SUMMARY OF SHEETS
PROJECT COMPOSITE SHEETS: 1-2
BF 0225(4) SHEETS: 3-31
BF 0225(5) SHEETS: 32-63

Record Plans
Contractor: J. HUTCHINS, INC.
Resident Engineer: PETE HODGSON
Construction Began: JULY 10, 2018
Construction Complete: JUNE 4, 2019
Record Plans By: PETE HODGSON & JESSE IVES

I hereby certify that all construction required by this set of drawings has been accomplished as indicated herein.

BY: Eric Fortin Resident Engineer

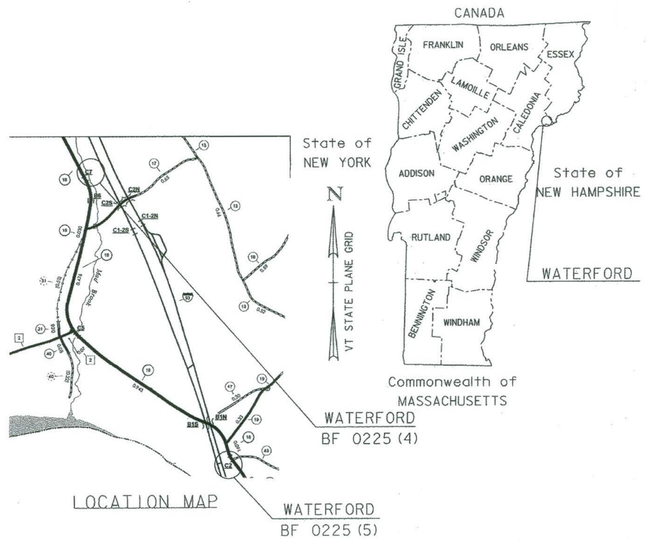
Date: 12-29-2019

NOTE: Any further information concerning final quantities, amounts or other details relative to this project may be found at Central Files in the electronic archives.

STATE OF VERMONT
AGENCY OF TRANSPORTATION

PROPOSED IMPROVEMENT
BRIDGE PROJECT

TOWN OF WATERFORD
COUNTY OF CALEDONIA



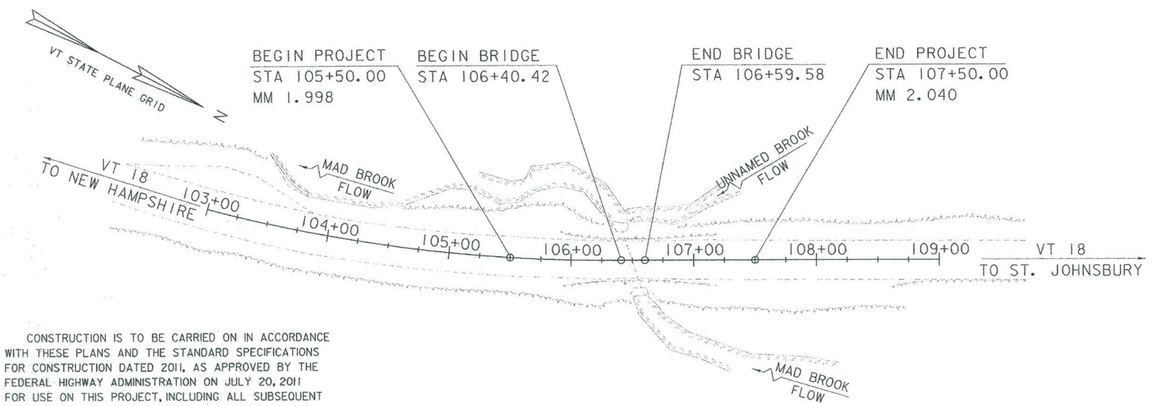
WATERFORD BF 0225(4)

ROUTE NO : VT ROUTE 18, RURAL MAJOR COLLECTOR BRIDGE NO : 7

PROJECT LOCATION: APPROXIMATELY 5.9 MILES SOUTH OF THE INTERSECTION OF VT ROUTE 18 AND US ROUTE 2

PROJECT DESCRIPTION: REPLACEMENT OF EXISTING CULVERT WITH A NEW PRECAST CONCRETE BOX CULVERT WITH RELATED APPROACH ROADWAY AND CHANNEL WORK.

LENGTH OF STRUCTURE: 19.16 FEET
LENGTH OF ROADWAY: 180.84 FEET
LENGTH OF PROJECT: 200.00 FEET



CONSTRUCTION IS TO BE CARRIED ON IN ACCORDANCE WITH THESE PLANS AND THE STANDARD SPECIFICATIONS FOR CONSTRUCTION DATED 2011, AS APPROVED BY THE FEDERAL HIGHWAY ADMINISTRATION ON JULY 20, 2011 FOR USE ON THIS PROJECT, INCLUDING ALL SUBSEQUENT REVISIONS AND SUCH REVISED SPECIFICATIONS AND SPECIAL PROVISIONS AS ARE INCORPORATED IN THESE PLANS.

QUALITY ASSURANCE PROGRAM : LEVEL 2	
SURVEYED BY :	R. GILMAN
SURVEYED DATE :	12-27-2013
DATUM	
VERTICAL	NAVD88
HORIZONTAL	NAD83(2011)

SCALE 1" = 60'-0"
60 0 60

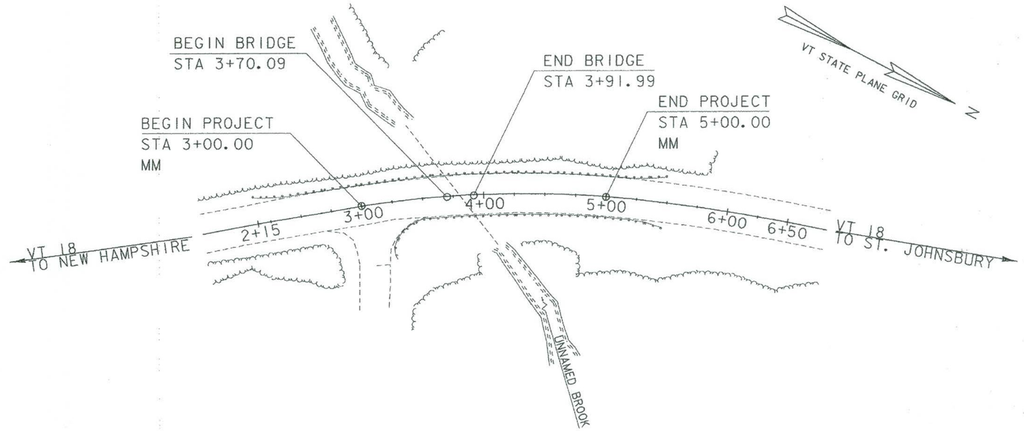
WATERFORD BF 0225(5)

ROUTE NO : VT ROUTE 18, RURAL MAJOR COLLECTOR BRIDGE NO : 2

PROJECT LOCATION: APPROXIMATELY 7.6 MILES SOUTH OF THE INTERSECTION OF VT ROUTE 18 AND US ROUTE 2.

PROJECT DESCRIPTION: REPLACEMENT OF EXISTING CULVERT WITH A NEW PRECAST CONCRETE BOX CULVERT WITH RELATED APPROACH ROADWAY AND CHANNEL WORK.

LENGTH OF STRUCTURE: 21.90 FEET
LENGTH OF ROADWAY: 178.10 FEET
LENGTH OF PROJECT: 200.00 FEET



STATE OF VERMONT
DARREN L. BLOOD
NO. 83424
CIVIL
LICENSED PROFESSIONAL ENGINEER
01/18/2018

GM2 ASSOCIATES

GM2 Associates, Inc.
197 Loudon Road, Suite 310
Concord, NH 03301
Tel: 603-856-7854
Fax: 603-856-7855

DIRECTOR OF PROJECT DELIVERY
APPROVED [signature] DATE 01/18/2018

PROJECT MANAGER : D. LANDRY

PROJECT NAME : WATERFORD
PROJECT NUMBER : BF 0225(4) & BF 0225(5)

SHEET 1 OF 63 SHEETS

GENERAL INFORMATION

SYMBOLOGY LEGEND NOTE

THE SYMBOLOGY ON THIS SHEET IS INTENDED TO COVER STANDARD CONVENTIONAL SYMBOLOGY. THE SYMBOLOGY IS USED FOR EXISTING & PROPOSED FEATURES WITH HEAVIER LINEWEIGHT, IN COMBINATION WITH PROJECT ANNOTATION, AS NOTED ON PROJECT PLAN SHEETS. THIS LEGEND SHEET COVERS THE BASICS. SYMBOLOGY ON PLANS MAY VARY, PLAN ANNOTATIONS AND NOTES SHOULD BE USED TO CLARIFY AS NEEDED.

R.O.W. ABBREVIATIONS (CODES) & SYMBOLS

POINT	CODE	DESCRIPTION
	CH	CHANNEL EASEMENT
	CONST	CONSTRUCTION EASEMENT
	CUL	CULVERT EASEMENT
	D&C	DISCONNECT & CONNECT
	DIT	DITCH EASEMENT
	DR	DRAINAGE EASEMENT
	DRIVE	DRIVEWAY EASEMENT
	EC	EROSION CONTROL
	HWY	HIGHWAY EASEMENT
	I&M	INSTALL & MAINTAIN EASEMENT
	LAND	LANDSCAPE EASEMENT
	R&RES	REMOVE & RESET
	R&REP	REMOVE & REPLACE
	SR	SLOPE RIGHT
	UE	UTILITY EASEMENT
	(P)	PERMANENT EASEMENT
	(T)	TEMPORARY EASEMENT
■	BNDNS	BOUND SET
⊡	BNDNS	BOUND TO BE SET
●	IPNS	IRON PIN SET
◎	IPNS	IRON PIN TO BE SET
⊠	CALC	EXISTING ROW POINT
○	PROW	PROPOSED ROW POINT
[LENGTH]		LENGTH CARRIED ON NEXT SHEET

COMMON TOPOGRAPHIC POINT SYMBOLS

POINT	CODE	DESCRIPTION
※	APL	BOUND APPARENT LOCATION
▫	BM	BENCHMARK
⊡	BND	BOUND
⊡	CB	CATCH BASIN
✡	COMB	COMBINATION POLE
⊡	DITHR	DROP INLET THROATED DNC
✡	EL	ELECTRIC POWER POLE
⊙	FPOLE	FLAGPOLE
○	GASFIL	GAS FILLER
⊙	GP	GUIDE POST
×	GSO	GAS SHUT OFF
⊙	GUY	GUY POLE
⊙	GUYW	GUY WIRE
×	GV	GATE VALUE
❀	H	TREE HARDWOOD
△	HCTRL	CONTROL HORIZONTAL
⚠	HVCTRL	CONTROL HORIZ.& VERTICAL
◇	HYD	HYDRANT
⊗	IP	IRON PIN
⊗	IPIPE	IRON PIPE
✡	LI	LIGHT - STREET OR YARD
⚑	MB	MAILBOX
○	MH	MANHOLE (MH)
▫	MM	MILE MARKER
⊖	PM	PARKING METER
▫	PMK	PROJECT MARKER
⊙	POST	POST STONE/WOOD
▼▼	RRSIG	RAILROAD SIGNAL
◒	RRSL	RAILROAD SWITCH LEVER
✕	S	TREE SOFTWOOD
⊃	SAT	SATELLITE DISH
❀	SHRUB	SHRUB
⚑	SIGN	SIGN
⅄	STUMP	STUMP
⊙	TEL	TELEPHONE POLE
⊙	TIE	TIE
⊙—⊙	TSIGN	SIGN W/DOUBLE POST
⅄	VCTRL	CONTROL VERTICAL
⊙	WELL	WELL
×	WSO	WATER SHUT OFF

THESE ARE COMMON VAOT SURVEY POINT SYMBOLS FOR EXISTING FEATURES, ALSO USED FOR PROPOSED FEATURES WITH HEAVIER LINEWEIGHT, IN COMBINATION WITH PROPOSED ANNOTATION.

PROPOSED GEOMETRY CODES

CODE	DESCRIPTION
PC	POINT OF CURVATURE
PI	POINT OF INTERSECTION
CC	CENTER OF CURVE
PT	POINT OF TANGENCY
PCC	POINT OF COMPOUND CURVE
PRC	POINT OF REVERSE CURVE
POB	POINT OF BEGINNING
POE	POINT OF ENDING
STA	STATION PREFIX
AH	AHEAD STATION SUFFIX
BK	BACK STATION SUFFIX
D	CURVE DEGREE OF (100FT)
R	CURVE RADUIS OF
T	CURVE TANGENT LENGTH
L	CURVE LENGTH OF
E	CURVE EXTERNAL DISTANCE

UTILITY SYMBOLOGY

UNDERGROUND UTILITIES

- UGU — UTILITY (GENERIC-UNKNOWN)
- UT — TELEPHONE
- UE — ELECTRIC
- UC — CABLE (TV)
- UEC — ELECTRIC+CABLE
- UET — ELECTRIC+TELEPHONE
- UCT — CABLE+TELEPHONE
- UECT — ELECTRIC+CABLE+TELEP.
- G — GAS LINE
- W — WATER LINE
- S — SANITARY SEWER (SEPTIC)

ABOVE GROUND UTILITIES (AERIAL)

- AGU — UTILITY (GENERIC-UNKNOWN)
- T — TELEPHONE
- E — ELECTRIC
- C — CABLE (TV)
- EC — ELECTRIC+CABLE
- ET — ELECTRIC+TELEPHONE
- AER E&T — ELECTRIC+TELEPHONE
- CT — CABLE+TELEPHONE
- ECT — ELECTRIC+CABLE+TELEP.
- UTILITY POLE GUY WIRE

PROJECT CONSTRUCTION SYMBOLOGY

PROJECT DESIGN & LAYOUT SYMBOLOGY

- CLEAR ZONE
- PLAN LAYOUT MATCHLINE

PROJECT CONSTRUCTION FEATURES

- TOP OF CUT SLOPE
- TOE OF FILL SLOPE
- STONE FILL
- BOTTOM OF DITCH ℄
- CULVERT PROPOSED
- STRUCTURE SUBSURFACE
- PROJECT DEMARCATION FENCE
- BARRIER FENCE
- TREE PROTECTION ZONE (TPZ)
- STRIPING LINE REMOVAL
- SHEET PILES

CONVENTIONAL BOUNDARY SYMBOLOGY

BOUNDARY LINES

- TOWN BOUNDARY LINE
- COUNTY BOUNDARY LINE
- STATE BOUNDARY LINE
- PROPOSED STATE R.O.W. (LIMITED ACCESS)
- PROPOSED STATE R.O.W.
- STATE ROW (LIMITED ACCESS)
- STATE ROW
- TOWN ROW
- PERMANENT EASEMENT LINE (P)
- TEMPORARY EASEMENT LINE (T)
- SURVEY LINE
- PROPERTY LINE (P/L)
- SLOPE RIGHTS
- 6F PROPERTY BOUNDARY
- 4F PROPERTY BOUNDARY
- HAZARDOUS WASTE

EPSC LAYOUT PLAN SYMBOLOGY

EPSC MEASURES

- FILTER CURTAIN
- SILT FENCE
- SILT FENCE WOVEN WIRE
- CHECK DAM
- DISTURBED AREAS REQUIRING RE-VEGETATION
- EROSION MATTING

SEE EPSC DETAIL SHEETS FOR ADDITIONAL SYMBOLOGY

ENVIRONMENTAL RESOURCES

- WETLAND BOUNDARY
- RIPARIAN BUFFER ZONE
- WETLAND BUFFER ZONE
- SOIL TYPE BOUNDARY
- T&E — THREATENED & ENDANGERED SPECIES
- HAZ — HAZARDOUS WASTE AREA
- AG — AGRICULTURAL LAND
- HABITAT — FISH & WILDLIFE HABITAT
- FLOOD PLAIN — FLOOD PLAIN
- OHW — ORDINARY HIGH WATER (OHW)
- STORM WATER
- USDA FOREST SERVICE LANDS
- WILDLIFE HABITAT SUIT/CONN

ARCHEOLOGICAL & HISTORIC

- ARCH — ARCHEOLOGICAL BOUNDARY
- HISTORIC DIST — HISTORIC DISTRICT BOUNDARY
- HISTORIC — HISTORIC AREA
- (H) HISTORIC STRUCTURE

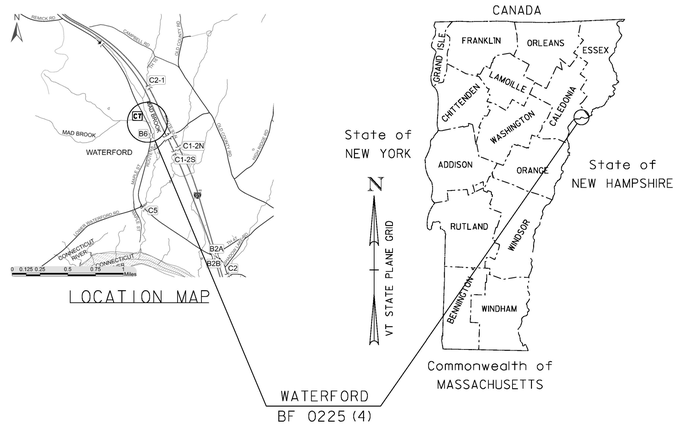
CONVENTIONAL TOPOGRAPHIC SYMBOLOGY

EXISTING FEATURES

- ROAD EDGE PAVEMENT
- ROAD EDGE GRAVEL
- DRIVEWAY EDGE
- DITCH
- FOUNDATION
- FENCE (EXISTING)
- FENCE WOOD POST
- FENCE STEEL POST
- GARDEN
- ROAD GUARDRAIL
- RAILROAD TRACKS
- CULVERT (EXISTING)
- STONE WALL
- WALL
- WOOD LINE
- BRUSH LINE
- HEDGE
- BODY OF WATER EDGE
- LEDGE EXPOSED

PROJECT NAME:	WATERFORD
PROJECT NUMBER:	BF 0225(4) & BF 0225(5)
FILE NAME:	zl3c268_zl5b05lleg.dgn
PROJECT LEADER:	T. LEVINS
DESIGNED BY:	A. KURDEKAR
LEGEND SHEET	
PLOT DATE:	09/27/2017
DRAWN BY:	A. KURDEKAR
CHECKED BY:	T. LEVINS
SHEET	2 OF 63

STATE OF VERMONT
AGENCY OF TRANSPORTATION

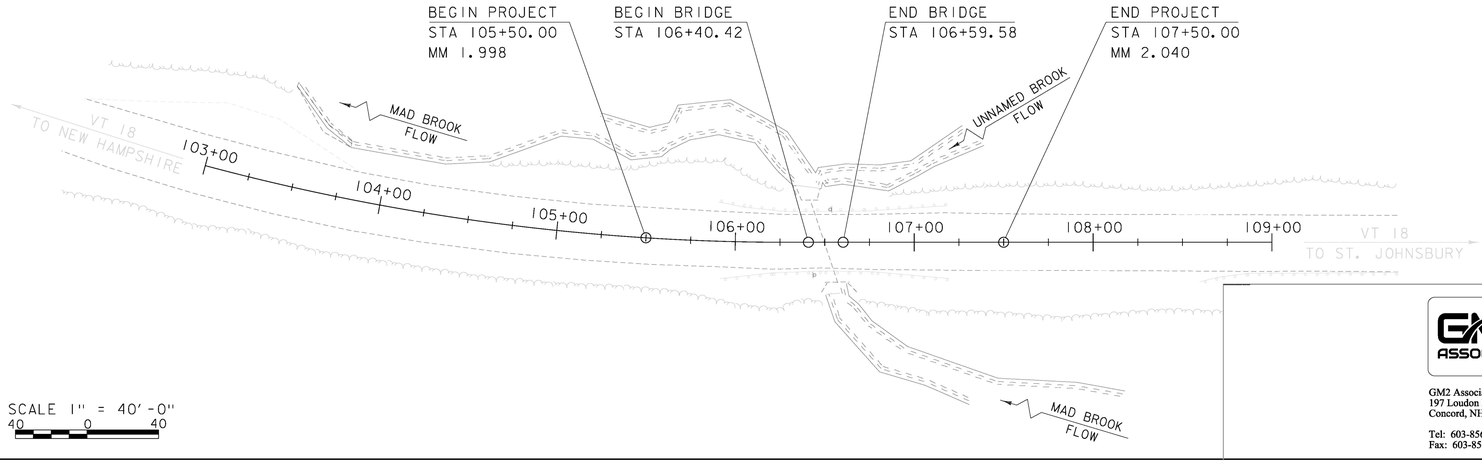


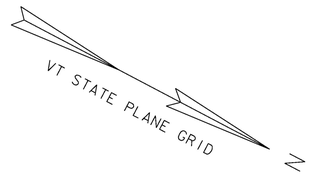
PROPOSED IMPROVEMENT
BRIDGE PROJECT

TOWN OF WATERFORD
COUNTY OF CALEDONIA

ROUTE NO : VT ROUTE 18, RURAL MAJOR COLLECTOR BRIDGE NO : 7

PROJECT LOCATION:	APPROXIMATELY 5.9 MILES SOUTH OF THE INTERSECTION OF VT ROUTE 18 AND US ROUTE 2
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CONTRACT PLANS
27-DEC-2017

QUALITY ASSURANCE PROGRAM : LEVEL	2
SURVEYED BY :	R. GILMAN
SURVEYED DATE :	12-27-2013
DATUM	
VERTICAL	NAVD88
HORIZONTAL	NAD83 (2011)

SCALE 1" = 40'-0"
40 0 40

GM2 ASSOCIATES
GM2 Associates, Inc.
197 Loudon Road, Suite 310
Concord, NH 03301
Tel: 603-856-7854
Fax: 603-856-7855

DIRECTOR OF PROJECT DELIVERY
APPROVED _____ DATE _____

PROJECT MANAGER : D. LANDRY

PROJECT NAME : WATERFORD
PROJECT NUMBER : BF 0225 (4)

SHEET 3 OF 63 SHEETS

STATE OF VERMONT
AGENCY OF TRANSPORTATION

PRELIMINARY INFORMATION SHEET (CULVERT)

Version **LRFD**

INDEX OF SHEETS

PLAN SHEETS

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9	TIE SHEET
10	EXISTING CONDITIONS
11	LAYOUT SHEET
12	VT ROUTE 18 PROFILE & BANKING DIAGRAM
13	CHANNEL PROFILE
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15	DETOUR (2)
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17-18	BORING LOGS
19	BOX LAYOUT
20	RAIL LAYOUT SHEET
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25-27	CHANNEL SECTIONS
28	EPSC NARRATIVE
29	EPSC CONSTRUCTION SITE PLAN
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STANDARDS LIST

E-193	PAVEMENT MARKING DETAILS	08-18-1995
G-1	STEEL BEAM GUARDRAIL DETAILS (POST, DELINEATOR TYPICALS)	03-10-2017
G-1D	STEEL BEAM GUARDRAIL DETAILS (END TERMINAL, ANCHOR MEDIAN)	03-10-2017
T-1	TEMPORARY TRAFFIC CONTROL GENERAL NOTES	04-25-2016
T-17	TRAFFIC CONTROL MISCELLANEOUS DETAILS	08-06-2012
T-28	CONSTRUCTION SIGN DETAILS	08-06-2012
T-30	CONSTRUCTION SIGN DETAILS	08-06-2012
T-42	BRIDGE NUMBER PLAQUE	04-09-2014
T-44	MILE MARKER DETAILS, STATE AND TOWN HIGHWAYS	04-09-2014
T-45	SQUARE TUBE SIGN POST AND ANCHOR	01-02-2013

DETAIL SHEETS

HSD-400.01	SAFETY EDGE DETAILS	03-29-2016
SD-502.00	CONCRETE DETAILS AND NOTES	10-10-2012
SD-366.00	LONG SPAN STEEL BEAM GUARDRAIL GALVANIZED	01-03-2014

FINAL HYDRAULIC REPORT

HYDROLOGIC DATA

Date: Nov. 2015

DRAINAGE AREA : 1.8 sq. mi.
CHARACTER OF TERRAIN : Hilly to mountainous, mostly forested
STREAM CHARACTERISTICS : Alluvial, sinuous
NATURE OF STREAMBED : Cobbles, gravel and a few boulders

PEAK FLOW DATA - ANNUAL EXCEEDANCE PROBABILITY (AEP)

43% =	100 cfs	2% =	375 cfs
10% =	225 cfs	1% =	450 cfs
4% =	300 cfs	0.2% =	625 cfs

DATE OF FLOOD OF RECORD: unknown
ESTIMATED DISCHARGE: unknown
WATER SURFACE ELEV.: unknown
NATURAL STREAM VELOCITY : @ 2% AEP = 10.0 fps
ICE CONDITIONS : Moderate
DEBRIS: Moderate
DOES THE STREAM REACH MAXIMUM HIGHWATER ELEV. RAPIDLY? Yes
IS ORDINARY RISE RAPID? Yes
IS STAGE AFFECTED BY UPSTREAM OR DOWNSTREAM CONDITIONS? No
IF YES, DESCRIBE:

WATERSHED STORAGE: < 1%
HEADWATERS:
UNIFORM: X
IMMEDIATELY ABOVE SITE:

EXISTING STRUCTURE INFORMATION

STRUCTURE TYPE: Concrete slab bridge widened with concrete box
YEAR BUILT: Built in 1938
CLEAR SPAN(NORMAL TO STREAM): 9'
VERTICAL CLEARANCE ABOVE STREAMBED: 4'
WATERWAY OF FULL OPENING: 36 sq. ft.
DISPOSITION OF STRUCTURE: Remove
TYPE OF MATERIAL UNDER SUBSTRUCTURE: unknown

WATER SURFACE ELEVATIONS AT:

43% AEP =	906.6'	VELOCITY =	9.0 fps
10% AEP =	908.3'	"	12.3 fps
4% AEP =	909.0'	"	13.2 fps
2% AEP =	909.4'	"	13.4 fps
1% AEP =	909.7'	"	14.0 fps

LONG TERM STREAMBED CHANGES: unknown

IS THE ROADWAY OVERTOPPED BELOW 1% AEP: Not enough survey to determine
FREQUENCY:
RELIEF ELEVATION:
DISCHARGE OVER ROAD @ 1% AEP:

UPSTREAM STRUCTURE

TOWN: Waterford — DISTANCE: 1500'
HIGHWAY # : I93 — STRUCTURE #:
CLEAR SPAN: 7.0' — CLEAR HEIGHT: 7.0'
YEAR BUILT: 1982 — FULL WATERWAY: 38.5 sq. ft.
STRUCTURE TYPE: Corrugated metal pipe

DOWNSTREAM STRUCTURE

TOWN: Waterford — DISTANCE: 500'
HIGHWAY # : VT 18 — STRUCTURE #: 6
CLEAR SPAN: 14' — CLEAR HEIGHT: 6'
YEAR BUILT: 1938 — FULL WATERWAY: 84 sq. ft.
STRUCTURE TYPE: Concrete slab bridge

LRFR LOAD RATING FACTORS

LOADING LEVELS	TRUCK						
	H-20	HL-93	3S2	6 AXLE	3A. STR.	4A. STR.	5A. SEMI
TONNAGE	20	36	36	66	30	34.5	38
INVENTORY							
POSTING							
OPERATING							
COMMENTS:	TABLE TO BE COMPLETED BY CONTRACTOR'S DESIGNER						

AS BUILT "REBAR" DETAIL

LEVEL I	LEVEL II	LEVEL III
TYPE:	TYPE:	TYPE:
GRADE:	GRADE:	GRADE:

CULVERT DESIGN CRITERIA

1. PROPOSED CULVERT IS A PRECAST CONCRETE STRUCTURE (16'-0" X 8'-0" X 52' BOX).
2. CULVERT END IS NOT SKEWED UPSTREAM; SKEWED DOWNSTREAM. ENDS PLUMB.
3. CULVERT WILL BE SET AT A SLOPE OF 4.08 IN. ON 10 FT.

PROPOSED STRUCTURE

STRUCTURE TYPE: Precast concrete box

CLEAR SPAN(NORMAL TO STREAM): 16'
VERTICAL CLEARANCE ABOVE STREAMBED: 5'
WATERWAY OF FULL OPENING: 80 sq. ft.

WATER SURFACE ELEVATIONS AT:

43% AEP =	906.5'	VELOCITY=	7.2 fps
10% AEP =	907.6'	"	9.8 fps
4% AEP =	908.2'	"	11.0 fps
2% AEP =	908.6'	"	11.7 fps
1% AEP =	908.9'	"	12.5 fps

IS THE ROADWAY OVERTOPPED BELOW 1% AEP: Not enough survey to determine
FREQUENCY:
RELIEF ELEVATION:
DISCHARGE OVER ROAD @ 1% AEP:

BRIDGE LOW CHORD ELEVATION: 910.0' at inlet
FREEBOARD: @ 2% AEP = 1.4' at inlet

SCOUR: Not calculated for a box.

REQUIRED CHANNEL PROTECTION: Stone Fill, Type IV on channel banks

PERMIT INFORMATION

		DEPTH OR ELEVATION:
AVERAGE DAILY FLOW:	-	
ORDINARY LOW WATER:	-	-
ORDINARY HIGH WATER:	-	-

TEMPORARY BRIDGE REQUIREMENTS

STRUCTURE TYPE: No temporary bridge needed.
CLEAR SPAN (NORMAL TO STREAM):
VERTICAL CLEARANCE ABOVE STREAMBED:
WATERWAY AREA OF FULL OPENING:

ADDITIONAL INFORMATION

TRAFFIC MAINTENANCE NOTES

1. MAINTAIN TRAFFIC ON AN OFF SITE DETOUR.
2. TRAFFIC SIGNALS ARE NOT NECESSARY.
3. SIDEWALKS ARE NOT NECESSARY

DESIGN VALUES

1. DESIGN LIVE LOAD		HL-93
2. FUTURE PAVEMENT	d_p:	3.0 INCH
3. CULVERT OPENING	D:	16.00 FT
4. MIN. MID-SPAN POS. CAMBER @ RELEASE (PRESTRESSED UNITS)	Δ:	---
5. PRESTRESSING STRAND	f_y:	---
6. PRESTRESSED CONCRETE STRENGTH	f'_c:	---
7. PRESTRESSED CONCRETE RELEASE STRENGTH	f'_{ci}:	---
8. CONCRETE, HIGH PERFORMANCE CLASS AA	f'_c:	4.0 KSI
9. CONCRETE, HIGH PERFORMANCE CLASS A	f'_c:	4.0 KSI
10. CONCRETE, HIGH PERFORMANCE CLASS B	f'_c:	3.5 KSI
11. CONCRETE, CLASS C	f'_c:	3.0 KSI
12. REINFORCING STEEL	f_y:	60 KSI
13. STRUCTURAL STEEL AASHTO M270	f_y:	---
14. NOMINAL BEARING RESISTANCE OF SOIL	q_n:	13.3 KSF
15. SOIL BEARING RESISTANCE FACTOR (REFER TO AASHTO LRFD)	ϕ:	0.45
16. NOMINAL BEARING RESISTANCE OF ROCK	q_n:	---
17. ROCK BEARING RESISTANCE FACTOR (REFER TO AASHTO LRFD)	ϕ:	---
18. PILE RESISTANCE FACTOR	ϕ:	---
19. LATERAL PILE DEFLECTION	Δ:	--- INCH
20. BASIC WIND SPEED	V_{3s}:	---
21. MINIMUM GROUND SNOW LOAD	p_g:	---
22. SEISMIC DATA PGA: 9 %g	S_s:	---
	S_1:	---
23.		---
24.		---
25.		---
26.		---

TRAFFIC DATA

YEAR	ADT	DHV	% D	% T	ADTT
2017	1200	140	58	27.3	280
2037	1200	140	58	37.1	380

20 year ESAL for flexible pavement from 2017 to 2037 : 1938000
40 year ESAL for flexible pavement from 2017 to 2057 : 4423000
Design Speed : 50 mph

PROJECT NAME: **WATERFORD**
PROJECT NUMBER: **BF 0225(4)**

FILE NAME: z13c268pi.dgn
PROJECT LEADER: T. LEVINS
DESIGNED BY: B. WILLIAMS
PRELIMINARY INFORMATION SHEET

PLOT DATE: 10/2/2017
DRAWN BY: B. WILLIAMS
CHECKED BY: T. LEVINS

GENERAL NOTES

1. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM TO THE AGENCY OF TRANSPORTATION'S STANDARD SPECIFICATIONS FOR CONSTRUCTION, DATED 2011, AND ITS LATEST REVISIONS, AND THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS 7TH EDITION, AND ITS LATEST REVISIONS.

2. PREPARATION OF THE SITE WILL BE ALLOWED PRIOR TO THE BRIDGE CLOSURE PERIOD. HOWEVER, EXCAVATION FOR AND PLACEMENT OF BOX SECTIONS SHALL BE PERFORMED DURING BRIDGE CLOSURE PERIOD ONLY.

3. ITEM 529.15 "REMOVAL OF STRUCTURE" WILL BE USED FOR ALL WORK REQUIRED TO REMOVE THE EXISTING CONCRETE STRUCTURE UNDER VT 18.

4. THE CONTRACTOR SHALL INSTALL TEMPORARY TRAFFIC BARRIER AT THE LIMITS OF WORK AT EACH END OF THE PROJECT (TO PREVENT VEHICLES FROM ENTERING WORK ZONE) TO REMAIN IN PLACE UNTIL FINAL GRADE IS ESTABLISHED AND PROPOSED GUARDRAIL IS INSTALLED BETWEEN STA 104+71.3 AND STA 108+43.4. PAYMENT WILL BE INCLUDED IN THE BID PRICE FOR ITEM 900.645 "SPECIAL PROVISION (TRAFFIC CONTROL, ALL-INCLUSIVE)."

5. ALL DIMENSIONS ARE HORIZONTAL OR VERTICAL AND ARE GIVEN AT 68 DEGREES F UNLESS OTHERWISE NOTED.

6. EXCAVATED STREAM BED MATERIAL SUPPLEMENTED WITH E-STONE TYPE E3 SHALL BE PLACED INSIDE THE BOX SECTIONS AND AS SHOWN IN THE PLANS. PAYMENT WILL BE UNDER ITEM 900.608 "SPECIAL PROVISIONS (E-STONE TYPE E3)." SEE SPECIAL PROVISIONS.

TRAFFIC CONTROL

7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN AND IMPLEMENTATION OF A SITE SPECIFIC TRAFFIC CONTROL PLAN FOR ALL STAGES OF CONSTRUCTION. THE PLAN SHALL CLEARLY DETAIL HOW TRAFFIC WILL BE MAINTAINED PRIOR TO, DURING, AND AFTER THE BRIDGE CLOSURE PERIOD. THE PLAN SHALL SPECIFY ALL CONSTRUCTION ACTIVITIES REQUIRING ALTERNATING ONE WAY TRAFFIC, RELATE THOSE ACTIVITIES TO THE CONSTRUCTION SCHEDULE, AND SHOW APPROPRIATE TEMPORARY TRAFFIC CONTROL. THE CONTRACTOR SHALL SUBMIT DETAILED TRAFFIC CONTROL PLANS TO THE PROJECT MANAGER FOR APPROVAL PER SUBSECTION 105.03. ALL COSTS WILL BE INCLUDED IN ITEM 900.645 "SPECIAL PROVISION (TRAFFIC CONTROL, ALL-INCLUSIVE)."

PRECAST CONCRETE

8. DESIGN CRITERIA (PRECAST BOX):

   A. SOIL UNIT WEIGHT = 125 PCF
   B. DESIGN LIVE LOAD = HL-93
   C. NOMINAL BEARING RESISTANCE (BEDROCK) = N/A
   D. NOMINAL BEARING RESISTANCE (GRANULAR BACKFILL) = 13.3 KSF
   E. BEARING RESISTANCE FACTOR = 0.45
   F. DESIGN FILL OVER BOX = 3 FEET
   G. AT-REST EARTH PRESSURE (Ko) = 0.398
   H. CONCRETE COMPRESSIVE STRENGTH = SEE SUBSECTION 540.05(e)

9. DESIGN CRITERIA (PRECAST WINGWALLS):

   A. SOIL UNIT WEIGHT = 125 PCF
   B. DESIGN LIVE LOAD = HL-93
   C. NOMINAL BEARING RESISTANCE (BEDROCK) = N/A
   D. NOMINAL BEARING RESISTANCE (GRANULAR BACKFILL) = 13.3 KSF (SEE CHART IN GEOTECH REPORT)
   E. BEARING RESISTANCE FACTOR = 0.45
   F. DESIGN FILL OVER BOX = N/A
   G. AT-REST EARTH PRESSURE (Ko) = 0.398
   H. CONCRETE COMPRESSIVE STRENGTH = SEE SUBSECTION 540.05(e)

10. ALL CONCRETE SHALL BE PRECAST. ITEM 540.10 "PRECAST CONCRETE STRUCTURE" WHICH INCLUDES ALL BOX SEGMENTS, HEADWALLS, WINGWALLS, AND CUTOFF WALLS. ALL CONNECTIONS SHALL BE DESIGNED BY THE FABRICATOR AND WILL BE CONSIDERED INCIDENTAL TO ITEM 540.10.

11. THE PRECAST CONCRETE STRUCTURE SHALL BE DESIGNED FOR HYDROSTATIC PRESSURE UNLESS RAPID DRAINING MATERIAL MEETING THE REQUIREMENTS OF SUBSECTION 704.18 IS USED. IF USED, RAPID DRAINING MATERIAL WILL BE PAID AT THE UNIT PRICE BID FOR ITEM 204.30 "GRANULAR BACKFILL FOR STRUCTURES." NO WEEPHOLES IN THE BOX SECTIONS WILL BE ALLOWED.

12. THE PRECAST BOX SECTIONS ARE SHOWN FOR REFERENCE ONLY. THE ACTUAL DIMENSIONS AND SHAPE WILL BE DEPENDENT ON THE FABRICATOR. THE MINIMUM INSIDE DIMENSIONS SHALL BE 8'-0" IN HEIGHT AND 16'-0" IN WIDTH. THE EXPOSED ENDS OF THE FIRST AND LAST UNITS SHALL BE VERTICAL.

13. ALL LIFTING HOLES AND BOLT POCKETS SHALL BE FILLED WITH MORTAR TYPE IV AFTER BEING SET IN THEIR FINAL POSITION. THIS WORK WILL BE INCLUDED IN THE UNIT PRICE BID FOR ITEM 540.10 "PRECAST CONCRETE STRUCTURE." FILLING THE JOINTS BETWEEN BOX SEGMENTS WITH GROUT IS NOT REQUIRED.

14. WATER REPELLENT, SILANE SHALL BE APPLIED TO ALL EXPOSED EXTERIOR SURFACES OF THE PRECAST CONCRETE STRUCTURE. PAYMENT FOR SILANE WILL BE INCLUDED IN THE UNIT BID PRICE FOR CONTRACT ITEM 514.10 "WATER REPELLENT, SILANE."

15. A TWO (2) FOOT WIDE STRIP OF SHEET MEMBRANE WATERPROOFING MEETING THE REQUIREMENTS OF SUBSECTION 519.02, CENTERED ON THE JOINT, SHALL BE PLACED AT EACH JOINT. THE SHEET MEMBRANE SHALL COVER 1 FOOT TO EACH SIDE OF THE JOINT BOTH ON TOP AND THE FULL HEIGHT OF THE SIDES OF THE STRUCTURE. ANY OVERLAPPING OF THE MEMBRANE SHALL BE DONE IN A SHINGLE TYPE STYLE AND SHALL OVERLAP A MINIMUM OF ONE FOOT. PAYMENT FOR THE MEMBRANE WILL BE INCLUDED IN THE UNIT PRICE BID FOR CONTRACT ITEM 540.10 "PRECAST CONCRETE STRUCTURE."

16. PERMANENT CLOSURE HARDWARE SHALL BE REQUIRED BETWEEN ALL BOX SECTIONS AND WILL BE INCLUDED IN THE UNIT PRICE BID FOR CONTRACT ITEM 540.10 "PRECAST CONCRETE STRUCTURE."

REINFORCING STEEL

17. ALL REINFORCING STEEL SHALL BE LEVEL 1 (EPOXY COATED) REINFORCING STEEL IN ACCORDANCE WITH SECTION 507. PAYMENT FOR ALL REINFORCING STEEL WILL BE INCLUDED IN THE UNIT PRICE BID FOR CONTRACT ITEM 540.10 "PRECAST CONCRETE STRUCTURE."

18. ALL REINFORCING STEEL SHALL HAVE A MINIMUM CLEAR COVER OF 2".

GM2 ASSOCIATES

PROJECT NAME: WATERFORD
PROJECT NUMBER: BF 0225(4)

FILE NAME: zl3c268gen.dgn
PROJECT LEADER: T. LEVINS
DESIGNED BY: B. WILLIAMS
PROJECT NOTES

PLOT DATE: 09/27/2017
DRAWN BY: B. WILLIAMS
CHECKED BY: T. LEVINS
SHEET 5 OF 63

STATE OF VERMONT
AGENCY OF TRANSPORTATION

QUANTITY SHEET 1

SUMMARY OF ESTIMATED QUANTITIES										TOTALS		DESCRIPTIONS				DETAILED SUMMARY OF QUANTITIES		
						ROADWAY	EROSION CONTROL	BRIDGE	FULL C.E. ITEMS	GRAND TOTAL	FINAL	UNIT	ITEMS	ITEM NUMBER	ROUND	QUANTITIES	UNIT	ITEMS
						1				1		LS	CLEARING AND GRUBBING, INCLUDING INDIVIDUAL TREES AND STUMPS	201.10				
						610				610		CY	COMMON EXCAVATION	203.15				
								180		180		CY	UNCLASSIFIED CHANNEL EXCAVATION	203.27				
						12				~~12~~		CY	~~GRANULAR BORROW~~	~~203.32~~				
						1				~~1~~		CY	~~TRENCH EXCAVATION OF EARTH, EXPLORATORY (N.A.B.I.)~~	~~204.22~~				
								640		640		CY	STRUCTURE EXCAVATION	204.25				
								~~210~~ 230		230 ~~210~~		CY	GRANULAR BACKFILL FOR STRUCTURES	204.30				
						355				355		SY	COLD PLANING, BITUMINOUS PAVEMENT	210.10				
						500				500		CY	SUBBASE OF DENSE GRADED CRUSHED STONE	301.35				
						40				40		TON	AGGREGATE SHOULDERS	402.12				
						~~6~~ 5.87				5.87 ~~6~~		CWT	EMULSIFIED ASPHALT	404.65				
						1				1		LU	PRICE ADJUSTMENT, ASPHALT CEMENT (N.A.B.I.)	406.50				
								~~16~~ 10		10 ~~16~~		GAL	WATER REPELLENT, SILANE	514.10				
								1		1		EACH	REMOVAL OF STRUCTURE (12' x 32' CONCRETE BRIDGE)	529.15				
								1		1		LS	PRECAST CONCRETE STRUCTURE (16' x 8' x 52' BOX AND WINGWALLS)	540.10				
								110		110		CY	STONE FILL, TYPE IV	613.13				
						~~300~~ 354				354 ~~300~~		LF	STEEL BEAM GUARDRAIL, GALVANIZED	621.20				
						200				200		LF	STEEL BEAM GUARDRAIL, GALVANIZED/NESTED	621.206				
						4				4		EACH	ANCHOR FOR STEEL BEAM RAIL	621.60				
						263				263		LF	REMOVAL AND DISPOSAL OF GUARDRAIL	621.80				
						~~400~~ 255.5				255.5 ~~400~~		HR	FLAGGERS	630.15				
									0.5	0.5		LS	FIELD OFFICE, ENGINEERS	631.10				
									0.5	0.5		LS	TESTING EQUIPMENT, BITUMINOUS	631.17				
									1500	1500		DL	FIELD OFFICE TELEPHONE (N.A.B.I.)	631.26				
						0.5				0.5		LS	MOBILIZATION/DEMOBILIZATION	635.11				
						2				2		EACH	PORTABLE CHANGEABLE MESSAGE SIGN	641.15				
						~~600~~ 750				750 ~~600~~		LF	4 INCH WHITE LINE	646.20				
						~~400~~ 525				525 ~~400~~		LF	4 INCH YELLOW LINE	646.21				
							~~1010~~ 978			978 ~~1010~~		SY	GEOTEXTILE FOR ROADBED SEPARATOR	649.11				
								150		150		SY	GEOTEXTILE UNDER STONE FILL	649.31				
							~~130~~ 134			134 ~~130~~		SY	GEOTEXTILE FOR SILT FENCE	649.51				
							~~5~~ 25			25 ~~5~~		LB	SEED	651.15				
							~~40~~ 35			35 ~~40~~		LB	FERTILIZER	651.18				
							0.2			0.2		TON	AGRICULTURAL LIMESTONE	651.20				
							~~0.3~~ 0.2			0.2 ~~0.3~~		TON	HAY MULCH	651.25				
							40			40		CY	TOPSOIL	651.35				
								60		60		SY	GRUBBING MATERIAL	651.40				
							1			1		LS	EPSC PLAN (BF 0225 (4))	652.10				
							20			20		HR	MONITORING EPSC PLAN (BF 0225(4))	652.20				
							1			1		LU	MAINTENANCE OF EPSC PLAN (N.A.B.I.) (BF 0225 (4))	652.30				

GM2 ASSOCIATES

PROJECT NAME: WATERFORD
PROJECT NUMBER: BF 0225(4)

FILE NAME: z13c268qs.dgn
PROJECT LEADER: T. LEVINS
DESIGNED BY: B. WILLIAMS
QUANTITY SHEET 1

PLOT DATE: 09/27/2017
DRAWN BY: B. WILLIAMS
CHECKED BY: T. LEVINS
SHEET 6 OF 63

STATE OF VERMONT
AGENCY OF TRANSPORTATION

QUANTITY SHEET 2

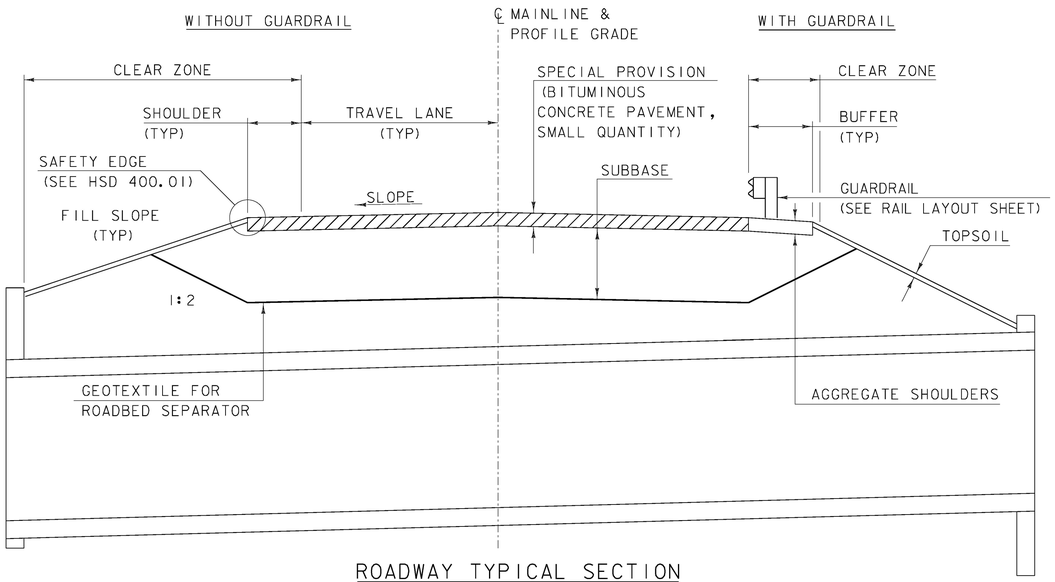
SUMMARY OF ESTIMATED QUANTITIES									TOTALS		DESCRIPTIONS				DETAILED SUMMARY OF QUANTITIES		
						ROADWAY	EROSION CONTROL	BRIDGE	FULL C.E. ITEMS	GRAND TOTAL	FINAL	UNIT	ITEMS	ITEM NUMBER	ROUND	QUANTITIES	UNIT	ITEMS
							~~173~~ 150			~~173~~ 150		SY	TEMPORARY EROSION MATTING	653.20				
							~~14.9~~ 30			~~14.9~~ 30		CY	VEHICLE TRACKING PAD	653.35				
							1			1		EACH	FILTER BAG	653.45				
							~~676~~ 530			~~676~~ 530		LF	PROJECT DEMARCATION FENCE	653.55				
						~~2~~ 1.25				~~1.25~~ 2		SF	TRAFFIC SIGNS, TYPE A	675.20				
						~~24~~21.25				~~21.25~~ 24		LF	SQUARE TUBE SIGN POST AND ANCHOR	675.341				
						3				3		EACH	REMOVING SIGNS	675.50				
						4				4		EACH	DELINEATOR WITH STEEL POST	676.10				
						1				1		LU	PRICE ADJUSTMENT, FUEL (N.A.B.I.)	690.50				
								170		170		CY	SPECIAL PROVISION (E-STONE TYPE E3)	900.608				
								25000		25000		DL	SPECIAL PROVISION (INCENTIVE/DISINCENTIVE) (N.A.B.I.) (BF 0225(4))	900.615				
						3				3		EACH	SPECIAL PROVISION (CPM SCHEDULE)	900.620				
								1		1		LS	SPECIAL PROVISION (TEMPORARY RELOCATION OF STREAM) (BF 0225(4))	900.645				
						1				1		LS	SPECIAL PROVISION (TRAFFIC CONTROL, ALL-INCLUSIVE) (BF 0225 (4))	900.645				
						~~1~~				~~1~~		LU	~~SPECIAL PROVISION (MAT DENSITY PAY ADJUSTMENT, SMALL QUANTITY)~~ (N.A.B.I.)	~~900.650~~				NO CORES TAKEN PER RE PETE HODGSON
						1				1		LU	SPECIAL PROVISION (MIXTURE PAY ADJUSTMENT) (N.A.B.I.)	900.650				
						310				310		TON	SPECIAL PROVISION (BITUMINOUS CONCRETE PAVEMENT, SMALL QUANTITY)	900.680				

GM2 ASSOCIATES

PROJECT NAME: WATERFORD
PROJECT NUMBER: BF 0225(4)

FILE NAME: zl3c268qs.dgn
PROJECT LEADER: T. LEVINS
DESIGNED BY: B. WILLIAMS
QUANTITY SHEET 2

PLOT DATE: 09/27/2017
DRAWN BY: B. WILLIAMS
CHECKED BY: T. LEVINS
SHEET 7 OF 63



ROADWAY TYPICAL SECTION

NOT TO SCALE

ROAD TYPICAL INFORMATION

	LEFT		RIGHT	
	WIDTH	SLOPE	WIDTH	SLOPE
TRAVEL LANE	12'-0"	VARIES	12'-0"	VARIES
SHOULDER	4'-0"	VARIES	4'-0"	VARIES
BUFFER	3'-7"	-0.060	3'-7"	-0.060
FILL SLOPE		1:2.0		1:2.0
CLEAR ZONE (CUT)	12'-0"		12'-0"	
CLEAR ZONE (FILL)	16'-0"		16'-0"	
CLEAR ZONE (GUARDRAIL)	4'-0"		4'-0"	

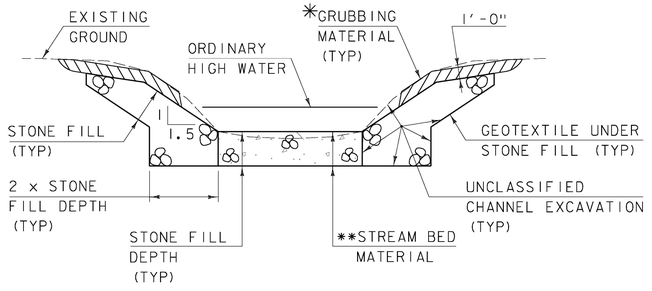
MATERIAL TOLERANCES

(IF USED ON PROJECT)

SURFACE	
- PAVEMENT (TOTAL THICKNESS)	+/- 1/4"
- AGGREGATE SURFACE COURSE	+/- 1/2"
SUBBASE	+/- 1"
SAND BORROW	+/- 1"

MATERIAL INFORMATION

	THICKNESS	TYPE
WEARING COURSE	1½"	SPECIAL PROVISION (BITUMINOUS CONCRETE PAVEMENT, SMALL QUANTITY) (TYPE IVS)
BINDER COURSE	1½"	SPECIAL PROVISION (BITUMINOUS CONCRETE PAVEMENT, SMALL QUANTITY) (TYPE IVS)
BASE COURSE #2	N/A	N/A
BASE COURSE #1	3½"	SPECIAL PROVISION (BITUMINOUS CONCRETE PAVEMENT, SMALL QUANTITY) (TYPE IIS)
SUBBASE	36"	SUBBASE OF DENSE GRADED CRUSHED STONE
STONE FILL	4'-0"	STONE FILL, TYPE IV
TOPSOIL	4"	TOPSOIL
STREAM BED MATERIAL	3'-0"	SPECIAL PROVISION (E-STONE TYPE E3)

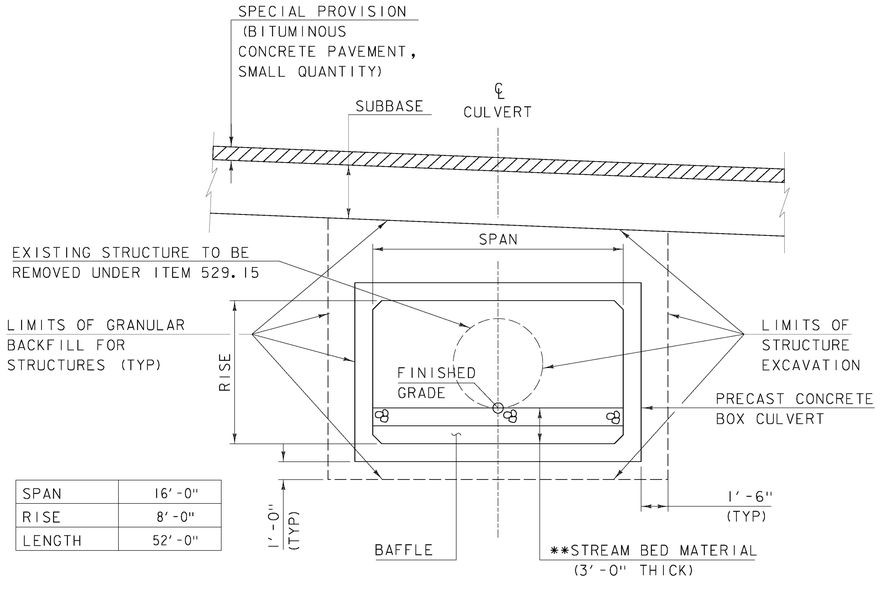


CHANNEL TYPICAL SECTION

NOT TO SCALE

* WHENEVER CHANNEL SLOPE INTERSECTS ROADWAY SUBBASE, GRUBBING MATERIAL SHALL BEGIN AT THE BOTTOM OF SUBBASE.

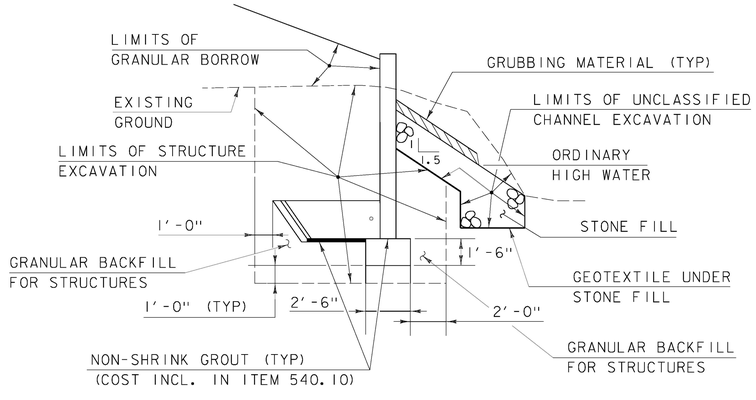
** THE CONTRACTOR SHALL CREATE A LOW FLOW CHANNEL IN THE STREAM BED MATERIAL AS DIRECTED BY THE RESIDENT ENGINEER.



SPAN	16'-0"
RISE	8'-0"
LENGTH	52'-0"

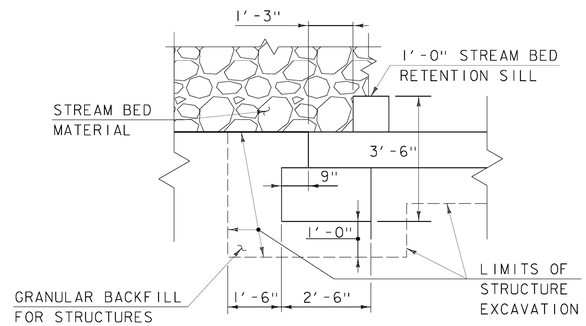
CULVERT TYPICAL SECTION

NOT TO SCALE



WINGWALL EARTHWORK TYPICAL SECTION

NOT TO SCALE



CUTOFF WALL TYPICAL SECTION

NOT TO SCALE

NOTE:

BOTTOM OF WING WALL SHALL BE AT SAME ELEVATION AS BOTTOM OF BOX CULVERT.

GM2 ASSOCIATES

PROJECT NAME: WATERFORD
PROJECT NUMBER: BF 0225(4)

FILE NAME: zl3c268typ.dgn
PROJECT LEADER: T. LEVINS
DESIGNED BY: A. KURDEKAR
TYPICAL SECTIONS

PLOT DATE: 09/27/2017
DRAWN BY: A. KURDEKAR
CHECKED BY: T. LEVINS
SHEET 8 OF 63

GPS CONTROL POINTS

PT #1 REMICK
NORTH = 685606.947
EAST = 1791789.540
ELEV. = 1353.599

GENERAL LOCATION, WATERFORD, VT.
TO REACH FROM THE VT ROUTE 18 BRIDGE OVER INTERSTATE 93 AT EXIT 1 GO SOUTHEAST ALONG VT ROUTE 18 FOR 4.1 MI (6.6 KM) TO THE INTERSECTION OF REMICK ROAD RIGHT AND THE SITE OF THE MARK ON THE RIGHT.
THE MARK IS SET 15 CM (6 INCHES) BELOW GROUND SURFACE IN THE TOP OF A FENO STYLE MONUMENT. IT IS 22.5 M (73.8 FT) WEST OF AND 2.5 M (8.2 FT) HIGHER THAN THE CENTERLINE OF VT ROUTE 18, 13.0 M (42.7 FT) NORTH OF THE CENTERLINE OF REMICK ROAD, 8.7 M (28.5 FT) NORTHWEST OF A ROAD SIGN (LEGAL LOAD LIMIT), 5.5 M (18.0 FT) SOUTH OF A POLE GUY WITH SHEATH AND 8.5 M (27.9 FT) SOUTH-SOUTHWEST OF POLE NO 73-1/250 AND A POLE STUB AND A FIBERGLASS WITNESS POST.

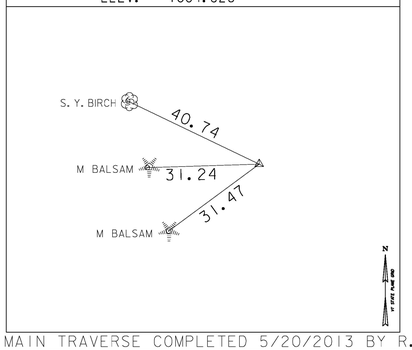
PT #2 REMICK AZ MK
NORTH = 684854.031
EAST = 1793272.968
ELEV. = 1250.614

GENERAL LOCATION, WATERFORD, VT.
TO REACH FROM THE VT ROUTE 18 BRIDGE OVER INTERSTATE 93 AT EXIT 1 GO SOUTHEAST ALONG VT ROUTE 18 FOR 4.1 MI (6.6 KM) TO THE INTERSECTION OF REMICK ROAD RIGHT. CONTINUE STRAIGHT AHEAD AND GO SOUTHEAST ALONG VT ROUTE 18 FOR 0.3 MI (0.5 KM) TO THE SITE OF THE MARK ON THE LEFT.
THE MARK IS SET IN THE TOP OF A 0.5 M (1.6 FT) X 0.7 M (2.3 FT) ROCK OUTCROP WHICH PROJECTS SLIGHTLY ABOVE GROUND SURFACE. IT IS 14.4 M (47.2 FT) NORTHEAST OF AND 0.2 M (0.7 FT) LOWER THAN THE CENTERLINE OF VT ROUTE 18, 9.3 M (30.5 FT) EAST-SOUTHEAST OF THE CENTER OF A 50 CM (20 INCH) SQUARE STEEL DROP INLET, 26.2 M (86.0 FT) SOUTHEAST OF MILE MARKER 0180/0316/0300, 24.8 M (81.4 FT) NORTH OF THE NORTHWEST END OF A STEEL BEAM GUARD RAIL, 62.4 M (204.7 FT) NORTHWEST OF AN ANGLE POINT WITH BRACES IN A WIRE RIGHT-OF-WAY FENCE AND 2.1 M (6.9 FT) SOUTHWEST OF THE RIGHT-OF-WAY FENCE AND A FIBERGLASS WITNESS POST.

TRAVERSE TIES

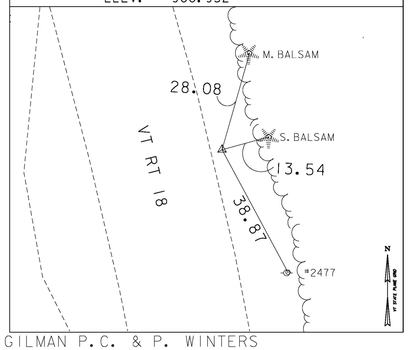
HVCTRL #6

NORTH =681770.531
EAST =1795350.982
ELEV. = 1004.826



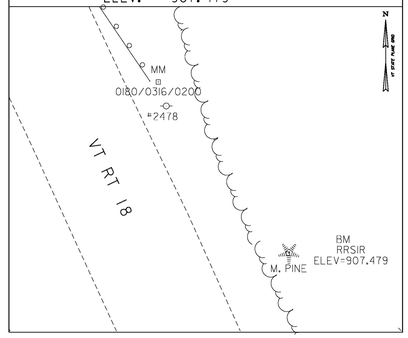
HVCTRL #7

NORTH = 680291.218
EAST = 1796122.684
ELEV. = 900.952



BM #1315

NORTH = 680496.387
EAST = 1796070.057
ELEV. = 907.479



NORTH =
EAST =
ELEV. =

NORTH =
EAST =
ELEV. =

MAIN TRAVERSE COMPLETED 5/20/2013 BY R. GILMAN P.C. & P. WINTERS

ALIGNMENT TIES

NORTH =
EAST =
ELEV. =

NORTH =
EAST =
ELEV. =

NORTH =
EAST =
ELEV. =

NORTH =
EAST =
ELEV. =

NORTH =
EAST =
ELEV. =

DATUM
VERTICAL NAVD 88
HORIZONTAL NAD83(2011)
ADJUSTMENT COMPASS

PROJECT NAME: WATERFORD
PROJECT NUMBER: BF 0225(4)

FILE NAME: survey\x13C268T1.dgn
PROJECT LEADER: C. WILLIAMS
DESIGNED BY: VTRANS
TIE SHEET

PLOT DATE: 09/27/2017
DRAWN BY: C. CYR
CHECKED BY: P. BEYOR
SHEET 9 OF 63

BUCKLAND FINE SANDY LOAM, VERY STONY
15% - 35% SLOPES
HIGHLY ERODIBLE
"K" VALUE = 0.43

BUCKLAND FINE SANDY LOAM, VERY STONY
8% - 15% SLOPES
POTENTIALLY HIGHLY ERODIBLE
"K" VALUE = 0.43

VT STATE PLANE GRID

N

EXISTING ROW

MAD BROOK FLOW

UNNAMED BROOK FLOW

STATE OF VERMONT
PROJECT FAP 70-E
1942

VT 18
TO NEW HAMPSHIRE

104+00

105+00

106+00

107+00

108+00

109+00

VT 18
TO ST. JOHNSBURY

STATE OF VERMONT
PROJECT FAP 70-C
1941

52+00

51+00

50+00

HVCTRL
102

SIGN
VD-701
BRIDGE 7
VT 18

HVCTRL
101

HVCTRL
100

TEL
2478

TEL
2479

TEL MILE MARKER
0180
036
020D

GUYW

BENCHMARK
RR SPIKE IN ROOT
ELEV. = 907.48

CABOT SILT LOAM, VERY STONY
8% - 15% SLOPES
POTENTIALLY HIGHLY ERODIBLE
"K" VALUE = 0.32

EXISTING BRIDGE DATA
SLAB BRIDGE WIDENED WITH BOX CULVERT
LENGTH = 12 FT
WIDTH = 32 FT CURB TO CURB
BUILT IN 1938

EXISTING CONDITIONS

SCALE 1" = 20'-0"
20 0 20

GM2 ASSOCIATES

PROJECT NAME:	WATERFORD
PROJECT NUMBER:	BF 0225(4)
FILE NAME:	z13c268erobdr.dgn
PROJECT LEADER:	T. LEVINS
DESIGNED BY:	A. KURDEKAR
EXISTING CONDITIONS	
PLOT DATE:	09/27/2017
DRAWN BY:	A. KURDEKAR
CHECKED BY:	T. LEVINS
SHEET	10 OF 63

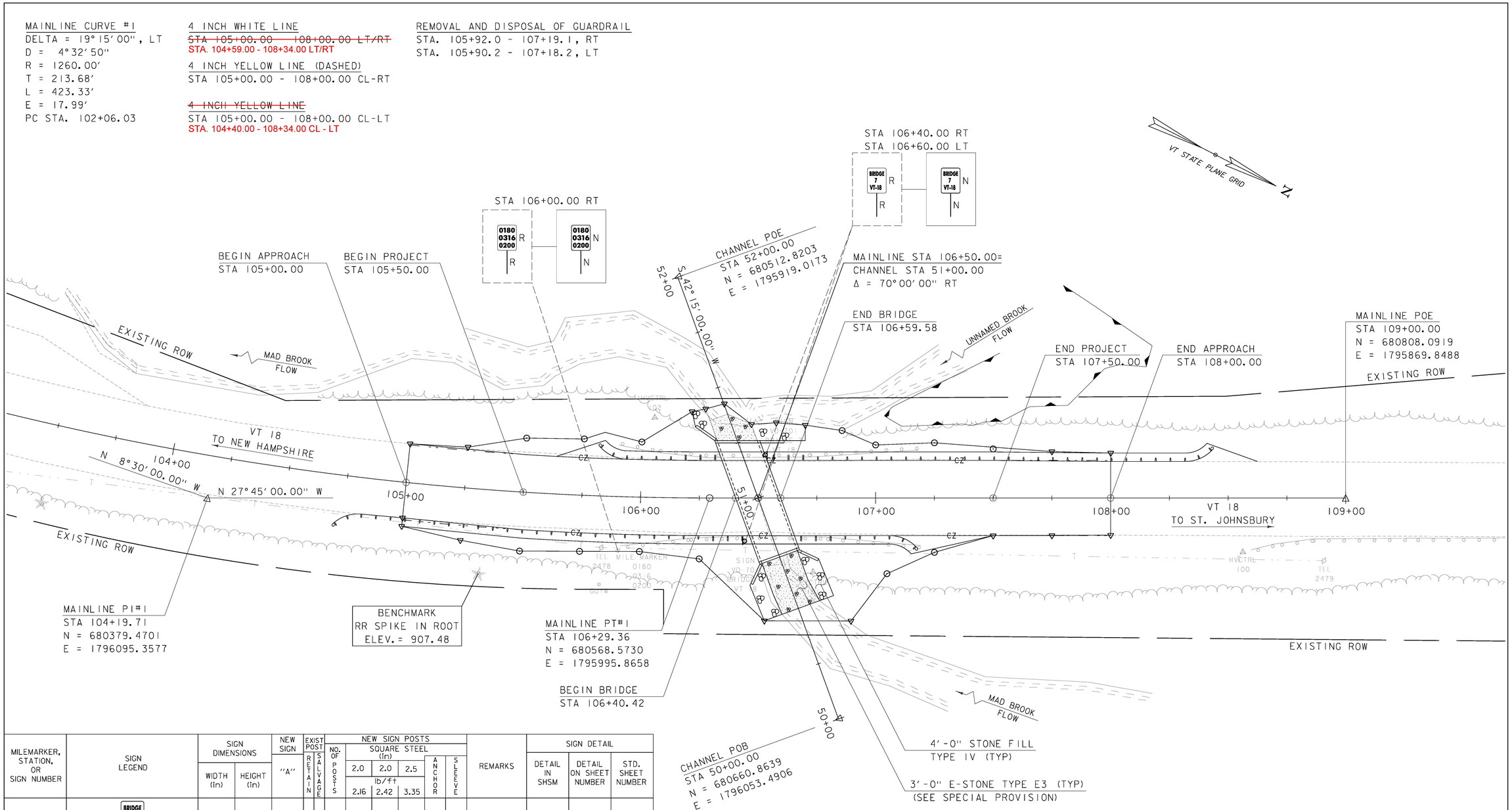
MAINLINE CURVE #1
DELTA = 19°15'00", LT
D = 4°32'50"
R = 1260.00'
T = 213.68'
L = 423.33'
E = 17.99'
PC STA. 102+06.03

4 INCH WHITE LINE
~~STA 105+00.00 - 108+00.00 LT/RT~~
STA. 104+59.00 - 108+34.00 LT/RT

4 INCH YELLOW LINE (DASHED)
STA 105+00.00 - 108+00.00 CL-RT

~~4 INCH YELLOW LINE~~
STA 105+00.00 - 108+00.00 CL-LT
STA. 104+40.00 - 108+34.00 CL - LT

REMOVAL AND DISPOSAL OF GUARDRAIL
STA. 105+92.0 - 107+19.1, RT
STA. 105+90.2 - 107+18.2, LT



MILEMARKER, STATION, OR SIGN NUMBER	SIGN LEGEND	SIGN DIMENSIONS WIDTH (In)	SIGN DIMENSIONS HEIGHT (In)	NEW SIGN "A"	EXIST POST RETAIN	EXIST POST SALVAGE	NEW SIGN POSTS NO. OF POSTS	SQUARE STEEL (In) 2.0 lb/ft 2.16	2.0 lb/ft 2.42	2.5 lb/ft 3.35	ANCHOR	SLEEVE	REMARKS	SIGN DETAIL DETAIL IN SHSM	DETAIL ON SHEET NUMBER	STD. SHEET NUMBER
106+40.00 RT	BRIDGE 7 VT-18	6	10	0.42			1	8			X		VD-701			T-42
106+60.00 LT	BRIDGE 7 VT-18	6	10	0.42			1	8			X		VD-701			T-42
106+00.00 RT	0180 0316 0200	6	10	0.42			1	8			X		VD-700			T-44
								FT 24	FT	FT		EA				
TOTALS				SF 1.25					FT 24							

FINAL POST LENGTHS ARE TO BE DETERMINED IN THE FIELD. POST SIZES ARE COMPUTED BASED ON INFORMATION FURNISHED ON THE STANDARD SHEETS AND THE VTRANS "SIGN POST DESIGN GUIDELINE."

SIGN LEGEND
N = NEW
R = REMOVE
S = SALVAGE
RET = RETAIN

SHSM = STANDARD HIGHWAY SIGNS AND MARKINGS (MUTCD) (APPROVED BY THE FHWA)

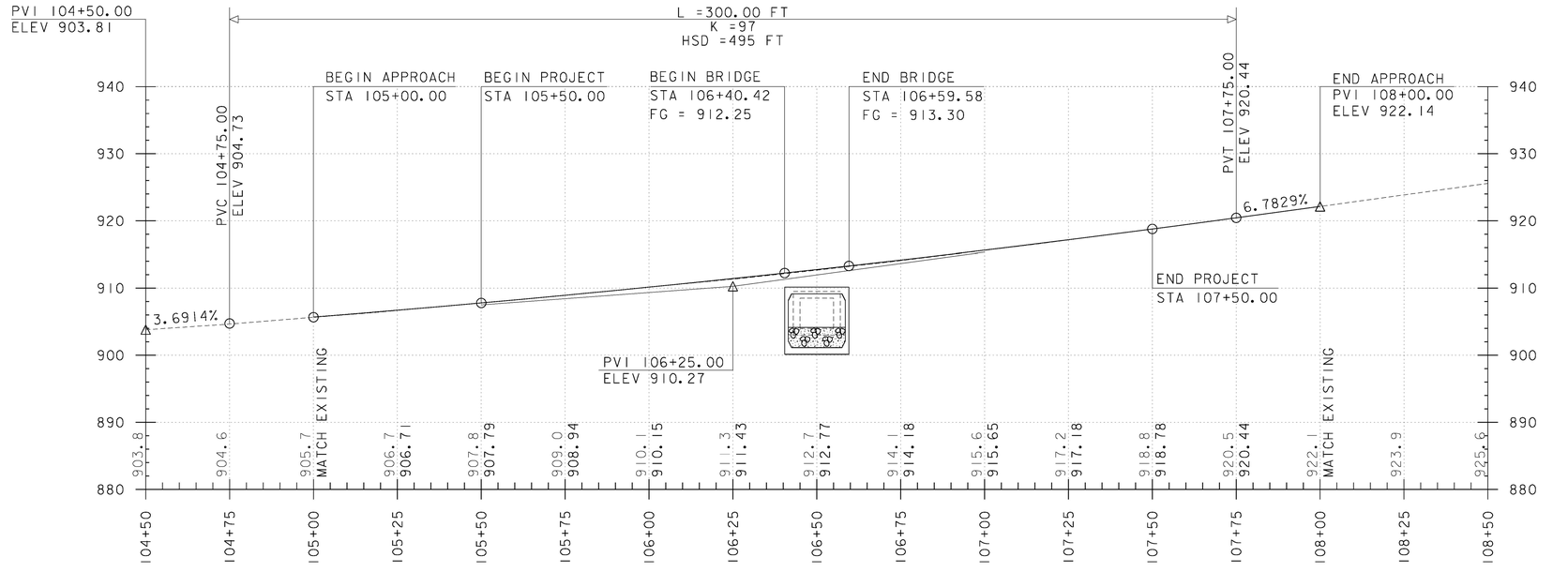
LAYOUT
SCALE 1" = 20'-0"
20 0 20

GM2 ASSOCIATES

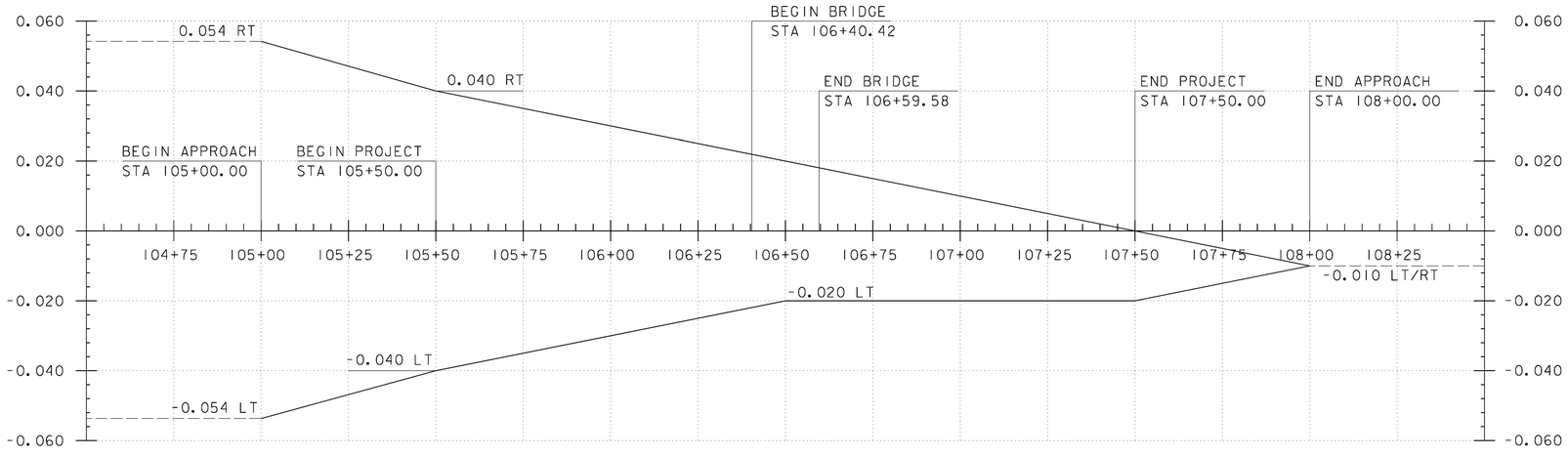
PROJECT NAME: WATERFORD
PROJECT NUMBER: BF 0225(4)

FILE NAME: zl3c268bdr.dgn
PROJECT LEADER: T. LEVINS
DESIGNED BY: J. MERCER
LAYOUT SHEET

PLOT DATE: 09/27/2017
DRAWN BY: J. MERCER
CHECKED BY: T. LEVINS
SHEET 11 OF 63



MAINLINE PROFILE
HOR. SCALE 1" = 20'-0"
VER. SCALE 1" = 10'-0"



BANKING DIAGRAM
HOR. SCALE 1" = 20'-0"
NO VER. SCALE

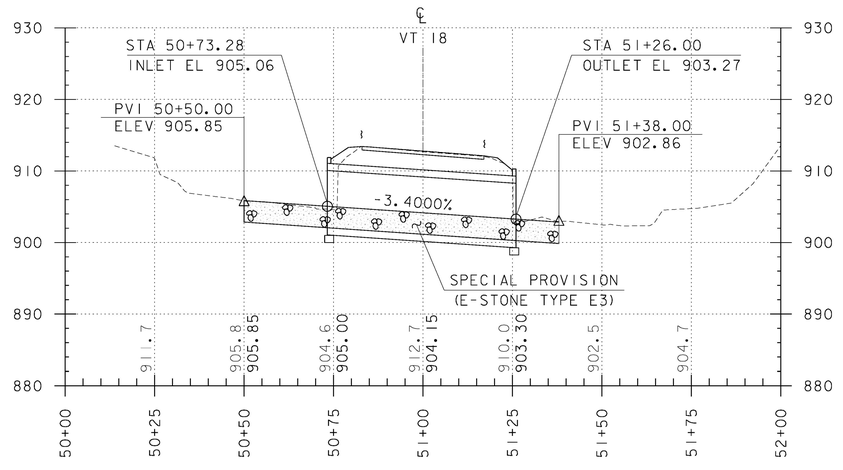
NOTE:

ELEVATIONS SHOWN TO THE NEAREST TENTH ARE EXISTING GROUND ALONG THE PROPOSED ALIGNMENT.

ELEVATIONS SHOWN TO THE NEAREST HUNDREDTH ARE FINISH GRADES ALONG THE PROPOSED ALIGNMENT.

GM2 ASSOCIATES

PROJECT NAME:	WATERFORD
PROJECT NUMBER:	BF 0225(4)
FILE NAME:	z13c268pro.dgn
PROJECT LEADER:	T. LEVINS
DESIGNED BY:	J. MERCER
VT ROUTE 18 PROFILE & BANKING DIAGRAM	
PLOT DATE:	09/27/2017
DRAWN BY:	J. MERCER
CHECKED BY:	T. LEVINS
SHEET	12 OF 63



CHANNEL PROFILE

HOR. SCALE 1" = 20'-0"
VER. SCALE 1" = 10'-0"

NOTE:

ELEVATIONS SHOWN TO THE NEAREST TENTH ARE EXISTING GROUND ALONG THE PROPOSED ALIGNMENT.

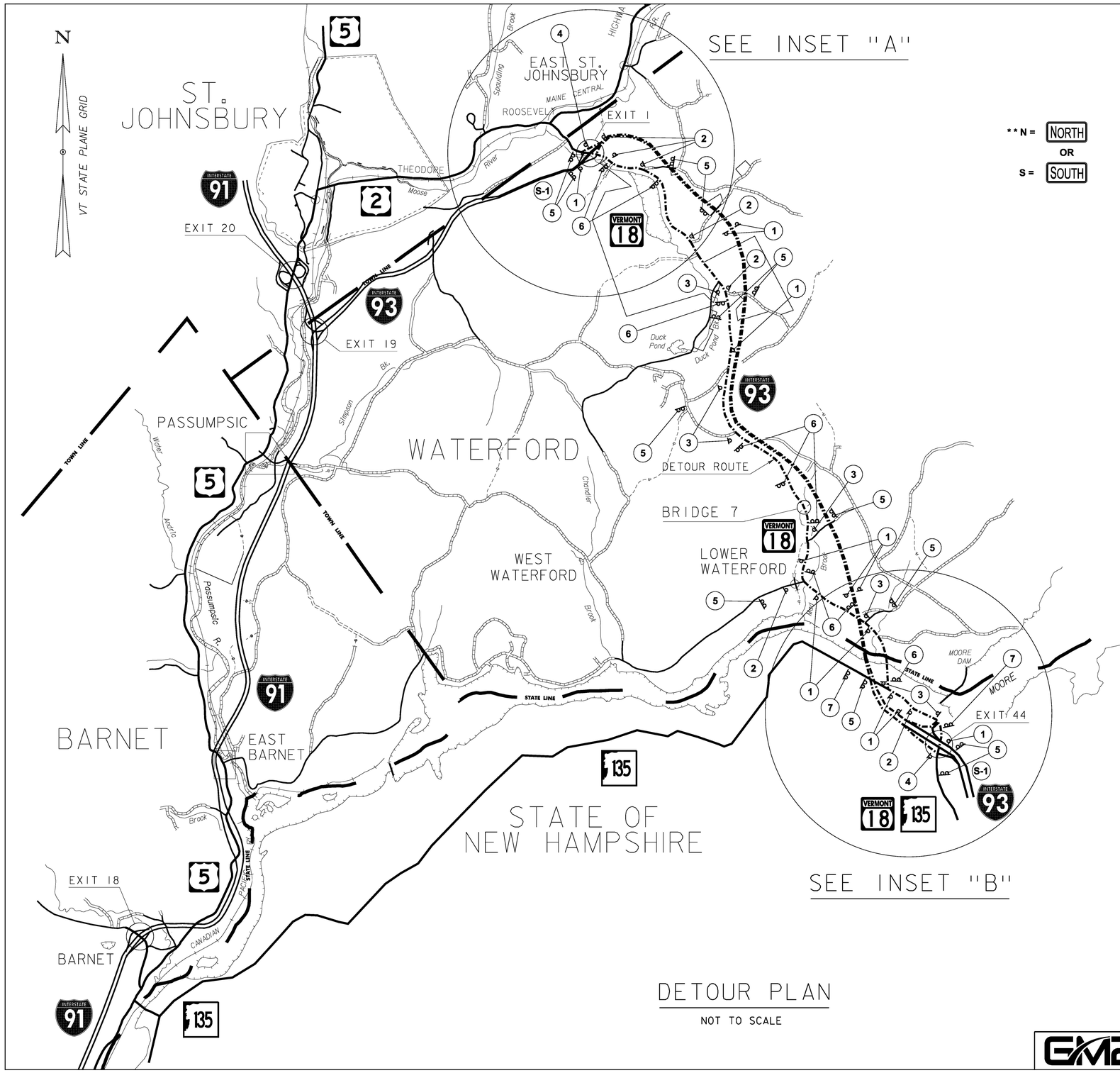
ELEVATIONS SHOWN TO THE NEAREST HUNDREDTH ARE FINISH GRADES ALONG THE PROPOSED ALIGNMENT.

