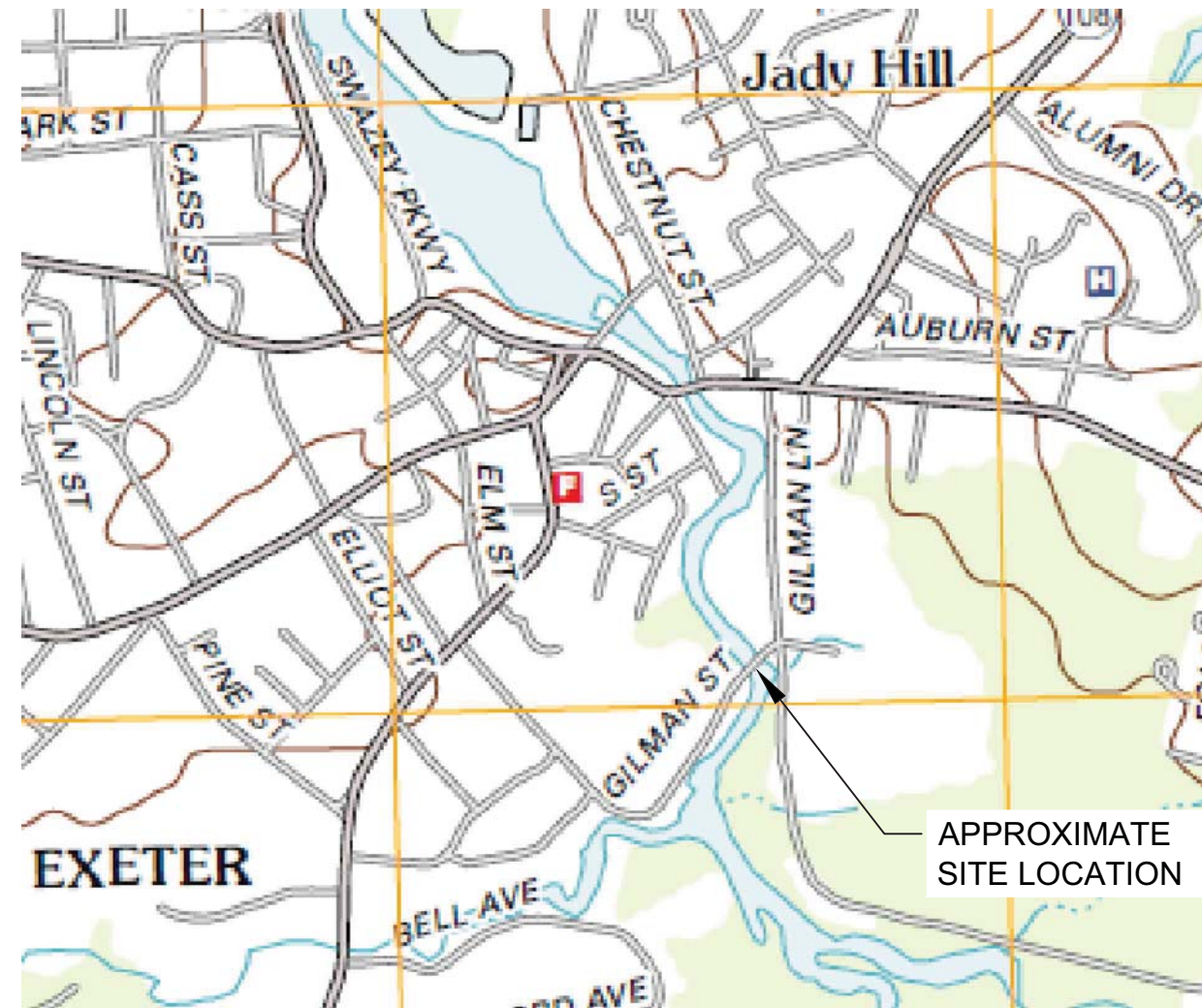


HILL BRIDGE RESTORATION

PHILLIPS EXETER ACADEMY EXETER, NEW HAMPSHIRE



SITE TOPOGRAPHIC MAP IS EXCERPT OF USGS EXETER, NH-MA QUADRANGLE, 2012, DOWNLOADED BY SA FROM [HTTP://STORE.USGS.GOV](http://store.usgs.gov) ON FEBRUARY 5, 2012



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NOTES:

GENERAL:

1. The Design Documents are part of the Contract Documents and include:
 - Design Drawings (also referred to as Sheets, Plans, Contract Plans, Contract Drawings, etc.)
 - Project Specifications
 - The New Hampshire Department of Transportation (NHDOT) Standard Specifications for Road and Bridge Construction, 2016 (aka 2016 NHDOT Standard Specifications). Amend NHDOT Standard Specification references to "Department" or "Department of Transportation" to read "Phillips Exeter Academy" in sole judgment of Engineer.
 - If discrepancies exist between the Specifications (including NHDOT Standard Specifications and Project Specifications) and these drawings, the provisions of the Drawings govern. If discrepancies exist between Specifications referenced herein (e.g. NHDOT, etc.) and the Drawings or Project Specifications, the provisions of these Drawings and Project Specifications govern. All such discrepancies shall be in the sole judgment of the Engineer.
2. The "Work" generally consists of repairs to the bridge (e.g. fill excavation, concrete repairs, fill placement, erosion resistance improvements, roadway replacement, etc.) and landscaping site improvements in the vicinity of the bridge (e.g. landscaping, bank stabilization, etc.). These drawings prepared by Stephens Associates ("Structural Drawings") show the bridge repairs. Drawings prepared by Kyle Zick Landscape Architecture, Inc. (KZLA) show landscaping/site improvements ("Landscaping Drawings"). Structural drawings shall be used in conjunction with the Landscaping Drawings, properly reviewed (by Engineer) Contractor shop drawings, manufacturer's specifications and references cited therein.
3. Safe and successful completion of the work shown is the sole responsibility of the Contractor. Secure construction site and all safety hazards from public access at all times.
4. No changes to the design shall be made without approval of Owner (Phillips Exeter Academy, aka PEA) and Engineer (Stephens Associates Consulting Engineers, LLC).
5. Review or approval by PEA or Engineer of any aspect of the work shall not absolve the Contractor of responsibility for that or any other aspect of the work.
6. Comply with all applicable local, state and federal regulations and permits, including but not limited to, OSHA standards. Contractor shall comply with conditions of permits issued for the project by regulatory authorities, and any and all interpretations of such conditions by the Owner.
7. Verify all dimensions and conditions in the field. Notify Engineer of any discrepancies before proceeding with the affected portion of the work.
8. Unless otherwise noted, details shown on drawings are typical for all similar conditions.
9. Do not operate steel-tracked equipment directly on concrete bridge arch.
10. Do not damage existing site structures/features to remain and/or new structures. Protect all work from damage. Contractor shall repair any damage at Contractor's expense.
11. Perform no work except in the presence of the Engineer unless otherwise agreed by Engineer. Provide Owner and Engineer with free, unobstructed access at all times to observe the work.
12. Access Site via Chadwick Lane. Where truck or other vehicle access to northeast end of Bridge is necessary, coordinate such access with Owner in advance. Do not trespass on adjacent private properties. Access River only within construction limits.
13. Manage, collect and contain all debris and waste generated by construction activities (e.g. by demolition, mechanical removal and cleaning, sandblasting, hydrodemolition, surface preparation, etc.) in accordance with all applicable local, state and federal regulations and permits. Do not allow materials generated by construction activities to enter Exeter river or areas outside limit of construction.
14. Remove from site and properly dispose of any and all debris and waste generated by construction, including excavated soils not re-used as fill, in accordance with all applicable local, state and federal regulations and permits.
15. After construction completion and prior to demobilizing, clean and restore site to satisfaction of PEA and in accordance with site drawings.

REFERENCES:

16. New Hampshire Department of Transportation (NHDOT) Standard Specifications for Road and Bridge Construction, 2016.
17. American Society for Testing Materials (ASTM) standards, as noted, most recent edition.
18. New Hampshire Department of Environmental Services, New Hampshire Stormwater Manual, 2008, or most recent edition.

DESIGN BASIS:

19. Construction loads on bridge (including weight of scaffolding, vehicles, equipment, etc.) shall not exceed 75 pounds per square foot (psf), nor shall any vehicle or other concentrated load exceed 5 tons.
20. Compaction equipment shall have a static weight of no more than 2,000 lb. per drum.
21. Design live loads: (post-repairs)
 - 15-ton, 2-axle vehicle
 - JLG 600 SI boom lift
 - 85 psf pedestrian load

SUBMITTALS:

22. All submittals shall be submitted to Engineer by electronic mail (email) in a standard written format no less than 3 weeks before commencing any such work as the submittal addresses. Do not commence work until successful review of submittal by Engineer (i.e. Engineer indicates submittal is complete and takes no exceptions to the submitted information). Submittals shall be made in paper hardcopy, in addition to electronically, whenever indicated herein or otherwise requested by Engineer. Submittals include the following:
 23. Detailed plan of construction sequence and schedule, including specific calendar dates.
 24. Erosion and Sediment Control and Stormwater Pollution Prevention Plan (SWPPP) (refer to Sheet G-4)
 25. Temporary Water Control Plan
 26. Flood Contingency Plan
 27. Concrete Repair submittals (refer to Project Specifications).
 28. Plan for temporary access to outside and underside of bridge for concrete repairs, including any shoring/scaffolding/temporary support, barges, water control/cofferdams, etc.
 29. Construction Debris and Waste Management Plan to demonstrate means and methods for containing, collecting, controlling and disposing of debris and waste (e.g. for demolition, mechanical removal and cleaning, sandblasting, hydrodemolition, surface preparation, placement of repair material, etc.). Plan shall also demonstrate compliance with project permits.
 30. Documentation of proper disposal of all construction debris, waste, and excavated soils not re-used as fill.
 31. Weights of all vehicles and heavy equipment (e.g. paving machines, rollers, etc.) proposed for use on bridge and confirmation that weights do not exceed specified construction loads.
 32. Sample stamped asphalt patterns for selection of pattern by PEA.
 33. Proposed asphalt mixes, including job mix formulas, and theoretical maximum densities.
 34. Means and methods for bridge plaque cleaning, restoration and refinishing.
 35. Project DigSafe number.
 36. Representative samples of each proposed fill material to Engineer for laboratory testing. Quantity of each fill material sample shall be sufficient for laboratory testing, weighing approximately 100 lb.
 37. Sign proofs for new signs at Bridge.
 38. Results of each test (for tests performed by Contractor) within 24 hours of testing.
 39. Materials, means, and/or methods proposed as equivalent, except as expressly disallowed. Engineer will be sole judge of product equivalency where Contractor submits alternate products.

MATERIALS:

40. In addition to the materials described and specified elsewhere on the Drawings and/or Specifications, provide the following:
 41. Concrete Materials:
 - a. Concrete: normal-weight, 4,500 psi 28-day compressive strength designed in accordance with ACI 211.1. Air entrainment 5% to 7%. Slump: 4 to 7 inches.
 - b. Reinforcing steel: deformed bars conforming to ASTM 615, grade 60. Detailed in accordance with ACI 315.
 - c. Concrete repair materials: refer to Project Specifications.
 - d. Compressive filler for joints: sealer in accordance with NHDOT section 562 with backer rod.
 - e. Adhesive for reinforcing steel dowels: HILTI HIT-HY 200, installed per manufacturer's instructions.
 42. Crushed gravel: NHDOT 304.3 crushed gravel. NHDOT 304.4 crushed stone (fine) may be substituted for crushed gravel.
 43. Stamped asphalt pavement: NHDOT 403 hot bituminous pavement, 3/8 in. nominal max. aggregate size. Alternate: at sole option of Owner, apply stamped surface treatment and coloring per requirements of PEA.
 44. Sealant for pvc pipes in concrete: 791 Silicone Weatherproofing Sealant by DOW Corning Corporation, Midland, MI or equivalent.
 45. Drain system materials: see sheet S-5.
 46. Pipe sleeves for electrical conduit: 1.5 in. inside diameter, schedule 40 pvc pipe, with all necessary appurtenances, meeting NHDOT 614, except pitch may be steeper than specified in NHDOT 614 where necessary to cross bridge.
 47. Lightweight foam concrete: see sheet S-6.
 48. Geotextile and riprap: see sheet G-3.

EARTHWORK AND PAVEMENT:

49. Excavation (general):
 - a. Mark excavations and notify DigSafe as required by law prior to excavation. Provide DigSafe number to Owner.
 - b. Excavation beyond limits shown herein (over-excavation) shall be at Contractor's expense and shall not be included for payment. Contractor shall backfill such over-excavation at their own expense and in accordance with all appropriate designs and specifications for nearby or similar work under the contract.
 - c. Remove all existing pavement and properly dispose of off-site in accordance with local, state and federal requirements and at no additional cost to Owner.
 - d. Excavate and replace any loose or soft zones observed during excavation or compaction with NHDOT 304.3 Crushed Gravel or other appropriate material,

50. Excavation of fill overlying bridge:
 - a. Remove existing fill overlying the bridge to limits shown herein and stockpile on-site for evaluation by Engineer of potential for re-use as backfill. A test pit performed near the arch crown indicated approximately 3 to 4 in. of clayey soil immediately on top of the arch concrete. Where dissimilar soils are encountered during excavation (e.g. granular soil overlying clayey soil), separate the dissimilar soils and stockpile separately. Prevent stockpiled soils from becoming too wet for proper workability and compaction to be placed as fill.
 - b. Remove existing fill evenly from each end of bridge. Difference in elevation of fill at each end shall be 2 ft. or less.
 - c. Clean concrete surfaces exposed by excavating fill for clear observation of concrete condition by Engineer, including sounding of exposed concrete surfaces, observation for cracks, and in preparation for concrete spandrel repairs. Use commonly used methods that do not damage the concrete (e.g. hand tools, pressure washing, compressed air, or other approved methods, etc.) to expose a clean concrete surface, to satisfaction of Engineer. Capture and contain all spoils (e.g. water, mud, concrete, soil, etc.) and protect existing soil to remain at ends of bridge from water or from otherwise becoming soft/loose/disturbed, etc.
51. Fill placement and compaction:
 - a. At sole option of Owner, backfill bridge with excavated soils as fill, NHDOT 304.3 Crushed Gravel, or lightweight foam concrete fill alternate. Lightweight foam concrete fill alternate shown on sheet S-6.
 - b. Compact soil subgrades prior to placing new fill. If compaction disturbs the subgrade, in sole judgment of Engineer, terminate compaction and remedy subgrade disturbance to satisfaction of Engineer.
 - c. Protect soil subgrades from frost during construction.
 - d. Place and compact fill per NHDOT 304. Place fill in level, max. 8-in. (loose thickness) lifts to 92 percent of maximum dry unit weight as determined by ASTM D698 (standard proctor test).
 - e. Construct fills at lower elevations prior to constructing fills at higher elevations (including fills on opposite ends of bridge), such that no lift is more than 16 in. above an adjacent lift, or a lift on the opposite end of the bridge arch.
 - f. Fill not meeting compaction specifications shall be reworked until it meets specifications, including but not limited to, removing/replacing, rehandling, reconditioning, and/or rerolling, etc. of part or all of each lift at Contractor's expense.
52. Dewatering:
 - a. Contractor shall be prepared to dewater excavations to maintain groundwater level near excavation at least 1 ft. below bottom of excavation. Additionally, prevent water from entering excavation from adjacent river (e.g. by cofferdams, plugging drain pipes for excavation within bridge, etc.)
 - b. Construction activity on a wet or frozen subgrade, including but not limited to excavation, compaction, and placement of geotextile, riprap, fill, sand, drain system components, formwork, reinforcing steel, concrete, or lightweight foam concrete, will not be permitted.
 - c. If dewatering is needed, prevent separation (loss) of fines from dewatered material, and prevent discharge of silty/turbid water to wetlands.
 - d. Temporary dewatering sumps shall be lined with geotextile. Upon completion of temporary dewatering, any and all crushed stone used in temporary dewatering sumps shall be removed and replaced with material selected by Engineer, or shall be grouted.
 - e. The Contractor shall place only crushed stone fill underwater, if deemed necessary in sole judgment of Engineer. Place no other fill on wet or disturbed subgrade.
53. Construct new pavement section per detail 2/S-1 over full extent of bridge length, and beyond bridge to limits shown on landscape drawings. At option of Owner, construct soil portion of pavement section using excavated soils or NHDOT 304.3 Crushed Gravel.

Testing:

54. Testing will be performed by Owner or their representative unless otherwise noted herein.
55. Contractor shall accommodate testing by Owner or their representative, and any additional testing Owner/Engineer deems necessary. Contractor's accommodation shall include, but shall not be limited to, providing clear and safe access to material and the work for Engineer to perform testing, allowing time for testing to be completed, etc.
56. If any portion of the work does not meet requirements of the contract documents, and testing is required for replacement work, the cost of such re-testing shall be borne by the Contractor.



Original Drawing Size = 22 x 34 in.

