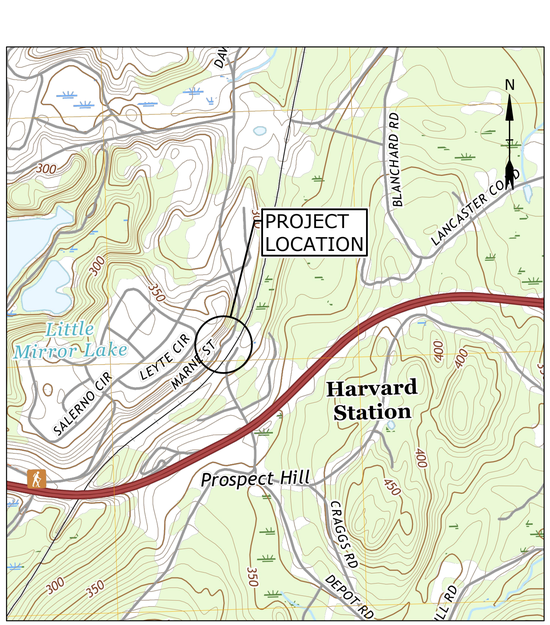
TOWN OF HARVARD, MASSACHUSETTS

HARVARD-DEVENS WATER SYSTEM INTERCONNECTION PROJECT

CONTRACT NO. 1 / DWSRF 7285
PERMIT DRAWINGS

DECEMBER 2023



LOCATION MAP
SCALE: 1" = 1,000'

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LIST OF DRAWINGS	
GENERAL	
G-001	COVER SHEET
G-002	DRAWING INDEX
G-003	GENERAL NOTES, LEGEND, AND ABBREVIATIONS
CIVIL	
C-100	EXISTING CONDITIONS AND EROSION CONTROL PLAN
C-200	SITE LAYOUT PLAN
C-301	GRADING PLAN
C-302	GRADING AND DRAINAGE PLAN
C-400	UTILITY PLAN
C-501	CIVIL DETAILS - 1
C-502	CIVIL DETAILS - 2
C-503	CIVIL DETAILS - 3
C-504	CIVIL DETAILS - 4
ARCHITECTURAL	
A-101	ARCHITECTURAL FLOOR AND ROOF PLANS
A-201	EXTERIOR ELEVATIONS
A-301	ARCHITECTURAL SECTIONS AND DETAILS
A-501	ARCHITECTURAL SCHEDULES AND DETAILS
STRUCTURAL	
S-001	STRUCTURAL NOTES AND DETAILS
S-002	STRUCTURAL MASONRY NOTES AND DETAILS
S-101	STRUCTURAL FOUNDATION AND FLOOR PLANS
S-102	STRUCTURAL ROOF FRAMING PLAN
S-301	STRUCTURAL SECTIONS
S-501	STRUCTURAL DETAILS
PROCESS	
M-001	PROCESS PIPING LEGENDS AND ABBREVIATIONS
M-002	PROCESS FLOW DIAGRAM
M-101	PROCESS PIPING PLAN AND SECTION
M-501	PROCESS DETAILS
INSTRUMENTATION	
I-001	INSTRUMENTATION LEGEND
I-101	INSTRUMENTATION DIAGRAM
PLUMBING	
P-001	PLUMBING LEGEND AND GENERAL NOTES
P-101	PLUMBING FLOOR PLAN
HVAC	
H-001	HVAC LEGEND, GENERAL NOTES, AND ELEVATIONS
H-101	HVAC FLOOR PLAN
H-601	HVAC DETAILS AND SCHEDULES
ELECTRICAL	
E-001	ELECTRICAL LEGEND AND ABBREVIATIONS
E-100	ELECTRICAL SITE PLAN
E-101	ELECTRICAL FLOOR PLAN
E-102	ELECTRICAL LIGHTING PLAN
E-501	ELECTRICAL DETAILS - 1
E-502	ELECTRICAL DETAILS - 2
E-503	ELECTRICAL DETAILS - 3
E-601	ELECTRICAL ONELINE DIAGRAM AND PANELBOARD SCHEDULES

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Harvard-Devens Water System Interconnection Project

Harvard Public Works Department

Harvard, Massachusetts

MARK	DATE	DESCRIPTION

PROJECT NO:	H1776-016
DATE:	DECEMBER 2023
FILE:	H1776-16-G-002.dwg
DRAWN BY:	TAL
DESIGNED/CHECKED BY:	JEC
APPROVED BY:	TJM

DRAWING INDEX

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G-002

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LEGEND

DESCRIPTION	EXISTING	PROPOSED
PROPERTY LINE		
RIGHT-OF-WAY LINE		
EASEMENT LINE		
LIMITS OF WORK		
INTERMEDIATE CONTOURS		
INDEX CONTOURS	25	25
SPOT GRADE	X 141.2	+ 32.0
MAGNITUDE & DIRECTION OF SLOPE		0.0%
STORM DRAIN	SD	SD
STORM UNDERDRAIN		UD
GRAVITY SANITARY SEWER	SS	SS
SANITARY SEWER FORCE MAIN	SFM	SFM
SANITARY SEWER LOW PRESSURE	SSLP	SSLP
SANITARY SEWER COMBINED	COMB	COMB
WATER SERVICE	W	W
POTABLE WATER	PW	PW
FIRE SERVICE		F
HIGH PRESSURE FIRE SERVICE		F-HP
UNDERGROUND ELECTRIC	E	E
PRIMARY ELECTRIC SERVICE	PE	PE
SECONDARY ELECTRIC	SE	SE
OVERHEAD ELECTRIC	OE	OE
TELEPHONE SERVICE	T	T
TEL-DATA SERVICE	T–D	T-D
COMMUNICATIONS SERVICE	T–C	T-C
CABLE TV SERVICE	CTV	CTV
BELOW GROUND GAS SERVICE	G	G
ABOVE GROUND GAS SERVICE		
OVERHEAD UTILITY (UNSPECIFIED)	OHW	OHW
CURB		
EDGE OF PAVEMENT		
DIRT ROAD		
SIDEWALK		
RETAINING WALL		
STONE WALL		
FENCE - CHAIN LINK		
FENCE - WOOD POST		
GUARDRAIL		
METAL BEAM RAIL		
TRAIN TRACKS		
STORM DRAIN STRUCTURES	MANHOLE (D) CATCH BASIN (CB)	MANHOLE (D) AREA DRAIN CATCH BASIN (CB)
SANITARY SEWER MANHOLE	(S)	(S)
WATER SERVICE STRUCTURES	HYDRANT MANHOLE (W) VALVE	HYDRANT MANHOLE (W) VALVE
GAS SERVICE STRUCTURES	MANHOLE (G) VALVE	MANHOLE (G) VALVE
ELECTRIC SERVICE STRUCTURES	UTILITY CO. POLE # MANHOLE (E) LIGHT	UTILITY CO. POLE # MANHOLE (E) LIGHT
TELECOMMUNICATIONS MANHOLE	(T)	(T)
TREELINE		
TREE	EVERGREEN DECIDUOUS	EVERGREEN DECIDUOUS

EROSION CONTROL AND RESOURCE AREA PROTECTION NOTES

1. PROVIDE ALL EROSION CONTROL MEASURES SHOWN, SPECIFIED, REQUIRED BY PERMIT, AND/OR REQUIRED BY THE ENGINEER PRIOR TO ANY CONSTRUCTION OR IMMEDIATELY UPON REQUEST. MAINTAIN SUCH CONTROL MEASURES UNTIL FINAL SURFACE TREATMENTS ARE IN PLACE AND/OR UNTIL PERMANENT VEGETATION IS ESTABLISHED. INSPECT AFTER EACH RAINSTORM AND DURING MAJOR STORM EVENTS TO CONFIRM THAT ALL SEDIMENTATION AND EROSION CONTROL MEASURES REQUIRED ARE IN PLACE AND EFFECTIVE.
2. PRIOR TO STARTING WORK, CLEARLY STAKE WORK LIMITS. DO NOT DISTURB VEGETATION AND TOPSOIL BEYOND THE PROPOSED LIMITS. COORDINATE WITH THE ENGINEER FOR LOCATIONS OF TEMPORARY STOCKPILING OF TOPSOIL DURING CONSTRUCTION.
3. COMPACT, STABILIZE, AND LOAM AND SEED SIDE SLOPES, SHOULDER AREAS AND DISTURBED VEGETATED AREAS IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND AS REQUIRED BY PERMITS. GRADE SIDE SLOPES, SHOULDER AREAS AND DISTURBED VEGETATED AREAS TO A MAXIMUM SLOPE OF 3 HORIZONTAL TO 1 VERTICAL (3H:1V), WHERE POSSIBLE. PROVIDE BIODEGRADABLE EROSION CONTROL BLANKETS TO PREVENT EROSION WHERE SLOPES ARE STEEPER THAN 3H:1V.
4. SETTLE OR FILTER ALL SILT-LADEN WATER FROM DEWATERING ACTIVITIES IN A SEDIMENTATION OR FILTER BAG TO REMOVE SEDIMENTS PRIOR TO RELEASE USING A SEDIMENTATION OR FILTER BAG LOCATED DOWN-GRADIENT OF THE DEWATERED AREA.
5. REMOVE AND PROPERLY DISPOSE OF SILT TRAPPED AT BARRIERS IN UPLAND AREAS OUTSIDE BUFFER ZONES. REMOVE MATERIALS DEPOSITED IN ANY TEMPORARY SETTLING BASINS AT THE COMPLETION OF THE PROJECT. RESTORE ALL DISTURBED AREAS TO THEIR PRECONSTRUCTION CONDITION.
6. SWEEP, COLLECT, REMOVE AND DISPOSE OF ANY SEDIMENT TRACKED ONTO PUBLIC RIGHT-OF-WAYS AT THE END OF EACH DAY.
7. LOAM AND SEED ALL DISTURBED VEGETATED AREAS TO ESTABLISH COVER AND STABILIZATION AS SOON AS POSSIBLE FOLLOWING DISTURBANCE.
8. MAINTAIN AN ADDITIONAL SUPPLY OF EROSION CONTROL MEASURES ON-SITE FOR EMERGENCY REPAIRS.
9. STORE FUEL, OIL, PAINT, OR OTHER HAZARDOUS MATERIALS IN A SECONDARY CONTAINER AND REMOVE TO A SECURE LOCKED AND COVERED AREA DURING NON-WORK HOURS.
10. PROVIDE A SUPPLY OF ABSORBENT SPILL RESPONSE MATERIALS SUCH AS BOOMS, BLANKETS, AND OIL ABSORBENT MATERIALS AT THE CONSTRUCTION SITE AT ALL TIMES TO CLEAN UP POTENTIAL SPILLS OF HAZARDOUS MATERIALS. IMMEDIATELY REPORT SPILLS OF HAZARDOUS MATERIALS TO THE STATE ENVIRONMENTAL AGENCY AND THE MUNICIPALITY WHERE THE WORK IS OCCURRING.

ABBREVIATIONS

ABDN('D)	ABANDON(ED)
AC	ASBESTOS CEMENT PIPE
BC	BITUMINOUS CURB
BFP	BACK FLOW PREVENTOR
BIT	BITUMINOUS
BL	BASELINE
BLDG	BUILDING
BND	BOUND
BOC	BOTTOM OF CURB
BOT	BOTTOM
BS	BOTTOM OF STEP
BW	BOTTOM OF WALL
CATV	CABLE TELEVISION
CB	CATCH BASIN
CEM	CEMENT
CI	CAST IRON PIPE
CL	CENTERLINE
CLF	CHAIN LINK FENCE
CO	CLEAN OUT
CONC	CONCRETE
CPP	CORRUGATED POLYETHYLENE PIPE
CY	CUBIC YARD
DH	DRILL HOLE
DI	DUCTILE IRON PIPE
DIA	DIAMETER
DMH	DRAIN MANHOLE
DN	DOWN
E	EAST
EF	EACH FACE
EG	EXISTING GRADE
EL/ELEV	ELEVATION
ELEC	ELECTRIC
EMH	ELECTRIC MANHOLE
EOP	EDGE OF PAVEMENT
EW	EACH WAY
EXIST	EXISTING
FES	FLARED END SECTION
FF	FINISH FLOOR
FM	FORCE MAIN
G	GAS
GC	GENERAL CONTRACTOR
GG	GAS GATE
GRAN	GRANITE
HC	HANDICAP
HDPE	HIGH DENSITY POLYETHYLENE
HMA	HOT MIX ASPHALT
HYD	HYDRANT
IN	INCHES
INV	INVERT
IP	IRON PIN
L	LENGTH OF CURB
LP	LIGHT POLE
LT	LEFT
MAX	MAXIMUM
MH	MANHOLE
MIN	MINIMUM
MISC	MISCELLANEOUS
MON	MONUMENT
MJ	MECHANICAL JOINT

ABBREVIATIONS CONT'D

N	NORTH
NITC	NOT IN THIS CONTRACT
NTS	NOT TO SCALE
N/A	NOT APPLICABLE
N/F	NOW OR FORMERLY
OC	ON CENTER
OCS	OUTLET CONTROL STRUCTURE
OH	OVERHEAD
PB	PLANT BED
PC	POINT OF CURVATURE
PCC	POINT OF COMPOUND CURVATURE
PCPP	PERFORATED CORRUGATED POLYETHYLENE PIPE
PE	POLYETHYLENE
PERF	PERFORATED
PI	POINT OF INTERSECTION
PRC	POINT OF REVERSE CURVATURE
PRO	PROPANE
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PT	POINT OF TANGENCY
PVC	POLYVINYLCHLORIDE
PVMT	PAVEMENT
R	RADIUS
RCP	REINFORCED CONCRETE PIPE
RD	ROOF DRAIN
REV	REVISION
ROW	RIGHT OF WAY
RT	RIGHT
R&D	REMOVE AND DISPOSE
R&R	REMOVE AND RESET
R&S	REMOVE AND STACK
S	SOUTH
SAN	SANITARY
SCH	SCHEDULE
SF	SQUARE FOOT
SMH	SEWER MANHOLE
SS	STAINLESS STEEL
STA	STATION
STL	STEEL
STRM	STORM
T	TANGENT LENGTH
TC	TOP OF CURB
TEL	TEL-DATA
TP	TEST PIT
TS	TOP OF STEP
TW	TOP OF WALL
TYP	TYPICAL
UP	UTILITY POLE
W	WATER
WC	WATER COLUMN
WG	WATER GATE
WV	WATER VALVE
XFMR	TRANSFORMER

LEGEND

RESOURCE AREAS
VEGETATED WETLAND LIMIT
TOP OF BANK
MEAN ANNUAL HIGH WATER
LAND SUBJECT TO FLOODING
100-FOOT BUFFER ZONE
200-FOOT RIVERFRONT AREA
LOCAL RESOURCE AREA
LOCAL BUFFER ZONE - 1
LOCAL BUFFER ZONE - 2
WETLANDS WATER COURSE
WETLAND FLAG (WF)

LEGEND

DEMOLITION / GEOTECHNICAL
EROSION & SEDIMENT CONTROL
ITEM TO BE DEMOLISHED
TEST PIT
MONITORING WELL
BORING

BASE PLAN NOTES

1. THE EXISTING CONDITIONS INFORMATION SHOWN ON THE DRAWINGS IS BASED ON THE FOLLOWING:
   - SURVEY DRAWINGS PROVIDED BY DUNN MCKENZIE, INC. TITLED EXISTING CONDITION PLAN OF DEPOT ROAD AND DATED JUNE 21, 2023. THE OFFICE OF DUNN-MCKENZIE IS LOCATED AT 206 DEDHAM STREET, NORFOLK, MA.
2. UTILITY LOCATIONS SHOWN WERE PLOTTED FROM INFORMATION SUPPLIED BY RESPECTIVE UTILITY COMPANIES AND DATA OBTAINED FROM FIELD SURVEYS AND AS BUILT DRAWINGS. THE ACCURACY AND COMPLETENESS OF SUBSURFACE INFORMATION SHOWN ON THESE DRAWINGS IS NOT GUARANTEED. DETERMINE THE LOCATIONS AND ELEVATIONS OF ALL UTILITIES WHICH MAY AFFECT CONSTRUCTION OPERATIONS.
3. SUB-SURFACE EXPLORATIONS WERE PERFORMED BY MARTIN GEO-ENVIRONMENTAL, LLC ON APRIL 24, 2023 AND SEABOARD DRILLING, LLC FROM SEPTEMBER 18, 2023 THROUGH OCTOBER 24, 2023. BORING LOCATIONS SHOWN ON THE DRAWINGS ARE APPROXIMATE AND BORING INFORMATION IS NOT GUARANTEED IN ANY WAY TO REPRESENT EXISTING CONDITIONS. BORING LOGS ARE INCLUDED IN THE PROJECT MANUAL FOR THE CONTRACTORS INFORMATION ONLY.
4. THE DRAWINGS ARE BASED ON THE FOLLOWING DATUMS: HORIZONTAL-NAD83 ; VERTICAL-NAVD88
5. THE EXISTING CONDITIONS SHOWN ARE APPROXIMATE. FIELD VERIFY EXISTING CONDITIONS.
6. THE PROPERTY LINES SHOWN ON THE DRAWINGS ARE APPROXIMATE AND ARE NOT BASED ON DEED OR PLAN RESEARCH.
7. THE PROPERTY OWNER OF THE PROPOSED BOOSTER PUMP STATION LOCATION IS MASSDEVELOPMENT. THE MASSDEVELOPMENT OFFICE IS AT 33 ANDREWS PARKWAY, DEVENS, MA. THE TOWN OF HARVARD IS SEEKING AN EASEMENT FOR THE BOOSTER PUMP STATION FROM MASSDEVELOPMENT.

GENERAL NOTES

1. NOTIFY DIGSAFE AT 1-888-344-7233 AND OTHER UTILITY OWNERS IN THE AREA NOT ON THE DIGSAFE LIST AT LEAST 72 HOURS PRIOR TO ANY DIGGING, TRENCHING, ROCK REMOVAL, DEMOLITION, BORING, BACKFILLING, GRADING, LANDSCAPING, OR ANY OTHER EARTH MOVING OPERATIONS.
2. LOCATIONS OF EXISTING UTILITIES ARE APPROXIMATE. IN ADDITION, SOME UTILITIES MAY NOT BE SHOWN. DETERMINE THE EXACT LOCATION OF UTILITIES BY TEST PIT OR OTHER METHODS, AS NECESSARY TO PREVENT DAMAGE TO UTILITIES AND/OR INTERRUPTIONS IN UTILITY SERVICE. PERFORM TEST PIT EXCAVATIONS AND OTHER INVESTIGATIONS TO LOCATE UTILITIES, AND PROVIDE THIS INFORMATION TO THE ENGINEER, PRIOR TO CONSTRUCTING THE PROPOSED IMPROVEMENTS. LOCATE ALL EXISTING UTILITIES TO BE CROSSED BY HAND EXCAVATION.
3. BOLD TEXT AND LINES INDICATE PROPOSED WORK. LIGHT TEXT AND LINES INDICATE APPROXIMATE EXISTING CONDITIONS.
4. TIGHE & BOND ASSUMES NO RESPONSIBILITY FOR ANY ISSUES, LEGAL OR OTHERWISE, RESULTING FROM CHANGES MADE TO THESE DRAWINGS WITHOUT WRITTEN AUTHORIZATION FROM TIGHE & BOND.
5. EXCAVATE ADDITIONAL TEST PITS TO LOCATE EXISTING UTILITIES AS DIRECTED OR APPROVED BY THE ENGINEER.
6. NOTIFY THE ENGINEER OF ANY UTILITIES IDENTIFIED DURING CONSTRUCTION THAT ARE NOT SHOWN ON THE DRAWINGS OR THAT DIFFER IN SIZE OR MATERIAL.
7. THE CONTRACTOR IS RESPONSIBLE FOR SITE SAFETY; COORDINATION WITH THE OWNER, ALL SUBCONTRACTORS, AND WITH OTHER CONTRACTORS WORKING WITHIN THE LIMITS OF WORK, THE MEANS AND METHODS OF CONSTRUCTING THE PROPOSED WORK.
8. OBTAIN, PAY FOR AND COMPLY WITH PERMITS, NOTICES AND FEES NECESSARY TO COMPLETE THE WORK. ARRANGE AND PAY FOR NECESSARY INSPECTIONS AND APPROVALS FROM THE JURISDICTIONAL AUTHORITIES.
9. SHORE UTILITY TRENCHES WHERE FIELD CONDITIONS DICTATE AND/OR WHERE REQUIRED BY LOCAL, STATE AND FEDERAL HEALTH AND SAFETY CODES.
10. FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO CONSTRUCTION. IF FIELD CONDITIONS ARE OBSERVED THAT VARY SIGNIFICANTLY FROM THOSE SHOWN ON THE DRAWINGS, IMMEDIATELY NOTIFY THE ENGINEER IN WRITING FOR RESOLUTION OF THE CONFLICTING INFORMATION.
11. PROTECT AND MAINTAIN ALL UTILITIES IN THE AREAS UNDER CONSTRUCTION DURING THE WORK. LEAVE ALL PIPES AND STRUCTURES WITHIN THE LIMITS OF THE CONTRACT IN A CLEAN AND OPERABLE CONDITION AT THE COMPLETION OF THE WORK. TAKE ALL NECESSARY PRECAUTIONS TO PREVENT SAND AND SILT FROM DISTURBED AREAS FROM ENTERING THE DRAINAGE SYSTEM.
12. NOTIFY THE ENGINEER IN WRITING OF ANY CONFLICT, ERROR, AMBIGUITY, OR DISCREPANCY WITH THE PLANS OR BETWEEN THE PLANS AND ANY APPLICABLE LAW, REGULATION, CODE, STANDARD SPECIFICATION, OR MANUFACTURER'S INSTRUCTIONS.
13. THE CONTRACTOR IS RESPONSIBLE FOR SUPPORT OF EXISTING UTILITIES AND REPAIR OR REPLACEMENT COSTS OF UTILITIES DAMAGED DURING CONSTRUCTION, WHETHER ABOVE OR BELOW GRADE. REPLACE DAMAGED UTILITIES IMMEDIATELY AT NO ADDITIONAL COST TO THE OWNER AND AT NO COST TO THE PROPERTY OWNER.
14. TAKE NECESSARY MEASURES AND PROVIDE CONTINUOUS BARRIERS OF SUFFICIENT TYPE, SIZE, AND STRENGTH TO PREVENT ACCESS TO ALL WORK AND STAGING AREAS AT THE COMPLETION OF EACH DAYS WORK.
15. NO OPEN TRENCHES WILL BE ALLOWED OVER NIGHT. THE USE OF ROAD PLATES TO PROTECT THE EXCAVATION WILL BE CONSIDERED UPON REQUEST, BUT BACKFILLING IS PREFERRED.
16. THE CONTRACTOR IS RESPONSIBLE FOR ALL NECESSARY TRAFFIC CONTROL/SAFETY DEVICES TO ENSURE SAFE VEHICULAR AND PEDESTRIAN ACCESS THROUGH THE WORK AREA, OR FOR SAFELY IMPLEMENTING DETOURS AROUND THE WORK AREA. PERFORM TRAFFIC CONTROL IN ACCORDANCE WITH THE CONTRACTOR'S APPROVED TRAFFIC CONTROL PLAN.
17. MAINTAIN EMERGENCY ACCESS TO ALL PROPERTIES WITHIN THE PROJECT AREA AT ALL TIMES DURING CONSTRUCTION.
18. WHEN WORKING IN THE ROAD, PROVIDE THE OWNER AND LOCAL FIRE/POLICE/SCHOOL AUTHORITIES A DETAILED PLAN OF APPROACH INDICATING METHODS OF PROPOSED TRAFFIC ROUTING ON A DAILY BASIS. PROVIDE COORDINATION TO ENSURE COMMUNICATION AND COORDINATION BETWEEN THE OWNER, CONTRACTOR AND LOCAL FIRE/POLICE/SCHOOL AUTHORITIES THROUGHOUT THE CONSTRUCTION PERIOD.
19. REMOVE AND DISPOSE OF ALL CONSTRUCTION-RELATED WASTE MATERIALS AND DEBRIS IN STRICT ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL LAWS.
20. THE TERM "DEMOLISH" USED ON THE DRAWINGS MEANS TO REMOVE AND DISPOSE OF IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL REQUIREMENTS.
21. THE TERM "ABANDON" USED ON THE DRAWINGS MEANS TO LEAVE IN PLACE AND TAKE APPROPRIATE MEASURES TO DECOMMISSION AS SPECIFIED OR NOTED ON THE DRAWINGS.
22. ALL PROPOSED WORK MAY BE ADJUSTED IN THE FIELD BY THE OWNER'S PROJECT REPRESENTATIVE TO MEET EXISTING CONDITIONS.

SURFACE RESTORATION NOTES

1. PROTECT PROJECT FEATURES (FENCES, TREES, ETC.) FROM DAMAGE DURING CONSTRUCTION, INCLUDING PROVIDING TEMPORARY SUPPORTS, WHEN APPROPRIATE.
2. IF REMOVAL OF PROJECT FEATURES IS REQUIRED IN ORDER TO PERFORM THE PROPOSED WORK, REMOVE THOSE SITE FEATURES ONLY UPON APPROVAL OF ENGINEER. REPLACE ALL REMOVED PROJECT FEATURES; NEW ITEMS SHALL BE EQUAL OR BETTER IN QUALITY AND CONDITION TO THE ITEMS REMOVED.
3. EXISTING SURVEY MONUMENTS DISTURBED BY THE CONTRACTOR SHALL BE REPLACED BY A LAND SURVEYOR LICENSED IN THE STATE IN WHICH THE WORK IS PERFORMED AT NO ADDITIONAL COST TO THE OWNER.
4. COORDINATE THE ADJUSTMENT OF EXISTING UTILITY STRUCTURES WITH EACH RESPONSIBLE UTILITY OWNER PRIOR TO RECONSTRUCTION AND/OR PAVING OPERATIONS. RAISE ALL STRUCTURES TO FINISHED GRADES PRIOR TO THE END OF THE CONSTRUCTION SEASON AND PRIOR TO FINISHED PAVING.
5. TRANSFER ALL TEMPORARY BENCHMARKS, AS NECESSARY.
6. RESTORE ALL AREAS DISTURBED BY THE CONTRACTOR BEYOND THE PAYLINE LIMITS TO ORIGINAL CONDITIONS AT NO ADDITIONAL COST TO THE OWNER.
7. REGRADE ALL UNPAVED AREAS DISTURBED BY THE WORK AS REQUIRED. REPAIR/REPLACE PAVED SURFACES DISTURBED BY THE WORK IN-KIND, UNLESS OTHERWISE NOTED. RESTORE SURFACES TO EXISTING OR PROPOSED CONDITIONS AS INDICATED ON THE DRAWINGS.
8. PROVIDE A SMOOTH, FLUSH TRANSITION BETWEEN ALL NEW AND EXISTING PAVEMENTS AND WALKING SURFACES.

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Harvard-Devens Water System Interconnection Project

Harvard Public Works Department

Harvard, Massachusetts

MARK	DATE	DESCRIPTION

PROJECT NO:	H1776-016
DATE:	DECEMBER 2023
FILE:	H1776-16-G-003.dwg
DRAWN BY:	TAL
DESIGNED/CHECKED BY:	JEC
APPROVED BY:	TJM

GENERAL NOTES, LEGEND, AND ABBREVIATIONS

SCALE: NO SCALE

G-003

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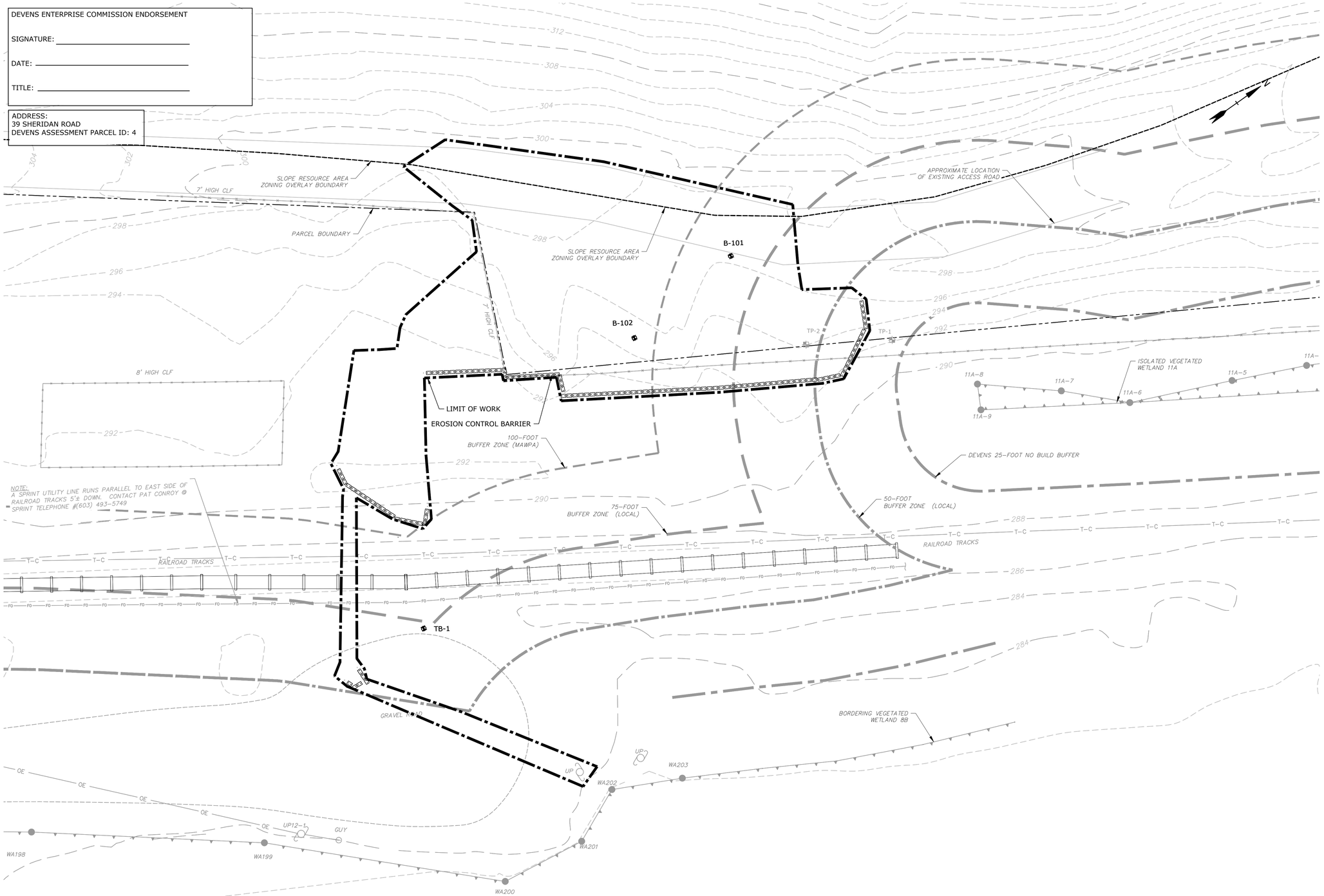
DEVENS ENTERPRISE COMMISSION ENDORSEMENT

SIGNATURE: _____

DATE: _____

TITLE: _____

ADDRESS:
39 SHERIDAN ROAD
DEVENS ASSESSMENT PARCEL ID: 4



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SCALE: 1" = 15'

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DESIGNED/CHECKED BY:	JEC
APPROVED BY:	TJM

EXISTING CONDITIONS AND EROSION CONTROL PLAN

SCALE: AS SHOWN

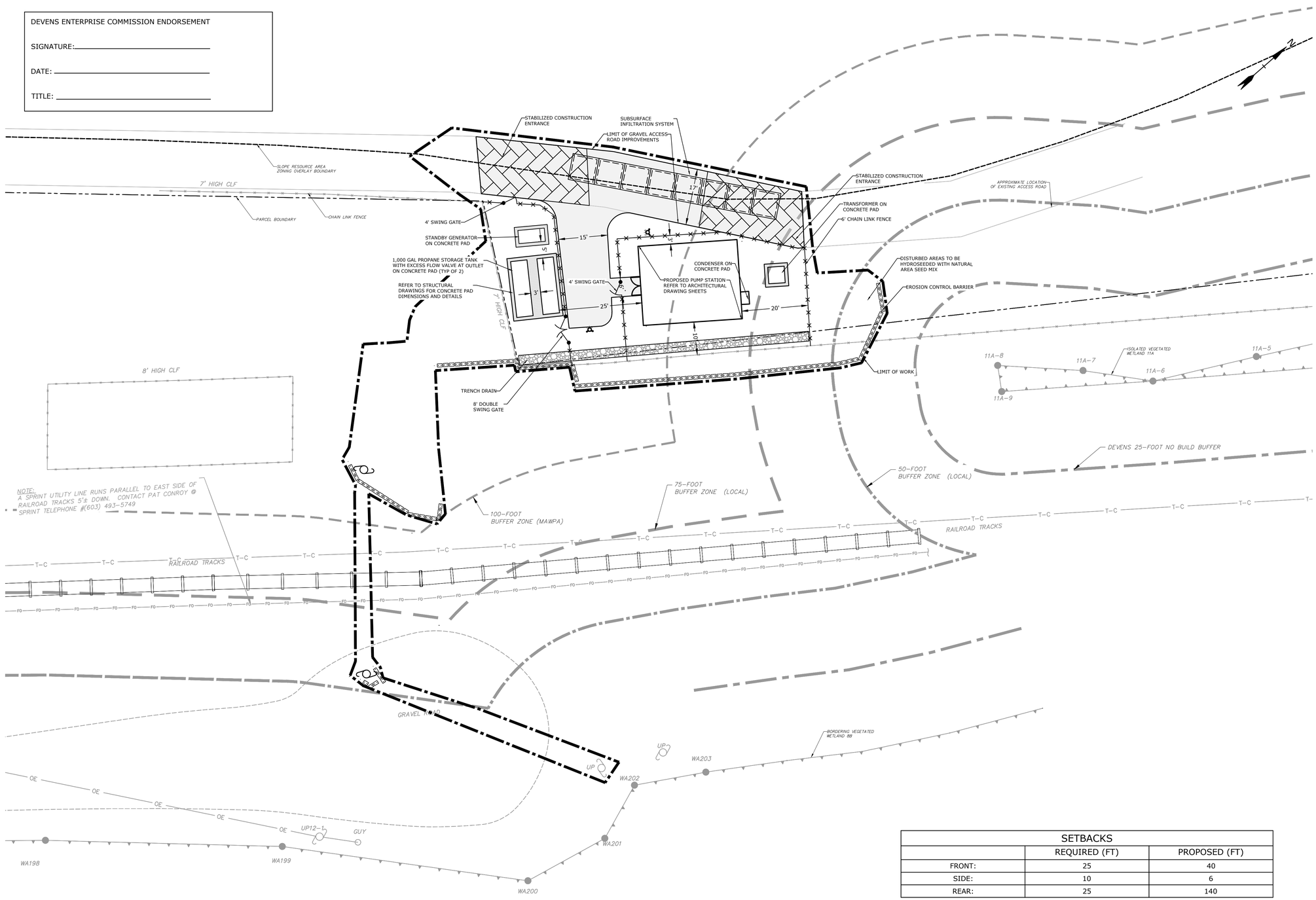
C-100

DEVENS ENTERPRISE COMMISSION ENDORSEMENT

SIGNATURE: _____

DATE: _____

TITLE: _____



SETBACKS		
	REQUIRED (FT)	PROPOSED (FT)
FRONT:	25	40
SIDE:	10	6
REAR:	25	140

Tighe&Bond
53 SOUTHAMPTON ROAD
WESTFIELD, MA 01085
(413) 562-1600

COMMONWEALTH OF MASSACHUSETTS
THOMAS MAHANNA
CIVIL
No. 39479
REGISTERED PROFESSIONAL ENGINEER
12/12/23

COMMONWEALTH OF MASSACHUSETTS
MARY E. DANIELSON
ENVIRONMENTAL
No. 55926
REGISTERED PROFESSIONAL ENGINEER
12/12/23

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Harvard-Devens Water System Interconnection Project

Harvard Public Works Department

Harvard, Massachusetts

MARK	DATE	DESCRIPTION

PROJECT NO:	H1776-016
DATE:	DECEMBER 2023
FILE:	H1776-16-C-200.dwg
DRAWN BY:	TAL
DESIGNED/CHECKED BY:	JEC
APPROVED BY:	TJM

SITE LAYOUT PLAN

SCALE: AS SHOWN

C-200

Last Saved: 12/8/2023
Printed: December 11, 2023 - 8:37am By: TLaBe
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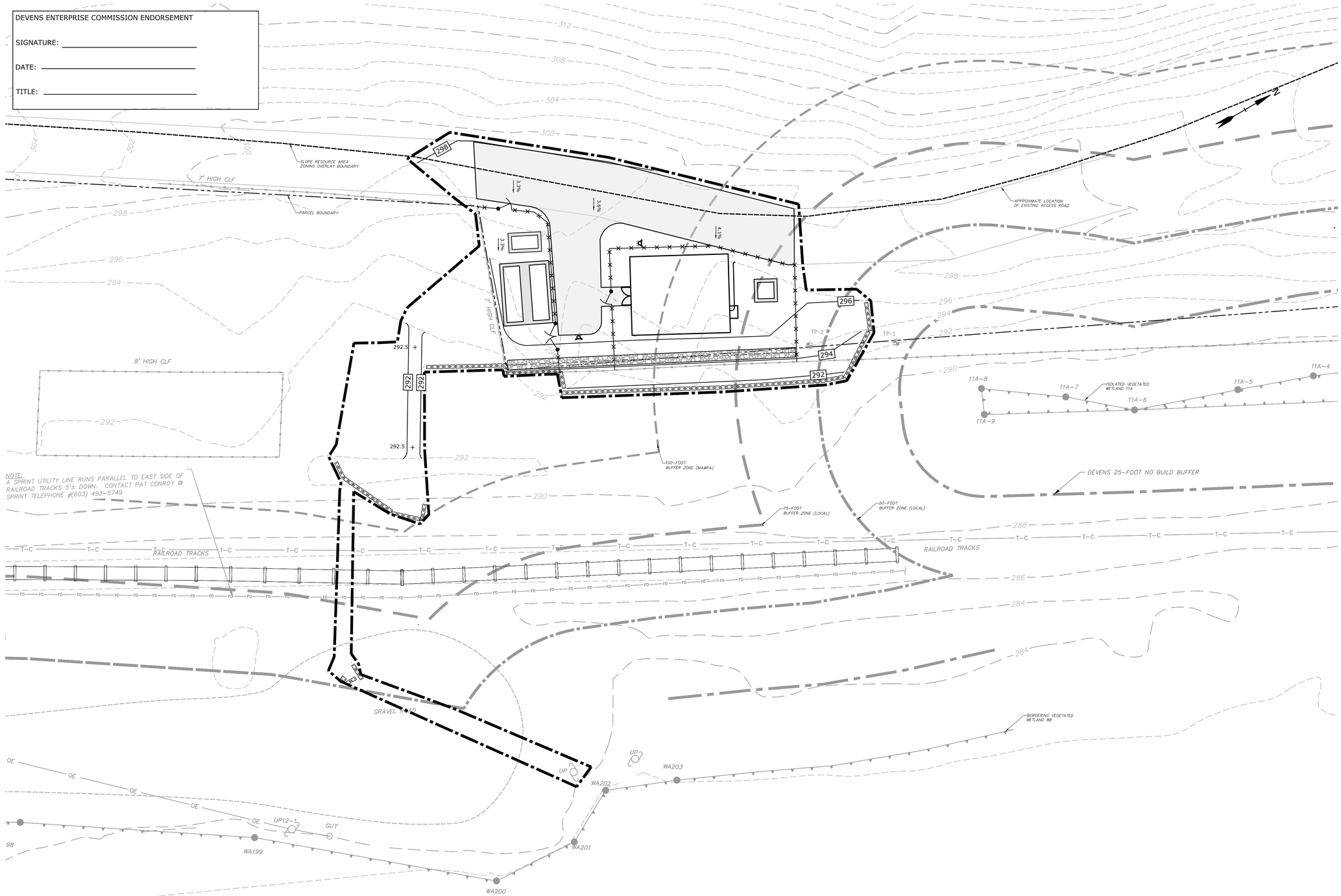
DEVENS ENTERPRISE COMMISSION ENDORSEMENT

SIGNATURE: _____

DATE: _____

TITLE: _____



SCALE: 1" = 15'

Tighe&Bond
53 SOUTHAMPTON ROAD
WESTFIELD, MA 01085
(413) 562-1600

COMMONWEALTH OF MASSACHUSETTS
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Harvard Public Works Department

Harvard, Massachusetts

MARK	DATE	DESCRIPTION

PROJECT NO:	H1776-016
DATE:	DECEMBER 2023
FILE:	H1776-16-C-300.dwg
DRAWN BY:	TAL
DESIGNED/CHECKED BY:	JEC
APPROVED BY:	TJM

GRADING PLAN

SCALE: AS SHOWN

C-301

Last Saved: 12/8/2023
Plotted: Dec 11, 2023 - 8:37am By: TLabbe
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DEVENS ENTERPRISE COMMISSION ENDORSEMENT

SIGNATURE: _____

DATE: _____

TITLE: _____

SUBSURFACE INFILTRATION SYSTEM
8 INFILTRATION CHAMBERS
CHAMBER TOP ELEV = 292.0
CHAMBER BOTTOM ELEV = 287.0
GRAVEL BED BOTTOM ELEV = 286.5
12" INV IN (STC 450i) = 292.0
12" INV IN (DMH 2) = 291.7
12" INV OUT (DMH 3) = 291.5