GM2 ASSOCIATES

PROJECT NAME: WATERFORD
PROJECT NUMBER: BF 0225(4)

FILE NAME: zI3c268pro.dgn
PROJECT LEADER: T. LEVINS
DESIGNED BY: J. MERCER
CHANNEL PROFILE

PLOT DATE: 09/27/2017
DRAWN BY: J. MERCER
CHECKED BY: T. LEVINS
SHEET I3 OF 63

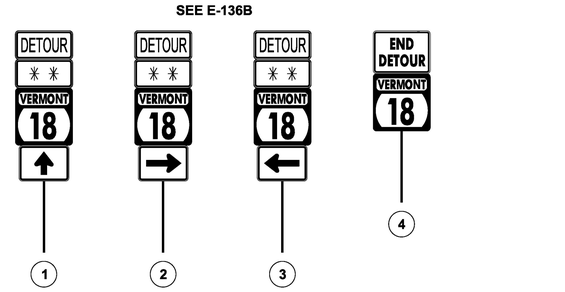


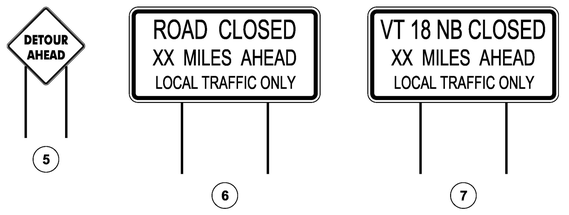
DETOUR PLAN

NOT TO SCALE

**N = NORTH OR S = SOUTH

SEE E-136B





V	T		1	8		
C	L	O	S	E	D	
N	O	R	T	H		O F

PHASE 1

M	A	D	B	R	O	O K
U	S	E		I	-	9 3
D	E	T	O	U	R	

PHASE 2

F	R	I		M	/	D D
6	P	M	-		M	O N
M	/	D D		6	A	M

PHASE 3

* M = MONTH
DD = DAY

S-1

DETOUR ROUTE

NOTES:
1. SEE DETOUR (2) SHEET FOR INSETS.

GM2 ASSOCIATES

PROJECT NAME:	WATERFORD
PROJECT NUMBER:	BF 0225(4)
FILE NAME: z13c268detour1.dgn	PLOT DATE: 09/27/2017
PROJECT LEADER: T.LEVINS	DRAWN BY: B.WILLIAMS
DESIGNED BY: J.MERCER	CHECKED BY: J.MERCER
DETOUR (1)	SHEET 14 OF 63

NOTES:

1. THE PORTABLE CHANGEABLE MESSAGE SIGNS SHALL BE FULLY OPERATIONAL A MINIMUM OF TWO WEEKS PRIOR TO CLOSURE OF VT 18. PAYMENT SHALL BE MADE UNDER THE CURRENT UNIT PRICE BID ITEM 641.15, PORTABLE CHANGEABLE MESSAGE SIGN.

2. ELIMINATE PHASE 3 FOR S-1 DURING ACTUAL CLOSURE.

3. DETOUR SIGNS SHALL BE LOCATED ADJACENT TO EXISTING INTERSECTION ROUTE MARKER ASSEMBLIES WHERE APPLICABLE.

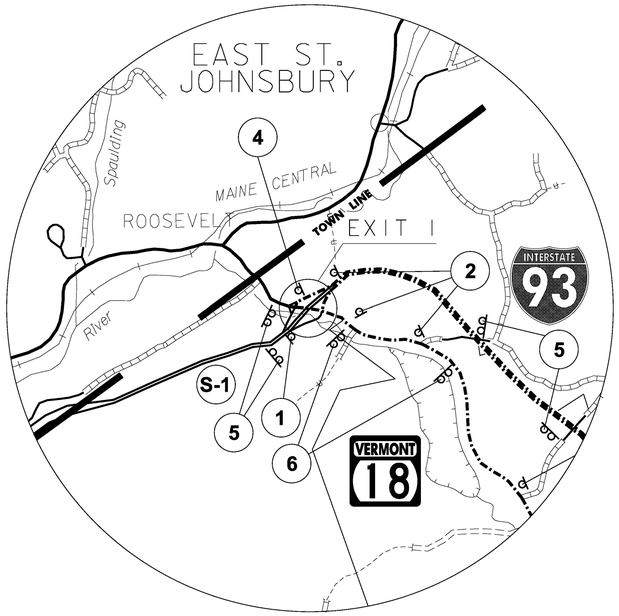
4. COVER ANY CONFLICTING EXISTING SIGNS AS DIRECTED BY THE ENGINEER.

5. CONFIRMATION ROUTE MARKERS (SIGN I) SHALL BE INSTALLED IMMEDIATELY FOLLOWING EACH TURN AND AT ALL LOCATIONS ALONG THE DETOUR WHERE ROUTE MARKERS EXIST FOR THE PARENT ROUTE.

6. DETOUR SIGNING IS THE RESPONSIBILITY OF THE CONTRACTOR. PAYMENT FOR ALL TEMPORARY TRAFFIC CONTROL DEVICES FOR IMPLEMENTING THE DETOUR, INCLUDING BUT NOT LIMITED TO SIGNS AND BARRICADES, WILL BE INCLUDED IN THE UNIT PRICE BID FOR ITEM 900.645, SPECIAL PROVISION (TRAFFIC CONTROL, ALL-INCLUSIVE).

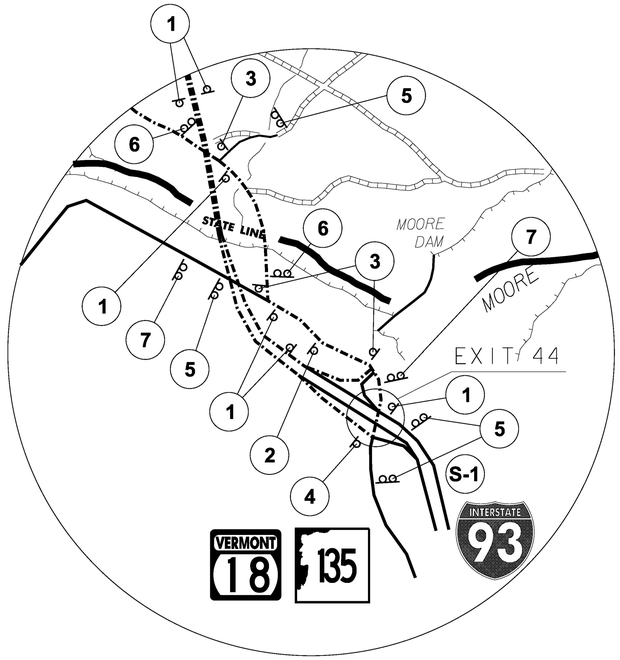
7. THE MANAGEMENT OF TEMPORARY FACILITIES SHOULD BE GIVEN SUFFICIENT ATTENTION. IT IS IMPORTANT THAT CYCLIST'S ROUTES ARE FREE OF RUTS, SAND, AND MUD TO PREVENT CYCLIST'S CRASHES.

8. BICYCLES TRAVELING THROUGH THE WORK ZONE SHALL FOLLOW THE RULES OF THE ROAD JUST LIKE A MOTORIST. FLAGGER PERSONNEL MAY ASK RIDERS TO GO LAST TO ENSURE THEIR SAFETY.



INSET "A"





INSET "B"

INSETS
NOT TO SCALE

SIGN LEGEND	SIGN DIMENSIONS (NON-INTERSTATE)		SIGN DIMENSIONS (INTERSTATE)		SIGN COLOR	
	WIDTH (in)	HEIGHT (in)	WIDTH (in)	HEIGHT (in)	LETTERING	BACKGROUND
DETOUR M4-8	24	12	30	15	BLACK	ORANGE
NORTH M3-2 SOUTH M3-4	24	12	36	18	GREEN	WHITE
VERMONT 18 E-136B	24	24	36	36	GREEN	WHITE
M6-3 M6-1L	21	15	30	21	BLACK	ORANGE
END DETOUR M4-8A	24	18			BLACK	ORANGE
DETOUR AHEAD W20-2	48	48			BLACK	ORANGE
ROAD CLOSED XX MILES AHEAD LOCAL TRAFFIC ONLY R11-3A W/FLAGS	60	30			BLACK	WHITE

GM2 ASSOCIATES

PROJECT NAME: WATERFORD
PROJECT NUMBER: BF 0225(4)

FILE NAME: z13c268detour2.dgn
PROJECT LEADER: T.LEVINS
DESIGNED BY: J.MERCER
DETOUR (2)

PLOT DATE: 09/27/2017
DRAWN BY: B.WILLIAMS
CHECKED BY: J.MERCER
SHEET 15 OF 63

SOIL CLASSIFICATION

AASHTO	
A1	Gravel and Sand
A3	Fine Sand
A2	Silty or Clayey Gravel and Sand
A4	Silty Soil - Low Compressibility
A5	Silty Soil - Highly Compressible
A6	Clayey Soil - Low Compressibility
A7	Clayey Soil - Highly Compressible

ROCK QUALITY DESIGNATION

R.Q.D. (%)	ROCK DESCRIPTION
<25	Very Poor
25 to 50	Poor
51 to 75	Fair
76 to 90	Good
>90	Excellent

SHEAR STRENGTH

UNDRAINED SHEAR STRENGTH IN P.S.F.	CONSISTENCY
<250	Very Soft
250-500	Soft
500-1000	Med. Stiff
1000-2000	Stiff
2000-4000	Very Stiff
>4000	Hard

CORRELATION GUIDE OF "N" TO DENSITY/CONSISTENCY

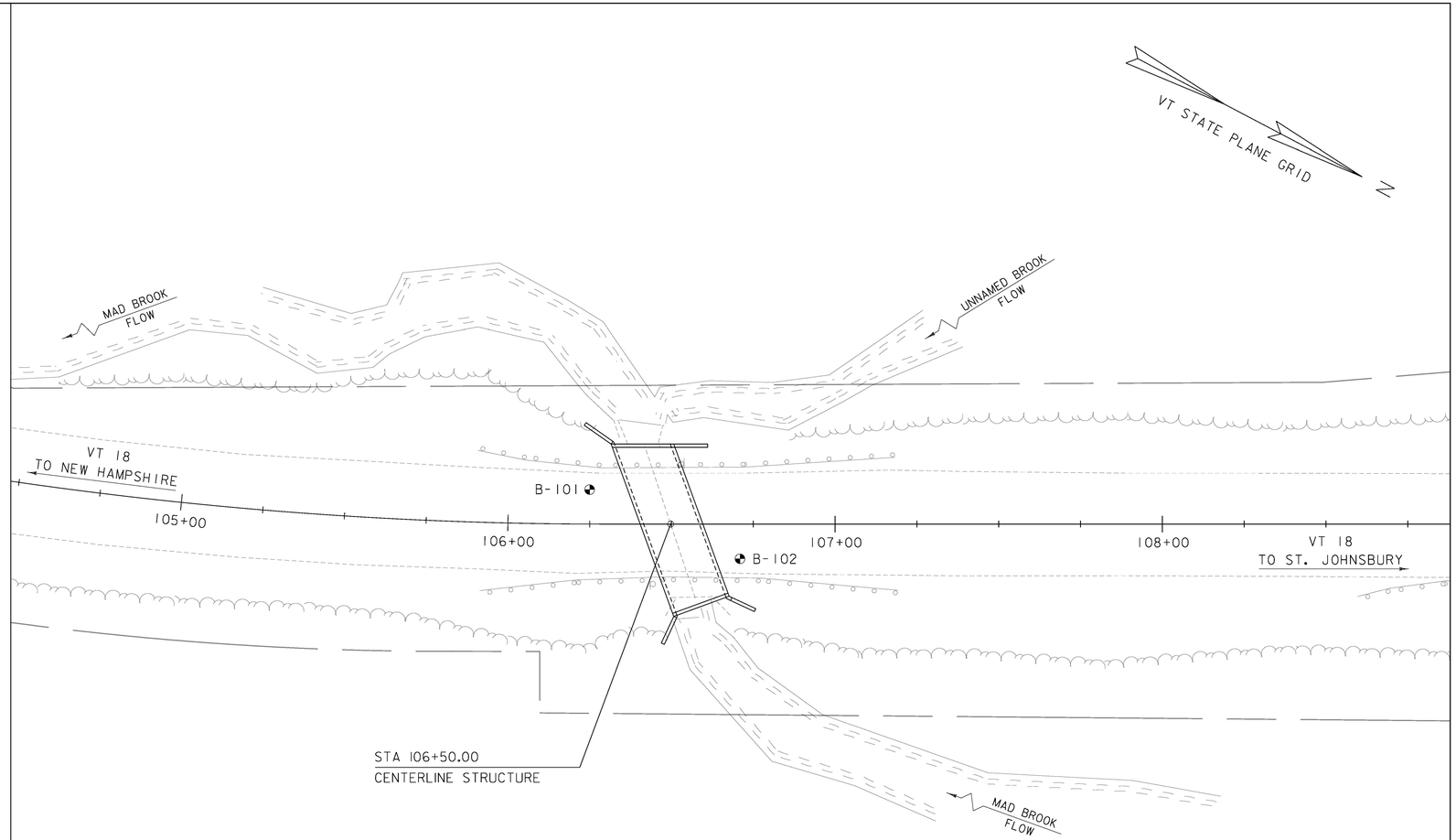
DENSITY (GRANULAR SOILS)		CONSISTENCY (COHESIVE SOILS)	
N	DESCRIPTIVE TERM	N	DESCRIPTIVE TERM
<5	Very Loose	<2	Very Soft
5-10	Loose	2-4	Soft
11-24	Med. Dense	5-8	Med. Stiff
25-50	Dense	9-15	Stiff
>50	Very Dense	16-30	Very Stiff
		31-60	Hard
		>60	Very Hard

COMMONLY USED SYMBOLS

▼	Water Elevation
◔	Standard Penetration Boring
⊕	Auger Boring
⊙	Rod Sounding
S	Sample
N	Standard Penetration Test Blow Count Per Foot For: 2" O.D. Sampler 1 3/8" I.D. Sampler Hammer Weight Of 140 Lbs. Hammer Fall Of 30"
VS	Field Vane Shear Test
US	Undisturbed Soil Sample
B	Blast
DC	Diamond Core
MD	Mud Drill
WA	Wash Ahead
HSA	Hollow Stem Auger
AX	Core Size 1 1/8"
BX	Core Size 1 5/8"
NX	Core Size 2 1/8"
M	Double Tube Core Barrel Used
LL	Liquid Limit
PL	Plastic Limit
PI	Plasticity Index
NP	Non Plastic
w	Moisture Content (Dry Wgt. Basis)
D	Dry
M	Moist
MTW	Moist To Wet
W	Wet
Sat	Saturated
Bo	Boulder
Gr	Gravel
Sa	Sand
Si	Silt
Cl	Clay
HP	Hardpan
Le	Ledge
NLTD	No Ledge To Depth
CNPF	Can Not Penetrate Further
TLOB	Top of Ledge Or Boulder
NR	No Recovery
Rec.	Recovery
%Rec.	Percent Recovery
RQD	Rock Quality Designation
CBR	California Bearing Ratio
<	Less Than
>	Greater Than
R	Refusal (N > 100)
VTSPG	NAD83 - See Note 7

COLOR

blk	Black	pnk	Pink
bl	Blue	pu	Purple
brn	Brown	rd	Red
dk	Dark	tn	Tan
gry	Gray	wh	White
gn	Green	yel	Yellow
lt	Light	mltc	Multicolored
or	Orange		



BORING LAYOUT

SCALE 1" = 20'-0"

20 0 20

DEFINITIONS (AASHTO)

BEDROCK (LEDGE) - Rock in its native location of indefinite thickness.

BOULDER - A rock fragment with an average dimension > 12 inches.

COBBLE - Rock fragments with an average dimension between 3 and 12 inches.

GRAVEL - Rounded particles of rock < 3" and > 0.0787" (#10 sieve).

SAND - Particles of rock < 0.0787" (#10 sieve) and > 0.0029" (#200 sieve).

SILT - Soil < 0.0029" (#200 sieve), non or slightly plastic and exhibits no strength when air-dried.

CLAY - Fine grained soil, exhibits plasticity when moist and considerable strength when air-dried.

VARVED - Alternate layers of silt and clay.

HARDPAN - Extremely dense soil, cemented layer, not softened when wet.

MUCK - Soft organic soil (containing > 10% organic material.

MOISTURE CONTENT - Weight of water divided by dry weight of soil.

FLOWING SAND - Granular soil so saturated (loose) that it flows into drill casing during extraction of wash rod.

STRIKE - Angle from magnetic north to line of intersection of bed with a horizontal plane.

DIP - Inclination of bed with a horizontal plane.

GENERAL NOTES

1. The subsurface explorations shown herein were made between 4-1-14 and 4-4-14 by the Agency.
2. Soil and rock classifications, properties and descriptions are based on engineering interpretation from available subsurface information by the Agency and may not necessarily reflect actual variations in subsurface conditions that may be encountered between individual boring or sample locations.
3. Observed water levels and/or conditions indicated are as recorded at the time of exploration and may vary according to the prevailing rainfall, methods of exploration and other factors.
4. Engineering judgment was exercised in preparing the subsurface information presented herein. Analysis and interpretation of subsurface data was performed and interpreted for Agency design and estimating purposes. Presentation of the information in the Contract is intended to provide the Contractor access to the same data available to the Agency. The subsurface information is presented in good faith and is not intended as a substitute for personal investigation, independent interpretation, independent analysis or judgment by the Contractor.
5. Pictorial structure details shown on the boring plan layout or soils profile are for illustrative purposes only and may not accurately portray final contract details.
6. Terminology used on boring logs to describe the hardness, degree of weathering, and spacing of fractures, joints and other discontinuities in the bedrock is defined in the AASHTO Manual on Subsurface Investigations, 1988.
7. Northing and Easting coordinates are shown in Vermont State Plane Grid North American Datum 1983 in meters and survey feet.

BORING CHART

HOLE NO.	SURV. STATION	OFFSET	GROUND ELEV.	ELEV. TLOB
B-101	106+25	-11.0	911.10	882.80
B-102	106+71	10.0	914.10	873.10

PROJECT NAME: WATERFORD

PROJECT NUMBER: BF 0225(4)

FILE NAME: zl3c268borinfo.dgn
PROJECT LEADER: T. LEVINS
DESIGNED BY: A. KURDEKAR
BORING INFORMATION SHEET

PLOT DATE: 09/27/2017
DRAWN BY: A. KURDEKAR
CHECKED BY: T. LEVINS
SHEET 16 OF 63

STATE OF VERMONT
AGENCY OF TRANSPORTATION
CONSTRUCTION AND
MATERIALS BUREAU
CENTRAL LABORATORY

BORING LOG

WATERFORD
BF 0225(4)
VT-18 BR-7

Boring No.: **B-101**
Page No.: 1 of 2
Pin No.: 13C268
Checked By: MLM

Boring Crew: JUDKINS, DAIGNEAULT
Date Started: 4/01/14 Date Finished: 4/02/14
VTSPG NAD83: N 680559.75 ft E 1795988.59 ft
Station: 106+25 Offset: -11.00
Ground Elevation: 911.1 ft

	Casing	Sampler
Type:	WB	SS
I.D.:	4 in	1.5 in
Hammer Wt:	N.A.	140 lb.
Hammer Fall:	N.A.	30 in.
Hammer/Rod Type:	Auto/AWJ	
Rig:	CME 45C SKID	CE = 1.33

Groundwater Observations

Date	Depth (ft)	Notes
04/01/14	5.0	While drilling.
04/02/14	8.0	Before drilling.

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Run (Dip deg.)	Core Rec. % (RQD %)	Drill Rate minutes/ft	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
		Asphalt Pavement, 0.0 ft - 0.45 ft								
		A-1-b, SiGrSa, Lt/brn, Moist, Rec. = 0.9 ft				22-11-11-16 (22)	9.9	33.5	45.4	21.1
2.5		Field Note:, Roller coned ahead. Cleaned out casing.								
		A-2-4, SiGrSa, Lt/brn, MTW, Rec. = 0.9 ft, Lab Note: Broken Rock was within sample.				24-R@5.0" (R)	23.1	33.6	34.8	31.6
5.0		A-1-a, SaGr, brn, MTW, Rec. = 0.8 ft, NXDC, Cleaned out casing.				48-29-14-R@3.5" (36)	15.0	59.9	25.2	14.9
7.5		A-1-b, SaGr, brn, MTW, Rec. = 1.0 ft				24-14-22-16 (36)	15.3	61.3	22.0	16.7
		A-1-b, SiSaGr, brn-gry, Moist, Rec. = 0.3 ft, Lab Note: Broken Rock was within sample.				35-17-14-11 (31)	10.8	42.7	35.3	22.0
10.0		Field Note:, No Recovery, NXDC, Cobbles				R@1.0" (R)				
BOC EL. 899.54										
12.5		A-4, GrSaSi (HP), gry, Moist, Rec. = 1.6 ft				9-15-16-25 (31)	9.9	23.7	28.1	48.2
15.0		A-4, GrSaSi (HP), gry, Moist, Rec. = 1.0 ft				27-37-26-R@2.5" (63)	9.3	24.1	32.6	43.3
17.5		A-4, SaSi (HP), gry, Moist, Rec. = 1.6 ft				25-34-32-R@2.5" (66)	12.1	6.1	32.1	61.8
		Field Note:, NXDC, Cleaned out casing								
20.0		A-4, SaSi (HP), gry, Moist, Rec. = 1.4 ft				23-32-39-R@1.0" (71)	10.7	12.5	31.1	56.4
		Field Note:, NXDC, Cleaned out casing								

Notes:
1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
<<SUB>><<SUB>> is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations may occur due to other factors than those present at the time measurements were made.

BORING LOG 2 WATERFORD BF 0225(4).GPJ VERMONT AOT.GDT 1/13/17

BOC = APPROX. BOTTOM OF CULVERT

STATE OF VERMONT
AGENCY OF TRANSPORTATION
CONSTRUCTION AND
MATERIALS BUREAU
CENTRAL LABORATORY

BORING LOG

WATERFORD
BF 0225(4)
VT-18 BR-7

Boring No.: **B-101**
Page No.: 2 of 2
Pin No.: 13C268
Checked By: MLM

Boring Crew: JUDKINS, DAIGNEAULT
Date Started: 4/01/14 Date Finished: 4/02/14
VTSPG NAD83: N 680559.75 ft E 1795988.59 ft
Station: 106+25 Offset: -11.00
Ground Elevation: 911.1 ft

	Casing	Sampler
Type:	WB	SS
I.D.:	4 in	1.5 in
Hammer Wt:	N.A.	140 lb.
Hammer Fall:	N.A.	30 in.
Hammer/Rod Type:	Auto/AWJ	
Rig:	CME 45C SKID	CE = 1.33

Groundwater Observations

Date	Depth (ft)	Notes
04/01/14	5.0	While drilling.
04/02/14	8.0	Before drilling.

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Run (Dip deg.)	Core Rec. % (RQD %)	Drill Rate minutes/ft	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
22.5										
25.0		A-4, SaSi (HP), gry, Moist, Rec. = 1.1 ft				23-32-35-R@1.0" (67)	12.2	15.2	28.8	56.0
27.5		28.3 ft - 33.3 ft, Light gray, Fine-grained feldspathic Metasandstone, with thin slaty partings. Hard, Unweathered, Good rock, NXMDC, RMR = 67	1 (35)	100 (64)	5 5 5 6 10	Top of Bedrock @ 28.3 ft				
30.0										
32.5		33.3 ft - 38.3 ft, Light gray, Fine-grained feldspathic Metasandstone, with thin slaty partings. Hard, Unweathered, Good rock, NXMDC, RMR = 67	2 (35)	100 (50)	3 3 3 3 4					
35.0										
37.5		Hole stopped @ 38.3 ft								
40.0		Remarks: Hole collapsed at 7.0 ft.								
42.5										

Notes:
1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
<<SUB>><<SUB>> is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations may occur due to other factors than those present at the time measurements were made.

BORING LOG 2 WATERFORD BF 0225(4).GPJ VERMONT AOT.GDT 1/13/17

GM2 ASSOCIATES

PROJECT NAME: WATERFORD
PROJECT NUMBER: BF 0225(4)

FILE NAME: zl3c268b101.dgn
PROJECT LEADER: T. LEVINS
DESIGNED BY: A. KURDEKAR
BORING LOGS 1

PLOT DATE: 09/27/2017
DRAWN BY: A. KURDEKAR
CHECKED BY: T. LEVINS
SHEET 17 OF 63

STATE OF VERMONT
AGENCY OF TRANSPORTATION
CONSTRUCTION AND
MATERIALS BUREAU
CENTRAL LABORATORY

BORING LOG

WATERFORD
BF 0225(4)
VT-18 BR-7

Boring No.: **B-102**
Page No.: 1 of 2
Pin No.: 13C268
Checked By: MLM

Boring Crew: JUDKINS, DAIGNEAULT, NIETO
Date Started: 4/03/14 Date Finished: 4/04/14
VTSPG NAD83: N 680610.25 ft E 1795985.87 ft
Station: 106+71 Offset: 10.00
Ground Elevation: 914.1 ft

	Casing	Sampler
Type:	WB	SS
I.D.:	4 in	1.5 in
Hammer Wt:	N.A.	140 lb.
Hammer Fall:	N.A.	30 in.
Hammer/Rod Type:		Auto/AWJ
Rig:	CME 45C SKID	CE = 1.33

Groundwater Observations

Date	Depth (ft)	Notes
04/03/14	7.0	End of day.
04/04/14	9.0	Before drilling.
04/04/14	6.6	After drilling.

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Run (Dip deg.)	Core Rec. % (RQD %)	Drill Rate minutes/ft	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
		Field Note:, Asphalt Pavement								
		Visual Description:, SiGrSa, gry, Moist, Rec. = 1.1 ft, Lab Note: Lots of Asphalt Pavement was within sample.				19-29-R@2.5" (R)	9.8			
		A-4, SaSi, Dk/brn, MTW, Rec. = 1.5 ft, Lab Note: Broken Rock was within sample. Roller coned and cleaned out casing.				32-27-30-R@1.0" (57)	24.6	19.0	39.9	41.1
5		Field Note:, No Recovery. Appears to be sandy gravel, Roller coned and cleaned out casing.				19-17-10-7 (27)				
		Field Note:, No Recovery., Roller coned and cleaned out casing.				5-10-20-25 (30)				
10		A-1-b, SaGr, gry, MTW, Rec. = 0.8 ft, Lab Note: Broken Rock was within sample. Roller coned and cleaned out casing.				12-18-19-18 (37)	12.6	50.4	32.9	16.7
		A-4, GrSaSi, tan, Moist, Rec. = 0.3 ft, Lab Note: Broken Rock was within sample. Roller coned and cleaned out casing.				26-R@5.0" (R)	10.2	28.7	30.5	40.8
BOC EL. 900.73		A-4, SaGrSi, gry, Moist, Rec. = 0.8 ft, Lab Note: Broken Rock was within sample. NXDC, Cleaned out casing.				45-21-15-20 (36)	9.8	31.3	30.5	38.2
15		Field Note:, No Recovery, NXDC, Cleaned out casing.				36-15-40-R@2.5" (55)				
		A-4, GrSaSi, gry, Moist, Rec. = 1.2 ft, Lab Note: Broken Rock was within sample. NXDC, Cleaned out casing.				40-27-26-R@0.0" (63)	9.8	22.5	35.4	42.1
20		A-4, SaSi (HP), gry, Moist, Rec. = 1.5 ft				19-25-30-R@3.5" (55)	11.6	3.9	29.6	66.5
25		A-4, SaGrSi (HP), gry, Moist, Rec. = 1.0 ft, Lab Note: Broken Rock was within sample. NXDC, Cleaned out casing.				22-27-18-28 (45)	11.1	24.9	20.7	54.4

Notes:
1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
<<SUB>><<SUB>> is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations may occur due to other factors than those present at the time measurements were made.

BORING LOG 2 WATERFORD BF 0225(4).GPJ VERMONT AOT.GDT 1/13/17

BOC = APPROX. BOTTOM OF CULVERT

STATE OF VERMONT
AGENCY OF TRANSPORTATION
CONSTRUCTION AND
MATERIALS BUREAU
CENTRAL LABORATORY

BORING LOG

WATERFORD
BF 0225(4)
VT-18 BR-7

Boring No.: **B-102**
Page No.: 2 of 2
Pin No.: 13C268
Checked By: MLM

Boring Crew: JUDKINS, DAIGNEAULT, NIETO
Date Started: 4/03/14 Date Finished: 4/04/14
VTSPG NAD83: N 680610.25 ft E 1795985.87 ft
Station: 106+71 Offset: 10.00
Ground Elevation: 914.1 ft

	Casing	Sampler
Type:	WB	SS
I.D.:	4 in	1.5 in
Hammer Wt:	N.A.	140 lb.
Hammer Fall:	N.A.	30 in.
Hammer/Rod Type:		Auto/AWJ
Rig:	CME 45C SKID	CE = 1.33

Groundwater Observations

Date	Depth (ft)	Notes
04/03/14	7.0	End of day.
04/04/14	9.0	Before drilling.
04/04/14	6.6	After drilling.

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Run (Dip deg.)	Core Rec. % (RQD %)	Drill Rate minutes/ft	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
		Field Note:, NXDC, advanced casing								
30		A-4, SaGrSi (HP), gry, Moist, Rec. = 1.1 ft, Lab Note: Broken Rock was within sample. NXDC, Cleaned out casing.				11-14-16-17 (30)	11.9	27.5	22.2	50.3
		Field Note:, NXDC, advanced casing								
35		Field Note:, No Recovery				10-11-R@5.0" (R)				
		Geologist's Note:, Till, (HP), NXMDC, Drill time = 3, 15, 8, 21, minutes per foot.								
40		41.0 ft - 46.0 ft, Dark gray, Slate, Moderately hard, Unweathered, Good rock, NXMDC, RMR = 68	1 (40)	100 (84)	6 6 7 7 8	Top of Bedrock @ 41.0 ft				
45										
50		46.0 ft - 51.0 ft, Dark gray, Slate, Moderately hard, Unweathered, Good rock, NXMDC, RMR = 68	2 (40)	100 (86)	5 6 7 7 7					
		Hole stopped @ 51.0 ft								
55		Remarks: Hole collapsed at 8.2 ft.								

Notes:
1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
<<SUB>><<SUB>> is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations may occur due to other factors than those present at the time measurements were made.

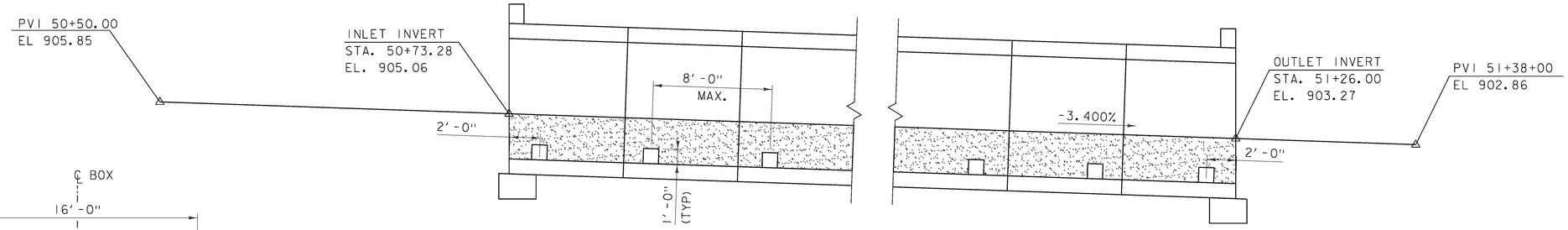
BORING LOG 2 WATERFORD BF 0225(4).GPJ VERMONT AOT.GDT 1/13/17

GM2 ASSOCIATES

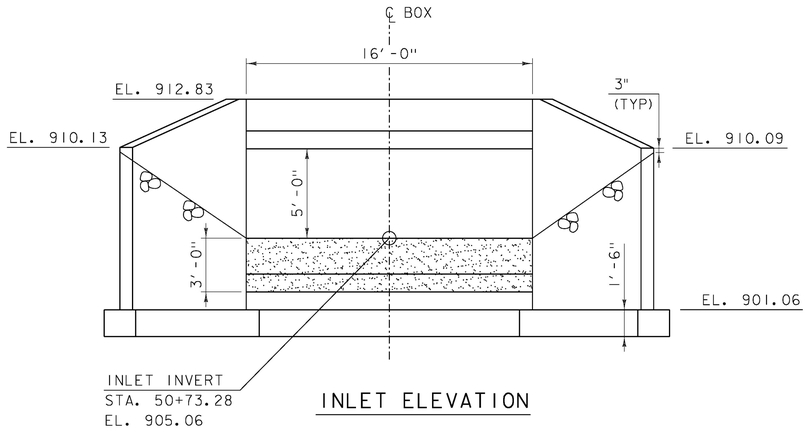
PROJECT NAME: WATERFORD
PROJECT NUMBER: BF 0225(4)

FILE NAME: zl3c268b102.dgn
PROJECT LEADER: T. LEVINS
DESIGNED BY: A. KURDEKAR
BORING LOGS 2

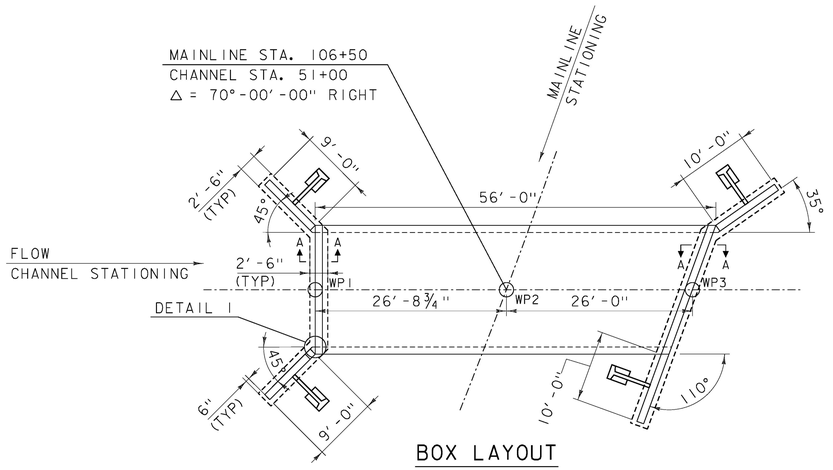
PLOT DATE: 09/27/2017
DRAWN BY: A. KURDEKAR
CHECKED BY: T. LEVINS
SHEET 18 OF 63



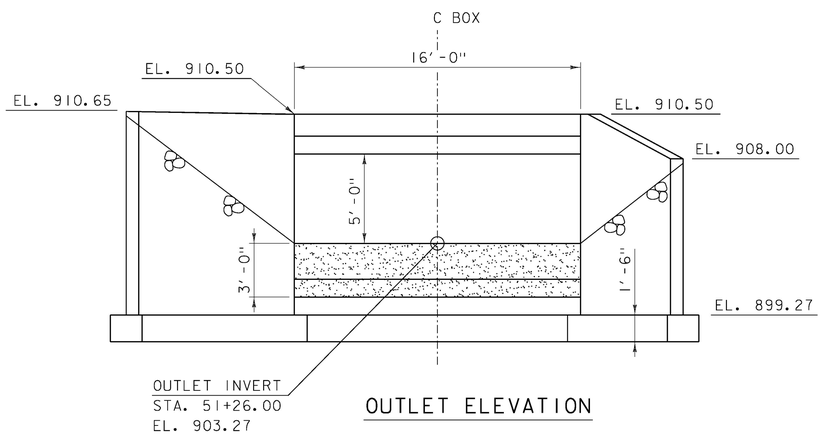
BOX PROFILE



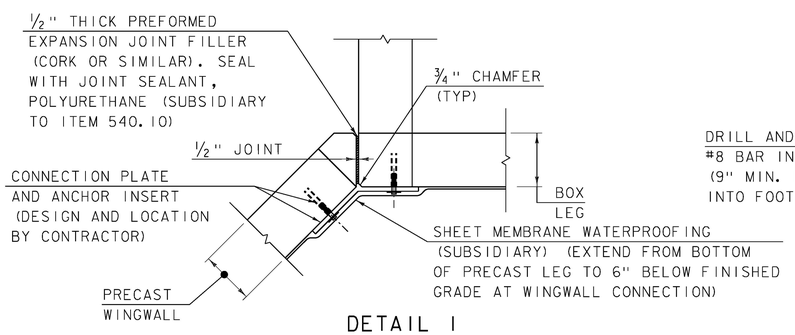
INLET ELEVATION



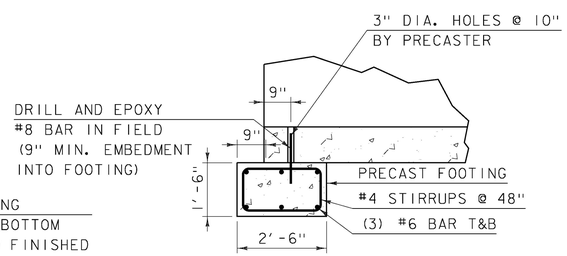
BOX LAYOUT



OUTLET ELEVATION



DETAIL I



SECTION A-A

NOTES:

1. DIMENSIONS SHOWN ARE BASED ON AN ASSUMED WALL THICKNESS OF 1'-0".
2. THE PRECAST BOX SECTIONS ARE SHOWN FOR REFERENCE ONLY. THE ACTUAL DIMENSIONS AND SHAPE WILL BE DEPENDENT ON THE FABRICATOR.

GM2 ASSOCIATES

PROJECT NAME: WATERFORD
PROJECT NUMBER: BF 0225(4)

FILE NAME: zl3c268box.dgn
PROJECT LEADER: T. LEVINS
DESIGNED BY: B. WILLIAMS
BOX LAYOUT

PLOT DATE: 09/27/2017
DRAWN BY: M. DUTTON
CHECKED BY: T. LEVINS
SHEET 19 OF 63

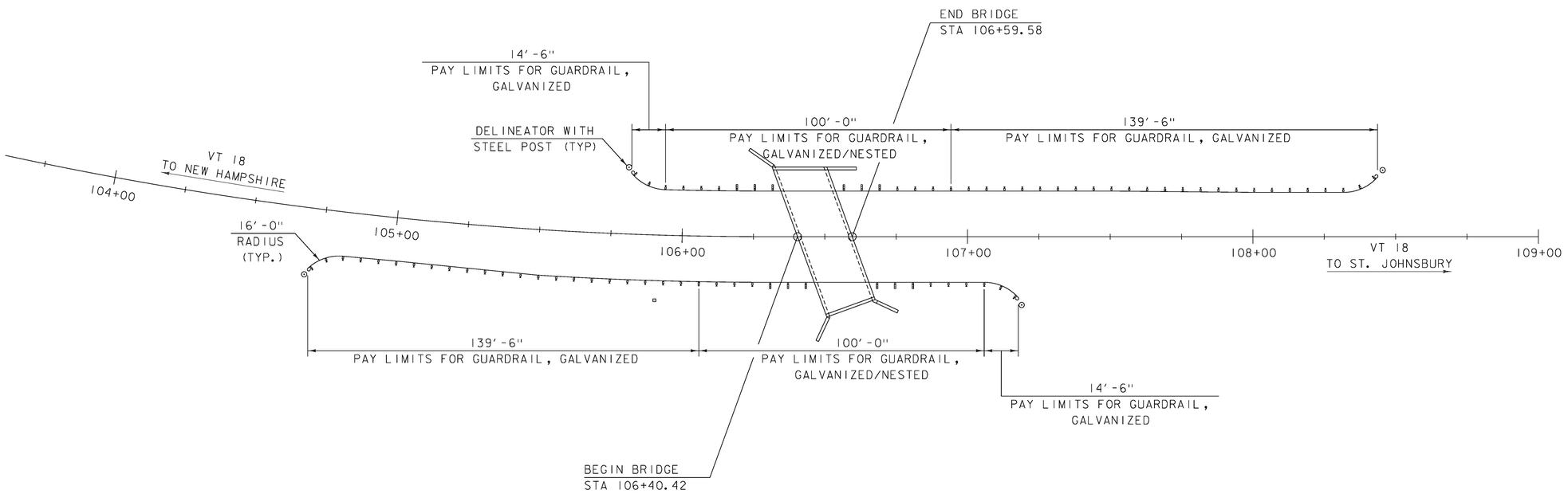
STEEL BEAM GUARDRAIL, GALVANIZED
STA. 104+71.3 - 106+06.1, RT
STA. 107+05.8 - 107+17.6, RT
STA. 105+81.8 - 105+93.7, LT
STA. 106+94.2 - 108+43.4, LT

ANCHOR FOR STEEL BEAM RAIL
STA. 104+78.5, RT
STA. 107+10.4, RT
STA. 105+89.0, LT
STA. 108+36.2, LT

STEEL BEAM GUARDRAIL, GALVANIZED/NESTED
STA. 106+06.1 - 107+05.8, RT
STA. 105+93.7 - 106+94.2, LT

DELINEATOR WITH STEEL POST
STA. 104+70, RT (BLUE)
STA. 105+80, LT (GREEN)
STA. 107+19, RT (GREEN)
STA. 108+45, LT (BLUE)

VT STATE PLANE GRID
N



RAIL LAYOUT

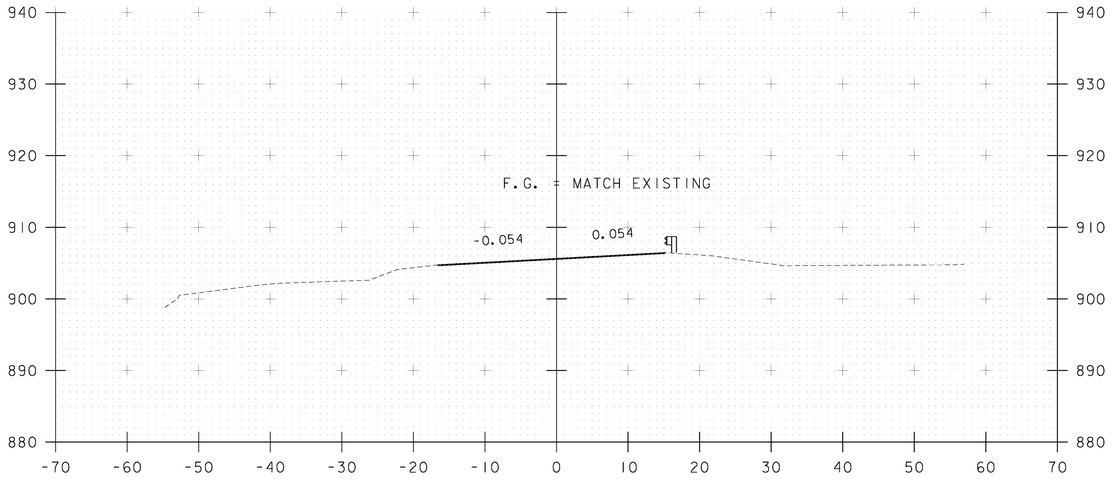
SCALE 1" = 20'-0"
20 0 20

NOTES:

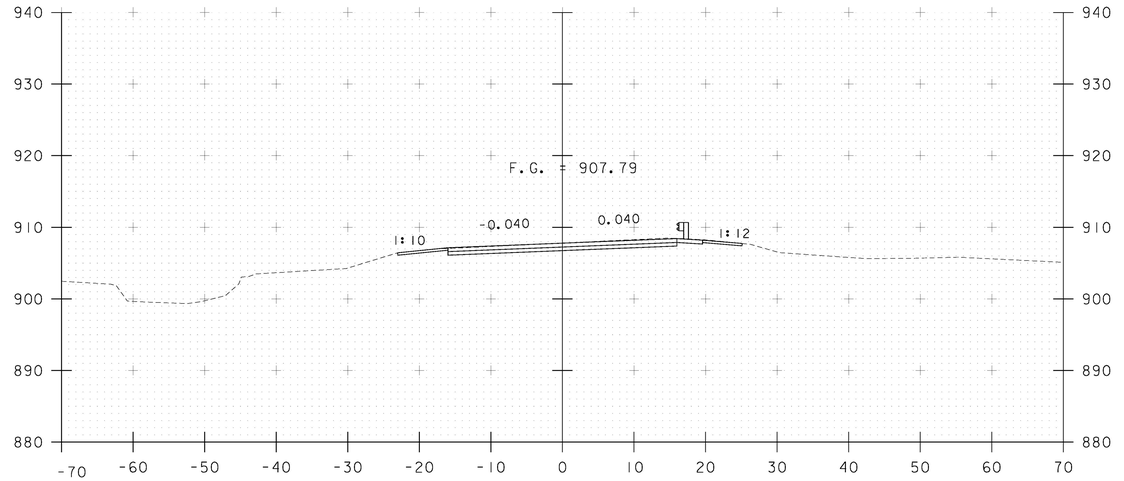
1) SEE STANDARDS G-1 AND G-1d FOR ADDITIONAL INFORMATION.

GM2 ASSOCIATES

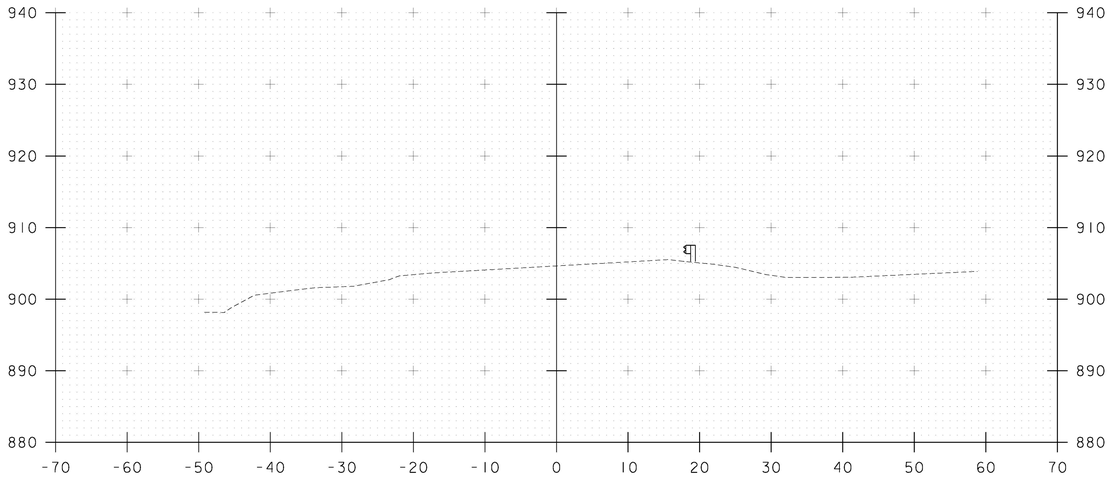
PROJECT NAME: WATERFORD	
PROJECT NUMBER: BF 0225(4)	
FILE NAME: zl3c268rail.dgn	PLOT DATE: 09/27/2017
PROJECT LEADER: T. LEVINS	DRAWN BY: J. MERCER
DESIGNED BY: J. MERCER	CHECKED BY: T. LEVINS
RAIL LAYOUT SHEET	SHEET 20 OF 63



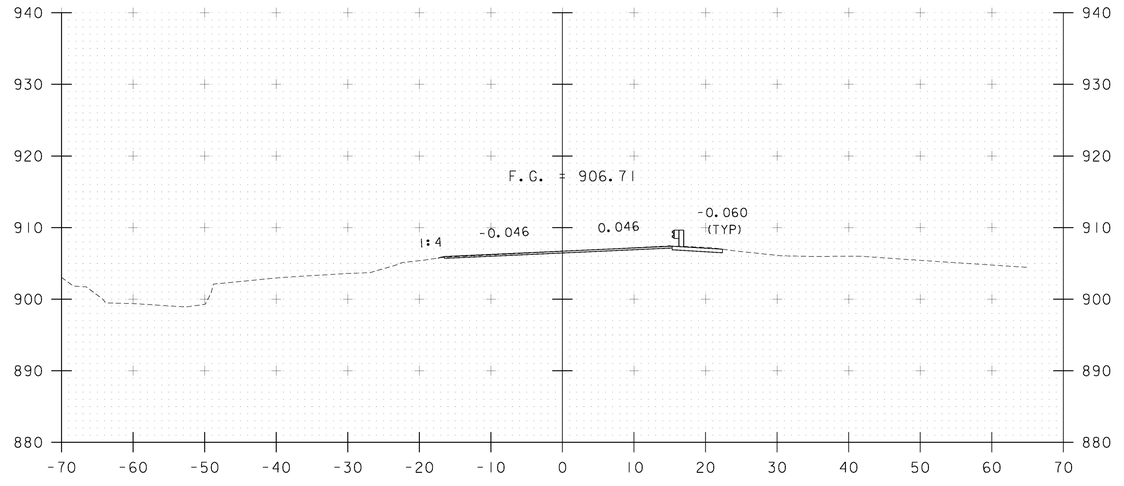
105+00
BEGIN APPROACH



105+50
BEGIN PROJECT



104+75

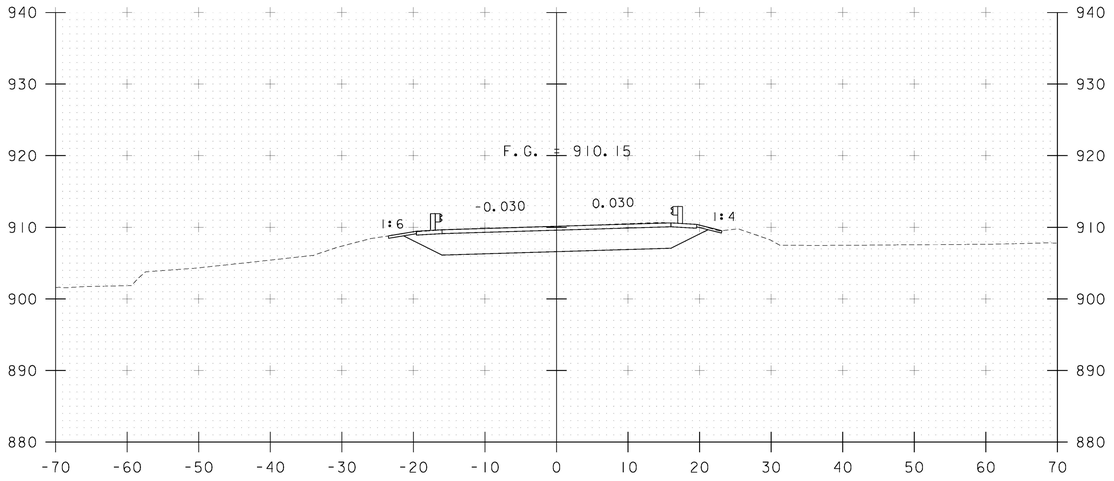


105+25

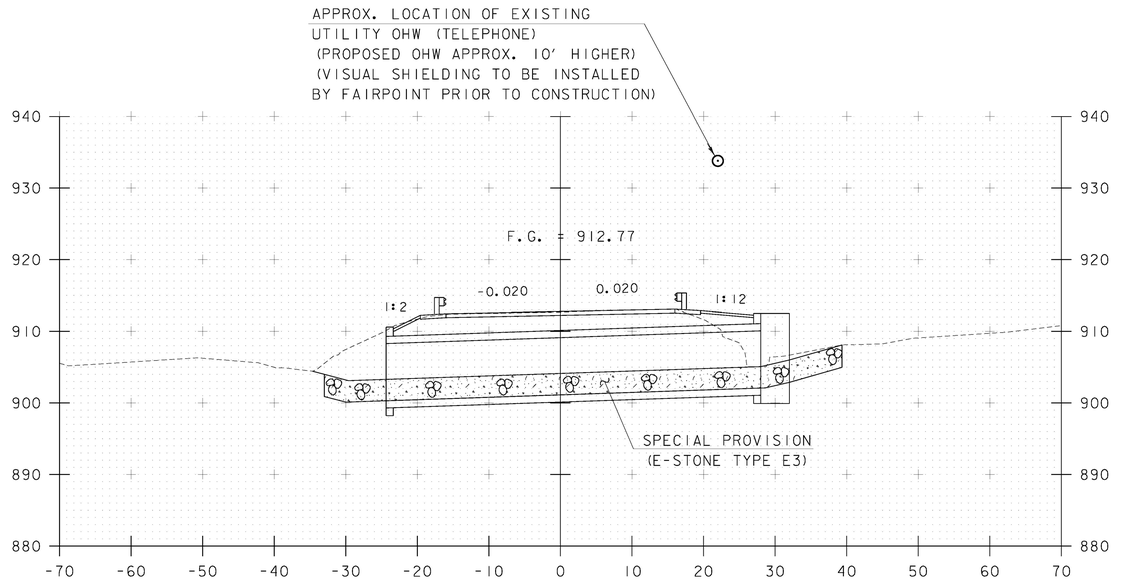
STA. 104+75 TO STA. 105+50

GM2 ASSOCIATES

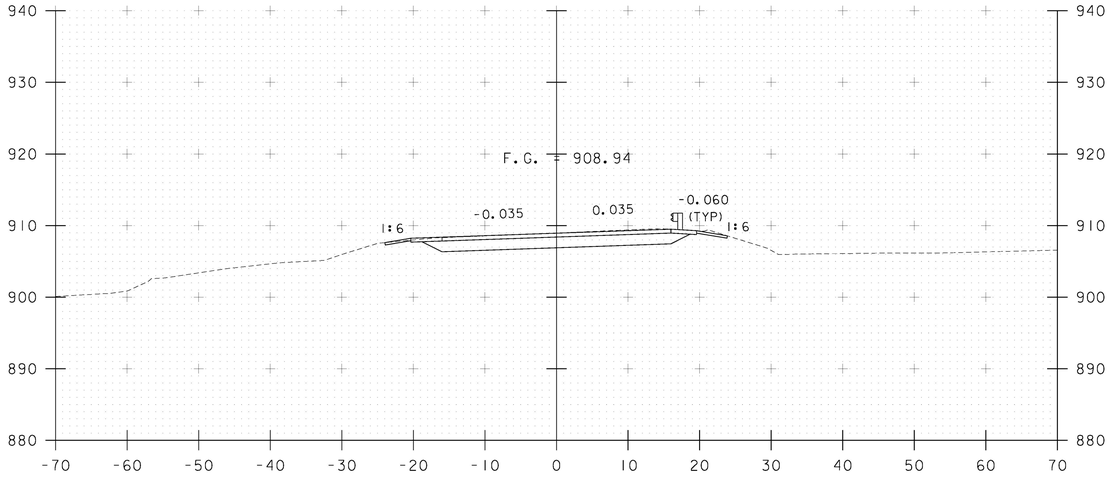
PROJECT NAME:	WATERFORD
PROJECT NUMBER:	BF 0225(4)
FILE NAME:	z13c268xs.dgn
PROJECT LEADER:	T. LEVINS
DESIGNED BY:	J. MERCER
MAINLINE SECTIONS	1
PLOT DATE:	09/27/2017
DRAWN BY:	A. KURDEKAR
CHECKED BY:	T. LEVINS
SHEET	21 OF 63



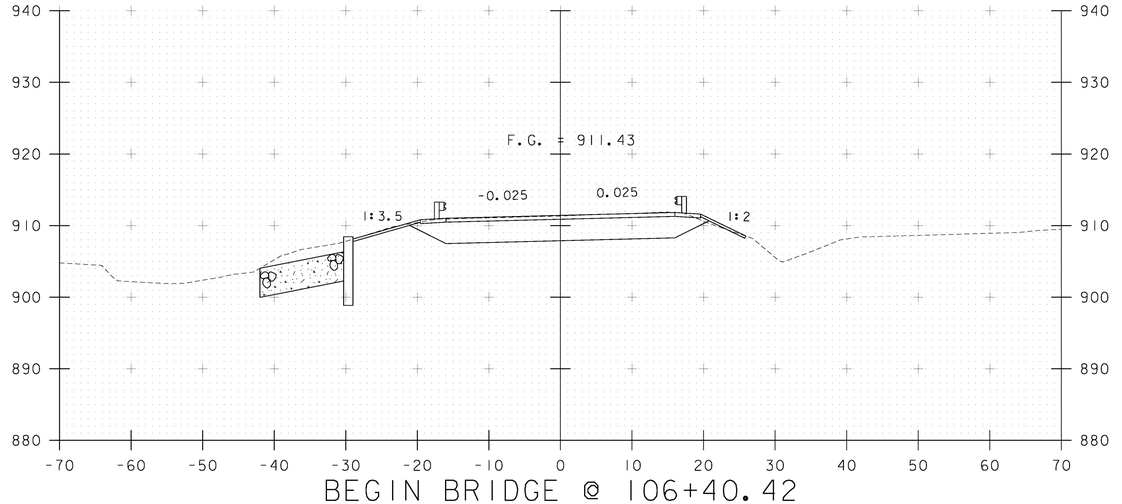
106+00



106+50



105+75



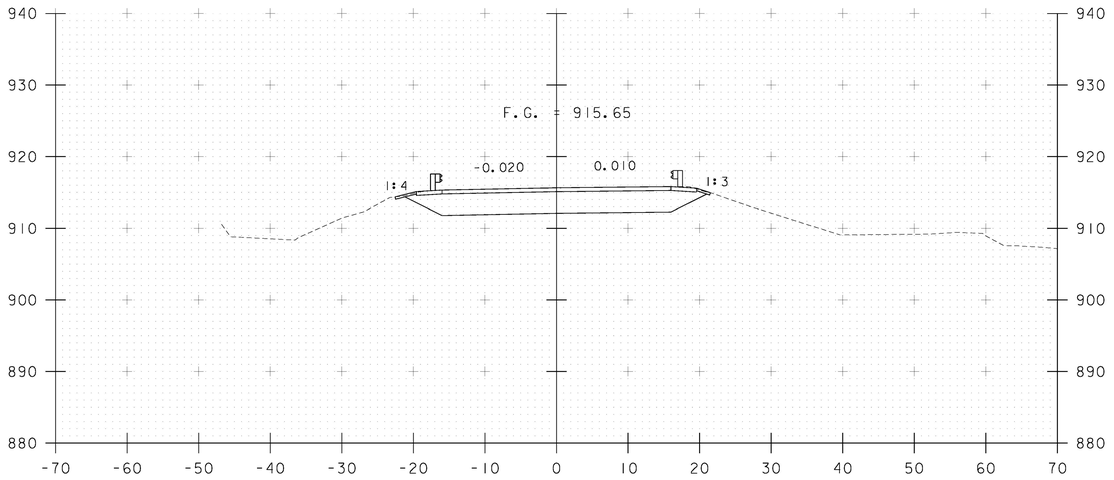
BEGIN BRIDGE @ 106+40.42

106+25

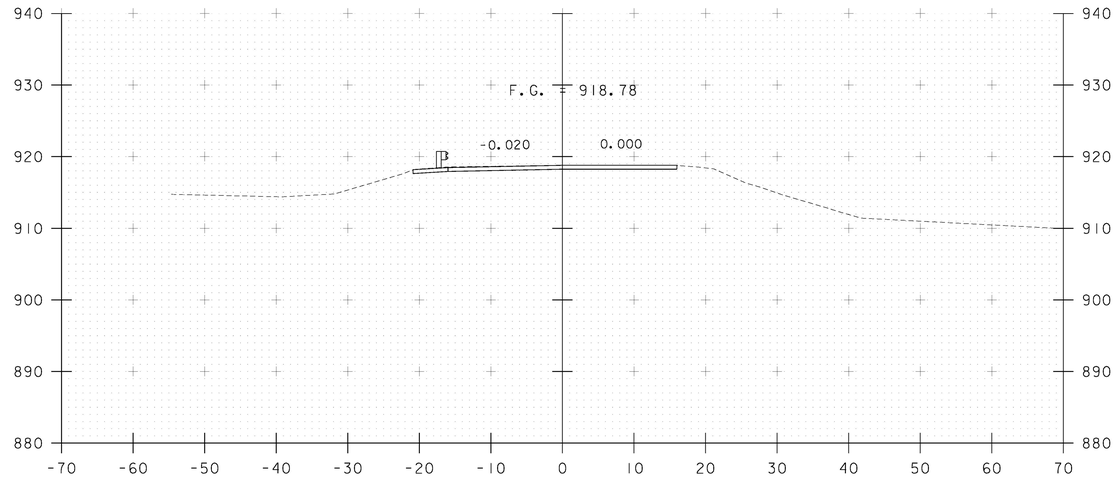
STA. 105+75 TO STA. 106+50

GM2 ASSOCIATES

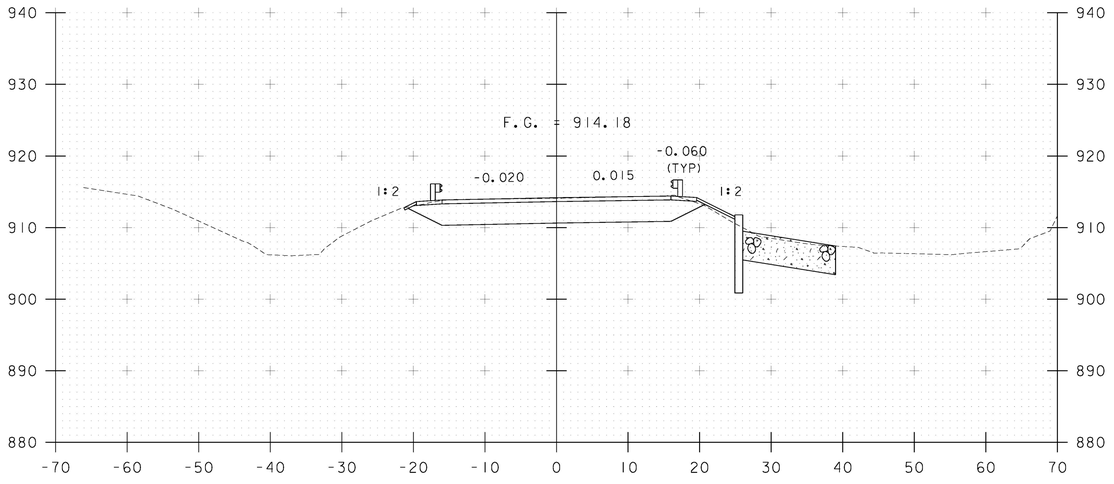
PROJECT NAME:	WATERFORD
PROJECT NUMBER:	BF 0225(4)
FILE NAME:	zl3c268xs.dgn
PROJECT LEADER:	T. LEVINS
DESIGNED BY:	J. MERCER
MAINLINE SECTIONS	2
PLOT DATE:	09/27/2017
DRAWN BY:	A. KURDEKAR
CHECKED BY:	T. LEVINS
SHEET	22 OF 63



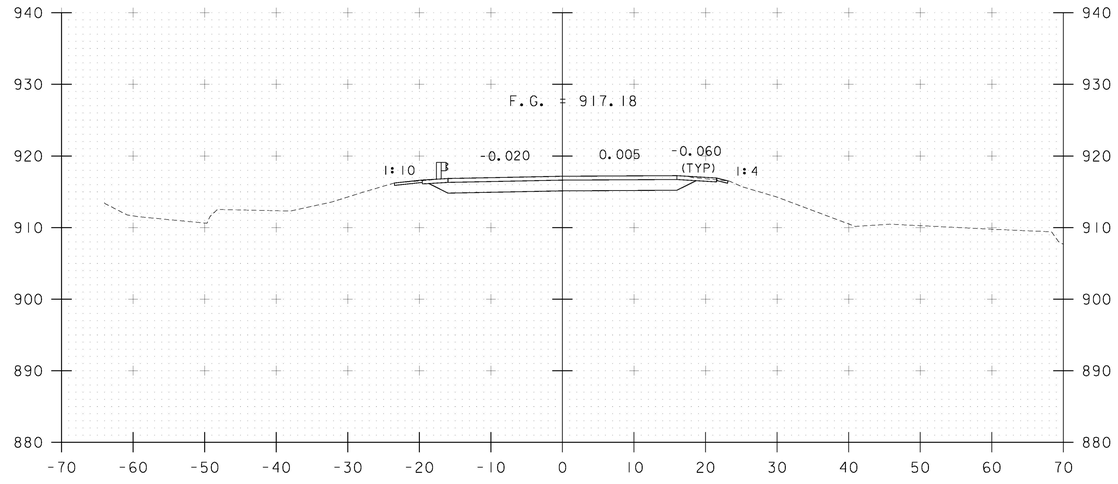
107+00



107+50
END PROJECT



106+75
END BRIDGE @ 106+59.58

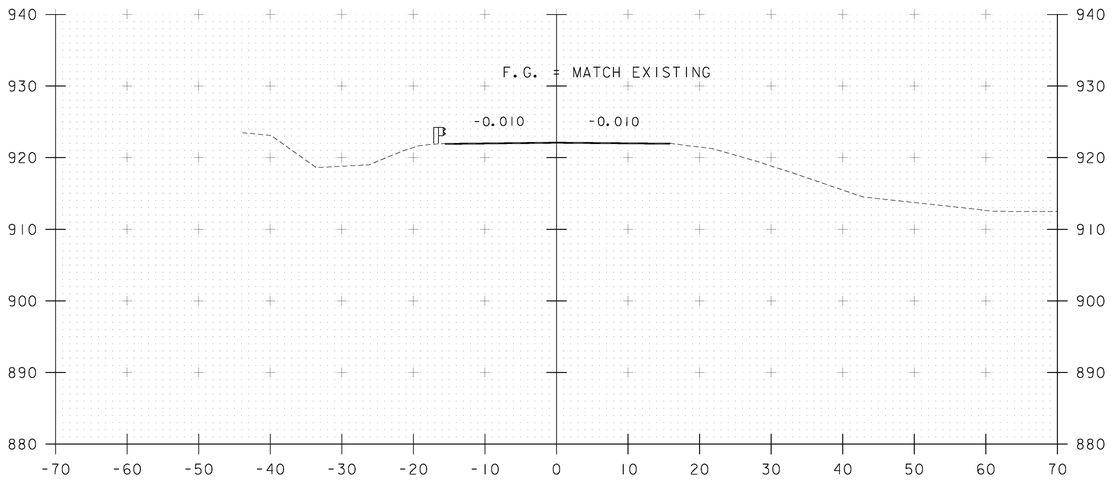


107+25

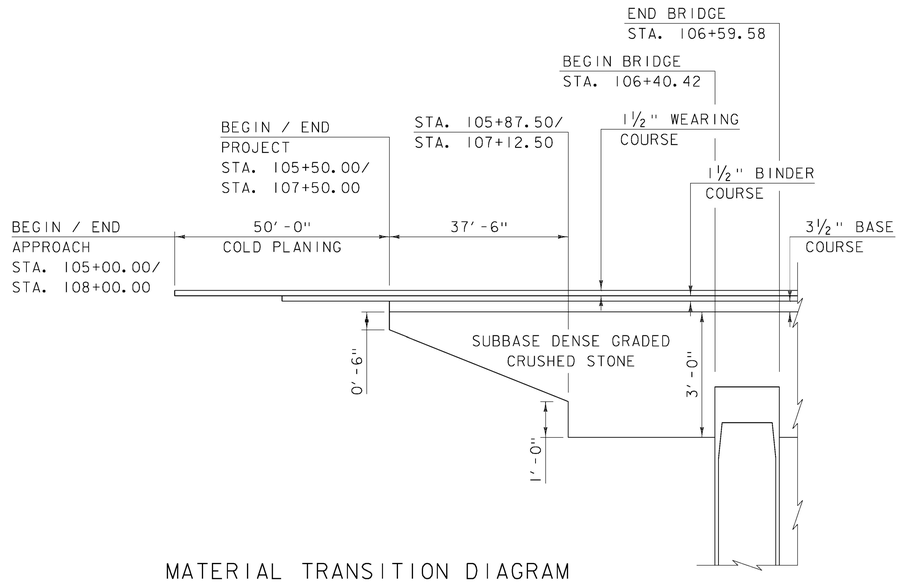
STA. 106+75 TO STA. 107+50

GM2 ASSOCIATES

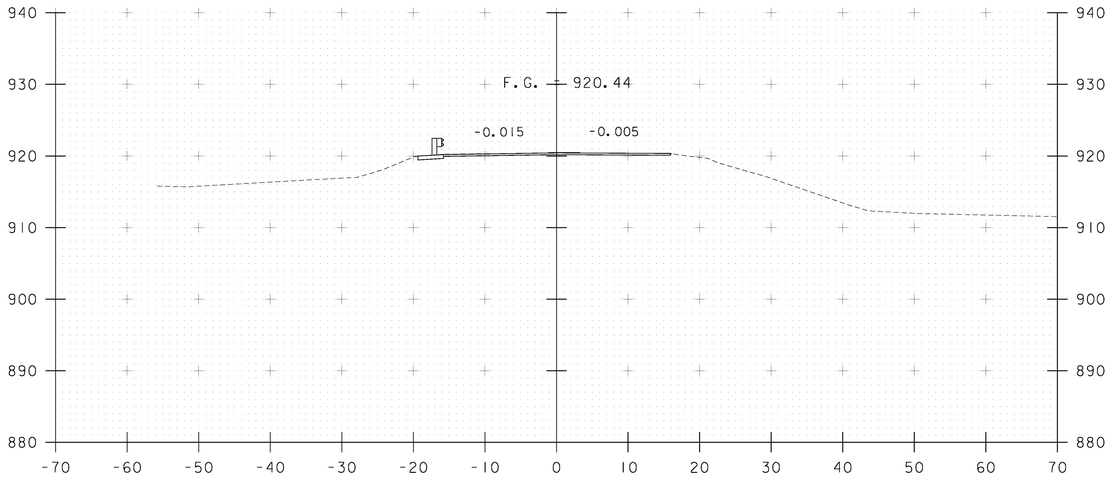
PROJECT NAME:	WATERFORD
PROJECT NUMBER:	BF 0225(4)
FILE NAME:	zl3c268xs.dgn
PROJECT LEADER:	T. LEVINS
DESIGNED BY:	J. MERCER
MAINLINE SECTIONS	3
PLOT DATE:	09/27/2017
DRAWN BY:	A. KURDEKAR
CHECKED BY:	T. LEVINS
SHEET	23 OF 63



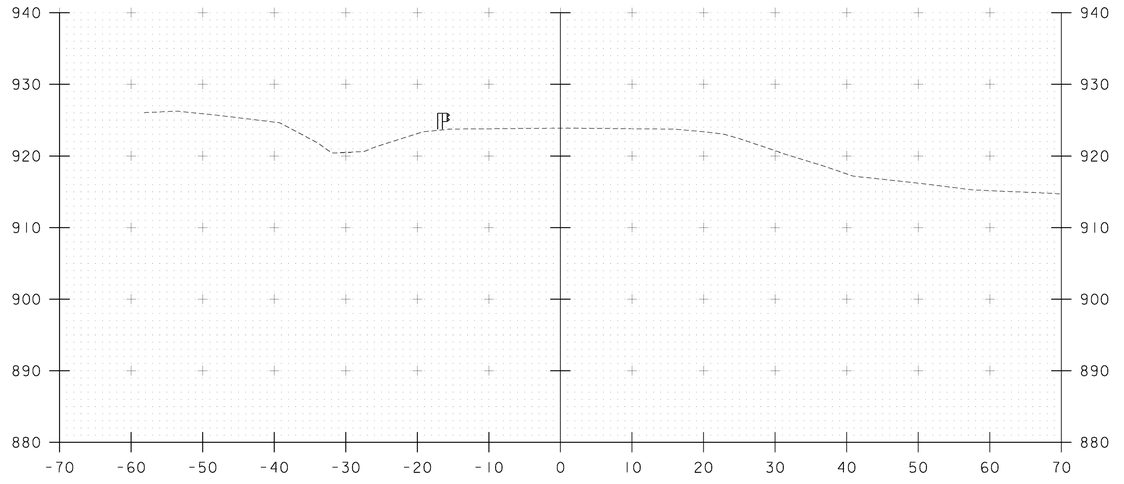
108+00
END APPROACH



MATERIAL TRANSITION DIAGRAM
NOT TO SCALE



107+75



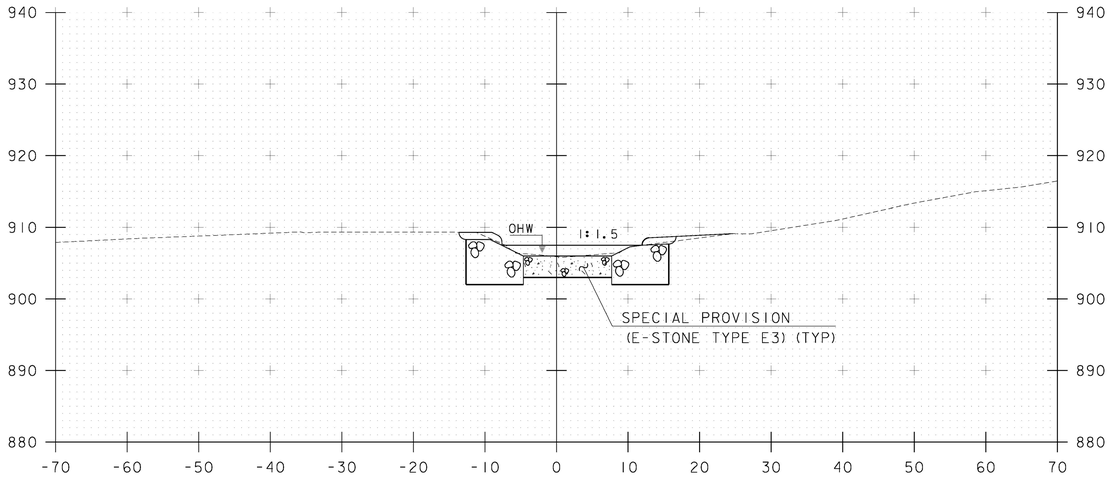
108+25

STA. 107+75 TO STA. 108+25

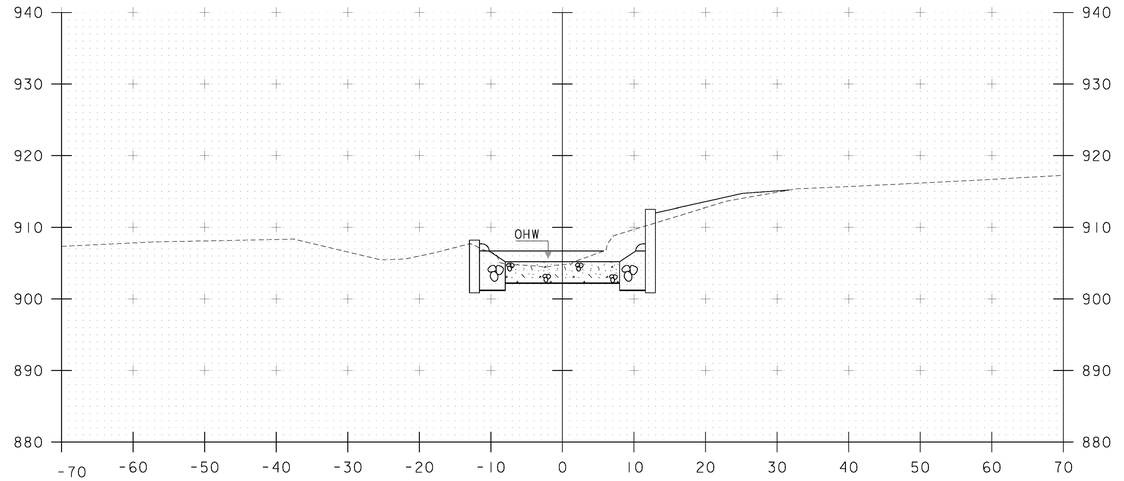
GM2 ASSOCIATES

PROJECT NAME:	WATERFORD		
PROJECT NUMBER:	BF 0225(4)		
FILE NAME:	zl3c268xs.dgn	PLOT DATE:	09/27/2017
PROJECT LEADER:	T. LEVINS	DRAWN BY:	A. KURDEKAR
DESIGNED BY:	J. MERCER	CHECKED BY:	T. LEVINS
MAINLINE SECTIONS	4	SHEET	24 OF 63

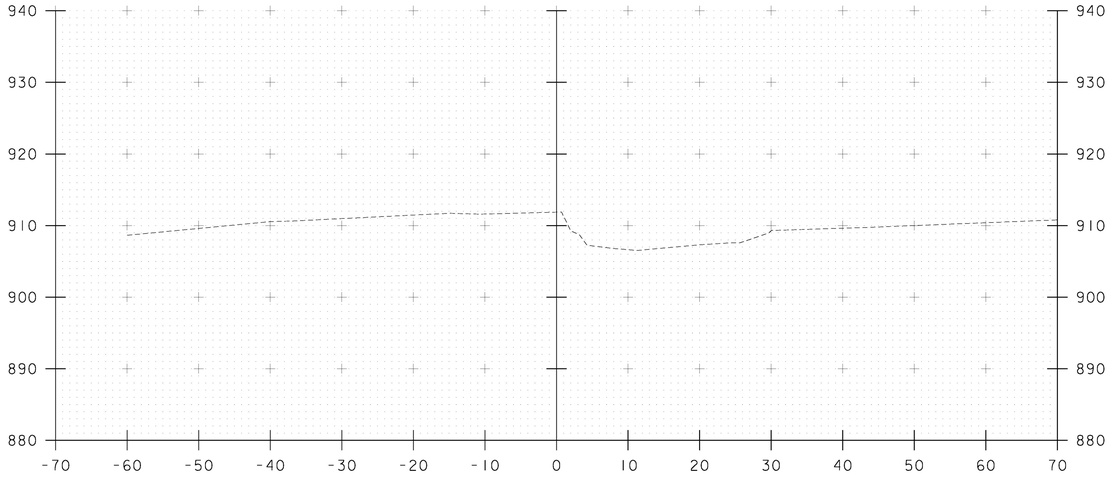
STA 50+50.00
BEGIN UNCLASSIFED CHANNEL EXCAVATION
BEGIN GEOTEXTILE UNDER STONE FILL
BEGIN STONE FILL, TYPE IV
BEGIN SPECIAL PROVISION (E-STONE TYPE E3)
BEGIN GRUBBING MATERIAL



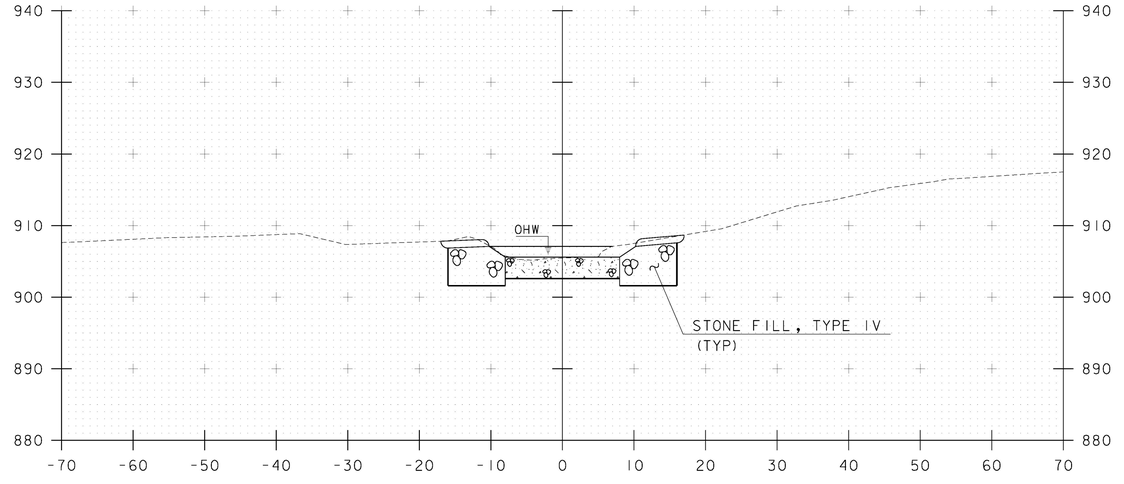
50+50



50+70



50+25



50+60

STA. 50+25 TO STA. 50+70

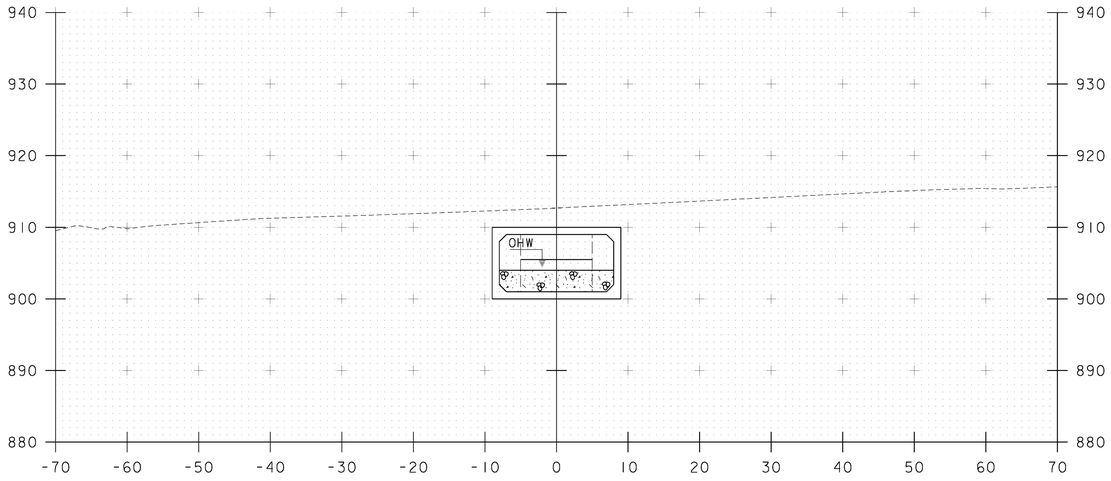
GM2 ASSOCIATES

PROJECT NAME: WATERFORD
PROJECT NUMBER: BF 0225(4)

