

**Vermont Department of Environmental Conservation**

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*Agency of Natural Resources*

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**AUTHORIZATION TO CONDUCT NEXT FLOOD MEASURES**

Pursuant to Section F Next Flood Protective Measure of the Vermont Stream Alteration General Permit

Project Number: **SA-05-015-2016 Reservoir Road Culvert**

Applicant Name: Chester Highway Department, Chester, Vermont

Contact: Graham Kennedy

Mailing Address: P.O. Box 370, 556 Elm Street, Chester, Vermont 05143

Phone: (802) 875-2173 or (802) 875-2737

Project Location: Reservoir Road over unnamed tributary Williams River

Email: [jhchester@vermontel.net](mailto:jhchester@vermontel.net)

The Secretary of the Vermont Agency of Natural Resources (VT ANR) has determined that:


1. This project authorizes replacing a stone culvert damaged by T.S. Irene with a 12' x 8' concrete box. The stream bed inside the culvert shall be stabilized with stone & sediments in Appendix M Stream Bed Stone Fill Type E1 stone.
2. The proposed activity is eligible for coverage under the VT ANR Stream Alteration General Permit – Next Flood Protective Measures.
3. The proposed activity will meet the terms and conditions of Section F of the General Permit provided:
  - a) The project will be completed and approved as shown on the plans dated April 13, 2016, prepared by Dufresne Group, as approved by the Vermont Agency of Natural Resources as attached herein.
  - b) The project is proportional to the threat and conditioned to cease when the threat to life or to improved property has ended.
  - c) The project will not result in a threat to life, public health or safety.
  - d) The project will meet the standards detailed in subsection C.2.2.4 of the General Permit.
  - e) The project will meet Stream Alteration Standards to the greatest extent possible.
  - f) A pre-construction meeting is held between the contractor, owner/applicant, and the ANR River Management Engineer.
  - g) The River Management Engineer is notified by phone or email when construction begins and when the project is complete.
  - h) In-stream working dates for all GP activities are from July 1<sup>st</sup> through October 1<sup>st</sup>; any in-stream work outside these dates will require an Individual Stream Alteration Permit authorization by the River Management Engineer.
  - i) This authorization has been posted for public access and this authorization constitutes final approval.

If there are any changes in the project plan or deviation in construction from the plan, the Permittee must notify the River Management Engineer immediately.

If the project is constructed as you have described, as shown on the above referenced approved plans and according to the above conditions, there is no reason to expect any violation of Vermont Water Quality Standards.

Signed this 28<sup>th</sup> day of June, 2016  
Alyssa B. Schuren, Commissioner  
Department of Environmental Conservation

This permit expires October 1, 2016.

by:   
\_\_\_\_\_  
Todd Menees, P.E., P.H., River Management Engineer

## **Streambed Stone Fill Design Guidance**

<b>Type</b>	<b>Velocity Range (fps)*</b>	<b>Embeddedness (in)</b>
E1	$V \leq 9$	18
E2	$9 < V \leq 11$	24
E3	$11 < V \leq 13$	36
E4	$13 < V \leq 15$	48

\*Maximum velocity should be based on a minimum 50-year design flow rate and calculated at the structure outlet.

### **Item xxx.xxx CY Streambed Stone Fill Specification**

Type E1. The longest dimension of the stone shall be at least 18 inches, and at least 50 percent of the volume of the stone in place shall have a least dimension of 12 inches, and at least 25 percent of the particles shall have a maximum dimension of 2 inches and be well graded material.

Type E2. The longest dimension of the stone shall be at least 24 inches, and at least 50 percent of the volume of the stone in place shall have a least dimension of 18 inches, and at least 25 percent of the particles shall have a maximum dimension of 2 inches and be well graded material.

Type E3. The longest dimension of the stone shall be at least 36 inches, and at least 50 percent of the volume of the stone in place shall have a least dimension of 24 inches, and at least 25 percent of the particles shall have a maximum dimension of 2 inches and be well graded material.

Type E4. The longest dimension of the stone shall be at least 48 inches, and at least 50 percent of the volume of the stone in place shall have a least dimension of 36 inches, and at least 25 percent of the particles shall have a maximum dimension of 2 inches and be well graded material.

#### Notes

- The streambed stone fill shall be hard, blasted, angular rock other than serpentine rock containing the fibrous variety chrysotile (asbestos). Similar sized river sediment is an acceptable alternative as is a mixture of angular material and river sediment.
- Stone placed inside of a closed structure shall be placed such that the structure is not damaged.
- Care shall be taken to limit segregation of the materials.
- Add sand borrow item as needed to seal the bed and prevent subsurface flow.
- There shall be no subsurface flow upon final inspection.