6.5' 12" HDPE @ 1.5% SLOPE

9' 6" HDPE @ 2.2% SLOPE

DOWNSPOUT TO 6" DIA HDPE CONNECTION INV OUT= 292.0

61' 12" HDPE @ 1.0% SLOPE

DMH 3
RIM = 292.3
INV IN (N)= 290.9
INV OUT (SE) = 290.8

PUMP STATION FFE = 297.0

DMH 2
RIM = 297.2
INV IN (NW)= 291.5
INV IN (SW) = 291.8
INV OUT (NE) = 291.8

18' 4" W UG TO DMH 2
FLOW FROM SAMPLE SINK
INV = 292.0

1.5 INCH STONE

6.5' 12" HDPE @ 1.8% SLOPE

STC 450i
RIM = 295.6
INV IN (SE)= 292.6
INV OUT (W) = 292.5

5.5' 12" HDPE @ 1.8% SLOPE

DMH 1
RIM = 294.5
INV IN (S) = 292.7
INV OUT (NW) = 292.7

TP-2

TP-1

LIMIT OF WORK

EROSION CONTROL BARRIER

3' 12" HDPE @ 3.3% SLOPE

TRANSITION FROM PERFORATED PIPE TO SOLID WALL PIPE
INV = 292.8

58' 12" HDPE @ 0.5% SLOPE

TOP OF BERM = 292.5

6" PERFORATED PIPE
INV = 293.8

FENCE SECTIONS SPACED TO AVOID CONFLICT WITH TRENCH DRAIN

TRENCH DRAIN
88' 6" PERFORATED HDPE @ 0.5% SLOPE

12" HDPE OUTLET
INV = 290.5

OUTLET PROTECTION

100-FOOT BUFFER ZONE (MAWPA)

75-FOOT BUFFER ZONE (LOCAL)

50-FOOT BUFFER ZONE (LOCAL)

DEVENS 25-FOOT NO BUILD BUFFER

APPROXIMATE LOCATION OF EXISTING ACCESS ROAD

SLOPE RESOURCE AREA ZONING OVERLAY BOUNDARY

PARCEL BOUNDARY

7' HIGH CLF

8' HIGH CLF

NOTE:
A SPRINT UTILITY LINE RUNS PARALLEL TO EAST SIDE OF RAILROAD TRACKS 5'± DOWN. CONTACT PAT CONROY @ SPRINT TELEPHONE #(603) 493-5749

RAILROAD TRACKS

GRAVEL ROAD

ISOLATED VEGETATED WETLAND 11A

BORDERING VEGETATED WETLAND 88

11A-4
11A-5
11A-6
11A-7
11A-8
11A-9

WA198
WA199
WA200
WA201
WA202
WA203

UP12-1

GUY

OE

SCALE: 1" = 15'

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53 SOUTHAMPTON ROAD
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Harvard-Devens Water System Interconnection Project

Harvard Public Works Department

Harvard, Massachusetts

MARK	DATE	DESCRIPTION

PROJECT NO:	H1776-016
DATE:	DECEMBER 2023
FILE:	H1776-16-C-300.dwg
DRAWN BY:	TAL
DESIGNED/CHECKED BY:	JEC
APPROVED BY:	TJM

GRADING AND DRAINAGE PLAN

SCALE: AS SHOWN

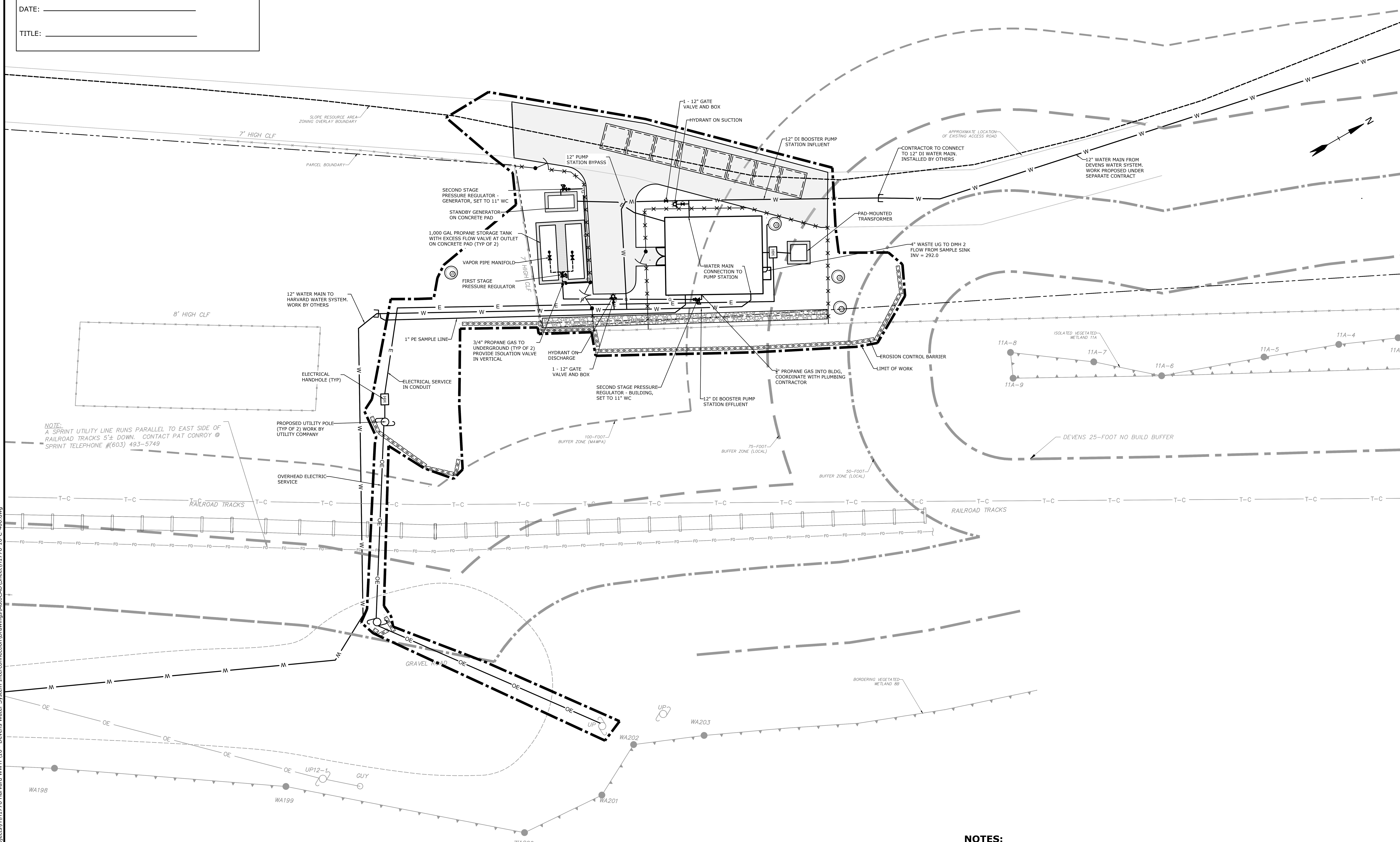
C-302

DEVENS ENTERPRISE COMMISSION ENDORSEMENT

SIGNATURE: ____________________

DATE: ____________________

TITLE: ____________________



SLOPE RESOURCE AREA ZONING OVERLAY BOUNDARY
7' HIGH CLF
PARCEL BOUNDARY
8' HIGH CLF
1 - 12" GATE VALVE AND BOX
HYDRANT ON SUCTION
12" DI BOOSTER PUMP STATION INFLUENT
12" PUMP STATION BYPASS
SECOND STAGE PRESSURE REGULATOR - GENERATOR, SET TO 11" WC
STANDBY GENERATOR ON CONCRETE PAD
1,000 GAL PROPANE STORAGE TANK WITH EXCESS FLOW VALVE AT OUTLET ON CONCRETE PAD (TYP OF 2)
VAPOR PIPE MANIFOLD
FIRST STAGE PRESSURE REGULATOR
WATER MAIN CONNECTION TO PUMP STATION
PAD-MOUNTED TRANSFORMER
4" WASTE UG TO DMH 2 FLOW FROM SAMPLE SINK INV = 292.0
APPROXIMATE LOCATION OF EXISTING ACCESS ROAD
CONTRACTOR TO CONNECT TO 12" DI WATER MAIN. INSTALLED BY OTHERS
12" WATER MAIN FROM DEVENS WATER SYSTEM. WORK PROPOSED UNDER SEPARATE CONTRACT
12" WATER MAIN TO HARVARD WATER SYSTEM. WORK BY OTHERS
1" PE SAMPLE LINE
3/4" PROPANE GAS TO UNDERGROUND (TYP OF 2) PROVIDE ISOLATION VALVE IN VERTICAL
HYDRANT ON DISCHARGE
1 - 12" GATE VALVE AND BOX
SECOND STAGE PRESSURE REGULATOR - BUILDING, SET TO 11" WC
12" DI BOOSTER PUMP STATION EFFLUENT
3/4" PROPANE GAS INTO BLDG, COORDINATE WITH PLUMBING CONTRACTOR
EROSION CONTROL BARRIER
LIMIT OF WORK
ELECTRICAL HANDHOLE (TYP)
ELECTRICAL SERVICE IN CONDUIT
PROPOSED UTILITY POLE (TYP OF 2) WORK BY UTILITY COMPANY
OVERHEAD ELECTRIC SERVICE
NOTE: A SPRINT UTILITY LINE RUNS PARALLEL TO EAST SIDE OF RAILROAD TRACKS 5'± DOWN. CONTACT PAT CONROY @ SPRINT TELEPHONE #(603) 493-5749
100-FOOT BUFFER ZONE (MAWPA)
75-FOOT BUFFER ZONE (LOCAL)
50-FOOT BUFFER ZONE (LOCAL)
ISOLATED VEGETATED WETLAND 11A
11A-8
11A-7
11A-6
11A-5
11A-4
11A-3
11A-9
DEVENS 25-FOOT NO BUILD BUFFER
RAILROAD TRACKS
GRAVEL ROAD
BORDERING VEGETATED WETLAND BB
WA198
WA199
WA200
WA201
WA202
WA203
UP12-1
GUY

NOTES:

1. TRENCHING, BACKFILLING, AND REGRADING BY GC
2. PROPANE PIPING AND COMPONENTS (TANKS, REGULATORS, VALVES, ANODELESS RISERS, ETC.) BY PROPANE SUPPLIER
3. PROVIDE ANODELESS RISERS AT ALL TRANSITIONS FROM ABOVEGROUND TO UNDERGROUND PIPING
4. GC AND PROPANE SUPPLIER TO COORDINATE
5. PROPANE PIPING IN BUILDING BY PLUMBING CONTRACTOR

0 15' 30'
SCALE: 1" = 15'

Tighe&Bond

COMMONWEALTH OF MASSACHUSETTS THOMAS MAHANNA CIVIL No. 39479 REGISTERED PROFESSIONAL ENGINEER 12/12/2023

COMMONWEALTH OF MASSACHUSETTS MARY E. DANIELSON ENVIRONMENTAL No. 55926 REGISTERED PROFESSIONAL ENGINEER 12/12/23

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Harvard-Devens Water System Interconnection Project

Harvard Public Works Department

Harvard, Massachusetts

MARK	DATE	DESCRIPTION

PROJECT NO:	H1776-016
DATE:	JULY 2023
FILE:	H1776-16-C-400.dwg
DRAWN BY:	TMP, JM
DESIGNED/CHECKED BY:	AL, MED
APPROVED BY:	TJM

UTILITY PLAN

SCALE: AS SHOWN

C-400

Last Saved: 12/8/2023
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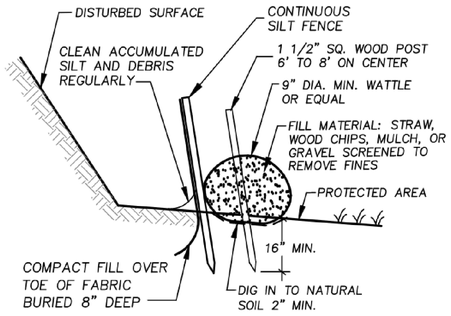
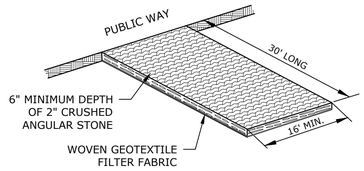
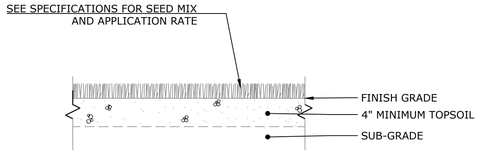


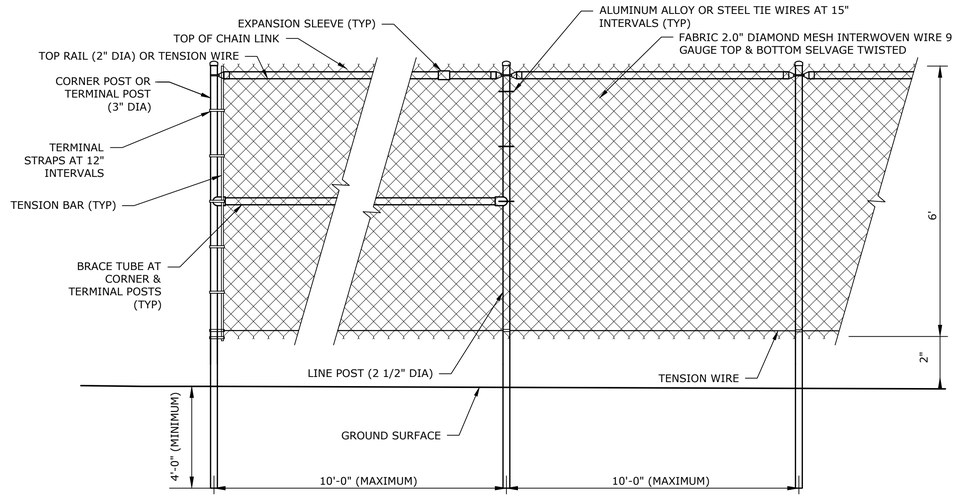
HARVARD SILT FENCE/WATTLE SILTATION BARRIER
NO SCALE



CONSTRUCTION ENTRANCE
NO SCALE



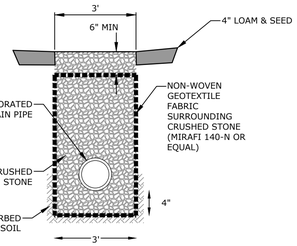
LAWN AREAS
NO SCALE



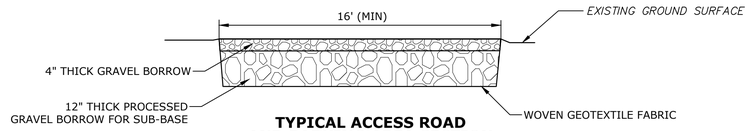
CHAIN LINK FENCING NOTES:

1. UNLESS OTHERWISE NOTED ON THE SITE PLANS, ALL CHAIN LINK FENCING COMPONENTS SHALL HAVE A HOT DIPPED GALVANIZED FINISH. ANY CHIPS IN THE GALVANIZED FINISH DUE TO SITE INSTALLATION SHOULD BE MINIMIZED AND REPAIRED WITH INDUSTRIAL GRADE GALVANIZED PAINT. ALL CUT ENDS ARE TO BE FINISHED WITH INDUSTRIAL GRADE PAINT-ON GALVANIZED FINISH.
2. CHAIN LINK FABRIC SHALL BE MADE OF 9 GAUGE STEEL WIRE, 2" MESH SIZE, AND HOT DIPPED GALVANIZED PRIOR TO WEAVING. THE FABRIC SHALL BE FINISHED WITH A SELVAGE TWIST TOP AND BOTTOM.
3. ALL POSTS ARE TO BE PLUMB IN ALL DIRECTIONS.
4. LINE & TERMINAL POSTS, BRACE TUBES, TOP RAILS, & GATE POSTS SHALL ALL BE SCHEDULE 40 PIPE. REFERENCED DIAMETER IS NOMINAL.
5. IF REFUSAL IS ENCOUNTERED, AUGER HOLES FOR POSTS AND BACKFILL WITH GRANULAR SOIL.

CHAIN LINK FENCE
NO SCALE



UNDERDRAIN DETAIL
NO SCALE



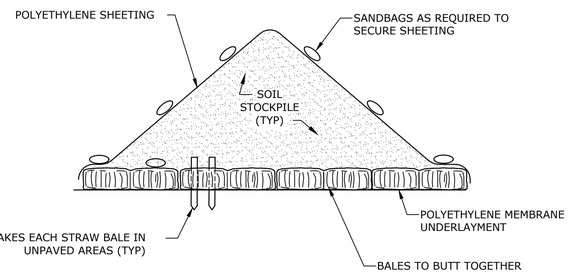
TYPICAL ACCESS ROAD AND PARKING AREA SECTION
NO SCALE

TABLE A - MAXIMUM SURFACE REPAIR PAY WIDTHS (SEE NOTE)	
NOMINAL PIPE DIAMETER 0 - 24"	
PAVEMENT TEMPORARY 6'-6" MAX. PERMANENT 8'-6" MAX.	LOAMING & SEEDING 8'-6" MAX.
TABLE B - MAXIMUM TRENCH EXCAVATION PAY WIDTHS (SEE NOTE)	
NOMINAL PIPE DIAMETER 0 - 24"	
5'-0"	

NOTES:

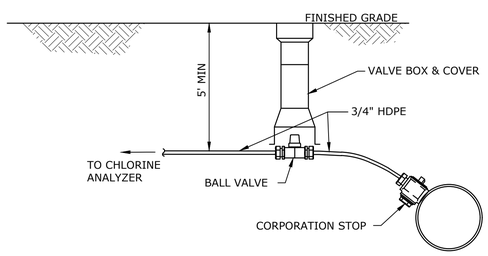
1. THE PAYLINE DIMENSIONS SHOWN REPRESENT THE MAXIMUM PAYLINE LIMITS TO BE PAID. WHEN THE ACTUAL SURFACE REPAIR OR TRENCH WIDTH IS LESS, THE ACTUAL WIDTH SHALL BE PAID FOR AT THE APPLICABLE UNIT PRICE.

TRENCH PAYLINES



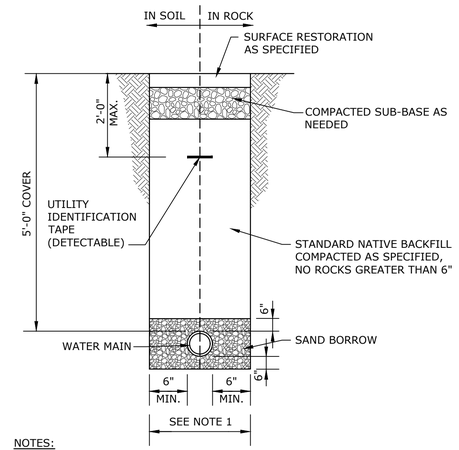
NOTES:
1. NATURAL FIBER COMPOSTABLE SILT SOCKS ARE ACCEPTABLE IN LIEU OF STRAW BALES. THE USE OF ANY MATERIALS CONTAINING PLASTIC MONOFILAMENT WEBBING IS PROHIBITED.

TEMPORARY CONTROLLED STOCKPILE AREA
NO SCALE



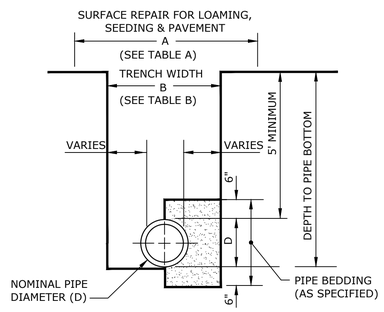
NOTES:
1. SAMPLING LINES ARE A 5' BURY, WITH A 1" HOSE NOZZLE. CONNECT TO CHLORINE ANALYZERS IN BOOSTER PUMP STATION.

SAMPLING LINE DETAIL
NO SCALE



NOTES:
1. SEE TRENCH EXCAVATION AND SURFACE REPAIR PAYLINES DETAIL.

TYPICAL WATER MAIN TRENCH
NO SCALE



TYPICAL TRENCH SECTION
NO SCALE

Tighe&Bond
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WESTFIELD, MA 01085
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COMMONWEALTH OF MASSACHUSETTS
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Harvard-Devens Water System Interconnection Project

Harvard Public Works Department

Harvard, Massachusetts

MARK	DATE	DESCRIPTION

PROJECT NO:	H1776-016
DATE:	DECEMBER 2023
FILE:	H1776-16-C-500.dwg
DRAWN BY:	TAL
DESIGNED/CHECKED BY:	JEC
APPROVED BY:	TJM

CIVIL DETAILS - 1

SCALE: AS SHOWN

C-501

Last Saved: 11/20/2023
Last Plotted: 12/12/2023 11:23am By: ASpinelli
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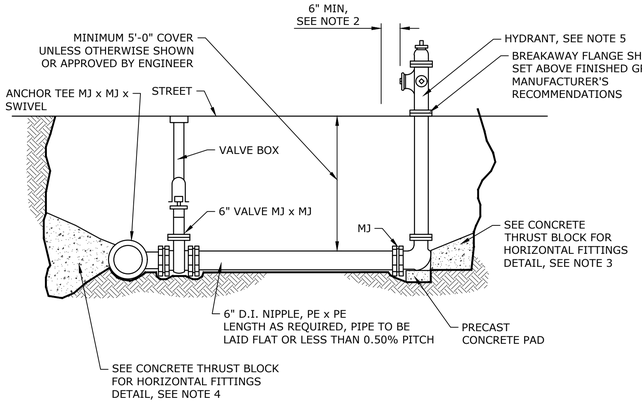
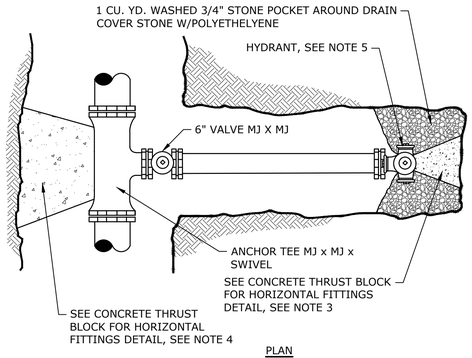


ELEVATION

NOTES:

1. ALL MJ JOINTS SHALL HAVE RETAINER GLANDS.
2. HYDRANT OFFSET DISTANCES TO EXISTING SURFACE FEATURES SHALL BE FIELD COORDINATED WITH THE OWNER AND AS DIRECTED BY THE ENGINEER.
3. CARE SHALL BE TAKEN TO SHIELD HYDRANT BASE DRAIN HOLES DURING PLACEMENT OF THE CONCRETE THRUST BLOCK. DRAIN HOLES SHALL BE VERIFIED AS OPEN AND FREE OF OBSTRUCTIONS PRIOR TO BACKFILLING.
4. CARE SHALL BE TAKEN TO SHIELD ALL MECHANICAL JOINT GLANDS AND BOLTS DURING PLACEMENT OF CONCRETE THRUST BLOCK. ALL BOLTS AND GLANDS SHALL BE FREE AND UNOBSTRUCTED BEFORE BACKFILLING.
5. HYDRANT SHALL BE SET PLUMB. VERTICAL HYDRANT EXTENSIONS SHALL BE USED AS NECESSARY TO PROPERLY LOCATE THE BREAKAWAY FLANGE PER MANUFACTURER'S RECOMMENDATIONS.



PLAN

HYDRANT INSTALLATION

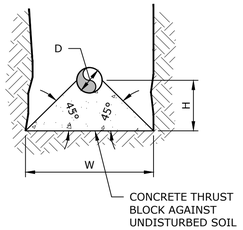
NO SCALE

SIZE (IN.)	FITTING	MINIMUM RESTRAINED LENGTH, FT.
8"	90° BEND	26
8"	45° BEND	11
8"	22 1/2° BEND	6
8"	11 1/4° BEND	3
8"	DEAD END	65
8"	45° VERTICAL UP BEND	11
8"	45° VERTICAL DOWN BEND	27
8"	8" TEE	44
	8"X6" REDUCER	28
	8"X6" TEE	23
6"	90° BEND	20
6"	45° BEND	8
6"	22 1/2° BEND	4
6"	11 1/4° BEND	2
6"	DEAD END	50
6"	45° VERTICAL UP BEND	8
6"	45° VERTICAL DOWN BEND	21
6"	6" TEE	16
12"	90° BEND	36
12"	45° BEND	15
12"	22 1/2° BEND	7
12"	11 1/4° BEND	4
12"	DEAD END	92
12"	45° VERTICAL UP BEND	15
12"	45° VERTICAL DOWN BEND	38
12"	12" TEE	56
	12"X10" REDUCER	27
	12"X8" REDUCER	49
	12"X8" TEE	33
	12"X6" TEE	10

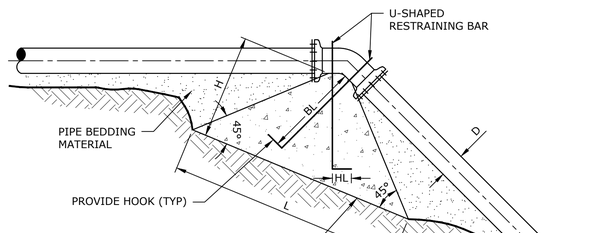
NOTES:

1. MINIMUM RESTRAINED LENGTH BASED ON DIPRA, RESTRAINED LENGTH CALCULATOR, LATEST EDITION.
2. THE FOLLOWING CONDITIONS APPLY:
   SOIL TYPE: SAND SILT
   MAX. PRESSURE: 200psi
   TRENCH TYPE 4
   BURIED DEPTH: 5'
3. TABLE SUBJECT TO RECALCULATIONS BASED ON OBSERVED FIELD CONDITIONS.

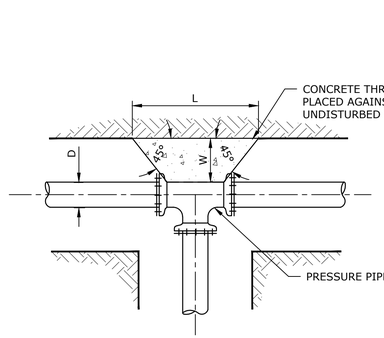
MINIMUM RESTRAINED LENGTHS FOR DI PIPE



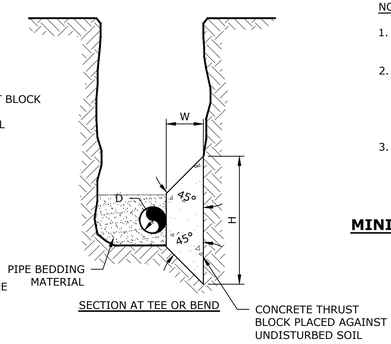
CAST-IN-PLACE SECTION



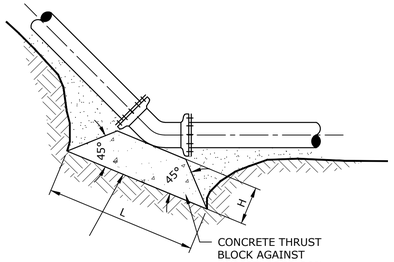
CAST-IN-PLACE DOWNWARD VERTICAL BEND



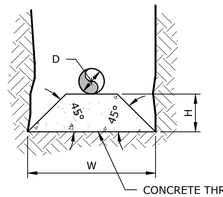
PLAN AT TEE



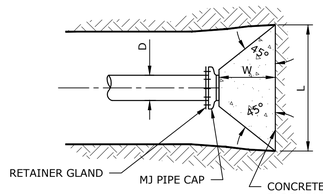
SECTION AT TEE OR BEND



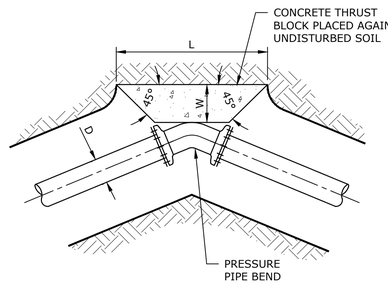
PRECAST UPWARD VERTICAL BEND



PRECAST SECTION



PLAN AT CAP



PLAN AT BEND

PRECAST UPWARD VERTICAL BENDS				
D	BEARING AREA (SF)	"L"	"H"	"W*"
6"	2.9	2.0'	1.4'	5'
8"	4.9	2.7'	1.8'	5'
12"	10.5	4.0'	2.6'	5'

* "W" IS BASED ON AN ASSUMED TRENCH WIDTH OF 5 FEET.

CAST-IN-PLACE DOWNWARD VERTICAL BENDS									
D	VOLUME (CF)	BEARING AREA (SF)	"L"	"H"	"W"*	RESTRAINING BAR SIZE	BAR LENGTH "BL"	HOOK LENGTH "HL"
6"	52.9	0.7	4.6'	2.3'	5'	2-#4	11.0"	8.0"
8"	90.9	1.3	6.0'	3.0'	5'	2-#4	11.0"	8.0"
12"	193.5	2.7	8.8'	4.4'	5'	2-#6	17.0"	12.0"

* "W" IS BASED ON AN ASSUMED TRENCH WIDTH OF 5 FEET.

NOTES:

1. THE THRUST BLOCK DIMENSIONS SHOWN WERE CALCULATED BASED ON A 200 PSI INTERNAL PIPE PRESSURE, A SOIL BEARING STRENGTH OF 3,000 PSF, AND A 45° BEND.
2. CONCRETE THRUST BLOCKS SHALL BE POURED AGAINST UNDISTURBED SOIL.
3. DIMENSIONS L, H, & W MAY BE ADJUSTED TO MEET FIELD CONDITIONS, PROVIDED THE BEARING AREA REMAINS UNCHANGED, UPON APPROVAL BY ENGINEER.
4. DOWNWARD VERTICAL BENDS SHALL BE RESTRAINED BY CAST-IN-PLACE CONCRETE THRUST BLOCKS OR OTHER RESTRAINING METHOD AS APPROVED BY ENGINEER.
   - RESTRAINING BARS SHALL BE ASTM A615 GRADE 60 REINFORCING STEEL.
   - THE PORTION OF THE RESTRAINING BARS EXPOSED TO SOIL SHALL BE PROVIDED WITH TWO COATS OF BITUMASTIC MATERIAL.
   - POLYETHYLENE SHEETING (MIN. THICKNESS OF 4 MILS) SHALL BE PLACED OVER MJ FITTINGS TO PREVENT DIRECT CONTACT BETWEEN CONCRETE AND THE FITTING.

PRECAST & CAST-IN-PLACE CONCRETE THRUST BLOCK FOR VERTICAL BENDS

NO SCALE

PRECAST CONCRETE THRUST BLOCK																
	45° BEND				22½° BEND				11 ¼° BEND				TEE/END			
D	BEARING AREA (SF)	"L"	"H"	"W"	BEARING AREA (SF)	"L"	"H"	"W"	BEARING AREA (SF)	"L"	"H"	"W"	BEARING AREA (SF)	"L"	"H"	"W"
6"	2.9	2.0'	1.4'	0.7'	1.5	1.5'	1.0'	0.5'	0.7	1.0'	0.7'	0.4'	2.3	2.3'	1.6'	0.8'
8"	4.9	2.7'	1.8'	0.9'	2.5	1.9'	1.3'	0.7'	1.3	1.4'	0.9'	0.5'	3.1	3.1'	2.1'	1.1'
12"	10.5	4.0	2.2'	1.3'	5.3	2.8'	1.9'	1.0'	2.7	2.1'	1.3'	0.7'	13.7	4.6'	3.0'	1.5'

NOTES:

1. THE THRUST BLOCK DIMENSIONS SHOWN WERE CALCULATED BASED ON A 200 PSI INTERNAL PIPE PRESSURE AND A SOIL BEARING STRENGTH OF 3,000 PSF.
2. CONCRETE THRUST BLOCKS SHALL BE PLACED AGAINST UNDISTURBED SOIL.
3. DIMENSIONS L, H, & W MAY BE ADJUSTED TO MEET FIELD CONDITIONS, PROVIDED THE BEARING AREA REMAINS UNCHANGED, UPON APPROVAL OF ENGINEER.
4. THE HEIGHT OF THE BLOCK (H) SHALL BE LESS THAN OR EQUAL TO HALF THE TRENCH DEPTH BUT NOT LESS THAN THE PIPE DIAMETER.

PRECAST CONCRETE THRUST BLOCK FOR HORIZONTAL FITTINGS

NO SCALE

Tighe&Bond
53 SOUTHAMPTON ROAD
WESTFIELD, MA 01085
(413) 562-1600

COMMONWEALTH OF MASSACHUSETTS
THOMAS MAHANNA
CIVIL
No. 39479
REGISTERED PROFESSIONAL ENGINEER
12/12/23

COMMONWEALTH OF MASSACHUSETTS
MARY E. DANIELSON
ENVIRONMENTAL
No. 55926
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12/12/23

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Harvard-Devens Water System Interconnection Project

Harvard Public Works Department

Harvard, Massachusetts

MARK	DATE	DESCRIPTION

PROJECT NO:	H1776-016
DATE:	DECEMBER 2023
FILE:	H1776-16-C-500.dwg
DRAWN BY:	TAL
DESIGNED/CHECKED BY:	JEC
APPROVED BY:	TJM

CIVIL DETAILS - 2

SCALE: AS SHOWN

C-502

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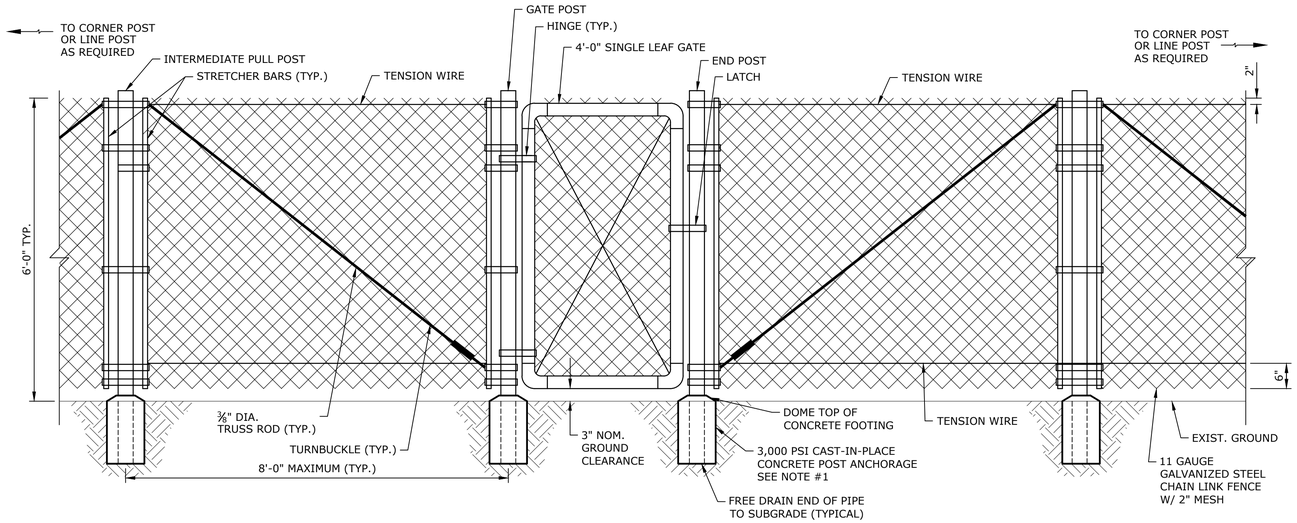


6' CHAIN LINK FENCE AND GATE DETAIL
NO SCALE

NOTES:

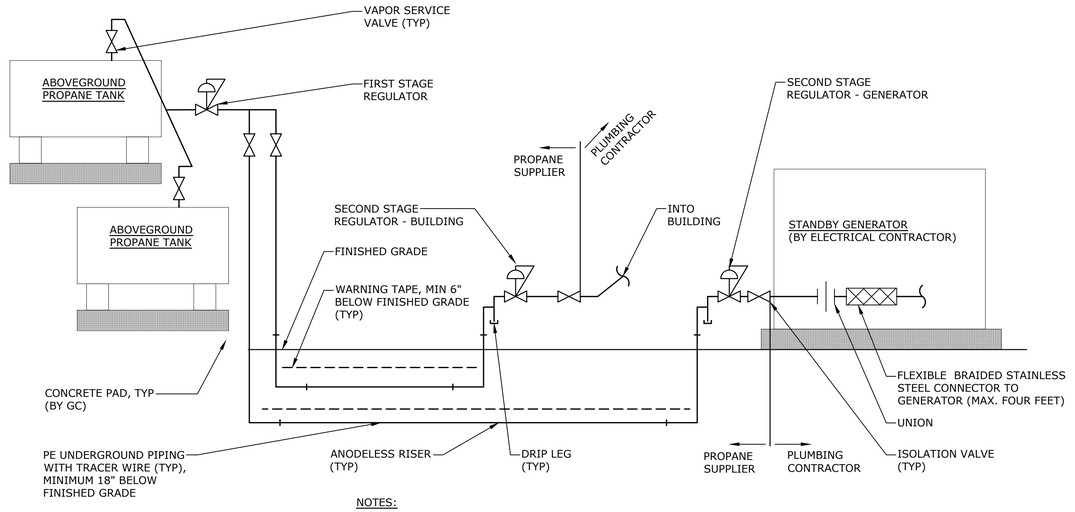
1. CONTRACTOR SHALL SET GATE AND END POSTS IN 10"Ø X 3-6" LONG CONCRETE BASES. CORNER AND INTERMEDIATE POSTS SHALL BE SET IN 10" Ø X 3'-0" LONG CONCRETE BASES.

2. TOP AND BOTTOM TENSION WIRES SHALL BE 7 GAUGE GALVANIZED STEEL. THE METHOD BY WHICH TENSION WIRE IS FASTENED TO POSTS SHALL BE APPROVED BY THE ENGINEER.

3. MATERIAL FOR POSTS SHALL BE AS FOLLOWS:
   GATE POST: SCHEDULE 40 STEEL PIPE, 2 ⅞" O.D., 5.79 LBS/FT
   END, CORNER, AND INTERMEDIATE POSTS: SCHEDULE 40 STEEL PIPE, 2 ⅜" O.D., 3.65 LBS/FT.

