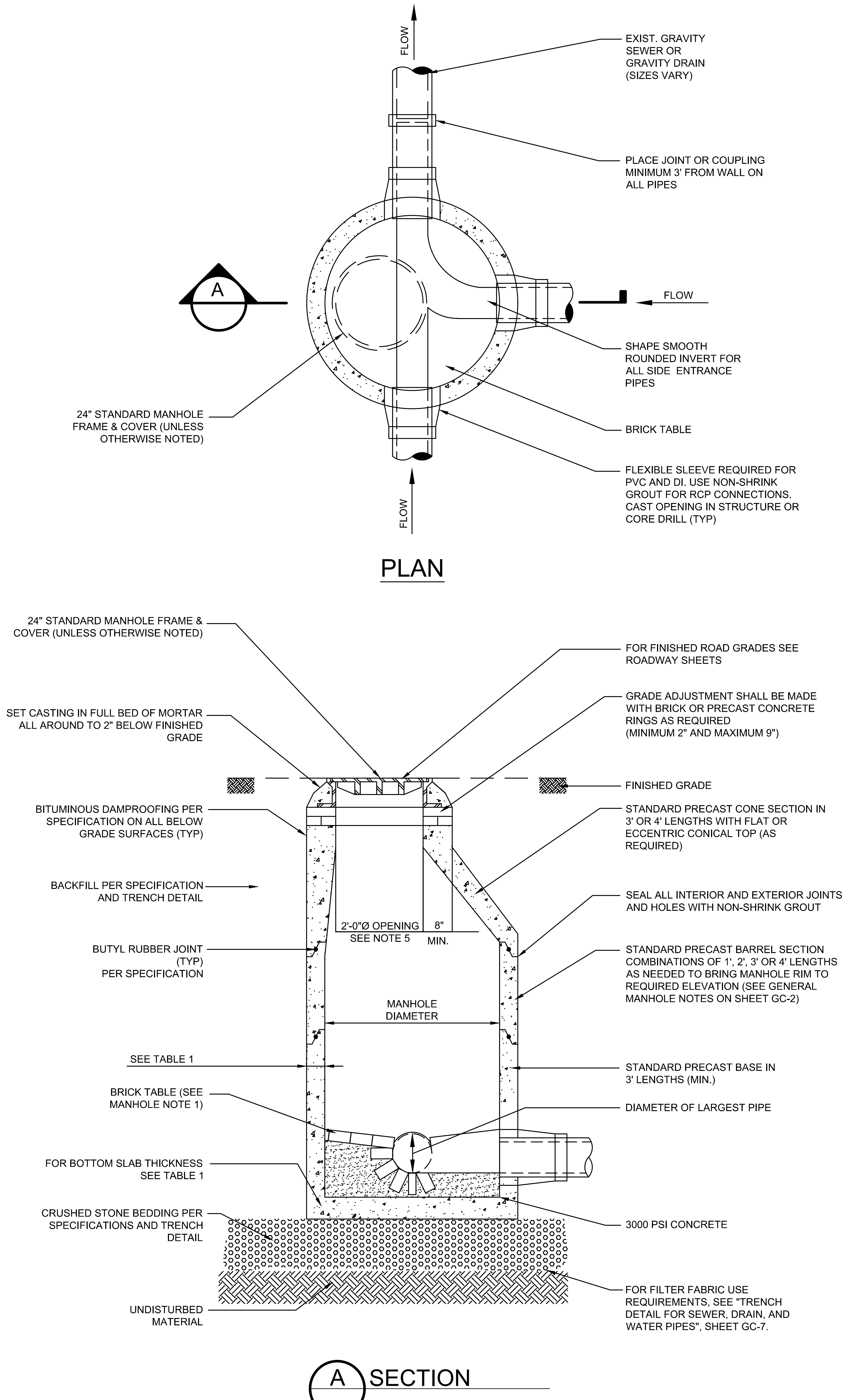
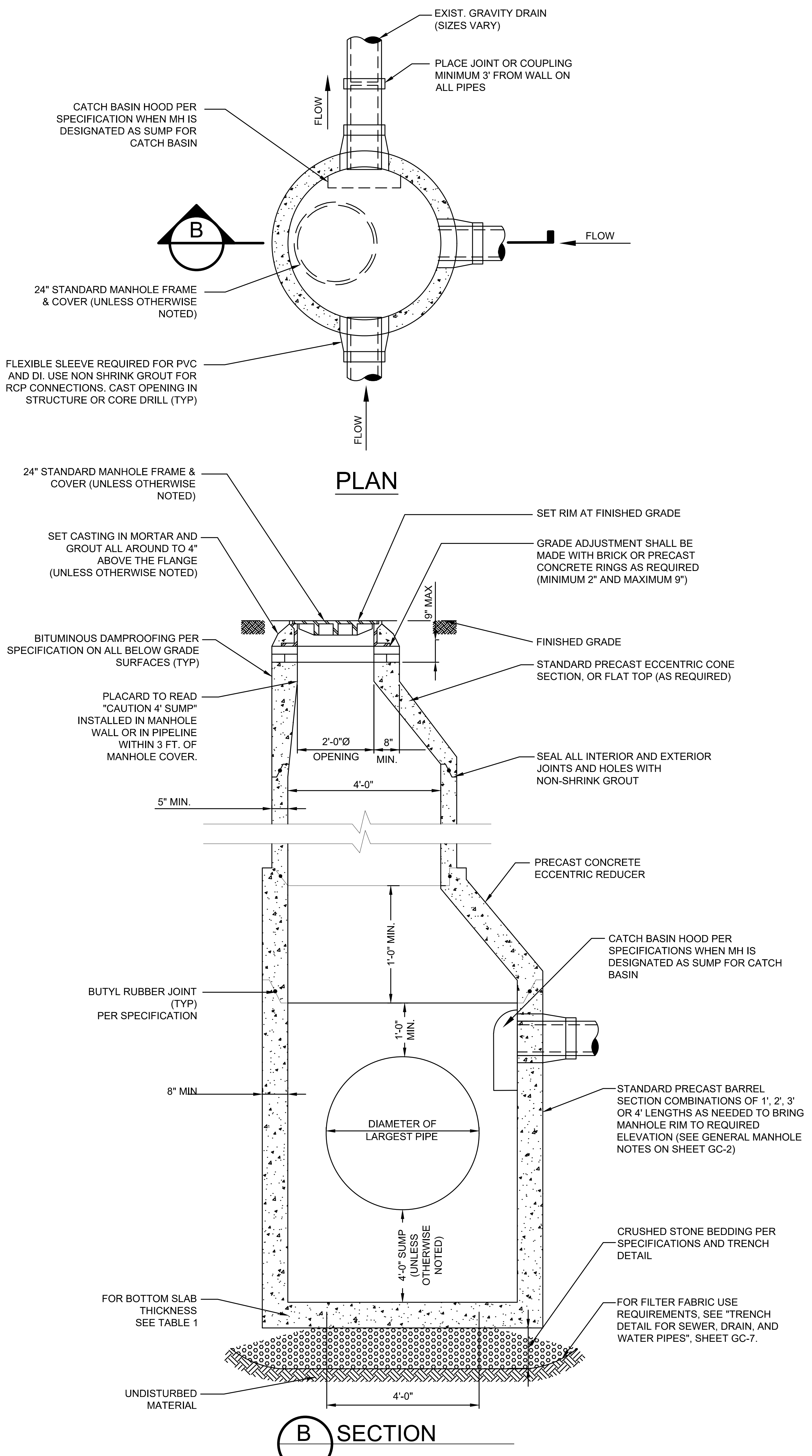

FLOW
EXIST. GRAVITY SEWER OR GRAVITY DRAIN (SIZES VARY)
PLACE JOINT OR COUPLING MINIMUM 3' FROM WALL ON ALL PIPES
A
FLOW
SHAPE SMOOTH ROUNDED INVERT FOR ALL SIDE ENTRANCE PIPES
24" STANDARD MANHOLE FRAME & COVER (UNLESS OTHERWISE NOTED)
BRICK TABLE
FLEXIBLE SLEEVE REQUIRED FOR PVC AND DI. USE NON-SHRINK GROUT FOR RCP CONNECTIONS. CAST OPENING IN STRUCTURE OR CORE DRILL (TYP)
FLOW
PLAN
24" STANDARD MANHOLE FRAME & COVER (UNLESS OTHERWISE NOTED)
FOR FINISHED ROAD GRADES SEE ROADWAY SHEETS
GRADE ADJUSTMENT SHALL BE MADE WITH BRICK OR PRECAST CONCRETE RINGS AS REQUIRED (MINIMUM 2" AND MAXIMUM 9")
SET CASTING IN FULL BED OF MORTAR ALL AROUND TO 2" BELOW FINISHED GRADE
FINISHED GRADE
BITUMINOUS DAMPROOFING PER SPECIFICATION ON ALL BELOW GRADE SURFACES (TYP)
STANDARD PRECAST CONE SECTION IN 3' OR 4' LENGTHS WITH FLAT OR ECCENTRIC CONICAL TOP (AS REQUIRED)
BACKFILL PER SPECIFICATION AND TRENCH DETAIL
SEAL ALL INTERIOR AND EXTERIOR JOINTS AND HOLES WITH NON-SHRINK GROUT
2'-0"Ø OPENING SEE NOTE 5
8" MIN.
BUTYL RUBBER JOINT (TYP) PER SPECIFICATION
STANDARD PRECAST BARREL SECTION COMBINATIONS OF 1', 2', 3' OR 4' LENGTHS AS NEEDED TO BRING MANHOLE RIM TO REQUIRED ELEVATION (SEE GENERAL MANHOLE NOTES ON SHEET GC-2)
MANHOLE DIAMETER
SEE TABLE 1
STANDARD PRECAST BASE IN 3' LENGTHS (MIN.)
BRICK TABLE (SEE MANHOLE NOTE 1)
DIAMETER OF LARGEST PIPE
FOR BOTTOM SLAB THICKNESS SEE TABLE 1
3000 PSI CONCRETE
CRUSHED STONE BEDDING PER SPECIFICATIONS AND TRENCH DETAIL
UNDISTURBED MATERIAL
FOR FILTER FABRIC USE REQUIREMENTS, SEE "TRENCH DETAIL FOR SEWER, DRAIN, AND WATER PIPES", SHEET GC-7.
A SECTION

1 - MANHOLE DETAIL - TYPE 1/FIGURE 2252.2

(STANDARD MANHOLE)


EXIST. GRAVITY DRAIN (SIZES VARY)
PLACE JOINT OR COUPLING MINIMUM 3' FROM WALL ON ALL PIPES
FLOW
CATCH BASIN HOOD PER SPECIFICATION WHEN MH IS DESIGNATED AS SUMP FOR CATCH BASIN
B
FLOW
24" STANDARD MANHOLE FRAME & COVER (UNLESS OTHERWISE NOTED)
FLEXIBLE SLEEVE REQUIRED FOR PVC AND DI. USE NON SHRINK GROUT FOR RCP CONNECTIONS. CAST OPENING IN STRUCTURE OR CORE DRILL (TYP)
FLOW
PLAN
24" STANDARD MANHOLE FRAME & COVER (UNLESS OTHERWISE NOTED)
SET RIM AT FINISHED GRADE
SET CASTING IN MORTAR AND GROUT ALL AROUND TO 4" ABOVE THE FLANGE (UNLESS OTHERWISE NOTED)
GRADE ADJUSTMENT SHALL BE MADE WITH BRICK OR PRECAST CONCRETE RINGS AS REQUIRED (MINIMUM 2" AND MAXIMUM 9")
9" MAX
FINISHED GRADE
BITUMINOUS DAMPROOFING PER SPECIFICATION ON ALL BELOW GRADE SURFACES (TYP)
STANDARD PRECAST ECCENTRIC CONE SECTION, OR FLAT TOP (AS REQUIRED)
PLACARD TO READ "CAUTION 4' SUMP" INSTALLED IN MANHOLE WALL OR IN PIPELINE WITHIN 3 FT. OF MANHOLE COVER.
2'-0"Ø OPENING
8" MIN.
SEAL ALL INTERIOR AND EXTERIOR JOINTS AND HOLES WITH NON-SHRINK GROUT
4'-0"
5" MIN.
PRECAST CONCRETE ECCENTRIC REDUCER
1'-0" MIN.
CATCH BASIN HOOD PER SPECIFICATIONS WHEN MH IS DESIGNATED AS SUMP FOR CATCH BASIN
BUTYL RUBBER JOINT (TYP) PER SPECIFICATION
1'-0" MIN.
8" MIN
STANDARD PRECAST BARREL SECTION COMBINATIONS OF 1', 2', 3' OR 4' LENGTHS AS NEEDED TO BRING MANHOLE RIM TO REQUIRED ELEVATION (SEE GENERAL MANHOLE NOTES ON SHEET GC-2)
DIAMETER OF LARGEST PIPE
4'-0" SUMP (UNLESS OTHERWISE NOTED)
CRUSHED STONE BEDDING PER SPECIFICATIONS AND TRENCH DETAIL
FOR BOTTOM SLAB THICKNESS SEE TABLE 1
FOR FILTER FABRIC USE REQUIREMENTS, SEE "TRENCH DETAIL FOR SEWER, DRAIN, AND WATER PIPES", SHEET GC-7.
UNDISTURBED MATERIAL
4'-0"
B SECTION

2 - MANHOLE DETAIL - TYPE 4/FIGURE 2252.5

(SUMP MANHOLE)

TABLE 1 : MANHOLE DIMENSIONS

MANHOLE DIAMETER	SIDE WALL MIN. THICKNESS	BOTTOM SLAB MIN. THICKNESS	MAX PIPE DIAMETER * RCP	DI/PVC
4'	5"	6"	24"	30"
5'	6"	8"	36"	42"
6'	6"	8"	48"	54"
8'	8"	8"	66"	72"
10'	10"	10"	72"	84"

* MAY VARY DEPENDING ON SIZE AND LOCATION OF ADDITIONAL PENETRATIONS OR RELATIONSHIP OF PENETRATIONS IN MANHOLE

GENERAL MANHOLE NOTES:
1. INNER EDGE OF BRICK TABLE TO BE AT ELEV OF CROWN OF TOP OF PIPE. TABLE TO SLOPE AT 8.3% TO INSIDE OF MANHOLE BASE.
2. SEWER OR DRAIN MANHOLE DIAMETER SHALL BE 4', 5', 6', OR 8' AS SHOWN ON PLAN/PROFILE VIEWS.
3. DESIGN PRECAST SECTIONS WITH FRAME AND COVER FOR AASHTO H20 LOADINGS.
4. FOR DESCRIPTION OF MATERIALS, SEE SPECIFICATIONS.
5. OPENING IN TOP MANHOLE SECTION SHALL MATCH CASTING NOMINAL DIAMETER.
6. MANHOLES LARGER THAN 4' IN DIAMETER AT THE BASE SHALL BE REDUCED IN DIAMETER TO 4' AT TOP RISER SECTION

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STANDARD DETAILS - I

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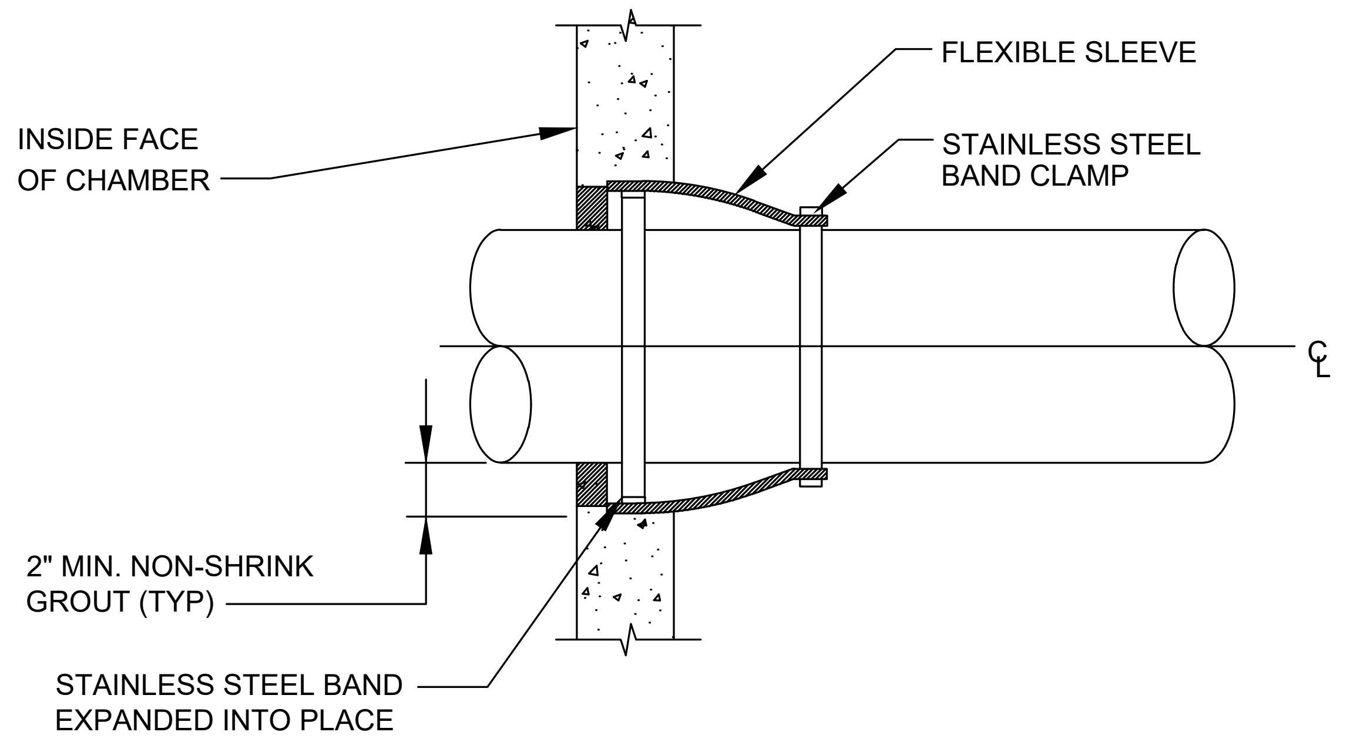
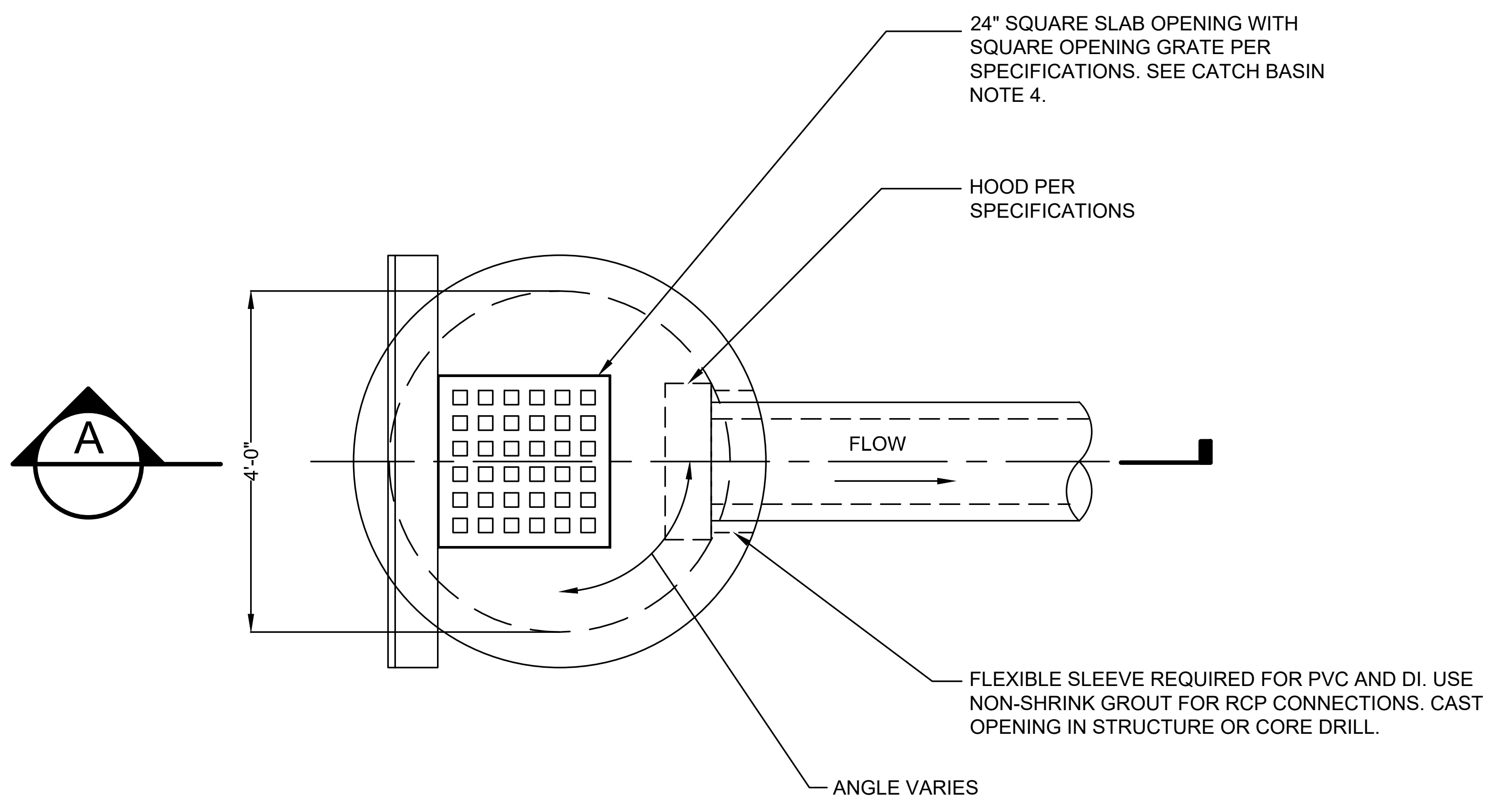


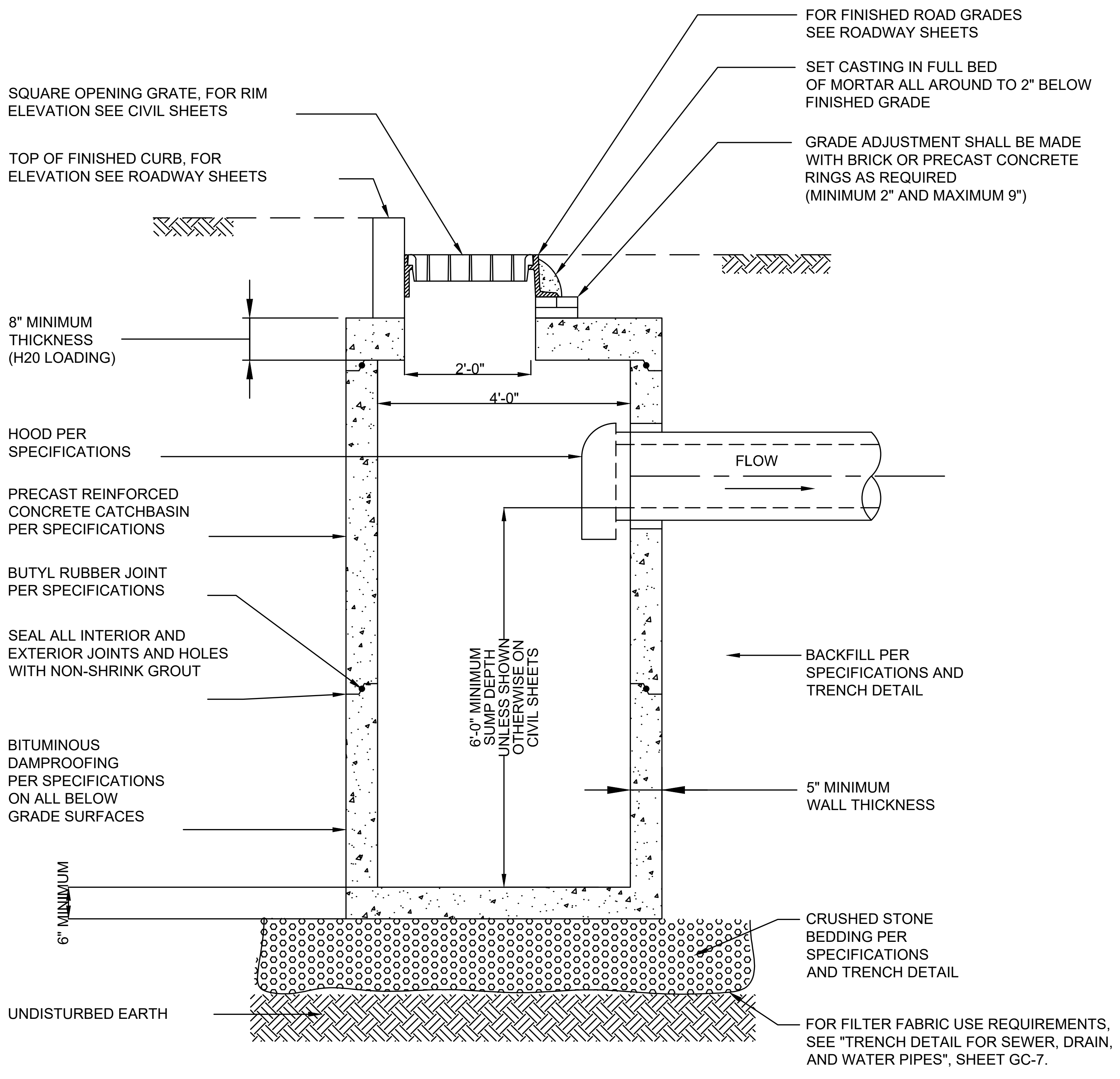
FLEXIBLE SLEEVE CONNECTION NOTE:

1. PRECAST OPENING OR CORE DRILLED INTO EXISTING STRUCTURE. SIZE VARIES TO ACCOMMODATE EXTENSION BONNET FLANGE DIAMETER OR PIPE.

3 FLEXIBLE SLEEVE CONNECTION DETAIL
-

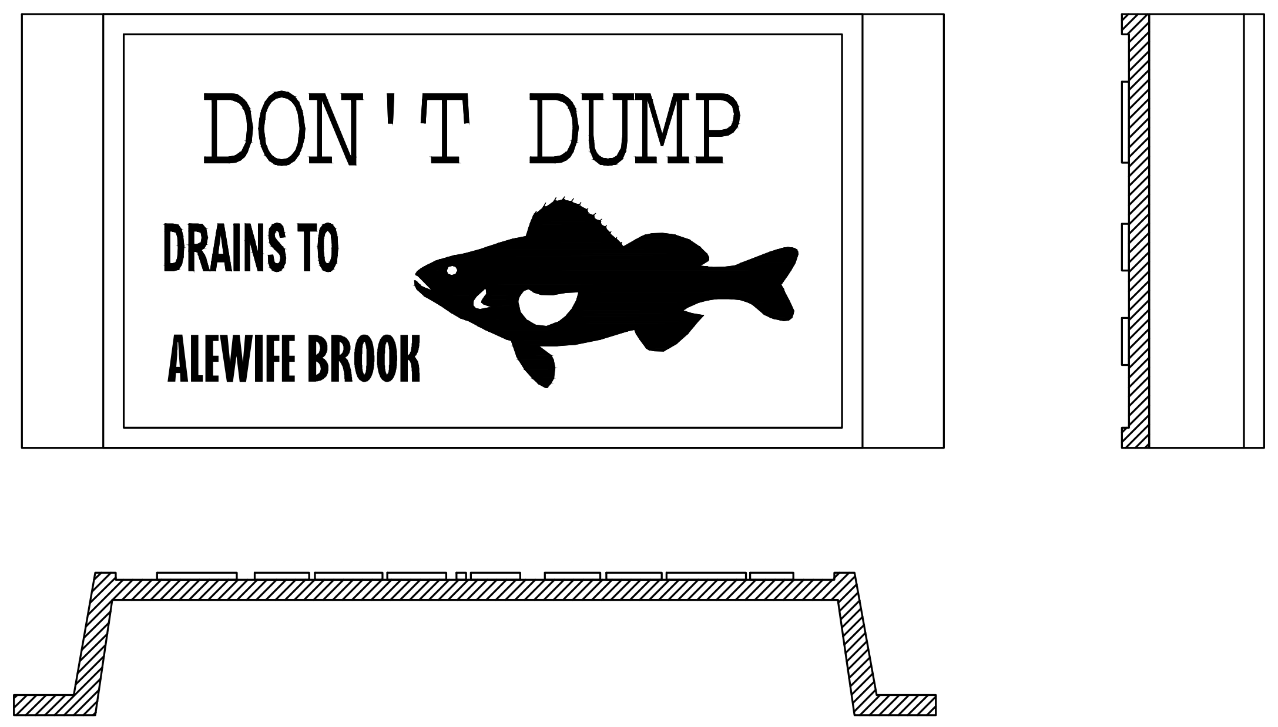

24" SQUARE SLAB OPENING WITH
SQUARE OPENING GRATE PER
SPECIFICATIONS. SEE CATCH BASIN
NOTE 4.
HOOD PER
SPECIFICATIONS
A
4'-0"
FLOW
FLEXIBLE SLEEVE REQUIRED FOR PVC AND DI. USE
NON-SHRINK GROUT FOR RCP CONNECTIONS. CAST
OPENING IN STRUCTURE OR CORE DRILL.
ANGLE VARIES

PLAN TYPE-1 (SINGLE GRATE)



A SECTION
(TYPE-1)

5 CATCH BASIN-TYPE 1/FIGURE 2604.2
(WITH SQUARE OPENING GRATE-SINGLE)
-



ALEWIFE BROOK

NOTE:

DIMENSIONS SHALL BE AS SPECIFIED.

4 CATCH BASIN DON'T DUMP CURB MARKER
-

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Title
STANDARD DETAILS - II

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TRENCH NOTES:
1. REFER TO SPEC. SECTION 02500 AND PAVEMENT DETAILS FOR PAVEMENT AND SUB BASE REQUIREMENTS.
2. REFER TO SPEC. SECTION 02210 FOR EXCAVATION, BACKFILL, GRADING, BEDDING AND COMPACTION REQUIREMENTS.
3. REFER TO SPEC. SECTION 01025 FOR MEASUREMENT AND PAYMENT.
4. BEDDING SHALL BE PER DIMENSION "A" UNLESS OTHERWISE INDICATED ON PROFILES.
5. FOR EXCAVATION, BEDDING AND BACKFILL IN SILT OR CLAY SOIL SEE SPEC. SECTION 02210.
6. FOR PIPE BEDDING INSTALLED BELOW SEASONAL HIGH GROUNDWATER ELEVATION, INSTALL TRENCH DAM (DETAIL 7) AT 100-FT SPACING.

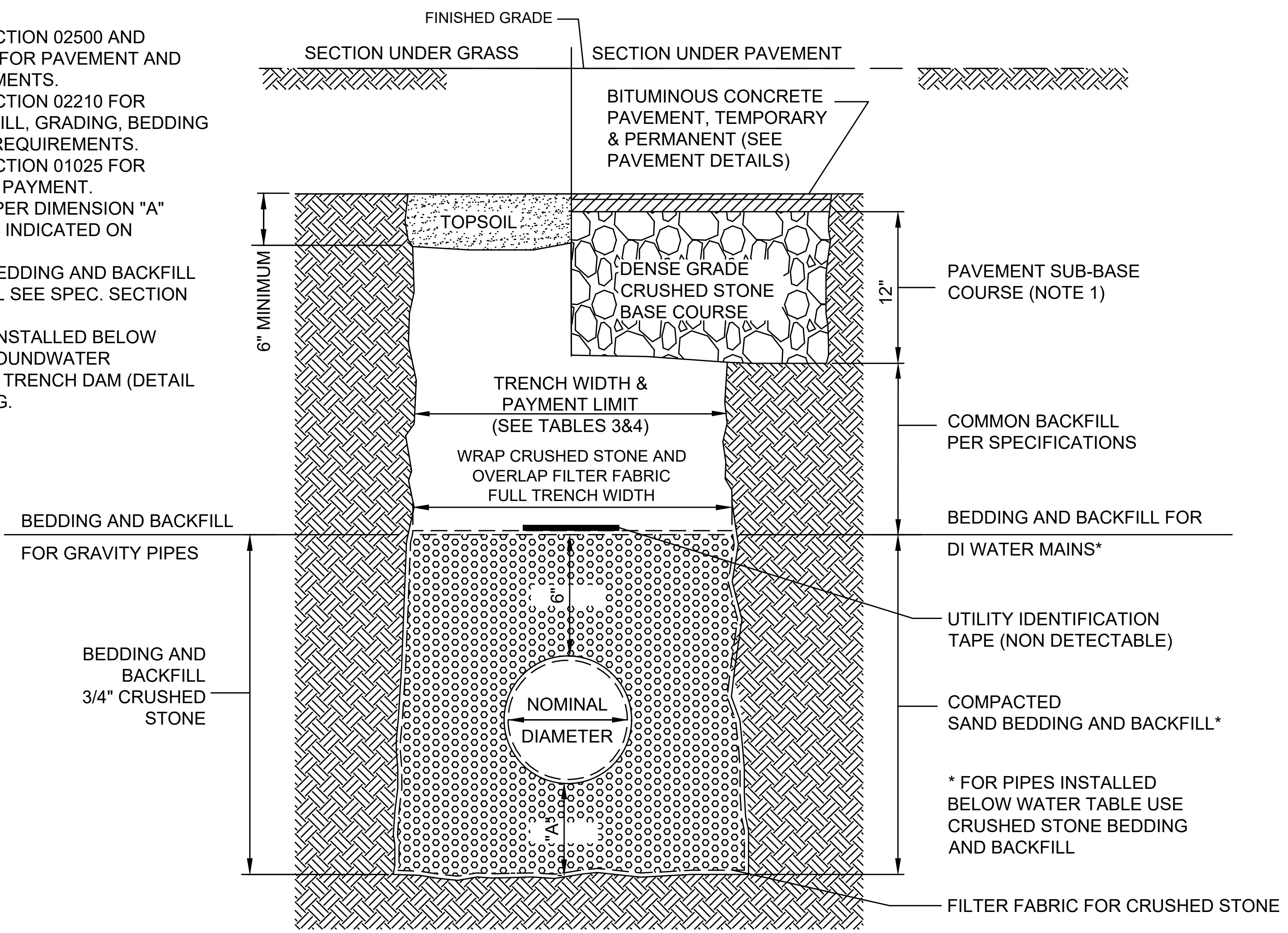

FINISHED GRADE
SECTION UNDER GRASS
SECTION UNDER PAVEMENT
BITUMINOUS CONCRETE PAVEMENT, TEMPORARY & PERMANENT (SEE PAVEMENT DETAILS)
TOPSOIL
DENSE GRADE CRUSHED STONE BASE COURSE
6" MINIMUM
12"
PAVEMENT SUB-BASE COURSE (NOTE 1)
TRENCH WIDTH & PAYMENT LIMIT (SEE TABLES 3&4)
WRAP CRUSHED STONE AND OVERLAP FILTER FABRIC FULL TRENCH WIDTH
COMMON BACKFILL PER SPECIFICATIONS
BEDDING AND BACKFILL FOR GRAVITY PIPES
BEDDING AND BACKFILL FOR DI WATER MAINS*
6"
UTILITY IDENTIFICATION TAPE (NON DETECTABLE)
BEDDING AND BACKFILL 3/4" CRUSHED STONE
NOMINAL DIAMETER
COMPACTED SAND BEDDING AND BACKFILL*
* FOR PIPES INSTALLED BELOW WATER TABLE USE CRUSHED STONE BEDDING AND BACKFILL
"A"
FILTER FABRIC FOR CRUSHED STONE

TABLE 3: TRENCH PAY LIMIT TABLE FOR PIPES

PIPE SIZE (DIA.)	MAX TRENCH WIDTH FOR PAYMENT	MAX "A" WITH FOR PAYMENT
LESS THAN 2"	2'-0"	6"
2" TO 6"	3'-0"	6"
8" TO 22"	4'-0"	9"
24" & GREATER	I.D. + 2'-0"	12"

I.D. = INSIDE DIMENSION

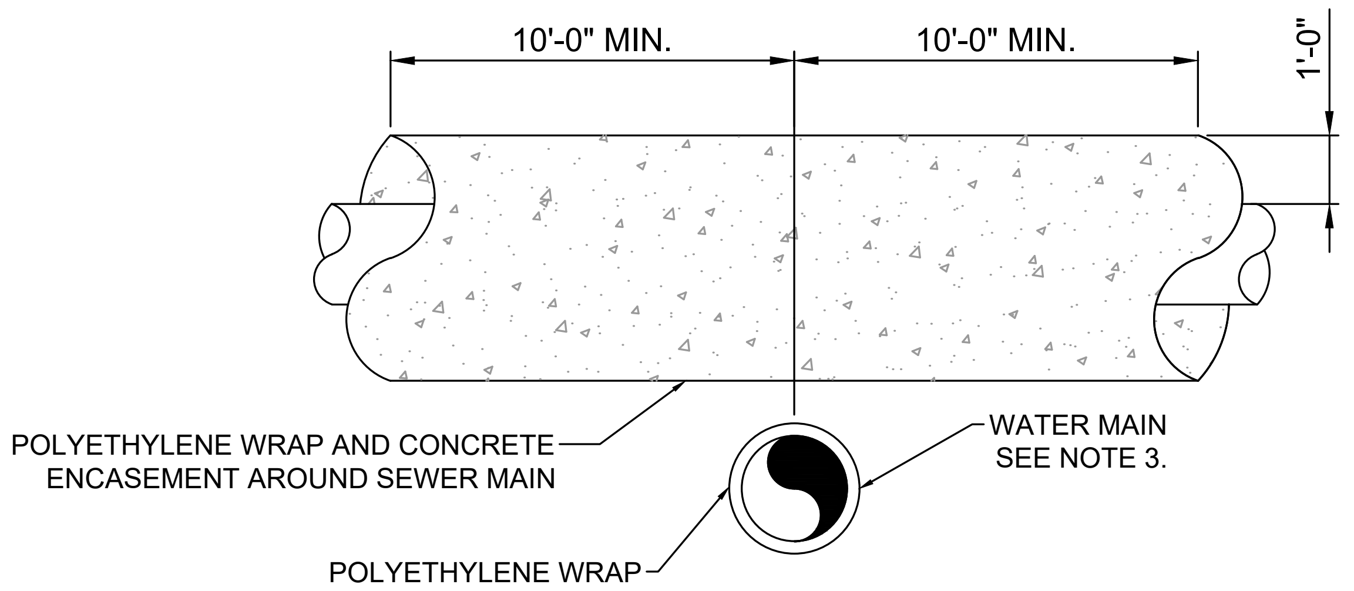
TABLE 4: TRENCH PAY LIMIT TABLE FOR PRECAST STRUCTURES

WALL THICKNESS	MAX TRENCH WIDTH FOR PAYMENT	MAX "A" WITH FOR PAYMENT
LESS THAN 6"	I.D. + 5'-0"	12"
6" TO 12"	I.D. + 6'-0"	12"
13" TO 18"	I.D. + 7'-0"	12"
19" & GREATER	O.D. + 6'-0"	12"

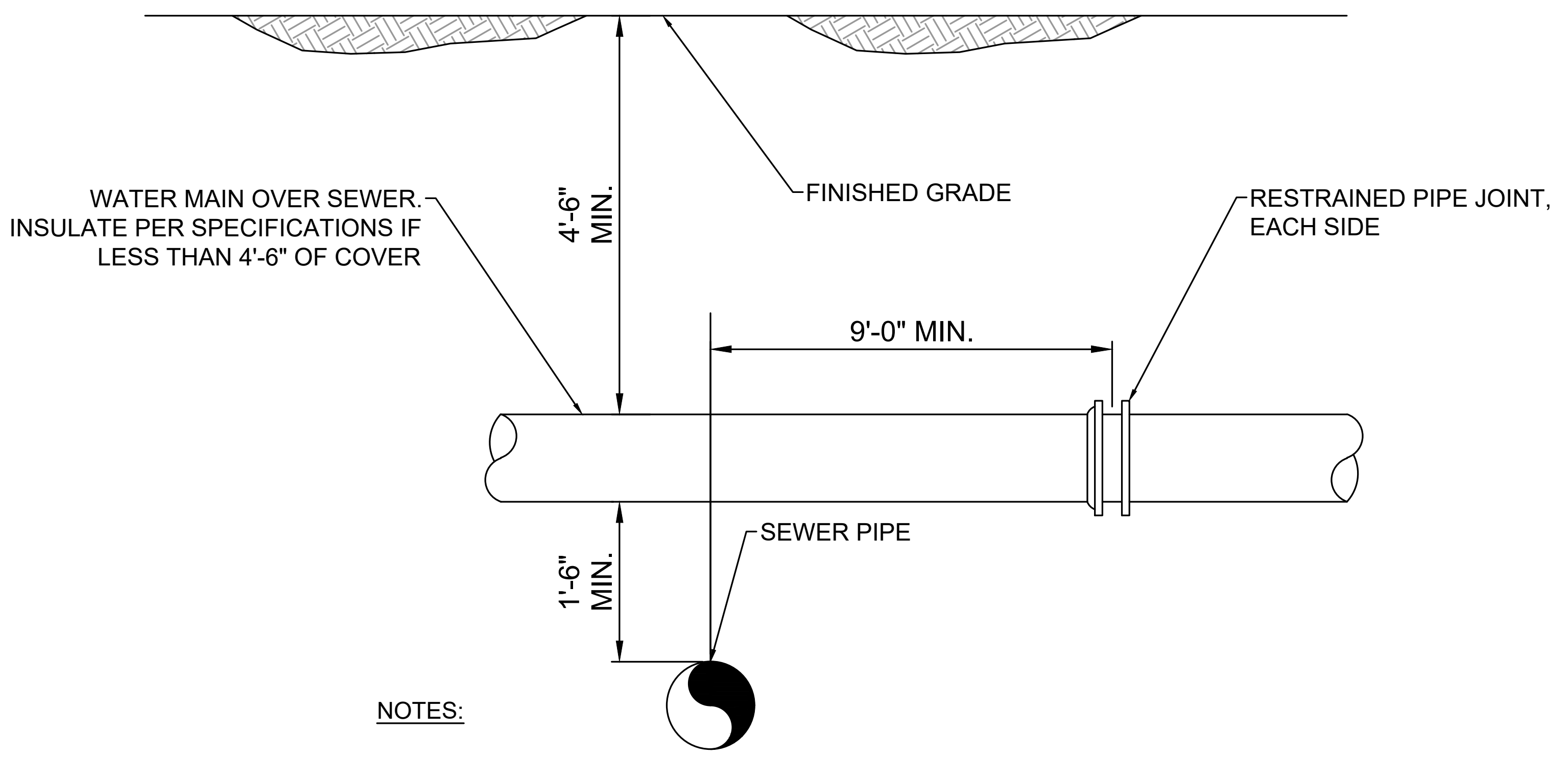
I.D. = INSIDE DIMENSION
O.D. = OUTSIDE DIMENSION

6 / - TRENCH DETAIL FOR SEWER, DRAIN AND WATER PIPES

NOT TO SCALE



CONCRETE ENCASEMENT FOR SEWER MAIN CROSSINGS


FINISHED GRADE
WATER MAIN OVER SEWER. INSULATE PER SPECIFICATIONS IF LESS THAN 4'-6" OF COVER
4'-6" MIN.
RESTRAINED PIPE JOINT, EACH SIDE
9'-0" MIN.
SEWER PIPE
1'-6" MIN.

NOTES:

1. SEWERS SHALL BE KEPT REMOTE FROM WATER SUPPLY PIPING AND STRUCTURES. WHEREVER FEASIBLE, SEWERS SHOULD BE LAID AT A MINIMUM HORIZONTAL DISTANCE OF 10 FEET FROM WATER MAINS. IF LOCAL CONDITIONS PREVENT THIS, THE WATER MAIN SHOULD BE LAID IN A SEPARATE TRENCH, AND THE ELEVATIONS OF THE CROWN OF THE SEWER PLACED AT LEAST 18 INCHES BELOW THE INVERT OF THE WATER MAIN.

2. WHENEVER SEWERS MUST CROSS BELOW WATER MAINS, THE CROWN OF THE SEWER SHOULD BE PLACED A MINIMUM OF 18 INCHES BELOW THE INVERT OF THE WATER MAIN. IN ADDITION, THE WATER MUST BE CONSTRUCTED WITH ONE FULL LENGTH OF PIPE CENTERED ON THE SEWER CROSSING. THE WATER PIPE SHALL HAVE RESTRAINED JOINTS FOR A DISTANCE OF 20 FEET ON EACH SIDE OF THE SEWER CROSSING.

3. WHEN IT IS IMPOSSIBLE TO OBTAIN HORIZONTAL OR VERTICAL SEPARATION AS STIPULATED ABOVE, THE WATER SHALL BE ENCASED IN 4 MIL. POLYETHYLENE TUBE. THE SEWER SHALL BE ENCASED IN 4 MIL. POLY AND SHALL BE ENCASED IN CONCRETE FOR A DISTANCE OF 10 FEET ON EITHER SIDE OF THE CROSSING.

B / C-10 SEWER CROSSING WATER MAIN

NOT TO SCALE

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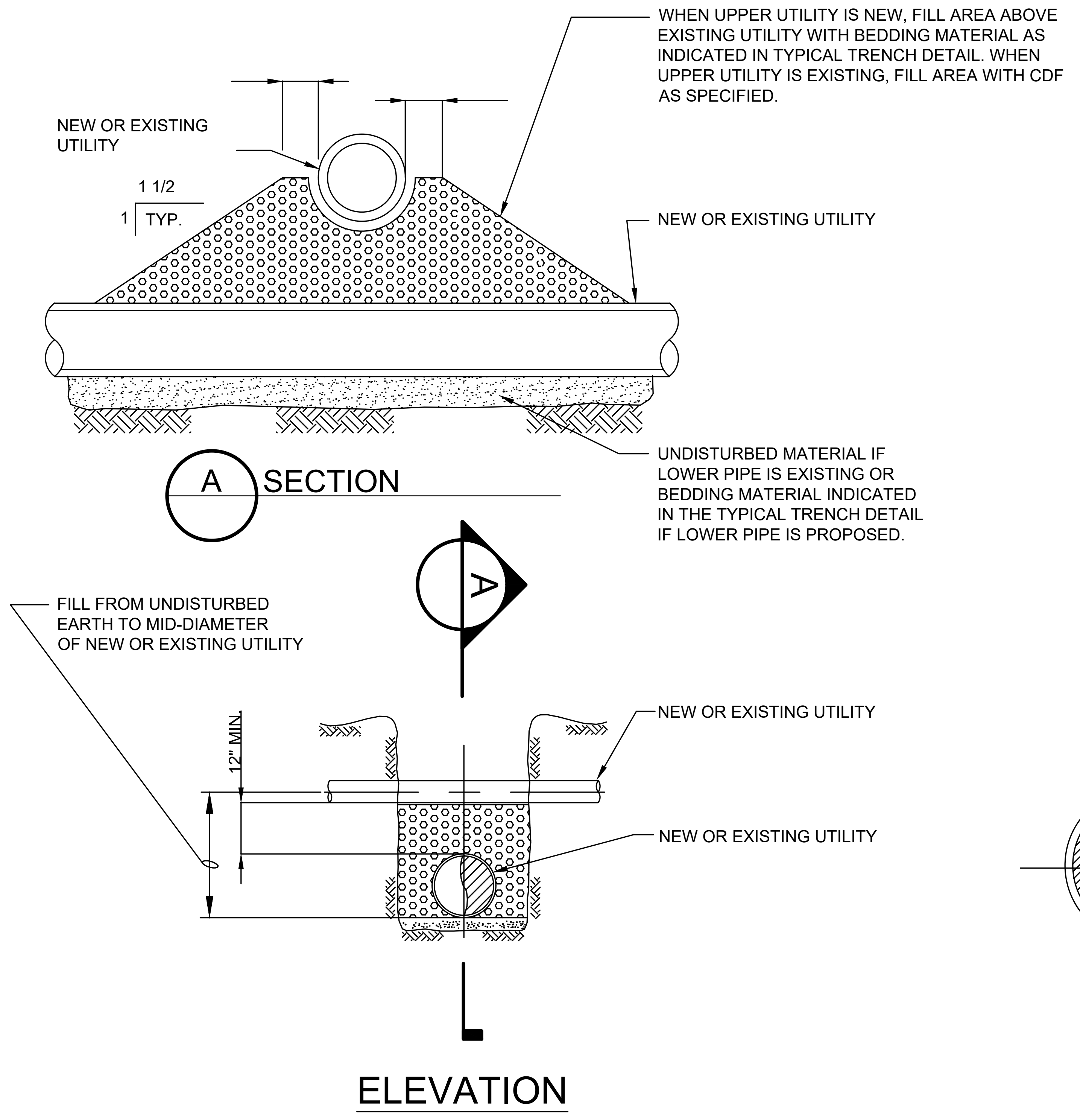
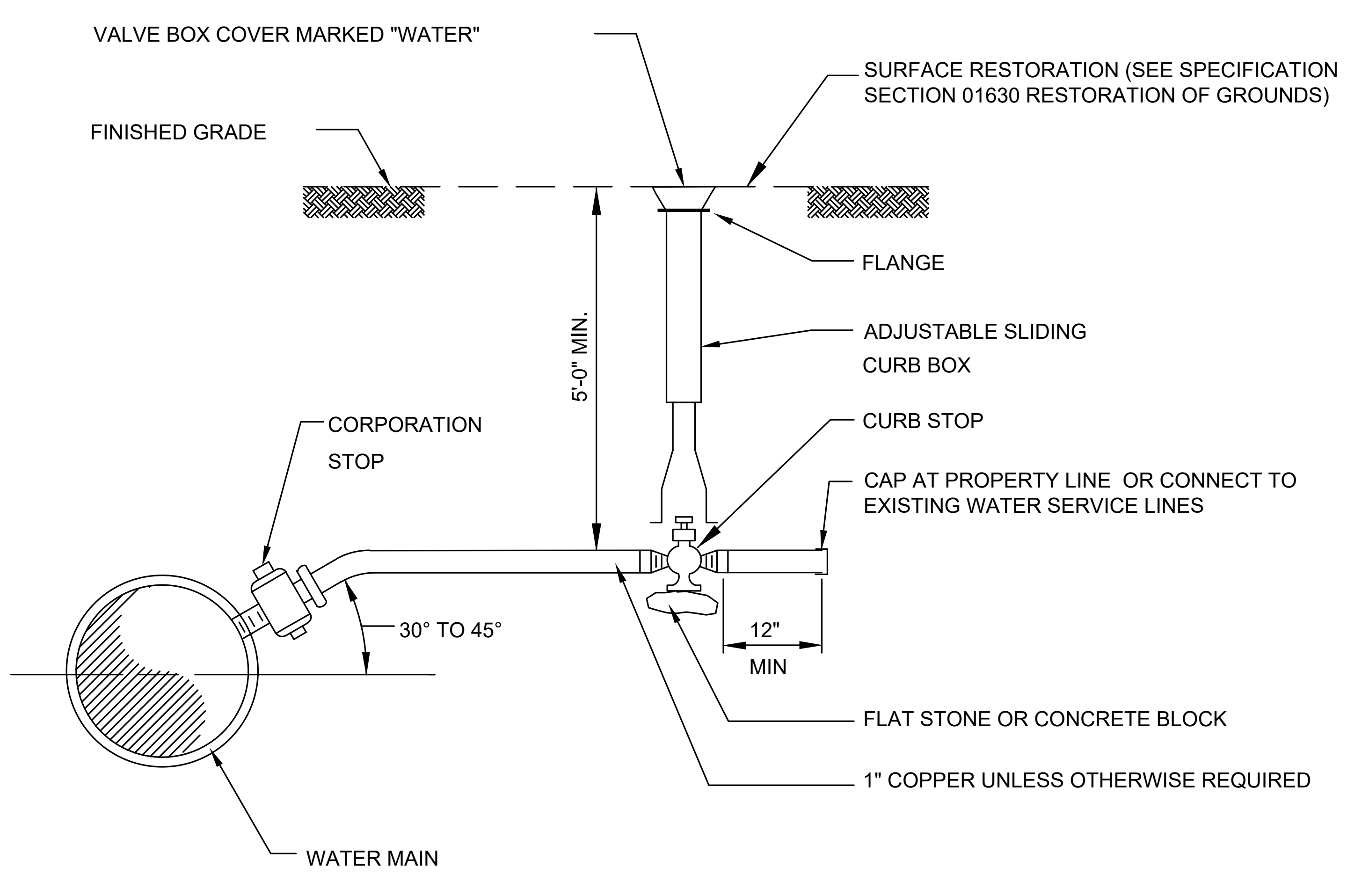


WHEN UPPER UTILITY IS NEW, FILL AREA ABOVE EXISTING UTILITY WITH BEDDING MATERIAL AS INDICATED IN TYPICAL TRENCH DETAIL. WHEN UPPER UTILITY IS EXISTING, FILL AREA WITH CDF AS SPECIFIED.
NEW OR EXISTING UTILITY
1 1/2
1 TYP.
NEW OR EXISTING UTILITY
UNDISTURBED MATERIAL IF LOWER PIPE IS EXISTING OR BEDDING MATERIAL INDICATED IN THE TYPICAL TRENCH DETAIL IF LOWER PIPE IS PROPOSED.
A SECTION
A
FILL FROM UNDISTURBED EARTH TO MID-DIAMETER OF NEW OR EXISTING UTILITY
12" MIN.
NEW OR EXISTING UTILITY
NEW OR EXISTING UTILITY
ELEVATION

8 UTILITY CROSSING DETAIL
-

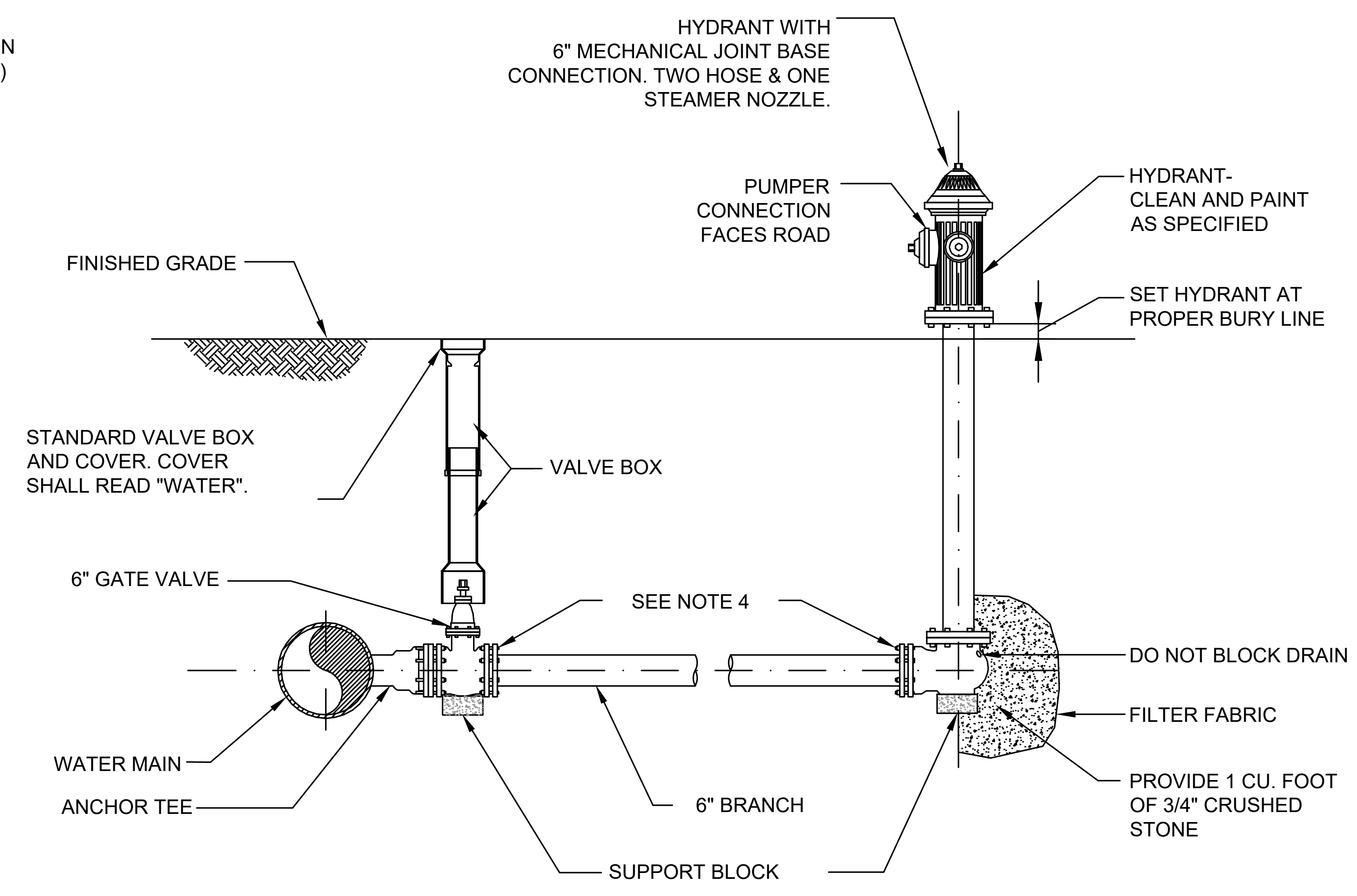
WATER NOTES:
1. ANY WATER MAIN TO BE ENCASED IN CONCRETE FOR STRUCTURAL PURPOSES SHALL BE ENCASED WITHIN FLOWABLE FILL WITH 0% ASH CONTENT.
2. ALL GATE VALVES SHALL BE RESILIENT SEATED AND "OPEN RIGHT".
3. ALL NEW WATER MAIN TO BE WRAPPED IN POLY >/= 9 MIL. THICK (INCLUDING TAPPING SLEEVE VALVES, CORPORATIONS, TEES, ETC.) AS REQUIRED BY SPECIFICATIONS



VALVE BOX COVER MARKED "WATER"
FINISHED GRADE
SURFACE RESTORATION (SEE SPECIFICATION SECTION 01630 RESTORATION OF GROUNDS)
FLANGE
5'-0" MIN.
ADJUSTABLE SLIDING CURB BOX
CURB STOP
CORPORATION STOP
CAP AT PROPERTY LINE OR CONNECT TO EXISTING WATER SERVICE LINES
30° TO 45°
12" MIN
FLAT STONE OR CONCRETE BLOCK
1" COPPER UNLESS OTHERWISE REQUIRED
WATER MAIN

9 NEW WATER SERVICE DETAIL
-

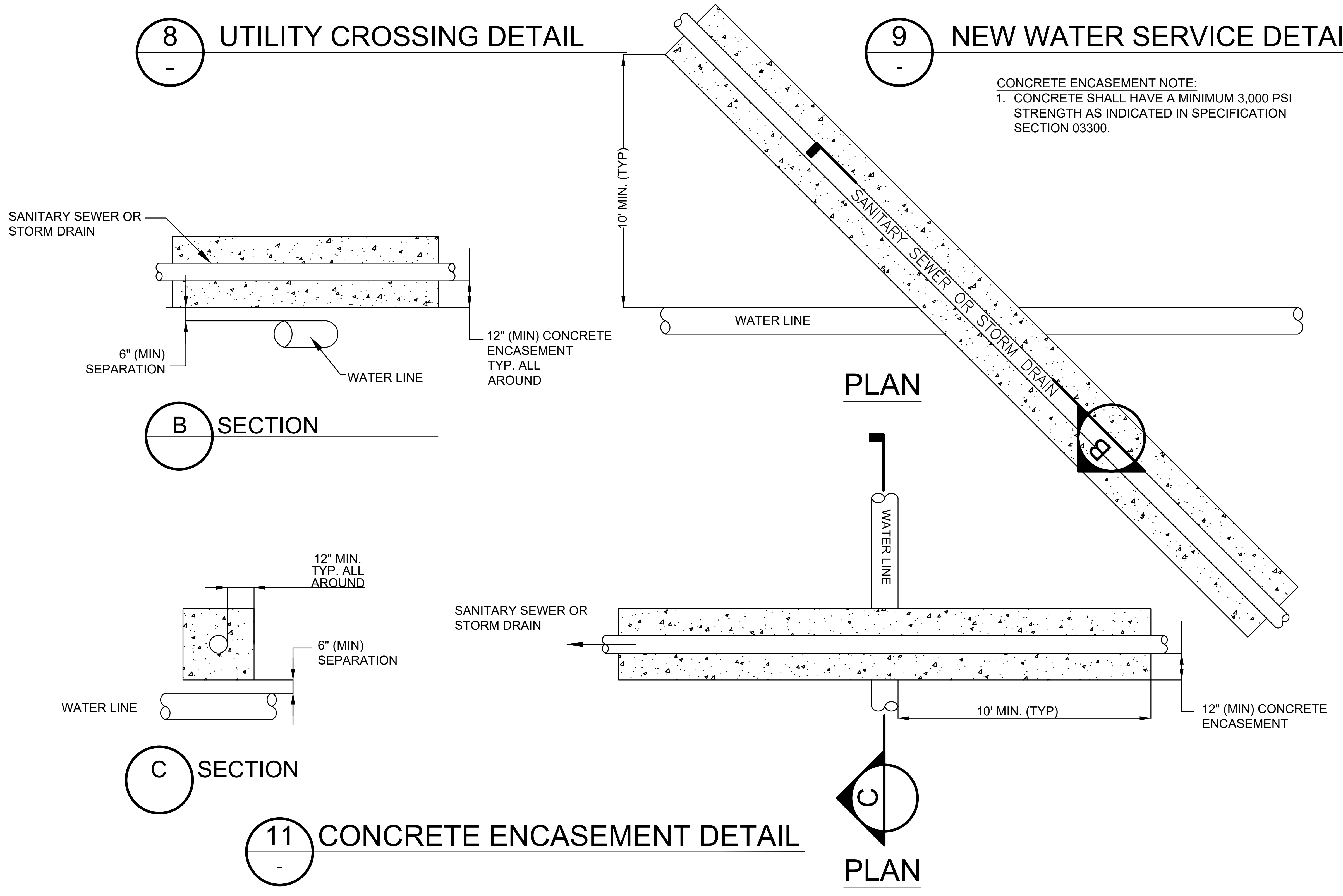
FIRE HYDRANT NOTES:
1. PROVIDE HYDRANT AND VALVE JOINTS WITH APPROVED MECHANICAL JOINTS.
2. SUPPORT BLOCKS TO BE PRESSURE TREATED WOOD OR CONCRETE MASONRY BLOCK.
3. ALL VALVES OPEN LEFT.
4. PROVIDE JOINT RESTRAINT AND THRUST BLOCK PER CITY WATER DEPARTMENT STANDARDS PER SPECIFICATION.