**GENERAL NOTES:**

1. SURVEY COMPLETED BY DUFRESNE GROUP IN MAY 2015. COORDINATE SYSTEM IS VERMONT STATE PLANE. VERTICAL DATUM IS NAVD88.
2. EXPLORATORY EXCAVATION IS REQUIRED TO LOCATE UNDERGROUND UTILITIES. CONTRACTOR SHALL USE EXTREME CAUTION TO PREVENT DAMAGE TO EXISTING UTILITIES. CONTRACTOR SHALL COORDINATE WITH DIG SAFE (1-888-DIG SAFE) A MINIMUM OF 72 HOURS PRIOR TO EXCAVATION.
4. ALL EXISTING UNDERGROUND UTILITIES WERE LOCATED USING THE BEST AVAILABLE INFORMATION. CONTRACTOR IS RESPONSIBLE FOR PROTECTION OF ALL UTILITIES WHETHER OR NOT THEY ARE SHOWN ON THE PLANS. ALL REPAIRS TO DAMAGED UTILITIES SHALL BE MADE BY THE CONTRACTOR USING MATERIALS APPROVED BY THE ENGINEER PRIOR TO INSTALLATION.
5. CONTRACTOR SHALL VERIFY LOCATION OF ALL OVERHEAD AND UNDERGROUND ELECTRIC, CABLE AND TELEPHONE LINES AND TAKE NECESSARY PRECAUTIONS IN STRICT ACCORDANCE WITH OSHA STANDARDS DURING CONSTRUCTION. CONTRACTOR SHALL CONTACT THE LOCAL POWER UTILITY AND TELEPHONE UTILITY REGARDING ANY NECESSARY SUPPORT OF ANY UTILITY POLES DURING CONSTRUCTION. LOCAL ELECTRIC UTILITY IS GREEN MOUNTAIN POWER. LOCAL PHONE UTILITY IS VERMONT TELEPHONE COMPANY.
7. GENERALLY HEAVY OR DARK LINE WORK OR NOTES REFER TO PROPOSED IMPROVEMENTS. LIGHT LINE WORK OR SCREENED GENERALLY DENOTES EXISTING FEATURES.
9. TECHNICAL SPECIFICATIONS PROVIDE NECESSARY INFORMATION AND ARE PART OF THE CONTRACT DOCUMENTS FOR THIS PROJECT.
8. ALL DISTURBED AREAS SHALL BE RESTORED TO CLASS A RESTORATION UNLESS OTHERWISE SHOWN. CONTRACTOR IS RESPONSIBLE FOR REMOVAL, CARE & REPLANTING OF ALL PLANTINGS AND SHRUBS DISTURBED DURING CONSTRUCTION.
9. THE CONTRACTOR SHALL BE REQUIRED TO STAKE OUT THE CULVERT AND MAINTAIN THE THREE DIMENSIONAL CONTROL OF THE SITE USING A COORDINATE SYSTEM AND ELEVATION THAT EXACTLY COINCIDES WITH THE DESIGN DRAWINGS.
10. THE ROADWAY MAY BE CLOSED TO THROUGH TRAVEL DURING THE CULVERT CONSTRUCTION PROJECT FOR A MAXIMUM PERIOD OF THREE WEEKS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR TRAFFIC CONTROL AND BARRICADES. THE CONTRACTOR SHALL NOT CLOSE OFF ACCESS TO DRIVEWAYS. CONTRACTOR SHALL ERECT SAFETY BARRIERS AND INSTALL ADEQUATE EXCAVATION SUPPORT AS SPECIFIED AND LIMIT CONSTRUCTION ACTIVITIES TO THE CURRENT ACTIVE AREA TO ACCOMMODATE TRAFFIC IMMEDIATELY ADJACENT TO THE WORK AREA. CONTRACTOR SHALL SUBMIT DETOUR AND CONSTRUCTION SIGNAGE PLAN TO ENGINEER FOR REVIEW AND APPROVAL PRIOR TO COMMENCING WORK.
11. CONTRACTOR TO USE EXTREME CAUTION WHEN EXCAVATING NEAR BUILDINGS AND OTHER STRUCTURES. ANY DAMAGE TO BUILDINGS AND STRUCTURES SHALL BE REPAIRED BY THE CONTRACTOR TO THE SATISFACTION OF THE ENGINEER AT NO ADDITIONAL COST TO THE OWNER.
12. THE CONTRACTOR'S EROSION PREVENTION AND SEDIMENT CONTROL MEASURES SHALL COMPLY WITH VERMONT STANDARDS AND SPECIFICATIONS FOR EROSION PREVENTION AND SEDIMENT CONTROL. THE CONTRACTOR SHALL REVIEW PROPOSED MEASURES WITH THE ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION.
13. REFER TO CIVIL AND STRUCTURAL DETAILS FOR CONSTRUCTION DETAILS.
14. CONTRACTOR'S STAGING AREA SHALL BE LOCATED WITHIN THE CONSTRUCTION EASEMENT AREAS DESIGNATED ON THESE PLANS.
15. REFER TO SPECIFICATIONS FOR BORING LOGS.
16. ALL CONSTRUCTION ACTIVITIES SHALL BE CONFINED TO THE PUBLIC RIGHT-OF-WAY OR EASEMENT AREAS.
17. THE TOWN HAS THE RIGHTS OF FIRST REFUSAL FOR ALL EXISTING STONES AND CONCRETE BLOCKS IN THE PROJECT AREA IDENTIFIED TO BE REMOVED. THE CONTRACTOR SHALL DELIVER THE ITEMS TO THE TOWN, SHOULD THEY DECIDE TO RETAIN THEM.

