STATE OF NEW HAMPSHIRE
INTER-DEPARTMENT COMMUNICATION

DATE: April 15, 2022

FROM: Andrew O'Sullivan
Wetlands Program Manager

AT (OFFICE): Department of Transportation
Bureau of Environment

SUBJECT: Final Engineered Design Plans
Derry-Londonderry 13065A Construction Contract
NHDES file #2018-03134

TO: Karl Benedict, Public Works Permitting Officer
New Hampshire Wetlands Bureau
29 Hazen Drive, P.O. Box 95
Concord, NH 03302-0095

In accordance with Condition #4 of the March 2021 NHDES approval notice, file #2018-03134, NHDOT is submitting the final engineered design plans and associated documentation for the Derry-Londonderry 13065A construction contract to the NHDES for approval prior to construction. Final analysis and designs for the three stream crossings in the 13065A construction area and the Tributary to Wheeler Pond stream relocation are completed and developed by the NHDOT design team in accordance with Env-Wt 900. No additional impacts for this construction contract subject to RSA 482-A jurisdiction are proposed and further permitting is not required to advance the final design.

A copy of the final design package and plans can be accessed on the Departments website via the following link: http://www.nh.gov/dot/org/projectdevelopment/environment/units/program-management/wetland-applications.htm.

A copy of the final design package and plans have been sent to the Army Corp of Engineers.

The lead people to contact for this project are Wendy Johnson, Bureau of Highway Design (271-3226 or Wendy.Johnson@dot.nh.gov) or Andrew O'Sullivan, Wetlands Program Manager, Bureau of Environment (271-3226 or Andrew.O'Sullivan@dot.nh.gov).

When final engineered design plans and associated documentation meets the approval of NHDES, please send confirmation directly to Andrew O'Sullivan, Wetlands Program Manager, Bureau of Environment, in order to commence construction.

AMO:amo
cc:
BOE Original
Michael Hicks, US Army Corp of Engineers (via electronic notification)
Kevin Nyhan, BOE (via electronic notification)
Wendy Johnson, Highway Design
Benjamin Martin, VHB

S:\Environment\PROJECTS\DERRY\13065\13065A\Wetlands\2022 Update\FINAL Memo, Plan and Matrix\Cover letter to NHDES

Memorandum

To: Wendy Johnson, PE
Project Manager

Marc Laurin
Senior Environmental Manager

Date: April 7, 2022

Project #: Derry-Londonderry 13065A
VHB #52768.00

From: Peter J. Walker
Nicole Martin, WSA
Annique Fleurat, PE

Re: NHDES Wetlands Permit No. 2018-03134
Interstate 93 Exit 4A Interchange Project
Contract A - Project Update

This memorandum provides an update of the team's progress on the Exit 4A project design (Derry-Londonderry 13065A), especially relative to the NH Department of Environmental Services (NHDES) and US Army Corps of Engineers (Corps) wetland approvals issued on May 5, 2020 and August 5, 2020, respectively. As you know, the design team has recently submitted Plans, Specifications, and Estimates (PS&E), in preparation for the April 19, 2022 deadline for advertising. Given that the PS&E submittal is a major design milestone, it provides an opportunity to present updated impact plans and other related information for agency review prior to advancing into the bid and construction phase.

As is typical for transportation projects of this size, the overall project has been subdivided into separate design contracts to facilitate the right-of-way (ROW) process and to foster a more competitive bidding environment. Specifically, three such construction contracts (Contracts A, B, and C) have been defined based on the status of ROW acquisition, as well as the location and scope of construction in each segment. **Figure 1** depicts the approximate limits of each contract.

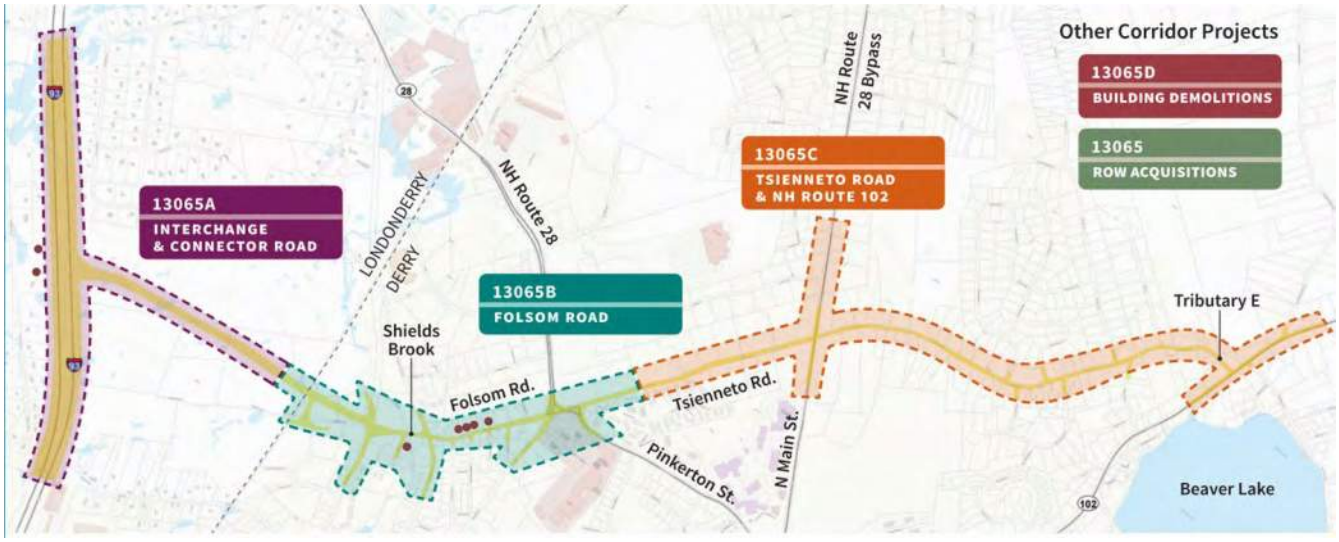

Figure 1. Derry-Londonderry 13065 (Exit 4A) Construction Contract Breakout

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Contract A (Interchange and Connector Road) includes Interstate 93 and the new connector road to the east and ends just before the Londonderry-Derry town line. This contract is proposed to be advertised in April 2022 and constructed in 2022-2023. Contract B (Folsom Road) begins at the end of Contract A just west of the Londonderry-Derry town line, extends along Folsom Road and down some intersecting roadways, and ends approximately 800 feet east of the Tsienneto Road and Pinkerton Street Intersection. Contract B is proposed to be advertised in October 2023 and constructed in 2024-2025. Contract C (Tsienneto Road and NH Route 102) begins at the end of Contract B and extends along Tsienneto Road up to and including the work on NH Route 102 (Chester Road). This contract also includes some work along NH Route 28 Bypass north and south of its intersection with Tsienneto Road. Contract C is proposed to be advertised in January 2025 and constructed in 2025-2026. Contracts A and C are being designed by VHB, while Contract B is being designed by a different consultant, McFarland-Johnson, Inc. (MJ).

This memorandum focuses on Contract A, the first of the three design segments scheduled for construction. Contract A includes construction of:

- The new I-93 Exit 4A interchange, including acceleration and deceleration lanes along I-93 northbound (NB) and southbound (SB) barrels,
- The relocation and restoration of the Wheeler Pond Tributary (also known as "Stream 1" or "Trolley Car Lane Stream"),
- A new bridge over I-93 to carry the interchange traffic, and
- Construction of a new connector road, recently named by the Town and now identified throughout as "Olde Rum Trail," from the new interchange east to Station 1038+50 at the Londonderry/Derry town line.

Similar updates for Contracts B and C will be prepared as those designs progress – likely in 2023 and 2024.

A. Wetland Impact Update

Attached is an updated wetland impact plan set with a corresponding impact summary table. (See **Attachment A**.) These impact plans were prepared by overlaying the Contract A PS&E slope limits onto the previously delineated wetlands. The wetlands are, with one exception,[1] as depicted in the plans prepared by Fuss & O'Neill (F&O) dated February 6, 2020 and referenced in the NHDES and Corps approvals (the "approved plans"). We used a combination of ArcGIS and CAD (OpenRoads) to identify the revised wetland impacts and calculate the updated impact totals. Some important considerations include:

[1] VHB (Kristopher P. Wilkes, NH CWS #288) refined the boundaries of Wetland 90. Note that the design of BMP 1038 has been modified to avoid permanent wetland impacts, so this minor revision does not affect the updated wetland tally.

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- As mentioned, there have been no changes or edits to the wetland boundaries, so all differences in the proposed impacts can be attributed to design changes (even the one exception at Wetland 90).
- Permanent impacts are based on the actual proposed limits of grading – whether a cut or a fill slope - except the impact to Wetland 64 and Vernal Pool 9 (Impacts BC, BD, BE, and BF). There is a possibility that the proposed cut slope in this area may impact these resources and could permanently drain Wetland 64 and the associated vernal pool. This impact was previously identified in the February 2020 approved plan set and included in the approved permit totals, so this impact has not been changed. Potential impacts to these resources will be further assessed during the upcoming wetland impact analysis update for Contract B.
- To determine temporary impacts, we applied a 5-foot buffer from the slope limits, like the previous wetland impact plans prepared by Fuss & O'Neill. We have conservatively applied this buffer even though the PS&E plans and NHDOT practices do not allow for the contractor to clear within wetlands. This buffer was increased slightly on the west side of the relocated Stream 1 (see discussion below), since we anticipate some additional clearing beyond the 5-foot buffer in certain areas to properly construct the restored stream channel.

Overall, based on the PS&E limits, permanent and temporary wetland impacts have decreased by about 22,622 square feet, from 287,289 sq ft to 264,667 sq ft. A summary of the impacts is presented in **Table 1**. This includes a 25,679 sq ft reduction of permanent impacts. Temporary impacts have increased from 43,103 sq ft to approximately 46,160 sq ft – due in part to revised design for the relocation of Wheeler Pond Tributary.

Table 1. Wetland Impacts – Permitted vs. PS&E Plans

	PS&E Plan	Permitted Plan	Change
Permanent Wetland Impact (sq ft)	209,405	234,853	-25,448
Permanent Stream Impact (sq ft)	9,102	9,333	-231
Temporary Impact (sq ft)	46,160	43,103	+3,057
Total Wetland Impact (sq ft)	**264,667**	**287,289**	**-22,622**
Permanent Bank Impact (lin ft)	543	543	0
Permanent Channel Impact (lin ft)	1,112	1,160	-48
Temporary Bank Impact (lin ft)	115	115	0
Temporary Channel Impact (lin ft)	2,004	1,938	+66
Total Stream Impacts (lin ft)	**3,774**	**3,756**	**+18**

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We reviewed the PS&E plans to identify any notable changes, which are described here:

- **Vernal Pools**: According to the approved plans, approximately 61,615 sq ft of vernal pool habitat would be permanently impacted in the Contract A area. This has been reduced to approximately 51,149 sq ft, including reductions of impact to VPs 2, 3, 4, 6, 8, and 42. Permanent impacts to VP46 increase slightly, from 611 sq ft to 628 sq ft, due to a modification of the slope line to better align the proposed culvert at Stream 8.
- **Wetlands**: According to the approved plans, approximately 234,853 sq ft of wetland habitat would be permanently impacted in the Contract A area. This has been reduced to approximately 209,405 sq ft in the PS&E plans. For the purposes of this analysis, we consider changes greater than 1,000 sq ft to be notable:
  - Wetland 11: According to the approved plans, approximately 7,106 sq ft of wetland habitat would be permanently impacted and 2,366 sq ft temporarily impacted in the Contract A area. This has been reduced to approximately 2,795 sq ft of permanent impact and approximately 1,428 sq ft of temporary impact in the PS&E plans. This results in an overall impact reduction of 5,249 sq ft (4,311 sq ft less permanent impact and 938 sq ft less temporary impact).
  - Wetland 14: According to the approved plans, approximately 95,325 sq ft of wetland habitat would be permanently impacted and 5,432 sq ft temporarily impacted in the Contract A area. This has been reduced to approximately 90,956 sq ft of permanent impact, while the temporary impact was increased to approximately 8,524 sq ft in the PS&E plans. This results in an overall impact reduction of 1,277 sq ft (4,369 sq ft less permanent impact and 3,092 sq ft more temporary impact due to the refinement of the Wheeler Pond Tributary relocation design).
  - Wetland 19: According to the approved plans, approximately 9,628 sq ft of wetland habitat would be permanently impacted and 0 sq ft temporarily impacted in the Contract A area. This has been reduced to approximately 6,979 sq ft of permanent impact, while the temporary impact was increased to approximately 202 sq ft in the PS&E plans. This results in an overall impact reduction of 2,447 sq ft (2,649 sq ft less permanent impact and 202 sq ft more temporary impact).
  - Wetland 90: According to the approved plans, approximately 1,148 sq ft of wetland habitat would be permanently impacted and 105 sq ft temporarily impacted in the Contract A area. This has been reduced to 0 sq ft of permanent impact and approximately 0 sq ft of temporary impact in the PS&E plans. This results in an overall impact reduction of approximately 1,253 sq ft. The PS&E design completed avoided impacting this resource.
- **Streams:** Overall, we decreased the proposed permanent stream impacts by about 231 sq ft and 48 lin ft. One area of a sizable stream impact reduction is with Stream 1 where impacts were reduced by approximately 483 sq ft (and increased by approximately 18 lin ft).
- **Temporary Impacts:** We increased the proposed temporary impacts by about 3,057 sq ft due largely to the refinement of the stream relocation design that expanded the temporary impact area beyond the 5-foot slope limits buffer to the east, since we anticipate some additional clearing beyond the 5-foot buffer in certain areas to properly construct the restored stream channel.

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B. Wheeler Pond Tributary – Updated Stream Relocation Plans

The Wheeler Pond Tributary (also known as "Stream 1" or "Trolley Car Lane Stream") flows from north to south within the forested area between Trolley Car Lane and I-93 southbound. Contract A includes construction of the I-93 SB ramp within a portion of the current tributary location. As depicted in the NHDES approved permit plans, the project includes relocation of a portion of this stream to allow for the construction of the new Exit 4A interchange.

Attachment B contains updated design plans for the Wheeler Pond Tributary relocation. The proposed design is based on the "Trolley Car Lane Stream Relocation Plan and Narrative" developed by F&O, dated April 2020, as approved by the NHDES Wetlands Bureau on May 5, 2020. The design recreates a stream channel and associated floodplain similar in character to the existing stream resource, including Rosgen Type B and Type E reaches.

The PS&E design proposes three distinct reaches, each with their own bankfull widths, depths, and planforms. Proposed Bankfull Widths (BFW) range from 6.4 feet for the "Upstream Reach" a small intermittent resource, to 10.8 feet for the upper perennial "Middle Reach" to 12.0 feet for the perennial "Downstream Reach." The plans include a design for proposed stream simulation material ("Streambed Material") based on observed pebble counts, with the gradation varying between the intermittent (finer) and perennial (coarser) stream reaches. A planting plan is included, depicting the creation of a riparian buffer, including two planting zones identified as the "Streambank" and "Vegetated Buffer" zones. The PS&E submittal includes seven Special Provisions to cover items required by the design but not contained in NHDOT's standard specifications.

Regarding the planform and layout of the relocated stream, the PS&E plans generally follow the F&O layout, which seeks to create a stable stream with sinuosity consistent with the impacted reaches. Like the approved plans, the PS&E plans propose to construct the Upstream Reach as a Rosgen E5 stream, with a proposed sinuosity of 1.39, the Middle Reach as a Rosgen E6 stream with a proposed sinuosity of 1.03, and the Downstream Reach as a Rosgen B4 stream with a proposed sinuosity of 1.01.

While the PS&E design maintains the major features of the F&O design (e.g., layout and sinuosity), a few noteworthy updates to the stream relocation plan include:

- **Refined BFW and depth estimates.** The PS&E design slightly increases the proposed BFW for the Downstream Reach from 10.8 ft to 12.0 ft based on field measurements obtained during summer 2021 field reviews. The proposed BFW for the Middle and Upper Reaches remains unchanged relative to the F&O plans, although their boundaries have been revised slightly.
- **More detailed proposed grading.** The PS&E design accounts for more detailed topographic surveys, including additional stream cross-sections developed by VHB in 2021.
- **Detailed meander and crossover cross-section designs.** The approved permit plans depicted a single typical cross-section for the entire stream. The PS&E plans recognize that channel cross-sections vary in natural streams, depending on planform geometry. The PS&E plan set contains three detailed typical cross-sections which would be applied to various meander and crossover sections.

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- **Addition of pool and riffle definition to the stream profile.** The plans now include detailed profile geometry with inclusion of pool and riffle features.
- **Addition and locations of root wads, riffle-crests, J-hooks.** We have added in-stream features intended to provide habitat value and ensure stream stability under various flow conditions. Details for these features are provided.
- **Limited grading and clearing impact throughout the stream reach.** The revised design limits floodplain grading and retains native riparian vegetation to the extent possible.
- **Additional detail on proposed plantings.** The plan set now includes more detail on the proposed planting plan. We substituted black cherry for alder to minimize the risk of avoiding an introduced alder species to the area, but otherwise propose the same species as in the April 2020 F&O plans. We have also revised planting quantities to reflect the current design.

Impacts TCF, C, B, D, TC, G, TH, L, TJ, M, TK, TL, N, and TM (see attached wetland impact plans in Attachment A) are associated with the stream relocation. The PS&E reduces the overall impacts to this system (permanent and temporary) from 120,746 sq ft / 1,834 lin ft to approximately 119,663 sq ft / 1,802 lin ft for an overall impact reduction of approximately 1,083 sq ft / 32 lin ft.

C. Stream Crossing Analysis – Previously Permitted Impact Areas

Condition 2 of the NHDES Permit #2018-03134 requires that:

> *"Final engineered design plans and associated documentation shall be submitted to the NHDES for approval prior to construction. Final analysis and designs for the remaining stream crossings in the project area shall be completed for the final design developed by the Design-Builder of the project in accordance with Env-Wt 900. Any additional impacts for this project are subject to RSA 482-A jurisdiction and will require further permitting."*

In addition to the relocation of Stream 1 as described above, the Contract A portion of the project includes three stream crossings, known as Streams 7, 8, and 9. Below, we describe each proposed stream crossing. Please refer to **Attachment C**, Stream Plan. NHDES Stream Crossing Worksheets have been completed for all three streams, and are appended as **Attachment D**.

Existing Conditions

Stream 7

Stream 7 is classified as Riverine, Intermittent, Streambed, with Mud substrate (R4SB5) and flows in a northeast to southwest direction from Wetland 19/Vernal Pool 42 into Wetland 17 before discharging into a 36-inch existing culvert that conveys the drainage southwest beneath I-93, eventually discharging to Wetland 14 on the west side of the highway corridor, just upstream of Stream 1. Stream 7 has a channel width ranging from three to four feet, bank height ranging

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from one to two feet, and a dominant substrate of mud. This stream channel passes through a well-vegetated herbaceous area within the open utility right-of-way (ROW) and then enters a dense tree canopy. The portion within the utility ROW is partially filled with cut woody debris from the routine vegetation maintenance. Refer to the photos provided in **Attachment E**.

Stream 8

Stream 8 is classified as R4SB5 and flows in a northeast to southwest direction from Wetland 22/Vernal Pool 46 into Wetland 20 and Wetland 19. Stream 8 has a channel width ranging from four to six feet, bank height ranging from zero to two feet, and a dominate substrate of mud. This stream channel is well defined within the forest and becomes less defined and more densely vegetated within the utility ROW as the hydrology spreads out within Wetland 19. See attached photos.

Stream 9

Stream 9 is classified as R4SB5 and is an ephemeral channel within the forest that flows in a northeast to southwest direction from Wetland 68/Vernal Pool 5 into Wetland 16/Vernal Pool 4. Stream 9 has a channel width ranging from two to four feet, a shallow bank height (likely ranging from zero to one foot), and a dominant substrate of mud. See attached photos.

Proposed Conditions

Stream 7

Approximately 42 feet of the existing 36-inch culvert that conveys Stream 7 will be removed from an existing manhole to its eastern (upstream) headwall (See Drainage Note R7 on the Stream Plan). A new section of 36-inch culvert will be extended 189 feet from the manhole to a new concrete headwall inlet at the remaining upstream section of the Stream 7 channel to the northeast (Drainage Note N34). This culvert extension is proposed to direct Stream 7 beneath the proposed I-93 northbound off-ramp that will traverse across the current alignment of Stream 7 to maintain the existing hydraulic connections across the I-93 corridor. The proposed inlet elevation is about 363.60. The culvert has been sized to convey the 50-year design storm without overtopping. See **Table 2**. Regarding permitted impacts, the PS&E design reduces permanent impacts to Stream 7 from 1,622 sq ft/233 lin ft (permitted) to 1,244 sq ft/186 lin ft. Temporary impacts increase by about 127 sq ft/30 lin ft, however.

Stream 8

A new 36-inch 275-foot-long culvert is proposed to convey Stream 8 beneath the proposed Olde Rum Trail connector road that will traverse across the current alignment of Stream 8 to maintain the existing hydraulic connections (See Drainage Note C34 on the Stream Plan). The proposed Olde Rum Trail connector road will fill approximately 291 linear

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feet of the Stream 8 channel, as well as Vernal Pool 42. The proposed inlet elevation is 374.00 and the proposed outlet elevation is 368.05. The culvert has been sized to convey the 50-year design storm without overtopping. The PS&E design does not change permanent or temporary impacts to Stream 8 - proposed impacts remain at 1,232 sq ft and 291 lin ft of permanent impact, with no temporary impacts, *i.e.,* the same as the permitted impact.

Stream 9

A new 24-inch culvert is proposed to convey Stream 9 beneath the proposed Best Management Practice (BMP) Maintenance Access Road to the proposed BMP 1012 that will traverse across the current alignment of Stream 9 to maintain the existing hydraulic connections (See Drainage Note C63 on the Stream Plan). The proposed inlet elevation is 353.65 and the proposed outlet elevation is 353.00. The culvert has been sized to convey the 50-year design storm without overtopping. Regarding permitted impacts, the PS&E design increases permanent impacts to Stream 9 from 48 sq ft/23 lin ft (permitted) to 332 sq ft/74 lin ft. Temporary impacts increase by about 45 sq ft/18 lin ft. These changes are due to the extension of an access road from BMP 1012 to BMP 1670.

Table 2. Stream Crossing Analysis – Hydraulic Capacity – 50-year Design Storm

				Design Storm Peak Flow Rates (cfs)	**Design Storm Peak Elevation (feet)**		
Stream ID	**Location**	**Impact**	**Watershed size**	*Proposed*	*Existing*	*Proposed*	*Proposed Freeboard*[1]
Stream 7 (Tier 1)	36-inch culvert at Sta. 1678/3680	Extend culvert	27.4 ac	16.1	359.6	368.6[2]	1.4
Stream 8 (Tier 1)	36-inch culvert Olde Rum Trail at Sta. 1012	New culvert	13.8 ac	0.4	--	376.9	2.7
Stream 9 (Tier 1)	24-inch culvert at Sta. 110+50	New culvert	14.0 ac	14.4	--	355.6	0.1

Notes:

1 Proposed freeboard indicates available capacity within the proposed culvert, in feet. A positive number indicates that the water surface elevation at the culvert inlet during the design storm is below the top of the culvert.

2 The apparent increase in the storm peak elevation is because the extended culvert inlet is located at a higher elevation (uphill) relative to the current culvert inlet. It does not indicate an increase in flood elevations.

Below, we provide responses to the design criteria for Tier 1 streams pursuant to NHDES Wetlands Bureau stream rules.

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Env-Wt 904.01 General Design Considerations

(a) All stream crossings, whether over tidal or non-tidal waters, shall be designed and constructed so as to:

(1) Not be a barrier to sediment transport;
The one proposed extended culvert and two new culverts will not be a barrier to sediment transport. The culverts have been adequately designed to accommodate the 50-year design storm and reduce the peak flow rates at the crossing locations.

(2) Not restrict high flows and maintain existing low flows;
As previously mentioned, the culverts were designed to accommodate the 50-year design storm and reduce the peak flow rates; therefore, they will not restrict high flows and will maintain existing low flows.

(3) Not obstruct or otherwise substantially disrupt the movement of aquatic organisms indigenous to the waterbody beyond the actual duration of construction;
All three streams impacted by Contract A are relatively small Tier 1 streams. Beyond the temporary duration of construction, aquatic organism passage through the extended culvert that convey Stream 7 will match the ability of the existing culvert. (Given the length of the existing culvert, AOP is likely limited.) The proposed culverts at Streams 8 and 9 are set at elevations which are intended to allow passage of aquatic organisms.

(4) Not cause an increase in the frequency of flooding or overtopping of banks;
Since the culverts have been designed to accommodate the 50-year design storm, they will not cause an increase in the frequency of flooding or overtopping of banks.

(5) Maintain or enhance geomorphic compatibility by:
a. Minimizing the potential for inlet obstruction by sediment, wood, or debris; and
b. Preserving the natural alignment of the stream channel;
The alignment of the stream channels will be modified as the flow will be conveyed through linear culverts. However, the inlet and outlets of the new/extended culverts have been located in a manner so as to minimize the potential for obstruction and preserve the natural alignment of the remaining stream channel.

(6) Preserve watercourse connectivity where it currently exists;
This project has included culverts wherever necessary to preserve watercourse connectivity where it currently exists.

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(7) Restore watercourse connectivity where:

a. Connectivity previously was disrupted as a result of human activity(ies); and

b. Restoration of connectivity will benefit aquatic organisms upstream or downstream of the crossing, or both;

The proposed stream crossings and culvert extension maintain all existing watercourse connectivity as a result of human activities. To allow for the construction of the northbound off ramp, the highway embankment will fill over the existing 18-inch drainpipe which had allowed VP4 to drain to VP3. The proposed design includes upgrading from 18-inch drainpipe to a proposed 24-inch culvert between the northbound off ramp and BMP 1670 (with a level spreader upstream of VP3) to maintain and improve this connection. The 24-inch culvert has been sized to convey the 50-year design storm without overtopping.

(8) Not cause erosion, aggradation, or scouring upstream or downstream of the crossing; and

The proposed crossings have been designed with standard measures to protect against erosion, aggradation, or scouring upstream or downstream of the crossing.

(9) Not cause water quality degradation.

The one proposed extended culvert and two new culverts will not cause water quality degradation.

Env-Wt 904.03 Tier 1 Stream Crossings.

(a) A tier 1 stream crossing shall be a crossing located on a watercourse where the contributing watershed is less than or equal to 200 acres.

(b) Tier 1 stream crossings shall:

(1) Meet the general design considerations specified in Env-Wt 904.01;

Refer to the text above for the project's compliance with Env-Wt 904.01.

(2) Be sized so as to accommodate the greater of:

a. The 50-year design storm; or

b. Applicable federal, state, or local requirements; and

The culverts were designed to accommodate the 50-year design storm.

(3) Be a span structure, pipe arch, open-bottom culvert, or closed-bottom culvert, with or without being embedded with stream simulation.

The one proposed extended culvert and two new culverts are all closed-bottom culverts.

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Attachments:

A - Wetland Impact Plans and Erosion Control Plans

B – Wheeler Pond Tributary Relocation Plans

C – Stream Plan

D – NHDES Stream Crossing Worksheets

E – Stream Photo Log

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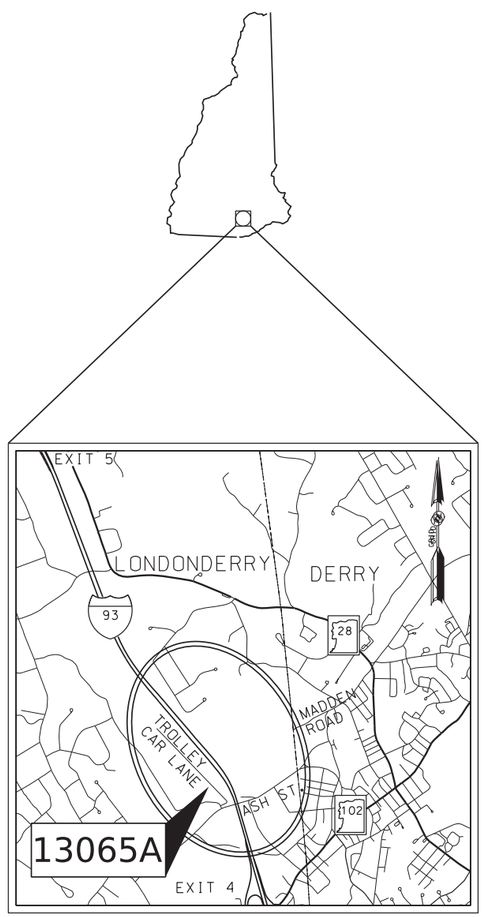
Attachment A

Wetland Impact Plans and Erosion Control Plans

STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION

WETLAND PLANS
FEDERAL AID PROJECT

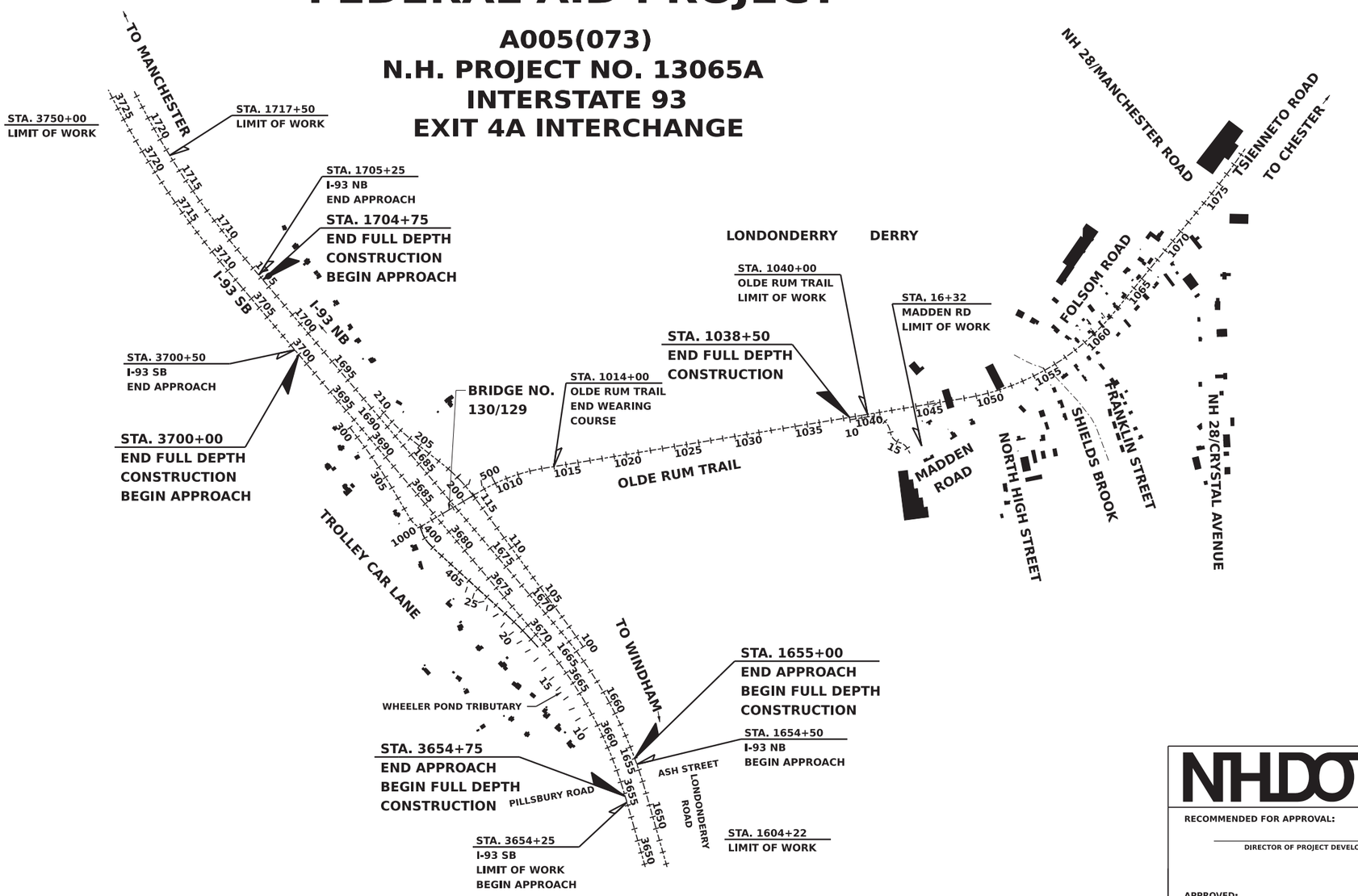
A005(073)
N.H. PROJECT NO. 13065A
INTERSTATE 93
EXIT 4A INTERCHANGE



LOCATION MAP

½ ¼ 0 ½ 1 mi.

GRAPHIC SCALE



TOWN OF LONDONDERRY & DERRY

COUNTY OF ROCKINGHAM

SCALE: 1"=500'

FOR CONSTRUCTION AND ALIGNMENT DETAILS - SEE CONSTRUCTION PLANS

INDEX OF SHEETS

1	TITLE SHEET
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35-44	DRAINAGE NOTES
45	TRAFFIC CONTROL SEQUENCING

DRAWN BY DATE

CHECKED BY DATE

NHDOT THE STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION

RECOMMENDED FOR APPROVAL:

DIRECTOR OF PROJECT DEVELOPMENT — DATE

APPROVED:

ASSISTANT COMMISSIONER AND CHIEF ENGINEER — DATE

FEDERAL PROJECT NO.	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
A005(073)	13065A	1	35

GENERAL

EDGE OF PAVEMENT — PROPOSED ROADWAY
TRAVELED WAY — existing roadway
(pavement removed outside slope lines)

DRIVEWAYS — (label surface type)

BUILDINGS — (building to be removed)
(label house or type of building)

FOUNDATION — (label type)

LEACH FIELD — leach field

BRIDGE CROSSINGS — STREAM — OVERPASS

STEPS AND WALK — (label type)

INTERMITTENT WATER COURSE

SHORE LINE — river/stream — pond — (label name of water body)

POTENTIAL WET AREA SYMBOL

BRUSH OR WOODS LINE

TREES (PLANS) — (deciduous) (coniferous) (stump)
(show station, circumference in feet & type)

TREE OR STUMP (CROSS-SECTIONS)

HEDGE — (label type)

MONITORING WELL — mon

WELL

FLAG POLE — fp

ORIGINAL GROUND (TYPICALS)

ROCK OUTCROP

ROCK LINE (TYPICALS & SECTIONS ONLY)

GUARDRAIL (label type) — existing — PROPOSED — bgr — cgr

JERSEY BARRIER

CURB (LABEL TYPE)

STONE WALL

RETAINING WALL (LABEL TYPE) — (points toward retained ground)

FENCE (LABEL TYPE)

SIGNS — (single post) — (double post)

GAS PUMP — gp

FUEL TANK (ABOVE GROUND) — ft — (label size & type)

STORAGE TANK FILLER CAP — fc

SEPTIC TANK — S

GRAVE — gr

MAILBOX — mb

VENT PIPE — vp

SATELLITE DISH ANTENNA — da

PHONE — ph

GROUND LIGHT/LAMP POST — gl — lp

BORING LOCATION

TEST PIT

INTERSTATE NUMBERED HIGHWAY — 93

UNITED STATES NUMBERED HIGHWAY — 3

STATE NUMBERED HIGHWAY — 102

SHORELAND - WETLAND

WETLAND DESIGNATION AND TYPE — 2 PUB2E
DELINEATED WETLAND — DW
ORDINARY HIGH WATER — OHW
TOP OF BANK — TOB
TOP OF BANK & ORDINARY HIGH WATER — TOBOHW
NORMAL HIGH WATER — NHW
WIDTH AT BANK FULL — WBF
PRIME WETLAND — PWET
PRIME WETLAND 100' BUFFER — PWET100
NON-JURISDICTIONAL DRAINAGE AREA — DA — NJDA
COWARDIN DISTINCTION LINE — CDL
TIDAL BUFFER ZONE — TBZ
DEVELOPED TIDAL BUFFER ZONE — DTBZ
HIGHEST OBSERVABLE TIDE LINE — HOTL
MEAN HIGH WATER — MHW
MEAN LOW WATER — MLW
VERNAL POOL — VP
SPECIAL AQUATIC SITE — SAS — SA
REFERENCE LINE — REF — RE
WATER FRONT BUFFER — 0 — WB50
NATURAL WOODLAND BUFFER — NWB150 — N
PROTECTED SHORELAND — PS250 — PS25
INVASIVE SPECIES LABEL — I I.S. — II I.S.
INVASIVE SPECIES — INV

FLOODPLAIN / FLOODWAY

500 YEAR FLOODPLAIN BOUNDARY — FP500
100 YEAR FLOODPLAIN BOUNDARY — FP100
FLOODWAY — FW

ENGINEERING

CONSTRUCTION BASELINE — 30 31 32
PC, PT, POT (ON CONST BASELINE)
PI (IN CONSTRUCTION BASELINES)
INTERSECTION OR EQUATION OF TWO LINES
ORIGINAL GROUND LINE (PROFILES AND CROSS-SECTIONS)
PROFILE GRADE LINE (PROFILES AND CROSS-SECTIONS)
CLEARING LINE — SLOPE LINE
SLOPE LINE — CLEARING LINE
SLOPE LINE (FILL)
SLOPE LINE (CUT)
PROFILES AND CROSS SECTIONS:
ORIGINAL GROUND ELEVATION (LEFT) — 72.5
FINISHED GRADE ELEVATION (RIGHT) — 79.14

REVISIONS AFTER PROPOSAL

NUMBER	DESCRIPTION	STATION	DATE

		DATE
SDR PROCESSED	VHB TEAM/NHDOT	2/8/2022
NEW DESIGN	VHB TEAM	3/21/2022
SHEET CHECKED	J. HILTON	3/21/2022
AS BUILT DETAILS		DATE

STATE OF NEW HAMPSHIRE
LONDONDERRY & DERRY
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

STANDARD SYMBOLS

MODEL:	SHEET 1 OF 2	REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
		2/25/2022	13065A_stdsymb1-2	13065A	2	35

DRAINAGE

MANHOLE

CATCH BASIN — cb

DROP INLET — di

(existing) / (PROPOSED)

DRAINAGE PIPE (existing) — DP — DP — (label size & type)

DRAINAGE PIPE (PROPOSED) — POP — POP

UNDERDRAIN (existing) W/ FLUSHING BASIN — DP — fb — DP — (label size & type)

UNDERDRAIN (PROPOSED) W/ FLUSHING BASIN — POP — POP

show direction of flow

HEADER (existing & PROPOSED) — DP — POP — (with stone outlet protection)

END SECTION (existing & PROPOSED)
- DP — POP — METAL or PLASTIC
- DP — POP — RCP

OPEN DITCH (PROPOSED)

EROSION CONTROL/ STONE SLOPE PROTECTION

BOUNDARIES / RIGHT-OF-WAY

RIGHT-OF-WAY LINE — (label type)

RR RIGHT-OF-WAY LINE

PROPERTY LINE — PL — PL

PROPERTY LINE (COMMON OWNER) — Z — Z

TOWN LINE — BOW / CONCORD

COUNTY LINE — COOS / GRAFTON

STATE LINE — MAINE / NEW HAMPSHIRE

NATIONAL FOREST

CONSERVATION LAND — LC — LC

BENCH MARK / SURVEY DISK

BOUND — bnd — (PROPOSED)

STATE LINE/ TOWN LINE MONUMENT — S/L — T/L

NHDOT PROJECT MARKER

IRON PIPE OR PIN — ip

DRILL HOLE IN ROCK — dh

TAX MAP AND LOT NUMBER — 156 / 14 — 1642/341 — 6.80 Ac.±

PROPERTY PARCEL NUMBER — 12

HISTORIC PROPERTY — H

UTILITIES

	existing	PROPOSED
TELEPHONE POLE		
POWER POLE		
JOINT OCCUPANCY		
MISCELLANEOUS/UNKNOWN POLE		
GUY POLE OR PUSH BRACE		
LIGHT POLE		
LIGHT ON POWER POLE		
LIGHT ON JOINT POLE		

(plot point at face not center of symbol)

POLE STATUS: REMOVE, LEAVE, PROPOSED, OR TEMPORARY AS APPLICABLE e.g.: R, L, P+04 25.0', T+04 25.0'

RAILROAD — (label ownership)

RAILROAD SIGN

RAILROAD SIGNAL

UTILITY JUNCTION BOX — jb — JB

OVERHEAD WIRE — OW — OW — (label type)

UNDERGROUND UTILITIES

WATER (on existing lines label size, type and note if abandoned) — W — W — PW — PW

SEWER — S — S — PS — PS

TELEPHONE — T — T — PT — PT

ELECTRIC — E — E — PE — PE

GAS — G — G — PG — PG

LIGHTING — L — L — PL — PL

INTELLIGENT TRANSPORTATION SYSTEM — ITS — ITS — PITS — PITS

FIBER OPTIC — FO — FO — PFO — PFO

WATER SHUT OFF — WSO

GAS SHUT OFF — GSO

HYDRANT — HYD

MANHOLES

SEWER — MHS

TELEPHONE — MHT

ELECTRICAL — MHE

GAS — MHG

UNKNOWN

WATER — MHW

TRAFFIC SIGNALS / ITS

	existing	PROPOSED
MAST ARM		30' MA (NOTE ANGLE FROM ℄)
OPTICOM RECEIVER		
OPTICOM STROBE		
TRAFFIC SIGNAL		
PEDESTAL WITH PEDESTRIAN SIGNAL HEADS AND PUSH BUTTON UNIT		
SIGNAL CONDUIT	C — C — C	PC — PC — PC
CONTROLLER CABINET	cc	CC
METER PEDESTAL	mp	MP
PULL BOX	pb	PB
LOOP DETECTOR (QUADRUPOLE)		(label size)
LOOP DETECTOR (RECTANGULAR)		(label size)
CAMERA POLE (CCTV)		
FIBER OPTIC DELINEATOR	fod	FOD
FIBER OPTIC SPLICE VAULT		SVF
ITS EQUIPMENT CABINET	its	ITS
MOTOR VEHICLE DETECTION SYSTEM (MVDS)		
VARIABLE SPEED LIMIT SIGN		
DYNAMIC MESSAGE SIGN		
ROAD AND WEATHER INFO SYSTEM		

CONSTRUCTION NOTES

CURB MARK NUMBER - BITUMINOUS	B-1
CURB MARK NUMBER - GRANITE	G-1
CLEARING AND GRUBBING AREA	A
DRAINAGE NOTE	1
EROSION CONTROL NOTE	A
FENCING NOTE	A
GUARDRAIL NOTE	1
ITS NOTE	1
LIGHTING NOTE	A
TRAFFIC SIGNAL NOTE	1

REVISIONS AFTER PROPOSAL

NUMBER	DESCRIPTION	STATION	DATE

		DATE
SDR PROCESSED	VHB TEAM/NHDOT	2/8/2022
NEW DESIGN	VHB TEAM	3/21/2022
SHEET CHECKED	J. HILTON	3/21/2022
AS BUILT DETAILS		DATE

STATE OF NEW HAMPSHIRE
LONDONDERRY & DERRY
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

STANDARD SYMBOLS

MODEL:	SHEET 2 OF 2	REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
		2/25/2022	13065A_stdsymb1-2	13065A	3	35

EROSION CONTROL STRATEGIES

1. ENVIRONMENTAL COMMITMENTS:
   1.1. THESE GUIDELINES DO NOT RELIEVE THE CONTRACTOR FROM COMPLIANCE WITH ANY CONTRACT PROVISIONS, OR APPLICABLE FEDERAL, STATE, AND LOCAL REGULATIONS.
   1.2. THIS PROJECT WILL BE SUBJECT TO THE US EPA'S NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) STORM WATER CONSTRUCTION GENERAL PERMIT AS ADMINISTERED BY THE ENVIRONMENTAL PROTECTION AGENCY (EPA). THIS PROJECT IS SUBJECT TO REQUIREMENTS IN THE MOST RECENT CONSTRUCTION GENERAL PERMIT (CGP).
   1.3. THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE NHDES WETLAND PERMIT, THE US ARMY CORPS OF ENGINEERS PERMIT, WATER QUALITY CERTIFICATION AND THE SPECIAL ATTENTION ITEMS INCLUDED IN THE CONTRACT DOCUMENTS.
   1.4. ALL STORM WATER, EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE NEW HAMPSHIRE STORMWATER MANUAL, VOLUME 3, EROSION AND SEDIMENT CONTROLS DURING CONSTRUCTION (DECEMBER 2008) (BMP MANUAL) AVAILABLE FROM THE NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES (NHDES).
   1.5. THE CONTRACTOR SHALL COMPLY WITH RSA 485-A:17, AND ALL, PUBLISHED NHDES ALTERATION OF TERRAIN ENV-WQ 1500 REQUIREMENTS (HTTP://DES.NH.GOV/ORGANIZATION/COMMISSIONER/LEGAL/RULES/INDEX.HTM)
   1.6. THE CONTRACTOR IS DIRECTED TO REVIEW AND COMPLY WITH SECTION 107.1 OF THE CONTRACT AS IT REFERS TO SPILLAGE, AND ALSO WITH REGARDS TO EROSION, POLLUTION, AND TURBIDITY PRECAUTIONS.

