



**US Army Corps  
of Engineers**®  
New England District  
696 Virginia Road  
Concord, MA 01742-2751

# PUBLIC NOTICE

**Comment Period Begins:** February 14, 2023  
**Comment Period Ends:** March 16, 2023  
**File Number:** NAE-2021-02624  
**In Reply Refer To:** Dan Vasconcelos  
**Phone:** (978) 318-8653  
**E-mail:** daniel.b.vasconcelos@usace.army.mil

The District Engineer has received a permit application to conduct work in waters of the United States from the Massachusetts Department of Transportation (MassDOT) – Highway Division, 10 Park Plaza, Boston, Massachusetts 02116. This work is proposed in an unnamed tributary to Winimusset Brook, and vegetated wetlands, at Ravine Road in New Braintree, Massachusetts. The site coordinates are: Latitude 42.34690°N, Longitude 72.13270°W.

Note: Although this project is eligible for review under the General Permits for Massachusetts (MA GPs), the work is not expected to be complete until after the MA GPs expire on April 5, 2023. The applicant is therefore seeking an individual permit to allow more time to complete the work.

The work involves the permanent discharge of 667 square feet of fill material below the Ordinary High Water (OHW) mark of an unnamed tributary to Winimusset Brook, and 200 square feet within vegetated wetlands, associated with the replacement of two existing culvert crossings conveying the stream below Ravine Road. The existing upstream crossing consists of a 60” diameter plastic pipe with concrete headwall, while the downstream crossing consists of two 5.2’ wide X 3.2’ high pipe arches with fieldstone masonry headwall. Both crossings will be replaced with new 23’ wide open bottom bridge spans. The stream channel below the new bridges will be reconstructed with rip-rap overtopped with natural streambed material. Replacement of the upstream crossing will necessitate the relocation of an existing driveway. An additional 1,421 square feet of temporary impacts below OHW, and 477 square feet of temporary impacts within vegetated wetlands, are proposed resulting from construction access, water control measures, and dewatering.

The applicant’s stated project purpose is to replace the two deteriorating culverts. The work is shown on the enclosed plans entitled “NEW BRAINTREE RAVINE ROAD” on 13 sheets, and dated “1/27/2023”.

The project has been designed to avoid and minimize impacts to waters of the United States, including wetlands, through the use of various best management practices, including the installation of erosion and sedimentation controls at the project limits and conducting culvert work behind dewatered cofferdams to minimize turbidity in waterways. No federal compensatory mitigation is proposed because the impacts are considered minimal.

## AUTHORITY

Permits are required pursuant to:

- Section 10 of the Rivers and Harbors Act of 1899
- Section 404 of the Clean Water Act
- Section 103 of the Marine Protection, Research and Sanctuaries Act.
- Section 14 of the Rivers and Harbors Act of 1899 (33 USC 408)

The decision whether to issue a permit will be based on an evaluation of the probable impact of the proposed activity on the public interest. That decision will reflect the national concern for both protection and utilization of important resources. The benefit which may reasonably accrue from the proposal must be balanced against its reasonably foreseeable detriments. All factors which may be relevant to the proposal will be considered, including the cumulative effects thereof; among those are: conservation, economics, aesthetics, general environmental concerns, wetlands, cultural value, fish and wildlife values, flood hazards, flood plain value, land use, navigation, shoreline erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food production and, in general, the needs and welfare of the people.

The U.S. Army Corps of Engineers, New England District (USACE), is soliciting comments from the public; Federal, state, and local agencies and officials; Indian Tribes; and other interested parties in order to consider and evaluate the impacts of this proposed activity. The USACE will consider all comments received to determine whether to issue, modify, condition or deny a permit for this proposal. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and the other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment and/or an Environmental Impact Statement pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity.

Where the activity involves the discharge of dredged or fill material into waters of the United States or the transportation of dredged material for the purpose of disposing it in ocean waters, the evaluation of the impact of the activity in the public interest will also include application of the guidelines promulgated by the Administrator, U.S Environmental Protection Agency, under authority of Section 404(b) of the Clean Water Act, and/or Section 103 of the Marine Protection Research and Sanctuaries Act of 1972, as amended.

#### **NATIONAL HISTORIC PRESERVATION ACT**

The Federal Highway Administration (FHWA) is the lead federal agency responsible for coordination pursuant to Section 106 of the National Historic Preservation Act. MassDOT has initiated coordination with the State Historic Preservation Officer (SHPO), Massachusetts Board of Underwater Archaeological Resources (BUAR), and relevant Tribal Historic Preservation Officers (THPOs) on behalf of the FHWA. Although FHWA has taken the lead on this consultation, based on his initial review, the District Engineer has determined that little likelihood exists for the proposed work to impinge upon properties with cultural or Native American significance, or listed in, or eligible for listing in, the National Register of Historic Places. The Corps will continue review and consultation as required to fulfil the requirements of the National Historic Preservation Act as part of the permit review process.

#### **ENDANGERED SPECIES CONSULTATION**

FHWA is the lead federal agency responsible for coordination pursuant to Section 7 of the Endangered Species Act. Although FHWA is the lead federal agency, the Corps has reviewed the application for the potential impact on Federally-listed threatened or endangered species and their designated critical habitat pursuant to section 7 of the Endangered Species Act as amended. It is our preliminary determination that the proposed activity for which authorization is being sought is designed, situated or will be operated/used in such a manner that it is not likely to adversely affect a listed species or their critical habitat. FHWA is coordinating with the

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**FILE NO. NAE-2021-02624**

U.S. Fish and Wildlife Service on listed species under their jurisdiction and the ESA consultation will be concluded prior to the final decision.

**OTHER GOVERNMENT AUTHORIZATIONS**

The following authorizations have been applied for, or have been, or will be obtained:

- (X) Permit, license or assent from State.
- (X) Permit from local wetland agency or conservation commission.
- (X) Water Quality Certification in accordance with Section 401 of the Clean Water Act.

**COMMENTS**

In order to properly evaluate the proposal, we are seeking public comment. Anyone wishing to comment is encouraged to do so. Comments should be submitted in writing by the above date. If you have any questions, please contact Dan Vasconcelos at (978) 318-8653, (800) 343-4789 or (800) 362-4367, if calling from within Massachusetts.

Any person may request, in writing, within the comment period specified in this notice, that a public hearing be held to consider the application. Requests for a public hearing shall specifically state the reasons for holding a public hearing. The USACE holds public hearings for the purpose of obtaining public comments when that is the best means for understanding a wide variety of concerns from a diverse segment of the public.

The initial determinations made herein will be reviewed in light of facts submitted in response to this notice. All comments will be considered a matter of public record. Copies of letters of objection will be forwarded to the applicant who will normally be requested to contact objectors directly in an effort to reach an understanding.

**THIS NOTICE IS NOT AN AUTHORIZATION TO DO ANY WORK.**

*Paul Maniccia*

**Paul M. Maniccia**  
**Chief, Permits and Enforcement Branch**  
**Regulatory Division**

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If you would prefer not to continue receiving Public Notices by email, please contact Ms. Tina Chaisson at (978) 318-8058 or e-mail her at [bettina.m.chaisson@usace.army.mil](mailto:bettina.m.chaisson@usace.army.mil).