**ABBREVIATION LIST**

APPROX	APPROXIMATELY
CL	CENTER LINE
CMP	CORRUGATED METAL PIPE
DIA	DIAMETER
ED	EDGE
ELEV	ELEVATION
GND	GROUND
H	HORIZONTAL
INV	INVERT
OHW	OVERHEAD WIRE
PL	PROPERTY LINE
PT	POINT
ROW	RIGHT-OF-WAY
STA	STATION
TBM	TEMPORARY BENCH MARK
TYP	TYPICAL
UG	UNDERGROUND
UP	UTILITY POLE
W	WATER LINE
V	VERTICAL

LEGEND	
<b>EXISTING:</b>	
— 500 —	MAJOR CONTOUR
— 499 —	MINOR CONTOUR
— — — — —	RIGHT-OF-WAY
- - - - -	EDGE OF GRAVEL ROAD/DRIVE
P-1	BORING LOCATION
— — — — —	CENTERLINE OF ROAD
— OHE —	OVERHEAD WIRES
■ ■ ■ ■ ■	ORDINARY HIGH WATER
←	STREAM FLOW DIRECTION
~ ~ ~ ~ ~	EDGE OF STREAM
<b>PROPOSED:</b>	
= = = = =	NEW REINFORCED CONCRETE WALL WITH FOOTING
~ ~ ~ ~ ~	TYPE II RIP RAP
~ ~ ~ ~ ~	GRAVEL
— 500 —	MAJOR CONTOUR
— 499 —	MINOR CONTOUR
— — — — —	GUARDRAIL