HYDRANT WITH 6" MECHANICAL JOINT BASE CONNECTION. TWO HOSE & ONE STEAMER NOZZLE.
PUMPER CONNECTION FACES ROAD
HYDRANT- CLEAN AND PAINT AS SPECIFIED
FINISHED GRADE
SET HYDRANT AT PROPER BURY LINE
STANDARD VALVE BOX AND COVER. COVER SHALL READ "WATER".
VALVE BOX
6" GATE VALVE
SEE NOTE 4
DO NOT BLOCK DRAIN
FILTER FABRIC
WATER MAIN
ANCHOR TEE
6" BRANCH
PROVIDE 1 CU. FOOT OF 3/4" CRUSHED STONE
SUPPORT BLOCK

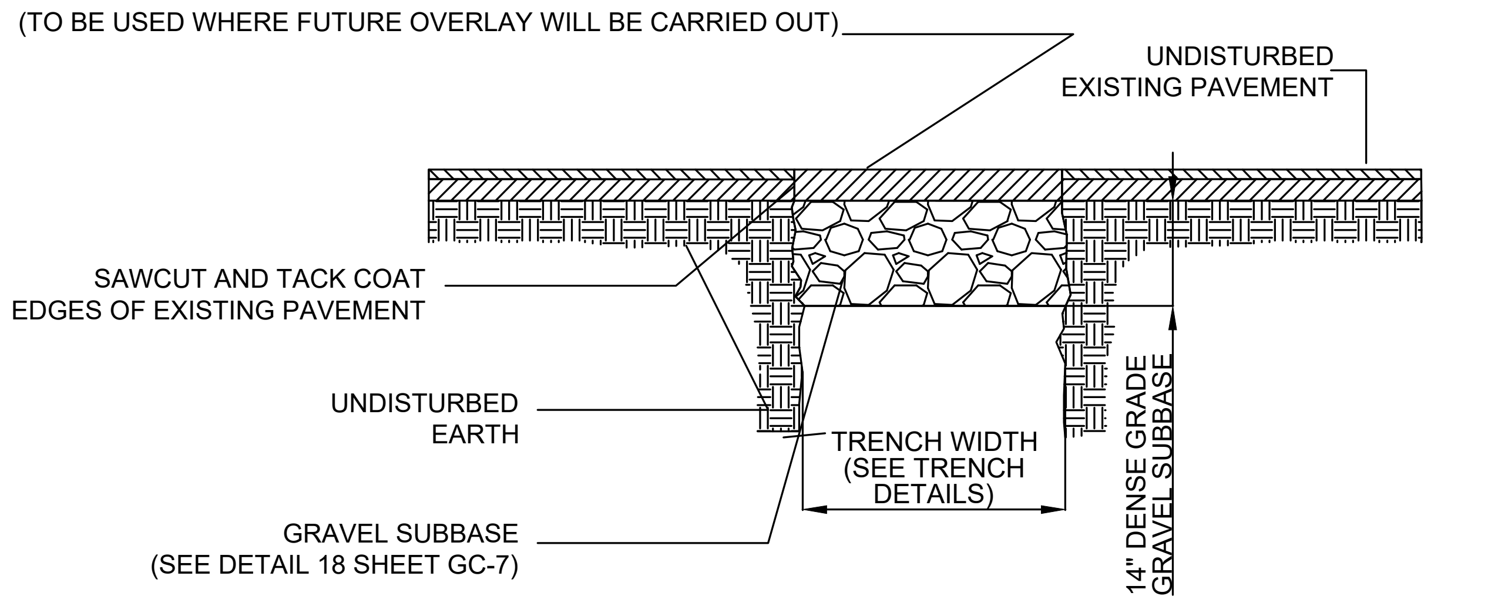
10 FIRE HYDRANT DETAIL
-

CONCRETE ENCASEMENT NOTE:
1. CONCRETE SHALL HAVE A MINIMUM 3,000 PSI STRENGTH AS INDICATED IN SPECIFICATION SECTION 03300.



10' MIN. (TYP)
SANITARY SEWER OR STORM DRAIN
SANITARY SEWER OR STORM DRAIN
WATER LINE
PLAN
B
6" (MIN) SEPARATION
WATER LINE
12" (MIN) CONCRETE ENCASEMENT TYP. ALL AROUND
B SECTION
12" MIN. TYP. ALL AROUND
6" (MIN) SEPARATION
WATER LINE
C SECTION
WATER LINE
SANITARY SEWER OR STORM DRAIN
10' MIN. (TYP)
12" (MIN) CONCRETE ENCASEMENT
C
PLAN

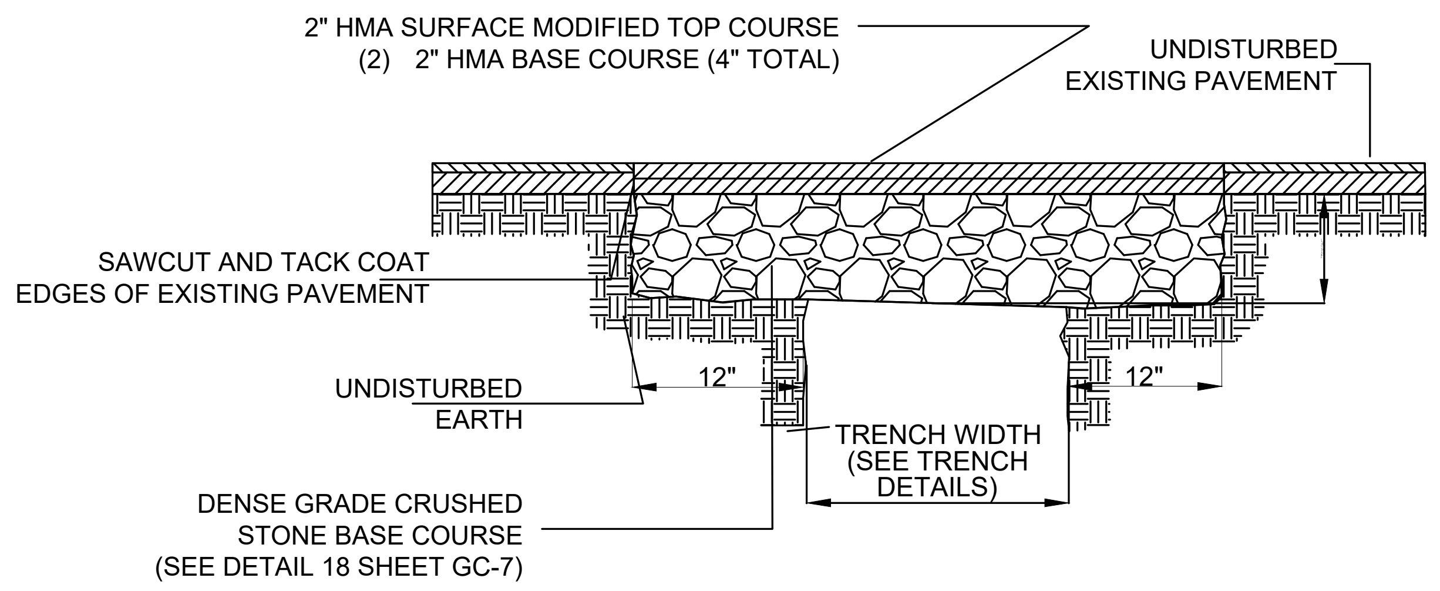
11 CONCRETE ENCASEMENT DETAIL
-



4" HMA BINDER COURSE (TO BE USED WHERE FUTURE OVERLAY WILL BE CARRIED OUT)
UNDISTURBED EXISTING PAVEMENT
SAWCUT AND TACK COAT EDGES OF EXISTING PAVEMENT
UNDISTURBED EARTH
TRENCH WIDTH (SEE TRENCH DETAILS)
14" DENSE GRADE GRAVEL SUBBASE
GRAVEL SUBBASE (SEE DETAIL 18 SHEET GC-7)

12 TEMPORARY TRENCH PAVEMENT DETAIL
-

TEMPORARY AND PERMANENT TRENCH PAVEMENT NOTE (DETAILS 24 & 25):
REMOVE AND DISPOSE ALL TEMPORARY PAVEMENT AS REQUIRED.
RESTORE AND COMPACT SUBBASE AS REQUIRED PRIOR TO PERMANENT TRENCH PAVEMENT.



2" HMA SURFACE MODIFIED TOP COURSE
(2) 2" HMA BASE COURSE (4" TOTAL)
UNDISTURBED EXISTING PAVEMENT
SAWCUT AND TACK COAT EDGES OF EXISTING PAVEMENT
UNDISTURBED EARTH
12"
12"
TRENCH WIDTH (SEE TRENCH DETAILS)
DENSE GRADE CRUSHED STONE BASE COURSE (SEE DETAIL 18 SHEET GC-7)

13 PERMANENT TRENCH PAVEMENT DETAIL
-

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Client/Project
CITY OF CAMBRIDGE
SHERMAN CSO TANK
CAMBRIDGE, MASSACHUSETTS

Project No.: 195151145
File Name: 51145C-17.DWG
Scale: #" = ##'

SB	SP	SP	2026.09.28
Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Title
STANDARD DETAILS - IV

Revision: Sheet: X of XX
Drawing No.
C-17

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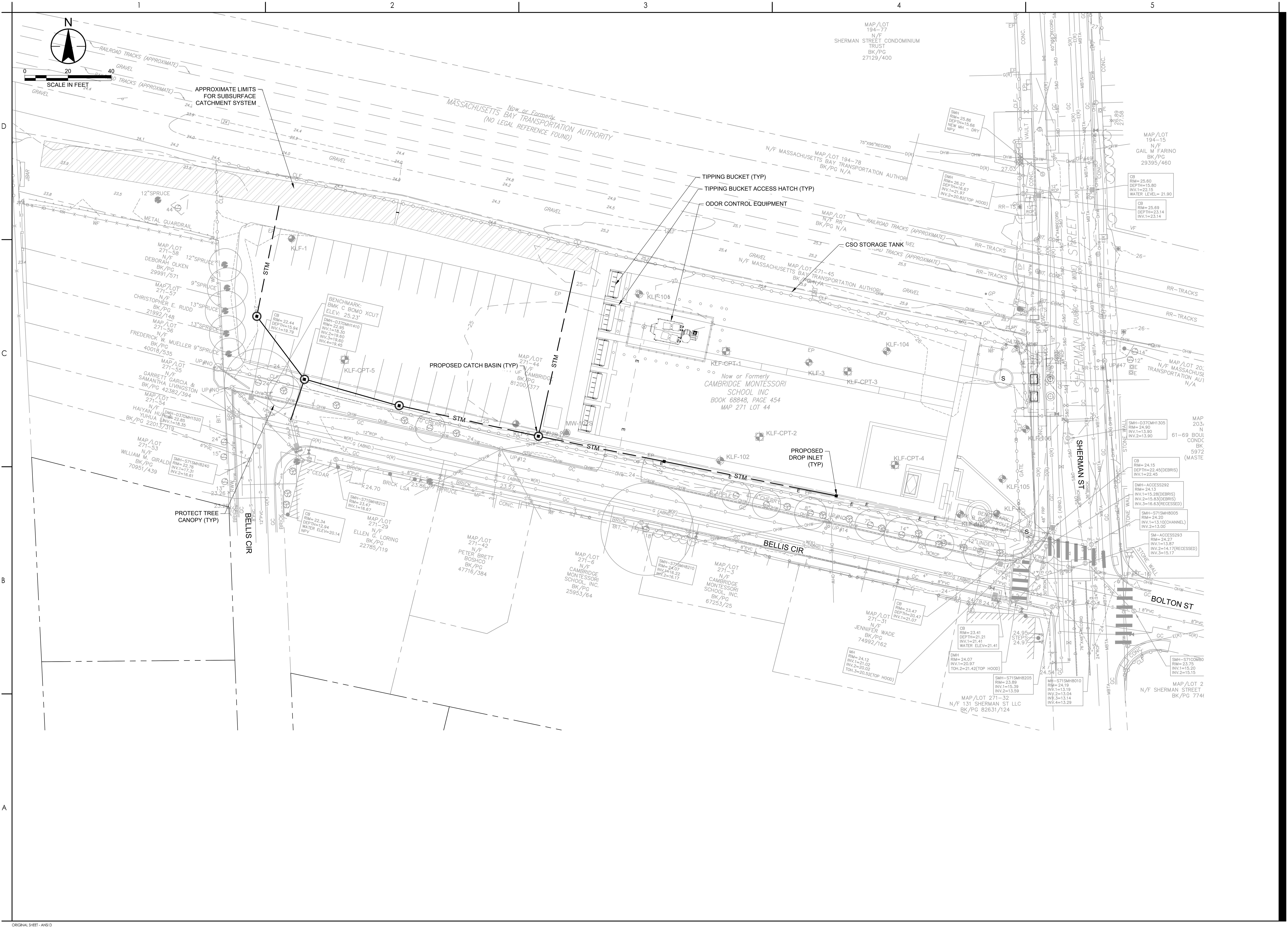
1
2
3
4
5
D
C
B
A
N
0
20
40
SCALE IN FEET
APPROXIMATE LIMITS FOR SUBSURFACE CATCHMENT SYSTEM
MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
Now or Formerly
(NO LEGAL REFERENCE FOUND)
RAILROAD TRACKS (APPROXIMATE)
GRAVEL
METAL GUARDRAIL
TIPPING BUCKET (TYP)
TIPPING BUCKET ACCESS HATCH (TYP)
ODOR CONTROL EQUIPMENT
CSO STORAGE TANK
PROPOSED CATCH BASIN (TYP)
PROPOSED DROP INLET (TYP)
PROTECT TREE CANOPY (TYP)
STM
BENCHMARK: BMK C BOMO XCUT ELEV: 25.23'
Now or Formerly
CAMBRIDGE MONTESSORI SCHOOL INC
BOOK 68848, PAGE 454
MAP 271 LOT 44
KLF-1
KLF-3
KLF-101
KLF-102
KLF-104
KLF-105
KLF-CPT-1
KLF-CPT-2
KLF-CPT-3
KLF-CPT-4
KLF-CPT-5
MAP/LOT 194-77 N/F SHERMAN STREET CONDOMINIUM TRUST BK/PG 27129/400
N/F MASSACHUSETTS BAY TRANSPORTATION AUTHORI MAP/LOT 194-78 BK/PG N/A
MAP/LOT 271-45 N/F MASSACHUSETTS BAY TRANSPORTATION AUTHORI BK/PG N/A
MAP/LOT 194-15 N/F GAIL M FARINO BK/PG 29395/460
MAP/LOT 271-58 N/F DEBORAH OLKEN BK/PG 29991/571
MAP/LOT 271-57 N/F CHRISTOPHER E. RUDD BK/PG 21992/148
MAP/LOT 271-56 N/F FREDERICK W. MUELLER BK/PG 40018/535
MAP/LOT 271-55 GARRETT GARCIA & SAMANTHA LIVINGSTON BK/PG 42382/394
MAP/LOT 271-54 HAIYAN HU YUHUA BK/PG 22013/31
MAP/LOT 271-53 N/F WILLIAM M. GIRALDI BK/PG 70951/439
MAP/LOT 271-29 N/F ELLEN G. LORING BK/PG 22785/119
MAP/LOT 271-42 N/F PETER BRETT BOSHCO BK/PG 47716/384
MAP/LOT 271-6 N/F CAMBRIDGE MONTESSORI SCHOOL, INC. BK/PG 25953/64
MAP/LOT 271-3 N/F CAMBRIDGE MONTESSORI SCHOOL, INC. BK/PG 67253/25
MAP/LOT 271-31 N/F JENNIFER WADE BK/PG 74992/162
MAP/LOT 271-32 N/F 131 SHERMAN ST LLC BK/PG 82631/124
N/F SHERMAN STREET
BELLIS CIR
SHERMAN ST
SHERMAN STREET (PUBLIC - 40' WIDE)
BOLTON ST
RR-TRACKS

ORIGINAL SHEET - ANSI D

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Client/Project
CITY OF CAMBRIDGE
SHERMAN CSO TANK
CAMBRIDGE, MASSACHUSETTS

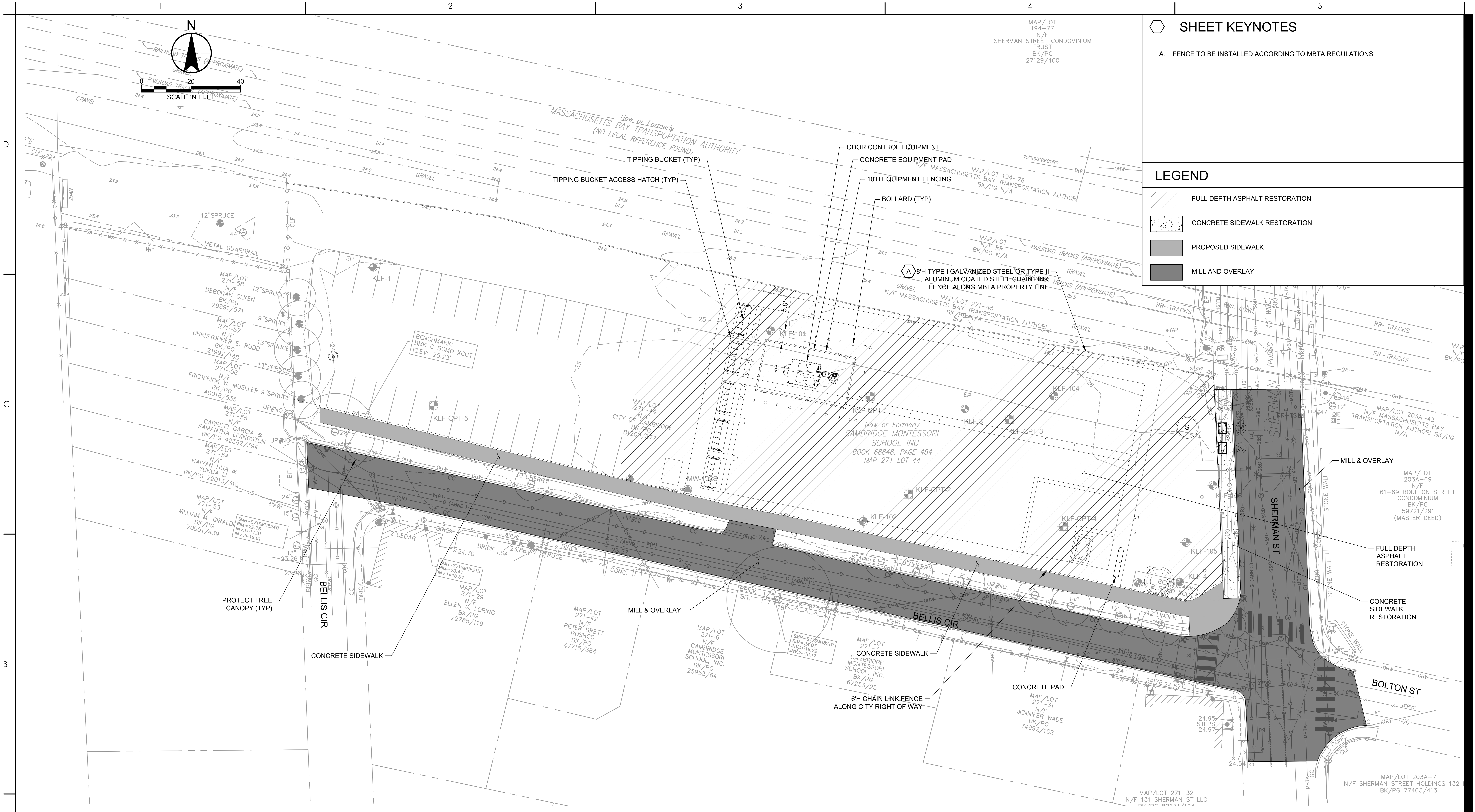
Project No.: 195151145
File Name: 51145C-19.DWG
Scale: 1" = 20'

SB	JM	SP	2026.09.28
Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Title
SITE DRAINAGE PLAN

Revision: Sheet: X of XX

Drawing No.
C-19


N
0 20 40
SCALE IN FEET
Now or Formerly
MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
(NO LEGAL REFERENCE FOUND)
RAILROAD TRACKS (APPROXIMATE)
GRAVEL
MAP/LOT 194-77 N/F SHERMAN STREET CONDOMINIUM TRUST BK/PG 27129/400
MAP/LOT 194-78 N/F MASSACHUSETTS BAY TRANSPORTATION AUTHORI BK/PG N/A
MAP/LOT N/F RR BK/PG N/A
MAP/LOT 271-45 N/F MASSACHUSETTS BAY TRANSPORTATION AUTHORI BK/PG N/A
ODOR CONTROL EQUIPMENT
CONCRETE EQUIPMENT PAD
10'H EQUIPMENT FENCING
BOLLARD (TYP)
TIPPING BUCKET (TYP)
TIPPING BUCKET ACCESS HATCH (TYP)
A
8'H TYPE I GALVANIZED STEEL OR TYPE II ALUMINUM COATED STEEL CHAIN LINK FENCE ALONG MBTA PROPERTY LINE
5.0'
KLF-1
KLF-103
KLF-104
KLF-3
KLF-CPT-1
KLF-CPT-2
KLF-CPT-3
KLF-CPT-4
KLF-CPT-5
KLF-102
KLF-105
KLF-4
MW-102S
BENCHMARK: BMK C BOMO XCUT ELEV. 25.23'
MAP/LOT 271-44 N/F CITY OF CAMBRIDGE BK/PG 8Y200/377
Now or Formerly
CAMBRIDGE MONTESSORI SCHOOL INC
BOOK 68848, PAGE 454
MAP 271 LOT 44
MAP/LOT 271-58 N/F DEBORAH OLKEN BK/PG 29991/571
MAP/LOT 271-57 N/F CHRISTOPHER E. RUDD BK/PG 21992/148
MAP/LOT 271-56 N/F FREDERICK W. MUELLER BK/PG 40018/535
MAP/LOT 271-55 N/F GARRETT GARCIA & SAMANTHA LIVINGSTON BK/PG 42382/394
MAP/LOT 271-54 N/F HAIYAN HUA & YUHUA LI BK/PG 22013/318
MAP/LOT 271-53 N/F WILLIAM M. GIRALDI BK/PG 70951/439
MAP/LOT 271-29 N/F ELLEN G. LORING BK/PG 22785/119
MAP/LOT 271-42 N/F PETER BRETT BOSHCO BK/PG 47716/384
MAP/LOT 271-6 N/F CAMBRIDGE MONTESSORI SCHOOL, INC. BK/PG 25953/64
MAP/LOT 271-7 N/F CAMBRIDGE MONTESSORI SCHOOL, INC. BK/PG 67253/25
MAP/LOT 271-31 N/F JENNIFER WADE BK/PG 74992/162
MAP/LOT 271-32 N/F 131 SHERMAN ST LLC
MAP/LOT 203A-43 N/F MASSACHUSETTS BAY TRANSPORTATION AUTHORI BK/PG N/A
MAP/LOT 203A-69 N/F 61-69 BOULTON STREET CONDOMINIUM BK/PG 59721/291 (MASTER DEED)
MAP/LOT 203A-7 N/F SHERMAN STREET HOLDINGS 132 BK/PG 77463/413
MILL & OVERLAY
FULL DEPTH ASPHALT RESTORATION
CONCRETE SIDEWALK RESTORATION
PROTECT TREE CANOPY (TYP)
CONCRETE SIDEWALK
MILL & OVERLAY
CONCRETE SIDEWALK
CONCRETE PAD
6'H CHAIN LINK FENCE ALONG CITY RIGHT OF WAY
BELLIS CIR
BELLIS CIR
SHERMAN ST
BOLTON ST
RR-TRACKS
STONE WALL
METAL GUARDRAIL

SHEET KEYNOTES

A. FENCE TO BE INSTALLED ACCORDING TO MBTA REGULATIONS

LEGEND

▨	FULL DEPTH ASPHALT RESTORATION
░	CONCRETE SIDEWALK RESTORATION
▒	PROPOSED SIDEWALK
▓	MILL AND OVERLAY

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SHERMAN CSO TANK

CAMBRIDGE, MASSACHUSETTS

Project No.: 195151145
File Name: 51145C-21.DWG
Scale: 1" = 20'

SB	SB	SP	2026.09.28
Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Title
SITE MATERIALS PLAN

Revision: Sheet: X of XX

Drawing No.
C-21

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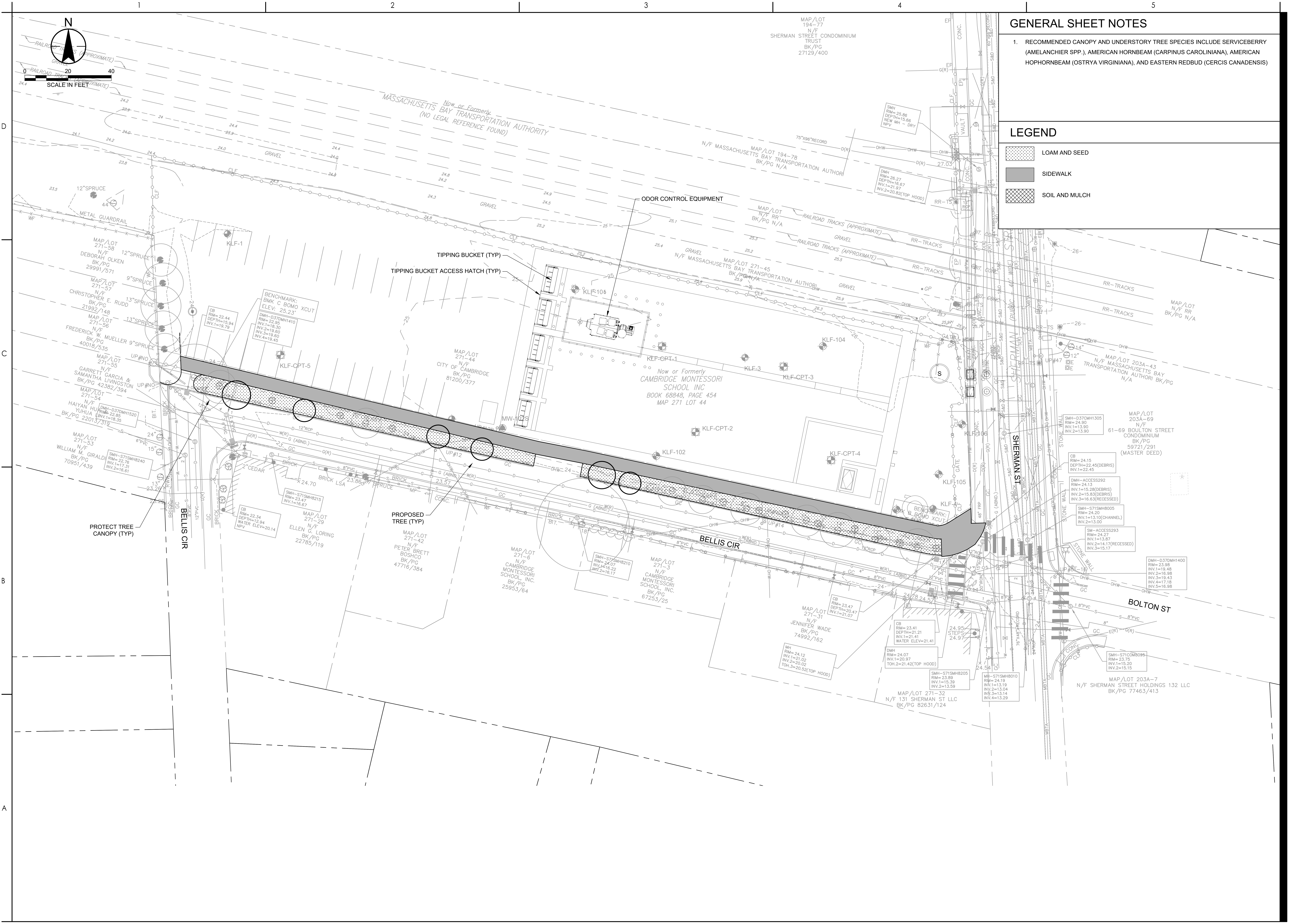

GENERAL SHEET NOTES

1. RECOMMENDED CANOPY AND UNDERSTORY TREE SPECIES INCLUDE SERVICEBERRY (AMELANCHIER SPP.), AMERICAN HORNBEAM (CARPINUS CAROLINIANA), AMERICAN HOPHORNBEAM (OSTRYA VIRGINIANA), AND EASTERN REDBUD (CERCIS CANADENSIS)

LEGEND

░ LOAM AND SEED

▒ SIDEWALK

▨ SOIL AND MULCH

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Client/Project
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SHERMAN CSO TANK
CAMBRIDGE, MASSACHUSETTS

Project No.: 195151145
File Name: 51145C-23.DWG

Scale: #" = ##'

Dwn.	Dsgn.	Chkd.	YYYY.MM.DD
LH	SP	SP	2026.09.28

Title
SITE PLANTING PLAN

Revision: Sheet: X of XX

Drawing No.
C-23

ORIGINAL SHEET - ANSI D

GENERAL NOTES

GENERAL

THESE NOTES ARE GENERAL AND APPLY TO THE ENTIRE PROJECT EXCEPT WHERE SPECIFICALLY INDICATED OTHERWISE.

STRUCTURAL DIMENSIONS CONTROLLED BY OR RELATED TO MECHANICAL OR ELECTRICAL EQUIPMENT SHALL BE COORDINATED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. BOLT SIZES, TYPES, AND PATTERNS SHALL BE VERIFIED WITH THE MANUFACTURER. ALL BOLT PATTERNS SHALL BE TEMPLATED TO ENSURE ACCURACY OF PLACEMENT.

MECHANICAL AND ELECTRICAL EQUIPMENT SUPPORTS, ANCHORAGES, OPENINGS, RECESSES AND REVEALS NOT SHOWN ON THE STRUCTURAL DRAWINGS BUT REQUIRED BY OTHER CONTRACT DRAWINGS, SHALL BE PROVIDED FOR PRIOR TO PLACING CONCRETE.

STRUCTURAL DRAWINGS SHALL BE USED IN COORDINATION WITH MECHANICAL, ELECTRICAL, ARCHITECTURAL, CIVIL DRAWINGS AND SHOP DRAWINGS PROVIDED BY MANUFACTURERS OF EQUIPMENT.

STRUCTURES HAVE BEEN DESIGNED FOR OPERATIONAL, HYDROSTATIC, AND BACKFILL LOADS ON THE COMPLETED STRUCTURES. THE STRUCTURES HAVE NOT BEEN DESIGNED TO RESIST THESE LOADS WHILE ONLY PARTIALLY CONSTRUCTED. DURING CONSTRUCTION, THE STRUCTURES SHALL BE PROTECTED FROM ALL CONSTRUCTION LOADS BY BRACING AND BALANCING UNTIL ALL STRUCTURAL ELEMENTS ARE IN PLACE, AND ALL CONCRETE HAS REACHED THE SPECIFIED 28 DAY COMPRESSIVE STRENGTH. OVERLOADING OF ANY STRUCTURAL ELEMENT IS PROHIBITED.

UNLESS OTHERWISE SHOWN, ON ALL STRUCTURAL DRAWINGS THE FINISHED GRADE AROUND STRUCTURES IS SHOWN THUS, //// INDICATING EITHER GROUND SURFACE, TOP OF CONCRETE SLAB, OR AC PAVEMENT. FOR DETAILS OF FINISH SURFACES, SEE CIVIL AND ARCHITECTURAL DRAWINGS.

STRUCTURAL STEEL

STEEL CONSTRUCTION SHALL CONFORM TO THE SPECIFICATIONS AND STANDARDS AS CONTAINED IN THE FIFTEENTH EDITION OF THE AISC STEEL CONSTRUCTION MANUAL.

STRUCTURAL WIDE FLANGE SHAPES SHALL BE STEEL MEETING ASTM A-992 SPECIFICATIONS.

OTHER SHAPES, BARS, PLATES AND SHEETS SHALL BE OF STEEL MEETING ASTM A-36 SPECIFICATIONS.

PIPE, PIPE COLUMNS, AND BOLLARDS SHALL BE OF STEEL MEETING ASTM A-53, TYPE E OR S, GRADE B STANDARD WEIGHT, UNO

HSS SHALL BE OF STEEL MEETING ASTM A-500 GRADE C.

STEEL JOISTS, BEAMS, AND GIRDERS SHALL NOT BE RELOCATED WITHOUT APPROVAL BY THE ENGINEER.

ALL WELDING SHALL BE BY THE SHIELDED ARC METHOD AND SHALL CONFORM TO AWS CODE FOR ARC AND GAS WELDING IN BUILDING CONSTRUCTION. QUALIFICATIONS OF WELDERS SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS FOR STANDARD QUALIFICATION PROCEDURE OF THE AWS.

CAST-IN-PLACE CONCRETE

UNLESS OTHERWISE NOTED OR SPECIFIED, ALL STRUCTURAL CONCRETE SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH OF 5000 PSI IN 28 DAYS.

REINFORCEMENT STEEL SHALL BE DEFORMED BARS CONFORMING TO THE REQUIREMENTS OF ASTM A-615, GRADE 60.

ALL DETAILING, FABRICATION AND PLACING OF REINFORCING BARS, UNLESS OTHERWISE INDICATED, SHALL BE IN ACCORDANCE WITH CRSI "MANUAL OF STANDARD PRACTICE", LATEST EDITION.

TOLERANCES IN PLACING REINFORCEMENT SHALL BE:
  +/- 3/8 INCH FOR MEMBERS WITH DEPTH D </= 8 INCHES
  +/- 1/2 INCH FOR MEMBERS WITH DEPTH D > 8 INCHES

ALL CONSTRUCTION JOINTS, SHALL BE ROUGH AND THOROUGHLY CLEANED FOR BOND.

LOCATION OF ALL CONSTRUCTION JOINTS SHALL BE AS SHOWN ON THE DRAWINGS OR APPROVED BY THE ENGINEER. ALL CONSTRUCTION JOINTS LOCATED ON THE DRAWINGS, OR REQUIRED FOR CONSTRUCTION BUT NOT SHOWN ON THE DRAWINGS, SHALL HAVE A 6" FLATSTRIP WATERSTOP IF IN CONTACT WITH WATER. IN ADDITION, JOINTS IN ALL SLABS COVERED WITH WATER SHALL HAVE BOTH A 6" FLATSTRIP WATERSTOP AND A SEALANT GROOVE.

DOWELS, PIPE, WATERSTOPS AND OTHER INSTALLED MATERIALS AND ACCESSORIES SHALL BE HELD SECURELY IN POSITION WHILE CONCRETE IS BEING PLACED.

UNLESS OTHERWISE INDICATED, ASIDE FROM NORMAL ACCESSORIES USED TO HOLD REINFORCING BARS FIRMLY IN POSITION, THE FOLLOWING (MINIMUM) SUPPORT/SPACERS SHALL BE ADDED:

A) IN SLABS #5 RISER BARS AT 36 INCHES OC MAXIMUM TO SUPPORT TOP REINFORCING BARS.

B) IN WALLS WITH 2 CURTAINS #3 U OR Z SHAPE SPACERS AT 6 FEET OC EACH WAY.

VERTICAL REINFORCEMENT FOR CONCRETE OR MASONRY SHALL BE SPLICED WITH DOWEL BARS OF THE SAME SIZE AND SPACING FROM THE FOUNDATION USING A STANDARD SPLICE LENGTH UNLESS INDICATED OTHERWISE.

SEALANT SHALL BE PLACED AT THE TOP OF ALL JOINTS RECEIVING EXPANSION JOINT FILLER. SEALANT DEPTH SHALL BE THE JOINT FILL THICKNESS OR 1/2", WHICHEVER IS LESS.

ALL GROUT SHALL BE NON-SHRINK GROUT, UNLESS INDICATED OTHERWISE.

UNLESS OTHERWISE SHOWN CONCRETE WALLS AND SLABS SHALL BE REINFORCED AS FOLLOWS: #4@12" EW , CENTER OF 6" SECTIONS; #5@12" EW, CENTER OF 8" SECTIONS; #4 @ 12" EW EF OF 10" SECTIONS; #5@12" EW EF OF 12" AND THICKER SECTIONS.

METAL CLIPS OR SUPPORTS SHALL NOT BE PLACED IN CONTACT WITH THE FORMS OR THE SUBGRADE. CONCRETE BLOCKS (OR DOBIES) SUPPORTING BARS ON SUBGRADE SHALL BE IN SUFFICIENT NUMBERS TO SUPPORT THE BARS WITHOUT SETTLEMENT, BUT IN NO CASE SHALL SUCH SUPPORT BE CONTINUOUS.

DOWELS SHALL BE WIRED OR OTHERWISE HELD IN POSITION. THEY SHALL NOT BE SHOVED INTO FRESHLY PLACED CONCRETE.

UNLESS OTHERWISE INDICATED ON THE DRAWINGS, LAPS OF REINFORCEMENT SHALL BE AS SHOWN ON DETAIL S-143.

REINFORCING BARS AND ACCESSORIES SHALL NOT BE IN CONTACT WITH ANY PIPE, PIPE FLANGE OR METAL PARTS EMBEDDED IN CONCRETE, A MINIMUM OF 2 INCHES CLEARANCE SHALL BE PROVIDED AT ALL TIMES.

ALL ITEMS EMBEDDED IN CONCRETE SHALL BE SPACED ON CENTER AT LEAST 3 TIMES THEIR OUTSIDE DIMENSION. THE OUTSIDE DIMENSION SHALL NOT EXCEED ONE THIRD OF THE MEMBER THICKNESS

UNLESS OTHERWISE SHOWN ON THE DRAWINGS CONCRETE COVER FOR REINFORCING BARS SHALL BE AS FOLLOWS:

FOR CONCRETE PLACED AGAINST EARTH (SEE CONSTRUCTION JOINT DETAILS FOR THIN SLABS-ON-GRADE, BOTTOM COVER MAY BE LESS THAN 3" IF SO INDICATED)	3"
FOR SURFACES IN CONTACT WITH WATER OR WEATHER AND FORMED SURFACES IN CONTACT WITH EARTH	2"
FOR CONCRETE NOT EXPOSED TO WEATHER, OR IN CONTACT WITH WATER OR EARTH	1 1/2"

UNLESS OTHERWISE NOTED, WALLS AND SLABS SHOWN WITH A SINGLE LAYER OF REINFORCEMENT SHALL HAVE THAT REINFORCEMENT CENTERED

SLABS WITH SLOPING SURFACES SHALL HAVE THE INDICATED SLAB THICKNESS MAINTAINED AS THE MINIMUM. SLAB-ON-GRADE BOTTOMS MAY EITHER SLOPE WITH THE TOP SURFACE OR BE LEVEL. REINFORCING IN SLABS WITH SLOPING SURFACES SHALL BE PLACED AT THE REQUIRED CLEARANCE FROM THE SLAB SURFACES.

TESTING HYDRAULIC STRUCTURES

REFER TO SPECIFICATION SECTION 01 88 13 SPECIAL CONSTRUCTION PERFORMANCE REQUIREMENTS FOR HYDRAULIC STRUCTURE LEAK TEST REQUIREMENTS.

STRUCTURAL STANDARD DETAILS

DETAILS ON STANDARD DETAILS SHEETS ARE PART OF STANTEC'S STRUCTURAL STANDARD DETAILS.

THESE DETAILS ARE TO BE USED WHEN REFERRED TO OR WHEN NO OTHER MORE RESTRICTIVE OR DIFFERENT DETAILS ARE INDICATED ON THE DRAWINGS.

DETAILS NOT PERTAINING TO THE PROJECT ARE MARKED THUS ▨

CONDUIT COORDINATION NOTES

REFER TO THE NOTES BELOW, AND ELECTRICAL AND STRUCTURAL DRAWINGS AND SPECIFICATIONS, FOR CONDUIT PLACEMENT REQUIREMENTS. CONDUIT NOT IN CONFORMANCE WITH THESE REQUIREMENTS SHALL NOT BE INSTALLED WITHOUT WRITTEN APPROVAL FROM THE STRUCTURAL ENGINEER OF RECORD.

FOR CONDUIT RUNNING IN THE PLANE OF CONCRETE SLABS OR WALLS:

THE OUTSIDE DIAMETER OF THE CONDUIT SHALL NOT EXCEED ONE-THIRD OF MEMBER THICKNESS;

CONDUIT SHALL NOT BE SPACED CLOSER THAN 3 OUTSIDE DIAMETERS ON CENTER;

CONDUIT SHALL BE LOCATED ONLY WITHIN THE MIDDLE THIRD OF THE MEMBER ;

CONDUIT SHALL NOT BE SUPPORTED DIRECTLY ON REBAR.

FOR CONDUIT RUNNING THROUGH THE PLANE OF CONCRETE SLABS OR WALLS:

COORDINATE CONDUIT PLACEMENT TO AVOID OR MINIMIZE IMPACT TO REBAR PLACEMENT.

CONDUIT SHALL BE 2 INCHES MINIMUM CLEAR OF REBAR.

REBAR MAY BE SHIFTED 2 INCHES MAXIMUM TO AVOID CONDUIT.

WHERE REBAR MUST BE CUT TO ACCOMMODATE CONDUIT PLACEMENT, PROVIDE ADDITIONAL REINFORCEMENT PER DETAIL S-144 OR S-148, CONSIDERING THE CONDUIT PENETRATION(S) AS AN EQUIVALENT CIRCULAR OR RECTANGULAR OPENING, RESPECTIVELY.

CONDUIT SHALL NOT BE RUN IN OR THROUGH GRADE BEAMS.

REV 011024

GENERAL STRUCTURAL DESIGN CRITERIA

DESIGN IN ACCORDANCE WITH THE TENTH EDITION MASSACHUSETTS STATE BUILDING CODE 780 CMR AND 2021 EDITION OF THE INTERNATIONAL BUILDING (IBC), EXCEPT WHERE OTHER APPLICABLE CODES OR THE FOLLOWING NOTES ARE MORE RESTRICTIVE.

RISK CATEGORY: III

GEOTECHNICAL INFORMATION:

FROST DEPTH (INCHES): 48
ALLOWABLE BEARING PRESSURE (PSF): 4000

WIND DESIGN DATA:

BASIC WIND SPEED (V, 3 SEC - MPH): 128
ALLOWABLE STRESS DESIGN WIND SPEED (V_{asd} - MPH) 99
WIND EXPOSURE C

EARTHQUAKE DESIGN DATA:

SEISMIC IMPORTANCE FACTOR (Ie): 1.25
MAPPED SPECTRAL RESPONSE PARAMETER (S_{D1}): 0.278
MAPPED SPECTRAL RESPONSE PARAMETER (S_S): 0.066
DESIGN SPECTRAL RESPONSE PARAMETER (S_1): 0.293
DESIGN SPECTRAL RESPONSE PARAMETER (S_{DS}): 0.106
SITE CLASS: D
SEISMIC DESIGN CATEGORY: B

SNOW LOAD DATA:

GROUND SNOW LOAD (Pg) (PSF): 40
SNOW EXPOSURE FACTOR(Ce): 1.0
SNOW IMPORTANCE FACTOR (Is): 1.1
THERMAL FACTOR (Ct): 1.2

CSO STORAGE TANK DESIGN CRITERIA

DESIGN IN ACCORDANCE WITH THE TENTH EDITION MASSACHUSETTS STATE BUILDING CODE 780 CMR AND IN ACCORDANCE WITH THE "CODE REQUIREMENTS FOR ENVIRONMENTAL ENGINEERING CONCRETE STRUCTURES AND COMMENTARY," ACI 350-20.

SOIL LOADS:

SOIL COVER (INCHES): 36
SOIL MOIST UNIT WEIGHT (PCF): 135
AT-REST EARTH PRESSURE COEFFICIENT (k_0) 0.47

DRILLED CONCRETE PIER CAPACITIES:

VERTICAL COMPRESSION LOAD (KIPS): XX
TENSION LOAD (KIPS): XX
LATERAL LOAD (KIPS): XX

ROOF LIVE LOADS:

ROOF VEHICLE LOAD: HL-93 TRUCK
VEHICLE IMPACT LOAD (% OF LOAD) 20.6

FLOOR LIVE LOADS:

VALVE VAULT FLOOR UNIFORM (PSF): 250

FLOOD LOAD DATA:

DESIGN FLOOD ELEVATION (2070 1% PRECIPITATION, FT): 24.4
DESIGN GROUNDWATER ELEVATION (FT): 17

SEISMIC DESIGN DATA:

BELOW GRADE:
BASIC SEISMIC-FORCE-RESISTING SYSTEM: BEARING WALL, ORDINARY REINF CONCRETE SHEAR WALLS
RESPONSE MODIFICATION FACTOR, R_i: 3.25
RESPONSE MODIFICATION FACTOR, R_c: 1.0
DESIGN BASE SHEAR, (V, KIPS) XX

DIVERSION STRUCTURE DESIGN CRITERIA

DESIGN IN ACCORDANCE WITH THE TENTH EDITION MASSACHUSETTS STATE BUILDING CODE 780 CMR AND IN ACCORDANCE WITH THE "CODE REQUIREMENTS FOR ENVIRONMENTAL ENGINEERING CONCRETE STRUCTURES AND COMMENTARY," ACI 350-20.

SEISMIC DESIGN DATA:

BELOW GRADE:
BASIC SEISMIC-FORCE-RESISTING SYSTEM: BEARING WALL, ORDINARY REINF CONCRETE SHEAR WALLS
RESPONSE MODIFICATION FACTOR, R_i: 3.25
RESPONSE MODIFICATION FACTOR, R_c: 1.0
DESIGN BASE SHEAR, (V, KIPS) XX

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Client/Project
CITY OF CAMBRIDGE
SHERMAN CSO TANK
CAMBRIDGE, MASSACHUSETTS

Project No.: 195151145
File Name: 51145S-1.DWG
Scale: NO SCALE

JXM	JXM	EER	2026.08.12
Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Title
STRUCTURAL
GENERAL NOTES AND
DESIGN CRITERIA

Revision: Sheet: XX of XX
Drawing No.
S-1

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2026.08.11 10:41:40 AM

ORIGINAL SHEET - ANSI D

DEFERRED SUBMITTALS:

DEFERRED SUBMITTALS ARE THOSE PORTIONS OF THE DESIGN WHICH ARE PROVIDED BY THE CONTRACTOR AND THEREFORE WERE NOT SUBMITTED AT THE TIME OF THE PERMIT APPLICATION, AND WHICH ARE TO BE SUBMITTED TO THE PERMITTING AGENCY PRIOR TO FABRICATION OR INSTALLATION OF THAT PORTION OF THE WORK.

NO WORK SHALL BE PERFORMED FOR DEFERRED SUBMITTAL ITEMS UNTIL THE PLANS FOR SUCH WORK HAVE BEEN REVIEWED AND FOUND ACCEPTABLE BY THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE AND APPROVED BY THE BUILDING OFFICIAL.

DRAWINGS AND CALCULATIONS FOR THESE ITEMS SHALL BE SIGNED AND SEALED BY A LICENSED MASSACHUSETTS PROFESSIONAL ENGINEER. NO FABRICATION SHALL COMMENCE UNTIL THE FINAL APPROVAL HAS BEEN ISSUED BY THE BUILDING OFFICIAL AND THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE.

THE DEFERRED SUBMITTALS SHALL INCLUDE AS A MINIMUM, BUT NOT BE LIMITED TO, THE FOLLOWING ITEMS:

SPECIFICATION SECTION	ITEM
01 33 17	EQUIPMENT ANCHORAGE
33 05 16	PRECAST MANHOLE TYPE STRUCTURES

STRUCTURAL OBSERVATIONS:

1. STRUCTURAL OBSERVATIONS WILL BE PROVIDED IN ACCORDANCE WITH THE 2021 IBC. THE OWNER WILL EMPLOY THE ENGINEER OF RECORD, HIS/HER DESIGNEE, OR A MASSACHUSETTS REGISTERED DESIGN PROFESSIONAL TO PERFORM STRUCTURAL OBSERVATIONS, AND WHO WILL PROVIDE ALL SERVICES NECESSARY TO MEET THE IBC STRUCTURAL OBSERVATIONS REQUIREMENTS.

2. STRUCTURAL OBSERVATIONS WILL BE PROVIDED DURING ALL FABRICATION AND CONSTRUCTION ACTIVITIES IN ACCORDANCE WITH THE NOTES AND SCHEDULES ON THIS DRAWING.

3. THE CONTRACTOR SHALL NOTIFY THE OWNER AND THE STRUCTURAL OBSERVER AT LEAST [FIVE] BUSINESS DAYS PRIOR TO EACH REQUIRED STRUCTURAL OBSERVATION.

SCHEDULE OF STRUCTURAL OBSERVATIONS

CONCRETE CONSTRUCTION	WHAT TO OBSERVE
FOUNDATIONS - PRIOR TO THE FIRST CONCRETE POUR, BUT AFTER SUBSTANTIAL PLACEMENT OF REINFORCING STEEL, WATERSTOPS, ANCHORS, AND OTHER EMBEDDED ITEMS	REVIEW FOUNDATION REINFORCEMENT, INCLUDING ADDITIONAL REINFORCEMENT AT PENETRATIONS REVIEW WALL DOWELS; ENSURE ADDITIONAL DOWELS ASSOCIATED WITH OPENINGS IN WALL AND JAMB STEEL ARE IN PLACE REVIEW WATERSTOP INSTALLATION, TIE-OFFS, AND JOINTS REVIEW ANCHOR BOLT PLACEMENT, HOLD-DOWN ANCHORS, AND OTHER STEEL EMBEDS. REVIEW PIPING AND CONDUIT PLACEMENT
WALLS - PRIOR TO THE FIRST CONCRETE POUR, BUT AFTER SUBSTANTIAL PLACEMENT OF REINFORCING STEEL, WATERSTOPS, ANCHORS, AND OTHER EMBEDDED ITEMS	REVIEW WALL REINFORCEMENT, INCLUDING ADDITIONAL REINFORCEMENT AT PENETRATIONS REVIEW JAMB STEEL, CHORD STEEL, AND WALL-TO-DIAPHRAGM CONNECTION DETAILS REVIEW WATERSTOP INSTALLATION, TIE-OFFS, AND JOINTS REVIEW ANCHOR BOLT PLACEMENT, HOLD-DOWN ANCHORS, AND OTHER STEEL EMBEDS. REVIEW PIPING AND CONDUIT PLACEMENT
ELEVATED SLABS - PRIOR TO THE FIRST CONCRETE POUR, BUT AFTER SUBSTANTIAL PLACEMENT OF REINFORCING STEEL, WATERSTOPS, ANCHORS, AND OTHER EMBEDDED ITEMS	REVIEW SLAB REINFORCEMENT, INCLUDING ADDITIONAL REINFORCEMENT AT PENETRATIONS REVIEW WALL DOWELS; ENSURE ADDITIONAL DOWELS ASSOCIATED WITH OPENINGS IN WALL AND JAMB STEEL ARE IN PLACE REVIEW CHORD STEEL AND WALL-TO-DIAPHRAGM CONNECTION DETAILS REVIEW WATERSTOP INSTALLATION, TIE-OFFS, AND JOINTS REVIEW ANCHOR BOLT PLACEMENT, HOLD-DOWN ANCHORS, AND OTHER STEEL EMBEDS. REVIEW PIPING AND CONDUIT PLACEMENT

STATEMENT OF SPECIAL INSPECTIONS

1. SPECIAL INSPECTIONS ARE REQUIRED IN ACCORDANCE WITH THE 2021 IBC CHAPTER 17 THE OWNER WILL ENGAGE THE SERVICES OF A QUALIFIED SPECIAL INSPECTOR, WHO WILL PROVIDE ALL SERVICES NECESSARY TO MEET THE IBC SPECIAL INSPECTION REQUIREMENTS.

2. SPECIAL INSPECTIONS WILL BE PROVIDED DURING ALL FABRICATION AND CONSTRUCTION ACTIVITIES IN ACCORDANCE WITH THE NOTES AND SCHEDULES ON THIS DRAWING.

DEFINITIONS

1. REFER TO CHAPTER 2 OF THE 2021 IBC FOR DEFINITION OF TERMS APPLICABLE TO SPECIAL INSPECTIONS AND STRUCTURAL OBSERVATIONS.

CONTRACTOR RESPONSIBILITY

REV 080321

1. EACH CONTRACTOR RESPONSIBLE FOR THE FABRICATION OR CONSTRUCTION OF A MAIN WIND-FORCE-RESISTING SYSTEM OR MAIN SEISMIC-FORCE RESISTING SYSTEM OR COMPONENT LISTED ABOVE SHALL SUBMIT A WRITTEN STATEMENT OF RESPONSIBILITY TO THE BUILDING OFFICIAL AND OWNER PRIOR TO THE COMMENCEMENT OF WORK ON THE SYSTEM OR COMPONENT. THE CONTRACTOR'S STATEMENT OF RESPONSIBILITY SHALL CONTAIN ACKNOWLEDGEMENT OF AWARENESS OF THE SPECIAL REQUIREMENTS CONTAINED IN THE STATEMENT OF SPECIAL INSPECTIONS.

REQUIRED SPECIAL INSPECTIONS AND TESTS OF CONCRETE CONSTRUCTION

1. SPECIAL INSPECTION FOR CONCRETE CONSTRUCTION WILL BE IN ACCORDANCE WITH 780 CMR SECTION 1705.3 AND THE FOLLOWING TABLE.

REV 080321

VERIFICATION AND INSPECTION	INSPECTION		REFERENCED STANDARD (A)	IBC REFERENCE
	CONTINUOUS	PERIODIC		
INSPECTION OF REINFORCING STEEL, INCLUDING PRESTRESSING TENDONS, AND PLACEMENT.	-	X	ACI 318: CH. 20, 25.2, 25.3, 26.6.1-26.6.3	1908.4
REINFORCING STEEL WELDING: A. VERIFY WELDABILITY OF REINFORCING BARS OTHER THAN ASTM A706; B. INSPECT SINGLE-PASS FILLET WELDS, MAXIMUM 5/16"; AND C. INSPECT ALL OTHER WELDS	- - X	X X -	AWS D1.4 ACI 318: 26.6.4	-
INSPECTION OF ALL ANCHORS CAST IN CONCRETE.	-	X	ACI 318: 17.8.2	-
INSPECTION OF ANCHORS POST-INSTALLED IN HARDENED CONCRETE MEMBERS (B). A. ADHESIVE ANCHORS INSTALLED IN HORIZONTALLY OR UPWARDLY INCLINED ORIENTATIONS TO RESIST SUSTAINED TENSION LOADS. B. MECHANICAL ANCHORS AND ADHESIVE ANCHORS NOT DEFINED DEFINED BY PART A.	X -	- X	ACI 318: 17.8.2.4 ACI 318: 17.8.2	-
VERIFYING USE OF REQUIRED DESIGN MIX.	-	X	ACI 318: CH. 19, 26.4.3, 26.4.4	1904.1, 1904.2, 1908.2, 1908.3
PRIOR TO CONCRETE PLACEMENT, FABRICATE SPECIMENS FOR STRENGTH TESTS, PERFORM SLUMP AND AIR CONTENT TESTS, AND DETERMINE THE TEMPERATURE OF THE CONCRETE.	X	-	ASTM C172 ASTM C31 ACI 318: 26.5, 26.12	1908.10
INSPECTION OF CONCRETE AND SHOTCRETE PLACEMENT FOR PROPER APPLICATION TECHNIQUES.	X	-	ACI 318: 26.5	1908.6, 1908.7, 1908.8
INSPECTION FOR MAINTENANCE OF SPECIFIED CURING TEMPERATURE AND TECHNIQUES.	-	X	ACI 318: 26.5.3-26.5.5	1908.9
ERECTION OF PRECAST CONCRETE MEMBERS	-	X	ACI 318: 26.9	-
INSPECT PRESTRESSED CONCRETE FOR: A. APPLICATION OF PRESTRESSING FORCES. B. GROUTING OF BONDED PRESTRESSING TENDONS.	X X	-	ACI 318: 26.10	-
VERIFY IN-SITU CONCRETE STRENGTH PRIOR TO STRESSING OF TENDONS IN POST-TENSIONED CONCRETE AND PRIOR TO REMOVAL OF SHORES AND FORMS FROM BEAMS AND STRUCTURAL SLABS.	-	X	ACI 318: 26.11.2	-
INSPECT FORMWORK FOR SHAPE, LOCATION AND DIMENSIONS OF THE CONCRETE MEMBER BEING FORMED.	-	X	ACI 318: 26.11.1.2(B)	-

(A) WHERE APPLICABLE, SEE ALSO IBC SECTION 1705.12, SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE.

(B) SPECIFIC REQUIREMENTS FOR SPECIAL INSPECTION SHALL BE INCLUDED IN THE RESEARCH REPORT FOR THE ANCHOR ISSUED BY AN APPROVED SOURCE IN ACCORDANCE WITH 17.8.2 IN ACI 318 OR OTHER QUALIFICATION PROCEDURES. WHERE SPECIFIC REQUIREMENTS ARE NOT PROVIDED, SPECIAL INSPECTION REQUIREMENTS WILL BE AS SPECIFIED BY THE REGISTERED DESIGN PROFESSIONAL AND WILL BE APPROVED BY THE BUILDING OFFICIAL PRIOR TO COMMENCEMENT OF THE WORK.

REQUIRED SPECIAL INSPECTIONS AND TESTS OF SOILS

1. SPECIAL INSPECTION FOR SOIL WILL BE IN ACCORDANCE WITH 780 CMR SECTION 1705.6 AND THE FOLLOWING TABLE.

VERIFICATION AND INSPECTION	INSPECTION	
	CONTINUOUS	PERIODIC
VERIFY MATERIALS BELOW FOOTINGS AND SHALLOW FOUNDATIONS ARE ADEQUATE TO ACHIEVE THE DESIGN BEARING CAPACITY.	-	X
VERIFY EXCAVATIONS ARE EXTENDED TO PROPER DEPTH AND HAVE REACHED PROPER MATERIAL.	-	X
PERFORM CLASSIFICATION AND TESTING OF COMPACTED FILL MATERIALS.	-	X
VERIFY USE OF PROPER MATERIALS, DENSITIES AND LIFT THICKNESSES DURING PLACEMENT AND COMPACTION OF COMPACTED FILL.	X	-
PRIOR TO PLACEMENT OF COMPACTED FILL, OBSERVE SUBGRADE AND VERIFY THAT SITE HAS BEEN PREPARED PROPERLY.	-	X

REQUIRED SPECIAL INSPECTIONS AND TESTS OF CAST-IN-PLACE DEEP FOUNDATION ELEMENTS

1. SPECIAL INSPECTION FOR CAST-IN-PLACE DEEP FOUNDATIONS WILL BE IN ACCORDANCE WITH 780 CMR SECTION 1705.8 AND THE FOLLOWING TABLE.