EXISTING CONDITIONS-SR4.DWG Printed on 31-Jan-2023 3:34 PM

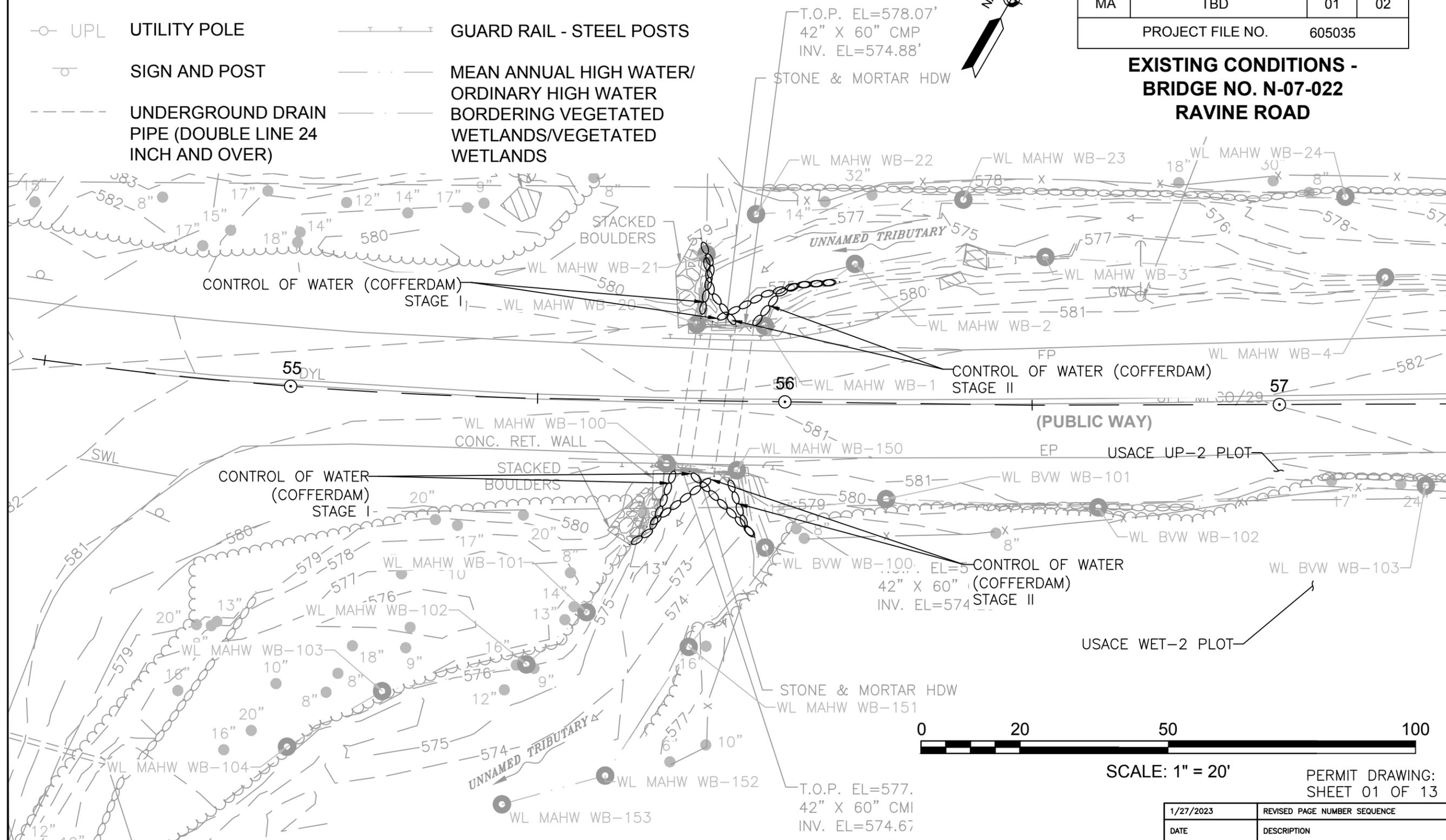
# LEGEND

- WETLAND FLAG
- SIZE TREE
- UPL UTILITY POLE
- SIGN AND POST
- UNDERGROUND DRAIN PIPE (DOUBLE LINE 24 INCH AND OVER)
- ~~~~ TREE LINE
- BALANCED STONE WALL
- x— CHAIN LINK OR METAL FENCE
- |— GUARD RAIL - STEEL POSTS
- |— MEAN ANNUAL HIGH WATER/ ORDINARY HIGH WATER BORDERING VEGETATED WETLANDS/VEGETATED WETLANDS

## NEW BRAINTREE RAVINE ROAD

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	TBD	01	02
PROJECT FILE NO.		605035	

## EXISTING CONDITIONS - BRIDGE NO. N-07-022 RAVINE ROAD



SCALE: 1" = 20'

PERMIT DRAWING:  
SHEET 01 OF 13

1/27/2023	REVISED PAGE NUMBER SEQUENCE
DATE	DESCRIPTION



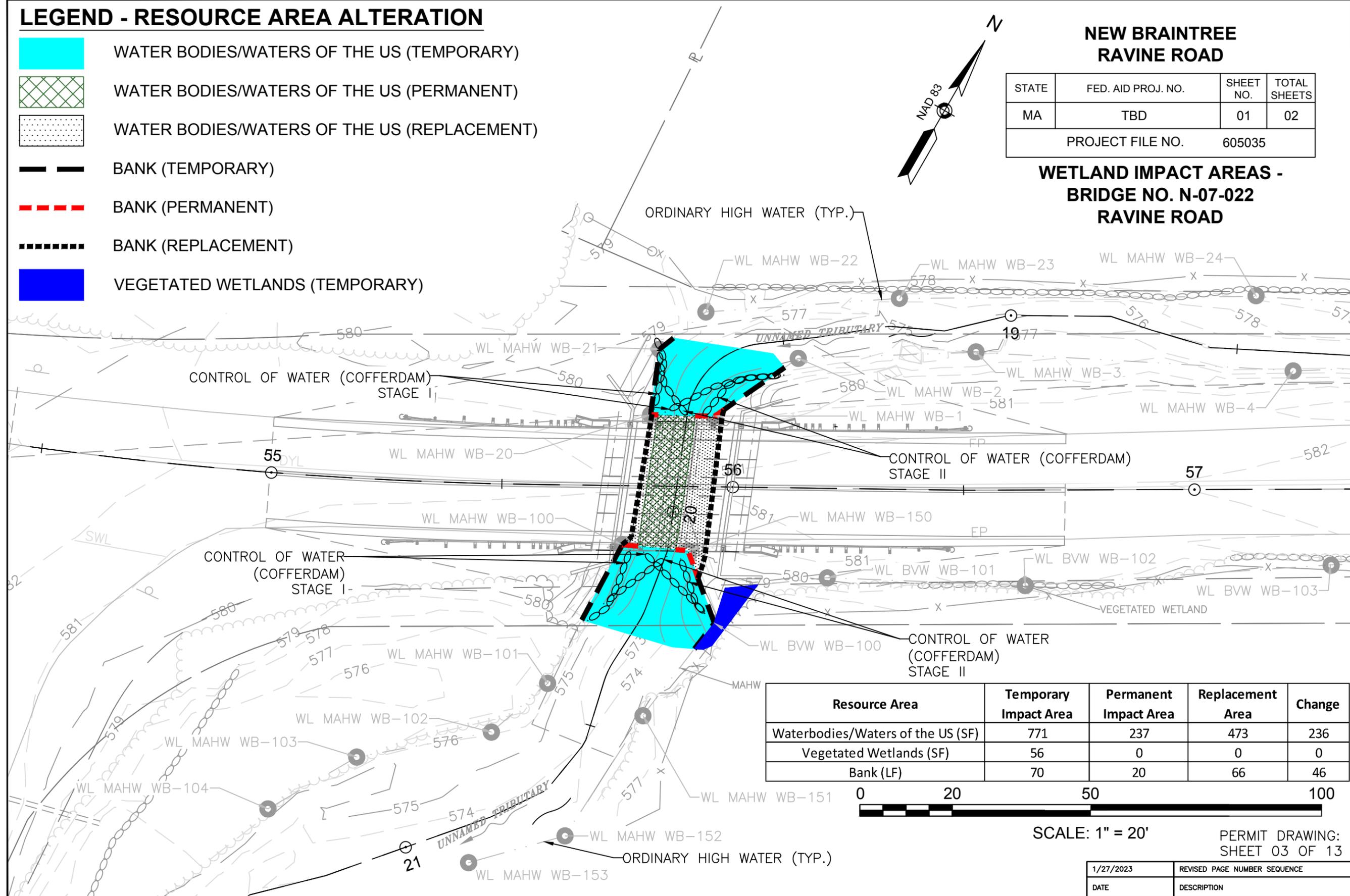
# LEGEND - RESOURCE AREA ALTERATION

- WATER BODIES/WATERS OF THE US (TEMPORARY)
- WATER BODIES/WATERS OF THE US (PERMANENT)
- WATER BODIES/WATERS OF THE US (REPLACEMENT)
- BANK (TEMPORARY)
- BANK (PERMANENT)
- BANK (REPLACEMENT)
- VEGETATED WETLANDS (TEMPORARY)

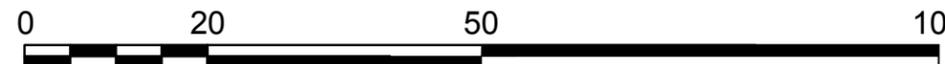
## NEW BRAINTREE RAVINE ROAD

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	TBD	01	02
PROJECT FILE NO.		605035	

## WETLAND IMPACT AREAS - BRIDGE NO. N-07-022 RAVINE ROAD



Resource Area	Temporary Impact Area	Permanent Impact Area	Replacement Area	Change
Waterbodies/Waters of the US (SF)	771	237	473	236
Vegetated Wetlands (SF)	56	0	0	0
Bank (LF)	70	20	66	46



SCALE: 1" = 20'

PERMIT DRAWING:  
SHEET 03 OF 13

1/27/2023	REVISED PAGE NUMBER SEQUENCE
DATE	DESCRIPTION

# LEGEND - RESOURCE AREA ALTERATION

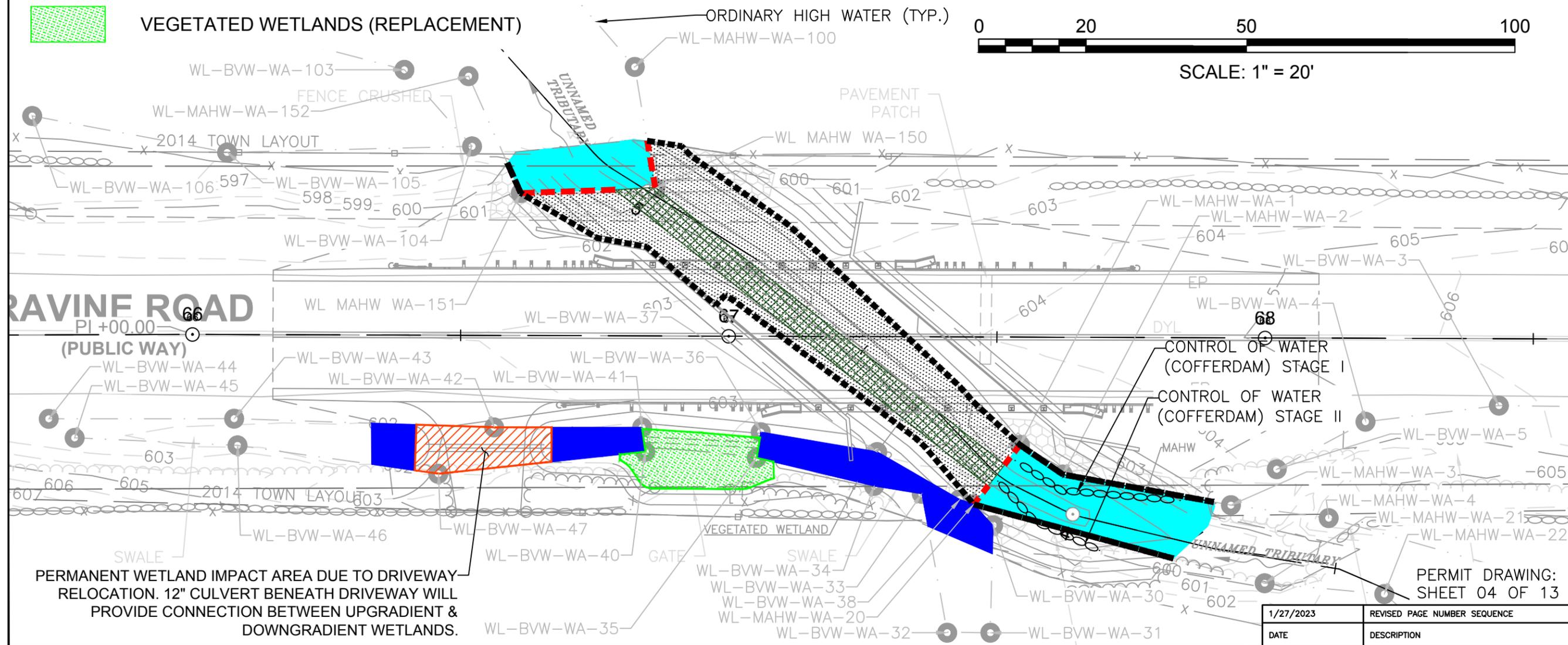
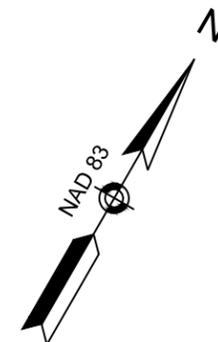
- WATER BODIES/WATERS OF THE US (TEMPORARY)
- WATER BODIES/WATERS OF THE US (PERMANENT)
- WATER BODIES/WATERS OF THE US (REPLACEMENT)
- BANK (TEMPORARY)
- BANK (PERMANENT)
- BANK (REPLACEMENT)
- VEGETATED WETLANDS (TEMPORARY)
- VEGETATED WETLANDS (PERMANENT)
- VEGETATED WETLANDS (REPLACEMENT)

## NEW BRAINTREE RAVINE ROAD

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	TBD	02	02
PROJECT FILE NO.		605035	

## WETLAND IMPACT AREAS - BRIDGE NO. N-07-021 RAVINE ROAD

Resource Area	Temporary Impact Area	Permanent Impact Area	Replacement Area	Change
Water Bodies/Waters of the US (SF)	650	430	1480	1050
Vegetated Wetlands (SF)	421	200	245	45
Bank (LF)	84	35	280	245



PERMANENT WETLAND IMPACT AREA DUE TO DRIVEWAY RELOCATION. 12" CULVERT BENEATH DRIVEWAY WILL PROVIDE CONNECTION BETWEEN UPGRADIENT & DOWNGRADIENT WETLANDS.

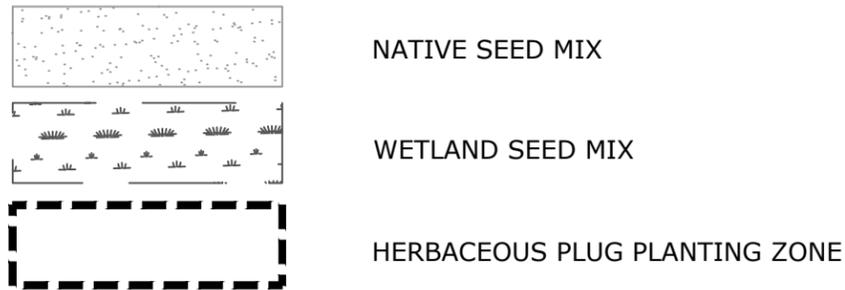
PERMIT DRAWING:  
SHEET 04 OF 13

1/27/2023	REVISED PAGE NUMBER SEQUENCE
DATE	DESCRIPTION

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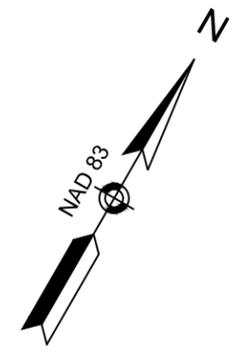
Wetland Replication Plantings				
Common Name	Scientific Name	Size	Quantity	Notes
Sensitive fern	<i>Onoclea sensibilis</i>	Plugs	20	Install 2' O.C.
Soft rush	<i>Juncus effusus</i>	Plugs	20	Install 2' O.C.
Wool grass	<i>Scirpus cyperinus</i>	Plugs	20	Install 2' O.C.

**LEGEND**



**Wetland Seed Mix**  
**New England Erosion Control/Restoration Mix for Detention Basins and Moist Sites**

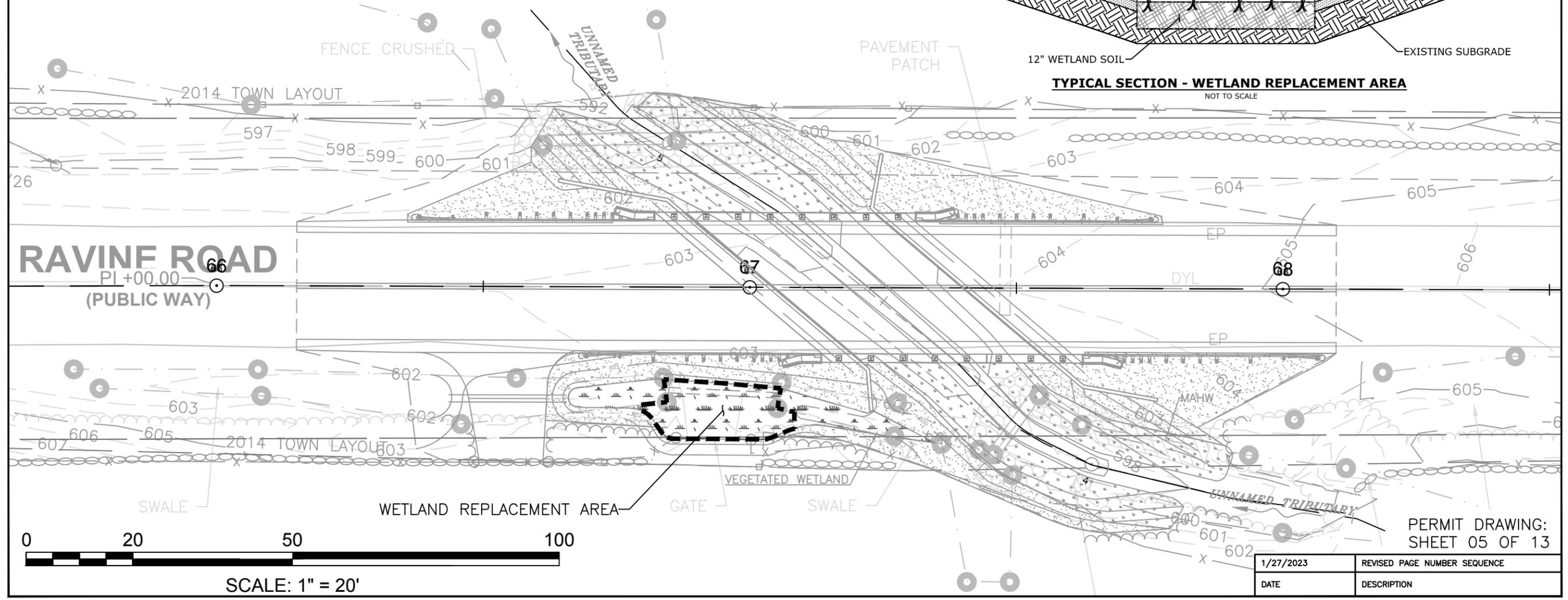
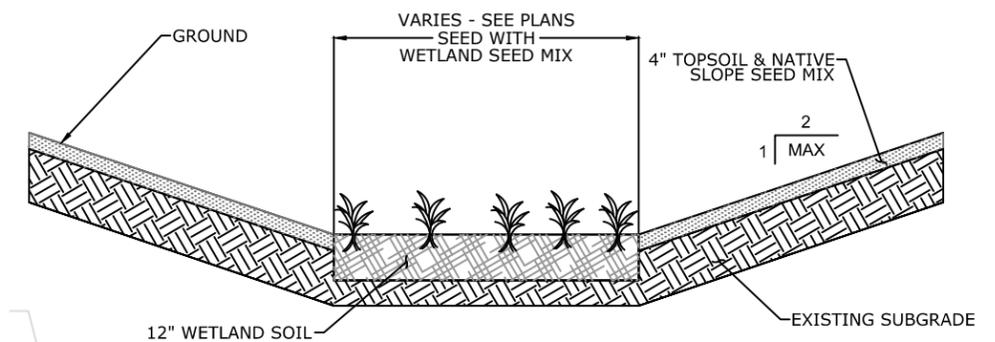
Riverbank Wild Rye (*Elymus riparius*), Creeping Red Fescue (*Festuca rubra*), Little Bluestem (*Schizachyrium scoparium*), Big Bluestem (*Andropogon gerardii*), Switch Grass (*Panicum virgatum*), Upland Bentgrass (*Agrostis perennans*), Nodding Bur Marigold (*Bidens cernua*), Hollow-Stem Joe Pye Weed (*Eupatorium fistulosum/Eutrochium fistulosum*), New England Aster (*Aster novae-angliae*), Boneset (*Eupatorium perfoliatum*), Blue Vervain (*Verbena hastata*), Soft Rush (*Juncus effusus*), Wool Grass (*Scirpus cyperinus*)  
 Application rate: 35 lbs/acre, 1250 sq ft/lb



**NEW BRAINTREE RAVINE ROAD**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	TBD	01	01
PROJECT FILE NO.		605035	

**WETLAND RESTORATION - BRIDGE NO. N-07-021 RAVINE ROAD**



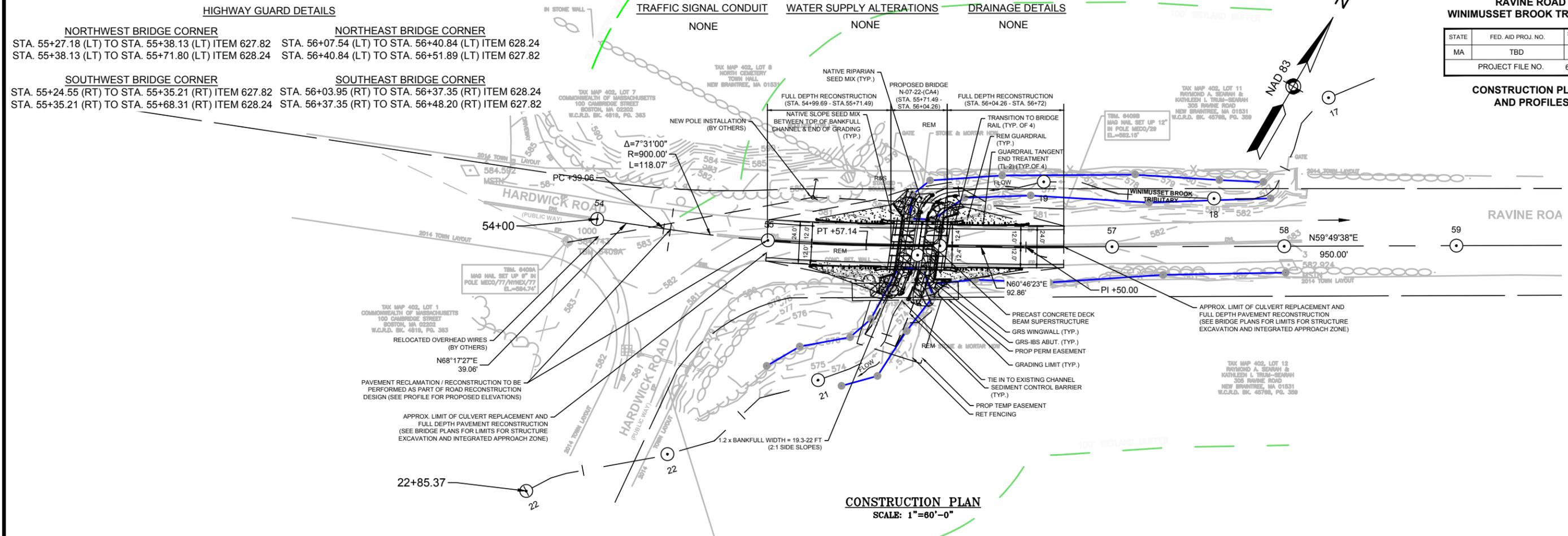
PERMIT DRAWING:  
SHEET 05 OF 13

DATE	DESCRIPTION
1/27/2023	REVISED PAGE NUMBER SEQUENCE

**NEW BRAINTREE  
RAVINE ROAD  
WINIMUSSET BROOK TRIBUTARY**

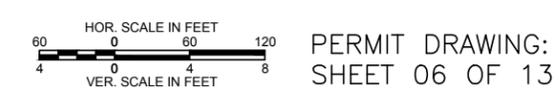
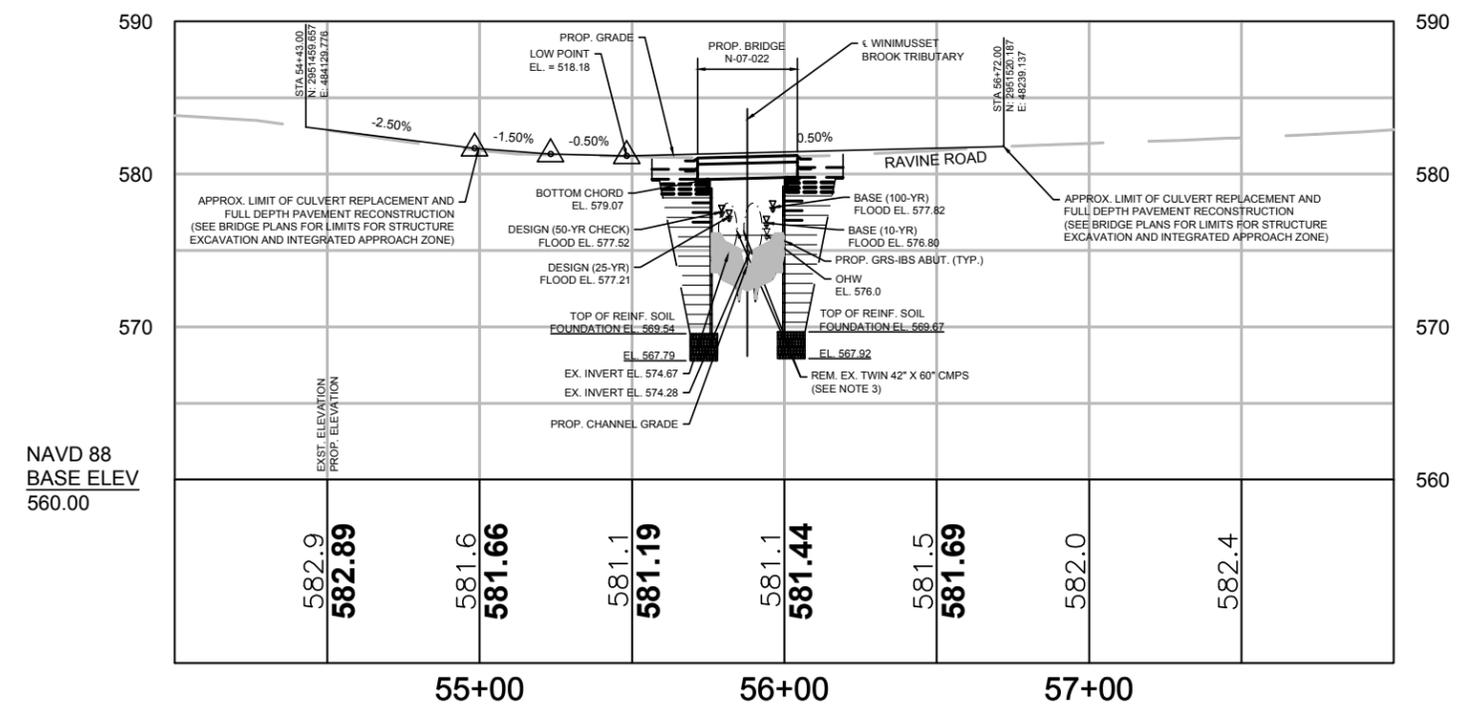
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	TBD	9	62
PROJECT FILE NO.		605035	

**CONSTRUCTION PLANS  
AND PROFILES**



**LEGEND**

	ROCKFILL
	NATIVE RIPARIAN SEED MIX
	LIVE STAKES
	NATIVE SLOPE SEED MIX



PERMIT DRAWING:  
SHEET 06 OF 13

1/27/2023	REVISED PAGE NUMBER SEQUENCE
DATE	DESCRIPTION