2. STANDARD EROSION CONTROL SEQUENCING APPLICABLE TO ALL CONSTRUCTION PROJECTS:
   2.1. PERIMETER CONTROLS SHALL BE INSTALLED PRIOR TO EARTH DISTURBING ACTIVITIES. PERIMETER CONTROLS AND STABILIZED CONSTRUCTION EXITS SHALL BE INSTALLED AS SHOWN IN THE BMP MANUAL AND AS DIRECTED BY THE STORMWATER POLLUTION PREVENTION PLAN (SWPPP) PREPARER.
   2.2. EROSION, SEDIMENTATION CONTROL MEASURES AND INFILTRATION BASINS SHALL BE CLEANED, REPLACED AND AUGMENTED AS NECESSARY TO PREVENT SEDIMENTATION BEYOND PROJECT LIMITS THROUGHOUT THE PROJECT DURATION.
   2.3. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSPECTED IN ACCORDANCE WITH THE CONSTRUCTION GENERAL PERMIT AND SECTION 645 OF THE NHDOT SPECIFICATIONS FOR ROAD AND BRIDGES CONSTRUCTION.
   2.4. AN AREA SHALL BE CONSIDERED STABLE IF ONE OF THE FOLLOWING HAS OCCURRED:
      (A) BASE COURSE GRAVELS HAVE BEEN INSTALLED IN AREAS TO BE PAVED;
      (B) A MINIMUM OF 85% VEGETATED GROWTH HAS BEEN ESTABLISHED;
      (C) A MINIMUM OF 3" OF NON-EROSIVE MATERIAL SUCH AS STONE OR RIP-RAP HAS BEEN INSTALLED;
      (D) TEMPORARY SLOPE STABILIZATION CONFORMING TO TABLE 1 HAS BEEN PROPERLY INSTALLED
   2.5. ALL STOCKPILES SHALL BE CONTAINED WITH A PERIMETER CONTROL. IF THE STOCKPILE IS TO REMAIN UNDISTURBED FOR MORE THAN 14 DAYS, MULCHING WILL BE REQUIRED.
   2.6. A WATER TRUCK SHALL BE AVAILABLE TO CONTROL EXCESSIVE DUST AT THE DIRECTION OF THE CONTRACT ADMINISTRATOR.
   2.7. TEMPORARY EROSION AND SEDIMENTATION CONTROL MEASURES SHALL REMAIN UNTIL THE AREA HAS BEEN PERMANENTLY STABILIZED.
   2.8. CONSTRUCTION PERFORMED ANY TIME BETWEEN NOVEMBER 30" AND MAY 1" OF ANY YEAR SHALL BE CONSIDERED WINTER CONSTRUCTION AND SHALL CONFORM TO THE FOLLOWING REQUIREMENTS.
      (A) ALL PROPOSED VEGETATED AREAS WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15", OR WHICH ARE DISTURBED AFTER OCTOBER 15", SHALL BE STABILIZED IN ACCORDANCE WITH TABLE 1.
      (B) ALL DITCHES OR SWALES WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15", OR WHICH ARE DISTURBED AFTER OCTOBER 15", SHALL BE STABILIZED TEMPORARILY WITH STONE OR IN ACCORDANCE WITH TABLE 1.
      (C) AFTER NOVEMBER 30" INCOMPLETE ROAD SURFACES, WHERE WORK HAS STOPPED FOR THE SEASON, SHALL BE PROTECTED IN ACCORDANCE WITH TABLE 1.
      (D) WINTER EXCAVATION AND EARTHWORK SHALL BE DONE SUCH THAT NO MORE THAN 1 ACRE OF THE PROJECT IS WITHOUT STABILIZATION AT ONE TIME, UNLESS A WINTER CONSTRUCTION PLAN HAS BEEN APPROVED BY NHDOT THAT MEETS THE REQUIREMENTS OF ENV-WQ 1505.02 AND ENV-WQ 1505.05.
      (E) A SWPPP AMENDMENT SHALL BE SUBMITTED TO THE DEPARTMENT, FOR APPROVAL, ADDRESSING COLD WEATHER STABILIZATION (ENV-WQ 1505.05) AND INCLUDING THE REQUIREMENTS OF NO LESS THAN 30 DAYS PRIOR TO THE COMMENCEMENT OF WORK SCHEDULED AFTER NOVEMBER 30".

GENERAL CONSTRUCTION PLANNING AND SELECTION OF STRATEGIES TO CONTROL EROSION AND SEDIMENT ON HIGHWAY CONSTRUCTION PROJECTS

3. PLAN ACTIVITIES TO ACCOUNT FOR SENSITIVE SITE CONDITIONS:
   3.1. CLEARLY FLAG AREAS TO BE PROTECTED IN THE FIELD AND PROVIDE CONSTRUCTION BARRIERS TO PREVENT TRAFFICKING OUTSIDE OF WORK AREAS.
   3.2. CONSTRUCTION SHALL BE SEQUENCED TO LIMIT THE DURATION AND AREA OF EXPOSED SOILS.
   3.3. PROTECT AND MAXIMIZE EXISTING NATIVE VEGETATION AND NATURAL FOREST BUFFERS BETWEEN CONSTRUCTION ACTIVITY AND SENSITIVE AREAS.
   3.4. WHEN WORK IS PERFORMED IN AND NEAR WATER COURSES, STREAM FLOW DIVERSION METHODS SHALL BE IMPLEMENTED PRIOR TO ANY EXCAVATION OR FILLING.
   3.5. WHEN WORK IS PERFORMED WITHIN 50 FEET OF SURFACE WATERS (WETLAND, OPEN WATER OR FLOWING WATER), PERIMETER CONTROL SHALL BE ENHANCED CONSISTENT WITH SECTION 2.1.2.1. OF THE 2012 NPDES CONSTRUCTION GENERAL PERMIT.

4. MINIMIZE THE AMOUNT OF EXPOSED SOIL:
   4.1. CONSTRUCTION SHALL BE SEQUENCED TO LIMIT THE DURATION AND AREA OF EXPOSED SOILS. MINIMIZE THE AREA OF EXPOSED SOIL AT ANY ONE TIME. PHASING SHALL BE USED TO REDUCE THE AMOUNT AND DURATION OF SOIL EXPOSED TO THE ELEMENTS AND VEHICLE TRACKING.
   4.2. UTILIZE TEMPORARY MULCHING OR PROVIDE ALTERNATE TEMPORARY STABILIZATION ON EXPOSED SOILS IN ACCORDANCE WITH TABLE 1.
   4.3. THE MAXIMUM AMOUNT OF DISTURBED EARTH SHALL NOT EXCEED A TOTAL OF 5 ACRES FROM MAY 1" THROUGH NOVEMBER 30", OR EXCEED ONE ACRE DURING WINTER MONTHS, UNLESS THE CONTRACTOR DEMONSTRATES TO THE DEPARTMENT THAT THE ADDITIONAL AREA OF DISTURBANCE IS NECESSARY TO MEET THE CONTRACTORS CRITICAL PATH METHOD SCHEDULE (CPM), AND THE CONTRACTOR HAS ADEQUATE RESOURCES AVAILABLE TO ENSURE THAT ENVIRONMENTAL COMMITMENTS WILL BE MET.

5. CONTROL STORMWATER FLOWING ONTO AND THROUGH THE PROJECT:
   5.1. DIVERT OFF SITE RUNOFF OR CLEAN WATER AWAY FROM THE CONSTRUCTION ACTIVITY TO REDUCE THE VOLUME THAT NEEDS TO BE TREATED ON SITE.
   5.2. DIVERT STORM RUNOFF FROM UPSLOPE DRAINAGE AREAS AWAY FROM DISTURBED AREAS, SLOPES, AND AROUND ACTIVE WORK AREAS AND TO A STABILIZED OUTLET LOCATION.
   5.3. CONSTRUCT IMPERMEABLE BARRIERS AS NECESSARY TO COLLECT OR DIVERT CONCENTRATED FLOWS FROM WORK OR DISTURBED AREAS.
   5.4. STABILIZE, TO APPROPRIATE ANTICIPATED VELOCITIES, CONVEYANCE CHANNELS OR PUMPING SYSTEMS NEEDED TO CONVEY CONSTRUCTION STORMWATER TO BASINS AND DISCHARGE LOCATIONS PRIOR TO USE.
   5.5. DIVERT OFF-SITE WATER THROUGH THE PROJECT IN AN APPROPRIATE MANNER SO NOT TO DISTURB THE UPSTREAM OR DOWNSTREAM SOILS, VEGETATION OR HYDROLOGY BEYOND THE PERMITTED AREA.

6. PROTECT SLOPES:
   6.1. INTERCEPT AND DIVERT STORM RUNOFF FROM UPSLOPE DRAINAGE AREAS AWAY FROM UNPROTECTED AND NEWLY ESTABLISHED AREAS AND SLOPES TO A STABILIZED OUTLET OR CONVEYANCE.
   6.2. CONSIDER HOW GROUNDWATER SEEPAGE ON CUT SLOPES MAY IMPACT SLOPE STABILITY AND INCORPORATE APPROPRIATE MEASURES TO MINIMIZE EROSION.
   6.3. CONVEY STORMWATER DOWN THE SLOPE IN A STABILIZED CHANNEL OR SLOPE DRAIN.
   6.4. THE OUTER FACE OF THE FILL SLOPE SHOULD BE IN A LOOSE RUFFLED CONDITION PRIOR TO TURF ESTABLISHMENT. TOPSOIL OR HUMUS LAYERS SHALL BE TRACKED UP AND DOWN THE SLOPE, DISKED, HARROWED, DRAGGED WITH A CHAIN OR MAT, MACHINE-RAKED, OR HAND-WORKED TO PRODUCE A RUFFLED SURFACE.

7. ESTABLISH STABILIZED CONSTRUCTION EXITS:
   7.1. INSTALL AND MAINTAIN CONSTRUCTION EXITS, ANYWHERE TRAFFIC LEAVES A CONSTRUCTION SITE ONTO A PUBLIC RIGHT-OF-WAY.
   7.2. SWEEP ALL CONSTRUCTION RELATED DEBRIS AND SOIL FROM THE ADJACENT PAVED ROADWAYS AS NECESSARY.

8. PROTECT STORM DRAIN INLETS:
   8.1. DIVERT SEDIMENT LADEN WATER AWAY FROM INLET STRUCTURES TO THE EXTENT POSSIBLE.
   8.2. INSTALL SEDIMENT BARRIERS AND SEDIMENT TRAPS AT INLETS TO PREVENT SEDIMENT FROM ENTERING THE DRAINAGE SYSTEM.
   8.3. CLEAN CATCH BASINS, DRAINAGE PIPES, AND CULVERTS IF SIGNIFICANT SEDIMENT IS DEPOSITED.
   8.4. DROP INLET SEDIMENT BARRIERS SHOULD NEVER BE USED AS THE PRIMARY MEANS OF SEDIMENT CONTROL AND SHOULD ONLY BE USED TO PROVIDE AN ADDITIONAL LEVEL OF PROTECTION TO STRUCTURES AND DOWN-GRADIENT SENSITIVE RECEPTORS.

9. SOIL STABILIZATION:
   9.1. WITHIN THREE DAYS OF THE LAST ACTIVITY IN AN AREA, ALL EXPOSED SOIL AREAS, WHERE CONSTRUCTION ACTIVITIES ARE COMPLETE, SHALL BE STABILIZED.
   9.2. IN ALL AREAS, TEMPORARY SOIL STABILIZATION MEASURES SHALL BE APPLIED IN ACCORDANCE WITH THE STABILIZATION REQUIREMENTS (SECTION 2.2) OF THE 2012 CGP. (SEE TABLE 1 FOR GUIDANCE ON THE SELECTION OF TEMPORARY SOIL STABILIZATION MEASURES.)
   9.3. EROSION CONTROL SEED MIX SHALL BE SOWN IN ALL INACTIVE CONSTRUCTION AREAS THAT WILL NOT BE PERMANENTLY SEEDED WITHIN TWO WEEKS OF DISTURBANCE AND PRIOR TO SEPTEMBER 15, OF ANY GIVEN YEAR, IN ORDER TO ACHIEVE VEGETATIVE STABILIZATION PRIOR TO THE END OF THE GROWING SEASON.
   9.4. SOIL TACKIFIERS MAY BE APPLIED IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS AND REAPPLIED AS NECESSARY TO MINIMIZE SOIL AND MULCH LOSS UNTIL PERMANENT VEGETATION IS ESTABLISHED.

10. RETAIN SEDIMENT ON-SITE AND CONTROL DEWATERING PRACTICES:
   10.1. TEMPORARY SEDIMENT BASINS (CGP-SECTION 2.1.3.2) OR SEDIMENT TRAPS (ENV-WQ 1506.10) SHALL BE SIZED TO RETAIN, ON SITE, THE VOLUME OF A 2-YEAR 24-HOUR STORM EVENT FOR ANY AREA OF DISTURBANCE OR 3,600 CUBIC FEET OF STORMWATER RUNOFF PER ACRE OF DISTURBANCE, WHICHEVER IS GREATER.
   TEMPORARY SEDIMENT BASINS USED TO TREAT STORMWATER RUNOFF FROM AREAS GREATER THAN 5-ACRES OF DISTURBANCE SHALL BE SIZED TO ALSO CONTROL STORMWATER RUNOFF FROM A 10-YEAR 24 HOUR STORM EVENT. ON-SITE RETENTION OF THE 10-YEAR 24-HOUR EVENT IS NOT REQUIRED.
   10.2. CONSTRUCT AND STABILIZE DEWATERING INFILTRATION BASINS PRIOR TO ANY EXCAVATION THAT MAY REQUIRE DEWATERING.
   10.3. TEMPORARY SEDIMENT BASINS OR TRAPS SHALL BE PLACED AND STABILIZED AT LOCATIONS WHERE CONCENTRATED FLOW (CHANNELS AND PIPES) DISCHARGE TO THE SURROUNDING ENVIRONMENT FROM AREAS OF UNSTABILIZED EARTH DISTURBING ACTIVITIES.

11. ADDITIONAL EROSION AND SEDIMENT CONTROL GENERAL PRACTICES:
   11.1. USE TEMPORARY MULCHING, PERMANENT MULCHING, TEMPORARY VEGETATIVE COVER, AND PERMANENT VEGETATIVE COVER TO REDUCE THE NEED FOR DUST CONTROL. USE MECHANICAL SWEEPERS ON PAVED SURFACES WHERE NECESSARY TO PREVENT DUST BUILDUP. APPLY WATER, OR OTHER DUST INHIBITING AGENTS OR TACKIFIERS, AS APPROVED BY THE NHDES.
   11.2. ALL STOCKPILES SHALL BE CONTAINED WITH TEMPORARY PERIMETER CONTROLS. INACTIVE SOIL STOCKPILES SHOULD BE PROTECTED WITH SOIL STABILIZATION MEASURES (TEMPORARY EROSION CONTROL SEED MIX AND MULCH, SOIL BINDER) OR COVERED WITH ANCHORED TARPS.
   11.3. EROSION AND SEDIMENT CONTROL MEASURES WILL BE INSPECTED IN ACCORDANCE WITH SECTION 645 OF NHDOT SPECIFICATIONS, WEEKLY AND WITHIN 24 HOURS AFTER ANY STORM EVENT GREATER THAN 0.25 IN. OF RAIN PER 24-HOUR PERIOD. EROSION AND SEDIMENT CONTROL MEASURES WILL ALSO BE INSPECTED IN ACCORDANCE WITH THE GUIDANCE MEMO FROM THE NHDES CONTAINED WITHIN THE CONTRACT PROPOSAL AND THE EPA CONSTRUCTION GENERAL PERMIT.
   11.4. THE CONTRACTOR SHOULD UTILIZE STORM DRAIN INLET PROTECTION TO PREVENT SEDIMENT FROM ENTERING A STORM DRAINAGE SYSTEM PRIOR TO THE PERMANENT STABILIZATION OF THE CONTRIBUTING DISTURBED AREA.
   11.5. PERMANENT STABILIZATION MEASURES WILL BE CONSTRUCTED AND MAINTAINED IN LOCATIONS AS SHOWN ON THE CONSTRUCTION PLANS TO STABILIZE AREAS. VEGETATIVE STABILIZATION SHALL NOT BE CONSIDERED PERMANENTLY STABILIZED UNTIL VEGETATIVE GROWTH COVERS AT LEAST 85% OF THE DISTURBED AREA. THE CONTRACTOR SHALL BE RESPONSIBLE FOR EROSION AND SEDIMENT CONTROL FOR ONE YEAR AFTER PROJECT COMPLETION.
   11.6. CATCH BASINS: CARE SHALL BE TAKEN TO ENSURE THAT SEDIMENTS DO NOT ENTER ANY EXISTING CATCH BASINS DURING CONSTRUCTION. THE CONTRACTOR SHALL PLACE TEMPORARY STONE INLET PROTECTION OVER INLETS IN AREAS OF SOIL DISTURBANCE THAT ARE SUBJECT TO SEDIMENT CONTAMINATION.
   11.7. TEMPORARY AND PERMANENT DITCHES SHALL BE CONSTRUCTED, STABILIZED AND MAINTAINED IN A MANNER THAT WILL MINIMIZE SCOUR. TEMPORARY AND PERMANENT DITCHES SHALL BE DIRECTED TO DRAIN TO SEDIMENT BASINS OR STORM WATER COLLECTION AREAS.
   11.8. WINTER EXCAVATION AND EARTHWORK ACTIVITIES NEED TO BE LIMITED IN EXTENT AND DURATION, TO MINIMIZE POTENTIAL EROSION AND SEDIMENTATION IMPACTS. THE AREA OF EXPOSED SOIL SHALL BE LIMITED TO ONE ACRE, OR THAT WHICH CAN BE STABILIZED AT THE END OF EACH DAY UNLESS A WINTER CONSTRUCTION PLAN, DEVELOPED BY A QUALIFIED ENGINEER OR A CPESC SPECIALIST, IS REVIEWED AND APPROVED BY THE DEPARTMENT.
   11.9. CHANNEL PROTECTION MEASURES SHALL BE SUPPLEMENTED WITH PERIMETER CONTROL MEASURES WHEN THE DITCH LINES OCCUR AT THE BOTTOM OF LONG FILL SLOPES. THE PERIMETER CONTROLS SHALL BE INSTALLED ON THE FILL SLOPE TO MINIMIZE THE POTENTIAL FOR FILL SLOPE SEDIMENT DEPOSITS IN THE DITCH LINE.

BEST MANAGEMENT PRACTICES (BMP) BASED ON AMOUNT OF OPEN CONSTRUCTION AREA

12. STRATEGIES SPECIFIC TO OPEN AREAS LESS THAN 5 ACRES:
   12.1. THE CONTRACTOR SHALL COMPLY WITH RSA 485:A:17 AND ENV-WQ 1500; ALTERATION OF TERRAIN FOR CONSTRUCTION AND USE ALL CONVENTIONAL BMP STRATEGIES.
   12.2. SLOPES STEEPER THAN 3:1 WILL RECEIVE TURF ESTABLISHMENT WITH MATTING.
   12.3. SLOPES 3:1 OR FLATTER WILL RECEIVE TURF ESTABLISHMENT ALONE.
   12.4. AREAS WHERE HAUL ROADS ARE CONSTRUCTED AND STORMWATER CANNOT BE TREATED THE DEPARTMENT WILL CONSIDER INFILTRATION.
   12.5. FOR HAUL ROADS ADJACENT TO SENSITIVE ENVIRONMENTAL AREAS OR STEEPER THAN 5%, THE DEPARTMENT WILL CONSIDER USING EROSION STONE, CRUSHED GRAVEL, OR CRUSHED STONE BASE TO HELP MINIMIZE EROSION ISSUES.
   12.6. ALL AREAS THAT CAN BE STABILIZED SHALL BE STABILIZED PRIOR TO OPENING UP NEW TERRITORY.
   12.7. DETENTION BASINS SHALL BE DESIGNED AND CONSTRUCTED TO ACCOMMODATE A 2 YEAR STORM EVENT.

13. STRATEGIES SPECIFIC TO OPEN AREAS BETWEEN 5 AND 10 ACRES:
   13.1. THE CONTRACTOR SHALL COMPLY WITH RSA 485:A:17 AND ENV-WQ 1500 ALTERATION OF TERRAIN AND SHALL USE CONVENTIONAL BMP STRATEGIES AND ALL TREATMENT OPTIONS USED FOR UNDER 5 ACRES WILL BE UTILIZED.
   13.2. DETENTION BASINS WILL BE CONSTRUCTED TO ACCOMMODATE THE 2-YEAR 24-HOUR STORM EVENT AND CONTROL A 10-YEAR 24-HOUR STORM EVENT.
   13.3. SLOPES STEEPER THAN A 3:1 WILL RECEIVE TURF ESTABLISHMENT WITH MATTING OR OTHER TEMPORARY SOIL STABILIZATION MEASURES DETAILED IN TABLE 1. THE CONTRACTOR MAY ALSO CONSIDER A SOIL BINDER IN ACCORDANCE WITH THE NHDES APPROVALS OR REGULATIONS. OTHER ALTERNATIVE MEASURES, SUCH AS BONDED FIBER MATRIXES (BFMS) OR FLEXIBLE GROWTH MEDIUMS (FGMS) MAY BE UTILIZED, IF MEETING THE NHDES APPROVALS AND REGULATIONS.
   13.4. SLOPES 3:1 OR FLATTER WILL RECEIVE TURF ESTABLISHMENT OR OTHER TEMPORARY SOIL STABILIZATION MEASURES DETAILED IN TABLE 1. THE CONTRACTOR MAY ALSO CONSIDER A SOIL BINDER IN ACCORDANCE WITH THE NHDES APPROVALS OR REGULATIONS.

14. STRATEGIES SPECIFIC TO OPEN AREAS OVER 10 ACRES:
   14.1. THE CONTRACTOR SHALL COMPLY WITH RSA 485:A:17 AND ENV-WQ 1500 ALTERATION OF TERRAIN AND SHALL USE CONVENTIONAL BMP STRATEGIES AND ALL TREATMENT OPTIONS USED FOR UNDER 5 ACRES AND BETWEEN 5 AND 10 ACRES WILL BE UTILIZED.
   14.2. THE DEPARTMENT ANTICIPATES THAT SOIL BINDERS WILL BE NEEDED ON ALL SLOPES STEEPER THAN 3:1, IN ORDER TO MINIMIZE EROSION AND REDUCE THE AMOUNT OF SEDIMENT IN THE STORMWATER TREATMENT BASINS.
   14.3. THE CONTRACTOR WILL BE REQUIRED TO HAVE AN APPROVED DESIGN IN ACCORDANCE WITH ENV-WQ 1506.12 FOR AN ACTIVE FLOCCULANT TREATMENT SYSTEM TO TREAT AND RELEASE WATER CAPTURED IN STORM WATER BASINS. THE CONTRACTOR SHALL ALSO RETAIN THE SERVICES OF AN ENVIRONMENTAL CONSULTANT WHO HAS DEMONSTRATED EXPERIENCE IN THE DESIGN OF FLOCCULANT TREATMENT SYSTEMS. THE CONSULTANT WILL ALSO BE RESPONSIBLE FOR THE IMPLEMENTATION AND MONITORING OF THE SYSTEM.

TABLE 1
GUIDANCE ON SELECTING TEMPORARY SOIL STABILIZATION MEASURES

APPLICATION AREAS	DRY MULCH METHODS				HYDRAULICALLY APPLIED MULCHES [2]				ROLLED EROSION CONTROL BLANKETS [3]			
	HMT	WC	SG	CB	HM	SMM	BFM	FRM	SNSB	DNSB	DNSCB	DNCB
SLOPES [1]												
STEEPER THAN 2:1	NO	NO	YES	NO	NO	NO	NO	YES	NO	NO	NO	YES
2:1 SLOPE	YES [1]	YES [1]	YES	YES	NO	NO	YES	YES	NO	YES	YES	YES
3:1 SLOPE	YES	YES	YES	YES	NO	YES	YES	YES	YES	YES	YES	NO
4:1 SLOPE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	NO	NO
WINTER STABILIZATION	4T/AC	YES	YES	YES	NO	NO	YES	YES	YES	YES	YES	YES
CHANNELS												
LOW FLOW CHANNELS	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	YES
HIGH FLOW CHANNELS	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES

ABBREV.	STABILIZATION MEASURE	ABBREV.	STABILIZATION MEASURE	ABBREV.	STABILIZATION MEASURE
HMT	HAY MULCH & TACK	HM	HYDRAULIC MULCH	SNSB	SINGLE NET STRAW BLANKET
WC	WOOD CHIPS	SMM	STABILIZED MULCH MATRIX	DNSB	DOUBLE NET STRAW BLANKET
SG	STUMP GRINDINGS	BFM	BONDED FIBER MATRIX	DNSCB	2 NET STRAW-COCONUT BLANKET
CB	COMPOST BLANKET	FRM	FIBER REINFORCED MEDIUM	DNCB	2 NET COCONUT BLANKET

NOTES:
1. ALL SLOPE STABILIZATION OPTIONS ASSUME A SLOPE LENGTH ≤10 TIMES THE HORIZONTAL DISTANCE COMPONENT OF THE SLOPE, IN FEET.
2. PRODUCTS CONTAINING POLYACRYLAMIDE (PAM) SHALL NOT BE APPLIED DIRECTLY TO OR WITHIN 100 FEET OF ANY SURFACE WATER WITHOUT PRIOR WRITTEN APPROVAL FROM THE NH DEPARTMENT OF ENVIRONMENTAL SERVICES.
3. ALL EROSION CONTROL BLANKETS SHALL BE MADE WITH WILDLIFE FRIENDLY BIODEGRADABLE NETTING.

STATE OF NEW HAMPSHIRE
LONDONDERRY & DERRY
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

EROSION CONTROL STRATEGIES AND STABILIZATION MATRIX

REVISION DATE	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
02-25-2022	13065A_EROstrat	13065A	4	35

WETLAND IMPACT SUMMARY

WETLAND NUMBER	WETLAND CLASSIFICATION	LOCATION	PERMANENT N.H.W.B. & A.C.O.E. (WETLAND)	BANK	CHANNEL	TEMPORARY IMPACTS	TOWN	COMMENTS
			SF	LF	LF	SF		
S1	R4UB3	A			44	336	L	SELF-MITIGATING
S1	R4UB3	B			1651	19469	L	SELF-MITIGATING
14	PFO1/2E	C	21575				L	
14	PFO1/2E	D	14112				L	
15	PFO1E	E	3669				L	
VP2	VP	F	6653				L	
14	PFO1/2E	G	5946				L	
15	PFO1E	H	1294				L	
16	PFO1E	I	2336				L	
VP3	VP	J	5652				L	
16	PFO1E	K	507				L	
S70	R4SB5	L	50		18		L	
14	PFO1/2E	M	13193				L	
14	PFO1/2E	N	36131				L	
16	PFO1E	O	199				L	
VP4	VP	P	8911				L	
16	PFO1E	Q	1537				L	
16	PFO1E	R	1815				L	
S9	R4SB5	S	332		74		L	
17	PFO1E	T	39				L	
S7	R4SB5	U	884		117		L	
17	PFO1E	V	3485				L	
S7	R4SB5	W	360		69		L	
13	PFO1E	X	1820				L	
66	PFO1E	Y	803				L	
11	PFO1E	Z	1502				L	
11	PFO1E	AA	561				L	
67	PFO1E	AB	477				L	
11	PFO1E	AC	7				L	
11	PFO1E	AD	725				L	
19	PFO1E	AE	6979				L	
VP42	VP	AF	1974				L	
18	PEM1E	AG	659				L	
S8	R4SB5	AH	1232		291		L	
20	PFO1E	AI	273				L	
20	PFO1E	AJ	1232				L	
21	PFO1E	AK	276				L	
VP46	VP	AL	628				L	
22	PFO1E	AM	364				L	
24	PFO1E	AN	127				L	
VP6	VP	AO	13815				L	
24	PFO1E	AP	0				L	
24	PFO1E	AQ	452				L	
24	PFO1E	AR	43				L	
24	PFO1E	AS	2526				L	
24	PFO1E	AT	141				L	
90	PFO1E	AU	0				L	
35	PFO1E	AV	0				L	
35	PFO1E	AW	1301				L	
VP8	VP	AX	10748				L	
35	PFO1E	AY	21				L	
35	PFO1E	AZ	302				L	
35	PFO1E	BA	5				L	
35	PFO1E	BB	562				L	
VP9	VP	BC	3335				L/D	
64	PFO1E	BD	180				L/D	
64	PFO1E	BE	382				L/D	
64	PFO1E	BF	1140				L/D	
39	PEM1F	BG	4379				D	
S11	R4SB5	BH	77		77		D	
40	PSS1E	BI	852				D	

WETLAND IMPACT SUMMARY

WETLAND NUMBER	WETLAND CLASSIFICATION	LOCATION	PERMANENT N.H.W.B. & A.C.O.E. (WETLAND)	BANK	CHANNEL	TEMPORARY IMPACTS	TOWN	COMMENTS
			SF	LF	LF	SF		
86	PFO1E	BJ	552				D	
72	PSS1/PEM1/PFO1B	BK	155				D	PRIME WETLAND
S2	R3UB3	BL	4048	404	202		D	
41	PFO1E	BM	176				D	
41	PFO1E	BN	6901				D	
S2	R3UB3	BO	780	107	45		D	
46	PFO1E	BP	2561				D	
73	PEM1/PSS1E	BQ	2850				D	
49	PFO1E	BR	3025				D	
100	PFO1E	BS	311				D	
102	PEM1E	BT	90				D	
S101	R4SB2	BU	54		13		D	
61	PFO1E	BV	582				D	
81	PFO	BW	273				D	
54	PEM1E	BX	62				D	
S3	R4SB5	BY	159		24		D	
S3	R4SB5	BZ	265		33		D	
S4	R4SB5	CA	219		46		D	
S4	R4SB5	CB	196		29		D	
80	PFO1E/PEM1E	CC	941				D	
80	PFO1E/PEM1E	CD	81				D	
80	PFO1E/PEM1E	CE	215				D	
80	PFO1E/PEM1E	CF	598				D	
80	PFO1E/PEM1E	CG	40				D	
S100	R4SB6	CH	125		22		D	
59	PFO1E	CI	815				D	
56	PEM1E	CJ	615				D	
62	PSS/PEM1E	CK	1389				D	PRIME WETLAND
59	PFO1E	CL	1666				D	
62	PSS/PEM1E	CM	172				D	PRIME WETLAND
S5	R3UB3	CN	109	32	11		D	
62	PSS/PEM1E	CO	410				D	PRIME WETLAND
S102	R4SB2	CP	212		41		D	
19	PFO1E	CQ	0				L	
S1	R4UB3	CR			0	0	L	SELF-MITIGATING
9	PFO1	CT	25				L	
S1	R4UB3	TA			5	42	L	
S1	R4UB3	TB			45	145	L	
14	PFO1/2E	TC				1680	L	
15	PFO1E	TD				399	L	
15	PFO1E	TE				137	L	
VP2	VP	TF				644	L	
15	PFO1E	TG				51	L	
14	PFO1/2E	TH				1080	L	
VP3	VP	TI				674	L	
14	PFO1/2E	TJ				2082	L	
14	PFO1/2E	TK				2322	L	
S1	R4UB3	TL			5	114	L	
14	PFO1/2E	TM				1360	L	
S9	R4SB5	TN			11	22	L	
66	PFO1E	TO				316	L	
11	PFO1E	TP				642	L	
11	PFO1E	TQ				363	L	
67	PFO1E	TR				721	L	

PS & E PLANS
SUBJECT TO CHANGE
DATE 3/21/2022

NUMBER	DESCRIPTION	STATION	STATION	DATE
	REVISIONS AFTER PROPOSAL			

SDR PROCESSED	VHB TEAM/NHDOT	DATE 2/8/2022
NEW DESIGN	VHB TEAM	DATE 3/21/2022
SHEET CHECKED	J. HILTON	DATE 3/21/2022
AS BUILT DETAILS		DATE

STATE OF NEW HAMPSHIRE
LONDONDERRY & DERRY
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

WETLAND IMPACT TABLE

DATE PLOTTED	VHB PROJECT NO.	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
4/1/2022	52768.00	13065A_WET_sum_01	13065A	5	35

WETLAND IMPACT SUMMARY								
WETLAND NUMBER	WETLAND CLASSIFICATION	LOCATION	PERMANENT N.H.W.B. & A.C.O.E. (WETLAND)	BANK	CHANNEL	TEMPORARY IMPACTS	TOWN	COMMENTS
			SF	LF	LF	SF		
9	PFO1	TS				0	L	
9	PFO1	TT				438	L	
11	PFO1E	TU				423	L	
21	PFO1E	TZ				126	L	
VP46	VP	TAA				131	L	
22	PFO1E	TAB				96	L	
VP6	VP	TAC				149	L	
24	PFO1E	TAD				48	L	
24	PFO1E	TAE				14	L	
VP6	VP	TAF				484	L	
24	PFO1E	TAG				19	L	
90	PFO1E	TAH				0	L	
35	PFO1E	TAI				75	L	
VP8	VP	TAJ				0	L	
VP8	VP	TAK				375	L	
35	PFO1E	TAL				103	L	
35	PFO1E	TAM				0	L	
VP8	VP	TAN				266	L	
35	PFO1E	TAO				26	L	
39	PEM1F	TAP				356	D	
S2	R3UB3	TAQ		32	20	129	D	
72	PSS1/PEM1/PFO1B	TAR				100	D	PRIME WETLAND
S2	R3UB3	TAS		10	5	85	D	
41	PFO1E	TAT				150	D	
S2	R3UB3	TAU		10	5	154	D	
41	PFO1E	TAV				160	D	
S2	R3UB3	TAW		10	5	77	D	
S2	R3UB3	TAX		10	5	87	D	
85	PSS1E	TAY				63	D	
46	PFO1E	TAZ				646	D	
73	PEM1/PSS1E	TBA				1281	D	
83	PEM1E	TBB				100	D	
49	PFO1E	TBC				459	D	
102	PEM1E	TBD				53	D	
60	PFO1E	TBE				54	D	
81	PEM1H/PUB5H	TBF				144	D	
81	PEM1H/PUB5H	TBG				260	D	
54	PEM1E	TBH				162	D	
103	PFO1	TBI				9	D	
S3	R4SB5	TBJ			5	19	D	
S3	R4SB5	TBK			5	34	D	
S4	R4SB5	TBL			5	33	D	
S4	R4SB5	TBM			5	15	D	
80	PFO1E/PEM1E	TBN				420	D	
80	PFO1E/PEM1E	TBO				561	D	
80	PFO1E/PEM1E	TBP				213	D	
80	PFO1E/PEM1E	TBQ				130	D	
80	PFO1E/PEM1E	TBR				52	D	
59	PFO1E	TBS				176	D	
56	PEM1E	TBT				112	D	
62	PSS/PEM1E	TBU				1228	D	PRIME WETLAND
59	PFO1E	TBV				92	D	
59	PFO1E	TBW				94	D	
S5	R3UB3	TBX		25	5	135	D	
59	PFO1E	TBY				482	D	
S5	R3UB3	TBZ		18	8	22	D	
62	PSS/PEM1E	TCA				73	D	PRIME WETLAND
62	PSS/PEM1E	TCB				159	D	PRIME WETLAND
54	PEM1E	TCC				27	D	
VP11	VP	TCD				87	D	
S1	R4UB3	TCE			0	0	L	
S1	R4UB3	TCF			128	549	L	

