

**FLOAT BRIDGE ROAD CAUSEWAY
RECONSTRUCTION
TOWN OF CASTLETON, VERMONT
TECHNICAL SPECIFICATIONS**

March 22, 2016

prepared by:

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IMERYS TALC VERMONT, INC.
GENESIS PROJECT**

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GEOTECHNICAL REPORTS

M & W Soils Engineering, Inc issued September 19, 2013

M & W Soils Engineering, Inc issued February 14, 2013

M & W Soils Engineering, Inc issued July 2, 2012

Root Engineering issued December 6, 1995

PERMITS

U.S. Army Corps of Engineers, Vermont General Permit

State of Vermont Stormwater Program, Construction General Permit

State of Vermont Lakes & Ponds Program, Lake Encroachment Permit

SECTION 02000 - SUMMARY OF WORK

The Float Bridge Road Causeway, buttressed on either side by gabion walls, has failed. The Town seeks to have a large aggregate stone backfill installed against the gabion walls to reduce the lateral movement.

The Town seeks a Base Bid for the construction on the south side of the eastern causeway. Alternate #1 is for the construction on the north side of the eastern causeway. Alternate #2 is for a 1.5 inch asphalt overlay on the eastern causeway. There is no proposed construction to the western causeway.

Topographic information below the water surface is very limited and the elevation contours depicted on the plan are approximate. The soil along the lake's bottom is believed to be unconsolidated. There is a potential for settlement of the lake soils during construction due to the backfill overburden. The contractor is responsible for additional material needed to achieve the finished slopes due to settlement.

Shrubs and other vegetation at the base of the gabion wall shall be cut to grade and removed prior to the installation of the geotextile.

All disturbed vegetated surfaces shall be revegetated with seed and stabilization blanket following final stabilization.

Geotechnical Reports issued by M & W Soils are included within the specifications for additional information. The town does not seek to have the geotechnical report recommendations for roadway reconstruction implemented; the activities associated with the gabion and slope stabilization are limited to the plans and specifications.

The contractor shall endeavor to limit damage to the asphalt roadway. The guardrails shall remain or if damaged or removed for construction be replaced as part of the work. The contractor shall maintain the guardrail or provide a suitable alternative if temporarily removed.

The contractor shall be responsible for traffic control during construction, including after hours. The contractor may close one lane of traffic during periods of construction with the other traffic lane operated by flaggers. All traffic controls are to be coordinated with the Town.

If granted permission by the Town, the contractor may close both lanes of traffic for brief, singular construction activities, but the intent is for one lane of travel to be maintained at all times for regular vehicle traffic. This includes emergency vehicles and buses. Float Bridge Road provides access for campers, boats (large and small), trucks, etc. One way traffic shall be maintained at all times. The roadway shall be open to two way traffic at the conclusion of daily work activities except when approved by the town in writing.

The waterway underneath the Grady Bridge must be remain open and safe to travel from construction at all times for normal flow and boat traffic.

A construction schedule is required to be submitted by the bidders as part of the bid submittal. Schedules shall account for any alternates.

Float Bridge Road contains overhead and buried utilities. The contractor shall contact Dig Safe for utility delineation prior to commencement.

The contractor shall respect the property of private landowners adjacent to the causeway. No construction equipment shall enter or material storage may occur on private property unless permitted in writing from the owner and agreed to by the town. Use of other properties may be subject to permitting.

The construction is subject to the following three permits:

- Lake Encroachment Permit issued by the State of Vermont Lakes and Ponds Program on February 18, 2014
- Construction General Permit for Moderate Risk Project issued by the State of Vermont Stormwater Program issued September 30, 2013. The contractor shall file paperwork to be a co-permittee and On-Site Plan Coordinator as required by the permit
- Army Corps of Engineers General Permit issued on November 25, 2013 and March 2, 2016

The contractor shall be thoroughly familiar with the requirements of the permits. If the permit conditions cannot be implemented, the contractor shall contact the Owner and Engineer prior to bidding.

Construction within the waters of the State is approved, subject to permits. The Lake Encroachment Permit restricts construction within the water of the state to between June 23 and December 31. A floating turbidity curtain is required for sediment settling within the water. The contractor is responsible for all safety onsite, including but not limited to, construction within the water.

End

SECTION 02103
EROSION CONTROLS

PART I - GENERAL

1.01 DESCRIPTION

- A. Work Included
 - 1. Limit of Construction Fence
 - 2. Stone Check Dams
 - 3. Siltation Fence
 - 4. Dust Control
 - 5. Earth Stabilization
 - 5. Floating Turbidity Barrier

1.02 CONSTRUCTION GENERAL PERMIT

- A. All soil disturbance is subject to the Construction General Permit for Stormwater Runoff from a Construction Site issued by the Vermont Stormwater Program for the project. The contractor shall file paperwork to be a co-permittee as required by the permit.
- B. The contractor shall be thoroughly familiar with the requirements of the permit and include same within the bid. In order to maintain permit compliance the contractor **must** follow all the criteria outlined in the permit. If these criteria cannot fully be implemented, the contractor shall contact the Owner and Engineer prior to any construction.
- C. All areas of disturbance must have temporary or final stabilization at the end of each workday..
- D. The project construction may disturb no more than an aggregate of 1 acre.
- E. The plans and erosion control procedures described herein provide a guideline for the contractor in implementation of erosion control measures. The Contractor shall obtain a copy and become familiar with The Vermont Standards and Specifications for Erosion Prevention and Sediment Control and the Vermont Erosion Prevention and Sediment Control Field Guide. The Contractor shall not be limited to the methods and procedures outlined on the plans or in the standards. The Contractor shall employ any appropriate measures as site conditions require to prevent erosion and sedimentation outside of the active construction area.

PART II - PRODUCTS

2.01 LIMIT OF CONSTRUCTION FENCE

- A. Snow fence, orange in color, 30"-36" height.
- B. Posts: wood or steel, minimum length of five feet. Set in the ground at least two feet, at a spacing of six to ten feet. Stapling or attaching the fence to existing trees should be avoided.

2.03 STONE CHECK DAMS

- A. Stone size: 3/4" to 12" clean washed stone.
- B. Installation: saddle configuration in drainage swale, 6" min. height, 24" max.

2.04 SILTATION FENCE

- A. Support fence: Livestock wire fence, at least 14-gauge, a minimum of 36 inches in height, with a maximum mesh spacing of six inches.
- B. Posts: Wood or steel, minimum length of five feet. Set in the ground at least two feet, at a spacing of six to ten feet. Stapling or attaching the fence to existing trees should be avoided.
- C. Filter fabric: Either woven or non-woven material. Commercial filter fabrics are recommended. Minimum of three feet in height. Secure to the top of the support fence by suitable tie wire or hog rings. The bottom of the cloth should be keyed into the ground sufficiently to prevent water from flowing beneath it.

2.04 DUST CONTROL

- A. Only clean water used and shall be clear and free of harmful amounts of oil, salt, acids, alkalis, sugar, organic matter or other substances injurious to the finished product, plant life or the establishment of vegetation. Where the source of water is relatively shallow, the intake shall be maintained at such a depth and so enclosed as to exclude silt, mud, grass and other foreign materials.
- B. Calcium Chloride shall not be used.

2.05 EARTH STABILIZATION

- A. Seed: See Seeding Schedule on plan
- B. Blanket: Install Bionet S75-BN Biodegradable Straw Blanket as manufactured by North American Green on all vegetated areas to be seeded

2.06 FLOATING TURBIDITY BARRIER

- A. Barrier shall be Type 2 Turbidity Curtain as manufactured by Indian Valley Industries or equal.
- B. Shall preclude sediment from traveling outside of the barrier.

PART III - EXECUTION

3.01 LIMIT OF CONSTRUCTION FENCE

- A. Where appropriate, fence shall be installed around the perimeter of the work area to separate the general public from the active construction area.
- B. Fencing limits shall be pulled in tighter to the construction area as work is completed.
- C. Drive fence posts.
- D. Staple or attach fence with zip ties.

3.03 STONE CHECK DAMS

- A. Stone check dams shall be installed along downgradient edge of construction (between building site and existing pavement).
- B. Check dams shall be installed in drainage swales and areas of concentrated stormwater runoff as a temporary measure while vegetation becomes established.
- C. Check dams shall be installed in a saddle configuration a minimum of 6" and a maximum of 24" high.
- D. Horizontal spacing of check dams shall be such that the bottom of one check dam is at the same vertical elevation as the top of the stone check dam immediately downgradient.
- E. Inspection shall be frequent and repair or replacement shall be made promptly as needed.
- F. Stone check dams shall be removed when they have served their usefulness, so as not to block or impede storm flow or drainage.

3.04 SILTATION FENCE

- A. Drive fenceposts.
- B. Construct small trench on front side of fence.
- C. Staple or attach wire fence.
- D. Staple or attach filter fabric to wire fence allowing sufficient material for use in the bottom of the trench.
- E. Bury the filter cloth a minimum of six inches to prevent undermining.

3.05 DUST CONTROL

- A. Water shall be applied to such travelled areas as needed. The number of applications and the amount of water used shall be based upon field and weather conditions.
- B. Calcium chloride shall be applied in such a manner and by such devices that uniform distribution is obtained over the entire area on which it is applied. Application rate shall be 0.5 pound of calcium chloride per square yard. In general, calcium chloride shall be used on roadways under construction. It shall not be used on surfaces on which bituminous material will be applied.

3.07 FLOATING TURBIDITY BARRIER

- A. Follow all manufacturers' instructions.
End

SECTION 02210
SITE GRADING

PART I - GENERAL

1.01 DESCRIPTION

- A. Work Included:
 - 1. Loam and Seeding

1.02 LIMITS

- A. All areas where the existing topsoil or vegetation has been disturbed by the construction.

PART II - PRODUCTS

2.01 TOPSOIL (imported)

- A. Topsoil shall be of a quality that will support healthy, vigorous plant growth.
- B. Topsoil shall be a natural workable loam, free from refuse, roots, stones, brush, weeds, or other materials which would be detrimental to the proper development of plant growth.
- C. Topsoil shall be obtained from an area which has demonstrated by a healthy growth of grass, cultivated crops or wild vegetation, that it is good quality and reasonably free draining.
- D. The topsoil and its source shall be inspected and approved by the Engineer or Owner before its use.

2.02 SEED

Seed shall be of the following composition:

<u>Principal Use</u>	<u>Seed Mixture</u>	<u>Pounds per Acre</u>
Permanent Cover	Birdsfoot Trefoil	10
	Tall Fescue	20
	Perennial Ryegrass	5
	Creeping Red Fescue	20
Temporary Cover (Spring/Summer/early Fall)	Annual or Perennial Ryegrass	20
Temporary Cover (Late Fall/early Winter)	Aroostook Winter Rye	90

2.03 FERTILIZER

Fertilizer may not be used adjacent to the lake.

PART III - EXECUTION

3.01 PREPARATION OF AREA

- A. The ground surface shall be shaped in reasonable conformity to the lines and grades indicated on the Plans.
- B. The surface shall be thoroughly raked, dragged, or otherwise mechanically smoothed.
- C. All stones, lumps, roots, or other objectionable material shall be removed.

3.02 APPLICATION

- B. After seed application, the area shall be lightly raked to mix the seed with the soil and rolled with a lightweight roller.
- C. Straw blanket installation shall be done within 24 hours of seeding **and secured as necessary to stay in place.**

3.03 CARE DURING CONSTRUCTION

- A. The Contractor is responsible for protecting and caring for seeded areas until established growth covers all seeded areas.
- B. The Contractor shall repair and/or re-work, at no cost to the Owner, all areas where growth has died or not occurred or where washing and gulling has occurred.

End

SECTION 02220
EXCAVATION AND BACKFILL

PART I - GENERAL

1.01 DESCRIPTION

- A. Work Included
1. General Excavation, Backfill, and Compaction for sitework only.

1.02 JOB CONDITIONS

- A. Safety
1. The Contractor is responsible for initiating, maintaining, and supervising all safety precautions in relation to the work to be performed.
 2. The Contractor shall take all necessary precautions for the safety of and shall provide the necessary protection to prevent damage, injury and/or loss to all persons on the work and other persons who may be affected thereby.
 3. The Contractor shall take all necessary precautions to protect all materials to be incorporated whether installed or in storage and all other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement.
 4. The Contractor shall verify location of existing underground services, footing, piping and underground work of other contractors, prior to beginning any excavation.
 5. Any damage caused by a contractor shall be repaired and/or replaced at the contractor's expense.
- B. Subsurface conditions: The Contractor shall promptly and before such conditions are disturbed, except in the event of an emergency, notify the Owner by Written Notice of:
1. Subsurface or latent physical conditions at the site differing materially from those indicated in the plans.
 2. Unknown physical conditions at the site of an unusual nature.
- C. Accessibility: The surfaces of walkways, roadways, waterways and other means of getting through and around excavations shall be kept in good and passable conditions at all times.
- D. Unauthorized Excavation: Excavation made beyond the limits shown on the Plans shall be satisfactorily refilled by the Contractor at his expense to the satisfaction of the Engineer.

PART II - PRODUCTS

2.01 FILL MATERIAL

- A. Imported Fill Material for Blast Rock slope:
1. All imported material shall be hard, blasted, angular rock with a longest dimension of the rock varying from 24" to 36". The least dimension of the rock shall be greater than 33 percent of the longest dimension.
 2. Voids in the Blast Rock slope shall be chinked in place by smaller materials consisting of hard, blasted, angular rock. No aggregate smaller than 4 inches in size shall be used.

3. When the fill material is slate or other metamorphic rock, the percent of wear of the aggregate shall not be more than 35 percent when tested in accordance with AASHTO T 96.
- C. Geotextile for Blast Rock slope:
1. Geotextile shall be Woven Mirafi HP270 or approved equal.

PART III - EXECUTION

3.01 EXCAVATION

- A. General
1. All excavated material shall be placed so as not to endanger the work and so that free access may be had at any time to all parts of the work.
- B. Limits
1. Excavation limits shall be ample in length and width to perform the work to be done within the excavation.
 2. Two sections of gabion wall are identified on the plan for removal of the upper 50% of its height. The gabion walls on either side of these sections shall have the stone backfill installed prior to removal of the section. The gabion wall shall be cut where it connects to adjacent gabions. Once removed, this section of causeway shall immediately have the stone backfill installed.
 3. Photographs of the two sections of gabions to be removed:

Section One is located on the causeway's south side from Sta 0+98 to Sta 1+38



Section Two is located on the causeway's north side from Sta 3+13 to Sta 3+21



3.02 UNSUITABLE MATERIALS

- A. Where excavation occurs in fill ground or unstable subsoils incapable of safely supporting proposed construction, carry the excavation down to undisturbed soil, but not less than 12 inches below bottom elevation and return to required elevation with compacted fill.

3.03 BACKFILL

- A. General
 - 1. The excavation shall be carefully backfilled as soon as possible after the work is performed and conditions are suitable for backfill.
 - 2. All voids shall be completely filled.
- B. Ordinary Compacted Areas and Subgrades
 - 1. Backfill to grades indicated on drawings by depositing in uniform horizontal layers (lifts) of 12 inches maximum thickness.
 - 2. Spread each layer uniformly and compact each layer (lift) to not less than 90% of maximum dry density as determined by ASTM D 1557, Method D.

3.04 2:1 BLAST ROCK SLOPE BACKFILL

A. General

1. The woven geotextile shall be placed on the lake bottom prior to any rock backfill. Geotextile layers shall be overlapped and placed with folds to allow for stretching without tearing. The geotextile shall extend 3 feet beyond the toe of the blast rock slope. Any holes created in the geotextile by rock placement shall be covered with geotextile and overlapped by at least 12 inches.
2. Blast rock placement shall begin at the toe of the slope. Contractor to exercise care when placing rock so as not to tear geotextile.
3. The finished blast rock surface shall have a grade not exceeding 2 (horizontal): 1 (vertical).
4. Voids in the Blast Rock slope shall be chinked in place by smaller materials consisting of hard, blasted, angular rock.
5. The section of gabion wall to be removed shall immediately have the stone backfill installed following removal. The backfill shall be installed at a uniform grade to the adjacent backfill slopes with no low spots.

3.05 DISPOSAL OF EXCESS MATERIAL

- A. The Contractor shall dispose of all excess excavated material at a location selected by the Contractor and approved by the Owner.

End

SECTION 02430

PAVED SURFACES

PART I - GENERAL

1.01 DESCRIPTION

- A. Work Included: Paving or gravel for:
 - 1. Roads

1.02 QUALITY ASSURANCES

- A. Standards: All Work shall conform to the State of Vermont, Agency of Transportation, Standard Specifications for Construction, latest edition.

PART II - PRODUCTS

2.04 AGGREGATE FOR SURFACE COURSE AND SHOULDERS

- A. All crushed gravel for surface course and shoulders shall meet the Vermont Standard Specifications 704.12 6" minimum thickness.

2.05 BITUMINOUS PAVING

- A. Road
 - 1. Wearing Course
 - a. All paving shall meet Vermont Standard Specification 406, Type III, minimum thickness 1 ½".

PART III - EXECUTION

3.01 INSPECTION

- A. Prior to placement of materials, carefully inspect the work of adjacent trades and verify all work is complete to the point where the work in this section may commence.

3.02 SOFT SPOTS

Areas of soft, yielding or other unsuitable material that will not compact readily shall be removed and replaced with a suitable material and properly compacted.

3.03 COMPACTION: Earth and Gravels

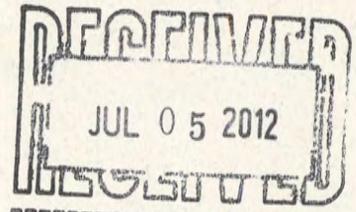
- A. No stone particle size shall exceed 2/3 the thickness of the layer being placed.
- B. Material to be compacted shall be spread in uniform horizontal layers not to exceed 12" in thickness. If more than one 12" layer is needed, two more layers of equal thickness shall be placed.

- C. In no case shall the moisture content in each layer be more than three percent above the optimum moisture content, and it shall be less than that quantity that will cause the material to become unstable during compaction.
- D. Each layer shall be compacted to densities listed below as determined by ASTM D 1557, Method D.
 - 4. Surface Course and Shoulder, 704.12, 95% maximum dry density.
- E. Shoulder gravels shall be placed and compacted after pavement placement is complete.

3.04 PAVEMENT

- A. Pavement shall be made, handled, placed, and compacted according to Section 406, Bituminous Concrete Pavement, Vermont Standard Specifications for Construction, latest edition.

End



Randall Rhoades

Warren L. Stevens - PE

265 Main Street, PO Box 1466, Charlestown, NH 03603 • Phone: (603) 826-5873 • Fax: (603) 826-4210 • mwsoils@myfairpoint.net

July 2, 2012

Enman-Kesselring Consulting Engineers
61 Prospect Street
Rutland, VT 05701
Atten: Blair Enman

RE: Castleton Float Bridge
Test Pits & Soils Report

Dear Blair,

On June 18, 2012 and June 28, 2012 I was on site to view the causeway and observe test pits in the road subbase. The following soils were observed in the pits:

TP-1: West side, South lane

0 to 6" pavement
6" to 14" silty crushed gravel
14" to 30" clean brown sandy gravel
30" to 36" layer of very silty sandy gravel, dense material removed in "cemented" clumps
36" to 47" fine silty gravels
47" to 66" coarse gravel with cobbles, some slate
66" purple and blue slate, mixed with gravel, slate pieces are large

TP-2: East side, South lane

0 to 5.5" pavement
5.5" to 22.5" silty crushed gravel
22.5" to 26.5" dense silty sandy gravel (cemented)
26.5" to 48" silty gravel with small slate pieces
48" to 60" large pieces of purple slate, mixed with some gravel

TP-3: East side, North lane

0 to 5" pavement
5" to 23" silty crushed gravel
23" to 27" "cemented" dense very silty gravel
27" to 32" clean gravels
32" to 48" gravels with slate, large slate pieces occurring at 48"

The pavement thickness is certainly more than adequate. The gravels are quite silty and some layers will be frost susceptible. The layer noted as

"cemented" is an impermeable layer of silty gravel containing 52.7% silt in the sand portion, (75.5%). This would tend to trap moisture above it. Frost action in the subgrade would tend to push the gabions outward. There is no apparent damage from frost heaves in the road surface, but with the uniform layers of finer gravels there would not be.

Three sieve analyses were conducted on selected samples. Primarily to determine the amount of fines in the subgrade. All samples showed in excess of 12% fines in the sand portion. Stone content was adequate. The samples did not include the 1.5" to 3" stone noted on site in some layers.

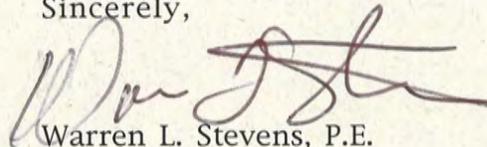
The construction of the gabions probably added a new surcharge of weight along the former edge of the embankment, with the weight of gabions and the wedge of soil behind. The gabion base was above water level, per design. Water and ice action would affect fines and smaller slate pieces at the gabion base. The historical comments indicate the slate fill settled visibly as it was installed. I am sure the added weight of gabions caused settlement to some degree under them and contributes to their "tip out".

It was noted that muskrats were undermining at least one area along the North lane, West side. I viewed one going into a tunnel below the water level and under the gabions

Removal of gabions, and reusing stone in them, along with the 2' blast rock will provide a surface you can work with. The road surface should be stabilized after all these years. The rock slopes will not add substantial additional weight, and gabion removal will lessen it.