**DUFRESNE GROUP**  
CONSULTING ENGINEERS

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REVISIONS	DATE	COMMENTS	BY

RESERVOIR ROAD  
CULVERT REPLACEMENT

**GENERAL NOTES, LEGEND  
AND EXISTING CONDITIONS**

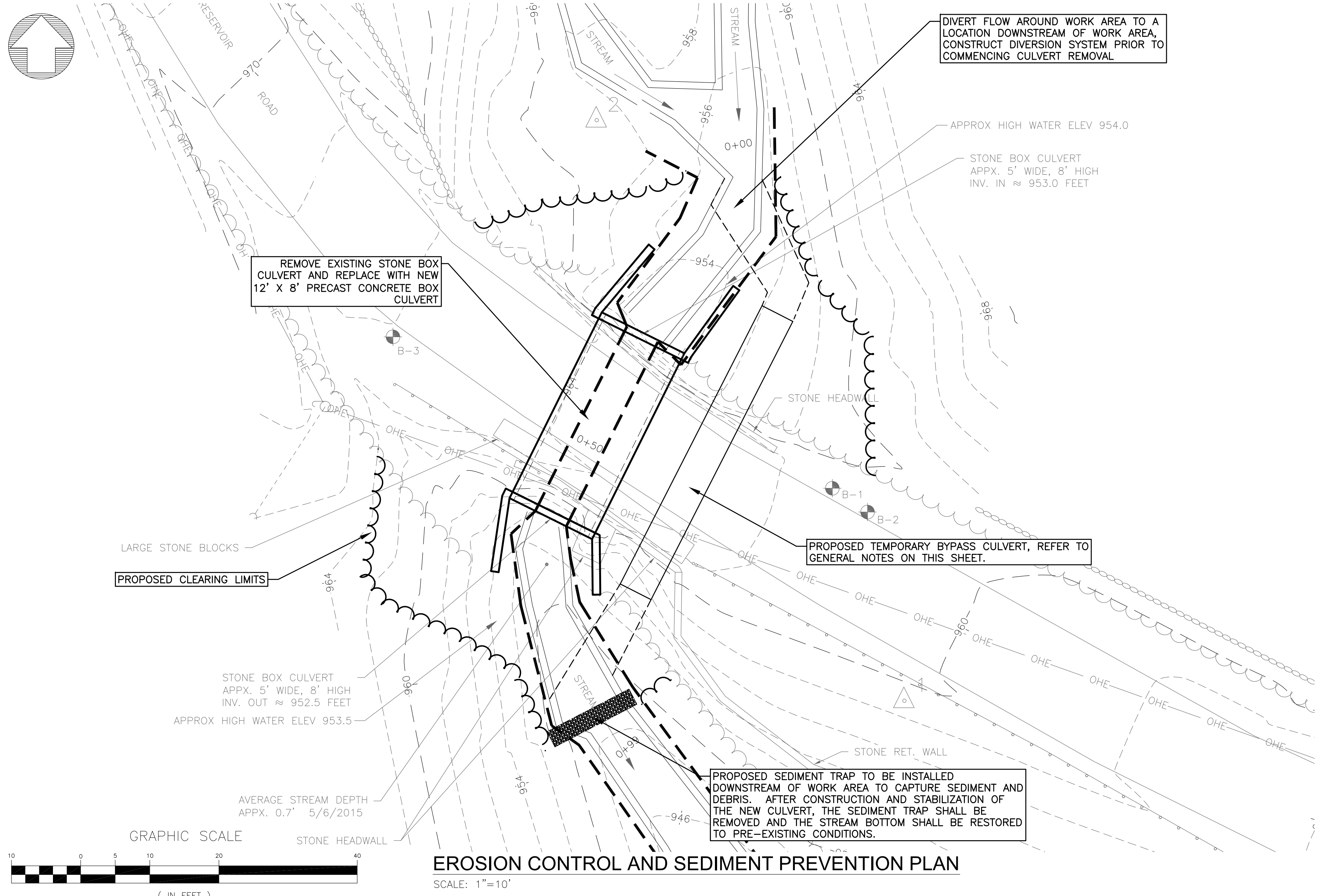
CHESTER, VERMONT

Project #	7150015
Project Mgr.	NRJ
Design by	NRJ
Drawn by	TPK
Reviewed by	NRJ
Approved by	TPK
Date	APRIL 13, 2016
Scale	AS SHOWN

**BID  
DOCUMENTS**  
DO NOT REVISE

**G1**

SHEET 1 OF 4



DIVERT FLOW AROUND WORK AREA TO A LOCATION DOWNSTREAM OF WORK AREA, CONSTRUCT DIVERSION SYSTEM PRIOR TO COMMENCING CULVERT REMOVAL

REMOVE EXISTING STONE BOX CULVERT AND REPLACE WITH NEW 12" X 8' PRECAST CONCRETE BOX CULVERT

APPROX HIGH WATER ELEV 954.0

STONE BOX CULVERT APPX. 5' WIDE, 8' HIGH INV. IN  $\approx$  953.0 FEET

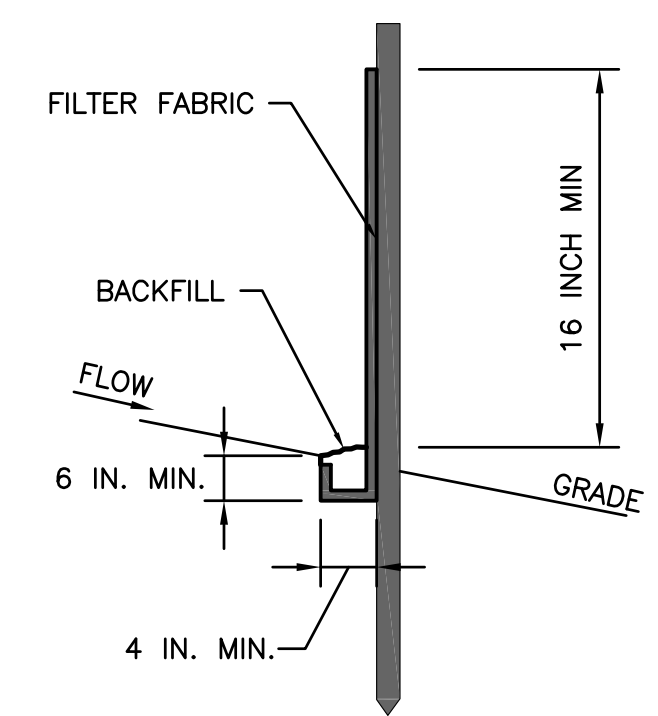
PROPOSED TEMPORARY BYPASS CULVERT, REFER TO GENERAL NOTES ON THIS SHEET.

PROPOSED SEDIMENT TRAP TO BE INSTALLED DOWNSTREAM OF WORK AREA TO CAPTURE SEDIMENT AND DEBRIS. AFTER CONSTRUCTION AND STABILIZATION OF THE NEW CULVERT, THE SEDIMENT TRAP SHALL BE REMOVED AND THE STREAM BOTTOM SHALL BE RESTORED TO PRE-EXISTING CONDITIONS.

