

Vermont Department of Environmental Conservation
Watershed Management Division
St. Johnsbury Regional Office
1229 Portland Street, Suite 201
St. Johnsbury, VT 05819
www.watershedmanagement.vt.gov

Agency of Natural Resources

[fax] 802-748-6687
[cell] 802-279-1143

AUTHORIZATION TO CONDUCT NEXT FLOOD MEASURES

Pursuant to Section F of the Vermont Stream Alteration General Permit

Project Number: **NFM - 09 - 1024- 2016**

Applicant Name: Town of Putney and Ron Bell Phone: (603) 363-9966

Mailing Address: 17 Echo Cove Way, Spofford, NH 03462

Project Location: Hickory Ridge Road South, Putney, VT

Email: bellengineering@myfairpoint.net

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

1. This project authorizes the replacement of CMC with a concrete box culvert.
2. The proposed activity is eligible for coverage under the VT ANR Stream Alteration General Permit – Next Flood Measures.
3. The proposed activity will meet the terms and conditions of Section F of the General Permit provided:
 - The project will be completed and approved as described in the plans revised 2/29/2016, by Ron Bell, and approved by the Vermont Agency of Natural Resources.
 - The project is proportional to the threat and conditioned to cease when the threat to life or to improved property has ended.
 - The project will not result in a threat to life, public health or safety.
 - The project will meet the standards detailed in subsection E.2.1 and E.2.2 of the General Permit.
 - The project will meet Stream Alteration Standards to the greatest extent possible.
 - A pre-construction meeting is held between the contractor, owner/applicant, and the ANR River Management Engineer. Preconstruction meeting is scheduled for 9/1/2016
 - The River Management Engineer is notified by phone or email when construction begins and when the project is complete. (802) 490-6962
 - A final construction inspection is required for any culvert and bridge related work.
 - Additional conditions: _____

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

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

Alyssa B. Schuren, ANR DEC Commissioner



Scott Jensen, P.E., River Management Engineer

Dated: August 31, 2016

VERMONT AGENCY OF NATURAL RESOURCES

APPLICATION FOR COVERAGE UNDER THE STREAM ALTERATION GENERAL PERMIT FOR REPORTING ACTIVITY (SECTION C.2.3)

10 VSA, Section 1022 & 7503

Applicant Name Ronald K. Bell, PE

Mailing Address 17 Echo Cove Way, Spofford, NH 03462

Telephone: Home 603 363-8401 Work 603-363-9966 Mobile

Email bellengineering@myfairpoint.net

Landowner (if different than applicant) TOWN OF PUTNEY

Landowner Mailing Address TOWN OF PUTNEY

PUTNEY TOWN HALL - MAIN STREET, PUTNEY, VT 05346, Phone 802-387-5862, Email tm@putneyvt.org

Agency Use Only: Project ID, Receipt Date

Watershed Size at Project Location: Less than 0.5 square miles, 0.5 - 1.0 square miles, 1.0 - 10.0 square miles (checked), If >10 sq mi use Individual Permit

Project Location Address Hickory Ridge Road South Town Putney Lat/Long 43.0080/-72.5407

River UN NAMED BROOK Drainage Area 3.2 Nearest Rd Hickory Ridge Road South

Brief Project Description Remove existing metal culvert + replace with a box culvert with a 20' x 6.75' opening. Footings and stem wall to 6' below stream bottom.

Consultant or Designer (if known) Ronald K. Bell, PE Phone 603 363-9966

Contractor (if known) Phone

- Required Attachments: Location Map, 2 copies of project design drawings including: 1) plan view, 2) longitudinal profile, 3) cross sections, 4) existing and proposed conditions, 5) bankfull width (channel width at high water)

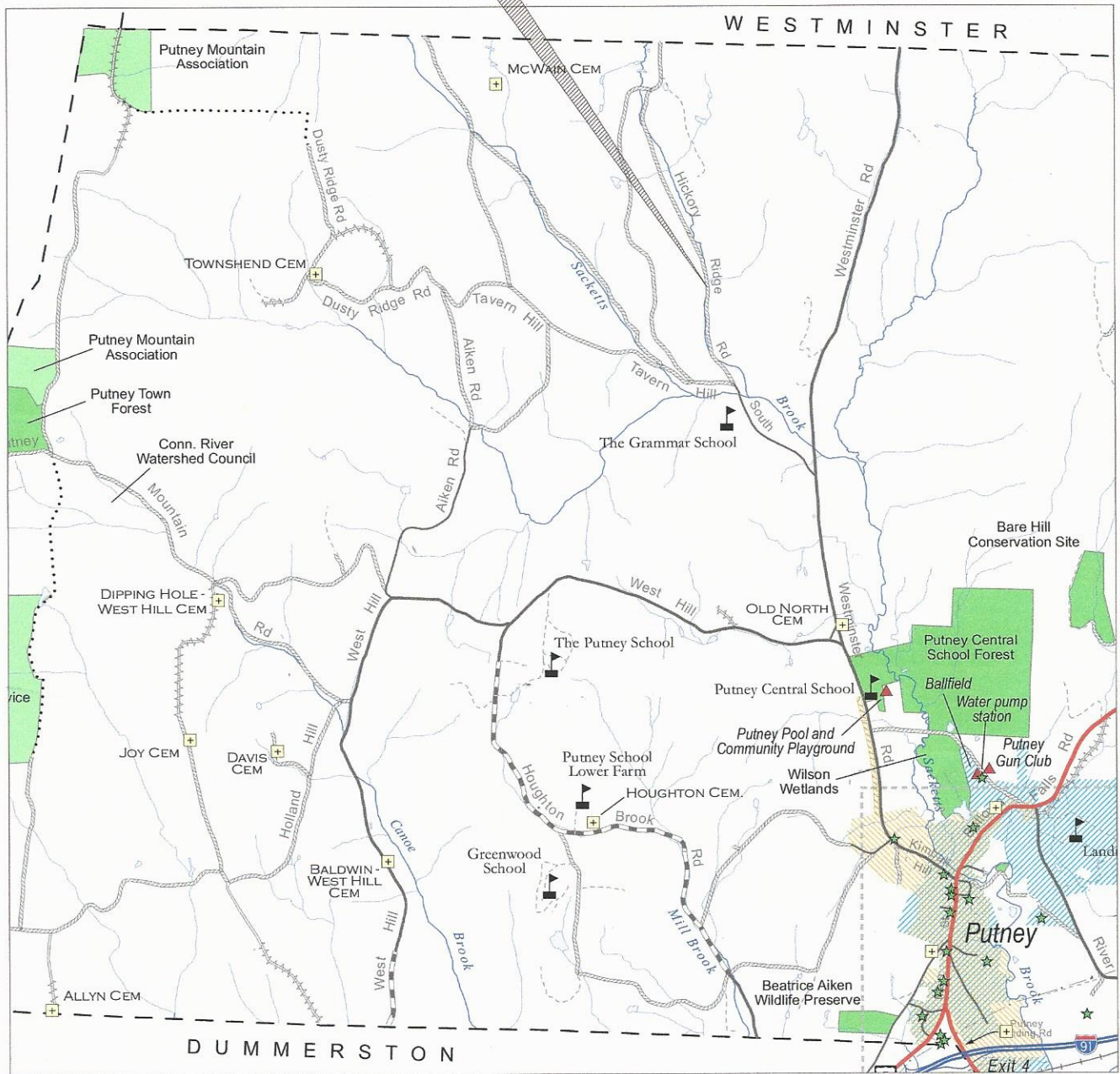
CERTIFICATION: I hereby certify that the information on this application is, to the best of my knowledge, true and accurate and that I have provided a copy of this application to the Clerk of the municipality in which this activity is located, the local and regional planning commissions, and to each adjoining landowner as required in 10 V.S.A., Section 7503. I recognize that by signing this application I am giving consent to employees of the State to enter the subject property for the purpose of processing this application and for ensuring compliance with subsequent agency decisions relating to the project.

Applicant Signature Ronald K. Bell, PE Date 1-15-2016

Print full name Ronald K. Bell, PE

NOTE: A PERMIT MAY BE REQUIRED FROM THE US ARMY CORPS OF ENGINEERS. For information contact: USA Corps of Engineers, VT Project Office, 8 Carmichael Street Suite 205, Essex Jct VT 05452 802-872-2893

LOCATION



HYDRAULICS UNIT

TO: Hannah O'Connell, District Technician, District 2
FROM: Leslie Russell, P.E., Hydraulics Project Engineer
DATE: 20 July 2012
SUBJECT: Putney TH 6 BR 19 over unnamed brook
Hickory Ridge Road

We have completed our preliminary hydraulic study for the above referenced site, and offer the following information for your use:

Hydrology

This site has a hilly to mountainous drainage basin. It is mostly forested. The total contributing drainage area is about 3.2 sq. mi. There is an overall length of 24,195 feet from the divide to the site, with a 1070 foot drop in elevation, giving an average overall channel slope of 4.4 %. The stream slope at the site was estimated to be about 1% - 2%. Using several hydrologic methods, we came up with the following design flow rates:

<u>Recurrence Interval in Years</u>	<u>Flow Rate in Cubic Feet per Second (CFS)</u>
Q2.33	135
Q10	350
Q25	475 - Town Highway Design Flow
Q50	600
Q100	700 - Check flow

Existing Conditions

The existing structure is multi-plate open bottom arch that has a clear span length of 12', with a clear height of about 6', providing a waterway opening of approximately 58 sq. ft. There is a concrete headwall that the arch is pulling away from on the inlet side.

Our calculations show the existing structure is inadequate hydraulically. Headwater to depth ratios are not within the allowable values and water overtops the roadway below the Q50 flow.