If road subbase is removed, break up the "cemented" layer where possible, prior to placing gravel subbases.

Sincerely,

A handwritten signature in dark ink, appearing to read "Warren L. Stevens". The signature is fluid and cursive, with a large initial "W" and "L".

Warren L. Stevens, P.E.

WLS:sj

Enclosures

M & W SOILS ENGINEERING, INC.

P.O. Box 1466
Charlestown, NH 03603
Tel.(603) 826-5873

GRADATION

Type of Material:	Cemented Layer Silty gravel	Client:	Enman Engineering
Date of Sample:	6-28-12	Sampled by:	M & W SEI
Source of Sample:	Existing fill under road		
Usage:	Bomoseen Float Bridge		

Screen Size	Weight Retained	Percent Retained	Percent Passing	Specification Percent Passing
1-1/2 inch	0	0.0%	100.0%	
1 inch	0	0.0%	100.0%	
3/4 inch	0	0.0%	100.0%	
1/2inch	19.4	6.7%	93.3%	
3/8 inch	12.4	4.3%	89.0%	
#4	38.6	13.4%	75.5%	
#10	25.8	9.0%	66.6%	
#20	33.8	11.7%	54.8%	
#40	18.3	6.4%	48.5%	
#100	15.2	5.3%	43.2%	
#200	9.7	3.4%	39.8%	
pan	114.6	39.8%	0.0%	
Total	287.8			

Remarks:

Natural Moisture Content 9.7%
This sample was washed

M & W SOILS ENGINEERING, INC.
P.O. Box 1466
Charlestown, NH 03603
Tel.(603) 826-5873

GRADATION

Type of Material:	Crushed gravel with slate	Client:	Enman Engineering
Date of Sample:	6-28-12	Sampled by:	M & W SEI
Source of Sample:	TP-2, 2'-4'		
Usage:	Bomoseen		

Screen Size	Weight Retained	Percent Retained	Percent Passing	Specification Percent Passing
6 inch	0	0.0%	100%	
3 inch	0	0.0%	100%	
2 inch	0	0.0%	100%	
1 1/2 inch	114.8	7.0%	93%	
1 inch	368.7	22.5%	70.6%	
3/4 inch	149.6	9.1%	61.4%	
1/2 inch	173.1	10.5%	50.9%	
3/8 inch	102.3	6.2%	44.7%	
#4	278.6	17.0%	27.7%	
pan	455.1	27.7%	0.0%	

			Sand Portion	Total Sample
#4	0	0.0%	100%	27.7%
#10	53.2	27.9%	72%	20.0%
#20	67.4	35.4%	37%	10.2%
#40	27.5	14.4%	22%	6.2%
#100	13.7	7.2%	15%	4.2%
#200	5.3	2.8%	12.2%	3.4%
pan	23.3	12.2%	0.0%	0.0%

Remarks: Natural Moisture Content 5.0%

This sample was washed

M & W SOILS ENGINEERING, INC.
P.O. Box 1466
Charlestown, NH 03603
Tel.(603) 826-5873

GRADATION

Type of Material:	Gravel	Client:	Enman Engineering
Date of Sample:	6-28-12	Sampled by:	M & W SEI
Source of Sample:	TP-3, 5"-23"		
Usage:	Bomoseen		

Screen Size	Weight Retained	Percent Retained	Percent Passing	Specification Percent Passing
6 inch	0	0.0%	100%	
3 inch	0	0.0%	100%	
2 inch	0	0.0%	100%	
1 1/2 inch	0	0.0%	100%	
1 inch	215.1	11.4%	88.6%	
3/4 inch	60	3.2%	85.4%	
1/2 inch	163.6	8.7%	76.8%	
3/8 inch	146.4	7.8%	69.0%	
#4	365	19.3%	49.7%	
pan	938.7	49.7%	0.0%	

			Sand Portion	Total Sample
#4	0	0.0%	100%	49.7%
#10	61.7	21.9%	78%	38.8%
#20	91.9	32.6%	45%	22.6%
#40	43.4	15.4%	30%	15.0%
#100	24.7	8.8%	21%	10.6%
#200	11.1	3.9%	17.4%	8.6%
pan	49	17.4%	0.0%	0.0%

Remarks: Natural Moisture Content 6.5%

This sample was washed.



Warren L. Stevens - PE

Randall Rhoades

265 Main Street, PO Box 1466, Charlestown, NH 03603 • Phone: (603) 826-5873 • Fax: (603) 826-4210 • mwssoils@myfairpoint.net

February 14, 2013

Enman Kesselring Consulting Engineers
61 Prospect Street
Rutland, VT 058701
Atten: Pat Griffin

RE: Large Stone Rip Rap

Dear Pat

The larger stone would be preferable to me as it would be less likely to move from ice action. There may be some initial settlement as it is more dense than a gabion. However, if it can be laid back there may be no net increase in load, and possibly a net decrease. It would be advantageous to embed the stones to 1' to 2' below water level. My pictures from July 2011 show gabions set back from the edge of water in most cases. Smaller rock could be placed in front of the 4'+ boulders. Voids between and behind would be chinked with smaller stone, preferably a mix of the gabion stone with 12"+/- shot rock.

A geotextile, mirafi 600x or similar should be placed between all soil/stone interfaces.

A drawback with the large stone will be the larger equipment required to handle it.

I feel the large stone would be better than the slope of smaller stone, as long as it can be laid back on a 1 to 2 batter and voids are well chinked with a variety of smaller stone. We do expect erosion and ice damage over time, as well as undermining by muskrats. Repair should be much easier than replacing gabions.

It should be noted the state details may be for streams, which do not have the impact of a large ice sheet.

Sincerely,

A handwritten signature in black ink, appearing to be 'W. Stevens', is written over the typed name. The signature is fluid and cursive, with the first and last letters being capitalized and prominent.

Warren L. Stevens, P.E.

WL:sj



Warren L. Stevens - PE

Randall Rhoades

265 Main Street, PO Box 1466, Charlestown, NH 03603 • Phone: (603) 826-5873 • Fax: (603) 826-4210 • mwssoils@myfairpoint.net

September 19, 2013

Town of Castleton
556 Main Street
Castleton, VT 05735
Atten: Charles Jacien

RE: Float Bridge

Dear Charles,

This report summarizes site visits, observations and recommendations for replacement of the gabion retaining walls alongside the Float Bridge Road as it crosses Lake Bomoseen. The gabion walls have started to tip toward the lake. In some locations movement is substantial and voids have opened up behind the gabions. As these continue to move, they could become a hazard for people, especially climbing on them. In 2011, gabions on the lake side, Easterly end of the road, showed significant movement.

The causeway subgrade is built on a rock fill. Reportedly as the rock fill was placed it settled and additional fill was added until the fill stabilized. Gravel subbase fills typically of 4' to 5'+/- were placed over the rock fill. Test pits conducted on June 2012 verified this depth, and verified material below the gravels was a purple slate mixed with gravel. Slate pieces of 12" to 24" were common.

Test pit results were forwarded to Enman Engineering in a report dated July 2, 2012, a copy of which is attached.

It has been decided to remove the gabions and construct a rip rap slope to the lake. This rip rap will be placed on filter fabric, (mirafi HP270 or approved equal), to prevent migration of fines up into the stone voids. This will alleviate settlement. The slope will consist of 2' to 3' blast rock chinked with smaller stone. Stone may be reused from the gabions for the "smaller stone" as needed, and as available. This stone armoring will extend from the "toe of slope" under water to 3'+/- above normal lake levels. Smaller stone fill, 6"+/-, will be used on the slope above the large blast rock and as a base for road fill. Existing stone is apparent in the water extending out from the gabions.

OBSERVATIONS AND RECOMMENDATIONS:

1. The existing deep road fill was dense and free of voids. No significant

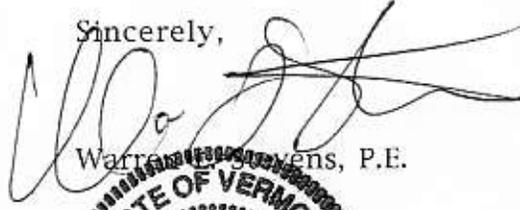
settlement of the road area is to be expected, given the age of the road. The new construction will not raise the road grade, and should lessen load at the shoulders. Minor settlement undoubtedly continues to a limited degree of the underlying deposits, but will be negligible.

2. Test borings done in water in 1995, along side the bridge, indicated varying depth of muck over more stable soils. Depths of muck ranged from less than 5' to 20'+/- of muck. Most of these borings were done 30' to 50' off the guard rails, as part of a study to construct a cutoff wall. No borings were done through the rock fill, but well outside its toe.
3. In areas around the proposed fishing platforms and along the Northeast section of the causeway, new fills will extend well beyond the existing toe, and possibly over unconsolidated muck. Gabions will have caused some consolidation of the sediments in these areas, essentially "pre loading" the existing toe. Settlement of the extended fill is to be expected, especially at the platforms. Add stone as required in these areas. In most cases the additional fill will be on the order of 4' or less and should exert 300 to 350 lbs/ft² of force on the lake bed. The fill extension beyond the new fishing platforms will have to extend over unconsolidated lake deposits. Additional stone may be required, as these areas are expected to settle. The amount of settlement will depend on the extent of the preexisting stone fill. As stated above, the fabric placed between the lake bed and the new fill should help mitigate settlement.
4. Place Mirafi HP270 slope fabric loosely, with some folds to allow for stretching without tearing. Rock slopes are designed for 2:1. the large blast rock may settle where it extends over unconsolidated deposits. If resultant slopes are steeper than 1-1/2 H to 1 V additional stone may be necessary. Ensure voids are thoroughly chinked with small stone to ensure stability.
5. Due to the potential for saturation and the significant void space in the 6" blast rock course to be placed on slopes above the large rock, and under the gravel road subbase, fabric should be placed to prevent migration of fines into voids. The use of Mirafi 180N blow blast rock, and Mirafi 600X between gravel road subbase and the 6" rock is acceptable.
6. Road subbase gravels shall meet Vermont AOT standard specifications for crushed gravel, (704.04A). All road subbase gravels shall be compacted to at least 95% of maximum density, per AASTO T-99. The 6" rock fill shall be proof rolled under observation of the engineer, prior to placing fabric and subbase gravel.
7. There has been concern raised regarding "displacement of muck" onto

adjoining properties, as apparently happened during the initial rock fill placement. The new rock placement will be a small percentage compared to the original fill, so displacement would be minor. It is expected a silt curtain will be placed around areas being worked to confine suspended soils to the work area and prevent siltation of other lake areas.

Design plans have been compiled by Enman Engineering, and have incorporated recommendations and information provided by this office. Plans dated July 30, 2013 have been provided for review and are approved for construction.

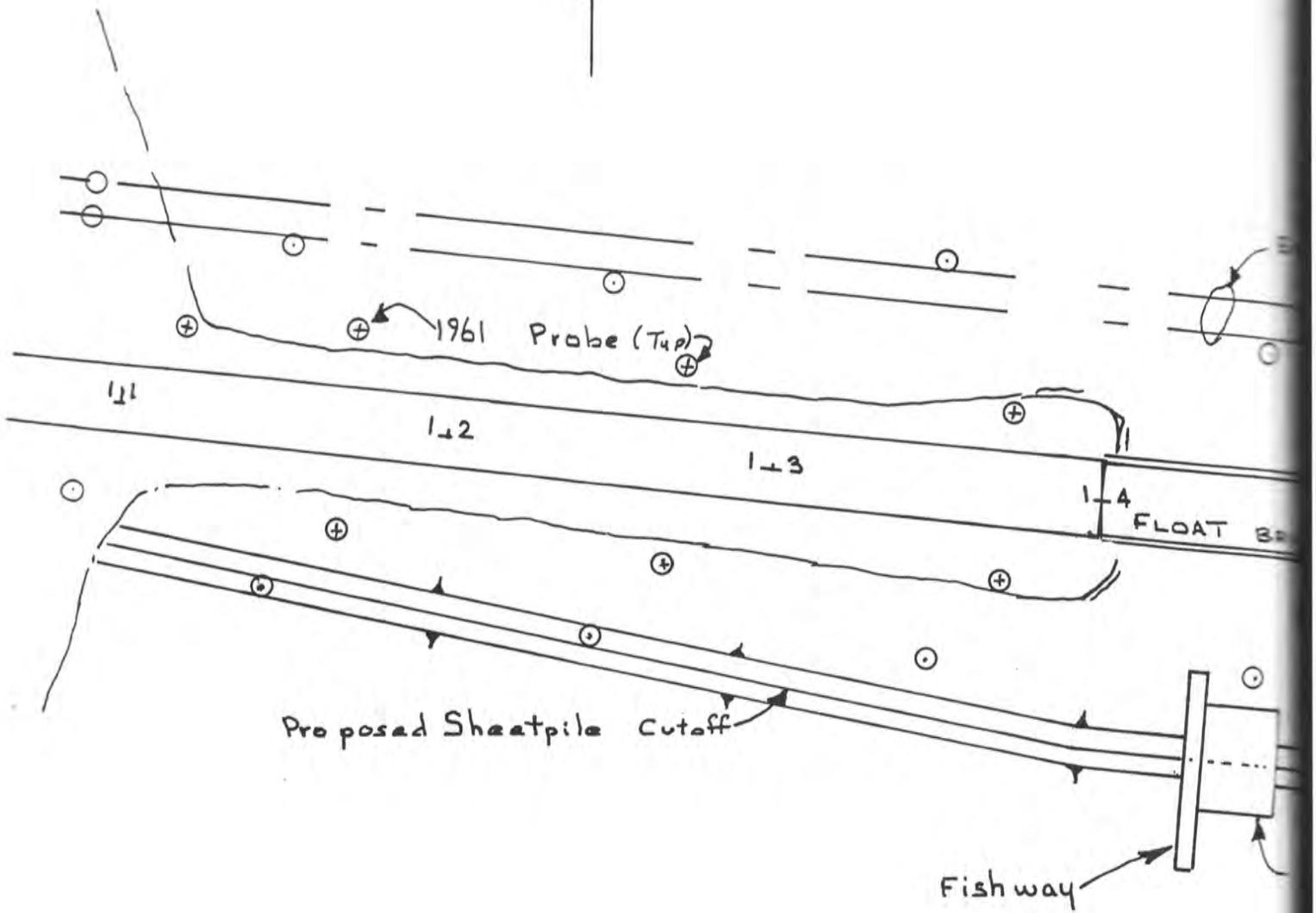
Sincerely,



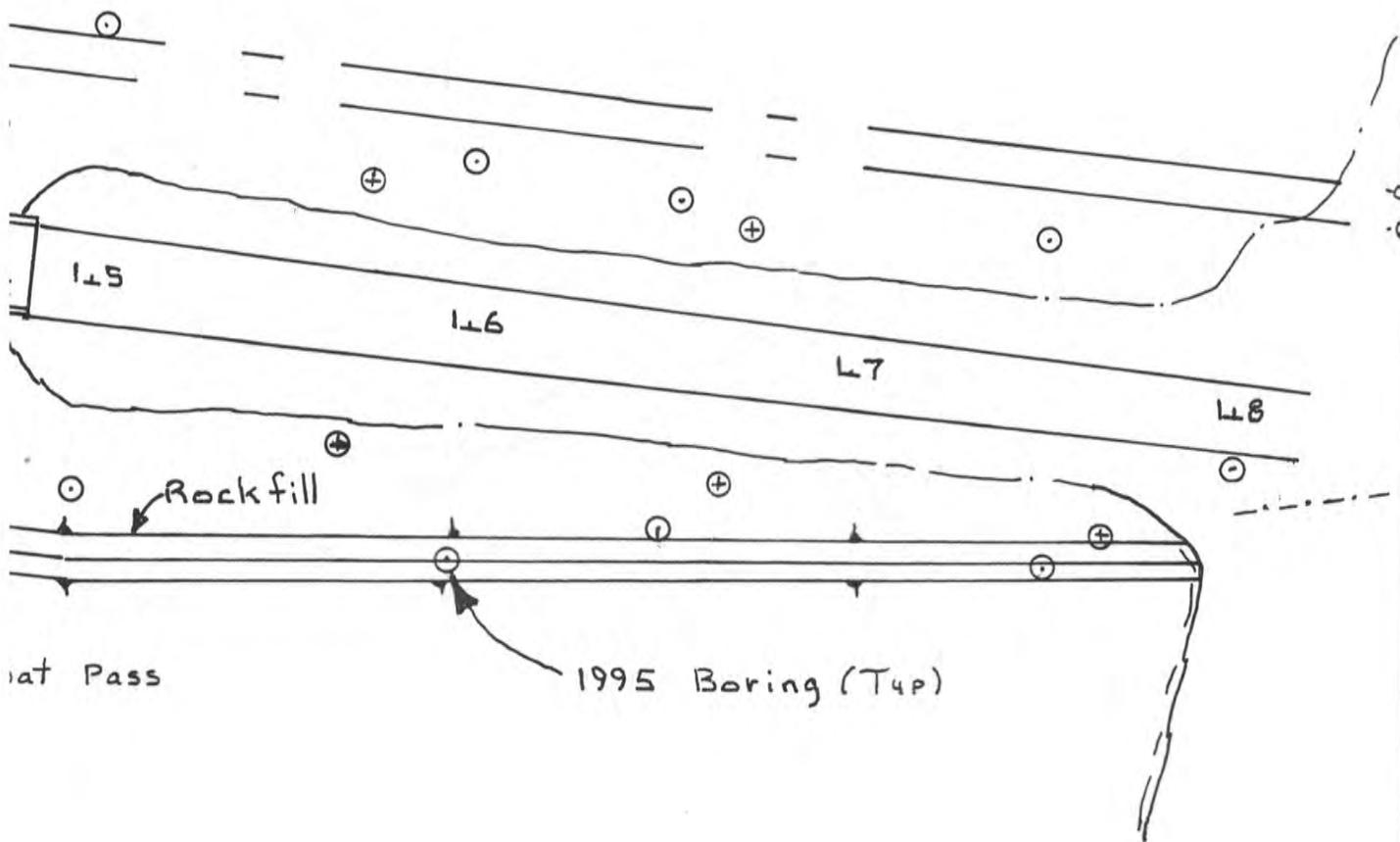
Warren L. Stevens, P.E.