**HIGHWAY GUARD DETAILS**

**NORTHWEST BRIDGE CORNER**  
 STA. 66+36.44 (LT) TO STA. 66+47.31 (LT) ITEM 628.82  
 STA. 66+47.31 (LT) TO STA. 66+80.69 (LT) ITEM 628.24

**SOUTHWEST BRIDGE CORNER**  
 STA. 66+68.22 (RT) TO STA. 66+79.07 (RT) ITEM 627.82  
 STA. 66+79.07 (RT) TO STA. 67+12.47 (RT) ITEM 628.24

**NORTHEAST BRIDGE CORNER**  
 STA. 67+32.07 (LT) TO STA. 67+65.46 (LT) ITEM 628.24  
 STA. 67+65.46 (LT) TO STA. 67+76.32 (LT) ITEM 627.82

**SOUTHEAST BRIDGE CORNER**  
 STA. 67+63.76 (RT) TO STA. 67+97.16 (RT) ITEM 628.24  
 STA. 67+97.16 (RT) TO STA. 68+08.01 (RT) ITEM 627.82

**TRAFFIC SIGNAL CONDUIT**

NONE

**WATER SUPPLY ALTERATIONS**

NONE

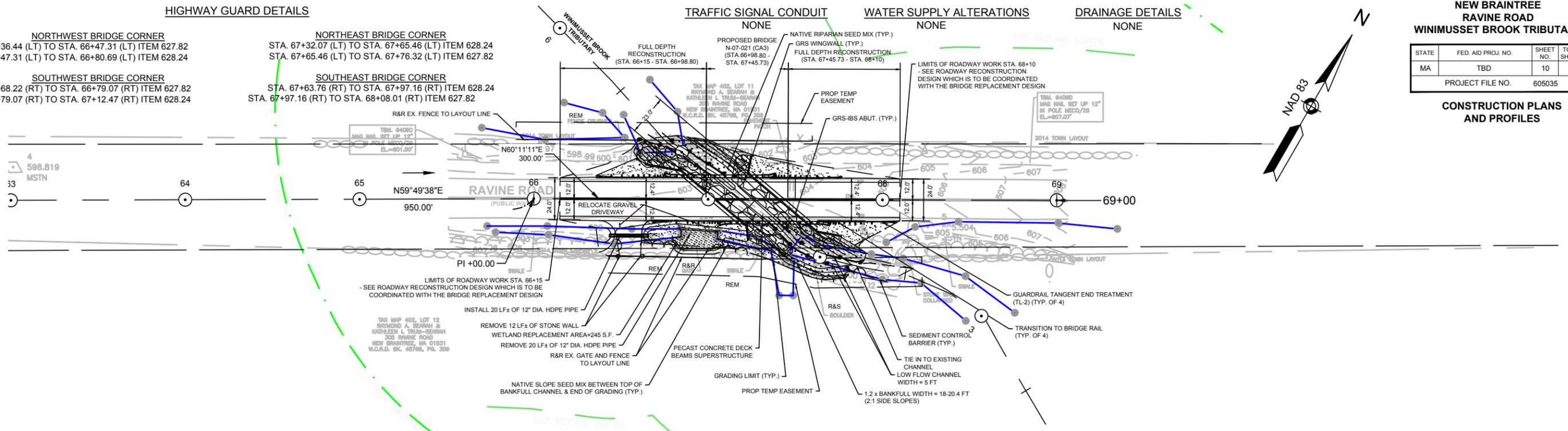
**DRAINAGE DETAILS**

NONE

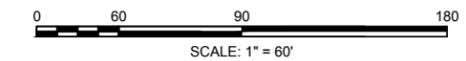
**NEW BRAINTREE  
 RAVINE ROAD  
 WINIMUSSET BROOK TRIBUTARY**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	TBD	10	62
PROJECT FILE NO.		605035	

**CONSTRUCTION PLANS  
 AND PROFILES**

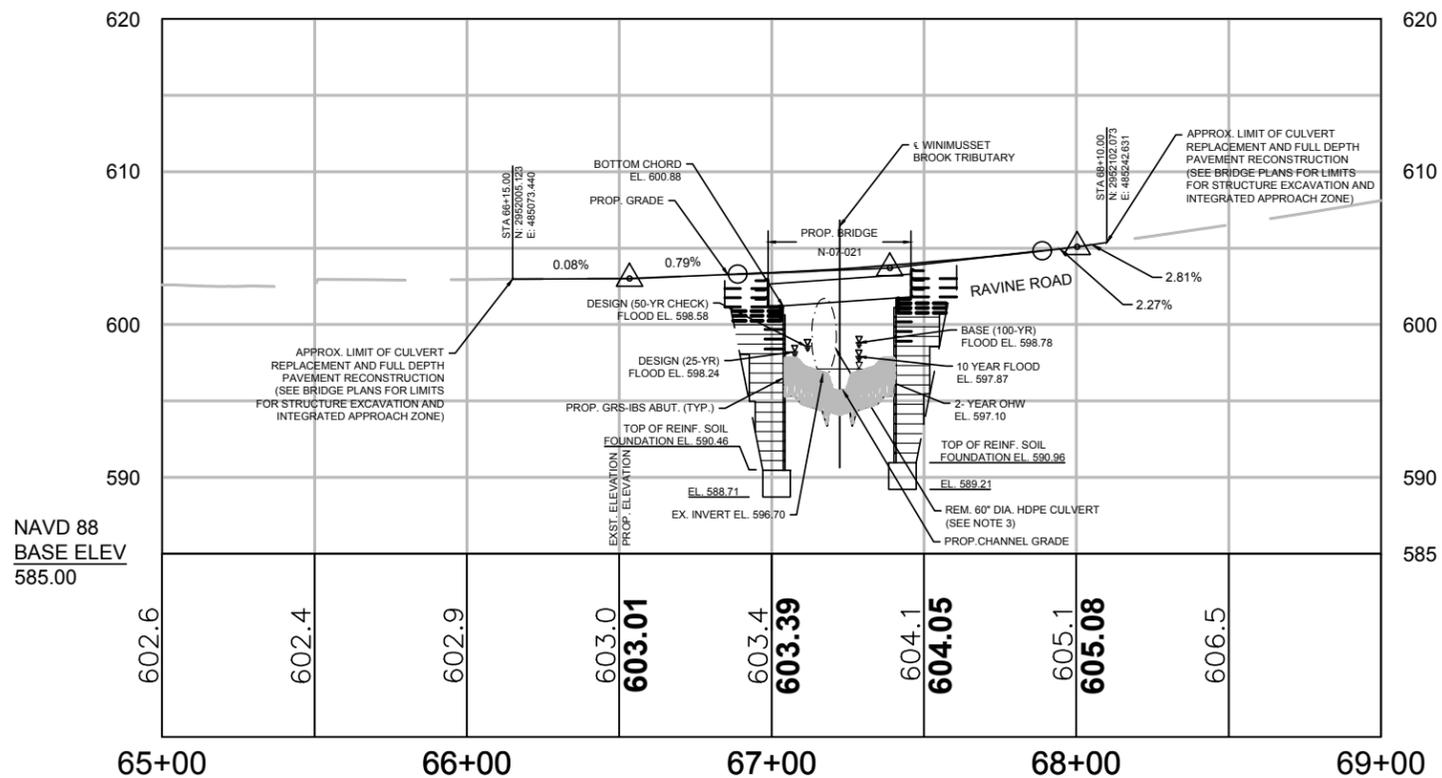


**CONSTRUCTION PLAN**  
 SCALE: 1"=60'-0"

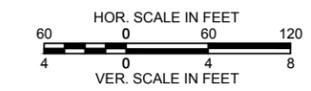


**LEGEND**

- ROCKFILL
- NATIVE RIPARIAN SEED MIX
- LIVE STAKES
- NATIVE SLOPE SEED MIX



**PROFILE - RAVINE ROAD**  
 SCALE: 1"=60'-0"  
 1"=4'-0"V



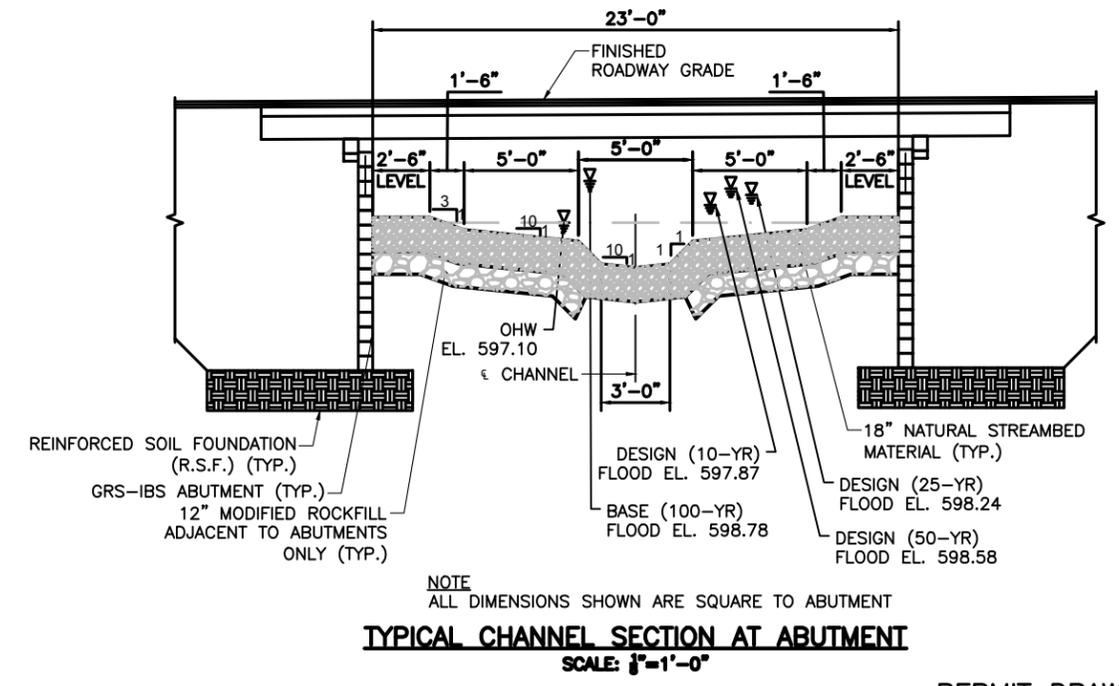
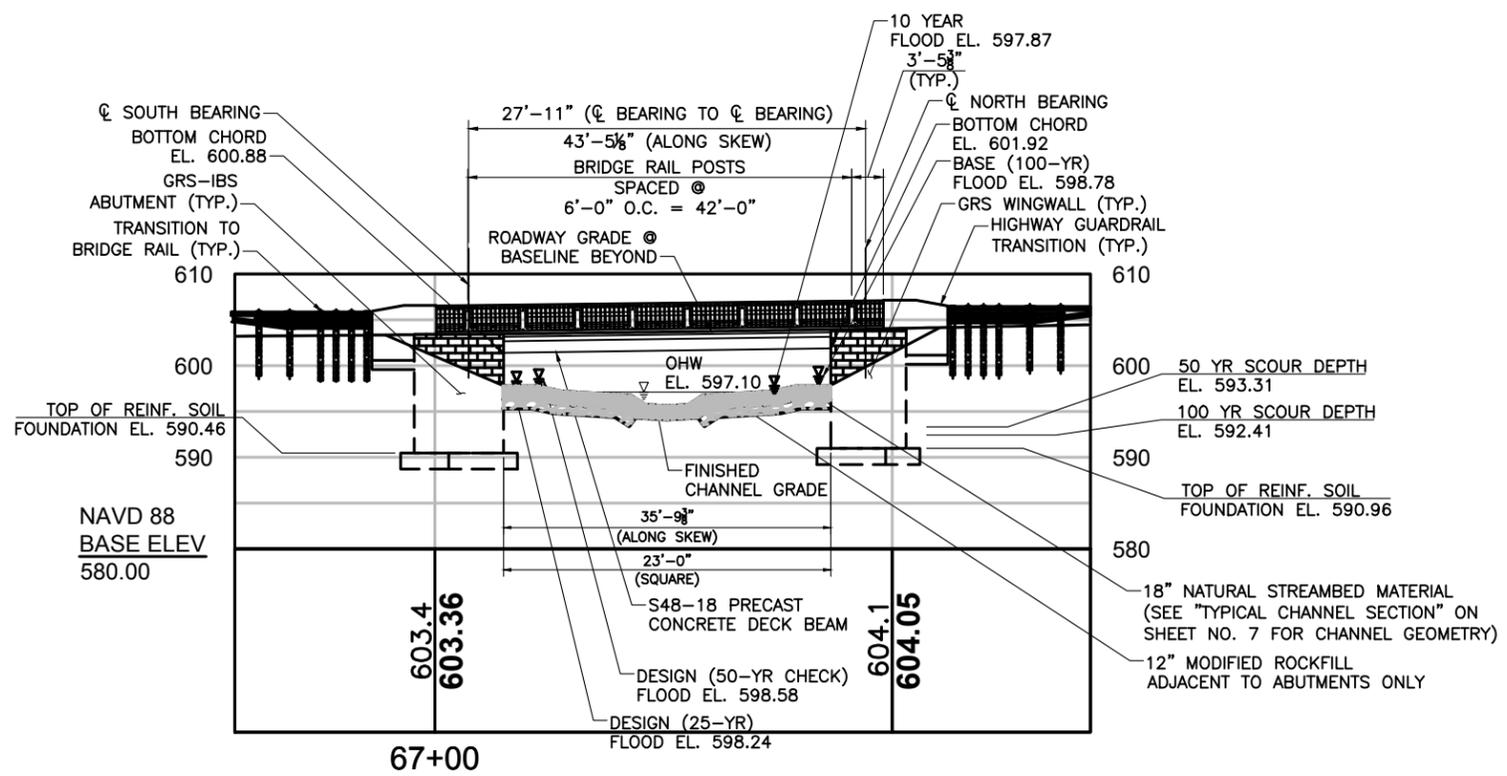
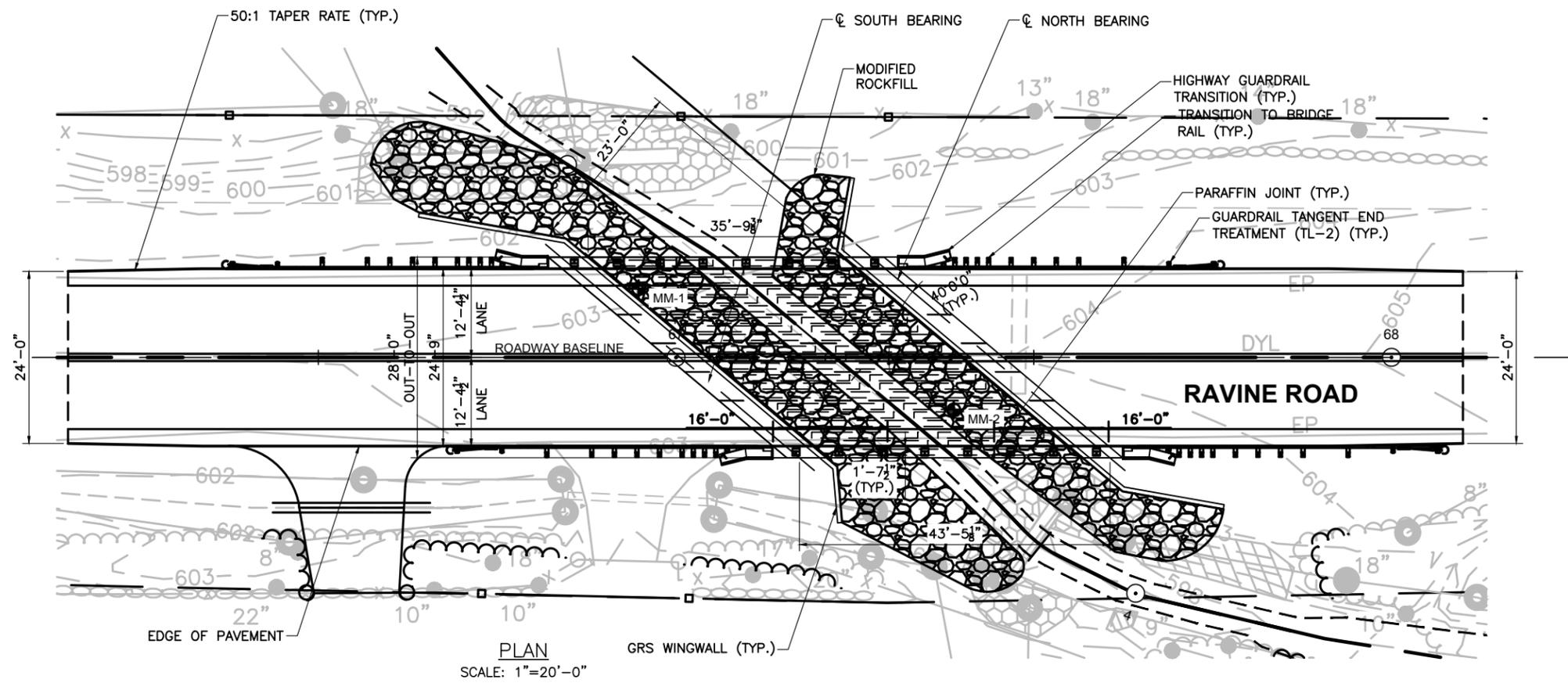
PERMIT DRAWING:  
 SHEET 07 OF 13

DATE	DESCRIPTION
1/27/2023	REVISED PAGE NUMBER SEQUENCE

**NEW BRAINTREE  
RAVINE ROAD  
WINIMUSSET BROOK TRIBUTARY**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	NFA	42	62
PROJECT FILE NO.		605035	

**GENERAL PLAN AND ELEVATION**



**PERMIT DRAWING:  
SHEET 08 OF 13**

**NOTE:**  
1. FOR DETAILED DIMENSIONS AND LAYOUT OF ABUTMENT AND WINGWALLS SEE SHEETS 07 AND 08 OF FULL PLANSET.  
2. FOR BRIDGE CLEARANCE - SEE SHEETS 07 AND 08 OF FULL PLANSET.

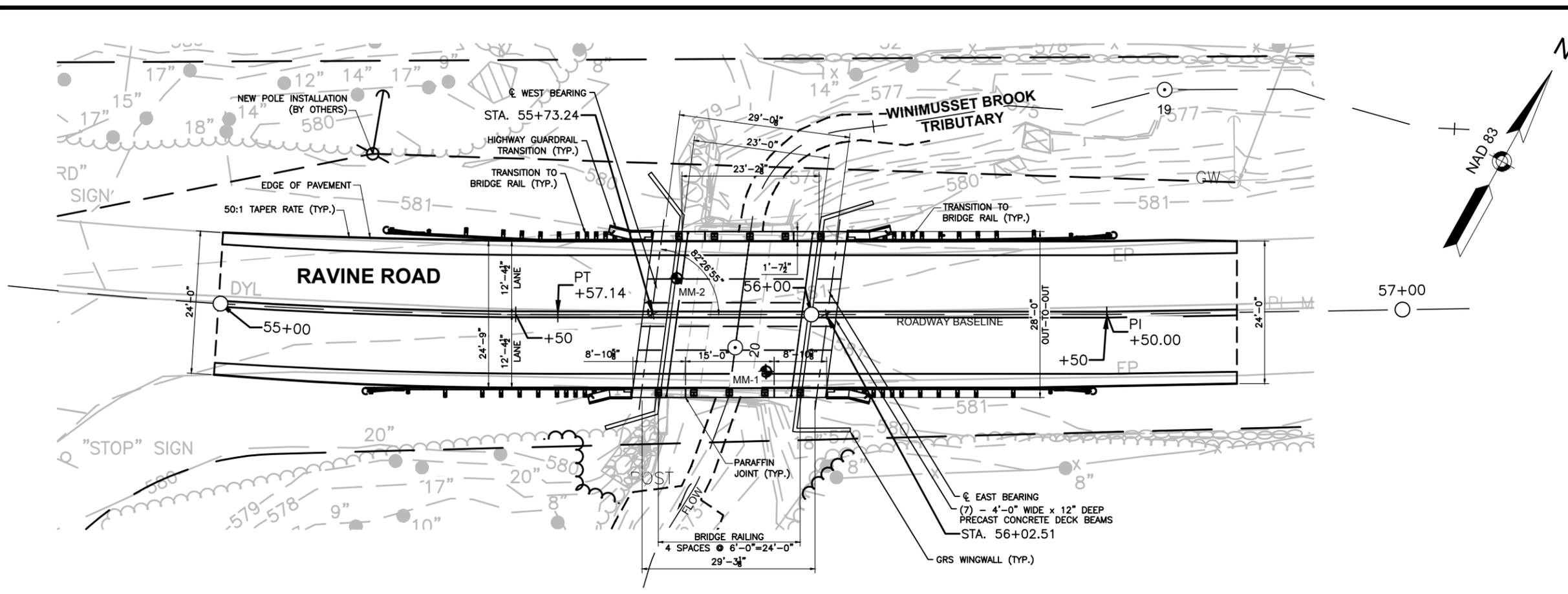
**ELEVATION**  
SCALE: 1"=20'-0"

1/27/2023	REVISED PAGE NUMBER SEQUENCE
12/2/2022	ISSUED FOR CONSTRUCTION
DATE	DESCRIPTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY:	STATE BRIDGE ENGINEER
USE ONLY PRINTS OF LATEST DATE	

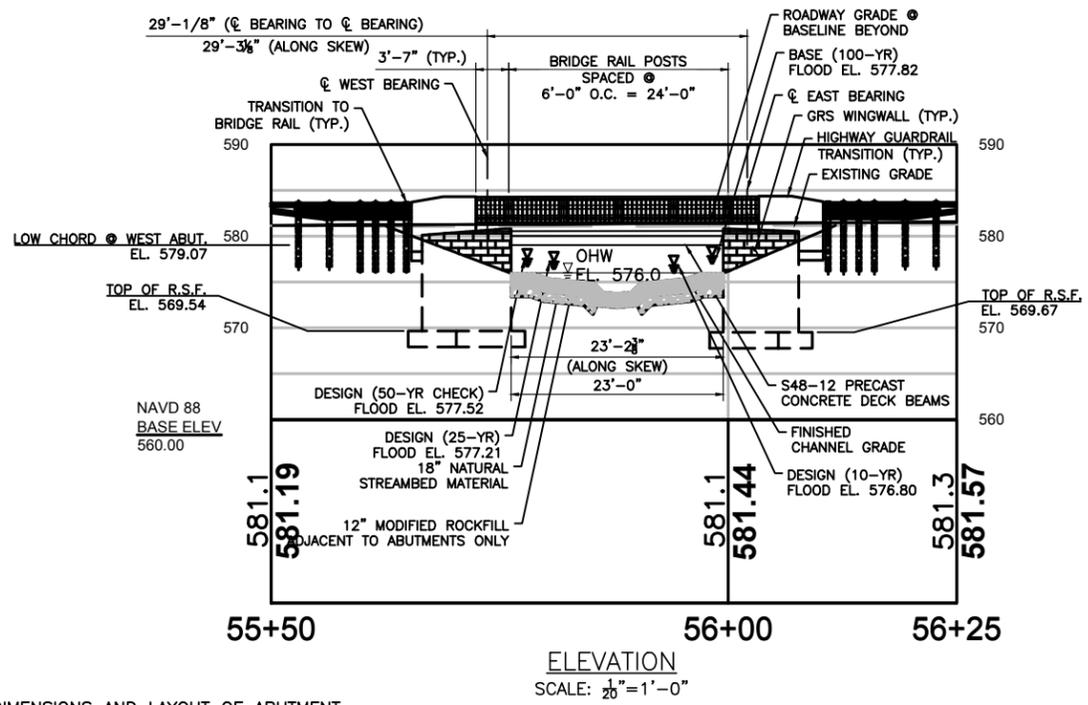
**NEW BRAintree  
RAVINE ROAD  
WINIMUSSET BROOK TRIBUTARY**

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	NFA	24	62
PROJECT FILE NO.		605035	

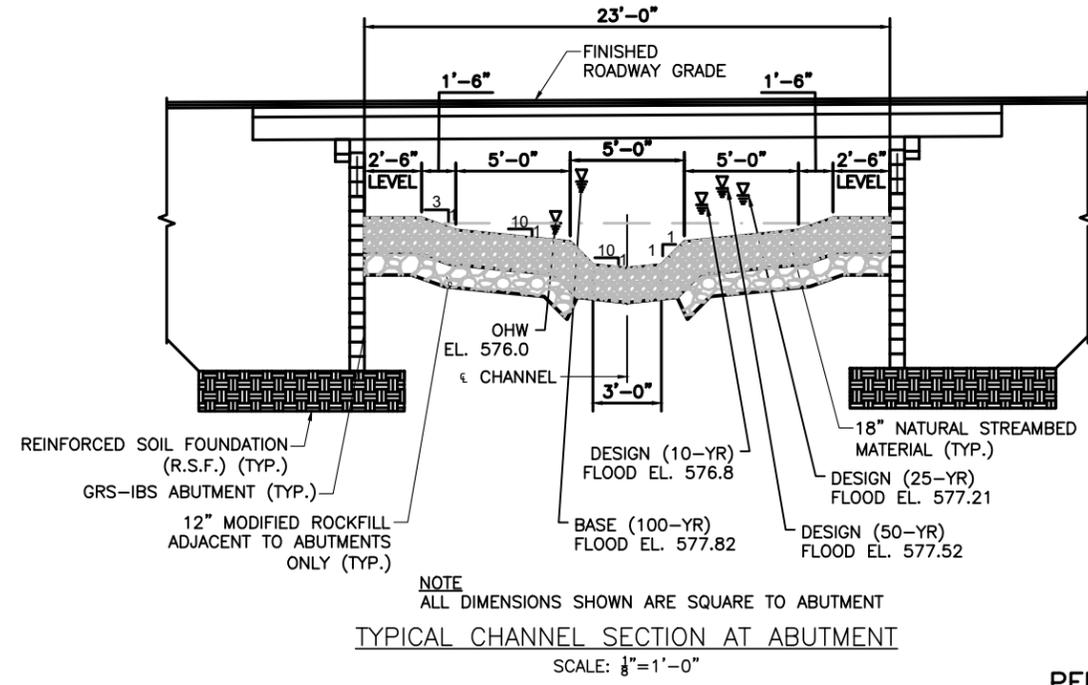
**GENERAL PLAN AND ELEVATION**



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



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



**TYPICAL CHANNEL SECTION AT ABUTMENT**  
SCALE: 1/8" = 1'-0"

**NOTE:**  
1. FOR DETAILED DIMENSIONS AND LAYOUT OF ABUTMENT AND WINGWALLS SEE SHEETS 27 AND 28 OF FULL PLAN SET.  
2. FOR BRIDGE CLEARANCE - SEE SHEETS 27 AND 28 OF FULL PLAN SET.

**PERMIT DRAWING:  
SHEET 09 OF 13**

DATE	DESCRIPTION
1/27/2023	REVISED PAGE NUMBER SEQUENCE
12/2/2022	ISSUED FOR CONSTRUCTION
THIS SHEET IS APPROVED FOR CONSTRUCTION BY MASSDOT	
AUTHORIZED SIGNATORY: STATE BRIDGE ENGINEER	
USE ONLY PRINTS OF LATEST DATE	

# SEDIMENT & EROSION CONTROL SPECIFICATIONS

## NEW BRAINTREE RAVINE ROAD WINIMUSSET BROOK TRIBUTARY

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	TBD	19	62
PROJECT FILE NO.		605035	

### GENERAL:

THESE GUIDELINES SHALL APPLY TO ALL WORK CONSISTING OF ANY AND ALL TEMPORARY AND/OR PERMANENT MEASURES TO CONTROL WATER POLLUTION AND SOIL EROSION, AS MAY BE REQUIRED, DURING THE CONSTRUCTION OF THE PROJECT.

IN GENERAL, ALL CONSTRUCTION ACTIVITIES SHALL PROCEED IN SUCH A MANNER SO AS NOT TO POLLUTE ANY WETLANDS, WATERCOURSE, WATER BODY, AND CONDUIT CARRYING WATER, ETC. THE CONTRACTOR SHALL LIMIT, INsofar AS POSSIBLE, THE SURFACE AREA OF EARTH MATERIALS EXPOSED BY CONSTRUCTION METHODS AND IMMEDIATELY PROVIDE PERMANENT AND TEMPORARY POLLUTION CONTROL MEASURES TO PREVENT CONTAMINATION OF ADJACENT WETLANDS, WATERCOURSES, AND WATER BODIES, AND TO PREVENT, INsofar AS POSSIBLE, EROSION ON THE SITE.

### LAND GRADING:

THE RESHAPING OF THE GROUND SURFACE BY EXCAVATION AND FILLING OR A COMBINATION OF BOTH, TO OBTAIN PLANNED GRADES, SHALL PROCEED IN ACCORDANCE WITH THE FOLLOWING CRITERIA:

- THE CUT FACE OF EARTH EXCAVATION SHALL NOT BE STEEPER THAN TWO HORIZONTAL TO ONE VERTICAL (2:1).
- THE PERMANENT EXPOSED FACES OF FILLS SHALL NOT BE STEEPER THAN TWO HORIZONTAL TO ONE VERTICAL (2:1).
- THE CUT FACE OF ROCK EXCAVATION SHALL NOT BE STEEPER THAN ONE HORIZONTAL TO TWO VERTICAL (1:2).
- PROVISION SHOULD BE MADE TO CONDUCT SURFACE WATER SAFELY TO STORM DRAINS TO PREVENT SURFACE RUNOFF FROM DAMAGING CUT FACES AND FILL SLOPES.