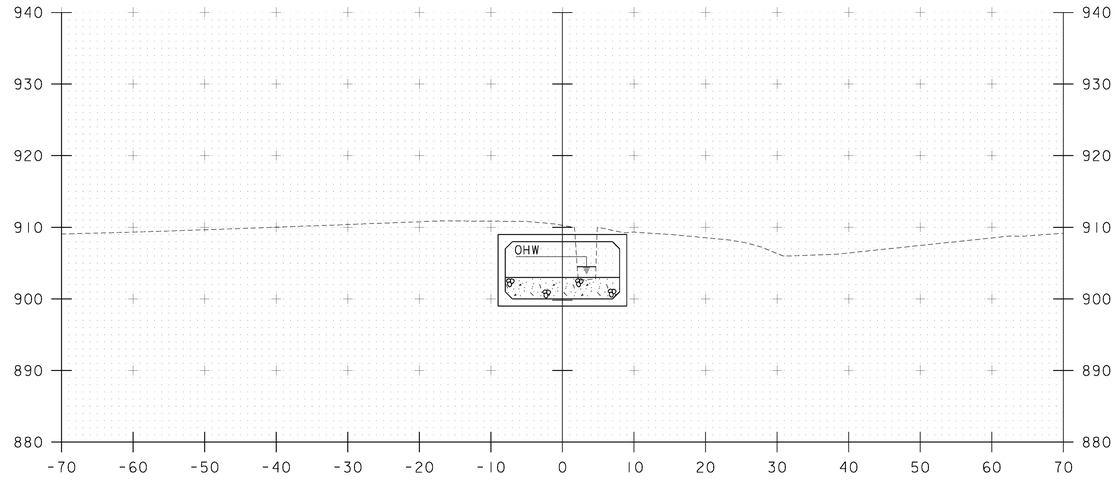
FILE NAME: zl3c268xs.dgn
PROJECT LEADER: T. LEVINS
DESIGNED BY: A. KURDEKAR
CHANNEL SECTIONS I

PLOT DATE: 09/27/2017
DRAWN BY: A. KURDEKAR
CHECKED BY: T. LEVINS
SHEET 25 OF 63

STA 51+25.00 AHEAD STATION
BEGIN UNCLASSIFED CHANNEL EXCAVATION
BEGIN GEOTEXTILE UNDER STONE FILL
BEGIN STONE FILL, TYPE IV
BEGIN GRUBBING MATERIAL

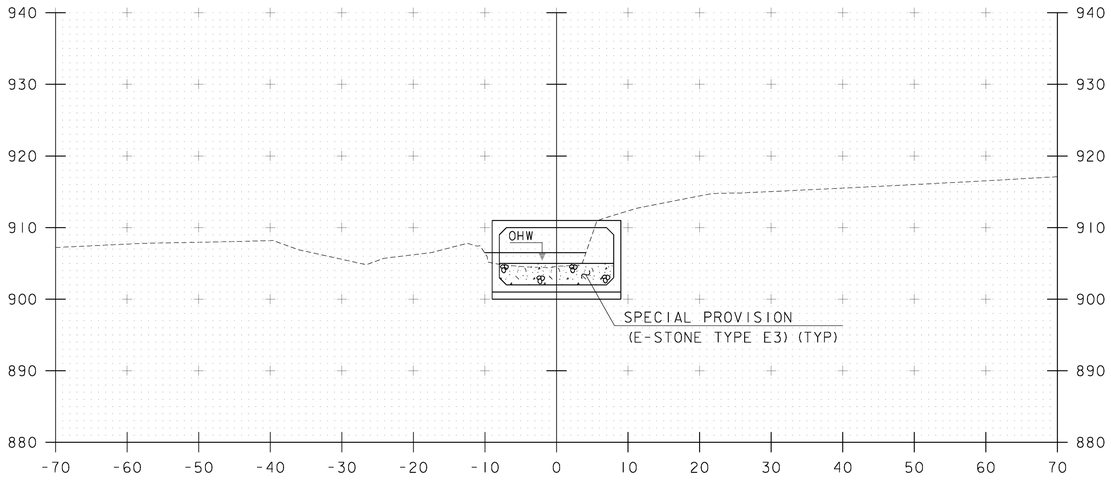


51+00

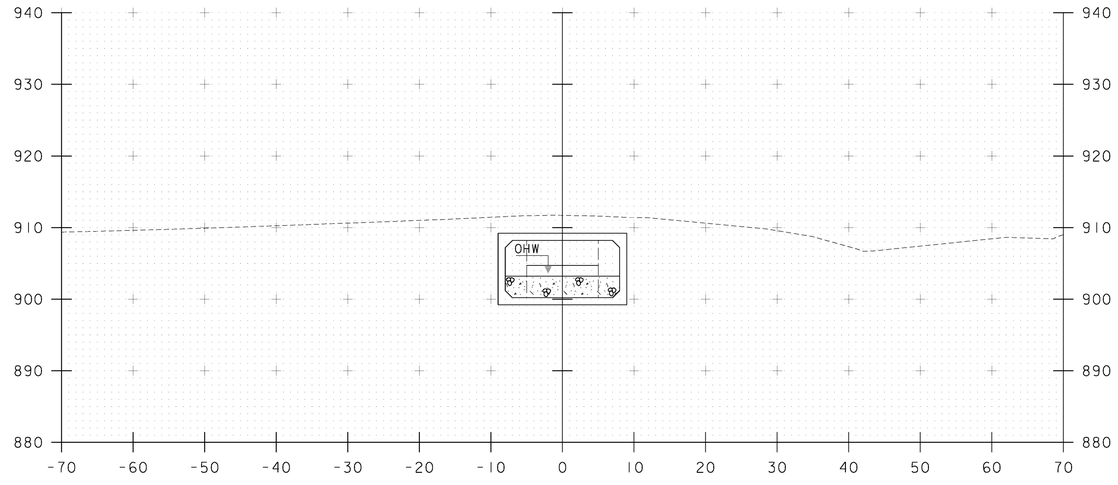


51+25

STA 50+75.00 BACK STATION
END UNCLASSIFED CHANNEL EXCAVATION
END GEOTEXTILE UNDER STONE FILL
END STONE FILL, TYPE IV
END GRUBBING MATERIAL



50+75



51+20

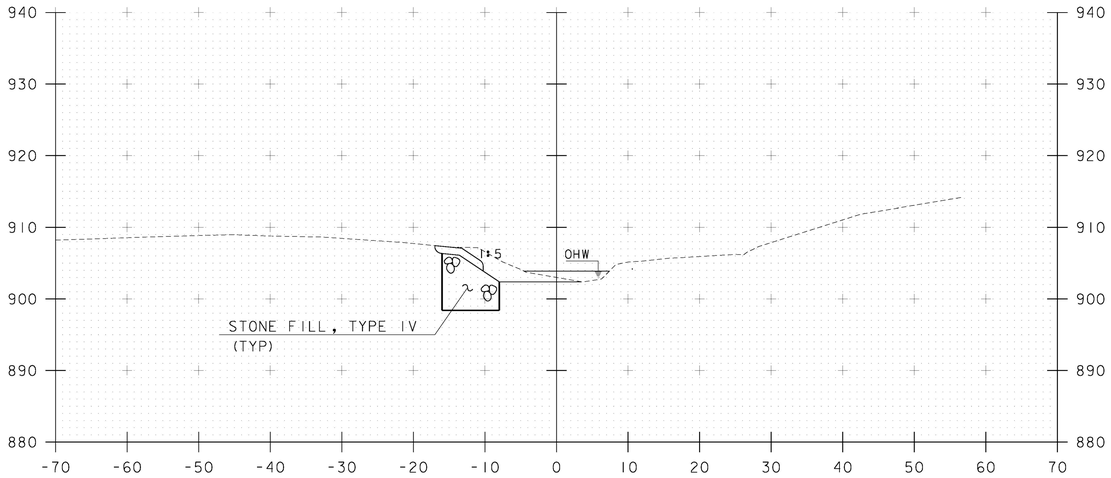
STA. 50+75 TO STA. 51+25

GM2 ASSOCIATES

PROJECT NAME: WATERFORD
PROJECT NUMBER: BF 0225(4)

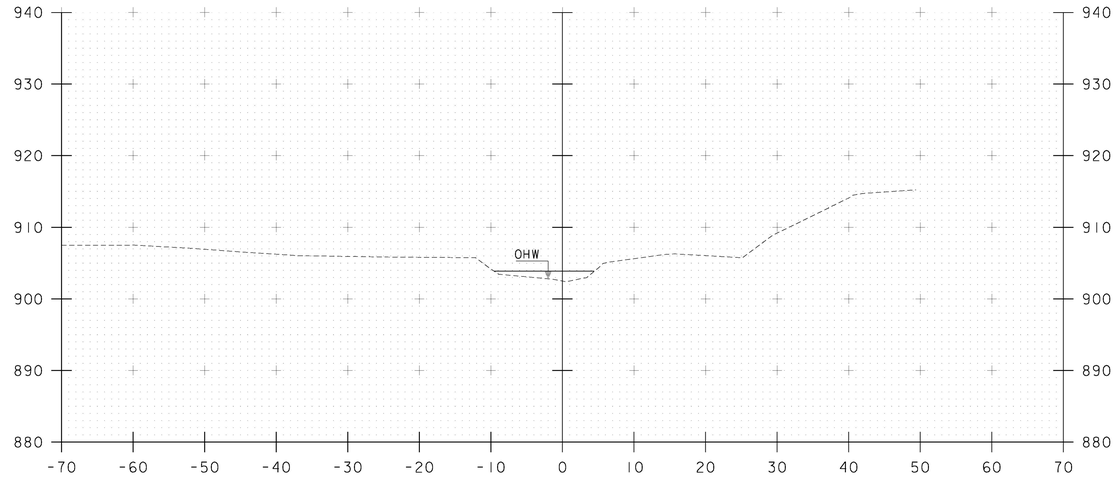
FILE NAME: zl3c268xs.dgn
PROJECT LEADER: T. LEVINS
DESIGNED BY: A. KURDEKAR
CHANNEL SECTIONS 2

PLOT DATE: 09/27/2017
DRAWN BY: A. KURDEKAR
CHECKED BY: T. LEVINS
SHEET 26 OF 63



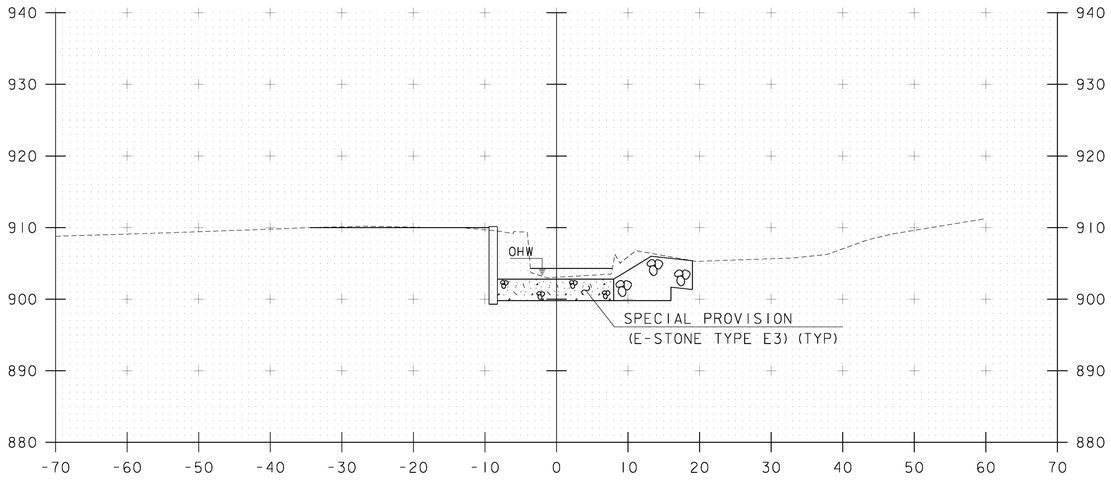
STA 51+40.00
END GEOTEXTILE UNDER STONE FILL
END STONE FILL, TYPE IV
END GRUBBING MATERIAL

51+40



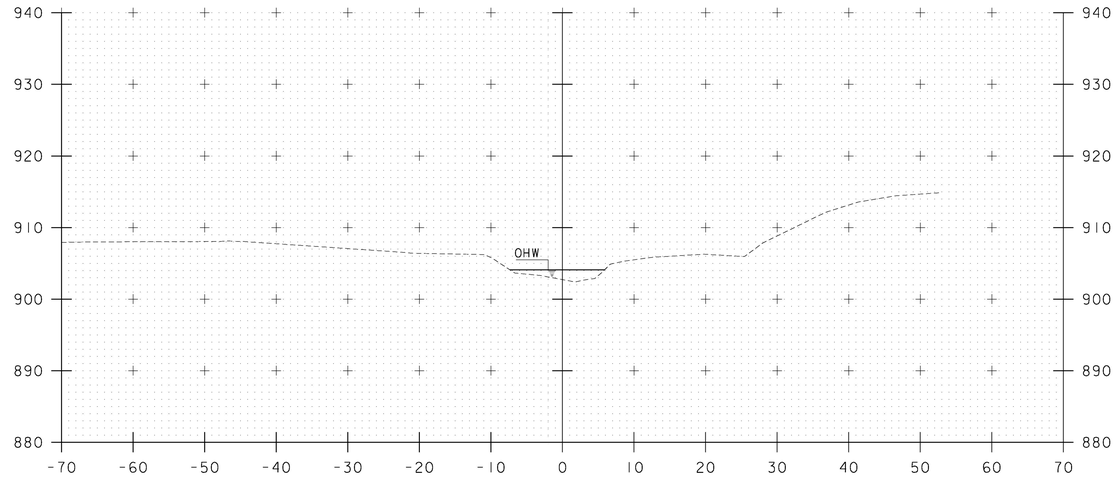
51+50

STA 51+38.00
END SPECIAL PROVISION(E-STONE TYPE E3) (TYP)



51+30

STA 51+42.00
END UNCLASSIFED CHANNEL EXCAVATION



51+45

STA. 51+30 TO STA. 51+75

GM2 ASSOCIATES

PROJECT NAME: WATERFORD
PROJECT NUMBER: BF 0225(4)

FILE NAME: zl3c268xs.dgn
PROJECT LEADER: T. LEVINS
DESIGNED BY: A. KURDEKAR
CHANNEL SECTIONS 3

PLOT DATE: 09/27/2017
DRAWN BY: A. KURDEKAR
CHECKED BY: T. LEVINS
SHEET 27 OF 63

EPSC PLAN NARRATIVE

1.1 PROJECT DESCRIPTION

THIS PROJECT INVOLVES THE REPLACEMENT OF THE EXISTING BRIDGE 7 AND ITS HEADWALLS. BRIDGE 7 WILL BE REPLACED WITH A PRECAST CONCRETE BOX CULVERT, SPANNING 19.16 FEET OVER MAD BROOK. IT IS LOCATED IN THE TOWN OF WATERFORD, ON VT ROUTE 18 IN A RURAL AREA, APPROXIMATELY 5.9 MILES SOUTH OF THE INTERSECTION OF VT ROUTE 18 AND US ROUTE 2.

NOTE: AREA OF DISTURBANCE INCLUDES LIMITS OF EARTH DISTURBANCE WITHIN THE PROJECT AREA, AS WELL AS WASTE, BORROW AND STAGING AREAS, AND OTHER EARTH DISTURBING ACTIVITIES WITHIN OR DIRECTLY ADJACENT TO THE PROJECT LIMITS AS SHOWN ON THE ATTACHED EPSC PLAN.

TOTAL AREA OF DISTURBANCE AS SHOWN ON THE ATTACHED EPSC PLAN IS APPROXIMATELY 0.31 ACRES.

IT IS ANTICIPATED THAT THIS PROJECT WILL LAST ONE TO TWO WEEKS.

1.2 SITE INVENTORY

1.2.1 TOPOGRAPHY

THE AREA SURROUNDING THE PROJECT IS GRASS AND WOODS IN A RURAL SETTING.

1.2.2 DRAINAGE, WATERWAYS, BODIES OF WATER, AND PROXIMITY TO NATURAL OR MAN-MADE WATER FEATURES

THE MAD BROOK & THE UNNAMED BROOK ARE THE ONLY WATER SOURCES ON THE PROJECT SITE. THE BROOKS ARE CLASSIFIED AS STEEP, SINUOUS, NARROW, WITH A CONFINED AND ARMORED CHANNEL AT THE SITE. THE STREAM BED CONSISTS OF GRAVEL, COBBLES AND BOULDERS. THE TRIBUTARY AREA AT THE CULVERT CROSSING IS 1.8 SQ. MI. DUE TO THE NATURE OF THE SURROUNDING TERRAIN THE PROJECT SITE COULD RECEIVE RUNOFF WATER FROM A FEW NEARBY SLOPES.

1.2.3 VEGETATION

THE VEGETATION IN THE PROJECT AREA CONSISTS OF HARDWOOD TREES AND UNDERGROWTH. THE IMPACT TO VEGETATION WILL BE LIMITED TO THAT WHICH IS DIRECTLY AFFECTED BY REPLACEMENT OF THE EXISTING CULVERT. UPON PROJECT COMPLETION, THE CHANNEL BANKS WILL BE ARMORED WITH STONE FILL TYPE III AS SPECIFIED ON THE PLANS. DISTURBED VEGETATION WILL BE REESTABLISHED WITH STANDARD SEED AND MULCH PRACTICES.

1.2.4 SOILS

ALL SOIL DATA CAME FROM THE U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE FOR THE COUNTY OF CALEDONIA, VERMONT. SOILS ON THE PROJECT SITE ARE BUCKLAND, FINE SANDY LOAM, VERY STONY 8% TO 35% SLOPES, “K” VALUE = 0.43 AND CABOT SILT LOAM, VERY STONY, 8% TO 15% SLOPES, “K” VALUE = 0.32.THE SOIL IS CONSIDERED HIGHLY ERODIBLE DUE TO SIGNIFICANT SLOPES.

NOTE: “K” VALUES GENERALLY INDICATE THE FOLLOWING:
0.0-0.23 = LOW EROSION POTENTIAL
0.24-0.36 = MODERATE EROSION POTENTIAL
0.37 AND HIGHER = HIGH EROSION POTENTIAL

1.2.5 SENSITIVE RESOURCE AREAS
CRITICAL HABITATS: NO
HISTORICAL OR ARCHEOLOGICAL AREAS: NO
PRIME AGRICULTURAL LAND: NO
THREATENED AND ENDANGERED SPECIES: NORTHERN LONG-EARED BAT
WATER RESOURCE: MAD BROOK & UNNAMED BROOK
WETLANDS: WETLANDS ARE LOCATED OUTSIDE OF THE BROOK LIMITS ON THE WEST AND EAST SIDE OF VT 18. THE EAST SIDE WETLAND IS MORE THAN 100 FEET FROM THE EXISTING STRUCTURE.

1.3 RISK EVALUATION

THIS PROJECT DOES NOT REQUIRE A PERMIT FOR STORMWATER RUNOFF FROM CONSTRUCTION SITES FOR LOW RISK PROJECTS. ANY MODIFICATIONS TO THE PROJECT THAT INCREASE THE RISK TO ENVIRONMENTAL RESOURCES SHALL BE EVALUATED IN ACCORDANCE WITH THE PERMIT REQUIREMENTS. THE CONTRACTOR WILL BE RESPONSIBLE FOR ANY ADDITIONAL PERMITTING.

1.4 EROSION PREVENTION AND SEDIMENT CONTROL

THE EROSION CONTROL PLANS ARE MEANT AS A GUIDELINE FOR PREVENTING EROSION AND CONTROLLING SEDIMENT TRANSPORT. THE PRINCIPLES OUTLINED IN THIS NARRATIVE CONSIST OF APPLYING MEASURES THROUGHOUT CONSTRUCTION OF THE PROJECT IN ORDER TO MINIMIZE SEDIMENT TRANSPORT TO THE RECEIVING WATERS. THE MEASURES INCLUDE STABILIZATION AND STRUCTURAL PRACTICES, STORMWATER CONTROLS AND OTHER POLLUTION PREVENTION PRACTICES. THEY HAVE BEEN PROPOSED BY THE DESIGNER AS A BASIS FOR PROTECTING RESOURCES AND WILL NEED TO BE BUILT UPON BASED ON THE SPECIFIC MEANS AND METHODS OF THE CONTRACTOR. REFER TO THE LOW RISK SITE HANDBOOK AND APPROPRIATE DETAIL SHEETS FOR SPECIFIC GUIDANCE AND CONSTRUCTION DETAILING.

ALL MEASURES SHALL BE REGULARLY MAINTAINED AND SHALL BE CHECKED FOR SEDIMENT BUILD-UP. SEDIMENT SHALL BE DISPOSED OF AT AN APPROVED SITE WHERE IT WILL NOT BE SUBJECT TO EROSION.

1.4.1 MARK SITE BOUNDARIES

SITE BOUNDARIES AND AREAS THAT CONSTRUCTION EQUIPMENT CAN ACCESS SHALL BE DELINEATED.

PROJECT DEMARCATION FENCE (PDF) SHALL BE USED TO PHYSICALLY MARK SITE BOUNDARIES.

1.4.2 LIMIT DISTURBANCE AREA
PREVENTING INITIAL SOIL EROSION BY MINIMIZING THE EXPOSED AREA IS MUCH MORE EFFECTIVE THAN TREATING ERODED SEDIMENT. EARTH DISTURBANCE CAN BE MINIMIZED THROUGH CONSTRUCTION PHASING BY ONLY OPENING UP EARTH AS NECESSARY. THIS CAN LIMIT THE AREA THAT WILL BE DISTURBED AND EXPOSED TO EROSION. EMPLOY TEMPORARY CONSTRUCTION STABILIZATION PRACTICES IN INCREMENTAL STAGES AS PHASES CHANGE. FOR PROJECTS WHICH FALL UNDER THE CONSTRUCTION GENERAL PERMIT, ONLY THE ACREAGE LISTED ON THE PERMIT AUTHORIZATION MAY BE EXPOSED AT ANY GIVEN TIME.

MAINTAINING VEGETATED BUFFERS ALONG STREAM BANKS, WETLANDS OR OTHER SENSITIVE AREAS IS A CRUCIAL EROSION AND SEDIMENT CONTROL MEASURE THAT SHOULD BE ESTABLISHED WHEREVER POSSIBLE.

1.4.3 SITE ENTRANCE/EXIT STABILIZATION
TRACKING OF SEDIMENT ONTO PUBLIC HIGHWAYS SHALL BE MINIMIZED TO REDUCE THE POTENTIAL FOR RUNOFF ENTERING RECEIVING WATERS. INSTALLATION SHALL COINCIDE WITH THE CONTRACTORS PROGRESS SCHEDULE.

STABILIZED CONSTRUCTION ENTRANCES SHALL BE INSTALLED AS PROPOSED ON THE EPSC PLAN AND ANYWHERE EQUIPMENT WILL BE GOING FROM AREAS OF EXPOSED SOILS TO PAVED SURFACES.

1.4.4 INSTALL SEDIMENT BARRIERS
SEDIMENT BARRIERS SHALL BE UTILIZED TO INTERCEPT RUNOFF AND ALLOW SUSPENDED SEDIMENT TO SETTLE OUT. THEY SHALL BE INSTALLED PRIOR TO ANY UP SLOPE WORK.

GEOTEXTILE FOR SILT FENCE SHALL BE INSTALLED AS PROPOSED ON THE EPSC PLAN.

1.4.5 DIVERT UPLAND RUNOFF
DIVERSIONARY MEASURES SHALL BE USED TO INTERCEPT RUNOFF FROM ABOVE THE CONSTRUCTION AND DIRECT IT AROUND THE DISTURBED AREA SO THAT CLEAN WATER DOES NOT BECOME MUDDIED WHILE TRAVELING OVER EXPOSED SOILS ON THE CONSTRUCTION SITE.

THE PROJECT AREA IS RELATIVELY FLAT. THEREFORE IT IS NOT ANTICIPATED THAT DIVERSION MEASURES WILL BE NECESSARY.

1.4.6 SLOW DOWN CHANNELIZED RUNOFF
CHECK STRUCTURES SHALL BE UTILIZED TO REDUCE THE VELOCITY, AND THUS THE EROSIVE POTENTIAL, OF CONCENTRATED FLOW IN CHANNELS.

NONE ANTICIPATED.

1.4.7 CONSTRUCT PERMANENT CONTROLS
PERMANENT STORMWATER TREATMENT DEVICES SHALL BE INSTALLED AS SHOWN ON THE PLANS AND IN ACCORDANCE WITHN PERMIT CONDITIONS.

NONE ANTICIPATED.

1.4.8 STABILIZE EXPOSED SOILS DURING CONSTRUCTION
ALL AREAS OF DISTURBANCE MUST HAVE TEMPORARY STABILIZATION IN PLACE WITHIN 48 HOURS OF DISTURBANCE OR IN ACCORDANCE WITH THE CONSTRUCTION GENERAL PERMIT 3-9020 AUTHORIZATION.

THE FORECAST OF RAINFALL EVENTS SHALL TRIGGER IMMEDIATE PROTECTION OF EXPOSED SOILS.

1.4.9 WINTER STABILIZATION
VARIOUS MEASURES SPECIFIC TO WINTER MAY BE NECESSARY SHOULD THE PROJECT EXTEND INTO WINTER (OCTOBER 15 THROUGH APRIL 15). REFER TO THE LOW RISK SITE HANDBOOK FOR GUIDANCE.

NONE ANTICIPATED.

1.4.10 STABILIZE SOIL AT FINAL GRADE
EXPOSED SOIL MUST BE STABILIZED WITHIN 48 HOURS OF REACHING FINAL GRADE.

SEED, MULCH, FERTILIZER AND LIME SHALL BE USED TO ESTABLISH PERMANENT VEGETATION. FOR SLOPES STEEPER THAN 1:3, BIODEGRADABLE EROSION CONTROL MATTING OR AN EQUIVALENT SHALL BE USED INSTEAD OF MULCH.

1.4.11 DE-WATERING ACTIVITIES
DISCHARGE FROM DEWATERING ACTIVITIES THAT FLOWS OFF OF THE CONSTRUCTION SITE MUST NOT CAUSE OR CONTRIBUTE TO A VIOLATION OF THE VERMONT WATER QUALITY STANDARDS.

FILTER BAG(S) SHALL BE USED FOR DEWATERING.

1.4.12 INSPECT YOUR SITE
INSPECT THE PROJECT SITE BASED ON SPECIAL PROVISION REQUIREMENTS OR CONSTRUCTION GENERAL PERMIT AUTHORIZATION STIPULATIONS.

1.5 SEQUENCE AND STAGING

THIS SECTION WILL BE DEVELOPED BY THE CONTRACTOR USING THE GUIDANCE OUTLINED IN THE VTRANS EPSC PLAN CONTRACTOR CHECKLIST.

1.5.1 CONSTRUCTION SEQUENCE

1.5.2 OFF-SITE ACTIVITIES
IN ADDITION TO THE CONTRACTOR CHECKLIST ANY ACTIVITIES OUTSIDE THE CONSTRUCTION LIMITS SHALL FOLLOW SUBSECTIONS 105.25- 105.29 OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION.

GM2 ASSOCIATES

PROJECT NAME: WATERFORD
PROJECT NUMBER: BF 0225(4)

FILE NAME: zl3c268epscnarrative.dgn
PROJECT LEADER: T. LEVINS
DESIGNED BY: A. KURDEKAR
EPSC NARRATIVE

PLOT DATE: 09/27/2017
DRAWN BY: A. KURDEKAR
CHECKED BY: T. LEVINS
SHEET 28 OF 63

VT STATE PLANE GRID

N

EXISTING ROW

MAD BROOK FLOW

UNNAMED BROOK FLOW

STATE OF VERMONT
PROJECT FAP 70-E
1942

VT 18
TO NEW HAMPSHIRE

104+00

105+00

106+00

107+00

108+00

109+00

VT 18
TO ST. JOHNSBURY

STATE OF VERMONT
PROJECT FAP 70-C
1941

51+00

52+00

50+00

EXISTING ROW

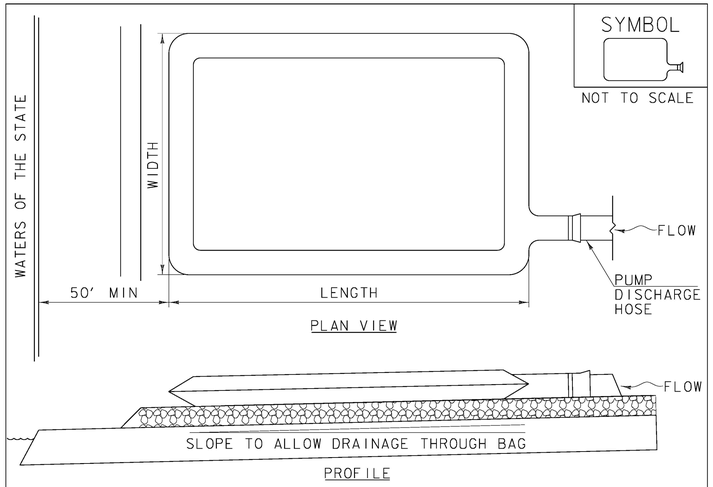
EXISTING ROW

MAD BROOK FLOW

SCALE 1" = 20'-0"
20 0 20

GM2 ASSOCIATES

PROJECT NAME:	WATERFORD
PROJECT NUMBER:	BF 0225(4)
FILE NAME: zl3c268epsc const.dgn	PLOT DATE: 09/27/2017
PROJECT LEADER: T. LEVINS	DRAWN BY: A. KURDEKAR
DESIGNED BY: A. KURDEKAR	CHECKED BY: T. LEVINS
EPSC CONSTRUCTION SITE PLAN	SHEET 29 OF 63



SYMBOL

NOT TO SCALE

CONSTRUCTION SPECIFICATIONS

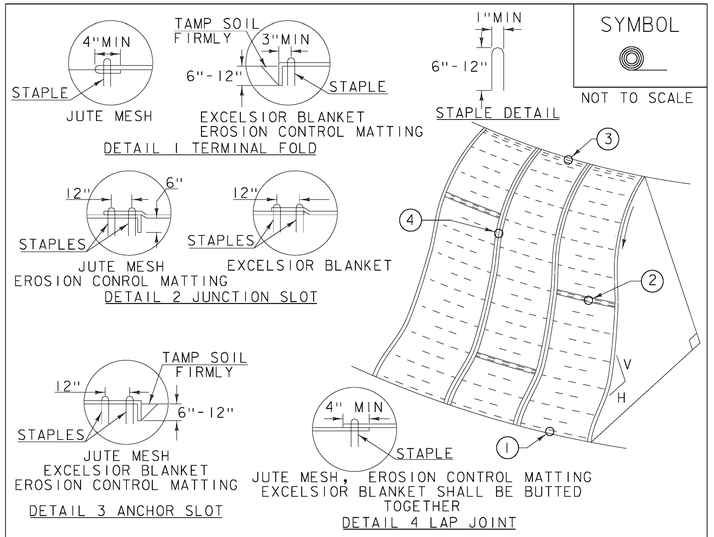
1. THE PRIMARY PURPOSE OF FILTER BAG IS TO RETAIN SILT, SAND, AND FINES DURING DEWATERING OPERATIONS.
2. FILTER BAGS SHALL BE INSTALLED ON A VEGETATED SLOPE GRADED TO ALLOW INCOMING WATER TO FLOW THROUGH THE BAG.
3. FILTER BAGS MAY ALSO BE PLACED ON COARSE AGGREGATE, STONE, OR HAYBALES TO INCREASE FILTRATION EFFICIENCY.
4. FILTER BAGS SHALL BE LOCATED A MINIMUM OF 50' FROM WATERS OF THE STATE UNLESS OTHERWISE APPROVED BY THE ENGINEER.
5. THE NECK OF THE FILTER BAG SHALL BE STRAPPED TIGHTLY TO THE DISCHARGE HOSE.
6. A FILTER BAG IS FULL WHEN IT NO LONGER CAN EFFICIENTLY FILTER SEDIMENT OR ALLOW WATER TO PASS AT A REASONABLE RATE.
7. FILTER BAG SHALL BE DISPOSED OF AS APPROVED IN THE EPSC PLAN OR AS DIRECTED BY THE ENGINEER.

FILTER BAG

NOTES:
REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006- "FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.

THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 653 FOR FILTER BAG (PAY ITEM 653.45) AND AS SPECIFIED IN THE CONTRACT.

REVISIONS	
MARCH 24, 2008	WHF
JANUARY 13, 2009	WHF



SYMBOL

NOT TO SCALE

CONSTRUCTION SPECIFICATIONS

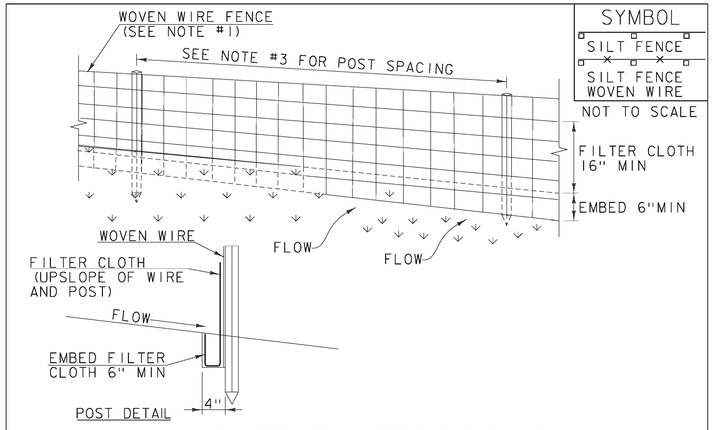
1. APPLY TO SLOPES GREATER THAN 3H:1V OR WHERE NECESSARY TO AID IN ESTABLISHING VEGETATION.
2. APPLY FERTILIZER, LIME SEED PRIOR TO PLACING MATTING.
3. STAPLES ARE TO BE PLACED ALTERNATELY, IN COLUMNS APPROXIMATELY 2' APART AND IN ROWS APPROXIMATELY 3' APART. APPROXIMATELY 175 STAPLES ARE REQUIRED PER 4'X225' ROLL OF MATERIAL AND 125 STAPLES ARE REQUIRED PER 4'X150' ROLL OF MATERIAL.
4. DISTURBED AREAS SHALL BE SMOOTHLY GRADED. EROSION CONTROL MATERIAL SHALL BE PLACED LOOSELY OVER GROUND SURFACE. DO NOT STRETCH.
5. ALL TERMINAL ENDS AND TRANSVERSE LAPS SHALL BE STAPLED AT APPROXIMATELY 12" INTERVALS.

ADAPTED FROM DETAILS PROVIDED BY: NEW YORK STATE DEC
ORIGINALLY DEVELOPED BY USDA-NRCS
VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION

ROLLED EROSION CONTROL PRODUCT (RECP) SIDE SLOPE

NOTES:
REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006- "FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.
THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 653 AND AS SHOWN IN THE PLANS FOR TEMPORARY EROSION MATTING (PAY ITEM 653.20) ~~OR PERMANENT EROSION MATTING (PAY ITEM 653.21).~~

REVISIONS	
APRIL 16, 2007	JMF
JANUARY 13, 2009	WHF



SYMBOL

SILT FENCE

SILT FENCE WOVEN WIRE

NOT TO SCALE

CONSTRUCTION SPECIFICATIONS

1. WOVEN WIRE REINFORCED FENCE IS REQUIRED WITHIN 100' UPSLOPE OF RECEIVING WATERS WHEN THE PROJECT FALLS UNDER A CONSTRUCTION STORMWATER PERMIT. WOVEN WIRE SHALL BE A MIN. 14 GAUGE WITH A 6" MAX. MESH OPENING.
2. FILTER CLOTH SHALL BE EITHER FILTER X, MIRAFI100X, STABILINKA T140N OR APPROVED EQUIVALENT.
3. POST SPACING FOR WIRE-BACKED FENCE SHALL BE 10' MAXIMUM. FOR FILTER-CLOTH FENCE, WHEN ELONGATION IS >50%, POST SPACING SHALL NOT EXCEED 4' AND WHEN ELONGATION IS <50%, POST SPACING SHALL NOT EXCEED 6'.
4. WOVEN WIRE FENCE IS TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES. FILTER CLOTH IS TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION.
5. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVER-LAPPED BY 6" AND FOLDED.
6. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN SEDIMENT REACHES HALF OF FABRIC HEIGHT.

ADAPTED FROM DETAILS PROVIDED BY: NEW YORK STATE DEC
ORIGINALLY DEVELOPED BY USDA-NRCS
VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SILT FENCE

NOTES:
REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006- "FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.

THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 649 AND AS SHOWN IN THE PLANS FOR GEOTEXTILE FOR SILT FENCE (PAY ITEM 649.51) ~~OR GEOTEXTILE FOR SILT FENCE, WOVEN WIRE REINFORCED (PAY ITEM 649.515).~~

REVISIONS	
MARCH 21, 2008	WHF
DECEMBER 11, 2008	WHF
JANUARY 13, 2009	WHF

GM2 ASSOCIATES

PROJECT NAME:	WATERFORD
PROJECT NUMBER:	BF 0225(4)
FILE NAME:	zl3c238epsc_detl.dgn
PROJECT LEADER:	T. LEVINS
DESIGNED BY:	A. KURDEKAR
EPSC DETAILS 1	
PLOT DATE:	09/27/2017
DRAWN BY:	A. KURDEKAR
CHECKED BY:	T. LEVINS
SHEET	30 OF 63

VAOT LOW GROW/FINE FESCUE MIX						
	LBS/AC					
WEIGHT	BROADCAST	HYDROSEED	NAME	LATIN NAME	GERM	PURITY
38%	57	95	CREEPING RED FESCUE	FESTUCA RUBRA VAR. RUBRA	90%	98%
29%	43.5	72.5	HARD FESCUE	FESTUCA LONGIFOLIA	85%	95%
15%	22.5	37.5	CHEWINGS FESCUE	FESTUCA RUBRA VAR. COMMUTATA	87%	95%
15%	22.5	37.5	ANNUAL RYEGRASS	LOLIUM MULTIFLORUM	90%	95%
3%	4.5	7.5	INERTS			
100%	150	250				

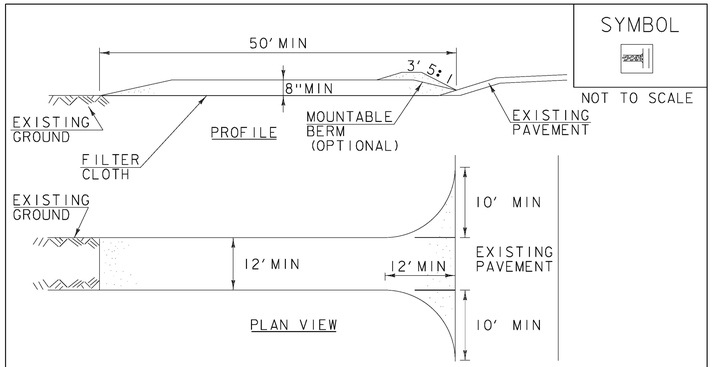
VAOT RURAL AREA MIX						
	LBS/AC					
WEIGHT	BROADCAST	HYDROSEED	NAME	LATIN NAME	GERM	PURITY
37.5%	22.5	45	CREEPING RED FESCUE	FESTUCA RUBRA VAR. RUBRA	85%	98%
37.5%	22.5	45	TALL FESCUE	FESTUCA ARUNDINACEA	90%	95%
5.0%	3	6	RED TOP	AGROSTIS GIGANTEA	90%	95%
15.0%	9	18	WHITE FIELD CLOVER	TRIFOLIUM REPENS	85%	98%
5.0%	3	6	ANNUAL RYE GRASS	LOLIUM MULTIFLORUM	85%	95%
100%	60	120				

GENERAL AMENDMENT GUIDANCE		
FERTILIZER	LIME	
10/20/10	AG LIME	PELLITIZED
500 LBS/AC	2 TONS/AC	1 TONS/AC

CONSTRUCTION GUIDANCE

1. SEED MIX: THE CONTRACTOR SHALL COORDINATE WITH THE RESIDENT ENGINEER ON WHICH SEED MIX TO USE.
2. SEED MIX: USE AS INDICATED IN THE PLANS AND/OR FOR ALL ESTABLISHED UPLAND (NON WETLAND) AREAS DISTURBED BY THE CONTRACTOR.
3. ALL SEED MIXTURES: SHALL NOT HAVE A WEED CONTENT EXCEEDING 0.40% BY WEIGHT AND SHALL BE FREE OF ALL NOXIOUS SEED.
4. FERTILIZER AND LIMESTONE: SHALL FOLLOW RATES SHOWN ON PLAN OR AS DIRECTED BY THE ENGINEER.
5. HAY MULCH: TO BE PLACED ON EARTH SLOPES AT THE RATE OF 2 TONS/ACRE, ACHIEVE 90% GROUND COVER OR AS DIRECTED BY THE ENGINEER.
6. HYDROSEEDING: ALTHOUGH GUIDANCE IS GIVEN ABOVE THE SITE CONDITIONS AND THE TYPE OF HYDROSEED PROPOSED FOR USE WILL ULTIMATELY DICTATE THE AMOUNTS AND TYPES OF SOIL AMENDMENTS TO BE APPLIED.
7. TURF ESTABLISHMENT: PLACING SEED, FERTILIZER, LIME AND MULCH PRIOR TO SEPTEMBER 15 AND AFTER APRIL 15 CAN BETTER ENSURE A VIGOROUS GROWTH OF GRASS.

ADAPTED FROM VTRANS TECHNICAL LANDSCAPE MANUAL FOR ROADWAYS AND TRANSPORTATION FACILITIES	TURF ESTABLISHMENT
THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 651FOR SEED (PAY ITEM 651.15)	REVISIONS JANUARY 12, 2015 WHF



SYMBOL

NOT TO SCALE

CONSTRUCTION SPECIFICATIONS

1. STONE SIZE- USE 1-4" STONE, RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
2. LENGTH- NOT LESS THAN 50' (EXCEPT ON A SINGLE RESIDENCE LOT WHERE A 30' MINIMUM LENGTH APPLIES).
3. THICKNESS- NOT LESS THAN 8".
4. WIDTH- 12' MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS. 24' IF SINGLE ENTRANCE TO SITE.
5. GEOTEXTILE MUST BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING STONE.
6. SURFACE WATER- ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED BENEATH THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
7. MAINTENANCE- THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY, ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
8. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
9. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED ACCORDING TO PERMIT REQUIREMENTS.

ADAPTED FROM DETAILS PROVIDED BY: NEW YORK STATE DEC ORIGINALLY DEVELOPED BY USDA-NRCS VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION	STABILIZED CONSTRUCTION ENTRANCE
NOTES: REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006- " FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE. THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 653 FOR VEHICLE TRACKING PAD (PAY ITEM 653.35) OR AS SPECIFIED IN THE CONTRACT.	REVISIONS MARCH 24, 2008 WHF JANUARY 13, 2009 WHF

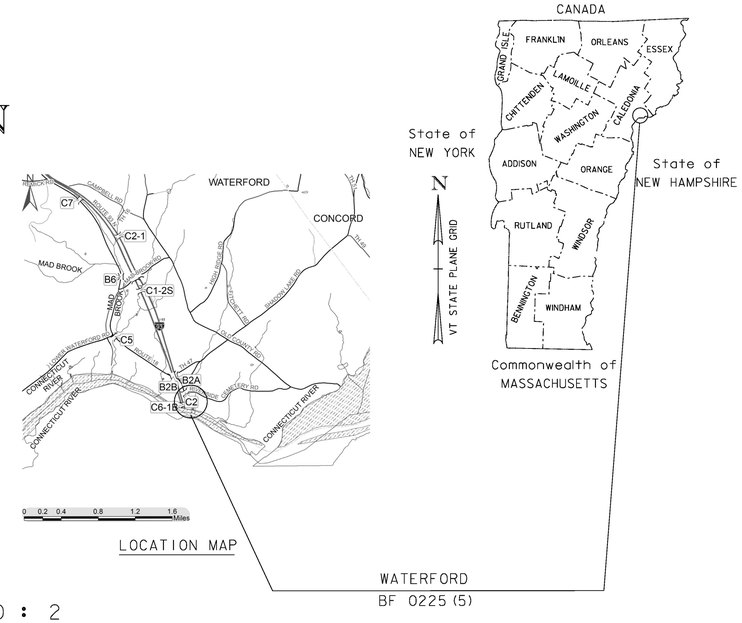
GM2 ASSOCIATES

PROJECT NAME: WATERFORD
PROJECT NUMBER: BF 0225(4)

FILE NAME: zl3c238epsc_det2.dgn
PROJECT LEADER: T. LEVINS
DESIGNED BY: A. KURDEKAR
EPSC DETAILS 2

PLOT DATE: 09/27/2017
DRAWN BY: A. KURDEKAR
CHECKED BY: T. LEVINS
SHEET 31 OF 63

STATE OF VERMONT
AGENCY OF TRANSPORTATION



PROPOSED IMPROVEMENT
BRIDGE PROJECT

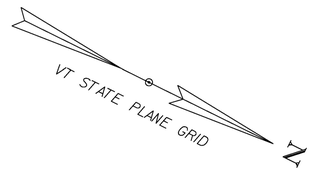
TOWN OF WATERFORD
COUNTY OF CALEDONIA

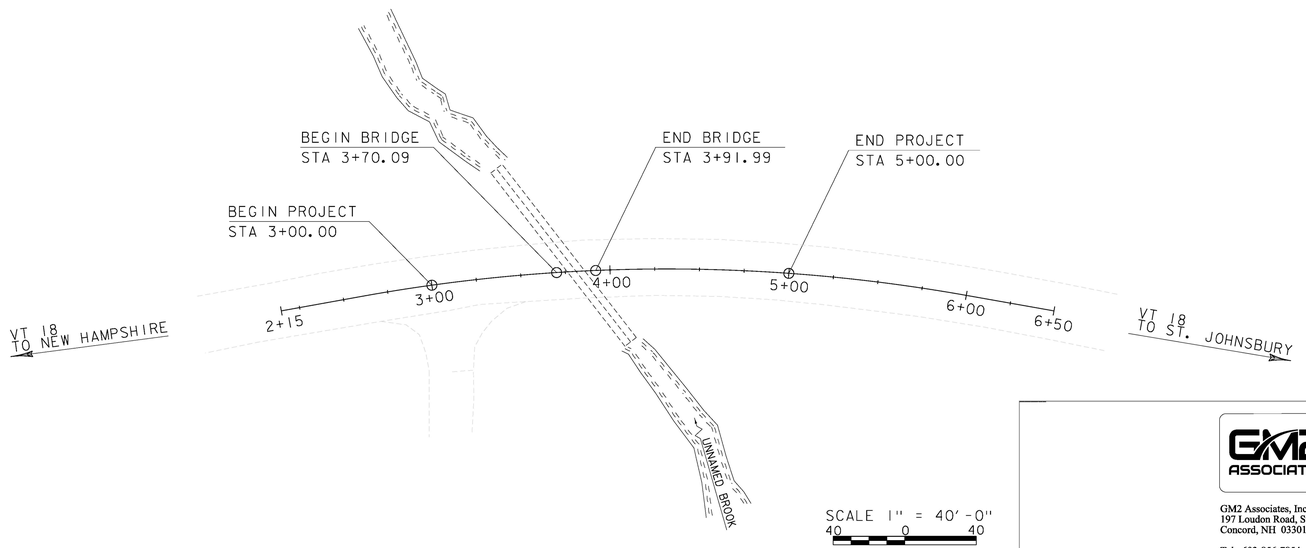
ROUTE NO : VT ROUTE 18, RURAL MAJOR COLLECTOR BRIDGE NO : 2

PROJECT LOCATION: APPROXIMATELY 7.6 MILES SOUTH OF THE INTERSECTION OF VT ROUTE 18 AND US ROUTE 2.

PROJECT DESCRIPTION: REPLACEMENT OF EXISTING CULVERT WITH A NEW PRECAST CONCRETE BOX CULVERT WITH RELATED APPROACH ROADWAY AND CHANNEL WORK.

LENGTH OF STRUCTURE: 21.90 FEET
LENGTH OF ROADWAY: 178.10 FEET
LENGTH OF PROJECT: 200.00 FEET





CONSTRUCTION IS TO BE CARRIED ON IN ACCORDANCE WITH THESE PLANS AND THE STANDARD SPECIFICATIONS FOR CONSTRUCTION DATED 2011, AS APPROVED BY THE FEDERAL HIGHWAY ADMINISTRATION ON JULY 20, 2011 FOR USE ON THIS PROJECT, INCLUDING ALL SUBSEQUENT REVISIONS AND SUCH REVISED SPECIFICATIONS AND SPECIAL PROVISIONS AS ARE INCORPORATED IN THESE PLANS.

QUALITY ASSURANCE PROGRAM : LEVEL	2
SURVEYED BY :	VTRANS
SURVEYED DATE :	12/27/2013
DATUM	
VERTICAL	NAVD88
HORIZONTAL	NAVD83 (2011)

CONTRACT PLANS
27-DEC-2017

GM2 ASSOCIATES
GM2 Associates, Inc.
197 Loudon Road, Suite 310
Concord, NH 03301
Tel: 603-856-7854
Fax: 603-856-7855

DIRECTOR OF PROJECT DELIVERY
APPROVED _____ DATE _____

PROJECT MANAGER : D. LANDRY

PROJECT NAME : WATERFORD
PROJECT NUMBER : BF 0225 (5)

SHEET 32 OF 63 SHEETS

STATE OF VERMONT
AGENCY OF TRANSPORTATION

PRELIMINARY INFORMATION SHEET (CULVERT)

Version
LRFD

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STANDARDS LIST

B-71	STANDARD FOR RESIDENTIAL AND COMMERCIAL DRIVES	07-08-2005
E-193	PAVEMENT MARKING DETAILS	08-18-1995
G-1	STEEL BEAM GUARDRAIL DETAILS (POST, DELINEATOR, TYPICALS)	03-10-2017
G-1D	STEEL BEAM GUARDRAIL DETAILS (END TERMINAL, ANCHOR MEDIAN)	03-10-2017
T-1	TEMPORARY TRAFFIC CONTROL GENERAL NOTES	04-25-2016
T-10	CONVENTIONAL ROADS CONSTRUCTION APPROACH SIGNING	08-06-2012
T-17	TRAFFIC CONTROL MISCELLANEOUS DETAILS	08-06-2012
T-28	CONSTRUCTION SIGN DETAILS	08-06-2012
T-30	CONSTRUCTION SIGN DETAILS	08-06-2012
T-42	BRIDGE NUMBER PLAQUE	04-09-2014
T-45	SQUARE TUBE SIGN POST AND ANCHOR	01-02-2013

DETAIL SHEETS

HSD-400.01	SAFETY EDGE DETAILS	03-29-2016
SD-502.00	CONCRETE DETAILS AND NOTES	10-10-2012

FINAL HYDRAULIC REPORT

HYDROLOGIC DATA

Date: October 2016

DRAINAGE AREA : 1.1 sq. mi.
CHARACTER OF TERRAIN : Mostly forested, rural
STREAM CHARACTERISTICS : Sinuous and incised
NATURE OF STREAMBED : Sand, gravel, cobbles

PEAK FLOW DATA - ANNUAL EXCEEDANCE PROBABILITY (AEP)

43% =	70 cfs	2% =	260 cfs
10% =	160 cfs	1% =	310 cfs
4% =	210 cfs	0.2% =	430 cfs

DATE OF FLOOD OF RECORD: Unknown
ESTIMATED DISCHARGE: Unknown
WATER SURFACE ELEV.: Unknown
NATURAL STREAM VELOCITY : @ 2% AEP = 10.9 fps
ICE CONDITIONS : Moderate
DEBRIS: Light to moderate
DOES THE STREAM REACH MAXIMUM HIGHWATER ELEV. RAPIDLY? No
IS ORDINARY RISE RAPID? No
IS STAGE AFFECTED BY UPSTREAM OR DOWNSTREAM CONDITIONS? No
IF YES, DESCRIBE:

WATERSHED STORAGE: <1%
HEADWATERS:
UNIFORM: X
IMMEDIATELY ABOVE SITE:

EXISTING STRUCTURE INFORMATION

STRUCTURE TYPE: Corrugated galvanized metal plate pipe
YEAR BUILT: 1981
CLEAR SPAN(NORMAL TO STREAM): 8'
VERTICAL CLEARANCE ABOVE STREAMBED: 8'
WATERWAY OF FULL OPENING: 50 sq. ft.
DISPOSITION OF STRUCTURE: Remove and replace
TYPE OF MATERIAL UNDER SUBSTRUCTURE: See borings

WATER SURFACE ELEVATIONS AT:

43% AEP =	713.0'	VELOCITY =	9.4 fps
10% AEP =	714.4'	"	12.3 fps
4% AEP =	715.0'	"	13.6 fps
2% AEP =	715.5'	"	14.6 fps
1% AEP =	715.9'	"	15.5 fps

LONG TERM STREAMBED CHANGES: Scour hole at outlet

IS THE ROADWAY OVERTOPPED BELOW 1% AEP: No
FREQUENCY: N/A
RELIEF ELEVATION: 725.2'
DISCHARGE OVER ROAD @ 1% AEP: N/A

UPSTREAM STRUCTURE

TOWN: Waterford
DISTANCE: 1800'
HIGHWAY # : TH 19
STRUCTURE #:
CLEAR SPAN:
CLEAR HEIGHT:
YEAR BUILT:
FULL WATERWAY:
STRUCTURE TYPE:

DOWNSTREAM STRUCTURE

TOWN: Waterford
DISTANCE: 1000'
HIGHWAY # :
STRUCTURE #:
CLEAR SPAN:
CLEAR HEIGHT:
YEAR BUILT:
FULL WATERWAY:
STRUCTURE TYPE: Confluence with Connecticut River

PROPOSED STRUCTURE

STRUCTURE TYPE: Concrete box

CLEAR SPAN(NORMAL TO STREAM): 16'
VERTICAL CLEARANCE ABOVE STREAMBED: 5'
WATERWAY OF FULL OPENING: 80 sq. ft.

WATER SURFACE ELEVATIONS AT:

43% AEP =	711.2'	VELOCITY=	7.1 fps
10% AEP =	712.0'	"	9.7 fps
4% AEP =	712.4'	"	10.4 fps
2% AEP =	712.8'	"	11.0 fps
1% AEP =	713.2'	"	12.3 fps

IS THE ROADWAY OVERTOPPED BELOW 1% AEP: No
FREQUENCY: N/A
RELIEF ELEVATION: 725.2'
DISCHARGE OVER ROAD @ 1% AEP: N/A

BRIDGE LOW CHORD ELEVATION: 715.1'
FREEBOARD: @ 2% AEP = 2.3'

SCOUR: Scour not calculated for a box

REQUIRED CHANNEL PROTECTION: Stone Fill Type III*

PERMIT INFORMATION

AVERAGE DAILY FLOW:	-	DEPTH OR ELEVATION:
ORDINARY LOW WATER:	-	-
ORDINARY HIGH WATER:	-	-

TEMPORARY BRIDGE REQUIREMENTS

STRUCTURE TYPE: None required
CLEAR SPAN (NORMAL TO STREAM):
VERTICAL CLEARANCE ABOVE STREAMBED:
WATERWAY AREA OF FULL OPENING:

ADDITIONAL INFORMATION

* E-stone Type E3 should be used to fill the box and in the channel.

TRAFFIC MAINTENANCE NOTES

1. MAINTAIN TRAFFIC ON AN OFF SITE DETOUR.
2. TRAFFIC SIGNALS ARE NOT NECESSARY.
3. SIDEWALKS ARE NOT NECESSARY

DESIGN VALUES

1. DESIGN LIVE LOAD		HL-93
2. FUTURE PAVEMENT	d_p:	3.0 INCH
3. CULVERT OPENING	D:	16.00 FT
4. MIN. MID-SPAN POS. CAMBER @ RELEASE (PRESTRESSED UNITS)	Δ:	- - -
5. PRESTRESSING STRAND	f_y:	- - -
6. PRESTRESSED CONCRETE STRENGTH	f'_c:	- - -
7. PRESTRESSED CONCRETE RELEASE STRENGTH	f'_{ci}:	- - -
8. CONCRETE, HIGH PERFORMANCE CLASS AA	f'_c:	4.0 KSI
9. CONCRETE, HIGH PERFORMANCE CLASS A	f'_c:	4.0 KSI
10. CONCRETE, HIGH PERFORMANCE CLASS B	f'_c:	3.5 KSI
11. CONCRETE, CLASS C	f'_c:	3.0 KSI
12. REINFORCING STEEL	f_y:	60 KSI
13. STRUCTURAL STEEL AASHTO M270	f_y:	- - -
14. NOMINAL BEARING RESISTANCE OF SOIL	q_n:	12 KSF
15. SOIL BEARING RESISTANCE FACTOR (REFER TO AASHTO LRFD)	ϕ:	0.45
16. NOMINAL BEARING RESISTANCE OF ROCK	q_n:	- - -
17. ROCK BEARING RESISTANCE FACTOR (REFER TO AASHTO LRFD)	ϕ:	---
18. PILE RESISTANCE FACTOR	ϕ:	---
19. LATERAL PILE DEFLECTION	Δ:	- - -
20. BASIC WIND SPEED	V_{3s}:	- - -
21. MINIMUM GROUND SNOW LOAD	p_g:	- - -
22. SEISMIC DATA PGA: 9 %g	S_s:	- - -
	S_1:	- - -
23.		
24.		- - -
25.		- - -
26.		- - -

TRAFFIC DATA

YEAR	ADT	DHV	% D	% T	ADTT
2015	1100	150	57	6.2	90
2035	1100	150	57	8.5	130

20 year ESAL for flexible pavement from 2015 to 2035 : 593.000
40 year ESAL for flexible pavement from 2015 to 2055 : 1.254.000
Design Speed : 50 mph

AS BUILT "REBAR" DETAIL

LEVEL I	LEVEL II	LEVEL III
TYPE:	TYPE:	TYPE:
GRADE:	GRADE:	GRADE:

CULVERT DESIGN CRITERIA

1. PROPOSED CULVERT IS A PRECAST CONCRETE STRUCTURE (16'-0" X 8'-0" X 122' BOX).
2. CULVERT ENDS ARE NOT SKEWED. CULVERT ENDS ARE PLUMB.
3. CULVERT WILL BE SET AT A SLOPE OF 7.361 FT ON 100 FT.

PROJECT NAME: **WATERFORD**
PROJECT NUMBER: **BF 0225(5)**

FILE NAME: **z15b051pi.dgn**
PROJECT LEADER: **T. LEVINS**
DESIGNED BY: **B. WILLIAMS**
PRELIMINARY INFORMATION SHEET

PLOT DATE: 9/27/2017
DRAWN BY: **B. WILLIAMS**
CHECKED BY: **T. LEVINS**
SHEET 33 OF 63

GENERAL NOTES

1. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM TO THE AGENCY OF TRANSPORTATION'S STANDARD SPECIFICATIONS FOR CONSTRUCTION, DATED 2011, AND ITS LATEST REVISIONS, AND THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS 7TH EDITION, AND ITS LATEST REVISIONS.

2. PREPARATION OF THE SITE WILL BE ALLOWED PRIOR TO THE BRIDGE CLOSURE PERIOD. HOWEVER, EXCAVATION FOR AND PLACEMENT OF BOX SECTIONS SHALL BE PERFORMED DURING BRIDGE CLOSURE PERIOD ONLY.

3. ITEM 529.15 "REMOVAL OF STRUCTURE" WILL BE USED FOR ALL WORK REQUIRED TO REMOVE THE EXISTING CGMPP UNDER VT 18.

4. THE CONTRACTOR SHALL INSTALL TEMPORARY TRAFFIC BARRIER AT THE LIMITS OF WORK AT EACH END OF THE PROJECT (TO PREVENT VEHICLES FROM ENTERING WORK ZONE) TO REMAIN IN PLACE UNTIL FINAL GRADE IS ESTABLISHED AND PROPOSED GUARDRAIL IS INSTALLED BETWEEN STA 2+63.5 AND STA 5+69.5. PAYMENT WILL BE INCLUDED IN THE BID PRICE FOR ITEM 900.645 "SPECIAL PROVISION (TRAFFIC CONTROL, ALL-INCLUSIVE)."

5. ALL DIMENSIONS ARE HORIZONTAL OR VERTICAL AND ARE GIVEN AT 68 DEGREES F UNLESS OTHERWISE NOTED.

6. EXCAVATED STREAM BED MATERIAL SUPPLEMENTED WITH E-STONE TYPE E3 SHALL BE PLACED INSIDE THE BOX SECTIONS AND AS SHOWN IN THE PLANS. PAYMENT WILL BE UNDER ITEM 900.608 "SPECIAL PROVISIONS (E-STONE TYPE E3)." SEE SPECIAL PROVISIONS.

TRAFFIC CONTROL

7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN AND IMPLEMENTATION OF A SITE SPECIFIC TRAFFIC CONTROL PLAN FOR ALL STAGES OF CONSTRUCTION. THE PLAN SHALL CLEARLY DETAIL HOW TRAFFIC WILL BE MAINTAINED PRIOR TO, DURING, AND AFTER THE BRIDGE CLOSURE PERIOD. THE PLAN SHALL SPECIFY ALL CONSTRUCTION ACTIVITIES REQUIRING ALTERNATING ONE WAY TRAFFIC, RELATE THOSE ACTIVITIES TO THE CONSTRUCTION SCHEDULE, AND SHOW APPROPRIATE TEMPORARY TRAFFIC CONTROL. THE CONTRACTOR SHALL SUBMIT DETAILED TRAFFIC CONTROL PLANS TO THE PROJECT MANAGER FOR APPROVAL PER SUBSECTION 105.03. ALL COSTS WILL BE INCLUDED IN ITEM 900.645 "SPECIAL PROVISION (TRAFFIC CONTROL, ALL-INCLUSIVE)."

REINFORCING STEEL

8. ALL REINFORCING STEEL SHALL BE LEVEL I (EPOXY COATED) REINFORCING STEEL IN ACCORDANCE WITH SECTION 507. PAYMENT FOR ALL REINFORCING STEEL WILL BE INCLUDED IN THE UNIT PRICE BID FOR CONTRACT ITEM 540.10 "PRECAST CONCRETE STRUCTURE."

9. ALL REINFORCING STEEL SHALL HAVE A MINIMUM CLEAR COVER OF 2".

PRECAST CONCRETE

10. DESIGN CRITERIA (PRECAST BOX):

    A. SOIL UNIT WEIGHT = 125 PCF
    B. DESIGN LIVE LOAD = HL-93
    C. NOMINAL BEARING RESISTANCE (BEDROCK) = N/A
    D. FACTORED NET BEARING RESISTANCE (GRANULAR BACKFILL) = 14.9 KSF
    E. BEARING RESISTANCE FACTOR = 0.45
    F. DESIGN FILL OVER BOX = 14 FEET
    G. AT-REST EARTH PRESSURE (Ko) = 0.398
    H. CONCRETE COMPRESSIVE STRENGTH = SEE SUBSECTION 540.05(e)

11. DESIGN CRITERIA (PRECAST WINGWALLS):

    A. SOIL UNIT WEIGHT = 125 PCF
    B. DESIGN LIVE LOAD = HL-93
    C. NOMINAL BEARING RESISTANCE (BEDROCK) = N/A
    D. FACTORED NET BEARING RESISTANCE (GRANULAR BACKFILL) = SEE CHART IN GEOTECH REPORT
    E. BEARING RESISTANCE FACTOR = 0.45
    F. DESIGN FILL OVER BOX = N/A
    G. AT-REST EARTH PRESSURE (Ko) = 0.398
    H. CONCRETE COMPRESSIVE STRENGTH = SEE SUBSECTION 540.05(e)

12. ALL CONCRETE SHALL BE PRECAST. ITEM 540.10 "PRECAST CONCRETE STRUCTURE" WHICH INCLUDES ALL BOX SEGMENTS, HEADWALLS, WINGWALLS, AND CUTOFF WALLS. ALL CONNECTIONS SHALL BE DESIGNED BY THE FABRICATOR AND WILL BE CONSIDERED INCIDENTAL TO ITEM 540.10.

13. THE PRECAST CONCRETE STRUCTURE SHALL BE DESIGNED FOR HYDROSTATIC PRESSURE UNLESS RAPID DRAINING MATERIAL MEETING THE REQUIREMENTS OF SUBSECTION 704.18 IS USED. IF USED, RAPID DRAINING MATERIAL WILL BE PAID AT THE UNIT PRICE BID FOR ITEM 204.30 "GRANULAR BACKFILL FOR STRUCTURES." NO WEEPHOLES IN THE BOX SECTIONS WILL BE ALLOWED.

14. THE PRECAST BOX SECTIONS ARE SHOWN FOR REFERENCE ONLY. THE ACTUAL DIMENSIONS AND SHAPE WILL BE DEPENDENT ON THE FABRICATOR. THE MINIMUM INSIDE DIMENSIONS SHALL BE 8'-0" IN HEIGHT AND 16'-0" IN WIDTH. THE EXPOSED ENDS OF THE FIRST AND LAST UNITS SHALL BE VERTICAL.

15. ALL LIFTING HOLES AND BOLT POCKETS SHALL BE FILLED WITH MORTAR TYPE IV AFTER BEING SET IN THEIR FINAL POSITION. THIS WORK WILL BE INCLUDED IN THE UNIT PRICE BID FOR ITEM 540.10 "PRECAST CONCRETE STRUCTURE." FILLING THE JOINTS BETWEEN BOX SEGMENTS WITH GROUT IS NOT REQUIRED.

16. WATER REPELLENT, SILANE SHALL BE APPLIED TO ALL EXPOSED EXTERIOR SURFACES OF THE PRECAST CONCRETE STRUCTURE. PAYMENT FOR SILANE WILL BE INCLUDED IN THE UNIT BID PRICE FOR CONTRACT ITEM 514.10 "WATER REPELLENT, SILANE."

17. A TWO (2) FOOT WIDE STRIP OF SHEET MEMBRANE WATERPROOFING MEETING THE REQUIREMENTS OF SUBSECTION 519.02, CENTERED ON THE JOINT, SHALL BE PLACED AT EACH JOINT. THE SHEET MEMBRANE SHALL COVER 1 FOOT TO EACH SIDE OF THE JOINT BOTH ON TOP AND THE FULL HEIGHT OF THE SIDES OF THE STRUCTURE. ANY OVERLAPPING OF THE MEMBRANE SHALL BE DONE IN A SHINGLE TYPE STYLE AND SHALL OVERLAP A MINIMUM OF ONE FOOT. PAYMENT FOR THE MEMBRANE WILL BE INCLUDED IN THE UNIT PRICE BID FOR CONTRACT ITEM 540.10 "PRECAST CONCRETE STRUCTURE."

18. PERMANENT CLOSURE HARDWARE SHALL BE REQUIRED BETWEEN ALL BOX SECTIONS AND WILL BE INCLUDED IN THE UNIT PRICE BID FOR CONTRACT ITEM 540.10 "PRECAST CONCRETE STRUCTURE."

GM2 ASSOCIATES

PROJECT NAME: WATERFORD
PROJECT NUMBER: BF 0225(5)

FILE NAME: z15b05igen.dgn
PROJECT LEADER: T. LEVINS
DESIGNED BY: B. WILLIAMS
PROJECT NOTES

PLOT DATE: 09/27/2017
DRAWN BY: B. WILLIAMS
CHECKED BY: T. LEVINS

STATE OF VERMONT
AGENCY OF TRANSPORTATION

QUANTITY SHEET 1

SUMMARY OF ESTIMATED QUANTITIES										TOTALS		DESCRIPTIONS				DETAILED SUMMARY OF QUANTITIES		
						ROADWAY	EROSION CONTROL	BRIDGE	FULL C.E. ITEMS	GRAND TOTAL	FINAL	UNIT	ITEMS	ITEM NUMBER	ROUND	QUANTITIES	UNIT	ITEMS
						1				1		LS	CLEARING AND GRUBBING, INCLUDING INDIVIDUAL TREES AND STUMPS	201.10				
						630				630		CY	COMMON EXCAVATION	203.15				
								390		390		CY	UNCLASSIFIED CHANNEL EXCAVATION	203.27				
						~~30~~				~~30~~		~~CY~~	~~GRANULAR BORROW~~	~~203.32~~				
						~~1~~				~~1~~		~~CY~~	~~TRENCH EXCAVATION OF EARTH, EXPLORATORY (N.A.B.I.)~~	~~204.22~~				
								1870		1870		CY	STRUCTURE EXCAVATION	204.25				
								~~380~~		~~380~~		CY	GRANULAR BACKFILL FOR STRUCTURES	204.30				
						360				360		SY	COLD PLANING, BITUMINOUS PAVEMENT	210.10				
						630				630		CY	SUBBASE OF DENSE GRADED CRUSHED STONE	301.35				
						40				40		TON	AGGREGATE SHOULDERS	402.12				
						~~6~~ 5.27				~~6~~ 5.27		CWT	EMULSIFIED ASPHALT	404.65				
						1				1		LU	PRICE ADJUSTMENT, ASPHALT CEMENT (N.A.B.I.)	406.50				
								27		27		GAL	WATER REPELLENT, SILANE	514.10				
								1		1		EACH	REMOVAL OF STRUCTURE (96" DIA. x 122' LONG CGMPP) (BF 0225(5))	529.15				
								1		1		LS	PRECAST CONCRETE STRUCTURE (16' x 8' x 122' BOX AND WINGWALLS)	540.10				
								140		140		CY	STONE FILL, TYPE IV	613.13				
						508				508		LF	STEEL BEAM GUARDRAIL, GALVANIZED	621.20				
						4				4		EACH	ANCHOR FOR STEEL BEAM RAIL	621.60				
						590				590		LF	REMOVAL AND DISPOSAL OF GUARDRAIL	621.80				
						~~400~~ 462.25				~~400~~ 462.25		HR	FLAGGERS	630.15				
									0.5	0.5		LS	FIELD OFFICE, ENGINEERS	631.10				
									0.5	0.5		LS	TESTING EQUIPMENT, BITUMINOUS	631.17				
									1500	1500		DL	FIELD OFFICE TELEPHONE (N.A.B.I.)	631.26				
						0.5				0.5		LS	MOBILIZATION/DEMOBILIZATION	635.11				
						2				2		EACH	PORTABLE CHANGEABLE MESSAGE SIGN	641.15				
						~~600~~ 1,019				~~600~~ 1,019		LF	4 INCH WHITE LINE	646.20				
						~~600~~ 976				~~600~~ 976		LS	4 INCH YELLOW LINE	646.21				
							~~1010~~ 978			~~1010~~ 978		SY	GEOTEXTILE FOR ROADBED SEPARATOR	649.11				
								200		200		SY	GEOTEXTILE UNDER STONE FILL	649.31				
							~~205~~ 222			~~205~~ 222		SY	GEOTEXTILE FOR SILT FENCE	649.51				
						~~135~~				~~135~~		~~SY~~	~~GEOTEXTILE FOR FILTER CURTAIN~~	~~649.61~~				
							~~12~~ 25			~~12~~ 25		LB	SEED	651.15				
							~~100~~ 150			~~100~~ 150		LB	FERTILIZER	651.18				
							~~0.4~~ 0.2			~~0.4~~ 0.2		TON	AGRICULTURAL LIMESTONE	651.20				
							~~0.6~~ 0.74			~~0.6~~ 0.74		TON	HAY MULCH	651.25				
							110			110		CY	TOPSOIL	651.35				
								60		60		SY	GRUBBING MATERIAL	651.40				
							1			1		LS	EPSC PLAN (BF 0225 (5))	652.10				
							20			20		HR	MONITORING EPSC PLAN (BF 0225(5))	652.20				
							1			1		LU	MAINTENANCE OF EPSC PLAN (N.A.B.I.) (BF 0225 (5))	652.30				

GM2 ASSOCIATES

PROJECT NAME: WATERFORD
PROJECT NUMBER: BF 0225(5)

FILE NAME: z15b05lqs.dgn
PROJECT LEADER: T. LEVINS
DESIGNED BY: B. WILLIAMS
QUANTITY SHEET 1

PLOT DATE: 09/27/2017
DRAWN BY: B. WILLIAMS
CHECKED BY: T. LEVINS
SHEET 35 OF 63

STATE OF VERMONT
AGENCY OF TRANSPORTATION

QUANTITY SHEET 2

SUMMARY OF ESTIMATED QUANTITIES

ROADWAY	EROSION CONTROL	BRIDGE	FULL C.E. ITEMS
	~~730~~ 868		
	~~30~~ 25		
	1		
	~~690~~ 539		
~~1~~ 0.84			
~~16~~ 14			
~~2~~ 5			
4			
1			
		350	
		35000	
3			
		1	
1			
~~1~~			
1			
310			

TOTALS

GRAND TOTAL	FINAL
~~730~~ 868	
~~30~~ 25	
1	
~~690~~ 539	
~~1~~ 0.84	
~~16~~ 14	
~~2~~ 5	
4	
1	
350	
35000	
3	
1	
1	
~~1~~	
1	
310	

DESCRIPTIONS

UNIT	ITEMS	ITEM NUMBER	ROUND
SY	TEMPORARY EROSION MATTING	653.20	
CY	VEHICLE TRACKING PAD	653.35	
EACH	FILTER BAG	653.45	
LF	PROJECT DEMARCATION FENCE	653.55	
SF	TRAFFIC SIGNS, TYPE A	675.20	
LF	SQUARE TUBE SIGN POST AND ANCHOR	675.341	
EACH	REMOVING SIGNS	675.50	
EACH	DELINEATOR WITH STEEL POST	676.10	
LU	PRICE ADJUSTMENT, FUEL (N.A.B.I.)	690.50	
CY	SPECIAL PROVISION (E-STONE TYPE E3)	900.608	
DL	SPECIAL PROVISION (INCENTIVE/DISINCENTIVE) (N.A.B.I.) (BF 0225(5))	900.615	
EACH	SPECIAL PROVISION (CPM SCHEDULE)	900.620	
LS	SPECIAL PROVISION (TEMPORARY RELOCATION OF STREAM) (BF 0225 (5))	900.645	
LS	SPECIAL PROVISION (TRAFFIC CONTROL, ALL-INCLUSIVE) (BF 0225 (5))	900.645	
~~LU~~	~~SPECIAL PROVISION (MAT DENSITY PAY ADJUSTMENT, SMALL QUANTITY) (N.A.B.I.)~~	~~900.650~~	
LU	SPECIAL PROVISION (MIXTURE PAY ADJUSTMENT) (N.A.B.I.)	900.650	
TON	SPECIAL PROVISION (BITUMINOUS CONCRETE PAVEMENT, SMALL QUANTITY)	900.680	

DETAILED SUMMARY OF QUANTITIES

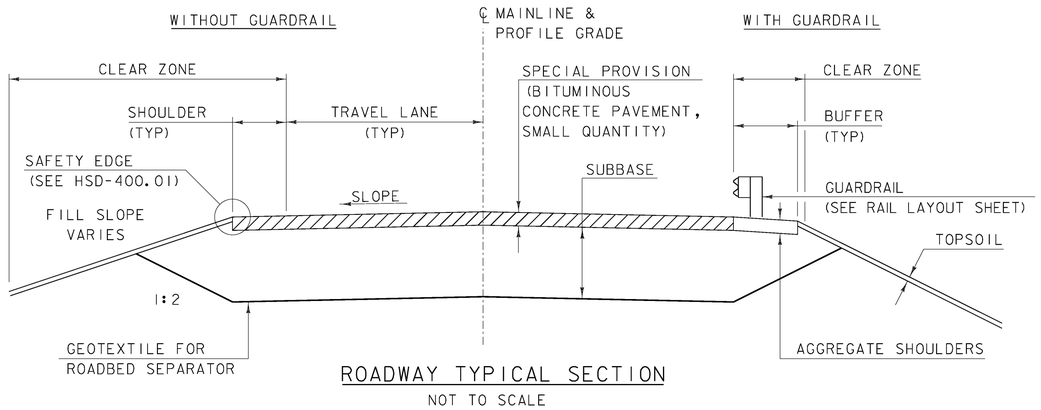
QUANTITIES	UNIT	ITEMS
		PER RE PET HODGSON
		NO CORES TAKEN PER RE PETE HODGSON

GM2 ASSOCIATES

PROJECT NAME: WATERFORD
PROJECT NUMBER: BF 0225(5)

FILE NAME: z15b05qs.dgn
PROJECT LEADER: T. LEVINS
DESIGNED BY: B. WILLIAMS
QUANTITY SHEET 2

PLOT DATE: 09/27/2017
DRAWN BY: B. WILLIAMS
CHECKED BY: T. LEVINS
SHEET 36 OF 63



ROADWAY TYPICAL SECTION

NOT TO SCALE

ROAD TYPICAL INFORMATION

	LEFT		RIGHT	
	WIDTH	SLOPE	WIDTH	SLOPE
TRAVEL LANE	12'-0"	VARIES	12'-0"	VARIES
SHOULDER	4'-0"	VARIES	4'-0"	VARIES
BUFFER	3'-7"	-0.060	3'-7"	-0.060
FILL SLOPE		1:2.0		1:2.0
CLEAR ZONE (CUT)	12'-0"		12'-0"	
CLEAR ZONE (FILL)	16'-0"		16'-0"	
CLEAR ZONE (GUARDRAIL)	4'-0"		4'-0"	

MATERIAL TOLERANCES

(IF USED ON PROJECT)

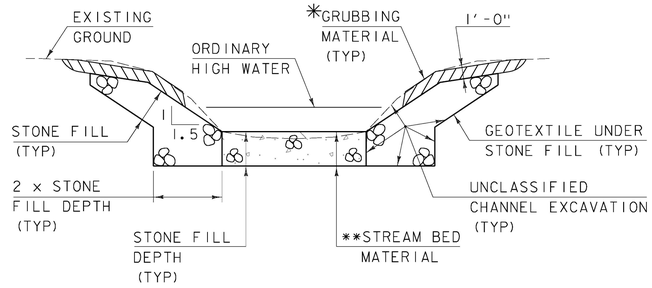
SURFACE	
- PAVEMENT (TOTAL THICKNESS)	+/- 1/4"
- AGGREGATE SURFACE COURSE	+/- 1/2"
SUBBASE	+/- 1"
SAND BORROWS	+/- 1"

MATERIAL INFORMATION

	THICKNESS	TYPE
WEARING COURSE	1 1/2"	SPECIAL PROVISION (BITUMINOUS CONCRETE PAVEMENT, SMALL QUANTITY) (TYPE IVS)
BINDER COURSE	1 1/2"	SPECIAL PROVISION (BITUMINOUS CONCRETE PAVEMENT, SMALL QUANTITY) (TYPE IVS)
BASE COURSE #2	N/A	N/A
BASE COURSE #1	3 1/2"	SPECIAL PROVISION (BITUMINOUS CONCRETE PAVEMENT, SMALL QUANTITY) (TYPE IIS)
SUBBASE	36"	SUBBASE OF DENSE GRADED CRUSHED STONE
STONE FILL	4'-0"	STONE FILL, TYPE IV
TOPSOIL	4"	TOPSOIL
STREAM BED MATERIAL	3'-0"	SPECIAL PROVISION (E-STONE TYPE E3)

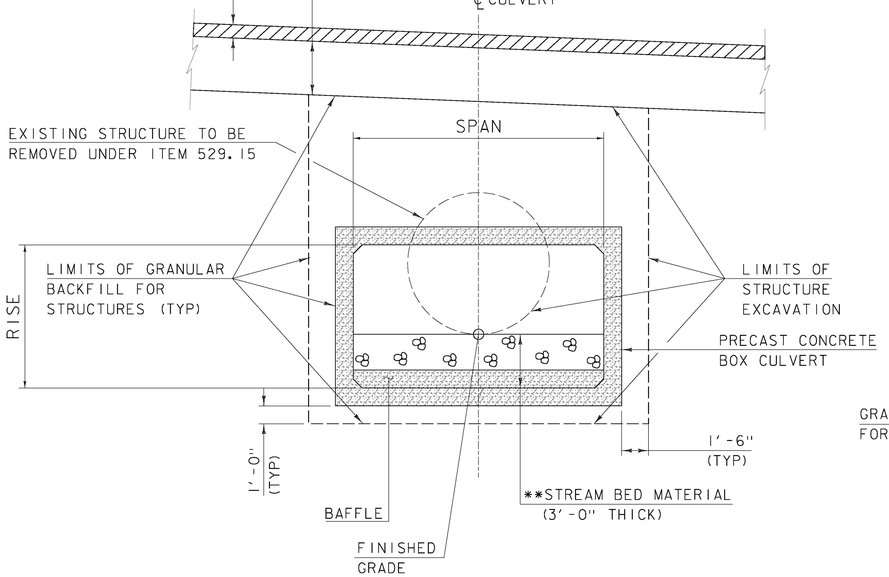
✳ WHENEVER CHANNEL SLOPE INTERSECTS ROADWAY SUBBASE, GRUBBING MATERIAL SHALL BEGIN AT THE BOTTOM OF SUBBASE.

