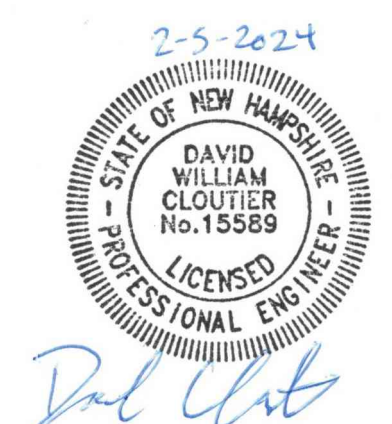
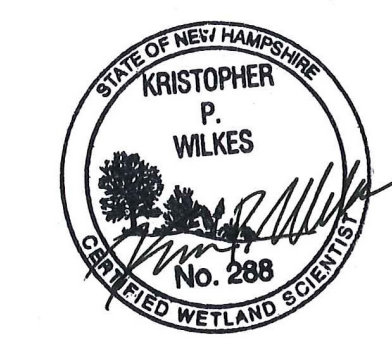
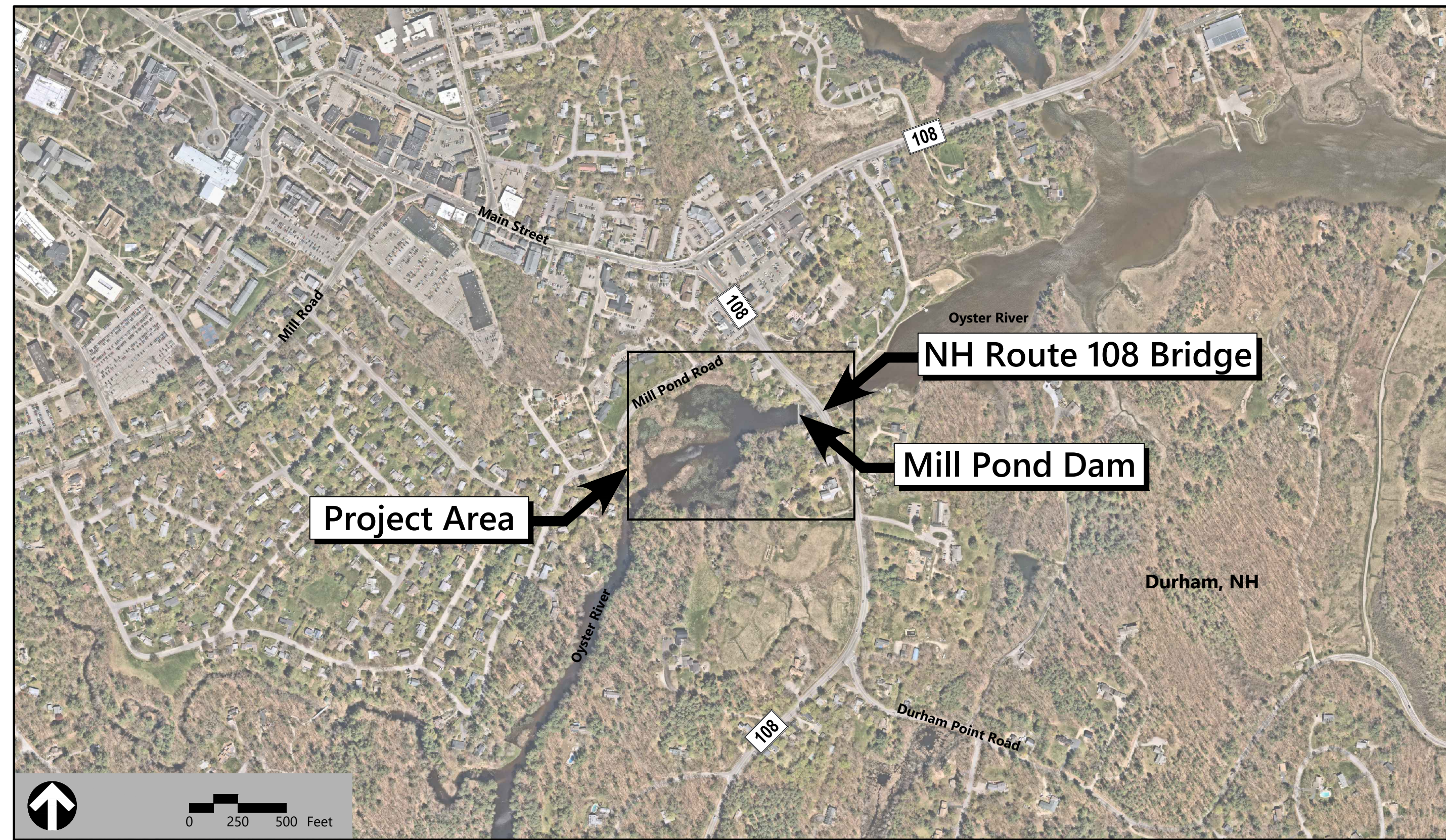


Site Plans

Issued for Permitting
 Date Issued January 17, 2024
 Latest Issue January 17, 2024

Mill Pond Dam Removal and Oyster River Restoration Durham, NH



Town of Durham - Town Council

- Sally Needell, Chair
- James Lawson, Chair Pro Tem
- Wayne Burton
- Joe Friedman
- Emily Friedrichs
- Charles "Chuck" Hotchkiss
- Eric Lund
- Carden Welsh

Town Administrator

Todd Selig

Director of Public Works and Engineering

Richard Reine M.S.C.E., CA

Assistant Director of Public Works

Sam Hewitt

Town Engineer

April Talon, P.E.

Sheet Index

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C-3	Staging and Construction Sequence Plan	January 17, 2024
C-4	River Channel Grading Plan and Profile	January 17, 2024
C-5	River Channel Cross Sections	January 17, 2024
C-6	Wetland and Shoreland Impact Plan	January 17, 2024
C-7	Erosion and Sediment Control Plan	January 17, 2024
C-8	Restoration and Planting Plan	January 17, 2024
C-9.1	Dam Removal Detail	January 17, 2024
C-9.2	Details	January 17, 2024
C-9.3	Details	January 17, 2024



2 Bedford Farms Drive
Suite 200
Bedford, NH 03110
603.391.3900

Legend table with columns: Exist., Prop., Exist., Prop. and various symbols for property lines, floodplains, curbs, basins, etc.

Abbreviations

General

Table of abbreviations for construction terms like ABAN (ABANDON), ACR (ACCESSIBLE CURB RAMP), etc.

Utility

Table of utility symbols and abbreviations like CB (CATCH BASIN), CMP (CORRUGATED METAL PIPE), etc.

Description of Work

- 1. THE GOALS OF THIS PROJECT ARE TO REMOVE THE MILL POND DAM AND CONDUCT ACTIVE CHANNEL RESTORATION OF THE OYSTER RIVER TO STABILIZE SEDIMENTS WITHIN THE MILL POND IMPOUNDMENT TO PROTECT ADJACENT PROPERTIES WHILE CREATING UPSTREAM PASSAGE FOR DIADROMOUS FISH SPECIES SUCH AS ALEWIFE.
2. THE MILL POND DAM IS A CONCRETE AMBUREN-STYLE DAM WITH A DENIL FISHWAY AT THE LEFT ABUTMENT, SQUARE-TOP SPILLWAY, AND LOW-LEVEL OUTLET GATES AT THE RIGHT ABUTMENT.
3. THE WORK CONSISTS OF FULL REMOVAL OF THE FISHWAY AND REMOVAL OF THE MAJORITY OF THE SPILLWAY; THE RIGHT ABUTMENT, GATE STRUCTURE, AND RIGHTMOST PORTION OF THE DAM SPILLWAY SHALL REMAIN IN PLACE.

Layout and Materials

- 1. ANY EXISTING PROPERTY LINE MONUMENTATION DISTURBED DURING CONSTRUCTION SHALL BE SET OR RESET BY A LICENSED LAND SURVEYOR (LIS).
2. IN ORDER TO PROVIDE VISUAL CLARITY ON THE PLANS, NOT ALL DEPICTED ITEMS ARE DRAWN TO THEIR ACTUAL DIMENSIONS. REFER TO THE LABELED DIMENSIONS AND THE PROVIDED DETAILS FOR ACTUAL DESIGN INFORMATION.

Utilities

- 1. THE LOCATIONS, SIZES, AND TYPES OF EXISTING UTILITIES ARE SHOWN AS AN APPROXIMATE REPRESENTATION ONLY. VHB HAS NOT INDEPENDENTLY VERIFIED THIS INFORMATION AS SHOWN ON THE PLANS. THE UTILITY INFORMATION SHOWN DOES NOT GUARANTEE THE ACTUAL EXISTENCE, SERVICEABILITY, OR OTHER DATA CONCERNING THE UTILITIES, NOR DOES IT GUARANTEE AGAINST THE POSSIBILITY THAT ADDITIONAL UTILITIES MAY BE PRESENT THAT ARE NOT SHOWN ON THE PLANS.
2. WHERE AN EXISTING UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, OR EXISTING CONDITIONS DIFFER FROM THOSE SHOWN, SUCH THAT THE WORK CANNOT BE COMPLETED AS INTENDED, THE LOCATION, ELEVATION, AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR.

Existing Conditions Information

- 1. PLAN REFERENCES ARE:
1.1. PLAN ENTITLED "COLLEGE BROOK INTERCEPTOR EXTENSION" DATED: JULY, 1968 PREPARED BY CAMP, DRESSER, & MCKEE.
1.2. NHDOT RIGHT-OF-WAY PLANS FEDERAL AID PROJECT STP-TE-X-5133(009) N.H. PROJECT NO. 13080 N.H. ROUTE 108, TOWNS OF DURHAM & NEWMARKET, DATED: 04/18.
1.3. PLAN OF LAND DOUGLAS R. WORTHEN DURHAM, N.H. DATED: MARCH 1990, RECORDED AT SCR# PLAN #200-10
2. PROPERTY LINES SHOWN WERE TAKEN FROM PLAN REFERENCES 1, 2, AND 3.
3. THE EXISTING CONDITIONS SHOWN ON THIS PLAN ARE COMPILED FROM PLAN REFERENCE 1, AND AN ACTUAL ON-THE-GROUND INSTRUMENT SURVEY PERFORMED BY VHB IN DECEMBER 2019, JANUARY 2020, AND MAY 2023.

Flood Contingency Plan

THE CONTRACTOR SHALL OPEN THE EXISTING DAM GATES PRIOR TO CONSTRUCTION TO LOWER IMPOUNDED WATER LEVELS. THE EXISTING DAM SPILLWAY MAY BE PARTIALLY BREACHED TO LOWER IMPOUNDED WATER LEVELS SUFFICIENTLY TO CONDUCT ACTIVE CHANNEL RESTORATION (REMOVING UPSTREAM SEDIMENTS AND PLACING STREAMBED MATERIAL, STREAMBANKS, AND FLOODPLAIN FILL). DURING ACTIVE CHANNEL RESTORATION, THE CONTRACTOR SHALL MAINTAIN A FLOOD CONTINGENCY PLAN TO PLUG ANY OPEN GATE OR BREACH IN THE DAM IN ORDER TO PREVENT THE MASS RELEASE OF SEDIMENTS FROM THE ACTIVE WORK AREA.

DURING CONSTRUCTION THE CONTRACTOR SHALL MONITOR THE NATIONAL WEATHER SERVICE FORECAST OFFICE FOR RAINFALL FORECASTS AND WEATHER UPDATES. THE CONTRACTOR SHALL INITIATE A FLOOD CONTINGENCY PLAN UNDER THE FOLLOWING CONDITIONS:

- WHEN MORE THAN 1.0" OF RAINFALL IS FORECAST OVER A 24-HOUR PERIOD.
• WHEN WATER LEVELS RISE TO WITHIN 12" OF THE TOP OF THE TEMPORARY COFFERDAM.
• ALL PHASES: WHEN A FLOOD WATCH HAS BEEN ISSUED FOR THE OYSTER RIVER.

RAINFALL FORECASTS AND FLOOD WATCHES ARE ISSUED BY RADIO BROADCAST AND ARE AVAILABLE VIA THE INTERNET AT HTTPS://WWW.WEATHER.GOV/. THE CONTRACTOR SHALL REMOVE ALL CONSTRUCTION VEHICLES FROM THE FLOODPLAIN AREA EXCEPT THOSE NECESSARY TO IMPLEMENT THE FLOOD CONTINGENCY PLAN WHEN A "FLOOD WARNING" HAS BEEN ISSUED. THE CONTRACTOR SHALL HAVE STAFF AND MATERIALS AVAILABLE SEVEN DAYS PER WEEK TO IMPLEMENT THE FLOOD CONTINGENCY PLAN IF NEEDED. ONCE A FLOOD WATCH HAS BEEN ISSUED, THE PLAN SHALL INCLUDE:

- 1. NOTIFICATION OF THE OWNER AND ENGINEER WITHIN FOUR (4) HOURS OF ANY INTENDED ACTIONS AS WELL AS ALL COMPLETED ACTIONS DESCRIBED IN THIS SECTION.
2. REMOVAL OF ALL CONSTRUCTION VEHICLES AND EQUIPMENT FROM THE FLOODPLAIN AREA AS SOON AS IS REASONABLY POSSIBLE.
3. STABILIZING WITH COBBLE STREAMBED MIX/STONE FILL IN EXPOSED CHANNEL AREAS CONTAINED WITHIN THE TEMPORARY COFFERDAM.
4. COVER EXPOSED SEDIMENT AND/OR SUBGRADE WITHIN THE TEMPORARY COFFERDAM WITH SIX-MILLIMETER PLASTIC SHEETING. PLASTIC SHEETING SHOULD OVERLAP AT SEAMS A MINIMUM OF THREE FEET. THE PLASTIC SHEETING AROUND THE PERIMETER SHALL BE KEVED INTO THE SURROUNDING SOIL SIX INCHES. THE SEAMS AND PERIMETER OF THE PLASTIC SHEETING SHALL BE COVERED WITH 3/4-INCH CRUSHED STONE BALLAST.
5. THE CONTRACTOR SHALL BE REQUIRED KEEP ON HAND SUFFICIENT PLASTIC SHEETING AND CRUSHED STONE TO COVER AND PROVIDE BALLAST OVER EXPOSED SOIL DEWATERING STOCKPILES.
6. IN THE EVENT OF FLOODING, NO ACTIVE WORK WILL BE ALLOWED TO TAKE PLACE WITHIN THE WORK ZONE UNTIL THE FLOOD WATERS HAVE RECEDED, AND ANY DAMAGE TO EROSION CONTROL MEASURES HAVE BEEN REPAIRED.

General

- 1. NOTIFY "DIG-SAFE" (1-888-344-7233) AT LEAST 72 HOURS BEFORE EXCAVATING.
2. ENSURE SITE SECURITY AND JOB SAFETY. CONSTRUCTION ACTIVITIES SHALL BE IN ACCORDANCE WITH OSHA STANDARDS AND LOCAL REQUIREMENTS.
3. APPLY FOUR (4) INCHES OF LOAM AND SEED (UNLESS OTHERWISE NOTED) TO ANY UPLAND AREAS DISTURBED DURING CONSTRUCTION AND NOT RESTORED WITH IMPERVIOUS SURFACES (PAVEMENTS, WALKS, ETC.)
4. PERFORM ALL WORK IN STRICT COMPLIANCE WITH NH WETLANDS PERMIT, US ARMY CORPS OF ENGINEERS PERMIT, AND ALL OTHER APPLICABLE PERMITS AND REGULATIONS. THE CONTRACTOR SHALL HAVE A COPY OF ALL NECESSARY PERMITS AVAILABLE ON SITE AT ALL TIMES.
UPON AWARD OF CONTRACT, MAKE NECESSARY CONSTRUCTION NOTIFICATIONS AND APPLY FOR AND OBTAIN NECESSARY PERMITS, PAY FEES, AND POST BONDS ASSOCIATED WITH THE WORK INDICATED ON THE DRAWINGS, IN THE SPECIFICATIONS, AND IN THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL NOT CLOSE OR OBSTRUCT ROADWAYS, SIDEWALKS, AND/OR FIRE HYDRANTS, WITHOUT APPROPRIATE PERMITS. THE CONTRACTOR SHALL NOT BLOCK ACCESS TO THE DRIVEWAYS/PARKING LOTS OF ADJACENT PROPERTIES AT ANY TIME.
5. ALL DISTURBANCES ASSOCIATED WITH CONSTRUCTION SHALL BE CONTAINED WITHIN THE LIMITS OF WORK DEPICTED ON THIS PLANS.
6. IN THE EVENT THAT SUSPECTED CONTAMINATED SOIL, GROUNDWATER, OR OTHER MEDIA ARE ENCOUNTERED DURING EXCAVATION AND CONSTRUCTION ACTIVITIES BASED ON VISUAL, OLFACTORY, OR OTHER EVIDENCE, STOP WORK IN THE VICINITY OF THE SUSPECT MATERIAL TO AVOID FURTHER SPREADING OF THE MATERIAL, AND NOTIFY THE ENGINEER IMMEDIATELY SO THAT THE APPROPRIATE TESTING AND SUBSEQUENT ACTION CAN BE TAKEN.
7. PREVENT DUST, SEDIMENT, AND DEBRIS FROM EXITING THE SITE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CLEANUP, REPAIRS AND CORRECTIVE ACTION IF SUCH OCCURS.
8. DAMAGE RESULTING FROM CONSTRUCTION LOADS SHALL BE REPAIRED BY THE CONTRACTOR AT THEIR OWN EXPENSE.
9. CONTROL STORMWATER RUNOFF DURING CONSTRUCTION TO PREVENT ADVERSE IMPACTS TO OFF SITE AREAS, AND REPAIR RESULTING DAMAGES, IF ANY, AT NO COST TO ADJACENT PROPERTY OWNERS. DAMAGE RESULTING FROM STORMWATER RUNOFF SHALL BE REPAIRED BY THE CONTRACTOR AT THEIR OWN EXPENSE.
10. FOR PURPOSES OF THIS PLAN SET AND CONSTRUCTION SPECIFICATIONS, THE TERMS "ENGINEER" AND "MONITOR" SHALL BE SYNONYMOUS AND SHALL MEAN THE INDIVIDUAL OR FIRM RETAINED BY THE TOWN OF DURHAM TO CONDUCT CONSTRUCTION MONITORING.

Erosion Control

- 1. INSPECT AND MAINTAIN EROSION CONTROL MEASURES WITHIN 24 HOURS AFTER EACH STORM EVENT (0.25" OF RAINFALL OR GREATER PER 24 HOUR PERIOD) AND DISPOSE OF DEPOSITED SEDIMENTS IN AN UPLAND AREA SUCH THAT THEY DO NOT ENCUMBER OTHER DRAINAGE STRUCTURES, EROSION CONTROL MEASURES AND PROTECTED AREAS.
2. CONTROL CONSTRUCTION SUCH THAT SEDIMENTATION DOES NOT AFFECT REGULATORY PROTECTED AREAS, WHETHER SUCH SEDIMENTATION IS CAUSED BY WATER, WIND, OR DIRECT DEPOSIT.
3. PERFORM CONSTRUCTION SEQUENCING SUCH THAT EARTH MATERIALS ARE EXPOSED FOR A MINIMUM OF TIME BEFORE THEY ARE COVERED, SEEDED, OR OTHERWISE STABILIZED TO PREVENT EROSION.
4. UPON COMPLETION OF CONSTRUCTION AND ESTABLISHMENT OF PERMANENT GROUND COVER, REMOVE AND DISPOSE OF EROSION CONTROL MEASURES AND CLEAN SEDIMENT AND DEBRIS.

- 5. TEMPORARILY SEED AND MULCH AREAS REMAINING UNSTABILIZED FOR A PERIOD OF MORE THAN 7 DAYS. CLEAN, WEED FREE, STRAW MULCH SHALL BE APPLIED AT A MINIMUM RATE OF 1-1/2 TONS/ACRE, WHICH EQUALS A THICKNESS OF APPROXIMATELY 1 INCH.
6. PERMANENT SEEDING SHALL OCCUR BETWEEN APRIL 1 AND JUNE 1, AND/OR BETWEEN AUGUST 15 AND OCTOBER 15. ALL SEEDING SHALL BE STRAW MULCHED.
7. APPLY WATER AS NEEDED TO CONTROL DUST
8. TEMPORARILY SEED AND MULCH SOILS TO BE STOCKPILED FOR A PERIOD OF MORE THAN 7 DAYS. INSTALL STACKED STRAW LOGS ALONG DOWNHILL SIDE OF STOCKPILES.
9. PROVIDE NECESSARY EROSION CONTROL MEASURES TO ENSURE THAT SURFACE WATER RUNOFF FROM UNSTABILIZED AREAS DOES NOT CARRY SILT, SEDIMENT, AND OTHER DEBRIS OUTSIDE OF THE LIMITS OF WORK.
10. AN AREA SHALL BE CONSIDERED STABLE IF ONE OF THE FOLLOWING HAS OCCURRED:
a. A MINIMUM OF 85% VEGETATED COVER HAS BEEN ESTABLISHED;
b. A MINIMUM OF 3-IN OF NON-EROSIVE MATERIAL, SUCH AS STONE OR RIPRAP, HAS BEEN INSTALLED;
c. EROSION CONTROL BLANKETS HAVE BEEN PROPERLY INSTALLED. THE ENGINEER SHALL BE RESPONSIBLE FOR MAKING A DETERMINATION AS TO WHETHER AN AREA IS STABLE.
11. ALL DITCHES, SWALES, AND DRAINAGE BASINS SHALL BE STABILIZED PRIOR TO DIRECTING RUNOFF TO THEM.
12. LOAM, SEED, MULCH, OR MAT FILL ALL CUT AND FILL SLOPES, IF REQUIRED, WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
13. ALL PERMANENT AND TEMPORARY SEEDING SHALL BE FREE OF NOXIOUS WEED SEED.
14. NO FERTILIZERS (EXCEPT LIMESTONE) SHALL BE USED WITHIN 25 FEET OF THE RIVER. FROM 25-250 FEET, LOW PHOSPHATE, SLOW RELEASE NITROGEN FERTILIZER MAY BE USED. THESE FERTILIZERS MUST BE GUARANTEED ON THE PACKAGE LABEL TO CONTAIN NOT MORE THAN 2 PERCENT PHOSPHOROUS AND AT LEAST 50 PERCENT SLOW RELEASE NITROGEN.
15. INSTALL STABILIZED CONSTRUCTION ENTRANCES AT CONSTRUCTION ENTRANCES. DETERMINE FINAL LOCATION PRIOR TO CONSTRUCTION.

Winter Construction

- 1. WINTER CONSTRUCTION IS NOT ANTICIPATED BUT IS A POSSIBILITY FOR THIS PROJECT. STABILIZE ALL PROPOSED VEGETATED AREAS WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15TH, OR WHICH ARE DISTURBED AFTER OCTOBER 15TH. STABILIZATION METHODS INCLUDE SEEDING AND INSTALLING EROSION CONTROL BLANKETS ON SLOPES GREATER THAN 4:1, SEEDING AND PLACING 3 TO 4 TONS OF MULCH PER ACRE AND SECURED WITH ANCHORED NETTING, ELSEWHERE, COMPLETE THE INSTALLATION OF EROSION CONTROL BLANKETS OR MULCH AND NETTING IN ADVANCE OF THAW OR SPRING MELTS, DO NOT INSTALL OVER ACCUMULATED SNOW OR FROZEN GROUND.
2. TEMPORARILY STABILIZE ALL DITCHES OR SWALES, WITH STONE OR EROSION CONTROL BLANKETS APPROPRIATE FOR THE DESIGN FLOW CONDITIONS, WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15TH, OR WHICH ARE DISTURBED AFTER OCTOBER 15TH.

State Regulations

- 1. ALL WORK SHALL COMPLY WITH THE FOLLOWING STATE PERMITS. CONDITIONS IN PERMIT SHALL GOVERN OVER PLANS UNLESS OTHERWISE DIRECTED OR APPROVED BY THE ENGINEER.
2. (ANTICIPATED) RSA 482-A, WETLAND DREDGE AND FILL, NH DEPARTMENT OF ENVIRONMENTAL SERVICES, WETLANDS BUREAU.
3. (ANTICIPATED) CLEAN WATER ACT, SECTION 401 WATER QUALITY CERTIFICATION, NH DEPARTMENT OF ENVIRONMENTAL SERVICES, WATERSHED MANAGEMENT BUREAU.
4. (ANTICIPATED) RSA 483-B, COMPREHENSIVE SHORELAND PROTECTION ACT, NH DEPARTMENT OF ENVIRONMENTAL SERVICES, WETLAND BUREAU.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SECURING AN EXCAVATION PERMIT WITH NHDOT FOR REMOVAL OR GUARDRAIL ALONG ROUTE 108.

Federal Regulations

- 1. (ANTICIPATED) CLEAN WATER ACT, SECTION 404, WETLAND DREDGE AND FILL PERMIT, US ARMY CORPS OF ENGINEERS.
2. (ANTICIPATED) USFWS ENDANGERED SPECIES ACT AND BIOLOGICAL OPINION.
3. (ANTICIPATED) NATIONAL HISTORIC PRESERVATION ACT, SECTION 106 CONSULTATION, NH STATE HISTORIC PRESERVATION OFFICE (NH DIVISION OF HISTORICAL RESOURCES).

Mill Pond Dam Removal and Oyster River Restoration
Newmarket Road
Durham, NH

Table with columns: No., Revision, Date, Apprd. (revision control table)

Table with columns: Designed by (BJM), Checked by (blank)

Issued for (blank) Date (January 17, 2024)

Permitting (blank) January 17, 2024

Not Approved for Construction
Drawing Title: Legend and General Notes
Drawing Number: (blank)

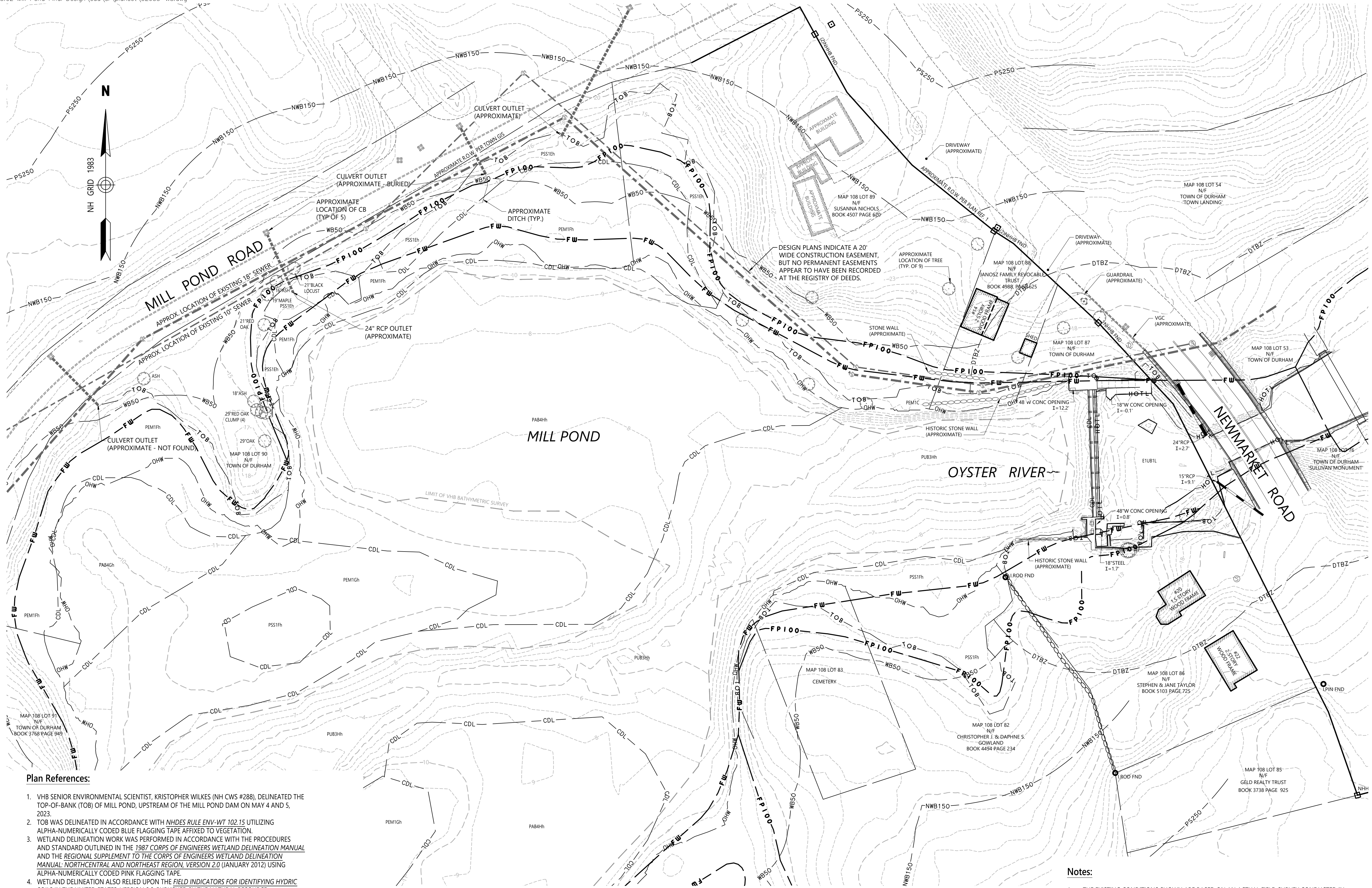
Professional Engineer Seal for David William Cloutier, No. 15589, State of New Hampshire. Includes sheet number 1 of 11 and project number 52633.02.