WLS:sj



ING POWER LINES

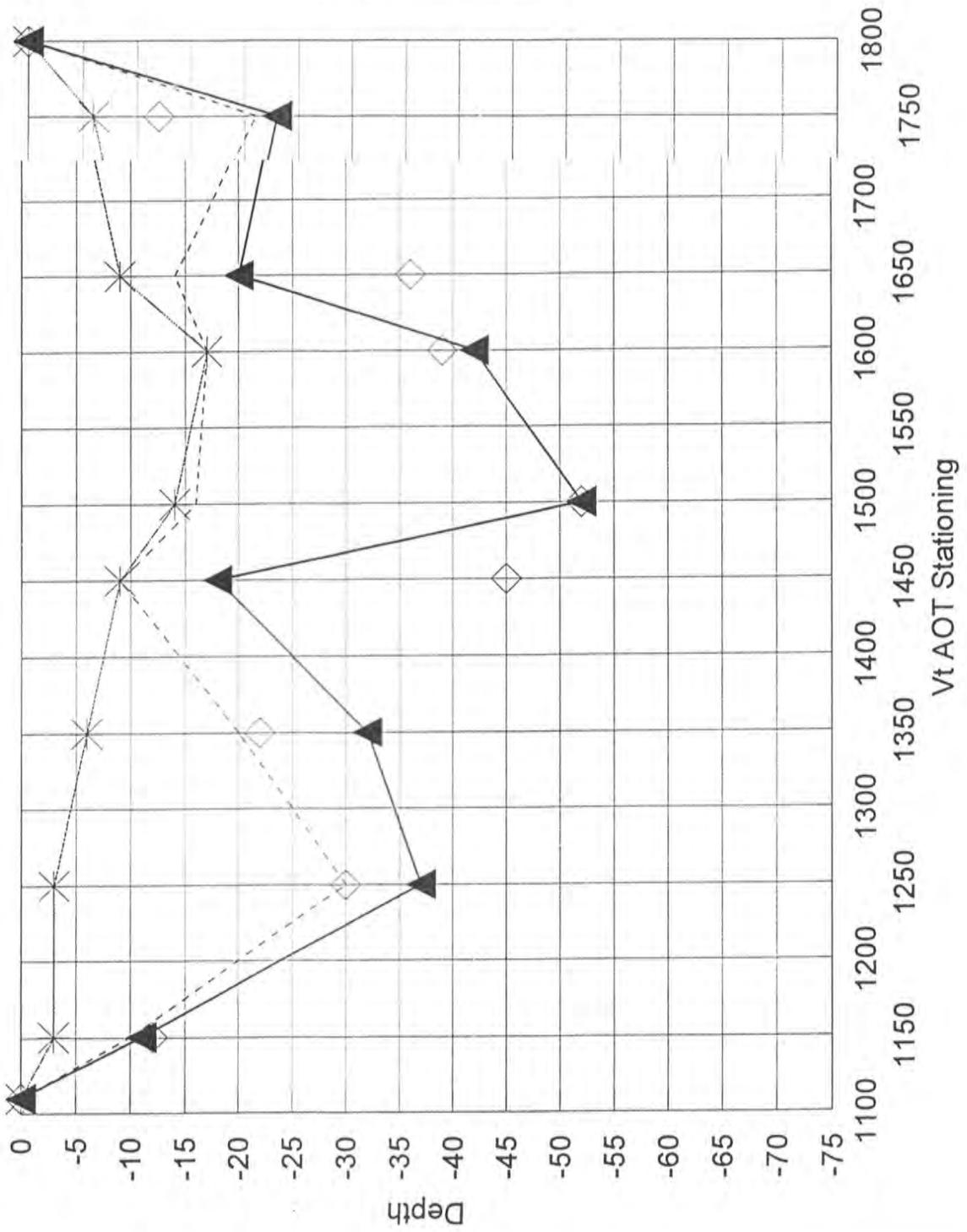


CONCEPTUAL SITE PLAN

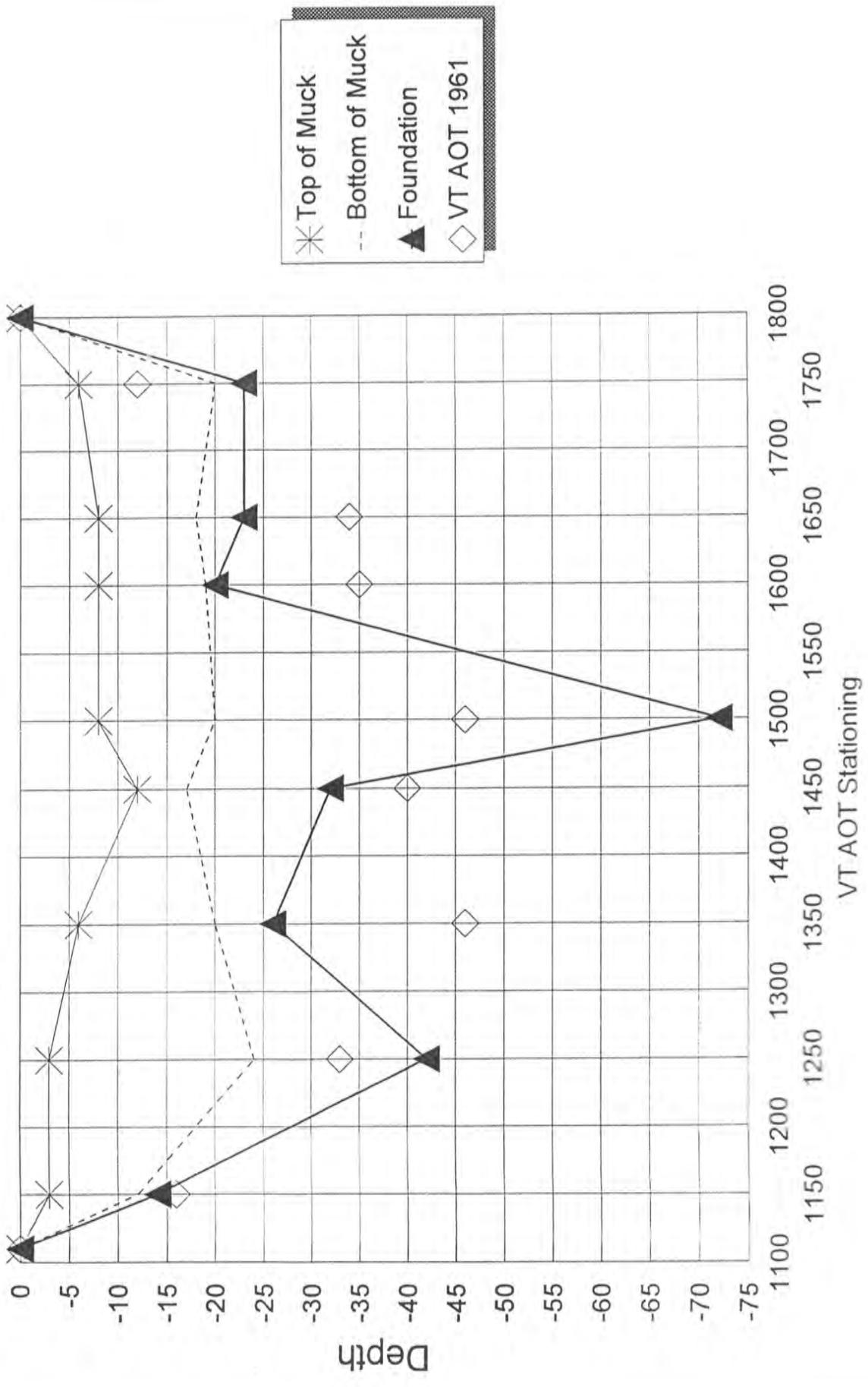
LAKE BOMOSEN

SCALE: 1" = 50'	APPROVED BY:	DRAWN BY M.R.
DATE: 12/6/95		REVISED
WETLANDS PROTECTION STRUCTURE		DEVELOPING NUMBER
ROOT ENGINEERING		

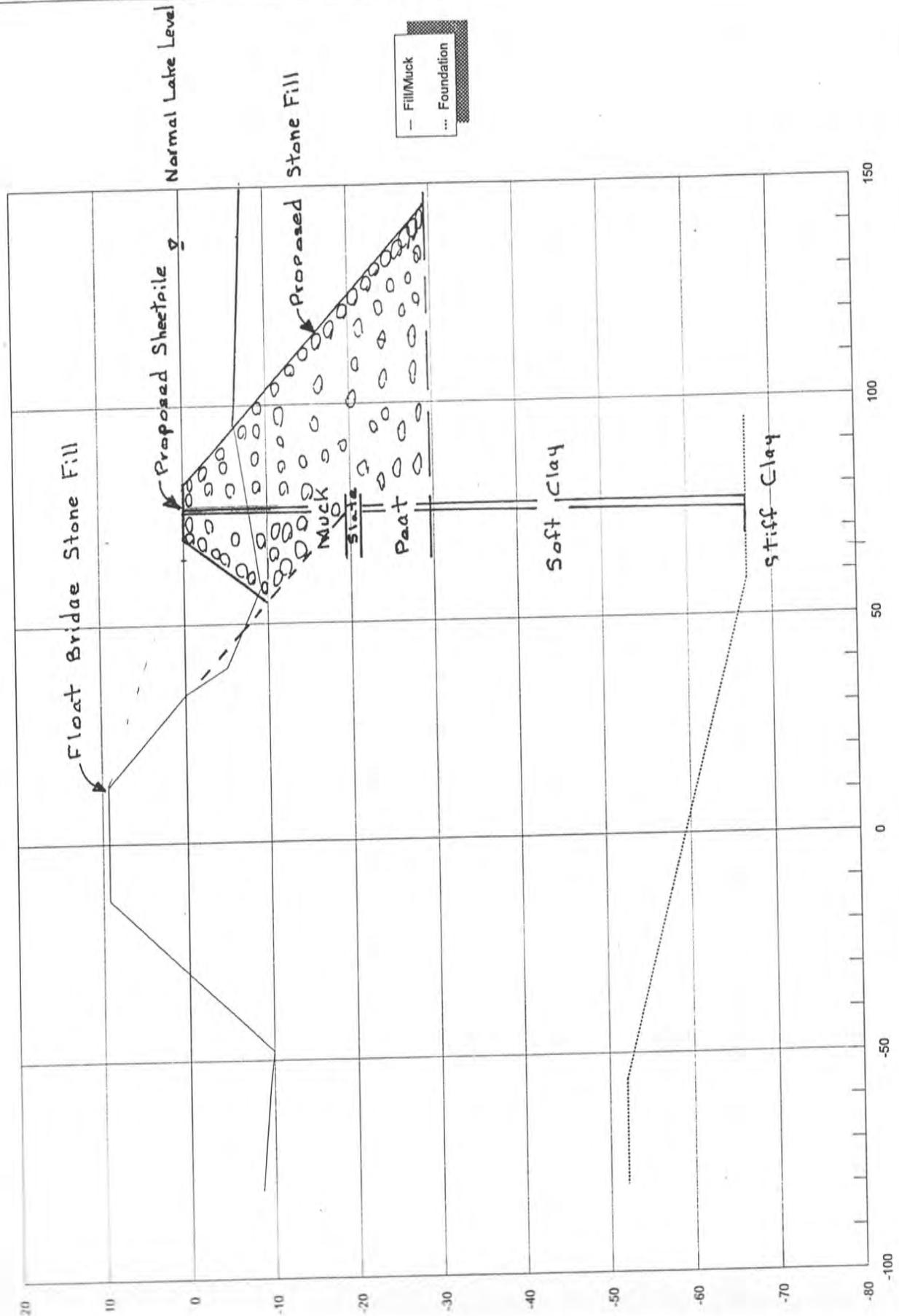
Lake Bomoseen Float Bridge North Side



Lake Bomoseen Float Bridge South Side



Float Bridge Section 1500



Synopsis of Lake Bomoseen (Float Bridge) borings
September 1995

Left Side (North)					Right Side (South)			
Station	Water	Offset	Muck	Base	Water	Offset	Muck	Base
11+50	3	42	7	Refusal @ 11 overall	3	39 to 44	9	loose silts 2 refusal 14 - 17 oa
12+50	3	43	27	soft grey clay 6 refusal @ 37 oa	3	44	21	soft clay 13 brown peat 1 silts 4
13+50	6	53	14	Soft peat 6 Purple slate 6 refusal @ 32' overall	6	40	14	purple & green slate with layers of peat 12
14+50	9	36	0	Purple slate peat layers refusal @ 18 overall	12	35	5	peat w/pieces of slate 10 purple green weathered slate 11
15+00 (+21)	14	53	2	wood - slate debris 5 peat 6 soft grey clay 25 stiff clay 12	8	43	12	grey clay 1 slate 1 peat 9 soft clay 36 stiff clay 10
16+00	17	34	0	brown peat with layers of slate and grey silts 25 wood pile 24,32 oa	8	52 fill 36-45	11	refusal @ 20
16+50	9	25	5	grey slate refusal @ 20 overall	8	37	10	cleared rock 1 soft slate 18
	8	33	3	refusal @ 12 oa				
17+50	6	30	15	med dense sand 2 very stiff clay 2	6	36	14	wood log 6" stiff silty clay 6
L 1	4		23	grey silts 5				
L 2	3		27	soft grey clay silt 25 med dense 10				
L 3	5		28	SOFT 45 med dense 8				

- NOTES: 1. By incremental depth unless otherwise stated.
2. Station 14 + 00 is located at westerly bridge seat.
3. Offset distance is measured from guard rail cable on top of causeway.
4. L. # are borings off Ledgemere point.
5. Soft means sampler progressed with weight of rods, no hammer used (zero blow count).
6. Refusal means sampler moved less than 6" with 100 blows of 140# hammer.

M & W Soils Engineering, Inc.
 Main St. Charlestown, NH 03603

SHEET 1 OF 1
 DATE 9/21/95
 HOLE NO. _____
 LINE & STA. 11+50
 OFFSET LEFT 42'

TO ROOT ENGINEERING
 PROJECT NAME WETLANDS PROT. STRUCTURE
 REPORT SENT TO MORRIS ROOT
 SAMPLE SENT TO ROOT ENGINEERING
 ADDRESS SPRINGFIELD, VT
 LOCATION CASTLETON, VT
 PROJ. NO. _____
 OUR JOB NO. 6468-95

GROUND WATER OBSERVATIONS
 T _____ AT _____ HOURS
 _____ AT _____ HOURS

CASING SAMPLER CORE BAR
 Type SS
 Size I. D. 1 1/2"
 Hammer Wt. 140# BIT
 Hammer Fall 30"

SURFACE ELEV. _____
 DATE STARTED 9/21/95
 DATE COMPL. 9/21/95
 BORING FORMAN M.D. & M.H.
 INSPECTOR _____
 SOILS ENGR. _____

LOCATION OF BORING 42' LEFT - OFF GUARD RAIL

Depth	CASING BLOWS PER FOOT	SAMPLE DEPTHS FROM-TO	TYPE OF SAMPLE	Blows per 6" on sampler			MOISTURE DENSITY OF CONSTANT	STRATA CHANGE ELEV.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, cond., hardness, Drilling time, seams and ect.	SAMPLE		
				From 0-6	6-12	To 12-18				NO.	PEN	REC
									WATER			
								2'10"	MUCK			
5'								10'	SAME MATERIAL			
10'		11'3"	SS				SOFT - WET	11'3"	GREY SILTS AND CLAY - REFUSAL ON SAMPLER			
		150 BLOWS - NO PENETRATION										
15'									EXPOSED BEDROCK 40' FROM BORING ON SHORE - SAMPLE HAD GREEN SLATE IN BOTTOM			

GROUND SURFACE TO 11'3"

USED _____ CASING THEN _____

Sample Type
 D-Dry C-Cored W-Washed
 UP-Unfinished Piston
 TP-Test Pit A-Auger V-Vane Test
 UT-Undisturbed Thinwall

Proportions Used
 trace 0 to 10%
 little 10 to 20%
 some 20 to 35%
 and 35 to 50%

140 lb. wt. x 30"-fall an 2" O.D. Sampler
 Cohesionless Density
 0-10 Loose
 10-30 Med. Dense
 30-50 Dense
 50+ Very Dense

Cohesive Consistency
 0-4 Soft 30 + Hard
 4-8 M/Stiff
 8-15 Stiff
 15-30 V-Stiff

summary
 EARTH BORING 11'3"
 ROCK CORING _____
 SAMPLES 0
 HOLE NO. _____

Main St. Charlestown, NH 03603

TO ROOT ENGINEERING
 PROJECT NAME WETLANDS PROT. STRUCTURE
 REPORT SENT TO MORRIS ROOT
 SAMPLE SENT TO ROOT ENGINEERING
 ADDRESS SPRINGFIELD, VT
 LOCATION CASTLETON, VT
 PROJ. NO.
 OUR JOB NO. 6468-95

DATE 9/16/95
 HOLE NO.
 LINE & STA. 11+50
 OFFSET RIGHT 39'

GROUND WATER OBSERVATIONS
 AT _____ AT _____ HOURS
 Type _____ SS _____
 Size I. D. _____ 1 1/2" _____
 Hammer Wt. _____ 140# BIT _____
 Hammer Fall _____ 30" _____
 SURFACE ELEV. _____
 DATE STARTED 9/16/95
 DATE COMPL. 9/18/95
 BORING FORMAN M.D. & M.H.
 INSPECTOR _____
 SOILS ENGR. _____

LOCATION OF BORING 39' RIGHT - GUARD RAIL

Depth	CASING BLOWS PER FOOT	SAMPLE DEPTHS FROM-TO	TYPE OF SAMPLE	Blows per 6" on sampler			MOISTURE DENSITY OF CONSTANT	STRATA CHANGE ELEV.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, cond., hardness, Drilling time, seams and ect	SAMPLE		
				From 0-6	6-12	To 12-18				NO.	PEN	REC
								3'3"	WATER			
5'									MUCK			
									SAME MATERIAL			
10'								12'				
		13'10" - 14'7"	SS	19	100/3"		LOOSE - WET	13'10"	GREY SILTS AND FINE SANDS	1	9"	9"
15'							DENSE - WET	14'7"	GREY SILTS WITH HORIZONTAL LAYERS OF SLATE REFUSAL ON SAMPLER			
20'												

GROUND SURFACE TO 14'7"

USED _____ CASING THEN _____

Sample Type
 D-Dry C-Cored W-Washed
 U-Undisturbed Thinwall
 P-Test Pit A-Auger V-Vane Test

Proportions Used
 trace 0 to 10%
 little 10 to 20%
 some 20 to 35%
 and 35 to 50%

140 lb. wt. x 30"-fall an 2" O.D. Sampler
 Cohesionless Density
 0-10 Loose
 10-30 Med. Dense
 30-50 Dense
 50+ Very Dense
 Cohesive Consistency
 0-4 Soft 30 + Hard
 4-8 M/Stiff
 8-15 Stiff
 15-30 V-Stiff

summary

EARTH BORING 14'7"
 ROCK CORING _____
 SAMPLES 1
 HOLE NO. _____

M & W Soils Engineering, Inc.
Main St. Charlestown, NH 03603

TO ROOT ENGINEERING
PROJECT NAME WETLANDS PROT. STRUCTURE
REPORT SENT TO MORRIS ROOT
SAMPLE SENT TO ROOT ENGINEERING
ADDRESS SPRINGFIELD, VT
LOCATION CASTLETON, VT
PROJ. NO. _____
OUR JOB NO. 6468-95

SHEET 1 OF 1
DATE 9/18/95
HOLE NO. _____
LINE & STA. 11+50
OFFSET RIGHT 44'

GROUND WATER OBSERVATIONS		CASING	SAMPLER	CORE BAR	SURFACE ELEV.
AT _____	AT _____ HOURS	Type _____	SS	_____	DATE STARTED <u>9/18/95</u>
AT _____	AT _____ HOURS	Size I. D. _____	1 1/2"	_____	DATE COMPL. <u>9/18/95</u>
		Hammer Wt. _____	140#	BIT	BORING FORMAN <u>M.D. & M.H.</u>
		Hammer Fall _____	30"	_____	INSPECTOR _____
					SOILS ENGR. _____

LOCATION OF BORING 44' RIGHT FROM GUARD RAIL

Depth	CASING BLOWS PER FOOT	SAMPLE DEPTHS FROM-TO	TYPE OF SAMPLE	Blows per 6" on sampler			MOISTURE DENSITY OF CONSTANT	STRATA CHANGE ELEV.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, cond., hardness. Drilling time, seams and ect.	SAMPLE		
				From 0-6	6-12	To 12-18				NO.	PEN	REC
								3'	WATER			
5'									MUCK			
10'									SAME MATERIAL			
15'		16'6" - 17'4"	SS	6	100/4"		LOOSE - WET	16'6"	BROWN SILTS AND TRACE OF ORGANICS	1	10"	10"
							DENSE	17'4"	SLATE - HORIZONTAL BEDDING REFUSAL ON SAMPLER			
20'												

GROUND SURFACE TO 17'4"

USED _____ CASING THEN _____

Sample Type
D-Dry C-Cored W-Washed
UP-Unfinished Piston
TP-Test Pit A-Auger V-Vane Test
UT-Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb. wt. x 30"-fall an 2" O.D. Sampler
Cohesionless Density
0-10 Loose
10-30 Med. Dense
30-50 Dense
50+ Very Dense
Cohesive Consistency
0-4 Soft 30 + Hard
4-8 M/Stiff
8-15 Stiff
15-30 V-Stiff

summary
EARTH BORING 17'4"
ROCK CORING _____
SAMPLES 1
HOLE NO. _____

TO ROOT ENGINEERING
PROJECT NAME WETLANDS PROT. STRUCTURE ADDRESS SPRINGFIELD, VT
REPORT SENT TO MORRIS ROOT LOCATION CASTLETON, VT
SAMPLE SENT TO ROOT ENGINEERING PROJ. NO. _____
OUR JOB NO. 6468-95

GROUND WATER OBSERVATIONS		CASING	SAMPLER	CORE BAR	SURFACE ELEV.
AT _____	AT _____	HOURS _____	Type _____	SS _____	DATE STARTED <u>9/21/95</u>
AT _____	AT _____	HOURS _____	Size I. D. _____	1 1/2" _____	DATE COMPL. <u>9/21/95</u>
			Hammer Wt. _____	140# _____	BORING FORMAN <u>M.D. & M.H.</u>
			Hammer Fall _____	30" _____	INSPECTOR _____
					SOILS ENGR. _____

LOCATION OF BORING 43' LEFT - OFF GUARD RAIL

Depth	CASING BLOWS PER FOOT	SAMPLE DEPTHS FROM-TO	TYPE OF SAMPLE	Blows per 6" on sampler			MOISTURE DENSITY OF CONSTANT	STRATA CHANGE ELEV.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, cond., hardness, Drilling time, seams and ect	SAMPLE		
				From 0-6	6-12	To 12-18				NO.	PEN	REC
									WATER			
								3'3"	MUCK			
5'									SAME MATERIAL			
10'									SAME MATERIAL			
15'									SAME MATERIAL			
20'									SAME MATERIAL			
25'									SAME MATERIAL			
30'								30'	SAME MATERIAL			
									SOFT - WET			
									GREY SILTS AND CLAYS			
35'		36'4" - 37'10"	SS	6	10			36'4"		1	20"	20"
					20				SOFT - WET			
		150 BLOWS - NO PENETRATION						37'10"	REFUSAL ON SAMPLER			

GROUND SURFACE TO 37'10"

Sample Type
D-Dry C-Cored W-Washed
UP-Unfinished Piston
TP-Test Pit A-Auger V-Vane Test
UT-Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb. wt. x 30"-fall an 2" O.D. Sampler
Cohesionless Density
0-10 Loose
10-30 Med. Dense
30-50 Dense
50+ Very Dense
Cohesive Consistency
0-4 Soft 30 + Hard
4-8 M/Stiff
8-15 Stiff
15-30 V-Stiff

summary
EARTH BORING 37'10"
ROCK CORING _____
SAMPLES 1
HOLE NO. _____

USED _____ CASING THEN _____

M & W Soils Engineering, Inc.
Main St. Charlestown, NH 03603

TO ROOT ENGINEERING ADDRESS SPRINGFIELD, VT
PROJECT NAME WETLANDS PROT. STRUCTURE LOCATION CASTLETON, VT
REPORT SENT TO MORRIS ROOT PROJ. NO. _____
SAMPLE SENT TO ROOT ENGINEERING OUR JOB NO. 6468-95

SHEET 1 OF 2
DATE 9/16/95
HOLE NO. _____
LINE & STA. 12+50
OFFSET RIGHT 44'