**EROSION CONTROL AND SEDIMENT PREVENTION PLAN**  
SCALE: 1"=10'

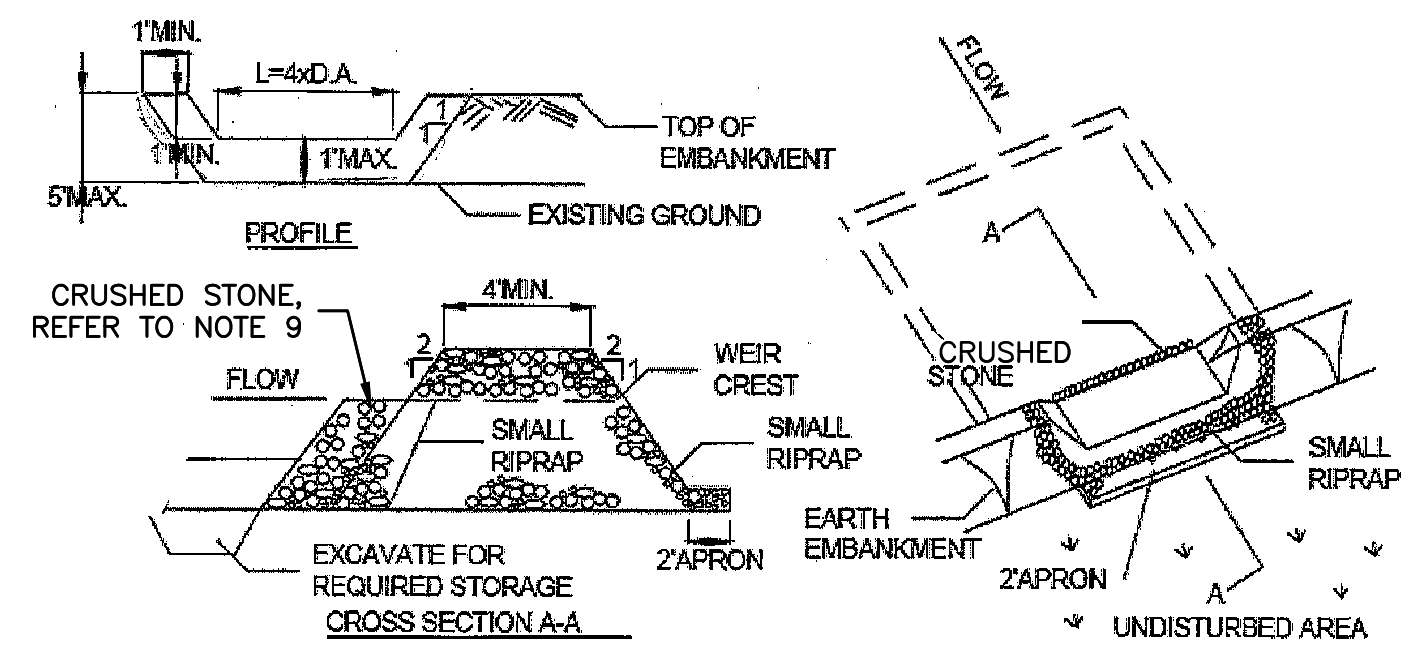
**GENERAL NOTES:**

1. ANY WATER FROM DEWATERING OR STREAM BYPASS SHALL BE TREATED WITH A SEDIMENT TRAP PRIOR TO ENTERING THE STREAM CHANNEL.
2. THE PROPOSED METHOD OF DEWATERING THE CONSTRUCTION EXCAVATION IS BY USED OF A TEMPORARY BYPASS CULVERT AS SHOWN ON THIS SHEET. ALL WATER PUMPED OUT OF THE EXCAVATION SHALL BE DISCHARGE UPSTREAM OF THE SEDIMENT TRAP OR THROUGH A SEDIMENT BAG. CONTRACTOR SHALL SUBMIT PLAN FOR STREAM DIVERSION TO ENGINEER FOR APPROVAL PRIOR TO CONDUCTING IN-STREAM WORK.
3. CONTRACTOR SHALL CONSTRUCT STABILIZED CONSTRUCTION ENTRANCES AS NECESSARY TO PREVENT TRACKING OF MATERIALS ONTO RESERVOIR ROAD. ADDITIONAL EROSION CONTROL AND SEDIMENT PREVENTION MEASURES, SUCH AS SILT FENCE AND STABILIZATION MAY BE REQUIRED DURING CONSTRUCTION AND WILL BE PROVIDED BY THE CONTRACTOR.
4. REFER TO CIVIL SHEETS FOR ADDITIONAL CULVERT AND UTILITY DETAILS.
5. INSTALL SILT FENCE AROUND SOIL STOCK PILES AND ALONG CONTOURS AT BASE OF DISTURBED AREAS. ACTUAL LOCATIONS TO BE FIELD DETERMINED.