OWNER

PHILLIPS EXETER ACADEMY
Exeter, New Hampshire

CLIENT

PHILLIPS EXETER ACADEMY
Exeter, New Hampshire

By: NAO Date: 8/21/2020
 Checked By: JET Date: 8/21/2020
 Checked By: RSS Date: 8/21/2020
 Checked By: _____ Date: _____

Revisions:
 1. By: _____ Date: _____
 Checked By: _____ Date: _____
 2. By: _____ Date: _____
 Checked By: _____ Date: _____
 3. By: _____ Date: _____
 Checked By: _____ Date: _____

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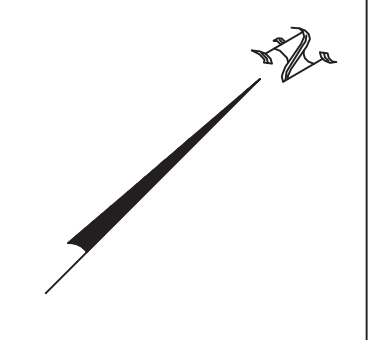
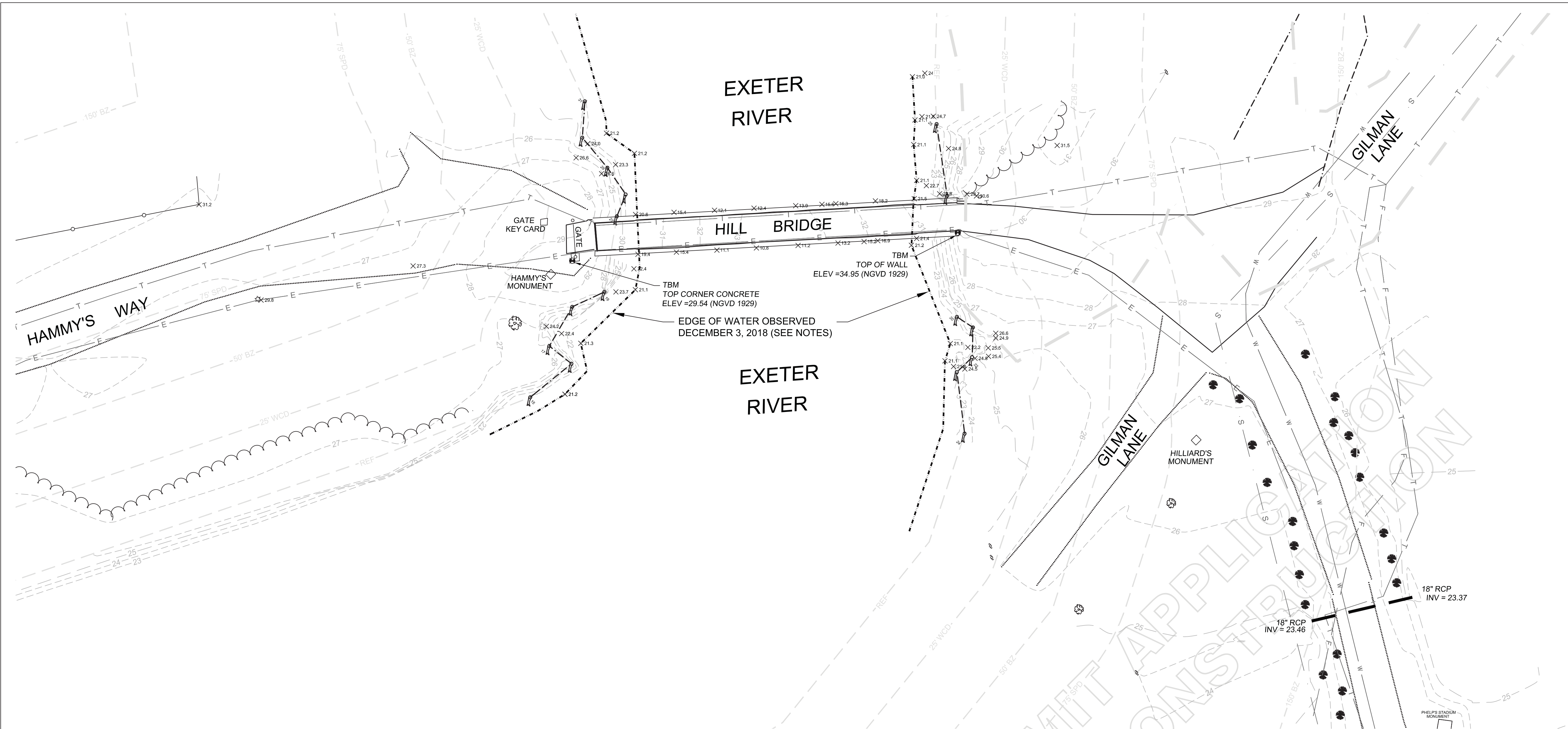


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 668 Main Street, Ste. 250, Wilmington, MA 01887
 Phone (978)988-2115; Fax (978)988-2117

Project:
 Number: 113-13-003
 Name: **Hill Bridge Restoration
Phillips Exeter Academy
Exeter, New Hampshire**
 Subject: **Cover and Notes**

Sheet No.: **G-1**

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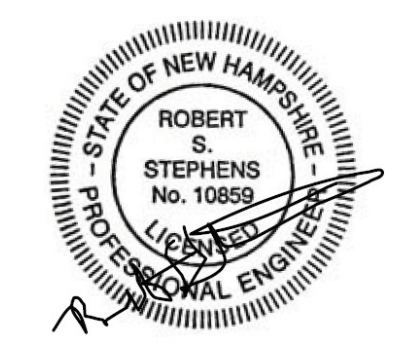
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OWNER
PHILLIPS EXETER ACADEMY
Exeter, New Hampshire

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Exeter, New Hampshire

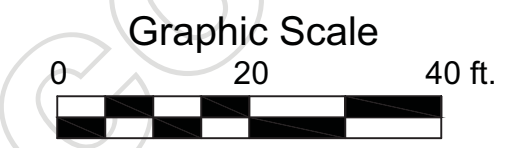
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1
G-2 **EXISTING CONDITIONS AND DELINEATED WETLANDS PLAN**
Scale: 1" = 20'



LEGEND:

- W — RECORD WATER
- S — RECORD SEWER
- E — RECORD ELECTRIC
- F — RECORD FIBER OPTIC
- T — RECORD TELEPHONE
- — EDGE OF ROAD - PAVED
- — EDGE OF ROAD - GRAVEL
- — CHAIN LINK FENCE
- — TREE LINE
- — EXISTING VEGETATION
- — DELINEATED WETLAND FLAG
- — EDGE OF WATER OBSERVED ON DECEMBER 3, 2018
- — DELINEATED WETLAND LINE
- — APPROXIMATE FEMA 100-YEAR FLOOD (SEE NOTES)
- — NHDES SHORELAND LINES (E.G. REFERENCE LINE, 50' BUFFER, 150' BUFFER, 250' BUFFER)
- — EXETER WETLAND CONSERVATION DISTRICT BOUNDARY (25' INLAND STREAMS BUFFER)
- — EXETER SHORELAND PROTECTION DISTRICT BOUNDARY (75' VEGETATIVE BUFFER, 150' SURFACE ALTERATION BUFFER, 300' EXETER RIVER BUFFER)

NOTES:

1. SA DID NOT PERFORM A SUBSURFACE SURVEY FOR UTILITIES. THE LOCATIONS OF UTILITIES SHOWN HEREIN ARE FROM THE MEI SURVEY. PRIOR TO COMMENCING WORK IN THIS AREA, CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PROTECT UTILITIES IN THE VICINITY OF THE WORK. AT MINIMUM, CONTRACTOR SHALL NOTIFY DIGSAFE, OTHER LOCATION UTILITY PROVIDERS (E.G. TOWN OF EXETER, PEA, ETC.) AND COMPLY WITH ALL APPLICABLE LAWS, RULES, CODES, AND STANDARDS.
2. BASE PLAN IS FROM AUTOCAD DRAWING WITH FILENAME "Hill Bridge 2013 MEI survey (emailed 11-5-18)," PREPARED BY MILLENNIUM ENGINEERING, INC. (MEI), UNDATED, BASED ON GROUND SURVEY PERFORMED BY MEI IN 2013 AND 2014, AND PROVIDED ELECTRONICALLY BY PEA ON NOVEMBER 5, 2018. DRAWING INDICATES THAT VERTICAL DATUM IS NGVD 1929.
3. WETLANDS DELINEATED BY GOVE ENVIRONMENTAL SERVICES, INC. (GESI) IN 2014 AND WETLAND FLAGS SURVEYED BY MEI AS PART OF THEIR GROUND SURVEY. GESI REINSPECTED THE WETLAND DELINEATION IN 2018 AND CONCLUDED THAT THE 2014 WETLANDS DELINEATION IS ACCURATE (REFER TO GESI LETTER, DATED SEPTEMBER 20, 2018).
4. SA ADDED THE FOLLOWING INFORMATION TO BASE PLAN:
 - a. LIMITED ELEVATION SURVEY OF TOPOGRAPHY ALONG EXETER RIVER BANKS AND EDGE OF WATER PERFORMED BY SA USING ENGINEER'S LEVEL ON NOVEMBER 30, 2018 (LEFT BANK) AND DECEMBER 3, 2018 (RIGHT BANK). SA SKETCHED LOCATION OF THESE SURVEY POINTS ON THIS DRAWING USING ANGLE AND STADIA, VISUAL CORRELATION WITH EXISTING SITE FEATURES, AND ENGINEERING JUDGEMENT.

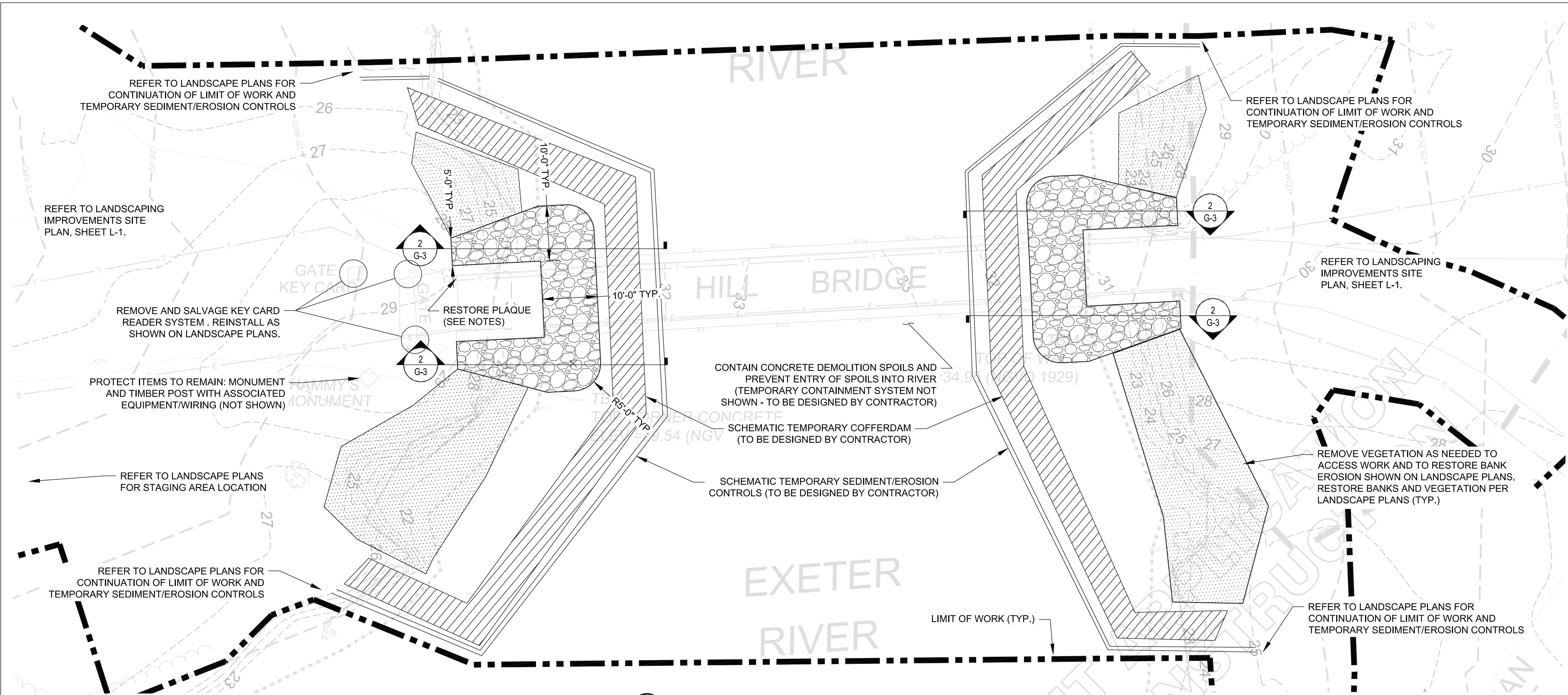
- b. LIMITED ELEVATION MEASUREMENT OF RIVER BATHYMETRY AT UPSTREAM AND DOWNSTREAM FACES OF BRIDGE BY SA ON APRIL 24, 2018. SA SKETCHED LOCATIONS OF THESE MEASUREMENTS USING TAPE MEASUREMENTS ALONG BRIDGE.
- c. APPROXIMATE 100-YEAR FLOOD IS FROM FEMA LOMR 18-01-0144P-330130, EFFECTIVE NOVEMBER 5, 2018, FOR EXETER, NH. SA ALIGNED REVISED MAP PANEL WITH SITE SURVEY BY VISUAL CORRELATION WITH SITE FEATURES AND SKETCHED LOCATION OF 100-YEAR FLOOD ON THIS DRAWING.

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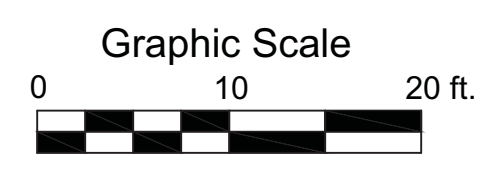
Project:
 Number: 113-13-003
 Name: **Hill Bridge Restoration
Phillips Exeter Academy
Exeter, New Hampshire**
 Subject: **Existing Conditions and
Delineated Wetlands Plan**
 Sheet No.:

G-2

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1 SITE PLAN
Scale: 1" = 10'

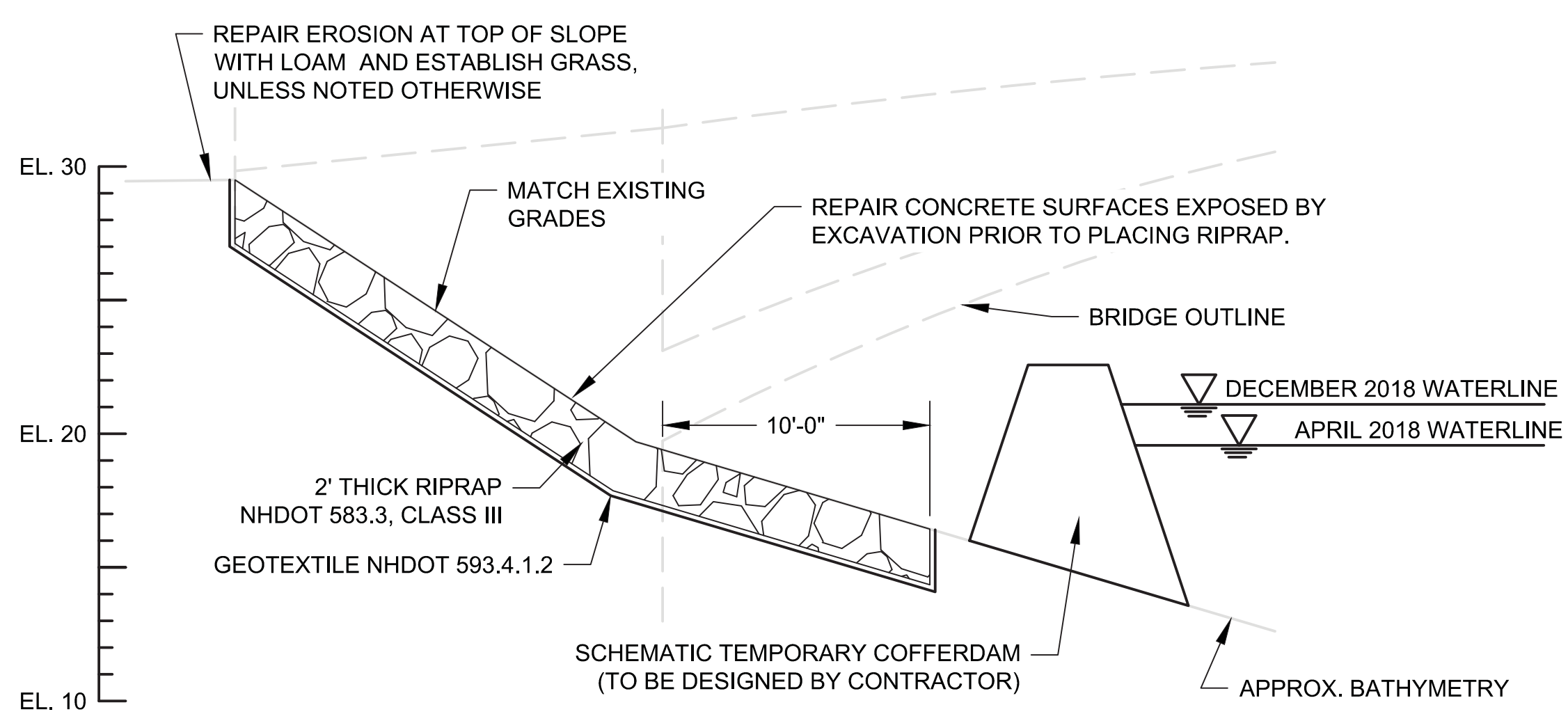


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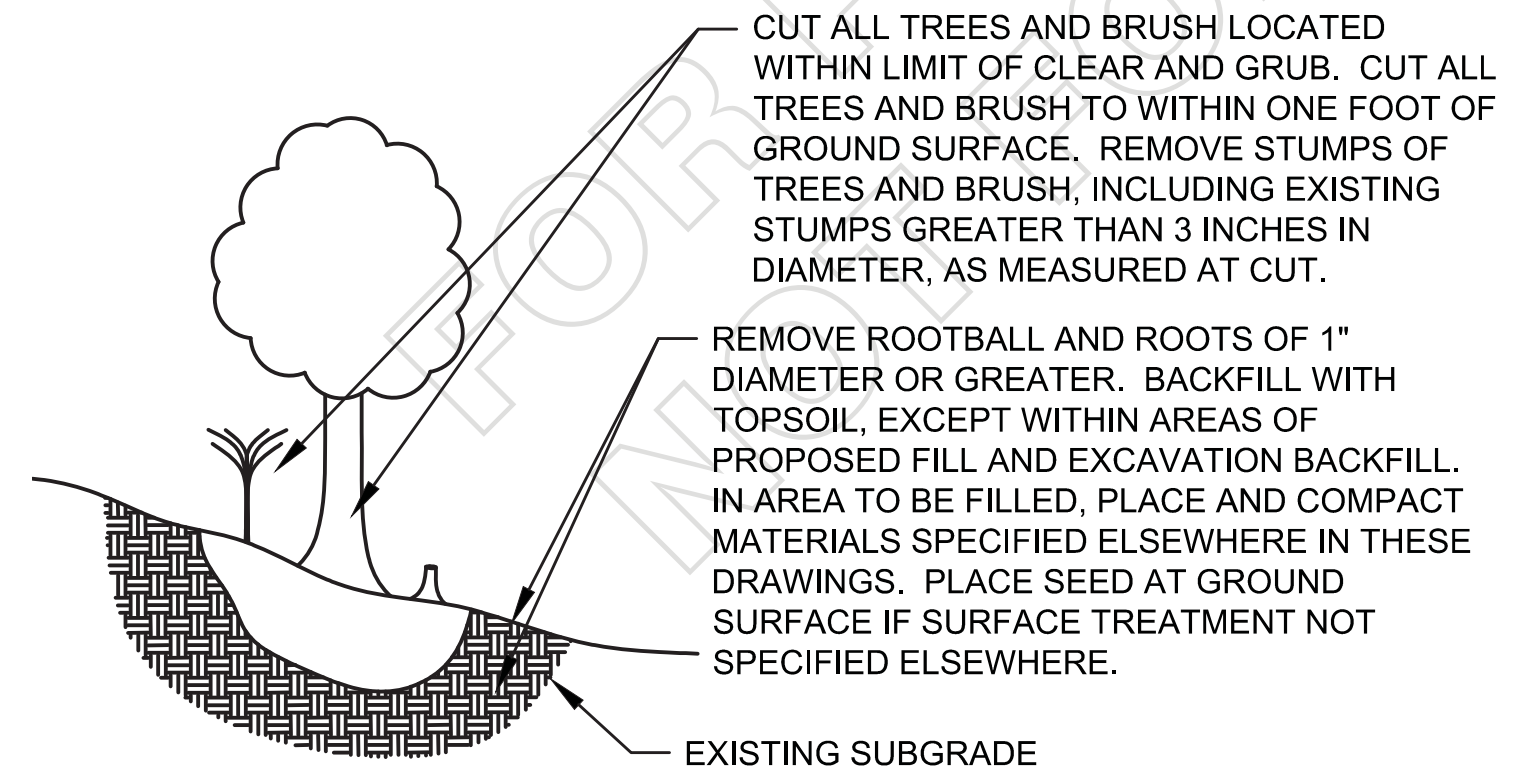
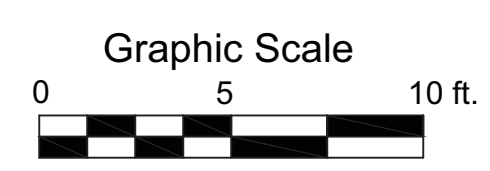
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- --- APPROXIMATE FEMA 100-YEAR FLOOD (SEE NOTES)
- 50' BZ --- NHDES SHORELAND LINES (E.G. REFERENCE LINE, 50' BUFFER, 150' BUFFER, 250' BUFFER)
- 25' WCD --- EXETER WETLAND CONSERVATION DISTRICT BOUNDARY (25' INLAND STREAMS BUFFER)
- 75' SPD --- EXETER SHORELAND PROTECTION DISTRICT BOUNDARY (75' VEGETATIVE BUFFER, 150' SURFACE ALTERATION BUFFER, 300' EXETER RIVER BUFFER)

NOTES:

1. REFER TO SHEET G-1 FOR DESIGN AND CONSTRUCTION NOTES AND SHEET G-4 FOR SITE NOTES AND DETAILS.
2. SITE PLAN SHOWS WORK IN RIVER CHANNEL BENEATH BRIDGE. WORK ON BRIDGE SHOWN ELSEWHERE.