VERIFICATION AND INSPECTION	INSPECTION	
	CONTINUOUS	PERIODIC
INSPECT DRILLING OPERATIONS AND MAINTAIN COMPLETE AND ACCURATE RECORDS FOR EACH ELEMENT.	X	-
VERIFY PLACEMENT LOCATIONS AND PLUMBNESS, CONFIRM ELEMENT DIAMETERS, BELL DIAMETERS (IF APPLICABLE), LENGTHS, EMBEDMENT INTO BEDROCK (IF APPLICABLE), AND ADEQUATE END-BEARING STRATA CAPACITY. RECORD GROUT AND CONCRETE VOLUMES.	X	-
FOR CONCRETE ELEMENTS PERFORM TESTS AND ADDITIONAL SPECIAL INSPECTIONS IN ACCORDANCE WITH SECTION 1705.3.	-	-

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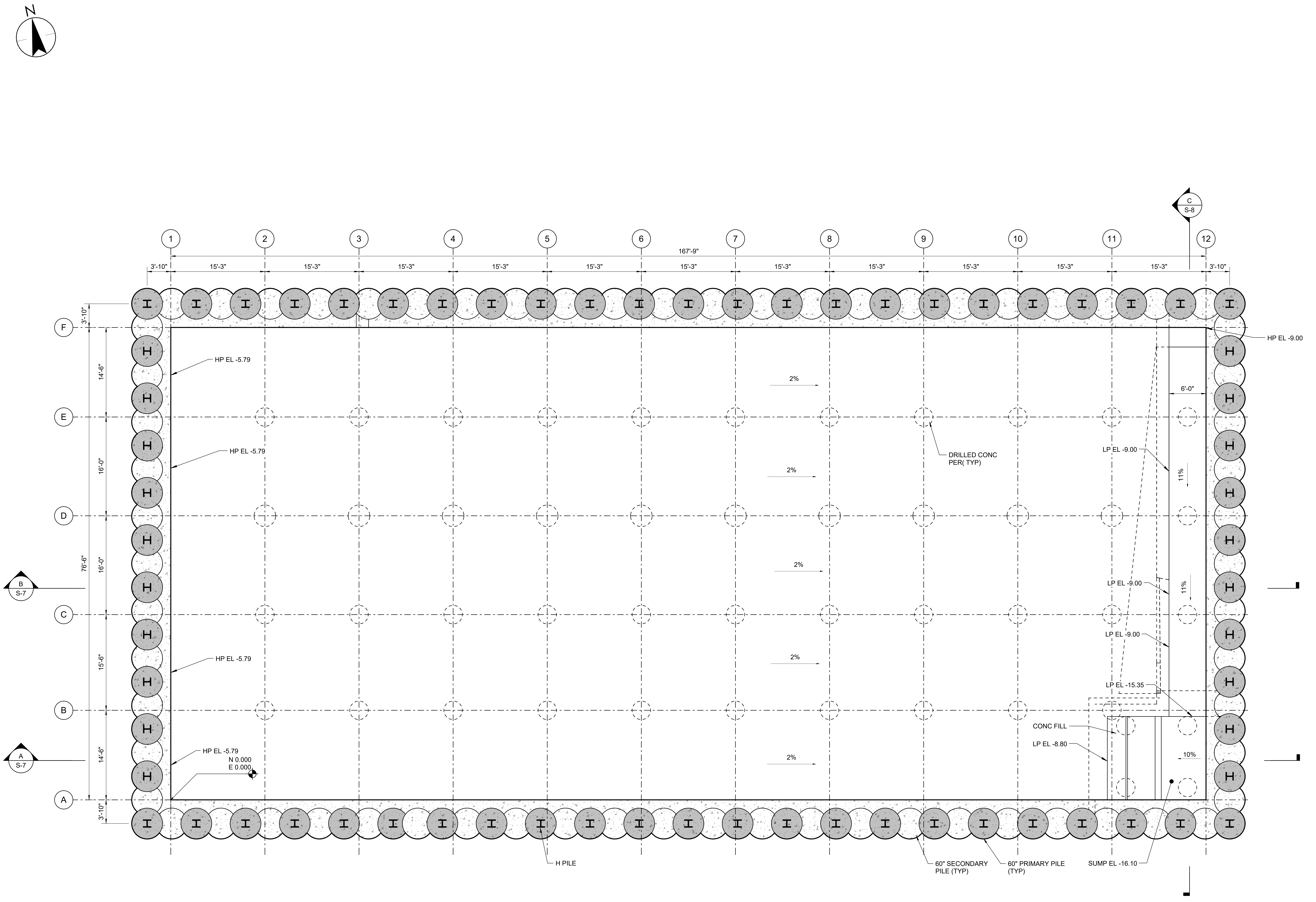
CAMBRIDGE, MASSACHUSETTS

Project No.: 195151145
File Name: 51145S-2.DWG
Scale: NO SCALE

JXM	JXM	EER	2026.08.12
Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Title
STRUCTURAL
NOTES AND SPECIAL
INSPECTIONS

Revision: Sheet: XX of XX
Drawing No.
S-2



PILING PLAN

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

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CAMBRIDGE, MASSACHUSETTS

Project No.:195151145
File Name: N/A

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JXM	JXM	EER	2026.08.12
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Title
PILING PLAN

Revision:

Drawing No.
S-3

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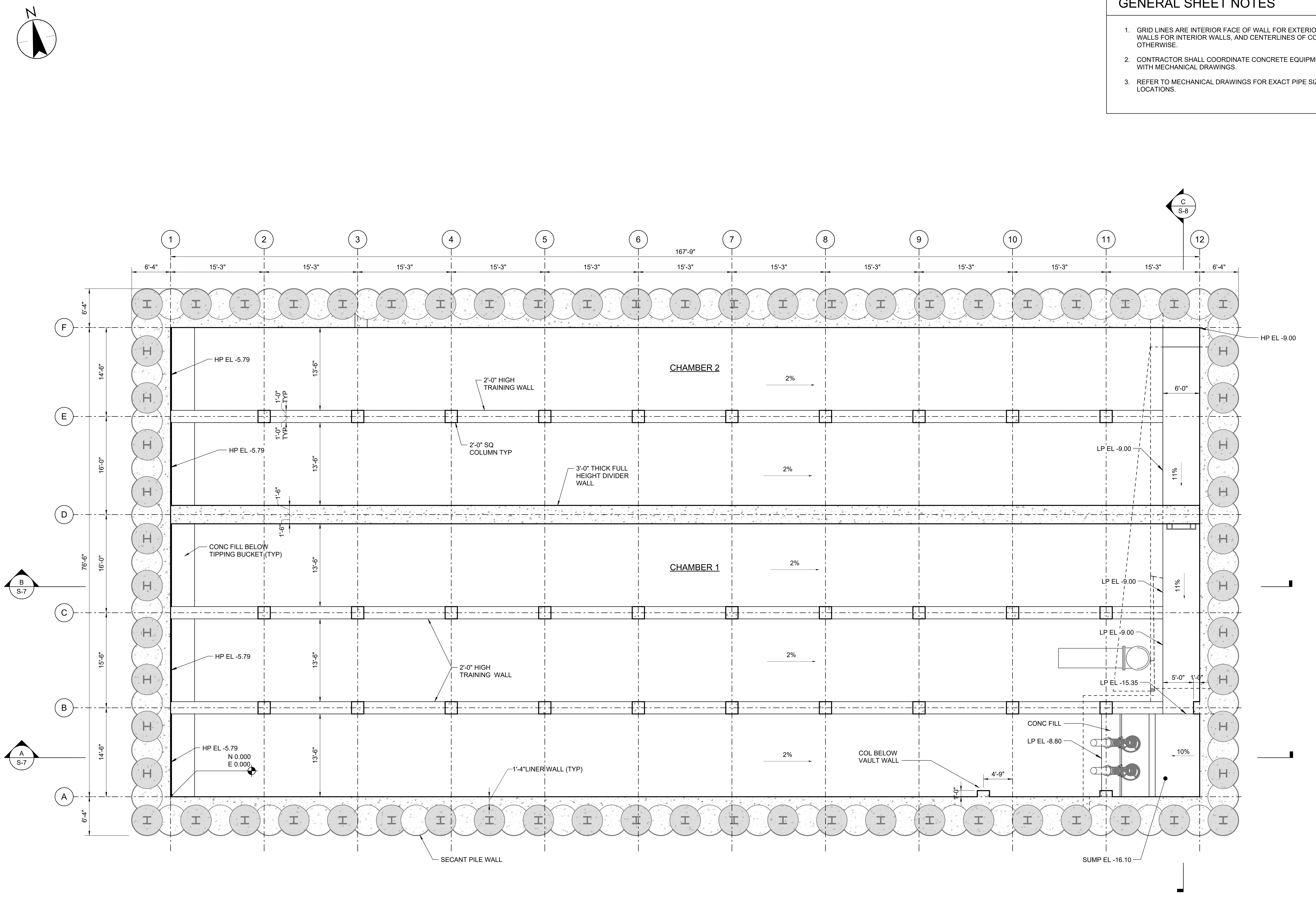
GENERAL SHEET NOTES

1. GRID LINES ARE INTERIOR FACE OF WALL FOR EXTERIOR WALLS, CENTERLINE OF WALLS FOR INTERIOR WALLS, AND CENTERLINES OF COLUMNS, UNLESS NOTED OTHERWISE.
2. CONTRACTOR SHALL COORDINATE CONCRETE EQUIPMENT PAD SIZE AND LOCATION WITH MECHANICAL DRAWINGS.
3. REFER TO MECHANICAL DRAWINGS FOR EXACT PIPE SIZE AND PIPE PENETRATION LOCATIONS.



TANK FOUNDATION PLAN

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

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CAMBRIDGE, MASSACHUSETTS

Project No.:195151145
File Name: N/A

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

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Title
TANK PLAN - FOUNDATION

Revision:

Drawing No.
S-4

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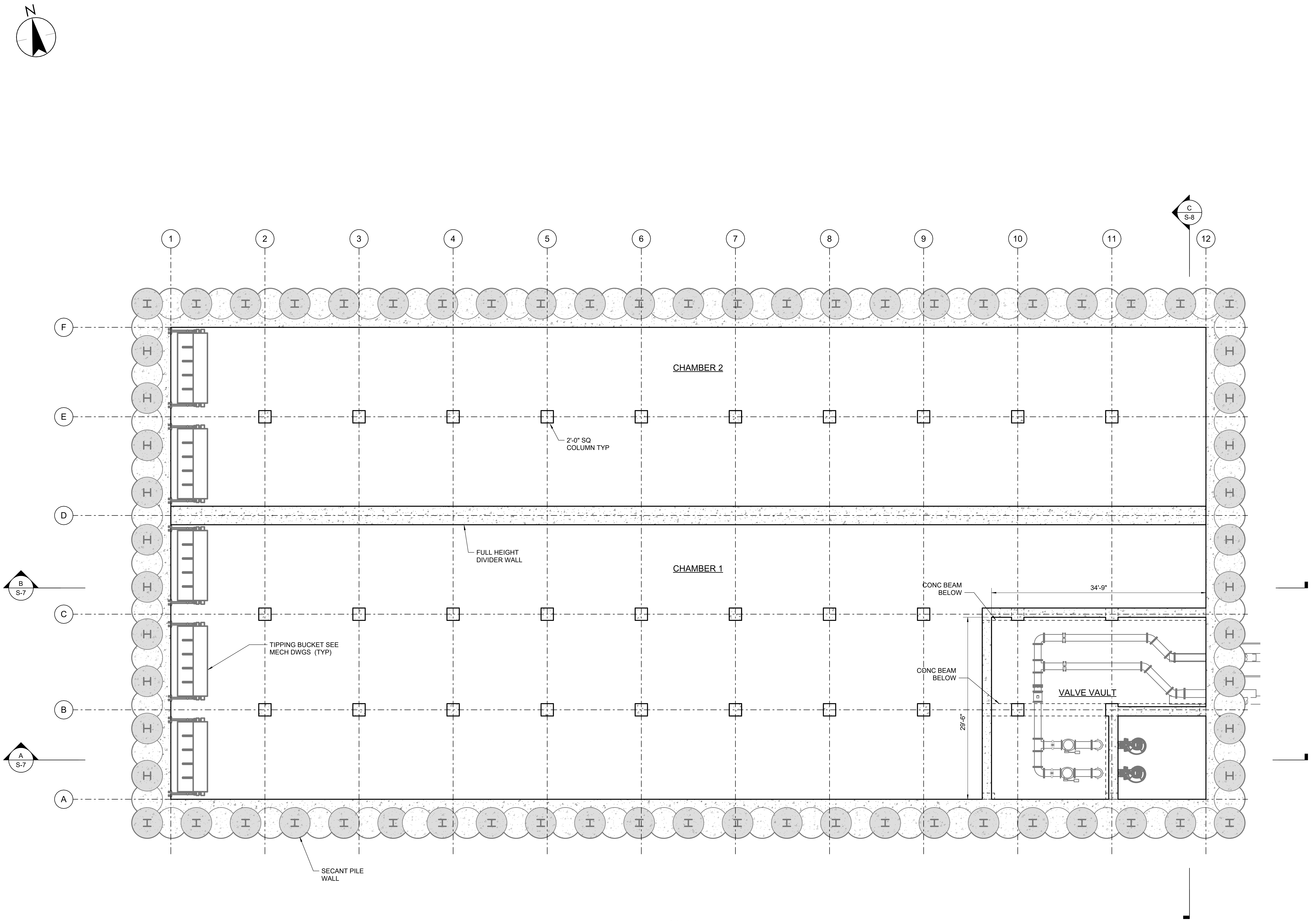

PLAN AT EL 12.00±

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

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CAMBRIDGE, MASSACHUSETTS

Project No.:195151145
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Scale: 1/8" = 1'-0"

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Title
TANK PLAN - INTERMEDIATE

Revision:

Drawing No.
S-5

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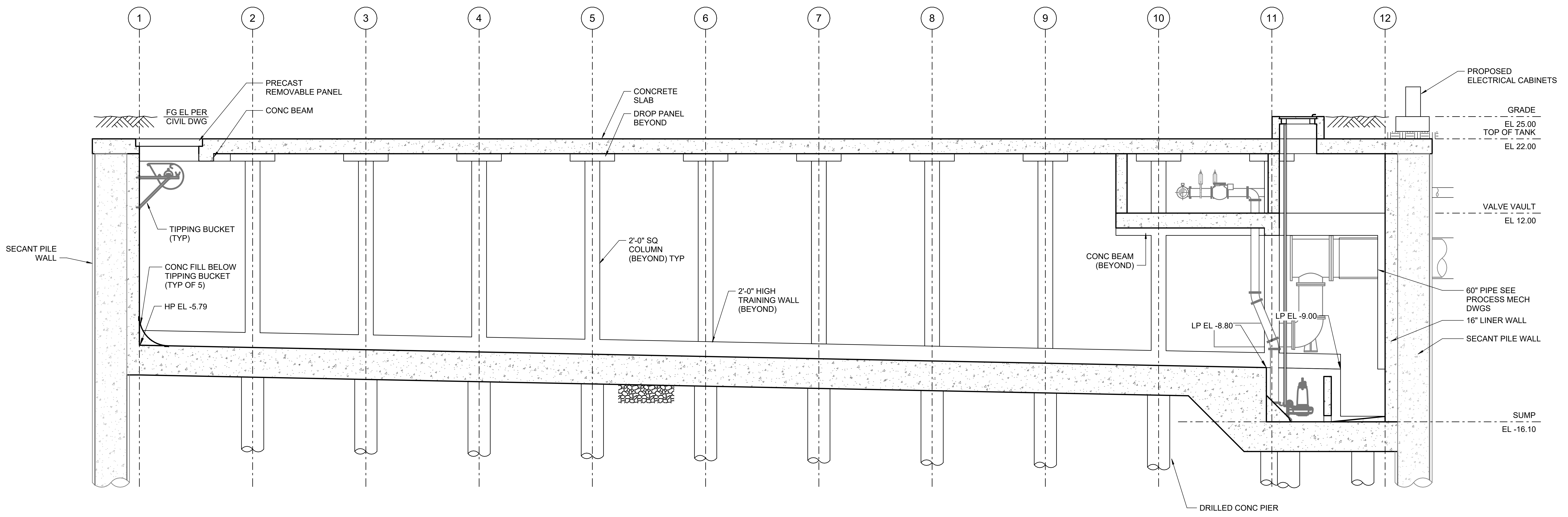

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S-3
SECTION
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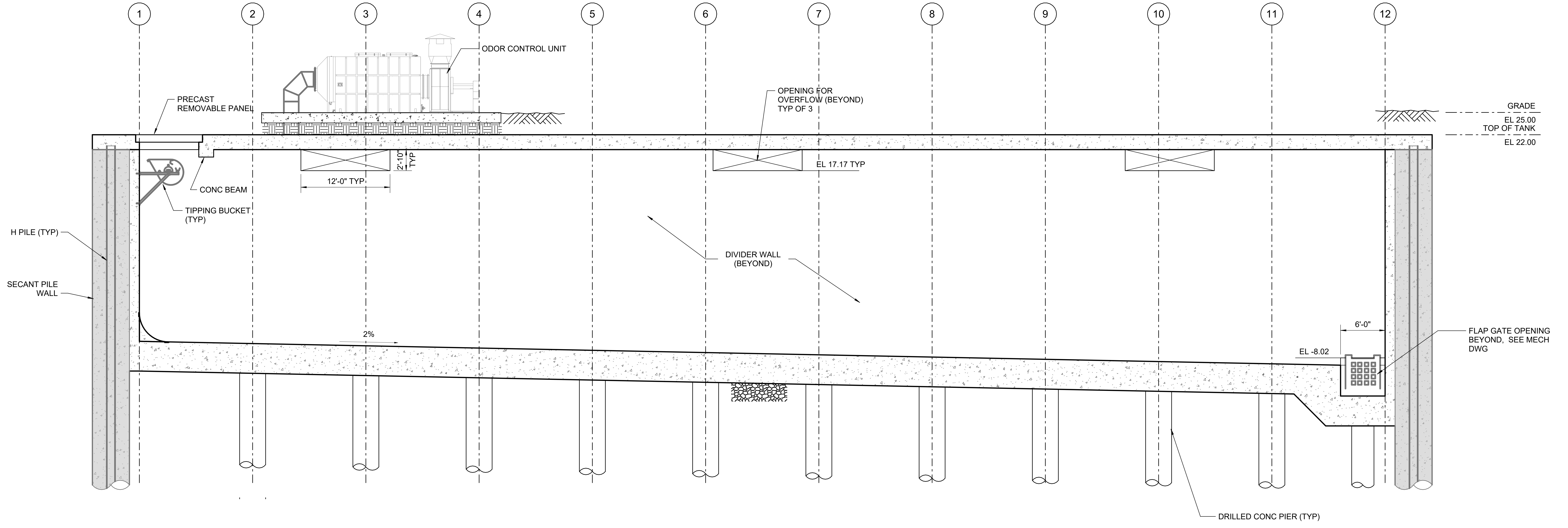

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S-3
SECTION
SCALE: 1/8" = 1'-0"

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Project No.:195151145
File Name: N/A
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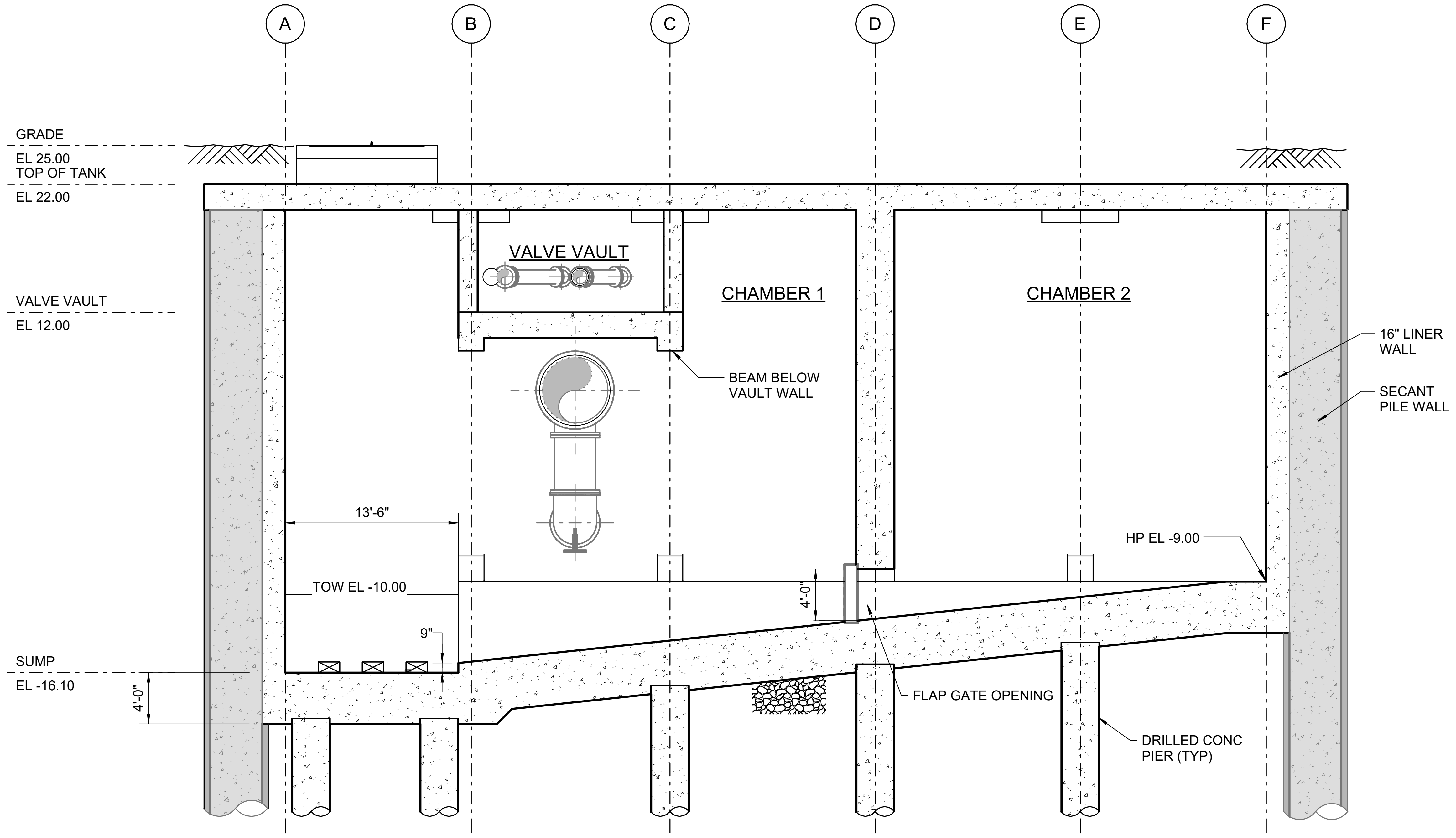
Title
TANK SECTIONS AND
DETAILS - I

Revision:

Drawing No.
S-7



C
S-3
SECTION
SCALE: 1/8" = 1'-0"

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Project No.:195151145
File Name: N/A
Scale: 1/8" = 1'-0"

DMB	JXM	EER	2026.08.12
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Title
TANK SECTIONS AND DETAILS - II

Revision:

Drawing No.
S-8

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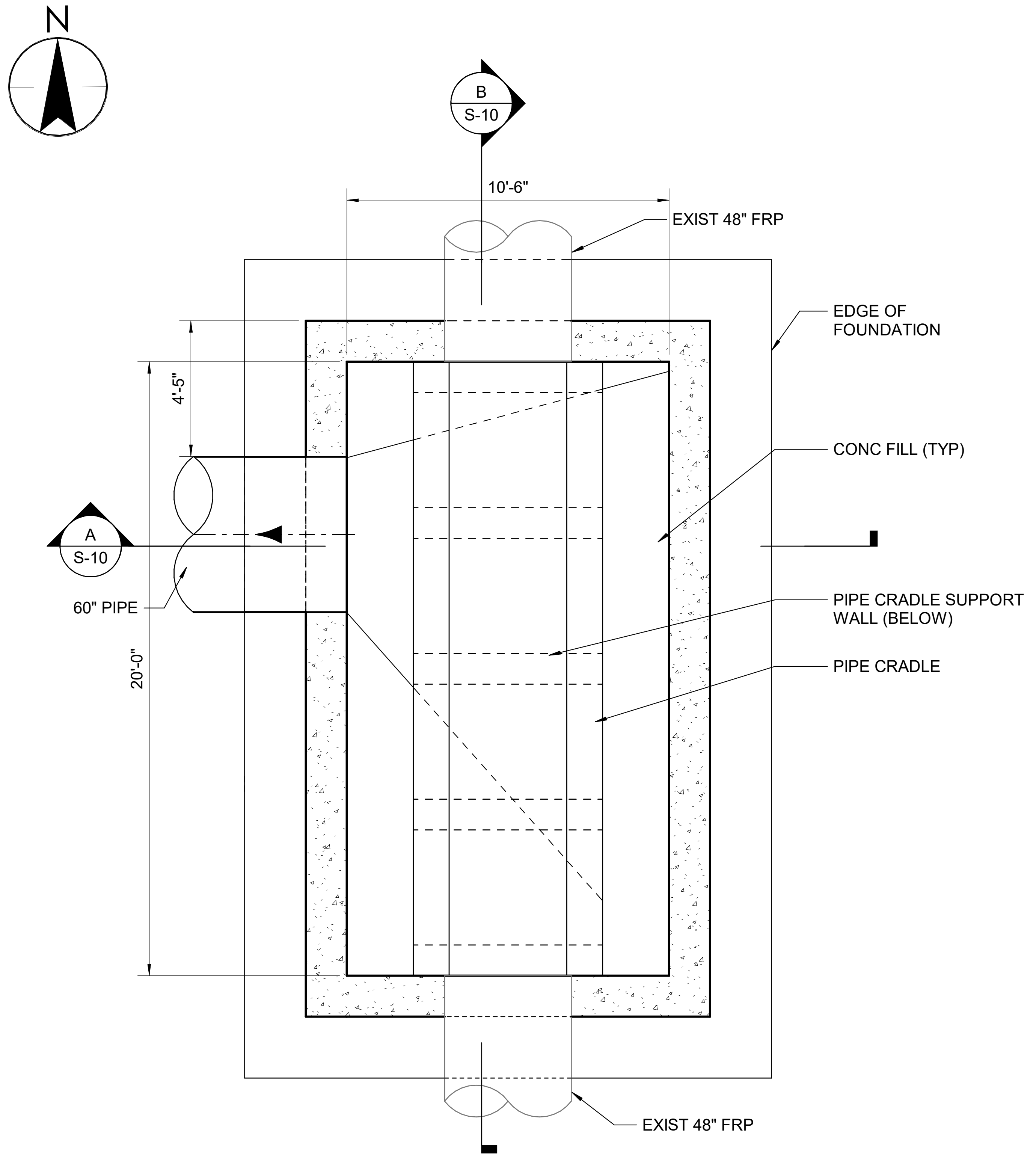
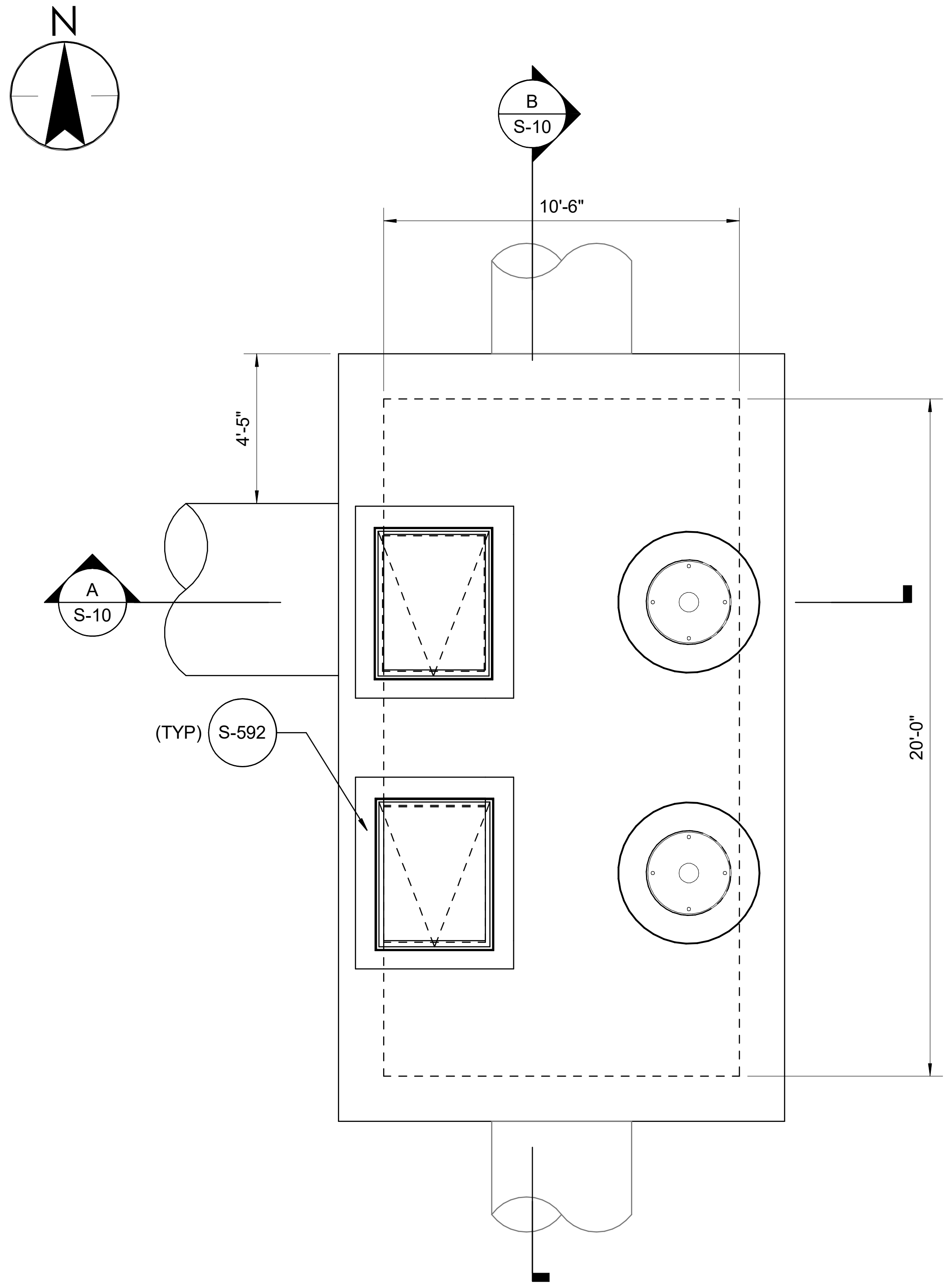


FOUNDATION PLAN

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

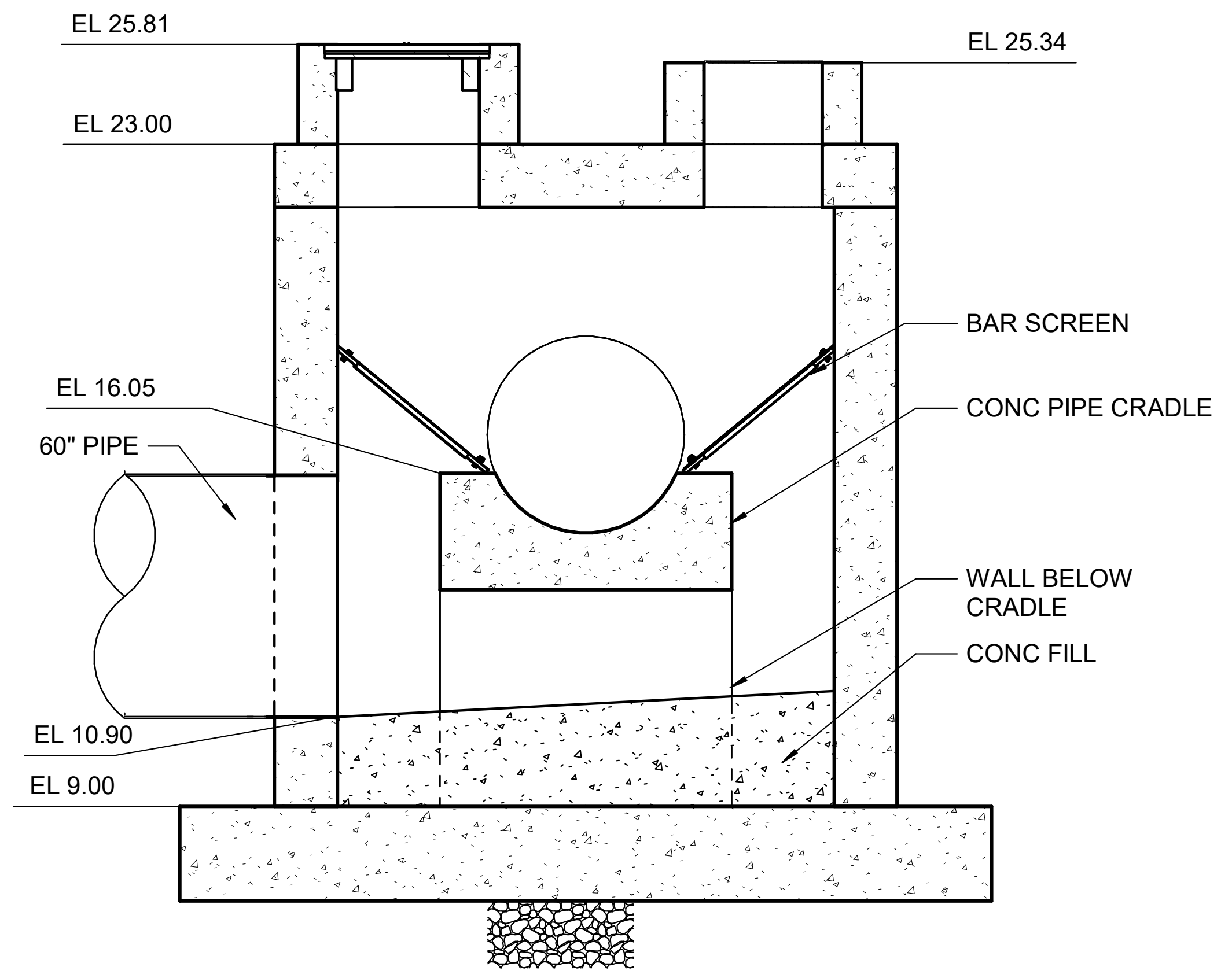


TOP PLAN

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

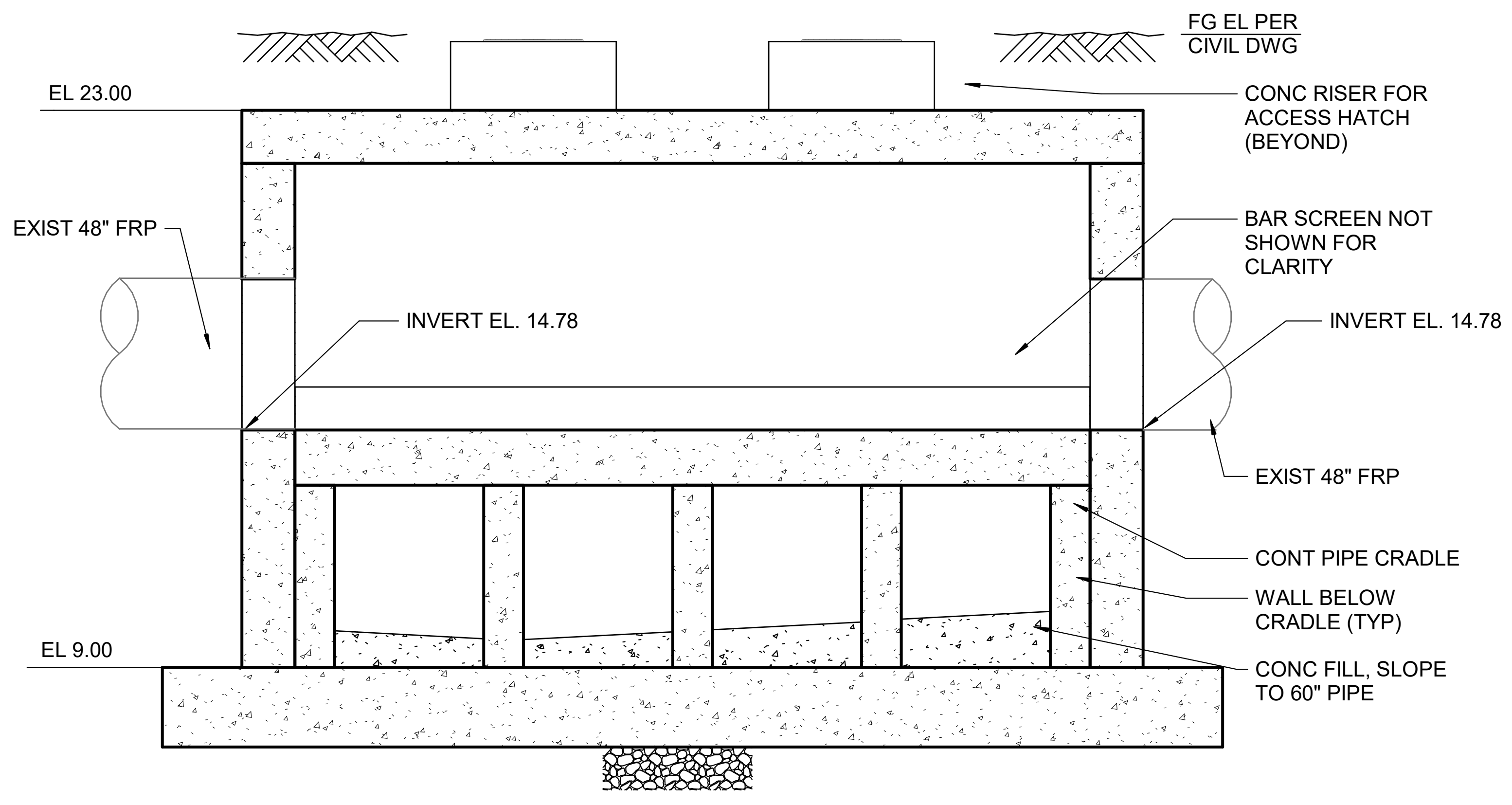
GENERAL SHEET NOTES

1. CONTRACTOR TO CONFIRM LOCATION OF EXISTING PIPING AND COORDINATE WITH CIVIL DRAWINGS.



A
S-10
SECTION

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



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S-10
SECTION

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

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CAMBRIDGE, MASSACHUSETTS

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File Name: N/A

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

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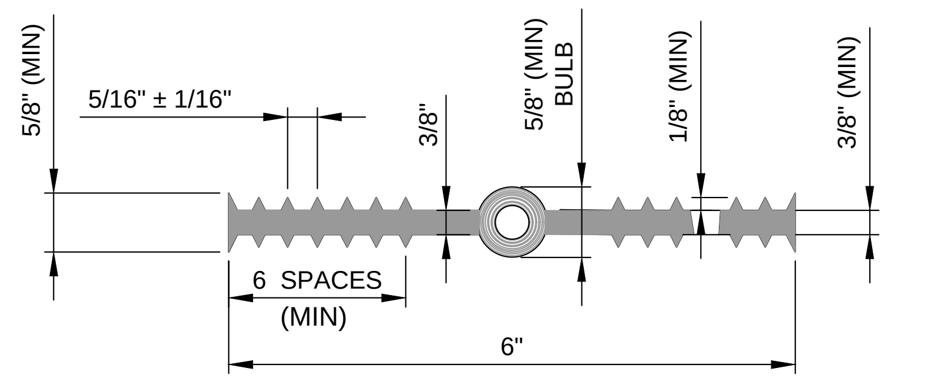
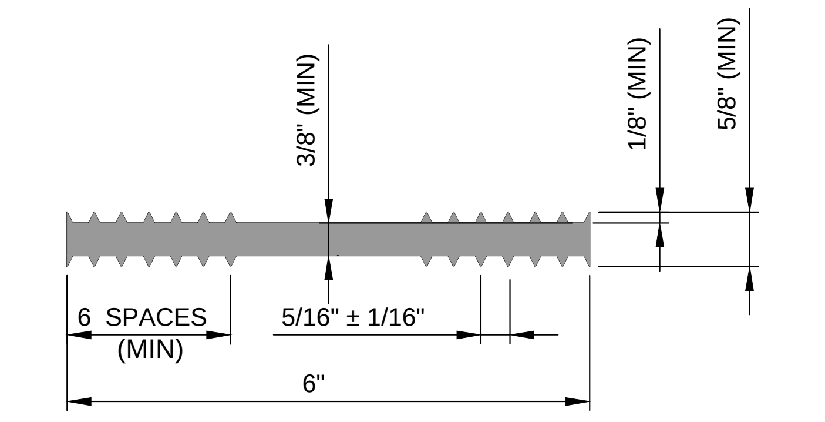
Title
DIVERSION STRUCTURE PLAN
AND SECTIONS

Revision:

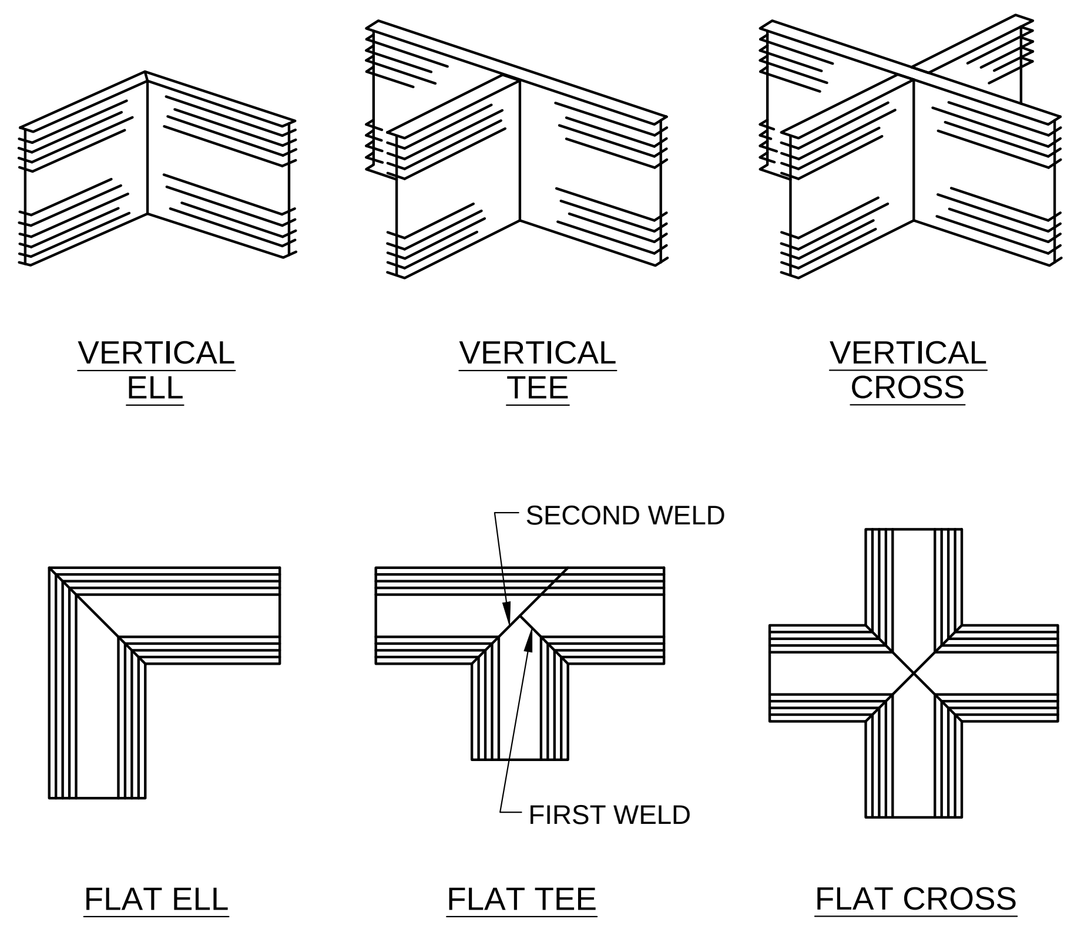
Drawing No.
S-10



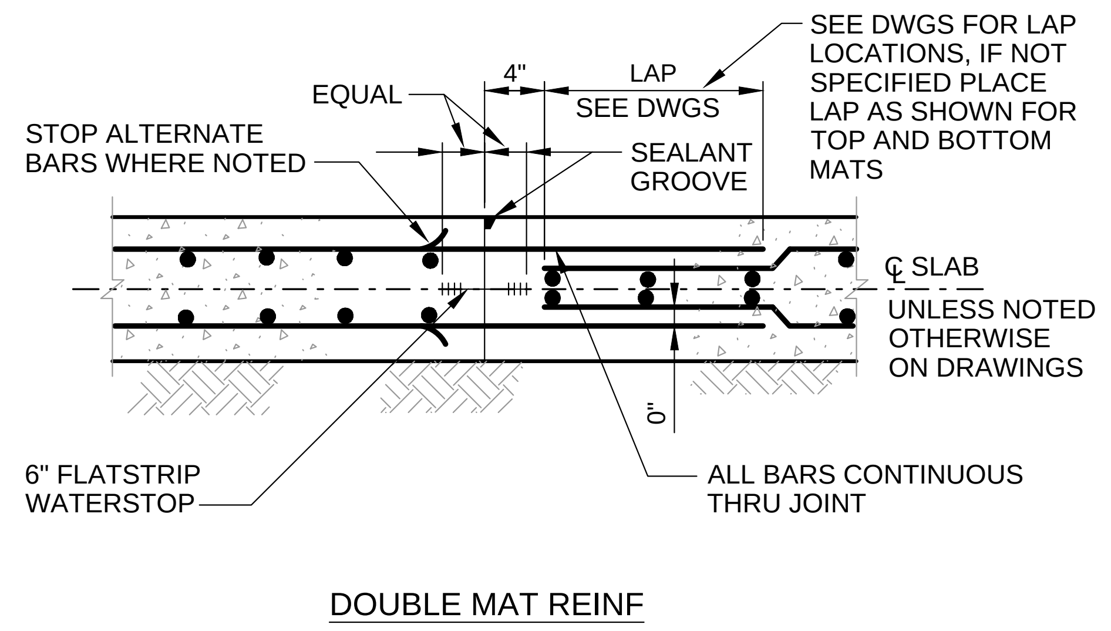
S-103 6" CENTER-BULB WATERSTOP
REV 010119



S-105 6" FLATSTRIP WATERSTOP
REV 010119



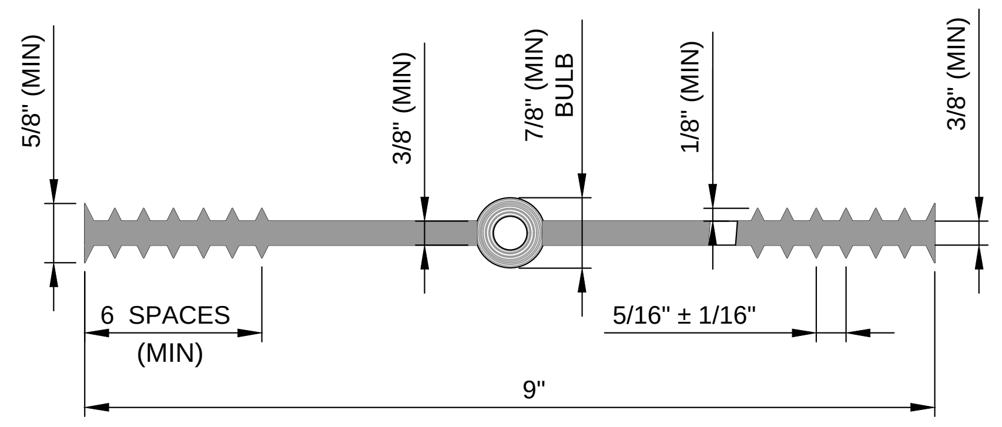
S-108 PREFABRICATED WATERSTOP JOINTS
REV 010119


EQUAL
4"
LAP
SEE DWGS
SEE DWGS FOR LAP LOCATIONS, IF NOT SPECIFIED PLACE LAP AS SHOWN FOR TOP AND BOTTOM MATS
STOP ALTERNATE BARS WHERE NOTED
SEALANT GROOVE
℄ SLAB UNLESS NOTED OTHERWISE ON DRAWINGS
0"
6" FLATSTRIP WATERSTOP
ALL BARS CONTINUOUS THRU JOINT
DOUBLE MAT REINF

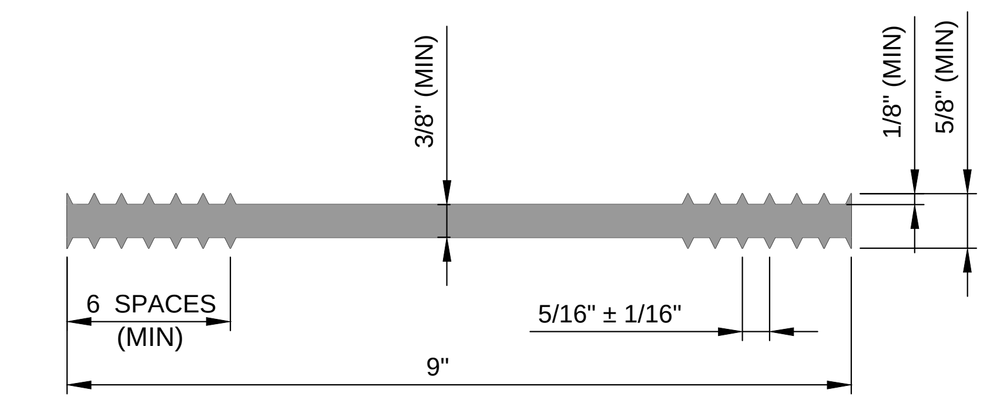
S-114 WITH WATERSTOP AND SEALANT GROOVE
REV 010119

S-115 NO WATERSTOP OR SEALANT GROOVE
REV 010119

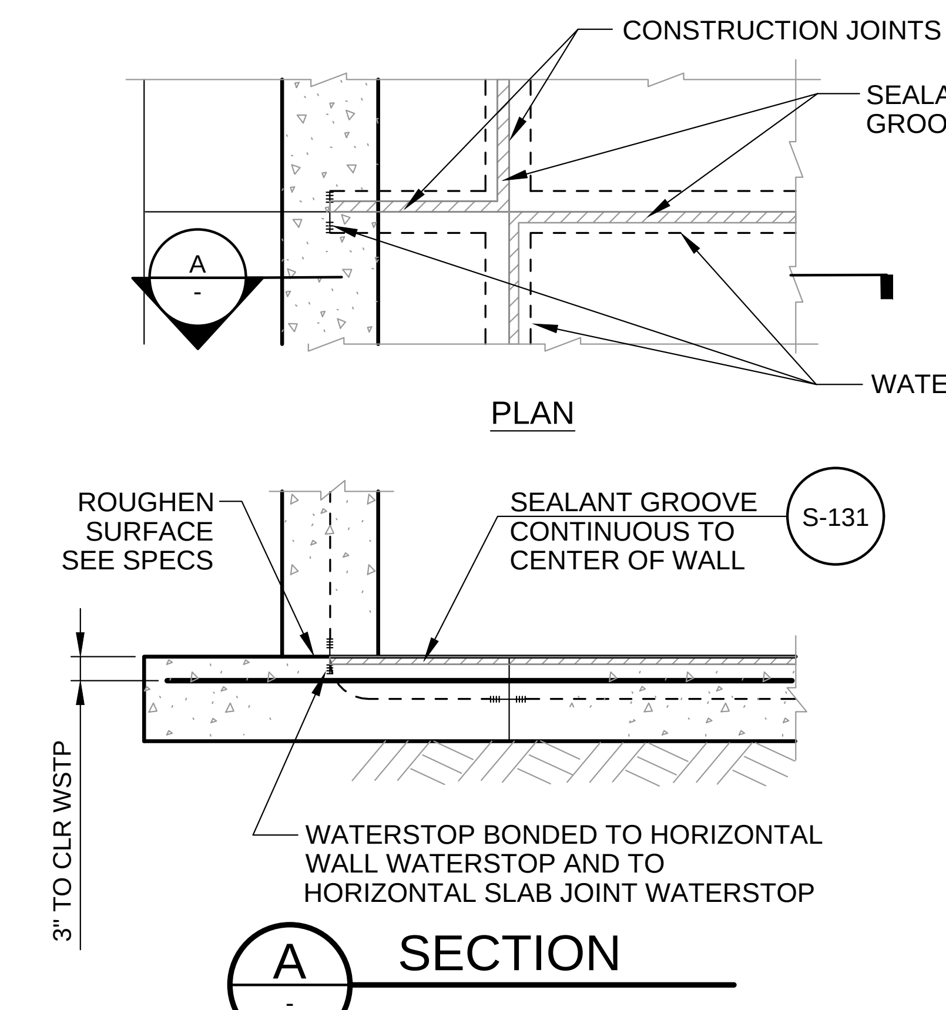
SLAB-ON-GRADE CONSTRUCTION JOINTS

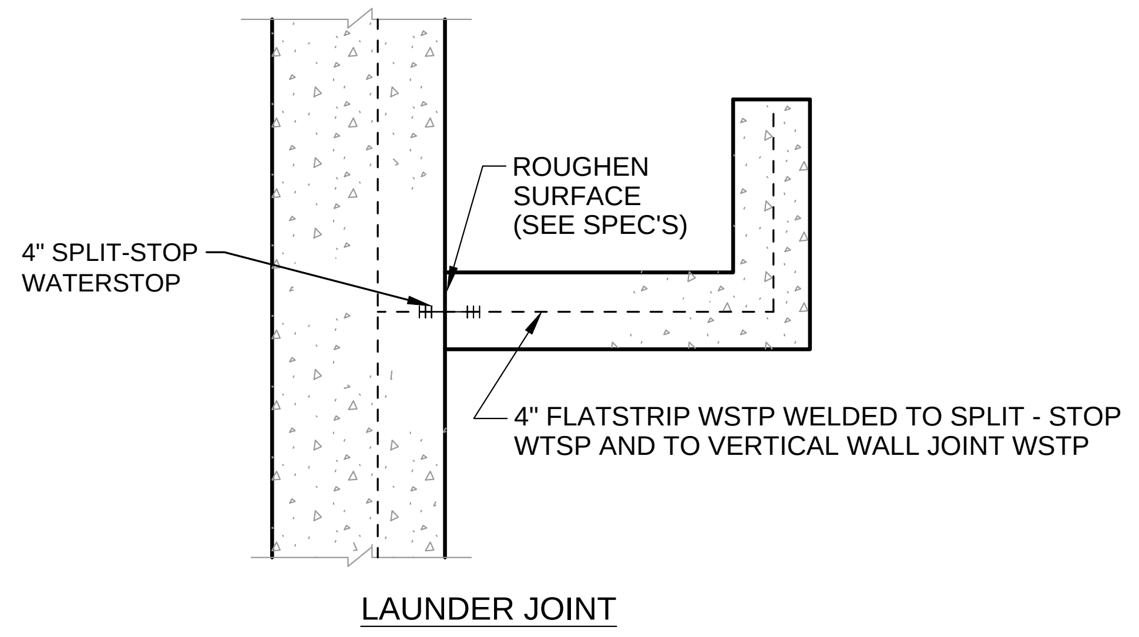


S-104 9" CENTER-BULB WATERSTOP
REV 010119



S-106 9" FLATSTRIP WATERSTOP
REV 010119

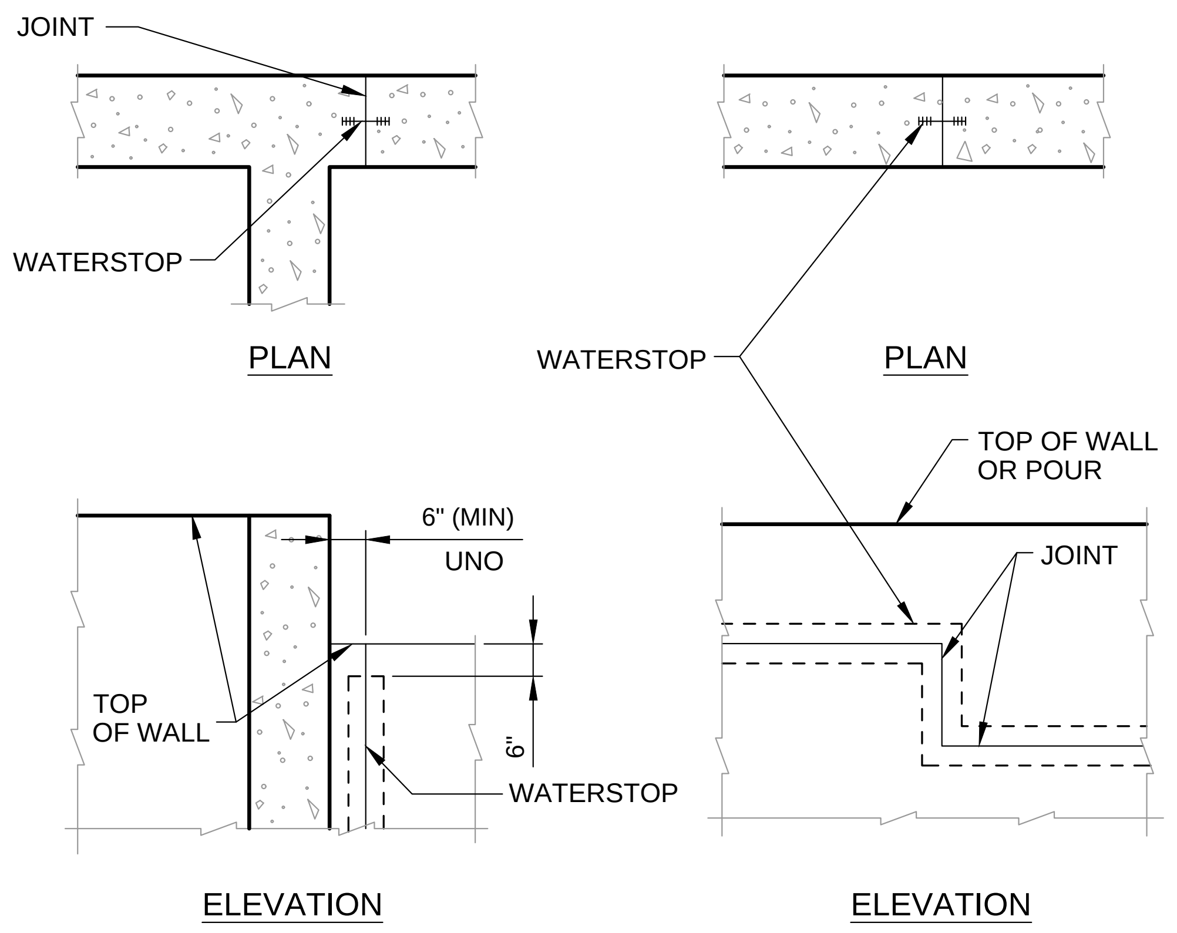

CONSTRUCTION JOINTS
SEALANT GROOVE
A
WATERSTOP
PLAN
ROUGHEN SURFACE SEE SPECS
SEALANT GROOVE CONTINUOUS TO CENTER OF WALL
S-131
3" TO CLR WSTP
WATERSTOP BONDED TO HORIZONTAL WALL WATERSTOP AND TO HORIZONTAL SLAB JOINT WATERSTOP
A
SECTION


ROUGHEN SURFACE (SEE SPEC'S)
4" SPLIT-STOP WATERSTOP
4" FLATSTRIP WSTP WELDED TO SPLIT - STOP WSTP AND TO VERTICAL WALL JOINT WSTP
LAUNDER JOINT

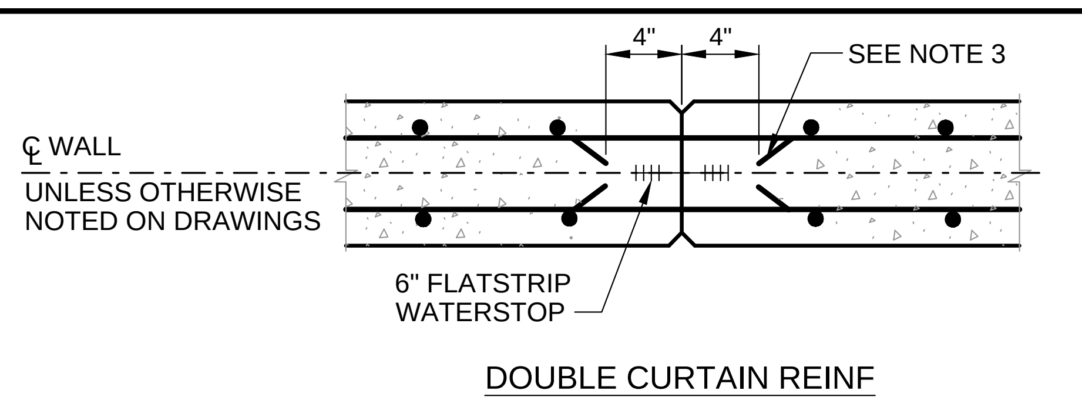
NOTES:

1. SEALANT GROOVE SHALL BE CONTINUED UNDER WALL AND SEALANT SHALL BOND WITH WALL WATERSTOP IN ALL CASES WHERE SUCH WATERSTOP OCCURS.
2. SEALANT UNDER WALL SHALL BE IN PLACE AND FULLY CURED PRIOR TO PLACEMENT OF CONCRETE FOR WALL.
3. CONSTRUCTION JOINTS PASSING THROUGH VARIOUS MEMBERS OF A WATER RETAINING STRUCTURE SHALL BE SEALED WITH WATERSTOPS BONDED TOGETHER, SO AS TO PROVIDE A CONTINUOUS WATERTIGHT JOINT.