The roadway fill affects the natural channel width of this reach. The pipe is on a large skew and there is scour along the south footing. Any new structure should be better aligned with the channel. There is heavy bank erosion up and downstream of the structure.

Recommendations

In sizing a new structure we attempt to select structures that meet the hydraulic standards, fit the natural channel width, the roadway grade and other site conditions. We measured a channel width of 17' to 20' perpendicular to the channel during our site visit. It was difficult to get an exact natural channel width measurement due to the roadway fill. The Agency of Natural Resources 'VT Regional Hydraulic Geometry Curves' give a bank full width of 22' for this size drainage area. Those curves are only based on drainage area and do not consider other factors, such as, slope and storage. Based on our calculations

and the information available, we recommend any of the following structures as a replacement at this site:

1. A bridge with a 20' by 6' minimum waterway opening, providing 120 sq. ft. of waterway area. This structure will result in a headwater depth at Q25 = 4.4' and at Q100 = 5.7'. This structure meets hydraulic standards by providing at least 1' of freeboard at Q25.
2. Any similar structure with a minimum clear span of 20' and at least 120 sq. ft. of waterway area, that fits the site conditions, could be considered.

General Comments

If a new bridge is installed, the bottom of abutment footings should be at least six feet below the channel bottom, or to ledge, to prevent undermining.

It is always desirable for a new structure of this size to have flared wingwalls at the inlet and outlet, to smoothly transition flow through the structure, and to protect the structure and roadway approaches from erosion. The wingwalls should match into the channel banks. Any new structure should be properly aligned with the channel, and constructed on a grade that matches the channel.

Stone Fill, Type III should be used to protect any disturbed channel banks or roadway slopes at the structure's inlet and outlet, up to a height of at least one-foot above the top of the opening. The stone fill should not constrict the channel or structure opening.

The Agency of Natural Resources (ANR), Corps of Engineers, or other permitting agency may have additional concerns regarding replacement of this structure, or any channel work. The River Management Engineer should be contacted with respect to those concerns, before a replacement structure is ordered.

Please keep in mind that while a site visit was made, these recommendations were made without the benefit of a survey and are based on limited information. The final decision regarding the replacement of this structure should take into consideration matching the natural channel conditions, the roadway grade, environmental concerns, safety, and other requirements of the site.

A bridge of this size warrants a more detailed hydraulic study if survey becomes available.

Please contact us if you have any questions or if we may be of further assistance.

LGR

cc: Todd Menees, A.N.R. River Management Engineer
Hydraulics Project File via NJW
Hydraulics Chrono File

Non_PMS_Projects\Hydraulics\ProjectFiles_NonCADD\Putney\TH 6 BR 19\Putney TH 6 BR 19
prel hyd memo.docx

TOWN OF PUTNEY, VERMONT

BRIDGE #19: HICKORY RIDGE ROAD SOUTH, (T.H. #5)

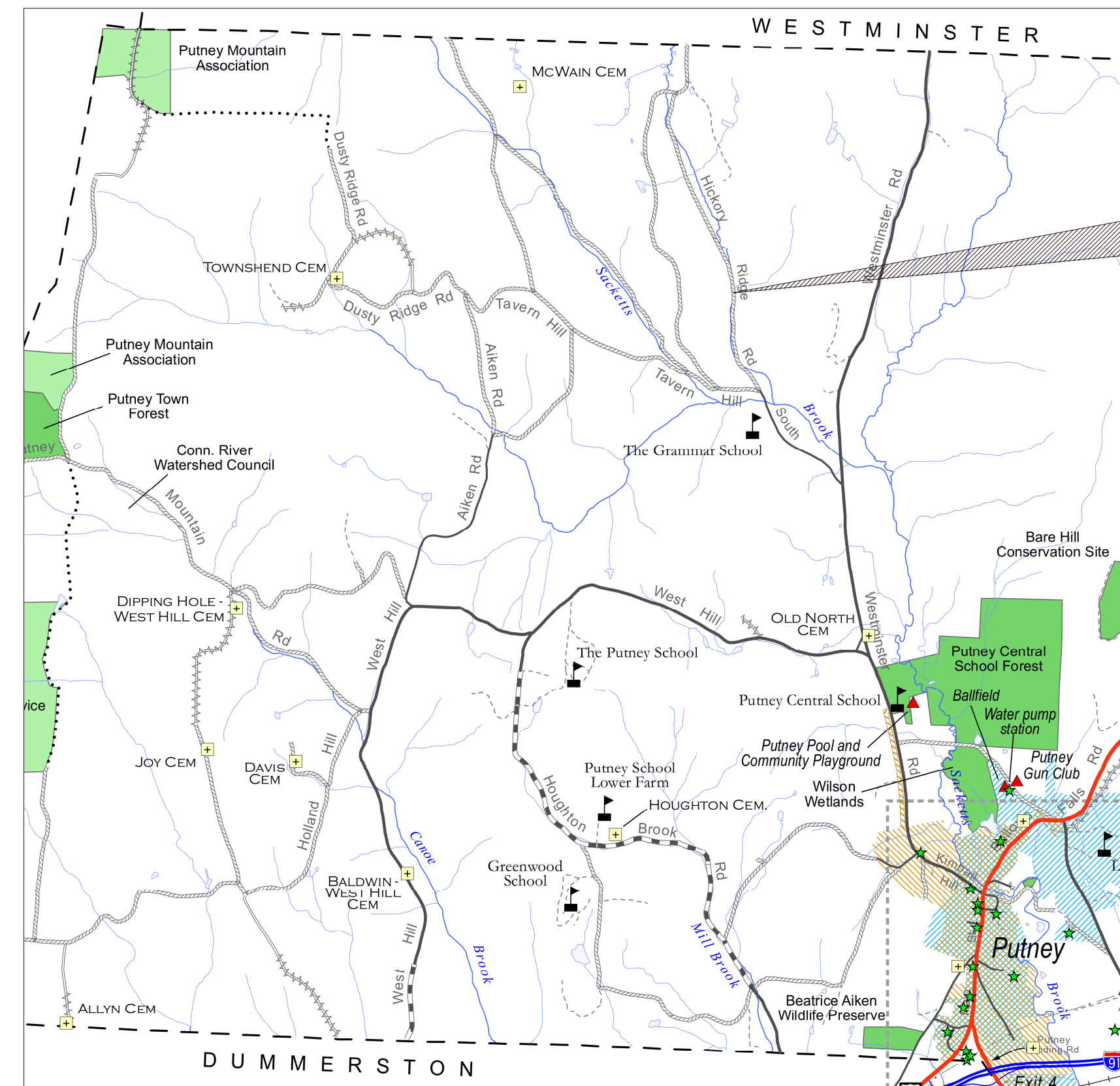
BRIDGE REPLACEMENT PROJECT

PLAN DATE: DECEMBER 18, 2015

REVISED: 2-15-2016 MODIFY BRIDGE RAIL TO S-367A
 REVISED: 2-29-2016 MODIFY NE WINGWALL

PLAN SHEETS:

- C-1 EXISTING CONDITIONS
- C-2 FINISH PLAN
- C-3 DETAILS AND SPECIFICATIONS
- C-4 DETAILS AND SPECIFICATIONS**
- C-5 EROSION CONTROL
- VTRANS STANDARD S-367 A



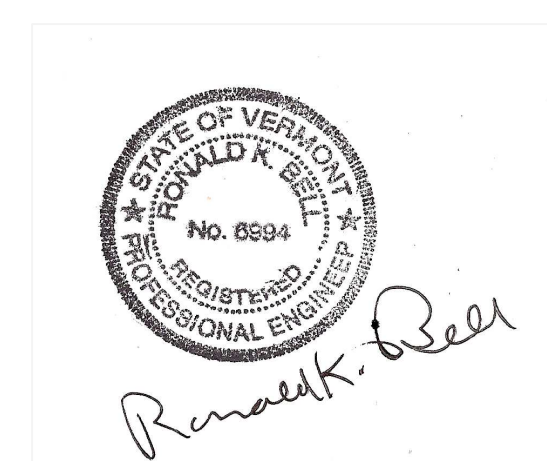
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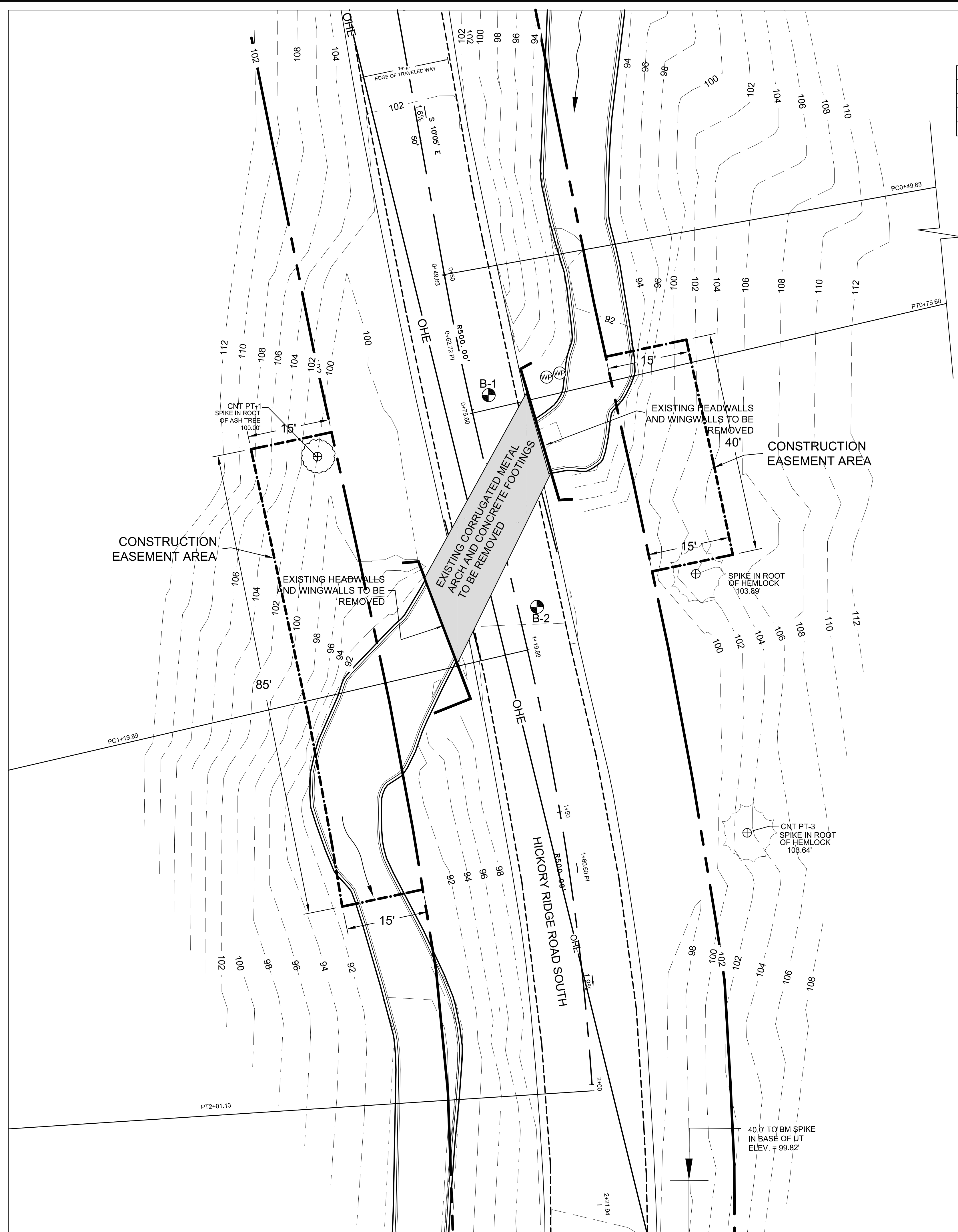
PROJECT NOTES