GROUND WATER OBSERVATIONS		CASING	SAMPLER	CORE BAR	SURFACE ELEV.
AT _____	AT _____	HOURS	Type	SS	DATE STARTED <u>9/16/95</u>
AT _____	AT _____	HOURS	Size I. D.	1 1/2"	DATE COMPL. <u>9/16/95</u>
			Hammer Wt.	140#	BORING FORMAN <u>M.D. & M.H.</u>
			Hammer Fall	30"	INSPECTOR _____
					SOILS ENGR. _____

LOCATION OF BORING 44' RIGHT OFF GUARD RAIL

Depth	CASING BLOWS PER FOOT	SAMPLE DEPTHS FROM-TO	TYPE OF SAMPLE	Blows per 6" on sampler			MOISTURE DENSITY OF CONSTANT	STRATA CHANGE ELEV.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, cond., hardness, Drilling time, seams and ect	SAMPLE		
				From 0-6	6-12	To 12-18				NO.	PEN	REC
		RODS PUSHED TO	37'6"									
								2'7"	WATER			
5'									MUCK			
10'									SAME MATERIAL			
15'									SAME MATERIAL			
20'									SAME MATERIAL			
25'								24'	SAME MATERIAL			
30'									VERY SOFT WET GREY SILTY CLAYS			
35'									SAME MATERIAL			
		37'6" - 39'6"	SS	16	24			37'6"	SAME MATERIAL	1	24'	24"
		39'6" - 41'6"	SS	36	20		MED. DENSE	38'6"	BROWN PEAT - WOOD (DRY)	2	24'	18"
				23	18		SOFT	39'	BROWN SILTS - TRACE OF ORGANICS			
				14	36				(SEE PAGE 2 OF 2)			

GROUND SURFACE TO _____

USED _____ CASING THEN _____

Sample Type
D-Dry C-Cored W-Washed
UP-Unfinished Piston
TP-Test Pit A-Auger V-Vane Test
UT-Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb. wt. x 30"-fall an 2" O.D. Sampler
Cohesionless Density
0-10 Loose
10-30 Med. Dense
30-50 Dense
50+ Very Dense
Cohesive Consistency
0-4 Soft 30 + Hard
4-8 M/Stiff
8-15 Stiff
15-30 V-Stiff

summary
EARTH BORING _____
ROCK CORING _____
SAMPLES _____
HOLE NO. _____

M & W Soils Engineering, Inc.
Main St. Charlestown, NH 03603

SHEET 1 OF 1
DATE 9/21/95
HOLE NO. _____
LINE & STA. 12+50
OFFSET LEFT 47'

TO ROOT ENGINEERING
PROJECT NAME WETLANDS PROT. STRUCTURE
REPORT SENT TO MORRIS ROOT
SAMPLE SENT TO ROOT ENGINEERING
ADDRESS SPRINGFIELD, VT
LOCATION CASTLETON, VT
PROJ. NO. _____
OUR JOB NO. 6468-95

GROUND WATER OBSERVATIONS		Type _____ Size I. D. _____ Hammer Wt. _____ Hammer Fall _____	CASING _____ SAMPLER SS _____ CORE BAR _____ BIT _____	SURFACE ELEV. _____
AT _____ AT _____ HOURS	DATE STARTED 9/21/95			
AT _____ AT _____ HOURS	DATE COMPL. 9/21/95			BORING FORMAN M.D. & M.H.
				INSPECTOR _____
				SOILS ENGR. _____

LOCATION OF BORING 47' LEFT - OFF GUARD RAIL

Depth	CASING BLOWS PER FOOT	SAMPLE DEPTHS FROM-TO	TYPE OF SAMPLE	Blows per 6" on sampler			MOISTURE DENSITY OF CONSTANT	STRATA CHANGE ELEV.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, cond., hardness, Drilling time, seams and ect.	SAMPLE		
				From 0-6	6-12	To 12-18				NO.	PEN	REC
								3'	WATER			
5'									MUCK			
									SAME MATERIAL			
10'									SAME MATERIAL			
									SAME MATERIAL			
15'									SAME MATERIAL			
									SAME MATERIAL			
20'									SAME MATERIAL			
									SAME MATERIAL			
25'									SAME MATERIAL			
								29'+/-				
30'							SOFT		GREY SILTS AND CLAYS WITH LAYERS OF PEAT			
								34'8"				
35'		34'8" - 34'9"	SS	150 BLOWS FOR 1'				34'9"	GREEN SLATE - REFUSAL ON SAMPLER			
									(PUSHED RODS FROM 0' TO 34'8")			

ROUND SURFACE TO 34'9"

USED _____ CASING THEN _____

Sample Type
C-Dry C-Cored W-Washed
P-Unfinished Piston
R-Test Pit A-Auger V-Vane Test
T-Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb. wt. x 30"-fall an 2" O.D. Sampler
Cohesionless Density
0-10 Loose
10-30 Med. Dense
30-50 Dense
50+ Very Dense
Cohesive Consistency
0-4 Soft 30 + Hard
4-8 M/Stiff
8-15 Stiff
15-30 V-Stiff

summary
EARTH BORING 34'9"
ROCK CORING _____
SAMPLES 0
HOLE NO. _____

M & W Soils Engineering, Inc.
Main St. Charlestown, NH 03603

TO ROOT ENGINEERING ADDRESS SPRINGFIELD, VT
PROJECT NAME WETLANDS PROT. STRUCTURE LOCATION CASTLETON, VT
REPORT SENT TO MORRIS ROOT PROJ. NO. _____
SAMPLE SENT TO ROOT ENGINEERING OUR JOB NO. 6468-95

SHEET 1 OF 1
DATE 9/20/95
HOLE NO. _____
LINE & STA. 13+50
OFFSET LEFT 53'

GROUND WATER OBSERVATIONS		CASING	SAMPLER	CORE BAR	SURFACE ELEV.
AT _____	AT _____ HOURS	Type	SS		DATE STARTED <u>9/20/95</u>
		Size I. D.	1 1/2"		DATE COMPL. <u>9/20/95</u>
		Hammer Wt.	140#	BIT	BORING FORMAN <u>M.D. & M.H.</u>
AT _____	AT _____ HOURS	Hammer Fall	30"		INSPECTOR _____
					SOILS ENGR. _____

LOCATION OF BORING 53' LEFT OFF GUARD RAIL

Depth	CASING BLOWS PER FOOT	SAMPLE DEPTHS FROM-TO	TYPE OF SAMPLE	Blows per 6" on sampler			MOISTURE DENSITY OF CONSTANT	STRATA CHANGE ELEV.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, cond., hardness, Drilling time, seams and etc.	SAMPLE		
				From 0-6	6-12	To 12-18				NO.	PEN	REC
5'									WATER			
									SAME MATERIAL			
10'									MUCK			
									SAME MATERIAL			
15'									SAME MATERIAL			
20'		19'8" - 20'8"	SS	20	1	1		19'8"	20 BLO WS - D ROVE THROUGH			
25'												
		25'6" - 27'6"	SS	11	5	6		25'6"			1	24" 20"
30'		27'6" - 29'6"	SS	5	15	4			PURPLE AND RED SLATE - HORIZONTAL BEDDING		2	24" 18"
		29'6" - 31'6"	SS	27	27	48					3	24" 24"
		31'6" - 32'3"	SS	28	100	3		32'3"	SAME MATERIAL			
35'												

GROUND SURFACE TO 32'3"

USED _____ CASING THEN _____

Sample Type
D-Dry C-Cored W-Washed
UP-Unfinished Piston
TP-Test Pit A-Auger V-Vane Test
UT-Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb. wt. x 30"-fall an 2" O.D. Sampler
Cohesionless Density
0-10 Loose
10-30 Med. Dense
30-50 Dense
50+ Very Dense
Cohesive Consistency
0-4 Soft 30 + Hard
4-8 M/Stiff
8-15 Stiff
15-30 V-Stiff

summary
EARTH BORING 32'3"
ROCK CORING _____
SAMPLES 3
HOLE NO. _____

M & W Soils Engineering, Inc.
Main St. Charlestown, NH 03603

SHEET 1 OF 1
DATE 9/16/95
HOLE NO. _____
LINE & STA. 13+50
OFFSET RIGHT 40'

TO ROOT ENGINEERING ADDRESS SPRINGFIELD, VT
PROJECT NAME WETLANDS PROT. STRUCTURE LOCATION CASTLETON, VT
REPORT SENT TO MORRIS ROOT PROJ. NO. _____
SAMPLE SENT TO ROOT ENGINEERING OUR JOB NO. 6468-95

GROUND WATER OBSERVATIONS		CASING	SAMPLER	CORE BAR	SURFACE ELEV.
AT _____	AT _____	HOURS	Type	SS	DATE STARTED 9/16/95
AT _____	AT _____	HOURS	Size I. D.	1 1/2"	DATE COMPL. 9/16/95
			Hammer Wt.	140#	BORING FORMAN M.D. & M.H.
			Hammer Fall	30"	INSPECTOR _____
					SOILS ENGR. _____

LOCATION OF BORING 40' RIGHT OFF GUARD RAIL

Depth	CASING BLOWS PER FOOT	SAMPLE DEPTHS FROM-TO	TYPE OF SAMPLE	Blows per 6" on sampler			MOISTURE DENSITY OF CONSTANT	STRATA CHANGE ELEV.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, cond., hardness, Drilling time, seams and etc.	SAMPLE		
				From 0-8	8-12	To 12-18				NO.	PEN	REC
5'									WATER			
								5'6"	SAME MATERIAL			
10'									MUCK			
									SAME MATERIAL			
15'									SAME MATERIAL			
									SAME MATERIAL			
20'		20' - 22'	SS	11	74			20'		1	24"	20"
		22' - 24'	SS	23	17					2	24"	10"
25'		24' - 26'	SS	8	15		MED. DENSE TO DENSE		PURPLE AND GREEN SLATE WITH HORIZONTAL BEDDING LAYERS OF GREEN CLAYS AND OCCASIONAL LAYER OF PEAT	3	24"	24"
		26' - 28'	SS	19	16							
30'		28' - 30'	SS	17	14							
		30' - 32'	SS	9	9				SAME MATERIAL	4	24"	24"
35'				18	20			32'				

GROUND SURFACE TO 32'

USED _____ CASING THEN _____

Sample Type

D-Dry C-Cored W-Washed
UP-Unfinished Piston
TP-Test Pit A-Auger V-Vane Test
UT-Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb. wt. x 30"-fall an 2" O.D. Sampler
Cohesionless Density
0-10 Loose
10-30 Med. Dense
30-50 Dense
50+ Very Dense
Cohesive Consistency
0-4 Soft 30 + Hard
4-8 M/Stiff
8-15 Stiff
15-30 V-Stiff

summary

EARTH BORING 32'
ROCK CORING _____
SAMPLES 4

HOLE NO. _____

M & W Soils Engineering, Inc.
Main St. Charlestown, NH 03603

SHEET 1 OF 1
DATE 9/20/95
HOLE NO. _____
LINE & STA. 14+45
OFFSET LEFT 36'

TO ROOT ENGINEERING ADDRESS SPRINGFIELD, VT
PROJECT NAME WETLANDS PROT. STRUCTURE LOCATION CASTLETON, VT
REPORT SENT TO MORRIS ROOT PROJ. NO. _____
SAMPLE SENT TO ROOT ENGINEERING OUR JOB NO. 6468-95

GROUND WATER OBSERVATIONS		CASING	SAMPLER	CORE BAR	SURFACE ELEV.
AT _____	AT _____ HOURS	Type _____	SS	_____	DATE STARTED <u>9/20/95</u>
AT _____	AT _____ HOURS	Size I. D. _____	1 1/2"	_____	DATE COMPL. <u>9/20/95</u>
		Hammer Wt. _____	140#	BIT	BORING FORMAN <u>M.D. & M.H.</u>
		Hammer Fall _____	30"	_____	INSPECTOR _____
					SOILS ENGR. _____

LOCATION OF BORING 36' LEFT OFF GUARD RAIL

Depth	CASING BLOWS PER FOOT	SAMPLE DEPTHS FROM-TO	TYPE OF SAMPLE	Blows per 6" on sampler			MOISTURE DENSITY OF CONSTANT	STRATA CHANGE ELEV.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, cond., hardness, Drilling time, seams and ect	SAMPLE		
				From 0-6	6-12	To 12-18				NO.	PEN	REC
5'									WATER			
									SAME MATERIAL			
		9'6" - 11'6"	SS	5	5		9'6"		SAME MATERIAL	1	24"	20"
10'		11'6" - 13'6"	SS	12	17				PURPLE AND GREY SLATE - HORIZONTAL LAYERS - SMALL LAYERS OF PEAT AND GREY SILTS			
		13'6" - 15'6"	SS	8	10		MED. DENSE TO DENSE					
		15'6" - 17'6"	SS	3	3							
15'				12	7					2	24"	24"
				14	82							
20'								17'6"	REFUSAL ON SAMPLER			
									(BENT SAMPLER BAD)			

GROUND SURFACE TO 17'6"

USED _____ CASING THEN _____

Sample Type
D-Dry C-Cored W-Washed
UP-Unfinished Piston
TP-Test Pit A-Auger V-Vane Test
UT-Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb. wt. x 30"-fall an 2" O.D. Sampler
Cohesionless Density
0-10 Loose
10-30 Med. Dense
30-50 Dense
50+ Very Dense
Cohesive Consistency
0-4 Soft 30 + Hard
4-8 M/Stiff
8-15 Stiff
15-30 V-Stiff

summary
EARTH BORING 17'6"
ROCK CORING _____
SAMPLES 2
HOLE NO. _____

Main St. Charlestown, NH 03603

SHEET 1
 DATE 9/15/95
 HOLE NO.
 LINE & STA. 14+50
 OFFSET RIGHT 35'

TO ROOT ENGINEERING
 PROJECT NAME WETLANDS PROT. STRUCTURE
 REPORT SENT TO MORRIS ROOT
 SAMPLE SENT TO ROOT ENGINEERING
 ADDRESS SPRINGFIELD, VT
 LOCATION CASTLETON, VT
 PROJ. NO.
 OUR JOB NO. 6468-95

GROUND WATER OBSERVATIONS		CASING SAMPLER CORE BAR		SURFACE ELEV.	
AT _____	AT _____	HOURS _____	Type _____	SS _____	DATE STARTED 9/15/95
AT _____	AT _____	HOURS _____	Size I. D. _____	1 1/2" _____	DATE COMPL. 9/15/95
			Hammer Wt. _____	140# BIT _____	BORING FORMAN M.D. & M.H.
			Hammer Fall _____	30" _____	INSPECTOR _____
					SOILS ENGR. _____

LOCATION OF BORING 35' RIGHT OFF GUARD RAIL - MIDDLE OF GUARD RAIL - SOUTH SIDE OF BRIDGE

Depth	CASING BLOWS PER FOOT	SAMPLE DEPTHS FROM-TO	TYPE OF SAMPLE	Blows per 6" on sampler			MOISTURE DENSITY OF CONSTANT	STRATA CHANGE ELEV.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, cond., hardness. Drilling time, seams and etc.	SAMPLE			
				From 0-6	6-12	To 12-18				NO.	PEN	REC	
5'									WATER				
									SAME MATERIAL				
									SAME MATERIAL				
10'								12'					
									MUCK				
		16'6" - 18'6"	SS	32	1			16'6"		1	24"	18"	
15'				WH	WH								
									PEAT WITH FIBERS - OCCASIONAL PIECES OF SLATE				
		21' - 22'	SS	21	13								
		22' - 24'	SS	15	7								
20'				9	8								
		24' - 26'	SS	7	5				SAME MATERIAL				
				7	12								
		26' - 27'	SS	46	11			26'		2	24"	24"	
25'				8	22					3	24"	24"	
				28	34								
		27' - 29'	SS	8	22								
		29' - 31'	SS	23	21			DENSE - WET	PURPLE AND GREEN WEATHERED SLATE OCCASIONAL THIN LAYER OF PEAT 2"-6" THICK		4	24"	18"
30'				20	14								
		31' - 32'	SS	22	12								
		32' - 34'	SS	18	10								
35'				12	10								
		34' - 36'	SS	9	9						5	24"	18"
				11	13				SAME MATERIAL				
		36' - 37'	SS	14	20			37'			6	24"	18"

GROUND SURFACE TO 37'

USED _____ CASING THEN _____

Sample Type

D-Dry C-Cored W-Washed
 UP-Unfinished Piston
 TP-Test Pit A-Auger V-Vane Test
 UT-Undisturbed Thinwall

Proportions Used
 trace 0 to 10%
 little 10 to 20%
 some 20 to 35%
 and 35 to 50%

140 lb. wt. x 30"-fall an 2" O.D. Sampler
 Cohesionless Density
 0-10 Loose
 10-30 Med. Dense
 30-50 Dense
 50+ Very Dense

Cohesive Consistency
 0-4 Soft 30 + Hard
 4-8 M/Stiff
 8-15 Stiff
 15-30 V-Stiff

summary

EARTH BORING 37'
 ROCK CORING _____
 SAMPLES 6
 HOLE NO. _____

M & W Soils Engineering, Inc.
Main St. Charlestown, NH 03603

SHEET 1 OF 2
DATE 9/14/95
HOLE NO. _____
LINE & STA. 15+00
OFFSET RIGHT 43'

TO ROOT ENGINEERING ADDRESS SPRINGFIELD, VT
PROJECT NAME WETLANDS PROT. STRUCTURE LOCATION CASTLETON, VT
REPORT SENT TO MORRIS ROOT PROJ. NO. _____
SAMPLE SENT TO ROOT ENGINEERING OUR JOB NO. 6468-95

GROUND WATER OBSERVATIONS		CASING	SAMPLER	CORE BAR	SURFACE ELEV.
AT _____	AT _____ HOURS	Type	SS	_____	DATE STARTED <u>9/14/95</u>
AT _____	AT _____ HOURS	Size I. D.	1 1/2"	_____	DATE COMPL. <u>9/15/95</u>
		Hammer Wt.	140#	BIT	BORING FORMAN <u>M.D. & M.H.</u>
		Hammer Fall	30"	_____	INSPECTOR _____
					SOILS ENGR. _____

LOCATION OF BORING 43' OFF GUARD RAIL

Depth	CASING BLOWS PER FOOT	SAMPLE DEPTHS FROM-TO	TYPE OF SAMPLE	Blows per 6" on sampler			MOISTURE DENSITY OF CONSTANT	STRATA CHANGE ELEV.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, cond., hardness. Drilling time, seams and ect.	SAMPLE		
				From 0-6	6-12	To 12-18				NO.	PEN	REC
5'									WATER			
6'									SAME MATERIAL			
7'												
8'												
9'									MUCK			
10'												
11'									SAME MATERIAL			
12'												
13'												
14'												
15'												
16'												
17'												
18'												
19'		19'8" - 21'8"	SS	45	60			19'8"	SAME MATERIAL	1	24"	24"
20'				10	8		SOFT - WET	20'2"	GREY CLAYS			
21'		21'8" - 23'8"	SS	3	1			21'	SLATE - PURPLE AND GREEN			
22'				1	1							
23'		23'8" - 25'8"	SS	1	1				PEAT			
24'				1	1							
25'												
26'									SAME MATERIAL			
27'												
28'												
29'												
30'							SOFT - WET		GREY SILTY CLAYS			
31'												
32'												
33'												
34'									SAME MATERIAL			
35'												

GROUND SURFACE TO _____ USED _____ CASING THEN _____

Sample Type D-Dry C-Cored W-Washed U-Undisturbed Piston TP-Test Pit A-Auger V-Vane Test UT-Undisturbed Thinwall	Proportions Used trace 0 to 10% little 10 to 20% some 20 to 35% and 35 to 50%	140 lb. wt. x 30"-fall an 2" O.D. Sampler Cohesionless Density 0-10 Loose 10-30 Med. Dense 30-50 Dense 50+ Very Dense	Cohesive Consistency 0-4 Soft 30 + Hard 4-8 M/Stiff 8-15 Stiff 15-30 V-Stiff	summary	
				EARTH BORING _____	ROCK CORING _____
				SAMPLES _____	HOLE NO. _____

M & W Soils Engineering, Inc.
Main St. Charlestown, NH 03603

SHEET 2 OF 2
DATE 9/14/95
HOLE NO. _____
LINE & STA. 15+00
OFFSET RIGHT 43'

TO ROOT ENGINEERING ADDRESS SPRINGFIELD, VT
PROJECT NAME WETLANDS PROT. STRUCTURE LOCATION CASTLETON, VT
REPORT SENT TO MORRIS ROOT PROJ. NO. _____
SAMPLE SENT TO ROOT ENGINEERING OUR JOB NO. 6468-95

GROUND WATER OBSERVATIONS		Type	CASING	SAMPLER	CORE BAR	SURFACE ELEV.
AT _____	AT _____		HOURS	_____	SS	_____
		Size I. D.	_____	1 1/2"	_____	DATE COMPL. 9/15/95
		Hammer Wt.	_____	140#	BIT	BORING FORMAN M.D. & M.H.
		Hammer Fall	_____	30"	_____	INSPECTOR _____
						SOILS ENGR. _____