S-118 CONSTRUCTION JOINT WALL TO SLAB
REV 010119



S-120 WATERSTOP DETAILS FOR WALL JOINTS
REV 010119



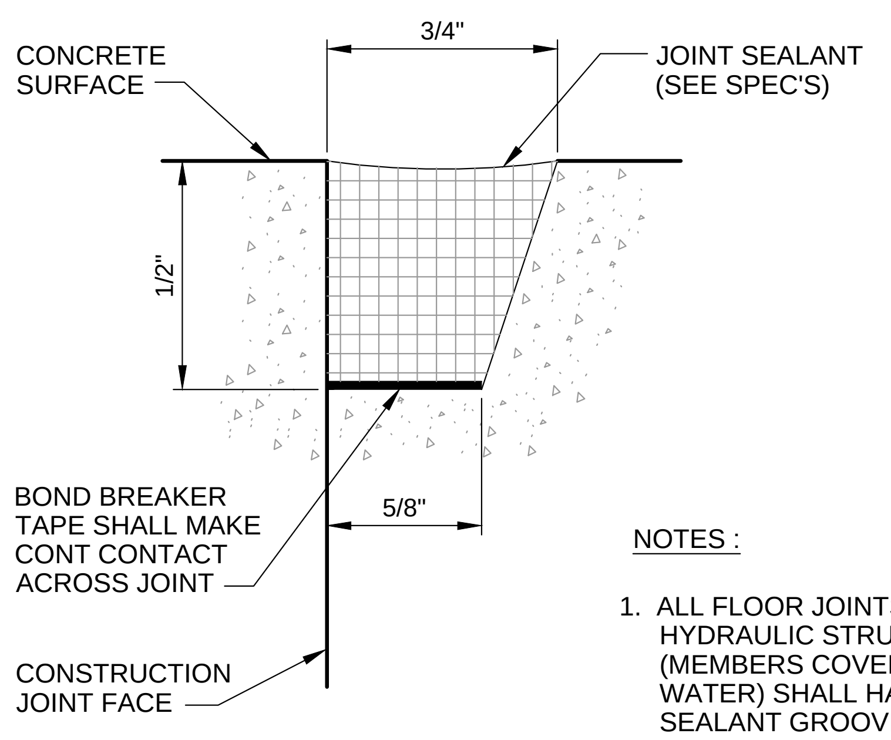
S-123 WITH WATERSTOP
REV 010119

S-124 NO WATERSTOP
REV 010119

NOTES:

1. UNLESS OTHERWISE NOTED 3/4" CHAMFERS SHALL BE OMITTED IN SURFACES TO RECEIVE ARCHITECTURAL TREATMENT.
2. UNLESS SPECIFICALLY NOTED OTHERWISE #5 AND LARGER BARS SHALL BE CONTINUOUS THRU JOINT. #4 AND SMALLER BARS SHALL STOP ALTERNATE BARS AT JOINT.
3. STAGGER SPLICES UNLESS NOTED OTHERWISE.

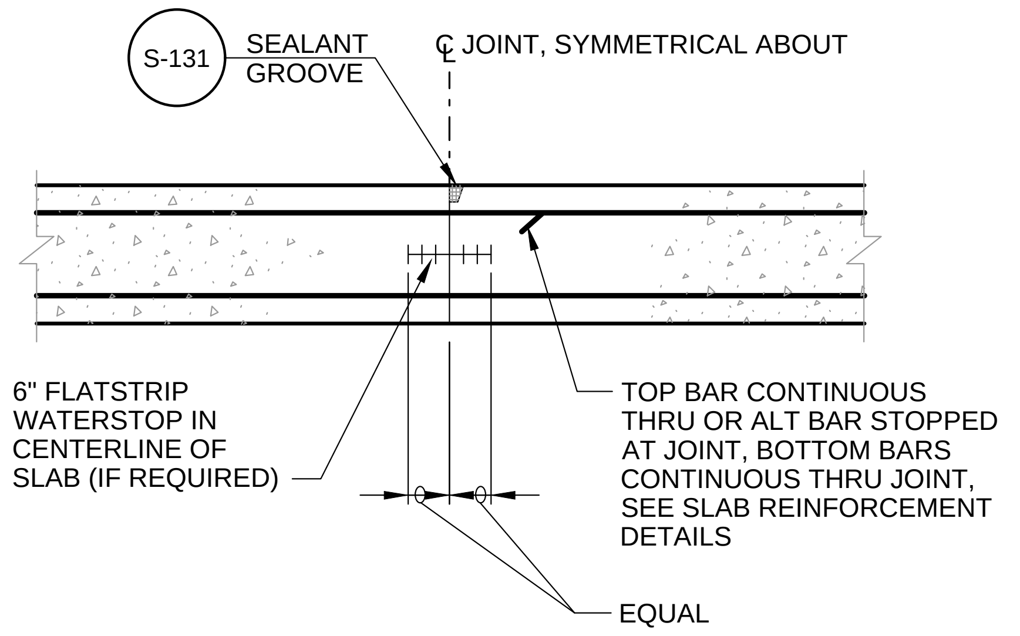
VERTICAL WALL CONSTRUCTION JOINT


CONCRETE SURFACE
3/4"
JOINT SEALANT (SEE SPEC'S)
1/2"
5/8"
BOND BREAKER TAPE SHALL MAKE CONT CONTACT ACROSS JOINT
CONSTRUCTION JOINT FACE

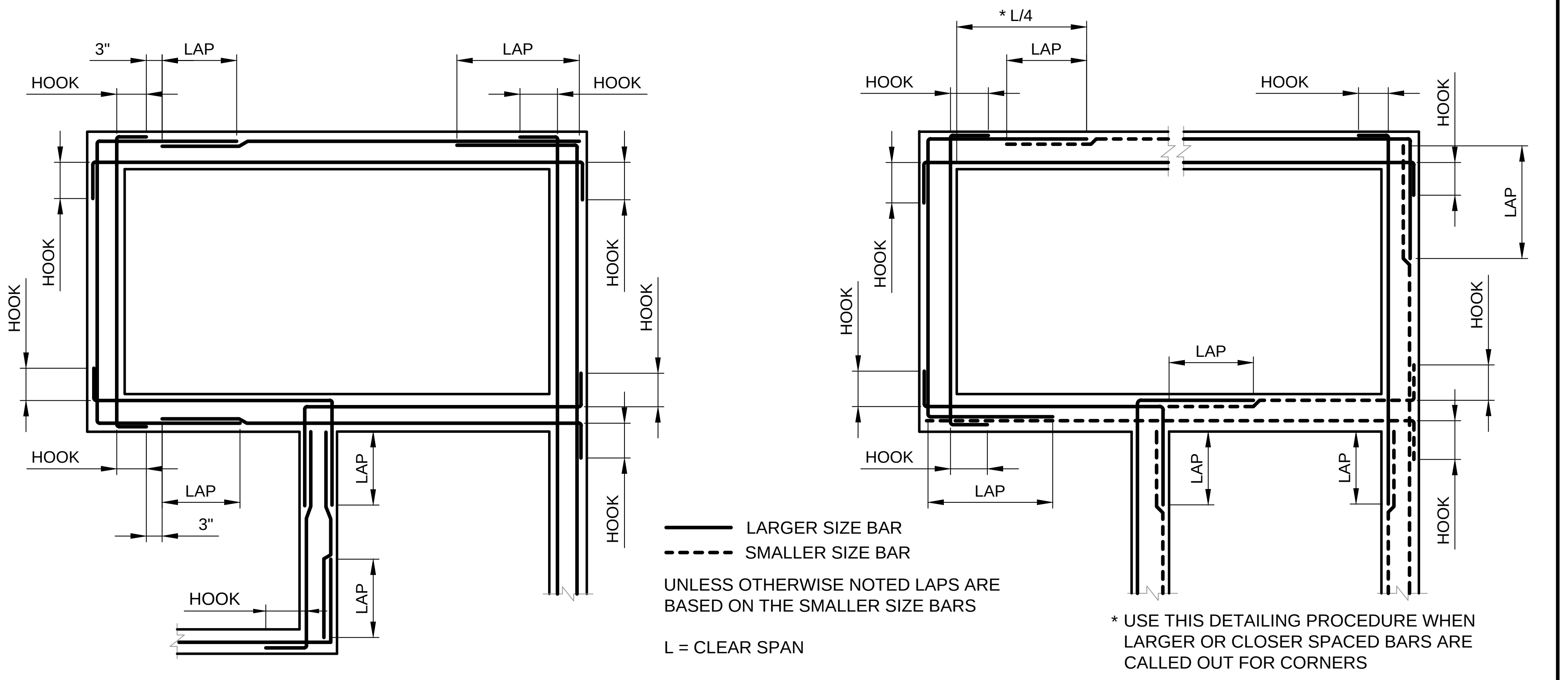
NOTES :

1. ALL FLOOR JOINTS OF HYDRAULIC STRUCTURES (MEMBERS COVERED WITH WATER) SHALL HAVE A SEALANT GROOVE
2. SANDBLASTING REQUIRED PRIOR TO APPLICATION OF PRIMER

S-131 SEALANT GROOVE
REV 010119


S-131
SEALANT GROOVE
℄ JOINT, SYMMETRICAL ABOUT
6" FLATSTRIP WATERSTOP IN CENTERLINE OF SLAB (IF REQUIRED)
TOP BAR CONTINUOUS THRU OR ALT BAR STOPPED AT JOINT, BOTTOM BARS CONTINUOUS THRU JOINT, SEE SLAB REINFORCEMENT DETAILS
EQUAL

S-137 SUSPENDED SLAB CONSTRUCTION JOINT
REV 010119



LARGER SIZE BAR
SMALLER SIZE BAR

UNLESS OTHERWISE NOTED LAPS ARE BASED ON THE SMALLER SIZE BARS

L = CLEAR SPAN

* USE THIS DETAILING PROCEDURE WHEN LARGER OR CLOSER SPACED BARS ARE CALLED OUT FOR CORNERS

S-141 HORIZONTAL REINFORCEMENT AT WALL INTERSECTIONS
REV 010119

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Client/Project
CITY OF CAMBRIDGE
SHERMAN CSO TANK
CAMBRIDGE, MASSACHUSETTS

Project No.: 195151145
File Name: 51145S-13.DWG
Scale: NO SCALE

Dwn.	Dsgn.	Chkd.	YYYY.MM.DD
JXM	JXM	EER	2026.08.12

Title
STRUCTURAL
STANDARD DETAILS - I

Revision: Sheet: XX of XX
Drawing No.
S-13

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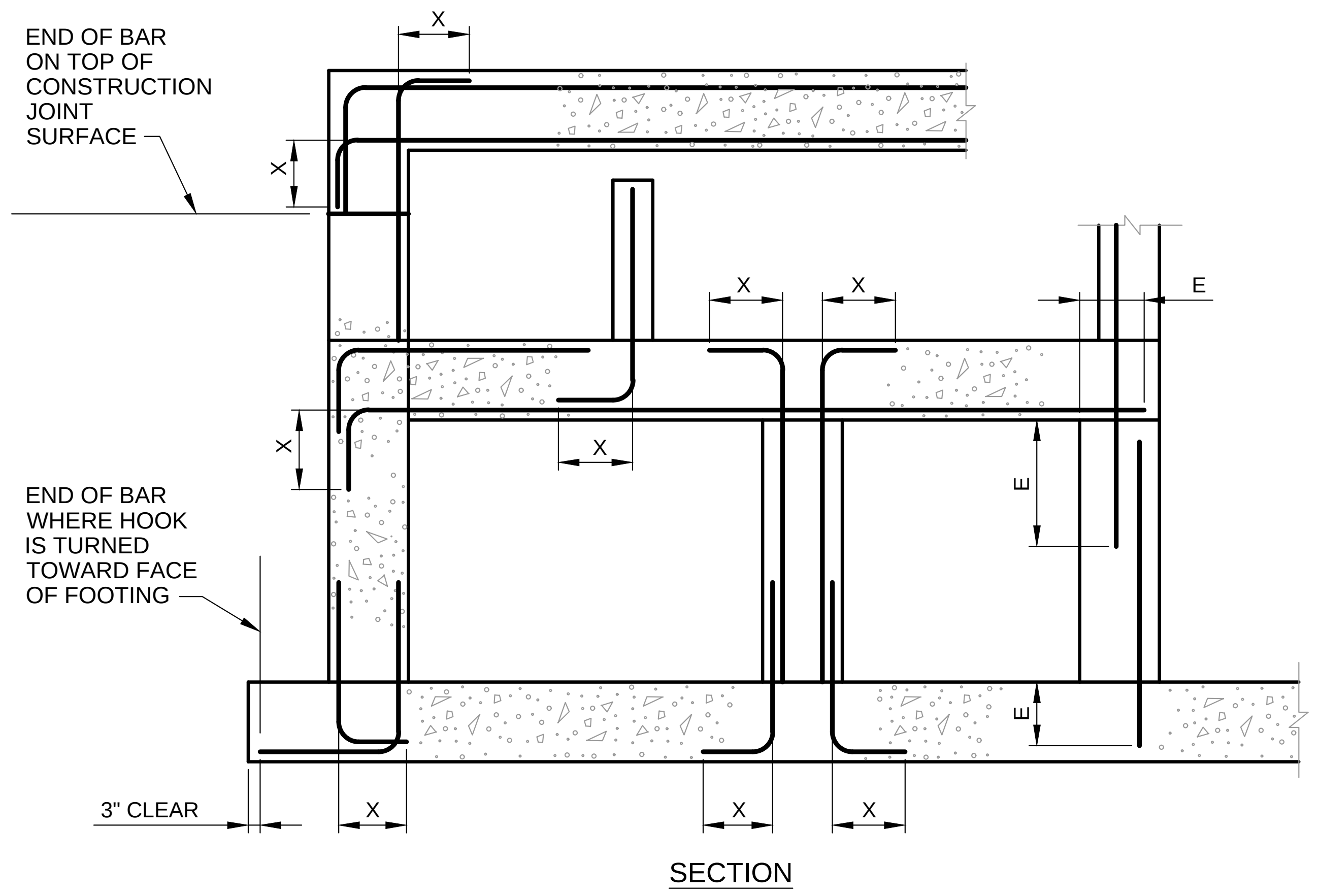


LENGTH (*)			
BAR SIZE	HOOK X	LAP	EMBEDMENT E
#3	6"	16" (21")	12" (16")
#4	8"	16" (21")	12" (16")
#5	10"	20" (26")	15" (20")
#6	12"	28" (37")	22" (28")
#7	14"	48" (62")	37" (48")
#8	16"	62" (81")	48" (62")
#9	19"	79" (102")	61" (79")
#10	22"	100" (130")	77" (100")
#11	24"	123" (160")	95" (123")

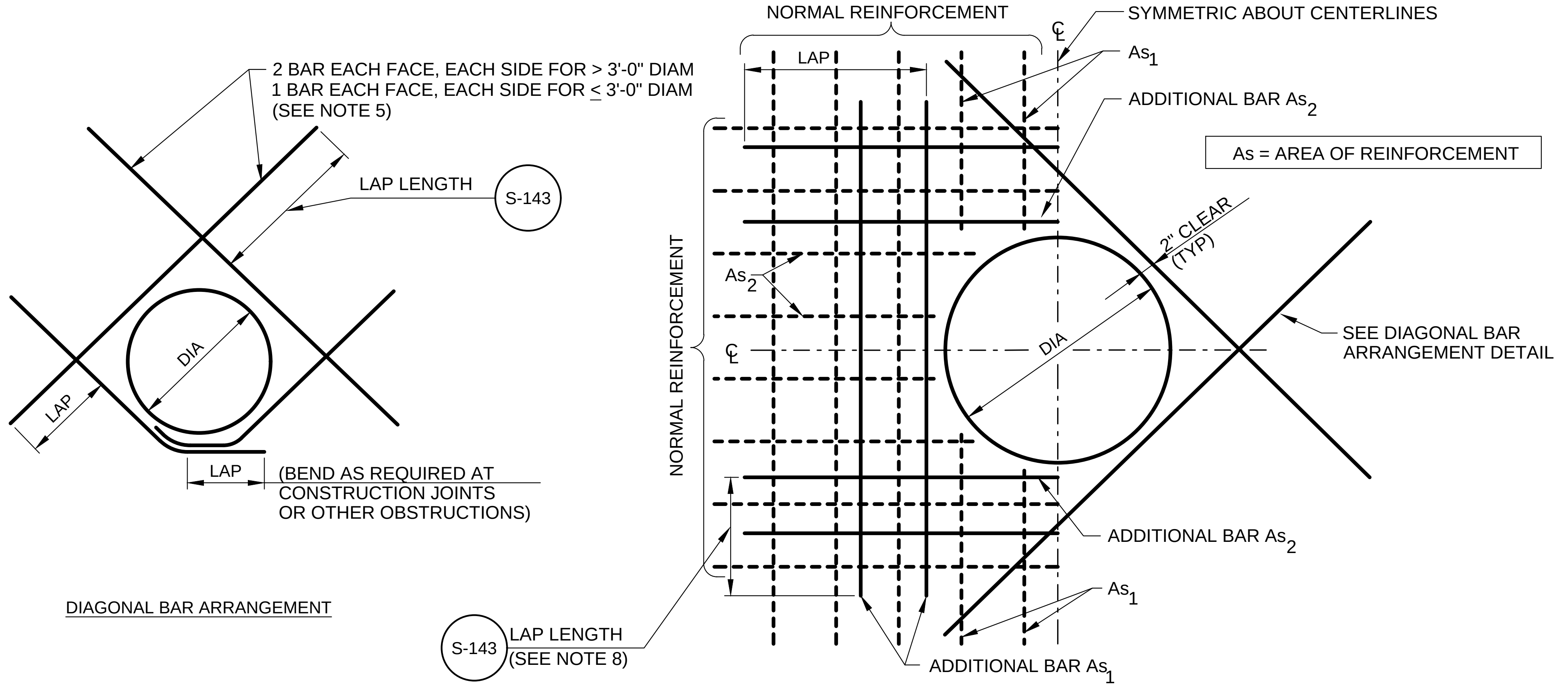
* USE LENGTH IN PARENTHESIS FOR WALL HORIZONTAL REBARS AND SLAB BARS WITH 12" OR MORE OF FRESH CONCRETE UNDERNEATH

NOTES:

1. USE LAP LENGTHS AS DETERMINED FROM THESE TABLES UNLESS SHOWN OTHERWISE.
2. THE TABLES SHOWN ARE FOR f'c=4000psi, fy=60,000psi, 1.5" MIN CONCRETE COVER AND 3" MIN BAR SPACING.
3. MULTIPLY THE LAP AND E SHOWN IN THESE TABLES BY 1.5 FOR EPOXY COATED REINFORCING.
4. WHEN BARS OF DIFFERENT SIZES ARE LAP SPLICED, LAP LENGTH SHALL BE THE LARGER OF: EMBEDMENT LENGTH OF LARGER BAR OR LAP LENGTH OF SMALLER BAR
5. USE REINFORCING BAR COUPLERS FOR SPLICES OF #11 AND LARGER BARS UNLESS DRAWINGS INDICATE LAP SPLICES SHOWN IN TABLE ARE ACCEPTABLE.
6. ALL DOWEL BARS SHALL EXTEND AN EMBEDMENT LENGTH E INTO ANOTHER MEMBER OR ACROSS A CONSTRUCTION JOINT UNLESS SHOWN TO SPLICE WITH OTHER BARS OR TO EXTEND TO THE FAR FACE OF THE MEMBER AND END WITH A STANDARD HOOK.

S-143 STANDARD 90° BAR HOOKS, EMBEDMENT LENGTHS AND LAP LENGTHS

REV 010119

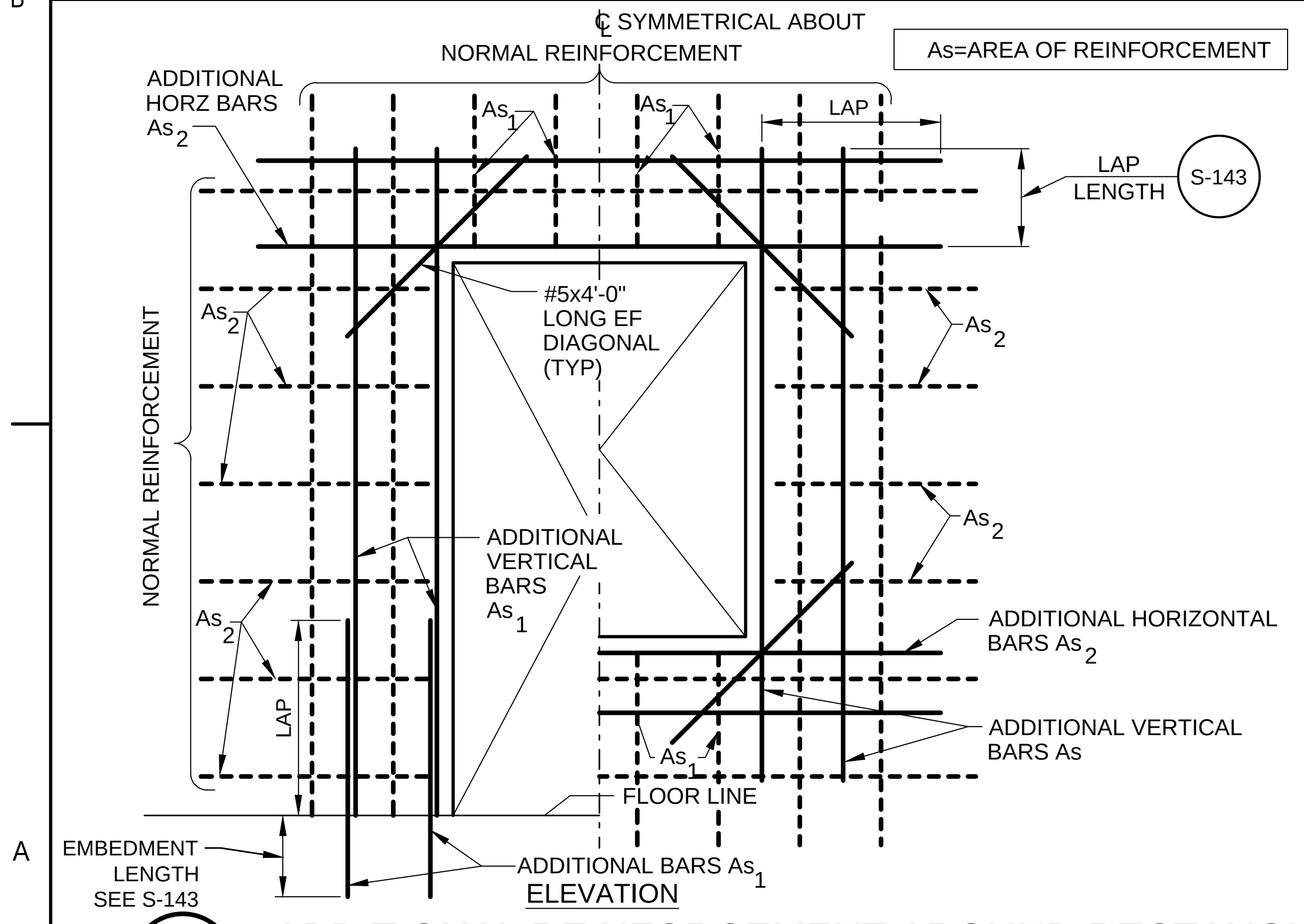


NOTES:

1. THIS DETAIL TO BE USED AT ALL CIRCULAR OPENINGS EXCEPT WHEN OTHER DETAILING IS INDICATED ON THE DRAWINGS.
2. CUT NORMAL REINFORCEMENT 2" CLEAR OF OPENING.
3. CUT NORMAL REINFORCEMENT AT OPENINGS:
    - A. AS_1 AND AS_2= 1/2 AREA OF TOTAL CUT BARS TO BE ADDED ON EACH SIDE OF OPENING.
4. DIAGONAL AND ADDITIONAL BARS AS_1 AND AS_2 TO BE PLACED.
    - A. AT CENTERLINE OF WALLS OR SLABS WHERE ONE LAYER OF REINFORCEMENT IS PROVIDED.
    - B. AT EACH FACE OF WALLS OR SLABS WHERE TWO LAYERS OF REINFORCEMENT ARE PROVIDED.
5. UNLESS OTHERWISE NOTED, SIZE OF DIAGONAL BARS SHALL BE THE SIZE OF THE LARGEST NORMAL REINFORCING BAR CUT.
6. INCREASE SIZE OF ADDITIONAL BARS AS NEEDED TO FIT WITHIN A DISTANCE OF 2X WALL/ SLAB THICKNESS FROM OPENING, PROVIDE 2" MIN CLEAR BETWEEN BARS.
7. WHERE A SLAB OR INTERSECTING WALL CONNECTS WITHIN ONE WALL THICKNESS OF THE OPENING, ADDITIONAL BARS ON THAT SIDE OF THE OPENING MAY BE OMITTED.
8. WHEN THE LAP LENGTH OF THE ADDITIONAL BARS CANNOT BE ACHIEVED DUE TO AN ADJACENT WALL OR SLAB, ADDITIONAL CORNER BARS OR SLAB DOWELS, REPECTIVELY, MATCHING THE CUT BARS, ARE TO BE INCLUDED IN THE ADJACENT WALL OR SLAB TO LAP WITH THE ADDITIONAL BARS.

S-144 ADDITIONAL REINFORCEMENT AT CIRCULAR OPENINGS

REV 010119

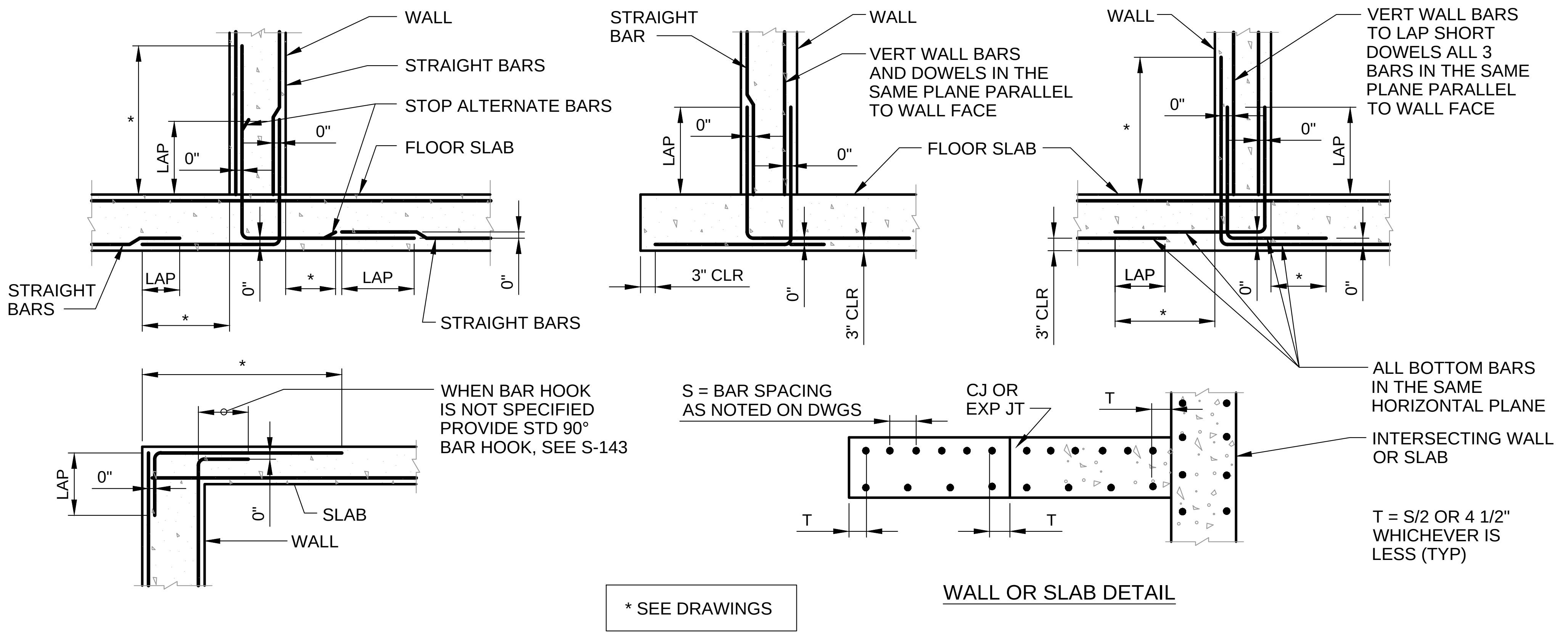


NOTES:

1. CUT NORMAL REINFORCEMENT AT OPENING:
   As_1 AND As_2 = 1/2 AREA OF CUT BARS TO BE ADDED ON EACH SIDE OF OPENING.
2. DIAGONAL AND ADDITIONAL BARS As_1 AND As_2 TO BE PLACED:
    - A) AT CENTERLINE OF WALLS OR SLABS WHERE ONE LAYER OF REINFORCEMENT IS PROVIDED.
    - B) AT EACH FACE OF WALLS OR SLABS WHERE TWO LAYERS OF REINFORCEMENT ARE PROVIDED.
3. INCREASE SIZE OF ADDITIONAL BARS AS NEEDED TO FIT WITHIN A DISTANCE OF 2 X WALL / SLAB THICKNESS FROM OPENING. PROVIDE 2" MIN CLEAR BETWEEN BARS.
4. THIS DETAIL TO BE USED ONLY WHEN NO OTHER DETAIL IS INDICATED ON THE DRAWINGS.
5. WHERE A SLAB OR INTERSECTING WALL CONNECTS WITHIN ONE WALL THICKNESS OF THE OPENINGS, ADDITIONAL BARS ON THAT SIDE MAY BE OMITTED.
6. THIS DETAIL APPLIES TO BELOW GRADE OPENINGS AND WHEN SPECIFICALLY REFERENCED. REFER TO DETAIL S-147 FOR ABOVE GRADE OPENINGS.

S-148 ADDITIONAL REINFORCEMENT AROUND RECTANGULAR OPENING

REV 010119



* SEE DRAWINGS

S-149 STANDARD FOR REINFORCING BAR DETAILING

REV 010119

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Client/Project
CITY OF CAMBRIDGE
SHERMAN CSO TANK
CAMBRIDGE, MASSACHUSETTS

Project No.: 195151145
File Name: 51145S-14.DWG
Scale: NO SCALE

JXM	JXM	EER	2026.08.12
Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Title
STRUCTURAL
STANDARD DETAILS - II

Revision: Sheet: XX of XX
Drawing No.
S-14

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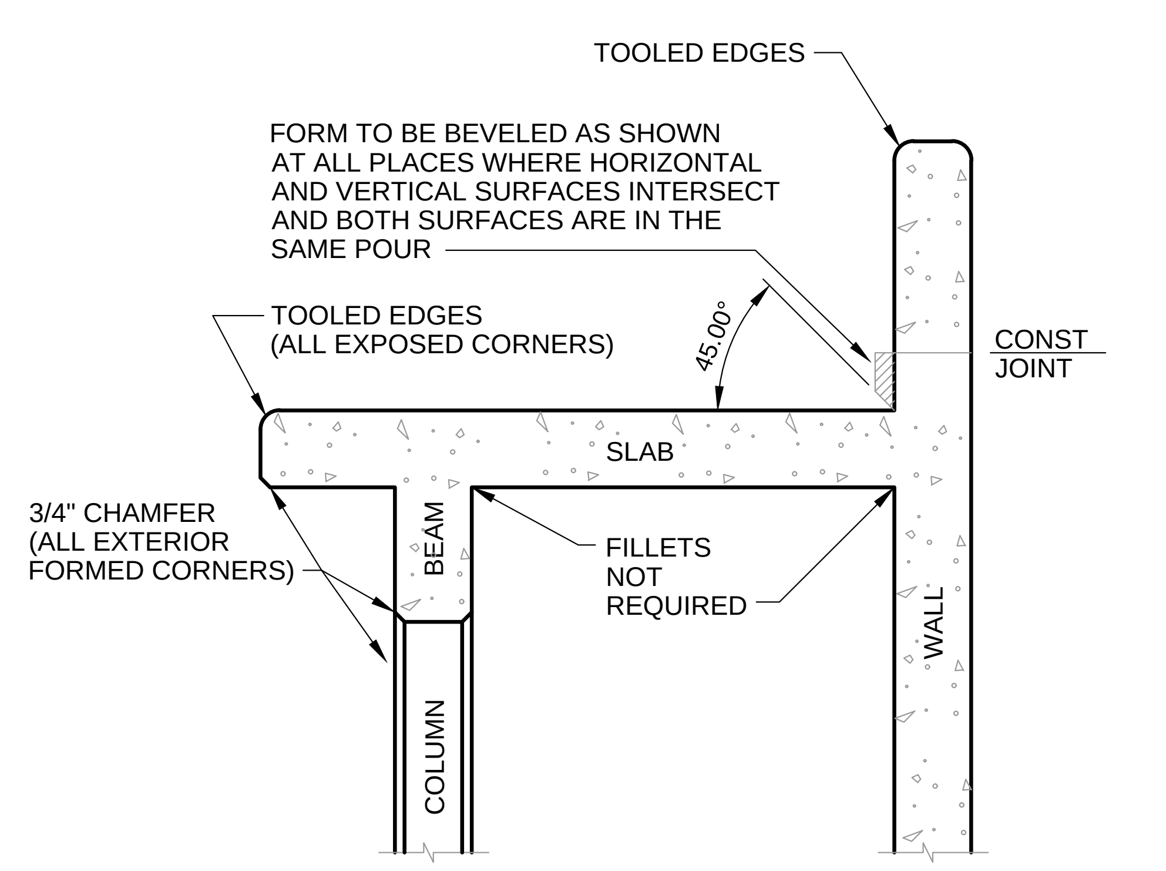
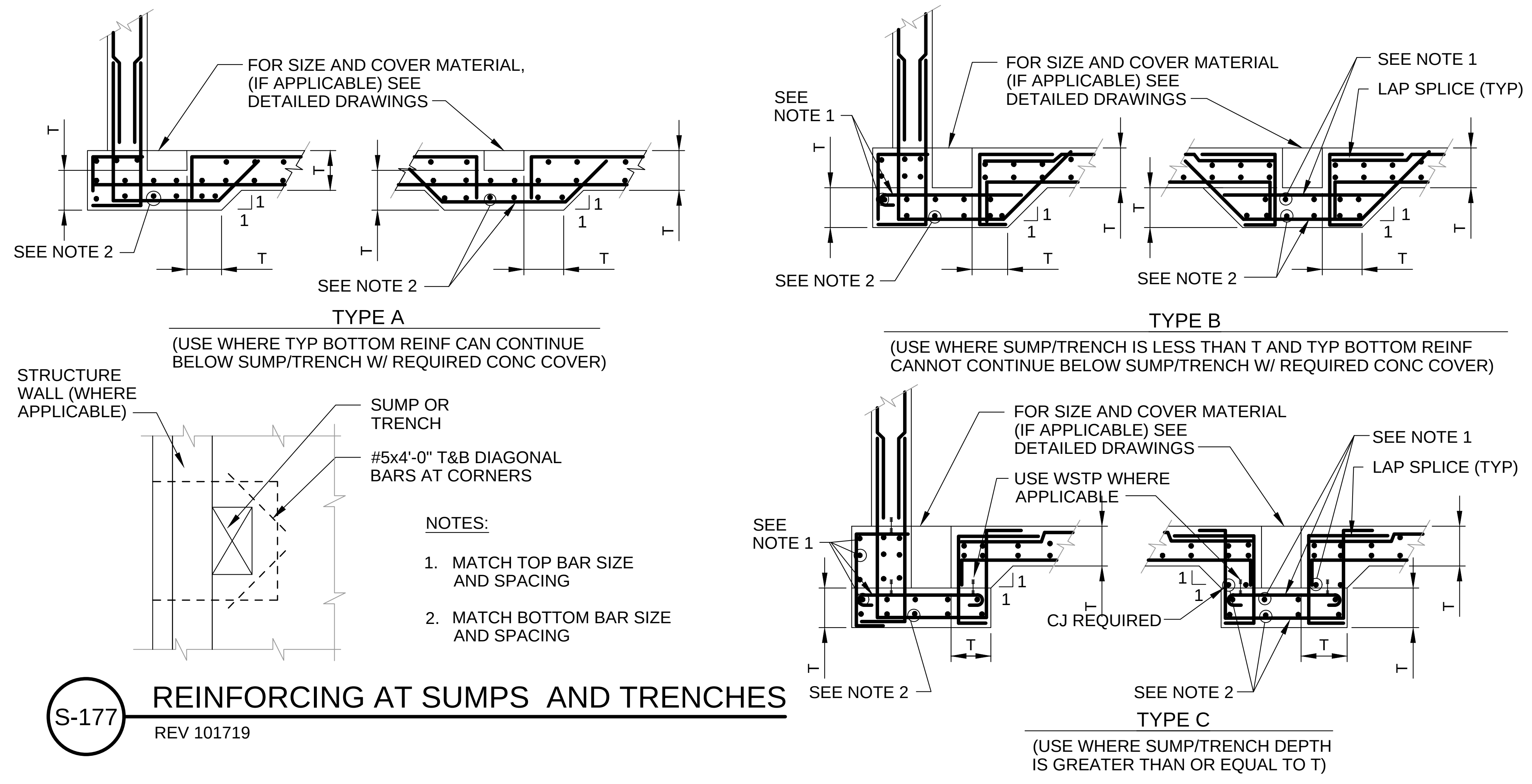

TOOLED EDGES
FORM TO BE BEVELED AS SHOWN AT ALL PLACES WHERE HORIZONTAL AND VERTICAL SURFACES INTERSECT AND BOTH SURFACES ARE IN THE SAME POUR
45.00°
CONST JOINT
TOOLED EDGES (ALL EXPOSED CORNERS)
SLAB
3/4" CHAMFER (ALL EXTERIOR FORMED CORNERS)
BEAM
FILLETS NOT REQUIRED
WALL
COLUMN

S-152 FORMING DETAILS

REV 010119

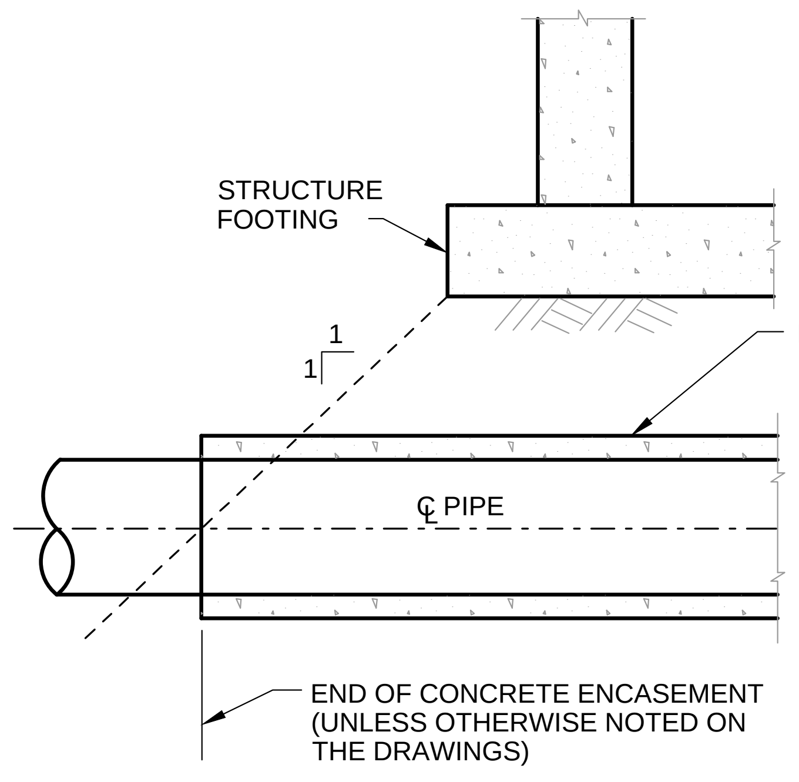

FOR SIZE AND COVER MATERIAL, (IF APPLICABLE) SEE DETAILED DRAWINGS
T
1
1
T
SEE NOTE 2
SEE NOTE 2
TYPE A
(USE WHERE TYP BOTTOM REINF CAN CONTINUE BELOW SUMP/TRENCH W/ REQUIRED CONC COVER)
SEE NOTE 1
FOR SIZE AND COVER MATERIAL (IF APPLICABLE) SEE DETAILED DRAWINGS
SEE NOTE 1
LAP SPLICE (TYP)
SEE NOTE 2
SEE NOTE 2
TYPE B
(USE WHERE SUMP/TRENCH IS LESS THAN T AND TYP BOTTOM REINF CANNOT CONTINUE BELOW SUMP/TRENCH W/ REQUIRED CONC COVER)
STRUCTURE WALL (WHERE APPLICABLE)
SUMP OR TRENCH
#5x4'-0" T&B DIAGONAL BARS AT CORNERS
FOR SIZE AND COVER MATERIAL (IF APPLICABLE) SEE DETAILED DRAWINGS
USE WSTP WHERE APPLICABLE
SEE NOTE 1
LAP SPLICE (TYP)
SEE NOTE 1
CJ REQUIRED
SEE NOTE 2
SEE NOTE 2
TYPE C
(USE WHERE SUMP/TRENCH DEPTH IS GREATER THAN OR EQUAL TO T)

NOTES:

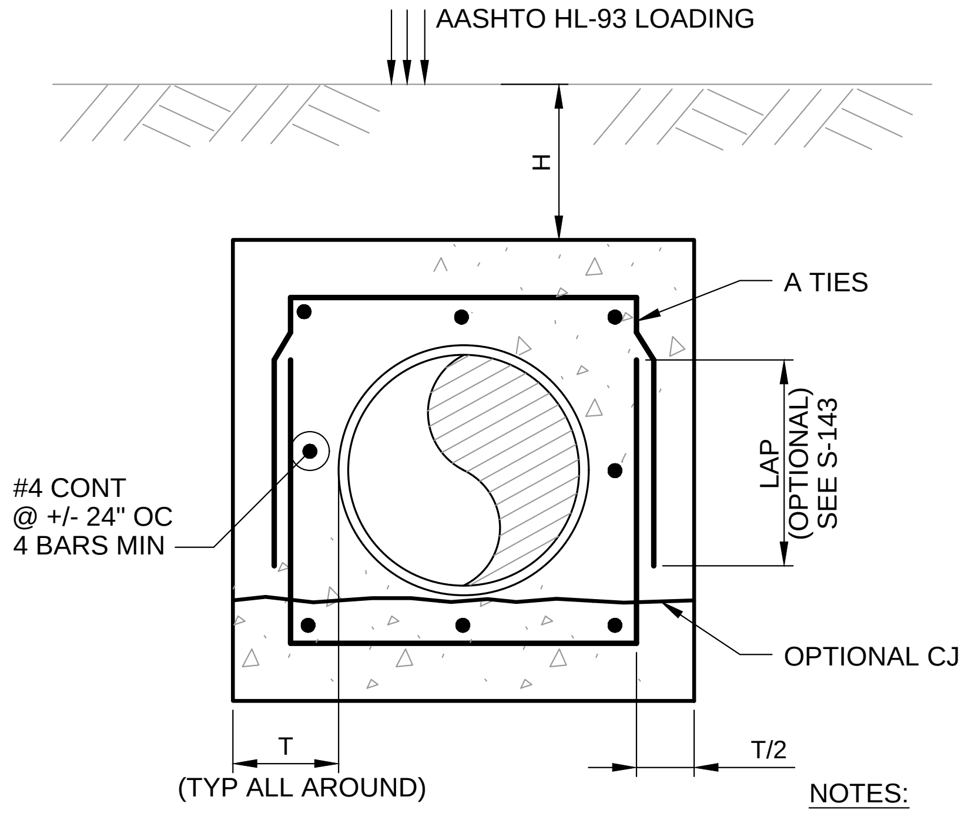
1. MATCH TOP BAR SIZE AND SPACING
2. MATCH BOTTOM BAR SIZE AND SPACING

S-177 REINFORCING AT SUMPS AND TRENCHES

REV 101719


STRUCTURE FOOTING
1
1
ENCASEMENT UNDER STRUCTURE
℄ PIPE
END OF CONCRETE ENCASEMENT (UNLESS OTHERWISE NOTED ON THE DRAWINGS)

END OF ENCASEMENT BEYOND STRUCTURE

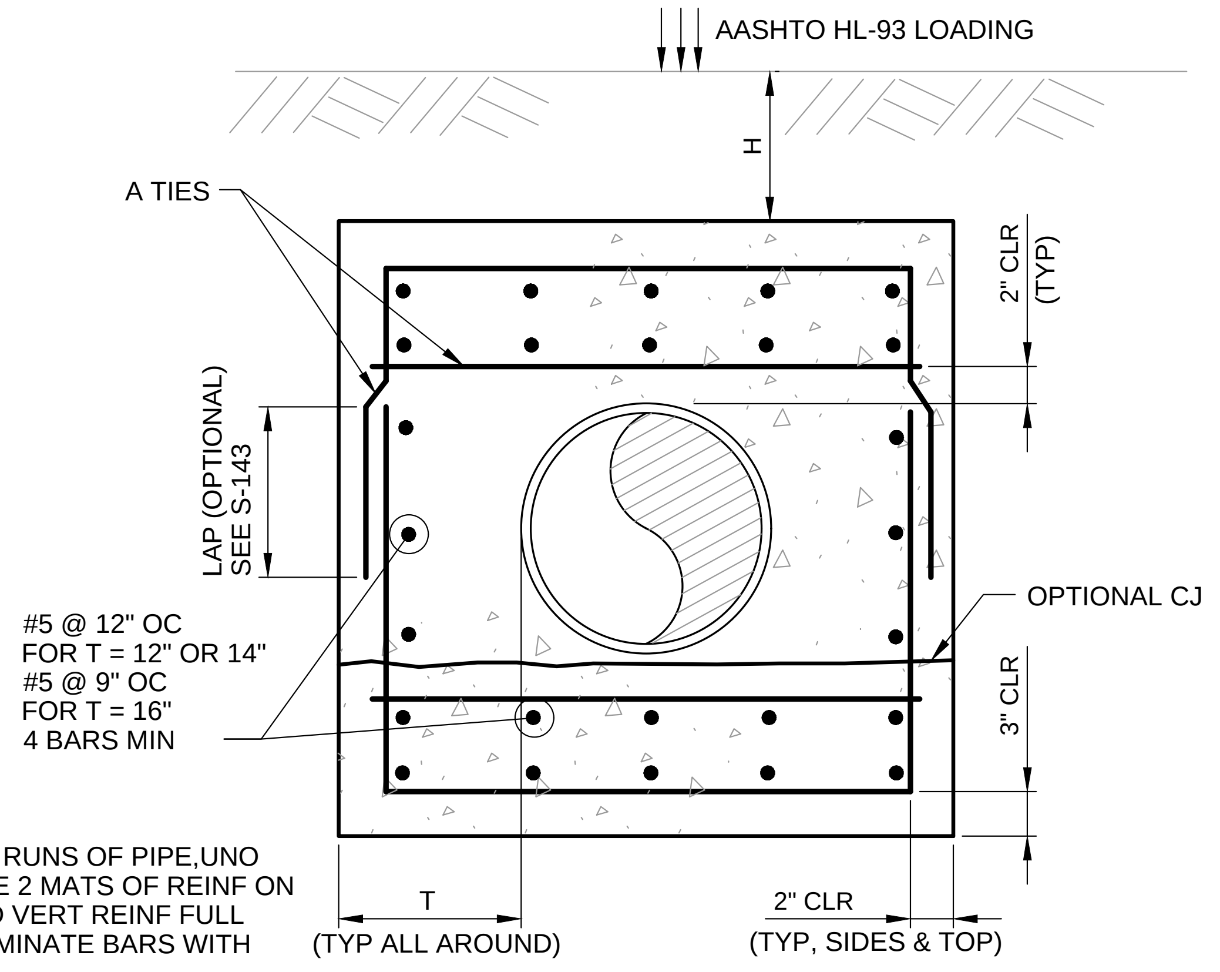


T= 6" OR 8" ENCASEMENT

COVER H	PIPE OUTSIDE DIAMETER									
	8"-24"		30"-32"		36"		42"-54"		60"-72"	
	A	T	A	T	A	T	A	T	A	T
2' MIN	#4@12"	6"	#4@12"	6"	#4@9"	6"	#5@12"	8"	#4@9"	12"
3'					#4@12"		#4@9"		#5@12"	8"
4'							#4@12"		#5@10"	
5'							#4@12"		#5@10"	
6'					↓		#4@9"		#5@10"	
7'			↓		#4@12"		#4@9"		#6@12"	↓
8'			#4@12"	↓	#4@9"	↓	#5@12"		#6@10"	8"
9'		↓	#4@9"	6"	#4@9"	6"	#5@10"	↓	#4@9"	12"
10'		6"	#4@12"	8"	#4@9"	8"	#5@10"	8"	#5@12"	
12'		8"		12"	#4@12"	12"	#4@9"	12"	#5@10"	
14'		12"			#4@12"		#4@9"		#6@12"	↓
16'			↓		#4@12"	↓	#5@12"	↓	#6@10"	12"
18'	↓	↓	#4@12"	↓	#4@9"	12"	#5@10"	12"	#6@10"	14"
20'	#4@12"	12"	#4@9"	12"	#4@9"	14"	#6@12"	14"	#6@10"	16"

NOTES:

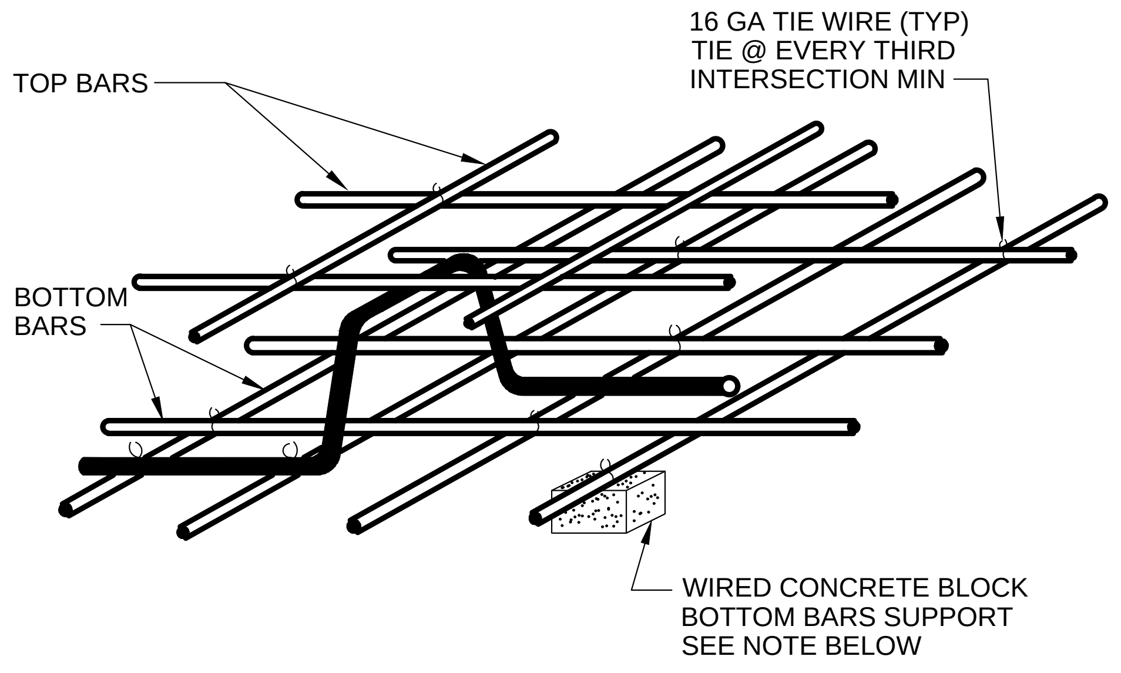
1. WHERE ENCASEMENT PASSES UNDER SPREAD FOOTING OR MAT FOUNDATION, USE H=20' UNO
2. ALL ENCASEMENTS UNDER STRUCTURES SHALL BE SEPARATED FROM THE STRUCTURE FOUNDATIONS BY BACKFILL OR 2 LAYERS OF 40# FELT UNO
3. WHEN ENCASEMENTS TERMINATE @ STRUCTURE, ENCASEMENT REINFORCING SHALL BE DOWELED INTO THE STRUCTURE
4. CONTINUE ENCASEMENT ALONG VERTICAL RUNS OF PIPE,UNO FOR T = 12" TO 16" ENCASEMENTS, PROVIDE 2 MATS OF REINF ON ALL FOUR SIDES OF ENCASEMENT. EXTEND VERT REINF FULL DEPTH INTO HORIZ ENCASEMENT AND TERMINATE BARS WITH STD HOOKS.



T= 12" - 16" ENCASEMENT

S-171 PIPE ENCASEMENT

REV 011024

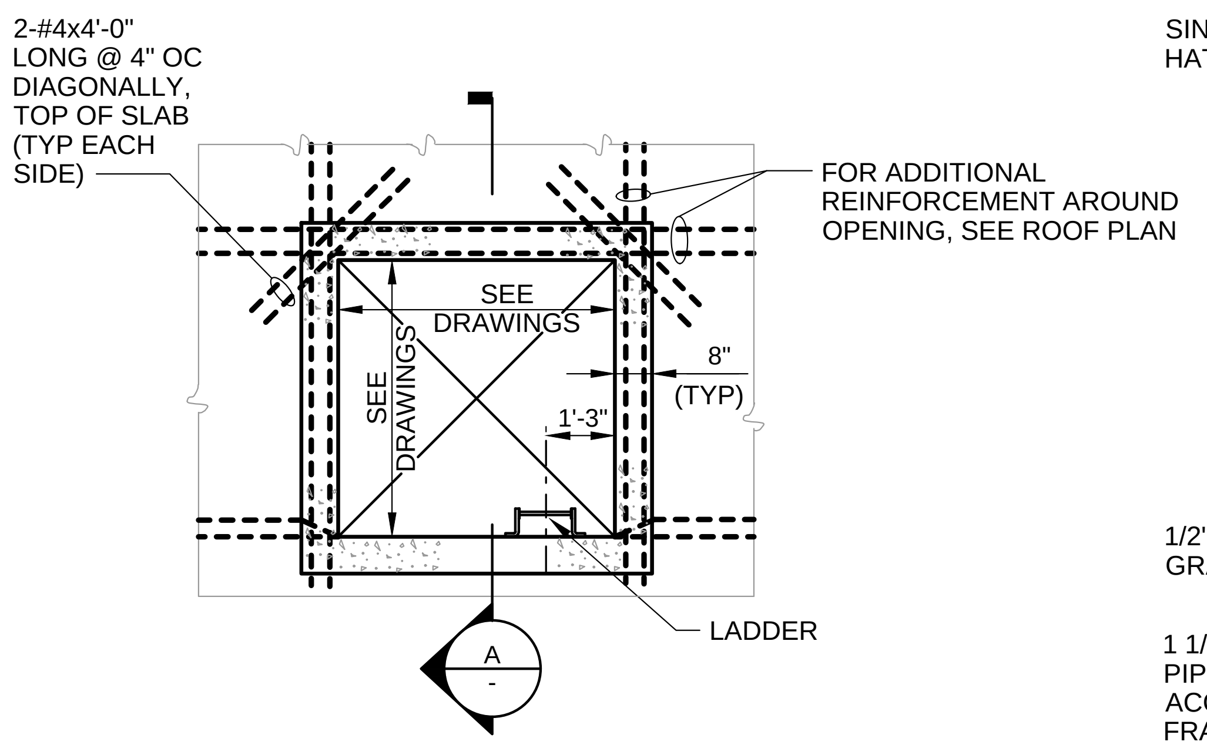

16 GA TIE WIRE (TYP) TIE @ EVERY THIRD INTERSECTION MIN
TOP BARS
BOTTOM BARS
WIRED CONCRETE BLOCK BOTTOM BARS SUPPORT SEE NOTE BELOW

NOTE:

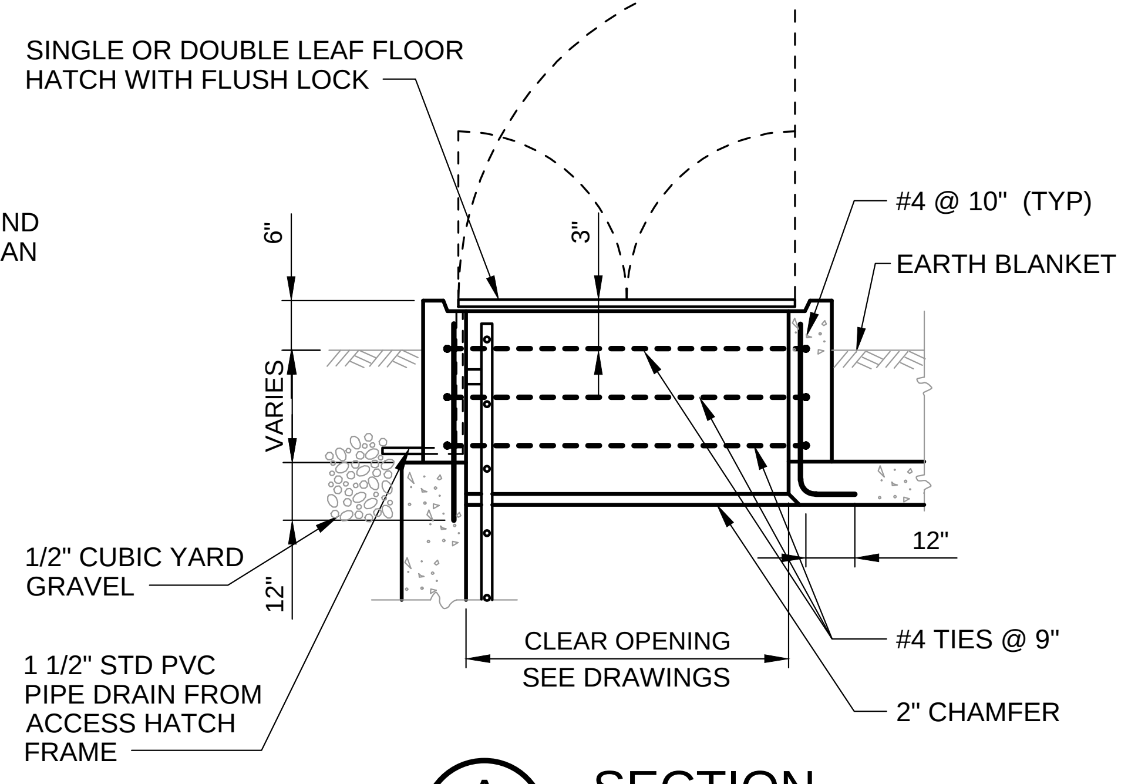
METAL BAR SUPPORTS, IF USED IN SLABS NOT ON GROUND, SHALL NOT MAKE CONTACT WITH FORMS

S-204 REINFORCEMENT SUPPORT

REV 010119


2-#4x4'-0" LONG @ 4" OC DIAGONALLY, TOP OF SLAB (TYP EACH SIDE)
FOR ADDITIONAL REINFORCEMENT AROUND OPENING, SEE ROOF PLAN
SEE DRAWINGS
SEE DRAWINGS
8" (TYP)
1'-3"
LADDER
A
-

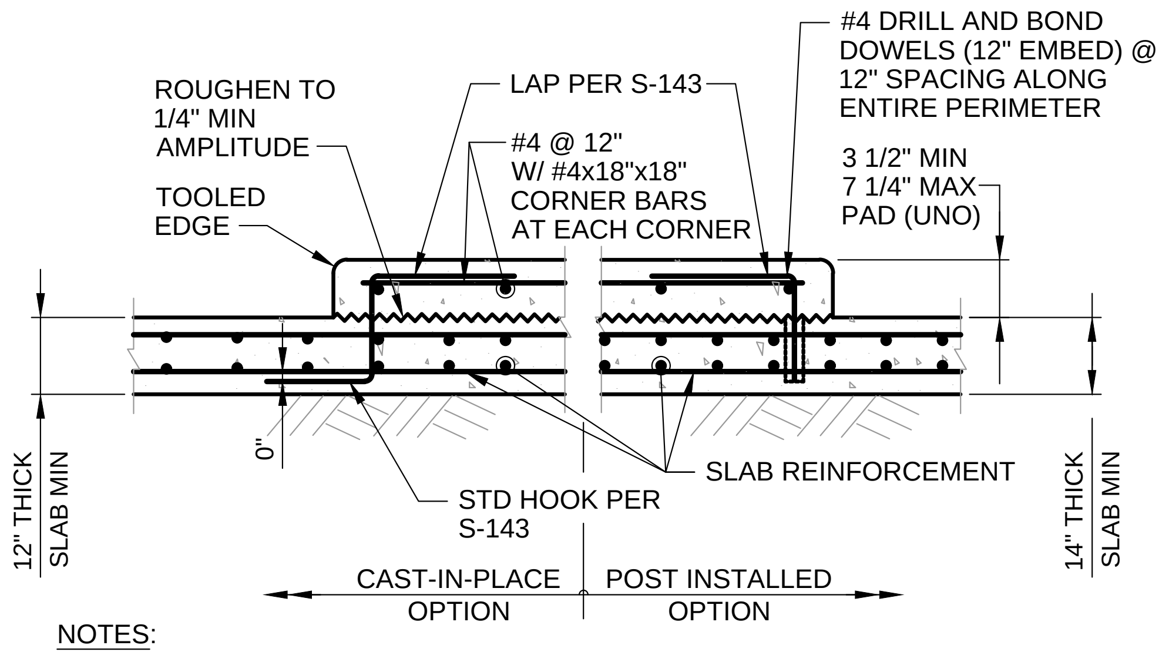
PLAN


SINGLE OR DOUBLE LEAF FLOOR HATCH WITH FLUSH LOCK
#4 @ 10" (TYP)
EARTH BLANKET
6"
3"
VARIES
12"
1/2" CUBIC YARD GRAVEL
1 1/2" STD PVC PIPE DRAIN FROM ACCESS HATCH FRAME
12"
CLEAR OPENING SEE DRAWINGS
#4 TIES @ 9"
2" CHAMFER

A - SECTION

S-592 ACCESS HATCH

REV 010119


ROUGHEN TO 1/4" MIN AMPLITUDE
LAP PER S-143
#4 DRILL AND BOND DOWELS (12" EMBED) @ 12" SPACING ALONG ENTIRE PERIMETER
TOOLED EDGE
#4 @ 12" W/ #4x18"x18" CORNER BARS AT EACH CORNER
3 1/2" MIN 7 1/4" MAX PAD (UNO)
0"
12" THICK SLAB MIN
STD HOOK PER S-143
SLAB REINFORCEMENT
14" THICK SLAB MIN
CAST-IN-PLACE OPTION
POST INSTALLED OPTION

NOTES:

1. WHERE SLAB THICKNESS IS LESS THAN REQUIRED FOR POST-INSTALLED ANCHOR EMBEDMENT, USE CAST-IN-PLACE OPTION.
2. LOCATE AND AVOID ALL REINFORCEMENT PRIOR TO DRILLING INTO CONCRETE.
3. THIS DETAIL APPLIES TO REINFORCEMENT WITH fy = 60KSI AND CONCRETE WITH A COMPRESSIVE STRENGTH f'c = 4000 PSI AT 28 DAYS.
4. THE DETAIL APPLIES WHERE EQUIPMENT PADS OR HOUSEKEEPING PADS ARE INDICATED ON THE CONSTRUCTION DOCUMENTS.