2 BRIDGE EROSION RESISTANCE IMPROVEMENTS SECTION
Scale: 1" = 5'



3 TYPICAL VEGETATION REMOVAL
Not to Scale

Original Drawing Size = 22 x 34 in.

OWNER
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Exeter, New Hampshire

CLIENT
PHILLIPS EXETER ACADEMY
Exeter, New Hampshire

By: NAO Date: 8/21/2020
Checked By: JET Date: 8/21/2020
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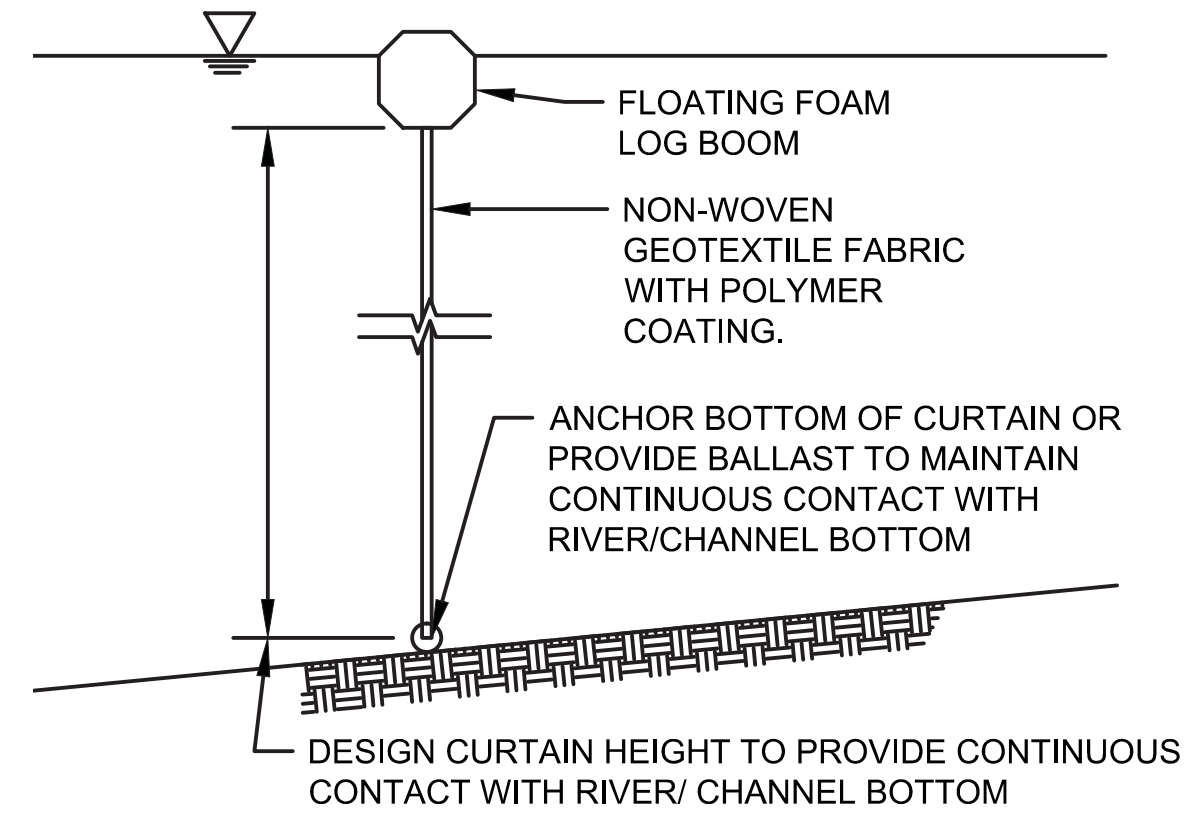
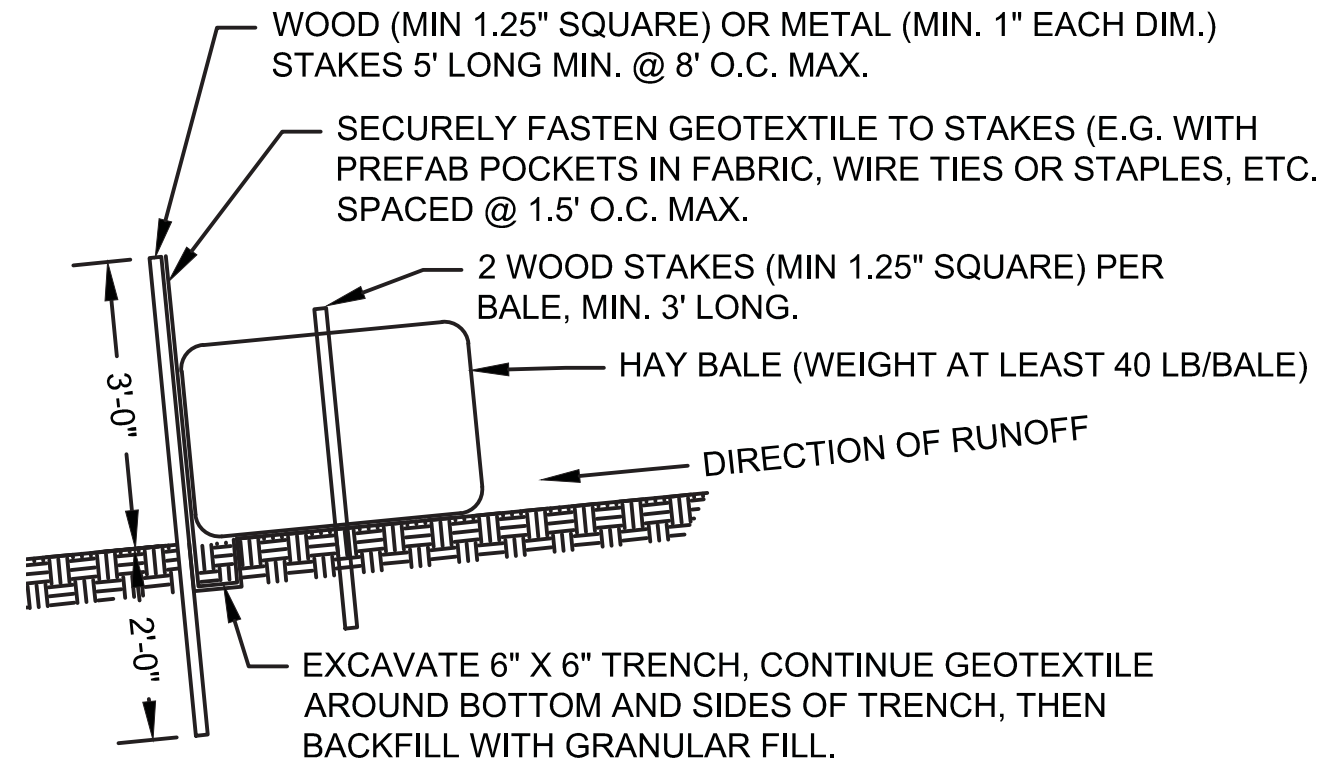
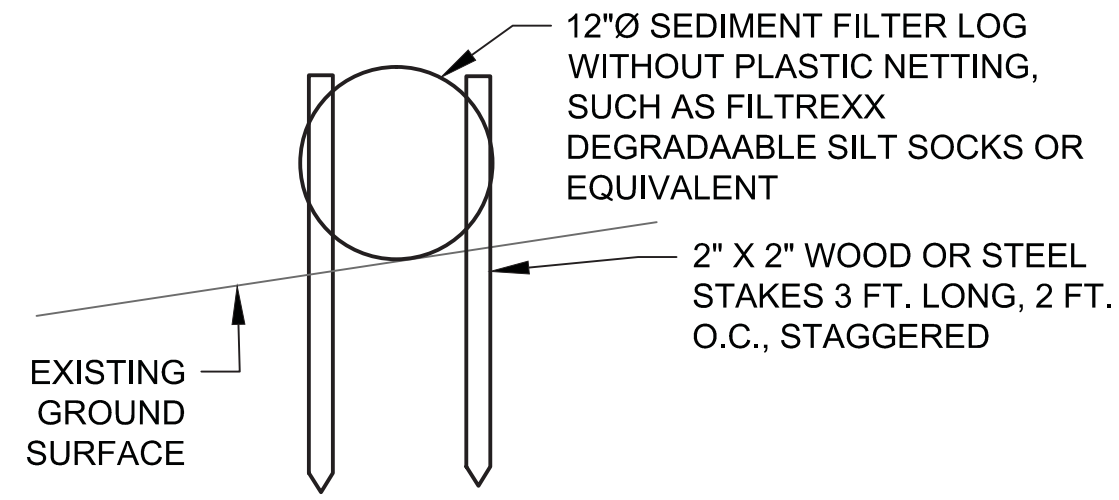
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Phone (978)988-2115; Fax (978)988-2117

Project Number: 113-13-003
Name: **Hill Bridge Restoration
Phillips Exeter Academy
Exeter, New Hampshire**
Subject: **Site Plan and Details**

Sheet No.: **G-3**

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1
G-4 **SEDIMENT FILTER LOG**
Not to Scale

2
G-4 **HAY BALE BARRIER**
Not to Scale

3
G-4 **TURBIDITY CURTAIN**
Not to Scale

NOTES:

1. Refer to Sheet G-1 for design and construction notes.

WATER MANAGEMENT AND EROSION AND SEDIMENT CONTROL:

2. Comply with all requirements of the permits obtained by the Owner (e.g. NHDES Wetland and Shoreland Permits, etc.). Where these permits require submittal to the respective agency, submit required information to Engineer at least two weeks prior to the date required by agency for Engineer to submit to the agency. Where these permits require notification of the respective agency, notify Engineer of the required information at least one week prior to notification deadline specified in the permit.
3. Maintain a copy of Drawings, Specifications, all Permits, and SWPPP, Flood Control Plan, and Water Control Plan, including amendments, on-site at all times. Provide same to each subcontractor and ensure each subcontractor is familiar with permit requirements.

CONSTRUCTION PERIOD POLLUTION PREVENTION AND EROSION AND SEDIMENT CONTROL PLAN (CPPP ESCP):

4. Prepare and submit an Erosion and Sediment Control and Stormwater Pollution Prevention Plan (referred to herein as SWPPP), at least three weeks before start of dewatering and any land-disturbing activity. Contractor shall allow time for Owner and regulatory authorities to review SWPPP. No additional compensation will be made for time, effort, or expense incurred by Contractor during review, revision, and approval. Owner and regulators will review SWPPP. Contractor shall revise and resubmit SWPPP as required by Owner. Owner will submit completed SWPPP to regulatory agencies in accordance with permit requirements. No work shall commence prior to approval of the SWPPP by the regulatory agencies.
5. The SWPPP shall conform to the following standards and references:
 - a. NHDOT Standard 645
 - b. New Hampshire Department of Environmental Services (NHDES) New Hampshire Stormwater Manual
 - c. Contract Specifications
6. The CPPP ESCP shall further include the following information:
 - a. Controls to protect quality (e.g. turbidity, etc.) of Exeter River.
 - b. A Spill Response and Refueling Plan in accordance with NHDES and EPA guidelines
 - c. Design of containment system to retain water, spoils and debris from all concrete demolition, surface preparation, and new concrete work, and to prevent discharge of such to the surrounding environment.

WATER AND FLOOD MANAGEMENT

7. Dewatering is required inside temporary cofferdams to repair concrete and construct the riprap, and for any and all other construction that should or normally would be performed in the dry, in sole judgment of Engineer. Dewatering of excavations is necessary to repair concrete and construct riprap, etc.
8. Control water at all times throughout construction, including delays, so as not to inundate the work.
9. Within excavations, maintain groundwater at least 1 foot below excavation bottom of the work at all times.
10. Contractor shall be solely responsible for water control during construction. Design, provide, install, maintain, and remove all temporary water control measures necessary for construction. Submit procedures for water control during normal and flood conditions.
11. Cofferdams and other water diversion may consist of sandbags, jersey barriers, or other non-erodible barriers, and shall not consist of erodible fill. Remove and properly dispose of all cofferdams at the end of construction.
12. The Contractor shall fulfill the requirements of their insurance with respect to all aspects of construction, including flooding.
13. Contractor may use commonly accepted means of water management and construction sequence, pending successful review by Engineer of Contractor's SWPPP and other related submittals.
14. Monitor local weather daily (using weather.gov hourly weather forecast graph for the Project Site. <https://forecast.weather.gov/MapClick.php?lat=42.9803&lon=-70.9476&unit=0&lg=english&FcstType=graphical> and monitor Exeter River streamflow at USGS Gage "Exeter River a Haigh Road, near Brentwood, NH daily (using <https://waterdata.usgs.gov/nwis>

/uv01073587).

15. Commence no construction of temporary water controls until Engineer has reviewed all applicable submittals and taken no exception.
16. Maintain downstream flow during construction.
17. Contractor shall remove all temporary water controls before demobilizing from Site. Cofferdam removal shall not commence without express written consent of Engineer. At minimum, construction shall be completed at the structure dewatered by the cofferdam, the concrete curing and finishing procedures shall be complete, and concrete shall have attained 80% of its design strength as demonstrated by laboratory test results. Removal of cofferdam is at Contractor's sole risk. Reinstallation of water controls and any other temporary construction necessary to fix or replace work failing to meet requirements of the contract documents shall be at the Contractor's sole expense.
18. Submit temporary water control plan detailing water management means and methods for cofferdams, dewatering, and handling of water in Exeter River during construction in normal and flood conditions. Plan shall include detailed design (e.g. dimensions, elevations, etc.) of cofferdams, and design water levels as well as detailed plans for removal of temporary water controls.
19. Submit flood contingency plan. Flood contingency plan shall detail Contractor's monitoring of forecasts, procedures to be taken in advance of floods, Contractor's monitoring and procedures during floods, and methods to prevent damage to the Work.

SEDIMENT AND EROSION CONTROL AND POLLUTION PREVENTION

20. Design temporary erosion/siltation control in conjunction with and consideration of water control. Locations of temporary erosion controls shown are schematic.
21. Temporary erosion controls shall be located between the work and edges of adjacent water bodies in accordance with local, state, and federal regulations.
22. Prior to performing any land-disturbing activity, furnish and install temporary erosion and sedimentation controls in accordance with Design Drawings, permit requirements, and SWPPP, and any additional requirements imposed by regulators. Inspect and maintain sediment and erosion controls during construction. Remove sediment and erosion controls at end of construction after grass and landscaping are established for all disturbed ground.
23. Work may take place only with sediment and erosion controls in place, and only in-the-dry. If any in-water work is necessary in sole judgment of Engineer, turbidity curtains shall be in place around any and all areas of in-water work.
24. Protect all discharge points of temporary water controls (e.g. pump/siphon pipes, etc.) from erosion.
25. Prevent tracking or flowing of sediment onto public rights of way. Clean public rights of way of soil daily.
26. Per NH Department of Fish and Game requirements, sediment and erosion controls shall not have plastic netting.
27. Inspect construction equipment daily for leaking fuel, oil, and hydraulic fluid. Repair faulty equipment outside of wetland/surface waters. Maintain oil spill kits on-site and readily accessible at all times during construction.
28. Refuel construction equipment only outside of surface waters and wetlands.

VEGETATION REMOVAL:

29. Within limits shown on this drawing, clear and grub per NHDOT 201 as needed to access the Work and restore bank erosion, including all trees, shrubs, vines, ivy, poison ivy, and other vegetation, including stumps and roots of trees and shrubs larger than 3 in. diameter.
30. Do not remove any trees larger than 3 in. diameter other than those included in vegetation removal limits shown herein without express written permission from Owner.

GENERAL DEMOLITION:

31. Protect and do not disturb all existing structures and site features to remain. Repair/ restore any and all damage/disturbance to existing structures to remain that occurs during construction, or is caused by Contractor, at Contractor's sole expense.

CONCRETE DEMOLITION

32. Prior to start of concrete demolition, install and maintain a containment system to retain water, spoils, and debris from all concrete demolition, surface preparation, and new concrete work, and to prevent discharge of such to the surrounding environment.

PLAQUE RESTORATION:

33. Clean and restore existing bridge plaque to lasting, healthy luster in sole judgment of Owner, and apply lasting, protective finish. Submit means and methods to restore plaque (see submittal notes, Sheet G-1).

UTILITY CONDUITS:

34. Existing buried utility conduits extend across bridge on either side of roadway, as shown on Existing Conditions and Delineated Wetlands Plan (Sheet G-2). Conduit depths unknown. Protect existing fiber optic line and/or temporarily relocate line so that it remains operational during construction.
35. Coordinate with Phillips Exeter Academy (PEA) regarding utilities at least 2 weeks before excavation. If needed, PEA will contract with their data cabling vendor to pull wires from the existing buried conduits and secure them on Site, for reinstallation after excavation work is complete.
36. If needed, remove existing conduits within limits of excavation of existing bridge fill. Cut existing conduits near ends of excavation to provide clean, square pipe end for connection to new pull boxes. Do not damage existing conduits or appurtenances (e.g. pull boxes, etc.) outside limits of excavation.
37. Install four new 4-in. diameter PVC pipe conduits (two on each side of roadway) across bridge per NHDOT 614 and instructions of PEA. Match elevation of existing conduits at each end of bridge and provide smooth, linear transition between ends. Install 2 new reinforced-concrete, hand-holes (aka Pull boxes) at each end of the bridge (4 total boxes). Pull boxes shall meet NHDOT Section 614.2.5, including AASHTO H-20 load-rating, and shall be rectangular, with 12" x 18" nominal plan dimensions and 12" nominal depth. Connect existing and new conduits to the new pull boxes.
38. Backfill conduits and pull boxes per NHDOT 614 using fill materials specified herein.

GROUND SURFACE FINISH:

39. Refer to landscape plan for ground surface finishes.

BRIDGE EROSION RESISTANCE IMPROVEMENTS (AKA RIPRAP):

40. Construct temporary cofferdam/water diversion, dewater, and excavate for new riprap. Refer to temporary cofferdam/water diversion, dewatering notes on this sheet, and excavation and subgrade preparation notes on Sheet G-1.
41. Install geotextile per NHDOT 593 over properly prepared subgrade.
42. Install riprap over geotextile per NHDOT 583.
43. Materials:
 - a. Geotextile: NHDOT 593.4.1.3 (Woven monofilament fabric for permanent erosion control, strength class 1), such as Tencate Miraf FW404 or equivalent.
 - b. Riprap: NHDOT 583.3, Class III (nominal 12 to 24 in. diameter).