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Legend

- ⊕ DRAIN MANHOLE
- ▣ CATCH BASIN
- ⊖ SEWER MANHOLE
- ⊕ ELECTRIC MANHOLE
- ⊕ TELEPHONE MANHOLE
- ⊕ MANHOLE
- ⊕ HAND HOLE
- ⊕ WATER GATE
- ⊕ FIRE HYDRANT
- ⊕ GAS GATE
- ⊕ BOLLARD w/LIGHT
- ⊕ STREET SIGN
- ⊕ LIGHT POLE
- ⊕ UTILITY POLE
- ⊕ GUY WIRE
- ⊕ MONITORING WELL
- ⊕ FLOOD LIGHT
- ⊕ WELL
- ⊕ MARSH
- ⊕ F.F.E. -45.27'
- ⊕ FINISHED FLOOR ELEVATION
- ⊕ EDGE OF PAVEMENT
- ⊕ VERTICAL GRANITE CURB
- ⊕ GUARDRAIL
- ⊕ CHAIN LINK FENCE
- ⊕ DRAINAGE LINE
- ⊕ SEWER LINE
- ⊕ UNDERGROUND ELECTRIC
- ⊕ TELEPHONE LINE
- ⊕ GAS LINE
- ⊕ WATER LINE
- ⊕ STONE WALL
- ⊕ TREE LINE
- ⊕ ORDINARY HIGH WATER
- ⊕ TOP OF BANK
- ⊕ HIGHEST OBSERVABLE TIDE LINE
- ⊕ WATERFRONT BUFFER
- ⊕ NATURAL WOODLAND BUFFER
- ⊕ PROTECTED SHORELAND
- ⊕ COWARDIN DISTINCTION LINE
- ⊕ APPROXIMATE RIGHT-OF-WAY
- ⊕ GIS PARCEL LINES



Plan References:

- VHB SENIOR ENVIRONMENTAL SCIENTIST, KRISTOPHER WILKES (NH CWS #288), DELINEATED THE TOP-OF-BANK (TOB) OF MILL POND, UPSTREAM OF THE MILL POND DAM ON MAY 4 AND 5, 2023.
- TOB WAS DELINEATED IN ACCORDANCE WITH NHDES RULE ENV-WT 102.15 UTILIZING ALPHA-NUMERICALLY CODED BLUE FLAGGING TAPE AFFIXED TO VEGETATION.
- WETLAND DELINEATION WORK WAS PERFORMED IN ACCORDANCE WITH THE PROCEDURES AND STANDARD OUTLINED IN THE 1987 CORPS OF ENGINEERS WETLAND DELINEATION MANUAL AND THE REGIONAL SUPPLEMENT TO THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL: NORTHCENTRAL AND NORTHEAST REGION, VERSION 2.0 (JANUARY 2012) USING ALPHA-NUMERICALLY CODED PINK FLAGGING TAPE.
- WETLAND DELINEATION ALSO RELIED UPON THE FIELD INDICATORS FOR IDENTIFYING HYDRIC SOILS IN THE UNITED STATES, VERSION 8.2, PUBLISHED BY THE NATURAL RESOURCE CONSERVATION SERVICE THE FIELD INDICATORS FOR IDENTIFYING HYDRIC SOILS IN NEW ENGLAND, VERSION 4.0, PUBLISHED BY THE NEW ENGLAND INTERSTATE WATER POLLUTION CONTROL COMMISSION IN JUNE 2020.
- DOMINANT WETLAND VEGETATION WAS ASSESSED USING THE NATIONAL WETLAND PLANT LIST PUBLISHED BY THE U.S. ARMY CORPS OF ENGINEERS.
- MILL POND AND BORDERING AREAS WERE CLASSIFIED USING THE USFWS METHODOLOGY CLASSIFICATION OF WETLANDS AND DEEPWATER HABITATS OF THE UNITED STATES (COWARDIN ET AL., 1979, REVISED 1985).
- COWARDIN CLASSIFICATION AREAS DEPICTED ON THE PLANS WERE DERIVED FROM A COMBINATION OF FIELD OBSERVATION AND INTERPRETATION OF DESKTOP AERIAL IMAGERY.
- TOB FLAGS WERE LOCATED IN THE FIELD WITH A HANDHELD GPS UNIT CAPABLE OF SUB-METER ACCURACY.
- DUE TO THE EXISTING IMPOUNDMENT, THE ORDINARY HIGH WATER (OHW) MARK UPSTREAM OF THE MILL POND DAM WAS SET TO A REFERENCE ELEVATION OF 11.4 FT NAVD88 BASED ON HISTORIC (2009-2022) FIELD-SURVEYED WATER LEVELS ASSOCIATED WITH THE DAM.
- THE HIGHEST OBSERVABLE TIDE LINE (HOTL) DOWNSTREAM OF THE MILL POND DAM WAS SET TO A REFERENCE ELEVATION OF 4.5 FT NAVD88 BASED ON FIELD-SURVEYED WATER LEVELS ASSOCIATED WITH THE OCTOBER 2019 HIGHEST ASTRONOMICAL TIDE (HAT), COMMONLY KNOWN AS THE "KING TIDE."

Wetland Classification Codes

CODE	CODE DESCRIPTION
PEM1C	- PALUSTRINE, EMERGENT, PERSISTENT, SEASONALLY FLOODED
PEM1E	- PALUSTRINE, EMERGENT, PERSISTENT, SEASONALLY FLOODED/SATURATED
PEM1Fh	- PALUSTRINE, EMERGENT, PERSISTENT, SEMI-PERMANENTLY FLOODED, DIKED/IMPOUNDED
PEM1Gh	- PALUSTRINE, EMERGENT, PERSISTENT, INTERMITTENTLY EXPOSED, DIKE/IMPOUNDED
PAB4Gh	- PALUSTRINE, AQUATIC BED, FLOATING VASCULAR, INTERMITTENTLY EXPOSED, DIKED/IMPOUNDED
PAB4Hh	- PALUSTRINE, AQUATIC BED, FLOATING VASCULAR, PERMANENTLY FLOODED, DIKED/IMPOUNDED
PUB3Hh	- PALUSTRINE, UNCONSOLIDATED BOTTOM, MUD, PERMANENTLY FLOODED, DIKED/IMPOUNDED
PSS1Fh	- PALUSTRINE, SCRUB-SHRUB, BROAD-LEAVED DECIDUOUS, SEMI-PERMANENTLY FLOODED, DIKED/IMPOUNDED
E1UB1L	- ESTUARINE, SUBTIDAL, UNCONSOLIDATED BOTTOM, COBBLE-GRAVEL, SUBTIDAL

Plan References:

- NHDOT RIGHT-OF-WAY PLANS FEDERAL AID PROJECT STP-TE-X-5133(009) N.H. PROJECT NO. 13080 N.H. ROUTE 108, TOWNS OF DURHAM & NEWMARKET, DATED: 04/18.
- PLAN OF LAND DOUGLAS R. WORTHEN DURHAM, N.H. DATED: MARCH 1990, RECORDED AT SCRDP PLAN #20D-10.



Notes:

- THE EXISTING CONDITIONS SHOWN ARE BASED ON AN ACTUAL FIELD SURVEY CONDUCTED IN DECEMBER 2019, JANUARY 2020 AND MAY 2023.
- THE PROPERTY LINES SHOWN ARE APPROXIMATE AND ARE BASED ON LIMITED PROPERTY RESEARCH AND LIMITED FIELD WORK.
- THE HORIZONTAL DATUM IS BASED ON THE NEW HAMPSHIRE STATE PLANE COORDINATE SYSTEM 1983.
- THE VERTICAL DATUM IS BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.
- THE LOCATION OF OYSTER RIVER IS BASED ON HISTORICAL PLANS AND THE TOWN OF DURHAM'S GIS MAPPING, AND HAS NOT BEEN SURVEYED.
- FEATURES LABELED AS "APPROXIMATE" ARE BASED ON NON-SURVEY GRADE GPS OR TRACED FROM AERIAL PHOTOGRAPHY AND HAVE NOT BEEN FIELD SURVEYED.
- SEWER LINES ARE BASED ON DESIGN PLANS ENTITLED "COLLEGE BROOK INTERCEPTOR EXTENSION LANDING ROAD AND CROSS-COUNTRY STA. 0+00 TO STA. 10+53" PREPARED BY CAMP, DRESSER & MCKEE, DATED: JULY 1968.

Mill Pond Dam Removal and Oyster River Restoration
Newmarket Road
Durham, New Hampshire

No. Revision Date Apprd.

Designed by _____ Checked by _____

Issued for _____ Date _____

Permitting August 15, 2023

Not Approved for Construction
Existing Conditions
Plan of Land

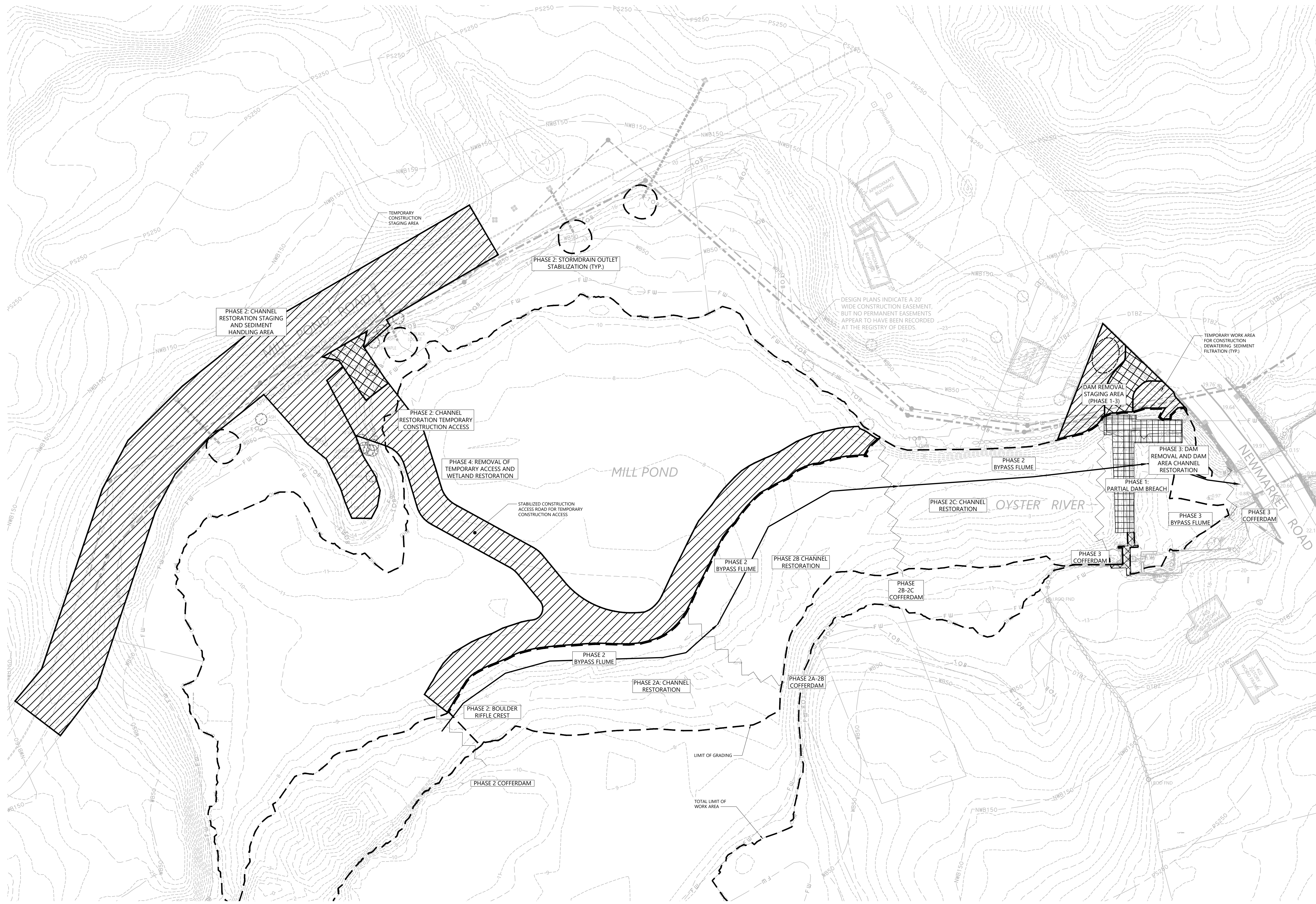
2-5-2024
STATE OF NEW HAMPSHIRE
DAVID WILLIAM CLOUTIER
No. 15589
LICENSED PROFESSIONAL ENGINEER
C-2
Sheet 2 of 10
Project Number 52633



2 Bedford Farms Drive
Suite 200
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603.391.3900

CONSTRUCTION SEQUENCE:

1. OPEN DAM GATES, BEGIN LOWERING IMPOUNDMENT.
2. MOBILIZATION: SET UP STAGING AREAS AND TEMPORARY ACCESS ROUTE.
3. PARTIAL BREACH OF DAM TO LOWER WATER LEVELS FOR ACTIVE CHANNEL RESTORATION. CONTRACTOR TO RETAIN THE MAJORITY OF DAM SPILLWAY (OR CONSTRUCT COFFERDAM AT DAM LOCATION) TO PREVENT LOSS OF SEDIMENT IN WORK AREA IN THE EVENT OF MAJOR RAIN EVENT.
4. CONTRACTOR TO BEGIN CHANNEL RESTORATION WORK IN PHASES, MOVING UPSTREAM TO DOWNSTREAM. PROVIDED PLAN ILLUSTRATES RESTORATION CONSTRUCTION IN THREE PHASES. CONTRACTOR TO PROVIDE A CONTROL OF WATER PLAN; FINAL NUMBER OF PHASES IS AT THE CONTRACTOR'S DISCRETION.
5. STRIP AND STOCKPILE 4.445 CY OF TOPSOIL TO USE DURING RESTORATION OF THE TEMPORARY ACCESS ROAD.
6. REMOVE SEDIMENT AND CONSTRUCT CHANNEL RESTORATION. INSTALL COFFERDAM AND BYPASS FLUME PIPE FOR EACH PHASE PRIOR TO MOVING EARTH. CONSTRUCT BOULDER RIFFLE CREST GRADE CONTROL BEFORE ANY OTHER STREAM RESTORATION.
7. DEWATER ACTIVE WORK AREA WITHIN COFFERDAM. DISCHARGE DEWATERING TO DEWATERED IMPOUNDMENT BED, DOWNSTREAM OF ACTIVE WORK AREA.
8. STOCKPILE, SEGREGATE, CHARACTERIZE, AND DRY EXCAVATED SEDIMENT IN THE STAGING AREA. DISPOSE OFFSITE.
9. FOLLOWING THE COMPLETION OF SEDIMENT REMOVAL AND CHANNEL RESTORATION, RELOCATE COFFERDAMS AND ROUTE FLOW THROUGH DAM GATE. REMOVE THE REMAINING DAM AND FISHWAY STRUCTURE PER DETAIL SHEET 8.1. RESTORE CHANNEL THROUGH DAM AREA PER DESIGN.
10. REMOVE ALL COFFERDAMS, BYPASS FLUMES, AND TEMPORARY ACCESS. RESTORE AREA AT THESE LOCATIONS.
11. REMOVE AND RESTORE STAGING AREAS.



Mill Pond Dam Removal and Oyster River Restoration

Newmarket Road Durham, NH

No.	Revision	Date	Appr.

Designed by	BJM	Checked by	
Issued for		Date	

Permitting October 13, 2023

Not Approved for Construction

Staging and Construction Sequence Plan

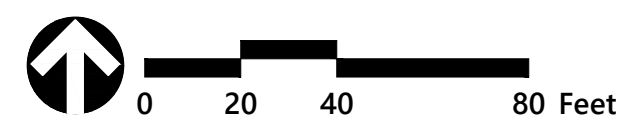
2-5-2024

STATE OF NEW HAMPSHIRE
DAVID WILLIAM CLOUTIER
No. 15588
LICENSED PROFESSIONAL ENGINEER

C-3

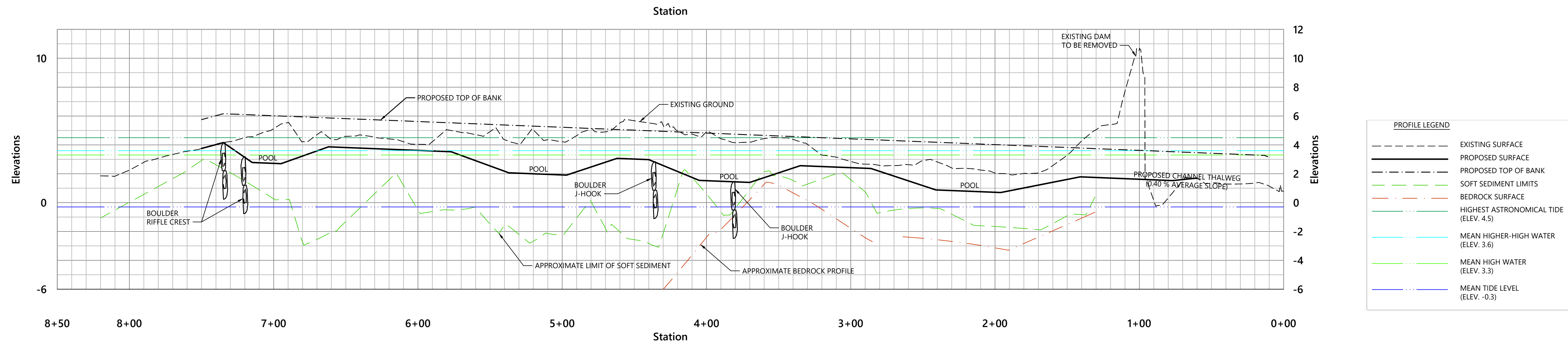
Sheet 3 of 11

Project Number
52633.02





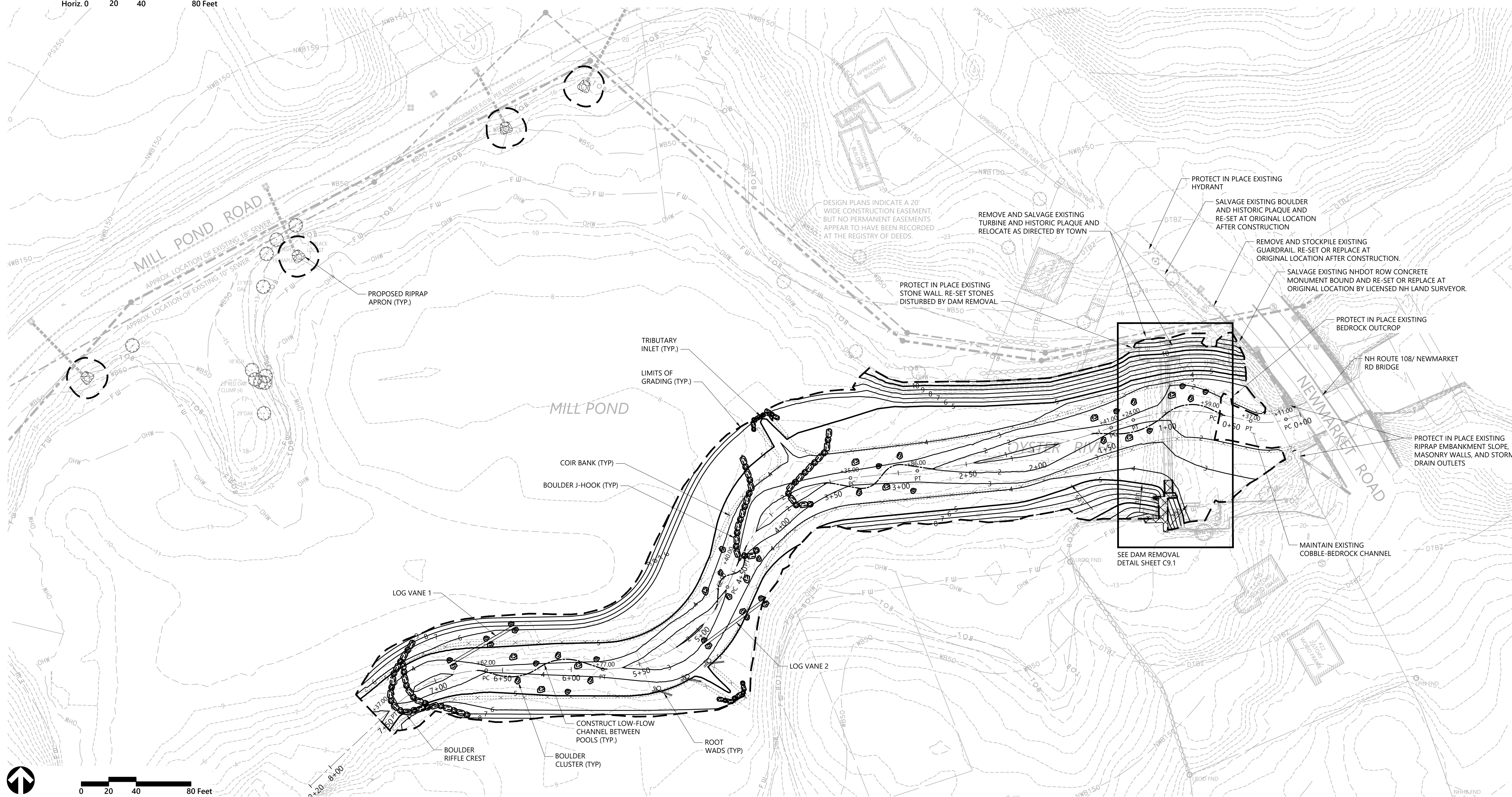
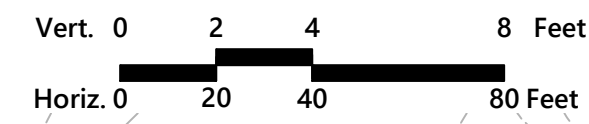
2 Bedford Farms Drive
Suite 200
Bedford, NH 03110
603.391.3900



PROFILE LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- PROPOSED TOP OF BANK
- SOFT SEDIMENT LIMITS
- BEDROCK SURFACE
- HIGHEST ASTRONOMICAL TIDE (ELEV. 4.5)
- MEAN HIGHER-HIGH WATER (ELEV. 3.6)
- MEAN HIGH WATER (ELEV. 3.3)
- MEAN TIDE LEVEL (ELEV. -0.3)

Oyster River Channel Profile



Mill Pond Dam Removal and Oyster River Restoration
Newmarket Road
Durham, NH

No.	Revision	Date	Appr.