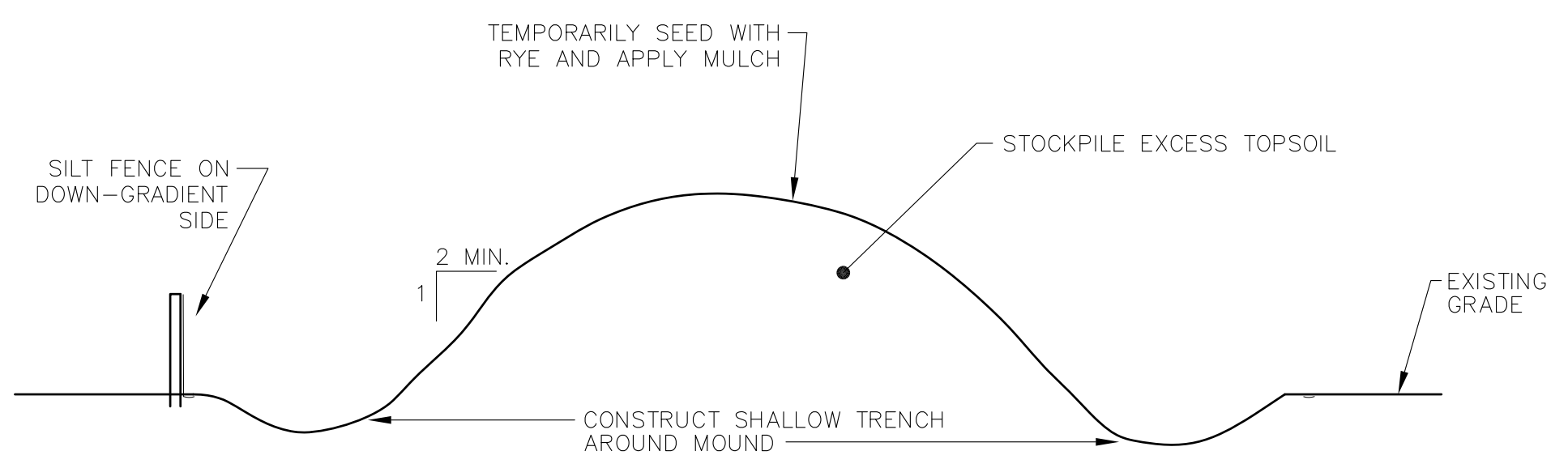
SLOPE STEEPNESS (H:V)	MAXIMUM SLOPE LENGTH BETWEEN SILT FENCE ROWS (FEET)
2:1	25
3:1	50
4:1	75
5:1 OR FLATTER	100