NOTES:

1. NH DEPARTMENT OF FISH AND GAME (NHFG) HAS IDENTIFIED THE STATE-ENDANGERED BLANDING'S TURTLE IN THE PROJECT VICINITY.
2. AS REQUIRED BY NH DEPARTMENT OF FISH AND GAME FOR THIS PROJECT:
 - 2.1. IN ORDER TO AVOID IMPACTS TO TURTLE AND SNAKE SPECIES, AVOID THE USE OF WELDED PLASTIC (E.G. POLYPROPYLENE) OR 'BIODEGRADABLE PLASTIC' NETTING OR THREAD IN EROSION CONTROL MATTING. INSTEAD, USE EROSION CONTROL BERM, WHITE FILTREXX DEGRADABLE WOVEN SILT SOCK, OR A 'WILDLIFE FRIENDLY' OPTION SUCH AS WOVEN ORGANIC MATERIAL (E.G. COCO OR JUTE MATTING SUCH AS NORTH AMERICAN GREEN SC150BN OR EQUIVALENT). INFORM NHFG WHICH OPTION CONTRACTOR INTENDS TO USE.
 - 2.2. CONTRACTOR SHALL TRAIN ITS PERSONNEL AND PERSONNEL OF SUBCONTRACTORS IN IDENTIFICATION OF BLANDING'S TURTLE AND ITS PROTECTED STATUS, ESPECIALLY DURING TURTLE MATING SEASON WHICH EXTENDS FROM LATE MAY THROUGH THE BEGINNING OF JULY.
 - 2.3. AS DESCRIBED BY NHFG, BLANDINGS TURTLES CAN BE IDENTIFIED BY:
 - 2.3.1. LARGE, DARK/BLACK DOMED SHELL WITH LIGHTER SPECKLES.
 - 2.3.2. DISTINCT YELLOW THROAT/CHIN.
 - 2.3.3. AQUATIC BUT OFTEN MOVES ON LAND.
 - 2.4. IF SPOTTED OR BLANDING'S TURTLES ARE FOUND LAYING EGGS IN THE WORK AREA, PLEASE CONTACT MELISSA DOPERALSKI AT 271-1738 OR JOSH MEGYESY AT 271-1125 FOR FURTHER INSTRUCTIONS. DO NOT DISTURB THE TURTLES, EGGS, ETC.
 - 2.5. DO NOT USE CHEMICAL FERTILIZER OR PESTICIDES (INCLUDING HERBICIDE) IN THE RIPARIAN ZONE. IF FERTILIZER USE IS PLANNED, USE NON-CHEMICAL FERTILIZERS SUCH AS NORTH COUNTRY ORGANICS PRO-GRO 5-3-4, A GENERAL-PURPOSE, SLOW RELEASE NATURAL FERTILIZER.

4
G-4 **TURTLE PROTECTION**
FROM NH DEPARTMENT OF FISH & GAME

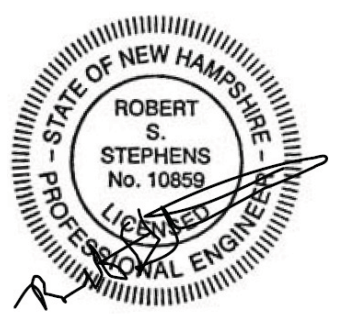
Original Drawing Size = 22 x 34 in.

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PHILLIPS EXETER ACADEMY
Exeter, New Hampshire

CLIENT
PHILLIPS EXETER ACADEMY
Exeter, New Hampshire

By: NAO Date: 8/21/2020
Checked By: JET Date: 8/21/2020
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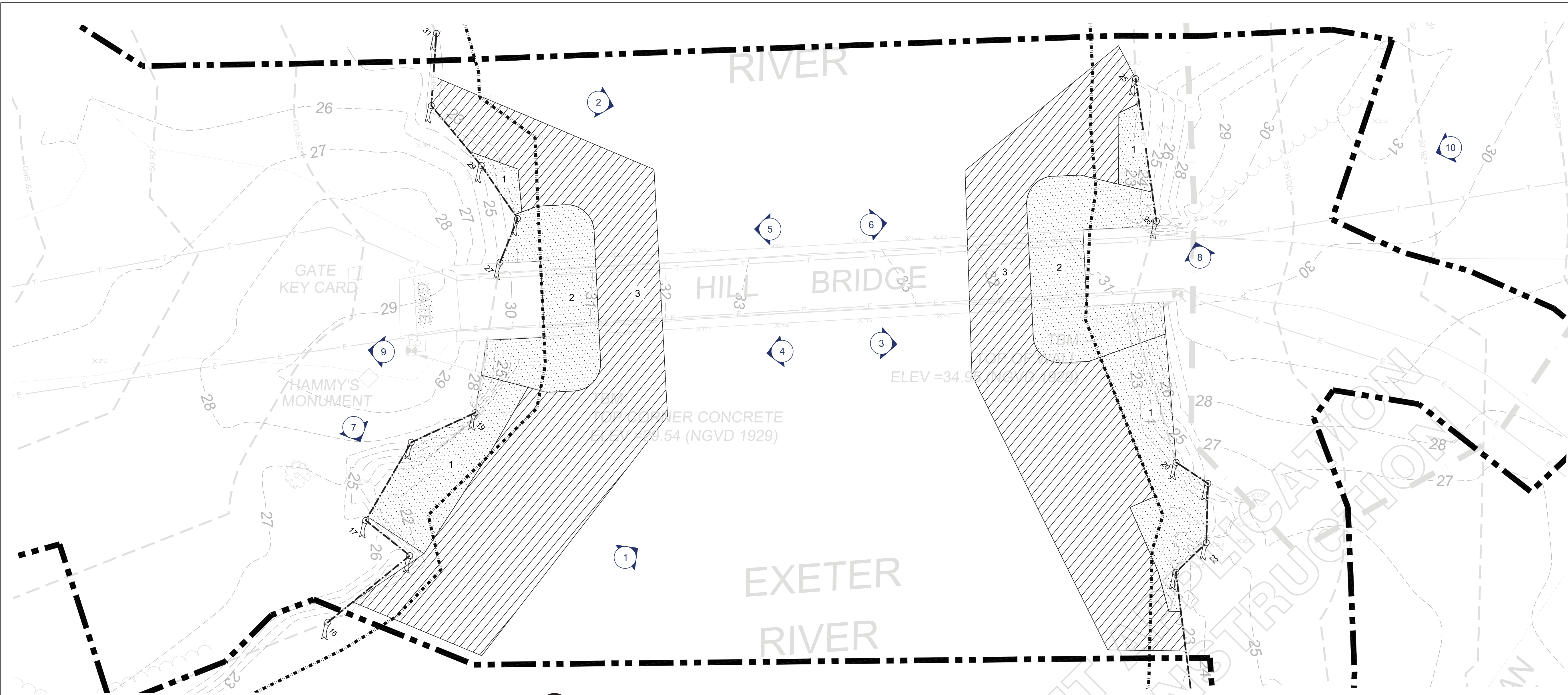
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Project:
Number: 113-13-003
Name: **Hill Bridge Restoration
Phillips Exeter Academy
Exeter, New Hampshire**
Subject: **Site Notes and Details**

Sheet No.: **G-4**

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1
G-5 NHDES WETLAND IMPACT PLAN
Scale: 1" = 10'

Graphic Scale
0 10 20 ft.

LEGEND:

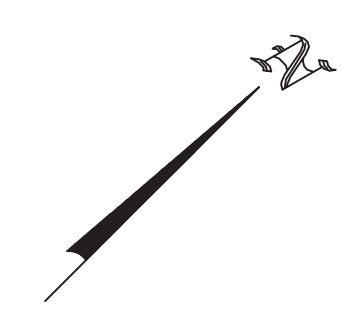
- PERMANENT NHDES WETLAND IMPACT
- TEMPORARY NHDES WETLAND IMPACT
- DELINEATED WETLAND LINE
- EDGE OF WATER OBSERVED ON DECEMBER 3, 2019, SIMILAR TO NORMAL HIGH WATER LINE AND NORMAL POOL. SEE NOTES SHEET G-2)
- FEMA 100-YEAR FLOOD. SEE NOTES SHEET G-2.
- LIMIT OF WORK
- NHDES WETLAND PERMIT APPLICATION PHOTOGRAPH LOCATION, NUMBER, AND DIRECTION
- NHDES SHORELAND LINES (E.G. REFERENCE LINE, 50' BUFFER, 150' BUFFER, 250' BUFFER)
- EXETER WETLAND CONSERVATION DISTRICT BOUNDARY (25' INLAND STREAMS BUFFER)
- EXETER SHORELAND PROTECTION DISTRICT BOUNDARY (75' VEGETATIVE BUFFER, 150' SURFACE ALTERATION BUFFER, 300' EXETER RIVER BUFFER)

SUMMARY OF IMPACTS/CONSTRUCTION ACTIVITIES IN DELINEATED WETLANDS:

AREA NO., DESCRIPTION OF IMPACT AND ACTIVITIES	POTENTIAL GENERAL EQUIPMENT	AREA OF IMPACT, FT ²		LENGTH OF IMPACT, FT.		
		BANK	CHANNEL	L. BANK	R. BANK	CHANNEL
PERMANENT WETLAND IMPACTS		TOTALS: 1,160 750		TOTALS: 80 95 85		
1. REMOVE VEGETATION AS NEEDED FOR RIVER ACCESS; PLACE FILL TO RESTORE BANK EROSION AND/OR STABILIZE BANKS; RESTORE VEGETATION.	EXCAVATOR, SKID-STEER LOADER	830	60	46	51	51
2. CLEAR VEGETATION, EXCAVATE AND PLACE RIPRAP FOR EROSION RESISTANCE	EXCAVATOR, SKID-STEER LOADER	330	690	34	34	34
TEMPORARY WETLAND IMPACTS:		TOTALS: 490 3,340		TOTALS: 110 110 110		
3. TEMPORARY COFFERDAM AND SEDIMENT/EROSION CONTROLS, TEMPORARY ACCESS TO CONSTRUCT REPAIRS	EXCAVATOR, COFFERDAM, TEMPORARY WORK PLATFORM	490	3,340	110	110	110

NOTES:

1. REFER TO DESIGN DRAWINGS FOR MORE INFORMATION, INCLUDING GENERAL DRAWINGS, STRUCTURAL DRAWINGS, AND LANDSCAPE DRAWINGS. REFER TO SHEET G-1 FOR TABLE OF CONTENTS.
2. PURPOSE OF SHEET IS TO SHOW POTENTIAL NHDES WETLAND IMPACTS, DESCRIPTION OF ACTIVITIES, AND POTENTIAL EQUIPMENT TO BE USED. CONTRACTOR IS RESPONSIBLE FOR MEANS AND METHODS OF CONSTRUCTION.
3. THE PROJECT AREA DOES NOT INCLUDE PRIME WETLANDS PER RSA 482-A:15.



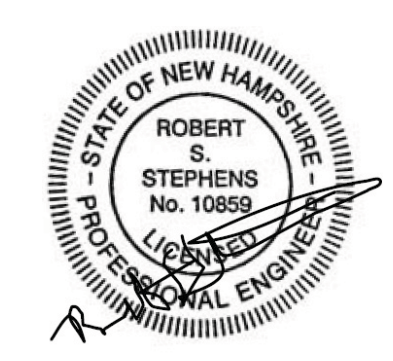
Original Drawing Size = 22 x 34 in.

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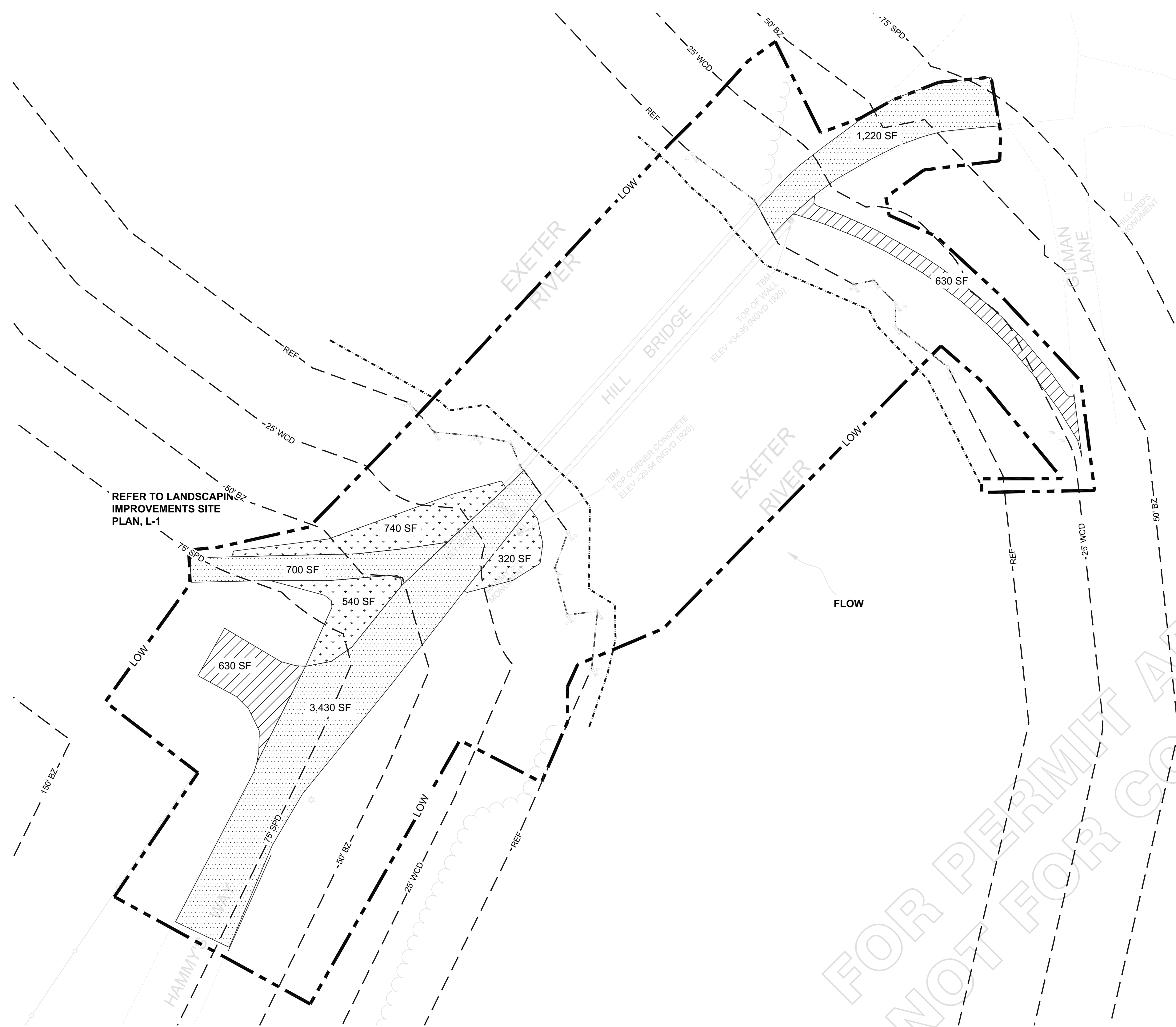
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Project:
Number: 113-13-003
Name: **Hill Bridge Restoration
Phillips Exeter Academy
Exeter, New Hampshire**
Subject: **NHDES Wetland Impacts**

Sheet No.: **G-5**

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1 NHDES SHORELAND PLAN WITHIN LIMIT OF WORK
 G-5 Scale: 1" = 20'

LEGEND:

- LIMIT OF WORK
- EDGE OF WATER OBSERVED ON DECEMBER 3, 2018
- REF SHORELAND REFERENCE LINE
- 50' BZ 50' WATERFRONT BUFFER
- 150' BZ 150' NATURAL WOODLAND BUFFER
- 250' BZ 250' PROTECTED SHORELAND
- 25' WCD EXETER WETLAND CONSERVATION DISTRICT BOUNDARY (25' INLAND STREAMS BUFFER)
- 75' SPD EXETER SHORELAND PROTECTION DISTRICT BOUNDARY (75' VEGETATIVE BUFFER, 150' SURFACE ALTERATION BUFFER, 300' EXETER RIVER BUFFER)
- PRE-CONSTRUCTION IMPERVIOUS SURFACE TO REMAIN
- NEW POST-CONSTRUCTION IMPERVIOUS SURFACE
- PRE-CONSTRUCTION IMPERVIOUS SURFACE TO BE REMOVED

NOTES:

1. REFER TO DESIGN DRAWINGS FOR MORE INFORMATION, INCLUDING GENERAL DRAWINGS, STRUCTURAL DRAWINGS, AND LANDSCAPE DRAWINGS. REFER TO SHEET G-1 FOR TABLE OF CONTENTS.
2. PURPOSE OF DRAWING IS TO SHOW PRE- AND POST-CONSTRUCTION IMPERVIOUS SURFACES RELATIVE TO NHDES SHORELAND LINES WITHIN LIMIT OF WORK.
3. REFER TO SHEET G-7 FOR PRE- AND POST-CONSTRUCTION IMPERVIOUS SURFACES AND AREAS TO REMAIN AS NATURAL WOODLAND RELATIVE TO NHDES SHORELAND LINES, OUTSIDE OF LIMITS OF WORK AND WITHIN PROPERTY LINES.



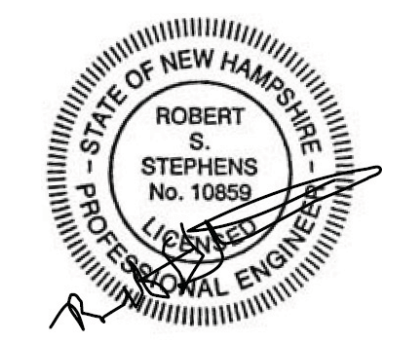
Approximate Scale
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 Original Drawing Size = 22 x 34 in.