LOCATION OF BORING 43' OFF GUARD RAIL

Depth	CASING BLOWS PER FOOT	SAMPLE DEPTHS FROM-TO	TYPE OF SAMPLE	Blows per 6" on sampler			MOISTURE DENSITY OF CONSTANT	STRATA CHANGE ELEV.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, cond., hardness, Drilling time, seams and etc.	SAMPLE		
				From 0-6	6-12	To 12-18				NO.	PEN	REC
							SOFT - WET		GREY SILTY CLAYS			
45'									SAME MATERIAL			
50'									SAME MATERIAL			
55'									SAME MATERIAL			
60'									SAME MATERIAL			
65'									SAME MATERIAL			
		66'6" - 68'6"	SS	10	10			66'6"		2	48"	18"
		68'6" - 70'6"	SS	8	12		STIFF - WET		GREY CLAYS - SILTS WITH TRACE OF FINE SANDS AND GRAVELS MIXED	*2A		
70'		70'6" - 72'6"	SS	12	17					3	24"	18"
		72'6" - 74'6"	SS	12	16					4	24"	15"
		74'6" - 76'6"	SS	18	21				SAME MATERIAL	5	24"	20"
75'				28	28			76'6"				
									(*2A: SAMPLE OF SOFT CLAYS)			

ROUND SURFACE TO 76'6"

USED _____ CASING THEN _____

Soils Type
Dry, C-Cored, W-Washed
Unfinished Piston
Test Pit A-Auger V-Vane Test
Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb. wt. x 30"-fall an 2" O.D. Sampler
Cohesionless Density
0-10 Loose
10-30 Med. Dense
30-50 Dense
50+ Very Dense

Cohesive Consistency
0-4 Soft 30 + Hard
4-8 M/Stiff
8-15 Stiff
15-30 V-Stiff

summary

EARTH BORING 76'6"
ROCK CORING _____
SAMPLES 5

HOLE NO. _____

M & W Soils Engineering, Inc.
Main St. Charlestown, NH 03603

SHEET 1 OF 2
DATE 9/19/95
HOLE NO. _____
LINE & STA. 15+21
OFFSET LEFT 53'

TO ROOT ENGINEERING ADDRESS SPRINGFIELD, VT
PROJECT NAME WETLANDS PROT. STRUCTURE LOCATION CASTLETON, VT
REPORT SENT TO MORRIS ROOT PROJ. NO. _____
SAMPLE SENT TO ROOT ENGINEERING OUR JOB NO. 6468-95

GROUND WATER OBSERVATIONS		CASING	SAMPLER	CORE BAR	SURFACE ELEV.
AT _____	AT _____ HOURS	Type _____	SS	_____	DATE STARTED 9/19/95
AT _____	AT _____ HOURS	Size I. D. _____	1 1/2"	_____	DATE COMPL. 9/20/95
		Hammer Wt. _____	140#	BIT	BORING FORMAN M.D. & M.H.
		Hammer Fall _____	30"	_____	INSPECTOR _____
					SOILS ENGR. _____

LOCATION OF BORING 53' LEFT - OFF GUARD RAIL

Depth	CASING BLOWS PER FOOT	SAMPLE DEPTHS FROM-TO	TYPE OF SAMPLE	Blows per 6" on sampler			MOISTURE DENSITY OF CONSTANT	STRATA CHANGE ELEV.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, cond., hardness, Drilling time, seams and etc.	SAMPLE		
				From 0-6	6-12	To 12-18				NO.	PEN	REC
									WATER			
5'									SAME MATERIAL			
10'								13'6"	SAME MATERIAL			
15'								16'	MUCK			
		17' - 19'	SS	5	6							
				9	2							
		19' - 21'	SS	1	2				WOOD AND SLATE DEBRIS			
				3	9							
20'		21' - 22'6"	SS	5	5			21'				
				5								
		22'6" - 24'6"	SS	10	6				PEAT			
				5	4							
25'		24'6" - 26'6"	SS	5	5							
				5	6							
		26'6" - 27'6"	SS	4	5			27'6"	SAME MATERIAL			
30'							SOFT - WET		GREY SILTY CLAYS			
									SAME MATERIAL			
35'												
									SAME MATERIAL			

GROUND SURFACE TO _____

USED _____ CASING THEN _____

Sample Type
D-Dry C-Cored W-Washed
UP-Unfinished Piston
TP-Test Pit A-Auger V-Vane Test
UT-Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb. wt. x 30"-fall an 2" O.D. Sampler
Cohesionless Density
0-10 Loose
10-30 Med. Dense
30-50 Dense
50+ Very Dense

Cohesive Consistency
0-4 Soft 30 + Hard
4-8 M/Stiff
8-15 Stiff
15-30 V-Stiff

summary
EARTH BORING _____
ROCK CORING _____
SAMPLES _____

HOLE NO. _____

TO ROOT ENGINEERING
PROJECT NAME WETLANDS PROT. STRUCTURE
REPORT SENT TO MORRIS ROOT
SAMPLE SENT TO ROOT ENGINEERING
ADDRESS SPRINGFIELD, VT
LOCATION CASTLETON, VT
PROJ. NO. _____
OUR JOB NO. 6468-95

GROUND WATER OBSERVATIONS		CASING	SAMPLER	CORE BAR	SURFACE ELEV.
AT _____	AT _____ HOURS	Type _____	SS	_____	DATE STARTED 9/19/95
_____	_____	Size I. D. _____	1 1/2"	_____	DATE COMPL. 9/20/95
AT _____	AT _____ HOURS	Hammer Wt. _____	140#	BIT	BORING FORMAN M.D. & M.H.
_____	_____	Hammer Fall _____	30"	_____	INSPECTOR _____
					SOILS ENGR. _____

LOCATION OF BORING 53' LEFT - OFF GUARD RAIL

Depth	CASING BLOWS PER FOOT	SAMPLE DEPTHS FROM-TO	TYPE OF SAMPLE	Blows per 6" on sampler			MOISTURE DENSITY OF CONSTANT	STRATA CHANGE ELEV.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, cond., hardness, Drilling time, seams and ect.	SAMPLE		
				From 0-6	6-12	To 12-18				NO.	PEN	REC
							SOFT - WET		GREY SILTY CLAYS			
4 5'									SAME MATERIAL			
									SAME MATERIAL			
5 0'		52'6" - 54'6"	SS	8	8			52'6"		1	24"	24"
				7	7							
		54'6" - 56'6"	SS	28	30							
				18	20		STIFF - WET		GREY SILTY CLAYS			
5 5'		56'6" - 57'6"	SS	15	15							
		57'6" - 59'6"	SS	9	9							
				9	9							
		59'6" - 61'6"		11	11				SAME MATERIAL	2	24"	12"
				12	11							
6 0'		61'6" - 62'6"	SS	16	15							
		62'6" - 64'6"	SS	16	11							
				10	11			64'6"	SAME MATERIAL			
6 5'									(PUSHED SAMPLER FROM 27'6" TO 52'6")			

GROUND SURFACE TO 64'6"

USED _____ CASING THEN _____

Sample Type
D-Dry C-Cored W-Washed
UP-Unfinished Piston
TP-Test Pit A-Auger V-Vane Test
UT-Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb. wt. x 30"-fall an 2" O.D. Sampler
Cohesionless Density
0-10 Loose
10-30 Med. Dense
30-50 Dense
50+ Very Dense

Cohensive Consistency
0-4 Soft 30 + Hard
4-8 M/Stiff
8-15 Stiff
15-30 V-Stiff

summary
EARTH BORING 64'6"
ROCK CORING _____
SAMPLES 2
HOLE NO. _____

Main St.

Charlestown, NH 03603

SHEET 1 OF 2
 DATE 9/19/95
 HOLE NO. _____
 LINE & STA. 16+00
 OFFSET LEFT 34'

TO ROOT ENGINEERING
 PROJECT NAME WETLANDS PROT. STRUCTURE
 REPORT SENT TO MORRIS ROOT
 SAMPLE SENT TO ROOT ENGINEERING
 ADDRESS SPRINGFIELD, VT
 LOCATION CASTLETON, VT
 PROJ. NO. _____
 OUR JOB NO. 6468-95

GROUND WATER OBSERVATIONS
 AT _____ AT _____ HOURS
 Type _____
 Size I. D. _____
 Hammer Wt. _____
 Hammer Fall _____
 CASING _____
 SAMPLER SS
 CORE BAR _____
 SURFACE ELEV. _____
 DATE STARTED 9/19/95
 DATE COMPL. 9/19/95
 BORING FORMAN M.D. & M.H.
 INSPECTOR _____
 SOILS ENGR. _____

LOCATION OF BORING 34' LEFT OF GUARD RAIL

Depth	CASING BLOWS PER FOOT	SAMPLE DEPTHS FROM-TO	TYPE OF SAMPLE	Blows per 6" on sampler			MOISTURE DENSITY OF CONSTANT	STRATA CHANGE ELEV.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, cond., hardness, Drilling time, seams and act	SAMPLE		
				From 0-6	6-12	To 12-18				NO.	PEN	REC
5'									WATER			
									SAME MATERIAL			
									SAME MATERIAL			
10'									SAME MATERIAL			
									SAME MATERIAL			
									SAME MATERIAL			
15'									SAME MATERIAL			
		17' - 19'	SS	2	1	1		17'				
				8								
20'		19'6" - 21'6"	SS	4	1	2			BROWN PEAT WITH PIECES OF SLATE			
				5								
		21'6" - 23'6"	SS	2	11				PIECES OF SLATE (11" PIECE OF WOOD IN SAMPLER)	1	24"	24"
25'				6	6							
		23'6" - 25'6"	SS	30	16			23'6"				
				9	8			24'6"	WOOD - VERTICAL SEAMS IN WOOD (PILE)?			
30'		25'6" - 27'6"	SS	5	5							
				6	5							
		27'6" - 29'6"	SS	6	5				BROWN PEAT WITH PIECES OF SLATE			
35'				5	5							
		29'6" - 31'6"	SS	6	8					2	24"	24"
				4	12							
40'		31'6" - 32'6"	SS	47	25			31'6"	SAME MATERIAL			
				10	13			32'6"	WOOD	3	24"	24"
		32'6" - 34'6"	SS	20	12							
45'		34'6" - 36'6"	SS	15	10							
				9	9							
		36'6" - 37'6"	SS	11	10				BROWN PEAT WITH LAYERS OF SLATE AND GREY SILTS			
50'				7	8							
		37'6" - 39'6"	SS	7	8							
				8	8							
55'		39'6" - 41'6"	SS	8	9				SAME MATERIAL	4	24"	24"
				9	7							

GROUND SURFACE TO _____ USED _____ CASING THEN _____

Sample Type D-Dry C-Cored W-Washed UP-Unfinished Piston TP-Test Pit A-Auger V-Vane Test UT-Undisturbed Thinwall	Proportions Used trace 0 to 10% little 10 to 20% some 20 to 35% and 35 to 50%	140 lb. wt. x 30"-fall an 2" O.D. Sampler Cohesionless Density 0-10 Loose 10-30 Med. Dense 30-50 Dense 50+ Very Dense	Cohesive Consistency 0-4 Soft 30 + Hard 4-8 M/Stiff 8-15 Stiff 15-30 V-Stiff	summary
				EARTH BORING _____ ROCK CORING _____ SAMPLES _____ HOLE NO. _____

TO ROOT ENGINEERING ADDRESS SPRINGFIELD, VT
 PROJECT NAME WETLANDS PROT. STRUCTURE LOCATION CASTLETON, VT
 REPORT SENT TO MORRIS ROOT PROJ. NO.
 SAMPLE SENT TO ROOT ENGINEERING OUR JOB NO. 6468-95

GROUND WATER OBSERVATIONS
 AT _____ AT _____ HOURS

 AT _____ AT _____ HOURS

CASING SAMPLER CORE BAR
 Type SS
 Size I. D. 1 1/2"
 Hammer Wt. 140# BIT
 Hammer Fall 30"

SURFACE ELEV. _____
 DATE STARTED 9/13/95
 DATE COMPL. 9/13/95
 BORING FORMAN M.D. & M.H.
 INSPECTOR _____
 SOILS ENGR. _____

LOCATION OF BORING 52' RIGHT OFF GUARD RAIL

Depth	CASING BLOWS PER FOOT	SAMPLE DEPTHS FROM-TO	TYPE OF SAMPLE	Blows per 6" on sampler			MOISTURE DENSITY OF CONSTANT	STRATA CHANGE ELEV.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, cond., hardness. Drilling time, seams and etc.	SAMPLE		
				From 0-6	6-12	To 12-18				NO.	PEN	REC
5'									WATER			
									SAME MATERIAL			
								7'10"				
10'									MUCK			
									SAME MATERIAL			
15'									SAME MATERIAL			
								18'8"				
20'		20' - 21'4"	SS	25	1	4 3/4"	LOOSE - WET	20'	GREY SILTS AND CLAYS	1	16"	6"
								21'4"	PURPLE AND GREY SLATE WITH HORIZONTAL BEDDING (GREY SILTS AND CLAYS IN BEDDING)			
25'												

ROUND SURFACE TO 21'4"

USED _____ CASING THEN _____

Sample Type
 Dry C-Cored W-Washed
 R-unfinished Piston
 V-Test Pit A-Auger V-Vane Test
 U-undisturbed Thinwall

Proportions Used
 trace 0 to 10%
 little 10 to 20%
 some 20 to 35%
 and 35 to 50%

140 lb. wt. x 30"-fall an 2" O.D. Sampler
 Cohesionless Density
 0-10 Loose
 10-30 Med. Dense
 30-50 Dense
 50+ Very Dense
 Cohesive Consistency
 0-4 Soft 30 + Hard
 4-8 M/Stiff
 8-15 Stiff
 15-30 V-Stiff

summary
 EARTH BORING 21'4"
 ROCK CORING _____
 SAMPLES 1
 HOLE NO. _____

TO ROOT ENGINEERING
 PROJECT NAME WETLANDS PROT. STRUCTURE
 REPORT SENT TO MORRIS ROOT
 SAMPLE SENT TO ROOT ENGINEERING
 ADDRESS SPRINGFIELD, VT
 LOCATION CASTLETON, VT
 PROJ. NO.
 OUR JOB NO. 6468-95

GROUND WATER OBSERVATIONS
 AT _____ AT _____ HOURS
 Type _____ SS
 Size I. D. _____ 1 1/2"
 Hammer Wt. _____ 140# BIT
 Hammer Fall _____ 30"
 SURFACE ELEV. _____
 DATE STARTED 9/18/95
 DATE COMPL. 9/18/95
 BORING FORMAN M.D. & M.H.
 INSPECTOR _____
 SOILS ENGR. _____

LOCATION OF BORING 25' LEFT OF GUARD RAIL

Depth	CASING BLOWS PER FOOT	SAMPLE DEPTHS FROM-TO	TYPE OF SAMPLE	Blows per 6" on sampler			MOISTURE DENSITY OF CONSTANT	STRATA CHANGE ELEV.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, cond., hardness, Drilling time, seams and etc.	SAMPLE		
				From 0-6	6-12	To 12-18				NO.	PEN	REC
5'									WATER			
									SAME MATERIAL			
								9'4"				
10'									MUCK			
		14' - 16'	SS	6	13			14'	SAME MATERIAL	1	24"	18"
15'												
		16' - 18'	SS	7	46				PURPLE AND GREY SLATE WITH SILT LAYERS	2	24"	16"
		18' - 19'9"	SS	20	19					3	21"	12"
20'				18	145/3*			19'9"	REFUSAL ON SAMPLER			

GROUND SURFACE TO 19'9"

USED _____ CASING THEN _____

Sample Type
 -Dry C-Cored W-Washed
 P-Unfinished Piston
 P-Test Pit A-Auger V-Vane Test
 T-Undisturbed Thinwall

Proportions Used
 trace 0 to 10%
 little 10 to 20%
 some 20 to 35%
 and 35 to 50%

140 lb. wt. x 30"-fall an 2" O.D. Sampler
 Cohesionless Density
 0-10 Loose
 10-30 Med. Dense
 30-50 Dense
 50+ Very Dense

Cohesive Consistency
 0-4 Soft 30 + Hard
 4-8 M/Stiff
 8-15 Stiff
 15-30 V-Stiff

summary
 EARTH BORING 19'9"
 ROCK CORING _____
 SAMPLES 3
 HOLE NO. _____

TO ROOT ENGINEERING ADDRESS SPRINGFIELD, VT
PROJECT NAME WETLANDS PROT. STRUCTURE LOCATION CASTLETON, VT
REPORT SENT TO MORRIS ROOT PROJ. NO.
SAMPLE SENT TO ROOT ENGINEERING OUR JOB NO. 6468-95

GROUND WATER OBSERVATIONS
T _____ AT _____ HOURS
I _____ AT _____ HOURS

CASING SAMPLER CORE BAR
Type _____ SS _____
Size I. D. _____ 1 1/2" _____
Hammer Wt. _____ 140# BIT
Hammer Fall _____ 30" _____

SURFACE ELEV. _____
DATE STARTED 9/19/95
DATE COMPL. 9/20/95
BORING FORMAN M.D. & M.H.
INSPECTOR _____
SOILS ENGR. _____

LOCATION OF BORING 33' LEFT FROM GUARD RAIL

Depth	CASING BLOWS PER FOOT	SAMPLE DEPTHS FROM-TO	TYPE OF SAMPLE	Blows per 6" on sampler			MOISTURE DENSITY OF CONSTANT	STRATA CHANGE ELEV.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, cond., hardness, Drilling time, seams and etc.	SAMPLE		
				From 0-6	6-12	To 12-18				NO.	PEN	REC
									WATER			
									SAME MATERIAL			
5'								8'2"				
									MUCK			
10'		11'2" - 12'2"	SS	36	14			11'2"			1	12' 12'
		REFUSAL ON SAMPLER						12'2"	PURPLE AND GREEN SLATE WITH GREY SILT LAYERS - REFUSAL ON SAMPLER			
15'												

GROUND SURFACE TO 12'2"

USED _____ CASING THEN _____

Sample Type
 1-Dry C-Cored W-Washed
 2P-Unfinished Piston
 3P-Test Pit A-Auger V-Vane Test
 4T-Undisturbed Thinwall

Proportions Used
 trace 0 to 10%
 little 10 to 20%
 some 20 to 35%
 and 35 to 50%

140 lb. wt. x 30"-fall an 2" O.D. Sampler
 Cohesionless Density
 0-10 Loose
 10-30 Med. Dense
 30-50 Dense
 50+ Very Dense
 Cohesive Consistency
 0-4 Soft 30 + Hard
 4-8 M/Stiff
 8-15 Stiff
 15-30 V-Stiff

summary

EARTH BORING 12'2"
 ROCK CORING _____
 SAMPLES 1
 HOLE NO. _____

Main St.

Charlestown, NH 03603

SHEET 1 OF 1
 DATE 9/13/95
 HOLE NO.
 LINE & STA. 16+50
 OFFSET RIGHT 37'

TO ROOT ENGINEERING
 PROJECT NAME WETLANDS PROT. STRUCTURE
 REPORT SENT TO MORRIS ROOT
 SAMPLE SENT TO ROOT ENGINEERING
 ADDRESS SPRINGFIELD, VT
 LOCATION CASTLETON, VT
 PROJ. NO.
 OUR JOB NO. 6468-95

GROUND WATER OBSERVATIONS		Type	CASING	SAMPLER	CORE BAR	SURFACE ELEV.
AT _____	AT _____ HOURS		NX	SS		DATE STARTED 9/13/95
		Size I. D.	3"	1 1/2"		DATE COMPL. 9/14/95
		Hammer Wt.		140#	BIT	BORING FORMAN M.D. & M.H.
AT _____	AT _____ HOURS	Hammer Fall		30"		INSPECTOR
						SOILS ENGR.

