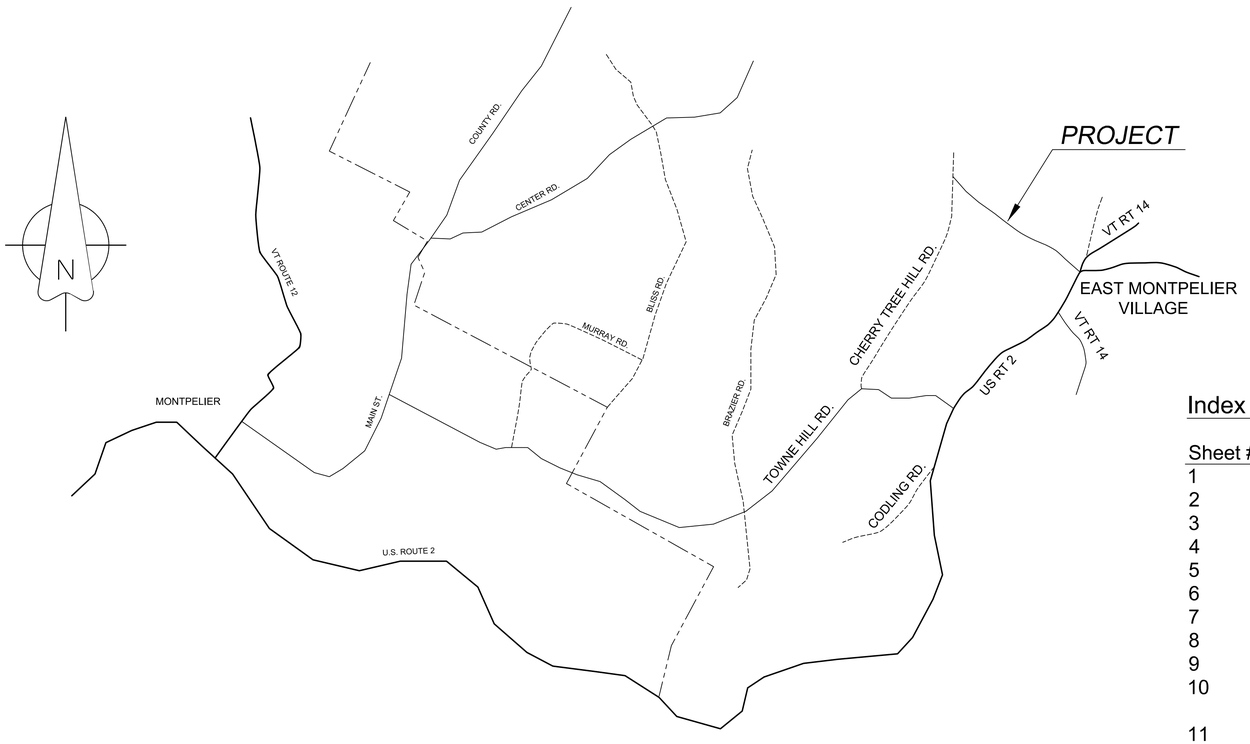
STATE OF VERMONT

WASHINGTON COUNTY

TOWN OF EAST MONTPELIER

T.H. 7, Quaker Road - Culvert Replacement & Upgrade

TH Structures Grant Program
FY 2017, Project BC 1773



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Project plans prepared through joint efforts of the following:

Newton Technical Services, LLC
728 South Barre Road
Barre, VT 05641
(802) 476-6900

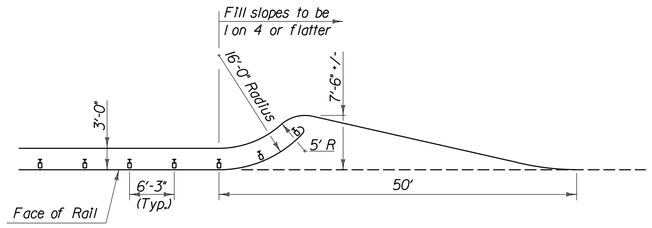
Contech Engineered Solutions LLC
9025 Centre Pointe Drive
West Chester, OH 45069

Chase & Chase Surveyors & Septic Designers, Inc.
301 North Main St., Suite 301
Barre, VT 05641
(802) 479-9636

ESTIMATED QUANTITIES

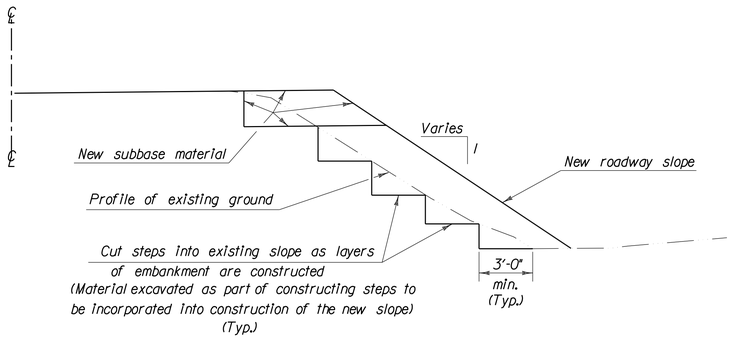
Item No.	Item Name	Unit	Total
201.10	Clearing and Grubbing Including Individual Trees and Stumps	LUMP SUM	1
203.15	Common Excavation	CY	297
203.27	Unclassified Channel Excavation	CY	25
203.28	Excavation of Surfaces and Pavements	CY	27
204.25	Structure Excavation	CY	287
204.30	Granular Backfill for Structures	CY	210
210.10	Cold Planing, Bituminous Pavement	SY	78
301.35	Subbase of Dense Graded Crushed Stone	CY	460
406.25	Bituminous Concrete Pavement	TON	70
501.34	Concrete, High Performance Class B (3500 psi)	CY	19
507.15	Reinforcing Steel	LBS	2241
514.10	Water Repellent, Silane	GAL	10
608.25	All Purpose Excavator Rental, Type I	HOURS	20
613.11	Stone Fill, Type II	CY	30
617.10	Relocate Mailbox, Single Support	EACH	1
621.205	Steel Beam Guardrail, Galvanized with 8' Posts	LF	658
621.60	Anchor for Steel Beam Guardrail	EACH	4
635.11	Mobilization/Demobilization	LUMP SUM	1
641.10	Traffic Control	LUMP SUM	1
646.20	4" White Line	LF	800
646.21	4" Yellow Line	LF	800
649.11	Geotextile for Roadbed Separator (for use under bed for new structure)	SY	63
649.31	Geotextile under Stone Fill	SY	65
651.40	Grubbing Material	SY	20
*	66" x 61' Aluminum Pipe (5 x 1 corrugations)	_____	_____
	Erosion Prevention and Sediment Control	LUMP SUM	1
	Temporary Stream Diversion	LUMP SUM	1
	Streambed Stone Fill, Type EI	CY	9
	Installation of New Structure	LUMP SUM	1
	Turf Establishment (Seed, Fertilizer, Mulch, etc.)	LUMP SUM	1

*(Not a bid item - town will purchase)



GUARDRAIL FLARE DETAIL

1" = 10'



DETAILS FOR BENCHING OF EXISTING SLOPES

Not to Scale

SEEDING FORMULA

% WT.	LBS./A.	NAME	PUR %	GERM %
37.5	22.5	CREEPING RED FESCUE	98	85
37.5	22.5	TALL FESCUE	95	90
5.0	3.0	RED TOP	95	90
15.0	9.0	BIRDSFOOT TREFOIL	98	85
5.0	3.0	ANNUAL RYEGRASS	95	85
100.0	60.0			

NOTES:

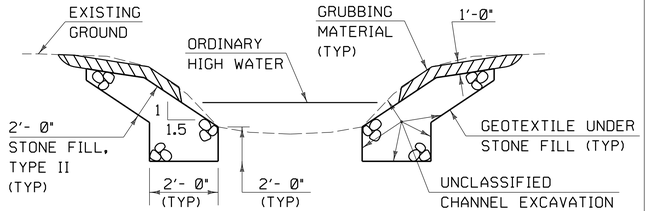
SEED MIXTURE: SHALL NOT HAVE A WEED CONTENT EXCEEDING 0.40% BY WEIGHT AND SHALL BE FREE OF ALL NOXIOUS SEED.

SEED: TO BE APPLIED PER SEEDING FORMULAS OR AS DIRECTED BY THE ENGINEER.

FERTILIZER: FORMULA 10-20-10, TO BE USED WITH SEED, APPLIED AT THE RATE OF 500 LBS./ACRE. (HYDRO SEEDERS MAY USE 19-19-19 FORMULA).

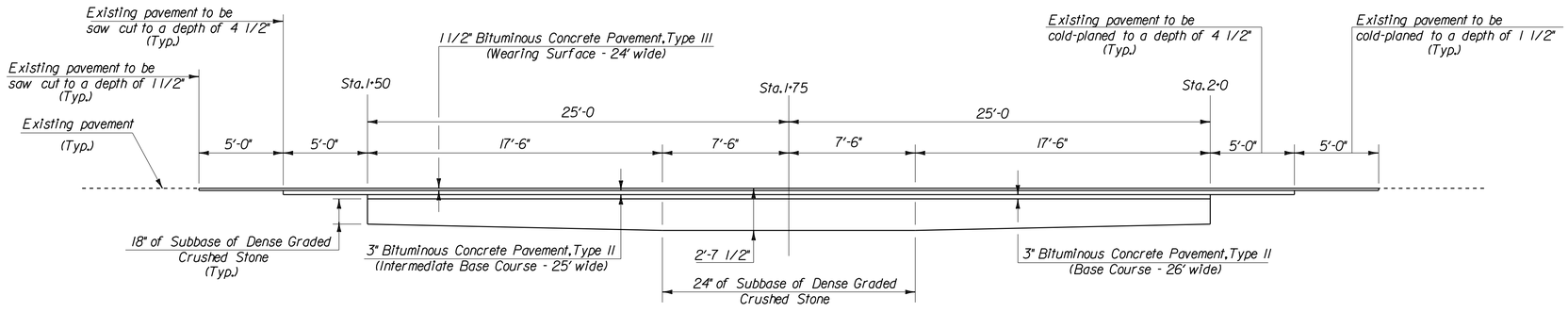
AGRICULTURAL LIMESTONE: TO BE APPLIED AT THE RATE OF 2 TONS/ACRE, OR AS DIRECTED BY THE ENGINEER.

HAY MULCH: TO BE PLACED ON EARTH SLOPES AT THE RATE OF 2 TONS/ACRE, OR AS DIRECTED BY THE ENGINEER.



TYPICAL CHANNEL SECTION

(NOT TO SCALE)



SUBBASE TRANSITION AND PAVEMENT JOINT DETAILS

1/4" = 1'-0"

NO.	REVISIONS	BY	DATE

DES DWN
DRN DWN
CHK DWN
APPD

DATE: April 2018

SCALE: As Noted

Town of East Montpelier
TH 7 – Quaker Road
TH Structures Grant Program
FY 2017 BC 1773

Quantity Sheet
and Miscellaneous Details

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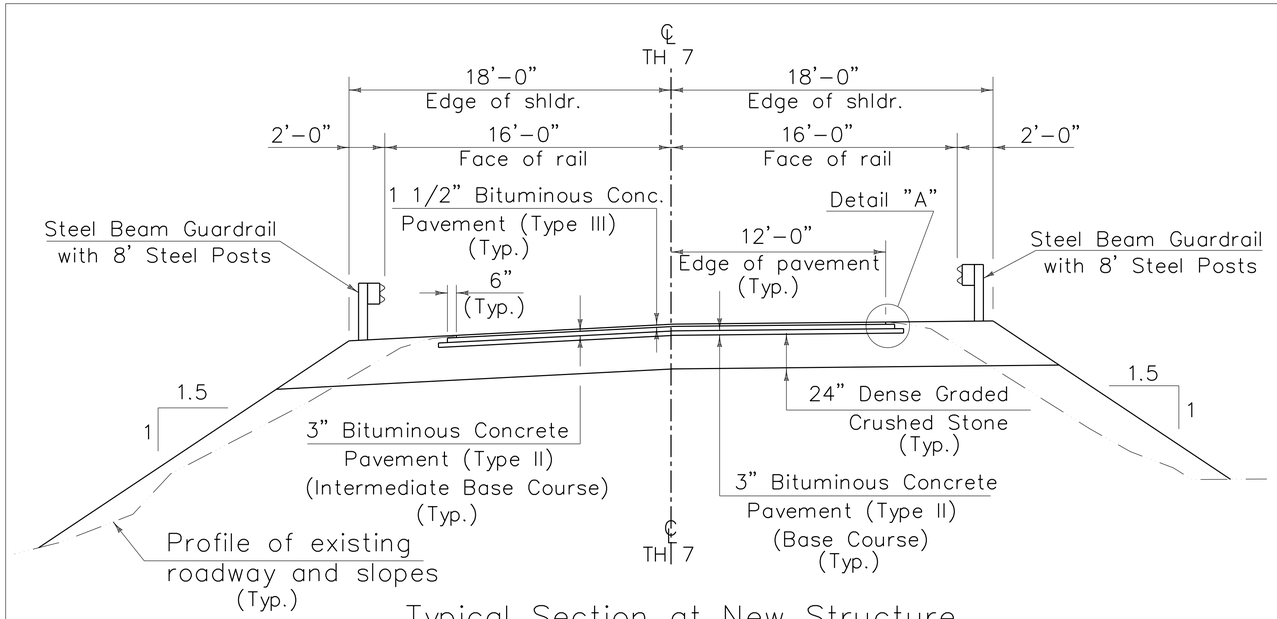
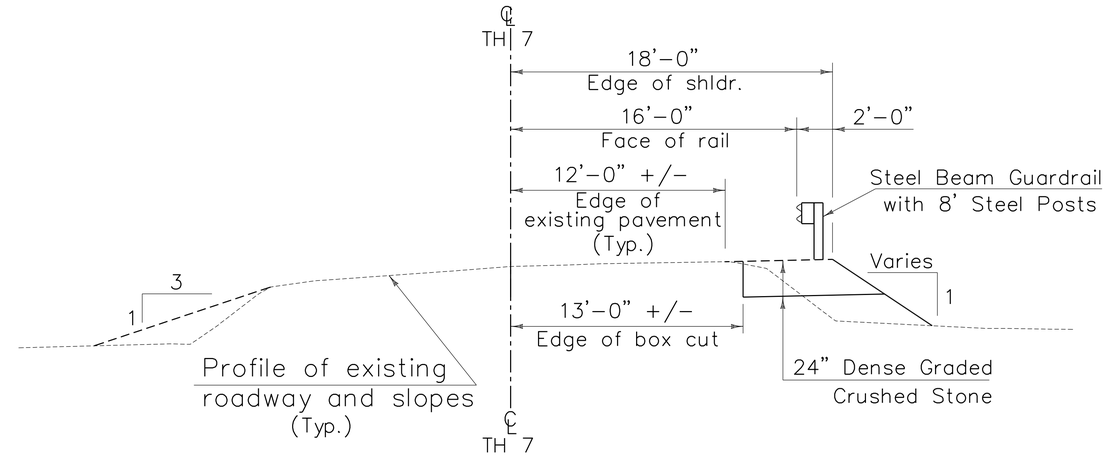


Typical Section at New Structure

Sta. 1+50 – Sta. 2+00

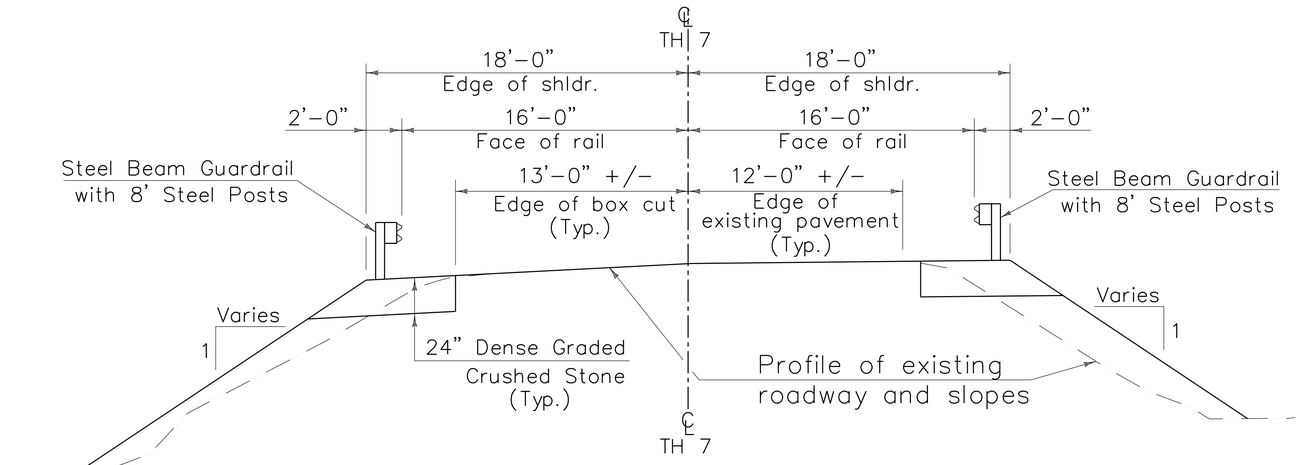
Note: Limits of Paving: Sta. 1+40 – Sta. 2+10

3" depth of Base Course Pavement to be paved at 26'–0" wide,
3" depth of Intermediate Base Course to be paved at 25'–0" wide,
and 1 1/2" depth of Wearing Course to be paved at 24'–0" wide



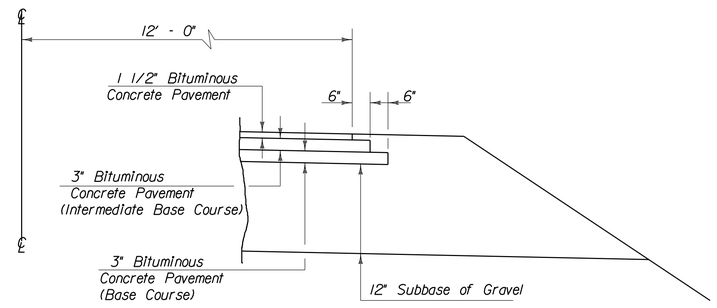
Typical Section

Sta. 3+00 – Sta. 4+00



Typical Section

Sta. 0+50 – Sta. 1+50
Sta. 2+00 Lt. – Sta. 3+00 Lt.