**SILT FENCE INSTALLATION DETAIL**  
NOT TO SCALE

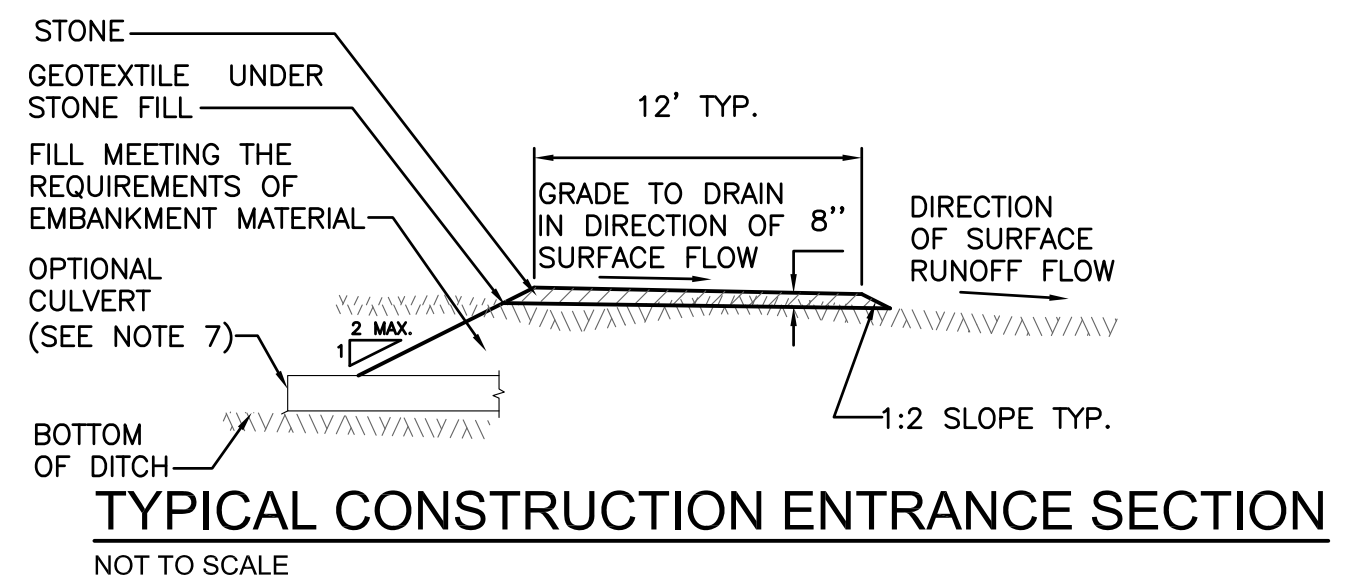


**STONE OUTLET SEDIMENT TRAP CONSTRUCTION SPECIFICATIONS:**

1. AREA UNDER EMBANKMENT SHALL BE CLEARED, GRUBBED, AND STRIPPED OF ANY VEGETATION AND ROOT MATERIAL. THE POOL AREA SHALL BE CLEARED.
2. THE FILL MATERIAL FOR THE EMBANKMENT SHALL BE FREE OF ROOTS AND OTHER WOODY VEGETATION AS WELL AS OVER-SIZED STONES, ROCKS, ORGANIC MATERIAL, OR OTHER OBJECTIONABLE MATERIAL. THE EMBANKMENT SHALL BE COMPACTED BY TRAVERSING WITH EQUIPMENT WHILE IT IS BEING CONSTRUCTED.
3. ALL CUT AND FILL SLOPES SHALL BE 2:1 OR FLATTER.
4. THE STONE USED IN THE OUTLET SHALL BE SMALL RIP RAP (TYPE I STONE FILL) WITH A 1 FOOT THICKNESS OF 2" AGGREGATE (WASHED CRUSHED STONE) PLACED ON THE UP-GRADE SIDE ON THE SMALL RIP RAP OR EMBEDDED FILTER CLOTH IN THE RIP RAP.
5. SEDIMENT SHALL BE REMOVED AND TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. IT SHALL BE PLACED ON SITE AND STABILIZED.
6. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND AS REQUIRED BY THE ENGINEER.
7. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND SEDIMENT ARE CONTROLLED.
8. THE STRUCTURE SHALL BE REMOVED AND THE AREA STABILIZED WHEN THE DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.
9. A ONE FOOT LAYER OF CRUSHED STONE MAY BE PLACED ON THE UPSTREAM SIDE OF THE RIP RAP IN PLACE OF THE EMBEDDED FILTER CLOTH.