- NO FILL SHOULD BE PLACED WHERE IT WILL SLIDE OR WASH UPON THE INTO ADJACENT WETLANDS, WATERCOURSES, OR WATER BODIES.
- PRIOR TO ANY RE-GRADING, A STABILIZED CONSTRUCTION ENTRANCE SHALL BE PLACED AT THE ENTRANCE TO THE WORK AREA IN ORDER TO REDUCE MUD AND OTHER SEDIMENTS FROM LEAVING THE SITE.

### TOPSOILING:

LOAM BORROW SHALL BE SPREAD OVER ALL EXPOSED AREAS IN ORDER TO PROVIDE A SOIL MEDIUM HAVING FAVORABLE CHARACTERISTICS FOR THE ESTABLISHMENT, GROWTH, AND MAINTENANCE OF VEGETATION.

UPON ATTAINING FINAL SUBGRADES, SCARIFY SURFACE TO PROVIDE A GOOD BOND WITH TOPSOIL.

REMOVE ALL LARGE STONES, TREE LIMBS, ROOTS AND CONSTRUCTION DEBRIS.

APPLY LIME ACCORDING TO SOIL TEST OR AT THE RATE OF TWO (2) TONS PER ACRE.

### MATERIAL:

- LOAM BORROW SHOULD HAVE PHYSICAL, CHEMICAL, AND BIOLOGICAL CHARACTERISTICS FAVORABLE TO THE GROWTH OF PLANTS.
- LOAM BORROW SHOULD HAVE A SANDY OR LOAMY TEXTURE.
- LOAM BORROW SHOULD BE RELATIVELY FREE OF SUBSOIL MATERIAL AND MUST BE FREE OF STONES (OVER 1" IN DIAMETER), LUMPS OF SOIL, ROOTS, TREE LIMBS, TRASH, OR CONSTRUCTION DEBRIS. IT SHOULD BE FREE OF ROOTS OR RHIZOMES SUCH AS THISTLE, NUTGRASS, AND QUACKGRASS.
- AN ORGANIC MATTER CONTENT OF SIX PERCENT (6%) IS REQUIRED. AVOID LIGHT COLORED SUBSOIL MATERIAL.
- SOLUBLE SALT CONTENT OF OVER 500 PARTS PER MILLION (PPM) IS LESS SUITABLE. AVOID TIDAL MARSH SOILS BECAUSE OF HIGH SALT CONTENT AND SULFUR ACIDITY.
- THE pH SHOULD BE MORE THAN 6.0. IF LESS, ADD LIME TO INCREASE pH TO AN ACCEPTABLE LEVEL.

### APPLICATION:

- AVOID SPREADING WHEN LOAM BORROW IS WET OR FROZEN.
- SPREAD LOAM BORROW UNIFORMLY TO A DEPTH OF AT LEAST SIX INCHES (6"), OR TO THE DEPTH SHOWN ON THE LANDSCAPING PLANS.

### EROSION CHECKS

#### GENERAL:

TEMPORARY PERVIOUS BARRIERS USING COMPOST FILTER TUBE HELD IN PLACE WITH STAKES AND EROSION CONTROL MATTING SHALL BE INSTALLED AND MAINTAINED AS REQUIRED TO CHECK EROSION AND REDUCE SEDIMENTATION.

#### CONSTRUCTION:

COMPOST FILTER TUBES SHOULD BE PLACED WITH A MINIMUM OVERLAP OF THREE FEET (3') OR SLEEVED TO JOIN IN A CONTINUOUS BARRIER. COMPOST TUBES SHALL BE TAMPED IN PLACE TO ENSURE GOOD CONTACT WITH SOIL SURFACE.

COMPOST FILTER TUBES SHALL BE STAKED OR LEANED AGAINST SUPPORTS ON SLOPES 2:1 OR GREATER. STAKES SHALL BE LOCATED AS REQUIRED TO SECURE TUBES IN PLACE UP TO FIVE FEET (5') APART. COMPOST FILTER TUBES SHALL BE PLACED AS CLOSE TO THE LIMITS OF SOIL DISTURBANCE AS POSSIBLE.

#### INSTALLATION AND MAINTENANCE:

- COMPOST FILTER TUBE AND EROSION CONTROL MATTING SHALL BE INSTALLED AT THE LOCATION INDICATED ON THE PLAN AND IN ADDITIONAL AREAS AS MAY BE DEEMED APPROPRIATE DURING CONSTRUCTION.
- ALL EROSION CHECKS SHALL BE MAINTAINED UNTIL ADJACENT AREAS ARE STABILIZED.
- INSPECTION SHALL BE FREQUENT (AT MINIMUM EVERY SEVEN CALENDAR DAYS AND AFTER EVERY RAINFALL EVENT GREATER THAN ONE HALF INCH) AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.
- EROSION CHECKS SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFULNESS SO AS NOT TO BLOCK OR IMPEDE STORM WATER FLOW OR DRAINAGE.

### VEGETATIVE COVER SELECTION & MULCHING

#### TEMPORARY VEGETATIVE COVER:

PERENNIAL RYEGRASS 3 LBS./1,000 SQ. FT. (10LJIUM PERENNE)  
(TO BE PAID UNDER SEEDING)

#### PERMANENT VEGETATIVE COVER:

- SEE SEDIMENTATION AND EROSION CONTROL PLAN FOR SEED MIX
- TEMPORARY MULCHING: STRAW AT 70-90 LBS./1,000 SQ. FT. (TEMPORARY VEGETATIVE AREAS) WOOD FIBER IN HYDROMULCH SLURRY 25-50 LBS./1,000 SQ. FT. (TO BE PAID UNDER SEEDING).

#### ESTABLISHMENT:

- SMOOTH AND FIRM SEEDBED WITH CULTIPACKER OR OTHER SIMILAR EQUIPMENT PRIOR TO SEEDING (EXCEPT WHEN HYDROSEEDING).
- SELECT ADAPTED SEED MIXTURE FOR THE SPECIFIC SITUATION. NOTE RATES AND THE SEEDING DATES (SEE VEGETATIVE COVER SELECTION & MULCHING SPEC. BELOW).
- APPLY SEED UNIFORMLY ACCORDING TO RATE INDICATED, BY BROADCASTING, DRILLING, OR HYDRAULIC APPLICATION.
- COVER GRASS AND LEGUME SEED WITH NOT MORE THAN 1/4 INCH OF SOIL WITH SUITABLE EQUIPMENT (EXCEPT WHEN HYDROSEEDING).
- MULCH IMMEDIATELY AFTER SEEDING, IF REQUIRED, ACCORDING TO TEMPORARY MULCHING SPECIFICATIONS. (SEE VEGETATIVE COVER SELECTION & MULCHING SPECIFICATION BELOW).
- USE PROPER INOCULANT ON ALL LEGUME SEEDINGS, USE FOUR (4) TIMES NORMAL RATES WHEN HYDROSEEDING.
- USE SOD WHERE THERE IS A HEAVY CONCENTRATION OF WATER AND IN CRITICAL AREAS WHERE IT IS IMPORTANT TO GET A QUICK VEGETATIVE COVER TO PREVENT EROSION.

### PERMANENT VEGETATIVE COVER

PERMANENT VEGETATIVE COVER SHALL BE ESTABLISHED AS VARIOUS SECTIONS OF THE PROJECT ARE COMPLETED IN ORDER TO STABILIZE THE SOIL, REDUCE DOWNSTREAM DAMAGE FROM SEDIMENT AND RUNOFF, AND TO ENHANCE THE AESTHETIC NATURE OF THE SITE. IT WILL BE APPLIED TO ALL CONSTRUCTION AREAS SUBJECT TO EROSION WHERE FINAL GRADING HAS BEEN COMPLETED AND A PERMANENT COVER IS NEEDED.