Detail "A"

Not to Scale

NO.	REVISIONS	BY	DATE

DES: DWN
DRN: DWN
CHK: DWN
APPD:

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Town of East Montpelier
TH 7 – Quaker Road
TH Structures Grant Program
FY 2017 BC 1773

Typical Sections and Pavement Details

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GENERAL NOTES

1. All work shall be carried out in accordance with the Vermont Agency of Transportation Standard Specifications for Construction dated 2011 and approved by the Federal Highway Administration on July 20, 2011, including all subsequent revisions and revised specifications.

2. Any work done shall also comply with the latest version of the State of Vermont Standards for Town Highway Maintenance and Grading Guidelines and any other highway-related policies and guidelines as adopted by the Town of East Montpelier.

3. Because there are known underground utilities within the project limits, the project was Dig-Safed prior to the survey work being done in order to provide the Contractor with as much information as possible regarding any buried utilities. However, if the Contractor, feels that any additional buried utility work may have been done in the meantime, the Contractor is responsible for contacting Dig-Safe and conducting a second evaluation prior to any work being done. The Contractor shall not be due any additional compensation for having to work around and with the existing utilities, either aerial or buried, and either noted/shown or not, located within the project limits.

4. The Contractor is advised that all in-stream work shall be accomplished between the dates of July 1 and October 1, 2018 as stated in the permit issued May 18, 2018 by the Vermont Agency of Natural Resources, Department of Environmental Conservation.

5. Town Highway 7 will be closed to traffic during the project. The road cannot be closed until July 9, 2018 and once closed, can only be closed for a maximum period of twenty-eight (28) calendar days; this period of time should ensure that the project, particularly the earthworks-related portion of it,, is constructed using the best construction methods and sequencing possible. Once reopened, TH 7 shall have been constructed to safely accommodate a minimum of one-way traffic in each direction, shall be able to accommodate regular vehicle traffic, as well as truck and farm-related traffic, and shall remain open. The Town will notify all parties involved, i.e. residents, school system, emergency services, etc. prior to the actual closing of the road. The Town will also notify those involved when the project is completed and the road can be reopened to traffic.

6. The Contractor shall furnish, erect and maintain the required signs and barricades to inform the public that the road is closed to traffic during construction and to direct traffic accordingly. Signs that may be appropriate to use include "ROAD WORK AHEAD", "ROAD CLOSED", "ROAD CLOSED TO THRU TRAFFIC", "LOCAL TRAFFIC ONLY", etc.

7. All signs and/or barricades, etc. that are used shall be in compliance with the latest edition of the Manual of Uniform Traffic Control Devices (MUTCD). If any signs are to be mounted on posts, the Contractor is responsible for contacting Dig-Safe and locating any underground utilities prior to installing any posts. All costs associated with this work shall be subsidiary to the item, Traffic Control.

8. In an effort to prevent erosion and to control sediment, the Contractor is required to provide all necessary temporary erosion control measures. Any silt fence installed by the Contractor will be removed by the Town once the project has stabilized. The costs associated with providing all erosion prevention and sediment control measures shall be included in the item, Erosion Prevention and Sediment Control.

9. The cost of cutting and removing any trees, stumps, brush or other material that is within the project limits shall be covered under the item, Clearing and Grubbing, Including Individual Trees and Stumps. If so desired, any trees removed that are suitable for firewood shall be cut into reasonable lengths, piled and left on the project for the respective landowner; otherwise all such material shall become the property of the Contractor and removed from the project. All stumps shall be removed and properly disposed of; no stumps are to be incorporated back into any phase of the project.

10. The Contractor is advised that a portion of the septic system for the property located at Sta. 1+75 Lt. - Sta. 2+50 Lt. is located in the front yard of that property; The Contractor shall refrain from traveling across, parking equipment on, or working in that area.

11. No borings have been taken nor have any test holes been done at this site.

12. The project will be constructed using both the existing horizontal and vertical alignments on TH 7.

13. The existing 24" metal culvert will be carefully removed by the Contractor and shall remain the property of the Town. Once removed, the Contractor is responsible for coodinating its removal from the project with the Town, and for loading the used culvert sections onto town-owned equipment.

14. The Contractor is responsible for providing any temporary diversion of the stream that is required and, for maintaining that diversion until no longer needed. The Contractor is also responsible for ensuring that all in-stream work is accomplished within the timeframe outlined in the Stream Alteration/General Permit and in a de-watered channel, i.e. "in the dry". Performing that work may result in using either a temporary channel, a bypass culvert, sandbags, a cofferdam system and pumps or a combination of each. Despite which method or combination of methods that are used, the cost of this work shall fall under the item, Temporary Stream Diversion and all work shall comply with the Agency of Natural Resources, Department of Environmental Conservation General Permit issued for the project.

15. The Town will purchase the new aluminum pipe and have it delivered to the project. The Contractor is responsible for the unloading, storage and security of the material on the project.

16. The bed for the new structure shall be undercut 1'-0" as shown on the plans; once the bottom of the undercut has been graded and compacted, geotextile fabric meeting the requirements of Item 649.11 Geotextile for Roadbed Separator shall be placed on that surface and the area backfilled and compacted with material meeting the requirements of Item 204.30, Granular Backfill for Structures.

17. If the new pipe is not assembled in place, the Contractor shall be responsible for furnishing the necessary equipment and rigging capable of safely and adequately lifting and setting all of the components to the line and grade shown on the plans. All costs associated with this work shall be included in the item, Installation of New Structure.

18. The Contractor is required to fill the invert of the new pipe to a depth of 1'-0", as well as the existing scour hole on the outlet end of the culvert, with material meeting the requirements of Streambed Stone Fill, Type E1 as required by ANR's River Management Engineer. The material specifications for that material are included in the plans and a quantity of that material is included in the project's quantities. Care shall be taken not to damage the new structure during the process.

19. The area around the new structure shall be backfilled and compacted per VT Agency of Transportation Specification 601.08. Lifts of backfill material shall be brought up evenly and compacted on both sides of the new structure; at no time shall the depth of the backfill on one side of the pipe be any higher than 2 feet above the lift on the other side. Material used for backfilling shall be clean, free-draining granular material meeting the VT AOT Material Specification 704.08.

20. The new structure shall have a minimum of 4' of cover over the top of it prior to any construction equipment being allowed to cross over the structure.

21. A new, reinforced concrete headwall shall be constructed at the inlet end of the structure, and a new, reinforced concrete cradle headwall shall be constructed at the outlet end of the structure. All concrete used for this work shall be 3500 psi and all reinforcing steel shall be plain, black bar and be 60 ksi steel. All exposed edges of concrete will be chamfered 1" x 1".

22. All exposed concrete shall be treated with a penetrating-type, protective sealer meeting the requirements of the item, Water Repellent, Silane. Approved products to be used shall be those appearing on the most recent version of the Approved Products List on file with the Agency of Transportation's Material and Research Section.

23. Stone Fill, Type II shall be used to protect any disturbed channel banks or roadway slopes at the inlet and outlet of the new structure. Stone Fill placed on the banks of the channel shall be placed on Geotextile Fabric for Stone Fill and shall be placed up to a height of at least one foot above the top of the opening but it shall not constrict the channel, or the opening of the structure.

24. All excess, suitable material from the excavation shall be used to construct the fill slopes on the project. Newly constructed fill slopes shall be as shown on the plans and have a minimum slope of 1 on 1 1/2 (1 vertical to 1 1/2 horizontal) unless shown otherwise; to reduce the chances of creating a shear plane, new material used to construct the fill slopes shall be "benched" into the existing ground (see detail on plans). If there is any excess material remaining, it shall first be offered to the town; if they don't need it, it shall become the property of the Contractor, hauled off site and be disposed of in an approved manner.

25. Once the roadway fill is brought to subgrade elevation, graded and compacted, and any related box cut excavation has been done, the Contractor shall then place, grade, and compact the Subbase of Dense Graded Crushed Stone. The material shall meet the VT AOT Material Specification 704.06A and shall be placed in 3 equal lifts, each lift being graded and compacted.

26. The existing pavement on TH 7 shall be saw-cut, cold-planed, and removed as shown on the plans. All existing pavement removed as part of the project shall be properly disposed of and shall not be reused as part of any other work on the project.

27. The entire area of the roadway between Sta. 1+50, Sta. 1+75, and Sta. 2+0 shall be excavated down to a depth as shown on the plans, graded to drain towards the outsides, and replaced with the item, Subbase of Dense Graded Crushed Stone. Between Sta. 1+50 and Sta. 2+0, the bottom of the subgrade shall be transitioned as shown on the plans; the overall depth of subbase material in this area will transition accordingly so that the overall depth of subbase material at Sta. 1+50 and Sta. 2+0 shall be 18"; the overall depth of the subbase material shall be 24" deep at Sta. 1+75. The existing roadbed shall be box cut as shown on the Typical Sections and roadway cross-sections.

28. New pavement complying with the item, Bituminous Concrete Pavement shall consist of 3" of Type II Base, 3" of Type II Intermediate Base and 1 1/2" of Type III Wearing Surface and shall be placed as shown on the plans.

29. New 4" white lines (edge/fog lines) complying with the item, 4" White Line, and new 4" double yellow lines (centerline) complying with the item, 4" Yellow Line, shall be painted when the project is complete; all new lines shall match into the existing lines on each end of the project. Waterborne paint conforming to VT AOT Material Specification 708.08(d) shall be used to paint all lines and glass beads shall conform to VT AOT Material Specification 708.09.

30. The Contractor is responsible for providing turf establishment (seed, fertilizer, mulch, etc.) on all disturbed areas as required; this work will fall under the item, Turf Establishment.

31. The Contractor shall take all necessary precautions to avoid the spreading of any invasive species (Japanese knotweed, buckthorn, etc.) found on the project, or in any material removed from the jobsite.

32. The Project has a completion date of August 17, 2018.

33. No work shall be done prior to the Town and the Contractor holding a Pre-Construction Meeting.

34. The Town of East Montpelier reserves the right to accept or reject any bid when deemed to be in the best interest of the Town. The Town will open and examine all bids and will make a decision on which bid to accept and which Contractor to award the bid to. Once the project is awarded to a Contractor, and that Contractor is given the Notice to Proceed by the Town, the Contractor shall have until the completion date shown above to complete any and all work awarded by the Town of East Montpelier.

35. The Contractor will be required to furnish proof of liability insurance by having a Certificate of Insurance showing the Town of East Montpelier as loss payee. The Contractor will also be required to furnish proof of worker's compensation insurance.

36. Unless otherwise noted, the Contractor shall submit a Lump Sum price for furnishing all the necessary tools, equipment and materials, and performing all the work required to complete the project.

37. Although every attempt has been made to ensure the accuracy of the Estimated Quantities shown in the plans, they are not guaranteed; they are provided as a basis for the Contractor to prepare his/her Lump Sum bid price for the project, and for the Town of East Montpelier to compare the bids that are submitted.

NO.	REVISIONS	BY	DATE

DES DWN
DRN KKJ
CHK DWN
APPD

DATE: April 2018

SCALE: As Noted

Town of East Montpelier
T.H. 7 – Quaker Road
TH Structures Grant Program
FY 2017 BC 1773

General Notes

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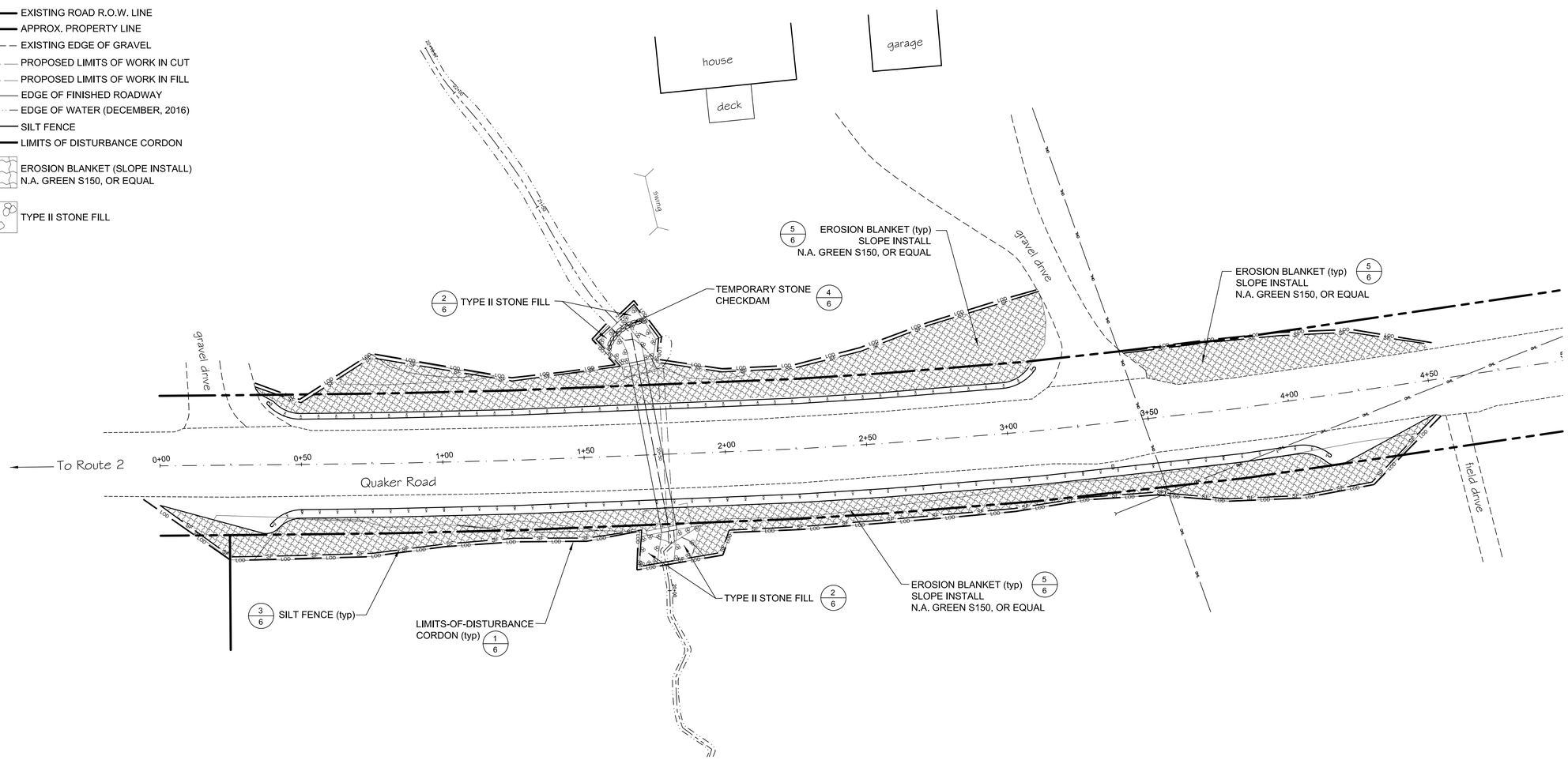
LEGEND:

- EXISTING ROAD R.O.W. LINE
- APPROX. PROPERTY LINE
- EXISTING EDGE OF GRAVEL
- PROPOSED LIMITS OF WORK IN CUT
- PROPOSED LIMITS OF WORK IN FILL
- EDGE OF FINISHED ROADWAY
- EDGE OF WATER (DECEMBER, 2016)
- SF SF SILT FENCE
- LOD LOD LIMITS OF DISTURBANCE CORDON
- EROSION BLANKET (SLOPE INSTALL) N.A. GREEN S150, OR EQUAL
- TYPE II STONE FILL



GENERAL NOTES:

1. CONTRACTOR SHALL INSTALL AND MAINTAIN ALL APPROPRIATE EROSION CONTROL MEASURES AS DICTATED BY THE STATE OF VERMONT "LOW-RISK SITE HANDBOOK FOR EROSION PREVENTION AND SEDIMENT CONTROL", EFFECTIVE AUGUST 2006. REFER TO THE HANDBOOK AND MANUFACTURERS SPECIFICATIONS FOR DETAILS REGARDING THE IMPLEMENTATION OF THESE MEASURES.