WETLAND IMPACT SUMMARY								
WETLAND NUMBER	WETLAND CLASSIFICATION	LOCATION	PERMANENT N.H.W.B. & A.C.O.E. (WETLAND)	BANK	CHANNEL	TEMPORARY IMPACTS	TOWN	COMMENTS
			SF	LF	LF	SF		
19	PFO1E	TCG				30	L	
19	PFO1E	TCH				164	L	
19	PFO1E	TCI				7	L	
21	PFO1E	TCJ				21	L	
16	PFO1E	TCK				171	L	
16	PFO1E	TCL				89	L	
VP4	VP	TCM				137	L	
VP42	VP	TCN				672	L	
S7	R4SB5	TCO			20	123	L	
S7	R4SB5	TCP			10	4	L	
S9	R4SB5	TCQ			6	17	L	
S9	R4SB5	TCR			6	22	L	
24	PFO1E	TCS				41	L	
24	PFO1E	TCT				3	L	
24	PFO1E	TCU				1	L	

WETLAND CLASSIFICATION CODES	
BANK	BANK
PEM1E	PALUSTRINE, EMERGENT, PERSISTENT, SEASONALLY FLOODED /SATURATED
PEM1F	PALUSTRINE, EMERGENT, PERSISTENT, SEMIPERMANENTLY FLOODED
PEM1H/PUB5H	PERMANENTLY FLOODED PALUSTRINE EMERGENT, PERSISTENT WETLAND, MIXED WITH OPEN WATER, UNCONSOLIDATED BOTTOM
PFO1/2E	PALUSTRINE, FORESTED, DOMINANTLY BROAD-LEAVED DECIDUOUS, MIXED WITH NEEDLE-LEAVED DECIDUOUS, SEASONALLY FLOODED /SATURATED
PFO1E	PALUSTRINE, FORESTED, BROAD-LEAVED DECIDUOUS, SEASONALLY FLOODED /SATURATED
PFO1E/PEM1E	PALUSTRINE, FORESTED, BROAD-LEAVED DECIDUOUS WETLAND MIXED WITH SEASONALLY SATURATED EMERGENT PERSISTENT WETLAND
PSS/PEM1E	PALUSTRINE, DOMINANTLY SCRUB-SHRUB, MIXED WITH EMERGENT, PERSISTENT, SEASONALLY FLOODED /SATURATED
PSS1E	PALUSTRINE, SCRUB-SHRUB, BROAD-LEAVED DECIDUOUS, SEASONALLY FLOODED /SATURATED
R3UB3	RIVERINE, UPPER PERENNIAL, UNCONSOLIDATED BOTTOM, MUD
R4UB3	RIVERINE, INTERMITTENT, UNCONSOLIDATED BOTTOM, MUD
R4SB	RIVERINE, INTERMITTENT, STREAMBED
R4SB5	RIVERINE, INTERMITTENT, STREAMBED, MUD
VP	VERNAL POOL

TOTAL IMPACTS FOR WETLANDS		
WETLAND AND STREAM IMPACTS (AREA)		
PERMANENT IMPACTS (WETLAND)	209,405	SF
PERMANENT IMPACTS (STREAM)	9,102	SF
TEMPORARY IMPACTS	46,160	SF
TOTAL WETLAND IMPACTS:	264,667	SF
STREAM IMPACTS (LINEAR)		
PERMANENT IMPACTS TO BANKS	543	LF
PERMANENT IMPACTS TO CHANNEL	1,112	LF
TEMPORARY IMPACTS TO BANKS	115	LF
TEMPORARY IMPACTS TO CHANNEL	2,004	LF
TOTAL STREAM IMPACTS:	3,774	LF

PS & E PLANS
SUBJECT TO CHANGE
DATE 3/21/2022

REVISIONS AFTER PROPOSAL

NUMBER	DESCRIPTION	DATE	STATION

SDR PROCESSED	VHB TEAM/NHDOT	DATE 2/8/2022
NEW DESIGN	VHB TEAM	DATE 3/21/2022
SHEET CHECKED	J. HILTON	DATE 3/21/2022
AS BUILT DETAILS		DATE

STATE OF NEW HAMPSHIRE
LONDONDERRY & DERRY
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

WETLAND IMPACT TABLE

DATE PLOTTED	VHB PROJECT NO.	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
4/1/2022	52768.00	13065A_WET_sum_02	13065A	6	35

REVISIONS AFTER PROPOSAL

NUMBER	DATE	STATION	DESCRIPTION

STA. 3654+75
END APPROACH
BEGIN FULL DEPTH
CONSTRUCTION

STA. 3654+25
I-93 SB
LIMIT OF WORK
BEGIN APPROACH

STA. 1654+50
I-93 NB
LIMIT OF WORK
BEGIN APPROACH

STA. 1655+00
END APPROACH
BEGIN FULL DEPTH
CONSTRUCTION

GRID

MATCH TO SHEET WET02

EXISTING L.A.R.O.W.
APPROX. EXISTING R.O.W.
Approx. location of existing sewer
MAZZAGLIA FAMILY TRUST
S1
R4UB3
TUFTS, JOSEPH D. & NANCY M.
PROPOSED STREAM RELOCATION
PROPOSED STREAM ALIGNMENT
TRIBUTARY TO WHEELER POND
TOWN OF LONDONDERRY
L.A. ROW
TA
TB
TCF
A
B
C
D
1
2
3
6
PILLSBURY REALTY DEVELOPMENT LLC
LIMIT OF AS-BUILT I-93 SLOPES
BMP 1649
MAINTENANCE ACCESS
I-93 NB
I-93 SB
PILLSBURY ROAD
EXISTING L.A.R.O.W. PER 10418-C
EXISTING L.A.R.O.W. PER 5201G RETURN BK. 1608 PG. 24
EXISTING L.A.R.O.W. PER 5201E RETURN BK. 1608 PG. 24

LEGEND

TYPE OF WETLAND IMPACT	SHADING/ HATCHING	TYPE OF WETLAND IMPACT	SHADING/ HATCHING
WETLANDS-NEW HAMPSHIRE WETLANDS BUREAU & ARMY CORP OF ENGINEERS (PERMANENT WETLAND)		NEW HAMPSHIRE WETLANDS BUREAU & ARMY CORP OF ENGINEERS (TEMPORARY WETLAND)	
VERNAL POOL-NEW HAMPSHIRE WETLANDS BUREAU & ARMY CORP OF ENGINEERS (PERMANENT WETLAND)		RELOCATED STREAM SELF MITIGATING	

50 0 50 100
SCALE IN FEET

	DATE
SDR PROCESSED	
NEW DESIGN	
SHEET CHECKED	
AS BUILT DETAILS	

STATE OF NEW HAMPSHIRE
LONDONDERRY & DERRY
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

WETLAND IMPACT PLANS

DATE PLOTTED	VHB PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
4/1/2022	52768.00	WET01	13065A_WET_Plans	13065A	7	35

REVISIONS AFTER PROPOSAL

NUMBER	DATE	STATION	DESCRIPTION

SDR PROCESSED DATE
NEW DESIGN DATE
SHEET CHECKED DATE
AS BUILT DETAILS DATE

4 DONOVAN, CORNELIUS J. & JOYCE LEE

5 ROY, ALAN J. & RIZZO-ROY, MARIA L.

8 FLYNN 2013 FAMILY TRUST

9 BELANGER FAMILY REVOCABLE TRUST

10 CANTAVE FAMILY REVOCABLE TRUST

11 DICKENSON, DONNA E.

6 PILLSBURY REALTY DEVELOPMENT LLC

7 PILLSBURY REALTY DEVELOPMENT LLC

MATCH TO SHEET WET01

MATCH TO SHEET WET03

PROPOSED STREAM RELOCATION

PROPOSED STREAM ALIGNMENT

TRIBUTARY TO WHEELER POND

LIMIT OF AS-BUILT I-93 SLOPES

L.A. ROW

EXISTING L.A.R.O.W.

SB ON RAMP

I-93 SB

I-93 NB

NB OFF RAMP

BMP 1670

BMP MAINTENANCE ACCESS

3'X3'X3' concrete block measuring device

"south I93 mile 12.6"

"south I93 mile 12 .8"

"north I93 mile 12 .8"

GRID

LEGEND

TYPE OF WETLAND IMPACT	SHADING/ HATCHING	TYPE OF WETLAND IMPACT	SHADING/ HATCHING
WETLANDS-NEW HAMPSHIRE WETLANDS BUREAU & ARMY CORP OF ENGINEERS (PERMANENT WETLAND)		NEW HAMPSHIRE WETLANDS BUREAU & ARMY CORP OF ENGINEERS (TEMPORARY WETLAND)	
VERNAL POOL-NEW HAMPSHIRE WETLANDS BUREAU & ARMY CORP OF ENGINEERS (PERMANENT WETLAND)		RELOCATED STREAM SELF MITIGATING	

50 0 50 100

SCALE IN FEET

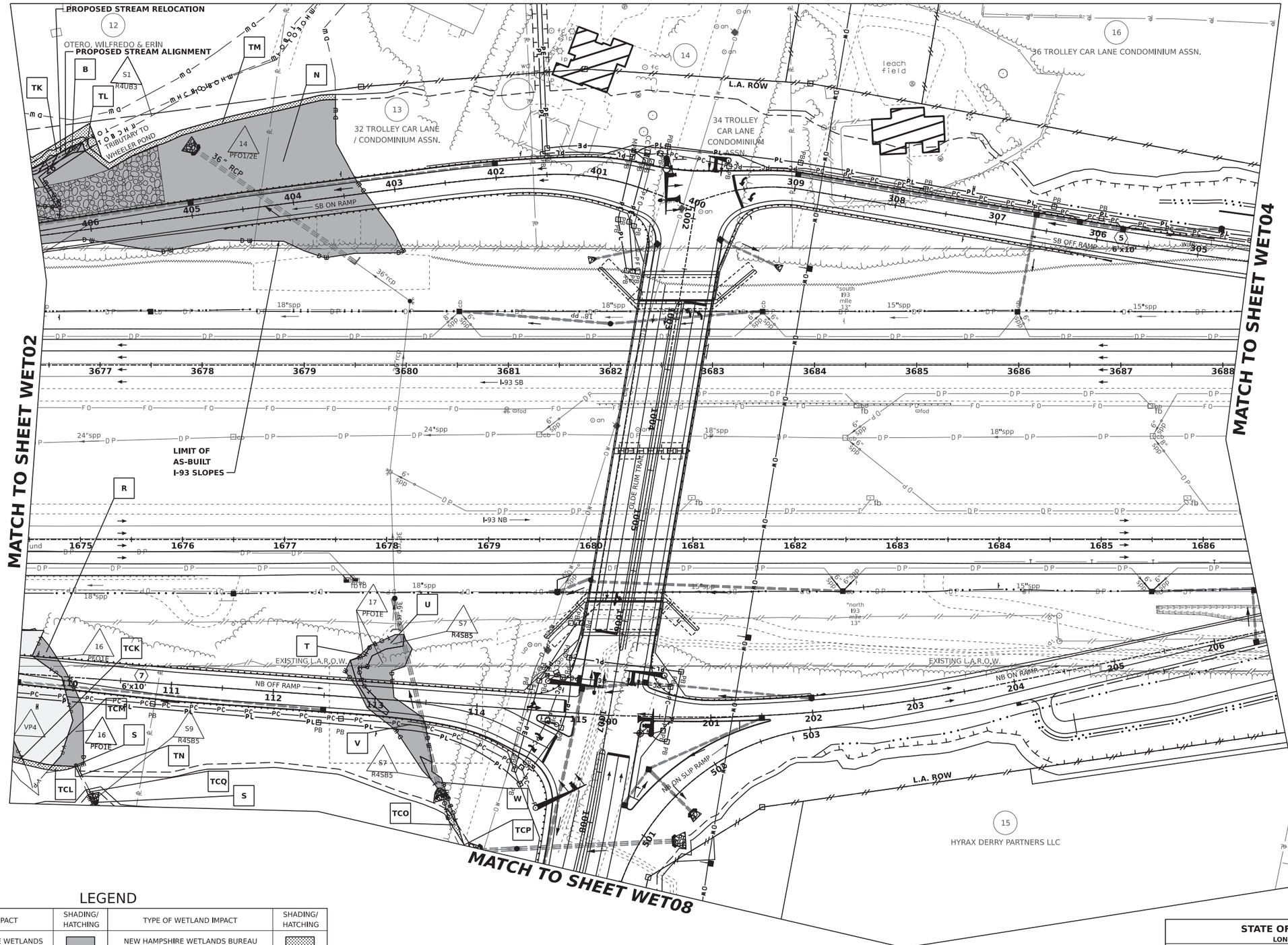
vhb

STATE OF NEW HAMPSHIRE
LONDONDERRY & DERRY
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

WETLAND IMPACT PLANS

DATE PLOTTED	VHB PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
4/1/2022	52768.00	WET02	13065A_WET_Plans	13065A	8	35

MATCH TO SHEET WET07



LEGEND

TYPE OF WETLAND IMPACT	SHADING/ HATCHING	TYPE OF WETLAND IMPACT	SHADING/ HATCHING
WETLANDS-NEW HAMPSHIRE WETLANDS BUREAU & ARMY CORP OF ENGINEERS (PERMANENT WETLAND)		NEW HAMPSHIRE WETLANDS BUREAU & ARMY CORP OF ENGINEERS (TEMPORARY WETLAND)	
VERNAL POOL-NEW HAMPSHIRE WETLANDS BUREAU & ARMY CORP OF ENGINEERS (PERMANENT WETLAND)		RELOCATED STREAM SELF MITIGATING	

50 0 50 100

SCALE IN FEET

REVISIONS AFTER PROPOSAL

NUMBER	DATE	STATION	DESCRIPTION

	DATE
SDR PROCESSED	
NEW DESIGN	
SHEET CHECKED	
AS BUILT DETAILS	

STATE OF NEW HAMPSHIRE
LONDONDERRY & DERRY
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

WETLAND IMPACT PLANS

DATE PLOTTED	VHB PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
4/1/2022	52768.00	WET03	13065A_WET_Plans	13065A	9	35

MATCH TO SHEET WET03

MATCH TO SHEET WET05

16 36 TROLLEY CAR LANE CONDOMINIUM ASSN.

18 ARIZA, FIDEL

19 FOUREAU, DYLAN

20 TOWN OF LONDONDERRY

17 STATE OF NH (DOT)

15 HYRAX DERRY PARTNERS LLC

21 GERAGHTY, SCOTT P. & MARIBETH

22 ROSZCZENKO, JOLANTA & WALDEMAR

N/F QUITONGAN, AUDIE & CHERYL

N/F TRULL, MICHAEL D. /& SANDRA

L.A. ROW

EXISTING L.A.R.O.W.

APPROX. EXISTING R.O.W.

BMP 1687

BMP 1691

D-box

leach field

wood & rockade

I-93 SB

I-93 NB

NB ON RAMP

STA. 3700+00
END FULL DEPTH CONSTRUCTION
BEGIN APPROACH

STA.3700+50
I-93 SB END APPROACH

PAVEMENT MATCH

GRID N

SCALE IN FEET
50 0 50 100

LEGEND

TYPE OF WETLAND IMPACT	SHADING/ HATCHING	TYPE OF WETLAND IMPACT	SHADING/ HATCHING
WETLANDS-NEW HAMPSHIRE WETLANDS BUREAU & ARMY CORP OF ENGINEERS (PERMANENT WETLAND)		NEW HAMPSHIRE WETLANDS BUREAU & ARMY CORP OF ENGINEERS (TEMPORARY WETLAND)	
VERNAL POOL-NEW HAMPSHIRE WETLANDS BUREAU & ARMY CORP OF ENGINEERS (PERMANENT WETLAND)		RELOCATED STREAM SELF MITIGATING	

NUMBER	DATE	STATION	DESCRIPTION
			REVISIONS AFTER PROPOSAL

SDR PROCESSED	DATE
NEW DESIGN	DATE
SHEET CHECKED	DATE
AS BUILT DETAILS	DATE

STATE OF NEW HAMPSHIRE
LONDONDERRY & DERRY
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

WETLAND IMPACT PLANS

DATE PLOTTED	VHB PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
4/1/2022	52768.00	WET04	13065A_WET_Plans	13065A	10	35

REVISIONS AFTER PROPOSAL

NUMBER	DATE	STATION	DESCRIPTION

SDR PROCESSED DATE
NEW DESIGN DATE
SHEET CHECKED DATE
AS BUILT DETAILS DATE

GRID

MATCH TO SHEET WET04

MATCH TO SHEET WET06

20
TOWN OF LONDONDERRY

11
PFO1E

N/F
WELDON, DANIEL A.

TQ
L.A.ROW
AA
wire
TU
AC
wire
TU
AD
EXISTING L.A.R.O.W. PER P5201G
EXISTING L.A.R.O.W. PER 10418-C
3'X3'X3' concrete block measuring device
"food exit 4" list of businesses
"south I93 mile 13 .4"
"north I93 mile 13 .4"
I-93 SB
I-93 NB
15"rcp
24"rcp
30"rcp
18"spp
15"spp
6"spp
PLUGGED PIPE
PAVEMENT MATCH
STA. 1705+25
I-93 NB
END APPROACH
STA. 1704+75
END FULL DEPTH CONSTRUCTION
BEGIN APPROACH
AB
TR
CT
TT
9
PFO1
N/F
TRULL, MICHAEL D. /& SANDRA
SCACCIA, GERALD P.
DARON, JODI L. & DAVID B.
GREEN, JOSEPH & VILLENEUVE, DANA
MOSS, BRIAN J.
KELLEY, EDWARD T.

LEGEND

TYPE OF WETLAND IMPACT	SHADING/ HATCHING	TYPE OF WETLAND IMPACT	SHADING/ HATCHING
WETLANDS-NEW HAMPSHIRE WETLANDS BUREAU & ARMY CORP OF ENGINEERS (PERMANENT WETLAND)		NEW HAMPSHIRE WETLANDS BUREAU & ARMY CORP OF ENGINEERS (TEMPORARY WETLAND)	
VERNAL POOL-NEW HAMPSHIRE WETLANDS BUREAU & ARMY CORP OF ENGINEERS (PERMANENT WETLAND)		RELOCATED STREAM SELF MITIGATING	

50 0 50 100
SCALE IN FEET

vhb

STATE OF NEW HAMPSHIRE
LONDONDERRY & DERRY
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

WETLAND IMPACT PLANS

DATE PLOTTED	VHB PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
4/1/2022	52768.00	WET05	13065A_WET_Plans	13065A	11	35

GRID

N/F
WELDON, DANIEL A.

N/F
P.S. COMPANY OF NH (DBA EVERSOURCE ENERGY)

N/F
STATE OF NH

N/F
TOWN OF LONDONDERRY

store wall

wire

6" birch

6" birch

psnh z119-17

psnh r187-12

EXISTING L.A.R.O.W.
PER P5201G

EXISTING L.A.R.O.W.
PER 10418-C

delin post

delin post

mm 13.6

"south I93 mile 13 .8"

"closed to unauthorized vehicles"

"closed to unauthorized vehicles"

I-93 SB

I-93 NB

3716 3717 3718 3719 3720 3721 3722 3723 3724 3725 3726 3727 3728

1714 1715 1716 1717 1718 1719 1720 1721 1722 1723 1724 1725 1726

"north I93 mile 13 .6"

"north I93 mile 13 .8"

MATCH TO SHEET WET05

STA. 1717+50
I-93 NB
LIMIT OF WORK

N/F
STATE OF NH

LEGEND

TYPE OF WETLAND IMPACT	SHADING/ HATCHING	TYPE OF WETLAND IMPACT	SHADING/ HATCHING
WETLANDS-NEW HAMPSHIRE WETLANDS BUREAU & ARMY CORP OF ENGINEERS (PERMANENT WETLAND)		NEW HAMPSHIRE WETLANDS BUREAU & ARMY CORP OF ENGINEERS (TEMPORARY WETLAND)	
VERNAL POOL-NEW HAMPSHIRE WETLANDS BUREAU & ARMY CORP OF ENGINEERS (PERMANENT WETLAND)		RELOCATED STREAM SELF MITIGATING	

50 0 50 100
SCALE IN FEET

NUMBER	DATE	STATION	DESCRIPTION
			REVISIONS AFTER PROPOSAL

SDR PROCESSED	DATE
NEW DESIGN	DATE
SHEET CHECKED	DATE
AS BUILT DETAILS	DATE

vhb

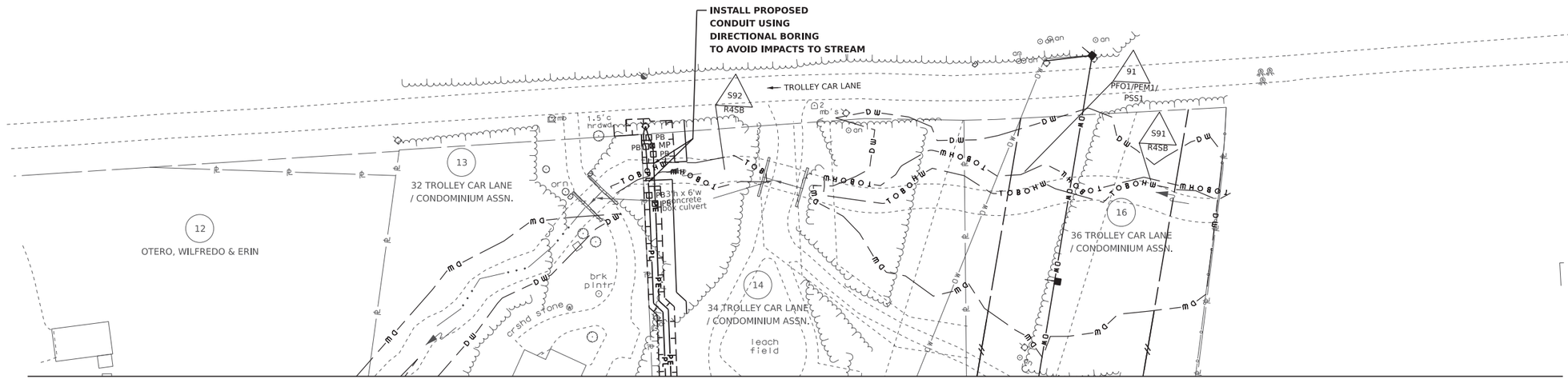
STATE OF NEW HAMPSHIRE
LONDONDERRY & DERRY
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

WETLAND IMPACT PLANS

DATE PLOTTED	VHB PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
4/1/2022	52768.00	WET06	13065A_WET_Plans	13065A	12	35

REVISIONS AFTER PROPOSAL

NUMBER	DATE	DESCRIPTION	STATION



MATCH TO SHEET WET03

LEGEND

TYPE OF WETLAND IMPACT	SHADING/ HATCHING	TYPE OF WETLAND IMPACT	SHADING/ HATCHING
WETLANDS-NEW HAMPSHIRE WETLANDS BUREAU & ARMY CORP OF ENGINEERS (PERMANENT WETLAND)		NEW HAMPSHIRE WETLANDS BUREAU & ARMY CORP OF ENGINEERS (TEMPORARY WETLAND)	
VERNAL POOL-NEW HAMPSHIRE WETLANDS BUREAU & ARMY CORP OF ENGINEERS (PERMANENT WETLAND)		RELOCATED STREAM SELF MITIGATING	

50 0 50 100

SCALE IN FEET

	DATE
SDR PROCESSED	
NEW DESIGN	
SHEET CHECKED	
AS BUILT DETAILS	

vhb

STATE OF NEW HAMPSHIRE
LONDONDERRY & DERRY
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

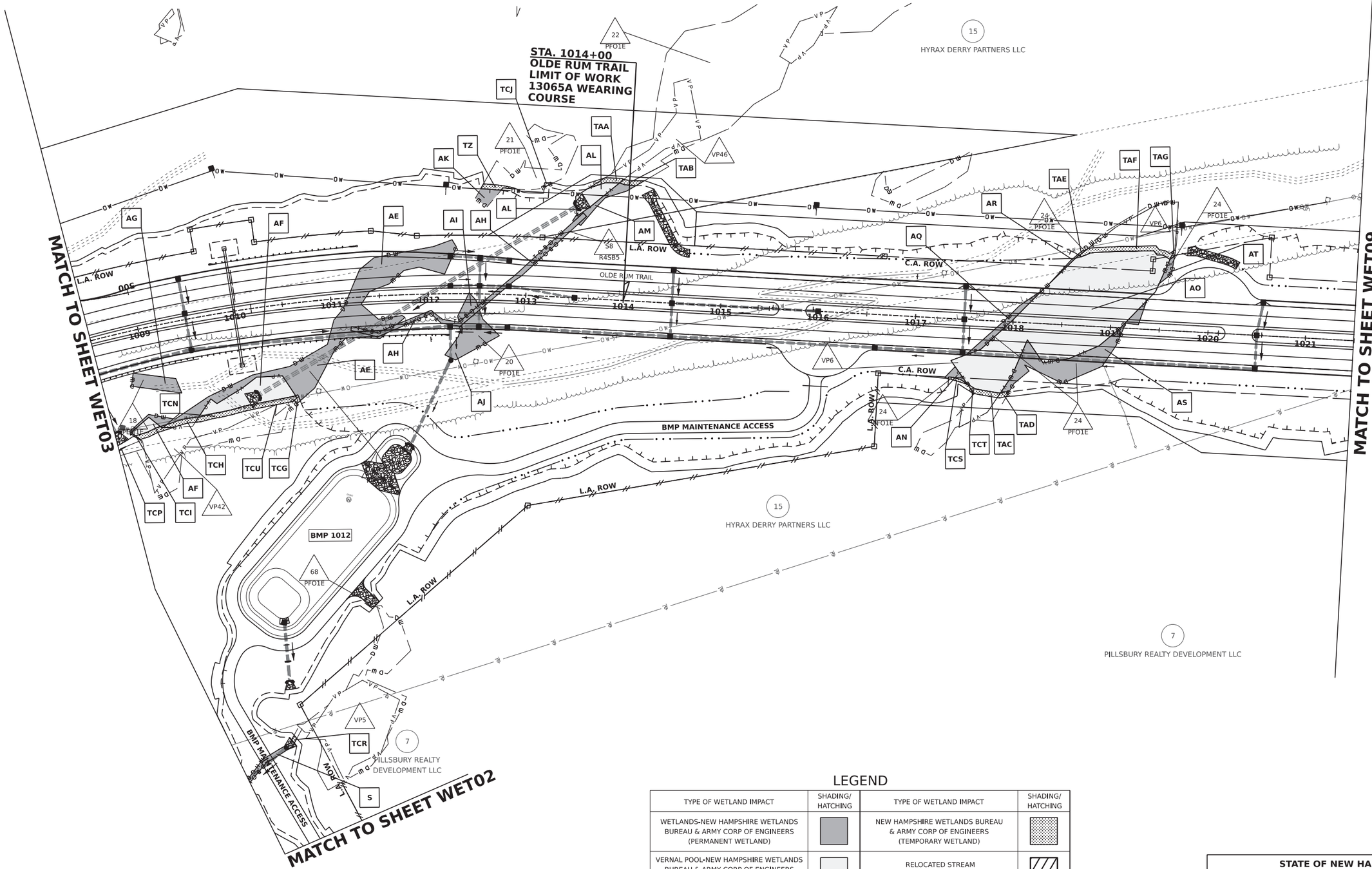
WETLAND IMPACT PLANS

DATE PLOTTED	VHB PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
4/1/2022	52768.00	WET07	13065A_WET_Plans	13065A	13	35

REVISIONS AFTER PROPOSAL

NUMBER	DATE	STATION	DESCRIPTION

SDR PROCESSED	DATE
NEW DESIGN	DATE
SHEET CHECKED	DATE
AS BUILT DETAILS	DATE



LEGEND

TYPE OF WETLAND IMPACT	SHADING/ HATCHING	TYPE OF WETLAND IMPACT	SHADING/ HATCHING
WETLANDS-NEW HAMPSHIRE WETLANDS BUREAU & ARMY CORP OF ENGINEERS (PERMANENT WETLAND)		NEW HAMPSHIRE WETLANDS BUREAU & ARMY CORP OF ENGINEERS (TEMPORARY WETLAND)	
VERNAL POOL-NEW HAMPSHIRE WETLANDS BUREAU & ARMY CORP OF ENGINEERS (PERMANENT WETLAND)		RELOCATED STREAM SELF MITIGATING	

STATE OF NEW HAMPSHIRE
LONDONDERRY & DERRY
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

WETLAND IMPACT PLANS

vhb

DATE PLOTTED	VHB PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
4/1/2022	52768.00	WET08	13065A_WET_Plans	13065A	14	35

MATCH TO SHEET WET08

MATCH TO SHEET WET10

15
HYRAX DERRY PARTNERS LLC

23
PILLSBURY REALTY DEVELOPMENT LLC

23
PILLSBURY REALTY DEVELOPMENT LLC

C.A. ROW

C.A. ROW

OLDE RUM TRAIL

C.A. ROW

C.A. ROW

1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032

18" RCP

18" FCP

18" pp

GRID

LEGEND

TYPE OF WETLAND IMPACT	SHADING/ HATCHING	TYPE OF WETLAND IMPACT	SHADING/ HATCHING
WETLANDS-NEW HAMPSHIRE WETLANDS BUREAU & ARMY CORP OF ENGINEERS (PERMANENT WETLAND)		NEW HAMPSHIRE WETLANDS BUREAU & ARMY CORP OF ENGINEERS (TEMPORARY WETLAND)	
VERNAL POOL-NEW HAMPSHIRE WETLANDS BUREAU & ARMY CORP OF ENGINEERS (PERMANENT WETLAND)		RELOCATED STREAM SELF MITIGATING	

50 0 50 100

SCALE IN FEET

REVISIONS AFTER PROPOSAL

NUMBER	DATE	STATION	DESCRIPTION

SDR PROCESSED DATE

NEW DESIGN DATE

SHEET CHECKED DATE

AS BUILT DETAILS DATE

vhb

STATE OF NEW HAMPSHIRE
LONDONDERRY & DERRY
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

WETLAND IMPACT PLANS

DATE PLOTTED	VHB PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
4/1/2022	52768.00	WET09	13065A_WET_Plans	13065A	15	35

REVISIONS AFTER PROPOSAL

NUMBER	DATE	STATION	DESCRIPTION

SDR PROCESSED DATE
NEW DESIGN DATE
SHEET CHECKED DATE
AS BUILT DETAILS DATE

MATCH TO SHEET WET09

23
PILLSBURY REALTY DEVELOPMENT LLC

24
SEVEN HILLS DEVELOPMENT LLC

26
SEVEN HILLS DEVELOPMENT, LLC

27
ABBOTT, MARCIA E.

XX
PILLSBURY REALTY/ DEVELOPMENT LLC

25
DERRY BUSINESS CENTER / UNIT OWNERS ASSN

LONDONDERRY
DERRY

OLDE RUM TRAIL

C.A. ROW

BMP 1038

90 PFO1E

35 PFO1E

64 PFO1E

39 PEM1F

911 R4SB5

VP8

VP9

1033 1034 1035 1036 1037 1038 1039 1040 1041 1042 1043 1044

AW AY AZ BA BB BC BD BE BF BG BH BI TAI TAK TAL TAM TAN TAO TAP

STA. 1040+00
OLDE RUM TRAIL
LIMIT OF WORK

STA. 1038+50
END FULL DEPTH CONSTRUCTION

STA. 16+31.53
MADDEN RD
LIMIT OF WORK

MADDEN ROAD WILL BE PARTIALLY CONSTRUCTED UNDER CONTRACT 13065A IN A TEMPORARY CONFIGURATION TO PROVIDE CONSTRUCTION ACCESS ONLY. SLOPE LIMITS SHOWN ON THIS SHEET DEPICT THE FULL BUILD CONDITION UNDER CONTRACT 13065B. HOWEVER, IMPACTS TO WETLAND 64 AND VP9 ARE TALLIED IN CONTRACT 13065A AS THIS CONSTRUCTION ACCESS ROAD IS LIKELY TO IMPACT THIS WETLAND SYSTEM TO SOME DEGREE. THE IMPACTS TO WETLAND 39 AND S11 WILL BE TALLIED UNDER CONTRACT 13065B AND MAY BE UPDATED AS THE DESIGN FOR THE PROJECT SEGMENT ADVANCES.

LEGEND

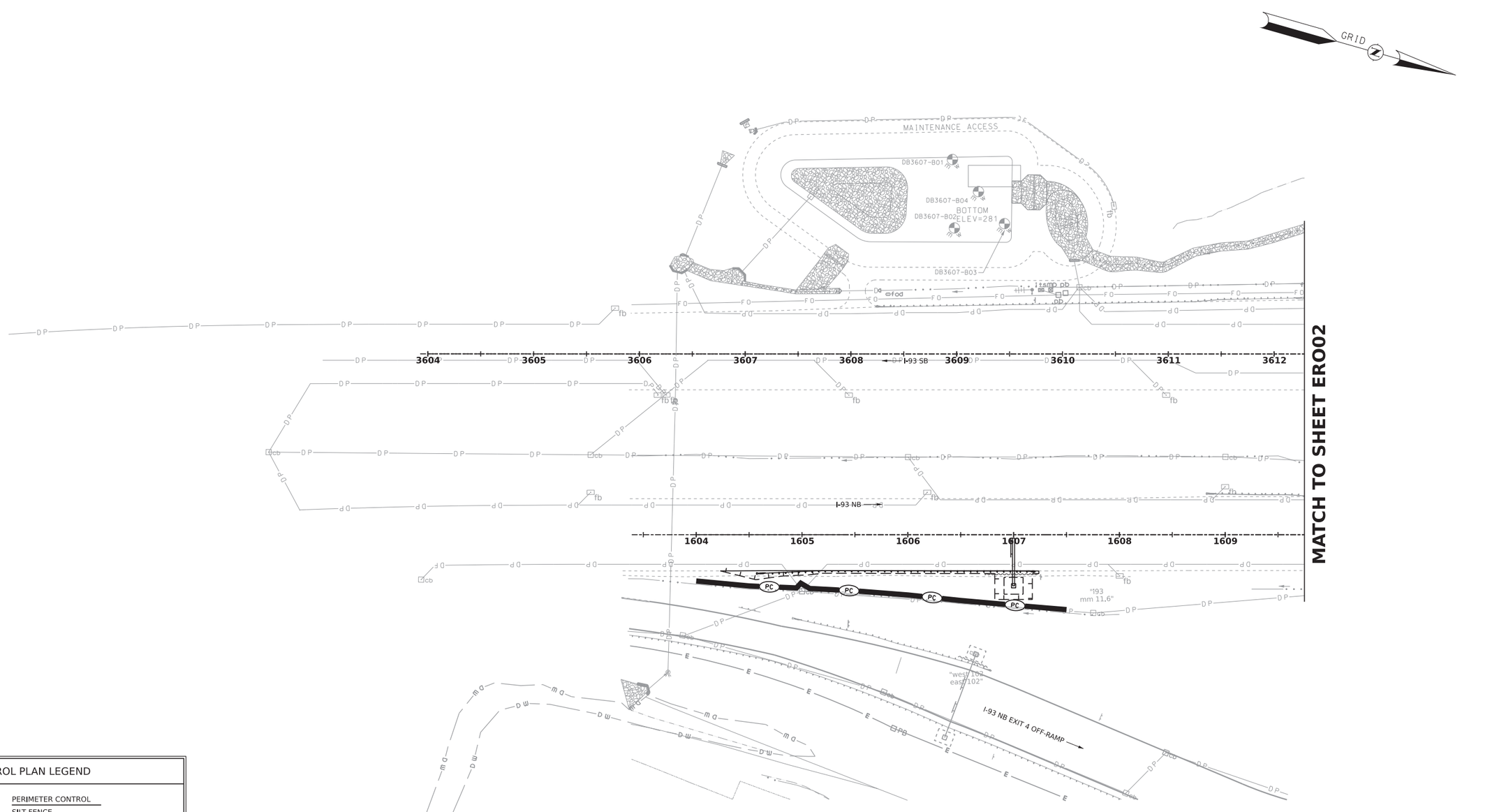
TYPE OF WETLAND IMPACT	SHADING/ HATCHING	TYPE OF WETLAND IMPACT	SHADING/ HATCHING
WETLANDS-NEW HAMPSHIRE WETLANDS BUREAU & ARMY CORP OF ENGINEERS (PERMANENT WETLAND)		NEW HAMPSHIRE WETLANDS BUREAU & ARMY CORP OF ENGINEERS (TEMPORARY WETLAND)	
VERNAL POOL-NEW HAMPSHIRE WETLANDS BUREAU & ARMY CORP OF ENGINEERS (PERMANENT WETLAND)		RELOCATED STREAM SELF MITIGATING	

50 0 50 100
SCALE IN FEET

STATE OF NEW HAMPSHIRE
LONDONDERRY & DERRY
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

WETLAND IMPACT PLANS

DATE PLOTTED	VHB PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
4/1/2022	52768.00	WET10	13065A_WET_Plans	13065A	16	35



EROSION CONTROL PLAN LEGEND

PERIMETER CONTROL
- SILT FENCE
- EROSION CONTROL MIX BERM
- EROSION CONTROL MIX SOX
- TURBIDITY CURTAIN
- SHEET PILE
- COFFER DAM

NATURAL BUFFER/PERIMETER CONTROL
- SILT FENCE
- EROSION CONTROL MIX BERM
- EROSION CONTROL MIX SOX
- TURBIDITY CURTAIN
- SHEET PILE
- COFFER DAM

CHANNEL PROTECTION
- STONE CHECK DAMS
- STRAW WATTLES
- CHANNEL MATTING
- CLASS D EROSION STONE
- CLASS C STONE

CLEAN WATER BYPASS
- PUMP THROUGH PIPE
- DRAIN THROUGH PIPE OR CHANNEL

50 0 50 100
SCALE IN FEET

NUMBER	DESCRIPTION	DATE	STATION

		DATE
SDR PROCESSED	VHB TEAM/NHDOT	2/8/2022
NEW DESIGN	VHB TEAM	3/21/2022
SHEET CHECKED	J. HILTON	3/21/2022
AS BUILT DETAILS		DATE

STATE OF NEW HAMPSHIRE
LONDONDERRY & DERRY
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

EROSION CONTROL PLANS

DATE PLOTTED	VHB PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
4/1/2022	52768.00	ERO01	13065A_ERO_Plans	13065A	17	35

GRID N

MATCH TO SHEET ERO01

MATCH TO SHEET ERO03

NASHUA ROAD

TMH #12

TMH #11

I-93 SB EXIT 4 ON-RAMP

I-93 SB

I-93 NB

I-93 NB EXIT 4 ON-RAMP

3613 3614 3615 3616 3617 3618 3619 3620 3621 3622 3623 3624 3625

1610 1611 1612 1613 1614 1615 1616 1617 1618 1619 1620 1621 1622 1623

50 0 50 100

SCALE IN FEET

REVISIONS AFTER PROPOSAL

NUMBER	DESCRIPTION	DATE	STATION	STATION

SDR PROCESSED	VHB TEAM/NHDOT	DATE 2/8/2022
NEW DESIGN	VHB TEAM	DATE 3/21/2022
SHEET CHECKED	J. HILTON	DATE 3/21/2022
AS BUILT DETAILS		DATE

STATE OF NEW HAMPSHIRE
LONDONDERRY & DERRY
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

EROSION CONTROL PLANS

DATE PLOTTED	VHB PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
4/1/2022	52768.00	ERO02	13065A_ERO_Plans	13065A	18	35

REVISIONS AFTER PROPOSAL

NUMBER	DATE	DESCRIPTION	STATION

SDR PROCESSED	VHB TEAM/NHDOT	DATE 2/8/2022
NEW DESIGN	VHB TEAM	DATE 3/21/2022
SHEET CHECKED	J. HILTON	DATE 3/21/2022
AS BUILT DETAILS		DATE

GRID

MATCH TO SHEET ERO02

MATCH TO SHEET ERO04

I-93 SB EXIT 4 OFF-RAMP

I-93 SB

I-93 NB

I-93 NB EXIT 4 ON-RAMP

MAINTENANCE ACCESS

DB3636-B02

DB1631-B01

PC

3626 3627 3628 3629 3630 3631 3632 3633 3634 3635 3636 3637 3638

1624 1625 1626 1627 1628 1629 1630 1631 1632 1633 1634 1635

50 0 50 100

SCALE IN FEET

vhb

STATE OF NEW HAMPSHIRE
LONDONDERRY & DERRY
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

EROSION CONTROL PLANS

DATE PLOTTED	VHB PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
4/1/2022	52768.00	ERO03	13065A_ERO_Plans	13065A	19	35

GRID N

MATCH TO SHEET ERO03

MATCH TO SHEET ERO05

EXISTING L.A.R.O.W.
PER 5201G RETURN
BK. 1608 PG. 24

3639 3640 3641 3642 3643 3644 3645 3646 3647 3648 3649 3650

I-93 SB

I-93 NB

1636 1637 1638 1639 1640 1641 1642 1643 1644 1645 1646 1647 1648

EXISTING LAROW
PER 10418-C

APPROX. EXISTING R.O.W.

emerg

50 0 50 100

SCALE IN FEET

REVISIONS AFTER PROPOSAL	NUMBER	DATE	STATION	DESCRIPTION

SDR PROCESSED	VHB TEAM/NHDOT	DATE 2/8/2022
NEW DESIGN	VHB TEAM	DATE 3/21/2022
SHEET CHECKED	J. HILTON	DATE 3/21/2022
AS BUILT DETAILS		DATE

STATE OF NEW HAMPSHIRE
LONDONDERRY & DERRY
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

EROSION CONTROL PLANS

DATE PLOTTED	VHB PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
4/1/2022	52768.00	ERO04	13065A_ERO_Plans	13065A	20	35

GRID N

STA. 3654+75
END APPROACH
BEGIN FULL DEPTH CONSTRUCTION

STA. 3654+25
I-93 SB
LIMIT OF WORK
BEGIN APPROACH

STA. 1654+50
I-93 NB
LIMIT OF WORK
BEGIN APPROACH

STA. 1655+00
END APPROACH
BEGIN FULL DEPTH CONSTRUCTION

MATCH TO SHEET ERO04

MATCH TO SHEET ERO06

EXISTING L.A.R.O.W.

