

# LITTLE RIVER DAM REMOVAL AND RIVER RESTORATION

HAVERHILL · MASSACHUSETTS  
**CONSTRUCTION PLANS**

FEBRUARY 10, 2026

PREPARED FOR  
**CITY OF HAVERHILL**  
 DEPT. OF PUBLIC WORKS  
 500 PRIMROSE STREET  
 HAVERHILL, MA 01830-2660



PREPARED BY  
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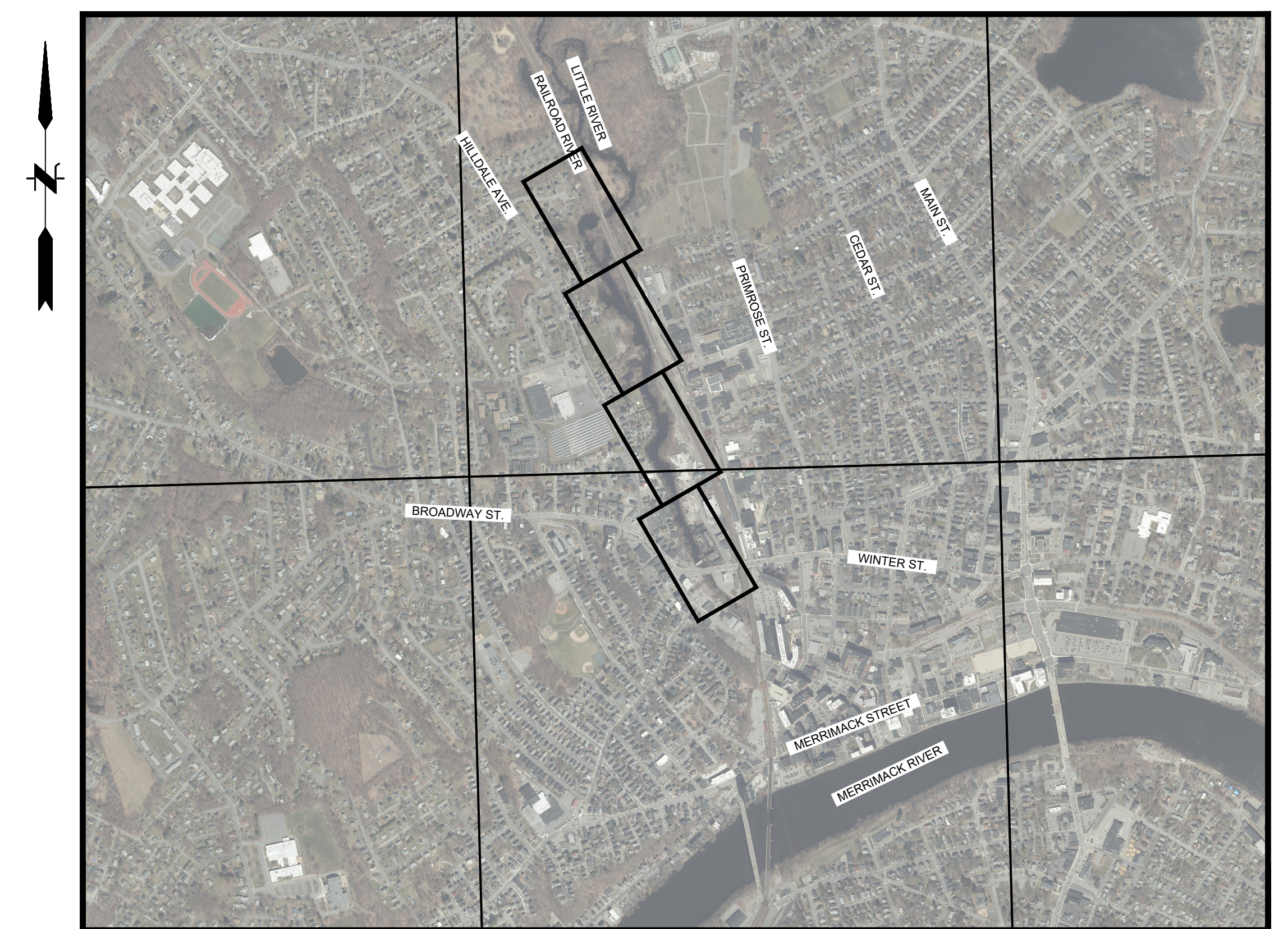
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**LOCATION MAP**  
 SCALE: 1" = 1000'

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**GI-001**

LEGEND	
EXIST	PROP

ABBREVIATIONS	
GENERAL APPROX	APPROXIMATE
BIT	BITUMINOUS PAVEMENT
BW	BOTTOM OF WALL
CC	CONCRETE CURB
CFS	CUBIC FEET PER SECOND
CLF	CHAIN LINK FENCE
CP	CONTROL POINT
EL./ELEV	ELEVATION
EXIST	EXISTING
FES	FABRIC ENCAPSULATED SOIL
GC	GRANITE CURB
HP	HIGH POINT
INV	INVERT
MAX	MAXIMUM
MBTA	MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
MIN	MINIMUM
NTS	NOT TO SCALE
PCC	PRECAST CONCRETE CURB
PROP	PROPOSED
R&D	REMOVE AND DISPOSE
R&R	REMOVE AND RESET
R&S	REMOVE AND STACK
T&S	TOP OF SLOPE
TW	TOP OF WALL
TYP.	TYPICAL
VGC	VERTICAL GRANITE CURB
UTILITY	
CB	CATCH BASIN
CMP	CORRUGATED METAL PIPE
CPP	CORRUGATED POLYETHYLENE PIPE
CSO	COMBINED SEWER OVERFLOW
DCB	DOUBLE CATCH BASIN
DI	DUCTILE IRON PIPE
F&G	FRAME AND GRATE
F&C	FRAME AND COVER
HDPE	HIGH DENSITY POLYETHYLENE
HYD	HYDRANT
INV	INVERT ELEVATION
PVC	POLYVINYL CHLORIDE PIPE
RCP	REINFORCED CONCRETE PIPE
RD	ROOF DRAIN
SMH	SEWER MANHOLE
TSV	TAPPING SLEEVE, VALVE AND BOX
UTILITY POLE	

LEGEND NOTE	
Symbols and legends of project features are graphic representations and are not necessarily shown on the drawings to scale or to their actual dimension or location. Coordinate detail sheet dimensions, manufacturers' literature, shop drawings, and field measurements of supplied products for layout of the project features.	

### MAP NOTES AND REFERENCES

- REFERENCES:
  - COMMONWEALTH OF MASSACHUSETTS DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGES, 2024 EDITION, REVISIONS AND ALL CURRENT ADDENDA, ARE MADE A PART HEREOF, AS IF ATTACHED HERETO. ALL REFERENCES TO "STATE STANDARD SPECIFICATIONS" SHALL REFER TO THE LATEST EDITION OF THE COMMONWEALTH OF MASSACHUSETTS DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES CONSTRUCTION.
  - THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION CONSTRUCTION STANDARD DETAILS, 2017 EDITION, AND ALL CURRENT REVISIONS, ARE MADE A PART HEREOF, AS IF ATTACHED HERETO.
  - THE MASSACHUSETTS EROSION AND SEDIMENT CONTROL GUIDELINES FOR URBAN AND SUBURBAN AREAS, 2003 EDITION, REVISIONS AND ALL CURRENT ADDENDA, ARE MADE A PART HEREOF, AS IF ATTACHED HERETO. ALL REFERENCES TO "SOIL EROSION AND SEDIMENT CONTROL HANDBOOK" SHALL REFER TO THE LATEST EDITION OF THE MASSACHUSETTS EROSION AND SEDIMENT CONTROL GUIDELINES FOR URBAN AND SUBURBAN AREAS.
- EXISTING CONDITIONS:
  - SURVEY CONTROL AND ELEVATIONS AT WINTER STREET WERE OBTAINED FROM FIELD SURVEY PERFORMED BY FUSS & O'NEILL FROM SEPTEMBER 12, 2021 TO FEBRUARY 11, 2022.
  - SURVEY CONTROL AND TREE LOCATIONS WITHIN CASHMAN PARK WERE OBTAINED FROM AN EXISTING CONDITIONS SURVEY PLAN OF CASHMAN PARK, DATED JUNE 1, 2017, AND PREPARED BY SMC SURVEYING AND MAPPING CONSULTANTS. CONTRACTOR TO ESTABLISH ADDITIONAL SURVEY CONTROL AS REQUIRED.
  - CONTOURS SHOWN ON THIS PLAN THAT ARE OUTSIDE OF THE RIVER AND CASHMAN PARK AREA ARE APPROXIMATE ONLY AND WERE OBTAINED FROM 2013-2014 USGS LIDAR DATA OBTAINED FROM NOAA'S ONLINE DATA ACCESS VIEWER.
  - BATHYMETRY AND SEDIMENT DEPTHS WITHIN THE RIVER WERE OBTAINED FROM THE FOLLOWING COMBINATION OF FIELD INVESTIGATIONS:
    - APPROXIMATE ELEVATIONS WITHIN RIVER WERE OBTAINED ON NOVEMBER 6, 2020 AND ON NOVEMBER 17, 2020 FROM DEPTH MEASUREMENTS TAKEN BY BOAT BY FUSS & O'NEILL AND T&B MARINE SERVICES, INC.
    - TOP AND BOTTOM OF SEDIMENT ELEVATIONS WITHIN RIVER WERE OBTAINED FROM FIELD SURVEY PERFORMED BY FUSS & O'NEILL FROM SEPTEMBER 12, 2021 TO FEBRUARY 11, 2022.
  - WETLAND FLAGGING ALONG LITTLE RIVER WITHIN THE LIMIT OF DISTURBANCE WAS PERFORMED BY FUSS & O'NEILL, INC. (MICHAEL SOARES, WETLAND SCIENTIST) ON SEPTEMBER 27, 2021 AND APRIL 29, 2022. THE WETLAND FLAGS WERE THEN LOCATED VIA SUB-METRIC GPS. DUE TO FIELD-SITE RESTRICTIONS OR SAFETY CONCERNS, IT WAS NOT POSSIBLE TO ACCESS AND FIELD-DELINEATE SOME SEGMENTS OF RIVERBANK AND BORDERING WETLANDS. IN LOCATIONS WHERE A TYPICAL FIELD DELINEATION OF THE BANK, LUWM, AND/OR BVW WAS NOT PRACTICABLE, BOUNDARIES OF RESOURCE AREAS BETWEEN FIELD DELINEATED SEGMENTS WERE COMPLETED IN GIS THROUGH A REVIEW OF AERIAL IMAGERY (2014-2021, SPRING AND SUMMER), FEDERAL AND STATE WETLANDS MAPPING (NATIONAL WETLANDS INVENTORY AND MASS DEP, RESPECTIVELY), AND 1-FOOT CONTOURS (DERIVED FROM 2013-2014 LIDAR). STATE-REGULATED RIVERFRONT AREA IS MEASURED HORIZONTALLY FROM BANK OF LITTLE RIVER, AND STATE-REGULATED BUFFER ZONE IS MEASURED HORIZONTALLY FROM THE BOUNDARIES OF BVW IDENTIFIED AT THE SITE.
  - ASSESSOR'S PARCELS, WETLAND BOUNDARIES (UPSTREAM OF THE MBTA BRIDGE AND THE LIMIT OF DISTURBANCE), POTENTIAL & CERTIFIED VERNAL POOLS, AND BUILDING FOOTPRINTS (OUTSIDE THE LIMIT OF DISTURBANCE) WERE OBTAINED FROM MASSACHUSETTS GEOGRAPHIC INFORMATION SYSTEM (MASSGIS).
- FLOOD ZONE:
  - FLOODWAY INFORMATION SHOWN ON THIS PLAN WAS OBTAINED FROM FEMA FLOOD INSURANCE RATE MAP (FIRM) PANEL NUMBER 25090C0087F AND WINTER STREET AND HALE STREET SEWER DIVERSION PLAN PREPARED BY METCALF & EDDY (DATED JULY 1937), (2) FLOOD PROTECTION SYSTEM IMPROVEMENT PLAN (CWSRF-3862, IFB020-13) PREPARED BY AECOM (DATED FEBRUARY 14, 2013), (3) PENTUCKET MILLS EXISTING CONDITIONS PLAN OF LAND PREPARED BY VHB (DATED APRIL 2016) AND (4) INTEGRATED FINAL COMBINED SEWER OVERFLOW LONG-TERM CONTROL PLAN AND SUPPLEMENTAL ENVIRONMENTAL IMPACT REPORT PREPARED BY GDM SMITH (DATED FEBRUARY 2017).
- SEDIMENT SAMPLING  
SELECT SEDIMENT SAMPLING LOCATIONS ARE REPRESENTED ON THE PLANS. DOCUMENTATION OF ALL SEDIMENT SAMPLING AND RESULTS OBTAINED PRIOR TO FEBRUARY 2024 IS PROVIDED IN THE REPORT TITLED "SEDIMENT SAMPLING REPORT COMPILATION, LITTLE RIVER DAM REMOVAL PROJECT" PREPARED BY FUSS & O'NEILL DATED FEBRUARY 2024.
- ACTIVITY AND USE LIMITATION AREAS AND UNDERGROUND STORAGE TANKS:  
ALL PROPERTIES WHERE WORK IS PROPOSED DO NOT HAVE UNDERGROUND STORAGE TANKS. HOWEVER, PARCEL 516-304-1 (93 LAFAYETTE SQUARE) IS CONSIDERED AN AUL (ACTIVITY AND USE LIMITATION) PROPERTY.

### GENERAL CONSTRUCTION AND COORDINATION REQUIREMENTS

- THE CONTRACTOR SHALL VERIFY THE LOCATION OF THE EXISTING DAM TO BE REMOVED, EXISTING ADJACENT STRUCTURES, AND THE PROPOSED LAYOUT OF THE RIVER CHANNEL IMPROVEMENTS WITH ITS RELATIONSHIP TO THE EXISTING SITE SURVEY. THE CONTRACTOR SHALL ALSO VERIFY ALL DIMENSIONS, SITE CONDITIONS, AND MATERIAL SPECIFICATIONS AND SHALL NOTIFY THE OWNER AND ENGINEER OF ANY ERRORS, OMISSIONS, OR DISCREPANCIES BEFORE COMMENCING OR PROCEEDING WITH WORK. THE CONTRACTOR SHALL STAKE OUT THE LIMIT OF DISTURBANCE.
- THE CONTRACTOR SHALL TAKE FIELD MEASUREMENTS AS REQUIRED TO FIT THE WORK PROPERLY. RECHECK MEASUREMENTS BEFORE CONSTRUCTING EACH WORK ITEM WHERE PORTIONS OF THE WORK ARE INDICATED TO FIT TO OTHER CONSTRUCTION. VERIFY DIMENSIONS OF OTHER CONSTRUCTION BY FIELD MEASUREMENTS BEFORE FABRICATION. COORDINATE FABRICATION SCHEDULE WITH CONSTRUCTION PROGRESS TO AVOID DELAYING THE WORK.
- THE LOCATION OF EXISTING UTILITIES ARE APPROXIMATE. HAVE BEEN PLOTTED FROM THE LATEST AVAILABLE INFORMATION, AND MAY NOT BE ALL INCLUSIVE. THE CONTRACTOR SHALL CHECK AND VERIFY THE LOCATIONS OF ALL EXISTING UTILITIES, BOTH OVERHEAD AND UNDERGROUND, AND "DIG-SAFE" SHALL BE NOTIFIED PRIOR TO COMMENCING ANY CONSTRUCTION OPERATIONS. RESTORATION AND REPAIR OF DAMAGE TO EXISTING UTILITIES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR WITH NO ADDITIONAL COST TO THE OWNER. NO EXCAVATION SHALL COMMENCE UNTIL ALL INVOLVED UTILITY COMPANIES AND/OR TOWN WHOSE FACILITIES MIGHT BE AFFECTED BY ANY WORK TO BE PERFORMED BY THE CONTRACTOR ARE NOTIFIED AT LEAST 72 HOURS IN ADVANCE. RELOCATION OF ANY UTILITIES SHALL BE AT THE OWNER'S EXPENSE AND COMPLETED WITH THE UTILITY WORK. THE OWNER SHALL BE NOTIFIED AS TO THE RELOCATIONS REQUIRED PRIOR TO THE START OF CONSTRUCTION.
- DEVIATIONS OR CHANGES FROM THESE PLANS WILL NOT BE ALLOWED UNLESS APPROVED BY THE ENGINEER/CONTRACT OWNER.
- THE CONTRACTOR SHALL MAKE EXPLORATORY EXCAVATIONS AND LOCATE ANY EXISTING UTILITIES SUFFICIENTLY AHEAD OF CONSTRUCTION TO PERMIT REVISIONS TO PLANS IF NECESSARY. HOWEVER, EXPLORATORY EXCAVATIONS AND OTHER ACTIVITIES INVOLVING SOIL DISTURBANCES WITHIN THE RIVER OR OTHER ADJACENT WATERCOURSES SHALL BE LIMITED TO THE LOW-FLOW PERIOD (I.E. THE PERIOD FROM JULY 1 TO OCTOBER 31 OF ANY CALENDAR YEAR).
- THE EXISTENCE AND/OR LOCATION OF UTILITIES SHOWN ON THESE PLANS MAY BE ONLY APPROXIMATELY CORRECT AND THE CONTRACTOR IS REQUIRED TO TAKE PRECAUTIONARY MEASURES TO PROTECT THE UTILITIES SHOWN HEREON AND ANY OTHER EXISTING UTILITIES NOT OF RECORD OR NOT SHOWN ON THESE PLANS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING, AT HIS/HER EXPENSE, ANY EXISTING UTILITIES DAMAGED DURING CONSTRUCTION.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPLACING, WITH MATCHING MATERIALS, ANY PAVEMENT, WALKS, CURBS, WALLS, FENCES, ETC., THAT MUST BE CUT OR THAT ARE DAMAGED DURING CONSTRUCTION.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL REMAINING NECESSARY PERMITS, INSPECTIONS, BONDS, ETC. AND OTHER APPROVAL RELATED ITEMS WITH THE LOCAL AND STATE/FEDERAL MUNICIPALITIES. NO CONSTRUCTION SHALL COMMENCE UNTIL SUCH PERMITS HAVE BEEN SECURED AND THE CONTRACTOR HAS SUPPLIED THE REQUIRED NOTICES.
- WORK ON MBTA PROPERTY CAN ONLY BE UNDERTAKEN UPON RECEIPT OF A LICENSE FROM MBTA.
- AN APPROVED SET OF PLANS AND ALL APPLICABLE PERMITS MUST BE AVAILABLE AT THE SITE THROUGH THE ENTIRE PERIOD OF CONSTRUCTION WHEN WORK IS ACTIVELY OCCURRING.
- CONTRACTOR AGREES THAT HE/SHE SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS; AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD THE CONTRACT OWNER (CITY OF HAVERHILL), PROPERTY OWNERS AND THE ENGINEER HARMLESS FROM ANY AND ALL LIABILITY, REAL AND ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING FOR LIABILITY ARISING FROM "THE SOLE NEGLIGENCE OF THE CONTRACT OWNER, PROPERTY OWNER OR THE ENGINEER."
- PHOTOGRAPHS, VIDEOTAPING, AND SKETCHES (AS NECESSARY) MUST BE TAKEN OF ADJOINING CONSTRUCTION AND SITE IMPROVEMENTS WITHIN 200 FEET OF EXCAVATION LIMITS ASSOCIATED WITH DEMOLITION AND RIVER CHANNEL IMPROVEMENTS PRIOR TO EXCAVATION AND EXCAVATION SUPPORT SYSTEMS. SUCH DOCUMENTATION SHALL ILLUSTRATE EXISTING SURFACES THAT MAY BE MISCONSTRUCTED AS DAMAGE CAUSED BY THIS PROJECT CONSTRUCTION OPERATIONS.
- METHODS AND MATERIALS USED IN THE CONSTRUCTION OF IMPROVEMENTS FOR THIS PROJECT SHALL CONFORM TO THE CURRENT CONSTRUCTION STANDARDS AND SPECIFICATIONS OF THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION AND THE CONTRACT DOCUMENTS.
- VERIFY SPACE REQUIREMENTS AND DIMENSIONS OF ITEMS SHOWN ON DRAWINGS. CHECK THE LOCATION, LEVEL AND GRADE, OF EVERY MAJOR ELEMENT AS THE WORK PROGRESSES.

- ESTABLISH BENCHMARKS AND CONTROL POINTS IN ADDITION TO THOSE INDICATED TO SET LINES, GRADES, AND LEVELS AT EACH STAGE OF CONSTRUCTION. LOCATE THE WORK AND COMPONENTS OF THE WORK ACCURATELY, IN CORRECT ALIGNMENT AND ELEVATION, AS INDICATED BOUNDS OR MONUMENTATION DISTURBED DURING CONSTRUCTION SHALL BE SET OR RESET BY A PROFESSIONAL SURVEYOR AS COORDINATED TO THE OWNER.
- COMPLY WITH MANUFACTURERS' WRITTEN INSTRUCTIONS AND RECOMMENDATIONS FOR INSTALLING MATERIALS AND PRODUCTS. INSTALL PRODUCTS AT THE TIME AND UNDER CONDITIONS THAT WILL ENSURE THE BEST POSSIBLE RESULTS. MAINTAIN CONDITIONS REQUIRED FOR PRODUCT PERFORMANCE UNTIL SUBSTANTIAL COMPLETION.
- USE PRODUCTS, CLEANERS, AND INSTALLATION MATERIALS THAT ARE NOT CONSIDERED HAZARDOUS.
- CONTRACTOR SHALL IDENTIFY TREES TO BE REMOVED PRIOR TO CONSTRUCTION AND MARK THEM WITH CONSTRUCTION TAPE FOR REVIEW BY THE OWNER/ENGINEER. TREES AND OTHER EXISTING VEGETATION SHALL BE RETAINED WHEREVER FEASIBLE. CONTRACTOR SHALL NOT REMOVE TREES UNTIL REVIEWED AND APPROVED BY THE OWNER/ENGINEER.
- TREES AND OTHER EXISTING VEGETATION NOT WITHIN THE LIMITS OF DISTURBANCE SHALL BE PROTECTED FROM DAMAGE. VEGETATED AREAS AND/OR TREES DAMAGED THAT ARE NOT PLANNED FOR REMOVAL SHALL BE RESTORED TO THEIR ORIGINAL CONDITION OR BETTER TO THE SATISFACTION OF THE CITY.
- THE CONTRACTOR SHALL RESTORE DISTURBED LANDSCAPE AREAS TO ORIGINAL CONDITION (I.E. SEED, SODED, PLANTED), UNLESS OTHERWISE DIRECTED IN CONTRACT DOCUMENTS.
- TRASH AND DEBRIS OF EVERY NATURE SHALL BE COLLECTED AND REMOVED FROM WITHIN THE LIMITS OF DISTURBANCE AND SHALL BE DISPOSED OF IN ACCORDANCE WITH APPLICABLE LAWS.
- ALL EXCESS EXCAVATED MATERIALS, EXCESS FILL, EXCESS CONSTRUCTION MATERIALS, DEBRIS, AND WASTE (INCLUDING IDENTIFIED CONTAMINATED SOILS WITHIN RIVER) SHALL BE REMOVED FROM THE SITE AND SHALL BE DISPOSED OF IN ACCORDANCE WITH APPLICABLE LAWS.
- DO NOT CLOSE OR OBSTRUCT ROADWAYS, SIDEWALKS, FIRE HYDRANTS, AND UTILITIES WITHOUT APPROPRIATE PERMITS.
- WORK IS RESTRICTED TO THE HOURS OF 7 AM TO 5 PM ON MONDAY THROUGH FRIDAY, EXCLUDING HOLIDAYS, UNLESS OTHERWISE APPROVED BY THE OWNER.
- PRIOR TO CONSTRUCTION, ADDITIONAL CONSTRUCTION ACCESSES AND/OR CONSTRUCTION EASEMENTS NOT SHOWN ON THIS PLAN (AGREED UPON THROUGH COORDINATION BETWEEN CONTRACTOR AND PROPERTY OWNER) MUST BE GRANTED IN WRITING BY PROPERTY OWNERS.
- STOP WORK IN THE VICINITY OF SUSPECTED CONTAMINATED SOIL, GROUNDWATER, OR OTHER MEDIA OUTSIDE OF THE AREA OF CONTAMINATED SOIL AREA IDENTIFIED WITHIN. IMMEDIATELY NOTIFY THE ENGINEER AND OWNER SUCH THAT APPROPRIATE TESTING AND SUBSEQUENT ACTION CAN BE TAKEN. RESUME WORK IN THE IMMEDIATE VICINITY ONLY UPON DIRECTION BY THE OWNER.

### PROTECTION OF WORK REQUIREMENTS

- THE WORK AND SITE SHALL BE PROTECTED AT ALL TIMES UNTIL FINAL ACCEPTANCE BY THE OWNER. CARE SHALL BE EXERCISED WHILE OPERATING EQUIPMENT ON, AND ADJACENT TO, THE WORK AREA. THE CONTRACTOR SHALL BE RESPONSIBLE TO PROTECT EQUIPMENT DOES NOT CAUSE DAMAGE TO EXISTING AND ADJACENT FEATURES NOT SCHEDULED FOR DEMOLITION OR REMOVAL.
- ACCESS TO VARIOUS PORTIONS OF THE SITE SHALL BE UNDERTAKEN IN SUCH A MANNER THAT THE WORK AND SITE ARE PROTECTED AT ALL TIMES. ACCESS WAYS SHALL BE CONSTRUCTED, MAINTAINED, AND PROTECTED WITH SEDIMENT CONTROLS TO PREVENT OFF-SITE AREAS.
- ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND IN SUCH A MANNER THAT THE WORK AND ADJACENT PROPERTIES ARE PROTECTED FROM DAMAGE AT ALL TIMES.
- CONSTRUCT IN-RIVER IMPROVEMENTS AND MAINTAIN IN-RIVER WORK AREAS IN ACCORDANCE WITH THE PROJECT'S APPROVED WATER CONTROL & CONSTRUCTION SEQUENCING PLANS. IN THE EVENT THAT FLOOD FLOWS ARE EXPECTED TO EXCEED THE CAPACITIES OF WATER CONTROL SYSTEMS; PROTECT ANY NON-STABLE OR ERODIBLE IMPROVEMENTS AND REMOVE ALL EQUIPMENT AND PERSONNEL FROM IN-RIVER LOCATIONS.

### EROSION AND SEDIMENT CONTROL

- PRIOR TO THE COMMENCEMENT OF CONSTRUCTION ACTIVITIES, INSTALL ALL EROSION AND SEDIMENT CONTROL DEVICES AS SHOWN ON THE PLAN OR AS REQUIRED BY SITE CONDITIONS. ALL EROSION CONTROL DEVICES SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION.
- INSTALL, INSPECT, AND MAINTAIN EROSION AND SEDIMENT CONTROL MEASURES THROUGHOUT CONSTRUCTION. REMOVE ALL SUCH MEASURES AND RESTORE ALL DISTURBED AREAS FOLLOWING CONSTRUCTION.
- EROSION AND SEDIMENT CONTROL SHALL COMPLY WITH THE SPECIFICATIONS AND ALL PERMIT REQUIREMENTS.
- REFER TO SITE RESTORATION AND LANDSCAPE AND PLANTING PLANS FOR POST-CONSTRUCTION RESTORATION MEASURES.
- REFER TO WATER CONTROL AND CONSTRUCTION SEQUENCING PLAN FOR CONTROL OF WATER.
- REFER TO SITE LAYOUT AND GRADING PLAN FOR DAM REMOVAL, SEDIMENT MANAGEMENT, AND PERMANENT CHANNEL STABILIZATION MEASURES.
- DISTURBANCE OF SOIL SURFACES IS REGULATED BY STATE LAW AND LOCAL ORDINANCE. ALL WORK SHALL COMPLY WITH THESE EROSION AND SEDIMENT CONTROL NOTES AND OTHER PERMIT CONDITIONS TO PREVENT OR MINIMIZE SOIL EROSION AND SEDIMENTATION TO OFF-SITE AREAS.
- THE CONTRACTOR SHALL COMPLY WITH THE LATEST EDITION OF THE "MASSACHUSETTS EROSION AND SEDIMENT CONTROL GUIDELINES FOR URBAN AND SUBURBAN AREAS" IN CONSTRUCTING THE EROSION AND SEDIMENT CONTROLS INDICATED ON THE PLANS. ALL EROSION AND SEDIMENT CONTROL MEASURES OR WORKS AND REHABILITATION MEASURES MUST CONFORM TO OR EXCEED THE SPECIFICATIONS OR STANDARDS SET OUT IN THE CONTRACT DOCUMENTS AND ENVIRONMENTAL PERMITS.
- THE CONTRACTOR IS RESPONSIBLE FOR THE TIMELY INSTALLATION, INSPECTION, MAINTENANCE, AND/OR REPLACEMENT OF ALL TEMPORARY EROSION AND SEDIMENT CONTROL DEVICES SHOWN ON THE PLANS TO ENSURE PROPER OPERATION THROUGHOUT THE LIFE OF THE PROJECT. REMOVE EROSION AND SEDIMENTATION CONTROLS AFTER STABLE VEGETATIVE GROWTH IS ESTABLISHED BY THE OWNER, ENGINEER OR LANDSCAPE ARCHITECT.
- THE CONTRACTOR SHALL INSPECT EROSION AND SEDIMENT CONTROL DEVICES ON A DAILY BASIS, AFTER EACH STORM EVENT, AND AT LEAST DURING PROLONGED RAINFALL. CLEAN OUT ACCUMULATED SEDIMENT BEHIND CONTROLS. REPAIR OR REPLACE CONTROLS PROMPTLY AS NEEDED. REMOVE ACCUMULATED SEDIMENT FROM BEHIND PERIMETER CONTROLS WHEN ONE-THIRD OF THE ORIGINAL HEIGHT OF THE CONTROLS BECOME FILLED WITH SEDIMENT. DISPOSE OF REMOVED SEDIMENT IN ON-SITE AREAS OR LAWFULLY OFF-SITE.
- IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO CLEAN ROADS, CONTROL DUST, AND TAKE ALL NECESSARY MEASURES TO ENSURE THAT THE SITE AND ALL ADJACENT ROADS AND PARKING AREAS BE MAINTAINED IN A MUD- AND DUST-FREE CONDITION AT ALL TIMES THROUGHOUT THE LIFE OF THE CONTRACT. DUST CONTROL SHALL INCLUDE, BUT IS NOT LIMITED TO, WATER AND/OR CRUSHED STONE OR COARSE GRAVEL.
- ALL PROPOSED TEMPORARY CONSTRUCTION ENTRANCES SHALL BE CONSTRUCTED AS SHOWN ON THE PLANS AND DETAILS. ALL VEHICLES TRAFFIC ENTERING OR EXITING THE PROJECT SITE SHALL PASS OVER THE CONSTRUCTION ENTRANCES TO REDUCE THE TRACKING OR FLOWING OF SEDIMENT ONTO THE SURROUNDING ROADWAYS. ENTRANCES SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO THE SURROUNDING ROADWAYS. THIS WILL REQUIRE PERIODIC AND ADDITIONAL STONE OR ADDITIONAL LENGTH AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED, OR TRACKED ONTO THE SURROUNDING ROADWAYS AND PARKING AREAS MUST BE REMOVED IMMEDIATELY. ADDITIONAL ENTRANCES FOR CONSTRUCTION PHASING SHALL BE INSTALLED AS REQUIRED TO PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO ROADWAYS.
- THE CONTRACTOR SHALL INSTALL ALL PERIMETER SEDIMENT CONTROL BARRIERS (I.E. SILT FENCE) AS SHOWN ON THE PLANS. A SILT FENCE SHALL ALSO BE INSTALLED AROUND ANY SOIL STOCKPILE AREAS.
- TEMPORARY VEGETATIVE COVER SHALL BE ESTABLISHED IMMEDIATELY IN ANY DISTURBED AREAS THAT HAVE NOT YET REACHED FINISHED GRADE AND CONSTRUCTION IS NOT EXPECTED TO RESUME FOR MORE THAN 14 DAYS. TEMPORARY VEGETATIVE COVER SHALL CONSIST OF SHORT-TERM EROSION CONTROL SEED (SUBSECTION M6.03.1 OF THE MASSDOT STANDARD SPECIFICATIONS) FROM APRIL 1 TO JUNE 1 AND AUGUST 15 TO OCTOBER 15. MAY ALSO BE INSTALLED BETWEEN OCTOBER 15 TO MARCH 31 IF COVERED WITH TEMPORARY MULCHING. SEED AT A RATE OF 75 LBS/ACRE BY HAND.
- PERMANENT VEGETATIVE COVER SHALL BE ESTABLISHED TO ALL DISTURBED AREAS THAT HAVE REACHED FINISHED GRADE AS SOON AS POSSIBLE, BUT NOT MORE THAN 14 DAYS AFTER THE COMPLETION OF CONSTRUCTION ACTIVITY IN THAT AREA HAS PERMANENTLY CEASED. RECOMMENDED PERMANENT SEEDING DATES ARE APRIL 1 TO JUNE 1 AND AUGUST 15 TO OCTOBER 15. REFER TO SITE RESTORATION PLANS FOR PERMANENT VEGETATIVE COVER SEED MIXTURES AND APPLICATION RATES. ALL PLANTINGS AND SEED SHALL BE COVERED BY A WARRANTY PERMITS AS DESCRIBED IN THE SPECIFICATIONS; RESEEDING/RE-PLANTING SHALL BE COMPLETED TO ENSURE STABLE VEGETATIVE COVER IS ESTABLISHED OVER ALL DISTURBED AREAS.
- IF PERMANENT SEEDING CANNOT BE COMPLETED WITHIN 14 DAYS OF THE COMPLETION OF CONSTRUCTION OR WITHIN THE RECOMMENDED SEEDING DATES, TEMPORARY BIODEGRADABLE EROSION CONTROL BLANKETING (CONTAINING NO PLASTIC COMPONENTS) OR MULCHING SHALL BE SPREAD/INSTALLED OVER ALL DISTURBED AREAS TO PROTECT THE SITE UNTIL ARRIVAL OF THE NEXT RECOMMENDED SEEDING PERIOD. MULCHING OR BLANKETING SHOULD BE INSTALLED AS SOON AS POSSIBLE IF SEEDING IS INSTALLED BETWEEN OCTOBER 15 AND MARCH 31, BUT NOT MORE THAN 14 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT AREA HAS TEMPORARILY CEASED. IF PERMANENT SEEDING IS INSTALLED IN JULY AND AUGUST, APPLY WATER TO SEEDED AREAS ON A DAILY BASIS.
- BLANKETING OR MULCHING MUST BE INSPECTED PERIODICALLY, IN PARTICULAR AFTER RAINSTORMS, TO CHECK FOR RILL EROSION. WHERE EROSION IS OBSERVED, ADDITIONAL MULCH MUST BE APPLIED OR BLANKETING REPAIRED OR REPLACED. INSPECTIONS SHALL TAKE PLACE UNTIL VEGETATION IS THOROUGHLY ESTABLISHED.
- INSPECT BANK TREATMENTS PERIODICALLY THROUGHOUT CONSTRUCTION TO DETERMINE IF SCOUR HAS OCCURRED BENEATH THE STONE, FABRIC OR LIFT MATS. DISPOSED ANY OF THE STONE, FABRIC, OR SOIL LIFT MATERIALS.
- STORAGE AND DISPOSAL: MATERIALS THAT COULD BE A POTENTIAL SOURCE OF STORMWATER POLLUTION, SUCH AS GASOLINE, DIESEL FUEL, HYDRAULIC OIL, ETC., SHALL BE STORED AT THE END OF EACH DAY IN A STORAGE TRAILER OR COVERED LOCATION AND TAKEN OFF-SITE AND PROPERLY DISPOSED OF. ALL TYPES OF WASTE GENERATED AT THIS SITE SHALL BE DISPOSED OF IN A MANNER CONSISTENT WITH STATE LAW AND/OR REGULATIONS.
- CONCRETE WASHOUT AREAS AND VEHICLE/EQUIPMENT FUELING ACTIVITIES SHALL BE LIMITED TO UPLAND LOCATIONS WITHIN THE PROJECT LIMIT OF DISTURBANCE THAT ARE LOCATED WITHIN A PORTION OF THE TEMPORARY STAGING AND STORAGE AREAS THAT ARE AT LEAST 50 FEET OUTSIDE OF JURISDICTIONAL WETLANDS.
- SPILL/LEAK PROTECTION AND RESPONSE: SPILL PREVENTION AND RESPONSE EQUIPMENT SHALL BE LOCATED ON ALL CONSTRUCTION EQUIPMENT OPERATED WITHIN THE PROJECT'S LIMIT OF DISTURBANCE. DEPLOY BOOMS AND OTHER CONTAINMENT/CLEANUP MEASURES IN THE EVENT OF A SPILL OR LEAK. NOTIFY LOCAL FIRE DEPT. AND MASSEP IMMEDIATELY OF ANY SPILLS.

### SPILL PREVENTION AND RESPONSE PROCEDURE

- CONTROL OF ALLOWABLE NON-STORMWATER DISCHARGES: IF ALLOWABLE NON-STORMWATER DISCHARGES ARE OCCURRING AT THE SITE, SUCH DISCHARGES SHALL BE VISUALLY OBSERVED AND RECORDED AS OUTLINED BELOW AND IN ACCORDANCE WITH ALL APPLICABLE PERMITS AND AUTHORITIES HAVING JURISDICTION. THE LIST OF EXPECTED SOURCES OF ALLOWABLE NON-STORM WATER DISCHARGES FOR THIS PROJECT ARE AS FOLLOWS: (1) DISCHARGE FROM VEHICLE WASHDOWN WHERE NO DETERGENTS ARE USED, (2) FIRE HYDRANT FLUSHINGS, (3) WATER USED TO CONTROL DUST, (4) POTABLE WATER INCLUDING UNCONTAMINATED WATER LINE FLUSHINGS, (5) PAVEMENT WASH WATERS, (6) UNCONTAMINATED, NON-TURBID DISCHARGES OF GROUNDWATER OR SPRING WATER, (7) CONSTRUCTION DEWATERING WATER DISCHARGE, (8) IRRIGATION DRAINAGE, (9) LAWN WATERING, AND (10) FOUNDATION OR FOOTING DRAINS.
- ANY INCIDENT OF GROUNDWATER AND SURFACE WATER CONTAMINATION RESULTING FROM THE IMPROPER DISCHARGE OF POLLUTANTS TO THE RIVER SYSTEM SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AS WELL AS ANY OTHER PARTIES DETERMINED TO BE RESPONSIBLE FOR THE CONTAMINATION. PURSUANT TO STATE LAWS AND REGULATIONS, THE REGULATING AGENCY MAY REQUIRE THE CONTRACTOR AND OTHER RESPONSIBLE PARTIES TO REMEDIATE ANY INCIDENTS THAT MAY ADVERSELY IMPACT GROUNDWATER QUALITY.
- THE CONTRACTOR SHALL BE RESPONSIBLE TO REMEDIATE INCIDENTS THAT ADVERSELY IMPACT GROUNDWATER AND SURFACE WATER QUALITY.



No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

SCALE:  
HORIZ.: 1"= 40'  
VERT.:  

DATUM:  
HORIZ.: NAD83  
VERT.: NAVD88

40 20 0 40  
GRAPHIC SCALE

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CITY OF HAVERHILL

GENERAL NOTES AND LEGEND

LITTLE RIVER DAM REMOVAL AND RIVER RESTORATION

HAVERHILL MASSACHUSETTS

PROJ. No.: 20170390 U40  
DATE: DECEMBER 16, 2024

**GI-002**

File: J:\DWG\2017\0390\U30\Civil\Plan\20170390U30\_Ind01.dwg Saved: 2024-12-11 5:45 PM Layout: G-003 Plotted: 2024-09-06 11:10 AM User: claire.nauman  
 PC3: AUTOCAD PDF (GENERAL DOCUMENTATION) PC3\_STB/CTB: FO STB  
 LAYER STATE:



No.	DATE	DESCRIPTION	DESIGNER	REVIEWER



SEAL

SCALE:  
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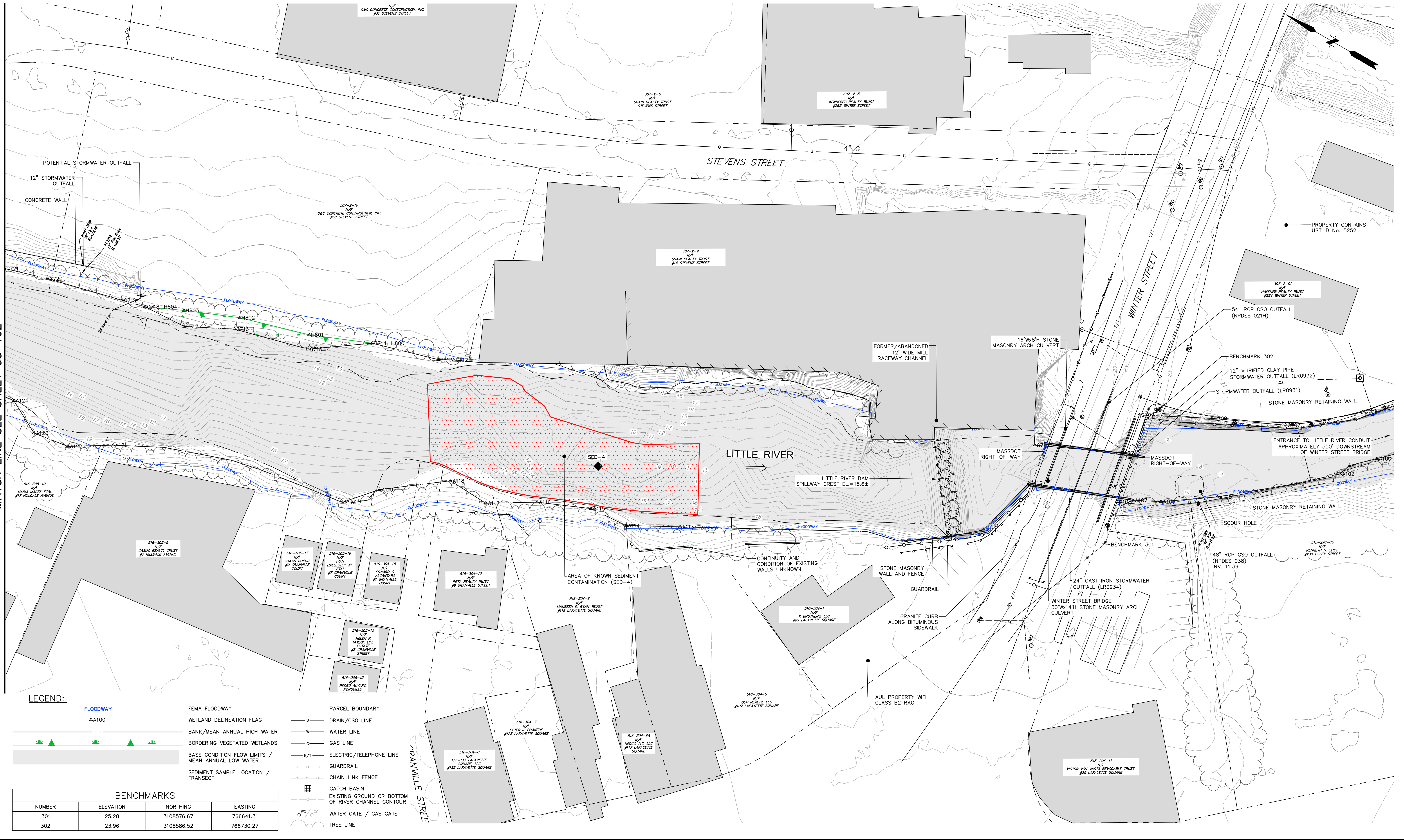
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CITY OF HAVERHILL  
 INDEX PLAN  
 LITTLE RIVER DAM REMOVAL AND RIVER RESTORATION  
 HAVERHILL MASSACHUSETTS

PROJ. No.: 20170390.U40  
 DATE: DECEMBER 16, 2024  
**GI-003**

File: J:\DWG\20170390\U30\Civil\Plan\20170390\U30\_EX01.dwg Layout: CS-101 Plotted: 2024-09-11 11:01 AM User: claire.nauman  
 PC3: AUTOCAD PDF (GENERAL DOCUMENTATION) PC3\_STB/CTB: FO STB  
 LAYER STATE:

MATCH LINE SEE SHEET CS-102



**LEGEND:**

- FLOODWAY
- FEMA FLOODWAY
- BANK/MEAN ANNUAL HIGH WATER
- BORDERING VEGETATED WETLANDS
- BASE CONDITION FLOW LIMITS / MEAN ANNUAL LOW WATER
- SEDIMENT SAMPLE LOCATION / TRANSECT
- PARCEL BOUNDARY
- DRAIN/CSO LINE
- WATER LINE
- GAS LINE
- ELECTRIC/TELEPHONE LINE
- GUARDRAIL
- CHAIN LINK FENCE
- CATCH BASIN
- EXISTING GROUND OR BOTTOM OF RIVER CHANNEL CONTOUR
- WATER GATE / GAS GATE
- TREE LINE

BENCHMARKS			
NUMBER	ELEVATION	NORTHING	EASTING
301	25.28	3108576.67	766641.31
302	23.96	3108586.52	766730.27



No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

SCALE:  
 HORZ.: 1"= 30'  
 VERT.:  
 DATUM:  
 HORZ.: NAD83  
 VERT.: NAVD88

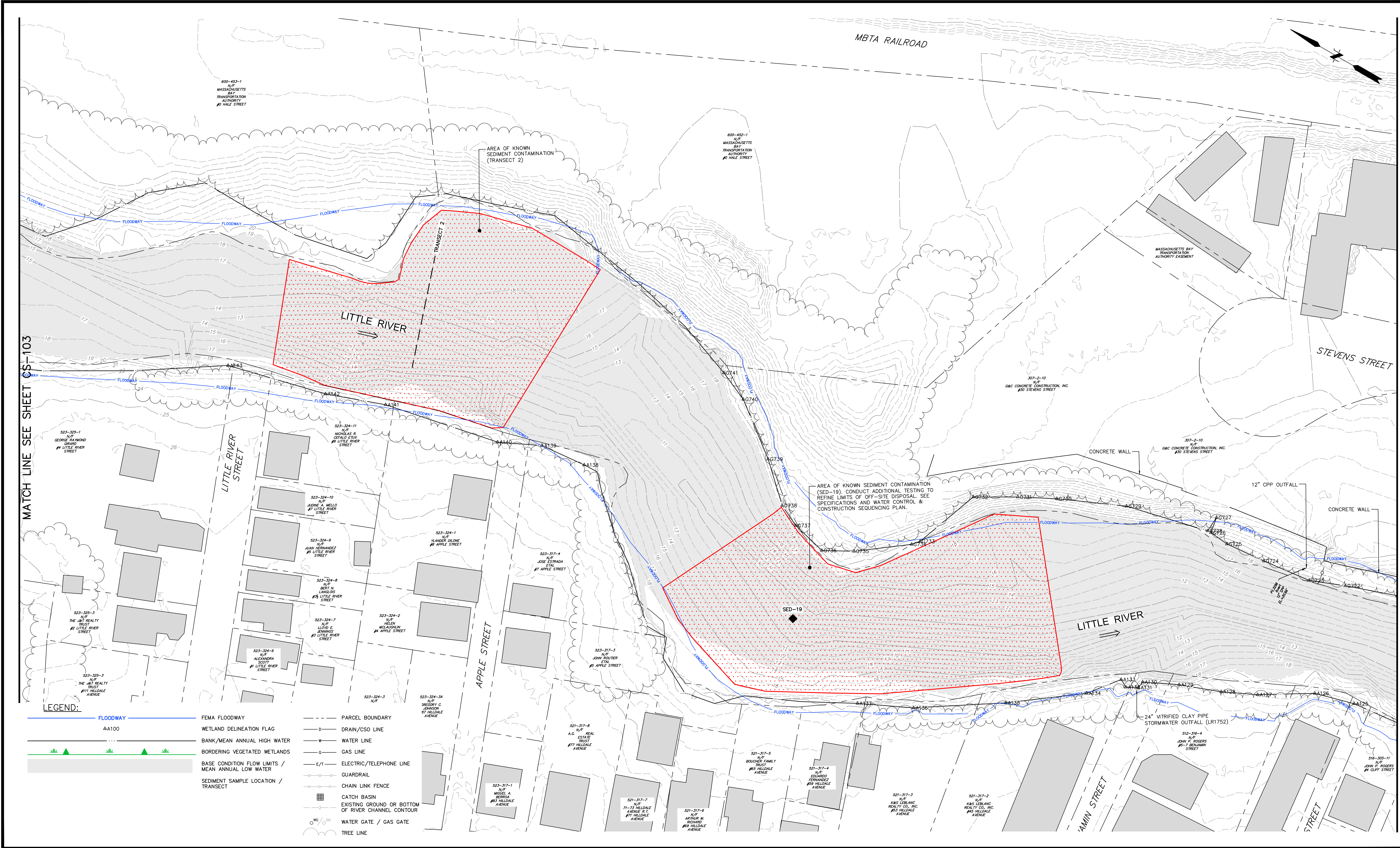
GRAPHIC SCALE

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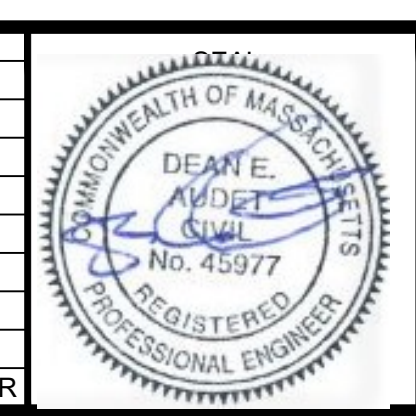
CITY OF HAVERHILL  
 EXISTING CONDITIONS PLAN NO. 1  
 LITTLE RIVER DAM REMOVAL AND RIVER RESTORATION  
 HAVERHILL MASSACHUSETTS

PROJ. No.: 20170390.U40  
 DATE: DECEMBER 16, 2024  
**CS-101**

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 LAYER STATE:



No.	DATE	DESCRIPTION	DESIGNER	REVIEWER



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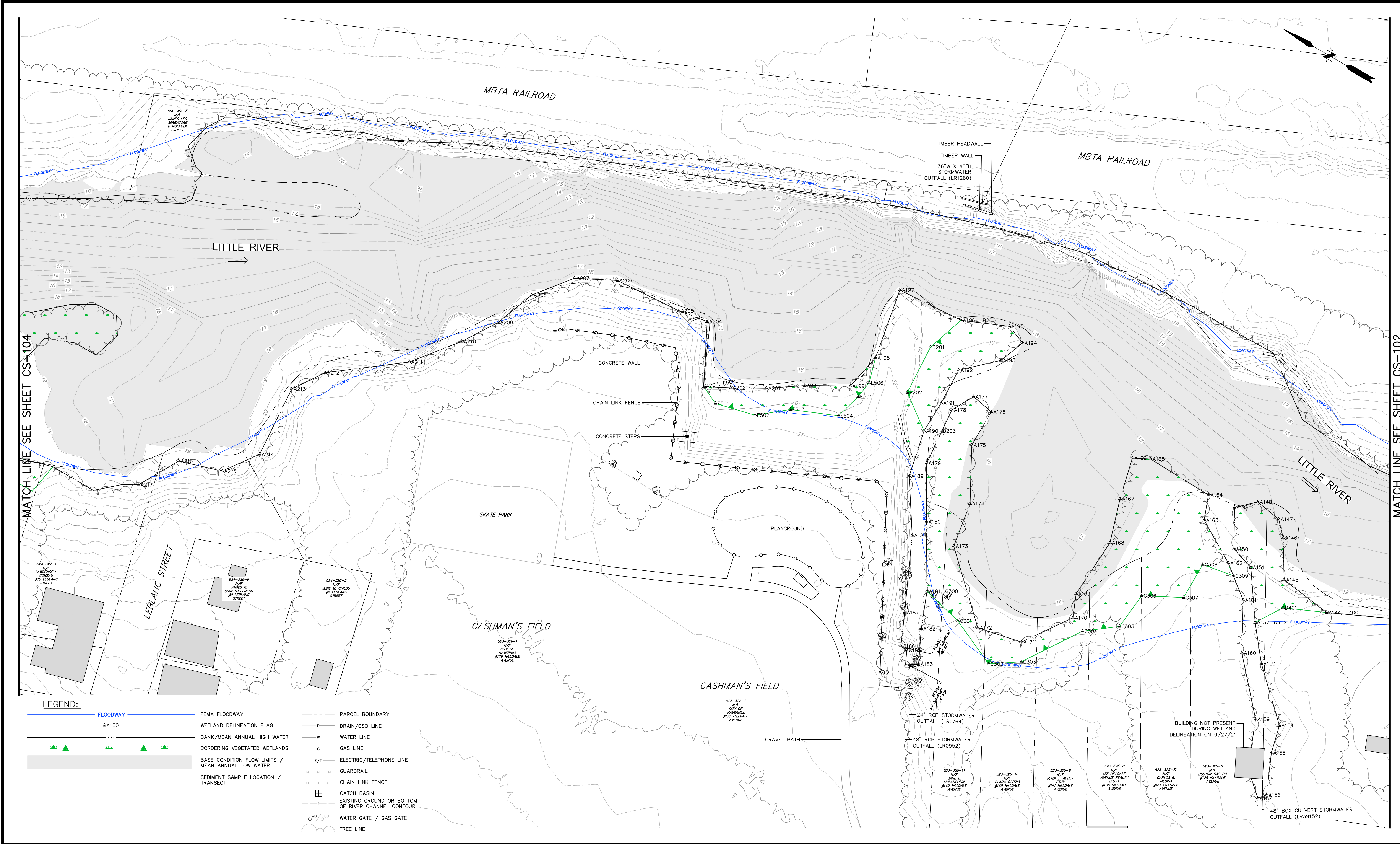
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 GRAPHIC SCALE

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CITY OF HAVERHILL  
 EXISTING CONDITIONS PLAN NO. 2  
 LITTLE RIVER DAM REMOVAL AND RIVER RESTORATION  
 HAVERHILL MASSACHUSETTS

PROJ. No.: 20170390 U40  
 DATE: DECEMBER 16, 2024  
**CS-102**

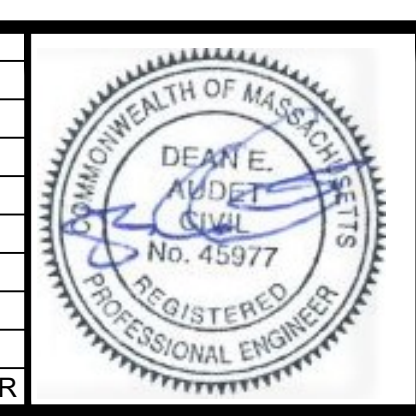
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 PC3: AUTOCAD PDF (GENERAL DOCUMENTATION) PC3\_STB/CTB: FO STB  
 LAYER STATE:



**LEGEND:**

FLOODWAY	FEMA FLOODWAY	PARCEL BOUNDARY
WETLAND DELINEATION FLAG	BANK/MEAN ANNUAL HIGH WATER	DRAIN/CSO LINE
BORDERING VEGETATED WETLANDS	BASE CONDITION FLOW LIMITS / MEAN ANNUAL LOW WATER	WATER LINE
SEDIMENT SAMPLE LOCATION / TRANSECT	CHAIN LINK FENCE	GAS LINE
	CATCH BASIN	ELECTRIC/TELEPHONE LINE
	EXISTING GROUND OR BOTTOM OF RIVER CHANNEL CONTOUR	GUARDRAIL
	WATER GATE / GAS GATE	CHAIN LINK FENCE
		EXISTING GROUND OR BOTTOM OF RIVER CHANNEL CONTOUR
		WATER GATE / GAS GATE
		TREE LINE

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER



SEAL

SCALE:

HORIZ.: 1"= 30'
VERT.:
DATUM:
HORIZ.: NAD83
VERT.: NAVD88

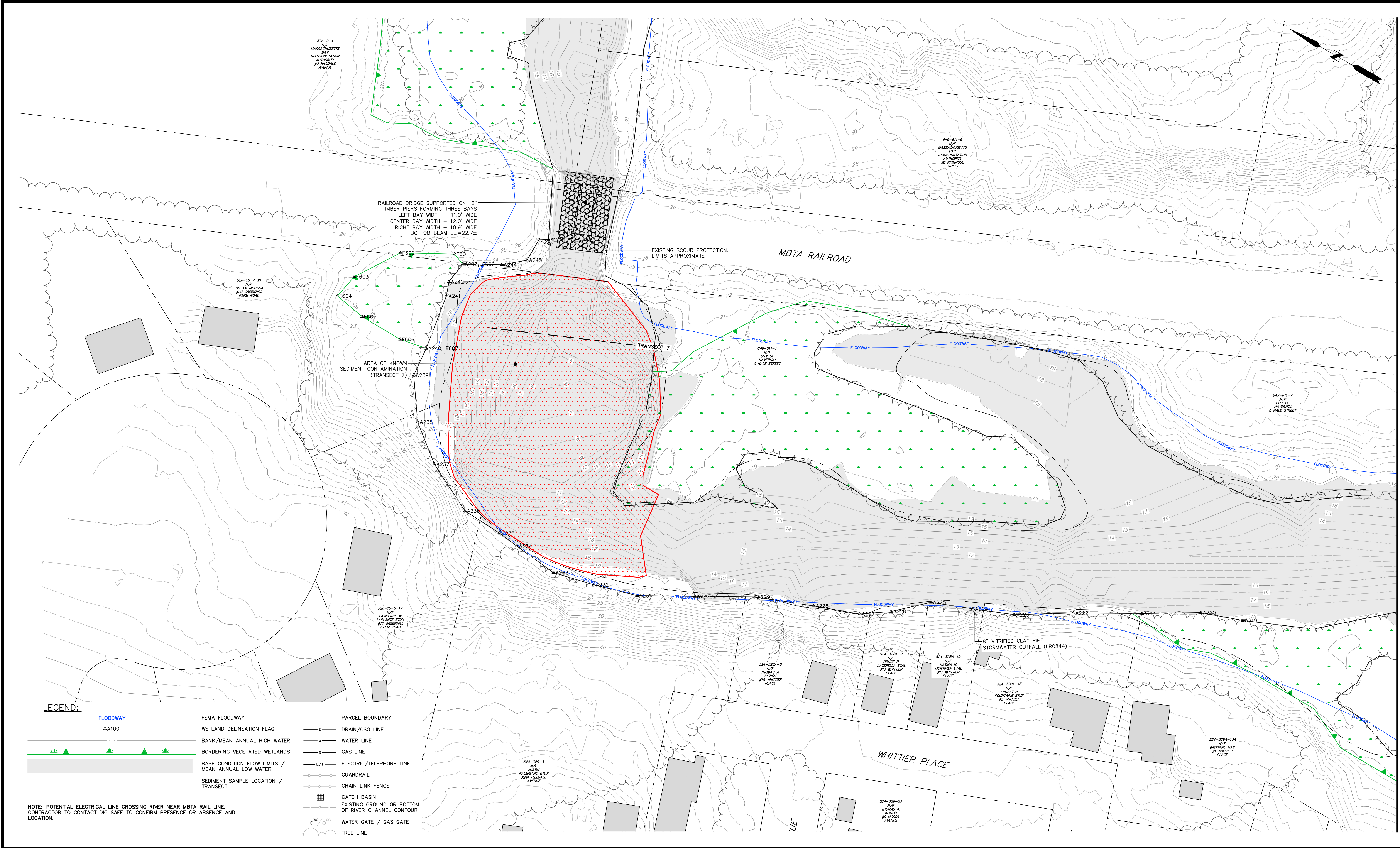
GRAPHIC SCALE

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CITY OF HAVERHILL  
 EXISTING CONDITIONS PLAN NO. 3  
 LITTLE RIVER DAM REMOVAL AND RIVER RESTORATION  
 HAVERHILL MASSACHUSETTS

PROJ. No.: 20170390.U40  
 DATE: DECEMBER 16, 2024  
**CS-103**

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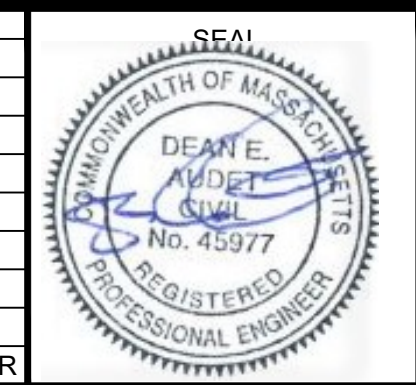
**LEGEND:**

- FLOODWAY
- WETLAND DELINEATION FLAG
- AREA OF KNOWN SEDIMENT CONTAMINATION (TRANSECT 7)
- PARCEL BOUNDARY
- DRAIN/CSO LINE
- BANK/MEAN ANNUAL HIGH WATER
- BORDERING VEGETATED WETLANDS
- BASE CONDITION FLOW LIMITS / MEAN ANNUAL LOW WATER
- SEDIMENT SAMPLE LOCATION / TRANSECT
- FEMA FLOODWAY
- WETLAND DELINEATION FLAG
- PARCEL BOUNDARY
- DRAIN/CSO LINE
- WATER LINE
- GAS LINE
- ELECTRIC/TELEPHONE LINE
- GUARDRAIL
- CHAIN LINK FENCE
- CATCH BASIN
- EXISTING GROUND OR BOTTOM OF RIVER CHANNEL CONTOUR
- WATER GATE / GAS GATE
- TREE LINE

NOTE: POTENTIAL ELECTRICAL LINE CROSSING RIVER NEAR MBTA RAIL LINE. CONTRACTOR TO CONTACT DIG SAFE TO CONFIRM PRESENCE OR ABSENCE AND LOCATION.