4. STRETCHER BARS SHALL BE GALVANIZED STEEL, ⅜" x ¾".

5. CONTRACTOR SHALL SUBMIT SHOP DRAWING FOR LOCK TO SECURE GATE LATCH FOR ENGINEER'S APPROVAL.

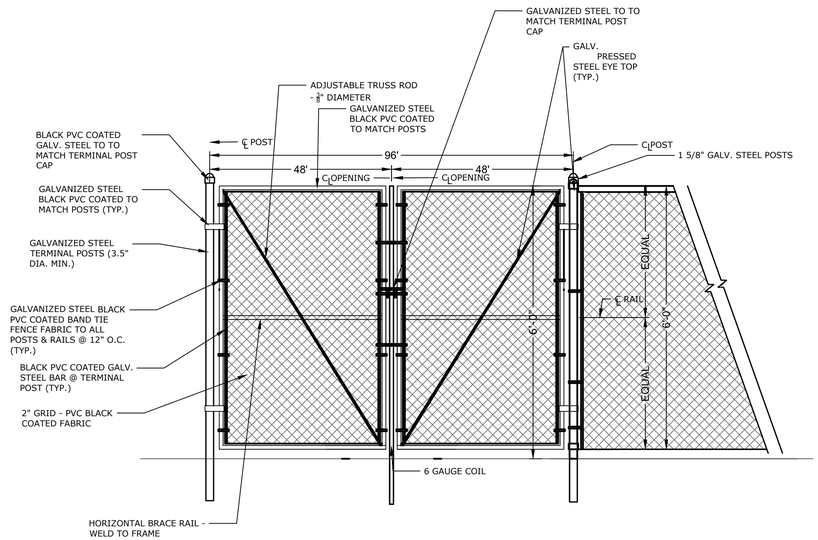


NOTES:

1. FOLLOW LOCAL AND MANUFACTURER REQUIREMENTS. SHOWN COMPONENTS REPRESENT MINIMUM INSTALLATION REQUIREMENTS.

2. COORDINATE INSTALLATION WITH GC AND PROPANE SUPPLIER.

PROPANE PIPING FOR OUTDOOR GENERATOR
NO SCALE



8' DOUBLE CHAINLINK GATE
NO SCALE

Tighe&Bond
53 SOUTHAMPTON ROAD
WESTFIELD, MA 01085
(413) 562-1600

COMMONWEALTH OF MASSACHUSETTS
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Harvard Public Works Department

Harvard, Massachusetts

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APPROVED BY:	TJM

CIVIL DETAILS - 3

SCALE: AS SHOWN

C-503

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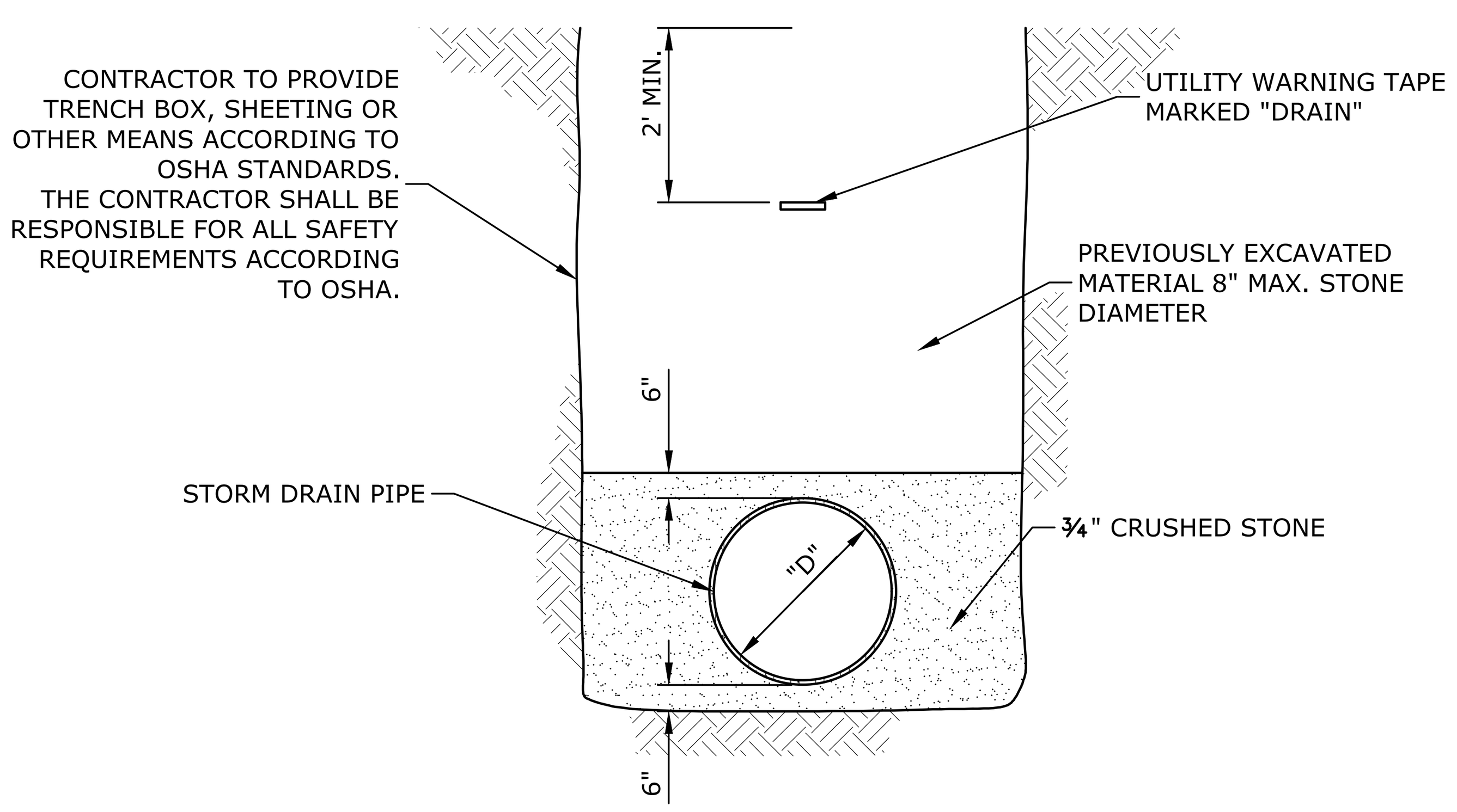
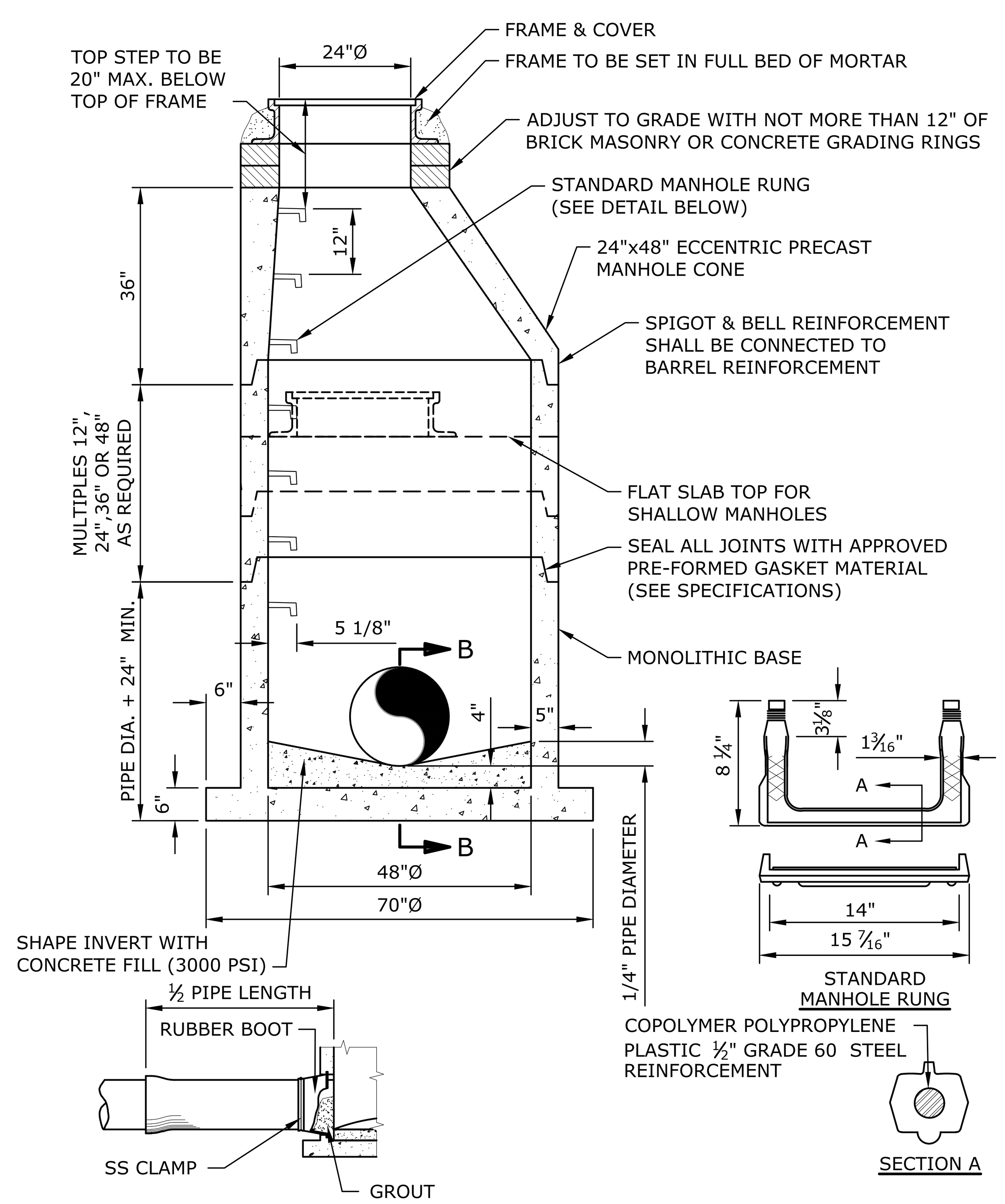
Tighe&Bond
53 SOUTHAMPTON ROAD
WESTFIELD, MA 01085
(413) 562-1600

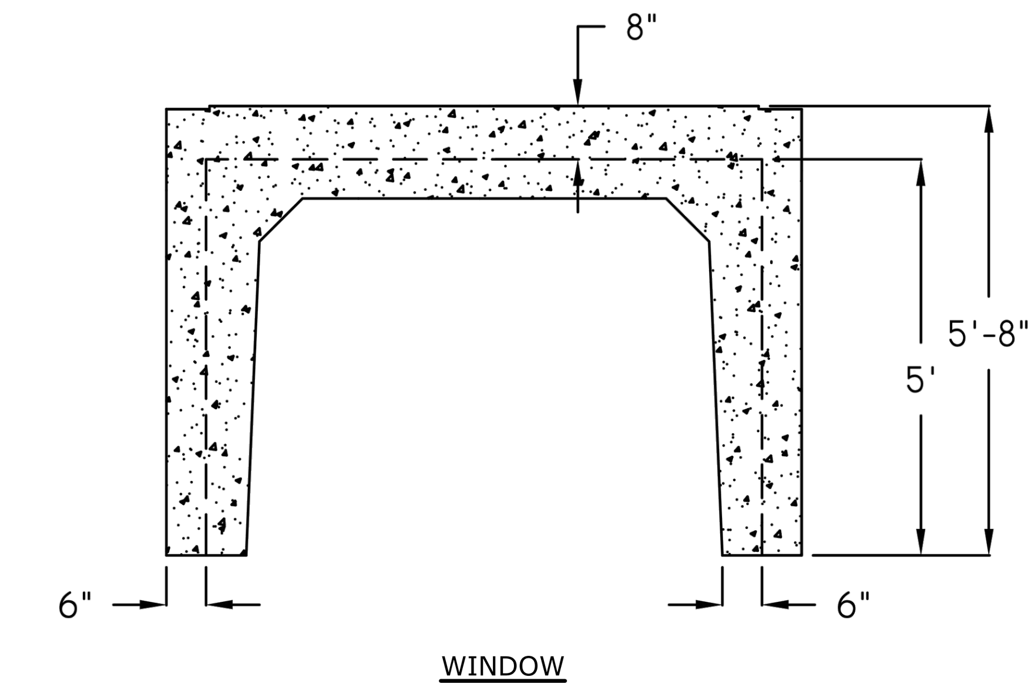


NOTES:
1. COMPACT ALL BACKFILL MATERIAL WITH VIBRATORY PLATE EQUIPMENT (MINIMUM TWO PASSES) TO A MINIMUM DENSITY OF 95 PERCENT OF THE STANDARD PROCTOR DENSITY AS DETERMINED BY ASTM D698.
2. PLACE BACKFILL MATERIAL IN MAXIMUM ONE FOOT LIFTS.
3. FOR PIPES LESS THAN 24" IN DIAMETER THE TRENCH WIDTH SHALL BE 5.0'. FOR PIPES 24" IN DIAMETER AND GREATER, TRENCH WIDTH SHALL BE THE PIPE DIAMETER + 3.0'

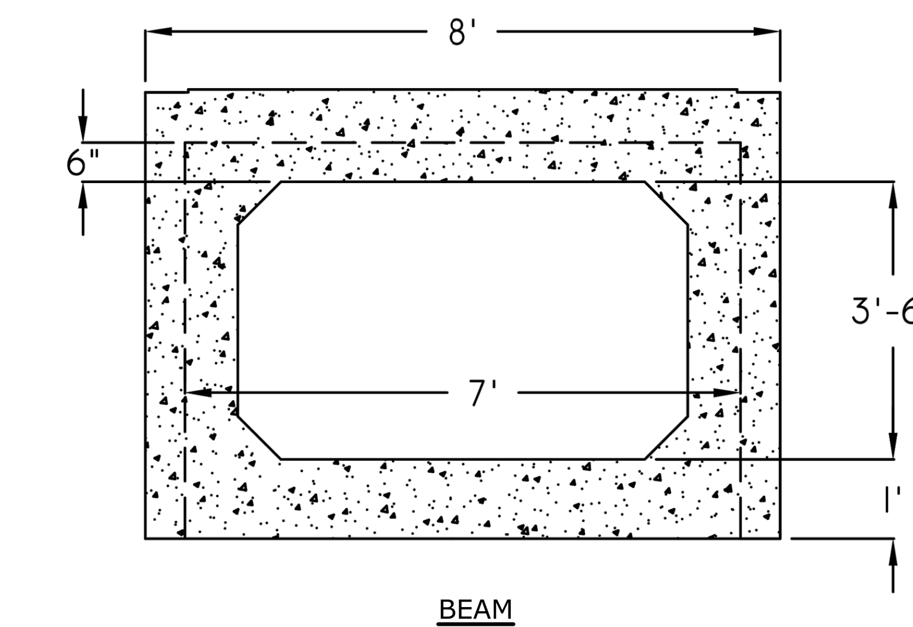
TYPICAL DRAIN TRENCH SECTION
NO SCALE



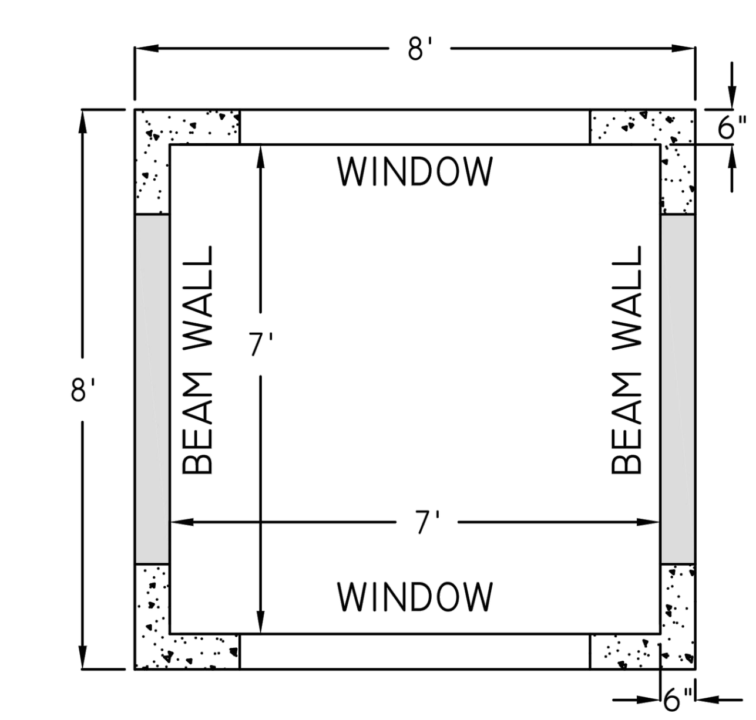
48" PRECAST DRAIN MANHOLE
NO SCALE



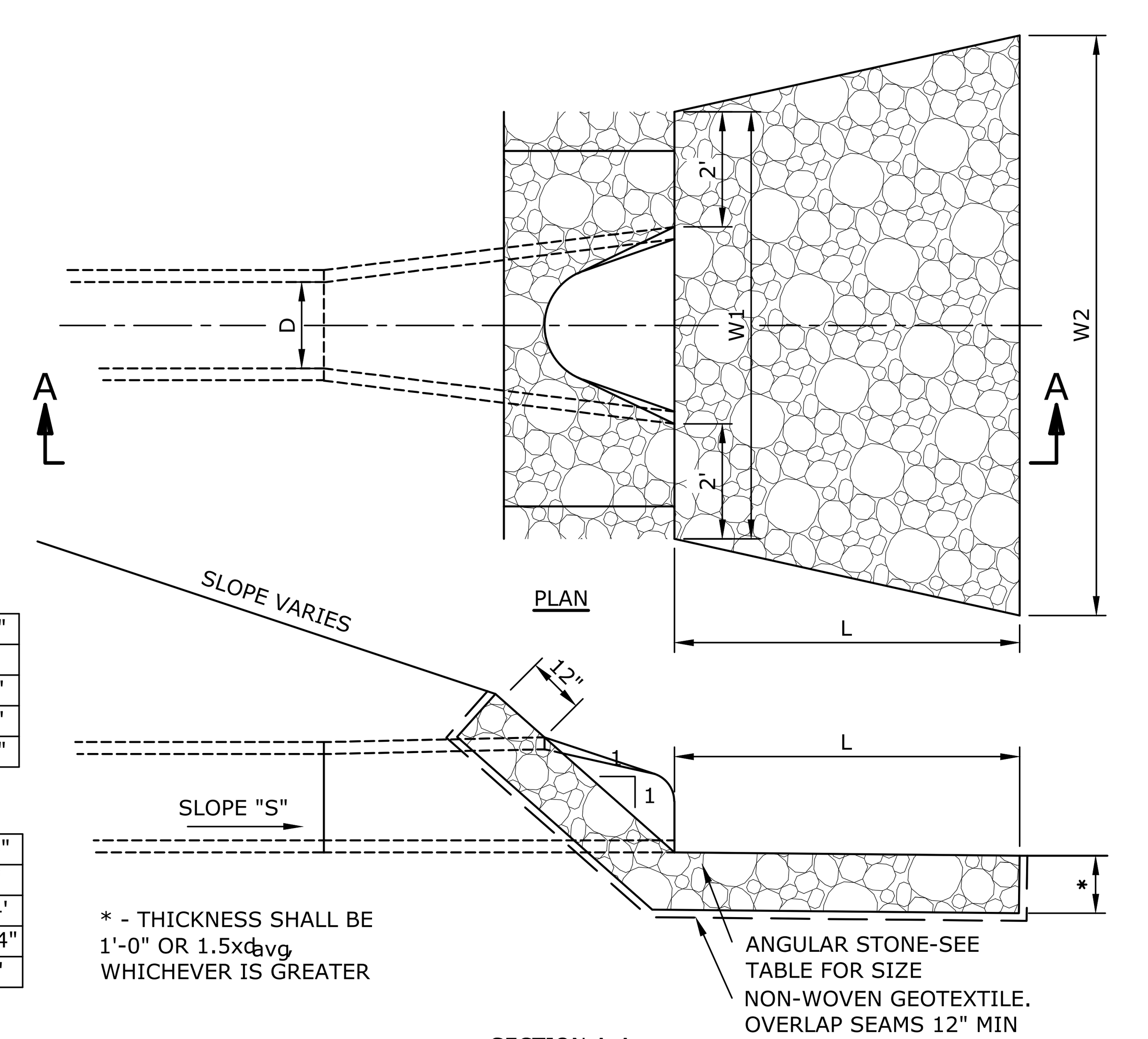
INSIDE DIMENSION	CAPACITY (GAL)	CAPACITY (CU FT)	WEIGHT (LBS)
2'	829	110.28	9090
2.5'	1056	140.44	9366
3'	1283	170.61	9640.5
3.5'	1510	200.78	9915
4'	1737	230.94	10191
4.5'	1964	261.11	10465.5
5'	2190	291.28	10740



NOTES:
1. CONRETE - 5,000 PSI, 28 DAYS
2. REINFORCING STEEL CONFORMS TO LATEST ASTM A615 AND A82 OR A185 SPECS
3. H-20 DESIGN LOADING PER AASHTO HS-20-44



RETAIN-IT INFILTRATION SYSTEM MODULE
NO SCALE



DIMENSIONS FOR "S"=5.0%

D	12"	15"	18"	21"	24"
W1	6'	6'-6"	7'	7'-6"	8'
W2	14'	18'	18'	22'	26'
L	8'	12'	12'	16'	20'
davg	6"	6"	8"	12"	12"

DIMENSIONS FOR "S"=1.0%

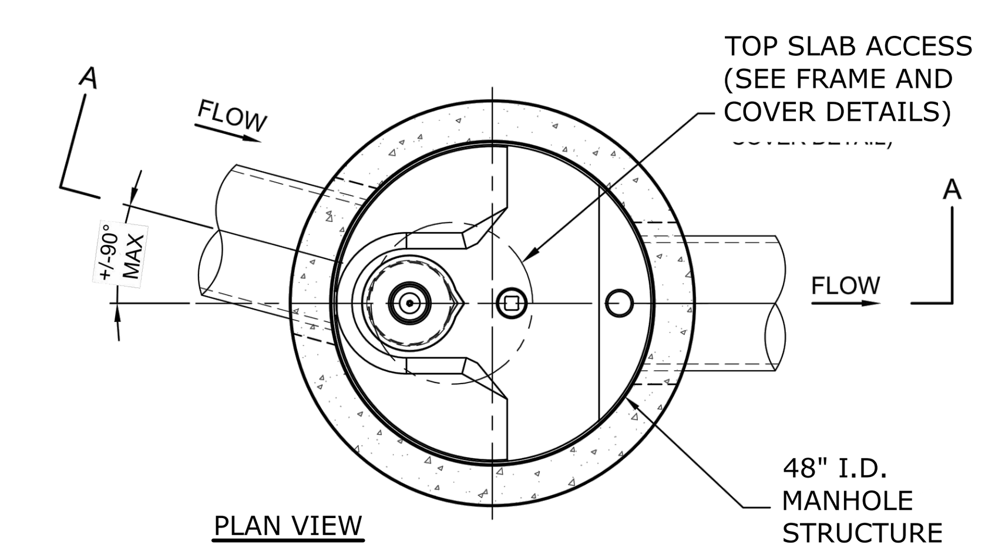
D	12"	15"	18"	21"	24"
W1	6'	6'-6"	7'	7'-6"	8'
W2	6'	8'	10'	12'	14'
L	5'	5'	5'	6'-6"	8'-4"
davg	3"	6"	6"	6"	6"

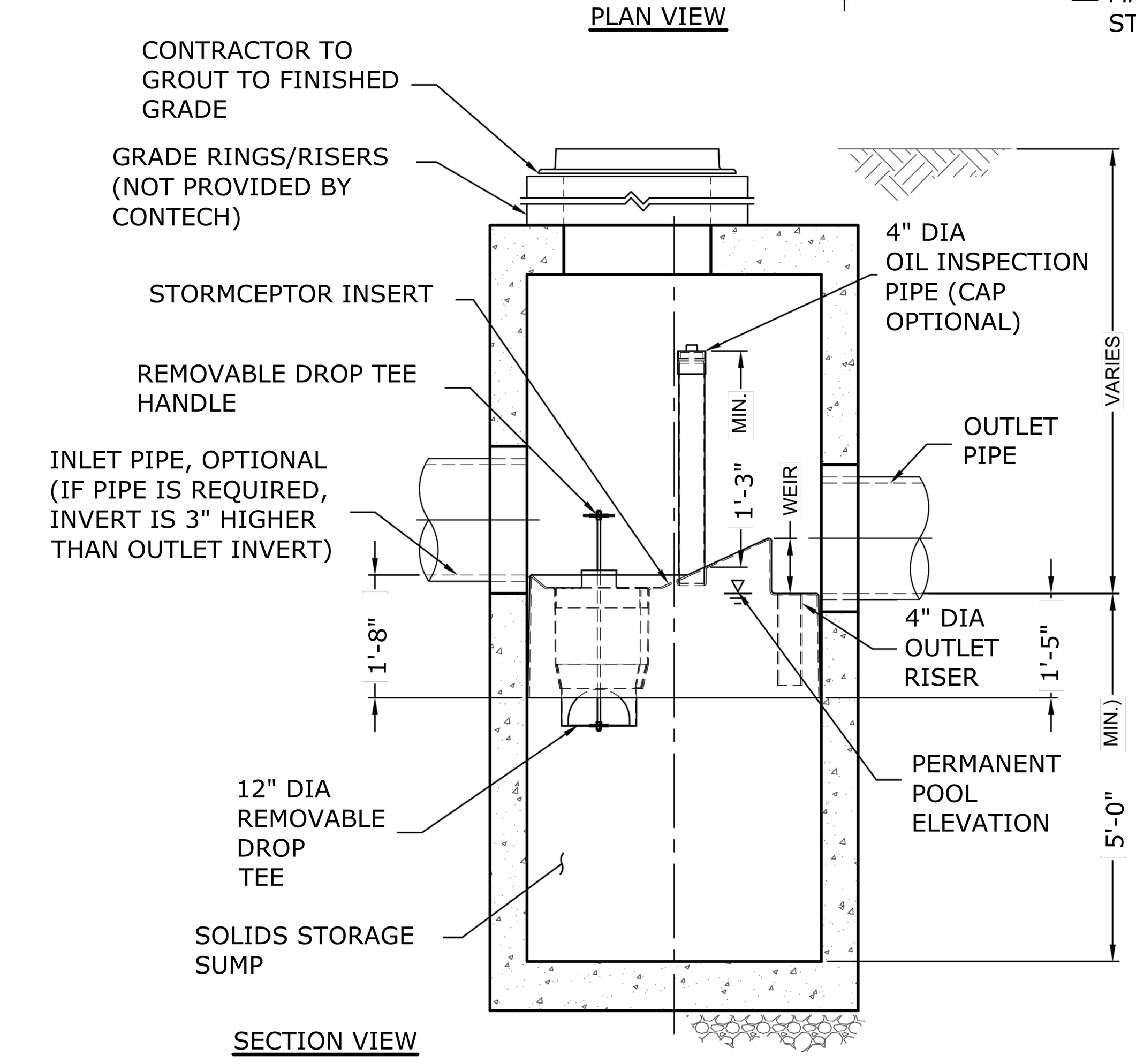
davgDENOTES AVERAGE STONE DIAMETER

* - THICKNESS SHALL BE 1'-0" OR 1.5xdavg WHICHEVER IS GREATER

ANGULAR STONE-SEE TABLE FOR SIZE
NON-WOVEN GEOTEXTILE. OVERLAP SEAMS 12" MIN

STONE OUTLET PROTECTION
NO SCALE





STORMCEPTOR STC 450i
NO SCALE

THOMAS MAHANNA CIVIL No. 39479 REGISTERED PROFESSIONAL ENGINEER COMMONWEALTH OF MASSACHUSETTS 12/12/2023

COMMONWEALTH OF MASSACHUSETTS MARY E. DANIELSON ENVIRONMENTAL No. 55926 REGISTERED PROFESSIONAL ENGINEER 12/12/23

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Harvard Public Works Department

Harvard, Massachusetts

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DESIGNED/CHECKED BY:	JEC
APPROVED BY:	TJM

CIVIL DETAILS - 4

SCALE: AS SHOWN

C-504

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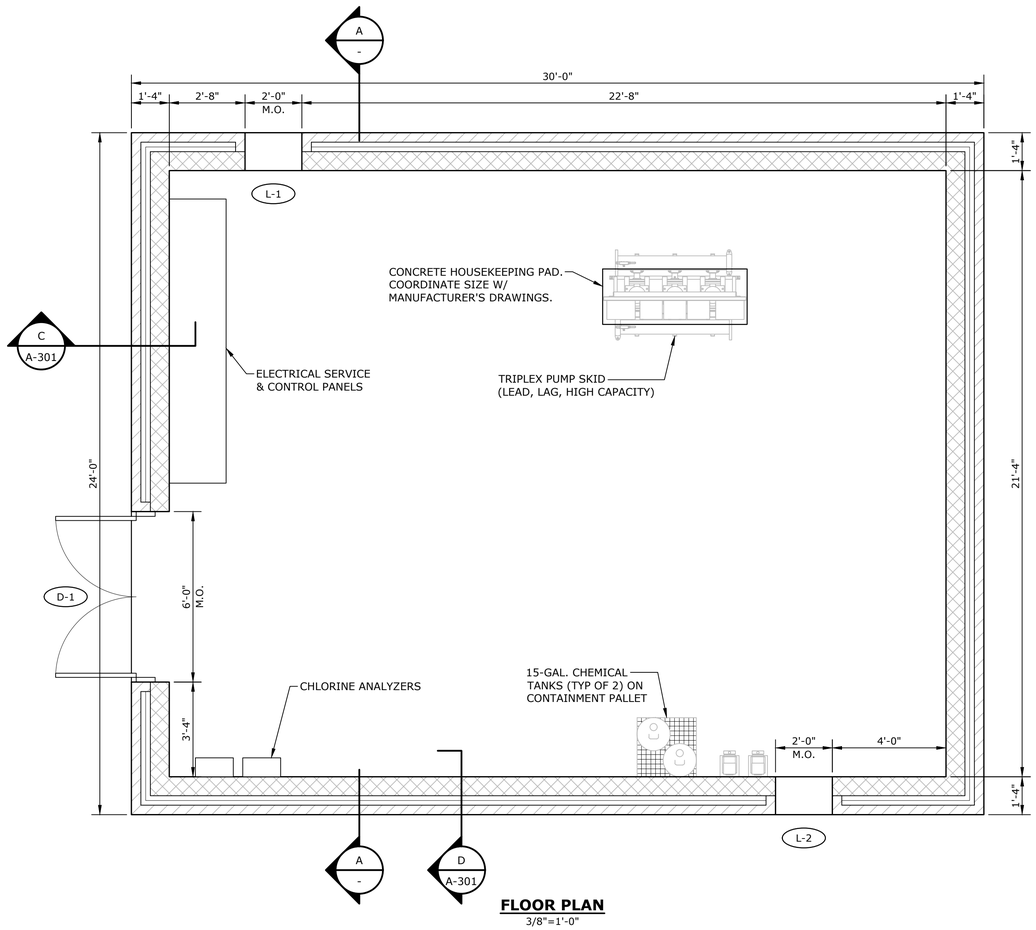
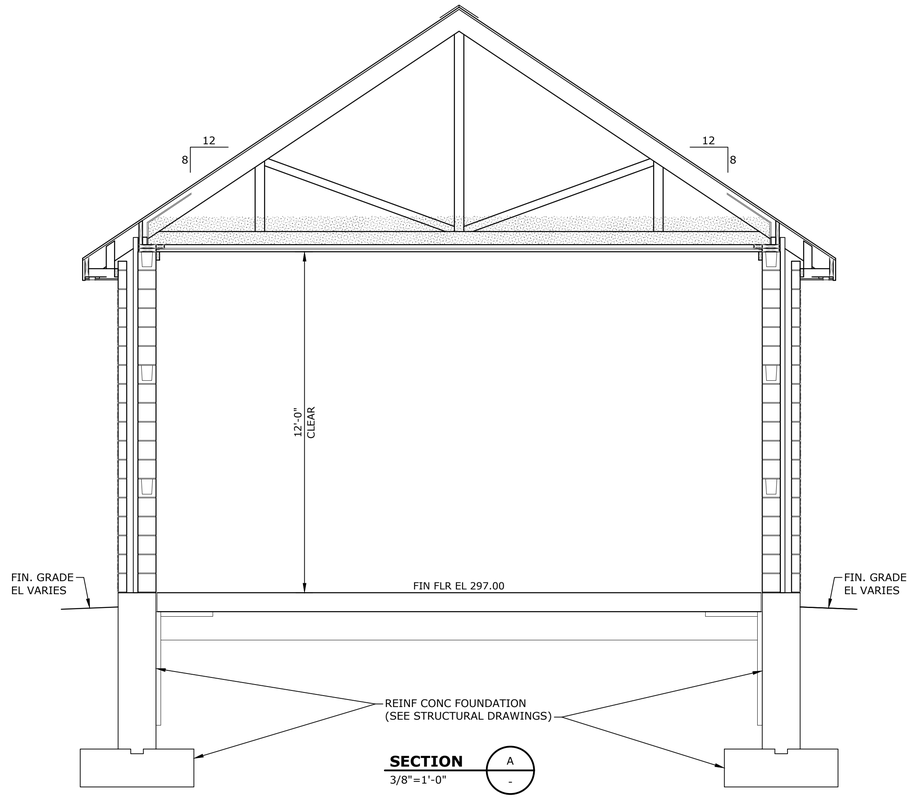


FLOOR PLAN
3/8"=1'-0"



SECTION A
3/8"=1'-0"

LEGEND

- CMU WALL
- CMU SPLIT FACE VENEER
- EJ — EXPANSION JOINT
- W-# — WINDOW DESIGNATION, SEE SCHEDULE ON DRAWING A-501
- D-# — DOOR DESIGNATION, SEE SCHEDULE ON DRAWING A-501

NOTES:

1. ALIGN MASONRY CONTROL JOINTS WITH FOUNDATION WALL CONCRETE CONSTRUCTION JOINTS.
2. FOR MASONRY DOWEL LOCATION SEE FLOOR PLAN ON DRAWING S-102.
3. ALL FACADE BRICK SHALL TURN IN AT OPENINGS TO CMU BACKUP.

0 2' 4' 6'
SCALE: 3/8"=1'-0"

Tighe&Bond

COMMONWEALTH OF MASSACHUSETTS
THOMAS MAHANNA
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No. 39479
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12/12/23

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DESIGNED/CHECKED BY:	X
APPROVED BY:	TJM

ARCHITECTURAL FLOOR AND ROOF PLANS

SCALE: AS SHOWN

A-101
SHEET X OF X

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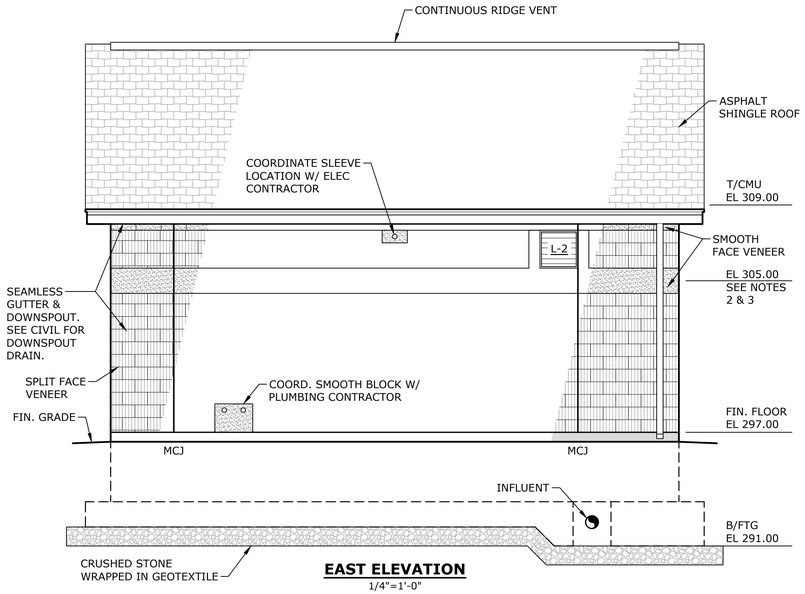
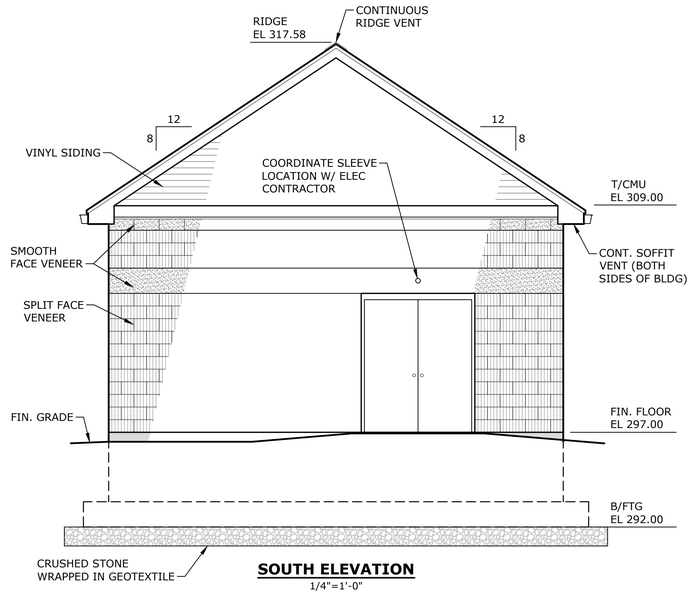
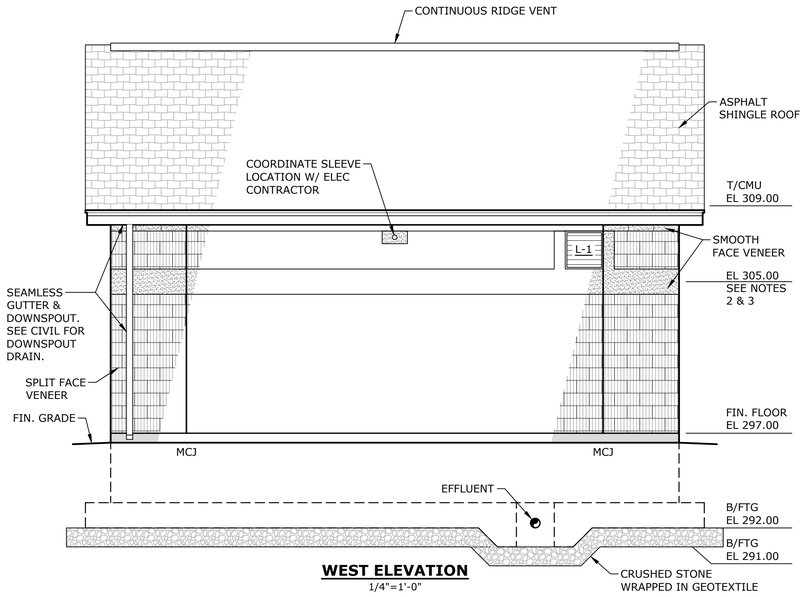


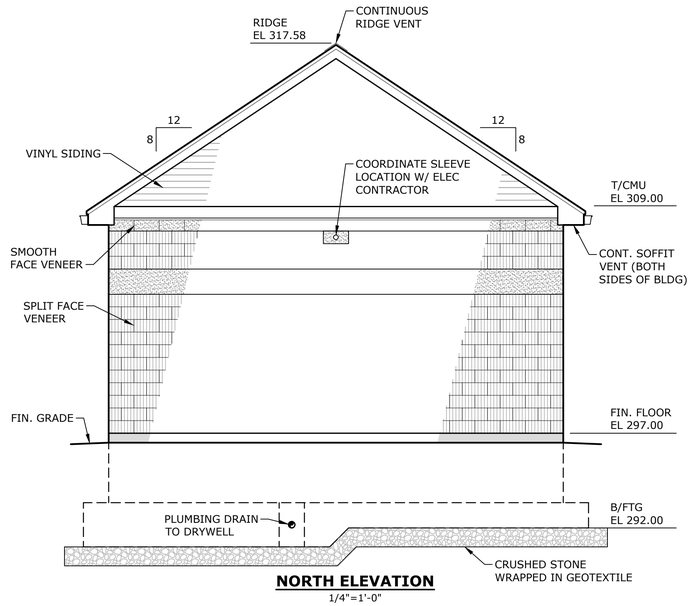
EAST ELEVATION
1/4"=1'-0"



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



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



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

NOTES:

1. PROVIDE SMOOTH FACE EXTERIOR BLOCK AT ALL MASONRY PENETRATIONS.
2. ALL TRADES TO COORDINATE PIPE AND CONDUIT PENETRATIONS CENTERED THROUGH SMOOTH FACE BLOCK AT EL 305.00.
3. SMOOTH FACE BLOCK COURSE BELOW EL 305.00 IS A STRUCTURAL BOND BEAM; DO NOT DRILL THOUGH BOND BEAM BLOCK COURSE.
4. PROVIDE METAL SLEEVE FOR ALL MEP PIPE PENETRATIONS PRIOR TO INSTALLATION OF PIPEWORK AT PENETRATION LOCATIONS.