- 1) DESIGN LOAD IS HL-93
- 2) THIS PLAN INCLUDES PRE-CAST OR SITE-CAST FOOTINGS WITH A PRECAST 3 SIDED BOX CULVERT, APRON AND WINGWALLS.
- 3) THE CONTRACTOR SHALL PROVIDE THE ENGINEER AND TOWN OF PUTNEY SHOP DRAWINGS FROM THE COMPANY PROVIDING THE PRECAST BOX CULVERT.
- 4) THE CONTRACT SHALL MEET WITH THE ENGINEER PRIOR TO CONSTRUCTION TO REVIEW THE PROJECT AND THESE PLANS.
- 5) THE CONTRACTOR SHALL REMOVE THE EXISTING CORRUGATED METAL CULVERT AND CONCRETE APRON & WINGWALLS IN ADDITION TO THE STEEL CABLE GUARDRAIL LOCATED IN THE STREAM .



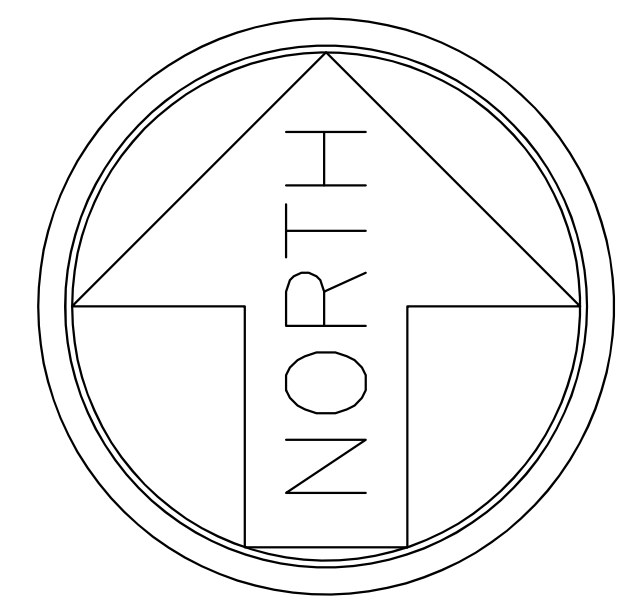
bellengineering@myfairpoint.net





CONTROL POINTS

Point	Northing	Easting	Elevation	Description
56	427.21	274.75	100.00	CONTROL PT 1 - ROOT OF ASH
35	405.87	343.69	103.89	CONTROL PT 2 - ROOT OF HEMLOCK
39	358.68	353.05	103.64	CONTROL PT 3 - ROOT OF HEMLOCK
44	255.35	342.42	99.82	BM BASE UT

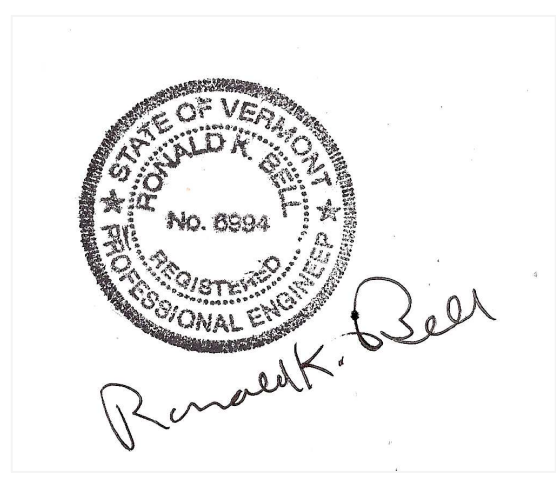
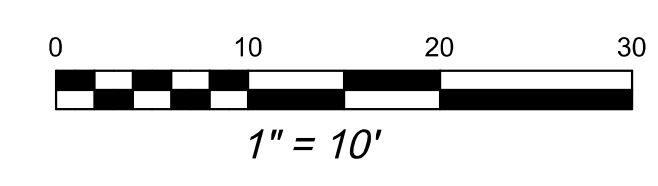


BORING DATA
HICKORY RIDGE ROAD SOUTH - BRIDGE

DATE: NOV. 15, 2015
BORING CO.: T&K WELL DRILLING
SOIL SAMPLES CLASSIFIED BY: RONALD K. BELL, PE
TYPE OF SAMPLER: 2" SPLIT SPOON DRIVEN WITH 140# SP HAMMER

BORING #1				
DEPTH (FT)	SAMPLE #	NUMBER OF BLOWS	N VALUE	CLASSIFICATION/REMARKS
0-2	1	32-20-21	40	SANDY GRAVEL; LOOSE
2-4	2	16-11-11-10	22	BROWN SANDY GRAVEL; DRY
4-6	3	4-3-3-3	6	DK OLIVE BRN SANDY GRAVEL; DRY
6-8	4	3-4-10-12	14	OLIVE BRN GRAVEL; MOIST
8-10	5	3-3-6-15	9	SOFT ROCK - GRAVEL
10-12	6	-	-	NO SAMPLE - COBBLE
12-14	7	5-25-20-11	45	ROCK - NO SAMPLE
14-16	8	45-50-52-46	104	ROCK - NO SAMPLE
16-18	9	73-54-62-50	116	ROCK - NO SAMPLE - SAMPLER WET
18-20	10	15-19-21-28	40	GLACIAL TILL - SILTY GRAVEL FIRM - WET
20-22	11	27-32-30-38	62	TILL - MASSIVE SILTY LOAM- WET

BORING #2				
DEPTH (FT)	SAMPLE #	NUMBER OF BLOWS	N VALUE	CLASSIFICATION/REMARKS
0-2	1	16-15-16-15	31	SANDY GRAVEL; LOOSE
2-4	2	3-1-2-7	3	OLIVE BRN SANDY GRAVEL; DRY
4-6	3	10-16-14-11	30	OLIVE BRN SANDY GRAVEL; DRY; FIRM
6-8	4	14-13-18-22	31	OLIVE BRN SILTY GRAVEL; MOIST; FIRM
8-10	5	13-20-18-22	38	WATER @ 9' SANDY GRAVEL
10-12	6	14-18-15-13	33	GLACIAL TILL - SILTY GRAVEL; FIRM
12-14	7	-	-	ROCK IN SAMPLER
14-16	8	18-15-21-20	36	WET SILTY GRAVEL; FIRM
16-18	9	18-21-27-24	48	GLACIAL TILL; MASSIVE
18-20	10	22-25-25-27	50	GLACIAL TILL - SILTY GRAVEL -WET



REVISIONS:

NO.	DATE	DESCRIPTION

2-25-2016 MODIFY NE WINGWALL
2-15-2016 MODIFY BRIDGE RAIL TO S-387A

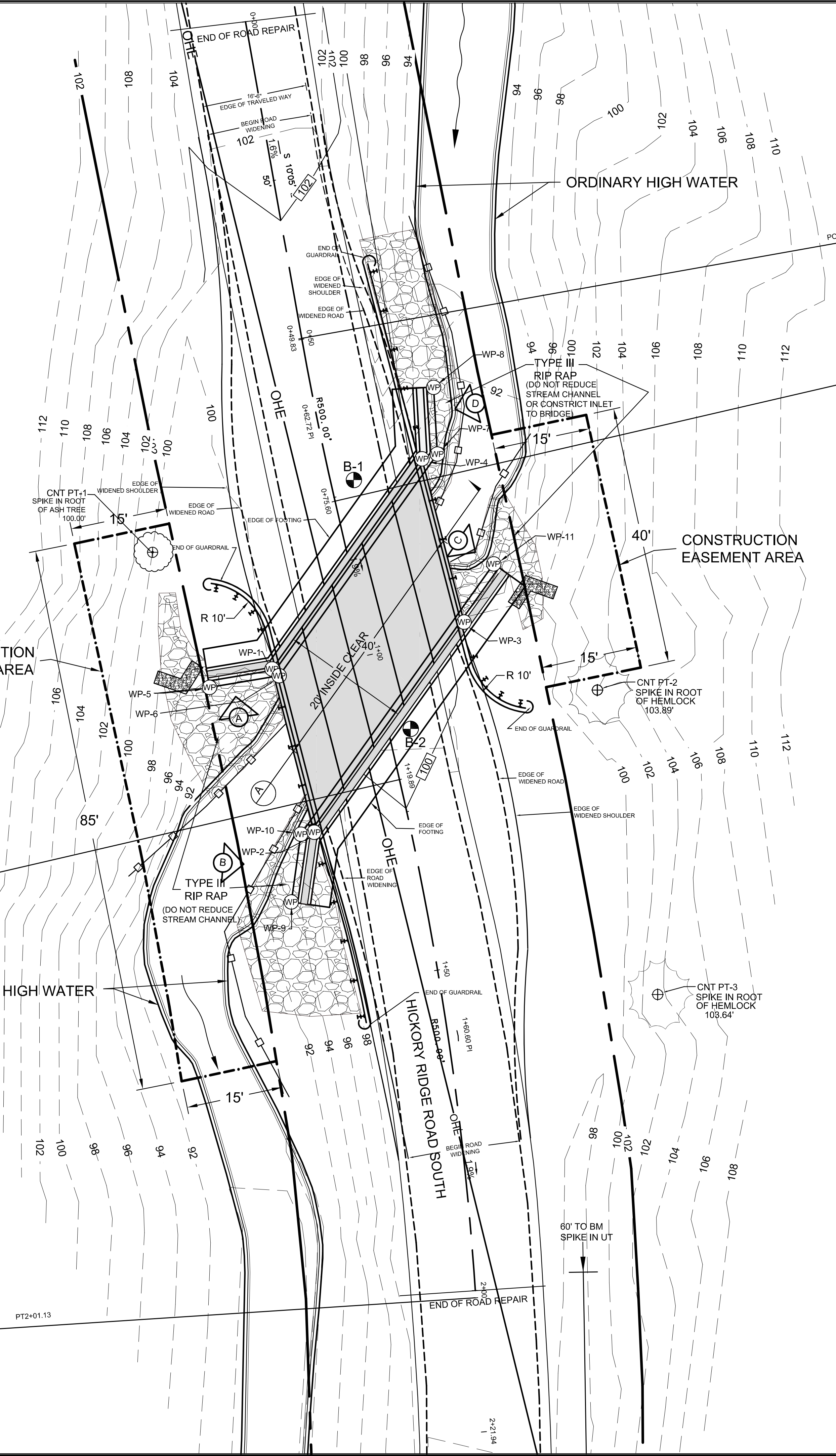
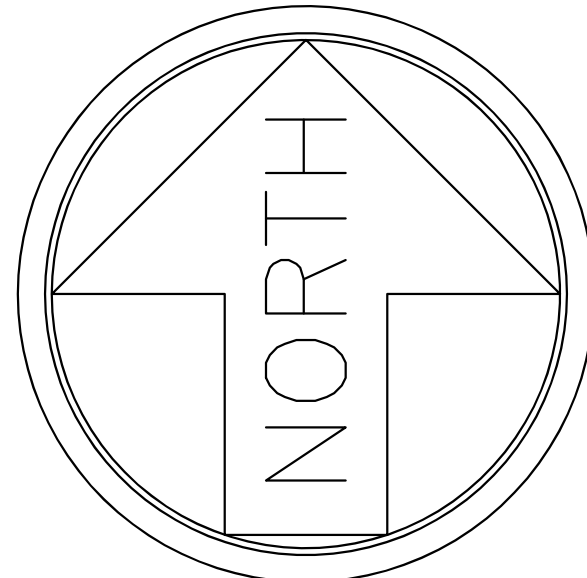
PROJECT:
BRIDGE #19
HICKORY RIDGE ROAD SOUTH (T.H. #5)
BRIDGE REPLACEMENT PROJECT

SHEET TITLE:
EXISTING CONDITIONS

SCALE:
1" = 10'

DATE:
DECEMBER 18, 2015

SHEET
C-1

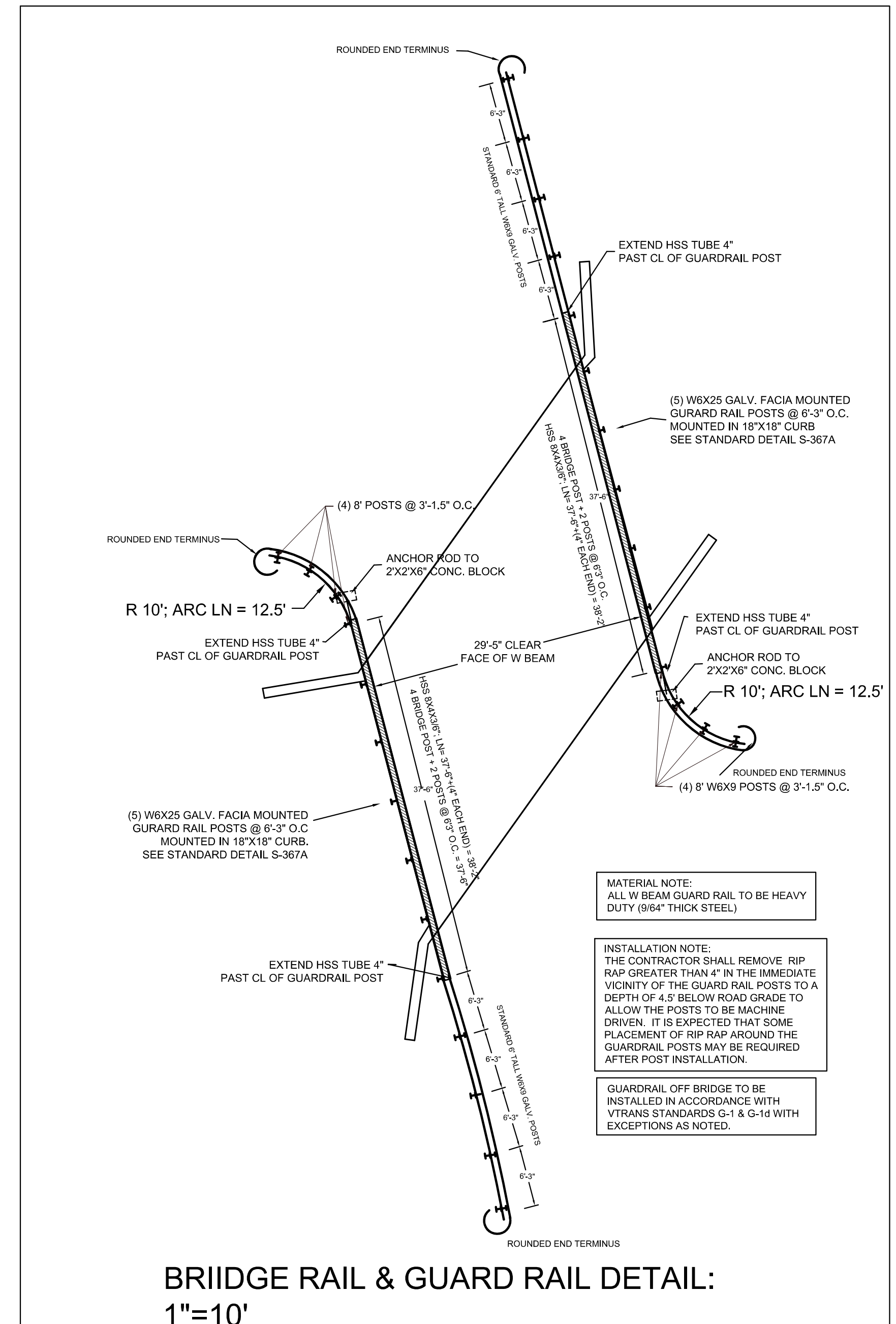
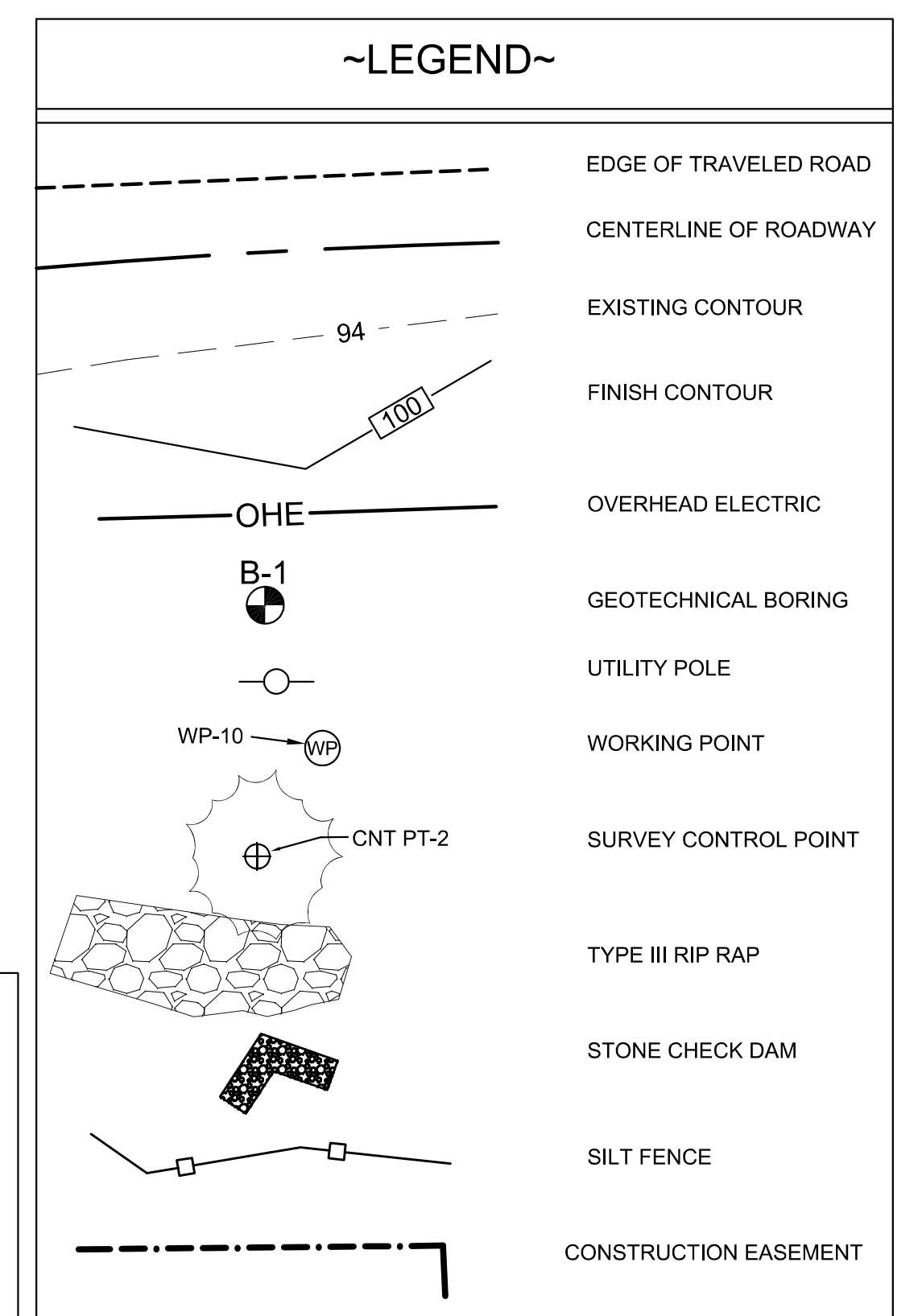