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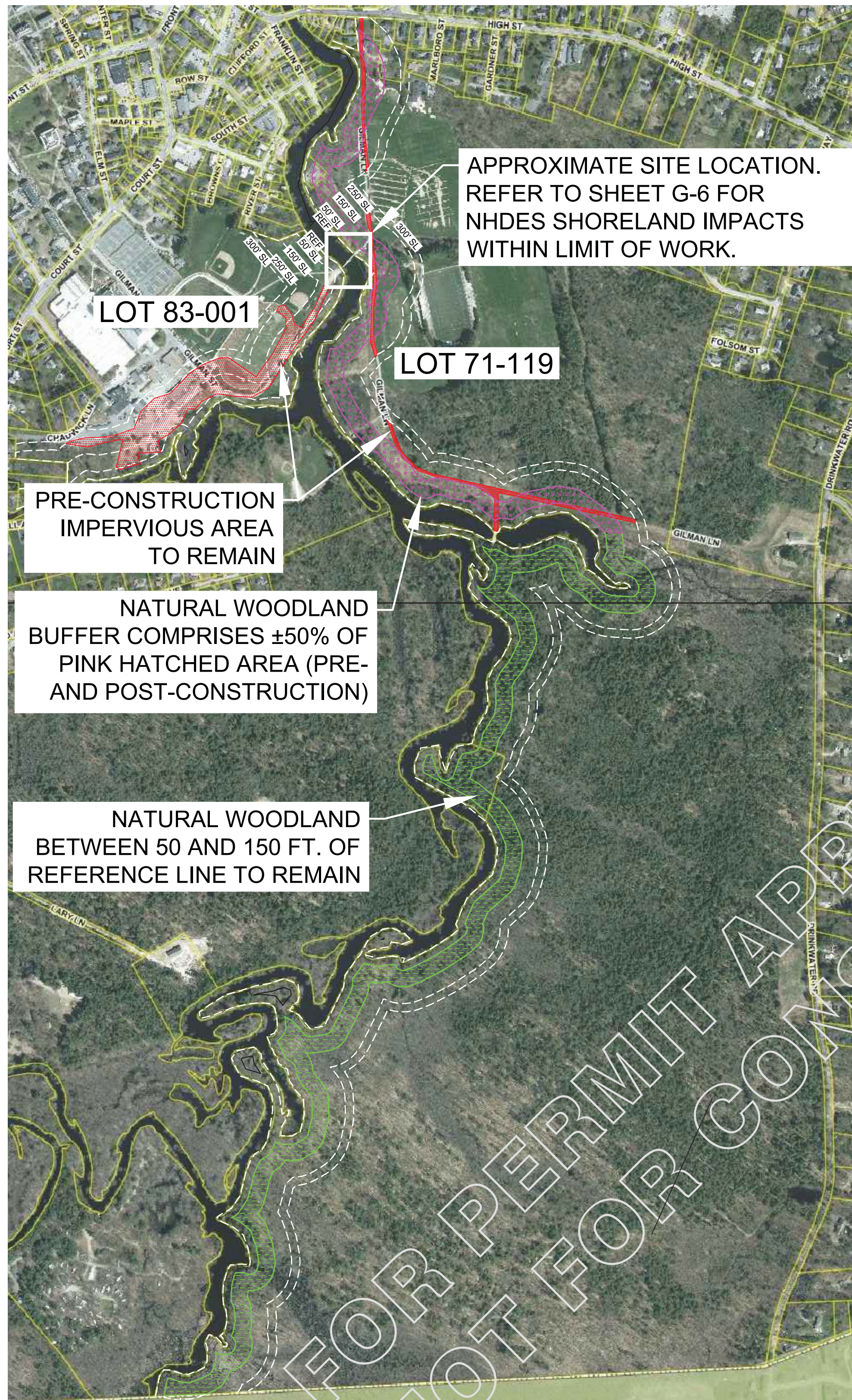
Project:
 Number: 113-13-003
 Name: **Hill Bridge Restoration
 Phillips Exeter Academy
 Exeter, New Hampshire**
 Subject: **NHDES Shoreland Plan
 Within Limit of Work**
 Sheet No.:

G-6

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1 PROPERTY LIMITS
Scale: 1" = 500'



2 NHDES SHORELAND PLAN OUTSIDE LIMIT OF WORK
Scale: 1" = 500'

LEGEND:

- REF - - - - - SHORELAND REFERENCE LINE
- 50' BZ - - - - - 50' WATERFRONT BUFFER
- 150' BZ - - - - - 150' NATURAL WOODLAND BUFFER
- 250' BZ - - - - - 250' PROJECTED SHORELAND.
- 300' BZ - - - - - 300' EXETER SHORELAND PROTECTION DISTRICT BOUNDARY
- PRE-CONSTRUCTION IMPERVIOUS SURFACE TO REMAIN
- PRE-CONSTRUCTION NATURAL WOODLAND BUFFER TO REMAIN
- NATURAL WOODLAND BUFFER COMPRISES ±50% OF PINK HATCHED AREA (PRE- AND POST-CONSTRUCTION)

NOTES:

1. REFER TO DESIGN DRAWINGS FOR MORE INFORMATION, INCLUDING GENERAL DRAWINGS, STRUCTURAL DRAWINGS, AND LANDSCAPE DRAWINGS. REFER TO SHEET G-1 FOR TABLE OF CONTENTS.
2. PURPOSE OF DRAWING IS TO SHOW PRE- AND POST-CONSTRUCTION IMPERVIOUS SURFACES AND AREAS TO REMAIN AS NATURAL WOODLAND RELATIVE TO NHDES SHORELAND LINES, OUTSIDE OF LIMITS OF WORK AND WITHIN PROPERTY LINES.
3. REFER TO SHEET G-6 FOR PRE- AND POST-CONSTRUCTION IMPERVIOUS SURFACES RELATIVE TO NHDES SHORELAND LINES WITHIN LIMIT OF WORK.
4. AERIAL PHOTOGRAPHS WITH PROPERTY BOUNDARIES DOWNLOADED FROM TOWN OF EXETER GIS WEBSITE, [HTTPS://WWW.MAPSONLINE.NET/EXETERNH](https://www.mapsonline.net/exeternh), ON APRIL 30, 2019.



Approximate Scale



Original Drawing Size = 22 x 34 in.

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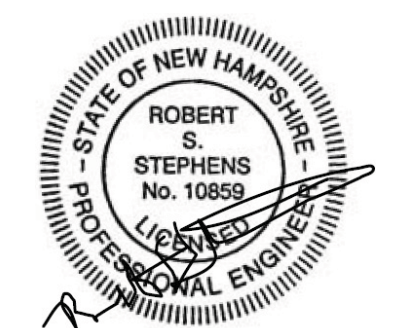
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1. By: Date:
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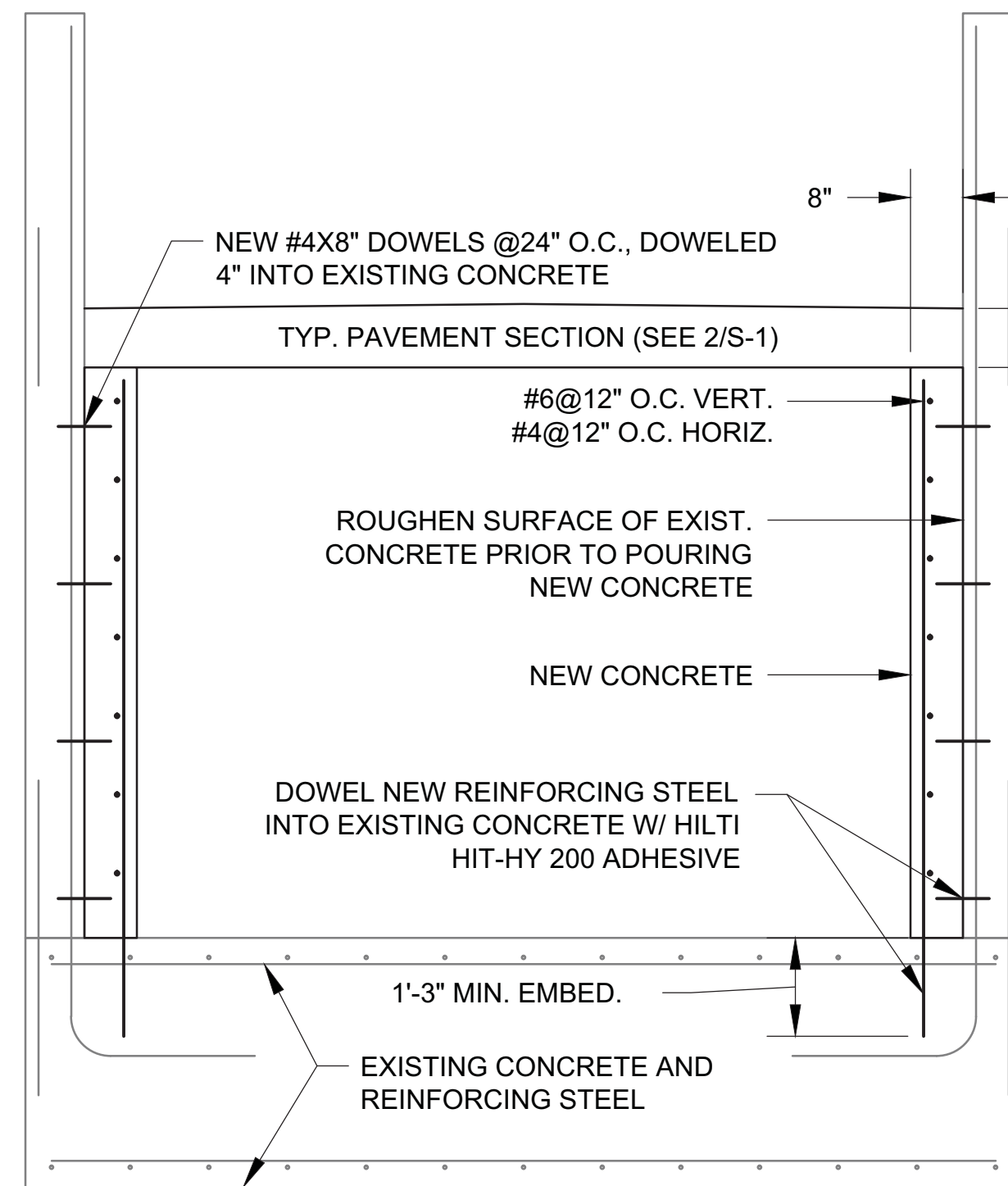
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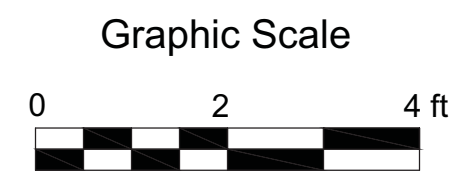
Project:
Number: 113-13-003
Name: **Hill Bridge Restoration
Phillips Exeter Academy
Exeter, New Hampshire**
Subject: **NHDES Shoreland Plan
Outside Limit of Work**
Sheet No.:

G-7

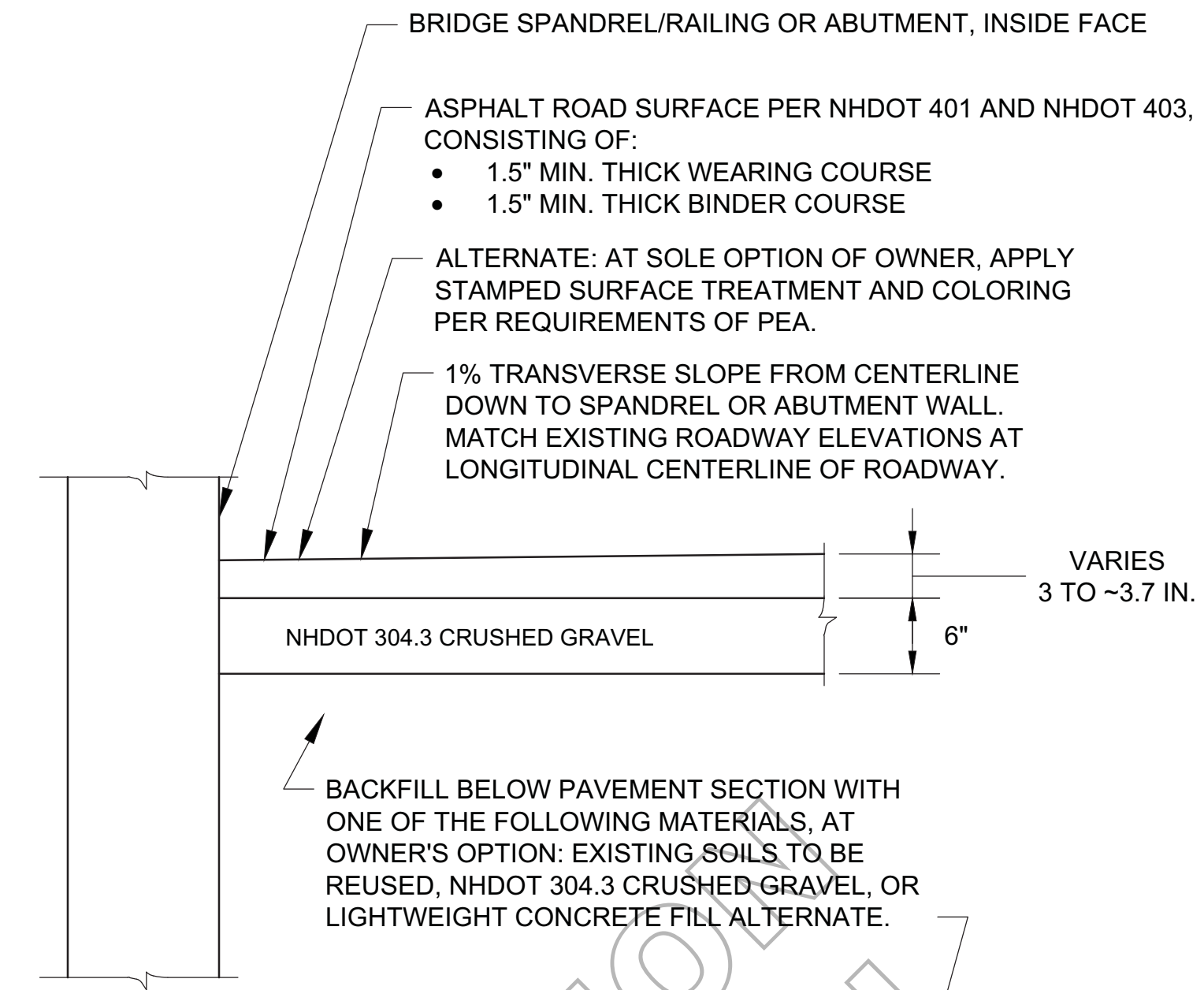
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1
S-1 TYP SPANDREL WALL STRENGTHENING
Scale : 1/2" = 1'

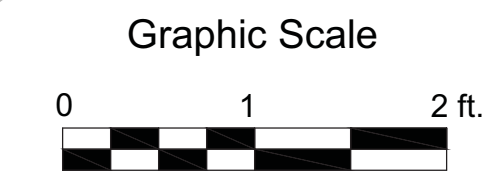


- NOTES:
1. AVOID EXISTING REINFORCING STEEL WHEN DOWELING NEW REINFORCING STEEL. MOVE DOWELS NOT MORE THAN 3 IN. TO AVOID EXISTING REINFORCING.
 2. WHERE NEW CONCRETE IS TO BE CAST, REPAIR DETERIORATED CONCRETE AND CRACKS AT INTERIOR FACE OF SPANDREL WALLS AND TOP SURFACE OF ARCH BEFORE CASTING NEW CONCRETE.
 3. CLEAR COVER OVER NEW REINFORCING BARS SHALL BE 2 ± 1/4 IN.
 4. BACKFILL OF SPANDREL WALLS: REFER TO SPECIFICATIONS. AT MINIMUM CONCRETE SHALL ACHIEVE 80 PERCENT OF SPECIFIED 28-DAY COMPRESSIVE STRENGTH BEFORE SPANDREL WALLS MAY BE BACKFILLED.



NOTE: OUTSIDE OF BRIDGE, PAVEMENT SECTION CONSISTS OF ASPHALT OVERLYING 6 IN. THICK NHDOT 304.3 CRUSHED GRAVEL.

2
S-1 BRIDGE BACKFILL AND PAVEMENT SECTION
Scale : 1" = 1'



CONCRETE REPAIR NOTES:

GENERAL:

1. Bridge elevations, plan and sections are based on existing drawing titled "Bridge over Fre...Phillips Exeter...Exeter" (part of title, date and engineer's name missing at torn edge), obtained by SA from Phillips Exeter Academy on March 30, 2012. SA revised plan, elevations, and sections shown herein based on tape measurements taken by SA in 2012 and 2018. Bridge elevations, plan, and sections are approximate, and Contractor shall verify all dimensions pertaining to their work in the field during construction.
2. Existing structural concrete members with cracked, spalled or delaminated concrete, or with exposed and/or corroded reinforcing steel, shall be repaired. Concrete surfaces to be repaired, include, but are not limited to, the arch underside and top side, inside and outside of spandrels, abutments, parapet walls, and pedestals, etc.
3. In general, concrete repairs consist of the following:
 - a. Repair of delaminated, spalled and cracked concrete, corroded reinforcing steel, and other details (e.g. expansion joints, etc.).
 - b. Strengthening of spandrels per detail 1/S-1.
 - c. Application of one parge coat to all exposed concrete bridge surfaces, including abutments.
4. Refer also to Project Specification section "Rehabilitation of Cast-In-Place Concrete" and Sheet G-1 for more information.
5. Place all materials according to manufacturer's instructions.
6. Concrete repair surface shall match original plane and shape in sole judgement of Engineer.
7. Concrete and concrete repair materials not meeting specifications, based on test results, shall be removed and replaced per specifications at Contractor's expense.
8. Per Specifications, provide concrete test equipment to Engineer and perform pull-off tests on completed concrete repairs at discretion of Owner.
9. Elevations and plans on sheets S-2 and S-3 show approximate location, extent and type of concrete deterioration based on existing conditions observations made in May 2018. Contractor shall identify locations of deterioration requiring repair by detailed field inspection in presence of engineer prior to start of concrete repairs, and on surfaces exposed by excavation. Final repair locations and extent will be in sole judgment of engineer.

INSPECTION/EXAMINATION

10. Refer also to Specification "Rehabilitation of Cast-In-Place Concrete" section 3.1, Examination.
11. Contractor shall identify locations of deterioration requiring repair by field inspection in presence of Engineer prior to start of concrete repairs. Visually inspect and sound concrete surfaces with hammer or chain to identify delaminated areas. Final repair locations and extent shall be in sole judgment of Engineer. Where clear observation of concrete surface is obstructed in sole judgment of Engineer (e.g. by soil, etc.), clean surface to satisfaction of Engineer.
12. At locations of low clearance between water and bridge (i.e. at underside of bridge near ends of arch), cofferdams/water diversion, excavation, and dewatering are likely necessary to access repairs at underside of bridge arch in sole judgment of Engineer. Contractor shall be prepared to repair concrete to 2 ft. below bottom of bridge arch (i.e. the bottom concrete exposed in the excavation for new riprap), in sole judgment of Engineer.

PREPARATION

13. Refer also to Specification "Rehabilitation of Cast-In-Place Concrete" section 3.2, Preparation.
14. For repair of depth greater than 1/2", sawcut perimeter of repair in simple, polygonal, geometric shape composed of right angles (i.e., corners shall be squared. See typical detail 8/S-4. Sawcut should be 1/2" min, but not deeper than the cover over reinforcement.
15. Remove deteriorated or unsound concrete, and all loose material or residue from concrete and reinforcing surfaces by mechanical means such as jackhammers (20 lb. or less), hydrodemolition (36,000 psi low-water volume), or other method in sole judgment of Engineer. Take care during removal not to damage existing reinforcement or the reinforcing bars' bond to surrounding concrete.
16. Check concrete surfaces for additional loose aggregate or delaminations in presence of Engineer and repeat removal process if necessary in sole judgment of Engineer. Place no concrete repair material until observation of prepared surface by Engineer.
17. In sole judgement of Engineer, remove concrete over steel to check for corrosion at cracks showing evidence of corrosion (e.g. rust stains, etc.).
18. Scarify sound concrete surface to 1/4" amplitude prior to placing repair material.
19. If exposed bars are corroded, remove concrete surrounding the bars to expose the corroded bars. Clearance between the bars and existing sound concrete surface shall be 1" minimum. Concrete removal shall extend to where uncorroded bars are found and bond between bars and concrete is sound.
20. Remove all loose scale and rust from exposed bars (e.g. with high-pressure water, abrasive blasting or other method in sole judgment of Engineer). Engineer will judge extent of section loss of all exposed reinforcing. If reinforcing bars have lost more than 20% of original cross-section, consult the Engineer for installation of additional reinforcing bars under the contract unit price for such repairs.

ABBREVIATIONS:

Approx. = approximately
E.F. = each face
Min. = minimum
O.C. = on center
Typ. = typical
Max. = maximum
E.W. = each way
Long. = longitudinal

Original Drawing Size = 22 x 34 in.