2. THE EROSION PREVENTION MEASURES SHOWN HEREON REPRESENT THE MINIMUM NECESSARY IN GOOD WEATHER CONDITIONS WITH A PROPERLY RUN SITE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PREVENTING SEDIMENT FROM LEAVING THE SITE AND SHALL EMPLOY WHATEVER ADDITIONAL MEASURES ARE NECESSARY TO ACCOMMODATE THEIR WORK PLAN AND CHANGING WEATHER CONDITIONS.

3. MATERIAL MOVED OFF-SITE SHALL BE SUBJECT TO THE SAME EROSION PREVENTION REQUIREMENTS AS ON-SITE MATERIALS. PLACE IN AN UPLAND LOCATION, SURROUND WITH SILTFENCE, MULCH AND SEED IF NOT TO BE UNDISTURBED FOR MORE THAN 14 DAYS.

4. THE STREAM DIVERSION SHALL BE INSTALLED IN A MANNER TO LIMIT THE CREATION OF SEDIMENT IN THE STREAMBED. CONTRACTOR SHALL SUBMIT A WRITTEN PLAN FOR THIS MEASURE FOR REVIEW AND APPROVAL PRIOR TO IMPLEMENTATION. IN NO CASE SHALL THE PROPOSED DIVERSION EXCEED THE DISTURBED FOOTPRINT SHOWN.

5. ANY ADDITIONAL DEWATERING REQUIRED SHALL BE DONE IN ACCORDANCE WITH DETAILS 7 AND 8, EMPLOYING FILTER BAGS AND APPROPRIATE DISCHARGE LOCATIONS TO PREVENT SILT LADEN WATER FROM IMMEDIATELY RE-ENTERING THE BROOK.

SEE SHEET 6 FOR DETAILS

GRAPHIC SCALE
20 0 20 40 80
1" = 20'

NO.	REVISIONS	BY	DATE

DES DWN
DRN KKJ
CHK DWN
APPD

DATE 04/27/18

SCALE 1" = 20'

Town of East Montpelier
T.H. 7 - Quaker Road
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Erosion Control & Stablization Plan

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CONSTRUCTION SPECIFICATIONS

1. LIMIT OF DISTURBANCE CORDON SHALL BE 3-FOOT HIGH ORANGE "CONTRUCTION" SAFETY FENCE OR APPROVED EQUIVALENT, AND SHALL BE LOCATED AS SHOWN ON THE APPLICABLE PLAN.

2. SAID FENCE SHALL BE SUPPORTED BY STEEL 'U' OR 'T' TYPE POSTS PLACED AT MAXIMUM 16-FOOT INTERVALS.

3. FENCE SHALL BE WIRE OR "ZIP" TIED TO THE SUPPORT POSTS.

4. THE FENCE SHALL BE MAINTAINED IN A WORKMAN LIKE MANNER, AND SHALL REMAIN IN PLACE UNTIL FINAL SITE STABILIZATION IS ACHIEVED.

DETAIL - LIMITS OF DISTURBANCE CORDON 1/6

NOT TO SCALE

STONE FILL: STONE FILL SHALL BE APPROVED, HARD, BLASTED ANGULAR ROCK, THE LEAST DIMENSION OF THE STONE SHALL BE NO LESS THAN 1/3 OF THE LONGEST DIMENSION. THE STONE SHALL BE REASONABLY WELL GRADED SO AS TO FORM A COMPACT MASS WHEN IN PLACE.

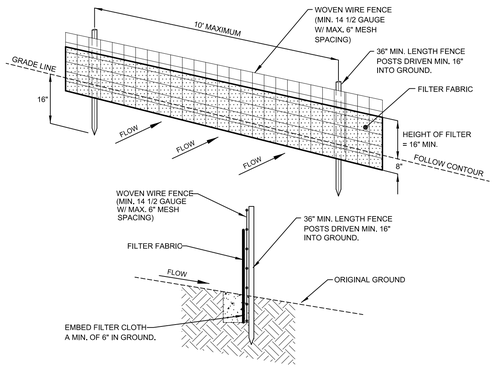
(a) TYPE I: THE LONGEST DIMENSION SHALL VARY FROM 1-INCH TO 12-INCHES, AND AT LEAST 50% OF THE VOLUME SHALL HAVE A LEAST DIMENSION OF 4-INCHES.

(b) TYPE II: THE LONGEST DIMENSION SHALL VARY FROM 2-INCHES TO 36-INCHES, AND AT LEAST 50% OF THE VOLUME SHALL HAVE A LEAST DIMENSION OF 12-INCHES.

DETAIL - STONE DEFINITION 2/6

NOT TO SCALE

NOTE: FOR WINTER CONSTRUCTION, ALL SILT FENCE MUST BE IN PLACE PRIOR TO GROUND FREEZE-UP.



CONSTRUCTION SPECIFICATIONS

1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES. POSTS SHALL BE STEEL EITHER "T" OR "U" TYPE OR HARDWOOD.

2. FILTER CLOTH TO BE TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION. FENCE SHALL BE WOVEN WIRE, 12 1/2 GAUGE, 6" MAXIMUM MESH OPENING.

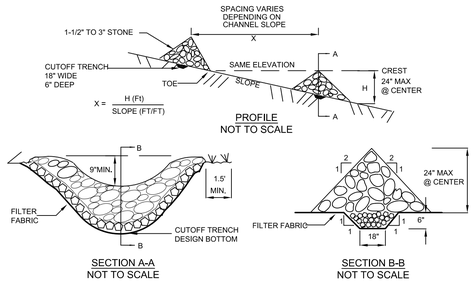
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVER-LAPPED BY SIX INCHES AND FOLDED. FILTER CLOTH SHALL BE EITHER FILTER X, MIRAFI 100X, STABILINKA T140N, OR APPROVED EQUIVALENT.

4. PREFABRICATED UNITS SHALL BE GEOFAB, ENVIROFENCE, OR APPROVED EQUIVALENT.

5. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.

DETAIL - SILT FENCE 3/6

NOT TO SCALE



CONSTRUCTION SPECIFICATIONS

1. STONE WILL BE PLACED ON A FILTER FABRIC FOUNDATION TO THE LINES, GRADES AND LOCATIONS SHOWN IN THE PLAN.

2. SET SPACING OF CHECK DAMS TO ASSURE THAT THE ELEVATIONS OF THE CREST OF THE DOWNSTREAM DAM IS AT THE SAME ELEVATION OF THE TOE OF THE UPSTREAM DAM.

3. EXTEND THE STONE A MINIMUM OF 1.5 FEET BEYOND THE DITCH BANKS TO PREVENT CUTTING AROUND THE DAM.

4. PROTECT THE CHANNEL DOWNSTREAM OF THE LOWEST CHECK DAM FROM SCOUR AND EROSION WITH STONE OR LINER AS APPROPRIATE.

5. ENSURE THAT CHANNEL APPURTENANCES SUCH AS CULVERT ENTRANCES BELOW CHECK DAMS ARE NOT SUBJECT TO DAMAGE OR BLOCKAGE FROM DISPLACED STONE. MAXIMUM DRAINAGE AREA 2 ACRES.

DETAIL - TEMPORARY STONE CHECK DAM 4/6

NOT TO SCALE

STABILIZATION NOTES

1. MULCH SHALL BE APPLIED TO ALL DISTURBED AREAS AT 2 TONS PER ACRE. MULCH SHALL CONSIST OF AIR-DRIED HAY OR STRAW FREE OF SEEDS AND COARSE MATERIALS.
2. TOPSOIL PILES SHALL BE MULCHED AND RINGED WITH SILT FENCE.
3. DISTURBED SOILS TO BE STABIZLED AS FOLLOWS:

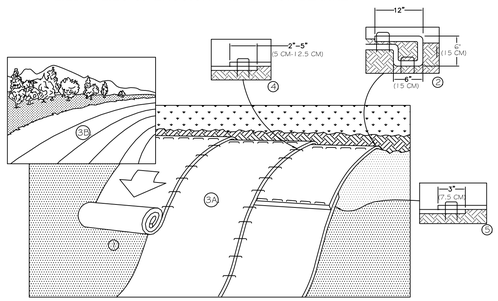
CHANNEL SLOPESLOPE	LINING
1% TO 5%	NORTH AMERICAN GREEN S150BN
>5%	STONE RIP RAP OR NORTH AMERICAN GREEN SC250

SIDE SLOPESLOPE	LINING
ALL	NORTH AMERICAN GREEN S150 OR EQUAL

4. LIME MAY BE APPLIED TO ACHIEVE SOIL PH OF 6.5 FOR AREAS TO BE SEEDED.
5. APPLY COMMERCIAL FERTILIZER AT 1.0 LBS/1,000SQ. FT OF N20, P5 AND K20, IF REQUIRED.
6. LIME AND FERTILIZER SHALL BE MIXED THOROUGHLY INTO THE SEEDBED DURING SOIL PREPARATION.
7. ALL DISTURBED AREA SHALL HAVE A MIN. OF 3" OF TOPSOIL PRIOR TO SEEDING.
8. DISTURBED SOILS SHALL BE SEEDED ACCORDING TO THE FOLLOWING TABLE:

SEEDING RATES FOR TEMPORARY STABILIZATION:			
APRIL 15 - SEPT. 15: RYEGRASS (ANNUAL OR PERENNIAL: 20 LBS/ACRE) SEPT. 15 - APRIL 15: WINTER RYE (120 LBS/ACRE)			
SEEDING RATES FOR FINAL STABILIZATION (VERMONT CONSERVATION MIX):			
CHOOSE FROM:	VARIETY	LBS./ACRE	LBS./1000 SQ. FT.
BIRDSFOOT TREFOIL OR COMMON WHITE CLOVER PLUS TALL FESCUE PLUS REDTOP OR RYEGRASS (PERENNIAL)	EMPIRE/PARDEE COMMON KY-31/REBEL COMMON PENNFINE/LINN	5* 8 10 2 5	0.1 0.2 0.25 0.05 0.1
* - MIX 2.5 LBS. EACH OF EMPIRE AND PARDEE OR 2.5 LBS. OR BIRDSFOOT AND 2.5 LBS. WHITE CLOVER PER ACRE.			

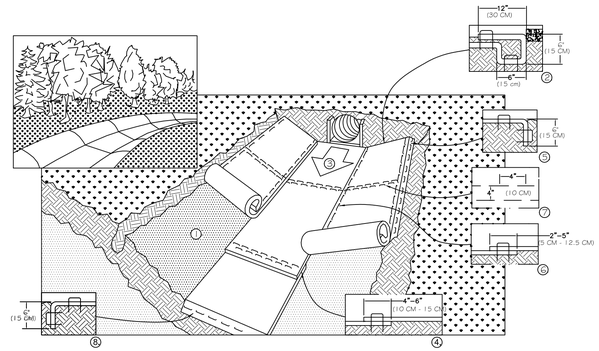
NOTE: WHERE SLOPES DO NOT EXCEED 3H:1V, MULCH MAY BE APPLIED IN LIEU OF EROSION PREVENTION BLANKET



1. PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED. NOTE: WHEN USING CELL-O-SEED DO NOT SEED PREPARED AREA. CELL-O-SEED MUST BE INSTALLED WITH PAPER SIDE DOWN.
2. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE BLANKET IN A 6" (15 CM) DEEP X 6" (15 CM) 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" (30 CM) APART IN THE BOTTOM OF THE TRENCH, BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" (30 CM) PORTION OF BLANKET BACK OVER SEED AND COMPACTED SOIL. SECURE BLANKET OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" (30 CM) APART ACROSS THE WIDTH OF THE BLANKET.
3. 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 THE DOT SYSTEM , STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.
4. THE EDGES OF PARALLEL BLANKETS MUST BE STAPLED WITH APPROXIMATELY 2" - 5" (5 CM - 12.5 CM) OVERLAP DEPENDING ON BLANKET TYPE.
5. CONSECUTIVE BLANKETS SPLICED DOWN THE SLOPE MUST BE PLACED END OVER END (SHINGLE STYLE) WITH AN APPROXIMATE 3" (7.5 CM) OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" (30 CM) APART ACROSS ENTIRE BLANKET WIDTH.
   NOTE:
   *IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" (15 CM) MAY BE NECESSARY TO PROPERLY SECURE THE BLANKETS.

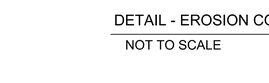
DETAIL - EROSION CONTROL BLANKET - SLOPE INSTALL 5/6

NOT TO SCALE



1. PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED. NOTE: WHEN USING CELL-O-SEED DO NOT SEED PREPARED AREA. CELL-O-SEED MUST BE INSTALLED WITH PAPER SIDE DOWN.
2. BEGIN AT THE TOP OF THE CHANNEL BY ANCHORING THE BLANKET IN A 6" (15 CM) DEEP X 6" (15 CM) WIDE TRENCH WITH APPROXIMATELY 12" (30 CM) OF BLANKET EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE BLANKET WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" (30 CM) APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" (30 CM) PORTION OF BLANKET BACK OVER SEED AND COMPACTED SOIL. SECURE BLANKET OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" (30 CM) ACROSS THE WIDTH OF THE BLANKET.
3. ROLL CENTER BLANKET IN DIRECTION OF WATER FLOW IN BOTTOM OF CHANNEL. 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 THE DOT SYSTEM , STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.
4. PLACE CONSECUTIVE BLANKETS END OVER END (SHINGLE STYLE) WITH A 4" - 6" (10 CM -15 CM) OVERLAP. USE A DOUBLE ROW OF STAPLES STAGGERED 4" (10 CM) APART AND 4" (10 CM) ON CENTER TO SECURE BLANKETS.
5. FULL LENGTH EDGE OF BLANKETS AT TOP OF SIDE SLOPES MUST BE ANCHORED WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" (30 CM) APART IN A 6" (15 CM) DEEP X 6" (15 CM) WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.
6. ADJACENT BLANKETS MUST BE OVERLAPPED APPROXIMATELY 2" - 5" (5 CM -12.5 CM) (DEPENDING ON BLANKET TYPE) AND STAPLED.
7. IN HIGH FLOW CHANNEL APPLICATIONS, A STAPLE CHECK SLOT IS RECOMMENDED AT 30 TO 40 FOOT (9 M - 12 M) INTERVALS. USE A DOUBLE ROW OF STAPLES STAGGERED 4" (10 CM) APART AND 4" (10 CM) ON CENTER OVER ENTIRE WIDTH OF THE CHANNEL.
8. THE TERMINAL END OF THE BLANKETS MUST BE ANCHORED WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" (30 CM) APART IN A 6" (15 CM) DEEP X 6" (15 CM) WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.

NOTE:
* IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" (15 CM) MAY BE NECESSARY TO PROPERLY ANCHOR THE BLANKETS.



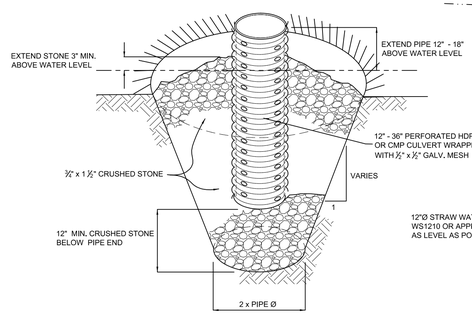
CRITICAL POINTS
A. OVERLAPS AND SEAMS
B. PROJECTED WATER LINE
C. CHANNEL BOTTOM/SIDE SLOPE VERTICES

NOTE:
* HORIZONTAL STAPLE SPACING SHOULD BE ALTERED IF NECESSARY TO ALLOW STAPLES TO SECURE THE CRITICAL POINTS ALONG THE CHANNEL SURFACE.

** IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" (15 cm) MAY BE NECESSARY TO PROPERLY ANCHOR THE BLANKETS.

DETAIL - EROSION CONTROL BLANKET - CHANNEL INSTALL 6/6

NOT TO SCALE



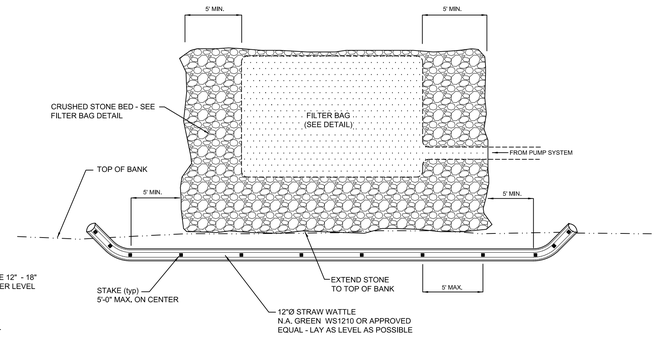
CONSTRUCTION NOTES:
1. PERFORATE PIPE WITH ½" X 6" SLOTS OR 1"Ø HOLES, 6" ON CENTER.

