RECORD PLANS

CONTRACTOR: J. A. MCDONALD INC. – LYNDON CENTER, VT

RESIDENT ENGINEER: TIM POCKETTE

CONSTRUCTION BEGAN: OCTOBER 1, 2012

CONSTRUCTION COMPLETE:

RECORD PLANS BY: TIM POCKETTE & STEPHEN KENT

I HEREBY CERTIFY THAT ALL THE CONSTUCTION REQUIRED BY THIS SET OF DRAWINGS HAS BEEN ACCOMPLISHED AS INDICATED HEREIN.

BY _____ RESIDENT ENGINEER

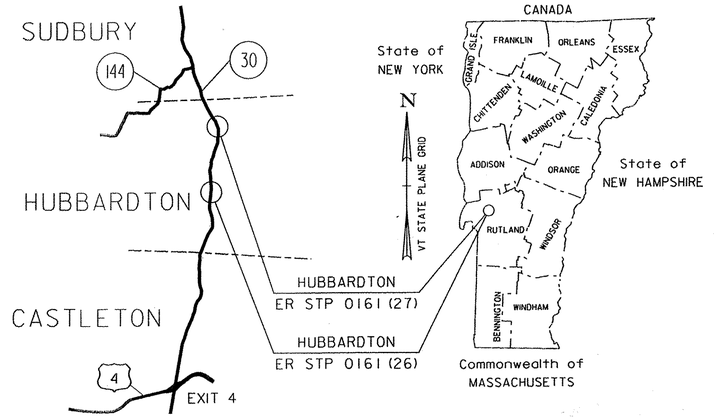
DATE 02-06-2013

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 HUBBARDTON
COUNTY OF RUTLAND



LOCATION MAP
NOT TO SCALE

HUBBARDTON ER STP 0161(26)
BRIDGE NO. 96

PROJECT LOCATION: BEGINNING AT A POINT ON VT ROUTE 30 APPROXIMATELY 2.022 MILES NORTH OF THE CASTLETON/HUBBARDTON TOWN LINE AND EXTENDING NORTHERLY 0.035 MILES.

PROJECT DESCRIPTION: REMOVAL OF THREE EXISTING PIPE CULVERTS, CONSTRUCTION OF A NEW PRECAST CONCRETE BURIED FRAME, AND ASSOCIATED ROADWAY AND CHANNEL WORK.

LENGTH OF STRUCTURE: 34.66 FEET (APPROX.) = 0.007 MILES
LENGTH OF ROADWAY: 150.34 FEET (APPROX.) = 0.028 MILES
LENGTH OF PROJECT: 185.00 FEET = 0.035 MILES

HUBBARDTON ER STP 0161(27)
BRIDGE NO. 98

PROJECT LOCATION: BEGINNING AT A POINT ON VT ROUTE 30 APPROXIMATELY 4.1 MILES NORTH OF THE CASTLETON/HUBBARDTON TOWN LINE AND EXTENDING NORTHERLY 0.033 MILES.

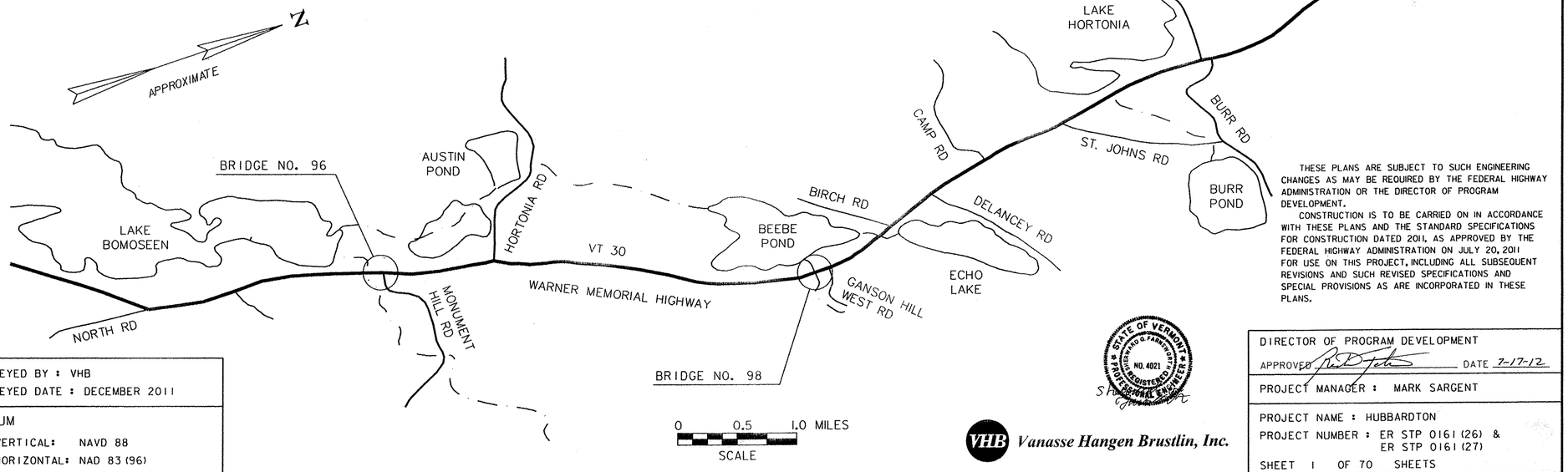
PROJECT DESCRIPTION: REMOVAL OF EXISTING CONCRETE FRAME, CONSTRUCTION OF A NEW PRECAST CONCRETE BOX CULVERT, AND ASSOCIATED ROADWAY AND CHANNEL WORK.

LENGTH OF STRUCTURE: 16.00 FEET (APPROX.) = 0.003 MILES
LENGTH OF ROADWAY: 159.00 FEET (APPROX.) = 0.030 MILES
LENGTH OF PROJECT: 175.00 FEET = 0.033 MILES

QUALITY ASSURANCE PROGRAM: LEVEL 2

CONVENTIONAL SYMBOLS

COUNTY LINE
TOWN LINE
LIMITS OF ACCESS
POINT OF ACCESS
FENCE LINE
STONE WALL
TRAVELED WAY
GUARD RAIL
RAILROAD
SURVEY LINE
CULVERT
POWER POLE
TELEPHONE POLE
TREES
CONTROL OF ACCESS
PROPERTY LINE
R.O.W. TAKING LINE
SLOPE RIGHTS
TOP OF CUT
TOE OF SLOPE



SURVEYED BY : VHB
SURVEYED DATE : DECEMBER 2011

DATUM
VERTICAL: NAVD 88
HORIZONTAL: NAD 83 (96)

0 0.5 1.0 MILES
SCALE

THESE PLANS ARE SUBJECT TO SUCH ENGINEERING CHANGES AS MAY BE REQUIRED BY THE FEDERAL HIGHWAY ADMINISTRATION OR THE DIRECTOR OF PROGRAM DEVELOPMENT.

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.

STATE OF VERMONT · EDWARD Q. FARNSWORTH · NO. 4021 · REGISTERED · PROFESSIONAL ENGINEER

DIRECTOR OF PROGRAM DEVELOPMENT
APPROVED _____ DATE 7-17-12

PROJECT MANAGER : MARK SARGENT

PROJECT NAME : HUBBARDTON
PROJECT NUMBER : ER STP 0161(26) & ER STP 0161(27)

SHEET 1 OF 70 SHEETS

VHB Vanasse Hangen Brustlin, Inc.

VHB 57478.01

INDEX OF COMPOSITE SHEETS

INDEX OF ER STP 0016I(26) SHEETS

INDEX OF ER STP 0016I(27) SHEETS

STRUCTURAL DETAILS

SD-501.00	CONCRETE DETAILS AND NOTES	5-07-2010
SD-502.00	CONCRETE DETAILS AND NOTES	6-04-2010

STANDARDS LIST

A-76	STANDARDS FOR TOWN AND DEVELOPMENT ROADS	03-03-2003
B-5	EMBANKMENT ON EARTH SLOPE	06-01-1994
	EMBANKMENT ON ROCK SLOPE	
	MUCK EXCAVATION	
	TYPICAL SLOPE ROUNDING	
B-71	STANDARDS FOR RESIDENTIL AND COMMERCIAL DRIVES	07-08-2005
C-10	CURBING	02-11-2008
E-100	CONSTRUCTION APPROACH SIGNS	01-02-2004
E-102	CONSTRUCTION SIGN DETAILS	06-30-2003
E-102A	CONSTRUCTION SIGN DETAILS	05-01-2004
E-106	TRAFFIC CONTROL MISCELLANEOUS DETAILS	03-01-2004
E-107A	BREAKAWAY BARRICADE DETAILS	06-08-2009
E-121	STANDARD SIGN PLACEMENT CONVENTIONAL ROAD	08-08-1995
E-136A	U.S. ROUTE MARKER SIGN DETAILS	08-08-1995
E-136B	STATE ROUTE MARKER SIGN DETAILS	08-08-1995
E-136C	STATE NUMERED TOWN HIGHWAY SIGN DETAILS	08-08-1995
E-155	WARNING SIGN DETAILS	05-01-2004
E-164	SQUARE STEEL SIGN POSTS	06-08-2009
E-193	PAVEMENT MARKING DETAILS	08-18-1995
G-1	STEEL BEAM GUARDRAIL WITH STEEL POSTS	
	STEEL BEAM GUARDRAIL WITH WOOD POSTS	01-03-2000
G-1d	STEEL BEAM GUARDRAIL APPROACH END TERMINAL	01-03-2000
	STEEL BEAM GUARDRAIL TRAILING END TERMINAL	
	ANCHOR FOR STEEL BEAM GUARDRAIL	
	STEEL BEAM MEDIAN BARRIER	
G-19	GENERIC PLANS FOR GUARDRAIL END TERMINALS	11-15-2002
S-360A	BRIDGE RAILING, GALVANIZED 2 RAIL BOX BEAM	04-23-2012
S-360B	GUARDRAIL APPROACH SECTION, GALVANIZED 2 RAIL BOX BEAM	04-23-2012
S-363	THRIE BEAM TO STANDARD STEEL BEAM TRANSITION SECTION	04-23-2012

COMPOSITE GENERAL NOTES FOR CONTROL OF WORK

1. THE CONTRACTOR SHALL BE LIMITED TO IMPACTING TRAFFIC IN ONE LOCATION ON VERMONT ROUTE 30 AT ANY GIVEN TIME. SEE SECTION 900 OF THE SPECIAL PROVISIONS FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

2. THE CONTRACTOR SHALL COORDINATE THEIR CONSTRUCTION SCHEDULE WITH THE UTILITY COMPANIES IN THE VICINITY OF BRIDGE NO. 96 DUE TO THE CONCURRENT RELOCATION OF UNDERGROUND TELEPHONE AND CABLE LINES THAT ARE HAVING TO BE RELOCATED OUTSIDE OF THE EXISTING STATE RIGHT-OF-WAY OR PLACED AERIAL ON EXISTING OR NEW POLES AS DETAILED ON SHEET 15 OF 70.

3. THE CONTRACTOR SHALL REPLACE BRIDGE NO. 98 BEFORE REPLACING BRIDGE NO. 96. ONLY ONE STRUCTURE SHALL BE CLOSED TO TRAFFIC AT ANY ONE TIME.

4. THE CONTRACTOR SHALL SUBMIT A CONSTRUCTION SEQUENCE AND PHASING PLAN TO THE ENGINEER DETAILING THE CONTRACTOR'S CONSTRUCTION SCHEDULE, IMPACTS TO VERMONT ROUTE 30 TRAFFIC, AND UTILITY RELOCATION ACTIVITIES TO BE PERFORMED BY THE UTILITY COMPANIES. NO CONSTRUCTION WORK SHALL PROCEED UNTIL THE PLAN IS APPROVED BY THE ENGINEER.

VHB Vanasse Hangen Brustlin, Inc.

PROJECT NAME: HUBBARDTON
PROJECT NUMBER: ER STP 0161(26) & ER STP 0161(27)

FILE NAME: z11c288-2901ndex.dgn | PLOT DATE: 7/16/2012
PROJECT LEADER: M.A. COLGAN | DRAWN BY: C.L. CILLEY
DESIGNED BY: S.G. FARNSWORTH | CHECKED BY: S.G. FARNSWORTH
COMPOSITE INDEX OF SHEETS | SHEET 2 OF 70

STATE OF VERMONT
AGENCY OF TRANSPORTATION

QUANTITY SHEET 1

SUMMARY OF ESTIMATED QUANTITIES								TOTALS		DESCRIPTIONS				DETAILED SUMMARY OF QUANTITIES		
ROADWAY (BRIDGE 96)	EROSION CONTROL (BRIDGE 96)	BRIDGE NO. 96	FULL C.E. ITEMS (BRIDGE 96)	ROADWAY (BRIDGE 98)	EROSION CONTROL (BRIDGE 98)	BRIDGE NO. 98	FULL C.E. ITEMS (BRIDGE 98)	GRAND TOTAL	FINAL	UNIT	ITEMS	ITEM NUMBER	ROUND	QUANTITIES	UNIT	ITEMS
0.5				0.5				1		LS	CLEARING AND GRUBBING, INCLUDING INDIVIDUAL TREES AND STUMPS	201.10				
410				470				880		CY	COMMON EXCAVATION	203.15			(SEE	SHEETS 11 AND 44 FOR PROJECT EARTHWORKS SUMMARIES)
		540				10		550		CY	UNCLASSIFIED CHANNEL EXCAVATION	203.27				
1				1				2		CY	TRENCH EXCAVATION OF EARTH, EXPLORATORY (N.A.B.I.)	204.22				
		200				20		220		CY	GRANULAR BACKFILL FOR STRUCTURES	204.30				
		700				440		1140		CY	COFFERDAM EXCAVATION, EARTH	208.30				
		80				50		130		CY	COFFERDAM EXCAVATION, ROCK	208.35				
		1						1		LS	COFFERDAM (ABUTMENT NO. 1)	208.40				
		1						1		LS	COFFERDAM (ABUTMENT NO. 2)	208.40				
						1		1		LS	COFFERDAM (BRIDGE 98)	208.40				
220				360				580		SY	COLD PLANING, BITUMINOUS PAVEMENT	210.10				
470				430				900		CY	SUBBASE OF DENSE GRADED CRUSHED STONE	301.35				
100				90				190		CWT	EMULSIFIED ASPHALT	404.65				
1						1		2		LU	PRICE ADJUSTMENT, ASPHALT CEMENT (N.A.B.I.)	406.50				
		12				9		21		GAL	WATER REPELLENT, SILANE	514.10				
		11						11		LF	JOINT SEALER, HOT POURED	524.11				
		70.4				32		102.4		LF	BRIDGE RAILING, GALVANIZED 2 RAIL BOX BEAM	525.33				
		1						1		EACH	REMOVAL OF STRUCTURE (THREE 60" X 60' HDPE)	529.15				
						1		1		EACH	REMOVAL OF STRUCTURE (TWO 48" X 40' HDPE)	529.15				
						1		1		LS	PRECAST CONCRETE STRUCTURE (14'-0" X 6'-0" X 34'-3" BOX)	540.10				
		1						1		LS	PRECAST CONCRETE STRUCTURE (32'-0" X 10'-0" X 40'-0" FRAME OR ARCH)	540.10				
5				5				10		CY	STONE FILL, TYPE I	613.10				
		120				40		160		CY	STONE FILL, TYPE II	613.11				
145				160				305		LF	CAST-IN-PLACE CONCRETE CURB, TYPE B	616.28				
14.5								14.5		LF	STEEL BEAM GUARDRAIL, GALVANIZED	621.20				
				22.75				22.75		LF	HD STEEL BEAM GUARDRAIL, GALVANIZED	621.21				
1				1				2		EACH	MANUFACTURED TERMINAL SECTION, FLARED	621.50				
2				1				3		EACH	MANUFACTURED TERMINAL SECTION, TANGENT	621.51				
1				2				3		EACH	ANCHOR FOR STEEL BEAM RAIL	621.60				
4				4				8		EACH	GUARDRAIL APPROACH SECTION, GALVANIZED 2 RAIL BOX BEAM	621.72				
241				180				421		LF	REMOVAL AND DISPOSAL OF GUARDRAIL	621.80				
63				90				153		LF	TEMPORARY TRAFFIC BARRIER	621.90				
300				80				380		HR	UNIFORMED TRAFFIC OFFICERS	630.10				
720				400				1120		HR	FLAGGERS	630.15				
			0.5				0.5	1		LS	FIELD OFFICE, ENGINEERS	631.10				
			0.5				0.5	1		LS	TESTING EQUIPMENT, BITUMINOUS	631.17				
			1500				1500	3000		DL	FIELD OFFICE TELEPHONE (N.A.B.I.)	631.26				
0.5				0.5				1		LS	MOBILIZATION/DEMOBILIZATION	635.11				
1								1		LS	TRAFFIC CONTROL (BRIDGE 96)	641.10				
				1				1		LS	TRAFFIC CONTROL (BRIDGE 98)	641.10				

VHB Vanasse Hangen Brustlin, Inc.

PROJECT NAME: HUBBARDTON
PROJECT NUMBER: ER STP 0161(26) & ER STP 0161(27)

FILE NAME: z11c288-290quantity.dgn
PROJECT LEADER: M.A. COLGAN
DESIGNED BY: E.A. FIALA
QUANTITY SHEET #1

PLOT DATE: 07/16/2012
DRAWN BY: E.A. FIALA
CHECKED BY: S. FARNSWORTH
SHEET 3 OF 70

VHB 57478

STATE OF VERMONT
AGENCY OF TRANSPORTATION

QUANTITY SHEET 2

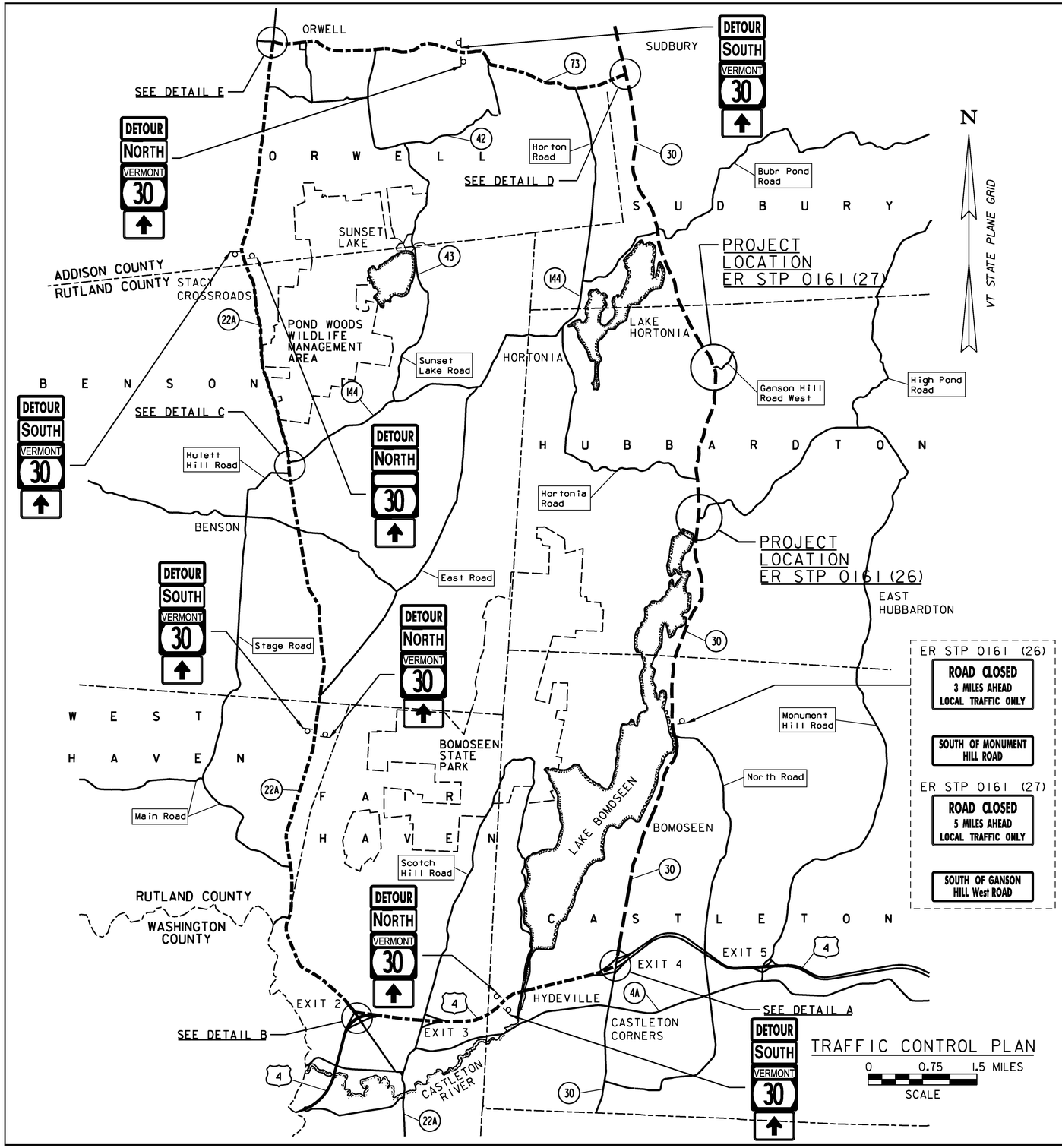
SUMMARY OF ESTIMATED QUANTITIES									TOTALS		DESCRIPTIONS				DETAILED SUMMARY OF QUANTITIES		
		ROADWAY (BRIDGE 96)	EROSION CONTROL (BRIDGE 96)	BRIDGE NO. 96	FULL C.E. ITEMS (BRIDGE 96)	ROADWAY (BRIDGE 98)	EROSION CONTROL (BRIDGE 98)	BRIDGE NO. 98	FULL C.E. ITEMS (BRIDGE 98)	GRAND TOTAL	FINAL	UNIT	ITEMS	ITEM NUMBER	ROUND	QUANTITIES	UNIT	ITEMS
		0.5				0.5				1		LS	PUBLIC RELATIONS OFFICER	641.12				
		90				30				120		DAY	PORTABLE CHANGEABLE MESSAGE SIGN RENTAL	641.17				
		620				528				1148		LF	4 INCH WHITE LINE	646.20				
		700				470				1170		LF	4 INCH YELLOW LINE	646.21				
		28				16				44		LF	24 INCH STOP BAR	646.26				
		4				4				8		EACH	LETTER OR SYMBOL	646.30				
				310				1950		2260		SY	GEOTEXTILE UNDER STONE FILL	649.31				
			110				80			190		SY	GEOTEXTILE FOR SILT FENCE, WOVEN WIRE REINFORCED	649.515				
			20				20			40		SY	GEOTEXTILE FOR FILTER CURTAIN	649.61				
			10				2.5			12.5		LB	SEED	651.15				
			50				20			70		LB	FERTILIZER	651.18				
			0.2				0.1			0.3		TON	AGRICULTURAL LIMESTONE	651.20				
			0.2				0.1			0.3		TON	HAY MULCH	651.25				
			10				20			30		CY	TOPSOIL	651.35				
			25				30			55		SY	GRUBBING MATERIAL	651.40				
			1							1		LS	EPSC PLAN (BRIDGE 96)	652.10				
							1			1		LS	EPSC PLAN (BRIDGE 98)	652.10				
			20							20		HR	MONITORING EPSC PLAN (BRIDGE 96)	652.20				
							10			10		HR	MONITORING EPSC PLAN (BRIDGE 98)	652.20				
			1							1		LU	MAINTENANCE OF EPSC PLAN (N.A.B.I.) (BRIDGE 96)	652.30				
							1			1		LU	MAINTENANCE OF EPSC PLAN (N.A.B.I.) (BRIDGE 98)	652.30				
			180				60			240		SY	TEMPORARY EROSION MATTING	653.20				
			15				15			30		CY	VEHICLE TRACKING PAD	653.35				
			1				1			2		EACH	FILTER BAG	653.45				
			490				450			940		LF	PROJECT DEMARCATION FENCE	653.55				
						8.5				8.5		SF	TRAFFIC SIGNS, TYPE A	675.20				
						15				15		LF	SQUARE TUBE SIGN POST AND ANCHOR	675.341				
				30				150		180		CY	SPECIAL PROVISION (COARSE AGGREGATE BACKFILL)	900.608				
				440				120		560		CY	SPECIAL PROVISION (GRANULAR BACKFILL FOR STRUCTURES)	900.608				
								15		15		CY	SPECIAL PROVISION (STONE FILL, STREAM BED MATERIAL)	900.608				
		1								1		LU	SPECIAL PROVISION (INCENTIVE/DISINCENTIVE)(BRIDGE 96)(N.A.B.I.)	900.650				
						1				1		LU	SPECIAL PROVISION (INCENTIVE/DISINCENTIVE)(BRIDGE 98)(N.A.B.I.)	900.650				
		1								1		LU	SPECIAL PROVISION (MAT DENSITY PAY ADJUSTMENT, SMALL QUANTITY)(BRIDGE 96)(N.A.B.I.)	900.650				
						1				1		LU	SPECIAL PROVISION (MAT DENSITY PAY ADJUSTMENT, SMALL QUANTITY)(BRIDGE 98)(N.A.B.I.)	900.650				
		1								1		LU	SPECIAL PROVISION (MIXTURE PAY ADJUSTMENT)(BRIDGE 96)(N.A.B.I.)	900.650				
						1				1		LU	SPECIAL PROVISION (MIXTURE PAY ADJUSTMENT)(BRIDGE 98)(N.A.B.I.)	900.650				
		250				280				530		TON	SPECIAL PROVISION (BITUMINOUS CONCRETE PAVEMENT, SMALL QUANTITY)	900.680				

Vanasse Hangen Brustlin, Inc.

PROJECT NAME: HUBBARDTON
PROJECT NUMBER: ER STP 0161(26) & ER STP 0161(27)

FILE NAME: z11c288-290quantity.dgn
PROJECT LEADER: M.A. COLGAN
DESIGNED BY: E.A. FIALA
QUANTITY SHEET #2

PLOT DATE: 07/26/2012
DRAWN BY: E.A. FIALA
CHECKED BY: S. FARNSWORTH
SHEET 4 OF 70



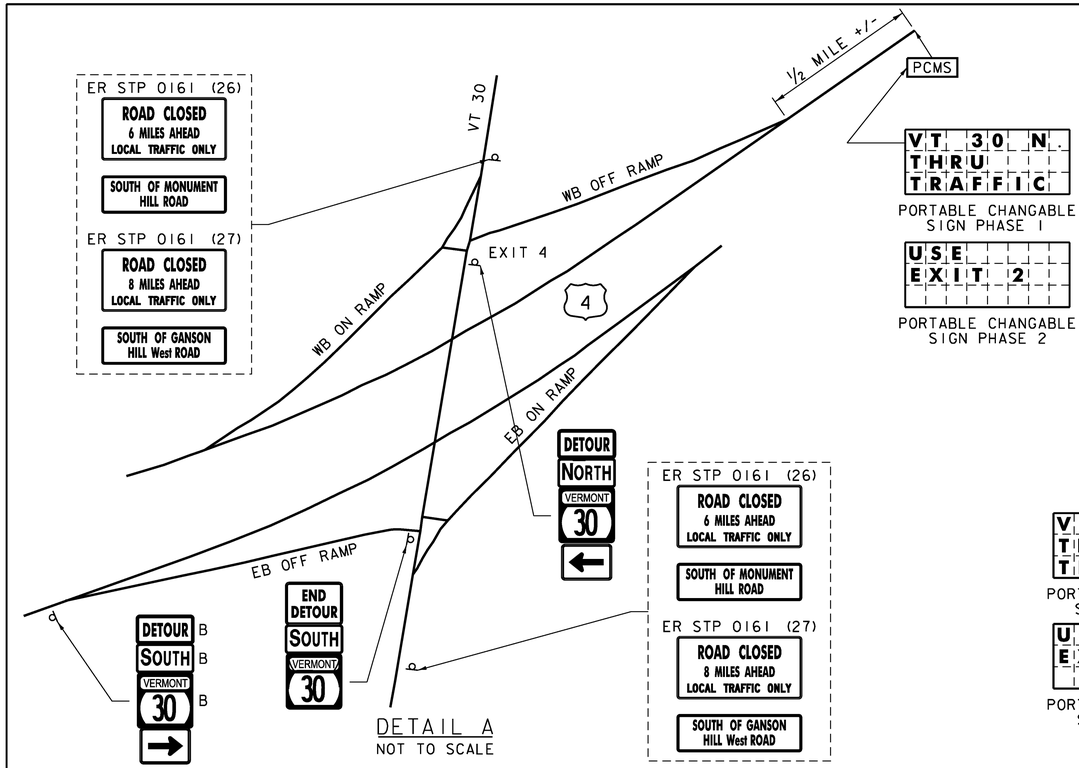
TRAFFIC CONTROL NOTES:

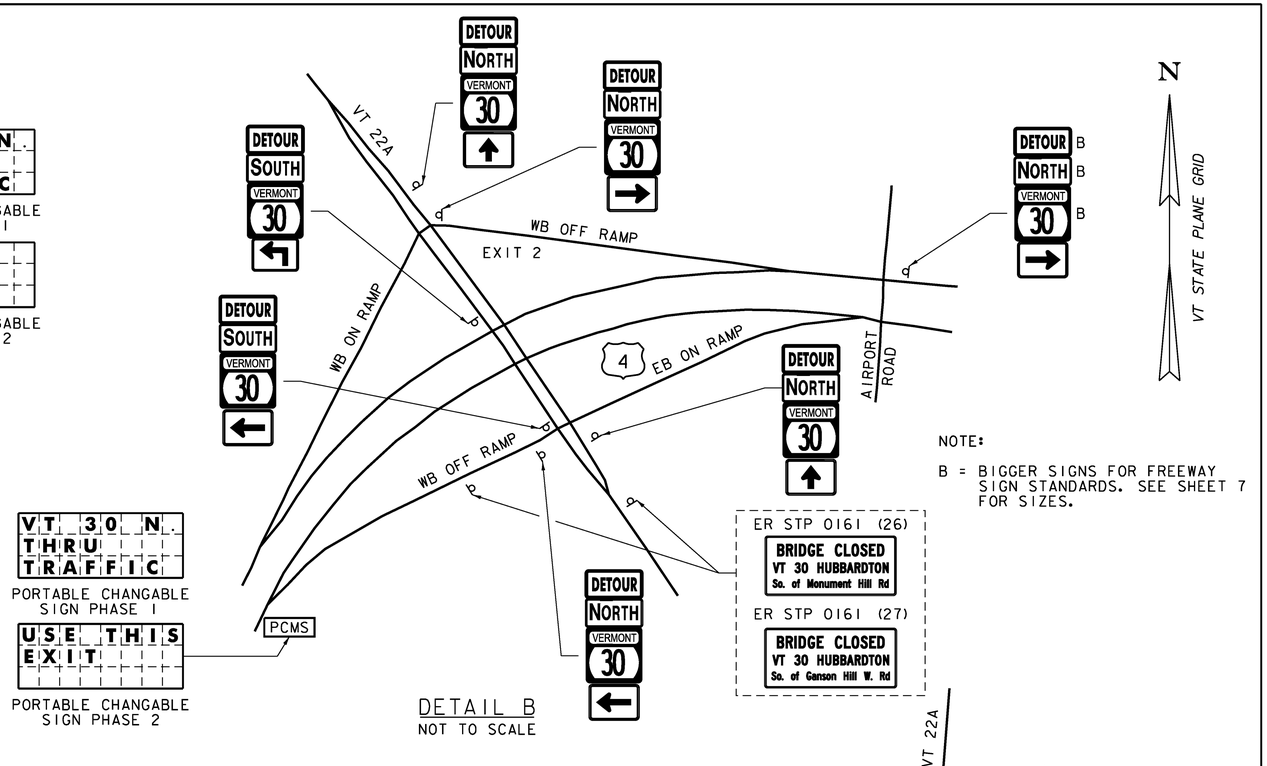
1. ALL SIGNS SHALL BE LOCATED SO THEY ARE VISIBLE AND ABLE TO BE READ BY THE TRAVELING PUBLIC. SIGNS SHALL BE INSTALLED SO AS NOT TO OBSTRUCT EXISTING SIGNS.
2. ALL SIGNS SHALL BE IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE ''MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES'' (MUTCD) AND THE ''STANDARD HIGHWAY SIGNS'' BOOK (SHS) PUBLISHED BY THE FEDERAL HIGHWAY ADMINISTRATION (FHWA).
3. SOLID SUBSTRATE CONSTRUCTION SIGNS SHALL HAVE RETROREFLECTIVE SHEETING EQUAL TO OR EXCEEDING ''AMERICAN SOCIETY FOR TESTING AND MATERIALS'' (ASTM D 4956) TYPE VII, VIII OR IX REQUIREMENTS, UNLESS OTHERWISE NOTED. SOLID SUBSTRATE REGULATORY SIGNS (WHITE BACKGROUND) SHALL HAVE RETROREFLECTIVE SHEETING EQUAL TO OR EXCEEDING ASTM D 4956 TYPE III.
4. SIGNS SHALL BE ERECTED BEFORE THE START OF ANY WORK AND SHALL BE COVERED UNTIL WORK COMMENCES, AND UPON COMPLETION OF THE WORK. EACH SIGN SHALL BE ERECTED IN A NEAT AND WORKMANLIKE MANNER. SIGNS SHALL BE REMOVED UPON COMPLETION OF THE WORK AT THE DISCRETION OF THE ENGINEER.
5. FIXED SIGNS SHALL BE SET SECURELY IN THE GROUND. THE BOTTOM OF A SIGN SHALL BE AT LEAST SEVEN FEET ABOVE THE EDGE OF PAVEMENT. THE NEAREST EDGE OF A SIGN SHALL BE AT LEAST SIX FEET OUTSIDE THE SHOULDER POINT OR FOUR FEET OUTSIDE GUARDRAIL.
6. WHERE SIGN INSTALLATIONS ARE NOT PROTECTED BY GUARDRAIL OR OTHER APPROVED TRAFFIC BARRIERS, ALL SIGN STANDS AND POST INSTALLATIONS SHALL BE ''NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM'' (NCHRP) REPORT 350 COMPLIANT. NO SIGN POSTS SHALL EXTEND OVER THE TOP OF THE SIGN INSTALLED ON SAID POST(S). WHEN ANCHORS ARE INSTALLED STUB SHALL NOT BE GREATER THAN FOUR INCHES ABOVE EXISTING GROUND.
7. DETOUR ROUTE MARKER ASSEMBLIES SHALL BE INSTALLED ADJACENT TO THE EXISTING ROUTE MARKER ASSEMBLIES AT THE INTERSECTIONS.
8. THE PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS) SHALL BE USED IN ACCORDANCE WITH SECTION 6F.60 OF THE MUTCD.
9. SEE TRAFFIC CONTROL SHEET 2 (SHEET 6) FOR DETAILS A-E.

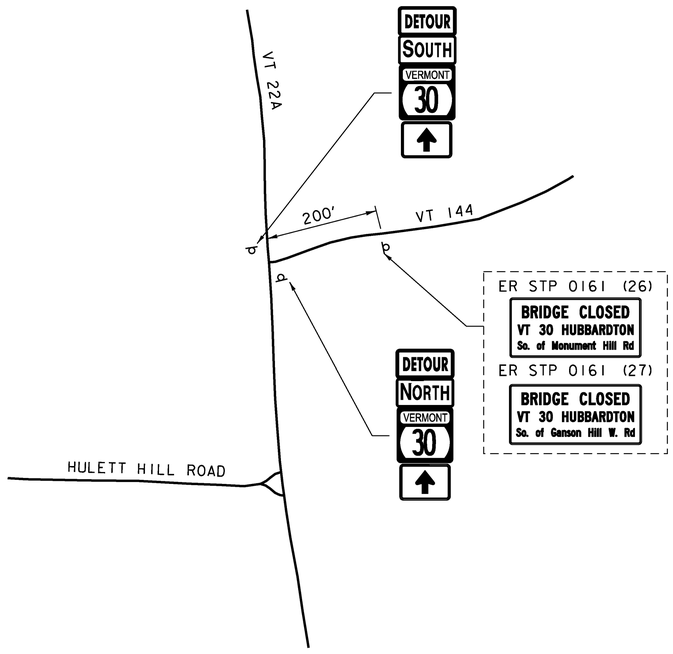
VHB Vanasse Hangen Brustlin, Inc.

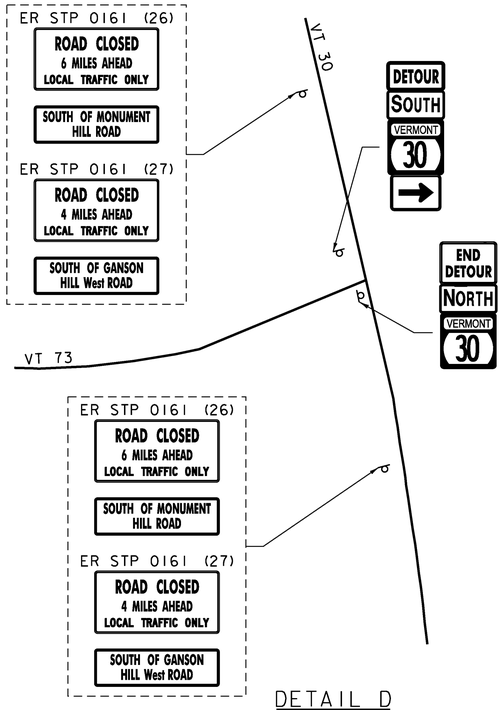
PROJECT NAME: HUBBARDTON	
PROJECT NUMBER: ER STP 0161(26) & ER STP 0161(27)	
FILE NAME: zllc288-290detour.dgn	PLOT DATE: 7/16/2012
PROJECT LEADER: M.A. COLGAN	DRAWN BY: C.L. CILLEY
DESIGNED BY: S.G. FARNSWORTH	CHECKED BY: S.G. FARNSWORTH
TRAFFIC CONTROL SHEET (1 OF 3)	SHEET 5 OF 70

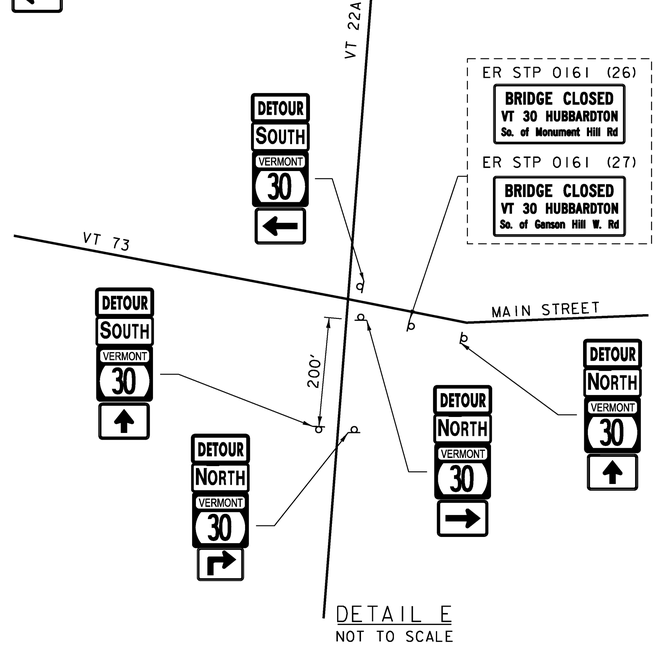
VHB 57478.01











Vanasse Hangen Brustlin, Inc.

PROJECT NAME:	HUBBARDTON
PROJECT NUMBER:	ER STP 0161(26) & ER STP 0161(27)
FILE NAME: zllc288-290detour_details.dgn	PLOT DATE: 7/16/2012
PROJECT LEADER: M.A. COLGAN	DRAWN BY: K.D. WENTWORTH
DESIGNED BY: S.G. FARNSWORTH	CHECKED BY: S.G. FARNSWORTH
TRAFFIC CONTROL SHEET (2 OF 3)	SHEET 6 OF 70

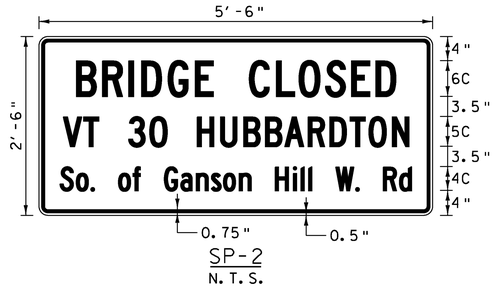
VHB 57478

IDENTIFICATION NUMBER	SIZE OF SIGN WIDTH (IN)	SIZE OF SIGN HEIGHT (IN)	TEXT	NUMBER OF SIGNS REQ'D	REMARKS
MI-6A	24	24	VERMONT 30	25	---
MI-6A - B	36	36	VERMONT 30	2	---
M3-1	24	12	NORTH	14	---
M3-1 - B	30	15	NORTH	1	---
M3-3	24	12	SOUTH	11	---
M3-3 - B	30	15	SOUTH	1	---
M4-8	24	12	DETOUR	23	MOUNT ABOVE THE M3-1 OR M3-3
M4-8 - B	30	15	DETOUR	2	MOUNT ABOVE THE M3-1 OR M3-3
M4-8A	24	18	END DETOUR	2	MOUNT ABOVE THE M3-1 OR M3-3
M5-1L	21	15	←	1	MOUNT BELOW THE MI-6A
M5-1R	21	15	→	1	MOUNT BELOW THE MI-6A
M6-1L	21	15	←	4	MOUNT BELOW THE MI-6A
M6-1R	21	15	→	5	MOUNT BELOW THE MI-6A
M6-3	21	15	↑	14	MOUNT BELOW THE MI-6A
R11-2	48	30	BRIDGE CLOSED	7	MOUNT BELOW THE MI-6A
R11-3A	60	30	ROAD CLOSED 3 MILES AHEAD LOCAL TRAFFIC ONLY	1	MOUNT ON TWO POSTS
R11-3A	60	30	ROAD CLOSED 4 MILES AHEAD LOCAL TRAFFIC ONLY	2	MOUNT ON TWO POSTS

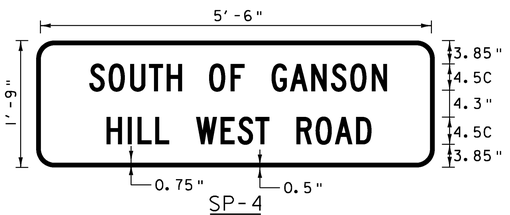
IDENTIFICATION NUMBER	SIZE OF SIGN WIDTH (IN)	SIZE OF SIGN HEIGHT (IN)	TEXT	NUMBER OF SIGNS REQ'D	REMARKS
R11-3A	60	30	ROAD CLOSED 5 MILES AHEAD LOCAL TRAFFIC ONLY	1	MOUNT ON TWO POSTS
R11-3A	60	30	ROAD CLOSED 6 MILES AHEAD LOCAL TRAFFIC ONLY	4	MOUNT ON TWO POSTS
R11-3A	60	30	ROAD CLOSED 8 MILES AHEAD LOCAL TRAFFIC ONLY	2	MOUNT ON TWO POSTS
SP-1	66	30	BRIDGE CLOSED VT 30 HUBBARDTON So. of Monument Hill Rd	3	MOUNT ON TWO POSTS
SP-2	66	30	BRIDGE CLOSED VT 30 HUBBARDTON So. of Ganson Hill W. Rd	3	MOUNT ON TWO POSTS
SP-3	66	21	SOUTH OF MONUMENT HILL ROAD	5	MOUNT ON TWO POSTS
SP-4	66	21	SOUTH OF GANSON HILL West ROAD	5	MOUNT ON TWO POSTS
VC-821	48	48	BRIDGE CLOSED AHEAD	4	---
VC-821	48	48	BRIDGE CLOSED 500 FT	4	---

NOTES:

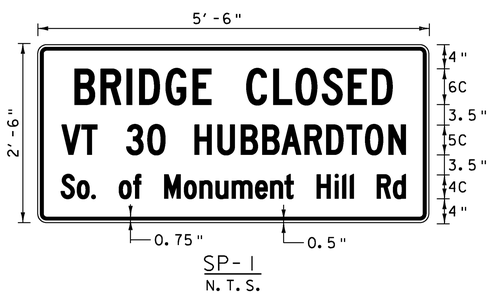
1. COLORS FOR THE MI-6A, M3-1, AND M3-3 SIGNS SHALL MATCH THE COLORS SHOWN ON VTRANS STD. E-136C.
2. COLORS FOR THE M5-1L, M5-1R, M6-1L, M6-1R, AND THE M6-3 SIGNS SHALL BE A BLACK ARROW AND BORDER ON RETROREFLECTIVE ORANGE BACKGROUND.
3. COLORS FOR THE SP-1, SP-2, SP-3 AND SP-4 SIGNS SHALL BE BLACK TEXT AND BORDER ON RETROREFLECTIVE WHITE BACKGROUND.
4. TWO ORANGE FLAGS (ONE EACH SIDE) SHALL BE PLACED AT THE TOP OF THE R11-3A, SP-1 AND SP-2 SIGNS.
5. THE MI-6A, MI-6A-B, M3-1 M3-3, M3-1-B, AND M3-3-B SIGNS SHALL BECOME THE PROPERTY OF THE STATE OF VERMONT AFTER THEY ARE REMOVED FROM THE DETOUR. THE CONTRACTOR SHALL DELIVER THE SIGNS TO THE STATE AT THE STATE GARAGE LOCATED AT 3090 VT 30, SUDBURY, VT. CONTACT THE STATE FOREMAN, NICK LUSSIER AT (802) 633-7211. ALL COSTS ASSOCIATED WITH PROVIDING THE SIGNS TO THE STATE SHALL BE INCIDENTAL TO ITEM 641.10 "TRAFFIC CONTROL".



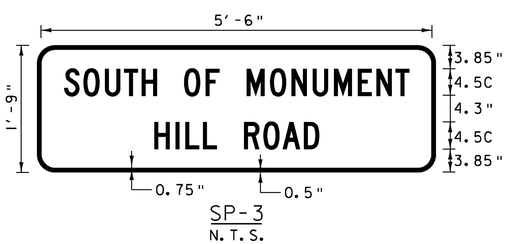
SP-2
N.T.S.



SP-4
N.T.S.



SP-1
N.T.S.



SP-3
N.T.S.

Vanasse Hangen Brustlin, Inc.

PROJECT NAME: HUBBARDTON
PROJECT NUMBER: ER STP 0161(26) & ER STP 0161(27)

FILE NAME: z:\c288-290detour_signs.dgn PLOT DATE: 7/16/2012
PROJECT LEADER: M.A. COLGAN DRAWN BY: E.A. FIALA
DESIGNED BY: S.G. FARNSWORTH CHECKED BY: S.G. FARNSWORTH
TRAFFIC CONTROL SHEET (3 OF 3) SHEET 7 OF 70

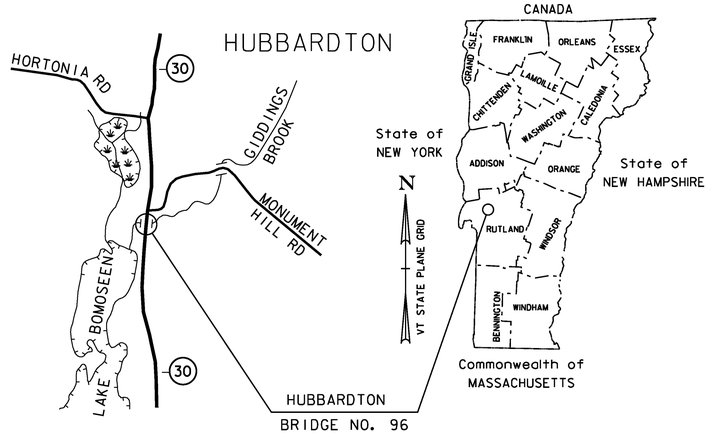
VHB 57478

STATE OF VERMONT
AGENCY OF TRANSPORTATION

PROPOSED IMPROVEMENT
BRIDGE PROJECT

TOWN OF HUBBARDTON
COUNTY OF RUTLAND

ROUTE NO. VT 30 (MAJOR COLLECTOR), BRIDGE NO. 96

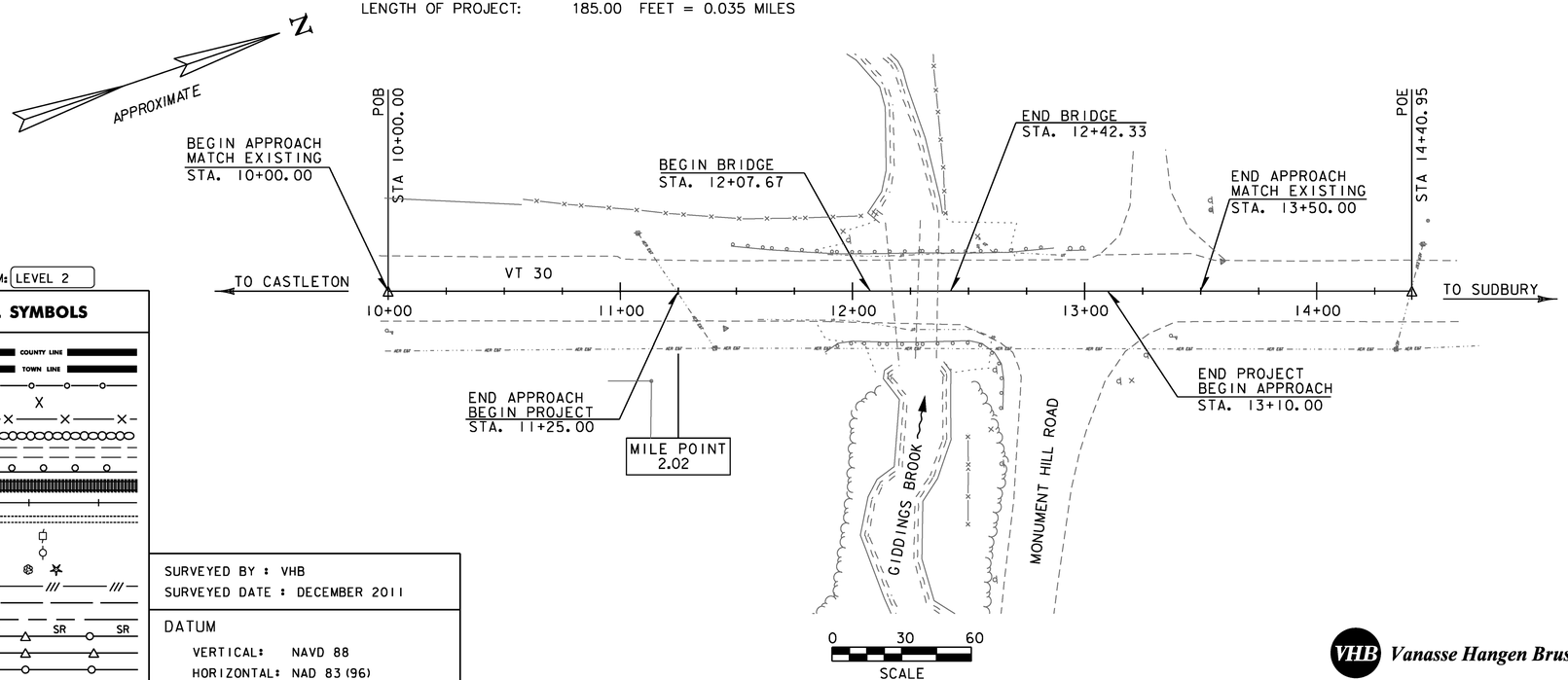


LOCATION MAP
NOT TO SCALE

PROJECT LOCATION: BEGINNING AT A POINT ON VT ROUTE 30 APPROXIMATELY 2.022 MILES NORTH OF THE CASTLETON/HUBBARDTON TOWN LINE AND EXTENDING NORTHERLY 0.035 MILES.

PROJECT DESCRIPTION: REMOVAL OF THREE EXISTING PIPE CULVERTS, CONSTRUCTION OF A NEW PRECAST CONCRETE BURIED FRAME, AND ASSOCIATED ROADWAY AND CHANNEL WORK.

LENGTH OF STRUCTURE: 34.66 FEET (APPROX.) = 0.007 MILES
LENGTH OF ROADWAY: 150.34 FEET (APPROX.) = 0.028 MILES
LENGTH OF PROJECT: 185.00 FEET = 0.035 MILES



QUALITY ASSURANCE PROGRAM: LEVEL 2

CONVENTIONAL SYMBOLS

COUNTY LINE
TOWN LINE
LIMITS OF ACCESS
POINT OF ACCESS
FENCE LINE
STONE WALL
TRAVELED WAY
GUARD RAIL
RAILROAD
SURVEY LINE
CULVERT
POWER POLE
TELEPHONE POLE
TREES
CONTROL OF ACCESS
PROPERTY LINE
R.O.W. TAKING LINE
SLOPE RIGHTS
TOP OF CUT
TOE OF SLOPE

SURVEYED BY : VHB
SURVEYED DATE : DECEMBER 2011

DATUM
VERTICAL: NAVD 88
HORIZONTAL: NAD 83 (96)

THESE PLANS ARE SUBJECT TO SUCH ENGINEERING CHANGES AS MAY BE REQUIRED BY THE FEDERAL HIGHWAY ADMINISTRATION OR THE DIRECTOR OF PROGRAM DEVELOPMENT.

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.

VHB Vanasse Hangen Brustlin, Inc.

PROJECT MANAGER : MARK SARGENT

PROJECT NAME : HUBBARDTON
PROJECT NUMBER : ER STP 0161(26)

SHEET 8 OF 70 SHEETS

VHB 57478.01

STATE OF VERMONT
AGENCY OF TRANSPORTATION

PRELIMINARY INFORMATION SHEET (BRIDGE)

Version 12.01.01c

LRFD

INDEX OF SHEETS

SEE SHEET 2 FOR INDEX OF SHEETS AND STANDARDS LIST

FINAL HYDRAULIC REPORT

HYDROLOGIC DATA

Date: September 2011

DRAINAGE AREA : 4.7 Sq. Miles
CHARACTER OF TERRAIN : Hilly - Mostly Forest
STREAM CHARACTERISTICS : Narrow and curving with small current
NATURE OF STREAMBED : Mostly gravel and cobbles

PEAK FLOW DATA

Q 2.33 =	200 CFS	Q 50 =	650 CFS
Q 10 =	420 CFS	Q 100 =	750 CFS
Q 25 =	550 CFS	Q 500 =	1000 CFS

DATE OF FLOOD OF RECORD: Aug 2011 / 1927
ESTIMATED DISCHARGE: Unknown
WATER SURFACE ELEV.: Unknown
NATURAL STREAM VELOCITY : Unknown
ICE CONDITIONS : Light
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: 18'x7'-3" Plate Arch on concrete footings
YEAR BUILT: 1960 - Washed out Aug. 2011
CLEAR SPAN(NORMAL TO STREAM): 18 ft
VERTICAL CLEARANCE ABOVE STREAMBED: 7.25 ft
WATERWAY OF FULL OPENING: Approximately 100 sq. feet
DISPOSITION OF STRUCTURE: Arch removed 2011-Concrete footings remove
TYPE OF MATERIAL UNDER SUBSTRUCTURE: Gravel

WATER SURFACE ELEVATIONS AT:

Q2.33 =	N/A	VELOCITY =	
Q10 =	N/A	"	
Q25 =	N/A	"	
Q50 =	N/A	"	
Q100 =	N/A	"	

LONG TERM STREAMBED CHANGES: Unknown

IS THE ROADWAY OVERTOPPED BELOW Q100: NO
FREQUENCY: N/A
RELIEF ELEVATION: 423.9
DISCHARGE OVER ROAD @Q100: NA

UPSTREAM STRUCTURE

TOWN: Hubbardton — DISTANCE: 0.5 Miles +/-
HIGHWAY # : Town Highway 2 — STRUCTURE #: No. 7
CLEAR SPAN: 21 Feet — CLEAR HEIGHT: 7 Feet
YEAR BUILT: 1938 / 1992 — FULL WATERWAY: 140 Sq. Ft
STRUCTURE TYPE: Concrete slab

DOWNSTREAM STRUCTURE

TOWN: Lake Bomoseen — DISTANCE: 1.5 Miles +/-
HIGHWAY # : — STRUCTURE #:
CLEAR SPAN: — CLEAR HEIGHT:
YEAR BUILT: — FULL WATERWAY:
STRUCTURE TYPE:

PROPOSED STRUCTURE

STRUCTURE TYPE: New Precast Concrete Buried Frame

CLEAR SPAN(NORMAL TO STREAM): 32'-0"
VERTICAL CLEARANCE ABOVE STREAMBED: 6.0 ft (min)
WATERWAY OF FULL OPENING: 174 sq. ft (min)

WATER SURFACE ELEVATIONS AT:

Q2.33 =	419.0	VELOCITY=	2.5 ft/sec
Q10 =	419.6	"	4.4 ft/sec
Q25 =	419.8	"	5.4 ft/sec
Q50 =	420.0	"	6.2 ft/sec
Q100 =	420.3	"	6.9 ft/sec

IS THE ROADWAY OVERTOPPED BELOW Q100: No
FREQUENCY:
RELIEF ELEVATION:
DISCHARGE OVER ROAD @Q100:

AVERAGE LOW ELEVATION OF SUPERSTRUCTURE: 422.1
VERTICAL CLEARANCE: @ Q100 = 1.7 FEET

SCOUR: Unknown

REQUIRED CHANNEL PROTECTION: Type II Stone Fill

PERMIT INFORMATION

		DEPTH OR ELEVATION:
AVERAGE DAILY FLOW:	10 CFS	
ORDINARY LOW WATER:	5 CFS	. 416.2
ORDINARY HIGH WATER:	200 CFS	. 419.0

TEMPORARY BRIDGE REQUIREMENTS

STRUCTURE TYPE: N/A - VT 30 to be closed
CLEAR SPAN (NORMAL TO STREAM):
VERTICAL CLEARANCE ABOVE STREAMBED:
WATERWAY AREA OF FULL OPENING:

ADDITIONAL INFORMATION

- THREE 60" x 60 ft HDPE TEMPORARY PIPES INSTALLED IN SEPTEMBER 2011
- TO BE REMOVED AND RETAINED BY CONTRACTOR
- EXISTING 1960 CONCRETE ARCH FOOTINGS TO BE REMOVED AS DEEMED NECESSARY

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. DESIGN SPAN	L:	32'-0" FT
4. MIN. MID-SPAN POS. CAMBER @ RELEASE (PRESTRESSED UNITS)	Δ:	- - -
5. PRESTRESSING STRAND (0.60 INCH DIAMETER - LOW RELAX)	f_y:	- - -
6. PRESTRESSED CONCRETE STRENGTH	f'_c:	- - -
7. PRESTRESSED CONCRETE RELEASE STRENGTH	f'_{ci}:	- - -
8. CONCRETE, HIGH PERFORMANCE CLASS AA	f'_c:	- - -
9. CONCRETE, HIGH PERFORMANCE CLASS A	f'_c:	- - -
10. CONCRETE, HIGH PERFORMANCE CLASS B	f'_c:	3.5 KSI
11. CONCRETE, CLASS C	f'_c:	- - -
12. REINFORCING STEEL	f_y:	60 KSI
13. STRUCTURAL STEEL AASHTO M270	f_y:	- - -
14. SOIL UNIT WEIGHT	γ:	0.140 KCF
15. NOMINAL BEARING RESISTANCE OF SOIL	q_n:	4.0 KSF
16. SOIL BEARING RESISTANCE FACTOR (REFER TO AASHTO LRFD)	ϕ:	- - -
17. NOMINAL BEARING RESISTANCE OF ROCK	q_n:	10.0 KSF
18. ROCK BEARING RESISTANCE FACTOR (REFER TO AASHTO LRFD)	ϕ:	- - -
19. NOMINAL AXIAL PILE RESISTANCE	q_p:	- - -
20. PILE YIELD STRENGTH ASTM A572	f_y:	- - -
21. PILE SIZE		- - -
22. EST. PILE LENGTH	L_p:	
23. PILE RESISTANCE FACTOR	ϕ:	- - -
24. LATERAL PILE DEFLECTION	Δ:	- - -
25. BASIC WIND SPEED	V_{3s}:	- - -
26. MINIMUM GROUND SNOW LOAD	p_g:	- - -
27. SEISMIC DATA — PGA: - - -	S_s:	- - -
	S_1:	- - -

FABRICATOR RESPONSIBLE FOR LOAD RATING

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:							

AS BUILT "REBAR" DETAILS

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

TRAFFIC DATA

YEAR	ADT	DHV	% D	% T	ADTT
2012	2300	280	50	6.4	150
2032	2790	330	50	6.4	180

20 year ESAL for flexible pavement from 2010 to 2030 :
40 year ESAL for flexible pavement from 2010 to 2050 :
Design Speed : 50 mph

VHB Vanasse Hangen Brustlin, Inc.

PROJECT NAME: **HUBBARDTON**
PROJECT NUMBER: **ER STP 0161(26)**

FILE NAME: z11c288pi.xls
PROJECT LEADER: M.A. COLGAN
DESIGNED BY: S.G. FARSWORTH
PRELIMINARY INFORMATION SHEET

PLOT DATE: 7/16/2012
DRAWN BY: C.L. CILLEY
CHECKED BY: S.G. FARNSWORTH
SHEET 9 OF 70

VHB 57478

GENERAL

1. ALL MATERIAL AND CONSTRUCTION SHALL CONFORM TO THE STATE OF VERMONT AGENCY OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION, DATED 2011, AND ITS LATEST REVISIONS, AND THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 4TH EDITION, AND ITS LATEST REVISIONS.

2. ALL EXISTING TRAFFIC SIGNS REMOVED DURING CONSTRUCTION SHALL BE RESET BACK TO THEIR ORIGINAL LOCATION IN ACCORDANCE WITH VERMONT STANDARDS. PAYMENT WILL BE CONSIDERED INCIDENTAL TO THE CONTRACT.

3. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO PREVENT SILTATION OR POLLUTION, ESPECIALLY THE DISCHARGE OF RAW CONCRETE, INTO ANY BROOK, STREAM OR RIVER.

4. ALL DIMENSIONS ARE HORIZONTAL OR VERTICAL AND ARE GIVEN AT 68 DEGREES FAHRENHEIT UNLESS OTHERWISE NOTED.

5. FEATURES OF THE EXISTING BRIDGE AND SURVEY SHOWN ON THESE PLANS HAVE BEEN OBTAINED FROM LIMITED SURVEY AND MAY NOT ACCURATELY REFLECT ACTUAL FIELD CONDITIONS. THE CONTRACTOR WILL BE RESPONSIBLE FOR MAKING FIELD MEASUREMENTS TO ENSURE CONSISTENCY WITH THE PROPOSED MODIFICATIONS. ANY DISCREPANCIES IN DIMENSIONS, CHARACTER OR EXTENT OF THE EXISTING FEATURES SHALL BE BROUGHT TO THE ATTENTION OF THE RESIDENT ENGINEER BEFORE ADVANCING THE WORK.

6. THE LIMITS OF COFFERDAMS ARE TO BE DETERMINED BY THE CONTRACTOR.

7. ITEM 529.15 "REMOVAL OF STRUCTURE (THREE 60" X 60' HDPE)" SHALL BE USED FOR REMOVAL AND DISPOSAL OF THE EXISTING CULVERTS .

8. THE CONTRACTOR SHALL VERIFY THE LOCATIONS OF ALL BURIED AND AERIAL UTILITIES AND POLES PRIOR TO STARTING WORK.

9. THE WATER LEVEL MAY VARY FROM WHAT IS SHOWN ON THE PLANS.

10. THE CONTRACTOR SHALL CONTACT "DIG SAFE" PRIOR TO BEGINNING CONSTRUCTION.

11. FOR INFORMATION REGARDING UTILITIES SEE THE SPECIAL PROVISIONS.

TRAFFIC MAINTENANCE DURING CONSTRUCTION

1. VERMONT ROUTE 30 SHALL BE CLOSED TO ALL TRAFFIC DURING CONSTRUCTION. SEE THE SPECIAL PROVISIONS FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

2. THE CONTRACTOR SHALL PLACE ALL ROAD CLOSURE SIGNING PRIOR TO THE COMMENCEMENT OF THE WORK. SIGNING SHALL BE INCLUDED ON GANSON HILL ROAD WEST.

3. PORTABLE CHANGEABLE MESSAGE SIGNS SHALL INFORM THE PUBLIC STARTING ONE WEEK BEFORE CLOSING OF VT 30.

4. THE CONTRACTOR SHALL MAINTAIN ACCESS TO THE EXISTING DRIVES AND TOWN HIGHWAYS AT ALL TIMES.

PRECAST CONCRETE STRUCTURES

1. THE DESIGN, CONSTRUCTION, HANDLING, AND ASSEMBLY OF THE PRECAST UNITS SHALL BE IN ACCORDANCE WITH SECTION 540 AND THE SPECIAL PROVISIONS. HANDLING AND INSTALLATION SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AS APPLICABLE.

2. THE PRECAST CONCRETE STRUCTURE SHALL BE DESIGNED TO SUPPORT CONSTRUCTION LIVE LOADS DIRECTLY ON TOP OF THE CONCRETE FRAME OR ARCH WITHOUT ANY FILL OVER THE CONCRETE FRAME OR ARCH.

3. DESIGN CRITERIA:

DESIGN LIVE LOAD:	HL-93
FILL OVER THE STRUCTURE:	2 FEET
FOUNDATION SOIL PARAMETERS	
UNIT WEIGHT:	110 PCF
FRICTION ANGLE:	27°
RETAINED SOIL PARAMETERS	
UNIT WEIGHT:	130 PCF
FRICTION ANGLE:	35 °

FACTORED BEARING RESISTANCE (FOOTING WIDTH):
5720 PSF (8 FEET)

4. REINFORCING STEEL SHALL CONFORM TO THE FOLLOWING:
   A. THE REINFORCING STEEL IN THE CURBS SHALL BE "LEVEL 11" OR HIGHER.
   B. THE REINFORCING STEEL IN THE PRECAST UNITS AND FOOTINGS SHALL BE "LEVEL 1, EPOXY COATED REINFORCING STEEL" OR HIGHER.

5. THE PRECAST CONCRETE STRUCTURE SHALL HAVE A MINIMUM CLEAR SPAN OF 32 FEET AND VERTICAL CLEAR HEIGHT OF 10 FEET MEASURED FROM CENTER OF THE SPAN TO TOP OF ASSUMED 2 FOOT THICK FOOTING. THE LUMP SUM COST FOR ITEM 540.10 SHALL INCLUDE THE PRECAST THREE SIDED FRAME OR ARCH UNITS, PRECAST FOOTINGS OR CAST-IN-PLACE FOOTINGS (CONCRETE, HIGH PERFORMANCE CLASS B), PRECAST HEADWALLS, PRECAST WINGWALLS, SHEET MEMBRANE WATERPROOFING, AND MECHANICAL CONNECTIONS.

6. THE PRECAST WINGWALLS SHALL BE SELECTED FROM THE LIST OF WALLS ON THE APPROVED RETAINING WALL DOCUMENT AVAILABLE FROM VAOT MATERIALS AND RESEARCH WEB SITE (HTTP://WWW.AOT.STATE.VT.US/PROGDEV/SECTIONS/M&R%20INFO/M&RSOIL&FOUNDATION.HTM). THE PRECAST RETAINING WALLS SHALL BE EITHER A "CONTECH PRECAST ANCHORED WINGWALL SYSTEM" OR A "T-WALL SYSTEM".

7. THE USE OF EQUIPMENT AND THE METHOD OF BACKFILLING AROUND THE BURIED STRUCTURE SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. CARE SHALL BE TAKEN WHEN BACKFILLING AGAINST JOINT SEALING MATERIALS.

8. PRECAST TOLERANCES:

HEIGHT/WIDTH:	+/- 1/4"
LENGTH:	+/- 1/2"

9. FABRICATION DRAWINGS FOR THE PRECAST CONCRETE UNIT SECTIONS SHALL INCLUDE A PLAN FOR SHIPPING AND LEVELING THE FRAME AND WINGWALL SECTIONS.

10. THE CONTRACTOR IS RESPONSIBLE FOR PROPER FIT-UP OF THE PRECAST AND ANY CAST-IN-PLACE ELEMENTS, PER THE FABRICATORS RECOMMENDATIONS, APPROVED FABRICATION AND ENGINEERING DRAWINGS, AND TO THE SATISFACTION OF THE ENGINEER.

11. ALL PRECAST UNITS INCLUDING THE HEADWALLS AND FOOTINGS SHALL BE DESIGNED BY THE FABRICATOR AND DESIGN CALCULATIONS SUBMITTED WITH FABRICATION DRAWINGS STAMPED BY AN ENGINEER REGISTERED IN THE STATE OF VT.

12. INSTALL SHEET MEMBRANE WATERPROOFING OVER THE TOP AND DOWN THE EXTERIOR SIDES OF THE PRECAST UNITS TO THE TOP OF THE FOOTING AND ALONG THE ENTIRE LENGTH. COST OF MEMBRANE WATERPROOFING IS INCIDENTAL TO THE PRECAST UNITS. TAKE CARE DURING BACKFILL OPERATIONS TO AVOID DAMAGE TO THE SHEET MEMBRANE WATERPROOFING.

13. THE BEGIN/END BRIDGE STATIONS ARE APPROXIMATE, AND MAY CHANGE BASED ON THE MANUFACTURER'S DESIGN DIMENSIONS. THE MIDPOINT OF THE STRUCTURE ALONG THE VT 30 CENTERLINE SHALL BE AS SHOWN ON THESE PLANS.

14. THE PLANS DEPICT A SCHEMATIC 3-SIDED STRUCTURE SUPPORTED ON SPREAD FOOTINGS. THE PLANS ALSO DEPICT PRECAST CONCRETE WINGWALLS. THE CONTRACTOR MAY PROVIDE A CONCRETE STRUCTURE THAT VARIES FROM THAT SHOWN PROVIDED MINIMUM HYDRAULIC OPENING AND UTILITY CLEARANCES ARE MET. THE NEW STRUCTURE AND WINGWALLS SHALL NOT EXTEND OUTSIDE OF THE EXISTING RIGHT-OF-WAY.

15. THE PRECAST CONCRETE STRUCTURES SHALL BE BACKFILLED IN SIX INCH LIFTS WITH THE ITEM 900.608, "SPECIAL PROVISION (GRANULAR BACKFILL FOR STRUCTURES)".

16. FOUNDATION EMBEDMENT SHALL CONFORM TO GEOTECHNICAL REQUIREMENTS. THE MINIMUM STRUCTURE COVER SHALL BE 1'-6" FOR THE ROADWAY (BETWEEN BRIDGE RAIL).

CONCRETE

1. THE KEY IN CONCRETE CONSTRUCTION JOINTS SHALL BE MONOLITHIC AND CONTINUOUS FOR THE FULL LENGTH OF THE JOINT, AND UPWARD KEYS SHALL BE PLACED INTEGRALLY WITH THE CONCRETE BELOW JOINTS.

2. ALL EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 1" x 1".

3. ALL REINFORCING STEEL SHALL BE DETAILED AND FABRICATED USING PROCEDURES AND TOLERANCES IN ACCORDANCE WITH APPLICABLE PUBLICATIONS OF THE CONCRETE REINFORCING STEEL INSTITUTE (CRSI).

4. REINFORCING STEEL PLACEMENT TOLERANCES SHALL BE:

SPACING:	+/- 1"
CLEARANCE:	+/- 1/4"

5. MINIMUM COVER FOR REINFORCING STEEL SHALL BE 2" ALONG THE BACK FACES OF WALLS AGAINST EARTH, 1 1/2" ALONG THE BOTTOM SURFACE OF THE DECK AND 3" ELSEWHERE, UNLESS OTHERWISE NOTED.

6. WATER REPELLENT (SILANE) SHALL BE APPLIED TO ALL EXPOSED CONCRETE SURFACES TO 1'-0" BELOW THE FINISH GRADE.

7. PLACE 4" DIAMETER WEEP HOLES AT 10'-0" MAXIMUM SPACING.

8. ALL FOOTING CONCRETE SHALL BE PLACED IN THE DRY. DEWATERING SHALL BE CONTINUOUS UNTIL THE FOOTINGS ARE BACKFILLED TO THE ELEVATION OF THE WATER. SUMPS AND TRENCHES THAT DIRECT WATER SHALL BE LOCATED TO PREVENT THE REMOVAL OF FINES BELOW THE FOOTINGS.

1960 PLATE ARCH WITH CONCRETE FOOTINGS

1. THE 18'-0" X 6'-3" STEEL PLATE ARCH WAS REMOVED AFTER THE AUGUST 2011 TROPICAL STORM IRENE FLOODING.

2. THE TWO CONCRETE FOOTINGS ARE STILL IN PLACE. A TOTAL OF 78 CUBIC YARDS HAS BEEN INCLUDED UNDER ITEM 208.35 "COFFERDAM EXCAVATION, ROCK" FOR THE REMOVAL OF THESE FOOTINGS.

CONTROL OF WORK

1. SEE THE "COMPOSITE GENERAL NOTES FOR CONTROL OF WORK" ON SHEET 2 FOR ADDITIONAL REQUIREMENTS.

STATE OF VERMONT
AGENCY OF TRANSPORTATION

QUANTITY SHEET 1

SUMMARY OF ESTIMATED QUANTITIES

ROADWAY (BRIDGE 96)	EROSION CONTROL (BRIDGE 96)	BRIDGE NO. 96	FULL C.E. ITEMS (BRIDGE 96)
0.5			
410			
		540	
1			
		200	
		700	
		80	
		1	
		1	
220			
470			
100			
1			
		12	
		11	
		70.4	
		1	
		1	
5			
		120	
145			
14.5			
1			
2			
1			
4			
241			
63			
300			
720			
			0.5
			0.5
			1500
0.5			
1			
0.5			
90			
620			
700			
28			

TOTALS

GRAND TOTAL	FINAL
0.5	
410	
540	
1	
200	
700	
80	
1	
1	
220	
470	
100	
1	
12	
11	
70.4	
1	
1	
5	
120	
145	
14.5	
1	
2	
1	
4	
241	
63	
300	
720	
0.5	
0.5	
1500	
0.5	
1	
0.5	
90	
620	
700	
28	

DESCRIPTIONS

UNIT	ITEMS	ITEM NUMBER	ROUND
LS	CLEARING AND GRUBBING, INCLUDING INDIVIDUAL TREES AND STUMPS	201.10	
CY	COMMON EXCAVATION	203.15	
CY	UNCLASSIFIED CHANNEL EXCAVATION	203.27	
CY	TRENCH EXCAVATION OF EARTH, EXPLORATORY (N.A.B.I.)	204.22	
CY	GRANULAR BACKFILL FOR STRUCTURES	204.30	
CY	COFFERDAM EXCAVATION, EARTH	208.30	
CY	COFFERDAM EXCAVATION, ROCK	208.35	
LS	COFFERDAM (ABUTMENT NO. 1)	208.40	
LS	COFFERDAM (ABUTMENT NO. 2)	208.40	
SY	COLD PLANING, BITUMINOUS PAVEMENT	210.10	
CY	SUBBASE OF DENSE GRADED CRUSHED STONE	301.35	
CWT	EMULSIFIED ASPHALT	404.65	
LU	PRICE ADJUSTMENT, ASPHALT CEMENT (N.A.B.I.)	406.50	
GAL	WATER REPELLENT, SILANE	514.10	
LF	JOINT SEALER, HOT POURED	524.11	
LF	BRIDGE RAILING, GALVANIZED 2 RAIL BOX BEAM	525.33	
EACH	REMOVAL OF STRUCTURE (THREE 60" X 60' HDPE)	529.15	
LS	PRECAST CONCRETE STRUCTURE (32'-0" X 10'-0" X 40'-0" FRAME OR ARCH)	540.10	
CY	STONE FILL, TYPE I	613.10	
CY	STONE FILL, TYPE II	613.11	
LF	CAST-IN-PLACE CONCRETE CURB, TYPE B	616.28	
LF	STEEL BEAM GUARDRAIL, GALVANIZED	621.20	
EACH	MANUFACTURED TERMINAL SECTION, FLARED	621.50	
EACH	MANUFACTURED TERMINAL SECTION, TANGENT	621.51	
EACH	ANCHOR FOR STEEL BEAM RAIL	621.60	
EACH	GUARDRAIL APPROACH SECTION, GALVANIZED 2 RAIL BOX BEAM	621.72	
LF	REMOVAL AND DISPOSAL OF GUARDRAIL	621.80	
LF	TEMPORARY TRAFFIC BARRIER	621.90	
HR	UNIFORMED TRAFFIC OFFICERS	630.10	
HR	FLAGGERS	630.15	
LS	FIELD OFFICE, ENGINEERS	631.10	
LS	TESTING EQUIPMENT, BITUMINOUS	631.17	
DL	FIELD OFFICE TELEPHONE (N.A.B.I.)	631.26	
LS	MOBILIZATION/DEMOBILIZATION	635.11	
LS	TRAFFIC CONTROL (BRIDGE 96)	641.10	
LS	PUBLIC RELATIONS OFFICER	641.12	
DAY	PORTABLE CHANGEABLE MESSAGE SIGN RENTAL	641.17	
LF	4 INCH WHITE LINE	646.20	
LF	4 INCH YELLOW LINE	646.21	
LF	24 INCH STOP BAR	646.26	

DETAILED SUMMARY OF QUANTITIES

QUANTITIES	UNIT	ITEMS
		EARTHWORKS SUMMARY
		FILL AVAILABLE
410	CY	COMMON EXCAVATION
540	CY	UNCLASSIFIED CHANNEL EXCAVATION
	CY	UNDERDRAIN EXCAVATION
	CY	STRUCTURE EXCAVATION
1	CY	TRENCH EXCAVATION OF EARTH
4	CY	ROUNDING
955	**CY**	**TOTAL FILL AVAILABLE**
		FILL REQUIRED
5	CY	PLANIMETERED FILL
0	CY	FACTORED FILL
5	CY	ROUNDING
10	**CY**	**TOTAL FILL REQUIRED**
945	**CY**	**TOTAL WASTE**

Vanasse Hangen Brustlin, Inc.

PROJECT NAME: HUBBARDTON
PROJECT NUMBER: ER STP 0161(26)

FILE NAME: z11c288qs.dgn
PROJECT LEADER: M.A. COLGAN
DESIGNED BY: E.A. FIALA
QUANTITY SHEET #1

PLOT DATE: 07/13/2012
DRAWN BY: E.A. FIALA
CHECKED BY: S. FARNSWORTH
SHEET 11 OF 70

VHB 57478

STATE OF VERMONT
AGENCY OF TRANSPORTATION

QUANTITY SHEET 2

SUMMARY OF ESTIMATED QUANTITIES							TOTALS		DESCRIPTIONS				DETAILED SUMMARY OF QUANTITIES		
ROADWAY (BRIDGE 96)	EROSION CONTROL (BRIDGE 96)	BRIDGE NO. 96	FULL C.E. ITEMS (BRIDGE 96)	GRAND TOTAL	FINAL	UNIT	ITEMS	ITEM NUMBER	ROUND	QUANTITIES	UNIT	ITEMS
4				4		EACH	LETTER OR SYMBOL	646.30				
		310		310		SY	GEOTEXTILE UNDER STONE FILL	649.31				
	110			110		SY	GEOTEXTILE FOR SILT FENCE, WOVEN WIRE REINFORCED	649.515				
	20			20		SY	GEOTEXTILE FOR FILTER CURTAIN	649.61				
	10			10		LB	SEED	651.15				
	50			50		LB	FERTILIZER	651.18				
	0.2			0.2		TON	AGRICULTURAL LIMESTONE	651.20				
	0.2			0.2		TON	HAY MULCH	651.25				
	10			10		CY	TOPSOIL	651.35				
	25			25		SY	GRUBBING MATERIAL	651.40				
	1			1		LS	EPSC PLAN (BRIDGE 96)	652.10				
	20			20		HR	MONITORING EPSC PLAN (BRIDGE 96)	652.20				
	1			1		LU	MAINTENANCE OF EPSC PLAN (N.A.B.I.) (BRIDGE 96)	652.30				
	180			180		SY	TEMPORARY EROSION MATTING	653.20				
	15			15		CY	VEHICLE TRACKING PAD	653.35				
	1			1		EACH	FILTER BAG	653.45				
	490			490		LF	PROJECT DEMARCATION FENCE	653.55				
		30		30		CY	SPECIAL PROVISION (COARSE AGGREGATE BACKFILL)	900.608				
		440		440		CY	SPECIAL PROVISION (GRANULAR BACKFILL FOR STRUCTURES)	900.608				
1				1		LU	SPECIAL PROVISION (INCENTIVE/DISINCENTIVE)(BRIDGE 96)(N.A.B.I.)	900.650				
1				1		LU	SPECIAL PROVISION (MAT DENSITY PAY ADJUSTMENT, SMALL QUANTITY)(BRIDGE 96)(N.A.B.I.)	900.650				
1				1		LU	SPECIAL PROVISION (MIXTURE PAY ADJUSTMENT)(BRIDGE 96)(N.A.B.I.)	900.650				
250				250		TON	SPECIAL PROVISION (BITUMINOUS CONCRETE PAVEMENT, SMALL QUANTITY)	900.680				

VHB Vanasse Hangen Brustlin, Inc.

PROJECT NAME: HUBBARDTON
PROJECT NUMBER: ER STP 0161(26)

FILE NAME: z11c288qs.dgn
PROJECT LEADER: M.A. COLGAN
DESIGNED BY: E.A. FIALA
QUANTITY SHEET #2

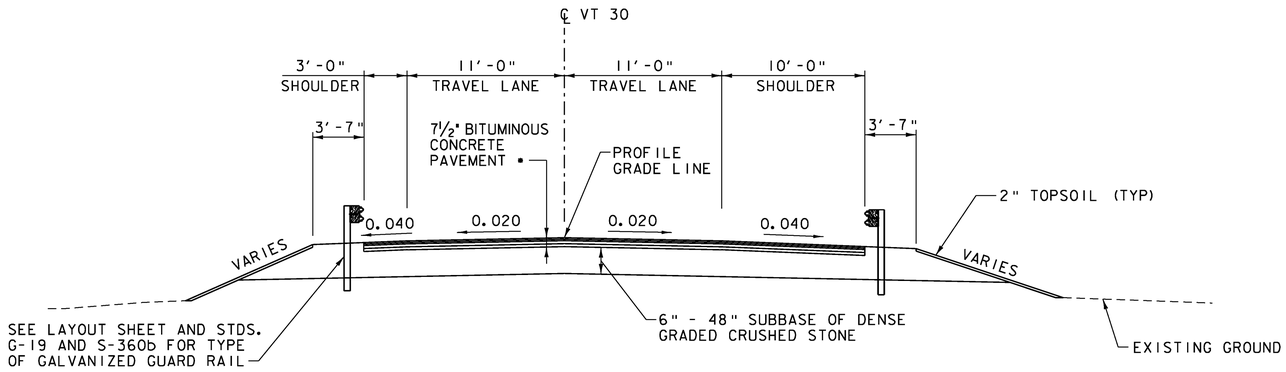
PLOT DATE: 07/26/2012
DRAWN BY: E.A. FIALA
CHECKED BY: S. FARNSWORTH
SHEET 12 OF 70

VHB 57478

MATERIAL TOLERANCES

(IF USED ON PROJECT)

SURFACE	
- PAVEMENT	+/- 1/4"
- AGGREGATE SURFACE COURSE	+/- 1/2"
BASE COURSE	+/- 1/2"
SUBBASE	+/- 1"
SAND BORROW	+/- 1"
GRANULAR BORROW	+/- 1"



* 1¼" TYPE IV WEARING COURSE OVER
1¼" TYPE IV BINDER COURSE OVER
2½" TYPE II BASE COURSE OVER
2½" TYPE II BASE COURSE

NOTE: PAVEMENT SHALL BE UNDER THE ITEM 900.680, "SPECIAL PROVISION (BITUMINOUS CONCRETE PAVEMENT, SMALL QUANTITY)".