Designed by BJM	Checked by
Issued for Permitting	Date January 17, 2024

Not Approved for Construction
Drawing Title
River Channel Grading Plan and Profile

2-5-2024

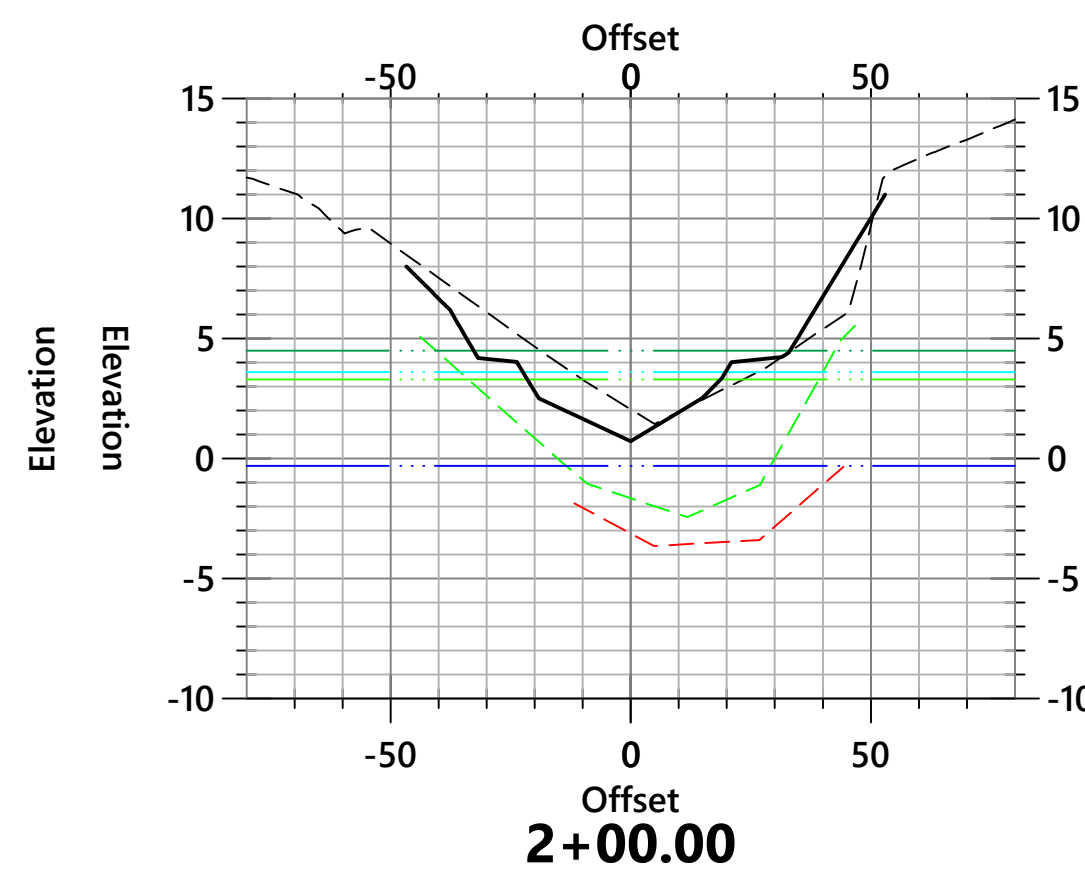
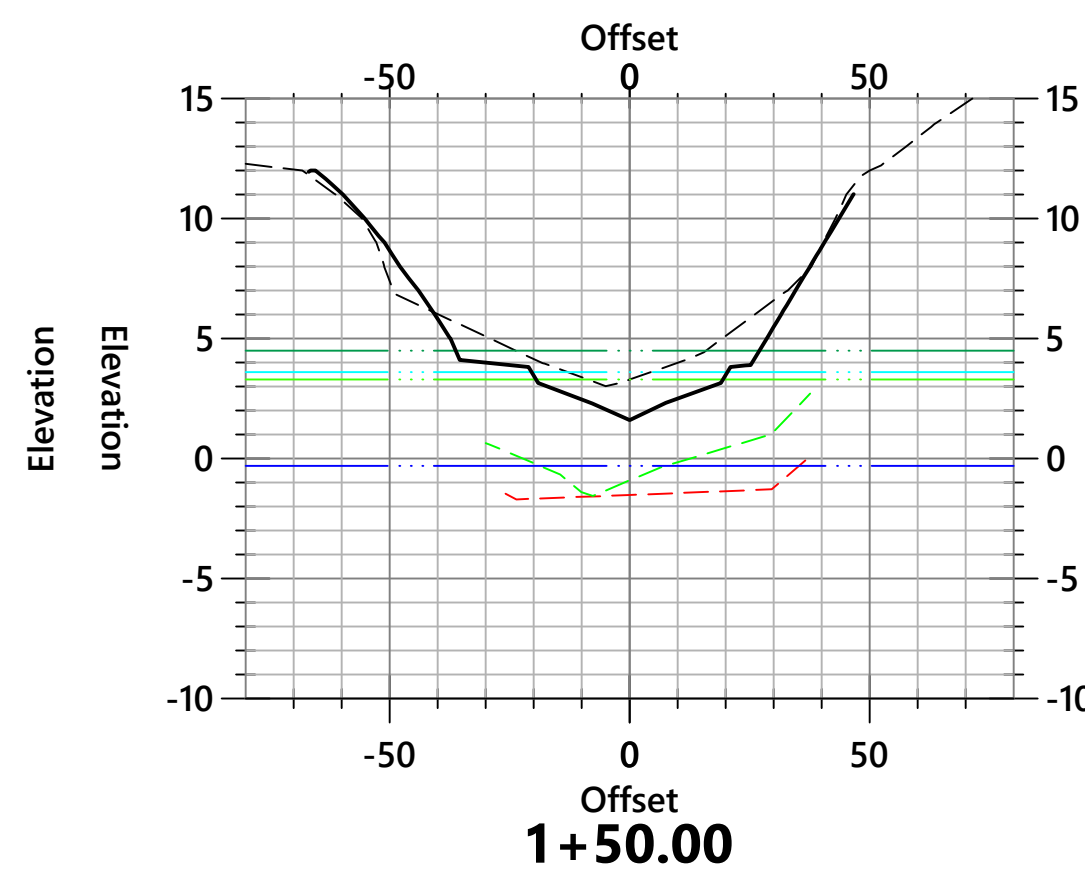
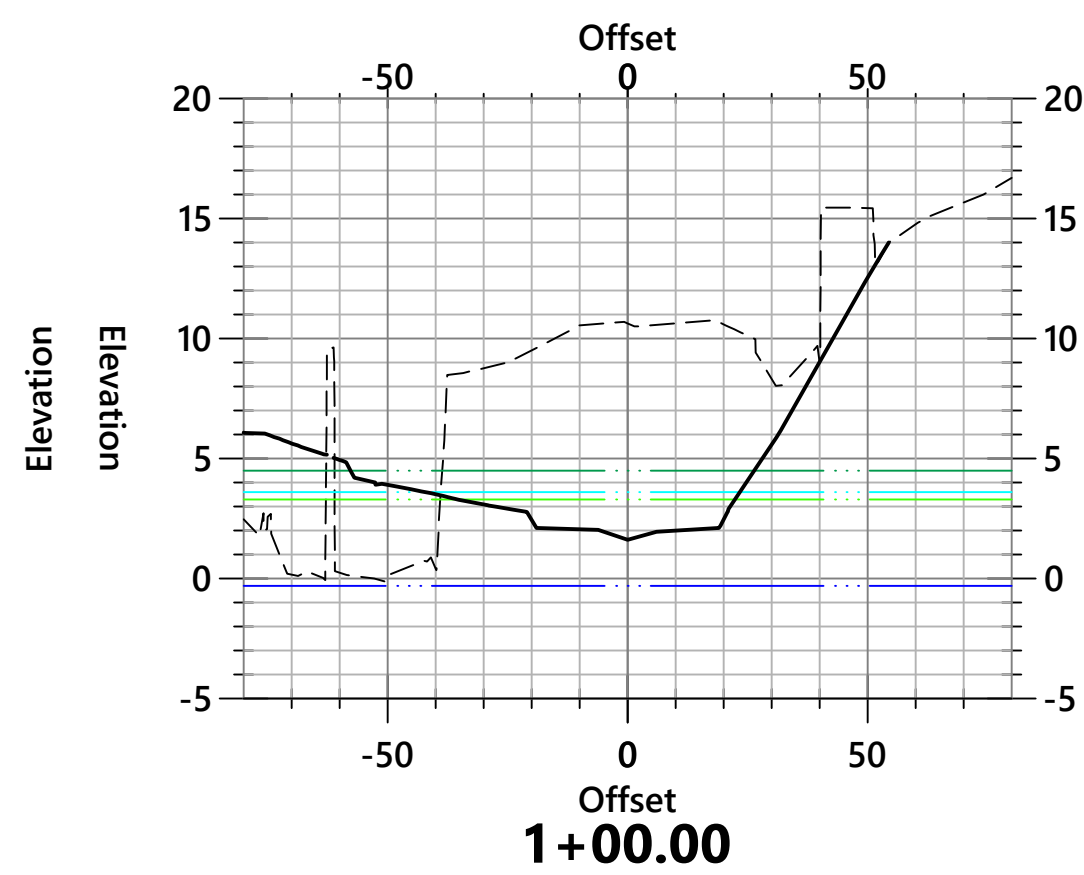
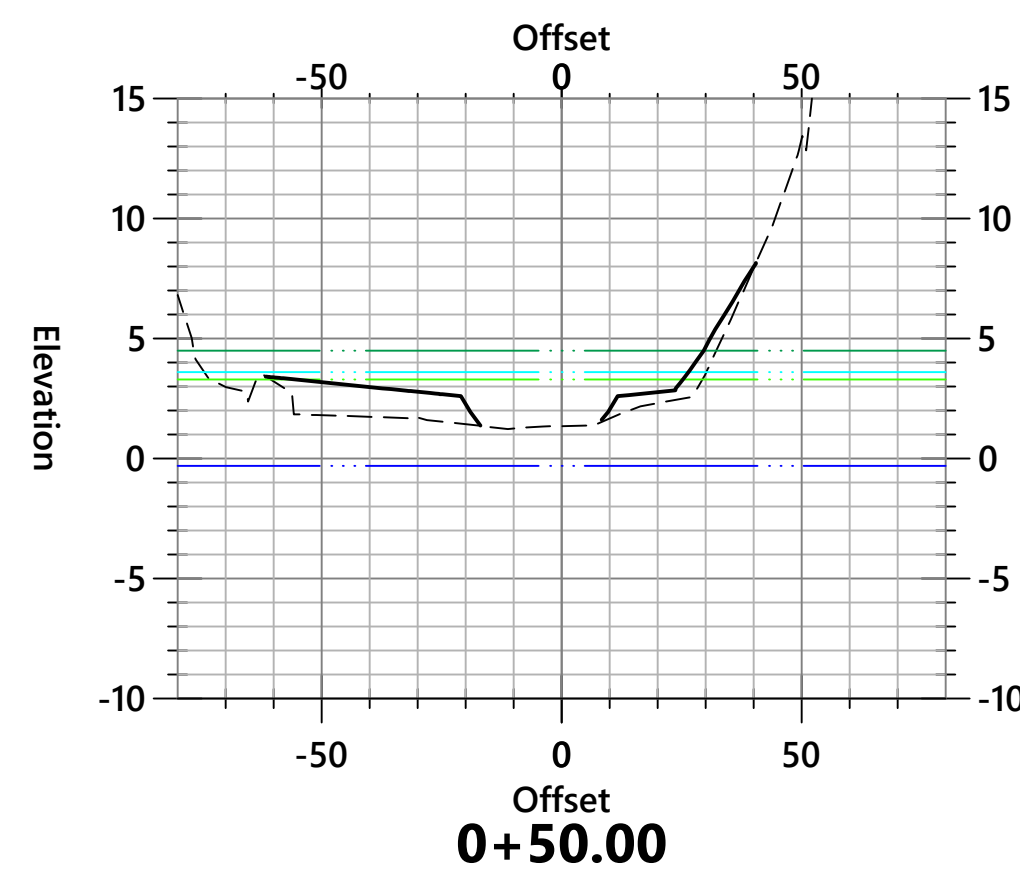
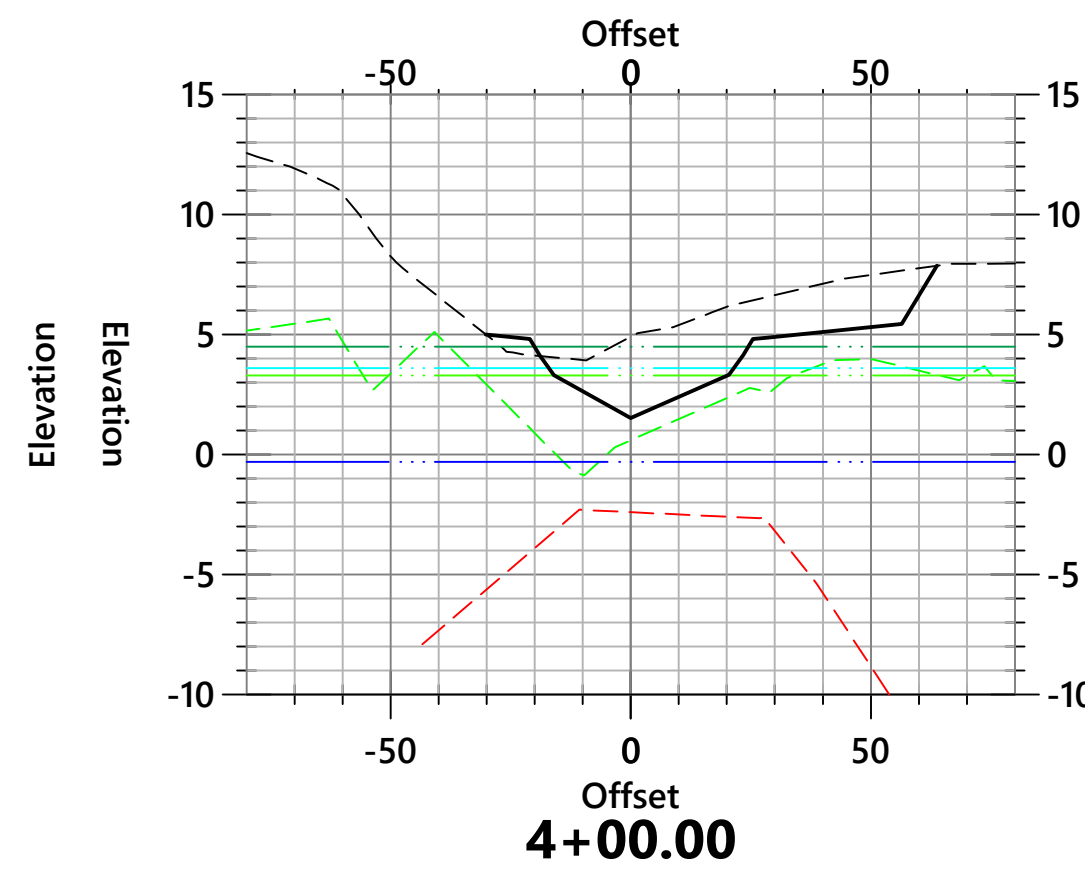
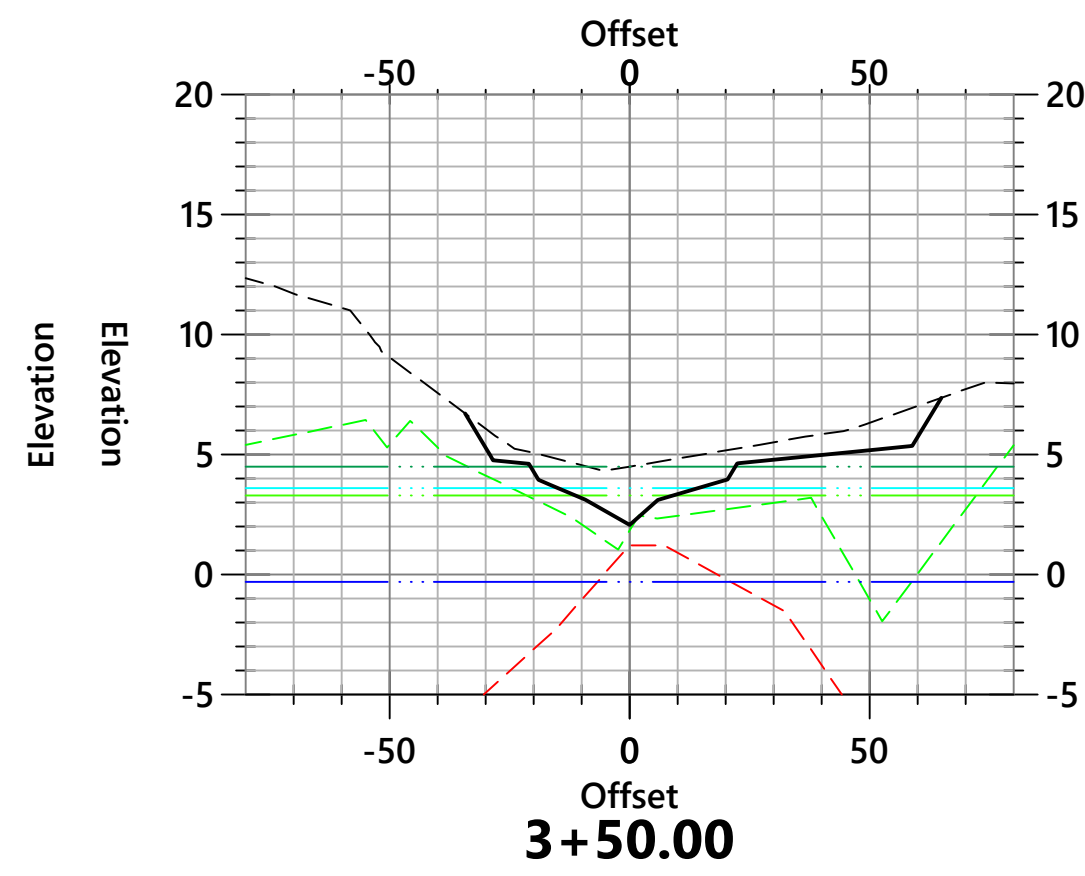
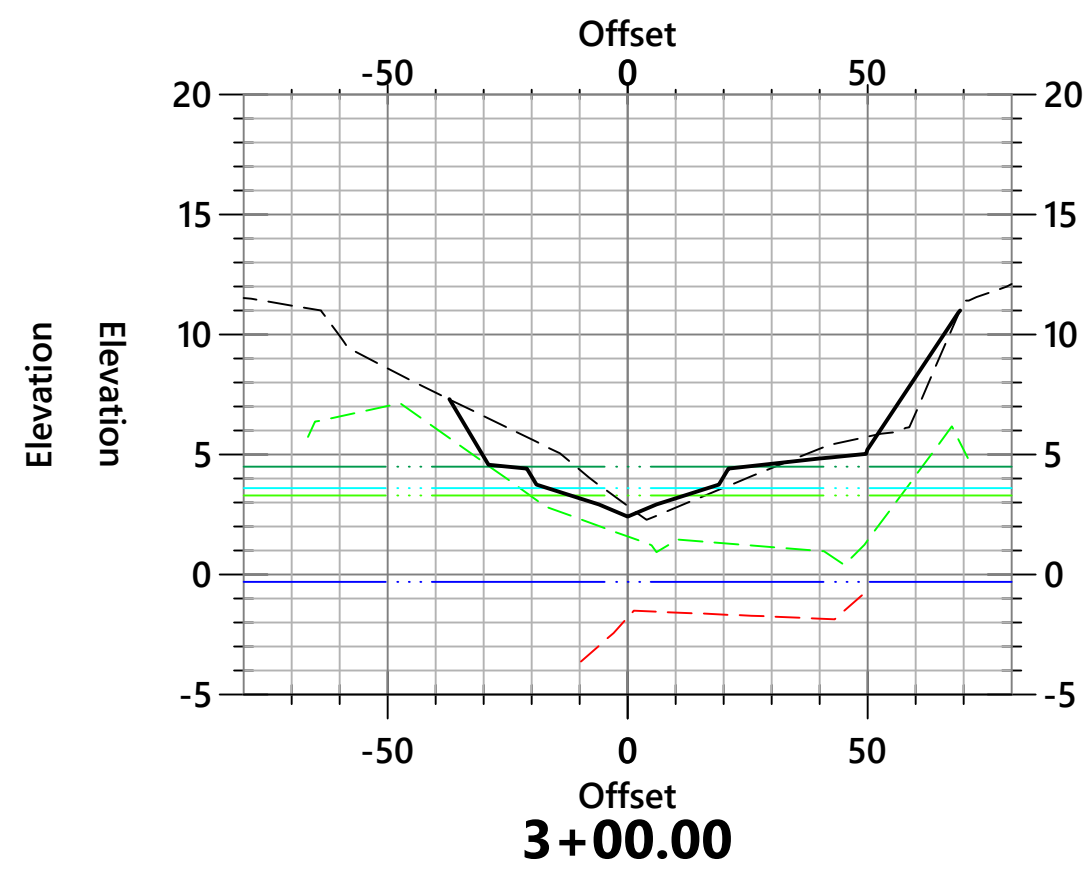
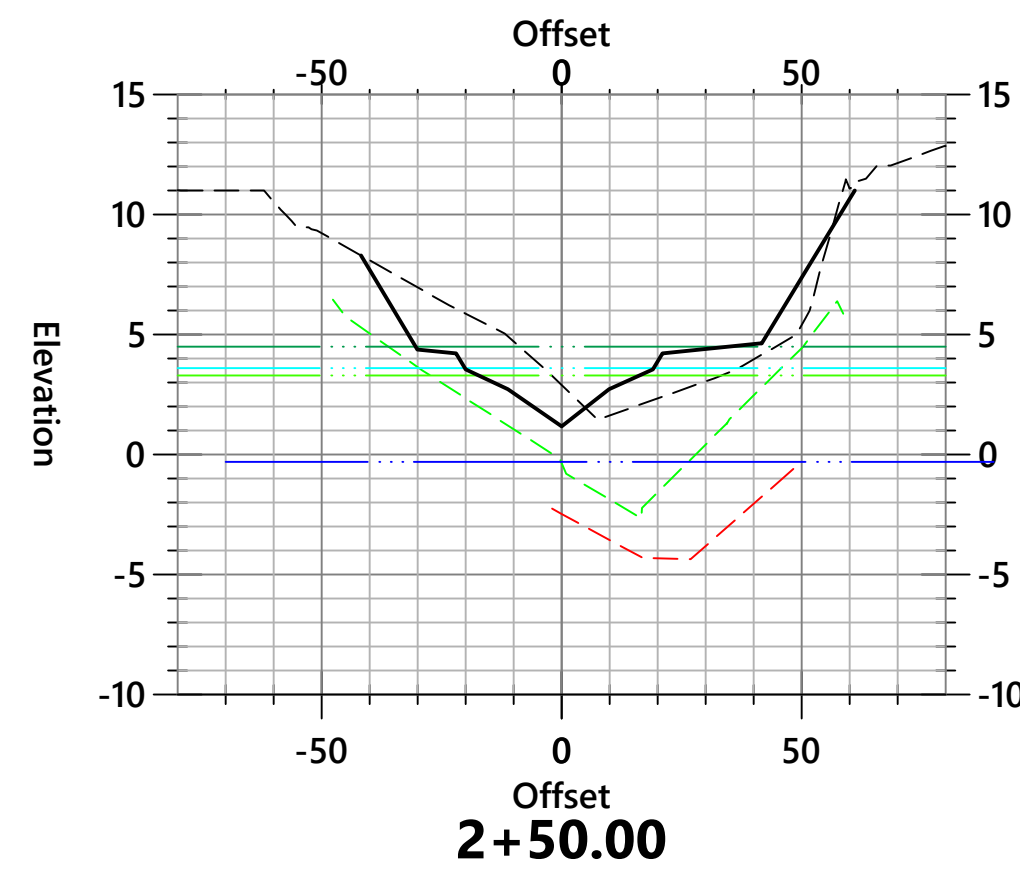
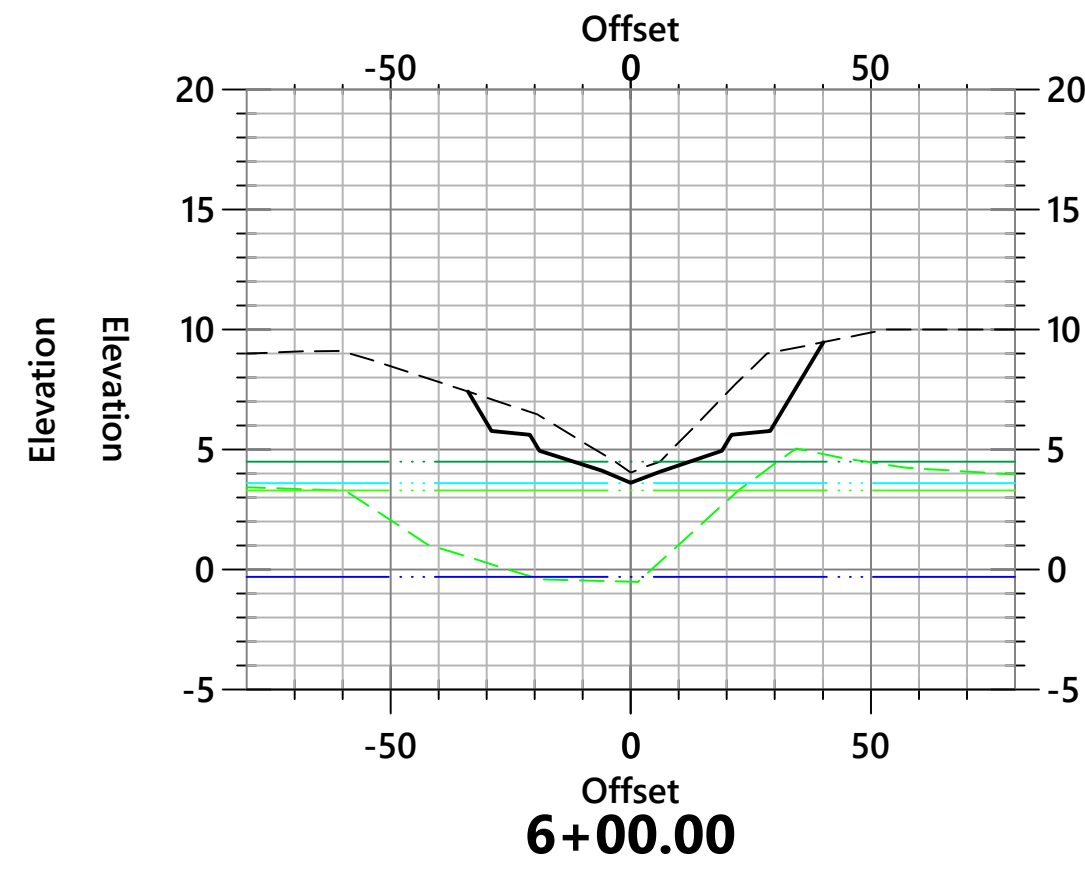
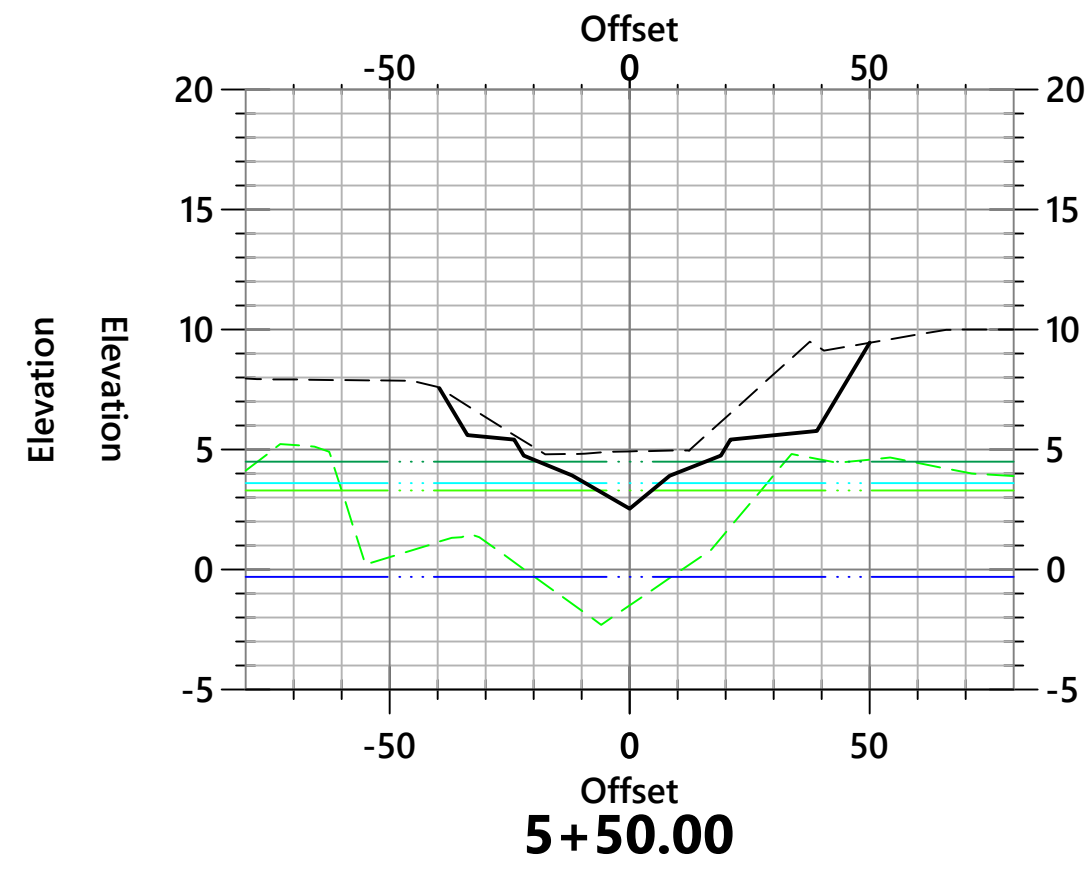
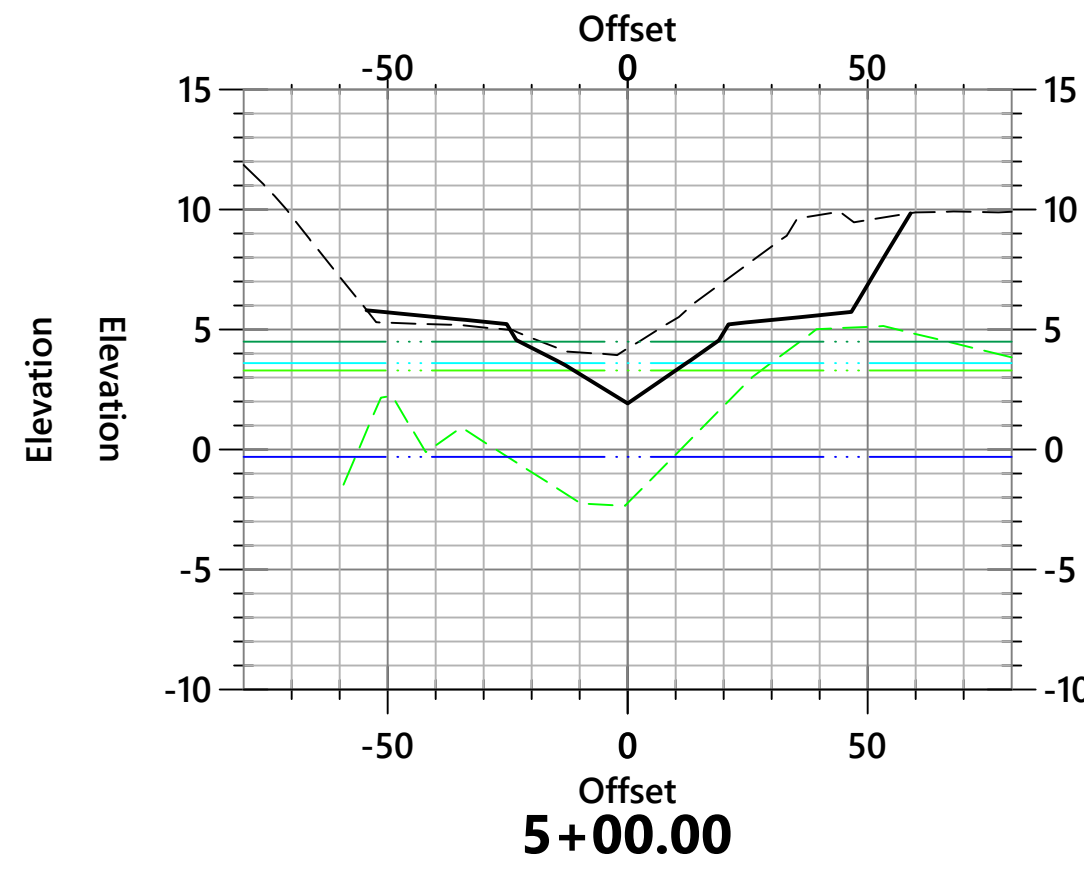
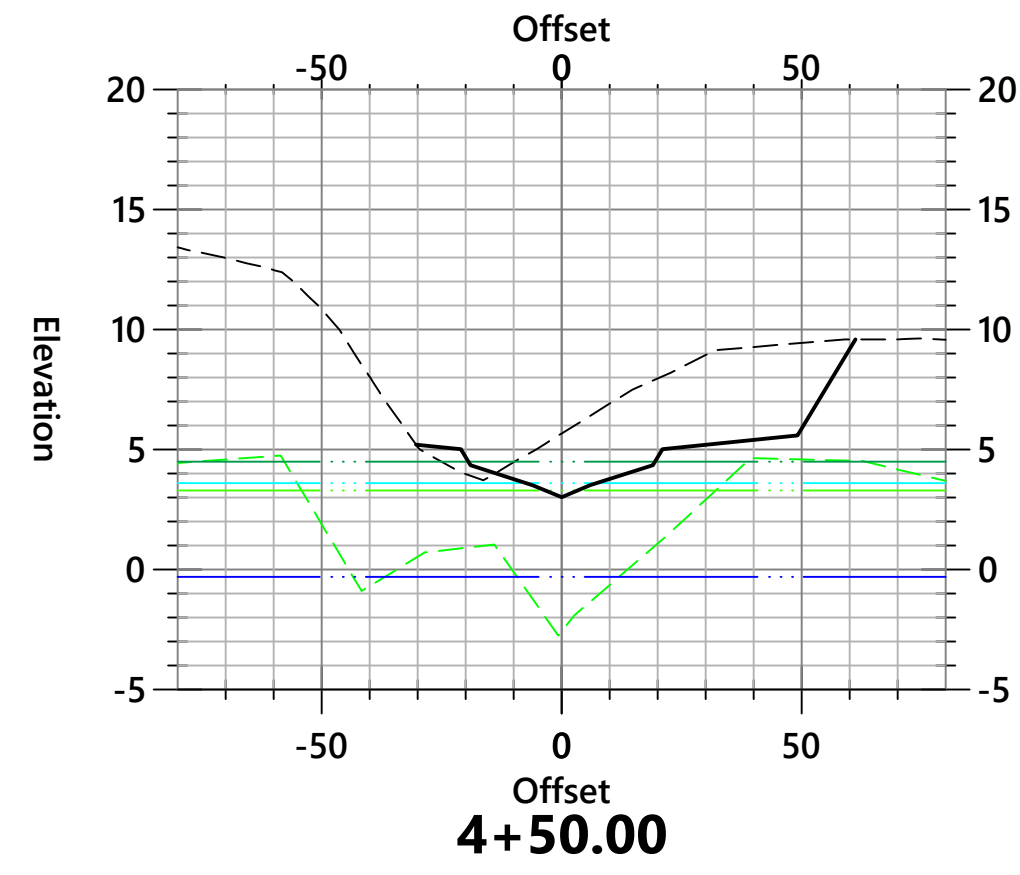
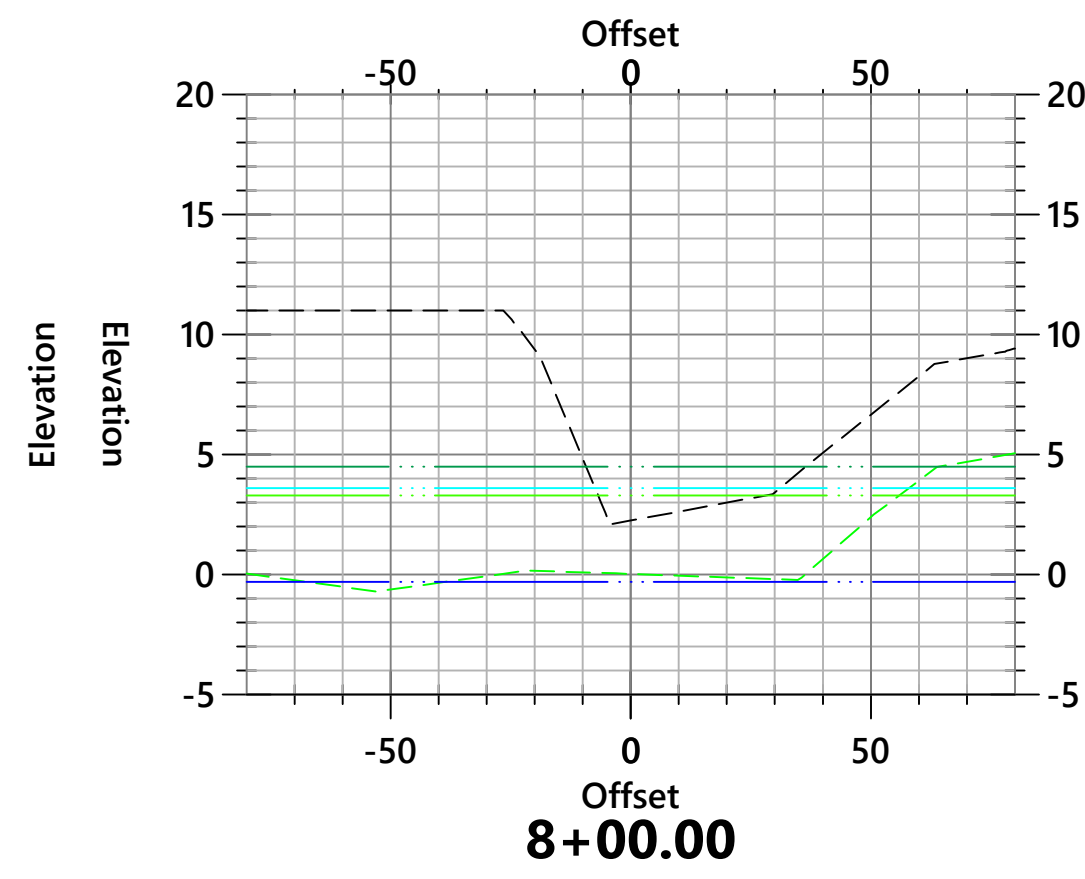
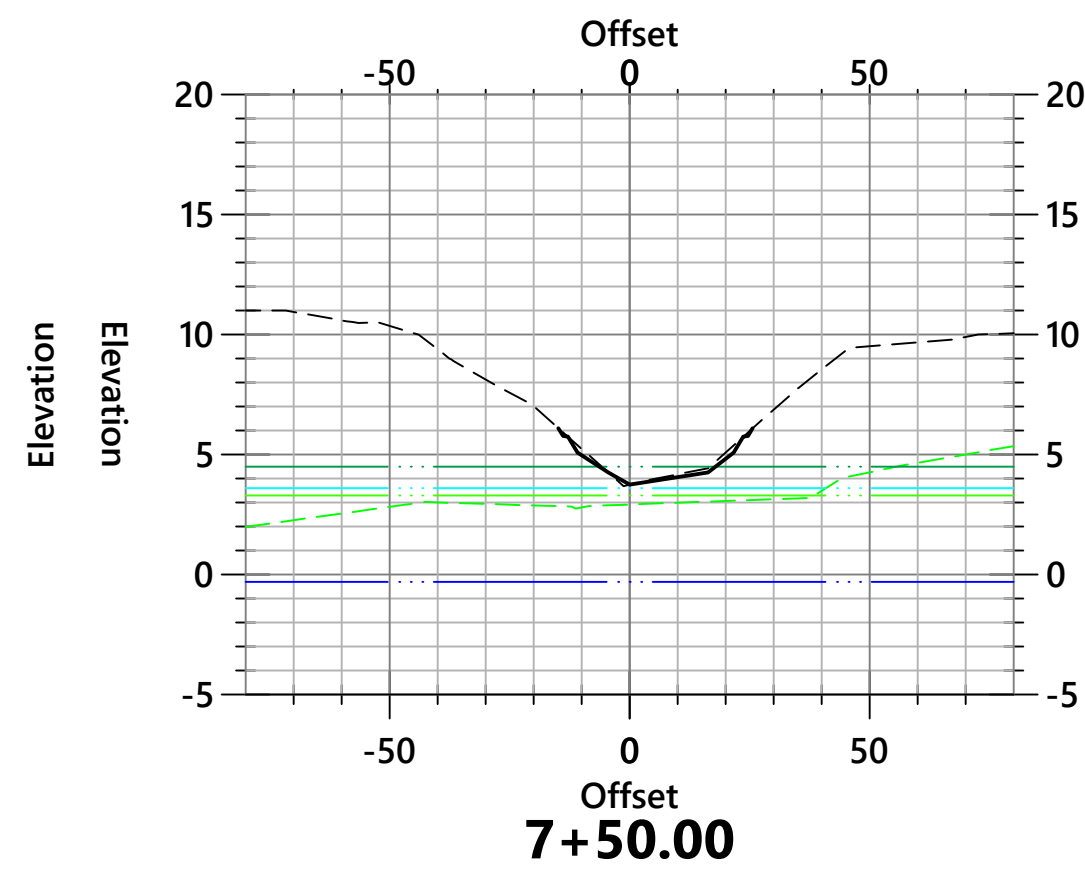
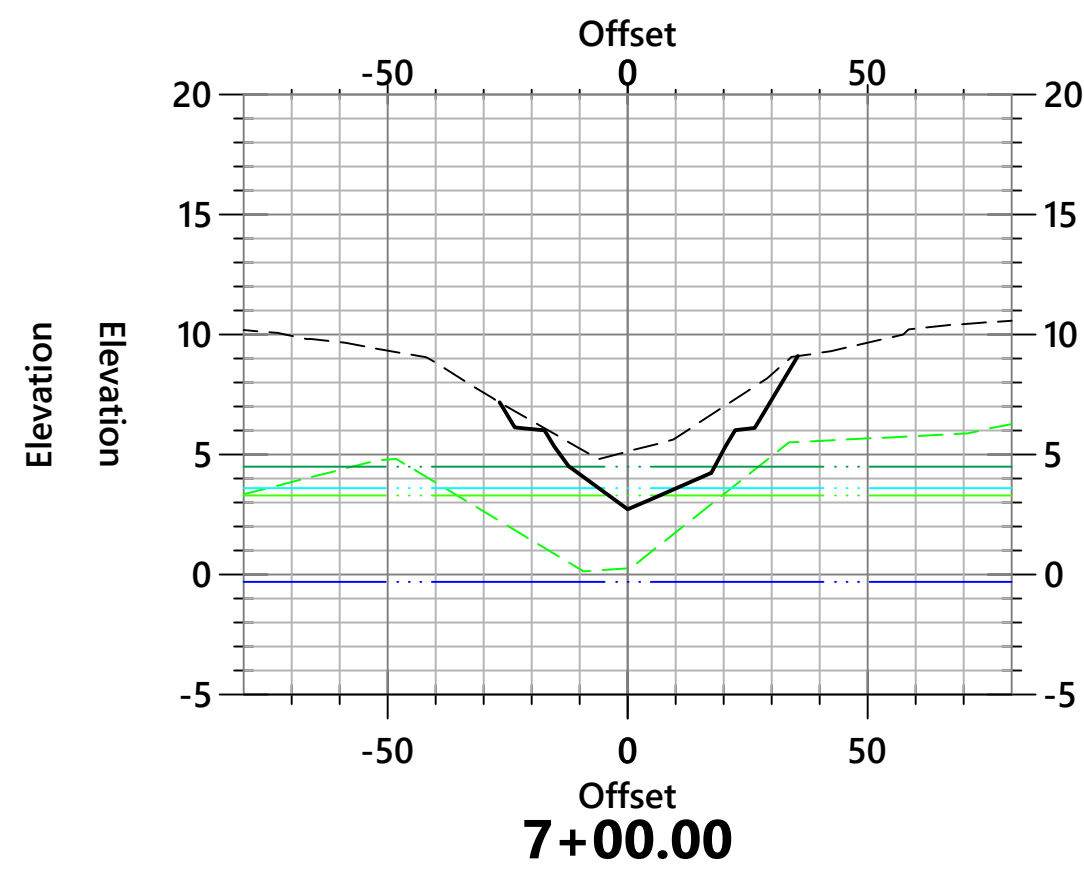
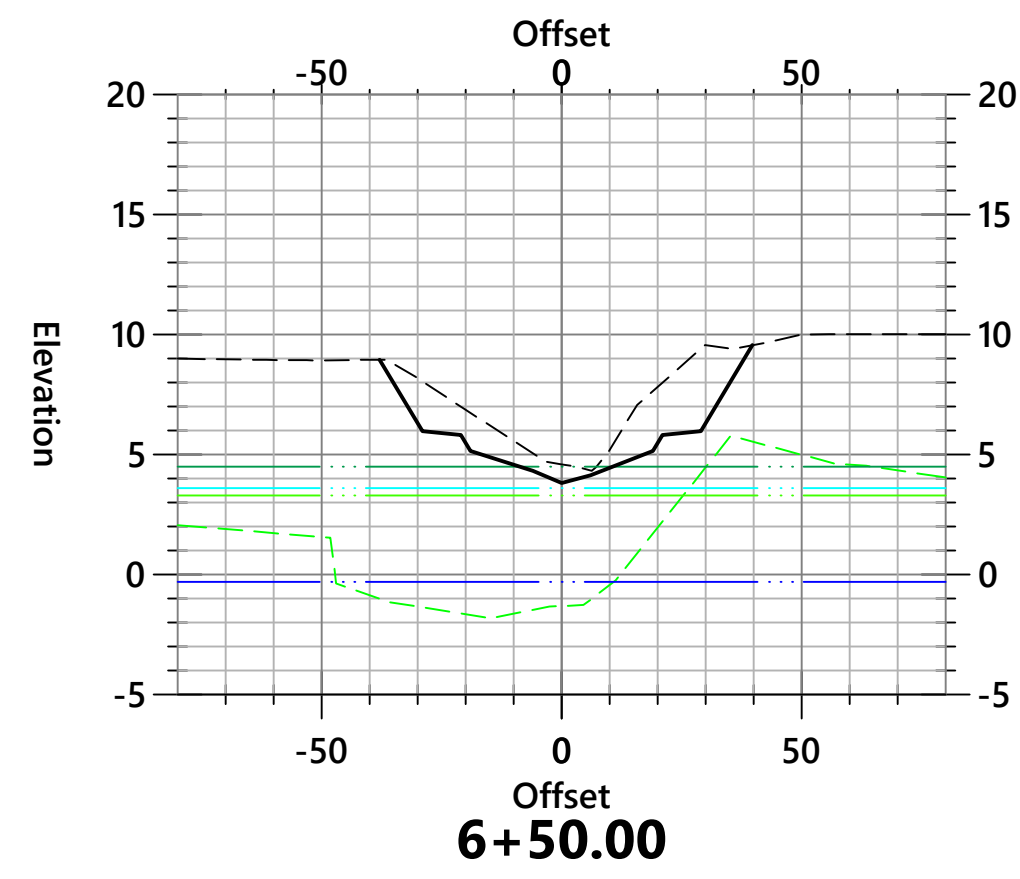
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Sheet **4** of **11**