#### SITE PREPARATION:

- INSTALL REQUIRED SURFACE WATER CONTROL MEASURES.
- REMOVE LOOSE ROCK, STONE, AND CONSTRUCTION DEBRIS FROM AREA.
- PERFORM ALL PLANTING OPERATIONS PARALLEL TO THE CONTOURS OF THE SLOPE.
- APPLY TOPSOIL AS INDICATED ELSEWHERE HEREIN.
- FERTILIZER NOT TO BE USED NEXT TO THE STREAM CHANNEL.

COMPOST FILTER TUBE  
MINIMUM 12 INCHES (300mm) IN DIAMETER WITH AN EFFECTIVE HEIGHT OF 9.5 INCHES (240mm).

TUBES FOR COMPOST FILTERS SHALL BE JUTE MESH OR APPROVED BIODEGRADABLE MATERIAL, HOWEVER PHOTO-BIODEGRADABLE FABRIC SHALL BE REMOVED AT END OF CONTRACT.

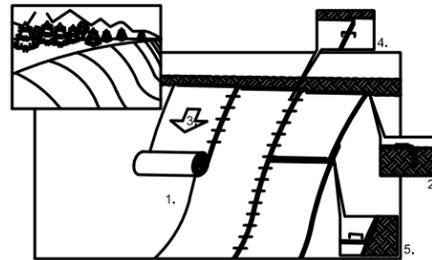
TAMP TUBES IN PLACE TO ENSURE GOOD CONTACT WITH SOIL SURFACE. IT IS NOT NECESSARY TO TRENCH TUBES INTO EXISTING GRADE.

COMPOST TUBES SHALL BE STAKED OR LEANED AGAINST SUPPORTS (TREES, CONER BLOCKS) ON SLOPES 2:1 OR GREATER.

WHERE NECESSARY, STAKING SHALL BE MIN. 1 INCH X 1 INCH X 3 FEET UNTREATED HARDWOOD STAKES, UP TO 5 FT. (1.5m) APART OR AS REQUIRED TO SECURE TUBES IN PLACE. TUBES SHALL BE STAKED ACCORDING TO MANUFACTURER'S SPECIFICATIONS.

UNDISTURBED SOIL & VEGETATION.  
TUBES SHALL BE PLACED AS CLOSE TO LIMITS OF SOIL DISTURBANCE AS POSSIBLE.

LIMIT OF WORK

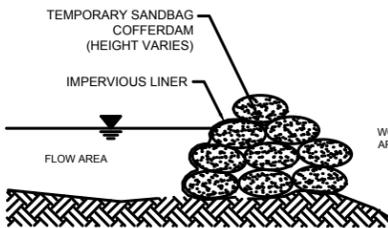


#### NOTES:

- PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING APPLICATION OF LIME, FERTILIZER, AND SEED.
- BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE BLANKET IN A 6" DEEP BY 6" WIDE TRENCH, BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.
- ROLL THE BLANKETS DOWN THE SLOPE IN THE DIRECTION OF THE WATER FLOW.
- THE EDGES OF PARALLEL BLANKETS MUST BE STAPLED WITH APPROXIMATELY 2" OVERLAP.
- WHEN BLANKETS MUST BE SPLICED DOWN THE SLOPE, PLACE BLANKETS END OVER END (SHINGLE STYLE) WITH APPROXIMATELY 6" OVERLAP. STAPLE THROUGH OVERLAP AREA, APPROXIMATELY 12" APART.

REFER TO GENERAL STAPLE PATTERN GUIDE IN NORTH AMERICAN GREEN CATALOG FOR CORRECT STAPLE PATTERN RECOMMENDATIONS FOR SLOPE INSTALLATIONS.

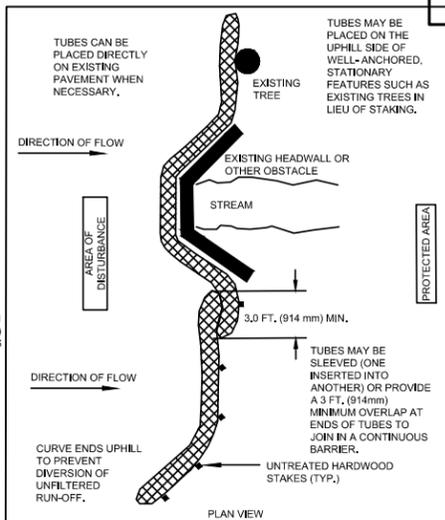
#### EROSION CONTROL MATTING NOT TO SCALE



#### NOTES:

- COFFER DAM AND PUMP SYSTEM TO BE SIZED FOR NORMAL FLOW CONDITIONS.

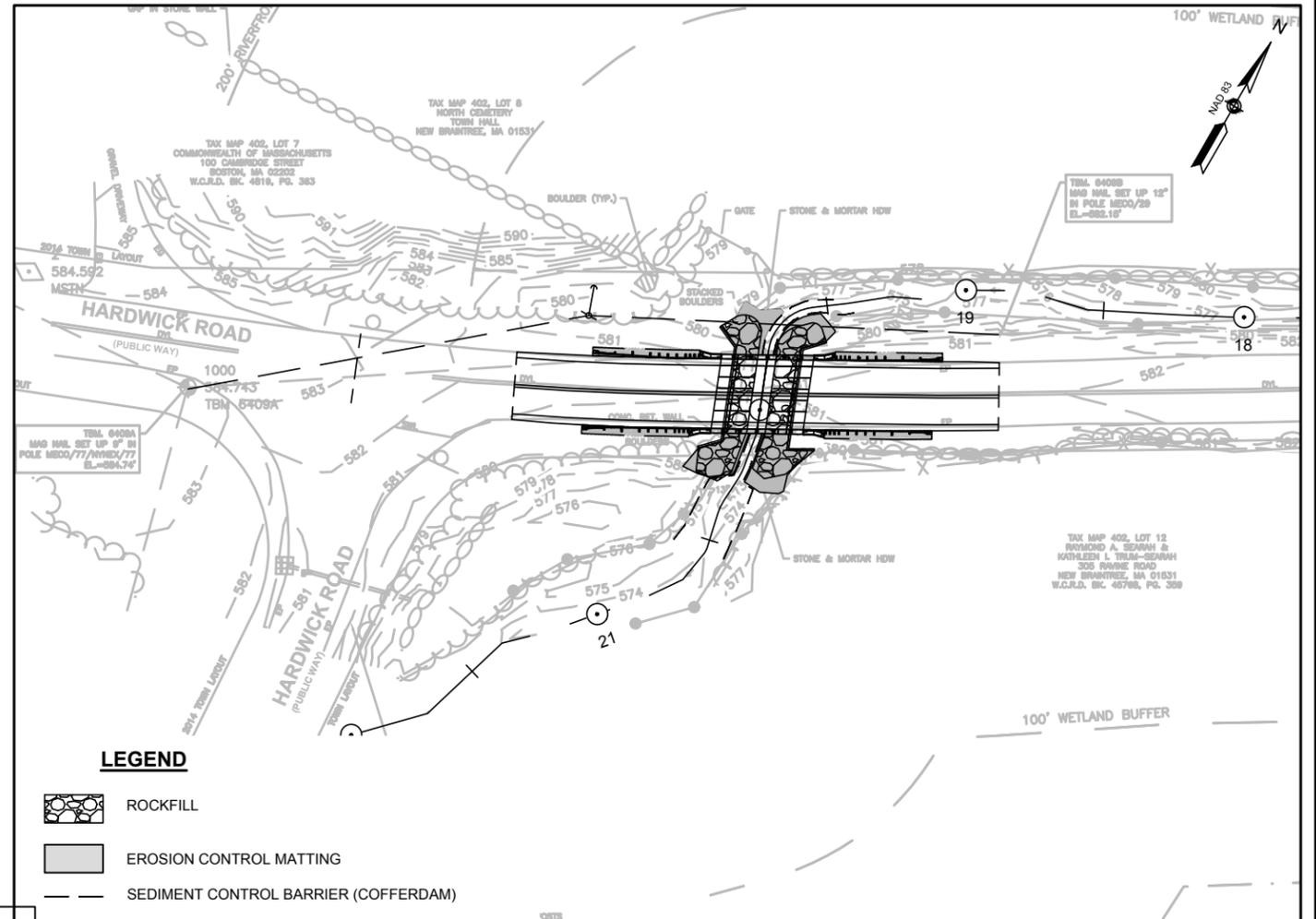
#### TEMPORARY SANDBAG COFFERDAM NOT TO SCALE



#### COMPOST FILTER TUBE DETAIL NOT TO SCALE

## SEDIMENT & EROSION CONTROL PLAN

SCALE 1" = 60'



### LEGEND

- ROCKFILL
- EROSION CONTROL MATTING
- SEDIMENT CONTROL BARRIER (COFFERDAM)

#### GENERAL NOTES:

- PROVIDE A MINIMUM TUBE DIAMETER OF 12 INCHES (300mm) FOR SLOPES UP TO 50 FEET (15.24m) IN LENGTH WITH A SLOPE RATIO OF 3H:1V OR STEEPER. LOWER SLOPES OF 3H:1V MAY REQUIRE LARGER TUBE DIAMETER OR ADDITIONAL COURSING OF FILTER TUBES TO CREATE A FILTER BERM. REFER TO MANUFACTURER'S RECOMMENDATIONS FOR SITUATIONS WITH LONGER OR STEEPER SLOPES.
- INSTALL TUBES ALONG CONTOURS AND PERPENDICULAR TO SHEET OR CONCENTRATED FLOW.
- TUBE LOCATION MAY BE SHIFTED TO ADJUST TO LANDSCAPE FEATURES, BUT SHALL PROTECT UNDISTURBED AREA AND VEGETATION TO MAXIMUM EXTENT POSSIBLE.
- DO NOT INSTALL IN PERENNIAL, EPHEMERAL OR INTERMITTENT STREAMS.
- ADDITIONAL TUBES SHALL BE USED AT THE DIRECTION OF THE ENGINEER.
- ADDITIONAL STAKING SHALL BE USED AT THE DIRECTION OF THE ENGINEER.

PERMIT DRAWING:  
SHEET 10 OF 13

1/27/2023	REVISED PAGE NUMBER SEQUENCE
DATE	DESCRIPTION

# SEDIMENT & EROSION CONTROL SPECIFICATIONS

## GENERAL:

THESE GUIDELINES SHALL APPLY TO ALL WORK CONSISTING OF ANY AND ALL TEMPORARY AND/OR PERMANENT MEASURES TO CONTROL WATER POLLUTION AND SOIL EROSION, AS MAY BE REQUIRED, DURING THE CONSTRUCTION OF THE PROJECT.

IN GENERAL, ALL CONSTRUCTION ACTIVITIES SHALL PROCEED IN SUCH A MANNER SO AS NOT TO POLLUTE ANY WETLANDS, WATERCOURSE, WATER BODY, AND CONDUIT CARRYING WATER, ETC. THE CONTRACTOR SHALL LIMIT, INsofar AS POSSIBLE, THE SURFACE AREA OF EARTH MATERIALS EXPOSED BY CONSTRUCTION METHODS AND IMMEDIATELY PROVIDE PERMANENT AND TEMPORARY POLLUTION CONTROL MEASURES TO PREVENT CONTAMINATION OF ADJACENT WETLANDS, WATERCOURSES, AND WATER BODIES, AND TO PREVENT, INsofar AS POSSIBLE, EROSION ON THE SITE.

## LAND GRADING:

THE RESHAPING OF THE GROUND SURFACE BY EXCAVATION AND FILLING OR A COMBINATION OF BOTH, TO OBTAIN PLANNED GRADES, SHALL PROCEED IN ACCORDANCE WITH THE FOLLOWING CRITERIA:

- THE CUT FACE OF EARTH EXCAVATION SHALL NOT BE STEEPER THAN TWO HORIZONTAL TO ONE VERTICAL (2:1).
- THE PERMANENT EXPOSED FACES OF FILLS SHALL NOT BE STEEPER THAN TWO HORIZONTAL TO ONE VERTICAL (2:1).