MATCH LINE SEE SHEET CS-103

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER



SEAL

SCALE:  
 HORZ.: 1"= 30'  
 VERT.:  
 DATUM:  
 HORZ.: NAD83  
 VERT.: NAVD88

GRAPHIC SCALE

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CITY OF HAVERHILL  
 EXISTING CONDITIONS PLAN NO. 4  
 LITTLE RIVER DAM REMOVAL AND RIVER RESTORATION  
 HAVERHILL MASSACHUSETTS

PROJ. No.: 20170390.U40  
 DATE: DECEMBER 16, 2024  
**CS-104**

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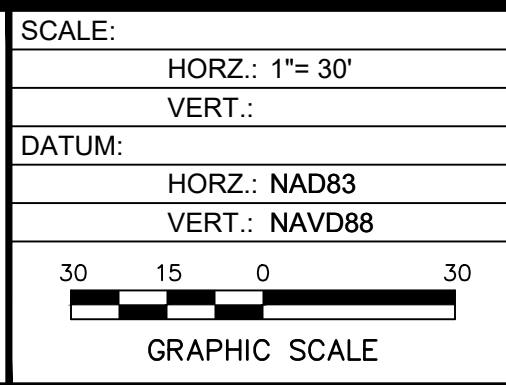
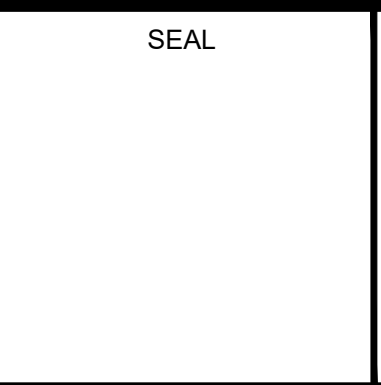
PC3: NONE STB/CTB: FO STB

LAYER STATE:

MATCH LINE SEE SHEET CP-102



No.	DATE	DESCRIPTION	DESIGNER	REVIEWER



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CITY OF HAVERHILL

**SITE PREPARATION AND  
 EROSION CONTROL PLAN NO. 1**

LITTLE RIVER DAM REMOVAL AND RIVER RESTORATION

HAVERHILL MASSACHUSETTS

PROJ. No.: 20170390 U40  
 DATE: FEBRUARY 6, 2026

**CP-101**

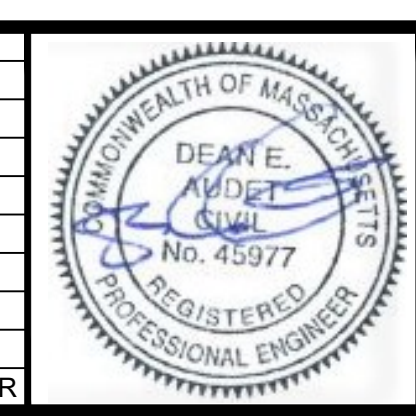
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PC3: NONE STB:CTB: FO STB

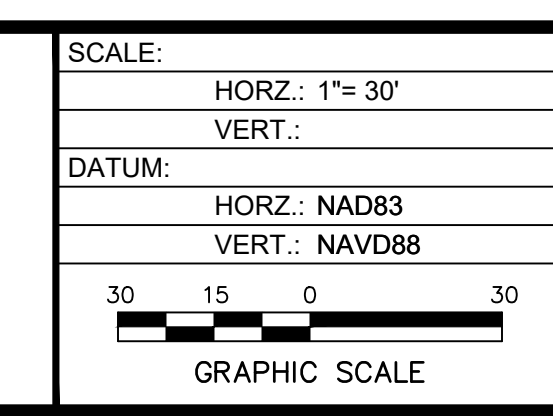
LAYER STATE:



No.	DATE	DESCRIPTION	DESIGNER	REVIEWER



SEAL



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CITY OF HAVERHILL

**SITE PREPARATION AND  
 EROSION CONTROL PLAN NO. 2**

LITTLE RIVER DAM REMOVAL AND RIVER RESTORATION

HAVERHILL MASSACHUSETTS

PROJ. No.: 20170390 U40  
 DATE: DECEMBER 16, 2024

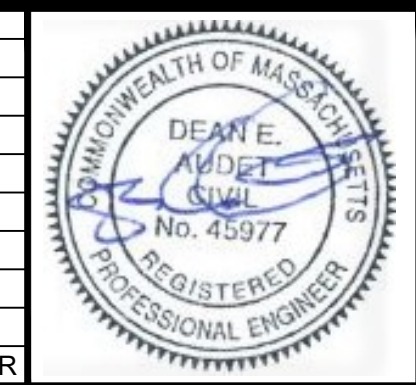
**CP-102**

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 LAYER STATE: PC3: NONE STB/CTB: FO.STB



MATCH LINE SEE SHEET CP-104 (Left) | MATCH LINE SEE SHEET CP-102 (Right) | INSET 2 | MATCH LINE SEE INSET 2 | MATCH LINE SEE INSET 1 | INSET 1

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER



SEAL

SCALE:  
 HORZ.: 1"= 30'  
 VERT.:  
 DATUM:  
 HORZ.: NAD83  
 VERT.: NAVD88  
 GRAPHIC SCALE

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CITY OF HAVERHILL  
 SITE PREPARATION AND  
 EROSION CONTROL PLAN NO. 3  
 LITTLE RIVER DAM REMOVAL AND RIVER RESTORATION  
 HAVERHILL MASSACHUSETTS

PROJ. No.: 20170390 U40  
 DATE: DECEMBER 16, 2024  
**CP-103**

File: J:\DWG\2017\0390\U30\Civil\Plan\20170390\U30\_ER001.dwg Layout: CP-104 Plotted: 2024-12-11 5:52 PM Saved: 2024-12-11 5:33 PM User: claire.nauman

PC3: NONE STRICTB: FO STB

LAYER STATE:



MATCH LINE SEE SHEET CP-103

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER



SEAL

SCALE:  
 HORZ.: 1"= 30'  
 VERT.:  
 DATUM:  
 HORZ.: NAD83  
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 GRAPHIC SCALE

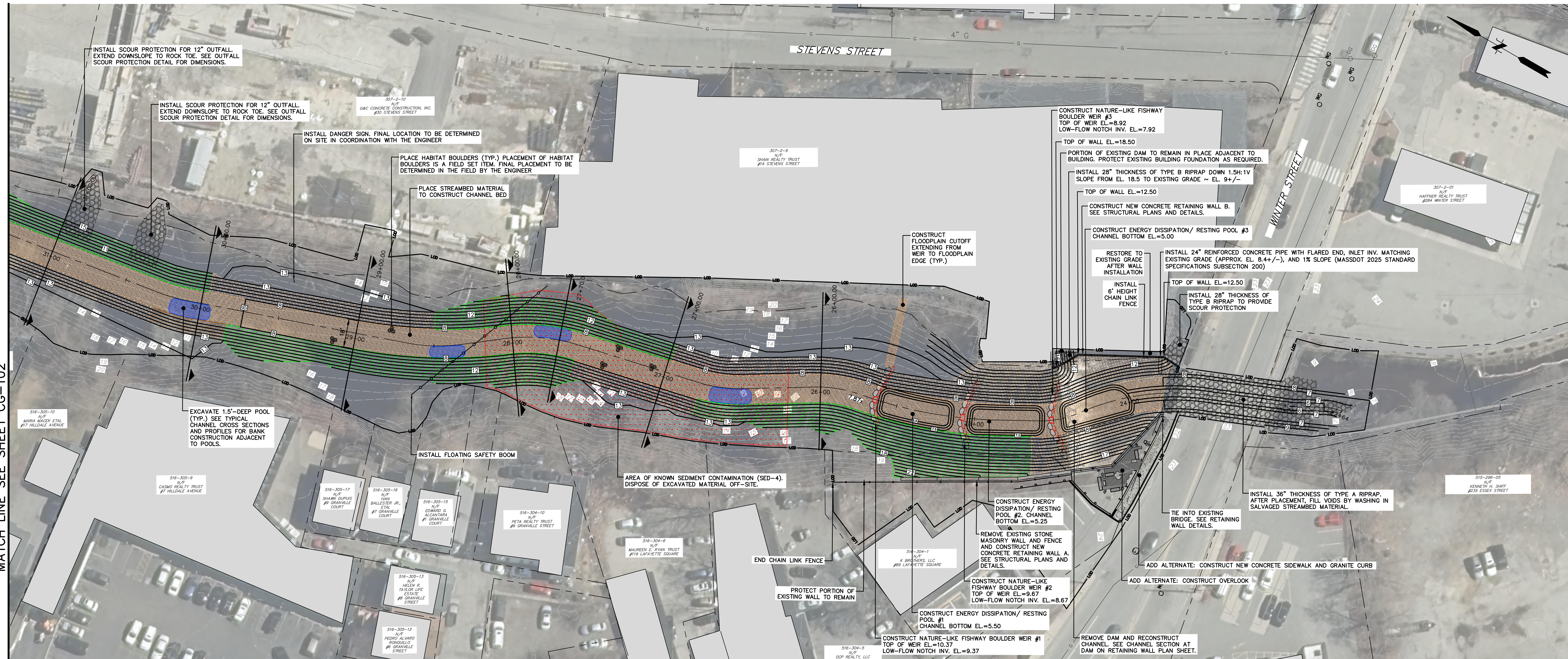
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CITY OF HAVERHILL  
 SITE PREPARATION AND  
 EROSION CONTROL PLAN NO. 4  
 LITTLE RIVER DAM REMOVAL AND RIVER RESTORATION  
 HAVERHILL MASSACHUSETTS

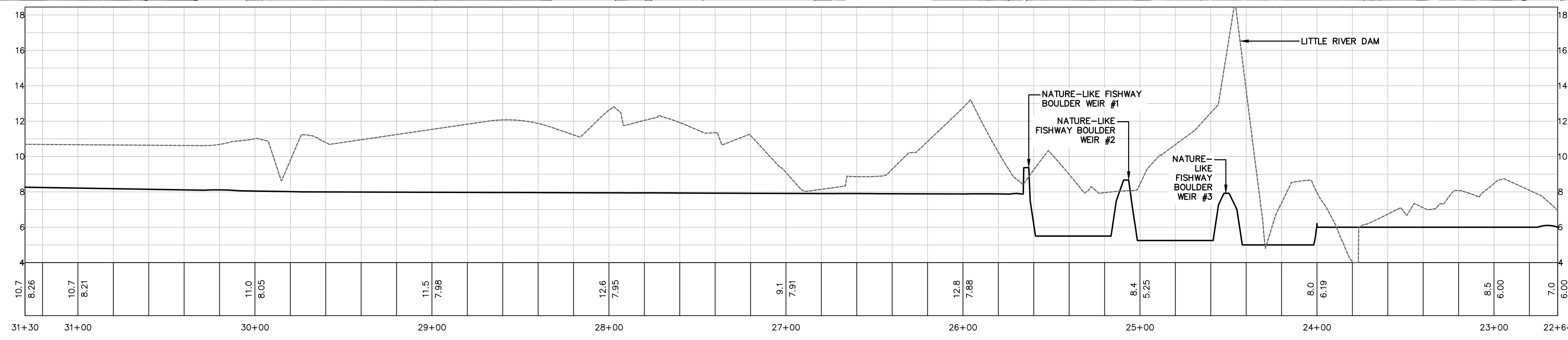
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 DATE: DECEMBER 16, 2024  
**CP-104**

File: J:\DWG\2017\0390\U30\CivilPlan\20170390\U30\_STP101.dwg Layout: CG-101 Plotted: 2026-02-10 2:50 PM Saved: 2026-02-10 1:56 PM User: claire.nauman  
 MS VIEW: LAYER STATE: PC3: NONE STB/CTB: FO STB

MATCH LINE SEE SHEET CG-102



- BANK TREATMENTS (SEE TYPICAL CHANNEL CROSS SECTIONS AND PROFILES):**
- SURFACE FABRIC TREATMENT WITH ROCK TOE
  - FABRIC ENCAPSULATED SOIL (FES) LIFTS WITH ROCK TOE
  - LARGE WOOD BANK TREATMENT
  - SURFACE FABRIC TREATMENT
  - POOL



PROFILE STA 22+64 - 31+30  
 SCALE: H: 1"=40'  
 V: 1"=4'

- NOTES:**
1. EXISTING SURFACE WAS CREATED FROM SPARSE TOPOGRAPHIC DATA. ELEVATIONS SHOWN ARE APPROXIMATE.
  2. EXTENTS OF BANK TREATMENT TYPES ARE BASED ON AVAILABLE TOPOGRAPHIC DATA AND SHALL BE VERIFIED IN THE FIELD WITH ENGINEER. THE INTENT IS TO CONSTRUCT FABRIC ENCAPSULATED SOIL LIFTS WITH A ROCK TOE WHERE BANK CUT IS REQUIRED TO ACHIEVE FINISH GRADE AND USE SURFACE FABRIC WITH A ROCK TOE WHERE BANK CUT IS REQUIRED TO ACHIEVE FINISH GRADE.
  3. TRAIL SHOWN ON THESE PLANS IS CONCEPTUAL IN NATURE AND GRAPHICALLY DISPLAYS INTENT. THE TRAIL SHALL MEET ADA ACCESSIBILITY REQUIREMENTS. CONTRACTOR TO STAKE OUT AND VERIFY FINAL TRAIL LOCATION IN FIELD WITH OWNER AND ENGINEER.
  4. BOULDERS SALVAGED FROM DAM AND WALL DEMOLITION SHALL BE STOCKPILED FOR REVIEW BY THE ENGINEER FOR INCORPORATION INTO THE PROJECT. BOULDERS NOT SUITABLE FOR RE-USE SHALL BE DISPOSED OFF-SITE.
  5. FINISHED GRADE WITHIN FLOODPLAIN SHALL BE LEFT ROUGHLY GRADED. SEE FLOODPLAIN MICROTOPOGRAPHY DETAIL.

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER



SEAL	SEAL	
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SCALE:

HORIZ.: 1"= 30'

VERT.:  

DATUM:

HORIZ.: NAD83

VERT.: NAVD88

GRAPHIC SCALE

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CITY OF HAVERHILL

SITE LAYOUT AND GRADING PLAN NO. 1

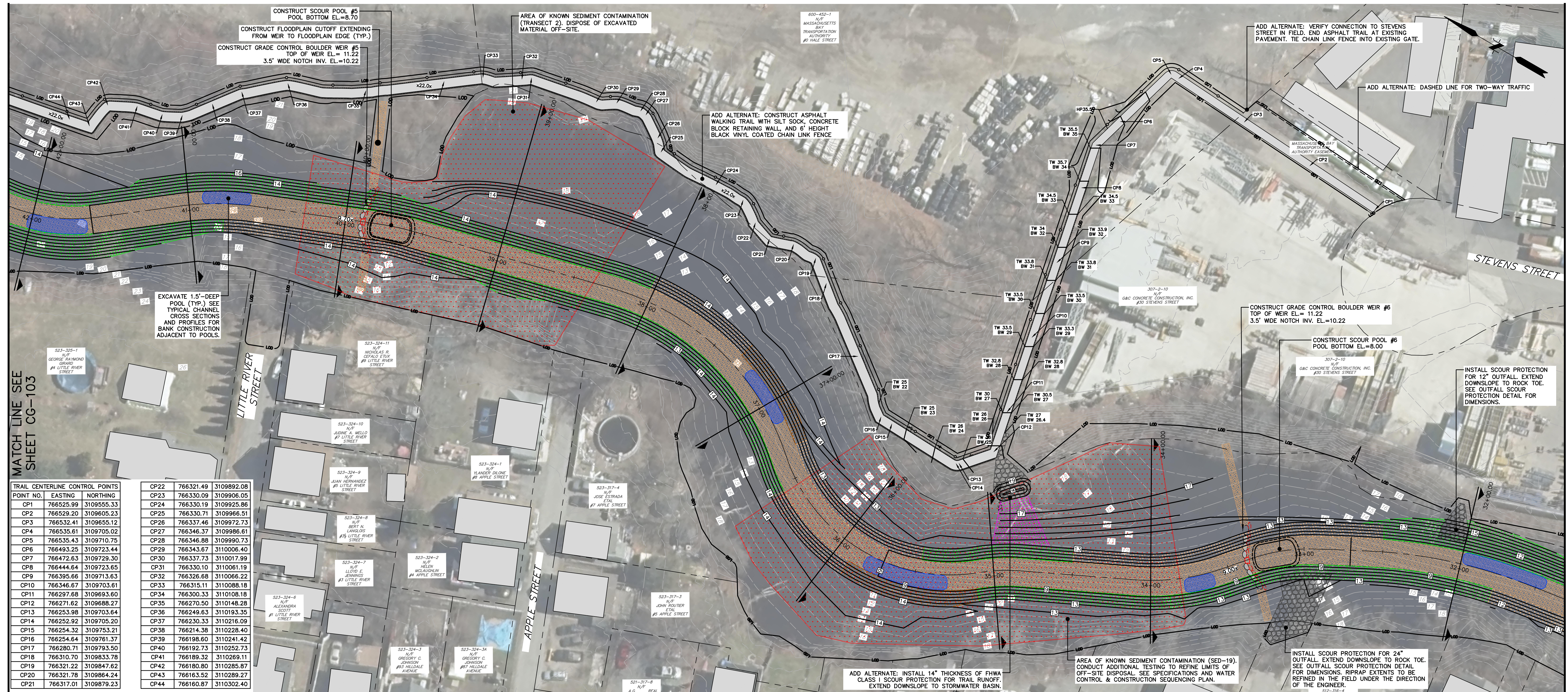
LITTLE RIVER DAM REMOVAL AND RIVER RESTORATION

HAVERHILL MASSACHUSETTS

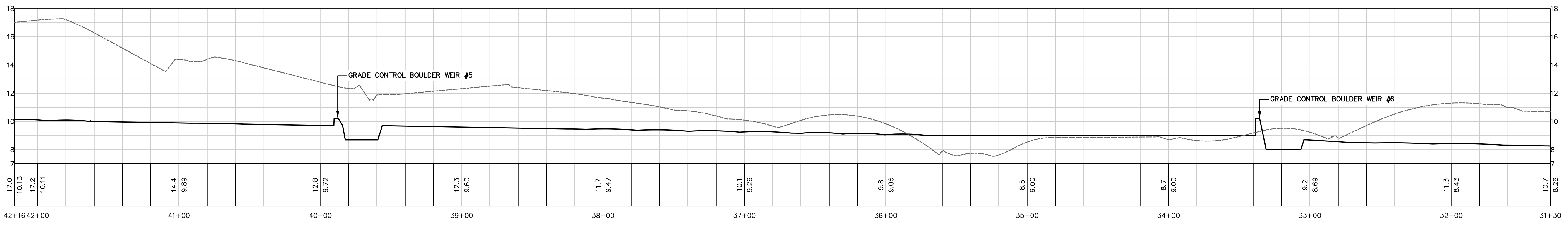
PROJ. No.: 20170390.U40  
 DATE: FEBRUARY 10, 2026

**CG-101**

File: J:\DWG\2017\0390\030\Civil\Plan\20170390\030\_SITP01.dwg Layout: CG-102 Plotted: 2024-12-11 5:54 PM Saved: 2024-12-11 5:32 PM User: claire.nauman  
 MS VIEW: LAYER STATE: PC3: NONE STB/CTB: FO STB



TRAIL CENTERLINE CONTROL POINTS	POINT NO.		EASTING	NORTHING
CP1	766525.99	3109555.33		
CP2	766529.20	3109605.23		
CP3	766532.41	3109655.12		
CP4	766535.61	3109705.02		
CP5	766535.43	3109710.75		
CP6	766493.25	3109723.44		
CP7	766472.63	3109729.30		
CP8	766444.64	3109723.65		
CP9	766395.66	3109713.63		
CP10	766346.67	3109703.61		
CP11	766297.68	3109693.60		
CP12	766271.62	3109688.27		
CP13	766253.98	3109703.64		
CP14	766252.92	3109705.20		
CP15	766254.32	3109753.21		
CP16	766254.64	3109761.37		
CP17	766280.71	3109793.50		
CP18	766310.70	3109833.78		
CP19	766321.22	3109847.62		
CP20	766321.78	3109864.24		
CP21	766317.01	3109879.23		
CP22	766321.49	3109892.08		
CP23	766330.09	3109906.05		
CP24	766330.19	3109925.86		
CP25	766330.71	3109966.51		
CP26	766337.46	3109972.73		
CP27	766346.37	3109986.61		
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CP33	766315.11	3110088.18		
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CP35	766270.50	3110148.28		
CP36	766249.63	3110193.35		
CP37	766230.33	3110216.09		
CP38	766214.38	3110228.40		
CP39	766198.60	3110241.42		
CP40	766192.73	3110252.73		
CP41	766189.32	3110269.11		
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No.	DATE	DESCRIPTION	DESIGNER	REVIEWER



SEAL

SCALE:  
 HORZ.: 1"=30'  
 VERT.:  
 DATUM:  
 HORZ.: NAD83  
 VERT.: NAVD88

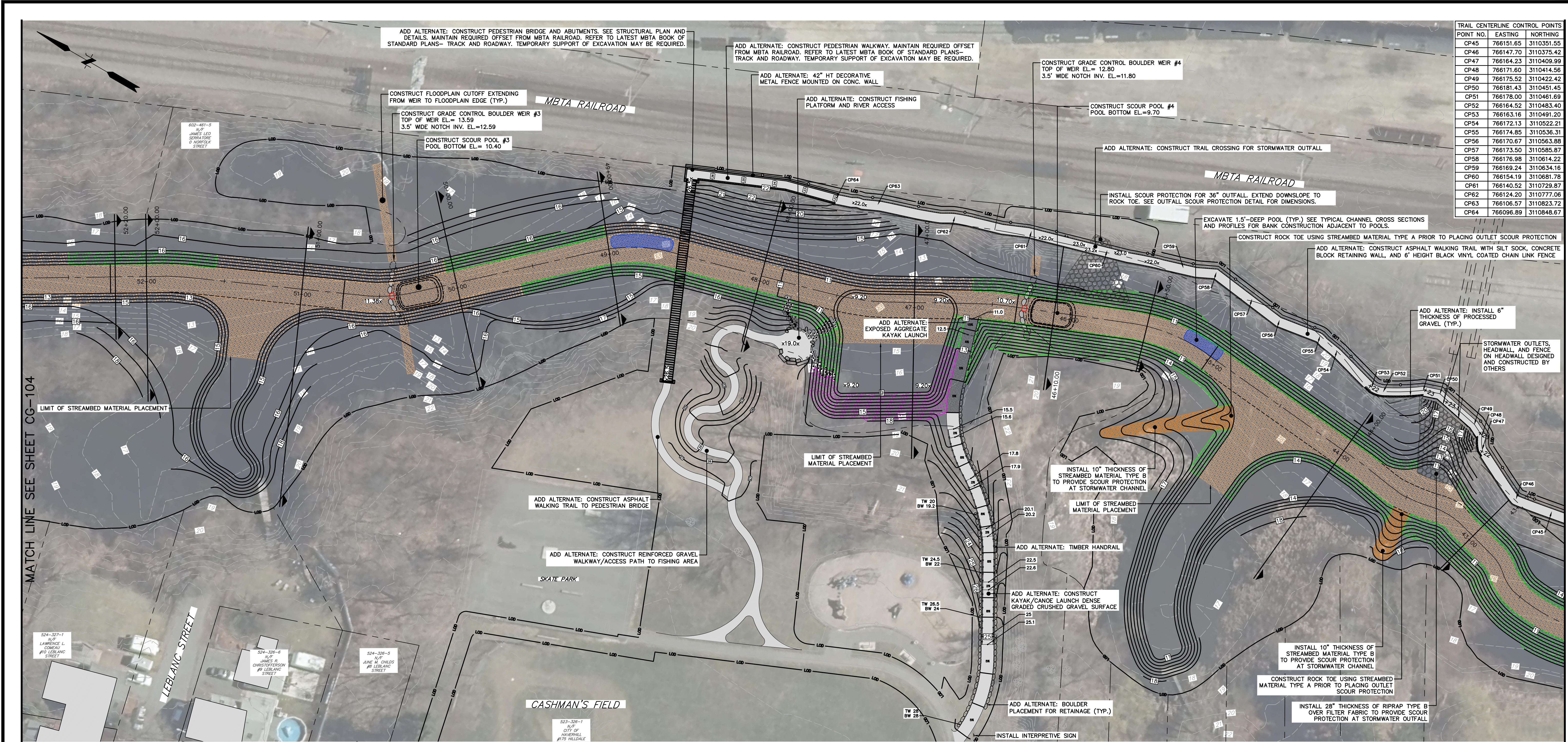
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 GRAPHIC SCALE

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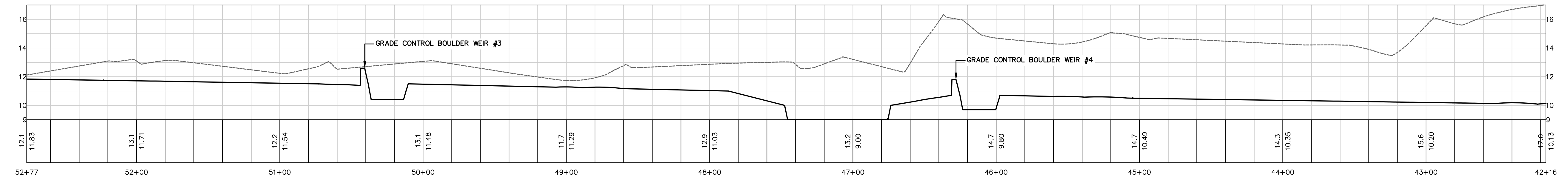
CITY OF HAVERHILL  
 SITE LAYOUT AND GRADING PLAN NO. 2  
 LITTLE RIVER DAM REMOVAL AND RIVER RESTORATION  
 HAVERHILL MASSACHUSETTS

PROJ. No.: 20170390 U40  
 DATE: DECEMBER 16, 2024  
**CG-102**

File: J:\DWG\2017\0390\U40\Civil\Plan\20170390\U40\_SITP01.dwg Layout: CG-103 Plotted: 2024-12-11 5:55 PM Saved: 2024-12-11 5:32 PM User: claire.nauman  
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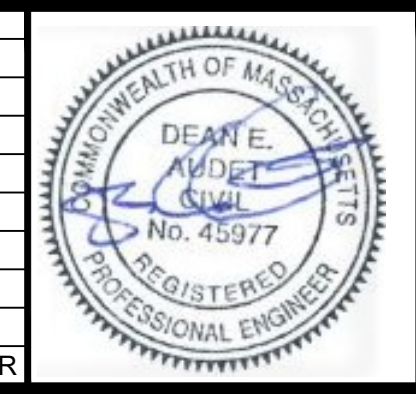


TRAIL CENTERLINE CONTROL POINTS		
POINT NO.	EASTING	NORTHING
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CP46	766147.70	3110375.42
CP47	766164.23	3110409.99
CP48	766171.60	3110414.56
CP49	766175.52	3110422.42
CP50	766181.43	3110451.45
CP51	766178.00	3110461.69
CP52	766164.52	3110483.40
CP53	766163.16	3110491.20
CP54	766172.13	3110522.21
CP55	766174.85	3110536.31
CP56	766170.67	3110563.88
CP57	766173.50	3110585.87
CP58	766176.98	3110614.22
CP59	766169.24	3110634.16
CP60	766154.19	3110681.78
CP61	766140.52	3110729.87
CP62	766124.20	3110777.06
CP63	766106.57	3110823.72
CP64	766096.89	3110848.67



PROFILE STA 42+16 - 52+77  
 SCALE: H: 1" = 40'  
 V: 1" = 4'

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER



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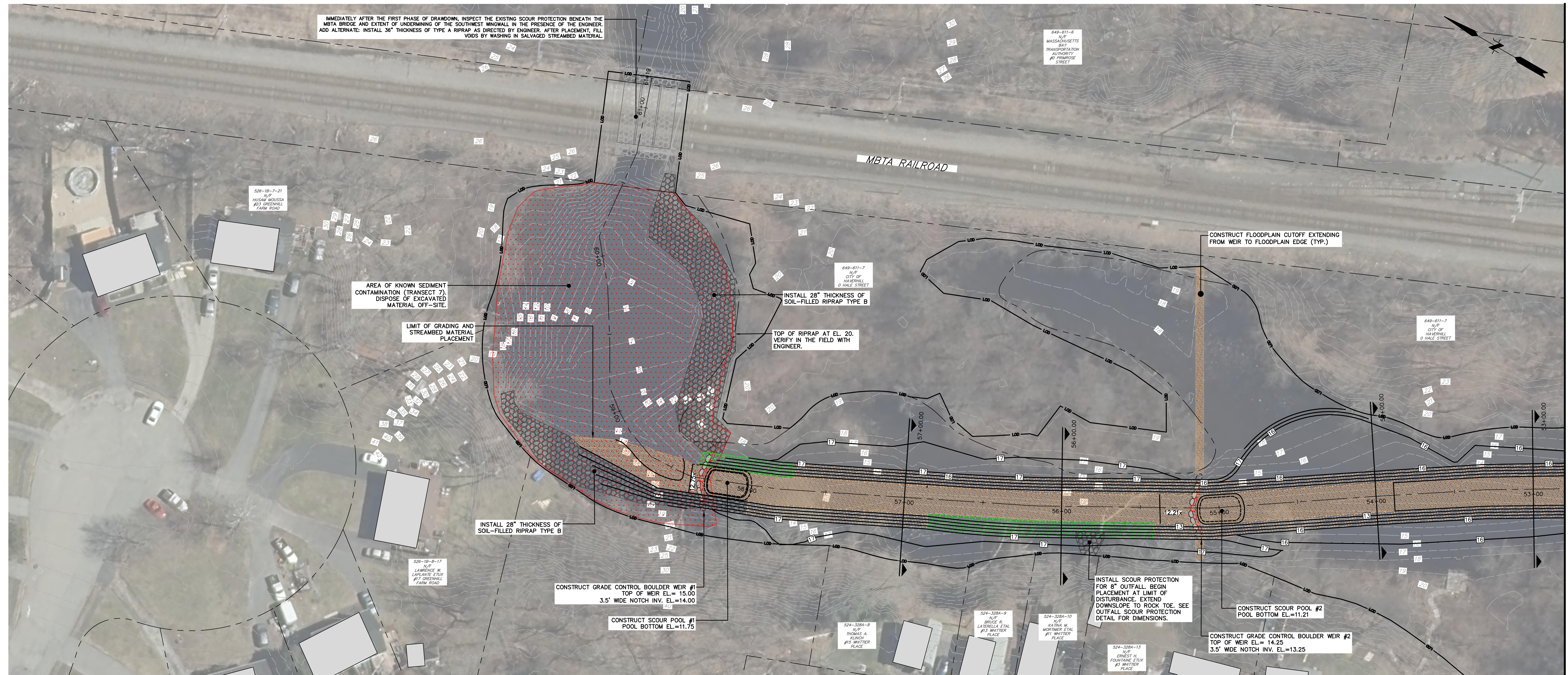
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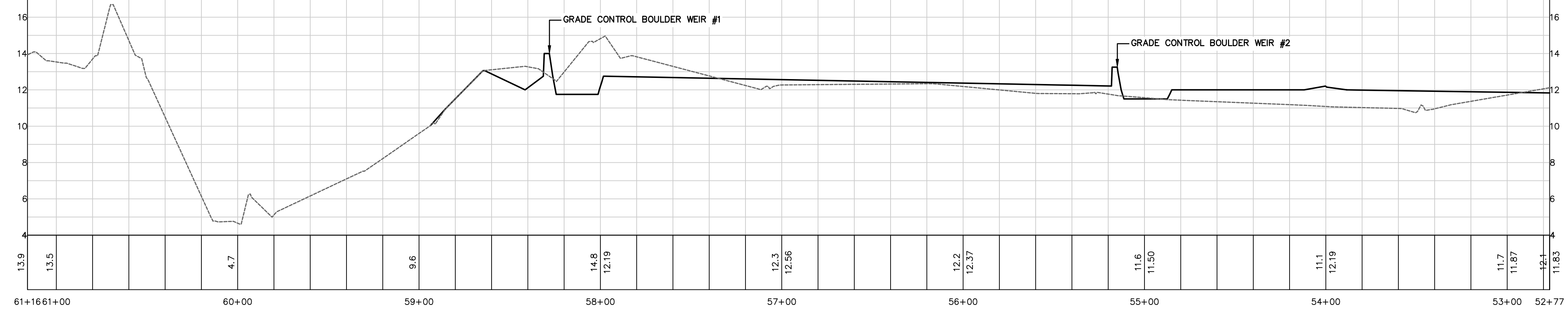
CITY OF HAVERHILL  
 SITE LAYOUT AND GRADING PLAN NO. 3  
 LITTLE RIVER DAM REMOVAL AND RIVER RESTORATION  
 HAVERHILL MASSACHUSETTS

PROJ. No.: 20170390 U40  
 DATE: DECEMBER 16, 2024  
**CG-103**

File: J:\DWG\2017\0390\U30\Civil\Plan20170390\U30\_STP01.dwg Layout: CG-104 Plotted: 2024-12-11 5:55 PM Saved: 2024-12-11 5:32 PM User: claire.nauman  
 PC3: NONE STB/CTB: FO STB  
 LMS VIEW: LAYER STATE:



NOTE: POTENTIAL ELECTRICAL LINE CROSSING RIVER NEAR MBTA RAIL LINE. CONTRACTOR TO CONTACT DIG SAFE TO CONFIRM PRESENCE OR ABSENCE AND LOCATION.



MATCH LINE SEE SHEET CG-103

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER



SEAL

SCALE:  
 HORZ.: 1"=30'  
 VERT.:  
 DATUM:  
 HORZ.: NAD83  
 VERT.: NAVD88

GRAPHIC SCALE

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CITY OF HAVERHILL  
 SITE LAYOUT AND GRADING PLAN NO. 4  
 LITTLE RIVER DAM REMOVAL AND RIVER RESTORATION  
 HAVERHILL MASSACHUSETTS

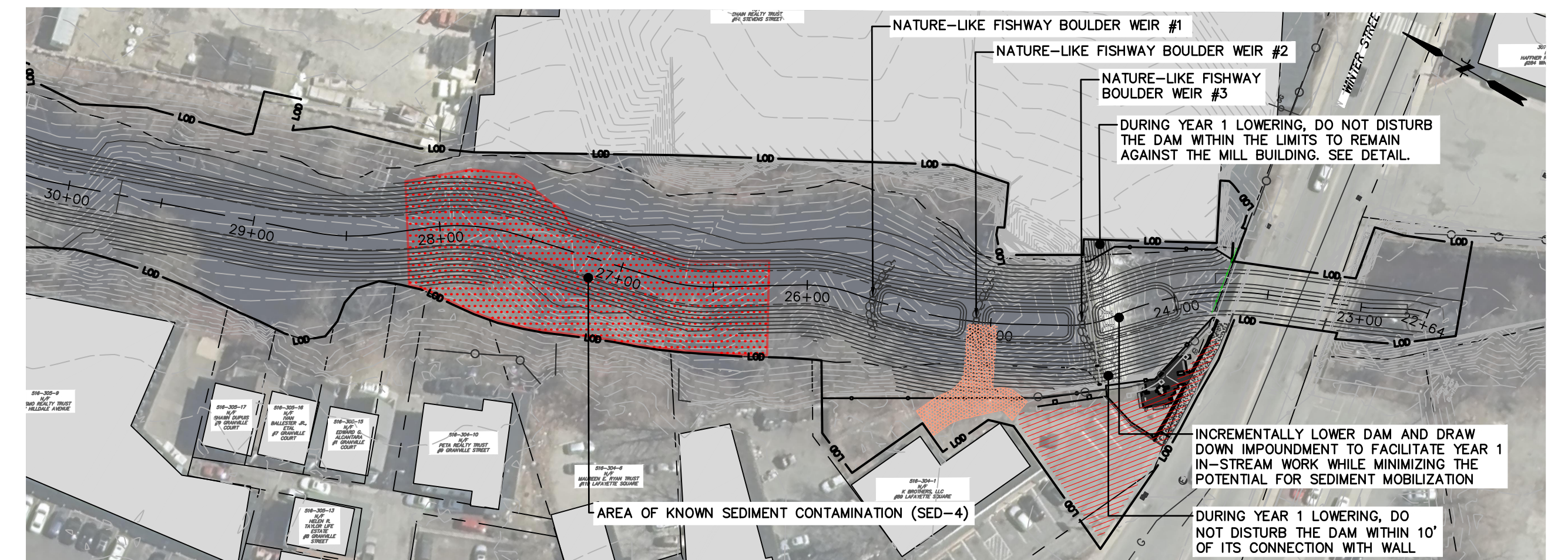
PROJ. No.: 20170390.U40  
 DATE: DECEMBER 16, 2024  
**CG-104**

**GENERAL WATER CONTROL SYSTEM NOTES:**

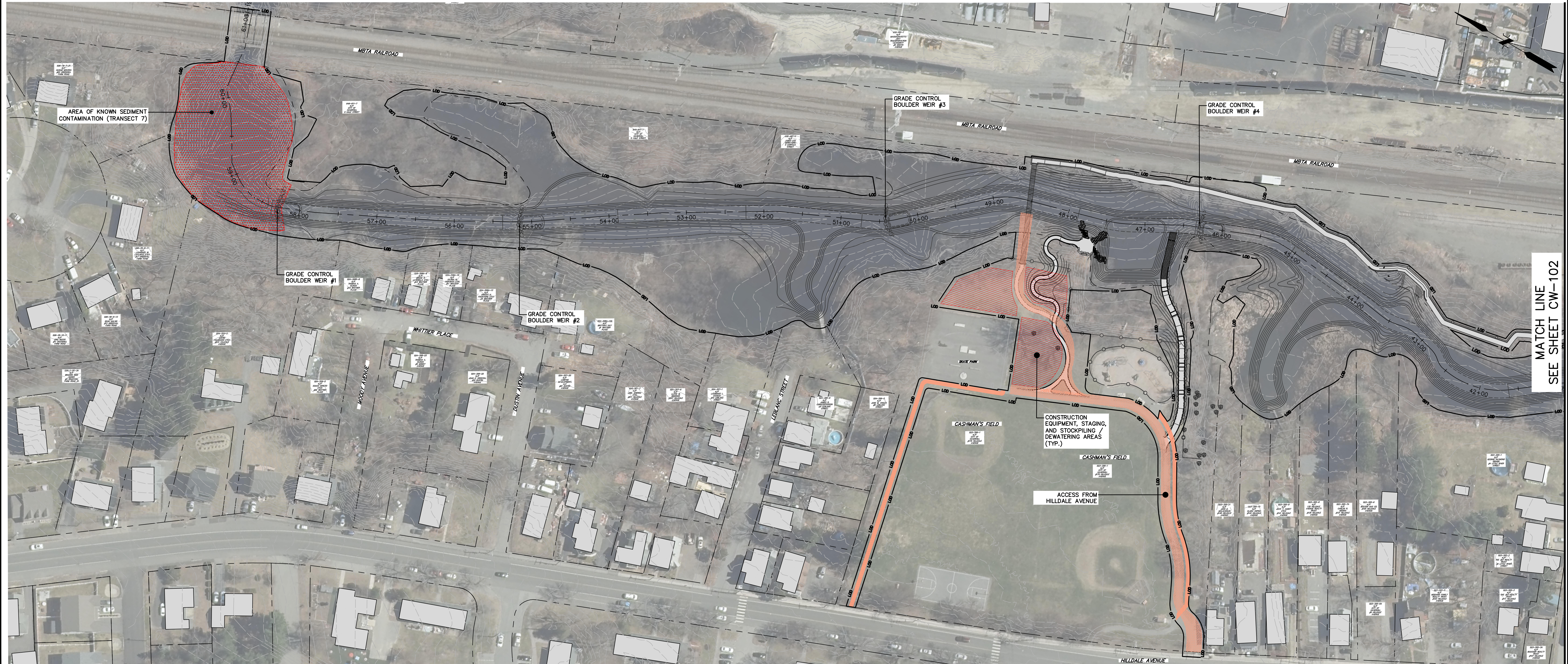
1. PRIOR TO ANY LAND DISTURBANCE ACTIVITIES, THE CONTRACTOR MUST PHYSICALLY MARK THE LIMITS OF DISTURBANCE IN ACCORDANCE WITH THE APPROVED PLANS.
2. ALL IN-WATER SILT-PRODUCING WORK SHALL OCCUR OUTSIDE OF A TIME OF YEAR RESTRICTION PERIOD OF MARCH 1 TO JUNE 30. ALL IN-WATER WORK SHALL BE SEQUENCED TO OCCUR DURING THE LOW-FLOW PERIOD (I.E., JULY 1 TO OCTOBER 31).
3. IT IS ANTICIPATED THAT THE WORK WILL BE CONDUCTED IN PHASES SPANNING TWO CONSECUTIVE LOW-FLOW PERIODS.
4. DEMOLITION OF THE DAM SHALL BE SEQUENCED SUCH THAT DRAWDOWN OF THE IMPOUNDMENT OCCURS AT A RATE OF 12 INCHES PER DAY OR LESS AND SHALL BE COMPLETED IN INCREMENTS TO ALLOW FOR PHASED CONSTRUCTION.
5. INCREMENTALLY LOWER A 50-FOOT-WIDE CENTRAL SECTION OF THE DAM. DO NOT DISTURB THE DAM STRUCTURE WITHIN THE LIMITS TO REMAIN AGAINST THE MILL BUILDING ON RIVER LEFT OR WITHIN 10 FEET OF ITS CONNECTION WITH THE WALL ON RIVER RIGHT. INCREMENTAL LOWERING SHALL BE PLANNED TO FACILITATE THE WORK WHILE MINIMIZING THE POTENTIAL FOR SEDIMENT MOBILIZATION.
6. CONSTRUCTION OF RETAINING WALL B SHALL BE COMPLETE BEFORE GRADE IS RESTORED ADJACENT TO THE MILL BUILDING.
7. THE CONTRACTOR SHALL INSTALL AND OPERATE A WATER CONTROL SYSTEM THAT ALLOWS WORK TO PROGRESS UPSTREAM TO DOWNSTREAM ALONG ONE OR BOTH BANKS.
8. TEMPORARY COFFERDAMS SHALL BE USED TO SEPARATE THE WORKING AREA FROM THE REST OF THE RIVER. SOIL DISTURBANCE IN COFFERDAMMED AREAS OR THE WATERCOURSE SHALL CEASE IN THE EVENT OF HIGH FLOWS THAT OVERTOP THE COFFERDAMS.
9. THE CONTRACTOR SHALL MONITOR WEATHER FORECASTS, STREAM FLOWS, AND WATER LEVELS AND SHALL REMOVE EQUIPMENT AND PERSONNEL FROM THE RIVER IF HIGH WATER LEVELS ARE EXPECTED.
10. THE CONTRACTOR SHALL MONITOR AND MANAGE TURBIDITY IN COMPLIANCE WITH THE PROJECT PERMITS.
11. THE CONTRACTOR SHALL PREPARE AND SUBMIT COFFERDAM DESIGNS, A WATER CONTROL AND DIVERSION PLAN, AND A FLOOD RESPONSE PLAN FOR ACCEPTANCE BY THE ENGINEER PRIOR TO THE START OF WORK AND ACCORDING TO THE TIMELINES IN THE PROJECT PERMITS.
12. OTHER SUBMITTALS SHALL BE PREPARED AND SUBMITTED AS INDICATED IN THE SPECIFICATIONS AND PROJECT PERMITS.

**SUGGESTED CONSTRUCTION SEQUENCE (YEAR 1):**

1. INSTALL EROSION AND SEDIMENT CONTROL MEASURES.
2. ESTABLISH TEMPORARY ACCESS ENTRANCES AND ROUTES AS REQUIRED TO CONDUCT YEAR 1 WORK.
3. COMPLETE INITIAL DRAWDOWN AND DAM LOWERING FACILITATE IN-STREAM WORK FROM THE MBTA BRIDGE TO APPROXIMATELY STATION 57+60.
4. FOLLOWING INITIAL DRAWDOWN, INSPECT EXISTING MBTA BRIDGE SCOUR PROTECTION IN THE PRESENCE OF THE ENGINEER. ADD ALTERNATE: INSTALL RIP RAP BENEATH THE MBTA BRIDGE AT THE DIRECTION OF THE ENGINEER.
5. PERFORM SEDIMENT REMOVAL OPERATIONS WITHIN LIMITS OF GRADING (INCLUDING AREA OF KNOWN SEDIMENT CONTAMINATION AT TRANSECT 7). INSTALL RIP RAP, AND CONSTRUCT GRADE CONTROL BOULDER WEIR #1, SCOUR POOL #1, AND BED AND BANK TREATMENTS FROM THE MBTA BRIDGE TO APPROXIMATELY STATION 57+60.
6. FURTHER DRAW DOWN THE IMPOUNDMENT AND LOWER THE DAM TO FACILITATE IN-STREAM WORK FROM APPROXIMATELY STATION 57+60 TO STATION 38+00 (SEE SHEET CW-102).
7. PERFORM SEDIMENT REMOVAL OPERATIONS WITHIN THE AREA OF KNOWN SEDIMENT CONTAMINATION AT TRANSECT 2 (SEE SHEET CW-102).
8. CONSTRUCT GRADE CONTROL BOULDER WEIRS #2-5, SCOUR POOLS #2-5, AND BED AND BANK TREATMENTS AND INSTALL SCOUR PROTECTION AT DRAINAGE OUTLETS FROM APPROXIMATELY STATION 57+60 TO STATION 38+00.
9. ADD ALTERNATE: CONSTRUCT RIVER ACCESS IMPROVEMENTS AT CASHMAN PARK (I.E., RIVER ACCESS STEPS AND KAYAK LAUNCH).
10. ADD ALTERNATE: CONSTRUCT PEDESTRIAN BRIDGE AND ABUTMENTS AND WALKWAY STRUCTURE. BEGIN WORK ON ASPHALT WALKING TRAIL.
11. SHUT DOWN IN-RIVER WORK NO LATER THAN OCTOBER 31. REMOVE ALL EQUIPMENT, WATER CONTROL, AND EROSION AND SEDIMENT CONTROL FROM THE FLOODWAY.
12. RESTORE AND SEED DISTURBED AREAS AS DESCRIBED IN THE SPECIFICATIONS.



WATER CONTROL - YEAR 1 (INCREMENTAL REMOVAL OF THE DAM AND LOWERING OF THE HEADPOND)  
SCALE: 1" = 60'



WATER CONTROL - YEAR 1 (CONSTRUCTION OF TEMPORARY UPSTREAM HAUL ROAD, REMOVAL OF CONTAMINATED SEDIMENT, AND CONSTRUCTION OF UPSTREAM RIVER CHANNEL IMPROVEMENTS)  
SCALE: 1" = 60'

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LAYER STATE: PC3: NONE ST/CTB: FO STB

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER



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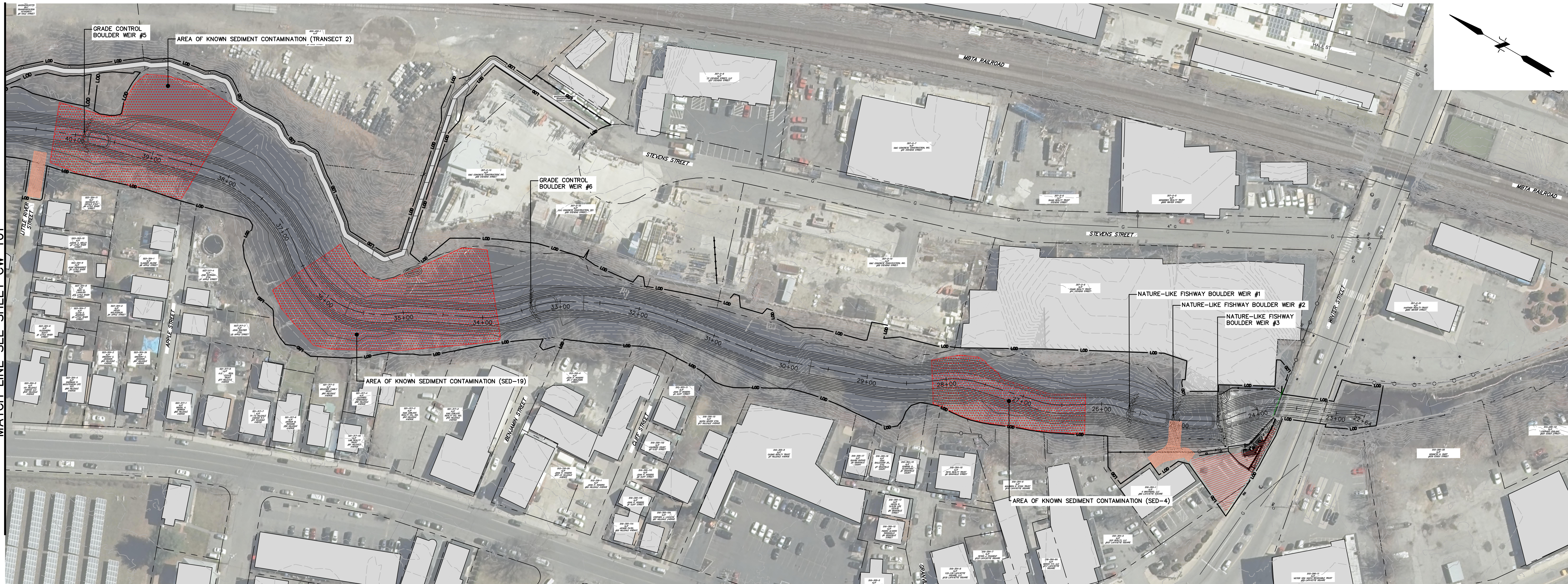
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DATUM:  
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VERT.: NAVD88

GRAPHIC SCALE

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CITY OF HAVERHILL  
CONSTRUCTION SEQUENCING PLAN  
NO. 1  
LITTLE RIVER DAM REMOVAL AND RIVER RESTORATION  
HAVERHILL MASSACHUSETTS

PROJ. No.: 20170390.U40  
DATE: FEBRUARY 10, 2026  
**CW-101**



WATER CONTROL — YEAR 2  
SCALE: 1" = 60'

**SUGGESTED CONSTRUCTION SEQUENCE (YEAR 2):**

1. INSTALL EROSION AND SEDIMENT CONTROL MEASURES.
2. ESTABLISH TEMPORARY ACCESS ENTRANCES AND ROUTES AS REQUIRED TO CONDUCT YEAR 2 WORK.
3. FURTHER DRAW DOWN THE IMPOUNDMENT AND LOWER THE DAM TO FACILITATE IN-STREAM WORK FROM APPROXIMATELY STATION 38+00 TO STATION 33+50.
4. PERFORM ADDITIONAL SEDIMENT SAMPLING IN THE AREA OF KNOWN SEDIMENT CONTAMINATION AT SED-19. SAMPLING SHALL COMPLY WITH THE REQUIREMENTS OF THE COMBINED 401 WATER QUALITY CERTIFICATION AND MASSDEP PROTOCOLS. CONTRACTOR SHALL SUBMIT SAMPLING DATA, INCLUDING A PLAN OF THE SAMPLE LOCATIONS, SAMPLING METHODS AND DEPTHS, AND LABORATORY QA/QC DATA TO MASSDEP. THE RESULTS SHALL BE USED BY THE ENGINEER TO REFINE THE LIMITS OF THE OF THE LEAD AND PAHS-IMPACTED SEDIMENT IN THAT AREA.
5. PERFORM SEDIMENT REMOVAL OPERATIONS WITHIN THE REFINED AREA OF KNOWN SEDIMENT CONTAMINATION AT SED-19.
6. CONSTRUCT BED AND BANK TREATMENTS FROM APPROXIMATELY STATION 38+00 TO STATION 33+50.
7. COMPLETE DRAWDOWN OF THE IMPOUNDMENT AND REMOVE THE CENTRAL SECTION OF THE DAM TO STREAMBED LEVEL.
8. PERFORM SEDIMENT REMOVAL OPERATIONS WITHIN THE AREA OF KNOWN SEDIMENT CONTAMINATION AT SED-4.
9. CONSTRUCT GRADE CONTROL BOULDER WEIR #6, SCOUR POOL #6, AND BED AND BANK TREATMENTS AND INSTALL SCOUR PROTECTION AT DRAINAGE OUTLETS FROM APPROXIMATELY STATION 33+50 TO STATION 25+75.
10. INSTALL FLOATING SAFETY BOOM.
11. CONSTRUCT NATURE-LIKE FISHWAY BOULDER WEIR #1, ENERGY DISSIPATION/RESTING POOL #1, AND ASSOCIATED BED AND BANK TREATMENTS.
12. REMOVE FULL VERTICAL EXTENT OF THE DAM AND EXISTING STONE MASONRY WALL AT WINTER STREET WITHIN THE LIMITS SHOWN ON THE DRAWINGS. PORTIONS OF DAM AND WALL TO REMAIN ON RIVER RIGHT SHALL BE DETERMINED IN THE FIELD WITH THE ASSISTANCE OF THE ENGINEER.
13. CONSTRUCT NEW CONCRETE RETAINING WALLS A AND B.
14. CONSTRUCT NATURE-LIKE FISHWAY BOULDER WEIRS #2 AND 3, ENERGY DISSIPATION/RESTING POOLS #2 AND 3, AND COMPLETE BED AND BANK TREATMENTS.
15. RELOCATE TURBIDITY CURTAIN TO DOWNSTREAM LIMIT OF DISTURBANCE.
16. INSTALL RIP RAP BENEATH WINTER STREET.
17. SHUT DOWN IN-RIVER WORK NO LATER THAN OCTOBER 31. REMOVE ALL EQUIPMENT, WATER CONTROL, AND EROSION AND SEDIMENT CONTROL FROM THE FLOODWAY.
18. RESTORE AND SEED DISTURBED AREAS AS DESCRIBED IN THE SPECIFICATIONS.
19. ADD ALTERNATE: CONSTRUCT UPLAND IMPROVEMENTS AT THE OVERLOOK.
20. ADD ALTERNATE: COMPLETE ASPHALT WALKING TRAIL.

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 MS VIEW: LAYER STATE: PC3: NONE STB:CTB: FO:STB

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER



SEAL

SCALE:  
 HORZ.: 1" = 60'  
 VERT.:  
 DATUM:  
 HORZ.: NAD83  
 VERT.: NAVD88

GRAPHIC SCALE

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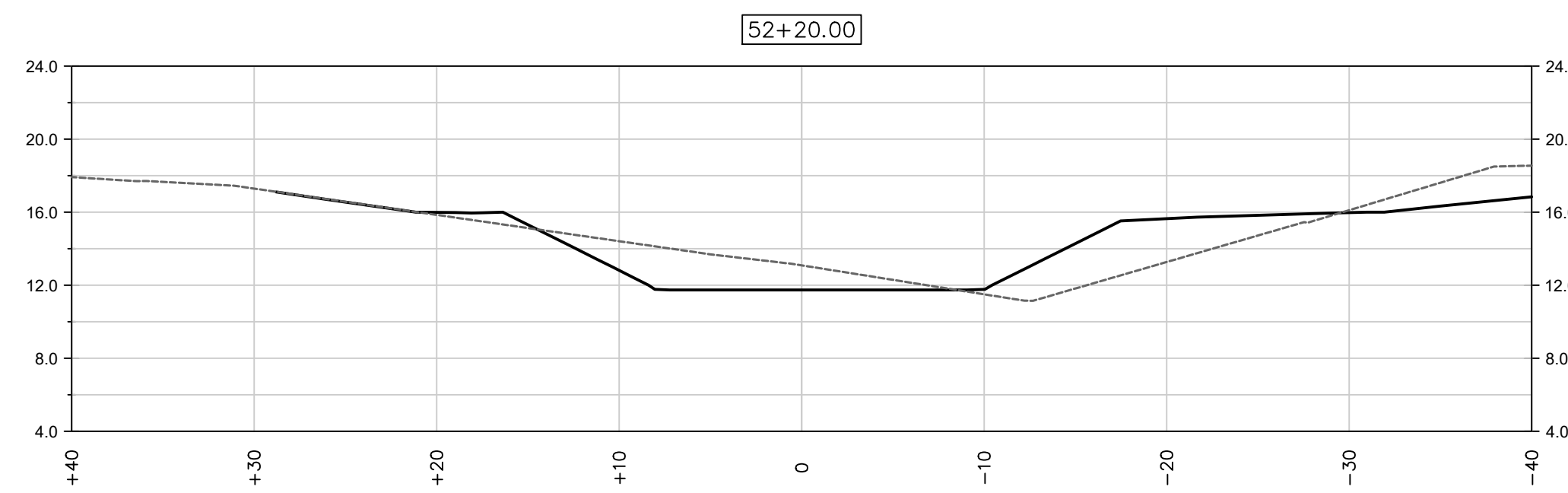
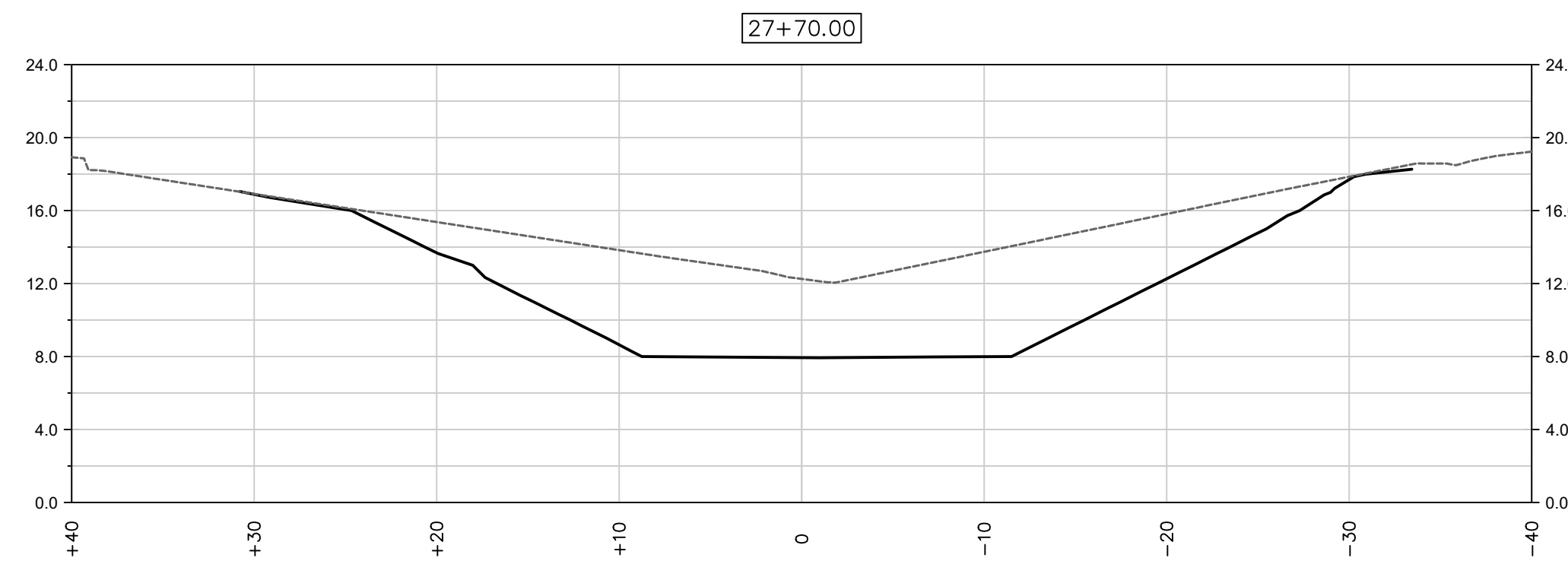
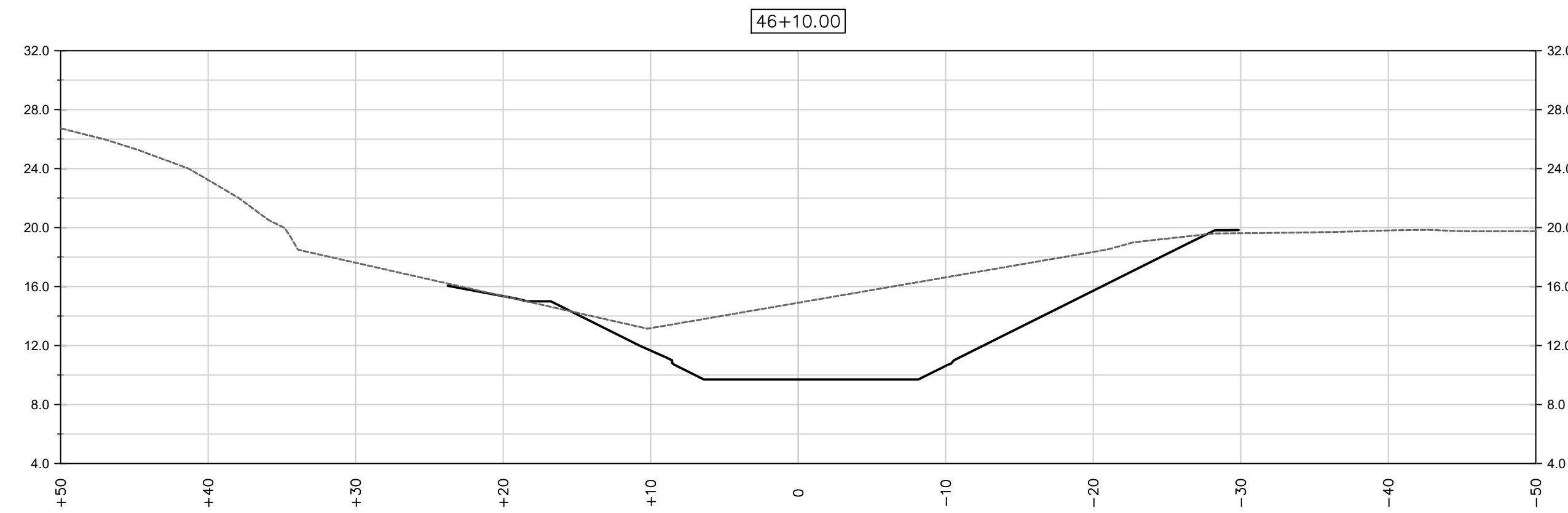
CITY OF HAVERHILL  
 CONSTRUCTION SEQUENCING PLAN  
 NO. 2  
 LITTLE RIVER DAM REMOVAL AND RIVER RESTORATION  
 HAVERHILL MASSACHUSETTS

PROJ. No.: 20170390.U40  
 DATE: FEBRUARY 10, 2026  
**CW-102**

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EXISTING GRADE  
 FINISH GRADE

NOTE: EXISTING SURFACE WAS CREATED FROM SPARSE TOPOGRAPHIC DATA. ELEVATIONS SHOWN ARE APPROXIMATE.