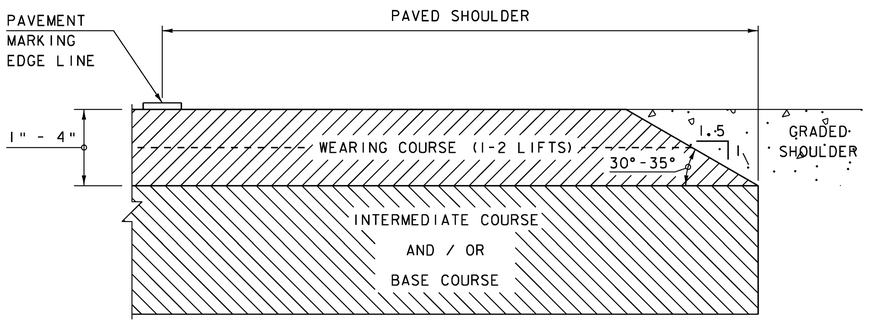
TACK COATS OF EMULSIFIED ASPHALT SHALL BE APPLIED AT THE RATE OF 0.040 GAL/SY BETWEEN SUCCESSIVE COURSES OF PAVEMENT OR AS DIRECTED BY THE ENGINEER.

VT 30 TYPICAL ROADWAY SECTION

SCALE: 1" = 5'

0 5

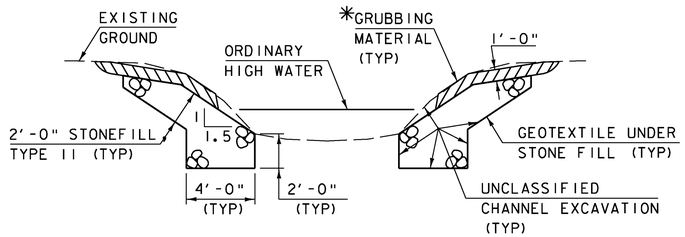
5 1 SCALE



SAFETY EDGE DETAIL

NOT TO SCALE

NOTE: LEVELING COURSE MAY INCLUDE THE "SAFETY EDGE" AT THE CONTRACTOR'S CHOICE.



TYPICAL CHANNEL SECTION

(NOT TO SCALE)

*GRUBBING MATERIAL SHALL NOT BE PLACED ON THE STONE FILL IN THE AREA UNDER THE BRIDGE. WHENEVER CHANNEL SLOPE INTERSECTS ROADWAY SUBBASE, GRUBBING MATERIAL SHALL BEGIN AT THE BOTTOM OF SUBBASE.

VHB Vanasse Hangen Brustlin, Inc.

PROJECT NAME: HUBBARDTON	
PROJECT NUMBER: ER STP 0161(26)	
FILE NAME: z11c288typ.dgn	PLOT DATE: 7/16/2012
PROJECT LEADER: M.A. COLGAN	DRAWN BY: C.L. CILLEY
DESIGNED BY: C.L. CILLEY	CHECKED BY: S.G. FARNSWORTH
TYPICAL ROADWAY SECTION	SHEET 13 OF 70

VHB 57478.01

GPS CONTROL POINTS

HVCTRL #100

WAITE AZ MK

NORTH = 440385.491
EAST = 1459351.822
ELEV. = 424.57

GENERAL LOCATION, HUBBARDTON, VT. TO REACH FROM THE INTERSECTION OF VT ROUTE 30 AND VT ROUTE 144 IN SUDBURY GO SOUTH ALONG VT ROUTE 30 FOR 4.2 MI (6.8 KM) TO THE INTERSECTION OF MONUMENT HILL ROAD LEFT. CONTINUE STRAIGHT AHEAD AND GO SOUTH ALONG VT ROUTE 30 FOR 0.1 MI (0.2 KM) TO THE SITE OF THE MARK ON THE LEFT, JUST NORTH OF THE HUBBARDTON CONGREGATIONAL CHURCH. TO REACH FROM THE US ROUTE 4 WESTBOUND BRIDGE OVER VT ROUTE 30 AT EXIT 4 IN CASTLETON GO NORTH ALONG VT ROUTE 30 FOR 6.4 MI (10.3 KM) TO THE SITE OF THE MARK ON THE RIGHT. THE MARK IS SET 3 CM BELOW GROUND SURFACE IN THE TOP OF A 30 CM DIAMETER CONCRETE MONUMENT POURED 1.3 M (4.3 FT) DEEP. IT IS 6.2 M (20.3 FT) EAST OF AND ABOUT 0.4 M (1.3 FT) HIGHER THAN THE CENTERLINE OF VT ROUTE 30, 21.3 M (69.9 FT) SOUTH OF THE CENTERLINE OF A GRAVEL DRIVE, 38.1 M (125.0 FT) EAST NORTHEAST OF THE NORTHEAST CORNER OF THE CHURCH, 24.9 M (81.7 FT) SOUTH OF POLE NO 53/224, AND 11.6 M (38.1 FT) NORTH OF POLE NO 224X AND A FIBERGLASS WITNESS POST.

HVCTRL #101

WAITE

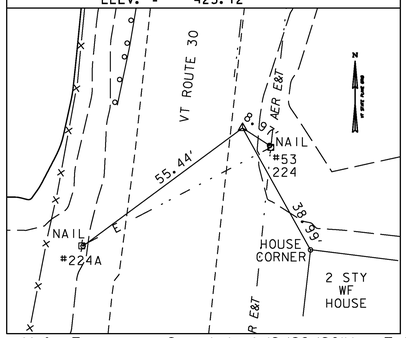
NORTH = 441544.996
EAST = 1459441.825
ELEV. = 419.00

GENERAL LOCATION, HUBBARDTON, VT. OWNERSHIP EUGENE R. AND FLORENCE WAITE, 2180 VT ROUTE 30, HUBBARDTON ROAD, BOMOSEEN, VT 05732. TO REACH FROM THE INTERSECTION OF VT ROUTE 30 AND VT ROUTE 144 IN SUDBURY GO SOUTH ALONG VT ROUTE 30 FOR 4.0 MI (6.4 KM) TO THE SITE OF THE MARK ON THE LEFT IN A LAWN IN FRONT OF THE WAITE RESIDENCE. IT IS 0.15 MI (0.24 KM) NORTH OF THE INTERSECTION OF VT ROUTE 30 AND MONUMENT HILL ROAD. TO REACH FROM THE US ROUTE 4 WESTBOUND BRIDGE OVER VT ROUTE 30 AT EXIT 4 IN CASTLETON GO NORTH ALONG VT ROUTE 30 FOR 6.5 MI (10.5 KM) TO THE INTERSECTION OF MONUMENT HILL ROAD RIGHT. CONTINUE STRAIGHT AHEAD AND GO NORTH ALONG VT ROUTE 30 FOR 0.15 MI (0.24 KM) TO THE SITE OF THE MARK ON THE RIGHT. THE MARK IS SET 5 CM BELOW GROUND SURFACE IN THE TOP OF A 30 CM DIAMETER CONCRETE MONUMENT POURED 1.3 M (4.3 FT) DEEP. IT IS 7.8 M (25.6 FT) EAST OF AND ABOUT 0.4 M (1.3 FT) LOWER THAN THE CENTERLINE OF VT ROUTE 30, 11.5 M (37.7 FT) SOUTH OF THE CENTERLINE OF THE WAITE PAVED DRIVE, 49.0 M (160.8 FT) WEST SOUTHWEST OF THE WEST CORNER OF THE WAITE TWO CAR GARAGE, AND 22.6 M (74.1 FT) SOUTH OF POLE NO 20T/53/221 AND A FIBERGLASS WITNESS POST.

TRAVERSE TIES

HVCTRL #1

NORTH = 440612.246
EAST = 1459371.617
ELEV. = 425.12



HVCTRL #2

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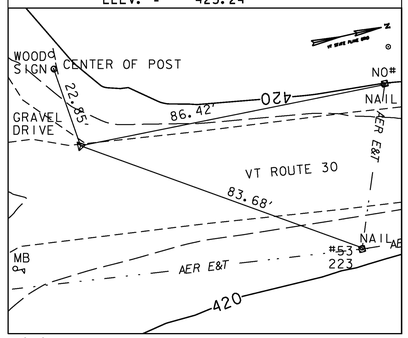
EAST = 1459366.209
ELEV. = 423.24



• Main Traverse Completed 12/29/2011 by T.J.Gaudet

DATUM	
VERTICAL	NAVD 88
HORIZONTAL	NAD 83(1996)
ADJUSTMENT	Compass

VHB Vanasse Hangen Brustlin, Inc.

PROJECT NAME:	HUBBARDTON
PROJECT NUMBER:	ER STP 0161(26)
FILE NAME: z11c288ti.dgn	PLOT DATE: 7/16/2012
PROJECT LEADER: M.A. COLGAN	DRAWN BY: J.A. CONNOLLY
DESIGNED BY: VHB	CHECKED BY: G.E. JOHNSON
TIE SHEET	SHEET 14 OF 70

VHB 57478.01

N

VT STATE PLANE GRID

REMOVAL AND DISPOSAL OF GUARDRAIL

STA 11+47.8 - 12+86.8 LT
STA 11+88.3 - 12+64.8 RT

BRIDGE RAILING, GALVANIZED 2 RAIL BOX BEAM

STA 12+07.4 - 12+42.6 LT
STA 12+07.4 - 12+42.6 RT

GUARDRAIL APPROACH SECTION, GALVANIZED 2 RAIL BOX BEAM

STA 11+78.3 - 12+07.4 LT
STA 12+42.6 - 12+71.7 LT
STA 11+78.3 - 12+07.4 RT
STA 12+42.6 - 12+67.7 RT

ANCHOR FOR STEEL BEAM RAIL

STA 12+65.7 ~~12+66.2~~ RT

MANUFACTURED TERMINAL SECTION, TANGENT

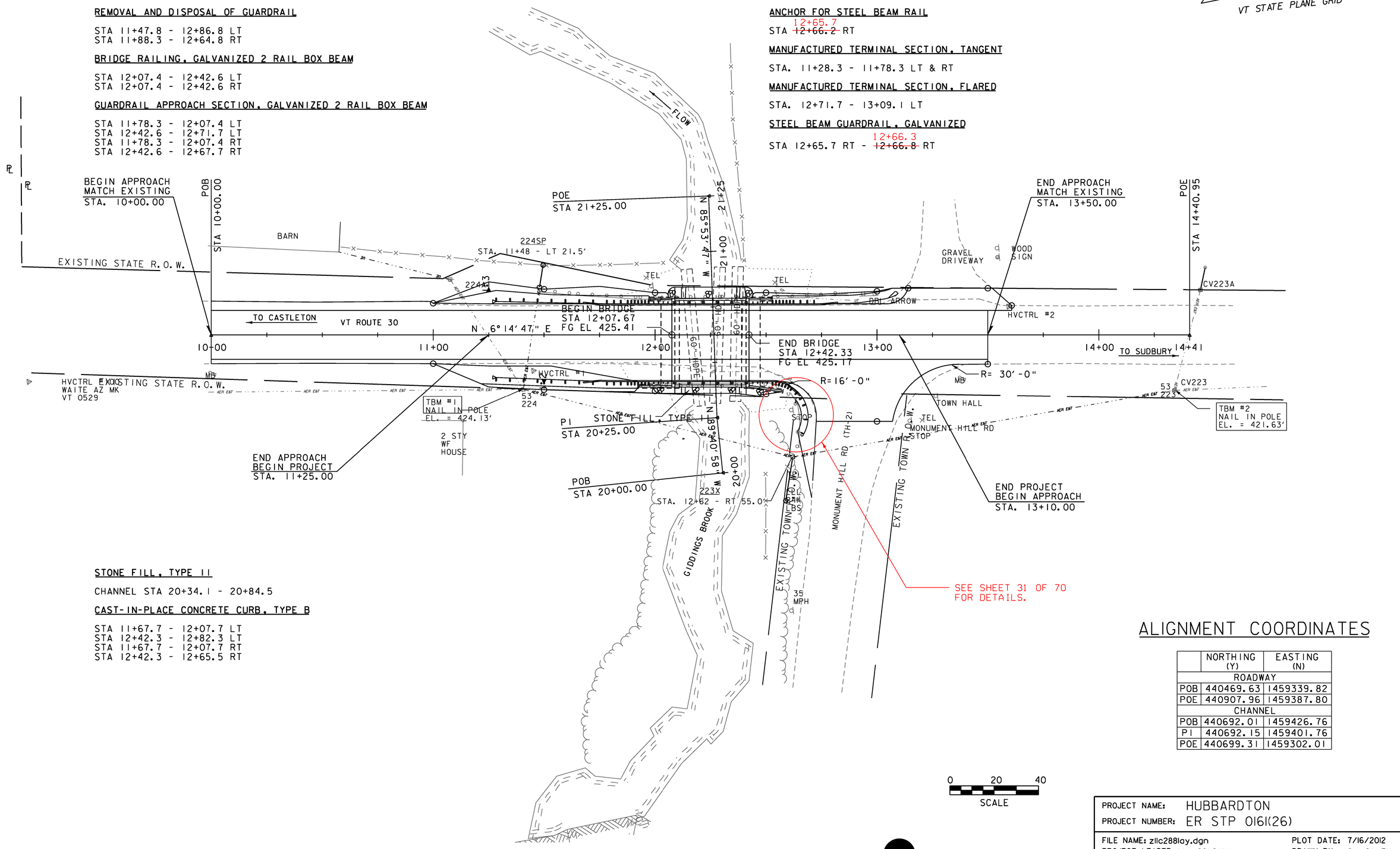
STA. 11+28.3 - 11+78.3 LT & RT

MANUFACTURED TERMINAL SECTION, FLARED

STA. 12+71.7 - 13+09.1 LT

STEEL BEAM GUARDRAIL, GALVANIZED

STA 12+65.7 RT - 12+66.3 ~~12+66.8~~ RT



STONE FILL, TYPE II

CHANNEL STA 20+34.1 - 20+84.5

CAST-IN-PLACE CONCRETE CURB, TYPE B

STA 11+67.7 - 12+07.7 LT
STA 12+42.3 - 12+82.3 LT
STA 11+67.7 - 12+07.7 RT
STA 12+42.3 - 12+65.5 RT

ALIGNMENT COORDINATES

	NORTHING (Y)	EASTING (N)
ROADWAY		
POB	440469.63	1459339.82
POE	440907.96	1459387.80
CHANNEL		
POB	440692.01	1459426.76
PI	440692.15	1459401.76
POE	440699.31	1459302.01

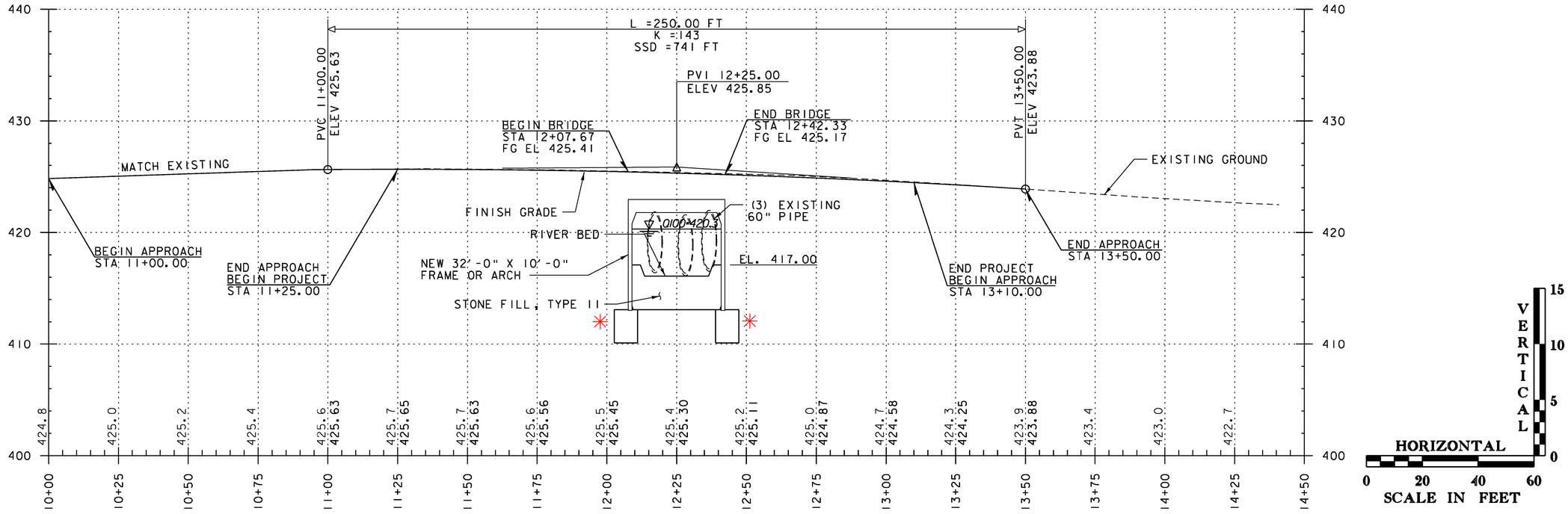
0 20 40
SCALE

VHB Vanasse Hangen Brustlin, Inc.

PROJECT NAME: HUBBARDTON
PROJECT NUMBER: ER STP 0161(26)

FILE NAME: z11c288lay.dgn
PROJECT LEADER: M.A. COLGAN
DESIGNED BY: S.G. FARNSWORTH
LAYOUT SHEET

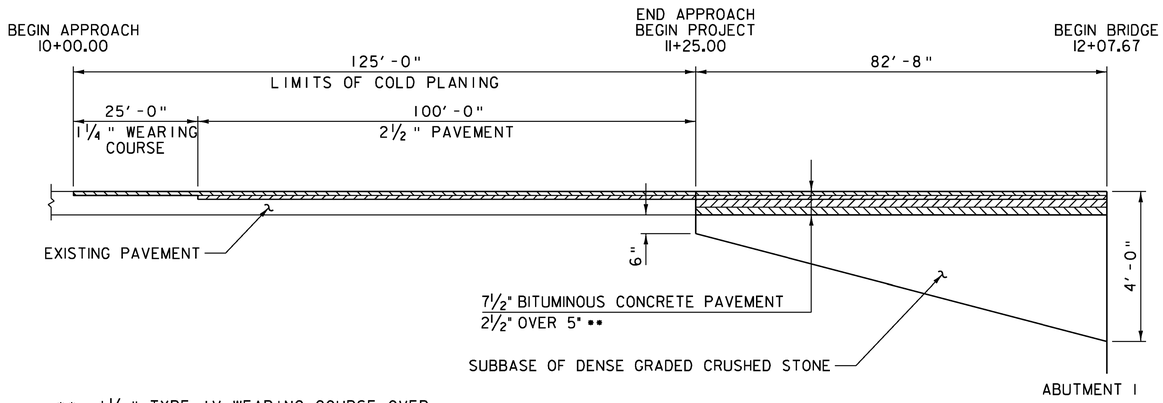
PLOT DATE: 7/16/2012
DRAWN BY: C.L. CILLEY
CHECKED BY: S.G. FARNSWORTH
SHEET 15 OF 70



VT 30 PROFILE

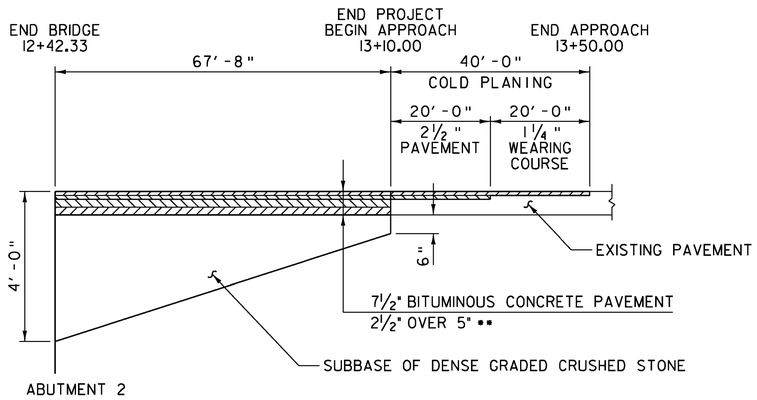
*NOTE: 2 FT FOOTINGS. SEE FINAL APPROVED SHOP DRAWINGS FOR DETAILS.

THE GRADES SHOWN TO THE NEAREST TENTH ARE THE ORIGINAL GROUND ELEVATIONS ALONG THE PROPOSED ALIGNMENT. THE GRADES SHOWN TO THE NEAREST HUNDRETH ARE THE PROPOSED GRADES FOR THE NEW ALIGNMENT.



** 1¼" TYPE IV WEARING COURSE OVER
1¼" TYPE IV BINDER COURSE OVER
2½" TYPE II BASE COURSE OVER
2½" TYPE II BASE COURSE

BEGIN PROJECT MATERIAL TRANSITION
NOT TO SCALE



END PROJECT MATERIAL TRANSITION
NOT TO SCALE

VHB Vanasse Hangen Brustlin, Inc.

PROJECT NAME:	HUBBARDTON
PROJECT NUMBER:	ER STP 0161(26)
FILE NAME: zllc288pro.dgn	PLOT DATE: 7/16/2012
PROJECT LEADER: M.A. COLGAN	DRAWN BY: E.A. FIALA
DESIGNED BY: S.G. FARNSWORTH	CHECKED BY: S.G. FARNSWORTH
PROFILE	SHEET 16 OF 70

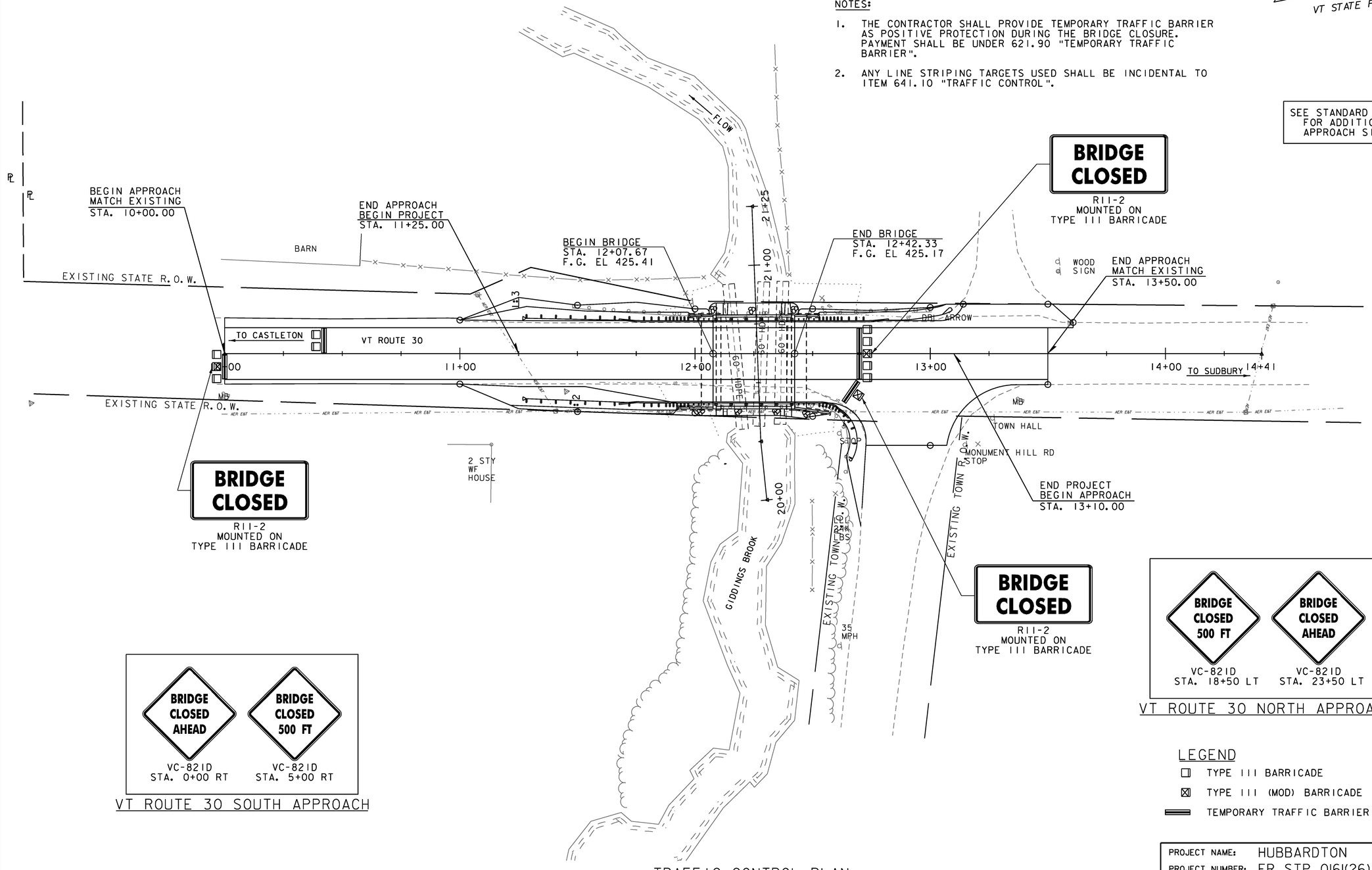
NOTES:

1. THE CONTRACTOR SHALL PROVIDE TEMPORARY TRAFFIC BARRIER AS POSITIVE PROTECTION DURING THE BRIDGE CLOSURE. PAYMENT SHALL BE UNDER 621.90 "TEMPORARY TRAFFIC BARRIER".
2. ANY LINE STRIPING TARGETS USED SHALL BE INCIDENTAL TO ITEM 641.10 "TRAFFIC CONTROL".

N

VT STATE PLANE GRID

SEE STANDARD E-100 FOR ADDITIONAL APPROACH SIGNS



BRIDGE CLOSED

R11-2
MOUNTED ON
TYPE III BARRICADE

BRIDGE CLOSED

R11-2
MOUNTED ON
TYPE III BARRICADE

BRIDGE CLOSED AHEAD — VC-821D STA. 0+00 RT

BRIDGE CLOSED 500 FT — VC-821D STA. 5+00 RT

VT ROUTE 30 SOUTH APPROACH

BRIDGE CLOSED 500 FT — VC-821D STA. 18+50 LT

BRIDGE CLOSED AHEAD — VC-821D STA. 23+50 LT

VT ROUTE 30 NORTH APPROACH

LEGEND

- TYPE III BARRICADE
- TYPE III (MOD) BARRICADE
- TEMPORARY TRAFFIC BARRIER

TRAFFIC CONTROL PLAN

0 20 40
SCALE

Vanasse Hangen Brustlin, Inc.

PROJECT NAME: HUBBARDTON
PROJECT NUMBER: ER STP 0161(26)

FILE NAME: z11c288tcp.dgn
PROJECT LEADER: M.A. COLGAN
DESIGNED BY: S.G. FARNSWORTH
TRAFFIC CONTROL PLAN

PLOT DATE: 7/16/2012
DRAWN BY: E.A. FIALA
CHECKED BY: S.G. FARNSWORTH
SHEET 17 OF 70

VHB 57478.01

EPSC PLAN NARRATIVE

1.1 PROJECT DESCRIPTION

THIS PROJECT INVOLVES THE REMOVAL OF THREE TEMPORARY CULVERTS AND REPLACEMENT WITH A CONCRETE RIDGED FRAME STRUCTURE FOR BRIDGE NO. 96 ON VT ROUTE 30. THE NEW STRUCTURE WILL SPAN THE GIDDINGS BROOK ALONG THE SAME ALIGNMENT. BRIDGE NO. 96 IS LOCATED IN THE TOWN OF HUBBARDTON, ON VT ROUTE 30, APPROXIMATELY 0.01 MILES SOUTH OF THE INTERSECTION OF VT ROUTE 30 AND MONUMENT HILL ROAD (TH 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 0.40 ACRES. IT IS ANTICIPATED THAT THIS PROJECT WILL LAST ONE CONSTRUCTION SEASON.

1.2 SITE INVENTORY

1.2.1 TOPOGRAPHY

THE TOPOGRAPHY OF THE AREA IS FLAT TREELESS BANKS ASCENDING FROM THE GIDDINGS BROOK TO ROLLING HILLS MOSTLY COVERED BY FOREST WITH OCCASIONAL OPEN AREAS. VT ROUTE 30 AND MONUMENT HILL ROAD (TH 2) ARE WITHIN THE PROJECT SITE. THERE IS A RESIDENCE TO THE SOUTH AND TO THE NORTH OF THE PROJECT SITE ALONG VT 30.

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

THE GIDDINGS BROOK IS THE ONLY WATER SOURCE ON THE PROJECT SITE. THE BROOK IS CLASSIFIED AS NARROW AND CURVING WITH BENDS UPSTREAM AND DOWNSTREAM OF THE PROJECT SITE AND A LOW CURRENT. THE BROOK BED CONSISTS OF GRAVEL, COBBLES, AND BOULDERS. THE TRIBUTARY AREA AT THE BRIDGE CROSSING IS APPROXIMATELY 4.7 SQ. MILES. THERE ARE NO OTHER CULVERTS WITHIN THE PROJECT AREA.

1.2.3 VEGETATION

THE VEGETATION IN THE PROJECT AREA CONSISTS OF SOME HARDWOOD AND SOFTWOOD TREES UPSTREAM OF VT 30. THE IMPACT TO VEGETATION WILL BE LIMITED TO THAT WHICH IS DIRECTLY AFFECTED BY REPLACEMENT OF THE EXISTING THREE TEMPORARY CULVERTS AND THE RECONSTRUCTION OF THE APPROACH ROADWAY. DISTURBED VEGETATION WILL BE RE-ESTABLISHED 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 RUTLAND, VERMONT. SOILS ON THE PROJECT SITE ARE:

CASTILE GRAVELLY FINE SANDY LOAM (71A), 0 TO 3% SLOPES, “K FACTOR” = 0.24, CONSIDERED MODERATELY ERODIBLE, COVERS MOST OF PROJECT SITE.

WARWICK-QUONSET COMPLEX (97B), “K FACTOR” = 0.24, CONSIDERED MODERATE ERODIBLE, SOUTHEAST CORNER OF PROJECT SITE.

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: NONE WITHIN PROJECT LIMITS
THREATENED AND ENDANGERED SPECIES: NO
WATER RESOURCE: GIDDINGS BROOK AND DOWNSTREAM LAKE BOMOSEEN
WETLANDS: NO

1.3 RISK EVALUATION

THIS PROJECT DOES NOT FALL UNDER THE JURISDICTION OF GENERAL PERMIT 3-9020 FOR STORMWATER RUNOFF FROM CONSTRUCTION SITES. SHOULD CHANGES PRIOR TO OR DURING CONSTRUCTION RESULT IN ONE OR MORE ACRES OF EARTH DISTURBANCE OR SHOULD THE PROJECT BECOME PART OF A LARGER PLAN OF DEVELOPMENT, 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, STORM WATER 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 CONSTRUCTION EQUIPMENT CAN ACCESS SHALL BE DELINEATED.

PROJECT DEMARCATION FENCING (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 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.

ITEM 649.515 WILL BE INSTALLED AS PROPOSED ON THE EPSC PLAN.

TURBIDITY FILTERS WILL BE INSTALLED WHERE WORK MUST TAKE PLACE WITHIN THE LIMITS OF THE BROOK IF COFFERDAMS OR OTHER METHODS OF SEPARATING THE BROOK FROM THE EXCAVATION AREAS ARE NEEDED.

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 DIVERSIONARY 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.

CHECK STRUCTURES ARE NOT ANTICIPATED FOR THIS PROJECT.

1.4.7 CONSTRUCT PERMANENT CONTROLS

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

PERMANENT EROSION CONTROL STRUCTURES ARE NOT ANTICIPATED FOR THIS PROJECT.

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. STONE FILL, TYPE I SHALL BE USED TO STABILIZE ALL SLOPES STEEPER THAN 1:2.

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.

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. FOR SLOPES STEEPER THAN 1:2, STONE FILL, TYPE I SHALL BE USED INSTEAD OF BIODEGRADABLE EROSION CONTROL MATTING.

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.

TREATMENT OF DEWATERING COFFERDAM IS ANTICIPATED. A LOCATION FOR TREATMENT HAS BEEN PROPOSED ON THE PLANS. IT IS ANTICIPATED THAT THE CONTRACTOR WILL HAVE TO PLACE A LARGE FILTRATION BAG ON THE EXISTING VT 30 PAVEMENT. HOWEVER THE SPECIFIC MEANS FOR TREATMENT OF DISCHARGE SHALL BE PROVIDED BY THE CONTRACTOR. PAYMENT FOR TREATMENT OF DISCHARGE WILL BE MADE UNDER CONTRACT ITEM 653.45.

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.

1.5.3 UPDATES

N

VT STATE PLANE GRID

7IA

RIPARIAN BUFFER

POE
STA 21+25.00

50'
TYPICAL

21+25

420

EXISTING STATE R.O.W.

224A

AER E&T

TEL

UT

TO CASTLETON

VT ROUTE 30

BEGIN BRIDGE
STA 12+07.67
FG EL 425.41

60" HDPE

END BRIDGE
STA 12+42.33
FG EL 425.17

11+00

12+00

13+00

HVCTRL #1

TBM #1
NAIL IN POLE
EL. = 424.13'

53
224

2 STY
WF
HOUSE

97B

7IA

P1
STA 20+25.00

POB
STA 20+00.00

GIDDINGS BROOK

STOP

LLL
24K
LBS

EXISTING TOWN R.O.W.

RIPARIAN BUFFER

MONUMENT HILL RD (TH-2)

DBL ARROW

GRAVEL
DRIVEWAY

WOOD
SIGN

HVCTRL #2

TO SUDBURY

R= 30'-0"

MB

TOWN HALL

MONUMENT HILL RD
STOP

LEGEND

- EXISTING CONTOUR
- UT — UNDERGROUND BURIED CABLE/TEL
- AER E&T — AERIAL ELECTRIC & TELEPHONE

SOIL CLASSIFICATION

CASTILE GRAVELLY FINE SANDY LOAM (71A)
"K FACTOR" = 0.24
CLASSIFIED MODERATE EROSION POTENTIAL

WARWICK-QUONSET COMPLEX (97B)
"K FACTOR" = 0.24
CLASSIFIED MODERATE EROSION POTENTIAL

0 10 20
SCALE

VHB Vanasse Hangen Brustlin, Inc.

PROJECT NAME: HUBBARDTON
PROJECT NUMBER: ER STP 0161(26)

FILE NAME: z11c288ero.dgn
PROJECT LEADER: M.A. COLGAN
DESIGNED BY: S.G. FARNSWORTH
EPSC EXISTING CONDITIONS SITE PLAN

PLOT DATE: 7/16/2012
DRAWN BY: C.L. CILLEY
CHECKED BY: S.G. FARNSWORTH
SHEET 19 OF 70

VHB 57478.01

N

VT STATE PLANE GRID

7IA

RIPARIAN BUFFER

POE
STA 21+25.00

50'
TYPICAL

21+25

420

PROPOSED FILTER BAG LOCATION

EXISTING STATE R.O.W.

PDF

TEL

AER E&T

UT

DBL ARROW

GRAVEL
DRIVEWAY

WOOD
SIGN

END APPROACH
MATCH EXISTING
STA. 13+50.00

HVCTRL #2

TO CASTLETON

VT ROUTE 30

BEGIN BRIDGE
STA 12+07.67
FG EL 425.41

60" HDPE

END BRIDGE
STA 12+42.33
FG EL 425.17

11+00

12+00

13+00

TO SUDBURY

HVCTRL #1

R=16'-0"

R= 30'-0"

MB

END APPROACH
BEGIN PROJECT
STA. 11+25.00

TBM #1
NAIL IN POLE
EL. = 424.13'

53
224

EXISTING STATE R.O.W.

TOWN HALL

END PROJECT
BEGIN APPROACH
STA. 13+10.00

MONUMENT HILL RD
STOP

2 STY
WF
HOUSE

97B

STONE FILL, TYPE II

PI
STA 20+25.00

POB
STA 20+00.00

LLL
24K
LBS

GIDDINGS BROOK

MONUMENT HILL RD (TH-2)

EXISTING TOWN R.O.W.

SOIL CLASSIFICATION

CASTILE GRAVELLY FINE SANDY LOAM (71A)
"K FACTOR" = 0.24
CLASSIFIED MODERATE EROSION POTENTIAL

WARWICK-QUONSET COMPLEX (97B)
"K FACTOR" = 0.24
CLASSIFIED MODERATE EROSION POTENTIAL

0 10 20
SCALE

LEGEND

- EXISTING CONTOUR
- UT — UNDERGROUND BURIED CABLE/TEL
- AER E&T — AERIAL ELECTRIC & TELEPHONE
- FILTER CURTAIN
- WOVEN WIRE SILT FENCE
- PDF — PROJECT DEMARCATION FENCE
- LIMITS OF SOIL DISTURBANCE
- TEMPORARY EROSION MATTING
- FILTER BAG

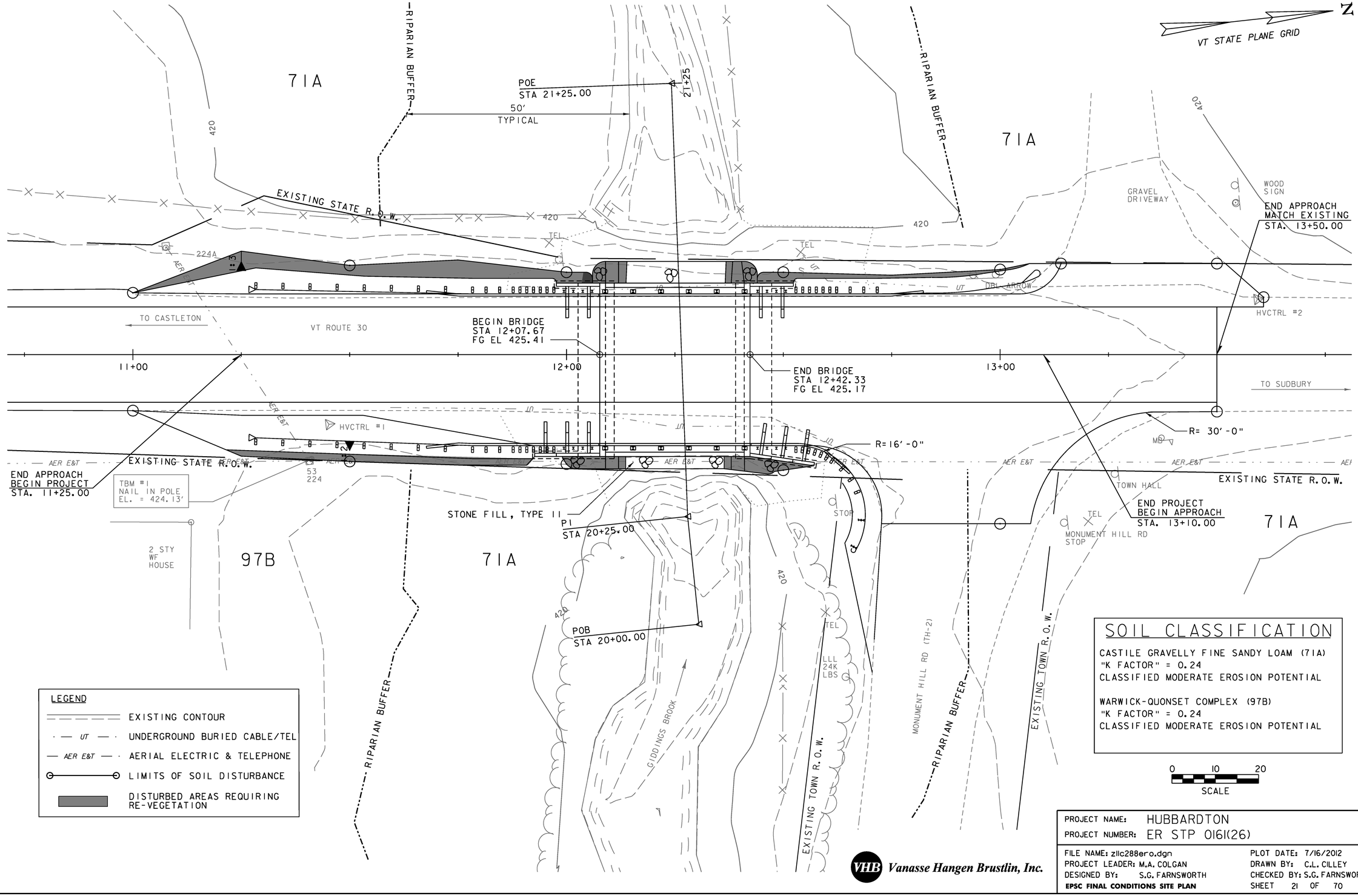
VHB Vanasse Hangen Brustlin, Inc.

PROJECT NAME: HUBBARDTON
PROJECT NUMBER: ER STP 0161(26)

FILE NAME: z11c288ero.dgn
PROJECT LEADER: M.A. COLGAN
DESIGNED BY: S.G. FARNSWORTH
EPSC CONSTRUCTION CONDITIONS SITE PLAN

PLOT DATE: 7/16/2012
DRAWN BY: C.L. CILLEY
CHECKED BY: S.G. FARNSWORTH
SHEET 20 OF 70

VHB 57478.01



LEGEND

- EXISTING CONTOUR
- UT — UNDERGROUND BURIED CABLE/TEL
- AER E&T — AERIAL ELECTRIC & TELEPHONE
- LIMITS OF SOIL DISTURBANCE
- DISTURBED AREAS REQUIRING RE-VEGETATION

SOIL CLASSIFICATION

CASTILE GRAVELLY FINE SANDY LOAM (7IA)
"K FACTOR" = 0.24
CLASSIFIED MODERATE EROSION POTENTIAL

WARWICK-QUONSET COMPLEX (97B)
"K FACTOR" = 0.24
CLASSIFIED MODERATE EROSION POTENTIAL

0 10 20
SCALE

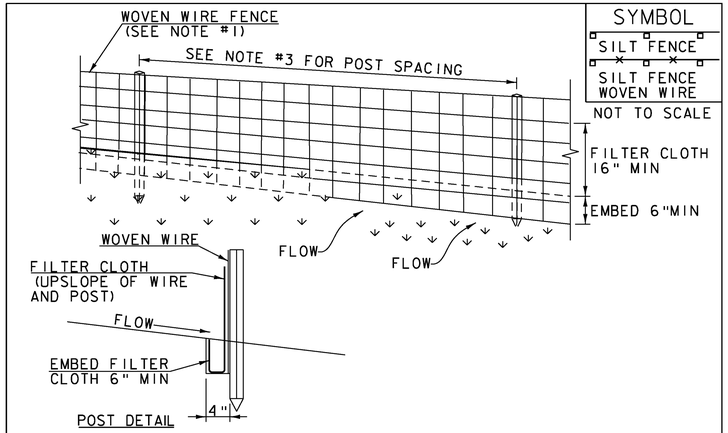
VHB Vanasse Hangen Brustlin, Inc.

PROJECT NAME: HUBBARDTON
PROJECT NUMBER: ER STP 0161(26)

FILE NAME: z11c288ero.dgn
PROJECT LEADER: M.A. COLGAN
DESIGNED BY: S.G. FARNSWORTH
EPSC FINAL CONDITIONS SITE PLAN

PLOT DATE: 7/16/2012
DRAWN BY: C.L. CILLEY
CHECKED BY: S.G. FARNSWORTH
SHEET 21 OF 70

VHB 57478.01



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.

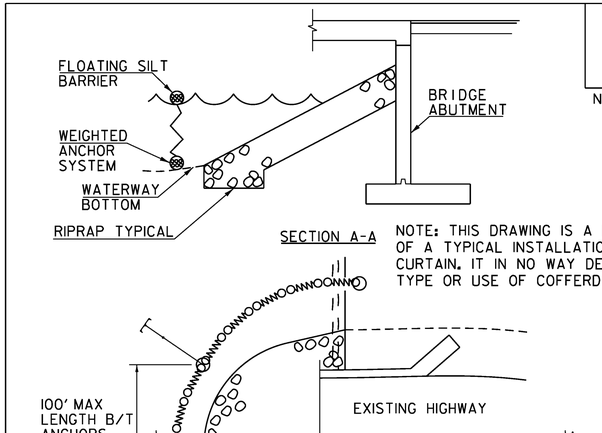
ADAPTED FROM DETAILS PROVIDED BY: NEW YORK STATE DEC
ORIGINALLY DEVELOPED BY USDA-NRCS
VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION

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



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.

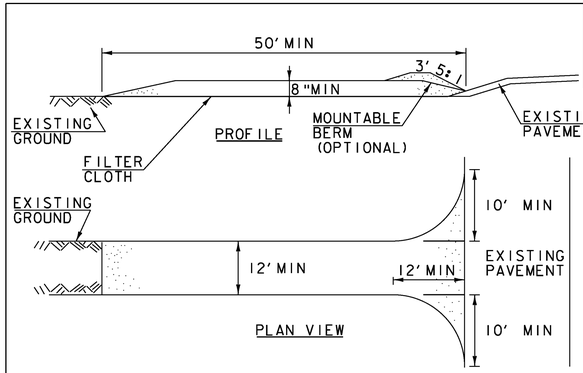
CONSTRUCTION SPECIFICATIONS

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 (PAY ITEM 649.61).

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

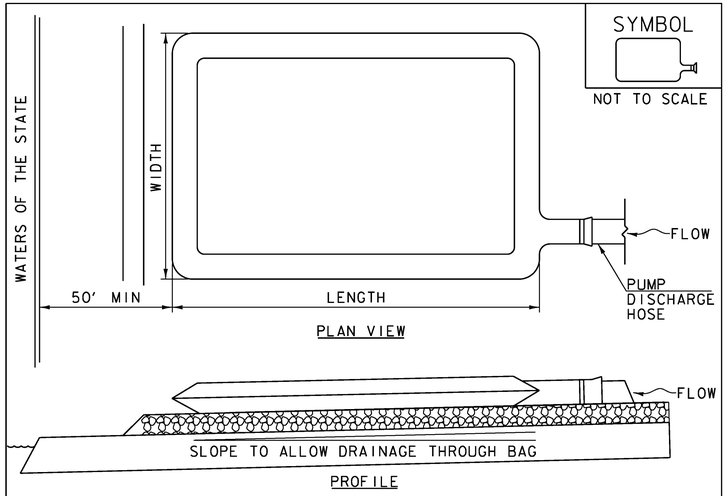
NOTES:
REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL -2006- " FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.

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

Vanasse Hangen Brustlin, Inc.

PROJECT NAME:	HUBBARDTON
PROJECT NUMBER:	ER STP 0161(26)
FILE NAME: z11c288ero_details.dgn	PLOT DATE: 7/16/2012
PROJECT LEADER: M.A. COLGAN	DRAWN BY: B.M. KLINEFELTER
DESIGNED BY: S.G. FARNSWORTH	CHECKED BY: S.G. FARNSWORTH
EPSC DETAILS (1 OF 2)	SHEET 22 OF 70



CONSTRUCTION SPECIFICATIONS

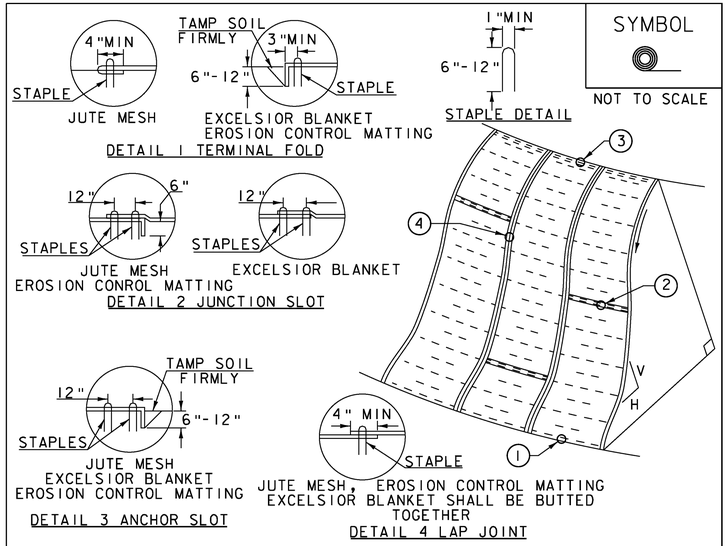
1. THE PRIMARY PURPOSE OF FILTER BAG IS TO RETAIN SILT, SAND, AND FINES DURING DEWATERING OPERATIONS.
2. FILTER BAGS SHALL BE INSTALLED ON A VEGETATED SLOPE GRADED TO ALLOW INCOMING WATER TO FLOW THROUGH THE BAG.
3. FILTER BAGS MAY ALSO BE PLACED ON COARSE AGGREGATE, STONE, OR HAYBALES TO INCREASE FILTRATION 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



CONSTRUCTION SPECIFICATIONS

1. APPLY TO SLOPES GREATER THAN 3H: IV 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

VAOT RURAL AREA MIX

LBS/AC					
% WEIGHT	BROADCAST	HYDROSEED	NAME	GERM %	PURITY %
37.5%	22.5	45	CREEPING RED FESCUE	85%	98%
37.5%	22.5	45	TALL FESCUE	90%	95%
5.0%	3	6	RED TOP	90%	95%
15.0%	9	18	BIRDSFOOT TREFOIL	85%	98%
5.0%	3	6	ANNUAL RYE GRASS	85%	95%
100%	60	120			

VAOT URBAN AREA MIX

LBS/AC					
% WEIGHT	BROADCAST	HYDROSEED	NAME	GERM %	PURITY %
42.5%	34	68	CREEPING RED FESCUE	85%	98%
10.0%	8	16	PERENNIAL RYE GRASS	90%	95%
42.5%	34	68	KENTUCKY BLUE GRASS	85%	85%
5.0%	4	8	ANNUAL RYE GRASS	85%	95%
100%	80	160			

GENERAL GUIDANCE

FERTILIZER		LIME	
BROADCAST	HYDROSEED	BROADCAST	HYDROSEED
10-20-10	19-19-19	PELLETIZED	LIQUID
500 LBS/AC		2 TONS/AC	4.4 GAL/AC

CONSTRUCTION GUIDANCE

1. RURAL SEED MIX: USE AS INDICATED IN THE PLANS AND/OR FOR ALL ESTABLISHED UPLAND (NON WETLAND) AREAS DISTURBED BY THE CONTRACTOR.
2. URBAN SEED MIX: USE AS INDICATED IN THE PLANS AND/OR FOR ALL ESTABLISHED LAWN 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. TOPSOIL: TO BE USED WITH SEED AS INDICATED ON THE PLANS, OR AS DIRECTED BY THE ENGINEER.
7. HYDROSEEDING: ALTHOUGH GUIDANCE IS GIVEN ABOVE THE SITE CONDITIONS AND THE TYPE OF HYDROSEED WILL ULTIMATELY DICTATE THE AMOUNTS AND TYPES OF SOIL AMENDMENTS TO BE APPLIED
8. 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 LANSCAPE MAUAL FOR ROADWAYS AND TRANSPORTATION FACILITIES

TURF ESTABLISHMENT

REVISIONS	
JUNE 23, 2009	WHF
JANUARY 15, 2010	WHF

Vanasse Hangen Brustlin, Inc.

PROJECT NAME:	HUBBARDTON
PROJECT NUMBER:	ER STP 0161(26)
FILE NAME: zllc288ero_details.dgn	PLOT DATE: 7/16/2012
PROJECT LEADER: M.A. COLGAN	DRAWN BY: B.M. KLINEFELTER
DESIGNED BY: S.G. FARNSWORTH	CHECKED BY: S.G. FARNSWORTH
EPSC DETAILS (2 OF 2)	SHEET 23 OF 70

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 1⅜" 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 1⅛"
BX	Core Size 1⅝"
NX	Core Size 2⅛"
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		

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.

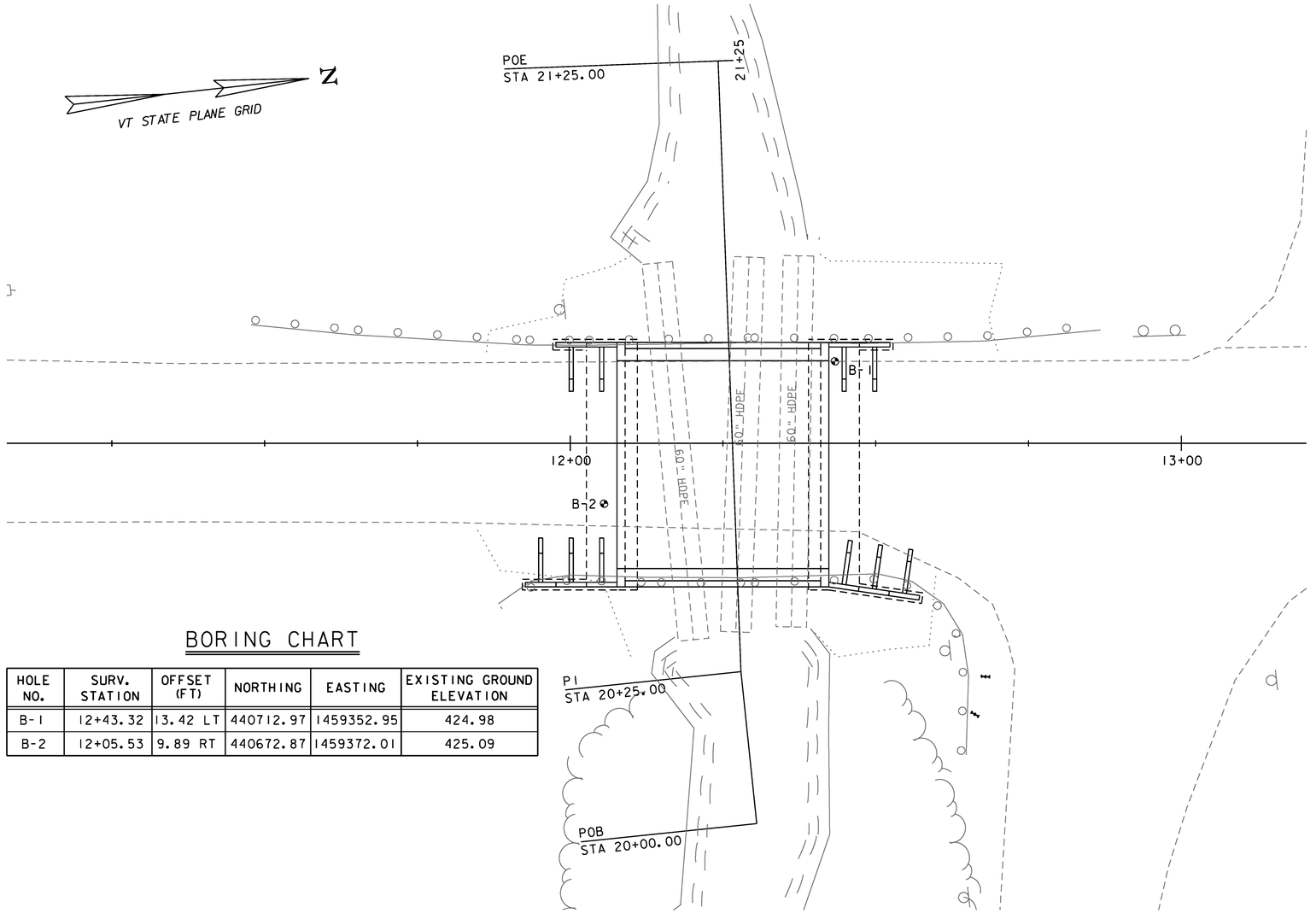
MUCK - Soft organic soil (containing > 10% organic material.

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.



BORING CHART

HOLE NO.	SURV. STATION	OFFSET (FT)	NORTHING	EASTING	EXISTING GROUND ELEVATION
B-1	12+43.32	13.42 LT	440712.97	1459352.95	424.98
B-2	12+05.53	9.89 RT	440672.87	1459372.01	425.09

BORING LAYOUT

GENERAL NOTES

1. The subsurface explorations shown herein were made between Dec 20-21, 2011 by ~~the Agency,~~ GeoDesign, Inc.
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.

0 10 20
SCALE

VHB Vanasse Hangen Brustlin, Inc.

PROJECT NAME: HUBBARDTON
PROJECT NUMBER: ER STP 0161(26)

FILE NAME: z11c288bor.dgn
PROJECT LEADER: M.A. COLGAN
DESIGNED BY: VTRANS
BORING INFORMATION SHEET

PLOT DATE: 7/16/2012
DRAWN BY: E.A. FIALA
CHECKED BY: S.G. FARNSWORTH
SHEET 24 OF 70

APPROX. EL 410.10
BOTTOM OF FOOTING

GEODESIGN INCORPORATED

GeoDesign, Inc.
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Phone: 802-674-2033/Fax: 802-674-5943

1233 Shelburne Rd., Suite 360
So. Burlington, VT 05403
Phone: 802-652-5140

BORING LOG

Project Name

Giddings Brook Culvert BR #96
VT Rt 30
Hubbardton, Vermont

Boring No.: B-1
Page No.: 1 of 2
File No.: 837-31.7
Checked By: DTH

Boring Company: TransTech Drilling Services
Foreman: John Loenhardt
GeoDesign Rep.: Joshua Gilman
Date Started: December 20, 2011 Date Finished: December 20, 2011
N. Coordinate: E. Coordinate:
Ground Surface Elevation (feet): 425
Station: Offset: ft

	Casing:	Sampler:
Type:	H.S.A.	SS
I.D.:	3.25 in.	1.38 in.
Hammer Wt.:	NA	140 lbs
Hammer Fall:	NA	30 in.
Rig Type:	CME 75	
Hammer Type:	Automatic	

Groundwater Observations			
Date	Depth (ft)	Elev. (ft)	Notes
▼ 12/20/11, 13:00	7.0	418.0	Wet sample

Depth (ft)	Casing Blows/ft	Sample Information: Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	Blows / 6 inch Interval: 0 - 6	6 - 12	12 - 18	18 - 24	Coring Time (min./ft)	Moisture Content (%)	Strata Description: Depth & Elevation(feet)	Symbol	Sample Description: Classification System: Burmister
													Asphalt 424.5		
													Fill (Silty Sand & Gravel with inferred cobbles / boulders)		
5		S1	SS	24	8	5	4	9	8	5					S1) Medium dense, gray brown fine to coarse GRAVEL, some fine to coarse Sand, little Silt, moist.
		S2	SS	9	9	7	6	50/3"							S2) Refusal, similar to S1 except wet.
10													10 Silty Sand & Gravel 415.0		
		S3	SS	24	6	14	6	5	6	5					S3) Medium dense, brown fine to coarse GRAVEL and fine to coarse SAND, little Silt, wet.
		S4	SS	24	10	16	6	3	2	2					S4) Loose, similar to S3.
		S5	SS	24	8	18	2	1	2	1					S5) Very loose, brown fine to coarse SAND and fine Gravel, little Silt, wet.
20		S6	SS	24	10	20	3	4	1	2					S6) Loose, brown fine to coarse SAND, little Silt, trace fine Gravel, wet.
		S7	SS	24	11	22	3	2	1	2					S7) Very loose, brown fine to coarse SAND, some fine to coarse Gravel, little Silt, wet.
25		S8	SS	24	7	25	2	2	2	2					S8) Loose, brown fine to coarse SAND, some Silt, trace fine Gravel, wet.
30															

Remarks:
1) Ground surface elevation estimated in the field by GeoDesign using site plan dated 9/26/2011 provided by VHB.
2) Following HSA refusal at 5 feet deep in B-1A (no samples collected), driller offset hole 2 feet south to B-1B and resumed.
3) Following sampling of S1 at B-1B, hole became out of plumb. Driller offset 5 feet north to B-1C and resumed.
4) When borehole B-1C became out of plumb (no samples collected), driller offset 2 feet north to B-1D.
5) One sample was collected at B-1B, and the rest were collected at B-1D.
6) Maintained head of water in augers below stream level.

Notes:
1) Stratification Lines Represent Approximate Boundary Between Material Types, Transitions May Be Gradual.
2) Water Level Readings Have Been Made At Times And Under Conditions Stated, Fluctuations Of Groundwater May Occur Due To Other Factors Than Those Present At The Time Measurements Were Made. A.C. = After coring; N.R. = Not Recorded.
3) Sample Type Coding: A=Auger; C=Core; D=Drive; G=Grab; PS=Piston Sampler; SS=Split Barrel (Split Spoon); ST=Shelby Tube; Geo=GeoProbe V=Vane; WOR/H=Weight of Rod/Hammer
4) Proportions Used: Trace = 1-10%; Little = 10-20%; Some = 20-35%; And = 35-50%
5) Stratification lines represent approximate boundary between material types, transitions may be gradual.

Boring No.: B-1

GEODESIGN INCORPORATED

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Phone: 802-652-5140

BORING LOG

Project Name

Giddings Brook Culvert BR #96
VT Rt 30
Hubbardton, Vermont

Boring No.: B-1
Page No.: 2 of 2
File No.: 837-31.7
Checked By: DTH

Boring Company: TransTech Drilling Services
Foreman: John Loenhardt
GeoDesign Rep.: Joshua Gilman
Date Started: December 20, 2011 Date Finished: December 20, 2011
N. Coordinate: E. Coordinate:
Ground Surface Elevation (feet): 425
Station: Offset: ft

	Casing:	Sampler:
Type:	H.S.A.	SS
I.D.:	3.25 in.	1.38 in.
Hammer Wt.:	NA	140 lbs
Hammer Fall:	NA	30 in.
Rig Type:	CME 75	
Hammer Type:	Automatic	

Groundwater Observations			
Date	Depth (ft)	Elev. (ft)	Notes
▼ 12/20/11, 13:00	7.0	418.0	Wet sample

Depth (ft)	Casing Blows/ft	Sample Information: Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	Blows / 6 inch Interval: 0 - 6	6 - 12	12 - 18	18 - 24	Coring Time (min./ft)	Moisture Content (%)	Strata Description: Depth & Elevation(feet)	Symbol	Sample Description: Classification System: Burmister
		S9	SS	24	9	30	2	2	3	1			Silty Sand & Gravel *(Continued)*		S9) Loose, brown fine to coarse SAND, some fine to coarse Gravel, little Silt, wet.
35		S10	SS	24	12	35	4	4	5	6					S10) Similar to S9.
40		S11	SS	24	10	40	2	3	3	3					S11) Similar to S9.
42.5													Stratified Sand and Silt/Clay 382.5		
45		S12	SS	24	15	45	2	3	3	5					S12) Medium / Loose, tan brown stratified CLAY & SILT and fine to coarse SAND, trace Silt, wet.
47													Bottom of Exploration at 47.0 ft 378.0		
50															
55															
60															

Remarks:
7) Depth of fill estimated.
8) Boring terminated at 47 feet deep with no refusal.

Notes:
1) Stratification Lines Represent Approximate Boundary Between Material Types, Transitions May Be Gradual.
2) Water Level Readings Have Been Made At Times And Under Conditions Stated, Fluctuations Of Groundwater May Occur Due To Other Factors Than Those Present At The Time Measurements Were Made. A.C. = After coring; N.R. = Not Recorded.
3) Sample Type Coding: A=Auger; C=Core; D=Drive; G=Grab; PS=Piston Sampler; SS=Split Barrel (Split Spoon); ST=Shelby Tube; Geo=GeoProbe V=Vane; WOR/H=Weight of Rod/Hammer
4) Proportions Used: Trace = 1-10%; Little = 10-20%; Some = 20-35%; And = 35-50%
5) Stratification lines represent approximate boundary between material types, transitions may be gradual.

Boring No.: B-1

VHB *Vanasse Hangen Brustlin, Inc.*

PROJECT NAME: HUBBARDTON
PROJECT NUMBER: ER STP 0161(26)

FILE NAME: z11c288borlogs.dgn
PROJECT LEADER: M.A. COLGAN
DESIGNED BY: VTRANS
BORING LOGS (1 OF 2)

PLOT DATE: 7/16/2012
DRAWN BY: E.A. FIALA
CHECKED BY: S.G. FARNSWORTH
SHEET 25 OF 70

VHB 57478.01

APPROX. EL 410.10
BOTTOM OF FOOTING

GEODESIGN INCORPORATED

GeoDesign, Inc.
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1233 Shelburne Rd., Suite 360
So. Burlington, VT 05403
Phone: 802-652-5140

BORING LOG

Project Name

Giddings Brook Culvert BR #96
VT Rt 30
Hubbardton, Vermont

Boring No.: B-2
Page No.: 1 of 2
File No.: 837-31.7
Checked By: DTH

Boring Company: TransTech Drilling Services
Foreman: John Leonhardt
GeoDesign Rep.: Joshua Gilman
Date Started: December 20, 2011 Date Finished: December 20, 2011
N. Coordinate: E. Coordinate:
Ground Surface Elevation (feet): 425
Station: Offset: ft

	Casing:	Sampler:
Type:	Flush	SS
I.D.:	4.0 in.	1.38 in.
Hammer Wt.:	140 lbs	140 lbs
Hammer Fall:	30 in.	30 in.
Rig Type:	CME 75	
Hammer Type:	Automatic	

Groundwater Observations			
Date	Depth (ft)	Elev. (ft)	Notes
▼ 12/20/11, 10:00			See Note 2

Sample Information													Strata Description	Symbol	Sample Description
Depth (ft)	Casing Blows/ft	Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	Blows / 6 inch Interval 0 - 6	6 - 12	12 - 18	18 - 24	Coring Time (min./ft)	Moisture Content (%)	Depth & Elevation(feet)		Classification System: Burmister
													Asphalt 424.5		
													Fill (Silty Sand & Gravel with possible cobbles / boulders)		
5		S1	SS	24	16	4	11	11	14	11					S1) Medium dense, gray/brown fine to coarse GRAVEL and fine to coarse Sand, little Silt, dry.
10		S2	SS	24	6	10	9	12	8	4			10 Silty Sand & Gravel 415.0		S2) Medium dense, gray/brown, fine to coarse GRAVEL, and fine to coarse SAND, little Clay & Silt, wet
15		S3	SS	24	0	14	8	5	3	2					S3) No recovery.
		S4	SS	24	10	16	4	2	3	3					S4) Loose, gray/brown fine to coarse GRAVEL and fine to coarse Sand, little Silt, wet.
		S5	SS	24	12	18	3	3	2	3					S5) Loose, gray/brown fine to coarse SAND, some Silt, little fine to coarse Gravel, wet.
20		S6	SS	24	7	20	4	3	2	3					S6) Similar to S5.
		S7	SS	24	10	22	3	3	3	3					S7) Loose, gray/brown fine to coarse SAND, some Silt, trace fine Gravel, wet.
25		S8	SS	24	8	24	3	3	2	4					S8) Similar to S7.
		S9	SS	24	16	26	3	3	2	2					S9) Similar to S7, except little Silt.
30															

Remarks

1) Ground surface elevation estimated in the field by GeoDesign using site plan dated 9/26/2011 provided by VHB.
2) Driller switched to wash and drive 4-inch I.D. flush-joint casing method due to slow advance with augers (inferred very dense soil). Relative moisture observations are effected by drilling water.
3) Depth of fill estimated.
4) Sample S4 by semi-continuous method after no recovery at Sample S3. SPT N-value not valid per *ASTM D1586*.
5) Boring terminated at 32 feet deep with no refusal.

Notes:
1) Stratification Lines Represent Approximate Boundary Between Material Types, Transitions May Be Gradual.
2) Water Level Readings Have Been Made At Times And Under Conditions Stated, Fluctuations Of Groundwater May Occur Due To Other Factors Than Those Present At The Time Measurements Were Made. A.C. = After coring; N.R. = Not Recorded.
3) Sample Type Coding: A=Auger; C=Core; D=Drive; G=Grab; PS=Piston Sampler; SS=Split Barrel (Split Spoon); ST=Shelby Tube; Geo=GeoProbe V=Vane; WOR/H=Weight of Rod/Hammer
4) Proportions Used: Trace = 1-10%; Little = 10-20%; Some = 20-35%; And = 35-50%
5) Stratification lines represent approximate boundary between material types, transitions may be gradual.

Boring No.: B-2

GEODESIGN INCORPORATED

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So. Burlington, VT 05403
Phone: 802-652-5140

BORING LOG

Project Name

Giddings Brook Culvert BR #96
VT Rt 30
Hubbardton, Vermont

Boring No.: B-2
Page No.: 2 of 2
File No.: 837-31.7
Checked By: DTH

Boring Company: TransTech Drilling Services
Foreman: John Leonhardt
GeoDesign Rep.: Joshua Gilman
Date Started: December 20, 2011 Date Finished: December 20, 2011
N. Coordinate: E. Coordinate:
Ground Surface Elevation (feet): 425
Station: Offset: ft

Casing: Sampler:
Type: Flush SS
I.D.: 4.0 in. 1.38 in.
Hammer Wt.: 140 lbs 140 lbs
Hammer Fall: 30 in. 30 in.
Rig Type: CME 75
Hammer Type: Automatic

Groundwater Observations
Date | Depth (ft) | Elev. (ft) | Notes
▼ 12/20/11, 10:00 | | | See Note 2

Sample Information													Strata Description	Symbol	Sample Description
Depth (ft)	Casing Blows/ft	Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	Blows / 6 inch Interval 0 - 6	6 - 12	12 - 18	18 - 24	Coring Time (min./ft)	Moisture Content (%)	Depth & Elevation(feet)		Classification System: Burmister
		S10	SS	24	8	30	3	2	3	4			Silty Sand & Gravel *(Continued)*		S10) Similar to S7, except little Silt.
35													32 Bottom of Exploration at 32.0 ft 393.0		
40															
45															
50															
55															
60															

Remarks

Notes:
1) Stratification Lines Represent Approximate Boundary Between Material Types, Transitions May Be Gradual.
2) Water Level Readings Have Been Made At Times And Under Conditions Stated, Fluctuations Of Groundwater May Occur Due To Other Factors Than Those Present At The Time Measurements Were Made. A.C. = After coring; N.R. = Not Recorded.
3) Sample Type Coding: A=Auger; C=Core; D=Drive; G=Grab; PS=Piston Sampler; SS=Split Barrel (Split Spoon); ST=Shelby Tube; Geo=GeoProbe V=Vane; WOR/H=Weight of Rod/Hammer
4) Proportions Used: Trace = 1-10%; Little = 10-20%; Some = 20-35%; And = 35-50%
5) Stratification lines represent approximate boundary between material types, transitions may be gradual.

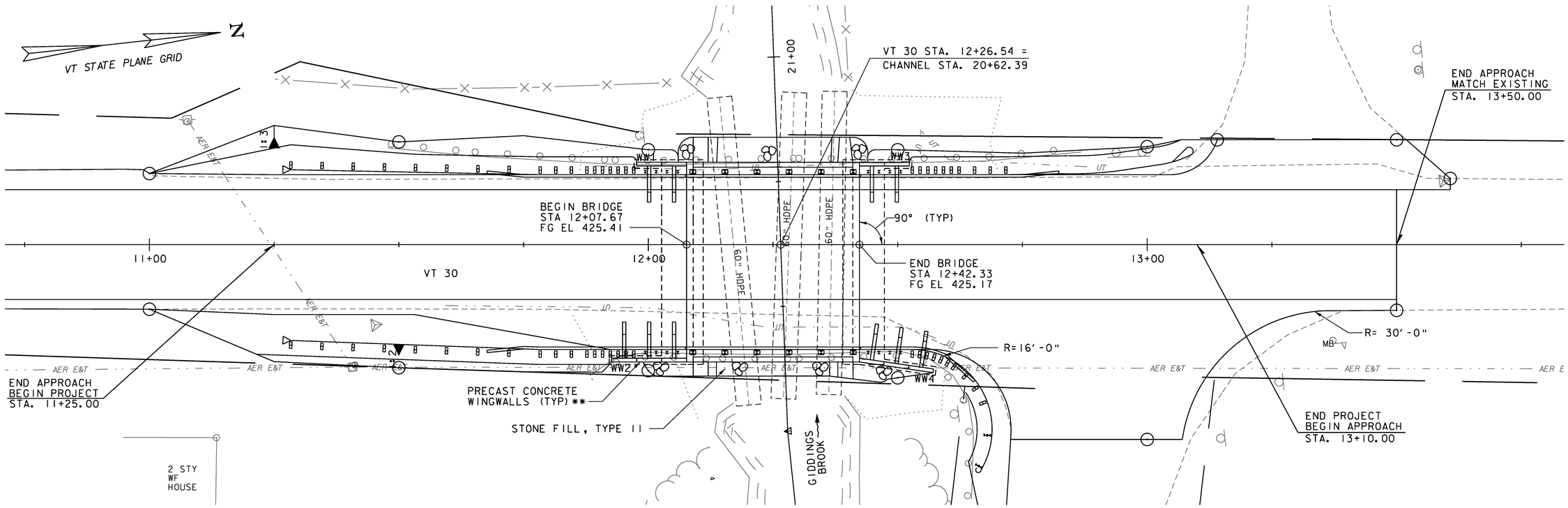
Boring No.: B-2

VHB

Vanasse Hangen Brustlin, Inc.

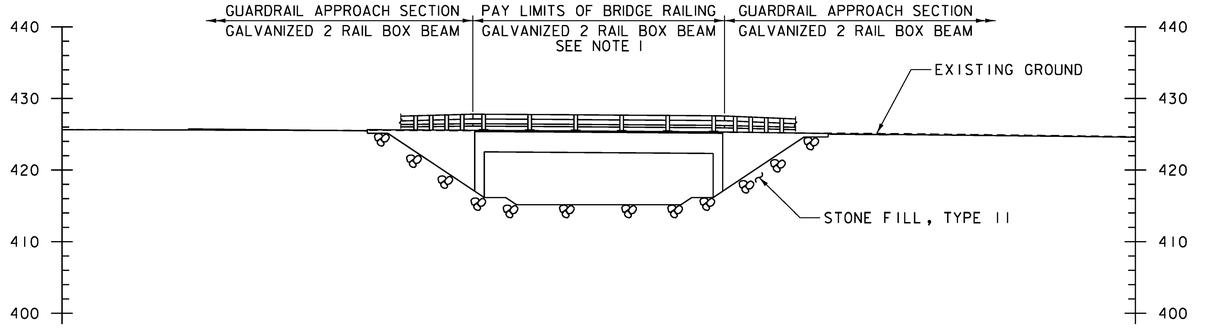
PROJECT NAME:	HUBBARDTON
PROJECT NUMBER:	ER STP 0161(26)
FILE NAME: z11c288borlogs.dgn	PLOT DATE: 7/16/2012
PROJECT LEADER: M.A. COLGAN	DRAWN BY: E.A. FIALA
DESIGNED BY: VTRANS	CHECKED BY: S.G. FARNSWORTH
BORING LOGS (2 OF 2)	SHEET 26 OF 70

VHB 57478.01



PLAN

SCALE 1" = 10'-0"



ELEVATION AT UPSTREAM FASCIA

SCALE 1" = 10'-0"

** - T-WALL PRECAST CONCRETE RETAINING WALL SYSTEM SHOWN. SEE NOTE 6 ON THE PROJECT NOTES SHEET FOR ALTERNATE PRECAST CONCRETE RETAINING WALL SYSTEM.

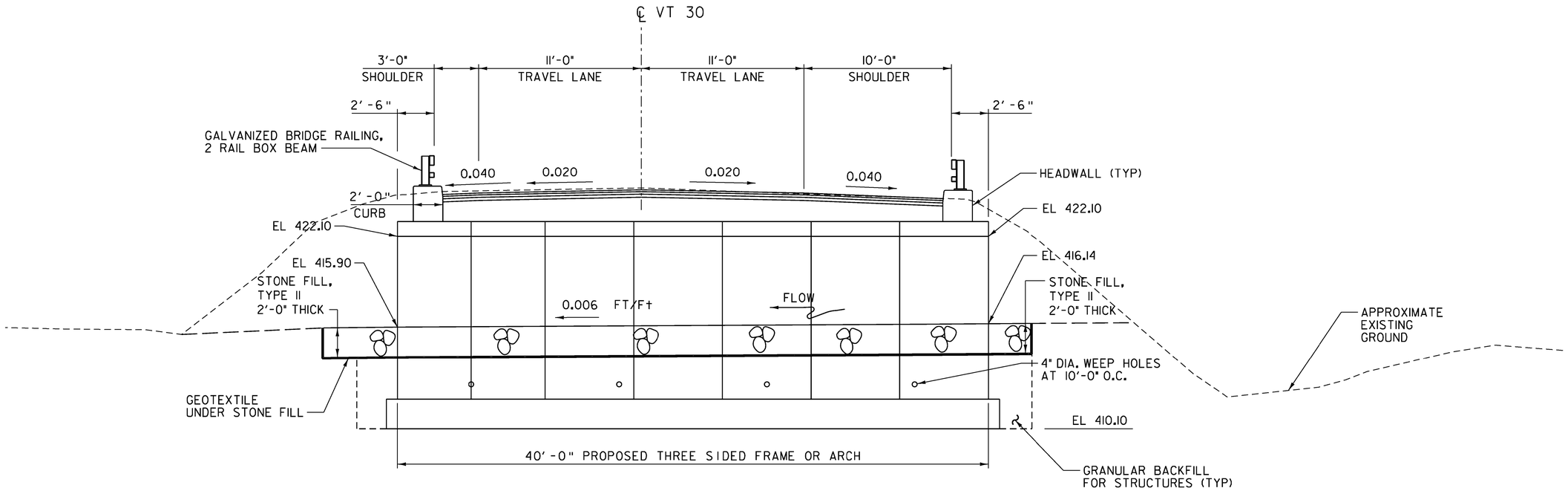
NOTE:

1. SEE "BRIDGE AND APPROACH RAILING" SHEET FOR BRIDGE RAIL LAYOUT.

Vanasse Hangen Brustlin, Inc.

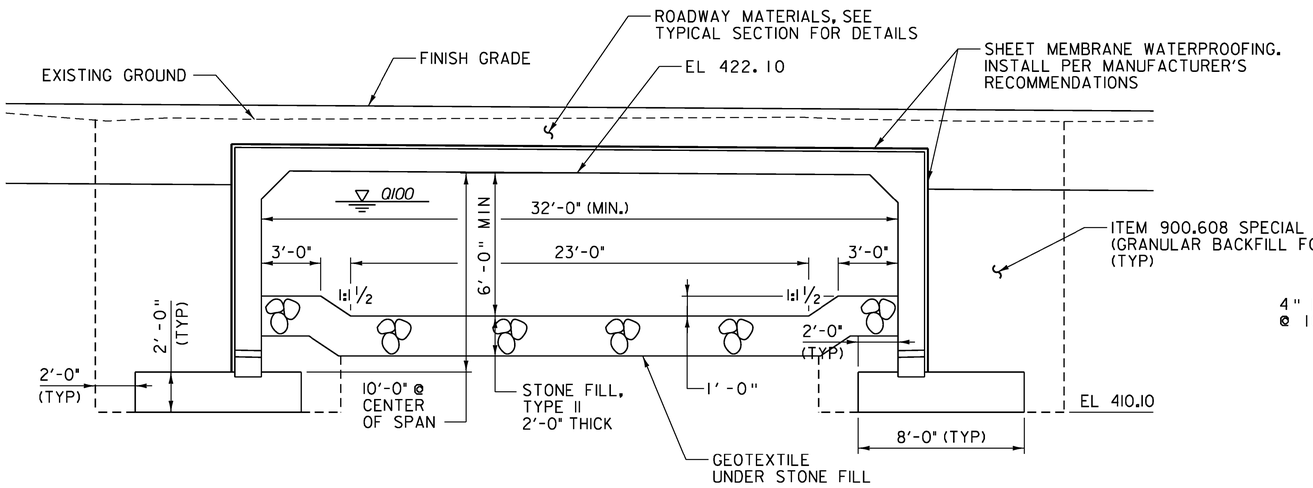
PROJECT NAME: HUBBARDTON	
PROJECT NUMBER: ER STP 0161(26)	
FILE NAME: z11c288plan.dgn	PLOT DATE: 7/16/2012
PROJECT LEADER: M.A. COLGAN	DRAWN BY: C.L. CILLEY
DESIGNED BY: S.G. FARNSWORTH	CHECKED BY: S.G. FARNSWORTH
PLAN AND ELEVATION	SHEET 27 OF 70

VHB 57478.01



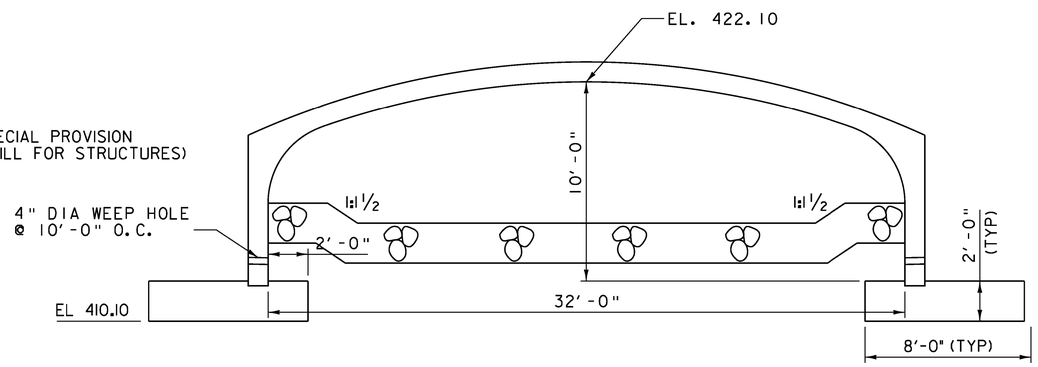
LONGITUDINAL SECTION

NOT TO SCALE



SECTION

NOT TO SCALE



ARCH OPTION

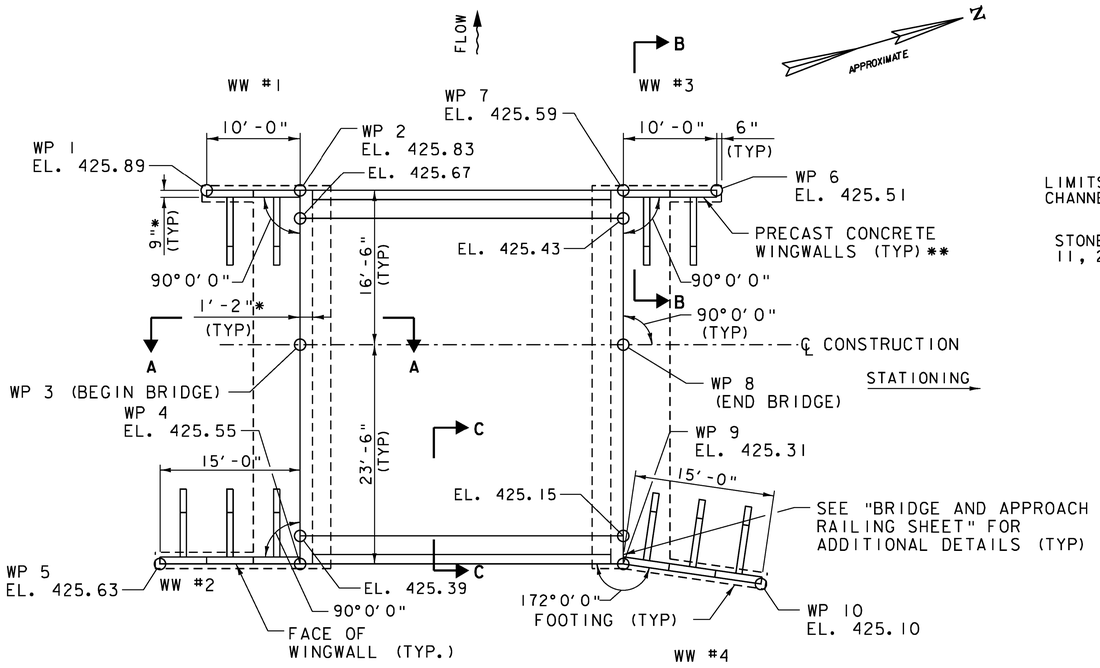
NOT TO SCALE

NOTE: SEE FINAL APPROVED SHOP DRAWINGS FOR ALL DETAILS REGARDING FRAME AND FOOTINGS

VHB Vanasse Hangen Brustlin, Inc.