CONTROL POINTS

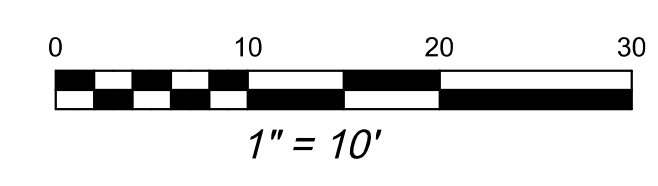
Point	Northing	Easting	Elevation	Description
56	427.21	274.75	100.00	CONTROL PT 1 - ROOT OF ASH
35	405.87	343.69	103.89	CONTROL PT 2 - ROOT OF HEMLOCK
39	358.68	353.05	103.64	CONTROL PT 3 - ROOT OF HEMLOCK
44	255.35	342.42	99.82	BM BASE UT

WORKING POINTS

Point	Northing	Easting	Elevation	Description
204	409.13	293.27	90.75	WP-1 INSIDE CRN CULVERT
205	383.85	299.80	90.75	WP-2 INSIDE CRN CULVERT
206	416.41	323.04	90.75	WP-3 INSIDE CRN CULVERT
207	441.86	316.46	90.75	WP-4 INSIDE CRN CULVERT
208	406.29	283.58	84.5	WP-5 NORTH FOOTING
209	408.10	294.38	84.5	WP-6 NORTH FOOTING
210	442.45	318.89	84.5	WP-7 NORTH FOOTING
211	452.82	318.30	84.5	WP-8 NORTH FOOTING
212	373.03	296.25	84.5	WP-9 SOUTH FOOTING
213	383.54	297.73	84.5	WP-10 SOUTH FOOTING
214	425.42	327.63	84.5	WP-11 SOUTH FOOTING



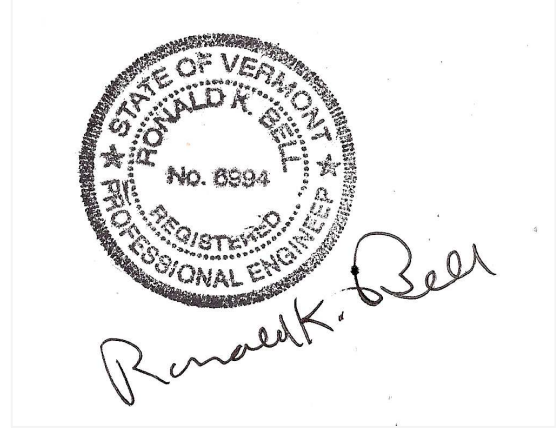
BRIDGE RAIL & GUARD RAIL DETAIL:
1"=10'



MATERIAL NOTE:
ALL W BEAM GUARD RAIL TO BE HEAVY DUTY (84\"/>

INSTALLATION NOTE:
THE CONTRACTOR SHALL REMOVE RIP RAP GREATER THAN 4\"/>

GUARDRAIL OFF BRIDGE TO BE
INSTALLED IN ACCORDANCE WITH VTRANS STANDARDS G-1 & G-1d WITH EXCEPTIONS AS NOTED.



REVISIONS:

NO.	DATE	DESCRIPTION

PROJECT:
BRIDGE #19
HICKORY RIDGE ROAD SOUTH (T.H. #5)
BRIDGE REPLACEMENT PROJECT

SHEET TITLE:
FINISH CONDITIONS

SCALE:
1" = 10'

DATE:
DECEMBER 18, 2015

SHEET
C-2

EROSION CONTROL AND WATER DIVERSION

- ALL EROSION CONTROL MEASURES SHALL BE INSTALLED BY THE CONTRACTOR PRIOR TO THE ADVANCEMENT OF ANY WORK AT THE SITE. THE CONTRACTOR SHALL TAKE SPECIAL CARE TO ENSURE THAT NO SEDIMENTS ENTER THE STREAM DURING CONSTRUCTION.
- THE CONTRACTOR SHALL REMOVE AND DISPOSE OF ALL TEMPORARY EROSION CONTROL MEASURES AT THE COMPLETION OF THE PROJECT.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR IMPLEMENTING AND MAINTAINING

TEMPORARY RIVER DIVERSION IN ORDER TO ACCOMPLISH THE INSTALLATION OF THE BRIDGE ABUTMENTS AND WING WALLS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SECURING ALL REQUIRED PERMITS PRIOR TO COMMENCING WORK. UPON COMPLETION OF THE WORK THE CONTRACTOR SHALL REMOVE ALL

MATERIALS USED FOR DIVERSION AND RETURN THE STREAM BED TO ITS ORIGINAL CONDITION.