S-191 EQUIPMENT PAD

REV 011024

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Client/Project
CITY OF CAMBRIDGE
SHERMAN CSO TANK
CAMBRIDGE, MASSACHUSETTS

Project No.: 195151145
File Name: 511455-15.DWG
Scale: NO SCALE

JXM	JXM	EER	2026.08.12
Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Title
STRUCTURAL
STANDARD DETAILS - III

Revision: Sheet: XX of XX
Drawing No.
S-15

GENERAL NOTES

GENERAL

1. THE DESIGN SHOWS EQUIPMENT, PIPING, DIMENSIONS, AND PLANS BASED ON REPRESENTATIVE EQUIPMENT SELECTED BY THE ENGINEER.
2. THE CONTRACTOR MAY SUBMIT PROPOSED DESIGN AMENDMENTS TO THE ENGINEER FOR REVIEW. INCLUDE PLANS, SECTIONS, DETAILS, AND SCHEMATICS OF EQUIPMENT AND APPURTENANCES REQUIRED.
3. BACKGROUND DRAWINGS AND DIMENSIONS SHOWN IN THE DESIGN ARE FOR REFERENCE ONLY. CLARIFY DISCREPANCIES WITH THE ENGINEER PRIOR TO FABRICATION OR CONSTRUCTION.
4. EQUIPMENT FOUNDATION AND PAD DIMENSIONS ARE APPROXIMATE. COORDINATE EQUIPMENT PAD DIMENSIONS WITH THE MANUFACTURER AND STRUCTURAL DETAILS TO SUIT INSTALLATION REQUIREMENTS.
5. CONFIRM PROPOSED DEVIATIONS FROM STANDARD DETAILS WITH ENGINEER

STRUCTURAL ANCHORS

1. ANCHOR DETAILS APPLY TO MIN 3000 PSI CAST-IN-PLACE CONCRETE ONLY. CHECK WITH ENGINEER FOR MASONRY OR PRE-CAST CONCRETE.
2. SCAN TO LOCATE REINFORCING STEEL IN CONCRETE AND CONFIRM SUITABILITY OF PROPOSED POST-INSTALL ANCHOR LOCATIONS WITH ENGINEER PRIOR TO INSTALLATION
3. USE ONLY UNDERCUT ANCHORS FOR OVERHEAD INSTALLATION AND WHEN PLACED IN CONSTANT TENSION (EPOXY AND EXPANSION ANCHORS NOT PERMITTED).
4. SUBMIT PROPOSED ANCHORS FOR ENGINEER'S REVIEW

PIPING

1. PROVIDE INTERCONNECTING PIPING, FITTINGS, WALL PIPES, AND PIPE SUPPORTS (INCLUDING THOSE REQUIRED FOR INSTRUMENTS, DRAINS, AND OTHER APPURTENANCES) AS REQUIRED FOR A COMPLETE PROCESS MECHANICAL PIPING SYSTEM.
2. CONNECT PIPE DRAIN OUTLETS AND EQUIPMENT DRAINS TO THE NEAREST FLOOR DRAIN, FLOOR SINK, HUB DRAIN, OR TRENCH DRAIN WITH CONTINUOUS DOWNWARD SLOPE.
3. ROUTE PIPE TO AVOID TRIP, HEAD, AND LIMB HAZARDS.
4. PASSIVATE STAINLESS STEEL AFTER WELDING.
5. USE SUPPORTS TO MINIMIZE STRAIN AT PIPE-TO-EQUIPMENT CONNECTIONS.
6. ELBOWS 2-1/2" AND LARGER SHALL BE STANDARD LONG RADIUS ELBOWS, UNLESS OTHERWISE NOTED. WHERE REQUIRED IN TIGHT AREAS FOR FIT-UP, USE SHORT RADIUS OR REDUCING ELBOWS.
7. SMALL DIAMETER PROCESS PIPING MAY NOT BE SHOWN IN ITS ENTIRETY. REFER TO P&IDS TO UNDERSTAND THE SCOPE ASSOCIATED WITH EACH PIPING SYSTEM.
8. MAINTAIN MINIMUM HEADROOM CLEARANCE HEIGHT OF 7'-6".
9. PROCESS MECHANICAL PIPING SYSTEMS AND EQUIPMENT SHALL BE INSTALLED IN SUCH A WAY TO BE EASILY DISMANTLED AND REMOVED WITHOUT DISTURBING THE REMAINING AND ADJACENT EQUIPMENT, PIPING, AND SUPPORTS.
10. UNLESS OTHERWISE SHOWN, HORIZONTAL REDUCERS INSTALLED IN PIPING SYSTEMS SHALL BE ECCENTRIC (BOTTOM FLAT). HORIZONTAL REDUCERS CONNECTED TO PUMP SUCTIONS SHALL BE ECCENTRIC (TOP FLAT).
11. SLEEVE COUPLINGS, FLANGED COUPLING ADAPTERS, AND FLEXIBLE COUPLINGS SUBJECT TO A POSITIVE INTERNAL FLUID PRESSURE SHALL BE PROVIDED WITH RESTRAINT SYSTEMS.
12. EXPOSED PIPING SUBJECT TO FREEZING SHALL BE INSULATED AND HEAT TRACED (IF HEAT TRACE IS SPECIFIED). SEE THE SPECIFICATION SECTION 'PIPING ,GENERAL' FOR HEAT TRACE AND INSULATION REQUIREMENTS.
13. SEAL WELD THREADED PIPE INSTALLATIONS FOR LIQUID OR GASEOUS CHLORINE, LIQUID OR GASEOUS SULFUR DIOXIDE, SODIUM HYDROXIDE, AND ACIDS UNDER PRESSURE. WHEN CONNECTING TO THREADED COMPONENTS OR EQUIPMENT, PROVIDE SEAL WELDED BREAKOUT CONNECTIONS (FLANGED TYPE).

PIPE SUPPORTS

1. SEE PIPE SUPPORTS SPECIFICATIONS FOR SPACING, AND OTHER REQUIREMENTS.
2. PIPE SUPPORT MATERIALS

EXPOSURE	SUPPORT LOCATION	HDG	304 SS	316 SS	OTHER
AIR, OCCASIONAL WATER	OUTDOOR OR INDOOR, NON-SUBMERGED, NON-COASTAL	X	X	X	
AIR, OCCASIONAL WATER	OUTDOOR OR INDOOR, COASTAL AREA WITH WIND-DRIVEN SALT SPRAY			X	
WATER	FULLY OR PARTIALLY SUBMERGED, OR WITHIN 24" OF LIQUID SURFACE			X	
AIR, OCCASIONAL WATER	CHEMICAL STORAGE AND DOSING ROOMS			X	
NON-CORROSIVE CHEMICAL	FULLY OR PARTIALLY SUBMERGED, OR WITHIN 24" OF LIQUID SURFACE			X	
CORROSIVE CHEMICAL	FULLY OR PARTIALLY SUBMERGED, OR WITHIN 24" OF LIQUID SURFACE			X (UNO)	X

OCCASIONAL CONTACT INCLUDES PRECIPITATION AND WATER CLEANING

HDG - HOT DIPPED GALVANIZED STEEL

UNO - UNLESS NOTED OTHERWISE

OTHER - SEE DRAWINGS, SPECIFICATION FOR DIRECTION

3. RE-COAT EXPOSED SURFACES OF DRILLED OR CUT FRP OR PVC-COATED SUPPORTS PER MANUFACTURER'S REQUIREMENTS
4. USE EXTRA-WIDE PIPE SADDLES OR METALLIC SHIELDS WITH LOOSE FIT AROUND THE CIRCUMFERENCE OF PVC AND FRP PIPE.
5. USE 2" WIDE BY 1/8" THICK ELASTOMERIC STRIP AROUND FULL CIRCUMFERENCE OF COPPER PIPE AND TUBE.
6. USE PLASTIC CAPS ON EXPOSED SUPPORT ENDS WITHIN 0'-0" AND 8'-0" OF WALKING SURFACES.
7. PROVIDE PIPE SUPPORTS REQUIRED FOR A COMPLETE PIPING SYSTEM. PIPE SUPPORTS SHALL BE PROVIDED WHERE REQUIRED BY THE SPECIFICATION SECTION 'PIPE SUPPORTS' AND/OR AT POINTS MARKED WITH AN "X" ON PLAN VIEW DRAWINGS.

VALVES AND GATES

1. MOUNT VALVE AND GATE OPERATORS TO ALLOW COMPLETE OPENING/CLOSING WITHOUT INTERFERENCE FROM ADJACENT EQUIPMENT.
2. SUBMIT VALVE OPERATOR ORIENTATION FOR ENGINEER'S REVIEW.
3. FOLLOW MANUFACTURER'S REQUIREMENT FOR PLACEMENT OF VALVE SEAT (UPSTREAM OR DOWNSTREAM) AND VALVE STEM ORIENTATION

COATINGS

1. APPLY PROTECTIVE COATINGS PER SPECS IN AREAS WITH CHEMICAL FEED EQUIPMENT, CHEMICAL STORAGE, CHEMICAL PIPE TRENCHES, AND/OR INJECTION VAULTS.

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SHERMAN CSO TANK
CAMBRIDGE, MASSACHUSETTS

Project No.: 195151145
File Name: 51145M-1.DWG
Scale: NO SCALE

PS	KVV	EO	2026.08.12
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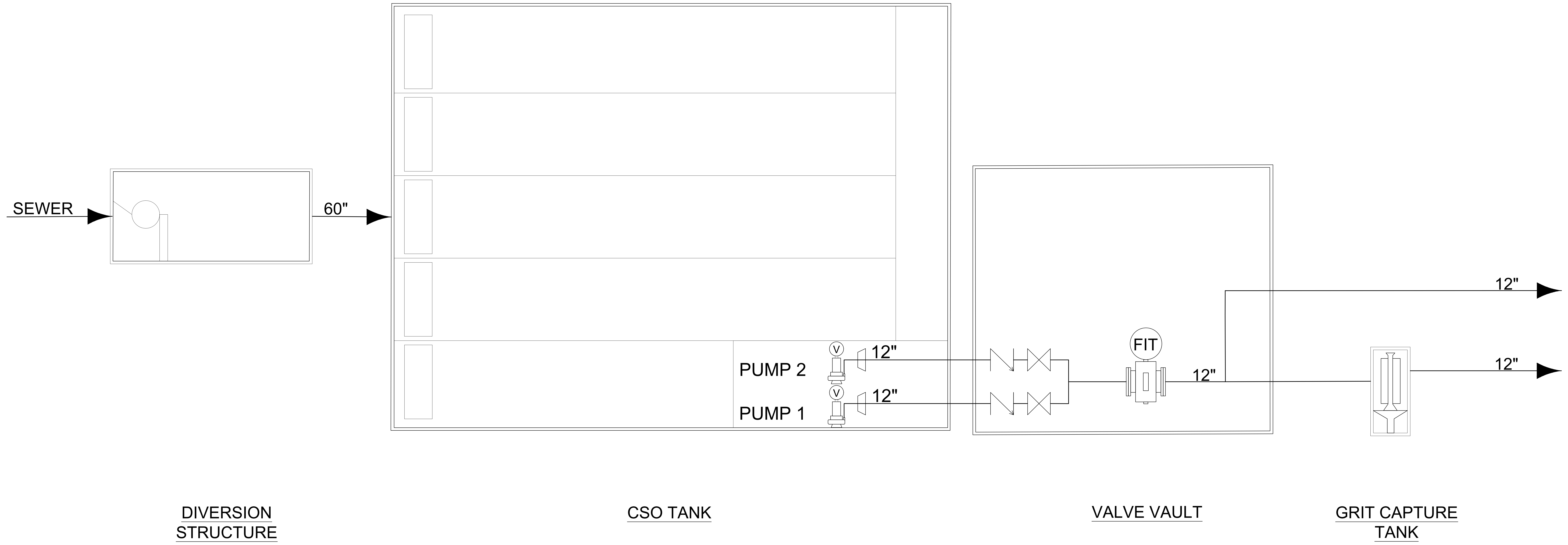
Title
NOTES, ABBREVIATIONS & SYMBOLS

Revision: Sheet: XX of XX

Drawing No.
M-1



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Title
SCHEMATIC FLOW
DIAGRAM

Revision: Sheet: XX of XX
Drawing No.
M-2

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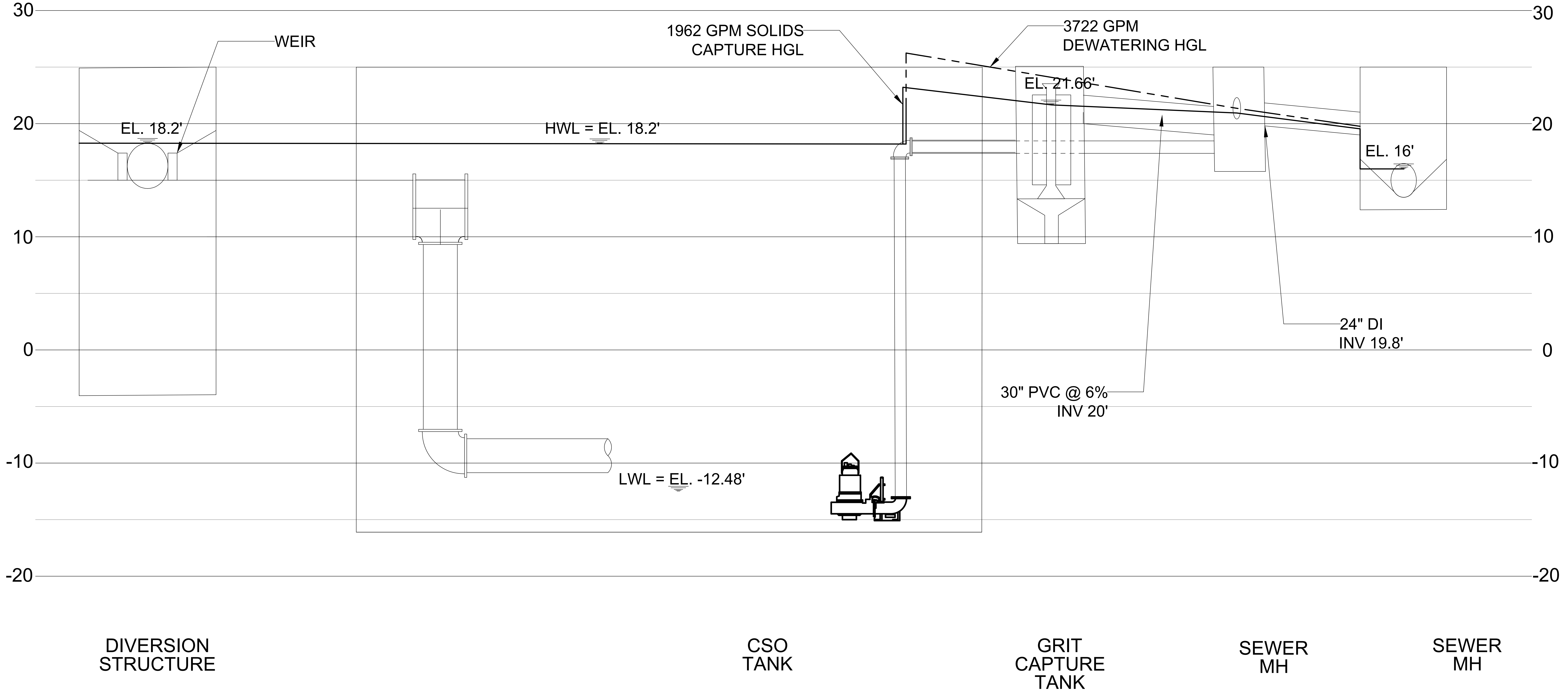

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File Name: 51145M-3.DWG
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Title
HYDRAULIC PROFILE

Revision: Sheet: XX of XX
Drawing No.
M-3

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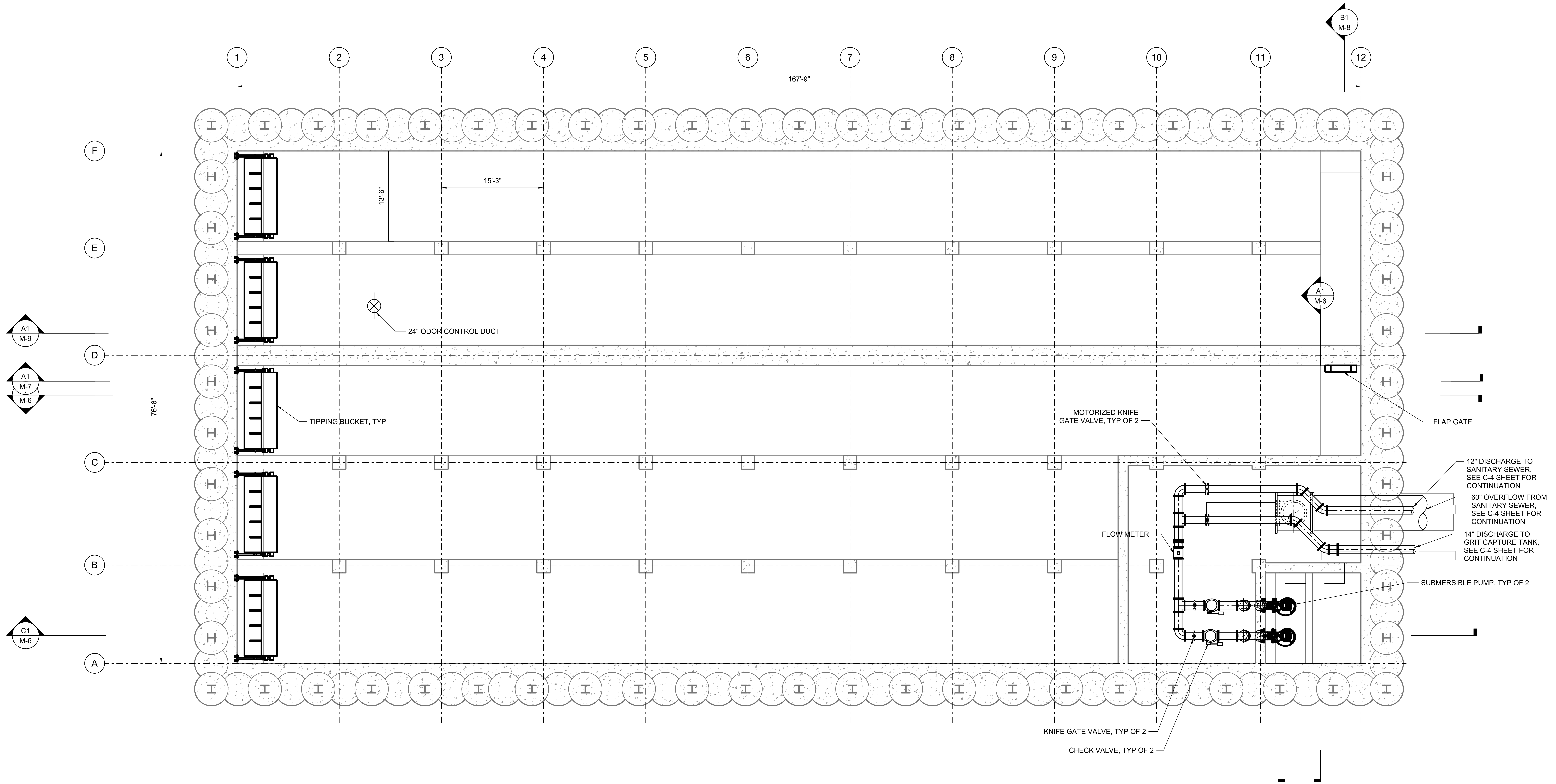
1
2
3
4
5
6
7
8
9
10
11
12
B1
M-8
167'-9"
F
E
D
C
B
A
13'-6"
15'-3"
76'-6"
24" ODOR CONTROL DUCT
TIPPING BUCKET, TYP
A1
M-9
A1
M-7
M-6
C1
M-6
A1
M-6
FLAP GATE
MOTORIZED KNIFE GATE VALVE, TYP OF 2
12" DISCHARGE TO SANITARY SEWER, SEE C-4 SHEET FOR CONTINUATION
60" OVERFLOW FROM SANITARY SEWER, SEE C-4 SHEET FOR CONTINUATION
14" DISCHARGE TO GRIT CAPTURE TANK, SEE C-4 SHEET FOR CONTINUATION
FLOW METER
SUBMERSIBLE PUMP, TYP OF 2
KNIFE GATE VALVE, TYP OF 2
CHECK VALVE, TYP OF 2

A1 TANK DEWATERING PLAN

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

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

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Title
TANK DEWATERING PLAN

Revision: Sheet: of

Drawing No.
M-5

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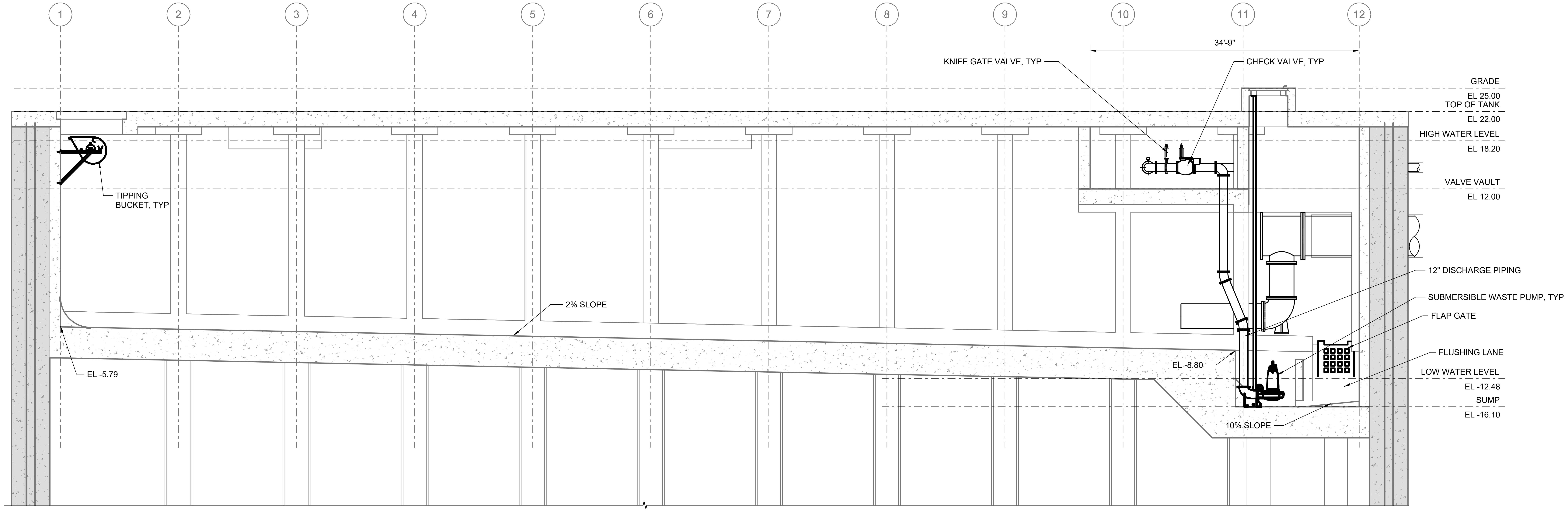
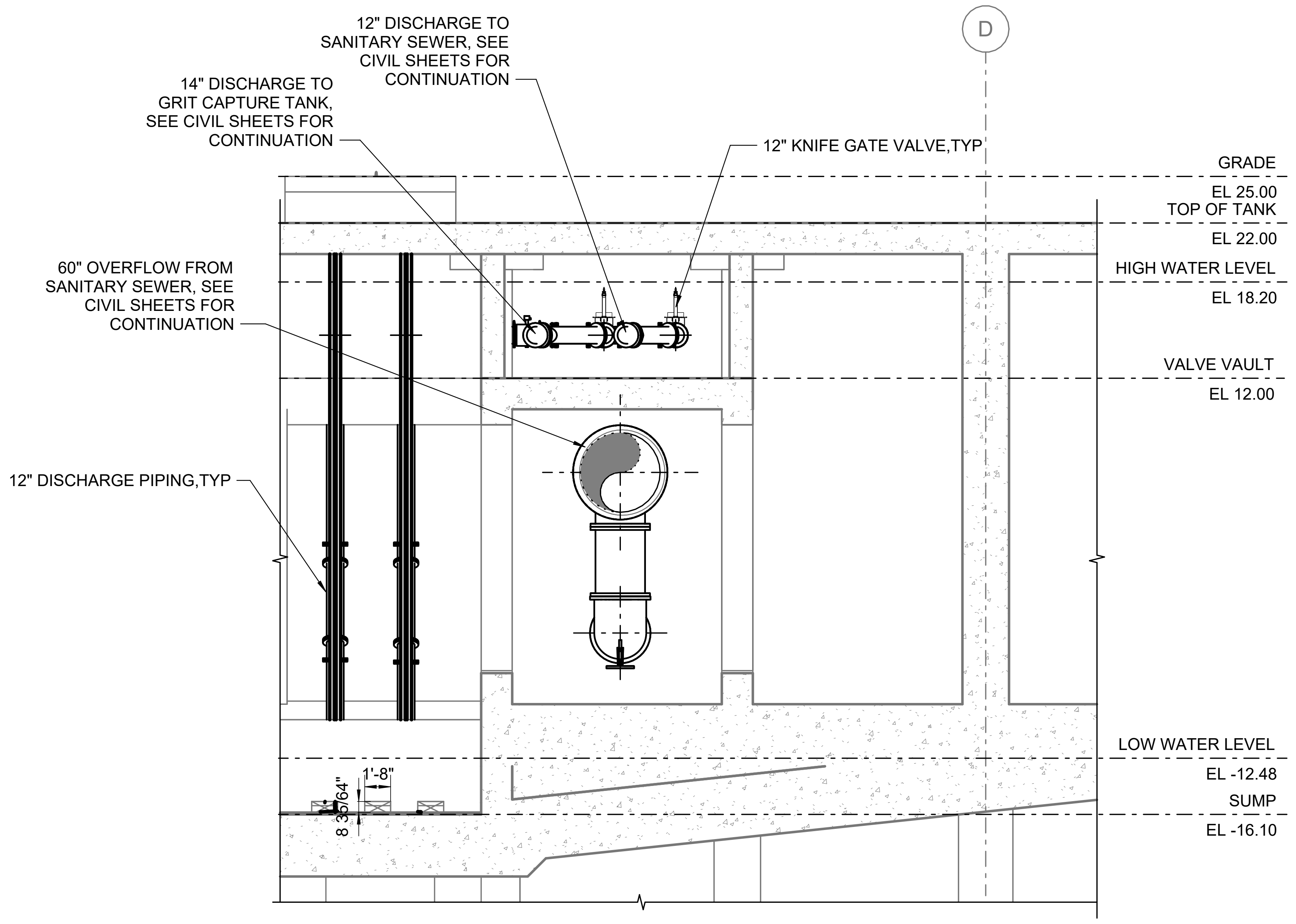


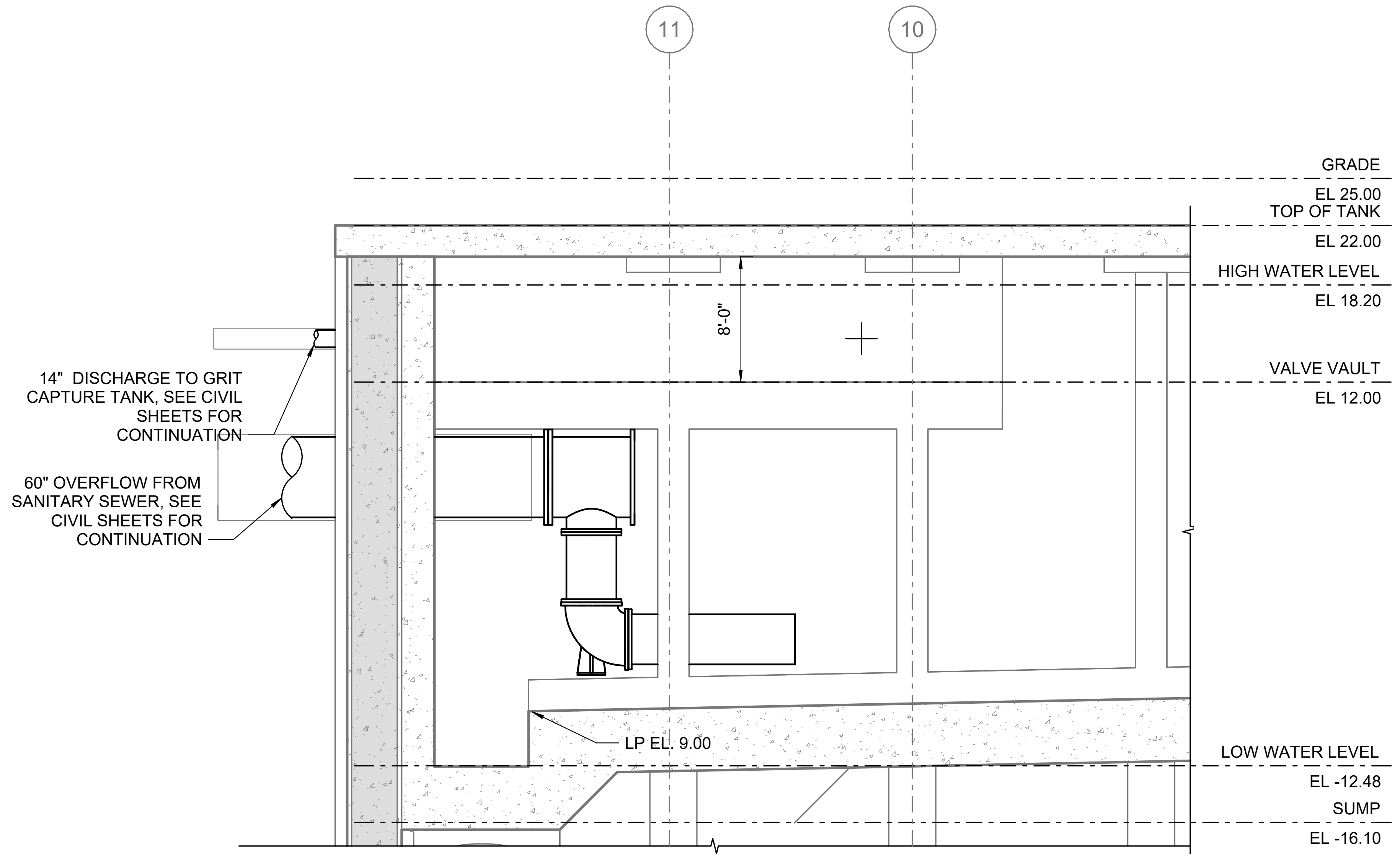
C1 M-5 TANK DEWATERING SECTION I

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


12" DISCHARGE TO SANITARY SEWER, SEE CIVIL SHEETS FOR CONTINUATION
14" DISCHARGE TO GRIT CAPTURE TANK, SEE CIVIL SHEETS FOR CONTINUATION
D
12" KNIFE GATE VALVE,TYP
GRADE
EL 25.00
TOP OF TANK
EL 22.00
HIGH WATER LEVEL
EL 18.20
60" OVERFLOW FROM SANITARY SEWER, SEE CIVIL SHEETS FOR CONTINUATION
VALVE VAULT
EL 12.00
12" DISCHARGE PIPING,TYP
1'-8"
8 35/64"
LOW WATER LEVEL
EL -12.48
SUMP
EL -16.10

A1 M-5 TANK DEWATERNG SECTION II

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


11
10
GRADE
EL 25.00
TOP OF TANK
EL 22.00
HIGH WATER LEVEL
EL 18.20
8'-0"
VALVE VAULT
EL 12.00
14" DISCHARGE TO GRIT CAPTURE TANK, SEE CIVIL SHEETS FOR CONTINUATION
60" OVERFLOW FROM SANITARY SEWER, SEE CIVIL SHEETS FOR CONTINUATION
LP EL 9.00
LOW WATER LEVEL
EL -12.48
SUMP
EL -16.10

A3 M-5 TANK DEWATERING SECTION III

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

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Title
TANK DEWATERING SECTIONS

Revision: Sheet: of
Drawing No.
M-6

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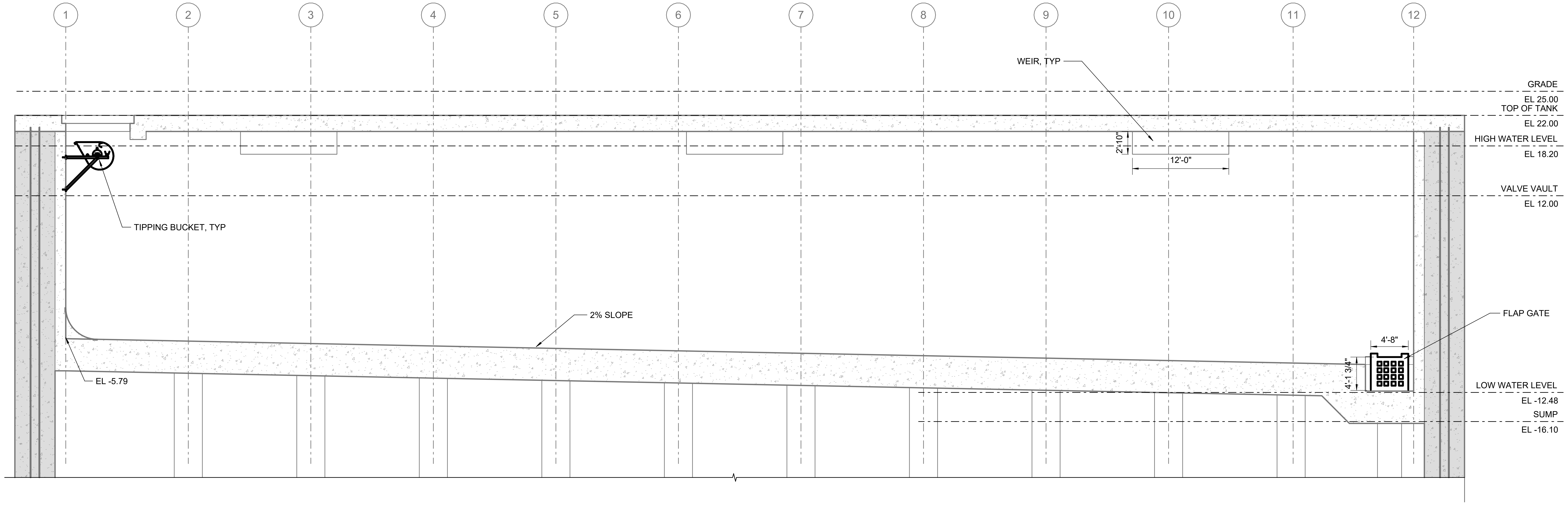

A1 TANK FLUSHING SECTION I

M-5

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

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Title
TANK FLUSHING SECTION I

Revision: Sheet: of

Drawing No.
M-7

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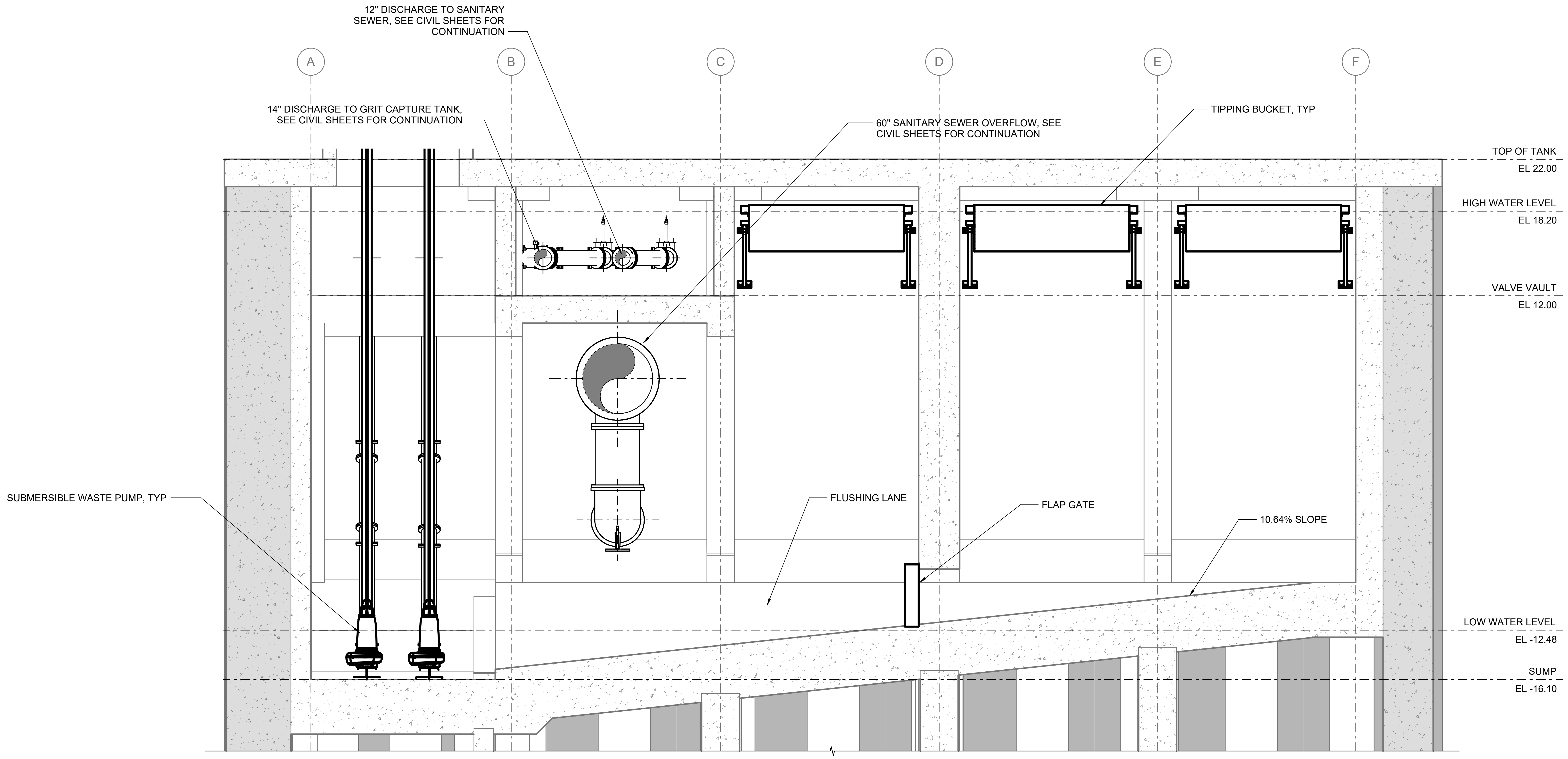
12" DISCHARGE TO SANITARY SEWER, SEE CIVIL SHEETS FOR CONTINUATION
A
B
C
D
E
F
14" DISCHARGE TO GRIT CAPTURE TANK, SEE CIVIL SHEETS FOR CONTINUATION
60" SANITARY SEWER OVERFLOW, SEE CIVIL SHEETS FOR CONTINUATION
TIPPING BUCKET, TYP
TOP OF TANK
EL 22.00
HIGH WATER LEVEL
EL 18.20
VALVE VAULT
EL 12.00
SUBMERSIBLE WASTE PUMP, TYP
FLUSHING LANE
FLAP GATE
10.64% SLOPE
LOW WATER LEVEL
EL -12.48
SUMP
EL -16.10

B1
M-5

TANK FLUSHING SECTION II

SCALE: 3/16" = 1'-0"

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Scale: 3/16" = 1'-0"

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Title
TANK FLUSHING SECTION II

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M-8

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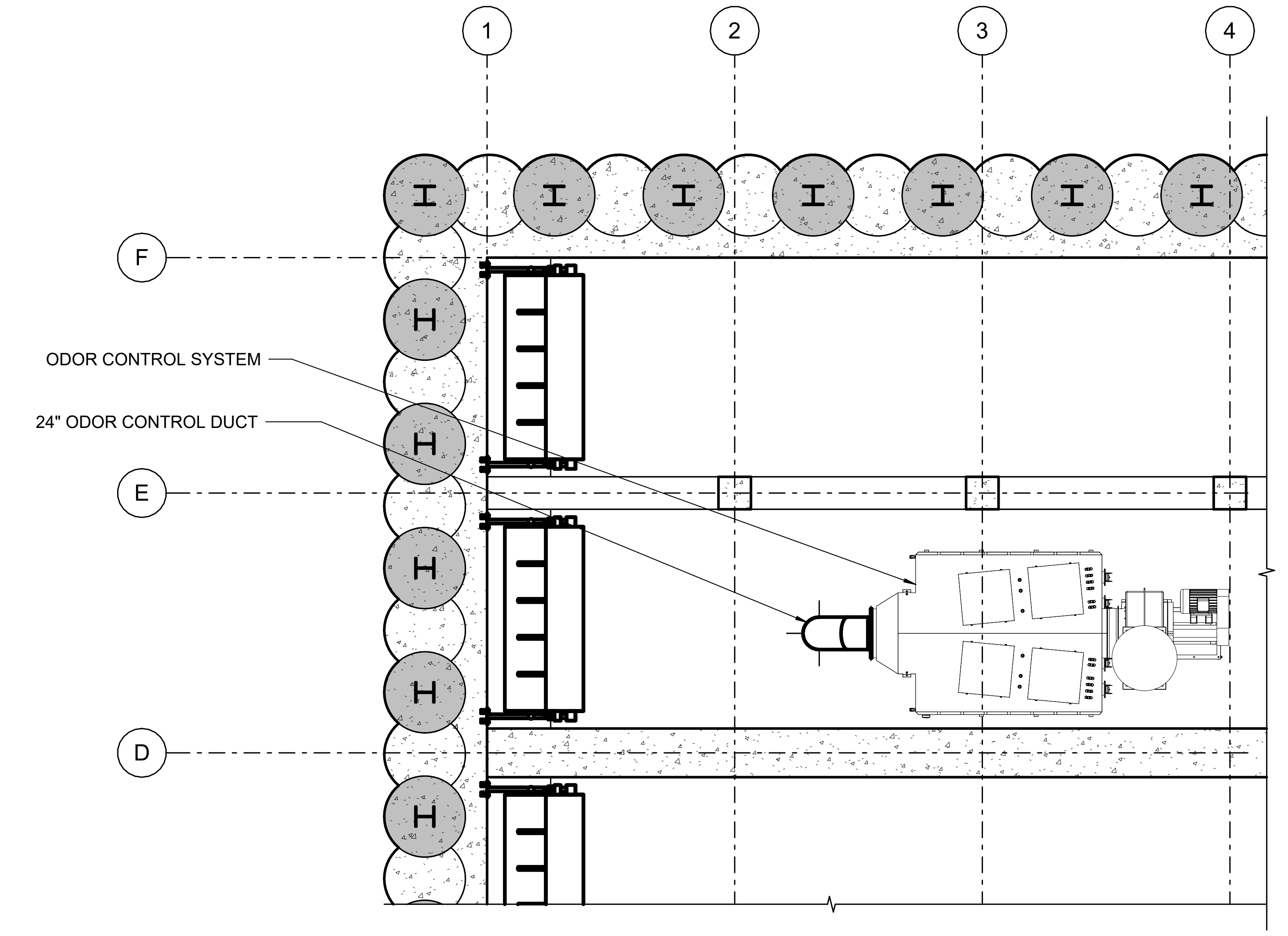
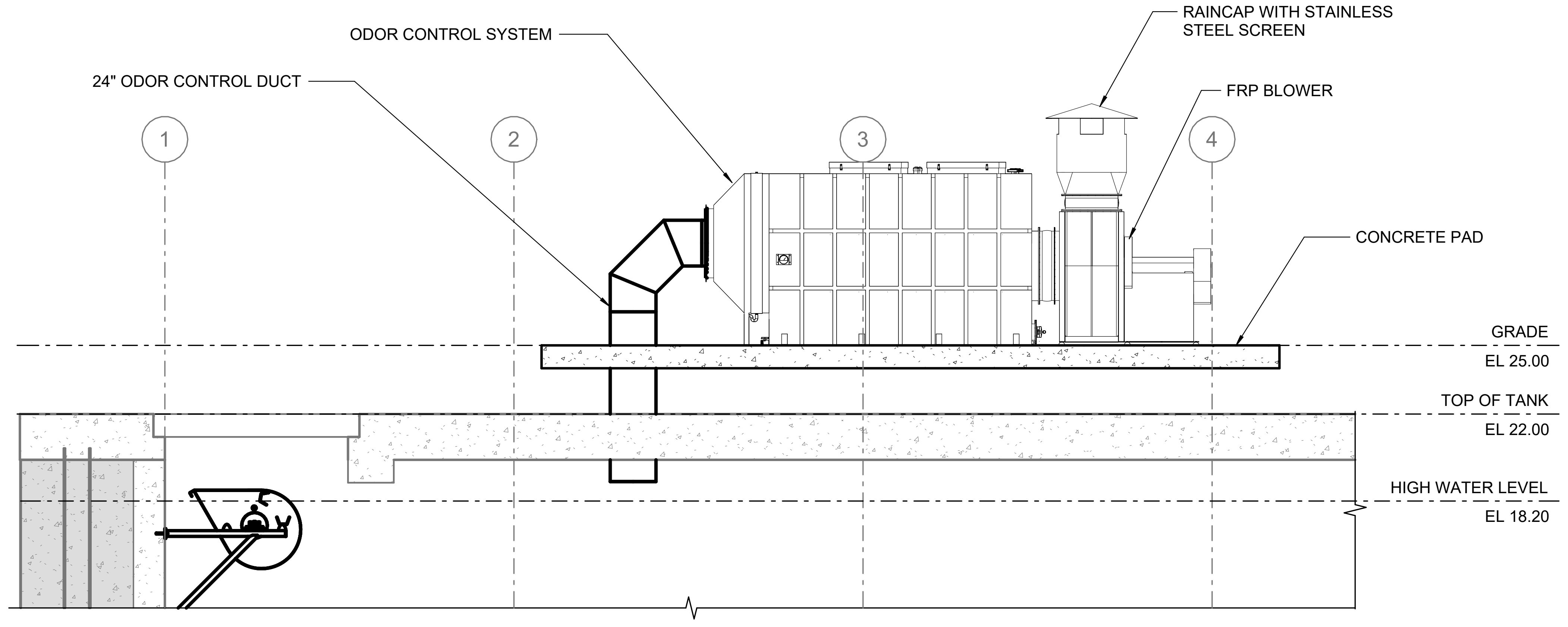


C1 ODOR CONTROL FLOOR PLAN

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



A1 M-5 ODOR CONTROL SECTION

SCALE: 3/16" = 1'-0"

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Title
ODOR CONTROL PLAN AND SECTION

Revision: Sheet: of

Drawing No.
M-9

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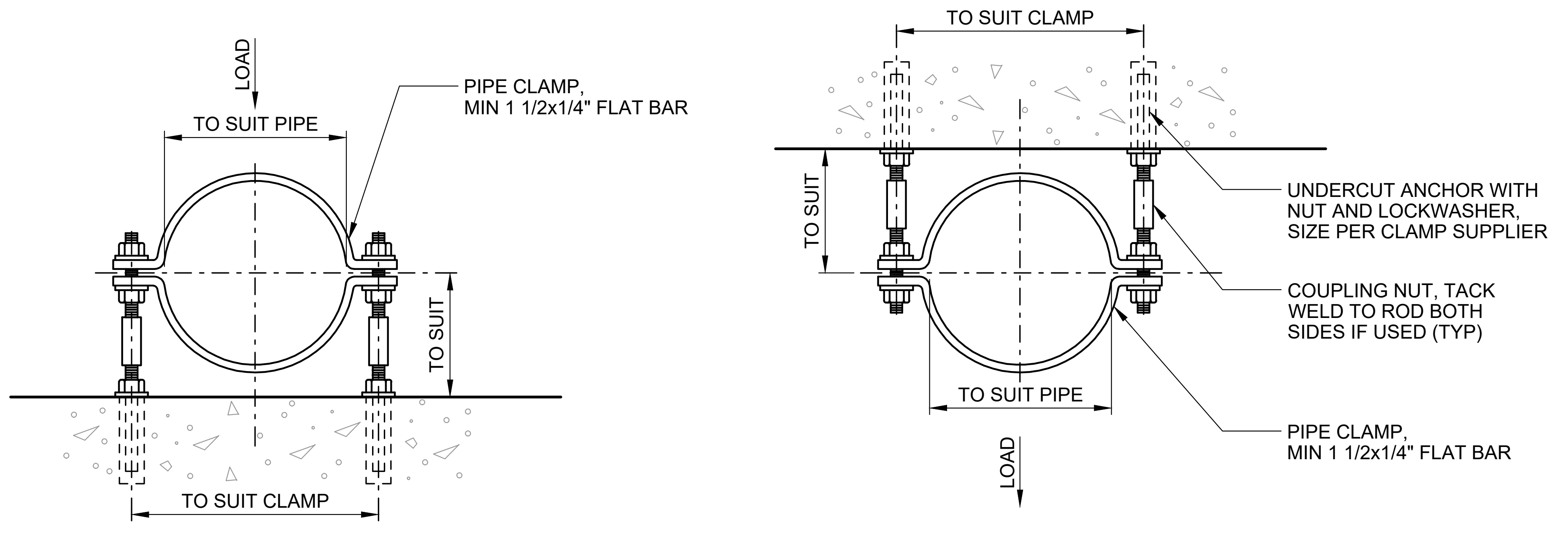


FLOOR SUPPORTED

CEILING SUPPORTED

NOTES :

1. WHERE LOCATED IN CHEMICAL OR CORROSIVE AREAS, PARTS SHALL BE FRP OR TYPE 316 STAINLESS STEEL.

D-101 MAT FLOOR OR CEILING-SUPPORTED PIPE CLAMP

(8" PIPE DIAMETER AND SMALLER)

REV 051724

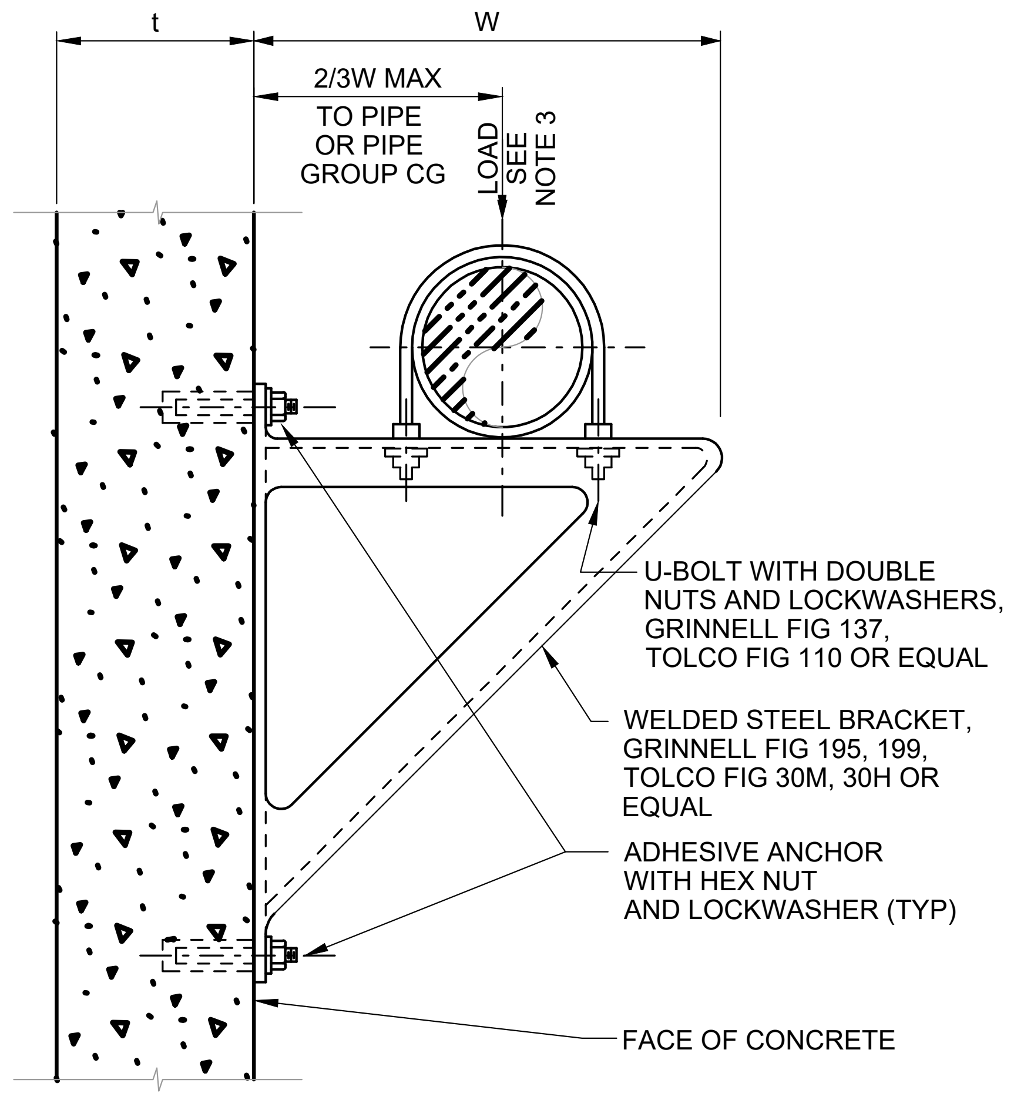
NOTES :

1. USE WITH A SINGLE 16" DIAMETER PIPE OR A GROUP OF PIPES NOT EXCEEDING THE MASS OF A 16" PIPE
2. FOR TOLCO 30H BRACKETS WITH 1 1/8"Ø HOLES, PROVIDE 1/4" THICK PLATE WASHER WITH STANDARD 1 1/16"Ø HOLE FOR 1"Ø THREADED ROD. WELD PLATE WASHER ALL AROUND WITH 3/16" FILLET WELD.
3. SEE TABLE FOR MAXIMUM ALLOWABLE LOAD.

							Sds≤0.5	
WALL TYPE	ANVIL FIG	TOLCO FIG	ANCHOR DIAMETER	MIN EDGE DISTANCE	EMBED	WALL THICK MIN (t)	MAX LOAD (LB)	NOTES
CONC	195	30M	3/4"	12"	7.5"	10"	1500	
CONC	199 NO 2-5	30H NO 3-6	1"	12"	9.5"	12"	2100	

SEISMIC AND WIND COMPLIANT DESIGN CRITERIA

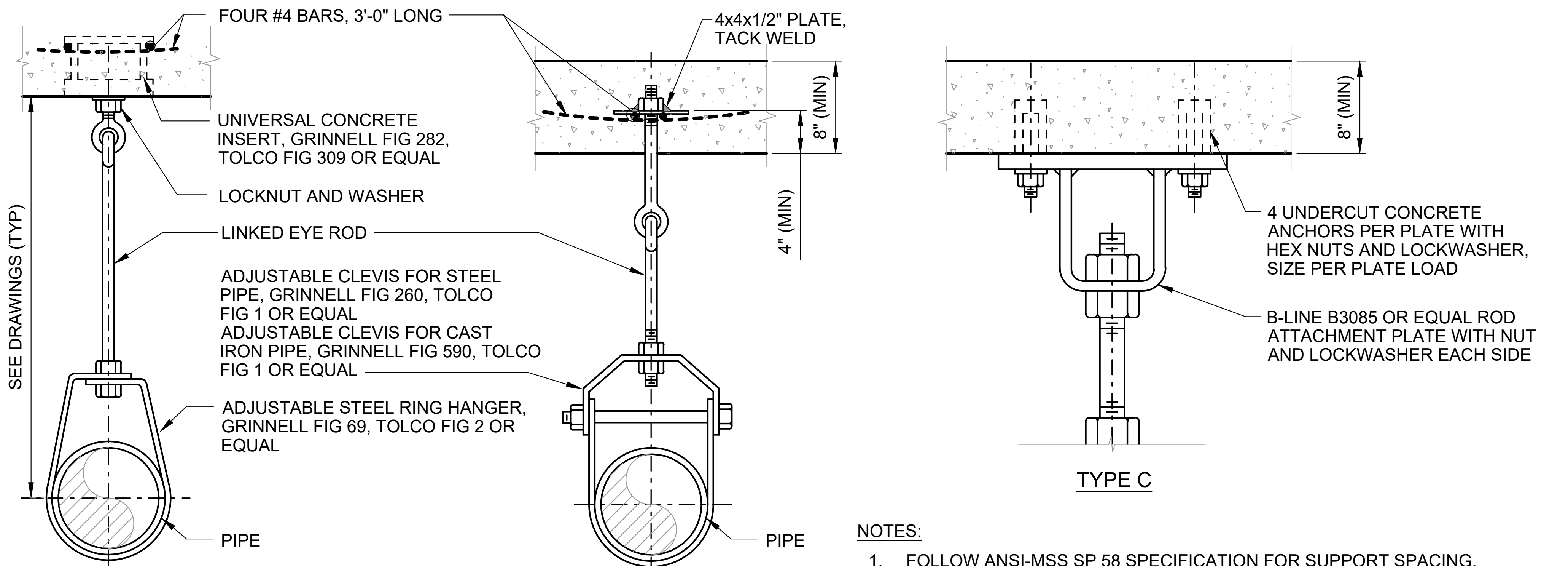
1. THE SUPPORT IS ADEQUATE FOR SEISMIC RESPONSE COEFFICIENT (SDS) GIVEN IN THE TABLE. SEISMIC FORCE ASSUMPTIONS (ASCE 7-10, EQN 13.3-1): ap=2.5, Rp=3.0, Ωo=2.5, Ip=1.0, z/h=1.0.
2. THE SUPPORT, DESIGNED FOR SEISMIC LOADS ARE ALSO ADEQUATE FOR A DESIGN WIND SPEED (Vult) OF UP TO 180 MPH WITH A MAXIMUM HEIGHT ABOVE GRADE OF 40'. WIND FORCE ASSUMPTIONS: EXPOSURE CATEGORY C, Kzt=1.0, Kz=1.04, Kd=0.85, G=0.85, Gcp=1.4,Cf=1.1 (DESIGNED PER ASCE 7-10 SECTION 29.5 - OTHER STRUCTURES).