PROJECT NAME:	HUBBARDTON
PROJECT NUMBER:	ER STP 0161(26)

FILE NAME: z11c288longsec.dgn	PLOT DATE: 7/16/2012
PROJECT LEADER: M.A. COLGAN	DRAWN BY: C.L. CILLEY
DESIGNED BY: S.G. FARNSWORTH	CHECKED BY: S.G. FARNSWORTH
BRIDGE SECTIONS	SHEET 28 OF 70



* PRECAST, PRE-ENGINEERED STRUCTURES SHALL BE DESIGNED BY THE MANUFACTURER. DIMENSIONS SHOWN ARE FOR QUANTITY PURPOSES ONLY.

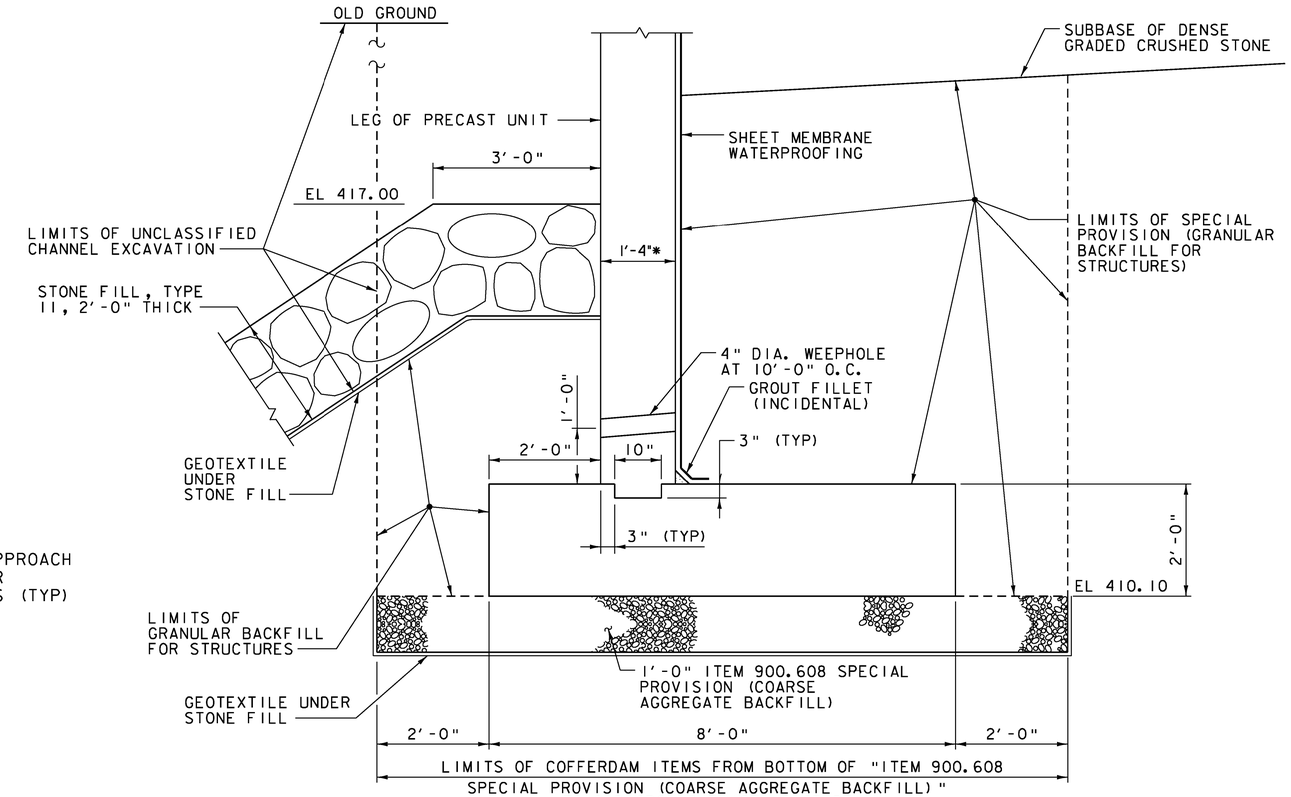
WP COORDINATES		
WP NO.	NORTHING	EASTING
1	440667.92	1459344.92
2	440677.86	1459346.01
3	440676.06	1459362.41
4	440673.51	1459385.77
5	440658.59	1459384.14
6	440722.26	1459350.87
7	440712.32	1459349.78
8	440710.52	1459366.19
9	440707.97	1459389.55
10	440722.38	1459393.28

FRAMING PLAN

SCALE: 1/8" = 1'-0"

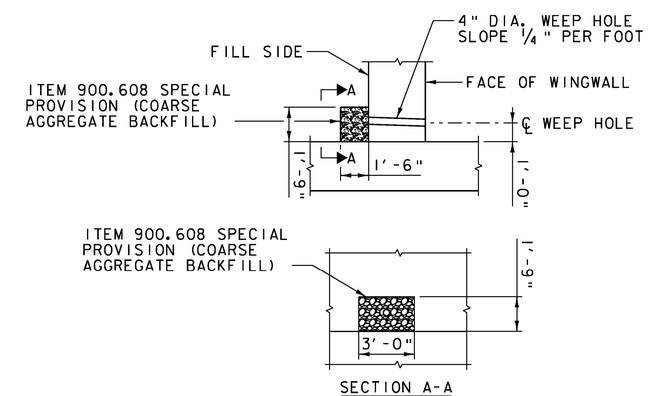
1 0 2 4 6 8
SCALE

NOTE: SEE FINAL APPROVED SHOP DRAWINGS FOR DETAILS REGARDING WINGWALLS



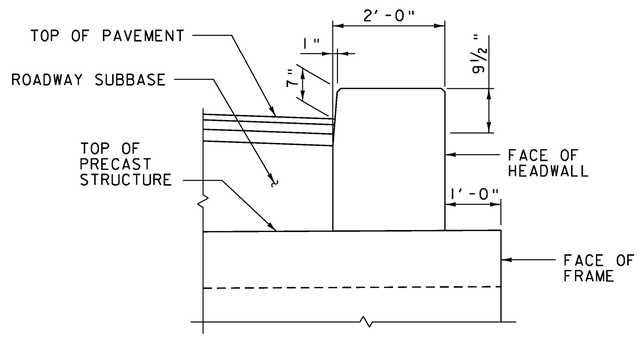
SECTION A-A

SCALE: 3/4" = 1'-0"



WEEPHOLE DETAILS

1/4" = 1'-0"



SECTION C-C
HEADWALL DETAIL

SCALE: 3/4" = 1'-0"

** - T-WALL PRECAST CONCRETE RETAINING WALL SYSTEM SHOWN. SEE NOTE 6 ON THE PROJECT NOTES SHEET FOR ALTERNATE PRECAST CONCRETE RETAINING WALL SYSTEM.

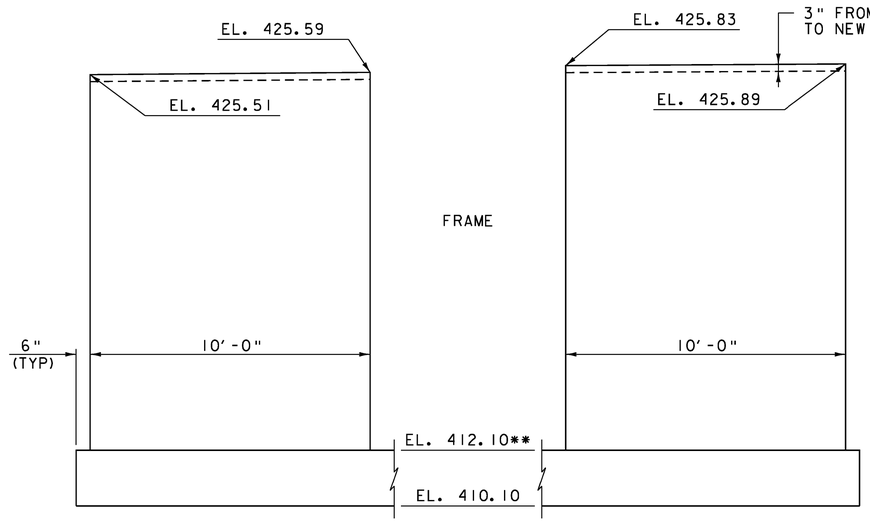
NOTE: SECTION B-B ON NEXT SHEET.

PROJECT NAME: HUBBARDTON
PROJECT NUMBER: ER STP 0161(26)

FILE NAME: z11c288abut.dgn
PROJECT LEADER: M.A. COLGAN
DESIGNED BY: S.G. FARNSWORTH
FRAMING PLAN AND DETAILS

PLOT DATE: 7/16/2012
DRAWN BY: C.L. CILLEY
CHECKED BY: S.G. FARNSWORTH
SHEET 29 OF 70

VHB Vanasse Hangen Brustlin, Inc.

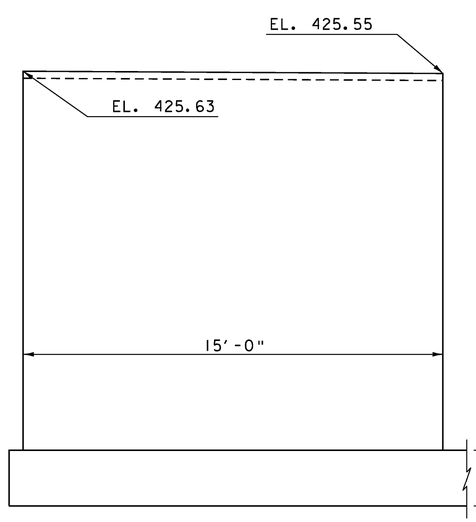


WW#3

SCALE 3/8" = 1'-0"

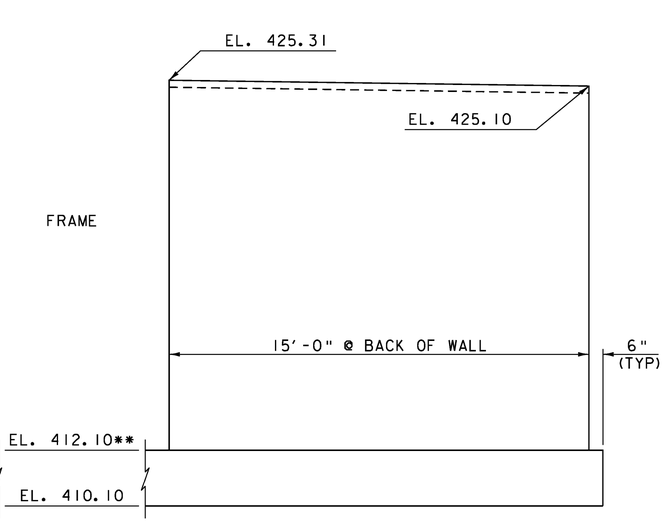
WW#1

SCALE 3/8" = 1'-0"



WW#2

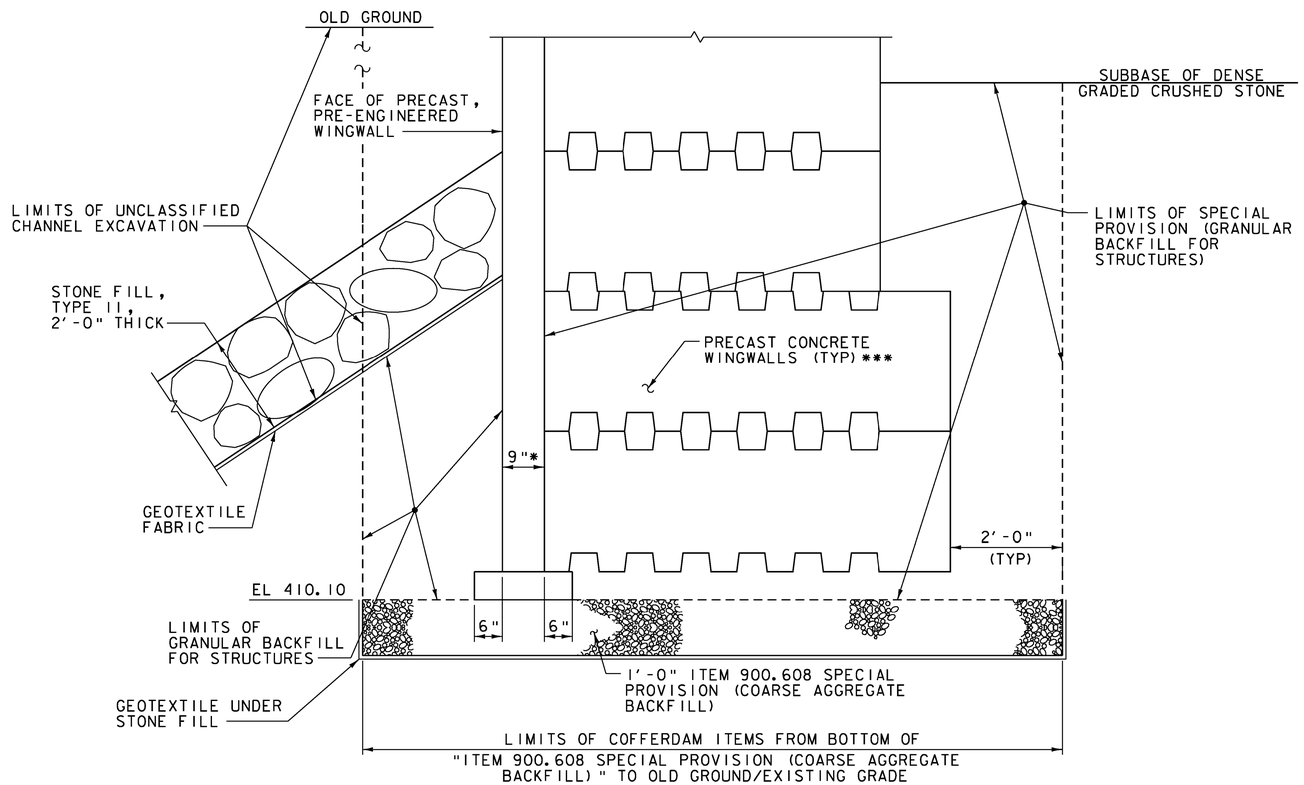
SCALE 3/8" = 1'-0"



WW#4

SCALE 3/8" = 1'-0"

NOTE: ** - TO MATCH SAME ELEVATION AS FRAME FOOTING



* PRECAST, PRE-ENGINEERED STRUCTURES SHALL BE DESIGNED BY THE MANUFACTURER. DIMENSIONS SHOWN ARE FOR QUANTITY PURPOSES ONLY.

SECTION B-B

WINGWALL FOOTING

SCALE: 3/4" = 1'-0"

NOTE: SEE FINAL APPROVED SHOP DRAWINGS FOR DETAILS REGARDING WINGWALLS

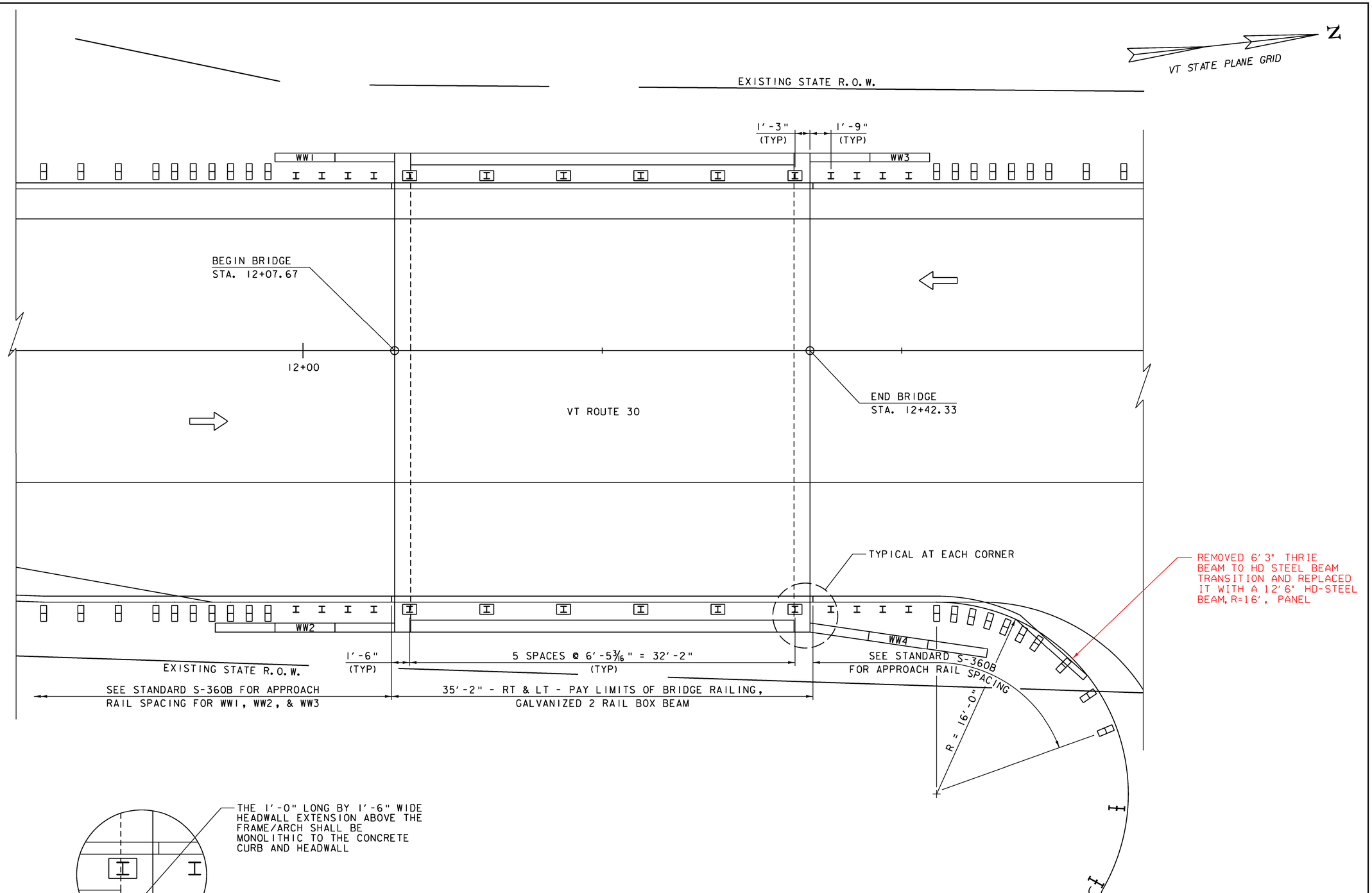
*** - T-WALL PRECAST CONCRETE RETAINING WALL SYSTEM SHOWN. SEE NOTE 6 ON THE PROJECT NOTES SHEET FOR ALTERNATE PRECAST CONCRETE RETAINING WALL SYSTEM

VHB Vanasse Hangen Brustlin, Inc.

PROJECT NAME: HUBBARDTON
PROJECT NUMBER: ER STP 0161(26)

FILE NAME: z11c288abut.dgn
PROJECT LEADER: M.A. COLGAN
DESIGNED BY: S.G. FARNSWORTH
WINGWALL DETAILS

PLOT DATE: 7/16/2012
DRAWN BY: E.A. FIALA
CHECKED BY: S.G. FARNSWORTH

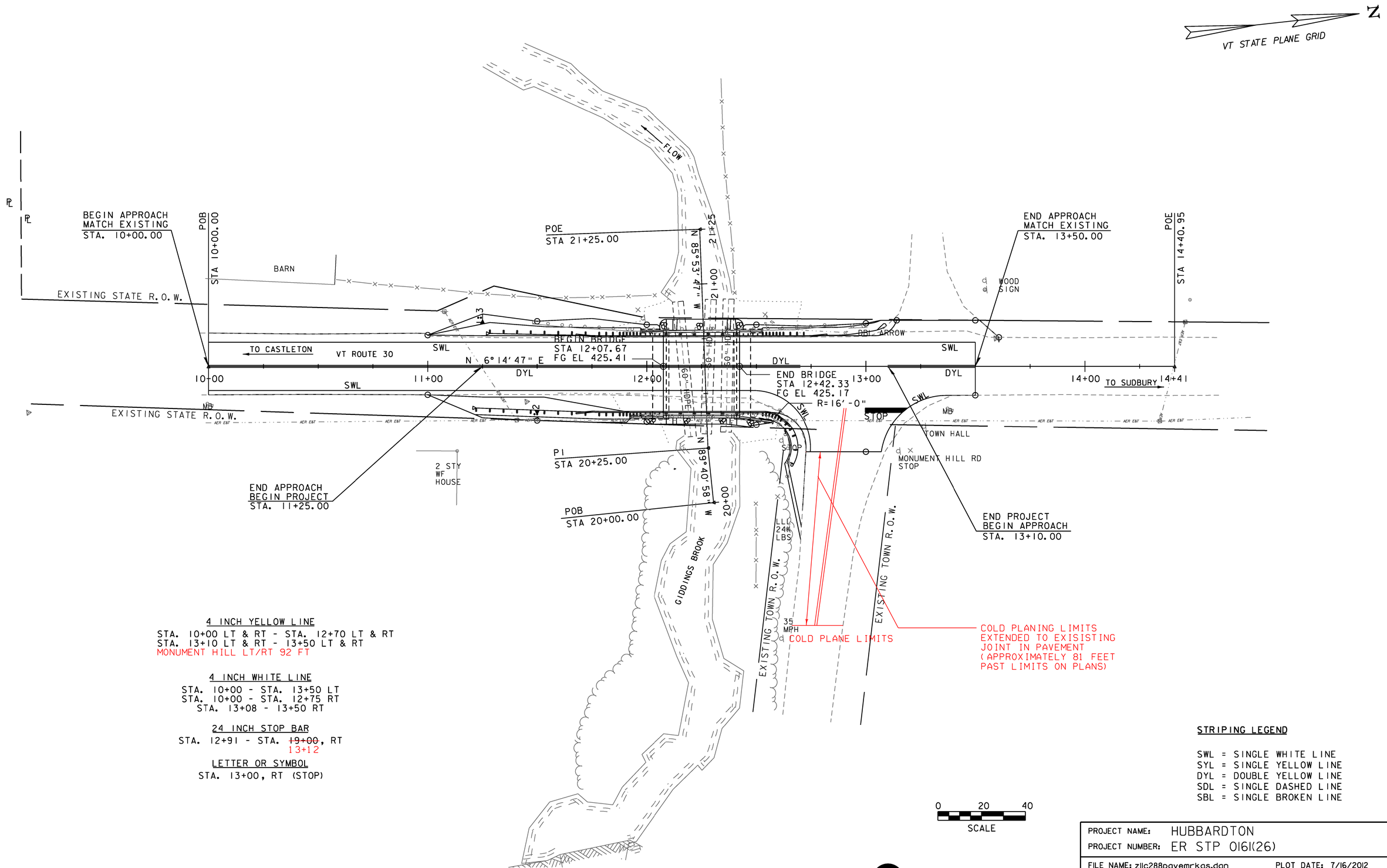


BRIDGE AND APPROACH RAIL LAYOUT

SCALE 1/4" = 1'-0"

Vanasse Hangen Brustlin, Inc.

PROJECT NAME:	HUBBARDTON
PROJECT NUMBER:	ER STP 0161(26)
FILE NAME: z11c288brail.dgn	PLOT DATE: 7/16/2012
PROJECT LEADER: M.A. COLGAN	DRAWN BY: E.A. FIALA
DESIGNED BY: S.G. FARNSWORTH	CHECKED BY: S.G. FARNSWORTH
BRIDGE AND APPROACH RAILING	SHEET 31 OF 70



4 INCH YELLOW LINE

STA. 10+00 LT & RT - STA. 12+70 LT & RT
STA. 13+10 LT & RT - 13+50 LT & RT
MONUMENT HILL LT/RT 92 FT

4 INCH WHITE LINE

STA. 10+00 - STA. 13+50 LT
STA. 10+00 - STA. 12+75 RT
STA. 13+08 - 13+50 RT

24 INCH STOP BAR

STA. 12+91 - STA. ~~19+00~~ 13+12, RT

LETTER OR SYMBOL

STA. 13+00, RT (STOP)

STRIPING LEGEND

SWL = SINGLE WHITE LINE
SYL = SINGLE YELLOW LINE
DYL = DOUBLE YELLOW LINE
SDL = SINGLE DASHED LINE
SBL = SINGLE BROKEN LINE

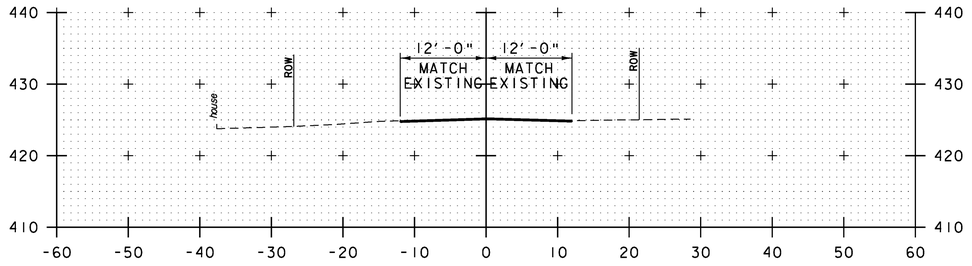
0 20 40
SCALE

VHB Vanasse Hangen Brustlin, Inc.

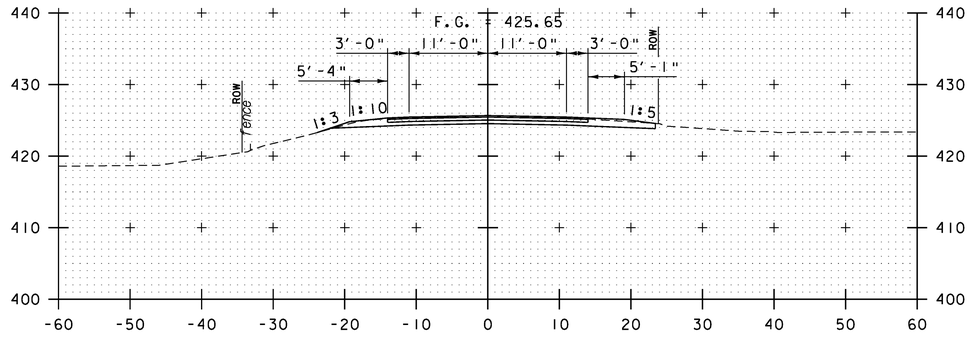
PROJECT NAME: HUBBARDTON
PROJECT NUMBER: ER STP 0161(26)

FILE NAME: z11c288pavemrkgs.dgn
PROJECT LEADER: M.A. COLGAN
DESIGNED BY: S.G. FARNSWORTH
PAVEMENT MARKINGS SHEET

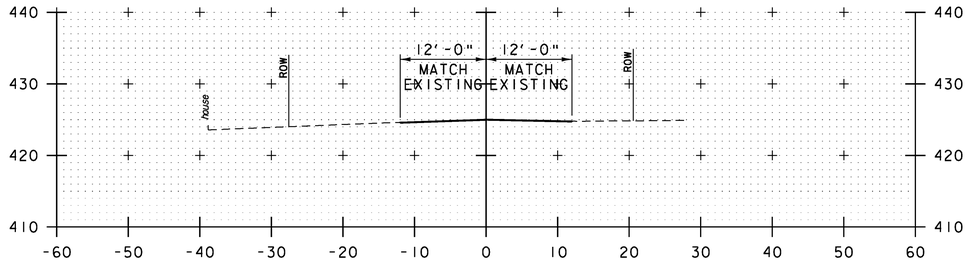
PLOT DATE: 7/16/2012
DRAWN BY: J.L. LEMIEUX
CHECKED BY: S.G. FARNSWORTH
SHEET 32 OF 70



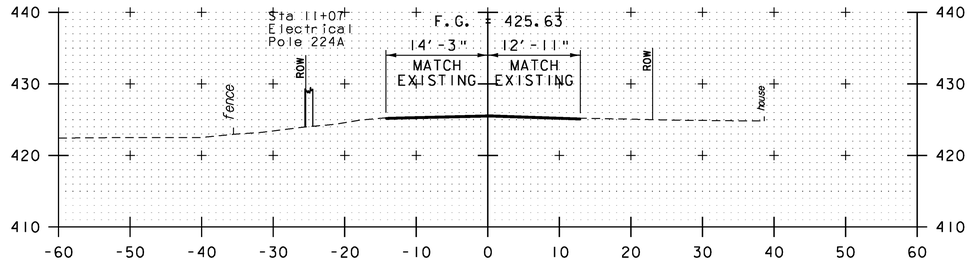
10+50



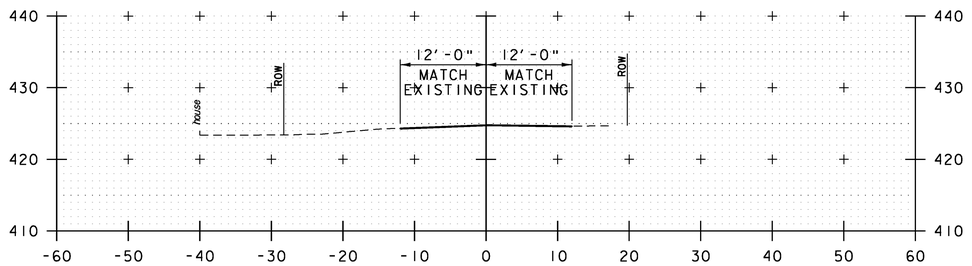
BEGIN PROJECT
11+25



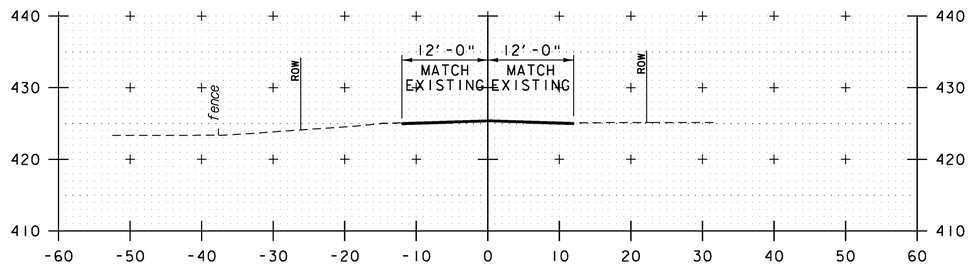
10+25



11+00



BEGIN APPROACH
10+00



10+75

ROADWAY CROSS SECTIONS

SCALE 1"=10'-0"

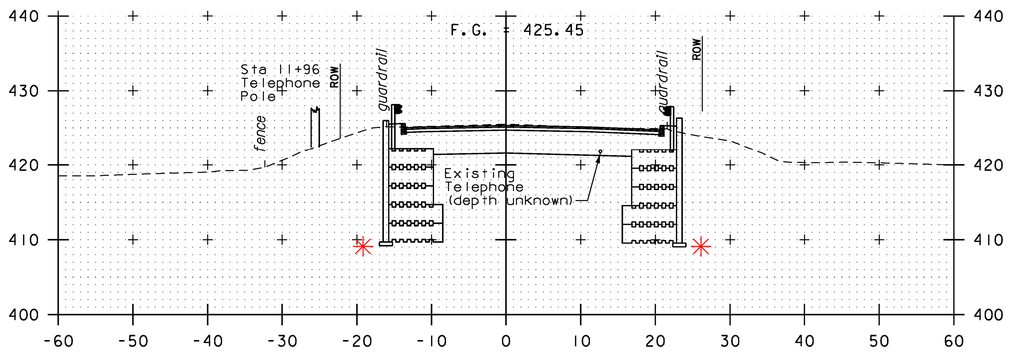
STA. 10+00 TO STA. 11+25

Vanasse Hangen Brustlin, Inc.

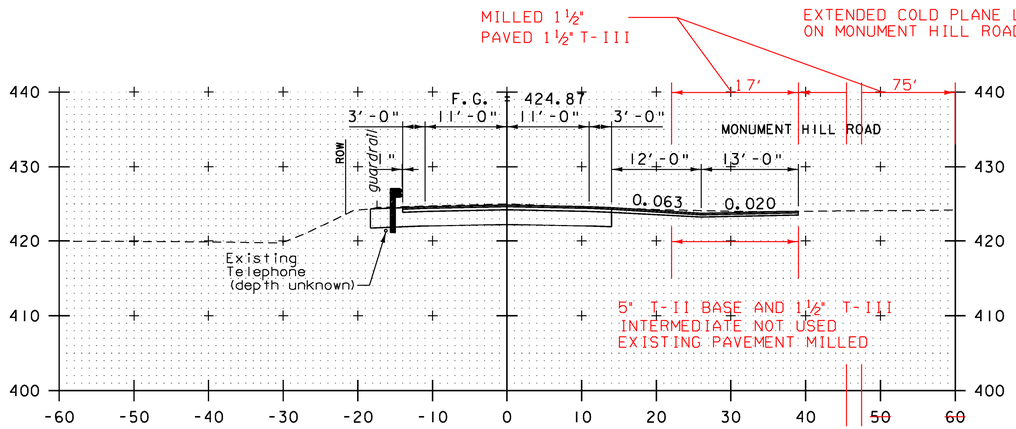
PROJECT NAME: HUBBARDTON	
PROJECT NUMBER: ER STP 0161(26)	
FILE NAME: z11c288xs_01.dgn	PLOT DATE: 7/16/2012
PROJECT LEADER: M.A. COLGAN	DRAWN BY: C.L. CILLEY
DESIGNED BY: S.G. FARNSWORTH	CHECKED BY: S.G. FARNSWORTH
ROADWAY CROSS SECTIONS (1 OF 3)	SHEET 33 OF 70

VHB 57478.01

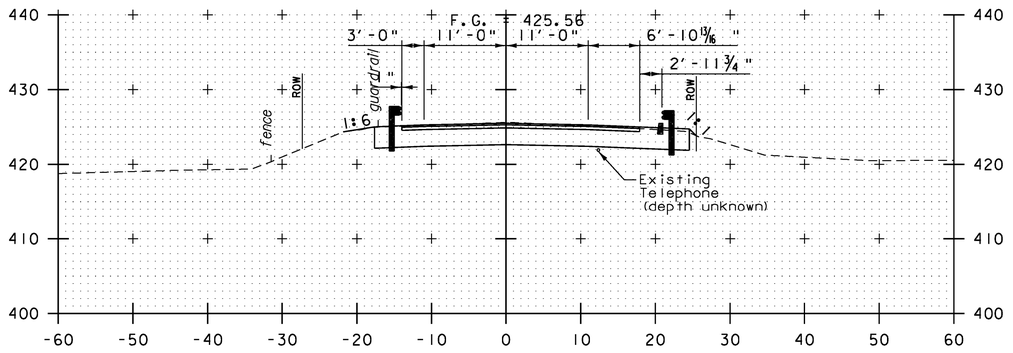
STA 12+07.67 BEGIN BRIDGE



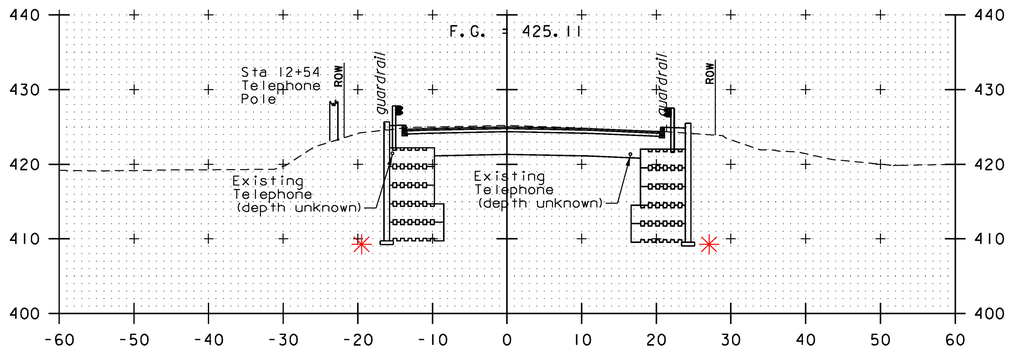
*NOTE: WINGWALL FOOTING/LEVELING PAD SET AT 412.27 AT ALL WING WALL LOCATIONS. SEE FINAL APPROVED SHOP DRAWINGS FOR DETAILS.



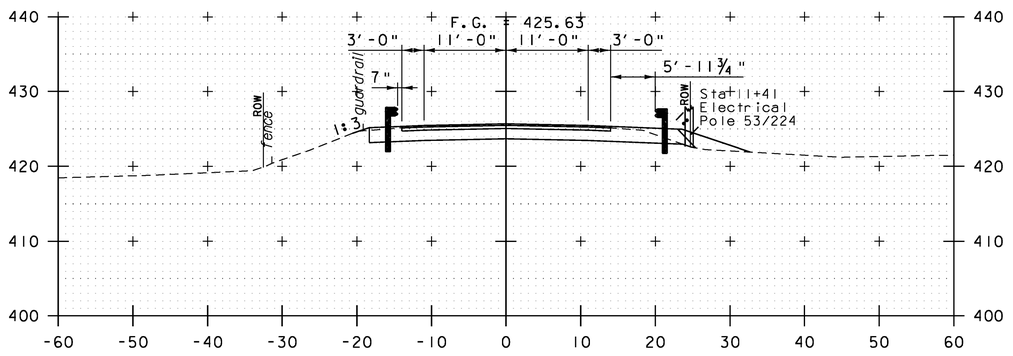
12+00



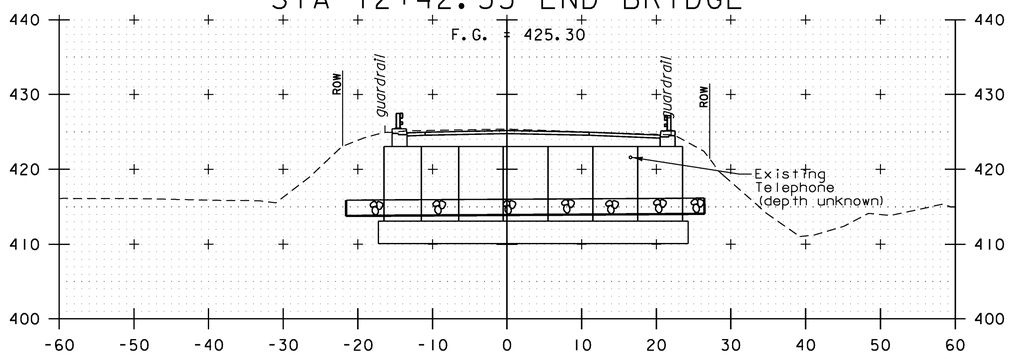
12+75



11+75



12+50
STA 12+42.33 END BRIDGE



11+50

12+25

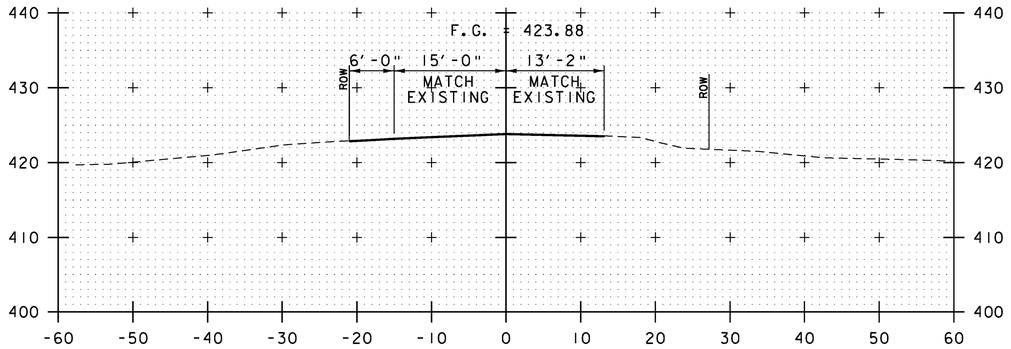
ROADWAY CROSS SECTIONS

SCALE 1"=10'-0"

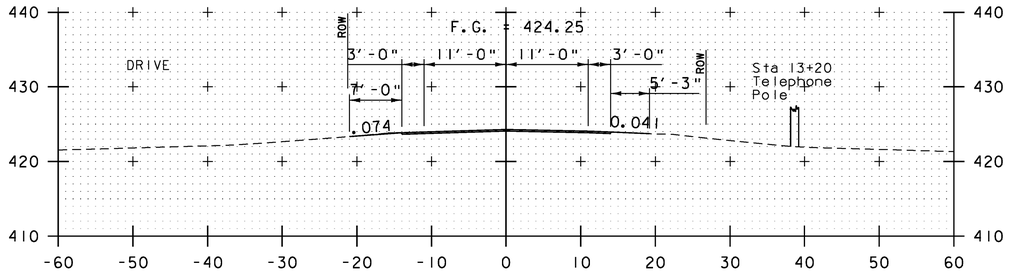
STA. 11+50 TO STA. 12+75

VHB Vanasse Hangen Brustlin, Inc.

PROJECT NAME:	HUBBARDTON
PROJECT NUMBER:	ER STP 0161(26)
FILE NAME: z11c288xs_02.dgn	PLOT DATE: 7/16/2012
PROJECT LEADER: M.A. COLGAN	DRAWN BY: C.L. CILLEY
DESIGNED BY: S.G. FARNSWORTH	CHECKED BY: S.G. FARNSWORTH
ROADWAY CROSS SECTIONS (2 OF 3)	SHEET 34 OF 70

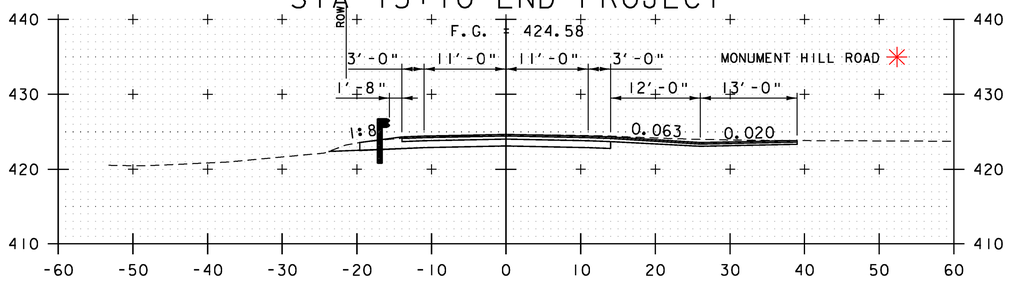


END APPROACH
13+50



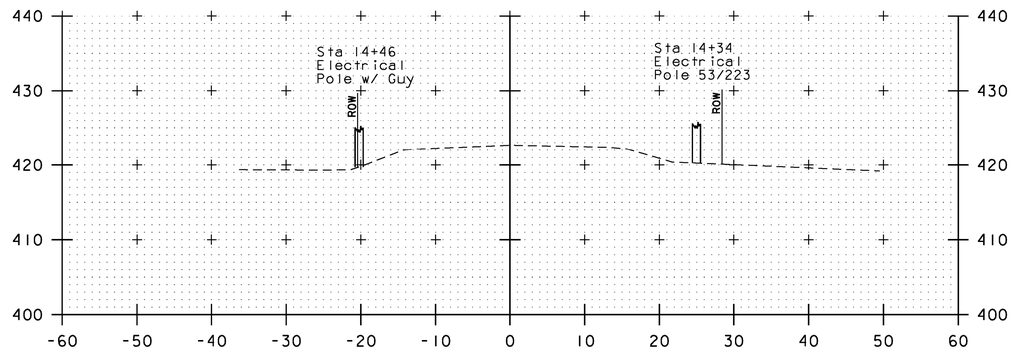
13+25

STA 13+10 END PROJECT

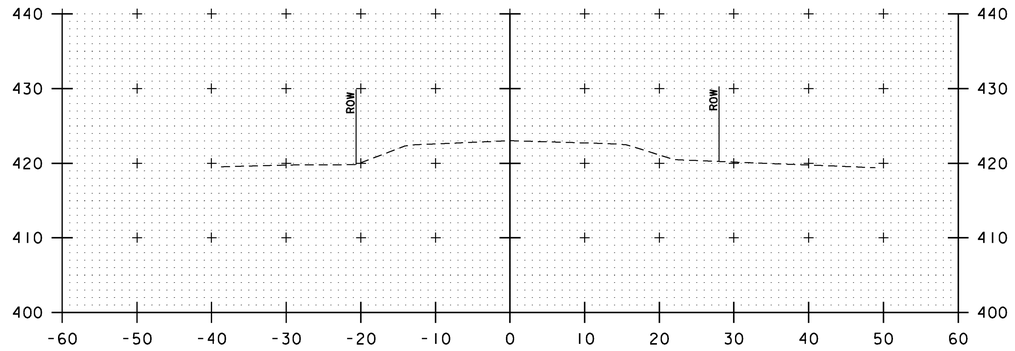


13+00

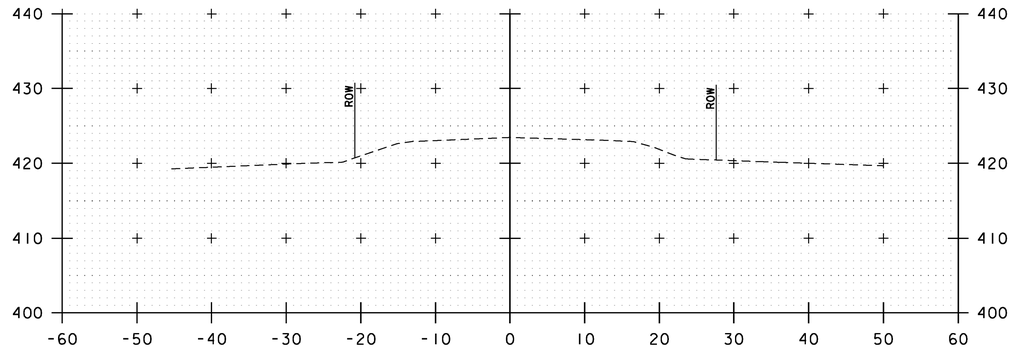
• SEE NOTE ON X-SECTION 12+75 FOR DETAILS ON MILLING



14+25



14+00



13+75

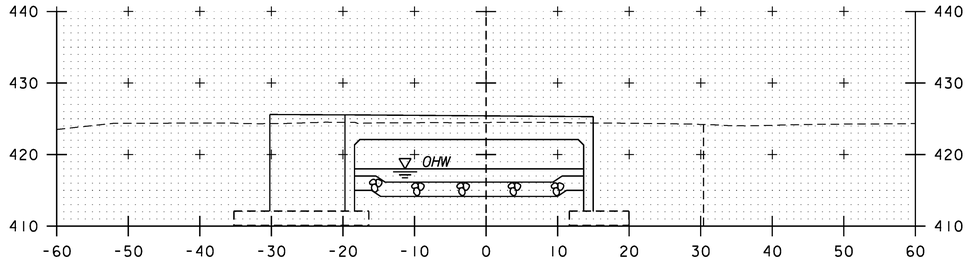
ROADWAY CROSS SECTIONS

SCALE 1"=10'-0"

STA. 13+00 TO STA. 14+25

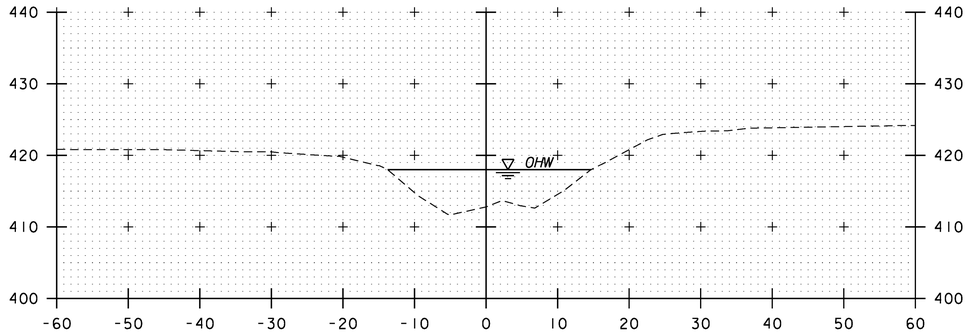
Vanasse Hangen Brustlin, Inc.

PROJECT NAME:	HUBBARDTON
PROJECT NUMBER:	ER STP 0161(26)
FILE NAME: z11c288xs_03.dgn	PLOT DATE: 7/16/2012
PROJECT LEADER: M.A. COLGAN	DRAWN BY: C.L. CILLEY
DESIGNED BY: S.G. FARNSWORTH	CHECKED BY: S.G. FARNSWORTH
ROADWAY CROSS SECTIONS (3 OF 3)	SHEET 35 OF 70

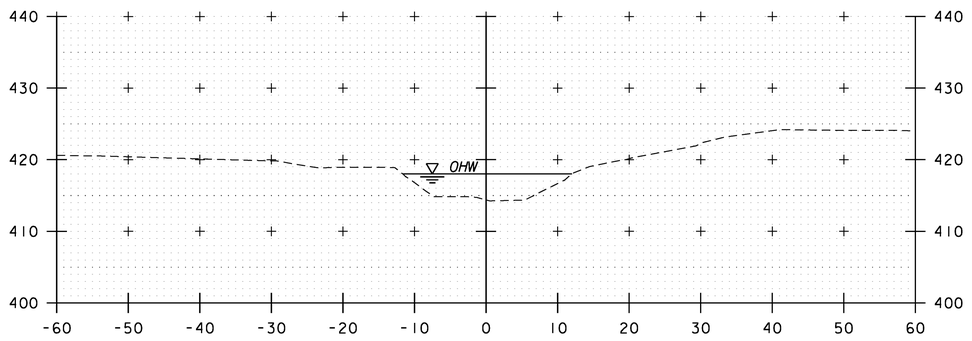


20+40

STA 20+34.1
BEGIN
UNCLASSIFIED CHANNEL EXCAVATION
GEOTEXTILE UNDER STONE FILL
STONE FILL, TYPE II

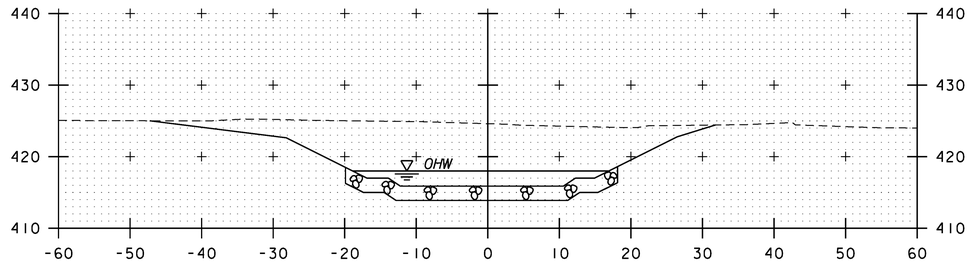


20+25



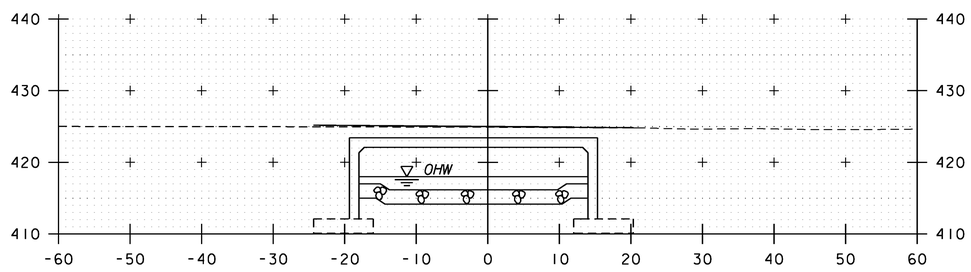
20+00

STA 20+84.5
END
UNCLASSIFIED CHANNEL EXCAVATION
GEOTEXTILE UNDER STONE FILL
STONE FILL, TYPE II



20+80

20+75



20+50

CHANNEL CROSS SECTIONS

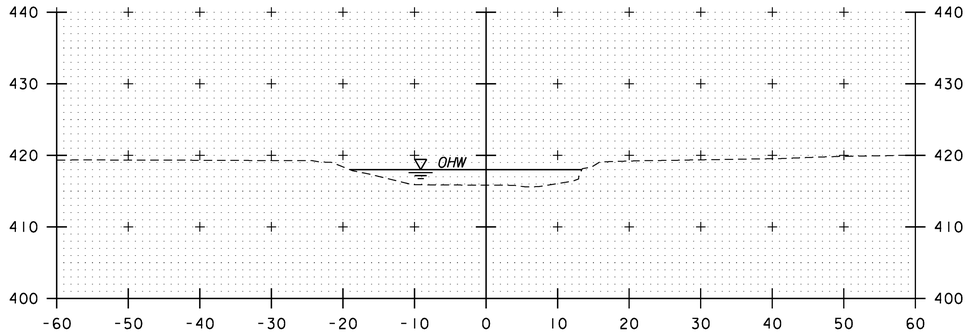
SCALE 1"=10'-0"

STA. 20+00 TO STA. 20+80

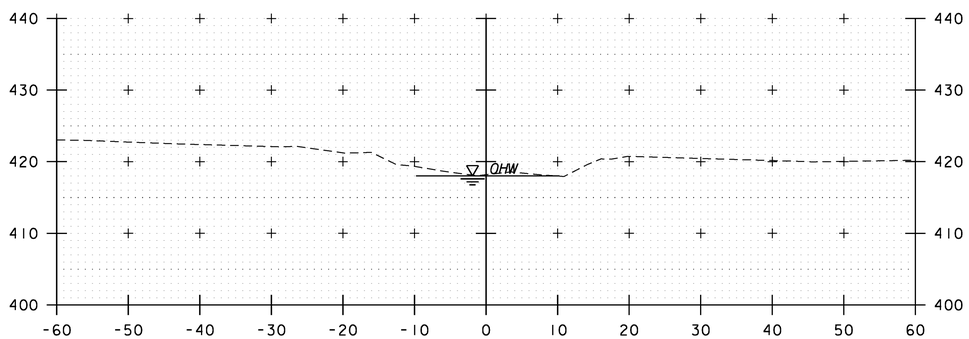
Vanasse Hangen Brustlin, Inc.

PROJECT NAME:	HUBBARDTON
PROJECT NUMBER:	ER STP 0161(26)
FILE NAME: z11c288chxs_01.dgn	PLOT DATE: 7/16/2012
PROJECT LEADER: M.A. COLGAN	DRAWN BY: E.A. FIALA
DESIGNED BY: S.G. FARNSWORTH	CHECKED BY: S.G. FARNSWORTH
CHANNEL CROSS SECTIONS (1 OF 2)	SHEET 36 OF 70

VHB 57478.01



21+00



20+90

CHANNEL CROSS SECTIONS

SCALE 1"=10'-0"

STA. 20+90 TO STA. 21+00

Vanasse Hangen Brustlin, Inc.

PROJECT NAME: HUBBARDTON	
PROJECT NUMBER: ER STP 0161(26)	
FILE NAME: z11c288chxs_02.dgn	PLOT DATE: 7/16/2012
PROJECT LEADER: M.A. COLGAN	DRAWN BY: C.L. CILLEY
DESIGNED BY: S.G. FARNSWORTH	CHECKED BY: S.G. FARNSWORTH
CHANNEL CROSS SECTIONS (2 OF 2)	SHEET 37 OF 70

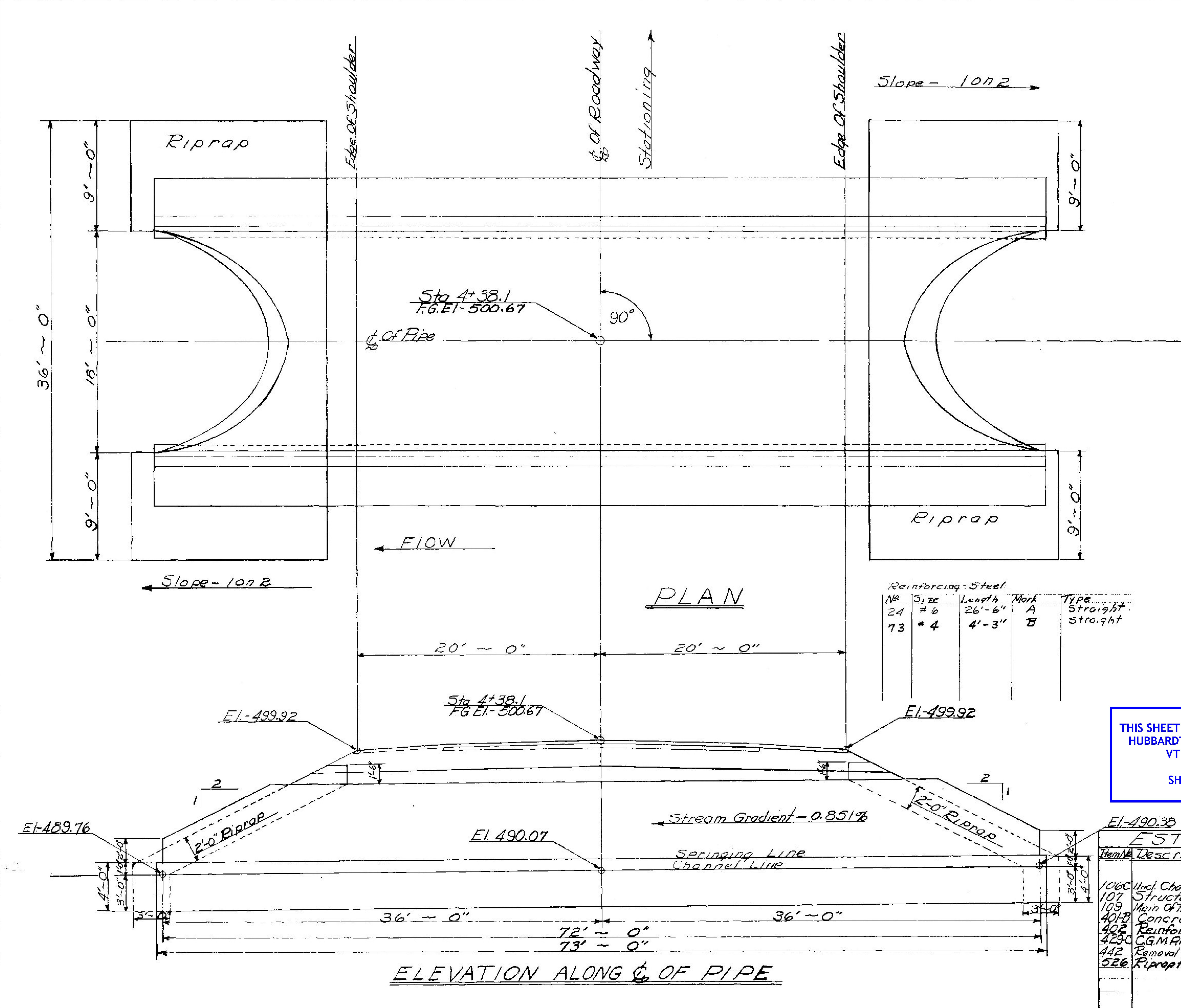
VHB 57478.01

NOTES:

1. IN 1960 WHEN THIS ARCH WAS INSTALLED, THE ROADWAY PROFILE GRADE OVER THE ARCH WAS ONLY RAISED THREE FEET AND NOT THE SIX FEET AS SHOWN IN THIS PROFILE.
2. IN SEPTEMBER 2011 WHEN VTRANS REMOVED THE STEEL ARCH THE TWO 1960 CONCRETE FOOTINGS WERE LEFT IN PLACE.

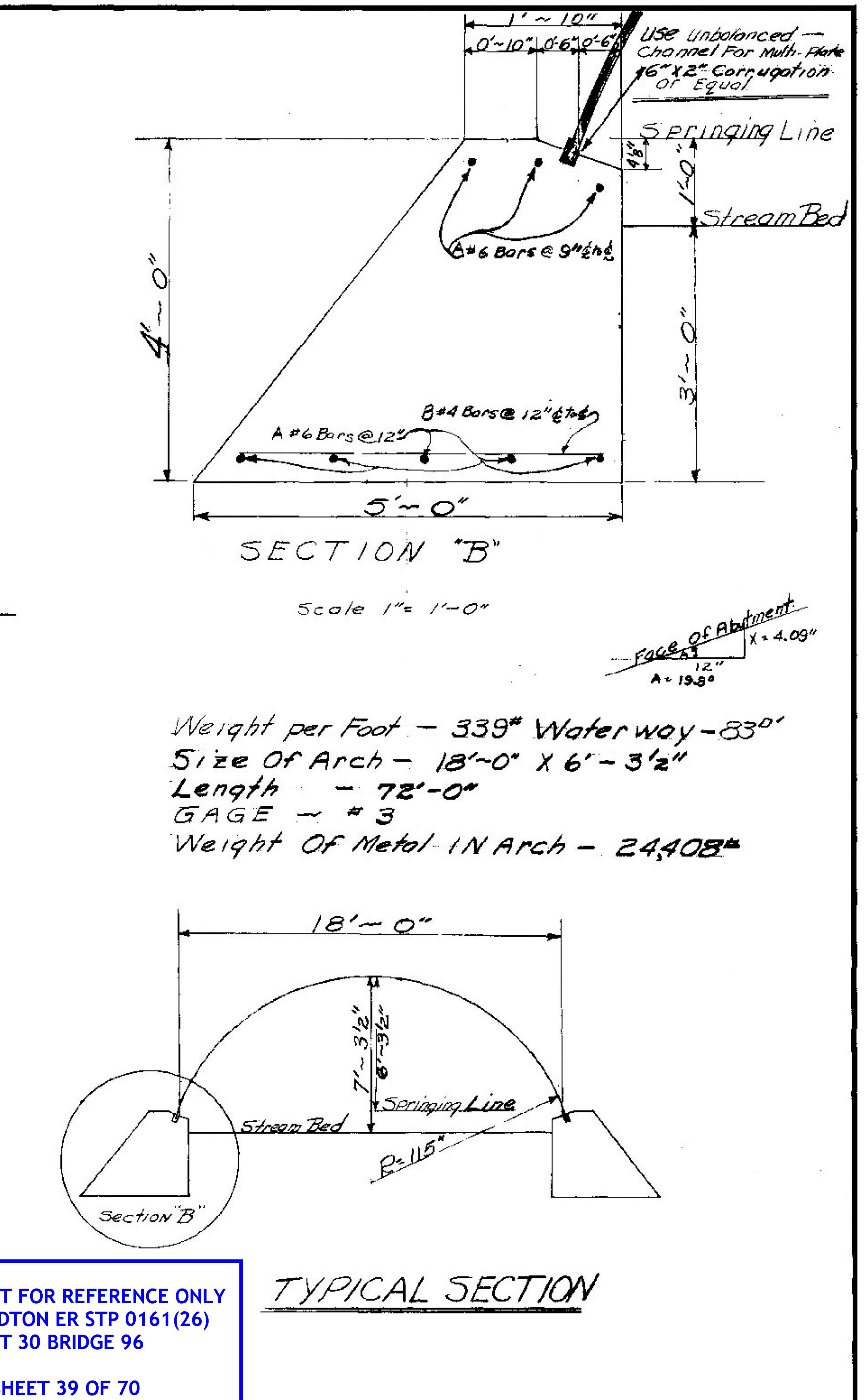
THIS SHEET FOR REFERENCE ONLY
HUBBARDTON ER STP 0161(26)
VT 30 BRIDGE 96

SHEET 38 OF 70



Reinforcing Steel

No	Size	Length	Mark	Type
24	#6	26'-6"	A	Straight
73	#4	4'-3"	B	Straight



THIS SHEET FOR REFERENCE ONLY
HUBBARDTON ER STP 0161(26)
VT 30 BRIDGE 96

SHEET 39 OF 70

ESTIMATED QUANTITIES

Item No	Description	Unit	Neat	Over	Total	Final
106C	Uncl. Channel Excav.	CY	9	1	10	
107	Structure Excav.	CY	254	26	280	
109	Main. Of Traffic for Br. Proj.	LS	1	~	1	
401-B	Concrete Class "B"	CY	74	4	78	
402	Reinforcing Steel	lbs	2325	—	2325	
429-C	C.G.M.P.A. ("24,408#")	LS	1	~	1	
442	Removal of Pres. Sup-str.	LS	1	~	1	
526	Riprap for Bank Prot.	CY	76	8	84	

STATE OF VERMONT
DEPARTMENT OF HIGHWAYS

TOWN OF HUBBARDTON
ROAD NO. 30 BRIDGE NO. 96
Log Station 106+79
C.G.M.P.A. 18'-0" x 6'-3½" x 72' @ Sta 4+38.1
SCALE ¼" = 1'-0"
SURVEYED BY Eastman
DRAWN BY Hopkins CHECKED BY Stone
PROJECT NO. MA-92/25.03/1959
SHEET 3 OF 4

490

7+50

490

6+50

490

5+50

490

3+50

490

3+00

490

2+00

490

1+50

490

1+00

℄

490

6+00

fn e e

490

5+00

Meadow e e. std. std.

490

4+56

e Twlkg. 8"

490

4+51

GR e.
T.Wing
Bo. 1

490

4+38.1

T.Rail
T.O. B.O.
brk.
brk.
35"Cd 493.6
86"RP 490.8

490

4+24

e GR
Twlkg

490

4+20

Twlkg GR. e
Bo

490

4+00

brk. fn. e fn.

490

2+50

fn. e. e lawn. lawn. bo.sill.

℄

Scale 1" = 10'

490

12+00

490

11+50

490

11+00

490

10+50

490

10+00

490

9+50

490

9+00

490

8+50

490

8+00

fn. e e

490

7+00

Fn. e e fn.

℄

HUBBARDTON
Route #30 Bridge #96
Log Station 106+79

LEVELS BY Eastman 4/60
SECTIONS PLOTTED BY Hopkins CKD. BY AM/GH
PLANIMETERED BY ____ CKD. BY BFS
EXAMINED BY ____
PROJECT MA NO. 72-5203(9) FILED
SHEET 4 OF 4

THIS SHEET FOR REFERENCE ONLY
HUBBARDTON ER STP 0161(26)
VT 30 BRIDGE 96

SHEET 40 OF 70

KEUFFEL & ESSER CO MADE IN U.S.A.

K&E STANDARD CROSS SECTION

KEUFFEL & ESSER CO MADE IN U.S.A.

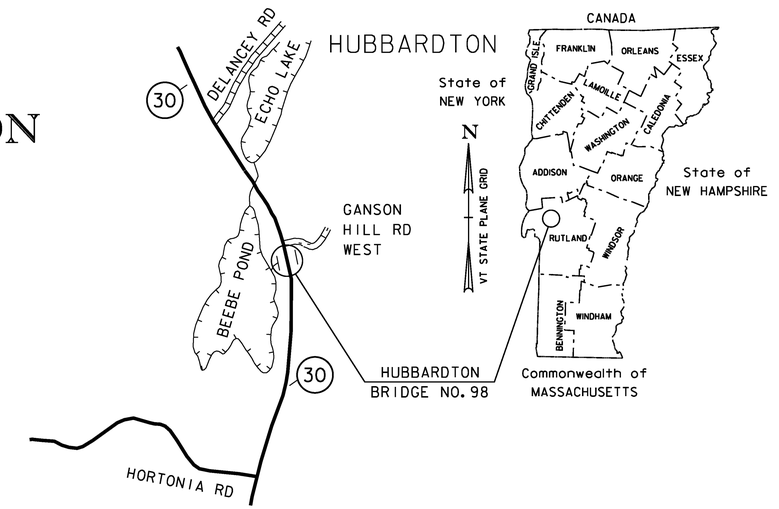
K&E STANDARD CROSS SECTION

STATE OF VERMONT
AGENCY OF TRANSPORTATION

PROPOSED IMPROVEMENT
BRIDGE PROJECT

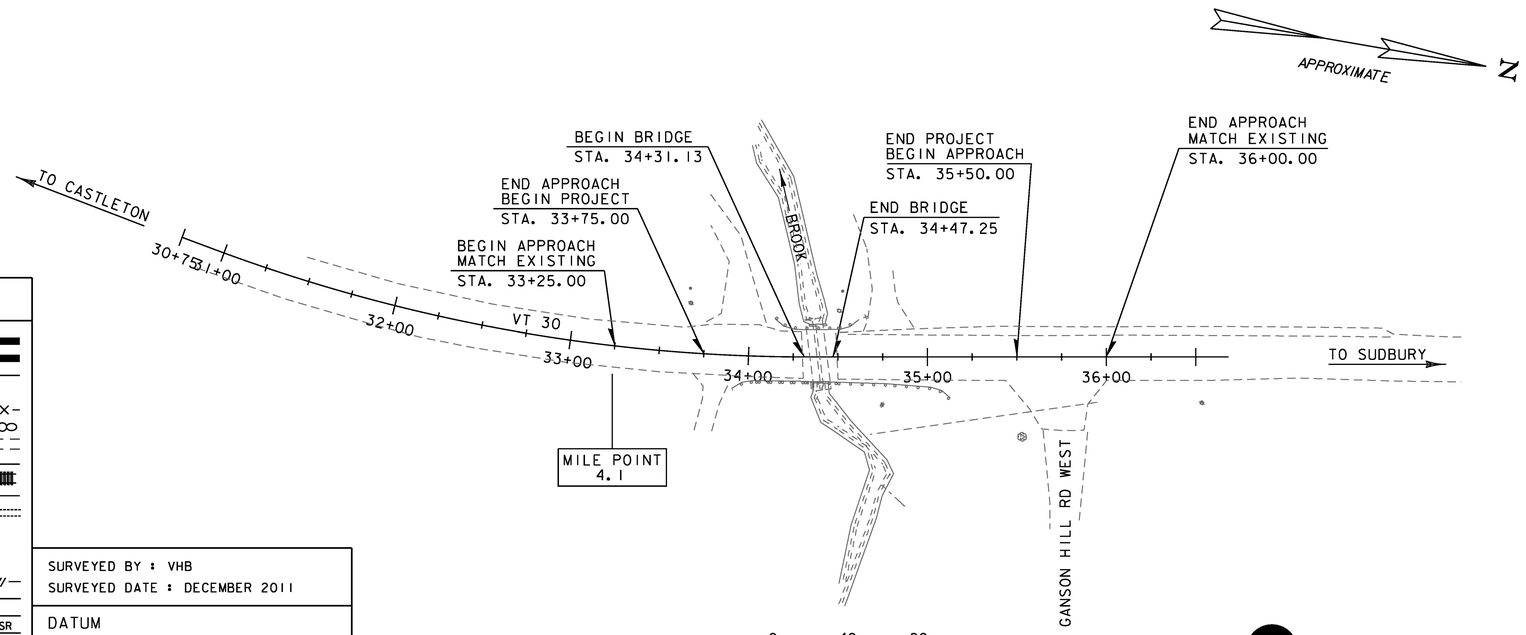
TOWN OF HUBBARDTON
COUNTY OF RUTLAND

ROUTE NO. VT 30 (MAJOR COLLECTOR), BRIDGE NO. 98



LOCATION MAP
NOT TO SCALE

PROJECT LOCATION:	BEGINNING ON VT ROUTE 30 APPROXIMATELY 4.1 MILES NORTH OF THE CASTLETON/HUBBARDTON TOWN LINE AND EXTENDING NORTHERLY 0.033 MILES.
PROJECT DESCRIPTION:	REMOVAL OF EXISTING PIPE CULVERTS, CONSTRUCTION OF A NEW PRECAST CONCRETE BOX CULVERT, AND ASSOCIATED ROADWAY AND CHANNEL WORK.
LENGTH OF STRUCTURE:	16.00 FEET (APPROX.) = 0.003 MILES
LENGTH OF ROADWAY:	159.00 FEET (APPROX.) = 0.030 MILES
LENGTH OF PROJECT:	175.00 FEET = 0.033 MILES



QUALITY ASSURANCE PROGRAM: LEVEL 2

CONVENTIONAL SYMBOLS

COUNTY LINE
TOWN LINE
LIMITS OF ACCESS
POINT OF ACCESS
FENCE LINE
STONE WALL
TRAVELED WAY
GUARD RAIL
RAILROAD
SURVEY LINE
CULVERT
POWER POLE
TELEPHONE POLE
TREES
CONTROL OF ACCESS
PROPERTY LINE
R.O.W. TAKING LINE
SLOPE RIGHTS (SR SR SR)
TOP OF CUT
TOE OF SLOPE

SURVEYED BY : VHB
SURVEYED DATE : DECEMBER 2011

DATUM
VERTICAL: NAVD 88
HORIZONTAL: NAD 83 (96)

THESE PLANS ARE SUBJECT TO SUCH ENGINEERING CHANGES AS MAY BE REQUIRED BY THE FEDERAL HIGHWAY ADMINISTRATION OR THE DIRECTOR OF PROGRAM DEVELOPMENT.

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.

VHB Vanasse Hangen Brustlin, Inc.

PROJECT MANAGER : MARK SARGENT

PROJECT NAME : HUBBARDTON
PROJECT NUMBER : ER STP 0161(27)

SHEET 41 OF 70 SHEETS

VHB 57478.02

STATE OF VERMONT
AGENCY OF TRANSPORTATION

PRELIMINARY INFORMATION SHEET (CULVERT)

Version 12.01.01c

LRFD

INDEX OF SHEETS

PLAN SHEETS

SEE SHEET 2 FOR INDEX OF SHEETS AND STANDARDS LIST

STANDARDS LIST

FINAL HYDRAULIC REPORT

HYDROLOGIC DATA

Date: APRIL 2012

DRAINAGE AREA : 1.2 Sq. Miles
CHARACTER OF TERRAIN : Hilly - mostly forest
STREAM CHARACTERISTICS : Narrow and curving with small current
NATURE OF STREAMBED : Mostly gravel and cobbles

PEAK FLOW DATA

Q 2.33 =	70 cfs	Q 50 =	200 cfs
Q 10 =	140 cfs	Q 100 =	220 cfs
Q 25 =	170 cfs	Q 500 =	280 cfs

DATE OF FLOOD OF RECORD : NOV 1927 and Aug. 2011
ESTIMATED DISCHARGE: Unknown
WATER SURFACE ELEV.:
NATURAL STREAM VELOCITY : @ Q50 = Unknown
ICE CONDITIONS : Light
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: Three sided concrete frame 8 ft x 4 ft
YEAR BUILT: 1957 - Undermined Aug 2011
CLEAR SPAN(NORMAL TO STREAM): 8 Foot Diameter
VERTICAL CLEARANCE ABOVE STREAMBED: 4 feet
WATERWAY OF FULL OPENING: Approx. 32 Sq. Feet
DISPOSITION OF STRUCTURE: Removed be VTrans Fall 2011
TYPE OF MATERIAL UNDER SUBSTRUCTURE: Gravel and sand

WATER SURFACE ELEVATIONS AT:

Q2.33 =		VELOCITY =	
Q10 =		"	
Q25 =		"	
Q50 =		"	
Q100 =		"	

LONG TERM STREAMBED CHANGES:

IS THE ROADWAY OVERTOPPED BELOW Q100: No
FREQUENCY:
RELIEF ELEVATION:
DISCHARGE OVER ROAD @Q100:

UPSTREAM STRUCTURE

TOWN: None
DISTANCE:
HIGHWAY # :
STRUCTURE #:
CLEAR SPAN:
CLEAR HEIGHT:
YEAR BUILT:
FULL WATERWAY:
STRUCTURE TYPE:

DOWNSTREAM STRUCTURE

TOWN: Beebe Pond
DISTANCE: 350 ft
HIGHWAY # :
STRUCTURE #:
CLEAR SPAN:
CLEAR HEIGHT:
YEAR BUILT:
FULL WATERWAY:
STRUCTURE TYPE:

FABRICATOR RESPONSIBLE FOR LOAD RATING

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" DETAILS

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

CULVERT DESIGN CRITERIA

1. CULVERT WILL BE SET AT A SLOPE OF 0.006 FT/FT
2. CULVERT WILL NOT REQUIRE FISH PASSAGE ACCOMODATIONS
3. CULVERT CONSTRUCTION WILL NOT REQUIRE A TEMPORARY PIPE OR PUMPING

TRAFFIC DATA

YEAR	ADT	DHV	% D	% T	ADTT
2012	1500	190	50	6.4	100
2032	1800	210	50	6.4	120

20 year ESAL for flexible pavement from 2010 to 2030 :
40 year ESAL for flexible pavement from 2010 to 2050 :
Design Speed : 50 mph

VHB Vanasse Hangen Brustlin, Inc.

PROPOSED STRUCTURE

STRUCTURE TYPE: BOX CULVERT

CLEAR SPAN(NORMAL TO STREAM): 14 Feet
VERTICAL CLEARANCE ABOVE STREAMBED: 5 Feet
WATERWAY OF FULL OPENING: 70 Sq. Feet

WATER SURFACE ELEVATIONS AT:

Q2.33 =	624.7	VELOCITY=	3.1 FT/SEC
Q10 =	626.3	"	4.7 FT/SEC
Q25 =	628.8	"	5.3 FT/SEC
Q50 =	627.3	"	6.3 FT/SEC
Q100 =	627.6 Feet	"	6.9 FT/SEC

IS THE ROADWAY OVERTOPPED BELOW Q100: No
FREQUENCY:
RELIEF ELEVATION:
DISCHARGE OVER ROAD @Q100: No

AVERAGE LOW ELEVATION OF SUPERSTRUCTURE: 628.0
VERTICAL CLEARANCE: @ Q 50 = 0.7 FT @ Q 100 = 0.4 FT

SCOUR:

REQUIRED CHANNEL PROTECTION: Type II Stone Fill

PERMIT INFORMATION

		DEPTH OR ELEVATION:
AVERAGE DAILY FLOW:	3 CFS	
ORDINARY LOW WATER:	1 CFS	0.2 FEET
ORDINARY HIGH WATER:	70 CFS	2.0 FEET

TEMPORARY BRIDGE REQUIREMENTS

STRUCTURE TYPE: N/A - VT 30 to be closed
CLEAR SPAN (NORMAL TO STREAM):
VERTICAL CLEARANCE ABOVE STREAMBED:
WATERWAY AREA OF FULL OPENING:

ADDITIONAL INFORMATION

Existing two 48 in x 40 ft HDPE temporary pipes, installed in Fall of 2011 by VTrans are to be removed and retained by contractor.

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:	14 FT 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:	
9. CONCRETE, HIGH PERFORMANCE CLASS A	f'_c:	
10. CONCRETE, HIGH PERFORMANCE CLASS B	f'_c:	
11. CONCRETE, CLASS C	f'_c:	
12. REINFORCING STEEL	f_y:	60 KSI
13. STRUCTURAL STEEL AASHTO M270	f_y:	---
14. SOIL UNIT WEIGHT	γ:	0.130 KCF
15. NOMINAL BEARING RESISTANCE OF SOIL	q_n:	2.5 KSF
16. SOIL BEARING RESISTANCE FACTOR (REFER TO AASHTO LRFD)	ϕ:	1.00
17. NOMINAL BEARING RESISTANCE OF ROCK	q_n:	
18. ROCK BEARING RESISTANCE FACTOR (REFER TO AASHTO LRFD)	ϕ:	---
19. NOMINAL AXIAL PILE RESISTANCE	q_p:	---
20. PILE YIELD STRENGTH ASTM A572	f_y:	---
21. PILE SIZE		---
22. EST. PILE LENGTH	L_p:	
23. PILE RESISTANCE FACTOR	ϕ:	---
24. LATERAL PILE DEFLECTION	Δ:	---
25. BASIC WIND SPEED	V_{3s}:	---
26. MINIMUM GROUND SNOW LOAD	p_g:	---
27. SEISMIC DATA	PGA: ---	S_s: ---
		S_1: ---

PROJECT NAME: **HUBBARDTON**
PROJECT NUMBER: **ER STP 0161(27)**

FILE NAME: z11c290pi.xls
PROJECT LEADER: M.A. COLGAN
DESIGNED BY: S.G. FARNSWORTH
PRELIMINARY INFORMATION SHEET

PLOT DATE: 7/16/2012
DRAWN BY: C.L. CILLEY
CHECKED BY: S.G. FARSWORTH
SHEET 42 OF 70

57428.02

GENERAL

1. ALL MATERIAL AND CONSTRUCTION SHALL CONFORM TO THE STATE OF VERMONT AGENCY OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION, DATED 2011, AND ITS LATEST REVISIONS, AND THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 4TH EDITION, AND ITS LATEST REVISIONS.
2. ALL EXISTING TRAFFIC SIGNS REMOVED DURING CONSTRUCTION SHALL BE RESET BACK TO THEIR ORIGINAL LOCATION IN ACCORDANCE WITH VERMONT STANDARDS. PAYMENT WILL BE CONSIDERED INCIDENTAL TO THE CONTRACT.
3. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO PREVENT SILTATION OR POLLUTION, ESPECIALLY THE DISCHARGE OF RAW CONCRETE, INTO ANY BROOK, STREAM OR RIVER.
4. ALL DIMENSIONS ARE HORIZONTAL OR VERTICAL AND ARE GIVEN AT 68 DEGREES FAHRENHEIT UNLESS OTHERWISE NOTED.
5. FEATURES OF THE EXISTING BRIDGE AND SURVEY SHOWN ON THESE PLANS HAVE BEEN OBTAINED FROM LIMITED SURVEY AND MAY NOT ACCURATELY REFLECT ACTUAL FIELD CONDITIONS. THE CONTRACTOR WILL BE RESPONSIBLE FOR MAKING FIELD MEASUREMENTS TO ENSURE CONSISTENCY WITH THE PROPOSED MODIFICATIONS. ANY DISCREPANCIES IN DIMENSIONS, CHARACTER OR EXTENT OF THE EXISTING FEATURES SHALL BE BROUGHT TO THE ATTENTION OF THE RESIDENT ENGINEER BEFORE ADVANCING THE WORK.
6. THE LIMITS OF COFFERDAM ARE TO BE DETERMINED BY THE CONTRACTOR.
7. ITEM 529.15 "REMOVAL OF STRUCTURE (TWO 48" X 40' HDPE)" SHALL BE USED FOR REMOVAL AND DISPOSAL OF THE EXISTING CULVERTS.
8. THE CONTRACTOR SHALL VERIFY THE LOCATIONS OF ALL BURIED AND AERIAL UTILITIES AND POLES PRIOR TO STARTING WORK.
9. THE WATER LEVEL MAY VARY FROM WHAT IS SHOWN ON THE PLANS.
10. THE CONTRACTOR SHALL CONTACT "DIG SAFE" PRIOR TO BEGINNING CONSTRUCTION.
11. EXISTING SURVEY FEATURES AND EXISTING CONTOURS ARE BASED ON SURVEY CONDUCTED IN DECEMBER 2011. THE ORIGINAL 1957 4'x8' CULVERT HAS SINCE BEEN REPLACED WITH TWO 48" X 40' HDPE CULVERTS AND THE SLOPES REGRADED.
12. FOR INFORMATION REGARDING UTILITIES SEE THE SPECIAL PROVISIONS.