0 2' 4' 6'
SCALE: 3/8"=1'-0"

Tighe&Bond

COMMONWEALTH OF MASSACHUSETTS
THOMAS MAHANNA
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DRAWN BY:	RWK
DESIGNED/CHECKED BY:	X
APPROVED BY:	TJM

EXTERIOR ELEVATIONS

SCALE: AS SHOWN

A-201
SHEET X OF X

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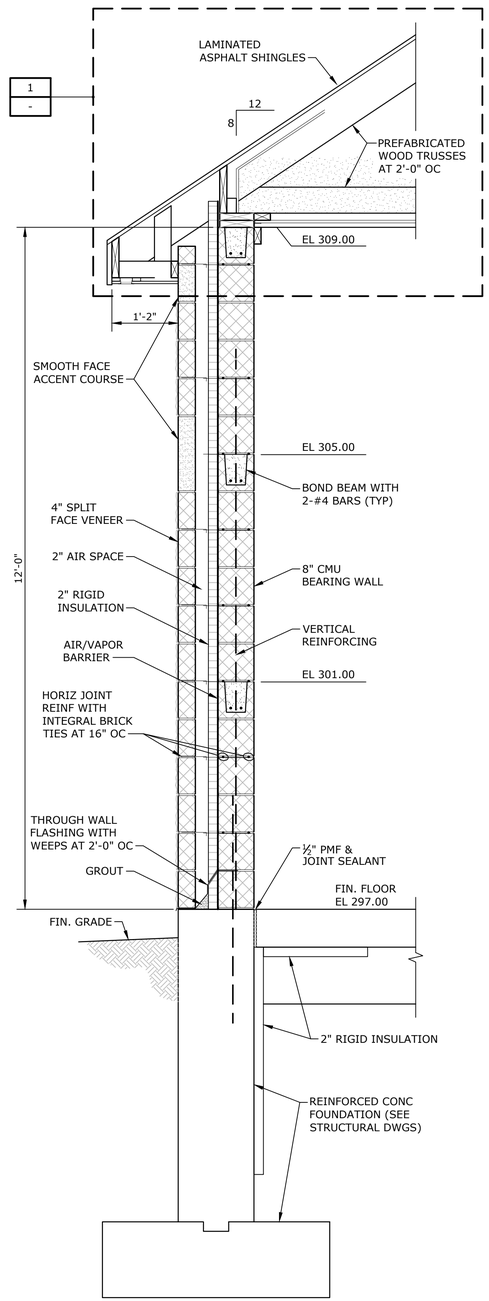

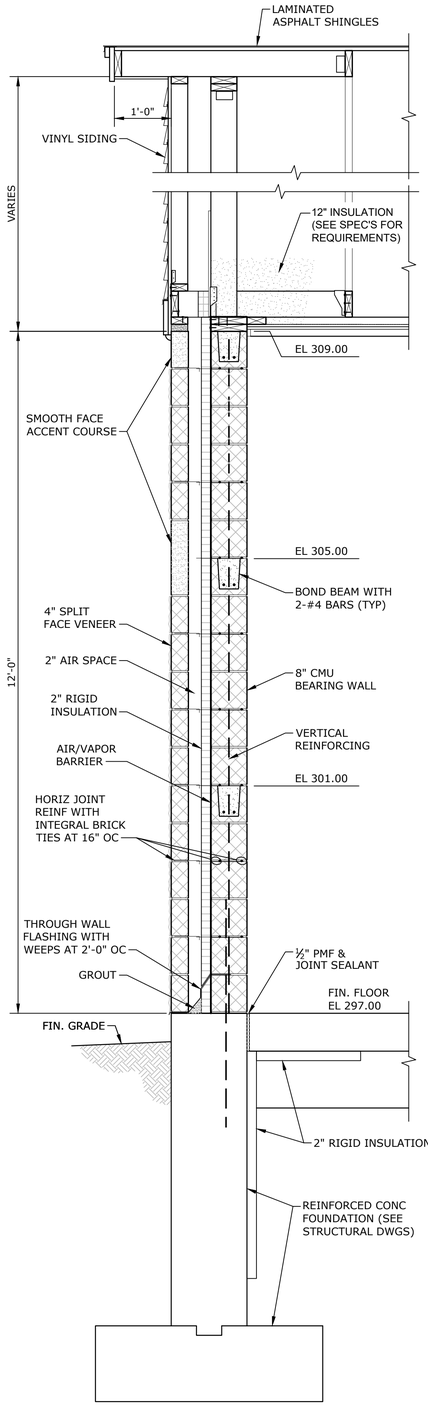

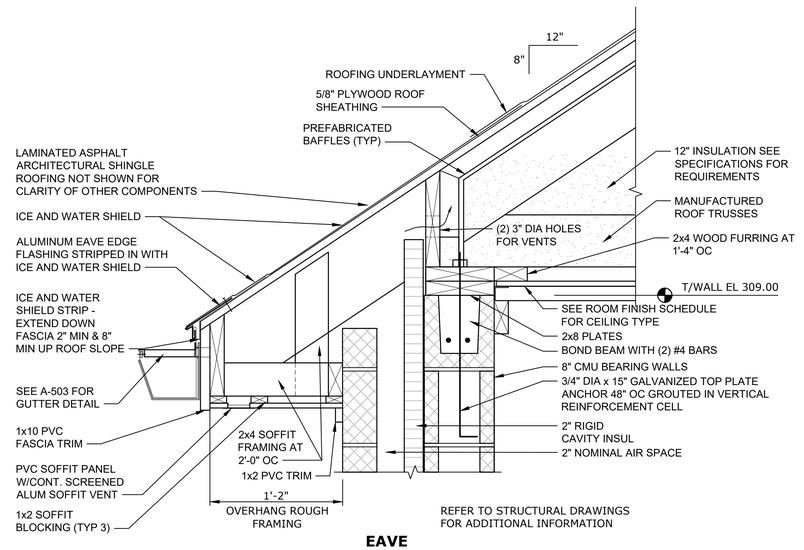

EAVE

DETAIL 1
1 1/2"=1'-0" -

0 0.5' 1' 1.5'
SCALE: 1 1/2"=1'-0"

0 1' 2' 3'
SCALE: 3/4"=1'-0"

Tighe&Bond

COMMONWEALTH OF MASSACHUSETTS
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REGISTERED PROFESSIONAL ENGINEER
12/12/23

COMMONWEALTH OF MASSACHUSETTS
MARY E. DANIELSON
ENVIRONMENTAL
No. 55926
REGISTERED PROFESSIONAL ENGINEER
12/12/23

PERMIT DRAWINGS - NOT FOR CONSTRUCTION

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Harvard-Devens Water System Interconnection Project

Harvard Public Works Department

Harvard, Massachusetts

MARK	DATE	DESCRIPTION

PROJECT NO:	H1776-16A
DATE:	DECEMBER 2023
FILE:	H1776-16-A-301.dwg
DRAWN BY:	RWK
DESIGNED/CHECKED BY:	X
APPROVED BY:	TJM

ARCHITECTURAL SECTIONS AND DETAILS

SCALE: AS SHOWN

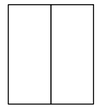
A-301
SHEET X OF X

DOOR SCHEDULE

DOOR NO.	DOOR SIZE	MATERIAL			DOOR TYPE	FRAME TYPE	FIRE RATING (HRS.)	DETAIL			GLAZING	WEATHER STRIPPING	HARDWARE SET
		DOOR	FRAME	DOOR THICKNESS				HEAD	JAMB	SILL			
D1	PAIR 3'-2"x7'-2"	HM INSUL	HM	-	A	1	1	H-1	J-1	S-1	-	W-1	HW-1

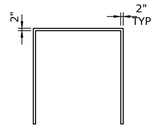
NOTES:

1. FIRE RATING LISTED IN NUMBER OF HOURS.
2. PROVIDE THRESHOLD AND WEATHER STRIPPING AT ALL EXTERIOR DOORS



A

DOOR TYPES



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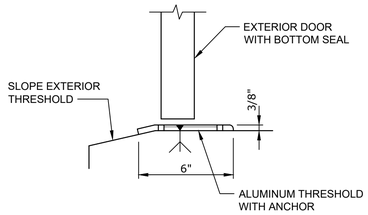
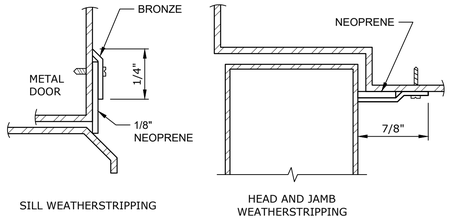
FRAME TYPES



S-1

SILL DETAIL

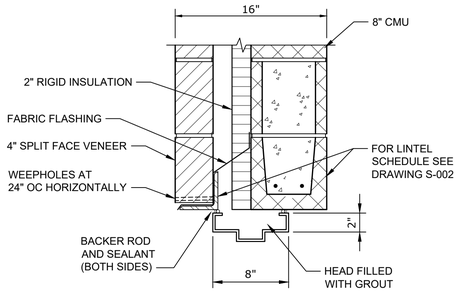
1"=1'-0"



W-1

WEATHERSTRIPPING DETAIL

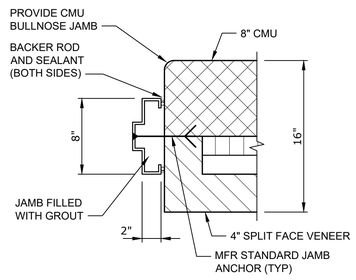
NO SCALE



H-1

HEAD DETAIL

1 1/2"=1'-0"



J-1

JAMB DETAIL

1 1/2"=1'-0"

ROOM FINISH SCHEDULE

LOCATION	FINISH				CEILING HEIGHT
	FLOOR	BASE	WALLS	CEILING	
PROCESS AREA - 101A	SEALED CONCRETE	-	BLOCK FILLER EPOXY PAINT	1/2" FRP CEILING	12'-0"

Tighe&Bond

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Harvard Public Works Department

Harvard, Massachusetts

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PROJECT NO:	H1776-16A
DATE:	DECEMBER 2023
FILE:	H1776-16-A-501.dwg
DRAWN BY:	AJS
DESIGNED/CHECKED BY:	TG
APPROVED BY:	TJM

ARCHITECTURAL SCHEDULES AND DETAILS

SCALE: AS SHOWN

A-501

SHEET 22 OF 47

GENERAL

1. STRUCTURAL WORKS SHALL CONFORM TO STATE BUILDING CODE, LATEST EDITION, INCLUDING MOST RECENT ADDENDA, AND CONTRACT DOCUMENTS. IN CASE OF CONFLICT, MOST STRINGENT REQUIREMENT SHALL GOVERN.
2. CONTRACTOR SHALL VERIFY AND COORDINATE DIMENSIONS RELATED TO THIS PROJECT.
3. CONTRACTOR SHALL EXAMINE DRAWINGS FOR ALL TRADES FOR THE VERIFICATION OF LOCATION AND DIMENSIONS OF ALL CHASES, INSERTS, OPENINGS, SLEEVES AND OTHER PROJECT REQUIREMENTS NOT SHOWN ON THE STRUCTURAL DRAWINGS.
4. PROVIDE CAULKING AT ALL CONTROL JOINTS. PROVIDE COMPRESSIBLE FILLER AND SEALANT AT ALL EXPANSION AND ISOLATION JOINTS.
5. PROVIDE PREMOLDED JOINT FILLLER WHERE SLABS ON GRADE ABUT WALLS AND COLUMNS.
6. ALL ELEVATIONS ARE BASED ON USGS DATUM. SEE SHEET G-002 BASE PLAN NOTE 4 FOR DATUM.

REINFORCEMENT

1. DETAILING, FABRICATION, AND ERECTION OF REINFORCEMENT, UNLESS OTHERWISE NOTED, SHALL CONFORM TO ACI "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE (ACI 318)" AND ACI "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES (ACI 315)", LATEST EDITION.
2. STEEL REINFORCEMENT UNLESS OTHERWISE SHOWN SHALL CONFORM TO ASTM A615 GRADE 60 MINIMUM (YIELD STRENGTH - 60,000 PSI)..
3. PROVIDE AND SCHEDULE ON SHOP DRAWINGS, ALL NECESSARY ACCESSORIES TO HOLD REINFORCEMENT SECURELY IN POSITION: MINIMUM REQUIREMENTS SHALL BE: HIGH CHAIRS, 4'-0" ON CENTER, #5 SUPPORT BAR FOR HIGH CHAIRS, SLAB BOLSTERS, 3'-6" ON CENTER, ALL WIRE CHAIRS AND BOLSTERS TO BE PLASTIC TIPPED.
4. THE CONCRETE PROTECTIVE COVERING FOR REINFORCEMENT SHALL BE AS FOLLOWS, UNLESS OTHERWISE SHOWN:
   A. CAST-IN-PLACE CONCRETE.

	EXPOSED TO EARTH, WATER OR WEATHER	NOT EXPOSED TO EARTH, WATER, OR WEATHER
(a) SLAB ON GRADE	3 INCHES	2 INCHES
(b) COLUMN TIES	2 INCHES	1 1/2 INCHES
(c) COLUMN MAIN REBARS	2 1/2 INCHES	2 INCHES
(d) BEAM STIRRUPS	2 INCHES	1 1/2 INCHES
(e) BEAM MAIN REBARS	2 1/2 INCHES	2 INCHES
(f) SLAB/WALL #3 TO #5 INCL'S	1 1/2 INCHES	3/4 INCHES
(g) SLAB/WALL #6 TO #11 INCL'S	2 INCHES	3/4 INCHES

   (h) NOTE:MAXIMUM DEVIATION FROM THESE REQUIREMENTS SHALL BE +1/4" FOR SECTIONS TEN (10) INCHES OR LESS, AND +1/2" FOR SECTIONS OVER TEN (10) INCHES THICK.

   B. IN NO CASE SHALL THE COVER BE LESS THAN THE BAR DIAMETER.
   C. WHERE CONTINUOUS BARS ARE CALLED FOR THEY SHALL BE RUN CONTINUOUSLY AROUND CORNERS AND LAPPED AT NECESSARY SPLICES OR HOOKED AT DISCONTINUOUS ENDS.
6. WHERE REINFORCEMENT IS NOT SHOWN ON DRAWINGS, PROVIDE REINFORCEMENT IN ACCORDANCE WITH APPLICABLE TYPICAL DETAILS OR SIMILAR TO THAT SHOWN FOR MOST NEARLY SITUATIONS, AS DETERMINED BY THE ENGINEER. IN NO CASE SHALL REINFORCEMENT BE LESS THAN MINIMUM REINFORCEMENT PERMITTED BY THE APPLICABLE CODES, NOR LESS THAN THE FOLLOWING:
   A. BEAM STIRRUPS - #3 @ 12" OC
   B. BEAM STIRRUP SUPPORTS - 1-#5 @ EACH STIRRUP BEND
   C. FACE REINFORCEMENT IN BEAMS OR PORTIONS OF BEAMS - #4 @ 12" EF
   D. STRUCTURAL SLABS - .0028 GROSS CONCRETE AREA IN EACH DIRECTION
   E. STRUCTURAL WALLS - .0028 GROSS CONCRETE AREA IN EACH DIRECTION
8. WHERE REINFORCEMENT IS CALLED FOR IN SECTION, REINFORCEMENT IS CONSIDERED TYPICAL WHEREVER THE SECTION APPLIES.
9. REINFORCEMENT SHALL BE CONTINUOUS THROUGH ALL CONSTRUCTION JOINTS UNLESS OTHERWISE INDICATED ON THE DRAWINGS.
10. WELDED WIRE FABRICS SHALL LAP 12" OR TWO SPACES, WHICHEVER IS LARGER, AND SHALL BE WIRED TOGETHER.
11. REINFORCEMENT COUPLER SPLICES SHALL BE MECHANICAL DEVICES CAPABLE OF TRANSMITTING THE ULTIMATE TENSILE AND COMPRESSIVE STRENGTH OF THE BAR.
12. INSTALLATION OF REINFORCEMENT SHALL BE COMPLETE AT LEAST 24 HOURS PRIOR TO SCHEDULED CONCRETE PLACEMENT. NOTIFY ENGINEER OF COMPLETION AT LEAST 24 HOURS PRIOR TO SCHEDULED COMPLETION OF REINFORCEMENT PLACEMENT.
13. REINFORCEMENT SHALL BE SET BEFORE PLACING CONCRETE. SETTING ANY REINFORCEMENT INTO WET CONCRETE IS PROHIBITED.

CONCRETE

1. CONCRETE WORK SHALL CONFORM TO THE LATEST EDITIONS OF THE BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE (ACI 318), AND SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDING (ACI 301).
2. CONCRETE SHALL BE CONTROLLED CONCRETE, PROPORTIONED, MIXED, AND PLACED UNDER THE SUPERVISION OF AN APPROVED CONCRETE TESTING AGENCY OR THE ENGINEER.
3. CONCRETE SHALL BE NORMAL WEIGHT CONCRETE AND SHALL HAVE A COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS, UNLESS OTHERWISE NOTED AND SHALL BE AIR ENTRAINED (SEE SPECS).
4. THE USE OF CONSTRUCTION JOINTS WHERE SHOWN ON THE DRAWINGS IS MANDATORY. OMISSIONS, ADDITIONS OR CHANGES SHALL NOT BE MADE EXCEPT WITH THE SUBMISSION OF A WRITTEN REQUEST TOGETHER WITH DRAWINGS OF THE PROPOSED JOINT LOCATIONS FOR APPROVAL OF THE STRUCTURAL ENGINEER.
5. WHERE CONSTRUCTION JOINTS ARE NOT SHOWN, DRAWINGS SHOWING LOCATION OF CONSTRUCTION JOINTS AND CONCRETE PLACING SEQUENCE SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO PREPARATION OF THE REINFORCEMENT SHOP DRAWINGS.
6. CONCRETE SLABS SHALL BE CAST SO THAT THE SLAB THICKNESS IS AT NO POINT LESS THAN THAT INDICATED ON THE DRAWINGS.
7. CONCRETE SLABS AND WALLS SHALL BE CAST ALTERNATELY OR IN A CHECKERBOARD FASHION SO THAT ADJACENT SECTIONS ARE PLACED NO SOONER THAN THREE DAYS APART. AT LEAST TWO DAYS MUST ELAPSE AFTER PLACING CONCRETE IN WALLS BEFORE PLACING FLOOR SYSTEM SUPPORTED THEREON.
8. CONCRETE SHALL BE PLACED WITHOUT HORIZONTAL CONSTRUCTION JOINTS EXCEPT WHERE SHOWN OR NOTED.
9. EXPOSED EDGES OF CONCRETE ELEMENTS SHALL HAVE CHAMFERED CORNERS
10. ONLY CRITICAL CONSTRUCTION JOINTS ARE SHOWN. SEE SPECIFICATIONS FOR REQUIRED MAXIMUM SPACING OF CONSTRUCTION JOINTS.

BASIC STRUCTURAL DESIGN CRITERIA (MASSACHUSETTS STATE BUILDING CODE)

A. BUILDING CLASSIFICATION
   1. CATEGORY IV - PUMP STATION

B. SNOW LOAD REQUIREMENTS
   1. GROUND SNOW LOAD (Pg) - 50 psf
   2. SNOW EXPOSURE FACTOR (Ce) - 0.9
   3. THERMAL FACTOR (Ct) - 1.0
   4. SNOW LOAD IMPORTANCE FACTOR (Is) - 1.30
   5. SLOPED ROOF SNOW LOAD (Pf) - 35 psf

C. WIND LOAD REQUIREMENTS
   1. ULTIMATE DESIGN WIND SPEED - V_{ult} = 133 mph
   2. WIND EXPOSURE - B
   4. HURRICANE-PRONE REGION

D. DEAD LOADS AND LIVE LOADS
   SEE TABLE BELOW

E. EARTHQUAKE DESIGN DATA
   1. SEISMIC IMPORTANCE FACTOR (Ie) - 1.50
   2. MAPPED SPECTRAL RESPONSE ACCELERATIONS:
      a. SHORT PERIOD RESPONSE (Ss) - 0.206
      b. 1-SECOND PERIOD RESPONSE (S_1) - 0.070
   3. SITE CLASS - D
   4. DESIGN SPECTRAL RESPONSE COEFFICIENTS:
      a. SHORT PERIOD RESPONSE (S_{DS}) - 0.192
      b. 1-SECOND PERIOD RESPONSE (S_{D1}) - 0.104
   5. SEISMIC DESIGN CATEGORY - C
   6. BASIC SEISMIC FORCE RESISTING SYSTEM: ORDINARY REINFORCED MASONRY SHEAR WALLS
   7. DESIGN BASE SHEAR: 15 KIPS
   8. SEISMIC RESPONSE COEFFICIENT: CS = 0.073.
   9. SEISMIC DESIGN COEFFICIENTS AND FACTORS:
      a. RESPONSE MODIFICATION FACTOR: R = 2
      b. OVERSTRENGTH FACTOR: $\Omega 0$ = 2.5
      c. DEFLECTION AMPLIFICATION FACTOR: Cd = 1.75
   10. ANALYSIS PROCEDURE: EQUIVALENT LATERAL FORCE PROCEDURE (ASCE 7-10 SECTION 12.8)

ROOF FRAMING STRUCTURAL LOADS

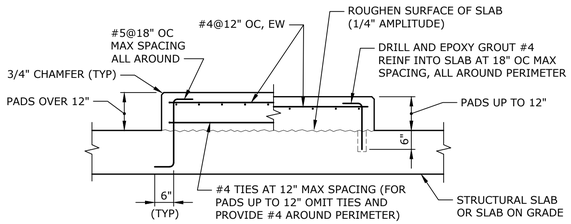
LOCATION	ALLOWABLE LOAD
PUMP STATION ROOF	SEE TYPICAL LOADING FOR ROOF TRUSSES ON S-102

BAR SIZE DESIGNATION		DEVELOPMENT LENGTH (INCHES)	SPLICE LENGTH (INCHES)	
ENGLISH	METRIC	Ld	CLASS B	CLASS B TOP BARS
#3	#10	15	19	25
#4	#13	19	25	33
#5	#16	24	31	40
#6	#19	29	37	48
#7	#22	42	54	70
#8	#25	48	62	81
#9	#29	54	70	91
#10	#32	61	79	103

REBAR SPLICE LENGTH SCHEDULE

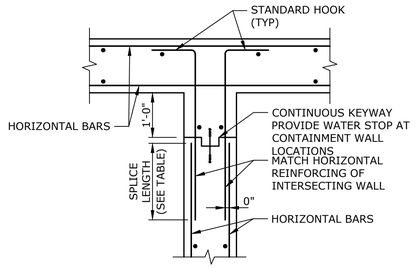
NOTES:

1. IF CLEAR SPACING BETWEEN THE REBARS IS LESS THAN THREE BAR DIAMETERS, OR IF COVER IS LESS THAN TWO BAR DIAMETERS, INCREASE THE SPLICE LENGTH BY AN ADDITIONAL 50%.
2. IF EPOXY COATED REBAR IS USED, INCREASE THE SPLICE LENGTH BY AN ADDITIONAL 50%.
3. IF LIGHTWEIGHT CONCRETE IS USED, INCREASE THE SPLICE LENGTH BY AN ADDITIONAL 30%.
4. THE MINIMUM REBAR SPLICE LENGTH SCHEDULE IS BASED ON F'c= 4,000 PSI AND Fy= 60,000 PSI. ADJUST FOR OTHER STRENGTHS USING ACI-318.
5. FOR HORIZONTAL REINFORCEMENT SO PLACED THAT MORE THAN 12 INCHES OF FRESH CONCRETE IS CAST IN THE MEMBER BELOW, INCREASE THE DEVELOPMENT LENGTH BY AN ADDITIONAL 30%.
6. WHEN BARS OF DIFFERENT SIZE ARE LAP SPLICED, THE SPLICE LENGTH SHALL BE THE LARGER OF EITHER THE DEVELOPMENT LENGTH OF THE LARGER BAR OR THE SPLICE LENGTH OF THE SMALLER BAR.

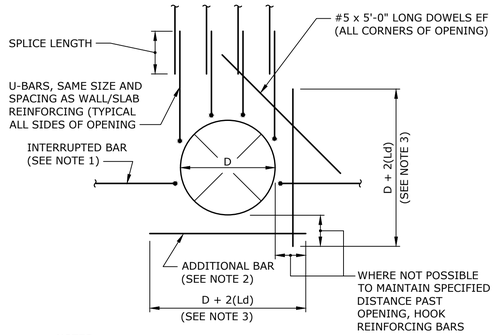


NOTE:
1. COORDINATE SIZE OF THE EQUIPMENT PAD WITH THE EQUIPMENT SHOP DRAWING.

EQUIPMENT PAD DETAIL
NO SCALE

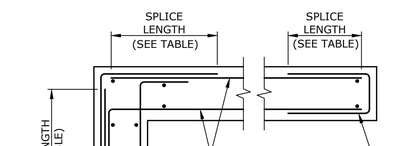


PLAN OF HORIZONTAL REINFORCING AT CONCRETE WALL INTERSECTIONS
NO SCALE

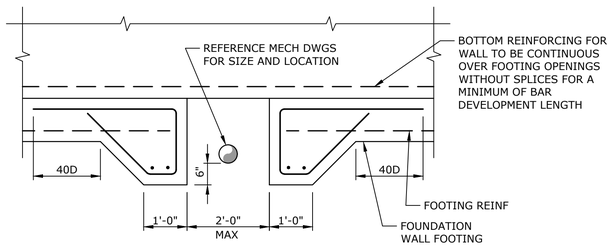


NOTES:
1. FOR SLAB OR WALL APPLICATION WITH A CONCRETE THICKNESS LESS THAN 12 INCHES, 180° OR 90°, HOOK BARS MAY BE USED IN LIEU OF "U-BARS".
2. PROVIDE ADDITIONAL BARS NOT LESS THAN ONE HALF (1/2) OF INTERRUPTED BARS AT EACH SIDE OF OPENING AT 3" ON CENTER.
3. FOR TOP BARS IN SLAB, INCREASE DEVELOPMENT LENGTH BY 30%.

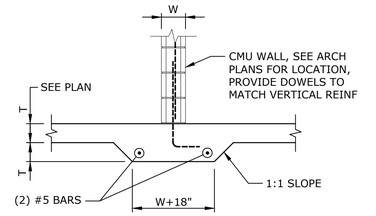
TYPICAL REINFORCING AT OPENING IN CONCRETE WALLS AND SLABS
NO SCALE



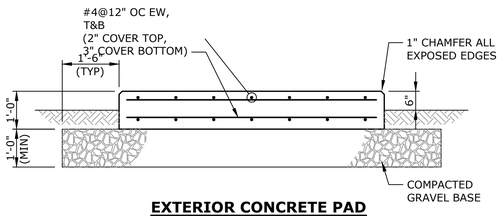
PLAN OF HORIZONTAL REINFORCING AT CORNERS OF CONCRETE WALLS
NO SCALE



PIPE THROUGH FOUNDATION WALL/FOOTING DETAIL
NO SCALE



THICKENED SLAB AT NON-BEARING CMU WALL
NO SCALE



EXTERIOR CONCRETE PAD
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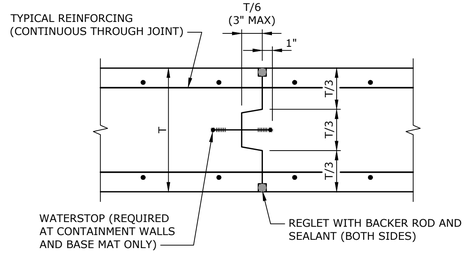

CONSTRUCTION JOINT
NO SCALE

Tighe&Bond

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DRAWN BY:	RWK
DESIGNED/CHECKED BY:	TG
APPROVED BY:	TJM

STRUCTURAL NOTES AND DETAILS

SCALE: AS SHOWN

S-001
SHEET 22 OF 47

Last Saved: 11/21/2023
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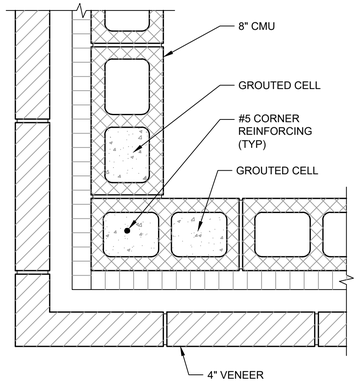
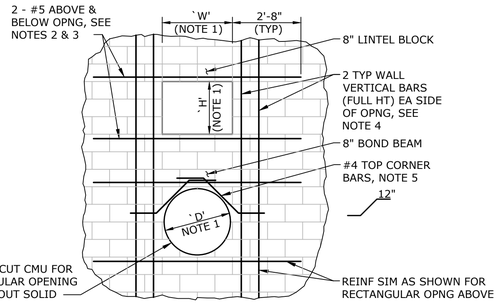
Tighe & Bond: J:\H\H1776 Harvard WWTF\16 - Devens Water System Interconnection\Drawings\AutoCAD\Sheet\H1776-16-S-001.dwg

MASONRY CONSTRUCTION

1. CONCRETE MASONRY CONSTRUCTION SHALL CONFORM TO THE LATEST EDITIONS OF THE "BUILDING CODE REQUIREMENTS FOR MASONRY STRUCTURES ACI 530/ASCE 5)", "SPECIFICATIONS FOR MASONRY STRUCTURES (ACI 530.1/ASCE 6)" AND TO THE NATIONAL CONCRETE MASONRY ASSOCIATION "SPECIFICATIONS FOR THE DESIGN AND CONSTRUCTION OF LOAD BEARING CONCRETE MASONRY" (TR758).
2. MATERIALS STRENGTH SHALL BE AS FOLLOWS:
   A. CONCRETE MASONRY UNITS SHALL CONFORM TO THE ASTM C-90 GRADE N-1, ULTIMATE COMPRESSIVE STRENGTH ON NET AREA + 1,900 PSI PER ASTM C-90.
   B. MORTAR SHALL CONFORM TO ASTM C-270 TYPE S. 1 PART CEMENT, 1/4 TO 1/2 LIME, 2-1/4 TO 3 SAND (ASTM C270).
   C. GROUT SHALL CONFORM TO ASTM C-476 FINE OR COARSE. 1 PART CEMENT, 0 TO 1/10 LIME, 2-1/4 TO 3 SAND (ASTM C476), PLUS COARSE AGGREGATE.
3. PRIOR TO GROUTING CELLS, BARS AND CELLS MUST BE INSPECTED BY THE ENGINEER.
4. THE BASE OF EACH CELL IN WHICH A BAR IS PLACED MUST HAVE A CLEANOUT HOLE.
5. THE DESIGN OF REINFORCED MASONRY CONSTRUCTION IS BASED ON ALLOWABLE STRESS PREDICATED ON "WITH INSPECTION" PROVISION REQUIRING QUALIFIED MASONRY INSPECTION TAKING PLACED ON A CONTINUOUS BASIS WHENEVER MASONRY IS BEING PLACED.
6. MASONRY BLOCK CELLS CONTAINING VERTICAL REINFORCING SHALL BE GROUTED SOLID. FILLING CELLS WITH MORTAR IS UNACCEPTABLE. THE COMPRESSIVE STRENGTH OF GROUT AT THE END OF 28 DAYS SHALL BE 3,000 PSI MINIMUM.
7. REINFORCED MASONRY WALLS SHALL HAVE #9 GA. WIRE (TRUSS TYPE) AT 16" OC HORIZONTAL REINFORCEMENT.
8. PLACE HORIZONTAL REINFORCING BARS CONTINUOUSLY THROUGH EXPANSION JOINTS. WRAP MASTIC TAPE ON TWO #5 HORIZONTAL BOND BEAM BARS FOR 18" ON SIDE OF JOINT.
9. MASONRY OPENINGS MORE THAN 16" WIDE REQUIRE APPROVED LINTELS.
10. MASONRY OPENINGS FOR UTILITIES ARE TO BE CLOSED UP WITH NEW MASONRY WORK AROUND THE UTILITY.
11. FILL THREE COURSES OF CONCRETE BLOCKS UNDER ALL BEARING PLATES WITH GROUT FOR A WIDTH EQUAL TO THREE TIMES THE BEARING PLATE LENGTH.
12. PROVIDE 1-#6 VERTICAL REINFORCING BARS AT 48" O.C. THIS REINFORCING BAR SHALL BE CONTINUOUS FULL HEIGHT AND SPLICED 2'-0" ABOVE EACH FLOOR LEVEL. AT OPENINGS THAT INTERRUPT BARS, ADD AN ADDITIONAL BAR TO EACH SIDE OF THE OPENING FOR EACH INTERRUPTED BAR.
13. PROVED ONE 1-#6 (MIN.) VERTICALLY GROUTED SOLID ON EACH SIDE OF CONTROL AND EXPANSION JOINTS AND EACH SIDE OF OPENINGS AND EXTEND 24" BEYOND EACH SIDE OF OPENING. PROVIDE 1-#4 HORIZONTALLY GROUTED SOLID ON TOP AND BOTTOM OF ALL OPENINGS, AND EXTEND 24" BEYOND EACH SIDE OF OPENING.
14. REINFORCED MASONRY WALLS SHALL BE BOND BEAMS AT EACH FLOOR LEVEL, AND ABOVE AND BELOW ALL OPENINGS. BOND BEAM REINFORCING BARS SHALL BE EXTENDED INTO AND BE CONTINUOUS WITH ALL INTERSECTING BOND BEAMS.
15. BONDING METHODS, TIES, LINTELS, AND ACCESSORIES SHALL BE APPROVED BY THE ENGINEER.
16. INSTALL LINTELS FOR ALL OPENINGS IN ACCORDANCE WITH THE DETAILS ON THE DRAWINGS.
17. ALL STEEL LINTELS WITH MULTIPLE MEMBERS SHALL BE STITCH WELDED ON TOP AND BOTTOM.

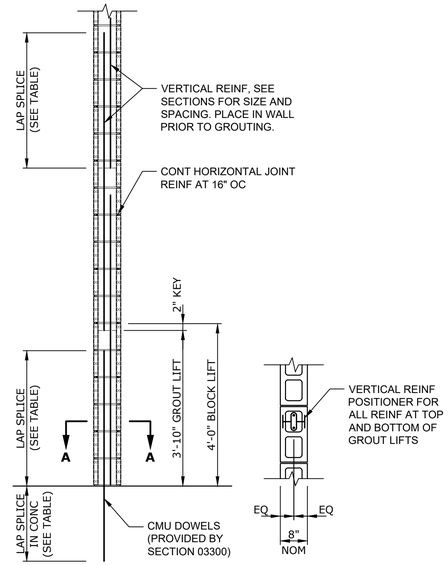


MASONRY WALL CORNER DETAIL
NO SCALE



NOTES:
1. TYPICAL FOR ALL OPENINGS WITH (W, H, OR D) 2'-0" OR GREATER AND 4'-0" OR LESS, UNLESS NOTED OTHERWISE. SEE PLANS FOR LARGER OPENINGS.
2. AT ADJACENT OPENINGS WITH LESS THAN 8'-0" WALL BETWEEN, CONTINUE HORIZONTAL REINFORCING TO 2'-8" BEYOND FARTHEST OPENING.
3. AT OPENINGS LOCATED WITHIN 2'-8" OF CORNER, CONTINUE HORIZONTAL REINFORCING AROUND CORNER 48 BAR DIAMETERS.
4. LOCATE VERTICAL BARS CENTERED IN 2 ADJACENT CELLS IN 8" WALLS, AND EACH FACE IN SINGLE GROUT CELL IN 12" WALLS. LAP 48 BAR DIAMETERS WITH MATCHING FOUNDATION DOWELS.
5. LOCATE #4 CORNER BARS CENTERED IN 8" WALLS, AND EACH FACE IN 12" WALLS.

CMU OPENING REINFORCING
NO SCALE



ELEVATION **SECTION A-A**

(BY SECTION 04800 UNLESS NOTED)

CMU REINFORCING CONSTRUCTION DETAILS
NO SCALE

BAR SIZE DESIGNATION	MINIMUM SPLICE LENGTH (INCHES)	MINIMUM DEVELOPMENT LENGTH (INCHES) BASED ON BAR IN CENTER OF:			
		6" CMU	8" CMU	10" CMU	12" CMU
#3	27	16	16	16	16
#4	36	21	21	21	21
#5	45	32	26	26	26
#6	54	61 (3)	43	40	40
#7	63	NP (4)	60	46	46
#8	72	NP (4)	92	71	61
#9	82	NP (4)	NP (4)	91	74

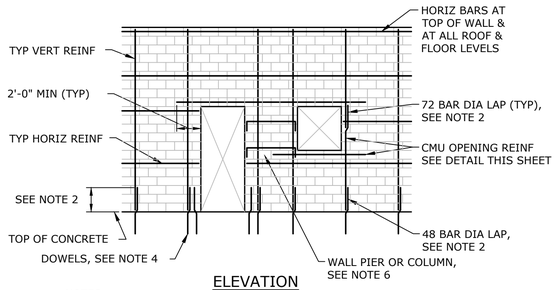
REBAR SPLICE LENGTH SCHEDULE IN MASONRY (ACI 530-05)

NOTES:
1. THE MINIMUM REBAR SPLICE LENGTH SCHEDULE IS BASED ON F'm=1,500 PSI AND Fy=60,000 PSI. ADJUST FOR OTHER STRENGTHS USING ACI-530.
2. IF EPOXY COATED REBAR IS USED, INCREASE DEVELOPMENT LENGTH BY AN ADDITIONAL 50%.
3. PERMITTED ONLY IF MORTAR FINS ARE REMOVED FROM THE CELL TO BE GROUTED.
4. NOT PERMITTED, BAR IS TOO LARGE FOR THIS WALL.
5. WHEN BARS OF DIFFERENT SIZE ARE LAP SPLICED, THE SPLICE LENGTH SHALL BE THE LARGER OF EITHER THE DEVELOPMENT LENGTH OF THE LARGER BAR OR THE SPLICE LENGTH OF THE SMALLER BAR.

LINTEL SCHEDULE

MASONRY OPENING	WALL		
	FACADE	CMU LINTEL	FLEXURAL STEEL
D-1	L5x3 1/2x5/16	16" DEEP	(2) #4
L-1, L-2	L5x3 1/2x5/16	8" DEEP	(2) #4

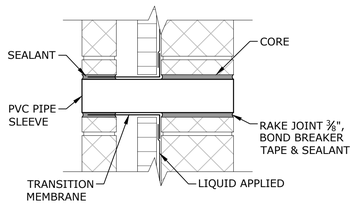
NOTES:
1. PROVIDE AND INSTALL STEEL LINTEL ANGLES FOR ALL MASONRY OPENINGS IN ACCORDANCE WITH SCHEDULE ABOVE (INSTALL LONG LEG VERTICAL).
2. PROVIDE 6" MINIMUM BEARING AT EACH END, BUT NOT LESS THAN 1" PER FOOT OF SPAN.
3. ALL LINTELS SHALL BE HOT DIPPED GALVANIZED.
4. SEE DOOR AND WINDOW SCHEDULES FOR LINTEL DETAILS AT DOOR AND WINDOW OPENINGS.
5. WHERE ANGLES OCCUR IN EXTERIOR WALLS, MINIMUM THICKNESS SHALL BE 5/16" AND SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION.
6. ALL CMU LINTELS TO BE FULLY GROUTED TO END OF BARS EACH SIDE OF OPENING, FILL TWO (2) COURSES OF MASONRY BELOW BEARING WITH GROUT.
7. EXTEND ALL BARS PAST OPENING A MINIMUM OF BAR DEVELOPMENT LENGTH.



ELEVATION

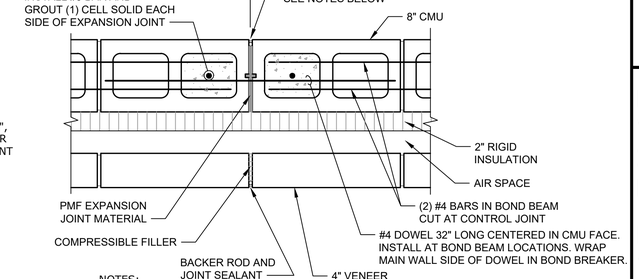
NOTES:
1. FOR TYPICAL WALL REINFORCING, SEE WALL SECTIONS AND DETAILS. FOR MINIMUM REINFORCING REQUIREMENTS, SEE GENERAL STRUCTURAL NOTES.
2. LAP VERTICAL REINFORCING WITH WALL DOWELS PER `REBAR SPLICE LENGTH SCHEDULE IN MASONRY'.
3. STAGGER SPLICES IN ADJACENT HORIZONTAL BARS IN THE SAME COURSE BY 2'-0".
4. PROVIDE DOWEL BARS IN FOUNDATION TO MATCH ALL VERTICAL REINFORCING.
5. GROUT EACH SIDE OF OPENING AS NOTED IN TYPICAL OPENING REINFORCING DETAIL.
6. FOR HORIZONTAL REINFORCING AT OPENINGS SEE COLUMN AND PIER DETAILS.

REINFORCED CMU WALL
NO SCALE



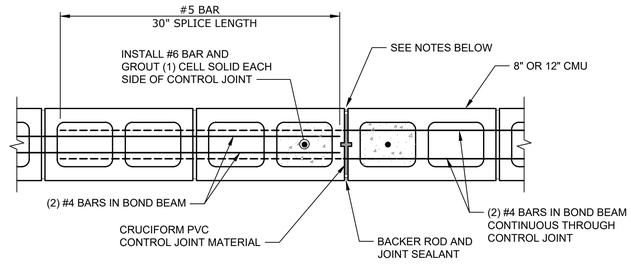
NOTES:
1. PROVIDE BLOCKING/SHIMMING AS REQUIRED TO ACCOMMODATE PIPE PENETRATION SIZE PVC SLEEVE TO PROVIDE ½" MINIMUM CLEARANCE ALL AROUND MEP PIPE.

PIPE PENETRATION DETAIL
NO SCALE



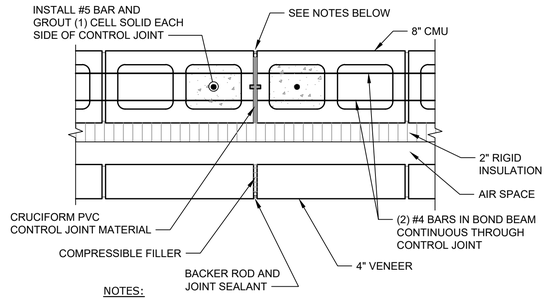
NOTES:
1. RAKE EXCESS MORTAR FROM EXPANSION JOINT.
2. PROVIDE BACKER ROD AND CAULK JOINT FOR FINAL COMPLETION.
3. EXTEND EXPANSION JOINT TO BOTTOM OF MASONRY BEAM AS INDICATED ON DRAWINGS.

EXTERIOR MASONRY WALL EXPANSION JOINT AT KNOCKOUT PANEL
NO SCALE



NOTES:
1. RAKE EXCESS MORTAR FROM CONTROL JOINT.
2. PROVIDE BACKER ROD AND CAULK JOINT FOR FINAL COMPLETION.
3. EXTEND CONTROL JOINT FULL HEIGHT OF THE WALL.

INTERIOR MASONRY WALL CONTROL JOINT
NO SCALE



NOTES:
1. RAKE EXCESS MORTAR FROM CONTROL JOINT.
2. PROVIDE BACKER ROD AND CAULK JOINT FOR FINAL COMPLETION.
3. EXTEND CONTROL JOINT FULL HEIGHT OF THE WALL.

EXTERIOR MASONRY WALL CONTROL JOINT
NO SCALE

Tighe&Bond

COMMONWEALTH OF MASSACHUSETTS — THOMAS MAHANNA — CIVIL — No. 39479 — REGISTERED PROFESSIONAL ENGINEER — 12/12/23

COMMONWEALTH OF MASSACHUSETTS — MARY E. DANIELSON — ENVIRONMENTAL — No. 55926 — REGISTERED PROFESSIONAL ENGINEER — 12/12/23

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Harvard-Devens Water System Interconnection Project

Harvard Public Works Department

Harvard, Massachusetts

MARK	DATE	DESCRIPTION

PROJECT NO:	H1776-16A
DATE:	DECEMBER 2023
FILE:	H1776-16-S-002.dwg
DRAWN BY:	RWK
DESIGNED/CHECKED BY:	TG
APPROVED BY:	TJM

STRUCTURAL MASONRY NOTES AND DETAILS

SCALE: AS SHOWN

S-002
SHEET 23 OF 47

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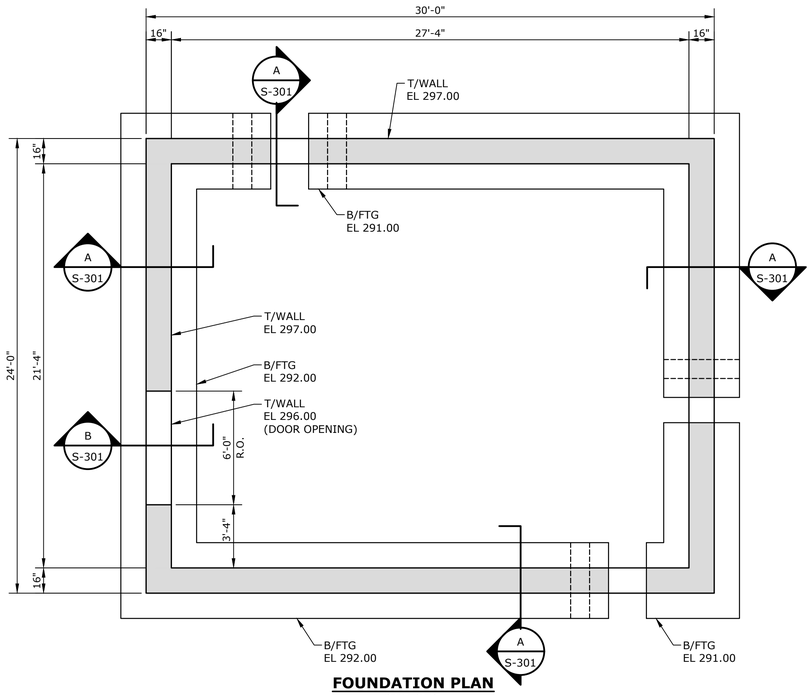
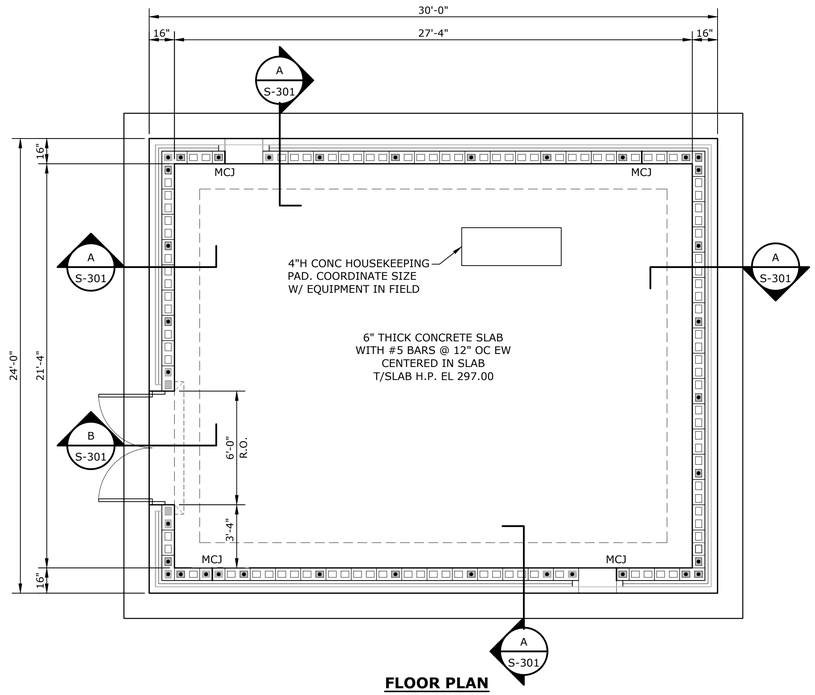


FOUNDATION PLAN
1/4"=1'-0"



FLOOR PLAN
1/4"=1'-0"

LEGEND

	GROUTED CMU CELL
	GROUTED AND REINFORCED CMU CELL VERTICAL REINFORCING #5 BARS (MAXIMUM 48" OC)
MCJ	MASONRY CONTROL JOINT
EJ	EXPANSION JOINT

NOTES:

1. ALIGN MASONRY CONTROL JOINTS WITH FOUNDATION WALL CONCRETE CONSTRUCTION JOINTS.
2. WHERE MASONRY OPENINGS ARE SHOWN, ALL PORTIONS OF CMU WALLS ABOVE AND BELOW OPENINGS SHALL BE GROUTED AND REINFORCED WITH #5 VERTICAL BARS AT 48" OC MAXIMUM SPACING FOR EXTERIOR WALLS AND #5 VERTICAL BARS AT 48" OC MAXIMUM SPACING FOR INTERIOR WALLS. SEE DRAWING S-002 FOR LINTEL SCHEDULE AND FOR ADDITIONAL REINFORCING REQUIREMENTS AROUND MASONRY OPENINGS.