APPROX. EXISTING R.O.W.

Approx. location of existing sewer

2 MAZZAGLIA FAMILY TRUST

3 TUFTS, JOSEPH D. & NANCY M.

6 PILLSBURY REALTY DEVELOPMENT LLC

TOWN OF LONDONDERRY

TEMPORARY SEDIMENT BASIN

L.A. ROW

BMP 1649

PILLSBURY ROAD

EXISTING L.A.R.O.W. PER 10418-C

EXISTING L.A.R.O.W. PER 5201G RETURN BK. 1608 PG. 24

MAINTENANCE ACCESS

I-93 SB

I-93 NB

50 0 50 100

SCALE IN FEET

REVISIONS AFTER PROPOSAL	NUMBER	DATE	STATION	DESCRIPTION

SDR PROCESSED	VHB TEAM/NHDOT	DATE 2/8/2022
NEW DESIGN	VHB TEAM	DATE 3/21/2022
SHEET CHECKED	J. HILTON	DATE 3/21/2022
AS BUILT DETAILS		DATE

STATE OF NEW HAMPSHIRE
LONDONDERRY & DERRY
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

EROSION CONTROL PLANS

vhb

DATE PLOTTED	VHB PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
4/1/2022	52768.00	ERO05	13065A_ERO_Plans	13065A	21	35

MATCH TO SHEET ERO05

MATCH TO SHEET ERO07

DONOVAN, CORNELIUS J. & JOYCE LEE

ROY, ALAN J. & RIZZO-ROY, MARIA L.

FLYNN 2013 FAMILY TRUST

BELANGER FAMILY REVOCABLE TRUST

CANTAVE FAMILY REVOCABLE TRUST

DICKENSON, DONNA E.

TEMPORARY SEDIMENT BASIN

TEMPORARY SEDIMENT BASIN

TEMPORARY SEDIMENT BASIN

L.A. ROW

TRIBUTARY TO WHEELER POND

I-93 SB

I-93 NB

SB ON RAMP

NB OFF RAMP

L.A. ROW

L.A. ROW

CLEAR TO SLOPE LINE ONLY AT DELINEATED WETLANDS AND VERNAL POOLS (I-93 NB SIDE ONLY)(TYP.)

PILLSBURY REALTY DEVELOPMENT LLC

PILLSBURY REALTY DEVELOPMENT LLC

DRAINAGE EASEMENT PER NH PROJ. 10418-C (5744/495)

UTILITY EASEMENT TO SPRINT SPECTRUM L.P. (3240/84) FOLLOWS "OLD FOLSOM ROAD", AS IT MAY APPLY TO THIS PARCEL.

BMP 1670

3'X3'X3' concrete block measuring device

EXISTING L.A.ROW

EXISTING L.A.ROW

GRID

50 0 50 100

SCALE IN FEET

REVISIONS AFTER PROPOSAL

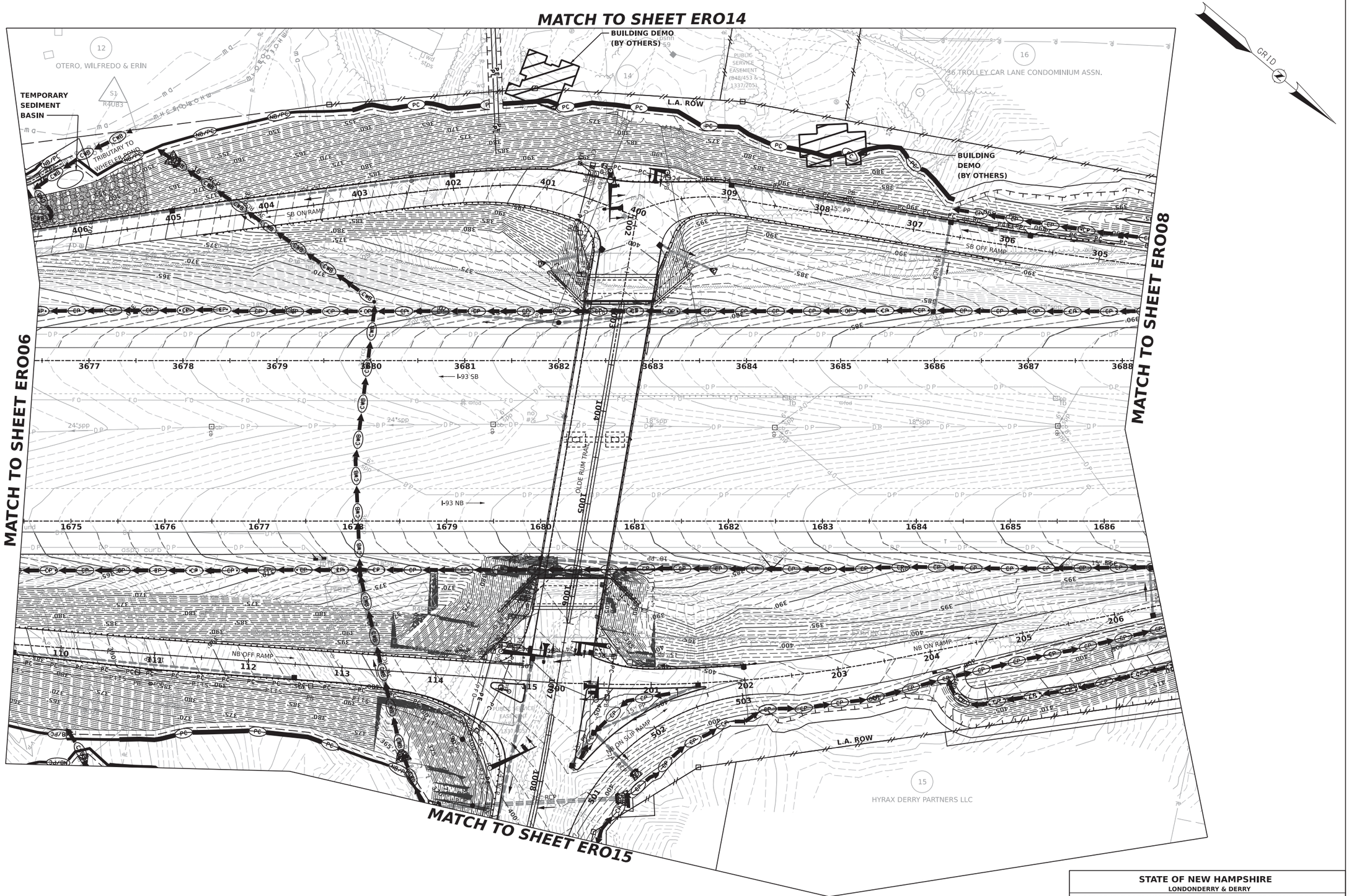
NUMBER	DESCRIPTION	DATE	STATION

SDR PROCESSED	VHB TEAM/NHDOT	DATE 2/8/2022
NEW DESIGN	VHB TEAM	DATE 3/21/2022
SHEET CHECKED	J. HILTON	DATE 3/21/2022
AS BUILT DETAILS		DATE

STATE OF NEW HAMPSHIRE
LONDONDERRY & DERRY
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

EROSION CONTROL PLANS

DATE PLOTTED	VHB PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
4/1/2022	52768.00	ERO06	13065A_ERO_Plans	13065A	22	35



50 0 50 100

SCALE IN FEET

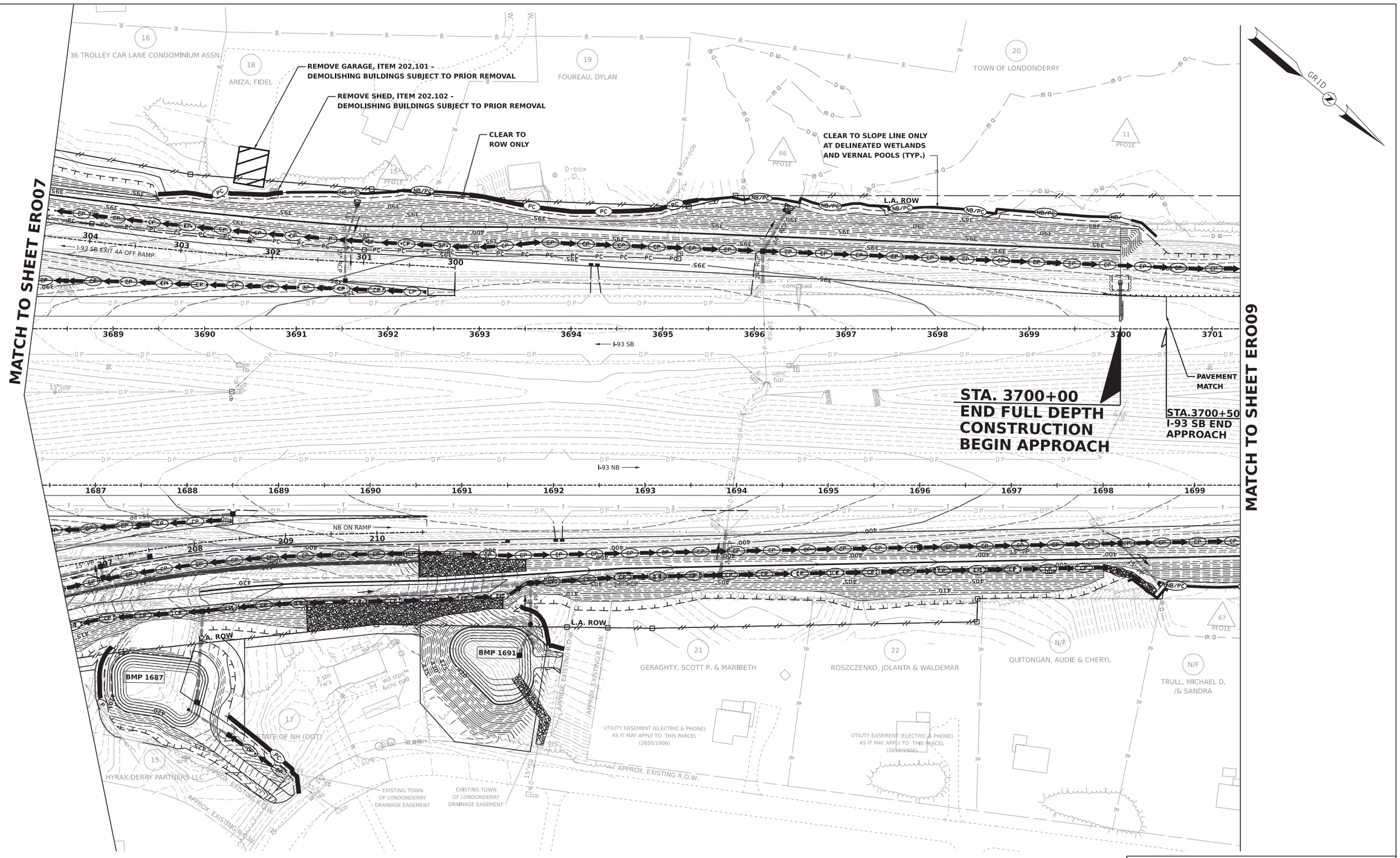
REVISIONS AFTER PROPOSAL	NUMBER	DATE	STATION
DESCRIPTION			

		DATE
SDR PROCESSED	VHB TEAM/NHDOT	2/8/2022
NEW DESIGN	VHB TEAM	3/21/2022
SHEET CHECKED	J. HILTON	3/21/2022
AS BUILT DETAILS		DATE

STATE OF NEW HAMPSHIRE
LONDONDERRY & DERRY
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

EROSION CONTROL PLANS

DATE PLOTTED	VHB PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
4/1/2022	52768.00	ERO07	13065A_ERO_Plans	13065A	23	35



NUMBER	DATE	STATION	DESCRIPTION
			REVISIONS AFTER PROPOSAL

SDR PROCESSED	VHB TEAM/NHDOT	DATE 2/8/2022
NEW DESIGN	VHB TEAM	DATE 3/21/2022
SHEET CHECKED	J. HILTON	DATE 3/21/2022
AS BUILT DETAILS		DATE

STATE OF NEW HAMPSHIRE
LONDONDERRY & DERRY
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

EROSION CONTROL PLANS

DATE PLOTTED	VHB PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
4/1/2022	52768.00	ERO08	13065A_ERO_Plans	13065A	24	35

REVISIONS AFTER PROPOSAL

NUMBER	DATE	STATION	DESCRIPTION

SDR PROCESSED	VHB TEAM/NHDOT	DATE 2/8/2022
NEW DESIGN	VHB TEAM	DATE 3/21/2022
SHEET CHECKED	J. HILTON	DATE 3/21/2022
AS BUILT DETAILS		DATE

GRID

MATCH TO SHEET ERO08

MATCH TO SHEET ERO10

L.A. ROW

EXISTING L.A.R.O.W. PER P5201G

EXISTING L.A.R.O.W. PER 10418-C

CLEAR TO SLOPE LINE ONLY AT DELINEATED WETLANDS AND VERNAL POOLS (TYP.)

20 TOWN OF LONDONDERRY

11 PFO1E

N/F WELDON, DANIEL A.

3'x3'x3' concrete block measuring device

I-93 SB

I-93 NB

asph curb

conc hdr

15"rcp

15"spp

18"spp

mes

wire

STA. 1704+75
END FULL DEPTH CONSTRUCTION
BEGIN APPROACH

STA. 1705+25
I-93 NB
END APPROACH

SOUTHBOUND MATCH

9 PFO1

N/F TRULL, MICHAEL D. /& SANDRA

N/F SCACCIA, GERALD P.

N/F DARON, JODI L. & DAVID B.

N/F GREEN, JOSEPH & VILLENEUVE, DANA

N/F MOSS, BRIAN J.

N/F KELLEY, EDWARD T.

50 0 50 100

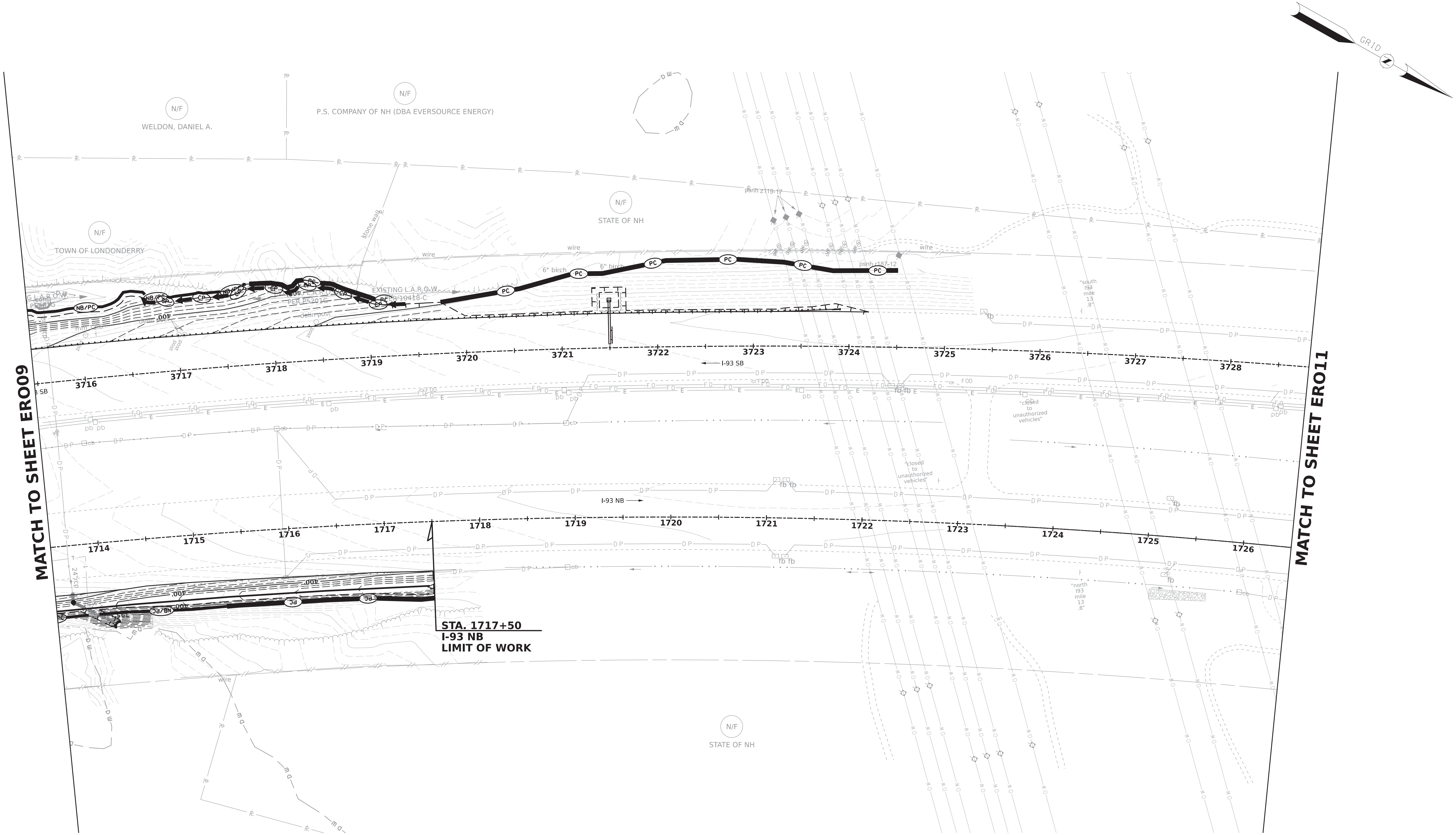
SCALE IN FEET

vhb

STATE OF NEW HAMPSHIRE
LONDONDERRY & DERRY
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

EROSION CONTROL PLANS

DATE PLOTTED	VHB PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
4/1/2022	52768.00	ERO09	13065A_ERO_Plans	13065A	25	35



REVISIONS AFTER PROPOSAL			
NUMBER	DATE	STATION	STATION	DESCRIPTION

SDR PROCESSED	VHB TEAM/NHDOT	DATE	2/8/2022
NEW DESIGN	VHB TEAM	DATE	3/21/2022
SHEET CHECKED	J. HILTON	DATE	3/21/2022
AS BUILT DETAILS		DATE	

STATE OF NEW HAMPSHIRE
LONDONDERRY & DERRY

DEPARTMENT OF TRANSPORTATION ∘ BUREAU OF HIGHWAY DESIGN

EROSION CONTROL PLANS

DATE PLOTTED	VHB PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
4/1/2022	52768.00	ERO10	13065A_ERO_Plans	13065A	26	35

GRID

N/F
CLARK III, REED PAIGE / ET AL

EXISTING L.A.R.O.W
PER 10418-C

EXISTING L.A.R.O.W.
PER P5201H

EXISTING L.A
PER P52

MATCH TO SHEET ERO10

MATCH TO SHEET ERO12

3729 3730 3731 3732 3733 3734 3735 3736 3737 3738 3739 3740 3741

I-93 SB

I-93 NB

1727 1728 1729 1730 1731 1732 1733 1734 1735 1736 1737 1738 1739

N/F
P.S. COMPANY OF NH / (DBA EVERSOURCE ENERGY)

EXISTING L.A.R.O.W.

N/F
CLARK IRREVOCABLE TRUST / CLARK, GERARD TRUSTEE

50 0 50 100
SCALE IN FEET

REVISIONS AFTER PROPOSAL

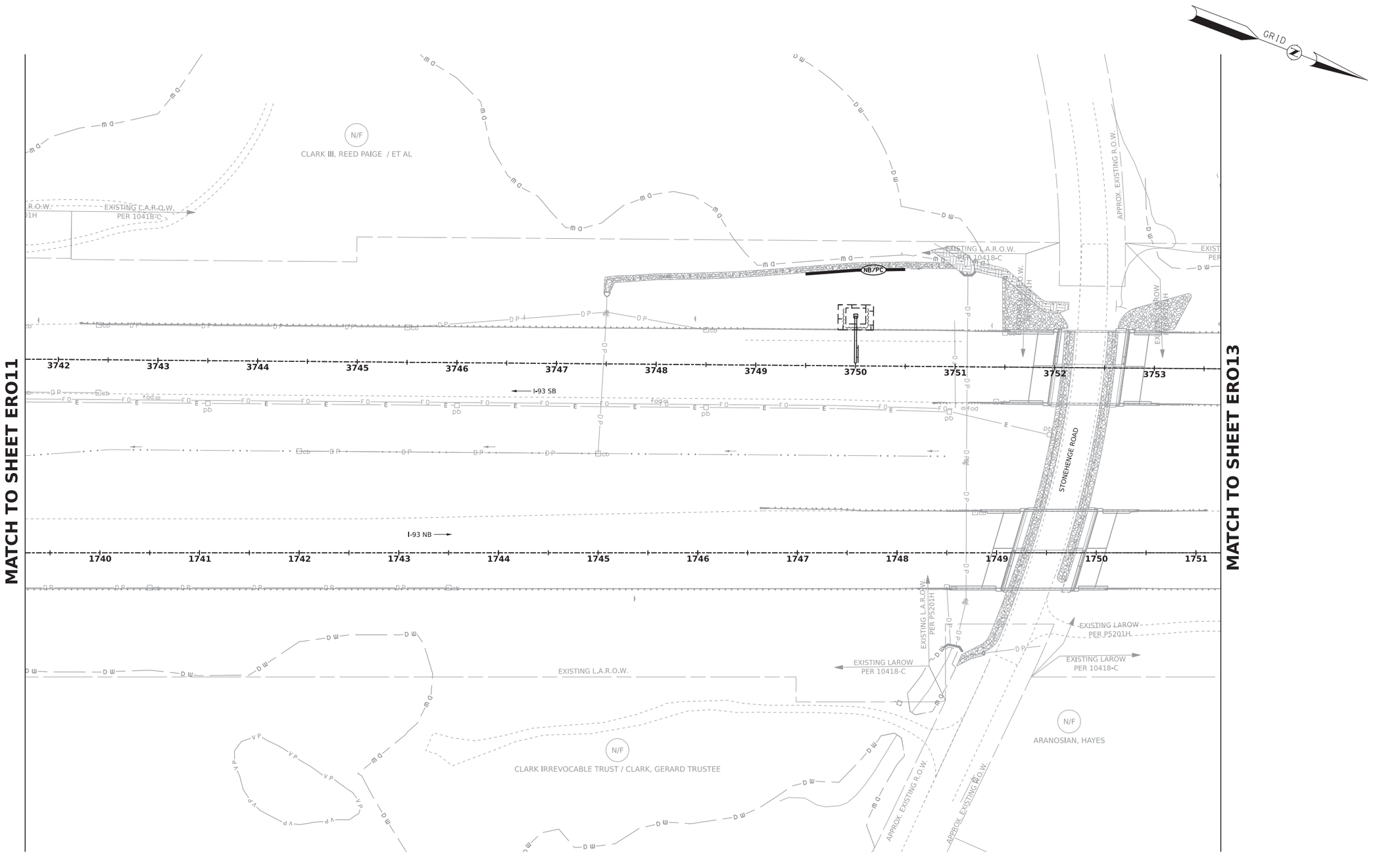
NUMBER	DATE	STATION	DESCRIPTION

SDR PROCESSED	VHB TEAM/NHDOT	DATE 2/8/2022
NEW DESIGN	VHB TEAM	DATE 3/21/2022
SHEET CHECKED	J. HILTON	DATE 3/21/2022
AS BUILT DETAILS		DATE

STATE OF NEW HAMPSHIRE
LONDONDERRY & DERRY
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

EROSION CONTROL PLANS

DATE PLOTTED	VHB PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
4/1/2022	52768.00	ERO11	13065A_ERO_Plans	13065A	27	35



50 0 50 100

SCALE IN FEET

NUMBER	DESCRIPTION	DATE	STATION

REVISIONS AFTER PROPOSAL

SDR PROCESSED	VHB TEAM/NHDOT	DATE 2/8/2022
NEW DESIGN	VHB TEAM	DATE 3/21/2022
SHEET CHECKED	J. HILTON	DATE 3/21/2022
AS BUILT DETAILS		DATE

STATE OF NEW HAMPSHIRE
LONDONDERRY & DERRY
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

EROSION CONTROL PLANS

DATE PLOTTED	VHB PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
4/1/2022	52768.00	ERO12	13065A_ERO_Plans	13065A	28	35

GRID

N/F
BETTEZ ROBERT J.C. REVOCABLE TRUST 2007

N/F
SQUEGLIA, ANDREA / & JOHN A.

N/F
NORTON, STEVEN A.

N/F
CLARK III, REED PAIGE / ET AL

N/F
SHEEHY, ESTHER R. / REVOCABLE TRUST

N/F
GRANDE, JUSTIN L.

N/F
CURRIER, LEIGH A. / & MARCIA M.

NG LAROW
10418-C

EXISTING L.A.R.O.W.
PER 10418-C

3754 3755 3756 3757 I-93 SB 3758 3759 3760 3761 3762 3763 3764 3765

MATCH TO SHEET ERO12

I-93 NB

1752 1753 1754 1755 1756 1757 1758 1759 1760 1761 1762 1763

EXISTING L.A.R.O.W.
PER 10418-C

N/F
ARANOSIAN, HAYES

N/F
SOUCY, JEAN-EDUE G / & DEBORAH A.

N/F
HALL, PAMELA A.

N/F
LAURENCIO, MANUEL / & LISA J.

50 0 50 100
SCALE IN FEET

NUMBER	DESCRIPTION	DATE	STATION
	REVISIONS AFTER PROPOSAL		

SDR PROCESSED	VHB TEAM/NHDOT	DATE 2/8/2022
NEW DESIGN	VHB TEAM	DATE 3/21/2022
SHEET CHECKED	J. HILTON	DATE 3/21/2022
AS BUILT DETAILS		DATE

STATE OF NEW HAMPSHIRE
LONDONDERRY & DERRY
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

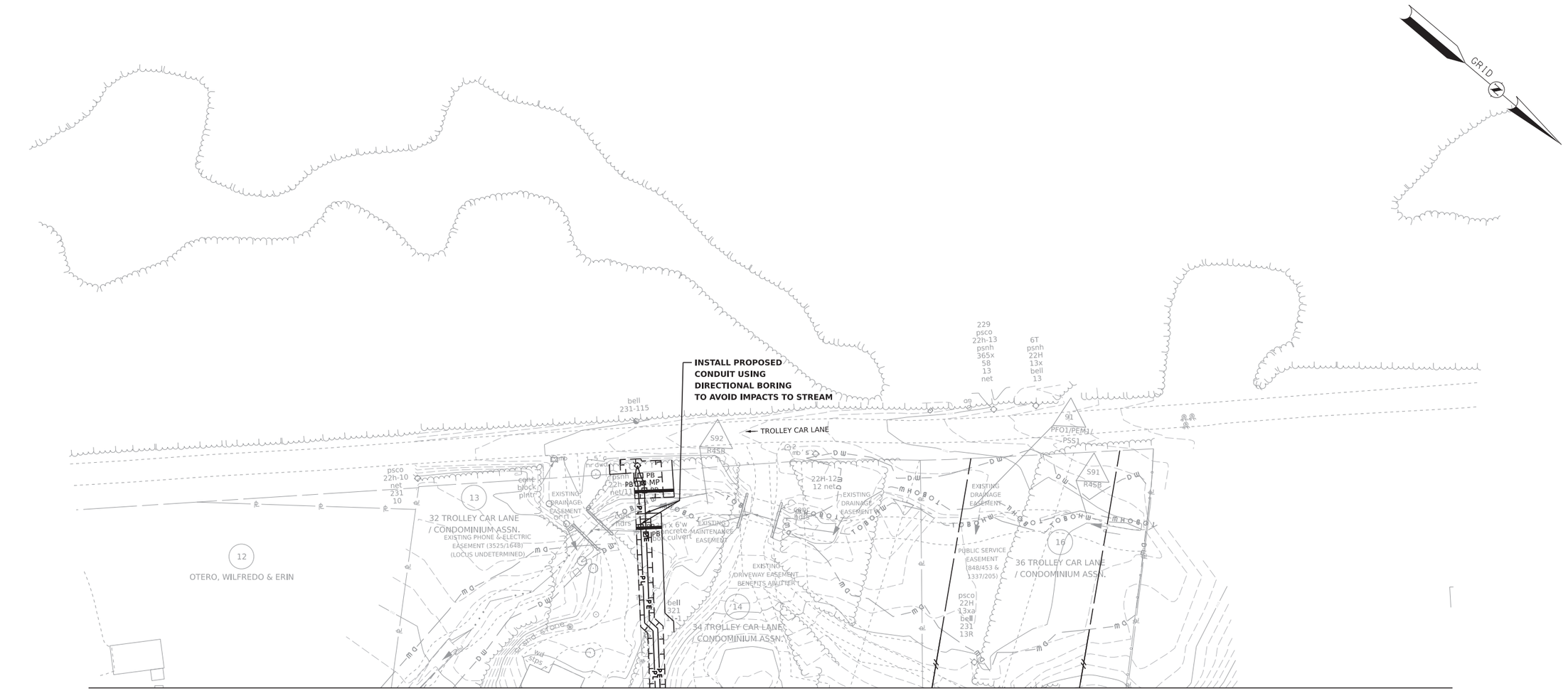
EROSION CONTROL PLANS

DATE PLOTTED	VHB PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
4/1/2022	52768.00	ERO13	13065A_ERO_Plans	13065A	29	35

REVISIONS AFTER PROPOSAL

NUMBER	DESCRIPTION	DATE	STATION

SDR PROCESSED	VHB TEAM/NHDOT	DATE 2/8/2022
NEW DESIGN	VHB TEAM	DATE 3/21/2022
SHEET CHECKED	J. HILTON	DATE 3/21/2022
AS BUILT DETAILS		DATE



MATCH TO SHEET ERO07

50 0 50 100

SCALE IN FEET

STATE OF NEW HAMPSHIRE
LONDONDERRY & DERRY
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

EROSION CONTROL PLANS

DATE PLOTTED	VHB PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
4/1/2022	52768.00	ERO14	13065A_ERO_Plans	13065A	30	35

STA. 1014+00
OLDE RUM TRAIL
LIMIT OF WORK
13065A WEARING
COURSE

MATCH TO SHEET ERO07

MATCH TO SHEET ERO16

MATCH TO SHEET ERO06

BMP 1012

OLDE RUM TRAIL

L.A. ROW

CLEAR TO SLOPE LINE ONLY
AT DELINEATED WETLANDS
AND VERNAL POOLS (TYP.)

HYRAX DERRY PARTNERS LLC

PUBLIC SERVICE EASEMENT
(848/453 & 1337/205)

PILLSBURY REALTY
DEVELOPMENT LLC

PILLSBURY REALTY DEVELOPMENT LLC

UTILITY EASEMENT TO SPRINT SPECTRUM L.P.
(3240/84) FOLLOWS "OLD FOLSOM ROAD", AS
IT MAY APPLY TO THIS PARCEL.

GRID N

50 0 50 100
SCALE IN FEET

REVISIONS AFTER PROPOSAL

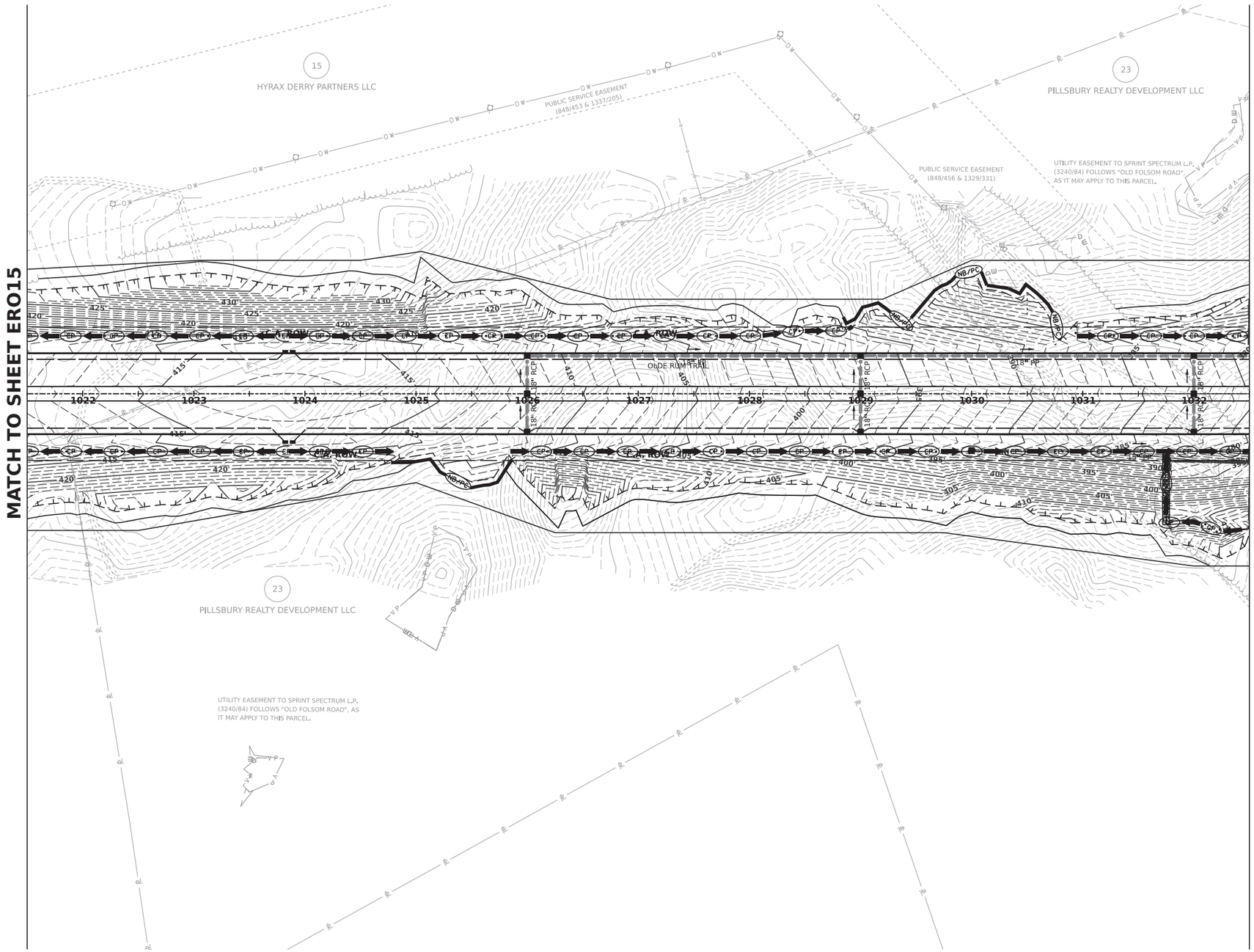
NUMBER	DESCRIPTION	STATION	DATE

SDR PROCESSED	VHB TEAM/NHDOT	DATE 2/8/2022
NEW DESIGN	VHB TEAM	DATE 3/21/2022
SHEET CHECKED	J. HILTON	DATE 3/21/2022
AS BUILT DETAILS		DATE

STATE OF NEW HAMPSHIRE
LONDONDERRY & DERRY
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

EROSION CONTROL PLANS

DATE PLOTTED	VHB PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
4/1/2022	52768.00	ERO15	13065A_ERO_Plans	13065A	31	35



23
PILLSBURY REALTY DEVELOPMENT LLC
UTILITY EASEMENT TO SPRINT SPECTRUM L.P.
(3240/84) FOLLOWS "OLD FOLSOM ROAD",
AS IT MAY APPLY TO THIS PARCEL.

50 0 50 100
SCALE IN FEET

NUMBER	DATE	DESCRIPTION	STATION	STATION

REVISIONS AFTER PROPOSAL

SDR PROCESSED	VHB TEAM/NHDOT	DATE 2/8/2022
NEW DESIGN	VHB TEAM	DATE 3/21/2022
SHEET CHECKED	J. HILTON	DATE 3/21/2022
AS BUILT DETAILS		DATE

STATE OF NEW HAMPSHIRE
LONDONDERRY & DERRY
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

EROSION CONTROL PLANS

DATE PLOTTED	VHB PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
4/1/2022	52768.00	ERO16	13065A_ERO_Plans	13065A	32	35

MATCH TO SHEET ERO16

MATCH TO SHEET ERO18

DO NOT DISTURB BEYOND PROPERTY LINE

CLEAR TO SLOPE LINE ONLY AT DELINEATED WETLANDS AND VERNAL POOLS (TYP.)

BMP 1038

STA. 1040+00
OLDE RUM TRAIL
LIMIT OF WORK

STA. 1038+50
END FULL DEPTH
CONSTRUCTION

STA. 16+31.53
MADDEN RD
LIMIT OF WORK

OLDE RUM TRAIL

C.A. ROW

PILLSBURY REALTY DEVELOPMENT LLC

SEVEN HILLS DEVELOPMENT LLC

PUBLIC SERVICE EASEMENT (848/456 & 1329/331)

PUBLIC SERVICE EASEMENT (5094/2987)

ABBOTT, MARCIA E.

DERRY BUSINESS CENTER / UNIT OWNERS ASSN

PILLSBURY REALTY DEVELOPMENT LLC

UTILITY EASEMENT TO SPRINT SPECTRUM L.P. (3240/84) FOLLOWS "OLD FOLSOM ROAD", AS IT MAY APPLY TO THIS PARCEL.