TRAFFIC MAINTENANCE DURING CONSTRUCTION

1. VERMONT ROUTE 30 SHALL BE CLOSED TO ALL TRAFFIC DURING CONSTRUCTION. SEE THE SPECIAL PROVISIONS FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
2. THE CONTRACTOR SHALL PLACE ALL ROAD CLOSURE SIGNING PRIOR TO COMMENCEMENT OF THE WORK. SIGNING SHALL BE INCLUDED ON GANSON HILL ROAD WEST.
3. PORTABLE CHANGEABLE MESSAGE SIGNS SHALL INFORM THE PUBLIC STARTING ONE WEEK BEFORE CLOSING OF VT 30.
4. THE CONTRACTOR SHALL MAINTAIN ACCESS TO THE EXISTING DRIVES AND TOWN HIGHWAYS AT ALL TIMES.

PRECAST CONCRETE STRUCTURES

1. THE DESIGN, CONSTRUCTION, HANDLING, AND ASSEMBLY OF THE PRECAST UNITS SHALL BE IN ACCORDANCE WITH SECTION 540 AND THE SPECIAL PROVISIONS. HANDLING AND INSTALLATION SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AS APPLICABLE.
2. THE PRECAST CONCRETE STRUCTURE SHALL BE DESIGNED TO SUPPORT CONSTRUCTION LIVE LOADS DIRECTLY ON TOP OF THE BOX CULVERT WITHOUT ANY FILL OVER THE BOX CULVERT.
3. DESIGN CRITERIA:

DESIGN LIVE LOAD:	HL-93
FILL OVER THE STRUCTURE:	2 FEET
FOUNDATION SOIL PARAMETERS	
UNIT WEIGHT:	110 PCF
FRICTION ANGLE	27°
RETAINED SOIL PARAMETERS	
UNIT WEIGHT:	130 PCF
FRICTION ANGLE:	35°

   UNFACTORED BEARING RESISTANCE (BOX WIDTH):
   2500 PSF (16 FEET)

4. REINFORCING STEEL SHALL CONFORM TO THE FOLLOWING:
   A. THE REINFORCING STEEL IN THE CURBS SHALL BE "LEVEL 11" OR HIGHER.
   B. THE REINFORCING STEEL IN THE PRECAST UNITS AND FOOTINGS SHALL BE "LEVEL 1, EPOXY COATED REINFORCING STEEL" OR HIGHER.
5. THE PRECAST CONCRETE BURIED STRUCTURE SHALL BE A CONCRETE BOX TYPE STRUCTURE WITH A MINIMUM CLEAR SPAN OF 14 FEET AND VERTICAL CLEAR HEIGHT OF 6 FEET BETWEEN TOP AND BOTTOM OF THE BOX. THE LUMP SUM COST FOR ITEM 540.10 SHALL INCLUDE THE PRECAST BOX; FOOTINGS, WINGWALLS AND CUT-OFF-WALLS, PRECAST HEADWALLS, PRECAST WINGWALLS, PRECAST BED RETENTION SILL, SHEET MEMBRANE WATERPROOFING, AND MECHANICAL CONNECTIONS.
6. THE PRECAST WINGWALLS SHALL BE SELECTED FROM THE LIST OF WALLS ON THE APPROVED RETAINING WALL DOCUMENT AVAILABLE FROM VTRANS MATERIALS AND RESEARCH WEB SITE (HTTP://WWW.AOT.STATE.VT.US/PROGDEV/SECTIONS/M&R%20INFO/M&RSOIL&FOUNDATION.HTM). THE PRECAST RETAINING WALLS SHALL BE EITHER A "CONTECH PRECAST ANCHORED WINGWALL SYSTEM" OR A "T-WALL SYSTEM".
7. THE USE OF EQUIPMENT AND THE METHOD OF BACKFILLING AROUND THE BURIED STRUCTURE SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. CARE SHALL BE TAKEN WHEN BACKFILLING AGAINST JOINT SEALING MATERIALS.
8. THE FOOTINGS TO THE PRECAST WINGWALLS MAY BE CONSTRUCTED OF EITHER PRECAST OR CAST-IN-PLACE CONCRETE, CLASS B, FOOTINGS.
9. PRECAST TOLERANCES:
   HEIGHT/WIDTH: +/- 1/4"
   LENGTH: +/- 1/2"
10. FABRICATION DRAWINGS FOR THE PRECAST CONCRETE UNIT SECTIONS SHALL INCLUDE A PLAN FOR SHIPPING AND LEVELING THE FRAME AND WINGWALL SECTIONS.
11. THE CONTRACTOR IS RESPONSIBLE FOR PROPER FIT-UP OF THE PRECAST AND ANY CAST-IN-PLACE ELEMENTS, PER THE FABRICATOR'S RECOMMENDATIONS, FABRICATION AND ENGINEERING DRAWINGS, AND TO THE SATISFACTION OF THE ENGINEER.
12. ALL PRECAST UNITS INCLUDING THE HEADWALLS AND FOOTINGS SHALL BE DESIGNED BY THE FABRICATOR AND DESIGN CALCULATIONS SUBMITTED WITH FABRICATION DRAWINGS STAMPED BY AND ENGINEER REGISTERED IN THE STATE OF VT.
13. INSTALL SHEET MEMBRANE WATERPROOFING OVER THE TOP AND DOWN THE EXTERIOR SIDES OF THE PRECAST UNITS AND ALONG THE ENTIRE LENGTH. TAKE CARE DURING BACKFILL OPERATIONS TO AVOID DAMAGE TO THE SHEET MEMBRANE WATERPROOFING.
14. THE BEGIN/END BRIDGE STATIONS ARE APPROXIMATE, AND MAY CHANGE BASED ON THE MANUFACTURER'S DESIGN DIMENSIONS. THE MIDPOINT OF THE STRUCTURE SHALL BE AS SHOWN IN THESE PLANS.
15. THE DIMENSIONS AND THE GEOMETRIC LAYOUT OF THE STRUCTURE (LAYOUT DIMENSIONS, ELEVATIONS, AND WORKING POINT COORDINATES) WERE DEVELOPED BASED ON PRECAST CONCRETE BOX CULVERT AND WINGWALL DIMENSIONS SHOWN IN THESE PLANS. IF THE DIMENSIONS OR GEOMETRY OF THE PRECAST BOX CULVERT OR PRECAST WINGWALL ARE ALTERED BY THE FABRICATOR FROM WHAT IS SHOWN IN THESE PLANS, THE LAYOUT MAY VARY FROM WHAT IS SHOWN. IN SUCH CASE, THE AFFECTED DIMENSIONS, ELEVATIONS AND WORKING POINT COORDINATES SHOULD BE ADJUSTED BY THE FABRICATOR ACCORDINGLY. THE NEW STRUCTURE AND WINGWALLS SHALL NOT EXTEND OUTSIDE THE EXISTING RIGHT-OF-WAY.
16. THE PRECAST CONCRETE STRUCTURES SHALL BE BACKFILLED IN SIX INCH LIFTS WITH THE ITEM "SPECIAL PROVISION (GRANULAR BACKFILL FOR STRUCTURES)".
17. FOUNDATION EMBEDMENT SHALL CONFORM TO GEOTECHNICAL REQUIREMENTS. THE MINIMUM STRUCTURE COVER SHALL BE 1'-6" FOR THE ROADWAY (BETWEEN BRIDGE RAIL).

CONCRETE

1. THE KEY IN CONCRETE CONSTRUCTION JOINTS SHALL BE MONOLITHIC AND CONTINUOUS FOR THE FULL LENGTH OF THE JOINT, AND UPWARD KEYS SHALL BE PLACED INTEGRALLY WITH THE CONCRETE BELOW JOINTS.
2. ALL EXPOSED CONCRETE SHALL BE CHAMFERED 1" x 1".
3. ALL REINFORCING STEEL SHALL BE DETAILED AND FABRICATED USING PROCEDURES AND TOLERANCES IN ACCORDANCE WITH APPLICABLE PUBLICATIONS OF THE CONCRETE REINFORCING STEEL INSTITUTE (CRSI).
4. REINFORCING STEEL PLACEMENT TOLERANCES SHALL BE:
   SPACING: +/- 1"
   CLEARANCE: +/- 1/4"
5. MINIMUM COVER FOR REINFORCING STEEL SHALL BE 2" ALONG THE BACK FACES OF WALLS AGAINST EARTH, 1 1/2" ALONG THE BOTTOM SURFACE OF THE DECK AND 3" ELSEWHERE, UNLESS OTHERWISE NOTED.
6. WATER REPELLENT (SILANE) SHALL BE APPLIED TO ALL EXPOSED SURFACES OF THE PRECAST BOX CULVERT AND WINGWALL SURFACES TO 1'-0" BELOW FINISH GRADE.
7. PLACE 4" DIAMETER WEEP HOLES AT 10'-0" MAXIMUM SPACING.
8. ALL FOOTING CONCRETE SHALL BE PLACED IN THE DRY. DEWATERING SHALL BE CONTINUOUS UNTIL THE FOOTINGS ARE BACKFILLED TO THE ELEVATION OF THE WATER. SUMPS AND TRENCHES THAT DIRECT WATER SHALL BE LOCATED TO PREVENT THE REMOVAL OF FINES BELOW THE FOOTINGS.

CONTROL OF WORK

1. SEE THE "COMPOSITE GENERAL NOTES FOR CONTROL OF WORK" ON SHEET 2 FOR ADDITIONAL REQUIREMENTS.

STATE OF VERMONT
AGENCY OF TRANSPORTATION

QUANTITY SHEET 1

SUMMARY OF ESTIMATED QUANTITIES

ROADWAY (BRIDGE 98)	EROSION CONTROL (BRIDGE 98)	BRIDGE NO. 98	FULL C.E. ITEMS (BRIDGE 98)
0.5			
470			
		10	
1			
		20	
		440	
		50	
		1	
360			
430			
90			
		1	
		9	
		32	
		1	
		1	
5			
		40	
160			
22.75			
1			
1			
2			
4			
180			
90			
80			
400			
			0.5
			0.5
			1500
0.5			
1			
0.5			
30			
528			
470			
16			
4			
		1950	

TOTALS

GRAND TOTAL	FINAL
0.5	
470	
10	
1	
20	
440	
50	
1	
360	
430	
90	
1	
9	
32	
1	
1	
5	
40	
160	
22.75	
1	
1	
2	
4	
180	
90	
80	
400	
0.5	
0.5	
1500	
0.5	
1	
0.5	
30	
528	
470	
16	
4	
1950	

DESCRIPTIONS

UNIT	ITEMS	ITEM NUMBER	ROUND
LS	CLEARING AND GRUBBING, INCLUDING INDIVIDUAL TREES AND STUMPS	201.10	
CY	COMMON EXCAVATION	203.15	
CY	UNCLASSIFIED CHANNEL EXCAVATION	203.27	
CY	TRENCH EXCAVATION OF EARTH, EXPLORATORY (N.A.B.I.)	204.22	
CY	GRANULAR BACKFILL FOR STRUCTURES	204.30	
CY	COFFERDAM EXCAVATION, EARTH	208.30	
CY	COFFERDAM EXCAVATION, ROCK	208.35	
LS	COFFERDAM (BRIDGE 98)	208.40	
SY	COLD PLANING, BITUMINOUS PAVEMENT	210.10	
CY	SUBBASE OF DENSE GRADED CRUSHED STONE	301.35	
CWT	EMULSIFIED ASPHALT	404.65	
LU	PRICE ADJUSTMENT, ASPHALT CEMENT (N.A.B.I.)	406.50	
GAL	WATER REPELLENT, SILANE	514.10	
LF	BRIDGE RAILING, GALVANIZED 2 RAIL BOX BEAM	525.33	
EACH	REMOVAL OF STRUCTURE (TWO 48" X 40' HDPE)	529.15	
LS	PRECAST CONCRETE STRUCTURE (14'-0" X 6'-0" X 34'-3" BOX)	540.10	
CY	STONE FILL, TYPE I	613.10	
CY	STONE FILL, TYPE II	613.11	
LF	CAST-IN-PLACE CONCRETE CURB, TYPE B	616.28	
LF	HD STEEL BEAM GUARDRAIL, GALVANIZED	621.21	
EACH	MANUFACTURED TERMINAL SECTION, FLARED	621.50	
EACH	MANUFACTURED TERMINAL SECTION, TANGENT	621.51	
EACH	ANCHOR FOR STEEL BEAM RAIL	621.60	
EACH	GUARDRAIL APPROACH SECTION, GALVANIZED 2 RAIL BOX BEAM	621.72	
LF	REMOVAL AND DISPOSAL OF GUARDRAIL	621.80	
LF	TEMPORARY TRAFFIC BARRIER	621.90	
HR	UNIFORMED TRAFFIC OFFICERS	630.10	
HR	FLAGGERS	630.15	
LS	FIELD OFFICE, ENGINEERS	631.10	
LS	TESTING EQUIPMENT, BITUMINOUS	631.17	
DL	FIELD OFFICE TELEPHONE (N.A.B.I.)	631.26	
LS	MOBILIZATION/DEMOBILIZATION	635.11	
LS	TRAFFIC CONTROL (BRIDGE 98)	641.10	
LS	PUBLIC RELATIONS OFFICER	641.12	
DAY	PORTABLE CHANGEABLE MESSAGE SIGN RENTAL	641.17	
LF	4 INCH WHITE LINE	646.20	
LF	4 INCH YELLOW LINE	646.21	
LF	24 INCH STOP BAR	646.26	
EACH	LETTER OR SYMBOL	646.30	
SY	GEOTEXTILE UNDER STONE FILL	649.31	

DETAILED SUMMARY OF QUANTITIES

QUANTITIES	UNIT	ITEMS
		EARTHWORKS SUMMARY
		FILL AVAILABLE
470	CY	COMMON EXCAVATION
10	CY	UNCLASSIFIED CHANNEL EXCAVATION
	CY	UNDERDRAIN EXCAVATION
	CY	STRUCTURE EXCAVATION
1	CY	TRENCH EXCAVATION OF EARTH
4	CY	ROUNDING
485	**CY**	**TOTAL FILL AVAILABLE**
		FILL REQUIRED
0	CY	PLANIMETERED FILL
100	CY	FACTORED FILL
0	CY	ROUNDING
100	**CY**	**TOTAL FILL REQUIRED**
385	**CY**	**TOTAL WASTE**

Vanasse Hangen Brustlin, Inc.

PROJECT NAME: HUBBARDTON
PROJECT NUMBER: ER STP 0161(27)

FILE NAME: z11c290qs.dgn
PROJECT LEADER: M.A. COLGAN
DESIGNED BY: E.A. FIALA
QUANTITY SHEET #1

PLOT DATE: 07/16/2012
DRAWN BY: E.A. FIALA
CHECKED BY: S. FARNSWORTH
SHEET 44 OF 70

VHB 57478

STATE OF VERMONT
AGENCY OF TRANSPORTATION

QUANTITY SHEET 2

SUMMARY OF ESTIMATED QUANTITIES						TOTALS		DESCRIPTIONS				DETAILED SUMMARY OF QUANTITIES		
ROADWAY (BRIDGE 98)	EROSION CONTROL (BRIDGE 98)	BRIDGE NO. 98	FULL C.E. ITEMS (BRIDGE 98)	GRAND TOTAL	FINAL	UNIT	ITEMS	ITEM NUMBER	ROUND	QUANTITIES	UNIT	ITEMS
	80			80		SY	GEOTEXTILE FOR SILT FENCE, WOVEN WIRE REINFORCED	649.515				
	20			20		SY	GEOTEXTILE FOR FILTER CURTAIN	649.61				
	2.5			2.5		LB	SEED	651.15				
	20			20		LB	FERTILIZER	651.18				
	0.1			0.1		TON	AGRICULTURAL LIMESTONE	651.20				
	0.1			0.1		TON	HAY MULCH	651.25				
	20			20		CY	TOPSOIL	651.35				
	30			30		SY	GRUBBING MATERIAL	651.40				
	1			1		LS	EPSC PLAN (BRIDGE 98)	652.10				
	10			10		HR	MONITORING EPSC PLAN (BRIDGE 98)	652.20				
	1			1		LU	MAINTENANCE OF EPSC PLAN (N.A.B.I.) (BRIDGE 98)	652.30				
	60			60		SY	TEMPORARY EROSION MATTING	653.20				
	15			15		CY	VEHICLE TRACKING PAD	653.35				
	1			1		EACH	FILTER BAG	653.45				
	450			450		LF	PROJECT DEMARCATION FENCE	653.55				
8.5				8.5		SF	TRAFFIC SIGNS, TYPE A	675.20				
15				15		LF	SQUARE TUBE SIGN POST AND ANCHOR	675.341				
		150		150		CY	SPECIAL PROVISION (COARSE AGGREGATE BACKFILL)	900.608				
		120		120		CY	SPECIAL PROVISION (GRANULAR BACKFILL FOR STRUCTURES)	900.608				
		15		15		CY	SPECIAL PROVISION (STONE FILL, STREAM BED MATERIAL)	900.608				
1				1		LU	SPECIAL PROVISION (INCENTIVE/DISINCENTIVE)(BRIDGE 98)(N.A.B.I.)	900.650				
1				1		LU	SPECIAL PROVISION (MAT DENSITY PAY ADJUSTMENT, SMALL QUANTITY)(BRIDGE 98)(N.A.B.I.)	900.650				
1				1		LU	SPECIAL PROVISION (MIXTURE PAY ADJUSTMENT)(BRIDGE 98)(N.A.B.I.)	900.650				
280				280		TON	SPECIAL PROVISION (BITUMINOUS CONCRETE PAVEMENT, SMALL QUANTITY)	900.680				

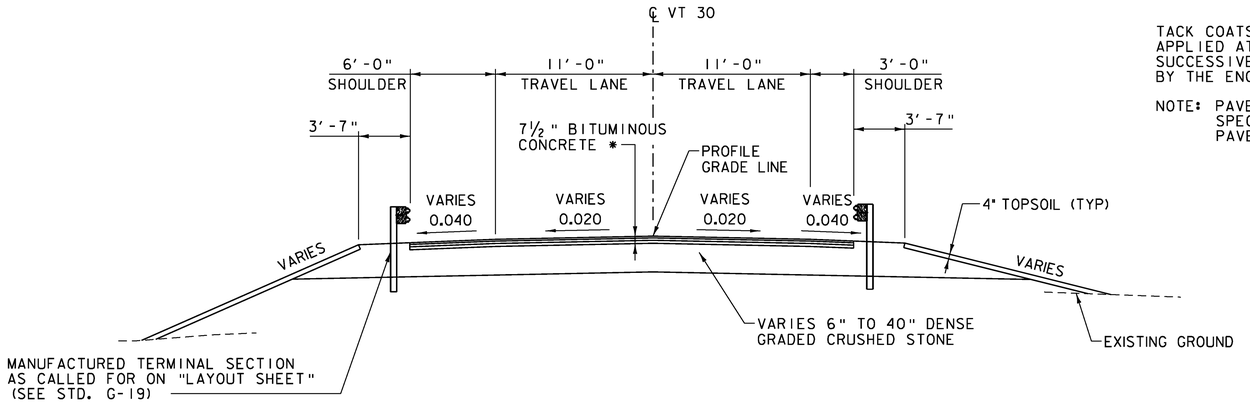
Vanasse Hangen Brustlin, Inc.

PROJECT NAME: HUBBARDTON
PROJECT NUMBER: ER STP 0161(27)

FILE NAME: z11c290qs.dgn
PROJECT LEADER: M.A. COLGAN
DESIGNED BY: E.A. FIALA
QUANTITY SHEET #2

PLOT DATE: 07/26/2012
DRAWN BY: E.A. FIALA
CHECKED BY: S. FARNSWORTH
SHEET 45 OF 70

VHB 57478



* 1¼" TYPE IV WEARING COURSE OVER
1¼" TYPE IV BINDER COURSE OVER
2½" TYPE II BASE COURSE OVER
2½" TYPE II BASE COURSE

TACK COATS OF EMULSIFIED ASPHALT SHALL BE APPLIED AT THE RATE OF 0.40 GAL/SY BETWEEN SUCCESSIVE COURSES OF PAVEMENT OR AS DIRECTED BY THE ENGINEER.

NOTE: PAVEMENT SHALL BE UNDER THE ITEM 900.680 SPECIAL PROVISION (BITUMINOUS CONCRETE PAVEMENT, SMALL QUANTITY).

MATERIAL TOLERANCES

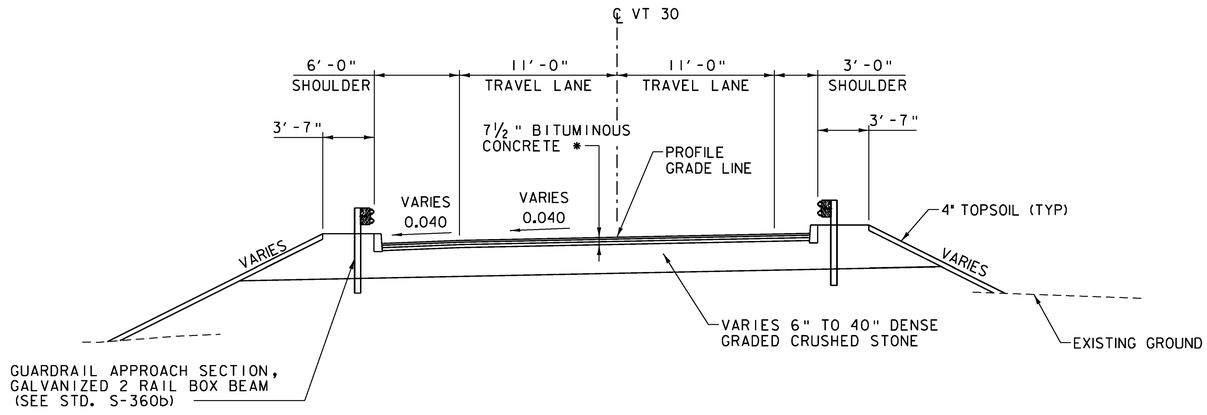
(IF USED ON PROJECT)

SURFACE	
- PAVEMENT	+/- ¼"
- AGGREGATE SURFACE COURSE	+/- ½"
BASE COURSE	+/- ½"
SUBBASE	+/- 1"
SAND BORROW	+/- 1"
GRANULAR BORROW	+/- 1"

VT30 TYPICAL ROADWAY APPROACH SECTION

SCALE: 1" = 5'

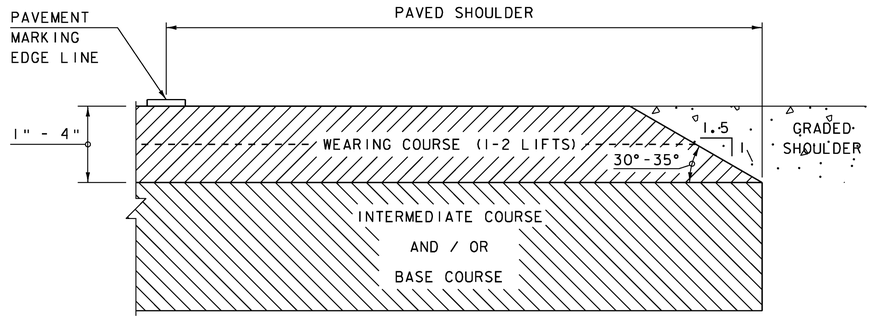
5 0 5
SCALE



VT30 TYPICAL ROADWAY BANK SECTION

SCALE: 1" = 5'

5 0 5
SCALE



SAFETY EDGE DETAIL

NOT TO SCALE

NOTE: LEVELING COURSE MAY INCLUDE THE "SAFETY EDGE" AT THE CONTRACTOR'S CHOICE.

SCALE 1" = 5'-0

5 0 5

Vanasse Hangen Brustlin, Inc.

PROJECT NAME: HUBBARDTON	
PROJECT NUMBER: ER STP 0161(27)	
FILE NAME: z11c290app+yp.dgn	PLOT DATE: 7/16/2012
PROJECT LEADER: M.A. COLGAN	DRAWN BY: C.L. CILLEY
DESIGNED BY: S.G. FARNSWORTH	CHECKED BY: S.G. FARNSWORTH
TYPICAL ROADWAY SECTION	SHEET 46 OF 70

VHB 57478.02

GPS CONTROL POINTS

HVCTRL #100

WAITE AZ MK

NORTH = 440385.491
EAST = 1459351.822
ELEV. = 424.57

GENERAL LOCATION, HUBBARDTON, VT. TO REACH FROM THE INTERSECTION OF VT ROUTE 30 AND VT ROUTE 144 IN SUDBURY GO SOUTH ALONG VT ROUTE 30 FOR 4.2 MI (6.8 KM) TO THE INTERSECTION OF MONUMENT HILL ROAD LEFT. CONTINUE STRAIGHT AHEAD AND GO SOUTH ALONG VT ROUTE 30 FOR 0.1 MI (0.2 KM) TO THE SITE OF THE MARK ON THE LEFT, JUST NORTH OF THE HUBBARDTON CONGREGATIONAL CHURCH. TO REACH FROM THE US ROUTE 4 WESTBOUND BRIDGE OVER VT ROUTE 30 AT EXIT 4 IN CASTLETON GO NORTH ALONG VT ROUTE 30 FOR 6.4 MI (10.3 KM) TO THE SITE OF THE MARK ON THE RIGHT. THE MARK IS SET 3 CM BELOW GROUND SURFACE IN THE TOP OF A 30 CM DIAMETER CONCRETE MONUMENT POURED 1.3 M (4.3 FT) DEEP. IT IS 6.2 M (20.3 FT) EAST OF AND ABOUT 0.4 M (1.3 FT) HIGHER THAN THE CENTERLINE OF VT ROUTE 30, 21.3 M (69.9 FT) SOUTH OF THE CENTERLINE OF A GRAVEL DRIVE, 38.1 M (125.0 FT) EAST NORTHEAST OF THE NORTHEAST CORNER OF THE CHURCH, 24.9 M (81.7 FT) SOUTH OF POLE NO 53/224, AND 11.6 M (38.1 FT) NORTH OF POLE NO 224X AND A FIBERGLASS WITNESS POST.

HVCTRL #102

BEEBE 2011

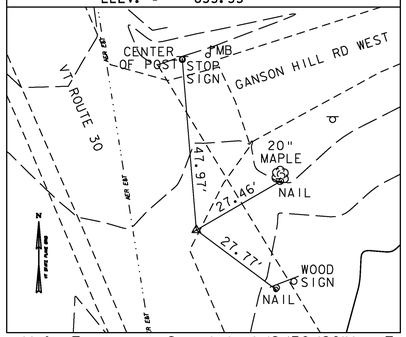
NORTH = 451710.905
EAST = 1460568.665
ELEV. = 631.03

GENERAL LOCATION, HUBBARDTON, VT. TO REACH FROM THE INTERSECTION OF VT ROUTE 30 AND VT ROUTE 144 IN SUDBURY GO SOUTH ALONG VT ROUTE 30 FOR 2.1 MI TO THE INTERSECTION OF GANSON HILL ROAD WEST LEFT. TO REACH FROM THE US ROUTE 4 WESTBOUND BRIDGE OVER VT ROUTE 30 AT EXIT 4 IN CASTLETON GO NORTH ALONG VT ROUTE 30 FOR 8.6 MI TO THE SITE OF THE MARK ON THE RIGHT. THE MARK IS 18.0 FT EAST OF AND ABOUT 0.3 FT LOWER THAN THE CENTERLINE OF VT ROUTE 30, 89.8 FT SOUTH OF THE CENTERLINE OF GANSON HILL ROAD WEST, 57.6 FT NORTHEAST OF POLE NO 183X, AND 15.8 FT NORTHWEST OF AN UNMARKED TELEPHONE POLE.

TRAVERSE TIES

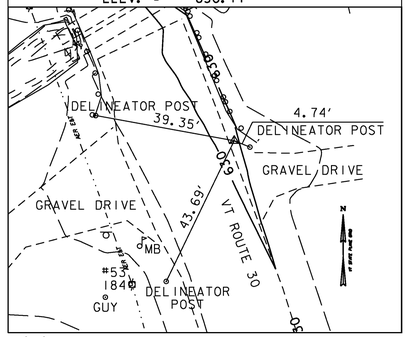
HVCTRL #1

NORTH = 451765.730
EAST = 1460543.864
ELEV. = 633.35



HVCTRL #2

NORTH = 451621.671
EAST = 1460600.242
ELEV. = 630.11



• Main Traverse Completed 12/30/2011 by T.J.Gaudet

DATUM

VERTICAL NAVD 88
HORIZONTAL NAD 83(1996)
ADJUSTMENT ------

Vanasse Hangen Brustlin, Inc.

PROJECT NAME: HUBBARDTON
PROJECT NUMBER: ER STP 0161(27)

FILE NAME: z11c2901t1.dgn
PROJECT LEADER: M.A. COLGAN
DESIGNED BY: VHB
TIE SHEET

PLOT DATE: 7/16/2012
DRAWN BY: B.M. KLINEFELTER
CHECKED BY: G.E. JOHNSON
SHEET 47 OF 70

VHB 57478.02

REMOVAL AND DISPOSAL OF GUARDRAIL

STA 34+14.4 - 34+61.8 LT
STA 33+91.4 - 35+12.8 RT

BRIDGE RAILING, GALVANIZED 2 RAIL BOX BEAM

STA 34+28.8 - 34+44.7 LT
STA 34+33.1 - 34+48.9 RT

GUARDRAIL APPROACH SECTION, GALVANIZED 2 RAIL BOX BEAM

STA 34+05.3 - 34+28.8 LT
STA 34+44.7 - 34+63.2 LT
STA 34+04.4 - 34+33.1 RT
STA 34+48.9 - 34+78.0 RT

HD STEEL BEAM GUARDRAIL, GALVANIZED

STA 34+04.5 - 34+05.3 LT
STA 33+89.5 - 34+04.0 RT

MANUFACTURED TERMINAL SECTION, TANGENT

STA 34+78.0 - 35+28.0 RT

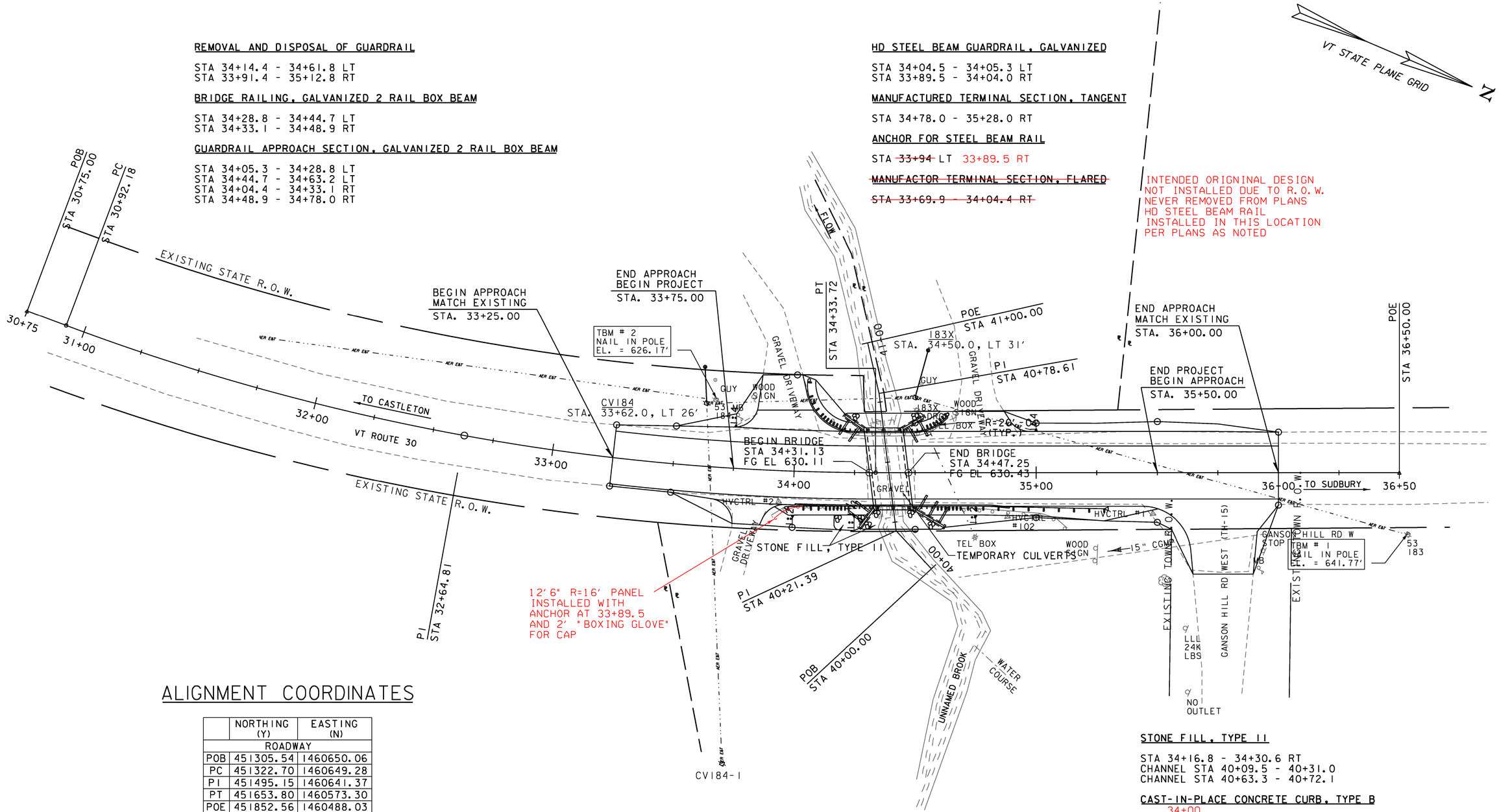
ANCHOR FOR STEEL BEAM RAIL

STA ~~33+94~~ LT 33+89.5 RT

~~MANUFACTOR TERMINAL SECTION, FLARED~~

~~STA 33+69.9 - 34+04.4 RT~~

INTENDED ORIGNINAL DESIGN
NOT INSTALLED DUE TO R.O.W.
NEVER REMOVED FROM PLANS
HD STEEL BEAM RAIL
INSTALLED IN THIS LOCATION
PER PLANS AS NOTED



ALIGNMENT COORDINATES

	NORTHING (Y)	EASTING (N)
ROADWAY		
POB	451305.54	1460650.06
PC	451322.70	1460649.28
PI	451495.15	1460641.37
PT	451653.80	1460573.30
POE	451852.56	1460488.03
CHANNEL		
POB	451690.61	1460600.80
PI	451671.06	1460592.12
PI	451642.21	1460542.70
POE	451629.65	1460525.39

CURVE #1

DELTA = 20°35'54.7" LT
D = 6°01'52.1"
R = 950.00'
T = 172.63'
L = 341.54'
E = 15.56'

STONE FILL, TYPE II

STA 34+16.8 - 34+30.6 RT
CHANNEL STA 40+09.5 - 40+31.0
CHANNEL STA 40+63.3 - 40+72.1

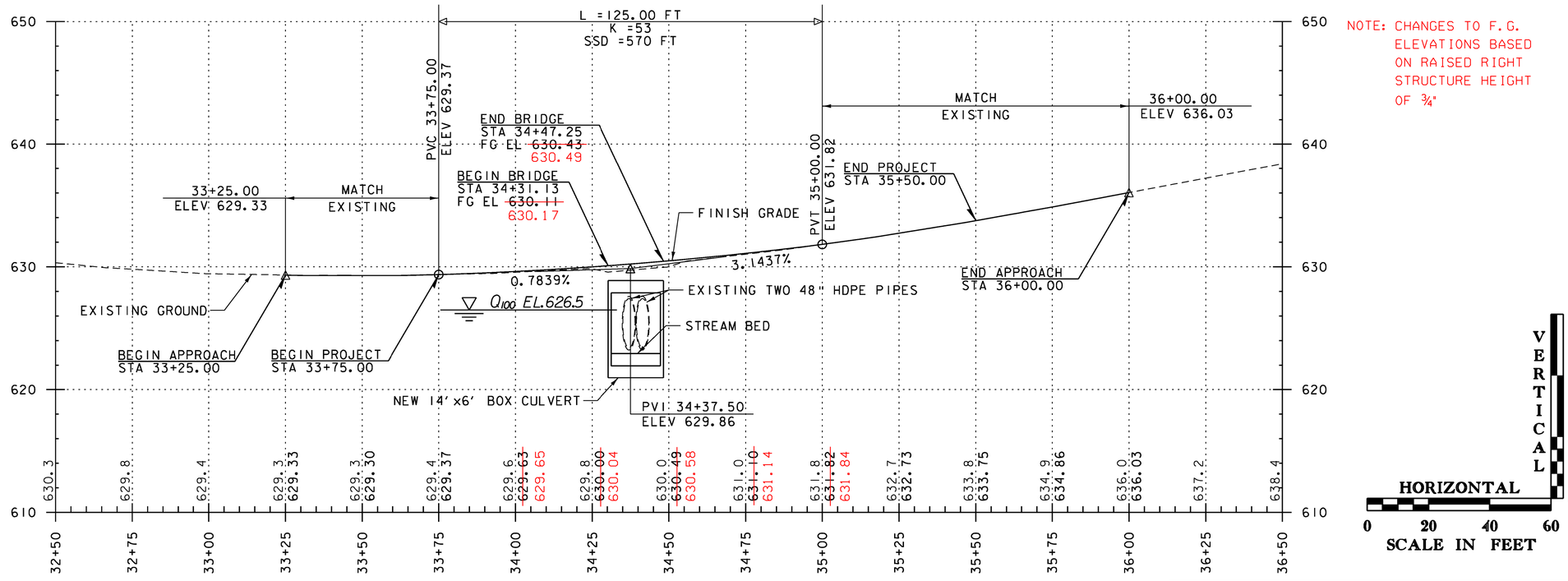
CAST-IN-PLACE CONCRETE CURB, TYPE B

34+00
STA ~~34+04.1~~ - 34+29.0 LT
STA 34+45.2 - 34+63.6 LT
STA 34+32.8 - 34+00.8 RT
STA 34+48.9 - 34+88.9 RT

0 20 40
SCALE

Vanasse Hangen Brustlin, Inc.

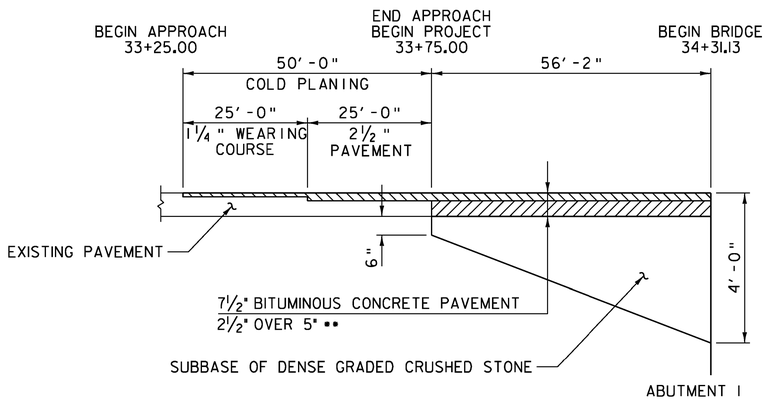
PROJECT NAME:	HUBBARDTON
PROJECT NUMBER:	ER STP 0161(27)
FILE NAME: z11c2901ay.dgn	PLOT DATE: 7/16/2012
PROJECT LEADER: M.A. COLGAN	DRAWN BY: C.L. CILLEY
DESIGNED BY: S.G. FARNSWORTH	CHECKED BY: S.G. FARNSWORTH
LAYOUT SHEET	SHEET 48 OF 70



NOTE: CHANGES TO F.G. ELEVATIONS BASED ON RAISED RIGHT STRUCTURE HEIGHT OF ¾"

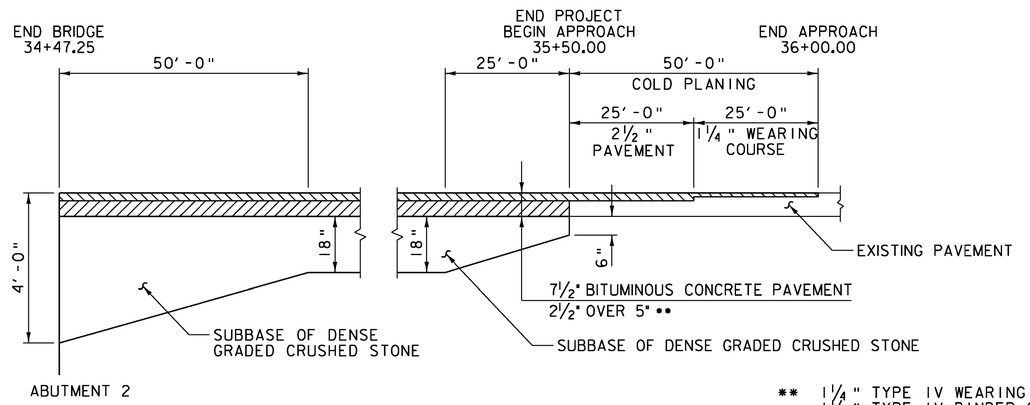
VT 30 PROFILE

THE GRADES SHOWN TO THE NEAREST TENTH ARE THE ORIGINAL GROUND ELEVATIONS ALONG THE PROPOSED ALIGNMENT. THE GRADES SHOWN TO THE NEAREST HUNDREDTH ARE THE PROPOSED GRADES FOR THE NEW ALIGNMENT.



BEGIN PROJECT MATERIAL TRANSITION

NOT TO SCALE



END PROJECT MATERIAL TRANSITION

NOT TO SCALE

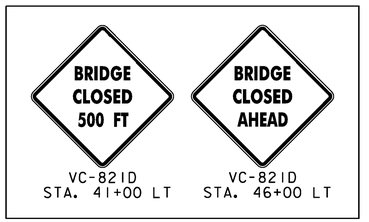
** 1¼" TYPE IV WEARING COURSE OVER
1¼" TYPE IV BINDER COURSE OVER
2½" TYPE II BASE COURSE OVER
2½" TYPE II BASE COURSE

PROJECT NAME:	HUBBARDTON
PROJECT NUMBER:	ER STP 0161(27)
FILE NAME: z11c290pro.dgn	PLOT DATE: 7/16/2012
PROJECT LEADER: M.A. COLGAN	DRAWN BY: C.L. CILLEY
DESIGNED BY: S.G. FARNSWORTH	CHECKED BY: S.G. FARNSWORTH
PROFILE	SHEET 49 OF 70

Vanasse Hangen Brustlin, Inc.

VT STATE PLANE GRID

N



VC-821D STA. 41+00 LT

VC-821D STA. 46+00 LT

VT ROUTE 30 NORTH APPROACH

EXISTING STATE R.O.W.

30+75

31+00

32+00

VT ROUTE 30

TO CASTLETON

33+00

EXISTING STATE R.O.W.

BEGIN APPROACH
MATCH EXISTING
STA. 33+25.00

END APPROACH
BEGIN PROJECT
STA. 33+75.00

AER EAT

MB

FLOW

BRIDGE CLOSED

R11-2
MOUNTED ON
TYPE III BARRICADE

END BRIDGE
STA. 34+47.25
F.G. EL 630.43

END APPROACH
MATCH EXISTING
STA. 36+00.00

END PROJECT
BEGIN APPROACH
STA. 35+50.00

34+00

35+00

36+00

TO SUDBURY

36+50

EXISTING TOWN R.O.W.

GANSON HILL RD WEST (TH-15)

EXISTING TOWN R.O.W.

15" CGMP

VB

BRIDGE CLOSED

R11-2
MOUNTED ON
TYPE III BARRICADE

BEGIN BRIDGE
STA. 34+31.13
F.G. EL 630.11

BRIDGE CLOSED

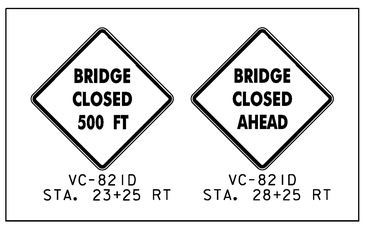
R11-2
MOUNTED ON
TYPE III BARRICADE

BRIDGE CLOSED

R11-2
MOUNTED ON
TYPE III BARRICADE

UNNAMED BROOK

WATER COURSE



VC-821D STA. 23+25 RT

VC-821D STA. 28+25 RT

VT ROUTE 30 SOUTH APPROACH

SEE STANDARD E-100 FOR ADDITIONAL CONSTRUCTION APPROACH SIGNS

LEGEND

- TYPE III BARRICADE
- TYPE III (MOD) BARRICADE
- TEMPORARY TRAFFIC BARRIER

NOTES:

1. THE CONTRACTOR SHALL PROVIDE TEMPORARY TRAFFIC BARRIER AS POSITIVE PROTECTION DURING THE BRIDGE CLOSURE. PAYMENT SHALL BE UNDER 621.90 "TEMPORARY TRAFFIC BARRIER".
2. ANY LINE STRIPING TARGETS USED SHALL BE INCIDENTAL TO ITEM 641.10 "TRAFFIC CONTROL".

TRAFFIC CONTROL PLAN

0 20 40

SCALE

VHB Vanasse Hangen Brustlin, Inc.

PROJECT NAME:	HUBBARDTON
PROJECT NUMBER:	ER STP 0161(27)
FILE NAME: z11c290tcp.dgn	PLOT DATE: 7/16/2012
PROJECT LEADER: M.A. COLGAN	DRAWN BY: E.A. FIALA
DESIGNED BY: S.G. FARNSWORTH	CHECKED BY: S.G. FARNSWORTH
TRAFFIC CONTROL PLAN	SHEET 50 OF 70

VHB 57478.02

EPSC PLAN NARRATIVE

1.1 PROJECT DESCRIPTION

THIS PROJECT INVOLVES THE REMOVAL OF TWO TEMPORARY CULVERTS AND REPLACEMENT WITH A CONCRETE BOX STRUCTURE FOR BRIDGE NO. 98 ON VT ROUTE 30. THE NEW STRUCTURE WILL CONVEY THE WATERS OF NONAME BROOK UNDER VT ROUTE 30 ALONG THE SAME ALIGNMENT. BRIDGE NO. 98 IS LOCATED IN THE TOWN OF HUBBARDTON, ON VT ROUTE 30, APPROXIMATELY 0.03 MILES SOUTH OF THE INTERSECTION OF VT ROUTE 30 AND GANSON HILL WEST ROAD (TH 15).

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 CONSTRUCTION SEASON.

1.2 SITE INVENTORY

1.2.1 TOPOGRAPHY

THE TOPOGRAPHY OF THE AREA IS FLAT TREELESS BANKS ASCENDING FROM THE NONAME BROOK TO ROLLING HILLS MOSTLY COVERED BY FOREST WITH OCCASIONAL OPEN AREAS. VT ROUTE 30 AND GANSON HILL WEST ROAD (TH 15) ARE WITHIN THE PROJECT SITE. THERE ARE RESIDENCES TO THE SOUTH AND TO THE NORTH OF THE PROJECT SITE ALONG VT 30.

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

THE NONAME BROOK IS THE ONLY WATER SOURCE ON THE PROJECT SITE. THE BROOK IS CLASSIFIED AS NARROW AND CURVING WITH BENDS UPSTREAM AND DOWNSTREAM OF THE PROJECT SITE AND A LOW CURRENT. THE BROOK BED CONSISTS OF GRAVEL, COBBLES, AND BOULDERS. THE TRIBUTARY AREA AT THE BRIDGE CROSSING IS APPROXIMATELY 1.2 SQ. MILES. THERE ARE NO OTHER CULVERTS WITHIN THE PROJECT AREA.

1.2.3 VEGETATION

THE VEGETATION IN THE PROJECT AREA CONSISTS OF SOME HARDWOOD AND SOFTWOOD TREES UPSTREAM AND DOWNSTREAM OF VT 30. THE IMPACT TO VEGETATION WILL BE LIMITED TO THAT WHICH IS DIRECTLY AFFECTED BY REPLACEMENT OF THE EXISTING TWO TEMPORARY CULVERTS AND THE RECONSTRUCTION OF THE APPROACH ROADWAY. DISTURBED VEGETATION WILL BE RE-ESTABLISHED 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 RUTLAND, VERMONT. SOILS ON THE PROJECT SITE ARE:

GEORGIA AND AMENIA SOILS (66B), 3 TO 8% SLOPES, “K FACTOR” = 0.32, CONSIDERED MODERATELY ERODIBLE, COVERS ONLY THE NORTHWEST CORNER OF THE PROJECT SITE.

MACOMBER-TACONIC COMPLEX (42C), 8% TO 15% SLOPES, “K FACTOR” = 0.37, CONSIDERED HIGHLY ERODIBLE, COVERS THREE QUARTERS OF THE PROJECT SITE.

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: NO
WATER RESOURCE: NONAME BROOK AND TRIBUTARY OF BEEBE POND
WETLANDS: CLASS III - NORTHEAST CORNER

1.3 RISK EVALUATION

THIS PROJECT DOES NOT FALL UNDER THE JURISDICTION OF GENERAL PERMIT 3-9020 FOR STORMWATER RUNOFF FROM CONSTRUCTION SITES. SHOULD CHANGES PRIOR TO OR DURING CONSTRUCTION RESULT IN ONE OR MORE ACRES OF EARTH DISTURBANCE OR SHOULD THE PROJECT BECOME PART OF A LARGER PLAN OF DEVELOPMENT, 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, STORM WATER 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 CONSTRUCTION EQUIPMENT CAN ACCESS SHALL BE DELINEATED.

PROJECT DEMARCATION FENCING (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 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.

ITEM 649.515 WILL BE INSTALLED AS PROPOSED ON THE EPSC PLAN.

TURBIDITY FILTERS WILL BE INSTALLED WHERE WORK MUST TAKE PLACE WITHIN THE LIMITS OF THE BROOK IF COFFERDAM OR OTHER METHODS OF SEPARATING THE BROOK FROM THE EXCAVATION AREAS ARE NEEDED.

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 DIVERSIONARY 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.

CHECK STRUCTURES ARE NOT ANTICIPATED FOR THIS PROJECT.

1.4.7 CONSTRUCT PERMANENT CONTROLS

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

PERMANENT EROSION CONTROL STRUCTURES ARE NOT ANTICIPATED FOR THIS PROJECT.

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. STONE FILL, TYPE I SHALL BE USED TO STABILIZE ALL SLOPES STEEPER THAN 1:2.

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.

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. FOR SLOPES STEEPER THAN 1:2, STONE FILL, TYPE I SHALL BE USED INSTEAD OF BIODEGRADABLE EROSION CONTROL MATTING.

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.

TREATMENT OF DEWATERING COFFERDAM IS ANTICIPATED. A LOCATION FOR TREATMENT HAS BEEN PROPOSED ON THE PLANS. IT IS ANTICIPATED THAT THE CONTRACTOR WILL HAVE TO PLACE A LARGE FILTRATION BAG ON THE EXISTING VT 30 PAVEMENT OR ON A DOWN STREAM FLAT AREA WITHIN RIGHT-OF-WAY. HOWEVER THE SPECIFIC MEANS FOR TREATMENT OF DISCHARGE SHALL BE PROVIDED BY THE CONTRACTOR. PAYMENT FOR TREATMENT OF DISCHARGE WILL BE MADE UNDER CONTRACT ITEM 653.45.

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.

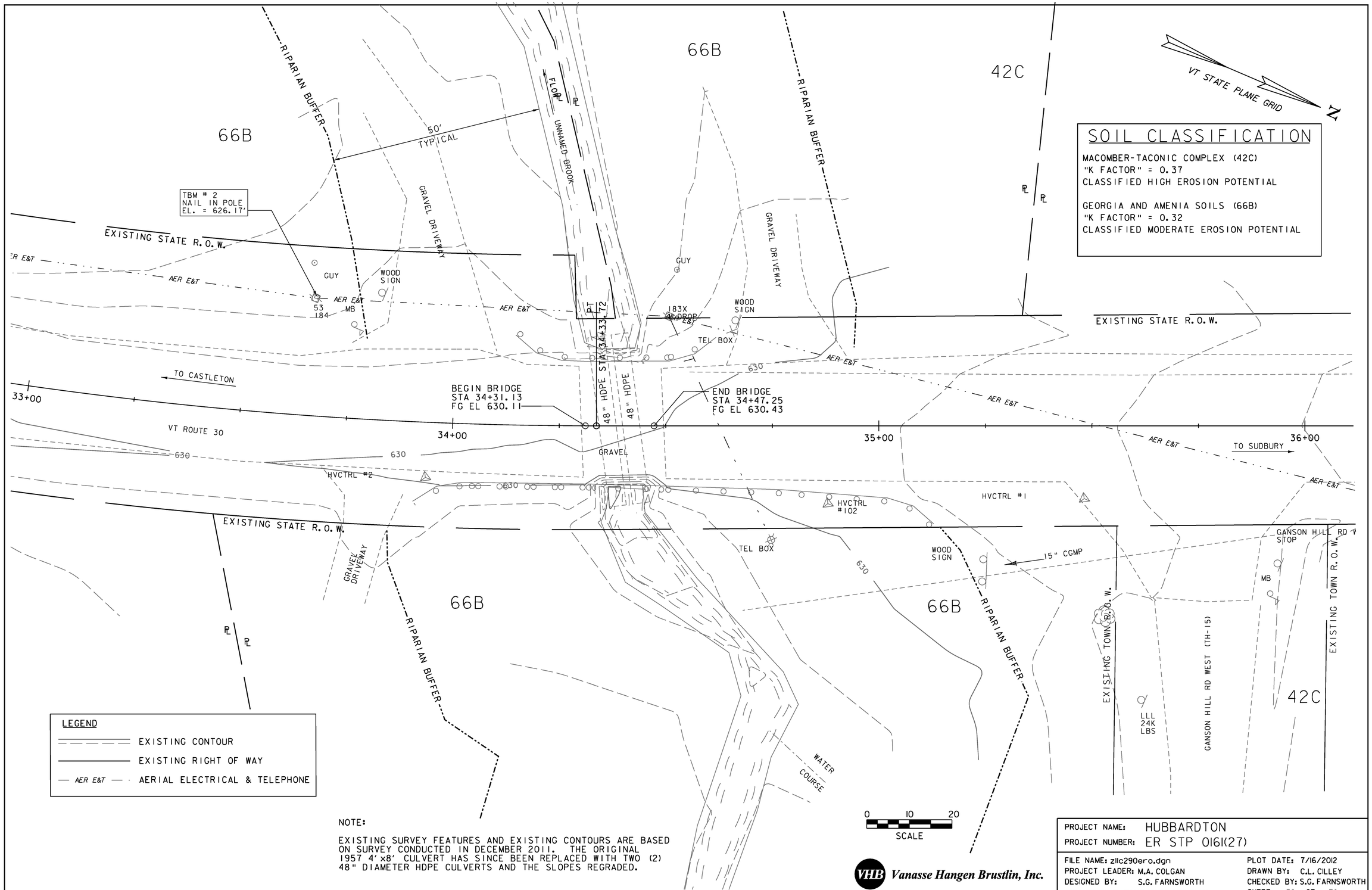
1.5.1 CONSTRUCTION SEQUENCE

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.

VHB *Vanasse Hangen Brustlin, Inc.*

PROJECT NAME:	HUBBARDTON
PROJECT NUMBER:	ER STP 0161(27)
FILE NAME: zllc290ero_narrative.dgn	PLOT DATE: 7/16/2012
PROJECT LEADER: M.A. COLGAN	DRAWN BY: B.M. KLINEFELTER
DESIGNED BY: S.G. FARNSWORTH	CHECKED BY: S.G. FARNSWORTH
EPSC NARRATIVE	SHEET 51 OF 70



SOIL CLASSIFICATION

MACOMBER-TACONIC COMPLEX (42C)
"K FACTOR" = 0.37
CLASSIFIED HIGH EROSION POTENTIAL

GEORGIA AND AMENIA SOILS (66B)
"K FACTOR" = 0.32
CLASSIFIED MODERATE EROSION POTENTIAL

LEGEND

- EXISTING CONTOUR
- EXISTING RIGHT OF WAY
- AER E&T — AERIAL ELECTRICAL & TELEPHONE

NOTE:

EXISTING SURVEY FEATURES AND EXISTING CONTOURS ARE BASED ON SURVEY CONDUCTED IN DECEMBER 2011. THE ORIGINAL 1957 4'x8' CULVERT HAS SINCE BEEN REPLACED WITH TWO (2) 48" DIAMETER HDPE CULVERTS AND THE SLOPES REGRADED.

0 10 20
SCALE

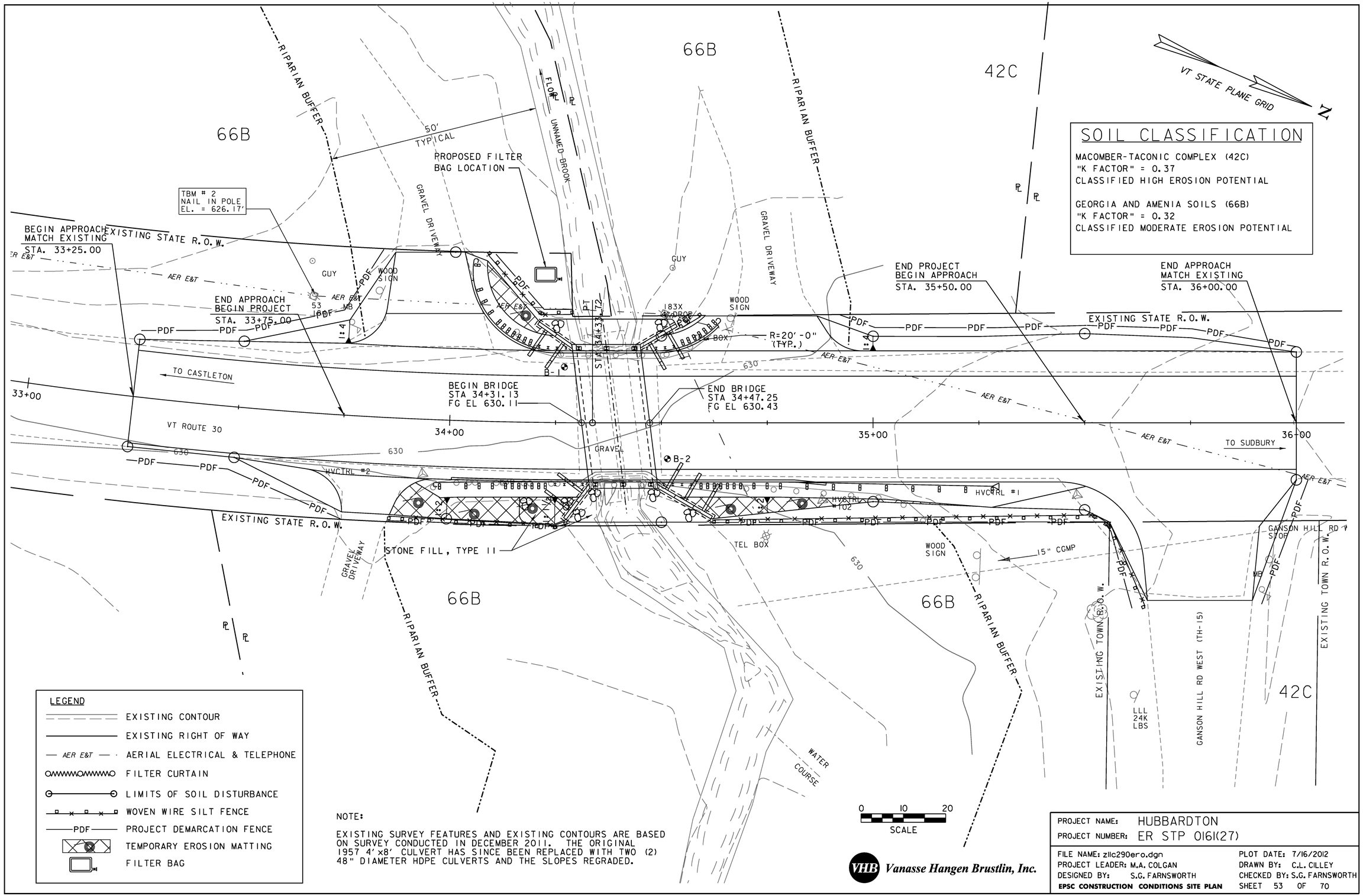
Vanasse Hangen Brustlin, Inc.

PROJECT NAME: HUBBARDTON
PROJECT NUMBER: ER STP 0161(27)

FILE NAME: z11c290ero.dgn
PROJECT LEADER: M.A. COLGAN
DESIGNED BY: S.G. FARNSWORTH
EPSC EXISTING CONDITIONS SITE PLAN

PLOT DATE: 7/16/2012
DRAWN BY: C.L. CILLEY
CHECKED BY: S.G. FARNSWORTH
SHEET 52 OF 70

VHB 57478.02



SOIL CLASSIFICATION

MACOMBER-TACONIC COMPLEX (42C)
"K FACTOR" = 0.37
CLASSIFIED HIGH EROSION POTENTIAL

GEORGIA AND AMENIA SOILS (66B)
"K FACTOR" = 0.32
CLASSIFIED MODERATE EROSION POTENTIAL

LEGEND

- EXISTING CONTOUR
- EXISTING RIGHT OF WAY
- AER E&T — AERIAL ELECTRICAL & TELEPHONE
- FILTER CURTAIN
- LIMITS OF SOIL DISTURBANCE
- WOVEN WIRE SILT FENCE
- PDF — PROJECT DEMARCATION FENCE
- TEMPORARY EROSION MATTING
- FILTER BAG

NOTE:

EXISTING SURVEY FEATURES AND EXISTING CONTOURS ARE BASED ON SURVEY CONDUCTED IN DECEMBER 2011. THE ORIGINAL 1957 4'x8' CULVERT HAS SINCE BEEN REPLACED WITH TWO (2) 48" DIAMETER HDPE CULVERTS AND THE SLOPES REGRADED.

0 10 20
SCALE

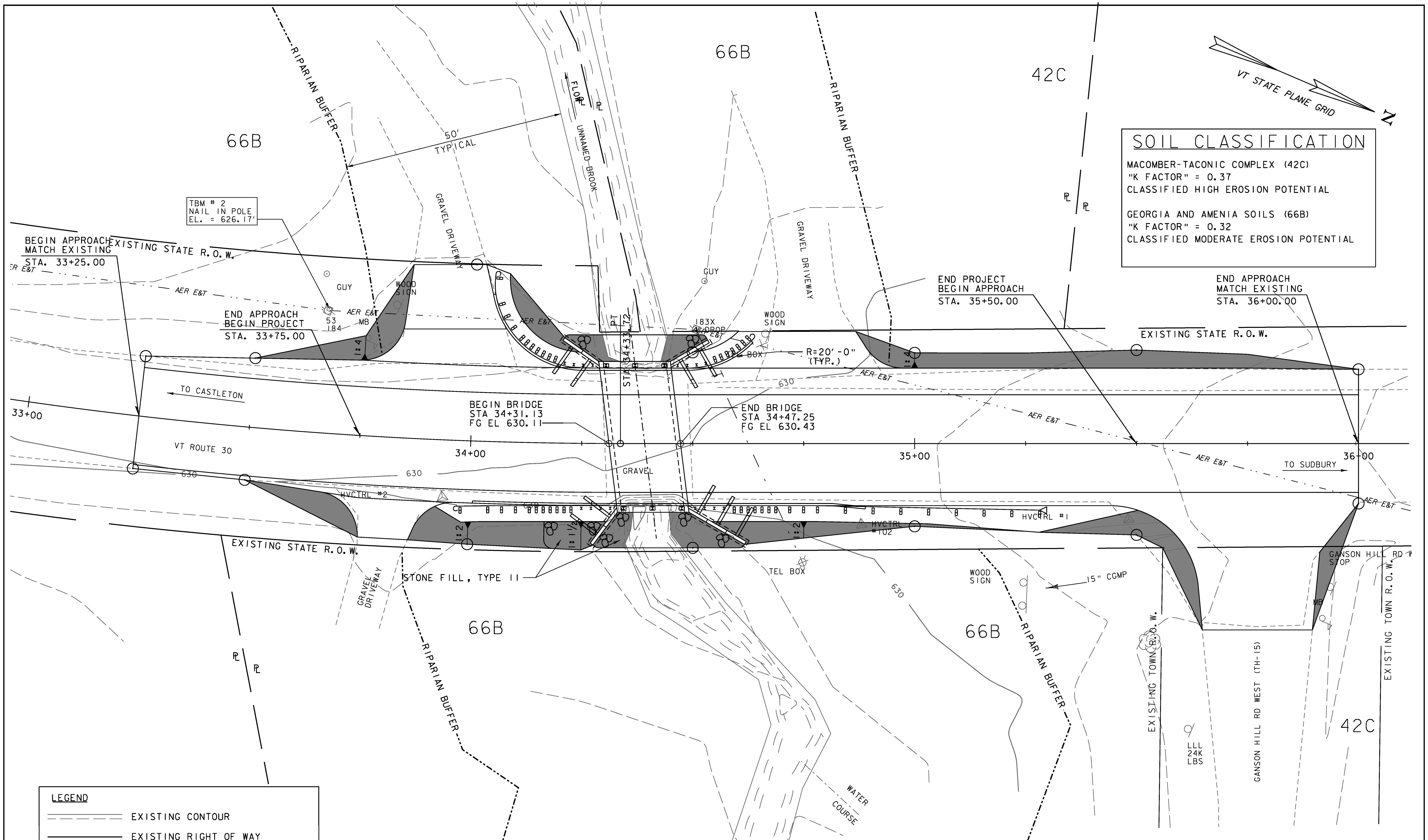
VHB Vanasse Hangen Brustlin, Inc.

PROJECT NAME: HUBBARDTON
PROJECT NUMBER: ER STP 0161(27)

FILE NAME: z11c290ero.dgn
PROJECT LEADER: M.A. COLGAN
DESIGNED BY: S.G. FARNSWORTH
EPSC CONSTRUCTION CONDITIONS SITE PLAN

PLOT DATE: 7/16/2012
DRAWN BY: C.L. CILLEY
CHECKED BY: S.G. FARNSWORTH
SHEET 53 OF 70

VHB 57478.02



SOIL CLASSIFICATION

MACOMBER-TACONIC COMPLEX (42C)
"K FACTOR" = 0.37
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GEORGIA AND AMENIA SOILS (66B)
"K FACTOR" = 0.32
CLASSIFIED MODERATE EROSION POTENTIAL

LEGEND

- EXISTING CONTOUR
- EXISTING RIGHT OF WAY
- AER E&T — AERIAL ELECTRICAL & TELEPHONE
- LIMITS OF SOIL DISTURBANCE
- DISTURBED AREAS REQUIRING RE-VEGETATION

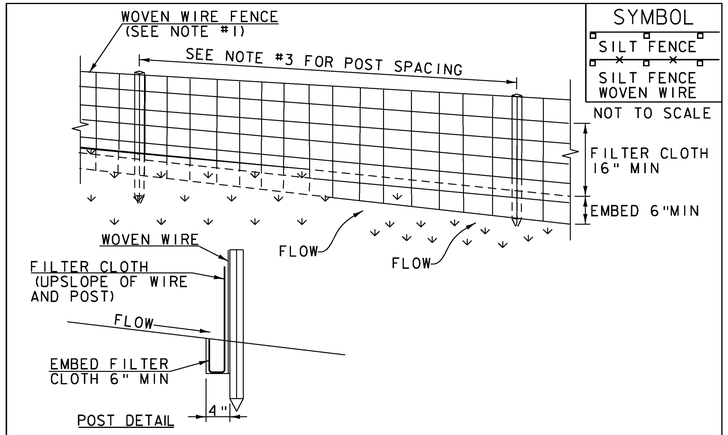
NOTE:

EXISTING SURVEY FEATURES AND EXISTING CONTOURS ARE BASED ON SURVEY CONDUCTED IN DECEMBER 2011. THE ORIGINAL 1957 4'x8' CULVERT HAS SINCE BEEN REPLACED WITH TWO (2) 48" DIAMETER HDPE CULVERTS AND THE SLOPES REGRADED.

VHB Vanasse Hangen Brustlin, Inc.

PROJECT NAME: HUBBARDTON	
PROJECT NUMBER: ER STP 0161(27)	
FILE NAME: z11c290ero.dgn	PLOT DATE: 7/16/2012
PROJECT LEADER: M.A. COLGAN	DRAWN BY: C.L. CILLEY
DESIGNED BY: S.G. FARNSWORTH	CHECKED BY: S.G. FARNSWORTH
EPSC FINAL CONDITIONS SITE PLAN	SHEET 54 OF 70

VHB 57478.02



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.

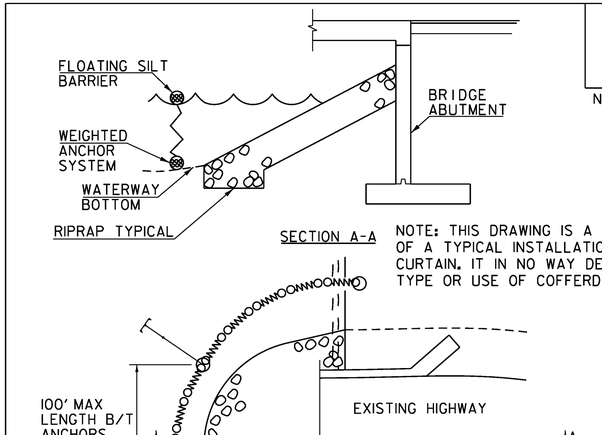
ADAPTED FROM DETAILS PROVIDED BY: NEW YORK STATE DEC ORIGINALLY DEVELOPED BY USDA-NRCS VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION

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



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.

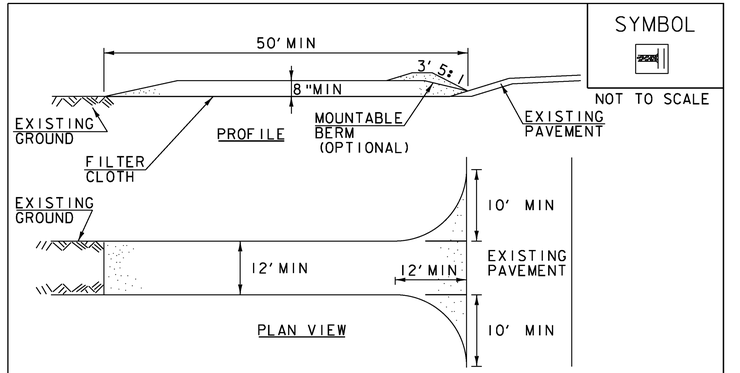
CONSTRUCTION SPECIFICATIONS

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 (PAY ITEM 649.61).

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

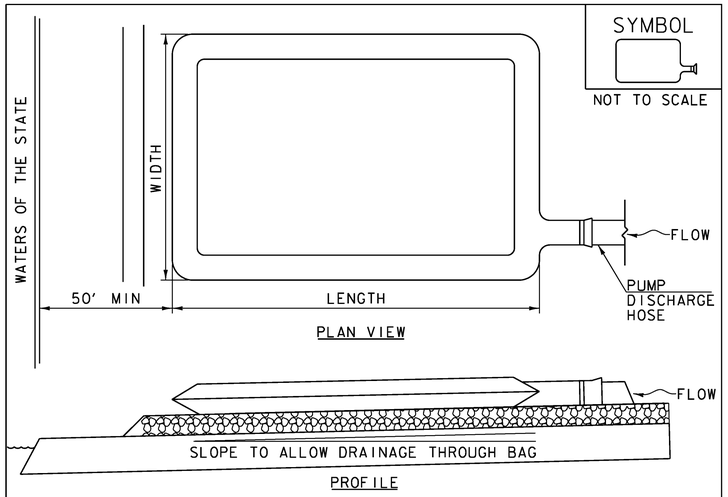
Vanasse Hangen Brustlin, Inc.

PROJECT NAME: HUBBARDTON
PROJECT NUMBER: ER STP 0161(27)

FILE NAME: z11c290ero_details.dgn
PROJECT LEADER: M.A. COLGAN
DESIGNED BY: S.G. FARNSWORTH
EPSC DETAILS (1 OF 2)

PLOT DATE: 7/16/2012
DRAWN BY: B.M. KLINEFELTER
CHECKED BY: S.G. FARNSWORTH
SHEET 55 OF 70

VHB 57478.02



CONSTRUCTION SPECIFICATIONS

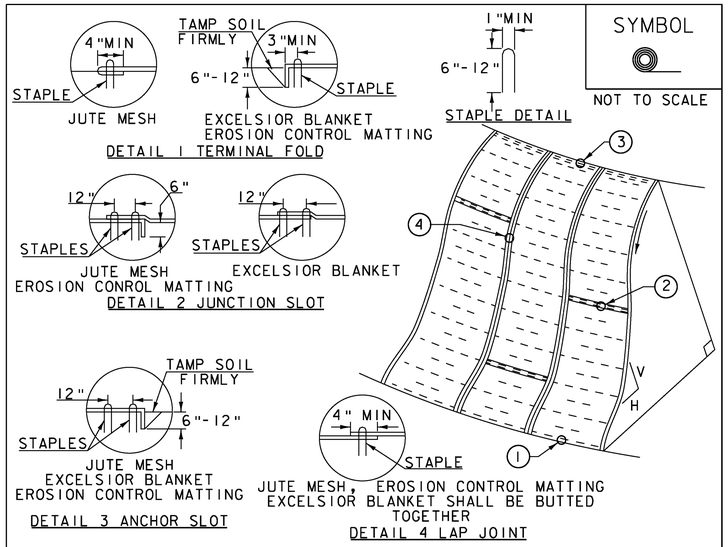
1. THE PRIMARY PURPOSE OF FILTER BAG IS TO RETAIN SILT, SAND, AND FINES DURING DEWATERING OPERATIONS.
2. FILTER BAGS SHALL BE INSTALLED ON A VEGETATED SLOPE GRADED TO ALLOW INCOMING WATER TO FLOW THROUGH THE BAG.
3. FILTER BAGS MAY ALSO BE PLACED ON COARSE AGGREGATE, STONE, OR HAYBALES TO INCREASE FILTRATION 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



CONSTRUCTION SPECIFICATIONS

1. APPLY TO SLOPES GREATER THAN 3H: IV 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

VAOT RURAL AREA MIX

LBS/AC					
% WEIGHT	BROADCAST	HYDROSEED	NAME	GERM %	PURITY %
37.5%	22.5	45	CREEPING RED FESCUE	85%	98%
37.5%	22.5	45	TALL FESCUE	90%	95%
5.0%	3	6	RED TOP	90%	95%
15.0%	9	18	BIRDSFOOT TREFOIL	85%	98%
5.0%	3	6	ANNUAL RYE GRASS	85%	95%
100%	60	120			

VAOT URBAN AREA MIX

LBS/AC					
% WEIGHT	BROADCAST	HYDROSEED	NAME	GERM %	PURITY %
42.5%	34	68	CREEPING RED FESCUE	85%	98%
10.0%	8	16	PERENNIAL RYE GRASS	90%	95%
42.5%	34	68	KENTUCKY BLUE GRASS	85%	85%
5.0%	4	8	ANNUAL RYE GRASS	85%	95%
100%	80	160			

GENERAL GUIDANCE

FERTILIZER		LIME	
BROADCAST	HYDROSEED	BROADCAST	HYDROSEED
10-20-10	19-19-19	PELLETIZED	LIQUID
500 LBS/AC		2 TONS/AC	4.4 GAL/AC

CONSTRUCTION GUIDANCE

1. RURAL SEED MIX: USE AS INDICATED IN THE PLANS AND/OR FOR ALL ESTABLISHED UPLAND (NON WETLAND) AREAS DISTURBED BY THE CONTRACTOR.
2. URBAN SEED MIX: USE AS INDICATED IN THE PLANS AND/OR FOR ALL ESTABLISHED LAWN 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. TOPSOIL: TO BE USED WITH SEED AS INDICATED ON THE PLANS, OR AS DIRECTED BY THE ENGINEER.
7. HYDROSEEDING: ALTHOUGH GUIDANCE IS GIVEN ABOVE THE SITE CONDITIONS AND THE TYPE OF HYDROSEED WILL ULTIMATELY DICTATE THE AMOUNTS AND TYPES OF SOIL AMENDMENTS TO BE APPLIED
8. 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 LANSCAPE MAUAL FOR ROADWAYS AND TRANSPORTATION FACILITIES

TURF ESTABLISHMENT

REVISIONS	
JUNE 23, 2009	WHF
JANUARY 15, 2010	WHF

Vanasse Hangen Brustlin, Inc.

PROJECT NAME:	HUBBARDTON
PROJECT NUMBER:	ER STP 0161(27)
FILE NAME: zllc290ero_details.dgn	PLOT DATE: 7/16/2012
PROJECT LEADER: M.A. COLGAN	DRAWN BY: B.M. KLINEFELTER
DESIGNED BY: S.G. FARNSWORTH	CHECKED BY: S.G. FARNSWORTH
EPSC DETAILS (2 OF 2)	SHEET 56 OF 70

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
ROD	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		

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.

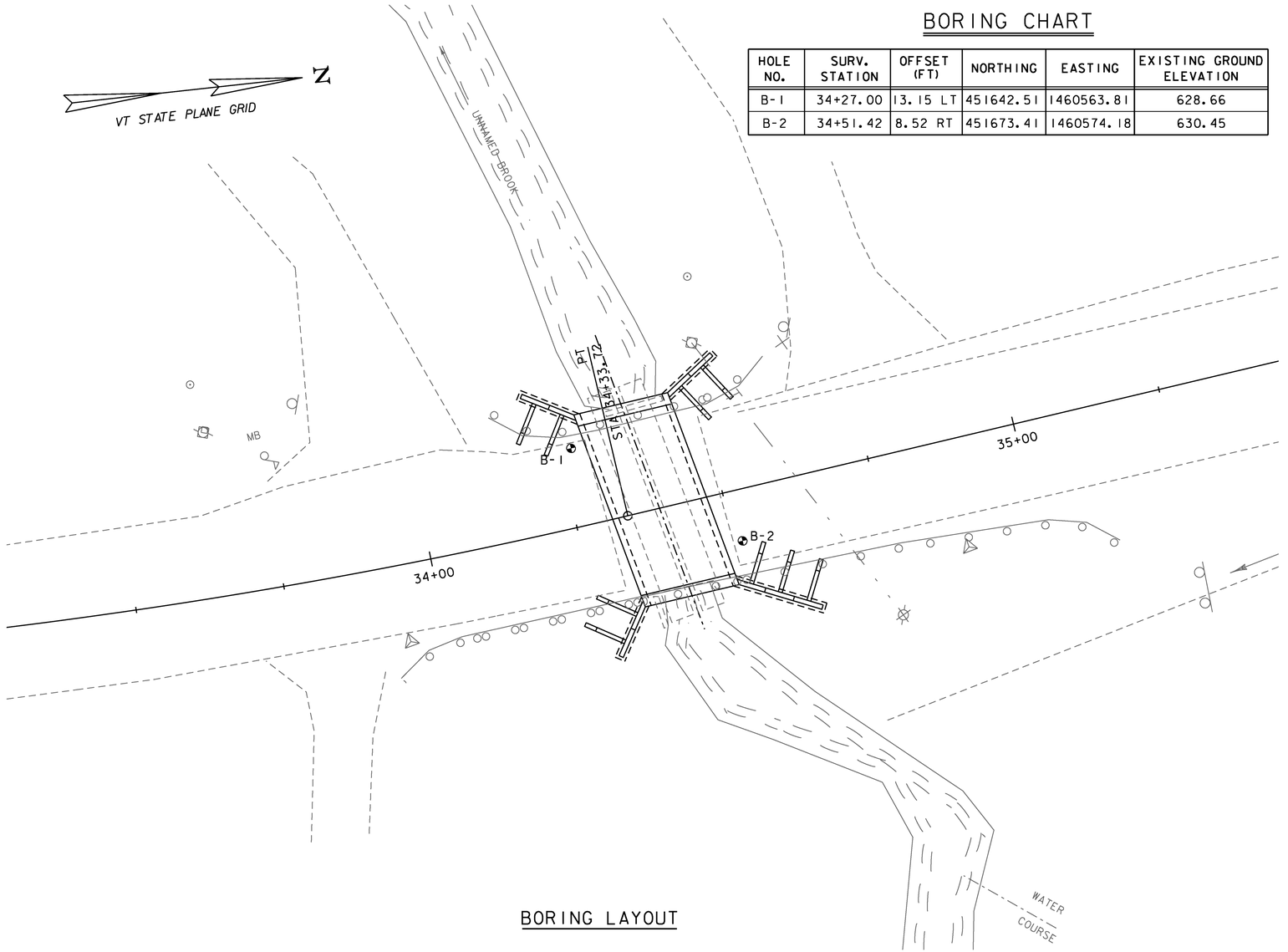
FLOWING SAND - Granular soil so saturated (loose) that it flows into drill casing during extraction of wash rod.

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

DIP - Inclination of bed with a horizontal plane.

BORING CHART

HOLE NO.	SURV. STATION	OFFSET (FT)	NORTHING	EASTING	EXISTING GROUND ELEVATION
B-1	34+27.00	13.15 LT	451642.51	1460563.81	628.66
B-2	34+51.42	8.52 RT	451673.41	1460574.18	630.45



BORING LAYOUT

GENERAL NOTES

1. The subsurface explorations shown herein were made December 21, 2011 by ~~the Agency.~~ GeoDesign.
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.

0 10 20
SCALE

VHB Vanasse Hangen Brustlin, Inc.