SEAL

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 VERT.: 1"=8'  
 DATUM:  
 HORZ.: NAD83  
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GRAPHIC SCALE

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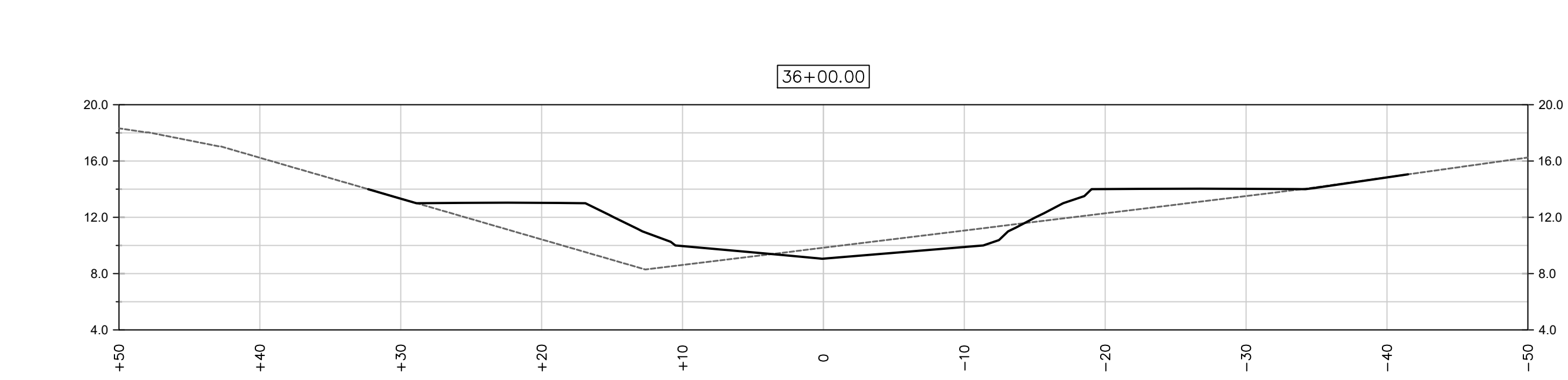
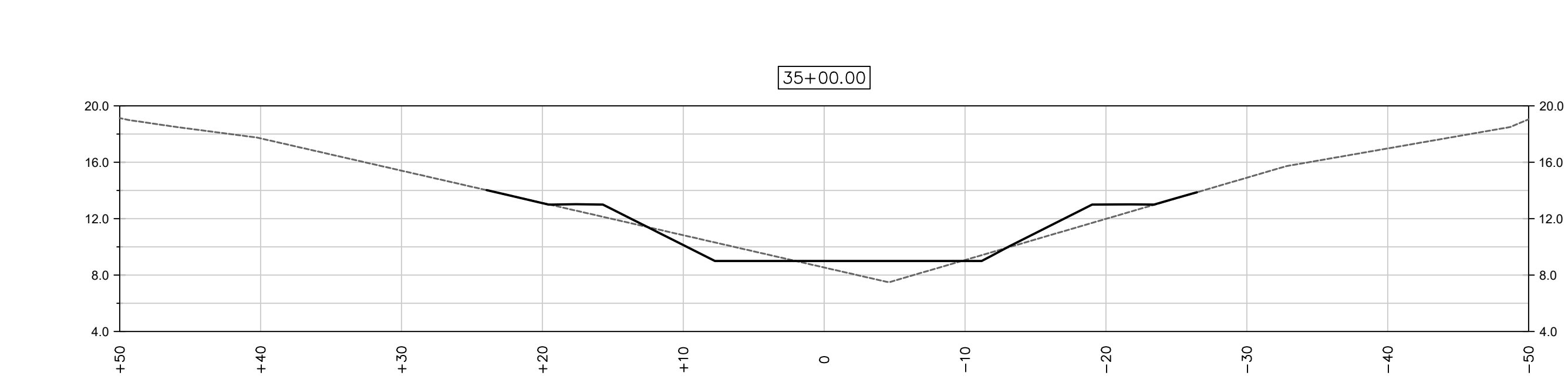
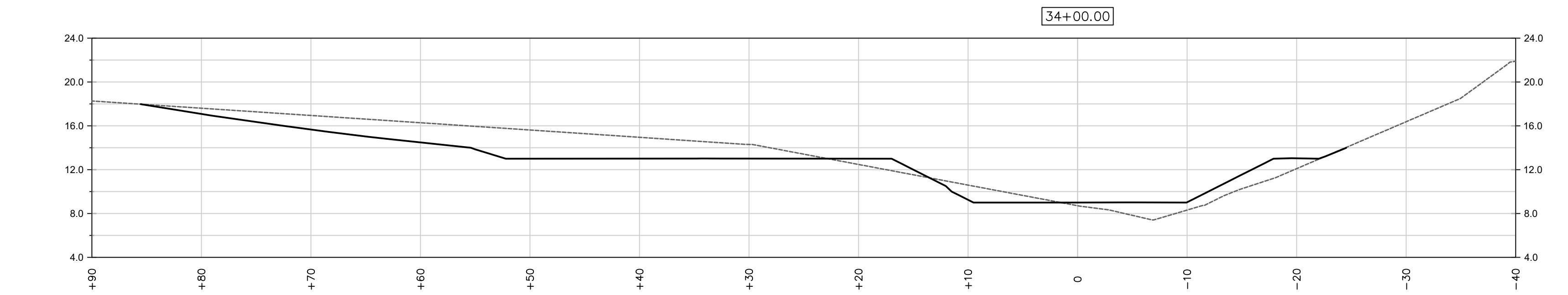
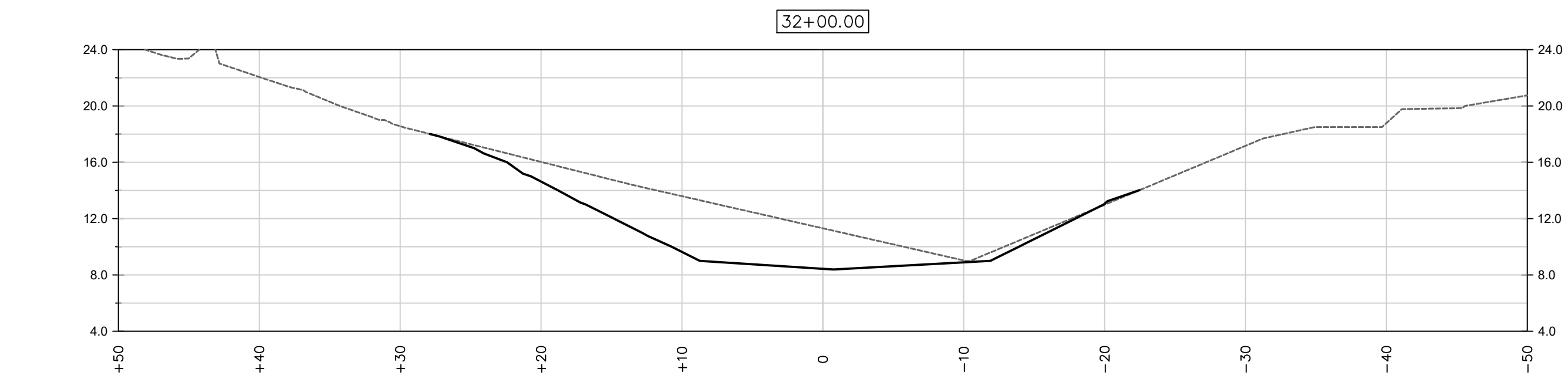
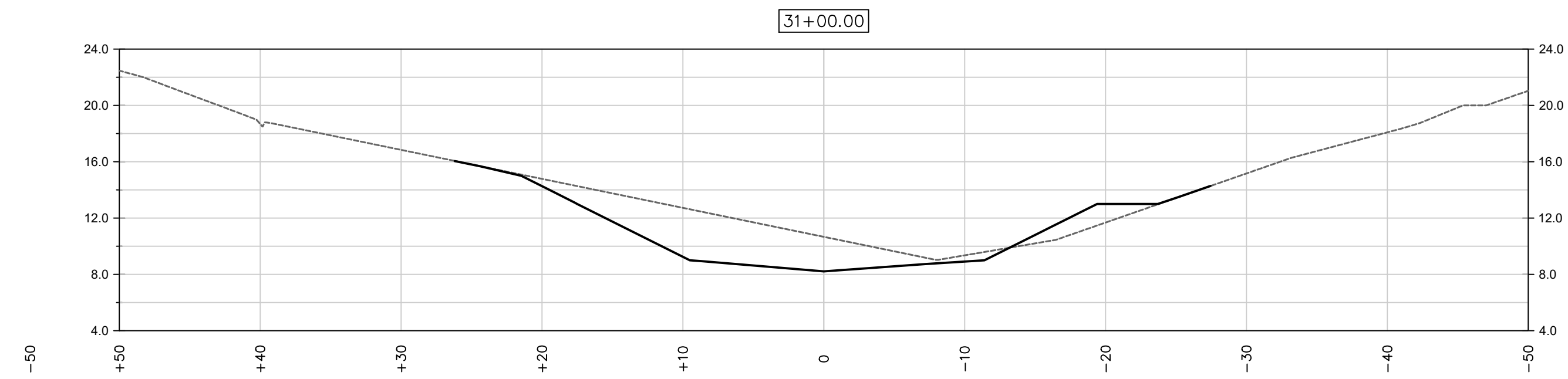
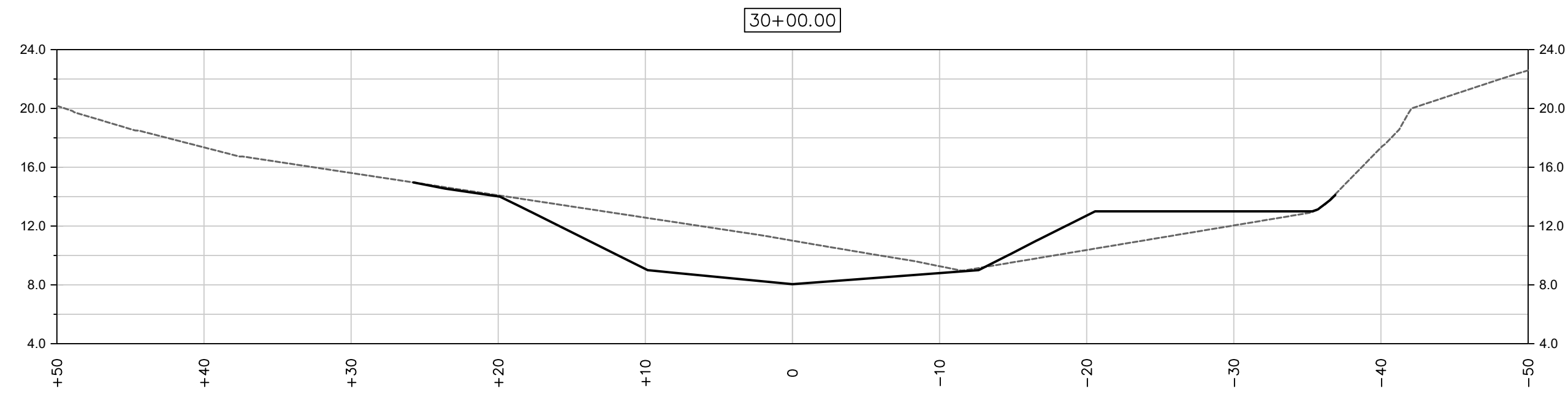
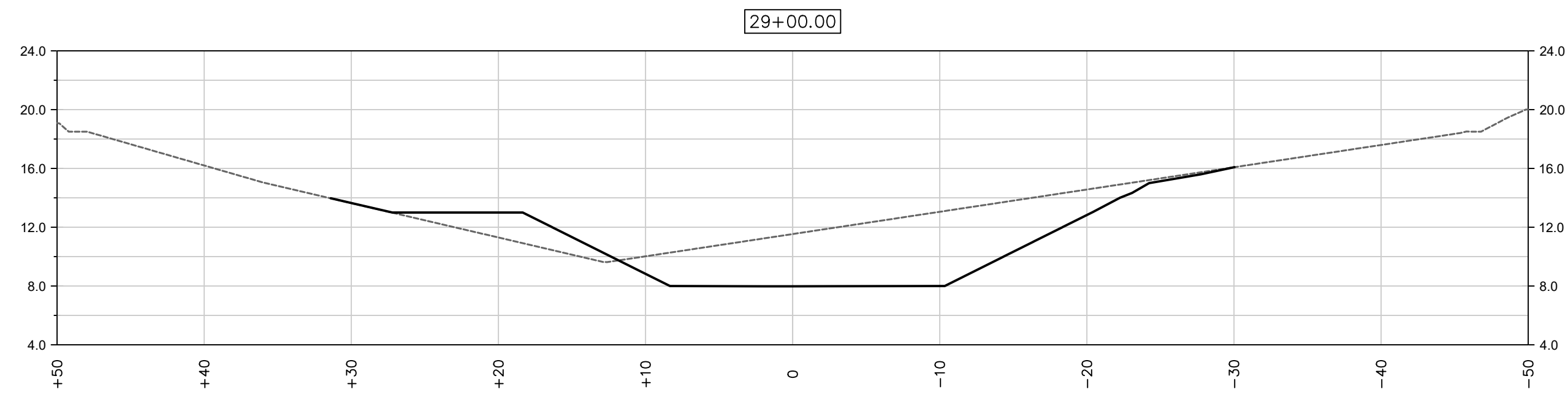
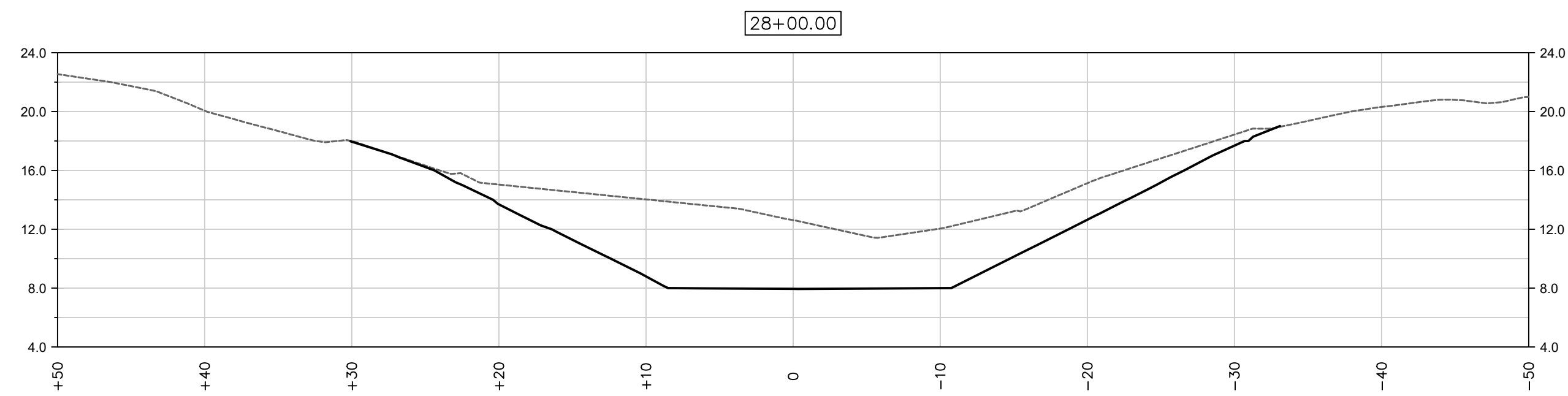
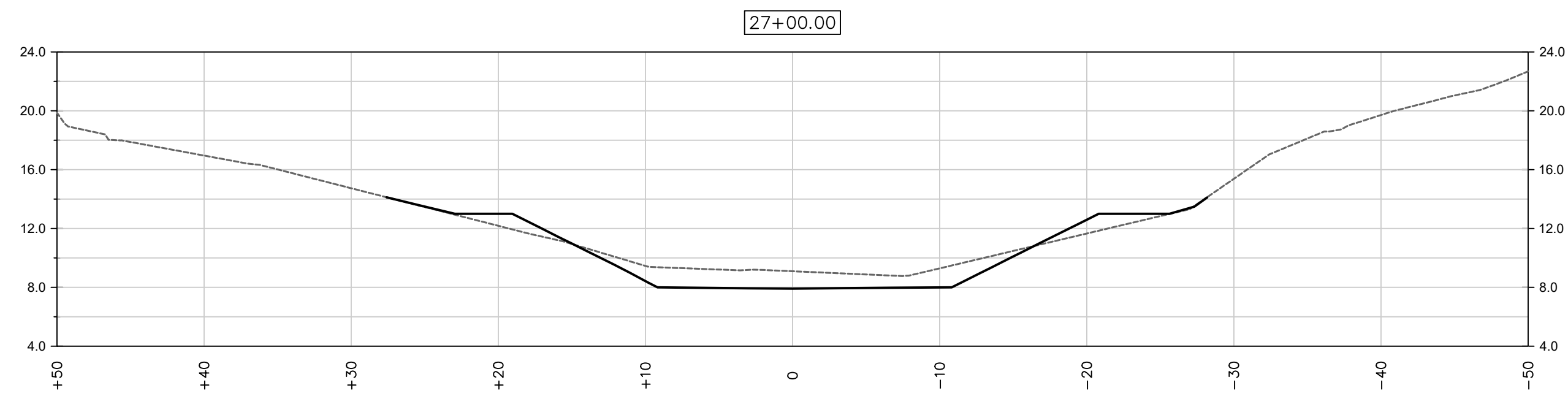
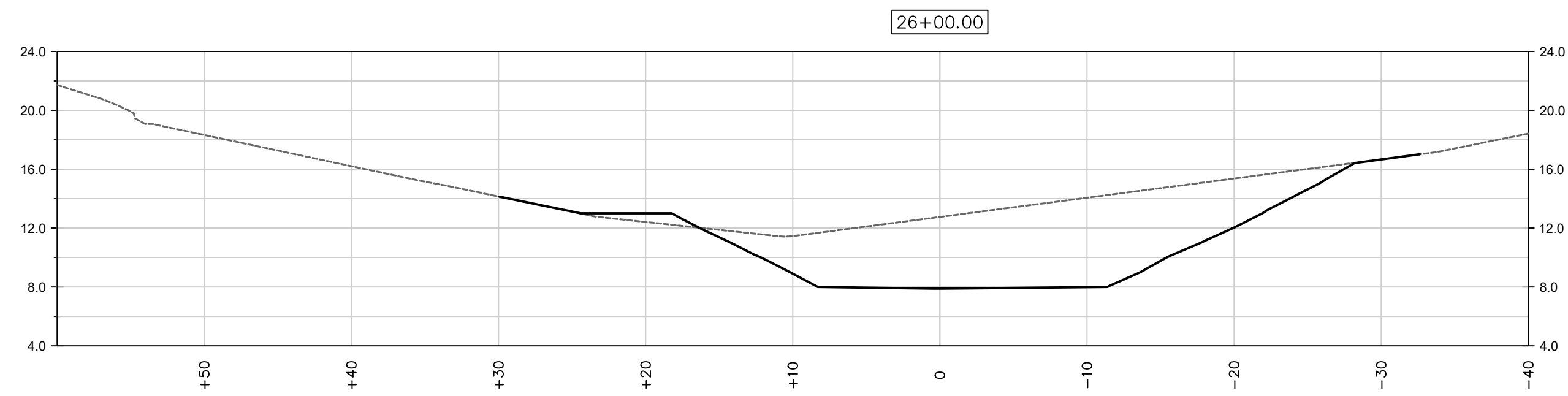
CITY OF HAVERHILL  
 GRADING CROSS SECTIONS  
 LITTLE RIVER DAM REMOVAL AND RIVER RESTORATION  
 HAVERHILL MASSACHUSETTS

PROJ. No.: 20170390.U40  
 DATE: DECEMBER 16, 2024

**CX-301**

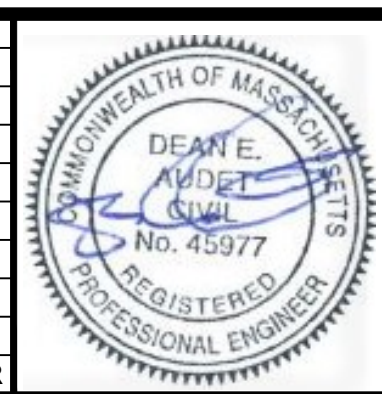
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 LAYER STATE:



EXISTING GRADE  
 FINISH GRADE  
 NOTE: EXISTING SURFACE WAS CREATED FROM SPARSE TOPOGRAPHIC DATA. ELEVATIONS SHOWN ARE APPROXIMATE.

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER



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 VERT.: 1"=8'

DATUM:  
 HORZ.: NAD83  
 VERT.: NAVD88

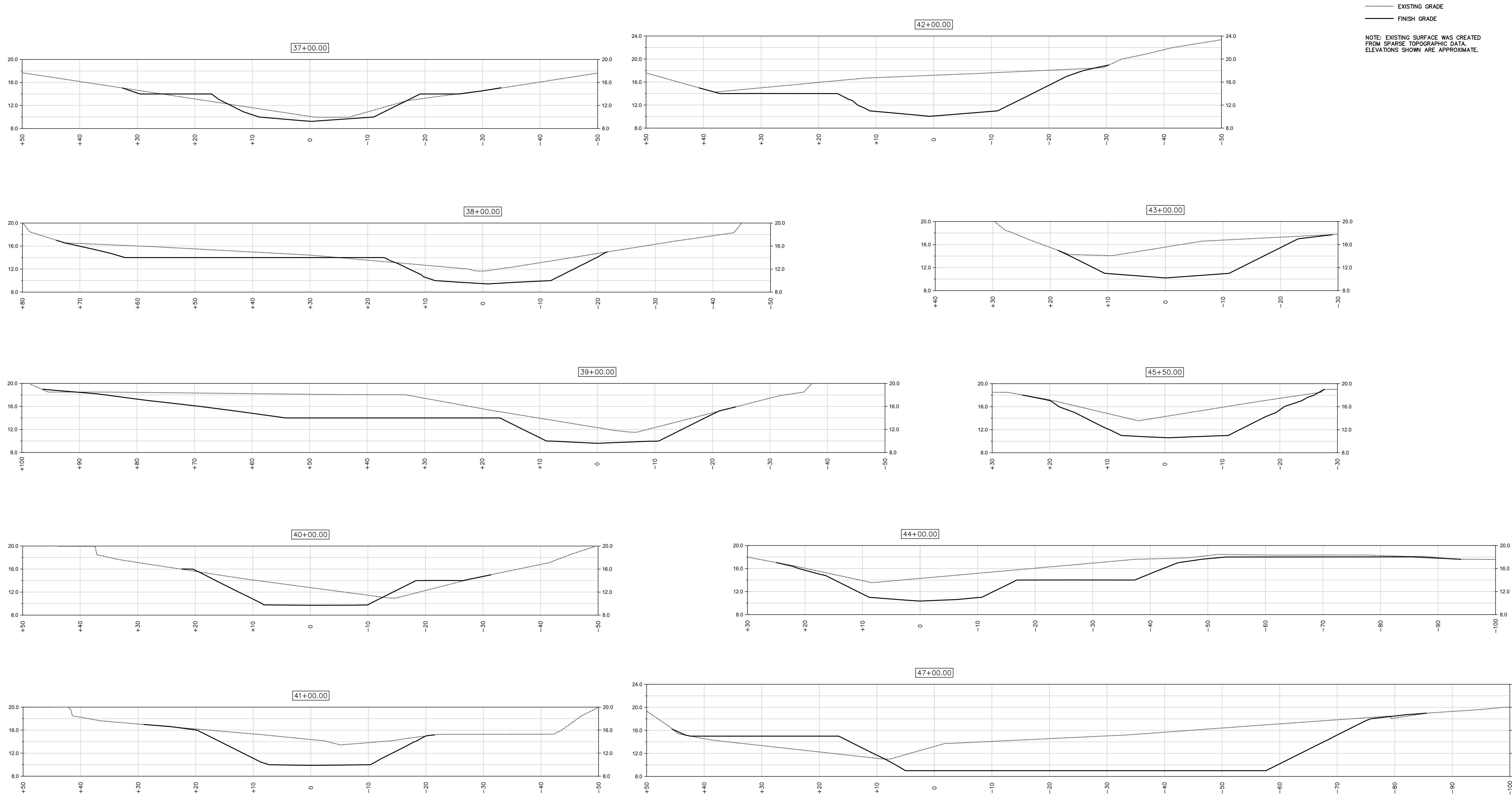
GRAPHIC SCALE

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CITY OF HAVERHILL  
 GRADING CROSS SECTIONS  
 LITTLE RIVER DAM REMOVAL AND RIVER RESTORATION  
 HAVERHILL MASSACHUSETTS

PROJ. No.: 20170390.U40  
 DATE: DECEMBER 16, 2024  
**CX-302**

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 LAYER STATE:



No.	DATE	DESCRIPTION	DESIGNER	REVIEWER



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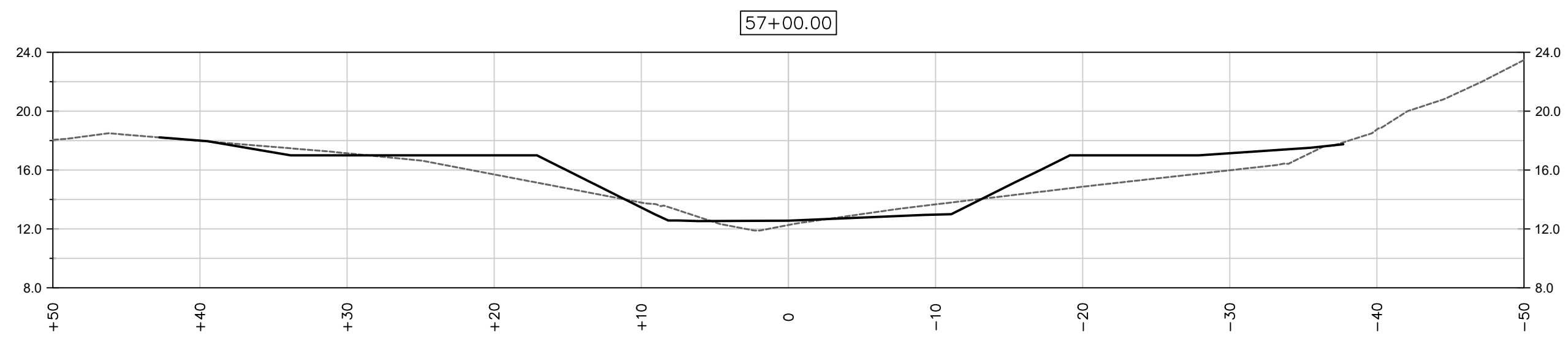
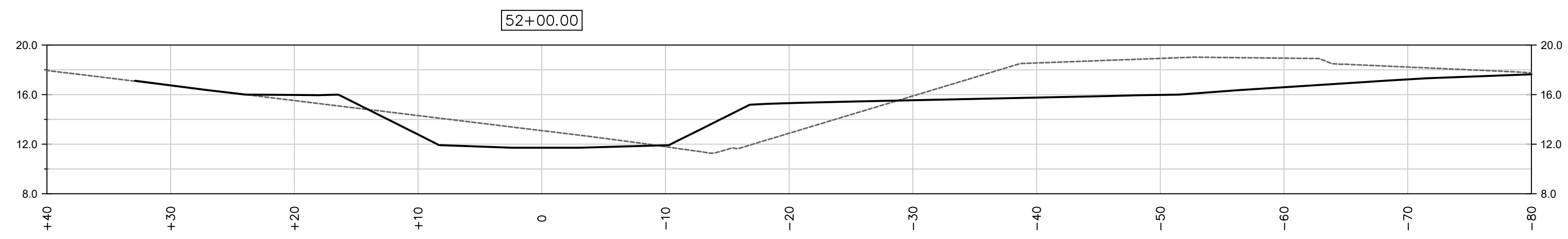
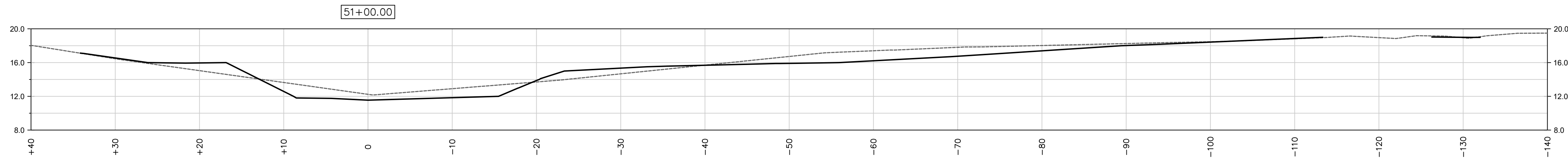
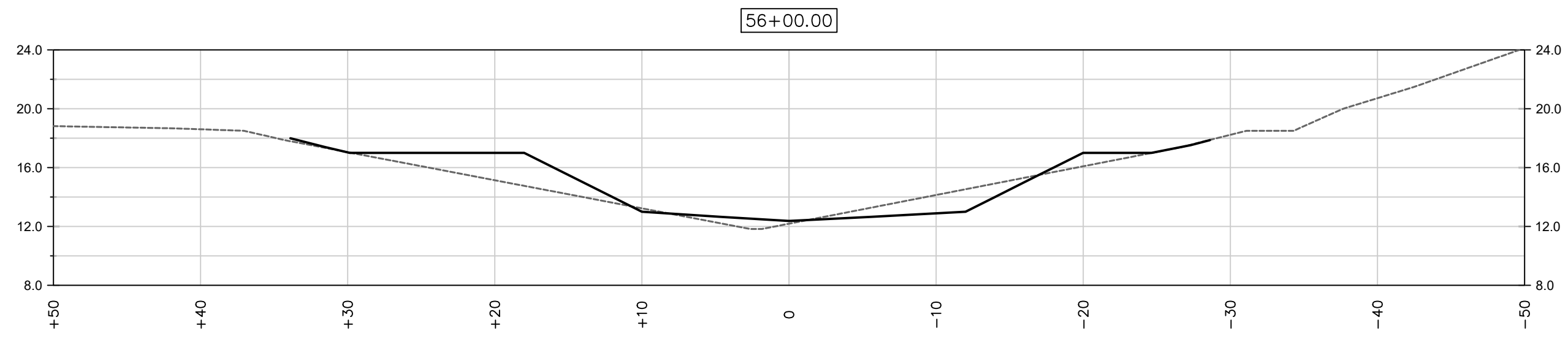
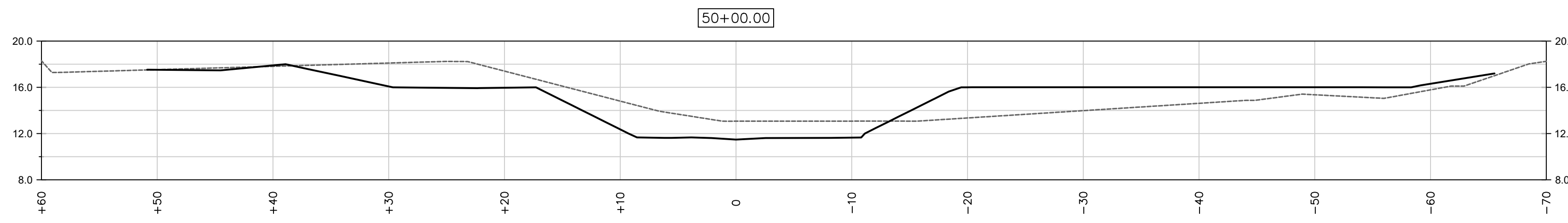
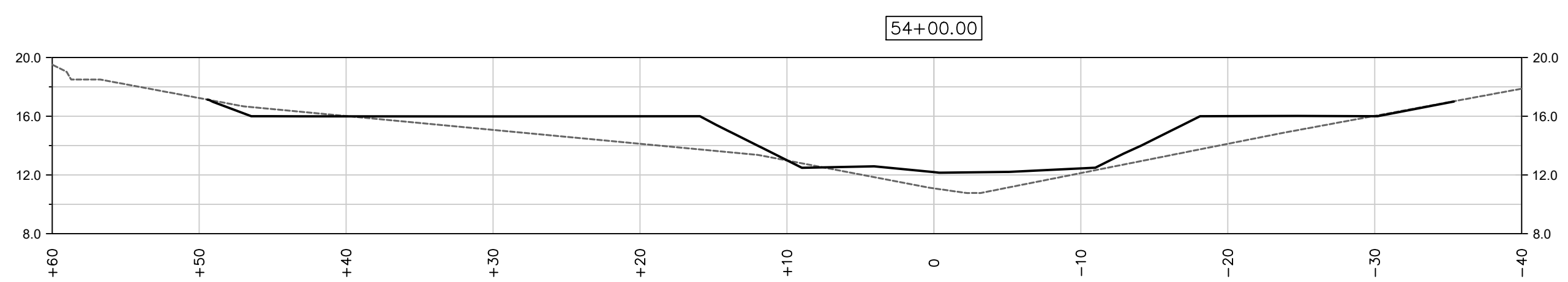
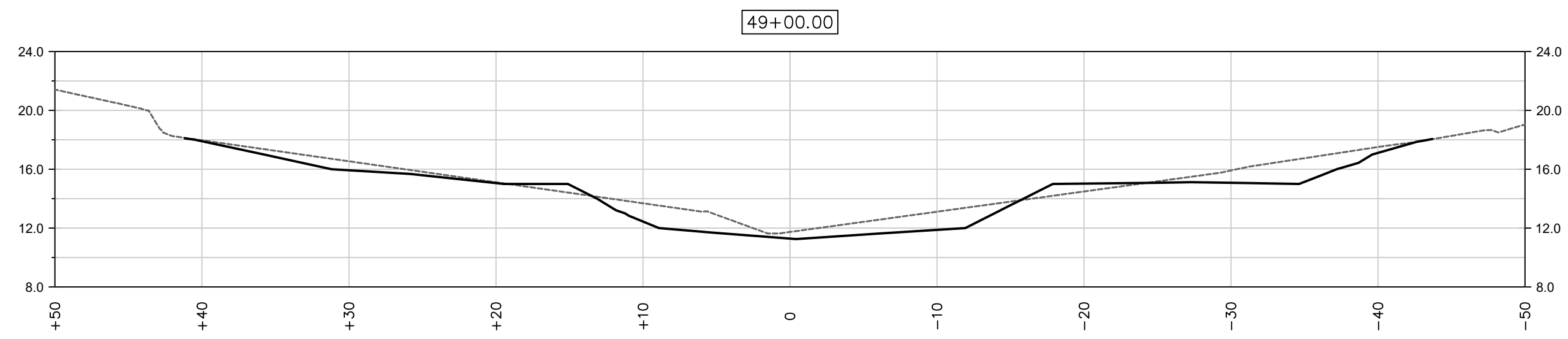
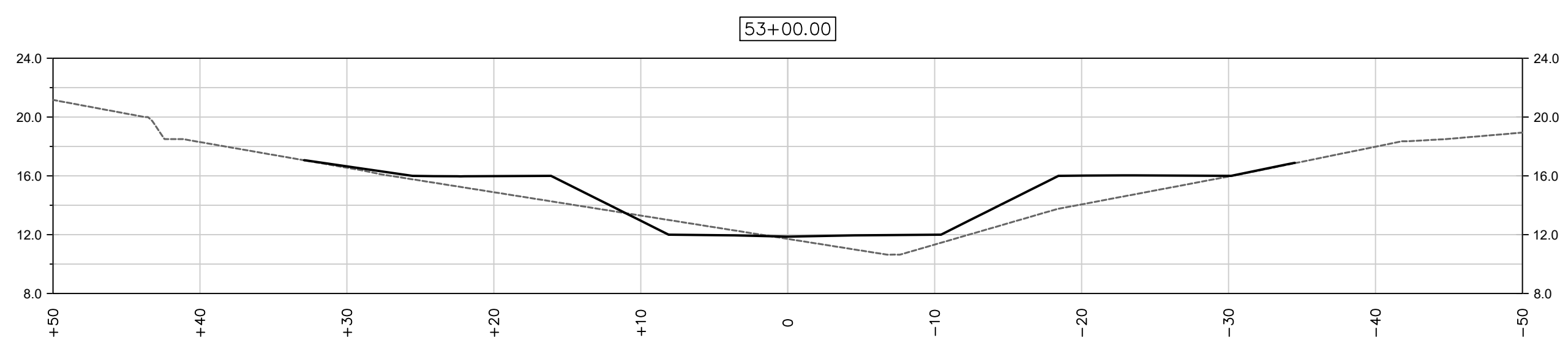
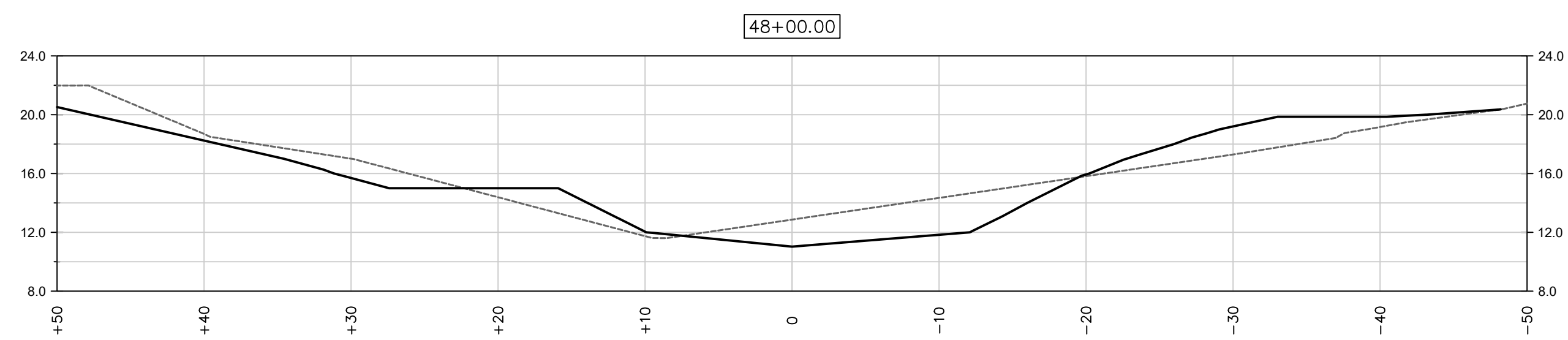
GRAPHIC SCALE

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CITY OF HAVERHILL  
 GRADING CROSS SECTIONS  
 LITTLE RIVER DAM REMOVAL AND RIVER RESTORATION  
 HAVERHILL MASSACHUSETTS

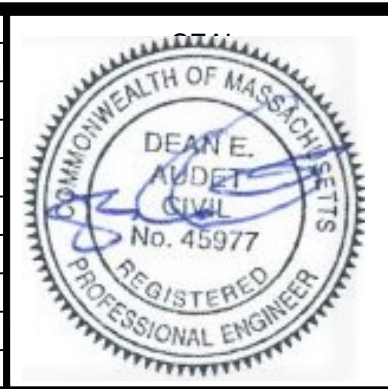
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 DATE: DECEMBER 16, 2024  
**CX-303**

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 LAYER STATE:



EXISTING GRADE  
 FINISH GRADE  
 NOTE: EXISTING SURFACE WAS CREATED FROM SPARSE TOPOGRAPHIC DATA. ELEVATIONS SHOWN ARE APPROXIMATE.

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER



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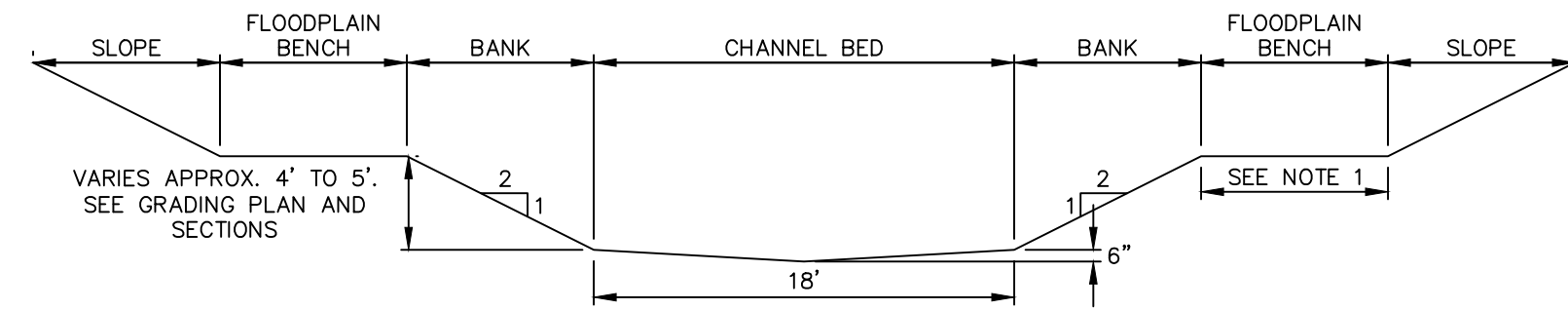
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 DATUM:  
 HORZ.: NAD83  
 VERT.: NAVD88

GRAPHIC SCALE

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CITY OF HAVERHILL  
 GRADING CROSS SECTIONS  
 LITTLE RIVER DAM REMOVAL AND RIVER RESTORATION  
 HAVERHILL MASSACHUSETTS

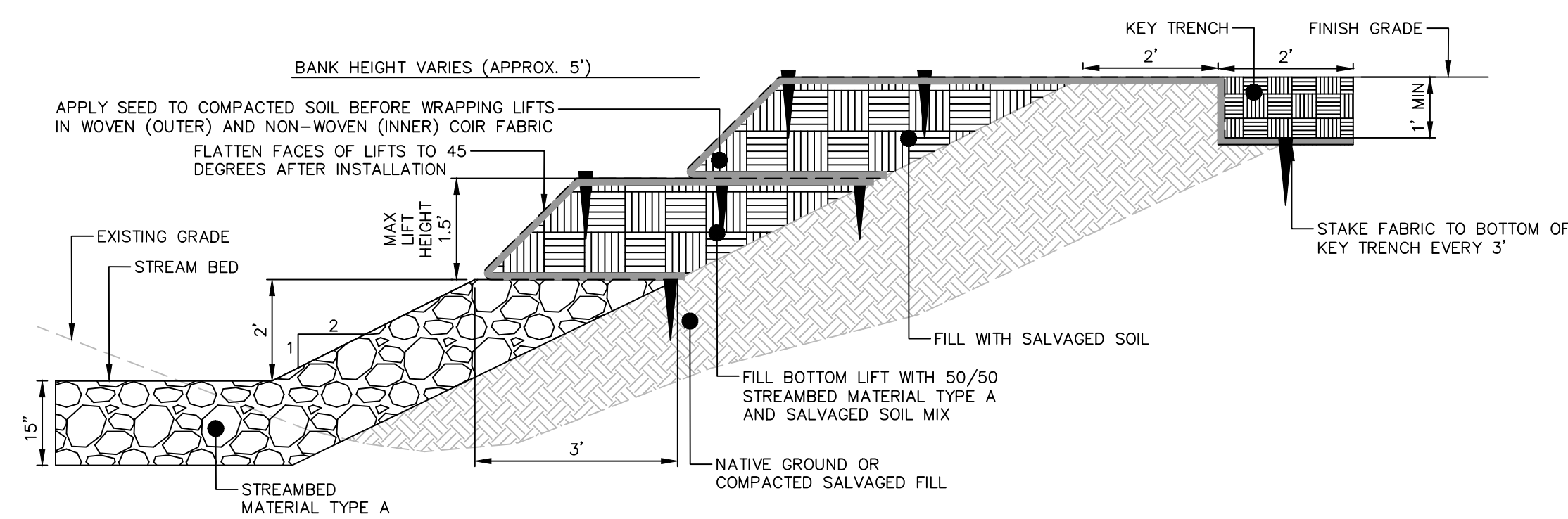
PROJ. No.: 20170390.U40  
 DATE: DECEMBER 16, 2024  
**CX-304**



NOTES:  
1. PRESENCE AND WIDTH OF FLOODPLAIN BENCH VARIES. SEE GRADING PLAN AND SECTION.

**TYPICAL CHANNEL SECTION**

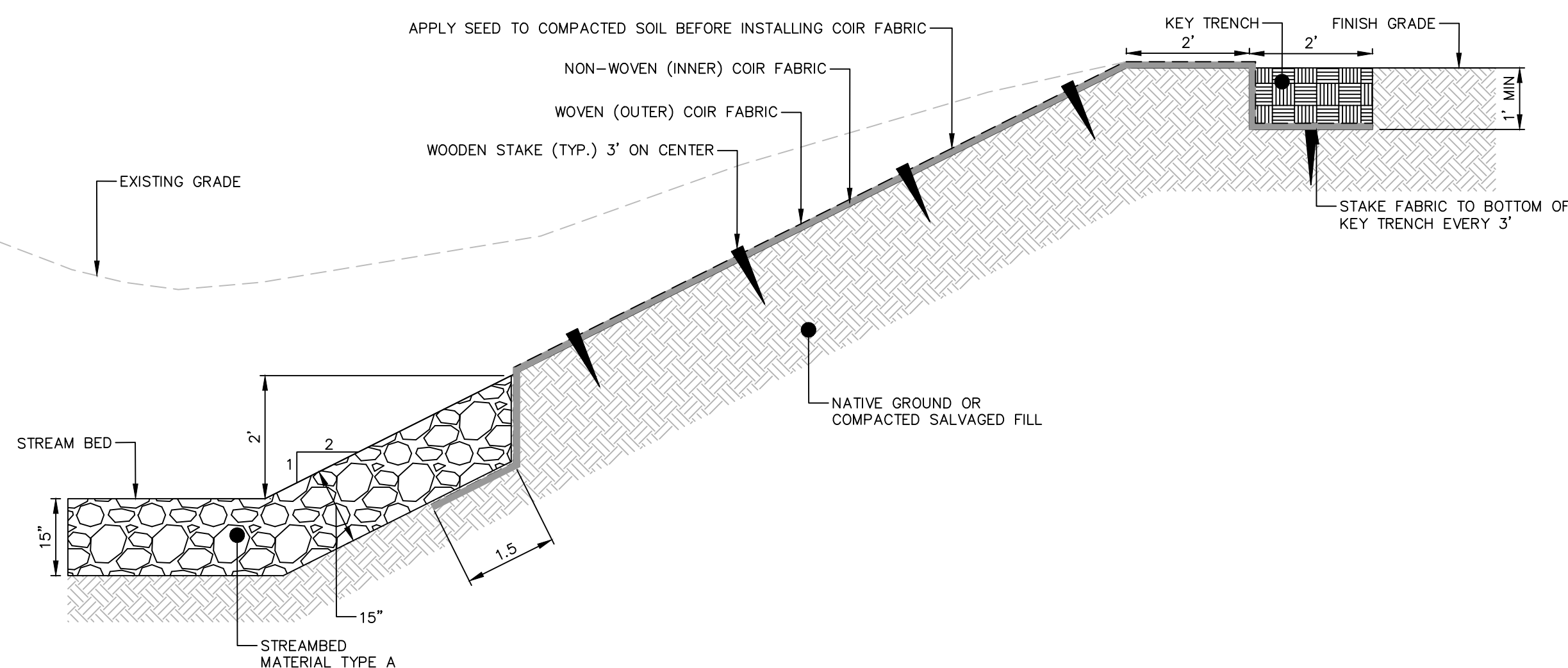
NOT TO SCALE



NOTES:  
1. PREPARE LEVEL SUBGRADE AND USE FORMS TO CONSTRUCT FES LIFTS. STAGGER FORMS FOR CONSTRUCTION OF UPPER AND LOWER LIFTS BY 15'.  
2. BUTT INNER FABRIC ENDS TOGETHER. JOIN OUTER FABRIC ENDS BY OVERLAPPING A MINIMUM OF 3' IN THE DIRECTION OF FLOW (UPSTREAM OVER DOWNSTREAM). STAGGER OVERLAPS BY 15' FROM LIFT TO LIFT.  
3. STAKE FABRIC BREAKING A MINIMUM NUMBER OF STRANDS. DO NOT PRE-CUT HOLES. DRIVE STAKES IN LEAVING 2" OF THE TOPS OF STAKE EXPOSED.  
4. BOX ENDS OF FABRIC TO FULLY ENCASE SOIL AT LATERAL TIE-INS.  
5. FILL KEY TRENCH WITH SALVAGED SOIL AND COMPACT OVER STAKED FABRIC.

**TYPICAL SECTION: FABRIC ENCAPSULATED SOIL (FES) LIFTS WITH ROCK TOE (NOT ADJACENT TO POOL)**

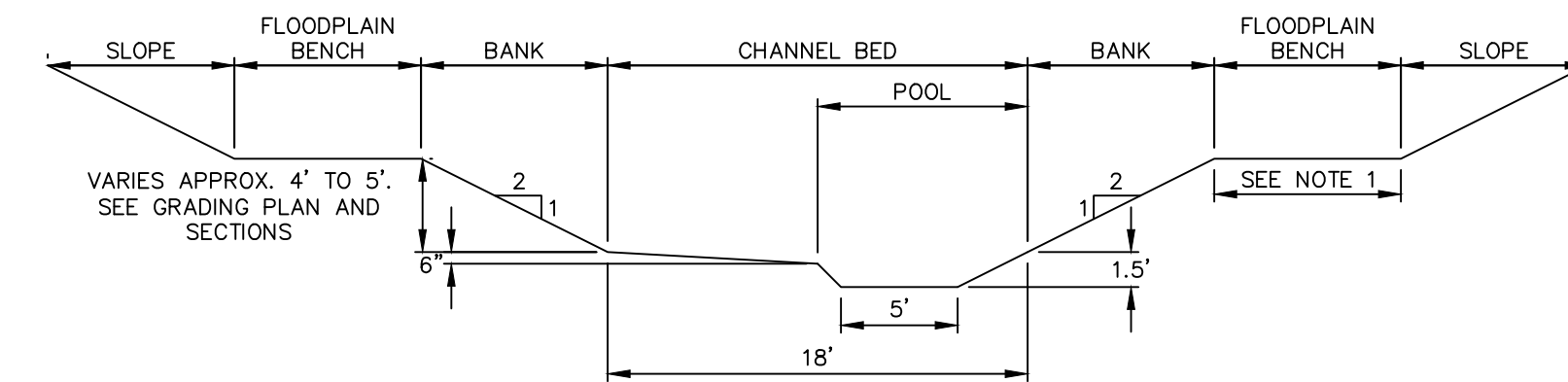
NOT TO SCALE



NOTES:  
1. BUTT INNER FABRIC ENDS TOGETHER. JOIN OUTER FABRIC ENDS BY OVERLAPPING A MINIMUM OF 3' IN THE DIRECTION OF FLOW (UPSTREAM OVER DOWNSTREAM). STAGGER OVERLAPS BY 15'.  
2. STAKE FABRIC BREAKING A MINIMUM NUMBER OF STRANDS. DO NOT PRE-CUT HOLES. DRIVE STAKES IN LEAVING 2" OF THE TOPS OF STAKE EXPOSED.  
3. BOX ENDS OF FABRIC TO FULLY ENCASE SOIL AT LATERAL TIE-INS.  
4. FILL KEY TRENCH WITH SALVAGED SOIL AND COMPACT OVER STAKED FABRIC.  
5. THE TOP 6" OF NATIVE GROUND OR SALVAGED FILL BENEATH THE COIR FABRIC SHALL MEET THE REQUIREMENTS OF SALVAGED SOIL.

**TYPICAL SECTION: SURFACE FABRIC TREATMENT WITH ROCK TOE (NOT ADJACENT TO POOL)**

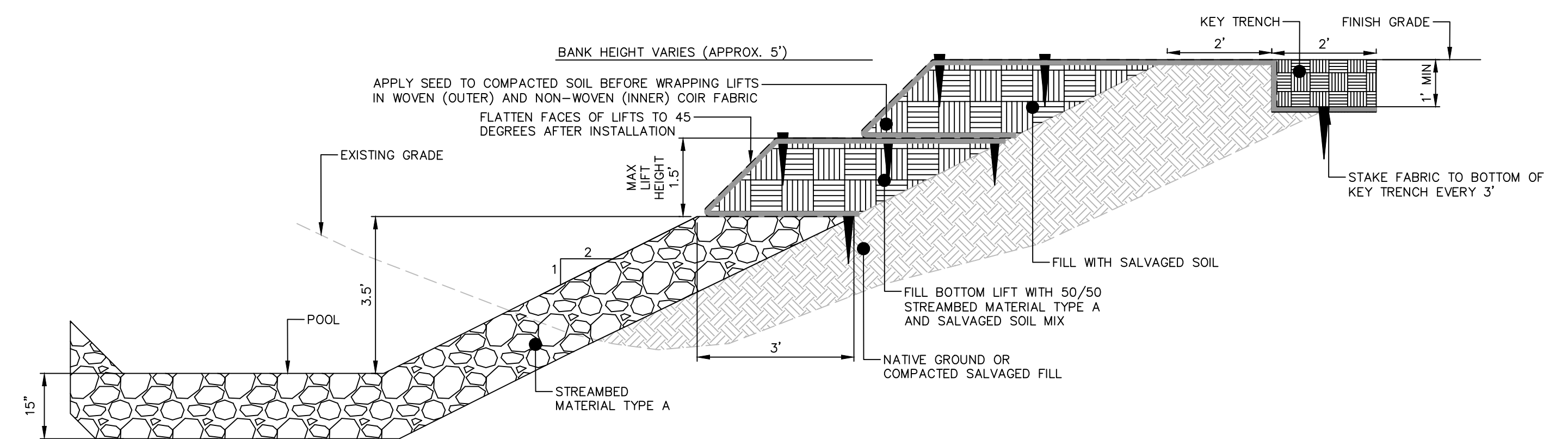
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NOTES:  
1. PRESENCE AND WIDTH OF FLOODPLAIN BENCH VARIES. SEE GRADING PLAN AND SECTION.

**TYPICAL POOL SECTION**

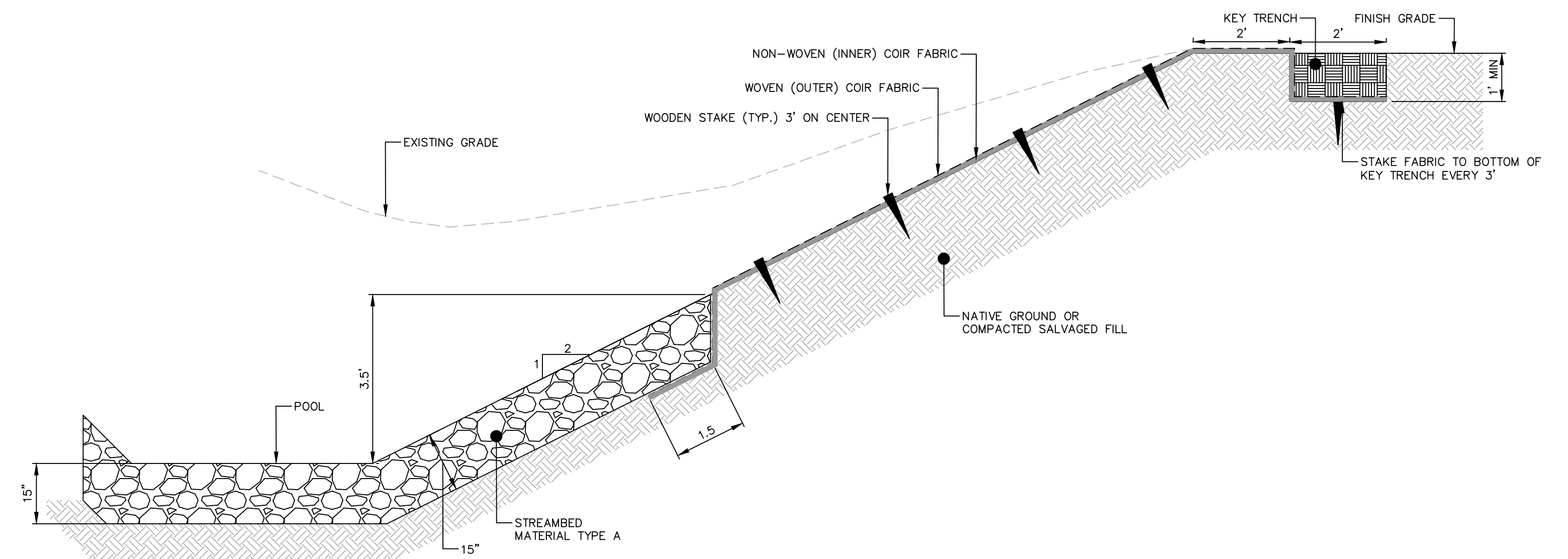
NOT TO SCALE



NOTES:  
1. PREPARE LEVEL SUBGRADE AND USE FORMS TO CONSTRUCT FES LIFTS. STAGGER FORMS FOR CONSTRUCTION OF UPPER AND LOWER LIFTS BY 15'.  
2. BUTT INNER FABRIC ENDS TOGETHER. JOIN OUTER FABRIC ENDS BY OVERLAPPING A MINIMUM OF 3' IN THE DIRECTION OF FLOW (UPSTREAM OVER DOWNSTREAM). STAGGER OVERLAPS BY 15' FROM LIFT TO LIFT.  
3. STAKE FABRIC BREAKING A MINIMUM NUMBER OF STRANDS. DO NOT PRE-CUT HOLES. DRIVE STAKES IN LEAVING 2" OF THE TOPS OF STAKE EXPOSED.  
4. BOX ENDS OF FABRIC TO FULLY ENCASE SOIL AT LATERAL TIE-INS.  
5. FILL KEY TRENCH WITH SALVAGED SOIL AND COMPACT OVER STAKED FABRIC.

**TYPICAL SECTION: FABRIC ENCAPSULATED SOIL (FES) LIFTS WITH ROCK TOE (ADJACENT TO POOL)**

NOT TO SCALE



NOTES:  
1. BUTT INNER FABRIC ENDS TOGETHER. JOIN OUTER FABRIC ENDS BY OVERLAPPING A MINIMUM OF 3' IN THE DIRECTION OF FLOW (UPSTREAM OVER DOWNSTREAM). STAGGER OVERLAPS BY 15'.  
2. STAKE FABRIC BREAKING A MINIMUM NUMBER OF STRANDS. DO NOT PRE-CUT HOLES. DRIVE STAKES IN LEAVING 2" OF THE TOPS OF STAKE EXPOSED.  
3. BOX ENDS OF FABRIC TO FULLY ENCASE SOIL AT LATERAL TIE-INS.  
4. FILL KEY TRENCH WITH SALVAGED SOIL AND COMPACT OVER STAKED FABRIC.  
5. THE TOP 6" OF NATIVE GROUND OR SALVAGED FILL BENEATH THE COIR FABRIC SHALL MEET THE REQUIREMENTS OF SALVAGED SOIL.

**TYPICAL SECTION: SURFACE FABRIC TREATMENT WITH ROCK TOE (ADJACENT TO POOL)**

NOT TO SCALE

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No.	DATE	DESCRIPTION	DESIGNER	REVIEWER



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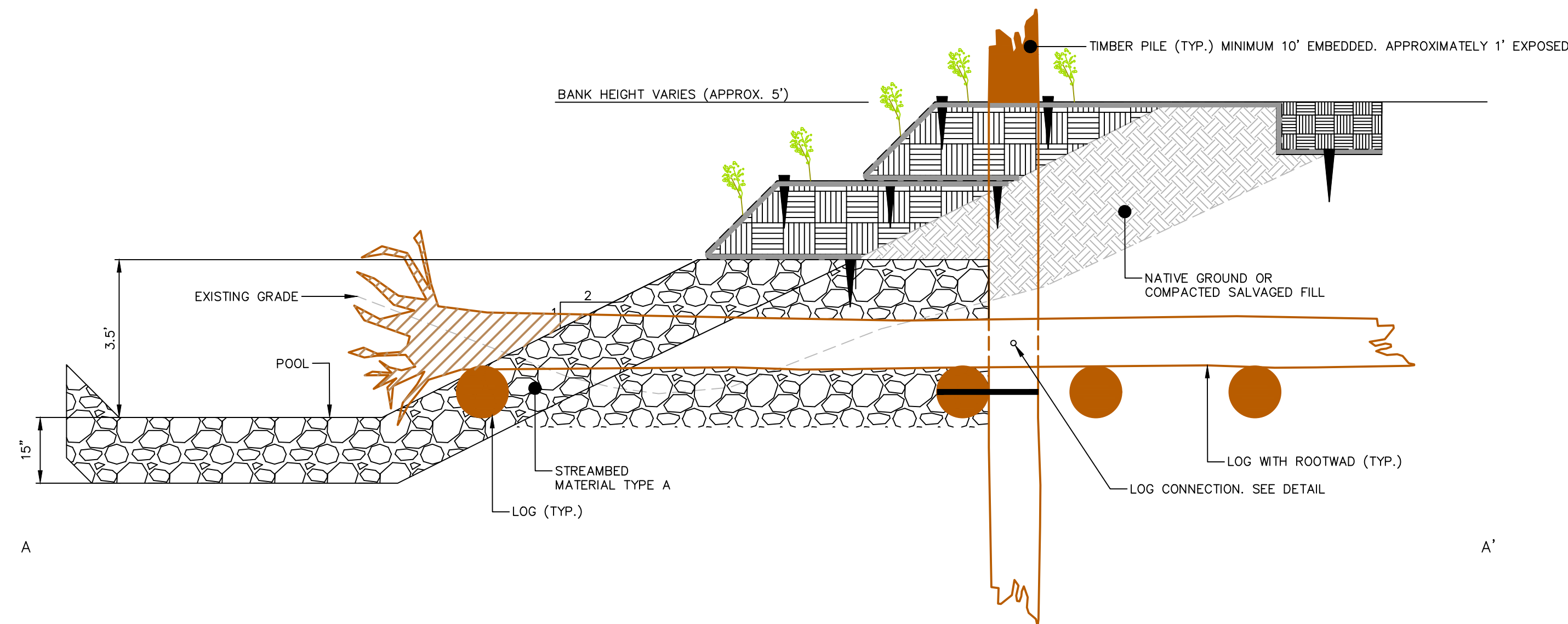
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 VERT.:  
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 HORZ.: NAD83  
 VERT.: NAVD88

GRAPHIC SCALE

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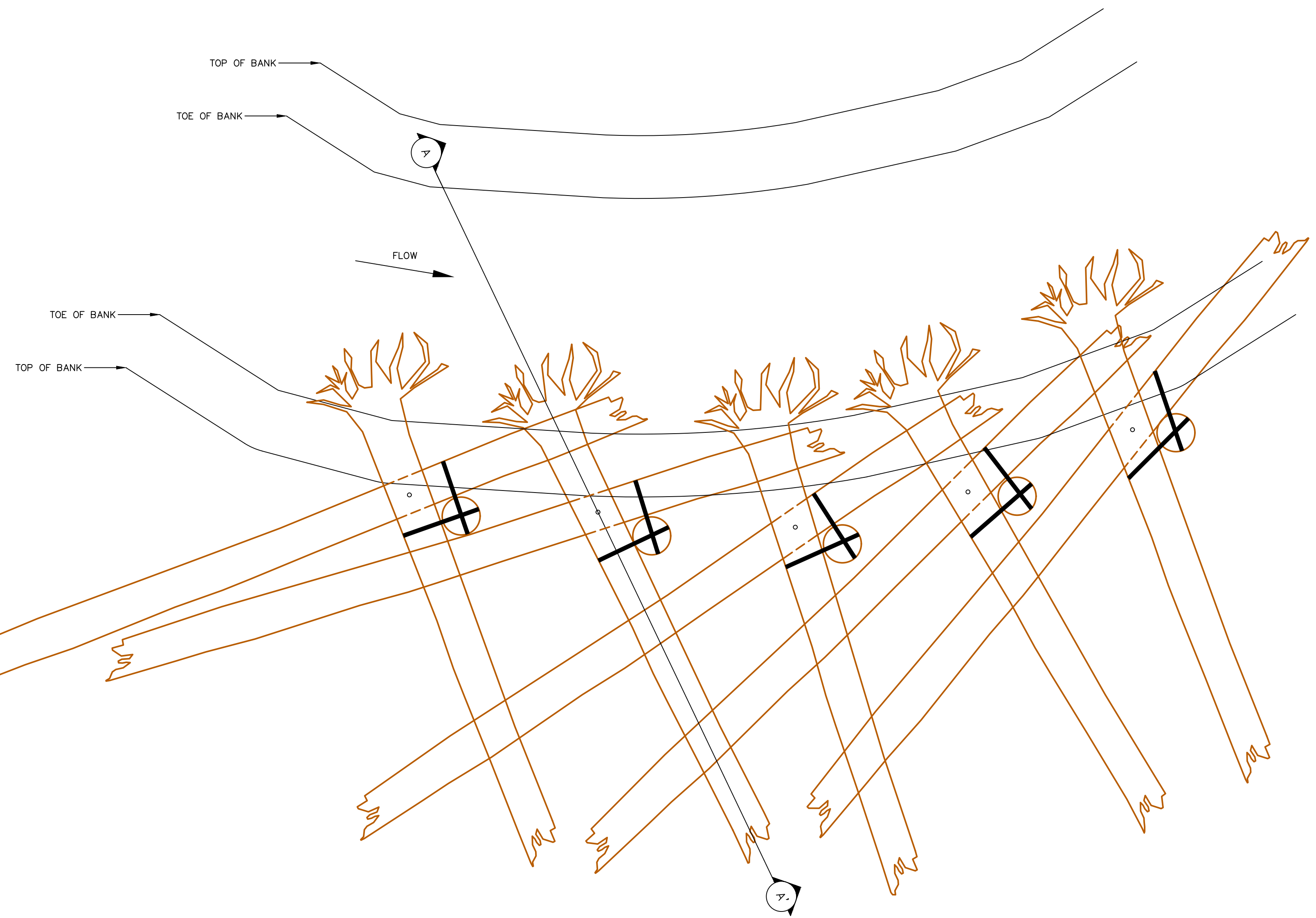
CITY OF HAVERHILL  
 TYPICAL CHANNEL CROSS SECTIONS AND  
 PROFILES  
 LITTLE RIVER DAM REMOVAL AND RIVER RESTORATION  
 HAVERHILL MASSACHUSETTS

PROJ. No.: 20170390.U40  
 DATE: DECEMBER 16, 2024  
**CT-301**



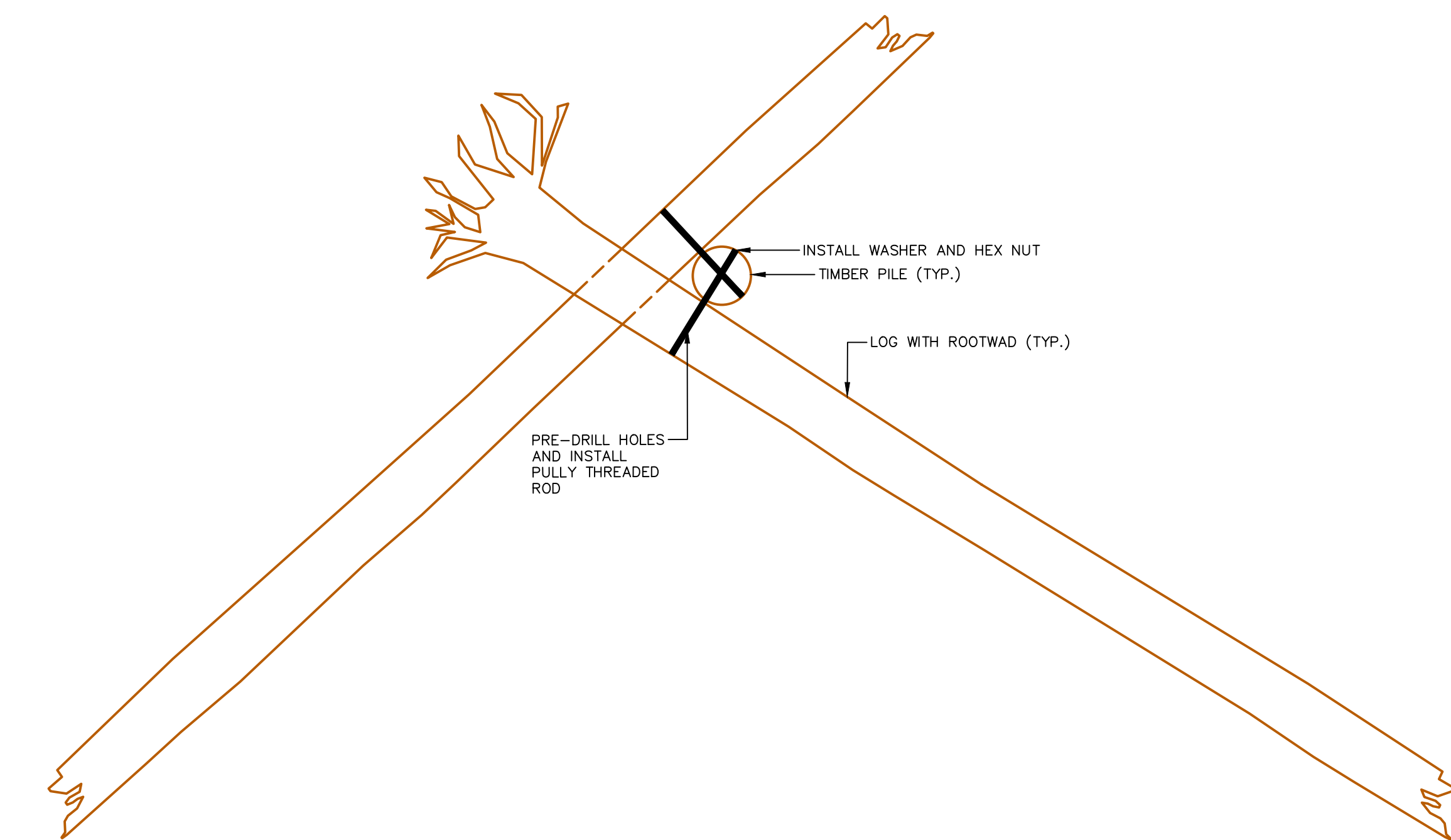
- NOTES:
1. PREPARE LEVEL SUBGRADE AND USE FORMS TO CONSTRUCT FES LIFTS. STAGGER FORMS FOR CONSTRUCTION OF UPPER AND LOWER LIFTS BY 15'.
  2. BUTT INNER FABRIC ENDS TOGETHER. JOIN OUTER FABRIC ENDS BY OVERLAPPING A MINIMUM OF 3' IN THE DIRECTION OF FLOW (UPSTREAM OVER DOWNSTREAM). STAGGER OVERLAPS BY 15' FROM LIFT TO LIFT.
  3. STAKE FABRIC BREAKING A MINIMUM NUMBER OF STRANDS. DO NOT PRE-CUT HOLES. DRIVE STAKES IN LEAVING 2" OF THE TOPS OF STAKE EXPOSED.
  4. BOX ENDS OF FABRIC TO FULLY ENCASE SOIL AT LATERAL TIE-INS.
  5. FILL KEY TRENCH WITH SALVAGED SOIL AND COMPACT OVER STAKED FABRIC.