SUBJECT TO ACCESS RIGHTS NOTED IN DEED 7937/2232 (LOCUS UNDETERMINED)

GRID

50 0 50 100
SCALE IN FEET

	DESCRIPTION	STATION	DATE	NUMBER
REVISIONS AFTER PROPOSAL				

SDR PROCESSED	VHB TEAM/NHDOT	DATE 2/8/2022
NEW DESIGN	VHB TEAM	DATE 3/21/2022
SHEET CHECKED	J. HILTON	DATE 3/21/2022
AS BUILT DETAILS		DATE

STATE OF NEW HAMPSHIRE
LONDONDERRY & DERRY
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

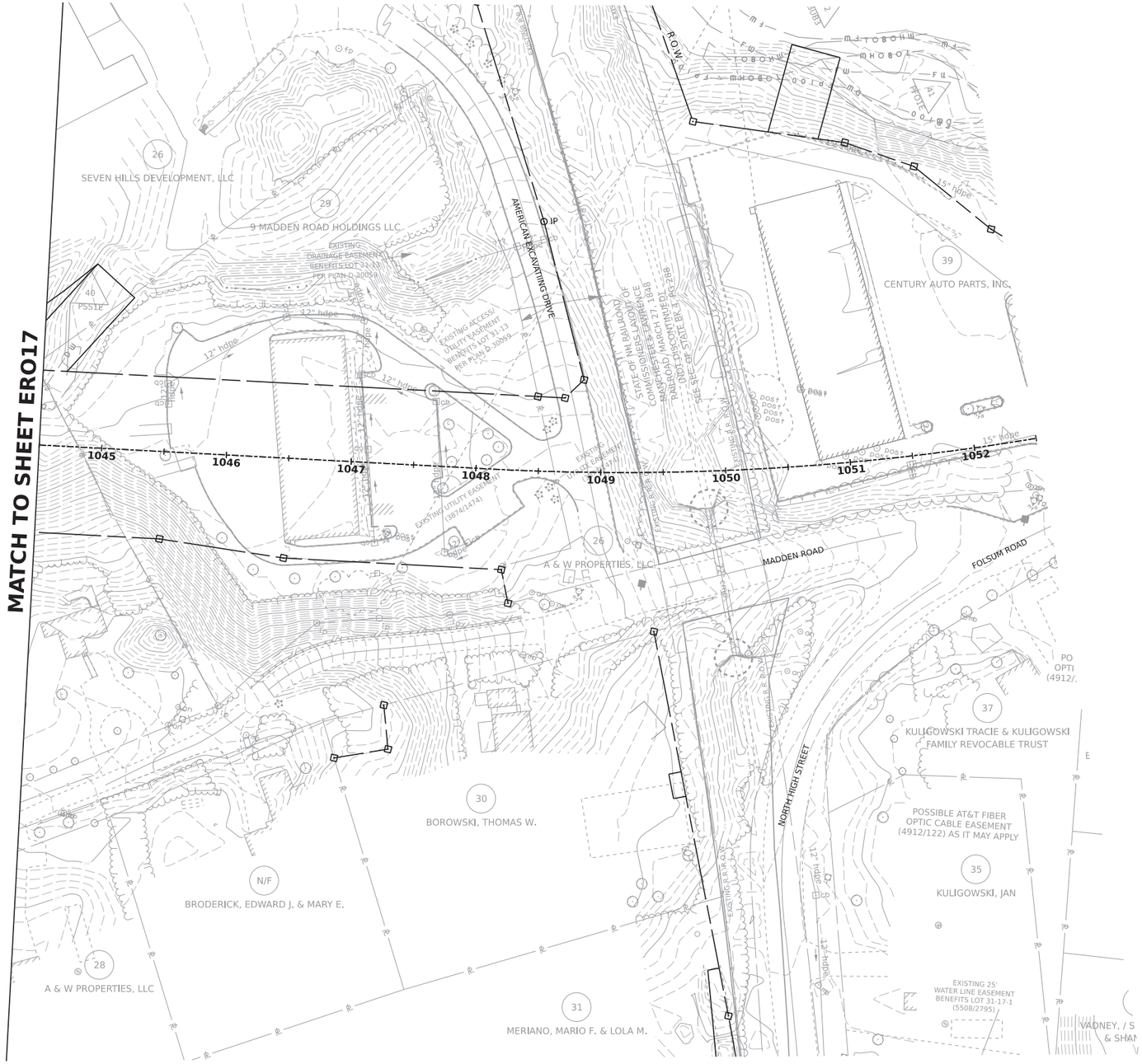
EROSION CONTROL PLANS

DATE PLOTTED	VHB PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
4/1/2022	52768.00	ERO17	13065A_ERO_Plans	13065A	33	35

REVISIONS AFTER PROPOSAL

NUMBER	DESCRIPTION	DATE	STATION

SDR PROCESSED	VHB TEAM/NHDOT	DATE 2/8/2022
NEW DESIGN	VHB TEAM	DATE 3/21/2022
SHEET CHECKED	J. HILTON	DATE 3/21/2022
AS BUILT DETAILS		DATE



50 0 50 100

SCALE IN FEET

STATE OF NEW HAMPSHIRE
LONDONDERRY & DERRY
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

EROSION CONTROL PLANS

DATE PLOTTED	VHB PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
4/1/2022	52768.00	ERO18	13065A_ERO_Plans	13065A	34	35

PHASE 1

- INSTALL PERMANENT CONSTRUCTION SIGNS PACKAGE AND WARNING DEVICES.

- MAINTAIN FOUR LANES OF TRAFFIC ON EXISTNG ROADWAYS WITH POLICE OFFICERS IN PLACE TO AID CONSTRUCTION EQUIPMENT WITH SITE ACCESS.

- PLACE PORTABLE CONCRETE BARRIER WITH DRAIN SLOT ALONG I-93 NORTHBOUND EDGE OF PAVEMENT FROM STA 1678+00, RT TO STA. 1690+50, RT; ALONG I-93 NORTHBOUND EDGE OF PAVEMENT FROM STA. 1678+00, LT TO STA. 1682+50, LT ON THE MEDIAN SIDE; AND ALONG I-93 SOUTHBOUND EDGE OF PAVEMENT FROM STA 3680+75, LT TO STA. 3691+00, LT.

- PLACE TRAFFIC BARRELS ALONG I-93 NORTHBOUND FROM STA. 1659+50, RT TO 1724+00, RT AT TWO FEET FROM EDGE OF TRAVEL WAY FOR RIGHT SHOULDER CLOSURE TO BEGIN INTERCHANGE ABUTMENT FOUNDATION CONSTRUCTION, MUCK AND OVERBURDEN REMOVAL, AND NB ON-RAMP SOUNDWALL BERM AND FOUNDATION CONSTRUCTION.

- PLACE TRAFFIC BARRELS ALONG I-93 NORTHBOUND FROM STA. 1666+50, LT TO 1684+30, LT AT TWO FEET FROM THE EDGE OF TRAVEL WAY FOR MEDIAN SHOULDER CLOSURE TO BEGIN INTERCHANGE BRIDGE PIER FOUNDATION CONSTRUCTION AND TO REMOVE AND RELOCATE THE EVERSOURCE 365 TRANSMISSION LINE (EVERSOURCE 365 RELOCATION BY OTHERS).

- PLACE TRAFFIC BARRELS ALONG I-93 SOUTHBOUND FROM STA. 3675+25, LT TO STA. 3697+50, LT AT TWO FEET FROM THE EDGE OF TRAVEL WAY FOR RIGHT SHOULDER CLOSURE TO BEGIN INTERCHANGE BRIDGE ABUTMENT FOUNDATION CONSTRUCTION.

- PLACE TRAFFIC BARRELS ALONG I-93 SOUTHBOUND FROM STA. 3679+70, RT TO STA. 3697+00, RT AT TWO FEET FROM THE EDGE OF TRAVEL WAY FOR MEDIAN SHOULDER CLOSURE TO BEGIN INTERCHANGE BRIDGE PIER FOUNDATION CONSTRUCTION AND TO REMOVE AND RELOCATE THE EVERSOURCE 365 TRANSMISSION LINE (EVERSOURCE 365 RELOCATION BY OTHERS).

- PERFORM TREE REMOVAL AND CLEARING OPERATIONS FOR EVERSOURCE OVERHEAD 365 TRANSMISSION FACILITY RELOCATION WORK IN THE AREAS OF THE PROPOSED INTERSTATE RAMPS, WITHIN THE LIMITS OF THE PROPOSED OLDE RUM TRAIL GRADING, AND IN THE STORMWATER TREATMENT AREAS. (EVERSOURCE IS RESPONSIBLE FOR CLEARING OUTSIDE OF THE 13065A PROJECT LIMITS.) ESTABLISH CONSTRUCTION ON THE EAST, MEDIAN, AND WEST SIDES OF I-93.

- CONSTRUCT PARTIAL EMBANKMENT SLOPES FOR I-93 NB ON-RAMP AS NEEDED TO SUPPORT THE INSTALLATION OF EVERSOURCE 365 POLE 65 (6 FEET OF FILL NEEDED).

- BEGIN CONSTRUCTION OF THE EMBANKMENT SLOPES FOR THE NEW RAMPS. PHASE 1 WILL FOCUS ON THE NORTHBOUND RAMPS FROM STA. 108+50 TO STA. 201+50 AND ON THE SOUTHBOUND RAMPS FROM STA. 301+50 TO STA. 403+00 TO AID IN CONSTRUCTION OF THE NEW BRIDGE ABUTMENTS.

- CONSTRUCT BMP 1012 AS TEMPORARY CONDITION BEST MANAGEMENT PRACTICES (BMP) FOR COLLECTION AND TREATMENT OF CONSTRUCTION STORMWATER.

- PERFORM MUCK EXCAVATION IN DELINEATED WETLANDS WITHIN PROPOSED SLOPE LINES.

- PERFORM ROCK EXCAVATION WITHIN THE I-93 NB ON-RAMP SLOPE LINES, AND I-93 SB OFF-RAMP SLOPE LINES.

- BEGIN CONSTRUCTION OF THE I-93 INTERCHANGE BRIDGE ABUTMENTS AND MEDIAN PIER FOUNDATIONS.

WINTER WORK

- EXTEND PORTABLE CONCRETE BARRIER WITH DRAIN SLOT ALONG I-93 NORTHBOUND EDGE OF PAVEMENT FROM STA 1690+50, RT TO STA. 1718+50, RT.

- CONSTRUCT I-93 NORTHBOUND SOUNDWALL FOUNDATIONS FROM STA. 208+00 TO STA. 1717+50.

- BEGIN BLASTING AND OVERBURDEN REMOVAL ALONG OLDE RUM TRAIL FROM STA. 1016+00 TO 1039+00.

PHASE 1A

- MAINTAIN PCB MEDIAN EDGE OF PAVEMENT (STA. 1678+00, LT TO STA. 1682+50, LT) FROM PHASE 1.

- RELOCATE PCB ALONG I-93 NORTHBOUND RIGHT EDGE OF PAVEMENT TO FOUR FEET FROM THE EDGE OF TRAVEL WAY (STA. 1678+00, RT. TO STA. 1682+50, RT.)

- COMPLETE CONSTRUCTION OF THE I-93 INTERCHANGE BRIDGE ABUTMENTS AND MEDIAN PIER FOUNDATIONS.

- PLACE TRAFFIC BARRELS ALONG I-93 NORTHBOUND FROM STA. 1638+60, RT TO STA. 1689+50, RT TO CLOSE THE RIGHT LANE AND SHOULDER.

- PLACE PCB ALONG I-93 NORTHBOUND FROM STA. 1651+50, RT TO STA. 1662+75, RT FOR THE CONSTRUCTION OF THE CLOSED DRAINAGE SYSTEM BETWEEN STRUCTURE N3 AND N9 (ADDITIONAL DRAINAGE STRUCTURES CAN BE CONSTRUCTED BEHIND EXISTING GUARDRAIL).

PHASE 2

- MAINTAIN PCB ALONG I-93 NORTHBOUND MEDIAN EDGE OF PAVEMENT FROM PHASE 1 (STA. 1678+00, LT TO STA. 1682+50, LT). MAINTAIN TRAFFIC BARRELS ALONG I-93 NORTHBOUND AT TWO FEET FROM THE EDGE OF TRAVEL WAY FROM PHASE 1 (STA. 1666+50, LT TO 1684+30, LT).

- RELOCATE PCB ALONG I-93 NORTHBOUND TO PHASE 1 LOCATION AT THE EDGE OF PAVEMENT (STA. 1678+00, RT TO STA. 1683+50, RT). ADJUST TRAFFIC BARRELS ALONG I-93 NORTHBOUND FROM PHASE 1A FROM STA. 1646+30, RT TO STA. 1696+96, RT TO PROVIDE DAILY CLOSURES OF THE RIGHT TRAVEL LANE AND SHOULDER.

- MAINTAIN PCB ALONG I-93 SOUTHBOUND AT PHASE 1 LOCATION AT THE EDGE OF PAVEMENT. EXTEND PCB AT EACH END TO STA. 3679+75, LT. AND STA. 3687+00, LT.

- PLACE PCB WITH DRAIN SLOT ALONG I-93 SOUTHBOUND EDGE OF PAVEMENT FROM STA. 3689+50, LT TO STA. 3696+35, LT. BEGIN LEADING END OF PCB BEHIND EXISTING GUARDRAIL.

- PLACE TRAFFIC BARRELS ALONG I-93 SOUTHBOUND FROM STA. 3656+06, LT TO 3722+20, LT TO PROVIDE DAILY CLOSURES OF THE RIGHT TRAVEL LANE AND SHOULDER.

- PLACE TRAFFIC BARRELS ALONG MADDEN ROAD AT THE TEMPORARY ACCESS ROAD TO CLOSE THE EAST END OF THE WORK ZONE. CONSTRUCT TEMPORARY CONSTRUCTION ACCESS FROM EXISTING MADDEN ROAD TO OLDE RUM TRAIL AND BMP 1038.

- MAINTAIN THREE LANES OF TRAFFIC ALONG EACH BARREL WITH POLICE OFFICERS IN PLACE TO AID CONSTRUCTION EQUIPMENT WITH SITE ACCESS. CONSTRUCT TEMPORARY ACCESS ROADS AS NEEDED WHILE UTILIZING EXISTING SHOULDERS AS ACCELERATION AND DECELERATION LANES FOR CONSTRUCTION VEHICLES.

- CONSTRUCT BMP 1038 AS TEMPORARY CONDITION BEST MANAGEMENT PRACTICES (BMP) FOR TREATMENT OF CONSTRUCTION STORMWATER.

- CONSTRUCT STREAM RELOCATION ALONG I-93 SOUTHBOUND AND ADJACENT TO THE SOUTHBOUND ON RAMP. STREAM BED RELOCATION AND SHIFTING OF STREAM NEEDS TO OCCUR PRIOR TO CONSTRUCTION OF SB ON RAMP AND SB ON ACCELERATION LANE AND SOUNDWALL EMBANKMENT IN PHASE 3.

PS & E PLANS
SUBJECT TO CHANGE
DATE 3/21/2022

NOTE: EXCEPT FOR THE TWO BUILDINGS TO BE REMOVED ON PARCEL 18, IT IS ASSUMED THAT ANY REQUIRED BUILDING DEMOLITION AND RIGHT-OF-WAY ACQUISITION HAS BEEN CONTRACTED AND COMPLETED "BY OTHERS" PRIOR TO THE CONSTRUCTION OF 13065A. IT IS ASSUMED THAT THE OVERHEAD TRANSMISSION LINE RELOCATION WILL BE DONE BY OTHERS CONCURRENT WITH PHASE 1 CONSTRUCTION.

PHASE 2 (CONTINUED)

- COMPLETE CONSTRUCTION OF THE EMBANKMENTS AND CONTINUE OFF-LINE WORK ALONG NORTHBOUND OFF-RAMP, NORTHBOUND ON-RAMP, AND SOUTHBOUND OFF-RAMP.

- CONSTRUCT NEW DRAINAGE SYSTEM EQUIPMENT DURING EMBANKMENT PLACEMENTS ALONG NORTHBOUND OFF-RAMP, NORTHBOUND ON-RAMP, AND SOUTHBOUND OFF-RAMP.

- BEGIN CONSTRUCTION OF BMP 1687 AND BMP 1691.

- START CONSTRUCTION OF THE INTERCHANGE BRIDGE PIER AND ABUTMENTS.

- CONSTRUCT EMBANKMENTS FOR OLDE RUM TRAIL FROM THE INTERCHANGE BRIDGE AT STA. 1006+10 TO STA. 1013+00 TO SUPPORT THE EASTERN ABUTMENT AND THE OLDE RUM TRAIL INTERSECTION.

- CONSTRUCT EMBANKMENT AND DRAINAGE SYSTEM ALONG THE I-93 SOUTHBOUND ON-RAMP.

- PERFORM MUCK EXCAVATION IN DELINEATED WETLANDS THROUGHOUT THE PROJECT WITHIN PROPOSED SLOPE LINES.

PHASE 3

- MAINTAIN PCB ALONG I-93 NORTHBOUND MEDIAN EDGE OF PAVEMENT FROM PHASE 1 (STA. 1678+00, LT TO STA. 1681+25, LT). MAINTAIN TRAFFIC BARRELS ALONG I-93 NORTHBOUND AT TWO FEET FROM THE EDGE OF TRAVEL WAY FROM STA. 1666+50, LT TO 1684+30, LT.

- ADJUST TRAFFIC BARRELS ALONG I-93 NORTHBOUND FROM STA. 1642+00, RT TO STA. 1654+60, RT AND FROM STA. 1704+66, RT TO STA. 1719+94, RT TO BEGIN AND END THE CLOSURE OF THE RIGHT LANE AND SHOULDER.

- ADJUST TRAFFIC BARRELS ALONG I-93 SOUTHBOUND FROM STA. 3719+50, LT TO STA. 3734+80, LT TO BEGIN THE CLOSURE OF THE RIGHT LANE AND SHOULDER.

- PLACE PCB WITH DRAIN SLOT ALONG I-93 NORTHBOUND FROM STA. 1654+60, RT TO 1704+66, RT AND I-93 SOUTHBOUND FROM STA. 3654+50, LT TO 3719+50, LT TO CLOSE RIGHT TRAVEL LANES AND SHOULDER.

- MAINTAIN THREE LANES OF TRAFFIC ON EXISTING ROADWAYS WITH POLICE OFFICERS IN PLACE TO AID CONSTRUCTION EQUIPMENT WITH SITE ACCESS. CONTINUE OFF-LINE WORK ON ALL FOUR I-93 INTERCHANGE RAMPS.

- CONSTRUCT SOUNDWALLS ADJACENT TO THE I-93 SOUTHBOUND ON-RAMP, I-93 SOUTHBOUND OFF-RAMP, AND I-93 NORTHBOUND.

- COMPLETE CONSTRUCTION OF BMP 1012 TO ITS FINAL CONDITION.

- PLACE TYPE 3 BARRICADES AT THE ENTRANCE TO THE TEMPORARY ACCESS CONNECTION FROM EXISTING MADDEN ROAD TO THE OLDE RUM TRAIL. MAINTAIN ACCESS OPPORTUNITY FOR CONTRACT 13065B CONSTRUCTION EFFORTS.

- CONSTRUCT RAMP TIE INS AT ALL FOUR RAMP CORNERS WITH ADJUSTMENTS TO ACCOMMODATE THE DIVERSION.

- CONSTRUCT NORTHBOUND RAMP AND SOUTHBOUND RAMP INTERSECTIONS WITH OLDE RUM TRAIL TO FACILITATE THE PHASE 3A DIVERSION.

- INSTALL GUARDRAIL FOLLOWED BY OVERHEAD SIGN STRUCTURE FOUNDATIONS OUTSIDE OF THE INTERCHANGE AREA AT STA. 1010+00, LT & RT; STA. 1607+00, RT; STA. 1633+00, RT; STA. 3721+50, LT; AND STA. 3750+00, LT. USE ISOLATED DAYTIME LANE AND SHOULDER CLOSURES WITH UNIFORMED OFFICERS AS NEEDED ALONG I-93 NORTHBOUND AND SOUTHBOUND.

- REMOVE PCB TO SAWCUT, COLD PLANE AND INLAY I-93 NORTHBOUND PAVEMENT FROM STA. 1657+17, RT TO STA. 1704+66, RT AND I-93 SOUTHBOUND PAVEMENT FROM STA. 3654+75, LT TO STA. 3699+26, LT.

- CONSTRUCT ELECTRICAL SERVICE CONDUIT AND POWER CABLES FROM TROLLEY CAR LANE TO I-93 SOUTHBOUND RAMPS INTERSECTION.

PHASE 3A

- ADJUST PCB ALONG I-93 NORTHBOUND AND I-93 SOUTHBOUND TO ALLOW ACCESS TO THE OFF-RAMP/ON-RAMP PAIR.

- INSTALL SINGLE LANE DIVERSION FOR NIGHT-TIME ONLY WORK USING CONSTRUCTED ON AND OFF RAMPS IN PHASE 2 AND PHASE 3 AND AN OVERNIGHT I-93 TRIPLE LEFT LANE CLOSURE.

- CONSTRUCT INTERCHANGE BRIDGE OVER EXISTING I-93 NORTHBOUND AND SOUTHBOUND BARRELS. PLACE THE STEEL BRIDGE GIRDERS WHILE TRAFFIC IS DIVERTED TO THE OFF-RAMP/ON-RAMP PAIRS.

PHASE 4

- PLACE TRAFFIC BARRELS ACROSS THE OPENINGS OF THE I-93 NORTHBOUND OFF-RAMP AND SOUTHBOUND OFF-RAMP.

- FINISH CONSTRUCTION OF RAMP TIE-INS TO FINAL PERMANENT CONDITION, USING DAYTIME SHOULDER AND LANE CLOSURES AS NEEDED.

- FINISH THE INTERCHANGE BRIDGE SUPERSTRUCTURE.- FINISH CONSTRUCTION OF TEMPORARY ACCESS ROAD AT MADDEN RD.

- COMPLETE CONSTRUCTION OF OLDE RUM TRAIL TO BASE PAVEMENT.

- INSTALL TRAFFIC SIGNAL EQUIPMENT AT THE OLDE RUM TRAIL & NORTHBOUND RAMPS AND OLDE RUM TRAIL & SOUTHBOUND RAMPS INTERSECTIONS. INSTALL ITS EQUIPMENT ALONG I-93 NORTHBOUND AND THE CONNECTOR ROAD, RESPECTIVELY. INSTALL NEW FIBER OPTIC CABLE TO CONNECT THE NEW TRAFFIC SIGNALS AND CCTV TO THE EXISTING FIBER OPTIC BACKHAUL. INSTALL NEW INTERCHANGE AND INTERSECTION LIGHTING.

- INSTALL OVERHEAD SIGN STRUCTURES AT STA. 1010+00; STA.1607+00, RT; STA. 1633+00, RT; STA. 1657+18, RT; STA. 3721+50, LT; AND STA. 3750+00, LT. REINSTALL OVERHEAD SIGN STRUCTURE AT STA. 3700+00, LT. USE ISOLATED NIGHTTIME LANE AND SHOULDER CLOSURES FOR STRUCTURE INSTALLATION.

- INSTALLATION OF THE OVERHEAD SIGNAGE ALONG I-93 TO BE COMPLETED NOT MORE THAN 96 HOURS PRIOR TO THE OPENING OF THE PROPOSED RAMPS AND OLDE RUM TRAIL.

- CONSTRUCT FINAL PAVEMENT MARKINGS AND SIGNING OVER THE ENTIRE PROJECT.

- COORDINATE REMOVAL OF CONSTRUCTION SIGNAGE PACKAGE AND WARNING DEVICES WITH THE 13065B CONTRACTOR.

REVISIONS AFTER PROPOSAL

NUMBER	DATE	STATION	DESCRIPTION

SDR PROCESSED	VHB TEAM/NHDOT	DATE 2/8/2022
NEW DESIGN	VHB TEAM	DATE 3/21/2022
SHEET CHECKED	J. HILTON	DATE 3/21/2022
AS BUILT DETAILS		DATE

STATE OF NEW HAMPSHIRE
LONDONDERRY & DERRY
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

TRAFFIC CONTROL SEQUENCING

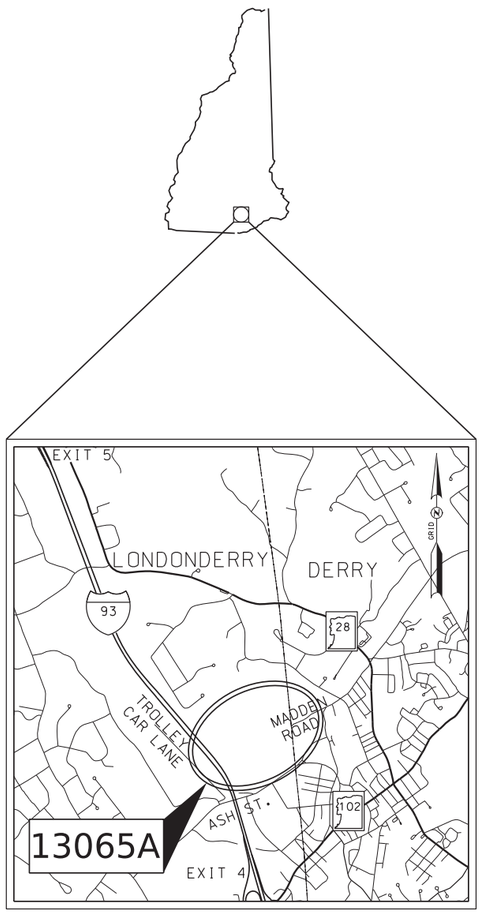
DATE PLOTTED	VHB PROJECT NO.	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
4/1/2022	52768.00	13065A_TCPseq	13065A	35	35

Attachment B

Wheeler Pond Tributary Relocation Plans

DESIGN DATA

OLDE RUM TRAIL		RAMPS	
AVERAGE DAILY TRAFFIC 2022	41,330	AVERAGE DAILY TRAFFIC 2025	18,440
AVERAGE DAILY TRAFFIC 2042	53,720	AVERAGE DAILY TRAFFIC 2040	23,970
PERCENT OF TRUCKS	6.7%	PERCENT OF TRUCKS	7.5%
DESIGN SPEED	40 MPH	DESIGN SPEED	20-50 MPH
LENGTH OF PROJECT	XX LF	LENGTH OF PROJECT	XX LF



LOCATION MAP

½ ¼ 0 ½ 1 mi.

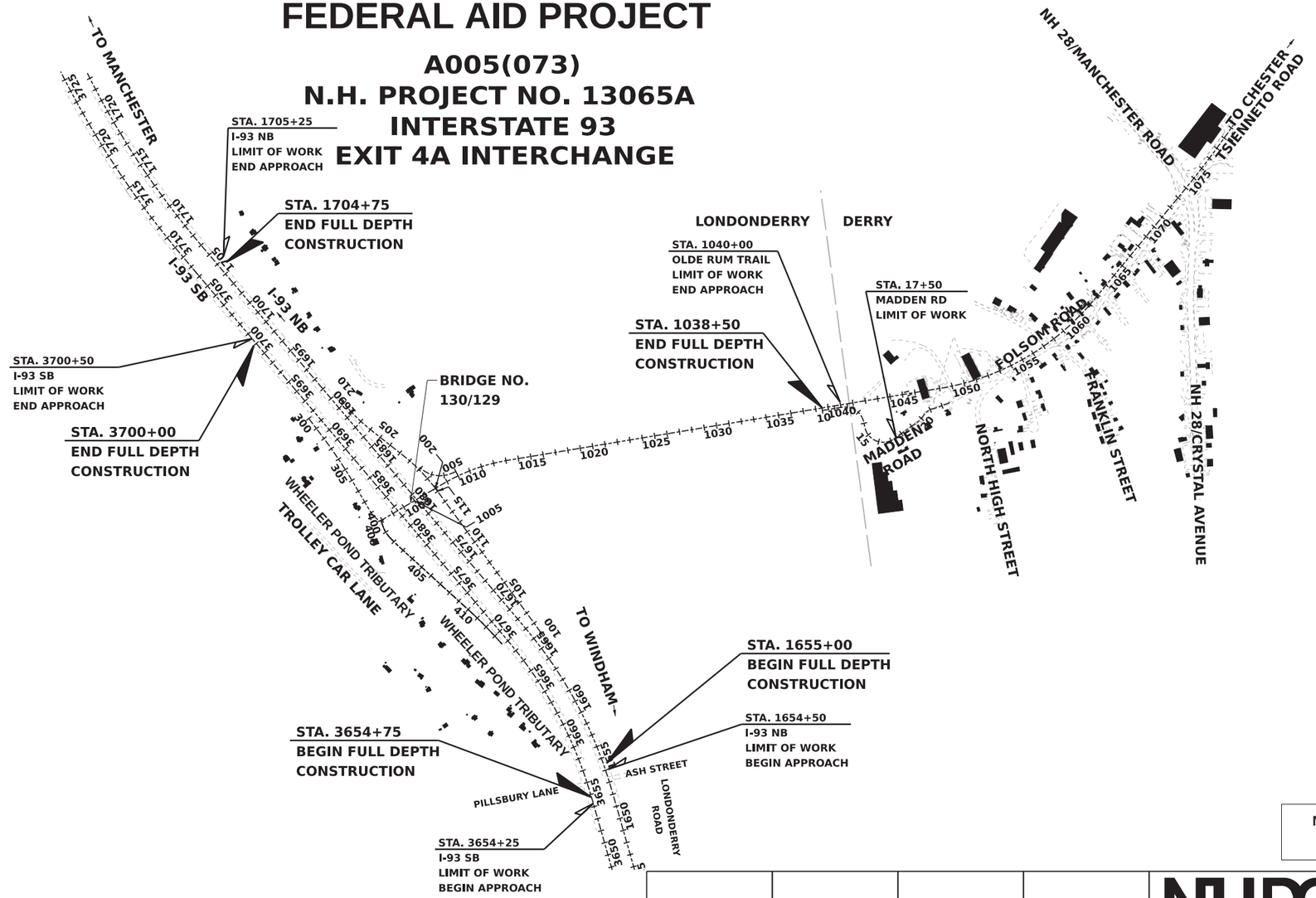
GRAPHIC SCALE

STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION

WHEELER POND TRIBUTARY RELOCATION PLANS

FEDERAL AID PROJECT

A005(073)
N.H. PROJECT NO. 13065A
INTERSTATE 93
EXIT 4A INTERCHANGE



TOWN OF LONDONDERRY & DERRY

COUNTY OF ROCKINGHAM

SCALE: 1"=500'

NHDES SUBMISSION
01/20/2022

VHB Structures	VHB Highway	VHB I.T.S. & Signing	VHB Signal Systems

NHDOT

THE STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION

RECOMMENDED FOR APPROVAL:

DIRECTOR OF PROJECT DEVELOPMENT — DATE

MUNICIPAL HIGHWAYS ENGINEER
BUREAU OF PLANNING AND COMMUNITY ASSISTANCE — DATE

APPROVED:

ASSISTANT COMMISSIONER AND CHIEF ENGINEER — DATE

DRAWN BY	XX	DATE	XX
CHECKED BY	XX	DATE	XX

DRAWING NAME	FEDERAL PROJECT NO.	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
13065A_FSC	A005(073)	13065A	1	646

REVISIONS AFTER PROPOSAL

NUMBER	DATE	STATION	DESCRIPTION

SDR PROCESSED DATE
NEW DESIGN DATE
SHEET CHECKED DATE
AS BUILT DETAILS DATE

STREAM RELOCATION NOTES:

1. LIMITS OF AUTHORIZED WORK WITHIN WETLAND AREAS ALONG THE WHEELER POND TRIBUTARY STREAM RELOCATION SHALL BE IDENTIFIED AND MARKED PRIOR TO CONSTRUCTION.
2. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED PRIOR TO ANY EARTH MOVING ACTIVITY THAT WILL INFLUENCE OR AFFECT STORMWATER RUNOFF.
3. THE STREAM CONSTRUCTION MONITORING SHALL BE PERFORMED BY AN INDIVIDUAL(S) WITH A COMBINATION OF EDUCATION AND EXPERIENCE OF AT LEAST 5 YEARS, SUCH AS A FLUVIAL GEOMORPHOLOGIST, HYDROLOGIST, ENGINEER OR QUALIFIED PROFESSIONAL, WHO HAS KNOWLEDGE SUFFICIENT TO EVALUATE STREAM SYSTEMS. LOCATION OF HABITAT AND IN-STREAM FEATURES DEPICTED ON THE PLANS ARE APPROXIMATE AND MAY BE MODIFIED DURING CONSTRUCTION BY THE QUALIFIED PROFESSIONAL WHEN APPROPRIATE TO MEET STREAM RELOCATION GOALS. THE PERMITTEE SHALL NOTIFY NHDES OF THE NAME AND CONTACT INFORMATION OF THE QUALIFIED PROFESSIONAL(S) AND SHALL RE-NOTIFY NHDES OF ANY CHANGES OF QUALIFIED PROFESSIONAL(S).
4. EXISTING DESIRABLE TREES 4 TO 8 INCHES IN DIAMETER IN AREAS TO BE FILLED OR DISTURBED BY CONSTRUCTION SHALL BE FLAGGED FOR RE-USE AS ROOTWADS. THESE TREES SHALL BE CUT NO LESS THAN 8 FEET ABOVE GROUND LEVEL AND SHALL BE REMOVED WITH ROOTBALL INTACT. TREES SUITABLE FOR RE-USE AS ROOTWADS SHALL BE STOCKPILED IN A NEARBY SHADED LOCATION UNTIL INSTALLATION. ROOTWADS SHALL BE TRIMMED TO THE DIMENSIONS SHOWN IN DETAILS PRIOR TO INSTALLATION.
5. PLANT AND SOIL MATERIALS FROM LOCATIONS WITH INVASIVE SPECIES SHALL NOT BE REUSED ON SITE BUT SHALL BE DISPOSED OF IN ACCORDANCE WITH NHDOT BEST MANAGEMENT PRACTICES FOR THE CONTROL OF INVASIVE AND NOXIOUS PLANT SPECIES MANUAL (2018).
6. CLEAR AREAS ONLY AS NEEDED TO MEET THE REQUIREMENTS OF THE SPECIFIC RELOCATION/CONSTRUCTION TASK TO BE COMPLETED. INSTALL CONSTRUCTION FENCING TO PREVENT ACCIDENTAL DISTURBANCE OF AREAS OUTSIDE OF THE WORK AREA.
7. ALL SOIL MOVING EQUIPMENT SHALL BE THOROUGHLY CLEANED TO MAKE IT FREE OF SOIL, NON-NATIVE INVASIVE SPECIES OR OTHER DEBRIS THAT COULD CONTAIN OR HOLD SEEDS PRIOR TO BEING DELIVERED TO THE PROJECT SITE. EQUIPMENT SHALL BE CONSIDERED FREE OF NON-NATIVE OR INVASIVE SPECIES AND OTHER SUCH DEBRIS WHEN A VISUAL INSPECTION BY THE ENGINEER, COMPLETED PRIOR TO THE EQUIPMENT BEING MOVED TO THE SITE, DOES NOT DISCOVER SUCH MATERIAL PRESENT.
8. NATIVE MATERIAL REMOVED FROM THE WHEELER POND TRIBUTARY STREAM BED SHALL BE STOCKPILED SEPARATELY AND REUSED TO EMULATE A NATURAL CHANNEL BOTTOM WITHIN THE CHANNEL. MATERIALS USED TO EMULATE A NATURAL CHANNEL BOTTOM MUST BE CONSISTENT WITH THE STREAMBED MATERIALS IDENTIFIED IN THE REFERENCE REACH AND SHALL NOT INCLUDE ANGULAR RIPRAP OR FRACTURED STONE UNLESS SPECIFICALLY IDENTIFIED ON THE APPROVED PLANS. ANY RIP RAP LOCATED ACROSS THE STREAM CHANNEL BED SHALL BE LOCATED AT OR BELOW SUBGRADE WITH STREAM BED SIMULATION AT THE CHANNEL BED SURFACE IN ORDER TO MAINTAIN LOW-FLOW AND NATURAL BED MATERIAL CONDITIONS
9. NATIVE TOPSOIL IN LOCATIONS THAT ARE FREE FROM INVASIVE SPECIES MAY BE STOCKPILED AND REPLACED WITHIN THE BUFFER AREA TO TAKE ADVANTAGE OF THE AVAILABLE SEED BANK THESE SOILS CONTAIN
10. SEGREGATE AND STOCKPILE THE EXCAVATED MATERIALS, SOIL MATERIALS AND DEBRIS. STOCKPILE (SEPARATELY) INVASIVE-FREE WETLAND SOIL, UPLAND SOIL, CHANNEL MATERIAL, BOULDERS AND LOGS, AND PROTECT WITH EROSION CONTROLS AS NEEDED. TEMPORARY STOCKPILE AREAS MUST NOT RESULT IN ADDITIONAL WETLAND OR STREAM IMPACTS BEYOND THOSE INCLUDED IN THE PROJECT WETLAND PERMITS.
11. ANY IMPORTED SOILS SHALL BE FREE OF INVASIVE PLANT MATERIAL, TOXIC SUBSTANCES, DEBRIS AND LARGE ROCKS AND BE SUITABLE FOR ESTABLISHING AND MAINTAINING NATIVE VEGETATION.
12. THE CONTRACTOR SHALL MONITOR THE WEATHER, RAINFALL AND STORM WARNINGS ISSUED BY THE NATIONAL WEATHER SERVICE THROUGHOUT THE PROJECT AND SHALL REMOVE ALL EQUIPMENT AND MATERIALS THAT MAY BE AFFECTED BY FLOOD FLOWS FROM THE STREAM RESTORATION WORK AREA PRIOR TO RAINFALL EVENTS PREDICTED TO EXCEED 1#2 INCH.
13. IN ALL AREAS OF GROUND DISTURBANCE, FINAL GRADING, SEEDING, MULCHING, AND PLANTING SHALL OCCUR AS OUTLINED IN THE DESIGN PLANS. ESTABLISHMENT OF FINAL CONTOURS IN BUFFER AREAS MAY REQUIRE SOIL DE-COMPACTION IN AREAS WHERE THE USE OF TIMBER MATS AND MACHINERY RESULT IN SOIL COMPACTION DURING THE CONSTRUCTION PHASE. IN AREAS OF SEVERE SOIL COMPACTION, OR IN AREAS WHERE IMPORTED TOPSOIL IS NEEDED, THE USE OF A SOIL MIX MAY BE REQUIRED TO ESTABLISH PRE-CONSTRUCTION CONTOURS AND SOIL ORGANIC CONTENT.
14. TEMPORARY STOCKPILE AREAS MUST NOT RESULT IN ADDITIONAL WETLAND OR STREAM IMPACTS BEYOND THOSE INCLUDED IN THE PROJECT WETLAND PERMITS.
15. TEMPORARY EROSION CONTROL BLANKETS AND SILT FENCE SHALL BE USED ON AND AT THE BASE OF SLOPES GREATER THAN 8 PERCENT. WELDED PLASTIC OR 'BIODEGRADABLE PLASTIC' NETTING OR THREAD IN EROSION CONTROL MATTING OR OTHER SOIL EROSION AND SEDIMENT CONTROL PRODUCTS ARE NOT PERMITTED AT THIS SITE. WILDLIFE FRIENDLY OPTIONS MADE OF WOVEN NATURAL FIBERS WILL BE PERMITTED. PERMANENT SLOPE BREAKERS AND WATER DIVERSIONS SHALL ALSO BE INSTALLED AND MAINTAINED.
16. ONCE ALL CONTRIBUTING UPSLOPE AREAS HAVE BEEN PERMANENTLY STABILIZED AND VEGETATED, REMOVE TRAPPED SEDIMENT FROM BEHIND ALL SILT FENCE, HAY BALES AND ANY OTHER TEMPORARY SEDIMENT CONTROL DEVICES. REMOVE ALL TEMPORARY SEDIMENT CONTROL DEVICES.
17. PER NHDES WETLAND PERMIT 2018-03134, CONDITION 1, THE WHEELER POND TRIBUTARY STREAM RELOCATION SHALL BE CONSTRUCTED AND MONITORED IN ACCORDANCE WITH THE TROLLEY CAR LANE STREAM RELOCATION PLAN AND NARRATIVE DATED APRIL 2020, RECEIVED BY NHDES ON APRIL 30, 2020 AND AVAILABLE FROM THE NHDOT.

PPS & E PLANS
SUBJECT TO CHANGE
DATE 1/17/2022

STREAM CHANNEL/BANK CONSTRUCTION NOTES:

1. CHANNEL BED MATERIAL - SUITABLE EXCAVATED MATERIAL USED FOR CONSTRUCTION OF STREAM BED SHALL MEET THE GRADATION REQUIREMENTS AS FOLLOWS:

   A. FINISHED STREAMBED MATERIALS IN THE UPSTREAM REACH SHALL HAVE A D50 OF APPROXIMATELY 1.0 MM WITH 50% OF VERY FINE TO MEDIUM SAND (0.06-1.0 MM) AND 50% OF COARSE TO VERY COARSE SAND (1.0-2.0 MM).