0 2' 4' 8'
SCALE: 1/4"=1'-0"

Tighe&Bond

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Harvard-Devens Water System Interconnection Project

Harvard Public Works Department

Harvard, Massachusetts

MARK	DATE	DESCRIPTION

PROJECT NO:	H1776-16A
DATE:	DECEMBER 2023
FILE:	H1776-16-S-101.dwg
DRAWN BY:	RWK
DESIGNED/CHECKED BY:	TG
APPROVED BY:	TJM

STRUCTURAL FOUNDATION AND FLOOR PLANS

SCALE: AS SHOWN

S-101
SHEET X OF X

Last Saved: 11/20/2023
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Plotted: October 08, 2023
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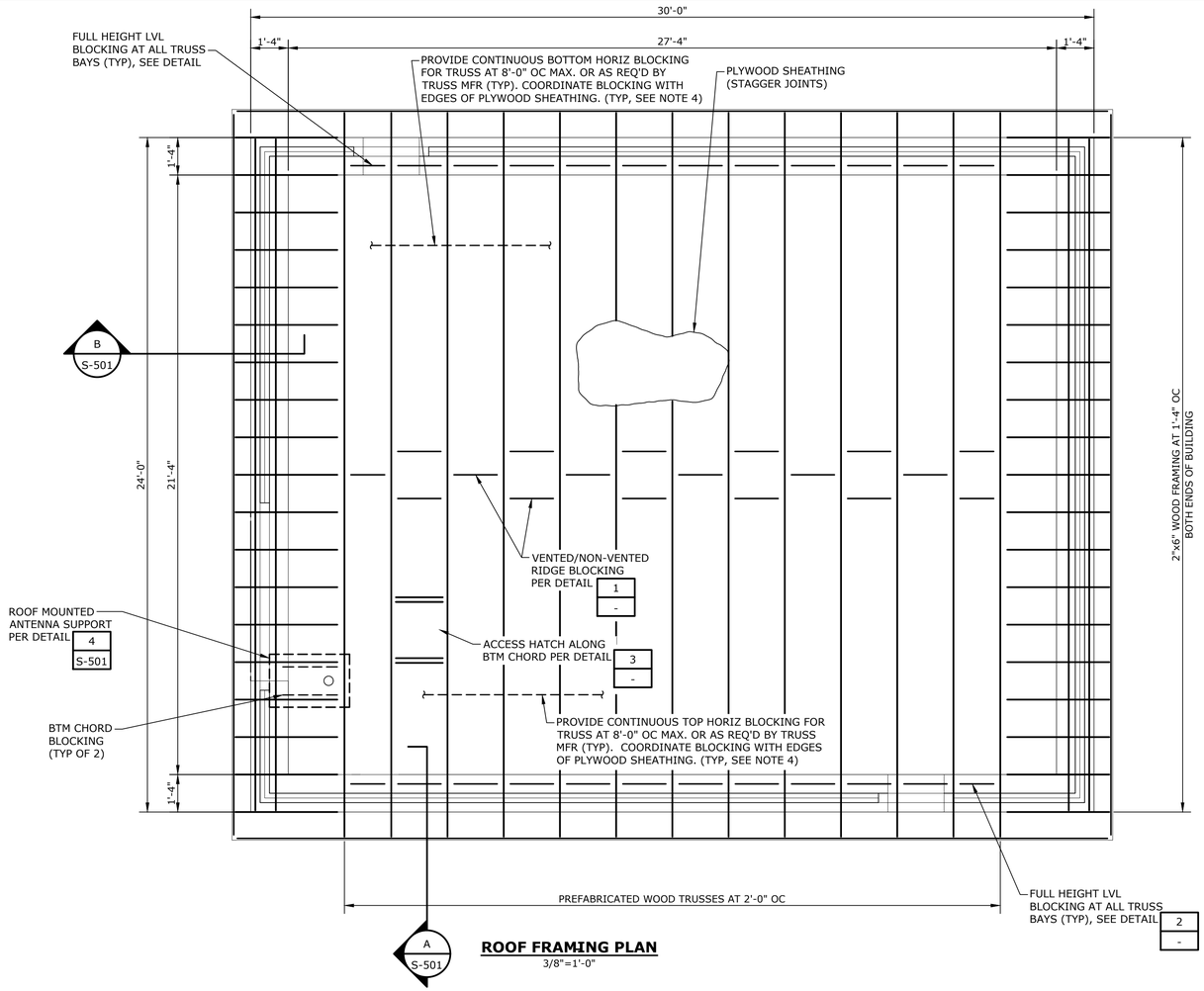
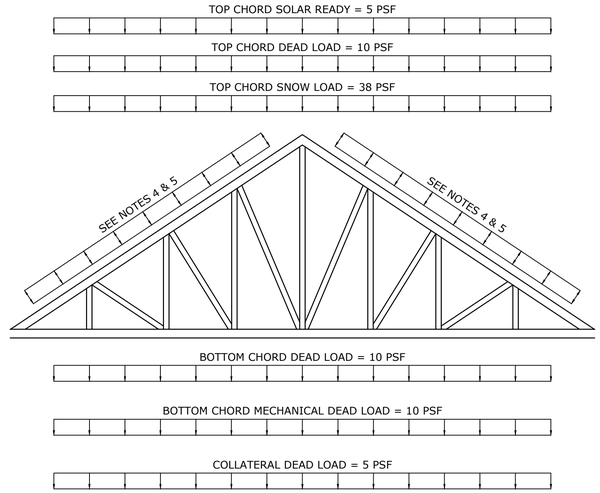


ROOF FRAMING PLAN

3/8"=1'-0"

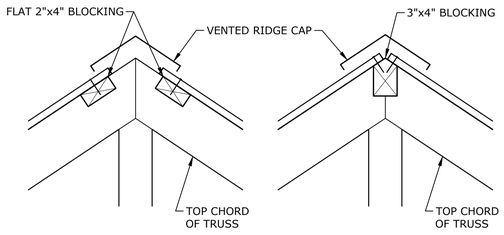


NOTES:

1. THE WOOD TRUSS CONSTRUCTION, INCLUDING CONNECTIONS AND BRACING, SHALL BE BY THE WOOD TRUSS CONTRACTOR.
2. REFER TO DRAWING S-001 & S-003 FOR ADDITIONAL NOTES AND DESIGN REQUIREMENTS.
3. DESIGN LOADINGS SHALL BE AS INDICATED ABOVE OR AS PER THE CURRENT EDITION OF THE MASSACHUSETTS STATE BUILDING CODE, WHICHEVER IS MORE STRINGENT.
4. IN ADDITION TO ABOVE LOADS, TRUSSES SHALL BE DESIGNED FOR UNBALANCED SNOW LOAD AND WIND PRESSURES PER THE CURRENT EDITION OF THE MASSACHUSETTS STATE BUILDING CODE.
5. TRUSS LOADS SHOWN ABOVE ARE IN ADDITION TO THE TRUSS SELF WEIGHT.
6. ALL TRUSSES AND CONNECTIONS SHALL BE DESIGNED FOR A MINIMUM NET UPLIFT OF 10 PSF.
7. TRUSSES AT DRAFTSTOP LOCATIONS SHALL BE DESIGNED TO SUPPORT DRAFTSTOP ASSEMBLY. SEE ARCHITECTURAL DRAWINGS AND ROOF FRAMING PLAN.

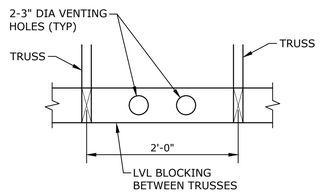
ROOF FRAMING NOTES:

1. INSTALL ⅝" ROOF SHEATHING PERPENDICULAR TO ROOF TRUSSES.
2. PROVIDE STAGGERED JOINTS IN SHEATHING PARALLEL TO ROOF TRUSS FRAMING.
3. FASTEN ROOF SHEATHING TO ROOF TRUSS FRAMING USING 8d NAILS SPACED AT 4" ON CENTER (MAXIMUM) AT SUPPORTED EDGES.
4. SPACE NAILS AT 6" ON CENTER ALONG INTERMEDIATE FRAMING MEMBERS.
5. PROVIDE CONTINUOUS TOP CHORD TRUSS BLOCKING AT ALL PLYWOOD JOINTS.
6. CONTRACTOR TO COORDINATE LOCATION OF BLOCKING WITH HVAC REQUIREMENT. SEE H-101 FOR HVAC DETAILS AND SCHEDULES.



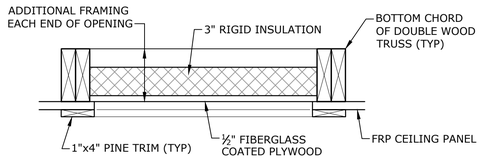
BLOCKING AT ALTERNATE TRUSS BAYS

DETAIL 1 — NO SCALE



LVL EAVE BLOCKING BETWEEN TRUSSES

DETAIL 2 — NO SCALE



ATTIC ACCESS HATCH

DETAIL 3 — NO SCALE

0 2' 4' 6'

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

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Harvard-Devens Water System Interconnection Project

Harvard Public Works Department

Harvard, Massachusetts

MARK	DATE	DESCRIPTION

PROJECT NO:	H1776-16A
DATE:	DECEMBER 2023
FILE:	H1776-16-S-102.dwg
DRAWN BY:	RWK
DESIGNED/CHECKED BY:	TG
APPROVED BY:	TJM

STRUCTURAL ROOF FRAMING PLAN

SCALE: AS SHOWN

S-102
SHEET X OF X

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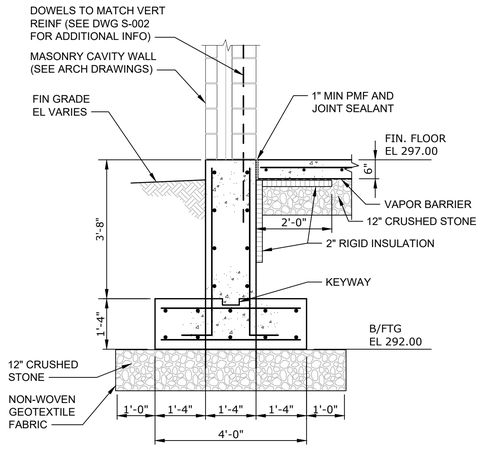
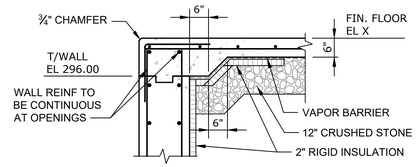


NOTE:
REINFORCING IS #5 @ 12" OC
UNLESS NOTED OTHERWISE

SECTION A
1/2"=1'-0" S-101



NOTE:
REINFORCING IS #5 @ 12" OC
UNLESS NOTED OTHERWISE

SECTION B
1/2"=1'-0" S-101

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

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Harvard Public Works Department

Harvard, Massachusetts

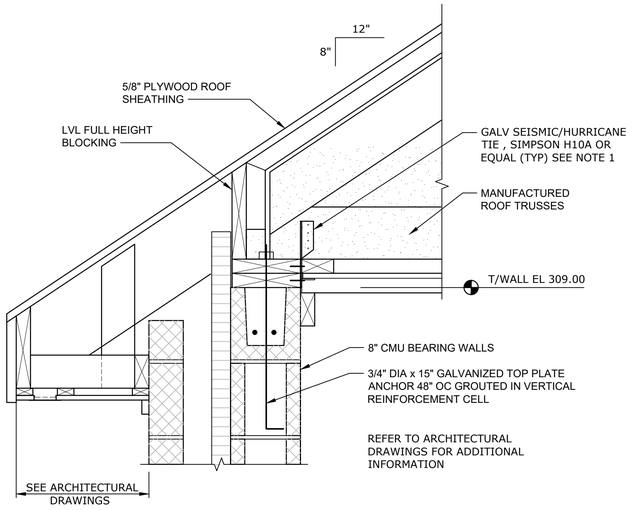
MARK	DATE	DESCRIPTION

PROJECT NO:	H1776-16A
DATE:	DECEMBER 2023
FILE:	H1776-16-S-301.dwg
DRAWN BY:	RWK
DESIGNED/CHECKED BY:	TG
APPROVED BY:	TJM

STRUCTURAL SECTIONS

SCALE: AS SHOWN

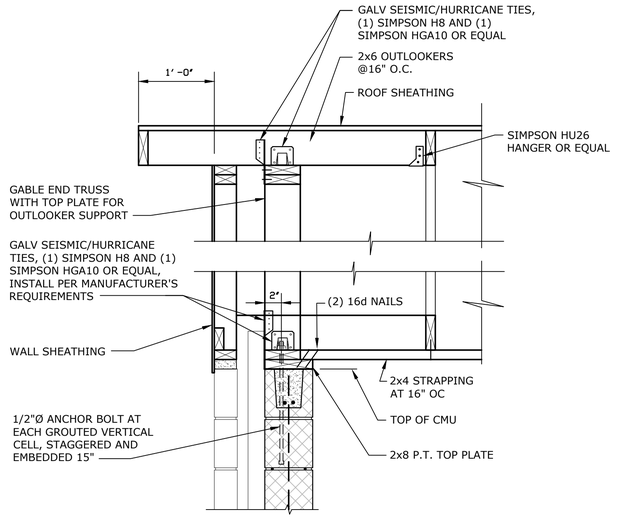
S-301
SHEET X OF X



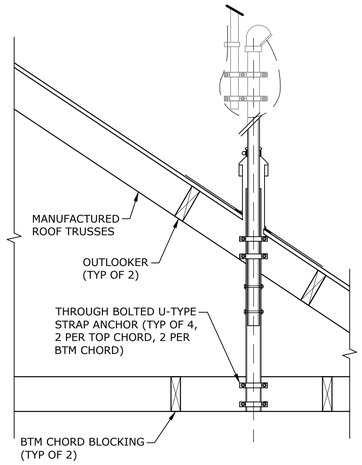
NOTES:

1. THE TRUSS ANCHORS SHALL HAVE A MINIMUM LATERAL CAPACITY OF 500 LB OUT-OF-PLANE OF THE TRUSSES.

SECTION A / S-102
1 1/2"=1'-0"



SECTION B / S-102
1"=1'-0"



TRUSS MOUNTED ANTENNA

DETAIL 4 / S-102
NO SCALE

0 0.5' 1' 2'
SCALE: 1"=1'-0"

0 0.5' 1' 1.5'
SCALE: 1 1/2"=1'-0"

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THOMAS MAHANNA
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Harvard Public Works Department

Harvard, Massachusetts

MARK	DATE	DESCRIPTION

PROJECT NO:	H1776-16A
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FILE:	H1776-16-S-501.dwg
DRAWN BY:	RWK, AJS
DESIGNED/CHECKED BY:	TG
APPROVED BY:	TJM

STRUCTURAL DETAILS

SCALE: AS SHOWN

S-501
SHEET X OF X

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PIPE SYMBOLS

- GATE VALVE
- BUTTERFLY VALVE
- BALL VALVE
- CHECK VALVE
- BALL CHECK VALVE
- COUPLING
- CONDUIT
- UNION
- REDUCER, CONCENTRIC
- REDUCER, ECCENTRIC
- CAP OR PLUG
- BLIND FLANGE
- FLUSH CONNECTION
- GAUGE ASSEMBLY WITH TEST CONNECTION
- 'Y' STRAINER
- DISSASSEMBLY FITTING
- CALIBRATION COLUMN
- SOLENOID METERING PUMP
- CHEMICAL INJECTOR
- MAGNETIC FLOW METER
- HYDRANT
- METERING PUMP SHELF
- DRAIN
- BATCH TANK

ABBREVIATIONS

AFF	ABOVE FINISHED FLOOR
ARV	AIR RELEASE VALVE
BALL	BALL VALVE
BF	BLIND FLANGE
TK	CHEMICAL TANK
BV	BUTTERFLY VALVE
C/P	CONTROL PANEL
CF	CHLORINE FEED
CHEM	CHEMICAL
CL	CHLORINE ANALYZER
CLG	CEILING
CMR	CHEMICAL ROOM
CONC	CONCRETE
CV	CONTROL VALVE
Ø	DIAMETER
DDV	DRAIN DOWN VALVE
DP	DIFFERENTIAL PRESSURE
DPI	DIFFERENTIAL PRESSURE INDICATOR
DPT	DIFFERENTIAL PRESSURE TRANSMITTER
ECS	EMERGENCY CONTROL SWITCH
EPDM	ETHYLENE PROPYLENE DIENE MONOMER
EPT	EFFLUENT PRESSURE TRANSMITTER
EV	EFFLUENT VALVE
EW	EACH WAY
FE	FLOW ELEMENT
FIT	FLOW INDICATOR TRANSMITTER
FT	FLOW TRANSMITTER
GAL	GALLONS
GN	GENERATOR
GV	GATE VALVE
INV	INLET VALVE
IPT	INFLUENT PRESSURE TRANSMITTER
MIN	MINIMUM
MP	METERING PUMP
NaOCl	SODIUM HYPOCHLORITE
OD	OUTSIDE DIAMETER
PE	POLYETHYLENE
pH	pH ANALYZER
PI	PRESSURE INDICATOR
PIT	PRESSURE INDICATOR TRANSMITTER
PP	PUMP
PRV	PRESSURE RELIEF VALVE
PS	PROXIMITY SWITCH
PSH	PRESSURE SWITCH (HIGH)
PSL	PRESSURE SWITCH (LOW)
PVC	POLYVINYL CHLORIDE
RV	RINSE VALVE
RW	RAW WATER
SCH	SCHEDULE
SOL	SOLENOID VALVE
SS	STAINLESS STEEL
TP	TRANSFER PUMP
T	TEMPERATURE
FW	FINISHED WATER
TW	TREATED WATER
TYP	TYPICAL
W/	WITH
XFER	TRANSFER

PIPE CLASS BREAK

SIZE–A-CLASS | SIZE–A-CLASS

PIPE MATERIAL ABBREVIATION

HDPE	HIGH DENSITY POLYETHYLENE
CU	COPPER
DI	DUCTILE IRON
PE	POLYETHYLENE
PVC	POLYVINYL CHLORIDE
SS	STAINLESS STEEL

LINE CODING

SIZE - A - CLASS
└ PIPE MATERIAL

LINE SYMBOLS

- EXISTING PROCESS LINE
- NEW PROCESS LINE
- DIRECTION OF FLOW
- CONTINUATION BEYOND PROJECT SCOPE
- PROCESS CONTINUATION (DESCRIPTION 1 / DESCRIPTION 2 / DWG X-XX)

GENERAL PROCESS NOTES

1. PROCESS EQUIPMENT DIMENSIONS, LOCATION AND PIPING SYSTEM LAYOUTS ARE BASED ON EQUIPMENT SELECTED BY THE ENGINEER. ALTERNATIVES PROPOSED BY THE CONTRACTOR THAT REQUIRE AN ARRANGEMENT OR SPACE DIFFERING FROM THAT INDICATED ON THE DRAWINGS OR SPECIFIED SHALL BE SUBMITTED FOR APPROVAL TO THE ENGINEER AND SHALL BE AT NO EXTRA COST TO THE OWNER. THE CONTRACTOR SHALL ASSUME THE COST OF AND THE RESPONSIBILITY FOR SATISFACTORILY ACCOMPLISHING ALL THE NECESSARY CHANGES CORRESPONDING TO THE PROPOSED ALTERNATES.
2. All PIPE SUPPORTS SHALL BE DESIGNED, FURNISHED AND INSTALLED BY THE CONTRACTOR AS SPECIFIED IN SECTION 11060. THE DESIGN AND LAYOUT SHALL BE SUBMITTED TO THE ENGINEER PRIOR TO INSTALLATION. STRUCTURAL DESIGN OF THE PRESSURE VESSELS SHALL BE PROVIDED, INCLUDING SEISMIC DESIGN IF SPECIFIED IN SECTION 11000. WHEN ENGINEERING SERVICES ARE SPECIFIED TO BE PROVIDED BY THE CONTRACTOR OR EQUIPMENT VENDORS; A LICENSED PROFESSIONAL ENGINEER SHALL PERFORM THE REQUIRED SERVICES.
3. ALL PIPING ADJACENT TO EQUIPMENT, VALVES, COUPLING, INSTRUMENTS AND OTHER APPURTENANCES SHALL BE PROPERLY SUPPORTED AND/OR ANCHORED SO AS NOT TO IMPOSE LOADS ON EQUIPMENT.
4. NOT ALL VALVE OPERATORS ARE SHOWN. OPERATORS SHALL BE LOCATED TO ALLOW CONVENIENT OPENING AND CLOSING OF VALVES. ORIENTATION OF OPERATORS SHALL BE APPROVED BY THE ENGINEER. NO VALVE SHALL BE INSTALLED WITH THE OPERATING STEM IN THE VERTICAL DOWNWARD POSITION. VALVE INDICATORS PROVIDED OVERHEAD SHALL BE VISIBLE FROM FINISHED FLOOR ELEVATION.
5. INTERIOR DUCTILE IRON PIPE, FITTINGS AND VALVES SHALL BE FLANGED OR GROOVED UNLESS OTHERWISE NOTED. WAFER VALVES ARE NOT ALLOWED. MECHANICAL JOINT PIPE AND RESTRAINED FITTINGS SHALL BE USED FOR BURIED APPLICATIONS. BURIED PIPE IS GENERALLY SHOWN ON THE CIVIL DRAWINGS.
6. ALL SPOOLS AND CONNECTORS ARE TO UTILIZE FACTORY BUILT FLANGES. UNIFLANGE ADAPTORS OR FLANGED COUPLING ADAPTORS MAY BE USED BUT ONLY AT THE ENGINEER'S DISCRETION. THE CONTRACTOR SHALL ASSUME A MINIMUM OF 20 FEET OF DUCTILE IRON PIPE AND MATERIALS AND LABOR ASSOCIATED WITH FIVE ADAPTORS FOR FIELD PIPING MODIFICATIONS.
7. ALL INTERIOR DUCTILE IRON PROCESS PIPING SHALL BE PAINTED IN ACCORDANCE WITH SECTION 09900. FITTINGS, PIPE AND CONNECTIONS FOR INTERIOR USE SHALL BE FACTORY PAINTED WITH PRIMER. BITUMINOUS COATED FITTINGS OR CONNECTIONS ARE NOT ALLOWED UNLESS OTHERWISE NOTED.
8. MECHANICAL PIPING DRAWINGS DO NOT SHOW ALL VALVES, GAUGES, SWITCHES, OPERATORS, DRAINS, VENTS REQUIRED FOR THE COMPLETE SYSTEM. SMALL DIAMETER PROCESS PIPING RUNS (3"Ø AND SMALLER), CORPORATION TAPS MAY NOT BE SHOWN IN THEIR ENTIRETY OR MAY BE SHOWN ON THE PLUMBING DRAWINGS. REFER TO APPROPRIATE DRAWINGS AND SPECIFICATIONS FOR COORDINATION BETWEEN TRADES. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO FULLY COORDINATE ALL PROCESS PIPING AND EQUIPMENT WITH THAT OF ALL OTHER TRADES TO PROVIDE A COMPLETE AND WORKING SYSTEM. GENERALLY SMALL PIPING IS SHOWN DIAGRAMMATICALLY. FIELD ROUTE SUBJECT TO THE APPROVAL OF THE ENGINEER TO AVOID INTERFERENCES. THE CONTRACTOR SHALL PROVIDE AND TEST ALL PIPING SYSTEMS AND APPURTENANCES AS INDICATED ON THE PROCESS FLOW DIAGRAMS/SCHEMATICS AND/OR AS DEFINED IN THE SPECIFICATIONS TO PROVIDE A COMPLETE AND WORKING SYSTEM.
9. THE NUMBER OF UNIONS AND OTHER TYPES OF DISMANTLING COUPLINGS/DISASSEMBLY FITTINGS SHOWN IS APPROXIMATE. THE CONTRACTOR SHALL PROVIDE UNIONS OR DISASSEMBLY FITTINGS AT ALL EQUIPMENT CONNECTIONS, AT A MINIMUM EVERY 50 FEET AND IN BRANCH LINES TO ALLOW CONVENIENT REMOVAL OF PIPING, EQUIPMENT AND APPURTENANCES. PIPE UNIONS SHALL BE PROVIDED AT ALL PIPING CONNECTIONS TO AND FROM MECHANICAL EQUIPMENT AND AT ALL VALVES 3"Ø AND SMALLER.
10. PIPES 3"Ø OR LARGER INSTALLED THROUGH CORE HOLES SHALL BE LINK-SEAL, WITH WATER PENETRATIONS BEING DOUBLE LINK-SEAL WITH GROUT UNLESS OTHERWISE NOTED. PROVIDE ESCUTCHEON PLATES OF SUITABLE SIZE ON ALL PROCESS LINES PASSING THROUGH INTERIOR WALLS.
11. ALL EQUIPMENT BASES, AIR RELEASE VALVES, OVERFLOWS AND PIPING HAVING DRAIN OUTLETS SHALL BE PIPED TO THE NEAREST DRAIN OR TRENCH DRAIN USING COPPER PIPE OF APPROPRIATE DIAMETER AS INDICATED ON THE DRAWINGS OR AS RECOMMENDED BY THE EQUIPMENT MANUFACTURER. COORDINATE WHAT DRAINS TERMINATE TO THE TIGHT TANK DRAIN SYSTEM AND THE DRYWELL DRAIN SYSTEM IN THE FIELD.
12. LISTINGS OF FITTINGS AND CONNECTIONS ARE FOR THE CONTRACTOR'S CONVENIENCE; ADDITIONAL CONNECTORS MAY BE REQUIRED. INCLUDE ALL ITEMS NECESSARY FOR COMPLETE SYSTEM INSTALLATION IN BID AMOUNT.
13. ALL PUMPS, TANKS AND EQUIPMENT SHALL BE MOUNTED ON 4" HIGH CONCRETE PADS UNLESS OTHERWISE NOTED.
14. SEE STRUCTURAL AND ARCHITECTURAL DRAWINGS FOR DIMENSIONS AND LOCATIONS OF SLABS, WALLS, BEAMS AND PADS, ETC. DO NOT SCALE PROCESS PIPING DRAWINGS.
15. PVC PIPE FOR CHEMICAL FEED SYSTEMS SHALL BE SOLVENT WELDED IN ACCORDANCE WITH SECTION 11040.
16. STAINLESS STEEL PIPING FOR CHEMICAL FEED SYSTEMS SHALL BE WELDED IN ACCORDANCE WITH SECTION 11050.
17. PROVIDE PROCESS PIPING IDENTIFICATION AS INDICATED IN SECTION 11075. PAINT PIPE AND PRESSURE FILTER IDENTIFICATION USING A STENCIL AS INDICATED IN SECTION 09900.
18. SAMPLE TAPS SHALL BE PROVIDED SO THAT WATER SAMPLES MAY BE OBTAINED FROM EACH PROCESS PIPING DESIGNATION AND FROM BEFORE AND AFTER EACH EQUIPMENT STAGE . TAPS SHALL BE CONSISTENT WITH SAMPLING NEEDS AND SHALL NOT BE OF PETCOCK TYPE. TAPS SHALL BE OF THE SMOOTH-NOSED TYPE WITHOUT INTERIOR OR EXTERIOR THREADS AND SHALL NOT BE OF THE MIXING TYPE OR WITH A SCREEN, AERATOR OR OTHER SUCH APPURTENANCE.

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Harvard-Devens Water System Interconnection Project

Harvard Public Works Department

Harvard, Massachusetts

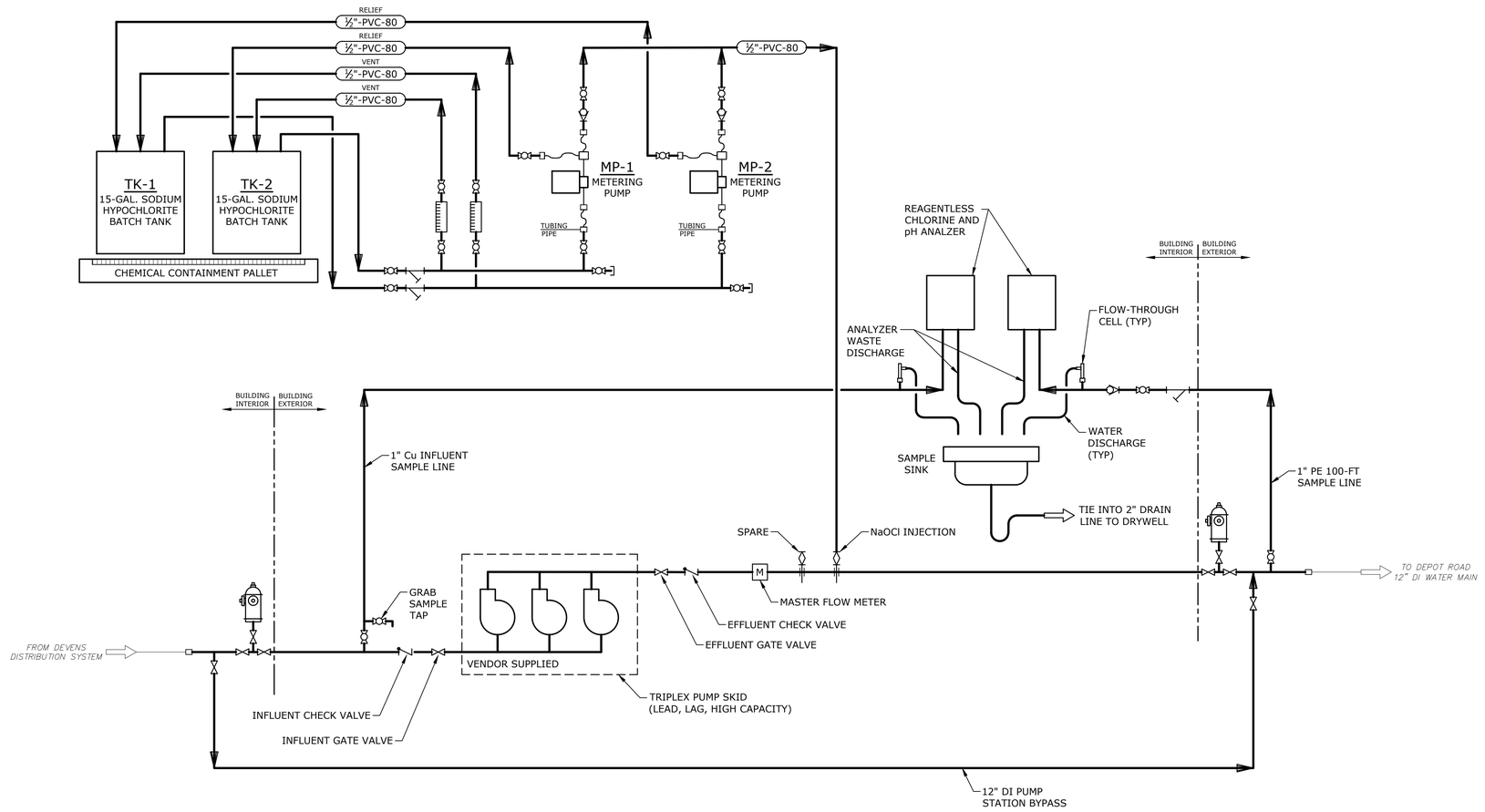
MARK	DATE	DESCRIPTION

PROJECT NO:	H1776-16A
DATE:	DECEMBER 2023
FILE:	H1776-16-M-001_M-003.dwg
DRAWN BY:	AJS
DESIGNED/CHECKED BY:	XXX
APPROVED BY:	TJM

PROCESS PIPING LEGENDS AND ABBREVIATIONS

SCALE: NO SCALE

M-001



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Printed: Nov 30, 2023 - 11:25am By: AEspelli
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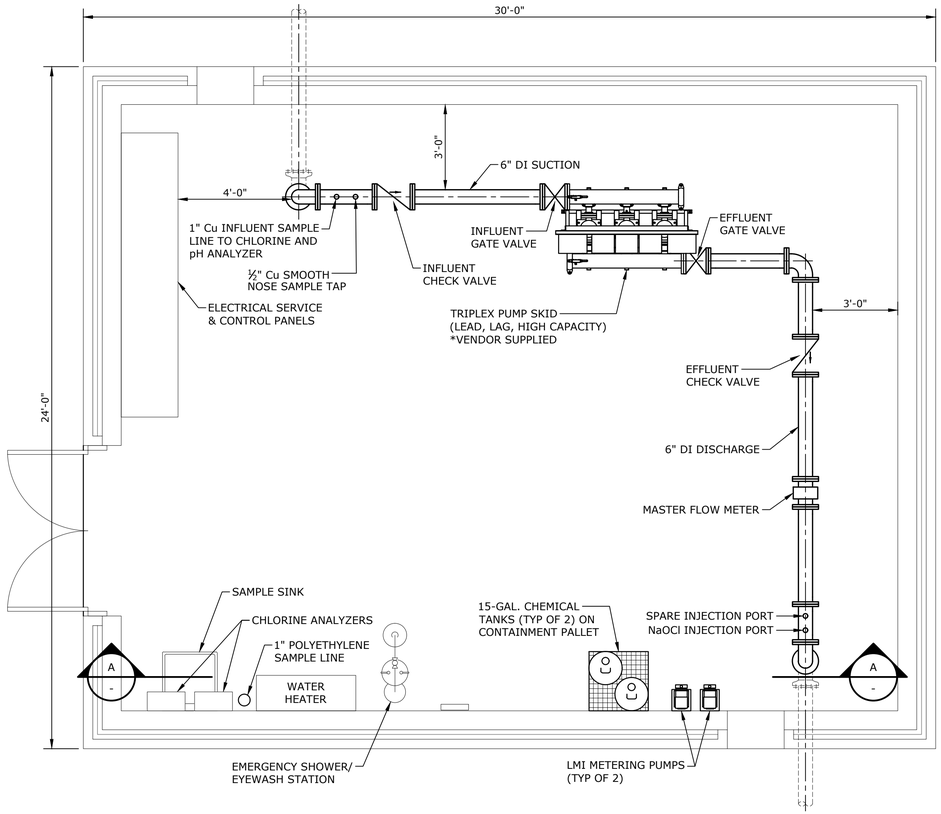
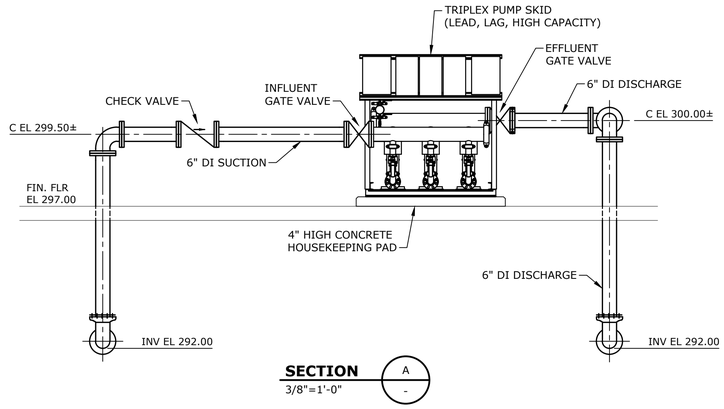
PROCESS FLOW DIAGRAM

SCALE: AS SHOWN

M-002



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



SECTION A / -
3/8"=1'-0"

0 2' 4' 6'
SCALE: 3/8"=1'-0"

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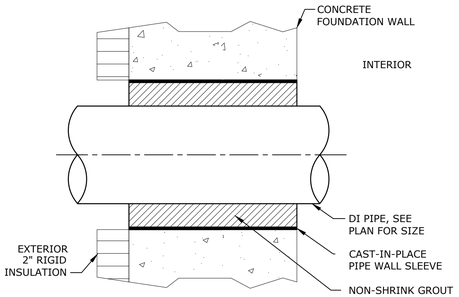
DESIGNED/CHECKED BY:	X
APPROVED BY:	TJM

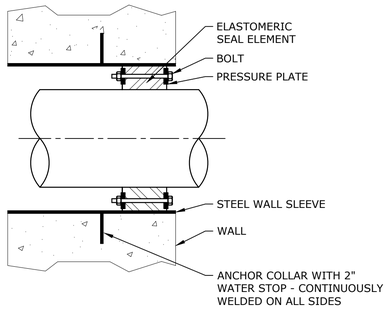
PROCESS PIPING PLAN AND SECTION

SCALE: AS SHOWN

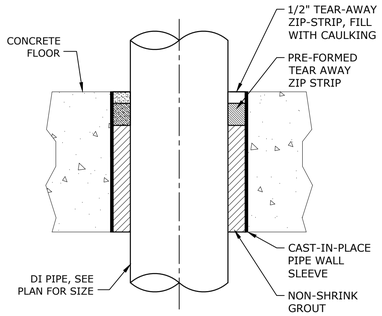
M-101
SHEET X OF X



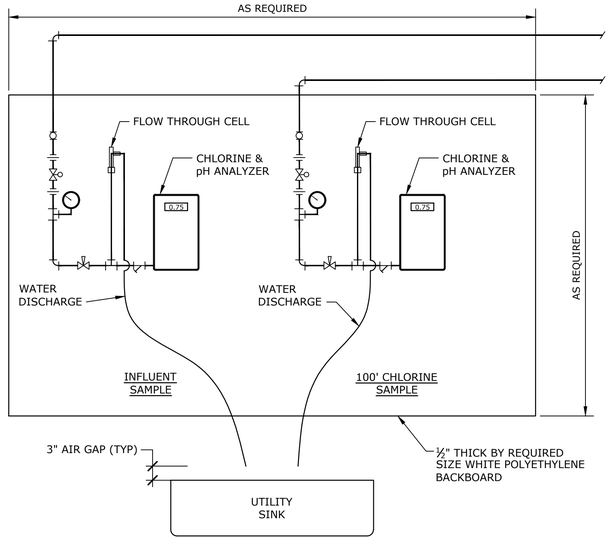
TYPICAL FOUNDATION WALL SLEEVE
NO SCALE



WALL SLEEVE WITH LINK SEAL
NO SCALE



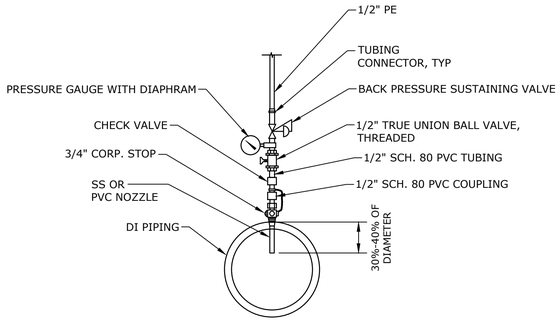
TYPICAL FLOOR SLEEVE
NO SCALE



NOTES:

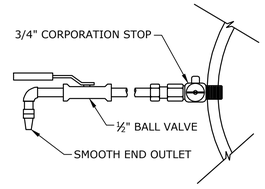
1. FOR PIPING SEE PLUMBING SHEETS.
2. BACKBOARDS AND PROCESS PIPING BY GENERAL CONTRACTOR.