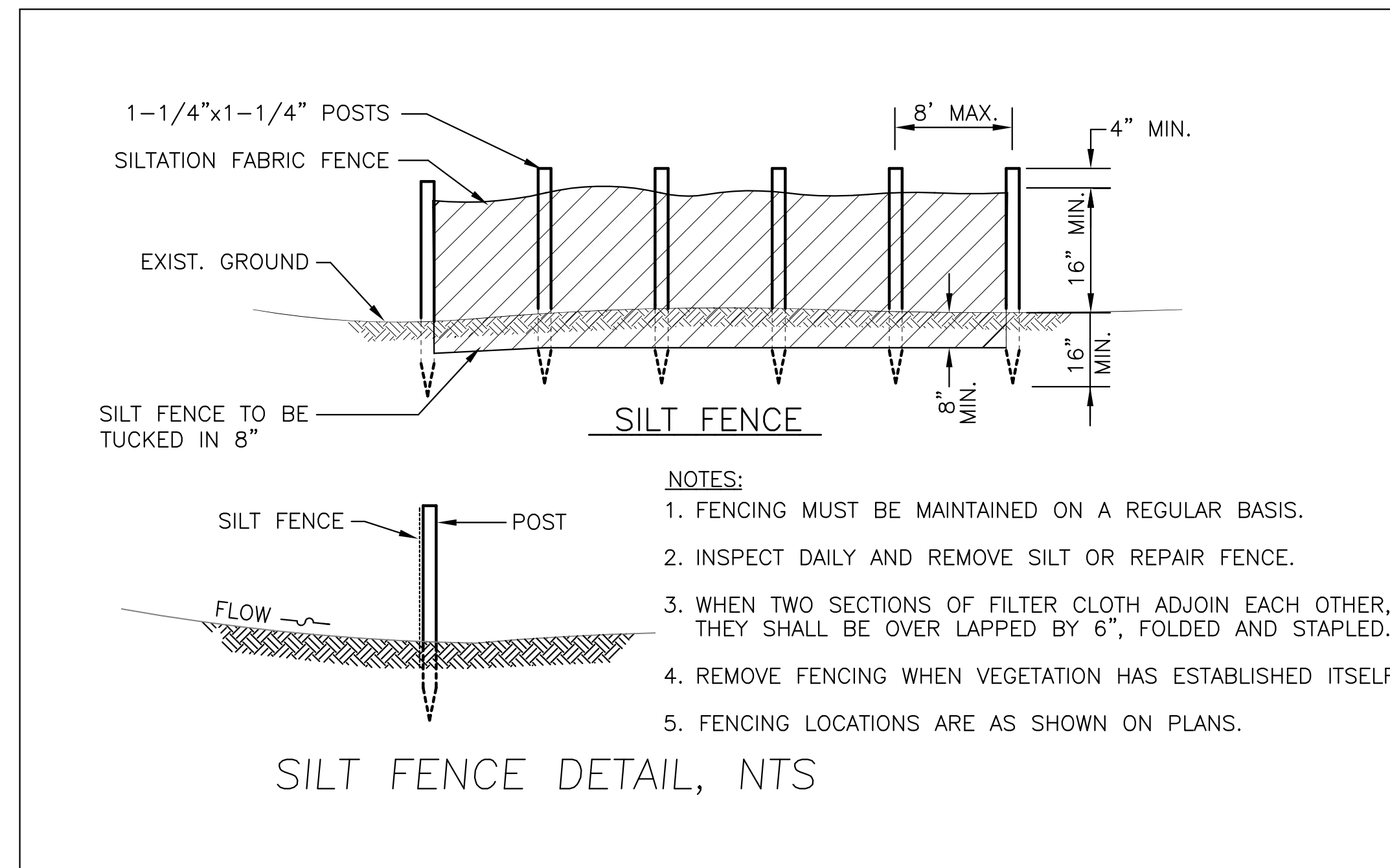
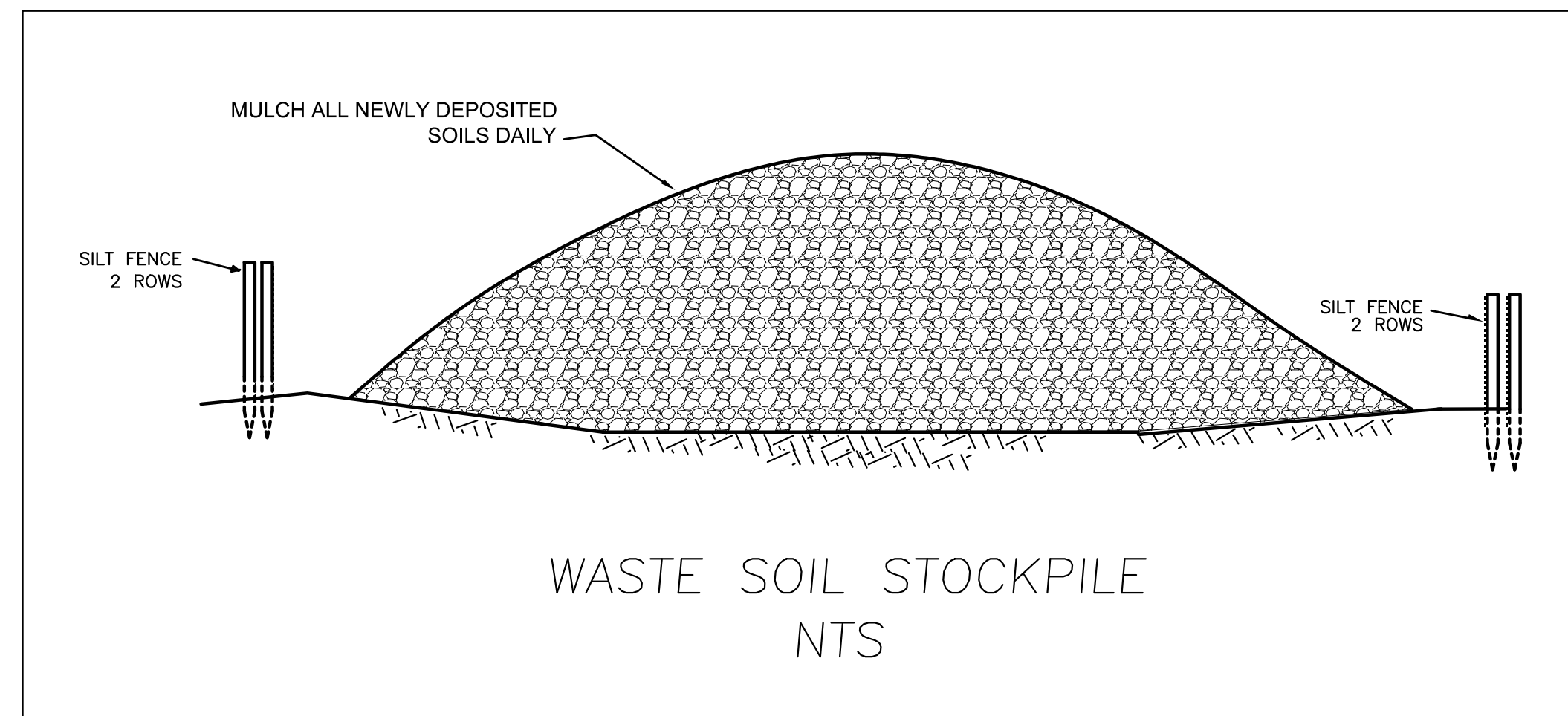
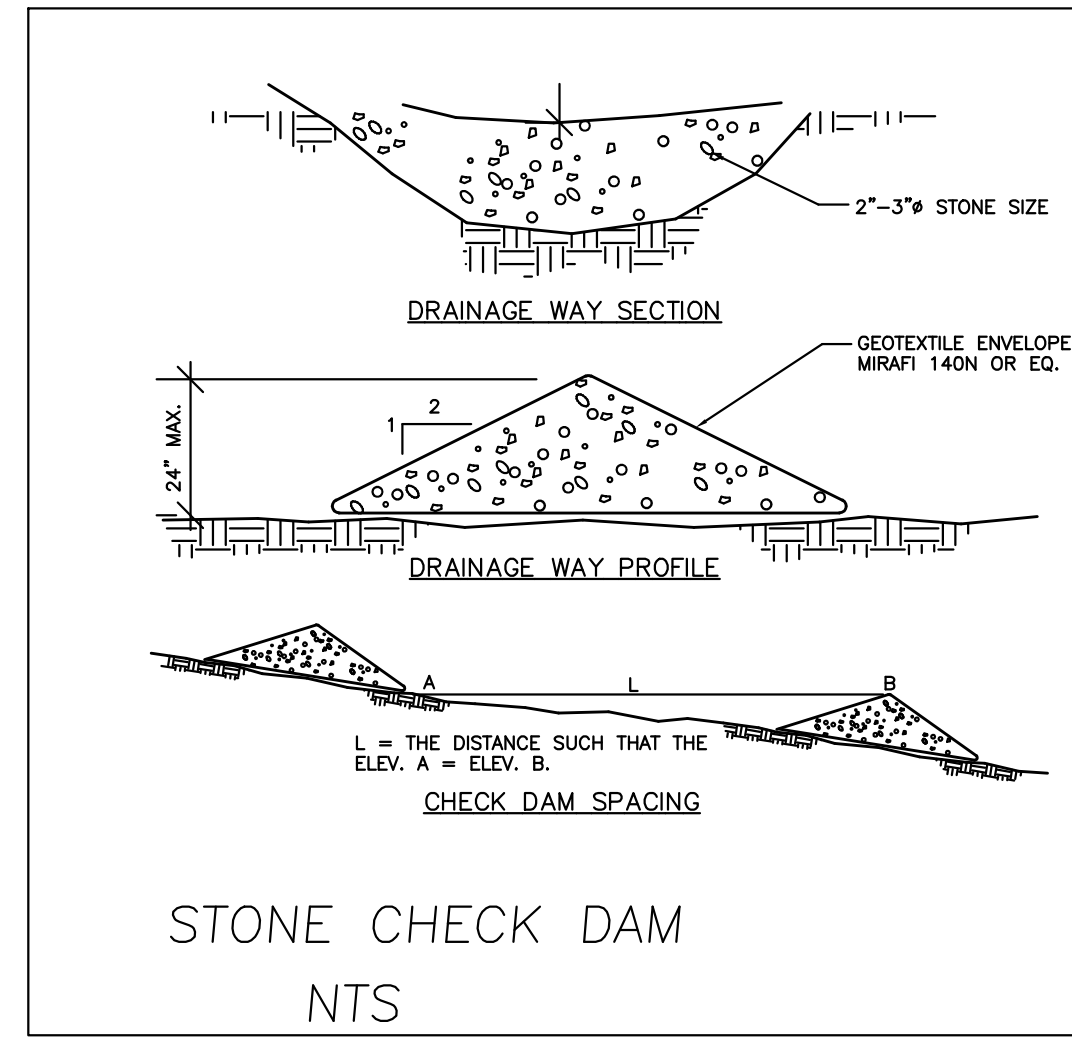
TEMPORARY EROSION AND SEDIMENT CONTROL

- THE SMALLEST PRACTICAL AREA OF LAND SHALL BE DISTURBED AT ANY GIVEN TIME DURING CONSTRUCTION. WHEN LAND IS DISTURBED, THE DISTURBANCE SHALL BE KEPT TO THE SHORTEST PRACTICABLE DURATION.
- DUST SHALL BE CONTROLLED WITH WATER DISTRIBUTED VIA TRUCK MOUNTED SPRAY BAR.
- SILT FENCE SHALL BE INSTALLED AS SHOWN ON THE EROSION CONTROL PLAN. SILT FENCE SHALL BE MIRAFI 100X OR EQUIVALENT AND SHALL BE KEPT INTO SOIL A MINIMUM OF 4 INCHES.
- STOCKPILED SOIL MATERIALS (TOPSOIL, BORROW, ETC.) SHALL HAVE SILT FENCE CONSTRUCTED AROUND PERIMETER. THE STOCKPILE MATERIAL SHALL BE SEEDED AND MULCHED AS SOON AS PRACTICABLE AND BE LOCATED UPHILL OF DISTURBED AREAS WHERE POSSIBLE. DURING WINDY CONDITIONS, STOCKPILED MATERIAL SHALL BE COVERED OR WATERED APPROPRIATELY TO PREVENT WIND EROSION.
- SLOPES GREATER THAN 3:1 SHALL HAVE EROSION CONTROL NETTING INSTALLED TO STABILIZE THE SLOPE AND REDUCE THE EROSION POTENTIAL. NETTING SHALL BE BIODEGRADABLE WITH 12 MONTH LONGEVITY (S150BN NORTH AMERICAN GREEN MULCH OR EQUIVALENT). PIN SETTING WITH WIRE STAPLES 3 FEET O.C. TO ENSURE FULL BONDING WITH THE SOIL SURFACE. SOIL SURFACE SHALL BE SLIGHTLY ROUGHENED AND NOT SMOOTH. IF LARGE AMOUNTS OF RUNOFF ARE ANTICIPATED OVER SLOPES, TEMPORARY DIVERSION SWALES SHALL BE INSTALLED UP SLOPE UNTIL SLOPE VEGETATION STABILIZES.