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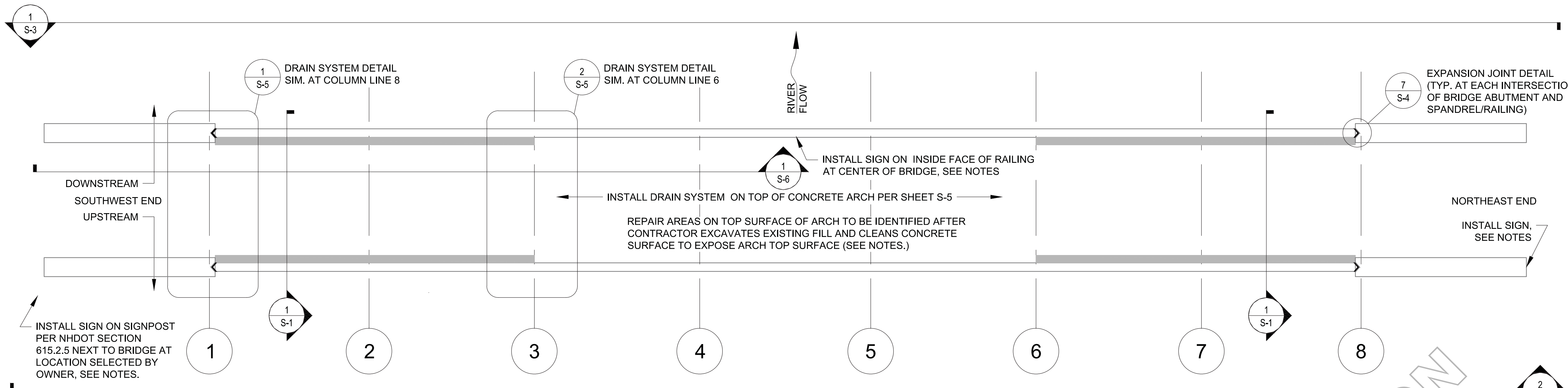
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Project:
Number: 113-13-003
Name: Hill Bridge Restoration
Phillips Exeter Academy
Exeter, New Hampshire
Subject: Bridge Repair Notes and
Details
Sheet No.:

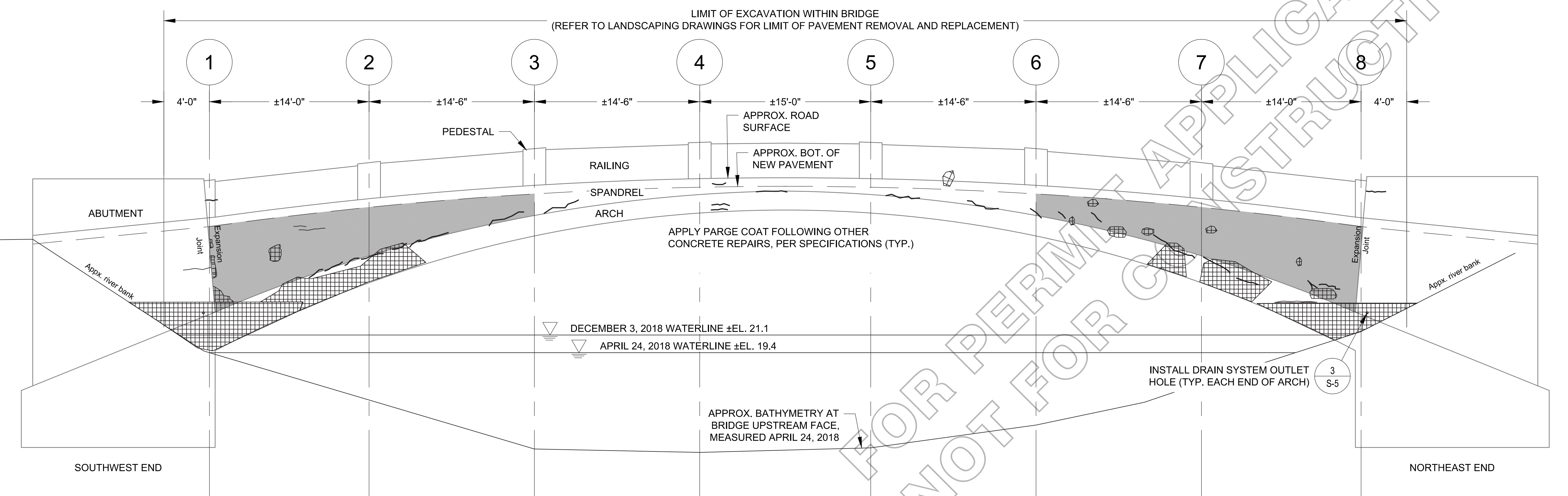
S-1

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1 S-2 BRIDGE PLAN
Scale : 1" = 5'

Graphic Scale
0 5 10 ft.



2 S-2 BRIDGE UPSTREAM ELEVATION
Scale : 1" = 5'

Graphic Scale
0 5 10 ft.

NOTES:

- REFER TO SHEET G-1 FOR DESIGN AND CONSTRUCTION NOTES AND SHEET S-1 FOR STRUCTURAL NOTES.
- SUBMIT SIGN PROOF. SIGN TEXT: "DANGER, HARD ROCKY BOTTOM. NO JUMPING/DIVING FROM BRIDGE." SIGNS SHALL MATCH EXISTING SIGNS AT END OF BRIDGE, IN SOLE JUDGMENT OF ENGINEER. INSTALL SIGNS PER NHDOT 615. WHERE SIGNS ARE INSTALLED INTO EXISTING BRIDGE CONCRETE, FASTEN WITH STAINLESS STEEL THREADED RODS, ANCHORED INTO CONCRETE WITH HILTI HIT-HY 200 EPOXY, WITH STAINLESS STEEL NUTS AND WASHERS.

KEY

- EXTENT OF SPANDREL STRENGTHENING PER SECTION 1/S-1
- VERTICAL SURFACE DETERIORATION (APPROX.). REPAIR PER DETAIL 1/S-4
- OVERHEAD DETERIORATION (APPROX.). REPAIR PER 3/S-4 AND/OR 4/S-4
- CRACKS (APPROX.). REPAIR PER DET. 5/S-4 AND/OR 6/S-4.

Original Drawing Size = 22 x 34 in.

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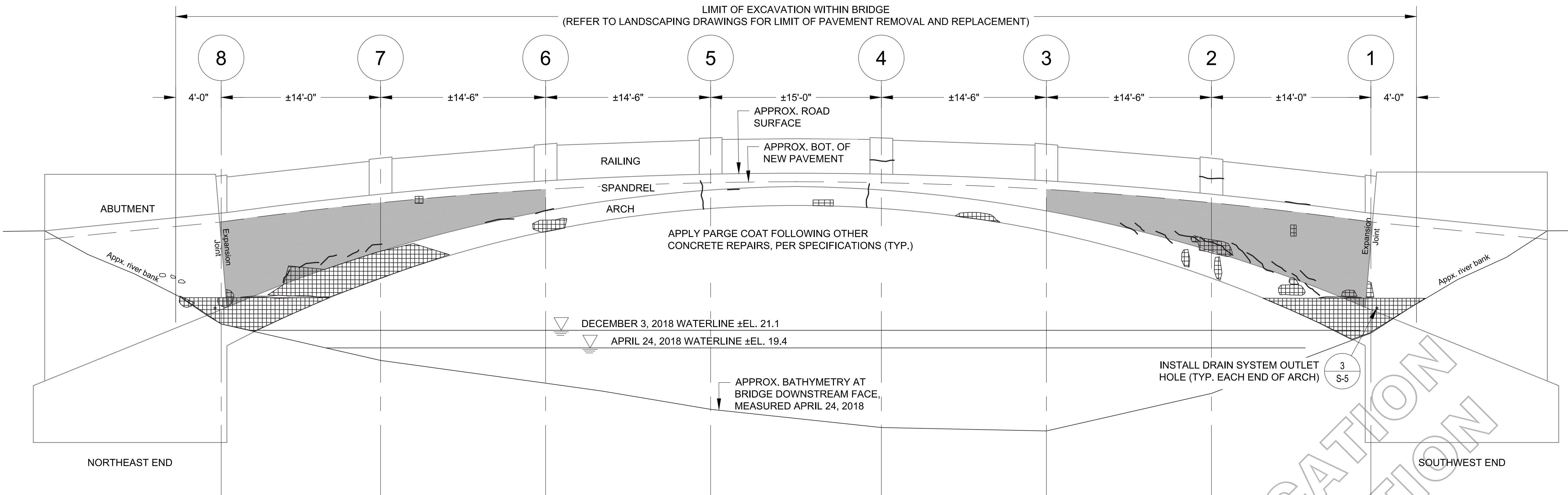
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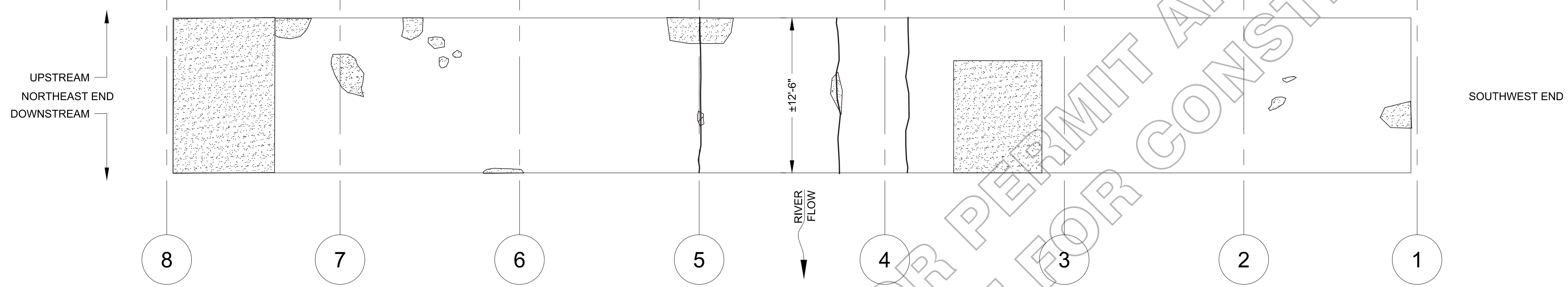
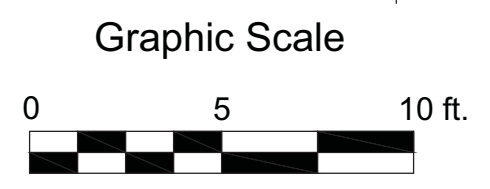
Project:
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Subject: **Bridge Repair Plan and
Elevation**
Sheet No.:

S-2

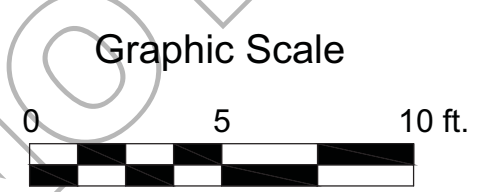
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1 BRIDGE DOWNSTREAM ELEVATION
Scale : 1" = 5'



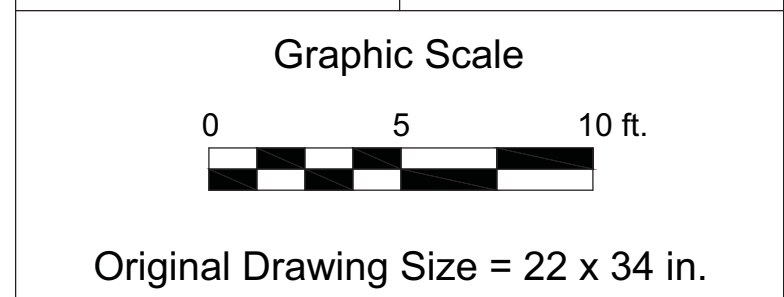
2 BRIDGE UNDERSIDE PLAN
Scale : 1" = 5'



KEY

EXTENT OF SPANDREL STRENGTHENING PER SECTION 1/S-1	OVERHEAD DETERIORATION (APPROX.) REPAIR PER 3/S-4 AND/OR 4/S-4
VERTICAL SURFACE DETERIORATION (APPROX.) REPAIR PER DETAIL 1/S-4	CRACKS (APPROX.) REPAIR PER DET. 5/S-4 AND/OR 6/S-4.

- NOTES:**
- REFER TO SHEET G-1 FOR DESIGN AND CONSTRUCTION NOTES AND SHEET S-1 FOR STRUCTURAL NOTES.



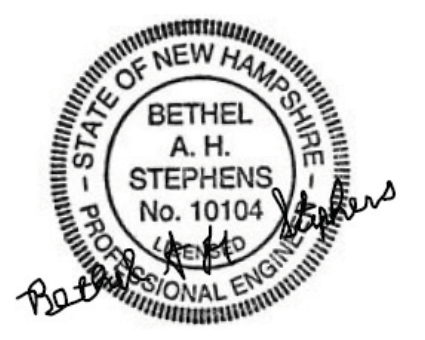
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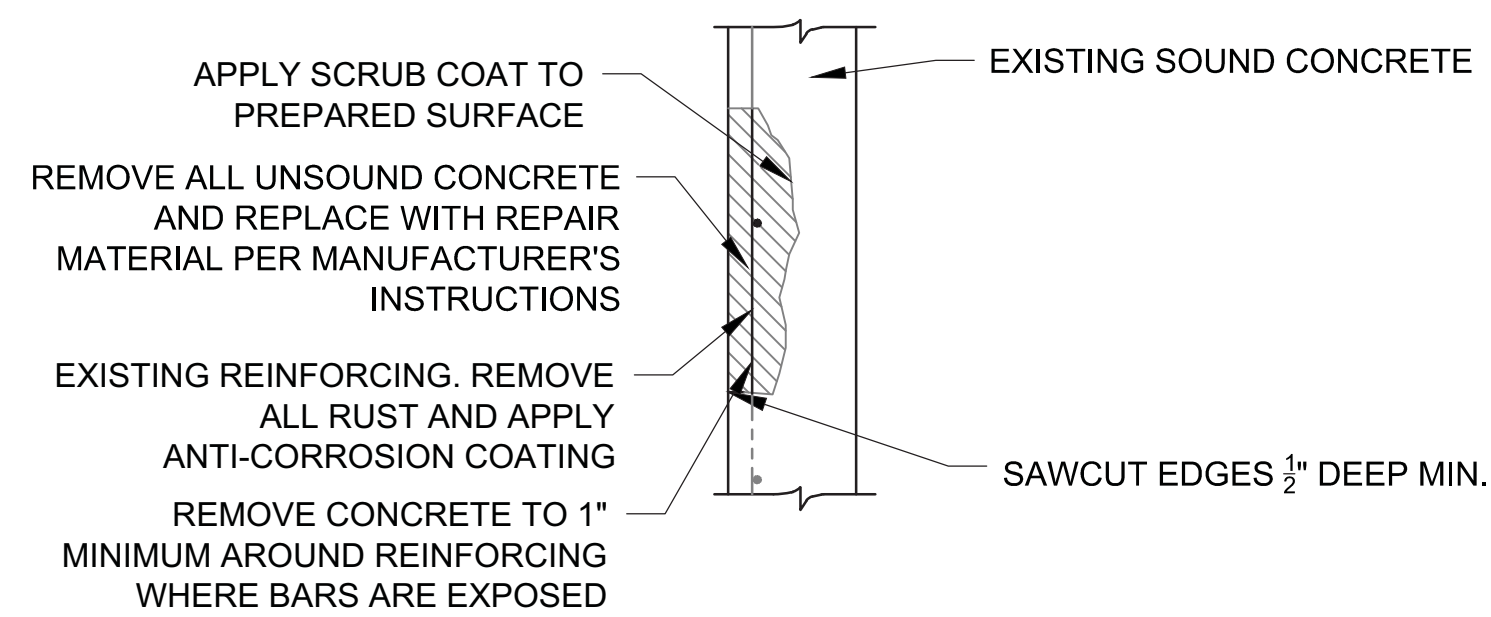
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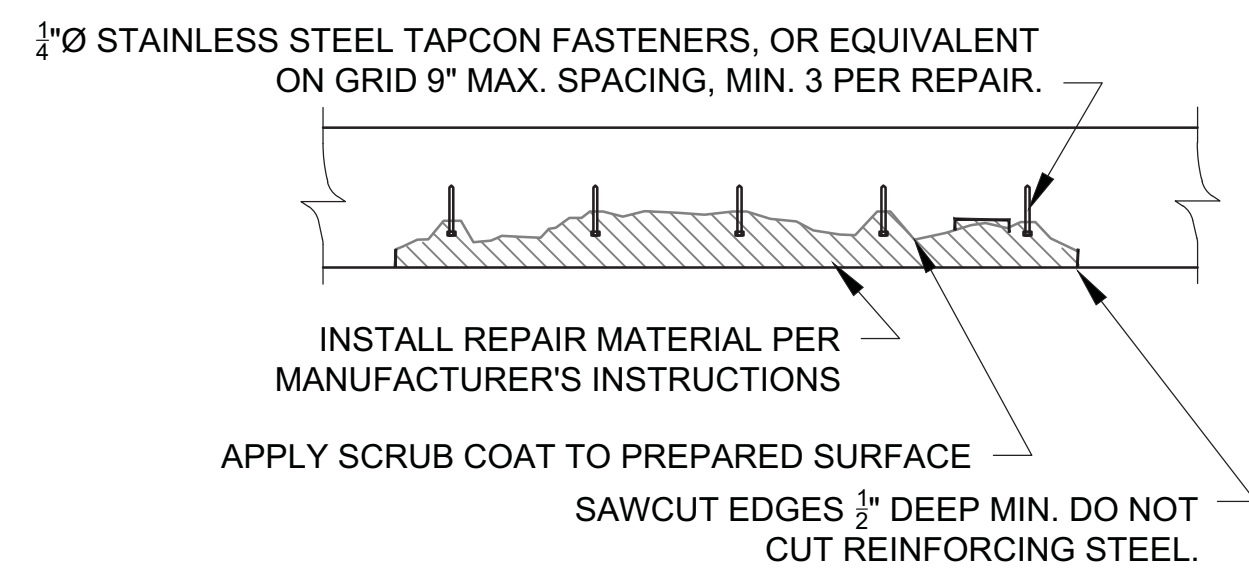
Project:
Number: 113-13-003
Name: **Hill Bridge Restoration
Phillips Exeter Academy
Exeter, New Hampshire**
Subject: **Bridge Underside Repair Plan
and Elevation**
Sheet No.: **S-3**

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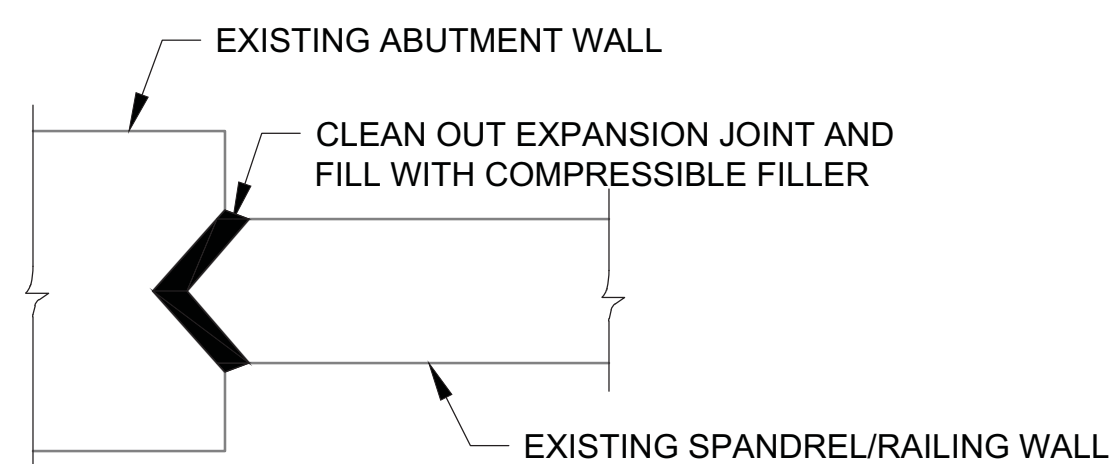
- NOTES:
1. [Hatched area symbol] INDICATES AREA OF DETERIORATED CONCRETE TO BE REMOVED AND REPLACED WITH REPAIR MATERIAL.
 2. WHERE SPACING BETWEEN ADJACENT BARS IS GREATER THAN 12", INSTALL FASTENERS PER DETAIL 4/S-4, ON 9" GRID.
 3. FOR VERTICAL REPAIR WITHOUT REINFORCING, INSTALL TAPCON FASTENERS PER 4/S-4.