ANALYZER BOARD SCHEMATIC
NO SCALE

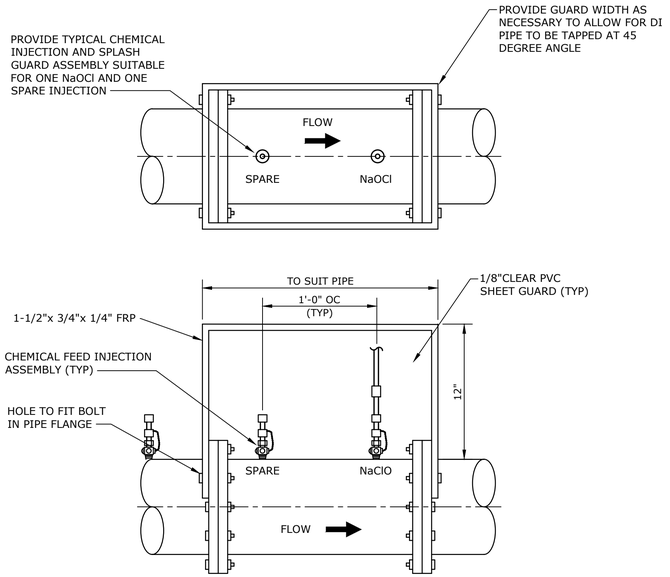


NOTE:
1. INSTALL CHEMICAL INJECTORS AT 45 DEGREE ANGLE TO LIMIT ANY DRIPS FROM RUNNING DOWN ONTO PIPE.

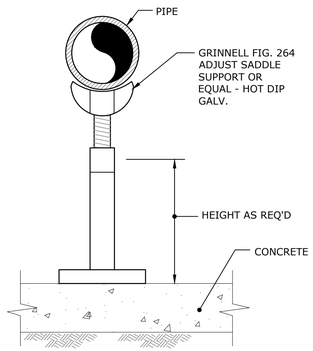
TYPICAL INJECTION ASSEMBLY
NO SCALE



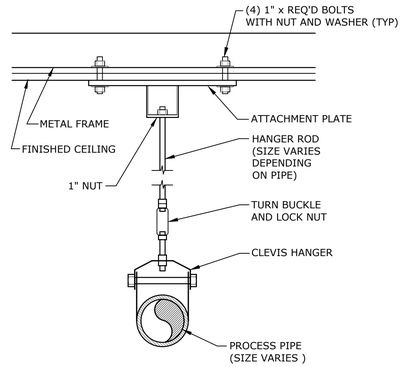
SMOOTH NOSED SAMPLE TAP DETAIL
NO SCALE



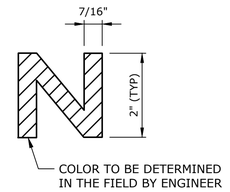
TREATED WATER CHEMICAL INJECTION AND SPLASH GUARD
NO SCALE



PEDESTAL PIPE SUPPORT
NO SCALE



HANGER PIPE SUPPORT
NO SCALE



CHEMICAL TANK IDENTIFICATION VINYL LETTERING DETAIL
NO SCALE

PIPE SUPPORT NOTES:

1. ALL METAL SUPPORTS SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION.
2. SUPPORT PIPE EVERY TEN FEET (MIN.) OF PIPE RUNS OF SCH80 PVC PIPE 8"Ø AND LARGER. SUPPORT PIPE EVERY SIX FEET (MIN.) FOR PIPE RUNS OF SCH80 PVC PIPE 2"Ø TO 6"Ø.
3. NOT ALL PIPE SUPPORTS ARE SHOWN ON THE DRAWINGS.
4. PROVIDE ADDITIONAL PIPE SUPPORTS AS NEEDED TO STABILIZE PIPING.

Tighe&Bond

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Harvard Public Works Department

Harvard, Massachusetts

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PROJECT NO:	H1776-16A
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DRAWN BY:	AJS
DESIGNED/CHECKED BY:	X
APPROVED BY:	TJM

PROCESS DETAILS

SCALE: AS SHOWN

M-501
SHEET X OF X

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VALVE ACTUATORS

- DIAPHRAGM
- ELECTRIC MOTOR
- SOLENOID
- DOUBLE-ACTING CYLINDER

PIPING SYMBOLS

- GAUGE ASSEMBLY WITH TEST CONNECTION
- GAUGE ASSEMBLY WITH TEST CONNECTION & DIAPHRAGM SEAL (SEE NOTE 3)
- EMERGENCY SHOWER & EYEWASH STATION
- SIGHT FLOW INDICATOR
- CHEMICAL INJECTOR
- BUTTERFLY DAMPER
- UNION
- PRESSURE SENSOR
- FLOW METER

IN-LINE INSTRUMENTS

- NOZZLE
- MAGNETIC ELEMENT
- VORTEX SHREDDING
- TURBINE
- ORIFICE
- VENTURI
- POSITIVE DISPLACEMENT
- SONIC
- PITOT
- AVERAGING PITOT
- TARGET
- ROTOMETER
- RESISTANCE TEMPERATURE DIFFERENTIAL
- PARSHALL FLUME

GENERAL INSTRUMENT OR FUNCTION SYMBOLS

	FIELD MOUNTED	PRIMARY LOCATION ACCESSIBLE TO OPERATOR	PRIMARY LOCATION INACCESSIBLE TO OPERATOR	AUXILIARY LOCATION ACCESSIBLE TO OPERATOR	HARDWARE INTERLOCK
DISCRETE INSTRUMENTS	○	⊖	⊖	⊖	◇1
SHARED DISPLAY SHARED CONTROL	▢	▢	▢	▢	DCS "SOFT" INTERLOCK
COMPUTER FUNCTION	⬡	⬡	⬡	⬡	◇I
PROGRAMMABLE LOGIC CONTROL	◇	◇ SEE NOTES 1 & 2	◇	◇	

LINE SYMBOLS

- EXISTING PROCESS LINE
- MAJOR PROCESS LINE
- MINOR PROCESS LINE
- ELECTRICAL (WIRING)
- AFD/PLC TO SCADA COMMUNICATION CABLE
- PNEUMATIC SIGNAL
- HYDRAULIC SIGNAL
- INTERNAL SYSTEM LINE (SOFTWARE OR DATA)
- ELECTROMAGNETIC SIGNAL (GUIDED)
- ELECTROMAGNETIC SIGNAL (NOT GUIDED)
- HARDWIRED INTERLOCK
- AUTOMATION INTERLOCK (◇A OR ◇A)
- LINE CODE (SIZE-MATERIAL-FLUID) — XX"-DI-BWD
- PROCESS CONTINUATION — DESCRIPTION 1 / DESCRIPTION 2 / DESCRIPTION 3
- PROCESS CONTINUATION WITH BACKFLOW — DESCRIPTION 1 / DESCRIPTION 2 / DESCRIPTION 3

INSTRUMENT NUMBERING

0000 (EXAMPLE)

P&ID DRAWING NO. — SEQUENTIAL INSTRUMENT NO.

EQUIPMENT NUMBERING

00 - 0000 (EXAMPLE)

- SEQUENTIAL EQUIPMENT NUMBER
- EQUIPMENT SERIES
- EQUIPMENT TYPE

PROCESS CONTINUATION CODES

A-S	LIQUID PROCESS FLOW
SA-SW	SLUDGE PROCESS FLOW
CA-CW	CHEMICAL FLOW
RA-RH	RECYCLE FLOW
GA-GJ	GENERAL FLOW (ODOR, AIR, ETC.)

TYPICAL VARIABLE LETTER COMBINATIONS

FIRST LETTERS	INITIATING OR MEASURED VARIABLE	CONTROLLERS				READOUT DEVICES		SWITCHES AND ALARM DEVICES			TRANSMITTERS			SOLENOIDS, RELAYS, COMPUTING DEVICES	PRIMARY ELEMENT	TEST POINT	WELL OR PROBE	VIEWING DEVICE, GLASS	SAFETY DEVICE	FINAL ELEMENT
		RECORDING	INDICATING	BLIND	SELF-ACTUATED CONTROL VALVES	RECORDING	INDICATING	HIGH	LOW	COMB	RECORDING	INDICATING	BLIND							
A	ANALYSIS	ARC	AIC	AC	-	AR	AI	ASH	ASL	ASHL	ART	AIT	AT	AY	AE	AP	AW	-	-	AZ
B	BURNER/COMBUSTION	BRC	BIC	BC	-	BR	BI	BSH	BSL	BSHL	BRT	BIT	BT	BY	BE	-	BW	BG	-	BZ
C	USER'S CHOICE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D	USER'S CHOICE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
E	VOLTAGE	ERC	EIC	EC	-	ER	EI	ESH	ESL	ESHL	ERT	EIT	ET	EY	EE	-	-	-	-	EZ
F	FLOW RATE	FRC	FIC	FC	FCV	FR	FI	FSH	FSL	FSHL	FRT	FIT	FT	FY	FE	FP	-	FG	-	FZ
FQ	FLOW QUANTITY	FQRC	FQIC	-	-	FQR	FQI	FQSH	FQSL	FQSHL	-	FQIT	FQT	FQY	FQE	-	-	-	-	FQZ
FF	FLOW RATIO	FFRC	FFIC	FFC	-	FFR	FFI	FFSH	FFSL	FFSHL	-	-	-	-	-	-	-	-	-	FFZ
G	USER'S CHOICE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
H	HAND	-	HIC	HC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I	CURRENT	IRC	IIC	-	-	IR	II	ISH	ISL	ISHL	IRT	IIT	IT	IY	IE	-	-	-	-	IZ
J	POWER	JRC	JIC	-	-	JR	JI	JSH	JSL	JSHL	JRT	JIT	JT	JY	JE	-	-	-	-	JZ
K	TIME	KRC	KIC	KC	KCV	KR	KI	KSH	KSL	KSHL	KRT	KIT	KT	KY	KE	-	-	-	-	KZ
L	LEVEL	LRC	LIC	LC	LCV	LR	LI	LSH	LSL	LSHL	LRT	LIT	LT	LY	LE	-	LW	LG	-	LZ
M	MOISTURE	-	-	-	-	-	-	MS	-	-	-	-	-	-	ME	-	-	-	-	-
N	USER'S CHOICE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
O	USER'S CHOICE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P	PRESSURE/VACUUM	PRC	PIC	PC	PCV	PR	PI	PSH	PSL	PSHL	PRT	PIT	PT	PY	PE	PP	-	-	PSE	PZ
PD	PRESSURE DIFFERENTIAL	PDRC	PDIC	PDC	PDCV	PDR	PDI	PDSH	PDSL	PDSHL	PDRT	PDIT	PDT	PDY	PDE	PDP	-	-	-	PDZ
Q	QUANTITY	QRC	QIC	-	-	QR	QI	QSH	QSL	QSHL	QRT	QIT	QT	QY	QE	-	RW	-	-	QZ
R	RADIATION	RRC	RIC	RC	-	RR	RI	RSH	RSL	RSHL	RRT	RIT	RT	RY	RE	-	-	-	-	RZ
S	SPEED/FREQUENCY	SRC	SIC	SC	SCV	SR	SI	SSH	SSL	SSHL	SRT	SIT	ST	SY	SE	-	-	-	-	SZ
T	TEMPERATURE	TRC	TIC	TC	TCV	TR	TI	TSH	TSL	TSHL	TRT	TIT	TT	TY	TE	TP	TPW	-	TSE	TZ
TD	TEMPERATURE DIFFERENTIAL	TDRC	TDIC	TDC	TDCV	TDR	TDI	TDSH	TDSL	TDSHL	TDRT	TDIT	TDT	TDY	TDE	TDP	TDPW	-	-	TDZ
U	MULTIVARIABLE	-	-	-	-	UR	UI	-	-	-	-	-	-	-	-	-	-	-	-	-
V	VIBRATION/MACHINERY ANALYSIS	-	-	-	-	VR	VI	VSH	VSL	VSHL	VRT	VIT	VT	VY	VE	-	-	-	-	VZ
W	WEIGHT/FORCE	WRC	WIC	WC	WCV	WR	WI	WSH	WSL	WSHL	WRT	WIT	WT	WY	WE	-	-	-	-	WZ
WD	WEIGHT/FORCE DIFFERENTIAL	WDRC	WDIC	WDC	WDCV	WDR	WDI	WDSH	WDSL	WDSHL	WDRT	WDIT	WDT	WDY	WDE	-	-	-	-	WDZ
X	UNCLASSIFIED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Y	EVENT/STATE/PRESENCE	-	YIC	YC	-	YR	YI	YSH	YSL	YSHL	YRT	YIT	YT	YY	YE	-	-	-	-	YZ
Z	POSITION/DIMENSION	ZRC	ZIC	ZC	ZCV	ZR	ZI	ZSH	ZSL	ZSHL	ZRT	ZIT	ZT	ZY	ZE	-	-	-	-	ZZ
ZD	GAUGING/DEVIATION	ZDRC	ZDIC	ZDC	ZDCV	ZDR	ZDI	ZDSH	ZDSL	ZDSHL	ZDRT	ZDIT	ZDT	ZDY	ZDE	-	-	-	-	ZDZ

SUCEEDING LETTERS	
VALUE	DESCRIPTION
A	ALARM
B	-
C	CLOSED
D	-
E	-
F	-
-	-
-	-
G	-
H	HIGH
HH	HIGH HIGH
I	-
J	-
K	-
L	LOW
LL	LOW LOW
M	MIDDLE
N	-
O	OPEN
P	-
Q	-
R	-
S	-
T	-
U	-
V	-
W	-
-	-
X	-
Y	-
Z	-
-	-

NOTE: THIS TABLE IS NOT ALL-INCLUSIVE.

NOTES:

1. TOP IDENTIFICATION IN PROGRAMMABLE LOGIC CONTROLLER SYMBOL INDICATES I/O TYPE:
   - DI = DIGITAL INPUT
   - DO = DIGITAL OUTPUT
   - AI = ANALOG INPUT
   - AO = ANALOG OUTPUT
2. LOWER IDENTIFICATION IN PROGRAMMABLE LOGIC CONTROLLER (PLC) SYMBOL INDICATES PLC LOCATION. REFER TO DWG PI-003.
3. THICK, DARK LINES AND TEXT INDICATE PROPOSED WORK. THIN, LIGHT LINES AND TEXT INDICATE APPROXIMATE EXISTING CONDITIONS.
4. ∗ INDICATES BEING FURNISHED WITH THE RELATED EQUIPMENT

Tighe&Bond

COMMONWEALTH OF MASSACHUSETTS — THOMAS MAHANNA — CIVIL — No. 39479 — REGISTERED PROFESSIONAL ENGINEER — 12/12/23

COMMONWEALTH OF MASSACHUSETTS — MARY E. DANIELSON — ENVIRONMENTAL — No. 55926 — REGISTERED PROFESSIONAL ENGINEER — 12/12/23

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Harvard-Devens Water System Interconnection Project

Harvard Public Works Department

Harvard, Massachusetts

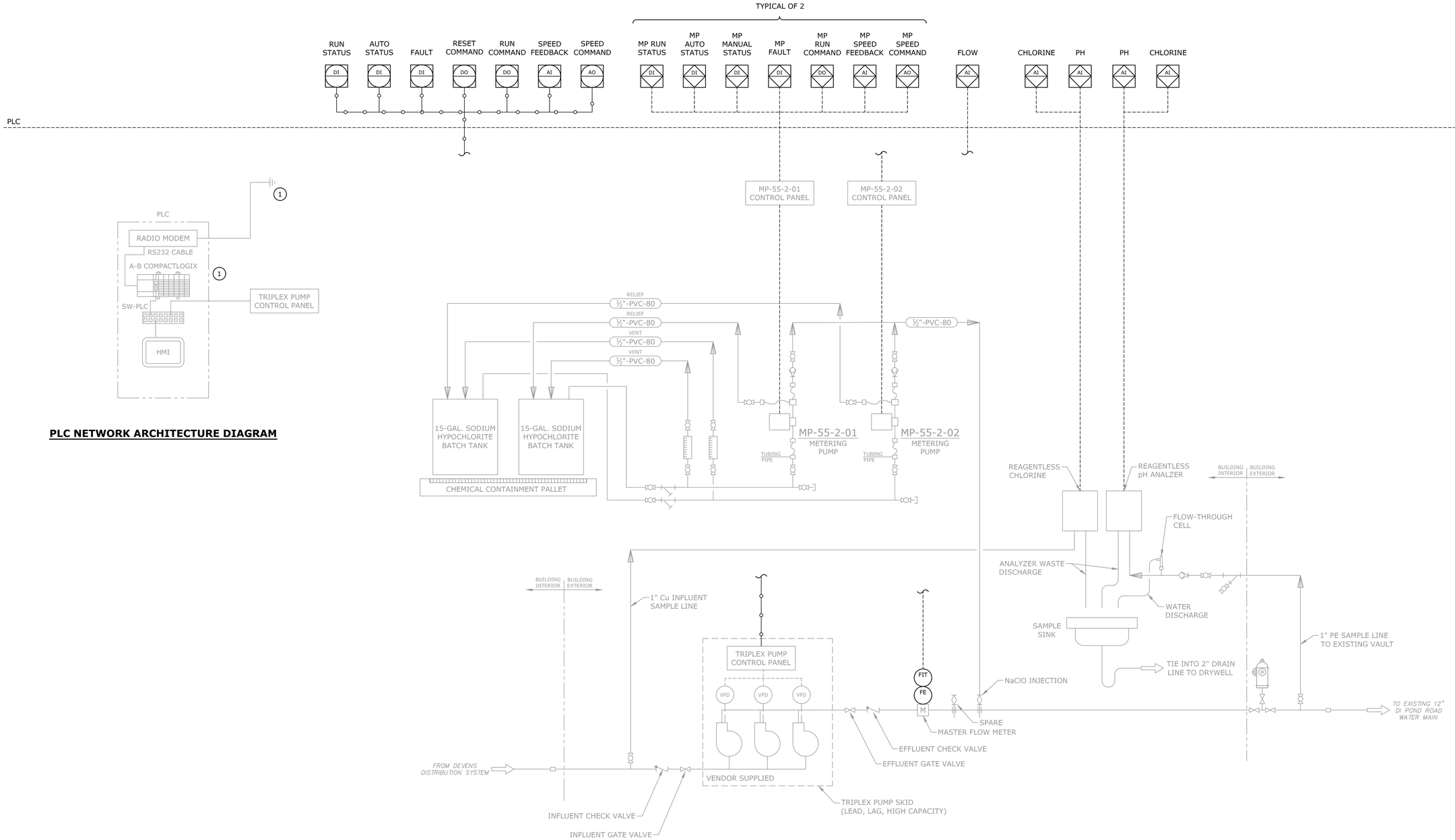
MARK	DATE	DESCRIPTION

PROJECT NO:	H1776-16A
DATE:	DECEMBER 2023
FILE:	H1776-16-I-001.dwg
DRAWN BY:	CTO
DESIGNED/CHECKED BY:	CTO, JC
APPROVED BY:	TJM

INSTRUMENTATION LEGEND

SCALE:

I-001
SHEET X OF XX



PLC NETWORK ARCHITECTURE DIAGRAM

KEY NOTES:

1. COORDINATE WITH THE OWNER AND OWNER'S SYSTEMS INTEGRATOR FOR SPECIFIC RADIO MODEM AND ANTENNA REQUIREMENTS. PROVIDE YAGI ANTENNA ON THE EXTERIOR OF THE BUILDING WHERE SHOWN. COORDINATE COMMUNICATIONS WITH THE OWNER'S SYSTEMS INTEGRATOR PRIOR TO FINALIZING INSTALLATION. CONNECT RADIO MODEM TO PLC USING RS232 SERIAL CABLE. PROVIDE ALL NECESSARY POWER SUPPLIES, DISCONNECTS, FUSES, LIGHTNING ARRESTORS, RADIO EQUIPMENT APPURTENANCES, I/O HARDWARE, I/O CABLES, ANTENNA CABLES, AND TERMINAL BLOCKS FOR FIELD WIRING. REFER TO SPECIFICATION SECTION 13455 FOR ALL RADIO EQUIPMENT REQUIREMENTS. SEE ANTENNA MOUNTING DETAIL.

Tighe&Bond

COMMONWEALTH OF MASSACHUSETTS
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Harvard, Massachusetts

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GENERAL SYMBOLS

- THICK, DARK SOLID LINES INDICATE NEW ITEMS
- THIN, LIGHT LINES INDICATE EXISTING ITEMS

PIPING SYSTEMS

- — DOMESTIC COLD WATER PIPE
- PRO PROPANE GAS
- TW TEMPERED WATER
- W WASTE PIPE

PIPING SYMBOLS

- CHECK VALVE
- GENERIC VALVE
- THERMOSTATIC MIXING VALVE
- PRESSURE RELIEF VALVE
- PRESSURE REDUCING VALVE
- STRAINER
- PRESSURE GAUGE
- SHOCK ABSORBER
- PIPE RISER UP
- PIPE RISER DOWN
- UNION OR FLANGE (AS INDICATED BY PIPE SIZE - SEE SPEC.)
- END CAP
- FLOOR LEVEL CLEANOUT
- PIPE BREAK (SINGLE LINE)
- WYE PLUS ONE EIGHTH BEND
- 90° MITERED ELBOW
- FLOOR DRAIN
- TEMPERATURE GAUGE WITH THERMOWELL
- HOSE BIB
- BFP BACKFLOW PREVENTER

ABBREVIATIONS

AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
FCO	FLOOR CLEAN OUT
CW	COLD WATER
DWH	DOMESTIC WATER HEATER
ES	EMERGENCY SHOWER
FD	FLOOR DRAIN
FF	FINISHED FLOOR
HW	HOT WATER
INV	INVERT ELEVATION
PRO	PROPANE GAS
PRV	PRESSURE RELIEF VALVE
TW	TEMPERED WATER
UG	UNDERGROUND
W	WASTE

VENTING SYSTEM COORDINATION

IN ACCORDANCE WITH 248 CMR REGULATIONS AND POLICIES ESTABLISHED BY THE MASSACHUSETTS BOARD OF STATE EXAMINERS OF PLUMBERS AND GAS FITTERS:

1. THE DIVISION 22 CONTRACTOR, WHO SHALL BE A LICENSED PLUMBER OR GAS FITTER IN THE STATE OF MASSACHUSETTS, SHALL SECURE A GAS FITTING PERMIT FOR THE INSTALLATION OF GAS FIRED EQUIPMENT SHOWN ON THE PLUMBING DRAWINGS. THE DIVISION 22 CONTRACTOR SHALL PROVIDE ALL GAS PIPING. THE DIVISION 22 CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR AND SUPERVISE THE INSTALLATION OF VENTING SYSTEMS, INCLUDING LOUVERS, COMBUSTION AIR DUCTWORK, BREECHING, STACKS, CHIMNEYS, AND OTHER VENTING ACCESSORIES ASSOCIATED WITH SAID GAS FIRED EQUIPMENT, WHICH SHALL BE PROVIDED BY THE DIVISION 23 CONTRACTOR. THESE SYSTEMS ARE INDICATED IN THE HVAC DRAWINGS AND DIVISION 23 SPECIFICATIONS.
2. THE DIVISION 23 CONTRACTOR SHALL PROVIDE ALL VENTING SYSTEMS INDICATED ON THE HVAC DRAWINGS AND WITHIN THE DIVISION 23 SPECIFICATIONS. THE DIVISION 23 CONTRACTOR SHALL ALSO COORDINATE WITH THE DIVISION 22 CONTRACTOR IN ORDER TO FACILITATE THE DIVISION 22 CONTRACTOR'S RESPONSIBILITY FOR, AND SUPERVISION OF, VENTING SYSTEMS FOR GAS FIRED EQUIPMENT. DIVISION 23 SUBMITTALS FOR VENTING SYSTEM MATERIALS AND VENTING SYSTEM SHOP DRAWINGS SHALL BE REVIEWED AND APPROVED BY THE DIVISION 22 CONTRACTOR PRIOR TO SUBMITTING TO THE ENGINEER.

GENERAL NOTES

1. PROVIDE ALL REQUIRED MATERIALS, LABOR, EQUIPMENT, AND SERVICES NECESSARY FOR THE INSTALLATION OF THE WORK AS SHOWN ON THESE DRAWINGS OR AS INDICATED IN THE PROJECT SPECIFICATIONS.
2. ALL MATERIALS, METHODS, SUPPORTS, AND EQUIPMENT INSTALLED MUST BE IN COMPLIANCE WITH PROJECT SPECIFICATIONS AND APPLICABLE CODES.
3. THE DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS AND WORK INCLUDED IN THE CONTRACT. PROVIDE OFFSETS AND TRANSITIONS IN PIPING TO AVOID OBSTRUCTIONS AND INTERFERENCES WITH FIELD CONDITIONS. OBTAIN APPROVAL FROM ENGINEER PRIOR TO MAJOR RELOCATIONS OR INSTALLATION SIGNIFICANT OFFSETS (MORE THAN 6 IN A SINGLE PIPING SYSTEM).
4. PLUMBING DRAWINGS DO NOT SHOW ALL CONDITIONS AND SYSTEMS OF THE BUILDING. CONTRACTOR SHALL USE ALL DRAWINGS AND SPECIFICATIONS OF CONTRACT DOCUMENTS FOR COORDINATION AND SHALL VERIFY FIELD CONDITIONS.
5. INSTALL ALL EQUIPMENT IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS INCLUDING LISTED SERVICE CLEARANCE SPACE.
6. COORDINATE LOCATIONS OF EQUIPMENT AND SYSTEMS WITH OTHER TRADES BEFORE AND DURING CONSTRUCTION. ANY MODIFICATIONS REQUIRED THAT RESULTED FROM A LACK OF COORDINATION SHALL BE PERFORMED AT NO ADDITIONAL COST.
7. INSTALL ALL PIPING AS CLOSE TO THE UNDERSIDE OF DECK AS POSSIBLE UNLESS NOTED OTHERWISE.
8. UNLESS OTHERWISE SPECIFIED OR INDICATED ON DRAWINGS, ALL HORIZONTAL STORM DRAIN AND SANITARY SEWER PIPING SHALL BE INSTALLED AT THE MINIMUM SLOPE OF: 3" PIPING AND SMALLER AT MINIMUM 1/4" PER FOOT (2%), 4" PIPING AND LARGER AT MINIMUM 1/8" PER FOOT (1%).
9. COORDINATE ALL PENETRATIONS THROUGH WALLS, FLOORS, AND THE ROOF WITH THE GENERAL CONTRACTOR AND OTHER TRADES.
10. ALL PLUMBING PIPING WHICH PASSES THROUGH WALLS, AND FOUNDATIONS SHALL BE INSTALLED WITH A SLEEVE, SEALED AND INSULATED. PROVIDE WALL ESCUTCHEONS.
11. PROPANE SUPPLIER TO PRESSURE TEST AND MAKE UP FINAL CONNECTION TO GENERATOR.

PLUMBING FIXTURES SCHEDULE

UNIT NO	MANUFACTURER	MODEL	MA APPROVAL NUMBER	FIXTURE TYPE	SIZE & DESCRIPTION	MATERIAL/ COLOR	CONNECTION SIZES (IN)				FAUCET OR VALVE			NOTES
							CW	HW	DRAIN	VENT	TYPE	MANUFACTURER/ MODEL	NOTES	
US-1	MUSTEE	19F	P3-0516-481	FREE STANDING SERVICE SINK	24"x30"x34" OVERALL	PLASTIC WHITE	-	-	2	1½"	-	-	-	PROVIDE OFFSET TAIL PIECE
ES-1	GUARDIAN	G1990	P3-0717-689 P-2023-051 (TMV)	COMBINATION EMERGENCY EYEWASH AND SHOWER	91" HIGH	PVC	-	1¼	2	-	MIXING VALVE WITH INTEGRAL TEMPERATURE GAUGE	G6040	DISCHARGE TEMPERATURE 80°F; FLOW RATE 20GPM	ALL SUPPLY AND DRAIN PIPES, FITTINGS AND FLOOR FLANGE SHALL BE PVC, VALVE SHALL HAVE A CHROME PLATED BALL. FLOW SWITCH PROVIDED BY DIV 13, TO BE INSTALLED BY DIV 15, AND WIRED BY DIV 16. COORDINATE WITH ELECTRICAL AND CONTROLS CONTRACTOR.
HB-1	WOODOFORD	MODEL 24-C	P3–0817–30	SURFACE MOUNT HOSE BIB WITH COMPRESSION INLET, METAL HAND WHEEL AND VACUUM BREAKER	¾"	BRASS	¾	-	-	-	-	-	-	MOUNT 48" AFF

NOTES:
1. ALL PLUMBING FIXTURES SHALL BE IAPMO LISTED.
2. ALL PLUMBING COMPONENTS IN CONTACT WITH POTABLE WATER SHALL BE LEAD FREE.

DOMESTIC GAS FIRED WATER HEATER SCHEDULE

UNIT NO	MANUFACTURER	MODEL	MA APPROVAL NUMBER	TYPE	FUEL	GAS INPUT MIN-MAX (MBH)	GAS PRESSURE MIN-MAX (IN WC)	EWT (°F)	LWT (°F)	THERMAL EFFICIENCY (%)	DIMENSIONS								ELECTRICAL DATA			REMARKS
											HEIGHT (IN)	WIDTH (IN)	DEPTH (IN)	CW INLET (IN)	HW OUTLET (IN)	GAS (IN)	RELIEF (IN)	DRAIN (IN)	VOLTAGE	PHASE	AMPS	
DWH-1	RHEEM	RTR-WM220DVLP	C1-1117-194	WALL MOUNTED TANKLESS TWO UNIT RACK	PROPANE	11-399	8-10.5	40	140	96	55	42	15	2½	2½	1½	¾	¾	120	1	8	SEE NOTES

NOTES:
1. WATER HEATER TO BE ASME RATED.
2. T&P RELIEF TO 6" ABOVE FLOOR. PROVIDE VACUUM RELIEF VALVES ON COLD WATER INLET.
3. VERIFY EXHAUST FLUE AND COMBUSTION AIR INTAKE SIZES, LAYOUTS, AND REQUIREMENTS WITH MANUFACTURER.
4. PROVIDE MANUFACTURER'S CONDENSATE NEUTRALIZATION KIT FOR EACH WATER HEATER SECTION.
5. MA APPROVAL NUMBER FOR RTGH-CM95. RACK INCLUDES TWO SUCH UNITS.

DRAIN SPECIALTIES

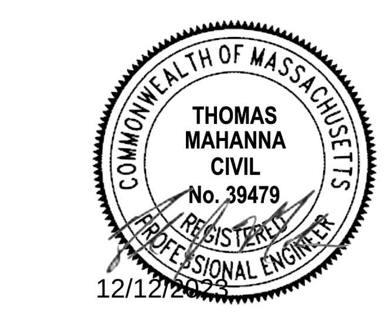
UNIT NO	MANUFACTURER	MODEL	MA APPROVAL NUMBER	TYPE	CONNECTION (IN)	DESCRIPTION
FD-1	JAY R SMITH	3510Y-P05-NB-NB	P3-0818-621	FLOOR DRAIN, MEDIUM DUTY	4	CAST IRON FLOOR DRAIN BODY WITH ADJUSTABLE 8-1/2" ROUND NICKEL BRONZE GRATE, FLASHING COLLAR, REMOVABLE NICKEL BRONZE SEDIMENT BUCKET, NO-HUB OUTLET CONNECTION.
CO-1	JAY R SMITH	4239L-NB	P3-0818-621	FLOOR CLEANOUT, MEDIUM DUTY, UNFINISHED FLOORS, NICKEL BRONZE COVER	4	COATED CAST IRON FLOOR CLEANOUT WITH GASKET SEAL, ADJUSTABLE TOP AND FRAME, TAPER THREAD BRONZE PLUG, ADJUSTABLE CAST IRON HOUSING WITH SCORIATED SECURED ROUND NICKEL BRONZE COVER, INSIDE CAULK OUTLET WITH CLAMPING RING AND FLANGE.

BACKFLOW PREVENTER SCHEDULE

UNIT NO	MANUFACTURER	MODEL	MA APPROVAL NUMBER	TYPE	SIZE (IN)	BODY MATERIAL	PRESSURE RATING (PSI)	CONNECTIONS	VALVES	STRAINER	OVERALL LENGTH (IN)	REMARKS
BFP-1	WATTS	LF-009-QT-S	P3-0217-395	REDUCED PRESSURE ZONE	3/4	BRONZE	175	NPT	QUARTER-TURN BALL VALVES	YES	14	-

NOTES:
1. SUPPORT ASSEMBLY PER MANUFACTURES RECOMMENDATIONS.
2. PIPE RELIEF DRAIN PIPING TO DISCHARGE OPEN-ENDED OVER LOCAL DRAIN WITH REQUIRED AIR GAP FOR REDUCE PRESSURE ZONE ASSEMBLIES.

Tighe&Bond



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Harvard-Devens Water System Interconnection Project

Harvard Public Works Department

Harvard, Massachusetts

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DRAWN BY:	OLR
DESIGNED/CHECKED BY:	JM, SJP
APPROVED BY:	TJM

PLUMBING LEGEND, GENERAL NOTES AND SCHEDULES

SCALE: NO SCALE

P-001

SHEET X OF XX

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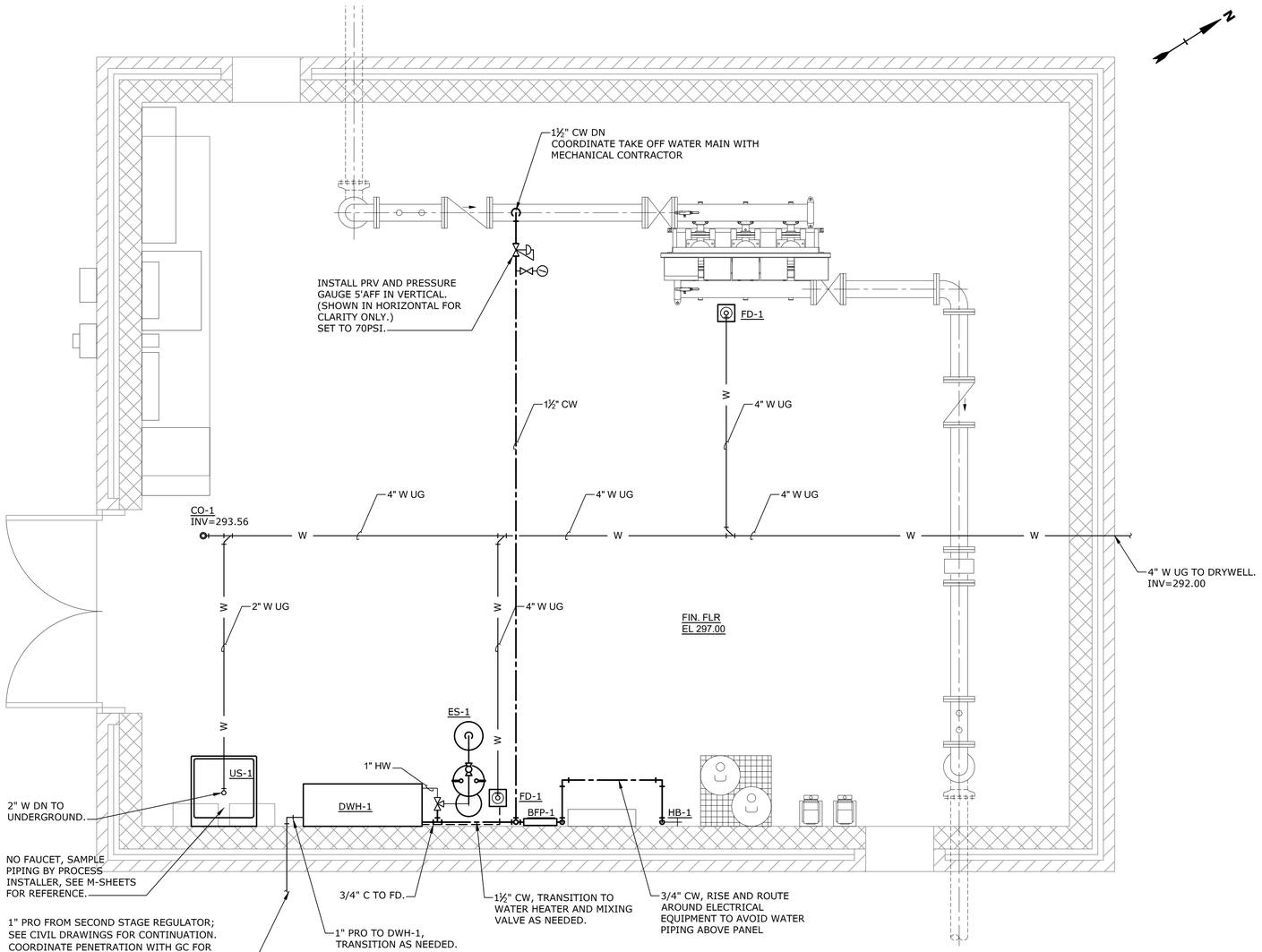
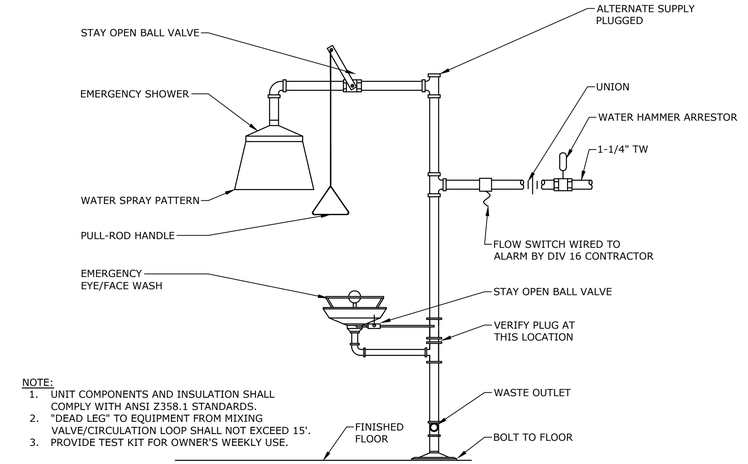
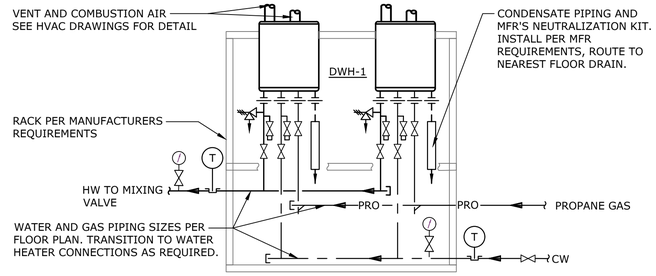




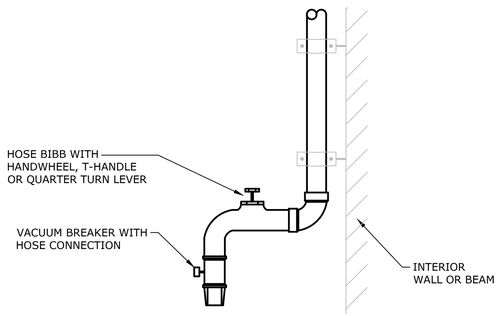
NOTE:
1. UNIT COMPONENTS AND INSULATION SHALL COMPLY WITH ANSI Z358.1 STANDARDS.
2. "DEAD LEG" TO EQUIPMENT FROM MIXING VALVE/CIRCULATION LOOP SHALL NOT EXCEED 15'.
3. PROVIDE TEST KIT FOR OWNER'S WEEKLY USE.

EMERGENCY SHOWER AND EYEWASH DETAIL
NO SCALE



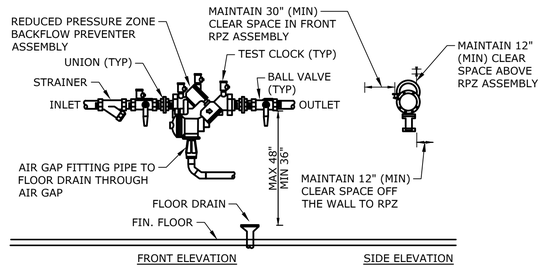
NOTES:
1. ASME RATED T&P RELIEF VALVE, FACTORY INSTALLED IN WATER HEATER. PIPE DISCHARGE TO 6" ABOVE FLOOR.
2. INSTALL GAS PIPING CONNECTION TO WATER HEATER WITH DRIP LEG PER GAS PIPING DROP DETAIL.
3. CONNECTIONS BETWEEN HEADER AND WATER HEADER MAY BE FLEX PIPE.

RACK MOUNTED INSTANTANEOUS GAS WATER HEATER PIPING SCHEMATIC
NO SCALE



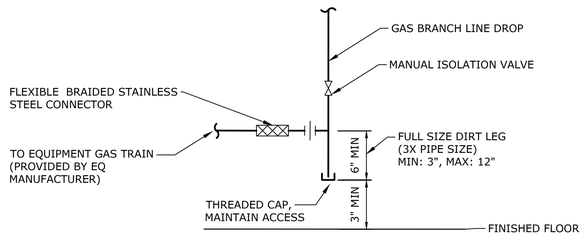
NOTES:
1. VACUUM BREAKER MAY BE INTEGRAL TO HOSE BIBB.
2. WHEEL OR HANDLE TO MATCH FITTING MATERIAL. PLASTIC IS NOT ACCEPTABLE.

HOSE BIBB DETAIL
NO SCALE



NOTES:
1. THE RPZ MOUNTING HEIGHT AND CLEARANCES INDICATED ABOVE SHALL BE MAINTAINED FOR PROPER ACCESS TO UNIT FOR TESTING. MAINTENANCE, AND INSPECTION PURPOSES.
2. THE ASSEMBLY SHALL BE ADEQUATELY SUPPORTED AND/OR RESTRAINED TO PREVENT LATERAL MOVEMENT. PIPE HANGERS, BRACES, SADDLES, STANCHIONS, PIERS, ETC., SHALL BE USED TO SUPPORT THE DEVICE AND SHOULD BE PLACED IN A MANNER THAT WILL NOT OBSTRUCT ACCESS TO THE TESTING PORTS OR VALVES.
3. REFER TO SCHEDULE FOR UNIT SIZE.
4. THE LOCATION AND MOUNTING HEIGHT OF THE RPZ SHALL BE APPROVED BY THE WATER AUTHORITY PRIOR TO INSTALLATION.
5. ACCESS TO THIS UNIT SHALL NOT REQUIRE THE USE OF A LADDER OR REMOVAL OF CEILING TILES OR OTHER PERMANENT OR SEMI-PERMANENT CONSTRUCTION.