2. PLACE PIPE ON 12" MINIMUM BED OF ¾" - 1 ½" CRUSHED STONE MATERIAL. BACK FILL BALANCE OF EXCAVATION WITH SAME MATERIAL.

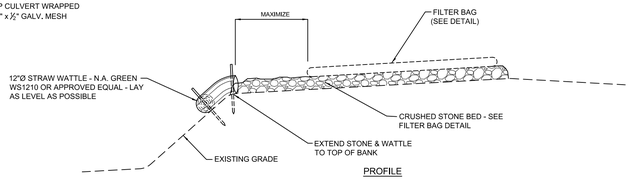
3. RECONSTRUCT SUMP IF/WHEN PUMP DISCHARGE DIMINISHES SUCH THAT REQUIRED DEWATERING CANNOT BE ACHIEVED.

DETAIL - DEWATERING PUMP-OUT SUMP 7/6

NOT TO SCALE



PLAN VIEW



PROFILE

CONSTRUCTION NOTES:
1. LOCATE FILTER BAG TO MAXIMIZE DISTANCE OF THE BAG TO THE TOP OF SLOPE ON LOW-GRADIENT AREA, ON EXISTING VEGETATION IF POSSIBLE.

2. EXTEND STONE BED BENEATH FILTER BAG TO TOP OF EXISTING SLOPE.

3. PLACE WATTLE ON SLOPE SUCH THAT THE TOP OF THE WATTLE IS SLIGHTLY BELOW THE TOP OF THE SLOPE.

4. LAY WATTLE PARALLEL TO CONTOURS SO THAT THE TOP OF THE WATTLE IS AS LEVEL AS PRACTICABLE. EXTEND ENDS TO TOP OF SLOPE SUCH THAT ALL DISCHARGE WILL BE THROUGH/OVER WATTLE.

5. ANCHOR WATTLE WITH STAKES DRIVEN THROUGH THE CENTER SPACED AT MAXIMUM 5' INTERVALS, SET ADDITIONAL STAKES AS NECESSARY TO ACHIEVE UNIFORM DISCHAGE ALONG WATTLE.

6. LEAVE WATTLE IN PLACE UNTIL BANK STABILIZATION WORK IS COMMENCED.

DETAIL - FILTER BAG DISCHARGE PAD 8/6

NOT TO SCALE

NO.	REVISIONS	BY	DATE

DES DWN
DRN KKJ
CHK DWN
APPD

DATE 04/27/18

SCALE as noted

Town of East Montpelier
T.H. 7 - Quaker Road
TH Structures Grant Program
FY 2017 BC 1773

Erosion Control & Stablization Details

Newton Technical Services, LLC
728 South Barre Road
Barre, VT 05641
(802) 476-6900

Chase & Chase Surveyors & Septic Designers, Inc.
301 North Main St., Suite 301
Barre, VT 05641
(802) 479-9636

LEGEND:

- EXISTING ROAD R.O.W. LINE
- APPROX. PROPERTY LINE
- EXISTING EDGE OF GRAVEL
- PROPOSED LIMITS OF WORK IN CUT
- PROPOSED LIMITS OF WORK IN FILL
- STONE FILL

WETLAND RELATED ELEMENTS

- EDGE OF WATER (DECEMBER, 2016)
- TOE — TOE — TOE OF EXISTING ROADWAY FILL
- WL — WL — LIMIT OF DELINEATED WETLAND
- WB — WB — 50' CLASS II WETLAND BUFFER
- LOD — LOD — LIMITS OF DISTURBANCE CORDON
- AREA OF PERMANENT WETLAND IMPACTS
- AREA OF PERMANENT BUFFER IMPACTS

NOTES:

1. QUAKER ROAD WILL BE CLOSED DURING CONSTRUCTION. NO TEMPORARY DETOUR IS REQUIRED.

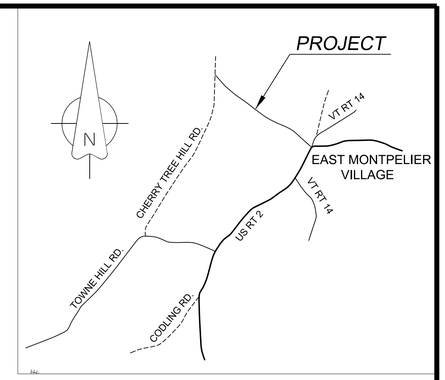
2. THE IMPACT AREAS HAVE BEEN CALCULATED BASED ON THE PROPOSED LIMITS OF WORK, TOE OF THE EXISTING ROADWAY IMPROVEMENTS (FILL), AND EDGE OF THE WATER AS LOCATED DECEMBER, 2016.

3. THE LIMITS OF THE DETAILED DELINEATION DO NOT DEFINE THE LIMIT OF THE BUFFER AT THE NORTH END OF THE PROJECT. IT HAS BEEN ASSUMED THAT ALL IMPROVEMENT IN THIS AREA ARE WITHIN THE BUFFER.

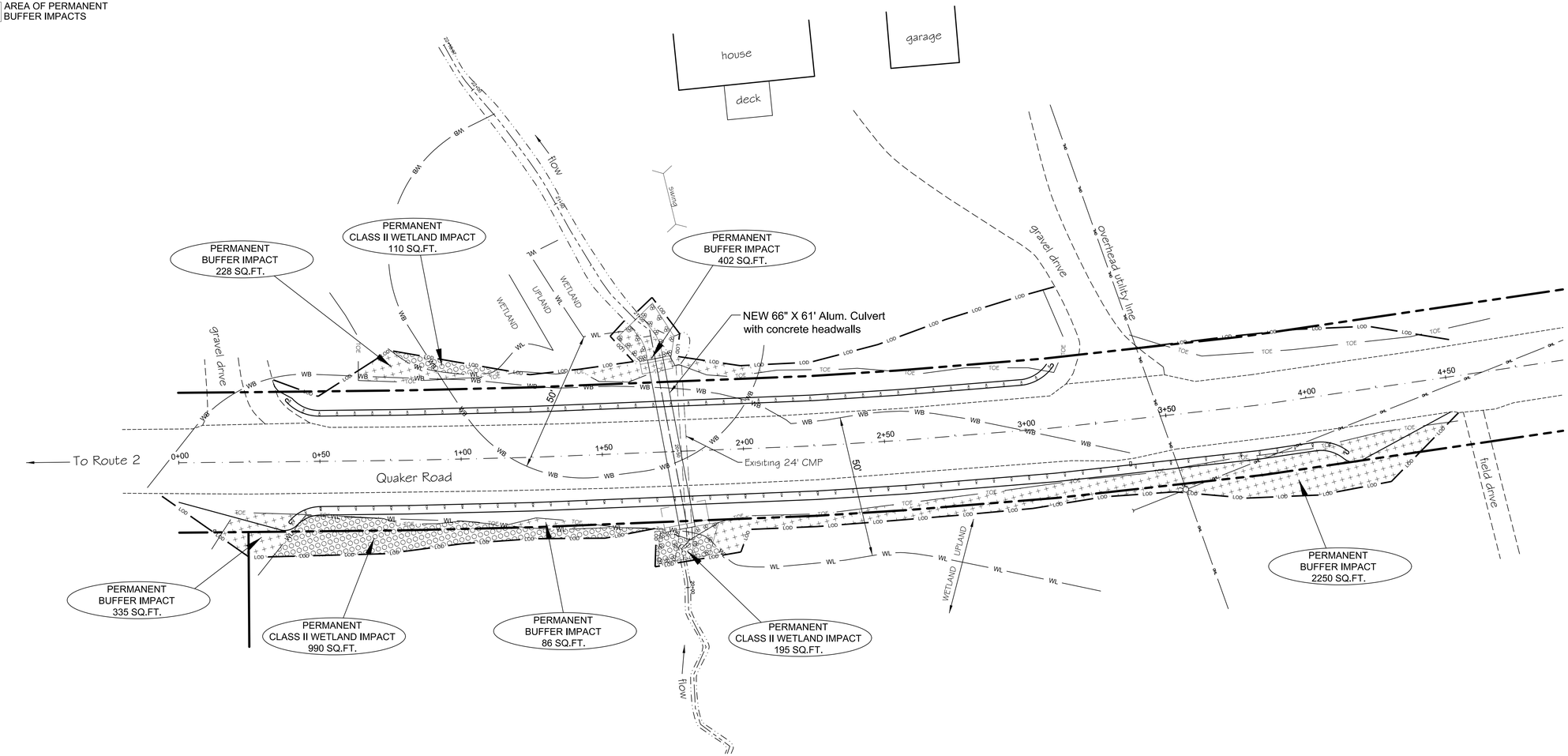
4. WETLAND & BUFFER IMPACT SUMMARY:

WETLAND - PERMANENT IMPACTS: 1295 S.F.

BUFFER - PERMANENT IMPACTS: 3301 S.F.



LOCATION MAP
NOT TO SCALE



GRAPHIC SCALE
20 0 20 40 80
1" = 20'

NO.	REVISIONS	BY	DATE

DES DWN
DRN KKJ
CHK DWN
APPD

DATE 04/27/18

SCALE 1" = 20'

Town of East Montpelier
T.H. 7 - Quaker Road
TH Structures Grant Program
FY 2017 BC 1773

Wetland Impact Plan

Newton Technical Services, LLC
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Barre, VT 05641
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Steel Beam Guardrail, Galvanized (8' Posts)
Lt. Sta. 0+39 - Sta. 3+00
Rt. Sta. 0+39.7 - Sta. 3+00

Anchor for Steel Beam Rail
Lt. Sta. 0+45
Rt. Sta. 0+45

Subbase Transition
Sta. 1+50 - Sta. 2+00

66" Alum. CULVERT
Sta. 1+75

LAND OF
R. & R. BROWN
505 QUAKER RD.

Begin Project
Sta. 0+25

gravel drive

Matchline

SEE NOTE 2

Existing 24" CMP

0+00 0+50 1+00 1+50 2+00 2+50 3+00

Road CL Sta. 1+75 = Structure CL Sta. 20+50
81°-30' Rt. Skew

To Route 2

Quaker Road

telecom pedestal

LAND OF
R. & D. CURTIS
430 QUAKER RD.

PROJECT BENCHMARK
SPIKE IN 8" SLIPPERY ELM
ELEV = 496.30' (ASSUMED)

LAND OF
P. IBEY
640 QUAKER RD.

LEGEND:

- ROAD RIGHT OF WAY LINE
- APPROX. PROPERTY LINE
- EDGE OF PAVEMENT
- EDGE OF STREAM
- UTILITY POLE
- ugu — UNDERGROUND UTILITY
- LIMITS OF WORK IN CUT
- LIMITS OF WORK IN FILL
- STONE FILL

NOTES

1. THIS PLAN IS BASED ON A TOPOGRAPHIC SURVEY BY CHASE & CHASE SURVEYORS, DECEMBER, 2016. THE VERTICAL DATUM IS ASSUMED LOCAL.

2. THE UNDERGROUND UTILITY ON THE NORTHEAST SIDE OF QUAKER ROAD WAS IDENTIFIED BY FAIRPOINT COMMUNICATIONS, FEBRUARY 2018.

THE UNDERGROUND UTILITIES (THREE LINES) ON THE SOUTHWEST SIDE OF QUAKER ROAD WWERE NOT IDENTIFIED DURING EITHER OF TWO DIG-SAFE CALLOUTS BUT ARE KNOWN TO EXIST FROM PRIOR WORK ON THE EXISTING CULVERT. FAIRPOINT, COMCAST AND WASHINGTON ELECTRIC CO-OP HAVE BEEN CONTACTED DIRECTLY REGARDING THESE LINES AND NONE CLAIM OWNERSHIP.

GRAPHIC SCALE
10 0 10 20 40
1" = 10'

Steel Beam Guardrail, Galvanized (8' Posts)
Lt. Sta. 3+00 - Sta. 3+11
Rt. Sta. 3+00 - Sta. 4+11.4

Anchor for Steel Beam Rail
Lt. Sta. 3+05
Rt. Sta. 4+05

End Project
Sta. 4+50

Matchline

gravel drive

overhead utility line

LAND OF
R. & R. BROWN
505 QUAKER RD.

3+00 3+50 4+00 4+50

mailbox

telecom pedestal

utility pole
(no # visible)

guy anchor

LAND OF
P. IBEY
640 QUAKER RD.

NO.	REVISIONS	BY	DATE

DES DWN
DRN KKJ
CHK DWN
APPD

DATE 04/27/18

SCALE 1" = 10'

Town of East Montpelier
T.H. 7 - Quaker Road
TH Structures Grant Program
FY 2017 BC 1773

Plan Sheet

Newton Technical Services, LLC
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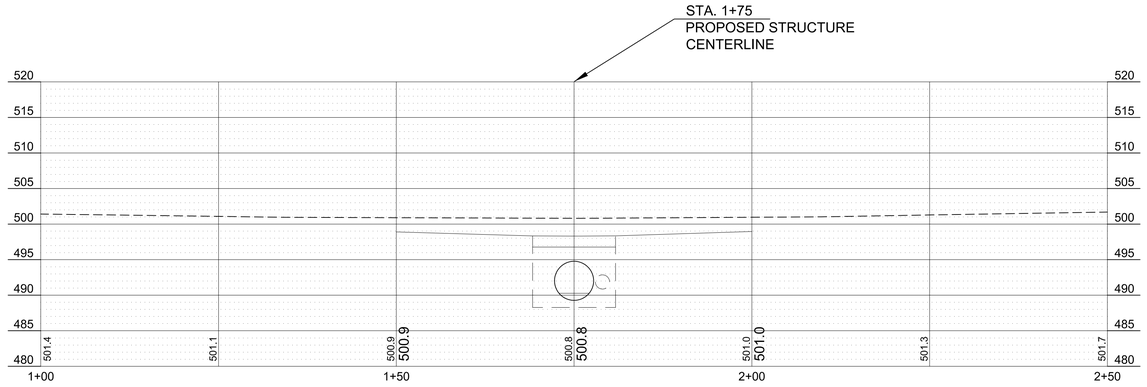
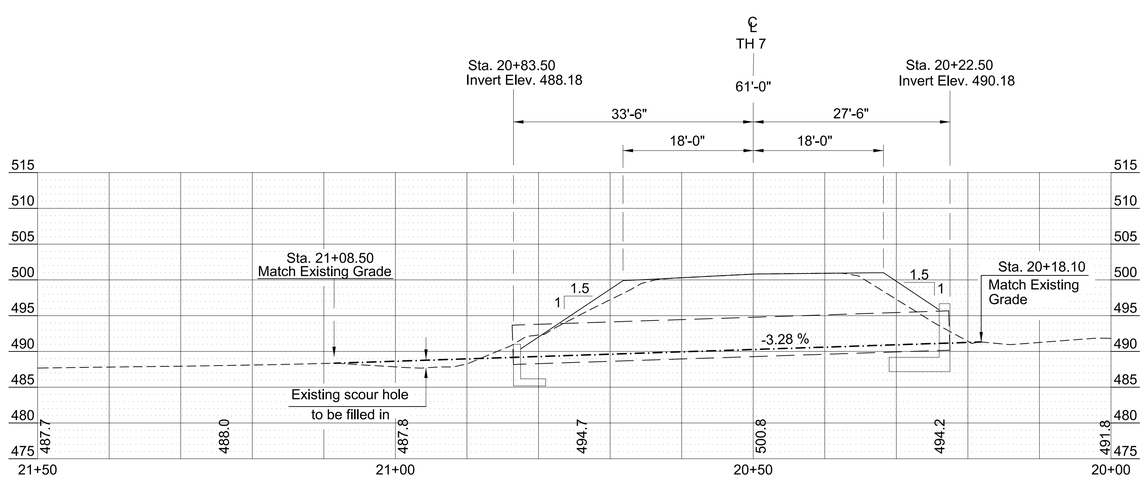


Road Profile
Scale: 1" = 10' (h & v)



Stream/Structure Profile
Scale: 1" = 10' (horiz)
1" = 10'(vert)

HORIZ 1" =20
VERT 1" = 20

NO.	REVISIONS	BY	DATE

DES DWN
DRN KKJ
CHK DWN
APPD

DATE 04/27/18

SCALE As noted

Town of East Montpelier
T.H. 7 - Quaker Road
TH Structures Grant Program
FY 2017 BC 1773