**TYPICAL SECTION: LARGE WOOD BANK TREATMENT**  
NOT TO SCALE



- NOTES:
1. LARGE WOOD PLACEMENT IS A FIELD SET ITEM. LARGE WOOD SHALL BE PLACED AS DIRECTED BY THE ENGINEER DURING CONSTRUCTION.
  2. LARGE WOOD BANK TREATMENT AND EXTENTS MAY VARY FROM THOSE SHOWN ON THE PLANS AS A RESULT OF SITE CONDITIONS AND MATERIAL AVAILABILITY.
  3. EACH 10-FOOT LENGTH OF LARGE WOOD BANK TREATMENT SHALL COMPRISE 2 LOGS, 2 LOG WITH ROOTWADS, AND 2 TIMBER PILES. THIS ASSUMES A 5' FLARED END ON EACH ROOTWAD.
  4. ALL LOGS SHALL BE ACHORED TO A MINIMUM OF ONE TIMBER PILE. ONE ADDITIONAL ANCHOR POINT MAY BE NEEDED TO ADJACENT LOGS AS DIRECTED BY THE ENGINEER DURING CONSTRUCTION.

**LARGE WOOD BANK TREATMENT TYPICAL LAYOUT**  
NOT TO SCALE



- NOTES:
1. INSTALL WASHER HEX NUT AT BOTH ENDS OF FULLY THREADED ROD INSERTED THROUGH LOGS.
  2. HAMMER (MUSHROOM) THE ENDS OF THE RODS TO SECURE THE NUTS.
  3. FILE ANY SHARP EDGES OF EXPOSED RODS.

**LOG CONNECTION DETAIL**  
NOT TO SCALE

File: J:\DWG\2017\0390\U40\CivilPlan\20170390\U40\_XST01.dwg Layout: CT-302 Plotted: 2024-12-11 5:59 PM Saved: 2024-11-26 6:51 PM User: claire.nauman  
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No.	DATE	DESCRIPTION	DESIGNER	REVIEWER



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GRAPHIC SCALE	

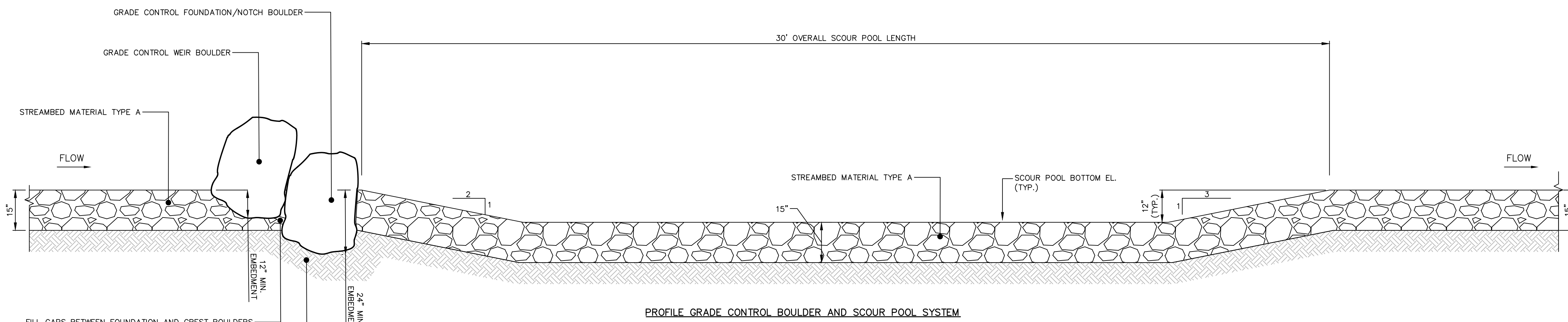
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CITY OF HAVERHILL  
 TYPICAL CHANNEL CROSS SECTIONS AND  
 PROFILES  
 LITTLE RIVER DAM REMOVAL AND RIVER RESTORATION  
 HAVERHILL MASSACHUSETTS

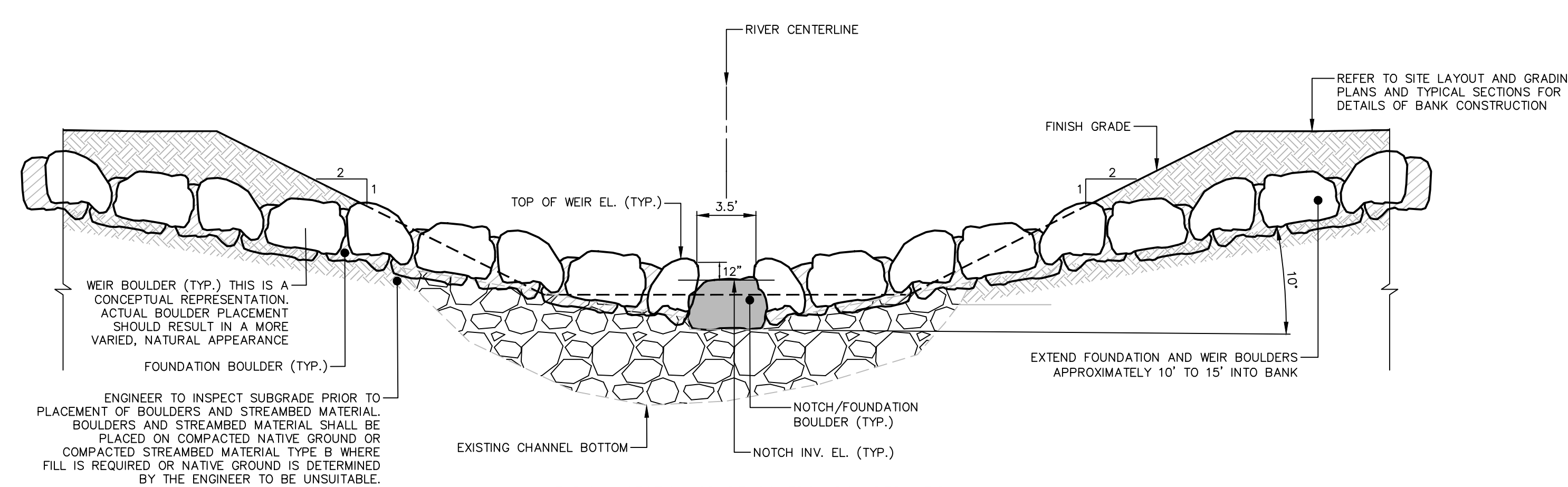
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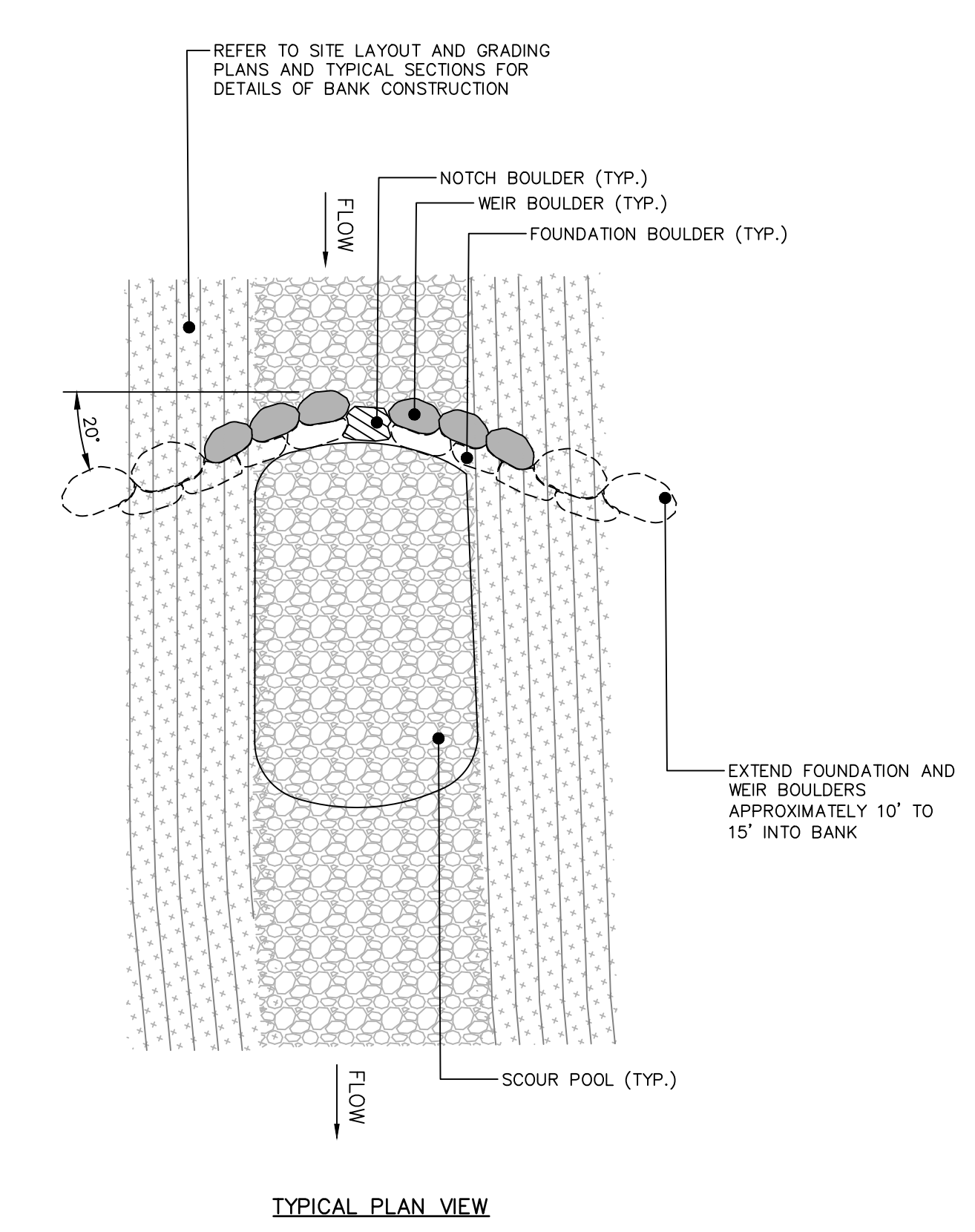


FILL GAPS BETWEEN FOUNDATION AND CREST BOULDERS BY WASHING STREAMBED MATERIAL TYPE B INTO VOIDS.  
 ENGINEER TO INSPECT SUBGRADE PRIOR TO PLACEMENT OF BOULDERS AND STREAMBED MATERIAL. BOULDERS AND STREAMBED MATERIAL SHALL BE PLACED ON COMPACTED NATIVE GROUND OR COMPACTED STREAMBED MATERIAL TYPE B WHERE FILL IS REQUIRED OR NATIVE GROUND IS DETERMINED BY THE ENGINEER TO BE UNSUITABLE.

- NOTES:**
- ADDITIONAL WEIR BOULDERS MAY BE PLACED BEHIND AND ABUTTING THE NOTCH BOULDERS AS DIRECTED BY THE ENGINEER TO OBTAIN REQUIRED NOTCH WIDTH.
  - WEIR BOULDERS SHALL HAVE A NOMINAL B-AXIS DIMENSION OF 2.5 FEET. THE MINIMUM B-AXIS DIMENSIONS SHALL BE 2 FEET AND THE MAXIMUM B-AXIS DIMENSIONS SHALL BE 3 FEET.
  - DIMENSIONS SELECTED FOR ANY FOUNDATION/NOTCH OR WEIR BOULDER SHALL RESULT IN A MINIMUM WEIGHT OF 2,400 LBS.
  - REFER TO THE SITE LAYOUT AND GRADING PLANS FOR THE TOP OF BOULDER WEIR AND NOTCH INVERT ELEVATIONS.
  - PLACE BOULDERS PRIOR TO PLACING STREAMBED MATERIAL.

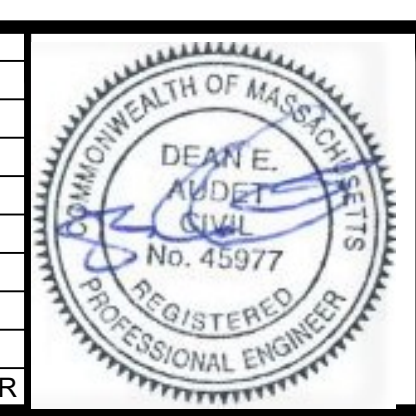


WEIR BOULDER (TYP.) THIS IS A CONCEPTUAL REPRESENTATION. ACTUAL BOULDER PLACEMENT SHOULD RESULT IN A MORE VARIED, NATURAL APPEARANCE.  
 ENGINEER TO INSPECT SUBGRADE PRIOR TO PLACEMENT OF BOULDERS AND STREAMBED MATERIAL. BOULDERS AND STREAMBED MATERIAL SHALL BE PLACED ON COMPACTED NATIVE GROUND OR COMPACTED STREAMBED MATERIAL TYPE B WHERE FILL IS REQUIRED OR NATIVE GROUND IS DETERMINED BY THE ENGINEER TO BE UNSUITABLE.



**TYPICAL GRADE CONTROL BOULDER AND SCOUR POOL SYSTEM**  
 NOT TO SCALE

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER



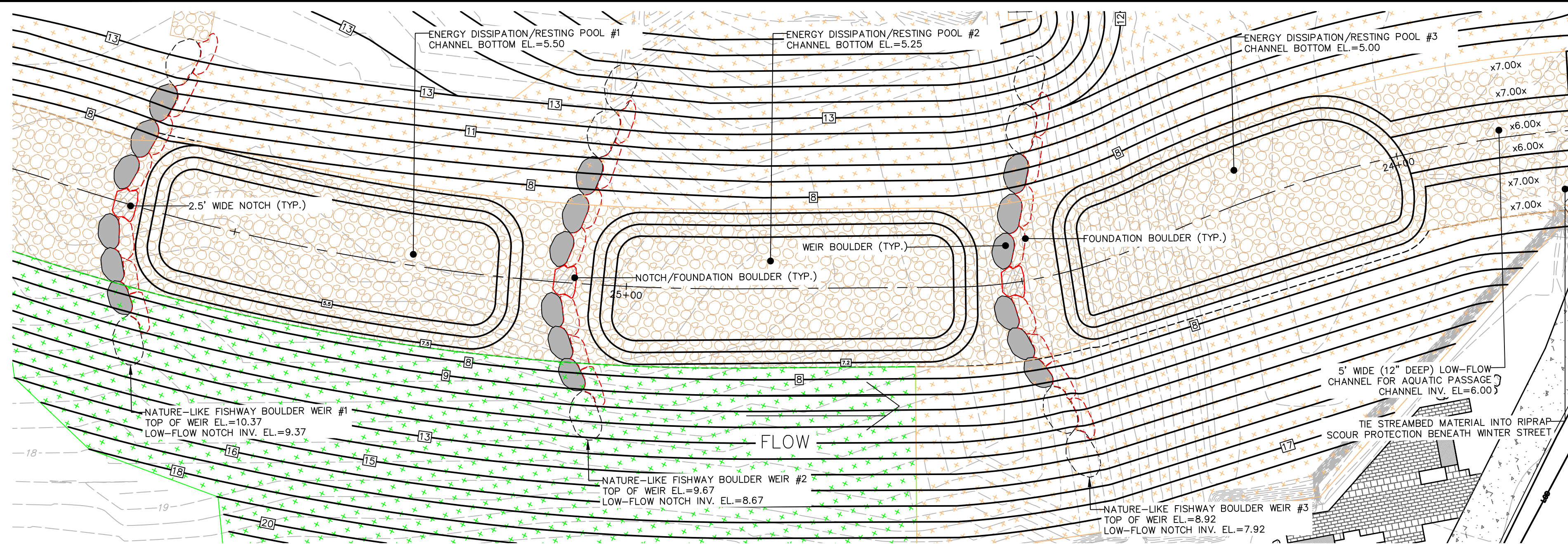
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DATUM:	HORZ.: NAD83
	VERT.: NAVD88
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CITY OF HAVERHILL  
 TYPICAL CHANNEL CROSS SECTIONS AND PROFILES  
 LITTLE RIVER DAM REMOVAL AND RIVER RESTORATION  
 HAVERHILL MASSACHUSETTS

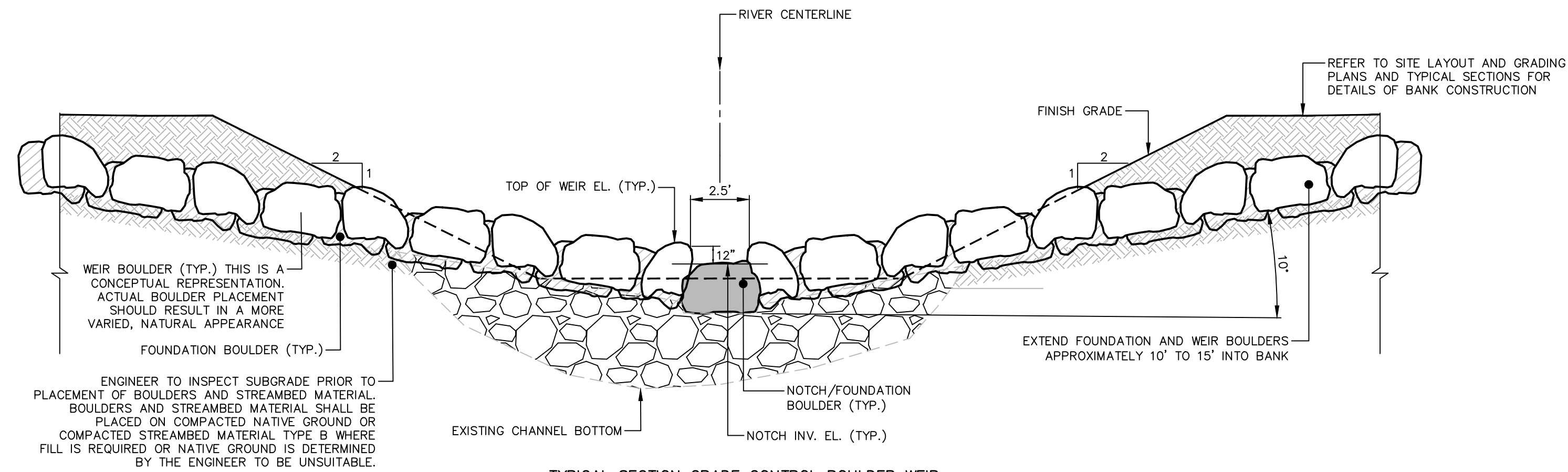
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 DATE: DECEMBER 16, 2024  
**CT-303**



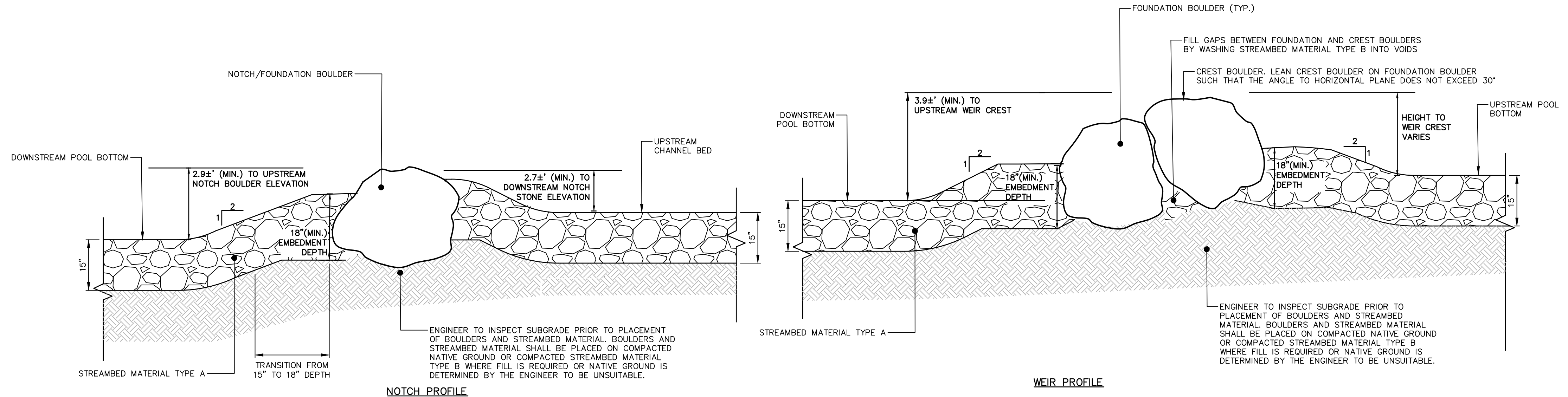
**NATURE-LIKE FISHWAY LAYOUT**

SCALE 1"=10'

- NOTES:**
1. ADDITIONAL WEIR BOULDERS MAY BE PLACED BEHIND AND ABUTTING THE NOTCH BOULDERS AS DIRECTED BY THE ENGINEER TO OBTAIN REQUIRED NOTCH WIDTH.
  2. WEIR BOULDERS SHALL HAVE A NOMINAL B-AXIS DIMENSION OF 2.5 FEET. THE MINIMUM B-AXIS DIMENSIONS SHALL BE 2 FEET AND THE MAXIMUM B-AXIS DIMENSIONS SHALL BE 3 FEET.
  3. DIMENSIONS SELECTED FOR ANY FOUNDATION/NOTCH OR WEIR BOULDER SHALL RESULT IN A MINIMUM WEIGHT OF 2,400 LBS.
  4. REFER TO THE SITE LAYOUT AND GRADING PLANS FOR THE TOP OF BOULDER WEIR AND NOTCH INVERT ELEVATIONS.
  5. PLACE BOULDERS PRIOR TO PLACING STREAMBED MATERIAL.



**TYPICAL SECTION GRADE CONTROL BOULDER WEIR**



**TYPICAL NATURE-LIKE FISHWAY WEIR AND RESTING POOL PROFILE**

NOT TO SCALE

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 LMS VIEW: LAYER STATE: PC3: NONE STB:CTB: FO:STB

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER



SEAL	SEAL	
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SCALE:

HORIZ.: AS NOTED
VERT.:

DATUM:

HORIZ.: NAD83
VERT.: NAVD88

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CITY OF HAVERHILL

**TYPICAL CHANNEL CROSS SECTIONS AND PROFILES**

LITTLE RIVER DAM REMOVAL AND RIVER RESTORATION

HAVERHILL MASSACHUSETTS

PROJ. No.: 20170390.U40  
 DATE: FEBRUARY 10, 2026

**CT-304**

File: J:\DWG\2017\0390\U30\Civil\Plan\20170390\U30\_LND01.dwg Layout: LA-101 Plotted: 2026-02-10 2:52 PM Saved: 2026-02-10 2:42 PM User: claire.natuman  
 LMS VIEW: PC3: NONE STB/CTB: FO.STB LAYER STATE:

MATCH LINE SEE SHEET LA-102



**LEGEND:**

- LARGE CONSERVATION GRADE SHADE TREE
- CONSERVATION GRADE ORNAMENTAL TREE
- CONSERVATION GRADE SHRUB BED
- EXISTING TREE TO REMAIN

**LANDSCAPE GRADE PLANT LIST**

KEY	BOTANICAL NAME	COMMON NAME	QTY	SIZE
<b>LARGE SHADE TREES</b>				
AR	ACER RUBRUM	RED MAPLE	8	2"-2 1/2" CAL.
AS	ACER SACHARINUM	SILVER MAPLE	2	2"-2 1/2" CAL.
BA	BETULA ALLEGHANIENSIS	YELLOW BIRCH	1	2"-2 1/2" CAL.
PO	PLATANUS OCCIDENTALIS	AMERICAN SYCAMORE	3	2"-2 1/2" CAL.
PS	PRUNUS SEROTINA	BLACK CHERRY	2	2"-2 1/2" CAL.
UA	ULMUS AMERICANA 'PRINCETON'	PRINCETON AMERICAN ELM	11	2"-2 1/2" CAL.
<b>ORNAMENTAL TREES</b>				
AL	AMELANCHIER LAEVIS	ALLEGHENY SERVICEBERRY	9	6-8" HT.
BP	BETULA POPULIFOLIA	GRAY BIRCH	27	1"-1 1/2" CAL.
CA	CORNUS ALTERNIFOLIA	PAGODA DOGWOOD	2	1"-1 1/2" CAL.
CC	CARPINUS CAROLINIANA	AMERICAN HORNBEAM	7	1"-1 1/2" CAL.

**CONSERVATION GRADE PLANT LIST**

KEY	BOTANICAL NAME	COMMON NAME	QTY	SIZE
<b>LARGE SHADE TREES</b>				
AR	ACER RUBRUM	RED MAPLE	35	4"-6"
AS	ACER SACHARINUM	SILVER MAPLE	35	4"-6"
BA	BETULA ALLEGHANIENSIS	YELLOW BIRCH	25	4"-6"
PO	PLATANUS OCCIDENTALIS	AMERICAN SYCAMORE	30	4"-6"
PD	POPULUS DELTOIDES	COTTONWOOD	15	4"-6"
PS	PRUNUS SEROTINA	BLACK CHERRY	30	4"-6"
QP	QUERCUS PALUSTRIS	PIN OAK	15	4"-6"
BG	NYSSA SYLVATICA	BLACK GUM	15	4"-6"
<b>ORNAMENTAL TREES</b>				
AL	AMELANCHIER LAEVIS	ALLEGHENY SERVICEBERRY	75	4"-6"
BP	BETULA POPULIFOLIA	GRAY BIRCH	65	4"-6"
CA	CORNUS ALTERNIFOLIA	PAGODA DOGWOOD	28	4"-6"
CC	CARPINUS CAROLINIANA	AMERICAN HORNBEAM	70	4"-6"

**CONSERVATION GRADE PLANT LIST**

KEY	BOTANICAL NAME	COMMON NAME	QTY	SIZE
<b>SHRUBS</b>				
AA	ARONIA ARBUTIFOLIA	RED CHOKEBERRY	45	1 GAL.
AI	ALNUS INCANA	SPECKLED ALDER	100	1 GAL.
AM	ARONIA MELANOCARPA	BLACK CHOKEBERRY	30	1 GAL.
CP	CLETHRA ALNIFOLIA	SWEET PEPPERBUSH	65	1 GAL.
CS	CORNUS SERICEA	RED-OSIER DOGWOOD	100	1 GAL.
HV	HAMAMELIS VIRGINIANA	WITCH HAZEL	85	1 GAL.
IV	ILEX VERTICILLATA	WINTERBERRY HOLLY	100	1 GAL.
KA	KALMIA ANGUSTIFOLIA	SHEEP LAUREL	60	1 GAL.
SD	SALIX DISCOLOR	PUSSY WILLOW	100	1 GAL.
VC	VACCINIUM CORYMBOSUM	HIGHBUSH BLUEBERRY	75	1 GAL.
VL	VIBURNUM LENTAGO	NANNYBERRY	80	1 GAL.

NOTE: SHRUBS TO BE PLANTED APPROXIMATELY 6' ON CENTER. MINIMUM OF THREE (3) DIFFERENT SPECIES PER SHRUB BED.

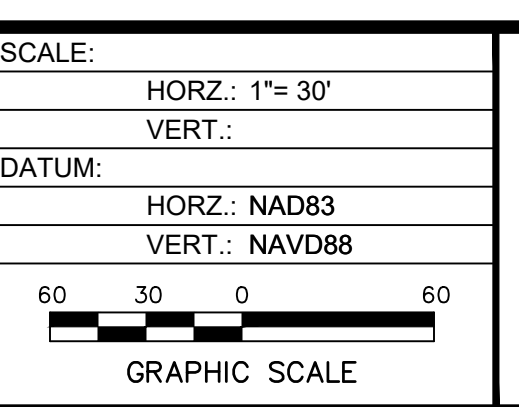
**PLANTING NOTES:**

1. ALL PLANTING MATERIAL TO BE NURSERY GROWN STOCK SUBJECT TO ANSI Z60.1 STANDARDS.
2. THE CONTRACTOR SHALL SUPPLY ALL PLANTS IN QUANTITIES SUFFICIENT TO COMPLETE THE WORK SHOWN ON THE DRAWINGS AND LISTED IN THE PLANT LIST. IN THE EVENT OF A DISCREPANCY BETWEEN QUANTITIES SHOWN IN THE PLANT LIST AND THOSE REQUIRED BY THE DRAWINGS, THE LARGER NUMBER SHALL APPLY.
3. PRECISE LOCATION OF ITEMS NOT DIMENSIONED ON THE PLAN ARE TO BE FIELD STAKED BY THE CONTRACTOR AND SHALL BE SUBJECT TO THE REQUIREMENTS SPECIFIED IN THE PREVIOUS NOTE.
4. ALL SHRUB MASSINGS AND TREE PITS SHALL BE MULCHED TO A DEPTH OF 3" WITH SHREDDED PINE BARK MULCH.
5. TREES SHALL NOT BE STAKED UNLESS OTHERWISE NOTED.
6. THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGED VEGETATION AND SHALL REPLACE OR REPAIR ANY DAMAGED MATERIAL, AT HIS OWN EXPENSE.
7. ALL SHRUB AND GROUND COVER PLANTING AREAS SHALL HAVE CONTINUOUS BEDS OF TOPSOIL 12" DEEP. ALL SOIL AND HYDROSEED AREAS SHALL HAVE A MINIMUM TOPSOIL BED OF 6".
8. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL UTILITIES IN THE FIELD. WHERE PLANT MATERIAL MAY INTERFERE WITH UTILITIES, THE CONTRACTOR SHALL NOTIFY THE LANDSCAPE ARCHITECT TO COORDINATE THEIR INSTALLATION.
9. FOR PLANTING SOIL MIX, SEE SPECIFICATIONS OR PLANTING DETAILS.
10. ALL EXISTING RILL, GULLY OR CHANNEL EROSION SHALL BE FILLED WITH APPROPRIATE BACKFILL MATERIAL, FINE RAKED, SCARIFIED AND STABILIZED WITH APPROPRIATE VEGETATIVE MATERIAL AND / OR APPROPRIATE SEDIMENTATION AND EROSION CONTROL MEASURES.
11. ADJUSTMENTS IN THE LOCATION OF THE PROPOSED PLANT MATERIAL AS A RESULT OF EXISTING VEGETATION TO REMAIN SHALL BE APPROVED BY THE LANDSCAPE ARCHITECT PRIOR TO INSTALLATION.
12. THE CONTRACTOR IS RESPONSIBLE FOR ALL MAINTENANCE REPAIR AND REPLACEMENT OF PLANT MATERIAL, AS REQUIRED, FOR THE DURATION OF THE PROJECT AND SUBSEQUENT WARRANTY PERIOD.
13. PLANTINGS INSTALLED IN THE DRY SUMMER MONTHS AND / OR LAWN SEEDS OUT OF SPRING OR FALL PERIODS, IF ALLOWED BY OWNER, WILL REQUIRE AGGRESSIVE IRRIGATION PROGRAMS AT THE CONTRACTOR'S EXPENSE, UNLESS OTHERWISE DIRECTED BY THE OWNER.
14. UPON COMPLETION OF PLANTING, REMOVE FROM SITE ALL EXCESS SOIL, MULCH, AND MATERIALS AND DEBRIS RESULTING FROM WORK OPERATIONS. CLEAN UP SHOULD BE COMPLETED AT THE END OF EACH WORKING DAY. RESTORE TO ORIGINAL CONDITIONS ALL DAMAGED PAVEMENTS, PLANTING AREAS, STRUCTURES AND LAWN AREAS RESULTING FROM LANDSCAPING OPERATIONS.
15. CONTRACTOR SHALL SURVEY, LOCATE, AND PROTECT ALL TREES WITHIN AREAS SHOWN AS "EXISTING VEGETATION TO REMAIN" WITHIN THE DEVELOPMENT ENVELOPE FOR REVIEW BY THE LANDSCAPE ARCHITECT PRIOR TO CLEARING OPERATIONS.
16. CONTRACTOR TO RESEED ALL DISTURBED AREAS.
17. LOCATIONS OF TREE AND SHRUB PLANTINGS TO BE VERIFIED IN THE FIELD AND CONFIRMED BY LANDSCAPE ARCHITECT.
18. SEE RESTORATION PLANS FOR SEED MIX AND TUBELING PLANTING.

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER



SEAL	SEAL	
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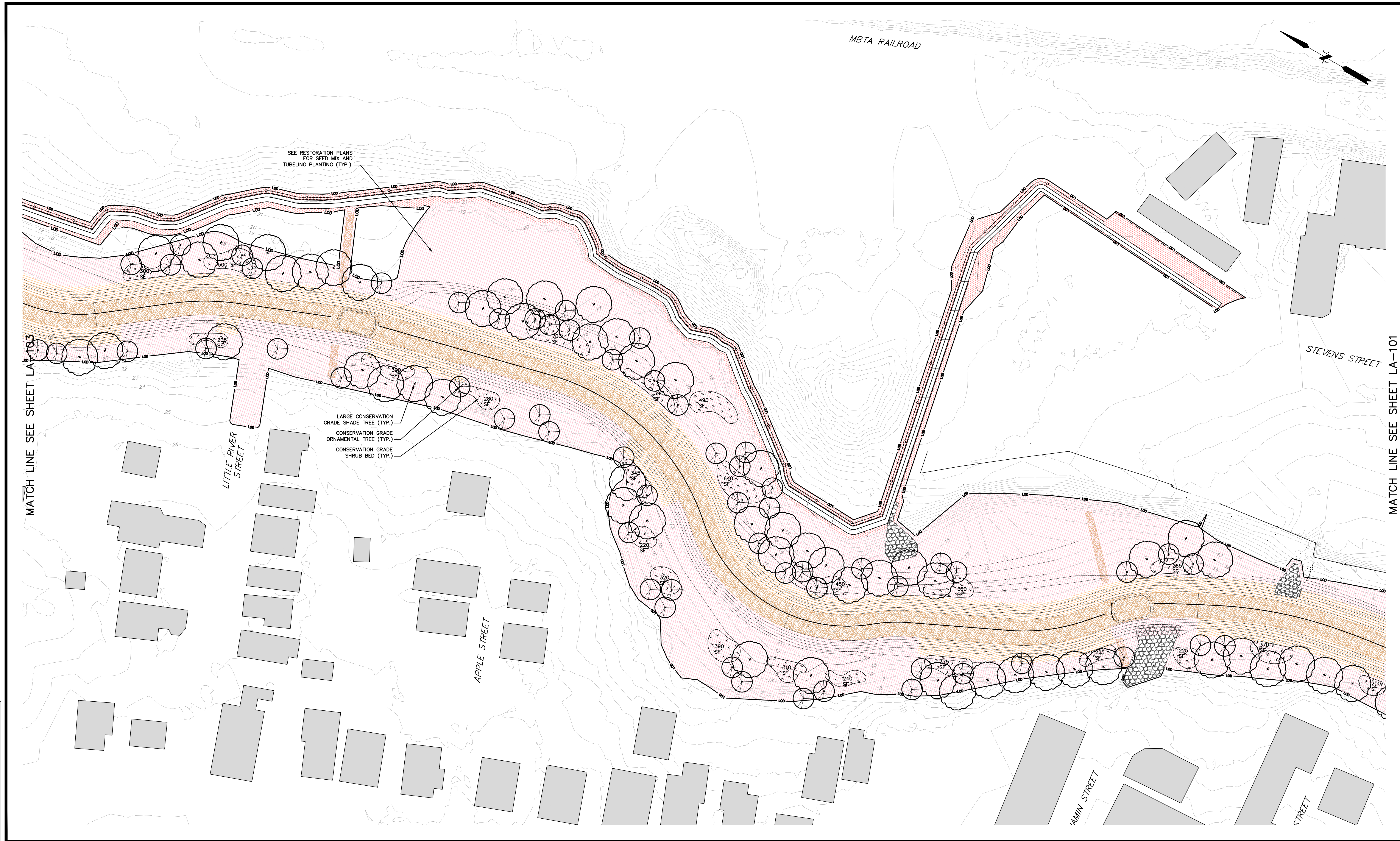


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CITY OF HAVERHILL  
 LANDSCAPE AND PLANTING  
 PLAN NO. 1  
 LITTLE RIVER DAM REMOVAL AND RIVER RESTORATION  
 HAVERHILL MASSACHUSETTS

PROJ. No.: 20170390 U40  
 DATE: FEBRUARY 6, 2026  
**LA-101**

File: J:\DWG\2017\0390\U30\Civil\Plan\20170390\U30\_LND01.dwg Plotted: 2024-12-11 6:22 PM Saved: 2024-12-11 6:20 PM User: claire.nauman  
 LAYER STATE: PC3: NONE STB/CTB: FO STB



No.	DATE	DESCRIPTION	DESIGNER	REVIEWER



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SCALE:  
 HORZ.: 1"= 30'  
 VERT.:  
 DATUM:  
 HORZ.: NAD83  
 VERT.: NAVD88  
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 GRAPHIC SCALE

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CITY OF HAVERHILL  
 LANDSCAPE AND PLANTING  
 PLAN NO. 2  
 LITTLE RIVER DAM REMOVAL AND RIVER RESTORATION  
 HAVERHILL MASSACHUSETTS

PROJ. No.: 20170390.U40  
 DATE: DECEMBER 16, 2024  
**LA-102**

File: J:\DWG\2017\0390\U30\Civil\Plan\20170390U30\_LND01.dwg Layout: LA-103 Plotted: 2024-12-11 6:22 PM Saved: 2024-12-11 6:20 PM User: claire.nauman  
 PC3: NONE STB/CTB: FO STB  
 LAYER STATE:



MATCH LINE SEE SHEET LA-104

MATCH LINE SEE SHEET LA-102

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER



SEAL

SCALE:  
 HORZ.: 1"= 30'  
 VERT.:  
 DATUM:  
 HORZ.: NAD83  
 VERT.: NAVD88

GRAPHIC SCALE

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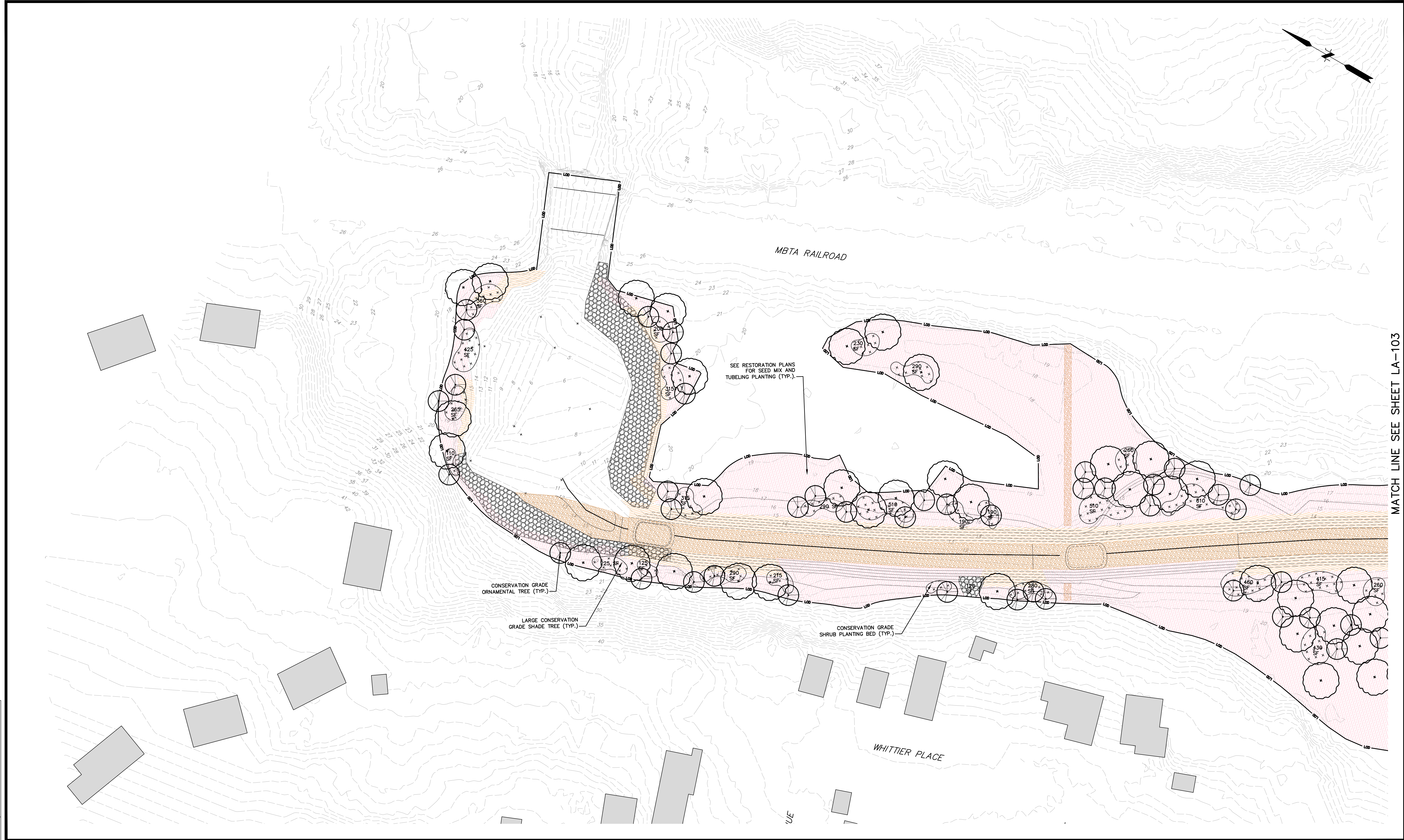
CITY OF HAVERHILL  
 LANDSCAPE AND PLANTING  
 PLAN NO. 3  
 LITTLE RIVER DAM REMOVAL AND RIVER RESTORATION  
 HAVERHILL MASSACHUSETTS

PROJ. No.: 20170390.U40  
 DATE: DECEMBER 16, 2024  
**LA-103**

File: J:\DWG\2017\0390\U30\Civil\Plan\20170390\U30\_LND01.dwg Layout: LA-104 Plotted: 2024-12-11 6:22 PM Saved: 2024-12-11 6:20 PM User: claire.nauman

PC3: NONE STB/CTB: FO STB

LAYER STATE:



MATCH LINE SEE SHEET LA-103

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER



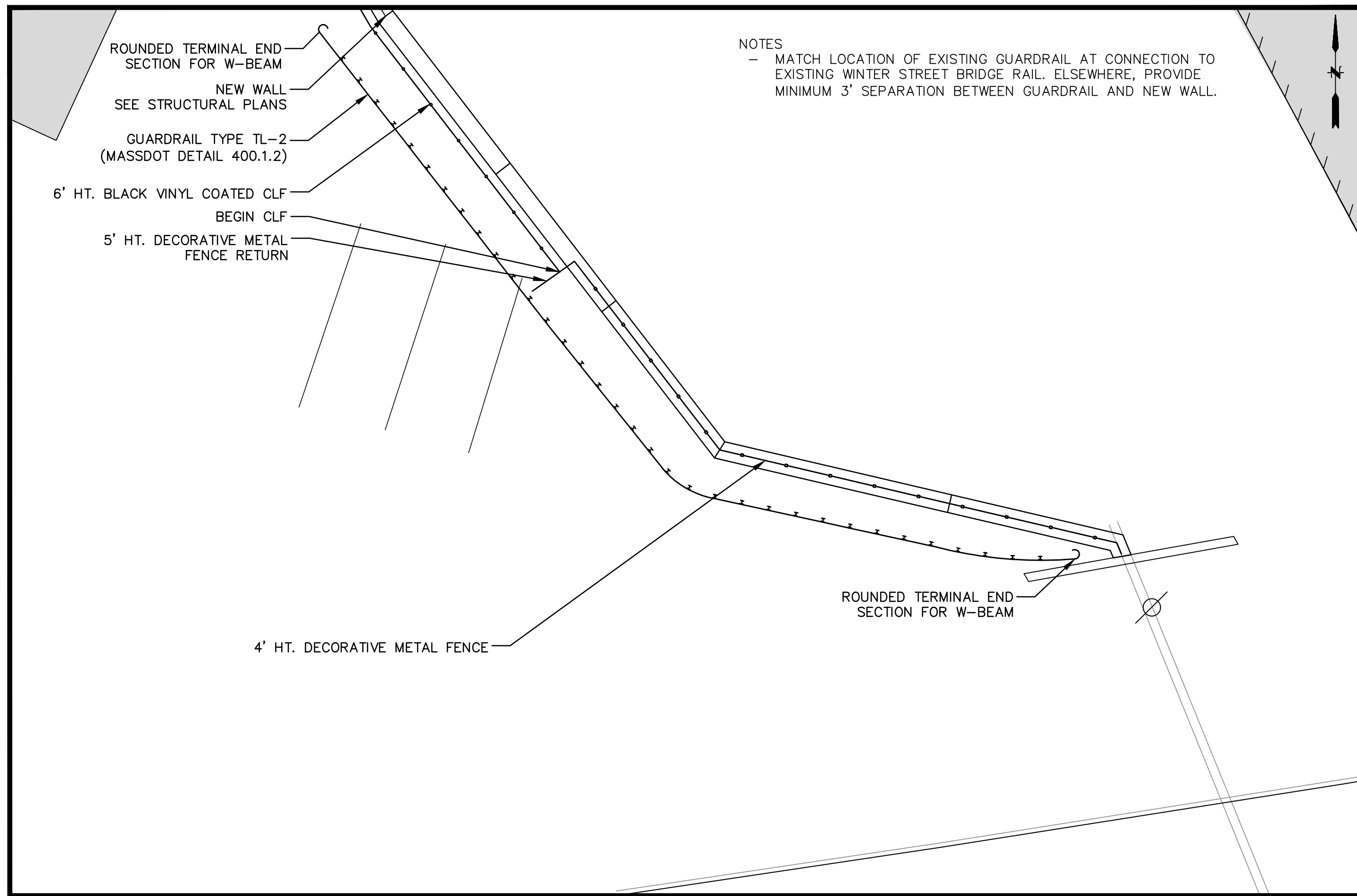
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 GRAPHIC SCALE

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CITY OF HAVERHILL  
 LANDSCAPE AND PLANTING  
 PLAN NO. 4  
 LITTLE RIVER DAM REMOVAL AND RIVER RESTORATION  
 HAVERHILL MASSACHUSETTS

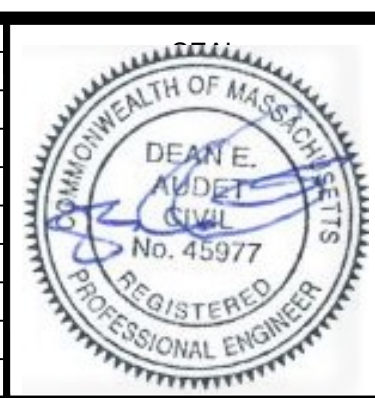
PROJ. No.: 20170390.U40  
 DATE: DECEMBER 16, 2024  
**LA-104**



1 BASE BID: RETAINING WALL - SITE PLAN ENLARGEMENT  
SCALE: 1" = 10'

File: J:\DWG\IP\2017\0390\U30\Civil\Plan\20170390\U30\_LND01.dwg Layout: LA-105 Plotted: 2024-12-16 8:24 AM Saved: 2024-12-16 8:21 AM User: claire.nauman  
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 LAYER STATE:

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER



SEAL

SCALE:  
 HORZ.: 1" = 10'  
 VERT.:  
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 HORZ.: NAD83  
 VERT.: NAVD88

GRAPHIC SCALE

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CITY OF HAVERHILL

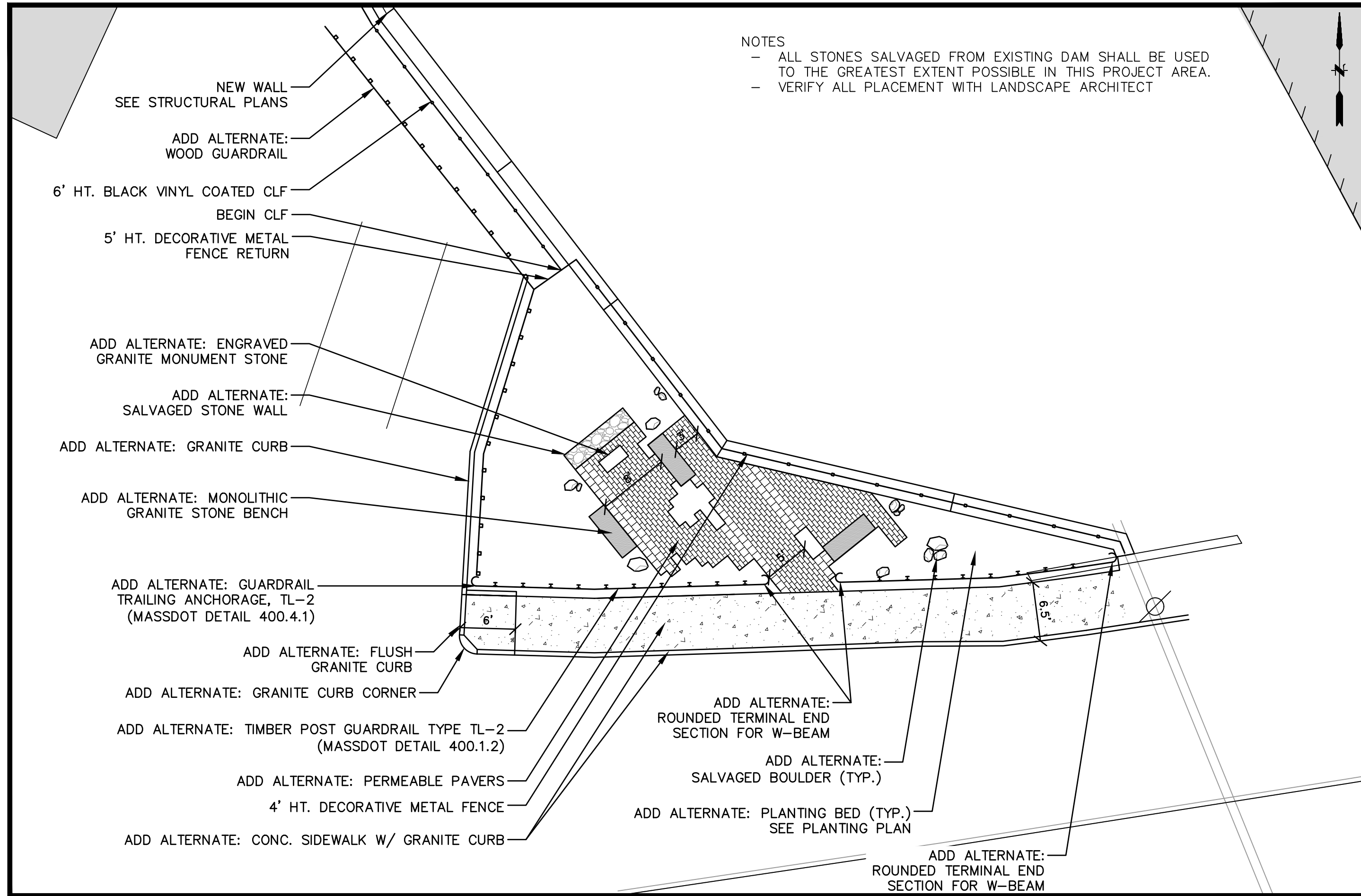
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LITTLE RIVER DAM REMOVAL AND RIVER RESTORATION

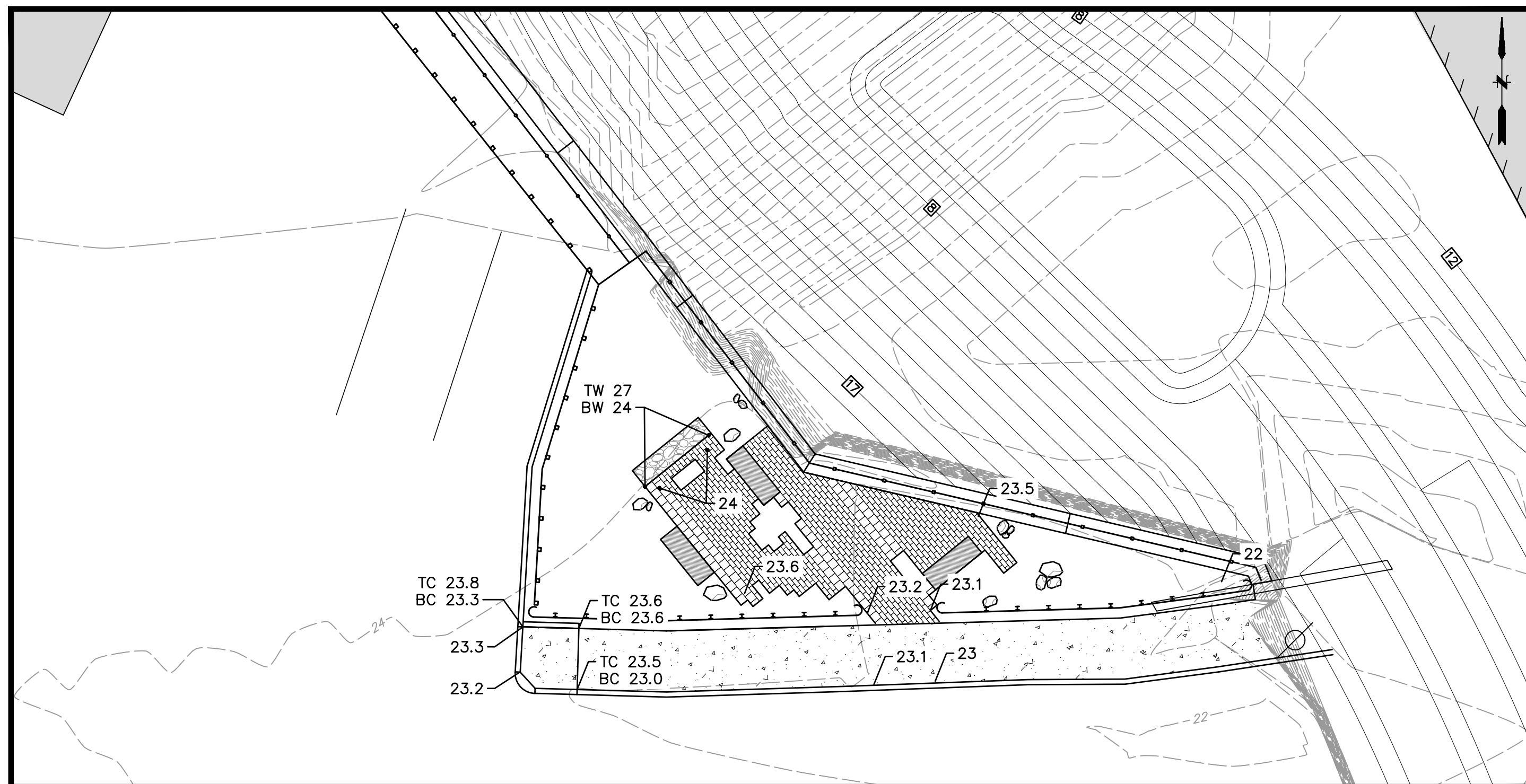
HAVERHILL MASSACHUSETTS

PROJ. No.: 20170390.U40  
 DATE: DECEMBER 16, 2024

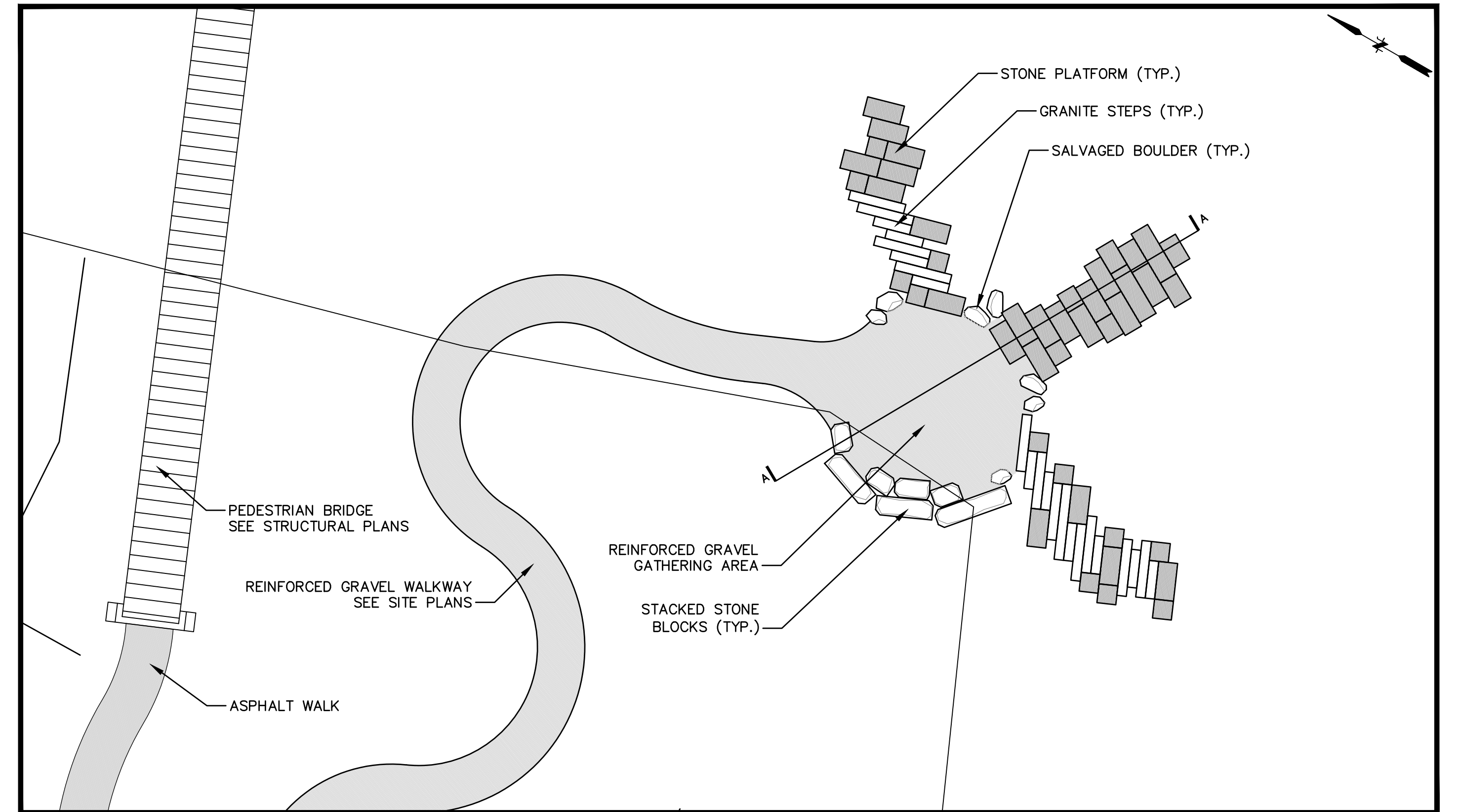
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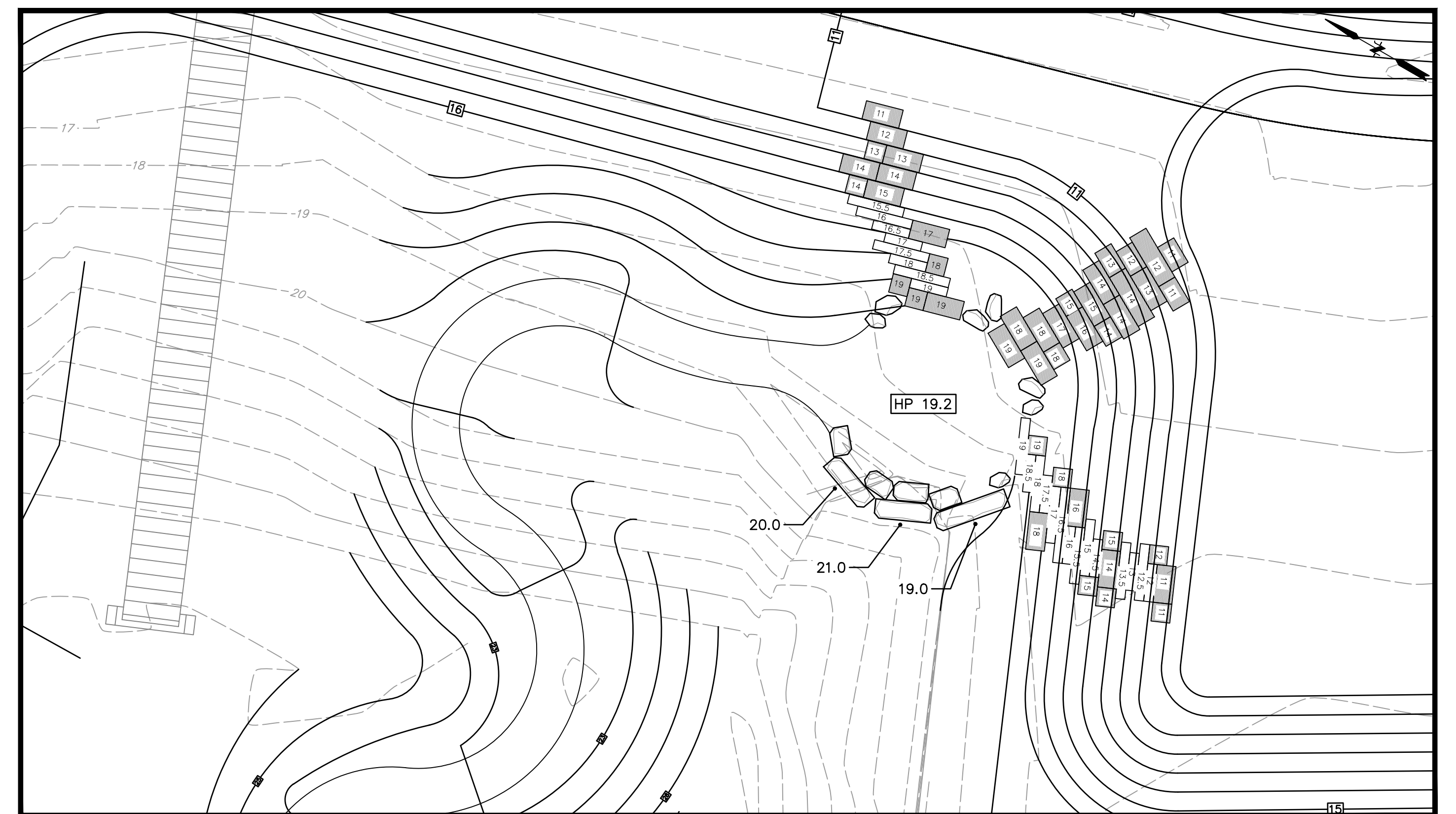
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SCALE: 1" = 10'