✳✳ THE CONTRACTOR SHALL CREATE A LOW FLOW CHANNEL IN THE STREAM BED MATERIAL AS DIRECTED BY THE RESIDENT ENGINEER.



CHANNEL TYPICAL SECTION

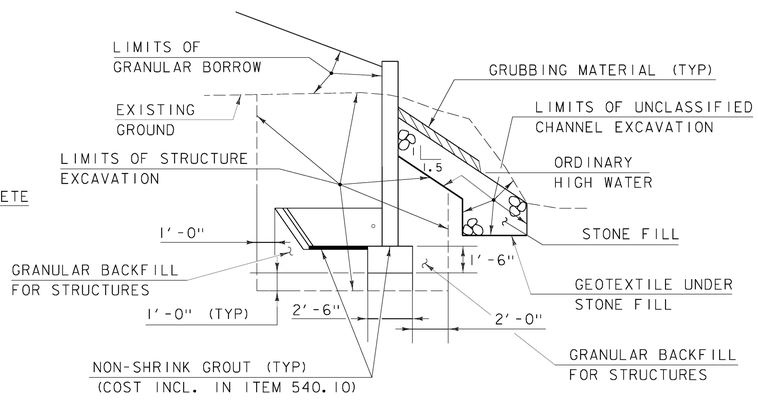
NOT TO SCALE



SPAN	16'-0"
RISE	8'-0"
LENGTH	122'-0"

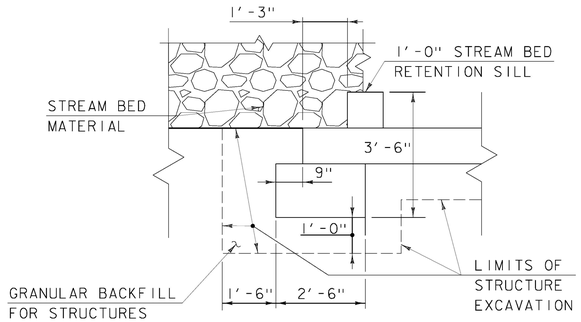
CULVERT TYPICAL SECTION

NOT TO SCALE



WINGWALL EARTHWORK TYPICAL SECTION

NOT TO SCALE



CUTOFF WALL TYPICAL SECTION

NOT TO SCALE

NOTE:
BOTTOM OF WINGWALL SHALL BE AT SAME ELEVATION AS BOTTOM OF BOX CULVERT.

PROJECT NAME: WATERFORD
PROJECT NUMBER: BF 0225(5)

FILE NAME: z15b051typical.dgn
PROJECT LEADER: T. LEVINS
DESIGNED BY: B. WILLIAMS / J. MERCER
TYPICAL SECTIONS

PLOT DATE: 09/27/2017
DRAWN BY: B. WILLIAMS
CHECKED BY: T. LEVINS
SHEET 37 OF 63

GM2 ASSOCIATES

CONTROL POINTS

PT #1 REMICK
NORTH = 685606.947
EAST = 1791789.540
ELEV. = 1353.599

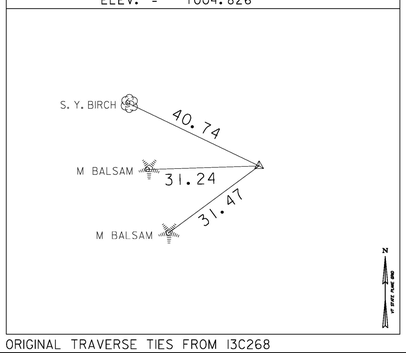
GENERAL LOCATION, WATERFORD, VT.
TO REACH FROM THE VT ROUTE 18 BRIDGE OVER INTERSTATE 93 AT EXIT 1 GO SOUTHEAST ALONG VT ROUTE 18 FOR 4.1 MI (6.6 KM) TO THE INTERSECTION OF REMICK ROAD RIGHT AND THE SITE OF THE MARK ON THE RIGHT.
THE MARK IS SET 15 CM (6 INCHES) BELOW GROUND SURFACE IN THE TOP OF A FENO STYLE MONUMENT. IT IS 22.5 M (73.8 FT) WEST OF AND 2.5 M (8.2 FT) HIGHER THAN THE CENTERLINE OF VT ROUTE 18, 13.0 M (42.7 FT) NORTH OF THE CENTERLINE OF REMICK ROAD, 8.7 M (28.5 FT) NORTHWEST OF A ROAD SIGN (LEGAL LOAD LIMIT), 5.5 M (18.0 FT) SOUTH OF A POLE GUY WITH SHEATH AND 8.5 M (27.9 FT) SOUTH-SOUTHWEST OF POLE NO 73-1/250 AND A POLE STUB AND A FIBERGLASS WITNESS POST.

PT #2 REMICK AZ MK
NORTH = 684854.031
EAST = 1793272.968
ELEV. = 1250.614

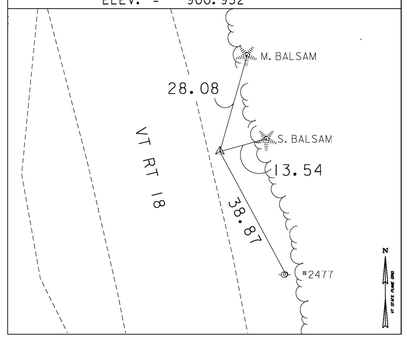
GENERAL LOCATION, WATERFORD, VT.
TO REACH FROM THE VT ROUTE 18 BRIDGE OVER INTERSTATE 93 AT EXIT 1 GO SOUTHEAST ALONG VT ROUTE 18 FOR 4.1 MI (6.6 KM) TO THE INTERSECTION OF REMICK ROAD RIGHT. CONTINUE STRAIGHT AHEAD AND GO SOUTHEAST ALONG VT ROUTE 18 FOR 0.3 MI (0.5 KM) TO THE SITE OF THE MARK ON THE LEFT.
THE MARK IS SET IN THE TOP OF A 0.5 M (1.6 FT) X 0.7 M (2.3 FT) ROCK OUTCROP WHICH PROJECTS SLIGHTLY ABOVE GROUND SURFACE. IT IS 14.4 M (47.2 FT) NORTHEAST OF AND 0.2 M (0.7 FT) LOWER THAN THE CENTERLINE OF VT ROUTE 18, 9.3 M (30.5 FT) EAST-SOUTHEAST OF THE CENTER OF A 50 CM (20 INCH) SQUARE STEEL DROP INLET, 26.2 M (86.0 FT) SOUTHEAST OF MILE MARKER 0180/0316/0300, 24.8 M (81.4 FT) NORTH OF THE NORTHWEST END OF A STEEL BEAM GUARD RAIL, 62.4 M (204.7 FT) NORTHWEST OF AN ANGLE POINT WITH BRACES IN A WIRE RIGHT-OF-WAY FENCE AND 2.1 M (6.9 FT) SOUTHWEST OF THE RIGHT-OF-WAY FENCE AND A FIBERGLASS WITNESS POST.

TRAVERSE TIES

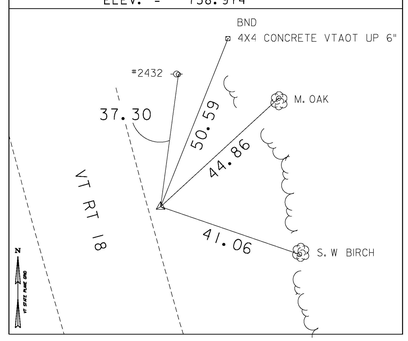
HVCTRL #6
NORTH = 681770.5310
EAST = 1795350.9820
ELEV. = 1004.826



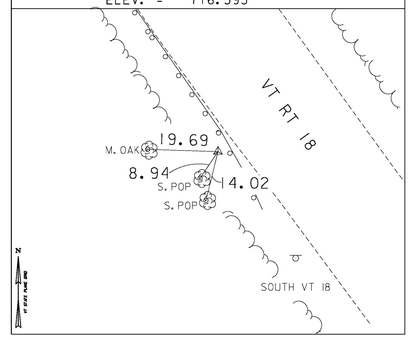
HVCTRL #7
NORTH = 680291.2180
EAST = 1796122.6840
ELEV. = 900.952



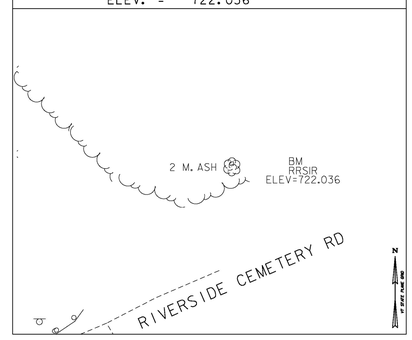
HVCTRL #16
NORTH = 673688.4623
EAST = 1799690.7929
ELEV. = 738.974



HVCTRL #17
NORTH = 673301.6880
EAST = 1799833.2040
ELEV. = 716.593



BM #1
NORTH = 673454.8702
EAST = 1799879.3334
ELEV. = 722.036



ORIGINAL TRAVERSE TIES FROM 13C268

ALIGNMENT TIES

NORTH =	NORTH =	NORTH =	NORTH =	NORTH =
EAST =	EAST =	EAST =	EAST =	EAST =
ELEV. =	ELEV. =	ELEV. =	ELEV. =	ELEV. =

DATUM
VERTICAL NAVD 88
HORIZONTAL NAD83(2011)
ADJUSTMENT COMPASS

PROJECT NAME: WATERFORD
PROJECT NUMBER: BF 0225(5)

FILE NAME: x15b05ttID.dgn
PROJECT LEADER: T. LEVINS
DESIGNED BY: VTRANS
TIE SHEET

PLOT DATE: 09/27/2017
DRAWN BY: C. CYR
CHECKED BY: P. BEYOR
SHEET 38 OF 63

VT STATE PLANE GRID

N

MOOSILAUKEE VERY FINE, SANDY LOAM
0% - 3% SLOPES
LOW EROSION POTENTIAL
NO "K" VALUE REPORTED

FOUND: HIGHWAY BOUND
4X4 CONTRETE VTHD
UP 6"

206.27'
S37°56'32"E

75.59'
N11°09'55"E

42.85'
N09°24'04"E

226.6'
S36°34'21"E

30.48'
S36°55'30"E

L=119.03'
R=1,004.93'

37.11'
S15°11'30"E

L=277.26'
R=904.93'

82.76'
N15°52'18"W

EXISTING R.O.W.

WOVEN WIRE FENCE

ARCH

STONE FILL

HVCTRL 202

HVCTRL 203

HVCTRL 204

HVCTRL 17

HVCTRL 200

HVCTRL 16

VT ROUTE 18
TO NEW HAMPSHIRE

VT ROUTE 18
TO ST. JOHNSBURY

ROW INFORMATION SOURCE:
WATERFORD I 93-1(2)
WATERFORD NRS 263

FOUND: HIGHWAY BOUND
4X4 CONTRETE
BROKEN AT GROUND

CEMETERY
WOOD FENCE

TH 43
RIVERSIDE CEMETERY
ROAD

EXISTING TOWN R.O.W.

BENCHMARK
RAILROAD SPIKE
IN ROOT
ELEV. = 722.04

GUYW

TEL

53+00
52+00
51+00
50+00
4+00
5+00
6+00
6+50
3+00
2+15

EXISTING BRIDGE DATA
96" CGMPP, 122' LONG
50 SQ FT WATERWAY
BUILT 1981

SCALE 1" = 20'-0"
20 0 20

GM2 ASSOCIATES

PROJECT NAME:	WATERFORD
PROJECT NUMBER:	BF 0225(5)
FILE NAME:	z15b05lerobdr.dgn
PROJECT LEADER:	T. LEVINS
DESIGNED BY:	B. WILLIAMS
EXISTING CONDITIONS	
PLOT DATE:	09/27/2017
DRAWN BY:	B. WILLIAMS
CHECKED BY:	T. LEVINS
SHEET	39 OF 63

STA 3+90.00 RT
STA 3+80.00 LT

BRIDGE 2 VT-18 R R

BRIDGE 2 VT-18 N N

CONSTRUCT ~~5'-0"~~ 25'-0" PAVED APRON
STA 2+68.44 - 3+46.74 RT

REMOVAL AND DISPOSAL OF GUARDRAIL
STA. 3+24.5 - 5+48.0, RT
STA. 2+13.8 - 5+48.8, LT

4 INCH WHITE LINE
~~STA 2+50.00 - 5+50.00 LT/RT~~
STA 2+00.00 - 7+68.00 LT/RT

4 INCH YELLOW LINE
~~STA 2+50.00 - 5+50.00 CL LT/RT~~
STA. 1+90.00 - 7+39.00 CL

MAINLINE CURVE 1
DELTA = 20° 16' 01"
D = 5° 59' 58"
R = 955.00'
T = 170.69'
L = 337.81'
E = 15.13'

VT STATE PLANE GRID
N

CHANNEL POE
STA 53+00.00

53+00

EXISTING R.O.W.

BEGIN BRIDGE
STA 3+70.09

HVCTRL 202

HVCTRL 203

BEGIN PROJECT
STA 3+00.00

BEGIN APPROACH
2+50.00

MAINLINE POB
STA 2+14.61

APPROX. LOCATION OF TIMBER PLANKS TO BE SALVAGED TO VTRANS

MAINLINE STA 3+81.00 =
CHANNEL STA 51+41.51
Δ = 55° 22' 43" RT

MAINLINE PI #1
STA 4+31.66

END BRIDGE
STA 3+91.99

END PROJECT
STA 5+00.00

END APPROACH
STA 5+50.00

MAINLINE POE
STA 6+49.78

SIGN VD-70 (BR 2 VT 18)

SIGN M3-3 M1-5 (VT 18)

HVCTRL 17

VT ROUTE 18
TO NEW HAMPSHIRE

N 36° 32' 07.89" W

2+15

3+00

4+00

5+00

6+00

6+50

N 16° 16' 06.84" W

VT ROUTE 18
TO ST. JOHNSBURY

SIGN D3-1 (RIVERSIDE CEMETERY RD VTH 43)

SIGN BOAT LAUNCH AND PICNIC AREA

SIGN VR-017

SIGN RI-1

RET

TEL #120T/2430

TH 43
RIVERSIDE CEMETERY
ROAD

EXISTING TOWN R.O.W.

MAINLINE PC
STA 2+60.97

SIGN VD-70 (BR 2 VT 18)

SIGN VR-048

GUYW

TEL #243

51+00

S 25° 57' 13" W

HVCTRL 200

MAINLINE PT
STA 5+98.78

HVCTRL 16

TEL #2432

CHANNEL POB
STA 50+00.00

50+00

UNNAMED BROOK

BENCHMARK
RAILROAD SPIKE
IN ROOT
ELEV. = 722.04

3'-0" E-STONE TYPE E3 (TYP)
(SEE SPECIAL PROVISION)

4'-0" STONE FILL
TYPE IV (TYP)

MILEMARKER, STATION, OR SIGN NUMBER	SIGN LEGEND	SIGN DIMENSIONS		NEW SIGN	EXIST POST		NEW SIGN POSTS					REMARKS	SIGN DETAIL		
		WIDTH (In)	HEIGHT (In)	"A"	RETAIN	SALVAGE	NO. OF POSTS	SQUARE STEEL (In) 2.0 2.16	2.0 lb/ft 2.42	2.5 3.35	ANCHOR	SHEAVE		DETAIL IN SHSM	DETAIL ON SHEET NUMBER	STD. SHEET NUMBER
3+90.00 RT	BRIDGE 2 VT-18	6	10	0.42			1	8			X		VD-701			T-42
3+80.00 LT	BRIDGE 2 VT-18	6	10	0.42			1	8			X		VD-701			T-42
								FT 16	FT	FT		EA				
TOTALS				SF 0.84				FT 16								

FINAL POST LENGTHS ARE TO BE DETERMINED IN THE FIELD. POST SIZES ARE COMPUTED BASED ON INFORMATION FURNISHED ON THE STANDARD SHEETS AND THE VTRANS "SIGN POST DESIGN GUIDELINE."

SIGN LEGEND
N = NEW
R = REMOVE
S = SALVAGE
RET = RETAIN

SHSM = STANDARD HIGHWAY SIGNS AND MARKINGS (MUTCD) (APPROVED BY THE FHWA)

LAYOUT

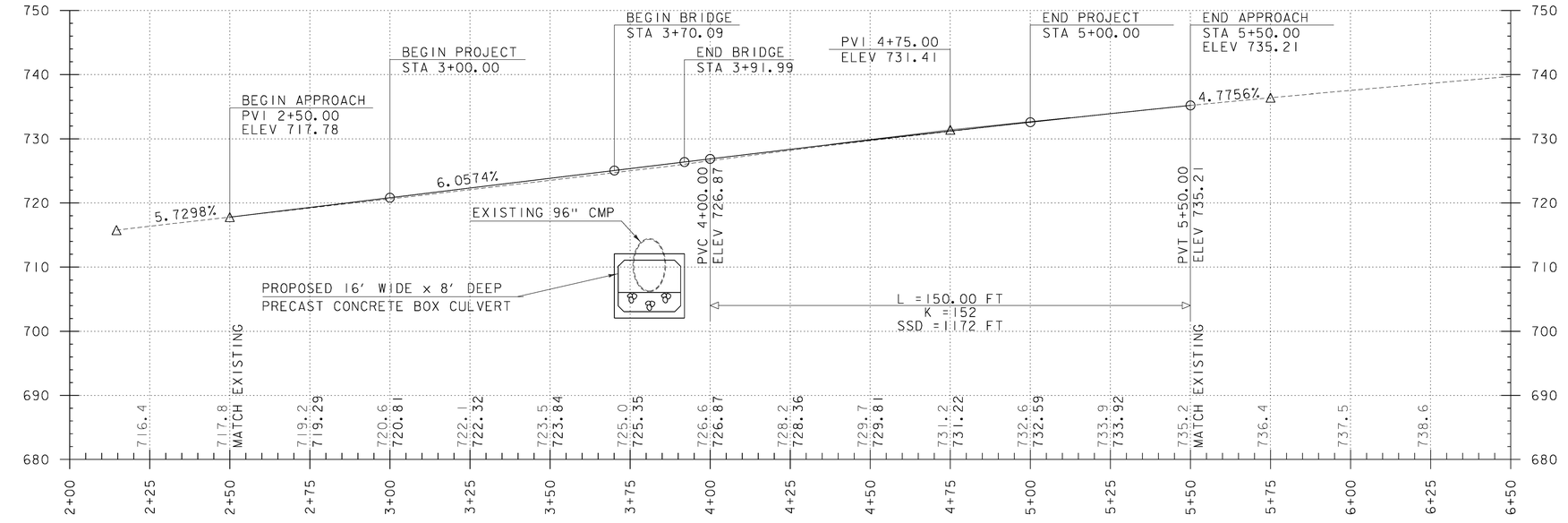
SCALE 1" = 20'-0"
20 0 20

GM2 ASSOCIATES

PROJECT NAME: WATERFORD
PROJECT NUMBER: BF 0225(5)

FILE NAME: z15b05lbdr.dgn
PROJECT LEADER: T. LEVINS
DESIGNED BY: J. MERCER
LAYOUT SHEET

PLOT DATE: 09/27/2017
DRAWN BY: B. WILLIAMS
CHECKED BY: T. LEVINS
SHEET 40 OF 63



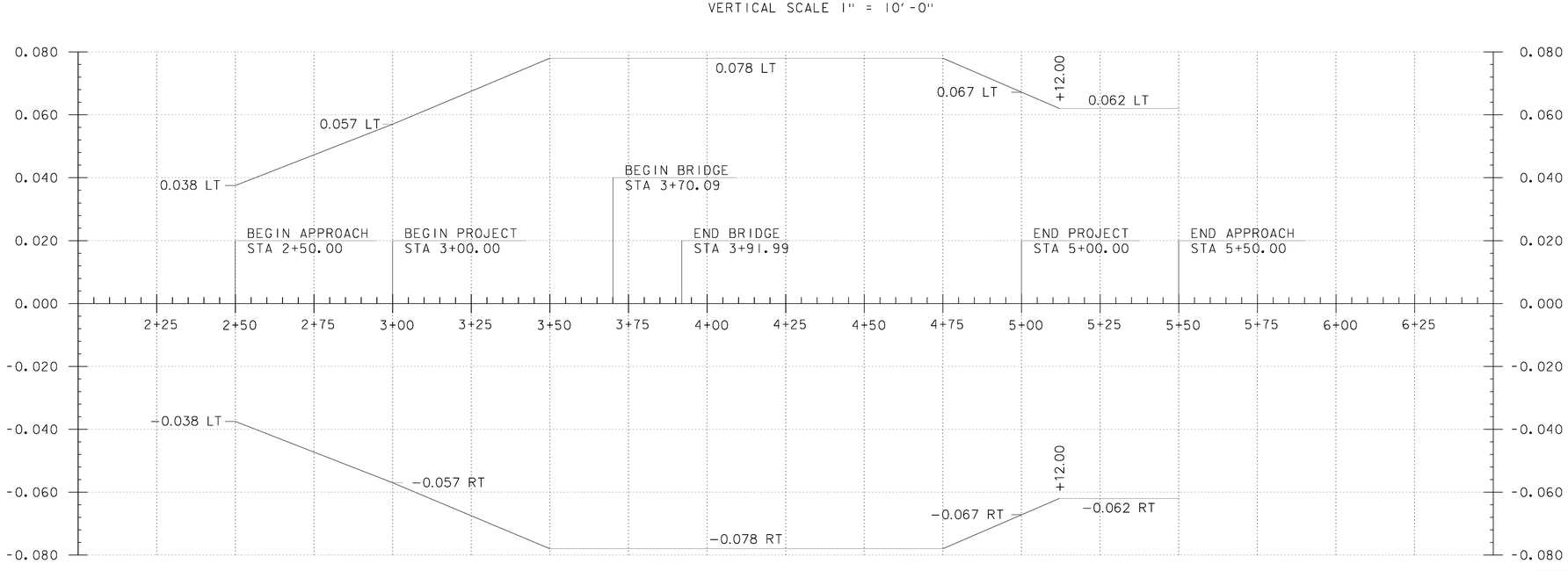
VT ROUTE 18 PROFILE

HORIZONTAL SCALE 1" = 20'-0"
VERTICAL SCALE 1" = 10'-0"

NOTE:

ELEVATIONS SHOWN TO THE NEAREST TENTH ARE EXISTING GROUND ALONG THE PROPOSED CENTERLINE.

ELEVATIONS SHOWN TO THE NEAREST HUNDREDTH ARE FINISH GRADES ALONG THE PROPOSED CENTERLINE.



BANKING DIAGRAM

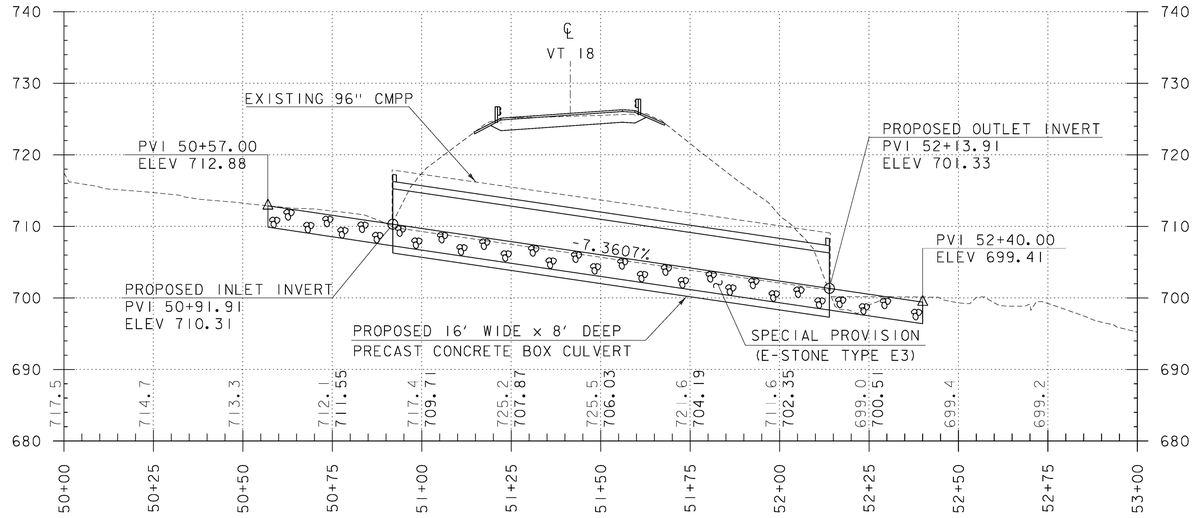
HORIZONTAL SCALE 1" = 20'-0"
NO VERT. SCALE

GM2 ASSOCIATES

PROJECT NAME: WATERFORD
PROJECT NUMBER: BF 0225(5)

FILE NAME: z15b051pro.dgn
PROJECT LEADER: T. LEVINS
DESIGNED BY: J. MERCER
ROADWAY PROFILE & BANKING DIAGRAM

PLOT DATE: 09/27/2017
DRAWN BY: J. MERCER
CHECKED BY: T. LEVINS
SHEET 41 OF 63



VT 18 CULVERT 2 PROFILE

HORIZONTAL SCALE 1" = 20'-0"
VERTICAL SCALE 1" = 10'-0"

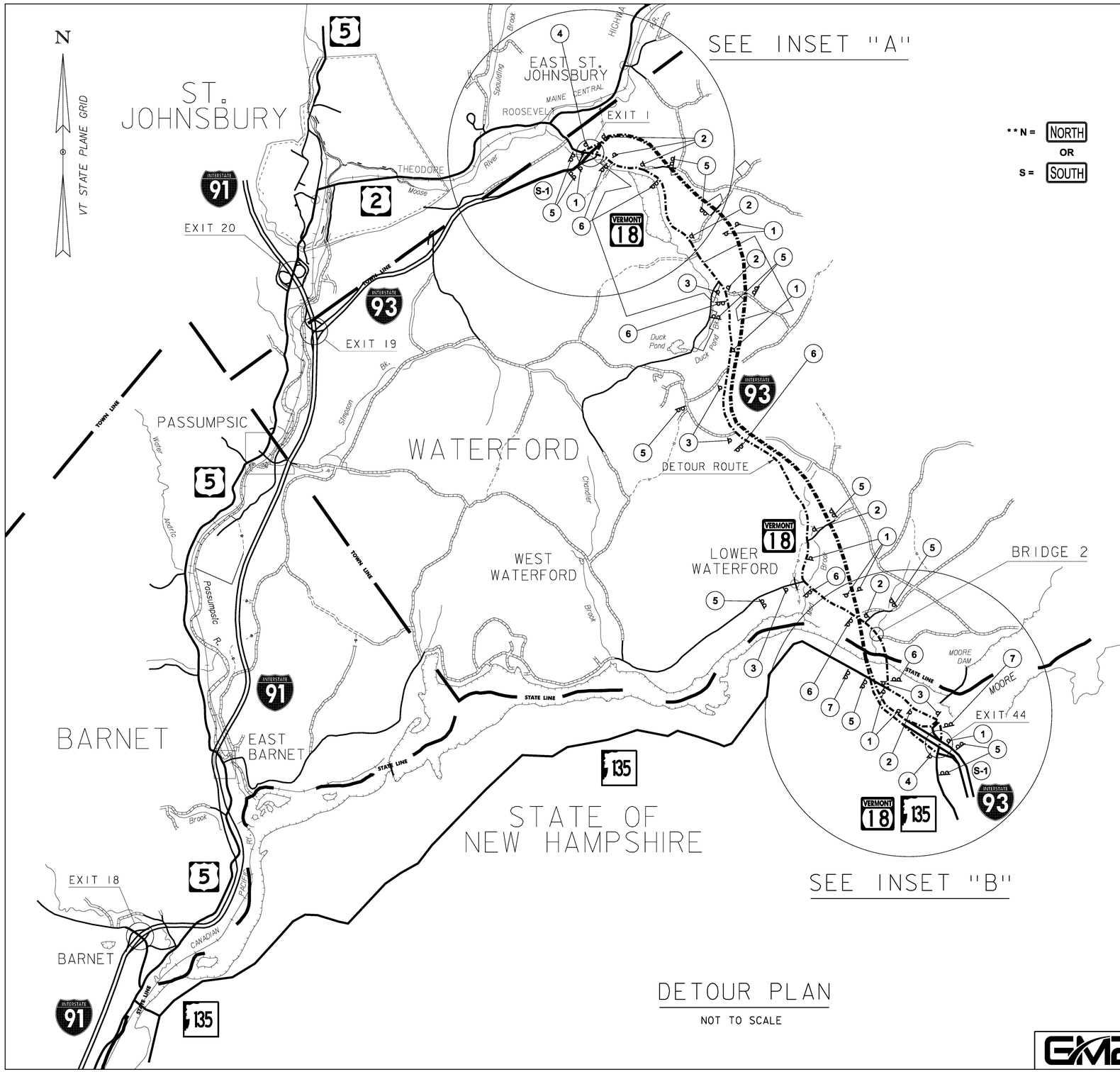
NOTE:

ELEVATIONS SHOWN TO THE NEAREST TENTH ARE EXISTING GROUND ALONG THE PROPOSED CENTERLINE.

ELEVATIONS SHOWN TO THE NEAREST HUNDREDTH ARE FINISH GRADES ALONG THE PROPOSED CENTERLINE.

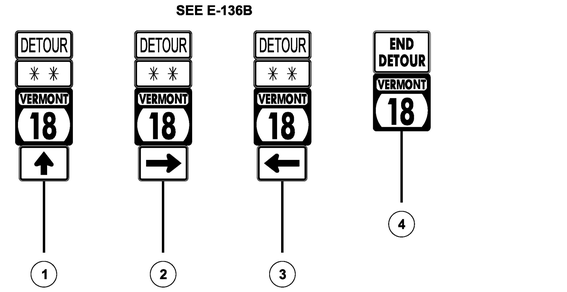
GM2 ASSOCIATES

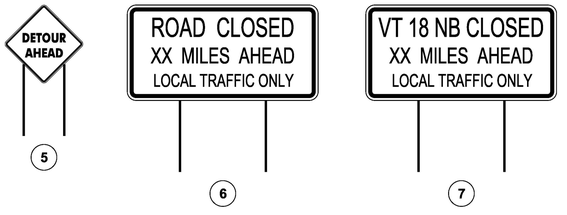
PROJECT NAME:	WATERFORD
PROJECT NUMBER:	BF 0225(5)
FILE NAME:	z15b051pro.dgn
PROJECT LEADER:	T. LEVINS
DESIGNED BY:	J. MERCER
CHANNEL PROFILE	
PLOT DATE:	09/27/2017
DRAWN BY:	B. WILLIAMS
CHECKED BY:	T. LEVINS
SHEET	42 OF 63



**N = NORTH OR S = SOUTH

SEE E-136B





V	T		1	8				
C	L	O	S	E	D			
N	O	R	T	H		O	F	

PHASE 1

C	E	M	E	T	E	R	Y	
U	S	E		I	-	9	3	
D	E	T	O	U	R			

PHASE 2

F	R	I		M	/	D	D	
6	P	M	-		M	O	N	
M	/	D	D		6	A	M	

PHASE 3

* M = MONTH
DD = DAY

S-1

DETOUR ROUTE

NOTES:
1. SEE DETOUR (2) SHEET FOR INSETS.

DETOUR PLAN

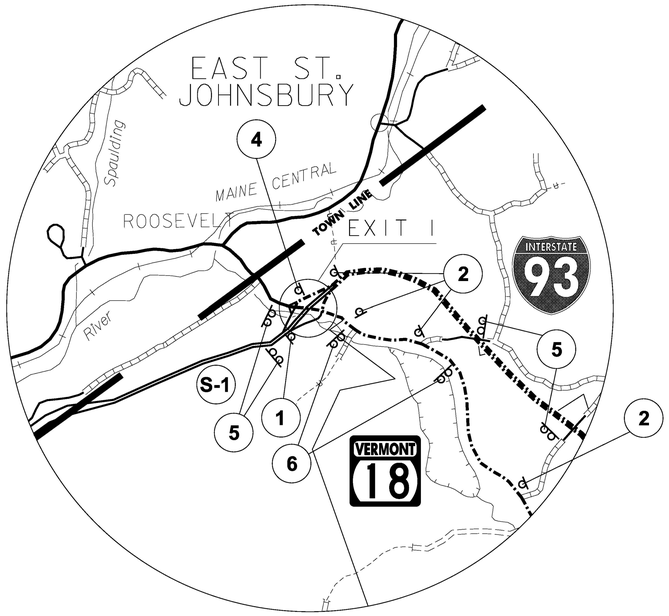
NOT TO SCALE

GM2 ASSOCIATES

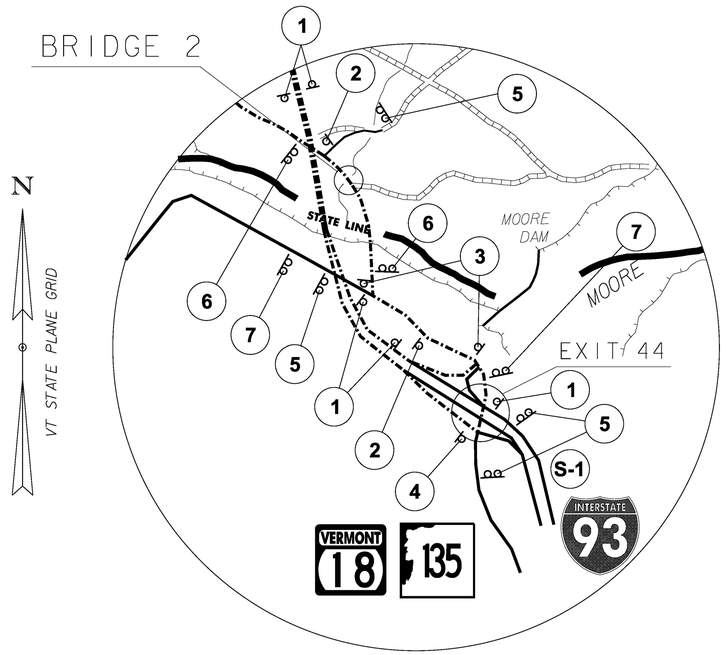
PROJECT NAME:	WATERFORD
PROJECT NUMBER:	BF 0225(5)
FILE NAME: z15B05ldetour1.dgn	PLOT DATE: 09/27/2017
PROJECT LEADER: T.LEVINS	DRAWN BY: B.WILLIAMS
DESIGNED BY: J.MERCER	CHECKED BY: J.MERCER
DETOUR (1)	SHEET 43 OF 63

NOTES:

1. THE PORTABLE CHANGEABLE MESSAGE SIGNS SHALL BE FULLY OPERATIONAL A MINIMUM OF TWO WEEKS PRIOR TO CLOSURE OF VT 18. PAYMENT SHALL BE MADE UNDER THE CURRENT UNIT PRICE BID ITEM 641.15, PORTABLE CHANGEABLE MESSAGE SIGN.
2. ELIMINATE PHASE 3 FOR S-1 DURING ACTUAL CLOSURE.
3. DETOUR SIGNS SHALL BE LOCATED ADJACENT TO EXISTING INTERSECTION ROUTE MARKER ASSEMBLIES WHERE APPLICABLE.
4. COVER ANY CONFLICTING EXISTING SIGNS AS DIRECTED BY THE ENGINEER.
5. CONFIRMATION ROUTE MARKERS (SIGN I) SHALL BE INSTALLED IMMEDIATELY FOLLOWING EACH TURN AND AT ALL LOCATIONS ALONG THE DETOUR WHERE ROUTE MARKERS EXIST FOR THE PARENT ROUTE.
6. DETOUR SIGNING IS THE RESPONSIBILITY OF THE CONTRACTOR. PAYMENT FOR ALL TEMPORARY TRAFFIC CONTROL DEVICES FOR IMPLEMENTING THE DETOUR, INCLUDING BUT NOT LIMITED TO SIGNS AND BARRICADES, WILL BE INCLUDED IN THE UNIT PRICE BID FOR ITEM 900.645, SPECIAL PROVISION (TRAFFIC CONTROL, ALL-INCLUSIVE).
7. THE MANAGEMENT OF TEMPORARY FACILITIES SHOULD BE GIVEN SUFFICIENT ATTENTION. IT IS IMPORTANT THAT CYCLIST'S ROUTES ARE FREE OF RUTS, SAND, AND MUD TO PREVENT CYCLIST'S CRASHES.
8. BICYCLES TRAVELING THROUGH THE WORK ZONE SHALL FOLLOW THE RULES OF THE ROAD JUST LIKE A MOTORIST. FLAGGER PERSONNEL MAY ASK RIDERS TO GO LAST TO ENSURE THEIR SAFETY.



INSET "A"



INSET "B"

INSETS
NOT TO SCALE

SIGN LEGEND	SIGN DIMENSIONS (NON-INTERSTATE)		SIGN DIMENSIONS (INTERSTATE)		SIGN COLOR	
	WIDTH (in)	HEIGHT (in)	WIDTH (in)	HEIGHT (in)	LETTERING	BACKGROUND
DETOUR M4-8	24	12	30	15	BLACK	ORANGE
NORTH M3-2 SOUTH M3-4	24	12	36	18	GREEN	WHITE
VERMONT 18 E-136B	24	24	36	36	GREEN	WHITE
M6-3 M6-1L	21	15	30	21	BLACK	ORANGE
END DETOUR M4-8A	24	18			BLACK	ORANGE
DETOUR AHEAD W20-2	48	48			BLACK	ORANGE
ROAD CLOSED XX MILES AHEAD LOCAL TRAFFIC ONLY R11-3A W/FLAGS	60	30			BLACK	WHITE

GM2 ASSOCIATES

PROJECT NAME: WATERFORD
PROJECT NUMBER: BF 0225(5)

FILE NAME: z15b05idetour2.dgn
PROJECT LEADER: T.LEVINS
DESIGNED BY: J.MERCER
DETOUR (2)

PLOT DATE: 09/27/2017
DRAWN BY: B.WILLIAMS
CHECKED BY: J.MERCER
SHEET 44 OF 63

SOIL CLASSIFICATION

AASHTO	
A1	Gravel and Sand
A3	Fine Sand
A2	Silty or Clayey Gravel and Sand
A4	Silty Soil - Low Compressibility
A5	Silty Soil - Highly Compressible
A6	Clayey Soil - Low Compressibility
A7	Clayey Soil - Highly Compressible

ROCK QUALITY DESIGNATION

R.Q.D. (%)	ROCK DESCRIPTION
<25	Very Poor
25 to 50	Poor
51 to 75	Fair
76 to 90	Good
>90	Excellent

SHEAR STRENGTH

UNDRAINED SHEAR STRENGTH IN P.S.F.	CONSISTENCY
<250	Very Soft
250-500	Soft
500-1000	Med. Stiff
1000-2000	Stiff
2000-4000	Very Stiff
>4000	Hard

CORRELATION GUIDE OF "N" TO DENSITY/CONSISTENCY

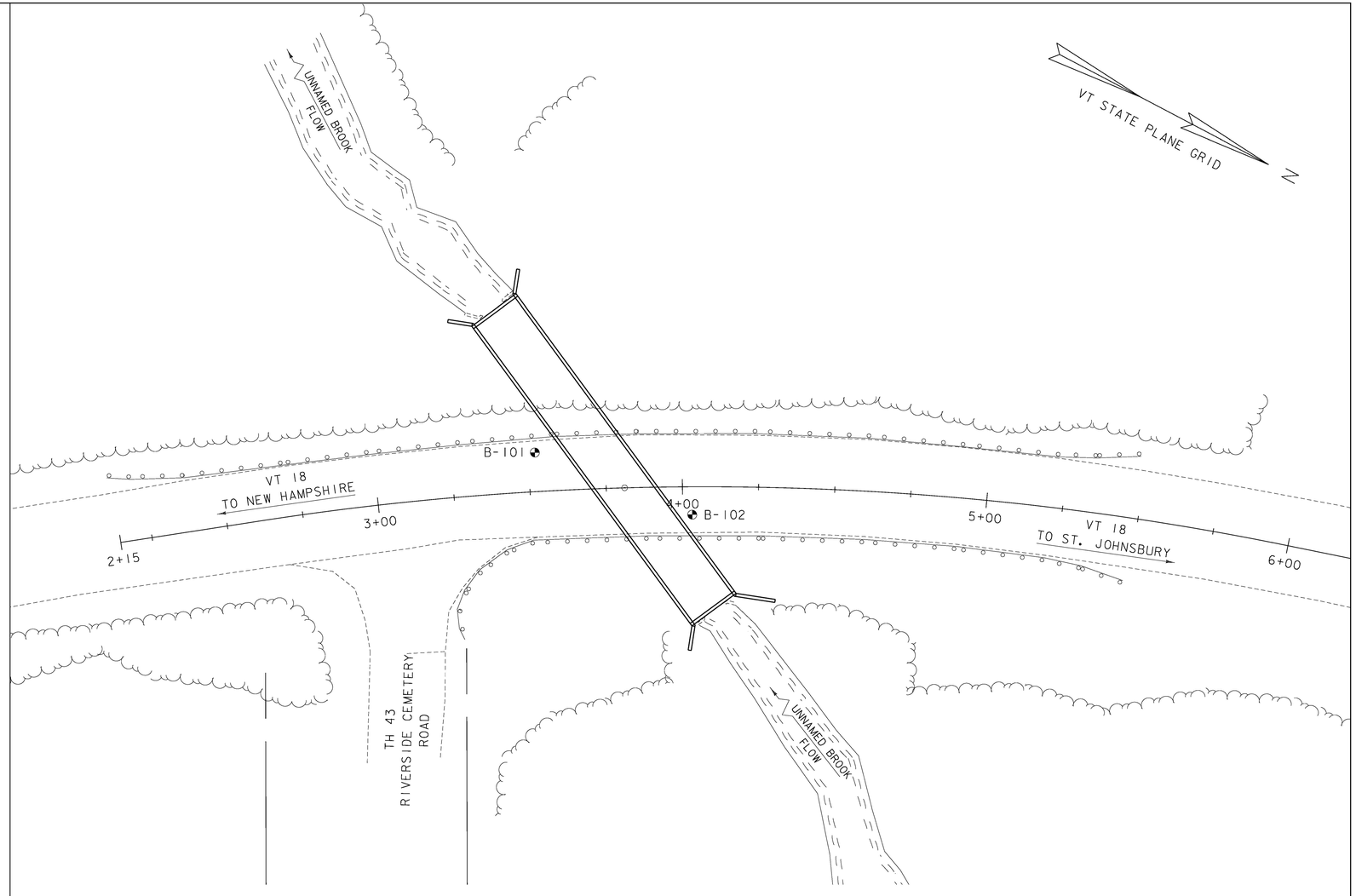
DENSITY (GRANULAR SOILS)		CONSISTENCY (COHESIVE SOILS)	
N	DESCRIPTIVE TERM	N	DESCRIPTIVE TERM
<5	Very Loose	<2	Very Soft
5-10	Loose	2-4	Soft
11-24	Med. Dense	5-8	Med. Stiff
25-50	Dense	9-15	Stiff
>50	Very Dense	16-30	Very Stiff
		31-60	Hard
		>60	Very Hard

COMMONLY USED SYMBOLS

▼	Water Elevation
⊕	Standard Penetration Boring
⊕	Auger Boring
⊙	Rod Sounding
S	Sample
N	Standard Penetration Test Blow Count Per Foot For: 2" O.D. Sampler 1 3/8" I.D. Sampler Hammer Weight Of 140 Lbs. Hammer Fall Of 30"
VS	Field Vane Shear Test
US	Undisturbed Soil Sample
B	Blast
DC	Diamond Core
MD	Mud Drill
WA	Wash Ahead
HSA	Hollow Stem Auger
AX	Core Size 1 1/8"
BX	Core Size 1 5/8"
NX	Core Size 2 1/8"
M	Double Tube Core Barrel Used
LL	Liquid Limit
PL	Plastic Limit
PI	Plasticity Index
NP	Non Plastic
w	Moisture Content (Dry Wgt. Basis)
D	Dry
M	Moist
MTW	Moist To Wet
W	Wet
Sat	Saturated
Bo	Boulder
Gr	Gravel
Sa	Sand
Si	Silt
Cl	Clay
HP	Hardpan
Le	Ledge
NLTD	No Ledge To Depth
CNPF	Can Not Penetrate Further
TLOB	Top of Ledge Or Boulder
NR	No Recovery
Rec.	Recovery
%Rec.	Percent Recovery
RQD	Rock Quality Designation
CBR	California Bearing Ratio
<	Less Than
>	Greater Than
R	Refusal (N > 100)
VTSPG	NAD83 - See Note 7

COLOR

blk	Black	pnk	Pink
bl	Blue	pu	Purple
brn	Brown	rd	Red
dk	Dark	tn	Tan
gry	Gray	wh	White
gn	Green	yel	Yellow
lt	Light	mltc	Multicolored
or	Orange		



BORING LAYOUT

SCALE 1" = 20'-0"

20 0 20

DEFINITIONS (AASHTO)

BEDROCK (LEDGE) - Rock in its native location of indefinite thickness.

BOULDER - A rock fragment with an average dimension > 12 inches.

COBBLE - Rock fragments with an average dimension between 3 and 12 inches.

GRAVEL - Rounded particles of rock < 3" and > 0.0787" (#10 sieve).

SAND - Particles of rock < 0.0787" (#10 sieve) and > 0.0029" (#200 sieve).

SILT - Soil < 0.0029" (#200 sieve), non or slightly plastic and exhibits no strength when air-dried.

CLAY - Fine grained soil, exhibits plasticity when moist and considerable strength when air-dried.

VARVED - Alternate layers of silt and clay.

HARDPAN - Extremely dense soil, cemented layer, not softened when wet.

MUCK - Soft organic soil (containing > 10% organic material.

MOISTURE CONTENT - Weight of water divided by dry weight of soil.

FLOWING SAND - Granular soil so saturated (loose) that it flows into drill casing during extraction of wash rod.

STRIKE - Angle from magnetic north to line of intersection of bed with a horizontal plane.

DIP - Inclination of bed with a horizontal plane.

GENERAL NOTES

1. The subsurface explorations shown herein were made between 8-10-16 and 8-11-16 by the Agency.
2. Soil and rock classifications, properties and descriptions are based on engineering interpretation from available subsurface information by the Agency and may not necessarily reflect actual variations in subsurface conditions that may be encountered between individual boring or sample locations.
3. Observed water levels and/or conditions indicated are as recorded at the time of exploration and may vary according to the prevailing rainfall, methods of exploration and other factors.
4. Engineering judgment was exercised in preparing the subsurface information presented herein. Analysis and interpretation of subsurface data was performed and interpreted for Agency design and estimating purposes. Presentation of the information in the Contract is intended to provide the Contractor access to the same data available to the Agency. The subsurface information is presented in good faith and is not intended as a substitute for personal investigation, independent interpretation, independent analysis or judgment by the Contractor.
5. Pictorial structure details shown on the boring plan layout or soils profile are for illustrative purposes only and may not accurately portray final contract details.
6. Terminology used on boring logs to describe the hardness, degree of weathering, and spacing of fractures, joints and other discontinuities in the bedrock is defined in the AASHTO Manual on Subsurface Investigations, 1988.
7. Northing and Easting coordinates are shown in Vermont State Plane Grid North American Datum 1983 in meters and survey feet.

BORING CHART

HOLE NO.	SURV. STATION	OFFSET	GROUND ELEV.	NLTD
B-101	3+52.29	-12.88	724.4	40.9'
B-102	4+03.18	9.12	726.2	40.9'

PROJECT NAME: WATERFORD
PROJECT NUMBER: BF 0225(5)

FILE NAME: z15b05lbor_info.dgn
PROJECT LEADER: T. LEVINS
DESIGNED BY: B. WILLIAMS
BORING INFORMATION SHEET

PLOT DATE: 09/27/2017
DRAWN BY: B. WILLIAMS
CHECKED BY: T. LEVINS
SHEET 45 OF 63

STATE OF VERMONT
AGENCY OF TRANSPORTATION
CONSTRUCTION AND
MATERIALS BUREAU
CENTRAL LABORATORY

BORING LOG

Waterford
BF 0225(5)
VT 18 Br. 2

Boring No.: **B-101**
Page No.: 1 of 1
Pin No.: 15b051
Checked By: END

Boring Crew: Judkins, Gomes
Date Started: 8/11/16 Date Finished: 8/11/16
VTSPG NAD83: N 673406.24 ft E 1799772.82 ft
Station: 3+52.29 Offset: -12.88
Ground Elevation: 724.4 ft

	Casing	Sampler
Type:	WB	SS
I.D.:	3 in	1.5 in
Hammer Wt:	N.A.	140 lb.
Hammer Fall:	N.A.	30 in.
Hammer/Rod Type:	Auto/AWJ	
Rig:	CME 45C SKID<<SUB>><<SUB>> = 1.42	

Groundwater Observations

Date	Depth (ft)	Notes
08/11/16	21.2	W.T. during drilling

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
		Asphalt Pavement, 0.0 ft - 0.2 ft					
		A-1-b, SaGr, brn, Moist, Rec. = 1.0 ft, Lab Note: Broken rock was within sample	9-18-15 (27)	6.3	43.8	40.4	15.8
		A-2-4, GrSiSa, brn, Moist, Rec. = 1.3 ft	20-38-14-11 (52)	8.8	21.0	55.4	23.6
		Field Note:, BXDC, Cleaned out casing					
5		Field Note:, No Recovery	12-12-10-12 (22)				
		A-2-4, GrSa, brn, Moist, Rec. = 1.4 ft	12-9-11-12 (20)	12.6	20.8	59.4	19.8
		A-2-4, Sa, brn, Moist, Rec. = 1.2 ft	8-6-4-5 (10)	11.4	12.2	69.7	18.1
10		A-2-4, Sa, brn, Moist, Rec. = 1.0 ft	8-8-8-9 (16)	10.3	8.2	79.8	12.0
		A-1-b, Sa, brn, Moist, Rec. = 1.0 ft	4-3-3-2 (6)	14.9	10.0	83.4	6.6
15		A-3, Sa, brn, Moist, Rec. = 0.1 ft	2-1-3-3 (4)	17.4	14.5	77.3	8.2
		A-1-b, SaGr, brn, Moist, Rec. = 0.6 ft	3-2-5-3 (7)	13.2	52.8	37.7	9.5
		Field Note:, No Recovery	4-6-11-7 (17)				
20		Field Note:, BXDC, Cleaned out casing					
		A-1-a, SaGr, brn, Moist, Rec. = 0.5 ft	6-9-7-4 (16)	9.7	62.3	26.7	11.0
BOC EL. 700.00							
25		Field Note:, BXDC, Cleaned out casing					
		A-2-4, SaSiGr, gry, Moist, Rec. = 1.2 ft, Lab Note: Broken rock was within sample	24-23-21-20 (44)	10.1	37.1	31.0	31.9
30		A-4, SaSi, gry, Moist, Rec. = 0.6 ft, Lab Note: Broken rock was within sample	17-R@2.5" (R)	12.0	19.0	32.6	48.4
		Field Note:, BXDC, Cleaned out casing					
35		A-4, SaGrSi, gry, Moist, Rec. = 0.9 ft, Lab Note: Broken rock was within sample	42-R@5" (R)	14.3	25.2	22.1	52.7
		Field Note:, BXDC, Cleaned out casing					
40		A-4, SaSi, gry, Moist, Rec. = 0.9 ft	32-R@5" (R)	8.1	13.3	35.7	51.0
		Hole stopped @ 40.9 ft					
45		Remarks: Hole collapsed at 1.9 feet.					

Notes:
1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
<<SUB>><<SUB>> is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations may occur due to other factors than those present at the time measurements were made.

BORING LOG 2 WATERFORD BF 0225(5).GPJ VERMONT AOT.GDT 9/19/16

BOC = APPROX. BOTTOM OF CULVERT

STATE OF VERMONT
AGENCY OF TRANSPORTATION
CONSTRUCTION AND
MATERIALS BUREAU
CENTRAL LABORATORY

BORING LOG

Waterford
BF 0225(5)
VT 18 Br. 2

Boring No.: **B-102**
Page No.: 1 of 1
Pin No.: 15b051
Checked By: END

Boring Crew: Judkins, Gomes
Date Started: 8/10/16 Date Finished: 8/10/16
VTSPG NAD83: N 673461.06 ft E 1799766.83 ft
Station: 4+3.18 Offset: 9.12
Ground Elevation: 726.2 ft

	Casing	Sampler
Type:	WB	SS
I.D.:	3 in	1.5 in
Hammer Wt:	N.A.	140 lb.
Hammer Fall:	N.A.	30 in.
Hammer/Rod Type:	Auto/AWJ	
Rig:	CME 45C SKID<<SUB>><<SUB>> = 1.42	

Groundwater Observations

Date	Depth (ft)	Notes
09/10/16	12.8	W.T. during drilling

Depth (ft)	Strata (1)	CLASSIFICATION OF MATERIALS (Description)	Blows/6" (N Value)	Moisture Content %	Gravel %	Sand %	Fines %
		Asphalt Pavement, 0.0 ft - 0.35 ft					
		A-1-a, SaGr, Rec. = 0.8 ft, Lab Note: A lot of broken rock was within sample	--8-9-10 (17)	5.6	66.1	23.3	10.6
		A-1-a, Gr, Rec. = 0.3 ft, Lab Note: A lot of broken rock was within sample	10-R@5" (R)	1.6	79.9	13.6	6.5
		Field Note:, BXDC, Cleaned out casing					
5		Field Note:, No Recovery	12-11-7-6 (18)				
		Field Note:, BXDC, Cleaned out casing					
		Field Note:, No Recovery	5-5-7-6 (12)				
		Field Note:, No Recovery	4-3-4-6 (7)				
10		A-1-b, Sa, Rec. = 0.5 ft	7-11-7-7 (18)	14.3	7.9	82.4	9.7
		Field Note:, BXDC, Cleaned out casing					
		A-3, Sa, Rec. = 0.7 ft	5-3-2-6 (5)	14.5	5.8	87.3	6.9
15		A-2-4, Sa, Rec. = 0.3 ft	3-4-3-3 (7)	17.2	8.0	81.1	10.9
		A-2-4, Sa, Rec. = 0.3 ft	2-3-1-6 (4)	17.1	9.5	73.8	16.7
		A-1-b, SiSaGr, Rec. = 0.6 ft, Lab Note: Broken rock was within sample	18-8-11-23 (19)	11.1	52.8	26.8	20.4
20		Field Note:, BXDC, Cleaned out casing					
		Field Note:, No Recovery, Rock stuck in end of sampler	6-7-6-6 (13)				
BOC EL. 703.73							
25		Field Note:, BXDC, Cleaned out casing					
		A-4, GrSaSi, Rec. = 1.0 ft, Lab Note: Broken rock was within sample	30-28-30-R@2.5" (58)	11.2	26.1	29.5	44.4
30		A-4, GrSaSi, Rec. = 0.9 ft, Lab Note: Broken rock was within sample	45-R@5" (R)	11.1	20.6	34.0	45.4
		Field Note:, BXDC, Cleaned out casing					
35		A-2-4, SiGrSa, Rec. = 1.0 ft, Lab Note: Broken rock was within sample	22-46-R@3.5" (R)	9.7	34.5	35.5	30.0
		Field Note:, BXDC, Cleaned out casing					
40		A-4, GrSaSi, Rec. = 0.9 ft	34-R@5" (R)	8.3	20.1	27.7	52.2
		Hole stopped @ 40.9 ft					
45		Remarks: Hole Collapsed at 16.6 feet.					

Notes:
1. Stratification lines represent approximate boundary between material types. Transition may be gradual.
<<SUB>><<SUB>> is the hammer energy correction factor.
3. Water level readings have been made at times and under conditions stated. Fluctuations may occur due to other factors than those present at the time measurements were made.

BORING LOG 2 WATERFORD BF 0225(5).GPJ VERMONT AOT.GDT 9/19/16

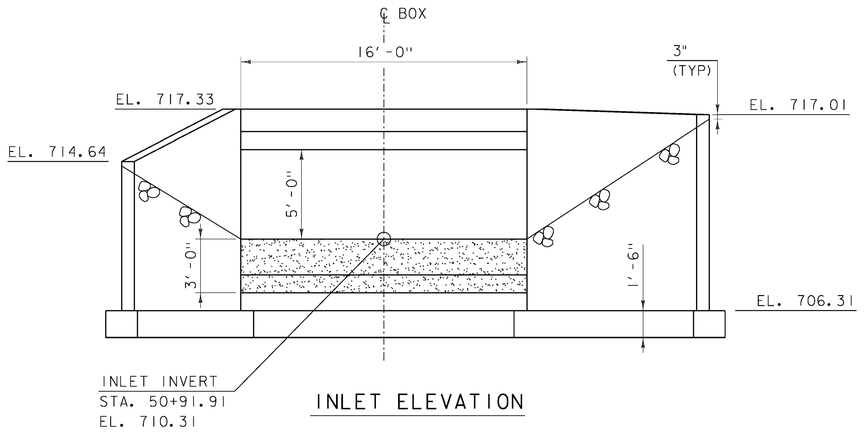
BOC = APPROX. BOTTOM OF CULVERT

GM2 ASSOCIATES

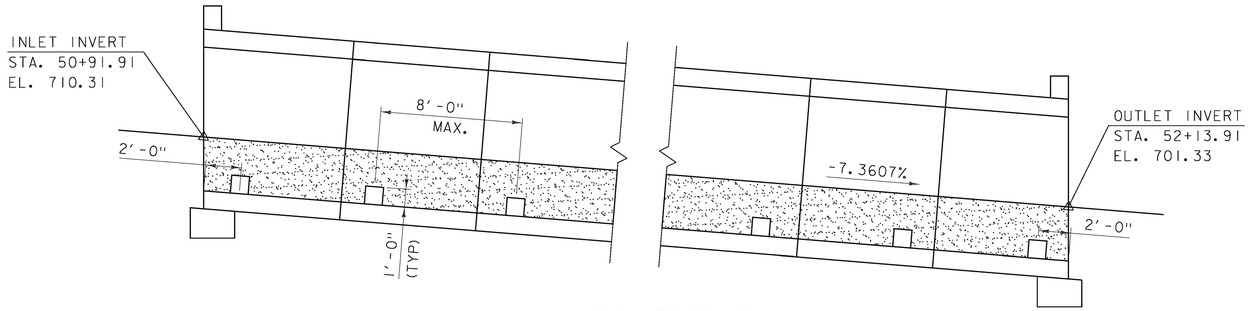
PROJECT NAME: WATERFORD
PROJECT NUMBER: BF 0225(5)

FILE NAME: zl5b051b101.dgn
PROJECT LEADER: T. LEVINS
DESIGNED BY: B. WILLIAMS
BORING LOGS

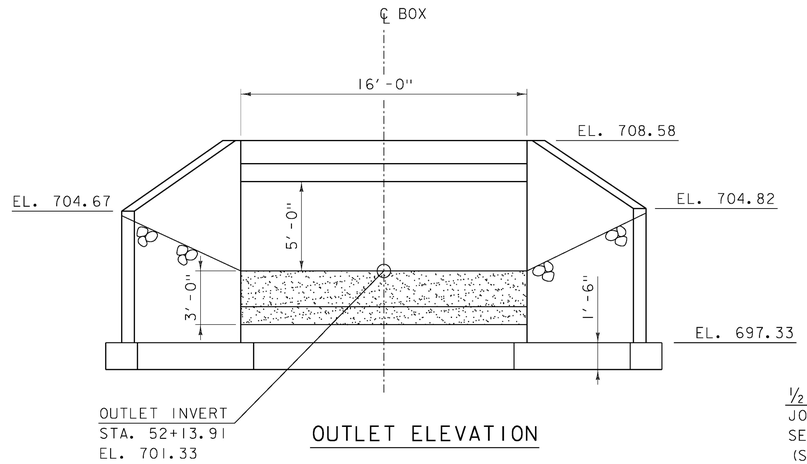
PLOT DATE: 09/27/2017
DRAWN BY: B. WILLIAMS
CHECKED BY: T. LEVINS
SHEET 46 OF 63



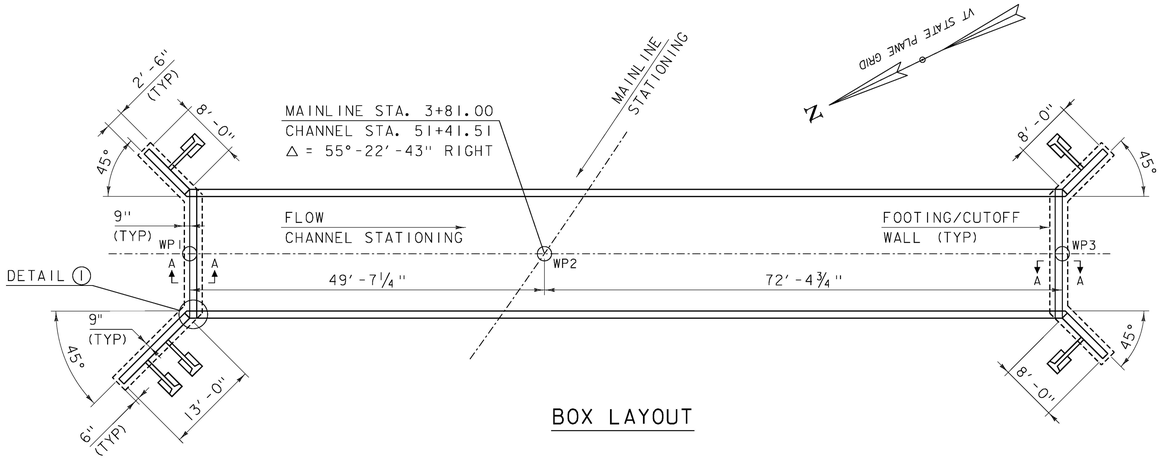
INLET ELEVATION



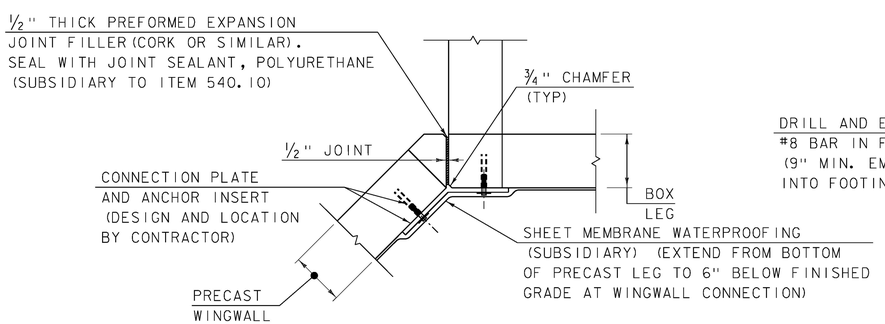
BOX PROFILE



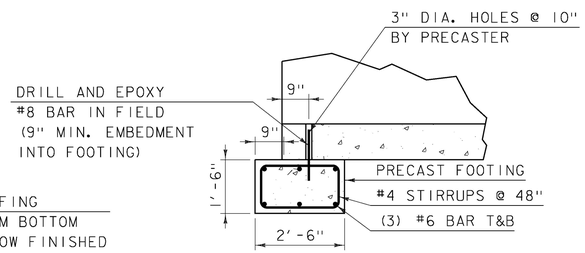
OUTLET ELEVATION



BOX LAYOUT



DETAIL I



SECTION A-A

NOTES:

1. DIMENSIONS SHOWN ARE BASED ON AN ASSUMED WALL THICKNESS OF 1'-0".
2. THE PRECAST BOX SECTIONS ARE SHOWN FOR REFERENCE ONLY. THE ACTUAL DIMENSIONS AND SHAPE WILL BE DEPENDENT ON THE FABRICATOR.

GM2 ASSOCIATES

PROJECT NAME: WATERFORD
PROJECT NUMBER: BF 0225(5)

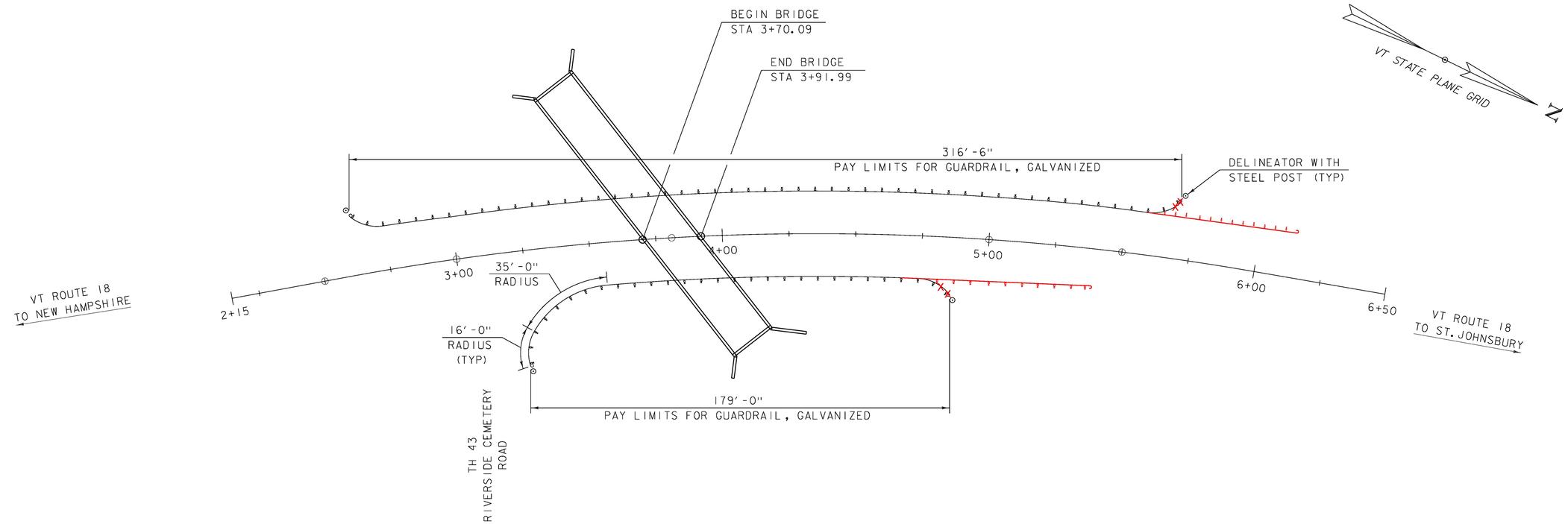
FILE NAME: z15b05lbox.dgn
PROJECT LEADER: T. LEVINS
DESIGNED BY: B. WILLIAMS
BOX LAYOUT

PLOT DATE: 09/27/2017
DRAWN BY: B. WILLIAMS
CHECKED BY: T. LEVINS
SHEET 47 OF 63

STEEL BEAM GUARDRAIL, GALVANIZED
STA. 3+23.6 - ~~4+86.2, RT~~ 5+36.2 RT
STA. 2+63.5 - ~~5+69.5, LT~~ 6+19.5 LT

ANCHOR FOR STEEL BEAM RAIL
STA. 3+23.0, RT
STA. ~~4+79.5, RT~~ 5+53.4 RT
STA. 2+69.8, LT
STA. ~~5+62.9, LT~~ 5+87.9 LT

DELINEATOR WITH STEEL POST
STA. 2+62, LT (GREEN)
STA. 3+24, RT (BLUE)
STA. ~~4+88, RT~~ (GREEN) 5+38 RT
STA. 5+71, ~~LT (BLUE)~~ 6+21 LT



RAIL LAYOUT

SCALE 1" = 20'-0"
20 0 20

NOTES:

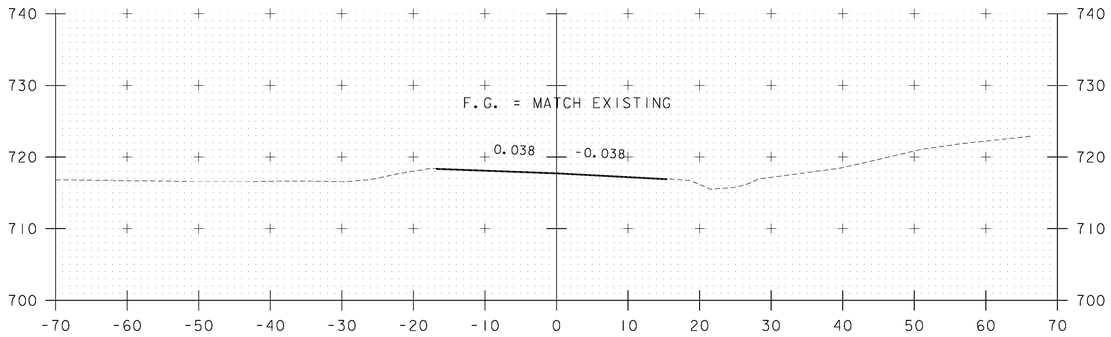
1) SEE STANDARDS G-1 AND G-1d FOR ADDITIONAL INFORMATION.

GM2 ASSOCIATES

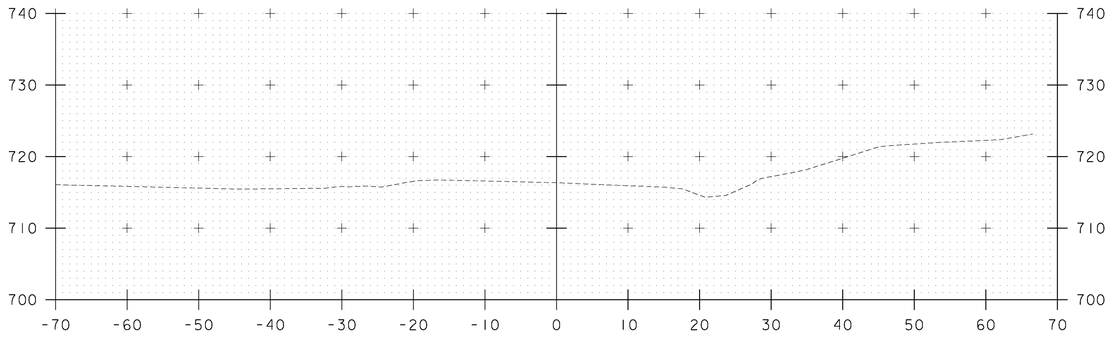
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PROJECT NUMBER: BF 0225(5)

FILE NAME: z15b05lrail.dgn
PROJECT LEADER: T. LEVINS
DESIGNED BY: J. MERCER
RAIL LAYOUT SHEET

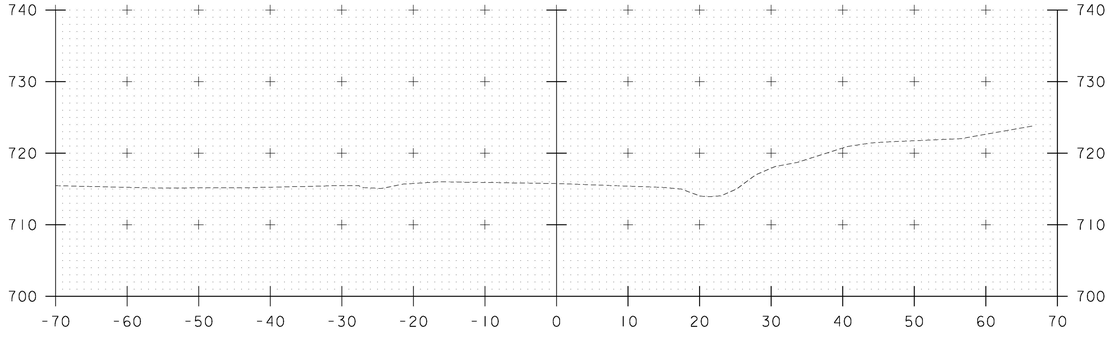
PLOT DATE: 09/27/2017
DRAWN BY: B. WILLIAMS
CHECKED BY: T. LEVINS
SHEET 48 OF 63



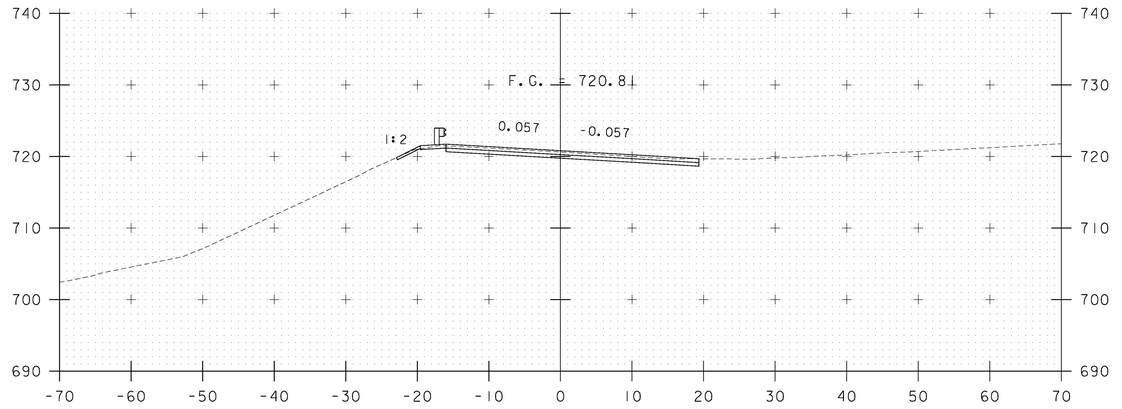
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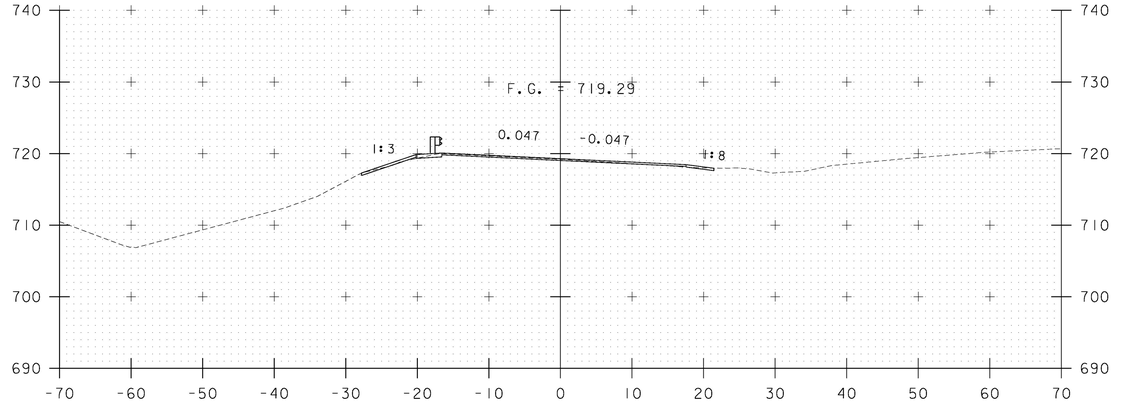
2+25



2+15



3+00
BEGIN PROJECT



2+75

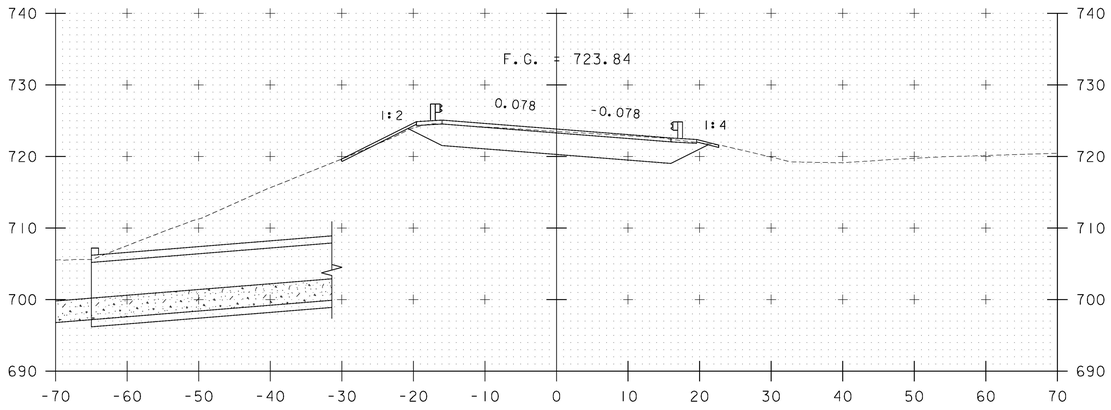
STA. 2+15 TO STA. 3+00

GM2 ASSOCIATES

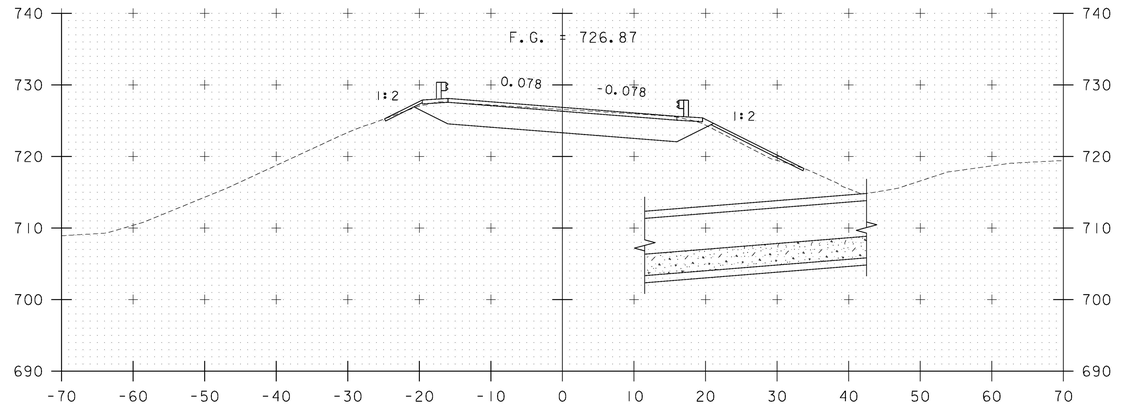
PROJECT NAME:	WATERFORD
PROJECT NUMBER:	BF 0225(5)

FILE NAME:	zl5b051xs.dgn	PLOT DATE:	09/27/2017
PROJECT LEADER:	T. LEVINS	DRAWN BY:	A. KURDEKAR
DESIGNED BY:	A. KURDEKAR/J. MERCER	CHECKED BY:	T. LEVINS
MAINLINE SECTIONS 1		SHEET	49 OF 63

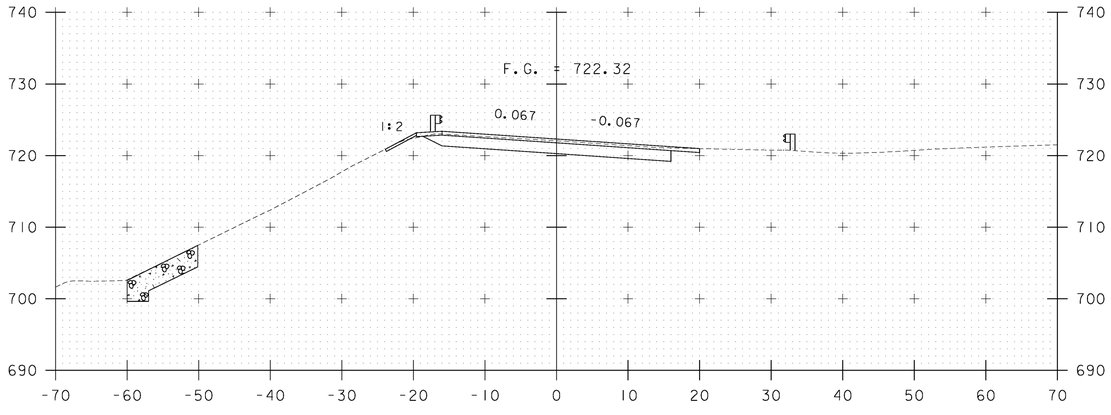
APPROX. LOCATION OF EXISTING
UTILITY OHW TO REMAIN IN PLACE
(VISUAL SHIELDING TO BE INSTALLED
BY FAIRPOINT PRIOR TO CONSTRUCTION)