Profile Sheet

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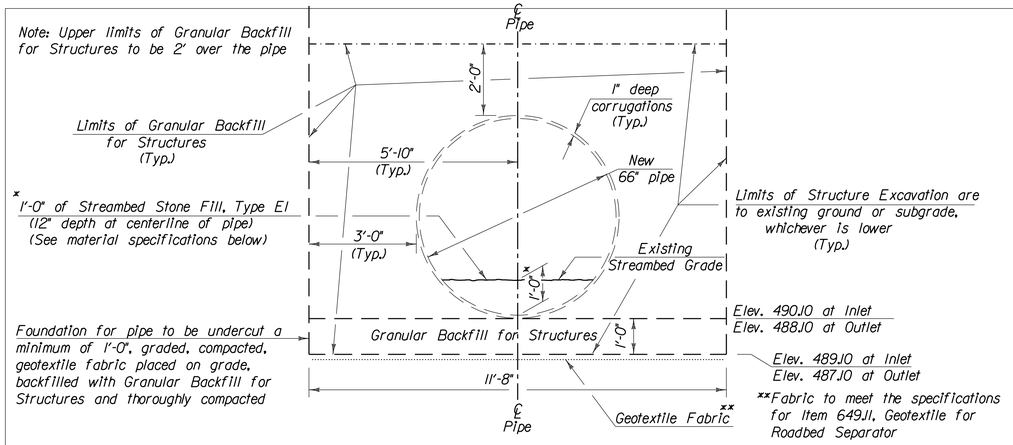
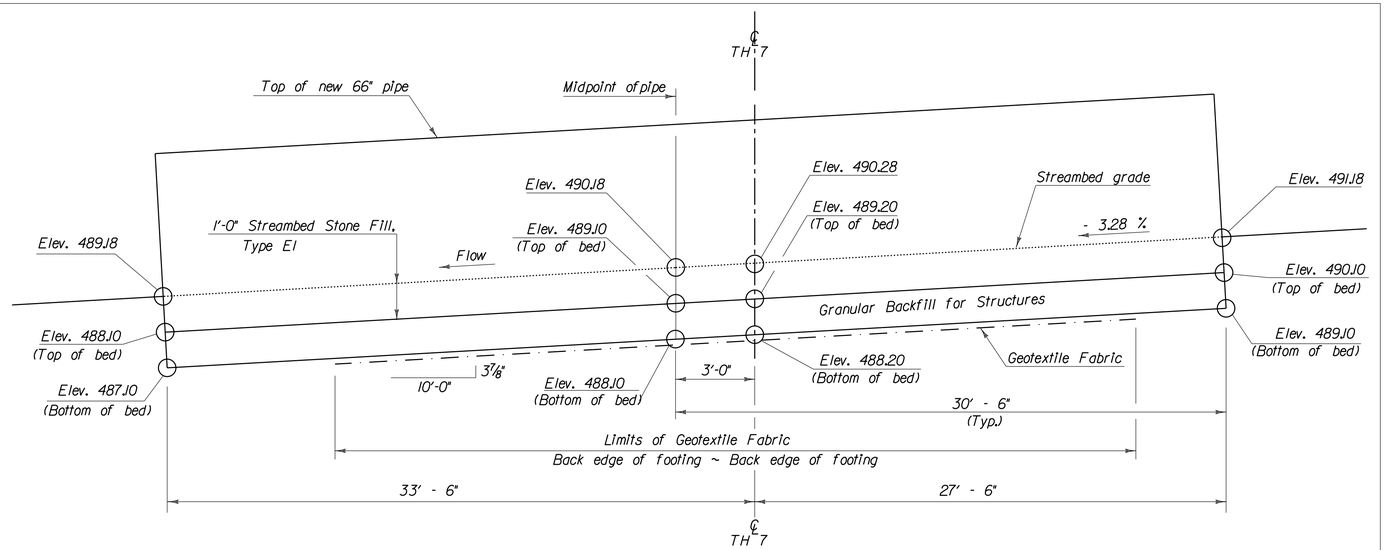


LIMITS OF EXCAVATION and BACKFILL for NEW 66" PIPE

1/2" = 1'-0"

NOTES:

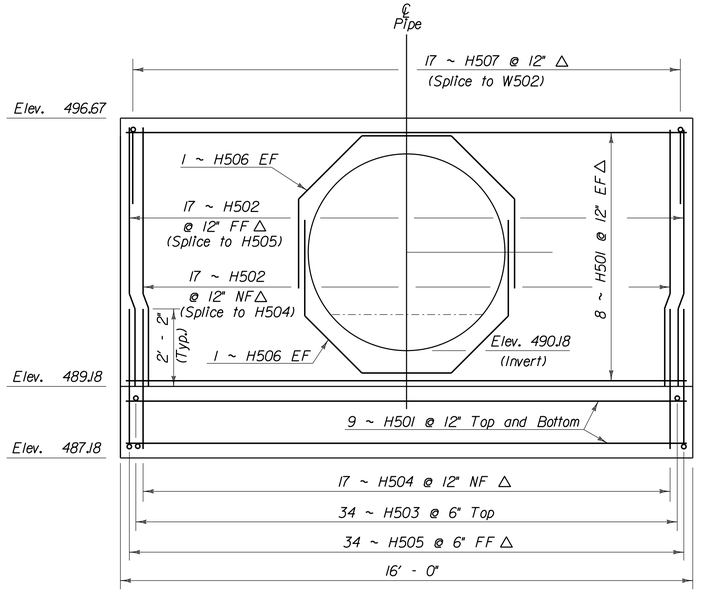
Specifications for Type EI Streambed Stone Fill:
The longest dimension of the stone shall be at least 18 inches, and at least 50 percent of the volume of the stone in place shall have a least dimension of 12 inches, and at least 25 percent of the particles shall have a maximum dimension of 2 inches and be well-graded material.



SCHEMATIC DIAGRAM WITH ELEVATIONS

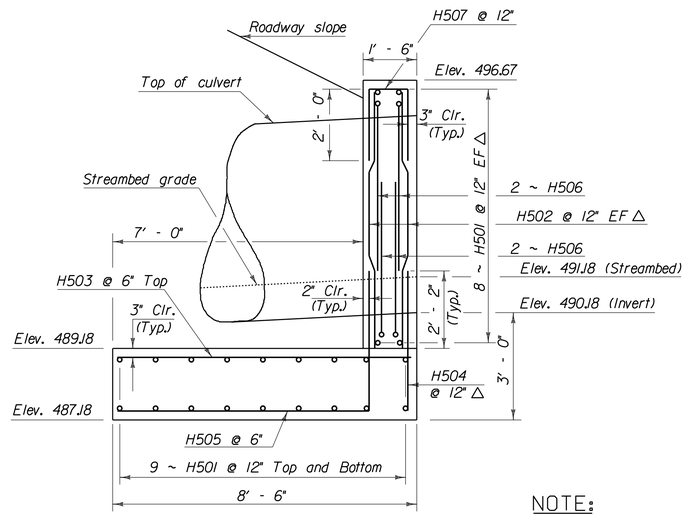
Not to Scale

(Note: Headwalls not shown for clarity)



ELEVATION VIEW

Not to Scale

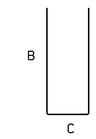


TYPICAL SECTION

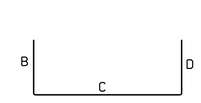
Not to Scale

NOTE:

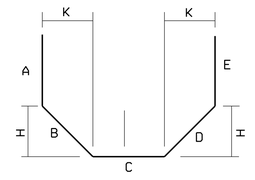
NF = NEAR FACE
FF = FAR FACE
EF = EACH FACE
△ = CUT TO FIT IN FIELD
3" CLEAR, UNLESS OTHERWISE SPECIFIED ON THE PLANS.
2'-2" BAR LAP UNLESS OTHERWISE SPECIFIED ON THE PLANS.



REBAR TYPE: S10



REBAR TYPE: 17



REBAR TYPE: 14

REINFORCING STEEL SCHEDULE FOR FULL HEADWALL

ITEM	EACH	SIZE	LENGTH	MARK	TYPE	A	B	C	D	E	H	K
1	34	5	15' - 6"	H501	STR.							
2	34	5	7' - 3"	H502	STR.							
3	34	5	8' - 0"	H503	STR.							
4	17	5	3' - 11"	H504	STR.							
5	34	5	10' - 10"	H505	17		3'-11"	6'-11"				
6	4	5	12' - 6"	H506	14	2'-6"	2'-6"	2'-6"	2'-6"	2'-6"	1'-9"	1'-9"
7	17	5	5' - 1"	H507	S10		2'-0"	1'-1"	2'-0"			

DETAILS FOR FULL HEADWALL

(Inlet End)

NO.	REVISIONS	BY	DATE

DES AOT & RTP
DRN DWN
CHK RTP
APPD

DATE April 2018

SCALE As Noted

Town of East Montpelier
TH 7 – Quaker Road
TH Structures Grant Program
FY 2017 BC 1773

Limits of Excavation and Backfill Schematic Diagram with Elevations Details for Inlet Headwall & Reinforcing Steel Schedule

Newton Technical Services, LLC
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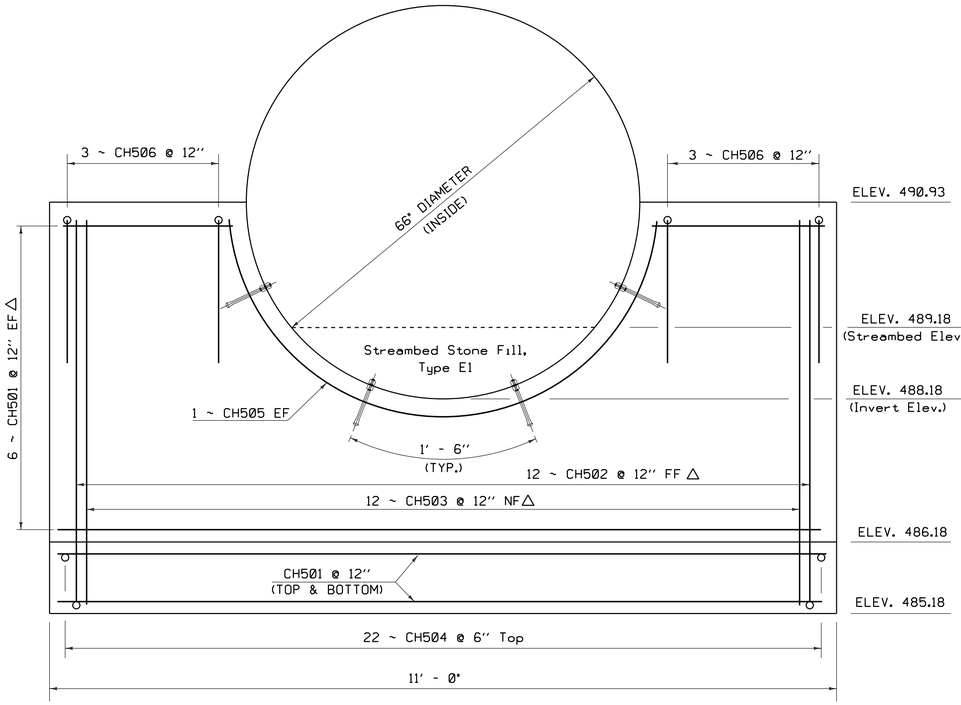
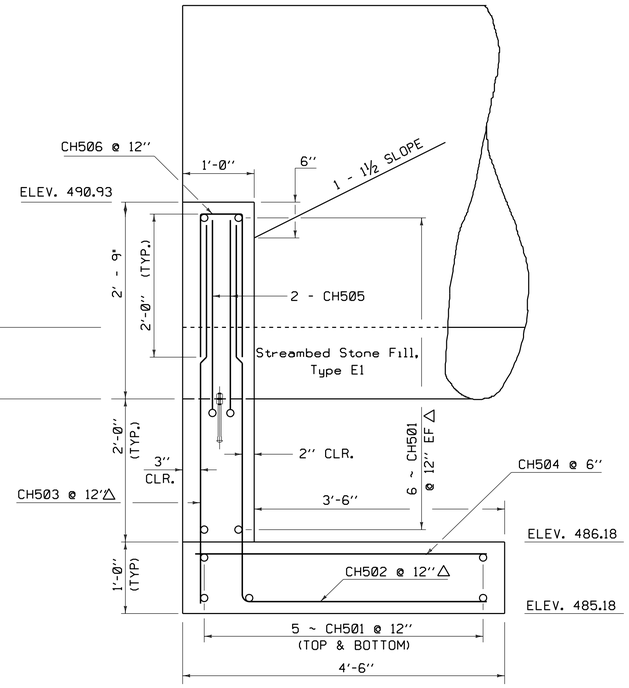


ELEVATION VIEW

Not to Scale

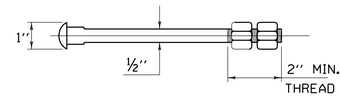


SIDE VIEW

Not to Scale

ANCHOR BOLT NOTES

1. ANCHOR BOLTS ARE REQUIRED ON NON-CONCRETE CULVERTS AND ARE TO BE INCLUDED IN THE COST OF THE PIPE.
2. ANCHOR BOLTS SHALL BE ½'' DIA. x 8'' WITH TWO ¾'' HEXAGONAL NUTS, MATERIALS SHALL MEET THE REQUIREMENTS OF ASTM A307. 9/16'' HOLES IN PIPE TO BE DRILLED OR PUNCHED PRIOR TO COATING OF PIPE, OR FIELD DRILLED AND COATED WHEN REQUIRED DUE TO A FIELD CHANGE.



GALVANIZED ANCHOR BOLT
(7 BOLTS REQUIRED)

DESIGN CRITERIA

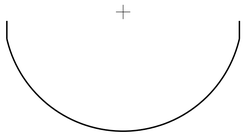
1. ASSUMED ALLOWABLE LOAD FOR SPREAD FOOTINGS:
   - ON SOIL: 4 KSF
   - ON LEDGE: 10 KSF
2. REINFORCING STEEL GRADE: 60 KSI
3. CONCRETE CLASS B: 3500 PSI
4. SOIL UNIT WEIGHT: 140 PSF
5. ASSUMED FOOTING FRICTION COEFFICIENT: 0.55
6. SOIL FRICTION ANGLE: 33.87
7. DEDUCT VOLUME OF PIPE.
8. ALL EXPOSED EDGES WILL BE CHAMFERED ONE INCH.
9. ALL REBAR CLEARANCES SHALL BE 3 INCHES UNLESS OTHERWISE NOTED.
10. CONSTRUCTION JOINT SURFACE SHALL BE ROUGH.

REBAR NOTES:

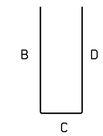
NF NEAR FACE
FF FAR FACE
EF EACH FACE
△ CUT TO FIT IN FIELD

REINFORCING STEEL SCHEDULE FOR CRADLE HEADWALL

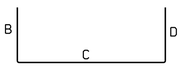
ITEM	EACH	SIZE	LENGTH	MARK	TYPE	A	B	C	D	O	R
1	22	5	10'-6''	CH501	STR.						
2	12	5	8'-8''	CH502	17		5'-3''	3'-5''	—		
3	12	5	5'-3''	CH503	STR.						
4	22	5	4'-0''	CH504	STR.						
5	2	5	8'-11'	CH505	10	—	8'-11''	—		6'-0''	3'-0''
6	6	5	4'-7''	CH506	S10		2'-0''	0'-7''	2'-0''		



REBAR TYPE: 10



REBAR TYPE: S10



REBAR TYPE: 17

Note: The design and details shown for the cradle headwall were taken from the Vermont Agency of Transportation's Standard Drawing D-34; certain dimensions were modified to meet the conditions for this specific project.

NO.	REVISIONS	BY	DATE

DES DWN
DRN DWN
CHK DWN
APPD

DATE: April 2018

SCALE: As Noted

Town of East Montpelier
TH 7 – Quaker Road
TH Structures Grant Program
FY 2017 BC 1773

Reinforced Concrete Cradle Headwall Details & Reinforcing Steel Schedule (Outlet End)

Newton Technical Services, LLC
728 South Barre Road
Barre, VT 05641
(802) 476-6900

Chase & Chase Surveyors & Septic Designers, Inc.
301 North Main St., Suite 301
Barre, VT 05641
(802) 479-9636

CONTECH ENGINEERED SOLUTIONS LLC

CORLIX

TH7 QUAKER ROAD
EAST MONTPELIER, VT

591750-INDEX	
PAGE NUMBER	PAGE TITLE
1	COVER SHEET
2	ASSEMBLY
3-4	DETAILS

THE UNDERSIGNED HEREBY APPROVES THE ATTACHED (4) PAGES.

_____ _____
CUSTOMER DATE

NOTES:

1.) ALL ELEVATIONS, DIMENSIONS AND LOCATIONS OF RISERS AND INLETS, SHALL BE VERIFIED BY THE ENGINEER PRIOR TO RELEASING FOR FABRICATION.