PROJECT NAME: HUBBARDTON
PROJECT NUMBER: ER STP 0161(27)

FILE NAME: z11c290bor.dgn
PROJECT LEADER: M.A. COLGAN
DESIGNED BY: VTRANS
BORING INFORMATION SHEET

PLOT DATE: 7/16/2012
DRAWN BY: E.A. FIALA
CHECKED BY: S.G. FARNSWORTH
SHEET 57 OF 70

APPROX. EL OF BOTTOM OF NEW BOX CULVERT

GEODESIGN INCORPORATED

GeoDesign, Inc.
P.O. Box 699
Windsor, VT 05089
Phone: 802-674-2033/Fax: 802-674-5943

1233 Shelburne Rd., Suite 360
So. Burlington, VT 05403
Phone: 802-652-5140

BORING LOG

Project Name: Beebe Pond Culvert BR #98 VT Rt 30 Hubbardton, VT

Boring No.: B-1
Page No.: 1 of 2
File No.: 837-31.8
Checked By: DTH

Boring Company: TransTech Drilling Services
Foreman: John Leonhardt
GeoDesign Rep.: Alan Baribault
Date Started: December 21, 2011 Date Finished: December 21, 2011
N. Coordinate: E. Coordinate:
Ground Surface Elevation (feet): 629
Station: Offset: ft

	Casing:	Sampler:
Type:	H.S.A.	SS
I.D.:	3.25 in.	1.38 in.
Hammer Wt.:	NA	140 lbs
Hammer Fall:	NA	30 in.
Rig Type:	CME 75 ATV	
Hammer Type:	Automatic	

Groundwater Observations			
Date	Depth (ft)	Elev. (ft)	Notes
12/21/11, 13:10	10.0	619.0	wet sample
12/21/11, 13:20	7.2	621.8	in HSA

Depth (ft)	Casing Blows/ft	Sample Information: Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	Blows / 6 inch Interval: 0 - 6	6 - 12	12 - 18	18 - 24	Coring Time (min./ft)	Moisture Content (%)	Strata Description: Depth & Elevation(feet)	Symbol	Sample Description: Classification System:
													Asphalt 628.5		
													Fill (Clay & Silt / Sand, possible cobbles / boulders)		
		S1	SS	24	2	3	9	11	11	5					S1) Medium dense, brown to black fine to coarse SAND, some Clay & Silt, trace fine to coarse Gravel (1 piece asphalt), moist (Slough).
5															
		S2	SS	24	7	5	6	8	13	11					S2) Medium dense, brown CLAY & SILT, some fine to coarse Sand, little fine to coarse Gravel, moist.
7															
		S3	SS	24	9	7	5	3	4	3			Silty, Gravelly Sand with possible cobbles / boulders 622.0		S3) Loose, brown fine to coarse SAND, some Clay & Silt, trace coarse Gravel, moist.
10															
		S4	SS	24	7	10	1	1	1	2					S4) Very loose, brown fine to coarse SAND, some fine Gravel, little Silt, wet.
		S5	SS	24	8	12	1	2	1	1					S5) Similar to S4.
15		S6	SS	24	8	14	3	2	1	2					S6) Similar to S4.
		S7	SS	24	14	16	3	2	3	7					S7) Loose/medium; S7A (upper 7 inches): Similar to S4, no sample (discarded prematurely by driller).
17													Sandy, Gravelly Clay & Silt 612.0		
		S8	SS	24	14	18	8	17	17	11					S7B (lower 7 inches): Gray CLAY & SILT (layered), trace fine to coarse Sand, trace fine Gravel, wet. PP = 1 to 1.25 tsf.
20															
		S9	SS	24	6	20	5	5	24	15					S8) Very stiff to hard, gray CLAY & SILT, some fine to coarse Sand, trace fine Gravel, wet.
21													Gravelly Sandy Clay & Silt w/ occassional silt layers (Glacial Till) 608.0		
		S10	SS	24	8	22	15	19	16	15					S9) Very stiff to hard, gray CLAY & SILT, some fine to coarse Sand, little fine to coarse Gravel, moist. PP = 3.0 to >4.5 tsf.
25		S11	SS	12	7	24	9	50/6"							S10) Hard, gray CLAY & SILT, some fine to coarse Sand, little fine to coarse Gravel, moist.
		S12	SS	17	3	26	19	20	45/5"						S11) Hard/refusal, gray CLAY & SILT, some fine to coarse Gravel (possible cobble fragments in spoon tip), some fine to coarse Sand, moist.
		S13	SS	24	16	28	64	20	24	16					S12) Similar to S10 with yellowish cobble fragments.
30															

Remarks:
1) Ground surface elevation estimated by GeoDesign using site plan dated 9/27/2011 provided by VHB.
2) Maintained head of water in augers below 10 feet deep.
3) Depth of fill estimated.
4) Boring terminated at 32 feet with no refusal.

Notes:
1) Stratification Lines Represent Approximate Boundary Between Material Types, Transitions May Be Gradual.
2) Water Level Readings Have Been Made At Times And Under Conditions Stated, Fluctuations Of Groundwater May Occur Due To Other Factors Than Those Present At The Time Measurements Were Made. A.C. = After coring. N.R. = Not Recorded.
3) Sample Type Cuding: Av=Auger; C=Core; D=Driven; G=Grab; PS=Piston Sampler; SS=Split Barrel (Split Spoon); ST=Shelby Tube; Geo=GeoProbe V=Vane; WOR/H=Weight of Rod/Hammer
4) Proportions Used: Trace = 1-10%; Little = 10-20%; Some = 20-35%; And = 35-50%.
5) Stratification lines represent approximate boundary between material types, transitions may be gradual.

Boring No.: B-1

VT BORING LOG MC 5/21/04 837-31.8 BEEBE POND BR #98.GPJ GEODESIGN STANDARD.GDT 3/19/12

GEODESIGN INCORPORATED

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BORING LOG

Project Name: Beebe Pond Culvert BR #98 VT Rt 30 Hubbardton, VT

Boring No.: B-1
Page No.: 2 of 2
File No.: 837-31.8
Checked By: DTH

Boring Company: TransTech Drilling Services
Foreman: John Leonhardt
GeoDesign Rep.: Alan Baribault
Date Started: December 21, 2011 Date Finished: December 21, 2011
N. Coordinate: E. Coordinate:
Ground Surface Elevation (feet): 629
Station: Offset: ft

	Casing:	Sampler:
Type:	H.S.A.	SS
I.D.:	3.25 in.	1.38 in.
Hammer Wt.:	NA	140 lbs
Hammer Fall:	NA	30 in.
Rig Type:	CME 75 ATV	
Hammer Type:	Automatic	

Groundwater Observations			
Date	Depth (ft)	Elev. (ft)	Notes
12/21/11, 13:10	10.0	619.0	wet sample
12/21/11, 13:20	7.2	621.8	in HSA

Depth (ft)	Casing Blows/ft	Sample Information: Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	Blows / 6 inch Interval: 0 - 6	6 - 12	12 - 18	18 - 24	Coring Time (min./ft)	Moisture Content (%)	Strata Description: Depth & Elevation(feet)	Symbol	Sample Description: Classification System:
		S14	SS	24	8	30	9	12	19	22					S13) Hard/dense, gray CLAY & SILT and fine to coarse SAND, some fine to coarse Gravel, moist.
															S14) Hard, gray CLAY & SILT, some fine to coarse Sand, little (+) fine to coarse Gravel, moist.
32													Bottom of Exploration at 32.0 ft 597.0		
35															
40															
45															
50															
55															
60															

Remarks:

Notes:
1) Stratification Lines Represent Approximate Boundary Between Material Types, Transitions May Be Gradual.
2) Water Level Readings Have Been Made At Times And Under Conditions Stated, Fluctuations Of Groundwater May Occur Due To Other Factors Than Those Present At The Time Measurements Were Made. A.C. = After coring. N.R. = Not Recorded.
3) Sample Type Cuding: Av=Auger; C=Core; D=Driven; G=Grab; PS=Piston Sampler; SS=Split Barrel (Split Spoon); ST=Shelby Tube; Geo=GeoProbe V=Vane; WOR/H=Weight of Rod/Hammer
4) Proportions Used: Trace = 1-10%; Little = 10-20%; Some = 20-35%; And = 35-50%.
5) Stratification lines represent approximate boundary between material types, transitions may be gradual.

Boring No.: B-1

VHB Vanasse Hangen Brustlin, Inc.

PROJECT NAME:	HUBBARDTON
PROJECT NUMBER:	ER STP 0161(27)
FILE NAME: zllc290borlogs.dgn	PLOT DATE: 7/16/2012
PROJECT LEADER: M.A. COLGAN	DRAWN BY: E.A. FIALA
DESIGNED BY: VTRANS	CHECKED BY: S.G. FARNSWORTH
BORING LOGS (1 OF 2)	SHEET 58 OF 70

VHB 57478.02

APPROX. EL OF BOTTOM OF NEW BOX CULVERT

APPROX. EL.

BOTTOM OF CULVERT

GEODESIGN INCORPORATED

GeoDesign, Inc.
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1233 Shelburne Rd., Suite 360
So. Burlington, VT 05403
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BORING LOG

Project Name

Beebe Pond Culvert BR #98
VT Rt 30
Hubbardton, VT

Boring No.: **B-2**
Page No.: 1 of 2
File No.: 837-31.8
Checked By: DTH

Boring Company:	TransTech Drilling Services		
Foreman:	John Leonhardt		
GeoDesign Rep.:	Alan Baribault		
Date Started:	December 21, 2011	Date Finished:	December 21, 2011
N. Coordinate:		E. Coordinate:	
Ground Surface Elevation (feet):	630		
Station:	Offset: ft		

	Casing:	Sampler:
Type:	H.S.A.	SS
I.D.:	3.25 in.	1.38 in.
Hammer Wt.:	NA	140 lbs.
Hammer Fall:	NA	30 in.
Rig Type:	CME 75 ATV	
Hammer Type:	Automatic	

Groundwater Observations			
Date	Depth (ft)	Elev. (ft)	Notes
▼ 12/21/11, 9:40	10.0	620.0	Wet sample.
▼ 12/21/11, 9:52	7.7	622.3	In HSA.
▼			
▼			

Depth (ft)	Casing Blows/ft	Sample Information: Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	Blows / 6 inch Interval: 0 - 6	6 - 12	12 - 18	18 - 24	Coring Time (min./ft)	Moisture Content (%)	Strata Description: Depth & Elevation(feet)	Symbol	Sample Description: Classification System:
													Asphalt Pavement 629.5		
		S1	SS	18	12	0.5	12	11	12				Silty Sand Reclaimed 629.3		S1) Medium dense; 3 inches frozen fine to medium SAND, little Silt; 3 inches reclaimed asphalt pavement (no sample);
													Asphalt 629.0		
		S2	SS	24	14	2	14	9	11	8			Fill (Silty, Gravelly Sand with inferred cobbles / boulders)		brown fine to coarse SAND, little (-) Silt, trace fine to coarse Gravel (1 piece coarse in spoon tip), moist.
5		S3	SS	24	2	4	9	6	5	9					S2) Medium dense, brown fine to coarse SAND, some fine to coarse gravel, little (-) Silt, moist.
		S4	SS	24	0	6	6	11	12	14					
		S5	SS	24	14	8	3	6	9	5			8 Silty Gravelly Sand with inferred cobbles / boulders 622.0		S3) Medium dense, black fine to coarse SAND, little Silt, trace fine gravel (likely slough material), moist.
10															S4) Medium dense, no recovery.
		S6	SS	24	7	10	12	12	5	3					S5) Medium dense, brown fine to coarse GRAVEL and fine to coarse SAND, little Silt, moist.
		S7	SS	24	6	12	4	2	3	3					S6) Medium dense, similar to S5 except wet.
													14.7		S7) Loose, brown fine to coarse SAND, some (+) Clayey Silt, little fine Gravel, wet.
15		S8	SS	24	10	14	6	8	6	6			Sandy, Gravelly Clay & Silt 615.3		S8) Medium dense / Medium;
		S9	SS	24	14	16	3	10	8	9					S8A (upper 4 inches): Layered, fine to coarse SAND, trace fine gravel, trace Clayey Silt, wet.
		S10	SS	24	10	18	4	43	10	13					S8B (lower 6 inches): Gray CLAY & SILT, little fine SAND (layered), wet. PP=1.0tsf.
20															
		S11	SS	24	4	20	5	10	20	21			21 Gravelly Sandy Clay & Silt with occasional silt layers (Glacial Till) 609.0		S9) Stiff to very stiff, gray CLAY & SILT, some fine to coarse Sand, trace fine gravel, wet. PP=3.5 to 4.5tsf.
		S12	SS	16	6	22	14	23	50/4"						S10) Very stiff, similar to S9 except trace fine to coarse Gravel (1 piece coarse gravel). PP=3.0 to 4.5 (high value was measured on coarse gravel).
25		S13	SS	24	16	24	21	16	23	21					S11) Very stiff, similar to S9 except little fine to coarse Gravel. PP>4.5tsf.
		S14	SS	24	15	26	12	22	25	23					S12) Stiff to very stiff/refusal, gray CLAY & SILT, some fine to coarse Sand, little fine to coarse Gravel, wet. PP = 2 to >4.5 (low values in upper portion possibly disturbed by augers).
		S15	SS	24	16	28	16	20	28	24					S13) Very stiff to hard, gray CLAY & SILT, little fine to coarse gravel (possible pulverized
30															

Remarks:

1) Ground surface elevation estimated by GeoDesign using site plan dated 9/27/2011 provided by VHB.
2) Maintained head of water in augers below 10 feet deep.
3) Depth of fill estimated.
4) Sample S2 by semi-continuous method, SPT N-value not valid per ASTM D1586.
5) Infer cobbles 4 to 12 feet from auger chatter. Advanced past cobble/boulder from 23.3 to 24 feet.
6) Drilling resistance increased significantly below 30 feet (approximately 20 minutes from 30 to 33 feet).

Notes:
1) Stratification Lines Represent Approximate Boundary Between Material Types, Transitions May Be Gradual.
2) Water Level Readings Have Been Made At Times And Under Conditions Stated, Fluctuations Of Groundwater May Occur Due To Other Factors Than Those Present At The Time Measurements Were Made. A.C. = After coring; N.R. = Not Recorded.
3) Sample Type Coding: A=Auger; C=Core; D=Driven; G=Grab; PS=Piston Sampler; SS=Split Barrel (Split Spoon); ST=Shelby Tube; Geo=GeoProbe V=Vane; WOR/H=Weight of Rod/Hammer
4) Proportions Used: Trace = 1-10%; Little = 10-20%; Some = 20-35%; And = 35-50%
5) Stratification lines represent approximate boundary between material types, transitions may be gradual.

Boring No.: **B-2**

GEODESIGN INCORPORATED

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P.O. Box 699
Windsor, VT 05089
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So. Burlington, VT 05403
Phone: 802-652-5140

BORING LOG

Project Name

Beebe Pond Culvert BR #98
VT Rt 30
Hubbardton, VT

Boring No.: **B-2**
Page No.: 2 of 2
File No.: 837-31.8
Checked By: DTH

Boring Company:	TransTech Drilling Services		
Foreman:	John Leonhardt		
GeoDesign Rep.:	Alan Baribault		
Date Started:	December 21, 2011	Date Finished:	December 21, 2011
N. Coordinate:		E. Coordinate:	
Ground Surface Elevation (feet):	630		
Station:	Offset: ft		

	Casing:	Sampler:
Type:	H.S.A.	SS
I.D.:	3.25 in.	1.38 in.
Hammer Wt.:	NA	140 lbs.
Hammer Fall:	NA	30 in.
Rig Type:	CME 75 ATV	
Hammer Type:	Automatic	

Groundwater Observations			
Date	Depth (ft)	Elev. (ft)	Notes
▼ 12/21/11, 9:40	10.0	620.0	Wet sample.
▼ 12/21/11, 9:52	7.7	622.3	In HSA.
▼			
▼			

Depth (ft)	Casing Blows/ft	Sample Information: Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	Blows / 6 inch Interval: 0 - 6	6 - 12	12 - 18	18 - 24	Coring Time (min./ft)	Moisture Content (%)	Strata Description: Depth & Elevation(feet)	Symbol	Sample Description: Classification System:
													Gravelly Sandy Clay & Silt with occasional silt layers (Glacial Till)		cobbles), some fine to coarse Sand, wet.
		S16	SS	10	5	33	21	50/4"					33.8 (Continued) Bottom of Exploration at 33.8 ft 596.2		S14) Dense, gray SILT and fine to coarse SAND, little (+) fine to coarse Gravel (possibly pulverized cobbles), moist.
35															S15) Very stiff to hard, gray CLAY & SILT, some fine to coarse Sand, trace to little fine to coarse Gravel, very moist. PP>4.5tsf.
															S16) Hard/refusal, similar to S15.
40															
45															
50															
55															
60															

Remarks:

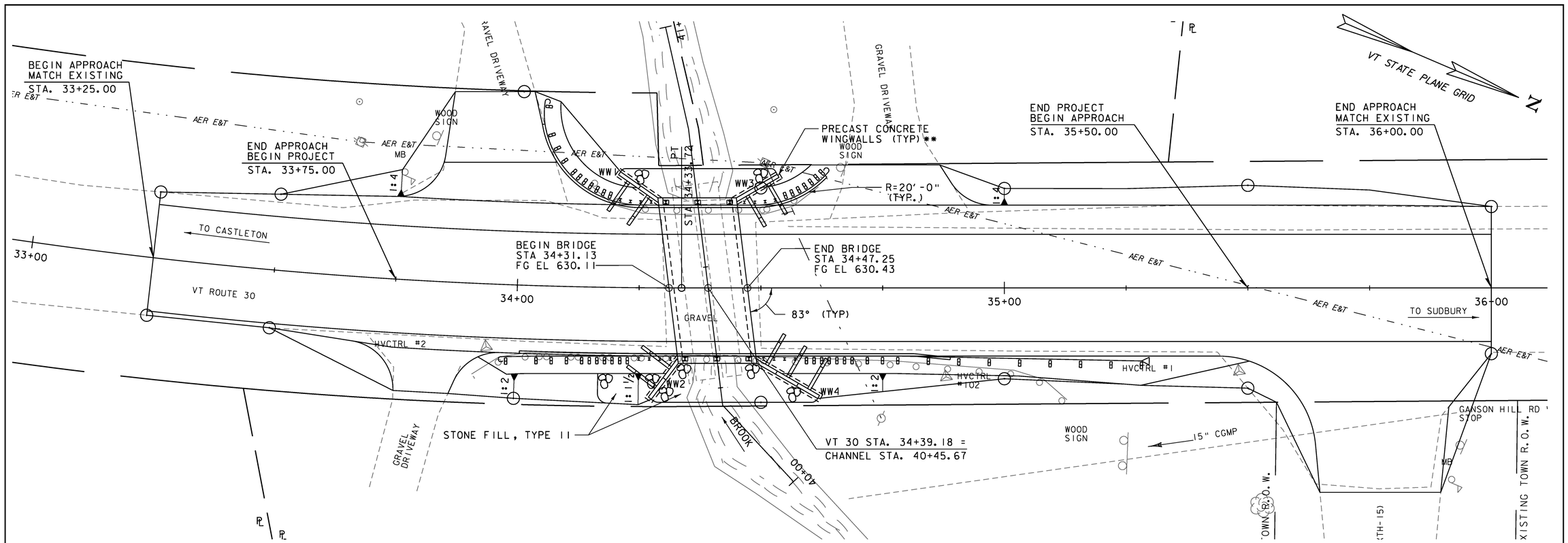
7) Boring terminated at 33.8 feet deep with split spoon refusal on inferred cobble, boulder, or bedrock.

Notes:
1) Stratification Lines Represent Approximate Boundary Between Material Types, Transitions May Be Gradual.
2) Water Level Readings Have Been Made At Times And Under Conditions Stated, Fluctuations Of Groundwater May Occur Due To Other Factors Than Those Present At The Time Measurements Were Made. A.C. = After coring; N.R. = Not Recorded.
3) Sample Type Coding: A=Auger; C=Core; D=Driven; G=Grab; PS=Piston Sampler; SS=Split Barrel (Split Spoon); ST=Shelby Tube; Geo=GeoProbe V=Vane; WOR/H=Weight of Rod/Hammer
4) Proportions Used: Trace = 1-10%; Little = 10-20%; Some = 20-35%; And = 35-50%
5) Stratification lines represent approximate boundary between material types, transitions may be gradual.

Boring No.: **B-2**

Vanasse Hangen Brustlin, Inc.

PROJECT NAME:	HUBBARDTON
PROJECT NUMBER:	ER STP 0161(27)
FILE NAME: zllc290borlogs.dgn	PLOT DATE: 7/16/2012
PROJECT LEADER: M.A. COLGAN	DRAWN BY: E.A. FIALA
DESIGNED BY: VTRANS	CHECKED BY: S.G. FARNSWORTH
BORING LOGS (2 OF 2)	SHEET 59 OF 70



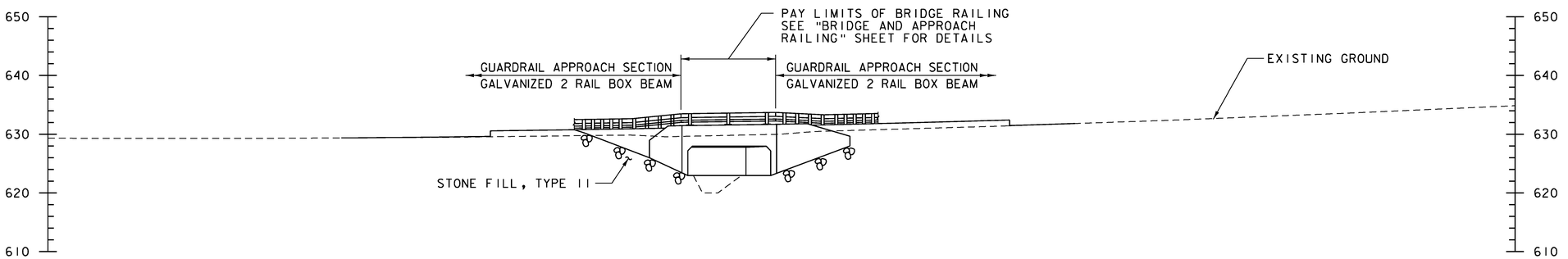
PLAN

SCALE 1" = 10'-0"

NOTE:

EXISTING SURVEY FEATURES AND EXISTING CONTOURS ARE BASED ON SURVEY CONDUCTED IN DECEMBER 2011. THE ORIGINAL 1957 4'x8' CULVERT HAS SINCE BEEN REPLACED WITH TWO 48" DIAMETER PIPE CULVERT AND THE SLOPES REGRADED.

** - T-WALL PRECAST CONCRETE RETAINING WALL SYSTEM SHOWN. SEE NOTE 6 ON THE PROJECT NOTES SHEET FOR ALTERATE PRECAST CONCRETE RETAINING WALL SYSTEM.



ELEVATION AT UPSTREAM FASCIA

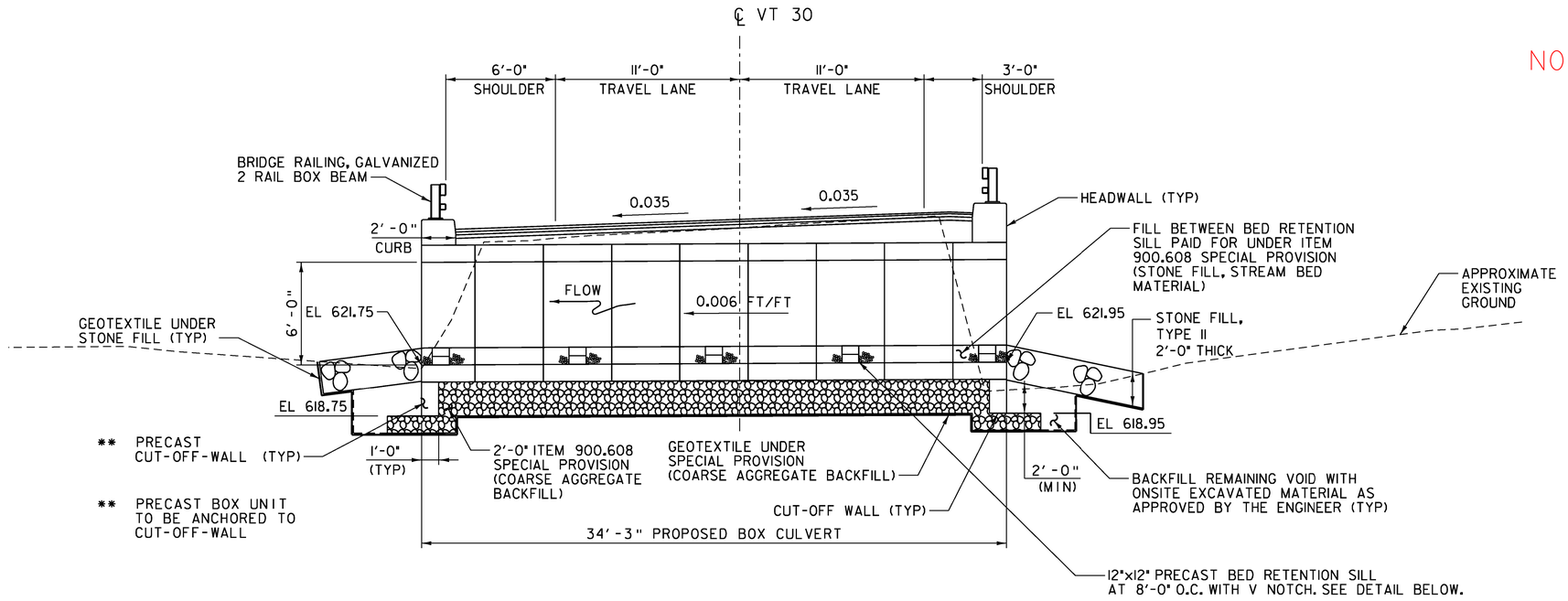
SCALE 1" = 10'-0"

Vanasse Hangen Brustlin, Inc.

PROJECT NAME:	HUBBARDTON
PROJECT NUMBER:	ER STP 0161(27)
FILE NAME: z11c290plan.dgn	PLOT DATE: 7/16/2012
PROJECT LEADER: M.A. COLGAN	DRAWN BY: E.A. FIALA
DESIGNED BY: S.G. FARNSWORTH	CHECKED BY: S.G. FARNSWORTH
PLAN AND ELEVATION	SHEET 60 OF 70

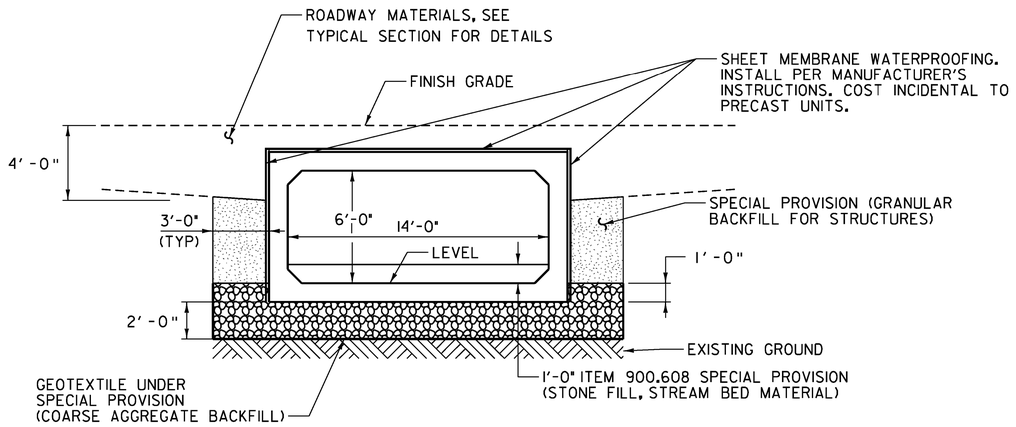
VHB 57478.02

NOTE: SEE FINAL APPROVED SHOP DRAWINGS FOR DETAILS ON PRECAST BOX AND WINGWALLS INC. ELEVATIONS



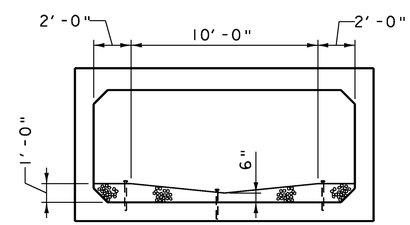
LONGITUDINAL SECTION

SCALE: 1/4" = 1'-0"



TYPICAL CULVERT SECTION

SCALE: 1/4" = 1'-0"



12" PRECAST BED RETENTION SILL SHALL HAVE A POSITIVE CONNECTION TO PRECAST BOX

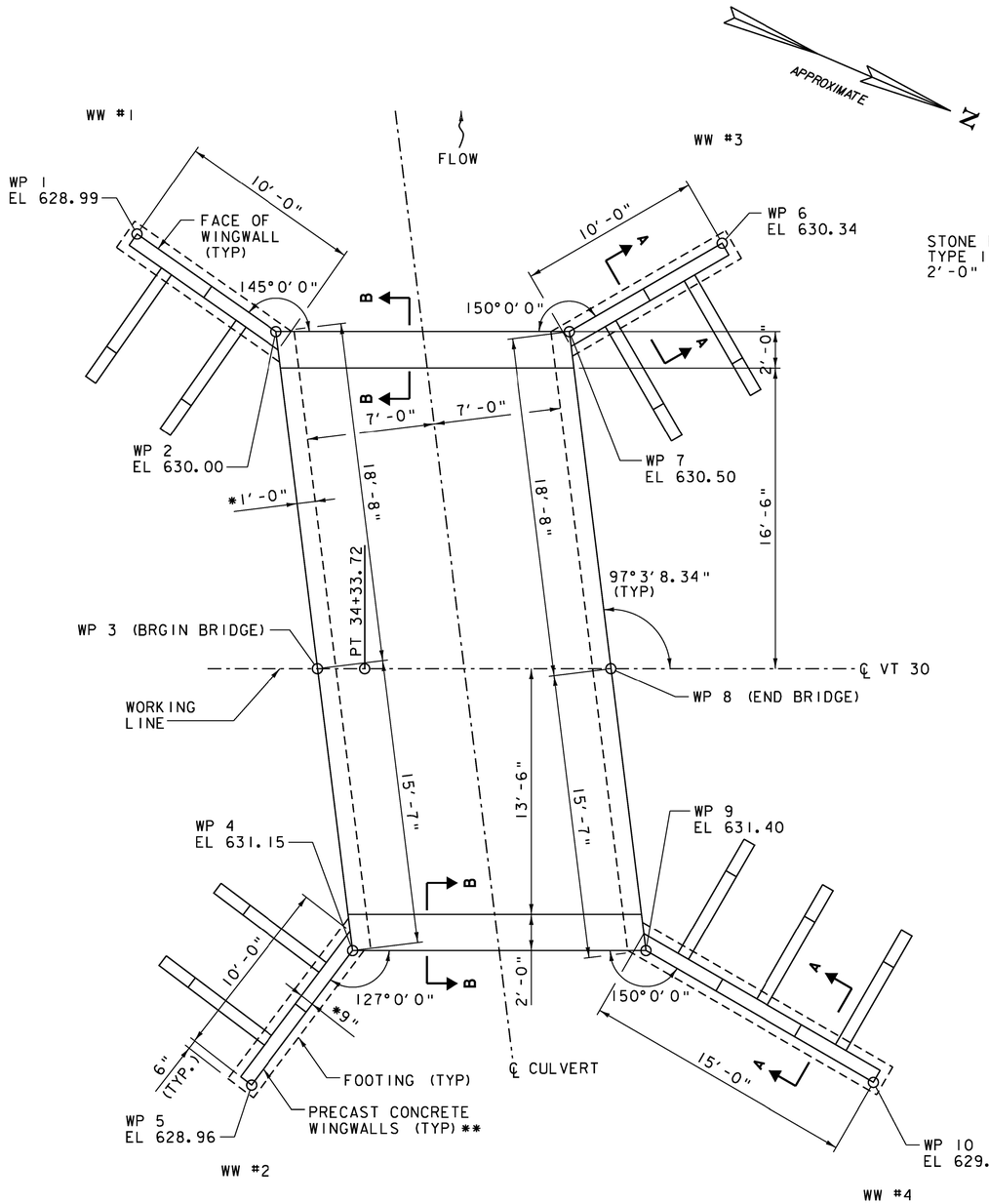
BED RETENTION SILL

SCALE: 1/4" = 1'-0"

1 0 2 4 6
SCALE

VHB Vanasse Hangen Brustlin, Inc.

PROJECT NAME:	HUBBARDTON
PROJECT NUMBER:	ER STP 0161(27)
FILE NAME: z11c290longsec.dgn	PLOT DATE: 7/16/2012
PROJECT LEADER: M.A. COLGAN	DRAWN BY: C.L. CILLEY
DESIGNED BY: S.G. FARNSWORTH	CHECKED BY: S.G. FARNSWORTH
BOX CULVERT SECTIONS	SHEET 61 OF 70



WP COORDINATES		
WP NO.	NORTHING	EASTING
1	451632.89	1460556.32
2	451642.02	1460558.23
3	451651.42	1460574.33
4	451659.29	1460587.81
5	4851657.09	1460596.77
6	451662.63	1460544.11
7	451656.83	1460551.87
8	451666.23	1460567.97
9	451674.11	1460581.46
10	451688.44	1460583.16

NOTE: SEE FINAL APPROVED SHOP DRAWINGS FOR DETAILSON PRECAST BOX AND WINGWALLS INCLUDING ELEVATIONS

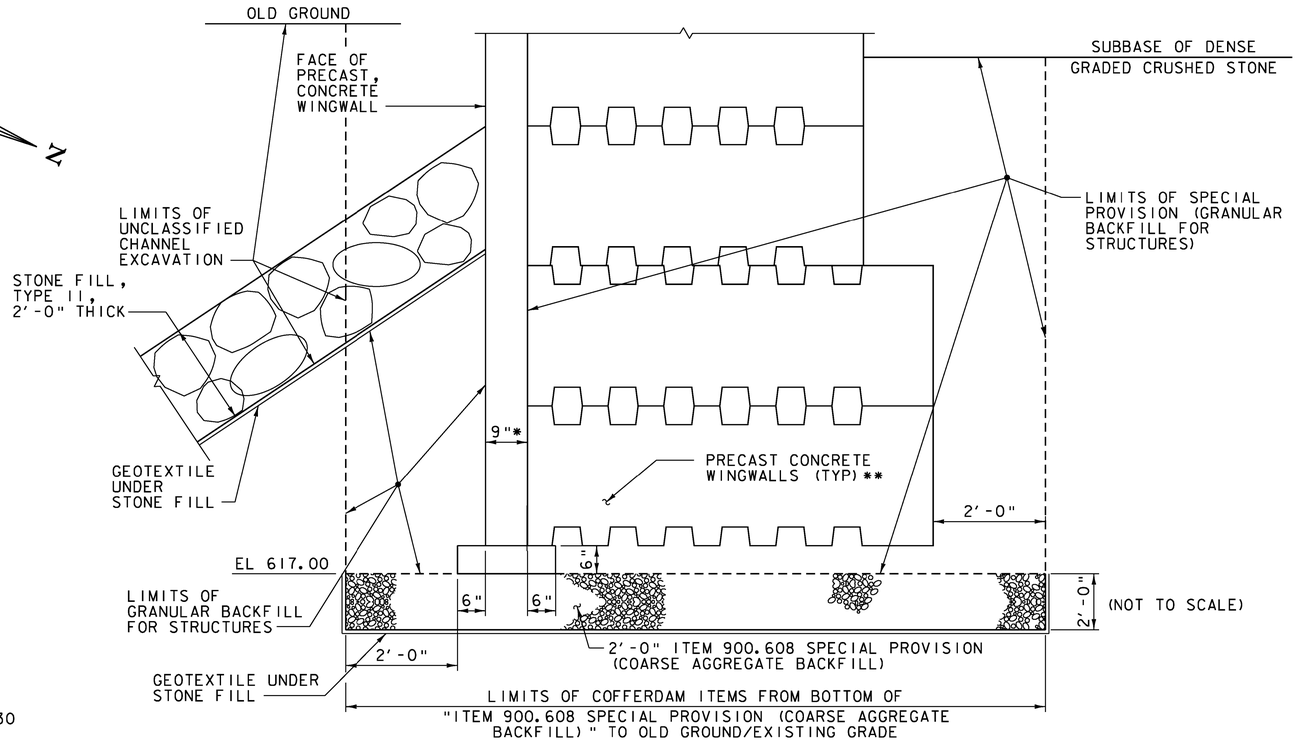
* PRECAST, PRE-ENGINEERED STRUCTURES SHALL BE DESIGNED BY THE MANUFACTURER. DIMENSIONS SHOWN ARE FOR QUANTITY PURPOSES ONLY.

BOX CULVERT PLAN

SCALE: 1/4" = 1'-0"

SCALE

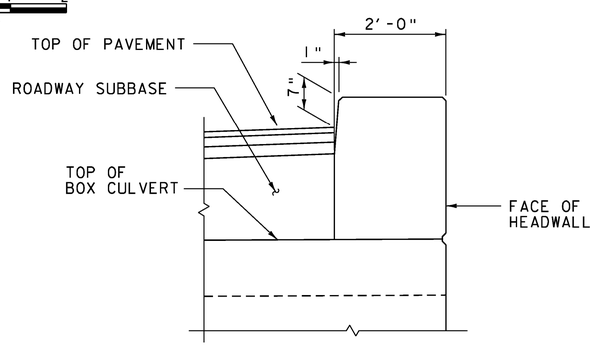
** - T-WALL PRECAST CONCRETE RETAINING WALL SYSTEM SHOWN. SEE NOTE 7 ON THE PROJECT NOTES SHEET FOR ALTERNATE PRECAST CONCRETE RETAINING WALL SYSTEM.



SECTION A-A
WINGWALL FOOTING

SCALE: 3/4" = 1'-0"

SCALE



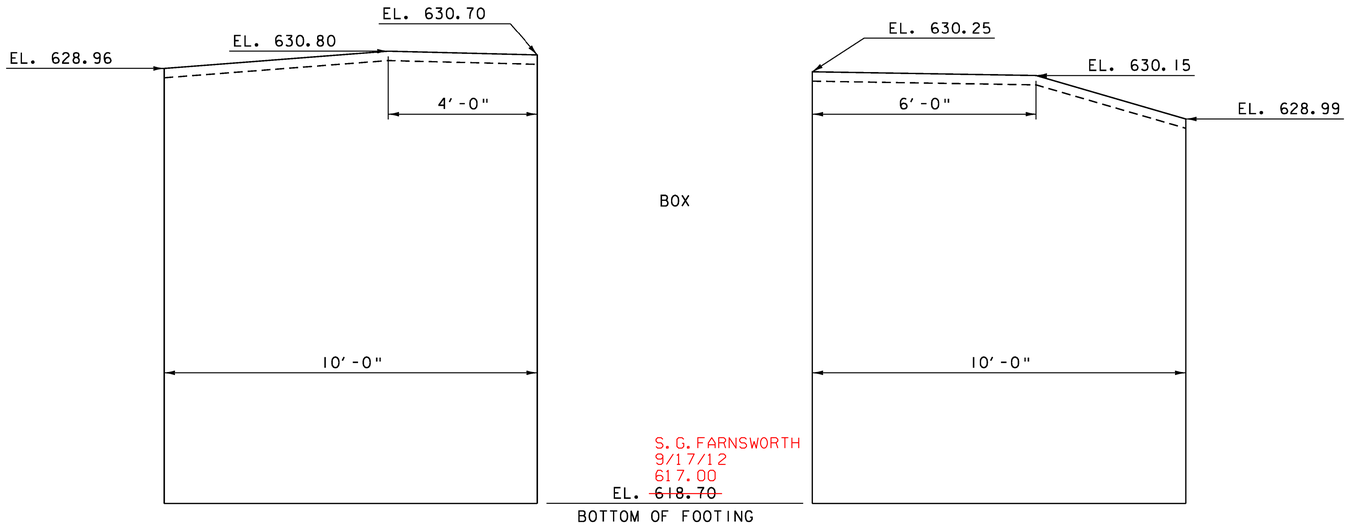
SECTION B-B
HEADWALL DETAIL

SCALE: 3/4" = 1'-0"

SCALE

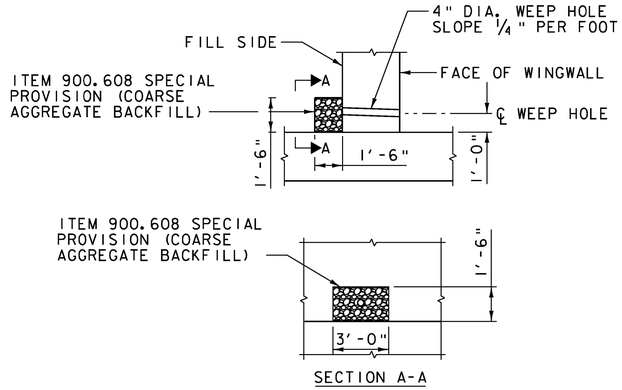
PROJECT NAME:	HUBBARDTON
PROJECT NUMBER:	ER STP 0161(27)
FILE NAME: z11c290abutdetail.dgn	PLOT DATE: 7/16/2012
PROJECT LEADER: M.A. COLGAN	DRAWN BY: C.L. CILLEY
DESIGNED BY: S.G. FARNSWORTH	CHECKED BY: S.G. FARNSWORTH
CULVERT PLAN & WINGWALL DETAILS (1 OF 2)	SHEET 62 OF 70

VHB Vanasse Hangen Brustlin, Inc.

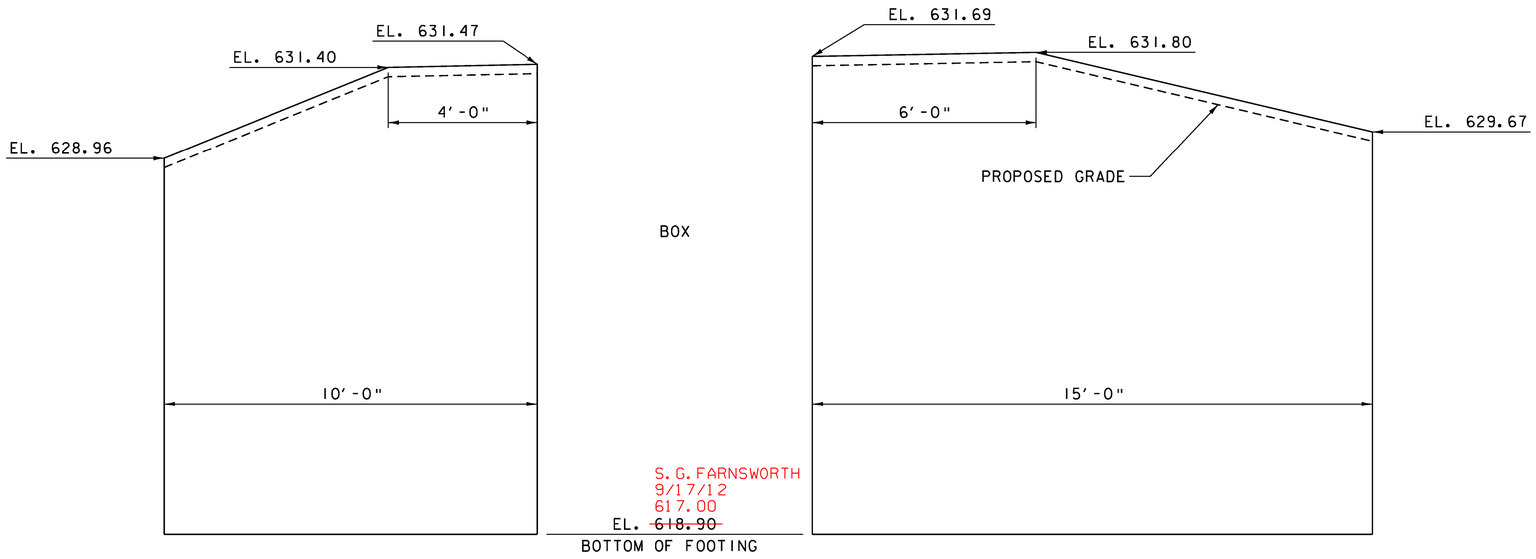


WW#3
SCALE ½" = 1'-0"

WW#1
SCALE ½" = 1'-0"



WEEPHOLE DETAILS
¼" = 1'-0"



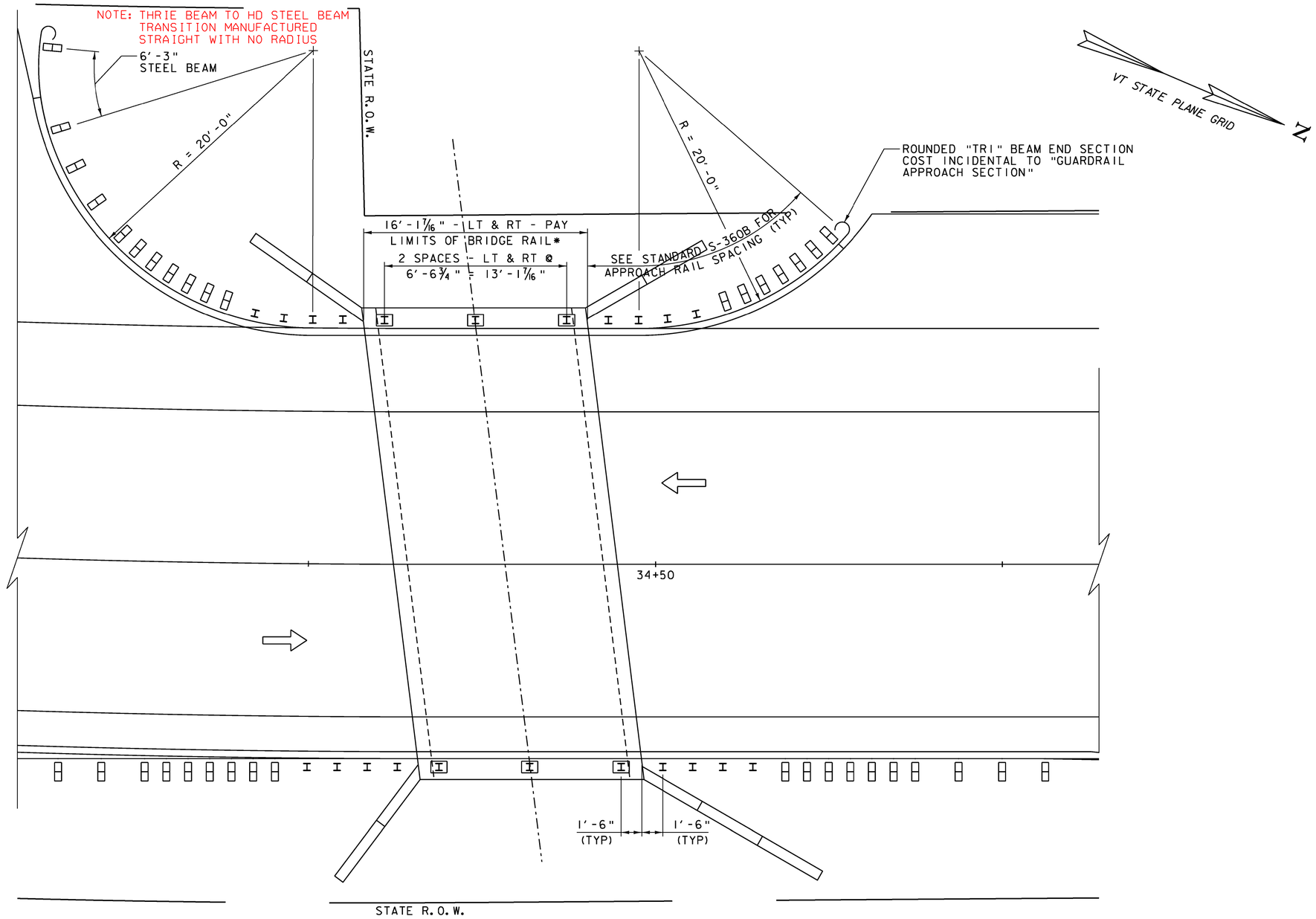
WW#2
SCALE ½" = 1'-0"

WW#4
SCALE ½" = 1'-0"

NOTE: SEE FINAL APPROVED SHOP DRAWINGS FOR DETAILS ON PRECAST BOX AND WINGWALLS INCLUDING ELEVATIONS

VHB Vanasse Hangen Brustlin, Inc.

PROJECT NAME:	HUBBARDTON
PROJECT NUMBER:	ER STP 0161(27)
FILE NAME: z11c290abutdetail.dgn	PLOT DATE: 7/26/2012
PROJECT LEADER: M.A. COLGAN	DRAWN BY: E.A. FIALA
DESIGNED BY: S.G. FARNSWORTH	CHECKED BY: S.G. FARNSWORTH
CULVERT PLAN & WINGWALL DETAILS (2 OF 2)	SHEET 63 OF 70



BRIDGE AND APPROACH RAIL

SCALE 1/4" = 1'-0"

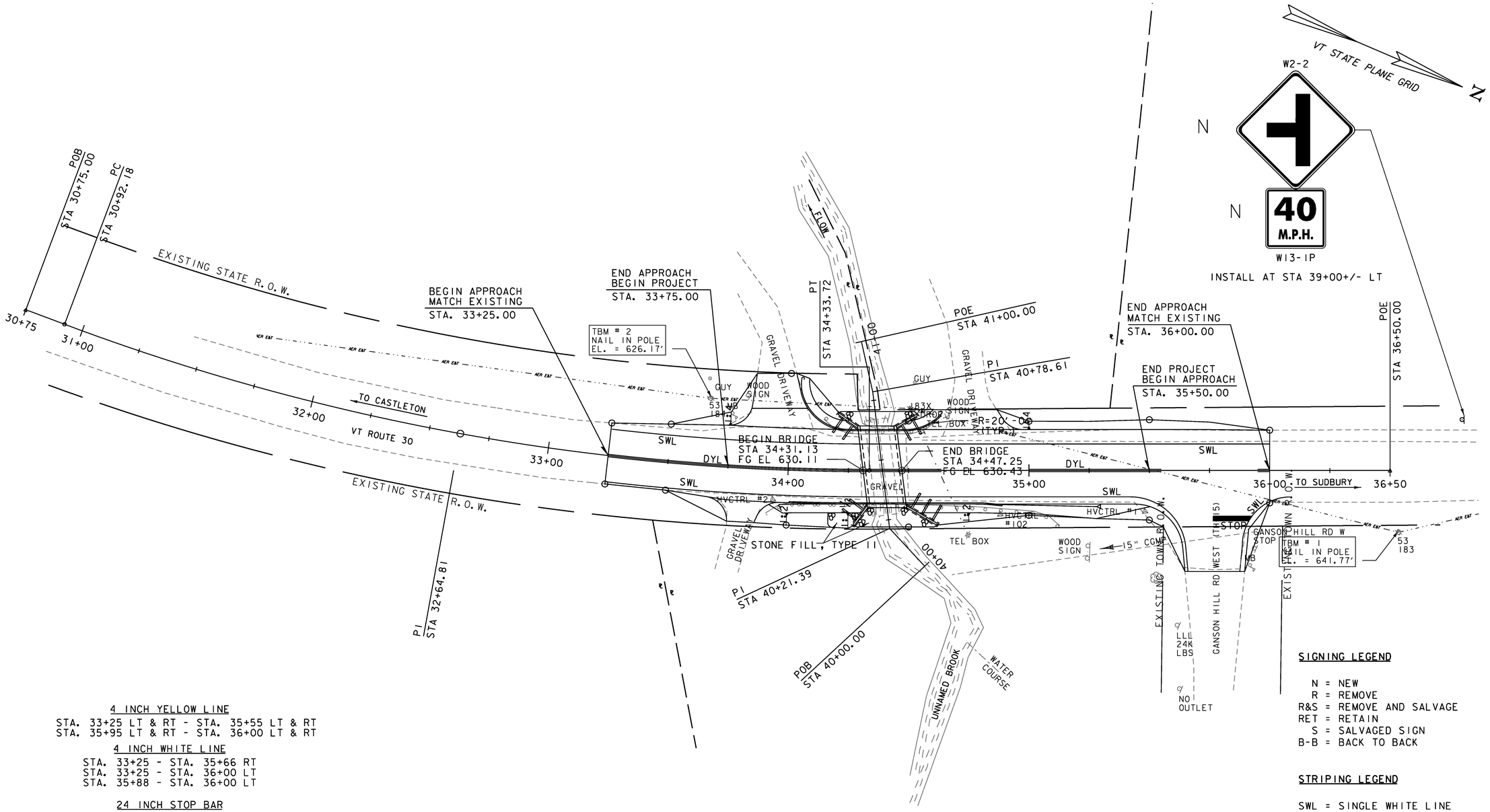
NOTE:

* - BRIDGE RAILING IS 2 RAIL BOX BEAM

PROJECT NAME:	HUBBARDTON
PROJECT NUMBER:	ER STP 0161(27)

FILE NAME: z11c290brail.dgn	PLOT DATE: 7/16/2012
PROJECT LEADER: M.A. COLGAN	DRAWN BY: E.A. FIALA
DESIGNED BY: S.G. FARNSWORTH	CHECKED BY: S.G. FARNSWORTH
BRIDGE AND APPROACH RAILING	SHEET 64 OF 70

Vanasse Hangen Brustlin, Inc.



4 INCH YELLOW LINE

STA. 33+25 LT & RT - STA. 35+55 LT & RT
STA. 35+95 LT & RT - STA. 36+00 LT & RT

4 INCH WHITE LINE

STA. 33+25 - STA. 35+66 RT
STA. 33+25 - STA. 36+00 LT
STA. 35+88 - STA. 36+00 LT

24 INCH STOP BAR

STA. 35+77 - STA. 35+93, RT

LETTER OR SYMBOL

STA. 35+85, RT (STOP)

SIGNING LEGEND

N = NEW
R = REMOVE
R&S = REMOVE AND SALVAGE
RET = RETAIN
S = SALVAGED SIGN
B-B = BACK TO BACK

STRIPING LEGEND

SWL = SINGLE WHITE LINE
SYL = SINGLE YELLOW LINE
DYL = DOUBLE YELLOW LINE
SDL = SINGLE DASHED LINE
SBL = SINGLE BROKEN LINE

NOTE:

EXISTING SURVEY FEATURES AND EXISTING CONTOURS ARE BASED ON SURVEY CONDUCTED IN DECEMBER 2011. THE ORIGINAL 1957 4'x8' CULVERT HAS SINCE BEEN REPLACED WITH TWO 48" DIAMETER PIPE CULVERTS AND THE SLOPES REGRADED.

0 20 40
SCALE

VHB Vanasse Hangen Brustlin, Inc.

PROJECT NAME: HUBBARDTON
PROJECT NUMBER: ER STP 0161(27)

FILE NAME: z11c290tsl.dgn
PROJECT LEADER: M.A. COLGAN
DESIGNED BY: S.G. FARNSWORTH
TRAFFIC SIGNS & PAVEMENT MARKINGS SHEET

PLOT DATE: 7/16/2012
DRAWN BY: J.L. LEMIEUX
CHECKED BY: S.G. FARNSWORTH
SHEET 65 OF 70

VHB 57478.02

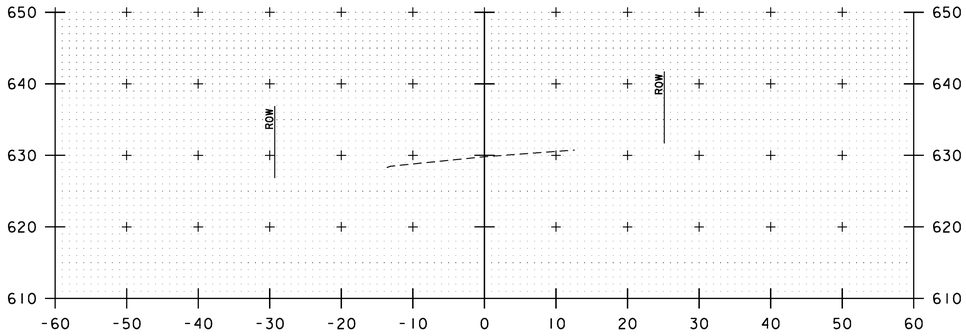
STATE OF VERMONT
AGENCY OF TRANSPORTATION

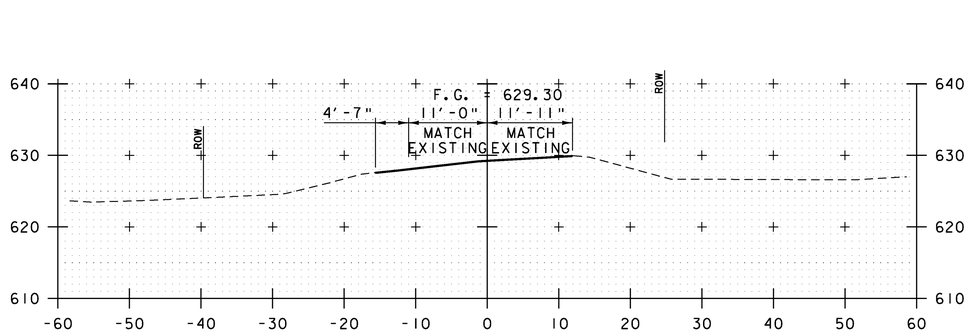
TRAFFIC SIGN SUMMARY SHEET

MILE MARKER, STATION, OR SIGN NUMBER	SIGN LEGEND	SIGN DIMENSIONS EA	WIDTH (IN)	HEIGHT (IN)	NEW & SALVAGED SIGNS "A"	"B"	SALV SIGN	SALV TIS	EXIST POST RETAIN	SALVAGE	NEW SIGN POSTS NO. OF POSTS	FLANGED CHANNEL LB/FT 1.12	2.0	3.0	SQUARE STEEL (IN) LB/FT 1.75 1.88	2.0 2.42	2.5 3.35	ANCHOR	SLEEVE	TUBULAR ALUMINUM Ø (IN) LB/FT 3.0 1.3	4.0 1.7	4.0 MOD 1.7	FOUNDATION	TUBULAR STEEL Ø (IN) LB/FT 3.0 7.6	3.5 9.0	4.0 10.8	5.0 14.6	W-SHAPE STEEL FTG. SIZE 24"	30"	WEIGHT	POST SIZE	SIGN FRAME REQUIRED	REMARKS	SIGN DETAIL DETAIL ON SHEET NUMBER	STD. SHEET NUMBER
OPTION ITEMS																																			
VT 30																																			
39+00, LT		1	30	30	6.25						1					~~X~~ 15.8																	W2-2		E-155
		1	18	18	2.25																												W13-1P		E-155
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."												FT	FT	FT	FT	FT ~~15~~ 15.8	FT		EA	LB	LB	LB		LB	LB	LB	LB								
	TOTALS				SF 8.5	SF	EA.	SF				FT			FT	~~15~~ 15.8				LB			EA.	LB				EA.	EA.	LB					

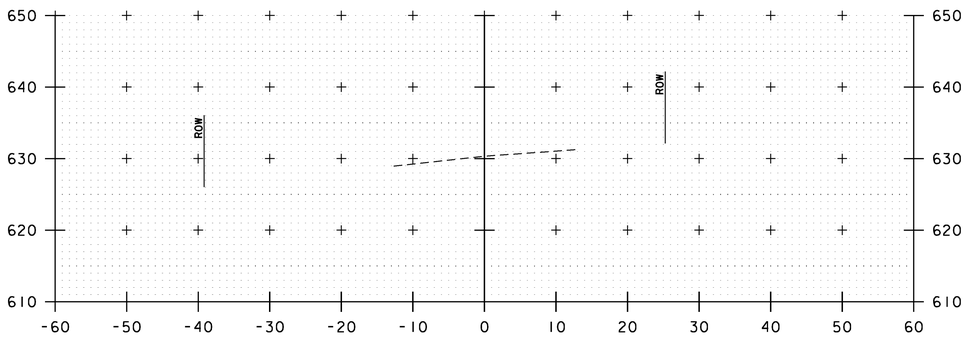
VHB Vanasse Hangen Brustlin, Inc.

PROJECT NAME:	HUBBARDTON
PROJECT NUMBER:	ER STP 0161(27)
FILE NAME: z11c290tss.dgn	PLOT DATE: 7/16/2012
PROJECT LEADER: M.A. COLGAN	DRAWN BY: E.A. FIALA
DESIGNED BY: E.A. FIALA	CHECKED BY: S.G. FARNSWORTH
TRAFFIC SIGN SUMMARY SHEET	SHEET 66 OF 70

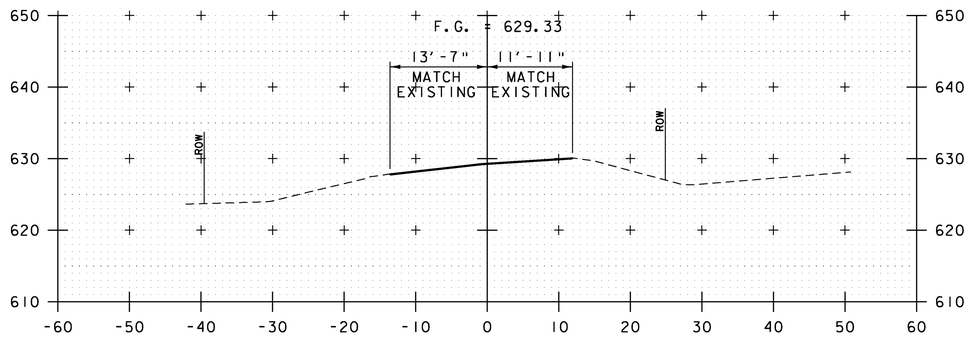




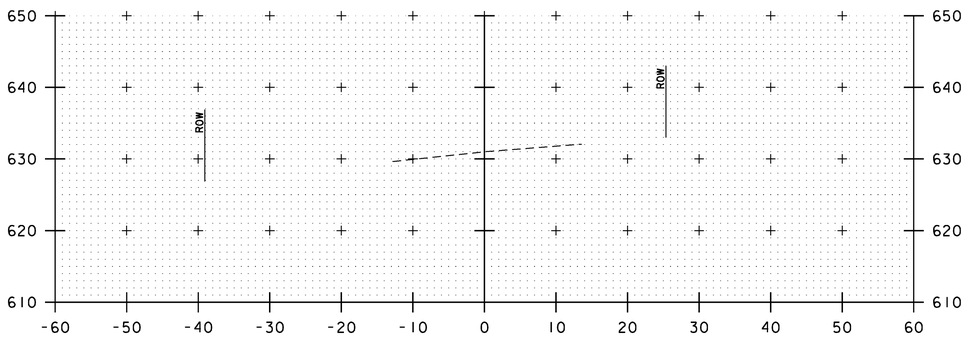
32+75



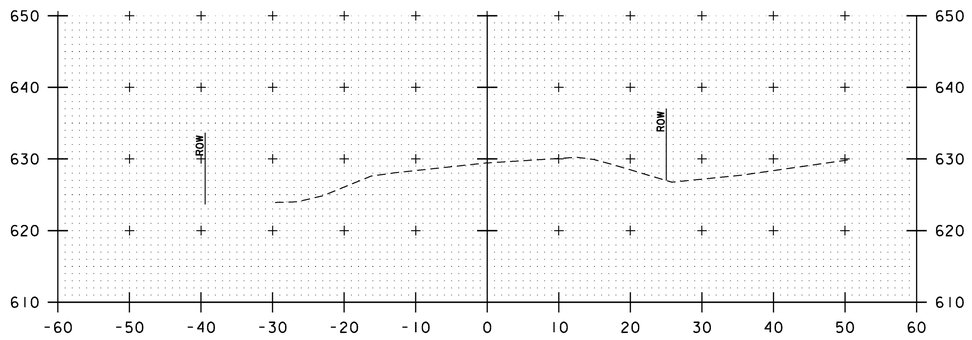
33+50



32+50



BEGIN APPROACH
33+25



32+25

33+00

0 10 20
SCALE

ROADWAY CROSS SECTIONS

SCALE 1"=10'-0"

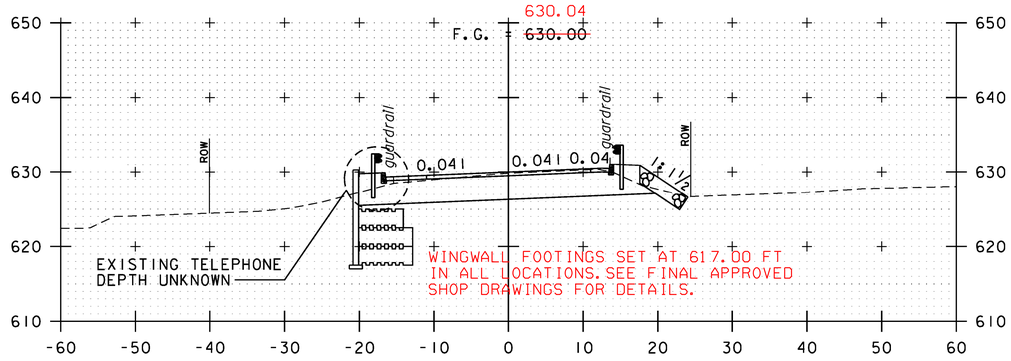
STA. 32+25 TO STA. 33+50

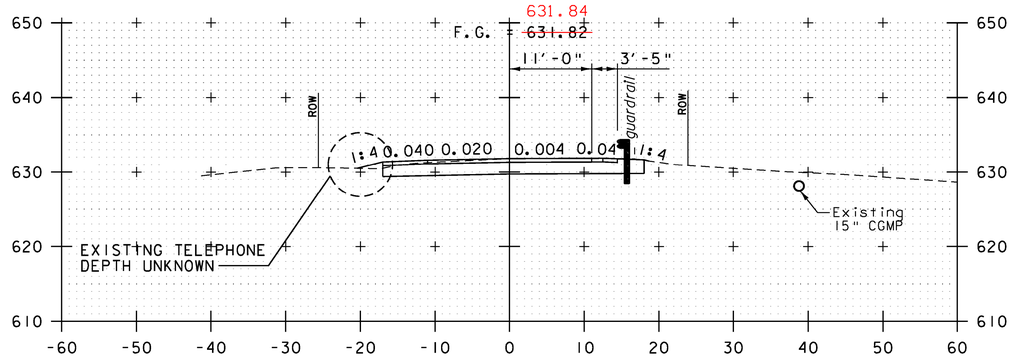
VHB Vanasse Hangen Brustlin, Inc.

PROJECT NAME:	HUBBARDTON
PROJECT NUMBER:	ER STP 0161(27)
FILE NAME: z11c290xs_01.dgn	PLOT DATE: 7/16/2012
PROJECT LEADER: M.A. COLGAN	DRAWN BY: C.L. CILLEY
DESIGNED BY: S.G. FARNSWORTH	CHECKED BY: S.G. FARNSWORTH
ROADWAY CROSS SECTIONS (1 OF 3)	SHEET 67 OF 70

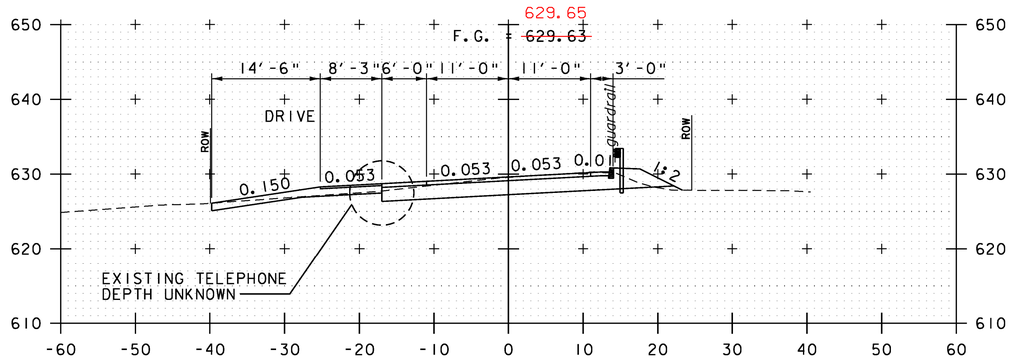
VHB 57478.02

STA 34+31.13 BEGIN BRIDGE

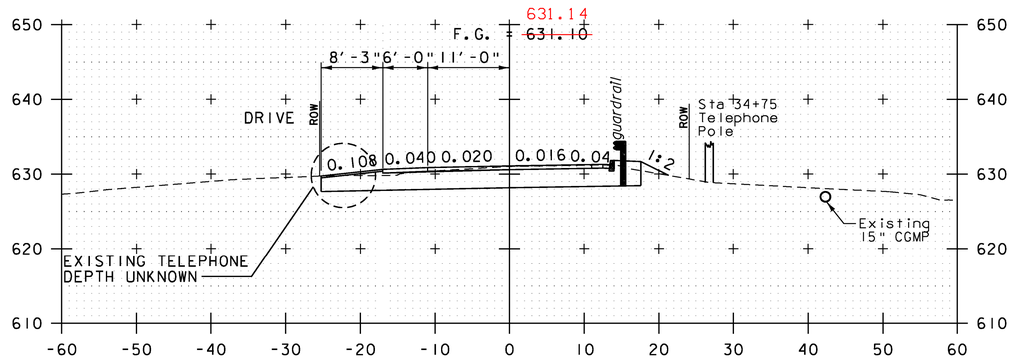




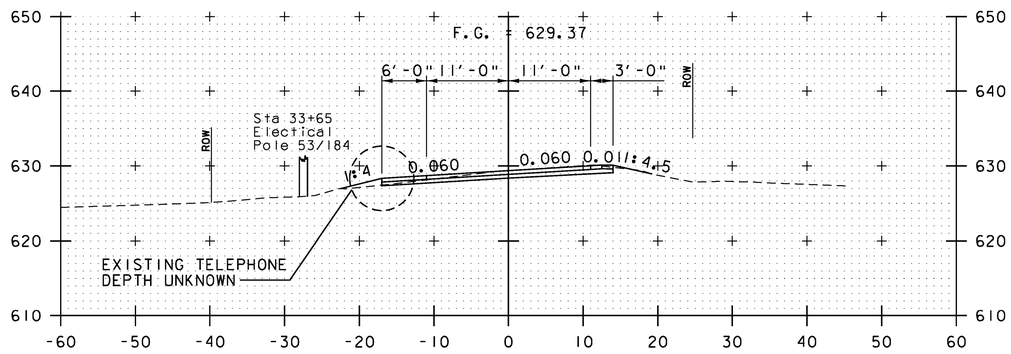
34+25



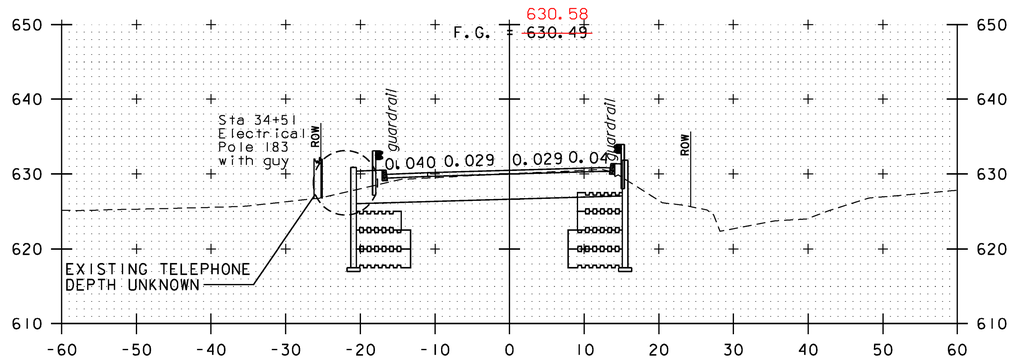
35+00



34+00



34+75



BEGIN PROJECT 33+75

34+50 STA 34+47.25 END BRIDGE

0 10 20
SCALE

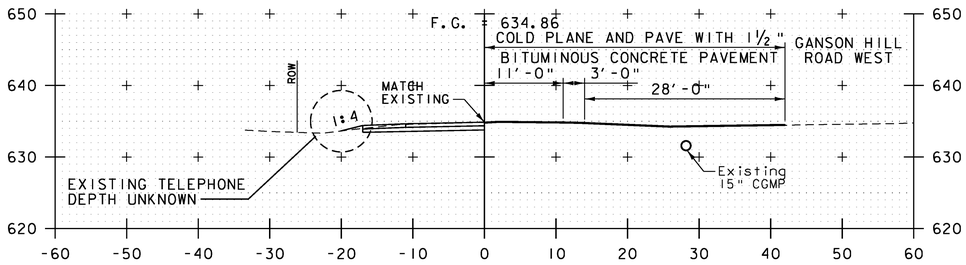
* ROADWAY CROSS SECTIONS
SCALE 1"=10'-0"

STA. 33+75 TO STA. 35+00

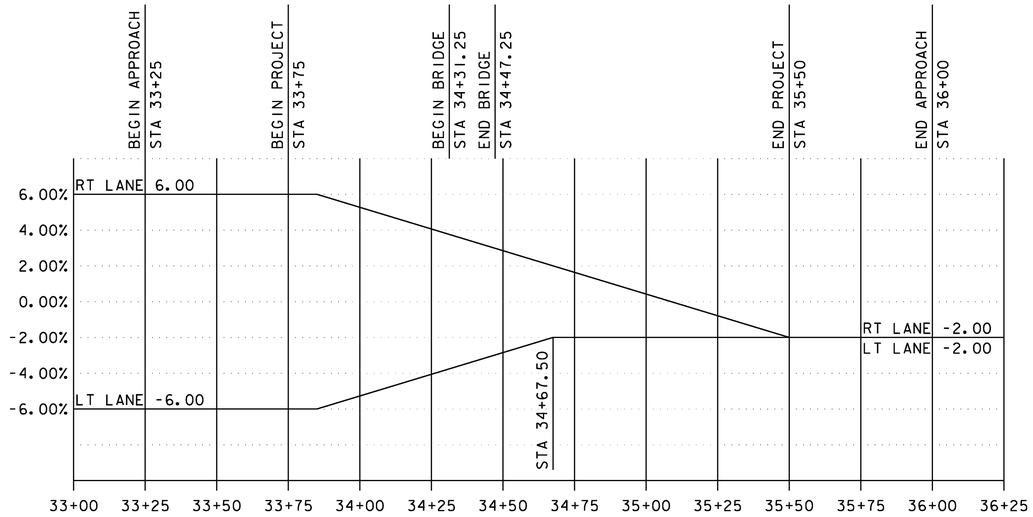
•NOTE: AS BUILT F.G. ELEVATIONS ARE BASED ON RAISED STRUCTURE. SUBGRADE ELEVATIONS ARE BASED ON DESIGN F.G. ELEVATIONS

VHB Vanasse Hangen Brustlin, Inc.

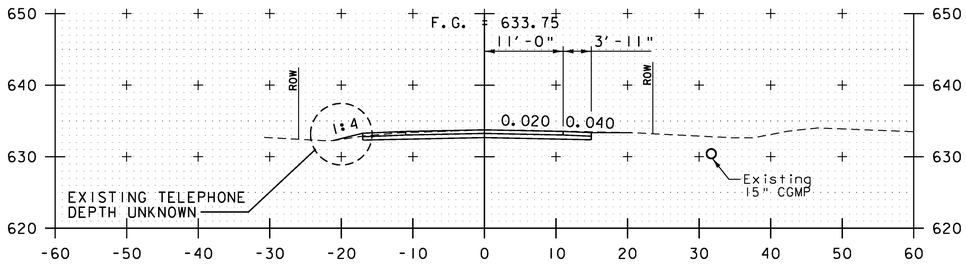
PROJECT NAME:	HUBBARDTON
PROJECT NUMBER:	ER STP 0161(27)
FILE NAME: z11c290xs_02.dgn	PLOT DATE: 7/16/2012
PROJECT LEADER: M.A. COLGAN	DRAWN BY: C.L. CILLEY
DESIGNED BY: S.G. FARNSWORTH	CHECKED BY: S.G. FARNSWORTH
ROADWAY CROSS SECTIONS (2 OF 3)	SHEET 68 OF 70



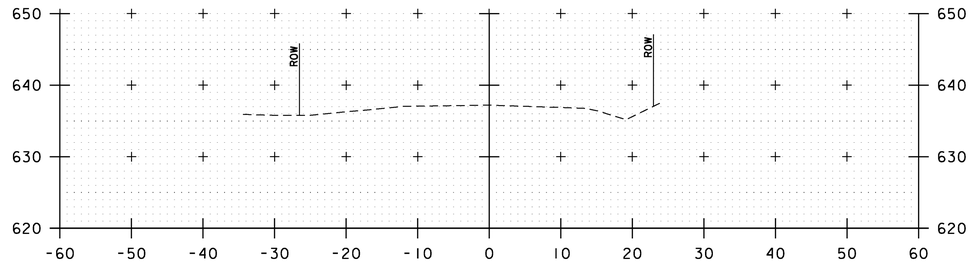
35+75



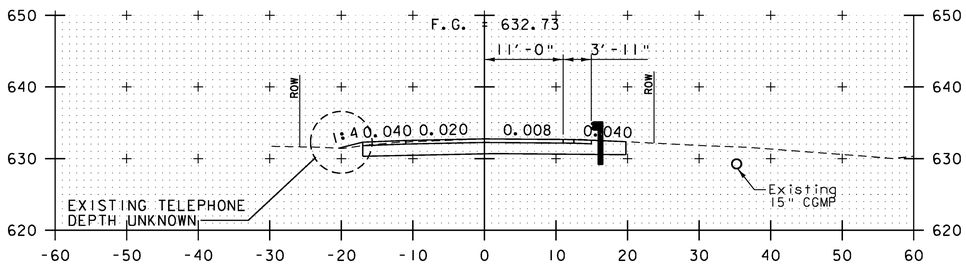
SUPERELEVATION DIAGRAM
NOT TO SCALE



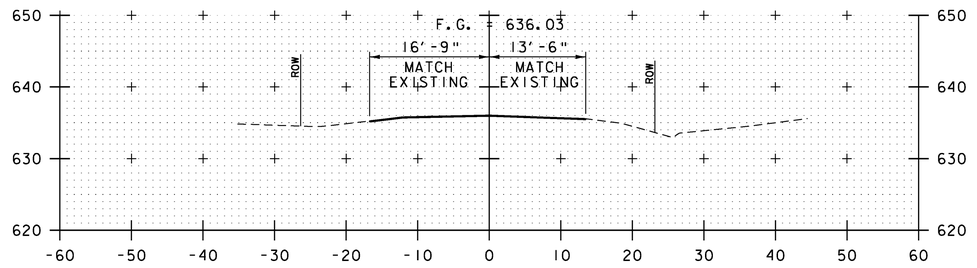
END PROJECT
35+50



36+25



35+25



END APPROACH
36+00

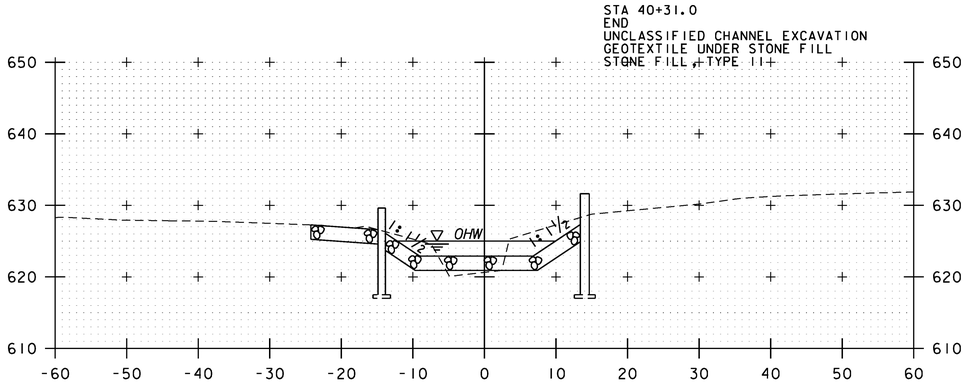
ROADWAY CROSS SECTIONS
SCALE 1"=10'-0"
STA. 35+25 TO STA. 36+25

0 10 20
SCALE

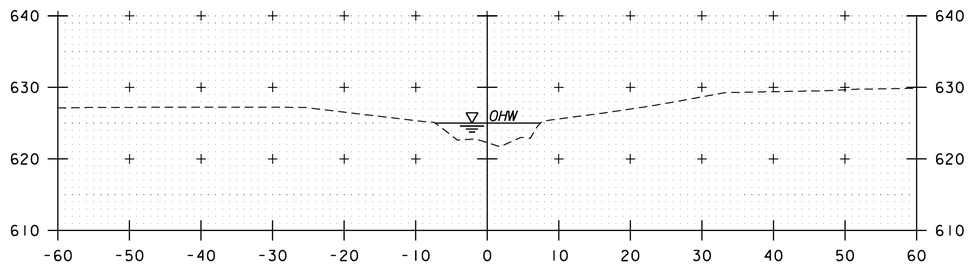
Vanasse Hangen Brustlin, Inc.