PERMANENT EROSION CONTROL

- GRASS LINE SWALES SHALL BE LOAMED, SEEDED, FERTILIZED AND COVERED WITH BIODEGRADABLE EROSION MATTING. AREAS WHICH EXHIBIT SIGNS OF EROSION SHALL BE REPAIRED AND RE-SEEDED IMMEDIATELY AND MAINTAINED UNTIL PERMANENT VEGETATION HAS STABILIZED.
- WHEN CONSTRUCTION IS COMPLETED IN AN AREA IT SHALL BE IMMEDIATELY LOAMED, SEEDED FERTILIZED AND MULCHED.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CONTINUED MAINTENANCE OF ALL DISTURBED AREAS, INCLUDING WATERING, UNTIL THE AREA IS INSPECTED BY THE OWNER OR ENGINEER AND FOUND TO BE STABILIZED.
- AFTER THE SITE IS STABILIZED, REMOVE ALL TEMPORARY MEASURES AND INSTALL PERMANENT VEGETATION ON THE DISTURBED AREAS.
- RE-SEEDING SHALL BE DONE UNTIL ALL AREAS ARE COMPLETELY COVERED WITH A MATURE STRAND OF GRASS. AN ARE SHALL BE CONSIDERED COVERED WHEN THE ENTIRE SURFACE CONTAINS A FRESH GROWTH OF GRASS. AREAS THAT, IN THE OPINION OF THE ENGINEER OR OWNER, ARE PREDOMINANTLY WEEDS SHALL BE PLOWED UP, FINE GRADED, FERTILIZED AND RES-SEEDED IN THE MANNER SPECIFIED PREVIOUSLY, EXERCISING CAUTION NOT TO DAMAGE NEW OR EXISTING PLANT MATERIAL.
- CUT AND FILL SLOPES SHALL BE MAXIMUM OF 2 HORIZONTAL TO 1 VERTICAL EXCEPT IN AREAS OF ROCK EXCAVATION OR AREAS DESIGNATED ON THE PLANS FOR SPECIAL CONSTRUCTION. ROCK MAY BE EXCAVATED TO A MAXIMUM OF 1 HORIZONTAL TO 4 VERTICAL. ALL PERMANENT SLOPES SHALL BE LOAMED, FERTILIZED, SEEDED AND MULCHED AFTER THE AREA IS GRADED AND WITHIN THREE (3) DAYS OF BEING STRIPPED OR EXPOSED.
- SURFACE AND SEEPAGE WATER SHALL BE DRAINED OR DIVERTED FROM THE SITE. STONES LARGER THAN 4 INCHES AND TRASH THAT WILL INTERFERE WITH SEEDING AND FUTURE MAINTENANCE OF THE ARE SHALL BE REMOVED.
- A MINIMUM OF 2 TONS OF LIME PER ACRE AND 1,000 POUNDS OF 5-10-10 FERTILIZER PER ACRE SHALL BE WORKED INTO THE TOP 3 TO 4 INCHES OF SOIL IN ORDER TO PREPARE A REASONABLE FIRM AND SMOOTH SEED BED. THE LAST TILLAGE OPERATION SHOULD BE PERFORMED ACROSS THE SLOPE WHENEVER PRACTICAL.
- SEED SHOULD BE SPREAD UNIFORMLY BY THE METHOD MOST APPROPRIATE FOR THE SITE. METHODS INCLUDE BROADCASTING, DRILLING AND HYDROSEEDING. WHEN BROADCASTING IS USED, COVER SEED WITH 1/4 INCH OF SOIL OR LESS WITH CULTIPACKING OR RAKING.
- REFER TO TABLE 1 FOR APPROPRIATE SEED MIXTURES AND TABLE 2 FOR RATES OF SEEDING. ALL LEGUMES (BIRD'S FOOT TREFLOIL) MUST BE INOCULATED WITH THEIR SPECIFIC INOCULANT.
- WHERE POSSIBLE, CONSTRUCTION SHALL BE SCHEDULED SO THAT SEEDING CAN TAKE PLACE BETWEEN EARLY SPRING MAY 1 AND SEPTEMBER 1 SO THAT ALL SEEDED AREAS HAVE A VISIBLE GROWTH BY OCTOBER 1.
- ALL SEEDED AREAS SHALL BE MULCHED IMMEDIATELY FOLLOWING THE SEEDING OPERATION. FROM THE FOLLOWING MULCH MATERIAL SHALL BE SELECTED BY THE ENGINEER AND APPLIED TO BEST MEET THE NEEDS OF THE SITE.

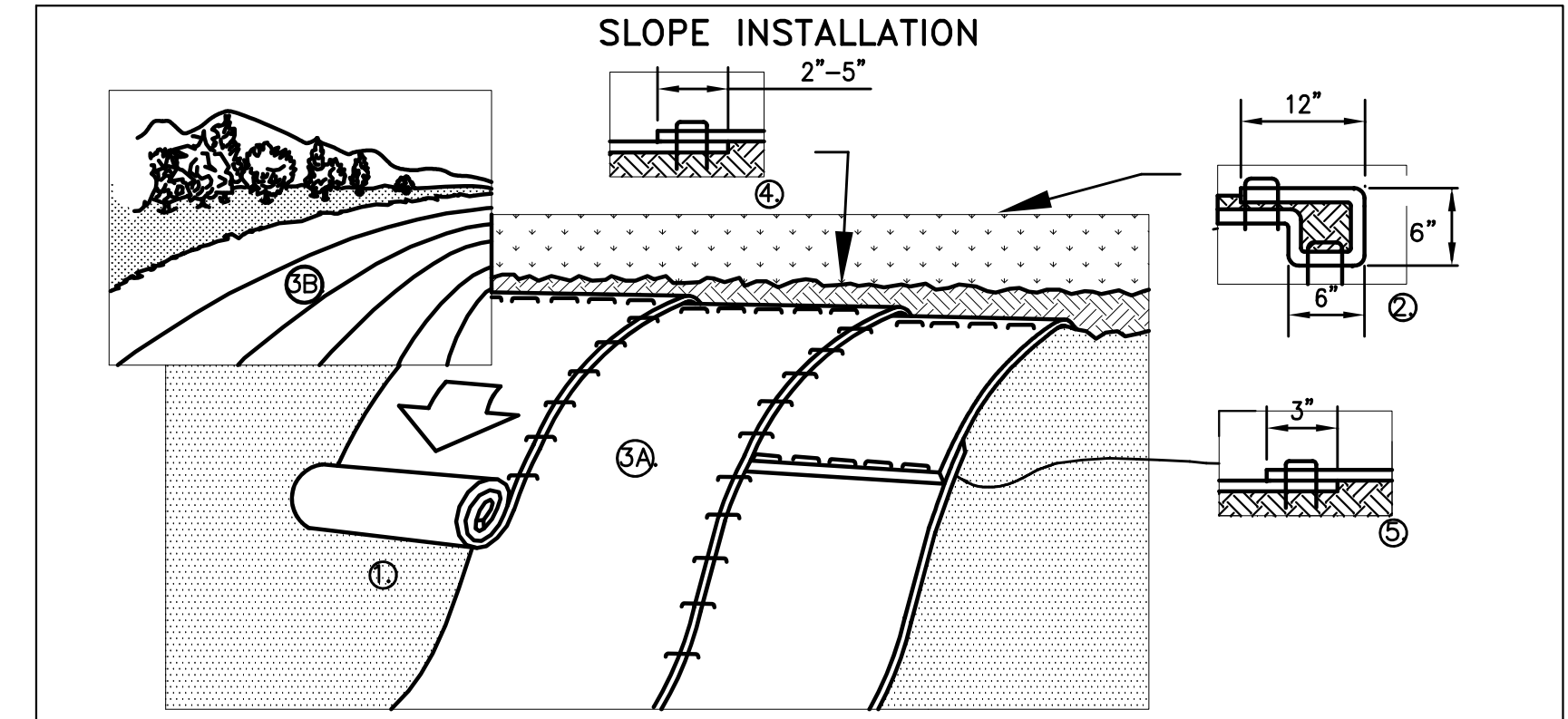
MULCH MATERIALS AND RATES	REMARKS
HAY OR STRAW, 1 TO 1 1/2 TONS PER ACRE TO 90 LBS/ 1,000 SQ. FT.	CAN BE SPREAD BY HAND OR BY MACHINE. MUST BE DRY AND FREE OF MOLD. MAY BE USED WITH PLANTINGS OR FOR EROSION CONTROL ALONE. SUBJECT TO BLOWING AND SLIPPING ON STEEP SLOPES UNLESS ANCHORED.
JUTE AND FIBROUS MATS	USED AS MULCH ESPECIALLY IN AREAS OF CONCENTRATED FLOW. MUST BE CAREFULLY INSTALLED AND ANCHORED. DURABLE. CAN BE USED FOR EROSION CONTROL WITHOUT OTHER MULCHING MATERIALS. THE WATERWAY, CHANNEL OR AREA TO BE PROTECTED IS TO BE SHAPED TO REQUIRED SHAPE AND GRADED AND THOROUGHLY COMPACTED BEFORE SEEDBED PREPARATION. ROCKS OR CLODS OVER 1 INCHES IN DIAMETER AND STICKS OR OTHER MATERIAL THAT WILL PREVENT CONTACT OF THE FIBER MATTING WITH THE SOIL SURFACE SHOULD BE REMOVED. AFTER SEEDING IS COMPLETED, MATTING SHOULD BE LAID IN DIRECTION OF FLOW AND APPLIED IN ACCORDANCE WITH INSTRUCTION IN EACH ROLL OF MATERIAL. AFTER MATTING IS INSTALLED A CULTIPACKER OR SUITABLE IMPLEMENT SHOULD BE ROLLED AT RIGHT ANGLES OVER THE ENTIRE AREA SO AS TO THOROUGHLY FUSE THE MATTING WITH THE SOIL SURFACE.
CRUSHED STONE, 1/2 TO 1 1/2 INCHES IN DIAMETER, SPREAD MORE THAN 1/2 INCH THICK.	EFFECTIVE IN CONTROLLING WIND AND WATER EROSION.