- THE CUT FACE OF ROCK EXCAVATION SHALL NOT BE STEEPER THAN ONE HORIZONTAL TO TWO VERTICAL (1:2).
- PROVISION SHOULD BE MADE TO CONDUCT SURFACE WATER SAFELY TO STORM DRAINS TO PREVENT SURFACE RUNOFF FROM DAMAGING CUT FACES AND FILL SLOPES.
- NO FILL SHOULD BE PLACED WHERE IT WILL SLIDE OR WASH UPON THE INTO ADJACENT WETLANDS, WATERCOURSES, OR WATER BODIES.
- PRIOR TO ANY RE-GRADING, A STABILIZED CONSTRUCTION ENTRANCE SHALL BE PLACED AT THE ENTRANCE TO THE WORK AREA IN ORDER TO REDUCE MUD AND OTHER SEDIMENTS FROM LEAVING THE SITE.

## TOPSOILING:

LOAM BORROW SHALL BE SPREAD OVER ALL EXPOSED AREAS IN ORDER TO PROVIDE A SOIL MEDIUM HAVING FAVORABLE CHARACTERISTICS FOR THE ESTABLISHMENT, GROWTH, AND MAINTENANCE OF VEGETATION.

UPON ATTAINING FINAL SUBGRADES, SCARIFY SURFACE TO PROVIDE A GOOD BOND WITH TOPSOIL.

REMOVE ALL LARGE STONES, TREE LIMBS, ROOTS AND CONSTRUCTION DEBRIS.

APPLY LIME ACCORDING TO SOIL TEST OR AT THE RATE OF TWO (2) TONS PER ACRE.

## MATERIAL:

- LOAM BORROW SHOULD HAVE PHYSICAL, CHEMICAL, AND BIOLOGICAL CHARACTERISTICS FAVORABLE TO THE GROWTH OF PLANTS.
- LOAM BORROW SHOULD HAVE A SANDY OR LOAMY TEXTURE.
- LOAM BORROW SHOULD BE RELATIVELY FREE OF SUBSOIL MATERIAL AND MUST BE FREE OF STONES (OVER 1" IN DIAMETER), LUMPS OF SOIL, ROOTS, TREE LIMBS, TRASH, OR CONSTRUCTION DEBRIS. IT SHOULD BE FREE OF ROOTS OR RHIZOMES SUCH AS THISTLE, NUTGRASS, AND QUACKGRASS.
- AN ORGANIC MATTER CONTENT OF SIX PERCENT (6%) IS REQUIRED. AVOID LIGHT COLORED SUBSOIL MATERIAL.
- SOLUBLE SALT CONTENT OF OVER 500 PARTS PER MILLION (PPM) IS LESS SUITABLE. AVOID TIDAL MARSH SOILS BECAUSE OF HIGH SALT CONTENT AND SULFUR ACIDITY.
- THE pH SHOULD BE MORE THAN 6.0. IF LESS, ADD LIME TO INCREASE pH TO AN ACCEPTABLE LEVEL.

## APPLICATION:

- AVOID SPREADING WHEN LOAM BORROW IS WET OR FROZEN.
- SPREAD LOAM BORROW UNIFORMLY TO A DEPTH OF AT LEAST SIX INCHES (6"), OR TO THE DEPTH SHOWN ON THE LANDSCAPING PLANS.

## EROSION CHECKS

### GENERAL:

TEMPORARY PERVIOUS BARRIERS USING COMPOST FILTER TUBE HELD IN PLACE WITH STAKES AND EROSION CONTROL MATTING SHALL BE INSTALLED AND MAINTAINED AS REQUIRED TO CHECK EROSION AND REDUCE SEDIMENTATION.

### CONSTRUCTION:

COMPOST FILTER TUBES SHOULD BE PLACED WITH A MINIMUM OVERLAP OF THREE FEET (3') OR SLEEVED TO JOIN IN A CONTINUOUS BARRIER. COMPOST TUBES SHALL BE TAMPED IN PLACE TO ENSURE GOOD CONTACT WITH SOIL SURFACE.

COMPOST FILTER TUBES SHALL BE STAKED OR LEANED AGAINST SUPPORTS ON SLOPES 2:1 OR GREATER. STAKES SHALL BE LOCATED AS REQUIRED TO SECURE TUBES IN PLACE UP TO FIVE FEET (5') APART. COMPOST FILTER TUBES SHALL BE PLACED AS CLOSE TO THE LIMITS OF SOIL DISTURBANCE AS POSSIBLE.

### INSTALLATION AND MAINTENANCE:

- COMPOST FILTER TUBE AND EROSION CONTROL MATTING SHALL BE INSTALLED AT THE LOCATION INDICATED ON THE PLAN AND IN ADDITIONAL AREAS AS MAY BE DEEMED APPROPRIATE DURING CONSTRUCTION.
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- INSPECTION SHALL BE FREQUENT (AT MINIMUM EVERY SEVEN CALENDAR DAYS AND AFTER EVERY RAINFALL EVENT GREATER THAN ONE HALF INCH) AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.
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## VEGETATIVE COVER SELECTION & MULCHING

### TEMPORARY VEGETATIVE COVER:

PERENNIAL RYEGRASS 3 LBS./1,000 SQ. FT. (LOLIUM PERENNE)  
(TO BE PAID UNDER SEEDING)

### PERMANENT VEGETATIVE COVER:

- SEE SEDIMENTATION AND EROSION CONTROL PLAN FOR SEED MIX
- TEMPORARY MULCHING: STRAW AT 70-90 LBS./1,000 SQ. FT. (TEMPORARY VEGETATIVE AREAS) WOOD FIBER IN HYDROMULCH SLURRY 25-50 LBS./1,000 SQ. FT. (TO BE PAID UNDER SEEDING).

### ESTABLISHMENT:

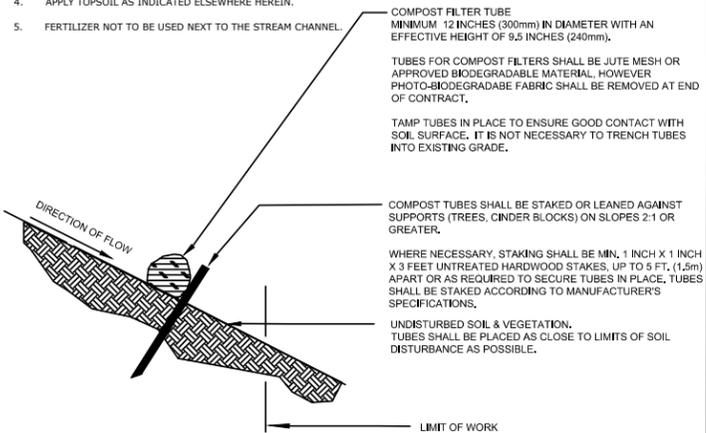
- SMOOTH AND FIRM SEEDBED WITH CULTIPACKER OR OTHER SIMILAR EQUIPMENT PRIOR TO SEEDING (EXCEPT WHEN HYDROSEEDING).
- SELECT ADAPTED SEED MIXTURE FOR THE SPECIFIC SITUATION. NOTE RATES AND THE SEEDING DATES (SEE VEGETATIVE COVER SELECTION & MULCHING SPEC. BELOW).
- APPLY SEED UNIFORMLY ACCORDING TO RATE INDICATED, BY BROADCASTING, DRILLING, OR HYDRAULIC APPLICATION.
- COVER GRASS AND LEGUME SEED WITH NOT MORE THAN 1/4 INCH OF SOIL WITH SUITABLE EQUIPMENT (EXCEPT WHEN HYDROSEEDING).
- MULCH IMMEDIATELY AFTER SEEDING, IF REQUIRED, ACCORDING TO TEMPORARY MULCHING SPECIFICATIONS. (SEE VEGETATIVE COVER SELECTION & MULCHING SPECIFICATION BELOW).
- USE PROPER INOCULANT ON ALL LEGUME SEEDINGS, USE FOUR (4) TIMES NORMAL RATES WHEN HYDROSEEDING.
- USE SOD WHERE THERE IS A HEAVY CONCENTRATION OF WATER AND IN CRITICAL AREAS WHERE IT IS IMPORTANT TO GET A QUICK VEGETATIVE COVER TO PREVENT EROSION.