Project Number
52633.02



2 Bedford Farms Drive
Suite 200
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603.391.3900



LEGEND

- EXISTING SURFACE
- PROPOSED SURFACE
- SOFT SEDIMENT LIMITS
- BEDROCK SURFACE
- HIGHEST ASTRONOMICAL TIDE (ELEV. 4.5)
- MEAN HIGHER-HIGH WATER (ELEV. 3.6)
- MEAN HIGH WATER (ELEV. 3.3)
- MEAN TIDE LEVEL (ELEV. -0.3)

Mill Pond Dam Removal and Oyster River Restoration

Newmarket Road
Durham, NH

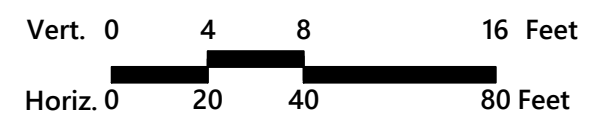
No.	Revision	Date	Appr.

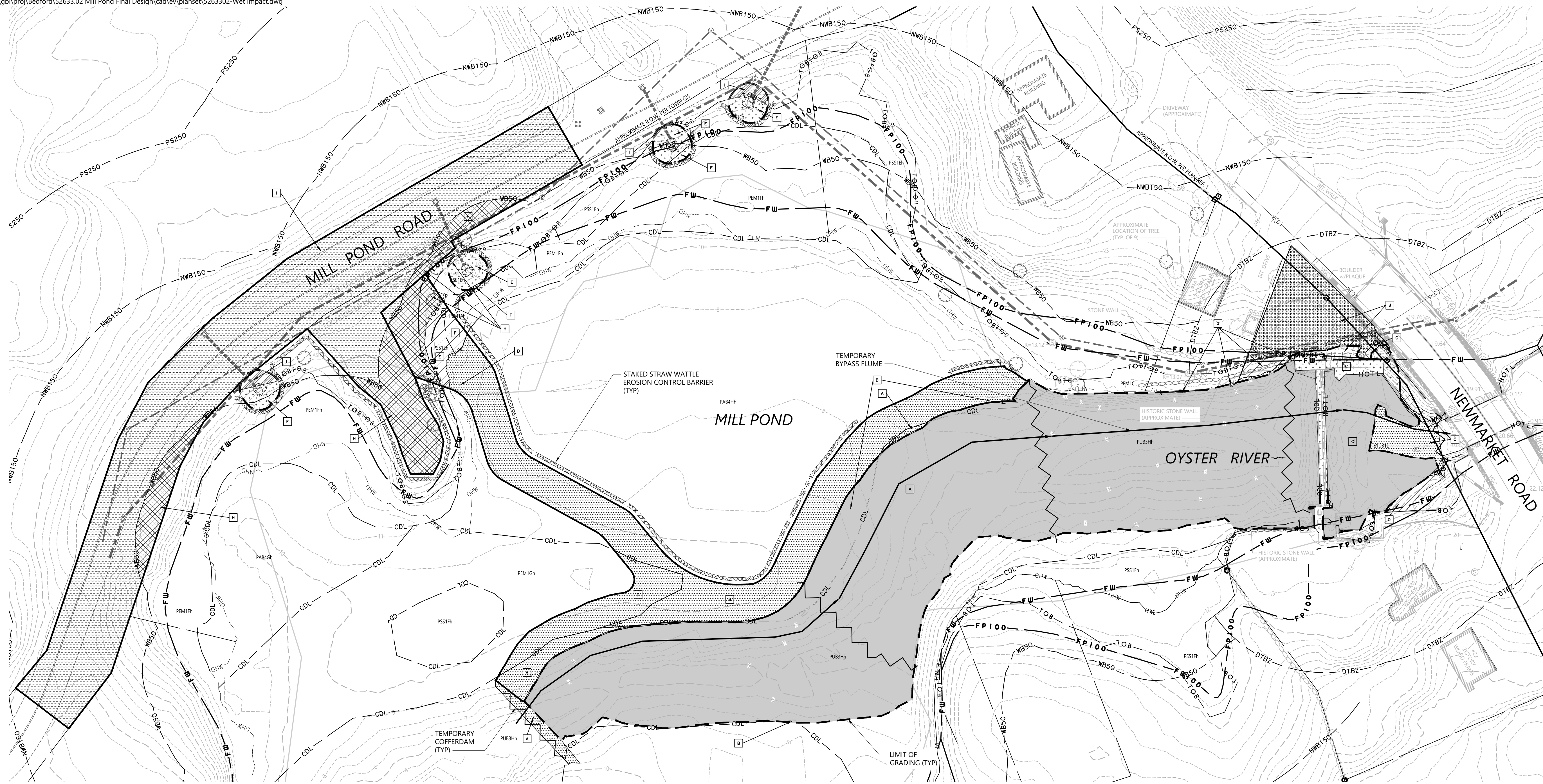
Designed by **BJM** Checked by
Issued for **Permitting** Date **January 17, 2024**

Not Approved for Construction
Drawing Title
River Channel Cross Sections

2-5-2024
STATE OF NEW HAMPSHIRE
DAVID WILLIAM CLOUTIER
No. 15589
LICENSED PROFESSIONAL ENGINEER
Project Number
52633.02

C-5
Sheet 5 of 11

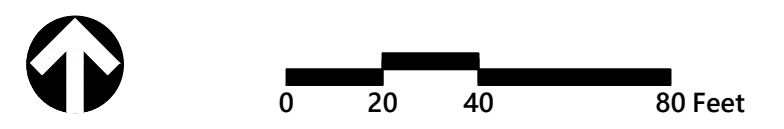




Mill Pond Dam Removal and Oyster River Restoration

Newmarket Road
Durham, NH

No.	Revision	Date	Appr'd



Legend

	LIMIT OF DISTURBANCE		50 FT. WATERFRONT BUFFER TEMPORARY IMPACT
	WETLAND DESIGNATION NUMBER		150 FT. NATURAL WOODLAND BUFFER PERMANENT IMPACT
	WETLAND IMPACT LOCATION		150 FT. NATURAL WOODLAND BUFFER TEMPORARY IMPACT
	N.H. WETLANDS BUREAU AND U.S. ARMY CORPS WETLAND PERMANENT IMPACT (BED/WETLAND)		DEVELOPED TIDAL BUFFER ZONE (DTBZ) PERMANENT IMPACT
	N.H. WETLANDS BUREAU AND U.S. ARMY CORPS WETLAND TEMPORARY IMPACT (BED/WETLAND)		DEVELOPED TIDAL BUFFER ZONE (DTBZ) TEMPORARY IMPACT
	N.H. WETLANDS BUREAU PERMANENT IMPACT (BANK)		
	N.H. WETLANDS BUREAU TEMPORARY IMPACT (BANK)		
	50 FT. WATERFRONT BUFFER PERMANENT IMPACT		

Wetland Classification Codes

CODE	CODE DESCRIPTION
PEM1C	- PALUSTRINE, EMERGENT, PERSISTENT, SEASONALLY FLOODED
PEM1E	- PALUSTRINE, EMERGENT, PERSISTENT, SEASONALLY FLOODED/SATURATED
PEM1Fh	- PALUSTRINE, EMERGENT, PERSISTENT, SEMI-PERMANENTLY FLOODED, DIKED/IMPOUNDED
PEM1Gh	- PALUSTRINE, EMERGENT, PERSISTENT, INTERMITTENTLY EXPOSED, DIKED/IMPOUNDED
PAB4Gh	- PALUSTRINE, AQUATIC BED, FLOATING VASCULAR, INTERMITTENTLY EXPOSED, DIKED/IMPOUNDED
PAB4Hh	- PALUSTRINE, AQUATIC BED, FLOATING VASCULAR, PERMANENTLY FLOODED, DIKED/IMPOUNDED
PUB3Hh	- PALUSTRINE, UNCONSOLIDATED BOTTOM, MUD, PERMANENTLY FLOODED, DIKED/IMPOUNDED
PSS1Fh	- PALUSTRINE, SCRUB-SHRUB, BROAD-LEAVED DECIDUOUS, SEMI-PERMANENTLY FLOODED, DIKED/IMPOUNDED
E1UB1L	- ESTUARINE, SUBTIDAL, UNCONSOLIDATED BOTTOM, COBBLE-GRAVEL, SUBTIDAL

RSA 482-A Impacts

Wetland and River Impacts (SF)

PERMANENT IMPACTS:	70,710 SF
TEMPORARY IMPACTS:	27,690 SF
TOTAL IMPACTS =	98,400 SF

Wetland and River Impacts (LF)

PERMANENT BANK IMPACTS:	195 LF
TEMPORARY BANK IMPACTS:	60 LF
TOTAL BANK IMPACTS:	255 LF
PERMANENT BED IMPACTS:	740 LF
TEMPORARY BED IMPACTS:	540 LF
TOTAL BED IMPACTS:	1,280 LF
TOTAL PROJECT IMPACTS:	1,535 LF

RSA 483-B Impacts

PERMANENT IMPACTS:	530 SF
TEMPORARY IMPACTS:	37,820 SF
TOTAL IMPACTS =	38,350 SF

Dam Removal & River Restoration Wetland Impact Summary

Wetland Classification	Impact Location	Area (sf)						Purpose
		Permanent Impacts			Temporary Impacts			
		Bed/Wetland SF	Bank SF	Buffer SF	Bed/Wetland SF	Bank SF	Buffer SF	
PUB3Hh	A	57,860			1,920			CHANNEL SHAPING & STABILIZATION, DAM REMOVAL & CONSTRUCTION ACCESS
PAB4Hh	B	2,700			15,030			CHANNEL SHAPING & STABILIZATION AND CONSTRUCTION ACCESS
E1UB1L	C	6,010	1,660		1,590	590		CHANNEL SHAPING & STABILIZATION AND DAM REMOVAL
PEM1Gh	D				2,800			CONSTRUCTION ACCESS
PSS1Eh	E		1,610			730		DRAINAGE OUTFALL GRADING/ STABILIZATION & CONSTRUCTION ACCESS
PEM1Fh	F		520			350		DRAINAGE OUTFALL GRADING/ STABILIZATION & CONSTRUCTION ACCESS
PEM1C	G		40			330		CHANNEL SHAPING & STABILIZATION
WATERFRONT BUFFER	H			40			7,380	DRAINAGE OUTFALL GRADING, TEMP. STAGING & CONSTRUCTION ACCESS
WOODLAND BUFFER	I			490			30,440	DRAINAGE OUTFALL GRADING, TEMP. STAGING & CONSTRUCTION ACCESS
DTBZ	J			310			4,350	CHANNEL SHAPING & STABILIZATION AND TEMP. STAGING
TOTAL		66,570	3,830	840	21,340	2,000	42,170	

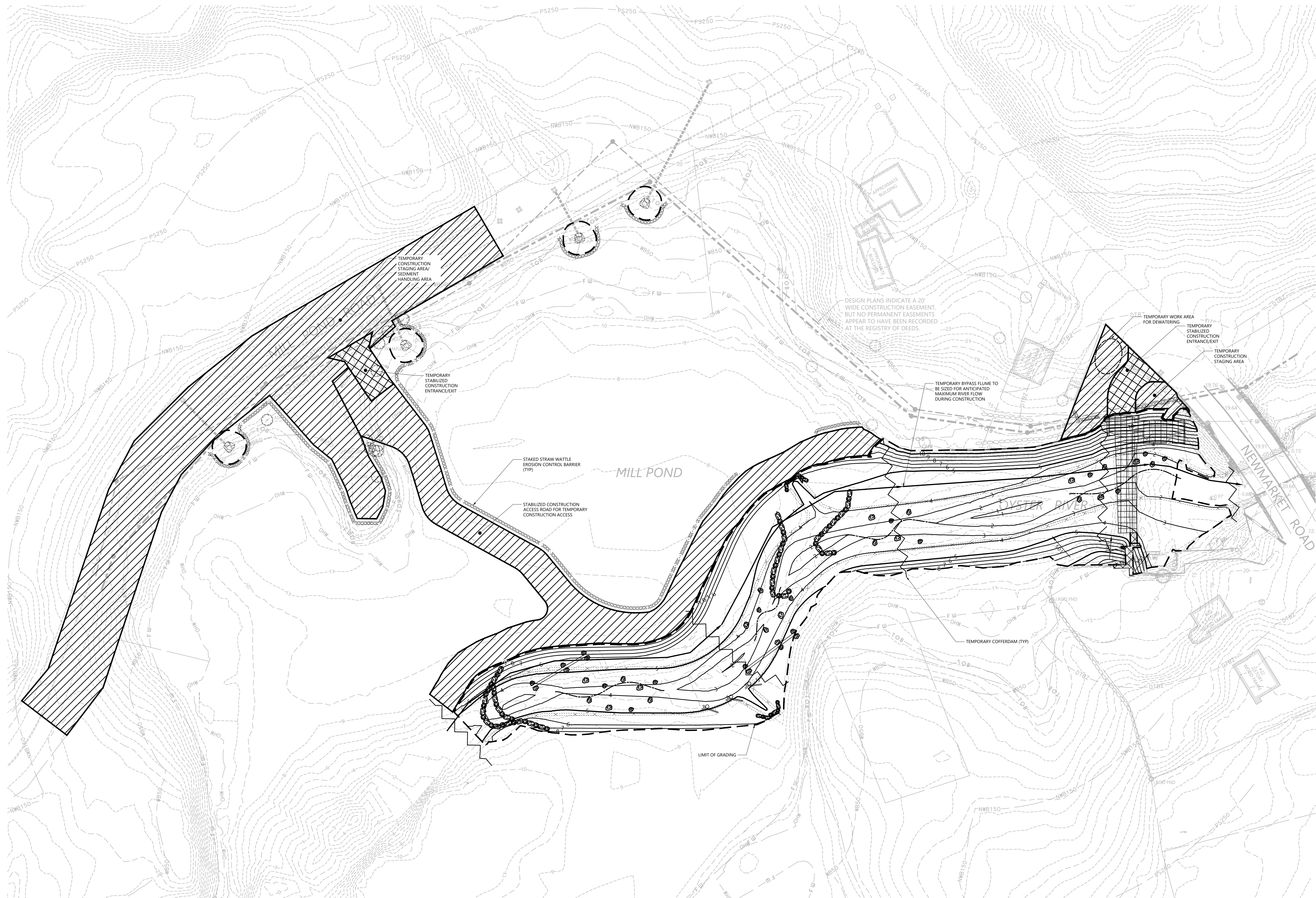
Designed by	BJM	Checked by	
Issued for		Date	
Permitting		January 17, 2024	

Not Approved for Construction
Drawing Title:
Wetland and Shoreland Impact Plan

2-5-2024
STATE OF NEW HAMPSHIRE
DAVID WILLIAM CLOUTIER
No. 15589
LICENSED PROFESSIONAL ENGINEER
Drawing Number
C-6
Sheet 6 of 11
Project Number
52633.02



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Bedford, NH 03110
603.391.3900



DESIGN PLANS INDICATE A 20' WIDE CONSTRUCTION EASEMENT, BUT NO PERMANENT EASEMENTS APPEAR TO HAVE BEEN RECORDED AT THE REGISTRY OF DEEDS.