LOCATION OF BORING 37' OFF GUARD RAIL

Depth	CASING BLOWS PER FOOT	SAMPLE DEPTHS FROM-TO	TYPE OF SAMPLE	Blows per 6" on sampler			MOISTURE DENSITY OF CONSTANT	STRATA CHANGE ELEV.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, cond., hardness, Drilling time, seams and ect	SAMPLE			
				From 0-6	6-12	To 12-18				NO.	PEN	REC	
5'									WATER				
									SAME MATERIAL				
								8'					
10'									MUCK				
									SAME MATERIAL				
15'													
20'		18' - 19'6"	SS	63	80	27		18'	SAME MATERIAL	*1	18"	10"	
		150 BLOWS - NO PENETRATION						DENSE	19'6"				
		21'6" - 23'	SS	3	5	12				2	18"	8"	
25'		23' - 25'	SS	4	5				SET UP TO CORE - STARTED CORING AT 19'6" CORED TO 21'6" BROKE THROUGH HARD ROCK AT 20'5" LOST WATER AT 20'5" RECOVERY 10" WENT BACK DOWN CORE HOLE AND SAMPLED WITH SPLIT SPOON SAMPLER	3	24"	10"	
		25' - 27'	SS	4	3			4		24"	4"		
		27' - 29'	SS	2	3			5		48"	18"		
30'		29' - 31'	SS	2	5								
		31' - 33'	SS	3	7						6	24"	10"
		33' - 35'	SS	10	5								
35'		35' - 37'	SS	5	8					GREY AND GREEN SLATE 1/16" THICK AND THINNER - HORIZONTAL BEDDING			
				10	13								
				15	8					7	48"	24"	
				9	10								
				10	12								
								37'	SAME MATERIAL				
									(*SOIL SAMPLE - SLATE WITH GREY CLAYS)				

GROUND SURFACE TO 37'

USED _____ CASING THEN _____

Sample Type
 D-Dry D-Cored W-Washed
 UP-Unfinished Piston
 TP-Test Pit A-Auger V-Vane Test
 UT-Undisturbed Thinwall

Proportions Used
 trace 0 to 10%
 little 10 to 20%
 some 20 to 35%
 and 35 to 50%

140 lb. wt. x 30"-fall an 2" O.D. Sampler
 Cohesionless Density
 0-10 Loose
 10-30 Med. Dense
 30-50 Dense
 50+ Very Dense

Cohesive Consistency
 0-4 Soft 30 + Hard
 4-8 M/Stiff
 8-15 Stiff
 15-30 V-Stiff

summary	
EARTH BORING	35'
ROCK CORING	2'
SAMPLES	7

HOLE NO. _____

SHEET 1 OF 1
 DATE 9/14/95
 HOLE NO. _____
 LINE & STA. 17+50
 OFFSET RIGHT 36'

TO ROOT ENGINEERING ADDRESS SPRINGFIELD, VT
 PROJECT NAME WETLANDS PROT. STRUCTURE LOCATION CASTLETON, VT
 REPORT SENT TO MORRIS ROOT PROJ. NO. _____
 SAMPLE SENT TO ROOT ENGINEERING OUR JOB NO. 6468-95

GROUND WATER OBSERVATIONS		CASING	SAMPLER	CORE BAR	SURFACE ELEV.
AT _____	AT _____ HOURS	Type _____	SS	_____	DATE STARTED 9/14/95
AT _____	AT _____ HOURS	Size I. D. _____	1 1/2"	_____	DATE COMPL. 9/14/95
		Hammer Wt. _____	140#	BIT	BORING FORMAN M.D. & M.H.
		Hammer Fall _____	30"	_____	INSPECTOR _____
					SOILS ENGR. _____

LOCATION OF BORING

Depth	CASING BLOWS PER FOOT	SAMPLE DEPTHS FROM-TO	TYPE OF SAMPLE	Blows per 6" on sampler			MOISTURE DENSITY OF CONSTANT	STRATA CHANGE ELEV.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, cond., hardness, Drilling time, seams and etc.	SAMPLE		
				From 0-6	6-12	To 12-18				NO.	PEN	REC
5'									WATER			
								6'	SAME MATERIAL			
10'									MUCK			
									SAME MATERIAL			
15'												
20'		19'6" - 21'6"	SS	10	3			19'6"	SAME MATERIAL	1	24"	10"
				6	8			20'	WOOD - LOG - DECAYED			
25'		21'6" - 23'6"	SS	8	5		VERY STIFF		GREY SANDY SILTY CLAY WITH TRACE OF FINE GRAVELS - LAYERS	2	24"	14"
				5	8		WET					
30'		23'6" - 25'6"	SS	17	22			25'6"				
				26	38							

GROUND SURFACE TO 25'6"

USED _____ CASING THEN _____

Sample Type

- D-Dry C-Cored W-Washed
- UP-Unfinished Piston
- TP-Test Pit A-Auger V-Vane Test
- UT-Undisturbed Thinwall

Proportions Used

- trace 0 to 10%
- little 10 to 20%
- some 20 to 35%
- and 35 to 50%

140 lb. wt. x 30"-fall an 2" O.D. Sampler

- Cohesionless Density
- 0-10 Loose
- 10-30 Med. Dense
- 30-50 Dense
- 50+ Very Dense

- Cohesive Consistency
- 0-4 Soft 30 + Hard
- 4-8 M/Stiff
- 8-15 Stiff
- 15-30 V-Stiff

summary

EARTH BORING 25'6"
 ROCK CORING _____
 SAMPLES 2

HOLE NO. _____



DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT
696 VIRGINIA ROAD
CONCORD MA 01742-2751

March 2, 2016

Regulatory Division
CENAE-R-PEC-62
File Number: NAE-2012-0260-M1

Mr. Mark S. Shea, Town Manager
Town of Castleton
P.O. Box 727
Castleton, Vermont 05735

Dear Mr. Shea:

In accordance with your recent request, your Department of the Army permit, number NAE-2012-0260, which was issued November 25, 2013, is hereby amended as shown on the attached plans, in three sheets, entitled "FLOAT BRIDGE RD. PHASE 2 CAUSEWAY", and last revised "2/25/16". The work will involve the placement of fill in about 0.35 acre of Lake Bomoseen in conjunction with the stabilization of the east causeway of Float Bridge Road in Castleton, Vermont.

The conditions of the original permit remain in full force and effect.

We continually strive to improve our customer service. In order for us to better serve you, we would appreciate your completing our Customer Service Survey located at http://corpsmapu.usace.army.mil/cm_apex/f?p=regulatory_survey

If you have any questions, please contact Michael S. Adams of my staff at (802) 872-2893.

Sincerely,


Frank J. DelGiudice
Chief, Permits & Enforcement Branch
Regulatory Division

Attachments

Copies furnished:

Mr. Misha Cetner

VT Department of Environmental Conservation

misha.cetner@vermont.gov

Mr. Patrick Griffin

pgriffin@enmanengineering.com

Mr. Mark Shea

manager@castletonvt.org



**DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT
696 VIRGINIA ROAD
CONCORD MA 01742-2751**

November 25, 2013

Regulatory Division
CENAE-R-PEC-61
Permit Number: NAE-2012-0260

Mr. Charles Jacien
Town of Castleton
P.O. Box 727
Castleton, Vermont 05735
manager@castletonvt.org

Dear Mr. Jacien:

We have reviewed your application to place fill in about 0.35 acre of Lake Bomoseen in conjunction with the stabilization of Float Bridge Road in Castleton, Vermont. The work is shown on the attached plans, on eight sheets, entitled "FLOAT BRIDGE RD. PHASE 2 CAUSEWAY", and dated "10/15/13".

Based on the information you have provided, we have determined that the proposed activity, which includes a discharge of dredged or fill material into waters or wetlands, will have only minimal individual or cumulative environmental impacts on waters of the United States, including wetlands. Therefore, this work is authorized as a Category 2 activity under the attached Federal permit known as the Vermont General Permit (GP). This work must be performed in accordance with the terms and conditions of the GP.

You are responsible for complying with all of the GP's requirements. Please review the attached GP carefully, in particular the GP conditions beginning on Page 7, to familiarize yourself with its contents. You should ensure that whoever does the work fully understands the requirements and that a copy of the permit document AND THIS AUTHORIZATION LETTER ARE at the project site throughout the time the work is underway.

This authorization expires on December 6, 2017, unless the GP is modified, suspended, or revoked. You must commence or have under contract to commence the work authorized herein by December 6, 2017 and complete the work by December 6, 2018. If you do not, you must contact this office to determine the need for further authorization before beginning or continuing the activity. We recommend you contact us *before* this permit expires to discuss permit reissuance.

If you change the plans or construction methods for work in our jurisdiction, please contact us immediately to discuss modification of this authorization. This office must approve any changes before you undertake them.

This authorization requires you to 1) notify us before beginning work so we may inspect the project, and 2) submit a Compliance Certification Form. You must complete and return the enclosed Compliance Certification Form within one month following the completion of the authorized work.

This authorization presumes that the work as described above and as shown on your plans noted above is in waters of the U.S. Should you desire to appeal our jurisdiction, please submit a request for an approved jurisdictional determination in writing to this office.

This permit does not obviate the need to obtain other Federal, state, or local authorizations required by law. Performing work not specifically authorized by this determination or failing to comply with any special condition(s) provided above or all the terms and conditions of the GP may subject you to the enforcement provisions of our regulations.

We continually strive to improve our customer service. In order for us to better serve you, we would appreciate your completing our Customer Service Survey located at <http://per2.nwp.usace.army.mil/survey.html>.

Please contact Marty Abair of my staff at (802) 872-2893 if you have any questions.

Sincerely,



Frank J. DelGiudice
Chief, Permits & Enforcement Branch
Regulatory Division

Attachments

Copies furnished:

Mr. Kevin Burke

Kevin.Burke@state.vt.us

Mr. Patrick Griffin

pgriffin@enmanengineering.com

STATE OF VERMONT
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
MANAGEMENT OF LAKES AND PONDS
29 V.S.A. Chapter 11

RE: Town of Castleton – Charles Jacien, Town Manager
P.O. Box 727
Castleton, VT 05735

Application No. 2013-028, Lake Bomoseen, Castleton, Vermont
Project: Repair and Reconstruct Existing Causeway (Float Bridge Road)
Project Location: Float Bridge Road, Castleton
Project Identification Number: RU12-1086

The Department of Environmental Conservation (Department) hereby issues this Decision and Permit for the above named project. The Department has approved the project subject to the conditions contained herein.

BACKGROUND

On August 15, 2013, an application was received by the Department of Environmental Conservation (Department) from the Town of Castleton (applicant) under the provisions of 29 V.S.A. Chapter 11, "Management of Lakes and Ponds," for authorization to repair and reconstruct existing causeway (Float Bridge Road) within the public waters of Lake Bomoseen, Castleton, Vermont.

On January 2, 2014, state and local officials, abutting property owners, and others having an interest in this matter were notified of this application and given the opportunity to file written comments or request a public information meeting. Due to an error in the initial distribution of the public notice to interested persons, specifically the Lake Bomoseen Association, the public notice period was extended for the Lake Bomoseen Association (LBA) through February 17, 2014. No request for a public information meeting was received.

The Department has reviewed the application, public comments, and other relevant documents and information, and has found that sufficient information exists with which to determine whether this project will be consistent with the public trust doctrine and, pursuant to 20 V.S.A. §405(b), whether the project will adversely affect the public good. The Department relied on guidance provided by case law to make a decision regarding the proposed project's consistency with the public trust doctrine.

FINDINGS AND ANALYSIS

1. **Jurisdiction:** Lake Bomoseen in Castleton, Vermont is a public water of the State of Vermont. The project encroaches beyond the shoreline as delineated by the mean water level. Therefore the Department has jurisdiction under 29 V.S.A. Chapter 11.
2. **Project Description:** The project is the repair and reconstruction of the causeway (Float Bridge Road) to address its current state of failure. The causeway is located within the waters of the

State of Vermont, but is maintained by the Town of Castleton. The project is situated within Lake Bomoseen and involves the placement of fill into the lake. The causeway was repaired in 2002 by the use of gabion walls, authorized under encroachment permit #2001-024. The gabion wall design was proposed at that time in an effort to repair and stabilize the road while minimizing the amount of fill placed into the lake. The applicant's engineer indicates that the failure of the gabion walls is due to undermining from wave action and un-resisted lateral forces (lake ice and frost heaving).

The east side of the causeway up to Grady Bridge abutment is approximately 300 feet long. The west side of the causeway up to the Grady Bridge abutment is also approximately 300 feet long. The Grady Bridge, located in the center of the causeway, from abutment to abutment spans approximately 100 feet. The repair and reconstruction of the causeway will involve the placement of new fill along the entire length of the causeway, on both north and south sides.

Project construction specifically involves eight phases as depicted in the plans; consisting of two major parts.

The first part (Phases 1 through 4) is embankment construction from the lake bottom up to three feet above mean high water level. This part involves the removal of the gabion walls and frost reactive material to the depth of free draining soils (36 inches +) following by installation of large rip-rap (24-36 inch diameter blast rock) below and above the water surface to create a 2:1 slope to support the roadway. Initially, two layers of geotextile fabric will be placed on the lake bottom, one to provide tensile strength to support the rip-rap fill, the other to reduce the permeation of the crushed stone into the mucky lake bottom. Large crushed rock will be placed atop the two fabrics to create an armored embankment. The roadway will be reconstructed within and atop these.

The second part (Phases 5 through 8) is more varied and involves all work above the large diameter rip-rap fill. The second part includes small diameter rip-rap installation, vegetated Geocell installation, fishing platform and walkway construction, removal of the upper 36 inches of the road and the reconstruction of the road. Initially, a layer of geotextile fabric will be installed, followed by 6 inch blast rock, and top dressed with a 6 inch layer of 2-3 inch diameter rip-rap. Crushed stone will be placed between blast rock and road base. A non-woven geotextile will be installed on top of the rip-rap surface followed by a vegetated Geocell system up to the edge of road guard rail. The roadway is to be constructed of road base and pavement courses.

All eight phases of project construction will require staggering between the north and south sides of the causeway to allow for the road to remain open to vehicle traffic during construction.

The project includes the installation of a fishing platform and walkway within the footprint of the stabilized side slope along the southeast quadrant of the causeway, along with two "fishing rocks" incorporated into the northeast and northwest quadrants.

Maintenance will be required during the lifespan of the causeway. Settlement and movement cannot be precluded. This design is conceived to retain the existing causeway, address current issues and provide the residents on the northwest corner of Lake Bomoseen continued access.

- 3. Project Purpose:** The purpose of the project is to address and repair failures of the existing causeway and provide residents of the northwest corner of Lake Bomoseen continued access, and to maintain continued safe pedestrian fishing access for the public along the causeway.

4. **Whether Excessive for the Stated Purpose:** The amount of additional fill was minimized to achieve a maximum slope of 2:1. The project is not excessive for the stated purpose.
5. **Less Intrusive Feasible Alternatives:** The causeway was repaired in 2002 using gabions as an effort to minimize additional fill into the lake. The gabion walls installed in 2002 are failing and the causeway requires repair. Although the new design for repair and reconstruction of the causeway will involve additional fill in the lake and be additionally intrusive, the design is considered to be the least intrusive feasible alternative to achieve the stated project purpose.
6. **Measures to Reduce Impacts on Public Resources:** A floating silt barrier will be placed in the water around the perimeter of the work area to contain turbidity. All project equipment will require visual inspection and cleaning prior to operating in Lake Bomoseen to prevent the introduction or spread of invasive species. All stone fill will be free of silt, clay, and organic materials. Soils to be utilized in the Geocell system are to be tested for and mixed (if necessary) with appropriate nutrients prior to installation/application, to avoid the need for fertilizing the soils adjacent to the lake. Areas with exposed soil are to be stabilized promptly with seed and mulch, and rolled erosion control matting where necessary (slopes 3:1 or greater) to minimize erosion.
6. **Placement of Fill:** The project includes the permanent placement of fill consisting of stone, coupled with a vegetated Geocell system, beyond the mean water level of Lake Bomoseen. The new fill associated with the new side slopes will extend considerably beyond the footprint of the existing causeway. The current gabion walls supporting the existing causeway are failing, causing erosion and may result in unsafe conditions for vehicles and pedestrians using the causeway in the future. Therefore the causeway requires repair and reconstruction. The public benefits of having a stable causeway that is not eroding into the lake and that is safe for both vehicle access and for pedestrian access overwhelmingly outweigh the presumed adverse impact.

Public Good Analysis:

7. **Effects on Water Quality:** Comments were received from the Lake Bomoseen Association (LBA) regarding whether sediment around the causeway will be removed and whether the collection of sediment resulting around the causeway bridge will improve. The project as designed does not include dredging of sediment, and only includes the removal of existing gabion structures and fill currently supporting the causeway that is to be replaced. The project is also not designed to alter flow or modify lake sediment deposition patterns. Controls will be installed in the lake during construction to control for sediment/turbidity temporarily generated during construction. The application was not modified in response to the noted comments.

A Type 2 heavy duty floating silt barrier will be installed in the lake around the work area. The barrier will extend from the surface to the bottom and will be secured to the bottom by the barrier's ballast. The floating silt barrier will be maintained until the project is complete and turbidity within the barrier has decreased to the level of turbidity outside the barrier. Silt fence and other erosion prevention and sediment control measures will be implemented on shore during construction to prevent erosion and control sediment in the project work areas. Disturbed areas on shore will be seeded and mulched promptly to minimize erosion. Heavy equipment will work from shore. Stone fill will be free from silt, clay and other organic material to protect water quality. Stone fill placed on the lake bottom along the edge of the causeway will protect the lake

from erosion into the future. The proposed project will not adversely impact water quality beyond the impacts during construction.

9. **Effects on Fish and Wildlife Habitat:** The project is located at an existing causeway. The repaired and reconstructed causeway footprint will be larger in size over the existing one due to the addition of fill to create 2:1 side slopes and a stable crossing that can be accessed safely by both vehicles and pedestrians. Stone fill placed on the lake bottom along the edge of the causeway will protect the lake from erosion into the future and adverse impacts to fish and wildlife habitat will be limited to the addition of stone fill along causeway side slopes and temporary impacts during construction.

Comments were received from the Department of Fish and Wildlife fisheries biologist. The comments requested that project construction in the lake be restricted until after June 22 of the calendar year to protect fish spawning habitat. In addition, comments noted issue with stone fill proposed in the general area north of road station 4+50 to 5+00 where an underwater deepwater channel connects the main lake and the area on the north side of the road crossing with the larger spawning areas to the north in the Lake Bomoseen wetlands. The comments note that spawning fish use this considerably deeper channel as a highway to access northern spawning grounds.

In light of the comments, project construction in the lake, including but not limited to for the installation of the silt barrier, will be restricted until after June 22 of any calendar year, unless otherwise approved by the Department of Fish and Wildlife fisheries biologist. Per further correspondence with between the fisheries biologist and the project designer, the design of the project along the northeast quadrant of the project in the vicinity of the deepwater channel will not cause adverse impacts to this channel, and is acceptable as designed. Therefore, the design did not require modification. There was no additional information received from noticed parties or others to indicate that the project would have an unacceptable negative impact on fish and wildlife habitat. The adverse impacts to fish and wildlife habitat are expected to be minimal and are outweighed by the reduction in erosion of the existing causeway into the future.

8. **Effects on Aquatic and Shoreline Vegetation:** The repaired and reconstructed causeway footprint will be larger in size over the existing one due to the addition of fill to create 2:1 side slopes and a stable crossing that can be accessed safely by both vehicles and pedestrians. Stone fill placed on the lake bottom along the edge of the causeway will protect the lake from erosion into the future and adverse impacts to existing aquatic vegetation will be limited to the addition of stone fill along causeway side slopes and temporary impacts during construction. The adverse impacts to aquatic vegetation are expected to be minimal and are outweighed by the reduction in erosion of the existing causeway into the future. The existing causeway side slopes are currently minimally vegetated along the edge of roadway and the remaining side slopes consist of unvegetated gabion walls. The project proposes to establish vegetation along the side slopes down to 3 feet above mean high water level through the use of a Geocell system. The project is expected to result in a positive impact to shoreline vegetation along the causeway.
9. **Effects on Navigation and Other Recreational and Public Uses, Including Fishing and Swimming:** Comments were received from the Lake Bomoseen Association (LBA) regarding the potential for negative impacts to the public's access both across Float Bridge Road by vehicles and pedestrians for access, and by boats travelling north-south on the lake through the Grady Bridge crossing during project construction. The LBA inquired whether the project would result in improvements to the Grady Bridge crossing to allow for the passage of larger boats. The LBA comments further question whether the project would impact the location where the aquatic

plant harvester docks, along with the offload conveyer docks on shore. The project is not designed to alter the size of the Grady Bridge crossing. Construction impacts are expected to be temporary and access by boats through the Grady Bridge Crossing will not be restricted outside of temporary traffic control restrictions during construction. Storage of the LBA plant harvester/conveyer during construction may require further coordination between the permittee and the LBA. The application was not modified in response to the noted comments.

The completed project will have a positive effect on recreational activities such as fishing, as fishing from the causeway will be easier and safer to use by the public and will provide continued public access to the west side of Lake Bomoseen in this area. Fishing access by the public will be improved by stabilizing the causeway and through the addition of a fishing platform and access walkway, along with the addition of two "fishing rocks" all to be located within the footprint of the proposed stabilized side slopes. The expanded footprint of the causeway is not expected to affect the public's use of the lake for boating, fishing and swimming, and is not expected to impede navigation in the area of the causeway, as the causeway, including the roadway bridge and underpass, will remain open throughout construction of the project for vehicular traffic and for vessels, respectively, with the exception of temporary traffic control closures. The project is not expected to alter the crossing to accommodate for navigation by larger vessels. Adverse impacts to the public's use of the immediate causeway area for fishing, swimming, or boating, will be temporary, and only during construction.

10. **Consistency with the Natural Surroundings:** The project will repair and reconstruct an existing causeway. Existing shoreline vegetation at the site outside of the crossing at the east and west sides of the lake will not be removed. The project will result in additional slope vegetation to be established along the length of the causeway that is not currently found on the gabion edges. The project is consistent with the existing natural surroundings.
11. **Consistency with Municipal Shoreland Zoning Ordinances and Applicable State Plans:** No comments were received during the investigation from local and state offices. As a municipal project the Town is not subject to any restrictions under municipal shoreland zoning ordinances. *Kedroff v. Town of Springfield* (1969) 127 Vt. 624. The project is therefore considered to be consistent with any applicable municipal shoreland zoning ordinances and applicable state plans.
12. **Cumulative Impact:** The repair and reconstruction of the causeway will result in additional encroachment, however the improvements will ensure continued safe access by the public to residences on the west side of the causeway, and will provide safe access to the causeway for pedestrians and use of the causeway for fishing. The improvements to the causeway will minimize erosion of the side slopes into Lake Bomoseen, and are expected to provide longer term erosion protection compared to the existing gabion walls. The cumulative impact of the proposed project is positive due to the long lasting improvements to the causeway providing public access.
13. **Public Good Analysis Summary:** Negative impacts on water quality will be limited to the work area during construction. The adverse impacts to fish and wildlife habitat are expected to be minimal and are outweighed by the reduction in erosion of the existing causeway into the future. The project is not expected to have a measureable new impact on aquatic vegetation and the project is expected to result in a positive impact to shoreline vegetation along the causeway. Adverse impacts to the public's use of the immediate causeway area for fishing, swimming, or boating will be temporary, and only during construction. The completed project will have a positive effect on recreational activities such as fishing, as the causeway will be safer to use by the public and will provide continued public access via the causeway to the west side of Lake

Bomoseen in this area. The expanded footprint of the causeway is not expected to affect the public's use of the lake for boating and swimming, and is not expected to impede navigation in the area of the causeway. The project will not significantly impact the existing natural surroundings and will have a positive cumulative due to the long lasting improvements to the causeway that provides public access. Overall, based on the above findings, the Department has determined that the proposed project will have a positive impact on the public good.