2 ADD ALTERNATE: OVERLOOK - GRADING PLAN ENLARGEMENT  
SCALE: 1" = 10'



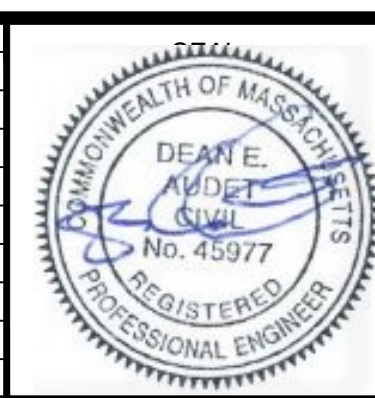
3 ADD ALTERNATE: CASHMAN'S PARK - SITE PLAN  
SCALE: 1" = 10'



4 ADD ALTERNATE: CASHMAN'S PARK - GRADING PLAN  
SCALE: 1" = 10'

File: J:\DWG\2017\0390\U30\Civil\Plan\20170390\U30\_LND01.dwg Plotted: 2024-12-11 6:24 PM Saved: 2024-12-11 6:20 PM User: claire.nauman  
LAYER STATE: PC3: NONE STB/CTB: FO STB

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER



SEAL

SCALE:  
HORZ.: 1" = 10'  
VERT.:  

DATUM:  
HORZ.: NAD83  
VERT.: NAVD88

GRAPHIC SCALE

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CITY OF HAVERHILL

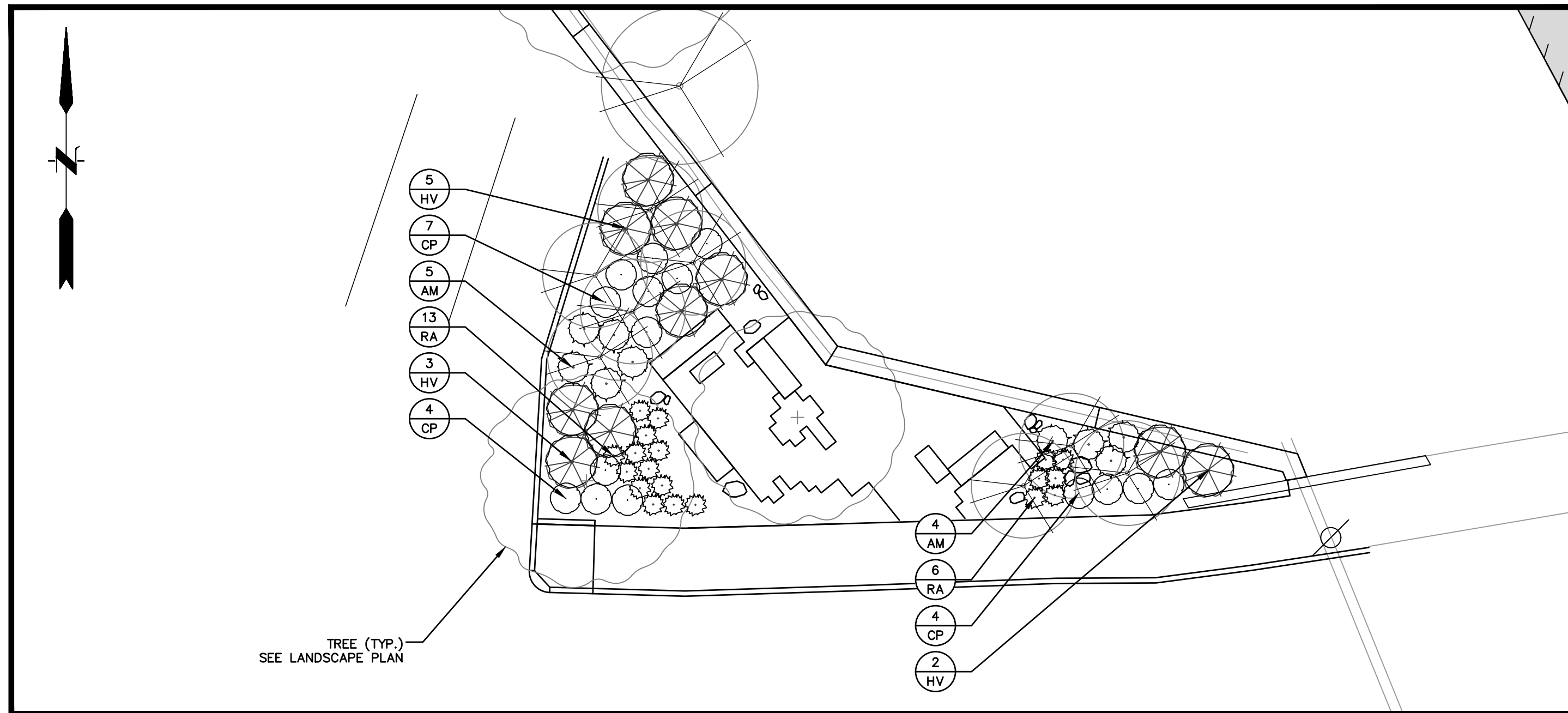
SITE PLAN ENLARGEMENTS

LITTLE RIVER DAM REMOVAL AND RIVER RESTORATION

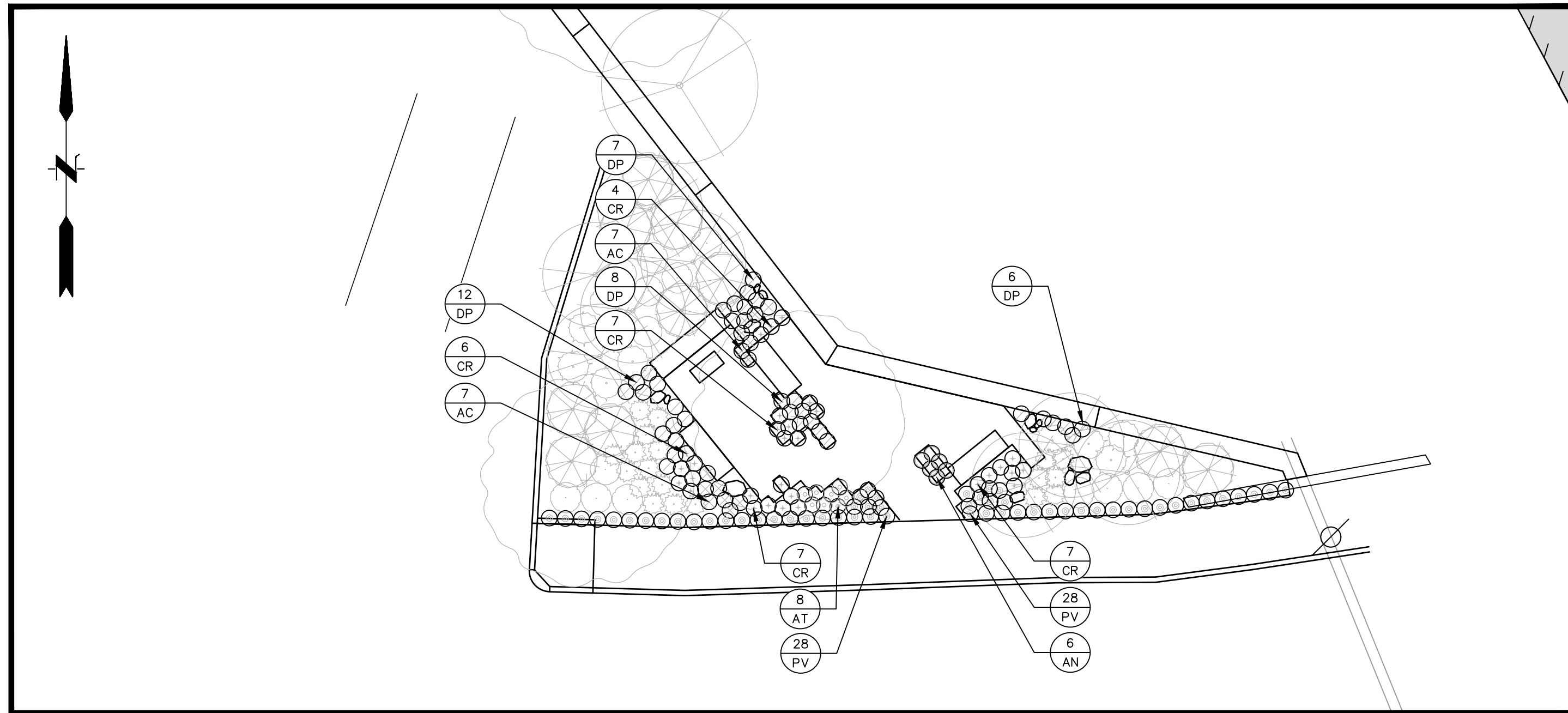
HAVERHILL MASSACHUSETTS

PROJ. No.: 20170390.U40  
DATE: DECEMBER 16, 2024

**LA-106**



**1 OVERLOOK - SHRUB PLANTING ENLARGEMENT**  
SCALE: 1" = 10'



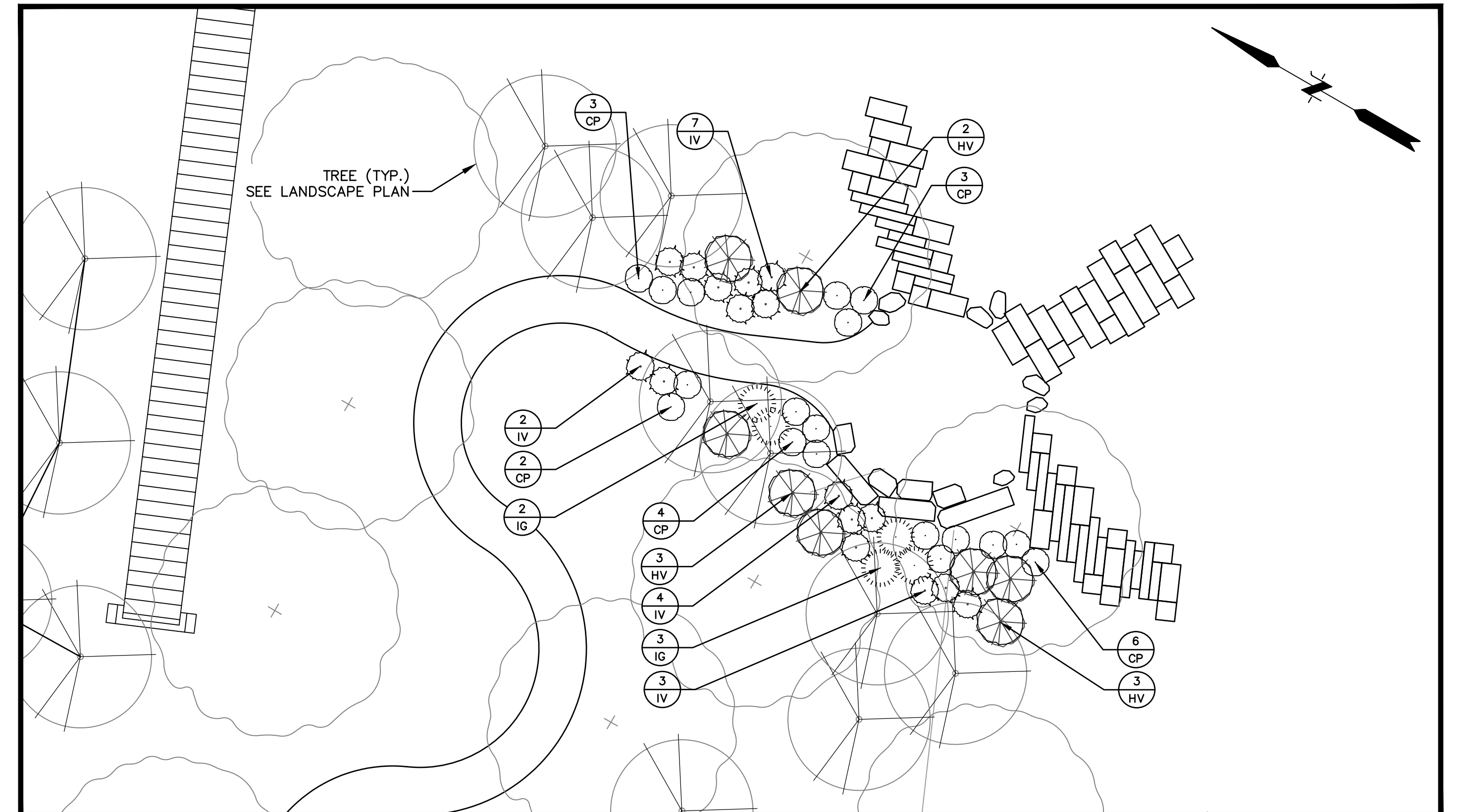
**2 OVERLOOK - PERENNIAL PLANTING ENLARGEMENT**  
SCALE: 1" = 10'

**LANDSCAPE GRADE PLANT LIST**

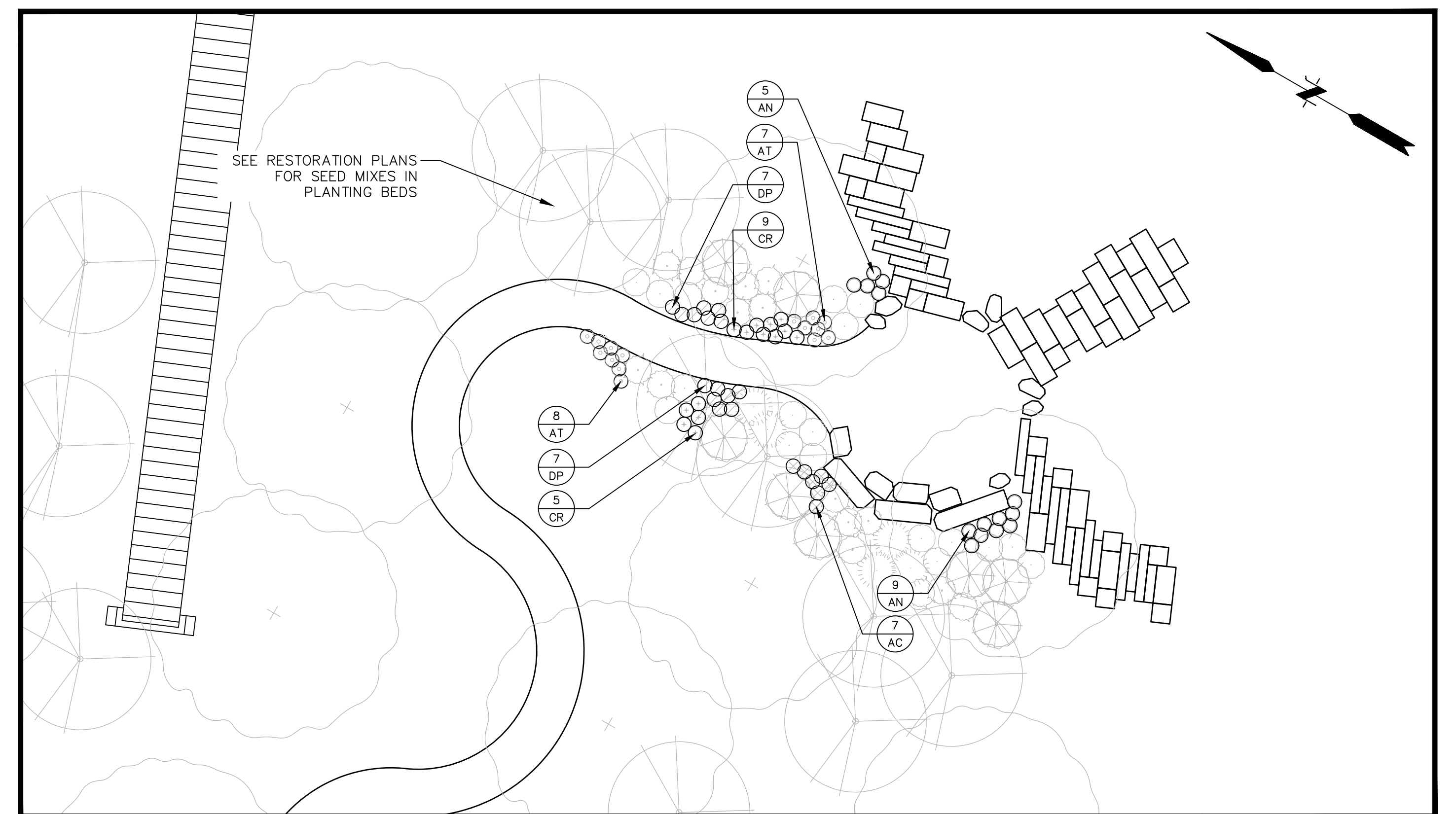
KEY	BOTANICAL NAME	COMMON NAME	QTY	SIZE
<b>SHRUBS</b>				
AM	ARONIA MELANOCARPA	BLACK CHOKEBERRY	9	3 GAL.
CP	CLETHRA ALNIFOLIA	SWEET PEPPERBUSH	33	3 GAL.
HV	HAMAMELUS VIRGINIANA	WITCH HAZEL	18	5-6' HT.
IG	ILEX GLABRA	INKBERRY	5	5 GAL.
IV	ILEX VERTICILLATA 'RED SPRITE'	RED SPRITE WINTERBERRY	16	3 GAL.
RA	RHUS AROMATICA 'GRO LOW'	GRO LOW SUMAC	19	3 GAL.

**PERENNIALS AND GRASSES**

CR	CAREX ROSEA	ROSY SEDGE	45	1 GAL.
PV	PANICUM VIRGATUM	SWITCHGRASS	56	1 GAL.
DP	DENNSTAEDIA PUNCTLOBULA	HAY-SCENTED FERN	47	1 GAL.
AC	AQUILEGIA CANADENSIS	RED COLUMBINE	21	1 GAL.
AT	ASCLEPIAS TUBEROSA	BUTTERFLY MILKWEED	23	1 GAL.
AN	ASTER NOVAE-ANGLIAE	NEW ENGLAND ASTER	20	1 GAL.



**3 CASHMAN'S PARK - SHRUB PLANTING ENLARGEMENT**  
SCALE: 1" = 10'



**4 CASHMAN'S PARK - PERENNIAL PLANTING ENLARGEMENT**  
SCALE: 1" = 10'

File: J:\DWG\2017\0390\U30\CivilPlan\20170390\U30.dwg Layout: LA-107 Plotted: 2024-12-11 6:25 PM Saved: 2024-12-11 6:20 PM User: claire.nauman  
 LAYER STATE: PC3: NONE STB/CTB: FO STB

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER



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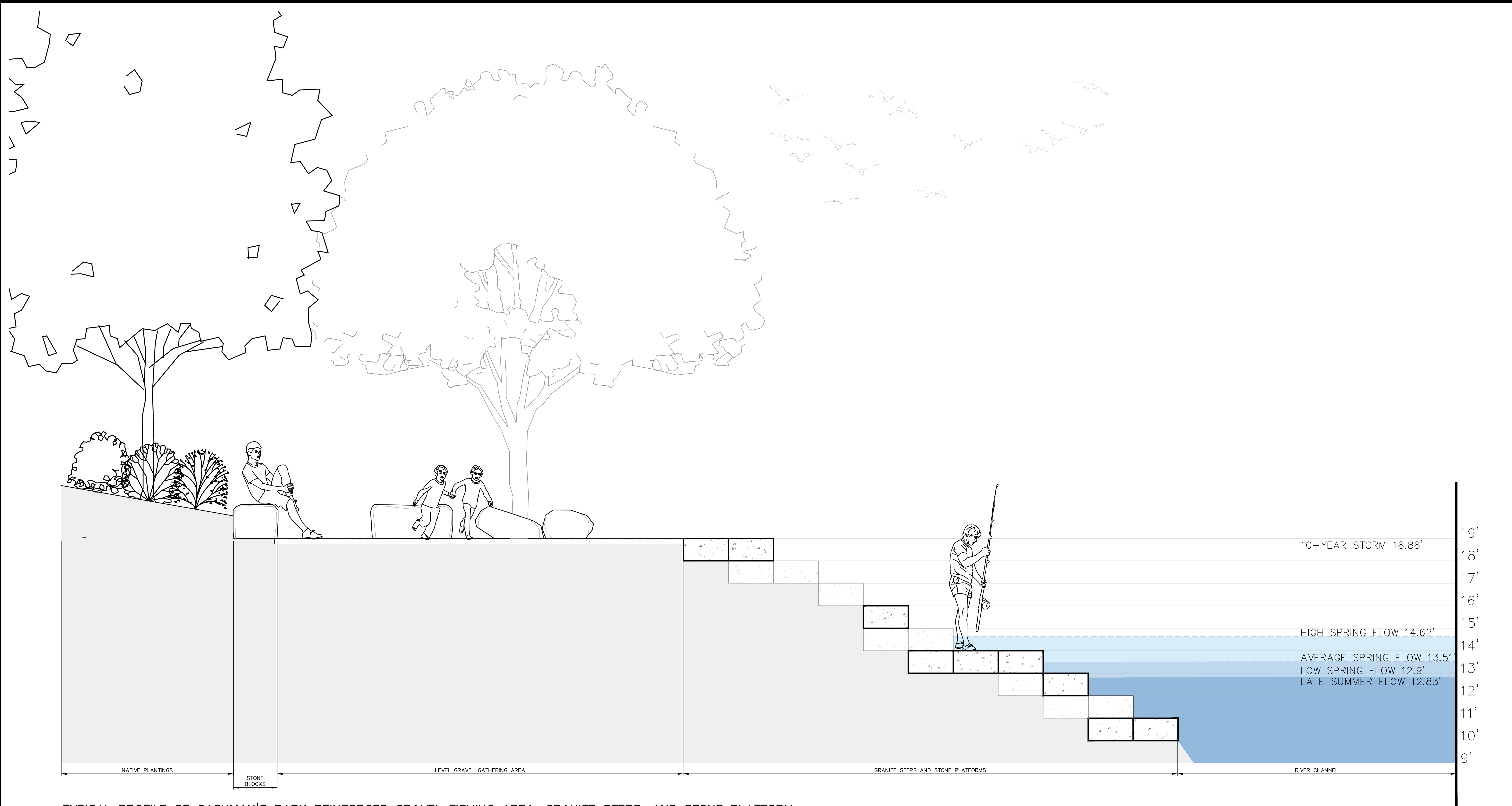
SCALE:	HORIZ.: 1" = 10'
	VERT.:
DATUM:	HORIZ.: NAD83
	VERT.: NAVD88
GRAPHIC SCALE	

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CITY OF HAVERHILL  
 ADD ALTERNATE: PLANTING  
 PLAN ENLARGEMENTS  
 LITTLE RIVER DAM REMOVAL AND RIVER RESTORATION  
 HAVERHILL MASSACHUSETTS

PROJ. No.: 20170390.U40  
 DATE: DECEMBER 16, 2024  
**LA-107**

File: J:\DWG\2017\0390\U30\Civil\Plan\20170390\U30\_DET01.dwg Layout: LA-108 Plotted: 2024-12-11 6:05 PM Saved: 2024-12-11 3:40 PM User: claire.nauman  
 PC3: AUTOCAD PDF (GENERAL DOCUMENTATION) PC3\_STB/CTB: FO STB  
 LAYER STATE:



TYPICAL PROFILE OF CASHMAN'S PARK REINFORCED GRAVEL FISHING AREA, GRANITE STEPS, AND STONE PLATFORM  
 NOT TO SCALE

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER



SEAL

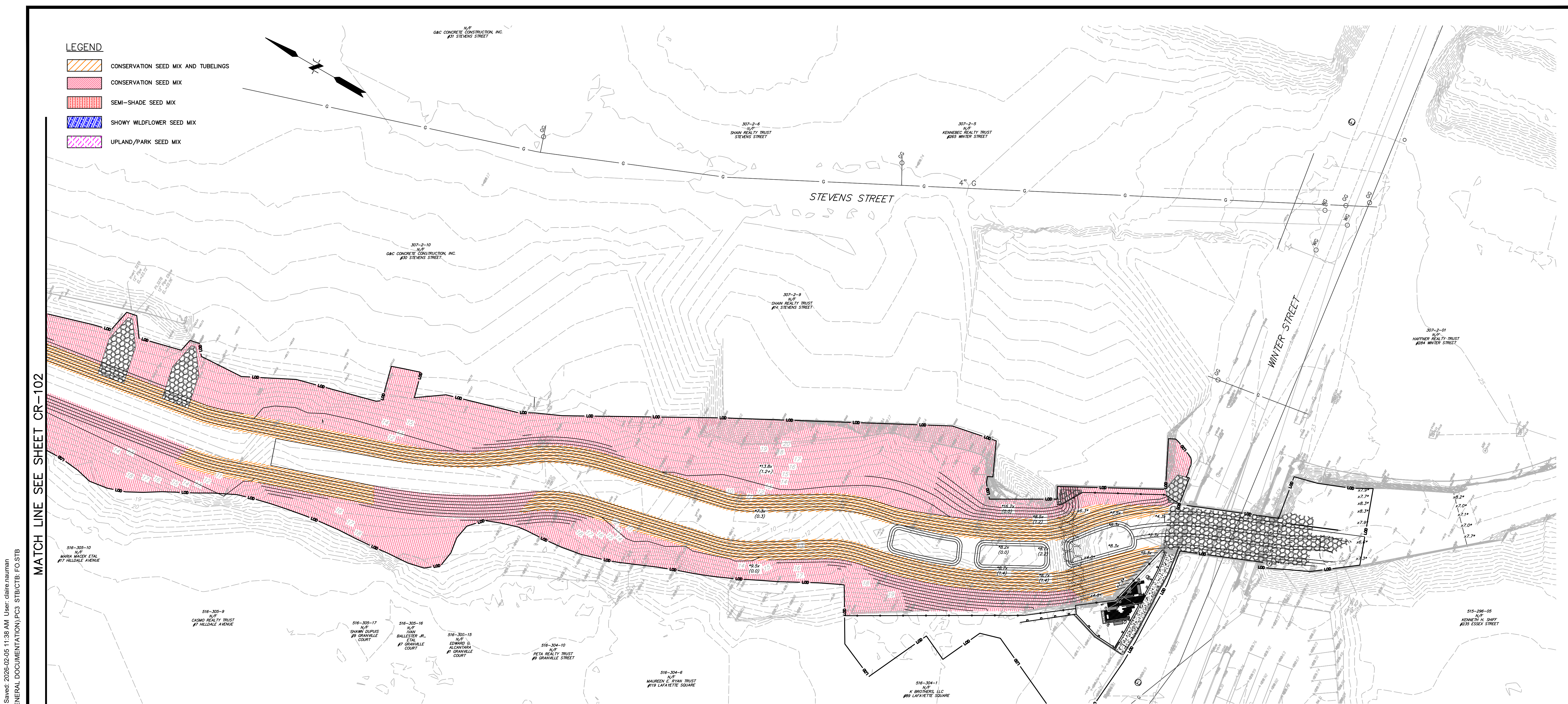
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 VERT.:  
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 HORZ.: NAD83  
 VERT.: NAVD88

GRAPHIC SCALE

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CITY OF HAVERHILL  
 ADD ALTERNATE: FISHING AREA TYPICAL  
 PROFILE  
 LITTLE RIVER DAM REMOVAL AND RIVER RESTORATION  
 HAVERHILL MASSACHUSETTS

PROJ. No.: 20170390.U40  
 DATE: DECEMBER 16, 2024  
**LA-108**



**LEGEND**

	CONSERVATION SEED MIX AND TUBELINGS
	CONSERVATION SEED MIX
	SEMI-SHADE SEED MIX
	SHOWY WILDFLOWER SEED MIX
	UPLAND/PARK SEED MIX

MATCH LINE SEE SHEET CR-102

**NEW ENGLAND CONSERVATION/WILDFLOWER MIX (CONSERVATION SEED MIX)**

KEY	BOTANICAL NAME	COMMON NAME	IND.
	ELYMUS VIRGINICUS	VIRGINIA WILD RYE	FACW
	SCHIZACHYRIUM SCOPARIUM	LITTLE BLUESTEM	FACU
	ANDROPOGON GERARDII	BIG BLUESTEM	FAC
	FESTUCA RUBRA	RED FESCUE	FACU
	PANICUM VIRGATUM	SWITCH GRASS	FAC
	CHAMAECRISTA FASCICULATA	PARTRIDGE PEA	FACU
	DESMODIUM CANADENSE	SHOWY TICK TREFLOIL	FAC
	SORGHASTRUM NUTANS	INDIAN GRASS	UPL
	ASCLEPIAS TUBEROSA	BUTTERFLY MILKWEED	NI
	BIDENS FRONDOSA	BEGGAR TICKS	FACW
	RUDEBECKIA HIRTA	BLACK EYED SUSAN	FACU
	EUPATORIUM PURPUREUM	PURPLE JOE PYE WEED	FAC
	ASTER PILOSUS	HEATH OR HAIRY ASTER	UPL
	SOLIDAGO JUNCEA	EARLY GOLDENROD	NI

CONSERVATION SEED MIX  
 APPLICATION RATE: CONSERVATION SEED MIX = 25 LBS/ACRE  
 AREA: CONSERVATION SEED MIX = 6.07-ACRES

**NEW ENGLAND SHOWY WILDFLOWER MIX (SHOWY WILDFLOWER SEED MIX)**

KEY	BOTANICAL NAME	COMMON NAME	IND.
	SCHIZACHYRIUM SCOPARIUM	LITTLE BLUESTEM	FACU
	CHAMAECRISTA FASCICULATA	PARTRIDGE PEA	FACU
	SORGHASTRUM NUTANS	INDIAN GRASS	UPL
	FESTUCA RUBRA	RED FESCUE	FACU
	ELYMUS CANADENSIS	CANADA WILD RYE	FACU
	ELYMUS RIPARIUS	RIVERBANK WILD RYE	FACW
	HELIOPSIS HELIANTHOIDES	OX EYE SUNFLOWER	UPL
	COREOPSIS LANCEOLATA	LANCE LEAVED COREOPSIS	FACU
	RUDEBECKIA HIRTA	BLACK EYED SUSAN	FACU
	LIATRIS SPICATA	SPIKED GAYFEATHER/MARSH BALZING STAR	FAC
	ASCLEPIAS SYRACA	COMMON MILKWEED	FACU
	VERONIA NOVEBORACENSIS	NEW YORK IRONWEED	FACW
	ASTER NOVAE-ANGLIAE	NEW ENGLAND ASTER	FACW
	EUPATORIUM PURPUREUM	PURPLE JOE PYE WEED	FAC
	ASCLEPIAS TUBEROSA	BUTTERFLY MILKWEED	NI
	SOLIDAGO JUNCEA	EARLY GOLDENROD	NI
	EUPATORIUM PERFORLIATUM	BONESET	FACW

SHOW WILDFLOWER SEED MIX  
 APPLICATION RATE: SHOWY WILDFLOWER SEED MIX = 23 LBS/ACRE  
 AREA: SHOWY WILDFLOWER SEED MIX = 0.005-ACRES

**NEW ENGLAND SEMI-SHADE GRASS AND FORBS MIX (SEMI-SHADE SEED MIX)**

KEY	BOTANICAL NAME	COMMON NAME	IND.
	ELYMUS VIRGINICUS	VIRGINIA WILD RYE	FACW
	ELYMUS CANADENSIS	CANADA WILD RYE	FACU
	FESTUCA RUBRA	RED FESCUE	FACU
	CHAMAECRISTA FASCICULATA	PARTRIDGE PEA	FACU
	LIATRIS SPICATA	SPIKED GAYFEATHER/MARSH BLAZING STAR	FAC
	ONOCLEA SENSIBILIS	SENSITIVE FERN	FACW
	ASTER PRENANTHOIDES	ZIGZAG ASTER	FAC
	EUPATORIUM FISTULOSUM	HOLLOW-STEM JOE PYE WEED	FACW
	EUPATORIUM PERFORLIATUM	BONESET	FACW
	JUNCUS TENUIS	PATH RUSH	FAC

SEMI-SHADE SEED MIX  
 APPLICATION RATE: SEMI-SHADE SEED MIX = 30 LBS/ACRE  
 AREA: SEMI-SHADE SEED MIX = 0.4-ACRES

KEY	UPLAND/PARK SEED MIX
	MIXTURE: SHALL BE IN ACCORDANCE WITH SECTION M.6.03.0-1 OF THE MASSDOT STANDARD SPECIFICATIONS FOR FLAT LAWN GRASS AREAS AND M.6.03.0-2 FOR SLOPED LAWN GRASS AREAS.
	APPLICATION RATE: 25 LBS/ACRE
	AREA: UPLAND/PARK SEED MIX 0.07-ACRES

**CONSERVATION SEED MIX AND TUBELINGS**

KEY	BOTANICAL NAME	COMMON NAME	IND.	QTY.
	ALNUS INCANA	SPECKLED ALDER	FACW	21,115
	CORNUS SERICEA	RED-OSIER DOGWOOD	NI	21,115
	SALIX DISCOLOR	PUSSY WILLOW	FACW	21,115
	SALIX SERICEA	SILKY WILLOW	OBL	21,115

CONSERVATION SEED MIX  
 APPLICATION RATE: CONSERVATION SEED MIX = 25 LBS/ACRE  
 AREA: CONSERVATION SEED MIX = 1.9-ACRES

TUBELING  
 PLANTING DENSITY: 1 TUBELING EVERY 1' ON CENTER

**RESTORATION NOTES:**

- CONSTRUCTION ACCESS ROUTES AND STAGING AREAS WITHIN CASHMAN'S PARK AREA THAT WERE PREVIOUSLY MAINTAINED AS LAWN AREA SHALL BE COVERED WITH TOPSOIL PRIOR TO SEEDING.
- DISTURBED AREAS SHALL BE RESTORED WITHIN 7 DAYS AFTER GRADING OR CONSTRUCTION ACTIVITIES HAVE TEMPORARILY OR PERMANENTLY CEASED.
- AREAS TO BE RESTORED BETWEEN SEPTEMBER THROUGH NOVEMBER SHALL BE OVERSEED WITH WINTER RYE (SECALE CEREALE) AT THE RATE OF 36LBS/ACRE IN ADDITION TO THE SPECIFIED NATIVE SEED MIX.
- APPLY SEED USING HAND BROADCAST OR SEED BROADCASTER AT SPECIFIED RATES.
- RESTORATION AREAS ALONG THE ASPHALT WALKING TRAIL SHALL BE MULCHED USING HYDROMULCH. ALL OTHER RESTORATION AREAS SHALL BE MULCHED WITH STRAW.

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER



SEAL	SEAL	
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SCALE:

HORIZ.: 1"=30'

VERT.:  

DATUM:

HORIZ.: NAD83

VERT.: NAVD88

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CITY OF HAVERHILL

SITE RESTORATION PLAN NO. 1

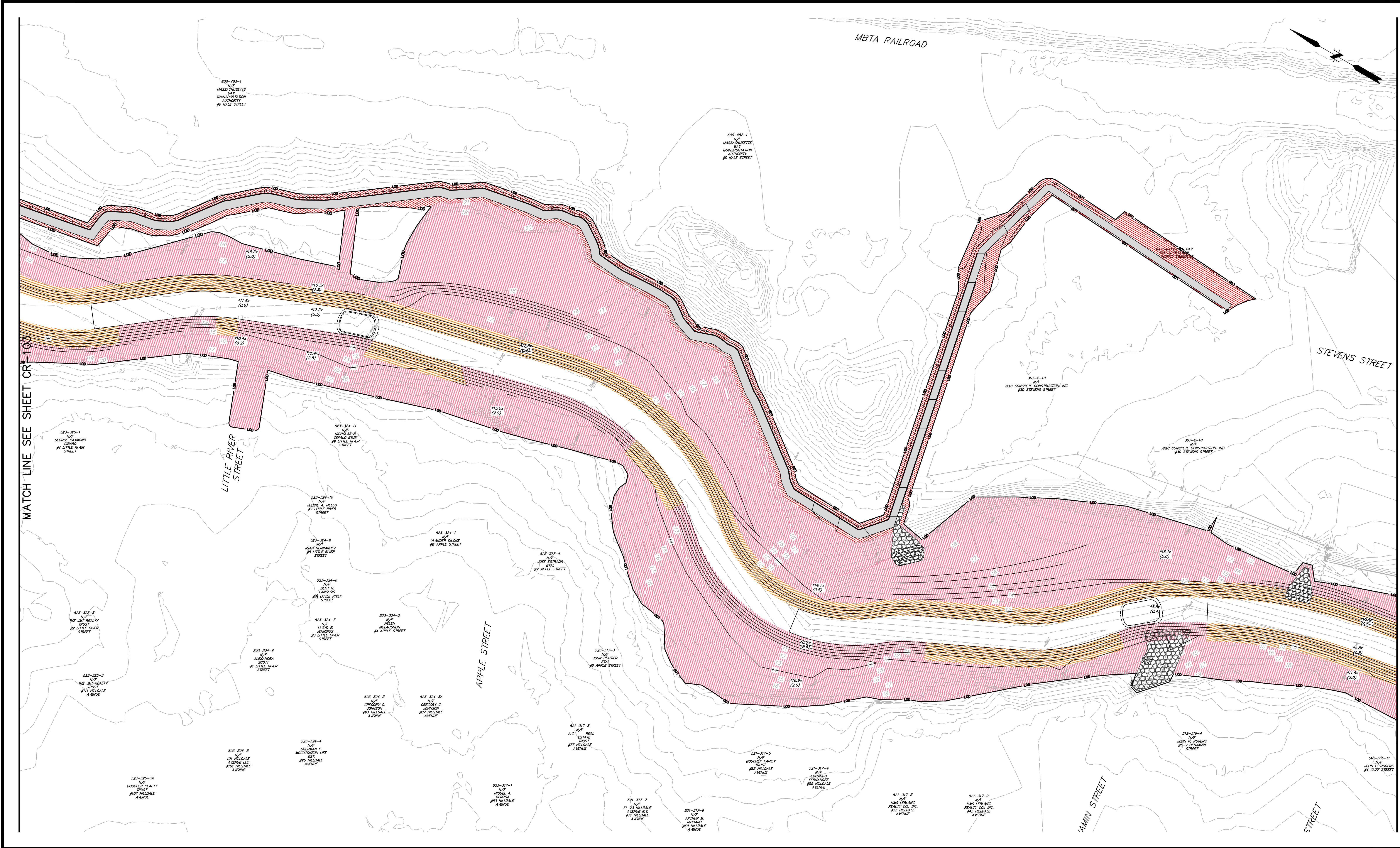
LITTLE RIVER DAM REMOVAL AND RIVER RESTORATION

HAVERHILL MASSACHUSETTS

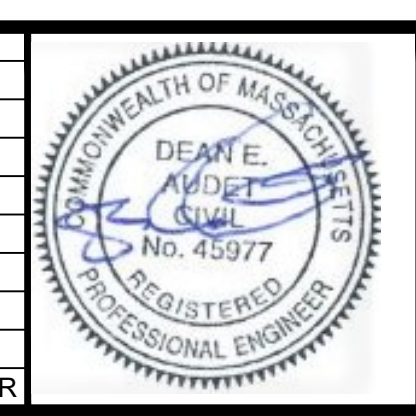
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 DATE: FEBRUARY 6, 2026

**CR-101**

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 PLOT: AUTOCAD PDF (GENERAL DOCUMENTATION) PC3 STB/CTB: FO STB  
 LAYER STATE:



No.	DATE	DESCRIPTION	DESIGNER	REVIEWER



SEAL

SCALE:  
 HORIZ.: 1"= 30'  
 VERT.:  
 DATUM:  
 HORIZ.: NAD83  
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GRAPHIC SCALE

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CITY OF HAVERHILL  
 SITE RESTORATION PLAN NO. 2  
 LITTLE RIVER DAM REMOVAL AND RIVER RESTORATION  
 HAVERHILL MASSACHUSETTS

PROJ. No.: 20170390-U40  
 DATE: DECEMBER 16, 2024  
**CR-102**

MATCH LINE SEE SHEET CR-103

MATCH LINE SEE SHEET CR-101

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PC3: NONE STB/CTB: FO STB

LAYER STATE:



No.	DATE	DESCRIPTION	DESIGNER	REVIEWER



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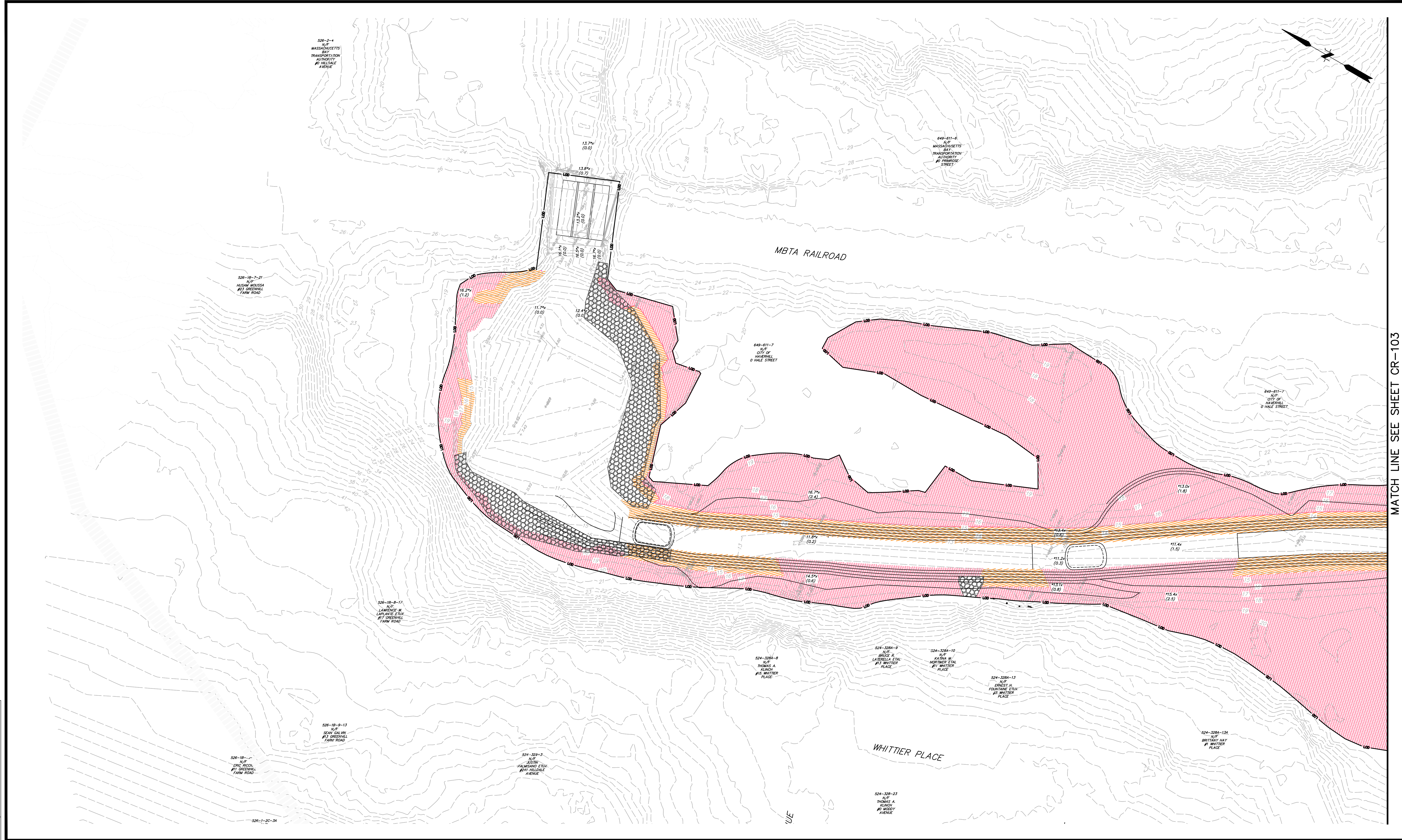
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CITY OF HAVERHILL  
 SITE RESTORATION PLAN NO. 3  
 LITTLE RIVER DAM REMOVAL AND RIVER RESTORATION  
 HAVERHILL MASSACHUSETTS

PROJ. No.: 20170390.U40  
 DATE: DECEMBER 16, 2024  
**CR-103**

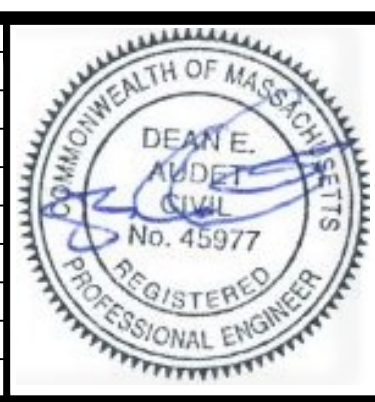
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MATCH LINE SEE SHEET CR-103

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER



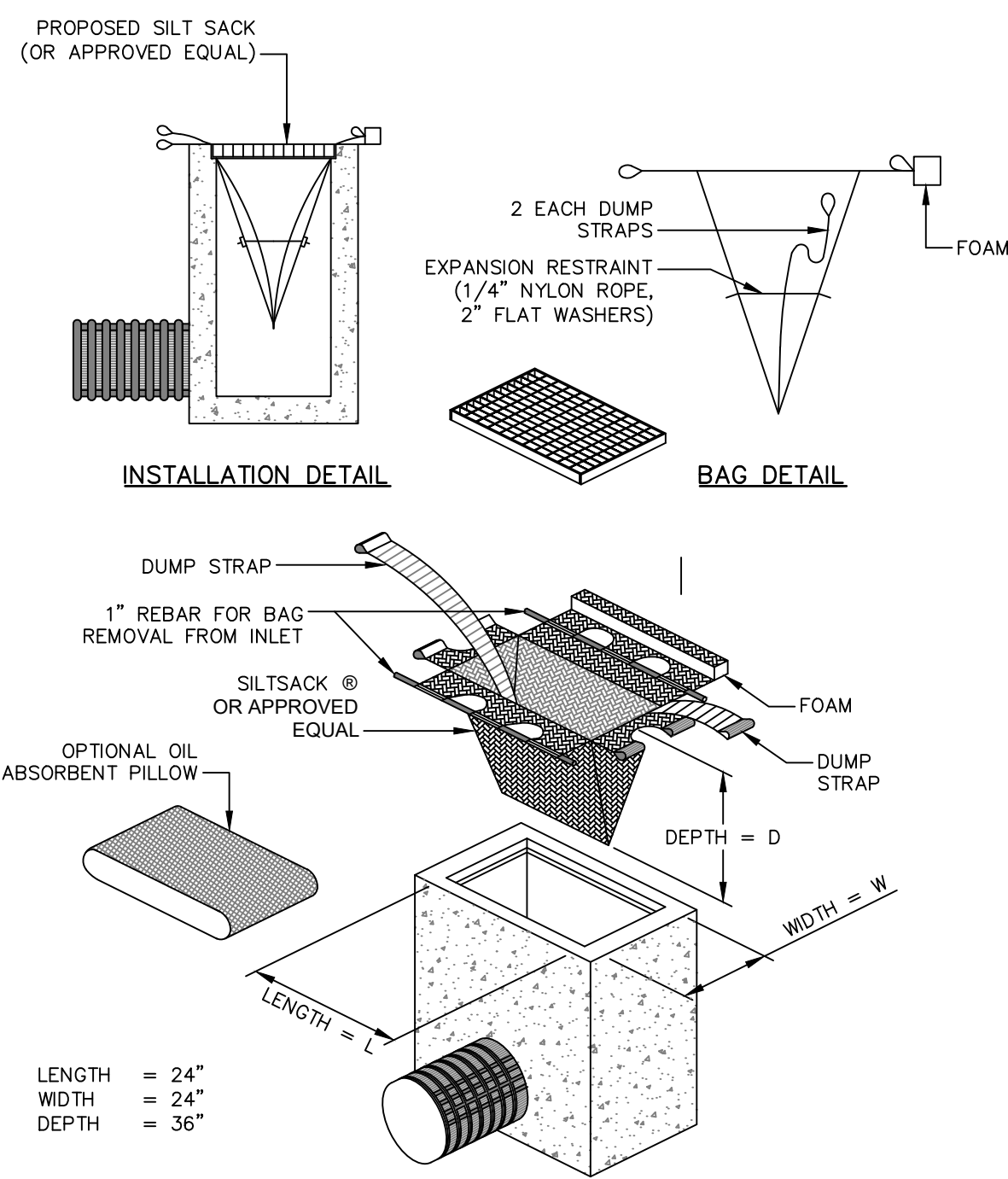
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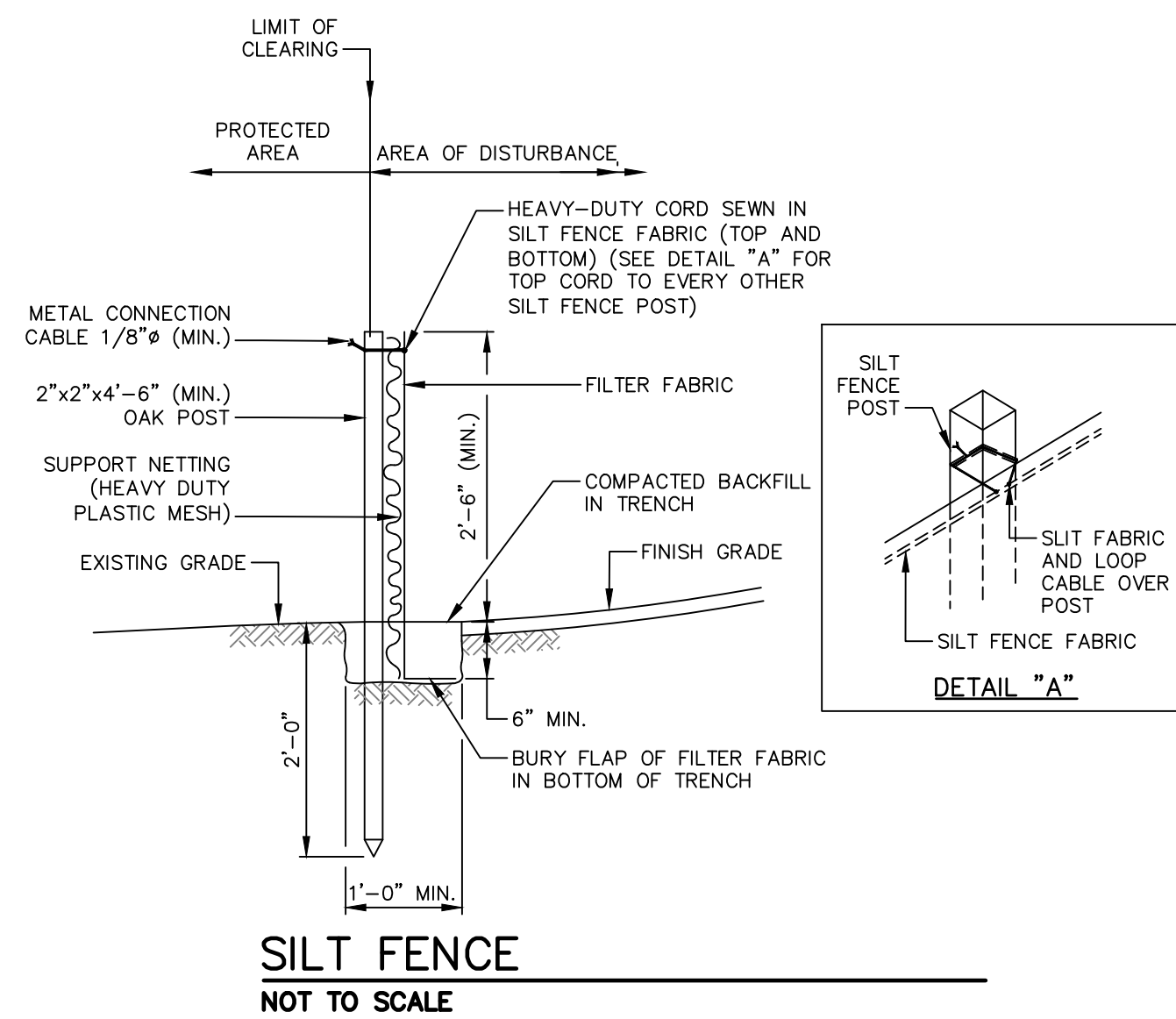
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CITY OF HAVERHILL  
 SITE RESTORATION PLAN NO. 4  
 LITTLE RIVER DAM REMOVAL AND RIVER RESTORATION  
 HAVERHILL MASSACHUSETTS

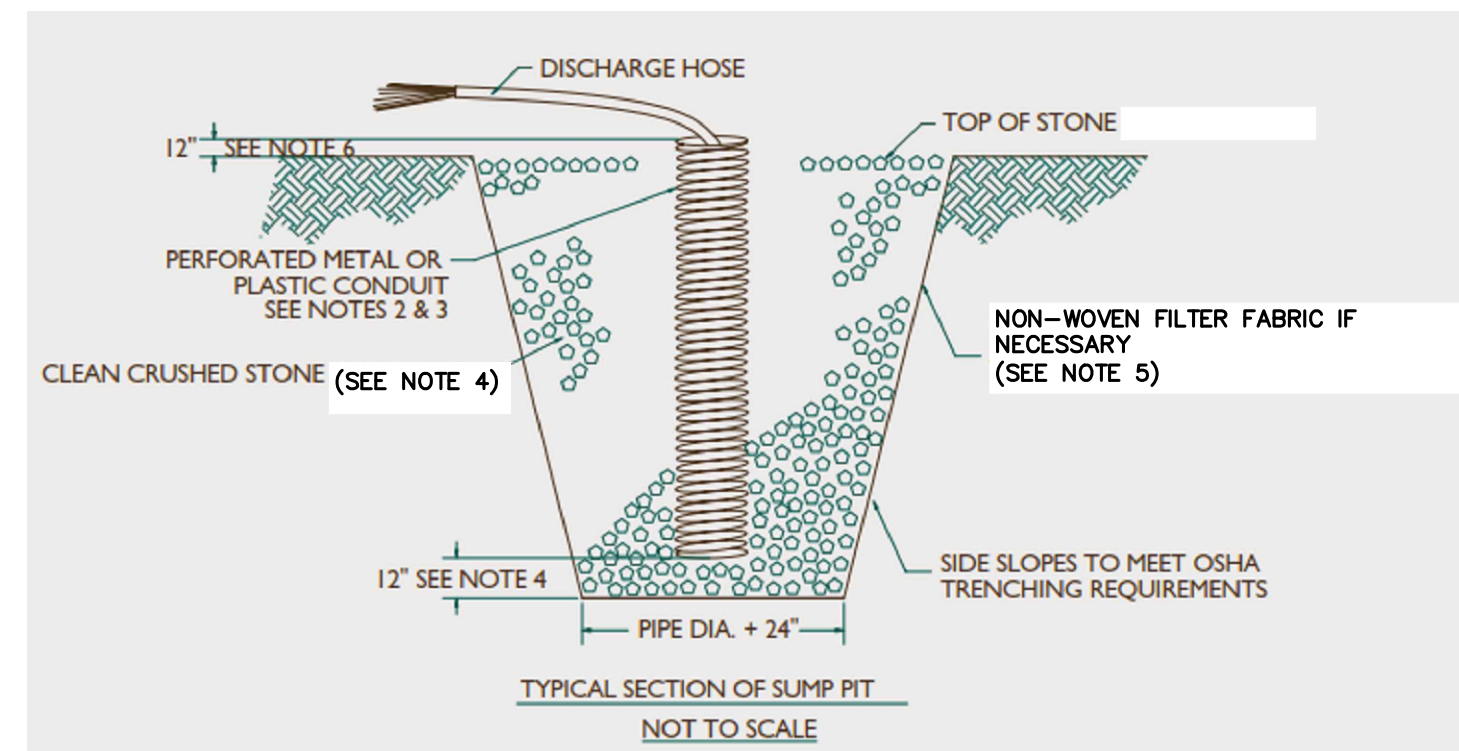
PROJ. No.: 20170390.U40  
 DATE: DECEMBER 16, 2024  
**CR-104**



**CATCH BASIN INLET PROTECTION**  
NOT TO SCALE

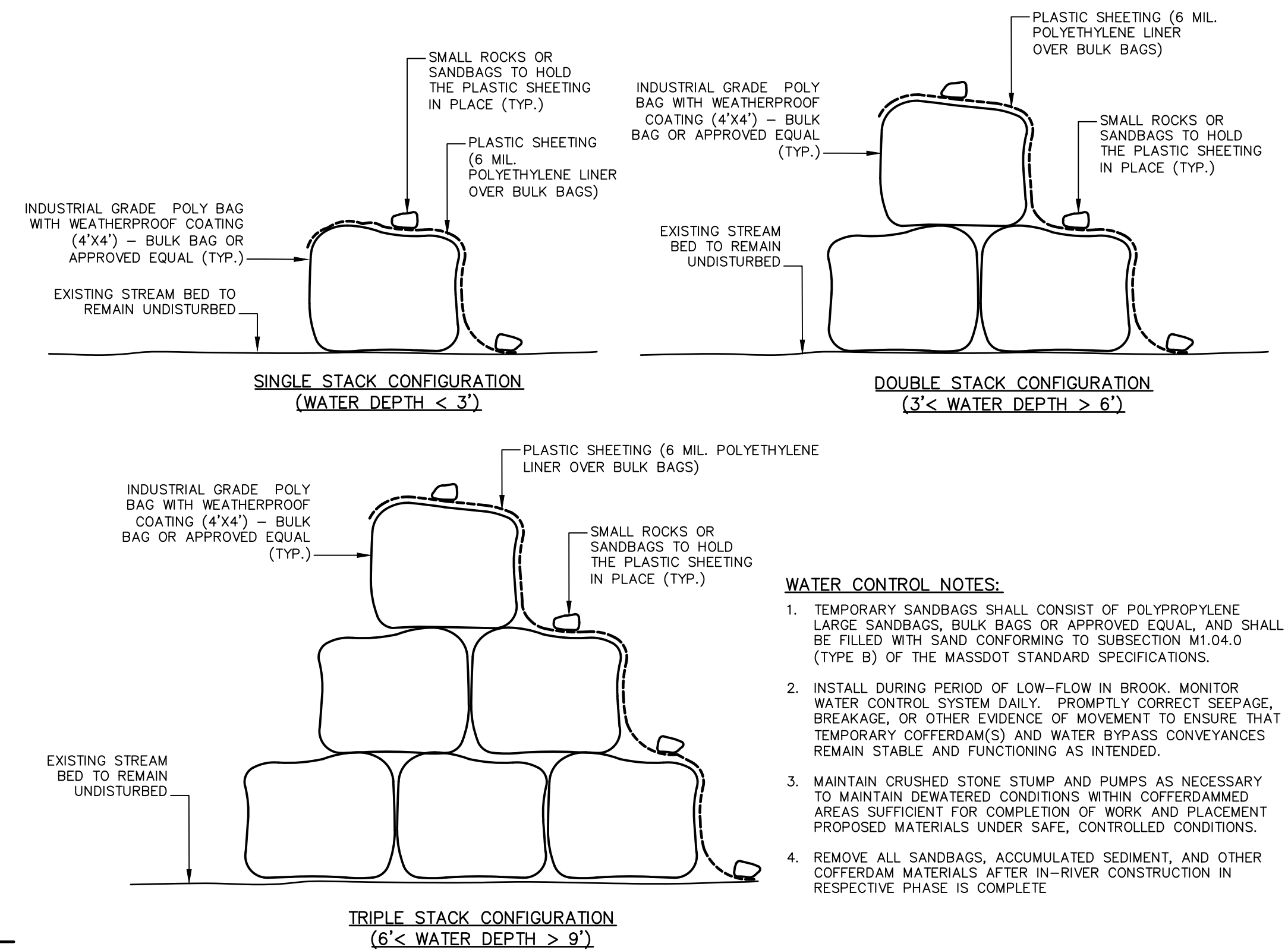


**SILT FENCE**  
NOT TO SCALE

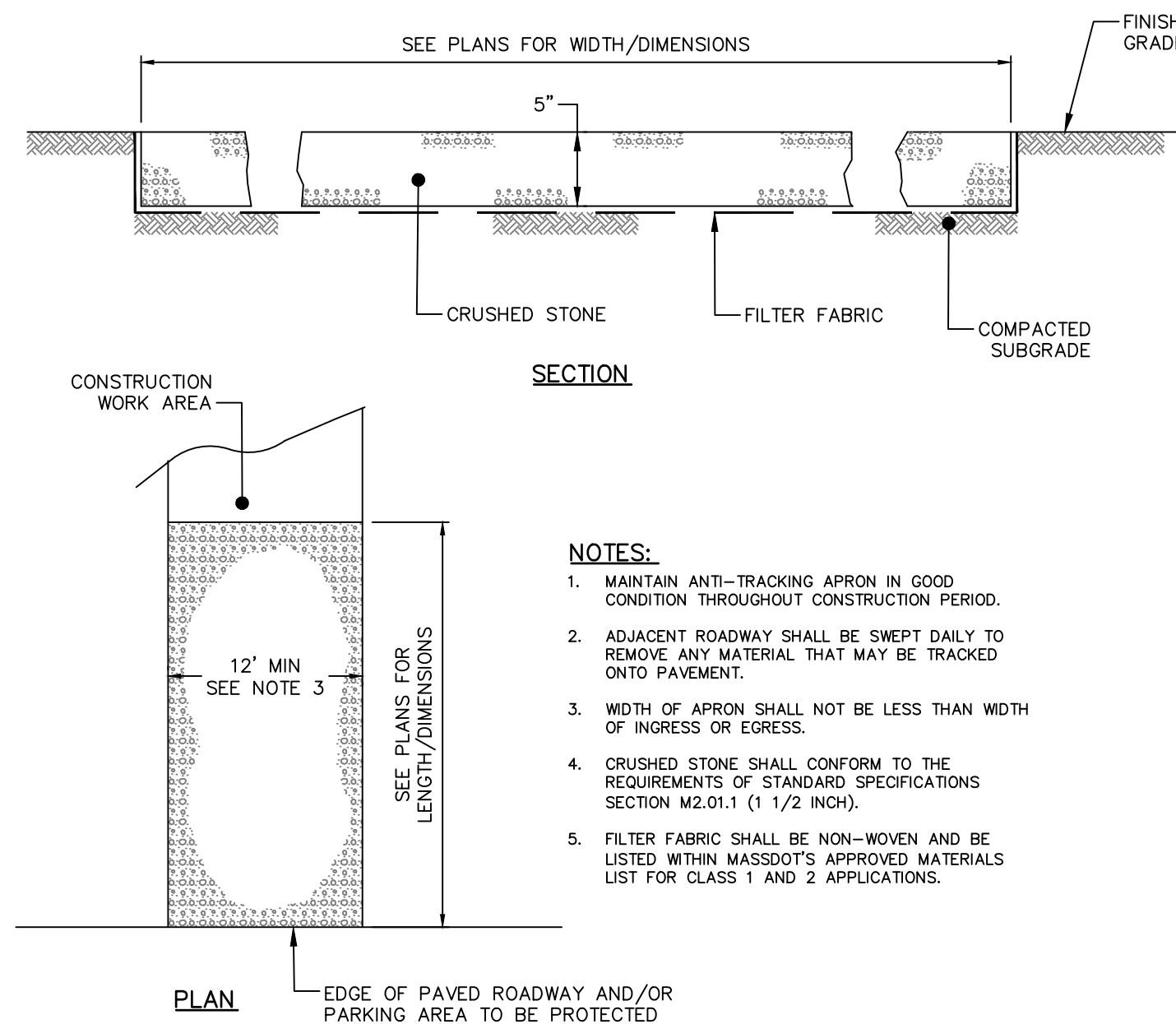


1. OVERALL SUMP PIT DIMENSIONS SHALL BE COMPATIBLE WITH ANTICIPATED SEEPAGE RATES AND PUMP SIZE TO BE USED.
2. THE STANDPIPE DIAMETER AND NUMBER OF PERFORATIONS SHALL BE COMPATIBLE WITH THE PUMP SIZE BEING USED.
3. PERFORATIONS IN THE STANDPIPE SHALL BE EITHER CIRCULAR OR SLOTS. PERFORATION SIZE SHALL NOT EXCEED 1/2" IN DIAMETER.
4. CRUSHED STONE SHALL CONFORM TO THE GRADATION LISTED FOR CRUSHED STONE IN SUBSECTION M2.01.4 OF THE MASSDOT STANDARD SPECIFICATIONS FOR 3/4" CRUSHED STONE. CRUSHED STONE SHALL EXTEND A MINIMUM OF 12" BELOW THE BOTTOM OF THE STANDPIPE.
5. IF EXCESSIVE MOVEMENT OF FINE SOIL PARTICLES FROM THE SURROUNDING EXISTING SOILS IS ANTICIPATED, A PROPERLY DESIGNED GEOTEXTILE SHALL BE PLACED BETWEEN THE EXISTING SOILS AND THE CRUSHED STONE OR GRAVEL BACKFILL.
6. THE STANDPIPE SHALL EXTEND A MINIMUM OF 12" ABOVE THE SURROUNDING GROUND.
7. WHEN USED FOR WATER CONTROL DURING THE CONSTRUCTION OF THE LOWER SLOPE AND TOE PROTECTION ASSOCIATED WITH BIOENGINEERED SLOPE STABILIZATION, TREE RETENTION SYSTEM, AND THE OUTFALL HEADWALL AND ASSOCIATED CHANNEL BOTTOM SCOUR PROTECTION; PUMP DISCHARGE MAY NEED TO BE DIVERTED THROUGH A DEWATERING BAG PRIOR TO BEING DIRECTED INTO THE BROOK IF IT IS DETERMINED BY THE ENGINEER THAT THE DISCHARGE IS TURBID OR CLOUDY.