PROJECT NAME:	HUBBARDTON
PROJECT NUMBER:	ER STP 0161(27)
FILE NAME: z11c290xs_03.dgn	PLOT DATE: 7/16/2012
PROJECT LEADER: M.A. COLGAN	DRAWN BY: C.L. CILLEY
DESIGNED BY: S.G. FARNSWORTH	CHECKED BY: S.G. FARNSWORTH
ROADWAY CROSS SECTIONS (3 OF 3)	SHEET 69 OF 70

VHB 57478.02

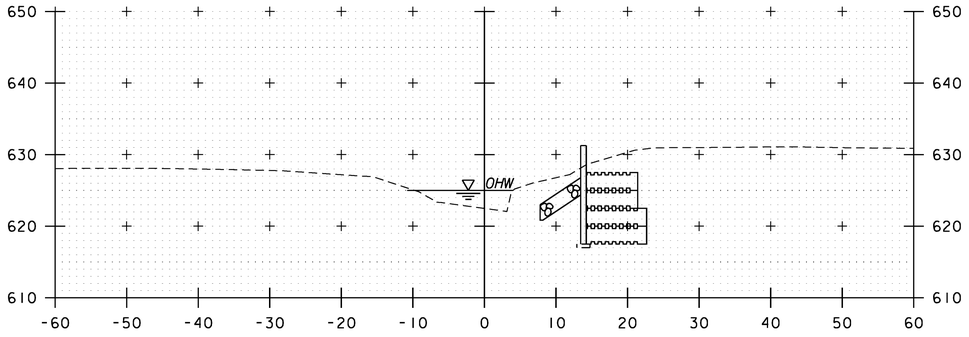


STA 40+31.0
END
UNCLASSIFIED CHANNEL EXCAVATION
GEOTEXTILE UNDER STONE FILL
STONE FILL, TYPE II



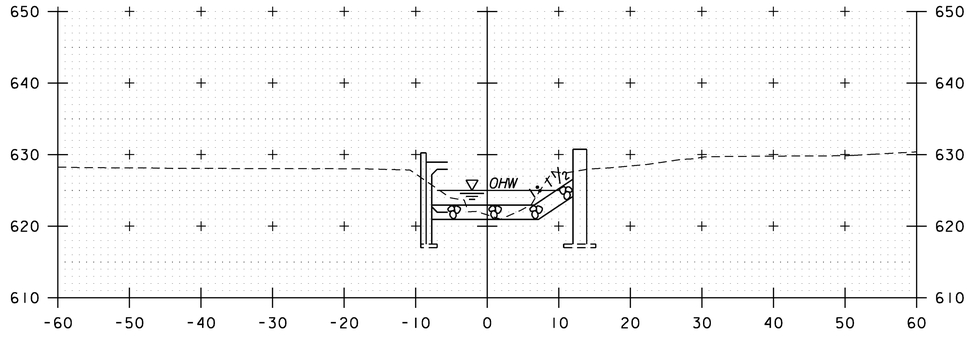
40+25

STA 40+09.5
BEGIN
UNCLASSIFIED CHANNEL EXCAVATION
GEOTEXTILE UNDER STONE FILL
STONE FILL, TYPE II

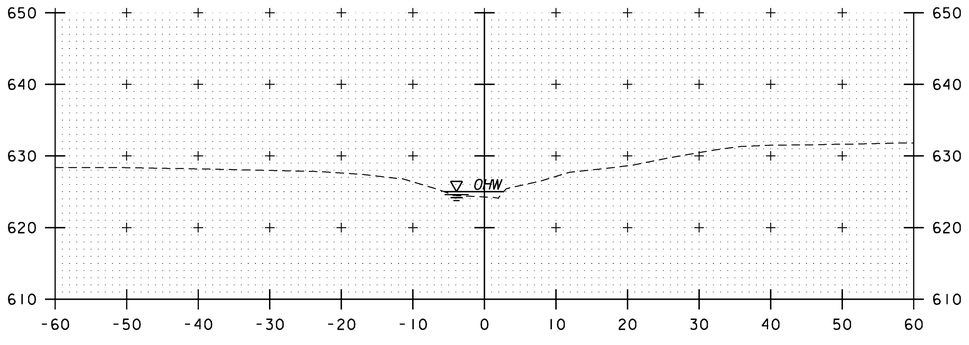


40+75

STA 40+72.1
END UNCLASSIFIED CHANNEL EXCAVATION
GEOTEXTILE UNDER STONE FILL
STONE FILL, TYPE II

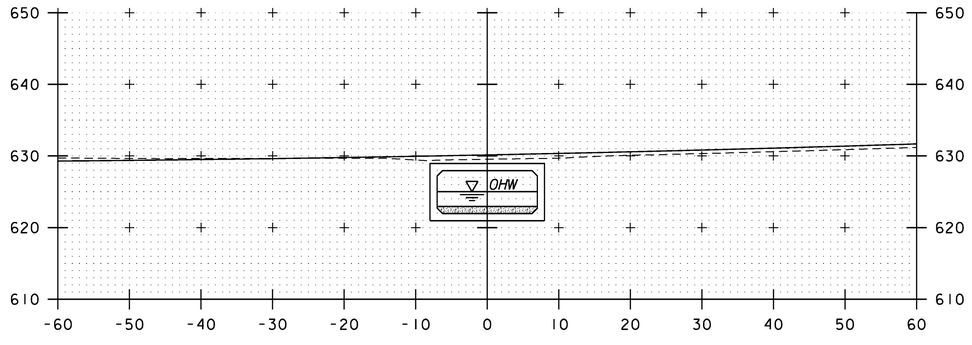


40+15



40+65

STA 40+63.3
BEGIN
UNCLASSIFIED CHANNEL EXCAVATION
GEOTEXTILE UNDER STONE FILL
STONE FILL, TYPE II



40+00

40+50

0 10 20
SCALE

CHANNEL CROSS SECTIONS

SCALE 1"=10'-0"

STA. 40+00 TO STA. 40+75

VHB Vanasse Hangen Brustlin, Inc.

PROJECT NAME:	HUBBARDTON
PROJECT NUMBER:	ER STP 0161(27)
FILE NAME: z11c290chxs_01.dgn	PLOT DATE: 7/16/2012
PROJECT LEADER: M.A. COLGAN	DRAWN BY: C.L. CILLEY
DESIGNED BY: S.G. FARNSWORTH	CHECKED BY: S.G. FARNSWORTH
CHANNEL CROSS SECTIONS	SHEET 70 OF 70

VHB 57478.02

VHB *Vanasse Hangen Brustlin, Inc.*

Transportation | Land Development | Environmental Services

October 16, 2012

Ref: 57478.01

Mr. Christopher M. Vick, P.E.
Concrete Systems, Inc.
9 Commercial Street
Hudson, NH 03051

Re: CSI Job No. C21377 -
Hubbardton ER STP 0161(26) - Bridge 96 – 32' x 10' Precast Frame & T-Walls
J. A. McDonald - General Contractor

Dear Mr. Vick:

The following **Precast Frame and T-Wall details [Item # 540.10 PRECAST CONCRETE STRUCTURE (32'- 0" x 10'-0" x 40'- 0" FRAME OR ARCH]** for the above project transmitted with CSI emails as noted below have been reviewed and are being returned herewith.

Precast Concrete Box, Revised Plans 2 submitted by email on 10-12-2012 at 3:45 PM

1. Revised(2) Sheet 1A of 1A, dated 10/12/2012, Furnish as corrected
2. Penn Insert Corp – 1" Diameter Bolt Pocket Former- submitted 10-16-2012, 1 of 2 , is Approved
3. Penn Insert Corp – 1" Diameter Bolt Pocket Former- submitted 10-16-2012, 2 of 2 , is Approved
4. Revised (2) Sheet 1 of 2, Drawing 21377-F1, dated 10-12-2012, is Approved
5. Revised(2) Sheet 2 of 2, Drawing 21377-F2, dated 10-12-2012, is Approved
6. Revised(1) Sheet 1A of 7A, dated 10-12-2012, is Approved
7. Revised (1) Sheet 2A of 7A, dated 10-12-2012, is Approved
8. Revised(1) Sheet 3A of 7A, dated 10-12-2012, is Approved
9. Revised (1) Sheet 4A of 7A, dated 10-12-2012, is Approved
10. Revised (1) Sheet 5A of 7A, dated 10-12-2012, is Approved
11. Revised (1) Sheet 6A of 7A, dated 10-12-2012, is Approved
12. Revised (1) Sheet 7A of 7A, dated 10-12-2012, Furnish as corrected

Side note to distribution list: The above fabrication plans call for Water repellant, Silane to be applied by CSI at the plant, however there has been an email or two that Water repellant might be applied instead after installation.

Precast Wall System - Concrete T-Walls – The Neel Company - Plans submitted on 10-02-2012

1. Sheets :1, 2, 5, and 6, dated 9-27-2012, are Approved as of 10-4-2012
2. Sheets : 3 and 4, dated 9-27-2012, are Furnish as Corrected as of 10-4-2012

You must provide notice to VTrans Structural Concrete Engineer, Jim Wild, as to the date fabrication represented by these drawings will begin. **A minimum of five working days notification must be provided to the Structural Concrete**

7056 US Route 7
Post Office Box 120
North Ferrisburgh, VT 05473
802.425.7788 • FAX 802.425.7799
www.vhb.com

VHB *Vanasse Hangen Brustlin, Inc.*

Re: **CSI Job No. C21377 -**
Hubbardton ER STP 0161(26) - Bridge 96 - 32' x 10' Precast Frame & T-Walls

J. A. McDonald - contractor

Engineer, Jim Wild as per specification 540.06. You can contact Jim Wild by phone at (802) 828-6931 or email at jim.wild@state.vt.us . **Any material fabricated prior to the notification date is subject to rejection without further cause.**

Should you need any further information or have any questions, please feel free to reach me at sfarnsworth@vhb.com or at (802) 425-7788 x6423.

Very truly yours,

VANASSE HANGEN BRUSTLIN, INC.

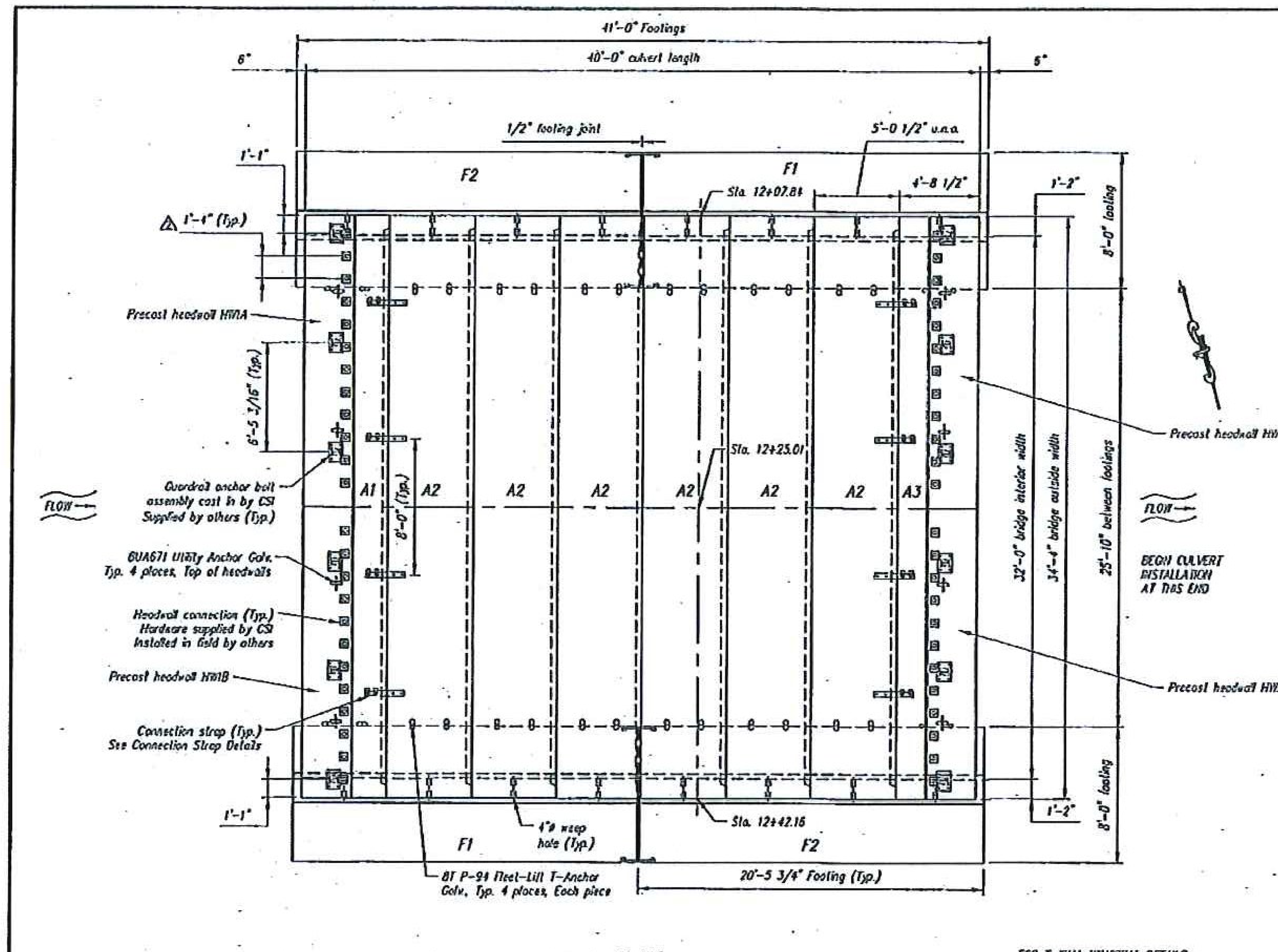
Sherward G. Farnsworth, P.E.
Senior Project Manager

SGF/sgf
Enclosures

Copy

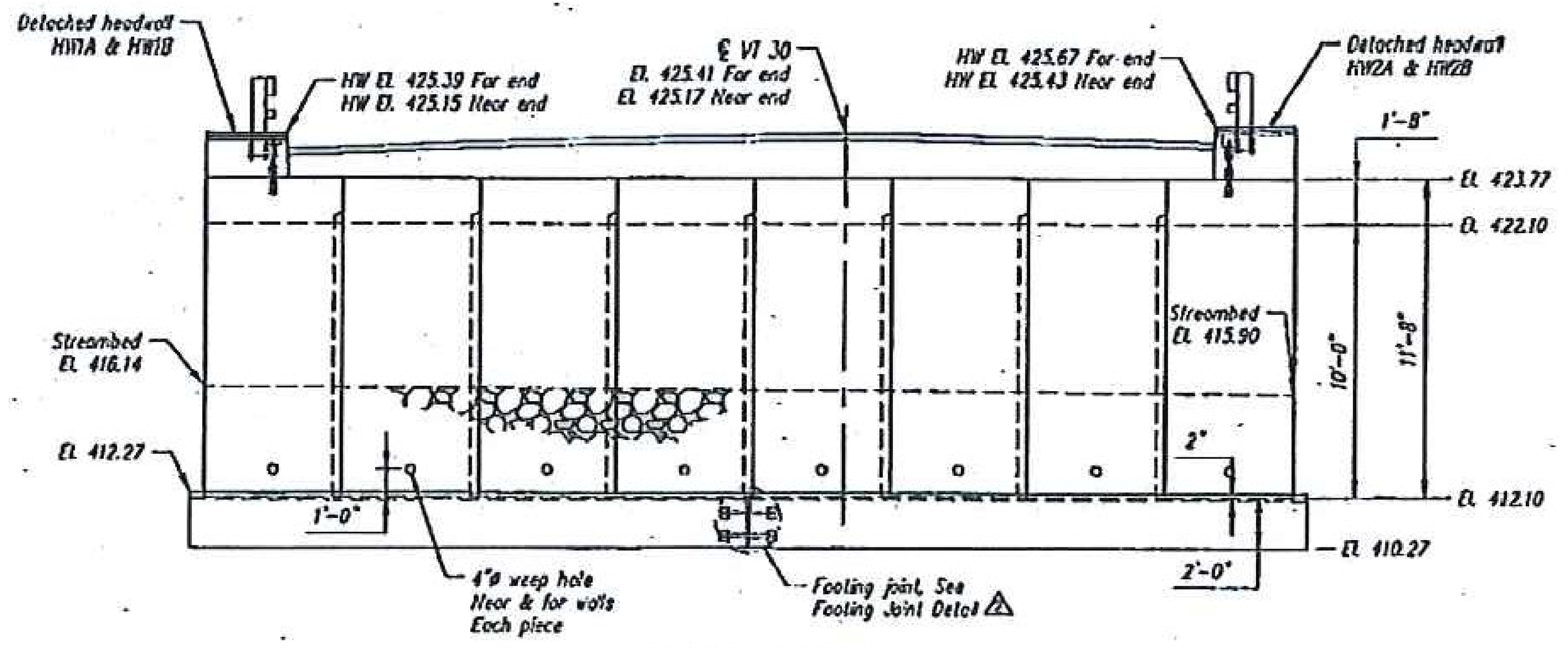
[X] VTrans Resident Engineer Tim Pockette (prints) via email & US mail
[X] Contractor JA MacDonald Att: Eric Boyden (prints) via email & US mail
[X] VTrans Regional Construction Engineer – Mark Mackintosh (letter) via email & US mail
[X] VTrans Consultant Project Manager - Mark Sargent (prints) via email & US mail
[X] VTrans Materials & Research Section (C&IA Unit) Att: Chris Rea – (Letter only)) via email & US mail –
--- Note Chris – Water Repellant, Silane (Vexcon Chemicals, Inc – Certi-Vex Penseal 244) is a conditional approval for 2012 --- being used at CSI

[X] VTrans Project Engineer: Stephen Kent via email & US mail
[X] VTrans Structural Concrete Engineer – Jim Wild (prints) via email & US mail
[X] VHB Project Manager – Sherward Farnsworth - Project electronic files 57478.01

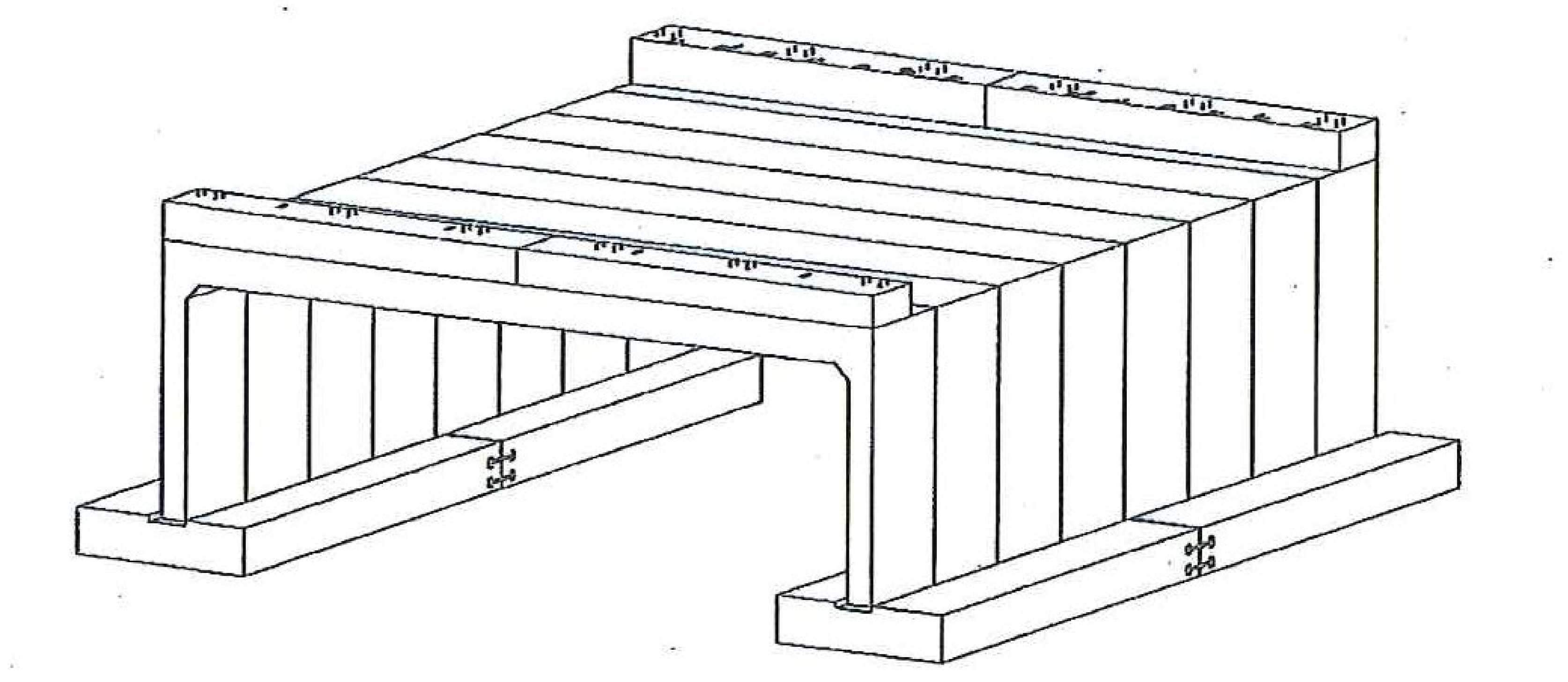


△ PLAN

FOR T-WALL WINGWALL DETAILS SEE THE NEEL CO. DRAWINGS



△ SIDE ELEVATION



△ ISOMETRIC VIEW LOOKING DOWNSTREAM

GENERAL NOTES:

1. Reference Standards:
   - AASHTO "LRFD Bridge Design Specifications"
   - ASTM C1504
2. Design Parameters:
   - Live load: HL-93
   - Earth Cover: 1.5 to 2' (Road Vehicles); None (Construction Vehicles equivalent to HS20)
   - Concrete: Design strength f'c = 5000 psi (Culvert); Design strength f'c = 4000 psi (Cut-off walls); Unit weight = 150 pcf; △ Stripping strength = 2500 psi; Shipping strength per VTrans Specifications
   - Reinforcing: ASTM A775 (rebar), grade 60, epoxy
   - Soil: Unit weight = 140 pcf; Minimum lateral pressure coefficient .25; Maximum lateral pressure coefficient .50
   - Cover to reinforcing: 2" headwalls & footings; 2" outside faces of culvert; 1 1/2" elsewhere u.n.o.
3. Dimensions include a joint creep. Actual culvert piece length is ½" shorter than shown (i.e. A1 = 5'-0").
4. No dampproofing or waterproofing supplied by CSI. Membrane waterproofing supplied and installed by others
5. DBS are Dowel Bar Splicers and DI are Dowel Ins. Both are supplied by CSI.
6. Headwall attachments designed for TL-4 impact load.
7. △ Water repellant by CSI on all exposed faces of culvert and headwalls to 1' below grade and inside culvert ends. Water repellant to be Vexcon Certi-Vex Penseal 244.

PIECE SCHEDULE (MX-FA5000SC20)

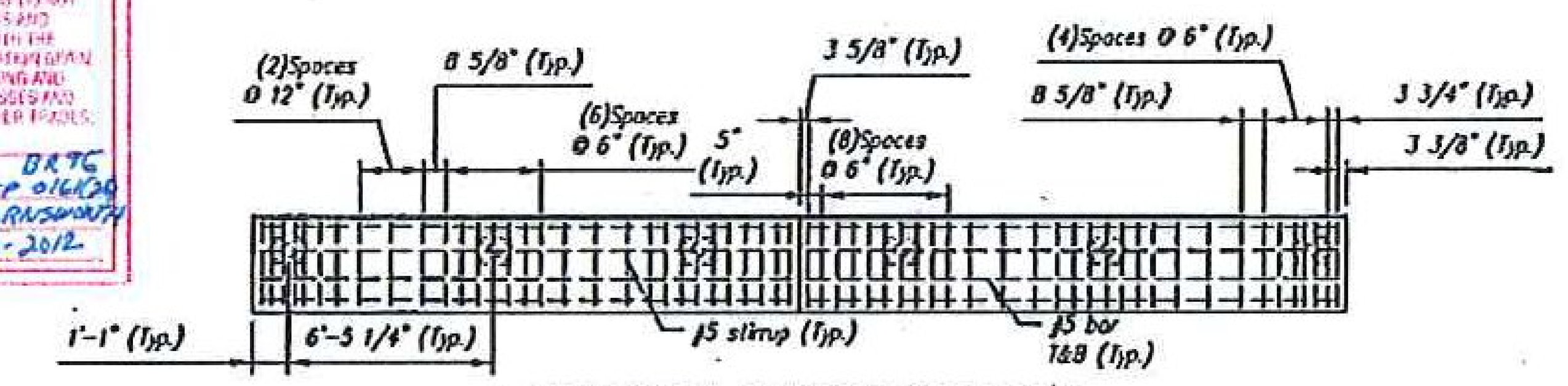
MARK	QTY	LENGTH	YDS	WEIGHT	
A1	1	5.00 '	14.65	29.67	TONS
A2	6	5.00 '	15.00	30.38	TONS
A3	1	4.71 '	14.47	29.31	TONS
F1	2	20.48 '	11.80	23.90	TONS
F2	2	20.48 '	11.80	23.90	TONS
△ HW1A	1	17.17 '	2.99	6.05	TONS
△ HW1B	1	17.17 '	2.76	5.59	TONS
△ HW2A	1	17.17 '	2.24	4.54	TONS
△ HW2B	1	17.17 '	3.47	7.03	TONS

SHOP DRAWING REVIEW

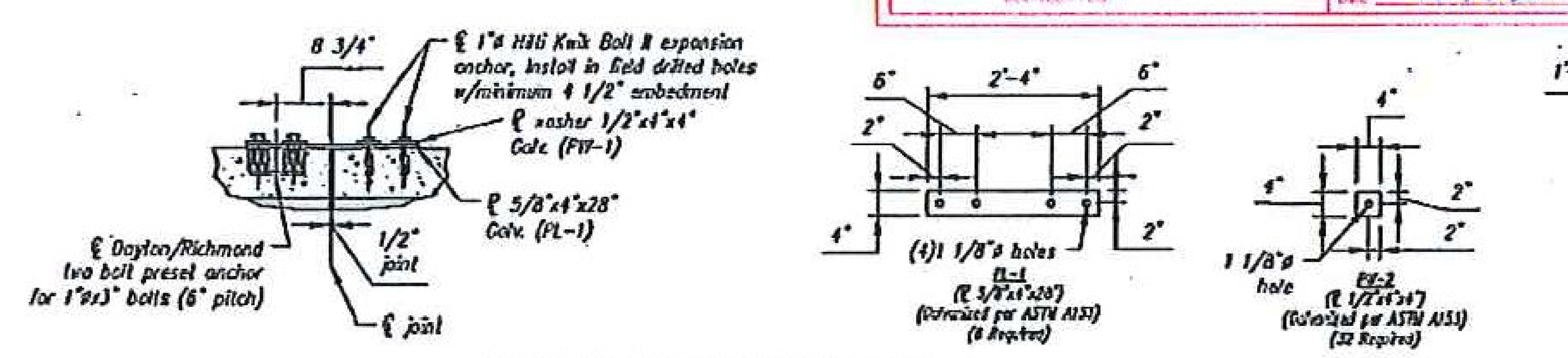
☐ [illegible]
☐ REJECTED ☐ REVISE AND RESUBMIT ☒ FURNISH AS CORRECTED

[illegible]

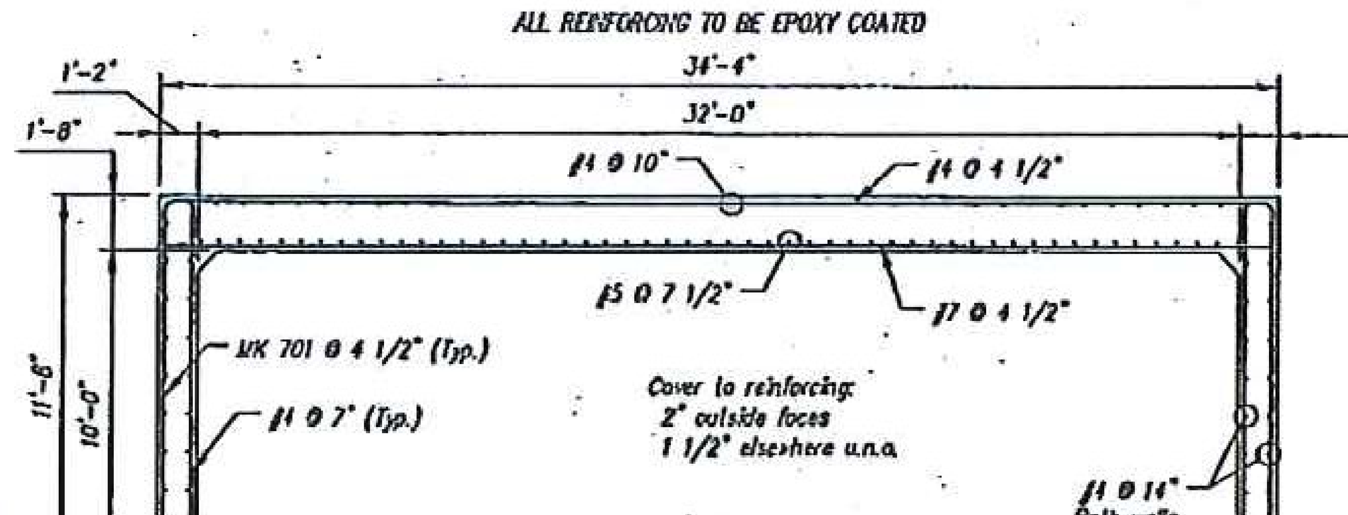
Vanasse Hangen Brustlin, Inc.
Job Number: HUBBARDTON BRTG ER STP 0161(26)
Reviewed By: S. FARNSWORTH
Date: 10-16-2012



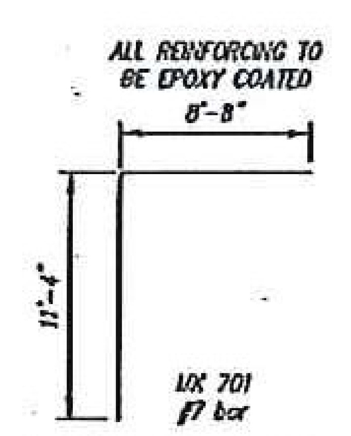
△ HEADWALL REINFORCING PLAN



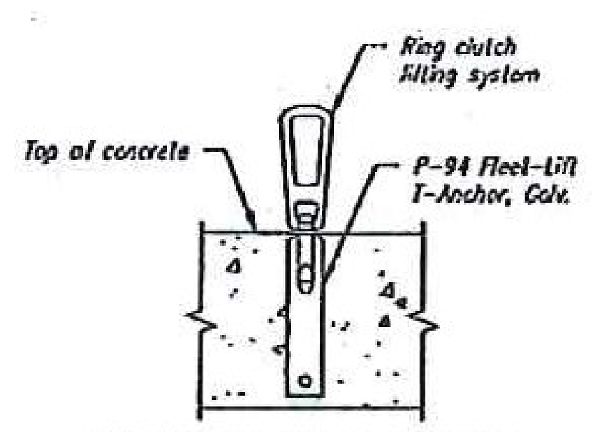
CONNECTION STRAP DETAILS



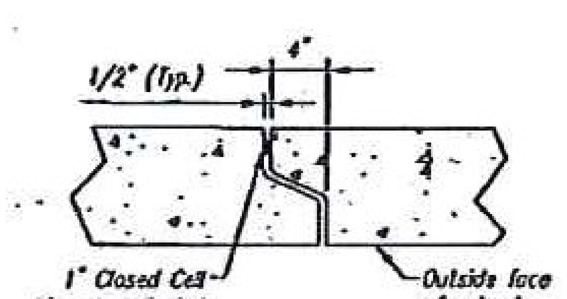
CULVERT REINFORCING SECTION



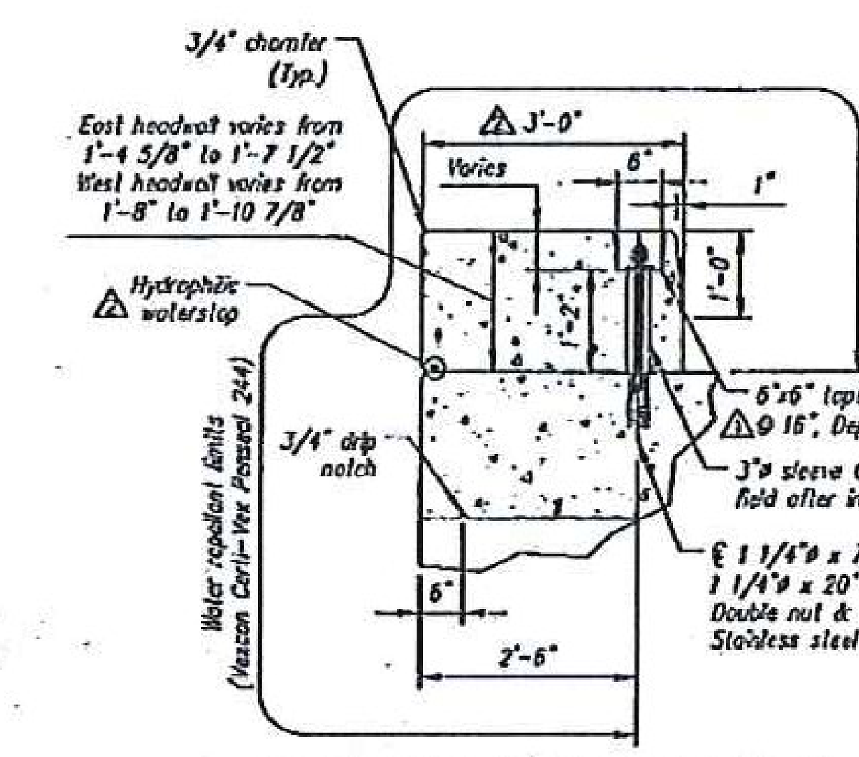
BENDING SCHEDULE



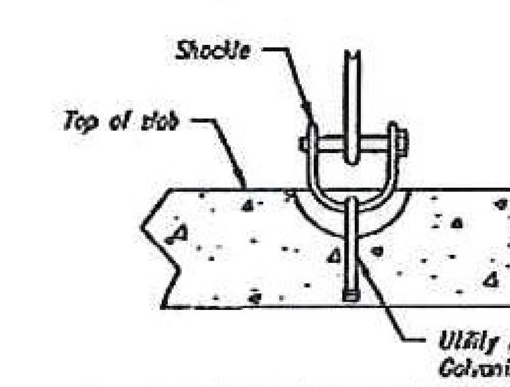
CULVERT AND FOOTING LIFTING HARDWARE DETAIL



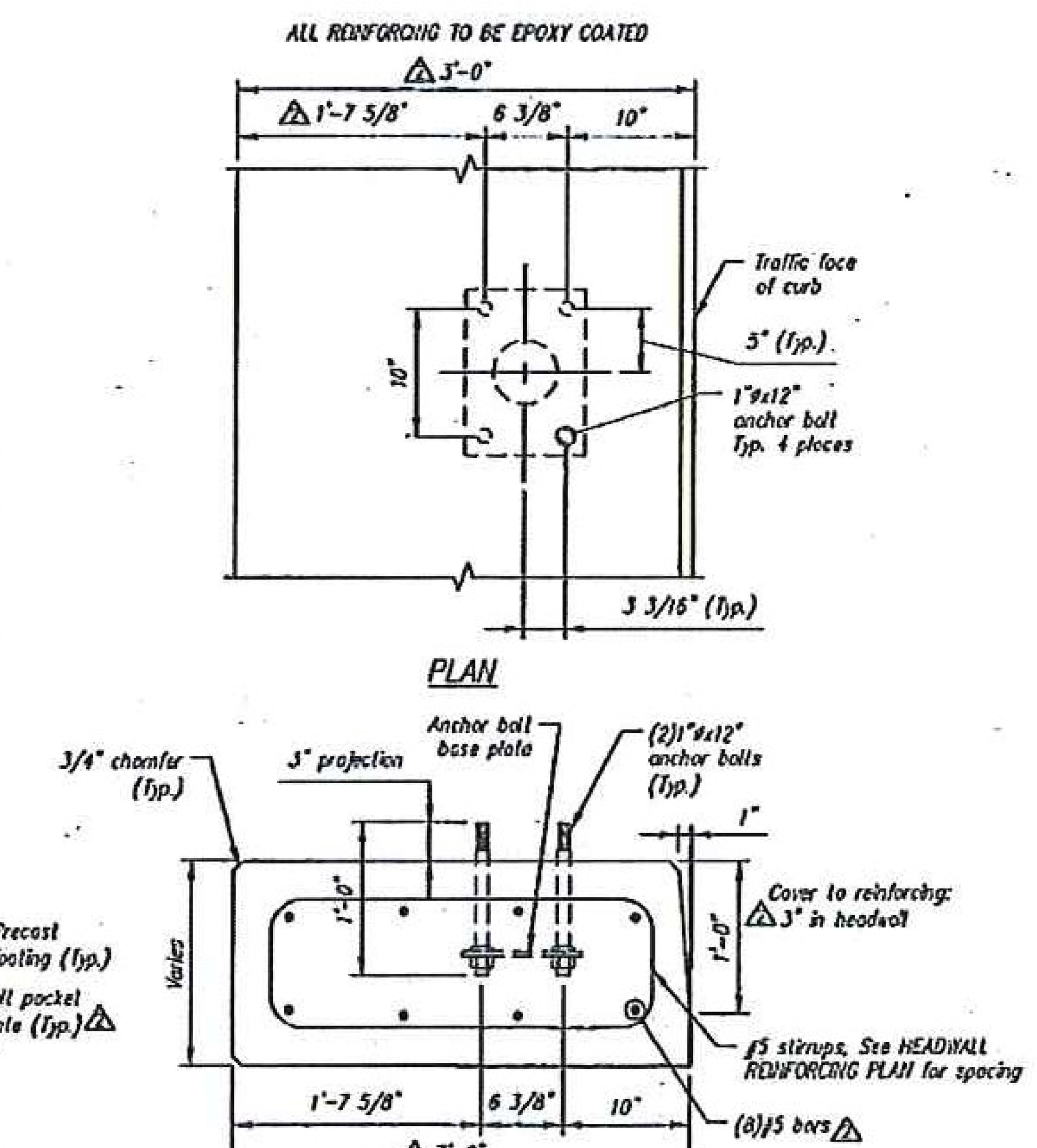
CULVERT JOINT DETAIL



△ HEADWALL SECTION THROUGH CONNECTION HARDWARE



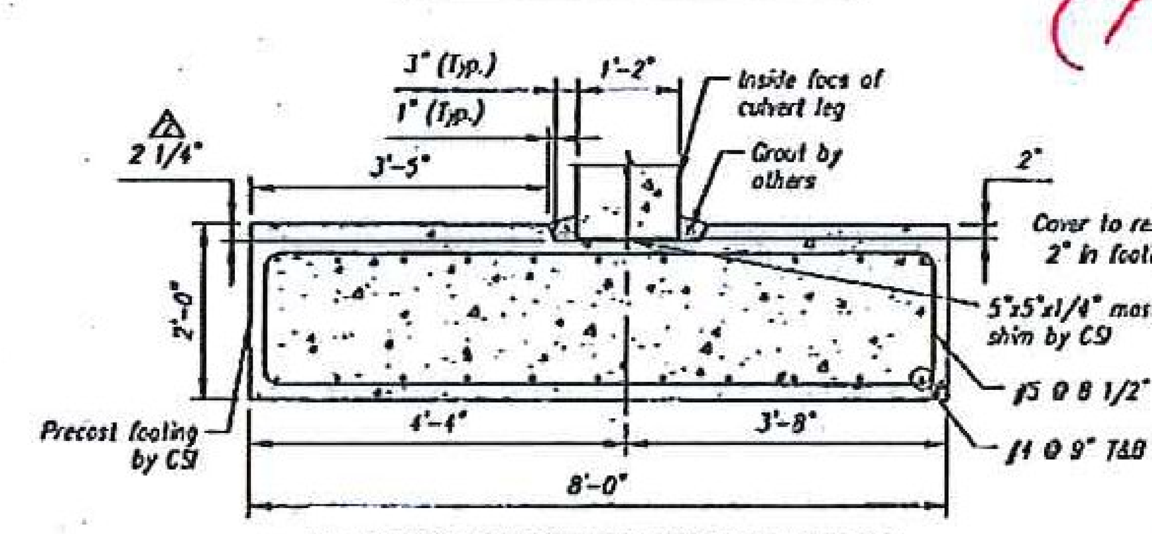
HEADWALL LIFTING DETAIL



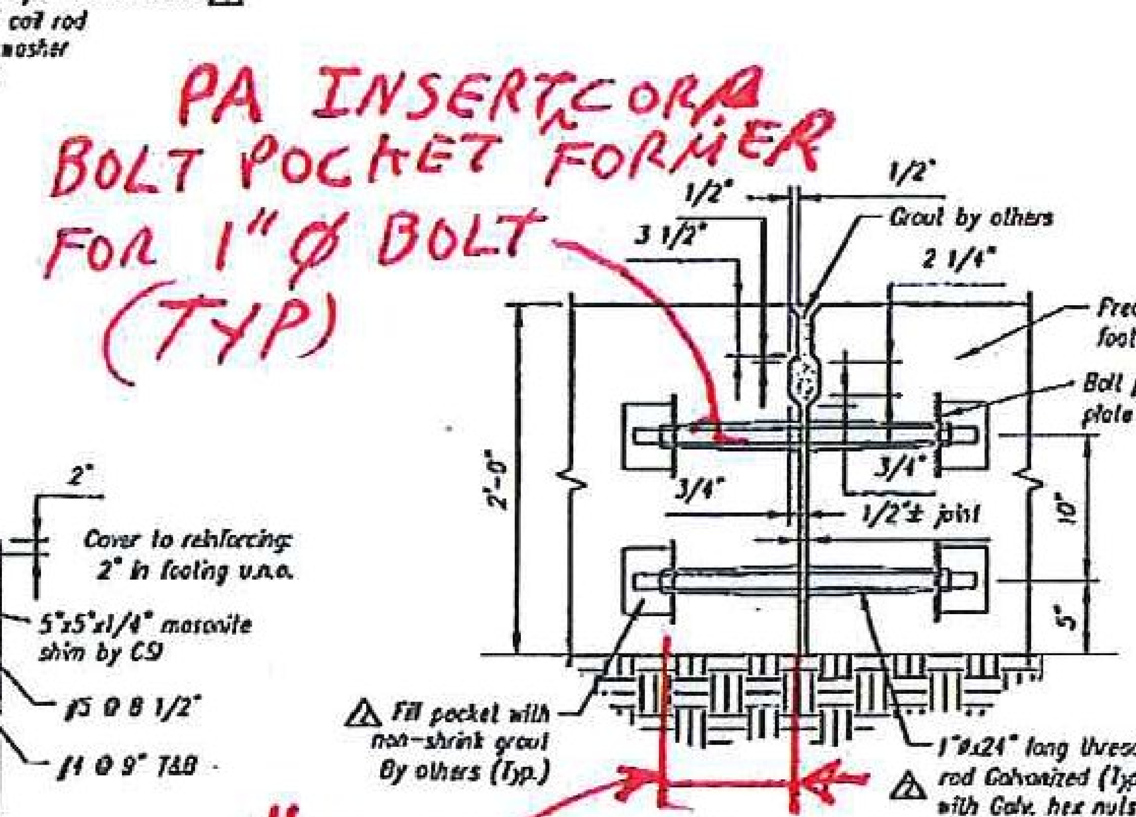
PLAN

SECTION

△ HEADWALL REINFORCING AND GUARDRAIL ANCHOR DETAILS



△ FOOTING REINFORCING SECTION



△ FOOTING JOINT DETAIL

Contractor is to verify that all information shown on drawings has been thoroughly checked, complies with the contract documents and is adequate to meet the field conditions. Some dimensions and details may differ slightly from contract drawings to accommodate the manufacturing or design process. Approval of this drawing indicates that any deviation from the contract documents has been reviewed and found to be acceptable. Production will not commence until receipt of signed, approved shop drawings.

STATE OF VERMONT CHRISTOPHER M. VICK No. [illegible] Structural LICENSED PROFESSIONAL ENGINEER
10/12/12
Stamp for structural design only

Rev.	Date	DESCRIPTION	By
5			
4			
3			
2	10/12/12	Added connection hardware to footings; Miscellaneous revisions	MS
1	09/25/2012	Revised headwall loading to TL-4	MS

REVISIONS

This drawing is based upon information provided from the following documents and/or sources:

- Engineer: Vanasse Hangen Brustlin, Inc.
- Project No: 57478.01
- Drawings: Proposed Improvement Bridge Project; Sheets 1 through 70 of 70 sheets
- Specifications: Special Provisions and Supplemental Specifications; Hubbardton ER STP 0161 (26) & ER stp 0161 (27)
- Other Sources:

Concrete Systems Inc.
9 Commercial St., Hudson, NH 03051
Phone 603-889-4163
Fax 603-889-2417

STATE AGENCY
VTrans

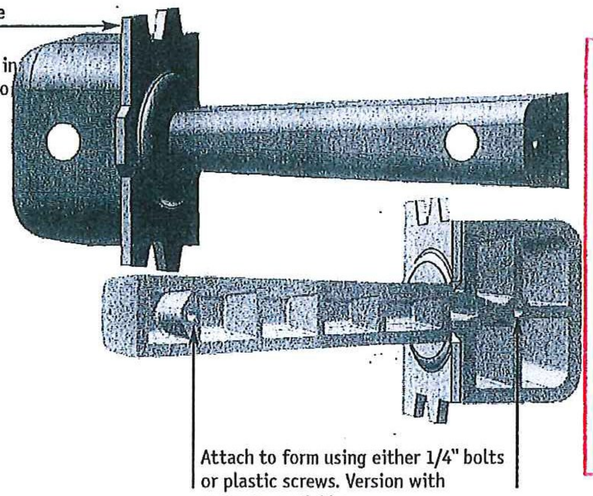
Drawn By	Date
M SCOTT	09/14/2012
Checked By: B KOLAWOLE	09/14/2012
Approved By	Date

HUBBARDTON ER STP 0161(26)
BRIDGE NO. 96

J.A. McDONALD, INC.
PROPOSED IMPROVEMENT BRIDGE PROJECT
HUBBARDTON, VT

D — BRIDGE NO. 96 LAYOUT AND DETAILS — REV 2
Drawing No. C21377-L01
Quantity: 1 | Project No: ER STP 0161(26) | SHEET 1A OF 1A

> BOLT POCKET FORMER



Introducing our Bolt Pocket Former – the ideal solution for tying together sections of box culvert or precast walls. This dual purpose forming device creates both a groove through the joint and a pocket for the bolt. The steel plate that remains embedded in the concrete accepts up to 1" rod. Molded out of a specially formulated urethane, our bolt pocket former will last for at least 50 pours when properly maintained. Call for more details and pricing information.

Pennsylvania Insert Corporation

phone: 800.220.4857 sales@pennsylvaniainsert.com fax: 610.948.9750

> serving concrete producers for over 30 years

SHOP DRAWING REVIEW

REVIEWED AS REQUIRED BY THE CONSTRUCTION CONTRACT DOCUMENTS AND APPROVED, BUT ONLY FOR CONFORMANCE TO THE DESIGN CONCEPT OF THE WORK, AND SUBJECT TO FURTHER LIMITATIONS AND REQUIREMENTS CONTAINED IN THE CONSTRUCTION CONTRACT DOCUMENTS.

☐ REJECTED ☐ REVISE AND RESUBMIT ☐ FURNISH AS CORRECTED

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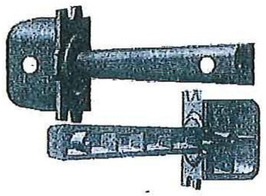
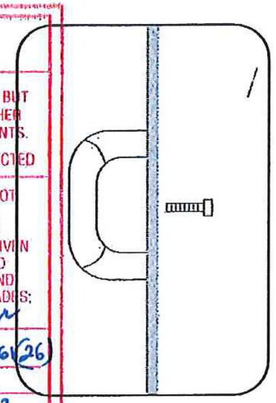
Vanasse Hangen Brustlin, Inc.
7056 US Route 7
North Ferrisburgh, VT 05473
802.425.7788

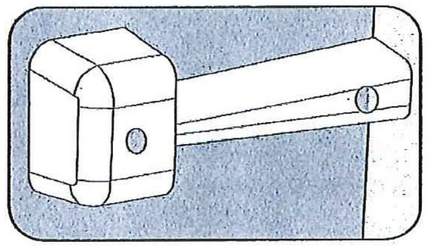
BR96 Job Number ER STP 0161(26)
Reviewed By: SGF
Date: 10-26-2012

BOLT POCKET FORMER

The simple forming solution for tying together sections of box culvert or precast walls.

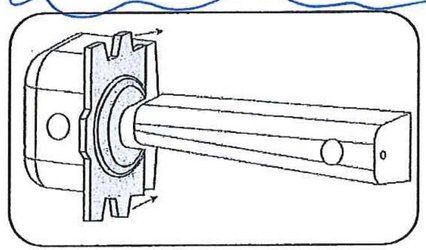




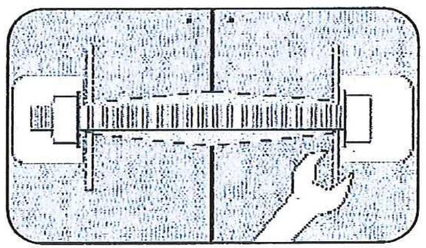


1. Attach Bolt Pocket Former to form using either 1/4" bolts or plastic screws for non collapsing forms. The inserts are replaceable should the threads show signs of wear after numerous uses.

1 OF 2 SGF 10-16-2012



2. Slide steel plate onto Bolt Pocket Former. Pour.



3. After stripping form, slide Bolt Pocket Former out using pliers. Steel plate remains embedded in concrete. A groove through the joint and bolt pocket are formed. For field installation*, the steel plate accepts up to 1" rod.
*We provide a field installation kit consisting of rod, 2 nuts, and 2 washers for an additional charge.

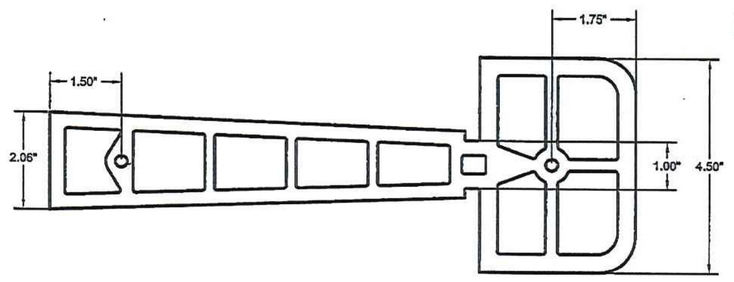
Pennsylvania Insert Corporation

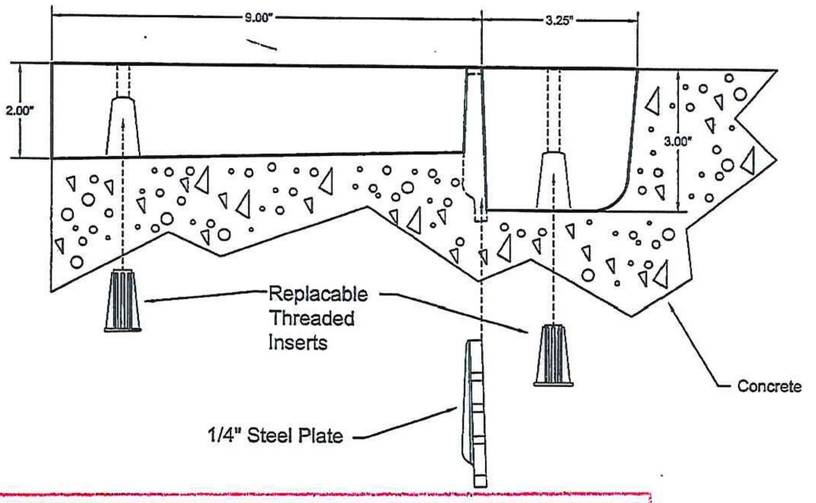
FOR INFO. CALL 1-800-220-4857
or sales@pennsylvaniainsert.com

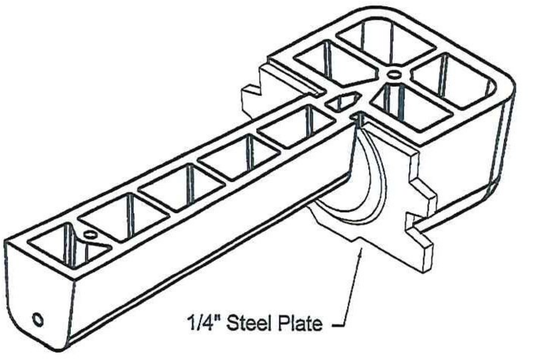
Fax to:	Customer		Approved/Notes	PA Insert Corp PO Box 199 Spring City PA 19475 tel: 610-948-9688 fax: 610-948-9750 email: sales@pennsylvaniainsert.com web: www.pennsylvaniainsert.com
Fax#	Project			
From	Job#	Ship Date		
Date	PA Insert Quote/Order#	Page ____ of ____		

BOLT POCKET FORMER (for up to 1" bolt)

- Made from durable Urethane for reusability
- Ribbed construction increases strength
- *Replacable 1/4" Threaded Inserts
- **1/4" Galvanized Steel Plate Standard
- Available with magnets to attach to form







*Threaded Inserts sold separately (Part Number 1200)
**Steel Plate stays in concrete, sold separately (Part Number 4024)

06/03/04

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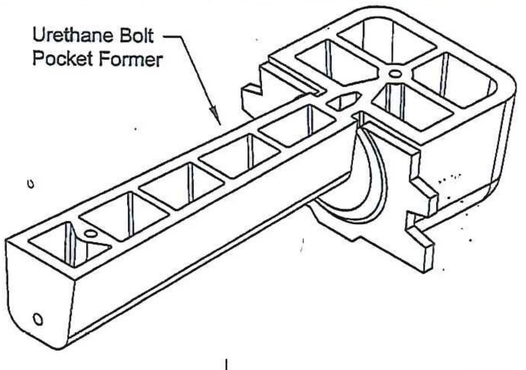
Vanasse Hangen Brustlin, Inc.
7056 US Route 7
North Ferrisburgh, VT 05473
802.425.7788

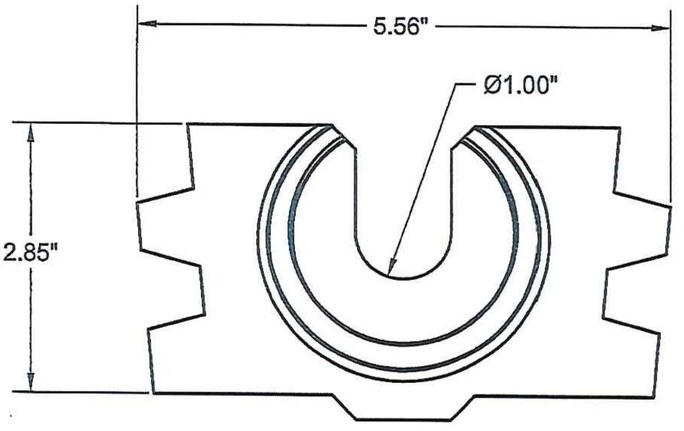
Reviewed By: S.G. FARNSWORTH Date: 10-16-2012

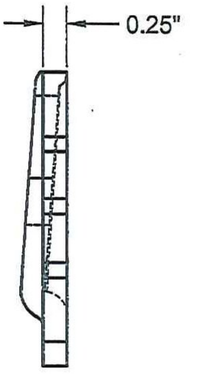
Fax to:	Customer		Approved/Notes	PA Insert Corp PO Box 199 Spring City PA 19475 tel: 610-948-9688 fax: 610-948-9750 email: sales@pennsylvaniainsert.com web: www.pennsylvaniainsert.com
Fax#	Project		HUBBARDTON BR 96 ER STP 0161 (26)	
From	Job#	Ship Date		
Date	PA Insert Quote/Order#	Job Number Page ____ of ____		

BOLT POCKET PLATE (use with bolt pocket former)



- *1/4" Galvanized Steel Plate Standard, distributes bolt load
- Teeth anchor plate securely in concrete
- Pressed center keeps bolt in position
- **Fits securely into reusable bolt pocket former

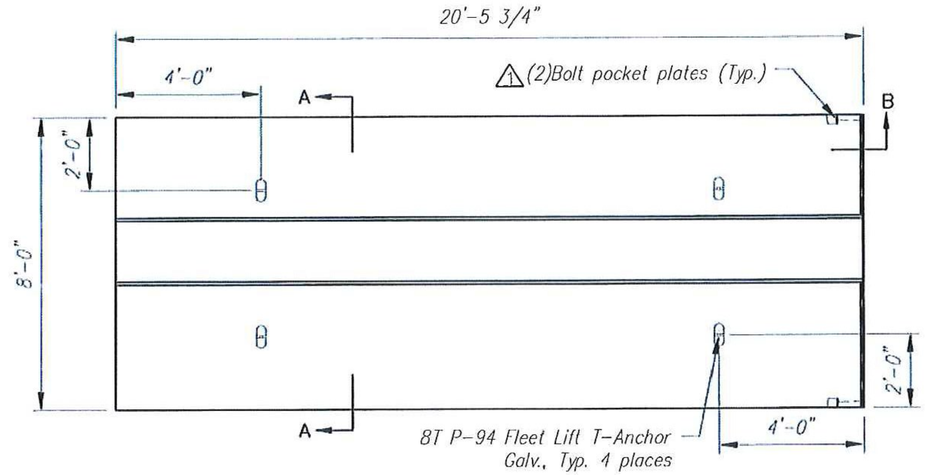




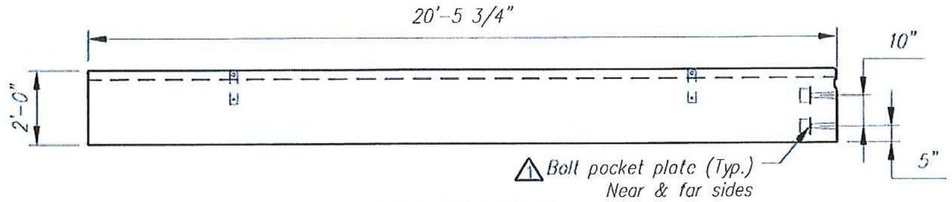
2 of 2
SGF 10-16-2012

*Plain Steel or Stainless Steel Optional
**Urethane Bolt Pocket Former sold separately (part number 4023)

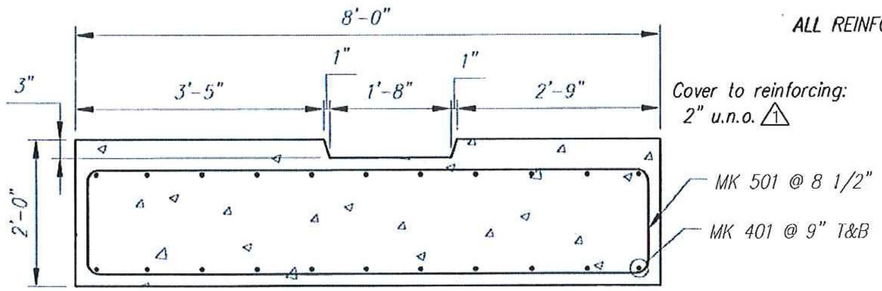
06/03/04



PLAN



ELEVATION



REINFORCING SECTION A-A

ALL REINFORCING TO BE EPOXY COATED

F1 - BILL OF MATERIALS / EMBEDS				
CSI ID#	DESCRIPTION	QTY	UM	COMMENTS
EM-00039	SPREAD ANCHORS 8T GALV	4	EA	
EM-00125	BOLT POCKET PLATES (GALVANIZED)	4	EA	
RM-00014	REBAR #4 EPOXY- GR 60 40'	296	LB	
RM-00016	REBAR #5 EPOXY- GR 60 40'	605	LB	
MX-FA5000SC20	MIX DSGN - FLY ASH - 5000 - SELF COMP	11.80	CY	

All Rebar to be Epoxy Coated

Footing Rebar Schedule			
MK	QTY	LENGTH	
401	#4	22	20 '- 2 "
501	#5	29	20 '- 0 "

SHOP DRAWING REVIEW

APPROVED AS REQUIRED BY THE CONSTRUCTION CONTRACT DOCUMENTS AND APPROVED BUT ONLY FOR CONFORMANCE TO THE DESIGN CONCEPT OF THE WORK AND SUBJECT TO FURTHER LIMITATIONS AND REQUIREMENTS CONTAINED IN THE CONSTRUCTION CONTRACT DOCUMENTS

☐ REJECTED ☐ REVISE AND RESUBMIT ☐ FURNISH AS CORRECTED

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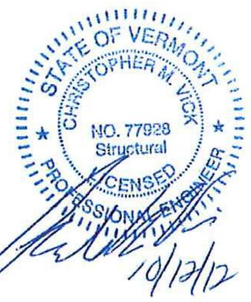
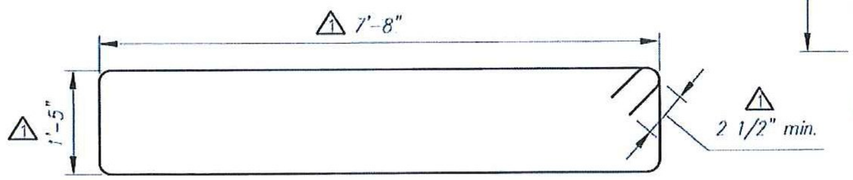
Vanasse Hangen Brustlin, Inc. 2056 VT Route 7 North Ferrisburgh, VT 05473 802.425.7785

HUBBARDTON BR96 Job Number ER STP 0161(26) Reviewed By S.FARNSWORTH Date 10-16-2012

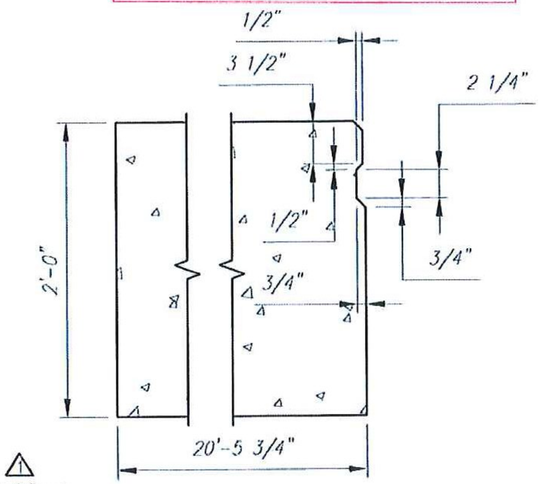


Stamp for structural design only



MK 501
#5 bar

BENDING SCHEDULE



SECTION B

Rev.	Date	DESCRIPTION	By
5			
4			
3			
2			
1	10/12/12	Added bolt plate; Cover to reinforcing to be 2"	MS

REVISIONS

Concrete Systems Inc.
9 Commercial St., Hudson, NH,03051
Phone 603-889-4163
Fax 603-889-2417

STATE AGENCY

VTrans Working to Get You There

Drawn By: M SCOTT	Date: 09/24/2012
Concrete Cu. Yd.: 11.80	Weight in Tons: 23.90
Approved By	Date

HUBBARDTON ER STP 0161(26)
BRIDGE NO. 96

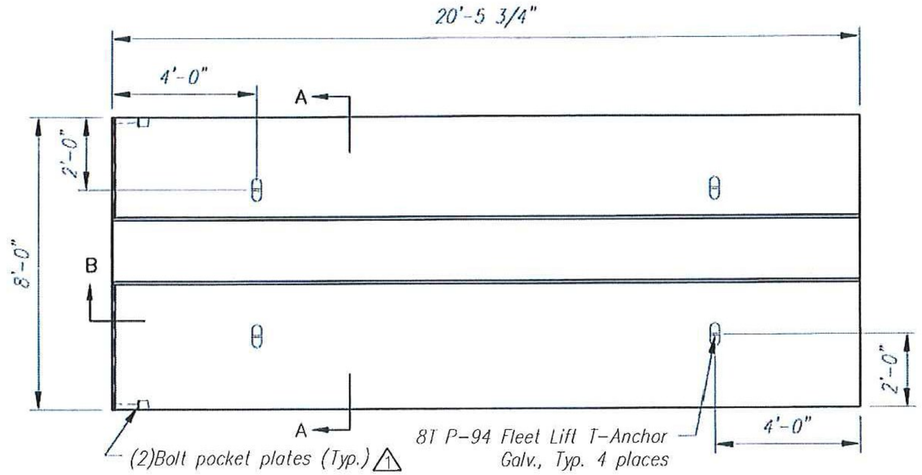
J.A. McDONALD, INC.

PROPOSED IMPROVEMENT BRIDGE PROJECT
HUBBARDTON, VT

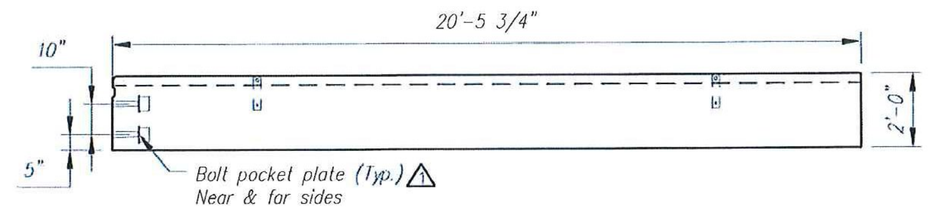
B | SHOP DRAWING F1 | REV 1

Drawing No. C21377-F1

Quantity: 2 | Project No: ER STP 0161(26) | SHEET 1 OF 2



PLAN



ELEVATION

F2 - BILL OF MATERIALS / EMBEDS				
CSI ID#	DESCRIPTION	QTY	UM	COMMENTS
EM-00039	SPREAD ANCHORS 8T GALV	4	EA	
1 EM-00125	BOLT POCKET PLATES (GALVANIZED)	4	EA	
RM-00014	REBAR #4 EPOXY- GR 60 40'	296	LB	
RM-00016	REBAR #5 EPOXY- GR 60 40'	605	LB	
MX-FA5000SC20	MIX DSGN - FLY ASH - 5000 - SELF COMP	11.80	CY	

All Rebar to be Epoxy Coated

Footing Rebar Schedule			
MK	QTY	LENGTH	
401 #4	22	20 ' - 2 "	
501 #5	29	20 ' - 0 "	

SHOP DRAWING REVIEW

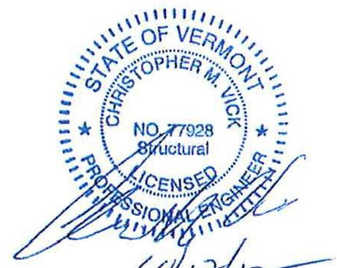
■ REVIEWED AS REQUIRED BY THE CONSTRUCTION CONTRACT DOCUMENTS AND APPROVED, BUT ONLY FOR CONFORMANCE TO THE DESIGN CONCEPT OF THE WORK, AND SUBJECT TO FURTHER LIMITATIONS AND REQUIREMENTS CONTAINED IN THE CONSTRUCTION CONTRACT DOCUMENTS.

☐ REJECTED ☐ REVISE AND RESUBMIT ☐ FURNISH AS CORRECTED

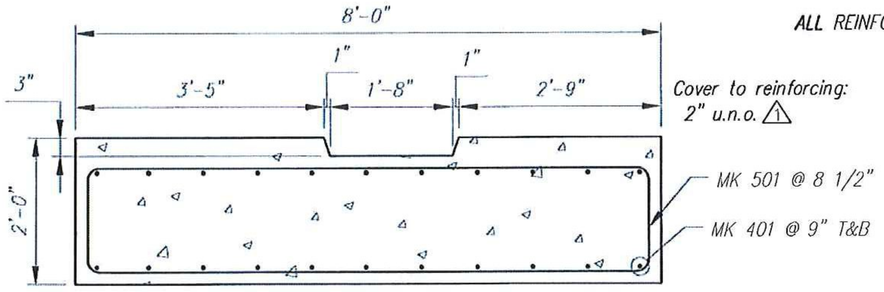
CORRECTIONS OR COMMENTS MADE ON THE SHOP DRAWINGS DURING THIS REVIEW DO NOT RELIEVE CONTRACTOR FROM COMPLIANCE WITH REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS. THIS CHECK IS ONLY FOR THE LIMITED PURPOSE OF CHECKING FOR CONFORMANCE WITH THE DESIGN CONCEPT OF THE PROJECT AND GENERAL COMPLIANCE WITH THE INFORMATION GIVEN IN THE CONTRACT DOCUMENTS. THE CONTRACTOR IS RESPONSIBLE FOR CONFIRMING AND CORRELATING ALL QUANTITIES AND DIMENSIONS, SELECTING FABRICATION PROCESSES AND TECHNIQUES OF CONSTRUCTION, COORDINATING WORK WITH THAT OF ALL OTHER TRADES, AND PERFORMING WORK IN A SAFE AND SATISFACTORY MANNER.

Vanasse Hangen Brustlin, Inc. 7056 US Route 7 North Ferrisburgh, VT 05473 802.425.7780

Job Number HUBBARDTON ER STP 0161(26) BR 96
Reviewed By S. FARNSWORTH
Date 12-16-2012

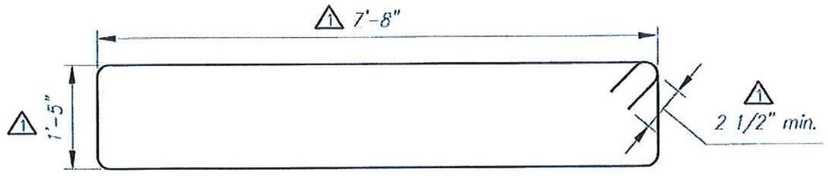


Stamp for structural design only



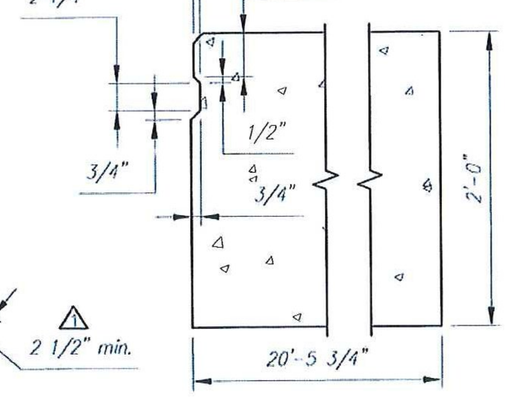
ALL REINFORCING TO BE EPOXY COATED

REINFORCING SECTION A-A



MK 501
#5 bar

BENDING SCHEDULE



SECTION B

Rev.	Date	DESCRIPTION	By
5			
4			
3			
2			
1	10/12/12	Added bolt plate; Cover to reinforcing to be 2"	MS

REVISIONS

CSI Concrete Systems Inc.
9 Commercial St., Hudson, NH,03051
Phone 603-889-4163
Fax 603-889-2417

STATE AGENCY

VTrans Working to Get You There

Drawn By M SCOTT	Date 09/24/2012
Concrete Cu. Yd. 11.80	Weight in Tons 23.90
Approved By	Date

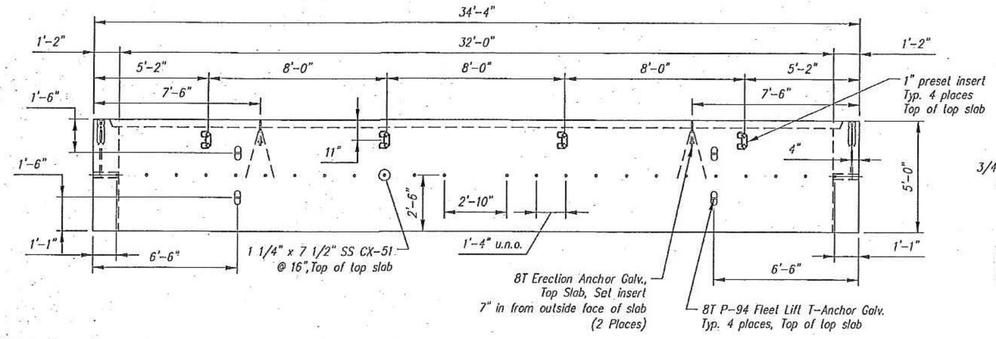
HUBBARDTON ER STP 0161(26)
BRIDGE NO. 96

J.A. McDONALD, INC.
PROPOSED IMPROVEMENT BRIDGE PROJECT
HUBBARDTON, VT

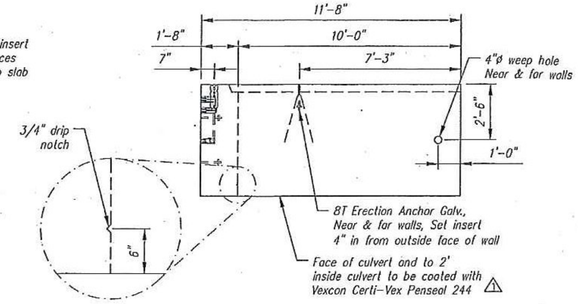
B | SHOP DRAWING F2 | REV 1

Drawing No. C21377-F2

Quantity: 2 | Project No: ER STP 0161(26) | SHEET 2 OF 2



PLAN



R. SIDE

A1 - BILL OF MATERIALS / EMBEDS				
CSI ID#	DESCRIPTION	QTY	UM	COMMENTS
DTJ	CERTI-VEX PENSEAL 244 WATER REPEL	0.7	GA	
EM-00005	1" X 8" PRESET WING INSERTS	4	EA	
EM-00034	4" FOAM CORE PVC	2.33	FT	
EM-00039	SPREAD ANCHORS 8T GALV	4	EA	
EM-00061	EC4 SS 1-1/4"-X7-1/2 F-58	24	EA	
EM-00122	8TON ERECTION ANCHOR GALV QL049G	4	EA	WITH TENSION BAR
JS-00002	1"X1"CLOSED NEOP GASKET	58	FT	AROUND BELL
RM-00014	REBAR #4 EPOXY- GR 60 40'	575	LB	
RM-00016	REBAR #5 EPOXY- GR 60 40'	253	LB	
RM-00018	REBAR #6 EPOXY-GR 60 40'	28	LB	
RM-00016	REBAR #7 EPOXY-GR 60 40'	1966	LB	
MX-FA5000SC20	MIX DSGN - FLY ASH - 5000 - SELF COMP.	14.65	CY	

All Rebar to be Epoxy Coated

Culvert Rebar Schedule			
MK		QTY	LENGTH
401	#4	18	11 ' 4 "
402	#4	13	22 ' 6 "
403	#4	78	4 ' 8 "
501	#5	52	4 ' 8 "
601	#6	4	4 ' 8 "
701	#7	26	20 ' 0 "
702	#7	13	34 ' 0 "

QTY = 1
WEIGHT = 29.67 TONS

SHOP DRAWING REVIEW

☒ REVIEWED AS REQUIRED BY THE CONSTRUCTION CONTRACT DOCUMENTS AND APPROVED, BUT ONLY FOR CONFORMANCE TO THE DESIGN CONCEPT OF THE WORK, AND SUBJECT TO FURTHER LIMITATIONS AND REQUIREMENTS CONTAINED IN THE CONSTRUCTION CONTRACT DOCUMENTS.

☐ REJECTED ☐ REVISE AND RESUBMIT ☐ FURNISH AS CORRECTED

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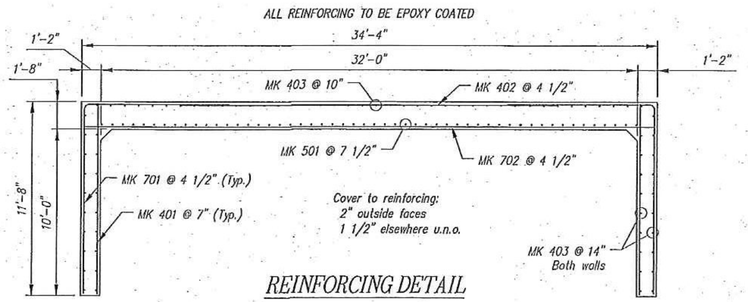
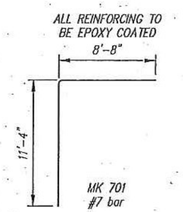
Vanasse Hangen Brustlin, Inc.
7056 US Route 7
North Ferrisburgh, VT 05473
802.425.7700

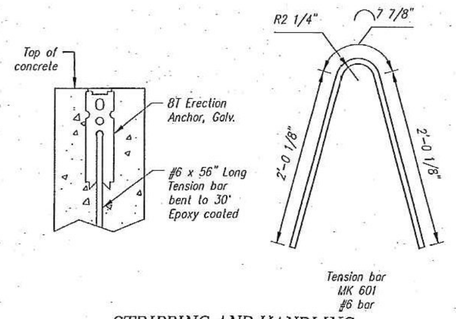
HUBBARDTON BR 96
Job Number ER STP 0161(26)
Reviewed By S. FARNSWORTH
Date 10-16-2012



REINFORCING DETAIL



BENDING SCHEDULE



STRIPPING AND HANDLING
INSERT DETAILS

Rev.	Date	DESCRIPTION	By
1	10/12/12	Water repellant to be Penseal 244; Revised tension bar detail	MS
2			
3			
4			
5			
6			
7			
8			
9			
10			

Contractor is to verify that all information shown on drawings has been thoroughly checked, complies with the contract documents and is adequate to meet the field conditions. Some dimensions and details may differ slightly from contract drawings to accommodate the manufacturing or design concepts used by individual suppliers. Any deviation from the contract documents has been clearly indicated on the shop drawings. Production will not commence until receipt of signed, approved shop drawings.

STATE OF VERMONT
CHRISTOPHER R. VICK
NO. 77928
Structural
LICENSED
PROFESSIONAL ENGINEER
10/12/12

Stamp for structural design only

This drawing is based upon information provided from the following documents and/or sources:
Engineer:
Project No:
Drawings:
Specifications:
Other:

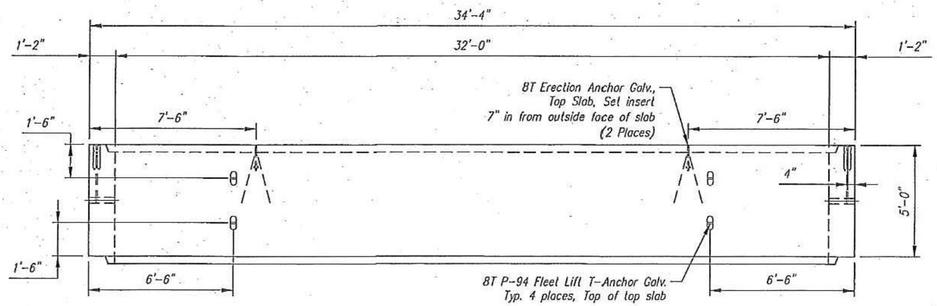
Concrete Systems Inc.
9 Commercial St., Hudson, NH,03051
Phone 603-889-4163
Fax 603-889-2417

STATE AGENCY
VTrans

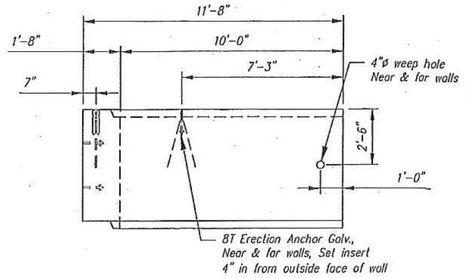
Drawn By	M SCOTT	Date 09/24/2012
Checked By		Date
Approved By		Date

HUBBARDTON ER STP 0161(26)
BRIDGE NO. 96
J.A. McDONALD, INC.
PROPOSED IMPROVEMENT BRIDGE PROJECT
HUBBARDTON, VT

C — SHOP DRAWING A1 — REV 1
Drawing No. C21377-A1
Quantity: 1 | Project No: ER STP 0161(26) | SHEET 1A OF 7A



PLAN



R. SIDE

QTY = 6
WEIGHT = 30.38 TONS

A2 - BILL OF MATERIALS / EMBEDS				
CSI ID#	DESCRIPTION	QTY	UM	COMMENTS
EM-00034	4" FOAM CORE PVC	2.33	FT	
EM-00039	SPREAD ANCHORS 8T GALV	4	EA	
EM-00122	8TON ERECTION ANCHOR GALV QL049G	4	EA	WITH TENSION BAR
JS-00002	1"X1"CLOSED NEOP GASKET	58	FT	AROUND BELL
RM-00014	REBAR #4 EPOXY- GR 60 40'	575	LB	
RM-00016	REBAR #5 EPOXY- GR 60 40'	253	LB	
RM-00018	REBAR #6 EPOXY-GR 60 40'	28	LB	
RM-00016	REBAR #7 EPOXY-GR 60 40'	1966	LB	
MX-FA5000SC20	MIX DSGN - FLY ASH - 5000 - SELF COMP.	15.00	CY	

All Rebar to be Epoxy Coated

Culvert Rebar Schedule

MK		QTY	LENGTH
401	#4	18	11 ' 4 "
402	#4	13	22 ' 6 "
403	#4	78	4 ' 8 "
501	#5	52	4 ' 8 "
601	#6	4	4 ' 8 "
701	#7	26	20 ' 0 "
702	#7	13	34 ' 0 "

SHOP DRAWING REVIEW

REVIEWED AS REQUIRED BY THE CONSTRUCTION CONTRACT DOCUMENTS AND APPROVED, BUT ONLY FOR CONFORMANCE TO THE DESIGN CONCEPT OF THE WORK, AND SUBJECT TO FURTHER LIMITATIONS AND REQUIREMENTS CONTAINED IN THE CONSTRUCTION CONTRACT DOCUMENTS

☐ REJECTED ☐ REVISE AND RESUBMIT ☐ FURNISH AS CORRECTED

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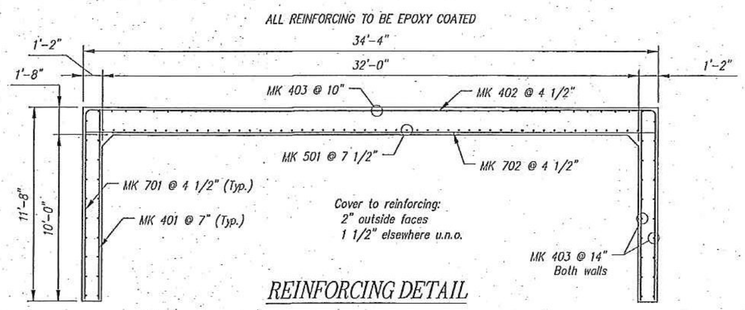
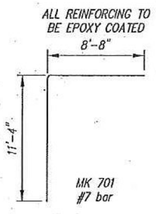
Vanasse Hangen Brustlin, Inc.
7056 US Route 7
North Ferrisburgh, VT 05473
802.425.7700

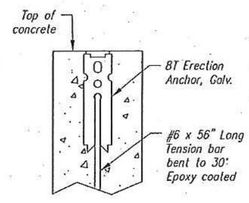
HUBBARDTON BR 96
Job Number ER STP 0161(26)
Reviewed By S.FARNSWORTH
Date 10-16-2012

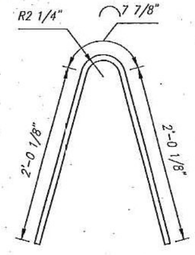


REINFORCING DETAIL



BENDING SCHEDULE





STRIPPING AND HANDLING
INSERT DETAILS

This drawing is based upon information provided from the following documents and/or sources:
Engineer:
Project No:
Drawings:
Specifications:
Other:

Concrete Systems Inc.
9 Commercial St., Hudson, NH,03051
Phone 603-889-4163
Fax 603-889-2417

STATE AGENCY
VTrans

Drawn By	Date
M SCOTT	09/24/2012
Checked By	Date
Approved By	Date

HUBBARDTON ER STP 0161(26)
BRIDGE NO. 96
J.A. McDONALD, INC.
PROPOSED IMPROVEMENT BRIDGE PROJECT
HUBBARDTON, VT

C | SHOP DRAWING A2 | REV 1
Drawing No. C21377-A2
Quantity: 6 | Project No: ER STP 0161(26) | SHEET 2A OF 7A

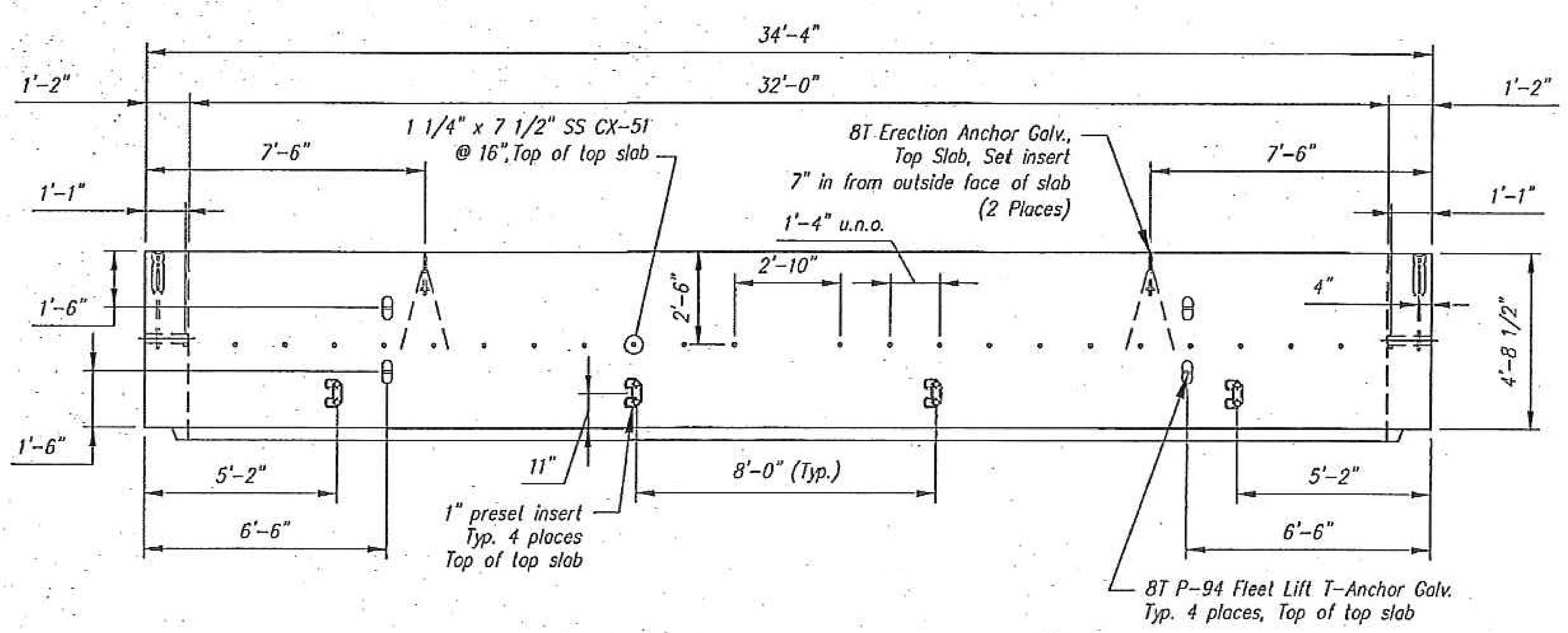
Rev.	Date	DESCRIPTION	By
1	10/12/12	Revised tension bar detail	MS
2			
3			
4			
5			
6			
7			
8			
9			
10			

REVISIONS

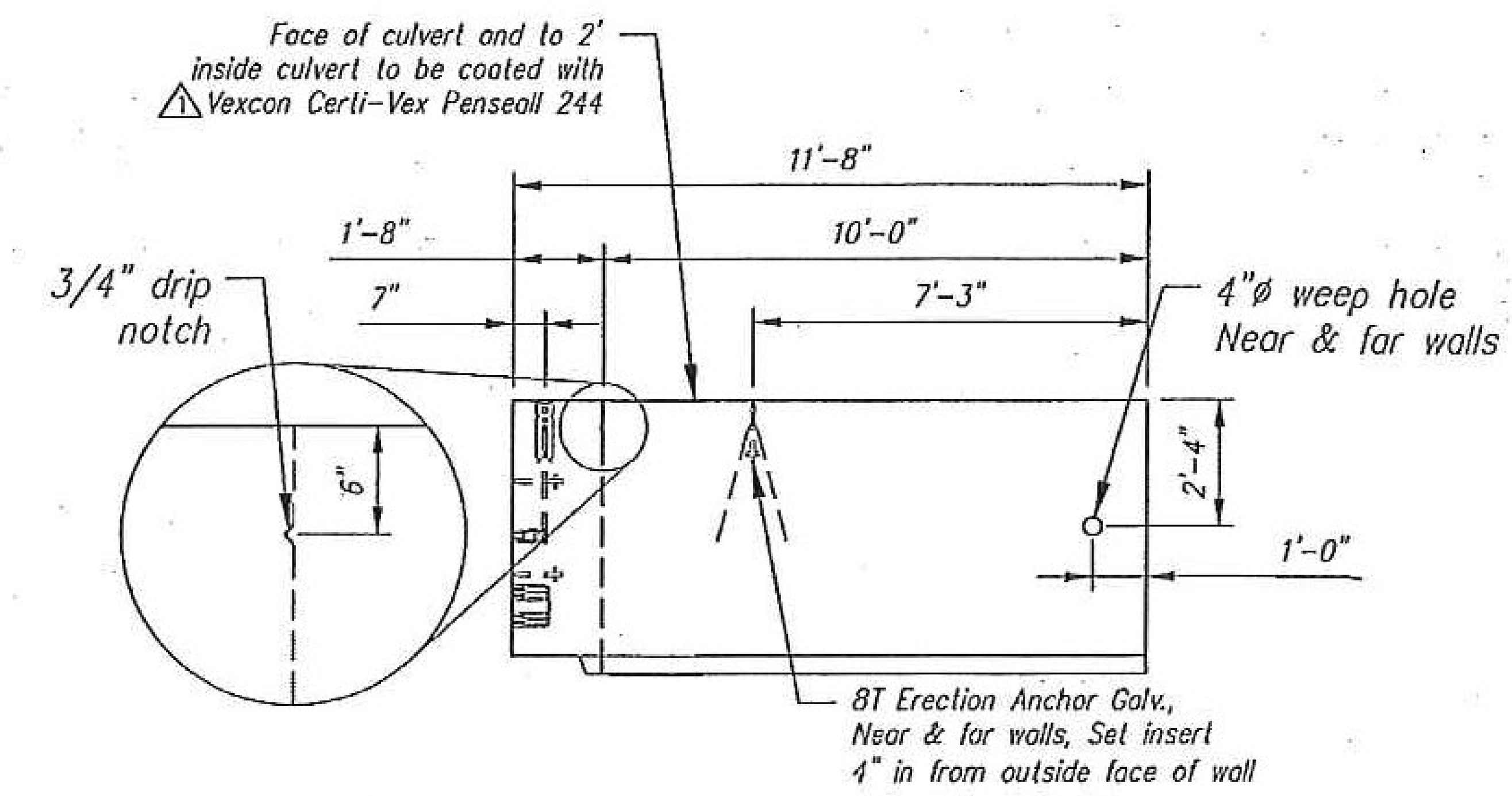
Contractor is to verify that all information shown on drawings has been thoroughly checked, complies with the contract documents and is adequate to meet the field conditions. Some dimensions and details may differ slightly from contract drawings to accommodate the manufacturing or design process used by this supplier. Any deviations or corrections from the contract documents has been reviewed and found to be acceptable. Production will not commence until receipt of signed, approved shop drawings.