2.) IN SITUATIONS WHERE A FINE-GRAINED BACKFILL MATERIAL IS USED ADJACENT TO THE PIPE SYSTEM, AND ESPECIALLY IN SITUATIONS INVOLVING HIGH GROUNDWATER TABLES, CONSIDERATION SHOULD BE GIVEN TO THE USE OF GASKETED PIPE JOINTS. AT THE VERY LEAST, THE PIPE JOINTS SHOULD BE WRAPPED IN A SUITABLE, NON-WOVEN GEOTEXTILE FABRIC TO PREVENT INFILTRATION OF FINES INTO THE PIPE SYSTEM.

3.) ALL FITTINGS AND REINFORCEMENT COMPLY WITH ASTM A998.

4.) SYSTEM MADE FROM: 66" Ø, 3"X1", ALUMINUM, 12GA., CORLIX.

5.) MINIMUM COVER HEIGHT FOR PIPE DESCRIBED IN NOTE #4 IS 12".

6.) CONSIDERATIONS FOR CONSTRUCTION EQUIPMENT LOADS MUST BE TAKEN INTO ACCOUNT. SEE DETAIL on PAGE 4.

7.) ALL PIPE DIMENSIONS ARE SUBJECT TO MANUFACTURERS TOLERANCES.

8.) ALL RISERS AND STUBS ARE 2 ⅔" X ½" CORRUGATION AND 16 GAGE, UNLESS OTHERWISE NOTED.

SPECIFICATION FOR CORRUGATED ALUMINUM PIPE - ALUMINUM:

SCOPE:
THIS SPECIFICATION COVERS THE MANUFACTURE AND INSTALLATION OF THE CORRUGATED ALUMINUM PIPE (CAP) DETAILED IN THE PROJECT PLANS.

MATERIALS:
THE ALUMINUM COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M 197 OR ASTM B 744.

PIPE:
THE CAP SHALL BE MANUFACTURED IN ACCORDANCE WITH THE APPLICABLE REQUIREMENTS OF AASHTO M-196 OR ASTM A 745. THE PIPE SIZES, GAUGES AND CORRUGATIONS SHALL BE AS SHOWN ON THE PROJECT PLANS.

ALL FABRICATION OF THE PRODUCT SHALL OCCUR WITHIN THE UNITED STATES.

HANDLING & ASSEMBLY:
SHALL BE IN ACCORDANCE WITH NCSPA'S (NATIONAL CORRUGATED STEEL PIPE ASSOCIATION) RECOMMENDATIONS.

INSTALLATION:
SHALL BE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SECTION 26, DIVISION II OR ASTM A 798 AND IN CONFORMANCE WITH THE PROJECT PLANS AND SPECIFICATIONS.
IF THERE ARE ANY INCONSISTENCIES OR CONFLICTS, THE CONTRACTOR MUST BRING THEM TO THE ATTENTION OF THE PROJECT ENGINEER.

IT IS ALWAYS THE CONTRACTOR'S RESPONSIBILITY TO FOLLOW OSHA GUIDELINES FOR SAFE PRACTICES.

CONSTRUCTION LOADS:
CONSTRUCTION LOADS MAY BE HIGHER THAN FINAL LOADS. FOLLOW THE MANUFACTURERS OR NCSPA'S GUIDELINES.

INSTALLATION SPECIFICATION

PRE-CONSTRUCTION MEETING

PRIOR TO INSTALLATION OF THE DRAINAGE SYSTEM A PRE-CONSTRUCTION MEETING SHALL BE CONDUCTED. THOSE REQUIRED TO ATTEND ARE THE SUPPLIER OF THE DRAINAGE SYSTEM, THE GENERAL CONTRACTOR, SUB CONTRACTORS AND THE ENGINEER.

FOUNDATION/BEDDING PREPARATION

PRIOR TO PLACING THE BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION, THEY SHALL BE REMOVED AND BROUGHT BACK TO THE GRADE WITH A FILL MATERIAL AS APPROVED BY THE ENGINEER. ONCE THE FOUNDATION PREPARATION IS COMPLETE, THE 4 INCHES OF A WELL-GRADED GRANULAR MATERIAL SHALL BE PLACED AS THE BEDDING.

BACKFILL

THE BACKFILL SHALL BE AN A1, A2 OR A3 GRANULAR FILL PER AASHTO M-145 OR A WELL-GRADED GRANULAR FILL AS APPROVED BY THE ENGINEER (SEE INSTALLATION GUIDELINES). THE MATERIAL SHALL BE PLACED IN 8-INCH LOOSE LIFTS AND COMPACTED TO 90% AASHTO T99 STANDARD PROCTOR DENSITY. WHEN PLACING THE FIRST LIFTS OF BACKFILL IT IS IMPORTANT TO MAKE SURE THAT THE BACKFILL IS PROPERLY COMPACTED UNDER AND AROUND THE PIPE HAUNCHES. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A TWO LIFT DIFFERENTIAL BETWEEN ANY OF THE PIPES AT ANY TIME DURING THE BACKFILL PROCESS. THE BACKFILL SHALL BE ADVANCED ALONG THE LENGTH OF THE DRAINAGE SYSTEM AT THE SAME RATE TO AVOID DIFFERENTIAL LOADING ON THE PIPE.

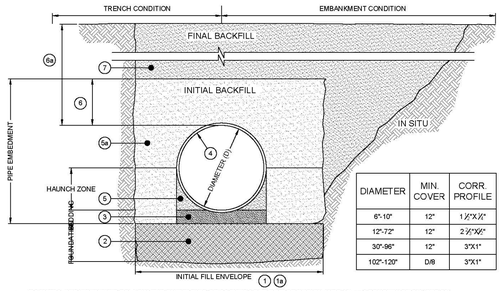
OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS. REFER TO TYPICAL BACKFILL DETAIL WITHIN THIS SET OF PLANS FOR TYPE OF MATERIAL REQUIRED.

MINIMUM COVER

BACKFILL SHALL BE PLACED TO THE PROPER ELEVATION OVER THE SYSTEM AS OUTLINED IN THE PLANS. MINIMUM COVER FOR CONSTRUCTION LOADING NEEDS TO BE DETERMINED BASED ON THE TYPE OF EQUIPMENT THAT IS PLANNED FOR CONSTRUCTION. PROPER COVER FOR CONSTRUCTION EQUIPMENT SHALL BE DETERMINED PRIOR TO THE PRE-CONSTRUCTION MEETING BY THE ENGINEER.

591750-010-CAP-CON-A

CONTECH PROJECT ID # 591750



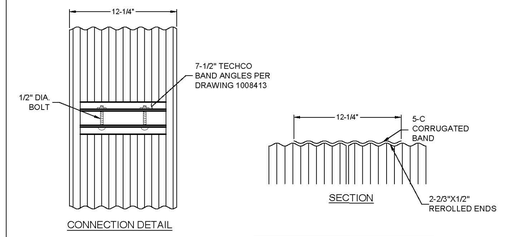
DIAMETER	MIN. COVER	CORR. PROFILE
6'-10"	12"	1⅔"X½"
12"-72"	12"	2 ⅔"X½"
30"-96"	12"	3"X1"
102"-120"	D/8	3"X1"

- **BACKFILL REQUIREMENTS FOLLOW THE GUIDELINES OF AASHTO LRFD BRIDGE DESIGN (SEC 12) and CONSTRUCTION (SEC 26).**

1. MINIMUM TRENCH WIDTH MUST ALLOW ROOM FOR PROPER COMPACTION OF HAUNCH MATERIALS UNDER THE PIPE.
   THE MINIMUM TRENCH WIDTH (12.6.6.1):
   PIPE ≤ 12": D + 16"
   PIPE > 12": 1.5D + 12"
1a. MINIMUM EMBANKMENT WIDTH (in feet) FOR INITIAL FILL ENVELOPE (12.6.6.2):
   PIPE < 24": 3.0D
   PIPE 24" - 120": D + 4'0"
2. THE FOUNDATION UNDER THE PIPE AND SIDE BACKFILL SHALL BE ADEQUATE TO SUPPORT THE LOADS ACTING UPON IT (26.5.2).
3. BEDDING MATERIAL SHALL BE A RELATIVELY LOOSE MATERIAL THAT IS ROUGHLY SHAPED TO FIT THE BOTTOM OF THE PIPE, AND A MINIMUM OF TWICE THE CORRUGATION DEPTH IN THICKNESS, WITH THE MAXIMUM PARTICLE SIZE OF ONE-HALF OF THE CORRUGATION DEPTH (26.3.8.1 AND 26.5.3).
4. CORRUGATED ALUMINUM PIPE (CAP) [CORLIX].
5. HAUNCH ZONE MATERIAL SHALL BE HAND SHOVELED OR SHOVEL SLICED INTO PLACE TO ALLOW FOR PROPER COMPACTION (26.5.4).
5a. INITIAL BACKFILL FOR PIPE EMBEDMENT TO MEET AASHTO A-1, A-2 OR A-3 CLASSIFICATION OR APPROVED EQUAL, COMPACTED TO 90% STANDARD PROCTOR (T-99). MAXIMUM PARTICLE SIZE NOT TO EXCEED 3" (26.3.8.1). ALL LIFTS SHOULD BE PLACED IN A CONTROLLED MANNER. IT IS RECOMMENDED THAT LIFTS NOT EXCEED AN 8" UNCOMPACTED LIFT HEIGHT TO PREVENT UNEVEN LOADING. AND THE LESSER OF 1/3 THE DIAMETER OR 24" AS THE MAXIMUM DIFFERENTIAL SIDE-TO-SIDE (26.5.4).
6. INITIAL BACKFILL ABOVE PIPE MAY INCLUDE ROAD BASE MATERIAL (AND RIGID PAVEMENT IF APPLICABLE). SEE TABLE ABOVE.
6a. TOTAL HEIGHT OF COMPACTED COVER FOR CONVENTIONAL HIGHWAY LOADS IS MEASURED FROM TOP OF PIPE TO BOTTOM OF FLEXIBLE PAVEMENT OR TOP OF RIGID PAVEMENT (12.6.6.3).
7. FINAL BACKFILL MATERIAL SELECTION AND COMPACTION REQUIREMENTS SHALL FOLLOW THE PROJECT PLANS AND SPECIFICATIONS PER THE ENGINEER OF RECORD (26.5.4.1).

NOTES:
- GEOTEXTILE SHOULD BE CONSIDERED FOR USE TO PREVENT SOIL MIGRATION INTO VARYING SOIL TYPES (PROJECT ENGINEER).
- FOR MULTIPLE BARREL INSTALLATIONS THE RECOMMENDED STANDARD SPACING BETWEEN PARALLEL PIPE RUNS SHALL BE PIPE DIA./2 BUT NO LESS THAN 12", OR 36" FOR PIPE DIAMETERS 72" AND LARGER. CONTACT YOUR CONTECH REPRESENTATIVE FOR NONSTANDARD SPACING (TABLE C12.6.7-1).

BACKFILL DETAIL
N.T.S



CORRUGATIONS	PIPE PRODUCTS
2-2/3"X1/2"	GALVANIZED ALUMINIZED BITUMINOUS COATED FIBER-BONDED ALUMINUM

GENERAL NOTES:

1. REFER TO CONTECH BAND SELECTION GUIDE FOR BAND WIDTH, GAGE, AND FASTENER TYPES.
2. BANDS FOR PIPE-ARCH ARE THE SAME AS FOR EQUIVALENT DIAMETER ROUND PIPE.
3. BANDS ARE NORMALLY FURNISHED AS FOLLOWS:
   12" THRU 48" 1-PIECE
   54" THRU 96" 2-PIECE
4. BAND FASTENERS ARE ATTACHED WITH SPOT WELDS, RIVETS OR HAND WELDS.
5. ALL ALUMINUM BANDS, BOTH SINGLE AND DOUBLE BB&S, ARE FURNISHED WITH A 14 GAGE ALUMINUM BACK-UP PLATE WELDED TO THE BAND AND THE STRAP.
6. REROLLED ANNULAR END CORRUGATIONS ARE NORMALLY 2-2/3" X 1/2".
7. DIMENSIONS ARE SUBJECT TO MANUFACTURING TOLERANCES.

5-C BAND DETAIL
N.T.S

591750-010-CAP-CON-A

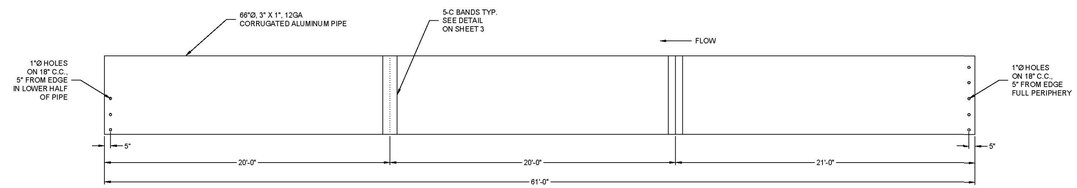
MARK	DATE	REVISION DESCRIPTION	BY

CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH PIPE SOLUTIONS
CONTECH CONTRACT DRAWING

CORLIX - 591750-010
TH7 QUAKER ROAD
EAST MONTPELIER, VT
SITE DESIGNATION:

PROJECT No.	SEQ No.	DATE
591750	010	5/21/2018
DESIGNED:		DRAWN: JAP
CHECKED:		APPROVED:
SHEET NO.:	3	OF 4



CORLIX LAYOUT PROFILE
SCALE: 1" = 5'

591750-010-CAP-CON-A

MARK	DATE	REVISION DESCRIPTION	BY

CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH PIPE SOLUTIONS
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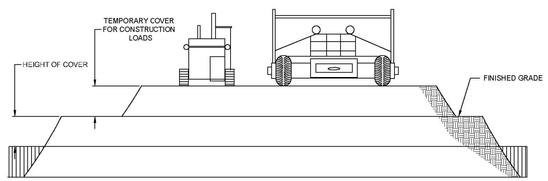
SHEET NO.:	2	OF 4



CONSTRUCTION LOADS:
FOR TEMPORARY CONSTRUCTION VEHICLE LOADS, AN EXTRA AMOUNT OF COMPACTED COVER MAY BE REQUIRED OVER THE TOP OF THE PIPE. THE HEIGHT-OF-COVER SHALL MEET THE MINIMUM REQUIREMENTS SHOWN IN THE TABLE BELOW. THE USE OF HEAVY CONSTRUCTION EQUIPMENT NECESSITATES GREATER PROTECTION FOR THE PIPE THAN FINISHED GRADE COVER MINIMUMS FOR NORMAL HIGHWAY TRAFFIC.

DIAMETERS	AXLE LOADS (kips)			
	18-50	50-75	75-110	110-150
	MINIMUM COVER (FT)			
15"-42"	3.0	3.5	4.0	4.0
48"-72"	4.0	4.0	5.0	5.0
78"-120"	4.0	5.0	5.5	5.5

MINIMUM COVER MAY VARY, DEPENDING ON LOCAL CONDITIONS. THE CONTRACTOR MUST PROVIDE THE ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. MINIMUM COVER IS MEASURED FROM THE TOP OF THE PIPE TO THE TOP OF THE* ***MAINTAINED* *CONSTRUCTION ROADWAY SURFACE.*

CONSTRUCTION LOADING DIAGRAM
N.T.S

591750-010-CAP-CON-A

MARK	DATE	REVISION DESCRIPTION	BY

CONTECH ENGINEERED SOLUTIONS LLC
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9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH PIPE SOLUTIONS
CONTECH CONTRACT DRAWING

CORLIX - 591750-010
TH7 QUAKER ROAD
EAST MONTPELIER, VT
SITE DESIGNATION:

PROJECT No.	SEQ No.	DATE
591750	010	5/21/2018
DESIGNED:		DRAWN: JAP
CHECKED:		APPROVED:
SHEET NO.:	4	OF 4

NO.	REVISIONS	BY	DATE

DES DWN
DRN KKJ
CHK DWN
APPD

DATE 05/21/18

SCALE As noted

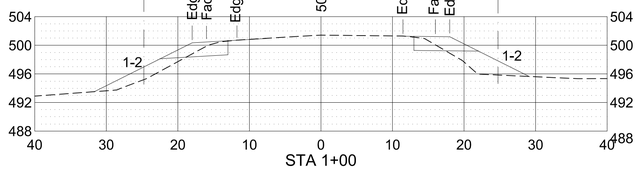
Town of East Montpelier
T.H. 7 - Quaker Road
TH Structures Grant Program
FY 2017 BC 1773

Culvert Manufacturers Details

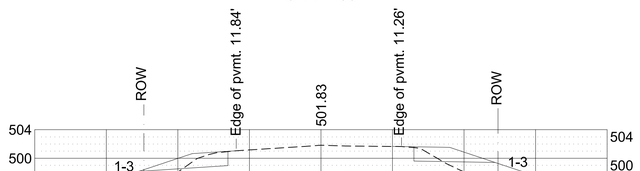
Newton Technical Services, LLC
728 South Barre Road
Barre, VT 05641
(802) 476-6900

Chase & Chase Surveyors & Septic Designers, Inc.
301 North Main St., Suite 301
Barre, VT 05641
(802) 479-9636