TEMPORARY BYPASS FLUME TO BE SIZED FOR ANTICIPATED MAXIMUM RIVER FLOW DURING CONSTRUCTION

TEMPORARY WORK AREA FOR DEWATERING

TEMPORARY STABILIZED CONSTRUCTION ENTRANCE/EXIT

TEMPORARY CONSTRUCTION STAGING AREA

TEMPORARY CONSTRUCTION STAGING AREA
SEDIMENT HANDLING AREA

TEMPORARY STABILIZED CONSTRUCTION ENTRANCE/EXIT

STAKED STRAW WATTLE EROSION CONTROL BARRIER (TYP)

STABILIZED CONSTRUCTION ACCESS ROAD FOR TEMPORARY CONSTRUCTION ACCESS

MILL POND

OYSTER RIVER

NEWMARKET ROAD

LIMIT OF GRADING

Mill Pond Dam Removal and Oyster River Restoration

Newmarket Road
Durham, NH

No.	Revision	Date	Appr.

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Issued for Permitting	Date January 17, 2024

Not Approved for Construction
Erosion and Sediment Control Plan

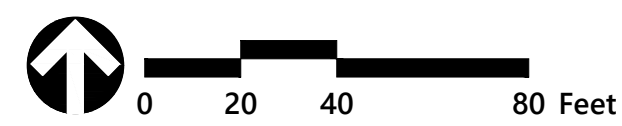
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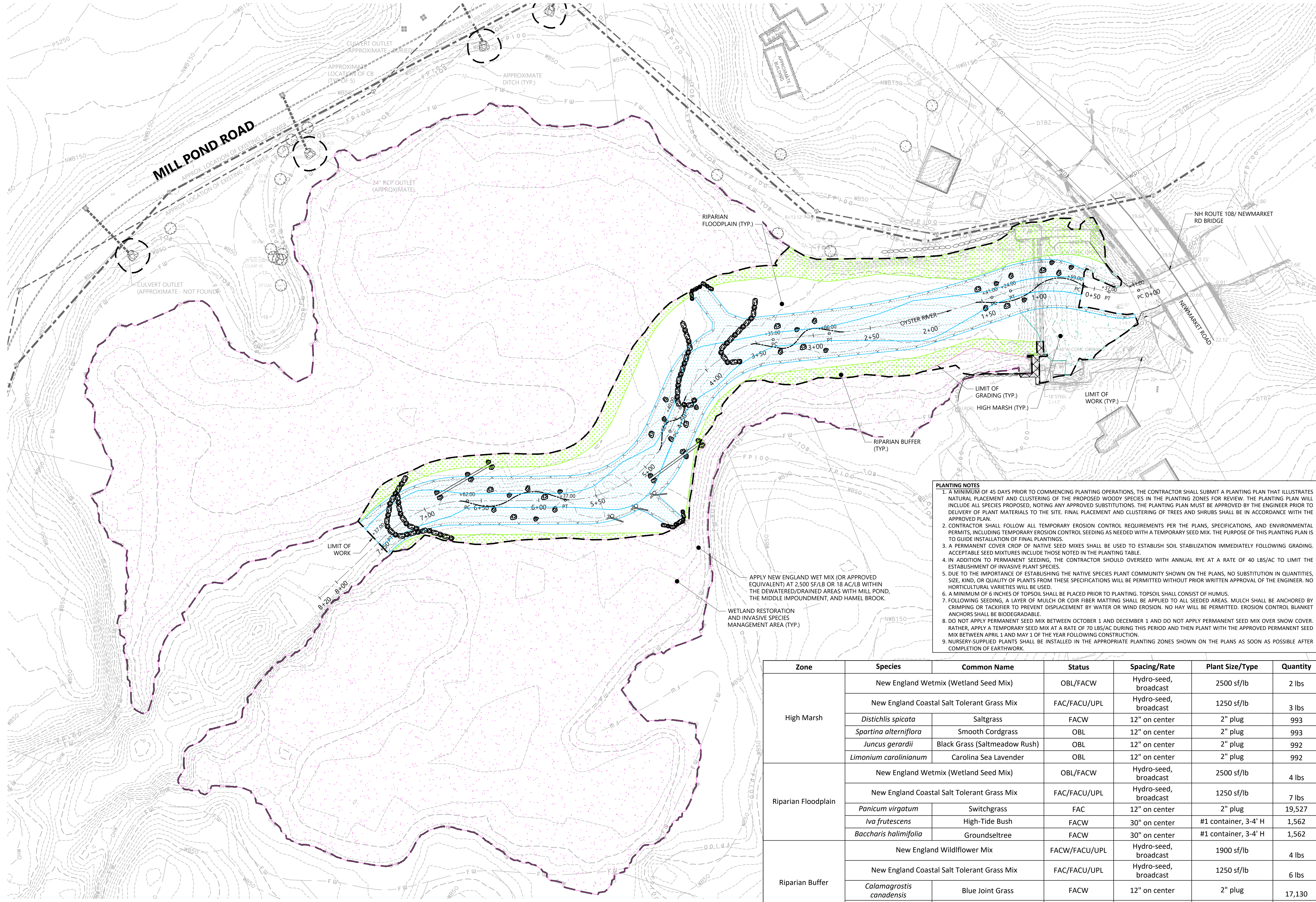
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Project Number 52633.02

David Cloutier





LEGEND

- PROPOSED STREAMBED
- PROPOSED HIGH MARSH
- PROPOSED RIPARIAN FLOODPLAIN
- PROPOSED RIPARIAN BUFFER
- PROPOSED WETLAND RESTORATION AND INVASIVE SPECIES MANAGEMENT

PLANTING NOTES

- A MINIMUM OF 45 DAYS PRIOR TO COMMENCING PLANTING OPERATIONS, THE CONTRACTOR SHALL SUBMIT A PLANTING PLAN THAT ILLUSTRATES NATURAL PLACEMENT AND CLUSTERING OF THE PROPOSED WOODY SPECIES IN THE PLANTING ZONES FOR REVIEW. THE PLANTING PLAN WILL INCLUDE ALL SPECIES PROPOSED, NOTING ANY APPROVED SUBSTITUTIONS. THE PLANTING PLAN MUST BE APPROVED BY THE ENGINEER PRIOR TO DELIVERY OF PLANT MATERIALS TO THE SITE. FINAL PLACEMENT AND CLUSTERING OF TREES AND SHRUBS SHALL BE IN ACCORDANCE WITH THE APPROVED PLAN.
- CONTRACTOR SHALL FOLLOW ALL TEMPORARY EROSION CONTROL REQUIREMENTS PER THE PLANS, SPECIFICATIONS, AND ENVIRONMENTAL PERMITS, INCLUDING TEMPORARY EROSION CONTROL SEEDING AS NEEDED WITH A TEMPORARY SEED MIX. THE PURPOSE OF THIS PLANTING PLAN IS TO GUIDE INSTALLATION OF FINAL PLANTINGS.
- A PERMANENT COVER CROP OF NATIVE SEED MIXES SHALL BE USED TO ESTABLISH SOIL STABILIZATION IMMEDIATELY FOLLOWING GRADING. ACCEPTABLE SEED MIXTURES INCLUDE THOSE NOTED IN THE PLANTING TABLE.
- IN ADDITION TO PERMANENT SEEDING, THE CONTRACTOR SHOULD OVERSEED WITH ANNUAL RYE AT A RATE OF 40 LBS/AC TO LIMIT THE ESTABLISHMENT OF INVASIVE PLANT SPECIES.
- DUE TO THE IMPORTANCE OF ESTABLISHING THE NATIVE SPECIES PLANT COMMUNITY SHOWN ON THE PLANS, NO SUBSTITUTION IN QUANTITIES, SIZE, KIND, OR QUALITY OF PLANTS FROM THESE SPECIFICATIONS WILL BE PERMITTED WITHOUT PRIOR WRITTEN APPROVAL OF THE ENGINEER. NO HORTICULTURAL VARIETIES WILL BE USED.
- A MINIMUM OF 6 INCHES OF TOPSOIL SHALL BE PLACED PRIOR TO PLANTING. TOPSOIL SHALL CONSIST OF HUMUS.
- FOLLOWING SEEDING, A LAYER OF MULCH OR COIR FIBER MATTING SHALL BE APPLIED TO ALL SEEDING AREAS. MULCH SHALL BE ANCHORED BY CRIMPING OR TACKIFIER TO PREVENT DISPLACEMENT BY WATER OR WIND EROSION. NO HAY WILL BE PERMITTED. EROSION CONTROL BLANKET ANCHORS SHALL BE BIODEGRADABLE.
- DO NOT APPLY PERMANENT SEED MIX BETWEEN OCTOBER 1 AND DECEMBER 1 AND DO NOT APPLY PERMANENT SEED MIX OVER SNOW COVER. RATHER, APPLY A TEMPORARY SEED MIX AT A RATE OF 70 LBS/AC DURING THIS PERIOD AND THEN PLANT WITH THE APPROVED PERMANENT SEED MIX BETWEEN APRIL 1 AND MAY 1 OF THE YEAR FOLLOWING CONSTRUCTION.
- NURSERY-SUPPLIED PLANTS SHALL BE INSTALLED IN THE APPROPRIATE PLANTING ZONES SHOWN ON THE PLANS AS SOON AS POSSIBLE AFTER COMPLETION OF EARTHWORK.

Zone	Species	Common Name	Status	Spacing/Rate	Plant Size/Type	Quantity
High Marsh	New England Wetmix (Wetland Seed Mix)		OBL/FACW	Hydro-seed, broadcast	2500 sf/lb	2 lbs
	New England Coastal Salt Tolerant Grass Mix		FAC/FACU/UPL	Hydro-seed, broadcast	1250 sf/lb	3 lbs
	<i>Distichlis spicata</i>	Saltgrass	FACW	12" on center	2" plug	993
	<i>Spartina alterniflora</i>	Smooth Cordgrass	OBL	12" on center	2" plug	993
	<i>Juncus gerardii</i>	Black Grass (Saltmeadow Rush)	OBL	12" on center	2" plug	992
Riparian Floodplain	New England Wetmix (Wetland Seed Mix)		OBL/FACW	Hydro-seed, broadcast	2500 sf/lb	4 lbs
	New England Coastal Salt Tolerant Grass Mix		FAC/FACU/UPL	Hydro-seed, broadcast	1250 sf/lb	7 lbs
	<i>Panicum virgatum</i>	Switchgrass	FAC	12" on center	2" plug	19,527
	<i>Iva frutescens</i>	High-Tide Bush	FACW	30" on center	#1 container, 3-4' H	1,562
	<i>Baccharis halimifolia</i>	Groundseltree	FACW	30" on center	#1 container, 3-4' H	1,562
Riparian Buffer	New England Wildflower Mix		FACW/FACU/UPL	Hydro-seed, broadcast	1900 sf/lb	4 lbs
	New England Coastal Salt Tolerant Grass Mix		FAC/FACU/UPL	Hydro-seed, broadcast	1250 sf/lb	6 lbs
	<i>Calamagrostis canadensis</i>	Blue Joint Grass	FACW	12" on center	2" plug	17,130
	<i>Clethra alnifolia</i>	Sweet Pepperbush	FAC	30" on center	#1 container, 3-4' H	1,370
Dewatered/Drained Areas	<i>Morella pensylvanica</i>		FAC	30" on center	#1 container, 3-4' H	1,371
	New England Wetmix (Wetland Seed Mix)		OBL/FACW	Hydro-seed, broadcast	2500 sf/lb	276 lbs

Mill Pond Dam Removal and Oyster River Restoration

Newmarket Road Durham, NH

No.	Revision	Date	Appr.

Designed by **BJM** Checked by _____
 Issued for _____ Date _____


Permitting January 17, 2024

Not Approved for Construction

Restoration and Planting Plan

Drawing Number _____

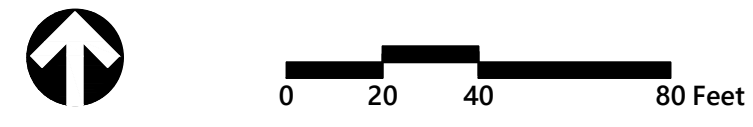
2-5-2024



C-8

Sheet 8 of 11

Project Number 52633.02

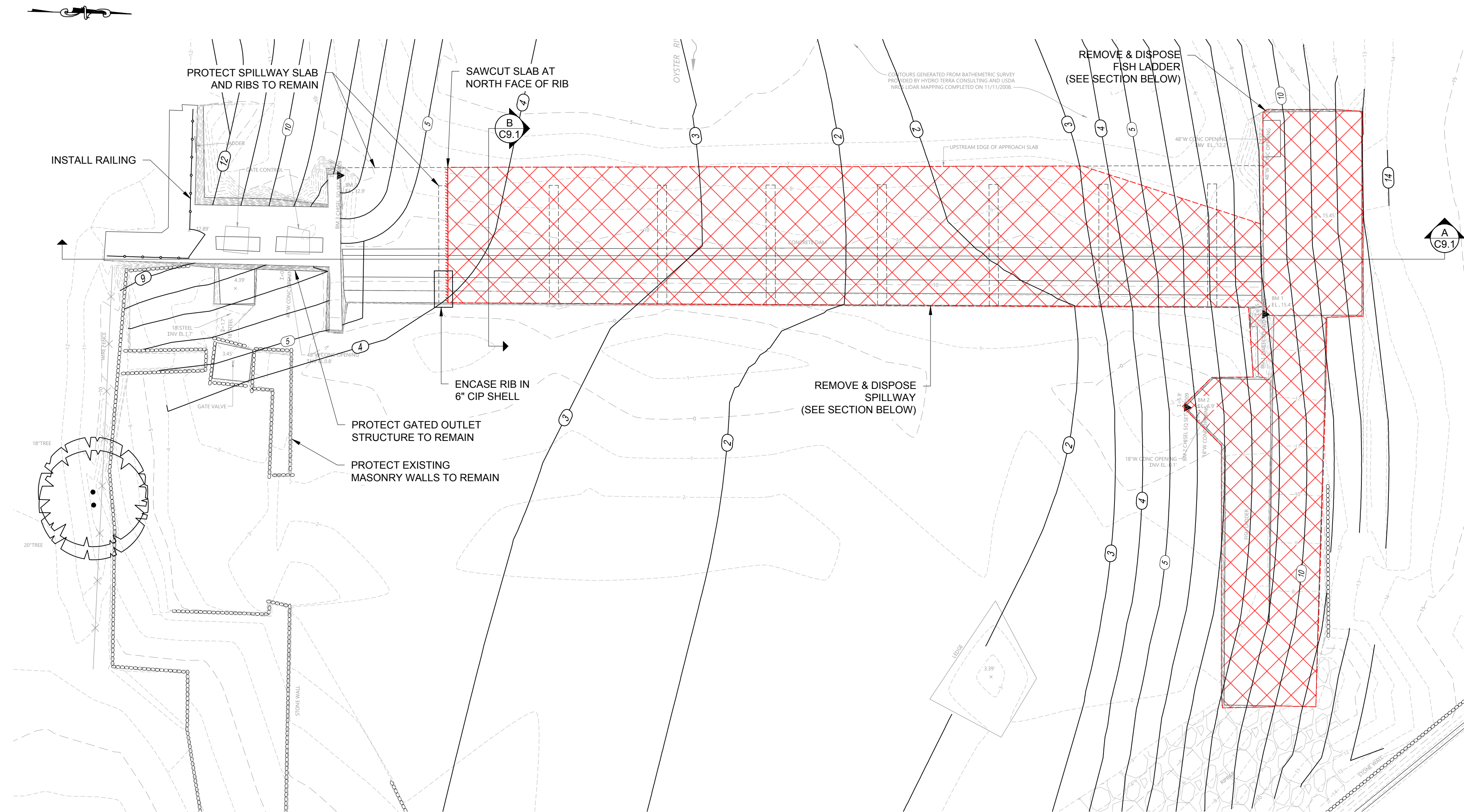




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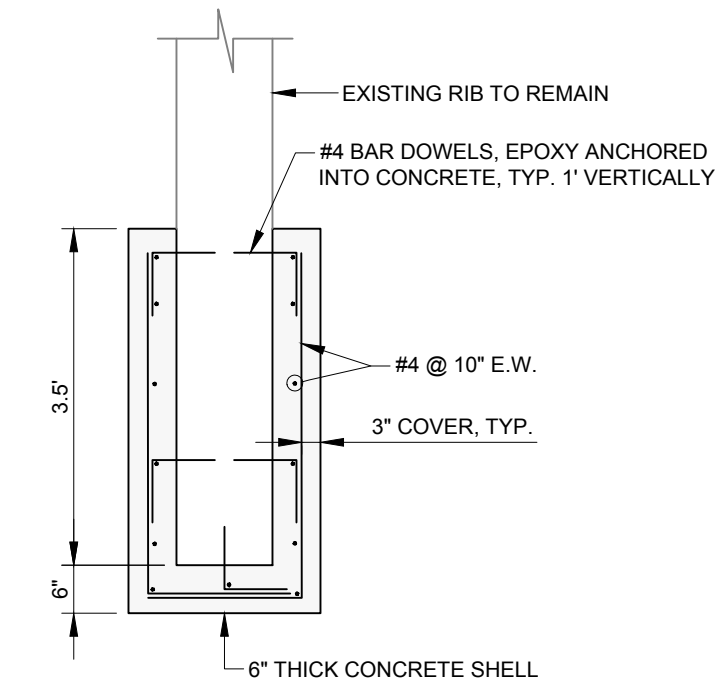


PARE CORPORATION
ENGINEERS - SCIENTISTS - PLANNERS
10 LINCOLN ROAD, SUITE 210
FOXBORO, MA 02035
508-543-1755

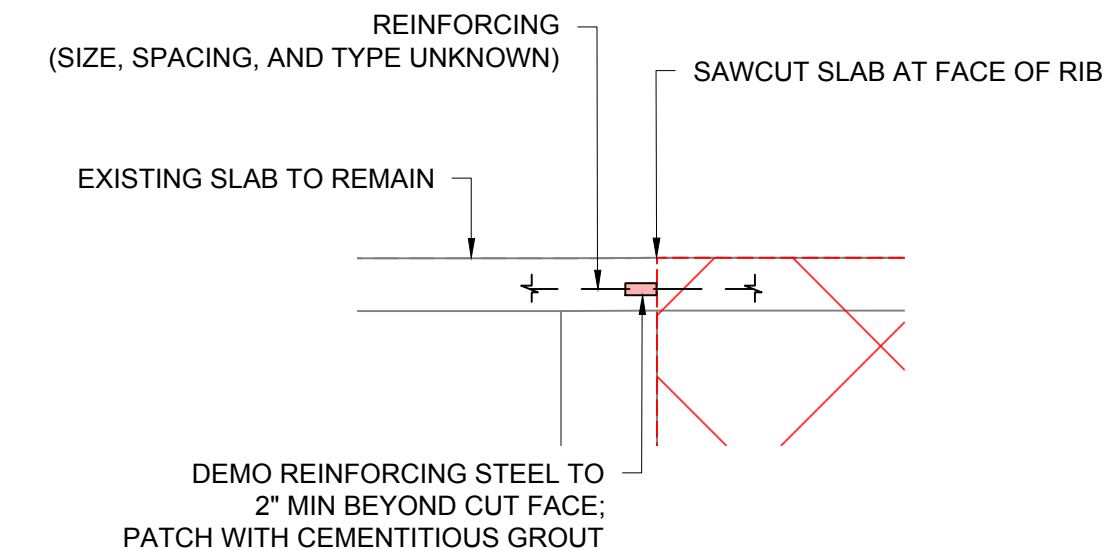


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0 4' 8' 16'

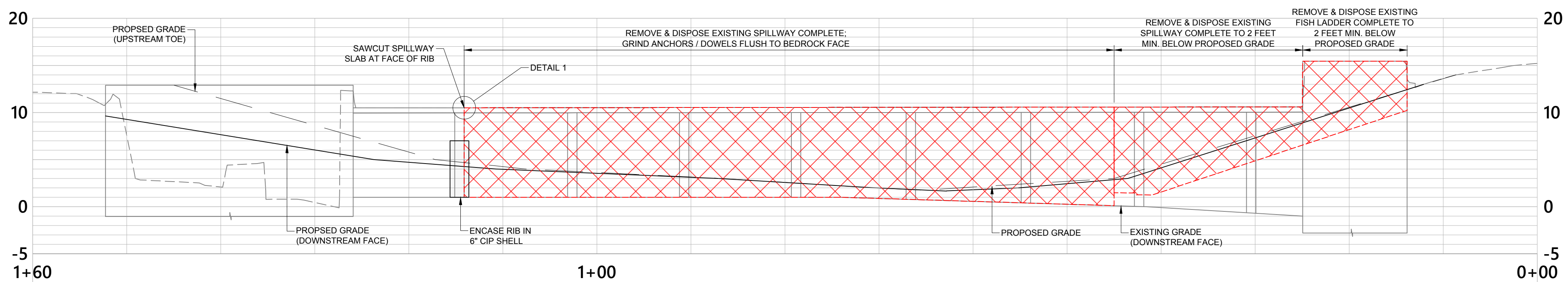
DAM PLAN
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CONCRETE SHELL DETAIL
NOT TO SCALE

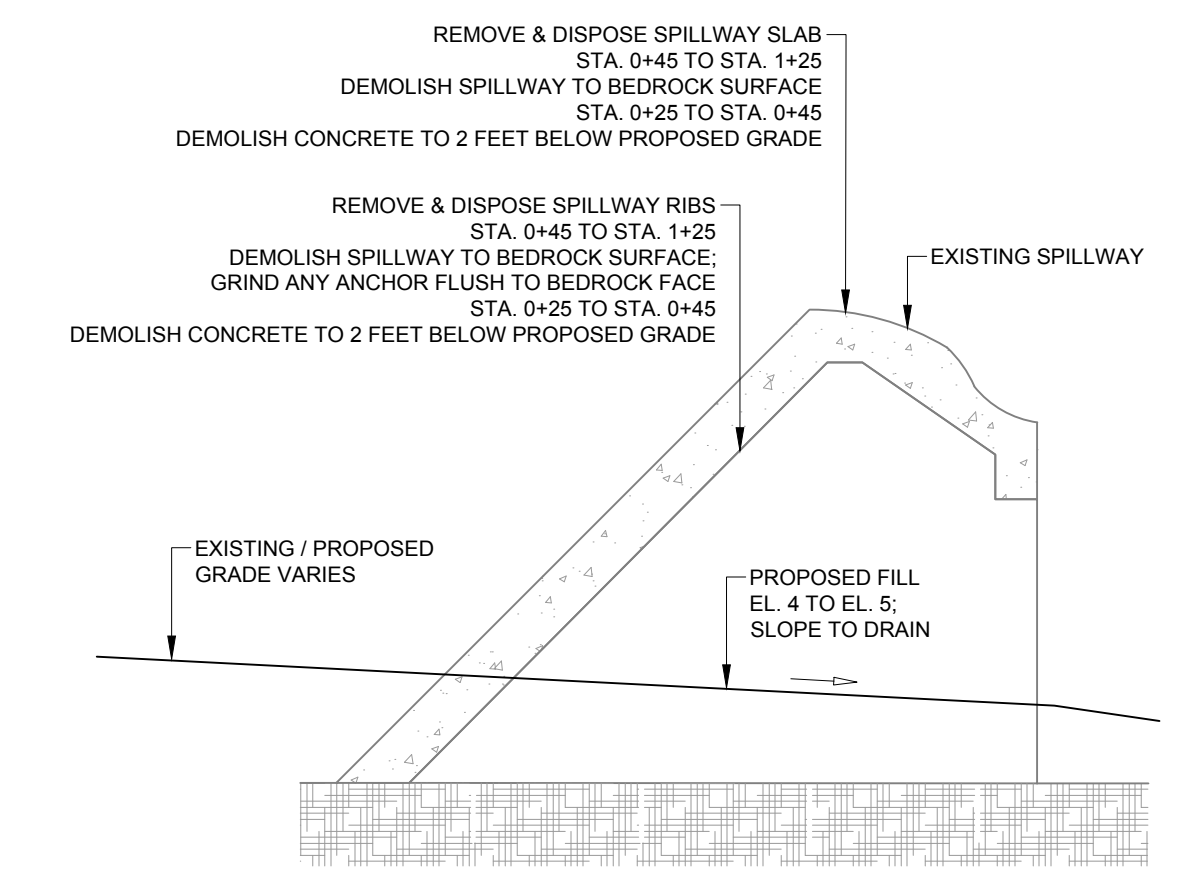


DETAIL 1
SCALE: 1"=2'