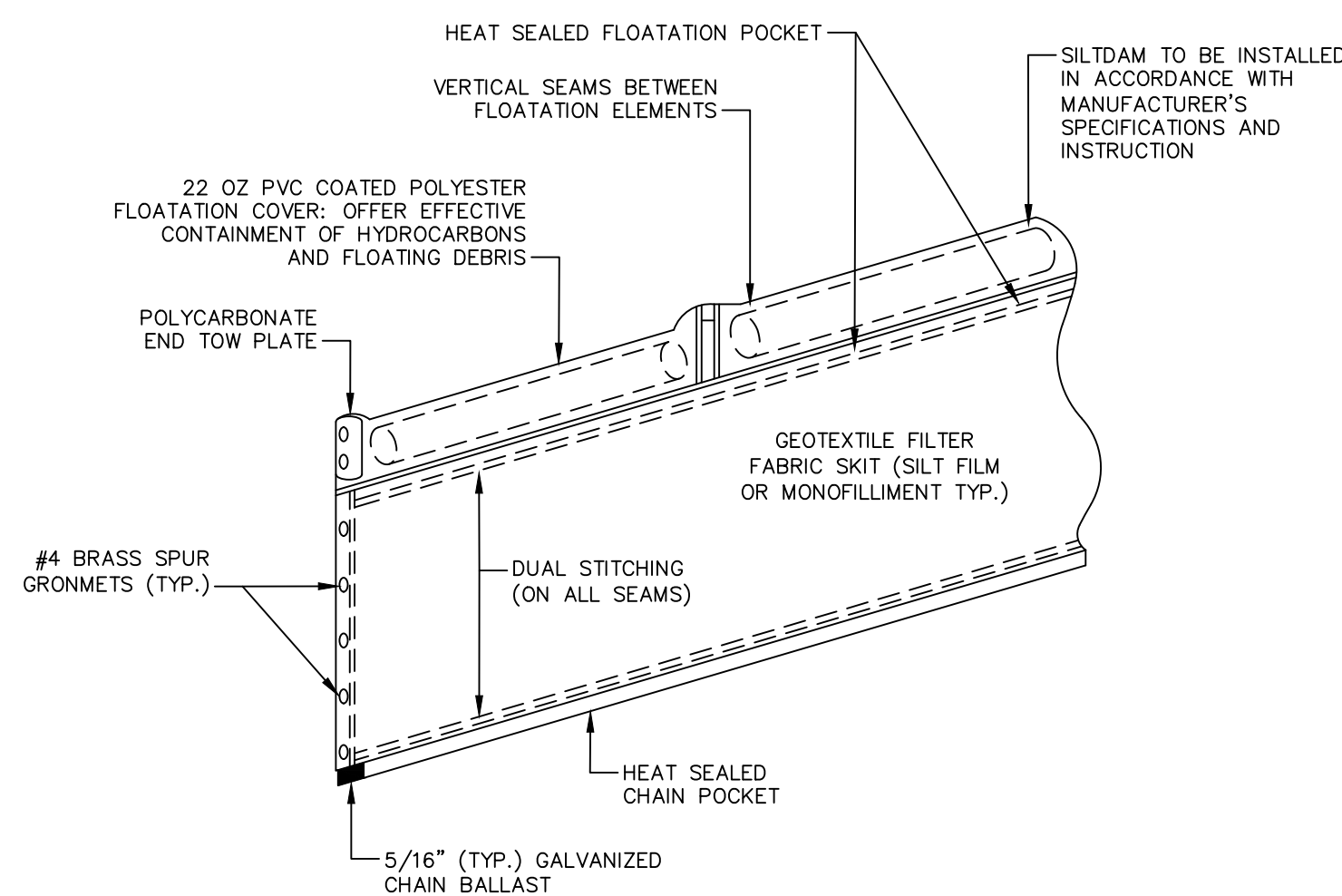
**CRUSHED STONE SUMP DETAIL**  
**(FOR CONSTRUCTION DEWATERING PUMPS)**  
NOT TO SCALE



**TEMPORARY LARGE SANDBAG COFFERDAM (BULK BAGS OR APPROVED EQUAL)**  
NOT TO SCALE

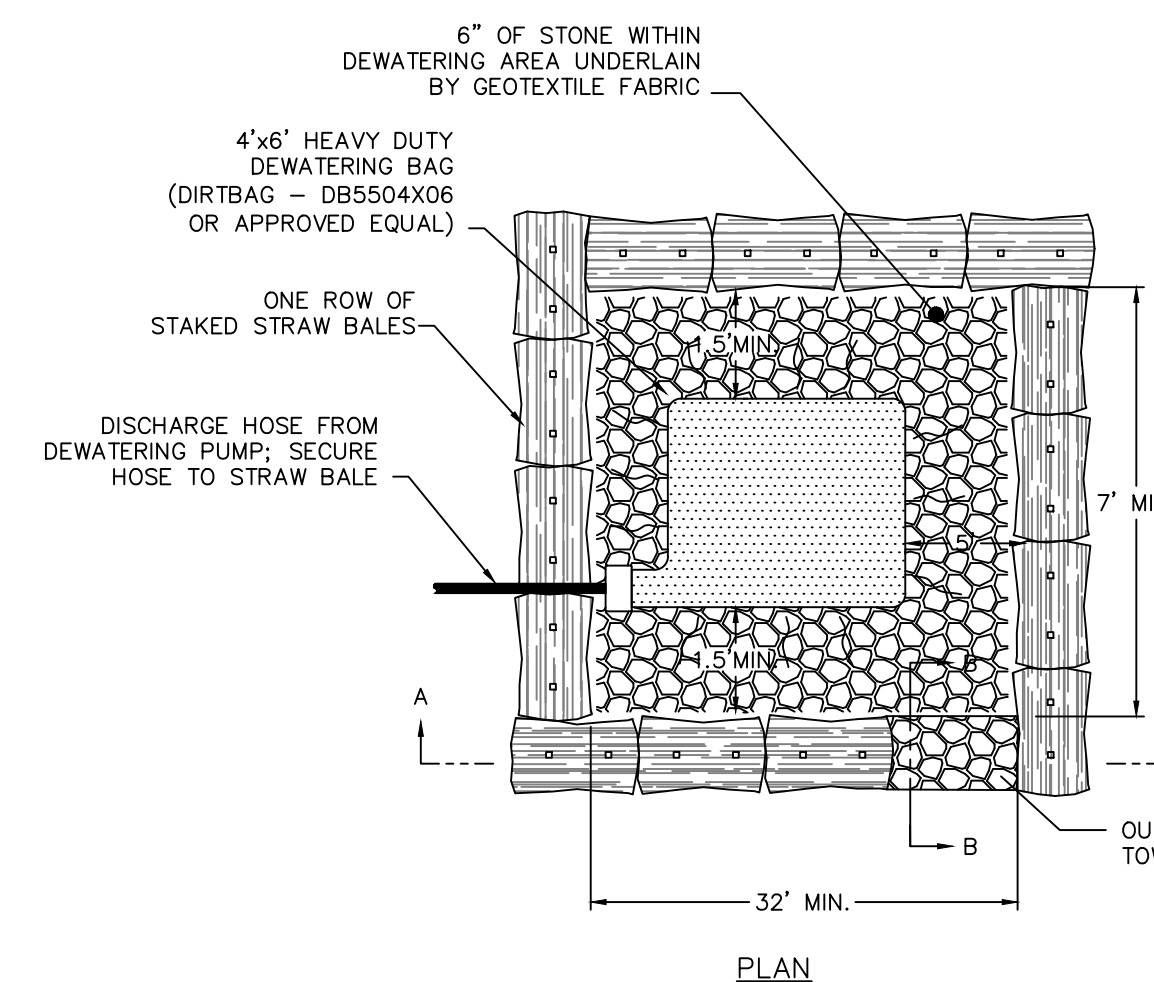


**CONSTRUCTION ACCESS/ENTRANCE**  
NOT TO SCALE



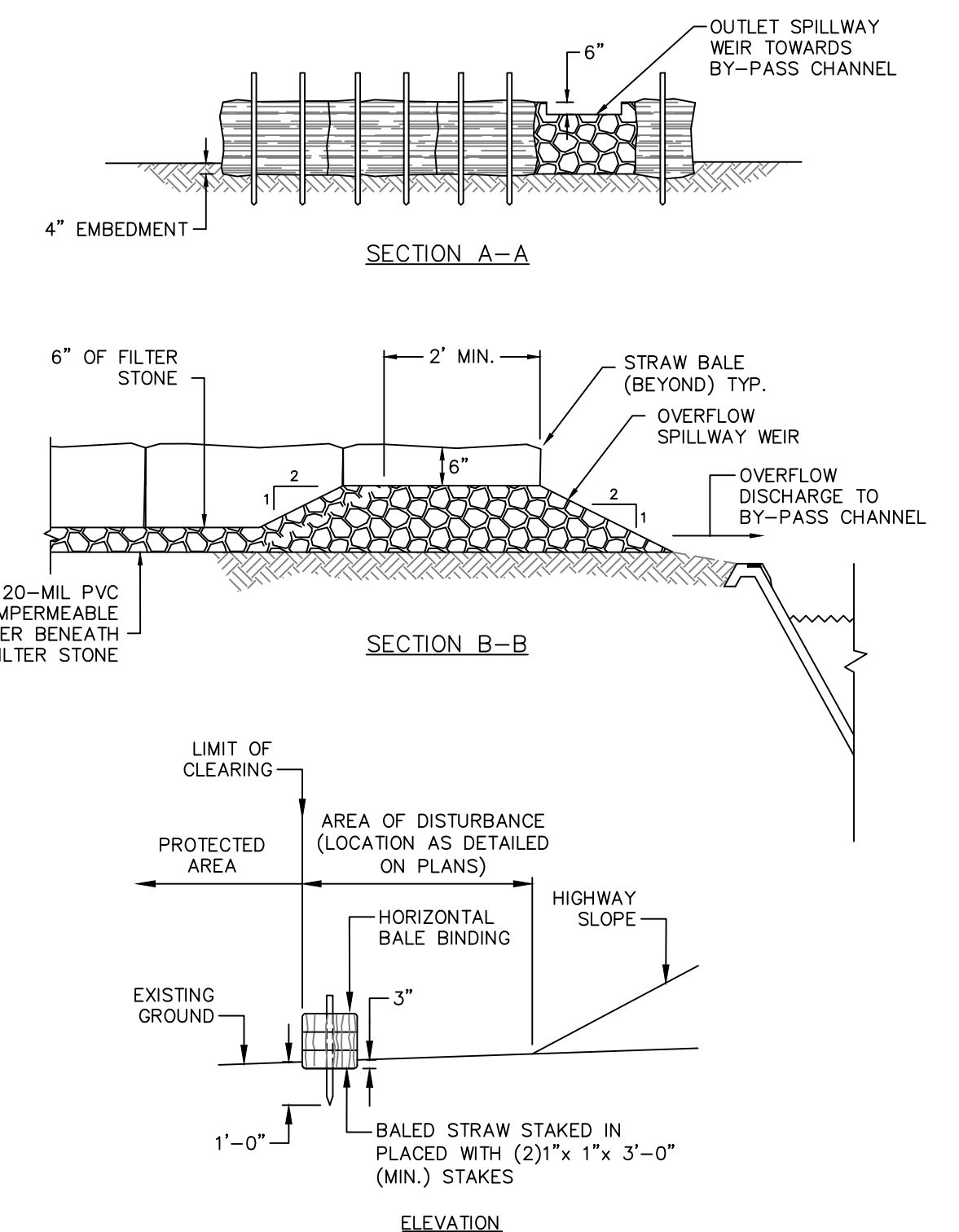
1. CURTAIN SHALL BE A TYPE III HEAVY DUTY CURTAIN THAT IS SUITABLE FOR INSTALLATION WITH FLOWS UP TO 5 FEET PER SECOND (FPS).
2. FLOATATION SIZE (6", 8" OR 12" DIA.) DETERMINED BY SKIRT DEPTH/SITE VARIABLES.
3. OTHER END TYPES AVAILABLE SUCH AS ALUMINUM UNIVERSAL SLIDE OR SLOTTED TUBE.
4. OPTIONAL TOP TENSION CABLE (5/16" TYP.) AVAILABLE FOR INCREASED STRENGTH.

**TYPE III FLOATING TURBIDITY CURTAIN**  
NOT TO SCALE



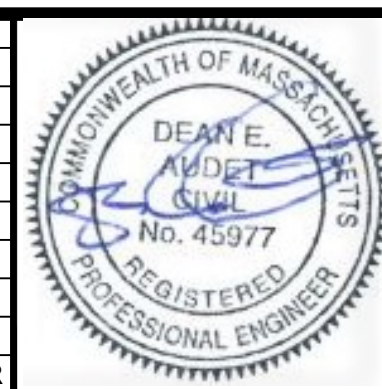
1. THE DEWATERING BAG, DIRTBAG® DB5504X06 OR APPROVED EQUAL, SHALL BE HEAVY DUTY AND CONSIST OF A NONWOVEN BAG SEWN WITH A DOUBLE NEEDLE MATCHING USING A HIGH STRENGTH THREAD.
2. EACH DEWATERING BAG SHALL HAVE A FILL SPOUT LARGE ENOUGH TO ACCOMMODATE A 4" DISCHARGE HOSE. THE BAG SHALL BE PROVIDED WITH STRAPS TO SECURE THE HOSE AND PREVENT PUMPED WATER FROM ESCAPING WITHOUT BEING FILTERED.
3. MAINTAIN DEWATERING BAG(S) AS NECESSARY TO EFFICIENTLY FILTER SEDIMENT OR PASS WATER AT A REASONABLE RATE. USE OF EXCESSIVE FLOW RATES OR OVERFILLING DIRTBAGS WITH SEDIMENT WILL CAUSE RUPTURES OF THE BAGS OR FAILURE OF THE HOSE ATTACHMENT STRAPS.
4. DISPOSE OF DEWATERING BAG AND CONTENTS AT OFF-SITE DISPOSAL FACILITY IN ACCORDANCE WITH THE APPROVED SOIL MANAGEMENT PLAN OR AS DIRECTED BY ENGINEER.
5. INSTALL DEWATERING BAG AND CRUSHED STONE BEDDING WITH A SLOPE SO INCOMING WATER FLOWS DOWNHILL THROUGH THE BAG WITHOUT CREATING MORE EROSION. STRAP THE NECK OF DEWATERING BAG TIGHTLY TO THE DISCHARGE HOSE.

**TEMPORARY DEWATERING BASIN WITH FILTER BAG**  
NOT TO SCALE



File: J:\DWG\2017\0390\U40\Civil\Plan\20170390\U40\_DET01.dwg Layout: 2024-12-11 4:20 PM Saved: 2024-12-11 3:40 PM User: claire.nauman  
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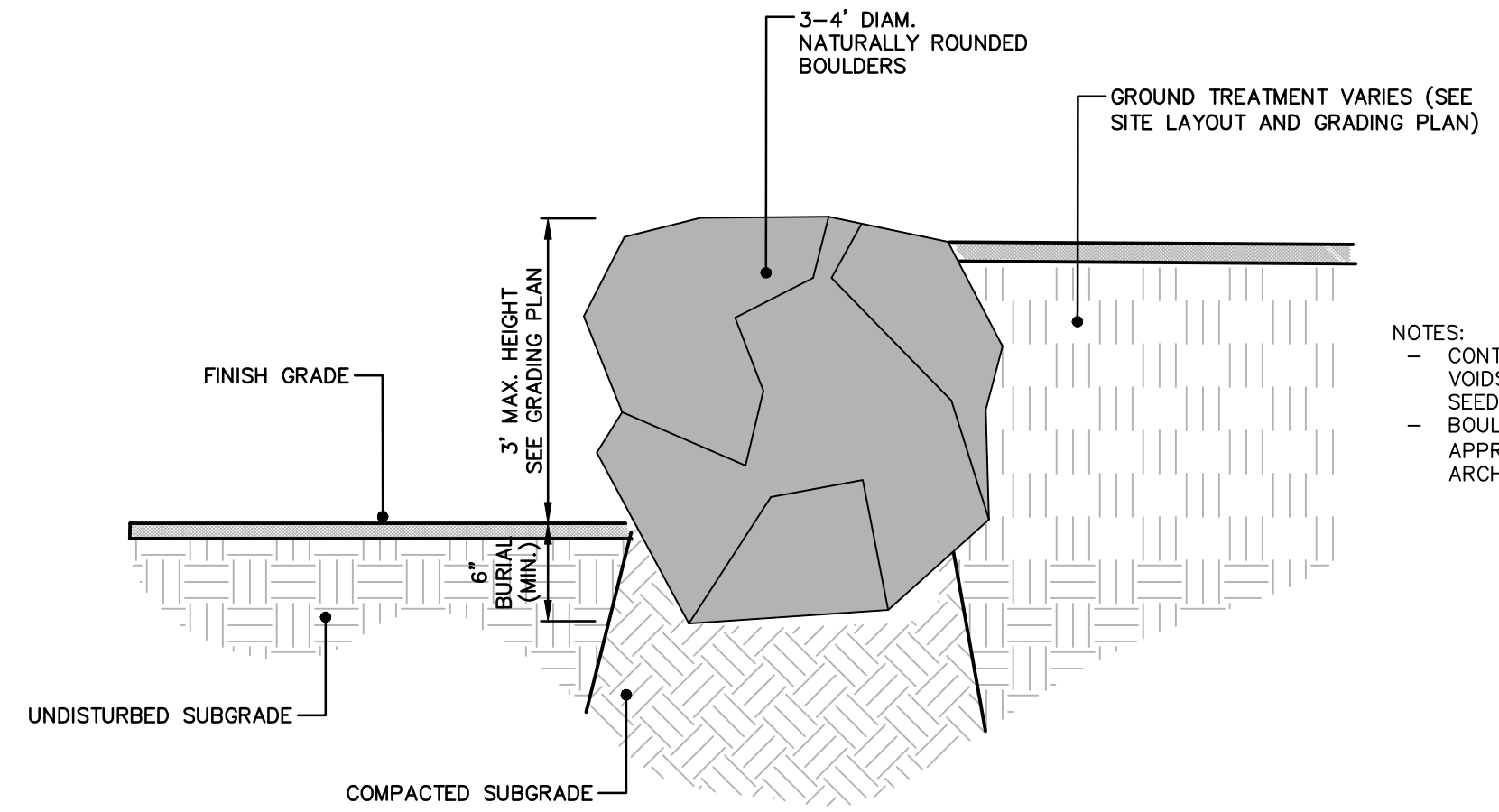
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	VERT.:
DATUM:	HORZ.: NAD83
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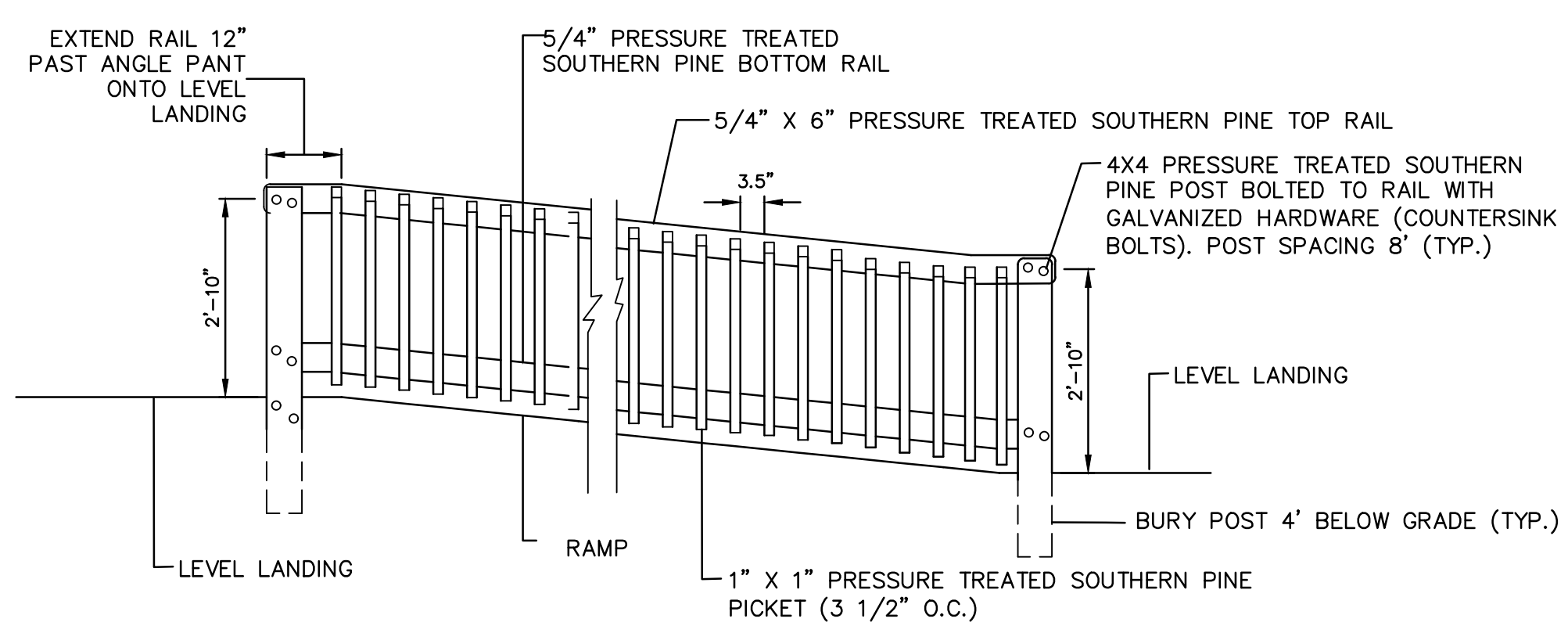
CITY OF HAVERHILL  
CONSTRUCTION DETAILS  
LITTLE RIVER DAM REMOVAL AND RIVER RESTORATION  
HAVERHILL MASSACHUSETTS

PROJ. No.: 20170390 U40  
DATE: DECEMBER 16, 2024  
**CD-501**

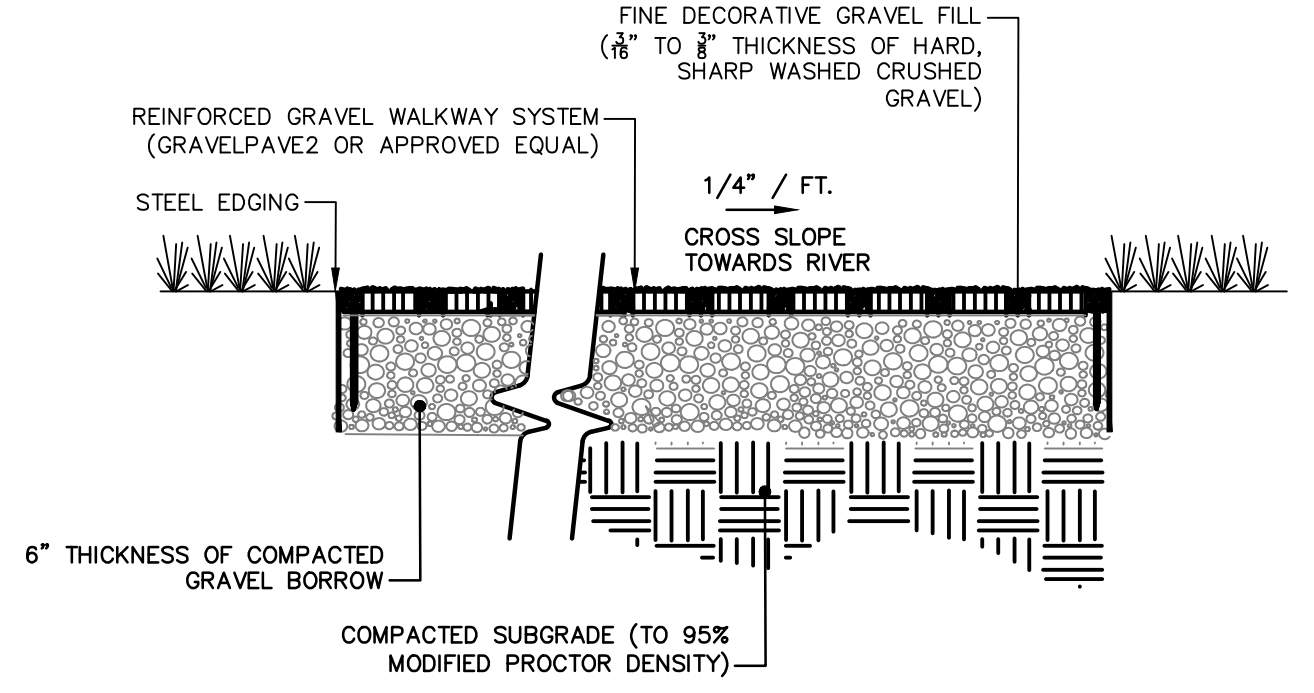
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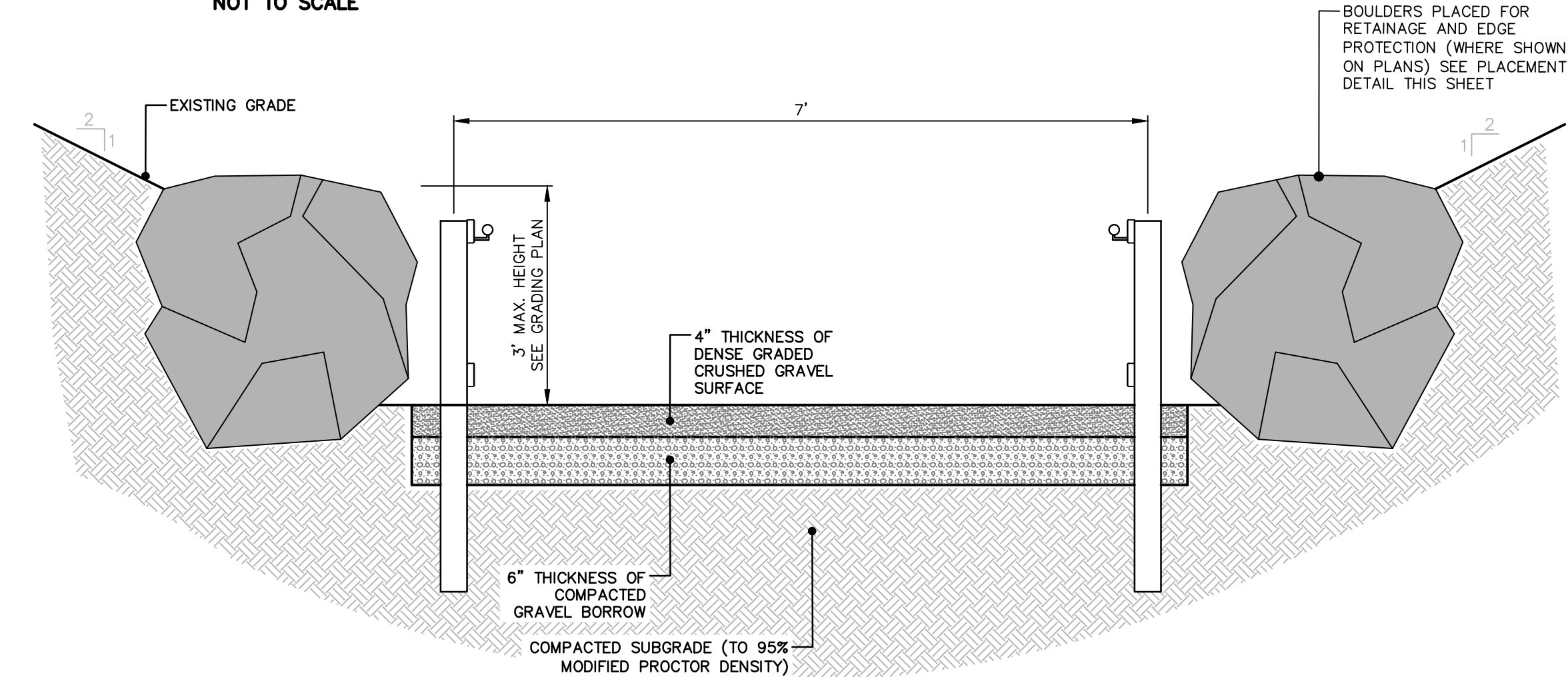
**ADD ALTERNATE: BOULDER PLACEMENT (FOR RETAINAGE)**  
 NOT TO SCALE



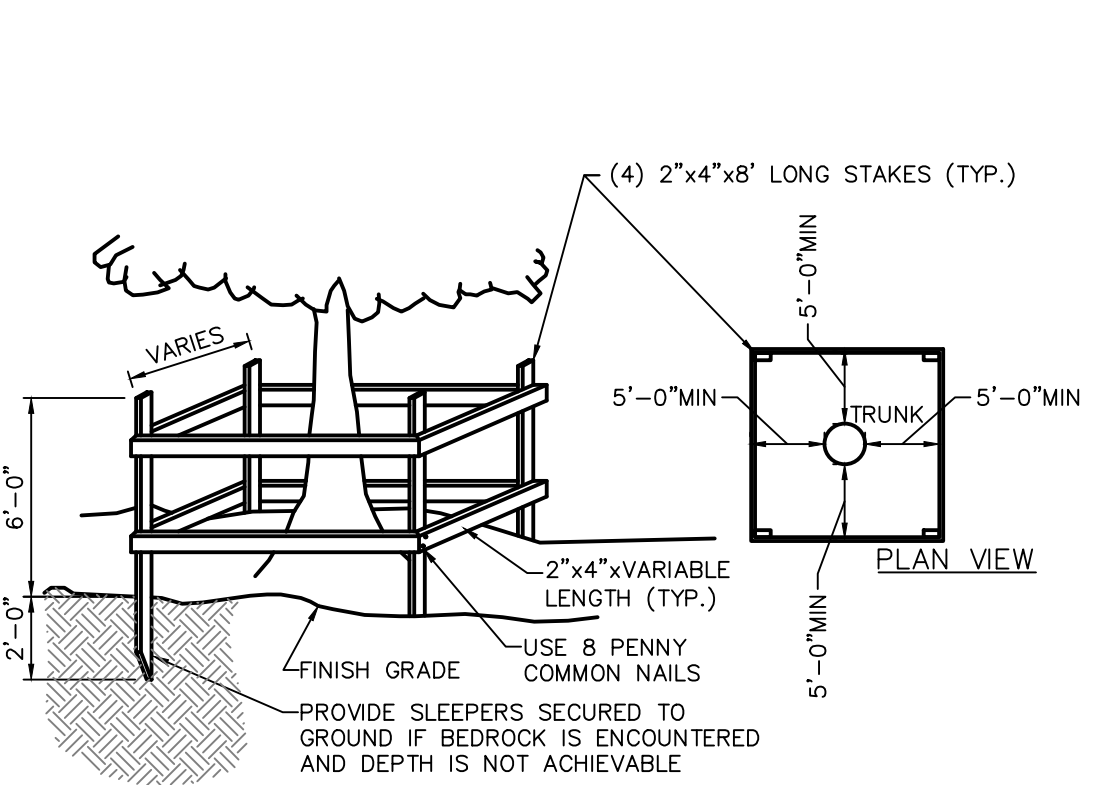
**ADD ALTERNATE: TIMBER HANDRAIL (AT KAYAK/CANOE ACCESS)**  
 NOT TO SCALE



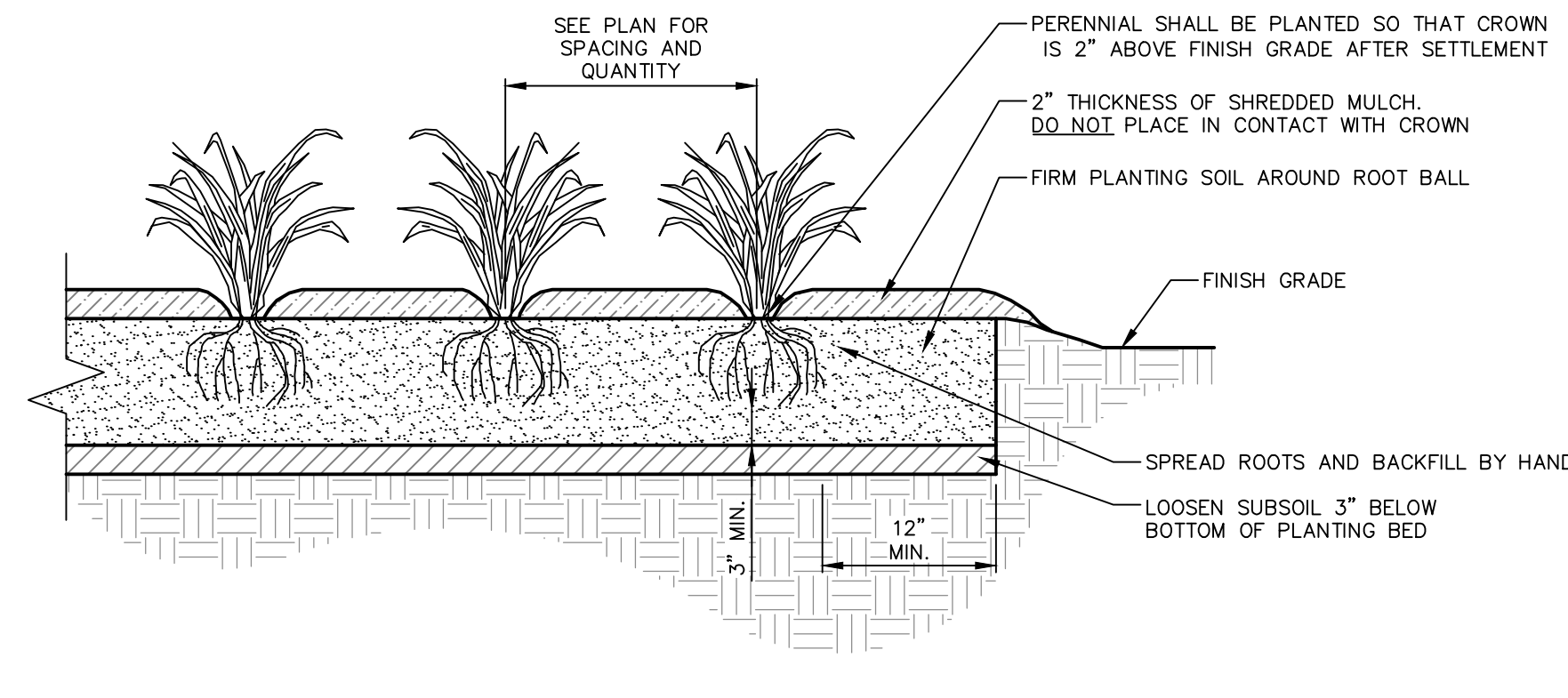
**ADD ALTERNATE: REINFORCED GRAVEL FOR WALKWAY AND GATHERING AREA**  
 NOT TO SCALE



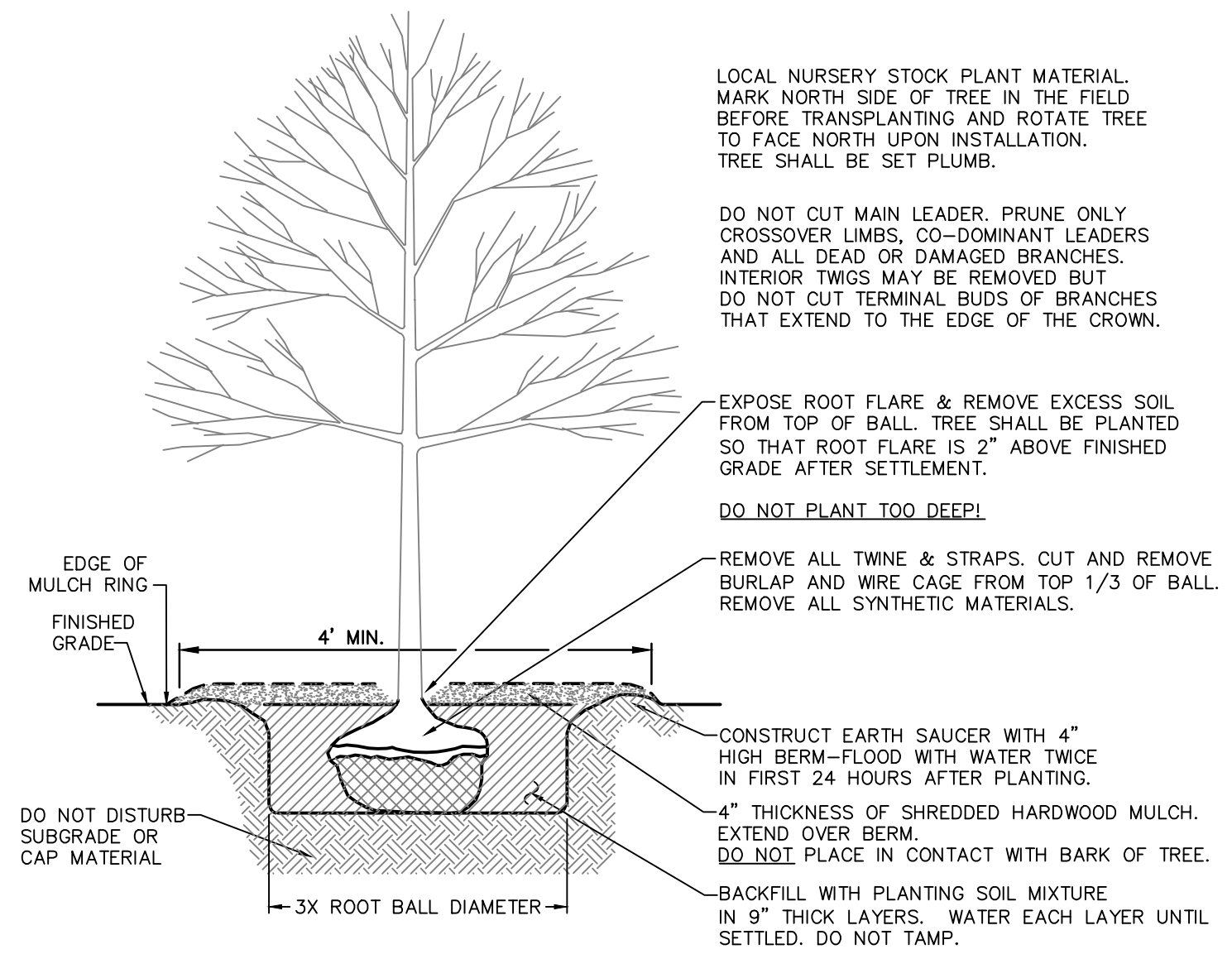
**ADD ALTERNATE: KAYAK/CANOE ACCESS PATH (AT CASHMAN PARK)**  
 NOT TO SCALE



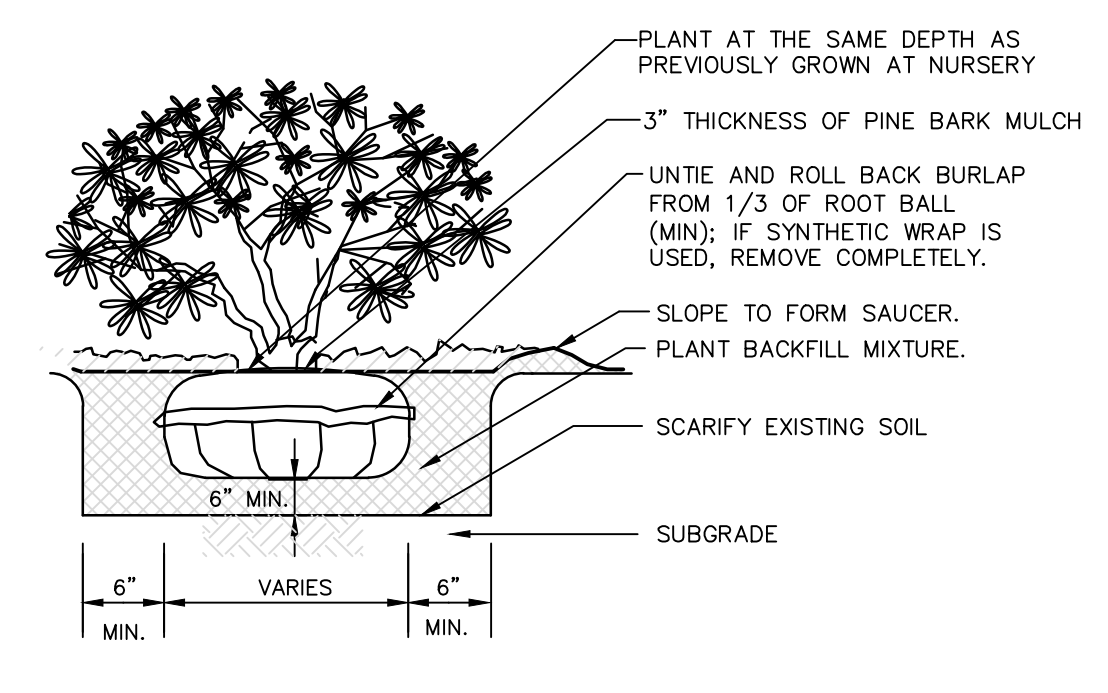
**TEMPORARY TREE PROTECTION**  
 NOT TO SCALE



**PERENNIAL PLANT BED**  
 Scale: N.T.S.



**TREE PLANTING DETAIL**  
 NOT TO SCALE



**SHRUB PLANTING**  
 NOT TO SCALE

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER



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SCALE:

HORIZ.: AS NOTED
VERT.:

DATUM:

HORIZ.: NAD83
VERT.: NAVD88

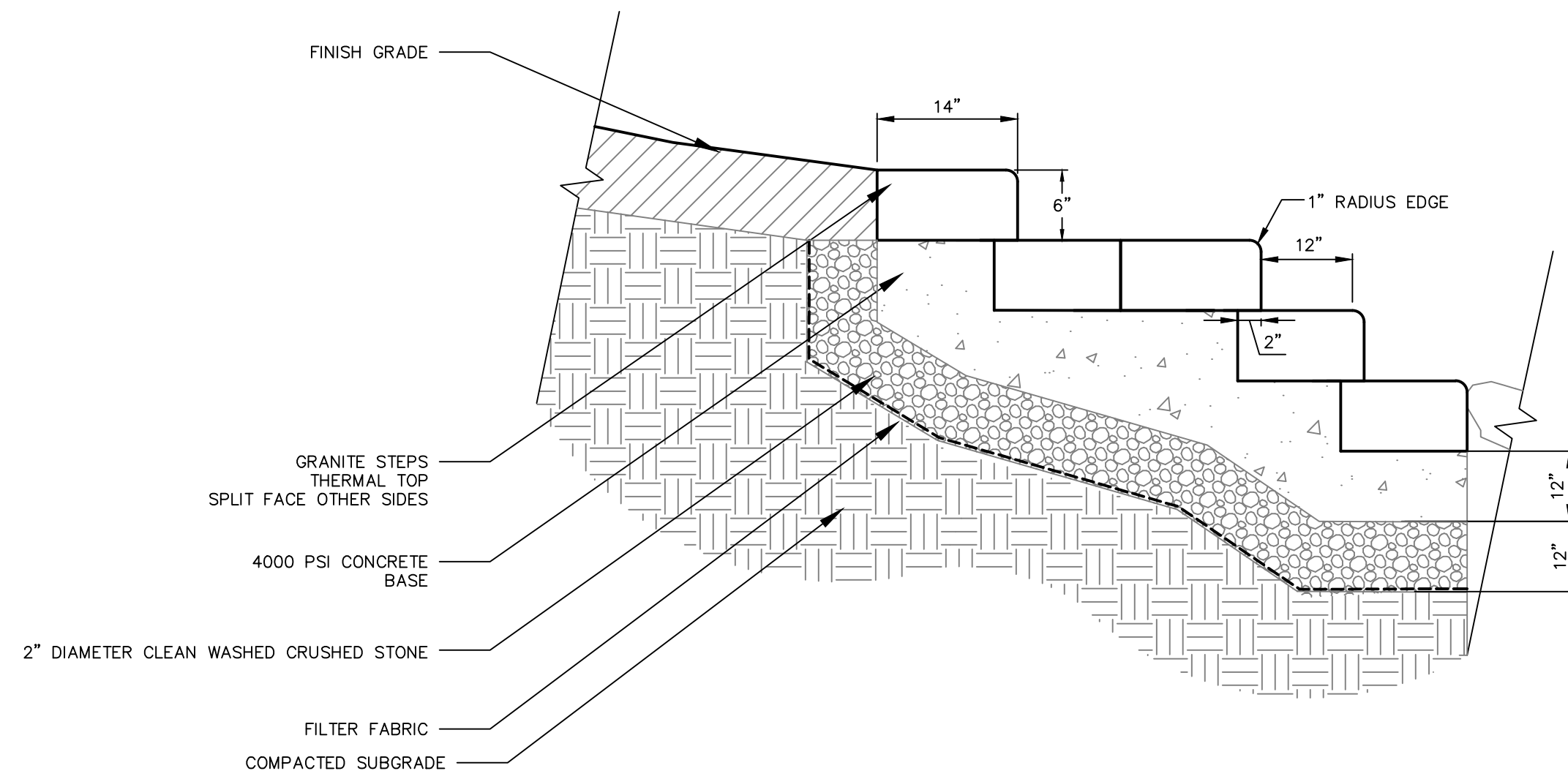
GRAPHIC SCALE

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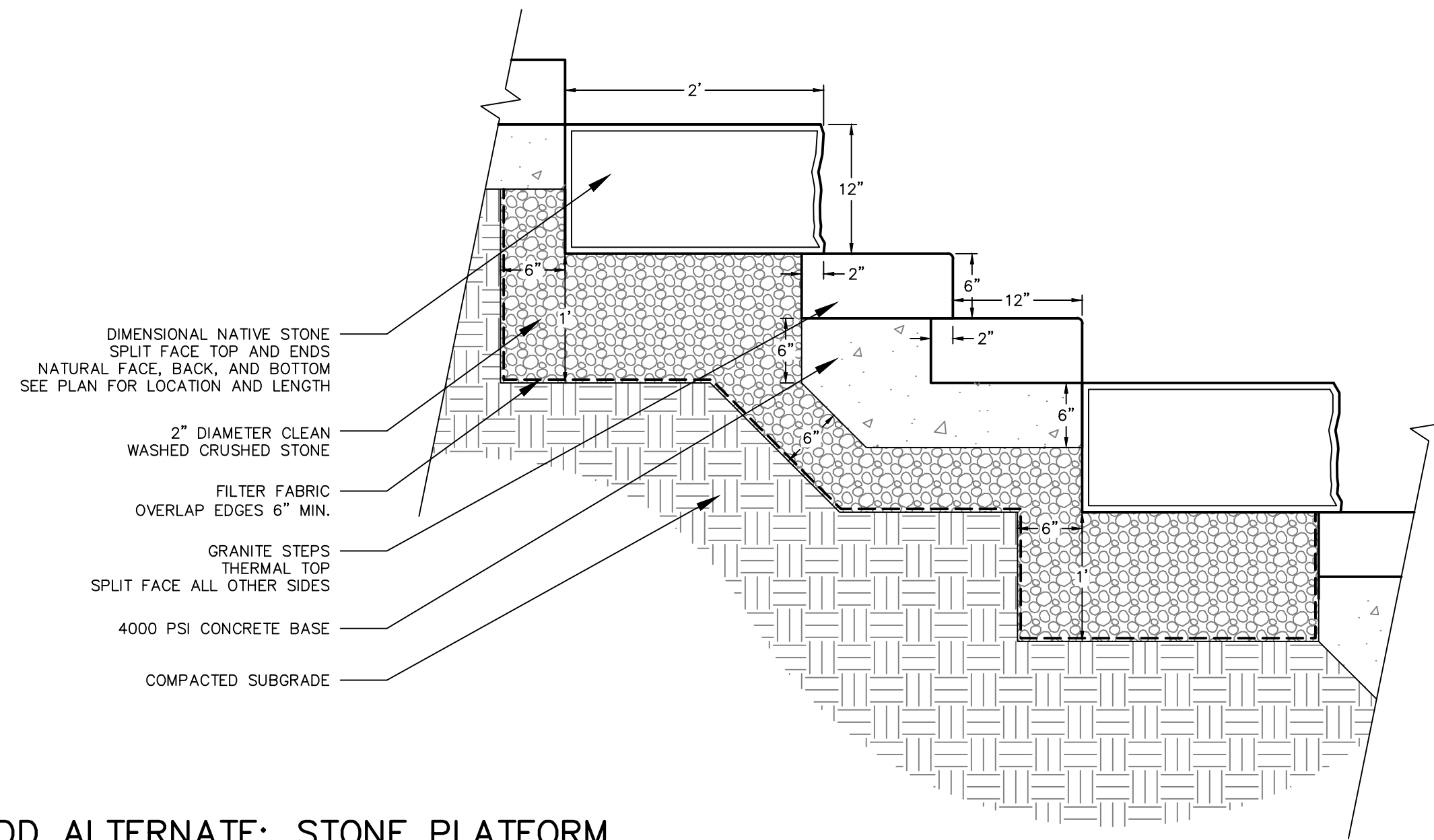
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CITY OF HAVERHILL  
 CONSTRUCTION DETAILS  
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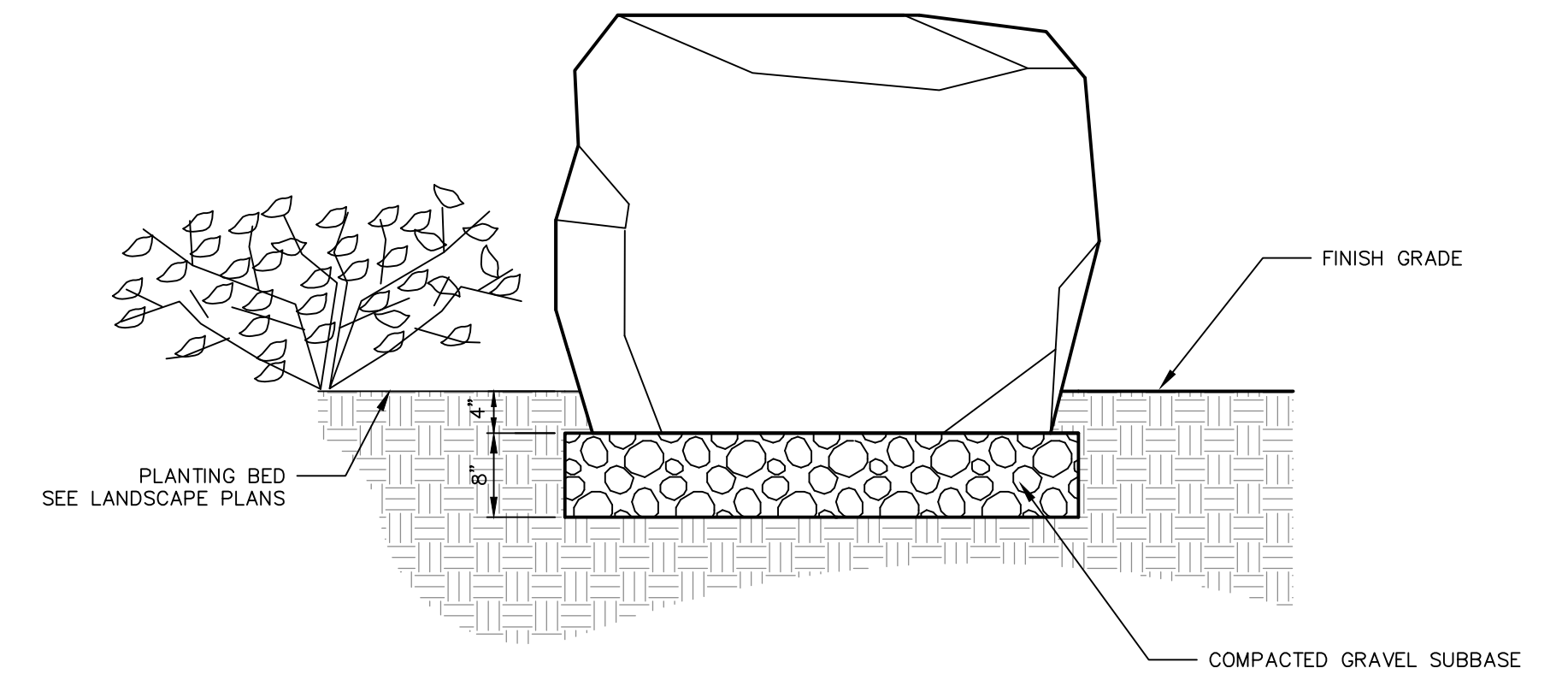
PROJ. No.: 20170390.U40  
 DATE: DECEMBER 16, 2024  
**CD-502**



**ADD ALTERNATE: GRANITE STEPS**  
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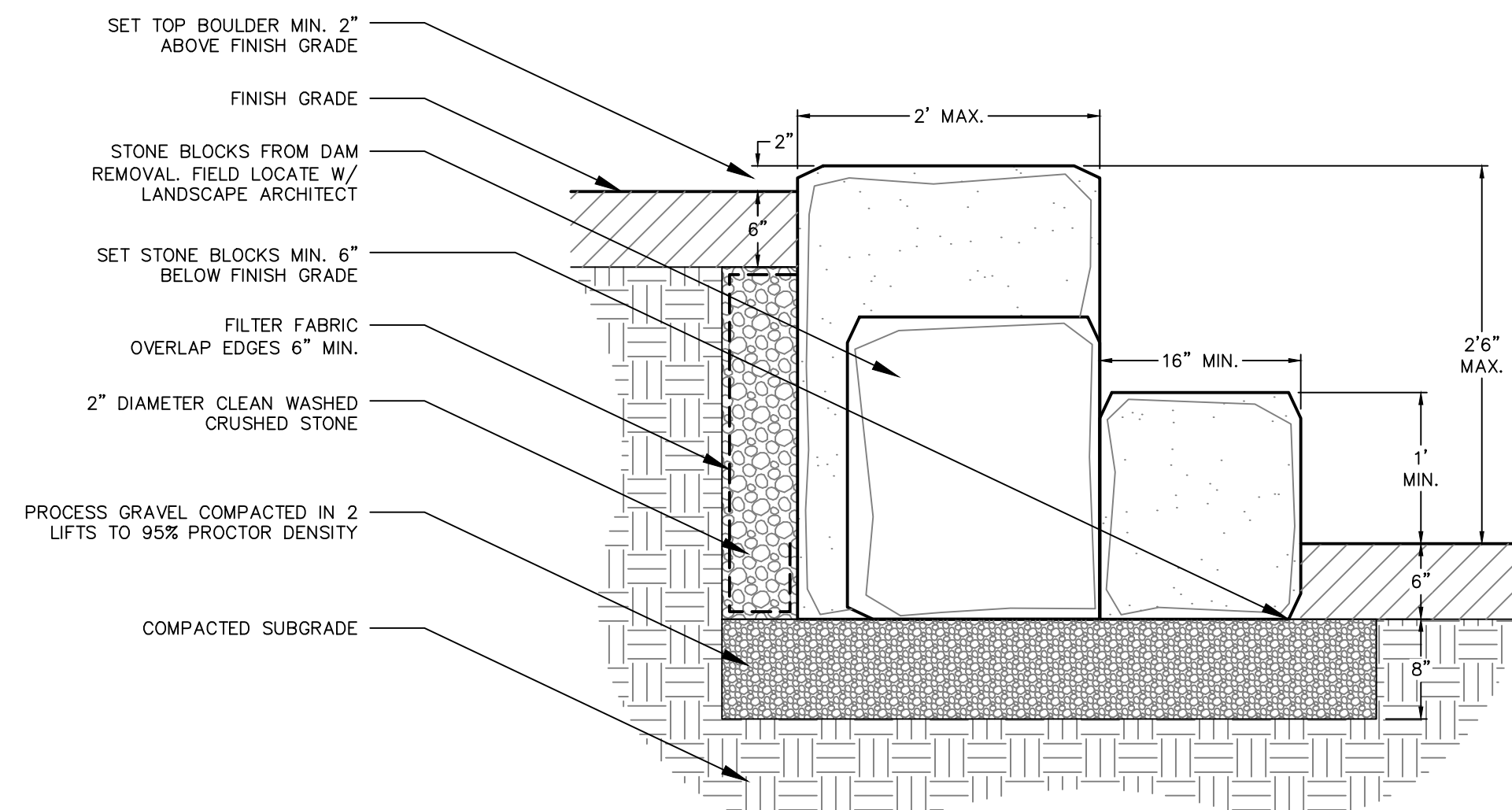
**ADD ALTERNATE: STONE PLATFORM**  
NOT TO SCALE



**ADD ALTERNATE: SALVAGED BOULDER**  
NOT TO SCALE

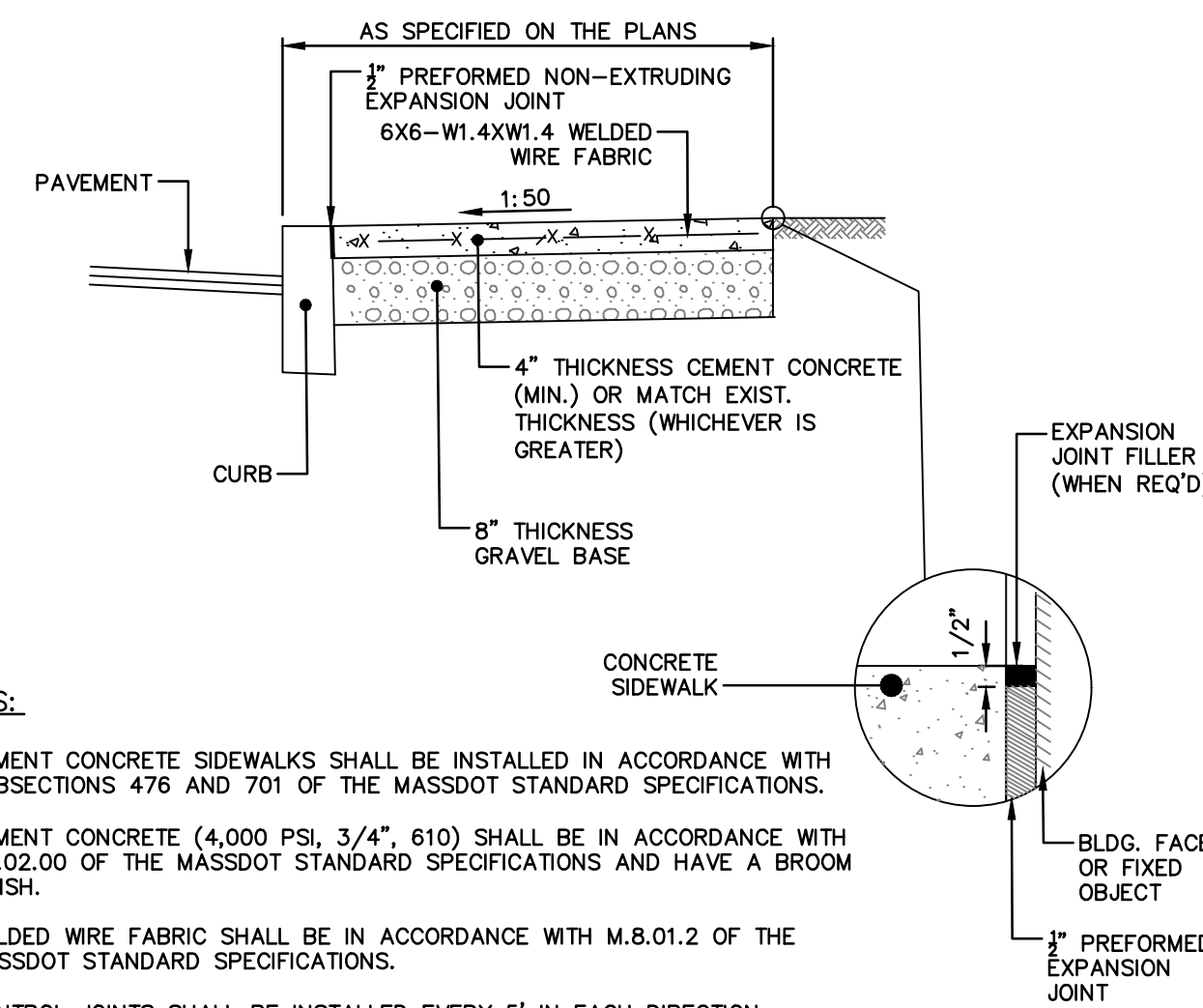
NOTES:  
1. LOCATIONS SHALL BE APPROVED BY ENGINEER / LANDSCAPE ARCHITECT IN THE FIELD.