1
S-4 **VERTICAL SURFACE REPAIR**
Not to Scale



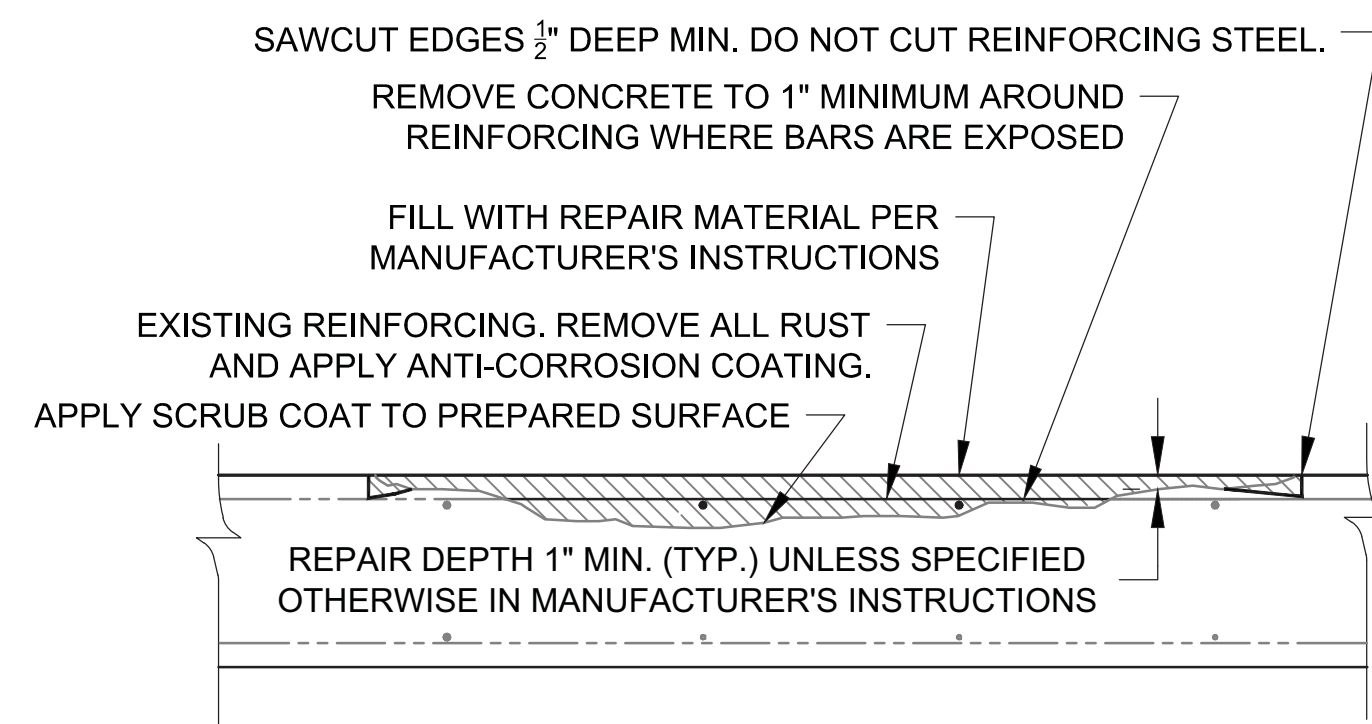
- NOTES:
1. [Hatched area symbol] INDICATES AREA OF OVERHEAD CONCRETE TO BE REMOVED AND REPLACED WITH REPAIR MATERIAL.
 2. FASTENER LENGTH SHOULD ALLOW FOR THE FOLLOWING REQUIREMENTS: 1 1/2" MIN. EMBED. INTO EXISTING CONCRETE, 1/2" MIN. PROTRUSION INTO REPAIR MATERIAL, AND 2 TO 2 1/2" COVER TO SURFACE OF REPAIR.
 3. WHERE REPAIR DEPTH DOES NOT ALLOW FOR 2" COVER OVER FASTENERS, OMIT FASTENERS IN SOLE JUDGMENT OF ENGINEER.

4
S-4 **OVERHEAD/VERTICAL REPAIR WITHOUT REINFORCING**
Not to Scale



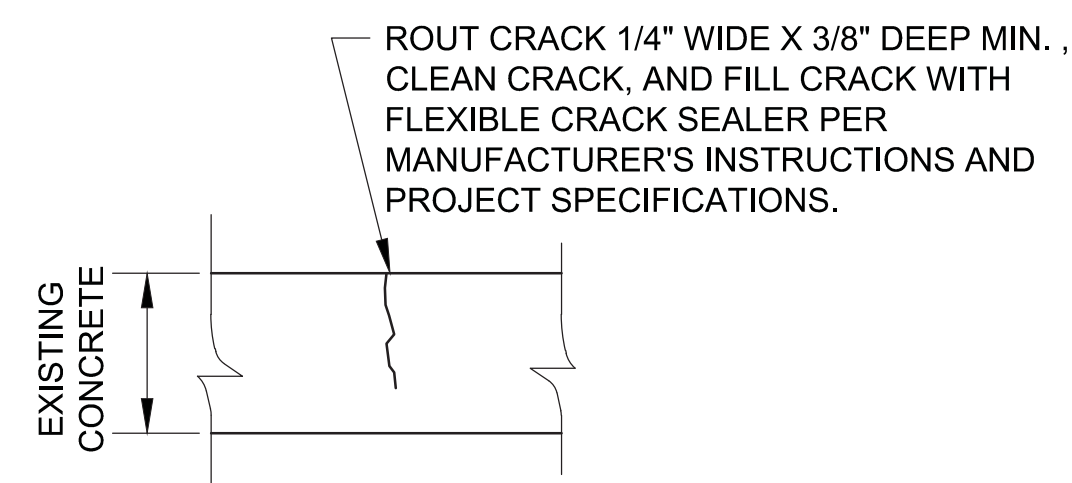
- NOTE:
1. INSTALL COMPRESSIBLE FILLER AFTER REPAIRS TO ADJACENT CONCRETE ARE COMPLETED AND CURED.
 2. REPAIR EXPANSION JOINT OVER FULL HEIGHT OF BRIDGE-ABUTMENT INTERSECTION AT EACH END OF BRIDGE, UPSTREAM AND DOWNSTREAM, TO TOP OF ARCH.
 3. DO NOT INSTALL PARGE COAT OVER EXPANSION JOINT. PROVIDE CLEAN EDGE AT INTERSECTION OF PARGE COAT AND COMPRESSIBLE FILLER.

7
S-4 **EXPANSION JOINT REPAIR DETAIL (PLAN VIEW)**
Not to Scale

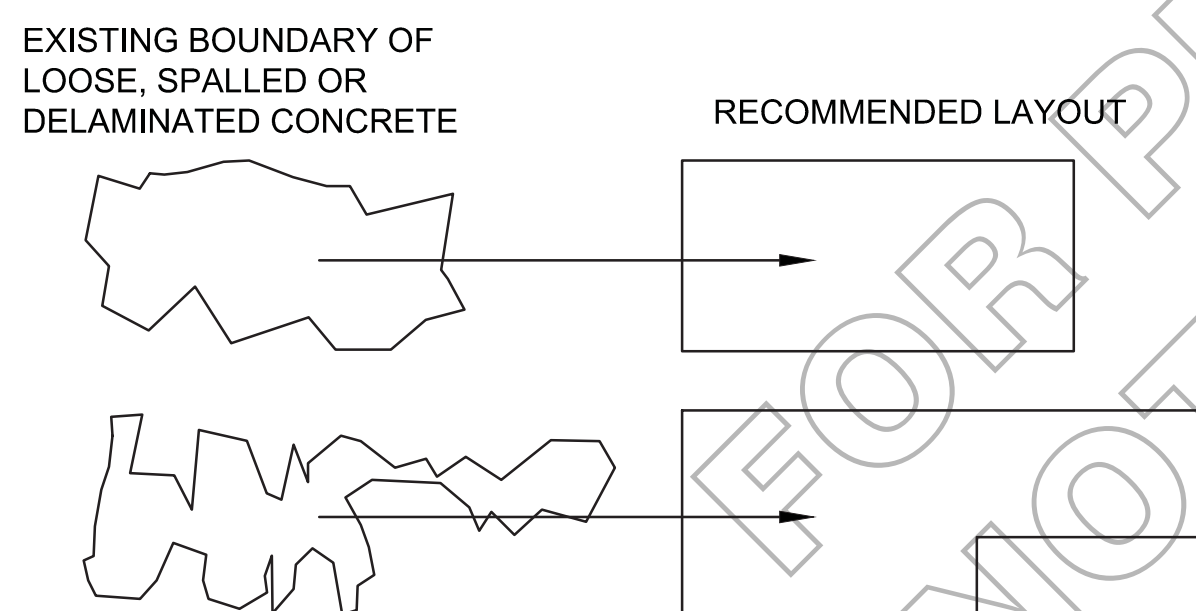


- NOTES:
1. [Hatched area symbol] INDICATES AREA OF DETERIORATED CONCRETE TO BE REMOVED AND REPLACED WITH REPAIR MATERIAL.

2
S-4 **HORIZONTAL/SLOPING SURFACE REPAIR**
Not to Scale

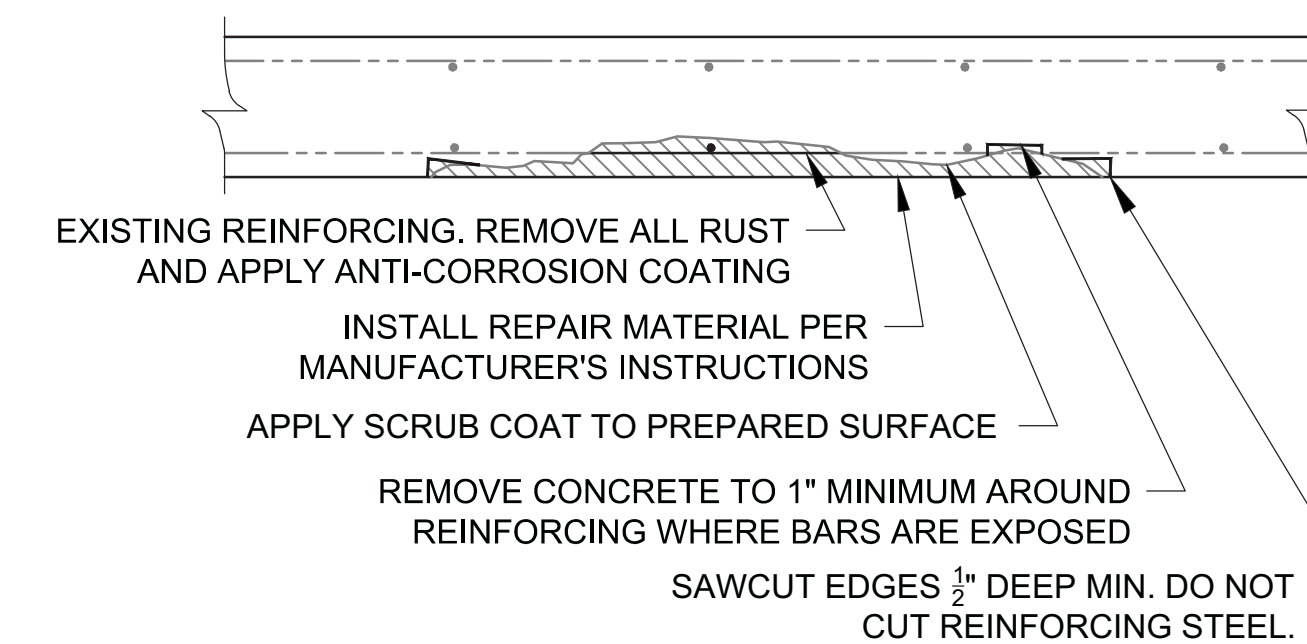


5
S-4 **CRACK REPAIR WITH FLEXIBLE SEALER**
Not to Scale



- NOTES:
1. LIMITS OF REPAIR TO BE DETERMINED BY ENGINEER.
 2. REPAIR CONFIGURATIONS TO BE KEPT AS SIMPLE AS POSSIBLE.
 3. CORNERS SHALL BE SQUARED TO AVOID FEATHERED EDGES.
 4. VERIFY DEPTH OF REINFORCING PRIOR TO CUTTING.
 5. SAWCUT TO MIN. 1/2" DEPTH. DO NOT CUT REINFORCING.

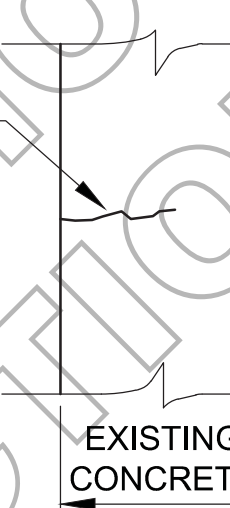
8
S-4 **GENERAL CONFIGURATION FOR REPAIR OF DAMAGED CONCRETE SURFACES**
Not to Scale



- NOTES:
1. [Hatched area symbol] INDICATES AREA OF DETERIORATED CONCRETE TO BE REMOVED AND REPLACED WITH REPAIR MATERIAL.
 2. WHERE SPACING BETWEEN ADJACENT REINFORCING BARS IS GREATER THAN 12", USE FASTENERS PER DETAIL 4/S-4, ON 9" GRID.

3
S-4 **OVERHEAD REPAIR WITH REINFORCING**
Not to Scale

CLEAN CRACK AND PRESSURE-INJECT WITH EPOXY REPAIR ADHESIVE PER MANUFACTURER'S INSTRUCTIONS AND PROJECT SPECIFICATIONS



- NOTES:
1. DETAIL APPLIES TO CRACKS LARGER THAN HAIRLINE WIDTH AS DETERMINED BY ENGINEER.
 2. DETAIL APPLIES FOR CRACKS ON VERTICAL, HORIZONTAL, OVERHEAD, OR SLOPING SURFACES.
 3. INSPECT ALL CRACKS FOR FULL DEPTH PENETRATION AND FOR FULL-DEPTH CRACKS. SEAL BACKSIDE PRIOR TO FILLING PER EPOXY REPAIR ADHESIVE MANUFACTURER'S INSTRUCTIONS.

6
S-4 **PRESSURE-INJECTION CRACK REPAIR**
Not to Scale

Original Drawing Size = 22 x 34 in.

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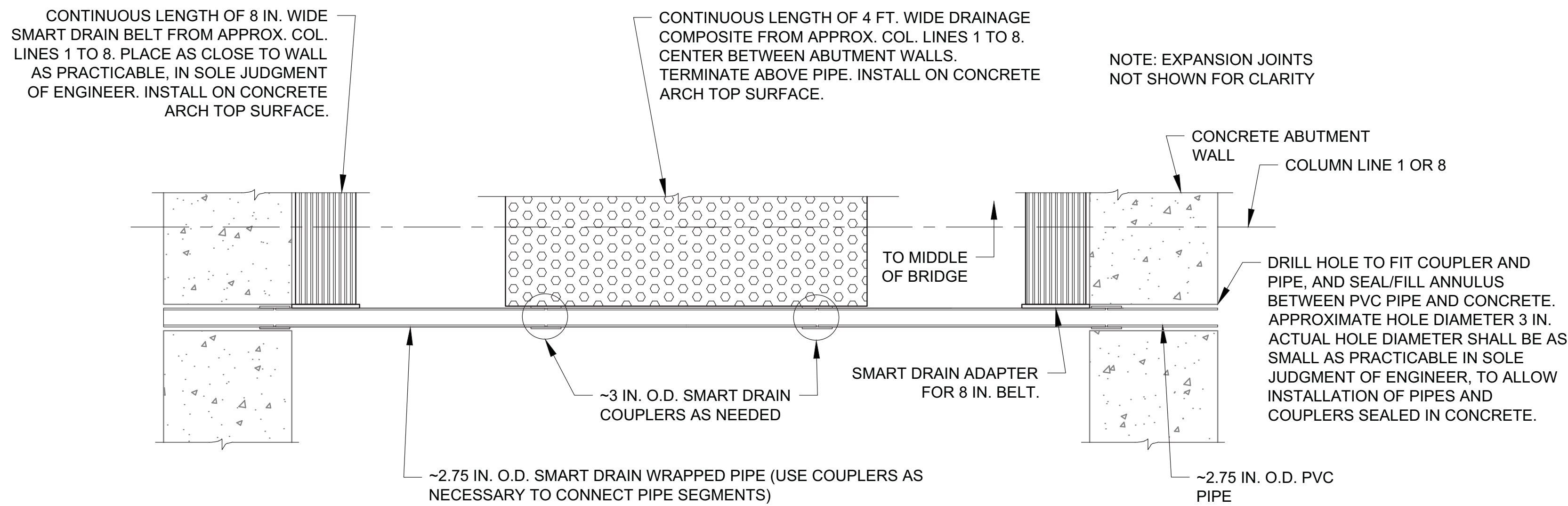
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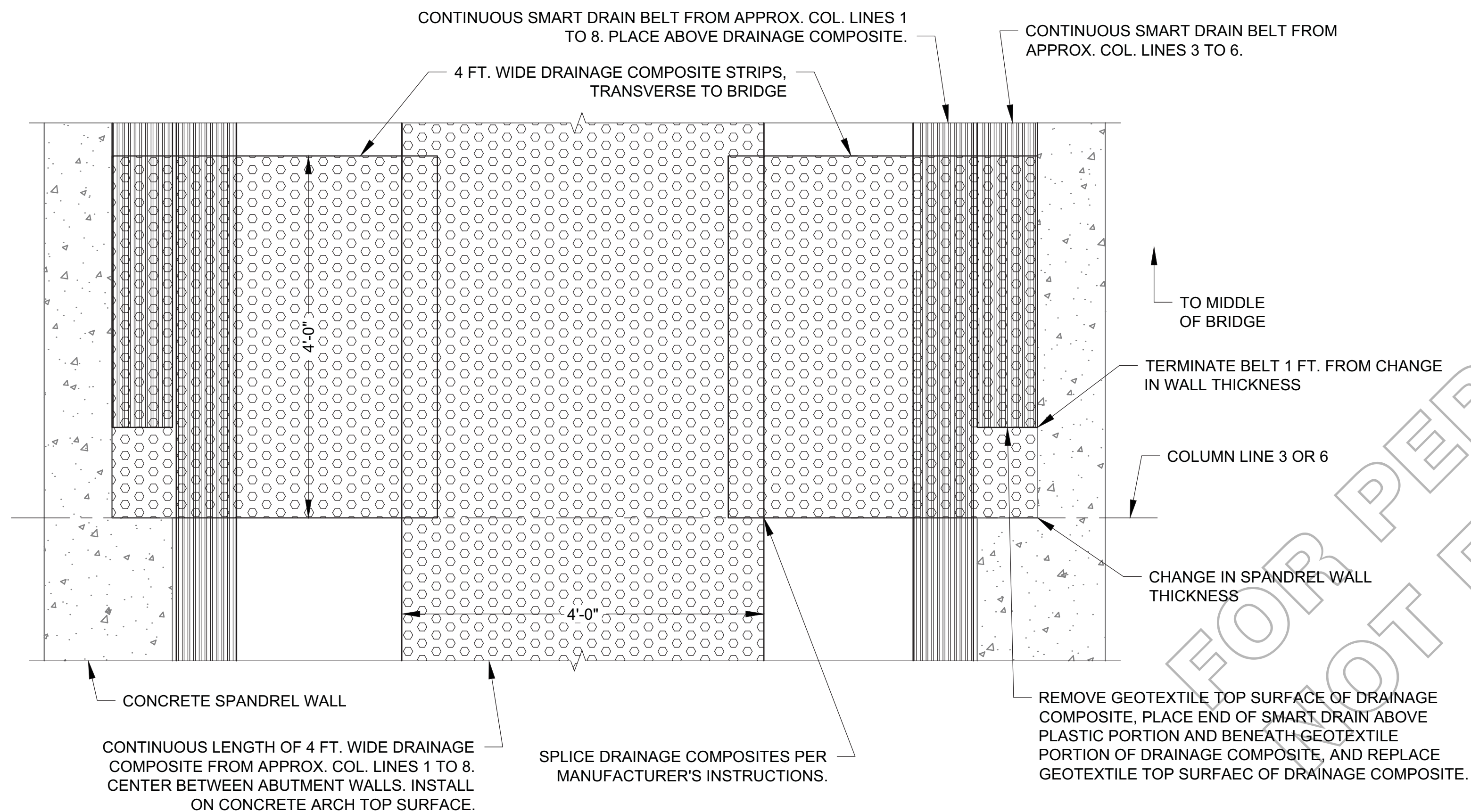
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Project:
Number: 113-13-003
Name: **Hill Bridge Restoration
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Subject: **Typical Concrete Repair
Details**
Sheet No.: **S-4**