Public Trust Analysis:

14. **Public Trust Analysis:** The public trust doctrine requires the Department to determine what public trust uses are at issue, to determine if the proposal provides a public purpose or benefit, to determine the cumulative effects of the proposal on the public trust uses, and to balance the beneficial and detrimental effects of the proposal. The public trust uses relevant to this proposal are recreational and including fishing, swimming, and boating. The completed project will have a positive impact on public trust uses by repairing and stabilizing the existing causeway, maintaining safe access for residents on the west side of the causeway, and by creating safer access for pedestrians to access the causeway for fishing, thus enhancing public use of the public water. The Department in its public trust review also looks at impacts to the public trust resource, in this case Lake Bomoseen. The negative impacts on the public resource are primarily short-term during the construction, and will be limited to the work area. The public benefits associated with the project outweigh the potential negative impacts on public trust uses and the public trust resource and the Department has therefore determined that the project is consistent with the public trust doctrine.

DECISION AND PERMIT

Based upon the foregoing Findings, it is the decision of the Department that the project described herein, as set forth in the above findings and in the plans on file with the Department, complies with the criteria of 29 V.S.A. §405, and is consistent with the public trust doctrine.

In accordance with 29 V.S.A. §§403 and 408, permission is hereby granted to the Town of Castleton, hereinafter called "permittee," to carry out the project in accordance with the following conditions:

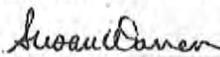
1. Permit #2013-028 supersedes the previously issued permit #2001-024 issued to the Town of Castleton for the repair of Float Bridge Road. The previously authorized repair using gabion walls as designed, permitted, and constructed under permit #2001-024 remains valid until construction completion of the new project authorized herein. The completed repairs (per applicant) to the bridge abutments of Grady Bridge on Float Bridge Road by the Town of Castleton, as previously authorized under permit #2012-045, are now also covered by this new permit subject to the conditions and design as previously permitted, and permit #2013-028 supersedes the previously issued permit #2012-045.
2. The project shall be carried out in strict accordance with the application and site plan, received on August 15, 2013, as revised on December 30, 2013, as referenced in this decision and permit; the above Findings; the conditions of this Permit; and such minor modifications as may be approved in writing by the Department.

3. The contractor(s) working on the approved project shall contact the Department and request co-permittee status. The contractor(s) shall not conduct work under this authorization without first obtaining co-permittee status via Attachment A. Once the project is complete and the area stabilized the contractor(s) may request termination of co-permittee status via Attachment B.
4. The permittee shall supply a work schedule to Kevin Burke of the Watershed Management Division, by email (kevin.burke@state.vt.us), a minimum of 48 hours prior to starting work.
5. Project construction in the lake, including but not limited to for the installation of the silt barrier, will be restricted until after June 22 of any calendar year, unless otherwise approved in writing by the Department of Fish and Wildlife fisheries biologist.
6. Prior to placing any equipment in Lake Bomoseen, the contractor shall inspect and clean all equipment. In addition, all water from bilges, etc. on all project equipment (boats, motors, etc.) shall be drained; all project equipment shall be rinsed with water at a temperature at or above 140° F for a minimum of one minute and/or washed with an appropriate disinfectant and all absorbent items that have come into contact with water (e.g. felt-bottom wading boots) shall be soaked in an appropriate disinfectant for a minimum of 30 minutes to ensure complete decontamination. As an alternative, the project equipment may be thoroughly dried and kept dry for at least five (5) days before and after being placed in Lake Bomoseen as a means of preventing the introduction of non-native species into or out of Lake Bomoseen. The permittee shall be responsible for making certain that the party or parties using/transporting the project equipment adhere to the approved measures.
7. The permittee shall install a Type 2 heavy duty floating silt barrier in the lake around the work area prior to any other work beyond the shoreline delineated by the mean water level of the lake. The barrier shall extend above the lake's surface and be secured to the bottom by the barrier's ballast to contain turbidity during the project. If turbidity is observed beyond the work area, work shall be stopped immediately until corrective measures can be taken. The floating silt barrier shall remain in place and be maintained until construction is complete and observations indicate turbidity within the floating silt barrier has decreased to the level of turbidity outside the barrier. Any pieces of the existing causeway, including but not limited to the existing gabion wall or materials deposited into the lake shall be removed from the lake.
8. Heavy equipment shall work from shore.
9. Only clean stone, free from silt, loam, clay and other organic material, shall be used.
10. Large rip-rap used as fill shall not extend more than three feet in height above mean high water level as depicted on the authorized plans, and the remainder of slope shall be stabilized with vegetation consisting of a mix of grasses, per use of Geocell, or Department approved equivalent, and as specified in the approved plans.
11. Silt fence and other erosion prevention and sediment control measures will be implemented on shore during construction to prevent erosion and control sediment in the project work areas. Areas disturbed by the construction activities shall be seeded and mulched appropriately.

12. Fuel and lubricants from equipment shall not be discharged into the water. Once work commences, it shall be accomplished as quickly as possible to avoid prolonged disturbance to the area.
13. Care shall be taken during construction to minimize damage to existing shoreline vegetation. Trees damaged during construction shall be replaced with similar ones and maintained in a viable condition or replaced with live tree(s). Any damage to existing shoreline vegetation shall be repaired and replaced as necessary with similar planting of similar size.
14. All debris and refuse shall be removed from the area and disposed of properly, in compliance with all applicable regulations.
15. The permittee shall complete the approved construction by **February 28, 2019**, or this permit shall expire. An extension of time may be granted for cause. A request for an extension must be received by the Department prior to the above date in order to prevent the expiration of this permit. A request for extension may be considered a minor modification.
16. Except as noted in **Condition #15**, this permit shall expire 30 years from the date of this permit. Upon expiration of the permit, the Department will review the area and determine if any site restoration or removal of fill will be required. If a renewal is desired, an application shall be filed at least 90 days prior to the expiration date. A renewal decision will be based on the relevant statutory criteria and Department rules, procedures and policies prevailing at that time.
17. The permittee shall allow the Commissioner of the Department, or his/her duly authorized representative, at reasonable times and upon presentation of credentials to enter upon and inspect the permitted property and the project to determine compliance with this permit.
18. This permit and conditions are binding upon the permittee. It may not be transferred without the prior written approval of the Department.
19. This permit is issued subject to the terms herein and may be suspended or revoked at any time for: failure by the permittee to disclose all relevant facts during the application process which were known at that time; misrepresentation of any relevant fact at any time; non-compliance with the terms and conditions of the permit; or a change in the factors associated with the encroachment's effect on the public trust or public good so that on balance the Department finds that the encroachment adversely affects the public trust or public good.
20. This permit does not convey any title or interest to the lands lying under public waters or waters affected, nor does it deprive the Department of the right to order the removal of the project and restoration of the area affected.
21. This permit does not grant any exclusive rights or privileges that would impair any rights possessed by other riparian or littoral owners of the State of Vermont. It does not grant any right, title or easement to or over any land not owned in fee by the applicants, nor does it authorize any damage to private property or invasion of private rights or the violation of federal, state or local laws or regulations.

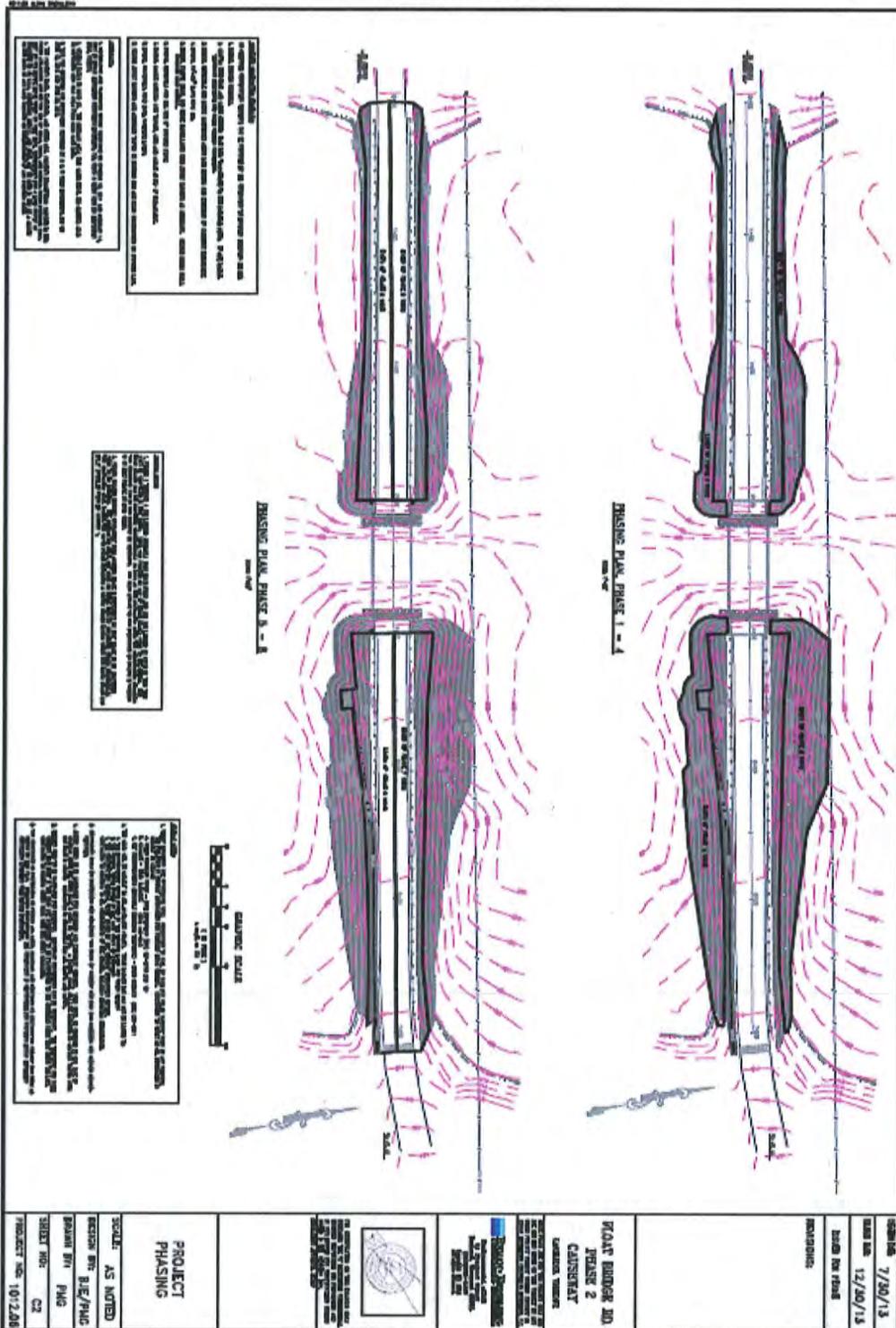
22. This permit does not relieve the permittee of the responsibility to comply with any other applicable federal, state and local laws, regulations and permits.
23. The Department, by issuance of this permit, accepts no legal responsibility for any damage direct or indirect of whatever nature and by whoever suffered arising out of the project described.
24. The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.
25. This Permit shall become effective 10 days after the Department issues this permit in accordance with 29 V.S.A. § 405(c).
26. Pursuant to 10 V.S.A. Chapter 220, any appeal of this decision must be filed with the clerk of the Environmental Division of the Superior Court within 30 days of the date of the decision. The Notice of Appeal must specify the parties taking the appeal and the statutory provision under which each party claims party status; must designate the act or decision appealed from; must name the Environmental Division; and must be signed by the appellant or their attorney. In addition, the appeal must give the address or location and description of the property, project, or facility with which the appeal is concerned and the name of the applicant or any permit involved in the appeal. The appellant must also serve a copy of the Notice of Appeal in accordance with Rule 5(b)(4)(B) of the Vermont Rules for Environmental Court Proceedings. For further information, see the Vermont Rules for Environmental Court Proceedings, available on line at www.vermontjudiciary.org. The address for the Environmental Division is: 2418 Airport Road, Suite 1, Barre, VT 05641 (Tel. # 802-828-1660).

David K. Mears, Commissioner
Department of Environmental Conservation

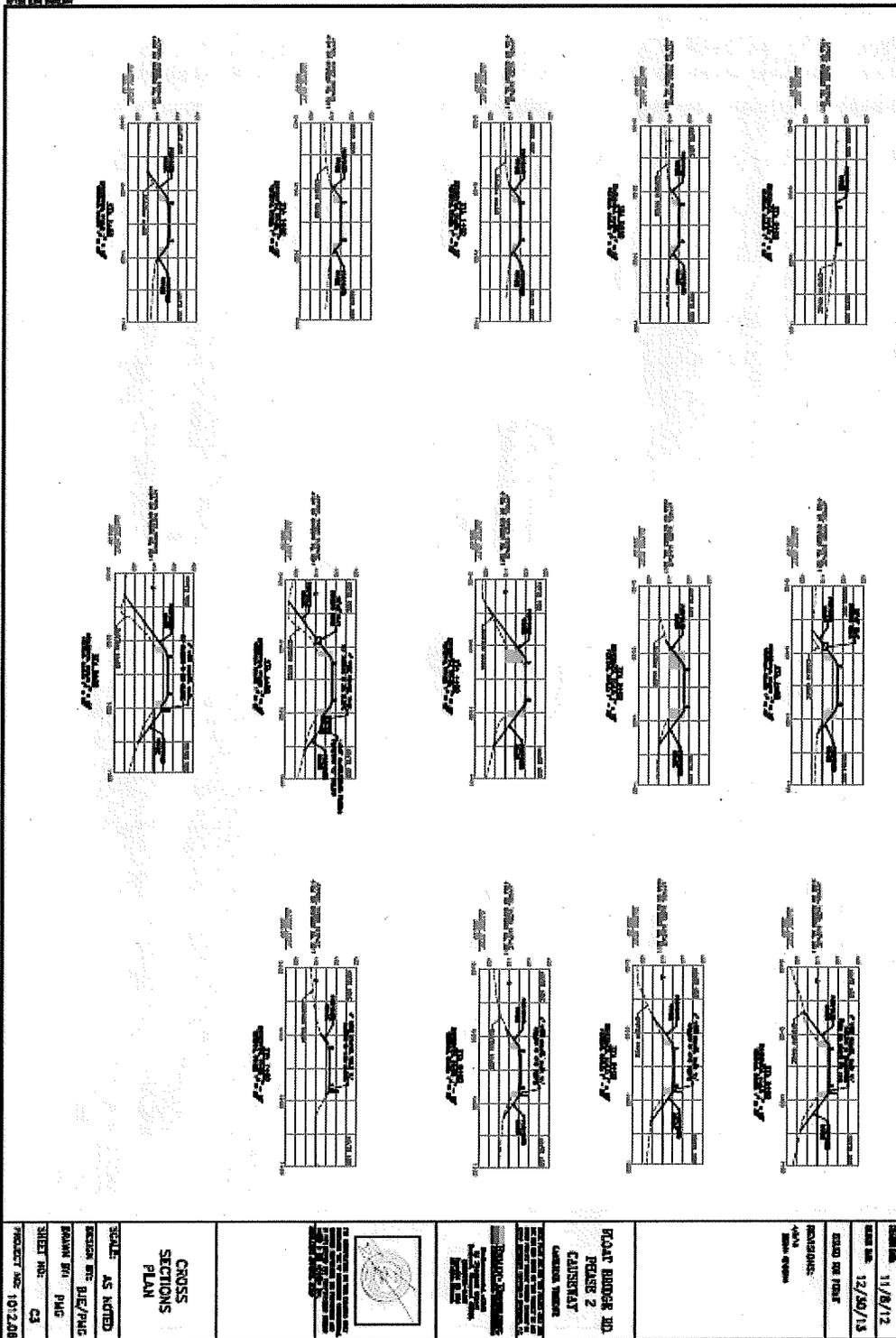
By  Digitally signed by Susan Warren
Date: 2014.02.18 16:09:45 -05'00'

Susan Warren
Lakes and Ponds Program Manager

**SITE PLAN
 NOT TO SCALE**

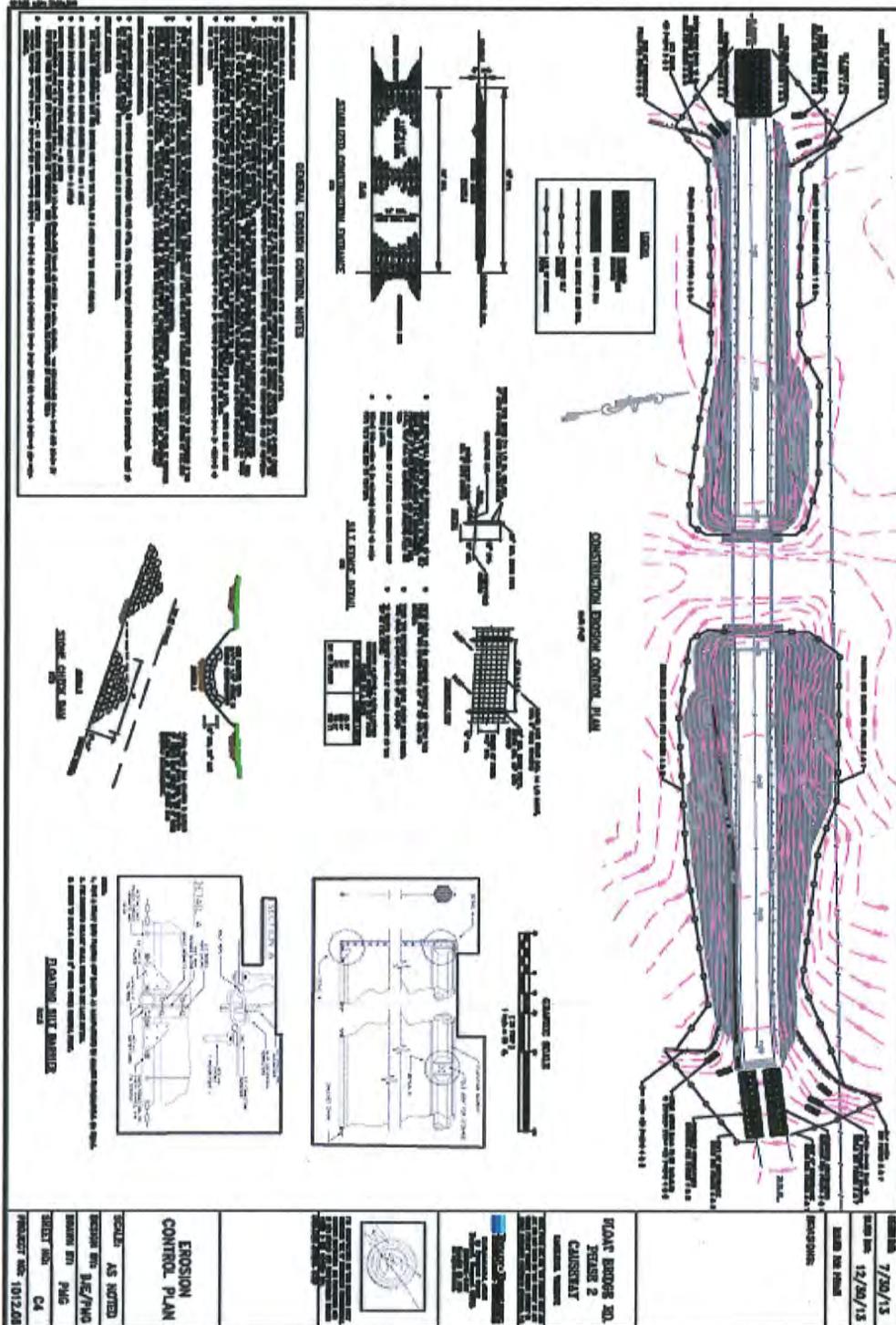


**SITE PLAN
 NOT TO SCALE**



<p>SCALE: AS NOTED</p> <p>DESIGNER: BJE/PAC</p> <p>DRAWN BY: PHG</p> <p>SHEET NO.: 03</p> <p>PROJECT NO.: 101200</p>	<p>CROSS SECTIONS PLAN</p>	<p>DATE: 11/8/12</p> <p>DATE FOR PLAN: 12/20/13</p> <p>PROJECT: CAUSAERT</p> <p>LOCATION: CAUSAERT</p>	<p>PROJECT NO.: 101200</p> <p>SHEET NO.: 03</p> <p>DATE: 11/8/12</p> <p>DATE FOR PLAN: 12/20/13</p> <p>PROJECT: CAUSAERT</p> <p>LOCATION: CAUSAERT</p>	<p>PROJECT NO.: 101200</p> <p>SHEET NO.: 03</p> <p>DATE: 11/8/12</p> <p>DATE FOR PLAN: 12/20/13</p> <p>PROJECT: CAUSAERT</p> <p>LOCATION: CAUSAERT</p>
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SITE PLAN
 NOT TO SCALE



**ATTACHMENT A
REQUEST FOR CO-PERMITTEE STATUS**

TITLE 29 VSA CHAPTER 11 MANAGEMENT OF LAKES AND PONDS

CONTRACTOR REQUEST FOR CO-PERMITTEE STATUS

I HEREBY REQUEST CO-PERMITTEE STATUS FOR MYSELF AS AN INDIVIDUAL OR ON BEHALF OF MY BUSINESS TO CONDUCT WORK AUTHORIZED BY TITLE 29 VSA CHAPTER 11 MANAGEMENT OF LAKES AND PONDS PERMIT NUMBER _____. IN REQUESTING CO-PERMITTEE STATUS, I HEREBY CERTIFY UNDER THE PENALTY OF LAW THAT I HAVE READ AND AM FAMILIAR WITH THE TERMS AND CONDITIONS OF THE PERMIT AND THAT ALL ACTIVITIES RELATED TO THIS AUTHORIZATION REQUEST WILL BE DONE IN ACCORDANCE WITH THE ISSUED PERMIT.