**ADD ALTERNATE: SALVAGED BOULDER**  
NOT TO SCALE



NOTE: LOCATIONS SHALL BE APPROVED BY ENGINEER OR LANDSCAPE ARCHITECT IN THE FIELD

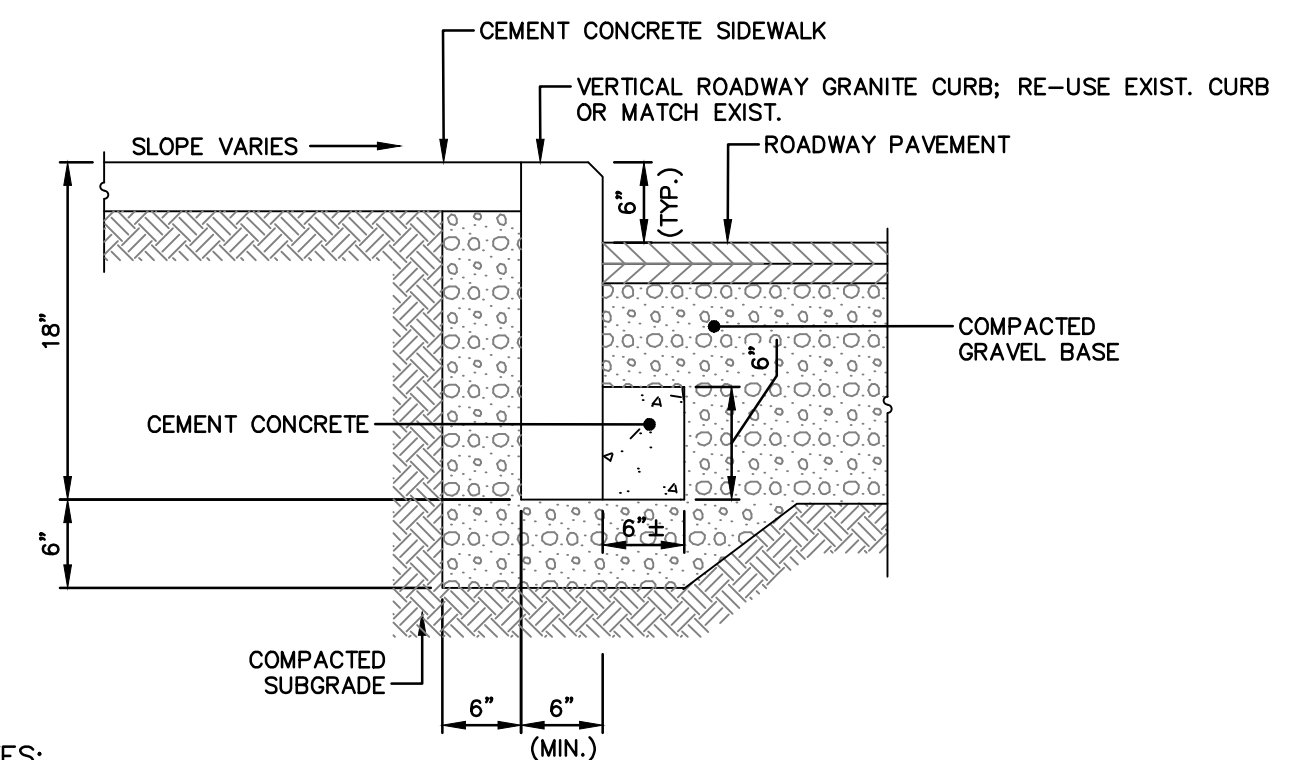
**ADD ALTERNATE: STACKED STONE BLOCKS**  
NOT TO SCALE



**NOTES:**

1. CEMENT CONCRETE SIDEWALKS SHALL BE INSTALLED IN ACCORDANCE WITH SUBSECTIONS 476 AND 701 OF THE MASSDOT STANDARD SPECIFICATIONS.
2. CEMENT CONCRETE (4,000 PSI, 3/4", 610) SHALL BE IN ACCORDANCE WITH M4.02.00 OF THE MASSDOT STANDARD SPECIFICATIONS AND HAVE A BROOM FINISH.
3. WELDED WIRE FABRIC SHALL BE IN ACCORDANCE WITH M.8.01.2 OF THE MASSDOT STANDARD SPECIFICATIONS.
4. CONTROL JOINTS SHALL BE INSTALLED EVERY 5' IN EACH DIRECTION.
5. EXPANSION JOINTS SHALL BE INSTALLED EVERY 20' IN EACH DIRECTION AT FOUNDATIONS AND WALLS IN A SQUARE PATTERN AROUND MANHOLE COVERS, HYDRANTS, SIGN POSTS AND UTILITY POLES. THE EXPANSION JOINT SHALL BE THE FULL DEPTH OF THE SIDEWALK AND FILLED WITH AN APPROVED TYPE OF PREMOLDED EXPANSION JOINT FILLER IN ACCORDANCE WITH M.9.14.0 OF THE MASSDOT STANDARD SPECIFICATIONS.

**ADD ALTERNATE: CEMENT CONCRETE SIDEWALK**  
NOT TO SCALE



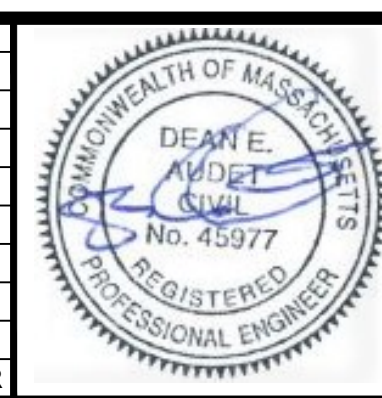
**NOTES:**

1. CURBING SHALL BE INSTALLED IN ACCORDANCE WITH SUBSECTION 501 OF THE MASSDOT STANDARD SPECIFICATIONS.
2. GRANITE CURB, GRANITE CURB INLETS, AND GRANITE CURB CORNERS SHALL BE IN ACCORDANCE WITH M9.04.1, M9.04.5, AND M9.04.6 OF THE MASSDOT STANDARD SPECIFICATIONS, RESPECTIVELY.
3. CEMENT CONCRETE (3,000 PSI, 3/4", 520) SHALL BE IN ACCORDANCE WITH M4.02.00 OF THE MASSDOT STANDARD SPECIFICATIONS AND INSTALLED IN ACCORDANCE WITH SUBSECTION 476 OF THE MASSDOT STANDARD SPECIFICATIONS.
4. MORTAR FOR CURBING JOINTS SHALL BE IN ACCORDANCE WITH M4.02.15 OF THE MASSDOT STANDARD SPECIFICATIONS.

**ADD ALTERNATE: VERTICAL ROADWAY GRANITE CURB**  
NOT TO SCALE

File: J:\DWG\2017\0390\U30\CivilPlan\20170390\U30\_DET01.dwg Layout: CD-503 Plotted: 2024-12-16 12:04 PM Saved: 2024-12-11 3:40 PM User: claire.nauman  
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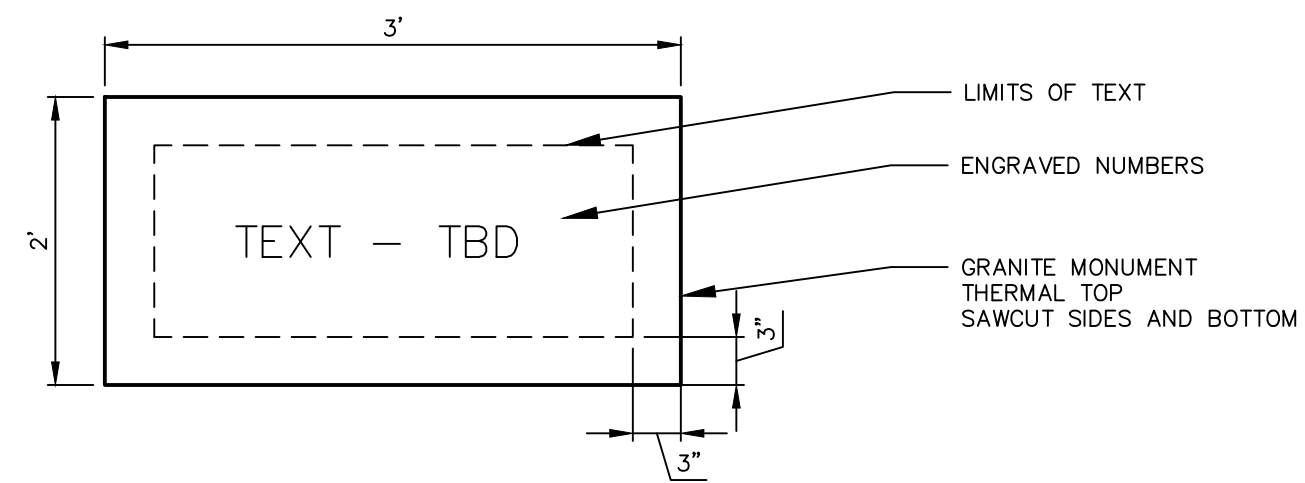
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DATUM:	HORIZ.: NAD83
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	GRAPHIC SCALE

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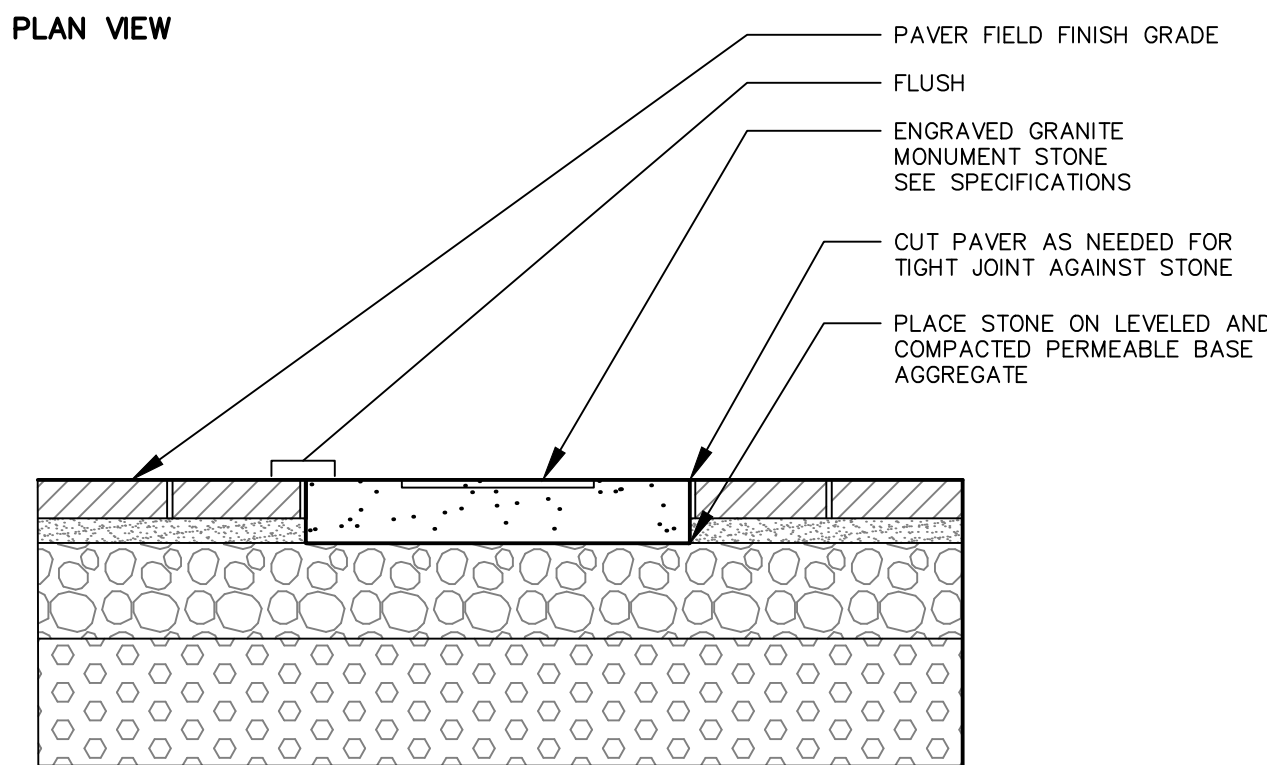
CITY OF HAVERHILL  
 CONSTRUCTION DETAILS  
 LITTLE RIVER DAM REMOVAL AND RIVER RESTORATION  
 HAVERHILL MASSACHUSETTS

PROJ. No.: 20170390.U40  
 DATE: DECEMBER 16, 2024  
**CD-503**

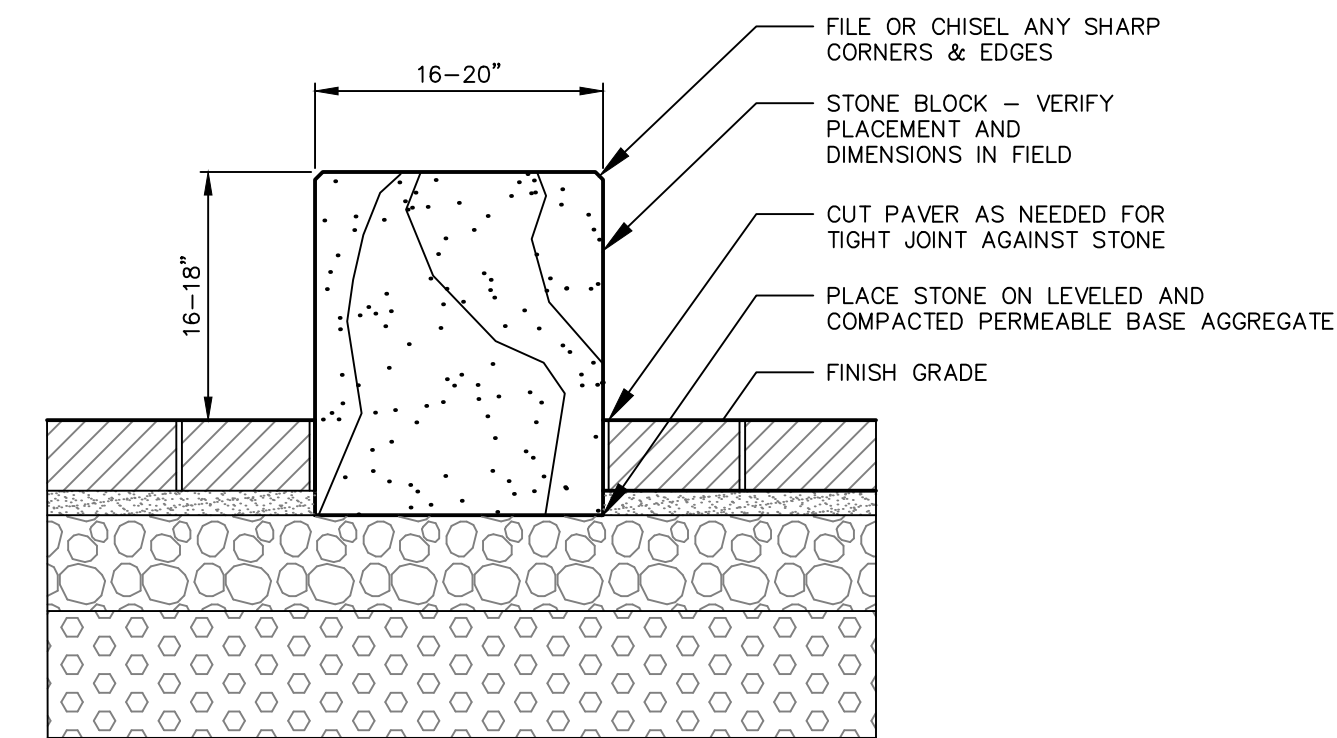




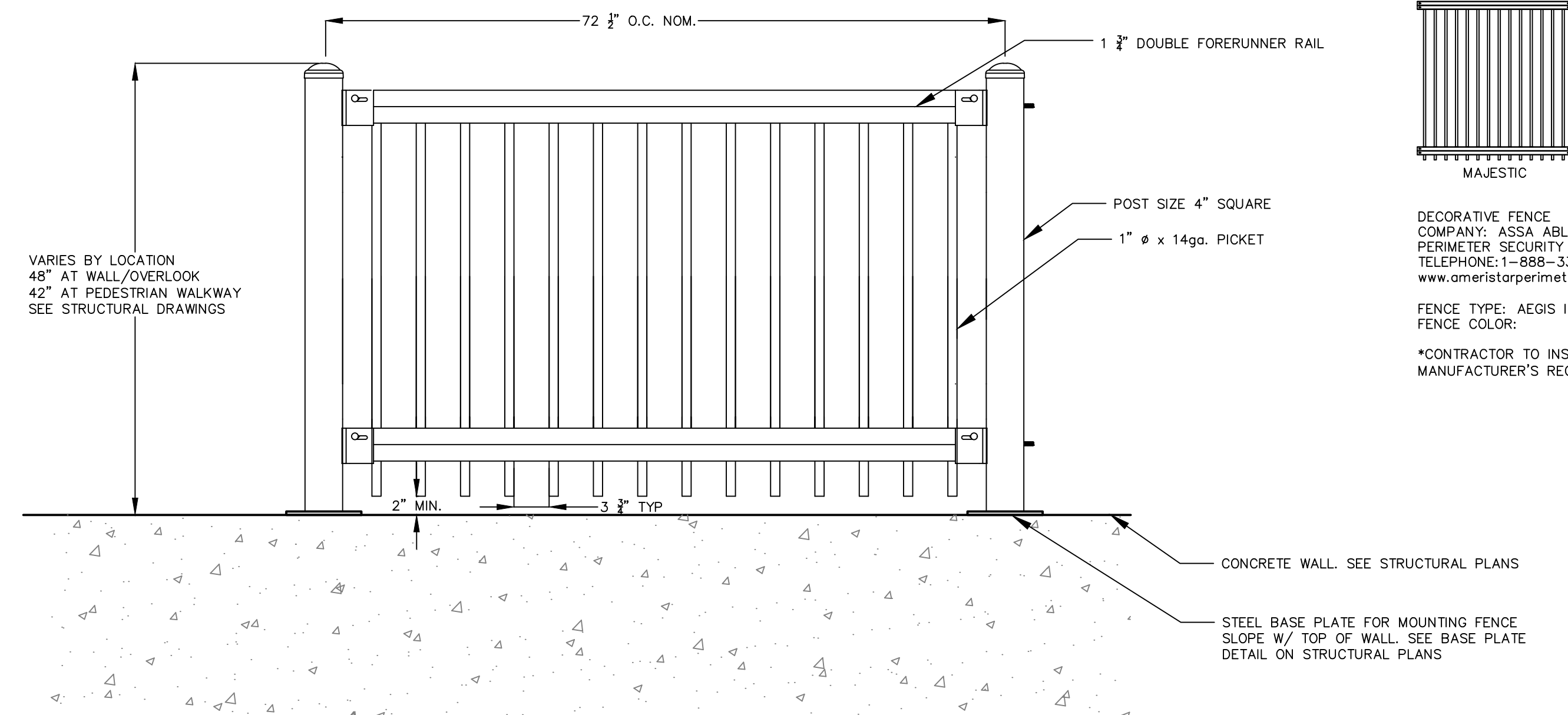
PLAN VIEW



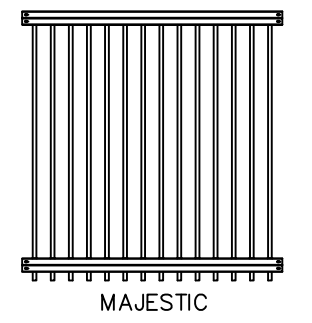
ADD ALTERNATE: ENGRAVED GRANITE MONUMENT STONE  
SCALE: NOT TO SCALE



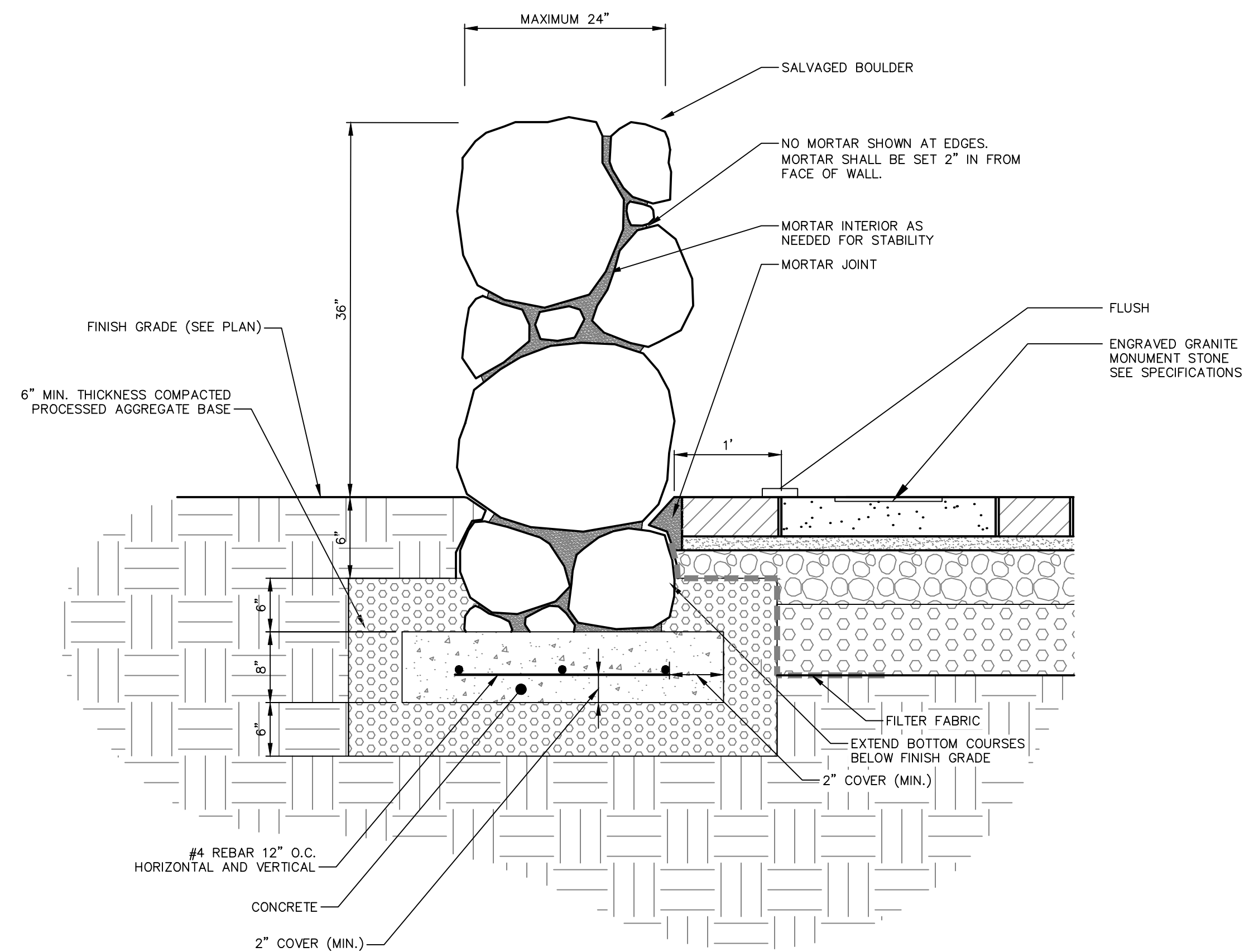
ADD ALTERNATE: MONOLITHIC GRANITE STONE BENCH IN PERMEABLE PAVERS  
SCALE: NOT TO SCALE



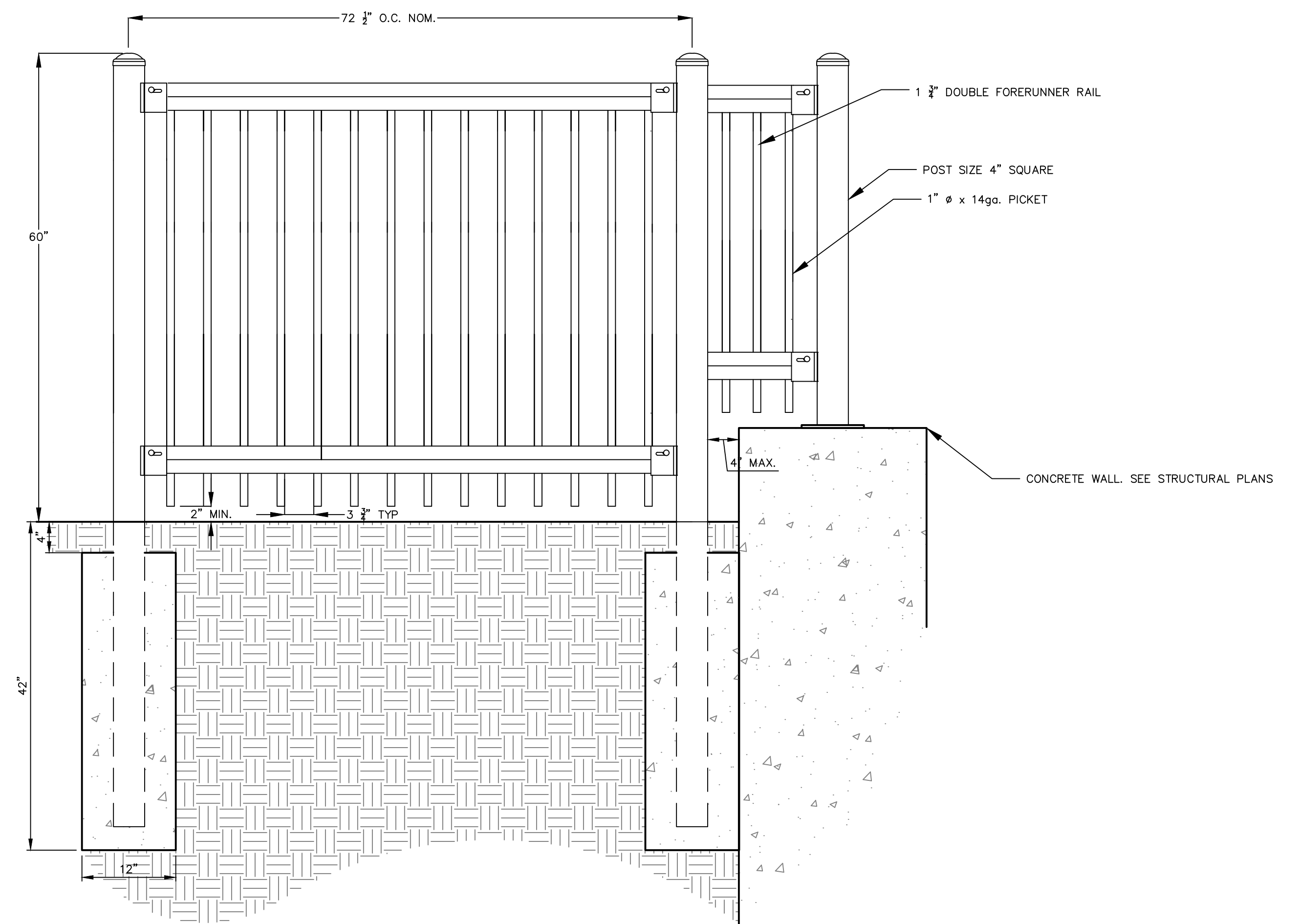
DECORATIVE METAL FENCE  
SCALE: NOT TO SCALE



DECORATIVE FENCE COMPANY: ASSA ABLOY, AMERISTAR PERIMETER SECURITY USA INC. TELEPHONE: 1-888-333-3422 www.ameristarperimeter.com  
FENCE TYPE: AEGIS II @XTREME 6'W FENCE COLOR:  
\*CONTRACTOR TO INSTALL PRODUCT PER MANUFACTURER'S RECOMMENDATIONS



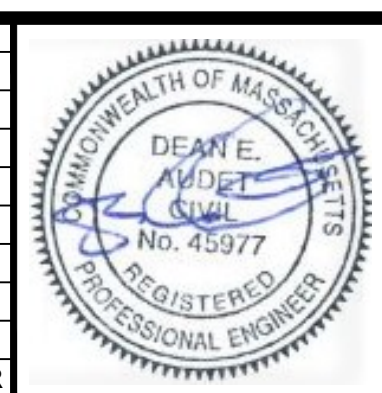
ADD ALTERNATE: SALVAGED STONE WALL AND GRANITE MONUMENT STONE  
NOT TO SCALE



DECORATIVE METAL FENCE RETURN  
SCALE: NOT TO SCALE

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LAYER STATE:

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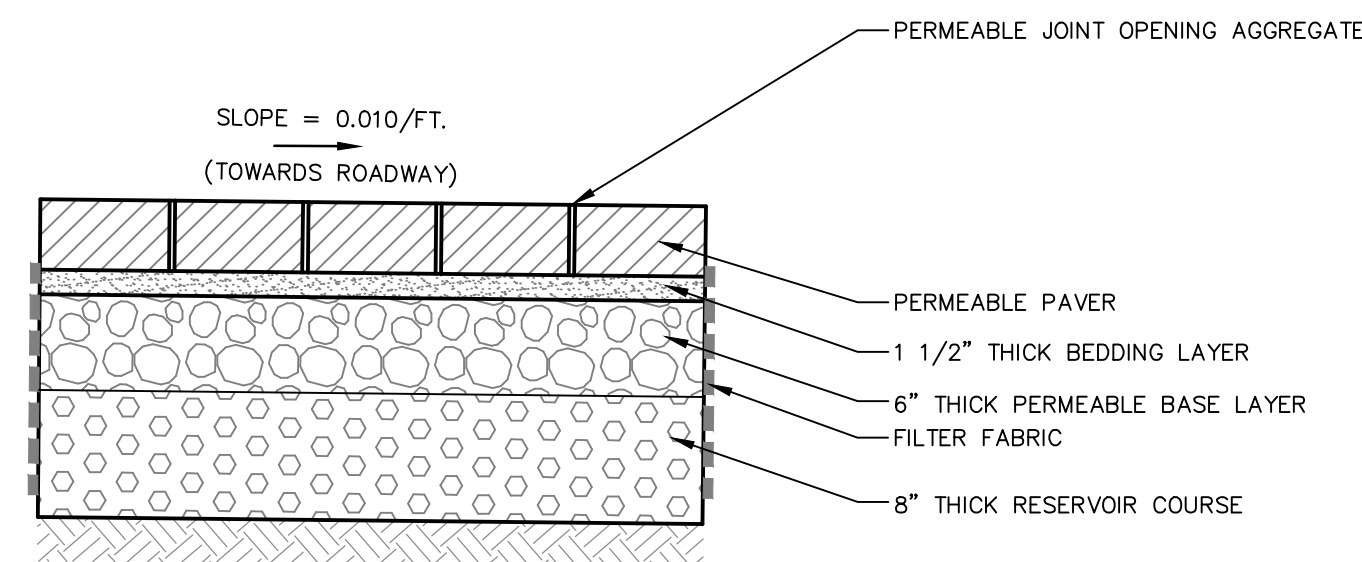
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 GRAPHIC SCALE	

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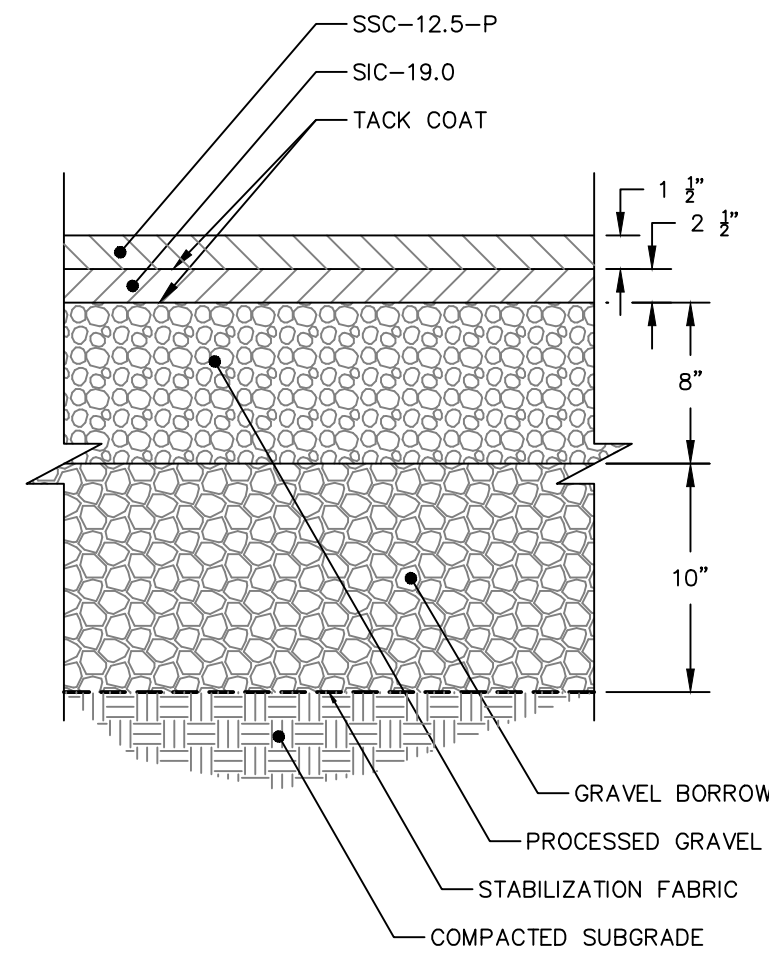
CITY OF HAVERHILL  
CONSTRUCTION DETAILS  
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**CD-505**

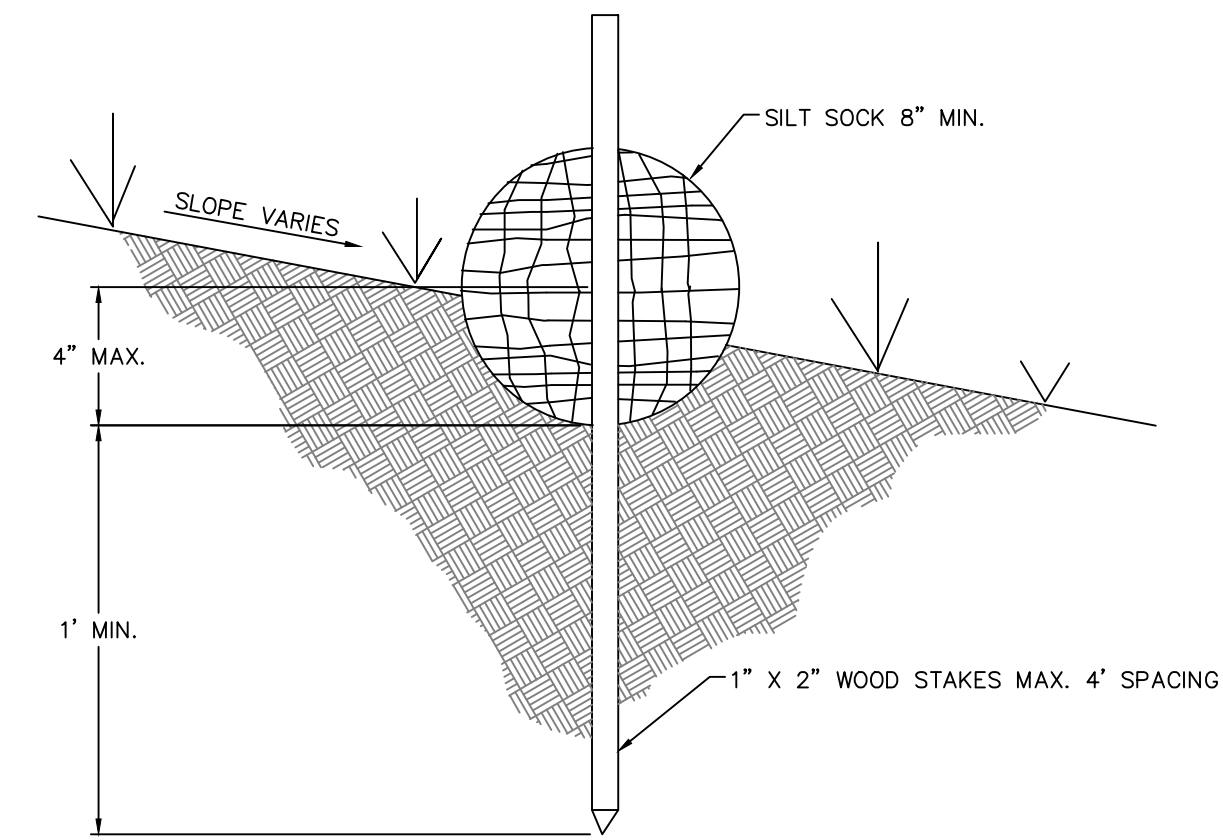


- NOTES:**
1. THICKNESS OF PERMEABLE CONCRETE PAVERS SHALL VARY BASED ON PRODUCT AND MANUFACTURER SELECTED.
  2. THE MINIMUM THICKNESSES OF THE BEDDING LAYER, PERMEABLE BASE LAYER, AND RESERVOIR COURSE LAYER AS SPECIFIED ABOVE REPRESENT MINIMUM THICKNESSES AFTER COMPACTION.
  3. PROTECT PERMEABLE PAVERS AND AGGREGATES FROM CONSTRUCTION VEHICLE TRAFFIC, RUNOFF FROM ADJACENT AREAS, AND SEDIMENTATION.

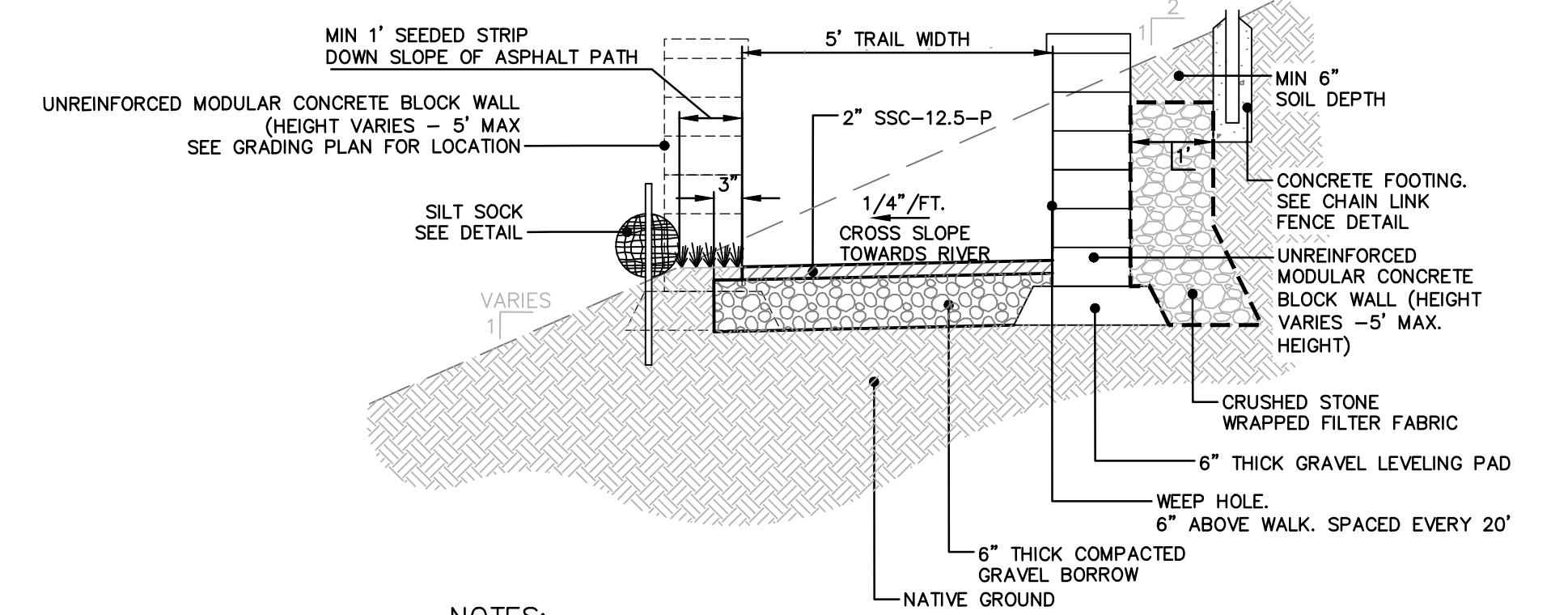
**ADD ALTERNATE: PERMEABLE PAVER SYSTEM**  
NOT TO SCALE



**FULL DEPTH ASPHALT PAVEMENT**  
NOT TO SCALE

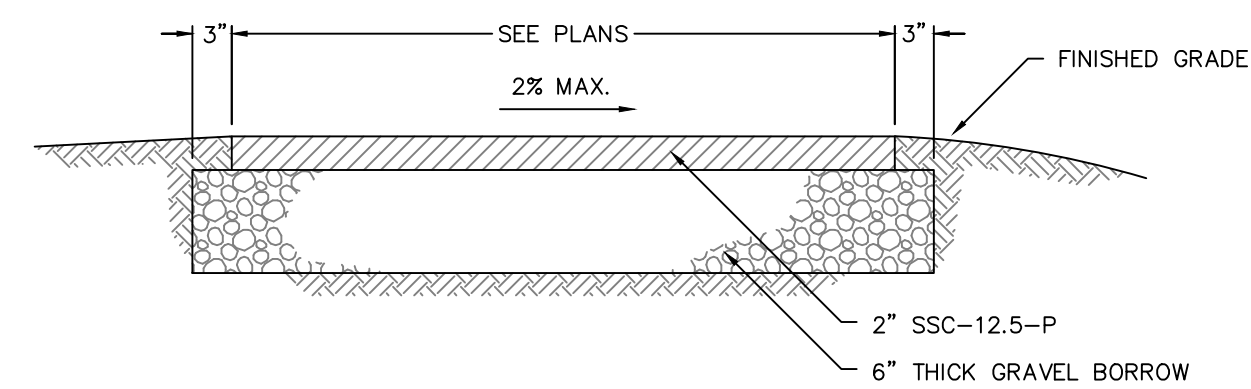


**ADD ALTERNATE: SILT SOCK ENTRENCHMENT DETAIL**  
NOT TO SCALE



- NOTES:**
1. ALIGNMENT OF TRAIL MAY VARY SLIGHTLY WITHIN LIMIT OF DISTURBANCE (AS FIELD DIRECTED BY ENGINEER OR LANDSCAPE ARCHITECT).
  2. PROVIDE MODULAR BLOCK WALL SHOP DRAWINGS FOR APPROVAL TO BE SIGNED AND SEALED BY MA LICENSED ENGINEER.
  3. REPLACE FILTER SOCK AND HYDROSEED STRIP WITH 6" THICKNESS OF PROCESSED GRAVEL ON EITHER SIDE OF HEADWALL AS SHOWN ON SITE LAYOUT AND GRADING PLAN AT RIVER STATION 43+50.

**ADD ALTERNATE: ASPHALT WALKING TRAIL WITH SILT SOCK**  
NOT TO SCALE

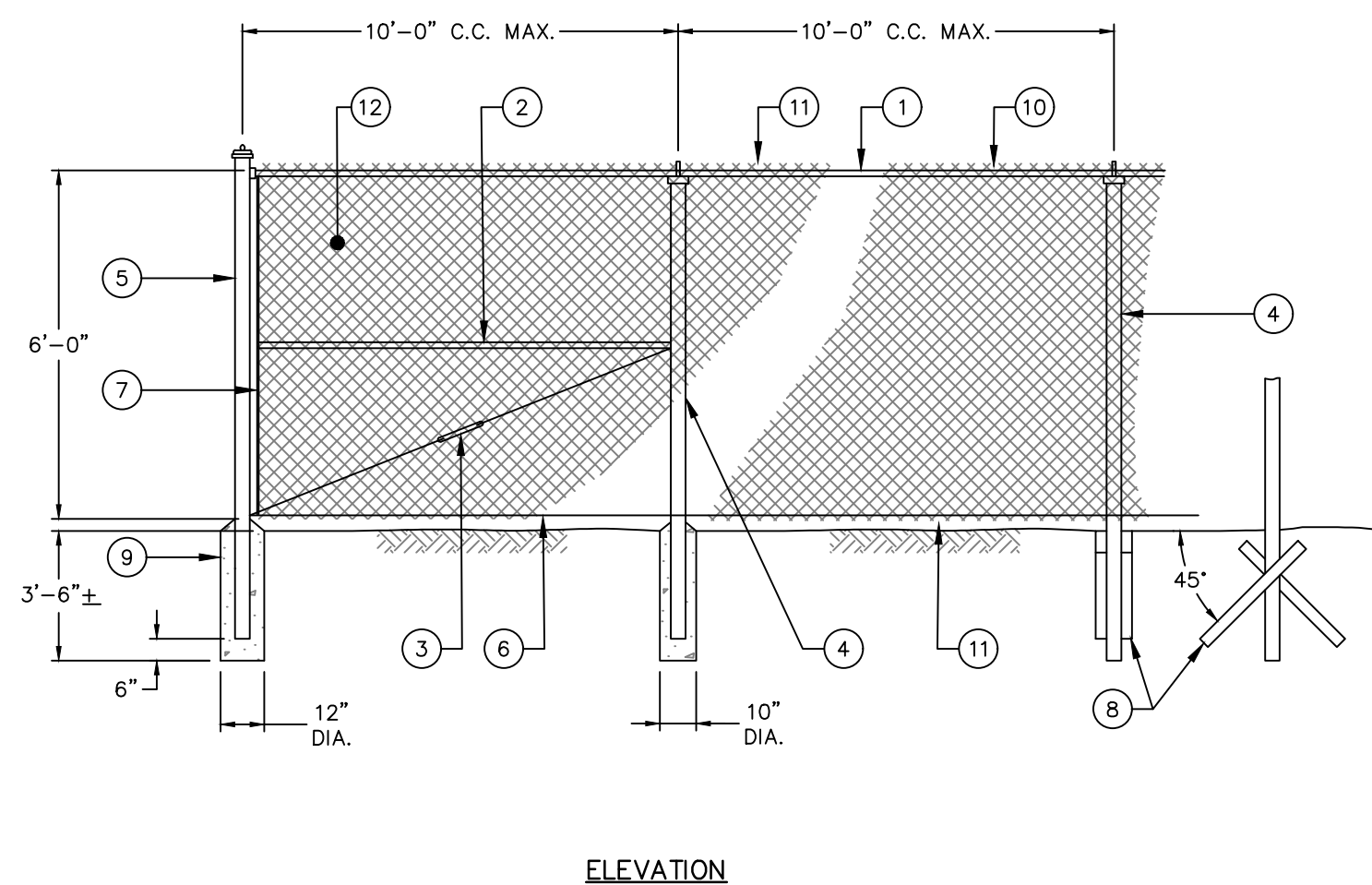


**ADD ALTERNATE: ASPHALT WALKING TRAIL TO PEDESTRIAN BRIDGE**  
NOT TO SCALE

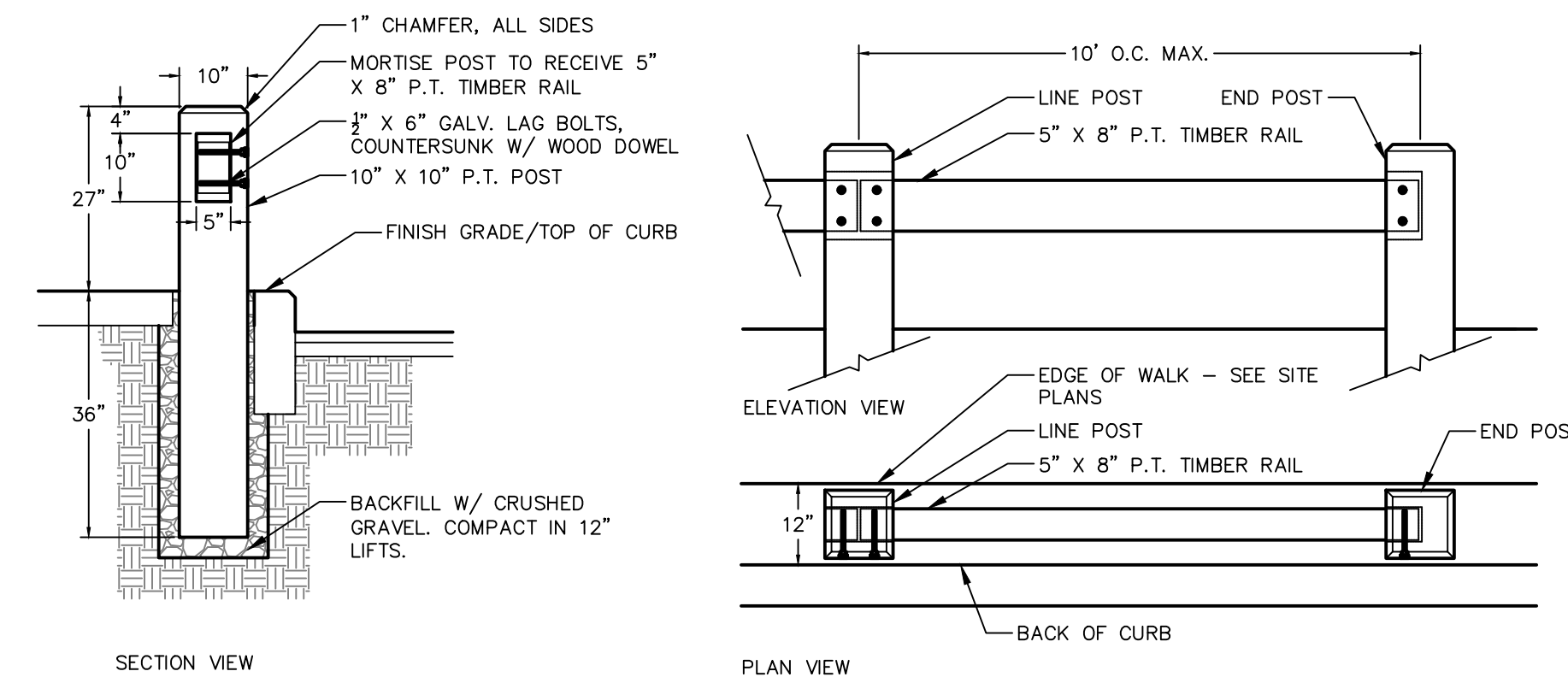
- NOTES:**
1. FOOTING DESIGN TO BE CHECKED BY AN ENGINEER FOR WIND LOADS IF SLATS ARE USED OR IF POOR SOIL CONDITIONS EXIST.
  2. STRAIGHT RUNS BETWEEN BRACED POSTS SHALL NOT EXCEED 500'.
  3. FENCE DETAILS ARE INTENDED AS A GUIDE ONLY. ALL FENCE MATERIALS AND CONSTRUCTION METHODS SHALL BE APPROVED BY THE ENGINEER AND FENCE MANUFACTURER.

**CHAIN LINK FENCE LEGEND**

- 1 5/8" O.D. TOP RAIL ATTACH FABRIC WITH 9 GAUGE WIRE CLIP EVERY 24"
  - 1 5/8" O.D. BRACE FOR RAIL FENCES OVER 6 FEET HIGH AND ALL FENCES WITHOUT TOP RAIL
  - 5/16" TRUSS ROD AND TURNBUCKLE
  - INTERMEDIATE POST
- | FENCE HEIGHT | SQUARE POST | ROUND POST |
|--------------|-------------|------------|
| 6' AND LESS  | 1 7/8"      | 2"         |
| OVER 6'      | 2 1/4"      | 2 1/2"     |
- ATTACH TO C.L. FABRIC WITH CLIPS EVERY 15"
- END OR CORNER POST
- | FENCE HEIGHT | SQUARE POST | ROUND POST |
|--------------|-------------|------------|
| 6' AND LESS  | 2"          | 2 1/2"     |
| OVER 6'      | 2 1/2"      | 3"         |
- 6 GAUGE BOTTOM TENSION WIRE ATTACH TO FABRIC WITH HOG RING AT 24" C.C.
  - TENSION ROD ATTACHED TO END OR CORNER POST
  - FOR COMPACT SOIL CONDITIONS, TWO 30" MIN. LENGTH DRIVE ANCHORS DRIVEN THROUGH FITTINGS AT 90° TO FENCE LINE INTO EARTH AT 45° (TO BE USED IN PLACE OF CONCRETE FOOTING).
  - CONCRETE FOOTING 42" DEEP WITH 12" DIA. AT END POST AND 10" DIA. AT INTERMEDIATE POST. HOLE CORE IN UNDISTURBED OR COMPACTED SOIL. (SEE NOTE NO. 1)
  - 6 GAUGE TENSION WIRE WHEN TOP RAIL IS NOT USED.
  - FABRIC SELVAGE: UNDER 6' SHALL BE KNUCKLED TOP AND BOTTOM 6' AND OVER SHALL BE KNUCKLED BOTTOM AND TWISTED ON THE TOP RECREATIONAL FENCING, REGARDLESS OF HEIGHT, SHALL BE KNUCKLED TOP AND BOTTOM
  - 9 GAUGE 2" WIRE MESH FABRIC (COMMERCIAL) BLACK VINYL COATED.



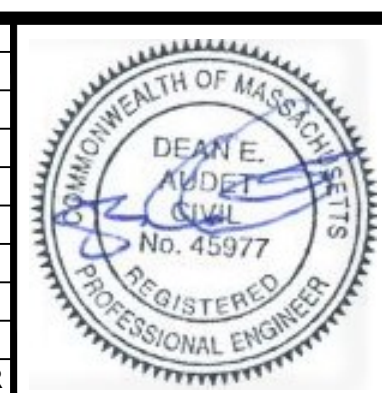
**CHAIN LINK FENCE**  
NOT TO SCALE



**ADD ALTERNATE: WOOD GUARDRAIL**  
SCALE: NOT TO SCALE

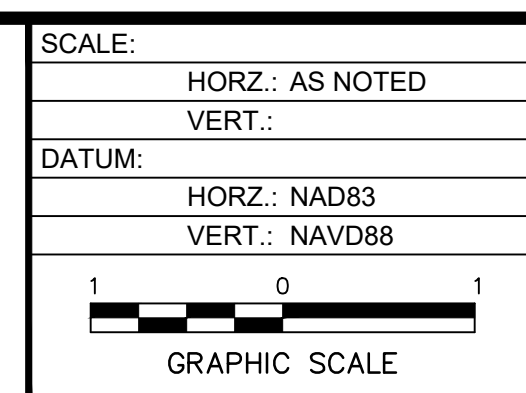
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LAYER STATE:

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER



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VERT.:  
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VERT.: NAVD88

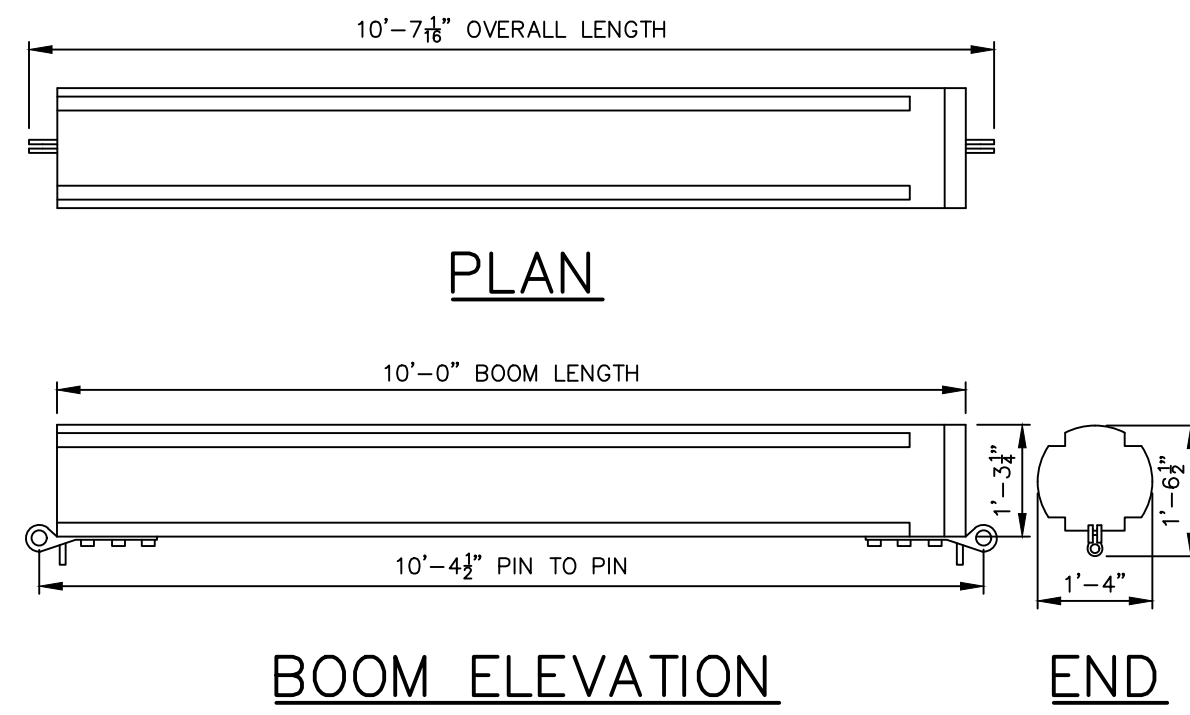


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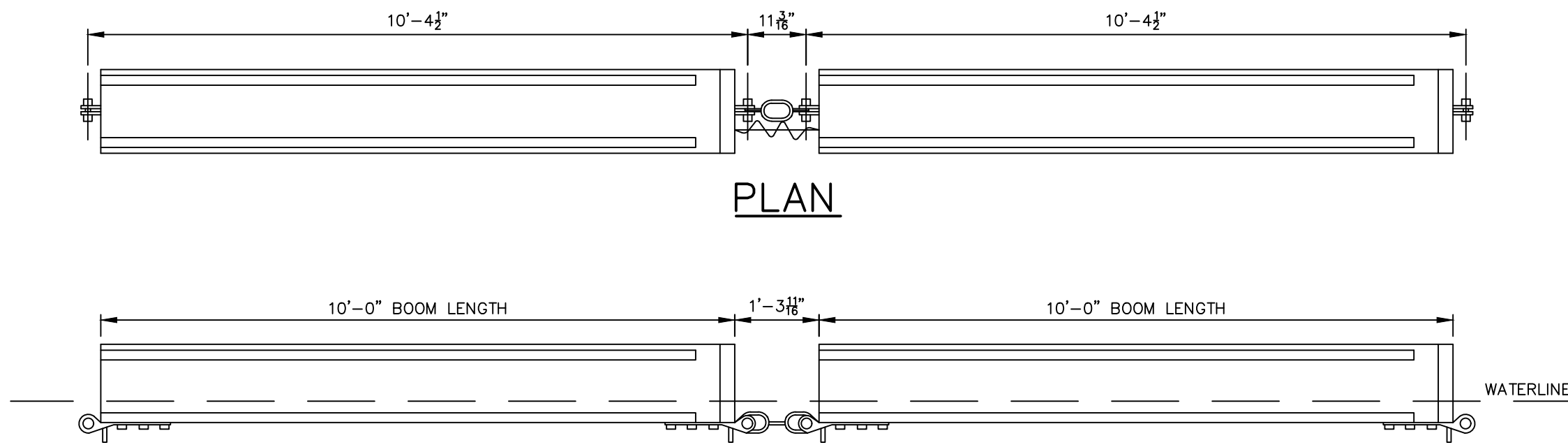
CITY OF HAVERHILL  
CONSTRUCTION DETAILS  
LITTLE RIVER DAM REMOVAL AND RIVER RESTORATION  
HAVERHILL MASSACHUSETTS

PROJ. No.: 20170390.U40  
DATE: DECEMBER 16, 2024  
**CD-506**

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 LMS VIEW: PC3: NONE STB/CTB: FO STB

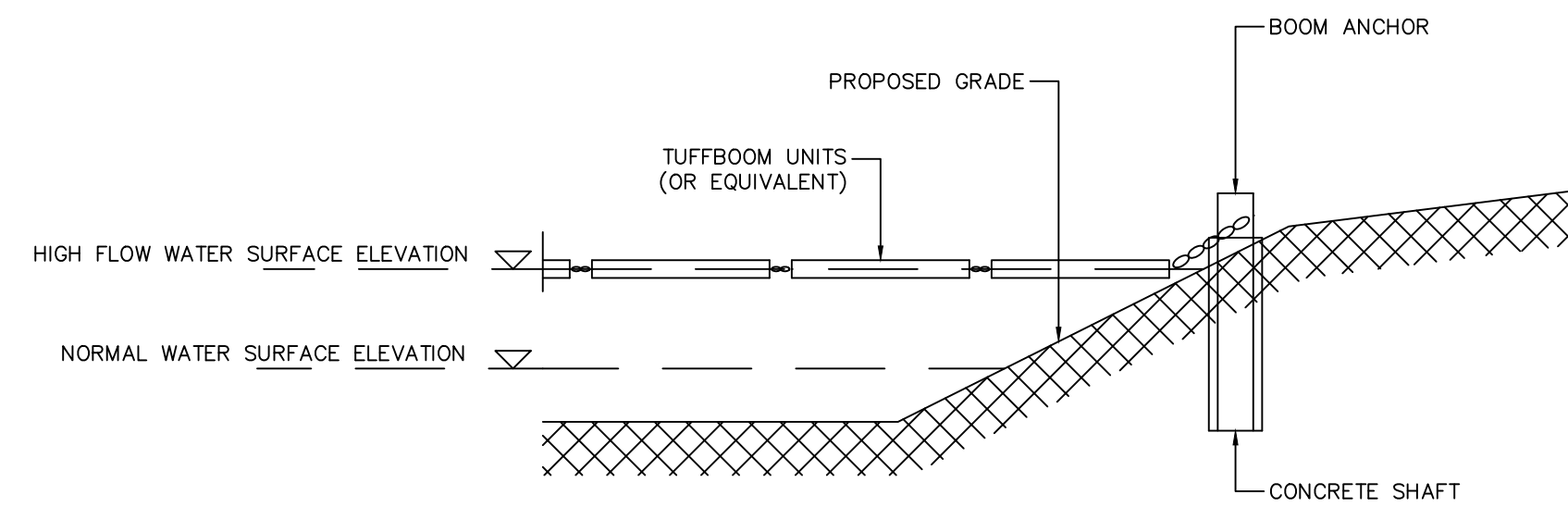


NOT TO SCALE



**BOOM CONNECTIONS ELEVATION**

NOT TO SCALE

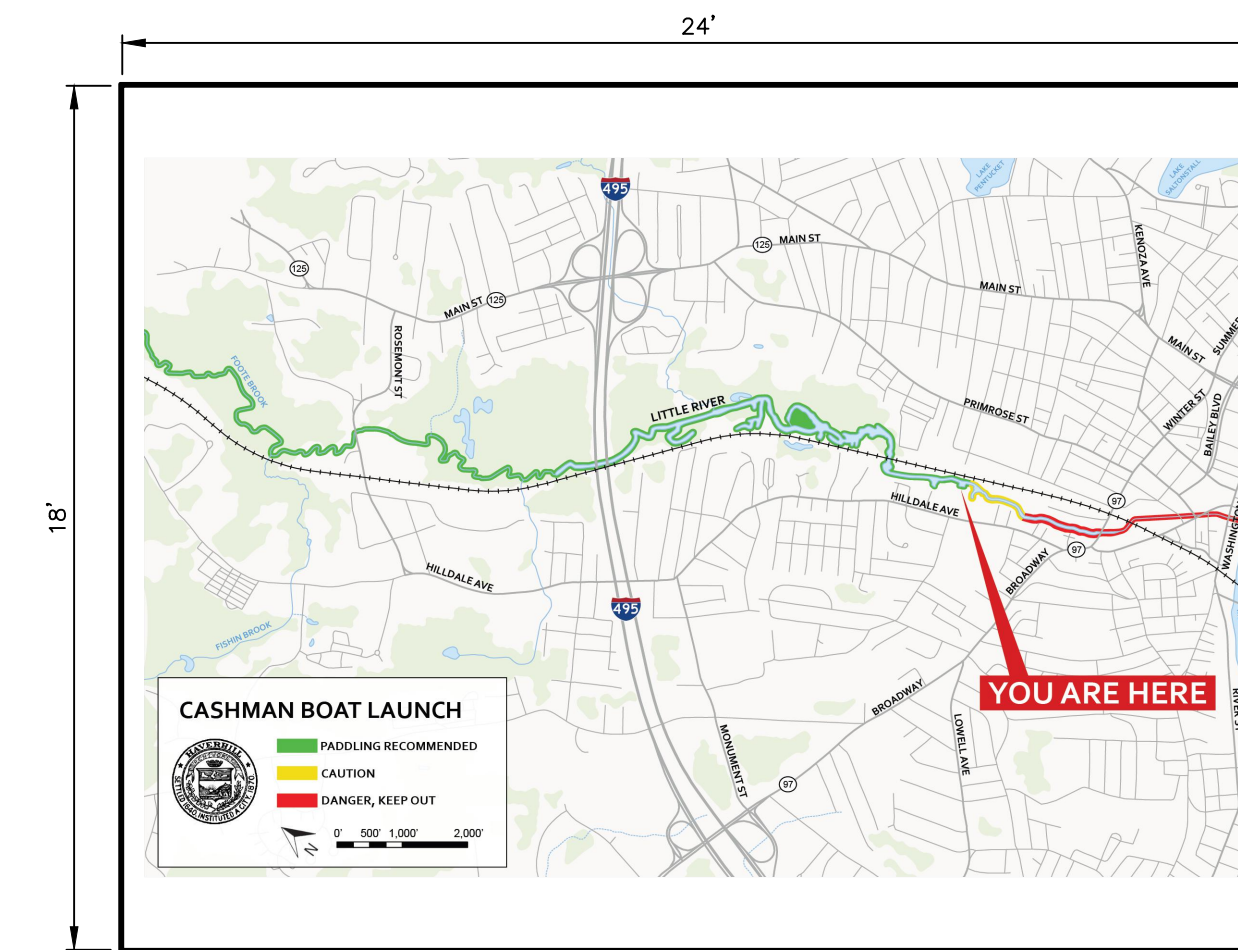


**NOTES:**

- FLOATING SAFETY BOOM SHALL BE TUFFBOOM BY WORTHINGTON WATERWAY BARRIERS, OR EQUIVALENT. CONTRACTOR SHALL PURSUE TIER ONE DESIGN WITH WORTHINGTON USING DESIGN PARAMETERS PROVIDED IN SPECIFICATIONS TO DETERMINE REQUIRED BOOM TENSION.
- THE BOOM SHALL BE SUPPLIED WITH ALL COMPONENTS REQUIRED TO COMPLETE THE INSTALLATION AND CONNECTION TO THE LAND ANCHORS.
- SHOP DRAWINGS AND SPECIFICATIONS SHALL BE PROVIDED FOR ALL COMPONENTS OF THE BOOM, ANCHORS, AND ANCHOR FOUNDATIONS.
- BOOM SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS.
- BOOM BUOY COLOR SHALL BE ALTERNATING RED AND WHITE.
- "DANGER - KEEP OUT" GRAPHICS SHALL BE PRINTED ON EACH BUOY.