SHEET 12 of 16



STA 1+00



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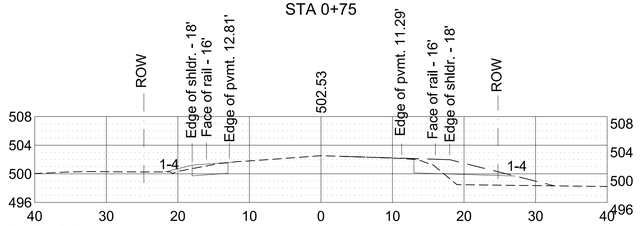


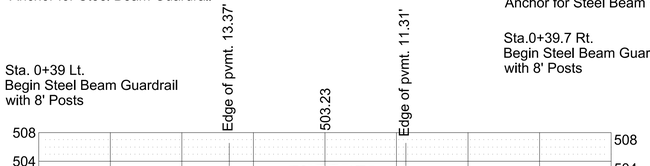
STA 0+50

Sta. 0+45 Lt.
Anchor for Steel Beam Guardrail

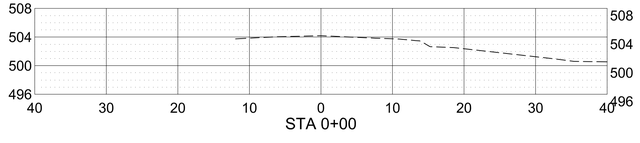
Sta. 0+45 Rt.
Anchor for Steel Beam Guardrail

Sta.0+39.7 Rt.
Begin Steel Beam Guardrail
with 8' Posts

Sta. 0+39 Lt.
Begin Steel Beam Guardrail
with 8' Posts



STA 0+25
BEGIN PROJECT



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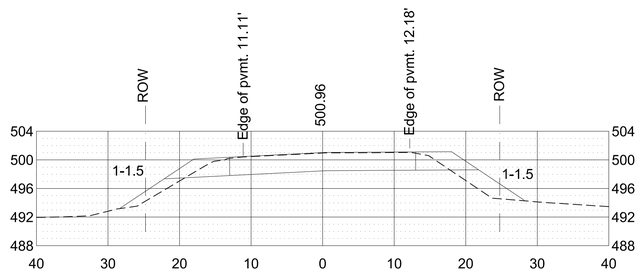
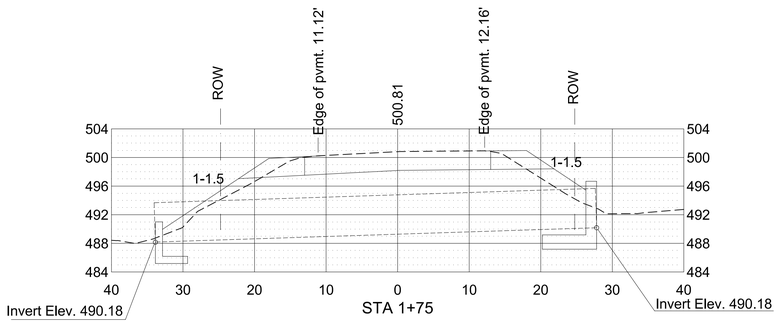


STA 2+00
End Subbase Transition



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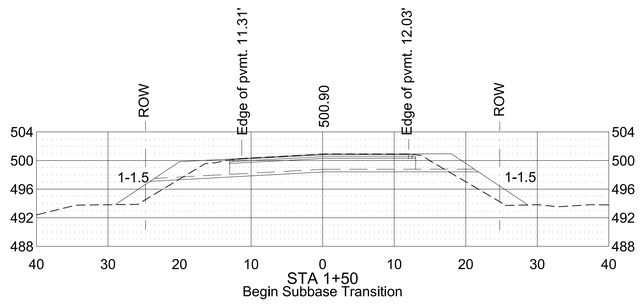

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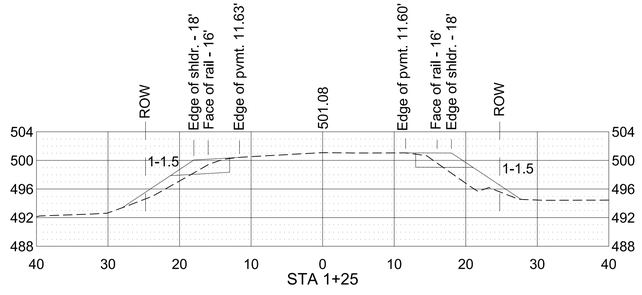
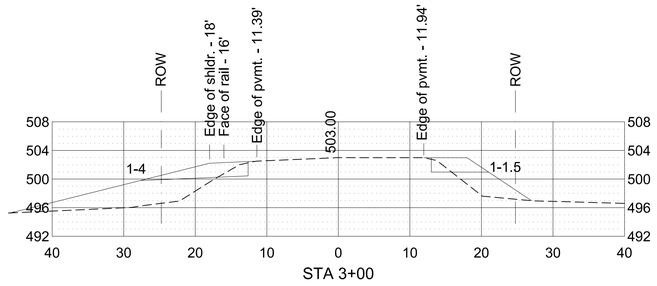
Begin Subbase Transition



STA 1+25

Sta. 3+11 Lt.
End Steel Beam Guardrail with 8' Posts

Sta. 3+05 Lt.
Anchor for Steel Beam Guardrail



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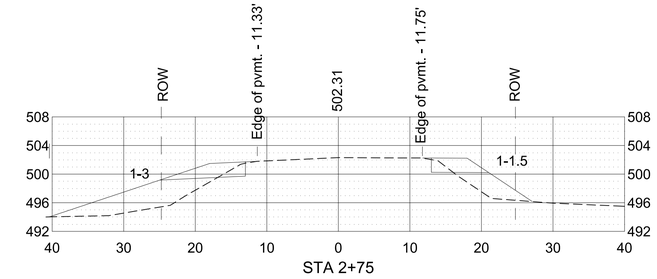

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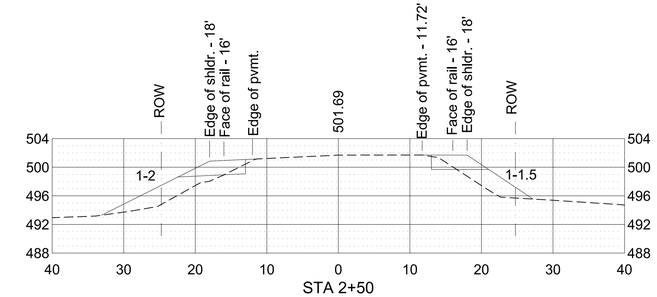

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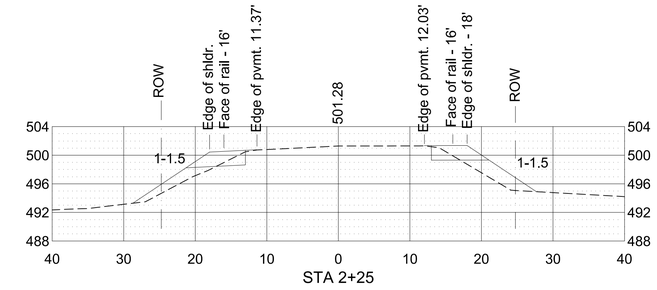


STA 2+25

NO.	REVISIONS	BY	DATE

DES DWN
DRN KKJ
CHK DWN
APPD

DATE 04/27/18

SCALE 1" = 10' (H & V)

Town of East Montpelier
T.H. 7 - Quaker Road
TH Structures Grant Program
FY 2017 BC 1773

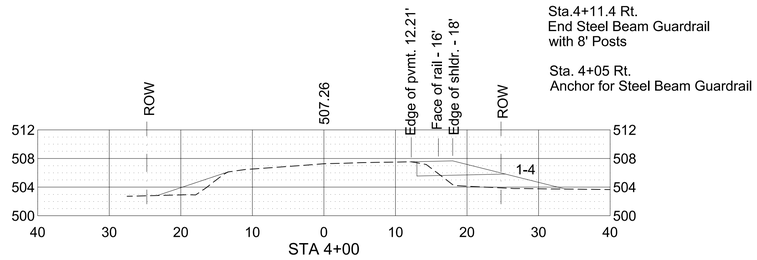
Road Cross-Sections

Newton Technical Services, LLC
728 South Barre Road
Barre, VT 05641
(802) 476-6900

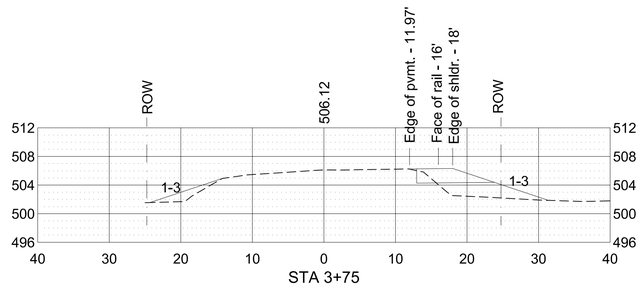
Chase & Chase Surveyors & Septic Designers, Inc.
301 North Main St., Suite 301
Barre, VT 05641
(802) 479-9636

Sta.4+11.4 Rt.
End Steel Beam Guardrail
with 8' Posts

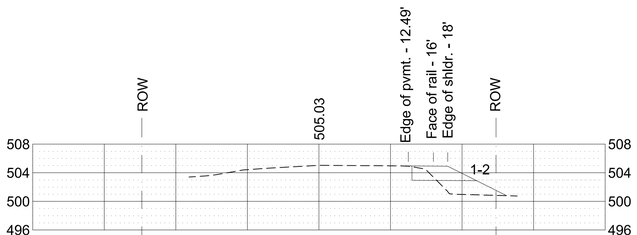
Sta. 4+05 Rt.
Anchor for Steel Beam Guardrail



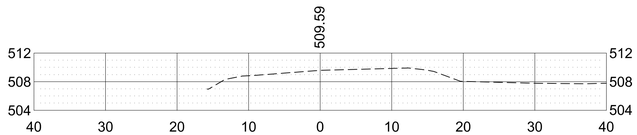
STA 4+00



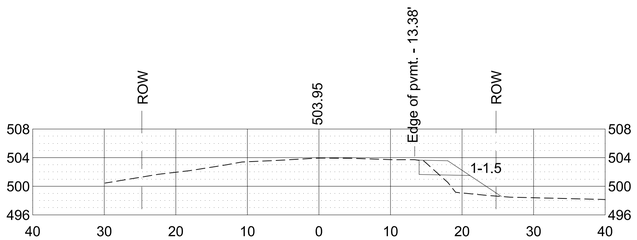
STA 3+75



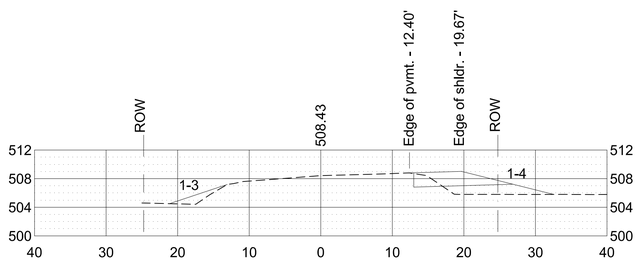
STA 3+50



STA 4+50
END PROJECT



STA 3+25



STA 4+25

NO.	REVISIONS	BY	DATE

DES DWN
DRN KKJ
CHK DWN
APPD

DATE 04/27/18

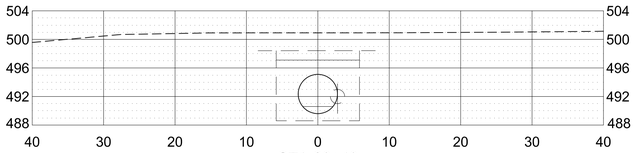
SCALE 1" = 10' (H & V)

Town of East Montpelier
T.H. 7 - Quaker Road
TH Structures Grant Program
FY 2017 BC 1773

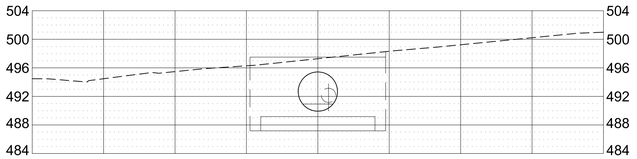
Road Cross-Sections

Newton Technical Services, LLC
728 South Barre Road
Barre, VT 05641
(802) 476-6900

Chase & Chase Surveyors & Septic Designers, Inc.
301 North Main St., Suite 301
Barre, VT 05641
(802) 479-9636



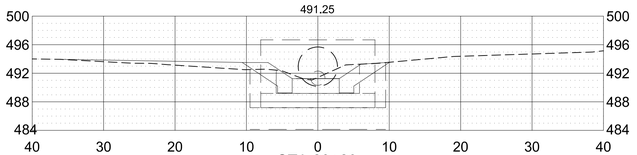
STA 20+40
Invert Elev. 489.60



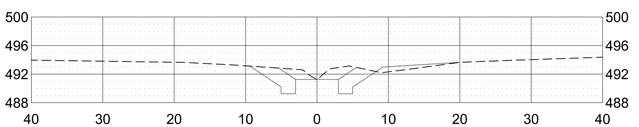
STA 20+30
Invert Elev. 489.93

Sta. 20+22.50
Begin New 66" x 61' Culvert
(Invert Elev. 490.18)
Begin Streambed Stone Fill, Type EI
End Geotextile Under Stone Fill
End Stone Fill, Type II

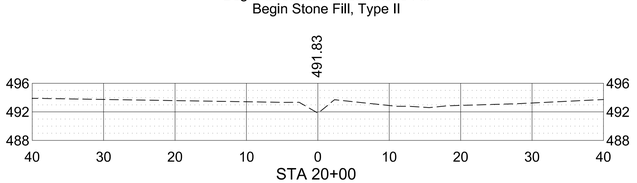
Sta. 20+21.0
End Unclassified Channel Excavation
Begin Structure Excavation
Begin Granular Backfill for Structures



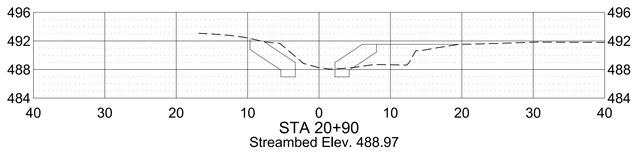
STA 20+20
Streambed Elev. 491.25



STA 20+10
Begin Unclassified Channel Excavation
Begin Geotextile Under Stone Fill
Begin Stone Fill, Type II



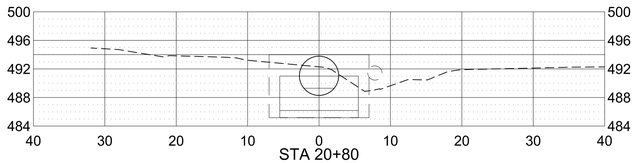
STA 20+00



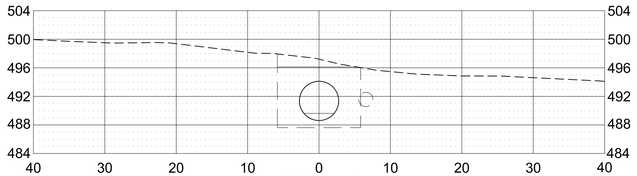
STA 20+90
Streambed Elev. 488.97

Sta. 20+85.0
End Structure Excavation
End Granular Backfill for Structures
Begin Unclassified Channel Excavation

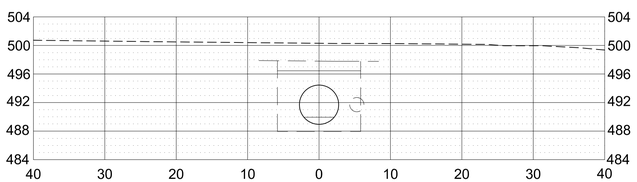
Sta. 20+83.50
End New 66" x 61' Culvert
(Invert Elev. 488.18)
Begin Geotextile under Stone Fill
Begin Stone Fill, Type II