REDUCED PRESSURE ZONE BACKFLOW PREVENTER
NO SCALE



NOTES:
1. FLEXIBLE CONNECTOR SHALL BE NO LONGER THAN FOUR FEET PER 248 CMR 5.00: AMENDMENTS TO NFPA 54.
2. REFER TO PLANS FOR GAS MAIN & BRANCH PIPING SIZES.

EQUIPMENT GAS PIPING DROP
NO SCALE

Tighe&Bond

THOMAS MAHANNA CIVIL No. 39479 REGISTERED PROFESSIONAL ENGINEER
COMMONWEALTH OF MASSACHUSETTS
12/12/23

MARY E. DANIELSON ENVIRONMENTAL No. 55926 REGISTERED PROFESSIONAL ENGINEER
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PLUMBING FLOOR PLAN AND DETAILS

SCALE: NO SCALE

P-001
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GENERAL SYMBOLS

BOLD LINES AND TEXT INDICATE PROPOSED WORK

LIGHT LINES AND ITALIZED TEXT INDICATE APPROXIMATE EXISTING CONDITIONS

CONTROL SYSTEMS

HOA — HAND/OFF/AUTO SWITCH

HVAC — HVAC CONTROL PANEL

TH — THERMOSTAT (LOCAL SENSOR/NON DDC)

TC — SPLIT SYSTEM/VRF TEMPERATURE CONTROLLER

TS — TIMER SWITCH

AIR SYSTEMS

M — MOTORIZED CONTROL DAMPER

SUPPLY AIRFLOW

EXHAUST AIRFLOW

SUPPLY DUCT DN

EXHAUST DUCT DN

EXHAUST FAN

UNIT HEATER (HORIZONTAL)

PIPING SYSTEMS

RL — REFRIGERANT LIQUID

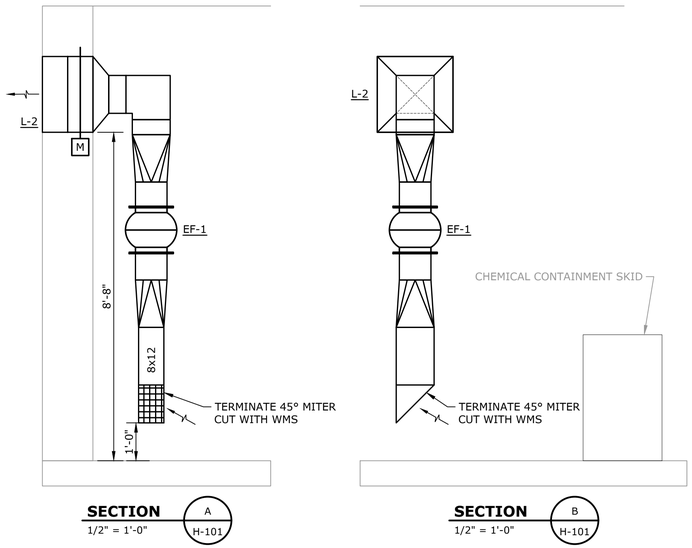
RG — REFRIGERANT GAS

C — COOLING COIL CONDENSATE

ELBOW TURNED DOWN

ABBREVIATIONS

ACU	AIR CONDITIONING UNIT
AFF	ABOVE FINISHED FLOOR
BOD	BOTTOM OF DUCT
BTU/HR	BRITISH THERMAL UNIT PER HOUR
C	CONDENSATE
CFM	CUBIC FEET PER MINUTE
CU	CONDENSING UNIT
D	DEPTH
DB	DRY BULB
DN	DOWN
EA	EXHAUST AIR
EER	ENERGY EFFICIENCY RATIO
EF	EXHAUST FAN
ESP	EXTERNAL STATIC PRESSURE
EUH	ELECTRIC UNIT HEATER
EXH	EXHAUST
°F	DEGREES FAHRENHEIT
FA	FREE AREA
FLA	FULL LOAD AMPERES
FPM	FEET PER MINUTE
FT	FEET
GC	GENERAL CONTRACTOR
H	HEIGHT
HP	HEAT PUMP OR HORSE POWER
HZ	HERTZ
IN	INCH
K	KILO (X1000)
KW	KILOWATT
L	LOUVER OR LENGTH
LB	POUNDS
M	MOTORIZED
MBH	THOUSAND BTU/HR
MCA	MINIMUM CIRCUIT AMPACITY
MOCP	MAXIMUM OVER CURRENT PROTECTION
MTR	MOTOR
OA	OUTSIDE AIR
PD	PRESSURE DROP
PH	PHASE
RG	REFRIGERANT GAS
RL	REFRIGERANT LIQUID
RPM	REVOLUTIONS PER MINUTE
SA	SUPPLY AIR
SEER	SEASONAL ENERGY EFFICIENCY RATIO
SENS	SENSIBLE
SQFT	SQUARE FEET
TYP	TYPICAL
W	WIDTH OR WATTS
WB	WET BULB
WG	WATER GAUGE
WMS	WIRE MESH SCREEN



SECTION A H-101 — 1/2" = 1'-0"

SECTION B H-101 — 1/2" = 1'-0"

EXHAUST FAN ELEVATIONS
1/2" = 1'-0"

GENERAL NOTES

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5. HVAC DRAWINGS DO NOT SHOW ALL CONDITIONS AND SYSTEMS OF THE BUILDING. CONTRACTOR SHALL USE ALL DRAWINGS AND SPECIFICATIONS OF CONTRACT DOCUMENTS FOR COORDINATION AND SHALL VERIFY FIELD CONDITIONS.
6. INSTALL ALL EQUIPMENT IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS INCLUDING LISTED SERVICE CLEARANCE SPACE.
7. COORDINATE NEW DUCTWORK AND PIPING WITH LIGHTING, AND OTHER UTILITIES. INSTALL ALL REQUIRED OFFSETS AND TRANSITIONS TO PREVENT INTERFERENCE WITH FIELD CONDITIONS. OBTAIN APPROVAL FROM ENGINEER PRIOR TO MAJOR RELOCATIONS OR INSTALLATION SIGNIFICANT OFFSETS (MORE THAN 6 IN A SINGLE PIPING SYSTEM).
8. COORDINATE ALL REQUIRED OPENINGS THROUGH WALLS WITH GENERAL CONTRACTOR AND OTHER TRADES.
9. INSTALL DUCTWORK AND PIPING AS CLOSE TO THE UNDERSIDE OF DECK AS POSSIBLE UNLESS NOTED OTHERWISE.
10. INSTALL REFRIGERANT PIPING PASSING THROUGH WALLS IN A SLEEVE. SEAL PENETRATION WITH NON-SHRINK GROUT AND INSULATE PIPE WITHIN SLEEVE. PROVIDE WALL ESCUTCHEONS FOR EXPOSED PIPING PASSING THROUGH WALLS.
11. INSTALL EQUIPMENT AND SUPPORTS IN ACCORDANCE WITH ALL RELEVANT BUILDING CODES. ALL EQUIPMENT SHALL BE SUPPORTED FROM STRUCTURAL MEMBERS. SUPPORT FROM DECKING WILL NOT BE ACCEPTED.
12. PROVIDE FLEXIBLE JOINTS ON ALL PIPING AND DUCTWORK WHERE PENETRATING BUILDING EXPANSION JOINTS.
13. DUCT SIZES SHOWN INDICATE CLEAR INSIDE DIMENSIONS OF DUCTWORK.
14. THERMOSTATS AND SWITCHES ARE SHOWN IN GENERAL LOCATIONS. COORDINATE EXACT LOCATION WITH FIELD CONDITIONS.
15. VERIFY EQUIPMENT PIPING CONNECTIONS WITH MANUFACTURER.
16. INSTALL ALL EXPOSED CONTROL WIRING IN CONDUIT AND IN ACCORDANCE WITH DIVISION 16 REQUIREMENTS.

MEP COORDINATION NOTES

1. SPARE 120 VOLT POWER CIRCUIT BREAKER(S) PROVIDED BY DIVISION 16 TO BE USED FOR HVAC CONTROLS. 120 VOLT POWER WIRING TO HVAC CONTROLS PROVIDED BY DIVISION 15. COORDINATE WITH DIVISION 16 CONTRACTOR FOR CIRCUIT BREAKER REQUIREMENTS AND LOCATIONS.
2. WIRING AND CONDUIT FOR HVAC CONTROLS SHALL CONFORM TO DIVISION 16 REQUIREMENTS.

VENTING SYSTEM COORDINATION

IN ACCORDANCE WITH 248 CMR REGULATIONS AND POLICIES ESTABLISHED BY THE MASSACHUSETTS BOARD OF STATE EXAMINERS OF PLUMBERS AND GAS FITTERS:

1. THE DIVISION 15 PLUMBING CONTRACTOR, WHO SHALL BE A LICENSED PLUMBER OR GAS FITTER IN THE STATE OF MASSACHUSETTS, SHALL SECURE A GAS FITTING PERMIT FOR THE INSTALLATION OF GAS FIRED EQUIPMENT SHOWN ON THE PLUMBING DRAWINGS. THE DIVISION 15 PLUMBING CONTRACTOR SHALL PROVIDE ALL GAS PIPING. THE DIVISION 15 PLUMBING CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR AND SUPERVISE THE INSTALLATION OF VENTING SYSTEMS, INCLUDING LOUVERS, COMBUSTION AIR DUCTWORK, BREECHING, STACKS, CHIMNEYS, AND OTHER VENTING ACCESSORIES ASSOCIATED WITH SAID GAS FIRED EQUIPMENT, WHICH SHALL BE PROVIDED BY THE DIVISION 15 HVAC CONTRACTOR. THESE SYSTEMS ARE INDICATED IN THE HVAC DRAWINGS AND DIVISION 15 HVAC SPECIFICATIONS.
2. THE DIVISION 15 HVAC CONTRACTOR SHALL PROVIDE ALL VENTING SYSTEMS INDICATED ON THE HVAC DRAWINGS AND WITHIN THE DIVISION 15 HVAC SPECIFICATIONS. THE DIVISION 15 HVAC CONTRACTOR SHALL ALSO COORDINATE WITH THE DIVISION 15 PLUMBING CONTRACTOR IN ORDER TO FACILITATE THE DIVISION 15 PLUMBING CONTRACTOR'S RESPONSIBILITY FOR, AND SUPERVISION OF, VENTING SYSTEMS FOR GAS FIRED EQUIPMENT. DIVISION 15 HVAC SUBMITTALS FOR VENTING SYSTEM MATERIALS AND VENTING SYSTEM SHOP DRAWINGS SHALL BE REVIEWED AND APPROVED BY THE DIVISION 15 PLUMBING CONTRACTOR PRIOR TO SUBMITTING TO THE ENGINEER.

Tighe&Bond

COMMONWEALTH OF MASSACHUSETTS — THOMAS MAHANNA — CIVIL — No. 39479 — REGISTERED PROFESSIONAL ENGINEER — 12/12/23

COMMONWEALTH OF MASSACHUSETTS — MARY E. DANIELSON — ENVIRONMENTAL — No. 55926 — REGISTERED PROFESSIONAL ENGINEER — 12/12/23

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Harvard-Devens Water System Interconnection Project

Harvard Public Works Department

Harvard, Massachusetts

MARK	DATE	DESCRIPTION

PROJECT NO:	H1776-16A
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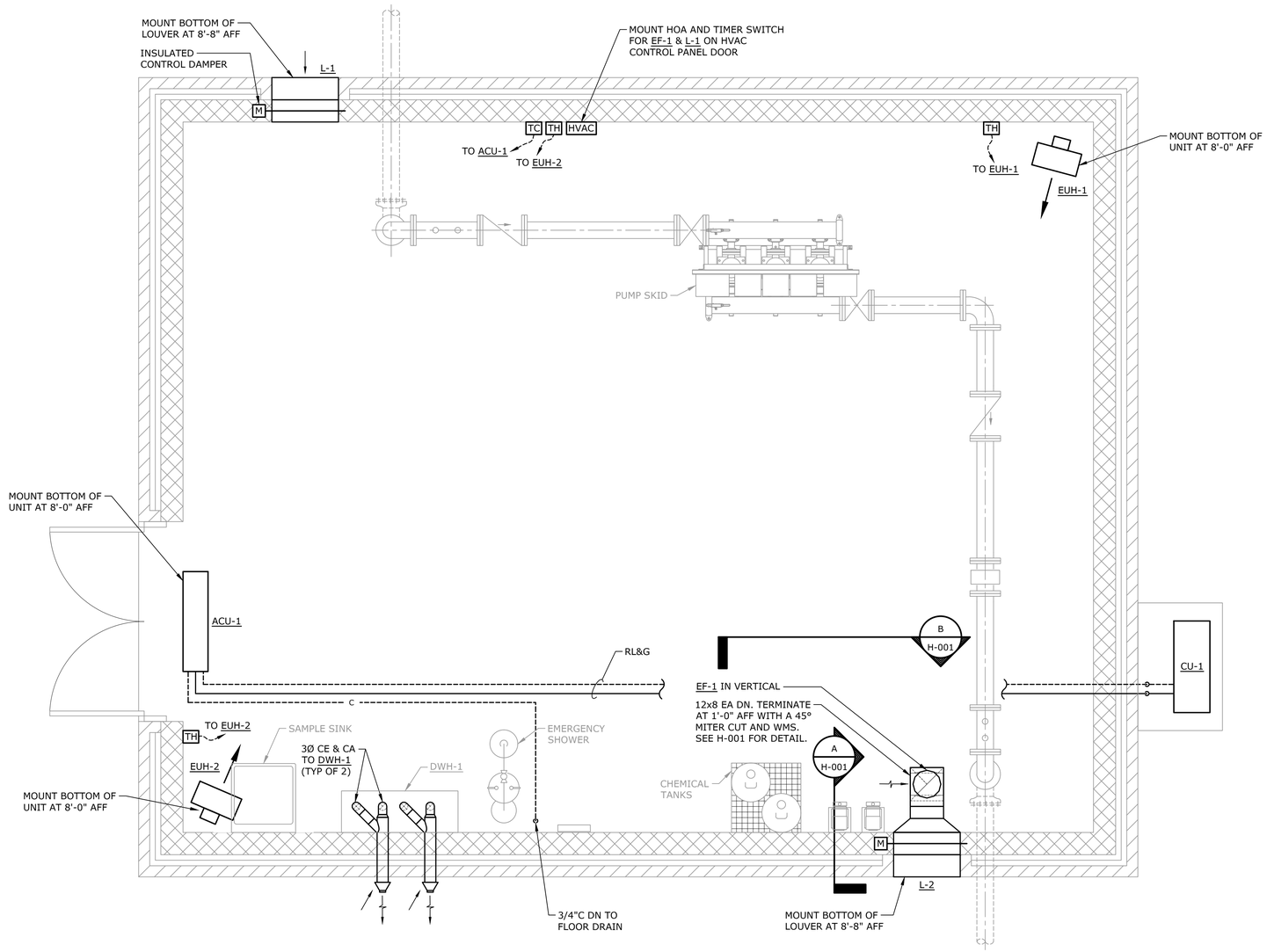
DRAWN BY:	OLR
DESIGNED/CHECKED BY:	OLR, SJP
APPROVED BY:	TJM

HVAC LEGEND, GENERAL NOTES, AND ELEVATIONS

SCALE: AS SHOWN

H-001
SHEET X OF XX



0 1' 2' 4'

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

Tighe&Bond

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Harvard-Devens Water System Interconnection Project

Harvard Public Works Department

Harvard, Massachusetts

MARK	DATE	DESCRIPTION

PROJECT NO:	H1776-16A
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APPROVED BY:	TJM

HVAC FLOOR PLAN

SCALE: AS SHOWN

H-101
SHEET X OF XX

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ELECTRIC UNIT HEATER SCHEDULE

UNIT NO.	LOCATION	SERVING	MANUFACTURER	MODEL NO.	KW	FAN HP	ELECTRICAL		CFM	STAGE	REMARKS
							VOLTS	PH			
EUH-1	PUMP STATION	PUMP STATION	INDEECO	234-U11R-0050C	5	1/4	208	1	700	1	
EUH-2	PUMP STATION	PUMP STATION	INDEECO	234-U11R-0050C	5	1/4	208	1	700	1	

GENERAL NOTES:
1. PROVIDE 24 VOLT THERMOSTAT, MOUNT ON WALL.
2. PROVIDE MOUNTING BRACKETS.
3. BACKUP HEATING SOURCE. SET EUH THERMOSTATS TO 50°F.

FAN SCHEDULE

UNIT NO.	LOCATION	SERVING	MANUFACTURER	MODEL NO.	TYPE	CFM	RPM	ESP (IN W.C.)	BHP	MHP	FEG	SPEED CONTROL	ELECTRICAL				REMARKS
													VOLTS	PH	FLA	FACTORY MOUNTED DISCONNECT?	
EF-1	SOUTH WALL	PUMP STATION	COOK	10CV17D	INLINE CENTRIFUGAL BLOWER	600	1,725	0.15	0.148	1/3	-	EC MOTOR	208	1	4	YES	

LOUVER SCHEDULE

UNIT NO.	LOCATION	SERVING	MANUFACTURER	MODEL NO.	FUNCTION	TYPE	SIZE W x H (IN)	CFM	FA VELOCITY (FPM)	FREE AREA (SQ FT)	P.D. (IN W.G.)	REMARKS
L-1	WEST WALL	PUMP STATION	RUSKIN	HZ700	SUPPLY	STATIONARY	24 x 24	600	340	1.77	0.040	
L-2	EAST WALL	PUMP STATION	RUSKIN	HZ700	EXHAUST	STATIONARY	24 x 24	600	340	1.77	0.038	

GENERAL NOTES:
1. PROVIDE KYNAR FINISH AND BIRD SCREEN.
2. VERIFY COLOR OF LOUVERS WITH OWNER.

VRF OUTDOOR CONDENSING UNIT SCHEDULE

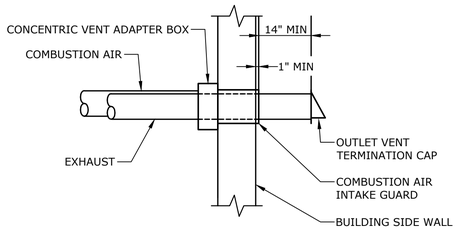
UNIT NO.	LOCATION	SERVING	MANUFACTURER	MODEL NO.	COOLING CAPACITY (MBH)	HEATING CAPACITY (MBH)	EER NONDUCTED	DIMENSIONS H x W x D (IN.)	ELECTRICAL				REMARKS
									VOLTS	PH	HZ	MCA / MOCP	
CU-1	NORTH WALL	ACU-1	MITSUBISHI	MUZ-FS15NAH-U1	14	16	14	35 x 33 x 13	208	1	60	18 / 20	

GENERAL NOTES:
1. COOLING PERFORMANCE IS BASED ON AN OUTDOOR DRY BULB TEMPERATURE OF 97°F, AN INDOOR TEMPERATURE OF 80°F AND ACCOUNTS FOR LOSS THROUGH PIPING.
2. HEATING PERFORMANCE IS BASED ON AN OUTDOOR TEMPERATURE OF 5°F AND AN INDOOR TEMPERATURE OF 70°F AND ACCOUNTS FOR LOSS THROUGH PIPING.
3. PROVIDE 18" EQUIPMENT STAND.
4. PROVIDE LOW AMBIENT HEATING "HYPERHEAT" TYPE UNIT CAPABLE OF CONTINUOUS OF OPERATION AS LOW AS -22°F.

VRF INDOOR UNIT SCHEDULE

UNIT NO.	LOCATION	SERVING	MANUFACTURER	MODEL NO.	COOLING OUTPUT		HEATING OUTPUT (MBH)	CFM	DIMENSIONS H x W x D (IN.)	ELECTRICAL			REMARKS
					SENSIBLE (MBH)	TOTAL (MBH)				VOLTS	PH	HZ	
ACU-1	PUMP STATION	PUMP STATION	MITSUBISHI	MSZ-FS15NA-U1	9.1	14.1	17.8	514	12 x 36 x 9	208	1	60	

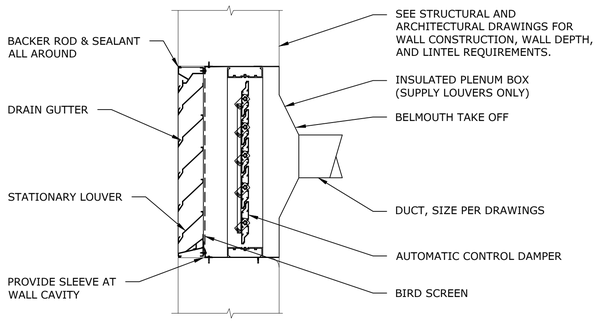
GENERAL NOTES:
1. COOLING PERFORMANCE IS BASED ON AN ENTERING DB/WB TEMPERATURE OF 80°F/67°F.
2. HEATING PERFORMANCE IS BASED ON AN ENTERING DB TEMPERATURE OF 70°F.
3. CALIBRATE ALL VRF ROOM TEMPERATURE CONTROLLERS PRIOR TO PROJECT CLOSEOUT.
4. MANUFACTURER SHALL SIZE ALL REFRIGERANT PIPING, FITTINGS, REQUIRED VALVES, ETC.
5. INDOOR UNIT POWERED BY OUTDOOR UNIT.
6. PRIMARY HEATING SOURCE. SET TEMPERATURE CONTROLLER TO 60°F.



NOTES:

1. FLUE AND COMBUSTION AIR SIZES WITH UNIT MANUFACTURER.
2. SEAL COMBUSTION AIR AND VENT PIPE TO ADAPTER BOX WITH SILICONE SEALANT.
3. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.
4. COORDINATE LOCATION OF PENETRATION WITH SMOOTH FACE BLOCK. PENETRATION TO BE CENTERED WITHIN BLOCK COURSE TO THE EXTENT POSSIBLE.

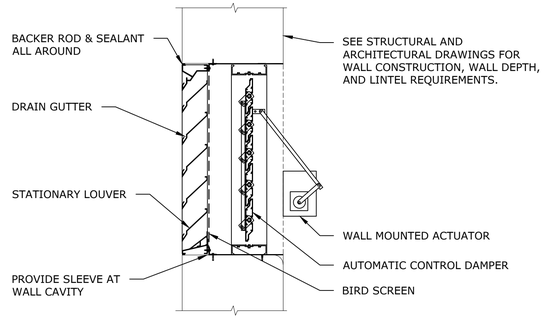
HORIZONTAL CONCENTRIC VENT KIT
NO SCALE



NOTES:

1. PROVIDE DUCT SLEEVE IN WALL CAVITY FROM LOUVER TO INTERIOR WALL.

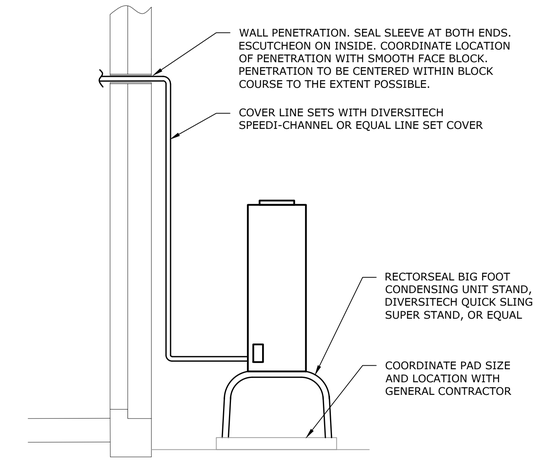
LOUVER - DUCTED
NO SCALE



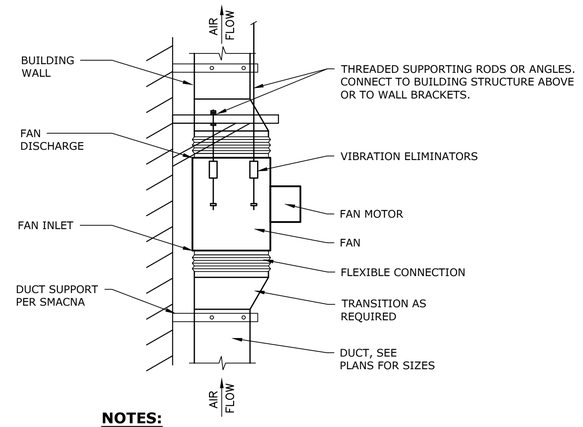
NOTES:

1. PROVIDE DUCT SLEEVE IN WALL CAVITY FROM LOUVER TO INTERIOR WALL.
2. INSTALL DAMPER WITHIN WALL CAVITY. MOUNT ACTUATOR ON WALL NEXT TO DAMPER. PROVIDE LINKAGES, BEARING BRACKETS, CRANK ARM AND OTHER PARTS AS REQUIRED. LOCATE ACTUATOR TO AVOID OBSTRUCTING PERSONNEL OR EQUIPMENT.
3. NOTIFY ENGINEER IF THERE IS INADEQUATE SPACE WITHIN THE WALL CAVITY FOR THE LOUVER AND DAMPER.

LOUVER
NO SCALE



OUTDOOR CONDENSING UNIT AND CONDENSATE TRAP
NO SCALE



NOTES:

1. DETAIL APPLIES TO INLINE CABINET OR TUBULAR FANS.

VERTICAL INLINE EXHAUST FAN
NO SCALE

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Harvard-Devens Water System Interconnection Project

Harvard Public Works Department

Harvard, Massachusetts

MARK	DATE	DESCRIPTION

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APPROVED BY:	TJM

HVAC DETAILS AND SCHEDULES

SCALE: AS SHOWN

H-601
SHEET X OF XX

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RACEWAYS AND WIRING

L4A1-1,3 — HOMERUN TO EQUIPMENT. "L4A1" INDICATES EQUIPMENT ID, "1,3" INDICATES PANELBOARD CIRCUIT NUMBERS, (20A, 1P, UNLESS INDICATED OTHERWISE) SEE DRAWINGS FOR QUANTITY AND SIZE OF WIRE AND CONDUIT. MINIMUM 2#12,#12G, IN ¾"C IF NOT INDICATED OR SCHEDULED OTHERWISE. DASHED LINES INDICATE IN OR UNDER SLAB.

L4A1-1,3 / 2#10,#10G,¾"C

CONDUIT, CONCEALED IN CONSTRUCTION IN FINISHED AREAS, EXPOSED IN UNFINISHED AREAS

UNDERGROUND CONDUIT (SHADING INDICATES CONCRETE ENCASED)

CONDUIT IN OR UNDER SLAB

CONDUIT TURNING UP

CONDUIT TURNING DOWN

NOTES:

1. GREEN GROUND CONDUCTOR NOT INDICATED BUT SHALL BE INCLUDED IN EACH RACEWAY. SIZE SHALL BE #12AWG UNLESS INDICATED OTHERWISE.
2. HOMERUNS TO PANELBOARDS SHALL HAVE A MAXIMUM OF THREE (3) PHASE CONDUCTORS (ONE PER PHASE), (3) NEUTRALS AND (3) GROUND CONDUCTORS IN EACH CONDUIT. DERATE CONDUCTORS AS REQUIRED PER CODE.

16 — FEEDER TAG - REFER TO LEGEND OR TABLE OF FEEDER SIZES

BRANCH CIRCUIT WIRING NOTES

1. WIRING IS SHOWN ON DRAWINGS ONLY FOR SPECIFIC ROUTES OR SPECIAL CONDITIONS.
2. WIRING AND CONDUIT SHALL BE REQUIRED BETWEEN ALL OUTLETS INDICATED WITH CIRCUIT NUMBERS AND PANEL DESIGNATIONS.
3. ALL SWITCH CONTROLS SHALL BE FURNISHED WITH WIRING AND CONDUIT AS REQUIRED.
4. ALTHOUGH ALL BRANCH CIRCUIT WIRING AND CONDUIT IS NOT SHOWN, IT IS THE INTENT OF THESE DOCUMENTS THAT A COMPLETE BRANCH CIRCUIT WIRING SYSTEM BE INSTALLED.
5. A GREEN GROUNDING CONDUCTOR SHALL BE RUN WITH ALL CIRCUITS. VERIFY CONDUIT SIZE TO ENSURE IT CAN ACCOMMODATE ALL PHASE, NEUTRAL AND GROUND CONDUCTORS.
6. ALL BRANCH CIRCUITS SHALL HAVE INDIVIDUAL NEUTRALS AND GROUNDS. BRANCH CIRCUITS SHALL NOT SHARE NEUTRALS OR GROUNDS.

LIGHTING FIXTURES

NUMBERS/LETTERS SHOWN BESIDE LIGHT FIXTURES SHALL INDICATE THE FOLLOWING:
"F1" (CAPITAL LETTER(S) OR COMBINATION OF CAPITAL LETTER(S) AND NUMBERS) INDICATES FIXTURE TYPE.
"2" (NUMBER OR PANELBOARD NAME AND NUMBER) INDICATES CIRCUIT NUMBER.
"a" (LOWERCASE LETTER) INDICATES SWITCH CONTROL OF FIXTURE.
"E" INDICATES FIXTURE IS WIRED TO EMERGENCY SYSTEM.
"NL" INDICATES FIXTURE IS WIRED AS A NIGHT LIGHT (ALWAYS ON).
"PC" INDICATES FIXTURE IS FURNISHED WITH PHOTOCELL CONTROL.
"MS" INDICATES FIXTURE IS FURNISHED WITH MOTION SENSOR.
"X#" INDICATES HAZARDOUS LOCATION, NUMBER INDICATES SPECIFIC TYPE.

F1 2 / MS a — LIGHTING FIXTURE, SURFACE, RECESSED OR PENDANT MOUNTED.

WALL MOUNTED LIGHTING FIXTURE

WALL MOUNTED LIGHTING FIXTURE - WIRED TO THE EMERGENCY LIFE SAFETY SYSTEM

WALL MOUNTED ILLUMINATED EXIT SIGN, ARROWS AS INDICATED ON DRAWINGS

EMERGENCY BATTERY UNIT

RECEPTACLES

MOUNTED AT 18" AFF UNLESS OTHERWISE NOTED.

NUMBERS/LETTERS SHOWN BESIDE RECEPTACLES SHALL INDICATED THE FOLLOWING:
"GFI" INDICATES INTEGRAL GROUND FAULT INTERRUPTER.
"2" (NUMBER OR PANELBOARD NAME AND NUMBER) INDICATES POWER CIRCUIT NUMBER.

2 GFI — SIMPLEX RECEPTACLE

TOGGLE SWITCHES

MOUNTED AT 48" AFF UNLESS OTHERWISE NOTED.

S_a — SINGLE POLE TOGGLE SWITCH. "a" INDICATES FIXTURE CONTROL

POWER DISTRIBUTION EQUIPMENT

M 2 — MOTOR, "2" INDICATES HORSEPOWER

UTILITY POLE

AREA CLASSIFICATIONS

DAMP LOCATION — INDICATES THAT ALL ELECTRICAL MATERIALS AND EQUIPMENT INSTALLED IN THE ROOM OR DEMARCATED AREA SHALL BE NEMA 12 CONSTRUCTION SUITABLE FOR USE IN A DAMP LOCATION (UNLESS NOTED OTHERWISE).

CIRCUIT BREAKER TRIP UNIT DESIGNATIONS

A	ADJUSTABLE GROUND FAULT ALARM
ARMS	ARC FLASH REDUCTION TECHNOLOGY
G	ADJUSTABLE GROUND FAULT PICKUP AND DELAY
I	ADJUSTABLE INSTANTANEOUS PICKUP
L	ADJUSTABLE LONG TIME PICKUP AND DELAY
S	ADJUSTABLE SHORT TIME PICKUP AND DELAY

MISCELLANEOUS

LIT ### LT6 CP100 — INSTRUMENT OR CONTROL DEVICE.
"LIT-###" INDICATES INSTRUMENT OR DEVICE ID NUMBER/TAG.
"LT6" INDICATES INSTRUMENT OR DEVICE TYPE.
"CP100" INDICATES SIGNAL SOURCE/DESTINATION CONTROL PANEL THAT THE ASSOCIATED SIGNAL WIRES WILL BE CONNECTED TO.
SEE THE CONTROL DEVICE WIRE AND CONDUIT SCHEDULE FOR SIGNAL AND POWER WIRING AND CONDUIT REQUIREMENTS.

J — JUNCTION BOX/PULL BOX. MATERIALS AS SPECIFIED IN 16136. SIZED AS REQUIRED FOR THE INTENDED USE IN ACCORDANCE WITH NEC REQUIREMENTS.

HH — HANDHOLE. SIZED AS REQUIRED FOR THE INTENDED USE IN ACCORDANCE WITH NEC REQUIREMENTS. PROVIDE (2) HANDHOLES WHERE REQUIRED TO SEPARATE POWER AND CONTROL WIRING. POWER AND CONTROL WIRING SHALL NOT SHARE THE SAME HANDHOLE.

GENERAL NOTES

1. FOR SYMBOLS AND ABBREVIATIONS, REFER TO DRAWING E-001.
2. BOLD TEXT AND LINES INDICATE PROPOSED WORK, LIGHT TEXT AND LINES INDICATE APPROXIMATE EXISTING CONDITIONS.
3. PROVIDE TEMPORARY POWER AND EQUIPMENT AS REQUIRED TO KEEP SYSTEMS OPERATIONAL, SEE 16050 FOR SEQUENCING AND SCHEDULING.
4. FOR ELECTRICAL DETAILS, REFER TO DETAIL DRAWINGS
5. REFER TO PROCESS MECHANICAL DRAWINGS AND VENDOR DRAWINGS FOR COORDINATION OF EQUIPMENT LOCATIONS AND POWER REQUIREMENTS.
6. REFER TO ARCHITECTURAL FLOOR PLANS FOR EQUIPMENT LOCATIONS.
7. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR COORDINATION OF CEILING MOUNTED DEVICES.
8. REFER TO ARCHITECTURAL ELEVATIONS AND ELECTRICAL DETAIL DRAWINGS FOR COORDINATION OF WALL MOUNTED DEVICES AND MOUNTING HEIGHTS.
9. ALL CONDUIT SHALL BE INSTALLED ATTACHED TO THE TOP OF STEEL (TOP CHORD OF JOIST/GIRDER).
10. COORDINATE ALL DEVICE LOCATIONS WITH GC AND/OR OWNER PRIOR TO ROUGH-IN.
11. COORDINATE ALL REQUIRED OPENINGS/PENETRATIONS THROUGH WALLS, FLOORS, AND CEILING WITH OTHER TRADES AND APPROVED EQUIPMENT SUBMITTALS.
12. ALL PIPES OR OTHER UTILITIES DAMAGED DURING THE CONTRACTOR'S OPERATIONS SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO REPAIR OR REPLACE AT NO COST TO THE OWNER.
13. SUPPORT ALL UTILITIES AND STRUCTURES DURING CONSTRUCTION AND MAKE REPAIRS IF DAMAGED.
14. THE LOCATIONS OF EXISTING UTILITIES AND EQUIPMENT ARE APPROXIMATE. DETERMINE THE EXACT LOCATION OF EXISTING UTILITIES AND STRUCTURES BEFORE COMMENCING WORK. BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGE WHICH MIGHT BE OCCASIONED BY FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UTILITIES AND STRUCTURES.
15. PREVENT DUST FROM BECOMING A NUISANCE OR HAZARD. CONTROL DUST DURING AND AFTER CONSTRUCTION.

GENERAL SITE NOTES

1. REFER TO THE CIVIL DRAWINGS FOR THE EXACT LOCATION OF ALL SITE LIGHTING, SIGNS, ETC.
2. ALL EXCAVATION, TRENCHING, BACK FILL AND COMPACTION OF DUCT BANKS, TRANSFORMER PADS, SITE LIGHTING BASE, BY THE GC.
3. SITE LIGHTING POLE BASES SHALL BE FURNISHED BY THE EC, INSTALLED BY THE GC.
4. EACH LIGHT POLE BASE SHALL HAVE A LIGHTING HAND HOLE BESIDE IT.
5. WHERE ROUTING IS SPECIFICALLY INDICATED, CONDUITS SHALL BE ROUTED AS INDICATED ON THE DRAWING. NO EXCEPTION WITHOUT PRIOR WRITTEN PERMISSION FROM THE PROJECT ELECTRICAL ENGINEER.
6. ALL CONCRETE WORK SHALL BE BY THE GC.

GENERAL WIRING DIAGRAM NOTES

1. DASHED LINES ON WIRING DIAGRAMS REPRESENT FIELD WIRING, WHICH SHALL BE RUN IN CONDUIT (¾" MINIMUM).
   A. FIELD WIRING FOR DISCRETE/DIGITAL/DRY CONTACT TYPE SIGNALS (SHOWN CONNECTED TO RELAY CONTACTS, SWITCHES, PUSHBUTTONS, PILOT LIGHTS, ETC.) SHALL BE #14 WIRING RUN IN CONDUIT.
   B. FIELD WIRING FOR EACH ANALOG/TRANSMITTER/SENSOR SIGNAL SHOWN (INCLUDING THERMISTOR & SEAL LEAK/FAIL SENSOR) SHALL BE A #18TSP CABLE (UNLESS OTHERWISE NOTED) RUN IN CONDUIT.
   C. LINES CALLED OUT AS ETHERNET (DASHED OR SOLID) REPRESENT AN ETHERNET CABLE RUN IN CONDUIT.
2. PRIOR TO INSTALLING ANY CONDUITS OR PULLING ANY WIRE, CONFIRM WIRING REQUIREMENTS WITH THE EQUIPMENT AND/OR SYSTEM SUPPLIER'S SUBMITTED WIRING DIAGRAMS. CONTACT THE ENGINEER TO RESOLVE ANY DISCREPANCIES.
3. PRIOR TO PERFORMING WIRING ON VENDOR SUPPLIED CONTROL PANELS AND VENDOR SUPPLIED EQUIPMENT, COORDINATE EXACT WIRING CONNECTIONS FROM VENDOR SUPPLIED WIRING DIAGRAMS. IF THERE ARE ANY DISCREPANCIES, REPORT THIS TO THE ENGINEER AND THE ENGINEER WILL PROVIDE DIRECTION ON HOW TO PROCEED.
4. FIELD WIRING REQUIREMENTS ARE NOT SHOWN ON THE DRAWING. REFER TO SITE/FLOOR PLANS FOR ADDITIONAL FIELD WIRING REQUIREMENTS.
5. #18 TSP SIGNAL CABLE MAY BE COMBINED WITH OTHER #18 TSP SIGNAL CABLE IN CONDUIT (UP TO 2.5") SIZED FOR 40% FILL.
6. #14 CONTROL WIRING MAY BE COMBINED WITH OTHER #14 CONTROL WIRING IN CONDUIT (UP TO 2") SIZED FOR 40% FILL.

GENERAL PROCESS POWER NOTES

1. ALL RECEPTACLES IN PROCESS AREAS, HOSE-DOWN AREAS, AND EXTERIOR TO THE BUILDING SHALL HAVE WEATHER-PROOF COVERS AND SHALL BE GFI TYPE.
2. ALL WIRE SHALL UTILIZE THE POWER CABLE TRAY SYSTEM AND CONDUITS TO SERVE ALL BUILDING AND PROCESS LOADS.

GENERAL POWER NOTES

1. ALL RECEPTACLES IN MECHANICAL ROOMS, ELECTRICAL ROOMS, AND MECHANICAL & ELECTRICAL CLOSETS SHALL BE GFI TYPE.
2. ALL RECEPTACLES IN PROCESS AREAS, HOSE-DOWN LOCATIONS, BELOW GRADE LOCATIONS, ON THE ROOF AND EXTERIOR TO THE BUILDING SHALL HAVE WEATHER-PROOF WHILE-IN-USE COVERS AND SHALL BE GFI TYPE.
3. ALL RECEPTACLES ON ROOF AND EXTERIOR OF THE BUILDING SHALL BE WEATHER RESISTANT GFCI AND SHALL HAVE "IN-USE COVERS".
4. DEVICE TYPES SHALL BE SUITABLE FOR THE SPECIFIC AREA CLASSIFICATION SHOWN.
5. REFER TO DRAWINGS FOR ALL FIXTURES WITH AUTOMATIC SENSORS. PROVIDE ELECTRICAL CONNECTIONS IN ACCORDANCE WITH THE MANUFACTURER'S REQUIREMENTS. COORDINATE LOCATION AND QUANTITY WITH GC AND ARCHITECT/ENGINEER PRIOR TO INSTALLATION.
6. ALL WIRE SHALL UTILIZE THE POWER CABLE TRAY SYSTEM (WHERE SHOWN) AND CONDUITS TO SERVE ALL BUILDING AND PROCESS LOADS.

ELECTRICAL FASTENING NOTES:

1. EQUIPMENT SHALL BE FASTENED USING THE FOLLOWING MEANS BASED ON THE TYPE OF WALL OR SURFACE:
   a. FOR MOUNTING TO CONCRETE (CMU OR PRECAST), USE CRACKED-CONCRETE RATED EXPANDING SHEATH CONCRETE ANCHORS.
   b. FOR MOUNTING TO METAL COLUMNS, METAL EQUIPMENT FRAME, OR METAL MOUNTING PLATES, USE STAINLESS STEEL STUD WELD WITH STAINLESS STEEL ACORN NUT.
   c. FOR MOUNTING TO INSULATED METAL PANELS (IMP), USE POPNUT OR PLASTISOL COATED JACKNUT THREADED INSERT MANUFACTURED BY EMHART TECHNOLOGIES OR AU-VE-CO PRODUCTS WITH STAINLESS STEEL SCREWS.
2. REFER TO DIVISION 16 SPECIFICATIONS FOR ADDITIONAL INFORMATION.
3. FASTENERS AND MATERIALS SHALL BE OF THE MATERIAL TYPE SPECIFIED FOR THE AREA, UNLESS SPECIFIED OTHERWISE ON THE DRAWINGS OR DETAILS.
4. WHEN MOUNTING TO IMP AND EQUIPMENT WEIGHT IS > 50 LBS, THRU BOLT AS SHOWN IN DETAIL.