STATE OF VERMONT
CHRISTOPHER M. VICK
NO. 77928
Structural
LICENSED
PROFESSIONAL ENGINEER
10/12/12

Stamp for structural design only



PLAN



R. SIDE

QTY = 1
WEIGHT = 29.31 TONS

A3 - BILL OF MATERIALS / EMBEDS				
CSI ID#	DESCRIPTION	QTY	UM	COMMENTS
DTJ	CERTI-VEX PENSEAL 244 WATER REPEL	0.7	GA	
EM-00005	1" X 8" PRESET WING INSERTS	4	EA	
EM-00034	4" FOAM CORE PVC	2.33	FT	
EM-00039	SPREAD ANCHORS 8T GALV	4	EA	
EM-00061	EC4 SS 1-1/4"-X7-1/2 F-58	24	EA	
EM-00122	8TON ERECTION ANCHOR GALV QL049G	4	EA	WITH TENSION BAR
RM-00014	REBAR #4 EPOXY- GR 60 40'	527	LB	
RM-00016	REBAR #5 EPOXY- GR 60 40'	235	LB	
RM-00018	REBAR #6 EPOXY-GR 60 40'	28	LB	
RM-00016	REBAR #7 EPOXY-GR 60 40'	1815	LB	
MX-FA5000SC20	MIX DSGN - FLY ASH - 5000 - SELF COMP.	14.47	CY	

All Rebar to be Epoxy Coated

Culvert Rebar Schedule			
MK		QTY	LENGTH
401	#4	16	11 '- 4 "
402	#4	12	22 '- 6 "
403	#4	78	4 '- 4 "
501	#5	52	4 '- 4 "
601	#6	4	4 '- 8 "
701	#7	24	20 '- 0 "
702	#7	12	34 '- 0 "

SHOP DRAWING REVIEW

- [x] REVIEWED AS REQUIRED BY THE CONSTRUCTION CONTRACT DOCUMENTS AND APPROVED, BUT ONLY FOR CONFORMANCE TO THE DESIGN CONCEPT OF THE WORK, AND SUBJECT TO FURTHER LIMITATIONS AND REQUIREMENTS CONTAINED IN THE CONSTRUCTION CONTRACT DOCUMENTS
- [ ] REJECTED
- [ ] REVISE AND RESUBMIT
- [ ] FURNISH AS CORRECTED

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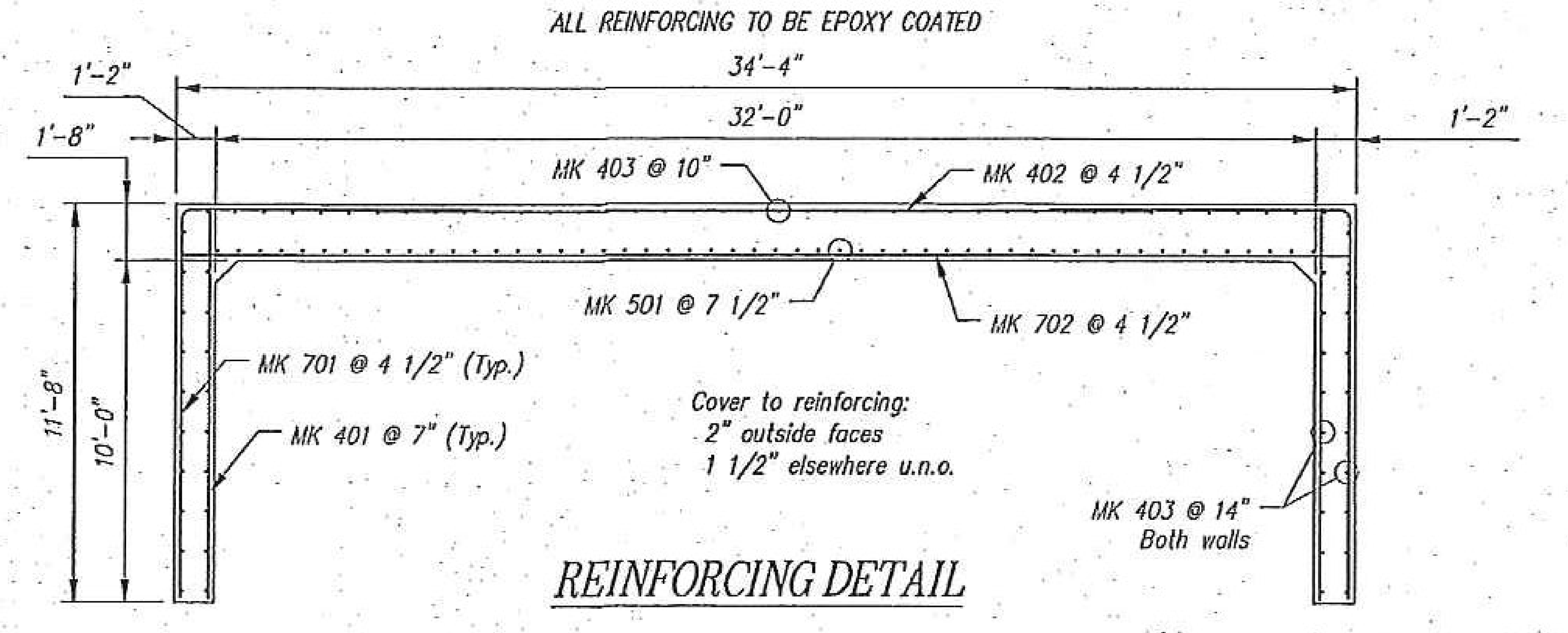
Vanasse Hangen Brustlin, Inc.
7056 US Route 7
North Ferrisburgh, VT 05473
802.425.7788

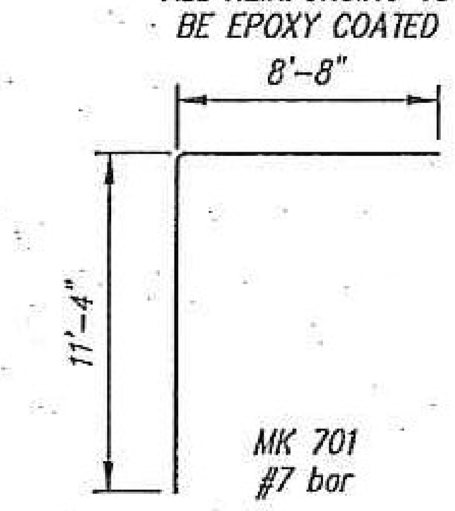
HUBBARDTON BR96
Job Number: ER STP 0161(26)
Reviewed By: S. FARNSWORTH
Date: 10-16-2012

ALL REINFORCING TO BE EPOXY COATED

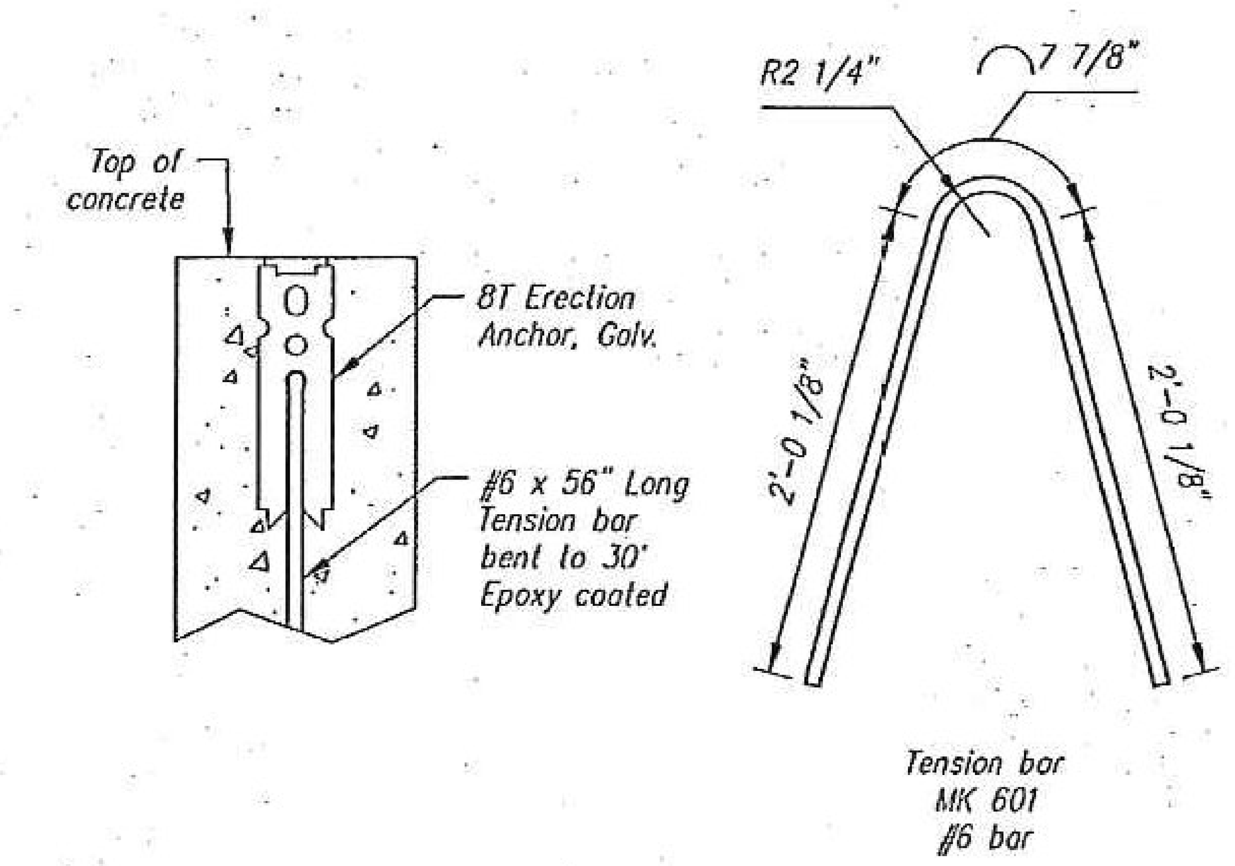


REINFORCING DETAIL

ALL REINFORCING TO BE EPOXY COATED



BENDING SCHEDULE



STRIPPING AND HANDLING INSERT DETAILS

Rev.	Date	DESCRIPTION	By
10			
9			
8			
7			
6			
5			
4			
3			
2			
1	10/12/12	Water repellant to be Penseal 244; Revised tension bar detail	MS

REVISIONS

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STATE OF VERMONT
CHRISTOPHER M. VICK
NO. 7792B
Structural
LICENSED
PROFESSIONAL ENGINEER
10/12/12
Stamp for structural design only

This drawing is based upon information provided from the following documents and/or sources:
Engineer:
Project No:
Drawings:
Specifications:
Other:

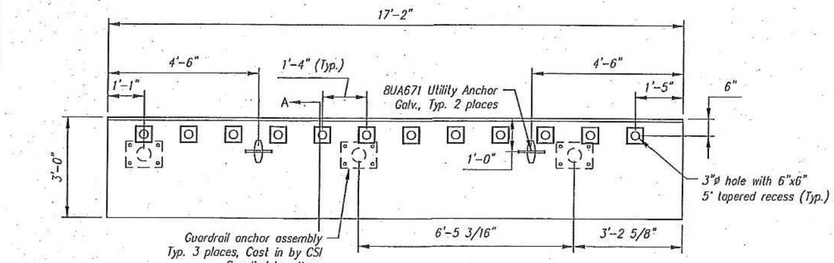
CSI
Concrete Systems Inc.
9 Commercial St., Hudson, NH, 03051
Phone 603-889-4163
Fax 603-889-2417

STATE AGENCY
VTrans

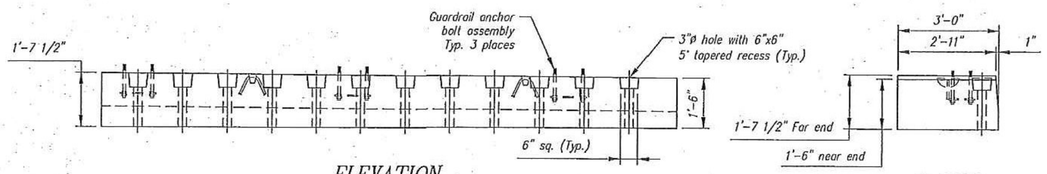
Drawn By	Date
M SCOTT	09/24/2012
Checked By	Date
Approved By	Date

HUBBARDTON ER STP 0161(26)
BRIDGE NO. 96
J.A. McDONALD, INC.
PROPOSED IMPROVEMENT BRIDGE PROJECT
HUBBARDTON, VT
SHOP DRAWING A3

C | Drawing No. C21377-A3 | REV 1
Quantity: 1 | Project No: ER STP 0161(26) | SHEET 3A OF 7A



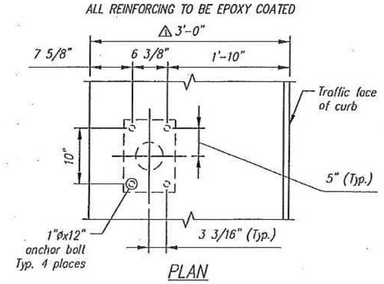
PLAN



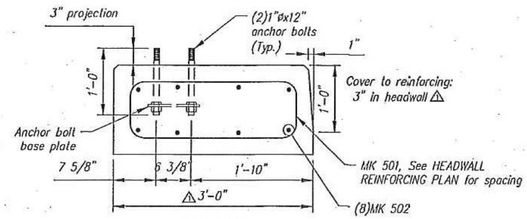
ELEVATION

R. SIDE

ALL REINFORCING TO BE EPOXY COATED

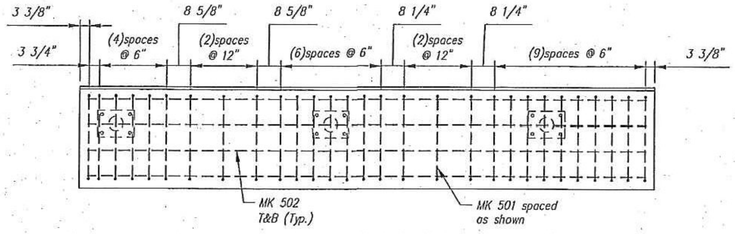


PLAN

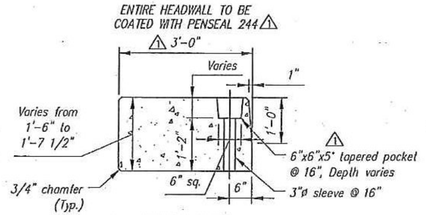


SECTION

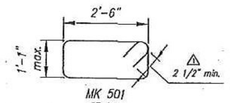
GUARDRAIL ANCHOR DETAILS



HEADWALL REINFORCING PLAN



SECTION A



BENDING SCHEDULE

QTY = 1

⚠ WEIGHT = 6.05 TONS

HW1A - BILL OF MATERIALS / EMBEDS				
CSI ID#	DESCRIPTION	QTY	UM	COMMENTS
DTJ	CERTI-VEX PENSEAL 244 WATER REPEL	0.5	GA	
⚠ EM-00033	3" FOAM CORE PVC	8.17	FT	
EM-00115	UTILITY ANCHOR #8UA671-GALVANIZED	2	EA	
⚠ RM-00016	REBAR #5 EPOXY- GR 60 40'	386	LB	
SBO	GUARDRAIL ANCHOR ASSY W/4 BOLTS	3	EA	
⚠ MX-FA5000SC20	MIX DSGN - FLY ASH - 5000 - SELF COMP.	2.99	CY	

⚠ All Rebar to be Epoxy Coated

Headwall Rebar Schedule		
MK	QTY	LENGTH
501 #5	29	8 ' 2 "
502 #5	8	16 ' 8 "

SHOP DRAWING REVIEW

REVIEWED AS REQUIRED BY THE CONSTRUCTION CONTRACT DOCUMENTS AND APPROVED, BUT ONLY FOR CONFORMANCE TO THE DESIGN CONCEPT OF THE WORK AND SUBJECT TO FURTHER LIMITATIONS AND REQUIREMENTS CONTAINED IN THE CONSTRUCTION CONTRACT DOCUMENTS

☐ REJECTED ☐ REVISE AND RESUBMIT ☐ FURNISH AS CORRECTED

CORRECTIONS OR COMMENTS MADE ON THE SHOP DRAWINGS DURING THIS REVIEW DO NOT RELIEVE CONTRACTOR FROM COMPLIANCE WITH REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS. THIS CHECK IS FOR REVIEW OF GENERAL CONFORMANCE WITH THE DESIGN CONCEPT OF THE PROJECT AND GENERAL COMPLIANCE WITH THE INFORMATION GIVEN IN THE CONTRACT DOCUMENTS. THE CONTRACTOR IS RESPONSIBLE FOR, CONFIRMING AND CORRELATING ALL QUANTITIES AND DIMENSIONS, SELECTING FABRICATION PROCESSES AND TECHNIQUES OF CONSTRUCTION, COORDINATING THIS WORK WITH THAT OF ALL OTHER TRADES, AND PERFORMING NEW WORK IN A SAFE AND SATISFACTORY MANNER.

Vanasse Hangen Brustlin, Inc.
7056 US Route 7
North Ferrisburgh, VT 05473
802.425.4788

HUBBARDTON BR 96
Job Number ER STP 0161(26)
Reviewed By S. FARNSWORTH
Date 10-16-2012

10			
9			
8			
7			
6			
5			
4			
3			
2	Revised headwall thickness	10/12/12	MS
1	DESCRIPTION	Date	By
Rev.	REVISIONS		

Contractor is to verify that all information shown on drawings has been transferred correctly from the contract documents and is adequate to meet the field conditions. Some dimensions and details may differ slightly from contract drawings to accommodate the manufacturing or the contract documents has been reviewed and found to be acceptable. Production will not commence until receipt of signed, approved shop drawings.

STATE OF VERMONT
CHRISTOPHER M. NICK
NO. 77928
Structural
LICENSED
PROFESSIONAL ENGINEER
10/12/12

Stamp for structural design only

This drawing is based upon information provided from the following documents and/or sources:

Engineer:
Project No:
Drawings:

Specifications:

Other:

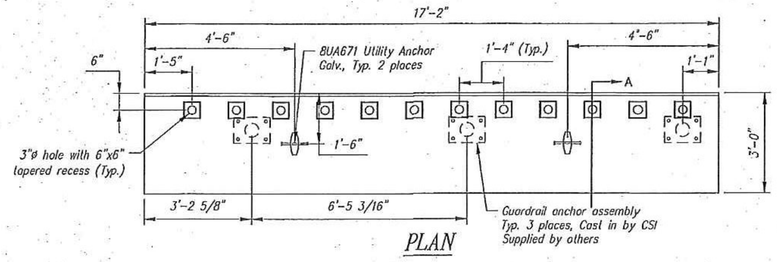
Concrete Systems Inc.
9 Commercial St., Hudson, NH,03051
Phone 603-889-4163
Fax 603-889-2417

STATE AGENCY
VTrans

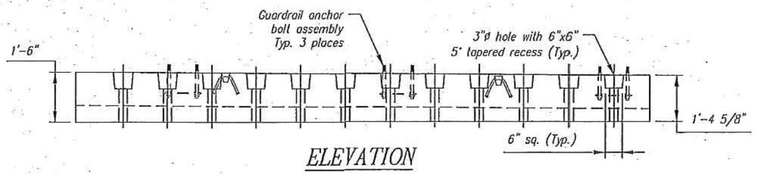
Drawn By	M SCOTT	Date 09/24/2012
Checked By		Date
Approved By		Date

HUBBARDTON ER STP 0161(26)
BRIDGE NO. 96
J.A. McDONALD, INC.
PROPOSED IMPROVEMENT BRIDGE PROJECT
HUBBARDTON, VT

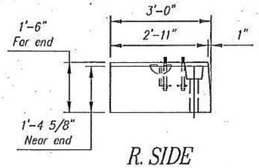
C	SHOP DRAWING HW1A	REV 1
	Drawing No. C21377-HW1A	
Quantity: 1	Project No: ER STP 0161(26)	SHEET 4A OF 7A



PLAN

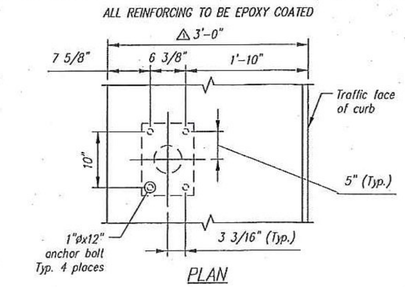


ELEVATION

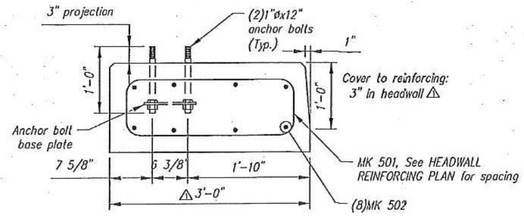


R. SIDE

ALL REINFORCING TO BE EPOXY COATED

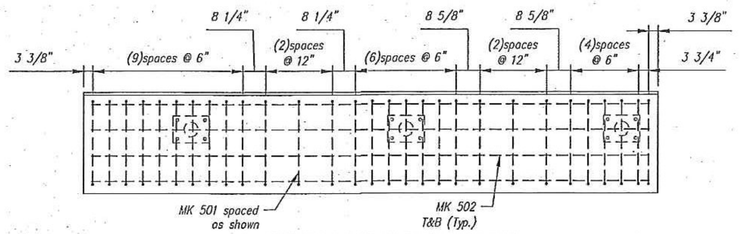


PLAN



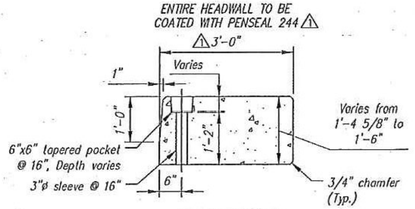
SECTION

GUARDRAIL ANCHOR DETAILS

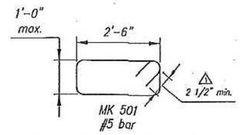


HEADWALL REINFORCING PLAN

ENTIRE HEADWALL TO BE
COATED WITH PENSEAL 244 △



SECTION A



BENDING SCHEDULE

QTY = 1

△ WEIGHT = 5.59 TONS

HW1B - BILL OF MATERIALS / EMBEDS					
	CSI ID#	DESCRIPTION	QTY	UM	COMMENTS
	DTJ	CERTI-VEX PENSEAL 244 WATER REPEL	0.5	GA	
△	EM-00033	3" FOAM CORE PVC	8.17	FT	
	EM-00115	UTILITY ANCHOR #8UA671-GALVANIZED	2	EA	
△	RM-00016	REBAR #5 EPOXY- GR 60 40'	329	LB	
	SBO	GUARDRAIL ANCHOR ASSY W/4 BOLTS	3	EA	
△	MX-FA5000SC20	MIX DSGN - FLY ASH - 5000 - SELF COMP.	2.76	CY	

All Rebar to be Epoxy Coated

△ Headwall Rebar Schedule			
MK	QTY	LENGTH	
501	#5	26	6 ' 8 "
502	#5	6	16 ' 10 "
503	#5	6	1 ' 0 "
504	#5	4	8 ' 8 "

SHOP DRAWING REVIEW

REVIEWED AS REQUIRED BY THE CONSTRUCTION CONTRACT DOCUMENTS AND APPROVED, BUT ONLY FOR CONFORMANCE TO THE DESIGN CONCEPT OF THE WORK AND SUBJECT TO FURTHER LIMITATIONS AND REQUIREMENTS CONTAINED IN THE CONSTRUCTION CONTRACT DOCUMENTS.

☐ REJECTED ☐ REVISE AND RESUBMIT ☐ FURNISH AS CORRECTED

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Vanasse Daugen Brustlin, Inc.
7056 US Route 7
North Pernstown, VT 05473
802.425.2066

Job Number: HUBBARDTON BR96 ER STP 0161(26)
Reviewed By: S. FARNSWORTH
Date: 10-16-2012

10			
9			
8			
7			
6			
5			
4			
3			
2	Revised headwall thickness	10/12/12	MS
1	DESCRIPTION	Date	By
Rev.	REVISIONS		

STATE OF VERMONT
CHRISTOPHER M. WICK
NO. 77928
Structural
LICENSED
PROFESSIONAL ENGINEER
10/12/12

Stamp for structural design only

This drawing is based upon information provided from the following documents and/or sources:

Engineer:
Project No:
Drawings:

Specifications:

Other:

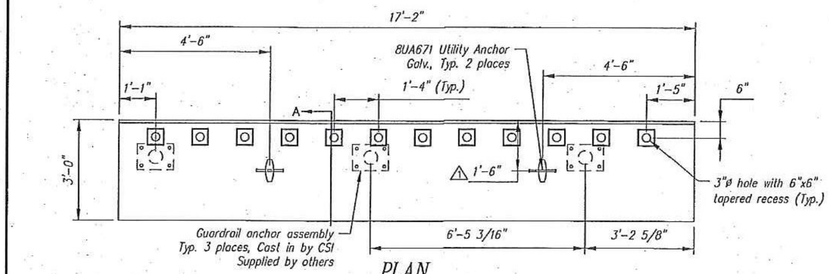
Concrete Systems Inc.
9 Commercial St., Hudson, NH,03051
Phone 603-889-4163
Fax 603-889-2417

STATE AGENCY
VTrans

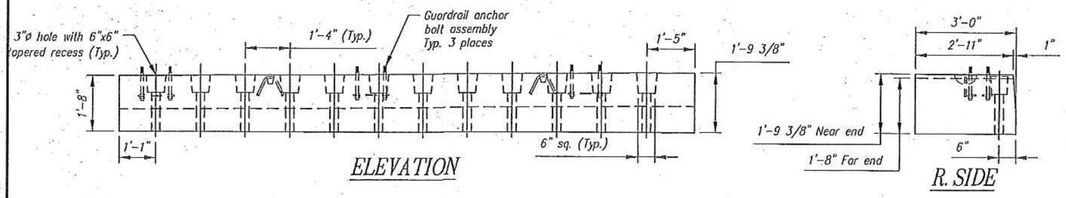
Drawn By	M SCOTT	Date 09/24/2012
Checked By		Date
Approved By		Date

HUBBARDTON ER STP 0161(26)
BRIDGE NO. 96
J.A. McDONALD, INC.
PROPOSED IMPROVEMENT BRIDGE PROJECT
HUBBARDTON, VT

C	SHOP DRAWING HW1B		REV 1
	Drawing No. C21377-HW1B		
Quantity: 1	Project No: ER STP 0161(26)	SHEET 5A OF 7A	

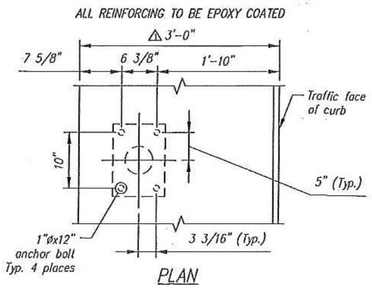


PLAN

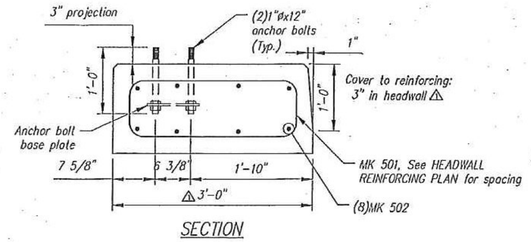


ELEVATION R. SIDE

ALL REINFORCING TO BE EPOXY COATED

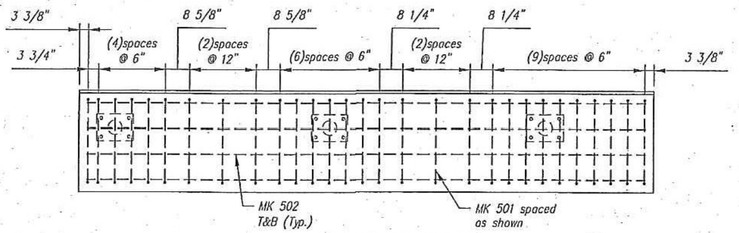


PLAN



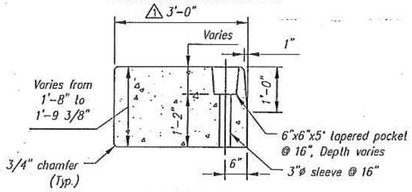
SECTION

GUARDRAIL ANCHOR DETAILS

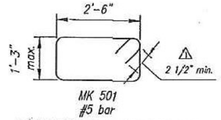


HEADWALL REINFORCING PLAN

ENTIRE HEADWALL TO BE COATED WITH PENSEAL 244 ⚠



SECTION A



BENDING SCHEDULE

QTY = 1
WEIGHT = 4.54 TONS

HW2A - BILL OF MATERIALS / EMBEDS				
CSI ID#	DESCRIPTION	QTY	UM	COMMENTS
DTJ	CERTI-VEX PENSEAL 244 WATER REPEL	0.55	GA	
⚠ EM-00033	3" FOAM CORE PVC	8.17	FT	
EM-00115	UTILITY ANCHOR #8UA671-GALVANIZED	2	EA	
⚠ RM-00016	REBAR #5 EPOXY- GR 60 40'	339	LB	
SBO	GUARDRAIL ANCHOR ASSY W/4 BOLTS	3	EA	
⚠ MX-FA5000SC20	MIX DSGN - FLY ASH - 5000 - SELF COMP.	2.24	CY	

All Rebar to be Epoxy Coated

Headwall Rebar Schedule			
⚠ MK	QTY	LENGTH	
501	#5	26	7 ' 0 "
502	#5	6	16 ' 10 "
503	#5	6	1 ' 0 "
504	#5	4	9 ' 0 "

SHOP DRAWING REVIEW

REVIEWED AS REQUIRED BY THE CONSTRUCTION CONTRACT DOCUMENTS AND APPROVED, BUT ONLY FOR CONFORMANCE TO THE DESIGN CONCEPT OF THE WORK, AND SUBJECT TO FURTHER LIMITATIONS AND REQUIREMENTS CONTAINED IN THE CONSTRUCTION CONTRACT DOCUMENTS

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VHB Vanasse Hangen Brustlin, Inc. 7056 US Route 7 North Ferrisburgh, VT 05473 802.425 7700

HUBBARDTON BR96
Job Number ER STP 0161(26)
Reviewed By S. FARNSWORTH
Date 10-16-2012

Rev.	Date	By	DESCRIPTION REVISIONS
1	10/12/12	MS	Revised headwall thickness
2			
3			
4			
5			
6			
7			
8			
9			
10			

Contractor is to verify that all information shown on drawings has been thoroughly checked, complies with the contract documents and is adequate to meet the field conditions. Some dimensions and details may differ between those shown on this drawing and those detailed from the design process. Approval of this drawing does not relieve from the contract documents has been reviewed and found to be acceptable. Production will not commence until receipt of signed, approved shop drawings.

STATE OF VERMONT
CHRISTOPHER M. VOLZ
NO. 77928
Structural
LICENSED
PROFESSIONAL ENGINEER
10/12/12

Stamp for structural design only

This drawing is based upon information provided from the following documents and/or sources:
Engineer:
Project No:
Drawings:
Specifications:
Other:

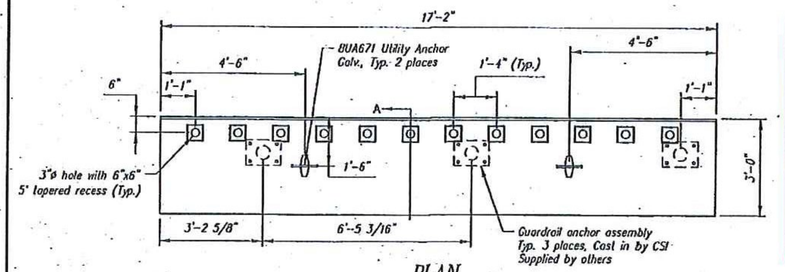
CSI Concrete Systems Inc.
9 Commercial St., Hudson, NH,03051
Phone 603-889-4163
Fax 603-889-2417

STATE AGENCY
VTrans

Drawn By	M SCOTT	Date 09/24/2012
Checked By		Date
Approved By		Date

HUBBARDTON ER STP 0161(26)
BRIDGE NO. 96
J.A. McDONALD, INC.
PROPOSED IMPROVEMENT BRIDGE PROJECT
HUBBARDTON, VT

C | SHOP DRAWING HW2A | REV 1
Drawing No. C21377-HW2A
Quantity: 1 | Project No: ER STP 0161(26) | SHEET 6A OF 7A



PLAN

SHOP DRAWING REVIEW

☐ REVISED AS NOTED BY THE CONSTRUCTION CONTRACT DOCUMENTS AND APPROVED, BUT ONLY FOR CONFORMANCE TO THE DESIGN CONCEPT OF THE WORK AND SUBJECT TO FURTHER LIMITATIONS AND RESPONSIBILITIES CONTAINED IN THE CONSTRUCTION CONTRACT DOCUMENTS

☐ REJECTED ☐ REVISE AND RESUBMIT ☒ APPROVED AS CORRECTED

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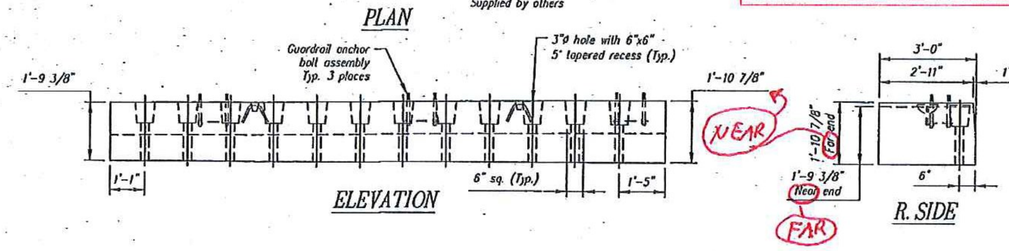
Vanasse Hangen Brustlin, Inc. 7056 US Route 7 North Ferrisburgh, VT 05473 802 425 7799

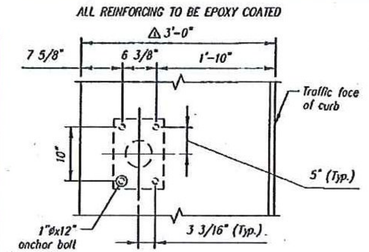
Job Number GR STP 0161(26) Reviewed By: J. FARNSWORTH Date: 10-16-2012



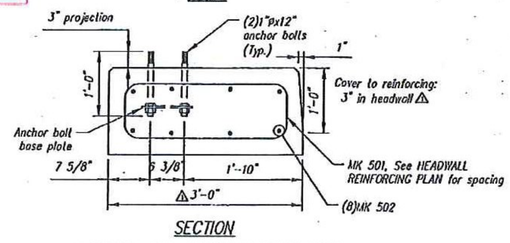
ELEVATION

R. SIDE

ALL REINFORCING TO BE EPOXY COATED

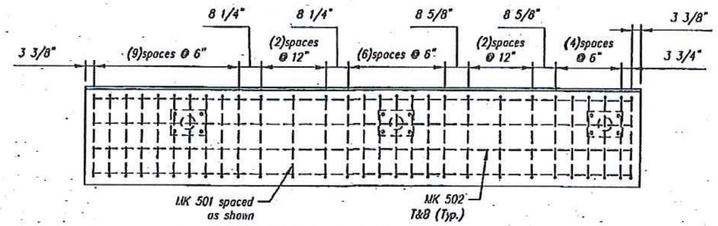


PLAN



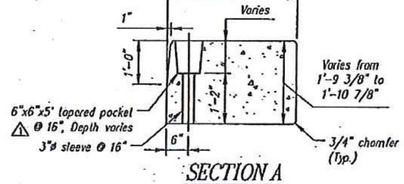
SECTION

GUARDRAIL ANCHOR DETAILS

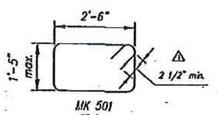


HEADWALL REINFORCING PLAN

ENTIRE HEADWALL TO BE COATED WITH PENSEAL 244 ⚠



SECTION A



BENDING SCHEDULE

QTY = 1
WEIGHT = 7.03 TONS

HW2B - BILL OF MATERIALS / EMBEDS				
CSI ID#	DESCRIPTION	QTY	UM	COMMENTS
DTJ	CERTI-VEX PENSEAL 244 WATER REPEL	0.55	GA	
EM-00033	3" FOAM CORE PVC	8.17	FT	
EM-00115	UTILITY ANCHOR #8UA671-GALVANIZED	2	EA	
RM-00016	REBAR #5 EPOXY- GR 60 40'	355	LB	
SBO	GUARDRAIL ANCHOR ASSY W/4 BOLTS	3	EA	
MX-FA5000SC20	MIX DSGN - FLY ASH - 5000 - SELF COMP.	3.47	CY	

All Rebar to be Epoxy Coated

Headwall Rebar Schedule			
MK	QTY	LENGTH	
501	#5	26	7 ' 6 "
502	#5	6	16 ' 10 "
503	#5	6	1 ' 0 "
504	#5	4	9 ' 6 "

Rev.	Date	By	DESCRIPTION
1	10/12/12	MS	Revised headwall thickness
2			
3			
4			
5			
6			
7			
8			
9			
10			

REVISIONS

Contractor is to verify that all information shown on drawings has been thoroughly checked, complies with the contract documents and is adequate to suit actual field conditions. Some dimensions and details may differ slightly from those shown on contract drawings due to accommodate the manufacturer design process. Approval of this drawing indicates that any deviation from the contract documents has been reviewed and found to be acceptable. Production will not commence until receipt of signed, approved shop drawings.

STATE OF VERMONT CHRISTOPHER M. WICK NO. 77020 Structural LICENSED PROFESSIONAL ENGINEER 10/12/12

Stamp for structural design only

This drawing is based upon information provided from the following documents and/or sources:
Engineer:
Project No:
Drawings:
Specifications:
Other:

Concrete Systems Inc.
9 Commercial St., Hudson, NH,03051
Phone 603-889-4163
Fax 603-889-2417

STATE AGENCY VTrans

Drawn by	M SCOTT	Date 09/24/2012
Checked by		Date
Approved by		Date

HUBBARDTON ER STP 0161(26)
BRIDGE NO. 96
J.A. McDONALD, INC.
PROPOSED IMPROVEMENT BRIDGE PROJECT
HUBBARDTON, VT

C | Drawing No. SHOP DRAWING HW2B | REV 1
C21377–HW2B

Quantity: 1 | Project No: ER STP 0161(26) | SHEET 7A OF 7A

VHB *Vanasse Hangen Brustlin, Inc.*
Transportation | Land Development | Environmental Services

October 2, 2012

Ref: 57478.02

Mr. Christopher M. Vick, P.E.
Concrete Systems, Inc.
9 Commercial Street
Hudson, NH 03051

Re: CSI Job No. C21377 -
Hubbardton ER STP 0161(27) - Bridge 98 – 14' x 6' Precast Box & T-Walls
J. A. McDonald - General Contractor

Dear Mr. Vick:

The following **Precast Box and T-Wall details** [Item # 540.10 PRECAST CONCRETE STRUCTURE (14'-0" x 6'-0" x 34'-3" BOX] for the above project transmitted with CSI emails as noted below have been reviewed and are being returned herewith.

Precast Concrete Box, Revised Plans #2 submitted on 10-2-2012 at 3:13 PM

1. Plan sheet 1B of 1B, Rev #2, dated 10-02-2012, is Approved
2. Plan sheet 1B of 3B, Rev #1, dated 10-02-2012, Furnish as Corrected
3. Plan sheet 2B of 3B, Rev #1, dated 10-02-2012, is Approved
4. Plan sheet 3B of 3B, Rev #1, dated 10-02-2012, Furnish as Corrected
5. Plan sheet 1 of 1, Drawing No. C21377 - CW1, dated 9-21-2012, is Approved

Precast Wall System - Concrete T-Walls – The Neel, Company - Plans submitted on 9-27-2012 at 10:54 AM

1. These plan sheets 1 to 7 of 7, dated 9-25-2012, are Approved

You must provide notice to VTrans Structural Concrete Engineer, Jim Wild, as to the date fabrication represented by these drawings will begin. **A minimum of five working days notification must be provided to the Structural Concrete Engineer, Jim Wild as per specification 540.06.** You can contact Jim Wild by phone at (802) 828-6931 or email at jim.wild@state.vt.us . **Any material fabricated prior to the notification date is subject to rejection without further cause.**

Should you need further information or have any questions, please feel free to reach me at sfarnsworth@vhb.com or at (802) 425-7788 x6423.

Very truly yours,

VANASSE HANGEN BRUSTLIN, INC.

Sherward G. Farnsworth

Sherward G. Farnsworth, P.E.
Senior Project Manager

SGF/sgf
Enclosures

7056 US Route 7
Post Office Box 120
North Ferrisburgh, VT 05473
802.425.7788 • FAX 802.425.7799
www.vhb.com

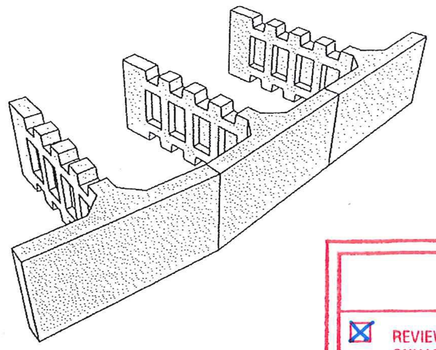
Vanasse Hangen Brustlin, Inc.

Re: **CSI Job No. C21377 -**
Hubbardton ER STP 0161(27) - Bridge 98 – 14' x 6' Precast Box & T-Walls
J. A. McDonald - contractor

Copy

[X] VTrans Resident Engineer Tim Pockette (prints) via email & US mail
[X] Contractor JA MacDonald Att: Eric Boyden (prints) via email & US mail
[X] VTrans Regional Construction Engineer – Mark Mackintosh (letter) via email & US mail
[X] VTrans Consultant Project Manager - Mark Sargent (prints) via email & US mail
[X] VTrans Materials & Research Section (C&IA Unit) Att: Chris Rea – (Letter only)) via email & US mail –
--- Note Chris – Water Repellant, Silane (Vexcon Chemicals, Inc – Certi-Vex Penseal 244) is a conditional approval for 2012 --- being used at CSI

[X] VTrans Structural Concrete Engineer – Jim Wild (prints) via email & US mail
[X] VHB Project Manager – Sherward Farnsworth - Project electronic files 57478.02



RTE. 30 BRIDGE IMPROVEMENTS
BRIDGE NO. 98
TOWN OF HUBBARDTON, VT
ER STP 0161 (27)

T-WALL®
RETAINING WALL SYSTEM

SHOP DRAWING REVIEW

☒ REVIEWED AS REQUIRED BY THE CONSTRUCTION CONTRACT DOCUMENTS AND APPROVED, BUT ONLY FOR CONFORMANCE TO THE DESIGN CONCEPT OF THE WORK, AND SUBJECT TO FURTHER LIMITATIONS AND REQUIREMENTS CONTAINED IN THE CONSTRUCTION CONTRACT DOCUMENTS.

☐ REJECTED ☐ REVISE AND RESUBMIT ☐ FURNISH AS CORRECTED

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Vanasse Hangen Brustlin, Inc.
7056 US Route 7
North Ferrisburgh, VT 05473
802.425.7788

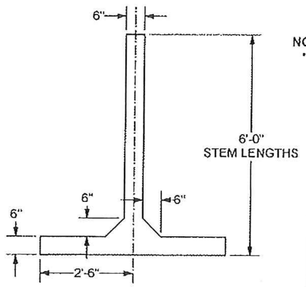
Job Number: HUBBARDTON ER STP 0161(27)
Reviewed By: S. FARNSWORTH
Date: 9-28-2012

DESIGNER

THE NEEL COMPANY
8328-D TRAFORD LANE
SPRINGFIELD, VIRGINIA 22152
PH: (703) 913-7858
FX: (703) 913-7859
WEB: WWW.NEELCO.COM

PRECASTER

CSI
Concrete Systems Inc.
9 Commercial St., Hudson, NH,03051
Phone 603-889-4163
Fax 603-889-2417
Web www.csigroup.biz

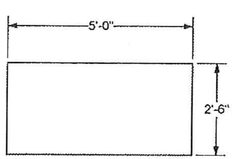


TOP VIEW

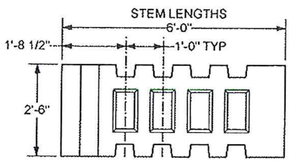
NOTES:
- UNIT STEM LENGTHS RANGE FROM 4'-0" TO 20'-0", IN 2'-0" INCREMENTS

T-WALL® UNIT WEIGHTS

PANEL TYPES	WEIGHTS
2.5x5.0x04 Std	1574 lbs
2.5x5.0x06 Std	1836 lbs
2.5x5.0x08 Std	2098 lbs
2.5x5.0x10 Std	2360 lbs
2.5x5.0x12 Std	2622 lbs
2.5x5.0x14 Std	2884 lbs
2.5x5.0x16 Std	3145 lbs
2.5x5.0x18 Std	3407 lbs
2.5x5.0x20 Std	3669 lbs



FRONT VIEW



SIDE VIEW

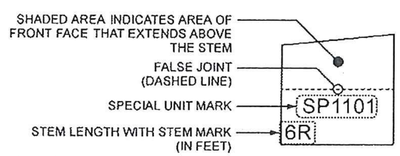
TYPICAL 2'-6" x 5'-0" x 6'-0" STEM T-WALL® UNIT

0 1/2" 1" 1 1/2" 2"
SHEET SCALE

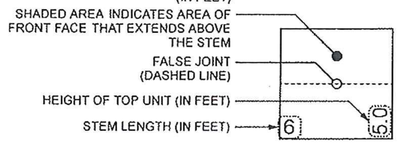
INDEX OF DRAWINGS

SHEET	TITLE	REV	DATE
1	COVER SHEET		9-25-2012
2	T-WALL® NOMENCLATURE AND TYPICAL SYSTEM DETAILS		9-25-2012
3	GENERAL T-WALL® NOTES		9-25-2012
4	PLAN, ELEVATIONS, SECTION & QUANTITIES		9-25-2012
5	STANDARD UNITS		9-25-2012
6	SLOPED TOP SPECIAL UNITS		9-25-2012
7	SLOPED TOP REDUCED HEIGHT STEM SPECIAL UNITS		9-25-2012

LEGEND



SPECIAL TOP T-WALL® UNIT (FRONT FACE HEIGHT VARIES)



STANDARD TOP T-WALL® UNIT (FRONT FACE HEIGHT VARIES)

STANDARD 2'-6" T-WALL® UNIT

TYPICAL PANEL NOTATION
NO SCALE

The design contained on these drawings is based upon information provided by the owner. On the basis of this information, The Neel Company has designed, and is responsible for, the internal stability of the structure only. External stability, including foundation and slope stability, is the responsibility of the owner.

PRECASTER: CONCRETE SYSTEMS INC. HUDSON, NH
PROJECT #: T21377

CONTRACTOR: J. A. MCDONALD INC. LYNDON CENTER, VERMONT
PROJECT #:

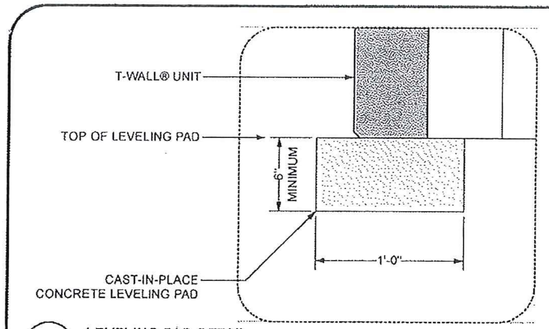
DESIGNER
THE NEEL COMPANY
8328-D TRAFORD LANE
SPRINGFIELD, VIRGINIA 221
PH: (703) 913-7858
FX: (703) 913-7859
WEB: WWW.NEELCO.COM
PROJECT #: TW4083

STATE OF VERMONT
CERTIFIED WITH RESPECT TO INTERNAL STABILITY OF T-WALL® STRUCTURES ONLY
THOMAS C. NEEL
6584
PROFESSIONAL ENGINEER

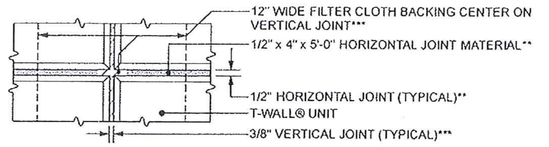
REVISIONS

RTE. 30 BRIDGE IMPROVEMENTS
BRIDGE NO. 98
TOWN OF HUBBARDTON, VT
ER STP 0161 (27)
SHOP DRAWINGS
COVER SHEET
T-WALL® RETAINING WALL SYSTEM

SCALE:	NO SCALE
DATE:	9-25-2012
DESIGNED BY:	NN
DRAWN BY:	HS
CHECKED BY:	NN
SHEET:	1



4 LEVELING PAD DETAIL
Scale: 2" = 1'-0"



3 HORIZONTAL AND VERTICAL JOINT DETAIL
Scale: 2" = 1'-0"
** SEE GENERAL NOTE 4 ON SHEET 3 FOR ADDITIONAL DETAILS
*** SEE GENERAL NOTE 5 ON SHEET 3 FOR ADDITIONAL DETAILS

NOMENCLATURE NOTE:

THIS SHEET IS PROVIDED FOR GENERAL INFORMATION PURPOSES ONLY, REFERENCING STANDARD DETAILS APPLICABLE TO ANY T-WALL® STRUCTURE. THIS SHEET IS NOT INTENDED TO PROVIDE DETAILS SPECIFIC TO THE WALL STRUCTURES CONTAINED IN THIS DRAWING PACKAGE. FOR INFORMATION SPECIFIC TO THESE WALLS, SEE THE APPLICABLE DRAWING SHEETS.

SHEAR KEY NOTES:

1. WALL IS DESIGNED FOR SPECIFIC NUMBER OF SHEAR KEYS AS SHOWN IN "TYPICAL SECTION AT MAXIMUM HEIGHT" FOR SPECIFIC WALLS. LOCATION OF SHEAR KEYS CAN BE ADJUSTED IF NECESSARY AT A SPECIFIC LEVEL.
2. ALL EXTENDED FACE TOP UNITS REQUIRE A MINIMUM OF 2 SHEAR KEYS, OR 1 SHEAR KEY FOR EVERY 6' OF STEM LENGTH (OR FRACTION THEREOF), WHICHEVER IS GREATER.
3. ALL OTHER UNITS REQUIRE 1 SHEAR KEY FOR EVERY 6' OF STEM LENGTH AS SHOWN IN TABLE BELOW.

SHOP DRAWING REVIEW

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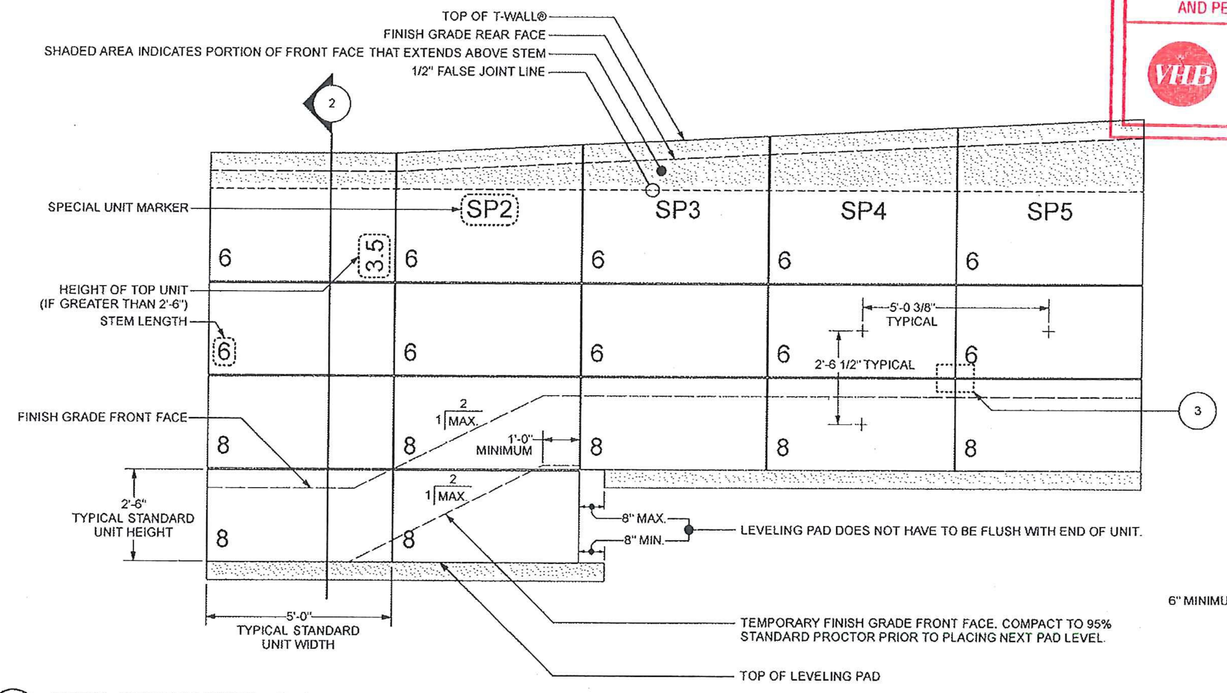
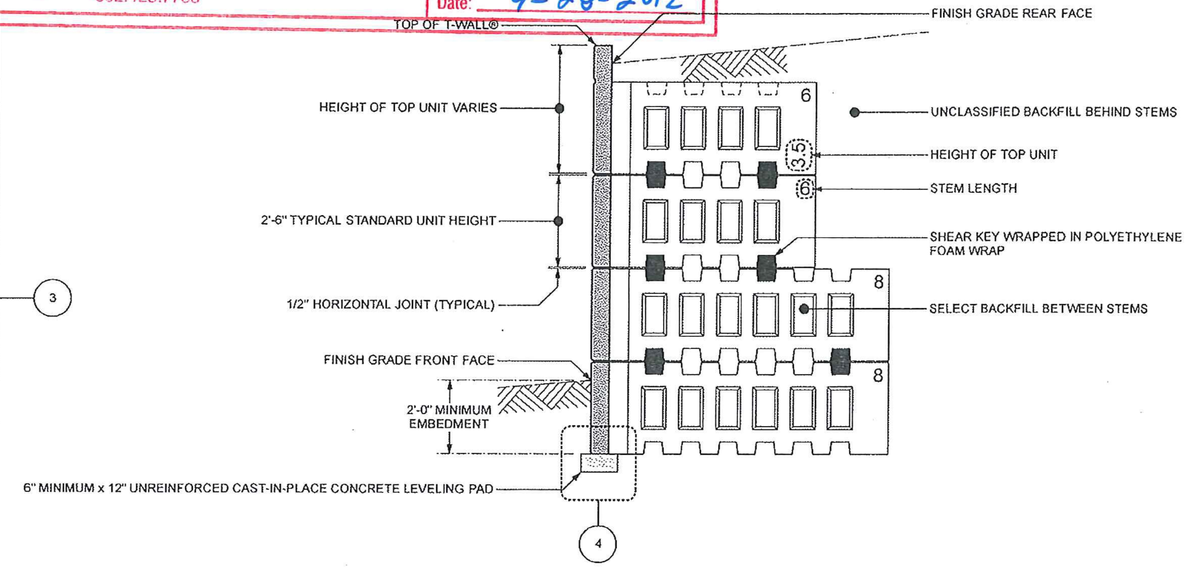
VHB Vanasse Hangen Brustlin, Inc.
7056 US Route 7
North Ferrisburgh, VT 05473
802.425.7788

Job Number: HUBBARDTON BRSTP 0161(27)
Reviewed By: S. FARNSWORTH
Date: 9-28-2012



1 PARTIAL ELEVATION SHOWN - TYPICAL DETAILS
Scale: 1/2" = 1'-0"

NOT ALL DETAILS APPLY. SEE SPECIFIC WALL ELEVATIONS



2 PARTIAL ELEVATION SHOWN - TYPICAL DETAILS
Scale: 1/2" = 1'-0"

NOT ALL DETAILS APPLY. SEE SPECIFIC WALL ELEVATIONS

0 1/2" 1" 1 1/2" 2"
SHEET SCALE

PRECASTER: CONCRETE SYSTEMS INC. HUDSON, NH
PROJECT #: T21377

CONTRACTOR: J. A. MCDONALD INC. LYNDON CENTER, VERMONT
PROJECT #:

DESIGNER
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PH: (703) 913-7858
FX: (703) 913-7859
WEB: WWW.NEELCO.COM
PROJECT #: TW4083

STATE OF VERMONT — CERTIFIED WITH RESPECT TO INTERNAL STABILITY OF T-WALL® STRUCTURES ONLY — THOMAS C. NEEL — 6584 — PROFESSIONAL ENGINEER

REVISIONS

RTE. 30 BRIDGE IMPROVEMENTS
BRIDGE NO. 98
TOWN OF HUBBARDTON, VT
ER STP 0161 (27)
SHOP DRAWINGS
T-WALL® NOMENCLATURE AND TYPICAL SYSTEM DETAILS
T-WALL® RETAINING WALL SYSTEM

SCALE:	AS NOTED
DATE:	9-25-2012
DESIGNED BY:	NN
DRAWN BY:	HS
CHECKED BY:	NN
SHEET:	2

UTILITIES NOTES:

1. THE CONTRACTOR SHALL VERIFY LOCATION OF ALL EXISTING UTILITIES (HORIZONTAL AND VERTICAL) PRIOR TO CONSTRUCTION.

2. CONTRACTOR SHALL NOTIFY OTHER PUBLIC UTILITIES (GAS, PHONE, ELECTRIC, CABLE TV, WATER, SEWER, ETC.) TO MAKE ALL NECESSARY ADJUSTMENTS TO RESPECTIVE FACILITIES BEFORE START OF CONSTRUCTION OF T-WALL®'S LEVELING PAD.

3. ANY EXISTING UTILITIES THAT ARE LOCATED WITHIN THE STEM AREA OF THE T-WALL® UNITS MUST BE RELOCATED. ALL UTILITIES MUST STAY CLEAR OF T-WALL® STEM BY 2'-0".

4 T-WALL® UNIT AND UTILITY CONFLICTS:
- FIELD CUTTING OF T-WALL® UNITS TO AVOID UTILITY CONFLICTS (NOT SHOWN ON CONTRACT DRAWINGS) IS PROHIBITED UNTIL IT IS BROUGHT TO THE DESIGNER'S ATTENTION. THE NEEL COMPANY SHALL PROVIDE DIRECTION AND / OR REDESIGN T-WALL® UNITS TO AVOID CONFLICTS.

SHOP DRAWING REVIEW

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Vanasse Hangen Brustlin, Inc.
7056 US Route 7
North Ferrisburgh, VT 05473
802.425.7788

Job Number: HUBBARTON ERSTP 0161(27)
Reviewed By: S. GEARNSHORTY
Date: 9-28-202

SPECIAL NOTES:

1. THESE DRAWINGS WERE PREPARED BASED ON INFORMATION GIVEN IN THE FOLLOWING:
   - CONTRACT DRAWINGS:
     - STATE OF VERMONT, AGENCY OF TRANSPORTATION PROPOSED IMPROVEMENT BRIDGE PROJECT PREPARED BY VHB DATED 7/16/2012
     - CAD DRAWING OF CULVERT FOR BRIDGE 98 PREPARED BY CSI, RECEIVED ELECTRONICALLY ON SEPT 14 2012
   - GEOTECHNICAL REPORT:
     - BASED ON CONTRACT DRAWINGS. NO GEOTECHNICAL REPORT PROVIDED FOR SHOP DRAWINGS.

2. REPORT DISCREPANCIES BETWEEN CONTRACT INFORMATION AND ACTUAL CONDITIONS AS SITE WORK PROGRESSES TO THE NEEL COMPANY FOR REDESIGN. NO LIABILITY IS ACCEPTED FOR INACCURATE INFORMATION SUPPLIED BY OTHERS.

3. THE FOLLOWING ASSUMPTIONS WERE MADE:
   - FOUNDATION IS ABLE TO SUPPORT BEARING PRESSURE SHOWN IN SPECIAL NOTES 4 WITH AN ACCEPTABLE FACTOR OF SAFETY.

4 APPLIED BEARING PRESSURE AT MAXIMUM HEIGHT:
ALL WINGWALLS = 3,662 PSF (FACTORED)

5. THE DESIGN CONTAINED ON THESE DRAWINGS IS BASED UPON INFORMATION PROVIDED BY THE OWNER. ON THE BASIS OF THIS INFORMATION, THE NEEL COMPANY HAS DESIGNED, AND IS RESPONSIBLE FOR, THE INTERNAL STABILITY OF THE STRUCTURE ONLY. EXTERNAL STABILITY, INCLUDING FOUNDATION AND SLOPE STABILITY, IS THE RESPONSIBILITY OF THE OWNER.

6. THE NEEL COMPANY HAS NOT PERFORMED GLOBAL STABILITY SETTLEMENT AND BEARING CAPACITY ANALYSIS FOR THE WALL FOUNDATION. THESE ANALYSES WILL BE THE RESPONSIBILITY OF OTHERS.

7. DRAINAGE:
   - THE NEEL COMPANY HAS NOT PERFORMED A DRAINAGE ANALYSIS FOR THIS WALL SITE. IT IS THE OWNER'S RESPONSIBILITY TO ASSURE THAT SURFACE RUN-OFF IS DIVERTED AWAY FROM THE WALL.

8. SELECT BACKFILL GRADATION AND COMPACTION:
   - BACKFILL GRADATION AND COMPACTION BETWEEN STEMS AND AROUND PIPES ARE IMPORTANT TO THE WALL STABILITY. THE OWNER'S GEOTECHNICAL ENGINEER SHOULD PROVIDE SUFFICIENT TESTING TO INSURE COMPLIANCE WITH THE SELECT BACKFILL GRADATION AND COMPACTION SPECIFICATIONS NOTED ON THIS SHEET. PLACEMENT OF LOOSE LIFT OF BACKFILL SHALL NOT EXCEED 12 INCHES.

9. T-WALL® FACE FORM FINISH:
   - PLAIN STEEL FORM FINISH

GENERAL NOTES:

1 PRIMARY REFERENCE.
- AASHTO, LRFD BRIDGE DESIGN SPECIFICATIONS, 4th EDITION 2004 (WITH INTERIMS)

2. SELECT BACKFILL BETWEEN STEMS:
   - ANGLE OF INTERNAL FRICTION - 34° (MINIMUM)
   - DENSITY - 120 pcf (MINIMUM)
   - 5% MAXIMUM PASSING #200 SIEVE
   - 100% PASSING 3" SIEVE
   - 95% STANDARD COMPACTION (ASTM D-698)

3. UNCLASSIFIED BACKFILL BEHIND STEMS:
   - ANGLE OF INTERNAL FRICTION - 30°
   - DENSITY - 120 pcf
   - 95% STANDARD COMPACTION (ASTM D-698)

4. HORIZONTAL JOINT:
   - 1/2 INCH ASPHALT EXPANSION JOINT MATERIAL PER ASTM D-994 AS SHOWN ON DEVELOPED ELEVATIONS.

5. VERTICAL JOINT:
   - 3/8 INCH SPACE
   - 12 INCHES WIDE FILTER CLOTH BACKING CENTERED AT JOINT, UNLESS OTHERWISE NOTED.
   - FILTER CLOTH BACKING: MIRAFI 160N OR EQUAL

6. OVERALL DIMENSIONAL TOLERANCES FOR FINISHED WALL:
   - VERTICAL ALIGNMENT (PLUMBNESS) - 3/4 INCH IN 10 FEET
   - HORIZONTAL ALIGNMENT (LINE) - 3/4 INCH IN 10 FEET

7 FOUNDATION:
- PROOF-ROLL THE FOUNDATION SUBGRADE ALONG THE ENTIRE WALL LENGTH PRIOR TO CONSTRUCTION OF THE T-WALL®. A GEOTECHNICAL ENGINEER MUST INSPECT THE EXCAVATED FOUNDATION SUBGRADE AND PROOF-ROLLING ACTIVITIES. ANY SOFT OR UNSUITABLE MATERIALS IDENTIFIED BY INSPECTION SHALL BE REMOVED AND REPLACED WITH COMPACTED STRUCTURAL BACKFILL AS DIRECTED BY THE ENGINEER. CONTRACTOR TO PROVIDE SUFFICIENT DEWATERING SO THAT THE EXCAVATIONS ARE DRY ENOUGH FOR INSPECTION, TESTING AND CONSTRUCTION.

8. CAST-IN-PLACE CONCRETE LEVELING PAD:
   - 6 INCHES MINIMUM x 12 INCHES
   - CONCRETE STRENGTH: 2500 psi (MINIMUM) @ 28 DAYS
   - NO REBAR
   - GRADE TOLERANCE - 1/4 INCH IN 10 FEET

9 T-WALL® UNIT REBAR:
- ASTM A615
- Fy = 60 ksi (GRADE 60)
- EPOXY COATED
- WELDING IS NOT PERMITTED

10 T-WALL® UNIT CONCRETE STRENGTH:
- 5000 psi (MINIMUM) @ 28 DAYS

11. SHEAR KEYS:
   - NO REBAR
   - CONCRETE STRENGTH: 5000 psi (MINIMUM) @ 28 DAYS
   - WALL IS DESIGNED FOR SPECIFIC NUMBER OF SHEAR KEYS AS SHOWN IN TYPICAL SECTION FOR SPECIFIC WALLS LOCATION OF SHEAR KEYS CAN BE ADJUSTED IF NECESSARY AT A SPECIFIC LEVEL.
   - SHEAR KEY WRAP:
     - 1/4 INCH POLYETHYLENE FOAM WRAP TWO TIMES AROUND THE SHEAR KEY.
     - SHEAR KEY WRAP: AF250 POLYETHYLENE FOAM

12. CONSTRUCTION:
   - TO BE IN ACCORDANCE WITH T-WALL® CONSTRUCTION MANUAL (v07.04) AND TYPICAL T-WALL® NOMENCLATURE ON SHEET TW-2.
   - T-WALL® CONSTRUCTION MANUAL (v07.04) CAN BE DOWNLOADED FROM OUR WEB SITE AT www.neelco.com, UNDER "Downloads".
   - CONTRACTOR IS RESPONSIBLE FOR THE STABILITY OF ALL EXCAVATED SLOPES. DESIGN AND CONSTRUCTION OF ANY REQUIRED TEMPORARY SUPPORT OF EXCAVATION SHALL ALSO BE THE RESPONSIBILITY OF THE CONTRACTOR.
   - ALL SURFACE RUNOFF IS TO BE DIVERTED AWAY FROM EXCAVATIONS TO AVOID THE DETERIORATION OF THE SUBGRADE SOILS DUE TO EXPOSURE TO MOISTURE.

0 1/2" 1" 1 1/2" 2"
SHEET SCALE

PRECASTER: CONCRETE SYSTEMS INC. HUDSON, NH
PROJECT #: T21377

CONTRACTOR: J. A. MCDONALD INC. LYNDON CENTER, VERMONT
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DESIGNER
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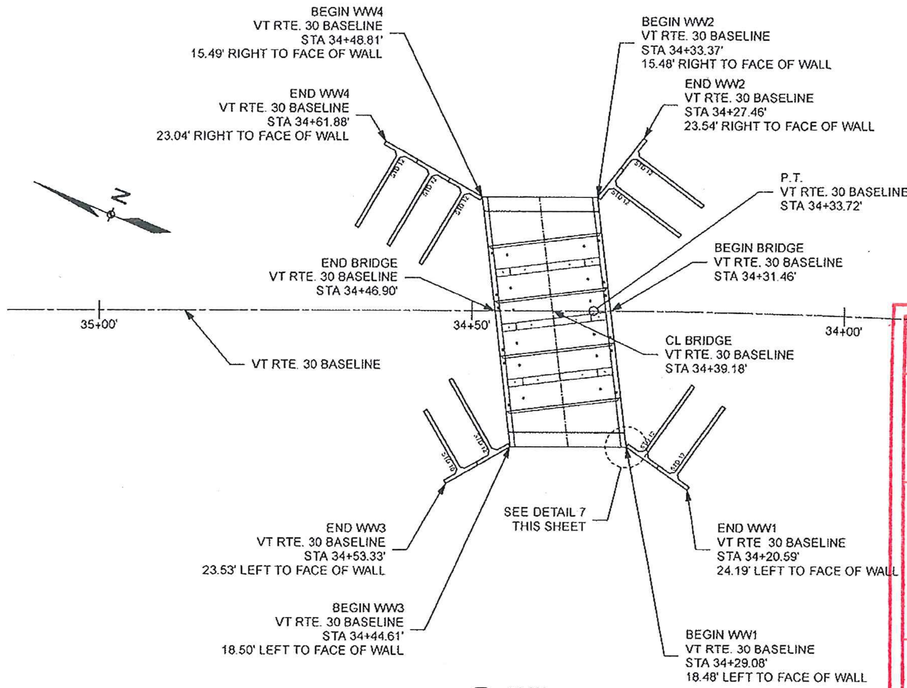
WEB: WWW.NEELCO.COM
PROJECT #: TW4083

STATE OF VERMONT
CERTIFIED WITH RESPECT TO INTERNAL STABILITY OF T-WALL® STRUCTURES ONLY
THOMAS C. NEEL
6584
PROFESSIONAL ENGINEER

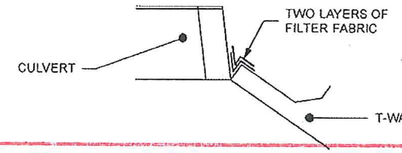
REVISIONS

RTE. 30 BRIDGE IMPROVEMENTS
BRIDGE NO. 98
TOWN OF HUBBARDTON, VT
ER STP 0161 (27)
SHOP DRAWINGS
GENERAL T-WALL® NOTES
T-WALL® RETAINING WALL SYSTEM

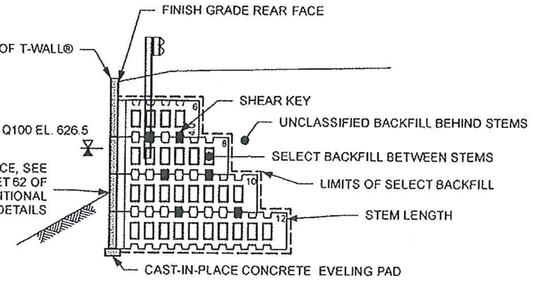
SCALE:	NO SCALE
DATE:	9-25-2012
DESIGNED BY:	NN
DRAWN BY:	HS
CHECKED BY:	NN
SHEET:	3



1 PLAN
Scale: 1" = 10 ft



7 INTERFACE DETAIL (TYP. ALL WALLS)
Scale: 1/2" = 1'-0"



6 TYPICAL SECTION @ MAXIMUM HEIGHT
Scale: 1" = 5 ft.

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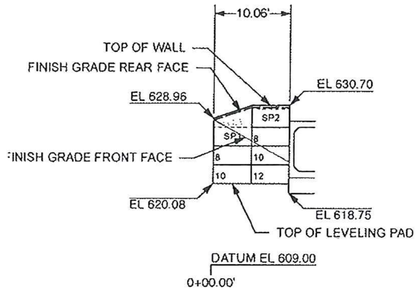
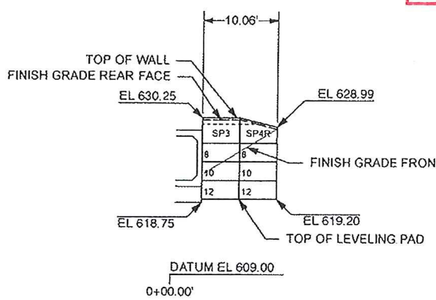
Job Number: HUBBARDTON ER STP 0161 (27)
Reviewed By: S. FARNSWORTH
Date: 9-28-2012

SHIP LOOSE LIST

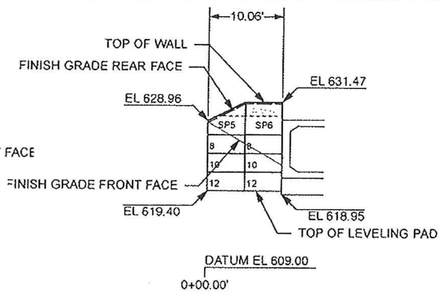
ITEM	QNTY
Shear Keys	57 ea.
AF250 Polyethylene Foam*	0.91 Rolls
1/2" x 4" x 5.00' Horizontal Joint Material**	135.00 LF
Filter Cloth (12" wide)***	68.62 LF



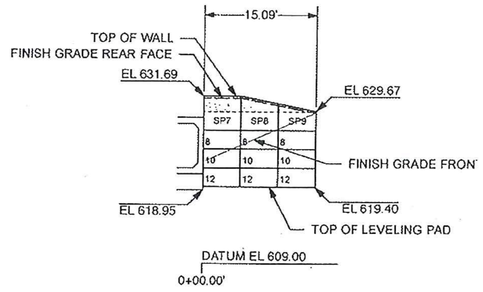
2 WW3 - ELEVATION (FRONT FACE)
Scale: 1" = 10 ft



3 WW1 - ELEVATION (FRONT FACE)
Scale: 1" = 10 ft



4 WW2 - ELEVATION (FRONT FACE)
Scale: 1" = 10 ft



5 WW4 - ELEVATION (FRONT FACE)
Scale: 1" = 10 ft

T-WALL Unit Count for WW3 9/25/12 11:48:24 AM

PANEL TYPE	QNTY (ea)	AREA (sf)	SELECT FILL (cy)
2.5 x 5.0 x 08 Std	2	25.00	6
2.5 x 5.0 x 10 Std	2	25.00	8
2.5 x 5.0 x 12 Std	1	12.50	5
Special Units	2	38.36	5
TOTALS:	7 ea	100.86 sf	24 cy

NOTE: Select backfill quantities are between stems only.

T-WALL Unit Count for WW1 9/25/12 11:46:52 AM

PANEL TYPE	QNTY (ea)	AREA (sf)	SELECT FILL (cy)
2.5 x 5.0 x 08 Std	2	25.00	6
2.5 x 5.0 x 10 Std	2	25.00	8
2.5 x 5.0 x 12 Std	2	25.00	10
Special Units	2	31.05	4
TOTALS:	8 ea	106.05 sf	29 cy

NOTE: Select backfill quantities are between stems only.

T-WALL Unit Count for WW2 9/25/12 11:54:09 AM

PANEL TYPE	QNTY (ea)	AREA (sf)	SELECT FILL (cy)
2.5 x 5.0 x 08 Std	2	25.00	6
2.5 x 5.0 x 10 Std	2	25.00	8
2.5 x 5.0 x 12 Std	2	25.00	10
Special Units	2	38.20	5
TOTALS:	8 ea	113.20 sf	29 cy

NOTE: Select backfill quantities are between stems only.

T-WALL Unit Count for WW4 9/25/12 12:01:15 PM

PANEL TYPE	QNTY (ea)	AREA (sf)	SELECT FILL (cy)
2.5 x 5.0 x 08 Std	3	37.50	10
2.5 x 5.0 x 10 Std	3	37.50	12
2.5 x 5.0 x 12 Std	3	37.50	15
Special Units	3	59.95	7
TOTALS:	12 ea	172.45 sf	43 cy

NOTE: Select backfill quantities are between stems only.