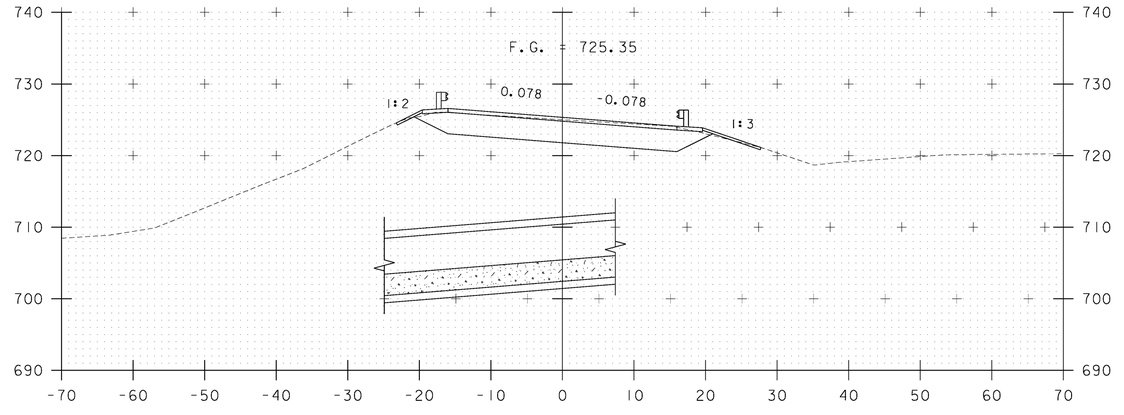
3+50



4+00
END BRIDGE @ 3+91.99



3+25



3+75
BEGIN BRIDGE @ 3+70.09

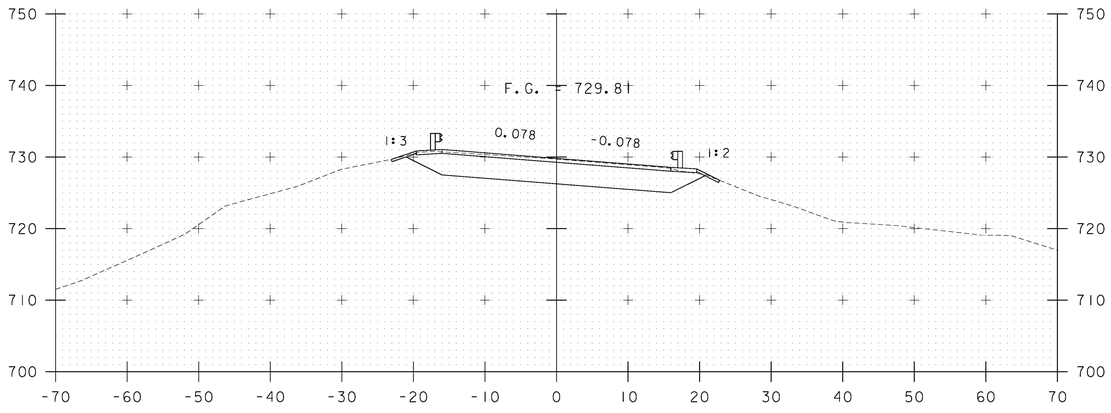
STA. 3+25 TO STA. 4+00

GM2 ASSOCIATES

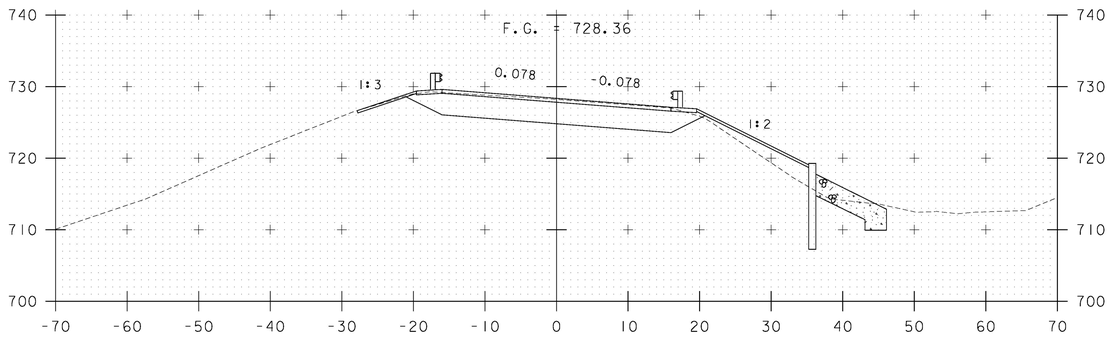
PROJECT NAME: WATERFORD
PROJECT NUMBER: BF 0225(5)

FILE NAME: zl5b05lxs.dgn
PROJECT LEADER: T. LEVINS
DESIGNED BY: A. KURDEKAR/ J. MERCER
MAINLINE SECTIONS 2

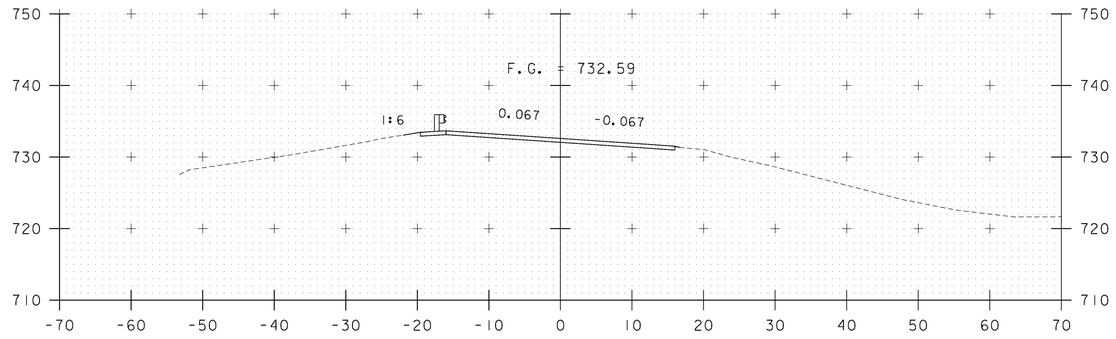
PLOT DATE: 09/27/2017
DRAWN BY: A. KURDEKAR
CHECKED BY: T. LEVINS
SHEET 50 OF 63



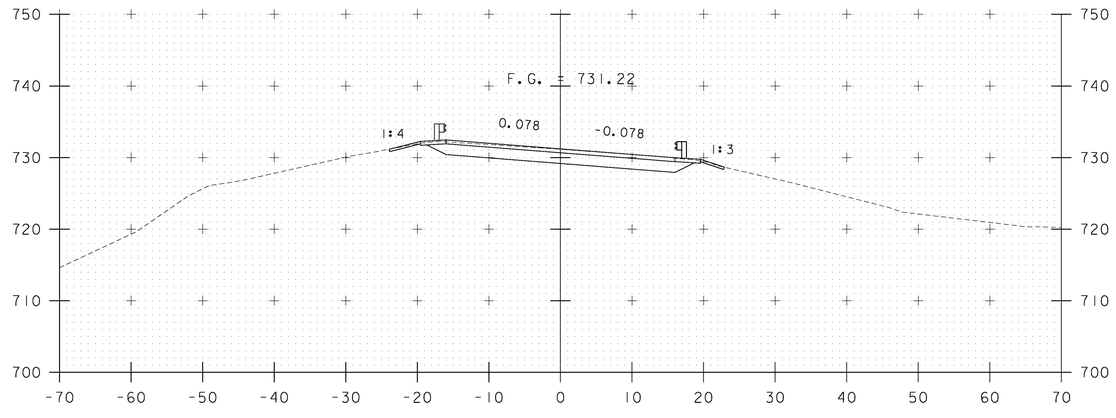
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4+25



5+00
END PROJECT



4+75

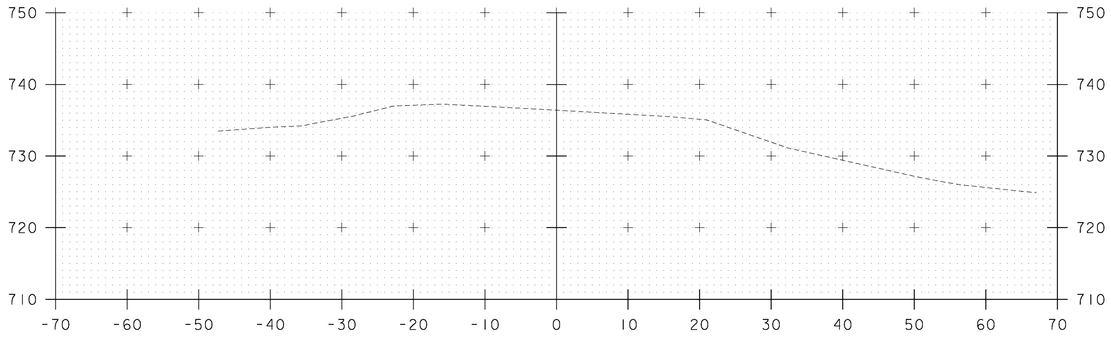
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GM2 ASSOCIATES

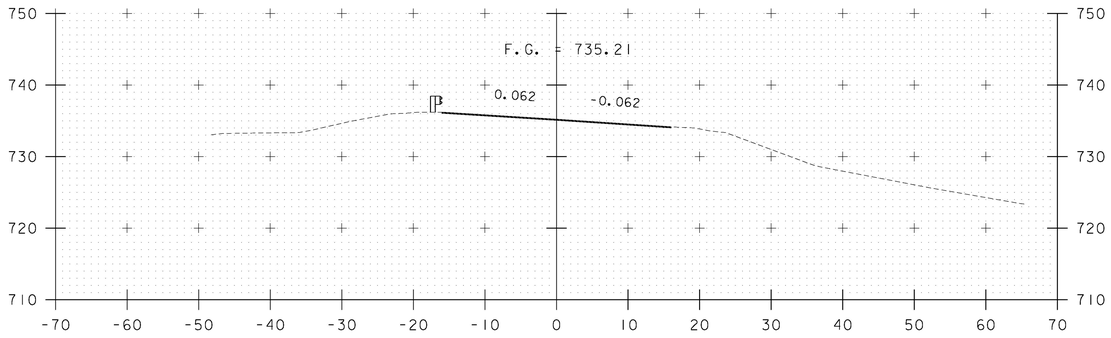
PROJECT NAME: WATERFORD
PROJECT NUMBER: BF 0225(5)

FILE NAME: zI5b05Ixs.dgn
PROJECT LEADER: T. LEVINS
DESIGNED BY: A. KURDEKAR/ J. MERCER
MAINLINE SECTIONS 3

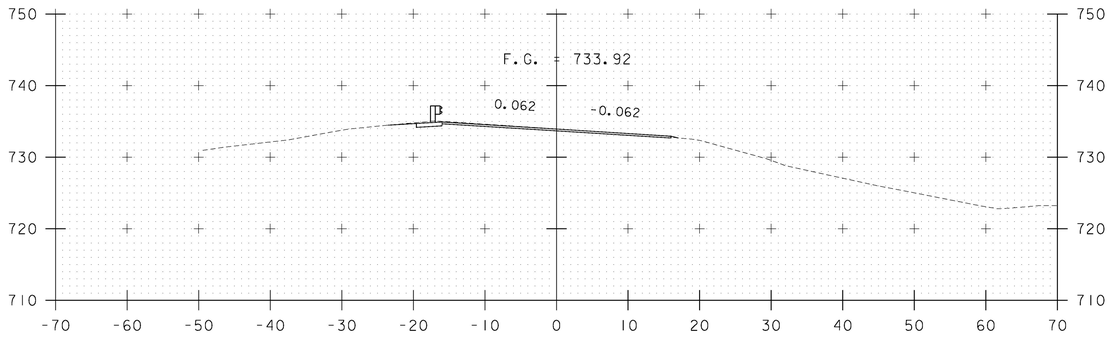
PLOT DATE: 09/27/2017
DRAWN BY: A. KURDEKAR
CHECKED BY: T. LEVINS
SHEET 51 OF 63



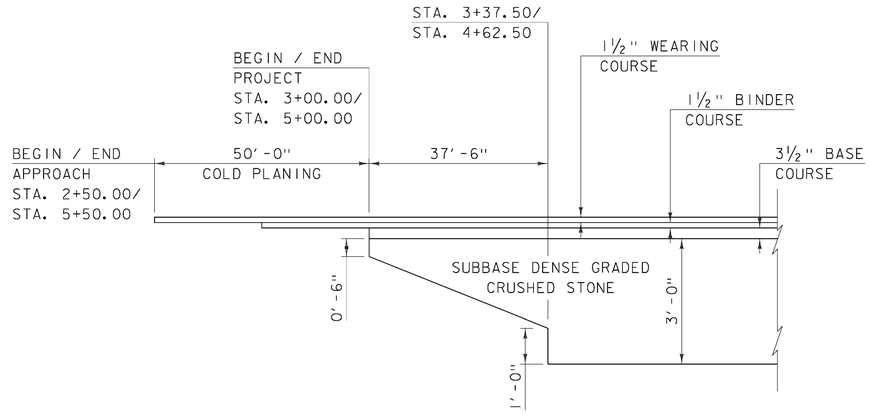
5+75



5+50
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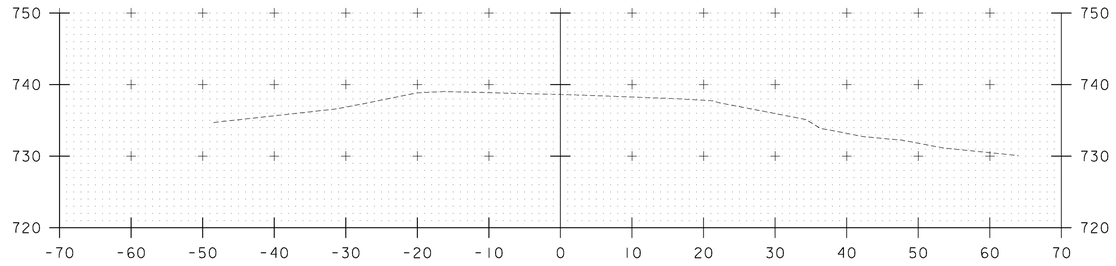


5+25

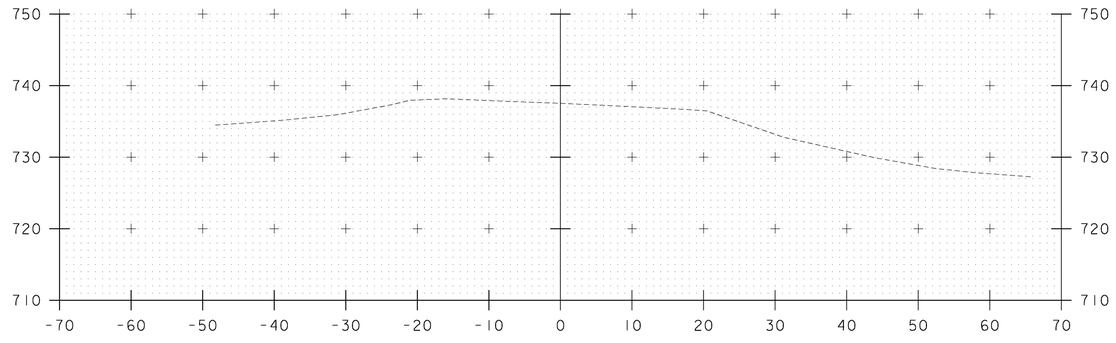


MATERIAL TRANSITION DIAGRAM

NOT TO SCALE



6+25



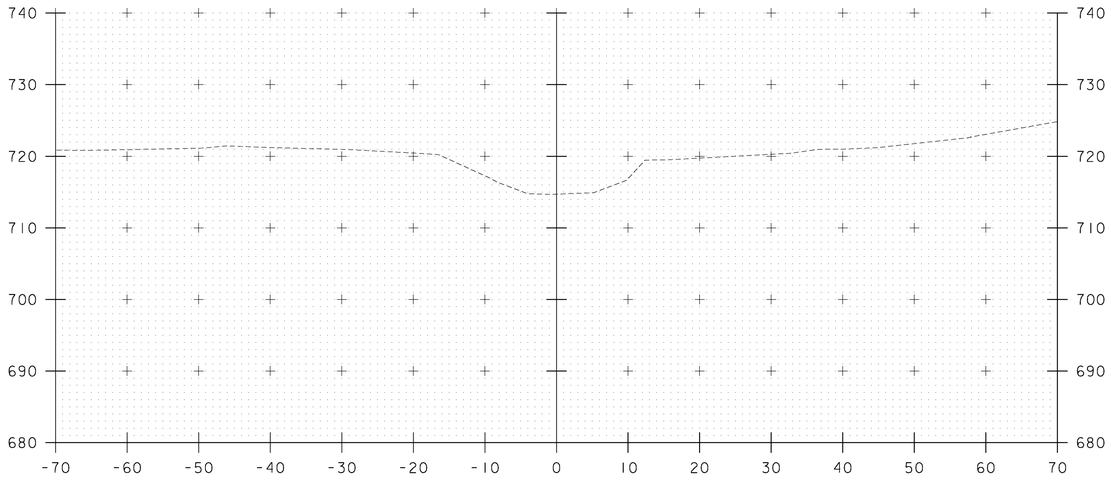
6+00

STA. 5+25 TO STA. 6+50

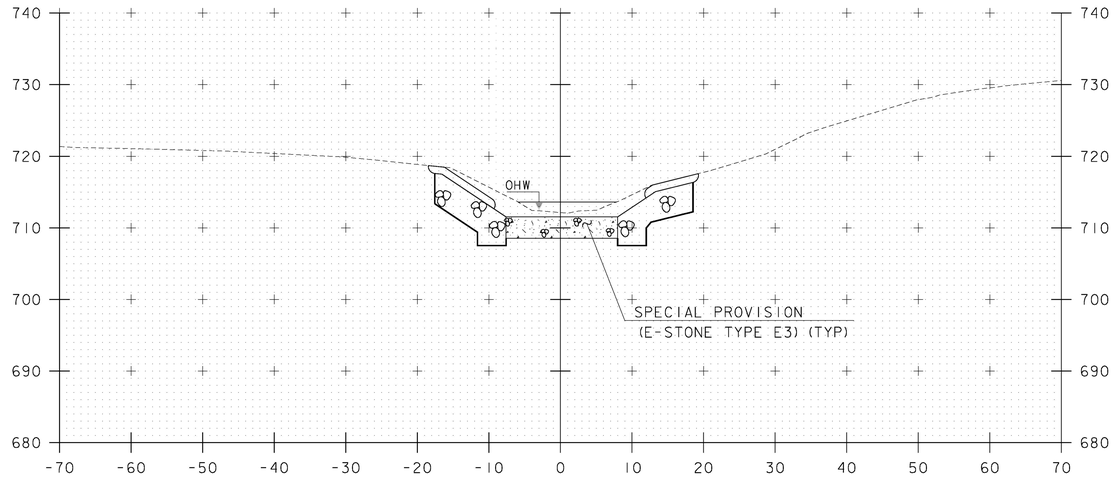
GM2 ASSOCIATES

PROJECT NAME:	WATERFORD		
PROJECT NUMBER:	BF 0225(5)		
FILE NAME:	z15b051xs.dgn	PLOT DATE:	09/27/2017
PROJECT LEADER:	T. LEVINS	DRAWN BY:	A. KURDEKAR
DESIGNED BY:	A. KURDEKAR/ J. MERCER	CHECKED BY:	T. LEVINS
MAINLINE SECTIONS	4	SHEET	52 OF 63

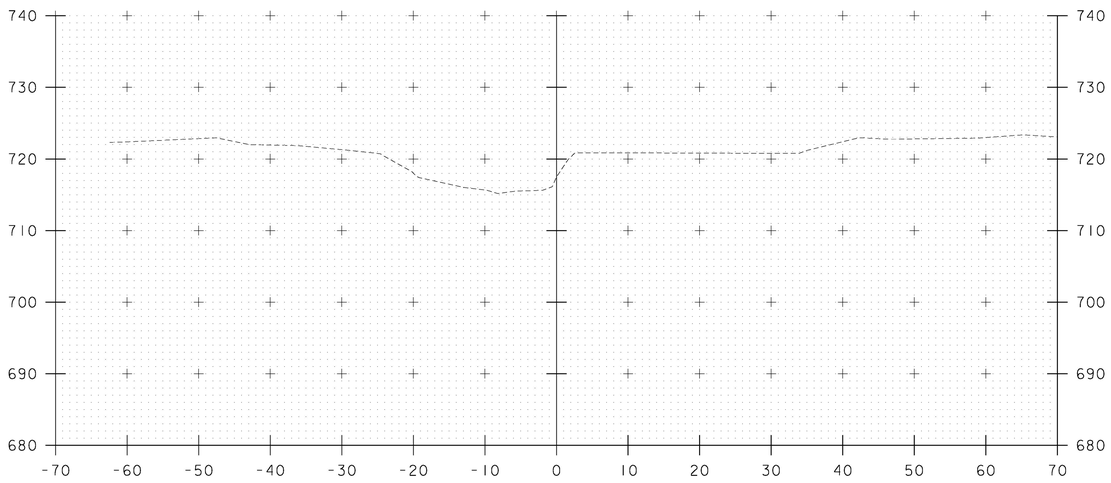
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BEGIN UNCLASSIFED CHANNEL EXCAVATION
BEGIN GEOTEXTILE UNDER STONE FILL
BEGIN STONE FILL, TYPE IV
BEGIN SPECIAL PROVISION(E-STONE TYPE E3) (TYP)
BEGIN GRUBBING MATERIAL



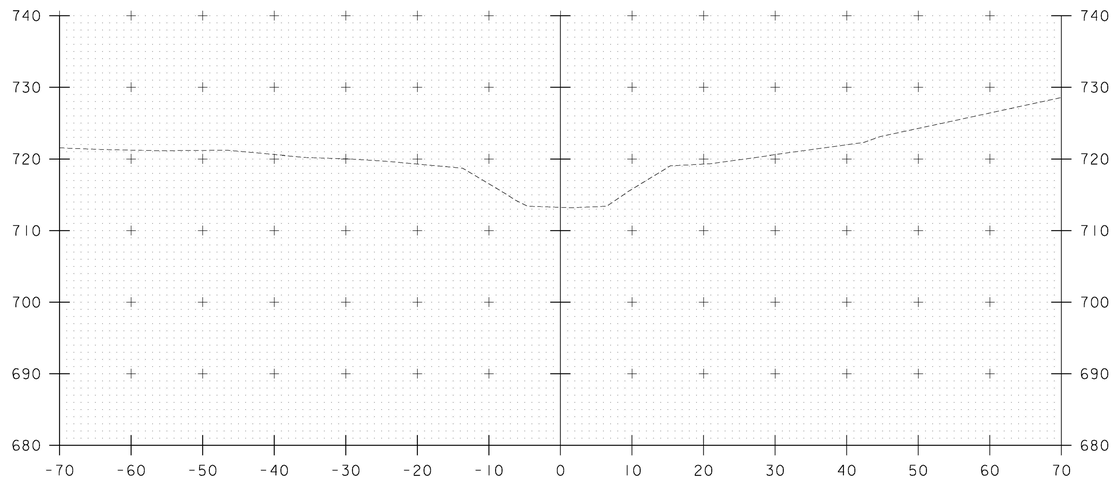
50+25



50+75



50+00



50+50

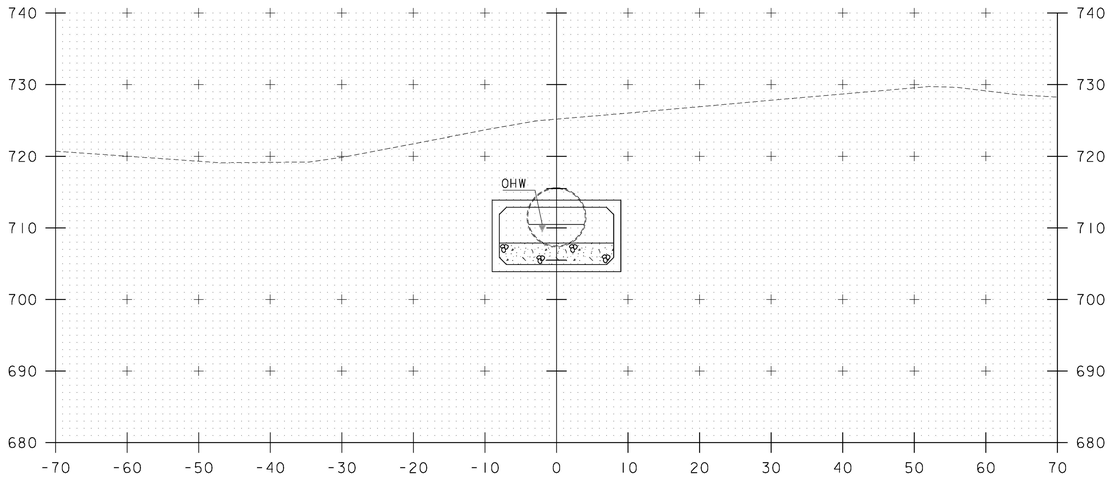
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GM2 ASSOCIATES

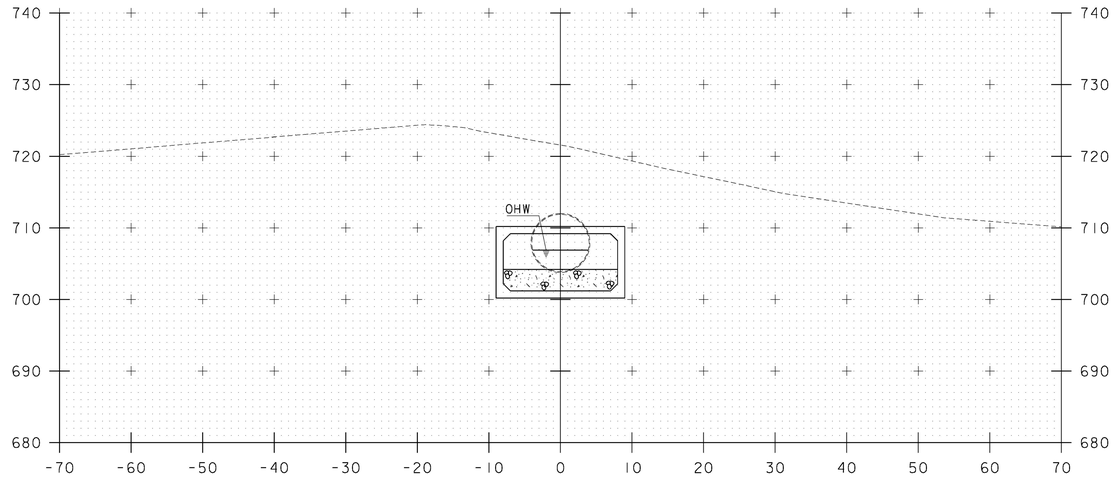
PROJECT NAME: WATERFORD
PROJECT NUMBER: BF 0225(5)

FILE NAME: z15b051xs.dgn
PROJECT LEADER: T. LEVINS
DESIGNED BY: B. WILLIAMS
CHANNEL SECTIONS I

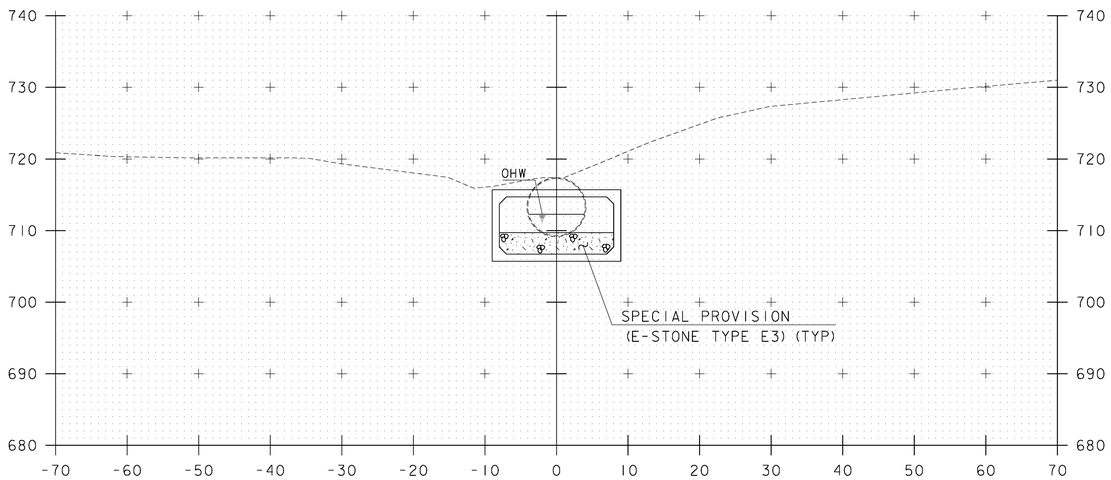
PLOT DATE: 09/27/2017
DRAWN BY: B. WILLIAMS
CHECKED BY: T. LEVINS
SHEET 53 OF 63



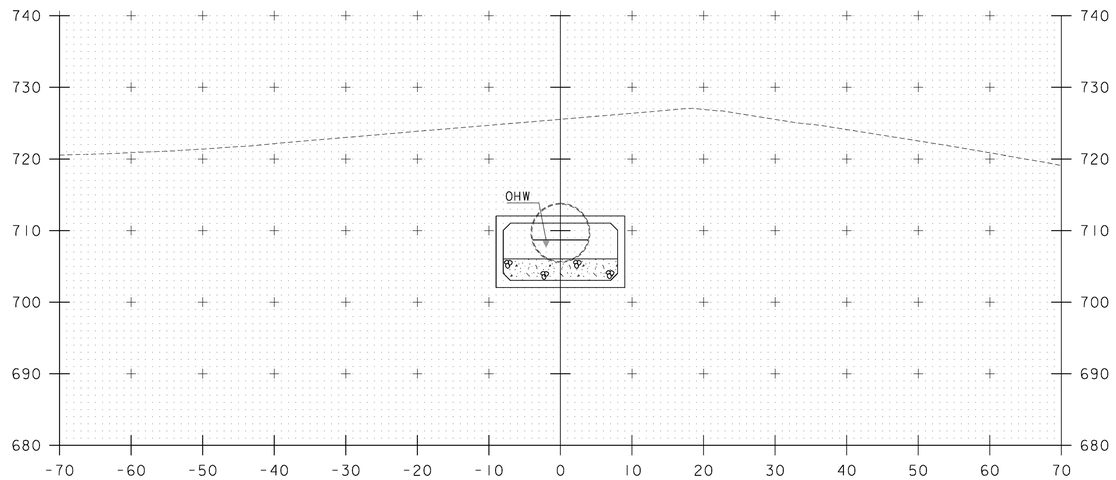
51+25



51+75



51+00



51+50

STA 50+91.91 BACK STATION
END UNCLASSIFED CHANNEL EXCAVATION
END GEOTEXTILE UNDER STONE FILL
END STONE FILL, TYPE IV
END GRUBBING MATERIAL

STA. 51+00 TO STA. 51+75

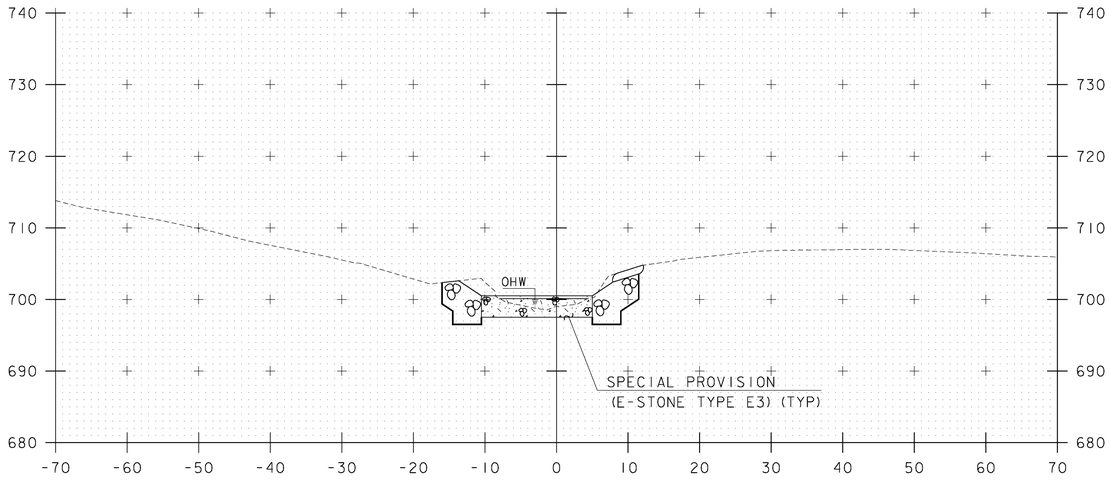
GM2 ASSOCIATES

PROJECT NAME: WATERFORD
PROJECT NUMBER: BF 0225(5)

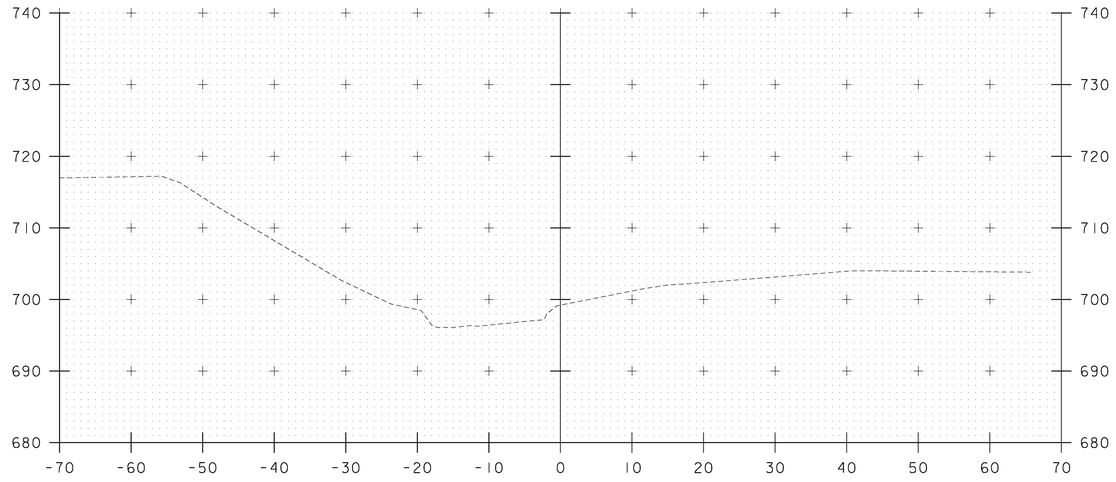
FILE NAME: z15b051xs.dgn
PROJECT LEADER: T. LEVINS
DESIGNED BY: B. WILLIAMS
CHANNEL SECTIONS 2

PLOT DATE: 09/27/2017
DRAWN BY: B. WILLIAMS
CHECKED BY: T. LEVINS
SHEET 54 OF 63

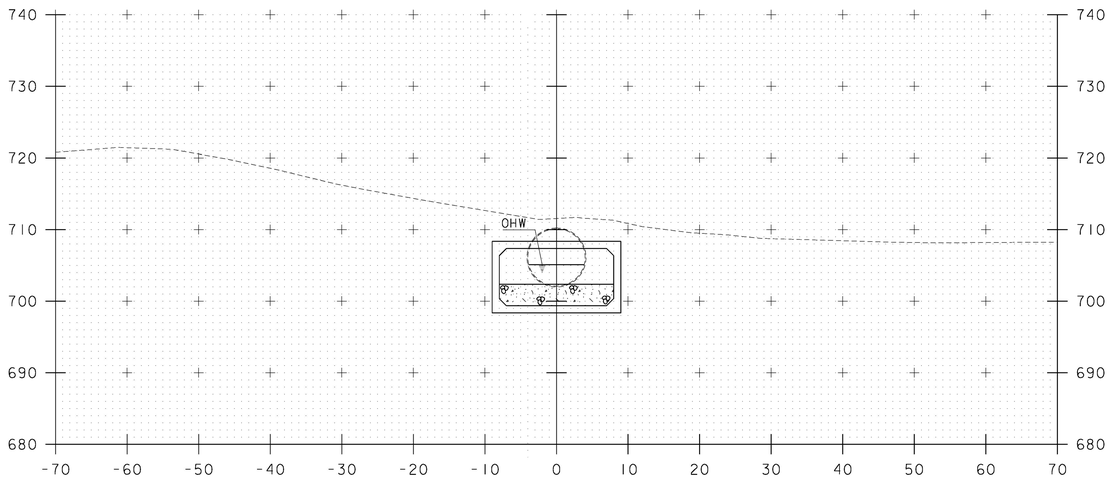
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END GRUBBING MATERIAL



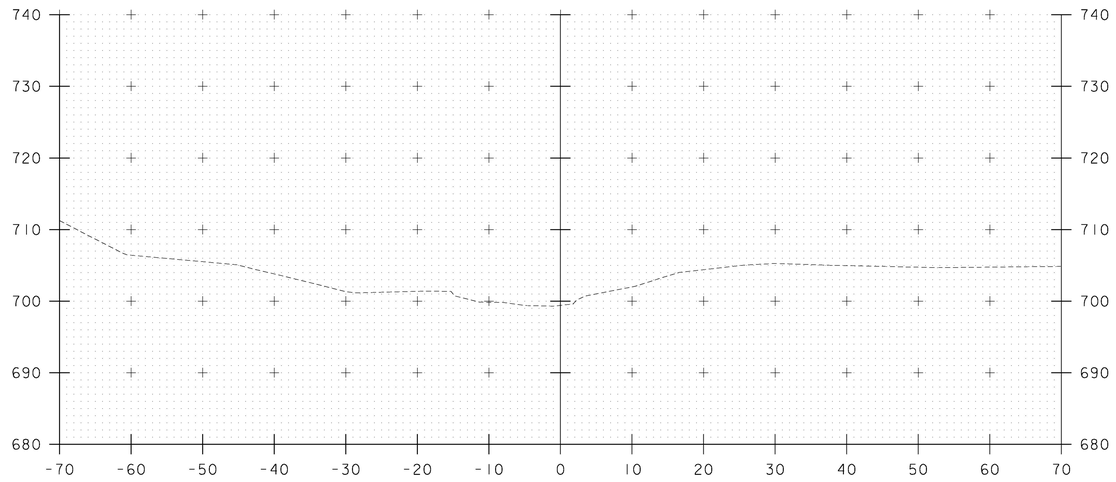
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52+75



52+00



52+50

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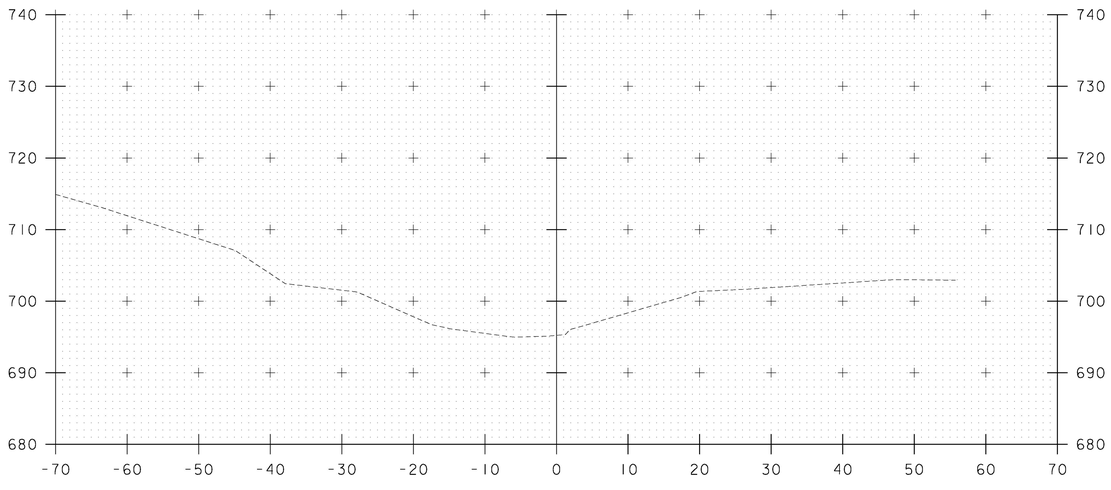
STA. 52+00 TO STA. 52+75

GM2 ASSOCIATES

PROJECT NAME: WATERFORD
PROJECT NUMBER: BF 0225(5)

FILE NAME: z15b05ixs.dgn
PROJECT LEADER: T. LEVINS
DESIGNED BY: B. WILLIAMS
CHANNEL SECTIONS 3

PLOT DATE: 09/27/2017
DRAWN BY: B. WILLIAMS
CHECKED BY: T. LEVINS
SHEET 55 OF 63



53+00

STA. 53+00 TO STA. 53+00

GM2 ASSOCIATES

PROJECT NAME:	WATERFORD
PROJECT NUMBER:	BF 0225(5)
FILE NAME:	z15b051xs.dgn
PROJECT LEADER:	T. LEVINS
DESIGNED BY:	B. WILLIAMS
CHANNEL SECTIONS	4
PLOT DATE:	09/27/2017
DRAWN BY:	B. WILLIAMS
CHECKED BY:	T. LEVINS
SHEET	56 OF 63

EPSC PLAN NARRATIVE

1.1 PROJECT DESCRIPTION

THIS PROJECT INVOLVES THE REPLACEMENT OF THE EXISTING BRIDGE 2 AND ITS HEADWALLS. BRIDGE 2 WILL BE REPLACED WITH A PRECAST CONCRETE BOX CULVERT, SPANNING 19.16 FEET OVER UNNAMED BROOK. IT IS LOCATED IN THE TOWN OF WATERFORD, ON VT ROUTE 18 IN A RURAL AREA, APPROXIMATELY 7.6 MILES SOUTH OF THE INTERSECTION OF VT ROUTE 18 AND US ROUTE 2.

NOTE: AREA OF DISTURBANCE INCLUDES LIMITS OF EARTH DISTURBANCE WITHIN THE PROJECT AREA, AS WELL AS WASTE, BORROW AND STAGING AREAS, AND OTHER EARTH DISTURBING ACTIVITIES WITHIN OR DIRECTLY ADJACENT TO THE PROJECT LIMITS AS SHOWN ON THE ATTACHED EPSC PLAN.

TOTAL AREA OF DISTURBANCE AS SHOWN ON THE ATTACHED EPSC PLAN IS APPROXIMATELY 0.63 ACRES.

IT IS ANTICIPATED THAT THIS PROJECT WILL LAST ONE TO TWO WEEKS.

1.2 SITE INVENTORY

1.2.1 TOPOGRAPHY

THE AREA SURROUNDING THE PROJECT IS GRASS AND WOODS IN A RURAL SETTING.

1.2.2 DRAINAGE, WATERWAYS, BODIES OF WATER, AND PROXIMITY TO NATURAL OR MAN-MADE WATER FEATURES

THE UNNAMED BROOK IS THE ONLY WATER SOURCE ON THE PROJECT SITE. THE BROOK IS CLASSIFIED AS STEEP, SINUOUS, NARROW, WITH A CONFINED AND ARMORED CHANNEL AT THE SITE. THE STREAM BED CONSISTS OF GRAVEL, COBBLES AND BOULDERS. THE TRIBUTARY AREA AT THE CULVERT CROSSING IS 1.1 SQ. MI. DUE TO THE NATURE OF THE SURROUNDING TERRAIN THE PROJECT SITE COULD RECEIVE RUNOFF WATER FROM A FEW NEARBY SLOPES.

1.2.3 VEGETATION

THE VEGETATION IN THE PROJECT AREA CONSISTS OF HARDWOOD TREES AND UNDERGROWTH. THE IMPACT TO VEGETATION WILL BE LIMITED TO THAT WHICH IS DIRECTLY AFFECTED BY REPLACEMENT OF THE EXISTING CULVERT. UPON PROJECT COMPLETION, THE CHANNEL BANKS WILL BE ARMORED WITH STONE FILL TYPE IV AS SPECIFIED ON THE PLANS. DISTURBED VEGETATION WILL BE REESTABLISHED WITH STANDARD SEED AND MULCH PRACTICES.

1.2.4 SOILS

ALL SOIL DATA CAME FROM THE U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE FOR THE COUNTY OF CALEDONIA, VERMONT. SOILS ON THE PROJECT SITE ARE MOOSILAUKEE SANDY LOAM, VERY FINE, 0% TO 3% SLOPES, “K” VALUE = 0.THE SOIL IS CONSIDERED TO HAVE LOW EROSION POTENTIAL DUE TO SHALLOW SLOPES.

NOTE: “K” VALUES GENERALLY INDICATE THE FOLLOWING:
0.0-0.23 = LOW EROSION POTENTIAL
0.24-0.36 = MODERATE EROSION POTENTIAL
0.37 AND HIGHER = HIGH EROSION POTENTIAL

1.2.5 SENSITIVE RESOURCE AREAS

CRITICAL HABITATS: NO
HISTORICAL OR ARCHEOLOGICAL AREAS: HIGH LAND FORM IN SW QUADRANT AND CEMETARY IN SE QUADRANT. OUTSIDE LIMITS OF CONSTRUCTION.
PRIME AGRICULTURAL LAND: NO
THREATENED AND ENDANGERED SPECIES: NORTHERN LONG-EARED BAT
WATER RESOURCE: UNNAMED BROOK
WETLANDS: WETLANDS ARE LOCATED OUTSIDE OF THE BROOK LIMITS ON THE WEST AND EAST SIDE OF VT 18. WETLANDS ARE OUTSIDE THE LIMITS OF WORK AND WILL NOT BE IMPACTED.

1.3 RISK EVALUATION

THIS PROJECT DOES NOT REQUIRE A PERMIT FOR STORMWATER RUNOFF FROM CONSTRUCTION SITES FOR LOW RISK PROJECTS. ANY MODIFICATIONS TO THE PROJECT THAT INCREASE THE RISK TO ENVIRONMENTAL RESOURCES SHALL BE EVALUATED IN ACCORDANCE WITH THE PERMIT REQUIREMENTS. THE CONTRACTOR WILL BE RESPONSIBLE FOR ANY ADDITIONAL PERMITTING.

1.4 EROSION PREVENTION AND SEDIMENT CONTROL

THE EROSION CONTROL PLANS ARE MEANT AS A GUIDELINE FOR PREVENTING EROSION AND CONTROLLING SEDIMENT TRANSPORT. THE PRINCIPLES OUTLINED IN THIS NARRATIVE CONSIST OF APPLYING MEASURES THROUGHOUT CONSTRUCTION OF THE PROJECT IN ORDER TO MINIMIZE SEDIMENT TRANSPORT TO THE RECEIVING WATERS. THE MEASURES INCLUDE STABILIZATION AND STRUCTURAL PRACTICES, STORMWATER CONTROLS AND OTHER POLLUTION PREVENTION PRACTICES. THEY HAVE BEEN PROPOSED BY THE DESIGNER AS A BASIS FOR PROTECTING RESOURCES AND WILL NEED TO BE BUILT UPON BASED ON THE SPECIFIC MEANS AND METHODS OF THE CONTRACTOR. REFER TO THE LOW RISK SITE HANDBOOK AND APPROPRIATE DETAIL SHEETS FOR SPECIFIC GUIDANCE AND CONSTRUCTION DETAILING.

ALL MEASURES SHALL BE REGULARLY MAINTAINED AND SHALL BE CHECKED FOR SEDIMENT BUILD-UP. SEDIMENT SHALL BE DISPOSED OF AT AN APPROVED SITE WHERE IT WILL NOT BE SUBJECT TO EROSION.

1.4.1 MARK SITE BOUNDARIES

SITE BOUNDARIES AND AREAS THAT CONSTRUCTION EQUIPMENT CAN ACCESS SHALL BE DELINEATED.

PROJECT DEMARCATION FENCE (PDF) SHALL BE USED TO PHYSICALLY MARK SITE BOUNDARIES.

1.4.2 LIMIT DISTURBANCE AREA

PREVENTING INITIAL SOIL EROSION BY MINIMIZING THE EXPOSED AREA IS MUCH MORE EFFECTIVE THAN TREATING ERODED SEDIMENT. EARTH DISTURBANCE CAN BE MINIMIZED THROUGH CONSTRUCTION PHASING BY ONLY OPENING UP EARTH AS NECESSARY. THIS CAN LIMIT THE AREA THAT WILL BE DISTURBED AND EXPOSED TO EROSION. EMPLOY TEMPORARY CONSTRUCTION STABILIZATION PRACTICES IN INCREMENTAL STAGES AS PHASES CHANGE. FOR PROJECTS WHICH FALL UNDER THE CONSTRUCTION GENERAL PERMIT, ONLY THE ACREAGE LISTED ON THE PERMIT AUTHORIZATION MAY BE EXPOSED AT ANY GIVEN TIME.

MAINTAINING VEGETATED BUFFERS ALONG STREAM BANKS, WETLANDS OR OTHER SENSITIVE AREAS IS A CRUCIAL EROSION AND SEDIMENT CONTROL MEASURE THAT SHOULD BE ESTABLISHED WHEREVER POSSIBLE.

1.4.3 SITE ENTRANCE/EXIT STABILIZATION

TRACKING OF SEDIMENT ONTO PUBLIC HIGHWAYS SHALL BE MINIMIZED TO REDUCE THE POTENTIAL FOR RUNOFF ENTERING RECEIVING WATERS. INSTALLATION SHALL COINCIDE WITH THE CONTRACTORS PROGRESS SCHEDULE.

STABILIZED CONSTRUCTION ENTRANCES SHALL BE INSTALLED AS PROPOSED ON THE EPSC PLAN AND ANYWHERE EQUIPMENT WILL BE GOING FROM AREAS OF EXPOSED SOILS TO PAVED SURFACES.

1.4.4 INSTALL SEDIMENT BARRIERS

SEDIMENT BARRIERS SHALL BE UTILIZED TO INTERCEPT RUNOFF AND ALLOW SUSPENDED SEDIMENT TO SETTLE OUT. THEY SHALL BE INSTALLED PRIOR TO ANY UP SLOPE WORK.

GEOTEXTILE FOR SILT FENCE SHALL BE INSTALLED AS PROPOSED ON THE EPSC PLAN. FILTER CURTAINS SHALL BE INSTALLED ON THE INLET AND OUTLET ENDS OF THE PROPOSED BOX AS PROPOSED ON THE EPSC PLAN.

1.4.5 DIVERT UPLAND RUNOFF

DIVERSIONARY MEASURES SHALL BE USED TO INTERCEPT RUNOFF FROM ABOVE THE CONSTRUCTION AND DIRECT IT AROUND THE DISTURBED AREA SO THAT CLEAN WATER DOES NOT BECOME MUDDIED WHILE TRAVELING OVER EXPOSED SOILS ON THE CONSTRUCTION SITE.

THE PROJECT AREA IS RELATIVELY FLAT. THEREFORE IT IS NOT ANTICIPATED THAT DIVERSION MEASURES WILL BE NECESSARY.

1.4.6 SLOW DOWN CHANNELIZED RUNOFF

CHECK STRUCTURES SHALL BE UTILIZED TO REDUCE THE VELOCITY, AND THUS THE EROSIVE POTENTIAL, OF CONCENTRATED FLOW IN CHANNELS.

NONE ANTICIPATED.

1.4.7 CONSTRUCT PERMANENT CONTROLS

PERMANENT STORMWATER TREATMENT DEVICES SHALL BE INSTALLED AS SHOWN ON THE PLANS AND IN ACCORDANCE WITHN PERMIT CONDITIONS.

NONE ANTICIPATED.

1.4.8 STABILIZE EXPOSED SOILS DURING CONSTRUCTION

ALL AREAS OF DISTURBANCE MUST HAVE TEMPORARY STABILIZATION IN PLACE WITHIN 48 HOURS OF DISTURBANCE OR IN ACCORDANCE WITH THE CONSTRUCTION GENERAL PERMIT 3-9020 AUTHORIZATION.

SURFACE ROUGHENING OF ALL EXPOSED SLOPES, COMBINED WITH TEMPORARY MULCHING, SHALL BE UTILIZED ON A REGULAR BASIS. BIODEGRADABLE EROSION CONTROL MATTING OR AN EQUIVALENT SHALL BE USED TO STABILIZE ALL SLOPES STEEPER THAN 1:3.

THE FORECAST OF RAINFALL EVENTS SHALL TRIGGER IMMEDIATE PROTECTION OF EXPOSED SOILS.

1.4.9 WINTER STABILIZATION

VARIOUS MEASURES SPECIFIC TO WINTER MAY BE NECESSARY SHOULD THE PROJECT EXTEND INTO WINTER (OCTOBER 15 THROUGH APRIL 15). REFER TO THE LOW RISK SITE HANDBOOK FOR GUIDANCE.

NONE ANTICIPATED.

1.4.10 STABILIZE SOIL AT FINAL GRADE

EXPOSED SOIL MUST BE STABILIZED WITHIN 48 HOURS OF REACHING FINAL GRADE.

SEED, MULCH, FERTILIZER AND LIME SHALL BE USED TO ESTABLISH PERMANENT VEGETATION. FOR SLOPES STEEPER THAN 1:3, BIODEGRADABLE EROSION CONTROL MATTING OR AN EQUIVALENT SHALL BE USED INSTEAD OF MULCH.

1.4.11 DE-WATERING ACTIVITIES

DISCHARGE FROM DEWATERING ACTIVITIES THAT FLOWS OFF OF THE CONSTRUCTION SITE MUST NOT CAUSE OR CONTRIBUTE TO A VIOLATION OF THE VERMONT WATER QUALITY STANDARDS.

FILTER BAG(S) SHALL BE USED FOR DEWATERING.

1.4.12 INSPECT YOUR SITE

INSPECT THE PROJECT SITE BASED ON SPECIAL PROVISION REQUIREMENTS OR CONSTRUCTION GENERAL PERMIT AUTHORIZATION STIPULATIONS.

1.5 SEQUENCE AND STAGING

THIS SECTION WILL BE DEVELOPED BY THE CONTRACTOR USING THE GUIDANCE OUTLINED IN THE VTRANS EPSC PLAN CONTRACTOR CHECKLIST.

1.5.1 CONSTRUCTION SEQUENCE

1.5.2 OFF-SITE ACTIVITIES

IN ADDITION TO THE CONTRACTOR CHECKLIST ANY ACTIVITIES OUTSIDE THE CONSTRUCTION LIMITS SHALL FOLLOW SUBSECTIONS 105.25- 105.29 OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION.

GM2 ASSOCIATES

PROJECT NAME: WATERFORD
PROJECT NUMBER: BF 0225(5)

FILE NAME: z15b05iepscnarrative.dgn
PROJECT LEADER: T. LEVINS
DESIGNED BY: B. WILLIAMS
EPSC NARRATIVE

PLOT DATE: 09/27/2017
DRAWN BY: B. WILLIAMS
CHECKED BY: T. LEVINS
SHEET 57 OF 63

VT STATE PLANE GRID

N

FOUND: HIGHWAY BOUND
4X4 CONTRETE VTHD
UP 6"

206.27'
S37°56'32"E

75.59'
N11°09'55"E

EXISTING R.O.W.

42.85'
N09°24'04"E

FOUND: HIGHWAY BOUND
4X4 CONTRETE VTHD
UP 6"

EXISTING R.O.W.

L=119.03'
R=1,004.93'

37.11'
S15°11'30"E

EXISTING R.O.W.

226.6'
S36°34'21"E

30.48'
S36°55'30"E

EXISTING R.O.W.

VT ROUTE 18
TO NEW HAMPSHIRE

ROW INFORMATION SOURCE:
WATERFORD I 93-1(2)
WATERFORD NRS 263

FOUND: HIGHWAY BOUND
4X4 CONTRETE
BROKEN AT GROUND

EXISTING R.O.W.

EXISTING TOWN R.O.W.

TH 43
RIVERSIDE CEMETERY
ROAD

EXISTING TOWN R.O.W.

BENCHMARK
RAILROAD SPIKE
IN ROOT
ELEV. = 722.04

L=277.26'
R=904.93'

EXISTING R.O.W.

82.76'
N15°52'18"W

FOUND: HIGHWAY BOUND
4X4 CONTRETE VTHD
UP 6"

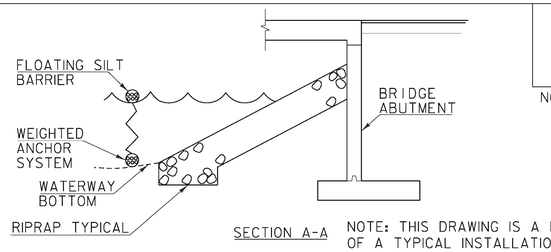
VT ROUTE 18
TO ST. JOHNSBURY

53+00
2+15
3+00
4+00
5+00
6+00
6+50
50+00

SCALE 1" = 20'-0"
20 0 20

GM2 ASSOCIATES

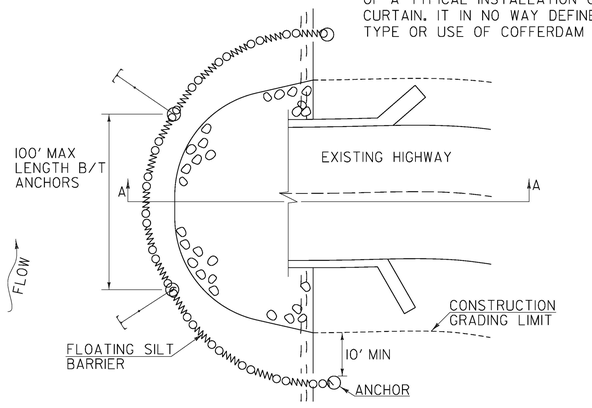
PROJECT NAME:	WATERFORD
PROJECT NUMBER:	BF 0225(5)
FILE NAME:	zl5b05lepsc_const.dgn
PROJECT LEADER:	T. LEVINS
DESIGNED BY:	B. WILLIAMS
EPSC CONSTRUCTION SITE PLAN	
PLOT DATE:	09/27/2017
DRAWN BY:	B. WILLIAMS
CHECKED BY:	T. LEVINS
SHEET	58 OF 63



SYMBOL

NOT TO SCALE

NOTE: THIS DRAWING IS A DEPICTION OF A TYPICAL INSTALLATION OF FILTER CURTAIN. IT IN NO WAY DEFINES THE TYPE OR USE OF COFFERDAM IF USED.



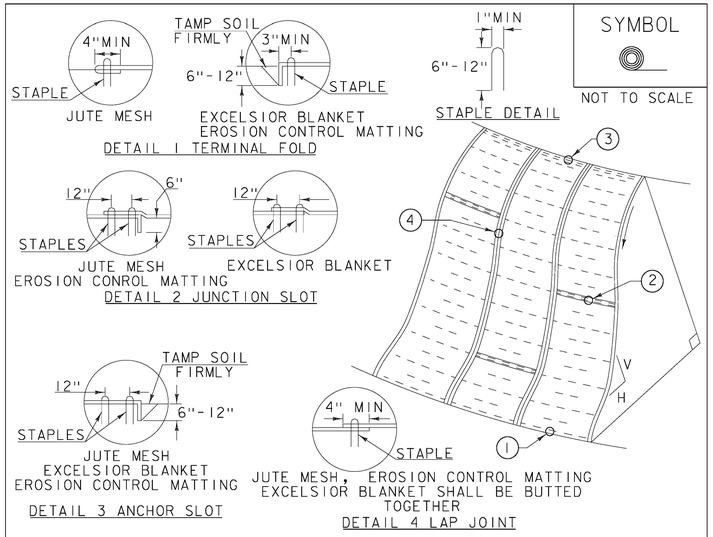
CONSTRUCTION SPECIFICATIONS

1. FILTER CURTAIN SHALL NOT BE PLACED ACROSS A FLOWING WATERWAY, OR IN A WATERWAY WITH STREAM VELOCITIES GREATER THAN 1.5 FEET/SECOND.
2. MAXIMUM 100' LENGTH BETWEEN ANCHORS.
3. LAST SECTION SHALL TERMINATE A MINIMUM OF 10' BEYOND LIMIT OF DISTURBANCE.
4. THE WEIGHTED ANCHOR SYSTEM SHALL BE A TYPE WHICH ALLOWS THE CURTAIN TO CONFORM TO THE BOTTOM OF THE WATERWAY.
5. THE CURTAIN SHALL BE REMOVED BY SLOWLY PULLING TOWARD THE SHORE MINIMIZING THE ESCAPE OF SEDIMENTS INTO WATERWAY.

FILTER CURTAIN

THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 649 FOR GEOTEXTILE FOR FILTER CURTAIN.

REVISIONS	
APRIL 1, 2008	WHF
JANUARY 13, 2009	WHF
SEPTEMBER 4, 2009	WHF



SYMBOL

NOT TO SCALE

CONSTRUCTION SPECIFICATIONS

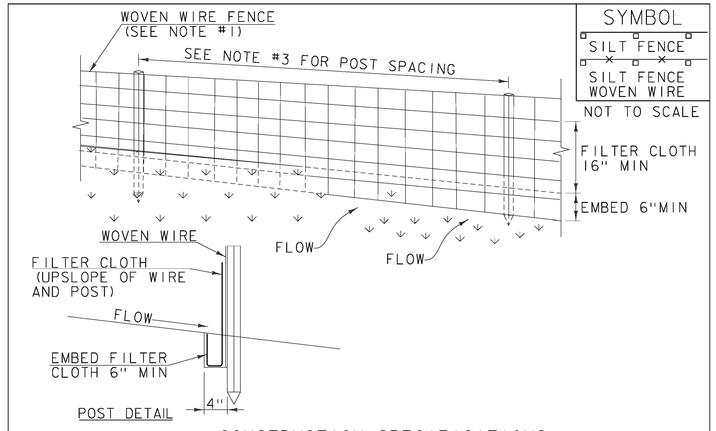
1. APPLY TO SLOPES GREATER THAN 3H:1V OR WHERE NECESSARY TO AID IN ESTABLISHING VEGETATION.
2. APPLY FERTILIZER, LIME SEED PRIOR TO PLACING MATTING.
3. STAPLES ARE TO BE PLACED ALTERNATELY, IN COLUMNS APPROXIMATELY 2' APART AND IN ROWS APPROXIMATELY 3' APART. APPROXIMATELY 175 STAPLES ARE REQUIRED PER 4'X225' ROLL OF MATERIAL AND 125 STAPLES ARE REQUIRED PER 4'X150' ROLL OF MATERIAL.
4. DISTURBED AREAS SHALL BE SMOOTHLY GRADED. EROSION CONTROL MATERIAL SHALL BE PLACED LOOSELY OVER GROUND SURFACE. DO NOT STRETCH.
5. ALL TERMINAL ENDS AND TRANSVERSE LAPS SHALL BE STAPLED AT APPROXIMATELY 12" INTERVALS.

ADAPTED FROM DETAILS PROVIDED BY: NEW YORK STATE DEC
ORIGINALLY DEVELOPED BY USDA-NRCS
VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION

ROLLED EROSION CONTROL PRODUCT (RECP) SIDE SLOPE

NOTES:
REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006- "FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.
THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 653 AND AS SHOWN IN THE PLANS FOR TEMPORARY EROSION MATTING (PAY ITEM 653.20) ~~OR PERMANENT EROSION MATTING (PAY ITEM 653.21).~~

REVISIONS	
APRIL 16, 2007	JMF
JANUARY 13, 2009	WHF



SYMBOL

SILT FENCE

SILT FENCE WOVEN WIRE

NOT TO SCALE

CONSTRUCTION SPECIFICATIONS

1. WOVEN WIRE REINFORCED FENCE IS REQUIRED WITHIN 100' UPSLOPE OF RECEIVING WATERS WHEN THE PROJECT FALLS UNDER A CONSTRUCTION STORMWATER PERMIT. WOVEN WIRE SHALL BE A MIN. 14 GAUGE WITH A 6" MAX. MESH OPENING.
2. FILTER CLOTH SHALL BE EITHER FILTER X, MIRAFI100X, STABILINKA T140N OR APPROVED EQUIVALENT.
3. POST SPACING FOR WIRE-BACKED FENCE SHALL BE 10' MAXIMUM. FOR FILTER-CLOTH FENCE, WHEN ELONGATION IS >50%, POST SPACING SHALL NOT EXCEED 4' AND WHEN ELONGATION IS <50%, POST SPACING SHALL NOT EXCEED 6'.
4. WOVEN WIRE FENCE IS TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES. FILTER CLOTH IS TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION.
5. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVER-LAPPED BY 6" AND FOLDED.
6. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN SEDIMENT REACHES HALF OF FABRIC HEIGHT.

ADAPTED FROM DETAILS PROVIDED BY: NEW YORK STATE DEC
ORIGINALLY DEVELOPED BY USDA-NRCS
VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SILT FENCE

NOTES:
REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006- "FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.

THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 649 AND AS SHOWN IN THE PLANS FOR GEOTEXTILE FOR SILT FENCE (PAY ITEM 649.51) ~~OR GEOTEXTILE FOR SILT FENCE, WOVEN WIRE REINFORCED (PAY ITEM 649.515).~~

REVISIONS	
MARCH 21, 2008	WHF
DECEMBER 11, 2008	WHF
JANUARY 13, 2009	WHF

GM2 ASSOCIATES

PROJECT NAME:	WATERFORD
PROJECT NUMBER:	BF 0225(5)
FILE NAME:	z15b05epsc_det1.dgn
PROJECT LEADER:	T. LEVINS
DESIGNED BY:	B. WILLIAMS
EPSC DETAILS 1	
PLOT DATE:	09/27/2017
DRAWN BY:	B. WILLIAMS
CHECKED BY:	T. LEVINS
SHEET	59 OF 63

VAOT LOW GROW/FINE FESCUE MIX						
	LBS/AC					
WEIGHT	BROADCAST	HYDROSEED	NAME	LATIN NAME	GERM	PURITY
38%	57	95	CREEPING RED FESCUE	FESTUCA RUBRA VAR. RUBRA	90%	98%
29%	43.5	72.5	HARD FESCUE	FESTUCA LONGIFOLIA	85%	95%
15%	22.5	37.5	CHEWINGS FESCUE	FESTUCA RUBRA VAR. COMMUTATA	87%	95%
15%	22.5	37.5	ANNUAL RYEGRASS	LOLIUM MULTIFLORUM	90%	95%
3%	4.5	7.5	INERTS			
100%	150	250				

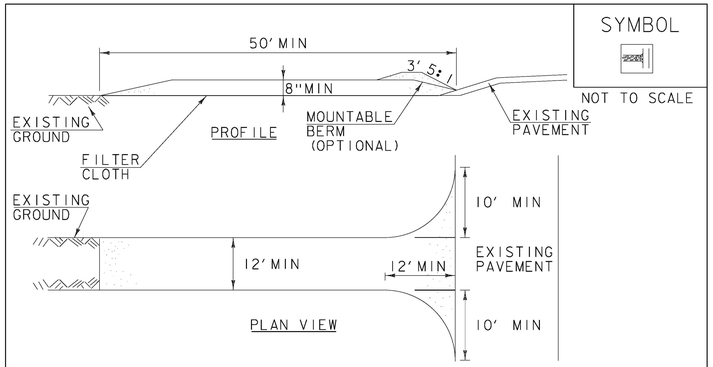
VAOT RURAL AREA MIX						
	LBS/AC					
WEIGHT	BROADCAST	HYDROSEED	NAME	LATIN NAME	GERM	PURITY
37.5%	22.5	45	CREEPING RED FESCUE	FESTUCA RUBRA VAR. RUBRA	85%	98%
37.5%	22.5	45	TALL FESCUE	FESTUCA ARUNDINACEA	90%	95%
5.0%	3	6	RED TOP	AGROSTIS GIGANTEA	90%	95%
15.0%	9	18	WHITE FIELD CLOVER	TRIFOLIUM REPENS	85%	98%
5.0%	3	6	ANNUAL RYE GRASS	LOLIUM MULTIFLORUM	85%	95%
100%	60	120				

GENERAL AMENDMENT GUIDANCE		
FERTILIZER	LIME	
10/20/10	AG LIME	PELLITIZED
500 LBS/AC	2 TONS/AC	1 TONS/AC

CONSTRUCTION GUIDANCE

1. SEED MIX: THE CONTRACTOR SHALL COORDINATE WITH THE RESIDENT ENGINEER ON WHICH SEED MIX TO USE.
2. SEED MIX: USE AS INDICATED IN THE PLANS AND/OR FOR ALL ESTABLISHED UPLAND (NON WETLAND) AREAS DISTURBED BY THE CONTRACTOR.
3. ALL SEED MIXTURES: SHALL NOT HAVE A WEED CONTENT EXCEEDING 0.40% BY WEIGHT AND SHALL BE FREE OF ALL NOXIOUS SEED.
4. FERTILIZER AND LIMESTONE: SHALL FOLLOW RATES SHOWN ON PLAN OR AS DIRECTED BY THE ENGINEER.
5. HAY MULCH: TO BE PLACED ON EARTH SLOPES AT THE RATE OF 2 TONS/ACRE, ACHIEVE 90% GROUND COVER OR AS DIRECTED BY THE ENGINEER.
6. HYDROSEEDING: ALTHOUGH GUIDANCE IS GIVEN ABOVE THE SITE CONDITIONS AND THE TYPE OF HYDROSEED PROPOSED FOR USE WILL ULTIMATELY DICTATE THE AMOUNTS AND TYPES OF SOIL AMENDMENTS TO BE APPLIED.
7. TURF ESTABLISHMENT: PLACING SEED, FERTILIZER, LIME AND MULCH PRIOR TO SEPTEMBER 15 AND AFTER APRIL 15 CAN BETTER ENSURE A VIGOROUS GROWTH OF GRASS.

ADAPTED FROM VTRANS TECHNICAL LANDSCAPE MANUAL FOR ROADWAYS AND TRANSPORTATION FACILITIES	TURF ESTABLISHMENT
THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 651FOR SEED (PAY ITEM 651.15)	REVISIONS JANUARY 12, 2015 WHF



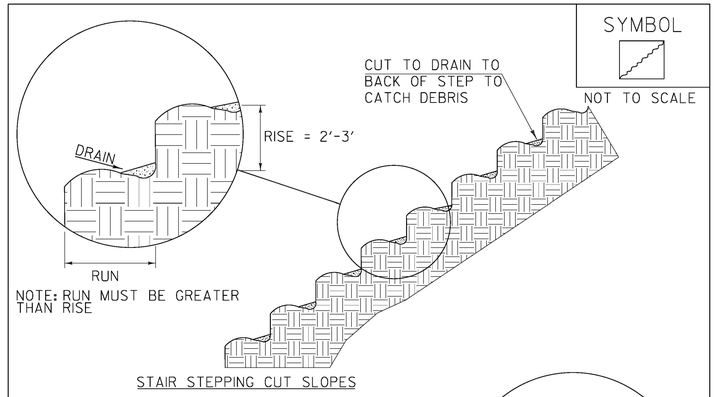
SYMBOL

NOT TO SCALE

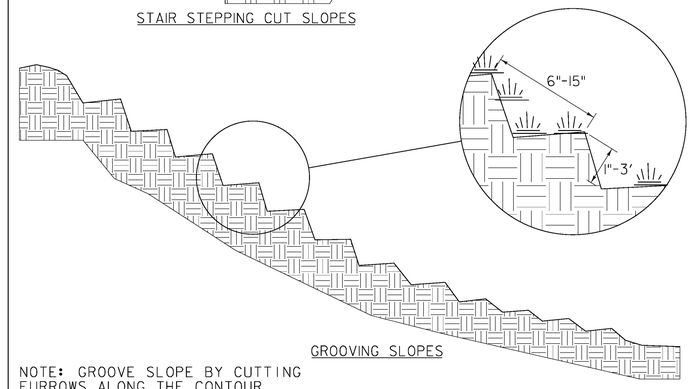
CONSTRUCTION SPECIFICATIONS

1. STONE SIZE- USE 1-4" STONE, RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
2. LENGTH- NOT LESS THAN 50' (EXCEPT ON A SINGLE RESIDENCE LOT WHERE A 30' MINIMUM LENGTH APPLIES).
3. THICKNESS- NOT LESS THAN 8".
4. WIDTH- 12' MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS. 24' IF SINGLE ENTRANCE TO SITE.
5. GEOTEXTILE MUST BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING STONE.
6. SURFACE WATER- ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED BENEATH THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
7. MAINTENANCE- THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY, ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
8. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
9. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED ACCORDING TO PERMIT REQUIREMENTS.

ADAPTED FROM DETAILS PROVIDED BY: NEW YORK STATE DEC ORIGINALLY DEVELOPED BY USDA-NRCS VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION	STABILIZED CONSTRUCTION ENTRANCE
NOTES: REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006- "FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE. THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 653 FOR VEHICLE TRACKING PAD (PAY ITEM 653.35) OR AS SPECIFIED IN THE CONTRACT.	REVISIONS MARCH 24, 2008 WHF JANUARY 13, 2009 WHF



STAIR STEPPING CUT SLOPES



GROOVING SLOPES

NOTE: GROOVE SLOPE BY CUTTING FURROWS ALONG THE CONTOUR. IRREGULARITIES IN THE SOIL SURFACE CATCH RAINWATER AND RETAIN LIME, FERTILIZER AND SEED.

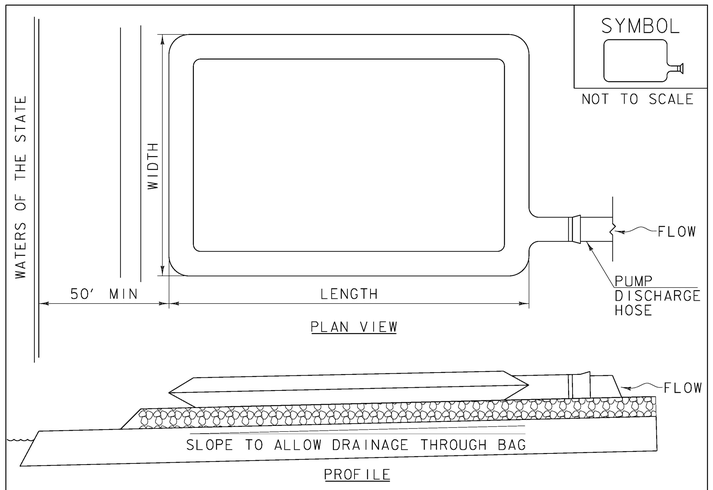
ADAPTED FROM DETAILS PROVIDED BY: NEW YORK STATE DEC ORIGINALLY DEVELOPED BY USDA-NRCS VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION	SURFACE ROUGHENING
NOTES: REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006- "FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE. THIS WORK SHALL BE CONSIDERED INCIDENTAL TO THE CONTRACT	REVISIONS APRIL 1, 2008 WHF JANUARY 13, 2009 WHF

GM2 ASSOCIATES

PROJECT NAME: WATERFORD
PROJECT NUMBER: BF 0225(5)

FILE NAME: z15b05lepsc_det2.dgn
PROJECT LEADER: T. LEVINS
DESIGNED BY: B. WILLIAMS
EPSC DETAILS 2

PLOT DATE: 09/27/2017
DRAWN BY: B. WILLIAMS
CHECKED BY: T. LEVINS
SHEET 60 OF 63



CONSTRUCTION SPECIFICATIONS

1. THE PRIMARY PURPOSE OF FILTER BAG IS TO RETAIN SILT, SAND, AND FINES DURING DEWATERING OPERATIONS.
2. FILTER BAGS SHALL BE INSTALLED ON A VEGETATED SLOPE GRADED TO ALLOW INCOMING WATER TO FLOW THROUGH THE BAG.
3. FILTER BAGS MAY ALSO BE PLACED ON COARSE AGGREGATE, STONE, OR HAYBALES TO INCREASE FILTRATION EFFICIENCY.
4. FILTER BAGS SHALL BE LOCATED A MINIMUM OF 50' FROM WATERS OF THE STATE UNLESS OTHERWISE APPROVED BY THE ENGINEER.
5. THE NECK OF THE FILTER BAG SHALL BE STRAPPED TIGHTLY TO THE DISCHARGE HOSE.
6. A FILTER BAG IS FULL WHEN IT NO LONGER CAN EFFICIENTLY FILTER SEDIMENT OR ALLOW WATER TO PASS AT A REASONABLE RATE.
7. FILTER BAG SHALL BE DISPOSED OF AS APPROVED IN THE EPSC PLAN OR AS DIRECTED BY THE ENGINEER.

FILTER BAG

NOTES:
REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006- " FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.

THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 653 FOR FILTER BAG (PAY ITEM 653.45) AND AS SPECIFIED IN THE CONTRACT.

REVISIONS	
MARCH 24, 2008	WHF
JANUARY 13, 2009	WHF

GM2 ASSOCIATES

PROJECT NAME: WATERFORD
PROJECT NUMBER: BF 0225(5)

FILE NAME: z15b05lepsc_det3.dgn
PROJECT LEADER: T. LEVINS
DESIGNED BY: B. WILLIAMS
EPSC DETAILS 3

PLOT DATE: 09/27/2017
DRAWN BY: B. WILLIAMS
CHECKED BY: T. LEVINS
SHEET 61 OF 63

CONSTRUCT 5'-0" PAVED APRON
STA 2+68.44 - 3+46.74 RT

REMOVAL AND DISPOSAL OF GUARDRAIL
STA. 3+24.5 - 5+48.0, RT
STA. 2+13.8 - 5+48.8, LT

STATE OF VERMONT
I-93

BEGIN R.O.W. PROJECT
WATERFORD BF 0225 (5)
STA. 3+01.89, 92.82' LT

MAINLINE CURVE 1
DELTA = 20°16'01"
D = 5°59'58"
R = 955.00'
T = 170.69'
L = 337.81'
E = 15.13'

VT STATE PLANE GRID

FOUND: HIGHWAY BOUND 4X4 CONTRETE VTHD UP 6"

53+00

3+11.70
99.73 LT

206.27'
S37°56'32"E

3+58.28
88.66 LT

CONST(T)

ROCK WEIRS (TYP)

BEGIN BRIDGE
STA 3+70.09

75.59'
N11°09'55"E

EXISTING R.O.W.

42.85'
N09°24'04"E

3+01.89
92.82 LT

HWY(P)

CONST(T)

226.6'
S36°34'21"E

3+86.32
59.27 LT

MAINLINE STA 3+81.00 =
CHANNEL STA 51+41.51
Δ = 55°22'43" RT

BEGIN PROJECT
STA 3+00.00

BEGIN APPROACH
2+50.00

3+08.78
51.75 LT

APPROX. LOCATION
OF TIMBER PLANKS
TO BE SALVAGED
TO VTRANS

52+00

END BRIDGE
STA 3+91.99

MAINLINE PI #1
STA 4+31.66

END PROJECT
STA 5+00.00

END APPROACH
STA 5+50.00

L=119.03'
R=1,004.93'

37.11'
S15°11'30"E

MAINLINE POB
STA 2+14.61

30.48'
S36°55'30"E

MAINLINE POE
STA 6+49.78

N 16°16'06.84" W

N 36°32'07.89" W

VT ROUTE 18
TO NEW HAMPSHIRE

VT ROUTE 18
TO ST. JOHNSBURY

2+15

3+00

4+00

5+00

6+00

6+50

4+47.04
49.93 RT

RET

51+00

MAINLINE PT
STA 5+98.78

L=277.26'
R=904.93'

EXISTING R.O.W.

82.76'
N15°52'18"W

FOUND: HIGHWAY BOUND 4X4 CONTRETE VTHD UP 6"

ROW INFORMATION SOURCE:
WATERFORD I 93-1(2)
WATERFORD NRS 263

3+70.06
49.77 RT

HWY(P)

3+90.83
68.30 RT

CONST(T)

4+46.12
57.97 RT

4+22.60
75.30 RT

FOUND: HIGHWAY BOUND 4X4 CONTRETE BROKEN AT GROUND

EXISTING R.O.W.

TRANSCANADA HYDRO NORTHEAST INC.

N/F
TOWN OF WATERFORD

MAINLINE PC
STA 2+60.97

EXISTING TOWN R.O.W.

EXISTING TOWN R.O.W.

TH 43
RIVERSIDE CEMETERY ROAD

TOWN OF WATERFORD
RIVERSIDE CEMETERY ROAD
T.H. 43

BENCHMARK
RAILROAD SPIKE
IN ROOT
ELEV. = 722.04

50+00

3'-0" E-STONE TYPE E3 (TYP)
(SEE SPECIAL PROVISION)

4'-0" STONE FILL
TYPE IV (TYP)

END R.O.W. PROJECT
WATERFORD BF 0225 (5)
STA. 4+53, 49.95' RT

TRANSCANADA HYDRO NORTHEAST INC.
joined by
NEW ENGLAND FORESTRY FOUNDATION, INC.

STATE OF VERMONT
I-93

FOUND: HIGHWAY BOUND 4X4 CONTRETE VTHD UP 6"

EXISTING R.O.W.

END APPROACH
STA 5+50.00

L=119.03'
R=1,004.93'

END PROJECT
STA 5+00.00

TRANSCANADA HYDRO NORTHEAST INC.
joined by
NEW ENGLAND FORESTRY FOUNDATION, INC.

LINES SHOWN ON THIS PLAN AS EXISTING PROPERTY LINES P/L ARE BELIEVED TO BE ACCURATE BUT SHOULD NOT BE RELIED UPON FOR PURPOSES UNRELATED TO THE STATE OF VERMONT'S ACQUISITION OF LAND AND RIGHTS FOR THIS PROJECT.