   B. FINISHED STREAMBED MATERIALS IN THE MIDDLE REACH AND DOWNSTREAM REACH SHALL HAVE A D50 OF APPROXIMATELY 2.5 MM WITH 25% OF FINE AND VERY FINE SAND (0.062-0.25 MM), 20% OF MEDIUM TO VERY COARSE SAND (0.25-2.0 MM), 45% OF GRAVEL (2.0-64.0 MM) AND 10% OF COBBLE (64-180 MM).

2. CHANNEL BED MATERIAL SHALL CONSIST OF INERT MATERIAL THAT IS HARD, DURABLE STONE AND COARSE SAND FREE FROM LOAM, CLAY, SURFACE COATINGS AND DELETERIOUS MATERIALS. THE COLOR OF STONE USED FOR STREAMBED RECONSTRUCTION SHALL BE EITHER EARTH TONES OR MEDIUM TO DARK GRAY AND SHALL BE APPROVED BY THE ENGINEER PRIOR TO PLACEMENT.
3. GRADE CONTROLS AND BANK STABILIZATION FEATURES WITHIN THE STREAM CHANNEL SHALL BE INSTALLED AS NOTED ON PLANS. TO THE EXTENT POSSIBLE, BOULDERS AND LOGS FROM THE IMMEDIATE PROJECT AREA SHALL BE USED.
4. THE OUTSIDE STREAM CURVES SHALL BE STABILIZED WITH COIR FIBER ROLLS UP TO THE BANKFULL ELEVATION, ANCHORED INTO THE SOIL.
5. STREAMBED GRAVEL, STREAMBED COBBLES, AND KEYED STONE FILL BOULDERS SHALL BE SUB-ANGULAR TO ROUNDED RIVER STONE. NO BLAST ROCK OR STONES WITH FRACTURED SURFACES MAY BE USED.

CONSTRUCTION SEQUENCE

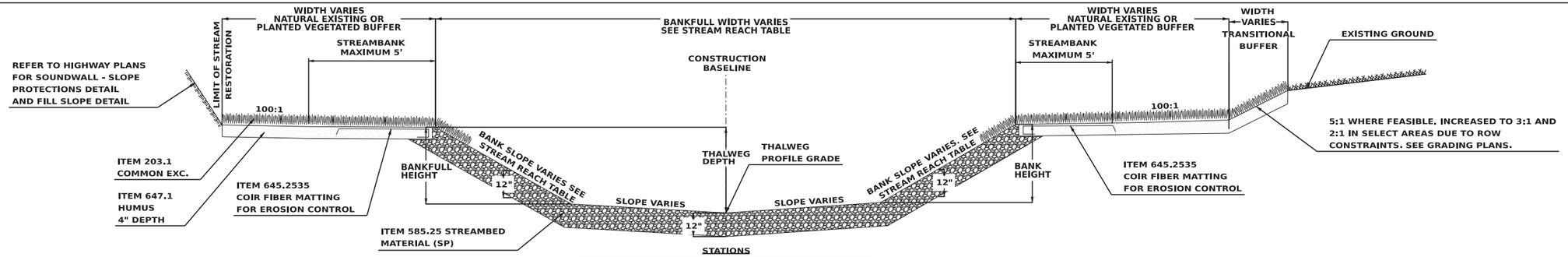
1. AT LEAST 30 DAYS PRIOR TO STREAM RELOCATION MOBILIZATION, THE CONTRACTOR SHALL SUBMIT A STORM WATER POLLUTION PREVENTION PLAN (SWPPP) AND A DETAILED CONSTRUCTION SEQUENCE AND WATER DIVERSION PHASING PLAN FOR APPROVAL BY THE ENGINEER. THE PLANS MUST DETAIL THE STEPS TO CONTROL, DIVERT AND RESTORE SURFACE AND GROUNDWATER WATER FLOW WITHIN THE STREAM RELOCATION AREA. THE CONTACTOR SHALL BE RESPONSIBLE FOR PROVIDING FINAL SWPPP AND SEQUENCE/WATER DIVERSION PHASING PLAN WHICH SHALL BE PREPARED BY A PROFESSIONAL ENGINEER OR A CPESC. THE PLANS SHALL DETAIL THE TIMING AND METHOD OF STREAM FLOW AND DIVERSION DURING CONSTRUCTION AND SHOW TEMPORARY SILTATION/EROSION/TURBIDITY CONTROL AND OTHER STABILIZATION MEASURES AND WATER QUALITY CONTROLS TO BE IMPLEMENTED AT EACH PHASE.
2. ALL IN-STREAM WORK SHALL OCCUR IN THE DRY, UNLESS SPECIFICALLY DETAILED IN THE CONTRACTOR'S SEQUENCE AND SUBSEQUENTLY APPROVED BY THE NHDOT.
3. STAKE OUT PROPOSED STREAM THALWEG, TOP OF STREAMBANKS, EXCAVATION LIMITS, OUTER EDGE OF RIPARIAN AREA/VEGETATED BUFFER, AND LIMITS OF NATIVE VEGETATION PRESERVATION AREAS.
4. THE CONTRACTOR, IN CONSULTATION WITH THE STREAM CONSTRUCTION MONITOR, SHALL FLAG EXISTING DESIRABLE TREES, SAPLINGS AND SHRUBS IN AREAS TO BE FILLED OR DISTURBED BY CONSTRUCTION FOR SALVAGE. THESE PLANTS MAY BE EITHER INSTALLED IMMEDIATELY ALONG THE RELOCATED STREAM CHANNEL OR STOCKPILED IN A NEARBY SHADED LOCATION WITH ROOT SYSTEMS PROTECTED UNTIL INSTALLATION.
5. INSTALL STABILIZED CONSTRUCTION ENTRANCE, EROSION AND SEDIMENT CONTROL DEVICES, AND WATER DIVERSION BMPS AS INDICATED IN THE APPROVED CONTRACTOR SEQUENCE/WATER DIVERSION PHASING PLAN, IN THE PLAN DETAILS AND SPECIFIED IN THE CONSTRUCTION SPECIFICATIONS.
6. CLEAR AND GRUB AS NECESSARY TO INSTALL PROPOSED CHANNEL AND RIPARIAN AREA.
7. STRIP TOPSOIL FROM THE AREA TO BE EXCAVATED (OUTSIDE OF INVASIVE SPECIES AREAS) AND SALVAGE & STOCKPILE MATERIAL FOR LATER PLACEMENT ON SUBGRADE ELEVATIONS TO ACHIEVE FINISH GRADES.
8. EXCAVATE THE PROPOSED STREAM CHANNEL AND RIPARIAN IN ACCORDANCE WITH THE TYPICAL SECTIONS, GRADING PLANS, AND CROSS SECTIONS. OVER EXCAVATE AREAS THAT WILL ULTIMATELY BE BACKFILLED WITH STREAMBED MATERIALS OR SEEDED AND MULCHED IN ORDER TO ALLOW FOR STREAMBED MATERIAL/HUMUS PLACEMENT TO ACHIEVE FINISH GRADE ELEVATIONS AS SHOWN ON TYPICAL CROSS-SECTIONS.
9. OVER EXCAVATE THE PROPOSED STREAM CHANNEL AS NECESSARY THEN INSTALL COIR FIBER ROLLS, STREAM BOULDER FEATURES, AND ROOTWADS AS SHOWN IN THE TYPICAL SECTION AND PLAN AND PROFILE DRAWINGS.
10. PLACE STREAMBED MATERIAL TO ACHIEVE FINISH GRADE ELEVATIONS IN THE PROPOSED STREAM CHANNEL. THE EXCAVATED CHANNEL SHALL BE KEPT FREE OF FLOWING OR STANDING WATER DURING THE EXCAVATION OPERATION AND PLACEMENT OF THE PROPOSED STREAMBED MATERIAL.
11. PLACE HUMUS IN RIPARIAN AREA TO ACHIEVE FINISH GRADES. SEED ALL AREAS AS PER PLANTING PLANS AND NOTES. INSTALL AND SECURE COIR FIBER MATTING AS SHOWN IN THE TYPICAL SECTION DRAWINGS.
12. INTRODUCE STREAMFLOW GRADUALLY INTO NEW CHANNEL AS PER APPROVED SEQUENCE/WATER DIVERSION PHASING PLAN.
13. PERFORM AS-BUILT SURVEY FOR COMPLETED STREAM RELOCATION SITE IN ACCORDANCE WITH THE CONSTRUCTION SPECIFICATIONS AND SUBMIT TO THE ENGINEER FOR REVIEW AND ACCEPTANCE.
14. POST-CONSTRUCTION MONITORING AS PER APPROVED ENVIRONMENTAL PERMITS.
15. TEMPORARY EROSION CONTROL MEASURES (E.G., SILT FENCE) SHALL BE PROPERLY MAINTAINED AT ALL TIMES AS SPECIFIED IN ITEM 699. TEMPORARY EROSION CONTROL MEASURES SHALL BE DISASSEMBLED AND PROPERLY DISPOSED OF AS SOON AS THE SITE IS STABLE BUT NO LATER THAN NOVEMBER 1, THREE FULL GROWING SEASONS AFTER PLANTING. SEDIMENT COLLECTED BY THESE DEVICES WILL BE REMOVED AND PLACED UPLAND IN A MANNER THAT PREVENTS ITS EROSION AND TRANSPORT TO A WATERWAY OR WETLAND.

vhb

STATE OF NEW HAMPSHIRE
LONDONDERRY & DERRY
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

WHEELER POND TRIBUTARY RELOCATION NOTES

DATE PLOTTED	VHB PROJECT NO.	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
1/17/2022	52768.00	13065A_Stream_Notes	13065A	47	647

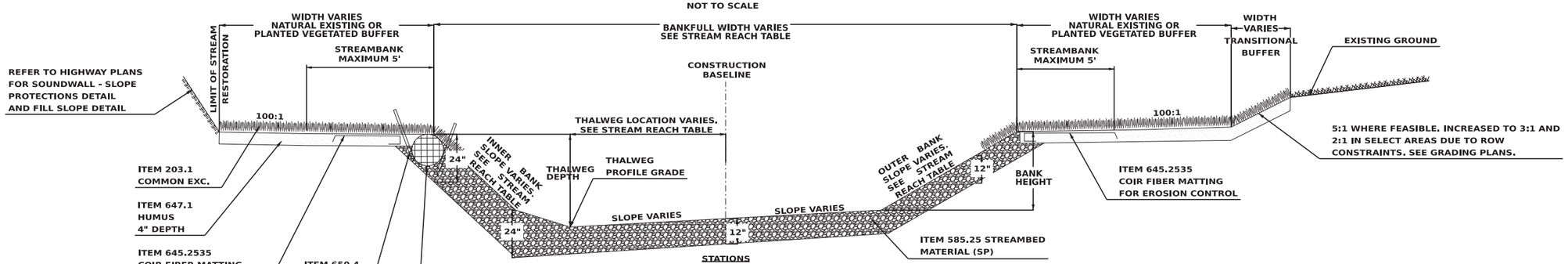


STATIONS

DOWNSTREAM REACH	MIDDLE REACH	UPSTREAM REACH
11+10	17+70	23+30
12+20 to 12+30	18+10 to 18+20	23+60 to 23+70
14+30 to 14+50	18+60	24+40
16+10 to 16+20	19+10 to 19+20	25+70 to 25+80
17+20	19+60	26+20 to 26+30
	20+10 to 20+30	
	20+80	
	21+30	
	22+00 to 22+20	
	22+90 to 23+00	

TYPICAL SECTION AT CROSSOVER BETWEEN MEANDER BENDS

NOT TO SCALE

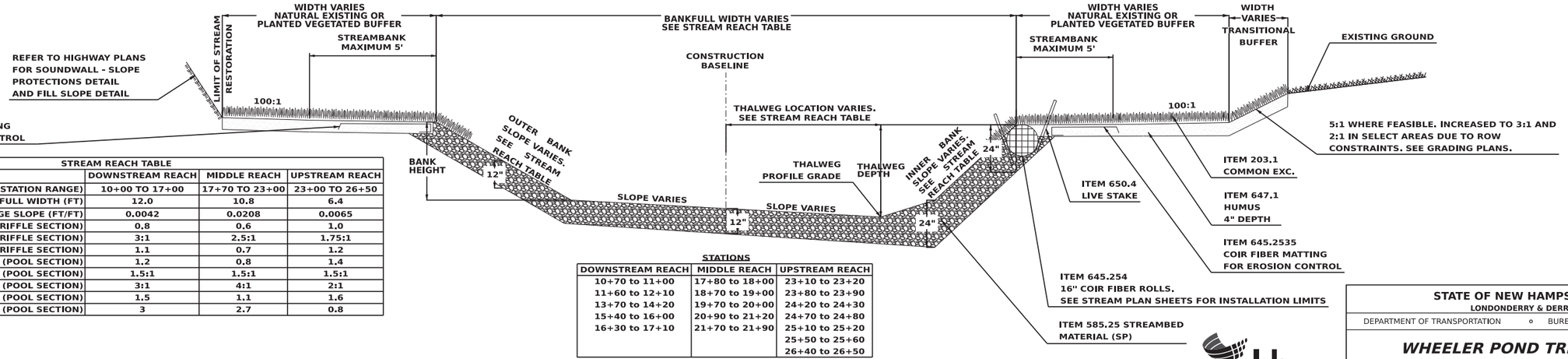


STATIONS

DOWNSTREAM REACH	MIDDLE REACH	UPSTREAM REACH
10+00 to 10+60	18+30 to 18+50	23+40 to 23+50
11+20 to 11+50	19+30 to 19+50	24+00 to 24+10
12+40 to 13+60	20+40 to 20+70	24+50 to 24+60
14+60 to 15+30	21+40 to 21+60	24+90 to 25+00
17+30 to 17+60	22+30 to 22+80	25+30 to 25+40
		25+90 to 26+10

TYPICAL SECTION THROUGH MEANDER (RIVER LEFT)

NOT TO SCALE



STREAM REACH TABLE			
	DOWNSTREAM REACH	MIDDLE REACH	UPSTREAM REACH
REACH LOCATION (STATION RANGE)	10+00 TO 17+00	17+70 TO 23+00	23+00 TO 26+50
PROPOSED BANKFULL WIDTH (FT)	12.0	10.8	6.4
AVERAGE SLOPE (FT/FT)	0.0042	0.0208	0.0065
BANK HEIGHT (RIFFLE SECTION)	0.8	0.6	1.0
BANK SLOPE (RIFFLE SECTION)	3:1	2.5:1	1.75:1
THALWEG DEPTH (RIFFLE SECTION)	1.1	0.7	1.2
BANK HEIGHT (POOL SECTION)	1.2	0.8	1.4
INNER BANK SLOPE (POOL SECTION)	1.5:1	1.5:1	1.5:1
OUTER BANK SLOPE (POOL SECTION)	3:1	4:1	2:1
THALWEG DEPTH (POOL SECTION)	1.5	1.1	1.6
THALWEG DISTANCE FROM CL (POOL SECTION)	3	2.7	0.8

STATIONS

DOWNSTREAM REACH	MIDDLE REACH	UPSTREAM REACH
10+70 to 11+00	17+80 to 18+00	23+10 to 23+20
11+60 to 12+10	18+70 to 19+00	23+80 to 23+90
13+70 to 14+20	19+70 to 20+00	24+20 to 24+30
15+40 to 16+00	20+90 to 21+20	24+70 to 24+80
16+30 to 17+10	21+70 to 21+90	25+10 to 25+20
		25+50 to 25+60
		26+40 to 26+50

TYPICAL SECTION THROUGH MEANDER (RIVER RIGHT)

NOT TO SCALE

PPS & E PLANS
SUBJECT TO CHANGE
DATE 12/29/2021

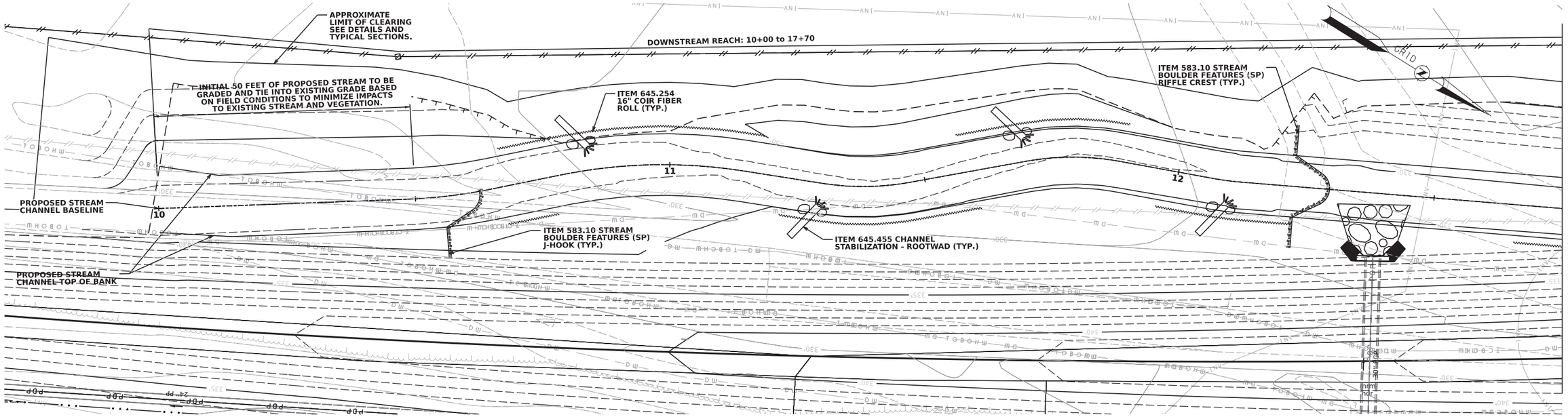
NUMBER	DATE	STATION	DESCRIPTION
			REVISIONS AFTER PROPOSAL

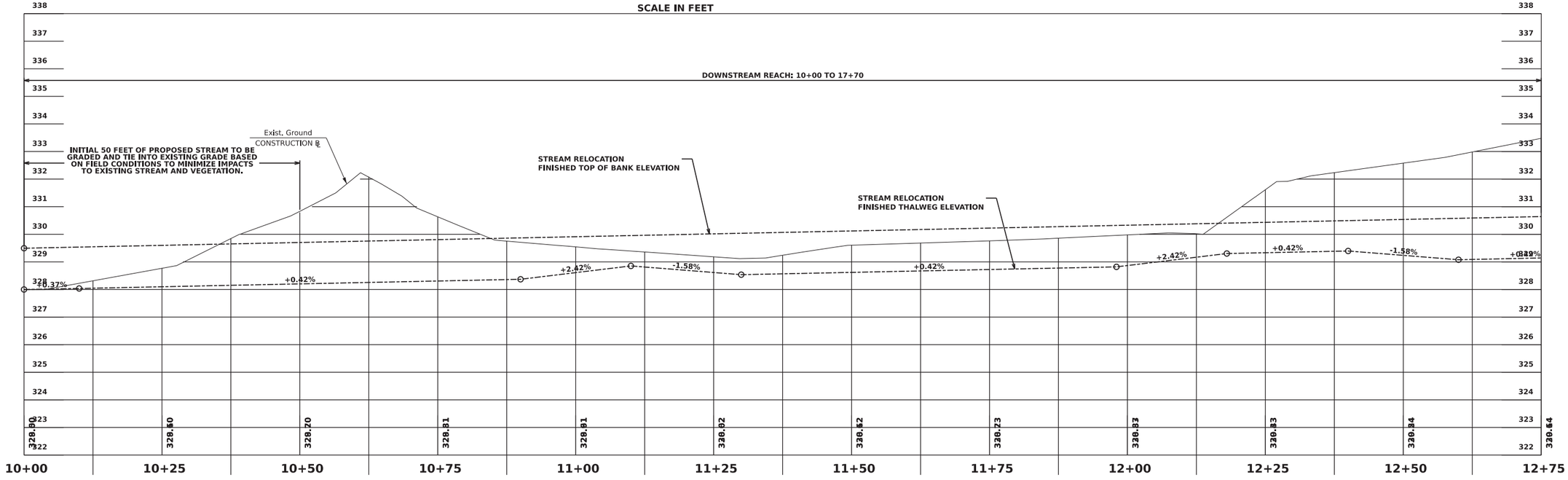
SDR PROCESSED DATE
NEW DESIGN DATE
SHEET CHECKED DATE
AS BUILT DETAILS DATE

STATE OF NEW HAMPSHIRE
LONDONDERRY & DERRY
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

WHEELER POND TRIBUTARY RELOCATION TYPICAL SECTIONS

DATE PLOTTED	VHB PROJECT NO.	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
12/29/2021	52768.00	13065A_Typ_Stream_01	13065A	1	1





SCALE:
1"= 10' HORIZ.
1"= 2' VERT.

PPS & E PLANS
SUBJECT TO CHANGE
DATE 12/29/2021

NUMBER	DATE	STATION	DESCRIPTION

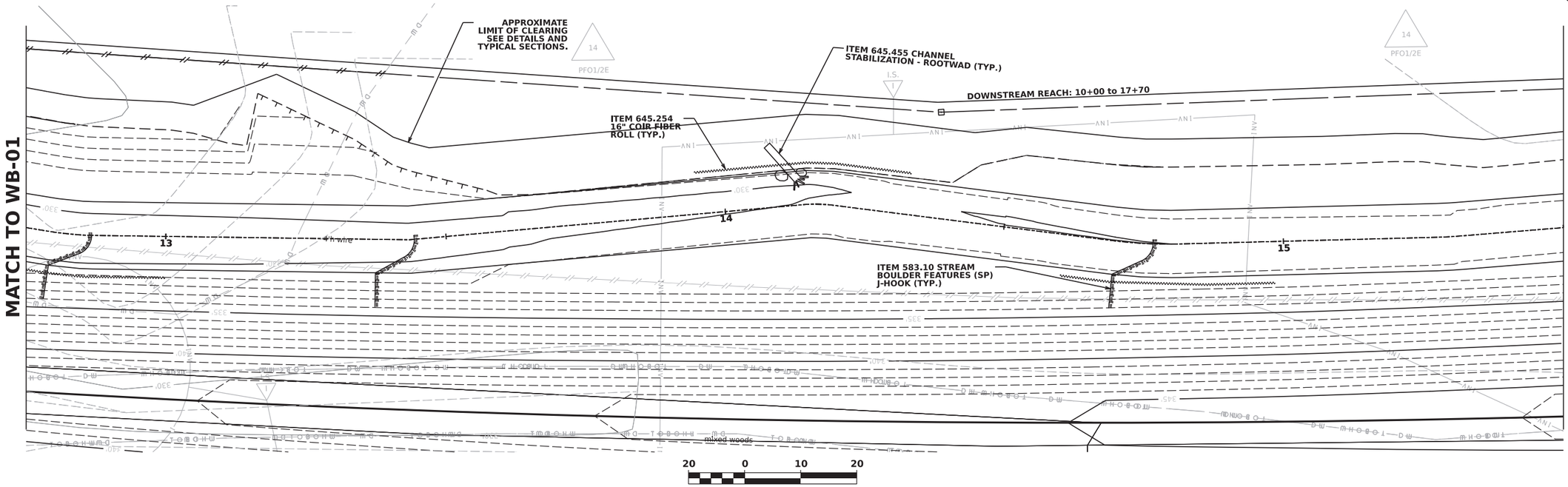
REVISIONS AFTER PROPOSAL

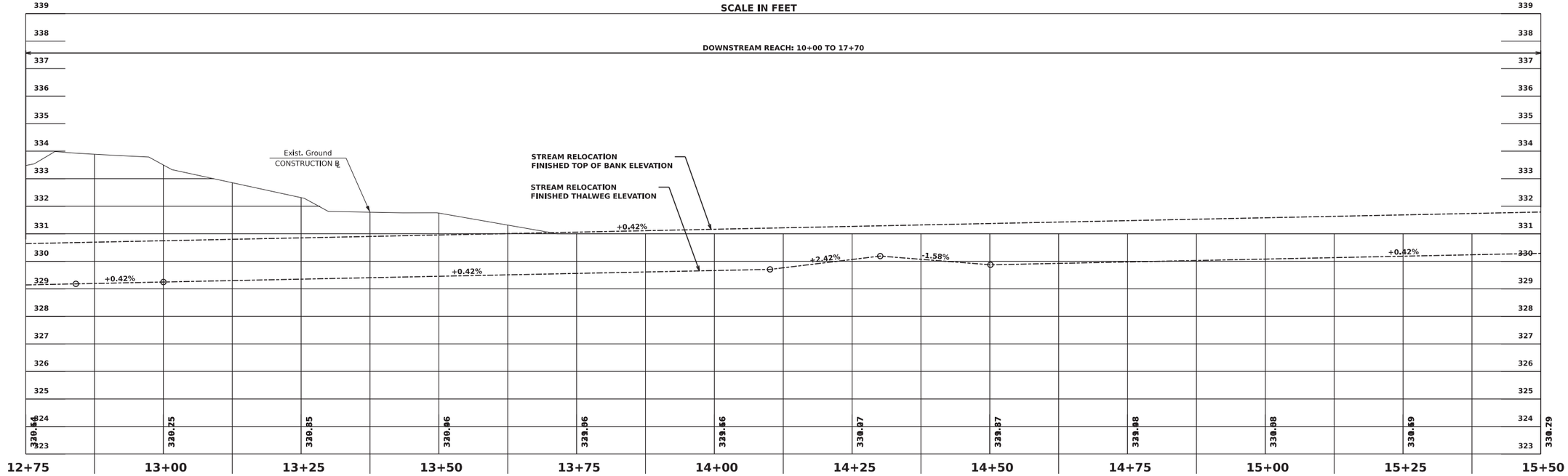
SDR PROCESSED DATE
NEW DESIGN DATE
SHEET CHECKED DATE
AS BUILT DETAILS DATE

STATE OF NEW HAMPSHIRE
LONDONDERRY & DERRY
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

WHEELER POND TRIBUTARY RELOCATION PLAN AND PROFILE

DATE PLOTTED	VHB PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
12/29/2021	52768.00	WB-01	13065A_Stream_PlanProfile	13065A	49	646





PPS & E PLANS
SUBJECT TO CHANGE
DATE 12/29/2021

SCALE:
1"= 10' HORIZ.
1"= 2' VERT.

STATE OF NEW HAMPSHIRE
LONDONDERRY & DERRY
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

WHEELER POND TRIBUTARY RELOCATION PLAN AND PROFILE

DATE PLOTTED	VHB PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
12/29/2021	52768.00	WB-02	13065A_Stream_PlanProfile	13065A	50	646

REVISIONS AFTER PROPOSAL

NUMBER	DESCRIPTION	DATE	STATION

SDR PROCESSED	DATE
NEW DESIGN	DATE
SHEET CHECKED	DATE
AS BUILT DETAILS	DATE

MATCH TO WB-02

MATCH TO WB-04

DOWNSTREAM REACH: 10+00 to 17+70

APPROXIMATE LIMIT OF CLEARING SEE DETAILS AND TYPICAL SECTIONS.

TRANSITION CHANNEL GEOMETRY FROM DOWNSTREAM REACH TO MIDDLE REACH

MIDDLE REACH: 17+70 TO 23+00

ITEM 645.254 16" COIR FIBER ROLL (TYP.)

ITEM 583.10 STREAM BOULDER FEATURES (SP) RIFFLE CREST (TYP.)

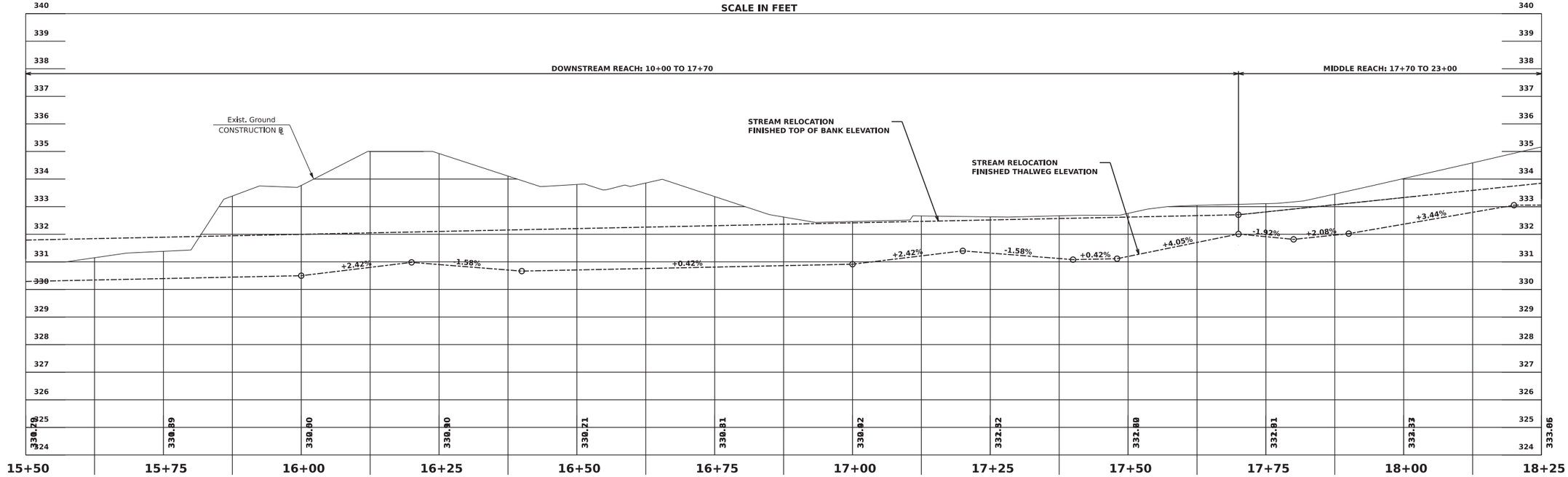
ITEM 645.455 CHANNEL STABILIZATION - ROOTWAD (TYP.)

PROPOSED SOUNDWALL

GRID

20 0 10 20

SCALE IN FEET



PPS & E PLANS
SUBJECT TO CHANGE
DATE 12/29/2021

SCALE:
1"= 10' HORIZ.
1"= 2' VERT.

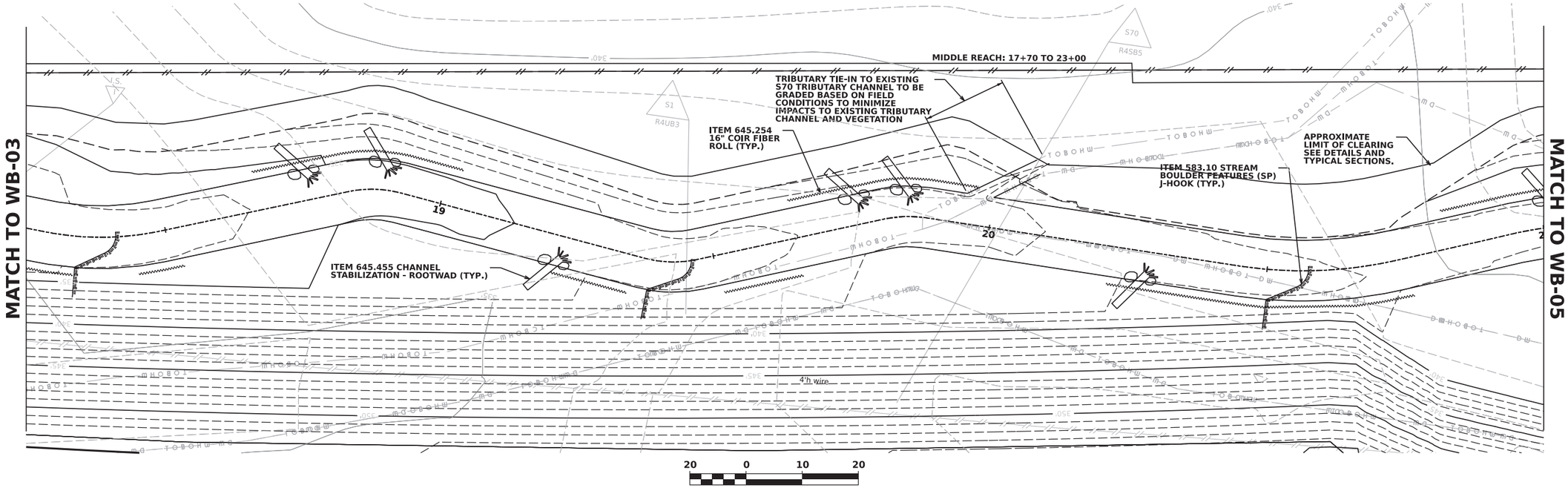
STATE OF NEW HAMPSHIRE
LONDONDERRY & DERRY
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

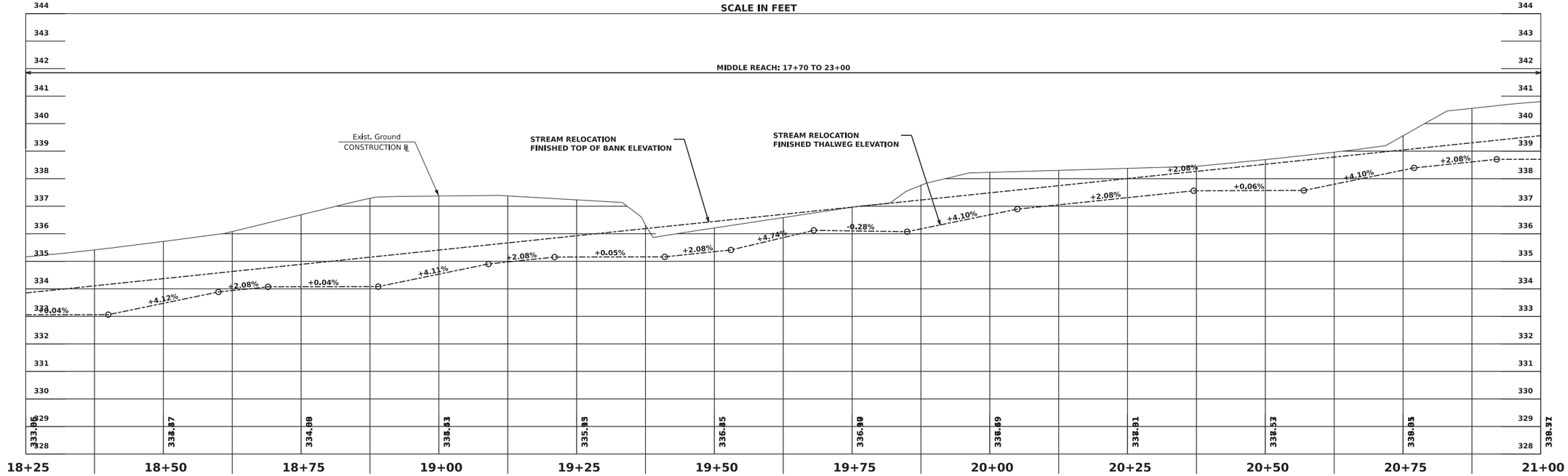
WHEELER POND TRIBUTARY RELOCATION PLAN AND PROFILE

DATE PLOTTED	VHB PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
12/29/2021	52768.00	WB-03	13065A_Stream_PlanProfile	13065A	51	646

NUMBER	DATE	STATION	DESCRIPTION
			REVISIONS AFTER PROPOSAL

SDR PROCESSED DATE
NEW DESIGN DATE
SHEET CHECKED DATE
AS BUILT DETAILS DATE





PPS & E PLANS
SUBJECT TO CHANGE
DATE 12/29/2021

SCALE:
1"= 10' HORIZ.
1"= 2' VERT.

NUMBER	DATE	STATION	DESCRIPTION
			REVISIONS AFTER PROPOSAL

SDR PROCESSED	DATE
NEW DESIGN	DATE
SHEET CHECKED	DATE
AS BUILT DETAILS	DATE

STATE OF NEW HAMPSHIRE
LONDONDERRY & DERRY
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

WHEELER POND TRIBUTARY RELOCATION PLAN AND PROFILE

DATE PLOTTED	VHB PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
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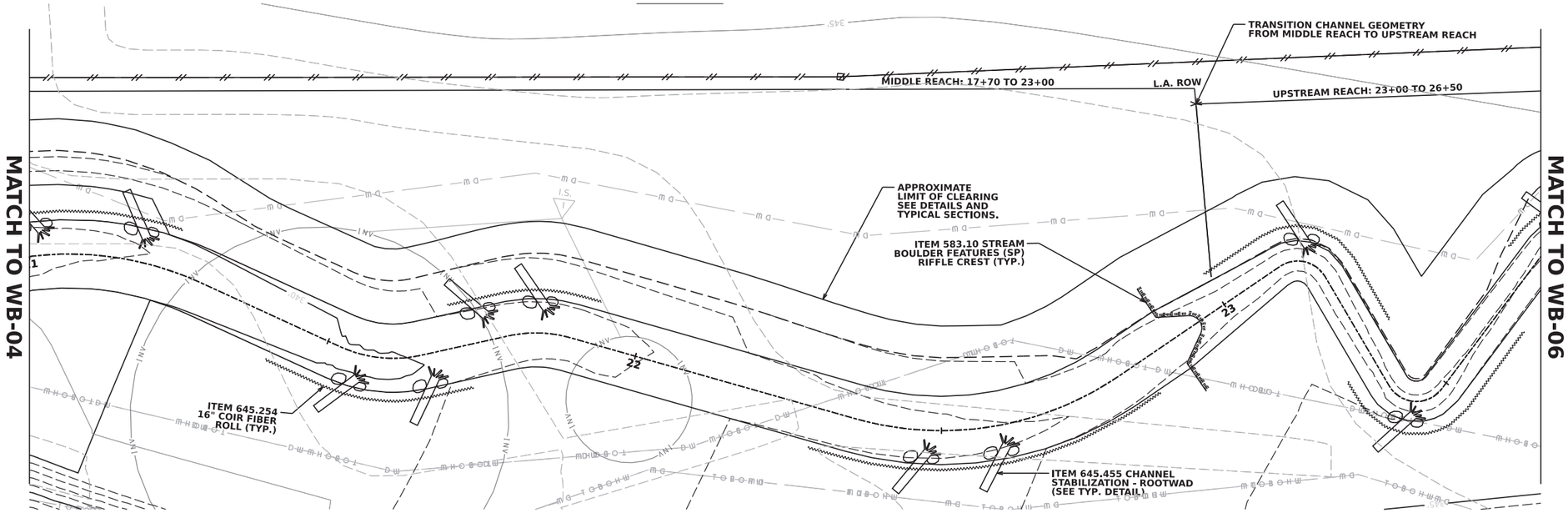
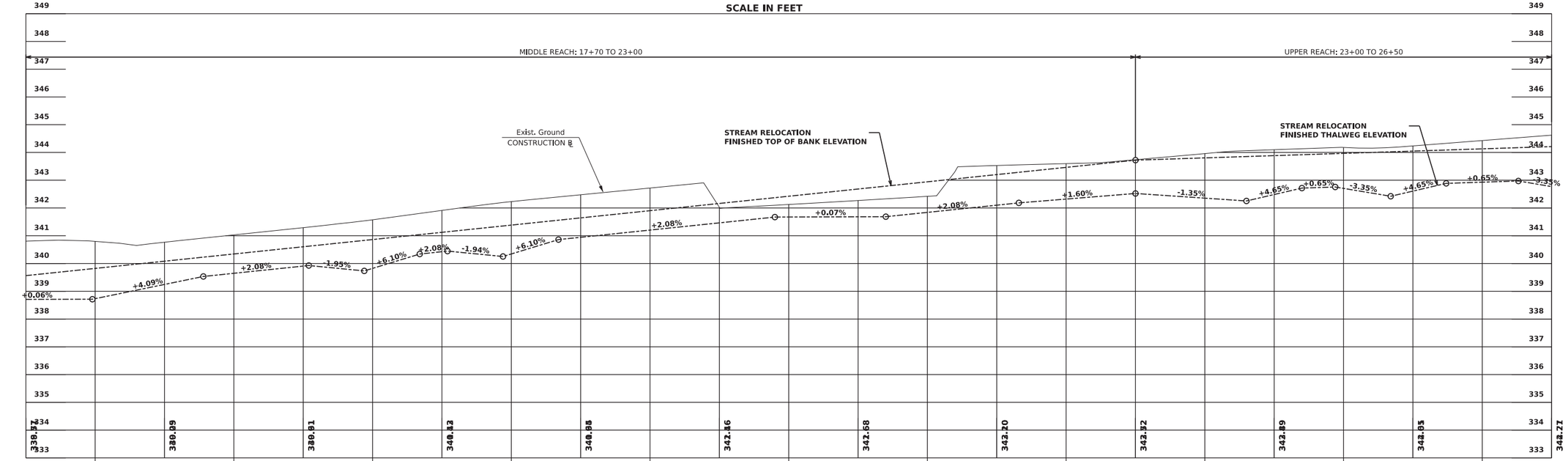




PPS & E PLANS
SUBJECT TO CHANGE
DATE 12/29/2021

SCALE:
1"= 10' HORIZ.
1"= 2' VERT.