## PERMANENT VEGETATIVE COVER

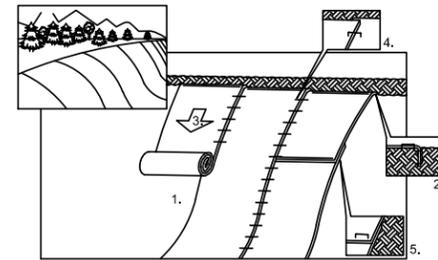
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### SITE PREPARATION:

- INSTALL REQUIRED SURFACE WATER CONTROL MEASURES.
- REMOVE LOOSE ROCK, STONE, AND CONSTRUCTION DEBRIS FROM AREA.
- PERFORM ALL PLANTING OPERATIONS PARALLEL TO THE CONTOURS OF THE SLOPE.
- APPLY TOPSOIL AS INDICATED ELSEWHERE HEREIN.
- FERTILIZER NOT TO BE USED NEXT TO THE STREAM CHANNEL.



COMPOST FILTER TUBE DETAIL  
NOT TO SCALE

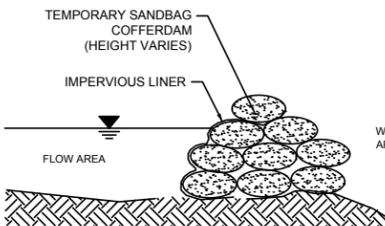


### NOTES:

- PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING APPLICATION OF LIME, FERTILIZER, AND SEED.
- BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE BLANKET IN A 6" DEEP BY 6" WIDE TRENCH, BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.
- ROLL THE BLANKETS DOWN THE SLOPE IN THE DIRECTION OF THE WATER FLOW.
- THE EDGES OF PARALLEL BLANKETS MUST BE STAPLED WITH APPROXIMATELY 2" OVERLAP.
- WHEN BLANKETS MUST BE SPLICED DOWN THE SLOPE, PLACE BLANKETS END OVER END (SHINGLE STYLE) WITH APPROXIMATELY 6" OVERLAP. STAPLE THROUGH OVERLAP AREA, APPROXIMATELY 12" APART.

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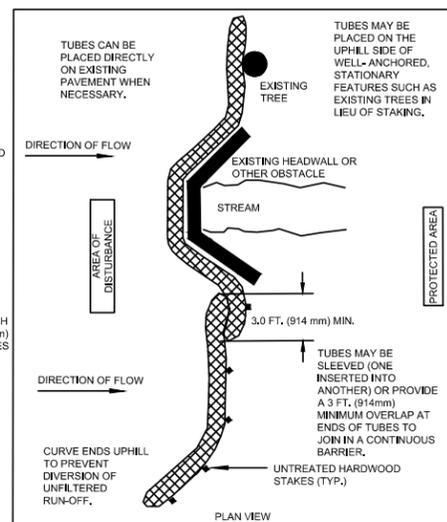
EROSION CONTROL MATTING  
NOT TO SCALE



### NOTES:

- COFFER DAM AND PUMP SYSTEM TO BE SIZED FOR NORMAL FLOW CONDITIONS.

TEMPORARY SANDBAG COFFERDAM  
NOT TO SCALE



COMPOST FILTER TUBE DETAIL  
NOT TO SCALE

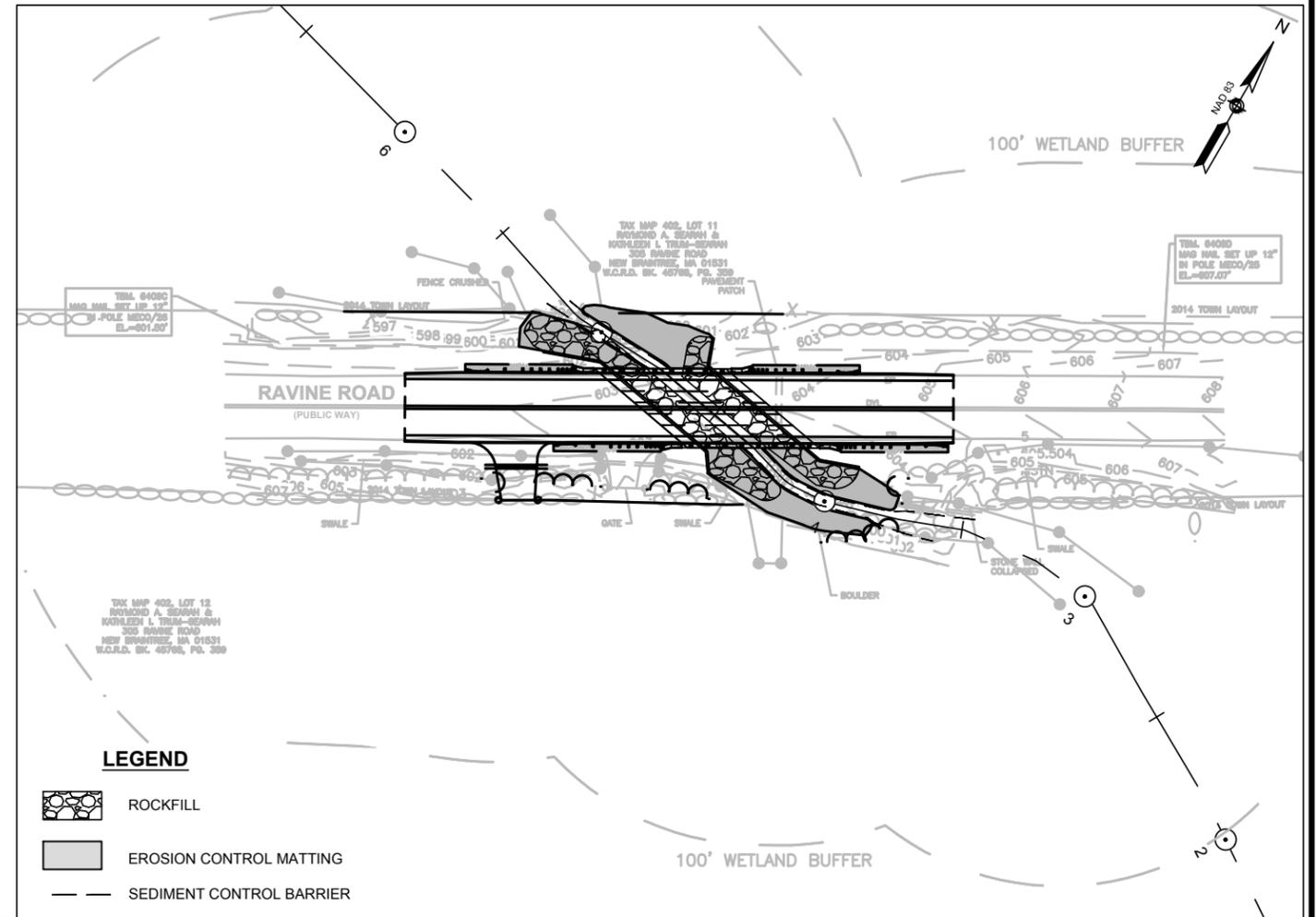
## NEW BRAINTREE RAVINE ROAD WINIMUSSET BROOK TRIBUTARY

STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	TBD	20	62
PROJECT FILE NO.		605035	

## SEDIMENT & EROSION CONTROL DETAILS

## SEDIMENT & EROSION CONTROL PLAN

SCALE 1" = 60'



## LEGEND

- ROCKFILL
- EROSION CONTROL MATTING
- SEDIMENT CONTROL BARRIER

### GENERAL NOTES:

- PROVIDE A MINIMUM TUBE DIAMETER OF 12 INCHES (300mm) FOR SLOPES UP TO 50 FEET (15.24m) IN LENGTH WITH A SLOPE RATIO OF 3H:1V OR STEEPER. LONGER SLOPES OF 3H:1V MAY REQUIRE LARGER TUBE DIAMETER OR ADDITIONAL COURSING OF FILTER TUBES TO CREATE A FILTER BERM. REFER TO MANUFACTURER'S RECOMMENDATIONS FOR SITUATIONS WITH LONGER OR STEEPER SLOPES.
- INSTALL TUBES ALONG CONTOURS AND PERPENDICULAR TO SHEET OR CONCENTRATED FLOW.
- TUBE LOCATION MAY BE SHIFTED TO ADJUST TO LANDSCAPE FEATURES, BUT SHALL PROTECT UNDISTURBED AREA AND VEGETATION TO MAXIMUM EXTENT POSSIBLE.
- DO NOT INSTALL IN PERENNIAL, EPHEMERAL OR INTERMITTENT STREAMS. ADDITIONAL TUBES SHALL BE USED AT THE DIRECTION OF THE ENGINEER.
- ADDITIONAL STAKING SHALL BE USED AT THE DIRECTION OF THE ENGINEER.

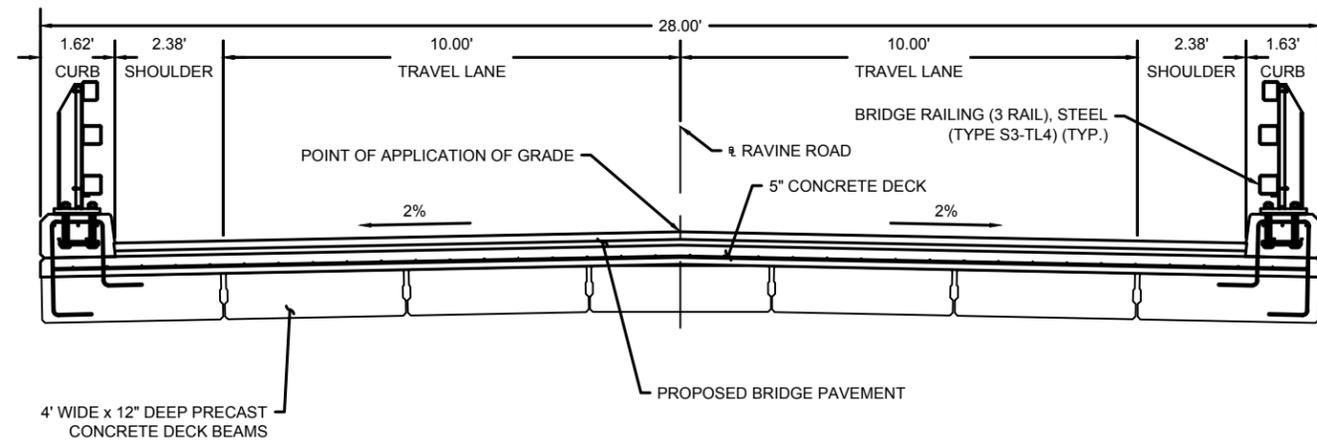
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SHEET 11 OF 13

DATE	DESCRIPTION
1/27/2023	REVISED PAGE NUMBER SEQUENCE

**NEW BRAINTREE  
RAVINE ROAD  
WINIMUSSET BROOK TRIBUTARY**

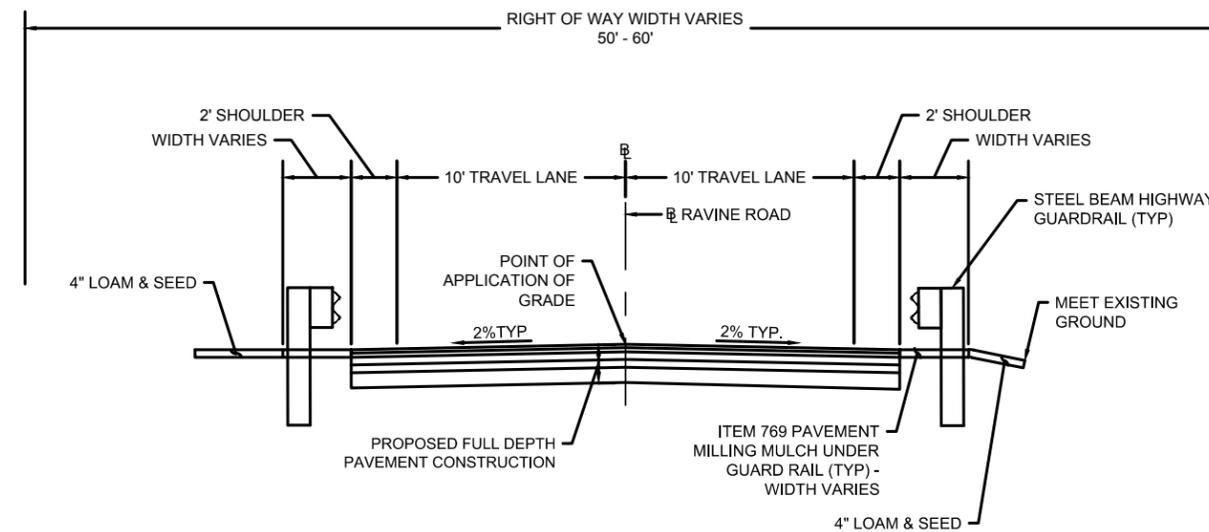
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MA	TBD	07	62
PROJECT FILE NO.		605035	

**TYPICAL SECTIONS**



**GRS-IBS - N-07-022 (CA4) SECTION**

SCALE: 1/4"=1'-0"  
STA. 55+72 - STA. 56+04



**TYPICAL ROADWAY SECTION**

SCALE: 1/4"=1'-0"  
STA. 55+00 - STA. 55+72  
STA. 56+04 - STA. 56+72

**PAVEMENT NOTES**

**PROPOSED BRIDGE PAVEMENT**

SURFACE: 1 1/2" SUPERPAVE BRIDGE PROTECTIVE COURSE - 9.5 (SPC-B-9.5) OVER  
1 1/2" SUPERPAVE BRIDGE PROTECTIVE COURSE - 12.5 (SPC-B-12.5) OVER  
SPRAY APPLIED BRIDGE MEMBRANE WATERPROOFING

**PROPOSED FULL DEPTH PAVEMENT**

SURFACE: 2" SUPERPAVE SURFACE COURSE OVER  
2 1/4" SUPERPAVE INTERMEDIATE COURSE

BASE: 4" SUPERPAVE BASE COURSE

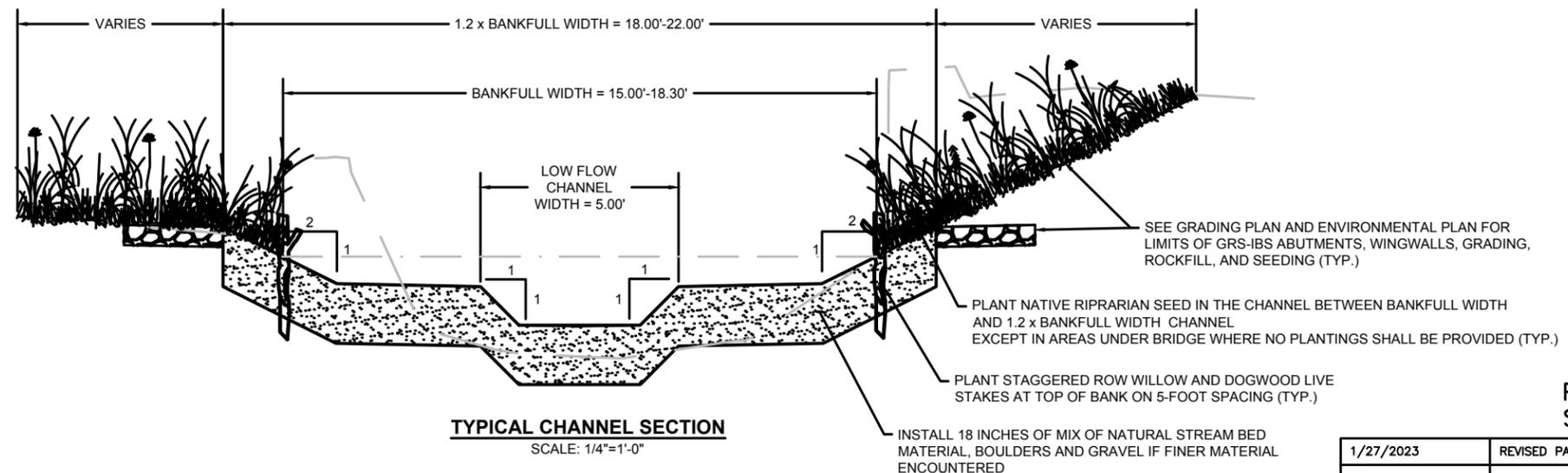
SUBBASE: 4" DENSE GRADED CRUSHED STONE OVER  
8" GRAVEL BORROW

**CHANNEL DESIGN AND CONSTRUCTION NOTES**

1. THE OBJECTIVE OF THE LOW FLOW CHANNEL IS TO MIMIC A NEARBY REFERENCE REACH IN TERMS OF CHANNEL BED PARTICLE SIZING AND HABITAT FEATURES SO THAT THE RECONSTRUCTED CHANNEL IS STABLE, HAS A CONCENTRATED LOW FLOW PATH, AND IS FISH PASSABLE UPON PROJECT COMPLETION.
2. BENCHES ARE TO BE ESTABLISHED TO ALLOW FOR PASSAGE OF SMALLER WILDLIFE.
3. THE LOW FLOW CHANNEL SHALL BE APPLIED UNDER THE INTEGRATED BRIDGE SYSTEM (IBS) AND WITHIN TRANSITION AREAS UP AND DOWNSTREAM TO TIE INTO THE EXISTING CHANNEL.
4. SET LOW FLOW CHANNEL WIDTH TO APPROXIMATELY 1/3 THE BANKFULL CHANNEL WIDTH (~5 FEET) AND LOW FLOW CHANNEL DEPTH TO APPROXIMATELY 1/2 THE BANKFULL CHANNEL DEPTH (~1 FOOT).
5. PARTICLE SIZING WITHIN THE LOW FLOW CHANNEL SHALL MIMIC NEARBY DISTRIBUTIONS APPROXIMATELY EQUAL TO 25% BOULDER, 65% COBBLE, AND 10% GRAVEL.