FOR R.O.W. USE ONLY

LAYOUT

SCALE 1" = 20'-0"
20 0 20

PROJECT NAME: WATERFORD
PROJECT NUMBER: BF 0225(5)

FILE NAME: rl5b05llay.dgn
PROJECT LEADER: D. LANDRY
DESIGNED BY: GM2 ASSOCIATES
R.O.W. LAYOUT SHEET 1 OF 1

PLOT DATE: 6/8/17
DRAWN BY: A. EGIZI
CHECKED BY: R. CLOUTIER
SHEET 62 OF 63

STATE OF VERMONT
AGENCY OF TRANSPORTATION

RIGHT - OF - WAY DETAIL SHEET

TABLE OF PROPERTY ACQUISITION

PARCEL NO.	PROPERTY OWNER	ROW LAYOUT NO.	BEGINNING STATION	ENDING STATION	TAKE	REMAINDER	RIGHT			RECORDING DATA					REMARKS
					AREA±	AREA±	TYPE	T / P	AREA ±	TITLE	DATE	TOWN / CITY	BOOK	PAGE	
1	GREAT RIVER HYDRO, LLC	1	3+01.89 LT	3+86.32 LT	2,835 SF		HIGHWAY	P							
	JOINED BY NEW ENGLAND FORESTRY		3+70.06 RT	4+47.04 RT	1,213 SF		HIGHWAY	P							
	FOUNDATION, INC.		3+03 LT	3+08.78 LT			CONSTRUCTION	T	41 SF						INCL. PDF & EC
			3+11.70 LT	3+93 LT			CONSTRUCTION	T	567 SF						INCL. PDF & EC
			3+50 RT	4+53 RT			CONSTRUCTION	T	658 SF						INCL. PDF & EC
2	NEW HAMPSHIRE OPTICAL		3+01.89 LT	4+53 RT											UTILITY
	SYSTEMS, INC.														
3	COMCAST OF CONNECTICUT/GEORGIA/		3+01.89 LT	4+53 RT											UTILITY
	MASSACHUSETTS/NEW HAMPSHIRE/														
	NEW YORK/NORTH CAROLINA/VIRGINIA/														
	VERMONT, LLC														
4	TELEPHONE OPERATING COMPANY OF		3+01.89 LT	4+53 RT											UTILITY
	VERMONT LLC														

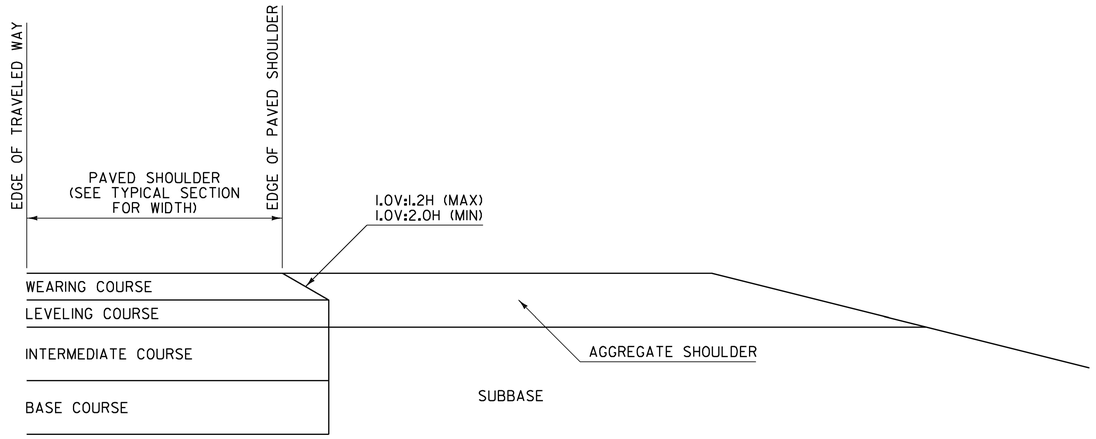
TABLE OF REVISIONS

REVISION NO.	ROW SET SHEET #	DESCRIPTION	DATE
1	3, 4	PARCEL 1, TRANSCANADA - CHANGE	06/01/17
		OWNER TO GREAT RIVER HYDRO, LLC	
		REV BY: MT CO 10243 APPR BY: RC	

PROJECT NAME: **WATERFORD**
PROJECT NUMBER: **BF 0225(5)**

FILE NAME: **r15b051detail.xls**
PROJECT LEADER: **D. LANDRY**
DESIGNED BY: **A. EGIZI**
R.O.W. DETAIL SHEET #1

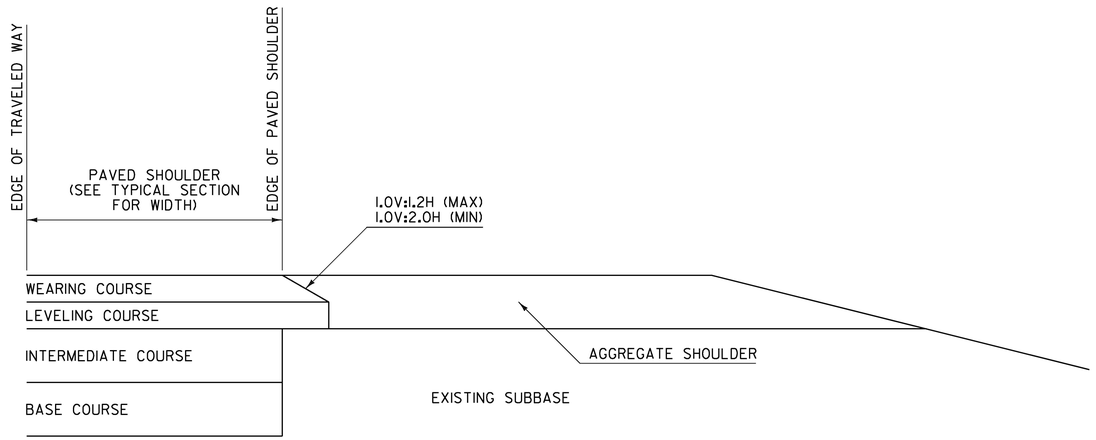
PLOT DATE: 6/8/17
DRAWN BY: **M. TROTTIER**
CHECKED BY: **R. CLOUTIER**
SHEET 63 OF 63



SAFETY EDGE DETAIL
FOR PAVING BELOW WEARING COURSE

NOTES:

1. THIS DETAIL IS INTENDED FOR WHEN PAVING EXTENDS BELOW THE WEARING COURSE.
2. PRIOR TO PLACEMENT OF THE LEVELING AND/OR WEARING COURSE, THE SUBBASE LOCATED BENEATH THE AGGREGATE SHOULDER SHALL BE PREPARED FLUSH WITH THE BOTTOM OF THE LEVELING COURSE.
3. BASE COURSE LIMITS MAY VARY, SEE TYPICAL SECTIONS FOR WIDTH.



SAFETY EDGE DETAIL
FOR PAVING WEARING COURSE ONLY

NOTES:

1. THIS DETAIL IS INTENDED FOR WHEN ONLY THE LEVELING AND/OR WEARING COURSE IS TO BE PLACED.
2. PAVEMENT COURSES MAY VARY, SEE TYPICAL SECTIONS FOR ACTUAL PAVEMENT COURSES REQUIRED.

SAFETY EDGE WIDTH BASED ON WEARING COURSE THICKNESS AND A 1V:1.6H SLOPE	
WEARING COURSE THICKNESS (INCHES)	NOMINAL SAFETY EDGE WIDTH (INCHES)
1.25	2.000
1.50	2.375
1.75	2.750
2.00	3.125
2.25	3.500
2.50	4.000

GENERAL NOTES:

1. PLACEMENT OF THE WEARING COURSE SHALL INCLUDE THE SAFETY EDGE, UNLESS THE FOLLOWING APPLIES:
   - A. THE ADJACENT SLOPE IS STEEPER THAN THE SAFETY EDGE.
   - B. THE EDGE OF PAVEMENT BEING PLACED ABUTS BOUND MATERIAL.
   - C. VEHICLES ARE RESTRICTED FROM LEAVING THE PAVED SURFACE (EXAMPLE: GUARDRAIL).
2. THE SAFETY EDGE SHALL BE FORMED IN SUCH A WAY THAT THE BITUMINOUS CONCRETE PAVEMENT IS EXTRUDED OR COMPRESSED TO FORM THE SLOPE. DEVICES THAT SIMPLY STRIKE-OFF THE MIX WITHOUT PROVIDING ANY COMPACTIVE EFFORT WILL NOT BE ALLOWED.
3. THE SAFETY EDGE SHALL NOT BE CONSIDERED PART OF THE PAVED SHOULDER.
4. THIS WORK SHALL BE INCIDENTAL TO THE RESPECTIVE BITUMINOUS CONCRETE PAVEMENT ITEM.

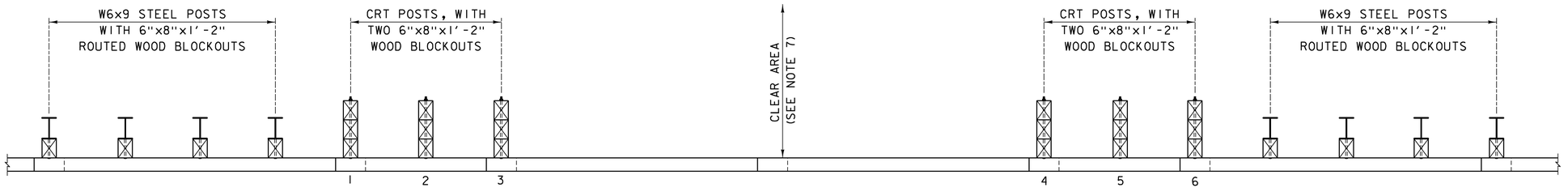
REV.	DATE	DESCRIPTION
0	MAR. 29, 2016	ORIGINAL APPROVAL
OTHER DETAILS REQUIRED: NONE		
DETAILS APPROVED FOR USE BY HIGHWAY SAFETY & DESIGN		

SAFETY EDGE DETAILS

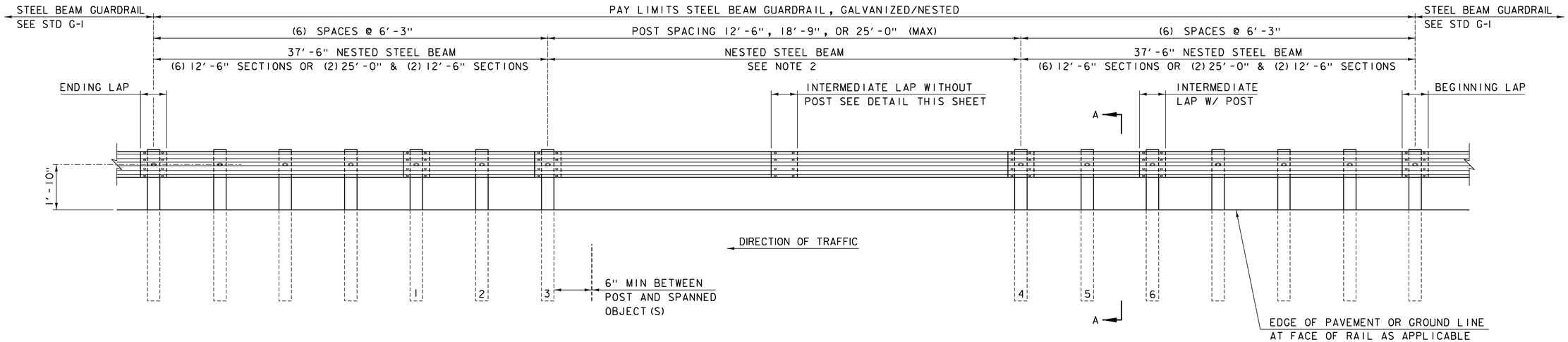
VTrans Working To Get You There VERMONT AGENCY OF TRANSPORTATION

HIGHWAY SAFETY & DESIGN DETAIL

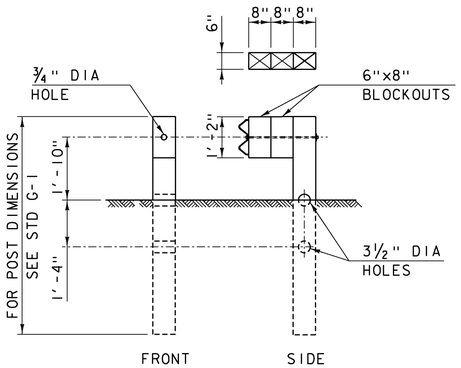
HSD-400.01



LONGSPAN STEEL BEAM GUARDRAIL PLAN

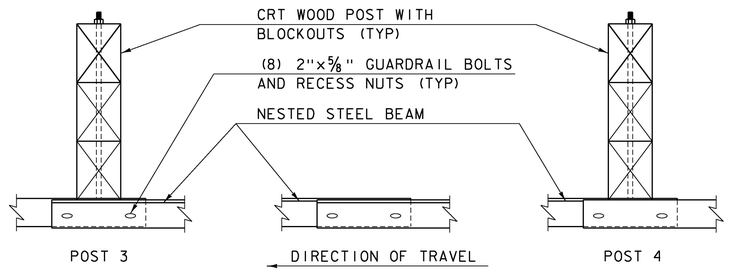


LONGSPAN STEEL BEAM GUARDRAIL ELEVATION



SECTION A-A

SECTION A-A TYPICAL FOR POST 1-6.
SEE NOTES 3 AND 4



INTERMEDIATE LAP WITHOUT POST

NOTES:

1. RAIL MEETS TEST LEVEL 3 REQUIREMENTS OF NCHRP REPORT 350.
2. THERE SHALL BE NO MORE THAN ONE SPLICE IN THE LONGSPAN LOCATION.
3. POSTS 1THRU 6 ARE BREAKAWAY CONTROLLED RELEASING TERMINAL (CRT) POSTS.
4. POSTS 1THRU 6 HAVE TWO 6"x8" BLOCKOUTS.
5. ON POSTS 1THRU 6, GUARDRAIL BOLT "D", AS SHOWN ON STD G1, SHALL BE 26" LONG.
6. ON ALL POSTS WHERE THE RAIL IS NESTED GUARDRAIL BOLT "A", AS SHOWN ON STD G1, SHALL BE 2" LONG.
7. CLEAR AREA BEHIND BACK OF RAIL SHALL BE:
   5'-0" MINIMUM FOR OBSTRUCTIONS LESS THAN OR EQUAL TO THE HEIGHT OF RAIL.
   6'-0" FOR OBSTRUCTIONS TALLER THAN THE TOP OF RAIL.
8. W6x9 STEEL POST MAY BE REPLACED WITH CRT WOOD POST WITH THE APPROVAL OF THE ENGINEER.
9. ALL MATERIALS NECCISSARY FOR THE ASSEMBLY OF THE RAIL MUST MEET THE REQUIREMENTS OF STD G-1 UNLESS OTHERWISE NOTED.
10. GUARDRAIL SECTIONS SHALL BE LAPPED IN THE DIRECTION OF TRAFFIC FLOW FOR THE LANE NEAREST THE GUARDRAIL.

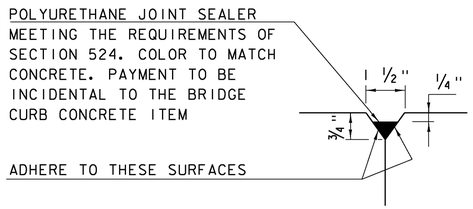
REVISIONS	
NOVEMBER 25, 2013	APPROVED FOR USE BY VAOT STRUCTURES SECTION
JANUARY 3, 2014	APPROVED FOR USE BY VAOT STRUCTURES SECTION

LONGSPAN STEEL BEAM GUARDRAIL, GALVANIZED

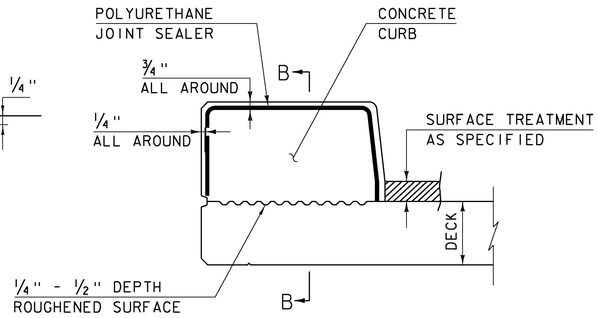
VERMONT AGENCY OF TRANSPORTATION
STRUCTURES - SECTION

STRUCTURES DETAIL

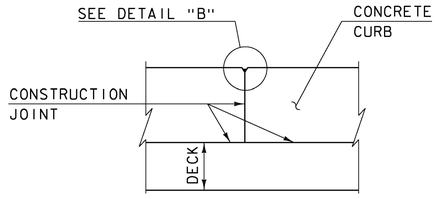
SD-366.00



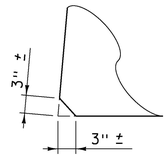
DETAIL "B"
(NOT TO SCALE)



CONCRETE CURB JOINT SECTION
(NOT TO SCALE)



SECTION B - B
(NOT TO SCALE)



ACUTE ANGLE CLIP DETAIL
(NOT TO SCALE)

1. SEE TYPICAL HORIZONTAL CONSTRUCTION JOINT DETAIL FOR ADDITIONAL INFORMATION

CONCRETE CURB JOINT NOTES

1. CONCRETE CURBS MAY BE PLACED IN ONE CONTINUOUS OPERATION IF AN APPROVED SHRINKAGE REDUCING ADMIXTURE LISTED IN THE SPECIAL PROVISIONS IS USED WITH THE CONCRETE MIX DESIGN. PAYMENT FOR THE SHRINKAGE REDUCING ADMIXTURE WILL BE INCIDENTAL TO THE BRIDGE CURB CONCRETE ITEM.

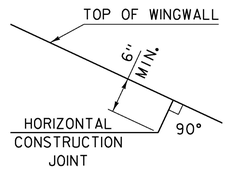
2. IF THE CONTRACTOR CHOOSES NOT TO USE AN APPROVED SHRINKAGE REDUCING ADMIXTURE, THE CURBS SHALL BE CONSTRUCTED WITH CONSTRUCTION JOINTS SPACED AT A MAXIMUM OF 15'-0" CENTER TO CENTER AND 2'-0" MINIMUM FROM THE CENTER OF NEAREST BRIDGE RAILING POST.

3. ON MULTI-SPAN CONTINUOUS SUPERSTRUCTURES, REGARDLESS OF WHETHER APPROVED SHRINKAGE REDUCING ADMIXTURE IS USED, CURB JOINTS SHALL BE LOCATED OVER THE CENTERLINE OF PIERS AND 7'-0" EACH SIDE OF THE CENTERLINE OF EACH PIER.

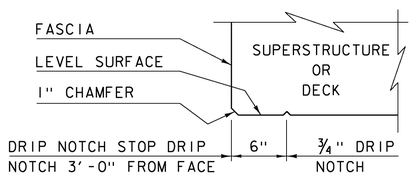
4. WHEN CURB JOINTS ARE USED THE CURBS SHALL BE PLACED IN ALTERNATE SECTIONS WITH A MINIMUM OF 48 HOUR DELAY BETWEEN ADJACENT PLACEMENTS.

5. LONGITUDINAL REINFORCING SHALL BE CONTINUOUS THROUGH CURB CONSTRUCTION JOINTS. CURB STIRRUP BARS SHALL BE TURNED AS NECESSARY TO MAINTAIN COVER IN THE FLARED CURB ENDS.

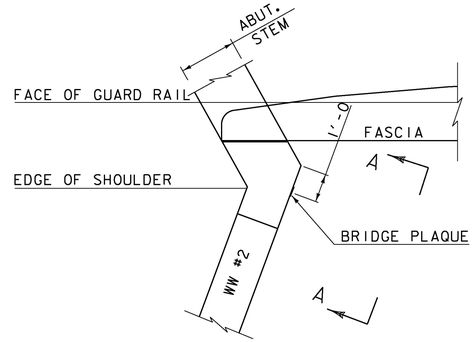
6. THE JOINT SPACING AND DETAILS SHOWN SHALL APPLY TO SIDEWALKS WHEN SHOWN IN THE PLANS.



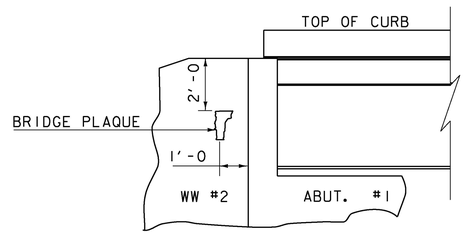
HORIZONTAL WINGWALL CONSTRUCTION JOINT
(NOT TO SCALE)



DRIP NOTCH DETAIL
(NOT TO SCALE)



PLAN



VIEW "A - A"

BRIDGE PLAQUE
(NOT TO SCALE)

THE BRIDGE PLAQUE WILL BE SUPPLIED BY THE AGENCY OF TRANSPORTATION AND SHALL BE INSTALLED BY THE CONTRACTOR AT ABUTMENT #1 ON THE RIGHT SIDE AS SHOWN OR AS DIRECTED BY THE ENGINEER.

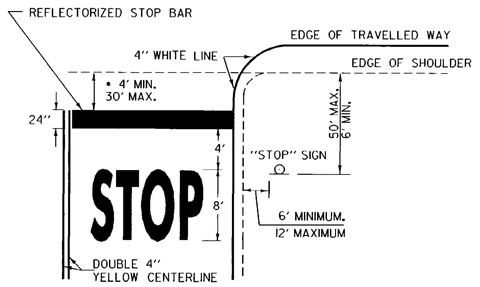
PAYMENT FOR INSTALLATION OF THE BRIDGE PLAQUE SHALL BE INCIDENTAL TO THE ADJACENT CONCRETE.

REVISIONS	
MAY 7, 2010	APPROVED FOR USE BY VAOT STRUCTURES SECTION
JUNE 4, 2010	MODIFIED AND ADDED TWO DETAILS
OCTOBER 10, 2012	MODIFIED HORZ. JOINT WINGWALL ADD 6" MIN. DIMENSION

CONCRETE DETAILS AND NOTES

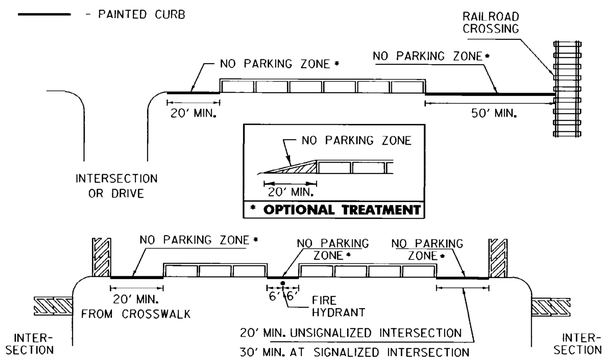
VERMONT AGENCY OF TRANSPORTATION
STRUCTURES - SECTION

STRUCTURES DETAIL
SD-502.00

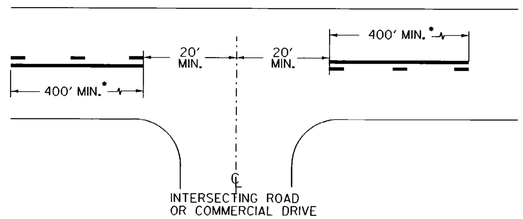


• THE "DESIRED STOPPING POINT" IS THE LOCATION BASED ON SITE CONDITIONS THAT BEST ALLOWS THE STOPPED VEHICLE TO VIEW THE APPROACHING TRAFFIC.

STOP BAR LAYOUT



NO PARKING LAYOUT DETAILS



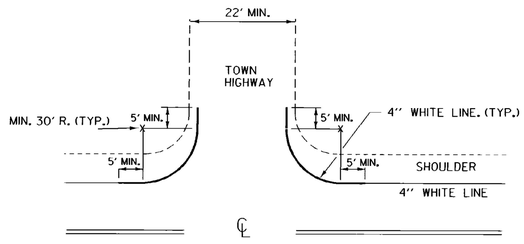
• THE SOLID LINE SHALL BE PAIRED WITH EITHER A SOLID OR DASHED LINE DEPENDING ON SIGHT DISTANCE AVAILABILITY IN THE OPPOSING DIRECTION. ADJUSTMENTS TO THE 40 FOOT CENTERLINE OPENING MAY BE MADE TO ACCOMMODATE SKEWED INTERSECTIONS.

CENTERLINE BREAKES:

A. AT ALL STATE HIGHWAYS AND TOWN HIGHWAYS, INCLUDING CLASS 4 TH'S. THAT HAVE STOP AND LEGAL LOAD LIMIT SIGNS INSTALLED

B. COMMERCIAL DRIVES:
1. WHERE A SEPERATE TURN LANE EXISTS ON THE MAIN LINE (LT. OR RT.)
2. SIGNIFICANT TRAFFIC VOLUMES EXISTS.
3. IF MOTORISTS NEED ASSISTANCE TO DEFINE ENTRANCE POINTS.

CENTERLINE LAYOUT

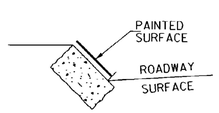


EDGELINES SHALL BE APPLIED TO ALL STATE HIGHWAYS AND SHOULD BE MAINTAINED AT A CONSTANT DISTANCE FROM THE CENTERLINE UNLESS PAVEMENT WIDTH INCREASES TO ALLOW WIDER LANES.

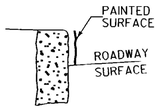
APPLY EDGELINE AS DETAILED ON ALL PAVED CLASS 1 & CLASS 2 TOWN HIGHWAYS AND ANY CLASS 3 TOWN HIGHWAY 22 FEET OR MORE IN WIDTH.

IF MIN. 30 FOOT RADIUS CANNOT BE OBTAINED, OR THE TOWN HIGHWAY IS NOT PAVED, BREAK THE EDGELINE USING AN 80 FOOT GAP AT INTERSECTION.

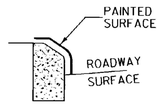
EDGELINE LAYOUTS



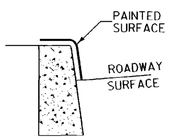
GRANITE SLOPE EDGING



VERTICAL GRANITE CURB

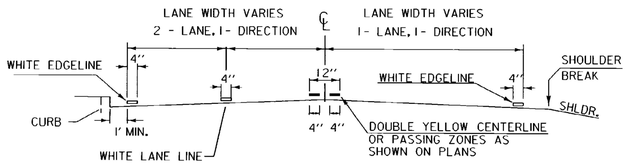


TYPE A (CONCRETE)

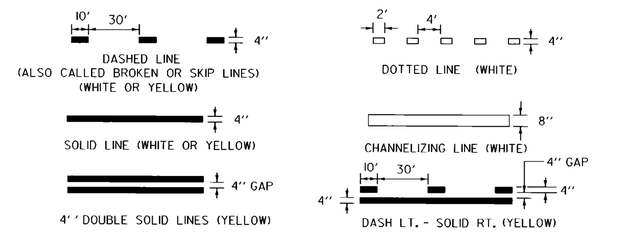


TYPE B (CONCRETE)

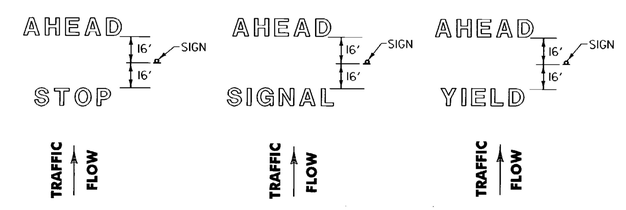
PAINTED CURB



PAVEMENT MARKING PLACEMENT DETAIL

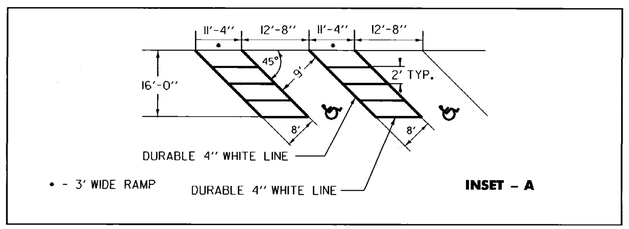


PAVEMENT MARKING LINE DETAILS



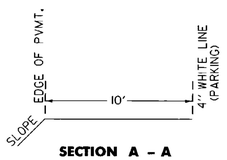
LETTER IN WORD MARKING SPACING DETAIL

NOTE: SINGLE WORDS CENTERED ON SIGN ie: SCHOOL OR YIELD



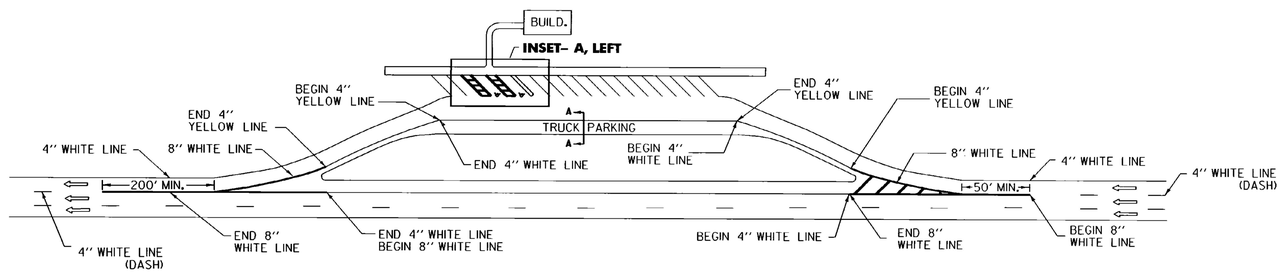
NOTE:

SEE STANDARD SHEET E-191 FOR HANDICAP SYMBOL POSITIONING AND DETAIL.



SECTION A - A

TRUCK PARKING DETAIL



REST AREA PARKING DETAILS

THIS SHEET IS NOT TO SCALE

OTHER STDS. E - 191, E - 192 REQUIRED

REVISIONS AND CORRECTIONS

AUG. 18, 1995 - DATE OF ORIGINAL ISSUE

APPROVED FOR THIS PROJECT AND/OR DESIGN IMPLEMENTATION. FHWA FINAL APPROVAL PENDING.

APPROVED

DIRECTOR OF ENGINEERING

TRAFFIC AND SAFETY ENGINEER

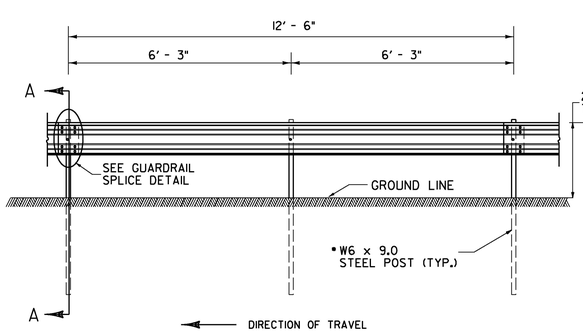
PAVEMENT MARKING DETAILS

/traf/std/stdel93.dgn/stdel93.i

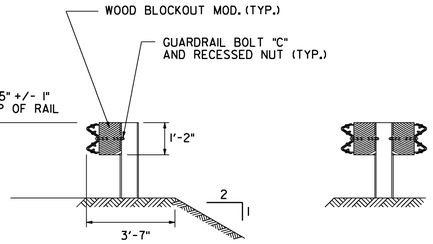
VERMONT AGENCY OF TRANSPORTATION

STANDARD E-193

"W" BEAM GUARDRAIL WITH STEEL POSTS



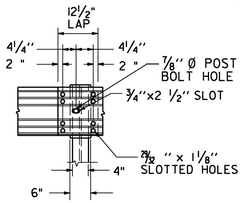
ELEVATION FROM ℄ OF ROAD



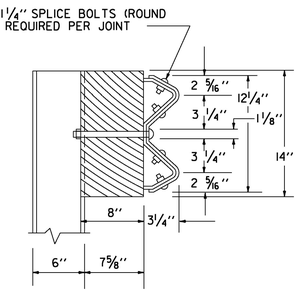
SINGLE - FACED BARRIER

DOUBLE - FACED BARRIER

SECTION A -A

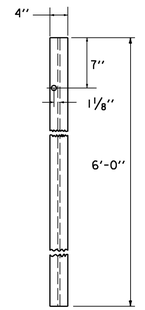


ELEVATION

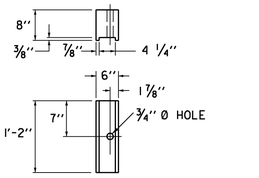


SECTION

GUARDRAIL SPLICE DETAIL



FRONT FACE STEEL POST

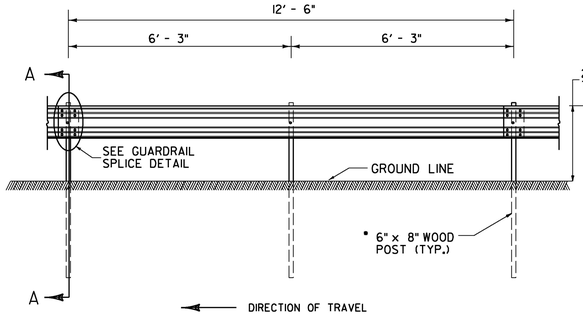


POST FACE
MODIFIED WOOD BLOCKOUT- ROUTED
6" X 8" X 1'-2" (FOR USE W/ STEEL POSTS ONLY)

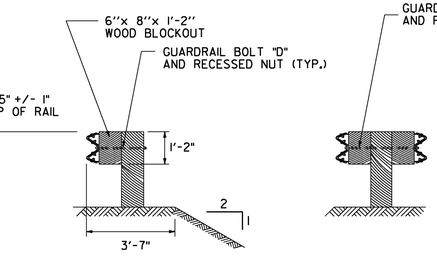
NOTES:

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.

"W" BEAM GUARDRAIL WITH WOOD POSTS



ELEVATION FROM ℄ OF ROAD

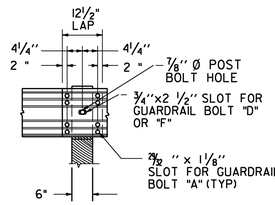


SINGLE - FACED BARRIER

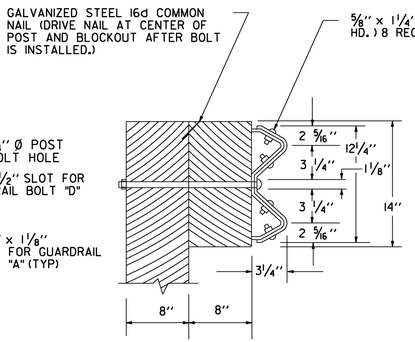
DOUBLE - FACED BARRIER

• NOTE : UNLESS OTHERWISE SPECIFIED ON PLANS

SECTION A -A

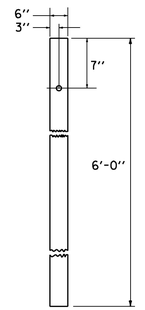


ELEVATION

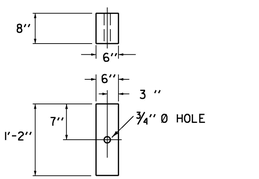


SECTION

GUARDRAIL SPLICE DETAIL



FRONT FACE WOOD POST

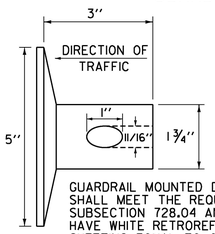


POST FACE
WOOD BLOCKOUT
6" X 8" X 1'-2"

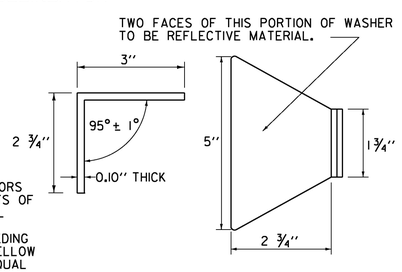
NOTES:

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.

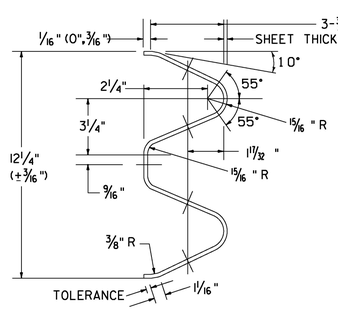
GUARDRAIL DELINEATOR



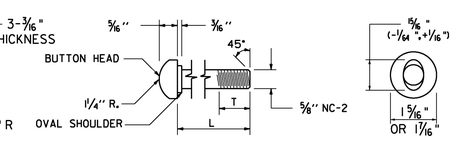
GUARDRAIL MOUNTED DELINEATORS SHALL MEET THE REQUIREMENTS OF SUBSECTION 728.04 AND SHALL HAVE WHITE RETROREFLECTIVE SHEETING EQUAL TO OR EXCEEDING SUBSECTION 750.08(B)(3) OR YELLOW RETROREFLECTIVE SHEETING EQUAL TO OR EXCEEDING SUBSECTION 750.08(B)(7).



THIS REFLECTORIZED ALUMINUM WASHER IS TO BE PLACED IN VALLEY OF BEAM WHEN MOUNTING BEAM ONTO EACH FIFTH POST. WASHER SHALL MEET SPECIFICATION REQUIREMENTS FOR A.S.T.M. B-209 ALLOY 5052-H32.

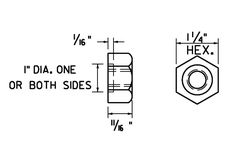


ARTBA RE-3(206'-3"=12'-6" CLASS A, TYPE 13-73
TYPICAL GUARDRAIL SECTION

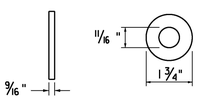


GUARDRAIL BOLT

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



RECESSED NUT FOR GUARDRAIL BOLT



WASHER FOR ⅝" BOLTS
ARTBA F-13-73
NOTE: WASHER IS USED UNDER RECESSED NUT WHERE GUARDRAIL BOLT IS USED WITH WOOD POSTS.

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 9/64 " THICK.

REV.	DATE	DESCRIPTION
--	FEB. 10, 2014	UPDATED TO REFLECT GUARDRAIL HEIGHT
		OF 29"; FHWA LETTER (MAY 17, 2010)
--	NOV. 10, 2015	UPDATED DELINEATOR RETROREFLECTIVE
		SHEETING NOTES
--	MAR. 10, 2017	REVISED GUARDRAIL SPLICE DETAIL

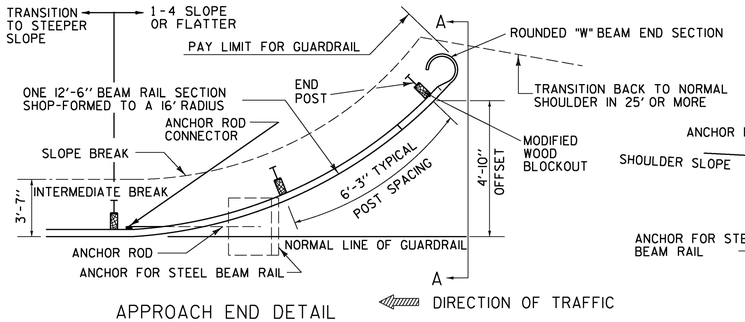
OTHER STANDARDS REQUIRED: G-ID

VTRANS AND FHWA APPROVAL ON FILE WITH CONTRACT ADMINISTRATION

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

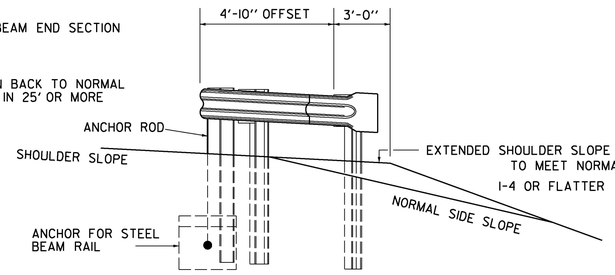
VTrans Working to Get You There
VERMONT AGENCY OF TRANSPORTATION

STANDARD
G-1

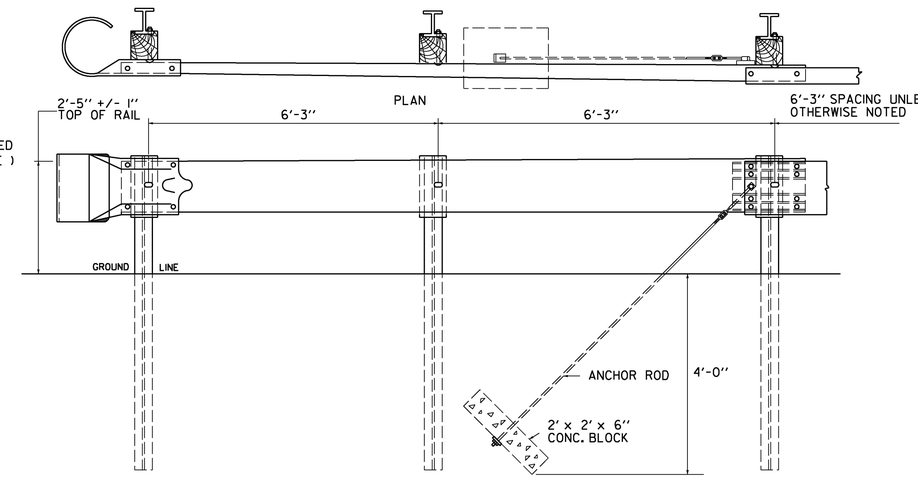


APPROACH END DETAIL

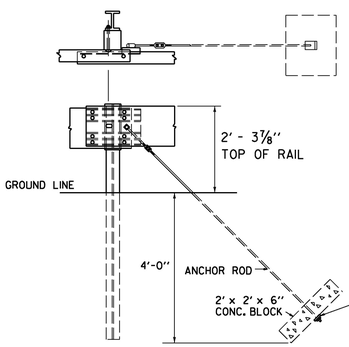
NHS APPROVED FOR USE WHERE DESIGN SPEED IS 40 OR LESS MPH
NON-NHS APPROVED FOR USE WHERE DESIGN SPEED IS 50 OR LESS MPH



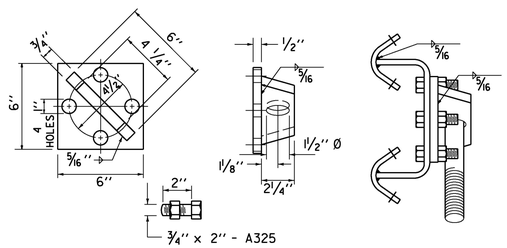
SECTION A-A



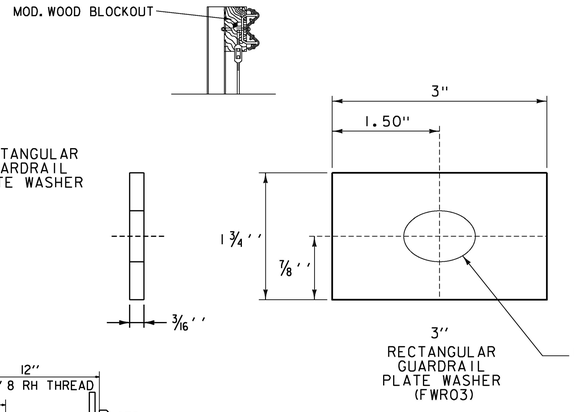
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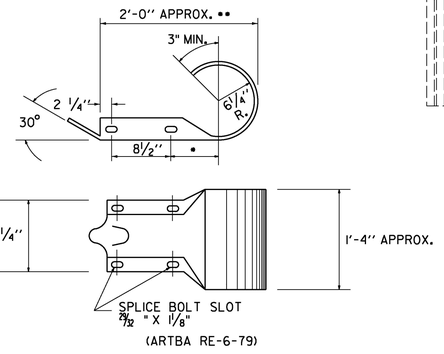


ANCHOR ROD



ANCHOR ROD CONNECTOR

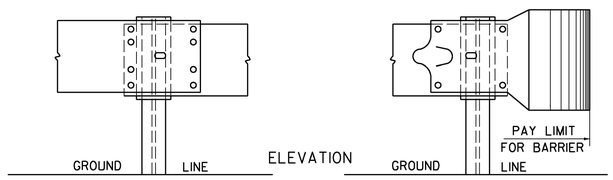


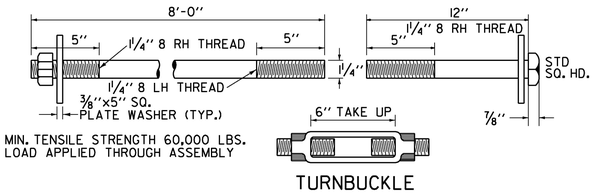


(ARTBA RE-6-79)

ROUNDED "W" BEAM END SECTION

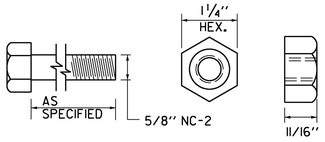
• THIS DIMENSION IS 7½" INRE-7-79. IF THE DIMENSION IS USED IN THIS PART, IT WILL GIVE AN ACCEPTABLE OVERALL LENGTH (••) OF APPROXIMATELY 2'- 11/2."





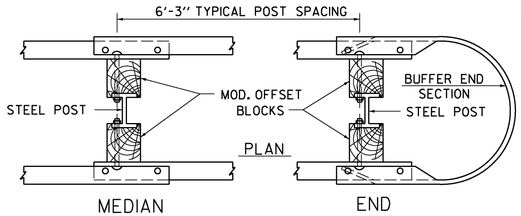
MIN. TENSILE STRENGTH 60,000 LBS.
LOAD APPLIED THROUGH ASSEMBLY

TURNBUCKLE



⅝" HEX NUT AND BOLT "F"
(ARTBA F-8-76)

FASTENER DETAILS



STEEL BEAM MEDIAN BARRIER

NOTE: TO BE USED OUTSIDE CLEAR ZONE ONLY.

TRAILING END TERMINAL FOR USE ON ONE-WAY HIGHWAYS

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 TERMNAL 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.

REV.	DATE	DESCRIPTION
2	JAN. 3, 2000	UPDATED TO REFLECT METRIC STD. CHANGES
3	FEB. 10, 2014	UPDATED TO REFLECT GUARDRAILS HEIGHT OF 29": AS NOTED IN FHWA LETTER DATED MAY 17,2000
4	MAR. 10, 2017	UPDATED WASHER DETAILS
OTHER STANDARDS REQUIRED: G-1		
VTRANS AND FHWA APPROVAL ON FILE WITH CONTRACT ADMINISTRATION		

STEEL BEAM GUARDRAIL END TERMINALS
ANCHOR FOR STEEL BEAM GUARDRAIL
STEEL BEAM MEDIAN BARRIER

VTrans Working to Get You There
VERMONT AGENCY OF TRANSPORTATION

STANDARD
G-1D

1. TRAFFIC CONTROL DEVICES NOT DETAILED IN THE VERMONT AGENCY OF TRANSPORTATION (VAOT) "STANDARD DRAWINGS" OR THE PROJECT PLANS SHALL BE IN ACCORDANCE WITH THE CURRENT "MANUAL ON TRAFFIC CONTROL DEVICES" (MUTCD) AND THE "STANDARD HIGHWAY SIGNS AND MARKINGS" BOOK, AND THEIR LATEST REVISIONS, (SHSM) PUBLISHED BY THE FEDERAL HIGHWAY ADMINISTRATION (FHWA).

2. CONSTRUCTION SIGNS SHALL BE ERECTED BEFORE THE START OF ANY WORK AND SHALL BE COVERED UNTIL WORK COMMENCES, DURING PERIODS OF INACTIVITY OR UPON COMPLETION OF THE WORK. EACH SIGN SHALL BE ERECTED IN A NEAT AND WORKMANLIKE MANNER.

3. DIAMOND SHAPED CONSTRUCTION SIGNS SHALL BE 48 INCH BY 48 INCH.

4. CONSTRUCTION SIGN COVERS SHALL CONSIST OF A PANEL, PAINTED FLAT BLACK, THE SAME SIZE AS THE SIGN IT COVERS. THE PANEL SHALL BE OF WOOD, PLYWOOD, HARDBOARD OR ANY MATERIAL SATISFACTORY TO THE ENGINEER. NO MATERIAL WILL BE APPROVED THAT WILL DETERIORATE BY EXPOSURE TO THE WEATHER DURING THE PROJECT. MOUNTING OF THE PANEL SHALL BE DONE IN SUCH A WAY AS NOT TO DAMAGE THE SIGN FACE MATERIAL.

5. SIGNS SHALL BE MAINTAINED IN A CLEAN AND LEGIBLE CONDITION SATISFACTORY TO THE ENGINEER. THEY SHALL BE KEPT PLUMB AND LEVEL, AND ALWAYS PRESENT A NEAT APPEARANCE. DAMAGED, DEFACED OR DIRTY SIGNS SHALL BE REPAIRED, CLEANED OR REPLACED AS ORDERED BY THE ENGINEER.

6. NO CROSS-BRACING OR BACK-BRACING TO KEEP POSTS PLUMB WILL BE ALLOWED. CONCRETE FOUNDATIONS, COLLARS OR SOIL BEARING PLATES ARE NOT PERMITTED.

7. CONSTRUCTION SIGNS INSTALLED ON POSTS SHALL BE SET SECURELY IN THE GROUND ON TWO POSTS. THE BOTTOM OF A SIGN SHALL BE AT LEAST FIVE FEET ABOVE THE EDGE OF PAVEMENT AND THE NEAREST EDGE OF A SIGN SHALL BE AT LEAST SIX FEET OUTSIDE THE SHOULDER POINT, FOUR FEET OUTSIDE GUARDRAIL, OR TWO FEET OUTSIDE CURBING OR SIDEWALK. THE INSTALLATION OF SIGNS SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER. IN URBAN AREAS, THE BOTTOM OF THE SIGN SHALL BE AT LEAST SEVEN FEET ABOVE THE SIDEWALK OR EDGE OF PAVEMENT, WHICHEVER IS HIGHER.

8. PORTABLE SIGNS SHALL BE PLACED ON THE EDGE OF ROADWAY AND A MINIMUM OF ONE FOOT ABOVE THE TRAVELED WAY. ALL VEGETATION THAT INTERFERES WITH VISIBILITY OF THE SIGNS SHALL BE REMOVED. WHEN PLACED BEHIND GUARDRAIL, THE BOTTOM OF THE SIGN FACE SHALL BE ABOVE THE TOP OF THE GUARDRAIL.

9. SIGNS SHALL BE REMOVED UPON COMPLETION OF THE WORK AT THE DISCRETION OF THE ENGINEER.

10. ROLL UP CONSTRUCTION SIGNS SHALL HAVE RETROREFLECTIVE SHEETING EQUAL TO OR EXCEEDING THE "AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS" (AASHTO) M 268 ["AMERICAN SOCIETY FOR TESTING AND MATERIALS" (ASTM) D 4956] TYPE VI AND TYPE VII UNLESS OTHERWISE NOTED.

11. SOLID SUBSTRATE CONSTRUCTION SIGNS SHALL HAVE RETROREFLECTIVE SHEETING EQUAL TO OR EXCEEDING THE "AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS" (AASHTO) M 268 ["AMERICAN SOCIETY FOR TESTING AND MATERIALS" (ASTM) D 4956] TYPE VIII OR IX REQUIREMENTS UNLESS OTHERWISE NOTED.

12. WHERE CONSTRUCTION SIGN INSTALLATIONS ARE NOT PROTECTED BY GUARDRAIL OR OTHER APPROVED TRAFFIC BARRIERS, ALL SIGN STANDS AND POST INSTALLATIONS SHALL MEET "NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM" (NCHRP) REPORT 350 OR THE AASHTO "MANUAL FOR ASSESSING SAFETY HARDWARE" (MASH). THE APPROPRIATE RESOURCE SHALL BE DETERMINED AS DESCRIBED IN THE MASH PUBLICATION. NO SIGN POSTS SHALL EXTEND OVER THE TOP OF THE SIGN INSTALLED ON SAID POSTS. WHEN ANCHORS ARE INSTALLED, STUBS SHALL NOT BE GREATER THAN FOUR INCHES ABOVE EXISTING GROUND.

13. ROADWAY AND SHOULDER WIDTHS DEPICTED ON THE STANDARD DRAWINGS MAY VARY.

14. THESE STANDARD DRAWINGS ARE INTENDED TO SERVE AS VTRANS STANDARD OPERATING PROCEDURE. IT IS NOTED THAT COMPONENT PARTS OF A TEMPORARY TRAFFIC CONTROL WORK ZONE MAY BE MODIFIED DUE TO FIELD CONDITIONS AT THE DISCRETION OF THE ENGINEER.

REV.	DATE	DESCRIPTION
0	AUG. 6, 2012	ORIGINAL APPROVAL
1	APR. 25, 2016	INSERTED NOTE 3, UPDATED STANDARD NAME

OTHER STANDARDS REQUIRED: NONE

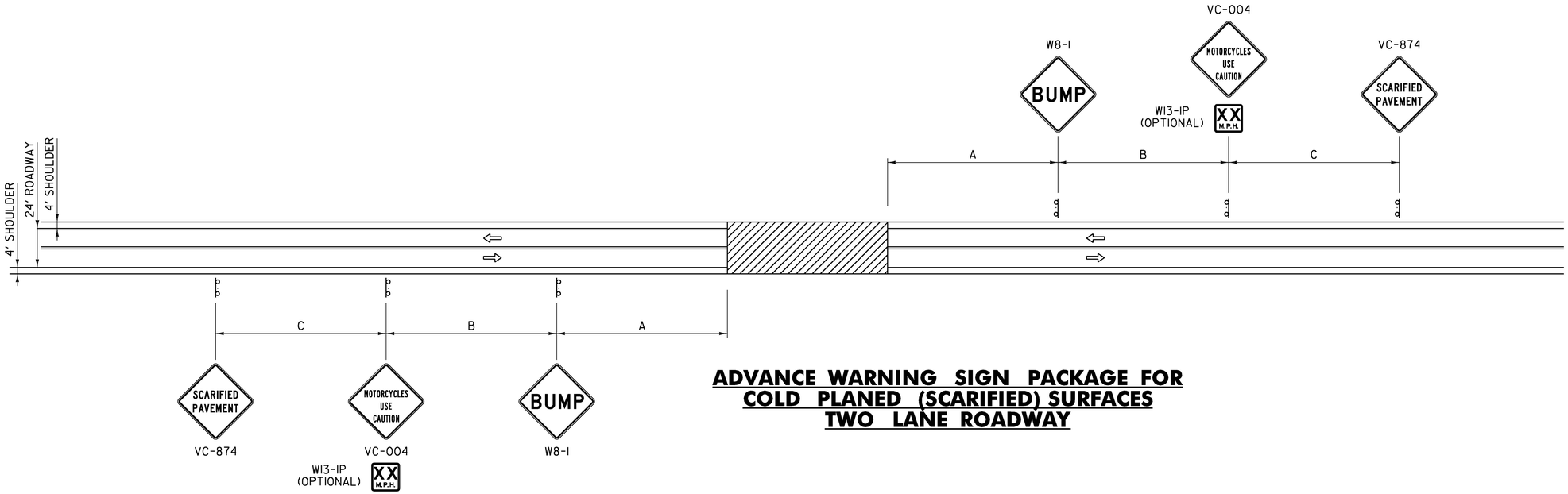
VTRANS AND FHWA APPROVAL ON FILE WITH CONTRACT ADMINISTRATION

TEMPORARY TRAFFIC CONTROL GENERAL NOTES

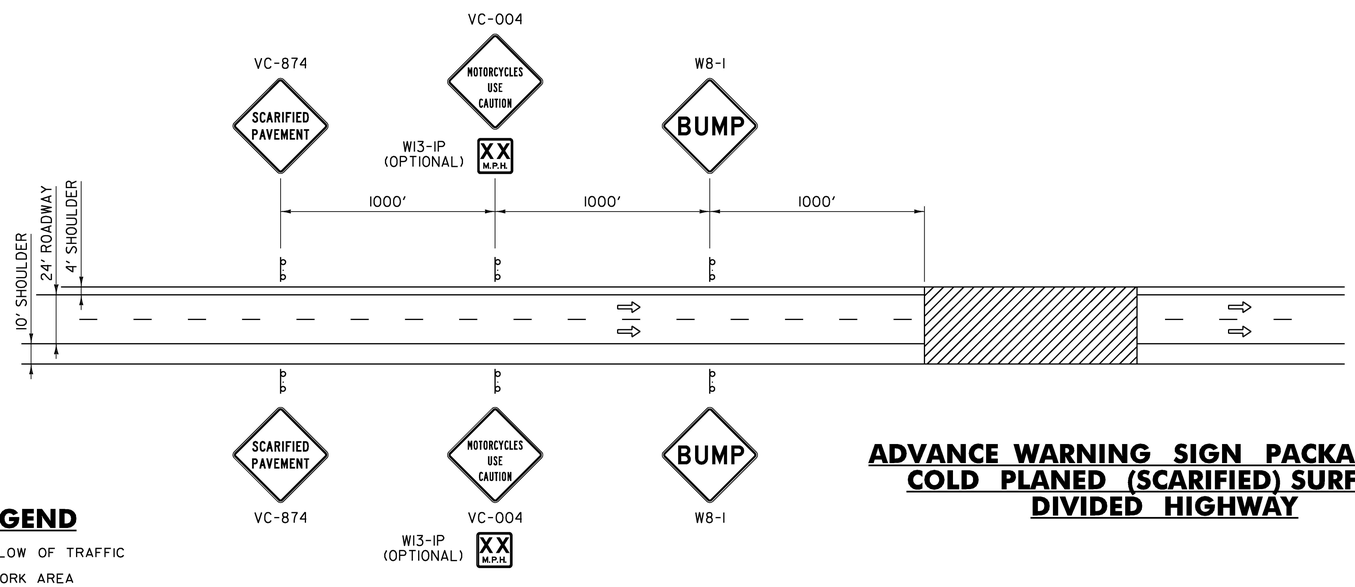
VTrans Working to Get You There VERMONT AGENCY OF TRANSPORTATION

STANDARD

T-1



ADVANCE WARNING SIGN PACKAGE FOR COLD PLANED (SCARIFIED) SURFACES TWO LANE ROADWAY



ADVANCE WARNING SIGN PACKAGE FOR COLD PLANED (SCARIFIED) SURFACES DIVIDED HIGHWAY

LEGEND

⇨ FLOW OF TRAFFIC

▨ WORK AREA

GENERAL NOTES:

1. THE BUMP SIGN MAY BE ELIMINATED WHEN THERE IS NO BUMP. WHEN THE CONTRACTOR IS WORKING IN THE CONSTRUCTION AREA, THE APPROPRIATE ADVANCED WARNING SIGN PACKAGE SHALL BE USED. SEE THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD) FOR ADDITIONAL INFORMATION.
2. GATE POSTING OF SIGNS IS AN OPTION AS DETERMINED BY THE ENGINEER FOR TWO LANE ROADWAY WHEN PASSING, TURNING OR CLIMBING LANES LIMIT VISIBILITY.
3. FOR DIMENSIONS A, B AND C, REFER TO THE MUTCD. USE TABLE 6C-1 (RECOMMENDED ADVANCE WARNING SIGN MINIMUM SPACING), FOR SIGN SPACING.

OTHER STDS. REQUIRED: T-1, T-28

REVISIONS AND CORRECTIONS

AUG. 6, 2012 - ORIGINAL APPROVAL DATE

APPROVED

HIGHWAY SAFETY & DESIGN ENGINEER

DIRECTOR OF PROGRAM DEVELOPMENT

Mark D. Richter

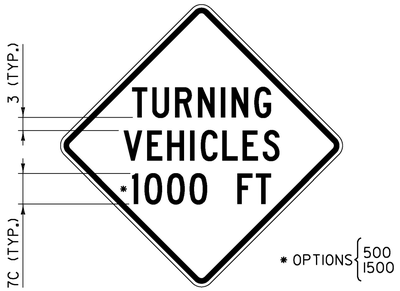
FEDERAL HIGHWAY ADMINISTRATION

TRAFFIC CONTROL MISCELLANEOUS DETAILS

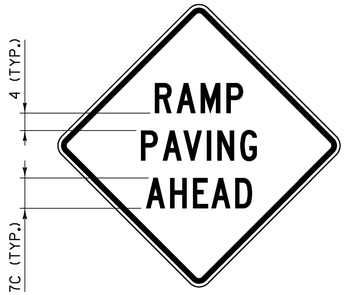
VERMONT AGENCY OF TRANSPORTATION

STANDARD

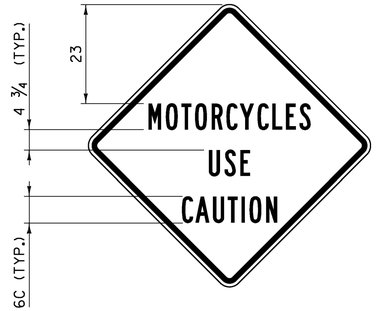
T-17



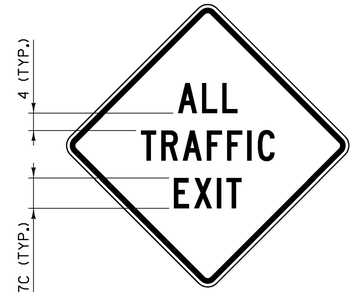
VC-001



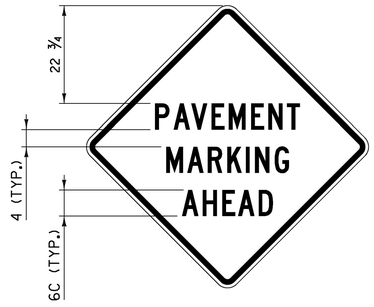
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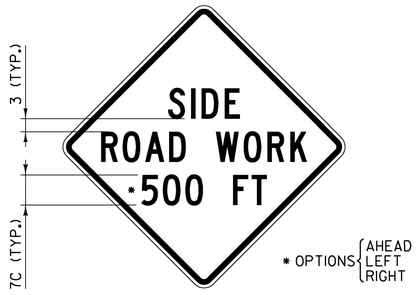
VC-004



VC-008



VC-813



VC-869



VC-874

GENERAL NOTES:

1. COLORS FOR SIGNS SHALL BE BLACK LEGEND AND BORDER ON FLUORESCENT ORANGE BACKGROUND.
2. CONSTRUCTION SIGNS SHALL BE 48 INCH BY 48 INCH. IF SOLID SUBSTRATE SIGNS ARE USED, SIGNS SHALL HAVE CORNERS ROUNDED TO A THREE INCH RADIUS.
3. SIGNS SHALL HAVE 1 1/4 INCH WIDE BORDERS THAT ARE INDENTED 3/4 INCH FROM THE EDGE OF THE SIGN.
4. SIGNS SHALL HAVE THE LEGEND CENTERED HORIZONTALLY AND VERTICALLY ON THE SIGN UNLESS OTHERWISE INDICATED.
5. ALL DIMENSIONS SHOWN IN INCHES.

OTHER STDS. REQUIRED: T-1

REVISIONS AND CORRECTIONS

AUG. 6, 2012 - ORIGINAL APPROVAL DATE

APPROVED

HIGHWAY SAFETY & DESIGN ENGINEER

DIRECTOR OF PROGRAM DEVELOPMENT

Mark D. Richter

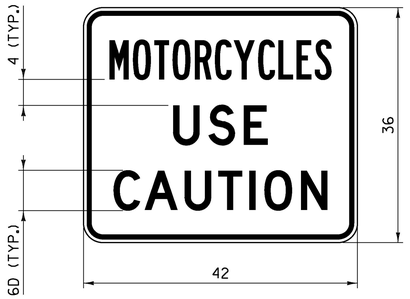
FEDERAL HIGHWAY ADMINISTRATION

CONSTRUCTION SIGN DETAILS

VERMONT AGENCY OF TRANSPORTATION

STANDARD

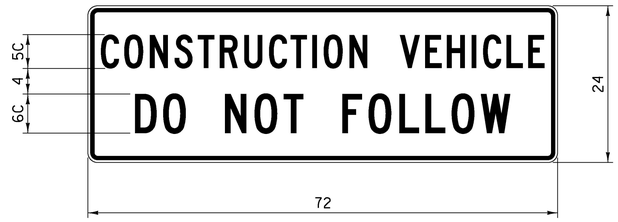
T-28



VC-004P

NOTES:

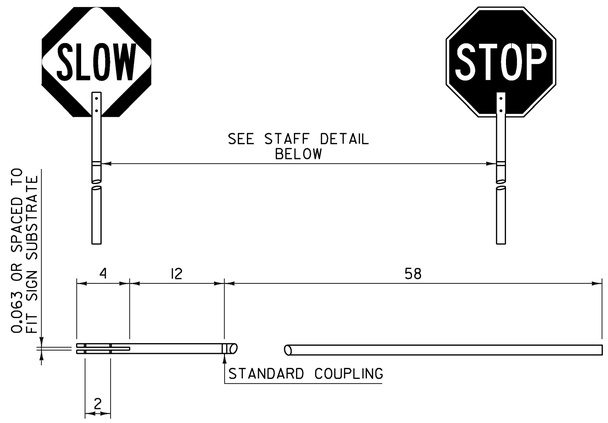
1. CORNERS SHALL BE ROUNDED TO A THREE INCH RADIUS.
2. THE BORDER SHALL BE ¾ INCH WIDE WITH A ½ INCH INDENT FROM THE EDGE OF THE SIGN.
3. "MOTORCYCLES" SHALL HAVE A SPECIFIED WIDTH OF 34 INCHES.
4. "USE" SHALL HAVE A SPECIFIED WIDTH OF 14 ½ INCHES.
5. "CAUTION" SHALL HAVE A SPECIFIED WIDTH OF 32 ¾ INCHES.
6. SIGN SHALL ONLY BE INSTALLED AS A SUPPLEMENTAL TO A PARENT WARNING SIGN AND SHALL NOT BE INSTALLED BY ITSELF.



VC-007

NOTES:

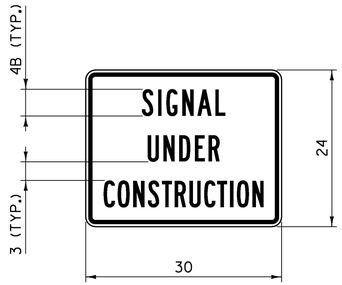
1. CORNERS SHALL BE ROUNDED TO A 1½ INCH RADIUS.
2. THE BORDER SHALL BE ⅝ INCH WIDE WITH A ⅜ INCH INDENT FROM THE EDGE OF THE SIGN.
3. "CONSTRUCTION VEHICLE" SHALL HAVE A SPECIFIED WIDTH OF 68 INCHES.
4. "DO NOT FOLLOW" SHALL HAVE A SPECIFIED WIDTH OF 57 ½ INCHES.
5. SIGN SHALL BE MOUNTED IN A CONSPICUOUS LOCATION ON THE REAR OF THE CONSTRUCTION VEHICLE.
6. THE SIGN SHALL BE MOUNTED AS NOT TO INTERFERE WITH THE VISIBILITY OF DIRECTIONAL SIGNALS OR TAIL LIGHTS AS REQUIRED BY LAW.
7. SIGN SHALL BE COVERED OR REMOVED WHEN NOT IN USE.



STOP-SLOW PADDLE & STAFF DETAIL

NOTES:

1. REFER TO THE "STANDARD HIGHWAY SIGNS AND MARKINGS" BOOK (SHSM) "TEMPORARY TRAFFIC CONTROL - WARNING SIGNS" FOR THE STOP-SLOW PADDLE DESIGN.
2. COLORS FOR THE SLOW SIDE OF THE PADDLE SHALL BE BLACK LEGEND AND BORDER ON A FLUORESCENT ORANGE DIAMOND WITH RETROREFLECTIVE SHEETING EQUAL TO OR EXCEEDING AASHTO M 268 [ASTM D 4956] TYPE VII, VIII OR IX REQUIREMENTS.
3. COLORS FOR THE STOP SIDE OF THE PADDLE SHALL BE WHITE RETROREFLECTIVE LEGEND AND BORDER ON A RED RETROREFLECTIVE OCTAGON. BOTH COLORS SHALL HAVE RETROREFLECTIVE SHEETING EQUAL TO OR EXCEEDING AASHTO M 268 [ASTM D 4956] TYPE III.
4. SIGN SUBSTRATE MATERIALS SHALL BE ALUMINUM, ACRYLONITRILE BUTADIENE STYRENE (ABS) PLASTIC OR EQUIVALENT.
5. THE STAFF MAY BE RIGID ABS PLASTIC OR WOOD WITH A ONE TO 1½ INCH DIAMETER.
6. SIGNS SHALL BE MAINTAINED IN A CLEAN AND LEGIBLE CONDITION SATISFACTORY TO THE ENGINEER. THEY SHALL BE COMPLETELY VISIBLE TO APPROACHING TRAFFIC AT ALL TIMES. THEY SHALL BE KEPT PLUMB AND LEVEL, AND ALWAYS PRESENT A NEAT APPEARANCE. DAMAGED, DEFACED OR DIRTY SIGNS SHALL BE REPAIRED, CLEANED OR REPLACED AS ORDERED BY THE ENGINEER.



VC-820

NOTES:

1. CORNERS SHALL BE ROUNDED TO A 1½ INCH RADIUS.
2. THE BORDER SHALL BE ⅝ INCH WIDE WITH A ⅜ INCH INDENT FROM THE EDGE OF THE SIGN.
3. "SIGNAL" SHALL HAVE A SPECIFIED WIDTH OF 12 ¾ INCHES.
4. "UNDER" SHALL HAVE A SPECIFIED WIDTH OF 11 INCHES.
5. "CONSTRUCTION" SHALL HAVE A SPECIFIED WIDTH OF 24 ½ INCHES.
6. SIGN SHALL ONLY BE INSTALLED AS A SUPPLEMENTAL TO A PARENT WARNING SIGN AND SHALL NOT BE INSTALLED BY ITSELF.

GENERAL NOTES:

1. ALL LEGEND SHALL BE CENTERED VERTICALLY AND HORIZONTALLY UNLESS OTHERWISE NOTED.
2. COLORS FOR SIGNS SHALL BE BLACK LEGEND AND BORDER ON FLUORESCENT ORANGE BACKGROUND UNLESS OTHERWISE NOTED.
3. ALL DIMENSIONS IN INCHES.

OTHER STDS. REQUIRED: T-1

REVISIONS AND CORRECTIONS

AUG. 6, 2012 - ORIGINAL APPROVAL DATE

APPROVED

HIGHWAY SAFETY & DESIGN ENGINEER

DIRECTOR OF PROGRAM DEVELOPMENT

Mark D. Richter

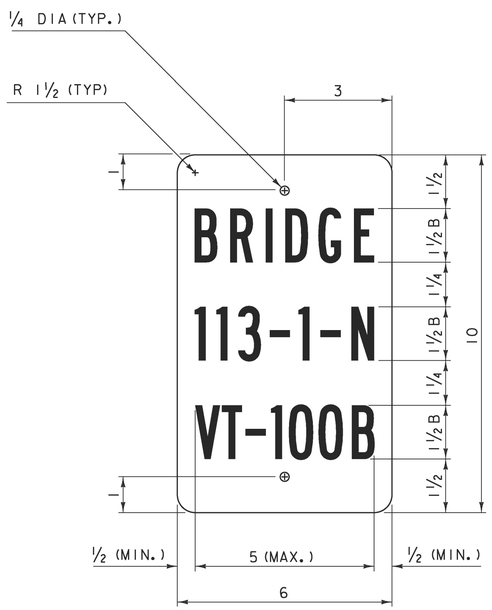
FEDERAL HIGHWAY ADMINISTRATION

CONSTRUCTION SIGN DETAILS

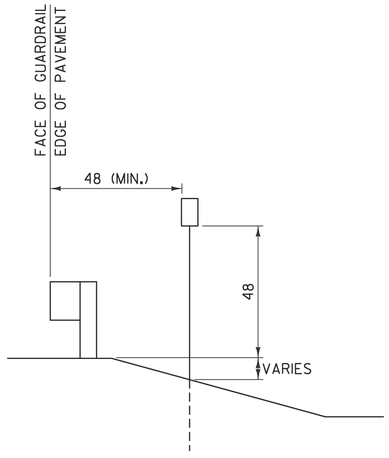
VERMONT AGENCY OF TRANSPORTATION

STANDARD

T-30



VD-701



VD-701 INSTALLATION DETAIL

GENERAL NOTES:

1. BRIDGE NUMBER PLAQUES ARE TO BE INSTALLED ALONG THE FEDERAL AID HIGHWAY SYSTEM INCLUDING ALL STATE HIGHWAYS AND TOWN HIGHWAYS ON THE FEDERAL AID HIGHWAY SYSTEM.
2. BRIDGE NUMBER PLAQUES SHALL BE LOCATED ON BOTH BRIDGE APPROACHES AT THE NEAREST VISIBLE LOCATION.
3. THE SIGN BASE MATERIAL SHALL BE 0.063 INCH FLAT SHEET ALUMINUM.
4. THE SIGN SHALL BE WHITE RETROREFLECTIVE LEGEND ON A GREEN RETROREFLECTIVE BACKGROUND, BOTH SHALL HAVE RETROREFLECTIVE SHEETING EQUAL TO OR EXCEEDING "AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS" (AASHTO) M 268 ["AMERICAN SOCIETY FOR TESTING AND MATERIALS" (ASTM) D 4956] TYPE III.
5. THE SECOND LINE OF TEXT INDICATES THE BRIDGE NUMBER. THE BRIDGE NUMBER CAN BE OBTAINED USING THE VERMONT AGENCY OF TRANSPORTATION (VAOT) ROUTE LOGS OR BY CONSULTING WITH THE VAOT STRUCTURES SECTION.
6. THE THIRD LINE OF TEXT INDICATES THE STATE ROUTE NUMBER. IN ALL CASES THIS WILL BE DEPICTED USING THE LETTER ABBREVIATION, FOLLOWED BY A HYPHEN, FOLLOWED BY THE ROUTE NUMBER. FOR EXAMPLE US ROUTE 2 WOULD BE IDENTIFIED USING US-2.
7. THE SECOND AND THIRD LINES OF TEXT SHALL BE CENTERED HORIZONTALLY AND SHALL BE AS DEFINED IN THE PLANS.
8. A SINGLE 14 GAGE, 1.75 INCH SQUARE STEEL POST AND 12 GAGE, TWO INCH SQUARE ANCHOR SHALL BE USED FOR INSTALLATION. THE ANCHOR SHALL BE A MINIMUM OF 30 INCHES IN LENGTH.
9. ALL DIMENSIONS SHOWN IN INCHES.

OTHER STDS. REQUIRED: **T-45**

REVISIONS AND CORRECTIONS

APRIL 9, 2014 - ORIGINAL APPROVAL DATE

APPROVED

HIGHWAY SAFETY & DESIGN ENGINEER

DIRECTOR OF PROGRAM DEVELOPMENT

Mark D. Richter

FEDERAL HIGHWAY ADMINISTRATION

BRIDGE NUMBER PLAQUE

VERMONT AGENCY OF TRANSPORTATION

STANDARD

T-42

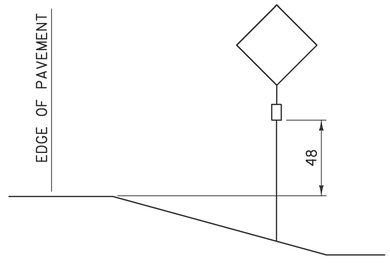
1 - ADDISON	2 - BENNINGTON	3 - CALEDONIA	4 - CHITTENDEN	5 - ESSEX	6 - FRANKLIN	7 - GRAND ISLE	8 - LAMOILLE
0101 ADDISON	0201 ARLINGTON	0301 BARNET	0401 BOLTON	0501 AVERILL	0601 BAKERSFIELD	0701 ALBURGH	0801 BELVIDERE
0102 BRIDPORT	0202 BENNINGTON	0302 BURKE	0402 BUELS GORE	0502 AVERYS GORE	0602 BERKSHIRE	0702 GRAND ISLE	0802 CAMBRIDGE
0103 BRISTOL	0203 DORSET	0303 DANVILLE	0403 BURLINGTON	0503 BLOOMFIELD	0603 ENOSBURG	0703 ISLE LA MOTTE	0803 EDEN
0104 CORNWALL	0204 GLASTENBURY	0304 GROTON	0404 CHARLOTTE	0504 BRIGHTON	0604 FAIRFAX	0704 NORTH HERO	0804 ELMORE
0105 FERRISBURGH	0205 LANDGROVE	0305 HARDWICK	0405 COLCHESTER	0505 BRUNSWICK	0605 FAIRFIELD	0705 SOUTH HERO	0805 HYDE PARK
0106 GOSHEN	0206 MANCHESTER	0306 KIRBY	0406 ESSEX	0506 CANAAN	0606 FLETCHER		0806 JOHNSON
0107 GRANVILLE	0207 PERU	0307 LYNDON	0407 HINESBURG	0507 CONCORD	0607 FRANKLIN		0807 MORRISTOWN
0108 HANCOCK	0208 POWNAL	0308 NEWARK	0408 HUNTINGTON	0508 EAST HAVEN	0608 GEORGIA		0808 STOWE
0109 LEICESTER	0209 READSBORO	0309 PEACHAM	0409 JERICHO	0509 FERDINAND	0609 HIGHGATE		0809 WATERVILLE
0110 LINCOLN	0210 RUPERT	0310 RYEGATE	0410 MILTON	0510 GRANBY	0610 MONTGOMERY		0810 WOLCOTT
0111 MIDDLEBURY	0211 SANDGATE	0311 ST JOHNSBURY	0411 RICHMOND	0511 GUILDHALL	0611 RICHFORD		
0112 MONKTON	0212 SEARSBURG	0312 SHEFFIELD	0412 ST GEORGE	0512 LEMINGTON	0612 ST ALBANS CITY		
0113 NEW HAVEN	0213 SHAFTSBURY	0313 STANNARD	0413 SHELBURNE	0513 LEWIS	0613 ST ALBANS TOWN		
0114 ORWELL	0214 STAMFORD	0314 SUTTON	0414 SO BURLINGTON	0514 LUNENBURG	0614 SHELDON		
0115 PANTON	0215 SUNDERLAND	0315 WALDEN	0415 UNDERHILL	0515 MAIDSTONE	0615 SWANTON		
0116 RIPTON	0216 WINHALL	0316 WATERFORD	0416 WESTFORD	0516 NORTON			
0117 SALISBURY	0217 WOODFORD	0317 WHEELOCK	0417 WILLISTON	0517 VICTORY			
0118 SHOREHAM			0418 WINOOSKI	0518 WARNERS GRANT			
0119 STARKSBORO				0519 WARREN GORE			
0120 VERGENNES							
0121 WALTHAM							
0122 WEYBRIDGE							
0123 WHITING							

9 - ORANGE	10 - ORLEANS	11 - RUTLAND	12 - WASHINGTON	13 - WINDHAM	14 - WINDSOR
0901 BRADFORD	1001 ALBANY	1101 BENSON	1201 BARRE CITY	1301 ATHENS	1401 ANDOVER
0902 BRAINTREE	1002 BARTON	1102 BRANDON	1202 BARRE TOWN	1302 BRATTLEBORO	1402 BALTIMORE
0903 BROOKFIELD	1003 BROWNINGTON	1103 CASTLETON	1203 BERLIN	1303 BROOKLINE	1403 BARNARD
0904 CHELSEA	1004 CHARLESTON	1104 CHITTENDEN	1204 CABOT	1304 DOVER	1404 BETHEL
0905 CORINTH	1005 COVENTRY	1105 CLARENDON	1205 CALAIS	1305 DUMMERSTON	1405 BRIDGEWATER
0906 FAIRLEE	1006 CRAFTSBURY	1106 DANBY	1206 DUXBURY	1306 GRAFTON	1406 CAVENDISH
0907 NEWBURY	1007 DERBY	1107 FAIR HAVEN	1207 E MONTPELIER	1307 GUILFORD	1407 CHESTER
0908 ORANGE	1008 GLOVER	1108 HUBBARDTON	1208 FAYSTON	1308 HALIFAX	1408 HARTFORD
0909 RANDOLPH	1009 GREENSBORO	1109 IRA	1209 MARSHFIELD	1309 JAMAICA	1409 HARTLAND
0910 STRAFFORD	1010 HOLLAND	1110 MENDON	1210 MIDDLESEX	1310 LONDONDERRY	1410 LUDLOW
0911 THETFORD	1011 IRASBURG	1111 MIDDLETOWN SPRINGS	1211 MONTPELIER	1311 MARLBORO	1411 NORWICH
0912 TOPSHAM	1012 JAY	1112 MT HOLLY	1212 MORETOWN	1312 NEWFANE	1412 PLYMOUTH
0913 TUNBRIDGE	1013 LOWELL	1113 MT TABOR	1213 NORTHFIELD	1313 PUTNEY	1413 POMFRET
0914 VERSHIRE	1014 MORGAN	1114 PAWLET	1214 PLAINFIELD	1314 ROCKINGHAM	1414 READING
0915 WASHINGTON	1015 NEWPORT CITY	1115 PITTSFIELD	1215 ROXBURY	1315 SOMERSET	1415 ROCHESTER
0916 WEST FAIRLEE	1016 NEWPORT TOWN	1116 PITTSFORD	1216 WAITSFIELD	1316 STRATTON	1416 ROYALTON
0917 WILLIAMSTOWN	1017 TROY	1117 POULTNEY	1217 WARREN	1317 TOWNSHEND	1417 SHARON
	1018 WESTFIELD	1118 PROCTOR	1218 WATERBURY	1318 VERNON	1418 SPRINGFIELD
	1019 WESTMORE	1119 RUTLAND CITY	1219 WOODBURY	1319 WARDSBORO	1419 STOCKBRIDGE
		1120 RUTLAND TOWN	1220 WORCESTER	1320 WESTMINSTER	1420 WEATHERSFIELD
		1121 KILLINGTON		1321 WHITINGHAM	1421 WESTON
		1122 SHREWSBURY		1322 WILMINGTON	1422 WEST WINDSOR
		1123 SUDBURY		1323 WINDHAM	1423 WINDSOR
		1124 TINMOUTH			1424 WOODSTOCK
		1125 WALLINGFORD			
		1126 WELLS			
		1127 WEST HAVEN			
		1128 WEST RUTLAND			

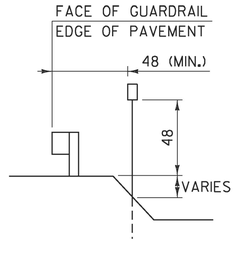
COUNTY AND TOWN DESIGNATIONS

9020 BARNET STATE HIGHWAY
9025 BENNINGTON NORTH STATE HIGHWAY
9030 BERLIN STATE HIGHWAY
9090 BRATTLEBORO STATE HIGHWAY
9150 CASTLETON STATE HIGHWAY
9180 COVENTRY STATE HIGHWAY
9210 FAIR HAVEN STATE HIGHWAY
9240 FAIRLEE STATE HIGHWAY
9270 FERRISBURGH STATE HIGHWAY
9330 MAIDSTONE STATE HIGHWAY
9360 MIDDLESEX STATE HIGHWAY
9390 MONTPELIER STATE HIGHWAY
9420 MONTPELIER JUNCTION STATE HIGHWAY
9430 NEWBURY STATE HIGHWAY
9480 NORTON STATE HIGHWAY
9540 NORWICH STATE HIGHWAY
9600 PUTNEY STATE HIGHWAY
9630 QUECHEE STATE HIGHWAY
9720 ST ALBANS STATE HIGHWAY SOUTH
9730 ST JOHNSBURY STATE HIGHWAY
9750 SOUTH ALBURGH STATE HIGHWAY
9840 WESTMINSTER STATE HIGHWAY
9870 WILDER STATE HIGHWAY
9900 WINHALL STATE HIGHWAY
9990 WEST RUTLAND - RUTLAND (BUSINESS US-4)
9991 BELLOWS FALLS SOI17 (ROCK - WEST ST)
9992 BELLOWS FALLS SOI17 (BRIDGE ST)
9993 BURLINGTON (ALTERNATE US-7)
9994 DERBY (ALTERNATE US-5)
9995 MONTPELIER (BUSINESS US-2)
9996 NEWPORT (ALTERNATE US-5)
9997 ST JOHNSBURY (ALTERNATE US-5)
9998 SO BURLINGTON - KENNEDY DRIVE

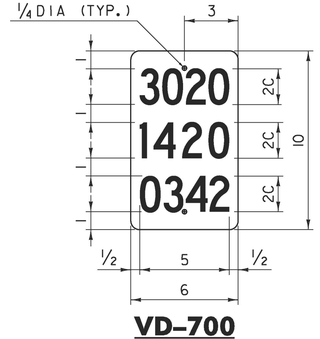
NAMED STATE AND TOWN HIGHWAYS ROUTE NUMBERS



VD-700 INSTALLATION DETAIL SUPPLEMENTARY SIGN



VD-700 INSTALLATION DETAIL



VD-700

GENERAL NOTES:

1. MILEMARKERS ARE TO BE INSTALLED ALONG THE FEDERAL AID HIGHWAY SYSTEM INCLUDING ALL STATE HIGHWAYS AND TOWN HIGHWAYS ON THE FEDERAL AID HIGHWAY SYSTEM.
2. MILEMARKERS WILL NORMALLY BE INSTALLED AT EACH 0.20 MILE INTERVAL, ALTERNATING SIDES OF THE ROAD, RESULTING IN A SIGN FACING TRAFFIC EACH 0.40 MILES. A MILEMARKER WILL ALSO BE INSTALLED AT EACH INTERSECTION, ON THE SAME POST AS THE STOP SIGN (MILEMARKER TO BE PLACED PARALLEL TO MAINLINE TRAVELED WAY, VISIBLE TO TRAFFIC). ANY MILEMARKER LOCATION FALLING WITHIN 0.05 MILE OF AN INTERSECTION WILL BE OMITTED. WHEN THE NORMAL LOCATION OF A MILEMARKER IS UNDESIRABLE, SUCH AS ON A LAWN, DRIVEWAY, OR LEDGE, AN ATTEMPT WILL BE MADE TO LOCATE IT ON THE OPPOSITE SIDE OF THE ROAD. IF NO SUITABLE LOCATION CAN BE FOUND WITHIN 20 FEET OF THE NORMAL LOCATION, IT MAY BE OMITTED.
3. ON CLASS 1 TOWN HIGHWAYS OR OTHER CONGESTED LOCATIONS MILEMARKERS WILL ONLY BE INSTALLED ON EXISTING SIGN POSTS AND WILL CARRY THE ACTUAL MILEAGE TO THAT LOCATION. A MILEMARKER LOCATED EVERY 0.10 MILES IS DESIRABLE THROUGH THESE LOCATIONS.
4. THE FIRST LINE OF TEXT ON MILEMARKERS INDICATE THE STATE ROUTE NUMBER. THE FOURTH NUMERAL BEING THE CORRESPONDING ROUTE NUMBER LETTER DESIGNATION. FOR EXAMPLE US-2 (WHICH HAS NO LETTER DESIGNATION) WOULD BE IDENTIFIED USING 0020 AND VT-100B WOULD BE IDENTIFIED USING 1002. FOR ANY NAMED FEDERAL AID HIGHWAY SYSTEM HIGHWAYS, THE FOUR DIGIT ROUTE NUMBER (9000 SERIES) LISTED UNDER "NAMED STATE AND TOWN HIGHWAYS ROUTE NUMBERS" SHALL BE UTILIZED.
5. THE SECOND LINE OF TEXT ON MILEMARKERS INDICATE THE COUNTY AND TOWN. THE COUNTY IS INDICATED IN THE FIRST AND SECOND NUMERALS AND THE TOWN IN THE THIRD AND FOURTH NUMERALS. THE APPROPRIATE FOUR DIGIT DESIGNATIONS ARE LISTED PER TOWN, UNDER "COUNTY AND TOWN DESIGNATIONS."
6. THE THIRD LINE OF TEXT ON MILEMARKERS INDICATE THE MILEAGE, IN HUNDREDTHS, FROM THE TOWN LINE OR BEGINNING OF A ROUTE. MILEAGE IS ALWAYS MEASURED TRAVELING FROM THE SOUTH TO NORTH OR FROM THE WEST TO EAST. THE ROUTE DIRECTION IS ESTABLISHED USING THE VERMONT AGENCY OF TRANSPORTATION (VAOT) ROUTE LOGS.
7. THE SIGN BASE MATERIAL SHALL BE 0.063 INCH FLAT SHEET ALUMINUM.
8. THE SIGN SHALL BE WHITE RETROREFLECTIVE LEGEND ON A GREEN RETROREFLECTIVE BACKGROUND, BOTH SHALL HAVE RETROREFLECTIVE SHEETING EQUAL TO OR EXCEEDING "AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS" (AASHTO) M 268 ["AMERICAN SOCIETY FOR TESTING AND MATERIALS" (ASTM) D 4956] TYPE III.
9. CORNERS SHALL BE ROUNDED TO A 1/2 INCH RADIUS.
10. ALL LINES OF TEXT SHALL BE CENTERED HORIZONTALLY AND SHALL BE AS IDENTIFIED IN THE PLANS. THE THREE LINES OF TEXT WILL EACH CONTAIN FOUR NUMERALS.
11. WHEN INSTALLED ON ITS OWN POST, A SINGLE 14 GAGE, 1.75 INCH SQUARE STEEL POST AND 12 GAGE, 2 INCH SQUARE ANCHOR SHALL BE USED FOR INSTALLATION. THE ANCHOR SHALL BE A MINIMUM OF 30 INCHES IN LENGTH.
12. ALL DIMENSIONS SHOWN IN INCHES.