STATE OF NEW HAMPSHIRE
LONDONDERRY & DERRY
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

WHEELER POND TRIBUTARY RELOCATION PLAN AND PROFILE

DATE PLOTTED	VHB PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
12/29/2021	52768.00	WB-05	13065A_Stream_PlanProfile	13065A	53	646

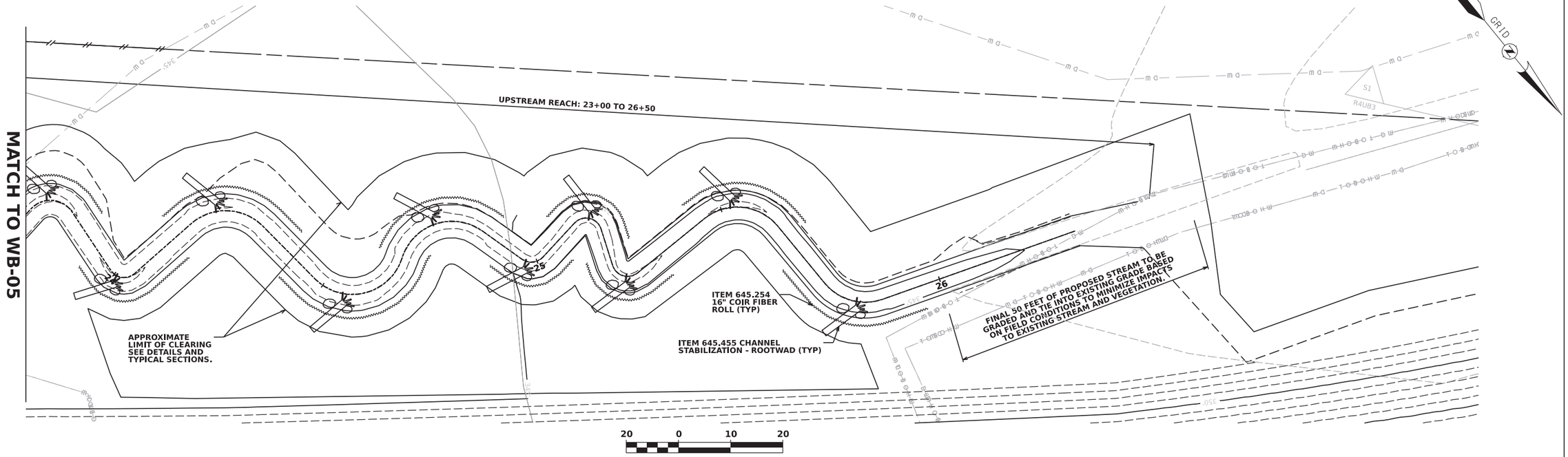
NUMBER	DATE	STATION	DESCRIPTION
			REVISIONS AFTER PROPOSAL

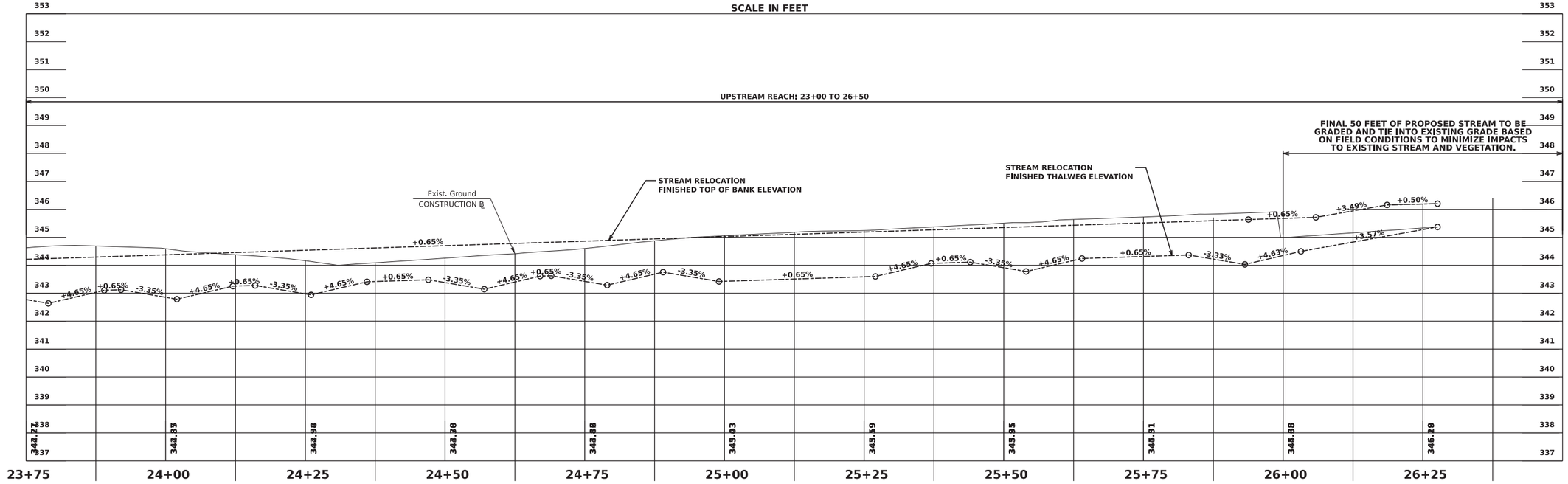
SDR PROCESSED	DATE
NEW DESIGN	DATE
SHEET CHECKED	DATE
AS BUILT DETAILS	DATE

REVISIONS AFTER PROPOSAL

NUMBER	DATE	STATION	DESCRIPTION

SDR PROCESSED DATE
NEW DESIGN DATE
SHEET CHECKED DATE
AS BUILT DETAILS DATE





PPS & E PLANS
SUBJECT TO CHANGE
DATE 12/29/2021

SCALE:
1"= 10' HORIZ.
1"= 2' VERT.

STATE OF NEW HAMPSHIRE
LONDONDERRY & DERRY
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

WHEELER POND TRIBUTARY RELOCATION PLAN AND PROFILE

DATE PLOTTED	VHB PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
12/29/2021	52768.00	WB-06	13065A_Stream_PlanProfile	13065A	54	646

PRESERVE EXISTING
NATIVE VEGETATION

GRID

4" wire

mixed woods

rip rap

24" RCP

mm

hdf

5469/2948
1.15 Ac.±

2972/1449
1.0 Ac.±

5814/2110
1.9 Ac.±

5160/1591
1.23 Ac.±

STREAMBANK

VEGETATED BUFFER

PPS & E PLANS
SUBJECT TO CHANGE
DATE 12/29/2021

50 0 50 100
SCALE IN FEET

REVISIONS AFTER PROPOSAL

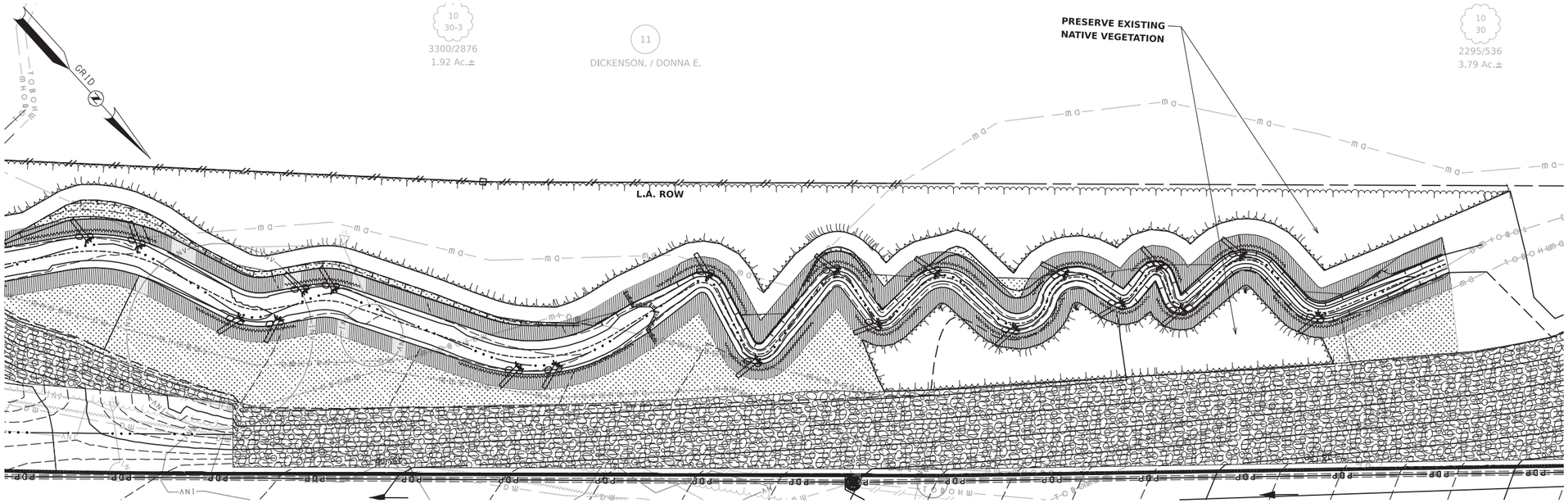
NUMBER	DATE	STATION	DESCRIPTION

SDR PROCESSED DATE
NEW DESIGN DATE
SHEET CHECKED DATE
AS BUILT DETAILS DATE

STATE OF NEW HAMPSHIRE
LONDONDERRY & DERRY
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

WHEELER POND TRIBUTARY RELOCATION PLANTING PLAN

DATE PLOTTED	VHB PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
12/29/2021	52768.00	Planting - Plan	12065A_Planting_Stream	13065A	55	646



PLANTING NOTES

1. CONTRACTOR SHALL FOLLOW ALL TEMPORARY EROSION CONTROL REQUIREMENTS PER PLANS, SPECIFICATIONS, AND ENVIRONMENTAL PERMITS, INCLUDING TEMPORARY EROSION CONTROL SEEDING AS NEEDED. THE PURPOSE OF THIS PLANTING PLAN IS TO GUIDE INSTALLATION OF FINAL PLANTINGS.

2. A PERMANENT COVER CROP OF NATIVE ANNUAL AND PERENNIAL SEED MIXES SHALL BE USED TO ESTABLISH SOIL STABILIZATION IMMEDIATELY FOLLOWING GRADING. ACCEPTABLE SEED MIXTURES INCLUDE NEW ENGLAND EROSION CONTROL/RESTORATION MIX FOR MOIST SITES AND NEW ENGLAND CONSERVATION/WILDLIFE MIX. (SEE PLANTING TABLE).

3. 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.

4. IN AREAS WHERE LESS THAN 4 INCHES OF TOPSOIL IS PRESENT, HUMUS SHALL BE PLACED PRIOR TO PLANTING. SUB GRADE SHALL BE ADJUSTED TO ACHIEVE FINAL ELEVATIONS.

5. USE OF SALVAGED TOPSOIL IS PREFERRED, BUT THE CONTRACTOR SHALL TAKE CARE TO PROHIBIT USE OF SALVAGED SOILS FROM AREAS DOMINATED BY INVASIVE SPECIES, WHICH ARE COMMON IN THE PROJECT AREA. SEE PLANS FOR THE LOCATION OF INVASIVE SPECIES POPULATIONS.

6. FOLLOWING SEEDING, A LAYER OF STRAW MULCH OR COIR FIBER MATTING SHALL BE APPLIED TO ALL SEEDED AREAS. MULCH SHALL BE ANCHORED BY CRIMPING OR TACKIFIER TO PREVENT DISPLACEMENT BY SURFACE WATER FLOW OR WIND EROSION. NO HAY WILL BE PERMITTED. EROSION CONTROL BLANKET ANCHORS SHALL BE BIODEGRADABLE.

7. 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.

8. LIVE STAKES (SEE PLANTING TABLE) SHALL BE INSTALLED DURING THE DORMANT SEASON (NOVEMBER TO MARCH) AS SPECIFIED ON THE PLANTING TABLE ALONG RELOCATED STREAM BANKS.

9. SALVAGED AND NURSERY-SUPPLIED PLANTS SHALL BE INSTALLED IN ALL LOCATIONS DISTURBED FOR STREAM CHANNEL RELOCATION AS SOON AS POSSIBLE AFTER COMPLETION OF EARTHWORK.

10. 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 VEGETATED BUFFER 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, SHRUBS AND FORBS SHALL BE IN ACCORDANCE WITH THE APPROVED PLAN.

11. A PERMANENT COVER CROP OF NATIVE ANNUAL AND PERENNIAL SEED MIXES (SEE PLANTING TABLE) SHALL BE USED TO ESTABLISH IMMEDIATE SOIL STABILIZATION. ACCEPTABLE SEED MIXTURES FOR RIPARIAN RESTORATION INCLUDE NEW ENGLAND EROSION CONTROL/RESTORATION MIX FOR MOIST SITES, NEW ENGLAND CONSERVATION/WILDLIFE MIX AND NEW ENGLAND ROADSIDE MATRIX WET MEADOW MIX.

12. FOLLOWING SEEDING, A LAYER OF MULCH SHALL BE APPLIED TO ALL SEEDED AREAS. MULCH SHALL BE ANCHORED TO PREVENT DISPLACEMENT BY SURFACE WATER FLOW OR WIND EROSION. ITES, NEW ENGLAND CONSERVATION/WILDLIFE MIX AND NEW ENGLAND ROADSIDE MATRIX WET MEADOW MIX.

STREAMBANK

VEGETATED BUFFER

PLANTING TABLE

DOT Item No.	COMMON NAME	SCIENTIFIC NAME	STATUS	SPACING	PLANT SIZE/TYPE	QUANTITY	LOCATION
650.2	Red Maple	*Acer rubrum*	FAC	15-20 feet	3-6 ft/Potted/Salvaged	40	Vegetated Buffer
650.2	Yellow birch	*Betula allegheniensis*	FAC	15-20 feet	3-6 ft/Potted/Salvaged	40	Vegetated Buffer
650.2	Ironwood	*Carpinus caroliniana*	FAC	10-15 feet	3-6 ft/Potted/Salvaged	80	Vegetated Buffer
650.2	Black cherry	*Prunus serotina*	FACU	3-6 feet	2-3 ft/Potted/Salvaged	300	Vegetated Buffer
650.2	Silky dogwood	*Cornus amomum*	FACW	3-6 feet	2-3 ft/Potted/Salvaged	200	Vegetated Buffer
650.2	Spicebush	*Lindera benzoin*	FACW	3-6 feet	2-3 ft/Potted/Salvaged	200	Vegetated Buffer
650.2	Black elderberry	*Sambucus nigra*	FACW	3-6 feet	2-3 ft/Potted/Salvaged	200	Vegetated Buffer
650.4	Silky dogwood	*Cornus amomum*	FACW	2-3 feet	Live stakes[1]	800	Streambank
650.4	Pussy Willow	*Salix discolor*	FACW	2-3 feet	Live stakes[1]	800	Streambank
650.4	Black elderberry	*Sambucus nigra*	FACW	2-3 feet	Live stakes[1]	800	Streambank
644.23	NE Erosion Control/Restoration Mix for Moist Sites[2]			35 lbs/acre	Hydro-seed, broadcast	21 lbs	Vegetated Buffer/Streambank
644.23	New England Conservation/Wildlife Mix[2]			25 lbs/acre	Hydro-seed, broadcast	15 lbs	Vegetated Buffer/Streambank

[1]Live stakes are only available for purchase or cutting and installation in November-March.

[2]Substitutions or equivalent products allowed upon approval of the Engineer.

PPS & E PLANS
SUBJECT TO CHANGE
DATE 1/17/2022

50 0 50 100
SCALE IN FEET

REVISIONS AFTER PROPOSAL

NUMBER	DATE	STATION	DESCRIPTION

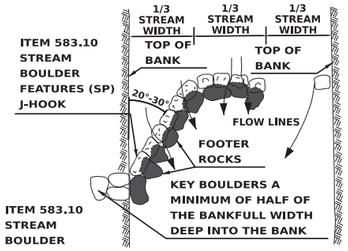
SDR PROCESSED DATE
NEW DESIGN DATE
SHEET CHECKED DATE
AS BUILT DETAILS DATE

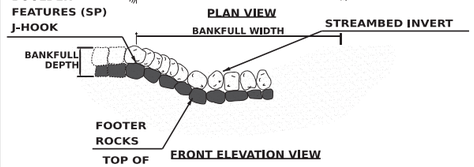
vhb

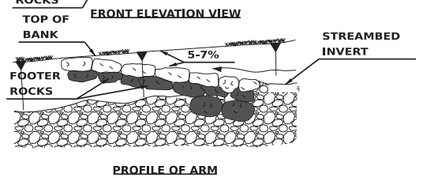
STATE OF NEW HAMPSHIRE
LONDONDERRY & DERRY
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

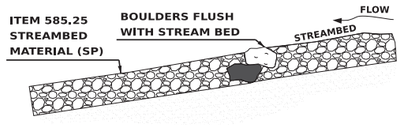
WHEELER POND TRIBUTARY RELOCATION PLANTING PLAN

DATE PLOTTED	VHB PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
1/17/2022	52768.00	Planting - Plan1	13065A_Planting_Stream	13065A	56	647







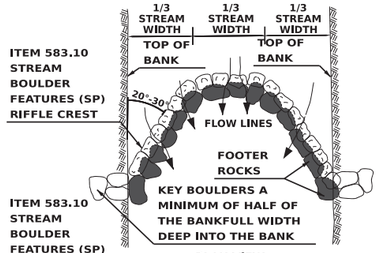


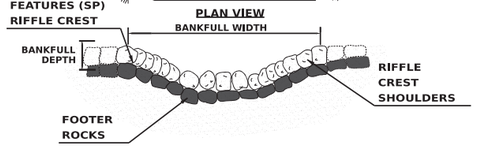
NOTES

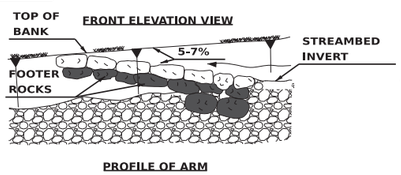
1. ITEM 583.10 STREAM BOULDER FEATURES TO BE PLACED ALONG PROPOSED STREAM ALIGNMENT AS SHOWN ON STREAM PLAN SHEETS.
2. REFER TO BOULDER AXIS DETAIL FOR BOULDER SIZES

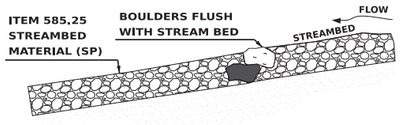
J-HOOK DETAIL

NOT TO SCALE







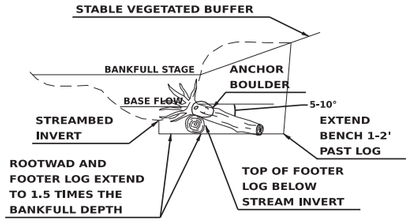


NOTES

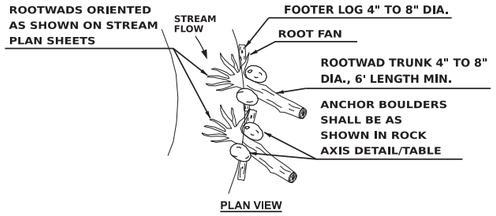
1. ITEM 583.10 STREAM BOULDER FEATURES TO BE PLACED ALONG PROPOSED STREAM ALIGNMENT AS SHOWN ON STREAM PLAN SHEETS.
2. REFER TO BOULDER AXIS DETAIL FOR BOULDER SIZES

RIFFLE CREST DETAIL

NOT TO SCALE



CROSS SECTION



PLAN VIEW

NOTES

1. ITEM 645.455 CHANNEL STABILIZATION - ROOTWAD TO BE PLACED INTO BANK AS SHOWN ON THE STREAM PLAN SHEETS. USE TRENCH PLACEMENT METHOD TO AVOID DESTROYING THE ROOT FAN. BACKFULL TRENCH IN ACCORDANCE WITH CONSTRUCTION SPECIFICATIONS.
2. ROOTWADS CAN BE TRIMMED IN FIELD TO MEET REQUIRED DIMENSIONS.
3. REFER TO STREAM PLAN FOR ROOTWAD LOCATIONS.
4. DO NOT PLACE ROOTWAD STRUCTURES WITHIN 5 FT OF CUT SLOPES.

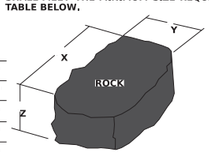
ROOTWAD

NOT TO SCALE

MINIMUM X- Y- Z DIMENSIONS FOR ALL STRUCTURE STONES SHALL MEET THE MINIMUM SIZE REQUIREMENTS GIVEN IN THE TABLE BELOW.

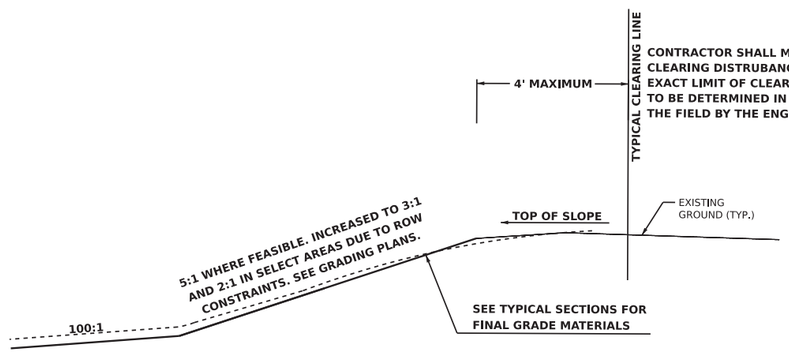
DIMENSION

X	Y	Z
18"	24"	24"
20"	20"	36"
24"	24"	24"
30"	24"	20"
36"	18"	24"



BOULDER AXIS DETAIL

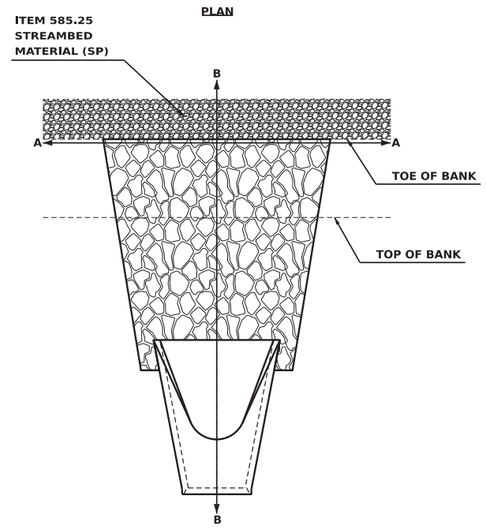
NOT TO SCALE



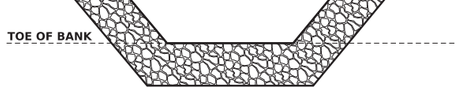
CUT SLOPE DETAIL
WESTERN STREAMBANK

NOT TO SCALE

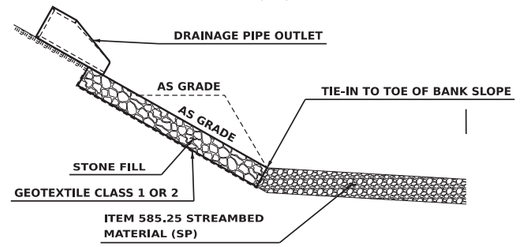
PLAN



CROSS-SECTION (A-A)



PROFILE (B-B)



DRAINAGE PIPE OUTLET APRON STREAM TRANSITION

NOT TO SCALE

PPS & E PLANS
SUBJECT TO CHANGE
DATE 12/29/2021

STATE OF NEW HAMPSHIRE
LONDONDERRY & DERRY
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

WHEELER POND TRIBUTARY RELOCATION DETAILS

DATE PLOTTED	VHB PROJECT NO.	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
12/29/2021	52768.00	13065A_Det_Stream	13065A	57	646

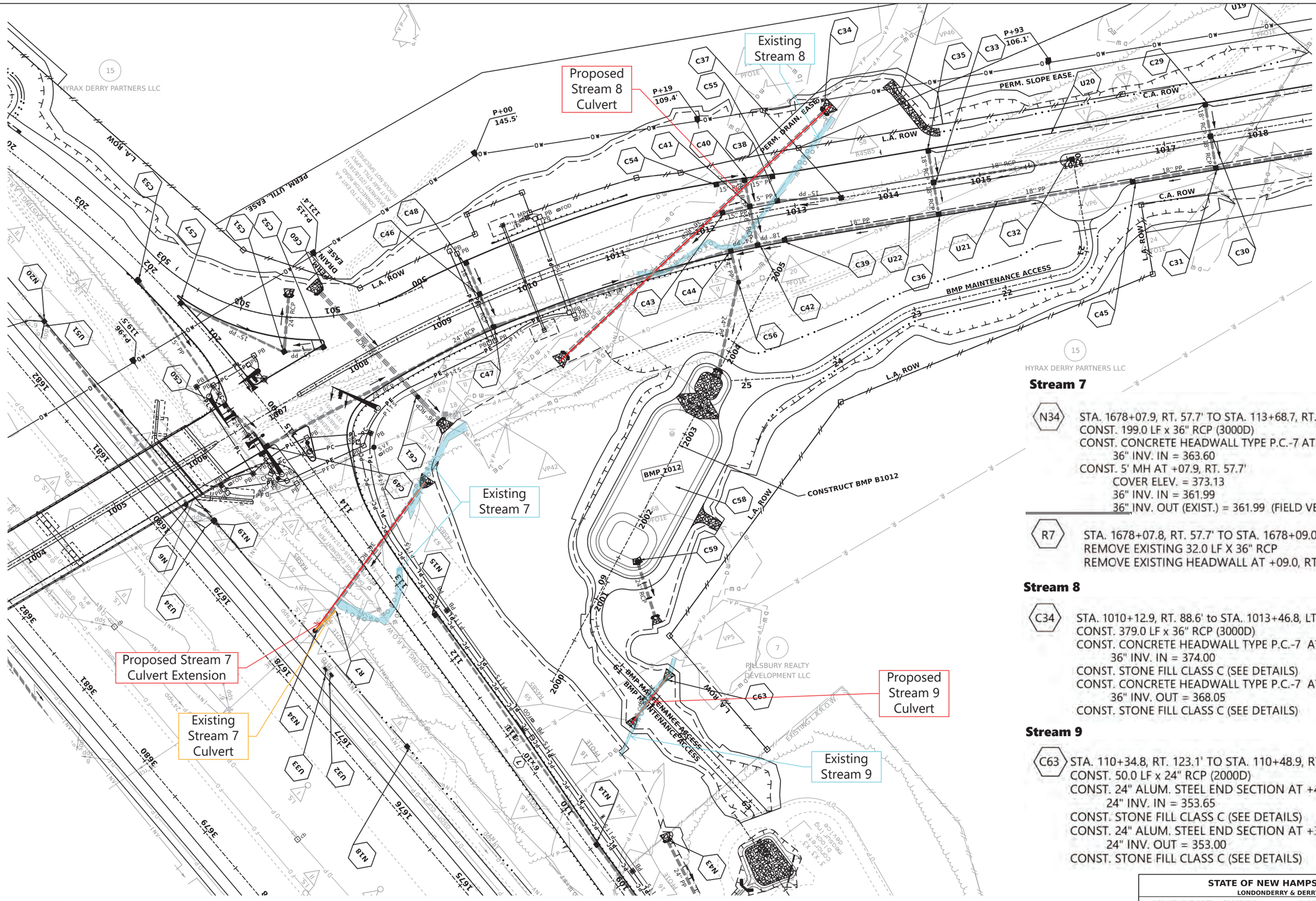
REVISIONS AFTER PROPOSAL

NUMBER	DATE	DESCRIPTION	STATION

SDR PROCESSED DATE
NEW DESIGN DATE
SHEET CHECKED DATE
AS BUILT DETAILS DATE

Attachment C

Stream Plan



Stream 7

N34 STA. 1678+07.9, RT. 57.7' TO STA. 113+68.7, RT. 83.1'
CONST. 199.0 LF x 36" RCP (3000D)
CONST. CONCRETE HEADWALL TYPE P.C.-7 AT +68.7, RT. 83.1'
36" INV. IN = 363.60
CONST. 5' MH AT +07.9, RT. 57.7'
COVER ELEV. = 373.13
36" INV. IN = 361.99
36" INV. OUT (EXIST.) = 361.99 (FIELD VERIFY)

R7 STA. 1678+07.8, RT. 57.7' TO STA. 1678+09.0, RT. 88.7'
REMOVE EXISTING 32.0 LF X 36" RCP
REMOVE EXISTING HEADWALL AT +09.0, RT. 88.7'

Stream 8

C34 STA. 1010+12.9, RT. 88.6' to STA. 1013+46.8, LT. 93.5'
CONST. 379.0 LF x 36" RCP (3000D)
CONST. CONCRETE HEADWALL TYPE P.C.-7 AT +46.8, LT. 93.5'
36" INV. IN = 374.00
CONST. STONE FILL CLASS C (SEE DETAILS)
CONST. CONCRETE HEADWALL TYPE P.C.-7 AT +12.9, RT. 88.6'
36" INV. OUT = 368.05
CONST. STONE FILL CLASS C (SEE DETAILS)

Stream 9

C63 STA. 110+34.8, RT. 123.1' TO STA. 110+48.9, RT. 170.3'
CONST. 50.0 LF x 24" RCP (2000D)
CONST. 24" ALUM. STEEL END SECTION AT +48.9, RT. 170.3'
24" INV. IN = 353.65
CONST. STONE FILL CLASS C (SEE DETAILS)
CONST. 24" ALUM. STEEL END SECTION AT +34.8, RT. 123.1'
24" INV. OUT = 353.00
CONST. STONE FILL CLASS C (SEE DETAILS)

50 0 50 100
SCALE IN FEET

Note: This plan sheet was developed as an illustration of all three Contract A stream crossings; label orientation follows the final PS&E cut sheet orientation.

NO.	DESCRIPTION	STATION	STATION	DATE

		DATE
SDR PROCESSED	VHB TEAM/NHDOT	2/8/2022
NEW DESIGN	VHB TEAM	3/21/2022
SHEET CHECKED	J. HILTON	3/21/2022
AS BUILT DETAILS		DATE

PS & E PLANS
SUBJECT TO CHANGE
DATE 3/21/2022

STATE OF NEW HAMPSHIRE
LONDONDERRY & DERRY
DEPARTMENT OF TRANSPORTATION ○ BUREAU OF HIGHWAY DESIGN

STREAM PLAN

DATE PLOTTED	VHB PROJECT NO.	MODEL	DGN	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
4/1/2022	52768.00	Default	13065A_Wet_Stream_Plan	13065A	1	1

Attachment D

NHDES Stream Crossing Worksheets

NHDES-W-06-071

Stream 7

WETLANDS PERMIT APPLICATION
STREAM CROSSING WORKSHEET

Land Resources Management
Wetlands Bureau

RSA 482-A/ Env-Wt-900

NOTE: This worksheet can be used to accompany Wetlands Permit Applications when proposing stream crossings.

1. Tier Classifications

Determine the contributing watershed size at USGS StreamStats

Note: Plans for Tier 2 and 3 crossings shall be designed and stamped by a professional engineer who is licensed under RSA 310-A to practice in New Hampshire.

Size of contributing watershed at the crossing location: 38.3 acres

☒ **Tier 1**: A *tier 1* stream crossing is a crossing located on a watercourse where the contributing watershed size is less than or equal to 200 acres

☐ **Tier 2**: A *tier 2* stream crossing is a crossing located on a watercourse where the contributing watershed size is greater than 200 acres and less than 640 acres

☐ **Tier 3**: A *tier 3* stream crossing is a crossing that meets any of the following criteria:

- ☐ On a watercourse where the contributing watershed is more than 640 acres
- ☐ Within a Designated River Corridor
- ☐ On a watercourse that is listed on the surface water assessment 305(b) report
- ☐ Within a 100-year floodplain (see *section 2* below)
- ☐ In a jurisdictional area having any protected species or habitat (NHB DataCheck)
- ☐ In or within 100 feet of a Prime Wetland

2. 100-year Floodplain

Use the FEMA Map Service Center to determine if the crossing is located within a 100-year floodplain. Please answer the questions below:

☒ **No**: The proposed stream crossing *is not* within the FEMA 100-year floodplain.

☐ **Yes**: The proposed project *is* within the FEMA 100-year floodplain. Zone = _____

- ☐ Elevation of the 100-year floodplain at the inlet: _____ feet (FEMA El. or Modeled El.)

3. Calculating Peak Discharge

Existing 100-year peak discharge (Q) calculated in cubic feet per second (CFS): 45.1 CFS	Calculation method: HydroCAD (CB X2)
Estimated Bankfull discharge at the crossing location: 3.4 CFS	Calculation method: HydroCAD (CB X2)

Note: If Tier 1 then skip to Section 10

4. Predicted Channel Geometry based on Regional Hydraulic Curves

*For **Tier 2** and **Tier 3** Crossings Only*

Bankfull Width: _____ feet	Mean Bankfull Depth: _____ feet
Bankfull Cross Sectional Area: _____ square feet	

5. Cross Sectional Channel Geometry: Measurements of the Existing Stream within a Reference Reach

*For **Tier 2** and **Tier 3** Crossings Only*

Describe the reference reach location: _____

Reference reach watershed size: _____ acres

Parameter	**Cross Section 1** Describe bed form _____ (*e.g. pool, riffle, glide*)	**Cross Section 2** Describe bed form _____ (*e.g. pool, riffle, glide*)	**Cross Section 3** Describe bed form _____ (*e.g. pool, riffle, glide*)	**Range**
Bankfull Width	_____ **feet**	_____ **feet**	_____ **feet**	_____ **feet**
Bankfull Cross Sectional Area	_____ **SF**	_____ **SF**	_____ **SF**	_____ **SF**
Mean Bankfull Depth	_____ **feet**	_____ **feet**	_____ **feet**	_____ **feet**
Width to Depth Ratio	_____	_____	_____	_____
Max Bankfull Depth	_____ **feet**	_____ **feet**	_____ **feet**	_____ **feet**
Flood Prone Width	_____ **feet**	_____ **feet**	_____ **feet**	_____ **feet**
Entrenchment Ratio	_____	_____	_____	_____

*Use **Figure 1** below to determine the measurements of the Reference Reach Attributes*

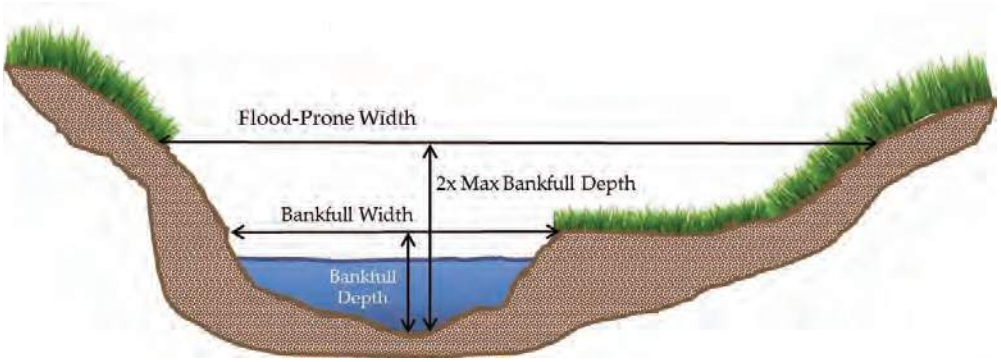


Figure 1: Determining the Reference Reach Attributes

6. Longitudinal Parameters of the Reference Reach and Crossing Location

*For **Tier 2** and **Tier 3** Crossings Only*

Average Channel Slope of the Reference Reach: _____

Average Channel Slope at the Crossing Location: _____

7. Plan View Geometry

*For **Tier 2** and **Tier 3** Crossings Only*

Sinuosity of the Reference Reach: _____

Sinuosity of the Crossing Location: _____

Note: Sinuosity is measured a distance of at least 20 times bankfull width, or 2 meander belt widths

8. Substrate Classification based on Field Observations *For **Tier 2** and **Tier 3** Crossings Only*	
% of reach that is *bedrock*	_____ %
% of reach that is *boulder*	_____ %
% of reach that is *cobble*	_____ %
% of reach that is *gravel*	_____ %
% of reach that is *sand*	_____ %
% of reach that is *silt*	_____ %

9. Stream Type of Reference Reach *For **Tier 2** and **Tier 3** Crossings Only*	
Stream Type of Reference Reach:	_____

*Refer to Rosgen Classification Chart (**Figure 2**) below*

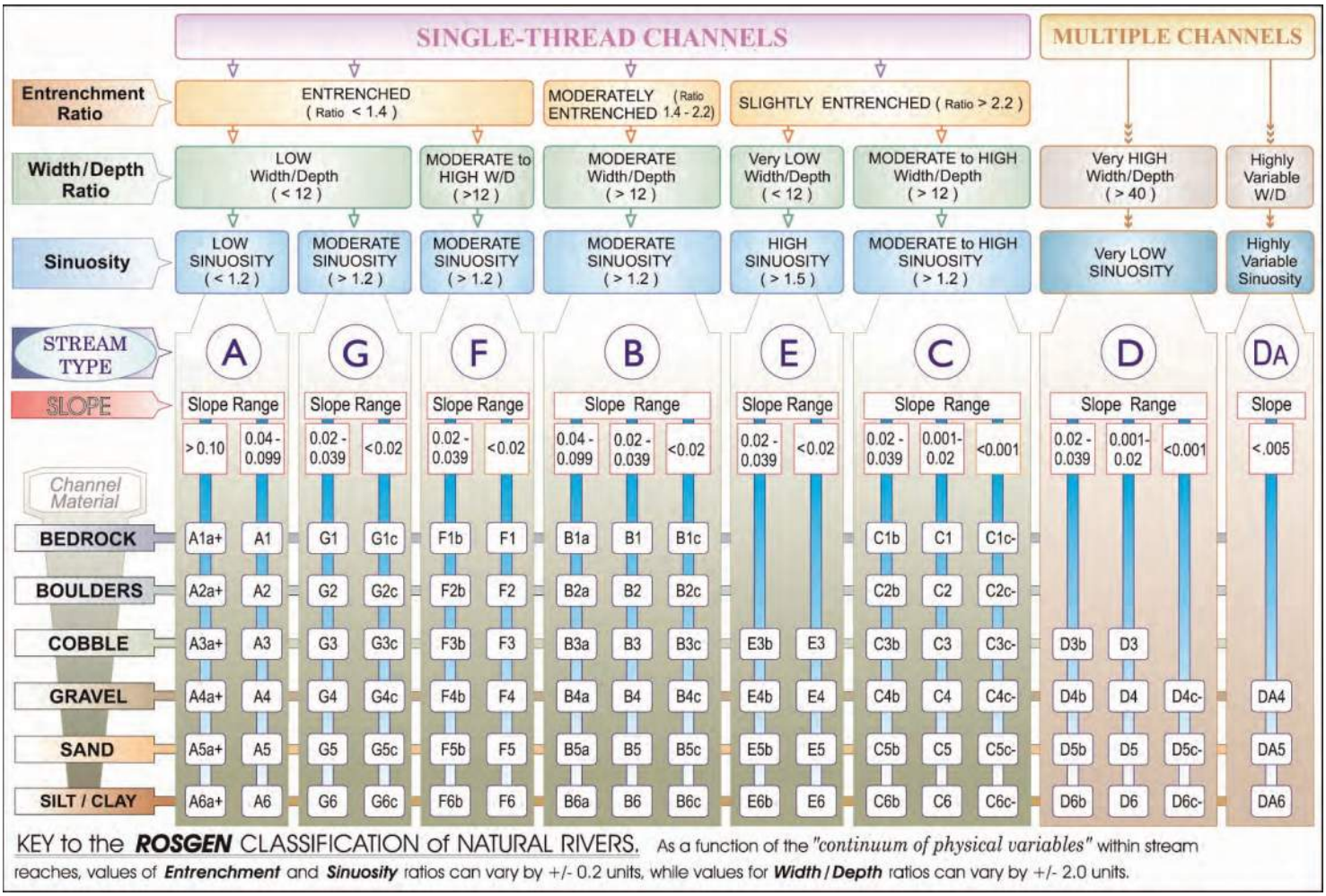


Figure 2. Reference from Applied River Morphology, Rosgen, 1996

10. Crossing Structure Metrics

Existing Conditions

Existing Structure Type:	☐ Bridge Span ☐ Pipe Arch ☐ Open-bottom Culvert ☒ Closed-bottom Culvert ☐ Closed-bottom Culvert with stream simulation ☐ Other: _____	
Existing Crossing Span *(perpendicular to flow)*	3.0 feet	**Culvert Diameter** 3.0 feet **Inlet Elevation** 358.06
Existing Crossing Length *(parallel to flow)*	388.0 feet	**Outlet Elevation** 349.91 **Culvert Slope** 2.1%

Proposed Conditions

Proposed Structure Type:	**Tier 1**	**Tier 2**	**Tier 3**	**Alternative Design**
Bridge Span	☐	☐	☐	☐
Pipe Arch	☐	☐		☐
Closed-bottom Culvert	☒	☐		☐
Open-bottom Culvert	☐	☐	☐	☐
Closed-bottom Culvert with stream simulation	☐	☐	☐	☐

Proposed structure Span *(perpendicular to flow)*	3.0 feet	**Culvert Diameter** 3.0 feet **Inlet Elevation** 367.00
Proposed Structure Length *(parallel to flow)*	188.3 feet	**Outlet Elevation** 359.00 **Culvert Slope** 4.25%
Proposed Entrenchment Ratio* *For **Tier 2** and **Tier 3** Crossings Only*	_____	*Note: To accommodate the entrenchment ratio, floodplain drainage structures may be utilized*

* *Note: Proposed Entrenchment Ratio must meet the minimum ratio for each stream type listed in **Figure 3**, otherwise the applicant must address the Alternative Design criteria listed in Env-Wt 904.09*

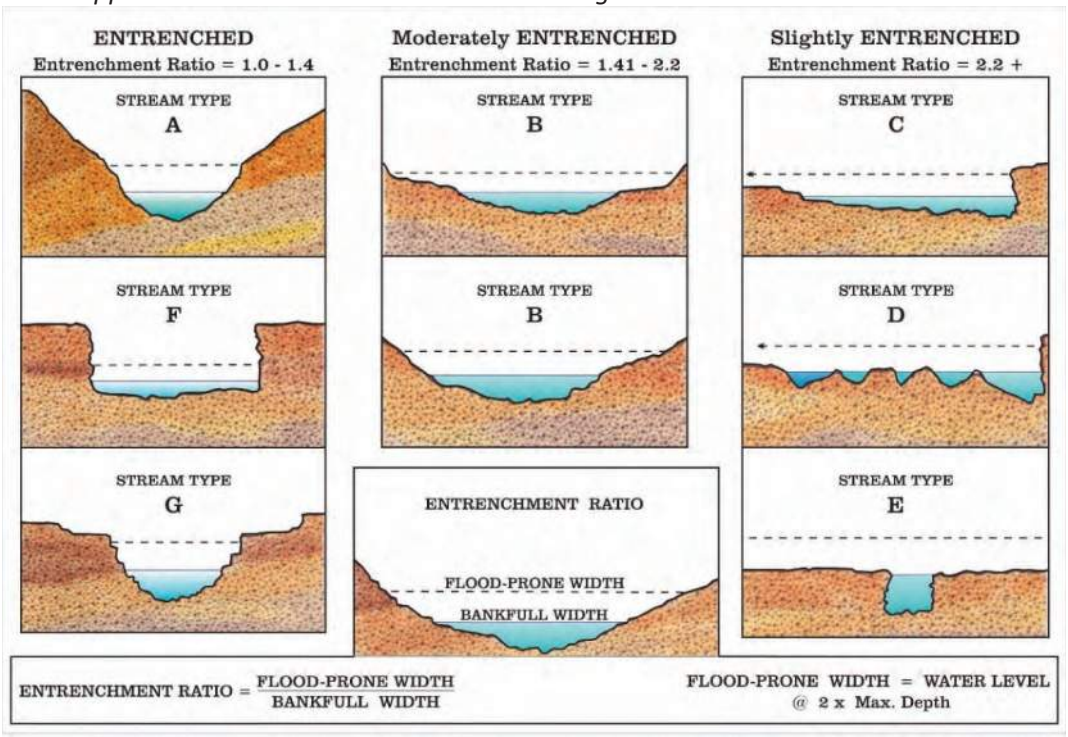


Figure 3. Reference from Applied River Morphology, Rosgen, 1996

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NHDES Wetlands Bureau, 29 Hazen Drive, PO Box 95, Concord, NH 03302-0095
www.des.nh.gov

11. Crossing Structure Hydraulics

	Existing	Proposed
100 year flood stage elevation at inlet	360.86	369.90
Flow velocity at outlet in feet per second (FPS)	7.2	5.80
Calculated 100 year peak discharge (Q) for the proposed structure in CFS		40.6
Calculated 50 year peak discharge (Q) for the proposed structure in CFS		30.3

12. Crossing Structure Openness Ratio

*For **Tier 2** and **Tier 3** Crossings Only*

Crossing Structure Openness Ratio = _____

Openness box culvert = (height x width)/length

Openness round culvert = (3.14 x radius^2)/length

13. General Design Considerations

Env-Wt 904.01 requires all stream crossings to be designed and constructed according to the following requirements. Check each box if the project meets these general design considerations.