D-104 PIPE BRACKET

(FOR PIPE 16" DIAMETER AND SMALLER)

REV 051724



TYPE A

TYPE B

TYPE C

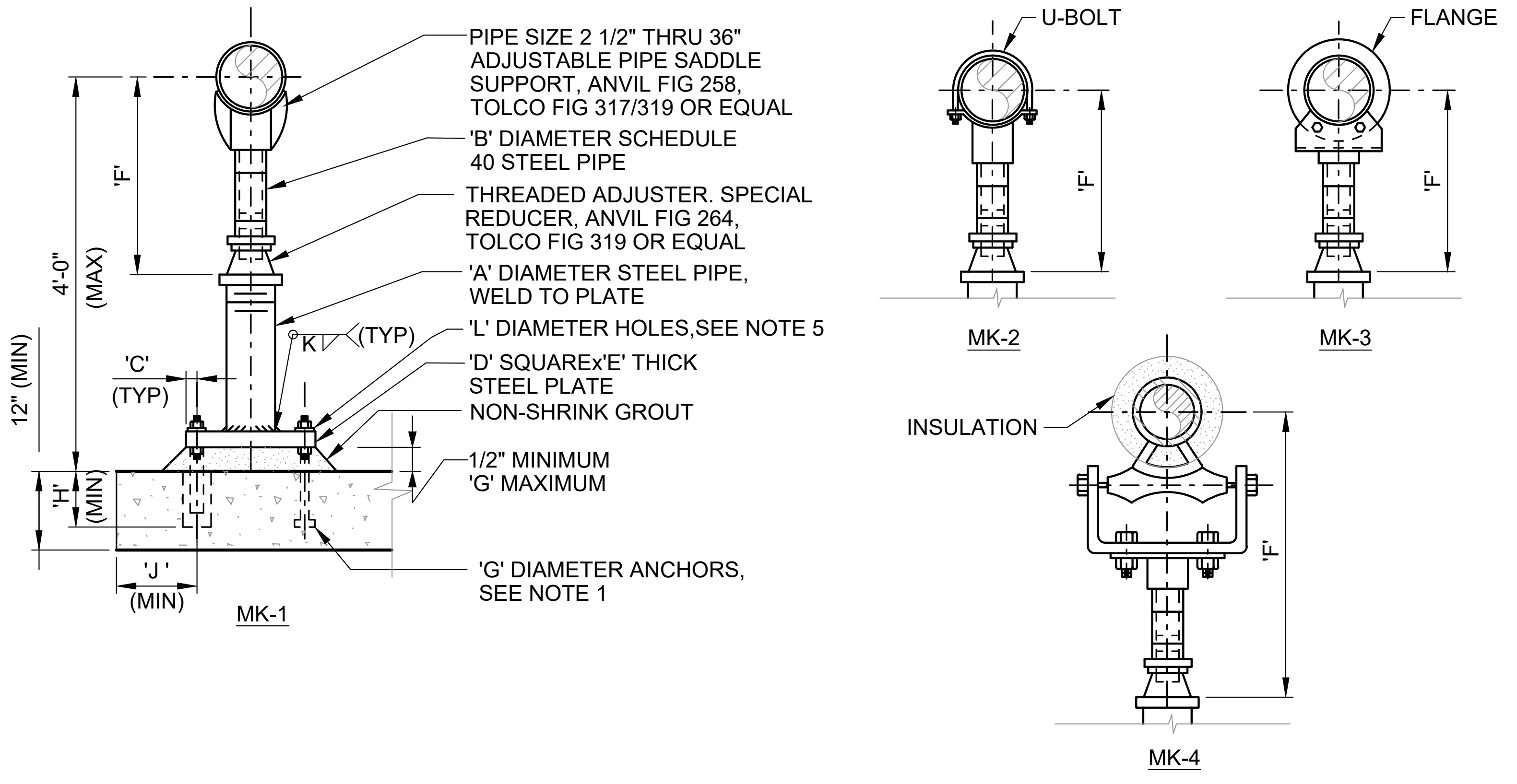
NOTES:

1. FOLLOW ANSI-MSS SP 58 SPECIFICATION FOR SUPPORT SPACING.
2. MIN 7" DISTANCE FROM ANCHOR TO CONCRETE EDGE
3. TOLCO FIG 200H OR EQUAL FOR TYPE A SUPPORT, PIPE 4" AND LESS
4. EATON B3086 OR EQUAL FOR TYPE B SUPPORT, PIPE 1/2" THROUGH 12"
5. SEE MANUFACTURER DATA SHEETS FOR ROD DIAMETER AND LOAD LIMITS.
6. ANCHOR ROD DIAMETERS AS PER ANSI MSS SP-57 AND ANSI MSS SP 127"
7. FOLLOW ANSI MSS SP-57 AND 127 FOR ANCHOR ROD DIAMETER.

D-107 PIPE HANGER

(12" PIPE DIAMETER AND SMALLER)

REV 051724



DIMENSIONS IN INCHES														Sds≤0.5	
NOMINAL PIPE DIAMETER	'A' (SCH 40 UNO)	'B'	'C'	'D'	'E'	'F' (APPROX) (MINIMUM)	'F' (APPROX) (MAXIMUM)	'G'	'H'	'J'	'K'	'L'	LOAD MAX (LBS)	'M'
2 1/2	* 2 / 2 1/2	1 1/2	1	8	7/16	7	11 1/2	1/2	4	6	3/8	13/16	1400	500
3	* 2 / 2 1/2	1 1/2	1	8	7/16	7 5/16	11 13/16	1/2	4	6	3/8	13/16	1400	500
3 1/2	* 2 / 2 1/2	1 1/2	1	8	7/16	7 9/16	12 1/16	1/2	4	6	3/8	13/16	1400	500
4	3	* 2 1/2 / 3	1 1/4	10	5/8	10 1/4	14 3/4	5/8	5	8	7/16	1 1/16	2650	1100
6	3	* 2 1/2 / 3	1 1/4	10	5/8	11 9/16	16 1/16	5/8	5	8	7/16	1 1/16	2650	1100
8	3	* 2 1/2 / 3	1 1/4	10	5/8	13 9/16	18 1/16	5/8	5	8	7/16	1 1/16	2650	1100
10	3	* 2 1/2 / 3	1 1/4	10	5/8	14 5/8	19 1/8	5/8	5	8	7/16	1 1/16	2650	1100
12	3	* 2 1/2 / 3	1 1/4	10	5/8	15 5/8	20 1/8	5/8	5	8	7/16	1 1/16	2650	1100
14	4	3	1 3/8	12	3/4	18 7/8	23 3/8	3/4	7	10.5	1/2	1 5/16	4200	2200
16	4	3	1 3/8	12	3/4	19 7/8	24 3/8	3/4	7	10.5	1/2	1 5/16	4200	2200
18	6 (SCH 80)	* 4 / 3 1/2	1 5/8	14	1 1/4	22 1/4	26 3/4	7/8	8	12	11/16	1 9/16	6050	2775
20	6 (SCH 80)	* 4 / 3 1/2	1 5/8	14	1 1/4	23 1/4	27 3/4	7/8	8	12	11/16	1 9/16	6050	2775
24	6 (SCH 80)	4	1 5/8	14	1 1/4	26 1/2	31	7/8	8	12	11/16	1 9/16	6050	2775
30	6 (SCH 80)	4	1 7/8	16	1 1/4	29 5/8	34 1/8	1	8	12	11/16	1 13/16	8150	3100
32	6 (SCH 80)	4	1 7/8	16	1 1/4	30 5/8	35 1/8	1	8	12	11/16	1 13/16	8150	3100
36	6 (SCH 80)	4	1 7/8	16	1 1/4	32 5/8	37 1/8	1	8	12	11/16	1 13/16	8150	3100

* SEE MANUFACTURER

NOTES:

1. PROVIDE CAST-IN-PLACE HEAVY HEX HEAD ASTM F1554 GR 36 ANCHORS, UNO.
2. REFER TO TABLE FOR MAXIMUM ALLOWABLE SERVICE LOAD ON EACH SUPPORT.
3. FOR 3/4" ANCHORS AND LARGER, PROVIDE SQUARE WASHERS PER AISC MANUAL OF STEEL CONSTRUCTION TABLE 14-2 WITH STD HOLES WELDED TO PLATE WITH 3/16" FILLETS. USE 1 3/4" SQx3/16" THICK WASHERS FOR 5/8" ANCHORS.
4. IF ADHESIVE ANCHORS ARE USED (SIMPSON SET XP, OR EQUAL), USE REDUCED MAX LOADS IN COLUMN 'M'. OVERSIZED HOLES AND WASHERS ARE NOT REQUIRED.

SEISMIC AND WIND COMPLIANT DESIGN CRITERIA

1. THE SUPPORTS ARE ADEQUATE FOR SEISMIC RESPONSE COEFFICIENT (SDS) GIVEN IN THE TABLE. SEISMIC FORCE ASSUMPTIONS (ASCE 7-10, EQN 13.3-1): ap=2.5, Rp=6, Ωo=2.5, Ip=1.0, z/h=1.0.

2. THE SUPPORTS, DESIGNED FOR SEISMIC LOADS, ARE ALSO ADEQUATE FOR A DESIGN WIND SPEED (Vult) OF UP TO 165 MPH WITH A MAXIMUM HEIGHT ABOVE GRADE OF 40'. WIND FORCE ASSUMPTIONS: EXPOSURE CATEGORY C, Kzt=1.0, Kz=1.04, Kd=0.95, G=0.85, Cf=1.2 (DESIGNED PER ASCE 7-10 SECTION 29.5 - OTHER STRUCTURES).

D-108 ADJ PIPE SUPPORT W OR W/O 'U' BOLT

(FOR PIPE 36" DIAMETER AND SMALLER)

REV 051724

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Revision	By	Appd	YYYY.MM.DD
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Client/Project
CITY OF CAMBRIDGE
SHERMAN CSO TANK
CAMBRIDGE, MASSACHUSETTS

Project No.: 195151145
File Name: 51145M-10.DWG
Scale: NO SCALE

PS	KVV	EO	2026.08.12
Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Title
STANDARD DETAILS - I

Revision:
Sheet: XX of XX

Drawing No.
M-10

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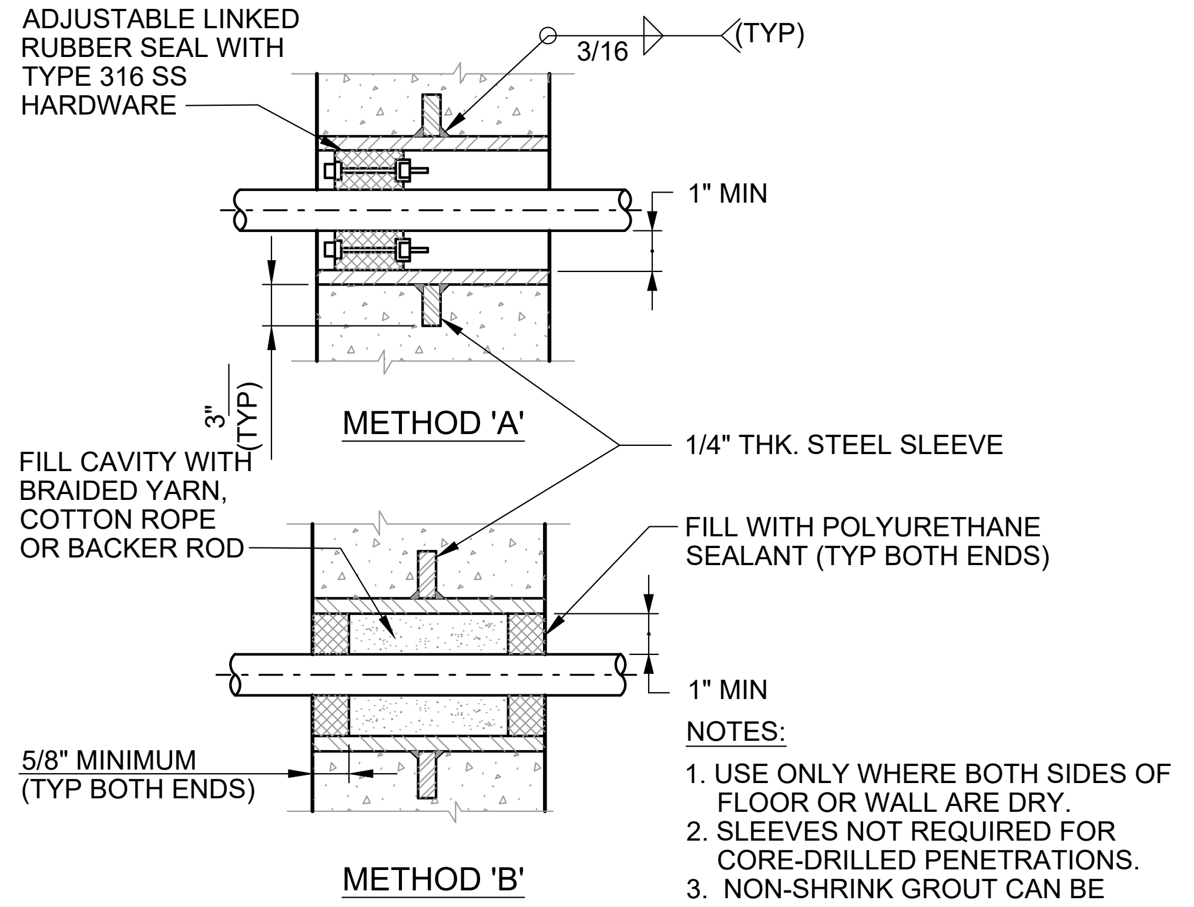
ORIGINAL SHEET - ANSI D

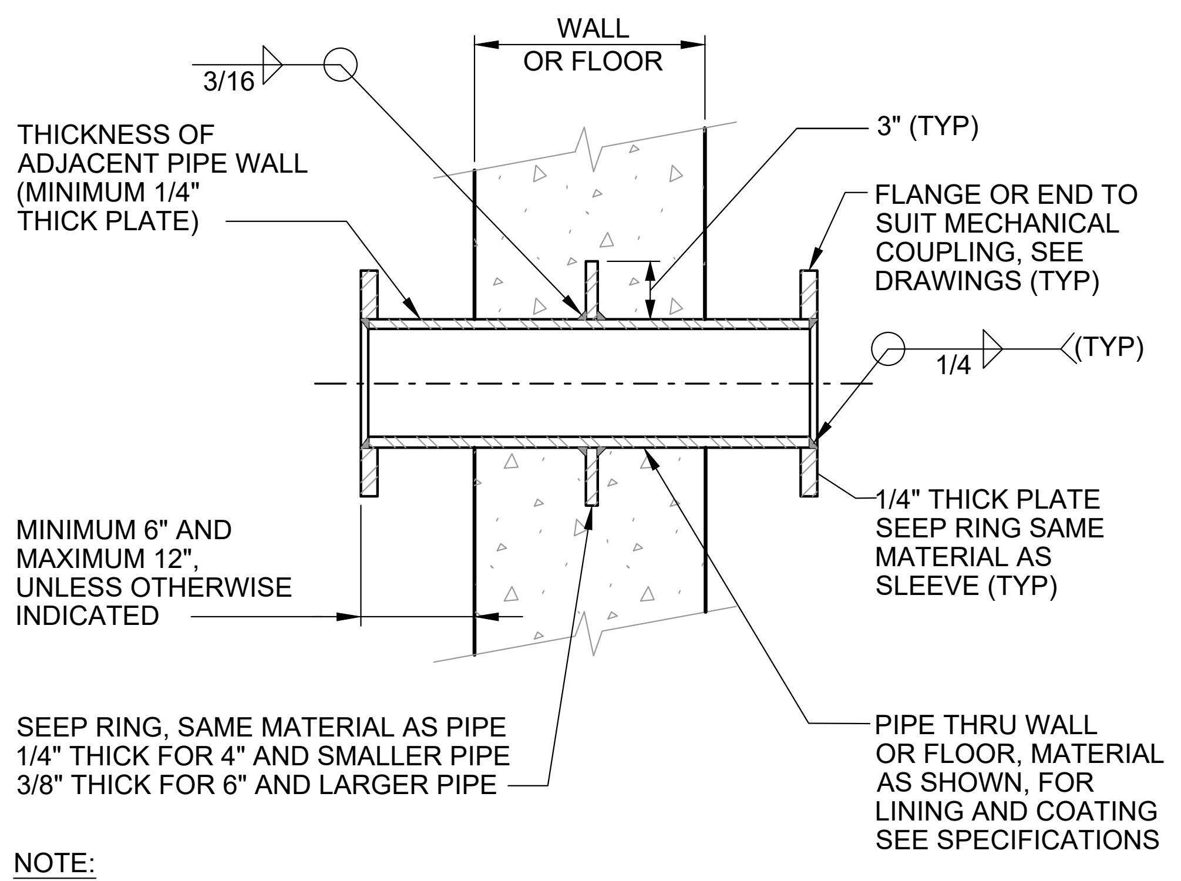

ADJUSTABLE LINKED RUBBER SEAL WITH TYPE 316 SS HARDWARE
3/16
(TYP)
1" MIN
3" (TYP)
METHOD 'A'
1/4" THK. STEEL SLEEVE
FILL CAVITY WITH BRAIDED YARN, COTTON ROPE OR BACKER ROD
FILL WITH POLYURETHANE SEALANT (TYP BOTH ENDS)
1" MIN
5/8" MINIMUM (TYP BOTH ENDS)
METHOD 'B'

NOTES:

1. USE ONLY WHERE BOTH SIDES OF FLOOR OR WALL ARE DRY.
2. SLEEVES NOT REQUIRED FOR CORE-DRILLED PENETRATIONS.
3. NON-SHRINK GROUT CAN BE INSTALLED OVER LINKED RUBBER SEALS.

D-111 WALL AND FLOOR PIPE PENETRATION (DRY)

REV 051724

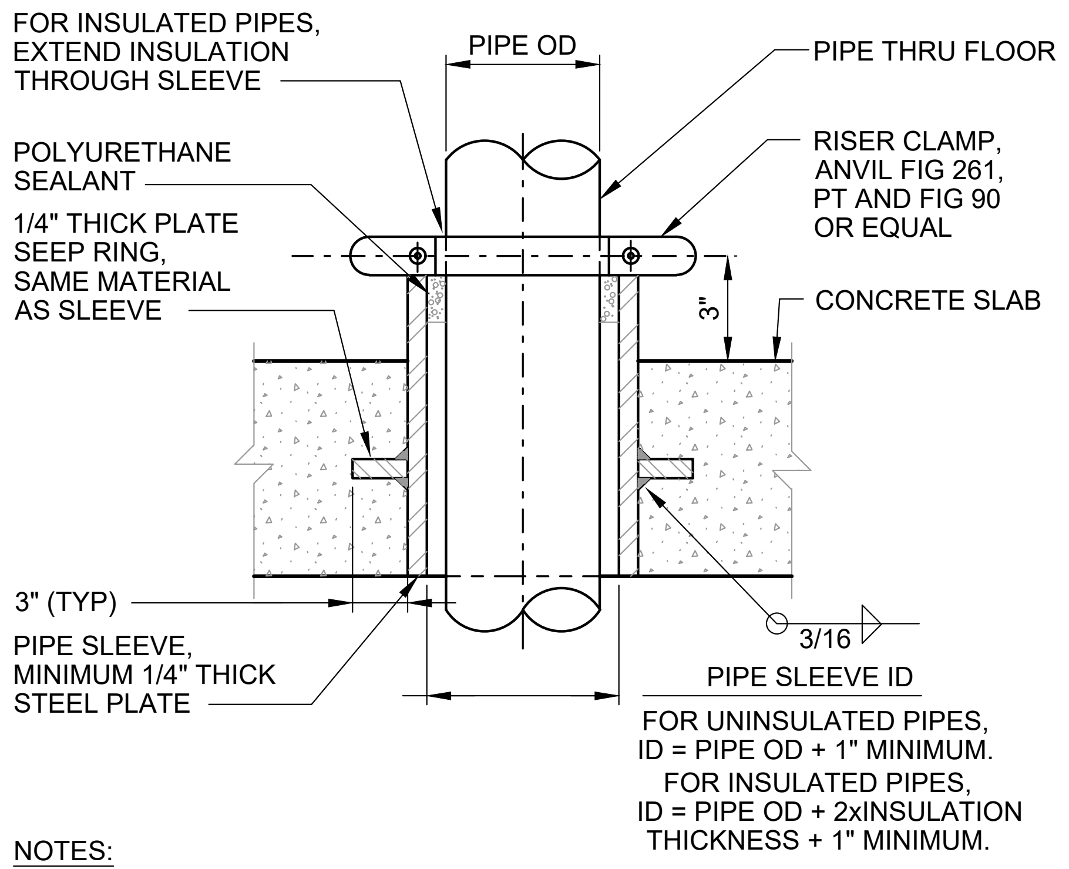

3/16
WALL OR FLOOR
THICKNESS OF ADJACENT PIPE WALL (MINIMUM 1/4" THICK PLATE)
3" (TYP)
FLANGE OR END TO SUIT MECHANICAL COUPLING, SEE DRAWINGS (TYP)
1/4
(TYP)
MINIMUM 6" AND MAXIMUM 12", UNLESS OTHERWISE INDICATED
1/4" THICK PLATE SEEP RING SAME MATERIAL AS SLEEVE (TYP)
SEEP RING, SAME MATERIAL AS PIPE 1/4" THICK FOR 4" AND SMALLER PIPE 3/8" THICK FOR 6" AND LARGER PIPE
PIPE THRU WALL OR FLOOR, MATERIAL AS SHOWN, FOR LINING AND COATING SEE SPECIFICATIONS

NOTE:

1. SEE STRUCTURAL DRAWINGS FOR WALL THICKNESS.

D-113 FABRICATED PIPE THIMBLE

REV 010119

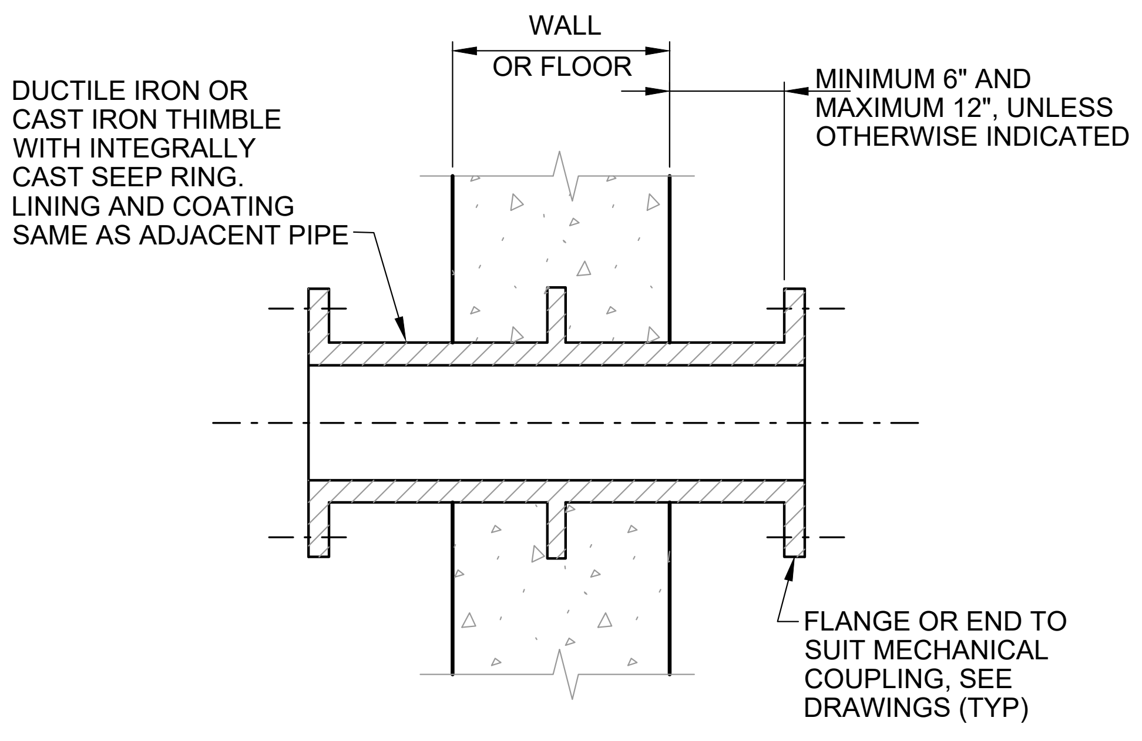

FOR INSULATED PIPES, EXTEND INSULATION THROUGH SLEEVE
PIPE OD
PIPE THRU FLOOR
POLYURETHANE SEALANT
RISER CLAMP, ANVIL FIG 261, PT AND FIG 90 OR EQUAL
1/4" THICK PLATE SEEP RING, SAME MATERIAL AS SLEEVE
3"
CONCRETE SLAB
3" (TYP)
3/16
PIPE SLEEVE, MINIMUM 1/4" THICK STEEL PLATE
PIPE SLEEVE ID
FOR UNINSULATED PIPES, ID = PIPE OD + 1" MINIMUM.
FOR INSULATED PIPES, ID = PIPE OD + 2xINSULATION THICKNESS + 1" MINIMUM.

NOTES:

1. HOT DIP GALVANIZE ALL PARTS AFTER FABRICATION.
2. THIS SLEEVED PIPE OPENING DETAIL SHALL BE USED IN DRY AREAS ONLY AND SHALL NOT BE USED FOR AREAS WITH WATER ON ONE OR BOTH SIDES.

D-114 VERTICAL PIPE SUPPORT SLEEVE

REV 010119


WALL OR FLOOR
DUCTILE IRON OR CAST IRON THIMBLE WITH INTEGRALLY CAST SEEP RING. LINING AND COATING SAME AS ADJACENT PIPE
MINIMUM 6" AND MAXIMUM 12", UNLESS OTHERWISE INDICATED
FLANGE OR END TO SUIT MECHANICAL COUPLING, SEE DRAWINGS (TYP)

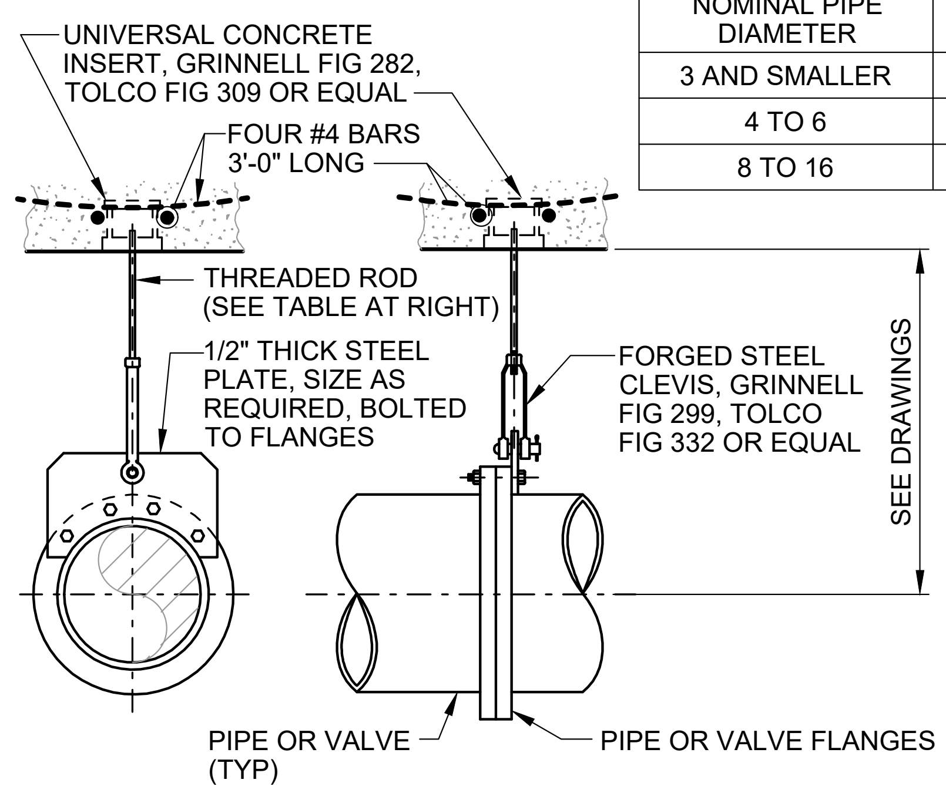
NOTE:

1. SEE STRUCTURAL DRAWINGS FOR WALL THICKNESS.

D-116 FLANGED OR GROOVED DUCTILE IRON OR CAST IRON PIPE THIMBLE

REV 010119

DIMENSIONS IN INCHES	
NOMINAL PIPE DIAMETER	ROD DIAMETER
3 AND SMALLER	1/2
4 TO 6	3/4
8 TO 16	1


UNIVERSAL CONCRETE INSERT, GRINNELL FIG 282, TOLCO FIG 309 OR EQUAL
FOUR #4 BARS 3'-0" LONG
THREADED ROD (SEE TABLE AT RIGHT)
1/2" THICK STEEL PLATE, SIZE AS REQUIRED, BOLTED TO FLANGES
FORGED STEEL CLEVIS, GRINNELL FIG 299, TOLCO FIG 332 OR EQUAL
SEE DRAWINGS
PIPE OR VALVE (TYP)
PIPE OR VALVE FLANGES

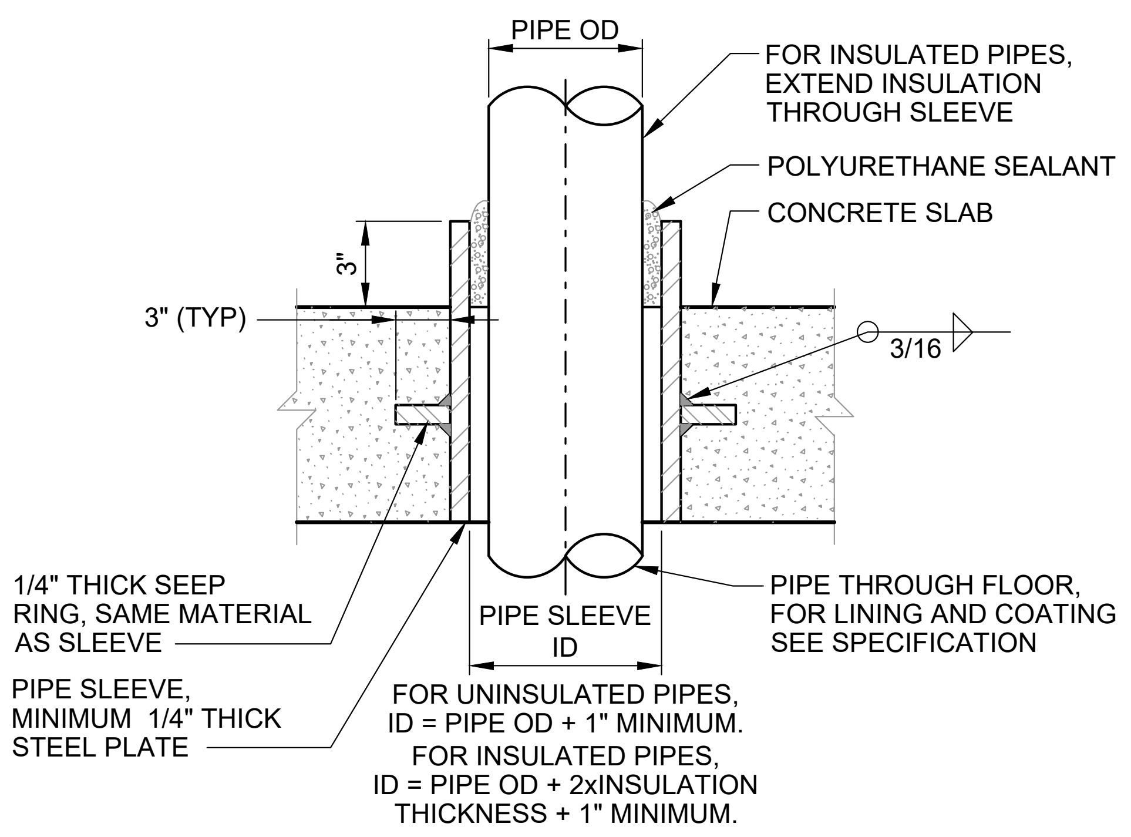
NOTES:

1. HOT DIP GALVANIZE PARTS AFTER FABRICATION.
2. WHERE LOCATED IN CHEMICAL OR CORROSIVE AREAS, PARTS SHALL BE FRP OR TYPE 316 STAINLESS STEEL.

D-128 PIPE OR VALVE HANGER

(FOR PIPE OR VALVE 16" DIAMETER AND SMALLER)

REV 010119

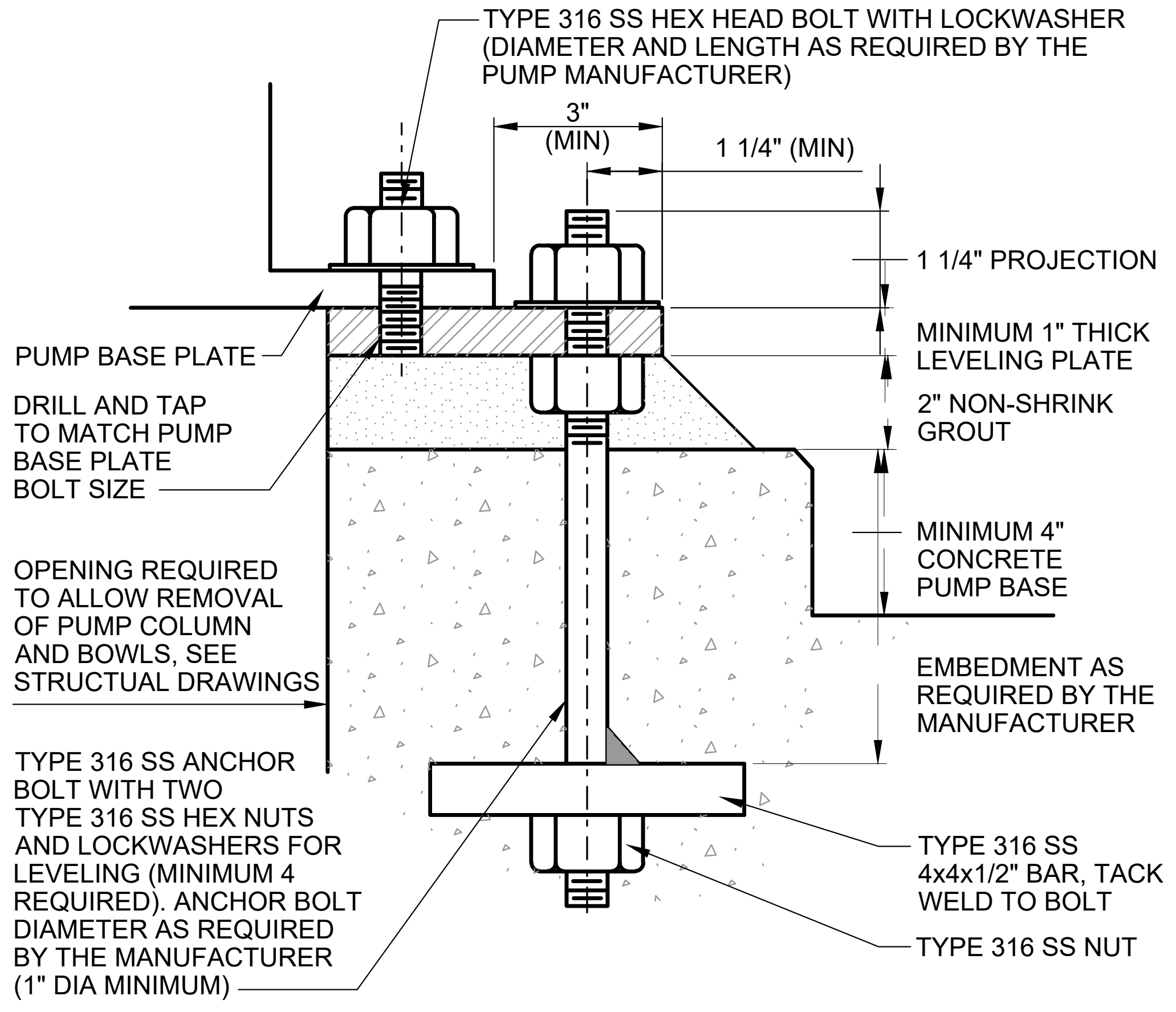

PIPE OD
FOR INSULATED PIPES, EXTEND INSULATION THROUGH SLEEVE
POLYURETHANE SEALANT
CONCRETE SLAB
3"
3" (TYP)
3/16
1/4" THICK SEEP RING, SAME MATERIAL AS SLEEVE
PIPE SLEEVE, MINIMUM 1/4" THICK STEEL PLATE
PIPE SLEEVE ID
PIPE THROUGH FLOOR, FOR LINING AND COATING SEE SPECIFICATION
FOR UNINSULATED PIPES, ID = PIPE OD + 1" MINIMUM.
FOR INSULATED PIPES, ID = PIPE OD + 2xINSULATION THICKNESS + 1" MINIMUM.

NOTES:

1. HOT DIP GALVANIZE ALL PARTS AFTER FABRICATION.
2. THIS SLEEVED PIPE OPENING DETAIL SHALL BE USED IN DRY AREAS ONLY AND SHALL NOT BE USED FOR AREAS WITH WATER ON ONE OR BOTH SIDES.

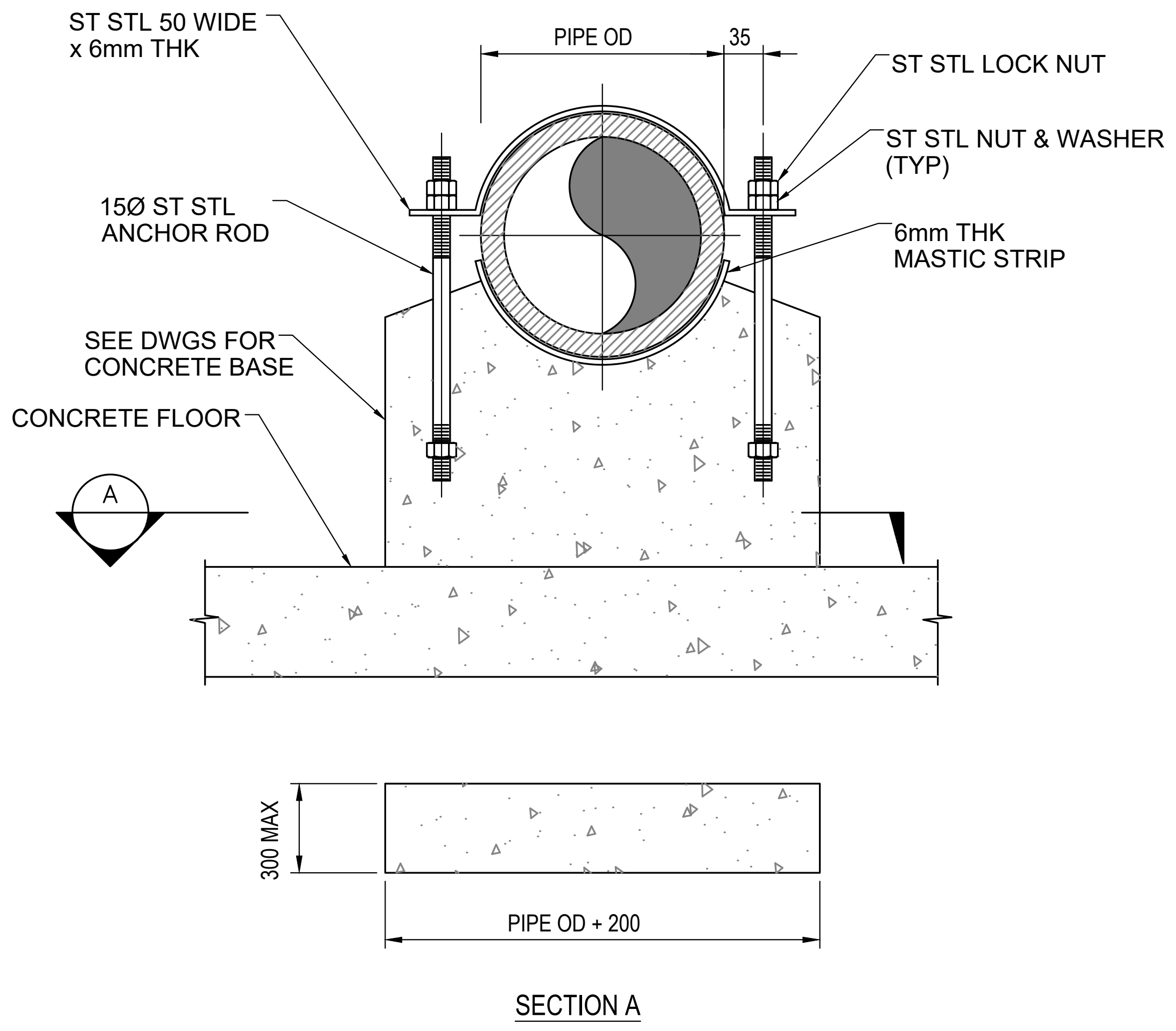
D-130 FLOOR PIPE SLEEVE

REV 010119


TYPE 316 SS HEX HEAD BOLT WITH LOCKWASHER (DIAMETER AND LENGTH AS REQUIRED BY THE PUMP MANUFACTURER)
3" (MIN)
1 1/4" (MIN)
1 1/4" PROJECTION
PUMP BASE PLATE
MINIMUM 1" THICK LEVELING PLATE
DRILL AND TAP TO MATCH PUMP BASE PLATE BOLT SIZE
2" NON-SHRINK GROUT
MINIMUM 4" CONCRETE PUMP BASE
OPENING REQUIRED TO ALLOW REMOVAL OF PUMP COLUMN AND BOWLS, SEE STRUCTURAL DRAWINGS
EMBEDMENT AS REQUIRED BY THE MANUFACTURER
TYPE 316 SS ANCHOR BOLT WITH TWO TYPE 316 SS HEX NUTS AND LOCKWASHERS FOR LEVELING (MINIMUM 4 REQUIRED). ANCHOR BOLT DIAMETER AS REQUIRED BY THE MANUFACTURER (1" DIA MINIMUM)
TYPE 316 SS 4x4x1/2" BAR, TACK WELD TO BOLT
TYPE 316 SS NUT

D-135 VERTICAL PUMP MOUNTING BASE

REV 010119

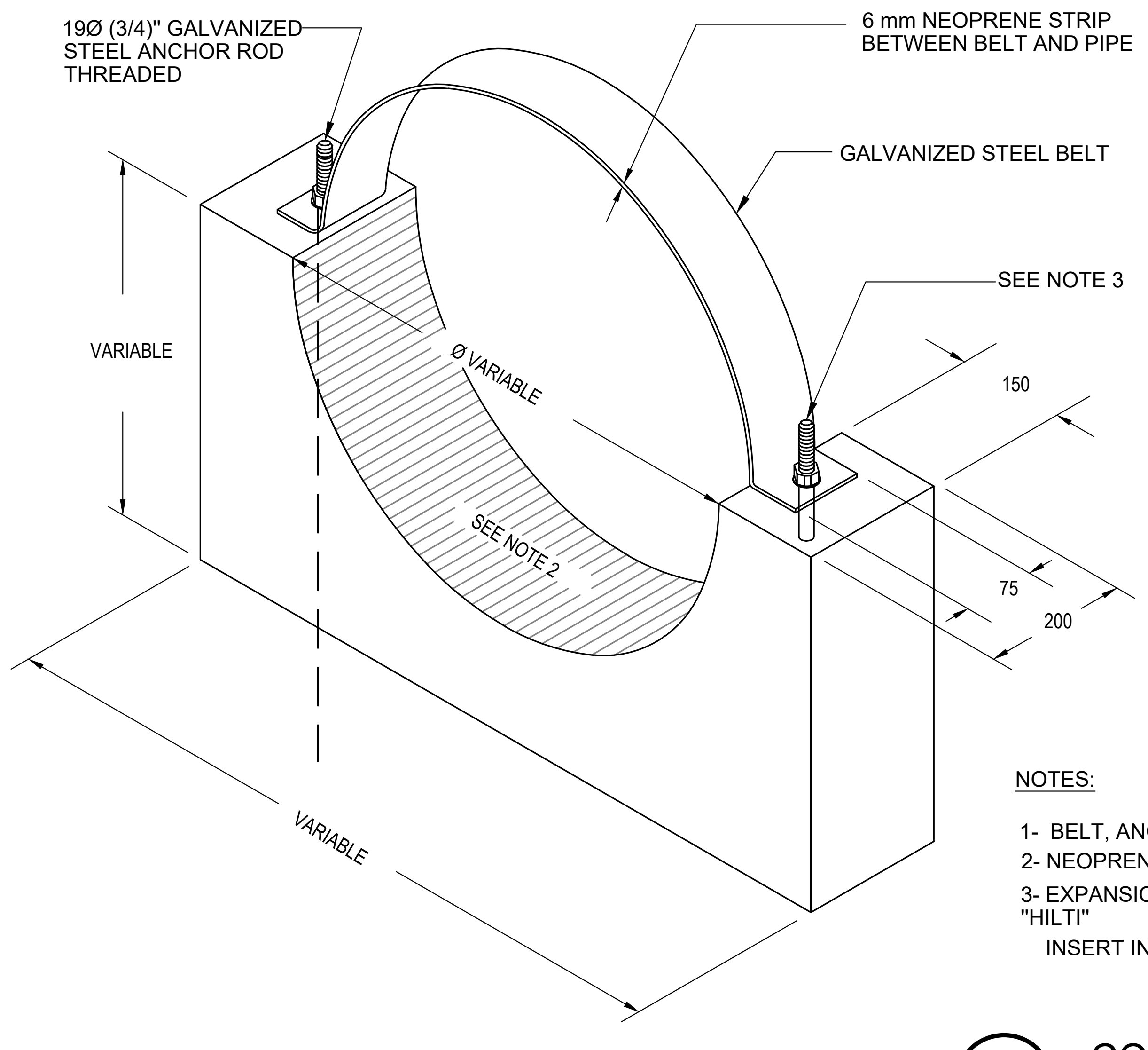


SECTION A

NOTE:

1. REINFORCING AS INDICATED ON STRUCTURAL DRAWINGS

D-918 CONCRETE SUPPORT FOR PIPE


19Ø (3/4") GALVANIZED STEEL ANCHOR ROD THREADED
6 mm NEOPRENE STRIP BETWEEN BELT AND PIPE
GALVANIZED STEEL BELT
SEE NOTE 3
VARIABLE
Ø VARIABLE
SEE NOTE 2
150
75
200
VARIABLE

NOTES:

1- BELT, ANCHORAGES, WASHERS, AND BOLTS ARE IN STAINLESS STEEL
2- NEOPRENE STRIP BETWEEN CONCRETE SUPPORT AND BASE
3- EXPANSION ANCHOR:STAINLESS STEEL ANCHORS TYPE 303 MOD. HDI FROM "HILTI"
INSERT IN THE CONCRETE SUPPORT

D-919 CONCRETE SUPPORT

Stantec
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www.stantec.com

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Revision	By	Appd	YYYY.MM.DD
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30% DESIGN SUBMITTAL			

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Client/Project
CITY OF CAMBRIDGE
SHERMAN CSO TANK
CAMBRIDGE, MASSACHUSETTS

Project No.: 195151145
File Name: 51145M-11.DWG
Scale: NO SCALE

PS	KVV	EO	2026.08.12
Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Title
STANDARD DETAILS - II

Revision: Sheet: XX of XX

Drawing No.
M-11

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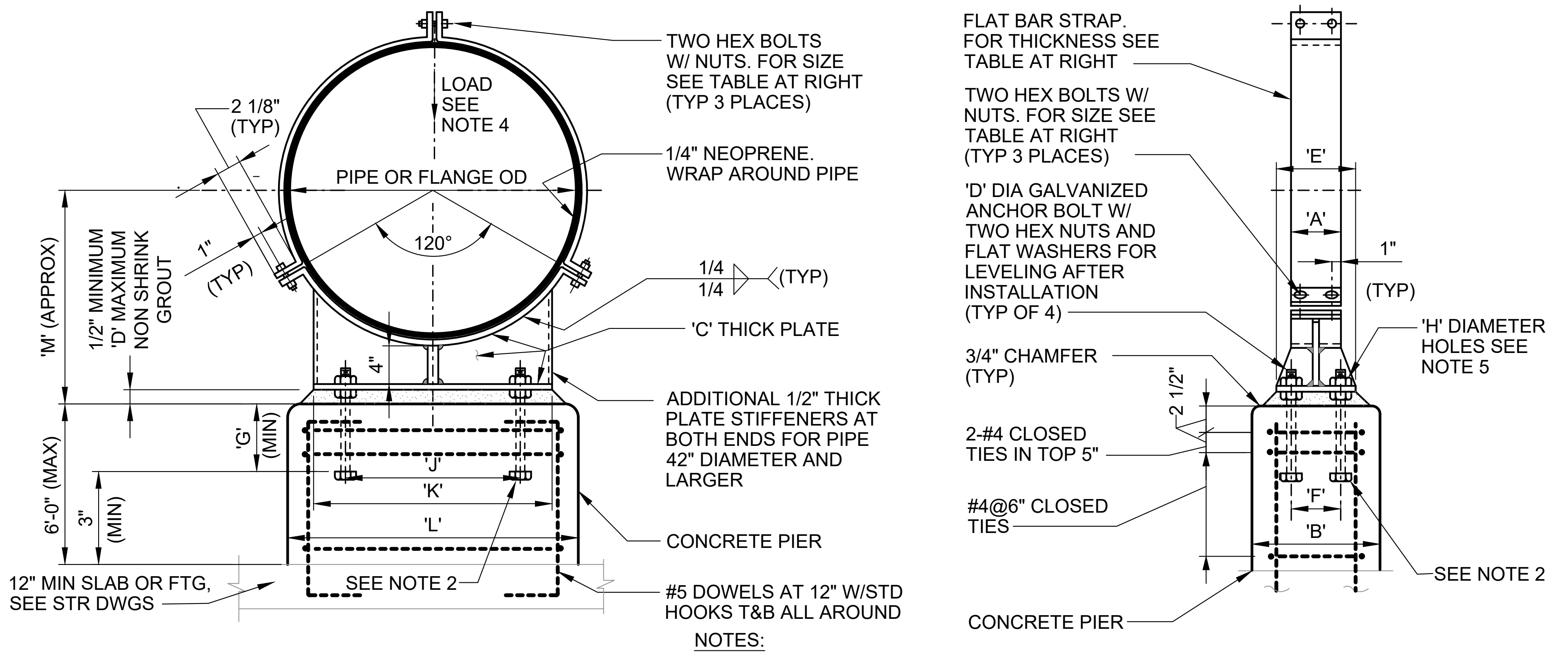
ORIGINAL SHEET - ANSI D


TWO HEX BOLTS W/ NUTS. FOR SIZE SEE TABLE AT RIGHT (TYP 3 PLACES)
LOAD SEE NOTE 4
2 1/8" (TYP)
1/4" NEOPRENE. WRAP AROUND PIPE
PIPE OR FLANGE OD
120°
1" (TYP)
'M' (APPROX)
1/2" MINIMUM 'D' MAXIMUM NON SHRINK GROUT
1/4 1/4 (TYP)
'C' THICK PLATE
4"
ADDITIONAL 1/2" THICK PLATE STIFFENERS AT BOTH ENDS FOR PIPE 42" DIAMETER AND LARGER
'G' (MIN)
'J'
'K'
'L'
6'-0" (MAX)
3" (MIN)
CONCRETE PIER
12" MIN SLAB OR FTG, SEE STR DWGS
SEE NOTE 2
#5 DOWELS AT 12" W/STD HOOKS T&B ALL AROUND
FLAT BAR STRAP. FOR THICKNESS SEE TABLE AT RIGHT
TWO HEX BOLTS W/ NUTS. FOR SIZE SEE TABLE AT RIGHT (TYP 3 PLACES)
'E'
'D' DIA GALVANIZED ANCHOR BOLT W/ TWO HEX NUTS AND FLAT WASHERS FOR LEVELING AFTER INSTALLATION (TYP OF 4)
'A'
1" (TYP)
'H' DIAMETER HOLES SEE NOTE 5
3/4" CHAMFER (TYP)
2 1/2"
2-#4 CLOSED TIES IN TOP 5"
'F'
#4@6" CLOSED TIES
'B'
SEE NOTE 2
CONCRETE PIER

D-110 PIPE SUPPORT WITH STRAP

(FOR PIPE 72" DIAMETER AND SMALLER)

REV 010119

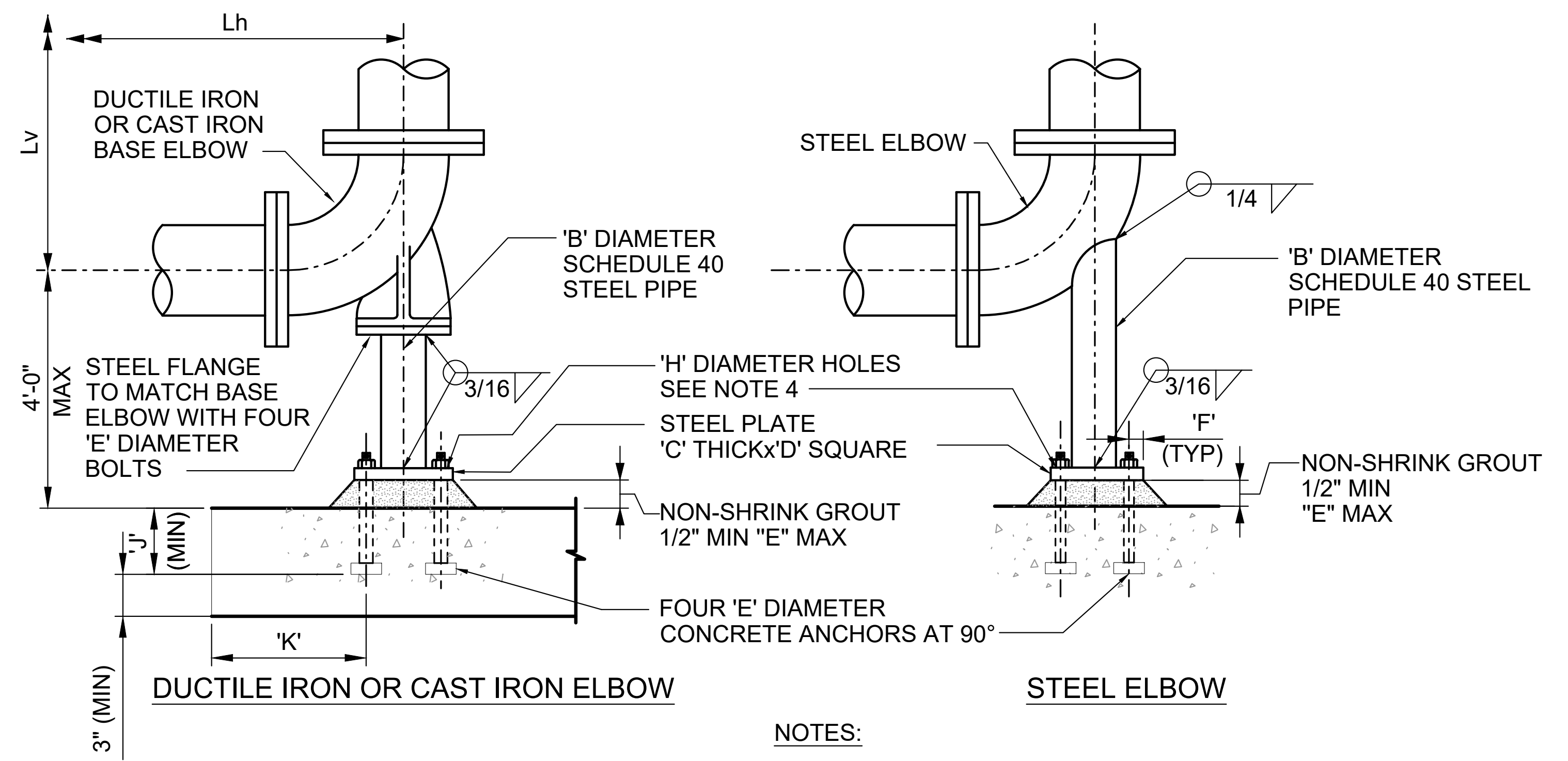
NOTES:

1. HOT DIP GALVANIZE PARTS AFTER FABRICATION, UNO. PROVIDE 316SS PARTS AND BOLTS IN SUBMERGED OR CORROSIVE CONDITIONS.
2. PROVIDE CAST-IN PLACE HEAVY HEX HEAD ASTM F1554 GR 36 ANCHORS, UNO.
3. WHEN SUPPORTING PIPE AND FLANGE ALTERNATIVELY ON THE SAME LINE, CONCRETE PIERS FOR PIPE SUPPORTS SHALL ALL HAVE THE SAME DIMENSION 'L' FOR FLANGE SUPPORT.
4. REFER TO TABLE FOR MAXIMUM ALLOWABLE UNFACTORED LOAD ON EACH SUPPORT.
5. FOR 3/4" ANCHORS AND LARGER, PROVIDE SQUARE WASHERS PER AISC MANUAL OF STEEL CONSTRUCTION TABLE 14-2 WITH STD HOLES WELDED TO PLATE WITH 3/16" FILLETS. USE 1 3/4" SQ x3/16" THICK WASHERS FOR 5/8" ANCHORS.
6. IF ADHESIVE ANCHORS ARE USED (SIMPSON SET XP, OR EQUAL), MULTIPLY MAX LOADS BY 75%. OVERSIZED HOLES AND WASHERS ARE NOT REQUIRED.

DIMENSIONS IN INCHES																			Sds≤0.5
NOMINAL PIPE DIAMETER									STRAP		SUPPORTING								LOAD MAX (LBS)
											PIPE				FLANGE				
	A	B	C	D	E	F	G	H	BOLT SIZE	FLAT BAR	J	K	L	M	J	K	L	M	
6	4	12	3/8	5/8	6	3 3/8	10	1 1/16	1/2	1/4	4	7	12	10	6	11	16	13	450
8	4	12	3/8	5/8	6	3 3/8	10	1 1/16	1/2	1/4	5	8	13	11	7 1/2	13	18	14	800
10	4	12	3/8	5/8	6	3 3/8	10	1 1/16	1/2	1/4	6	9	15	12	9	15	20	15	1200
12	4	12	3/8	5/8	6	3 3/8	10	1 1/16	1/2	1/4	8	11	17	13	11	17	22	16	1600
14	4	12	3/8	5/8	6	3 3/8	10	1 1/16	1/2	1/4	9	12	18	14	12	18	24	17	2300
16	4	12	3/8	5/8	6	3 3/8	10	1 1/16	1/2	1/4	10	13	19	15	13	20	25	18	3000
18	4	12	3/8	5/8	6	3 3/8	10	1 1/16	1/2	1/4	11	14	22	16	14	21	28	19	3700
20	5	12	3/8	5/8	6	3 3/8	10	1 1/16	5/8	3/8	11	15	23	17	15	23	30	21	5050
22	5	12	3/8	5/8	6	3 3/8	10	1 1/16	5/8	3/8	11	18	24	18	15	25	31	22	6400
24	5	14	3/8	5/8	6	3 3/8	10	1 1/16	5/8	3/8	11	19	24	19	15	26	32	23	7750
26	5	14	3/8	3/4	7	3 3/4	10	1 5/16	5/8	3/8	13	21	27	20	17	28	35	24	9200
30	5	14	3/8	3/4	7	3 3/4	10	1 5/16	5/8	3/8	15	23	29	22	19	31	37	26	10650
34	5	16	3/8	3/4	7	3 3/4	11	1 5/16	5/8	3/8	16	26	32	24	20	35	41	29	13050
36	5	18	3/8	3/4	7	3 3/4	11	1 5/16	5/8	3/8	17	27	34	25	21	36	44	30	15500
42	6	22	3/8	1	10	5	14	1 13/16	3/4	3/8	18	31	39	28	23	41	49	33	21850
48	6	26	3/8	1	12	8	14	1 13/16	3/4	3/8	19	36	46	31	25	46	56	37	28200
54	6	32	3/8	1 1/4	15	10	17	2 1/16	3/4	3/8	24	40	54	34	30	50	64	40	36550
60	6	36	1/2	1 1/4	16	11	17	2 1/16	3/4	3/8	28	45	60	37	35	56	70	44	44900
66	6	40	1/2	1 1/4	17	12	17	2 1/16	3/4	3/8	31	49	64	40	38	61	76	47	50600
72	6	42	1/2	1 1/4	17	12	17	2 1/16	3/4	3/8	33	53	68	43	43	65	80	50	56350

SEISMIC AND WIND COMPLIANT DESIGN CRITERIA

1. THE SUPPORTS ARE ADEQUATE FOR SEISMIC RESPONSE COEFFICIENT (SDS) GIVEN IN THE TABLE. SEISMIC FORCE ASSUMPTIONS (ASCE 7-10, EQN 13.3-1): ap=2.5, Rp=6, Ωo=2.5, Ip=1.0, z/h=1.0 FOR 6" TO 18" PIPES, z/h=0.4 FOR PIPES LARGER THAN 18".
2. THE SUPPORTS, DESIGNED FOR SEISMIC LOADS, ARE ALSO ADEQUATE FOR A DESIGN WIND SPEED (Vult) OF UP TO 160 MPH WITH A MAXIMUM HEIGHT ABOVE GRADE OF 40'. WIND FORCE ASSUMPTIONS: EXPOSURE CATEGORY C, Kzt=1.0, Kz=1.04, Kd=0.95, G=0.85, Cf=1.2 (DESIGNED PER ASCE 7-10 SECTION 29.5 - OTHER STRUCTURES).