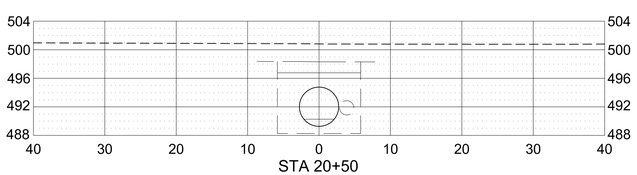
STA 20+80
Invert Elev. 488.29



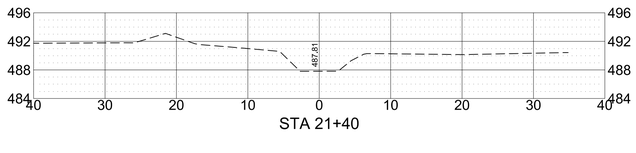
STA 20+70
Invert Elev. 488.62



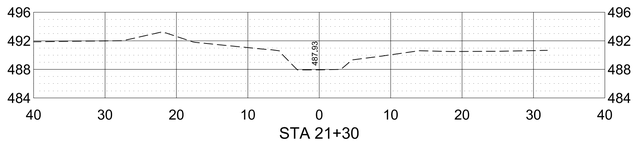
STA 20+60
Invert Elev. 488.95



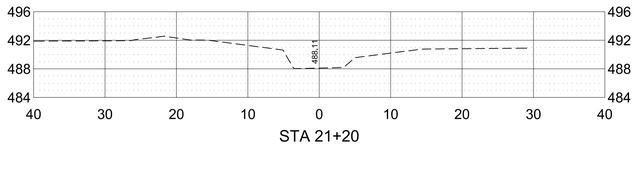
STA 20+50
Invert Elev. 489.27



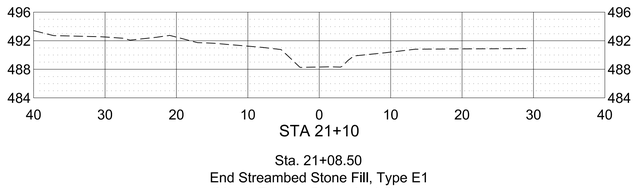
STA 21+40



STA 21+30

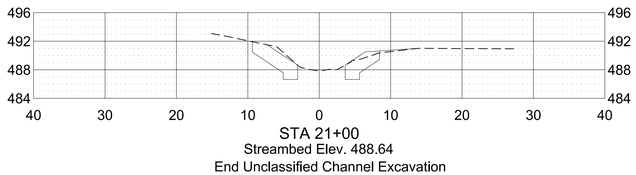


STA 21+20



STA 21+10

Sta. 21+08.50
End Streambed Stone Fill, Type E1
(Match Existing Streambed Grade)



STA 21+00
Streambed Elev. 488.64
End Unclassified Channel Excavation
End Geotextile under Stone Fill
End Stone Fill, Type II

NO.	REVISIONS	BY	DATE

DES DWN
DRN KKJ
CHK DWN
APPD

DATE 04/27/18

SCALE 1" = 10' (H & V)

Town of East Montpelier
T.H. 7 - Quaker Road
TH Structures Grant Program
FY 2017 BC 1773

Stream/Structure Cross-Sections

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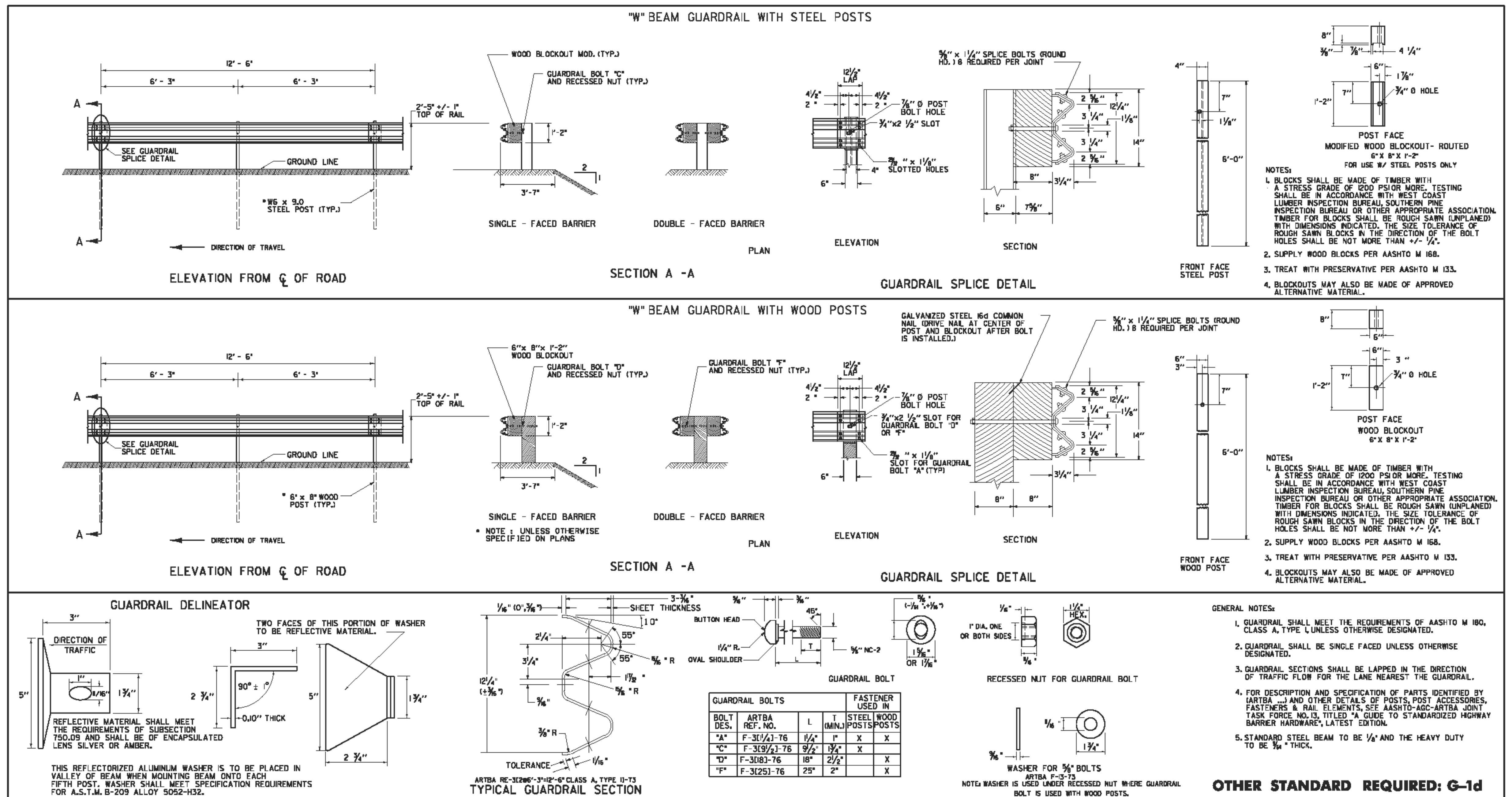


GUARDRAIL BOLTS				FASTENER USED IN	
BOLT DES.	ARTBA REF. NO.	L	T (MIN.)	STEEL POSTS	WOOD POSTS
"A"	F-3(1¼)-76	1¼"	1"	X	X
"C"	F-3(9½)-76	9½"	1¾"	X	
"D"	F-3(18)-76	18"	2½"		X
"F"	F-3(25)-76	25"	2"		X

NOTES: (STEEL POSTS)

1. BLOCKS SHALL BE MADE OF TIMBER WITH A STRESS GRADE OF 1200 PSI OR MORE. TESTING SHALL BE IN ACCORDANCE WITH WEST COAST LUMBER INSPECTION BUREAU, SOUTHERN PINE INSPECTION BUREAU OR OTHER APPROPRIATE ASSOCIATION. TIMBER FOR BLOCKS SHALL BE ROUGH SAWN (UNPLANED) WITH DIMENSIONS INDICATED. THE SIZE TOLERANCE OF ROUGH SAWN BLOCKS IN THE DIRECTION OF THE BOLT HOLES SHALL BE NOT MORE THAN +/- ¼".
2. SUPPLY WOOD BLOCKS PER AASHTO M 168.
3. TREAT WITH PRESERVATIVE PER AASHTO M 133.
4. BLOCKOUTS MAY ALSO BE MADE OF APPROVED ALTERNATIVE MATERIAL.

NOTES: (WOOD POSTS)

1. BLOCKS SHALL BE MADE OF TIMBER WITH A STRESS GRADE OF 1200 PSI OR MORE. TESTING SHALL BE IN ACCORDANCE WITH WEST COAST LUMBER INSPECTION BUREAU, SOUTHERN PINE INSPECTION BUREAU OR OTHER APPROPRIATE ASSOCIATION. TIMBER FOR BLOCKS SHALL BE ROUGH SAWN (UNPLANED) WITH DIMENSIONS INDICATED. THE SIZE TOLERANCE OF ROUGH SAWN BLOCKS IN THE DIRECTION OF THE BOLT HOLES SHALL BE NOT MORE THAN +/- ¼".
2. SUPPLY WOOD BLOCKS PER AASHTO M 168.
3. TREAT WITH PRESERVATIVE PER AASHTO M 133.
4. BLOCKOUTS MAY ALSO BE MADE OF APPROVED ALTERNATIVE MATERIAL.

GENERAL NOTES:

1. GUARDRAIL SHALL MEET THE REQUIREMENTS OF AASHTO M 180, CLASS A, TYPE I, UNLESS OTHERWISE DESIGNATED.
2. GUARDRAIL SHALL BE SINGLE FACED UNLESS OTHERWISE DESIGNATED.
3. GUARDRAIL SECTIONS SHALL BE LAPPED IN THE DIRECTION OF TRAFFIC FLOW FOR THE LANE NEAREST THE GUARDRAIL.
4. FOR DESCRIPTION AND SPECIFICATION OF PARTS IDENTIFIED BY (ARTBA ...) AND OTHER DETAILS OF POSTS, POST ACCESSORIES, FASTENERS & RAIL ELEMENTS, SEE AASHTO-AGC-ARTBA JOINT TASK FORCE NO. 13, TITLED "A GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE", LATEST EDITION.
5. STANDARD STEEL BEAM TO BE ⅛" AND THE HEAVY DUTY TO BE 5/64" THICK.

OTHER STANDARD REQUIRED: G–1d

REVISIONS AND CORRECTIONS

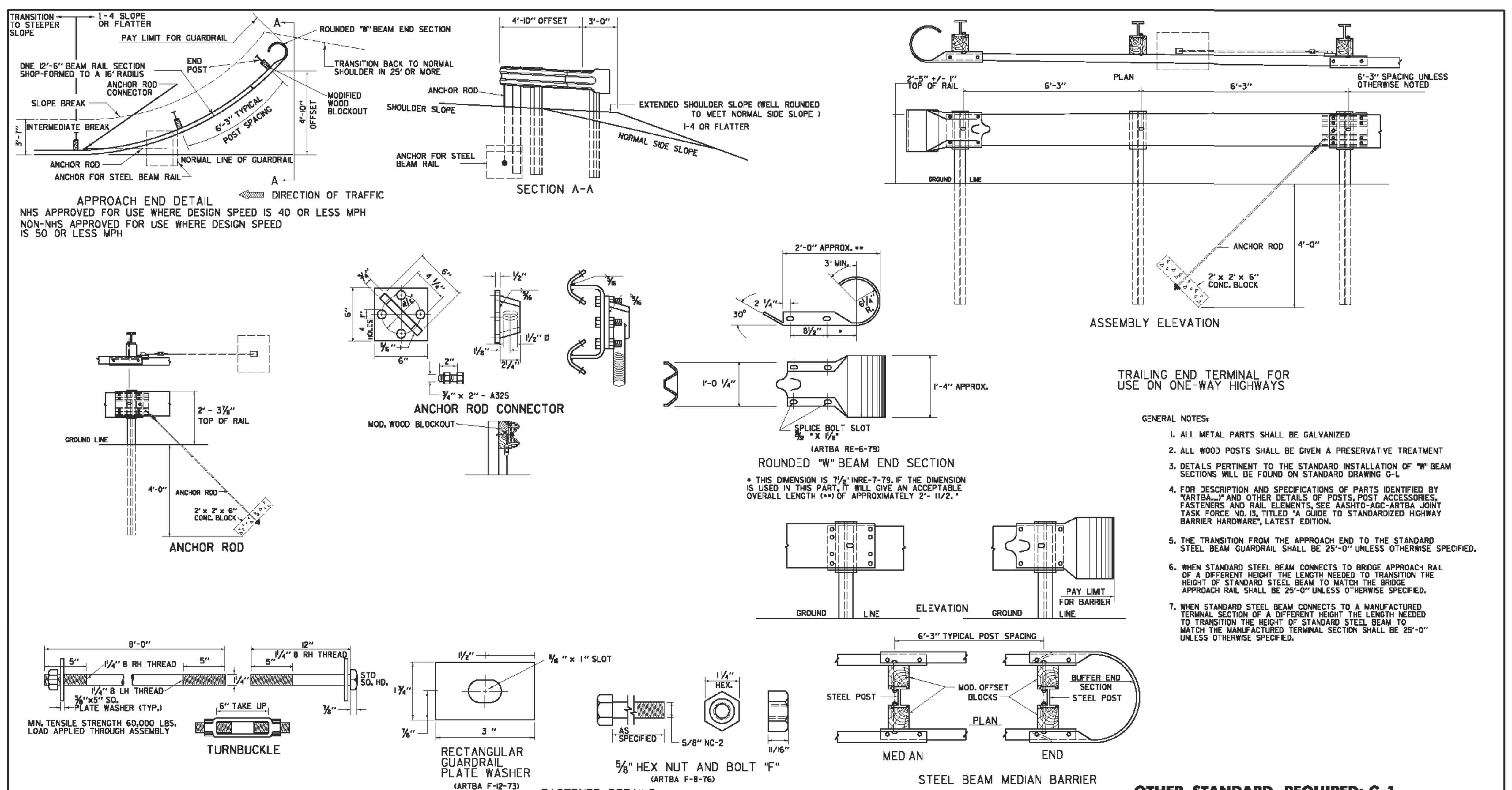
JUNE 1, 1994 - REISSUED, WITHOUT CHANGE, UNDER NEW SIGNATURES.
JAN. 3, 2000 - UPDATED TO REFLECT METRIC STD. CHANGES
FEB. 10, 2014 - UPDATED TO REFLECT GUARDRAIL HEIGHT OF 29"; AS NOTED IN FHWA LETTER DATED MAY 17, 2010

APPROVED
HIGHWAY SAFETY & DESIGN ENGINEER
DIRECTOR OF PROGRAM DEVELOPMENT
Mark D. Richter
FEDERAL HIGHWAY ADMINISTRATION

STEEL BEAM GUARDRAIL WITH STEEL POSTS
STEEL BEAM GUARDRAIL WITH WOOD POSTS

VERMONT AGENCY OF TRANSPORTATION

STANDARD G-1



GENERAL NOTES:

1. ALL METAL PARTS SHALL BE GALVANIZED
2. ALL WOOD POSTS SHALL BE GIVEN A PRESERVATIVE TREATMENT
3. DETAILS PERTINENT TO THE STANDARD INSTALLATION OF "W" BEAM SECTIONS WILL BE FOUND ON STANDARD DRAWING G-1.
4. FOR DESCRIPTION AND SPECIFICATIONS OF PARTS IDENTIFIED BY "(ARTBA...)" AND OTHER DETAILS OF POSTS, POST ACCESSORIES, FASTENERS AND RAIL ELEMENTS, SEE AASHTO-AGC-ARTBA JOINT TASK FORCE NO. 13, TITLED "A GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE", LATEST EDITION.
5. THE TRANSITION FROM THE APPROACH END TO THE STANDARD STEEL BEAM GUARDRAIL SHALL BE 25'-0" UNLESS OTHERWISE SPECIFIED.
6. WHEN STANDARD STEEL BEAM CONNECTS TO BRIDGE APPROACH RAIL OF A DIFFERENT HEIGHT THE LENGTH NEEDED TO TRANSITION THE HEIGHT OF STANDARD STEEL BEAM TO MATCH THE BRIDGE APPROACH RAIL SHALL BE 25'-0" UNLESS OTHERWISE SPECIFIED.
7. WHEN STANDARD STEEL BEAM CONNECTS TO A MANUFACTURED TERMINAL SECTION OF A DIFFERENT HEIGHT THE LENGTH NEEDED TO TRANSITION THE HEIGHT OF STANDARD STEEL BEAM TO MATCH THE MANUFACTURED TERMINAL SECTION SHALL BE 25'-0" UNLESS OTHERWISE SPECIFIED.

OTHER STANDARD REQUIRED: G–1

REVISIONS AND CORRECTIONS

JUNE 1, 1994 - REISSUED, WITHOUT CHANGE, UNDER NEW SIGNATURES.
JAN. 3, 2000 - UPDATED TO REFLECT METRIC STD. CHANGES
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APPROVED
HIGHWAY SAFETY & DESIGN ENGINEER
DIRECTOR OF PROGRAM DEVELOPMENT
Mark D. Richter
FEDERAL HIGHWAY ADMINISTRATION

STEEL BEAM GUARDRAIL APPROACH END TERMINAL
STEEL BEAM GUARDRAIL TRAILING END TERMINAL
ANCHOR FOR STEEL BEAM GUARDRAIL
STEEL BEAM MEDIAN BARRIER

VERMONT AGENCY OF TRANSPORTATION

STANDARD G-1d

NO.	REVISIONS	BY	DATE

DES DWN DRN KKJ CHK DWN APPD	DATE 04/27/18	SCALE Not to scale	Town of East Montpelier T.H. 7 - Quaker Road TH Structures Grant Program FY 2017 BC 1773	Standards	Newton Technical Services, LLC 728 South Barre Road Barre, VT 05641 (802) 476-6900	Chase & Chase Surveyors & Septic Designers, Inc. 301 North Main St., Suite 301 Barre, VT 05641 (802) 479-9636	SHEET 16 of 16