Scale: 1"=8'
0 4' 8' 16'

SECTION A
SCALE: 1"=8'



Scale: 1"=2'
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SECTION B
SCALE: 1"=2'

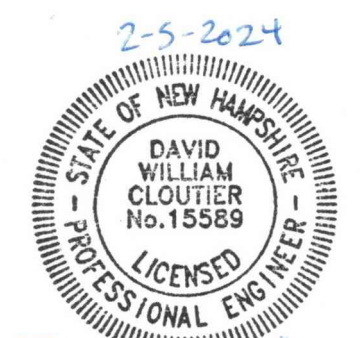
Mill Pond Dam Removal and Oyster River Restoration
Newmarket Road
Durham, NH

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Designed by _____ Checked by _____
Issued for _____ Date _____

JANUARY 5, 2024

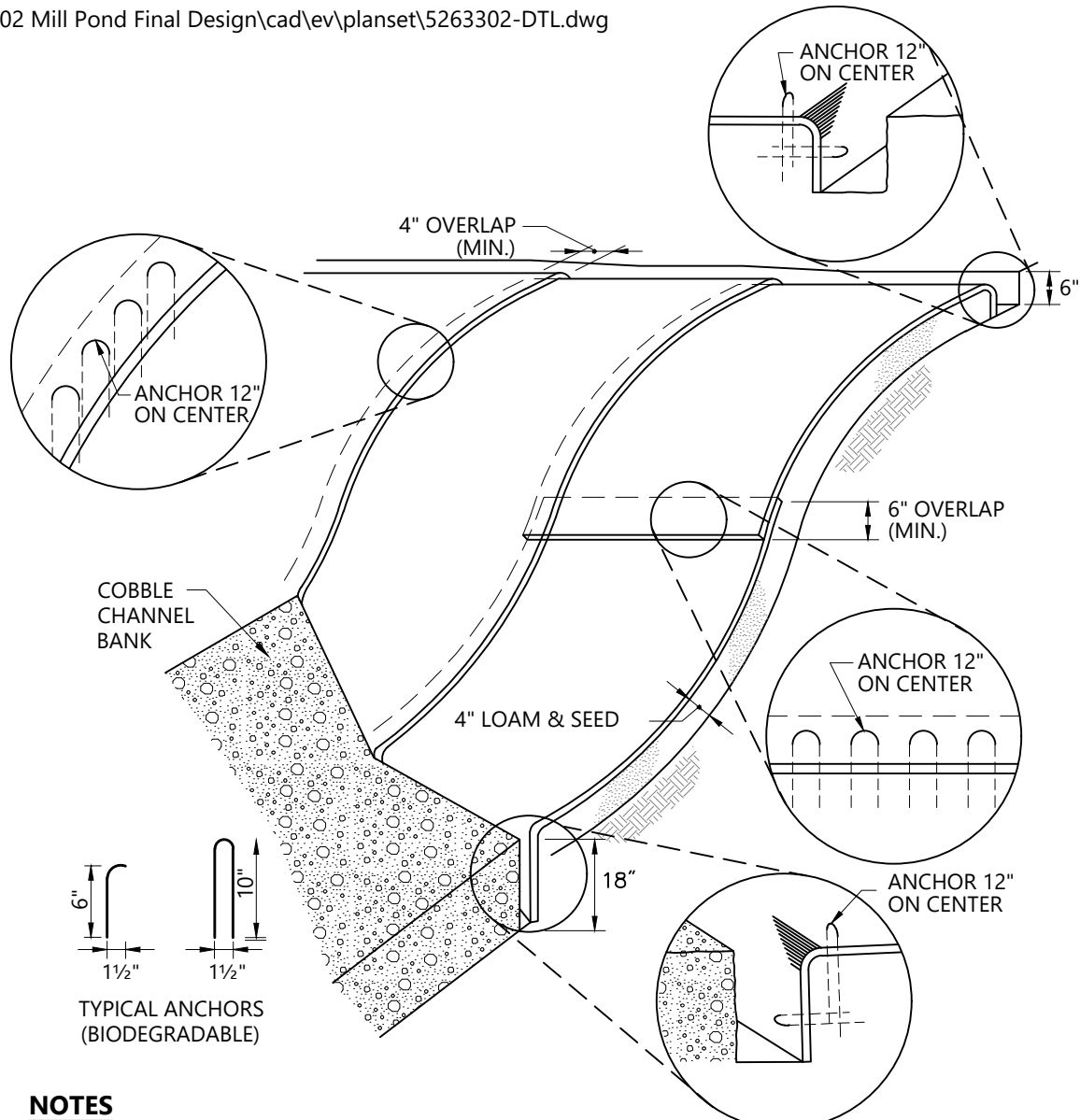
Not Approved for Construction
Detail



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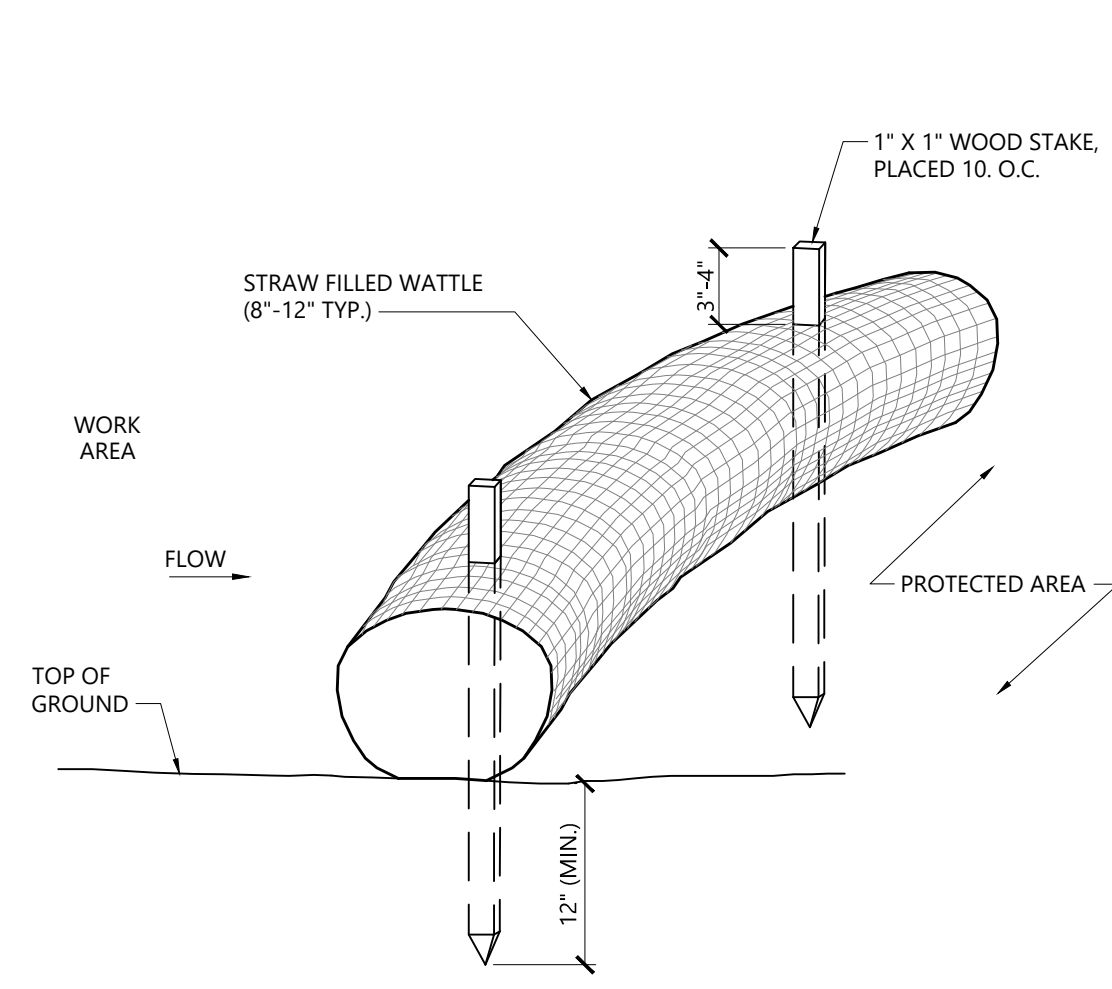
Sheet 9 of 11

Project Number 52633.02



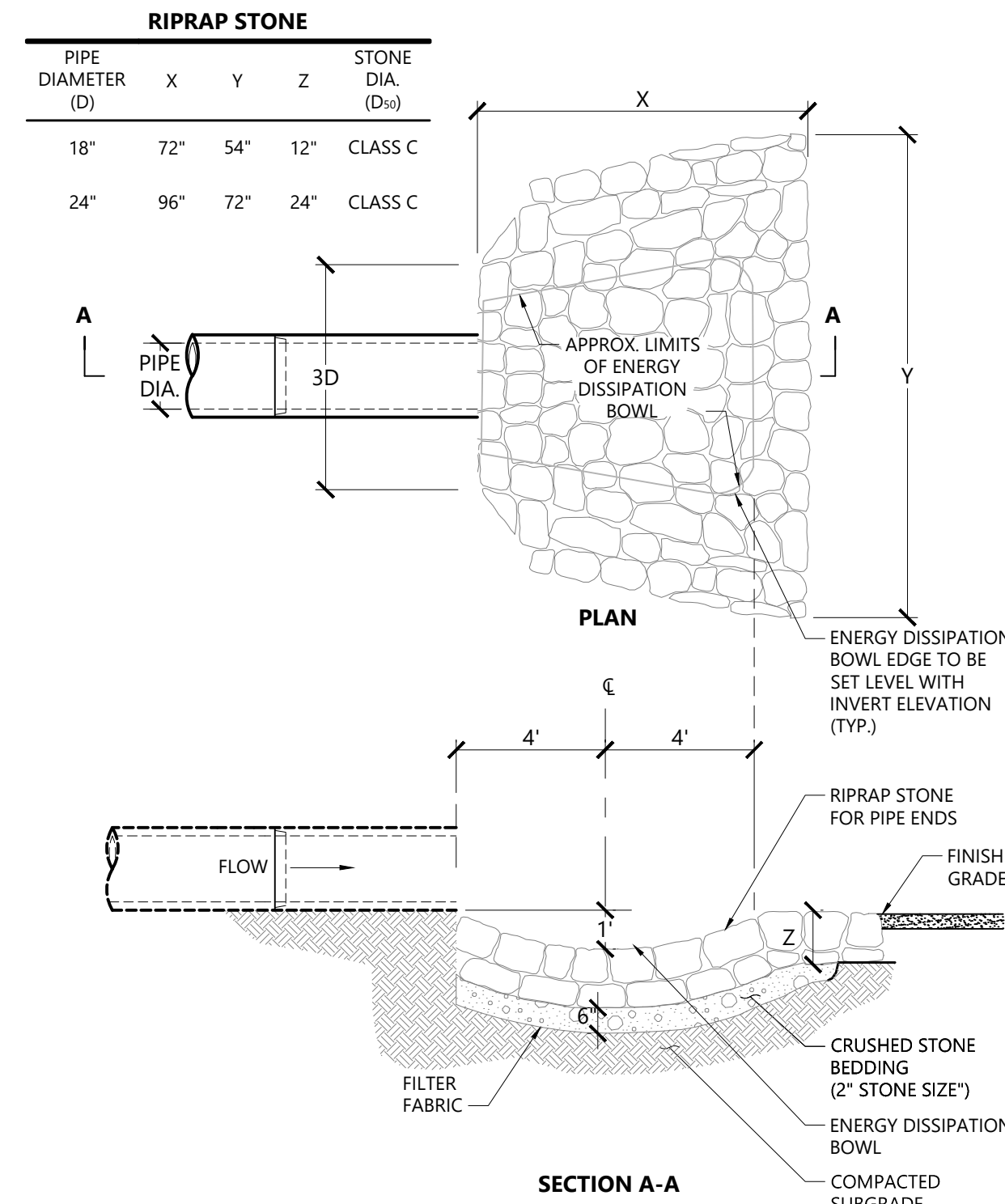
- NOTES**
- BEGIN AT THE TOP OF BLANKET INSTALLATION AREA BY ANCHORING BLANKET IN A 6" DEEP TRENCH BACKFILL AND COMPACT TRENCH AFTER ANCHORING.
 - ROLL THE BLANKET DOWN THE SLOPE IN THE DIRECTION OF THE WATER FLOW. THE EDGES OF BLANKETS MUST BE ANCHORED WITH APPROX. 4 INCH OVERLAP WHERE 2 OR MORE STRIP WIDTHS ARE REQUIRED.
 - ANCHOR BLANKET AT TRANSITION TO COBBLE CHANNEL BANK AT BOTTOM OF SLOPE IN AN 18" DEEP TRENCH. BACKFILL TRENCH WITH COMPACTED COBBLE BED MATERIAL.
 - WHEN BLANKETS MUST BE SPLICED, PLACE UPPER BLANKET END OVER LOWER END WITH 6 INCH (MIN.) OVERLAP AND ANCHOR BOTH TOGETHER.
 - METHOD OF INSTALLATION SHALL BE AS PER MANUFACTURER'S RECOMMENDATIONS (TRITON ENVIRONMENTAL COIR FIBER MATTING CM4400, OR APPROVED EQUAL).
 - EROSION CONTROL BLANKETS SHALL BE USED IN ALL AREAS WHERE LOAM AND SEED ARE TO BE APPLIED. EROSION CONTROL BLANKETS SHALL BE COMPOSED OF WILDLIFE-FRIENDLY MATERIALS WITH NO WELDED PLASTIC THREADS.

Erosion Control Blanket Slope Installation 10/20
N.T.S. Source: VHB LD_680



- NOTES**
- STRAW WATTLE SHALL BE AS MANUFACTURED BY EARTHSAVER OR APPROVED EQUAL.
 - STRAW WATTLES SHALL OVERLAP A MINIMUM OF 12 INCHES.
 - STRAW WATTLE SHALL BE INSPECTED PERIODICALLY AND AFTER ALL STORM EVENTS, AND REPAIR OR REPLACEMENT SHALL BE PERFORMED PROMPTLY AS NEEDED.
 - TEMPORARY STRAW WATTLES TO BE REMOVED BY CONTRACTOR. ALL OTHERS TO REMAIN IN PLACE UNLESS DIRECTED OTHERWISE BY ENGINEER.
 - IF NON BIODEGRADABLE NETTING IS USED THE NETTING SHALL BE COLLECTED AND DISPOSED OF OFFSITE.

Straw Wattle - Erosion Control Barrier 1/20
N.T.S. Source: VHB LD_659



Stone Protection at Stormdrain Outlet 1/16
N.T.S. Source: VHB REV LD_133

*** MINIMUM X-Y-Z DIMENSIONS FOR ALL STRUCTURE STONES TO BE USED FOR RIFFLE CRESTS AND FEATURE BOULDERS SHALL MEET THE MINIMUM SIZE REQUIREMENTS GIVEN IN THE TABLE BELOW.

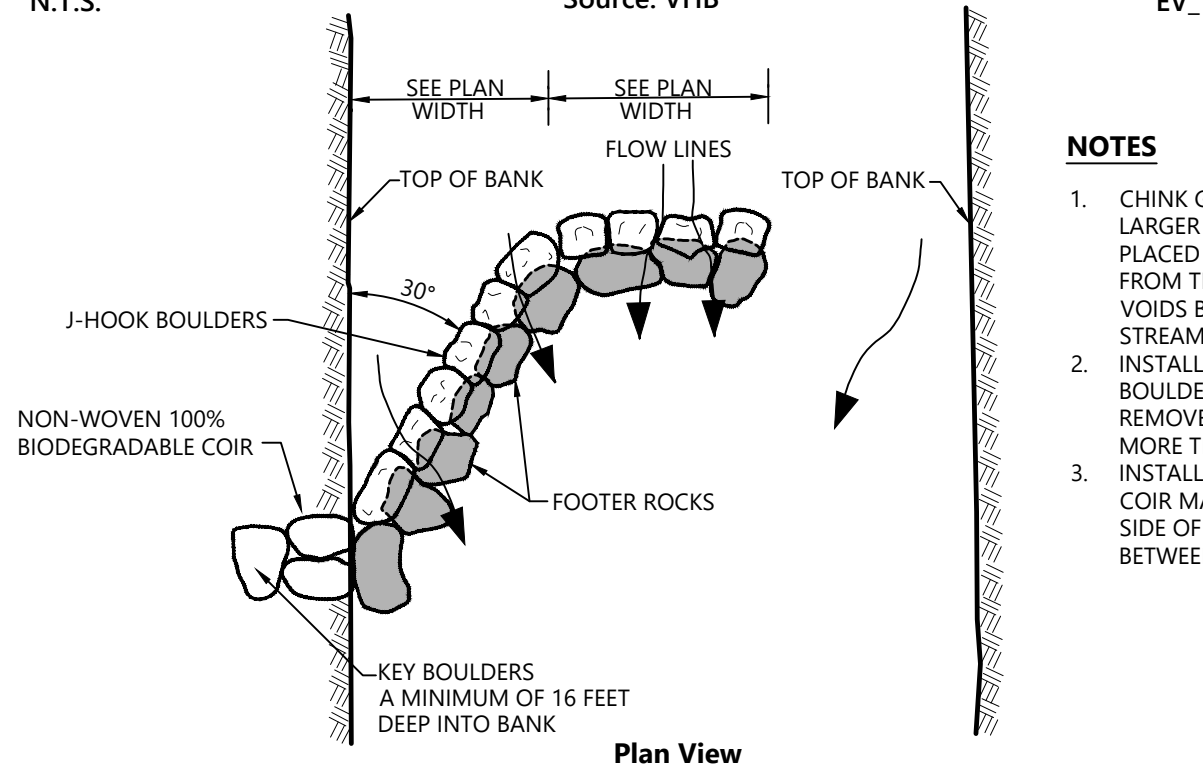
DIMENSION		
X	Y	Z
48"	42"	18"
48"	36"	21"
42"	36"	24"
42"	32"	27"
36"	32"	32"

Boulder Axis Detail 08/23
N.T.S. Source: VHB EV_1100

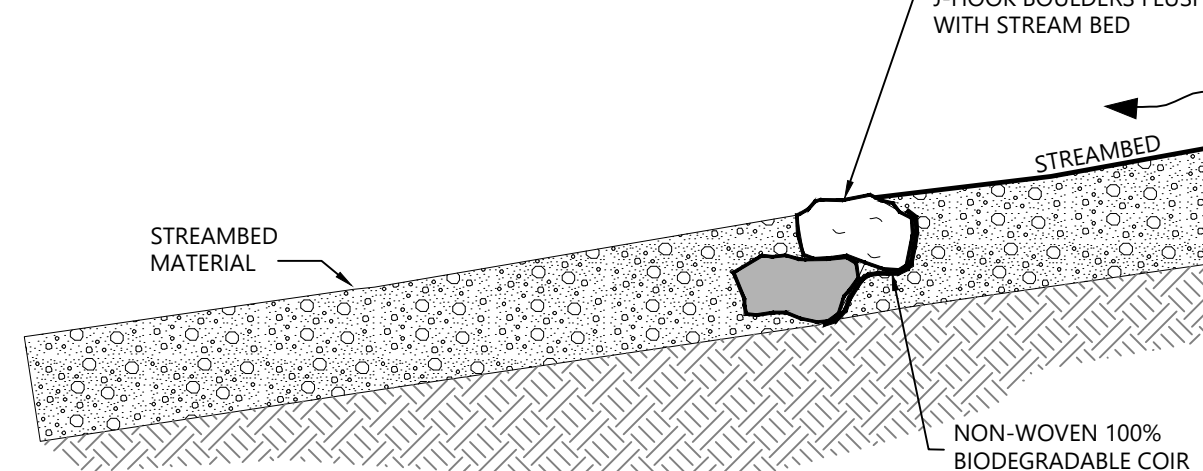
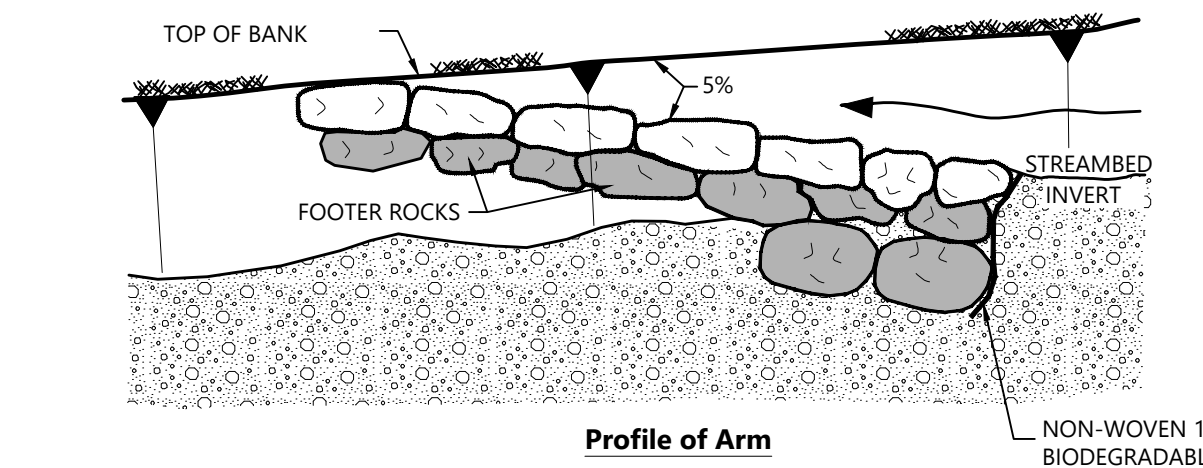
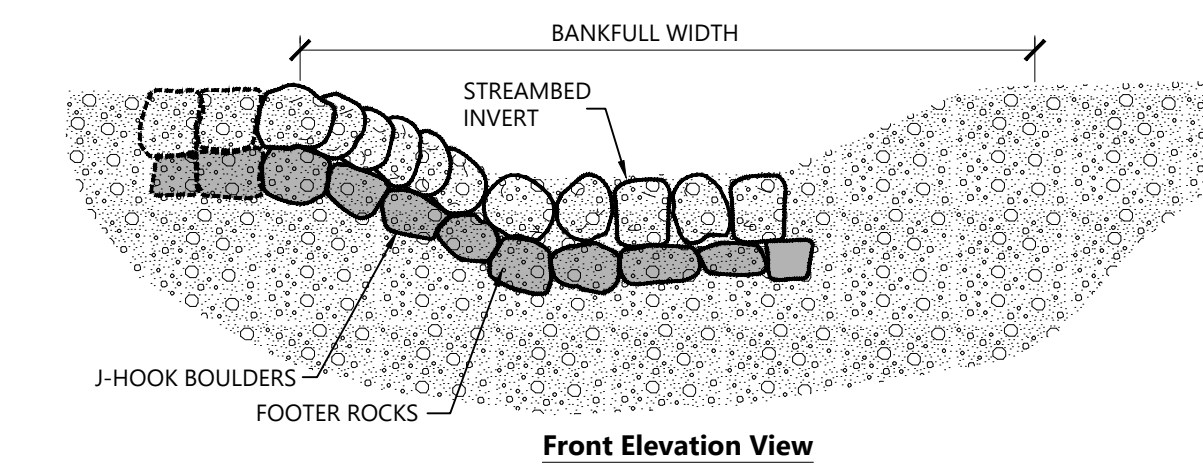
PERCENT PASSING	SIZE (IN)	DESCRIPTION	STATION
D95	5 - 9	RIFFLE POOL	0+00 TO 1+41
D84	3 - 6.5	RIFFLE POOL	1+41 TO 2+86
D50	1.5 - 3.5	RIFFLE POOL	2+86 TO 3+35
D30	0.5 - 1.25	RIFFLE POOL	3+35 TO 4+40
D16	0.1 - 0.5	RIFFLE POOL	4+40 TO 4+62
		POOL	4+62 TO 5+77
		POOL	5+77 TO 6+62
		POOL	6+62 TO 7+34

- NOTES**
- CONTRACTOR SHALL ADD UP TO 10% SAND TO GRAVEL-COBBLE BED MIX TO FILL VOIDS.
 - CONTRACTOR TO PLACE MINIMUM 15 INCH DEPTH OF SPECIFIED BED MATERIAL IN POOL SECTIONS AND MINIMUM 21 INCH DEPTH IN RIFFLE SECTIONS. SEE ABOVE TABLE FOR RIFFLE AND POOL STATION RANGES.

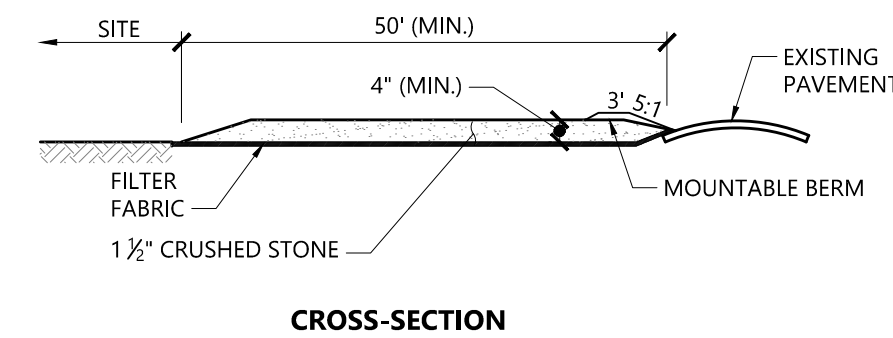
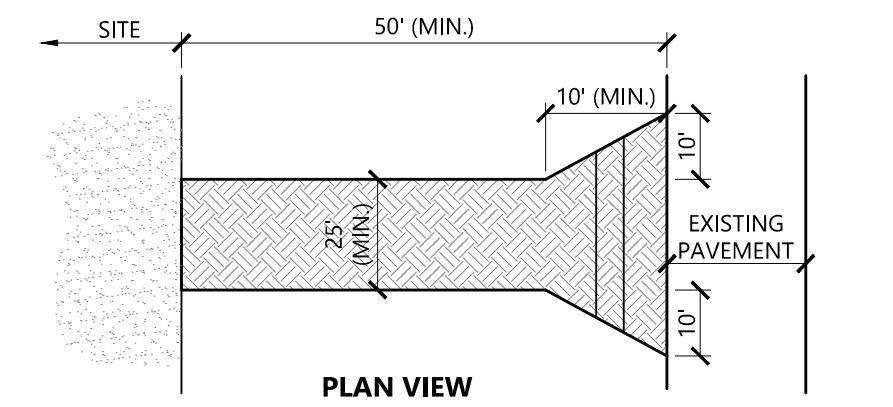
Streambed Material Specification 08/23
N.T.S. Source: VHB EV_1100



- NOTES**
- CHINK GAPS BETWEEN BOULDERS USING LARGER STONES FROM STREAMBED MATERIAL. PLACED BY HAND AND WEDGED INTO PLACE FROM THE UPSTREAM SIDE. BACKFILL ALL VOIDS BY FILLING AND WASHING-IN STREAMBED MATERIAL.
 - INSTALL J-HOOK SO TOPS OF J-HOOK BOULDERS ARE FLUSH WITH FINISH GRADE. REMOVE AND RE-SET BOULDERS THAT EXTEND MORE THAN 3 INCHES ABOVE FINISH GRADE.
 - INSTALL NON-WOVEN 100% BIODEGRADABLE COIR MATTING GEOTEXTILE ALONG UPSTREAM SIDE OF J-HOOK TO PREVENT SOIL PIPING BETWEEN BOULDERS.