Lh
Lv
DUCTILE IRON OR CAST IRON BASE ELBOW
'B' DIAMETER SCHEDULE 40 STEEL PIPE
4'-0" MAX
STEEL FLANGE TO MATCH BASE ELBOW WITH FOUR 'E' DIAMETER BOLTS
3/16
'H' DIAMETER HOLES SEE NOTE 4
STEEL PLATE 'C' THICKx'D' SQUARE
NON-SHRINK GROUT 1/2" MIN "E" MAX
'J' (MIN)
FOUR 'E' DIAMETER CONCRETE ANCHORS AT 90°
'K'
3" (MIN)
DUCTILE IRON OR CAST IRON ELBOW
STEEL ELBOW
1/4
'B' DIAMETER SCHEDULE 40 STEEL PIPE
3/16
'F' (TYP)
NON-SHRINK GROUT 1/2" MIN "E" MAX
STEEL ELBOW

D-140 ELBOW SUPPORT

(FOR PIPE 48" DIAMETER AND SMALLER)

REV 010119

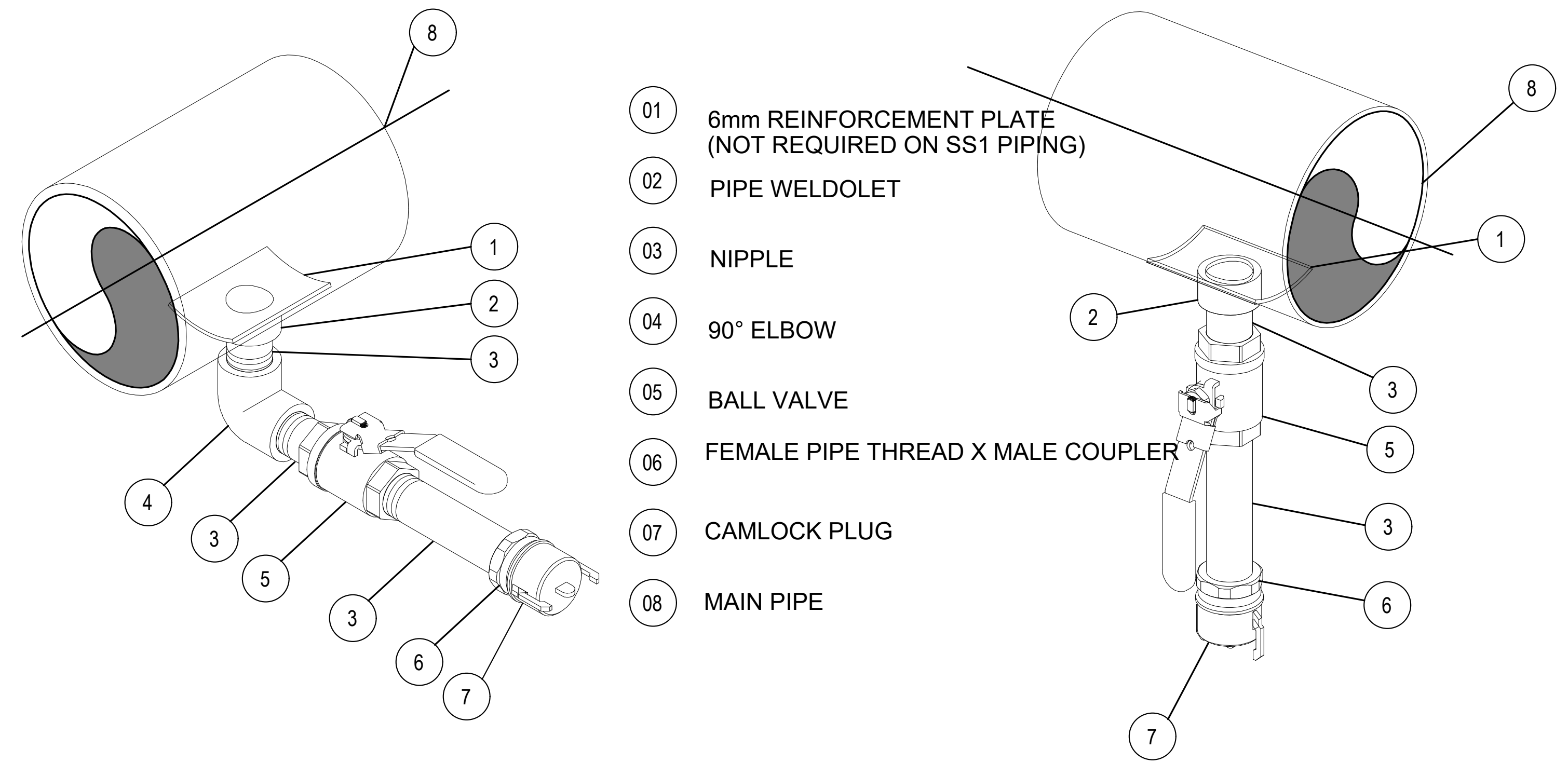
DIMENSIONS IN INCHES (UNO)									S_{ds}≤0.5	
NOMINAL PIPE DIAMETER	'B'	`C'	`D'	'E'	'F'	'H'	'J'	'K'	'L'	'L' ADH
4	2	3/8	6	5/8	1 3/8	1 1/16	4 1/2	12	33'	17'
6	2 1/2	3/8	7	5/8	1 3/8	1 1/16	8	12	38'	19'
8	4	1/2	10	5/8	1 3/8	1 1/16	8	12	43'	22'
10	4	1/2	10	5/8	1 3/8	1 1/16	8	12	43'	22'
12	6	5/8	11	7/8	1 7/8	1 9/16	9	12	48'	18'
14	6	5/8	11	7/8	1 7/8	1 9/16	9	12	48'	18'
16	6	5/8	17	1	2 1/4	1 13/16	9	13	52'	20'
18	8	5/8	17	1	2 1/4	1 13/16	9	13	52'	20'
20	8	3/4	21	1	2 1/4	1 13/16	9	13	57'	22'
24	8	3/4	21	1	2 1/4	1 13/16	9	13	57'	22'
30	10	7/8	24	1 1/4	2 5/8	2 1/16	9	16	57'	22'
36	12	7/8	32	1 1/4	2 5/8	2 1/16	9	16	57'	22'
42	16	1	32	1 1/2	3	2 5/16	11	16	57'	NA
48	18	1 1/8	38	1 3/4	3 1/2	2 3/4	12	22	57'	NA

NOTES:

1. PROVIDE CAST-IN-PLACE HEAVY HEX HEAD ASTM F1554 GR 36 ANCHORS, UNO.
2. HOT DIP GALVANIZE PARTS AFTER FABRICATION, UNO. PROVIDE 316SS PARTS AND BOLTS IN SUBMERGED OR CORROSIVE CONDITIONS.
3. 'L' IS ALLOWABLE LONGITUDINAL TRIBUTARY LENGTH, DEFINED AS 1/2 THE VERTICAL DISTANCE TO THE NEXT LATERAL PIPE SUPPORT (Lv) PLUS 1/2 THE HORIZONTAL DISTANCE TO THE NEXT LONGITUDINAL PIPE SUPPORT (Lh). REFER TO TABLE FOR MAXIMUM ALLOWABLE 'L' FOR EACH SUPPORT.
4. FOR 3/4" ANCHORS AND LARGER, PROVIDE SQUARE WASHERS PER AISC MANUAL OF STEEL CONSTRUCTION TABLE 14-2 WITH STD HOLES WELDED TO PLATE WITH 3/16" FILLETS. USE 1 3/4" SQx3/16" THICK WASHERS FOR 5/8" ANCHORS.
5. IF ADHESIVE ANCHORS ARE USED (SIMPSON SET XP, OR EQUAL), USE REDUCED ALLOWABLE LONGITUDINAL TRIBUTARY LENGTH, 'L' ADH, GIVEN IN TABLE. OVERSIZED HOLES AND WASHERS ARE NOT REQUIRED. DO NOT USE ADHESIVE ANCHORS FOR PIPES LARGER THAN 36" DIAMETER.

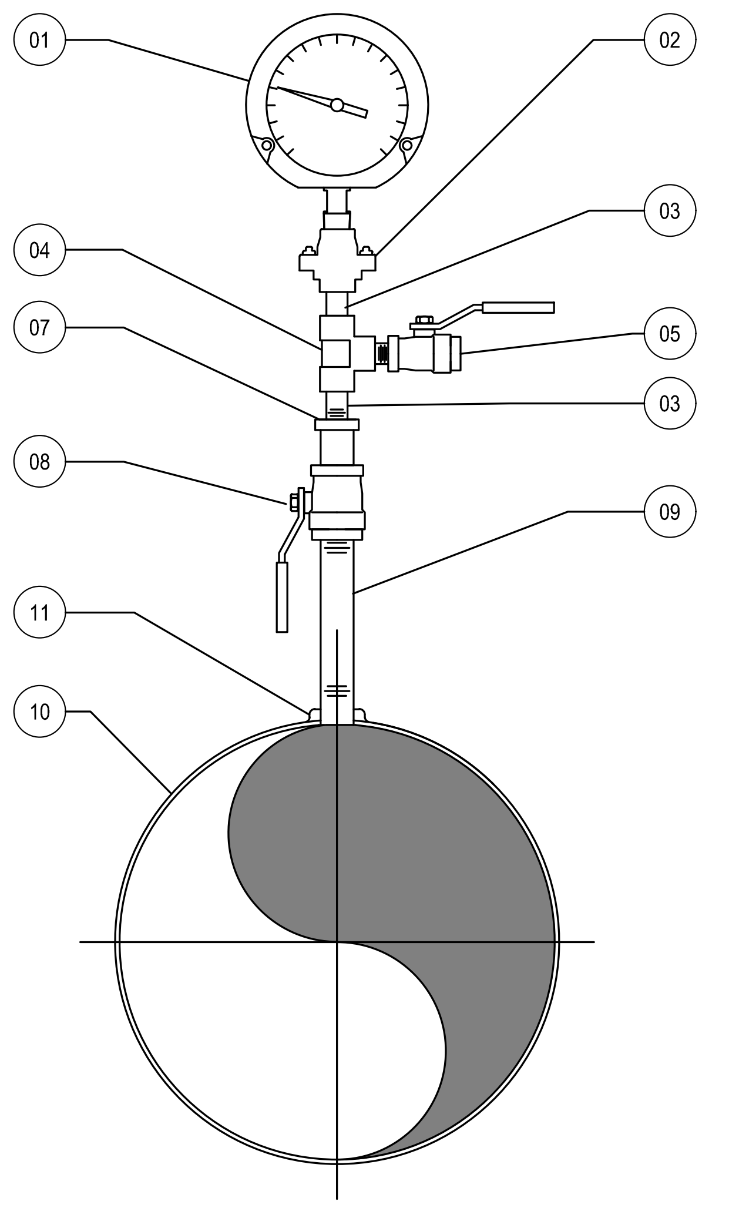
SEISMIC AND WIND COMPLIANT - DESIGN CRITERIA

1. THE SUPPORTS ARE ADEQUATE FOR SEISMIC RESPONSE COEFFICIENT (SDS) GIVEN IN THE TABLE. SEISMIC FORCE ASSUMPTIONS (ASCE 7-10, EQN 13.3-1): ap=2.5, Rp=6, Ωo=2.5, Ip=1.0, z/h=1.0 FOR 4" TO 18" PIPES, z/h=0.4 FOR PIPES LARGER THAN 18".
2. THE SUPPORTS, DESIGNED FOR SEISMIC LOADS, ARE ALSO ADEQUATE FOR A DESIGN WIND SPEED (Vult) OF UP TO 200 MPH WITH A MAXIMUM HEIGHT ABOVE GRADE OF 40', EXCEPT FOR 4" AND 6" PIPE DIAMETERS, WHICH ARE ADEQUATE FOR Vult OF UP TO 175 MPH. WIND FORCE ASSUMPTIONS: EXPOSURE CATEGORY C, Kzt=1.0, Kz=1.04, Kd=0.95, G=0.85, Cf=1.2 (DESIGNED PER ASCE 7-10, SECTION 29.5).



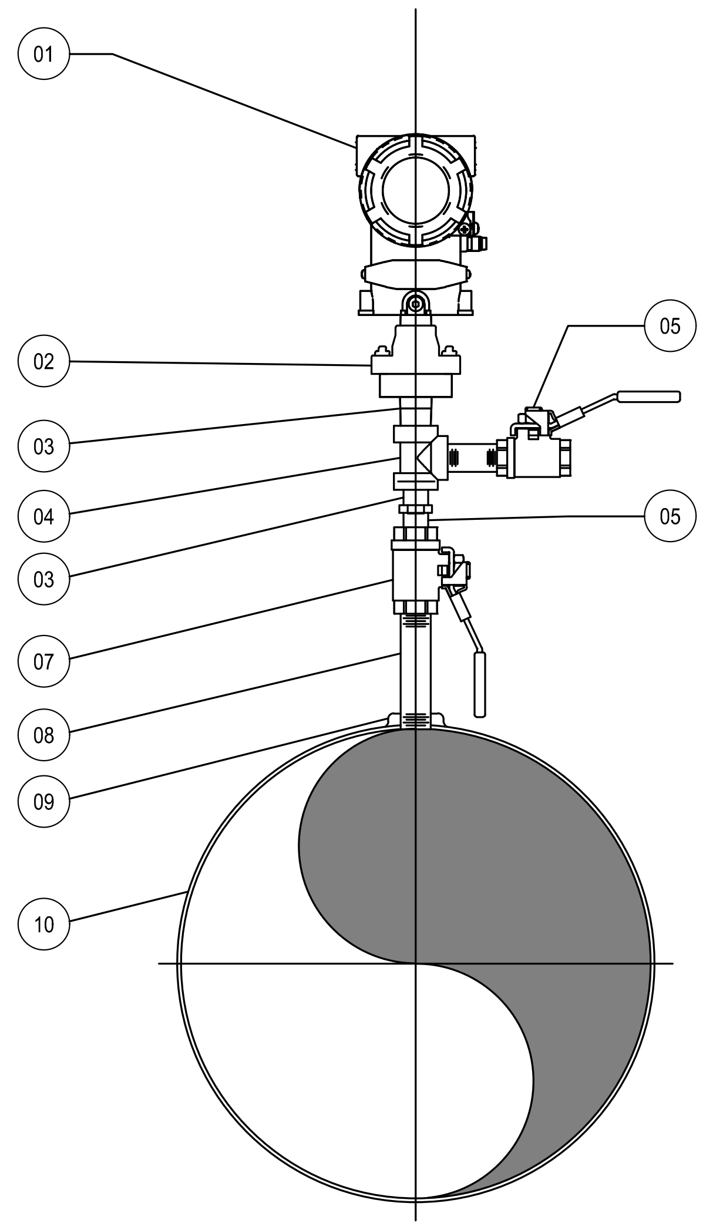
01	6mm REINFORCEMENT PLATE (NOT REQUIRED ON SS1 PIPING)
02	PIPE WELDOLET
03	NIPPLE
04	90° ELBOW
05	BALL VALVE
06	FEMALE PIPE THREAD X MALE COUPLER
07	CAMLOCK PLUG
08	MAIN PIPE

D-927 PROCESS DRAIN ARRANGEMENT



01	PRESSURE GAUGE
02	6mm DIAPHRAGM 6mm (REQUIRED WITH RAW WATER)
03	6mm SHORT NIPPLE
04	Ø6mm TEE
05	6Ømm MALE x 6mm FEMALE BALL VALVE
07	12xØ6mm HEXAGONAL
08	12Ø STAINLESS STEEL BALL VALVE
09	12mm PIPE
10	PIPE (VARIABLE DIAMETER)
11	**12Ø WELDOLET FPT**

D-931 PRESSURE GAGE INSALLATION



01	PRESSURE TRANSMITTER
02	DIAPHRAGM 6mm (REQUIRED WITH RAW WATER) REFER TO TRANSMITTER FOR DIAPHRAGM MOUNTING TYPE
03	6mm SHORT NIPPLE
04	6Ømm TEE
05	6Ømm BALL VALVE
06	12x6mm BUSHING
07	12Ø STAINLESS STEEL BALL VALVE
08	12Ø STAINLESS LONG NIPPLE
09	12Ø WELDOLET FPT
10	PIPE (VARIABLE DIAMETER)

D-932 PRESSURE TRANSMITTER INSTALLATION

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Client/Project
CITY OF CAMBRIDGE
SHERMAN CSO TANK
CAMBRIDGE, MASSACHUSETTS

Project No.: 195151145
File Name: 51145M-12.DWG
Scale: NO SCALE

PS	KVV	EO	2026.08.12
Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Title
STANDARD DETAILS - III

Revision: Sheet: XX of XX

Drawing No.
M-12

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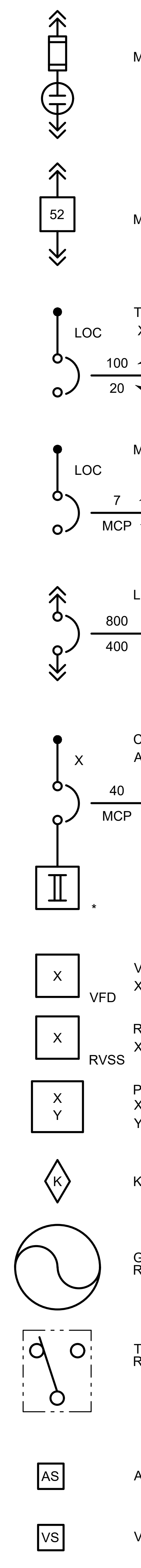
ORIGINAL SHEET - ANSI D

SINGLE LINE DIAGRAM SYMBOLOGY



MEDIUM VOLTAGE VACUUM DRAWOUT STARTER

MEDIUM VOLTAGE DRAWOUT BREAKER

THERMAL MAGNETIC CIRCUIT BREAKER
X = LOCATION
FRAME (AMPS)
TRIP (AMPS)

MCP CIRCUIT BREAKER
X = LOCATION
CONTINUOUS AMPS
TRIP SETTING BASED ON
MOTOR HORSEPOWER

LOW VOLTAGE DRAWOUT CIRCUIT BREAKER
(L-S-I-G)

L	LONG TIME
S	SHORT TIME
I	INSTANTANEOUS
G	GROUND FAULT

COMBINATION NEMA RATED STARTER WITH MCP DISCONNECT AND CONTROL POWER TRANSFORMER
ROMAN NUMERAL = NEMA SIZE
X = LOCATION
* = STARTER TYPE

(BLANK)	FULL VOLTAGE NON-REVERSING
FVR	FULL VOLTAGE REVERSING
2S2W	TWO SPEED TWO WINDING
2S1W	TWO SPEED ONE WINDING

VARIABLE FREQUENCY DRIVE
X = AMPERE RATING

REDUCED VOLTAGE SOLID STATE STARTER
X = AMPERE RATING

PACKAGED EQUIPMENT
X = EQUIPMENT SIZE
Y = TYPE (KW, KVA, OR HP AS INDICATED)

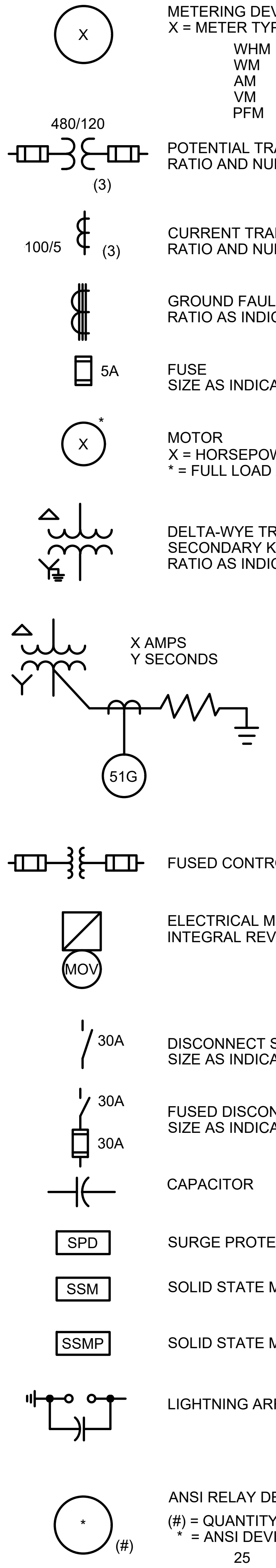
KEY INTERLOCK

GENERATOR
RATINGS AS INDICATED

TRANSFER SWITCH (MANUAL OR AUTOMATIC)
RATINGS AS INDICATED

AMMETER SWITCH

VOLTMETER SWITCH



METERING DEVICE
X = METER TYPE

WHM	WATT HOUR METER
WM	WATT METER
AM	AMMETER
VM	VOLTMETER
PFM	POWER FACTOR METER

POTENTIAL TRANSFORMER
RATIO AND NUMBER OF PT'S AS INDICATED

CURRENT TRANSFORMER
RATIO AND NUMBER OF CT'S AS INDICATED

GROUND FAULT CURRENT TRANSFORMER
RATIO AS INDICATED

FUSE
SIZE AS INDICATED

MOTOR
X = HORSEPOWER
* = FULL LOAD AMPS

DELTA-WYE TRANSFORMER WITH
SECONDARY KVA SIZE AND VOLTAGE
RATIO AS INDICATED

X AMPS
Y SECONDS

DELTA-WYE TRANSFORMER
WITH RESISTANCE GROUNDED
SECONDARY AND GROUND
FAULT RELAYING
X - GROUNDING RESISTOR AMPS
Y - GROUNDING RESISTOR SECONDS

FUSED CONTROL POWER TRANSFORMER

ELECTRICAL MOTOR OPERATED VALVE, WITH
INTEGRAL REVERSING STARTER

DISCONNECT SWITCH
SIZE AS INDICATED

FUSED DISCONNECT SWITCH
SIZE AS INDICATED

CAPACITOR

SURGE PROTECTIVE DEVICE

SOLID STATE METERING DEVICE

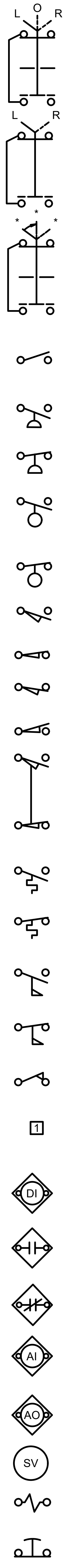
SOLID STATE MOTOR PROTECTIVE DEVICE

LIGHTNING ARRESTOR AND SURGE CAPACITOR

ANSI RELAY DEVICE
(#) = QUANTITY
* = ANSI DEVICE

25	SYNCHRONISM CHECK RELAY
27	UNDERVOLTAGE
27/47	UNDERVOLTAGE, PHASE SEQUENCE, UNBALANCED VOLTAGE
32	DIRECTIONAL POWER RELAY
41	FIELD CONTACTOR
43	SELECTOR SWITCH
49	HIGH OIL TEMPERATURE
50/51	INSTANTANEOUS AND TIME OVERCURRENT
50/51N	INSTANTANEOUS AND TIME RESIDUALLY CONNECTED GROUND OVERCURRENT
51G	GROUND FAULT
60	VOLTAGE BALANCE
62	TIME DELAY
63	SUDDEN PRESSURE
67	AC DIRECTIONAL CURRENT RELAY
71L	LOW OIL LEVEL
81	FREQUENCY RELAY
83	CONTROL POWER TRANSFORMER
86	LOCKOUT
87TL	TRANSFORMER DIFFERENTIAL
87M	MOTOR DIFFERENTIAL

SCHEMATIC DIAGRAM SYMBOLOGY



THREE - POSITION SELECTOR SWITCH

TWO - POSITION SELECTOR SWITCH

THREE - POSITION SPRING RETURN-TO-CENTER
MOMENTARY CONTACT SWITCH

SINGLE POLE TOGGLE SWITCH

VACUUM OR PRESSURE SWITCH
CLOSE ON RISING PRESSURE

VACUUM OR PRESSURE SWITCH
OPEN ON RISING PRESSURE

FLOAT LEVEL SWITCH
CLOSE ON RISING LEVEL

FLOAT LEVEL SWITCH
OPEN ON RISING LEVEL

NORMALLY OPEN

NORMALLY CLOSED

NORMALLY OPEN HELD CLOSED

NORMALLY CLOSED HELD OPEN

MAINTAINED POSITION

TEMPERATURE SWITCH
CLOSE ON RISING TEMPERATURE

TEMPERATURE SWITCH
OPEN ON RISING TEMPERATURE

FLOW SWITCH
CLOSE ON INCREASING FLOW

FLOW SWITCH
OPEN ON INCREASING FLOW

TORQUE SWITCH
OPEN ON INCREASING TORQUE

LOCATION SYMBOL
LEGEND SHOWN ON SCHEMATIC DRAWINGS
ALL DEVICES ARE LOCATED IN THE MCC
UNLESS INDICATED OTHERWISE

DIGITAL INPUT TO PLC/RTU/DCS

DIGITAL OUTPUT FROM PLC/RTU/DCS
NORMALLY OPEN

DIGITAL OUTPUT FROM PLC/RTU/DCS
NORMALLY CLOSED

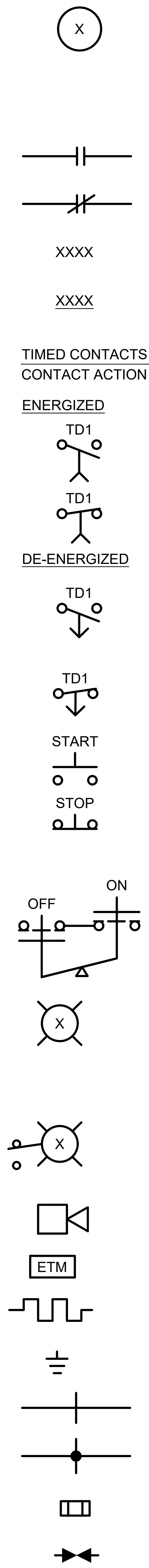
ANALOG INPUT TO PLC/RTU/DCS
4-20 mA (UNLESS INDICATED OTHERWISE)

ANALOG OUTPUT FROM PLC/RTU/DCS
4-20 mA (UNLESS INDICATED OTHERWISE)

SOLENOID VALVE

SOLENOID VALVE

E-STOP PUSHBUTTON



CONTROL RELAY OR COIL
X = DEVICE

CR	CONTROL RELAY
TD	TIME DELAY RELAY (TIMING RANGE AS INDICATED)
M	MOTOR STARTER
PC	PHOTOCELL

NORMALLY OPEN CONTACT

NORMALLY CLOSED CONTACT

NORMALLY OPEN CONTACT LINE REFERENCE

NORMALLY CLOSED CONTACT LINE REFERENCE

TIMED CONTACTS
CONTACT ACTION IS DELAYED AFTER COIL IS:

ENERGIZED

NORMALLY OPEN WITH TIME DELAY CLOSING

NORMALLY CLOSED WITH TIME DELAY OPENING

DE-ENERGIZED

NORMALLY OPEN WITH INSTANT CLOSING AND
TIME DELAY OPENING

NORMALLY CLOSED WITH INSTANT OPENING AND
TIME DELAY CLOSING

NORMALLY OPEN PUSHBUTTON

NORMALLY CLOSED PUSHBUTTON

NO/NC MAINTAINED PUSHBUTTON

PILOT LIGHT
X = LENS COLOR

R	RED
G	GREEN
A	AMBER
W	WHITE

PILOT LIGHT (PUSH-TO-TEST)
X = LENS COLOR (SEE ABOVE)

HORN

ELAPSED TIME METER

HEATER

GROUND CONNECTION

CROSSING OF CONDUCTORS - NOT CONNECTED

CROSSING OF CONDUCTORS - CONNECTED

FUSE

VOLTAGE SURGE SUPPRESSOR

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Client/Project
CITY OF CAMBRIDGE
SHERMAN CSO TANK
CAMBRIDGE, MASSACHUSETTS

Project No.: 195151145
File Name: 51145E-1
Scale: NO SCALE

AVK	KMB	PVD	YYYY.MM.DD
Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Title
SYMBOLS - SHEET I

Revision: Sheet: XX of XX
Drawing No.
E-1

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ORIGINAL SHEET - ANSI D

PLAN SYMBOLOGY

RECEPTACLES

X-# *	120V DUPLEX RECEPTACLE, NEMA CONFIGURATION 5-20R (WALL MOUNT) X = PANELBOARD DESIGNATION # = CIRCUIT DESIGNATION * = TYPE WP WEATHERPROOF XP EXPLOSION PROOF GFCI GROUND FAULT CIRCUIT INTERRUPTER
⊖	120V DUPLEX RECEPTACLE, NEMA CONFIGURATION 5-20R (FLOOR MOUNT)
△ X	SINGLE SPECIAL PURPOSE RECEPTACLE, 240V 1 PHASE X = AMPERAGE
▲ X	WELDING RECEPTACLE X = AMPERAGE
⊘ X	SPECIAL PURPOSE RECEPTACLE, 480 VAC X = AMPERAGE
▶	TELEPHONE OUTLET - FLOOR TYPE
◀	TELEPHONE OUTLET - WALL TYPE
▷	COMPUTER/DATA OUTLET - FLOOR TYPE
◁	COMPUTER/DATA OUTLET - WALL TYPE

CONDUIT AND RACEWAY SYMBOLOGY

—	EXPOSED OR CONCEALED CONDUIT
—	CONDUIT RUN (UNDERGROUND OR IN CONCRETE)
—○—	CONDUIT RUN (CHANGE IN ELEVATION)
—○	CONDUIT TURNING UP
—○	CONDUIT TURNING DOWN
—	CONDUITS GROUPED TOGETHER BUT SHOWN AS A SINGLE LINE FOR CLARITY
● ○	CONDUIT FROM FLOOR ABOVE TO FLOOR BELOW
—]	CONDUIT CAPPED, OR SEALED
→	HOMERUN TO EQUIPMENT INDICATED
▣ X	RACEWAY BOX X = BOX TYPE MH MANHOLE HH HANDHOLE PB PULLBOX
J	JUNCTION BOX OR FITTING

MISCELLANEOUS ELECTRICAL SYMBOLOGY

▭	POWER PANEL
☐	DISCONNECT SWITCH
M	MOTOR
T	THERMOSTAT
☐◁	HORN
☒	COMBINATION STARTER
$M	MANUAL MOTOR STARTER

FIRE PROTECTION SYMBOLOGY

F ◁	FIRE ALARM HORN WITH STROBE
A F ◁	FIRE ALARM LOUDSPEAKER WITH AMPLIFIER
FA	FIRE ALARM PULL STATION
F ●	FIRE ALARM STROBE
F ○	FIRE ALARM BELL WITH STROBE
FS	FIRE SUPPRESSION SWITCH
ER	END-OF-LINE TERMINATOR
*	DETECTOR X = TYPE SD SMOKE DETECTOR HD HEAT DETECTOR CD COMBINATION DETECTOR

SECURITY & COMM SYSTEMS SYMBOLOGY

I ◁ *	INTERCOM SPEAKER * = TYPE (REFER TO SPECIFICATIONS)
I ◁ * ●	INTERCOM SPEAKER WITH STROBE LIGHT * = TYPE (REFER TO SPECIFICATIONS)
I	INTERCOM WALL JACK
HS I	INTERCOM HANDSET - WALL MOUNTED
VC *	VIDEO CAMERA * = TYPE F FIXED PTZ PAN-TILT-ZOOM
*	SECURITY ACCESS DEVICE * = TYPE CR CARD READER KS KEY SWITCH PS DIGITAL KEYPAD

LIGHTING SYMBOLOGY

A X-#a	PENDANT OR CEILING MOUNT LUMINAIRE A = LUMINAIRE TYPE X = LIGHTING PANEL DESIGNATION # = CIRCUIT NUMBER a = SWITCH DESIGNATION
◐	PENDANT OR CEILING MOUNT LUMINAIRE - UNSWITCHED (NIGHT LIGHT)
⊢○	WALL MOUNTED LUMINAIRE
○—○	POLE, BRACKET, ARM, AND STREETLIGHT
▭	LINEAR LUMINAIRE
◢	LINEAR LUMINAIRE - UNSWITCHED
	EMERGENCY LUMINAIRE BATTERY OPERATED
⊗ →	EXIT LIGHT, ARROW INDICATE DIRECTION OF EXIT, SHADING INDICATES FACE
A *	LUMINAIRE CALLOUT A = LUMINAIRE TYPE * = APPROXIMATE MOUNTING HEIGHT AFF CLG = CEILING MOUNT (SEE LUMINAIRE SCHEDULE FOR MORE DETAILS)
$ X-#a *	LIGHT SWITCH X = LIGHTING PANEL DESIGNATION # = CIRCUIT DESIGNATION a = SWITCH DESIGNATION * = SWITCH TYPE 3 3-WAY 4 4-WAY D DIMMER M MANUAL MOTOR STARTER
■	LIGHTING PANEL

GROUNDING SYMBOLOGY

◉	GROUND ROD AND GROUND WELL
◉	GROUND ROD (3/4" X 10'-0")
—■—	GROUND CONNECTION - BOLTED TYPE
—●—	GROUND CONNECTION - EXOTHERMIC TYPE
— - - —	BARE COPPER GROUND TO GROUND WIRE IN SLAB, OR UNDERGROUND GROUND GRID, SIZE AS NOTED
⏚	EARTH GROUNDING
—×—	10'-0" COIL OF COPPER GROUND CABLE
◆	REBAR GROUNDING

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Issued By Appd YYYY.MM.DD

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CAMBRIDGE, MASSACHUSETTS

Project No.: 195151145
File Name: 51145E-2
Scale: NO SCALE

AVK	KMB	PVD	YYYY.MM.DD
Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Title
SYMBOLS - SHEET II

Revision: Sheet: XX of XX
Drawing No.
E-2

ELECTRICAL ABBREVIATIONS

A	AMPERE, AUTOMATIC
AC	ALTERNATING CURRENT
AF	CIRCUIT BREAKER FRAME SIZE
AM	AMMETER
ANN	ANNUNCIATOR
AS	ADJUSTABLE SPEED
AT	AMPERE TRIP
ATS	AUTOMATIC TRANSFER SWITCH
AUTO	AUTOMATIC
AWG	AMERICAN WIRE GAUGE
BATT	BATTERY
BC	BARE COPPER
BKR	BREAKER
C	CONDUIT, CLOSED
CAP	CAPACITOR
CB	CIRCUIT BREAKER
CKT	CIRCUIT
CLF	CURRENT LIMITING FUSE
COM	COMMON
COMM	COMMUNICATIONS
COMP	COMPARTMENT
CP	CONTROL PANEL
CPT	CONTROL POWER TRANSFORMER
CR	CONTROL RELAY, CARD READER
CT	CURRENT TRANSFORMER
DCS	DISTRIBUTED CONTROL SYSTEM
DISC	DISCONNECT
DISTR	DISTRIBUTION
DPDT	DOUBLE POLE DOUBLE THROW
DPST	DOUBLE POLE SINGLE THROW
E	EMERGENCY
EMT	ELECTRICAL METALLIC TUBING
ENCL	ENCLOSURE
ETM	ELAPSED TIME METER
F	FREQUENCY, FUSE, FIXED
FDR	FEEDER
FLA	FULL LOAD AMPS
FLUOR	FLUORESCENT
FM	FREQUENCY METER
FO	FIBER OPTIC
FVR	FULL VOLTAGE REVERSING
FVNR	FULL VOLTAGE NON-REVERSING
GEN	GENERATOR
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GND	GROUND
H	HAND
HD	HEAT DETECTOR
HH	HAND HOLE
HID	HIGH INTENSITY DISCHARGE
HOA	HAND-OFF-AUTOMATIC
HPS	HIGH PRESSURE SODIUM
HS	HAND SWITCH
HZ	HERTZ
IMC	INTERMEDIATE METALLIC CONDUIT
INCAND	INCANDESCENT
IND	INDICATION
INST	INSTANTANEOUS
I/O	INPUT/OUTPUT
Isc	SHORT CIRCUIT CURRENT, AMPS
ISO	ISOLATION
J, JB	JUNCTION BOX
KA	KILO AMPERES
KAIC	KILO AMP INTERRUPTING CURRENT
KCMIL	KILO CIRCULAR MILS
KVA	KILOVOLT AMPERE
L	LOCAL
LCP	LOCAL CONTROL PANEL
LCS	LOCAL CONTROL STATION
LOC	LOCAL
LOR	LOCAL-OFF-REMOTE
LOS	LOCKOUT STOP PUSHBUTTON
LP	LIGHTING PANEL
LRA	LOCKED ROTOR AMPS
LS	LEVEL SWITCH
LTG	LIGHTING
LTS	LIGHTS

M	MOTOR CONTACTOR COIL
mA	MILLIAMPERE
MCP	MOTOR CIRCUIT PROTECTOR
MLO	MAIN LUGS ONLY
MOV	MOTOR OPERATED VALVE
MS	MANUAL MOTOR STARTER
MTS	MANUAL TRANSFER SWITCH
NEUT	NEUTRAL
NP	NAMEPLATE
O	OPEN, OFF
OL	OVERLOAD
PA	PUBLIC ADDRESS
PB	PUSHBUTTON, PULLBOX
PC	PHOTOCELL
PCM	PROCESS CONTROL MODULE
PF	POWER FACTOR
PFM	POWER FACTOR METER
PH	PHASE
PL	PILOT LIGHT
PNLBD	PANELBOARD
PP	POWER PANELBOARD
POS	POSITION
POT	POTENTIOMETER
PRI	PRIMARY
PT	POTENTIAL TRANSFORMER
PTZ	PAN-TILT-ZOOM
PWR	POWER
R	REMOTE
RECPT	RECEPTACLE
RGS	RIGID GALVANIZED STEEL
RMS	ROOT MEAN SQUARE
RTU	REMOTE TERMINAL UNIT
RVSS	REDUCED VOLTAGE SOLID STATE
SEL SW	SELECTOR SWITCH
SEQ	SEQUENCE
SHLD	SHIELDED
SIG	SIGNAL
SP	SPARE
SP HTR	SPACE HEATER
SPDT	SINGLE POLE DOUBLE THROW
SPST	SINGLE POLE SINGLE THROW
SSM	SOLID STATE METER
SSMP	SOLID STATE MOTOR PROTECTOR
ST, SH	SHUNT TRIP
STR	STARTER
SSTU	SOLID STATE TRIP UNIT
SW	SWITCH
SWBD	SWITCHBOARD
SWGR	SWITCHGEAR
TACH	TACHOMETER
TB	TERMINAL BOX
TERM	TERMINAL
TM	REPEAT CYCLE TIMER
TD	TIME DELAY RELAY
TS	TEMPERATURE SWITCH
UPS	UNINTERRUPTIBLE POWER SUPPLY
V	VOLTAGE, VOLTS
VA	VOLT AMPERE
VAR	VOLT AMPERE REACTIVE
VFD	VARIABLE FREQUENCY DRIVE
VM	VOLTMETER
VP	VAPOR PROOF
W	WATTS, WIRE
WM	WATT METER
WP	WEATHERPROOF
XFMR	TRANSFORMER
XMTR	TRANSMITTER
XP	EXPLOSION PROOF

GENERAL ELECTRICAL NOTES

1. ALL RACEWAYS AND EQUIPMENT SHALL BE INSTALLED AND GROUNDED IN ACCORDANCE WITH THE 2023 EDITION OF THE NATIONAL ELECTRICAL CODE AND APPLICABLE LOCAL CODES.
2. THE CONTRACTOR SHALL VERIFY THE EXACT LOCATION OF TERMINAL BOXES AND CONDUIT ENTRANCES OF ALL EQUIPMENT AGAINST APPROVED SHOP DRAWINGS BEFORE STUBBING UP CONDUITS.
3. REFER TO SPECIFICATION SECTION 260533 FOR REQUIREMENTS RELATED TO FLEXIBLE CONDUIT INSTALLATION CONDUIT RUNS ARE SHOWN DIAGRAMMATICALLY ONLY AND SHALL BE INSTALLED IN A MANNER TO PREVENT CONFLICTS WITH EQUIPMENT OR STRUCTURAL CONDITIONS. EXPOSED CONDUIT SHALL BE INSTALLED PARALLEL OR PERPENDICULAR TO BEAMS AND WALLS. REFER TO SPECIFICATION SECTION 260533.
4. CONDUIT STUB-UPS SHALL NOT BE MORE THAN 6 INCHES FROM THE CENTERLINE OF TERMINAL BOXES.
5. IN THE EVENT OF INTERFERENCE BETWEEN ELECTRICAL EQUIPMENT SHOWN ON THE DRAWINGS AND OTHER EQUIPMENT, THE CONTRACTOR SHALL NOTIFY THE ENGINEER IN WRITING AND THE ENGINEER SHALL APPROVE PROPOSED CHANGES BEFORE THEY ARE MADE.
6. ALL SURFACE MOUNTED PANELS AND PANELBOARDS ON THE INTERIOR OF EXTERIOR WALLS ABOVE GRADE OR IN OTHER LOCATIONS CONSIDERED DAMP OR WET SHALL BE MOUNTED SO AS TO MAINTAIN A 1/4 INCH (MINIMUM) AIR SPACE BETWEEN THE ENCLOSURE AND THE WALL.
7. LOCATION OF PULLBOXES ARE APPROXIMATE. THE CONTRACTOR SHALL COORDINATE EXACT LOCATION WITH MECHANICAL PIPING AND SHALL BE 6 INCHES (MINIMUM) AWAY FROM MECHANICAL PIPING FLOW LINES.
8. ONLY MAJOR PULLBOXES ARE SHOWN. THE CONTRACTOR SHALL PROVIDE ADDITIONAL PULLBOXES WHERE REQUIRED TO MAKE A WORKABLE INSTALLATION.
9. THE WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE DETAILS WHETHER OR NOT THEY ARE REFERENCED ON THE DRAWINGS.
10. ALL CONDUIT RUNS CROSSING EXPANSION JOINTS SHALL HAVE EXPANSION OR EXPANSION AND DEFLECTION TYPE FITTINGS. FOR LOCATIONS OF EXPANSION JOINTS, REFER TO THE STRUCTURAL DWGS.
11. LUMINAIRES SHALL BE MOUNTED ACCORDING TO THE MOUNTING HEIGHT GIVEN ON THE DRAWINGS, WITH THE DISTANCE BEING MEASURED FROM THE BOTTOM OF THE LUMINAIRE TO THE FINISHED FLOOR. THE APPROPRIATE MOUNTING BRACKETS AND HARDWARE SHALL BE SUPPLIED.
12. ALL PANELBOARDS SHALL BE MOUNTED SO THAT THE DISTANCE FROM THE CENTERLINE OF THE TOP CIRCUIT BREAKER OPERATING HANDLE IN THE UPPERMOST POSITION TO THE FINISHED FLOOR SHALL NOT EXCEED 6'-7".
13. THE WIRING DIAGRAMS, QUANTITY AND SIZE OF WIRES AND CONDUIT REPRESENT A SUGGESTED ARRANGEMENT BASED UPON SELECTED STANDARD COMPONENTS OF ELECTRICAL EQUIPMENT. MODIFICATIONS ACCEPTABLE TO THE ENGINEER MAY BE MADE BY THE CONTRACTOR TO ACCOMMODATE EQUIPMENT ACTUALLY PURCHASED. THE BASIC SEQUENCE AND METHOD OF CONTROL MUST BE MAINTAINED AS INDICATED ON THE DRAWINGS AND/OR SPECIFICATIONS.
14. CONNECTIONS BETWEEN RIGID CONDUIT AND MOTOR TERMINAL BOXES OR SIMILAR EQUIPMENT SUBJECT TO VIBRATION SHALL BE FLEXIBLE LIQUID-TIGHT CONDUIT.
15. CONDUITS SHALL BE TERMINATED SO AS TO PERMIT NEAT CONNECTION TO MOTORS AND OTHER EQUIPMENT.
16. CONDUITS FOR FUTURE EQUIPMENT OR EXTENSIONS SHALL BE TERMINATED AS SHOWN IN DETAIL OR AS SPECIFIED.
17. MCC AND SWITCHGEAR COMPARTMENT DESIGNATIONS SHALL BE AS FOLLOWS:

    BLANK/SPACE: CONTAINS NECESSARY BUS AND HARDWARE FOR FUTURE ADDITION OF BREAKERS OR STARTERS.

    SPARE: CONTAINS A COMPLETE INSTALLED BREAKER OR STARTER AVAILABLE FOR FUTURE USE.
18. ALL MOTOR STARTER CONTROL POWER TRANSFORMERS SHALL BE SIZED TO PROVIDE SUFFICIENT VOLT-AMPERE CAPACITY FOR OPERATING ALL LOCAL AND REMOTE ELECTRICAL DEVICES ASSOCIATED WITH CONTROL OF THE MOTOR IN ADDITION TO THE STARTER COIL.
19. MOTOR CONTROL CENTERS AND ALL FREE STANDING PANELS SHALL BE SET ON CONCRETE HOUSEKEEPING PADS WITH LEVELING CHANNELS EMBEDDED IN THE PAD.
20. ALL RECEPTACLES IN OUTDOOR AND ANTICIPATED WET AREAS SHALL BE GROUND FAULT CIRCUIT INTERRUPTER RECEPTACLES WITH WEATHERPROOF COVERS.
21. ELECTRICAL CONTRACTOR SHALL VISIT THE SITE PRIOR TO BIDDING THE PROJECT TO VERIFY THE SCOPE OF WORK WITH FIELD CONDITIONS. PARTICULAR ATTENTION SHOULD BE GIVEN TO NEW CONDUIT RUNS IN EXISTING BUILDINGS.
22. EQUIPMENT LOCKOUTS SHALL BE IN STRICT ACCORDANCE WITH OWNER'S REQUIREMENTS.
23. FOR LIGHTING AND RECEPTACLE SYSTEMS, ONLY CIRCUIT NUMBERS ARE SHOWN. CONTRACTOR SHALL PROVIDE ALL NECESSARY CONDUITS, WIRES, FITTINGS, JUNCTION BOXES AND ALL NECESSARY COMPONENTS SHOWN OR NOT SHOWN ON THE DRAWINGS, TO MAKE THE ELECTRICAL INSTALLATION COMPLETE AND OPERATIONAL. ALL CONDUIT RUNS SHALL BE CONCEALED UNLESS INDICATED OTHERWISE. CIRCUIT LOADING SHALL BE AS INDICATED IN THE PANEL SCHEDULES. ALL LIGHTING AND RECEPTACLE CIRCUITS SHALL INCLUDE GROUND WIRE.
24. HVAC TEMPERATURE CONTROL WIRING SHALL BE THE RESPONSIBILITY OF THE TEMPERATURE CONTROLS SUBCONTRACTOR UNDER DIVISION 23, AND IS NOT SHOWN ON THE ELECTRICAL DRAWINGS. 120, 208, AND 420 VOLT POWER WIRING SHALL BE PROVIDED AS INDICATED AND AS A PART OF THE ELECTRICAL DIVISION 28 WORK.
25. REFER TO PERMANENT PLANT SPECIFICATIONS FOR EQUIPMENT DESIGN REQUIREMENTS.

ELECTRICAL DEMOLITION NOTES

1. BIDDING CONTRACTORS SHALL VISIT THE SITE TO ASSESS THE SCOPE OF DEMOLITION, REMOVAL AND MODIFICATION WORK.
2. ELECTRICAL CONTRACTOR AND THE OWNER SHALL DE-ENERGIZE ALL WIRING PRIOR TO REMOVAL OF EQUIPMENT, DEVICES, MOTORS INSTRUMENTATION, CONTROL PANELS, ETC. CONTRACTOR SHALL OBTAIN PRIOR APPROVAL FROM THE OWNER.
3. UNLESS OTHERWISE INDICATED ALL TEMPORARY ELECTRICAL EQUIPMENT, RACEWAYS, CABLE TRAYS, CABLES, LIGHTING AND GROUNDING SHALL BE REMOVED UPON DECOMMISSIONING OF TEMPORARY SYSTEMS. COORDINATE RENTAL EQUIPMENT RETURNS WITH RENTAL VENDORS. COORDINATE TURNOVER OF ALL PURCHASED EQUIPMENT WITH OWNER PRIOR TO DEMOLITION.

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Client/Project
CITY OF CAMBRIDGE
SHERMAN CSO TANK
CAMBRIDGE, MASSACHUSETTS

Project No.: 195151145
File Name: 51145E-3
Scale: NO SCALE

AVK	KMB	PVD	YYYY.MM.DD
Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Title
ABBREVIATIONS AND
GENERAL NOTES

Revision: Sheet: XX of XX
Drawing No.
E-3

GENERAL SHEET NOTES

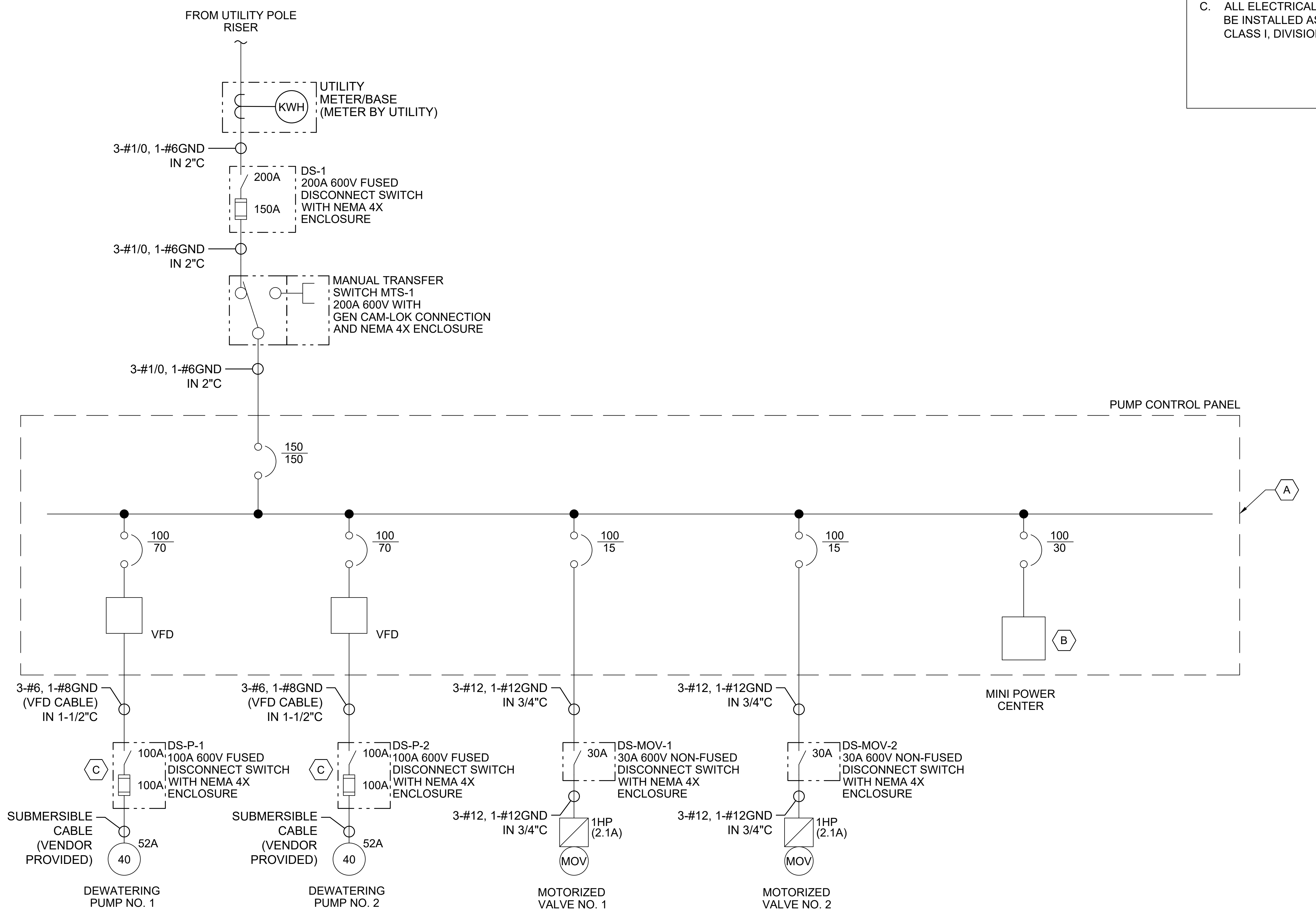
1. REFER TO SYMBOLS AND ABBREVIATIONS IN DRAWINGS E-1, -2, AND -3.

SHEET KEYNOTES

A. PUMP CONTROL PANEL, BREAKERS, AND VARIABLE FREQUENCY DRIVES ARE PROVIDED BY OTHERS. ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR CONDUIT/WIRE AND TERMINATIONS TO EQUIPMENT AS REQUIRED.

B. MINI POWER CENTER PRE-WIRED AND PROVIDED WITH CONTROL PANEL (PROVIDED BY OTHERS).

C. ALL ELECTRICAL INSTALLATIONS ADJACENT TO AND WITHIN CSO TANK SHALL BE INSTALLED AS PER THE REQUIREMENTS OF NEC ARTICLES 500 AND 501 FOR CLASS I, DIVISION 1 SPACES.


FROM UTILITY POLE RISER
KWH
UTILITY METER/BASE (METER BY UTILITY)
3-#1/0, 1-#6GND IN 2"C
200A
150A
DS-1 200A 600V FUSED DISCONNECT SWITCH WITH NEMA 4X ENCLOSURE
3-#1/0, 1-#6GND IN 2"C
MANUAL TRANSFER SWITCH MTS-1 200A 600V WITH GEN CAM-LOK CONNECTION AND NEMA 4X ENCLOSURE
3-#1/0, 1-#6GND IN 2"C
PUMP CONTROL PANEL
150/150
A
100/70
100/70
100/15
100/15
100/30
VFD
VFD
B
MINI POWER CENTER
3-#6, 1-#8GND (VFD CABLE) IN 1-1/2"C
3-#6, 1-#8GND (VFD CABLE) IN 1-1/2"C
3-#12, 1-#12GND IN 3/4"C
3-#12, 1-#12GND IN 3/4"C
C
100A
100A
DS-P-1 100A 600V FUSED DISCONNECT SWITCH WITH NEMA 4X ENCLOSURE
C
100A
100A
DS-P-2 100A 600V FUSED DISCONNECT SWITCH WITH NEMA 4X ENCLOSURE
30A
DS-MOV-1 30A 600V NON-FUSED DISCONNECT SWITCH WITH NEMA 4X ENCLOSURE
30A
DS-MOV-2 30A 600V NON-FUSED DISCONNECT SWITCH WITH NEMA 4X ENCLOSURE
SUBMERSIBLE CABLE (VENDOR PROVIDED)
52A
40
DEWATERING PUMP NO. 1
SUBMERSIBLE CABLE (VENDOR PROVIDED)
52A
40
DEWATERING PUMP NO. 2
3-#12, 1-#12GND IN 3/4"C
1HP (2.1A)
MOV
MOTORIZED VALVE NO. 1
3-#12, 1-#12GND IN 3/4"C
1HP (2.1A)
MOV
MOTORIZED VALVE NO. 2

SINGLE LINE DIAGRAM

SCALE: N.T.S.

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Project No.: 195151145
File Name: 51145E-9
Scale: NO SCALE

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Title
SINGLE-LINE DIAGRAM

Revision: Sheet: XX of XX
Drawing No.
E-9

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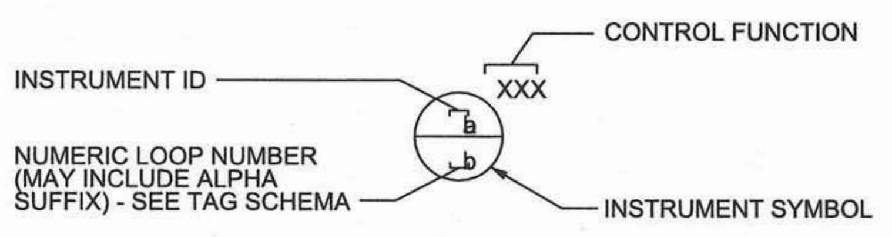
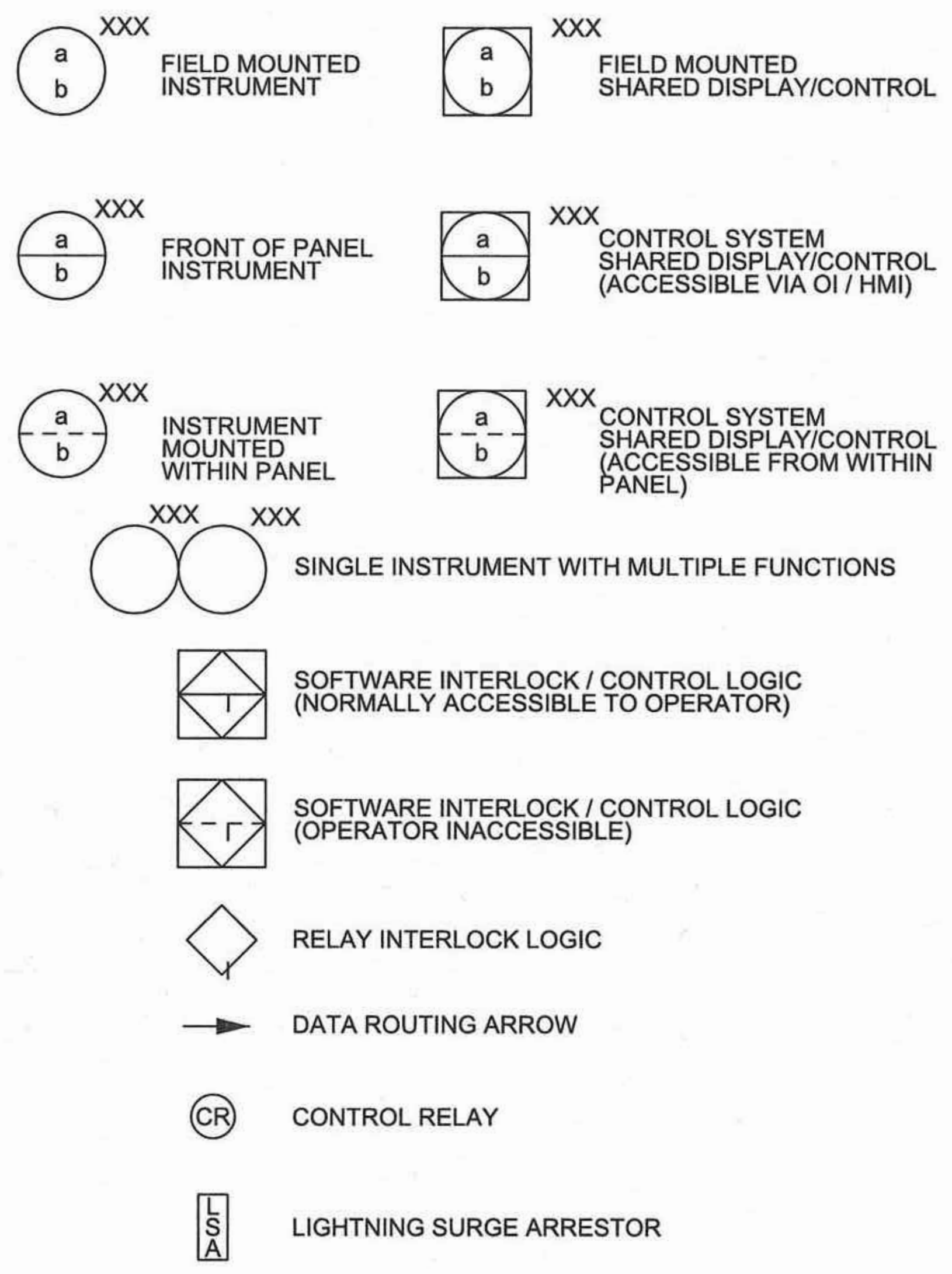
ORIGINAL SHEET - ANSI D

INSTRUMENTATION CALL - OUT


CONTROL FUNCTION
XXX
INSTRUMENT ID
a
b
NUMERIC LOOP NUMBER (MAY INCLUDE ALPHA SUFFIX) - SEE TAG SCHEMA
INSTRUMENT SYMBOL

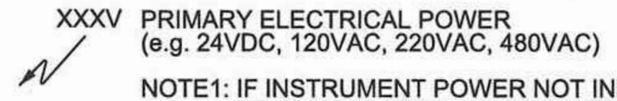
INSTRUMENT SYMBOLS


XXX
a
b
FIELD MOUNTED INSTRUMENT
FIELD MOUNTED SHARED DISPLAY/CONTROL
FRONT OF PANEL INSTRUMENT
CONTROL SYSTEM SHARED DISPLAY/CONTROL (ACCESSIBLE VIA OI / HMI)
INSTRUMENT MOUNTED WITHIN PANEL
CONTROL SYSTEM SHARED DISPLAY/CONTROL (ACCESSIBLE FROM WITHIN PANEL)
XXX XXX
SINGLE INSTRUMENT WITH MULTIPLE FUNCTIONS
SOFTWARE INTERLOCK / CONTROL LOGIC (NORMALLY ACCESSIBLE TO OPERATOR)
SOFTWARE INTERLOCK / CONTROL LOGIC (OPERATOR INACCESSIBLE)
RELAY INTERLOCK LOGIC
DATA ROUTING ARROW
CR
CONTROL RELAY
LSA
LIGHTNING SURGE ARRESTOR

a INSTRUMENT IDENTIFICATION/TAG NUMBER (SEE TAG DESIGNATION FOR MORE INFO)

b INSTRUMENT LOOP NUMBER

XXX CONTROL FUNCTION


XXXV
PRIMARY ELECTRICAL POWER (e.g. 24VDC, 120VAC, 220VAC, 480VAC)

NOTE1: IF INSTRUMENT POWER NOT INDICATED, REFER TO INSTRUMENT SCHEDULE FOR CONFIRMATION.