SIGNATURE: _____ DATE: _____

NAME (PLEASE PRINT): _____

TITLE: _____

CONTRACTING INDIVIDUAL, PARTNERSHIP, ASSOCIATION, OR CORPORATION:

ADDRESS: _____

BUSINESS PHONE/FAX: (____) _____ / (____) _____

JOB SITE CONTACT AND PHONE: _____

PROJECT NAME: _____

ANTICIPATED CONSTRUCTION START DATE _____

ANTICIPATED CONSTRUCTION COMPLETION DATE _____

SUBMIT ORIGINAL, COMPLETED FORM TO:

WATERSHED MANAGEMENT DIVISION
1 NATIONAL LIFE DRIVE
MAIN BUILDING FLOOR 2
MONTPELIER, VT 05620-3522

**ATTACHMENT B
REQUEST TO TERMINATE CO-PERMITTEE STATUS**

TITLE 29 VSA CHAPTER 11 MANAGEMENT OF LAKES AND PONDS

CONTRACTOR REQUEST FOR TERMINATION OF CO-PERMITTEE STATUS

I HEREBY REQUEST TERMINATION OF CO-PERMITTEE STATUS FOR MYSELF AS AN INDIVIDUAL OR ON BEHALF OF MY BUSINESS TO CONDUCT WORK AUTHORIZED BY TITLE 29 VSA CHAPTER 11 MANAGEMENT OF LAKES AND PONDS PERMIT NUMBER _____. I CERTIFY THAT FOR THE CONSTRUCTION ACTIVITY THAT WAS AUTHORIZED IS COMPLETE AND PERMANENT STABILIZATION HAS BEEN ACCOMPLISHED ON ALL DISTURBED AREAS ON THE SITE. THE PERMITTEE(S) REMAINS RESPONSIBLE FOR COMPLIANCE WITH ALL CONDITIONS OF THE PERMIT.

SIGNATURE: _____ DATE: _____

NAME (PLEASE PRINT): _____

TITLE: _____

CONTRACTING INDIVIDUAL, PARTNERSHIP, ASSOCIATION, OR CORPORATION:

ADDRESS: _____

BUSINESS PHONE/FAX: (____) _____ / (____) _____

JOB SITE CONTACT AND PHONE: _____

PROJECT NAME: _____

CONSTRUCTION COMPLETION DATE _____

WATERSHED MANAGEMENT DIVISION
1 NATIONAL LIFE DRIVE
MAIN BUILDING FLOOR 2
MONTPELIER, VT 05620-3522



Vermont Department of Environmental Conservation
Watershed Management Division
Main Building, Second Floor
One National Life Drive
Montpelier, Vermont 05620-3522

Agency of Natural Resources

[phone] 802-828-1535
[fax] 802-828-1544

Dear Permittee:

The Notice of Intent for the discharge of stormwater runoff from Moderate Risk Construction Activity under Construction General Permit (CGP) 3-9020 (Amended 2008) has been authorized. Enclosed are four documents that will assist you in maintaining compliance with this authorization. In addition, a link to the Stormwater Management Program's website has been provided where additional information is available, including but not limited to the On-Site Plan Coordinator Manual, which is also described under Item #5 below.

1. Authorized Notice of Intent (NOI)

The authorized NOI for moderate risk projects valid for 5 years. However, please be advised that Construction General Permit 3-9020 expired February 5, 2013 and will be replaced by a new general permit. As a continuing discharge you will need to comply with any new general permit. This may require that you submit a new NOI prior to the expiration of your existing authorization. The requirements for projects such as yours will be contained in the new General Permit when it is issued. If the project is completed or is sold before that time, you may terminate the authorization by submitting a Notice of Termination, subject to Subpart 7.4 of CGP 3-9020.

2. Notice of Authorization (NOA) for Posting

The enclosed Notice of Authorization, which details the authorization and conditions you selected in completion of Appendix A of CGP 3-9020, must be posted in a location visible to the public in accordance with Subpart 4.5.C of CGP 3-9020. In accordance with Subpart 5.1 of the CGP 3-9020, the project risk score must be re-evaluated prior to any major changes to the approved Erosion Prevention Sediment Control plan.

3. Vermont EPSC Field Guide

The Vermont Erosion Prevention and Sediment Control Field Guide was developed to assist contractors in the proper installation and maintenance of Best Management Practices. A copy of this document is available on our website at the following link: http://www.vtwaterquality.org/stormwater/hm/sw_cgp.htm

4. Turbidity Monitoring Guidance

The 2008 amendment to the Construction General Permit requires the On-Site Plan Coordinator to monitor discharges from Moderate Risk construction sites for turbidity. This document explains these requirements and provides guidance on proper sampling techniques. A copy of this document is available on our website at the following link: http://www.vtwaterquality.org/stormwater/hm/sw_cgp.htm

5. On-Site Plan Coordinator Manual

This manual provides a summary of the inspection and record-keeping requirements for your project, a copy of the permit, as well as all forms that might be needed throughout the project. This manual can be provided to the On-Site Plan Coordinator to ensure compliance with the authorization under the Construction General Permit 3-9020 and related inspection, monitoring, and record-keeping requirements. Records must be available for review by DEC representatives during site inspections. Included in the manual is the Notice of Addition for use by all landowners and persons who meet the definition of a Principal Operator (as per Subparts 2.1B, 3.1B of CGP 3-9020) and who were not included on the original NOI must submit a Notice of Addition Form. A copy of this document is available on our website at the following link: http://www.vtwaterquality.org/stormwater/hm/sw_cgp.htm

If you have any questions pertaining to this authorization, please contact the Stormwater Management Program's Environmental Analyst assigned to your district, or by email at anr.wsmdstormwatergeneral@state.vt.us. Additional Stormwater Management Program contact information and stormwater permitting information is available at www.vtwaterquality.org.

Stormwater Management Program

Cc. Co-Permittee/Application Preparer/Designer (if applicable)

Notice of Authorization

Under Vermont Construction General Permit 3-9020

For **Moderate Risk Projects**



Project Name: Float Bridge Road
Causeway, Phase 2
Reconstruction

Notice of Intent Number: 7064-9020

Date of Authorization: 9/30/2013

Permittee Name: Town of Castleton

Expiration Date: 9/30/2018

The project listed above has received authorization under General Permit 3-9020 to discharge stormwater from the following construction activities: Removal of the damaged gabion walls, for replacement with sloped, stabilized embankments from the road shoulder to the lake; roadway will be reconstructed as well. **This authorization includes the following requirements:**

1. Implementation of the authorized site-specific Erosion Prevention and Sediment Control Plan as prepared by: Enman-Kesselring Consulting Engineers (Sheet C1, "Site Plan," dated 7/30/13; Sheet C2, "Project Phasing," dated 7/30/13; Sheet C3, "Cross Sections Plans," dated 7/30/13; Sheet C4, "Erosion Control Plan," dated 7/30/13; Sheet C5, "Details Plan," dated 7/30/13; and all accompanying information).
2. All areas of disturbance must have temporary or final stabilization within **14 days** of the initial disturbance. After this time, any disturbance in the area must be stabilized at the end of each work day. The following exceptions apply:
 - a. Stabilization is not required if work is to continue in the area within the next 24 hours and there is no precipitation forecast for the next 24 hours.
 - b. Stabilization is not required if the work is occurring in a self-contained excavation (i.e. no outlet) with a depth of 2 feet or greater (e.g. house foundation excavation, utility trenches).
3. No more than **1 acre** of land may be disturbed at any one time.
4. Inspections shall be conducted at least once every seven (7) calendar days and within twenty-four (24) hours of the end of a storm event resulting in discharge of stormwater from the construction site.
5. If there is a discharge of visibly discolored stormwater from the construction site or from the construction site to waters of the State, the permittee shall take immediate corrective action.
6. If there is a discharge of visibly discolored stormwater from the construction site to waters of the State, the permittee shall notify DEC by submitting a report within 72 hours of the discharge.
7. The On-site Plan Coordinator shall have a copy of the approved EPSC Plan and all amendments available at a central location on-site for the use of all those identified as having responsibilities under this authorization whenever they are on the construction site. If an on-site location is unavailable to store the EPSC Plan when no personnel are present, notice of the EPSC plan's location shall be posted near the main entrance at the construction site.

To request information on this authorization or to report compliance concerns please contact:

Vermont DEC, Watershed Management Division
1 National Life Drive, Main 2
Montpelier, VT 05620-3522
802-828-1535

See Reverse for Posting Requirements

Permittee Directions for Posting:

This Notice of Authorization shall be placed near the construction entrance at a location visible to the public. If displaying it near the main entrance is infeasible, the notice shall be posted in a local public building such as a town hall or public library. For linear projects, the notice shall be posted at a publicly accessible location near the active part of the construction project (e.g. a public road crossing).

Notice of Intent (NOI)for Stormwater Discharges Associated with
Construction Activity on**Moderate Risk Sites**

Under Vermont Construction General Permit 3-9020

For Department Use Only
NOI Number: 7064-9020

Submission of this completed Notice of Intent (NOI) constitutes notice that the entity in Section A intends to be authorized to discharge pollutants to waters of the State, from the project identified in Section E, under Vermont's Construction General Permit (CGP). Submission of this NOI also constitutes notice that the party identified in Section A of this form has read, understands and meets the eligibility conditions of the CGP; has determined that the project qualifies for coverage as a Moderate Risk project in conformance with Appendix A of the CGP; agrees to comply with all applicable terms and conditions of the CGP; understands that continued authorization under the CGP is contingent on maintaining eligibility for coverage; and, that the applicable practices within the authorized Erosion Prevention and Sediment Control Plans must be implemented and maintained for the duration of construction activities. In order to be granted coverage, all information required on this form must be provided and an application fee of \$360 payable to the State of Vermont must be submitted.

A. Landowner Information1a. Name: Town of Castleton 1b. Contact (if applicable): Charles Jacien, Town Manager

2. Mailing Address

a. Street/P.O. Box: P. O. Box 727b. City/Town: Castleton c. State: Vermont d. Zip: _____

3. Contact Information

a. Phone: 802-468-5319 b. Fax: _____ c. Email: manager@castletonvt.org**B. Principal Operator Information (if known)**

1. Name: _____

2. Mailing Address

a. Street/P.O. Box: _____

b. City/Town: _____ c. State: _____ d. Zip: _____

3. Contact Information

a. Phone: _____ b. Fax: _____ c. Email: _____

C. On-Site Plan Coordinator Information (if known)

1. Name: _____

2. Mailing Address:

a. Street/P.O. Box: _____

b. City/Town: _____ c. State: _____ d. Zip: _____

3. Contact Information

a. Phone: _____ b. Fax: _____ c. Email: _____

D. EPSC Plan Preparer Information1. Name: Blair Enman, Enman Kesselring Consulting Engineers, PC

2. Mailing Address

a. Street/PO Box: 61 Prospect St.b. City/Town: Rutland c. State: Vermont d. Zip: 05701

3. Contact Information

a. Phone: 802-775-3437 b. Fax: _____ c. Email: benman@enmanengineering.com

D. Project Information

1. Project Name: Float Bridge Road Causeway Phase 2 Reconstruction

2a. Is this project part of a Common Plan of Development¹? Yes No

2b. If Yes, Name of Development: _____

3a. Does this project have any previously issued or pending stormwater discharge permits? Yes No

3b. If Yes, Prior NOI Number(s): _____

4. Location Address

a. Street: Float Bridge Road

b. City/Town: Castleton

c. Latitude: 43 ° 54 ' 21 "

d. Longitude: 72 ° 16 ' 5 "

e. County: Rutland

➔ Use DEC's Waterbody Identification (WBID) ArcGIS webpage ([click here](#)) to answer questions 5 and 6 below.

5. Name of receiving water(s)²: Castleton River, VT02-03

6. Include a topographic location map.

7. Project Type: Residential Commercial Industrial Other: Municipal

8. Total Area of Disturbance: 1 acres 9. Description of construction activities to be permitted (below):

The gabion walls that support the roadway are ailing due to frost, wave and ice action. Project seeks to remove the walls and create sloped, stabilized embankments from the road shoulder down into the lake while also reconstructing the roadway.

E. Public Notice Requirement

You must provide a copy of this complete NOI and related Appendix A to the municipal clerk for posting in the municipality in which the project is located. If the project and the related discharge(s) are located in different municipalities, then the completed NOI must be filed with the municipal clerk in each municipality. The municipal clerk must post the completed NOI. In order to be considered complete, you **must include the date of posting.**

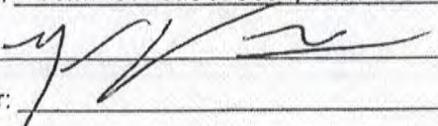
Date of Posting at Municipal Office(s): 8/26/13

Information for the Municipal Clerk regarding posting instructions can be found on **Page 4** of this NOI.

F. Certification Relating to the Accuracy of the Information Submitted

I hereby certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I also certify that the Erosion Prevention and Sediment Control Plan authorized with this Notice of Intent will be implemented and maintained in accordance with Construction General Permit 3-9020 (amended 2008).

Landowner Name: Town of Castleton/Charles Jacien Title: Town Manager

Signature:  Date: 8/26/13

Principal Operator: _____ Title: _____
(if known)

Signature: _____ Date: _____

EPSC Plan Preparer: Blaise Enman, PE Title: Principal
(if applicable) Enman Consulting

Signature:  Date: August 21, 2013

¹ "Common Plan of Development" is defined within the CGP 3-9020, Appendix C - Definitions, page A-12

² "Waters of the State" (i.e. receiving water) is defined within the CGP 3-9020, Appendix C - Definitions, page A-16

For Department Use Only

VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION AUTHORIZATION TO DISCHARGE

A determination has been made that the proposed construction activities qualify for coverage under General Permit 3-9020 (amended 2008) as a Moderate Risk project. Subject to the conditions of General Permit 3-9020 (amended 2008) the applicant is hereby authorized to discharge stormwater runoff from a construction site as described in this Notice of Intent Number 7064-9020.

Dated this 30th day of September, 2013

David K. Mears, Commissioner Department of Environmental Conservation

By: Padraic Monks
Padraic Monks, Program Manager
Stormwater Program

PUBLIC COMMENT

Public comments concerning this Notice of Intent to discharge under CGP 3-9020 (amended 2008) are invited and must be submitted within 10 days of receipt of this Notice by the Municipal Clerk. Comments should address how the application complies or does not comply with the terms and conditions of CGP 3-9020 (amended 2008). A letter of interest should be filed by those persons who elect not to file comments but who wish to be notified if the comment period is extended or reopened for any reason. All written comments received within the time frame described above will be considered by the Department of Environmental Conservation in its final ruling to grant or deny authorization to discharge under CGP 3-9020 (amended 2008). Send written comments to:

Vermont Department of Environmental Conservation
Watershed Management Division, Stormwater Program
1 National Life Drive, Main 2
Montpelier, VT 05620-3522

Please cite the NOI number in any correspondence.

APPEALS

Renewable Energy Projects – Right to Appeal to Public Service Board

If this decision relates to a renewable energy plant for which a certificate of public good is required under 30 V.S.A. §248, any appeal of this decision must be filed with the Vermont Public Service Board pursuant to 10 V.S.A. §8506. This section does not apply to a facility that is subject to 10 V.S.A. §1004 (dams before the Federal Energy Regulatory Commission), 10 V.S.A. §1006 (certification of hydroelectric projects) or 10 V.S.A. Chapter 43 (dams). Any appeal under this section must be filed with the clerk of the Public Service Board within 30 days of the date of this decision. For further information, see the Public Service Board website at <http://psb.vermont.gov> or call (802) 828-2358. The address for the Public Service Board is 112 State Street Montpelier, Vermont 05620-2701.

All Other Projects – Right to Appeal to Environmental Court

Pursuant to 10 V.S.A. Chapter 220, any appeal of this decision must be filed with the clerk of the Environmental Court within 30 days of the date of the decision. The Notice of Appeal must specify the parties taking the appeal and the statutory provision under which each party claims party status; must designate the act or decision appealed from; must name the Environmental Court; and must be signed by the appellant or their attorney. In addition, the appeal must give the address or location and description of the property, project or facility with which the appeal is concerned and the name of the applicant or any permit involved in the appeal. The appellant must also serve a copy of the Notice of Appeal in accordance with Rule 5(b)(4)(B) of the Vermont Rules for Environmental Court Proceedings. For further information, see the Vermont Rules for Environmental Court Proceedings, available online at www.vermontjudiciary.org or call (802) 828-1660. The address for the Environmental Court is 2418 Airport Road, Suite 1, Barre, Vermont 05641.

A copy of CGP 3-9020 (amended 2008) may be obtained by calling (802) 828-1535; by visiting the Department at the above address between the hours of 7:45 am and 4:30 pm; or by download from the Watershed Management Division's Web site at: www.vtwaterquality.org.

INFORMATION FOR MUNICIPAL CLERK

10 V.S.A. Chapter 47 §1263(b) provides for the public notice of an applicant's intent to discharge stormwater runoff associated with construction activity. Please post this notice and instruction sheet in a conspicuous place for 10 days from the date received. If you have any questions, contact the Watershed Management Division of the Department of Environmental Conservation at (802) 828-1535.

Submit this form and the \$360 fee to:

Vermont Department of Environmental Conservation
Watershed Management Division, Stormwater Program
1 National Life Drive, Main 2
Montpelier, VT 05620-3522

**Notification of
On-Site Plan Coordinator
Under General Permit 3-9020**



Submission of this completed form constitutes notice that the individual in Section C will assume the responsibilities of On-Site Plan Coordinator for the project described in Section A.

A. Project Information

1. Project Name: _____
2. Project Notice of Intent Number: _____

B. Landowner Information

1. Name: _____
2. Mailing Address:
- a. Street/PO Box: _____
- b. City/Town: _____ c. State: _____ d. Zip: _____

C. On-Site Plan Coordinator Information

1. Name: _____
2. Business Name: _____
3. Mailing Address:
- a. Street/PO Box: _____
- b. City/Town: _____ c. State: _____ d. Zip: _____
4. Contact Information:
- a. Phone: _____ b. Fax: _____ c. Email: _____

D. On-Site Plan Coordinator Certification

I hereby certify that I am knowledgeable in the principles and practice of erosion and sediment controls and possess the skills to assess conditions at the construction site that could impact stormwater quality and to assess the effectiveness of all sediment and erosion control measures selected to control the quality of stormwater discharges from the construction activity.

Signature: _____ Date: _____

E. Landowner Certification

I hereby designate the individual described in Section C as the On-Site Plan Coordinator for the project described in Section A. I hereby certify that the On-Site Plan Coordinator shall have the authority to stop and/or modify construction activities as necessary to comply with the EPSC Plan and the terms and conditions of the General Permit 3-9020 and shall be responsible for inspections and record keeping.

Signature: _____ Date: _____

Submit Original Form to:

Vermont Department of Environmental Conservation
Watershed Management Division, Stormwater Program
1 National Life Drive, Main 2
Montpelier, VT 05620-3522

**Notice of Addition
Of Owners or Operators To Coverage**

Under Vermont Construction General Permit 3-9020



Submission of this completed form constitutes notice that the entity in Section C seeks to be added as a co-permittee to an existing authorization to discharge under Vermont's Stormwater Construction General Permit (CGP) from the project identified in Section A. All landowners and persons who meet the definition of Principal Operator (Subparts 2.1B, 3.1B of the CGP) and who were not included on the original NOI must submit a Notice of Addition form.

A. Project Information

1. Project Name: _____ 2. Notice of Intent Number: _____

B. Original Permittee Information

1. Name: _____

2. Mailing Address:

a. Street/PO Box: _____

b. City/Town: _____ c. State: _____ d. Zip: _____

3. Contact Information

a. Phone: _____ b. Fax: _____ c. Email: _____

C. New Co-Permittee Information

Check one or both: New Landowner New Principal Operator

1. Name: _____

2. Business Name: _____

3. Mailing Address:

a. Street/PO Box: _____

b. City/Town: _____ c. State: _____ d. Zip: _____

4. Contact Information

a. Phone: _____ b. Fax: _____ c. Email: _____

D. Request for Addition as Co-Permittee

I hereby request that the entity in Section C be added as co-permittee to the existing authorization to discharge stormwater from construction activities stated in Section A. In requesting co-permittee status, I hereby certify under the penalty of law that I have read, understand, and meet the eligibility conditions of the CGP; that I agree to comply with all applicable terms and conditions of the CGP; that I understand that continued authorization under the CGP is contingent on maintaining eligibility for coverage, and that the applicable practices in the authorized Erosion Prevention and Sediment Control Plan must be implemented and maintained for the duration of the construction activities. I agree to comply with all applicable terms and conditions of the General Permit 3-9020.

Signature: _____ Date: _____

Submit Original Form to:

Vermont Department of Environmental Conservation
Watershed Management Division, Stormwater Program
1 National Life Drive, Main 2
Montpelier, VT 05620-3522