OTHER STDS. REQUIRED: T-45

REVISIONS AND CORRECTIONS

APRIL 9, 2014 - ORIGINAL APPROVAL DATE

APPROVED

HIGHWAY SAFETY & DESIGN ENGINEER

DIRECTOR OF PROGRAM DEVELOPMENT

Mark D. Richter

FEDERAL HIGHWAY ADMINISTRATION

MILEMARKER DETAILS STATE AND TOWN HIGHWAYS

VERMONT AGENCY OF TRANSPORTATION

STANDARD T-44

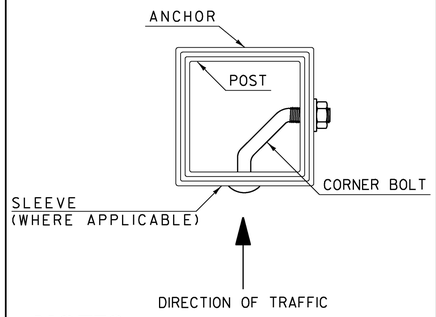
POST AND ANCHOR SELECTION CHART

POST SIZE (IN.)	POST THICKNESS (IN.)	POST WEIGHT (LBS/FT.)	POST GAGE	SECTION MODULUS (IN.³)	ONE POST SV	TWO POST SV	THREE POST SV	POSTS PERMITTED IN 8' PATH	ANCHOR SIZE (IN.)	ANCHOR GAGE	MINIMUM ANCHOR LENGTH
1.75	.083	1.88	14	0.222	45	90	135	TWO	2.00	12	30
2.00	.109	2.42	12	0.393	80	160	240	TWO	2.25	12	48
2.50	.109	3.35	12	0.673	137	274	411	ONE	3.00	7	48

NOTES:

1. ALL SIGN POSTS SHALL HAVE 7/16 INCH HOLES EVERY ONE INCH ON CENTER (ALL FOUR SIDES).
2. THE NUMBER OF SIGN POSTS PERMITTED WITHIN AN EIGHT FOOT PATH ASSUMES THAT THE SIGN ASSEMBLY IS NOT PROTECTED BY GUARDRAIL OR IS LOCATED WITHIN A GUARDRAIL'S DEFLECTION DISTANCE DETERMINED PER THE CURRENT "AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS" (AASHTO) ROADSIDE DESIGN GUIDE. ADDITIONAL POSTS MAY BE INSTALLED USING SLIP BASES THAT MEET "NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM" (NCHRP) REPORT 350 OR THE AASHTO "MANUAL FOR ASSESSING SAFETY HARDWARE" (MASH). THE APPROPRIATE RESOURCE SHALL BE DETERMINED AS DESCRIBED IN THE MASH PUBLICATION.
3. TO USE THE SELECTION VALUE (SV) COLUMNS IN THE TABLE ABOVE, MULTIPLY A SIGN'S SURFACE AREA IN SQUARE FEET (H x L) BY THE SIGN'S HEIGHT IN FEET MEASURED FROM THE GROUND TO THE CENTROID OF THE SIGN ASSEMBLY (h). THIS RESULT MUST BE LESS THAN OR EQUAL TO THE CORRESPONDING SELECTION VALUE. NOTE THAT FOR SIGNS WITH MULTIPLE POSTS, THE LARGEST HEIGHT DIMENSION SHALL BE USED TO CALCULATE THE POST SELECTION VALUE.
4. THE DESIGN CRITERIA UTILIZED IN SIGN POST AND ANCHOR SELECTION IS AS FOLLOWS: WIND SPEED OF 70 MPH (10 YEAR MEAN RECURRENCE INTERVAL), WIND PRESSURE OF 19 PSF, STEEL MINIMUM YIELD OF 55,000 PSI, AND AN ALLOWABLE STRESS OF 1.4 (0.60 FY).

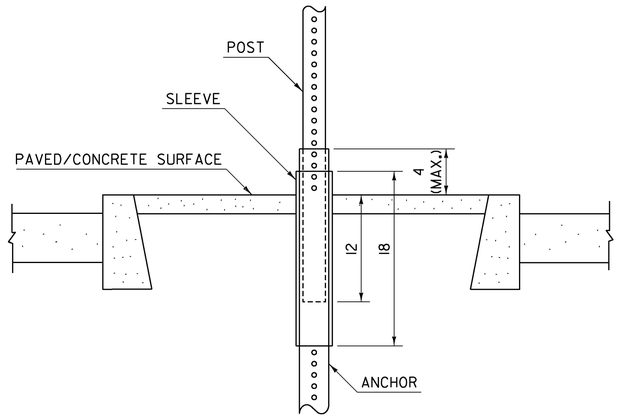
CORNER BOLT INSTALLATION DETAIL



NOTES:

1. CORNER BOLTS SHALL BE 5/16 INCH DIAMETER WITH 18 THREADS PER INCH AND DIMENSIONS SHALL BE DETERMINED BASED ON THE OUTERMOST DIMENSION OF THE SLEEVE, ANCHOR OR POST. THREAD EXPOSURE MUST EXCEED THE CORRESPONDING NUT WIDTH. THE CORNER BOLT AND CORRESPONDING HARDWARE SHALL BE ZINC PLATED, MEETING OR EXCEEDING THE REQUIREMENTS OF THE "AMERICAN SOCIETY FOR TESTING AND MATERIALS" (ASTM) A307.

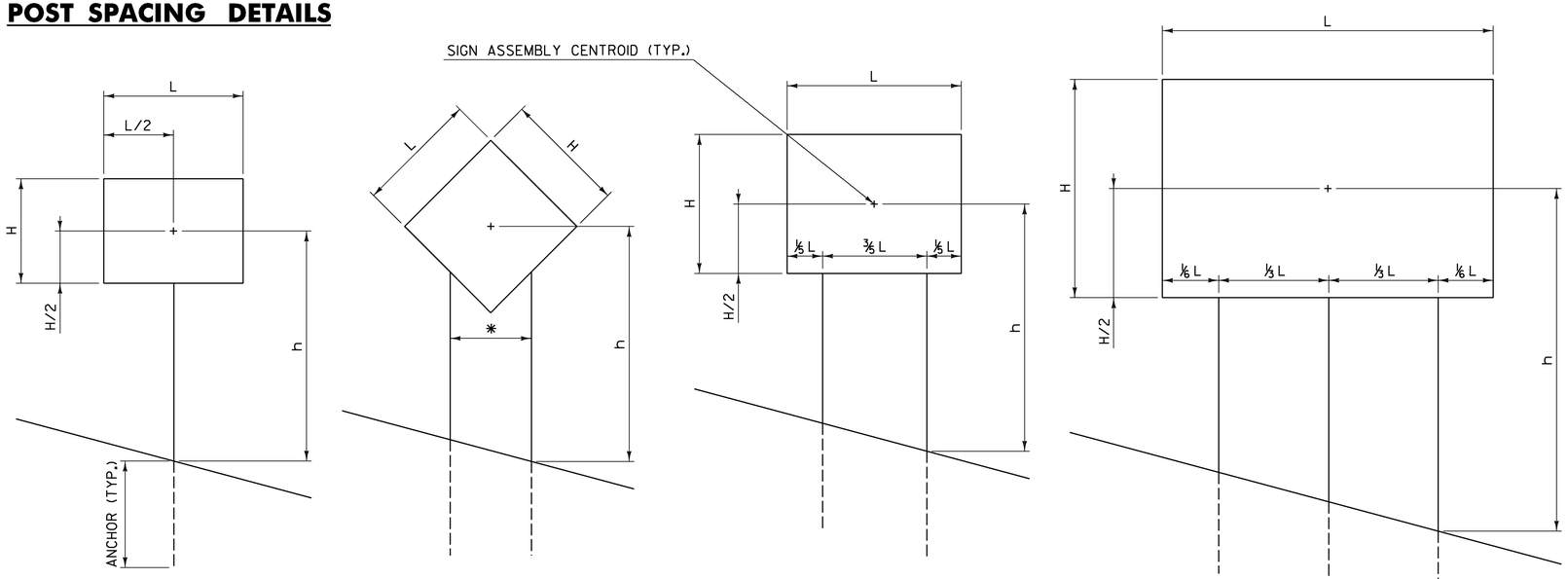
SLEEVE /ANCHOR INSTALLATION DETAIL



NOTES:

1. A SLEEVE SHALL BE INSTALLED FOR SIGN INSTALLATIONS IN CONCRETE OR PAVEMENT.
2. THE SLEEVE SHALL BE 18 INCHES MINIMUM IN LENGTH.
3. THREE INCH SLEEVES THAT DO NOT HAVE HOLES WILL REQUIRE THAT 7/16 INCH HOLES ARE DRILLED TO FACILITATE CONNECTIONS.
4. REFER TO CURRENT EDITION OF THE "VERMONT AGENCY OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION" FOR MATERIAL REQUIREMENTS.

POST SPACING DETAILS



* POST SPACING FOR DIAMOND SHAPED SIGNS SHALL BE AS FOLLOWS: 30" SIGN - 15"~20" SPACING, 36" SIGN - 18"~24" SPACING, 48" SIGN - 24"~32" SPACING.

GENERAL NOTES:

1. ALL SQUARE TUBE STEEL POSTS AND ANCHORS SHALL BE FORMED INTO A SIZE AND SHAPE IN SUCH A MANNER THAT NEITHER FLASH NOR WELD SHALL INTERFERE WITH THE TELESCOPING PROPERTIES, NOR DAMAGE THE GALVANIZING.
2. ANCHORS MAY BE DRIVEN OR SET INTO A DUG HOLE AND BACKFILLED. IF DRIVEN, A DRIVING CAP SHALL BE USED. THE DUG HOLE INSTALLATION METHOD SHALL BE UTILIZED IN AREAS WITH POOR SOIL CONDITIONS OR AS DIRECTED BY THE ENGINEER. BACKFILL SHALL BE COMPACTED AS DIRECTED BY THE ENGINEER.
3. THE TOPS OF SIGN POSTS SHALL BE AT OR NEAR THE TOP OF SIGN. THE POST SHALL NOT EXTEND ABOVE THE TOP OF SIGN.
4. SIGN POSTS SHALL BE INSTALLED A MINIMUM OF ONE FOOT BELOW GROUND, INSIDE THE ANCHOR. THE LENGTH OF ANCHOR EXPOSED ABOVE GROUND SHALL NOT EXCEED FOUR INCHES.
5. ALL DIMENSIONS SHOWN IN INCHES.

OTHER STDS. REQUIRED: **NONE**

REVISIONS AND CORRECTIONS

JAN. 2, 2013 - ORIGINAL APPROVAL DATE

APPROVED

HIGHWAY SAFETY & DESIGN ENGINEER

DIRECTOR OF PROGRAM DEVELOPMENT

Mark B. Richter

FEDERAL HIGHWAY ADMINISTRATION

SQUARE TUBE SIGN POST AND ANCHOR

VERMONT AGENCY OF TRANSPORTATION

STANDARD

T-45

GENERAL NOTES:

1. MARKINGS:
   - 16' x 8'
   - ASTM C1577
   - 3' COVER
   - DATE
   - CAMP PRECAST
   - LABEL "TOP"
   - PIECE NUMBER
2. ALL CULVERT SECTIONS TO BE SHIPPED LAYING DOWN, AND ROTATED IN THE FIELD (BY OTHERS).
3. ALL PRODUCTS TO BE SHIPPED AND ERECTED UTILIZING CHAINS OR STRAPS ATTACHED TO EMBEDDED ANCHORS.
4. THE CONTRACTOR/ERECTOR IS RESPONSIBLE WITH PROVIDING THE PROPER EQUIPMENT, CABLES, AND PULLEYS TO SAFELY AND PROPERLY HANDLE THE PRECAST PRODUCTS.
5. ASSURE LIFTERS ENGAGE EQUALLY, MIN. 60° SLING ANGLE.
6. REINFORCEMENT – BAR PER ASTM A775 GRADE 60. (EPOXY) COATED CONFORMING TO ASTM A934 . REPAIR DAMAGED EPOXY COATING WITH EPOXY COATING ACCORDING TO ASTM D3963. USE EPOXY COATED STEEL WIRE TIES TO FASTEN EPOXY COATED REINFORCING.
7. PROVIDE ADDITIONAL REINFORCING FOR INTERRUPTED WIRES EQUAL TO THE WIRES INTERRUPTED, HALF EACH SIDE. ADDITIONAL BARS TO BE IN THE SAME PLANE.
8. STRUCTURE SUITABILITY TO SITE CONDITIONS INCLUDING HYDRAULIC CAPACITY, EFFECT OF SCOUR, FROST & SETTLEMENT, AND INSTALLATION PLAN IS THE RESPONSIBILITY OF OTHERS.
9. WATER REPELLENT, SILANE SHALL BE APPLIED TO ALL EXPOSED EXTERIOR SURFACES OF THE PRECAST CONCRETE STRUCTURE.
10. EACH SECTION SHALL BE DRAWN TOGETHER WITH DRAW CONNECTORS AS SHOWN IN DRAWINGS. FILL ALL RECESSES & LIFTING VOIDS WITH 5,000 PSI (28 DAY) NON SHRINK GROUT MEETING REQUIREMENTS OF ITEM 707.03 MORTAR, TYPE IV IN THE LATEST EDITION OF THE VTRANS APPROVED PRODUCT LIST.
11. DESIGN BASED ON PLANS FOR PROJECT # BF 0225(5) DATED DECEMBER 27, 2017.

CULVERT DESIGN NOTES

1. DESIGN PER AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS 7TH EDITION WITH THE LATEST INTERIM REVISIONS.
2. EARTH COVER = 3'.
3. BAR COVER = 2" min
4. f'c @ 28 DAYS = 5,000 PSI, MIN. LIFTING STRENGTH 3,500 PSI
5. AIR ENTRAINED 7% ± 2%
6. REINFORCEMENT = ASTM A-775 GRADE 60, EPOXY COATED.

WINGWALL AND HEADWALL NOTES

1. DESIGN PER AASHTO LRFD 7th ED.
2. NO LIVE LOAD SURCHARGE
3. SOIL PARAMETERS: β'=4.77°, ϕ=32°, μ=0.50, γ=125 PCF.
4. 5,400 PSF BEARING RESISTANCE.
5. f'c @ 28 DAYS = 5,000 PSI.
6. REINFORCEMENT = BAR PER ASTM A615 GRADE 60. (EPOXY COATED)
7. BAR COVER = 2"min

Vermont Agency of Transportation

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2018.477.003_1630_0225_A___FT_RUN_5-17-18 (1)_wrlove.pdf

CK'D BY Danny Landry OK'D BY Danny Landry

May 31, 1018

RESUBMIT No Approved

BY Danny Landry DATE 06/14/2018

MANUFACTURED BY:

CAMP PRECAST
CONCRETE PRODUCTS
78 PRECAST RD
MILTON, VT 05468
PHONE: (802)893-2401
FAX: (802)893-1542

PROJECT:

CULVERT REPLACEMENT
16'–0" x 8'–0" BOX CULVERT
PROJECT BF 0225(4) BRIDGE NO. 7
WATERFORD, VERMONT

PREPARED BY:

DELTA
SPECIALTY PRECAST CONCRETE ENGINEERS
860 HOOPER ROAD, ENDWELL, NY 13760
PHONE(607)231–6600 FAX(607)231–6650

DRAWING SCHEDULE

SHEET NO.	DESCRIPTION	REVISIONS	
		REV. NO.	DATE
1	COVER		
2	PLAN AND ELEVATION		
3	END VIEWS		
4	BC–2 REINFORCING AND DETAILS		
5	BC–1 AND BC–3 REINFORCING		
6	BC–2 AND BC–3 DETAILS		
7	BC–1 DETAILS		
8	WINGWALL WW1 DETAILS		
9	WINGWALL WW2 DETAILS		
10	WINGWALL WW3 DETAILS		
11	WINGWALL WW4 DETAILS		
12	ANCHOR DETAILS		
13	CUTOFF WALLS CW1, 2, 3, & 4		
14	CUTOFF WALLS CW5 AND CW6		
15	TYPICAL DETAILS		
16	CUTOFF WALL PLAN		
18	CUTOFF WALL PLAN		

CURING, HANDLING, AND STORAGE PRACTICES AND PROCEDURES.

1. THE CONCRETE UTILIZED WILL BE PRODUCED, INSPECTED, HANDLED,PLACED,FINISHED AND REPAIRED AS PER SECTIONS 540.05 THROUGH 540.07 OF THE VERMONT STANDARD SPECIFICATIONS FOR CONSTRUCTION.
2. AFTER REACHING A MINIMUM STRIPPING STRENGTH OF 3,500 PSI THE CULVERT SECTION MAY BE REMOVED FROM THE FORM. ALL STRUCTURAL PIECES SHALL BE CURED UNTIL ATTAINING DESIGN STRENGTH OF 5,000 PSI.
3. IMMEDIATELY AFTER THE STRIPPING PROCESS IS COMPLETE, THE CULVERT SECTION WILL BE PLACED ONTO A WOODEN AND STEEL STRUCTURE TO BEGIN THE CURING PERIOD.
4. CURING PROCEDURES SHALL FOLLOW SECTIONS 501.17 AND 540.08 OF THE VERMONT STANDARD SPECIFICATIONS FOR CONSTRUCTION EXCEPT AS FOLLOWS;
   - 4.1.1. SECTION 501.17(b) WATER CURING SHALL BE MODIFIED TO INCLUDE CONTINUOUS MISTING AND OR FOGGING TO MAINTAIN AS NEAR AS POSSIBLE AND ATMOSPHERE OF 160% HUMIDITY
5. WHEN THE CULVERT SECTION ATTAINS DESIGN STRENGTH AS EVIDENCED BY TEST CYLINDER BREAKS CURED WITH THE PRECAST BOX SECTION, CURING PROCEDURES WILL END AND THE CONTAINMENT BUILDING WILL BE REMOVED.
6. AT THIS POINT, SECONDARY POURS (FISH BAFFLES, HEADWALLS) CAN BE PREFORMED.
7. STRUCTURAL SECONDARY POURS SHALL BE CURED IN ACCORDANCE WITH VERMONT STANDARD SPECIFICATIONS FOR CONSTRUCTION SECTION 501.17(5).
8. AS PER SECTION 540.09 THE CULVERT SECTIONS "SHALL BE HANDLED, STORED,AND SHIPPED IN SUCH A MANNER AS TO MINIMIZE CHIPPING, CRACKS, FRACTURE, DISCOLORATION, AND EXCESSIVE BENDING STRESSES. UNITS DAMAGED BY HANDLING, STORAGE, OR SHIPPING SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE. PLACE DUNNAGE BELOW LIFTERS.
9. AS PER SECTION 540.09 "PRECAST CONCRETE WILL NOT BE CONSIDERED FOR SHIPMENT UNTIL IT HAS BEEN ACCEPTED." (BY VTAOR OR IT'S REPRESENTATIVE). THIS ACCEPTANCE SHALL INCLUDE VERIFICATION THAT PIECES ARE FREE FROM DEFECTS AND ALL SPECIFICATION REQUIREMENTS INCLUDING THE COMPRESSIVE STRENGTH AND TOLERANCE REQUIREMENTS HAVE BEEN ACHIEVED. IN ADDITION, PRECAST CONCRETE WILL NOT BE CONSIDERED FOR SHIPMENT FOR A MINIMUM 72 HOURS FOLLOWING THE COMPLETION OF CASTING.

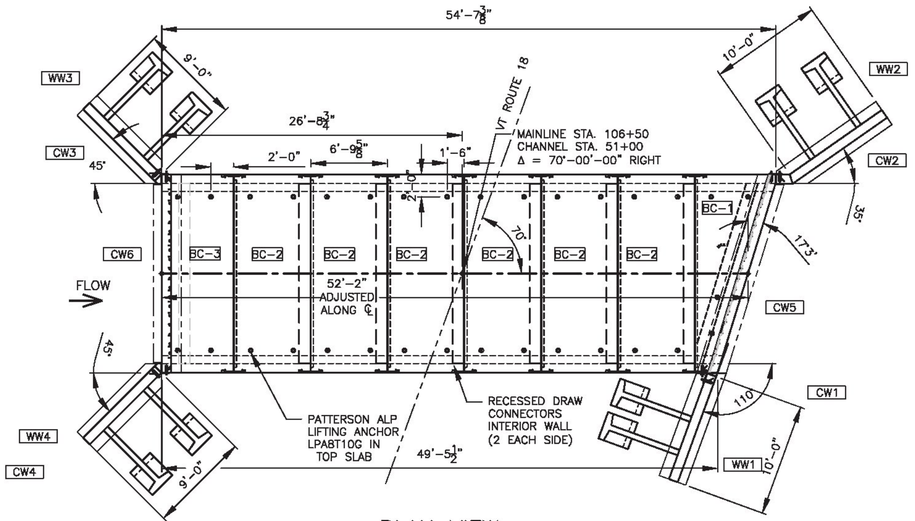
LRFR LOAD RATING FACTORS

LOAD LEVELS	TRUCK						
	H–20	HL–93	3S2	6 AXLE	3 AXLE	4 AXLE	5 AXLE
TONNAGE	20	36	36	66	30	34.5	38
INVENTORY	1.04	1.43	3.90	2.01	2.60	2.53	3.67
POSTING	–	–	–	–	–	–	–
OPERATING	1.35	1.86	5.06	2.60	3.37	3.28	4.76

STATE OF VERMONT
DARYL D. BURNS
No. 9031
Structural I
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PROFESSIONAL ENGINEER

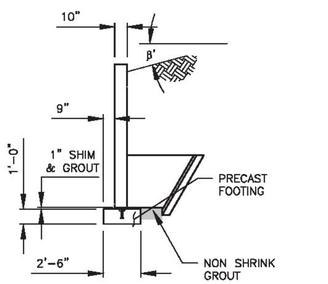
5/17/18

DELTA # 2018.477.003
4/20/18
1 OF 16

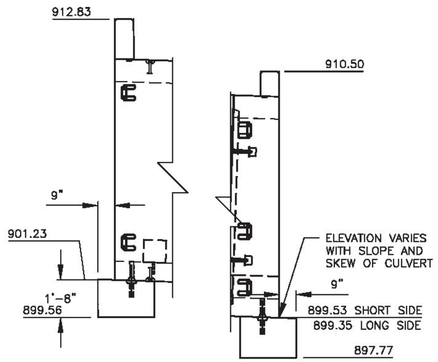


PLAN VIEW

DIMENSIONS IN THE HORIZONTAL PLANE



WINGWALL ELEVATION VIEW



INLET ELEVATION

OUTLET ELEVATION



5/17/18

REV.NO.	DATE	REVISION

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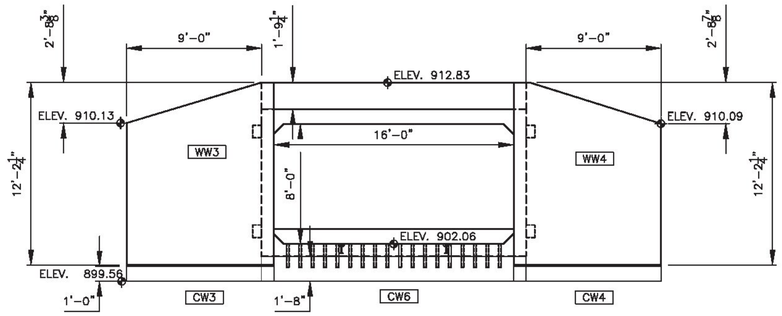
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FAX: (802)893-1542

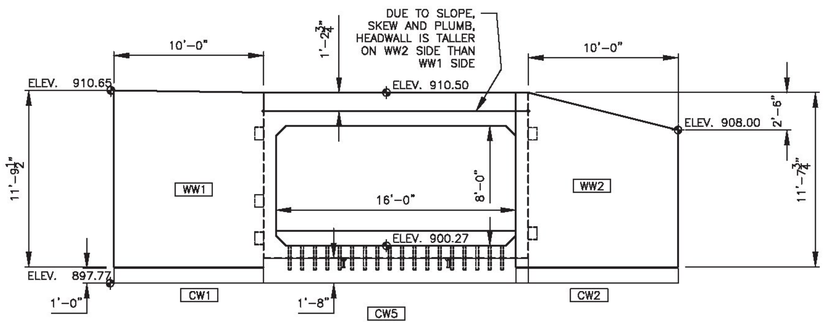
DATE: 4/20/18	SHEET TITLE: PLAN AND ELEVATION		DRWN BY: BJC
SCALE: N.T.S.			CKD BY: RPJ/RJA

PROJECT:
TOWN OF WATERFORD, CALEDONIA, VT
16' x 8' BOX CULVERT BF 0225(4)
VT RT. 18 BRIDGE #7

CONTRACTOR:		DWG. I.D. PD-02
DELTA PROJ. NO.: 2018.477.003		SHT. NO. 2 OF 16



INLET END VIEW



OUTLET END VIEW

(SECTION BC-1 IS SLOPED, SKEWED, AND PLUMB)

TABLE OF UNITS				
MARK	QTY	LONGEST LENGTH	VOL (CY)	WEIGHT (LBS)
* BC-1	1	7'-6"	8.19	38,759
ATTACHED	1	HEADWALL ON ABOVE	.81	
ATTACHED	1	BAFFLE EACH	0.57	
* BC-2	6	6'-9 5/8"	11.74	49,856
* BC-3	1	6'-7"	10.75	49,370
ATTACHED	1	HEADWALL ON ABOVE	.87	
WW1	1	10'-0"	4.8	19,602
WW2	1	10'-0"	4.4	17,901
WW3	1	9'-0"	4.3	17,456
WW4	1	9'-0"	4.3	17,456
CW1	1	17'-8"	0.94	3,807
CW2	1	17'-8"	0.98	3,969
CW3	1	8'-10 1/4"	0.85	3,443
CW4	1	8'-10 1/4"	0.85	3,443
CW5	1	8'-10 1/4"	2.85	11,543
CW6	1	13'-10 1/4"	2.70	10,935

* VOLUME FOR CULVERT ONLY. WEIGHT PER SHIPPING PIECE INCLUDES HEADWALL AND BAFFLE.

STATE OF VERMONT
DARYL D. BURNS
No. 9031
Structural I
PROFESSIONAL ENGINEER
LICENSED

5/17/18

REV.NO.	DATE	REVISION

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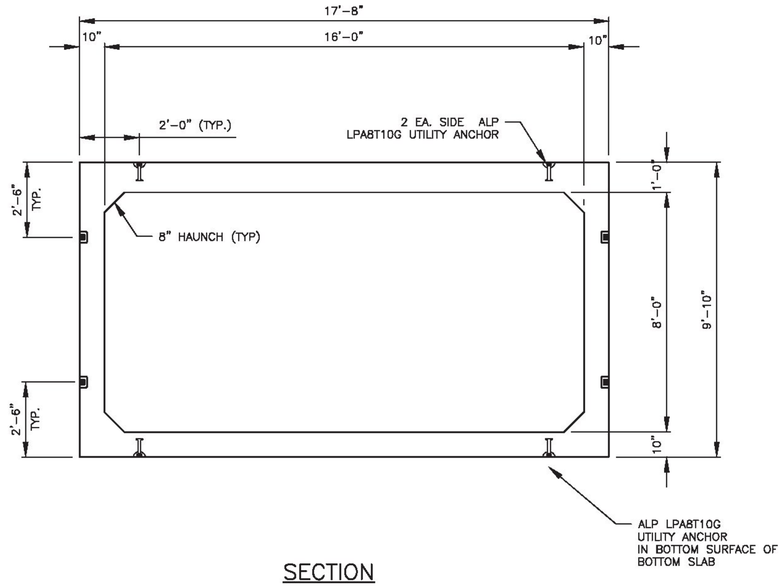
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FAX: (802)893-1542

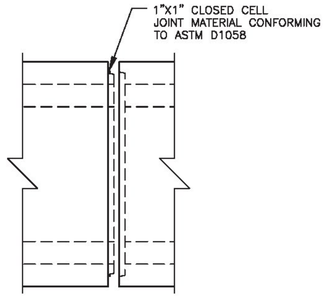
DATE: 4/20/18 | SHEET TITLE: END VIEWS | DRWN BY: BJC
SCALE: N.T.S. | CKD BY: RPJ/RJA

PROJECT: TOWN OF WATERFORD, CALEDONIA, VT
16' x 8' BOX CULVERT BF 0225(4)
VT RT. 18 BRIDGE #7

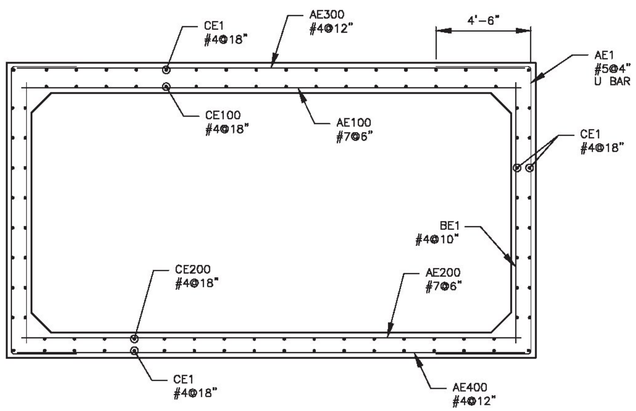
CONTRACTOR: ... | DWG. I.D. PD-02
DELTA PROJ. NO.: 2018.477.003 | SHT. NO. 3 OF 16



SECTION



JOINT DETAILS
(ELEVATION VIEW)
(SEE SHEET 15)



REINFORCING
SECTION
(2" MIN. CLEAR)
(ALL EPOXY BAR)

BC-2 BAR SCHEDULE

"U" BAR

MARK	QTY.	BAR SIZE	MAX. SPACING	LENGTH	TYPE	B	C
AE100	14	#7	6"	17'-4"	STR	–	–
AE200	14	#7	6"	17'-4"	STR	–	–
AE300	7	#4	12"	17'-4"	STR	–	–
AE400	7	#4	12"	17'-4"	STR	–	–
AE1	42	#5	4"	18'-6"	"U"	4'-6"	9'-6"
BE1	18	#4	10"	8'-6"	STR	–	-
CE100	11	#4	18"	6'-5"	STR	–	–
CE200	11	#4	18"	6'-5"	STR	–	–
CE1	48	#4	18"	6'-5"	STR	–	–
ALL EPOXY BAR							

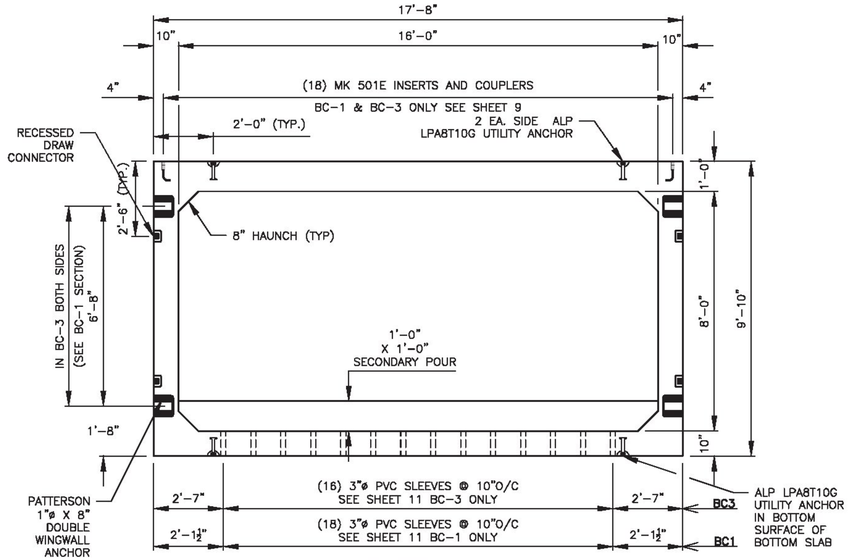
STATE OF VERMONT
DARYL D. BURNS
No. 9031
Structural I
LICENSED
PROFESSIONAL ENGINEER
5/17/18

REV.NO.	DATE	REVISION

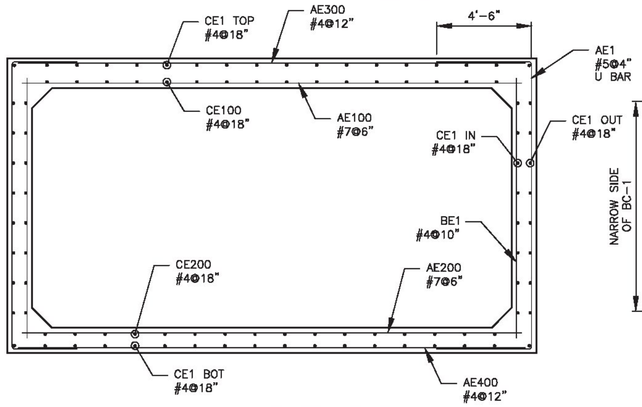
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PREPARED FOR:
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DATE: 4/20/18 | SHEET TITLE: BC-2 REINFORCING AND DETAILS | DRWN BY: BJC
SCALE: N.T.S. | CKD BY: RPJ/RJA
PROJECT: TOWN OF WATERFORD, CALEDONIA, VT
16' x 8' BOX CULVERT BF 0225(4)
VT RT. 18 BRIDGE #7
CONTRACTOR: ...
DWG. I.D. PD-02
DELTA PROJ. NO.: 2018.477.003
SHT. NO. 4 OF 16

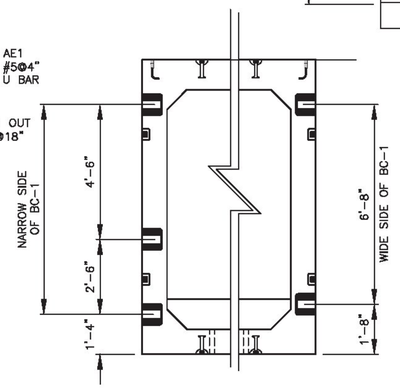


SECTION



REINFORCING SECTION BC-3

(2" MIN. CLEAR)
(ALL EPOXY BAR)



SECTION VIEW MK BC-1 ONLY

WW ANCHOR PLACEMENT



BC-3 BAR SCHEDULE

"U" BAR: B, C, B

MARK	QTY.	BAR SIZE	MAX SPC	LENGTH	TYPE	B	C
AE100	14	#7	6"	17'-4"	STR	–	–
AE200	13	#7	6"	17'-4"	STR	–	–
AE300	7	#4	12"	17'-4"	STR	–	–
AE400	7	#4	12"	17'-4"	STR	–	–
AE1	38	#5	4"	18'-6"	"U"	4'-6"	9'-6"
BE1	16	#4	10"	5'-9"	STR	–	–
CE100	11	#4	18"	6'-0"	STR	–	–
CE200	11	#4	18"	5'-9"	STR	–	–
CE1 TOP	11	#4	18"	6'-0"	STR	–	–
CE1 BOT	11	#4	18"	5'-9"	STR	–	–
CE1 OUT	14	#4	18"	SERIES 5'-8½" TO 6'-0½"	STR	–	–
CE1 IN	14	#4	18"	SERIES 6'-0 ½" TO 6'-4 ½"	STR	–	–

ALL EPOXY BAR

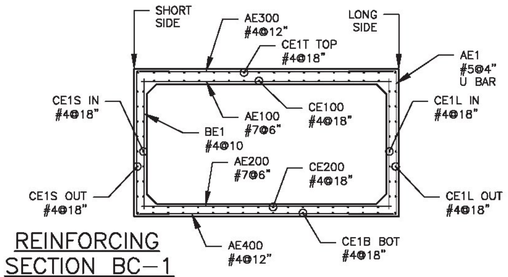
BC-1 BAR SCHEDULE

"U" BAR: B, C, B

MARK	QTY.	BAR SIZE	MAX. SPC.	LENGTH	TYPE	B	C
AE100	15	#7	6"	17'-4"	STR	SPLAY	
AE200	16	#7	6"	17'-4"	STR	SPLAY	
AE300	8	#4	12"	17'-4"	STR	SPLAY	
AE400	8	#4	12"	17'-4"	STR	SPLAY	
AE1	46	#5	4"	18'-6"	"U"	4'-6"	9'-6"
BE1	20	#4	10"	8'-6"	STR	–	–
CE100	11	#4	18"	SERIES 1'-8" TO 6'-10"	STR	–	–
CE200	11	#4	18"	SERIES 1'-11" TO 7'-1"	STR	–	–
CE1T TOP	11	#4	18"	SERIES 1'-8" TO 6'-10"	STR	–	–
CE1B BOT	11	#4	18"	SERIES 2'-0" TO 7'-2"	STR	–	–
CE1S IN SHORT	7	#4	18"	SERIES 1'-5" TO 1'-9"	STR	IN SHORT	
CE1S OUT SHORT	7	#4	18"	SERIES 1'-8" TO 2'-0"	STR	OUT SHORT	
CE1L IN LONG	7	#4	18"	SERIES 6'-7" TO 6'-11"	STR	IN LONG	
CE1L OUT LONG	7	#4	18"	SERIES 6'-10" TO 7'-2"	STR	OUT LONG	

TOP & BOT SLAB

WALLS



REINFORCING SECTION BC-1

(2" MIN. CLEAR)
(ALL EPOXY BAR)

STATE OF VERMONT
DARYL D. BURNS
No. 9031
Structural I
LICENSED PROFESSIONAL ENGINEER

5/17/18

REV.NO.	DATE	REVISION

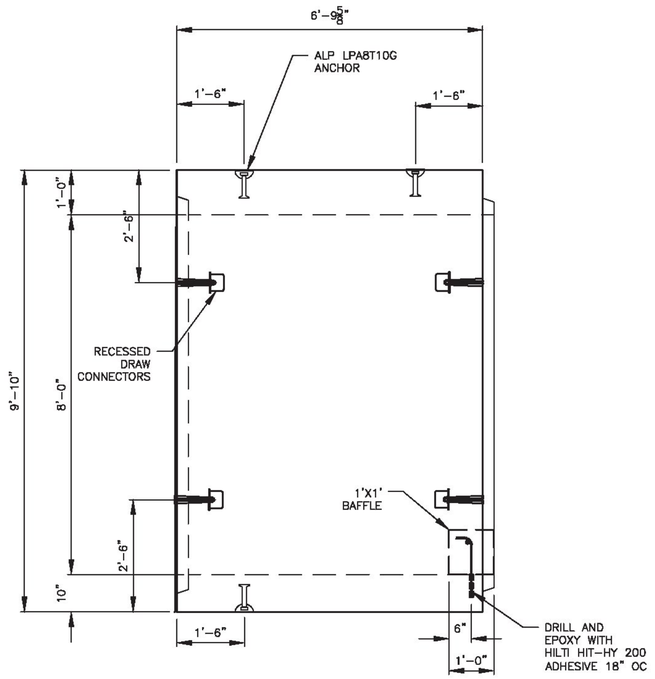
PREPARED BY:

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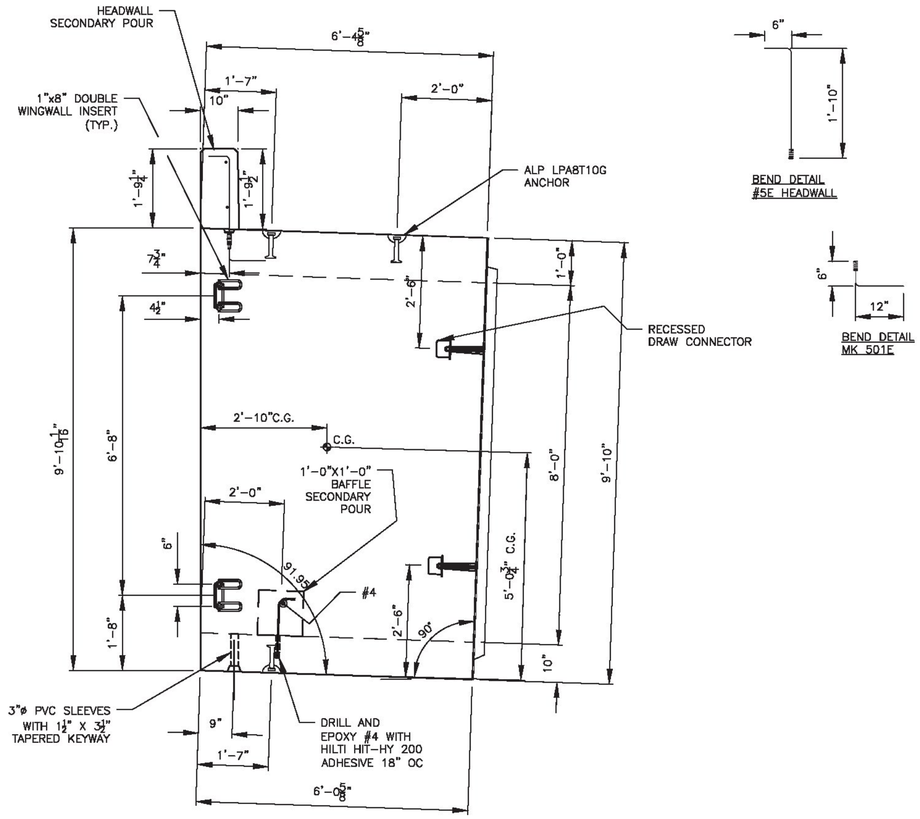
CAMP PRECAST CONCRETE PRODUCTS
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MILTON, VT 05468
PHONE: (802)893-2401
FAX: (802)893-1542

DATE: 4/20/18	SHEET TITLE: BC-1 AND BC-3 REINFORCING	DRWN BY:	BJC
SCALE: N.T.S.		CKD BY:	RPJ/RJA
PROJECT: TOWN OF WATERFORD, CALEDONIA, VT 16' x 8' BOX CULVERT BF 0225(4) VT RT. 18 BRIDGE #7			
CONTRACTOR: ...		DWG. I.D.	PD-02
DELTA PROJ. NO.: 2018.477.003		SHT. NO.	5 OF 16



ELEVATION VIEW MK BC-2

(6 REQUIRED)



ELEVATION VIEW MK BC-3



5/17/18

REV.NO.	DATE	REVISION

PREPARED BY:

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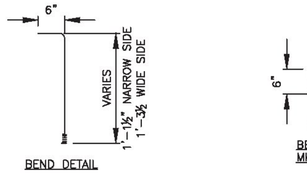
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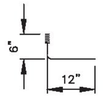
DATE: 4/20/18	SHEET TITLE: BC-2 AND BC-3 DETAILS		DRWN BY: BJC
SCALE: N.T.S.			CKD BY: RPJ/RJA

PROJECT: TOWN OF WATERFORD, CALEDONIA, VT
16' x 8' BOX CULVERT BF 0225(4)
VT RT. 18 BRIDGE #7

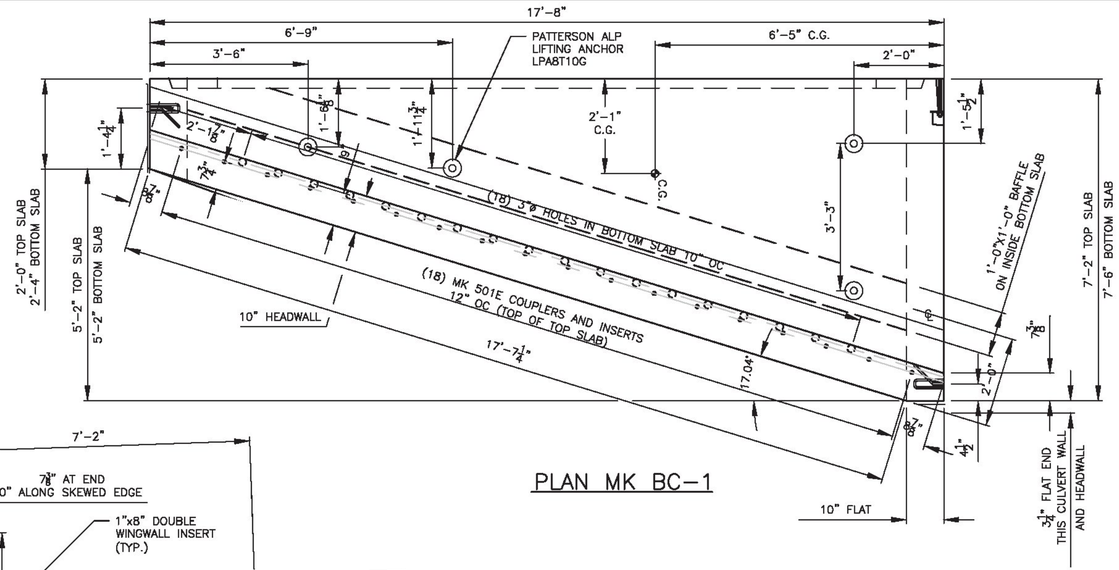
CONTRACTOR: ...		DWG. I.D. PD-02
DELTA PROJ. NO.: 2018.477.003		SHT. NO. 6 OF 16



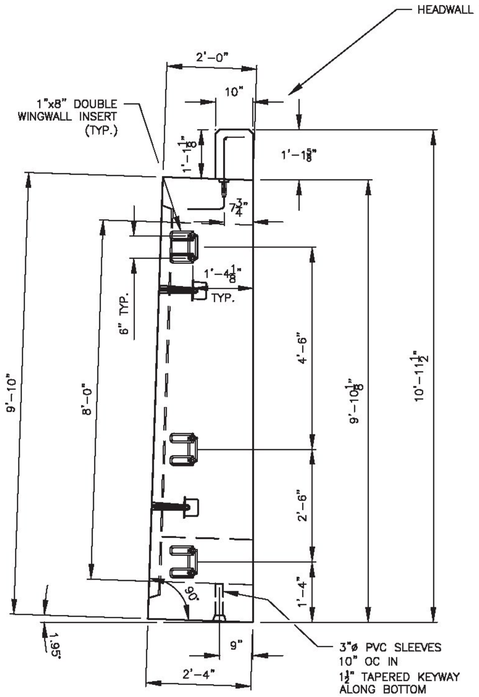
BEND DETAIL



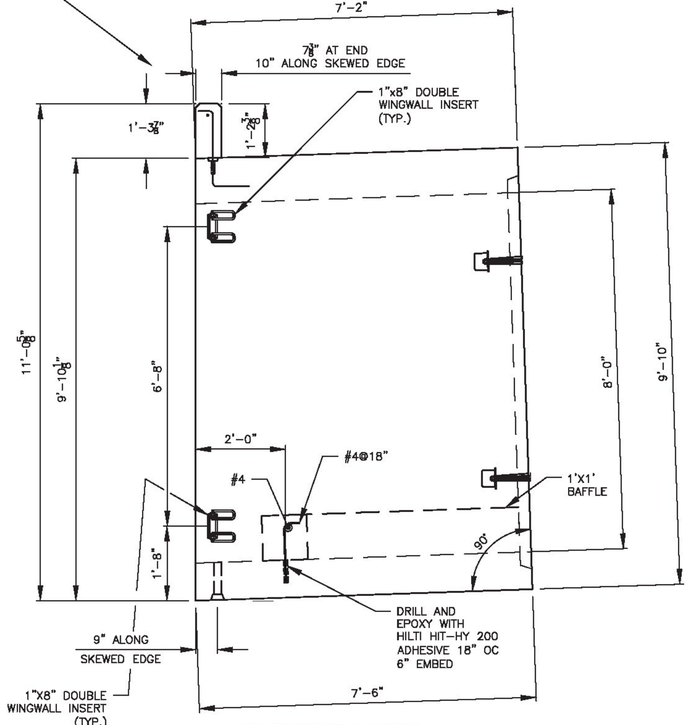
BEND DETAIL
MK 501E



PLAN MK BC-1



ELEVATION VIEW
MK BC-1 NARROW END



ELEVATION VIEW
MK BC-1 WIDE END

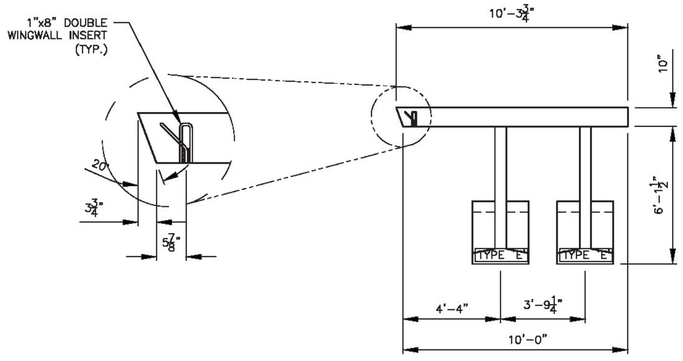
STATE OF VERMONT
DAVID D. BURNS
No. 9031
Structural I
LICENSED
PROFESSIONAL ENGINEER
5/17/18

REV.NO.	DATE	REVISION

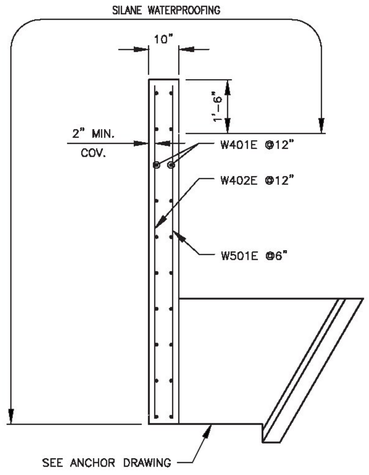
PREPARED BY:
DELTA
SPECIALTY PRECAST CONCRETE ENGINEERS
860 HOOPER ROAD, ENDWELL, NY 13760
TEL: (607) 231-8600 FAX: (607) 231-8650

PREPARED FOR:
CAMP PRECAST CONCRETE PRODUCTS
78 PRECAST RD
MILTON, VT 05468
PHONE: (802)893-2401
FAX: (802)893-1542

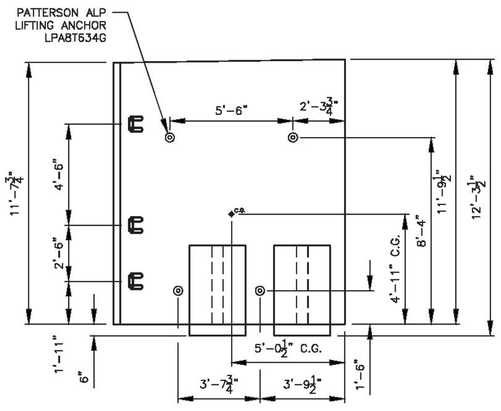
DATE: 4/20/18
SCALE: N.T.S.
SHEET TITLE: BC-1 DETAILS
DRWN BY: BJC
CKD BY: RPJ/RJA
PROJECT: TOWN OF WATERFORD, CALEDONIA, VT
16' x 8' BOX CULVERT BF 0225(4)
VT RT. 18 BRIDGE #7
CONTRACTOR: ...
DWG. I.D. PD-02
DELTA PROJ. NO.: 2018.477.003
SHT. NO. 7 OF 16



WINGWALL WW1



WINGWALL SECTION



WINGWALL WW1
ELEVATION
SHOWING BACK FACE OF WALL

WINGWALL WW1							
PART	MARK	QTY	SIZE	SPC	NOTE	LEN	TYPE
WW (H)	W401E	24	#4	12"	–	116"	STR
WW (V)	W402E	11	#4	12"	–	136	STR
WW (V)	W501E	20	#5	6"	–	136	STR

NOTE: ALL BAR COVER 2" MIN. UNLESS NOTED OTHERWISE. QUANTITIES ARE FOR ONE WINGWALL.



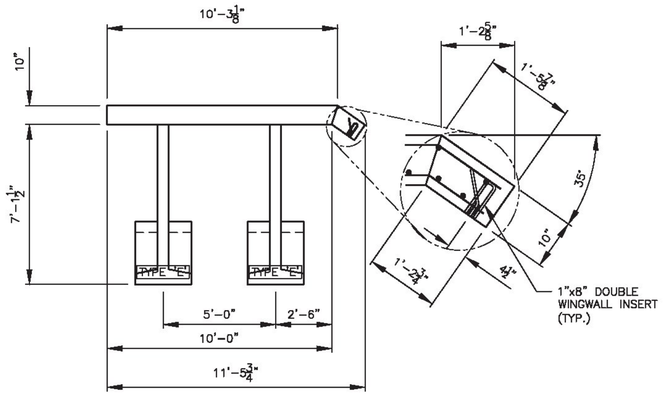
5/17/18

REV.NO.	DATE	REVISION

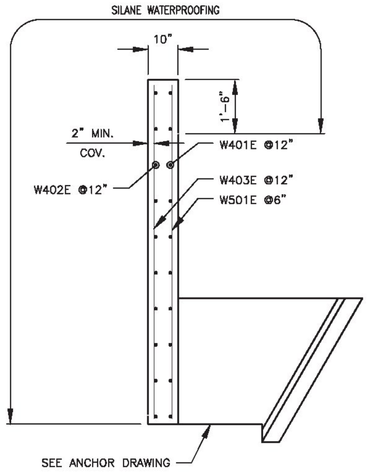
PREPARED BY:
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SPECIALTY PRECAST CONCRETE ENGINEERS
860 HOOPER ROAD, ENDWELL, NY 13760
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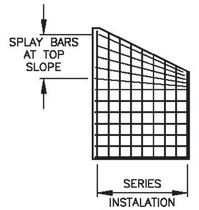
DATE: 4/20/18 | SHEET TITLE: WINGWALL WW1 DETAILS | DRWN BY: BJC
SCALE: N.T.S. | CKD BY: RPJ/RJA
PROJECT: TOWN OF WATERFORD, CALEDONIA, VT
16' x 8' BOX CULVERT BF 0225(4)
VT RT. 18 BRIDGE #7
CONTRACTOR: | DWG. I.D. PD-02
DELTA PROJ. NO.: 2018.477.003 | SHT. NO. 8 OF 16



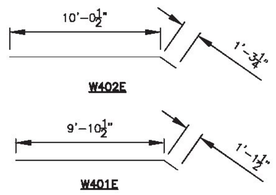
WINGWALL WW2

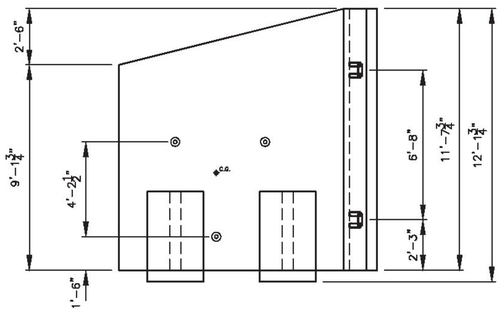


WINGWALL SECTION



TYPICAL REINFORCING ARRANGEMENT





WINGWALL WW2
ELEVATION
SHOWING BACK FACE OF WALL

WINGWALL WW2							
PART	MARK	QTY	SIZE	SPC	NOTE	LEN	TYPE
WW (H)	W401E	12	#4	12"	–	132"	BENT
WW (H)	W402E	12	#4	12"	–	135 3/4"	BENT
WW (V)	W403E	12	#4	12"	SERIES	136" TO 92"	STR
WW (V)	W501E	23	#5	6"	SERIES	136" TO 92"	STR

NOTE: ALL BAR COVER 2" MIN. UNLESS NOTED OTHERWISE. QUANTITIES ARE FOR ONE WINGWALL.

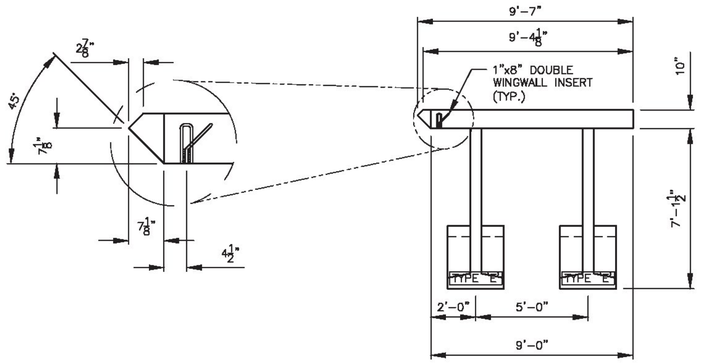
STATE OF VERMONT
DARYL D. BURNS
No. 9031
Structural I
LICENSED
PROFESSIONAL ENGINEER
5/17/18

REV.NO.	DATE	REVISION

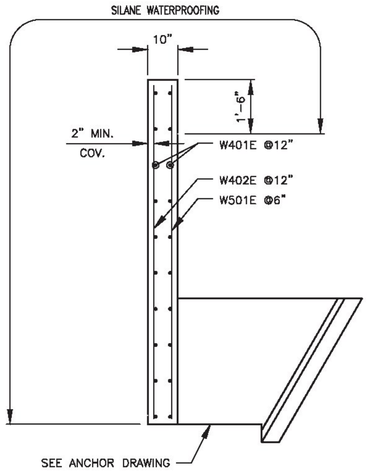
PREPARED BY:
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860 HOOPER ROAD, ENDWELL, NY 13760
TEL: (607) 231-6600 FAX: (607) 231-6650

PREPARED FOR:
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78 PRECAST RD
MILTON, VT 05468
PHONE: (802)893-2401
FAX: (802)893-1542

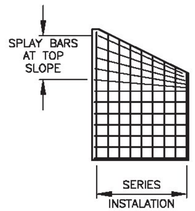
DATE: 4/20/18 | SHEET TITLE: WINGWALL WW2 DETAILS | DRAWN BY: BJC
SCALE: N.T.S. | CKD BY: RPJ/RJA
PROJECT: TOWN OF WATERFORD, CALEDONIA, VT
16' x 8' BOX CULVERT BF 0225(4)
VT RT. 18 BRIDGE #7
CONTRACTOR: ... | DWG. I.D. PD-02
DELTA PROJ. NO.: 2018.477.003 | SHT. NO. 9 OF 16



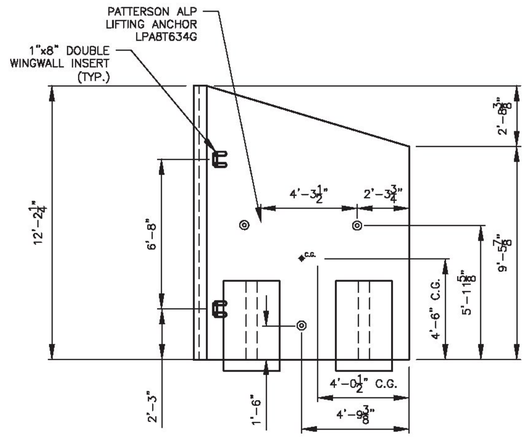
WINGWALL WW3



WINGWALL SECTION



TYPICAL REINFORCING ARRANGEMENT



WINGWALL WW3
ELEVATION
SHOWING BACK FACE OF WALL

WINGWALL WW3							
PART	MARK	QTY	SIZE	SPC	NOTE	LEN	TYPE
WW (H)	W401E	24	#4	12"	–	104"	STR
WW (V)	W402E	10	#4	12"	SERIES	142 TO 110"	STR
WW (V)	W501E	19	#5	6"	SERIES	142 TO 110"	STR

NOTE: ALL BAR COVER 2" MIN. UNLESS NOTED OTHERWISE. QUANTITIES ARE FOR ONE WINGWALL.

STATE OF VERMONT
DARYL D. BURNS
No. 9031
Structural I
LICENSED
PROFESSIONAL ENGINEER

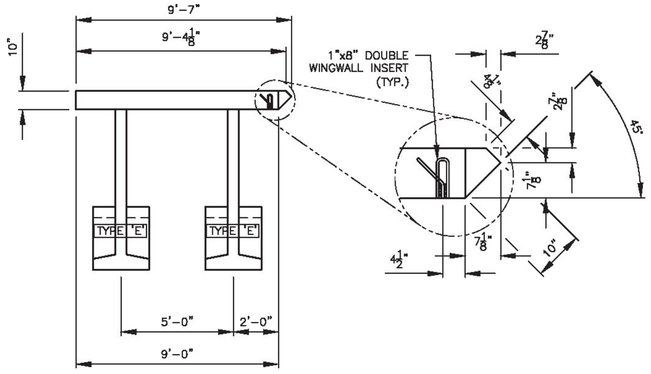
5/17/18

REV.NO.	DATE	REVISION

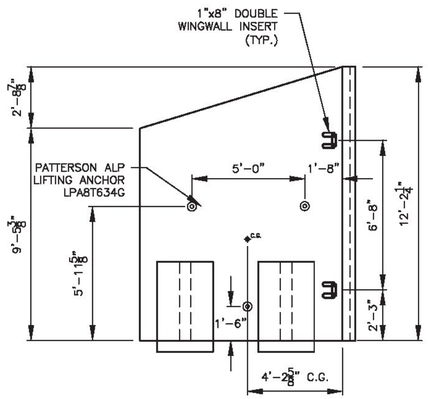
PREPARED BY:
DELTA
SPECIALTY PRECAST CONCRETE ENGINEERS
660 HOOPER ROAD, ENDWELL, NY 13760
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PREPARED FOR:
CAMP PRECAST CONCRETE PRODUCTS
78 PRECAST RD
MILTON, VT 05468
PHONE: (802)893-2401
FAX: (802)893-1542

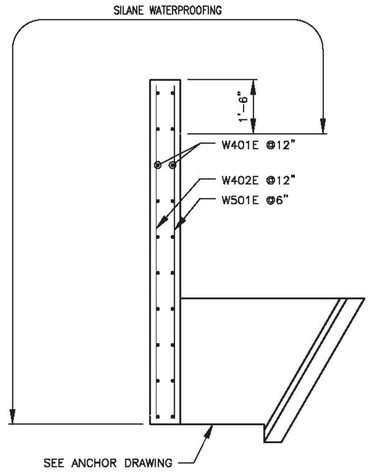
DATE: 4/20/18
SCALE: N.T.S.
SHEET TITLE: WINGWALL WW3 DETAILS
DRAWN BY: BJC
CKD BY: RPJ/RJA
PROJECT: TOWN OF WATERFORD, CALEDONIA, VT
16' x 8' BOX CULVERT
VT RT. 18 BRIDGE #7
CONTRACTOR: ...
DWG. I.D. PD-02
DELTA PROJ. NO.: 2018.477.003
SHT. NO. 10 OF 16



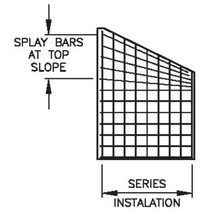
WINGWALL WW4



WINGWALL WW4 ELEVATION
SHOWING BACK FACE OF WALL



WINGWALL SECTION



TYPICAL REINFORCING ARRANGEMENT

WINGWALL WW4							
PART	MARK	QTY	SIZE	SPC	NOTE	LEN	TYPE
WW (H)	W401E	24	#4	12"	–	104"	STR
WW (V)	W402E	10	#4	12"	SERIES	142 TO 109"	STR
WW (V)	W501E	19	#5	6"	SERIES	142 TO 109"	STR

NOTE: ALL BAR COVER 2" MIN. UNLESS NOTED OTHERWISE. QUANTITIES ARE FOR ONE WINGWALL.



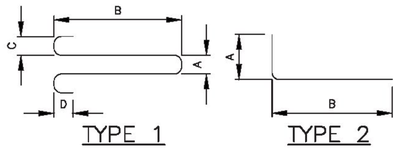
5/17/18

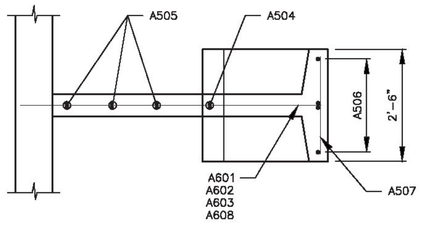
REV.NO.	DATE	REVISION

PREPARED BY:
DELTA
SPECIALTY PRECAST CONCRETE ENGINEERS
860 HOOPER ROAD, ENDWELL, NY 13760
TEL: (607) 231-6600 FAX: (607) 231-6650

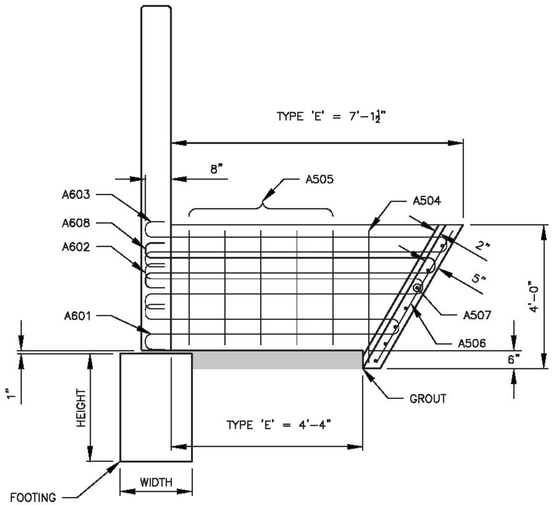
PREPARED FOR:
CAMP PRECAST CONCRETE PRODUCTS
78 PRECAST RD
MILTON, VT 05468
PHONE: (802)893-2401
FAX: (802)893-1542

DATE: 4/20/18 | SHEET TITLE: WINGWALL WW4 DETAILS | DRWN BY: BJC
SCALE: N.T.S. | CKD BY: RPJ/RJA
PROJECT: TOWN OF WATERFORD, CALEDONIA, VT
16' x 8' BOX CULVERT
VT RT. 18 BRIDGE #7
CONTRACTOR: ... | DWG. I.D. PD-02
DELTA PROJ. NO.: 2018.477.003 | SHT. NO. 11 OF 16



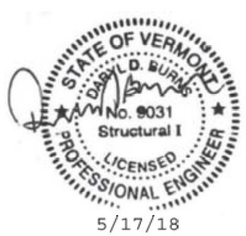


WINGWALL ANCHOR
PLAN VIEW



WINGWALL SECTION

E ANCHOR BAR SCHEDULE (EPOXY)									
PART	MARK	QTY	SIZE	SPC	LENGTH	TYPE	A	B	C	D
ANCHOR (E)	A601E	1	#6	0"	174"	TYP1	5"	72"		
ANCHOR (E)	A602E	1	#6	0"	190"	TYP1	5"	80"		
ANCHOR (E)	A603E	1	#6	0"	206"	TYP1	5"	88"		
ANCHOR	A504	2	#5	0"	56"	TYP2	12"	44"	0"	0"
ANCHOR (E)	A505	8	#5	12"	38"	STR				
ANCHOR	A506	4	#5	VAR.	50"	STR	0"	0"	0"	0"
ANCHOR	A507	7	#5	8"	26"	STR	0"	0"	0"	0"
ANCHOR (E)	A608E	1	#6	0"	198"	TYP1		84"		
CUBIC YARDS = .64 WEIGHT = 1.3 TONS										
NOTE: ALL BAR COVER 2" MIN. UNLESS NOTED OTHERWISE										

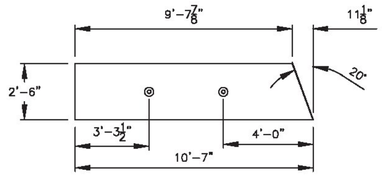


REV.NO.	DATE	REVISION

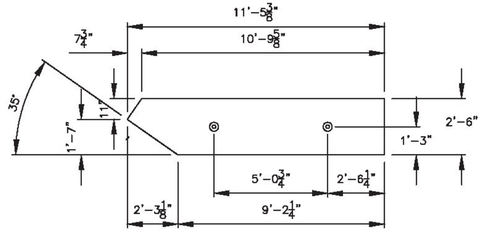
PREPARED FOR:
CAMP PRECAST CONCRETE PRODUCTS
78 PRECAST RD
MILTON, VT 05468
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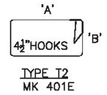
DATE: 4/20/18 | SHEET TITLE: ANCHOR DETAILS | DRAWN BY: BJC
SCALE: N.T.S. | CKD BY: RPJ/RJA
PROJECT: TOWN OF WATERFORD, CALEDONIA, VT
16' x 8' BOX CULVERT BF 0225(4)
VT RT. 18 BRIDGE #7
CONTRACTOR: ... | DWG. I.D. PD-02
DELTA PROJ. NO.: 2018.477.003 | SHT. NO. 12 OF 16



CUTOFF WALL CW1



CUTOFF WALL PLAN
FOR CW2



TYPE T2
MK 401E

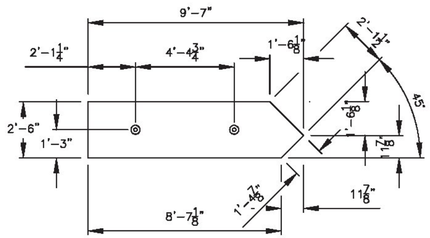
BAR SCHEDULE FOR CW1						
BAR MARK	BAR SIZE	QTY.	BAR TYPE	LENGTH	"A"	"B"
MK401E	#4	3	T2	6'-5"	2'-2"	8"
MK601E	#6	2	STR	10'-3"	–	–
MK602E	#6	2	STR	9'-9"	–	–
MK603E	#6	2	STR	9'-4"	–	–

ALL EPOXY BAR

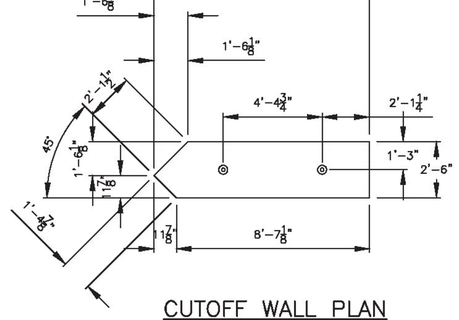
1 EACH

BAR SCHEDULE FOR CW2						
BAR MARK	BAR SIZE	QTY.	BAR TYPE	LENGTH	"A"	"B"
MK401E	#4	3	T2	6'-5"	2'-2"	8"
MK601E	#6	2	STR	10'-6"	–	–
MK602E	#6	2	STR	11'-0"	–	–
MK603E	#6	2	STR	8'-10"	–	–

ALL EPOXY BAR



CUTOFF WALL CW3

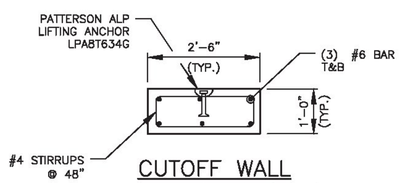


CUTOFF WALL PLAN
FOR CW4

1 EACH

BAR SCHEDULE FOR CW3 & CW4						
BAR MARK	BAR SIZE	QTY.	BAR TYPE	LENGTH	"A"	"B"
MK401E	#4	3	T2	6'-5"	2'-2"	8"
MK601E	#6	2	STR	8'-0"	–	–
MK602E	#6	2	STR	8'-10"	–	–
MK603E	#6	2	STR	8'-4"	–	–

ALL EPOXY BAR



CUTOFF WALL
REINFORCING (TYP)
CW1,CW2,CW3 &CW4
(2" MIN. CLR. TYP.)



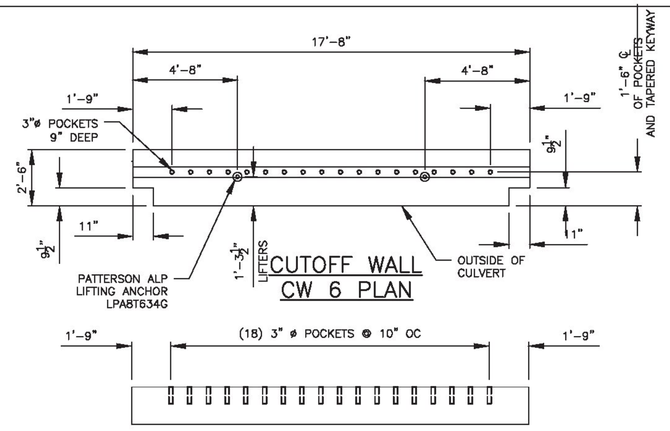
5/17/18

REV.NO.	DATE	REVISION

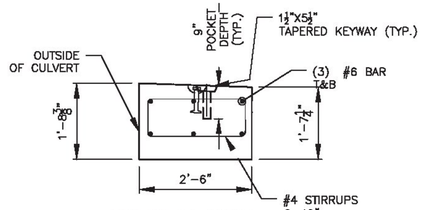
PREPARED BY:
DELTA
SPECIALTY PRECAST CONCRETE ENGINEERS
660 HOOPER ROAD, ENDWELL, NY 13760
TEL: (607) 231-6600 FAX: (607) 231-6650

PREPARED FOR:
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MILTON, VT 05468
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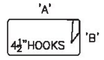
DATE: 4/20/18	SHEET TITLE: CUTOFF WALLS CW1, 2, 3 & 4		DRWN BY: BJC
SCALE: N.T.S.			CKD BY: RPJ/RJA
PROJECT: TOWN OF WATERFORD, CALEDONIA, VT 16' x 8' BOX CULVERT BF 0225(4) VT RT. 18 BRIDGE #7			
CONTRACTOR:			DWG. LO. PD-02
DELTA PROJ. NO.: 2018.477.003			SHT. NO. 13 OF 16



CUTOFF WALL
CW 6 PLAN



CUTOFF WALL
CW6 SECTION
(2" MIN. CLR. TYP.)



TYPE T2
MK 401E

BAR SCHEDULE FOR CW6

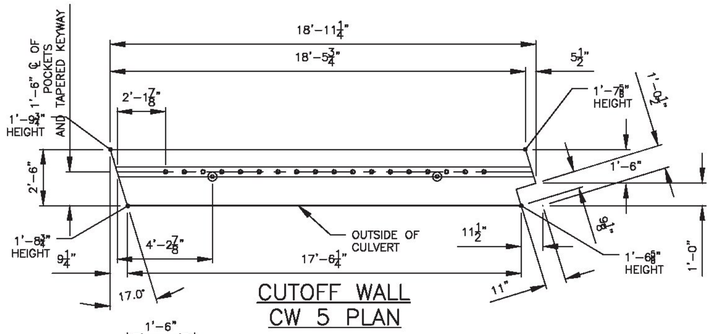
BAR MARK	BAR SIZE	QTY.	BAR TYPE	LENGTH	"A"	"B"
MK401E	#4	5	T2	7'-7"	2'-2"	1'-3"
MK601E	#6	4	STR	17'-4"	–	–
MK602E	#6	2	STR	15'-6"	–	–

ALL EPOXY BAR

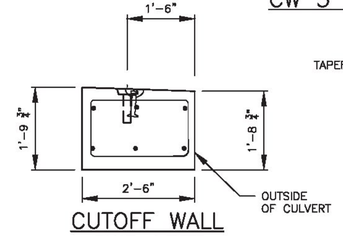
BAR SCHEDULE FOR CW5

BAR MARK	BAR SIZE	QTY.	BAR TYPE	LENGTH	"A"	"B"
MK401E	#4	5	T2	7'-5"	2'-2"	1'-2"
MK601E	#6	4	STR	18'-1"	–	–
MK602E	#6	2	STR	17'-1"	–	–

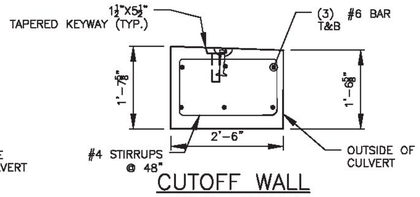
ALL EPOXY BAR



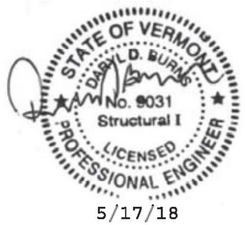
CUTOFF WALL
CW 5 PLAN



CUTOFF WALL
CW5 LEFT
END SECTION
(2" MIN. CLR. TYP.)



CUTOFF WALL
CW5 RIGHT
END SECTION
(2" MIN. CLR. TYP.)