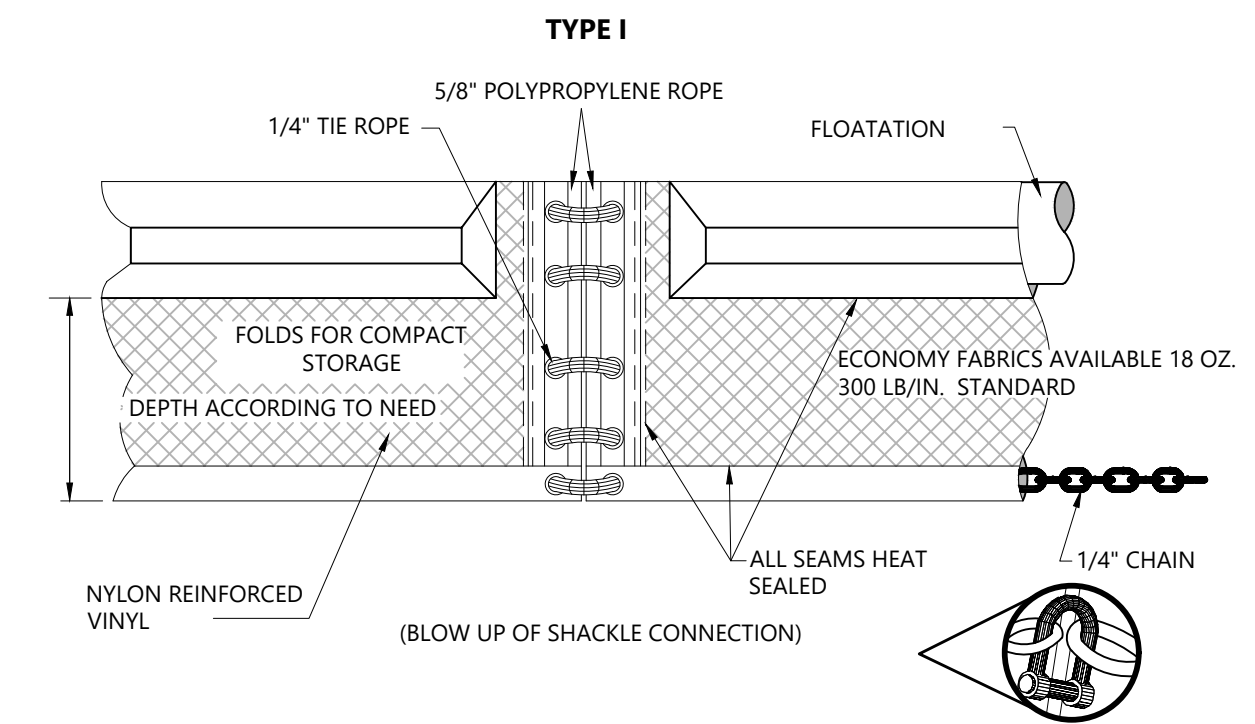


J-Hook 10/23
N.T.S. Source: VHB

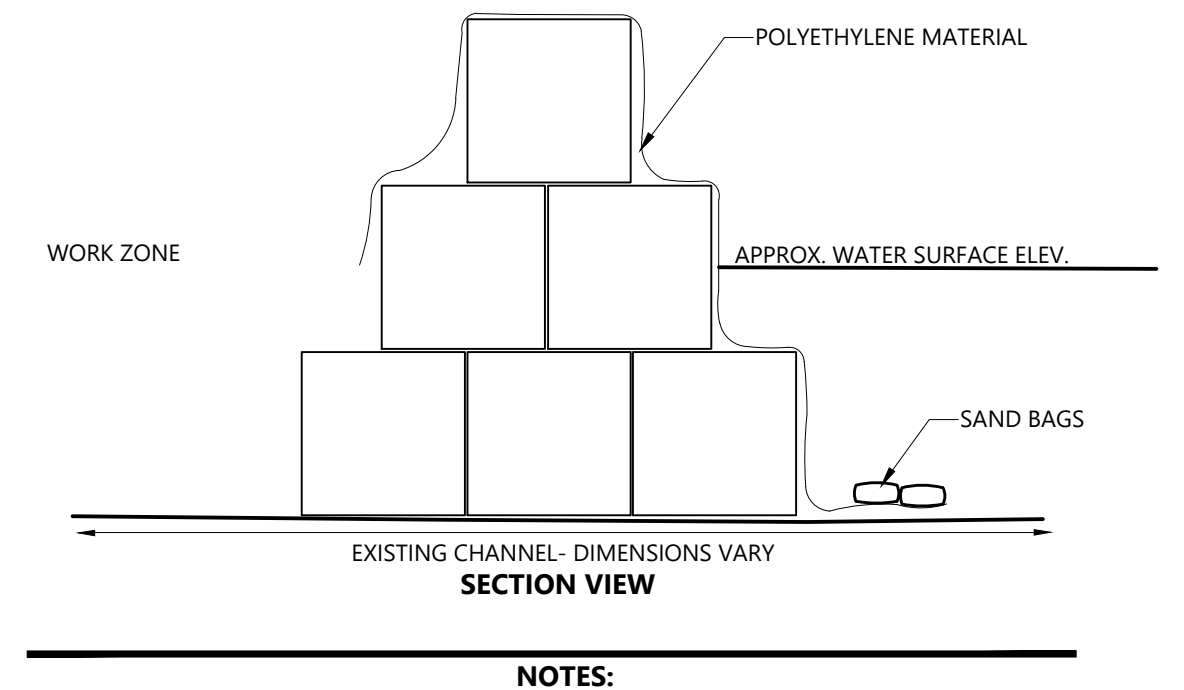


- NOTES**
- EXIT WIDTH SHALL BE A TWENTY-FIVE (25) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS.
 - THE EXIT SHALL BE MAINTAINED IN A CONDITION WHICH SHALL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY. BERM SHALL BE PERMITTED. PERIODIC INSPECTION AND MAINTENANCE SHALL BE PROVIDED AS NEEDED.
 - STABILIZED CONSTRUCTION EXIT SHALL BE REMOVED PRIOR TO FINAL FINISH MATERIALS BEING INSTALLED.

Stabilized Construction Exit 1/16
N.T.S. Source: VHB LD_682

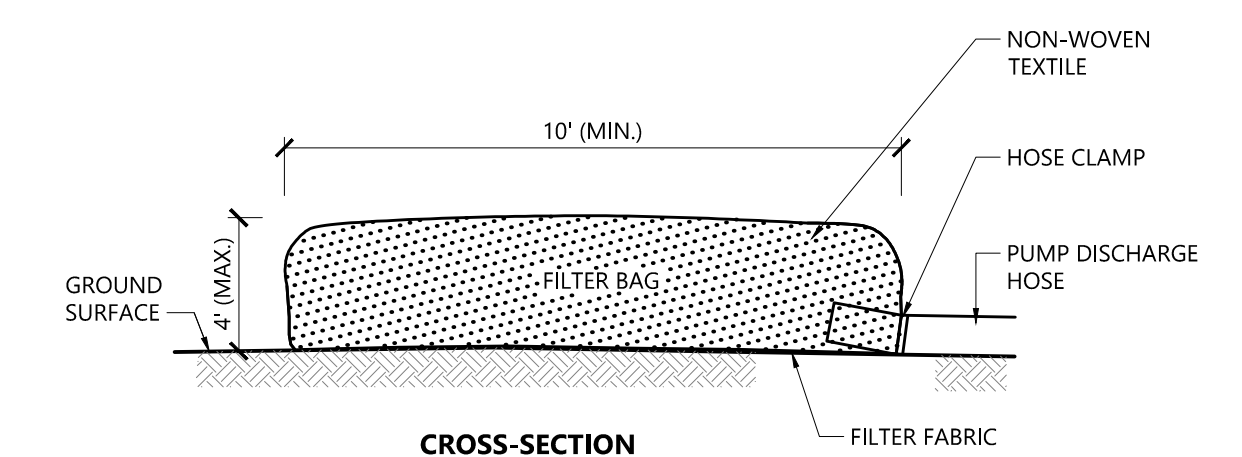
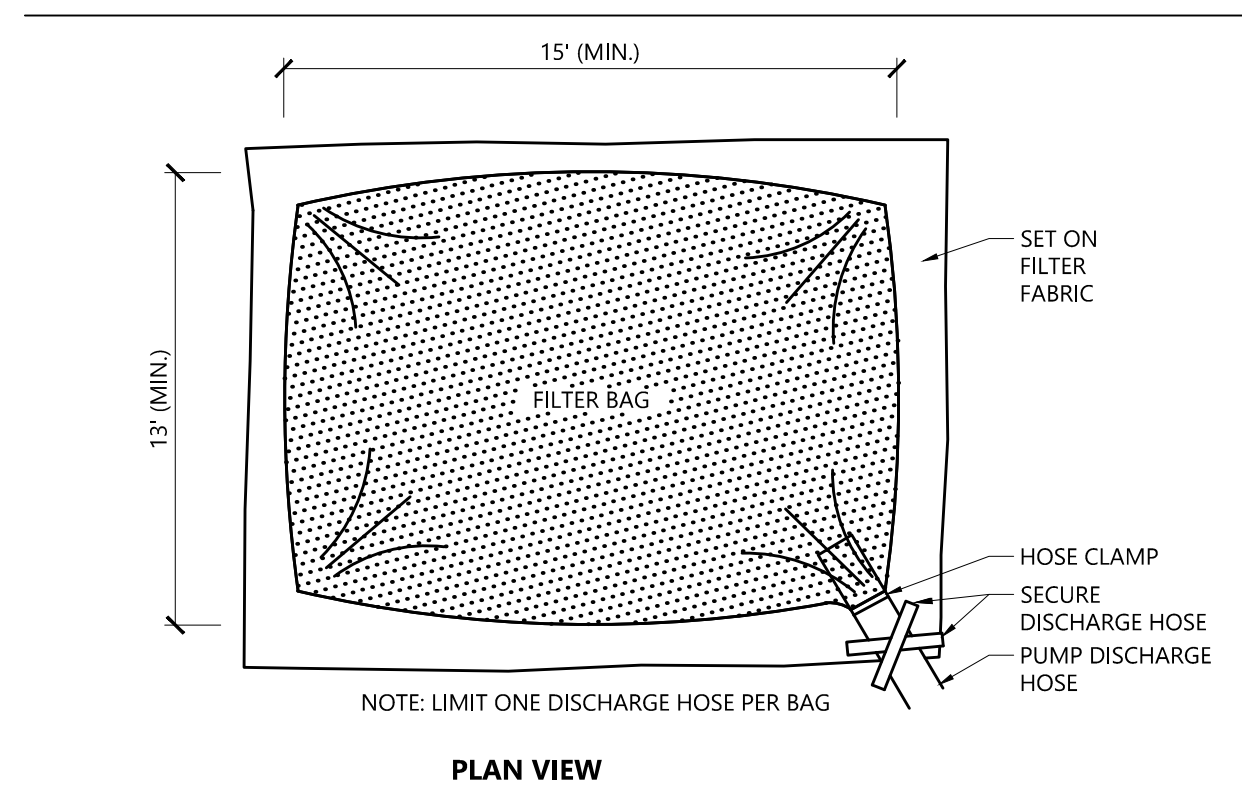


Turbidity Curtain 10/19
N.T.S. Source: VHB EV_1104



- NOTES:**
- CONTRACTOR TO DESIGN AND INSTALL COFFER DAM TO CONTROL OVERTOPPING FLOWS AND PREVENT EROSION OR DAMAGE TO SURROUNDING LAND.

Coffer Dam (Sand Bags) 08/23
N.T.S. Source: VHB EV_1103



- NOTES**
- BAG TO BE USED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.

Dewatering Filter Bag 1/16
N.T.S. Source: VHB LD_691

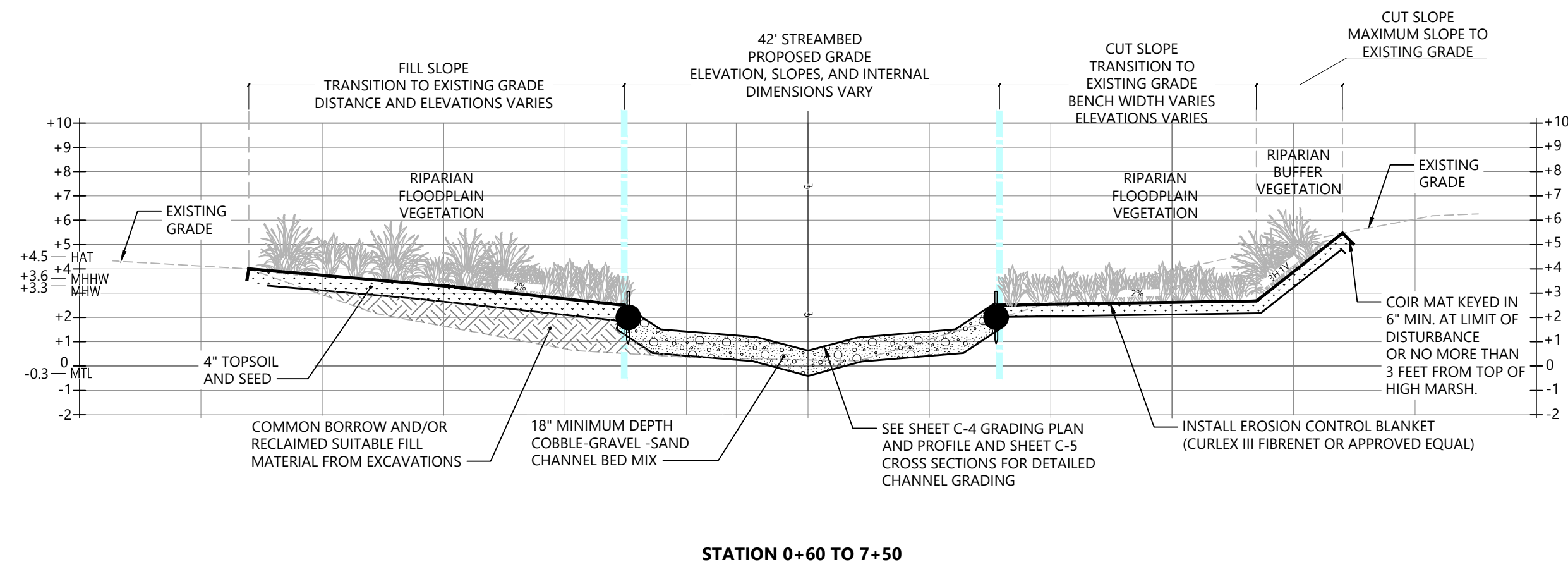
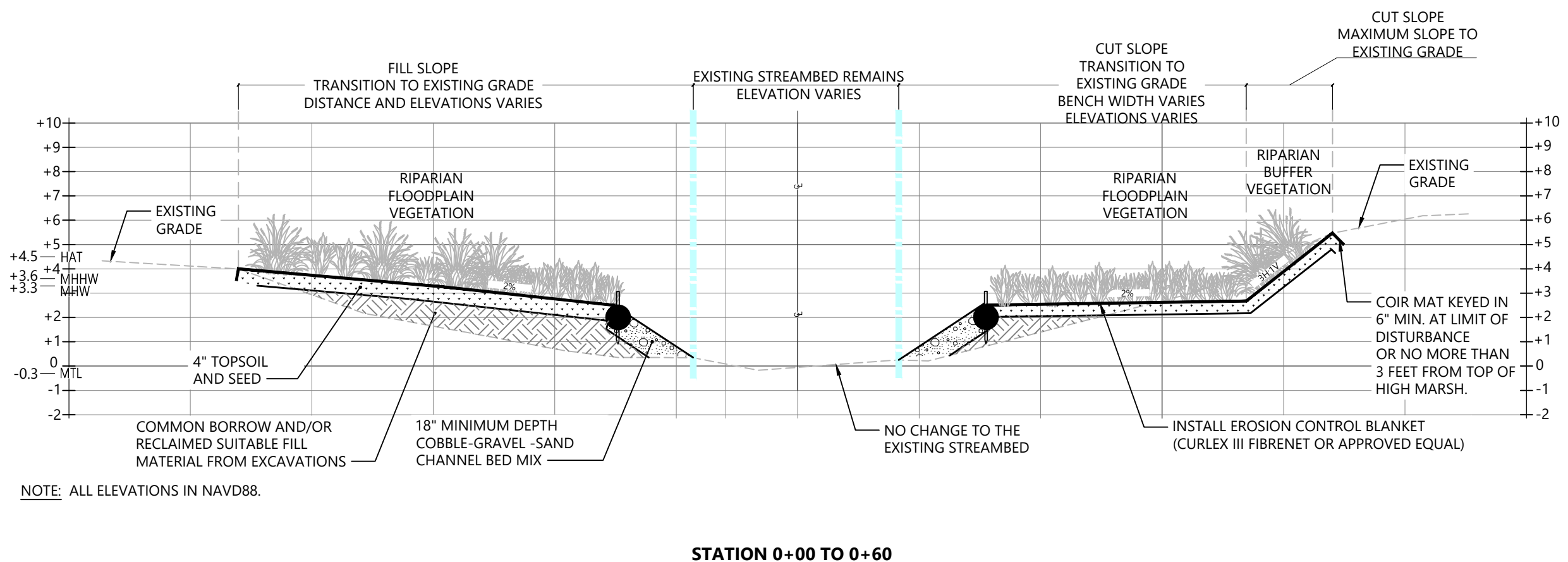
Mill Pond Dam Removal and Oyster River Restoration
Newmarket Road
Durham, NH

No.	Revision	Date	Appr.

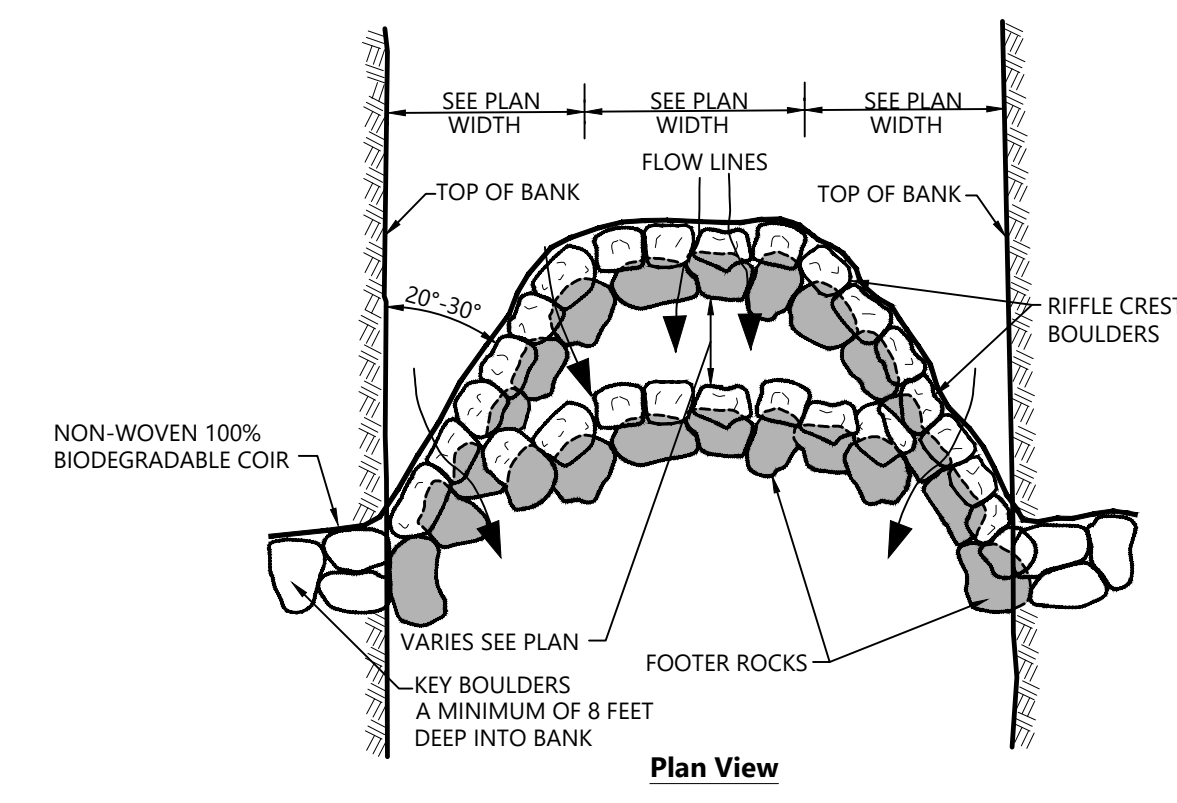
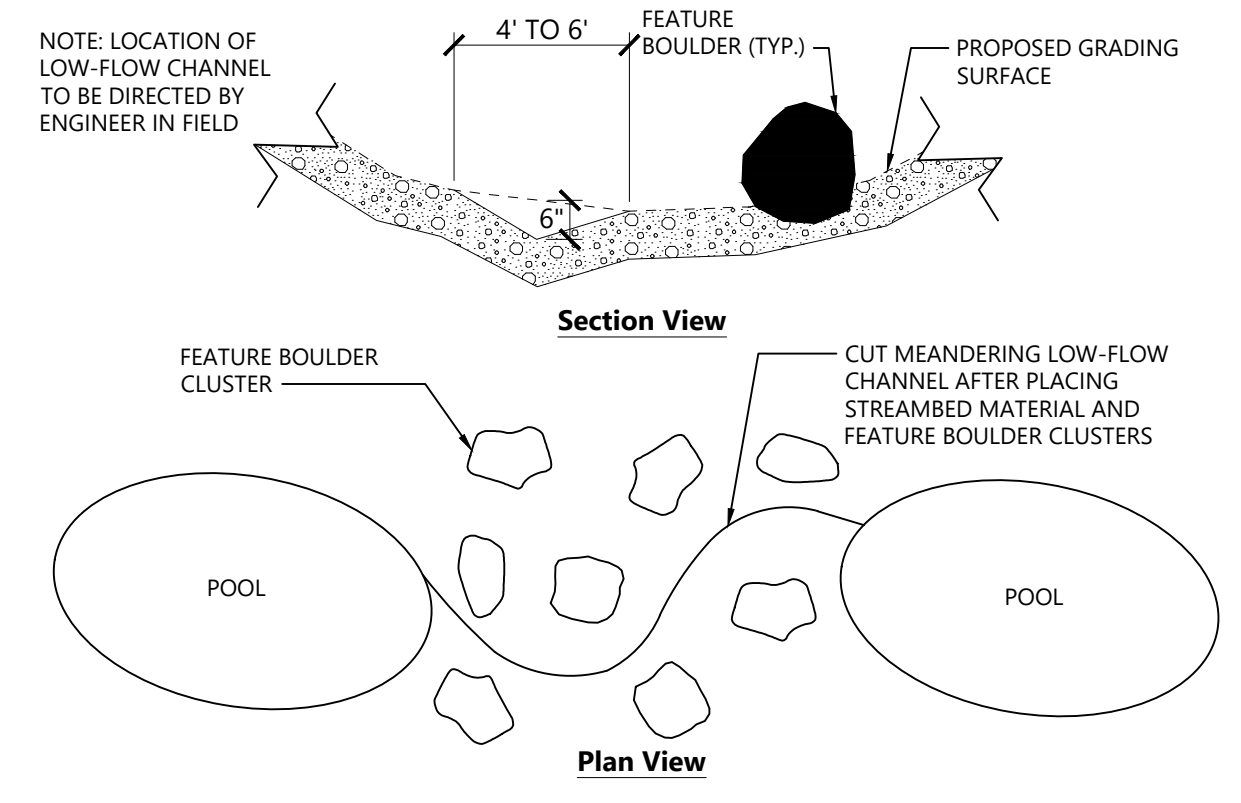
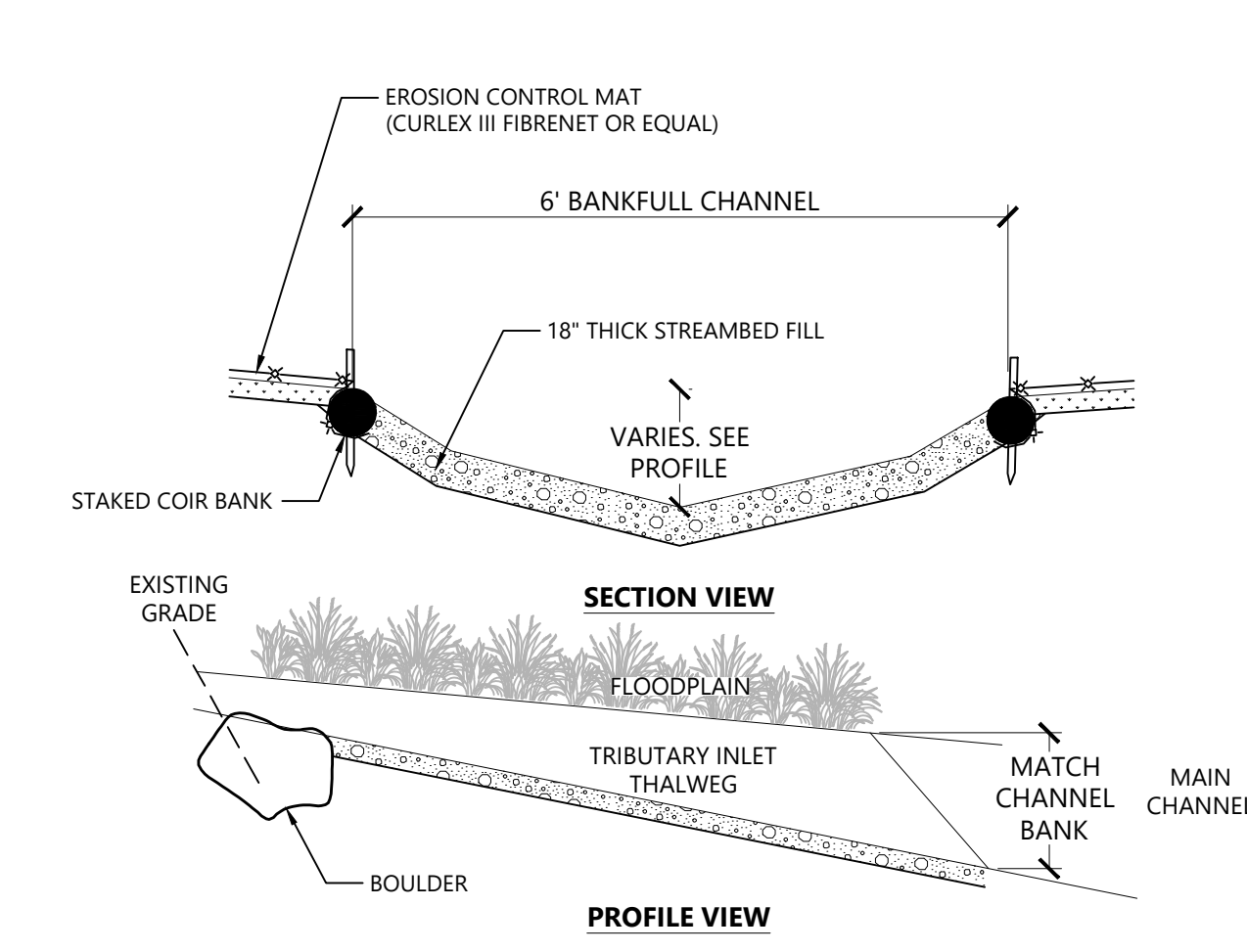
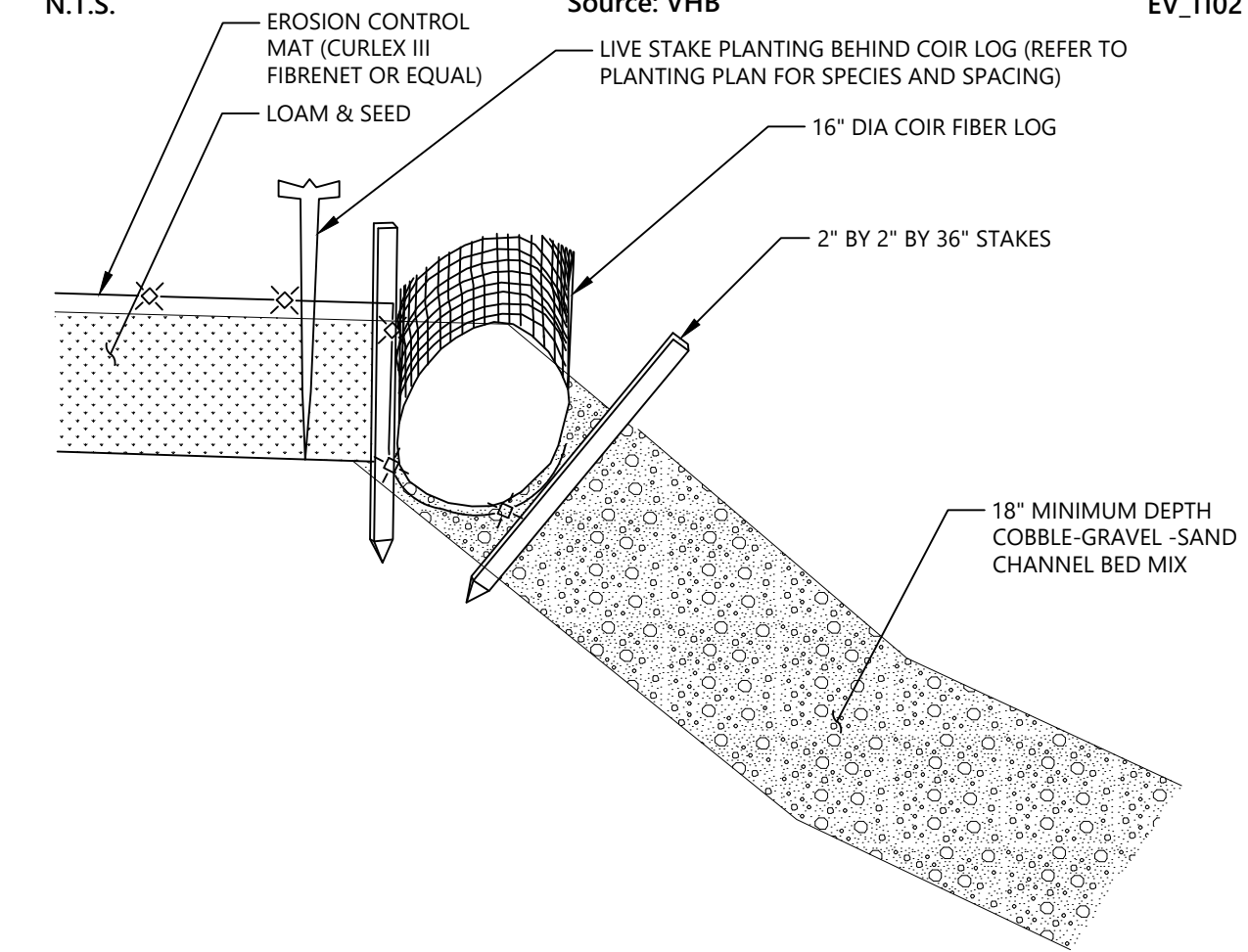
Designed by **BJM** Checked by
Issued for _____ Date
Permitting January 17, 2024