6. SOME 0.5 FOOT TALL DROPS (I.E., STEPS) DO EXIST WITHIN THE NEARBY CHANNEL. DROPS INCORPORATED INTO THE REALIGNED CHANNEL MUST BE FISH PASSABLE AND ARE SUBJECT TO APPROVAL BY THE PROJECT ENGINEER AND FISH BIOLOGIST.
7. UNLESS FIELD CONDITIONS INDICATE OTHERWISE (I.E., SHALLOW BEDROCK OR LARGE BOULDERS), THE USE OF A DROP OR STEP THROUGH THE IBS IS NOT ANTICIPATED.
8. DROPS ARE TO BE MADE OF BOULDERS EMBEDDED BY 75% OR MORE. THE RECONSTRUCTED CHANNEL SHALL NOT INCLUDE ANY DROPS WITHIN ONE (1) BANKFULL WIDTH OF THE INLET.
9. ALIGNMENT OF THE LOW FLOW CHANNEL THROUGH THE PROJECT REACH TO BE LOCATED IN THE FIELD DURING CONSTRUCTION BY THE PROJECT ENGINEER AND FISH BIOLOGIST.
10. PROPOSED CHANNEL TO BE CONSTRUCTED USING NATIVE STREAM BED MATERIAL EXCAVATED AND STOCKPILED, IF POSSIBLE.
11. PLACE NATIVE RIVER BOULDERS WITH GUIDANCE FROM PROJECT ENGINEER AND FISH BIOLOGIST. BOULDERS MAY BE PLACED ALONG BANK LINES OR EMBEDDED INTO THE CHANNEL TO PROVIDE HABITAT AND STRUCTURE STABILITY WHILE NOT REDUCING CAPACITY.

**HYDROLOGY NOTES**

100-YEAR DESIGN FLOOD DUE TO CLOGGING POTENTIAL  
Q100 = 58 CFS, OPENING APPROXIMATELY HALF FULL (HW = 2 FEET)  
GEOMORPHICALLY COMPATIBLE AS SPACE FOR SEDIMENT AND LARGE WOOD FROM ERODING WATERSHED.



**TYPICAL CHANNEL SECTION**

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

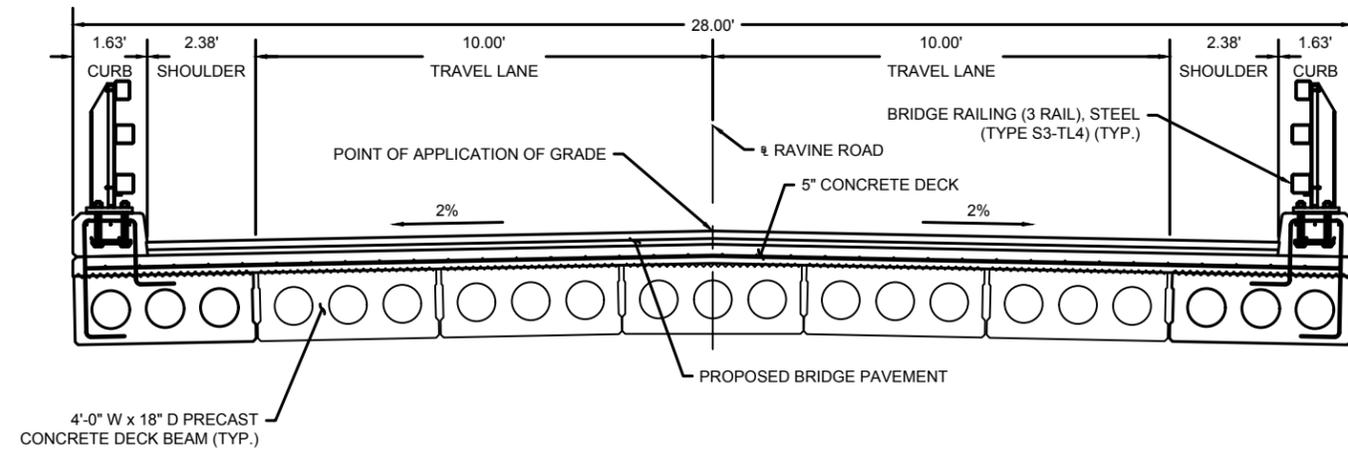
**PERMIT DRAWING:  
SHEET 12 OF 13**

DATE	REVISION	PAGE NUMBER	SEQUENCE
1/27/2023			

**NEW BRAINTREE  
RAVINE ROAD  
WINIMUSSET BROOK TRIBUTARY**

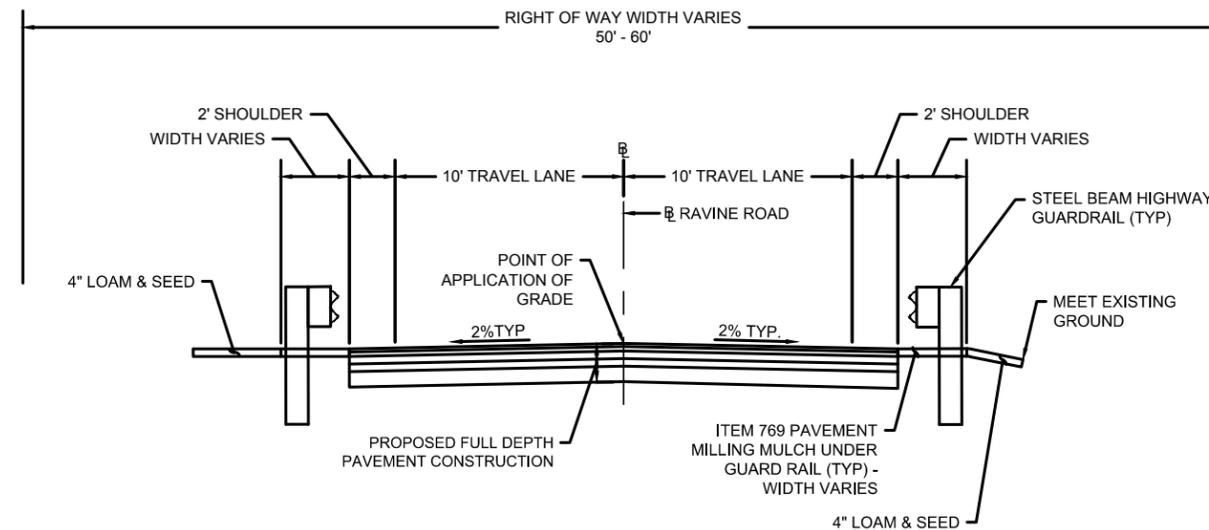
STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
MA	TBD	08	62
PROJECT FILE NO.		605035	

**TYPICAL SECTIONS**



**GRS-IBS - N-07-21 (CA3) SECTION**

SCALE: 1/4"=1'-0"  
STA. 66+99 - STA. 67+46



**TYPICAL ROADWAY SECTION**

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

**PAVEMENT NOTES**

**PROPOSED BRIDGE PAVEMENT**

SURFACE: 1 1/2" SUPERPAVE BRIDGE PROTECTIVE COURSE - 9.5 (SPC-B-9.5) OVER  
1 1/2" SUPERPAVE BRIDGE PROTECTIVE COURSE - 12.5 (SPC-B-12.5) OVER  
SPRAY APPLIED BRIDGE MEMBRANE WATERPROOFING

**PROPOSED FULL DEPTH PAVEMENT**

SURFACE: 2" SUPERPAVE SURFACE COURSE OVER  
2 1/4" SUPERPAVE INTERMEDIATE COURSE

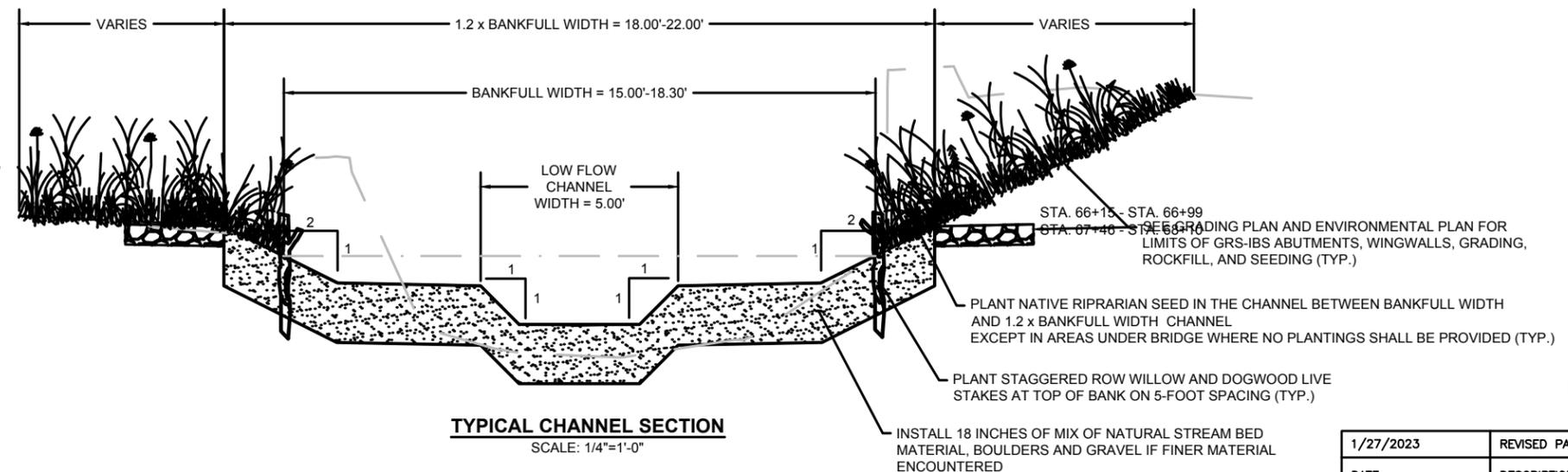
BASE: 4" SUPERPAVE BASE COURSE

SUBBASE: 4" DENSE GRADED CRUSHED STONE OVER  
8" GRAVEL BORROW

**CHANNEL DESIGN AND CONSTRUCTION NOTES**

1. THE OBJECTIVE OF THE LOW FLOW CHANNEL IS TO MIMIC A NEARBY REFERENCE REACH IN TERMS OF CHANNEL BED PARTICLE SIZING AND HABITAT FEATURES SO THAT THE RECONSTRUCTED CHANNEL IS STABLE, HAS A CONCENTRATED LOW FLOW PATH, AND IS FISH PASSABLE UPON PROJECT COMPLETION.
2. BENCHES ARE TO BE ESTABLISHED TO ALLOW FOR PASSAGE OF SMALLER WILDLIFE.
3. THE LOW FLOW CHANNEL SHALL BE APPLIED UNDER THE INTEGRATED BRIDGE SYSTEM (IBS) AND WITHIN TRANSITION AREAS UP AND DOWNSTREAM TO TIE INTO THE EXISTING CHANNEL.
4. SET LOW FLOW CHANNEL WIDTH TO APPROXIMATELY 1/3 THE BANKFULL CHANNEL WIDTH (~5 FEET) AND LOW FLOW CHANNEL DEPTH TO APPROXIMATELY 1/2 THE BANKFULL CHANNEL DEPTH (~1 FOOT).
5. PARTICLE SIZING WITHIN THE LOW FLOW CHANNEL SHALL MIMIC NEARBY DISTRIBUTIONS APPROXIMATELY EQUAL TO 25% BOULDER, 65% COBBLE, AND 10% GRAVEL.
6. SOME 0.5 FOOT TALL DROPS (I.E., STEPS) DO EXIST WITHIN THE NEARBY CHANNEL. DROPS INCORPORATED INTO THE REALIGNED CHANNEL MUST BE FISH PASSABLE AND ARE SUBJECT TO APPROVAL BY THE PROJECT ENGINEER AND FISH BIOLOGIST.
7. UNLESS FIELD CONDITIONS INDICATE OTHERWISE (I.E., SHALLOW BEDROCK OR LARGE BOULDERS), THE USE OF A DROP OR STEP THROUGH THE IBS IS NOT ANTICIPATED.
8. DROPS ARE TO BE MADE OF BOULDERS EMBEDDED BY 75% OR MORE. THE RECONSTRUCTED CHANNEL SHALL NOT INCLUDE ANY DROPS WITHIN ONE (1) BANKFULL WIDTH OF THE INLET.
9. ALIGNMENT OF THE LOW FLOW CHANNEL THROUGH THE PROJECT REACH TO BE LOCATED IN THE FIELD DURING CONSTRUCTION BY THE PROJECT ENGINEER AND FISH BIOLOGIST.
10. PROPOSED CHANNEL TO BE CONSTRUCTED USING NATIVE STREAM BED MATERIAL EXCAVATED AND STOCKPILED, IF POSSIBLE.
11. PLACE NATIVE RIVER BOULDERS WITH GUIDANCE FROM PROJECT ENGINEER AND FISH BIOLOGIST. BOULDERS MAY BE PLACED ALONG BANK LINES OR EMBEDDED INTO THE CHANNEL TO PROVIDE HABITAT AND STRUCTURE STABILITY WHILE NOT REDUCING CAPACITY.

**HYDROLOGY NOTES**  
100-YEAR DESIGN FLOOD DUE TO LOGGING POTENTIAL  
Q100 = 58 CFS, OPENING APPROXIMATELY HALF FULL (HW = 2 FEET)  
GEOMORPHICALLY COMPATIBLE AS SPACE FOR SEDIMENT AND LARGE WOOD  
FROM ERODING WATERSHED.



**TYPICAL CHANNEL SECTION**

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

**PERMIT DRAWING:  
SHEET 13 OF 13**

DATE	REVISION PAGE NUMBER SEQUENCE
1/27/2023	
	DESCRIPTION