NOTE2: FOR NON-VENDOR PACKAGES (UNLESS SPECIFICALLY NOTED OTHERWISE), REFER TO INSTALLATION DETAILS FOR AIR DISTRIBUTION MANIFOLD DETAILS.

CONTROL FUNCTION DESIGNATIONS

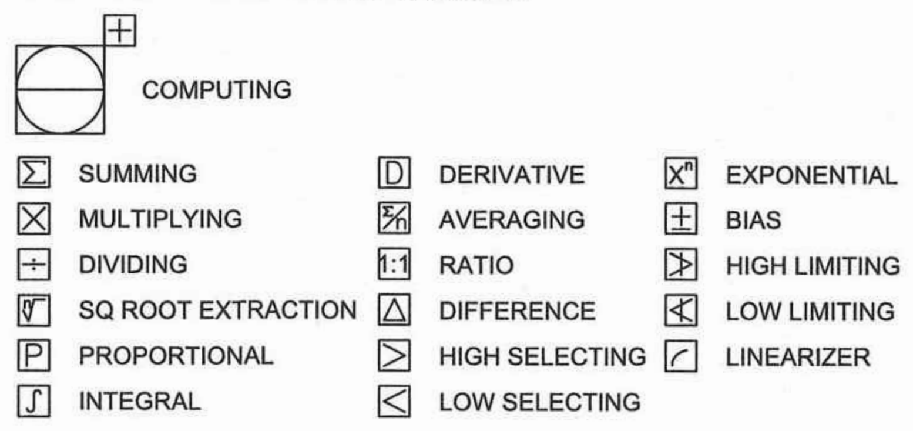
AHC	AUTO/HOLD/CLOSE	OLH	OFF/LOW/HIGH
AM	AUTO/MANUAL	O/O	ON/OFF
AS	AIR SUPPLY	OSC	OPEN/STOP/CLOSE
DEV	DEVIATION	PID	PROPORTIONAL/ INTEGRAL/DERIVATIVE
E-STOP	EMERGENCY STOP (RED PUSH-PULL MUSHROOM-HEAD BUTTON WITH ACCIDENTAL TRIP GUARD	POT	POTENTIOMETER
ETM	ELAPSED TIME METER	RDY	READY
FOR	FORWARD/ OFF/ REVERSE	R/L	RAISE/LOWER
HML	HIGH/MID/LOW	RSL	RAISE/STOP/LOWER
HOA	HAND/OFF/AUTO	RST	RESET
HOR	HAND/OFF/REMOTE	SD	SHUTDOWN
LOR	LOCAL/OFF/REMOTE	SEL	SELECT
L/R	LOCAL/REMOTE	SP	SET POINT
MOA	MANUAL/OFF/AUTO	S/R	START/RESET
OC	OPEN/CLOSE	S/S	START/STOP
OCA	OPEN/CLOSE/AUTO	STR	START
		STP	STOP

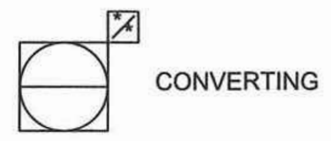
NOTE:

1. REFER TO DRAWING GI-2 FOR ANALYTICAL INSTRUMENT DESIGNATIONS.

INSTRUMENT SYMBOLS - CONT

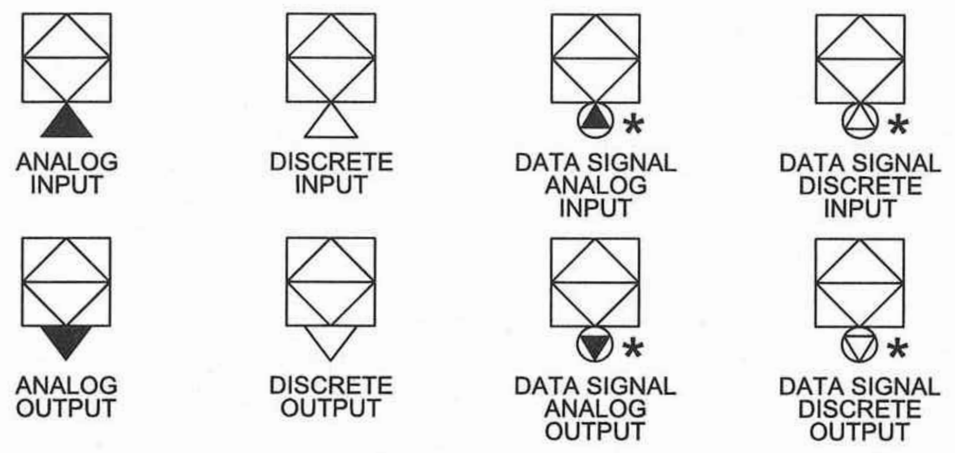
COMPUTING OR CONVERTING FUNCTIONS





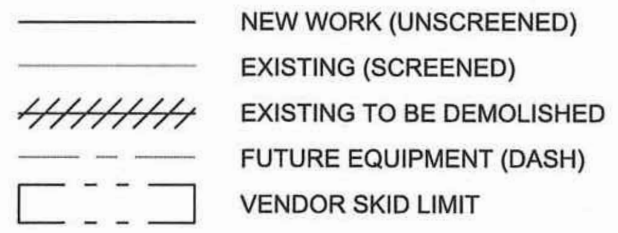
E	VOLTAGE	R	RESISTANCE (ELECT)	A	ANALOG
I	CURRENT	D	DIGITAL	B	BINARY
P	PNEUMATIC			H	HYDRAULIC

PLC / REMOTE I/O POINTS

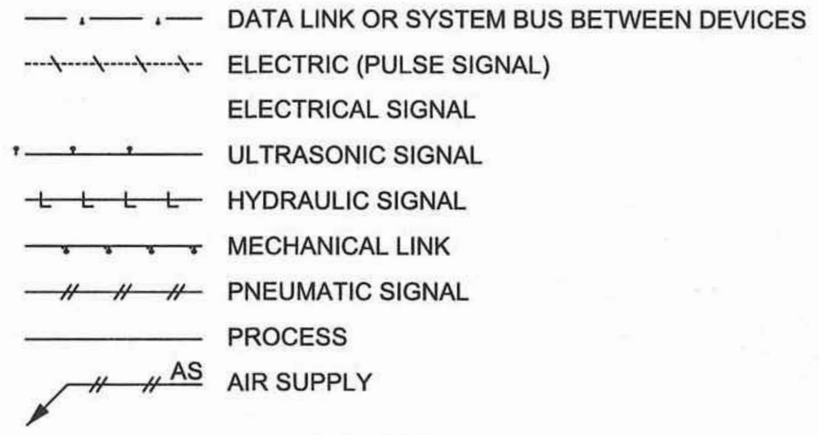


* FIELD NETWORK INTERFACE. SEE SPECIFICATION FOR MORE INFORMATION

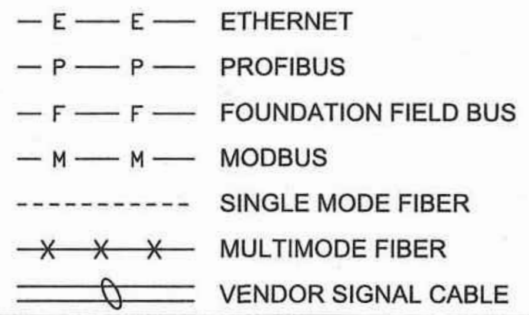
INSTRUMENTATION LINE SYMBOLOGY



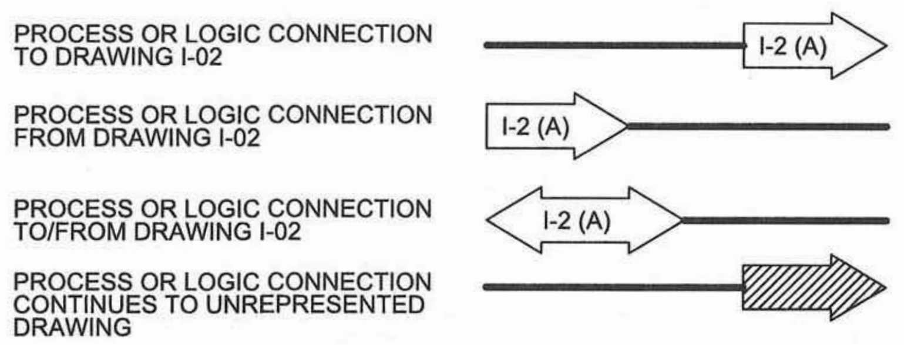
INSTRUMENT LINE DEFINITIONS
(UNLESS SPECIFICALLY NOTED OTHERWISE PER DRAWING LEGEND)



COMMUNICATION LINE DEFINITIONS
(UNLESS SPECIFICALLY NOTED OTHERWISE PER DRAWING LEGEND)



SIGNAL AND PROCESS OFF-PAGE CONNECTORS


PROCESS OR LOGIC CONNECTION TO DRAWING I-02
I-2 (A)
PROCESS OR LOGIC CONNECTION FROM DRAWING I-02
I-2 (A)
PROCESS OR LOGIC CONNECTION TO/FROM DRAWING I-02
I-2 (A)
PROCESS OR LOGIC CONNECTION CONTINUES TO UNREPRESENTED DRAWING

NOTE: REFER TO INSTRUMENTATION LINE SYMBOLOGY FOR PROCESS AND LOGIC LINESTYLE DEFINITION.

	FIRST LETTER		SUCCEEDING LETTER(S)		
	MEASURED OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS		ALARM		
B	BURNER, COMBUSTION				
C	CONDUCTIVITY			CONTROL	CLOSED
D	DENSITY	DIFFERENTIAL			
E	VOLTAGE		SENSOR (PRIMARY ELEMENT)		
F	FLOW RATE	RATIO (FRACTION)			FORWARD
G			GAUGE, GLASS, VIEWING DEVICE		
H	HAND				HIGH
I	CURRENT (ELECTRICAL)		INDICATE		
J	POWER	SCAN			
K	TIME, TIME SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L	LEVEL		LIGHT		LOW
M	MOISTURE	MOMENTARY			MIDDLE, INTERMEDIATE
N	TORQUE		ISOLATE	ISOLATOR	
O			ORIFICE, RESTRICTION		OPEN
P	PRESSURE, VACUUM		POINT (TEST) CONNECTION		
Q	QUANTITY	INTEGRATE, TOTALIZE			
R	RADIATION		RECORD		REVERSE
S	SPEED, FREQUENCY	SAFETY		SWITCH	
T	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION	MULTIFUNCTION
V	VIBRATION, MECHANICAL ANALYSIS			VALVE, DAMPER, LOUVER	
W	WEIGHT, FORCE		WELL		
X	INTRUSION	X AXIS			
Y	EVENT, STATE, OR PRESENCE	Y AXIS		COMPUTE, CONVERT	
Z	POSITION, DIMENSION	Z AXIS		DRIVER, ACTUATOR, FINAL CONTROL ELEMENT	

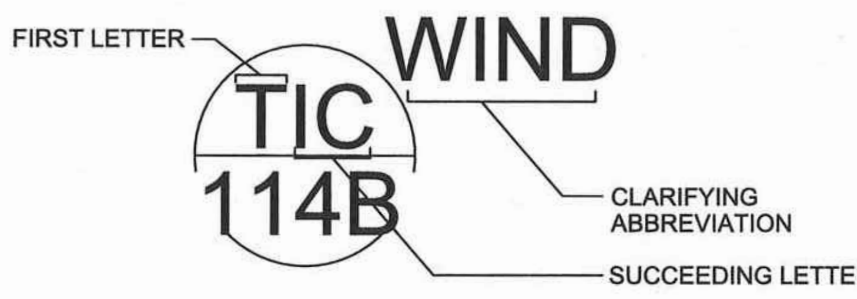
ABBREVIATIONS

ATM	ATMOSPHERE	NO	NORMALLY OPEN
DOL	DIRECT ONLINE STARTER	OI	OPERATOR INTERFACE
FOC	FIBER OPTIC CABLE	PC	PERSONAL COMPUTER
FOT	FIBER OPTIC TRANSCEIVER	PLC	PROGRAMMABLE LOGIC CONTROLLER
FVNR	FULL VOLTAGE NON-REVERSING STARTER	RIO	REMOTE I/O
HMI	HUMAN MACHINE INTERFACE	RVSS	REDUCED VOLTAGE SOLID-STATE STARTER
IA	INSTRUMENT AIR	RTU	REMOTE TERMINAL UNIT
LC	LOCKED CLOSED	TC	THERMOCOUPLE
LCP	LOCAL CONTROL PANEL	SOV	SOLENOID OPERATED VALVE
LCS	LOCAL CONTROL STATION	STP	SHIELDED TWISTED PAIR
LO	LOCKED OPEN	UPS	UNINTERRUPTABLE POWER SUPPLY
LSA	LIGHTNING SURGE ARRESTOR	UTP	UNSHIELDED TWISTED PAIR
MCC	MOTOR CONTROL CENTER	VCP	VENDOR CONTROL PANEL
MCP	MAIN CONTROL PANEL	VFD	VARIABLE FREQUENCY DRIVE
MOV	MOTOR OPERATED VALVE	VSD	VARIABLE SPEED DRIVE
MS	MOTOR STARTER	WIND	WINDING
MTR	MOTOR		
NC	NORMALLY CLOSED		

GENERAL INSTRUMENTATION NOTES

1. ADDITIONAL INSTRUMENTATION AND CONTROL SYMBOLS MAY BE USED AS REQUIRED. SYMBOLS AND NOMENCLATURE WILL BE EITHER BASED ON ISA STANDARD 5.1-INSTRUMENTATION SYMBOLS AND IDENTIFICATION OR DEFINED ELSEWHERE IN THE P&ID SET.
2. SEE ELECTRICAL AND GENERAL SHEETS FOR ADDITIONAL SYMBOLS AND ABBREVIATIONS.
3. SEE SPECIFICATION SECTION 17100 FOR COMPLETE DETAILS OF LOOP DRAWING SUBMITTAL REQUIREMENTS.
4. POWER SUPPLIES FOR INSTRUMENT LOOPS OR SYSTEMS SHALL BE FURNISHED BY THE INSTRUMENTATION SUPPLIER TO MEET THE VOLTAGE AND CURRENT REQUIREMENTS OF THE COMPONENTS IN EACH LOOP OR SYSTEM.
5. FIELD SWITCHES FOR ELECTRIC MOTOR OPERATION SHALL BE SUPPLIED BY THE ELECTRICAL CONTRACTOR. EXCEPTIONS (WHERE NOTED) ARE SWITCHES THAT ARE PART OF VENDOR PACKAGES.
6. VALVE ACTUATORS SHALL BE SUPPLIED WITH THE VALVE BY THE VALVE SUPPLIER, UNLESS OTHERWISE NOTED.

TAG SCHEMA



TYPICAL INSTRUMENT & CONTROL VALVE TAGGING

TIC-114B — — INSTRUMENT SCHEDULE (FULL TAG)
TIC — — · INSTRUMENT / VALVE ID
114 — — TAG NUMBER
B — · SUFFIX

TYPICAL EQUIPMENT TAG FORMAT

MX-114B — — — - EQUIPMENT SCHEDULE (FULL TAG)
MX — — — — EQUIPMENT ID
06114 — - TAG NUMBER
B — · SUFFIX

TYPICAL MANUAL VALVE TAG FORMAT

V-114B — — — · MANUAL VALVE SCHEDULE (FULL TAG)
V — — — — VALVE
06114 — - TAG NUMBER
B — · SUFFIX

TYPICAL PIPE LINE TAG FORMAT

12-RW-1234 — — — - PIPE LINE SCHEDULE (FULL TAG)
12 — — — — — — NOMINAL PIPE DIAMETER
RW — — — — — FLUID CODE
1234 — LINE NUMBER

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Project No.: 195151145
File Name: DRAWING1.DWG
Scale: #" = ##'

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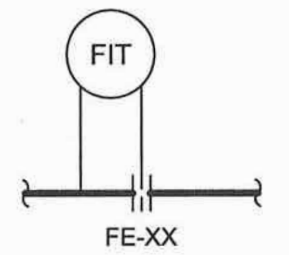
Title
GENERAL INSTRUMENTATION
SYMBOLS AND ABBREVIATIONS

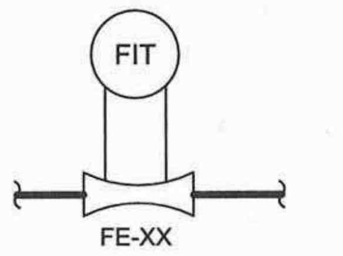
Revision: Sheet: ## of XX
Drawing No.
I-1

1 2 3 4 5

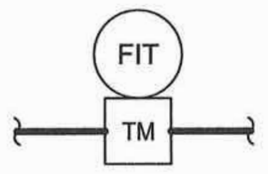
FLOW INSTRUMENTS



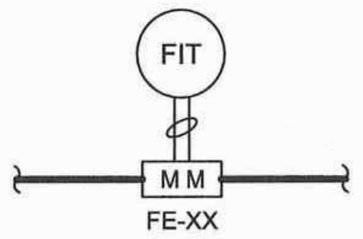
ORIFICE PLATE WITH VENA CONTRACTA, RADIUS, OR PIPE TAPS CONNECTED TO DIFFERENTIAL-PRESSURE -TYPE FLOW TRANSMITTER



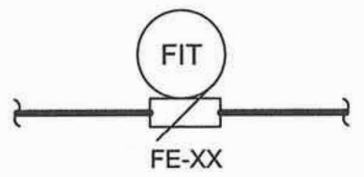
VENTURI TUBE WITH (DIFFERENTIAL PRESSURE) FLOW TRANSMITTER



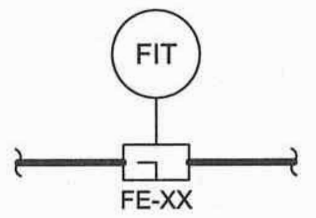
THERMAL MASS FLOW METER



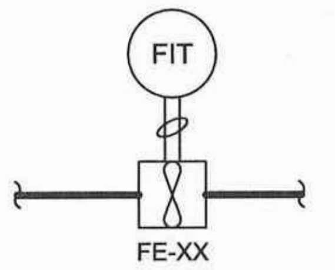
MAGNETIC FLOWMETER WITH REMOTE FLOW TRANSMITTER



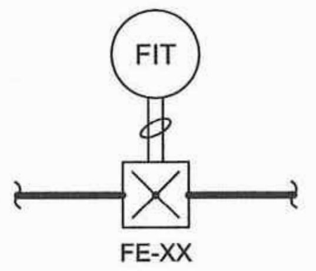
SONIC FLOWMETER (DOPPLER OR TRANSIT TIME)



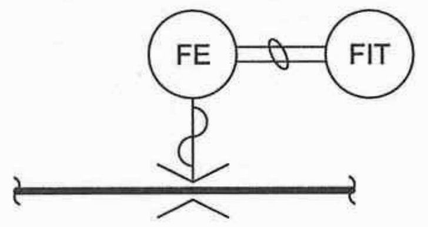
SINGLE PORT PITOT TUBE OR PITOT-VENTURI TUBE



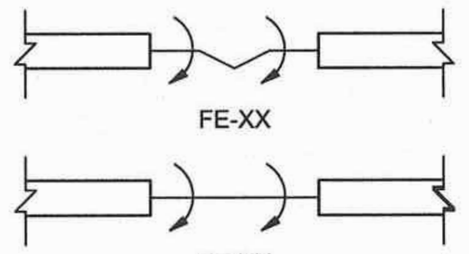
TURBINE OR PROPELLER TYPE FLOW METER



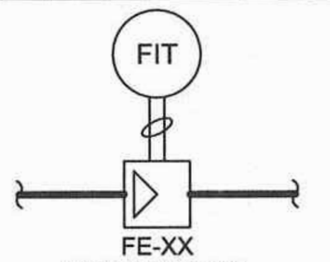
PADDLE WHEEL FLOW METER



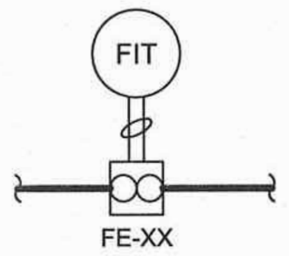
FLUME WITH ULTRASONIC FLOW TRANSMITTER



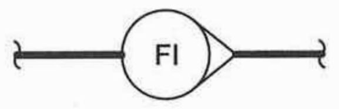
WEIR



VORTEX FLOW METER

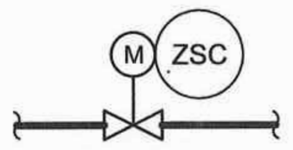


POSITIVE-DISPLACEMENT TYPE FLOW METER

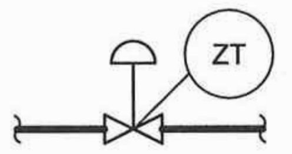


VARIABLE AREA FLOW INDICATOR (ROTAMETER)

POSITION INSTRUMENTS

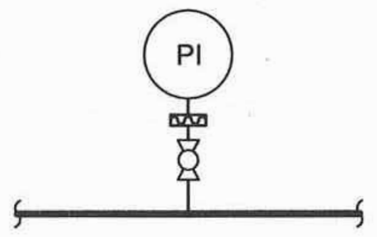


LIMIT SWITCH ON MOTORIZED VALVE INDICATING CLOSED POSITION

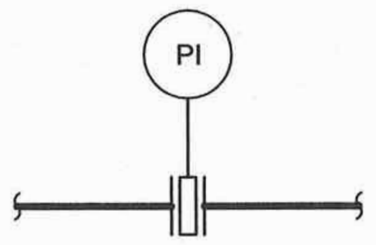


VALVE POSITION TRANSMITTER ON PNEUMATIC ACTUATED VALVE

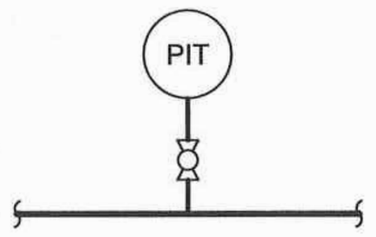
PRESSURE OR VACUUM INSTRUMENTS



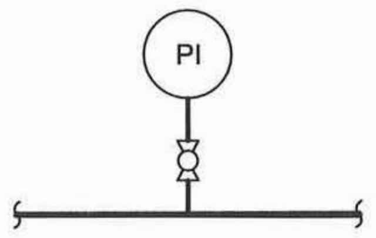
PROCESS LINE WITH DIAPHRAGM SEAL



PROCESS LINE WITH ANNULAR SEAL WITH FILLED SYSTEM

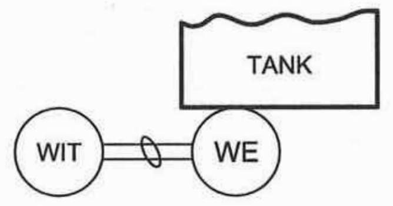


PRESSURE INDICATING TRANSMITTER

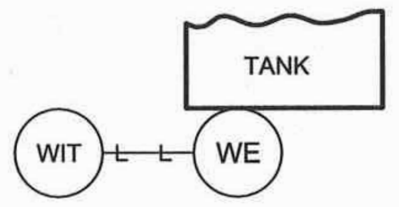


PRESSURE INDICATOR DIRECT - CONNECTED

WEIGHT INSTRUMENTS

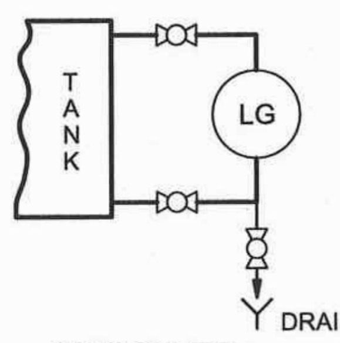


STRAIN GAUGE CONNECTED TO SEPARATE WEIGHT TRANSMITTER (TAG STRAIN GAUGE WE)

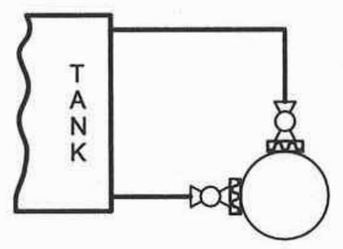


HYDRAULIC ACTUATED WEIGHT TRANSMITTER

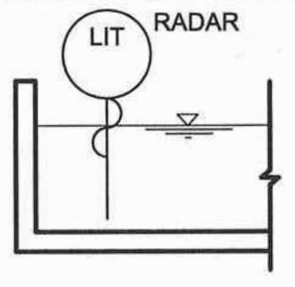
LEVEL INSTRUMENTS



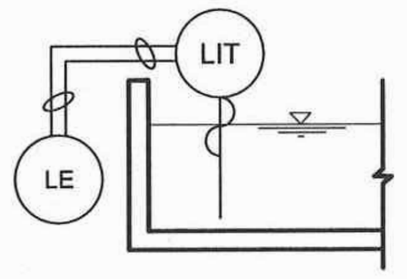
GAUGE GLASS (EXTERNALLY CONNECTED)



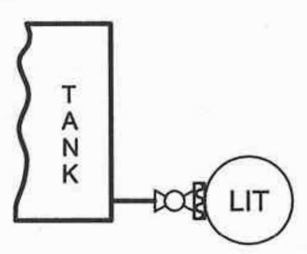
LEVEL TRANSMITTER, DIFFERENTIAL PRESSURE TYPE, (MOUNTED ON TANK)



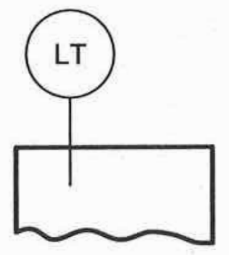
RADAR LEVEL TRANSMITTER



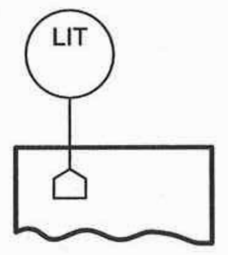
ULTRASONIC LEVEL TRANSMITTER



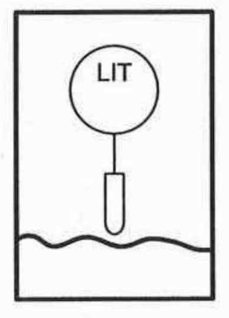
PRESSURE ACTUATED LEVEL TRANSMITTER



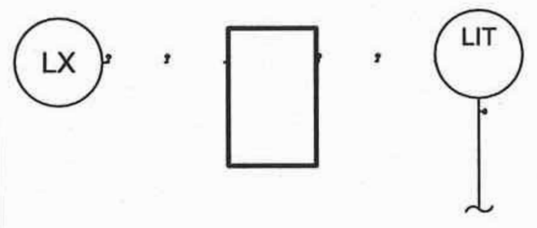
CAPACITANCE OR DIELECTRIC TYPE LEVEL TRANSMITTER



LEVEL TRANSMITTER FLOAT ACTUATED TYPE

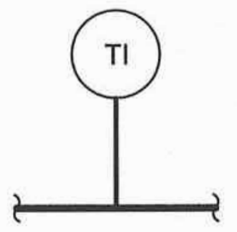


HYDROSTATIC TYPE LEVEL TRANSMITTER

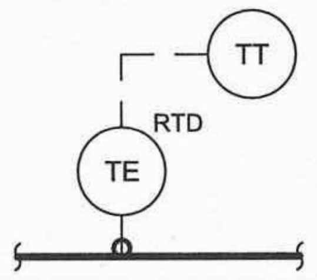


RADIOACTIVE OR SONIC TYPE LEVEL TRANSMITTER WITH INTEGRAL SENSOR

TEMPERATURE INSTRUMENTS

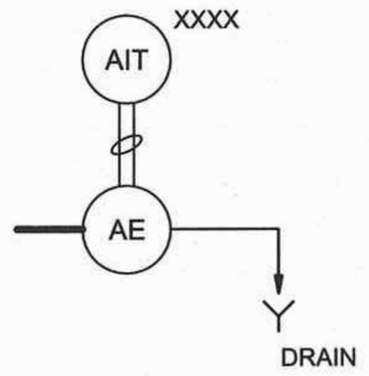


BIMETALLIC TYPE THERMOMETER, GLASS THERMOMETER, OR OTHER LOCAL UNCLASSIFIED TEMPERATURE INDICATOR



THERMOCOUPLE, RESISTANCE BULB (RTD) OR THERMISTOR (TH) TEMPERATURE TRANSMITTER WITH THERMOWELL

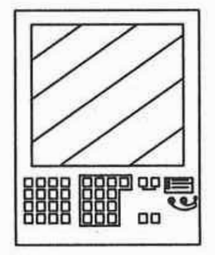
ANALYTICAL INSTRUMENTS

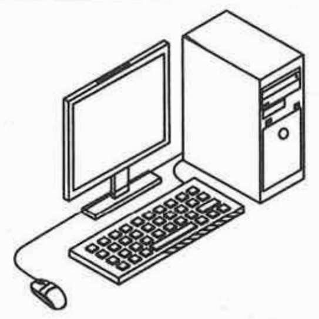


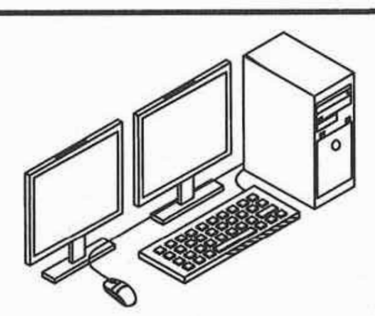
FLOW THROUGH ANALYZING ELEMENT WITH TRANSMITTER

ALK	ALKALINITY
CL_2	CHLORINE CONCENTRATION
COMB	COMBUSTIBLE GAS
CON	CONDUCTIVITY
DO	DISSOLVED OXYGEN
H_2S	HYDROGEN SULFIDE
LEL	LOWER EXPLOSIVE LIMIT
O_2	OXYGEN CONCENTRATION
O_3	OZONE
ORP	OXIDATION/REDUCTION POTENTIAL
PC	PARTICLE COUNTER
PH	HYDROGEN ION CONCENTRATION
SO_2	SULFUR DIOXIDE
TH	TOTAL HARDNESS
TURB	TURBIDITY
UV	ULTRA VIOLET

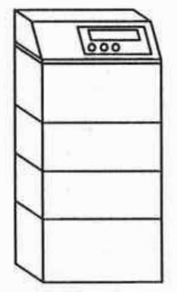
NETWORK AND CONTROL COMPONENTS SYMBOL LIBRARY

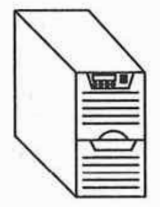

PANEL MOUNTED OPERATOR INTERFACE

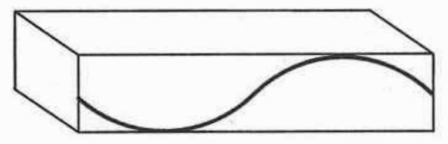

DESKTOP / CONSOLE WORKSTATION


DUAL SCREEN WORKSTATION

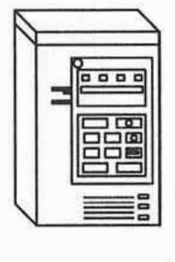
LAPTOP

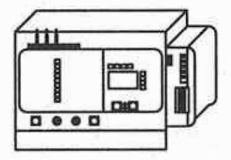

TOWER UPS

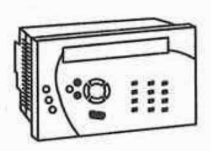

PANEL UPS

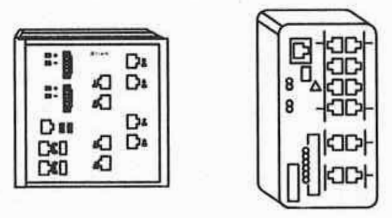

RACK MOUNT UPS

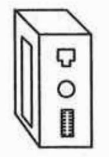
PRINTER

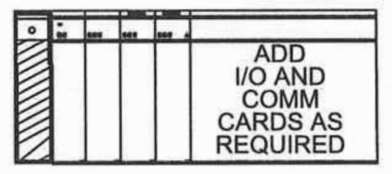

VARIABLE FREQUENCY DRIVE

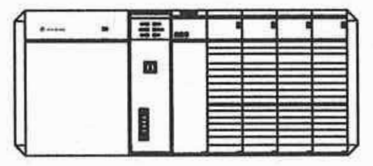

STARTER

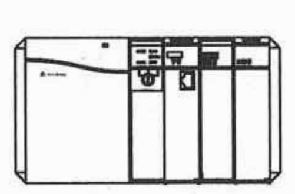

POWER MONITOR / MPRM

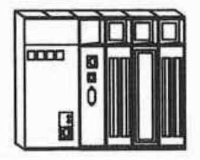

DIN-RAIL MOUNTED MODULAR ETHERNET SWITCH

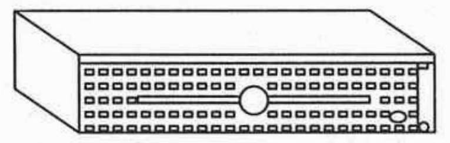

FIBER TRANSCEIVER

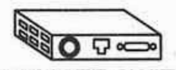

ADD I/O AND COMM CARDS AS REQUIRED
REMOTE I/O CHASSIS

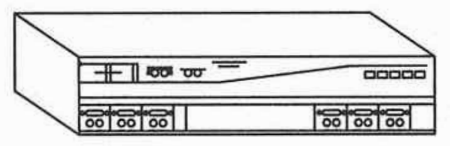

COMPACTLOGIX_ PLC

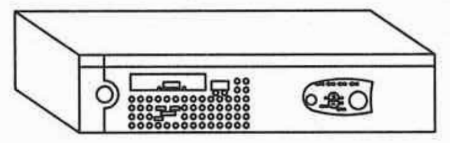

CONTROLLOGIX® PLC

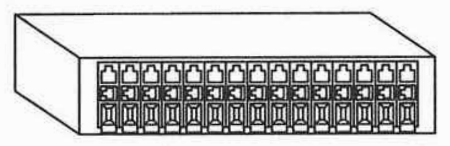

SIEMENS PLC

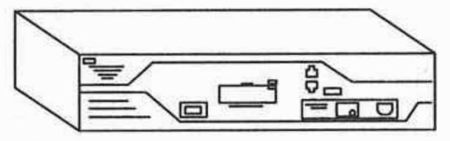

RACK MOUNT SERVER

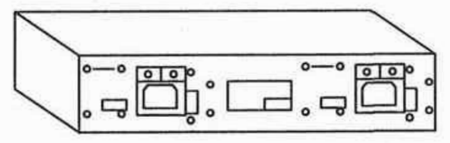

REMOTE SWITCH

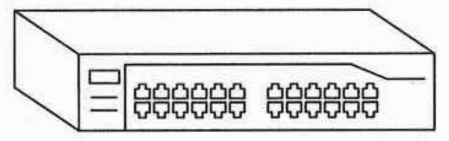

RACK MOUNT KVM SWITCH

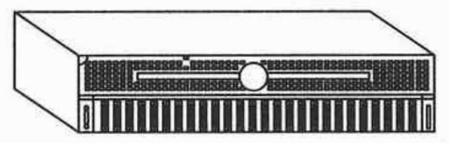

RACK MOUNT DIGITAL VIDEO RECORDER

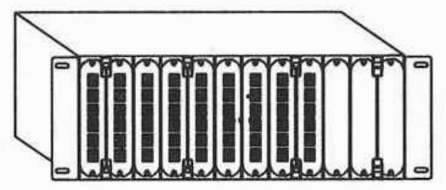

RACK MOUNT 15 PORT MEDIA CONVERTER CHASSIS

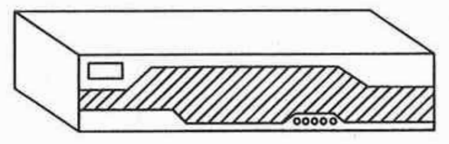

RACK MOUNT ROUTER

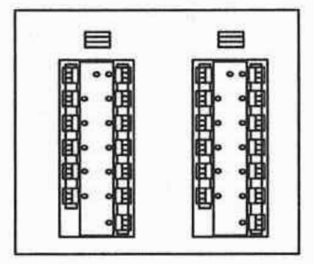

RACK MOUNT ETHERNET SWITCH REDUNDANT POWER SUPPLY

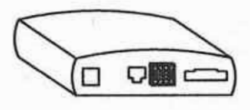

RACK MOUNT 24 PORT ETHERNET SWITCH

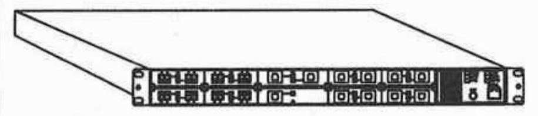

RACK MOUNT NETWORK ACCESSIBLE STORAGE

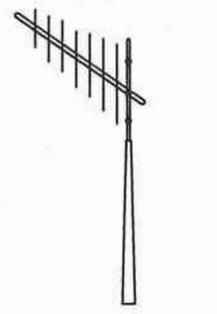

RACK MOUNT FIBER OPTIC PATCH PANEL

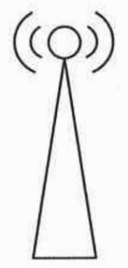

RACK MOUNT FIREWALL APPLICATION

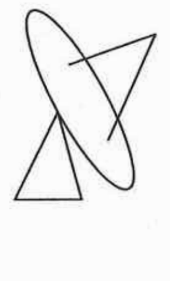

FOUNDATION FIELDBUS MEGABLOCKS

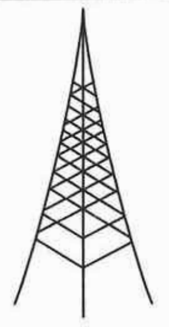

LEASED LINE MODEM

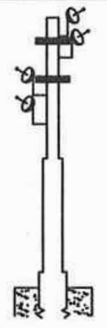

INDUSTRIAL HARDENED SWITCH

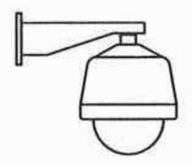

YAGI ANTENNA


OMNI ANTENNA

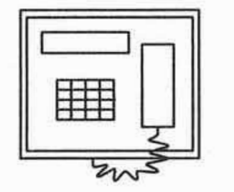

SATELLITE ANTENNA

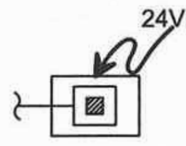

LATTICE TOWER


MONO-POLE TOWER

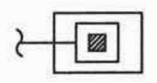

POLE-MOUNT CAMERA

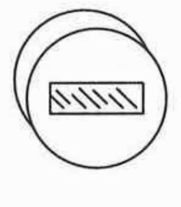
CONTROL VALVE ACTUATOR NETWORK SYMBOL


PHONE



ACTIVE TERMINATOR


PASSIVE TERMINATOR


GAS DETECTOR NETWORK SYMBOL

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Revision 0 By Appd YYYY.MM.DD

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Client/Project
CITY OF CAMBRIDGE
SHERMAN CSO TANK
CAMBRIDGE, MASSACHUSETTS

Project No.: 195151145
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Title
GENERAL INSTRUMENTATION SYMBOLS AND ABBREVIATIONS

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Drawing No.
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ORIGINAL SHEET - ANSI D

PROCESS ABBREVIATIONS

ADMINISTRATION BUILDING	ADM
AERATION AIR/AIR	A
AMBIENT AIR	AA
AMMONIA	AMN
ASH SLURRY	AS
ATTEMPERATOR SPRAY WATER	ASW
BLOWER BUILDING	BB
BOILER FEED WATER	BFW
BIOFILTER	BIO
BISULFITE AREA	BIS
BLOWDOWN	BLDN
BURNER MANAGEMENT SYSTEM	BMS
BACKWASH	BW
BYPASS	BYP
COMPRESSED AIR	CA
CAUSTIC	CAU
CONDENSATE COOLING WATER	CCW
CENTRATE	CEN
CENTRIFUGE FEED	CF
CALIBRATION GAS	CG
CLASSIFIER OVERFLOW	CLO
COMBUSTION AIR	CMBA
CONDENSATE	CN
CONDENSATE RETURN	CR
CHEMICAL STORAGE AREA	CS
CHEMICAL STORAGE FACILITY	CSF
COLD WATER/COOLING WATER	CW
COOLING WATER RETURN	CWR
COOLING WATER SUPPLY	CWS
DRY ASH	DA
DISSOLVED AIR FLOATATION	DAF
DEWATERED BIOSOLIDS	DB
DEGRITTED EASTERLY SLUDGE	DES
DISINFECTION PROCESS	DIS
DISCHARGE	DISCHG
DISSOLVED OXYGEN	DO
DEGRITTED PRIMARY SLUDGE	DPS
DRAIN	DR
DEGRITTED SLUDGE	DS
DIESEL FUEL	DSL
DEGRITTED SCRRENINGS & STRAININGS	DSS
DOMESTIC SOFT WATER	DSW
DILUTION WATER	DW
EXHAUST AIR	EA
EXHAUST OUTLET AIR	EAO
EXCESS ACTIVATED SLUDGE	EAS
EFFLUENT	EFF
EAST GALLERY	EG
ENERGY RECOVERY	ER
EASTERLY SLUDGE	ES
EASTERLY SKIMMINGS	ESK
EXHAUST GAS	EXG
FLUIDIZING AIR	FA
FLOOR DRAIN	FD
FERRIC CHLORIDE	FECL
FOUL AIR	FOA
FIRST STAGE AERATION	FSA
FIRST STAGE CLARIFIER	FSC
FIRST STAGE C GALLERY	FSCG
FIRST STAGE RECTANGULAR CLARIFIER	FSR
FINAL SETTLING TANK	FST
FIRST STAGE FINAL SETTLING TANK	FSTC
GRAVITY BELT THICKINER	GBT
GREASE FLUSH WATER	GF
GUARD HOUSE	GH
GRIT/GRIT SLURRY	GR
GREASE REMOVAL AREA	GRS
GRIT REMOVAL PROCESS	GRT
GRAVITY THICKENER	GT
GRAVITY THICKENER OVERFLOW	GTO
RADIOACTIVE	H3
HEATED FLUIDIZING AIR	HFA
HOT GAS	HG
HIGH PRESSURE STEAM RETURN	HPR
HIGH PRESSURE STEAM SUPPLY	HPS
HOT WATER	HW
HOT WATER RETURN	HWR
HOT WATER SUPPLY	HWS
INSTRUMENT AIR	IA
IMPLUSE AIR	IM
INLET OR INTAKE	IN
INCINERATOR	INC
INJECTED NATURAL GAS	ING
JUNCTION CHAMBER	JC
LAB AREA	LAB
LOW PRESSURE STEAM	LPS
LOCKER ROOM	LR
LIFT STATION	LS
LUBRICATION	LUB
MIXED LIQUOR	ML
MEDIUM PRESSURE STEAM	MPS
MAINTENANCE BUILDING	MTN
MAKE UP WATER	MU
SODIUM HYPOCHLORITE	NAOCL
NATURAL GAS	NG
NON POTABLE WATER	NPW
OUTSIDE AIR INTAKE	OAI
OVERFLOW	OF
OXYGEN SCAVENGER	OS
OUTLET (GENERAL)	OUT
PROCESS AIR	PA
PUMPED DRAINAGE	PD
PRIMARY INFLUENT	PE
PRIMARY INFLUENT BYPASS	PEB
PREHEATED FLUIDIZED AIR	PHFA
PHOSPHATE	PHOS
PRIMARY EFFLUENT	PI
PRIMAR EFFLUENT CHANNEL #1	PIC1
PLANT DRAINAGE	PLD
PLANT INFLUENT	PLI
POLYMER SOLUTION	PLS
PILOT NATURAL GAS	PNG
POLYMER	POL
PURGE AIR	PRA
PROCESS WATER	PRW
PRIMARY SLUDGE	PS
PRIMARY SETTLING TANKS #1-10	PSTA
PRIMARY SETTLING TANKS #11-18	PSTB
POTABLE WATER (CITY WATER)	PW
SHOOTING RANGE	RANGE
RETURN ACTIVATED SLUDGE	RAS
RECIRCULATION WATER	RCW

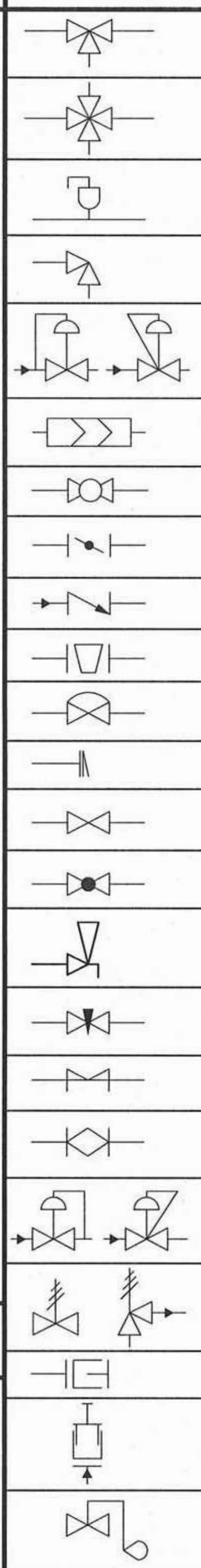
PROCESS ABBREVIATIONS (CONT.)

RAW WATER	RW
SUPERNATANT	S
SECOND STAGE AERATION	SA
SAMPLE	SAMP
SANITARY	SAN
STORED BIOSOLIDS	SB
SCREENINGS	SCR
SECONDARY EFFLUENT	SE
SECURITY BUILDING	SEC
SERVICE BUILDING	SERVB
SLUDGE FEED HEADER	SFH
SCRUBBED GAS	SG
SHOP AREA	SH
SUPERHEATED STEAM	SH ST
SKIMMINGS	SK
SAND	SND
SODIUM PHOSPHATE	SP
SUMP PUMP DISCHARGE	SPD
SODIUM PHOSPHATE	SPH
SLUDGE RECYCLE	SR
SERVICE BUILDING	SRV
SETTLED SLUDGE	SS
SLUDGE STORAGE	SS
SLUDGE SUCTION HEADER	SSH
SECOND STAGE LIFT STATION	SSLS
SECOND STAGE RETURN SLUDGE	SSRS
SCRUBBER SOLUTION WATER	SSW
STEAM	ST
STORAGE BUILDING	STB
STORMWATER	STM
SAND VENT	SVT
SEAL WATER	SW
SLUDGE WITHDRAWAL HEADER	SWH
SCREENED WASTEWATER	SWW
THERMAL CONDITIONING BUILDING	TCB
THERMALLY CONDITIONED SLUDGE	TC STO
THICKENER OVERFLOW	
TANK DRAINGE	TDR
THICKENED EXCESS ACTIVATED SLUDGE	TE AS
THICKENED PRIMARY SLUDGE	TPS
THICKENED THERMALLY CONDITIONED SLUDGE	TTCS
TRUCK UNLOADING	TU
UNDERDRAIN	UD
VACUUM FILTER WASTE LIQUOR	VF WL
VENT	VT
WELD AREA	WA
WITHDRAWAL	WD
WELL FLUSHING	WF
WEST GALLEY	WG
WASTE HEAT RETURN	WH R
WASTE HEAT SUPPLY	WH S
WASTE LIQUOR	WL
WASTE PICKLE LIQUOR	WPL
WELD SHOP AREA	WS
WATER TREATMENT SYSTEM	WTS

PROCESS MATERIAL ABBREVIATIONS

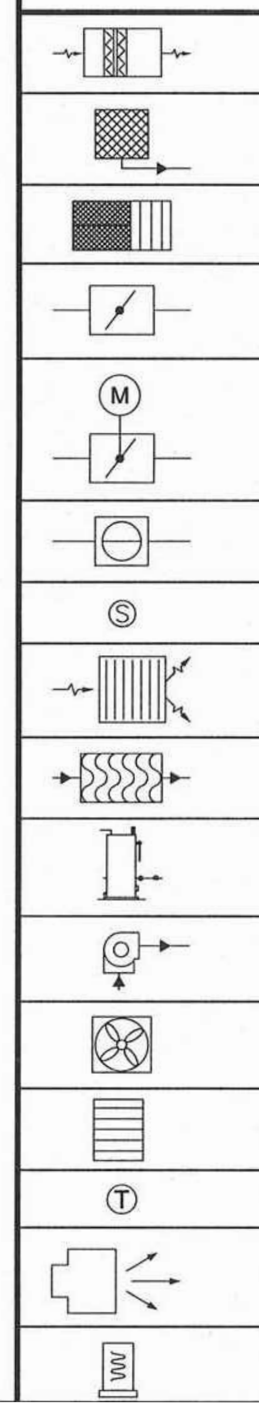
ALUMINUM	ALUM
BLACK STEEL	BST
CAST IRON	CI
CORRUGATED METAL PIPE	CMP
CHLORINATED POLYVINYL CHLORIDE	CPVC
CARBON STEEL	CS
COPPER	CU
DUCTILE IRON	DI
FIBER REINFORCED PIPE	FRP
GALVANIZED STEEL	GST
POLYVINYL CHLORIDE	PVC
REINFORCED CONCRETE PIPE	RCP
STAINLESS STEEL	SST
STEEL	STL
VITRIFIED PIPE	VCP

VALVES



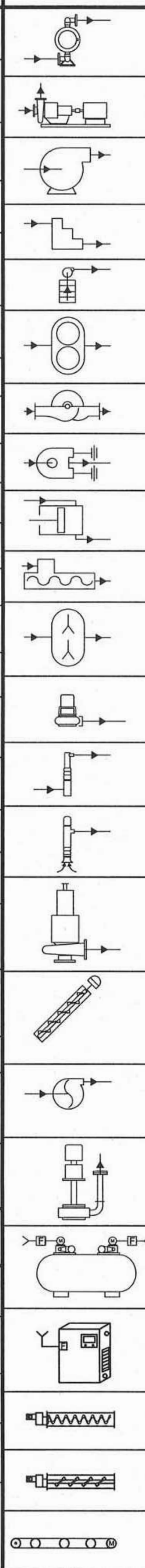
- 3 WAY MULTI-PORT VALVE
- 4 WAY MULTI-PORT VALVE
- AIR VACUUM, AIR RELEASE, OR COMBINATION AIR VACUUM AND AIR RELEASE ASSEMBLY
- ANGLE VALVE
- BACK-PRESSURE VALVE
- BACKFLOW PREVENTER VALVE
- BALL VALVE
- BUTTERFLY VALVE
- CHECK VALVE
- CONE VALVE
- DIAPHRAGM VALVE
- FLAP VALVE
- GATE VALVE
- GLOBE VALVE
- HOSE BIBB VALVE
- NEEDLE VALVE
- PINCH VALVE
- PLUG VALVE
- PRESSURE REGULATING VALVE
- PRESSURE RELIEF VALVE
- SLEEVE VALVE
- TELESCOPING VALVE
- FLOAT VALVE

HVAC



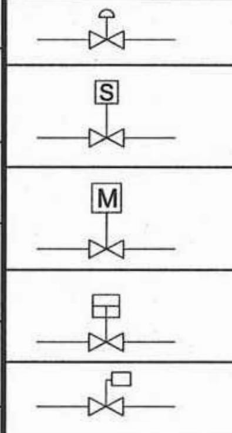
- AIR CONDITIONING UNIT
- DUCT AIR FILTER
- AIR HANDLING UNIT
- NON-MOTORIZED DAMPER
- MOTORIZED DAMPER
- DEHUMIDIFIER
- DUCT SMOKE DETECTOR
- EVAPORATIVE COOLER
- HEATER
- HVAC BOILER
- HVAC FAN
- VENT FAN
- HVAC LOUVER
- THERMOSTAT
- UNIT HEATER
- WATER HEATER

PUMPS & COMPRESSORS



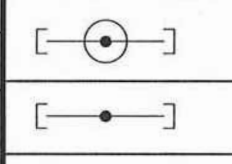
- SLUDGE DIAPHRAGM PUMP
- HORIZONTAL CENTRIFUGAL PUMP
- GENERIC PUMP
- CHEMICAL METERING PUMP
- DRUM PUMP
- ROTARY GEAR PUMP
- SPLIT-CASE PUMP
- HOSE / PERISTALTIC PUMP
- PLUNGER / PISTON PUMP
- PROGRESSIVE CAVITY PUMP
- ROTARY LOBE PUMP
- SUBMERSIBLE SUMP PUMP
- SUBMERSIBLE TURBINE PUMP
- VERTICAL TURBINE PUMP
- VERTICAL CENTRIFUGAL PUMP
- INCLINED ARCHIMEDES SCREW PUMP
- SLUDGE GRINDER
- VERTICAL SUMP PUMP
- RECIPROCATING COMPRESSOR
- ROTARY SCREW COMPRESSOR
- SHAFTLESS CONVEYOR
- SCREW CONVEYOR
- BELT CONVEYOR

VALVE AND GATE ACTUATORS



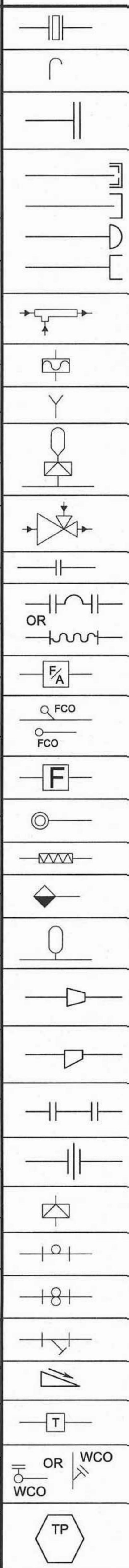
- DIAPHRAGM ACTUATOR
- E/H = ELECTROHYDRAULIC
  P = PNEUMATIC
  S = SOLENOID
- MOTOR ACTUATOR
- PISTON ACTUATOR
- WEIGHT BALANCED ACTUATOR

GATES



- SLIDE GATE
- STOP GATE OR SHEAR GATE

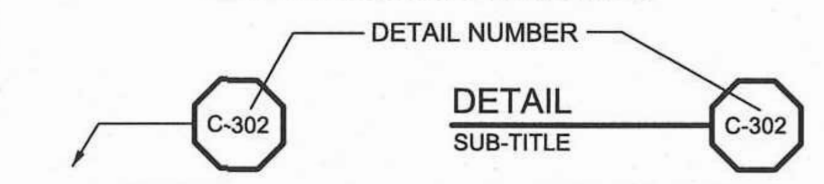
PIPING ACCESSORIES



- ANNULAR SEAL
- ATMOSPHERIC VENT
- BLIND FLANGE
- CAP - BREATHER
- CAP - SCREW / THREADED
- CAP - WELDED
- CAP - QUICK DISCONNECT
- CHLORINE INJECTOR OR CHEMICAL EDUCTOR
- DIAPHRAGM SEAL
- DRAIN
- EXPANSION CHAMBER WITH RUPTURE DISK
- EDUCTOR
- FLANGED
- FLEXIBLE CONNECTION - BELLOWS TYPE
- FLAME ARRESTOR
- FLOOR CLEANOUT
- FILTER
- HUB DRAIN
- INLINE MIXER
- PIPE MATERIAL CHANGE
- PULSATION DAMPENER
- REDUCER - CONCENTRIC
- REDUCER - ECCENTRIC
- REMOVABLE SPOOL PIECE
- UNION
- RUPTURE DISK
- STRAINER - BASKET TYPE
- STRAINER - DUPLEX BASKET TYPE
- STRAINER - WYE TYPE
- SLOPE
- TRAP
- WALL CLEANOUT
- TIE-IN POINT

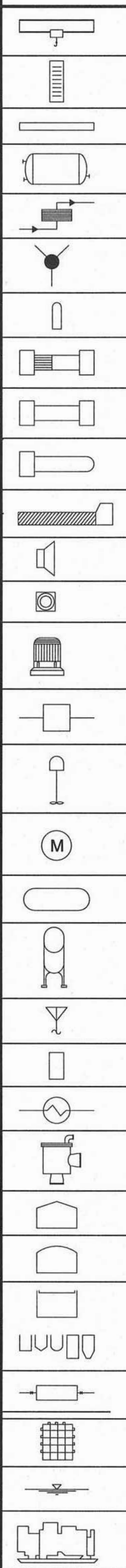
REFERENCE SYMBOLS

STANDARD DETAIL IDENTIFICATION



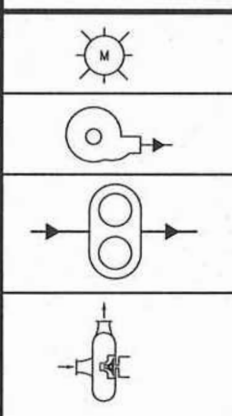
STANDARD DETAILS ARE LOCATED ON DISCIPLINE GENERAL SHEETS, IN NUMERICAL ORDER

MISCELLANEOUS



- BRIDGE CRANE
- CALIBRATION COLUMN
- CONTAINER SCALE
- CARTRIDGE FILTER
- DEMISTOR
- FIRE HYDRANT
- GAS BOTTLE
- HEAT EXCHANGER - PLATE TYPE
- HEAT EXCHANGER - STRAIGHT TYPE
- HEAT EXCHANGER - U TUBE
- HEATER
- HORN
- PANEL-MOUNTED HORN
- BEACON
- MISCELLANEOUS EQUIPMENT
- MIXER
- MOTOR SYMBOL
- HORIZONTAL PRESSURE VESSEL
- VERTICAL PRESSURE VESSEL
- RADIO ANTENNA
- REFRIGERATOR DRYER
- SAMPLE COOLER
- AUTO-BACKWASHING STRAINER
- TANK WITH CONE SHAPED ROOF
- TANK WITH DOME ROOF
- TANK WITH FLOATING COVER
- TANK, VESSEL, OR BIN
- TEMPERING TANK
- TOTE TANK
- WATER LEVEL
- GENERATOR

BLOWERS



- AERATOR
- BLOWER
- POSITIVE DISPLACEMENT BLOWER
- SINGLE STAGE CENTRIFUGAL BLOWER

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Title
GENERAL INSTRUMENTATION
SYMBOLS AND ABBREVIATIONS

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