**FLOATING SAFETY BOOM AND ANCHOR**

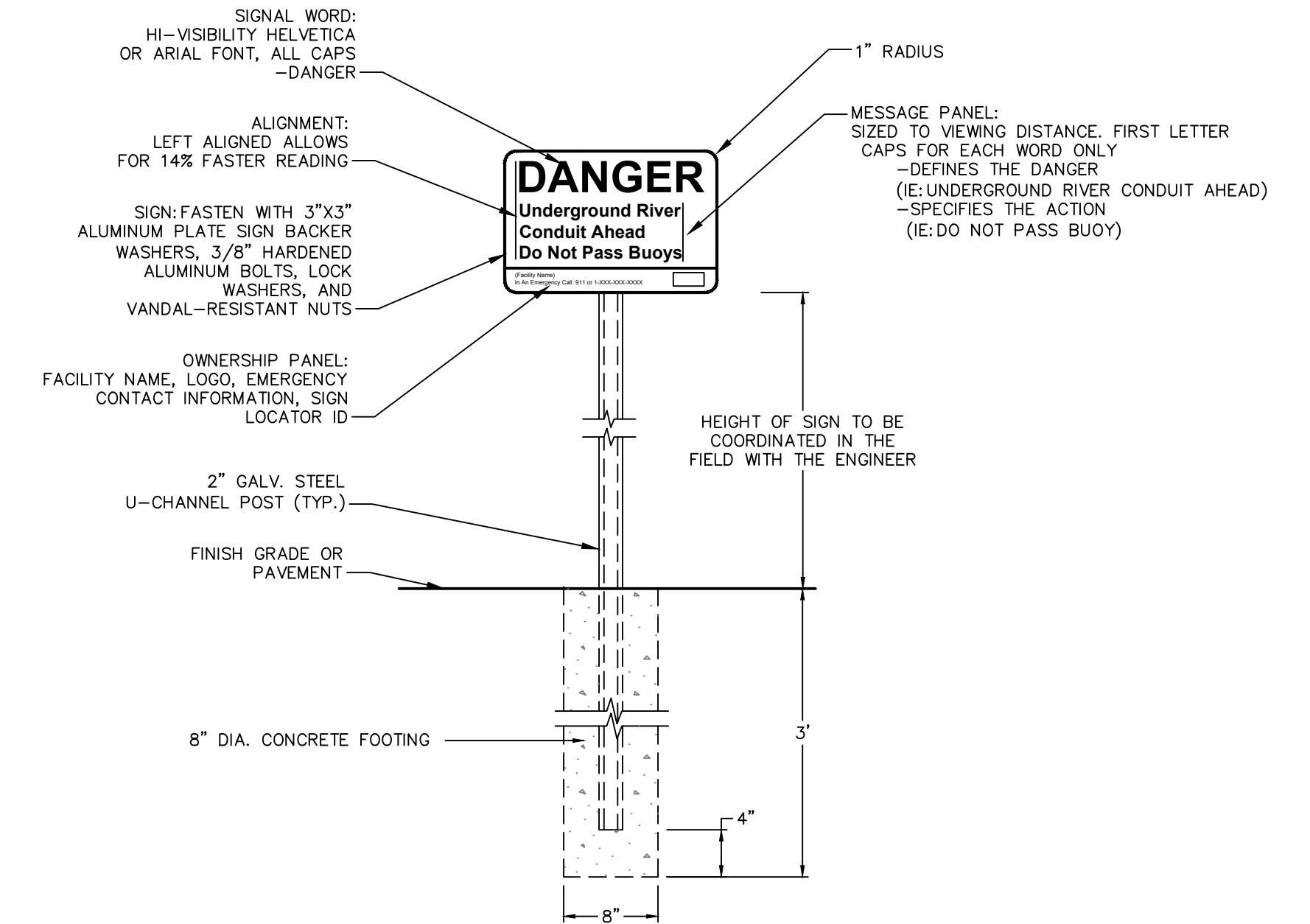
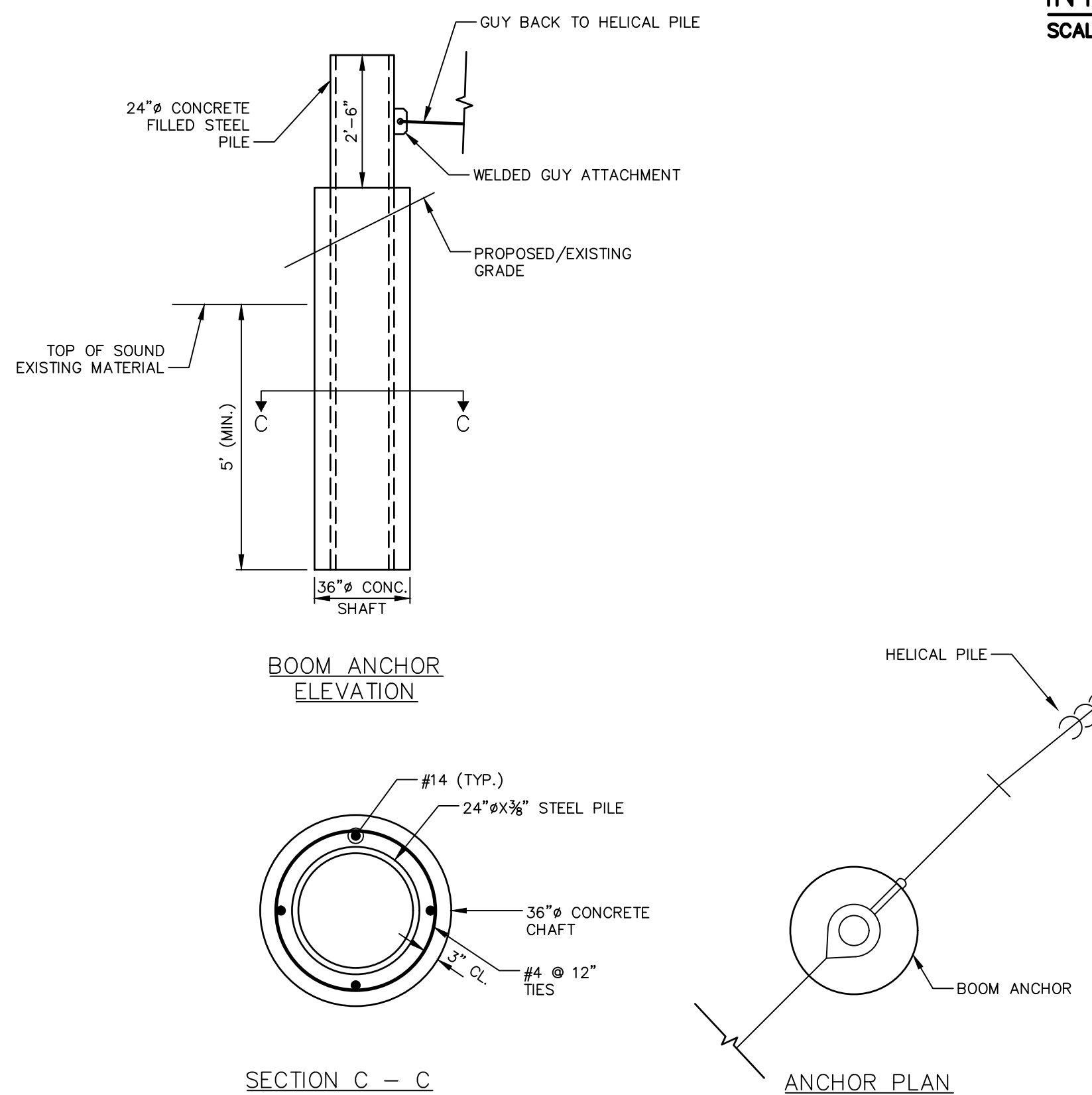
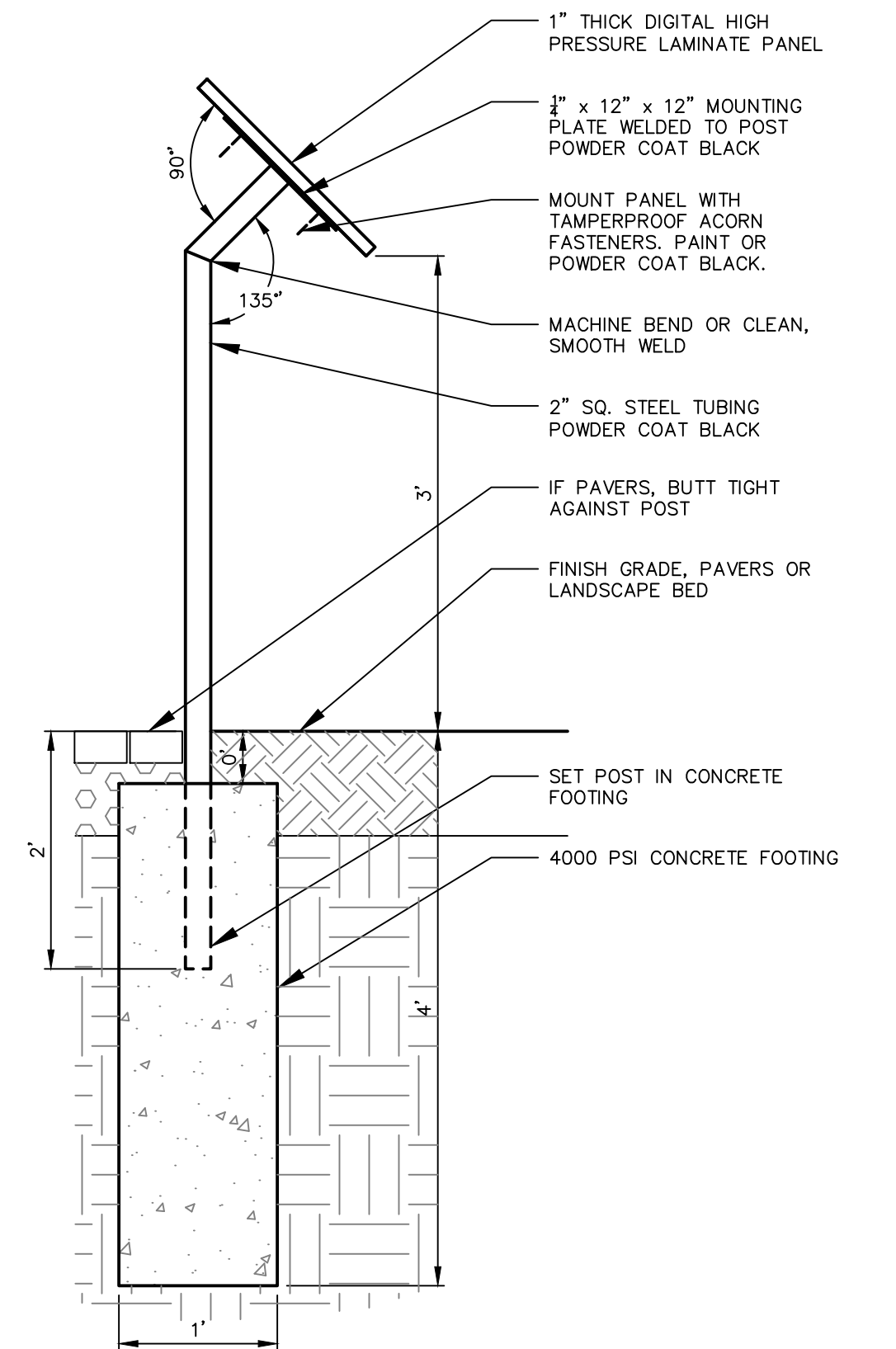
NOT TO SCALE



NOTES:  
 GRAPHIC TO BE PROVIDED BY DESIGNER.  
 GRAPHIC TO BE APPROVED BY OWNER BEFORE INSTALLATION.  
 SEE LAYOUT PLAN FOR LOCATIONS.

**INTERPRETIVE SIGN**

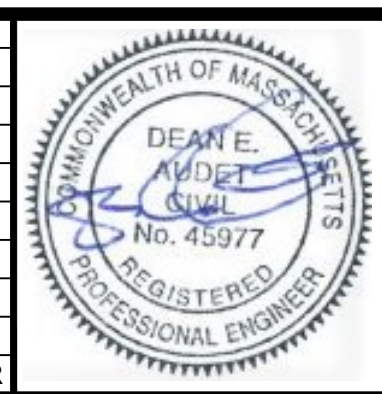
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**DANGER SIGN**

NOT TO SCALE

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER



SEAL

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	VERT.:
DATUM:	HORZ.: NAD83
	VERT.: NAVD88
	GRAPHIC SCALE

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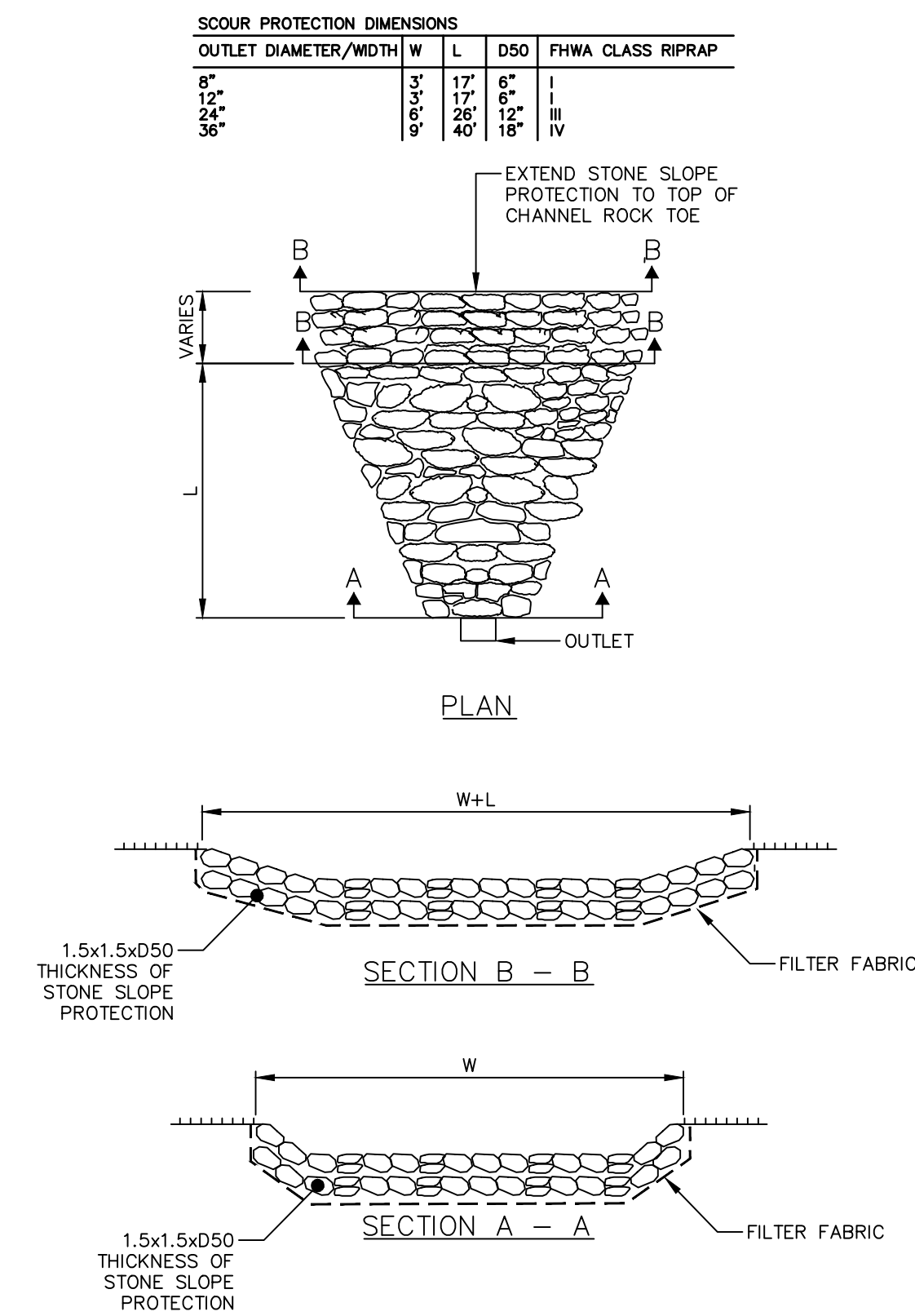
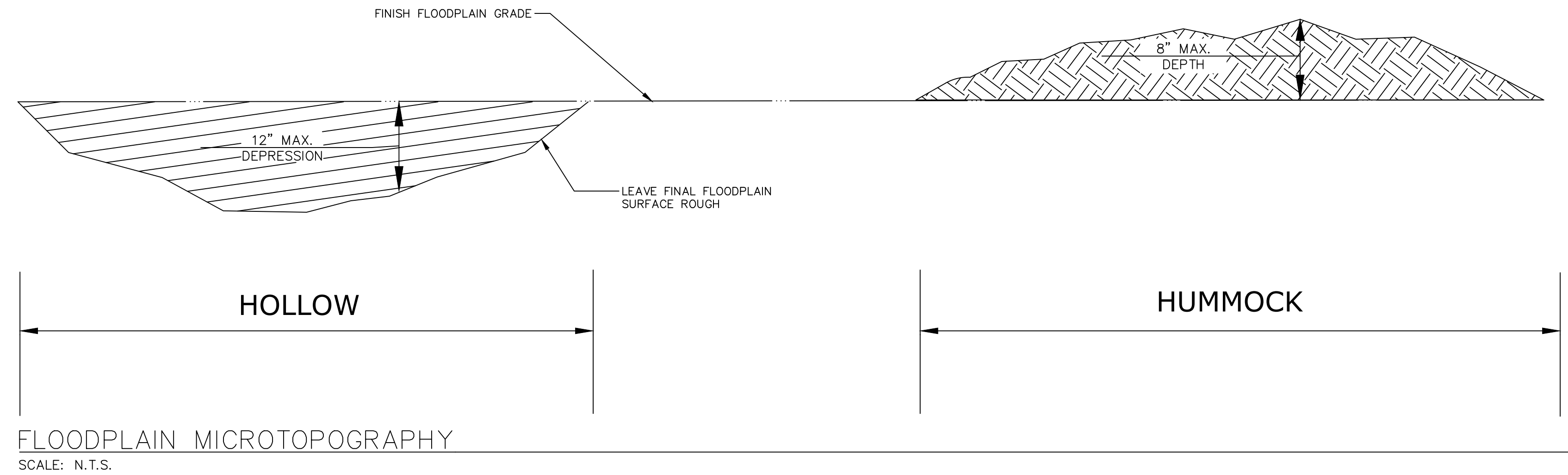
PROJ. No.: 20170390.U40  
 DATE: DECEMBER 16, 2024  
**CD-507**



**NOTES:**

1. CONTRACTOR TO SUBMIT SHOP DRAWING.
2. 5' MINIMUM CROSSING TRAVEL WIDTH.

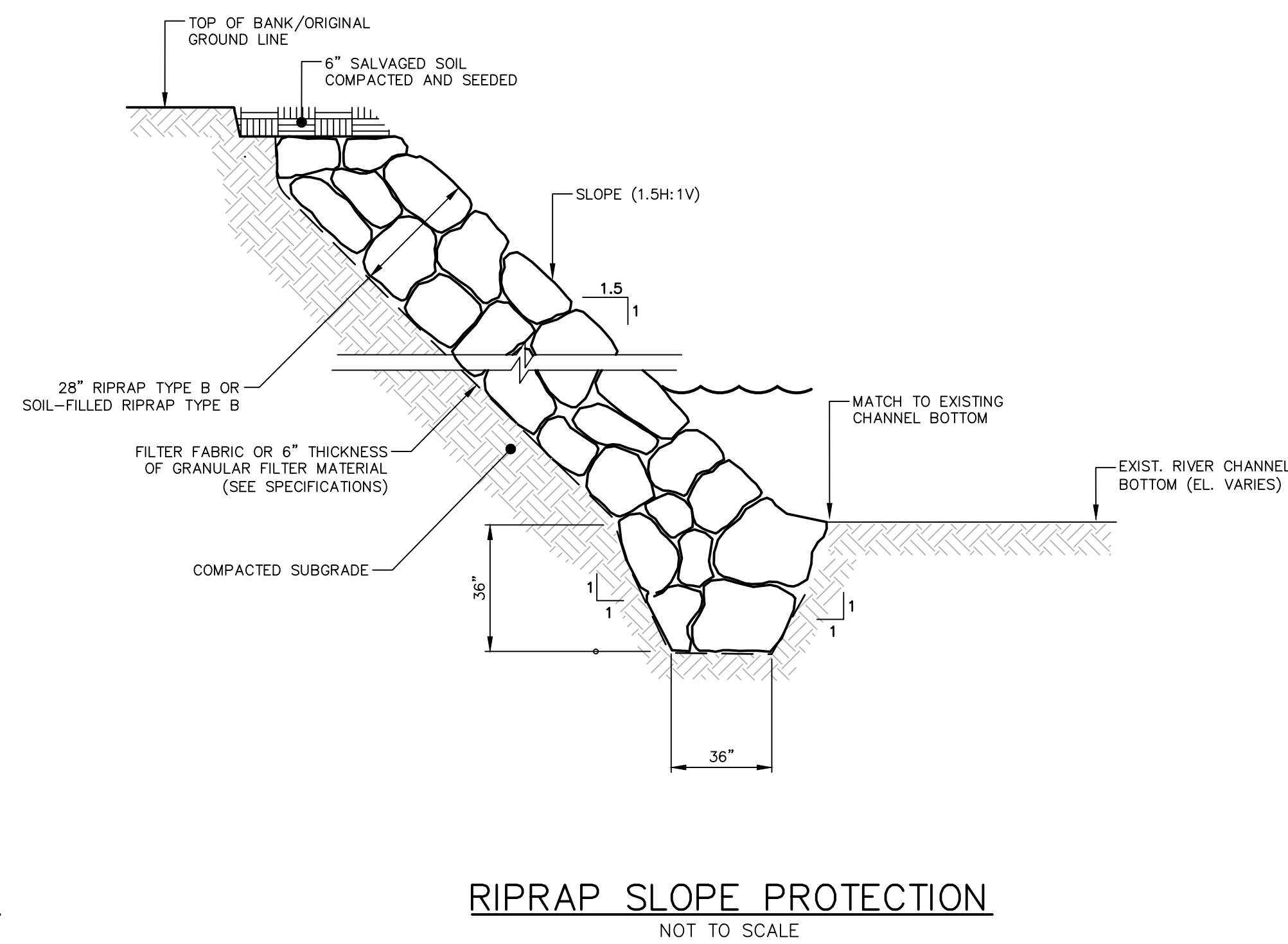
**ADD ALTERNATE: TRAIL CROSSING FOR STORMWATER OUTFALL GENERAL CONFIGURATION AND STYLE**  
**NOT TO SCALE**



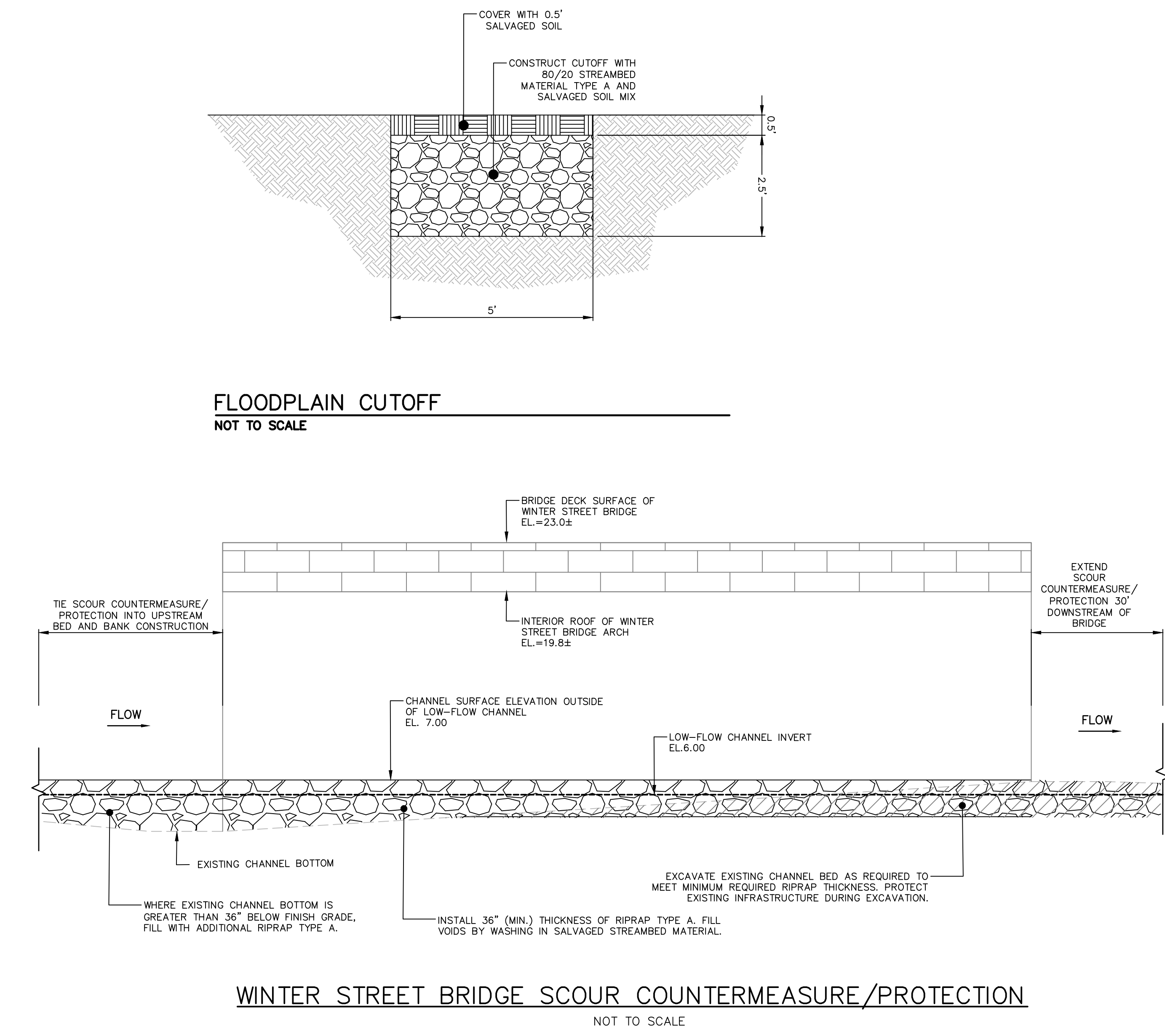
**NOTES:**

1. REFER TO SCOUR PROTECTION DIMENSIONS TABLE ABOVE FOR FEDERAL HIGHWAY ADMINISTRATION (FHWA) CLASS RIPRAP TO BE USED.
2. DIMENSIONS MAY BE MODIFIED BY ENGINEER TO MEET FIELD CONDITIONS.

**OUTFALL SCOUR PROTECTION**  
**NOT TO SCALE**



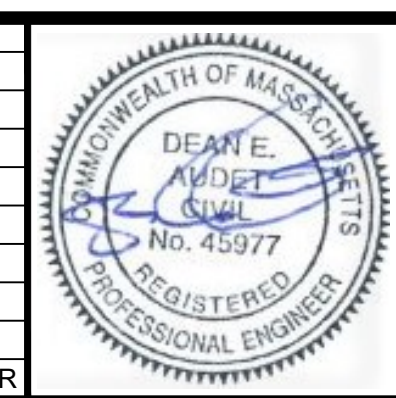
**RIPRAP SLOPE PROTECTION**  
**NOT TO SCALE**



**WINTER STREET BRIDGE SCOUR COUNTERMEASURE/PROTECTION**  
**NOT TO SCALE**

File: J:\DWG\2017\0390\U40\Civil\Plan\20170390\U40\_DET01.dwg Plotted: 2024-12-11 4:28 PM Saved: 2024-12-11 3:40 PM User: claire.nauman  
 LMS VIEW: PC3: NONE STB/CTB: FO STB

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER



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 LITTLE RIVER DAM REMOVAL AND RIVER RESTORATION  
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PROJ. No.: 20170390.U40  
 DATE: DECEMBER 16, 2024  
**CD-508**







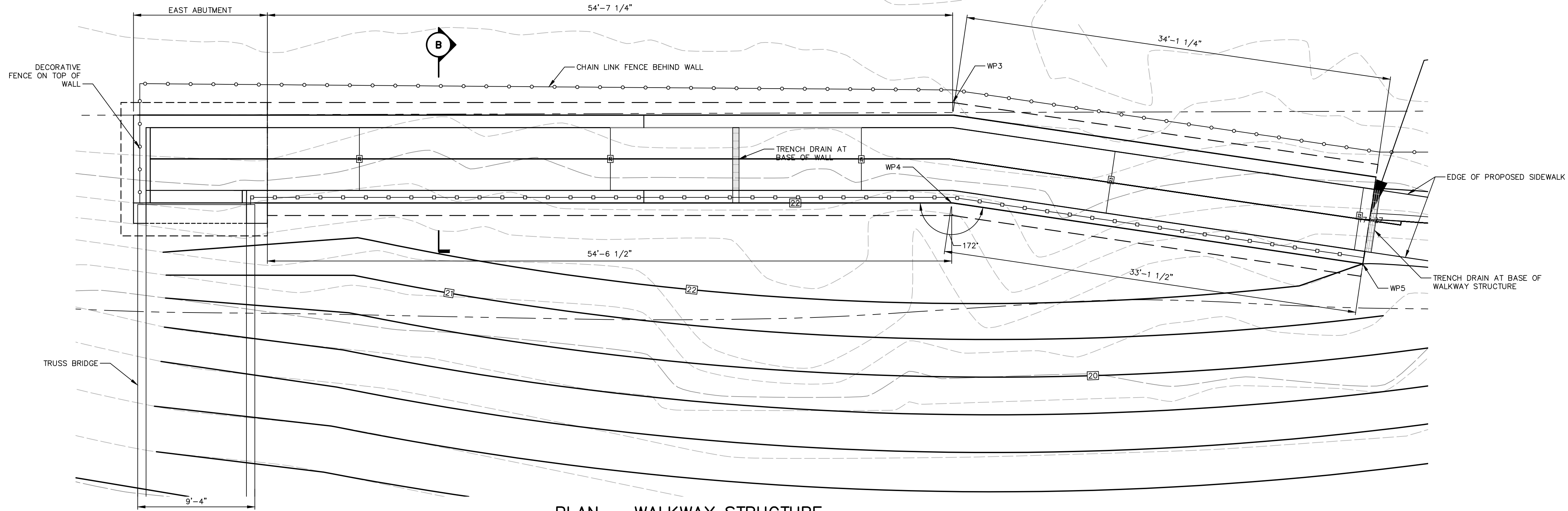






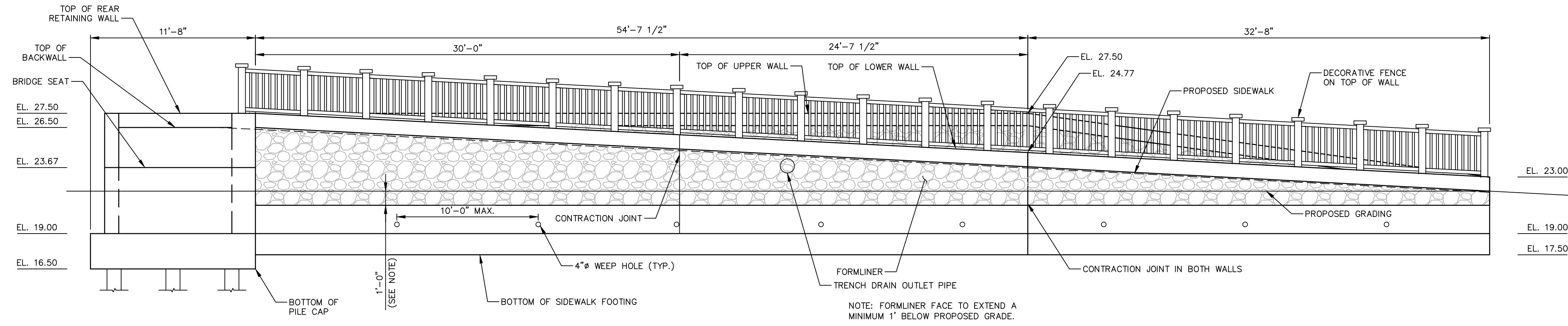


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 PC3: AUTOCAD PDF (GENERAL DOCUMENTATION) PC3\_STB/CTB: FO STB  
 LAYER STATE:



**PLAN - WALKWAY STRUCTURE**

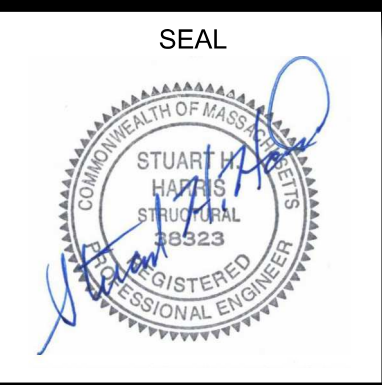
1" = 5'-0"



**ELEVATION - WALKWAY STRUCTURE**

1" = 5'-0"

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER



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 ADD ALTERNATE: PEDESTRIAN WALKWAY PLAN  
 AND ELEVATION  
 LITTLE RIVER DAM REMOVAL AND RIVER RESTORATION  
 HAVERHILL MASSACHUSETTS

PROJ. No.: 20170390.U40  
 DATE: DECEMBER 16, 2024  
  
S-108



**GENERAL STRUCTURAL NOTES:**

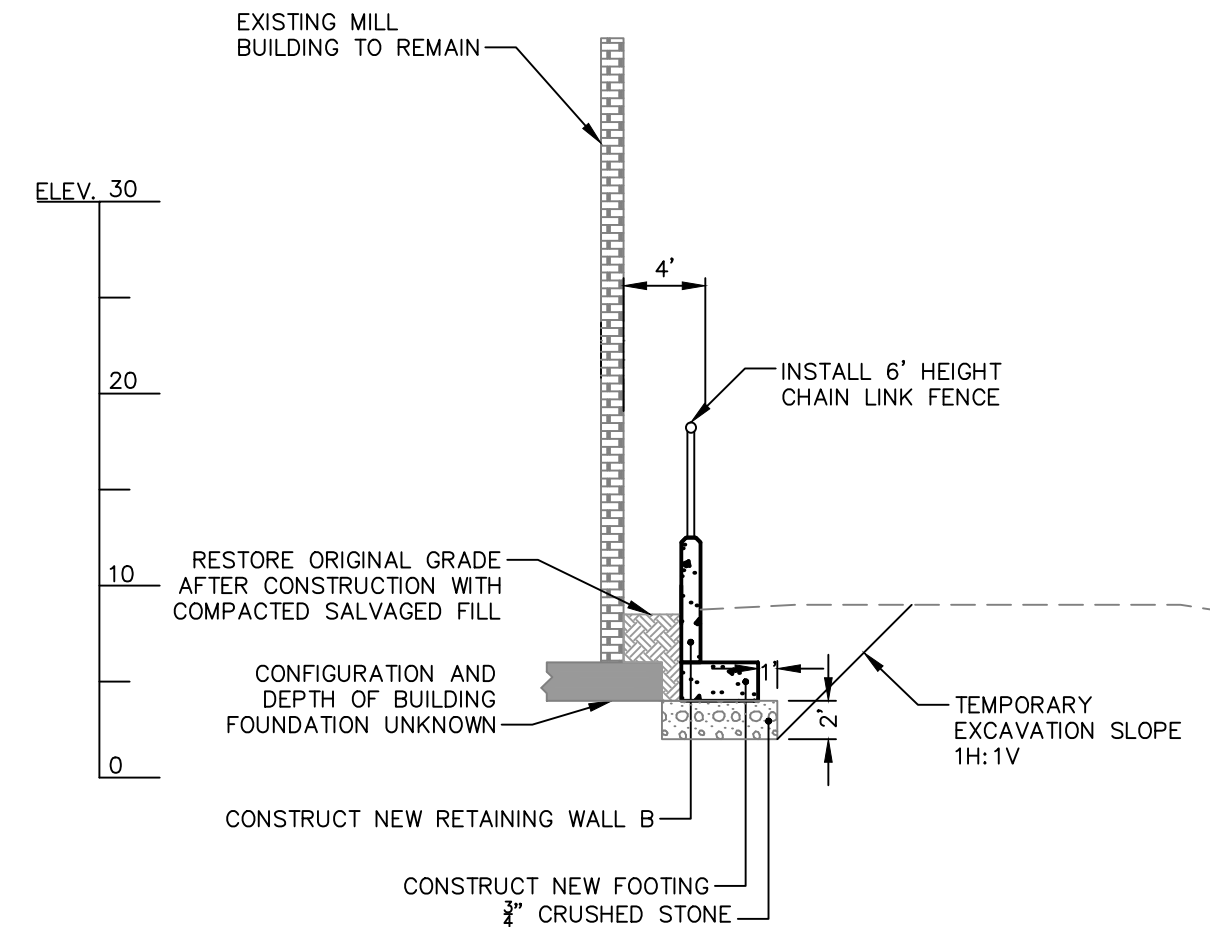
- ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE MASSACHUSETTS STATE BUILDING CODE AND ITS APPLICABLE REFERENCED STANDARDS.
- EXISTING STRUCTURAL SYSTEM IS SHOWN FOR INFORMATION ONLY. ALL EXISTING STRUCTURE LOCATIONS MUST BE FIELD VERIFIED.
- THE CONTRACTOR SHALL COORDINATE ALL DIMENSIONS AND ELEVATIONS WITH THE ARCHITECTURAL DRAWINGS PRIOR TO CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE ARCHITECT AND ENGINEER ON RECORD.
- THE CONTRACTOR SHALL COORDINATE THE SIZE AND LOCATION OF ALL SLEEVES, OPENINGS AND ANCHORAGES (INCLUDING ANCHOR BOLTS) AS REQUIRED BY ALL TRADES. OPENINGS NOT SPECIFICALLY SHOWN SHALL BE APPROVED BY THE ARCHITECT AND STRUCTURAL ENGINEER.
- IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO PROVIDE FOR A SAFE AND EFFICIENT METHOD OF SHORING AND/OR BRACING THE STRUCTURE DURING CONSTRUCTION.
- ALL WORK SHALL BE CONTINUOUSLY MONITORED AND INSPECTED BY AN INDEPENDENT TESTING AGENCY REFER TO SPECIAL INSPECTION NOTES ON THIS SHEET. SUBMIT ALL TEST AND INSPECTION REPORTS TO A/E FOR REVIEW.
- STRUCTURAL MEMBERS SHALL NOT BE MODIFIED IN THE FIELD WITHOUT WRITTEN APPROVAL FROM THE STRUCTURAL ENGINEER. IN THE EVENT OF A CONSTRUCTION OR FABRICATION ERROR, THE CONTRACTOR SHALL PREPARE A SKETCH WITH A PROPOSED REPAIR, AND SUBMIT IT TO THE ARCHITECT AND ENGINEER OF RECORD. FOR APPROVAL PRIOR TO PERFORMING ANY CORRECTIVE WORK.
- SUBMIT SHOP DRAWINGS FOR APPROVAL - FOR ALL TRADES INDICATED HEREIN - PRIOR TO PROCEEDING WITH FABRICATION AND/OR CONSTRUCTION. CONTRACTOR SHALL ALLOW FOR A 2 WEEK REVIEW PERIOD BY THE DESIGN TEAM.
- IN ANY CASE OF CONFLICT BETWEEN THE NOTES, DETAILS AND SPECIFICATIONS, THE MOST RIGID REQUIREMENTS SHALL GOVERN. CONTRACTOR SHALL MAKE NO DEVIATION FROM CONTRACT DOCUMENTS WITHOUT WRITTEN APPROVAL OF THE ENGINEER.
- JOB SAFETY AND CONSTRUCTION PROCEDURES ARE THE RESPONSIBILITY OF THE CONTRACTOR.
- ALL COSTS OF INVESTIGATION AND/OR REDESIGN, DUE TO CONTRACTOR MISLOCATION OF STRUCTURAL ELEMENTS OR OTHER LACK OF CONFORMANCE WITH THE PROJECT DOCUMENTS, SHALL BE AT THE CONTRACTOR'S EXPENSE.
- THESE DRAWINGS REPRESENT THE COMPLETED PROJECT WHICH HAS BEEN DESIGNED FOR THE WEIGHTS OF THE MATERIALS INDICATED ON THE DRAWINGS AND FOR THE SUPERIMPOSED LOADS INDICATED IN THE DESIGN DATA. IT IS THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE ALLOWABLE CONSTRUCTION LOADS AND TO PROVIDE PROPER DESIGN AND CONSTRUCTION OF FALSEWORK, FORMWORK, STAGINGS, BRACING, SHEETING AND SHORING, ETC.
- TYPICAL DETAILS APPLY REPETITIVELY ON THE PROJECT. CONTRACTOR SHALL COORDINATE THE GENERAL REQUIREMENTS OF TYPICAL DETAILS WITH PROJECT CONDITIONS, PLANS, SPECIFICATIONS, AND SECTIONS.

**CONCRETE NOTES:**

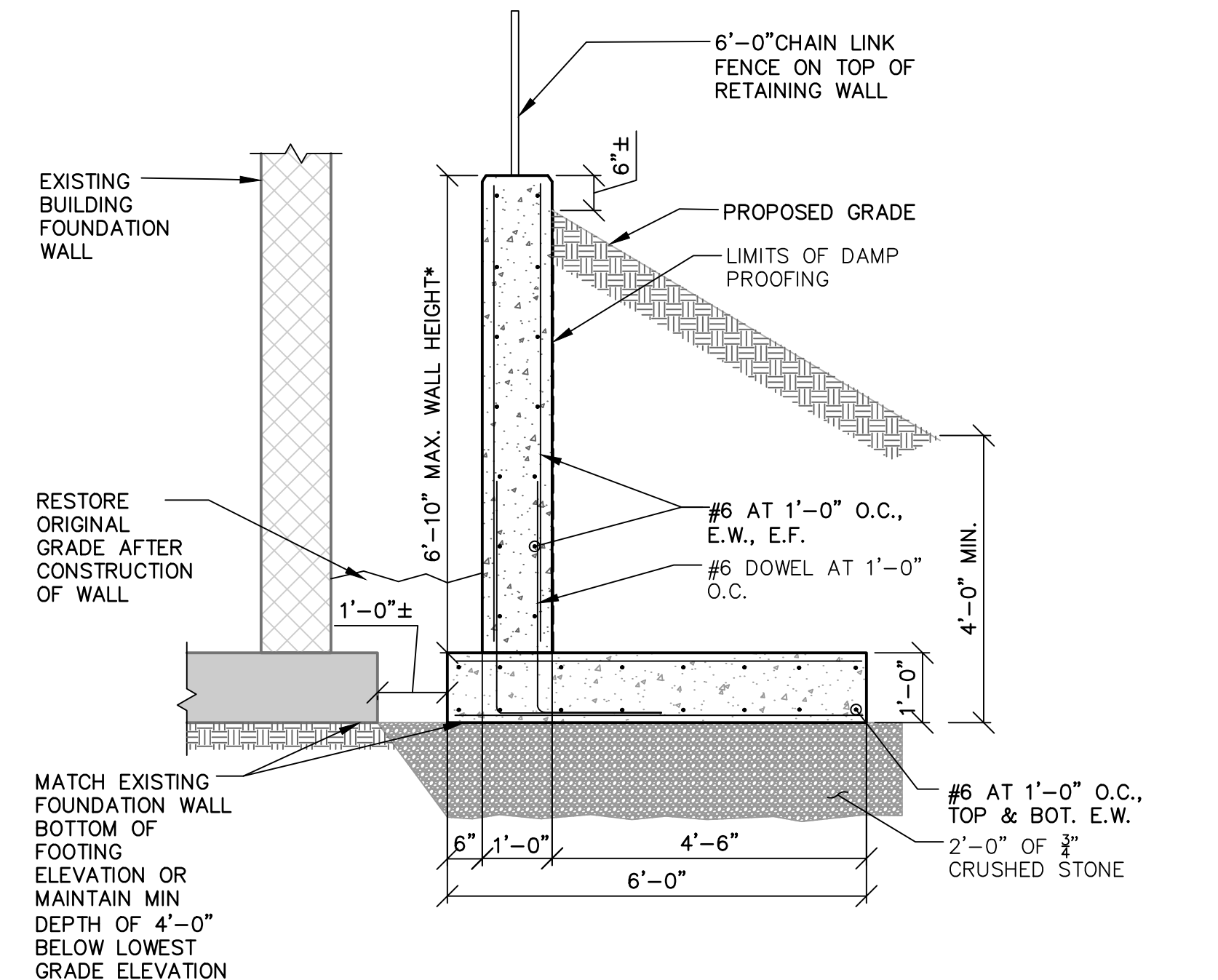
- ALL CONCRETE WORK SHALL CONFORM TO ACI 301 "SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS".
- ALL REINFORCING STEEL SHALL CONFORM TO ASTM A615 GRADE 60 AND BE DETAILED IN ACCORDANCE WITH ACI 315 "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES".
- REBARS SHALL HAVE A MINIMUM CONCRETE COVER AS FOLLOWS:  
CONCRETE DEPOSITED AGAINST GROUND.....3 IN.  
CONCRETE EXPOSED TO WEATHER OR IN CONTACT WITH GROUND:  
FOR BARS #5 AND LARGER.....2 IN..
- ALL REINFORCING BARS SHALL BE CONTINUOUS AND LAPPED A MINIMUM OF 48 BAR DIAMETERS AT ALL SPLICES, CORNERS, AND INTERSECTIONS UNLESS NOTED OTHERWISE.
- ALL REINFORCEMENT SHALL BE SECURELY TIED IN ITS PROPOSED LOCATION PRIOR TO AND DURING PLACEMENT OF CONCRETE USING APPROVED CHAIRS, SPACERS AND TIE WIRE AS REQUIRED. NO BARS SHALL BE CUT OR OMITTED IN THE FIELD WITHOUT THE APPROVAL OF THE ENGINEER.
- CONCRETE PROTECTION FOR REINFORCEMENT SHALL IN ALL CASES BE AT LEAST EQUAL TO THE DIAMETER OF THE BAR EXCEPT FOR CONCRETE SLABS.
- CONCRETE FOR WALLS, PIERS, AND FOOTINGS SHALL BE NORMAL WEIGHT CONCRETE AND SHALL DEVELOP A COMPRESSIVE STRENGTH OF 4,000 PSI IN 28 DAYS, UNLESS OTHERWISE NOTED. CONCRETE SHALL HAVE A MAXIMUM AGGREGATE SIZE OF 3/4 INCH, A MINIMUM CEMENT CONTENT OF 560 LBS/CU YD., AND A MAXIMUM SLUMP OF 4 INCHES.
- ALL EXPOSED EDGES OF CONCRETE SHALL HAVE A 3/4 INCH CHAMFER UNLESS NOTED OTHERWISE.
- ALL CONCRETE EXPOSED TO THE WEATHER SHALL BE AIR-ENTRAINED.
- SIZES AND LOCATIONS OF ALL REQUIRED EMBEDDED ITEMS FOR ALL TRADES SUCH AS ANCHOR BOLTS, PIPING SLEEVES, HOLDOWN ANCHORS, ETC., SHALL BE COORDINATED BY THE CONTRACTOR WITH OTHER TRADES.
- CONSTRUCTION JOINTS SHALL BE DETAILED AND LOCATED ON SHOP DRAWINGS AND APPROVED BY THE ENGINEER. UNLESS SHOWN OTHERWISE, CONSTRUCTION JOINTS ARE TO BE KEYPED AND PROVIDE FOR CONTINUITY OF REINFORCING STEEL. CONSTRUCTION JOINTS ARE TO BE LOCATED WHERE CONSTRUCTION OPERATIONS ARE SUSPENDED FOR 30 MINUTES OR MORE.
- CONSTRUCTION JOINTS IN WALLS SHALL BE LOCATED AT THE CONVENIENCE OF THE CONTRACTOR MID-WAY BETWEEN BUTTRESSES, BUT NOT LESS THAN 4'-0" FROM ANY OPENING, EXCEPT WHERE SPECIFICALLY SHOWN ON PLAN OR APPROVED BY THE ENGINEER. IN NO EVENT SHALL A STRAIGHT RUN LONGER THAN 80'-0" BE PLACED WITHOUT A JOINT.
- NO HORIZONTAL CONSTRUCTION JOINTS ARE PERMITTED IN WALLS, OTHER THAN SHOWN IN DETAILS.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR LIMITING POURS TO MINIMIZE SHRINKAGE CRACKING. IN GENERAL, WALLS SHALL NOT BE POURED IN CONTINUOUS LENGTHS EXCEEDING 30 FEET WITHOUT CONTRACTION (CONTROL) JOINTS. THE LOCATION AND CONFIGURATION OF JOINTS EXPOSED TO VIEW SHALL BE COORDINATED WITH THE ARCHITECT. CONTRACTION JOINTS IN SLAB-ON-GRADE SHOULD NOT EXCEED 20 FEET IN ANY DIRECTION. TYPICAL CONTRACTION JOINT PATTERNS ARE INDICATED ON FOUNDATION PLANS.

**FOUNDATION NOTES:**

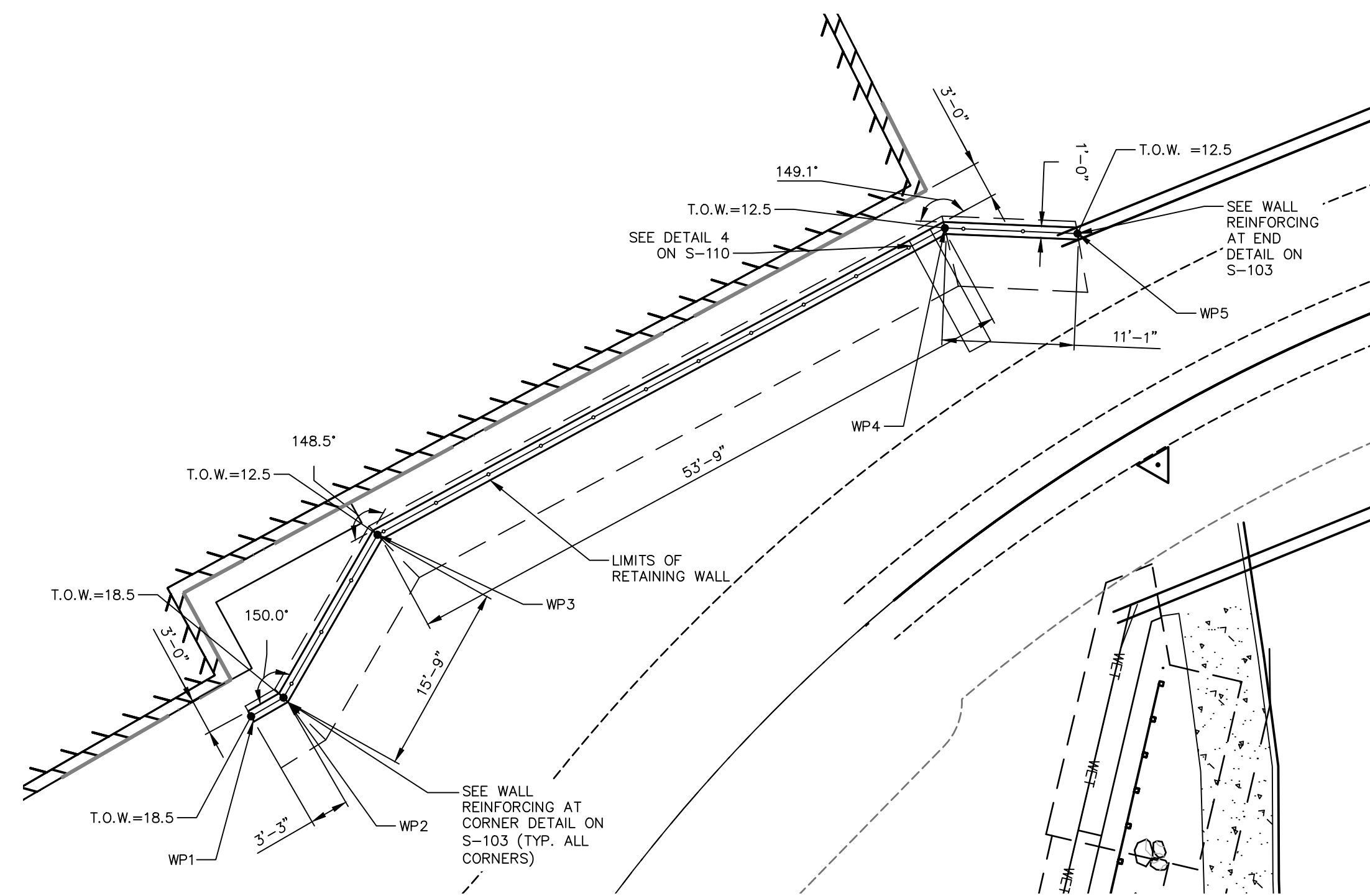
- ALL EARTHWORK FOR RETAINING WALL SHOWN ON CONTRACT DOCUMENTS SHALL BE IN ACCORDANCE WITH THE RECOMMENDATIONS NOTED IN THE PRELIMINARY GEOTECHNICAL ENGINEERING REPORT DATED MAY 31, 2022 PREPARED BY O'REILLY, TALBOT & OKUN ENGINEERING ASSOCIATES, INC.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING, OPERATING AND MAINTAINING ALL EQUIPMENT NECESSARY TO DEWATER SITE EXCAVATIONS.
- ALL BEARING MATERIAL SHALL BE INSPECTED BY A QUALIFIED TECHNICIAN PRIOR TO CONCRETE PLACEMENT. A QUALIFIED TECHNICIAN SHALL BE THE SOLE JUDGE AS TO THE SUITABILITY OF THE BEARING MATERIAL. FOOTING ELEVATIONS SHALL BE ADJUSTED AS REQUIRED.



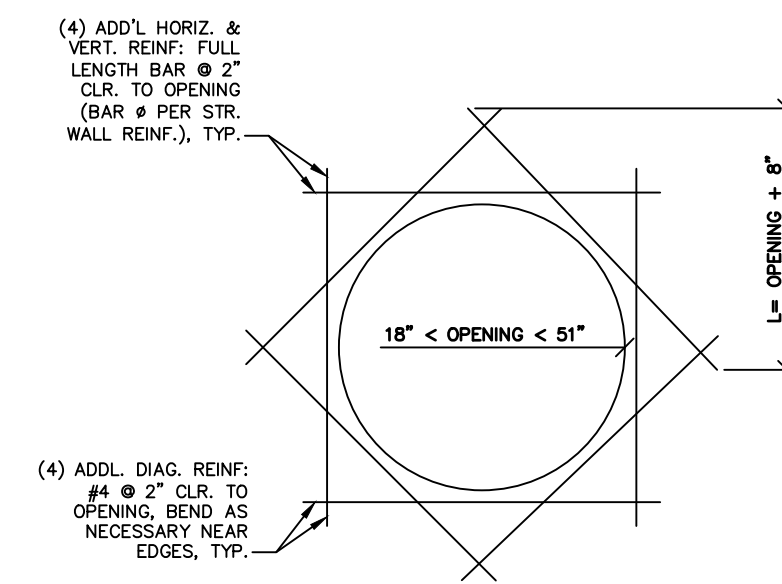
1 TYPICAL PAY LIMITS FOR RETAINING WALL B  
1"=10'



2 RETAINING WALL B SECTION  
1/2"=1'-0"



3 RETAINING WALL B PLAN  
1"=10'

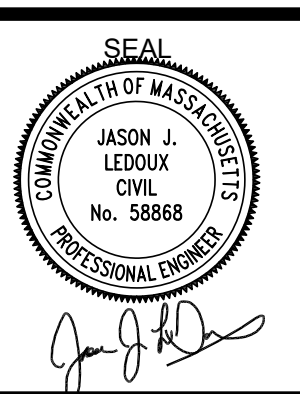


4 REINFORCING AT OPENING  
NOT TO SCALE

RETAINING WALL B WORKING POINT COORDINATES		
WP	NORTHING	EASTING
1	3108712.15	766629.07
2	3108709.32	766630.70
3	3108701.45	766644.35
4	3108654.15	766669.92
5	3108643.07	766669.46

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 MS VIEW: LAYER STATE: PC3: NONE STB/CTB: FO STB

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER



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VERT.:  
DATUM: HORIZ.: NAD83  
VERT.: NAVD88

GRAPHIC SCALE

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CITY OF HAVERHILL  
RETAINING WALL B PLAN, ELEVATION, AND  
DETAILS  
LITTLE RIVER DAM REMOVAL AND RIVER RESTORATION  
HAVERHILL MASSACHUSETTS

PROJ. No.: 20170390 U40  
DATE: FEBRUARY 6, 2026

**S-110**