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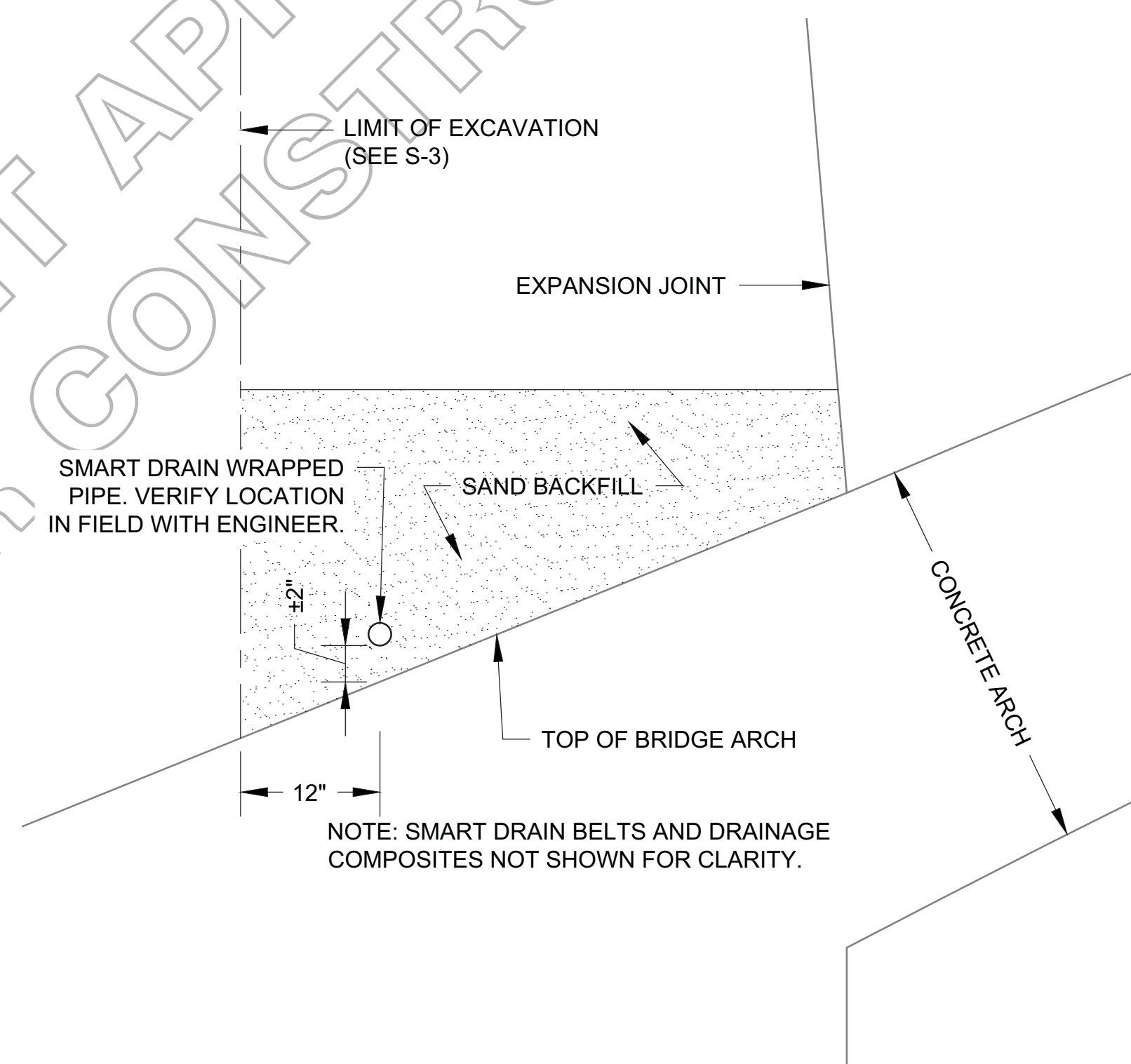
1
S-5 DRAIN SYSTEM DETAIL AT COL. LINES 1 AND 8 (PLAN VIEW)
Scale : 1" = 1'



2
S-5 DRAIN SYSTEM DETAIL AT COL. LINES 3 AND 6 (PLAN VIEW)
Scale : 1" = 1'

DRAIN SYSTEM:

- REFER TO SHEET G-1 FOR DESIGN AND CONSTRUCTION NOTES.
- FURNISH AND INSTALL DRAIN SYSTEM IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS AND AS SHOWN ON DRAWINGS.
- DRAIN SYSTEM MATERIALS:
 - SMART DRAIN SYSTEM, MANUFACTURED BY SMART DRAIN LLC, COLUMBIA, MD, INCLUDING 8 IN. WIDE BELT, WRAPPED PVC PIPE AND COUPLERS,
 - DRAINAGE COMPOSITE, PRODUCT MIRAFI G100N, MANUFACTURED BY TENCATE GEOSYNTHETICS AMERICAS, PENDERGRASS, GA.
 - NON-WRAPPED PVC PIPE, EPOXIED INTO CONCRETE ABUTMENT WALLS.
 - SAND FOR DRAIN SYSTEM: SIMILAR TO NHDOT 304.1, EXCEPT GRADED AS FOLLOWS: MAX. 1% PASSING #200 SIEVE, MAX. 10% PASSING #40 SIEVE, 100% PASSING #10 SIEVE.
- DRAIN SYSTEM OUTLET HOLES: LOCATE 4 OUTLET HOLES, ONE AT EACH CORNER OF BRIDGE, EACH ~1 FT. LANDWARD OF EXPANSION JOINT AND CENTERED 4 IN. ABOVE TOP SURFACE OF ARCH. BEFORE DRILLING HOLES, CONFIRM HOLE LOCATIONS WITH ENGINEER.
- PLACE SMART DRAIN BELT DIRECTLY ON CLEAN CONCRETE ARCH NEXT TO SPANDREL WALLS. AT CHANGES IN SPANDREL WALL THICKNESS, REFER TO DETAIL 2/S-6.
- SMART DRAIN BELTS AND DRAINAGE COMPOSITES SHALL EACH BE A SINGLE CONTINUOUS PIECE, WITHOUT SPLICES, FROM THE DRAINAGE PIPE AT ONE END OF BRIDGE TO THE DRAINAGE PIPE AT THE OTHER END.
- PLACE 3 IN. LAYER OF SAND OVER SMART DRAIN BELTS. MAINTAIN CONTINUOUS DOWNWARD SLOPE OF BELTS AND COMPOSITES, AND TERMINATE ABOVE DRAIN PIPE, IN SOLE JUDGMENT OF ENGINEER.
- AT ABUTMENTS (APPROX. COL. LINES 1 AND 8), PLACE SMART DRAIN PIPE CONTINUOUS BETWEEN ABUTMENT WALLS ON 2 IN. THICK LAYER OF SAND. CONNECT WRAPPED AND NON-WRAPPED PIPE SEGMENTS WITH SMART DRAIN COUPLERS AS NECESSARY BUT WITH NOT MORE THAN 4 COUPLERS FOR EACH PIPE. BACKFILL PIPE AND COUPLER-BELT CONNECTIONS WITH SAND 10 IN. THICK. TOP SURFACE OF SAND SHALL BE LEVEL.



3
S-5 DRAIN SYSTEM DETAIL AT COL. LINES 1 AND 8 (SECTION)
Scale : 1" = 1'

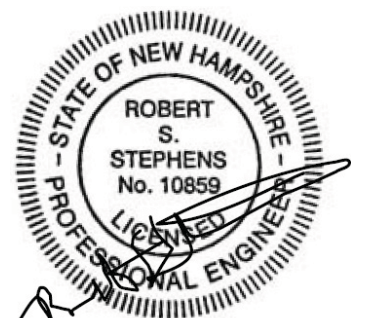
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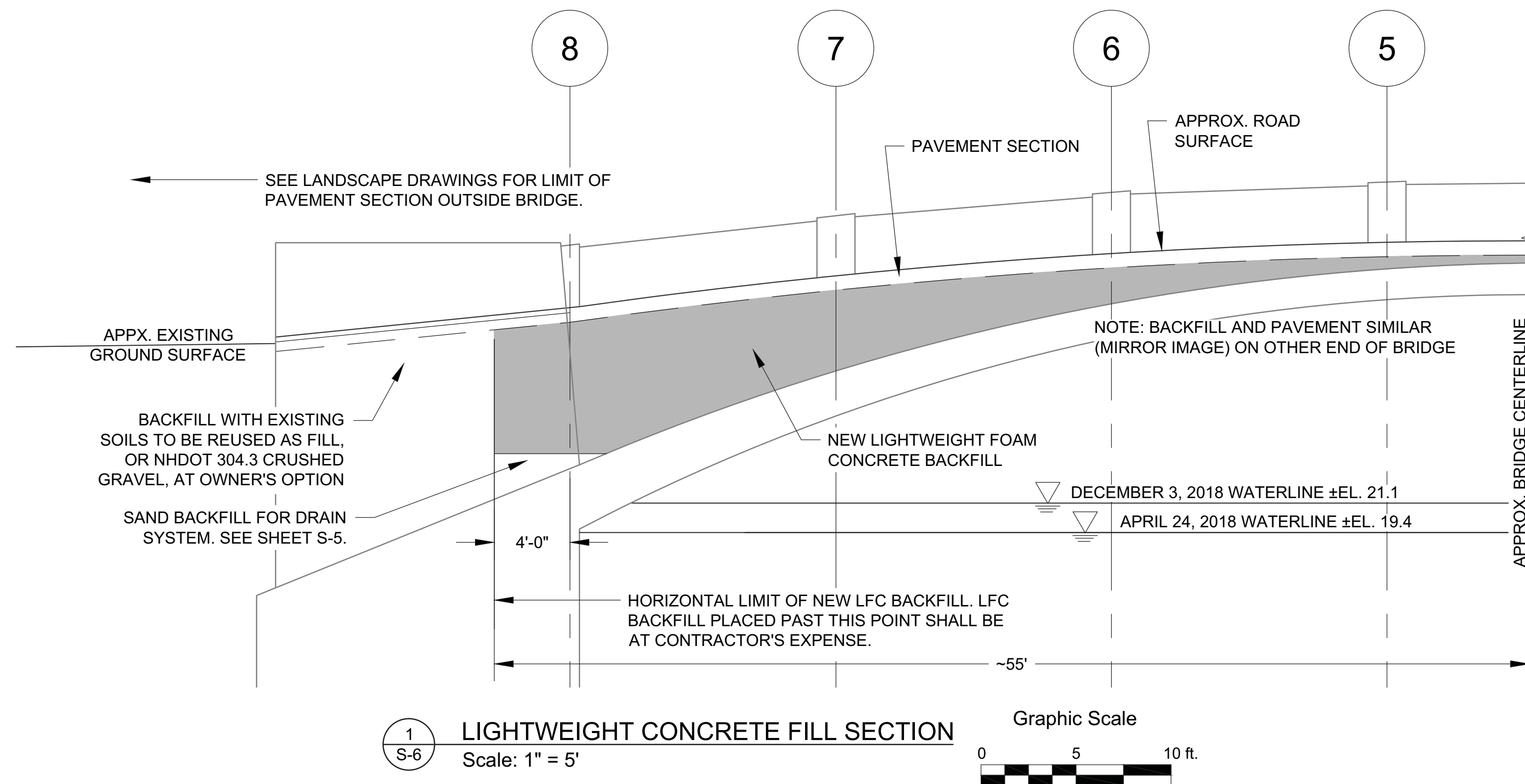
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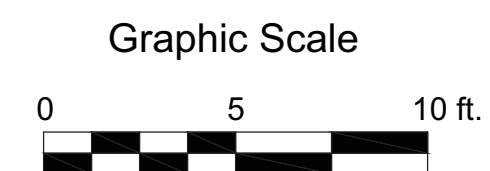
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Subject: **Drain System Details**

Sheet No.: **S-5**

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1
S-6 LIGHTWEIGHT CONCRETE FILL SECTION
Scale: 1" = 5'



NOTES:

1. REFER TO SHEET G-1 FOR DESIGN AND CONSTRUCTION NOTES.
2. IF LIGHTWEIGHT FOAM CONCRETE ALTERNATE IS SELECTED BY OWNER, SUBMIT, FURNISH AND INSTALL CAST-IN-PLACE LIGHTWEIGHT FOAM CONCRETE (AKA LFC, LIGHTWEIGHT CONCRETE FILL, CELLULAR CONCRETE, ETC.) PER THIS SHEET.
3. SUBMIT MEANS AND METHODS FOR LFC MIXING, PLACEMENT AND CURING.
4. MIX DESIGNER AND INSTALLER FOR LFC SHALL HAVE EXPERIENCE ON SIMILAR PROJECTS, IN SOLE JUDGMENT OF ENGINEER.
5. MIX, PLACE AND CURE LFC IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
6. PREPARE CONCRETE AND/OR SOIL SUBGRADES PER NOTES SHEET 2. DO NOT PLACE DURING RAIN, SNOW OR FREEZING WEATHER, OR IN STANDING WATER, IN SOLE JUDGMENT OF ENGINEER.
7. LFC TEMPERATURE:
 - A. PLACE IN MAX. 3 FT.-THICK LIFTS, WITH AT LEAST 3 DAYS BETWEEN LIFT PLACEMENTS. PREVENT SEGREGATION OF LFC DURING PLACEMENT.
 - B. MANAGE LFC HEAT RELEASE DUE TO HEAT-OF-HYDRATION DURING PLACEMENT AND CURING. MAX. ALLOWABLE TEMPERATURE = 154 DEG. F. MAX. ALLOWABLE TEMPERATURE DIFFERENTIAL BETWEEN HOTTEST AND COOLEST PORTIONS = 38 DEG. F.
 - C. PREVENT BOILS, CRACKING, AND COLLAPSE OF LFC (E.G. DUE TO EXCESS HEAT OF HYDRATION, ETC.).
 - D. MEASURE AND RECORD CONCRETE AND AMBIENT AIR TEMPERATURE HOURLY (OR MORE FREQUENTLY) USING 2 SETS OF 3 TEMPERATURE SENSORS (THERMOCOUPLES), AT LOCATIONS SELECTED BY ENGINEER, INSTALLED BY CONTRACTOR.
 - E. CONTRACTOR MAY SUBMIT ALTERNATIVE LFC PLACEMENT PLAN FOR ENGINEER'S REVIEW, INCLUDING LIFT THICKNESS AND LIFT TIMING, ANTICIPATED TEMPERATURES, AND MEANS AND METHODS TO ADDRESS POTENTIAL TEMPERATURE ISSUES.
8. CONSTRUCT LFC ON OPPOSITE ENDS OF BRIDGE ARCH SUCH THAT NO LIFT IS MORE THAN 3 FT. ABOVE A LIFT ON THE OPPOSITE END OF THE BRIDGE ARCH.
9. FINISH TOP SURFACE OF LFC TO WITHIN 0.5 IN. OF DESIGN ELEVATIONS SHOWN ON DRAWING. FINISH SURFACE SHALL NOT ALLOW FOR STANDING WATER.
10. PROTECT LFC FROM DAMAGE AFTER INSTALLATION.
11. PLACE 6 IN. CRUSHED STONE FOR PAVEMENT SECTION PRIOR TO OPERATING EQUIPMENT OVER LFC. DO NOT OPERATE HEAVY EQUIPMENT OR PLACE FILL OVER LFC UNTIL LFC HAS REACHED 20 PSI COMPRESSIVE STRENGTH.
12. LFC NOT MEETING SPECIFICATIONS SHALL BE REMEDIATED IN SOLE JUDGMENT OF ENGINEER, AT CONTRACTOR'S EXPENSE.

LIGHTWEIGHT FOAM CONCRETE (LFC) MATERIAL INFORMATION:

13. LFC SHALL BE ELASTIZELL EF BY ELASTIZELL CORPORATION OF AMERICA, ANN ARBOR, MI OR EQUIVALENT. EQUIVALENCE OF AN ALTERNATE PRODUCT SHALL BE IN SOLE JUDGMENT OF ENGINEER.
14. LFC SHALL CONSIST OF CEMENT, WATER, FOAMING AGENT AND OTHER ADMIXTURES.
15. USE POTABLE WATER ONLY.
16. PORTLAND CEMENT SHALL MEET ASTM C150 OR C595
17. FOAMING AGENT SHALL MEET ASTM C796 AND C869
18. SUBMIT MATERIAL INFORMATION FOR LFC, INCLUDING MIX DESIGN AND TECHNICAL INFORMATION SHOWING MIX DESIGN SATISFIES REQUIREMENTS LISTED BELOW.
19. LFC SHALL MEET THE FOLLOWING PHYSICAL PROPERTIES:

OVEN-DRY UNIT WEIGHT	67 ±3 PCF
MINIMUM COMPRESSIVE STRENGTH, 3 DAYS	20 PSI
MINIMUM COMPRESSIVE STRENGTH, 28 DAYS	200 PSI
MAXIMUM DRYING SHRINKAGE	2%
FROST HEAVE	0%

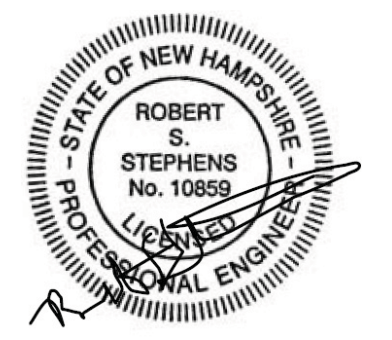
Original Drawing Size = 22 x 34 in.

OWNER
PHILLIPS EXETER ACADEMY
Exeter, New Hampshire

CLIENT
PHILLIPS EXETER ACADEMY
Exeter, New Hampshire

By: NAO Date: 8/21/2020
Checked By: JET Date: 8/21/2020
Checked By: RSS Date: 8/21/2020
Checked By: _____ Date: _____

Revisions:
1. By: _____ Date: _____
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Project:
Number: 113-13-003
Name: **Hill Bridge Restoration
Phillips Exeter Academy
Exeter, New Hampshire**
Subject: **Alternate Backfill: Lightweight
Foam Concrete**
Sheet No.: **S-6**

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