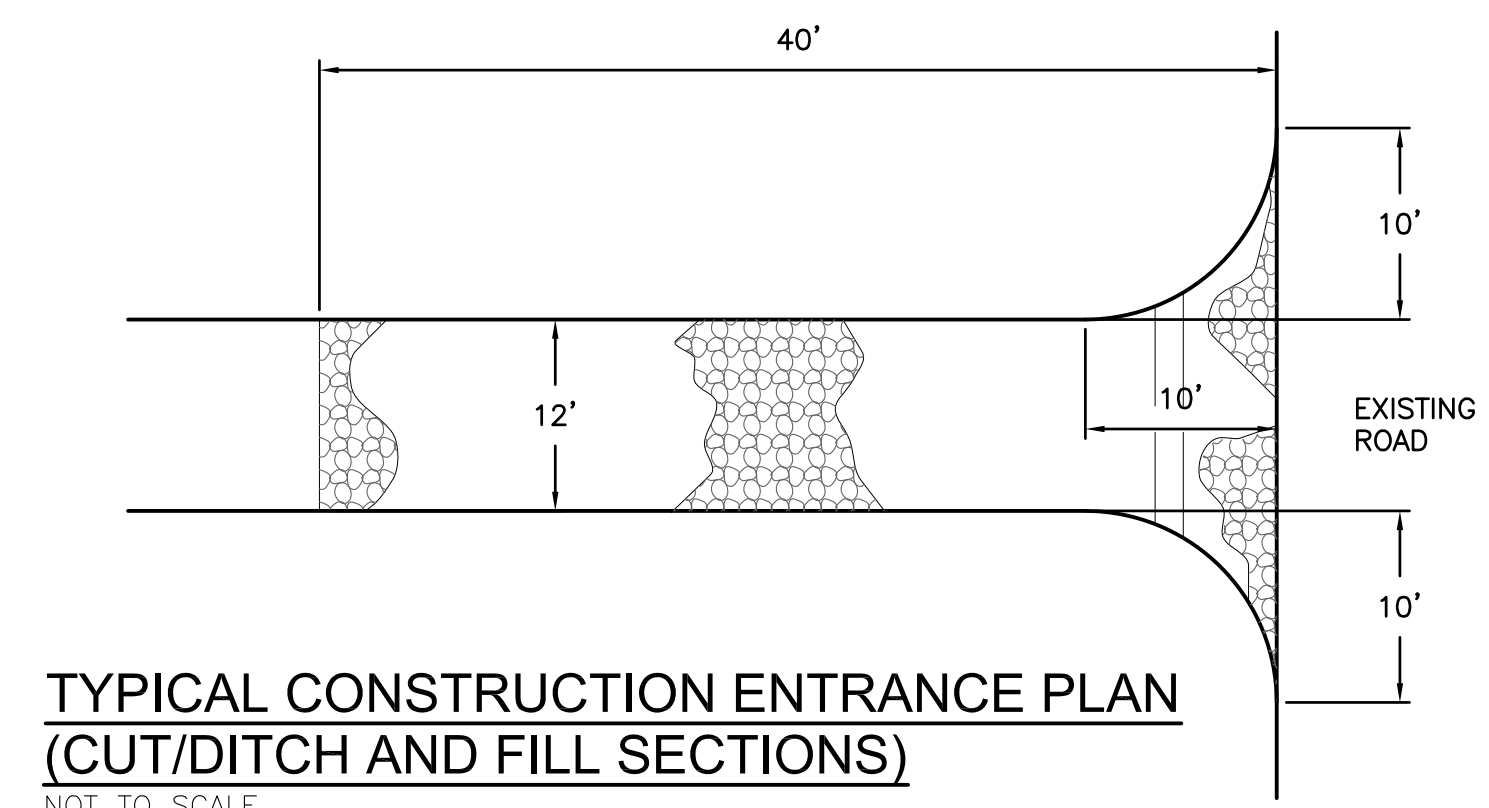
**TOPSOIL STOCKPILE MOUND**  
NOT TO SCALE



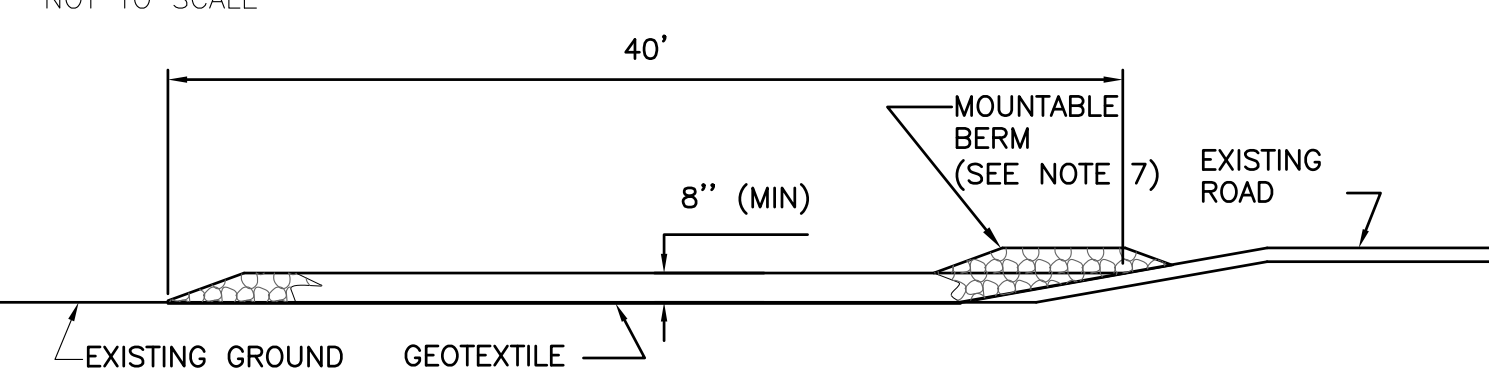
**TYPICAL CONSTRUCTION ENTRANCE SECTION**  
NOT TO SCALE

**CONSTRUCTION ENTRANCE NOTES:**

1. THE PURPOSE OF A STABILIZED CONSTRUCTION ENTRANCE IS TO REDUCE OR ELIMINATE THE TRACKING OF SEDIMENT ONTO PUBLIC RIGHTS OF WAY OR STREETS.
2. STONE SIZE - USE CLEAN STONE WITH GRADATION BETWEEN 1 INCHES AND 4 INCHES.
3. LENGTH - 40 FEET (MIN)
4. THICKNESS - 8 INCHES (MIN)
5. WIDTH - 12 FEET (MIN)
6. GEOTEXTILE UNDER STONE WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.
7. SURFACE WATER - ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS THE ENTRANCE AS DIRECTED BY THE ENGINEER. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
8. PROPOSED DRAINAGE PIPES SHALL BE SIZED WITH SUFFICIENT CAPACITY TO CARRY DITCH FLOWS. ALTERNATIVE WAYS OF TRANSPORTING DITCH DRAINAGE ACROSS CONSTRUCTION ENTRANCES MAY BE PROPOSED BY THE CONTRACTOR FOR APPROVAL BY THE ENGINEER.
9. WHEN WASHING OF VEHICLE IS NECESSARY, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
10. MEASURES SHALL BE INSPECTED EVERY SEVEN (7) CALENDAR DAYS AND WITHIN 24 HOURS OF A STORM EVENT GREAT ENOUGH TO CAUSE WATER TO LEAVE THE CONSTRUCTION SITE.
11. MAINTENANCE- THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. ALL SEDIMENT SPILLED, DROPPED, WASHED, OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
12. AT THE TIME OF REMOVAL OF THE STABILIZED CONSTRUCTION ENTRANCE THE DISTURBED AREA SHALL BE REPAIRED AND STABILIZED.



**TYPICAL CONSTRUCTION ENTRANCE PLAN (CUT/DITCH AND FILL SECTIONS)**  
NOT TO SCALE



**TYPICAL CONSTRUCTION ENTRANCE PROFILE (CUT AND DITCH SECTIONS)**  
NOT TO SCALE

**DG**  
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RESERVOIR ROAD  
CULVERT REPLACEMENT  
**EROSION CONTROL AND SEDIMENT PREVENTION PLAN**  
CHESTER, VERMONT

Project #	7150015
Project Mgr.	NRJ
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Date	APRIL 13, 2016
Scale	AS SHOWN

**BID DOCUMENTS**  
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