Not Approved for Construction
Drawing Title
Details
Drawing Number

2-5-2024
DAVID WILLIAM CLOUTIER No. 15589
LICENSED PROFESSIONAL ENGINEER
C-9.2
Sheet 10 of 11
Project Number 52633.02

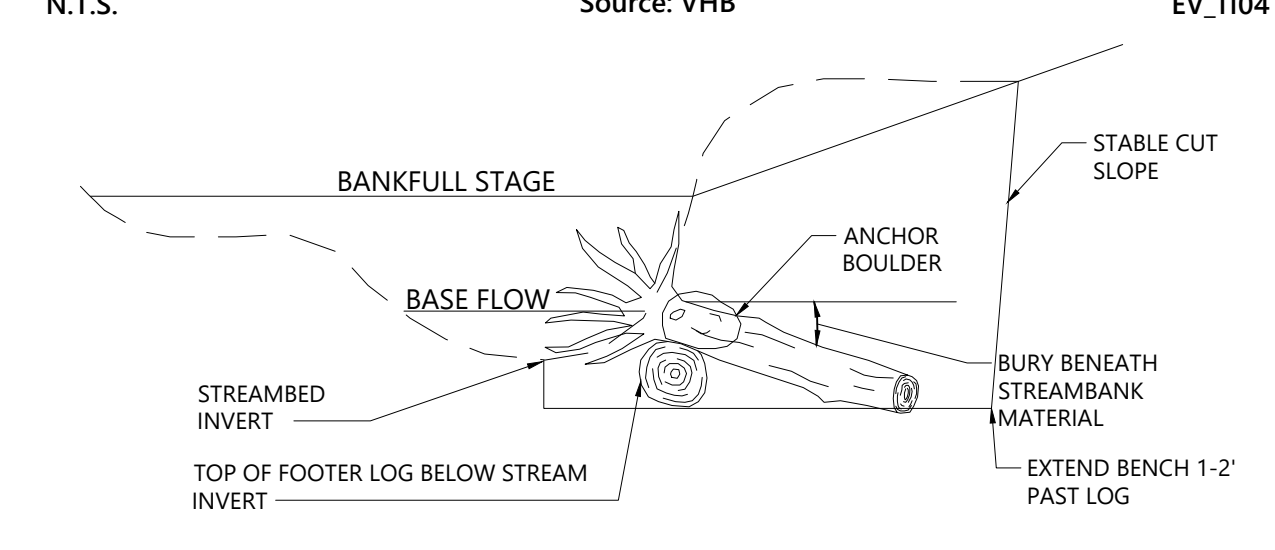


Typical Channel & Floodplain Section 08/23

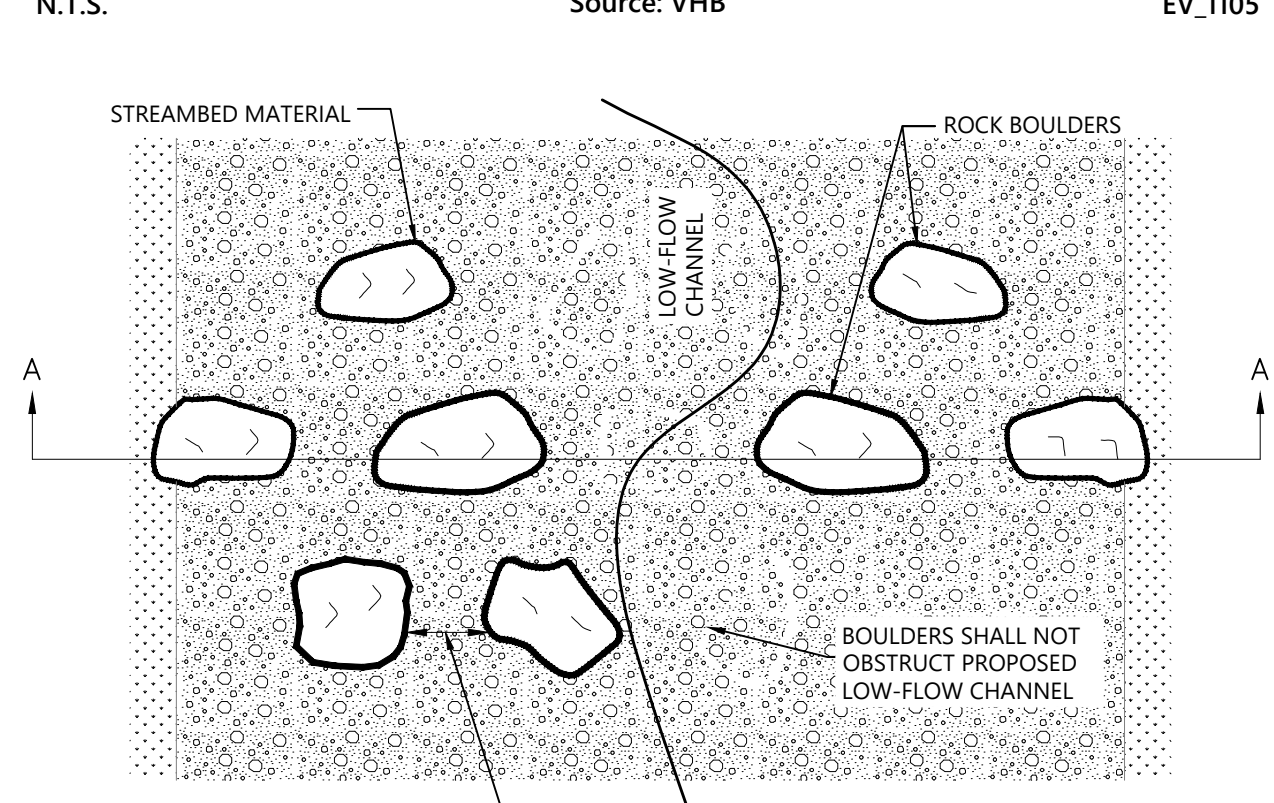


- NOTES**
1. CHINK GAPS BETWEEN BOULDERS USING LARGER STONES FROM STREAMBED MATERIAL PLACED BY HAND AND WEDGED INTO PLACE FROM THE UPSTREAM SIDE. BACKFILL ALL VOIDS BY FILLING AND WASHING-IN STREAMBED MATERIAL.
 2. INSTALL RIFFLE CREST SO TOPS OF RIFFLE CREST BOULDERS ARE FLUSH WITH FINISH GRADE. REMOVE AND RE-SET BOULDERS THAT EXTEND MORE THAN 3 INCHES ABOVE FINISH GRADE.
 3. INSTALL NON-WOVEN 100% BIODEGRADABLE COIR MATTING GEOTEXTILE ALONG UPSTREAM SIDE OF RIFFLE CREST TO PREVENT SOIL PIPING BETWEEN BOULDERS.

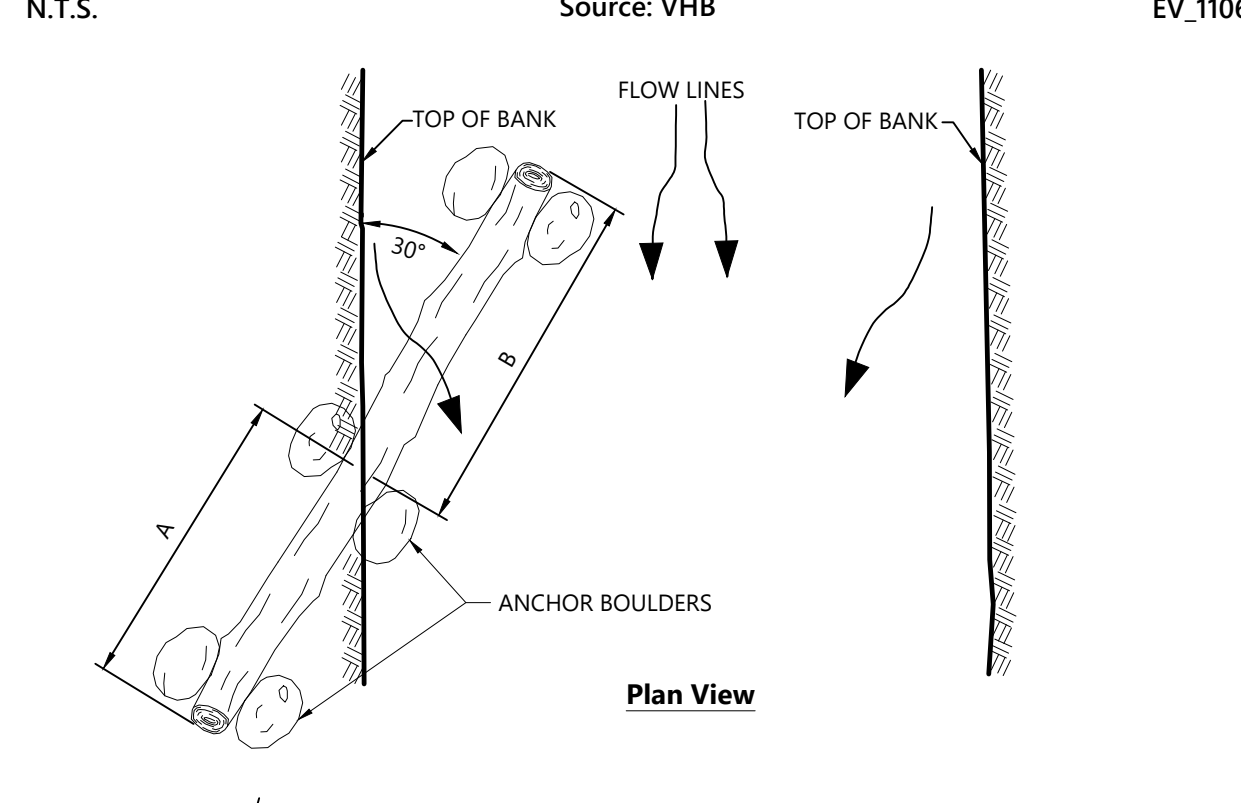
Coir Log Bank 08/23



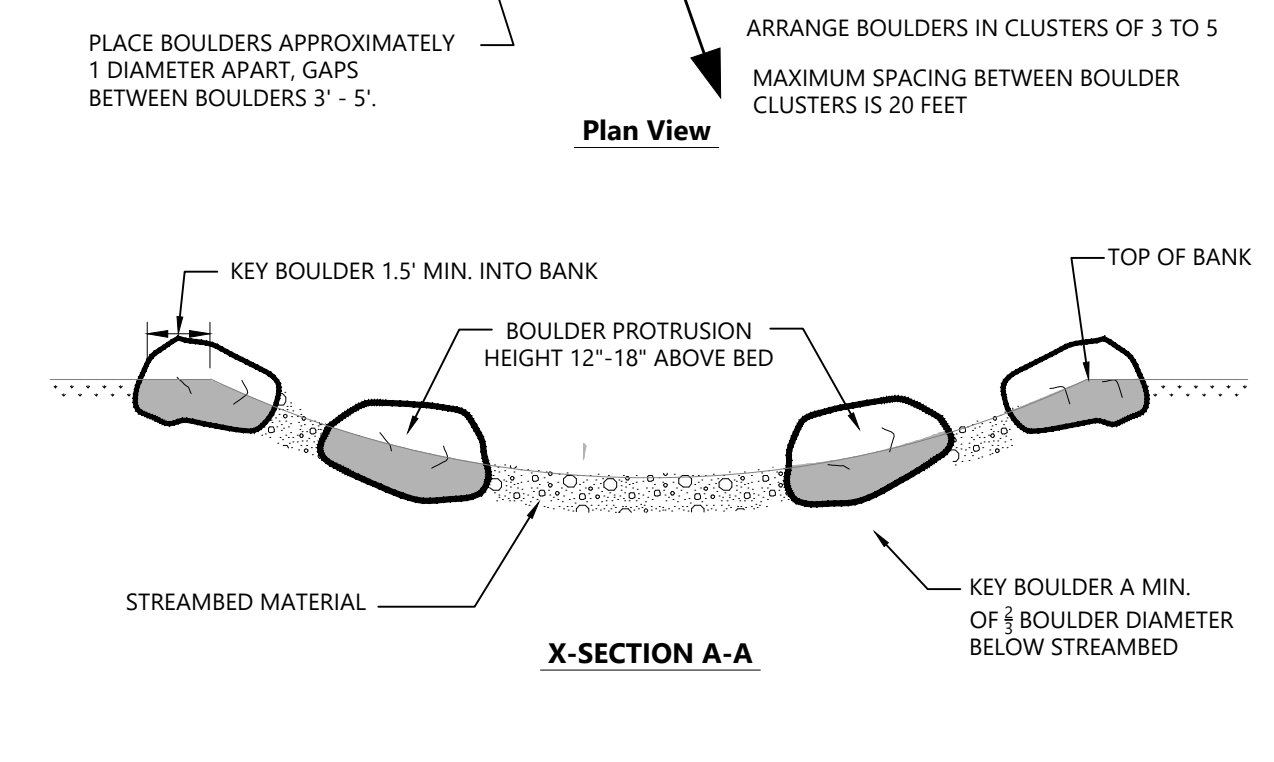
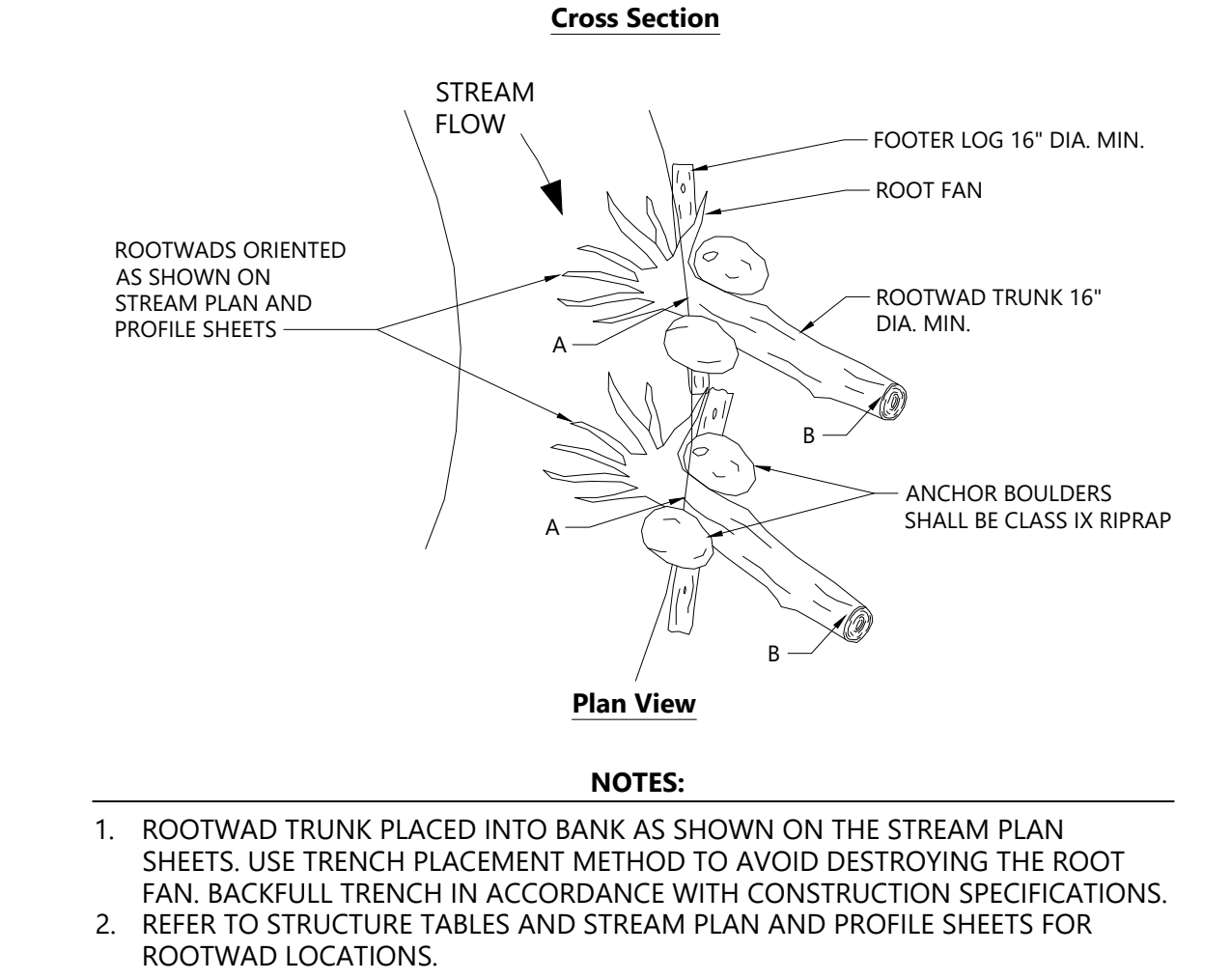
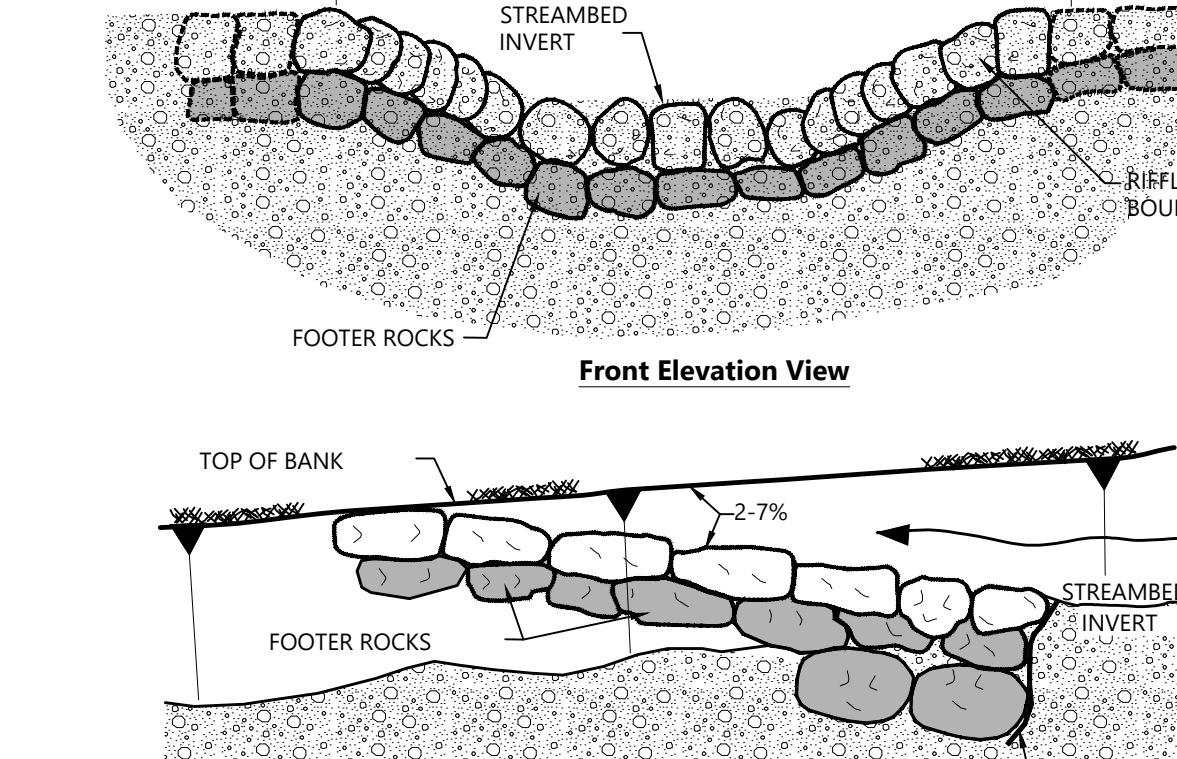
Tributary Inlet 08/23



Low Flow Channel 08/23



Riffle Crest 08/23

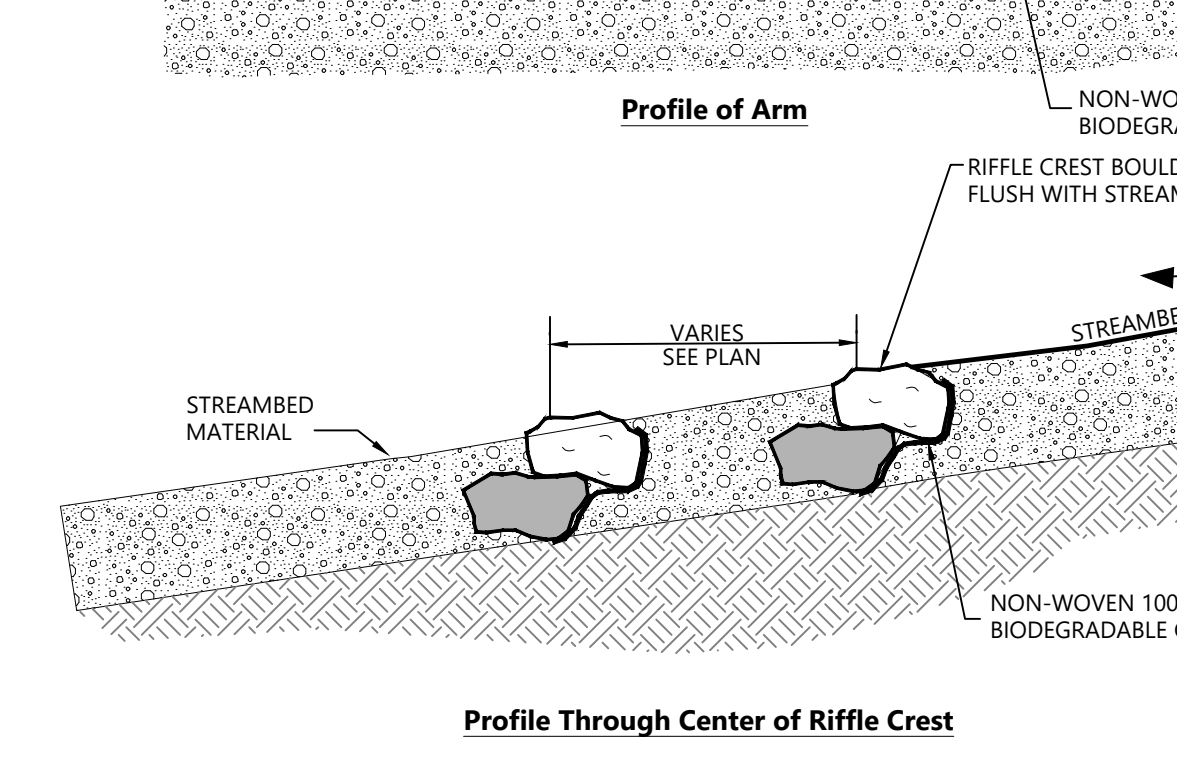


LOG VANE DIMENSIONS

ID	A	B
LOG VANE 1	24 FT	32 FT
LOG VANE 2	16 FT	40 FT

Notes

1. INSTALL ANCHOR BOULDERS TO STABILIZE LOG VANE AT TOP OF BANK, AT END WITHIN CHANNEL, AND AT BURIED END BEHIND BANK.
2. REFER TO STREAM PLAN SHEETS FOR LOG-VANE LOCATIONS.



Rootwad 08/23

Feature Boulder Cluster 08/23

Log-Vane 10/23

Riffle Crest 08/23

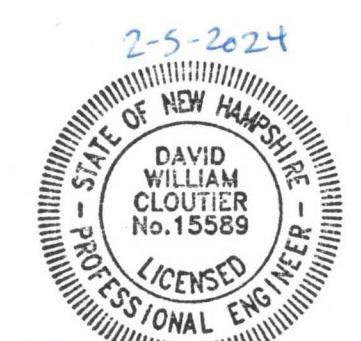
Mill Pond Dam Removal and Oyster River Restoration
Newmarket Road
Durham, NH

No.	Revision	Date	Appr.

Designed by: **BJM** Checked by:
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2-5-2024



C-9.3

Sheet 11 of 11
 Project Number: 52633.02