GENERAL SYMBOLS

BOLD LINES AND TEXT INDICATE PROPOSED WORK

LIGHT LINES AND ITALIZED TEXT INDICATE APPROXIMATE EXISTING CONDITIONS

SECTION (A / E-XXX) — SECTION REFERENCE LETTER; DRAWING WHERE SECTION IS SHOWN OR TAKEN

DETAIL (1 / E-XXX) — DETAIL REFERENCE NUMBER; DRAWING WHERE DETAIL IS SHOWN OR TAKEN

ABBREVIATIONS

#	WIRE SIZE OR IDENTIFICATION NUMBER
A	AMPERES
AF	AMPERE FRAME (CIRCUIT BREAKER RATING)
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AIC	AMPERE INTERRUPTING CAPACITY
AL	ALUMINUM
ARCH	ARCHITECT
AS	AMPERE SENSOR (CIRCUIT BREAKER RATING)
AT	AMPERE TRIP (CIRCUIT BREAKER RATING)
ATS	AUTOMATIC TRANSFER SWITCH
AWG	AMERICAN WIRE GAUGE
BLDG	BUILDING
C	CONDUIT
CB	CIRCUIT BREAKER
CT	CURRENT TRANSFORMER
CAT	CATALOG
CIR, CKT	CIRCUIT
CP	CONTROL PANEL
CPT	CONTROL POWER TRANSFORMER 480 VOLTS - 120/240 VOLTS, UNLESS OTHERWISE INDICATED
COL	COLUMN
△	DELTA
CU	COPPER
DISC SW, DS	DISCONNECT SWITCH
DWG	DRAWING
E	WIRED ON EMERGENCY CIRCUIT
EC	ELECTRICAL CONTRACTOR
EM	EMERGENCY
EXP	EXPLOSION PROOF
F	FLUSH
FU	FUSE
FT	FEET
FVNR	FULL VOLTAGE NON-REVERSING
FVR	FULL VOLTAGE REVERSING
G	GROUND
GC	GENERAL CONTRACTOR
GFI, GFCI	GROUND FAULT CIRCUIT INTERRUPTER
ID	IDENTIFICATION
KCMIL, MCM	ONE THOUSAND CIRCULAR MILS
KVA	KILOVOLT-AMPERES
KVAR	KILOVOLT-AMPERES REACTIVE
KW	KILOWATTS
LSIG	LONG/SHORT TIME, INSTANTANEOUS AND GROUND FAULT SETTINGS (FOR CIRCUIT BREAKER)
MC	MECHANICAL CONTRACTOR
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MISC	MISCELLANEOUS
MFR	MANUFACTURER
MLO	MAIN LUGS ONLY
NC, NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRICAL CODE
NIC	NOT IN CONTRACT
NL	NIGHT LIGHT
NO	NORMALLY OPEN
NTS	NOT TO SCALE
OL	OVERLOAD
P	POLE
PH, Ø	PHASE
PLC	PROGRAMMABLE LOGIC CONTROLLER
PVC	POLYVINYL CHLORIDE
PT	POTENTIAL TRANSFORMER
PVC	POLYVINYL CHLORIDE
R	RECESSED
RGS	RIGID GALVANIZED STEEL CONDUIT
RVNR	REDUCED-VOLTAGE NON-REVERSING
S	SURFACE
SCCR, SCR	SHORT CIRCUIT CURRENT INTERRUPTING RATING
SCH 40	SCHEDULE 40 PVC CONDUIT
SP	SPARE
SPD	SURGE PROTECTION DEVICE
SS	STAINLESS STEEL
SW	SWITCH
TEL	TELEPHONE
TSP	TWISTED SHIELDED PAIR CABLE
TYP	TYPICAL
UG	UNDERGROUND
UPS	UNINTERRUPTABLE POWER SUPPLY
V	VOLT
VFD	VARIABLE FREQUENCY DRIVE (ALSO REFERED TO AS ADJUSTABLE FREQUENCY DRIVE)
Y	WYE
W	WATT, WIRE
WTF	WATER TREATMENT FACILITY
WWTF	WASTEWATER TREATMENT FACILITY
WP	WEATHERPROOF
XFMR	TRANSFORMER

Tighe&Bond

COMMONWEALTH OF MASSACHUSETTS — THOMAS MAHANNA CIVIL No. 39479 — REGISTERED PROFESSIONAL ENGINEER — 12/12/2023

COMMONWEALTH OF MASSACHUSETTS — MARY E. DANIELSON ENVIRONMENTAL No. 55926 — REGISTERED PROFESSIONAL ENGINEER — 12/12/23

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Harvard-Devens Water System Interconnection Project

Harvard Public Works Department

Harvard, Massachusetts

MARK	DATE	DESCRIPTION

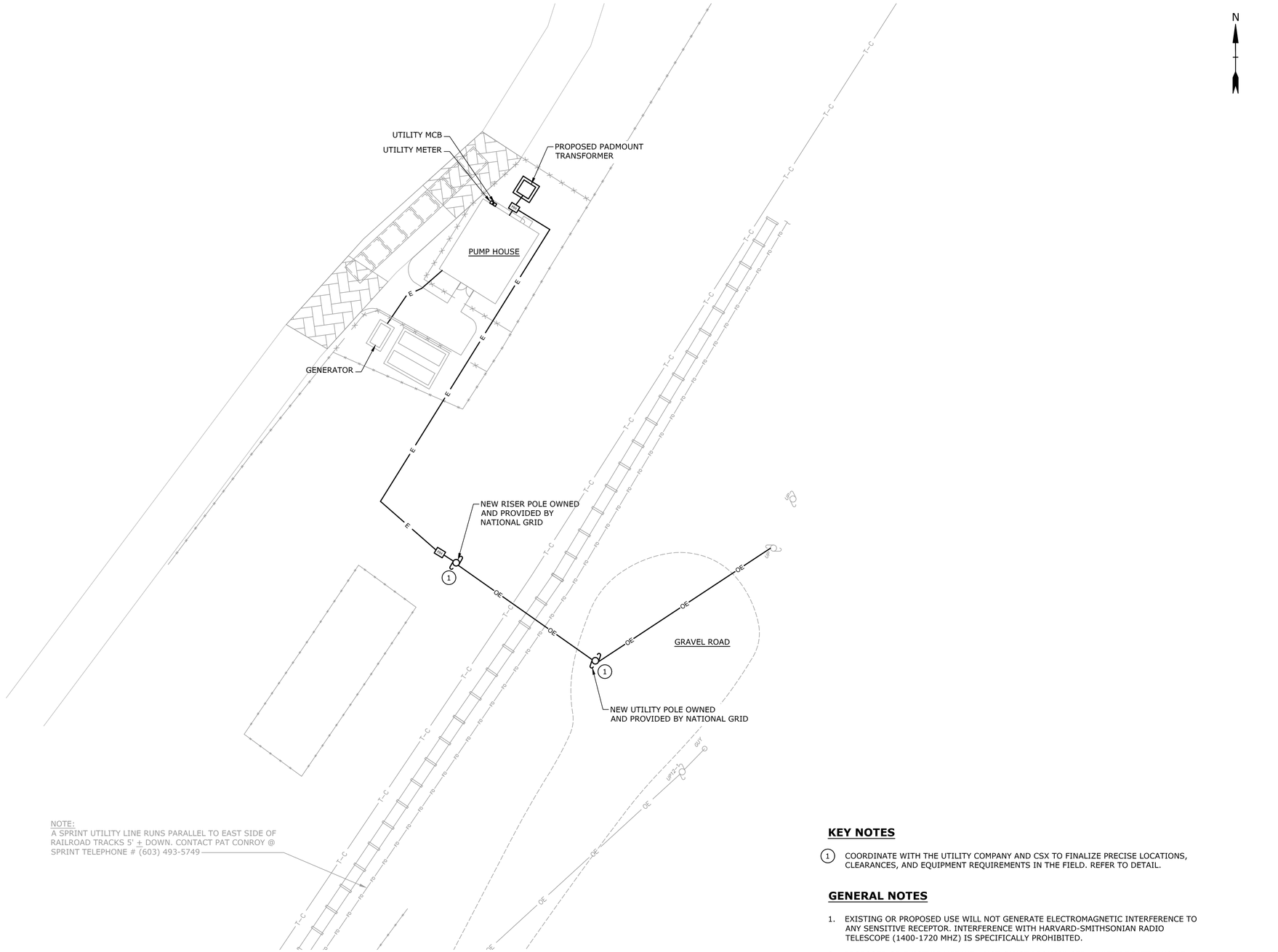
PROJECT NO:	H1776-16A
DATE:	DECEMBER 2023
FILE:	H1776-16-E-001.dwg
DRAWN BY:	CTO
DESIGNED/CHECKED BY:	CTO/JC
APPROVED BY:	TJM

EXTERIOR ELEVATIONS

SCALE:

E-001

SHEET X OF XX



KEY NOTES

(1) COORDINATE WITH THE UTILITY COMPANY AND CSX TO FINALIZE PRECISE LOCATIONS, CLEARANCES, AND EQUIPMENT REQUIREMENTS IN THE FIELD. REFER TO DETAIL.

GENERAL NOTES

1. EXISTING OR PROPOSED USE WILL NOT GENERATE ELECTROMAGNETIC INTERFERENCE TO ANY SENSITIVE RECEPTOR. INTERFERENCE WITH HARVARD-SMITHSONIAN RADIO TELESCOPE (1400-1720 MHZ) IS SPECIFICALLY PROHIBITED.
2. PROPOSED OR EXISTING USE WILL NOT CAUSE PRONOUNCED, MULTIPLE PATTERNS OF NOISE OR VIBRATION NUISANCE TO, OR INTERFERE WITH, ANY SENSITIVE RECEPTOR.
3. A DEP AIR QUALITY PERMIT IS NOT REQUIRED.

0 20' 40'

Tighe&Bond

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ELECTRICAL SITE PLAN

SCALE:

E-100
SHEET X OF XX

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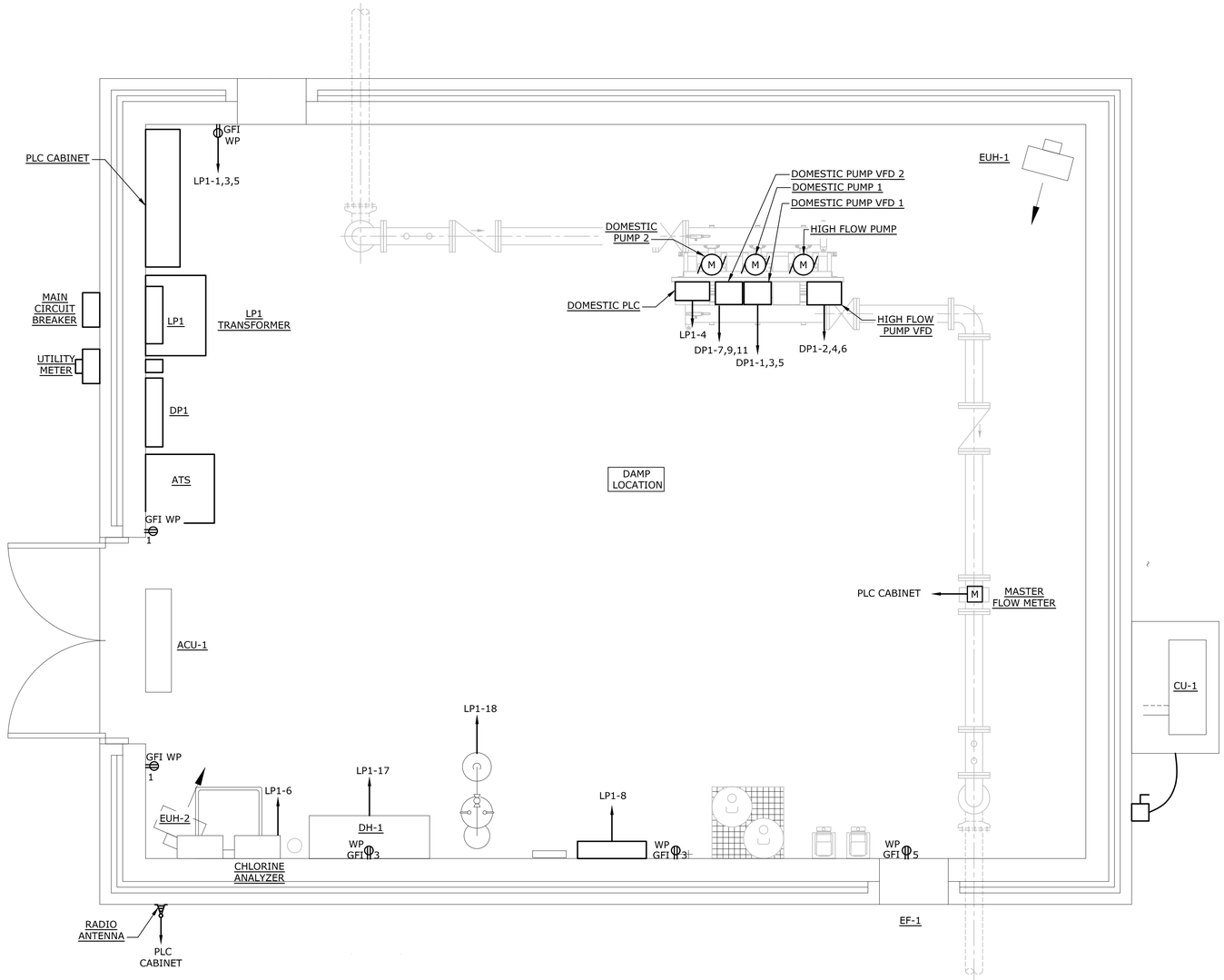

ELECTRICAL FLOOR PLAN

1/2" = 1' - 0"

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Harvard, Massachusetts

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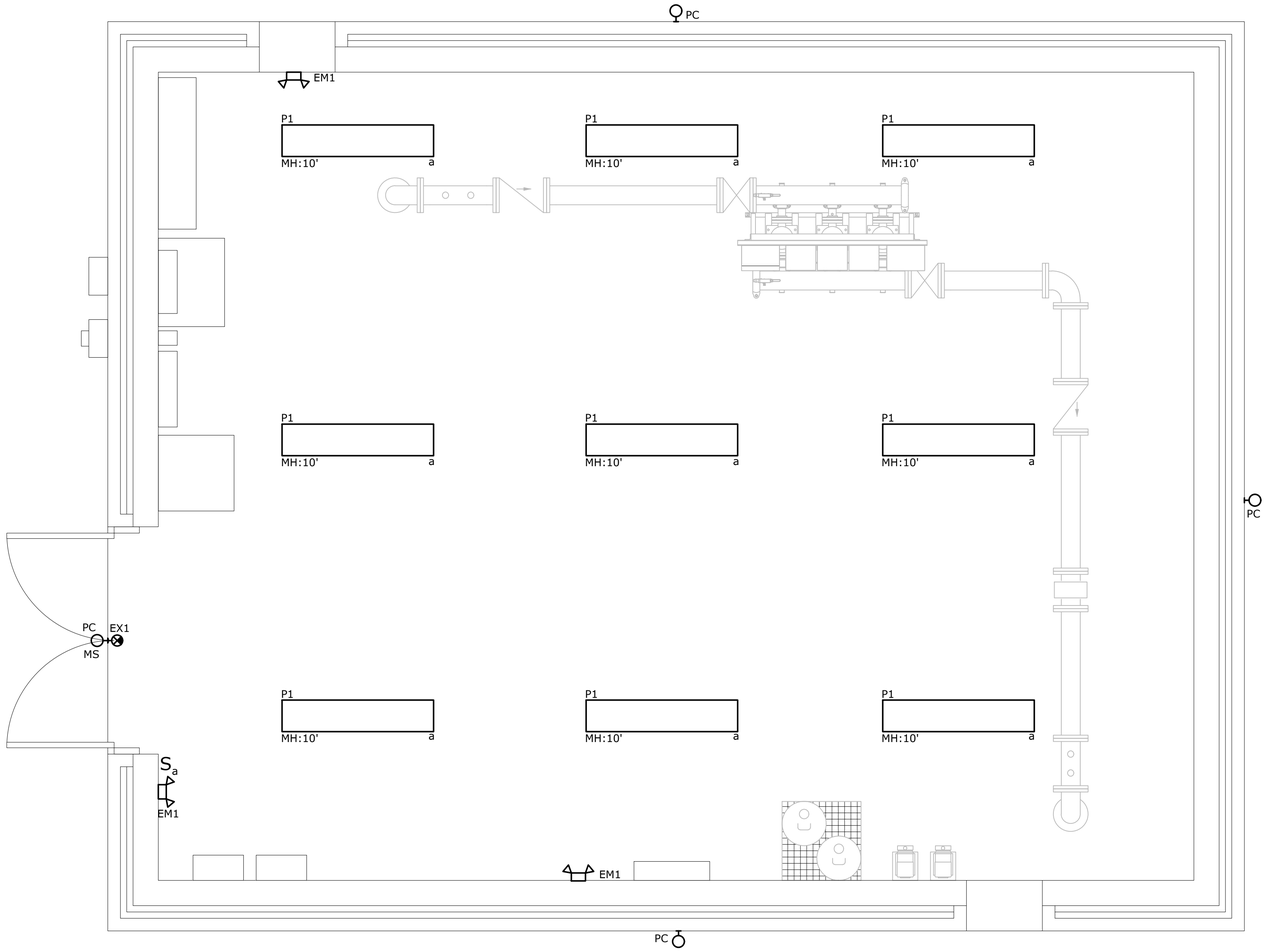
ELECTRICAL POWER FLOOR PLAN

SCALE:

E-101

SHEET X OF XX



ELECTRICAL LIGHTING PLAN
1/2" = 1' - 0"

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ELECTRICAL LIGHTING FLOOR PLAN

SCALE:

E-102
SHEET X OF XX

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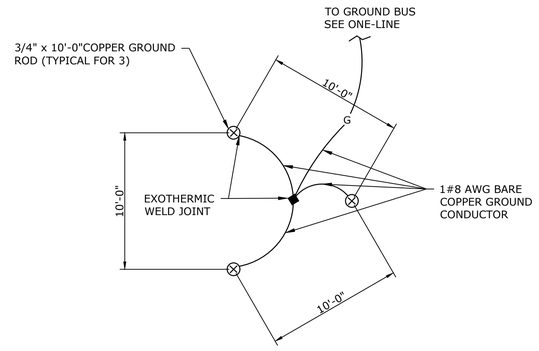
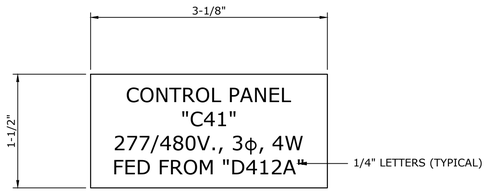


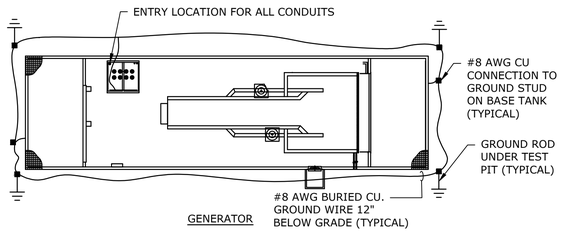
GROUNDING TRIAD - SINGLE SERVICE
NO SCALE



NOTES:

1. REFER TO SPECIFICATIONS FOR ADDITIONAL NAMEPLATE REQUIREMENTS.
2. NAMEPLATE TO BE 1/16" WHITE PLASTIC WITH BLACK CENTER LAMINATION. FACE TO BE WHITE, REVERSE ENGRAVED LETTERS TO BE BLACK.
3. IN PROCESS OR WET LOCATIONS, DO NOT SCREW IN PLACE. USE FOOD GRADE ADHESIVE TO SECURE NAMEPLATE.
4. IN NON-PROCESS LOCATIONS, SEE "DETAIL OF TYPICAL NAMEPLATE (NON-PROCESS AREAS)".

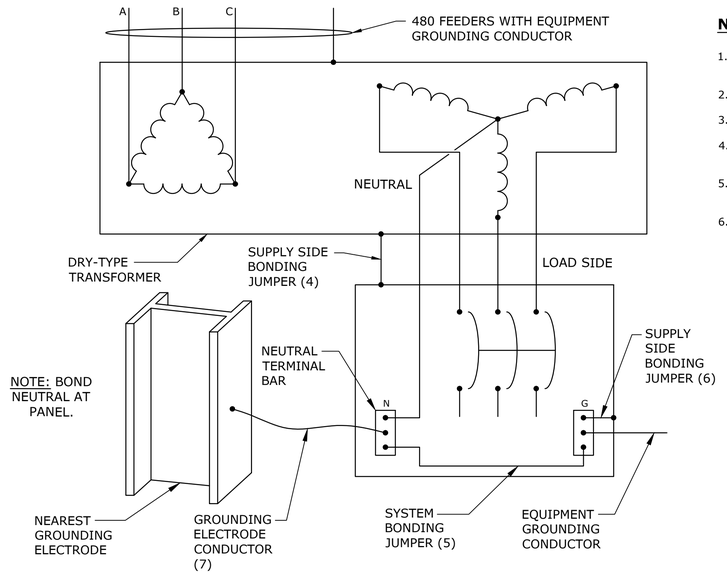
NAMEPLATE (PROCESS AREAS)
NO SCALE



GENERATOR GROUNDING
NO SCALE

SEPARATELY DERIVED DRY TYPE TRANSFORMER SCHEDULE

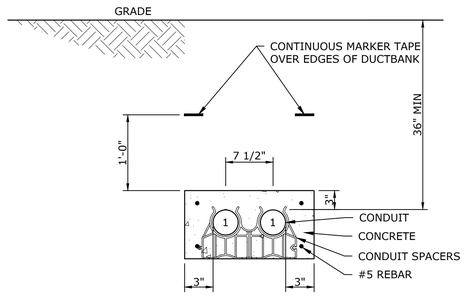
SIZE	KVA	480V AMPS	208V AMPS	480 VOLT PRIMARY MOCP	208 VOLT SECONDARY MOCP (3)	480 VOLT FEEDER (2)	120/208 VOLT FEEDER AND SUPPLY SIDE BONDING JUMPER (1)(2)(4)	SYSTEM BONDING JUMPER (1)(2)(5)	SUPPLY SIDE BONDING JUMPER (1)(2)(6)	GROUNDING ELETRODE CONDUCTOR (1)(2)(7)
T1	9	11	25	15A-3P	35A-3P	3#12 + 1#12G in 3/4" C	4#8 + 1#8G in 3/4" C	1#8	1#8	1#8 in 3/4" C
T2	15	18	42	25A-3P	60A-3P	3#10 + 1#10G in 3/4" C	4#4 + 1#6G in 1-1/4" C	1#6	1#6	1#8 in 3/4" C
T3	30	36	83	45A-3P	110A-3P	3#6 + 1#10G in 1" C	4#1 + 1#6G in 2" C	1#6	1#6	1#6 in 3/4" C
T4	45	54	125	70A-3P	175A-3P	3#4 + 1#8G in 1" C	4#2/0 + 1#4G in 2" C	1#4	1#4	1#4 in 3/4" C
T5	75	90	208	125A-3P	250A-3P	3#1/0 + 1#6G in 1-1/2" C	4#250 KCMIL + 1#2G in 2-1/2" C	1#2	1#2	1#2 in 3/4" C



SEPERATELY DERIVED SYSTEM GROUNDING FOR DELTA - WYE TRANSFORMERS
NO SCALE

NOTES:

1. SUPPLY SIDE BONDING JUMPER, SYSTEM BONDING JUMPER, AND GROUNDING ELECTRODE CONDUCTOR SHALL BE SIZED PER NEC TABLE 250.102. REFER TO DETAIL.
2. ALL CONDUCTOR SIZES ARE FOR COPPER CONDUCTORS PER NEC TABLE 310.15(B)16.
3. SUPPLY SIDE BONDING JUMPER INSTALLED IN FEEDER RACEWAY.
4. SYSTEM BONDING JUMPER INSTALLED INTERNAL TO PANELBOARD, BREAKER ENCLOSURE OR FUSED DISCONNECT ENCLOSURE.
5. SUPPLY SIDE BONDING JUMPER INSTALLED INTERNAL TO PANELBOARD, BREAKER ENCLOSURE OR FUSED DISCONNECT ENCLOSURE.
6. GROUNDING ELECTRODE CONDUCTOR SHALL BE INSTALLED IN CONDUIT.



2-WAY DUCTBANK
NO SCALE

NOTES:

1. UNLESS OTHERWISE INDICATED ON DRAWINGS, ELECTRICAL DUCT BANK CONCRETE ENCASING SHALL BE CONTINUOUS ALONG THE ENTIRE LENGTH OF THE DUCT BANK.
2. WHERE CONCRETE ENCASING IS NOT SHOWN FOR DUCT BANKS, PROVIDE STONE BORROW PER SPECIFICATION SECTION 02320.
3. CONCRETE SHALL BE PRE-MIX 2,500 P.S.I. 6" SLUMP LEAN CONCRETE, WITH RED DYE ADDED TO MIXTURE, CONCRETE BY ELECTRICAL CONTRACTOR.
4. #5 REBAR SHALL BE PLACED CONTINUOUS ALONG DUCTBANK (MINIMUM OF 4), WITH A MINIMUM 3" COVER ALONG BOTTOM SIDE, AND 3" COVER ALONG REMAINING THREE SIDES.

DUCT BANK GENERAL NOTES
NO SCALE

Tighe&Bond

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Harvard Public Works Department

Harvard, Massachusetts

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DESIGNED/CHECKED BY:	CTO/JC
APPROVED BY:	TJM

ELECTRICAL DETAILS - 1

SCALE:

E-501
SHEET X OF XX

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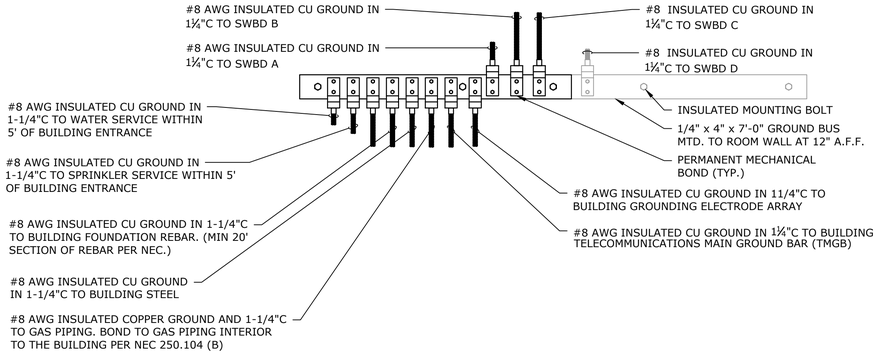
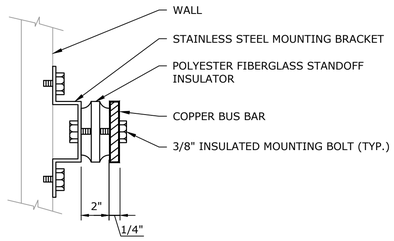
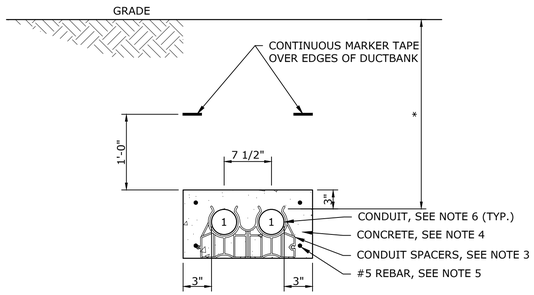


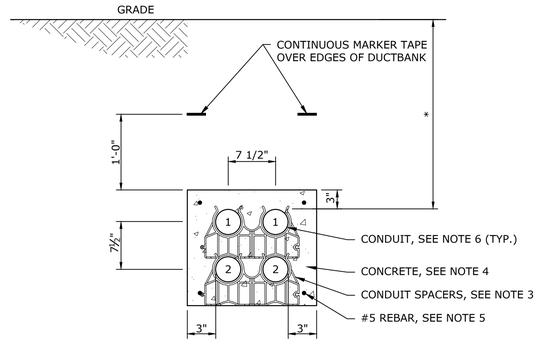


BUILDING ELECTRICAL GROUND BUS DETAIL



*ENGINEER TO UPDATE WITH CORRECT DEPTH. IF NO DEPTH IS GIVEN, USE 36" MIN.

2-WAY DUCTBANK (4" CONDUIT ONLY)
NO SCALE



*ENGINEER TO UPDATE WITH CORRECT DEPTH. IF NO DEPTH IS GIVEN, USE 36" MIN.

4-WAY DUCTBANK
NO SCALE

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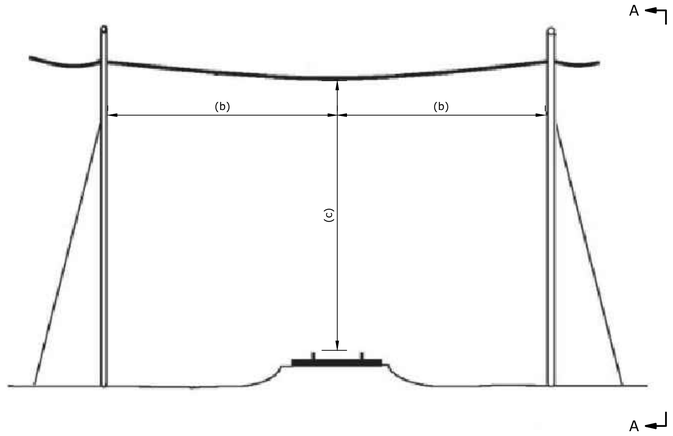
APPROVED BY:	TJM

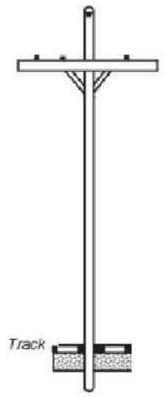
ELECTRICAL DETAILS - 2

SCALE:

E-502
SHEET X OF XX

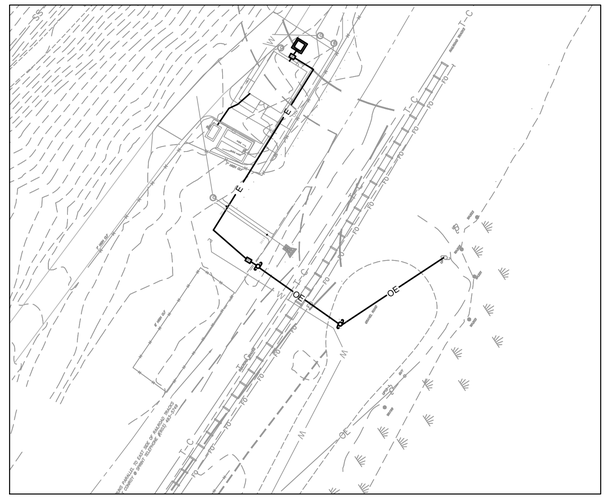


PROFILE VIEW A-A



*SPECIFIC POLE CONFIGURATION TO BE DETERMINED BY UTILITY COMPANY.

SECTION VIEW A-A



SITE PART PLAN

NO SCALE

UTILITY POLE DETAILS

NOTES:

1. REQUIREMENTS SHOWN ARE ALL MINIMUM REQUIREMENTS. ALL OTHER EQUIPMENT SPECIFICATIONS AND EQUIPMENT DETAILS ARE TO BE DETERMINED BY NATIONAL GRID.

LEGEND	
LETTER	DESCRIPTION
(a)	DISTANCE FROM CENTERLINE OF TRACK TO CSX R/W = 25'-0" MINIMUM **(DOES NOT APPLY - NO EXISTING CSX POLES)**
(b)	MINIMUM DISTANCE FROM POLE TO EDGE OF NEAREST TRACK
(c)	DISTANCE FROM TOP-OF-RAIL TO BOTTOM-OF-SAG = 28'-0"
(d)	HEIGHT OF WIRE ABOVE CSX AERIAL FACILITIES **(DOES NOT APPLY - NO EXISTING CSX POLES)**
(e)	DISTANCE BETWEEN EXISTING AND PROPOSED CABLE/WIRELINE **(DOES NOT APPLY - NO EXISTING CSX POLES)**

WIRE/CABLE DETAILS			
TYPE:	☑ ELECTRIC ☐ CABLE TV	☐ COMMUNICATIONS ☐ OTHER DESCRIBE: _____	
CONDUCTOR MATERIAL(S):	☑ ALUMINUM/COPPER ☐ FIBER OPTIC	☐ OTHER DESCRIBE: _____	
	WIRE/CABLE 1		
FIBER CABLE COUNT:	N/A		
WIRE SIZE/PAIR:	BY UTILITY COMPANY		
VOLTAGE:	13,800V		
IF OPTIONS ABOVE NOT APPLICABLE, DESCRIBE:	ALL EQUIPMENT IS UTILITY DESIGNED AND OWNED		
NUMBER OF PHASES (ELECTRIC ONLY):	3		
TYPE OF WIRE SUPPORTS:	N/A		
FALSE DEAD ENDS:	0		
TOTAL # OF CSX POLE LINES TO BE CROSSED:	0		

Tighe&Bond

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ELECTRICAL DETAILS - 3

SCALE: NO SCALE

E-503
SHEET X OF XX

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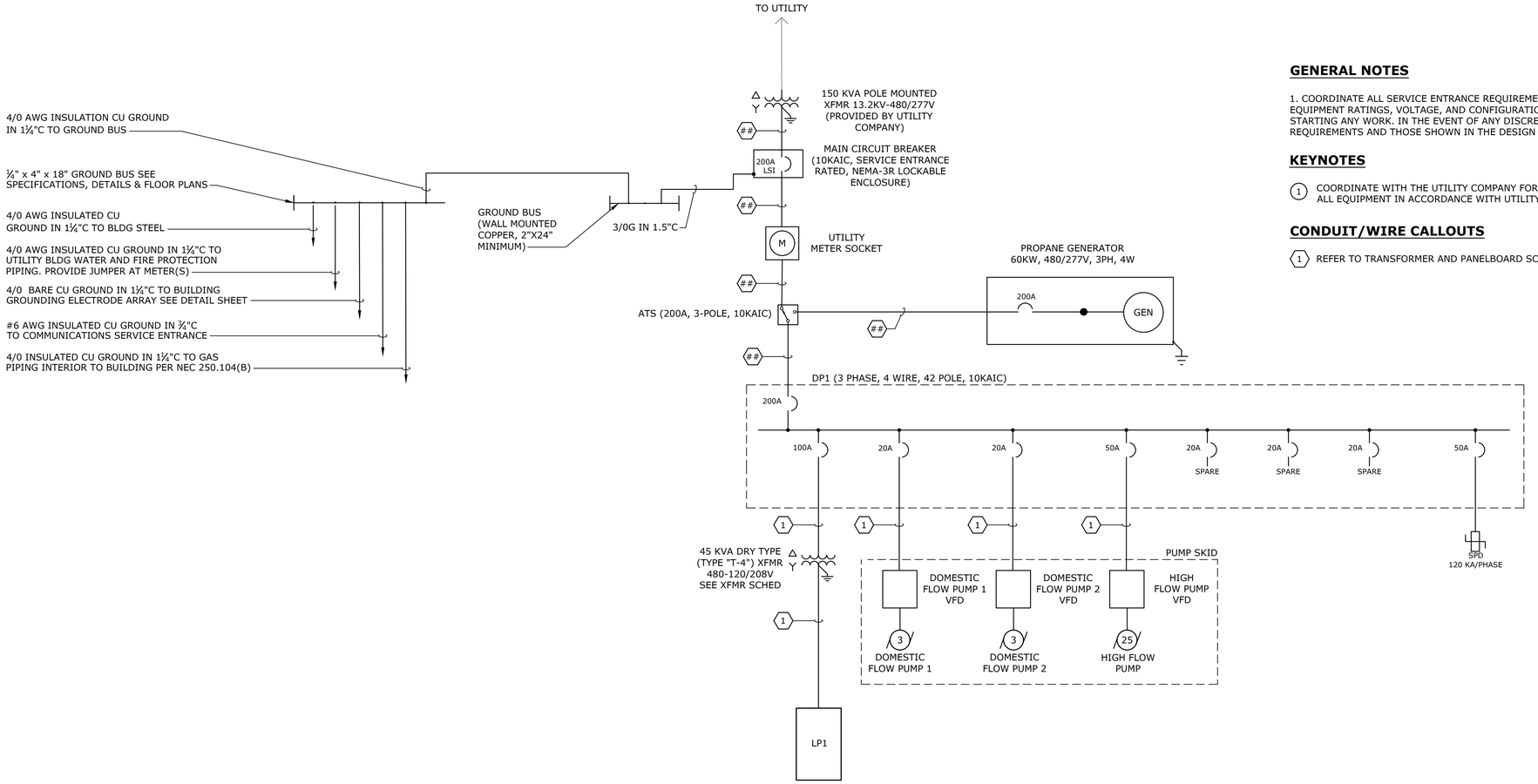
Tighe & Bond: \\tighebond.com\data\data\projects\H\H1776 Harvard WWTFL16 - Devens Water System Interconnection\Drawings\AutoCAD\Sheet\H1776-16-E-503.dwg



GENERAL NOTES

1. COORDINATE ALL SERVICE ENTRANCE REQUIREMENTS, UTILITY SOURCE, UTILITY EQUIPMENT RATINGS, VOLTAGE, AND CONFIGURATION WITH THE UTILITY COMPANY PRIOR TO STARTING ANY WORK. IN THE EVENT OF ANY DISCREPANCIES BETWEEN UTILITY REQUIREMENTS AND THOSE SHOWN IN THE DESIGN CONTACT THE ENGINEER FOR GUIDANCE.

KEYNOTES

(1) COORDINATE WITH THE UTILITY COMPANY FOR EQUIPMENT REQUIREMENTS. PROVIDE ALL EQUIPMENT IN ACCORDANCE WITH UTILITY COMPANY REQUIREMENTS.

CONDUIT/WIRE CALLOUTS

(1) REFER TO TRANSFORMER AND PANELBOARD SCHEDULES

		VOLTAGE (L-L):	208	PHASE:	3	WIRE:	4	VA, L1	8,180	PANEL NO.	LP1								
		VOLTAGE (L-N):	120					VA, L2	11,218										
		MAIN BUS:	100	AMPS				VA, L3	5,500	LOCATION:									
		MAIN BREAKER:	100	A FRAME		60	A TRIP			NOTES:									
		MOUNTING:	SURFACE		kAIC:	10		TOTAL VA	24,898										
		INCOMING FEEDER SIZE:																	
			VA LOAD									VA LOAD							
WIRE SIZE	CONDUIT SIZE	DIRECTORY	L1	L2	L3	CKT.	AMPS		AMPS	CKT.	L1	L2	L3	DIRECTORY	CONDUIT SIZE	WIRE SIZE			
2#12 & 1#12G	3/4"	RECEPTACLES	600			1	20		20	2	1,000			LIGHTING	3/4"	2#12 & 1#12G			
2#12 & 1#12G	3/4"	RECEPTACLES		600		3	20		20	4		500		DOMESTIC PLC	3/4"	2#12 & 1#12G			
2#12 & 1#12G	3/4"	RECEPTACLES			400	5	20		20	6			500	CHLORINE ANALYZER	3/4"	2#12 & 1#12G			
2#12 & 1#12G	3/4"	PLC	500			7	20		20	8	500			HVAC CONTROL PANEL	3/4"	2#12 & 1#12G			
2#12 & 1#12G	3/4"	FUTURE CHEM FEED PUMP		2,038		9	20		30	10		2,500		EUH-1	3/4"	2#10 & 1#10G			
2#12 & 1#12G	3/4"	EF-1			100	11	20		|	12			2,500	|	-	-			
2#12 & 1#12G	3/4"	CU-1	2,080			13	20		20	14	2,500			EUH-2	3/4"	2#12 & 1#12G			
-	-	|		2,080		15	|		|	16		2,500		|	-	-			
2#12 & 1#12G	3/4"	DWH-1			500	17	20		20	18			500	EMERGENCY EYE WASH	3/4"	2#12 & 1#12G			
-	-	SPARE	500			19	20		20	20	500			SPARE	-	-			
-	-	SPARE		500		21	20		20	22		500		SPARE	-	-			
-	-	SPARE			500	23	20		20	24			500	SPARE	-	-			
		SUBTOTAL	3,680	5,218	1,500						4,500	6,000	4,000	SUBTOTAL					

Tighe&Bond

COMMONWEALTH OF MASSACHUSETTS
THOMAS MAHANNA
CIVIL
No. 39479
REGISTERED PROFESSIONAL ENGINEER
12/12/23

COMMONWEALTH OF MASSACHUSETTS
MARY E. DANIELSON
ENVIRONMENTAL
No. 55926
REGISTERED PROFESSIONAL ENGINEER
12/12/23

PERMIT DRAWINGS - NOT FOR CONSTRUCTION

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Harvard-Devens Water System Interconnection Project

Harvard Public Works Department

Harvard, Massachusetts

MARK	DATE	DESCRIPTION

PROJECT NO:	H1776-16A
DATE:	DECEMBER 2023
FILE:	H1776-16-E-601.dwg
DRAWN BY:	CTO
DESIGNED/CHECKED BY:	CTO/JC
APPROVED BY:	TJM

ELECTRICAL ONELINE DIAGRAM AND PANELBOARD SCHEDULES

SCALE:

E-601
SHEET X OF XX

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