All stream crossings shall be designed and constructed so as to:

- [x] Not be a barrier to sediment transport.
- [x] Prevent the restriction of high flows and maintain existing low flows.
- [x] Not obstruct or otherwise substantially disrupt the movement of aquatic life indigenous to the waterbody beyond the actual duration of construction.
- [x] Not cause an increase in the frequency of flooding or overtopping of banks.
- [x] Preserve watercourse connectivity where it currently exists.
- [x] Restore watercourse connectivity where:
  (1) Connectivity previously was disrupted as a result of human activity(ies); and
  (2) Restoration of connectivity will benefit aquatic life upstream or downstream of the crossing, or both.
- [x] Not cause erosion, aggradation, or scouring upstream or downstream of the crossing.
- [x] Not cause water quality degradation.

14. Tier Specific Design Criteria

Stream crossings must be designed in accordance with the Tier specific design criteria listed in Part Env-Wt 904.

- [x] The proposed project meets the Tier specific design criteria listed in Part Env-Wt 904 and each requirement has been addressed in the plans and as part of the wetland application.

15. Alternative Design

NOTE: If the proposed crossing does not meet all of the general design considerations, the Tier specific design criteria, or the minimum entrenchment ratio for each given stream type listed in **Figure 3**, then an alternative design plan and associated requirements must be addressed pursuant to Env-Wt 904.09.

- [ ] I have submitted an alternative design and addressed each requirement listed in Env-Wt 904.09

NHDES-W-06-071

Stream 8

WETLANDS PERMIT APPLICATION
STREAM CROSSING WORKSHEET

Land Resources Management
Wetlands Bureau

RSA 482-A/ Env-Wt-900

NOTE: This worksheet can be used to accompany Wetlands Permit Applications when proposing stream crossings.

1. Tier Classifications

Determine the contributing watershed size at USGS StreamStats

Note: Plans for Tier 2 and 3 crossings shall be designed and stamped by a professional engineer who is licensed under RSA 310-A to practice in New Hampshire.

Size of contributing watershed at the crossing location: 11.3 acres

☒ **Tier 1**: A *tier 1* stream crossing is a crossing located on a watercourse where the contributing watershed size is less than or equal to 200 acres

☐ **Tier 2**: A *tier 2* stream crossing is a crossing located on a watercourse where the contributing watershed size is greater than 200 acres and less than 640 acres

☐ **Tier 3**: A *tier 3* stream crossing is a crossing that meets any of the following criteria:

- ☐ On a watercourse where the contributing watershed is more than 640 acres
- ☐ Within a Designated River Corridor
- ☐ On a watercourse that is listed on the surface water assessment 305(b) report
- ☐ Within a 100-year floodplain (see *section 2* below)
- ☐ In a jurisdictional area having any protected species or habitat (NHB DataCheck)
- ☐ In or within 100 feet of a Prime Wetland

2. 100-year Floodplain

Use the FEMA Map Service Center to determine if the crossing is located within a 100-year floodplain. Please answer the questions below:

☒ **No**: The proposed stream crossing *is not* within the FEMA 100-year floodplain.

☐ **Yes**: The proposed project *is* within the FEMA 100-year floodplain. Zone = _____

- ☐ Elevation of the 100-year floodplain at the inlet: _____ feet (FEMA El. or Modeled El.)

3. Calculating Peak Discharge

Existing 100-year peak discharge (Q) calculated in cubic feet per second (CFS): 13.8 CFS	Calculation method: HydroCAD (8R)
Estimated Bankfull discharge at the crossing location: 1.0 CFS	Calculation method: HydroCAD (8R)

➡ ***Note: If Tier 1 then skip to Section 10*** ⬅

4. Predicted Channel Geometry based on Regional Hydraulic Curves

*For **Tier 2** and **Tier 3** Crossings Only*

Bankfull Width: _____ feet	Mean Bankfull Depth: _____ feet
Bankfull Cross Sectional Area: _____ square feet	

5. Cross Sectional Channel Geometry: Measurements of the Existing Stream within a Reference Reach

*For **Tier 2** and **Tier 3** Crossings Only*

Describe the reference reach location: _____

Reference reach watershed size: _____ acres

Parameter	**Cross Section 1** Describe bed form _____ (*e.g. pool, riffle, glide*)	**Cross Section 2** Describe bed form _____ (*e.g. pool, riffle, glide*)	**Cross Section 3** Describe bed form _____ (*e.g. pool, riffle, glide*)	**Range**
Bankfull Width	_____ **feet**	_____ **feet**	_____ **feet**	_____ **feet**
Bankfull Cross Sectional Area	_____ **SF**	_____ **SF**	_____ **SF**	_____ **SF**
Mean Bankfull Depth	_____ **feet**	_____ **feet**	_____ **feet**	_____ **feet**
Width to Depth Ratio	_____	_____	_____	_____
Max Bankfull Depth	_____ **feet**	_____ **feet**	_____ **feet**	_____ **feet**
Flood Prone Width	_____ **feet**	_____ **feet**	_____ **feet**	_____ **feet**
Entrenchment Ratio	_____	_____	_____	_____

*Use **Figure 1** below to determine the measurements of the Reference Reach Attributes*

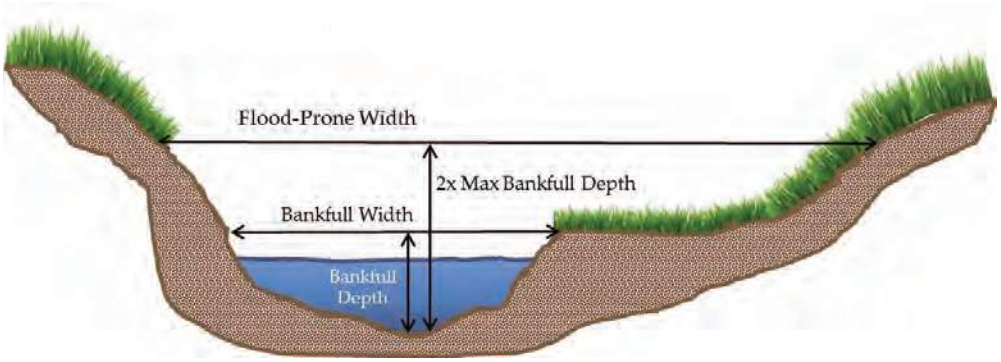

Figure 1: Determining the Reference Reach Attributes

6. Longitudinal Parameters of the Reference Reach and Crossing Location

*For **Tier 2** and **Tier 3** Crossings Only*

Average Channel Slope of the Reference Reach: _____

Average Channel Slope at the Crossing Location: _____

7. Plan View Geometry

*For **Tier 2** and **Tier 3** Crossings Only*

Sinuosity of the Reference Reach: _____

Sinuosity of the Crossing Location: _____

Note: Sinuosity is measured a distance of at least 20 times bankfull width, or 2 meander belt widths

8. Substrate Classification based on Field Observations *For **Tier 2** and **Tier 3** Crossings Only*	
% of reach that is *bedrock*	_____ %
% of reach that is *boulder*	_____ %
% of reach that is *cobble*	_____ %
% of reach that is *gravel*	_____ %
% of reach that is *sand*	_____ %
% of reach that is *silt*	_____ %

9. Stream Type of Reference Reach *For **Tier 2** and **Tier 3** Crossings Only*	
Stream Type of Reference Reach:	_____

*Refer to Rosgen Classification Chart (**Figure 2**) below*

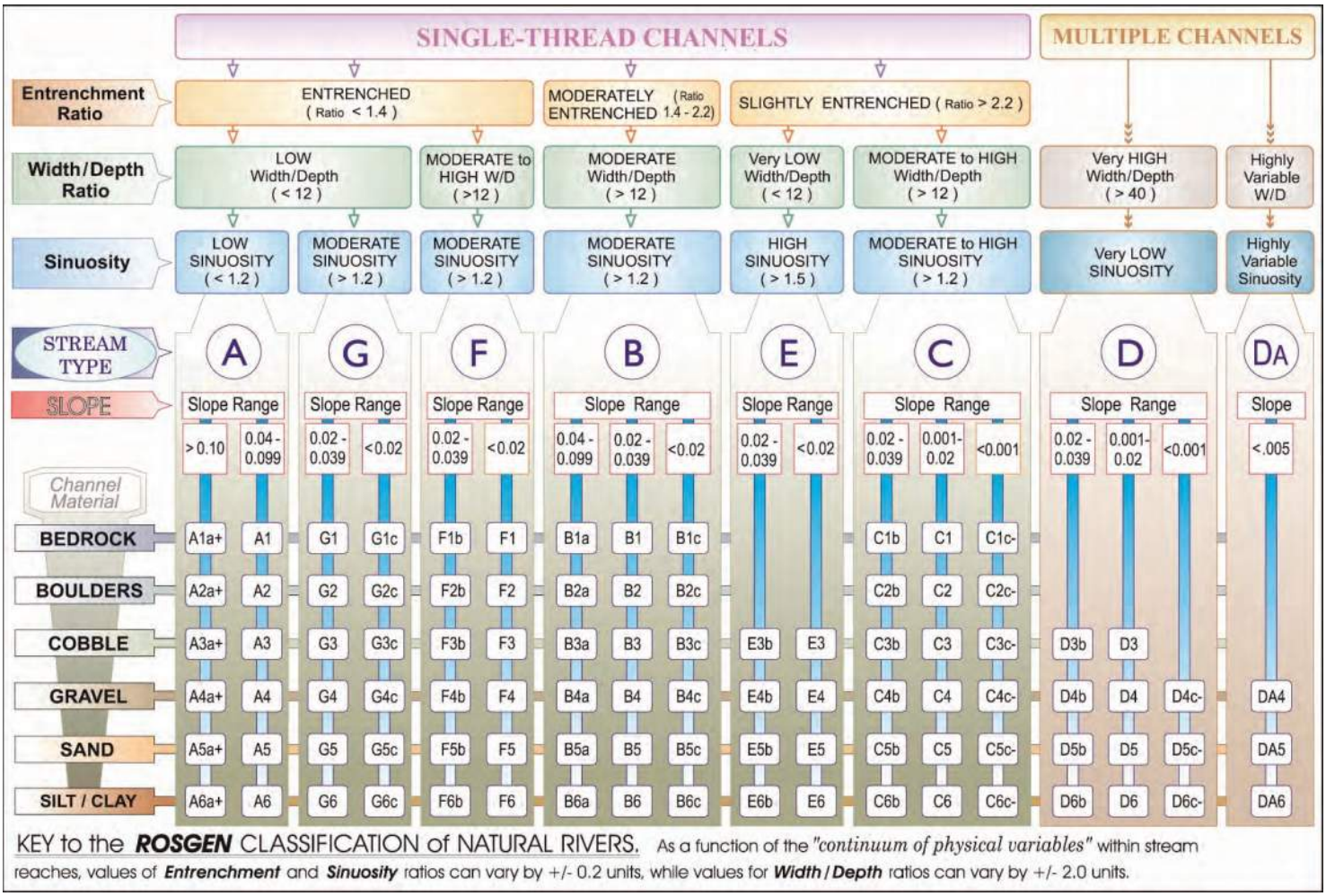

Figure 2. Reference from Applied River Morphology, Rosgen, 1996

10. Crossing Structure Metrics

Existing Conditions

Existing Structure Type:	☐ Bridge Span ☐ Pipe Arch ☐ Open-bottom Culvert ☐ Closed-bottom Culvert ☐ Closed-bottom Culvert with stream simulation ☒ Other: No Existing Crossing (New Crossing)	
Existing Crossing Span *(perpendicular to flow)*	_____ feet	**Culvert Diameter** _____ feet **Inlet Elevation** _____
Existing Crossing Length *(parallel to flow)*	_____ feet	**Outlet Elevation** _____ **Culvert Slope** _____

Proposed Conditions

Proposed Structure Type:	**Tier 1**	**Tier 2**	**Tier 3**	**Alternative Design**
Bridge Span	☐	☐	☐	☐
Pipe Arch	☐	☐		☐
Closed-bottom Culvert	☒	☐		☐
Open-bottom Culvert	☐	☐	☐	☐
Closed-bottom Culvert with stream simulation	☐	☐	☐	☐

Proposed structure Span *(perpendicular to flow)*	3.0 feet	**Culvert Diameter** 3.0 feet **Inlet Elevation** 376.63
Proposed Structure Length *(parallel to flow)*	378 feet	**Outlet Elevation** 368.05 **Culvert Slope** _____
Proposed Entrenchment Ratio* *For **Tier 2** and **Tier 3** Crossings Only*	_____	*Note: To accommodate the entrenchment ratio, floodplain drainage structures may be utilized*

* *Note: Proposed Entrenchment Ratio must meet the minimum ratio for each stream type listed in **Figure 3**, otherwise the applicant must address the Alternative Design criteria listed in Env-Wt 904.09*

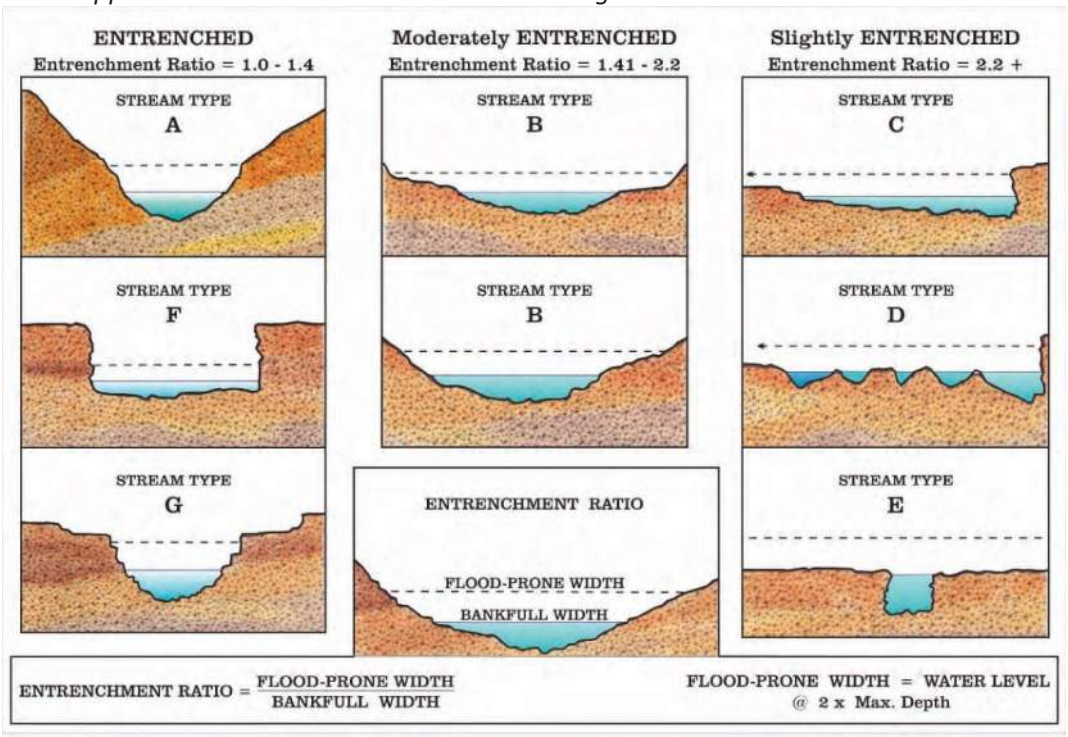

Figure 3. Reference from Applied River Morphology, Rosgen, 1996

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11. Crossing Structure Hydraulics

	Existing	Proposed
100 year flood stage elevation at inlet	N/a	378.3
Flow velocity at outlet in feet per second (FPS)	N/a	4.39
Calculated 100 year peak discharge (Q) for the proposed structure in CFS		17.7
Calculated 50 year peak discharge (Q) for the proposed structure in CFS		12.9

12. Crossing Structure Openness Ratio

*For **Tier 2** and **Tier 3** Crossings Only*

Crossing Structure Openness Ratio = _____

Openness box culvert = (height x width)/length

Openness round culvert = (3.14 x radius^2)/length

13. General Design Considerations

Env-Wt 904.01 requires all stream crossings to be designed and constructed according to the following requirements. Check each box if the project meets these general design considerations.

All stream crossings shall be designed and constructed so as to:

- ☒ Not be a barrier to sediment transport.
- ☒ Prevent the restriction of high flows and maintain existing low flows.
- ☒ Not obstruct or otherwise substantially disrupt the movement of aquatic life indigenous to the waterbody beyond the actual duration of construction.
- ☒ Not cause an increase in the frequency of flooding or overtopping of banks.
- ☒ Preserve watercourse connectivity where it currently exists.
- ☒ Restore watercourse connectivity where:
  (1) Connectivity previously was disrupted as a result of human activity(ies); and
  (2) Restoration of connectivity will benefit aquatic life upstream or downstream of the crossing, or both.
- ☒ Not cause erosion, aggradation, or scouring upstream or downstream of the crossing.
- ☒ Not cause water quality degradation.

14. Tier Specific Design Criteria

Stream crossings must be designed in accordance with the Tier specific design criteria listed in Part Env-Wt 904.

☒ The proposed project meets the Tier specific design criteria listed in Part Env-Wt 904 and each requirement has been addressed in the plans and as part of the wetland application.

15. Alternative Design

NOTE: If the proposed crossing does not meet all of the general design considerations, the Tier specific design criteria, or the minimum entrenchment ratio for each given stream type listed in **Figure 3**, then an alternative design plan and associated requirements must be addressed pursuant to Env-Wt 904.09.

☐ I have submitted an alternative design and addressed each requirement listed in Env-Wt 904.09

NHDES-W-06-071

Stream 9

WETLANDS PERMIT APPLICATION
STREAM CROSSING WORKSHEET

Land Resources Management
Wetlands Bureau

RSA 482-A/ Env-Wt-900

NOTE: This worksheet can be used to accompany Wetlands Permit Applications when proposing stream crossings.

1. Tier Classifications

Determine the contributing watershed size at USGS StreamStats

Note: Plans for Tier 2 and 3 crossings shall be designed and stamped by a professional engineer who is licensed under RSA 310-A to practice in New Hampshire.

Size of contributing watershed at the crossing location: 15.1 acres

☒ **Tier 1**: A *tier 1* stream crossing is a crossing located on a watercourse where the contributing watershed size is less than or equal to 200 acres

☐ **Tier 2**: A *tier 2* stream crossing is a crossing located on a watercourse where the contributing watershed size is greater than 200 acres and less than 640 acres

☐ **Tier 3**: A *tier 3* stream crossing is a crossing that meets any of the following criteria:

- ☐ On a watercourse where the contributing watershed is more than 640 acres
- ☐ Within a Designated River Corridor
- ☐ On a watercourse that is listed on the surface water assessment 305(b) report
- ☐ Within a 100-year floodplain (see *section 2* below)
- ☐ In a jurisdictional area having any protected species or habitat (NHB DataCheck)
- ☐ In or within 100 feet of a Prime Wetland

2. 100-year Floodplain

Use the FEMA Map Service Center to determine if the crossing is located within a 100-year floodplain. Please answer the questions below:

☒ **No**: The proposed stream crossing *is not* within the FEMA 100-year floodplain.

☐ **Yes**: The proposed project *is* within the FEMA 100-year floodplain. Zone = _____

- ☐ Elevation of the 100-year floodplain at the inlet: _____ feet (FEMA El. or Modeled El.)

3. Calculating Peak Discharge

Existing 100-year peak discharge (Q) calculated in cubic feet per second (CFS): 18.6 CFS	Calculation method: HydroCAD
Estimated Bankfull discharge at the crossing location: 0.9 CFS	Calculation method: HydroCAD

➡ ***Note: If Tier 1 then skip to Section 10*** ⬅

4. Predicted Channel Geometry based on Regional Hydraulic Curves

*For **Tier 2** and **Tier 3** Crossings Only*

Bankfull Width: _____ feet	Mean Bankfull Depth: _____ feet
Bankfull Cross Sectional Area: _____ square feet	

5. Cross Sectional Channel Geometry: Measurements of the Existing Stream within a Reference Reach

*For **Tier 2** and **Tier 3** Crossings Only*

Describe the reference reach location: _____

Reference reach watershed size: _____ acres

Parameter	**Cross Section 1** Describe bed form _____ (*e.g. pool, riffle, glide*)	**Cross Section 2** Describe bed form _____ (*e.g. pool, riffle, glide*)	**Cross Section 3** Describe bed form _____ (*e.g. pool, riffle, glide*)	**Range**
Bankfull Width	_____ **feet**	_____ **feet**	_____ **feet**	_____ **feet**
Bankfull Cross Sectional Area	_____ **SF**	_____ **SF**	_____ **SF**	_____ **SF**
Mean Bankfull Depth	_____ **feet**	_____ **feet**	_____ **feet**	_____ **feet**
Width to Depth Ratio	_____	_____	_____	_____
Max Bankfull Depth	_____ **feet**	_____ **feet**	_____ **feet**	_____ **feet**
Flood Prone Width	_____ **feet**	_____ **feet**	_____ **feet**	_____ **feet**
Entrenchment Ratio	_____	_____	_____	_____

*Use **Figure 1** below to determine the measurements of the Reference Reach Attributes*

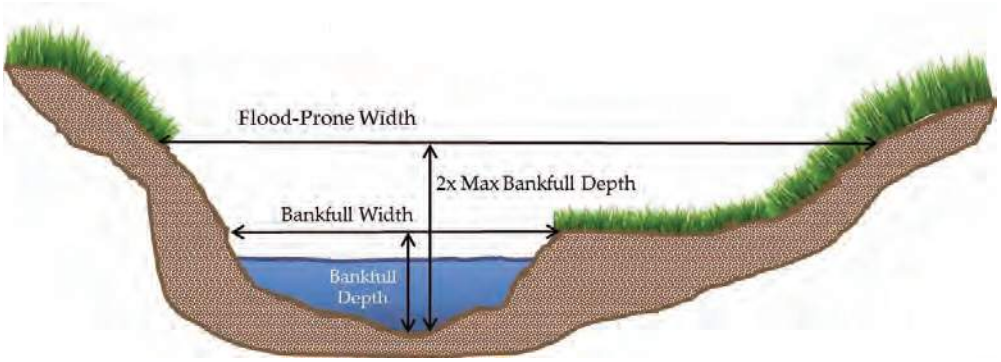

Figure 1: Determining the Reference Reach Attributes

6. Longitudinal Parameters of the Reference Reach and Crossing Location

*For **Tier 2** and **Tier 3** Crossings Only*

Average Channel Slope of the Reference Reach: _____

Average Channel Slope at the Crossing Location: _____

7. Plan View Geometry

*For **Tier 2** and **Tier 3** Crossings Only*

Sinuosity of the Reference Reach: _____

Sinuosity of the Crossing Location: _____

Note: Sinuosity is measured a distance of at least 20 times bankfull width, or 2 meander belt widths

8. Substrate Classification based on Field Observations *For **Tier 2** and **Tier 3** Crossings Only*	
% of reach that is *bedrock*	_____ %
% of reach that is *boulder*	_____ %
% of reach that is *cobble*	_____ %
% of reach that is *gravel*	_____ %
% of reach that is *sand*	_____ %
% of reach that is *silt*	_____ %

9. Stream Type of Reference Reach *For **Tier 2** and **Tier 3** Crossings Only*	
Stream Type of Reference Reach:	_____

*Refer to Rosgen Classification Chart (**Figure 2**) below*

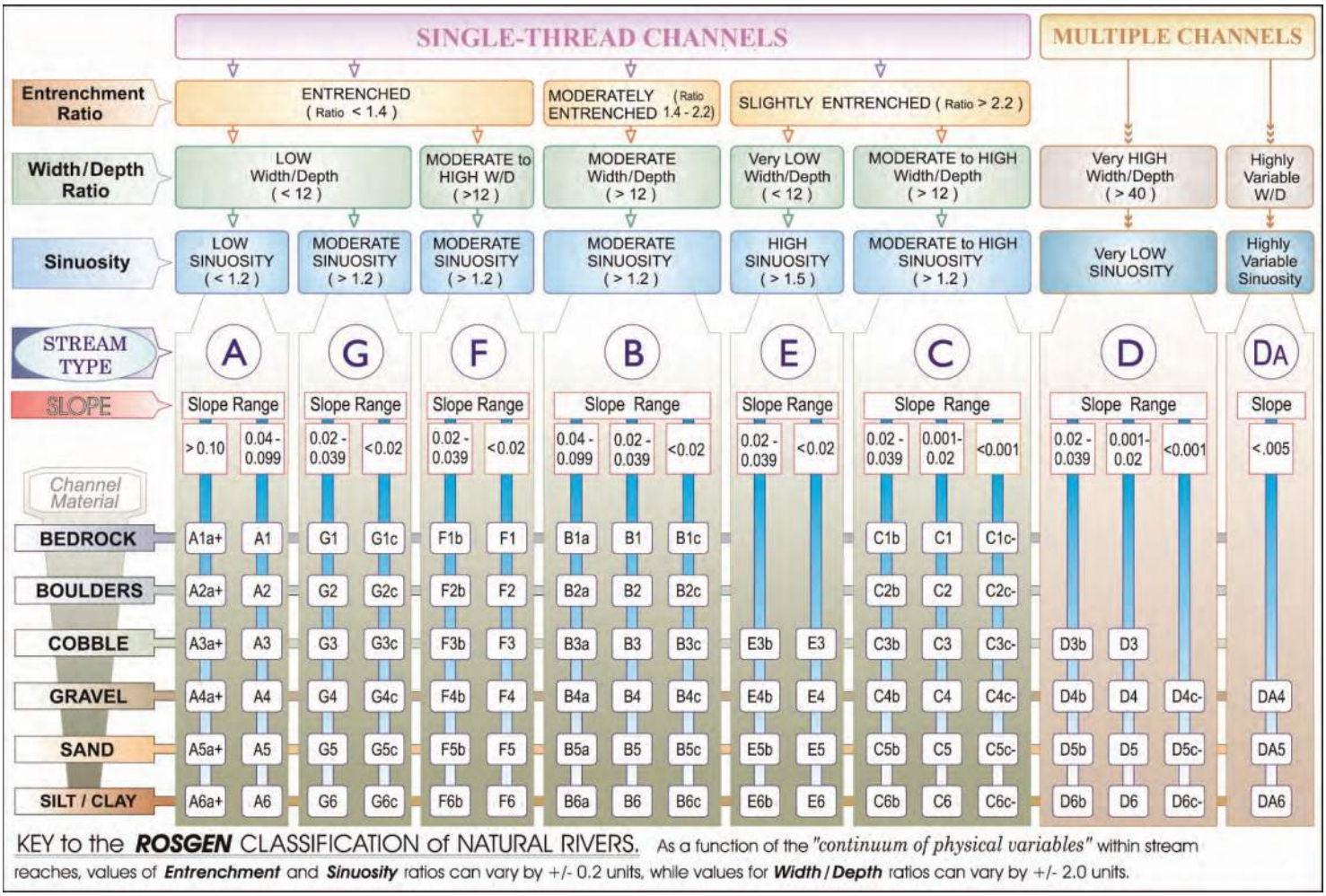

Figure 2. Reference from Applied River Morphology, Rosgen, 1996

10. Crossing Structure Metrics

Existing Conditions

Existing Structure Type:	☐ Bridge Span ☐ Pipe Arch ☐ Open-bottom Culvert ☐ Closed-bottom Culvert ☐ Closed-bottom Culvert with stream simulation ☒ Other: No Existing Crossing	
Existing Crossing Span *(perpendicular to flow)*	_____ feet	**Culvert Diameter** _____ feet **Inlet Elevation** _____
Existing Crossing Length *(parallel to flow)*	_____ feet	**Outlet Elevation** _____ **Culvert Slope** _____

Proposed Conditions

Proposed Structure Type:	**Tier 1**	**Tier 2**	**Tier 3**	**Alternative Design**
Bridge Span	☐	☐	☐	☐
Pipe Arch	☐	☐		☐
Closed-bottom Culvert	☐	☐		☐
Open-bottom Culvert	☐	☐	☐	☐
Closed-bottom Culvert with stream simulation	☐	☐	☐	☐

Proposed structure Span *(perpendicular to flow)*	2 feet	**Culvert Diameter** 2 feet **Inlet Elevation** 353.62
Proposed Structure Length *(parallel to flow)*	50 feet	**Outlet Elevation** 353.0 **Culvert Slope** 1.3%
Proposed Entrenchment Ratio* *For **Tier 2** and **Tier 3** Crossings Only*	_____	*Note: To accommodate the entrenchment ratio, floodplain drainage structures may be utilized*

* *Note: Proposed Entrenchment Ratio must meet the minimum ratio for each stream type listed in **Figure 3**, otherwise the applicant must address the Alternative Design criteria listed in Env-Wt 904.09*

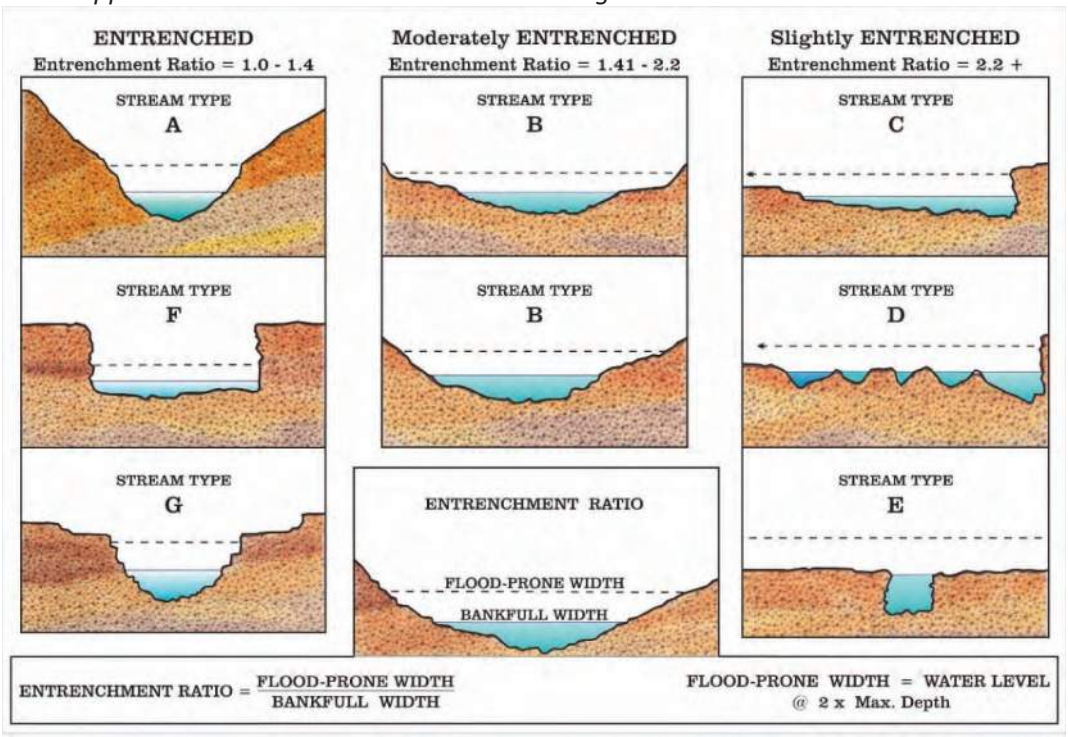

Figure 3. Reference from Applied River Morphology, Rosgen, 1996

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NHDES Wetlands Bureau, 29 Hazen Drive, PO Box 95, Concord, NH 03302-0095
www.des.nh.gov

11. Crossing Structure Hydraulics

	Existing	Proposed
100 year flood stage elevation at inlet	N/a	356.5
Flow velocity at outlet in feet per second (FPS)	N/a	6.6
Calculated 100 year peak discharge (Q) for the proposed structure in CFS		20.77
Calculated 50 year peak discharge (Q) for the proposed structure in CFS		14.19

12. Crossing Structure Openness Ratio

*For **Tier 2** and **Tier 3** Crossings Only*

Crossing Structure Openness Ratio = _____

Openness box culvert = (height x width)/length

Openness round culvert = (3.14 x radius^2)/length

13. General Design Considerations

Env-Wt 904.01 requires all stream crossings to be designed and constructed according to the following requirements. Check each box if the project meets these general design considerations.

All stream crossings shall be designed and constructed so as to:

- ☒ Not be a barrier to sediment transport.
- ☒ Prevent the restriction of high flows and maintain existing low flows.
- ☒ Not obstruct or otherwise substantially disrupt the movement of aquatic life indigenous to the waterbody beyond the actual duration of construction.
- ☒ Not cause an increase in the frequency of flooding or overtopping of banks.
- ☒ Preserve watercourse connectivity where it currently exists.
- ☒ Restore watercourse connectivity where:
  (1) Connectivity previously was disrupted as a result of human activity(ies); and
  (2) Restoration of connectivity will benefit aquatic life upstream or downstream of the crossing, or both.
- ☒ Not cause erosion, aggradation, or scouring upstream or downstream of the crossing.
- ☒ Not cause water quality degradation.

14. Tier Specific Design Criteria

Stream crossings must be designed in accordance with the Tier specific design criteria listed in Part Env-Wt 904.

☒ The proposed project meets the Tier specific design criteria listed in Part Env-Wt 904 and each requirement has been addressed in the plans and as part of the wetland application.

15. Alternative Design

NOTE: If the proposed crossing does not meet all of the general design considerations, the Tier specific design criteria, or the minimum entrenchment ratio for each given stream type listed in **Figure 3**, then an alternative design plan and associated requirements must be addressed pursuant to Env-Wt 904.09.

☐ I have submitted an alternative design and addressed each requirement listed in Env-Wt 904.09

Attachment E

Stream Photo Log

Stream Photo Log
I-93 Exit 4A Interchange Project – Londonderry, NH

Photo 1: View south of Stream 7, taken from the edge of the utility right-of-way (ROW). 9/8/2021.

Photo 2: View northeast of Stream 7 taken from near its confluence with Wetland 17. 8/3/2021.

Stream Photo Log
I-93 Exit 4A Interchange Project – Londonderry, NH

Photo 3: View northeast of the confluence of Wetland 22/Vernal Pool 46 in the background with Stream 8 in the foreground. 9/8/2021.

Photo 4: View southwest of Stream 8 taken from within the forest with the open utility ROW in the background. 9/8/2021.

Stream Photo Log
I-93 Exit 4A Interchange Project – Londonderry, NH

Photo 5: Downstream view southwest of Stream 9. 5/25/2021.

Photo 6: View northeast of Wetland 16/Vernal Pool 4 with its confluence with Stream 9 barely visible in the background. 5/25/2021.