- NOTES:**
- FENCING MUST BE MAINTAINED ON A REGULAR BASIS.
 - INSPECT DAILY AND REMOVE SILT OR REPAIR FENCE.
 - WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER, THEY SHALL BE OVER LAPPED BY 6", FOLDED AND STAPLED.
 - REMOVE FENCING WHEN VEGETATION HAS ESTABLISHED ITSELF.
 - FENCING LOCATIONS ARE AS SHOWN ON PLANS.

USE	SEEDING MIXTURE
STEEP CUTS AND FILLS	C
WATERWAYS & OTHER CHANNELS WITH FLOWING WATER	C,D

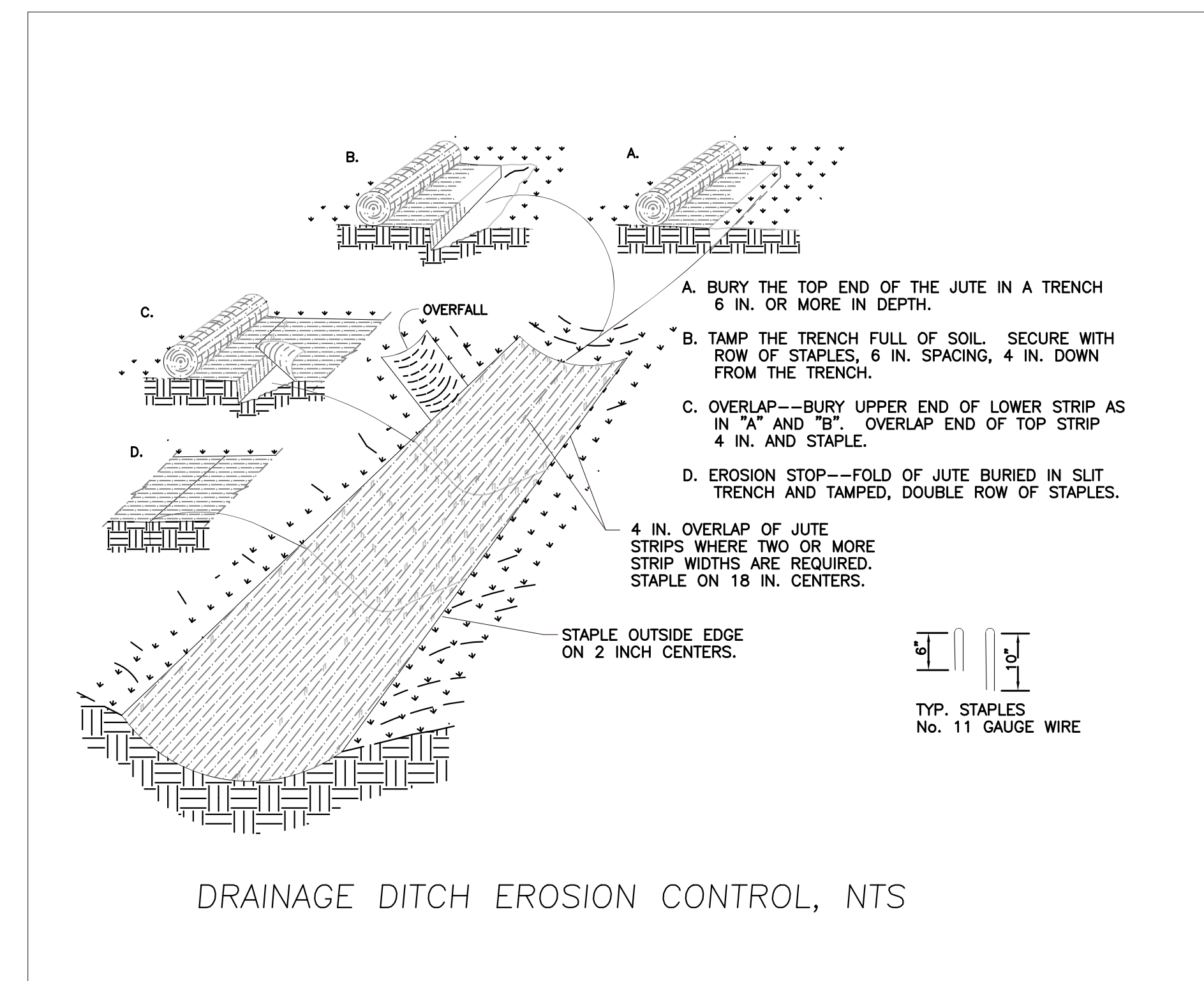
MIXTURE	Lb/ACRE	Lb/1,000 SQ. FT.
C. TALL FESCUE	20	0.45
CREeping RED FESCUE	20	0.45
BIRD'S FOOT TREFLOIL	8	0.20
TOTAL	48	1.10
D. BIRD'S FOOT TREFLOIL	10	0.25
RED TOP	5	0.10
RED CANARY GRASS	15	0.35
TOTAL	30	0.70



GENERAL NOTES:

- PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED.
- BEGIN AT THE TOP OF THE CHANNEL BY ANCHORING THE BLANKET IN A 6" (15cm) DEEP X 6" (15cm) WIDE TRENCH WITH APPROXIMATELY 12" (30cm) OF BLANKET EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE BLANKET WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" (30cm) APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE PORTION OF BLANKET OVER SEED AND COMPACTED SOIL. SECURE BLANKET OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" (30cm) APART ACROSS THE WIDTH OF THE BLANKET.
- IN CHANNEL APPLICATIONS, ROLL CENTER BLANKET IN DIRECTION OF WATER FLOW IN BOTTOM OF CHANNEL. IN SLOPE APPLICATIONS, ROLL THE BLANKETS (A) DOWN OR (B) HORIZONTALLY ACROSS THE SLOPE. BLANKETS WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL BLANKETS MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING OPTIONAL DOT SYSTEM, STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE PATTERN.
- PLACE CONSECUTIVE BLANKETS END OVER END (SHINGLE STYLE) WITH A 4"-6" (10cm-15cm) OVERLAP. USE A DOUBLE ROW OF STAPLES STAGGERED 4" (10cm) APART AND 4" (10cm) ON CENTER TO SECURE BLANKETS.
- FULL LENGTH EDGE OF BLANKETS AT TOP OF SIDE SLOPES MUST BE ANCHORED WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" (30cm) APART IN A 6" (15cm) DEEP X 6" (15cm) WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.
- ADJACENT BLANKETS MUST BE OVERLAPPED APPROXIMATELY 2"-5" (5cm-12.5cm) (DEPENDING ON BLANKET TYPE) AND STAPLED. TO ENSURE PROPER SEAM ALIGNMENT, PLACE THE EDGE OF THE OVERLAPPING BLANKET (BLANKET BEING INSTALLED ON TOP) EVEN WITH THE COLORED SEAM STITCH ON THE BLANKET BEING OVERLAPPED.
- IN HIGH FLOW CHANNEL APPLICATIONS, A STAPLE CHECK SLOT IS RECOMMENDED AT 30' TO 40' (9m-12m) INTERVALS. USE A DOUBLE ROW OF STAPLES STAGGERED 4" (10cm) APART AND 4" (10cm) ON CENTER OVER ENTIRE WIDTH OF CHANNEL.
- THE TERMINAL END OF THE BLANKETS MUST BE ANCHORED WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" (30cm) APART IN A 6" (15cm) DEEP X 6" (15cm) WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.
- IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" (15cm) MAY BE NECESSARY TO PROPERLY SECURE THE BLANKETS.

SOIL STABILIZATION BLANKET, NTS
(FOR SLOPES GREATER THAN 3:1)



REVISIONS:

PROJECT:
BRIDGE #19
HICKORY RIDGE ROAD SOUTH (T.H. #5)
BRIDGE REPLACEMENT PROJECT

SHEET TITLE:
EROSION CONTROL
SPECIFICATIONS AND DETAILS

SCALE:
NTS

DATE:
DECEMBER 18, 2015

SHEET