5/17/18

REV.NO.	DATE	REVISION

PREPARED BY:

DELTA
SPECIALTY PRECAST CONCRETE ENGINEERS
660 HOOPER ROAD, ENDWELL, NY 13760
TEL: (607) 231-6600 FAX: (607) 231-6650

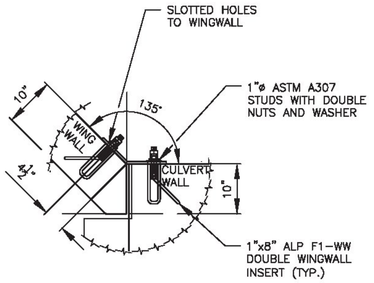
PREPARED FOR:

CAMP PRECAST CONCRETE PRODUCTS
78 PRECAST RD
MILTON, VT 05468
PHONE: (802)893-2401
FAX: (802)893-1542

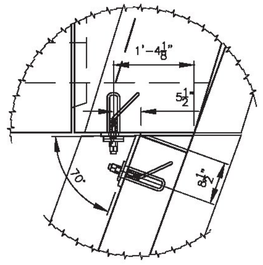
DATE: 4/20/18 | SHEET TITLE: CUTOFF WALLS CW5 AND CW6 | DRWN BY: BJC
SCALE: N.T.S. | CKD BY: RPJ/RJA

PROJECT:
TOWN OF WATERFORD, CALEDONIA, VT
16' x 8' BOX CULVERT BF 0225(4)
VT RT. 18 BRIDGE #7

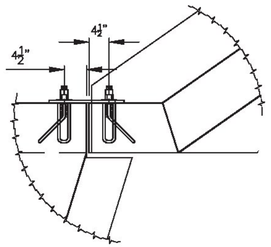
CONTRACTOR: | DWG. LO. PD-02
DELTA PROJ. NO.: 2018.477.003 | SHT. NO. 14 OF 16



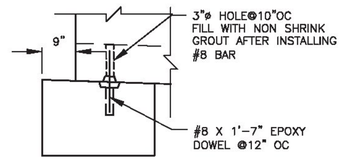
TYPICAL WINGWALL CONNECTION DETAIL
(WW3 & WW4)



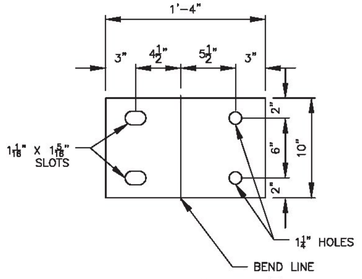
WINGWALL 1 CONNECTION DETAIL



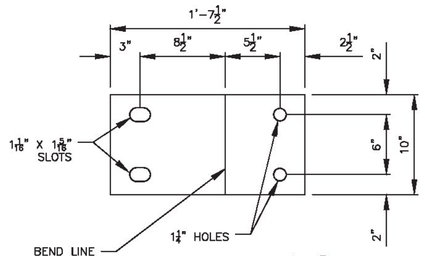
WINGWALL 2 CONNECTION DETAIL



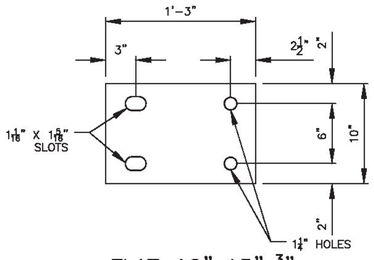
CUTOFF WALL PINNING



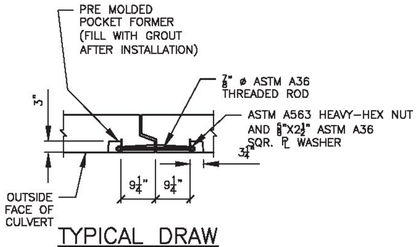
BENT 10"x16"x¾" ANCHOR PLATE DETAIL
(4 REQUIRED WW3 & WW4)



BENT 10"x19½"x¾" ANCHOR PLATE DETAIL
(3 REQUIRED) WW1

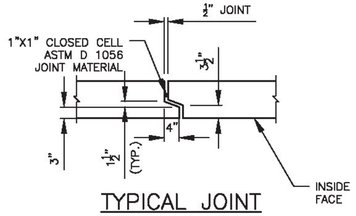


FLAT 10"x15"x¾" ANCHOR PLATE DETAIL
(2 REQUIRED) WW2

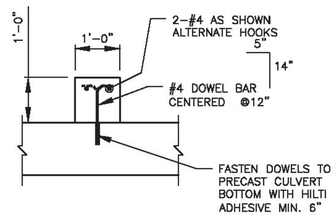


TYPICAL DRAW CONNECTOR DETAIL

1. DRAW CONNECTOR HARDWARE TO BE HOT DIPPED GALVANIZED.
2. DRAW CONNECTOR TO REMAIN IN PLACE AFTER INSTALLATION.
3. DRAW CONNECTOR TO BE PULLED UNTIL THE JOINT MATERIAL IS COMPRESSED.



TYPICAL JOINT DETAIL



TYPICAL PRECAST BAFFLE SECTION
(SECONDARY POUR)

STATE OF VERMONT
DARYL D. BURNS
No. 9031
Structural I
LICENSED
PROFESSIONAL ENGINEER

5/17/18

REV.NO.	DATE	REVISION

PREPARED BY:

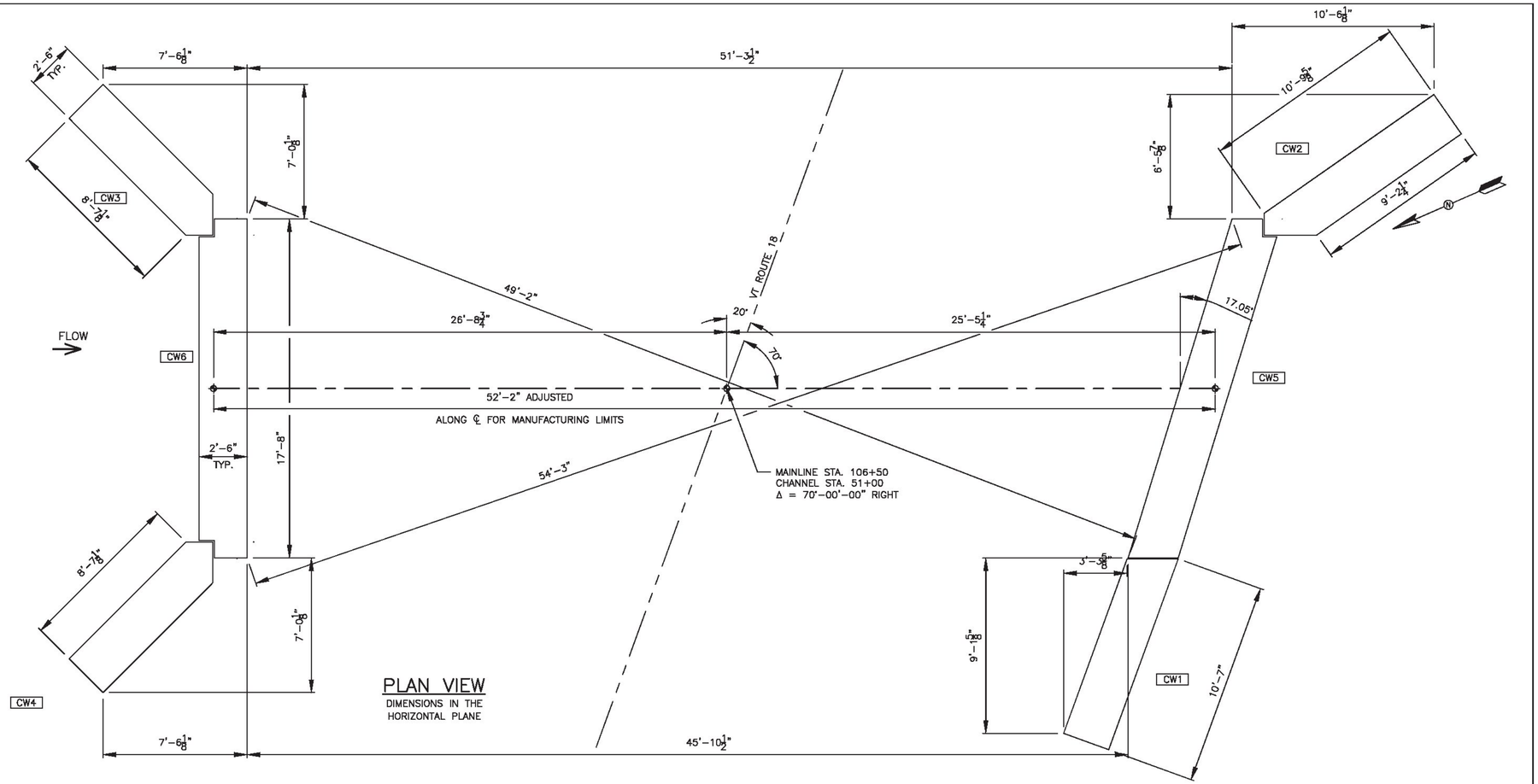
DELTA
SPECIALTY PRECAST CONCRETE ENGINEERS
860 HOOPER ROAD, ENDWELL, NY 13760
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PREPARED FOR:
CAMP PRECAST CONCRETE PRODUCTS
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MILTON, VT 05468
PHONE: (802)893-2401
FAX: (802)893-1542

DATE: 4/20/18	SHEET TITLE: TYPICAL DETAILS	DRWN BY:	BJC
SCALE: N.T.S.		CKD BY:	RPJ/RJA

PROJECT: TOWN OF WATERFORD, CALEDONIA, VT
16' x 8' BOX CULVERT BF 0225(4)
VT RT. 18 BRIDGE #7

CONTRACTOR:		DWG. I.D.	PD-02
DELTA PROJ. NO.:	2018.477.003	SHT. NO.	15 OF 16



PLAN VIEW
DIMENSIONS IN THE HORIZONTAL PLANE

STATE OF VERMONT
DARYL D. BURNS
No. 9031
Structural I
LICENSED PROFESSIONAL ENGINEER
5/17/18

REV.NO.	DATE	REVISION

PREPARED BY:
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TEL: (607) 231-6600 FAX: (607) 231-6650

PREPARED FOR:
CAMP PRECAST CONCRETE PRODUCTS
78 PRECAST RD
MILTON, VT 05468
PHONE: (802)893-2401
FAX: (802)893-1542

DATE: 4/20/18	SHEET TITLE: CUTOFF WALL PLAN		DRWN BY: BJC
SCALE: N.T.S.			CKD BY: RPJ/RJA

PROJECT:
TOWN OF WATERFORD, CALEDONIA, VT
16' x 8' BOX CULVERT BF 0225(4)
VT RT. 18 BRIDGE #7

CONTRACTOR: ...	DWG. I.D. PD-02
DELTA PROJ. NO.: 2018.477.003	SHT. NO. 16 OF 16

GENERAL NOTES:

1. MARKINGS:
   - 16' x 8'
   - ASTM C1577
   - 14' COVER
   - DATE
   - CAMP PRECAST
   - LABEL "TOP"
   - PIECE NUMBER
   - JOB NUMBER
   - NPCA
2. ALL CULVERT SECTIONS TO BE SHIPPED LAYING DOWN, AND ROTATED IN THE FIELD (BY OTHERS), OR STANDING UPRIGHT IF SHIPPING CONDITIONS ALLOWS.
3. ALL PRODUCTS TO BE SHIPPED AND ERECTED UTILIZING CHAINS OR STRAPS ATTACHED TO EMBEDDED ANCHORS.
4. THE CONTRACTOR/ERECTOR IS RESPONSIBLE WITH PROVIDING THE PROPER EQUIPMENT, CABLES, AND PULLEYS TO SAFELY AND PROPERLY HANDLE THE PRECAST PRODUCTS.
5. ASSURE LIFTERS ENGAGE EQUALLY, MIN. 60° SLING ANGLE.
6. REINFORCEMENT = BAR PER ASTM A775 GRADE 60. (EPOXY) ⚠ COATED CONFORMING TO ASTM A934 . REPAIR DAMAGED EPOXY COATING WITH EPOXY COATING ACCORDING TO ASTM D3963. USE EPOXY COATED STEEL WIRE TIES TO FASTEN EPOXY COATED REINFORCING, OR KODI-KLIPS
7. PROVIDE ADDITIONAL REINFORCING FOR INTERRUPTED WIRES EQUAL TO THE WIRES INTERRUPTED, HALF EACH SIDE. ADDITIONAL BARS TO BE IN THE SAME PLANE.
8. STRUCTURE SUITABILITY TO SITE CONDITIONS INCLUDING HYDRAULIC CAPACITY, EFFECT OF SCOUR, FROST & SETTLEMENT, AND INSTALLATION PLAN IS THE RESPONSIBILITY OF OTHERS.
9. WATER REPELLENT, SILANE SHALL BE APPLIED AS SHOWN.
10. EACH SECTION SHALL BE DRAWN TOGETHER WITH DRAW CONNECTORS AS SHOWN IN DRAWINGS. FILL ALL RECESSES & LIFTING VOIDS WITH 5,000 PSI (28 DAY) NON SHRINK GROUT MEETING REQUIREMENTS OF ITEM 707.03 MORTAR, TYPE IV IN THE LATEST EDITION OF THE VTRANS APPROVED PRODUCT LIST.
11. DESIGN BASED ON PLANS FOR PROJECT # BF 0225(5) DATED DECEMBER 27, 2017
12. CHAMFER TOP AND SIDE EDGES OF HEADWALL AND WINGWALLS ⚠
13. ALL LIFTERS TO BE GALVANIZED ⚠

CULVERT DESIGN NOTES

1. DESIGN PER AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS 7TH EDITION.
2. EARTH COVER = 14'.
3. BAR COVER = 2" U.N.O.
4. f'c @ 28 DAYS = 5,000 PSI
5. AIR ENTRAINED 7% ± 2% ⚠
6. REINFORCEMENT = ASTM A-775 GRADE 60, EPOXY COATED.

WINGWALL AND HEADWALL NOTES

1. DESIGN PER AASHTO LRFD 7th ED.
2. NO LIVE LOAD SURCHARGE
3. SOIL PARAMETERS: β'=26.57° OR 21.8°, ϕ=32°, μ=0.50, γ=125 PCF.
4. 5,400 PSF BEARING RESISTANCE.
5. f'c @ 28 DAYS = 5.0 KSI. ⚠
6. REINFORCEMENT = BAR PER ASTM A615 GRADE 60. (EPOXY COATED)
7. BAR COVER = 2" MIN. U.N.O.

MANUFACTURED BY:

CAMP PRECAST
CONCRETE PRODUCTS
78 PRECAST RD
MILTON, VT 05468
PHONE: (802)893-2401
FAX: (802)893-1542

PROJECT:

CULVERT REPLACEMENT
16'-0" x 8'-0" BOX CULVERT
PROJECT BF 0225(5) BRIDGE NO. 2
WATERFORD, VERMONT

PREPARED BY:

DELTA
SPECIALTY PRECAST CONCRETE ENGINEERS
860 HOOPER ROAD, ENDWELL, NY 13760
PHONE(607)231-6600 FAX(607)231-6650

DRAWING SCHEDULE

SHEET NO.	DESCRIPTION	REVISIONS	
		REV. NO.	DATE
1	COVER	1	5/7/2018
2	PLAN AND ELEVATION		
3	END VIEWS		
4	BC-2 REINFORCING AND DETAILS	1	5/7/2018
5	BC-1 AND BC-3 DETAILS	1	5/7/2018
6	WINGWALL WW1 DETAILS	1	5/7/2018
7	WINGWALL WW2 DETAILS	1	5/7/2018
8	WINGWALL WW3 DETAILS	1	5/7/2018
9	WINGWALL WW4 DETAILS	1	5/7/2018
10	ANCHOR DETAILS		
11	CUTOFF WALL DETAILS	1	5/7/2018
12	TYPICAL DETAILS	1	5/7/2018
13	CUTOFF WALL LAYOUT PLAN		

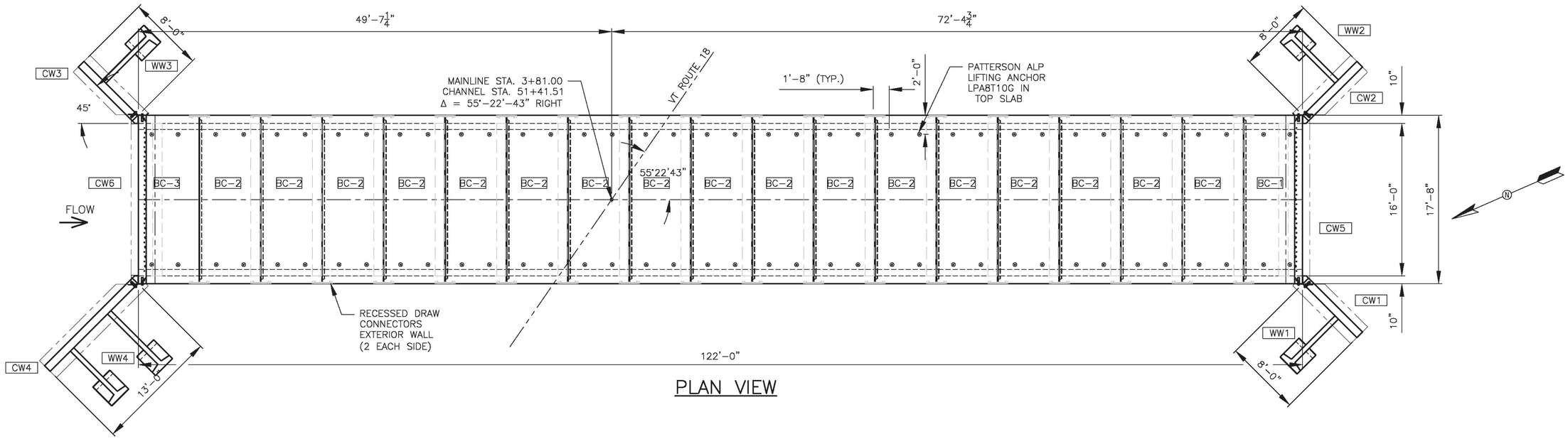
CURING, HANDLING, AND STORAGE PRACTICES AND PROCEDURES.

1. THE CONCRETE UTILIZED WILL BE PRODUCED, INSPECTED, HANDLED,PLACED,FINISHED AND REPAIRED AS PER SECTIONS 540.05 THROUGH 540.07 OF THE VERMONT STANDARD SPECIFICATIONS FOR CONSTRUCTION. THE SPECIFIC MIX DESIGN WAS APPROVED ON 4-12-17 BY VTAOT STRUCTURAL CONCRETE ENGINEER, JAMES WILD.
2. AFTER REACHING A MINIMUM STRIPPING STRENGTH OF 3,500 PSI THE CULVERT SECTION MAY BE REMOVED FROM THE FORM. ALL STRUCTURAL PIECES SHALL BE CURED UNTIL ATTAINING DESIGN STRENGTH OF 5,000 PSI BY LEAVING THEM IN THE MOLD OR, THE FOLLOWING:
   - A. IMMEDIATELY AFTER THE STRIPPING PROCESS IS COMPLETE, THE CULVERT SECTION WILL BE PLACED ONTO A WOODEN AND STEEL STRUCTURE TO BEGIN THE CURING PERIOD.
   - B. CURING PROCEDURES SHALL FOLLOW SECTIONS 501.17 AND 540.08 OF THE VERMONT STANDARD SPECIFICATIONS FOR CONSTRUCTION EXCEPT AS FOLLOWS;
     - a. SECTION 501.17(b) WATER CURING SHALL BE MODIFIED TO INCLUDE CONTINUOUS MISTING AND OR FOGGING TO MAINTAIN AS NEAR AS POSSIBLE AND ATMOSPHERE OF 100% HUMIDITY
   - C. WHEN THE CULVERT SECTION ATTAINS DESIGN STRENGTH AS EVIDENCED BY TEST CYLINDER BREAKS CURED WITH THE PRECAST BOX SECTION, CURING PROCEDURES WILL END AND THE CONTAINMENT BUILDING WILL BE REMOVED.
   - D. AT THIS POINT, SECONDARY POURS (BAFFLES, HEADWALLS) CAN BE PREFORMED.
3. STRUCTURAL SECONDARY POURS SHALL BE CURED IN ACCORDANCE WITH VERMONT STANDARD SPECIFICATIONS FOR CONSTRUCTION SECTION 501.17(5).
4. ⚠ AS PER SECTION 540.09 THE CULVERT SECTIONS "SHALL BE HANDLED, STORED,AND SHIPPED IN SUCH A MANNER AS TO MINIMIZE CHIPPING, CRACKS, FRACTURE, DISCOLORATION, AND EXCESSIVE BENDING STRESSES. UNITS DAMAGED BY HANDLING, STORAGE, OR SHIPPING SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE. LOCATE DUNNAGE BELOW LIFTERS.
5. AS PER SECTION 540.09 "PRECAST CONCRETE WILL NOT BE CONSIDERED FOR SHIPMENT UNTIL IT HAS BEEN ACCEPTED." (BY VTAOT OR IT'S REPRESENTATIVE). THIS ACCEPTANCE SHALL INCLUDE VERIFICATION THAT PIECES ARE FREE FROM DEFECTS AND ALL SPECIFICATION REQUIREMENTS INCLUDING THE COMPRESSIVE STRENGTH AND TOLERANCE REQUIREMENTS HAVE BEEN ACHIEVED. IN ADDITION, PRECAST CONCRETE WILL NOT BE CONSIDERED FOR SHIPMENT FOR A MINIMUM 72 HOURS FOLLOWING THE COMPLETION OF CASTING.

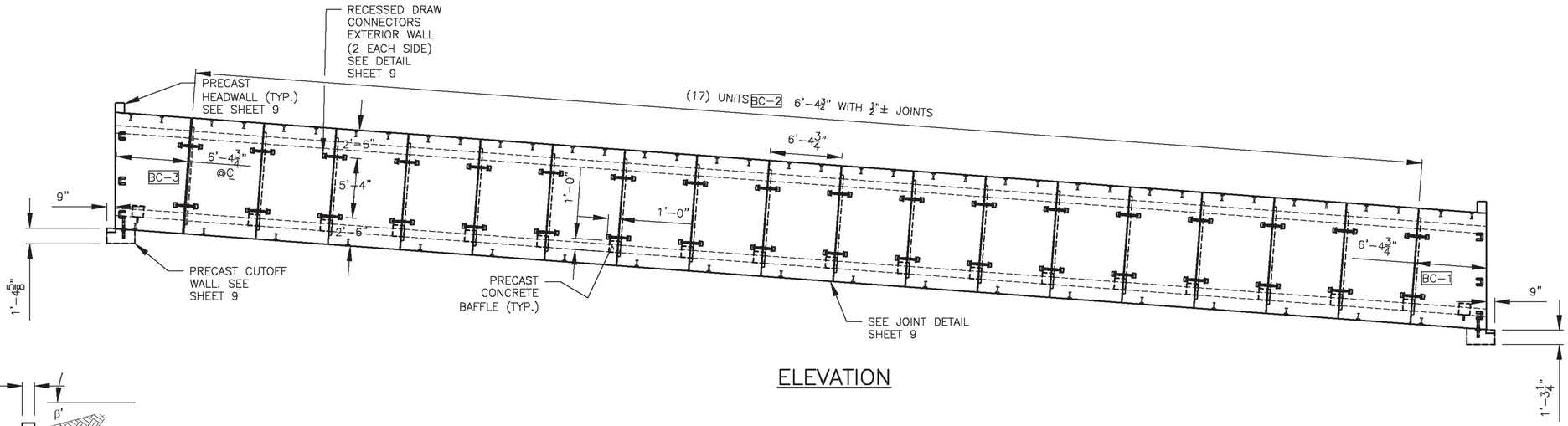
STATE OF VERMONT
DARYL D. BURNS
No. 9031
Structural I
LICENSED
PROFESSIONAL ENGINEER

5/8/18

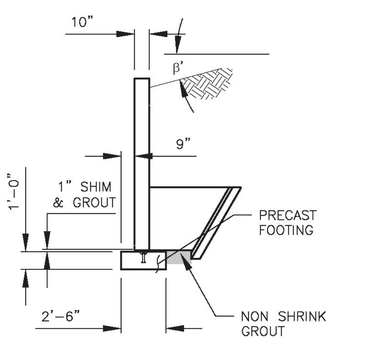
DELTA # 2018.477.003
3/30/18
1 OF 13



PLAN VIEW



ELEVATION



WINGWALL ELEVATION VIEW

STATE OF VERMONT
DARYL D. BURNS
No. 9031
Structural I
LICENSED
PROFESSIONAL ENGINEER

5/8/18

REV.NO.	DATE	REVISION

PREPARED BY:

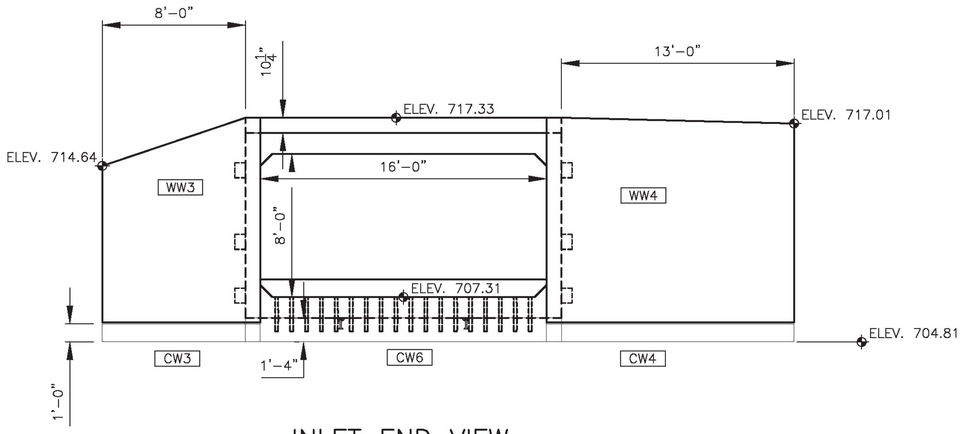
DELTA
SPECIALTY PRECAST CONCRETE ENGINEERS
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PREPARED FOR:
CAMP PRECAST
CONCRETE PRODUCTS
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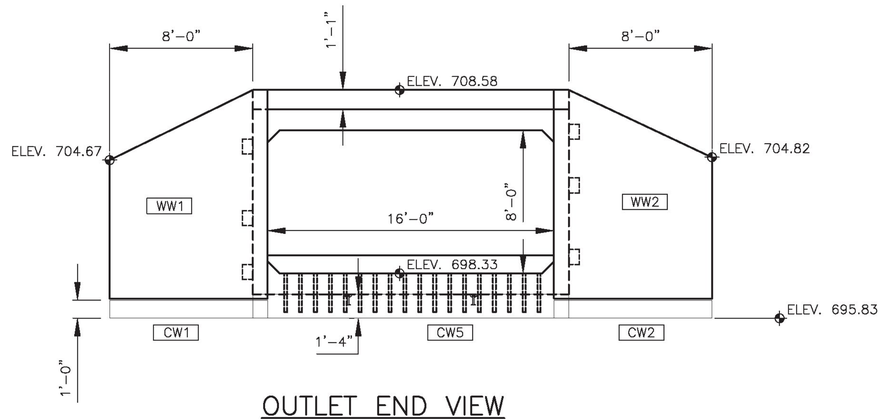
DATE: 3/29/18	SHEET TITLE: PLAN AND ELEVATION	DRWN BY:	BJC
SCALE: N.T.S.		CKD BY:	RJA

PROJECT:
WATERFORD, VT
16' x 8' BOX CULVERT BF 0225(5)
VT RT. 18 BRIDGE #2

CONTRACTOR: ...		DWG. I.D.	PD-01
DELTA PROJ. NO.:	2018.477.003	SHT. NO.	2 OF 13



INLET END VIEW



OUTLET END VIEW

TABLE OF UNITS				
MARK	QTY	LONGEST LENGTH	VOL (CY)	WEIGHT (LBS)
BC1	1	7'–4 1/8"	14.28	57,834
BC2	17	6'–4 1/2"	13.72	55,566
BC–3	1	6'–7"	14.19	57,470
WW1	1	8'–0"	3.05	12,353
WW2	1	8'–0"	3.07	12,434
WW3	1	8'–0"	3.15	12,758
WW4	1	13'–0"	5.85	23,693
CW5	1	17'–8"	2.2	9,072
CW6	1	17'–8"	2.1	8,545
CW1	1	8'–10 1/4"	0.7	2,835
CW2	1	8'–10 1/4"	0.7	2,835
CW3	1	8'–10 1/4"	0.7	2,835
CW4	1	13'–10 1/4"	1.2	4,738

STATE OF VERMONT
DARYL D. BURNS
No. 9031
Structural I
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PROFESSIONAL ENGINEER

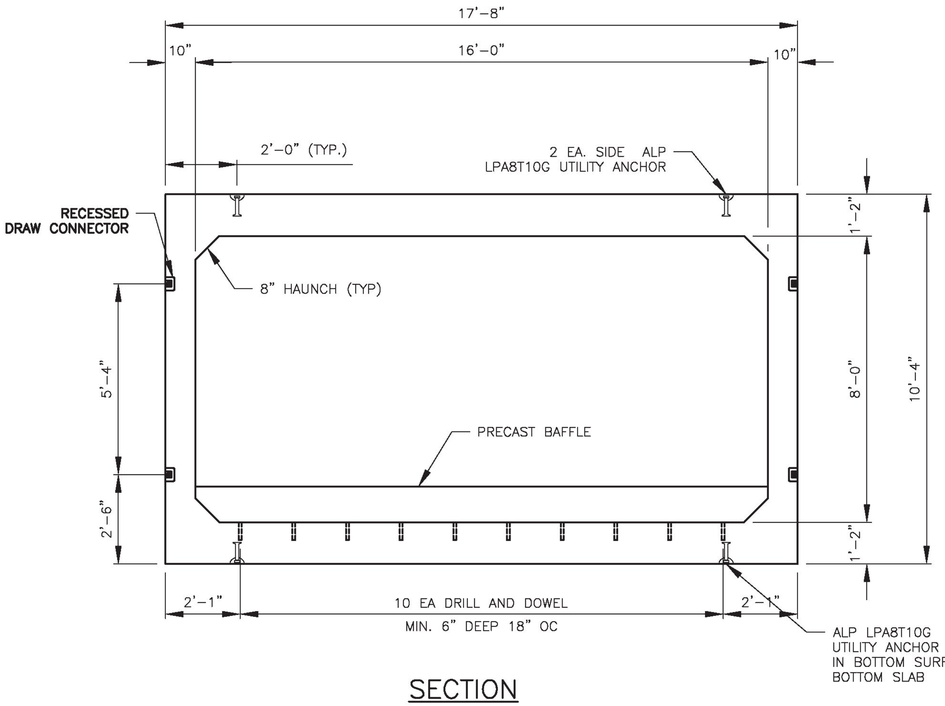
5/8/18

REV.NO.	DATE	REVISION

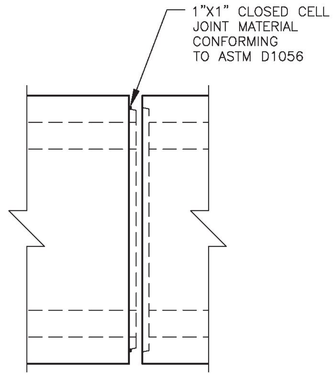
PREPARED FOR:
CAMP PRECAST CONCRETE PRODUCTS
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PHONE: (802)893-2401
FAX: (802)893-1542

PREPARED BY:
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SPECIALTY PRECAST CONCRETE ENGINEERS
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TEL: (607) 231–6600 FAX: (607) 231–6650

DATE: 3/29/18 | SHEET TITLE: END VIEWS | DRWN BY: BJC
SCALE: N.T.S. | CKD BY: RJA
PROJECT: WATERFORD, VT
16' x 8' BOX CULVERT BF 0225(5)
VT RT. 18 BRIDGE #2
CONTRACTOR: | DWG. I.D. PD–01
DELTA PROJ. NO.: 2018.477.003 | SHT. NO. 3 OF 13



SECTION



JOINT DETAILS

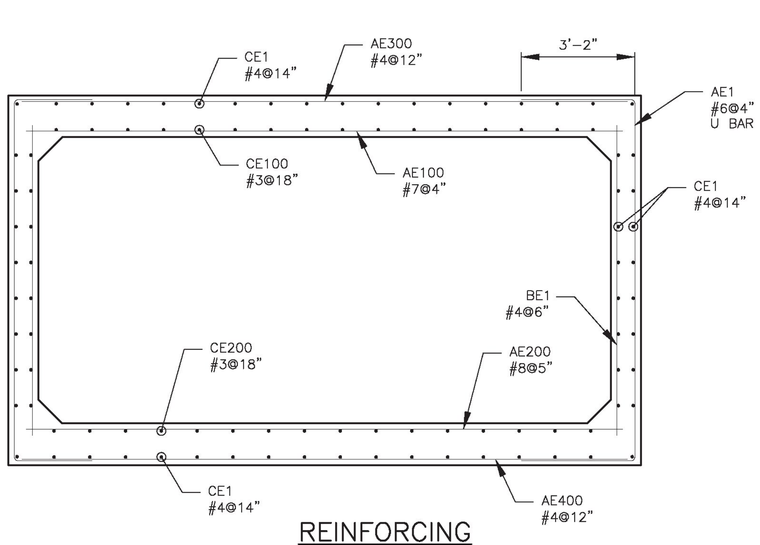
(ELEVATION VIEW)
(SEE SHEET 12)

17 EACH

BC-2 BAR SCHEDULE

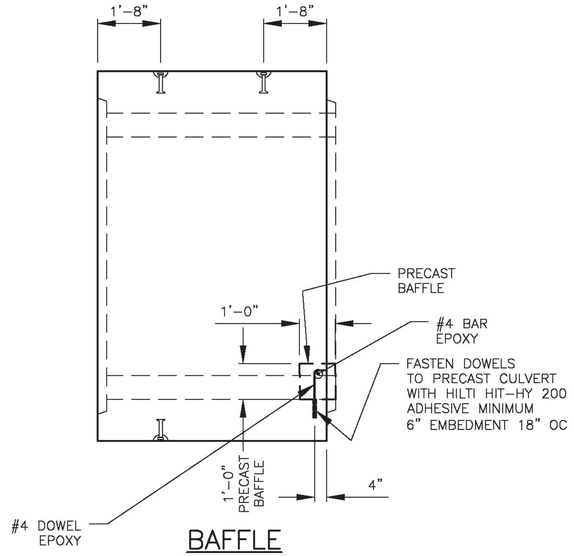
B C B
"U" BAR

MARK	QTY.	BAR SIZE	MAX. SPACING	LENGTH	TYPE	B	C
AE100	20	#7	4"	17'-3"	STR	–	–
AE200	16	#8	5"	17'-3"	STR	–	–
AE300	8	#4	12"	17'-3"	STR	–	–
AE400	8	#4	12"	17'-3"	STR	–	–
AE1	40	#6	4"	16'-4"	"U"	3'-2"	10'-0"
BE1	28	#4	6"	8'-6"	STR	–	-
CE100	11	#3	18"	6'-0 3/4"	STR	–	–
CE200	11	#3	18"	6'-0 3/4"	STR	–	–
CE1	62	#4	14"	6'-0 3/4"	STR	–	–
ALL EPOXY BAR							



REINFORCING SECTION

(2" CLEAR, MIN) ⚠
(ALL EPOXY BAR)



BAFFLE LOCAITON

(2" CLEAR)
(ALL EPOXY BAR)

STATE OF VERMONT
DARYL D. BURNS
No. 9031
Structural I
LICENSED
PROFESSIONAL ENGINEER

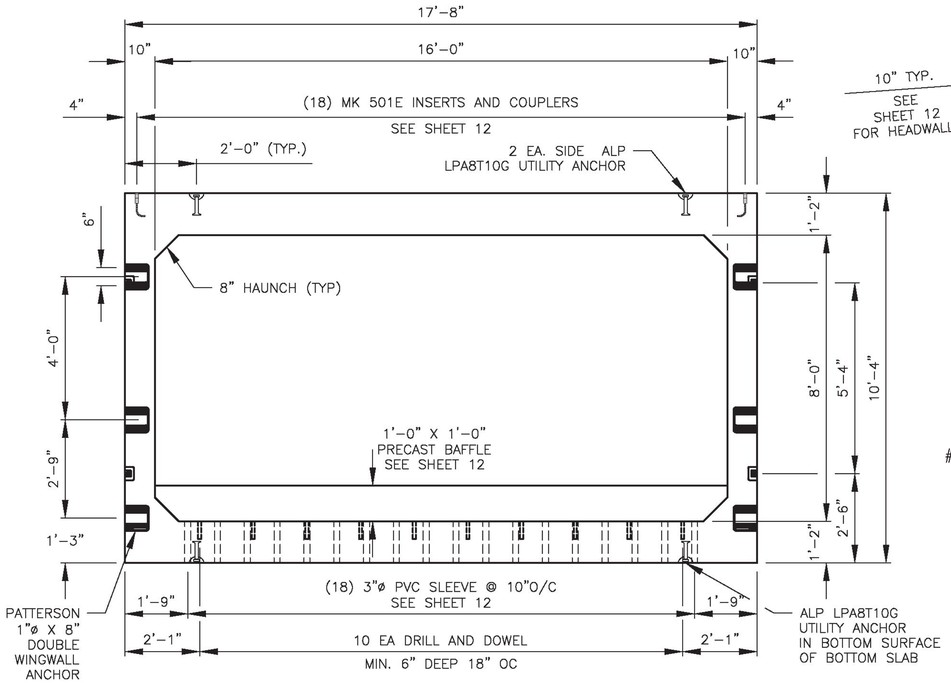
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1		

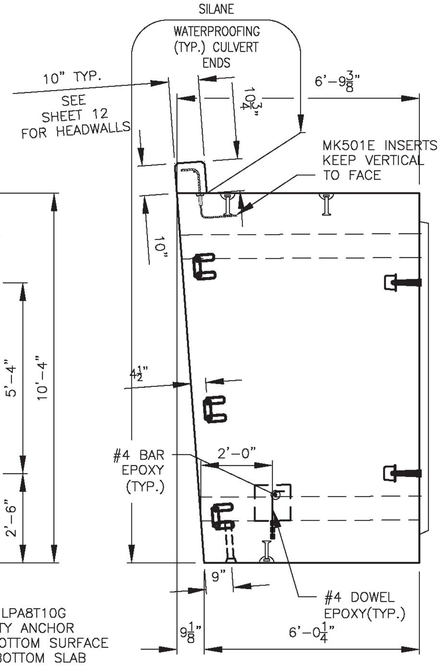
PREPARED FOR:
CAMP PRECAST CONCRETE PRODUCTS
78 PRECAST RD
MILTON, VT 05468
PHONE: (802)893-2401
FAX: (802)893-1542

PREPARED BY:
DELTA
SPECIALTY PRECAST CONCRETE ENGINEERS
860 HOOPER ROAD, ENDWELL, NY 13760
TEL: (607) 231-6600 FAX: (607) 231-6650

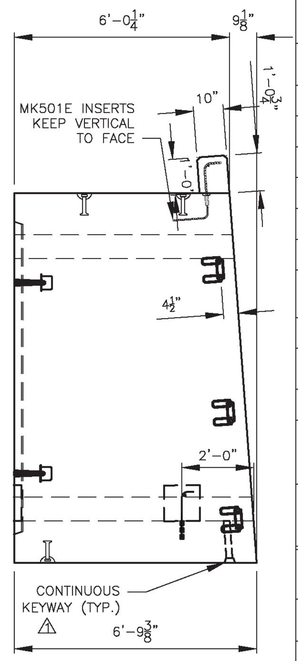
DATE: 3/29/18
SHEET TITLE: BC-2 REINFORCING AND DETAILS
DRWN BY: BJC
SCALE: N.T.S.
CKD BY: RJA
PROJECT:
WATERFORD, VT
16' x 8' BOX CULVERT BF 0225(5)
VT RT. 18 BRIDGE #2
CONTRACTOR: ...
DWG. I.D. PD-01
DELTA PROJ. NO.: 2018.477.003
SHT. NO. 4 OF 13



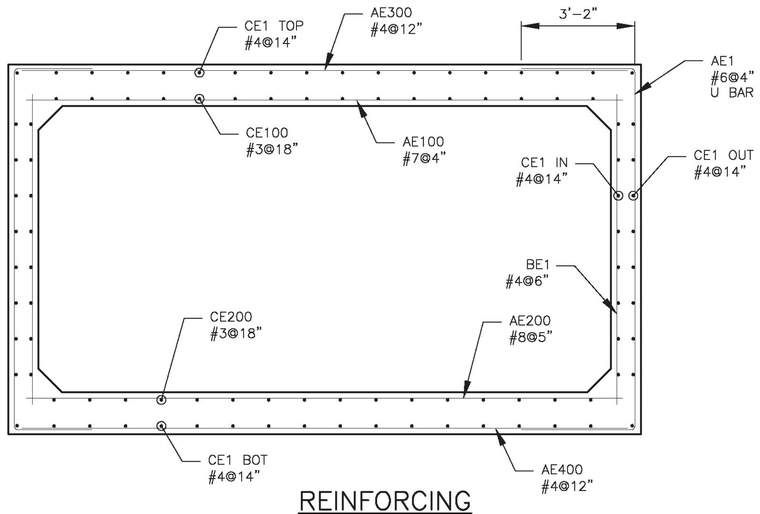
SECTION



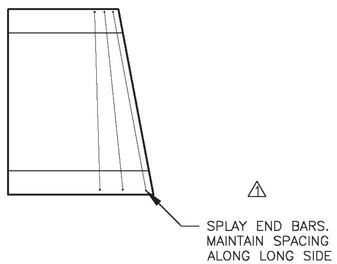
BC-3
ELEVATION



BC-1
ELEVATION



REINFORCING
SECTION
(2" CLEAR, MIN.) ⚠
(ALL EPOXY BAR)



BC-1 BAR SCHEDULE

B C B
"U" BAR

MARK	QTY.	BAR SIZE	MAX. SPACING	LENGTH	TYPE	B	C
AE100	17	#7	4"	17'-3"	STR	–	–
AE200	16	#8	5"	17'-3"	STR	–	–
AE300	7	#4	12"	17'-3"	STR	–	–
AE400	8	#4	12"	17'-3"	STR	–	–
AE1	38	#6	4"	16'-4"	"U"	3'-2"	10'-0"
BE1	28	#4	6"	4'-8"	STR	–	-
CE100	11	#3	18"	5'-4"	STR	–	–
CE200	11	#3	18"	6'-1 1/2"	STR	–	–
CE1 TOP	15	#4	14"	5'-8"	STR	–	–
CE1 BOT	15	#4	14"	6'-5 1/2"	STR		
CE1 OUT	16	#4	14"	SERIES 5'-9¼" TO 6'-4½"	STR		
CE1 IN	16	#4	14"	SERIES 5'-5 1/4"TO 6'-0 1/4"	STR		

BC-3 BAR SCHEDULE

B C B
"U" BAR

MARK	QTY.	BAR SIZE	MAX. SPACING	LENGTH	TYPE	B	C
AE100	21	#7	4"	17'-3"	STR	–	–
AE200	14	#8	5"	17'-3"	STR	–	–
AE300	8	#4	12"	17'-3"	STR	–	–
AE400	7	#4	12"	17'-3"	STR	–	–
AE1	38	#6	4"	16'-4"	"U"	3'-2"	10'-0"
BE1	28	#4	6"	4'-8"	STR	–	-
CE100	11	#3	18"	5'-4"	STR	–	–
CE200	11	#3	18"	6'-1 1/2"	STR	–	–
CE1 TOP	15	#4	14"	5'-8"	STR	–	–
CE1 BOT	15	#4	14"	6'-5 1/2"	STR	–	–
CE1 OUT	16	#4	14"	SERIES 5'-9¼" TO 6'-4½"	STR	–	–
CE1 IN	16	#4	14"	SERIES 6'-0 1/4" TO6'-8 1/4"	STR	–	–
ALL EPOXY BAR							

STATE OF VERMONT
DARYL D. BURNS
No. 9031
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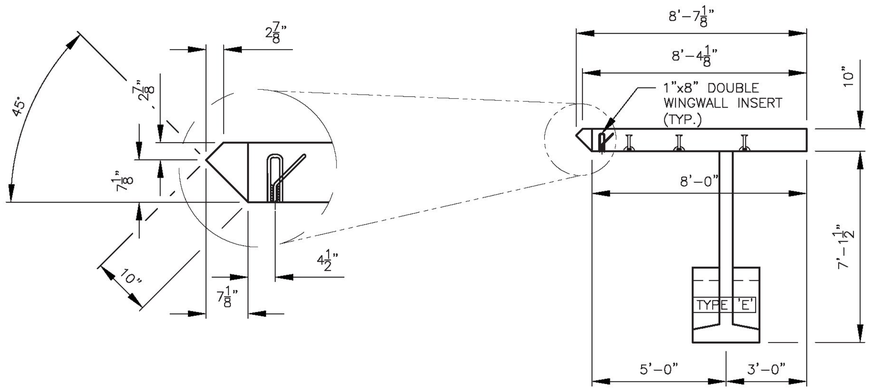
5/8/18

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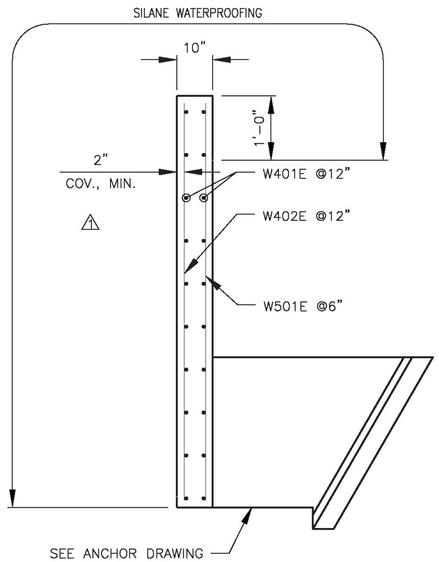
PREPARED FOR:
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78 PRECAST RD
MILTON, VT 05468
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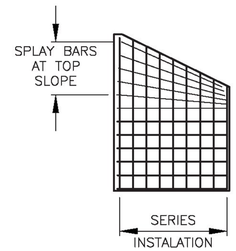
DATE: 3/29/18 | SHEET TITLE: BC-1 AND BC-3 DETAILS | DRWN BY: BJC
SCALE: N.T.S. | CKD BY: RJA
PROJECT: WATERFORD, VT
16' x 8' BOX CULVERT BF 0225(5)
VT RT. 18 BRIDGE #2
CONTRACTOR: | DWG. I.D. PD-01
DELTA PROJ. NO.: 2018.477.003 | SHT. NO. 5 OF 13



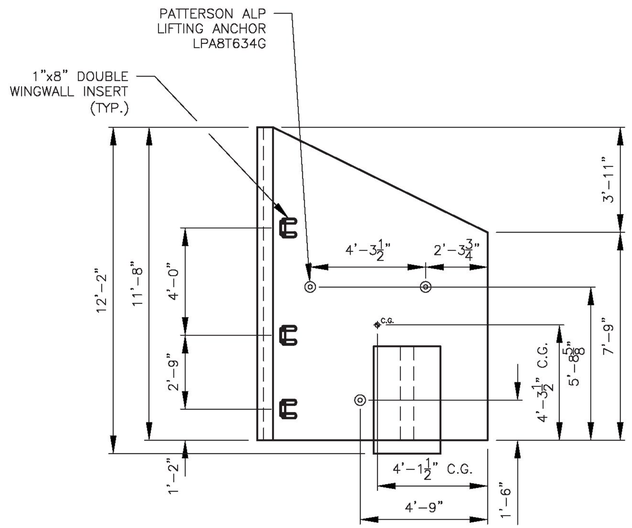
WINGWALL WW1



WINGWALL SECTION



TYPICAL REINFORCING ARRANGEMENT



WINGWALL WW1 ELEVATION

SHOWING BACK FACE OF WALL

WINGWALL WW1

PART	MARK	QTY	SIZE	SPC	NOTE	LEN	TYPE
WW (H)	W401E	24	#4	12"	–	94"	STR
WW (V)	W402E	9	#4	12"	SERIES	136" TO 90"	STR
WW (V)	W501E	18	#5	6"	SERIES	136" TO 90"	STR

NOTE: ALL BAR COVER 2" UNLESS NOTED OTHERWISE. QUANTITIES ARE FOR ONE WINGWALL.

STATE OF VERMONT
DARYL D. BURNS
No. 9031
Structural I
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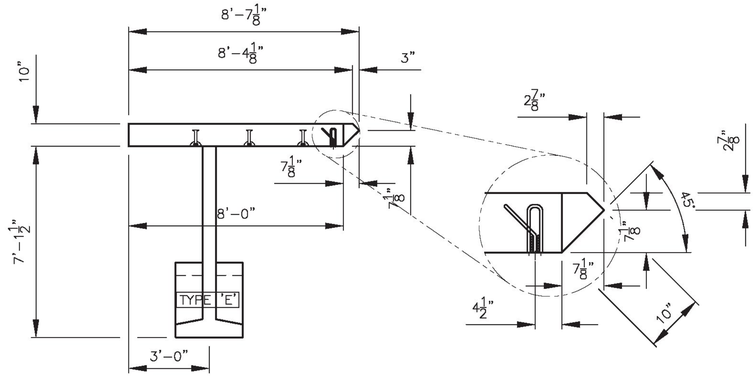
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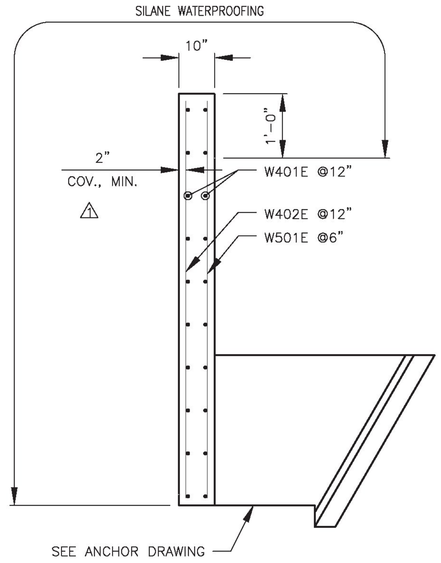
PREPARED FOR:
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78 PRECAST RD
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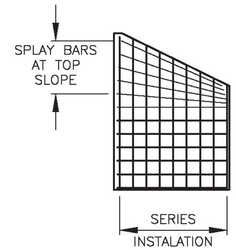
DATE: 3/29/18
SHEET TITLE: WINGWALL WW1 DETAILS
DRWN BY: BJC
SCALE: N.T.S.
CKD BY: RJA
PROJECT: WATERFORD, VT
16' x 8' BOX CULVERT BF 0225(5)
VT RT. 18 BRIDGE #2
CONTRACTOR: ...
DWG. I.D. PD-01
DELTA PROJ. NO.: 2018.477.003
SHT. NO. 6 OF 13



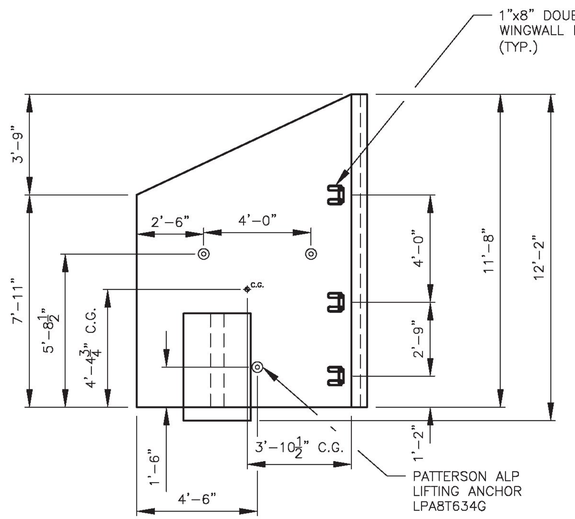
WINGWALL WW2



WINGWALL SECTION



TYPICAL REINFORCING ARRANGEMENT



WINGWALL WW2 ELEVATION

SHOWING BACK FACE OF WALL

WINGWALL WW2							
PART	MARK	QTY	SIZE	SPC	NOTE	LEN	TYPE
WW (H)	W401E	24	#4	12"	–	94"	STR
WW (V)	W402E	9	#4	12"	SERIES	136" TO 92"	STR
WW (V)	W501E	18	#5	6"	SERIES	136" TO 92"	STR

NOTE: ALL BAR COVER 2" UNLESS NOTED OTHERWISE. QUANTITIES ARE FOR ONE WINGWALL.

STATE OF VERMONT
DARYL D. BURNS
No. 9031
Structural I
LICENSED
PROFESSIONAL ENGINEER

5/8/18

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PREPARED BY:

DELTA
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TEL: (607) 231-6600 FAX: (607) 231-6650

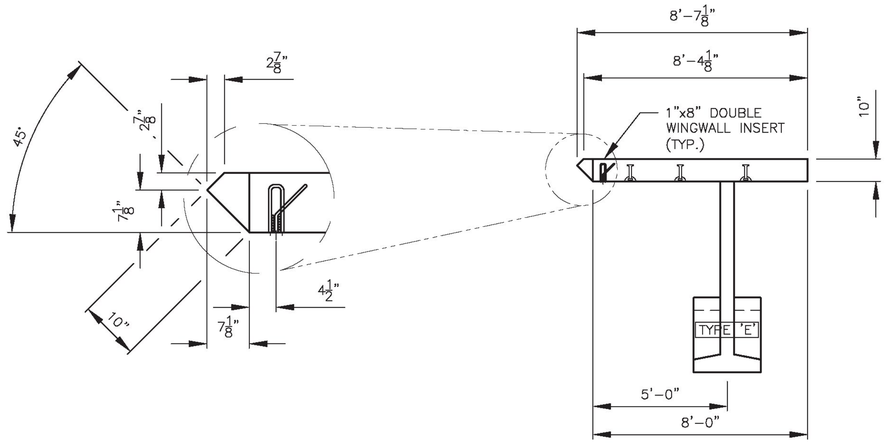
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CAMP PRECAST CONCRETE PRODUCTS
78 PRECAST RD
MILTON, VT 05468
PHONE: (802)893-2401
FAX: (802)893-1542

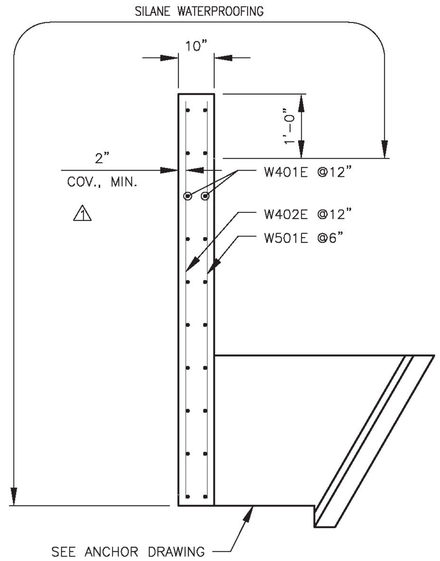
DATE: 3/29/18
SCALE: N.T.S.
SHEET TITLE: WINGWALL WW2 DETAILS
DRWN BY: BJC
CKD BY: RJA

PROJECT:
WATERFORD, VT
16' x 8' BOX CULVERT BF 0225(5)
VT RT. 18 BRIDGE #2

CONTRACTOR:
DWG. I.D. PD-01
DELTA PROJ. NO.: 2018.477.003
SHT. NO. 7 OF 13

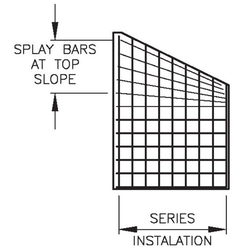


WINGWALL WW3

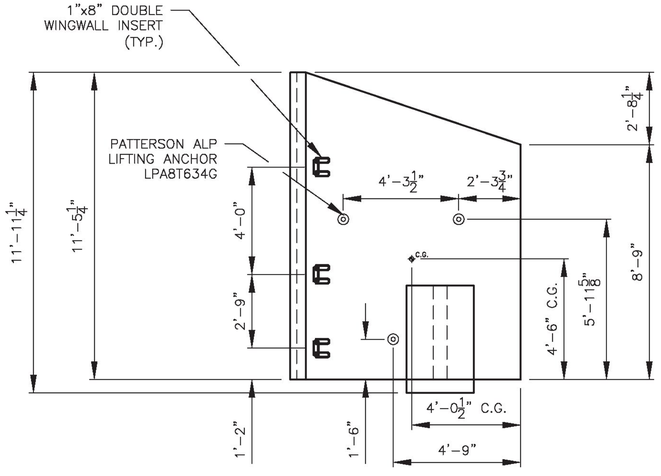


WINGWALL SECTION

ALL SURFACES COATED
WITH SILANE WATERPROOFING



TYPICAL REINFORCING ARRANGEMENT



WINGWALL WW3 ELEVATION

SHOWING BACK FACE OF WALL

WINGWALL WW3

PART	MARK	QTY	SIZE	SPC	NOTE	LEN	TYPE
WW (H)	W401E	24	#4	12"	–	94"	STR
WW (V)	W402E	9	#4	12"	SERIES	133" TO 102"	STR
WW (V)	W501E	18	#5	6"	SERIES	133" TO 102"	STR

NOTE: ALL BAR COVER 2" UNLESS NOTED OTHERWISE. QUANTITIES ARE FOR ONE WINGWALL.

STATE OF VERMONT
DARYL D. BURNS
No. 9031
Structural I
LICENSED
PROFESSIONAL ENGINEER

5/8/18

REV.NO.	DATE	REVISION
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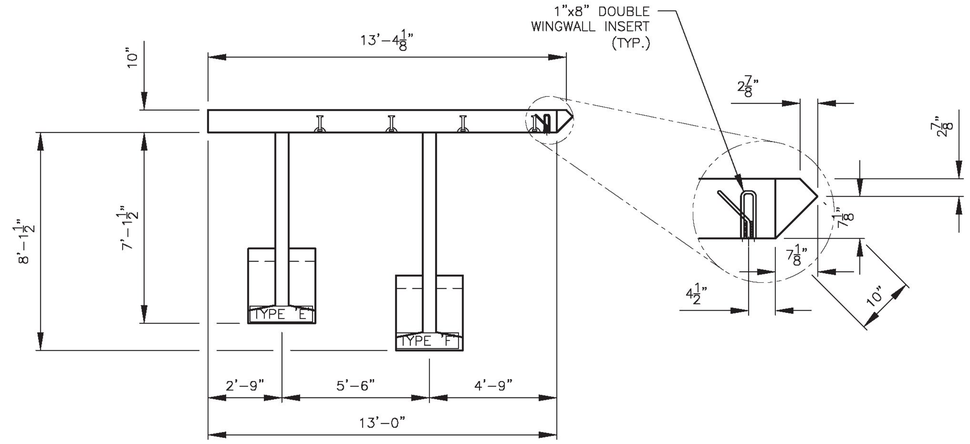
PREPARED BY:

DELTA
SPECIALTY PRECAST CONCRETE ENGINEERS
860 HOOPER ROAD, ENDWELL, NY 13760
TEL: (607) 231-6600 FAX: (607) 231-6650

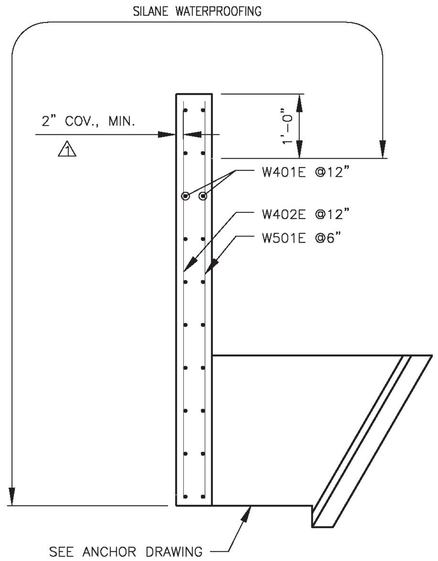
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78 PRECAST RD
MILTON, VT 05468
PHONE: (802)893-2401
FAX: (802)893-1542

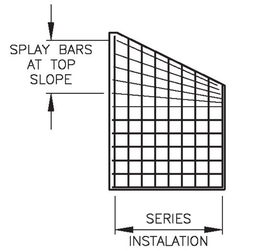
DATE: 3/29/18
SHEET TITLE: WINGWALL WW3 DETAILS
DRWN BY: BJC
SCALE: N.T.S.
CKD BY: RJA
PROJECT: WATERFORD, VT
16' x 8' BOX CULVERT
VT RT. 18 BRIDGE #2
CONTRACTOR: ---
DWG. I.D. PD-01
DELTA PROJ. NO.: 2018.477.003
SHT. NO. 8 OF 13



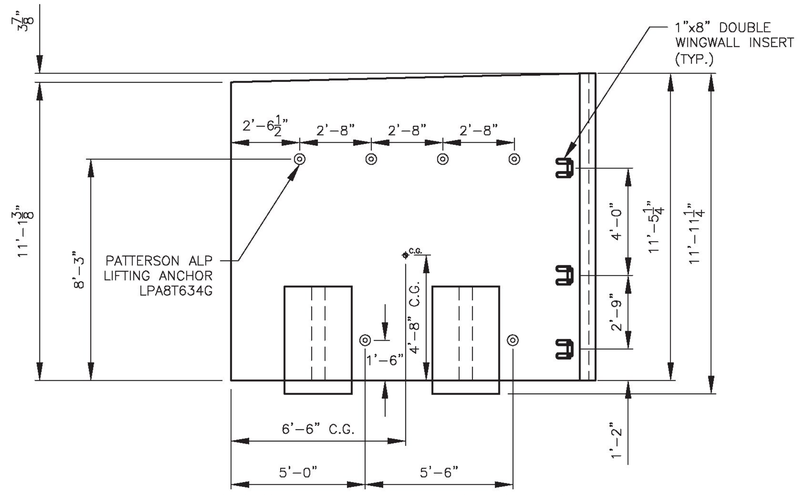
WINGWALL WW4



WINGWALL SECTION

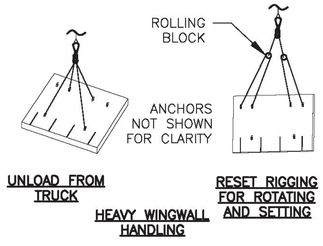


TYPICAL REINFORCING ARRANGEMENT



WINGWALL WW4 ELEVATION

SHOWING BACK FACE OF WALL



WINGWALL WW4							
PART	MARK	QTY	SIZE	SPC	NOTE	LEN	TYPE
WW (H)	W401E	24	#4	12"	–	152"	STR
WW (V)	W402E	13	#4	12"	SERIES	133" TO 102"	STR
WW (V)	W501E	26	#5	6"	SERIES	133" TO 129"	STR

NOTE: ALL BAR COVER 2" UNLESS NOTED OTHERWISE. QUANTITIES ARE FOR ONE WINGWALL.

STATE OF VERMONT
DARYL D. BURNS
No. 9031
Structural I
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PROFESSIONAL ENGINEER

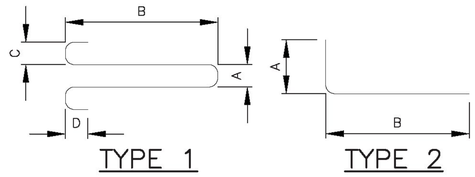
5/8/18

REV.NO.	DATE	REVISION

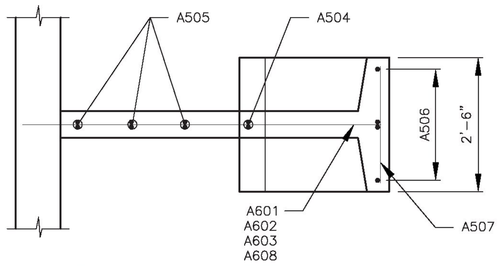
PREPARED FOR:
CAMP PRECAST CONCRETE PRODUCTS
78 PRECAST RD
MILTON, VT 05468
PHONE: (802)893-2401
FAX: (802)893-1542

PREPARED BY:
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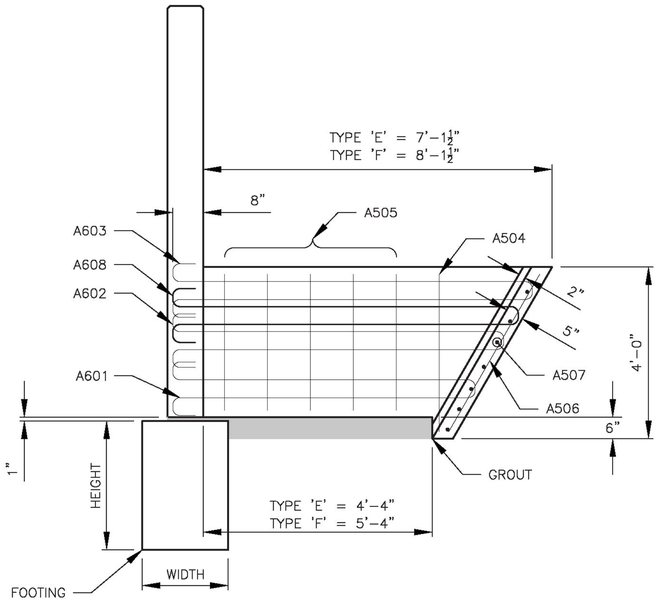
DATE: 3/29/18
SHEET TITLE: WINGWALL WW4 DETAILS
DRWN BY: BJC
SCALE: N.T.S.
CKD BY: RJA
PROJECT: WATERFORD, VT
16' x 8' BOX CULVERT
VT RT. 18 BRIDGE #2
CONTRACTOR:
DWG. I.D. PD-01
DELTA PROJ. NO.: 2018.477.003
SHT. NO. 9 OF 13



TYPE 1 TYPE 2



WINGWALL ANCHOR PLAN VIEW



WINGWALL SECTION

4 EACH

E ANCHOR BAR SCHEDULE (EPOXY)

PART	MARK	QTY	SIZE	SPC	LENGTH	TYPE	A	B	C	D
ANCHOR (E)	A601E	1	#6	0"	174"	TYP1	5"	72"	6"	6"
ANCHOR (E)	A602E	1	#6	0"	190"	TYP1	5"	80"	6"	6"
ANCHOR (E)	A603E	1	#6	0"	206"	TYP1	5"	88"	6"	6"
ANCHOR	A504	2	#5	0"	56"	TYP2	12"	44"	0"	0"
ANCHOR (E)	A505	8	#5	12"	38"	STR				
ANCHOR	A506	4	#5	VAR.	50"	STR	0"	0"	0"	0"
ANCHOR	A507	7	#5	8"	26"	STR	0"	0"	0"	0"
ANCHOR (E)	A608E	1	#6	0"	198"	TYP1	6"	84"	6"	6"
CUBIC YARDS = .64 WEIGHT = 1.3 TONS										
NOTE: ALL BAR COVER 2" UNLESS NOTED OTHERWISE										

1 EACH

F ANCHOR BAR SCHEDULE (EPOXY)

PART	MARK	QTY	SIZE	SPC	LENGTH	TYPE	A	B	C	D
ANCHOR (F)	A601E	1	#6	0"	198"	TYP1	6"	84"	6"	6"
ANCHOR (F)	A602E	1	#6	0"	214"	TYP1	6"	92"	6"	6"
ANCHOR (F)	A603E	1	#6	0"	230"	TYP1	6"	100"	6"	6"
ANCHOR	A504	2	#5	0"	56"	TYP2	12"	44"	0"	0"
ANCHOR (F)	A505	10	#5	12"	38"	STR				
ANCHOR	A506	4	#5	VAR.	50"	STR	0"	0"	0"	0"
ANCHOR	A507	7	#5	8"	26"	STR	0"	0"	0"	0"
ANCHOR (F)	A608E	1	#6	0"	222"	TYP1	6"	96"	6"	6"
CUBIC YARDS = .71 WEIGHT = 1.43 TONS										
NOTE: ALL BAR COVER 2" UNLESS NOTED OTHERWISE										

STATE OF VERMONT
DARYL D. BURNS
No. 9031
Structural I
LICENSED
PROFESSIONAL ENGINEER

5/8/18

REV.NO.	DATE	REVISION

PREPARED BY:

DELTA
SPECIALTY PRECAST CONCRETE ENGINEERS
860 HOOPER ROAD, ENDWELL, NY 13760
TEL: (607) 231-6600 FAX: (607) 231-6650

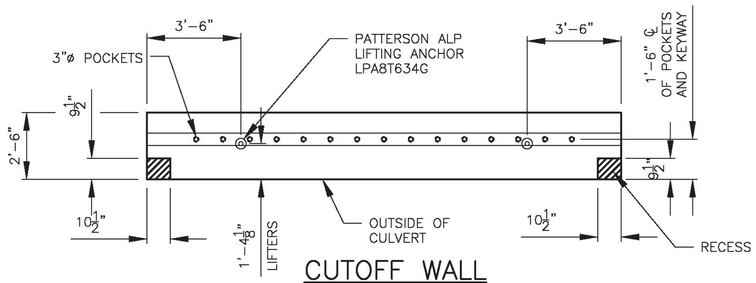
PREPARED FOR:

CAMP PRECAST CONCRETE PRODUCTS
78 PRECAST RD
MILTON, VT 05468
PHONE: (802)893-2401
FAX: (802)893-1542

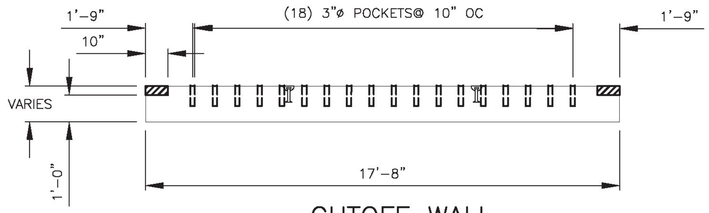
DATE: 3/29/18 | SHEET TITLE: ANCHOR DETAILS | DRWN BY: BJC
SCALE: N.T.S. | CKD BY: RJA

PROJECT:
WATERFORD, VT
16' x 8' BOX CULVERT BF 0225(5)
VT RT. 18 BRIDGE #2

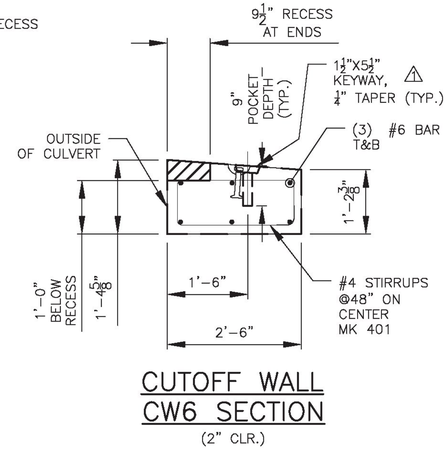
CONTRACTOR: ... | DWG. I.D. PD-01
DELTA PROJ. NO.: 2018.477.003 | SHT. NO. 10 OF 13



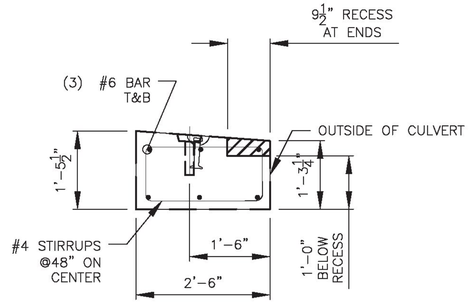
CUTOFF WALL
CW 5 & 6 PLAN



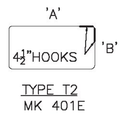
CUTOFF WALL
CW5 & CW6 ELEVATION



CUTOFF WALL
CW6 SECTION
(2" CLR.)



CUTOFF WALL
CW5 SECTION
(2" CLR.)



TYPE T2
MK 401E

1 EACH CW1, CW2 & CW3

BAR SCHEDULE FOR CW1, CW2 & CW3

BAR MARK	BAR SIZE	QTY.	BAR TYPE	LENGTH	"A"	"B"
MK401E	#4	3	T2	6'–5"	2'–2"	8"
MK601E	#6	2	STR	5'–10"	–	–
MK602E	#6	2	STR	7'–10"	–	–
MK603E	#6	2	STR	8'–3"	–	–

ALL EPOXY BAR

1 EACH

BAR SCHEDULE FOR CW4

BAR MARK	BAR SIZE	QTY.	BAR TYPE	LENGTH	"A"	"B"
MK401E	#4	5	T2	6'–5"	2'–2"	8"
MK601E	#6	2	STR	11'–0"	–	–
MK602E	#6	2	STR	12'–1"	–	–
MK603E	#6	2	STR	13'–3"	–	–

ALL EPOXY BAR

1 EACH

BAR SCHEDULE FOR CW5

BAR MARK	BAR SIZE	QTY.	BAR TYPE	LENGTH	"A"	"B"
MK401E	#4	6	T2	7'–1"	2'–2"	11 3/4"
MK601E	#6	6	STR	17'–4"	–	–

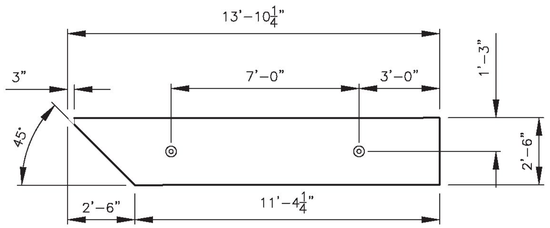
ALL EPOXY BAR

1 EACH

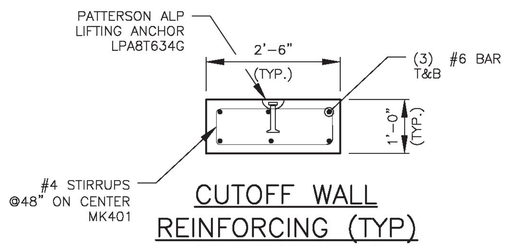
BAR SCHEDULE FOR CW6

BAR MARK	BAR SIZE	QTY.	BAR TYPE	LENGTH	"A"	"B"
MK401E	#4	6	T2	6'–10"	2'–2"	10 1/2"
MK601E	#6	6	STR	17'–4"	–	–

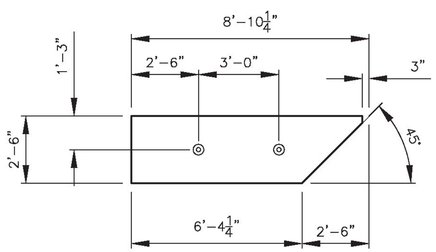
ALL EPOXY BAR



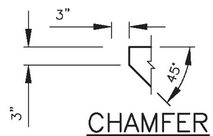
CUTOFF WALL PLAN
FOR CW4



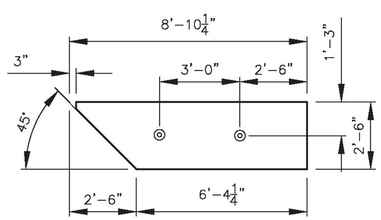
CUTOFF WALL
REINFORCING (TYP)
AT WINGWALLS
(2" CLR.)



CUTOFF WALL
CW1
& CW3



CHAMFER
SHARP TIPS OF
CUTOFF WALLS



CUTOFF WALL
CW2



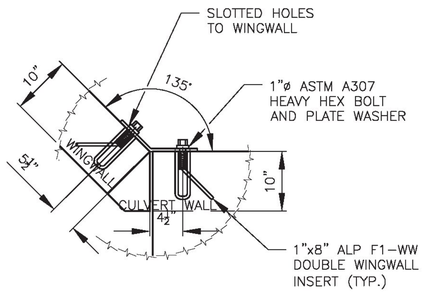
5/8/18

REV.NO.	DATE	REVISION
1		

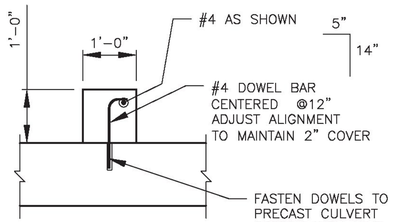
PREPARED FOR:
CAMP PRECAST CONCRETE PRODUCTS
78 PRECAST RD
MILTON, VT 05468
PHONE: (802)893-2401
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PREPARED BY:
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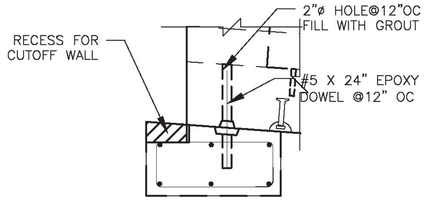
DATE: 3/29/18 | SHEET TITLE: CUTOFF WALL DETAILS | DRWN BY: BJC
SCALE: N.T.S. | CKD BY: RJA
PROJECT: WATERFORD, VT
16' x 8' BOX CULVERT BF 0225(5)
VT RT. 18 BRIDGE #2
CONTRACTOR:
DELTA PROJ. NO.: 2018.477.003 | DWG. I.D. PD–01 | SHT. NO. 11 OF 13



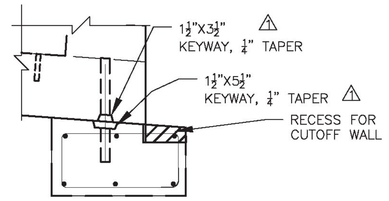
WINGWALL CONNECTION DETAIL
(TYPICAL)



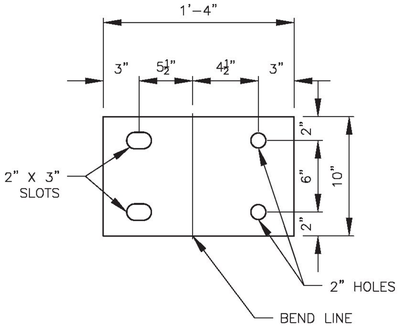
TYPICAL PRECAST BAFFLE SECTION
(SECONDARY POUR)



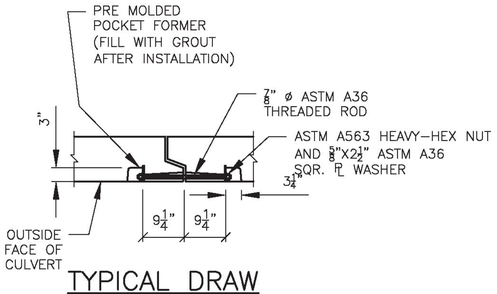
CUTOFF WALL CW2 SECTION
(SEE SHEET 11)



CUTOFF WALL CW1 SECTION
(SEE SHEET 11)

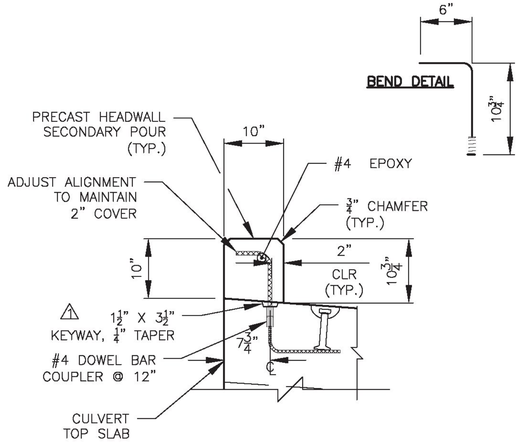


MID-WALL 10"x16"x3/4" FLAT ANCHOR PLATE DETAIL
(ELEVATION VIEW)

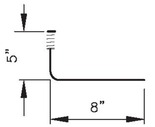


TYPICAL DRAW CONNECTOR DETAIL

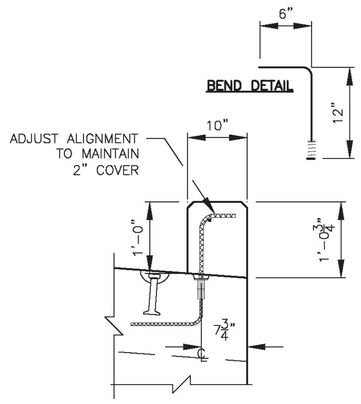
1. DRAW CONNECTOR HARDWARE TO BE HOT DIPPED GALVANIZED.
2. DRAW CONNECTOR TO REMAIN IN PLACE AFTER INSTALLATION.
3. DRAW CONNECTOR TO BE PULLED UNTIL THE JOINT MATERIAL IS COMPRESSED.



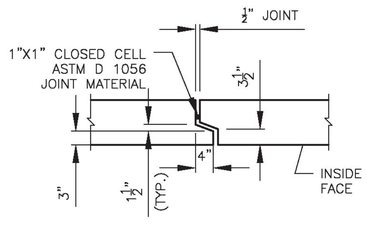
HEADWALL ON BC-3 CONNECTOR DETAIL
(TYPICAL)



(IN CULVERT TOP SLAB)
(TYPICAL)



HEADWALL NO BC-1 CONNECTOR DETAIL
(SEE TYPICAL CONNECTION)



TYPICAL JOINT DETAIL

STATE OF VERMONT
DARYL D. BURNS
No. 9031
Structural I
LICENSED
PROFESSIONAL ENGINEER

5/8/18

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1		

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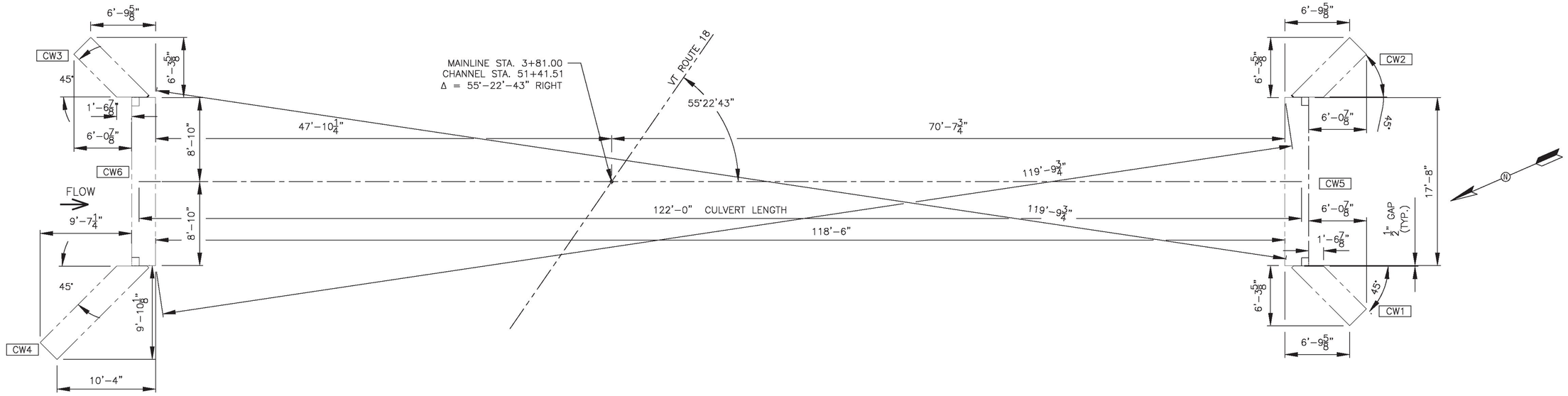
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DATE: 3/29/18	SHEET TITLE: TYPICAL DETAILS	DRWN BY:	BJC
SCALE: N.T.S.		CKD BY:	RJA

PROJECT:
WATERFORD, VT
16' x 8' BOX CULVERT BF 0225(5)
VT RT. 18 BRIDGE #2

CONTRACTOR: ...	DWG. I.D. PD-01
DELTA PROJ. NO.: 2018.477.003	SHT. NO. 12 OF 13



CUTOFF WALL LAYOUT PLAN

(ALL DIMENSION IN THE HORIZONTAL PLANE)

STATE OF VERMONT
DARYL D. BURNS
No. 9031
Structural I
LICENSED
PROFESSIONAL ENGINEER

5/8/18

REV.NO.	DATE	REVISION

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FAX: (802)893-1542

DATE: 3/29/18	SHEET TITLE: PLAN AND ELEVATION	DRWN BY:	BJC
SCALE: N.T.S.		CKD BY:	RJA

PROJECT:
WATERFORD, VT
16' x 8' BOX CULVERT BF 0225(5)
VT RT. 18 BRIDGE #2

CONTRACTOR:	DWG. I.D. PD-01
DELTA PROJ. NO.: 2018.477.003	SHT. NO. 13 OF 13