0 1/2" 1" 1 1/2" 2"
SHEET SCALE

PRECASTER: CONCRETE SYSTEMS INC.
HUDSON, NH
PROJECT #: T21377

CONTRACTOR: J. A. MCDONALD INC.
LYNDON CENTER, VERMONT
PROJECT #:

DESIGNER
THE NEEL COMPANY
8328-D TRAFORD LANE
SPRINGFIELD, VIRGINIA 22152
PH: (703) 913-7858
FX: (703) 913-7859
WEB: WWW.NEELCO.COM
PROJECT #: TW4083

STATE OF VERMONT
CERTIFIED WITH RESPECT TO INTERNAL STABILITY OF T-WALL STRUCTURES ONLY
THOMAS C. NEEL
6584
PROFESSIONAL ENGINEER

REVISIONS

RTE. 30 BRIDGE IMPROVEMENTS
BRIDGE NO. 98
TOWN OF HUBBARDTON, VT
ER STP 0161 (27)
SHOP DRAWINGS
PLAN, ELEVATIONS, SECTION & QUANTITIES
T-WALL® RETAINING WALL SYSTEM

SCALE:	AS NOTED
DATE:	9-25-2012
DESIGNED BY:	NN
DRAWN BY:	HS
CHECKED BY:	NN
SHEET:	4

SHOP DRAWING REVIEW

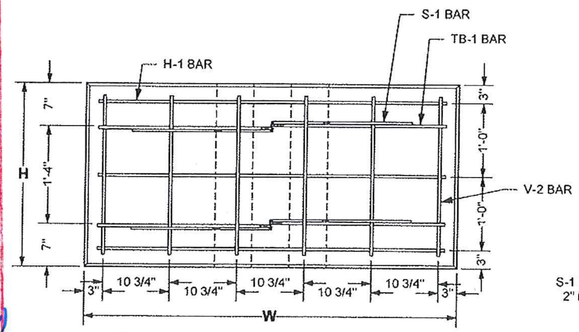
[X] REVIEWED AS REQUIRED BY THE CONSTRUCTION CONTRACT DOCUMENTS AND APPROVED, BUT ONLY FOR CONFORMANCE TO THE DESIGN CONCEPT OF THE WORK, AND SUBJECT TO FURTHER LIMITATIONS AND REQUIREMENTS CONTAINED IN THE CONSTRUCTION CONTRACT DOCUMENTS

[ ] REJECTED [ ] REVISE AND RESUBMIT [ ] FURNISH AS CORRECTED

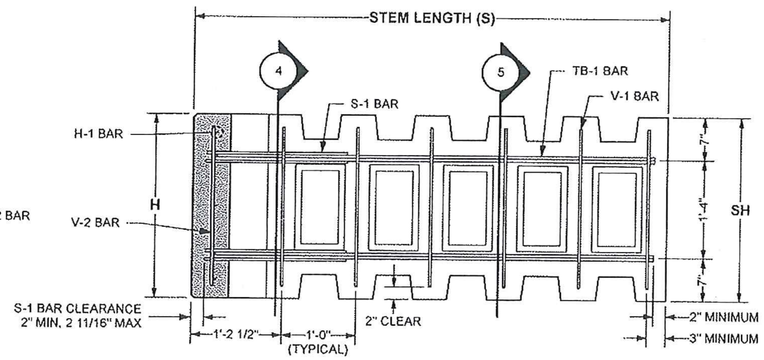
CORRECTIONS OR COMMENTS MADE ON THE SHOP DRAWINGS DURING THIS REVIEW DO NOT RELIEVE CONTRACTOR FROM COMPLIANCE WITH REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS. THIS CHECK IS ONLY FOR REVIEW OF GENERAL CONFORMANCE WITH THE DESIGN CONCEPT OF THE PROJECT AND GENERAL COMPLIANCE WITH THE INFORMATION GIVEN IN THE CONTRACT DOCUMENTS. THE CONTRACTOR IS RESPONSIBLE FOR: CONFIRMING AND CORRELATING ALL QUANTITIES AND DIMENSIONS; SELECTING FABRICATION PROCESSES AND TECHNIQUES OF CONSTRUCTION; COORDINATING HIS WORK WITH THAT OF ALL OTHER TRADES; AND PERFORMING HIS WORK IN A SAFE AND SATISFACTORY MANNER.

Vanasse Hangen Brustlin, Inc.
7056 US Route 7
North Ferrisburgh, VT 05473
802.425.7788

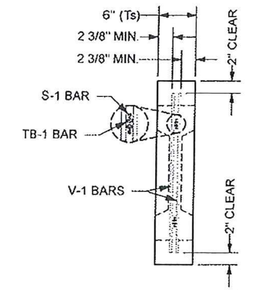
Job Number: HUBBARDTON ER STP 0161 (27)
Reviewed By: S. FARNSWORTH
Date: 9-28-2012



3 FRONT VIEW - 2.5 x 5.0 x 06 Std SHOWN
Scale: 1" = 1'-0" *(V-1 BARS IN STEM OMITTED FOR CLARITY)*



2 SIDE VIEW - 2.5 x 5.0 x 06 Std SHOWN
Scale: 1" = 1'-0"



4 SECTION AT STEM
Scale: 1" = 1'-0"

T-WALL UNIT PROPERTIES

UNIT TYPE	H	W	S	Tf*	Ts	SH	VOLUME*	WEIGHT*
2.5x5.0x06 Std	2'6"	5'0"	6'4 1/2"	6"	6"	2'6"	0.45 cy	1,827 lbs
2.5x5.0x08 Std	2'6"	5'0"	8'4 1/2"	6"	6"	2'6"	0.52 cy	2,088 lbs
2.5x5.0x10 Std	2'6"	5'0"	10'4 1/2"	6"	6"	2'6"	0.58 cy	2,349 lbs
2.5x5.0x12 Std	2'6"	5'0"	12'4 1/2"	6"	6"	2'6"	0.64 cy	2,610 lbs

* VOLUMES AND WEIGHTS ON THIS TABLE ARE BASED ON 6" FACE THICKNESS (Tf)

REBAR SCHEDULES

2.5x5.0x06 Std — HIGHWAY REBAR

Unit Dims	Bar Mark	Qnty	Size	Length	Dim "A"	Bar Weight	Bend Dia	Remarks
H=2'6"	H-1	3 ea	#4	4'8"		9.35 lbs		
W=5'0"	V-1	12 ea	#3	2'2"		9.78 lbs		
S=6'4 1/2"	V-2	6 ea	#3	2'2"		4.89 lbs		
SH=2'6"	S-1	4 ea	#3	3'4 1/2"		5.08 lbs	D= 2 1/4"	
	TB-1	4 ea	#4	8'2"	5'11"	21.81 lbs	D= 3"	
						50.90 lbs		

2.5x5.0x08 Std — HIGHWAY REBAR

Unit Dims	Bar Mark	Qnty	Size	Length	Dim "A"	Bar Weight	Bend Dia	Remarks
H=2'6"	H-1	3 ea	#4	4'8"		9.35 lbs		
W=5'0"	V-1	16 ea	#3	2'2"		13.03 lbs		
S=8'4 1/2"	V-2	6 ea	#3	2'2"		4.89 lbs		
SH=2'6"	S-1	4 ea	#3	3'4 1/2"		5.08 lbs	D= 2 1/4"	
	TB-1	4 ea	#4	10'2"	7'11"	27.16 lbs	D= 3"	
						59.51 lbs		

2.5x5.0x10 Std — HIGHWAY REBAR

Unit Dims	Bar Mark	Qnty	Size	Length	Dim "A"	Bar Weight	Bend Dia	Remarks
H=2'6"	H-1	3 ea	#4	4'8"		9.35 lbs		
W=5'0"	V-1	20 ea	#3	2'2"		16.29 lbs		
S=10'4 1/2"	V-2	6 ea	#3	2'2"		4.89 lbs		
SH=2'6"	S-1	4 ea	#3	3'4 1/2"		5.08 lbs	D= 2 1/4"	
	TB-1	4 ea	#4	12'2"	9'11"	32.50 lbs	D= 3"	
						68.11 lbs		

2.5x5.0x12 Std — HIGHWAY REBAR

Unit Dims	Bar Mark	Qnty	Size	Length	Dim "A"	Bar Weight	Bend Dia	Remarks
H=2'6"	H-1	3 ea	#4	4'8"		9.35 lbs		
W=5'0"	V-1	24 ea	#3	2'2"		19.55 lbs		
S=12'4 1/2"	V-2	6 ea	#3	2'2"		4.89 lbs		
SH=2'6"	S-1	4 ea	#3	3'4 1/2"		5.08 lbs	D= 2 1/4"	
	TB-1	4 ea	#4	14'2"	11'11"	37.84 lbs	D= 3"	
						76.71 lbs		

0 1/2" 1" 1 1/2" 2"
SHEET SCALE

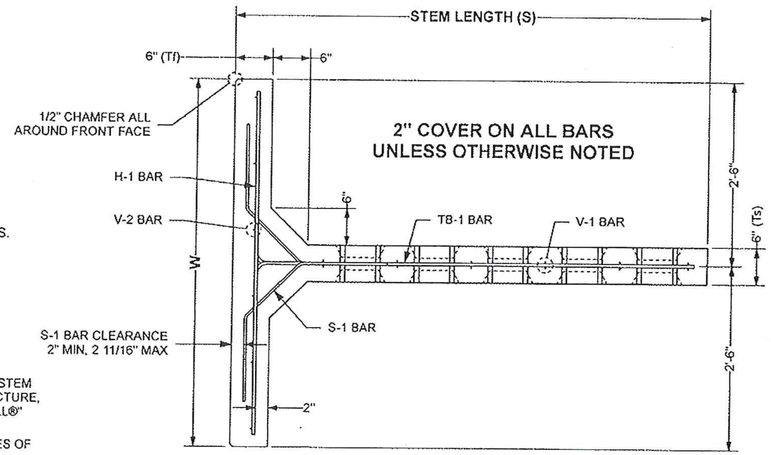
SPECIAL NOTES:

1. FRONT FACE OF T-WALL® UNITS FINISH TREATMENT:
   - PLAIN STEEL FORM FINISH
   - 1/2" CHAMFER ALL AROUND FRONT FACE

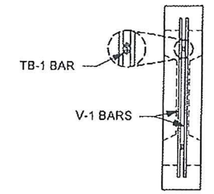
GENERAL NOTES:

1 PRIMARY REFERENCE:
- 2010 AASHTO LRFD BRIDGE SPECIFICATIONS WITH INTERIMS.

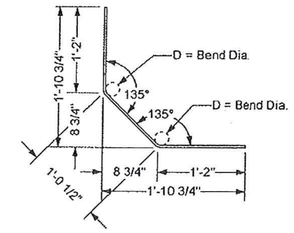
2. T-WALL® CONCRETE:
   - F'c = 5000 psi (MINIMUM) @ 28 DAYS
   - MINIMUM STRIPPING STRENGTH: 2500 psi
3. T-WALL® REINFORCING STEEL:
   - ASTM A615 GRADE 60 EPOXY COATED
   - Fy = 60 ksi (GRADE 60)
   - WELDING IS NOT PERMITTED
4. MARKING OF PRECAST UNITS:
   - CLEARLY MARK EACH PRECAST UNIT ON THE BUTT END OF THE STEM WITH THE UNIT TYPE (i.e. 2.5x5.0x06 STD), THE DATE OF MANUFACTURE, THE LOT NUMBER (IF APPLICABLE), AND THE TRADEMARK "T-WALL®"
5. REINFORCING FABRICATION AND PLACEMENT TOLERANCES:
   - THE STRUCTURAL DESIGN OF PRECAST UNITS ASSUMES 2 INCHES OF CONCRETE COVER OVER ALL REINFORCING BARS.
   - UNLESS OTHERWISE NOTED IN CONTRACT DOCUMENTS OR REFERENCED SPECIFICATIONS, TOLERANCES ON CONCRETE COVER SHALL BE ± 3/8 INCHES.
   - UNLESS OTHERWISE NOTED IN CONTRACT DOCUMENTS OR REFERENCED SPECIFICATIONS, TOLERANCES ON BAR PLACEMENT SHALL BE:
     - VERTICAL LOCATION OF TB-1 BARS: ± 3/8 INCHES
     - LOCATION / SPACING OF H-1, V-1 & V-2 BARS: ± 1 INCH
   - REGARDLESS OF THE SPECIFIED PLACEMENT TOLERANCES, CONCRETE COVER SHALL BE MAINTAINED WITHIN ± 3/8 INCHES AS PREVIOUSLY NOTED.
   - ALL REINFORCING BARS SHALL BE CUT AND BENT FOLLOWING REQUIREMENTS OF THE CRSI MANUAL OF STANDARD PRACTICE.
   - UNLESS NOTED OTHERWISE, TOLERANCES FOR BAR FABRICATION SHALL MEET REQUIREMENTS OF STANDARD ACI 318 AND THE CRSI MANUAL OF STANDARD PRACTICE.



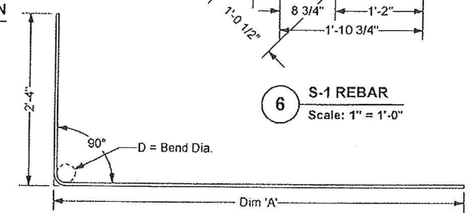
1 PLAN VIEW - 2.5 x 5.0 x 06 Std SHOWN
Scale: 1" = 1'-0"



5 SECTION AT STEM
Scale: 1" = 1'-0"



6 S-1 REBAR
Scale: 1" = 1'-0"



7 TB-1 REBAR
Scale: 1" = 1'-0"

PRECASTER: CONCRETE SYSTEMS INC.
HUDSON, NH
PROJECT #: T21377

CONTRACTOR: J. A. MCDONALD INC.
LYNDON CENTER, VERMONT
PROJECT #:

DESIGNER
THE NEEL COMPANY
8328-D TRAFORD LANE
SPRINGFIELD, VIRGINIA 22152
PH: (703) 913-7858
FX: (703) 913-7859
WEB: WWW.NEELCO.COM
PROJECT #: TW4083

STATE OF VERMONT
REGISTERED WITH RESPECT TO INTERNAL STABILITY OF T-WALL® STRUCTURES ONLY
THOMAS C. NEEL
6584
PROFESSIONAL ENGINEER

REVISIONS

RTE. 30 BRIDGE IMPROVEMENTS
BRIDGE NO. 98
TOWN OF HUBBARDTON, VT
ER STP 0161 (27)
SHOP DRAWINGS
STANDARD UNITS
REBARS & DIMENSIONS
T-WALL® RETAINING WALL SYSTEM

SCALE:	1" = 1'
DATE:	9-25-2012
DESIGNED BY:	NN
DRAWN BY:	HS
CHECKED BY:	NN
SHEET:	5

BORDER-TNC T-WALL HWY v4.1

SPECIAL NOTES:

1. FRONT FACE OF T-WALL® UNITS FINISH TREATMENT:
   - PLAIN STEEL FORM FINISH
   - 1/2" CHAMFER AROUND FRONT FACE
2. LIFTING INSERTS CAPACITY:
   - TWO QUICKLIFT 'QL050G' LIFTING INSERTS OR EQUAL, SPACED AT LEAST 30" APART.
   - 2000 LBS (1 TON) MINIMUM RATED WORKING LOAD CAPACITY.
   - MINIMUM CONCRETE STRENGTH SHALL BE 3,500 psi PRIOR TO STRIPPING AND LIFTING OPERATIONS.
3. 1/2" FALSE JOINT LOCATION:
   - IF H-1 IS GREATER THEN 2'-6", THEN FIRST FALSE JOINT WILL BE 2'-6" FROM THE BOTTOM OF THE UNIT.
   - IF H-1 IS GREATER THEN 5'-0", THEN SECOND FALSE JOINT WILL BE 2'-6" ABOVE THE FIRST FALSE JOINT.
   - THE FALSE JOINT WILL 1/2" HIGH AND 1/2" DEEP.

GENERAL NOTES:

1. PRIMARY REFERENCE:
   - 2010 AASHTO LRFD BRIDGE SPECIFICATIONS WITH INTERIM SPECIFICATIONS THROUGH 2010.
2. T-WALL® CONCRETE:
   - F'c = 5000 psi (MINIMUM) @ 28 DAYS
   - MINIMUM STRIPPING STRENGTH: 2500 psi
3. T-WALL® REINFORCING STEEL:
   - ASTM A615 GRADE 60 EPOXY COATED
   - Fy = 60 ksi (GRADE 60)
   - WELDING IS NOT PERMITTED
4. MARKING OF PRECAST UNITS:
   - CLEARLY MARK EACH PRECAST UNIT ON THE BUTT END OF THE STEM WITH THE UNIT TYPE (i.e. 2.5x5.0x06 STD), THE DATE OF MANUFACTURE, THE LOT NUMBER (IF APPLICABLE), AND THE TRADEMARK "T-WALL®".
5. REINFORCING FABRICATION AND PLACEMENT TOLERANCES:
   - THE STRUCTURAL DESIGN OF PRECAST UNITS ASSUMES 2 INCHES OF CONCRETE COVER OVER ALL REINFORCING BARS.
   - UNLESS OTHERWISE NOTED IN CONTRACT DOCUMENTS OR REFERENCED SPECIFICATIONS, TOLERANCES ON CONCRETE COVER SHALL BE ± 3/8 INCHES.
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     - VERTICAL LOCATION OF TB-1 BARS: ± 3/8 INCHES
     - LOCATION / SPACING OF H-1, V-1 & V-2 BARS: ± 1 INCH
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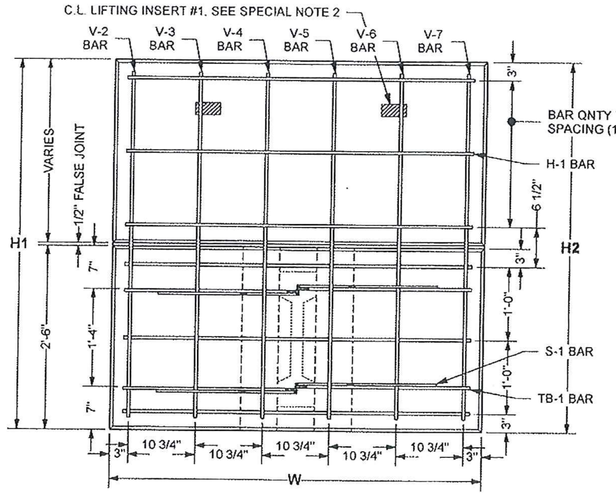
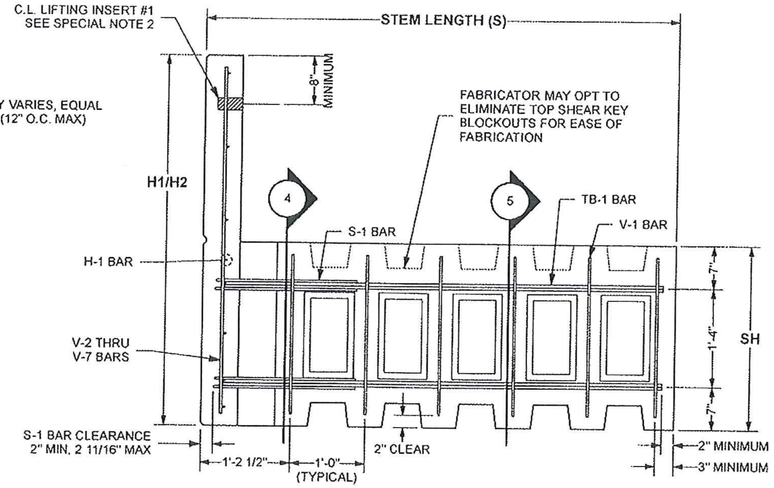
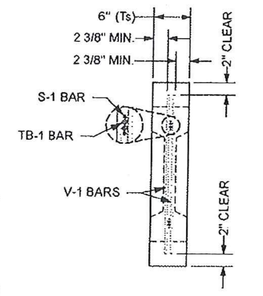
   - UNLESS NOTED OTHERWISE, TOLERANCES FOR BAR FABRICATION SHALL MEET REQUIREMENTS OF STANDARD ACI 318 AND THE CRSI MANUAL OF STANDARD PRACTICE.



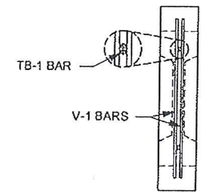
3 FRONT VIEW - 6' STEM UNIT SHOWN
Scale: 1" = 1'-0" *(V-1 BARS IN STEM OMITTED FOR CLARITY)*



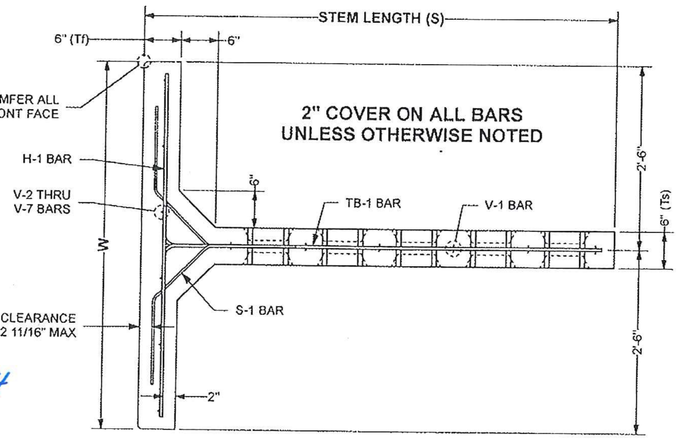
2 SIDE VIEW - 6' STEM UNIT SHOWN
Scale: 1" = 1'-0"



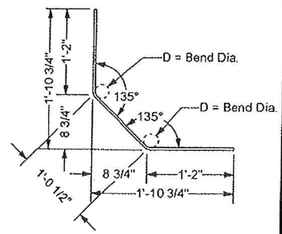
4 SECTION AT STEM
Scale: 1" = 1'-0"



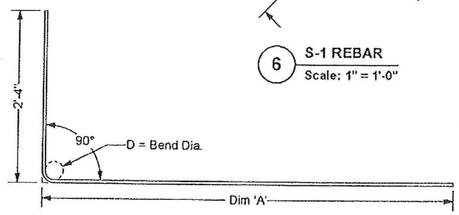
5 SECTION AT STEM
Scale: 1" = 1'-0"



1 PLAN VIEW - 6' STEM UNIT SHOWN
Scale: 1" = 1'-0"



6 S-1 REBAR
Scale: 1" = 1'-0"



7 TB-1 REBAR
Scale: 1" = 1'-0"

SHOP DRAWING REVIEW

☒ REVIEWED AS REQUIRED BY THE CONSTRUCTION CONTRACT DOCUMENTS AND APPROVED, BUT ONLY FOR CONFORMANCE TO THE DESIGN CONCEPT OF THE WORK, AND SUBJECT TO FUPTHER LIMITATIONS AND REQUIREMENTS CONTAINED IN THE CONSTRUCTION CONTRACT DOCUMENTS.

☐ REJECTED ☐ REVISE AND RESUBMIT ☐ FURNISH AS CORRECTED

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VHB *Vanasse Hangen Brustlin, Inc.*
7056 US Route 7
HIGHWAY REBAR sburgh, VT 05473
Remarks 802.425.7788

HUBBARDTSN
Job Number: ER 0161 (27)
Reviewed By: S. FARNSWORTH
Date: 9-28-2012

REBAR SCHEDULES
6' STEM SPECIAL UNITS

Unit Dims	Bar Mark	Qnty	Size	Length	Dim "A"	Bar Weight	Bend Dia
H=4'8" MAX	H-1	VARIES	#4	4'8"			
W=5'0"	V-1	12 ea	#3	2'2"		9.78 lbs	
S=6'4 1/2"	V-2 THRU V-7	1 ea	#5	VARIES			
SH=2'6"	S-1	4 ea	#3	3'4 1/2"		5.08 lbs	D= 2 1/4"
	TB-1	4 ea	#4	8'3"	5'11"	22.04 lbs	D= 3"

MARK No.	QNTY	STEM	WIDTH	H1	H2	H-1 BAR	V-2 BAR	V-3 BAR	V-4 BAR	V-5 BAR	V-6 BAR	V-7 BAR	VOL	WEIGHT	AREA
SP1	1 ea	6'0"	5'0"	3'9 5/8"	5'6 1/2"	7 ea	3'6 3/4"	3'10 7/8"	4'3"	4'5 1/8"	4'9 1/4"	5'1 3/8"	0.65 cy	2.651 lbs	23.36 sf
SP2	1 ea	6'0"	5'0"	3'0"	3'0"	4 ea	2'8"	2'8"	2'8"	2'8"	2'8"	2'8"	0.50 cy	2.024 lbs	15.00 sf
SP3	1 ea	6'0"	5'0"	3'5"	3'5"	4 ea	3'1"	3'1"	3'1"	3'1"	3'1"	3'1"	0.54 cy	2.181 lbs	17.10 sf
SP5	1 ea	6'0"	5'0"	1'11 1/8"	4'5 3/8"	5 ea	1'8 3/4"	2'2 3/4"	2'8 3/4"	2'11 3/4"	3'5 3/4"	3'11 3/4"	0.52 cy	2.095 lbs	15.95 sf
SP6	1 ea	6'0"	5'0"	4'5 3/8"	4'5 3/8"	5 ea	4'1 3/8"	4'1 3/8"	4'1 3/8"	4'1 3/8"	4'1 3/8"	4'1 3/8"	0.63 cy	2.567 lbs	22.25 sf
SP7	1 ea	6'0"	5'0"	4'8"	4'8"	6 ea	4'4"	4'4"	4'4"	4'4"	4'4"	4'4"	0.65 cy	2.650 lbs	23.35 sf
SP8	1 ea	6'0"	5'0"	4'8"	3'7 7/8"	6 ea	4'3 3/8"	4'1"	3'10 5/8"	3'9 3/8"	3'7"	3'4 5/8"	0.61 cy	2.461 lbs	20.82 sf
SP9	1 ea	6'0"	5'0"	3'7 7/8"	2'7 3/4"	5 ea	3'3 1/4"	3'0 7/8"	2'10 1/2"	2'9 1/4"	2'6 7/8"	2'4 1/2"	0.51 cy	2.082 lbs	15.78 sf

0 1/2" 1" 1 1/2" 2"
SHEET SCALE

PRECASTER: CONCRETE SYSTEMS INC. HUDSON, NH
PROJECT #: T21377

CONTRACTOR: J. A. MCDONALD INC. LYNDON CENTER, VERMONT
PROJECT #:

DESIGNER
THE NEEL COMPANY
6328-D TRAFORD LANE
SPRINGFIELD, VIRGINIA 22152
PH: (703) 913-7858
FX: (703) 913-7859
WEB: WWW.NEELCO.COM
PROJECT #: TW4083

STATE OF VERMONT — CERTIFIED WITH RESPECT TO INTERNAL STABILITY OF T-WALL® STRUCTURES ONLY — THOMAS C. NEEL — 6584 — PROFESSIONAL ENGINEER

REVISIONS

RTE. 30 BRIDGE IMPROVEMENTS
BRIDGE NO. 98
TOWN OF HUBBARDTON, VT
ER STP 0161 (27)
SHOP DRAWINGS
SLOPED TOP SPECIAL UNITS
REBARS & DIMENSIONS
T-WALL® RETAINING WALL SYSTEM

SCALE:	1" = 1'
DATE:	9-25-2012
DESIGNED BY:	NN
DRAWN BY:	HS
CHECKED BY:	NN
SHEET:	6

PLOT DATE & TIME: Tuesday, September 25, 2012, 3:16:59 PM
CAD FILE NAME: 06 REBAR - SLOPED TOP UNITS.dwx
VN SHEET NAME: TW-08

USER NAME: N/A
VECTORWORKS 2011

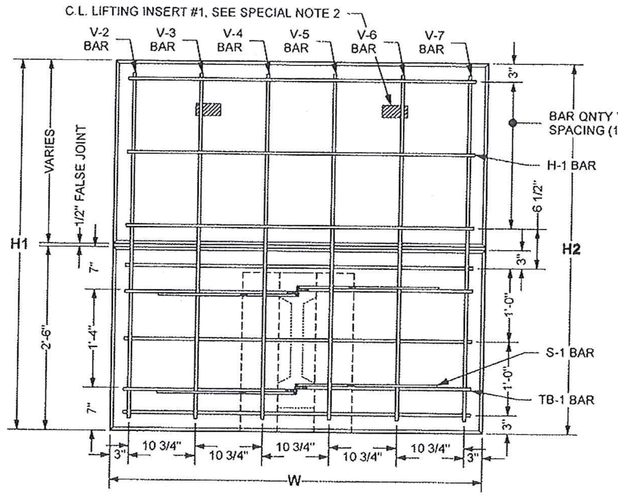
BORDER-TNC T-WALL HWY v4.1

SPECIAL NOTES:

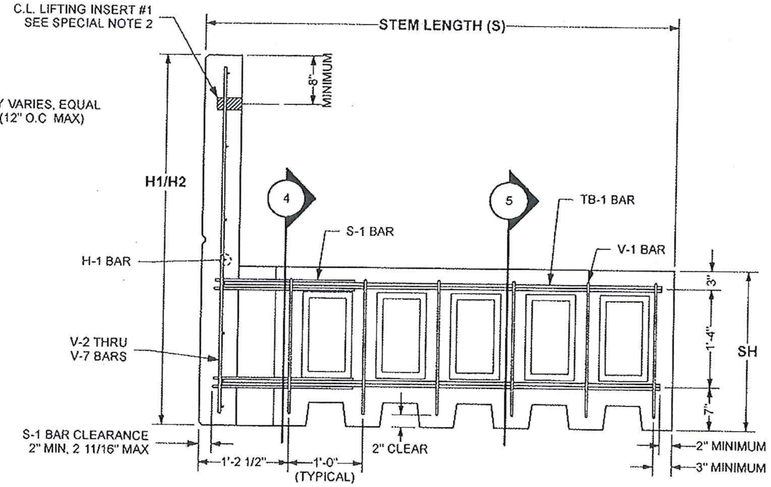
1. FRONT FACE OF T-WALL® UNITS FINISH TREATMENT:
   - PLAIN STEEL FORM FINISH
   - 1/2" CHAMFER AROUND FRONT FACE
2. LIFTING INSERTS CAPACITY:
   - TWO QUICKLIFT 'QL050G' LIFTING INSERTS OR EQUAL, SPACED AT LEAST 30" APART.
   - 2000 LBS (1 TON) MINIMUM RATED WORKING LOAD CAPACITY.
   - MINIMUM CONCRETE STRENGTH SHALL BE 3,500 psi PRIOR TO STRIPPING AND LIFTING OPERATIONS.
3. 1/2" FALSE JOINT LOCATION:
   - IF H-1 IS GREATER THEN 2'-6", THEN FIRST FALSE JOINT WILL BE 2'-6" FROM THE BOTTOM OF THE UNIT.
   - IF H-1 IS GREATER THEN 5'-0", THEN SECOND FALSE JOINT WILL BE 2'-6" ABOVE THE FIRST FALSE JOINT.
   - THE FALSE JOINT WILL 1/2" HIGH AND 1/2" DEEP.

GENERAL NOTES:

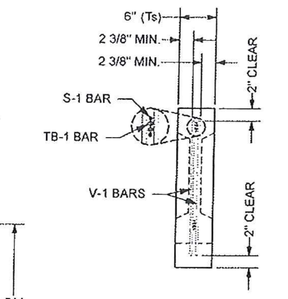
1. PRIMARY REFERENCE:
   - 2010 AASHTO LRFD BRIDGE SPECIFICATIONS WITH INTERIM SPECIFICATIONS THROUGH 2010.
2. T-WALL® CONCRETE:
   - F'c = 5000 psi (MINIMUM) @ 28 DAYS
   - MINIMUM STRIPPING STRENGTH: 2500 psi
3. T-WALL® REINFORCING STEEL:
   - ASTM A615 GRADE 60 EPOXY COATED
   - Fy = 60 ksi (GRADE 60)
   - WELDING IS NOT PERMITTED
4. MARKING OF PRECAST UNITS:
   - CLEARLY MARK EACH PRECAST UNIT ON THE BUTT END OF THE STEM WITH THE UNIT TYPE (i.e. 2.5x5.0x06 STD), THE DATE OF MANUFACTURE, THE LOT NUMBER (IF APPLICABLE), AND THE TRADEMARK "T-WALL®".
5. REINFORCING FABRICATION AND PLACEMENT TOLERANCES.
   - THE STRUCTURAL DESIGN OF PRECAST UNITS ASSUMES 2 INCHES OF CONCRETE COVER OVER ALL REINFORCING BARS.
   - UNLESS OTHERWISE NOTED IN CONTRACT DOCUMENTS OR REFERENCED SPECIFICATIONS, TOLERANCES ON CONCRETE COVER SHALL BE ± 3/8 INCHES.
   - UNLESS OTHERWISE NOTED IN CONTRACT DOCUMENTS OR REFERENCED SPECIFICATIONS, TOLERANCES ON BAR PLACEMENT SHALL BE:
     - VERTICAL LOCATION OF TB-1 BARS: ± 3/8 INCHES
     - LOCATION / SPACING OF H-1, V-1 & V-2 BARS: ± 1 INCH
   - REGARDLESS OF THE SPECIFIED PLACEMENT TOLERANCES, CONCRETE COVER SHALL BE MAINTAINED WITHIN ± 3/8 INCHES AS PREVIOUSLY NOTED.
   - ALL REINFORCING BARS SHALL BE CUT AND BENT FOLLOWING REQUIREMENTS OF THE CRSI MANUAL OF STANDARD PRACTICE.
   - UNLESS NOTED OTHERWISE, TOLERANCES FOR BAR FABRICATION SHALL MEET REQUIREMENTS OF STANDARD ACI 318 AND THE CRSI MANUAL OF STANDARD PRACTICE.



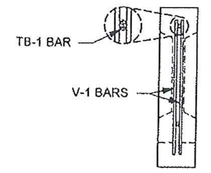
3 FRONT VIEW - 6' STEM UNIT SHOWN
Scale: 1" = 1'-0" *(V-1 BARS IN STEM OMITTED FOR CLARITY)*



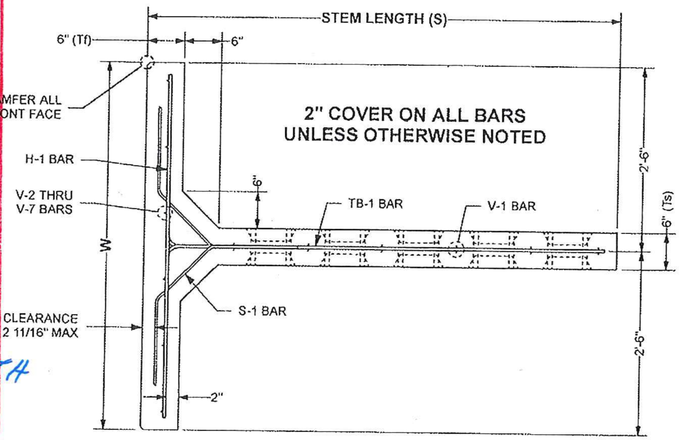
2 SIDE VIEW - 6' STEM UNIT SHOWN
Scale: 1" = 1'-0"



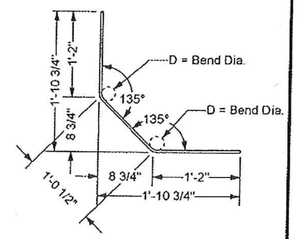
4 SECTION AT STEM
Scale: 1" = 1'-0"



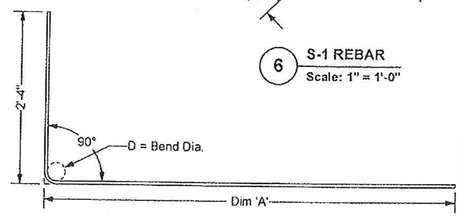
5 SECTION AT STEM
Scale: 1" = 1'-0"



1 PLAN VIEW - 6' STEM UNIT SHOWN
Scale: 1" = 1'-0"



6 S-1 REBAR
Scale: 1" = 1'-0"



7 TB-1 REBAR
Scale: 1" = 1'-0"

SHOP DRAWING REVIEW

☒ REVIEWED AS REQUIRED BY THE CONSTRUCTION CONTRACT DOCUMENTS AND APPROVED, BUT ONLY FOR CONFORMANCE TO THE DESIGN CONCEPT OF THE WORK, AND SUBJECT TO FURTHER LIMITATIONS AND REQUIREMENTS CONTAINED IN THE CONSTRUCTION CONTRACT DOCUMENTS.

☐ REJECTED ☐ REVISE AND RESUBMIT ☐ FURNISH AS CORRECTED

CORRECTIONS OR COMMENTS MADE ON THE SHOP DRAWINGS DURING THIS REVIEW DO NOT RELIEVE CONTRACTOR FROM COMPLIANCE WITH REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS. THIS CHECK IS ONLY FOR REVIEW OF GENERAL CONFORMANCE WITH THE DESIGN CONCEPT OF THE PROJECT AND GENERAL COMPLIANCE WITH THE INFORMATION GIVEN IN THE CONTRACT DOCUMENTS. THE CONTRACTOR IS RESPONSIBLE FOR; CONFIRMING AND CORRELATING ALL QUANTITIES AND DIMENSIONS; SELECTING FABRICATION PROCESSES AND TECHNIQUES OF CONSTRUCTION; COORDINATING HIS WORK WITH THAT OF ALL OTHER TRADES; AND PERFORMING HIS WORK IN A SAFE AND SATISFACTORY MANNER.

Vanasse Hangen Brustlin, Inc.
7056 US Route 7
North Ferrisburgh, VT 05473
802.425.7788

HUBBARDTON
Job Number ER STP 0161(27)
Reviewed By S. FARNSWORTH
Date: 9-28-2012

REBAR SCHEDULES

6' STEM SPECIAL UNITS

Unit Dims	Bar Mark	Qnty	Size	Length	Dim "A"	Bar Weight	Bend Dia	Remarks
H=4'8" MAX	H-1	VARIES	#4	4'8"				
W=5'0"	V-1	12 ea	#3	1'10"		8.27 lbs		
S=6'4 1/2"	V-2 THRU V-7	1 ea	#5	VARIES				
SH=2'2"	S-1	4 ea	#3	3'4 1/2"		5.08 lbs	D= 2 1/4"	
	TB-1	4 ea	#4	8'3"	5'11"	22.04 lbs	D= 3"	

MARK No.	QNTY	STEM	WIDTH	H1	H2	H-1 BAR	V-2 BAR	V-3 BAR	V-4 BAR	V-5 BAR	V-6 BAR	V-7 BAR	VOL	WEIGHT	AREA
SP4R	1 ea	6'0"	5'0"	3'5"	2'1 7/8"	4 ea	3'0 1/4"	2'9 1/4"	2'6 1/4"	2'4 3/4"	2'1 3/4"	1'10 3/4"	0.48 cy	1,945 lbs	13.95 sf

0 1/2" 1" 1 1/2" 2"
SHEET SCALE

PRECASTER: CONCRETE SYSTEMS INC. HUDSON, NH
PROJECT #: T21377

CONTRACTOR: J. A. MCDONALD INC. LYNDON CENTER, VERMONT
PROJECT #:

DESIGNER
THE NEEL COMPANY
8328-D TRAFORD LANE
SPRINGFIELD, VIRGINIA 22152
PH: (703) 913-7858
FX: (703) 913-7859
WEB: WWW.NEELCO.COM
PROJECT #: TW4083

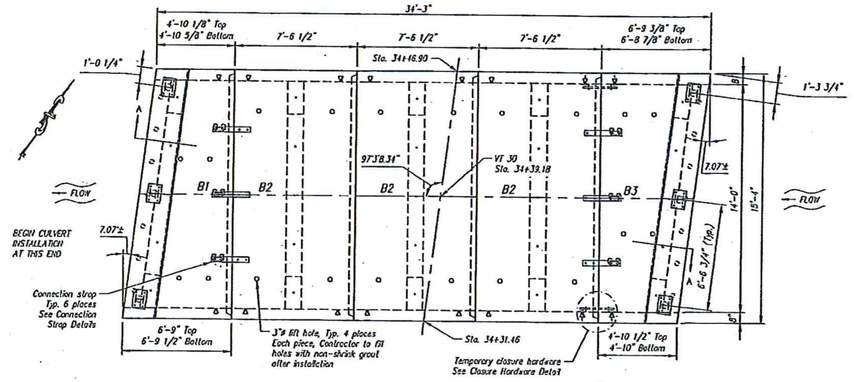
STATE OF VERMONT
CERTIFIED WITH RESPECT TO INTERNAL STABILITY OF T-WALL® STRUCTURES ONLY
THOMAS C. NEEL
6584
PROFESSIONAL ENGINEER

REVISIONS

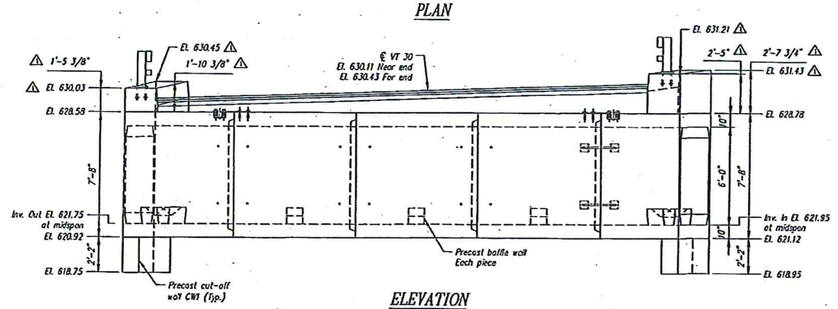
RTE. 30 BRIDGE IMPROVEMENTS
BRIDGE NO. 98
TOWN OF HUBBARDTON, VT
ER STP 0161 (27)
SHOP DRAWINGS
SLOPED TOP REDUCED HEIGHT STEM SPECIAL UNITS
REBARS & DIMENSIONS
T-WALL® RETAINING WALL SYSTEM

SCALE:	1" = 1'
DATE:	9-25-2012
DESIGNED BY:	NN
DRAWN BY:	HS
CHECKED BY:	NN
SHEET:	7

PLOT DATE & TIME: Tuesday, September 25, 2012, 4:16:47 PM
CAD FILE NAME: 07 REBAR - SLOPED TOP REDUCED STEM UNITS.vwx
VW SHEET NAME: TW-08
USER NAME: N/A
VECTORWORKS 2011



PLAN

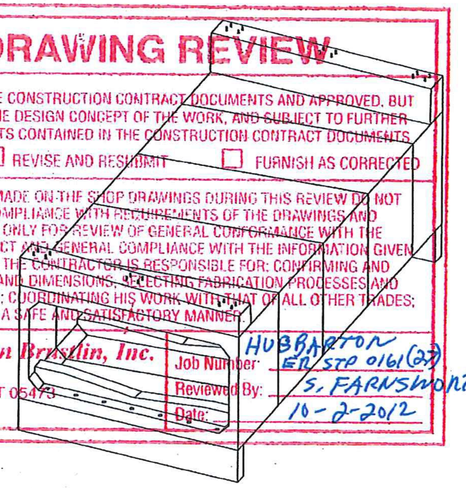


ELEVATION

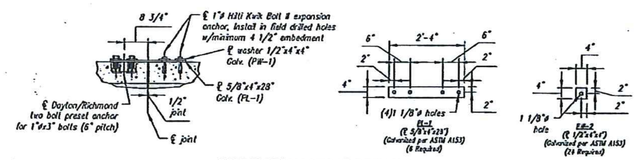
GENERAL NOTES:

1. Reference Standards:
   AASHTO "LRFD Bridge Design Specifications"
   ASTM C1433
2. Design Parameters:
   Live load: HL-93
   Earth Cover: 0 to 2'
   Concrete: Design strength f'c = 5000 psi (Culvert)
   Design strength f'c = 4000 psi (Cut-off walls)
   Unit weight = 150 pcf
   Reinforcing: ASTM A775 (rebar), grade 60, epoxy
   Soil: Unit weight = 140 pcf
   Minimum lateral pressure coefficient .25
   Maximum lateral pressure coefficient .50
   Cover to reinforcing: 3" headwalls ⚠
   2" outside faces of culvert
   1 1/2" elsewhere u.n.o.
3. Dimensions include a joint creep. Actual culvert piece length is ½" shorter than shown (i.e. B2 = 7'-6").
4. No dampproofing or waterproofing supplied by CSI. Membrane waterproofing supplied and installed by others
5. DBS are Dowel Bar Splicers and DI are Dowel Ins. Both are supplied by CSI.
6. Headwall attachments design for TL-4 impact load. ⚠
7. Water repellent by CSI on all exposed faces of culvert and headwalls to 1' below grade and inside culvert ends. Water repellent to be Vexcon Certi-Vex Penseal 244. ⚠

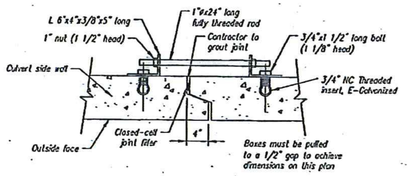
PIECE SCHEDULE (MKC-AS0008C20)					
MARK	QTY	LENGTH	YDS	WEIGHT	
B1	1	5.79 '	9.51	19.27	TONS
B2	3	7.50 '	9.99	20.21	TONS
B3	1	5.81 '	10.83	21.93	TONS
CW1	2	15.45 '	1.24	2.51	TONS



ISOMETRIC VIEW LOOKING UPSTREAM

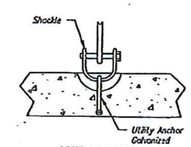


CONNECTION STRAP DETAILS

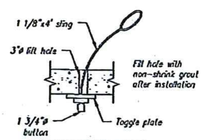


Closure hardware is temporary and is to be removed after installation

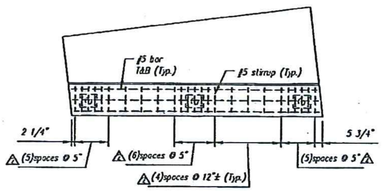
CLOSURE HARDWARE DETAIL



CUT-OFF WALL LIFTING HARDWARE DETAIL

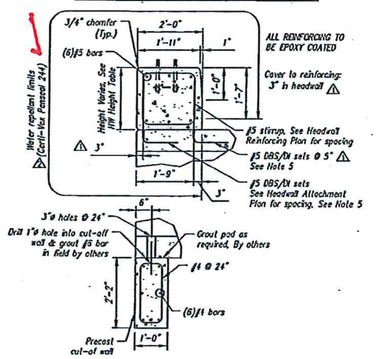


CULVERT LIFTING HARDWARE DETAIL

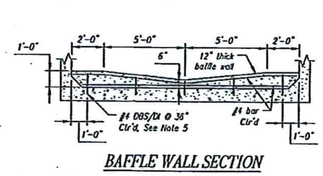


⚠ HEADWALL REINFORCING PLAN

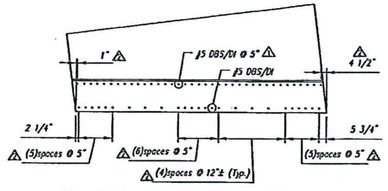
HW HEIGHT TABLE		
LOCATION	NORTH END	SOUTH END
OUTLET	1'-10 3/8"	1'-5 3/8"
INLET	2'-7 3/4"	2'-5"



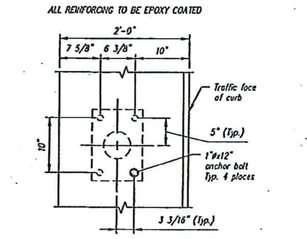
⚠ SECTION A



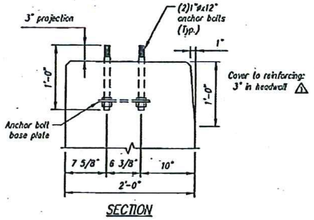
BAFFLE WALL SECTION



⚠ HEADWALL ATTACHMENT INSERT PLAN

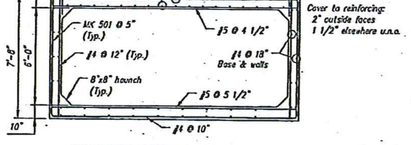


PLAN



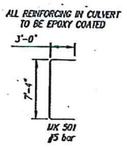
SECTION

GUARDRAIL ANCHOR DETAILS



CULVERT REINFORCING DETAIL

ALL REINFORCING IN CULVERT TO BE EPOXY COATED



CULVERT BENDING SCHEDULE

STATE OF VERMONT
CHRISTOPHER M. VICK
No. 77928
Structural
LICENSED PROFESSIONAL ENGINEER
12/12/12

Stamp for structural design only

Rev.	Date	DESCRIPTION	By
5			
4			
3			
2	10/02/12	Revised Silane Siloxane to Certi-vex Penseal 244; Miscellaneous revisions	MS
1	09/26/2012	per VHB mark up change hw elev, change hw loading to TL-4, misc	CMV

REVISIONS

This drawing is based upon information provided from the following documents and/or sources:
Engineer: Vanasse Hangen Brustlin, Inc.
Project No: 57478.01
Drawings: Proposed Improvement Bridge Project
Sheets 1 through 70 of 70 sheets
Specifications: Special Provisions and Supplemental Specifications
Hubbardton ER STP 0161 (26) & ER stp 0161 (27)
Other Sources:

Concrete Systems Inc.
9 Commercial St., Hudson, NH 03051
Phone 603-889-4163
Fax 603-889-2417

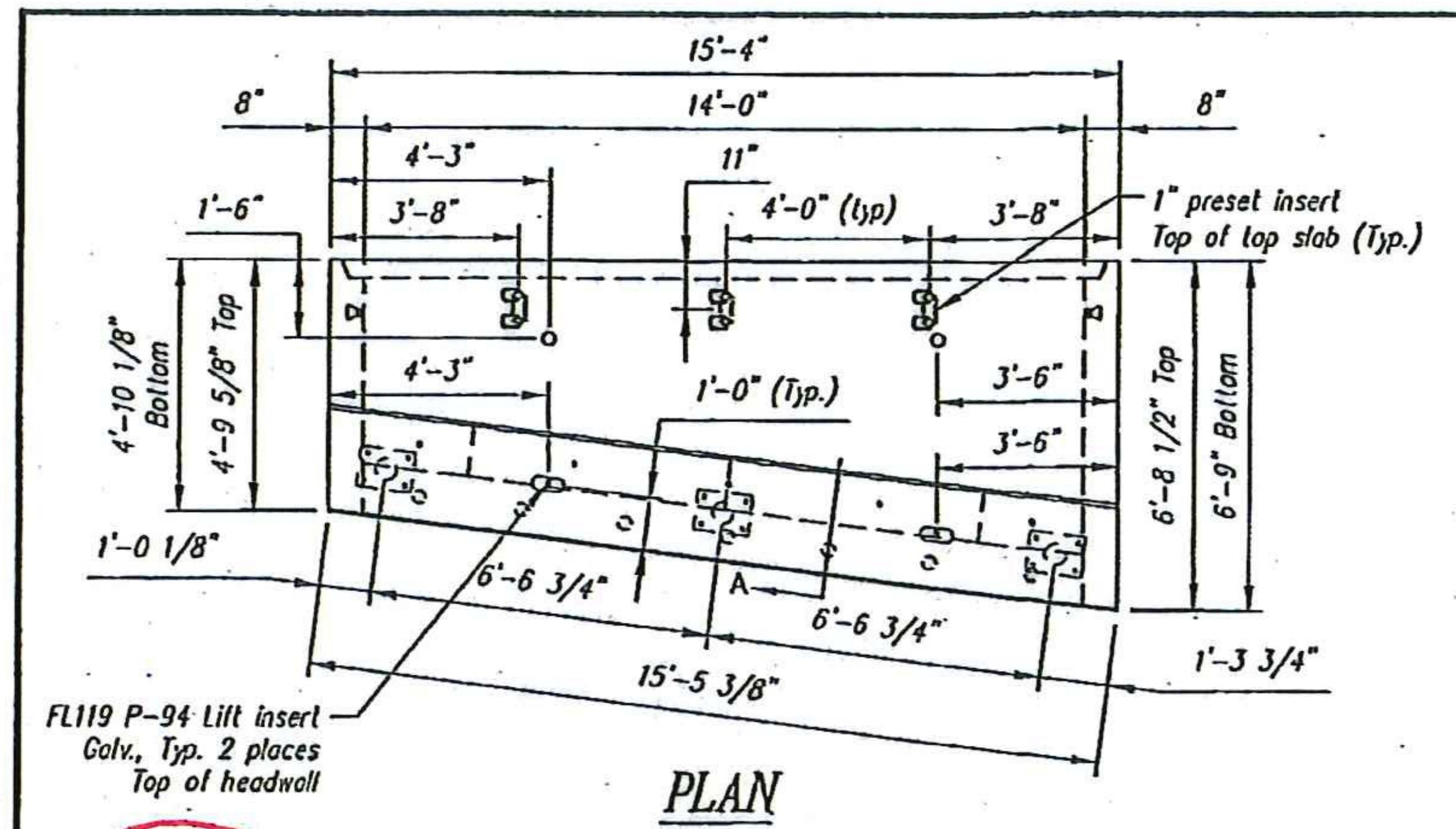
STATE AGENCY
VTrans

Drawn By	M. SCOTT	Date 09/14/2012
Checked By	B. KOLAWOLE	Date 09/14/2012
Approved By		Date

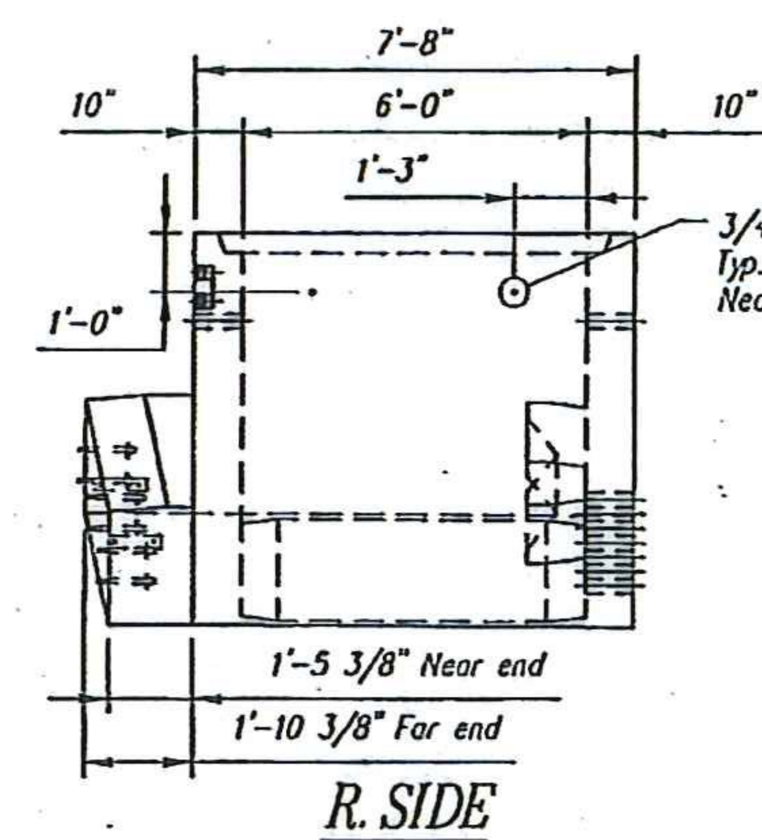
HUBBARDTON ER STP 0161(26)
BRIDGE NO. 98
J.A. McDONALD, INC.
PROPOSED IMPROVEMENT BRIDGE PROJECT
HUBBARDTON, VT

D — BRIDGE NO. 96 LAYOUT AND DETAILS — REV 2
Drawing No. C21377-L02
Quantity: 1 — Project No: ER STP 0161(27) — SHEET 18 OF 18

QTY = 1
WEIGHT = 19.27 TONS



PLAN

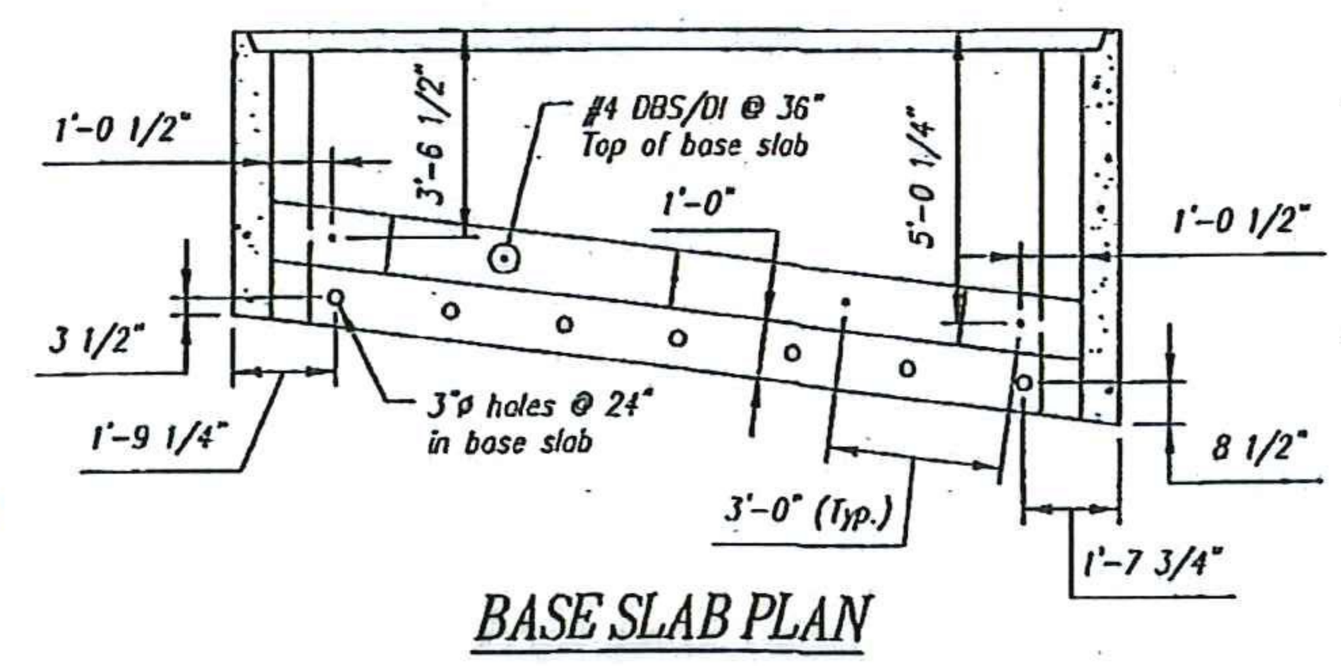


R. SIDE

SHOP DRAWING REVIEW

Vanasse Hangen Brustlin, Inc.
7056 US Route 7
North Ferrisburgh, VT 05473
802.425.7788

Job Number: HUBBARDTON ER STP 0161(27)
Reviewed By: S. FARNSWORTH
Date: 10-2-2012



BASE SLAB PLAN

B1 CULVERT PIECE - BILL OF MATERIALS / EMBEDS				
CSI ID#	DESCRIPTION	QTY	UM	COMMENTS
DTJ	CONSOLIDECK SALTGUARD (PENSEAL 244)	0.55	GA	
EM-00005	1" X 8" PRESET WING INSERTS	3	EA	
EM-00011	DBSAE #4 X 18" EPOXY	5	EA	DOWEL BAR SPLICER
EM-00013	DBSAE #5 X 18" EPOXY	62	EA	DOWEL BAR SPLICER
EM-00033	3" FOAM CORE PVC	9.17	FT	
EM-00112	3/4" NC. GALV. FERRULE INSERT	4	EA	
JS-00002	1"X1"CLOSED NEOP GASKET	46	FT	AROUND BELL
RM-00014	REBAR #4 EPOXY- GR 60 40'	516	LB	
RM-00016	REBAR #5 EPOXY- GR 60 40'	812	LB	
MX-FA5000SC20	MIX DESIGN - FLY ASH 5000 SELF COMPACTIN	7.21	CY	
B1 BAFFLE WALL - BILL OF MATERIALS / EMBEDS				
EM-00019	DI #4 X 18" EPOXY	5	EA	DOWEL IN
RM-00014	REBAR #4 EPOXY- GR 60 40'	18	LB	
MX-FA5000SC20	MIX DESIGN - FLY ASH 5000 SELF COMPACTIN	0.42	CY	
B1 HEADWALL - BILL OF MATERIALS / EMBEDS				
DTJ	CONSOLIDECK SALTGUARD (PENSEAL 244)	0.45	GA	
EM-00021	DI #5 X 18" EPOXY	62	EA	DOWEL IN
EM-00078	8T SPREAD ANCHOR #FL119/P94	2	EA	
RM-00016	REBAR #5 EPOXY- GR 60 40'	268	LB	
SBO	GUARDRAIL ANCHOR ASSY - 4 BOLTS PER	3	EA	
MX-FA5000SC20	MIX DESIGN - FLY ASH 5000 SELF COMPACTIN	1.88	CY	

SILANE-VEXCON CHEM

All Rebar to be Epoxy Coated

Culvert Rebar Schedule			
MK		QTY	LENGTH
401	#4	12	7' 4"
402	#4	14	15' 0"
403	#4	74	6'-5" max.
501	#5	28	13' 4"
502	#5	27	15' 0"

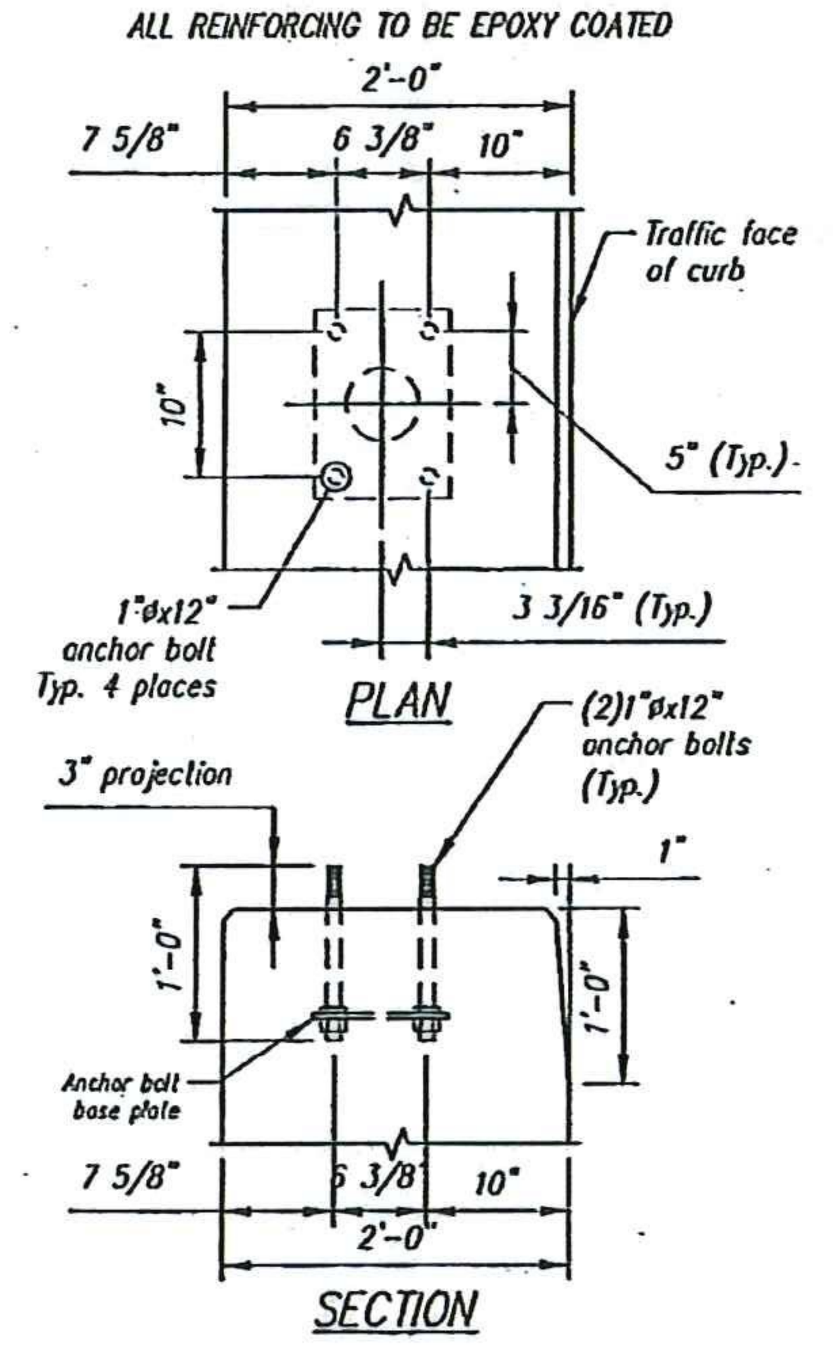
All Rebar to be Epoxy Coated

Headwall Rebar Schedule			
MK		QTY	LENGTH
502	#5	6	15' 0"
503	#5	25	6' 8"

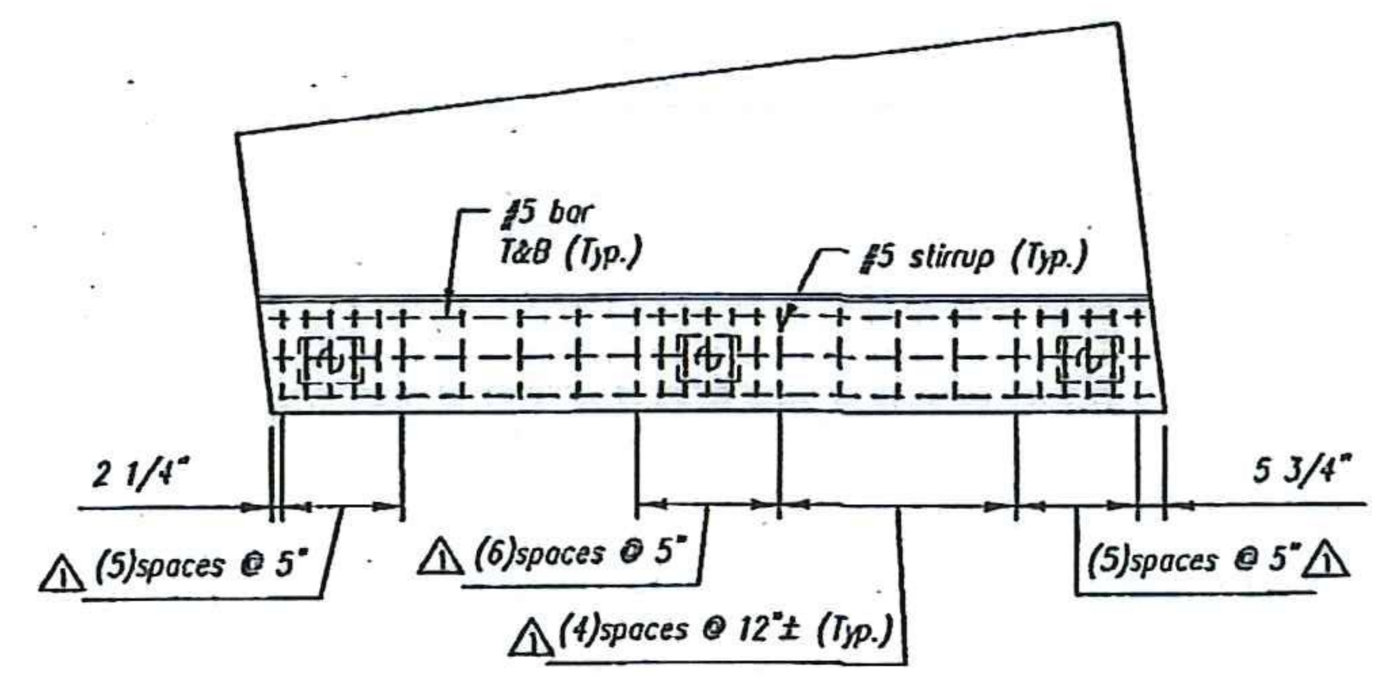
All Rebar to be Epoxy Coated

Baffle Wall Rebar Schedule			
MK		QTY	LENGTH
404	#4	1	13' 10"
405	#4	1	12' 8"

ALL REINFORCING TO BE EPOXY COATED

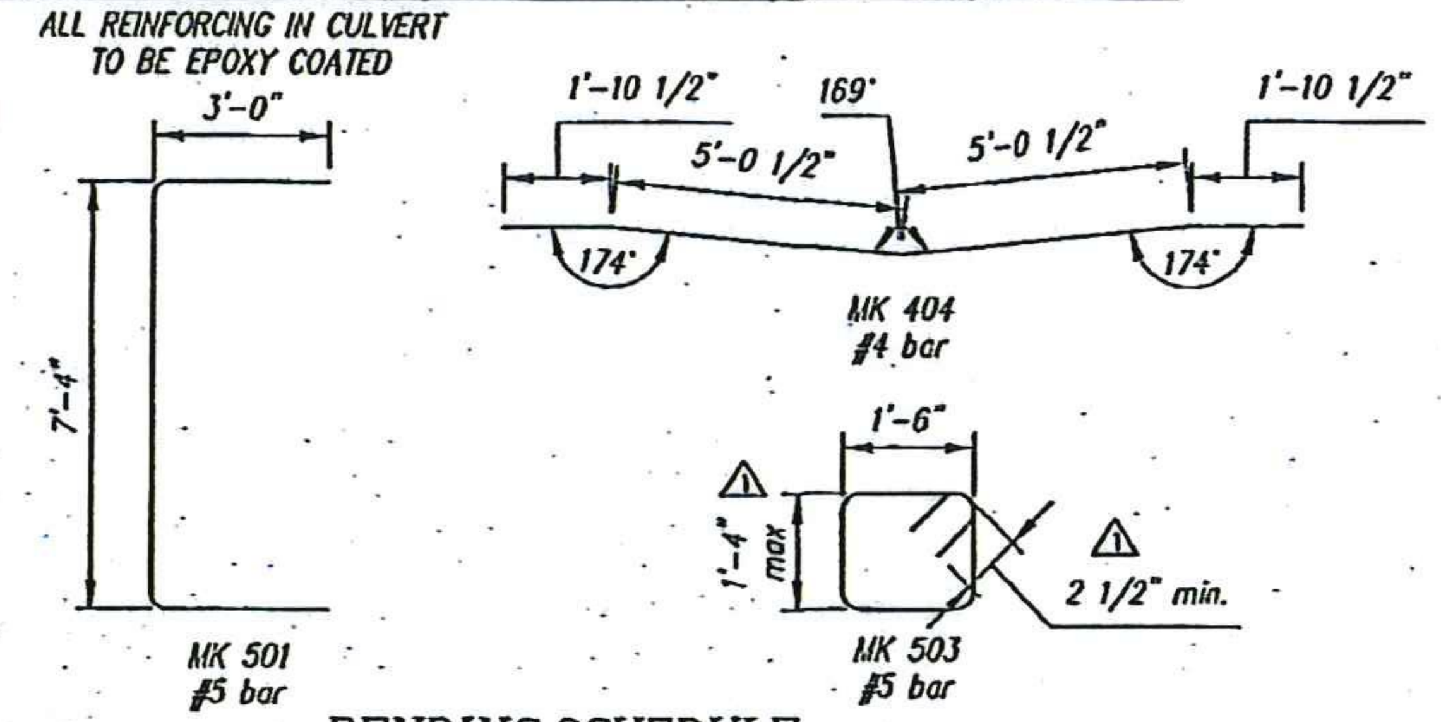


GUARDRAIL ANCHOR DETAILS

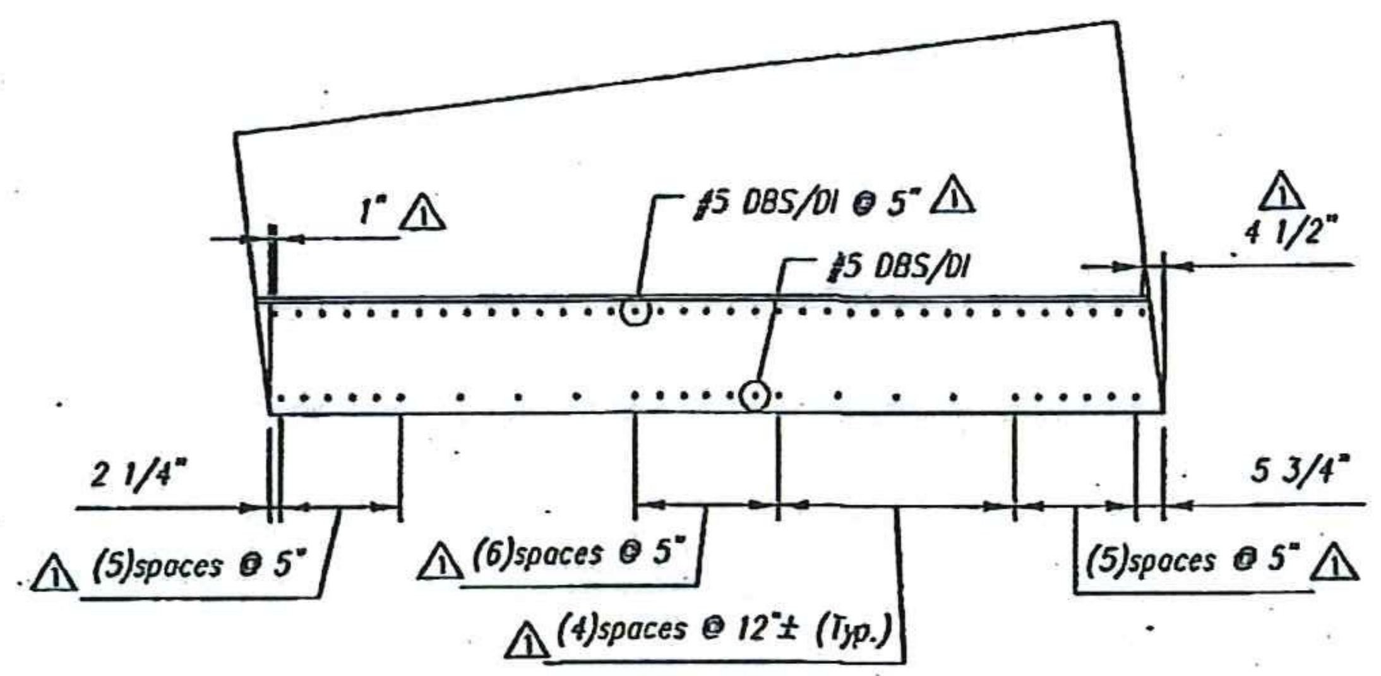


HEADWALL REINFORCING PLAN

ALL REINFORCING IN CULVERT TO BE EPOXY COATED

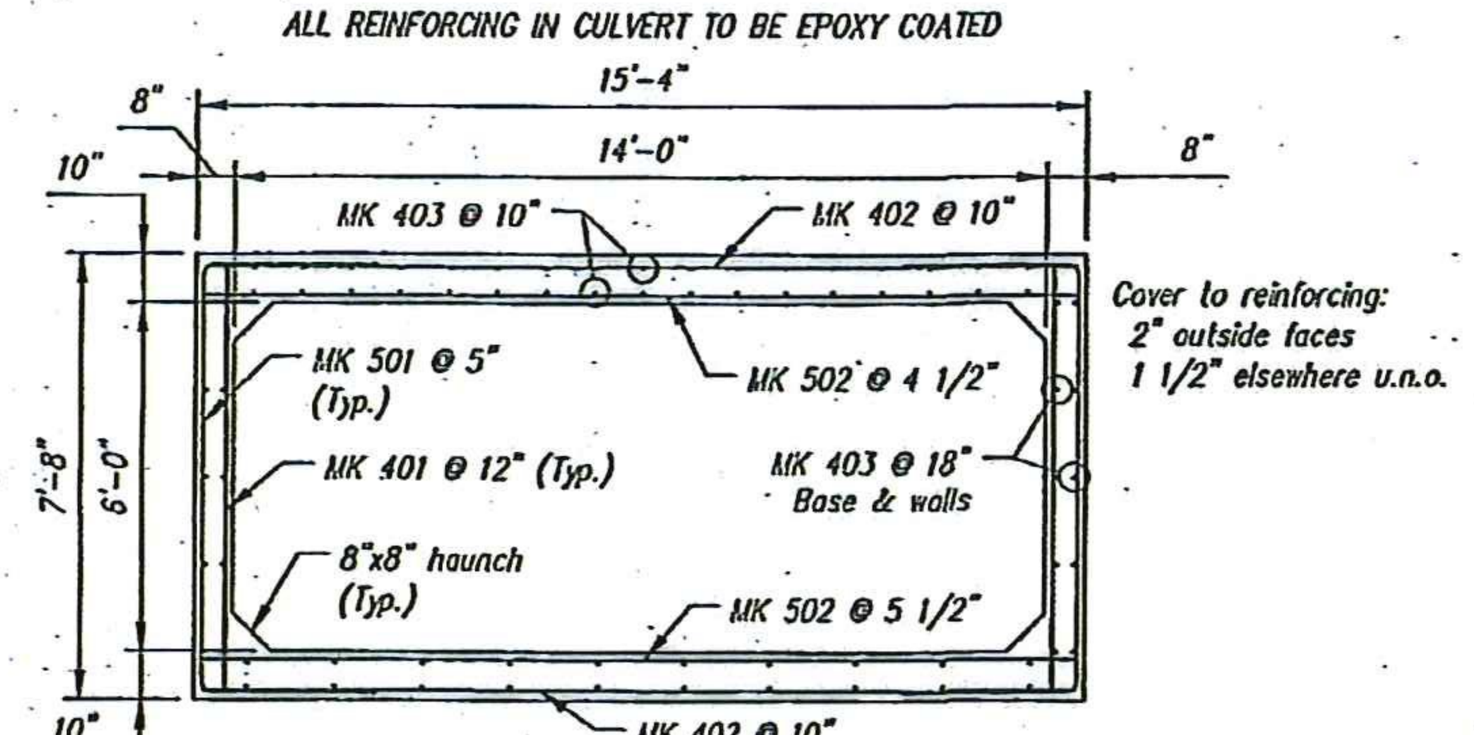


BENDING SCHEDULE



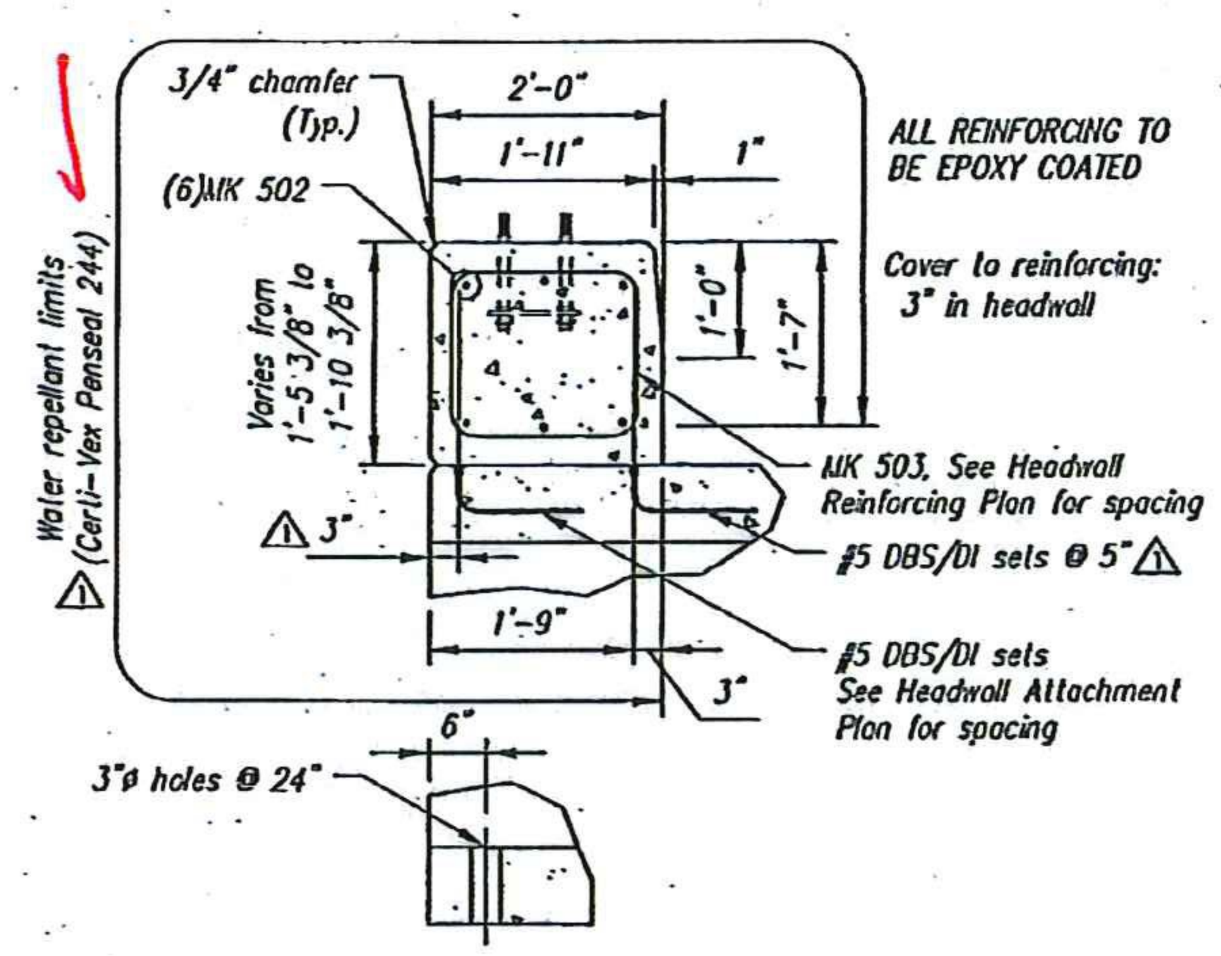
DBS LAYOUT DETAIL

ALL REINFORCING IN CULVERT TO BE EPOXY COATED



Cover to reinforcing:
2" outside faces
1 1/2" elsewhere u.n.o.

REINFORCING DETAIL

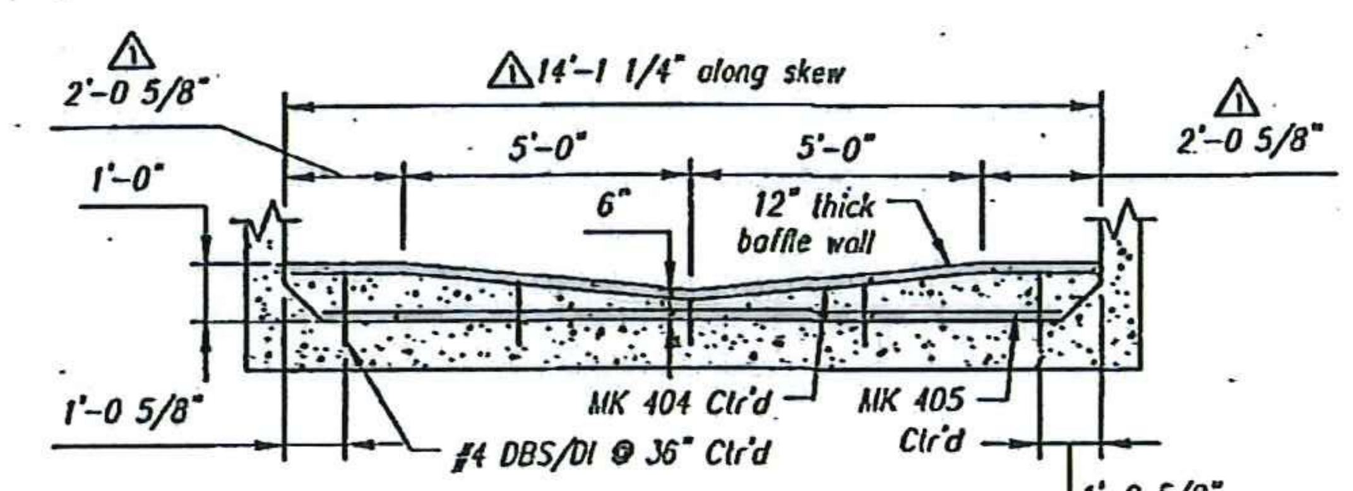


ALL REINFORCING TO BE EPOXY COATED

Cover to reinforcing:
3" in headwall

MK 503, See Headwall Reinforcing Plan for spacing
#5 DBS/DI sets @ 5"
#5 DBS/DI sets
See Headwall Attachment Plan for spacing

SECTION A



BAFFLE WALL SECTION

Rev.	Date	DESCRIPTION	By
1	10/02/12	Miscellaneous revisions; See revision triangles	MS
2			
3			
4			
5			
6			
7			
8			
9			
10			

REVISIONS

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STATE OF VERMONT
CHRISTOPHER M. VICK
NO. 7928
Structural
LICENSED
PROFESSIONAL ENGINEER
10/2/12

Stamp for structural design only

This drawing is based upon information provided from the following documents and/or sources:
Engineer:
Project No:
Drawings:
Specifications:
Other:

Concrete Systems Inc.
9 Commercial St., Hudson, NH, 03051
Phone 603-889-4163
Fax 603-889-2417

STATE AGENCY
VTrans

Drawn By: M SCOTT | Date: 09/21/2012
Checked By: | Date:
Approved By: | Date:

HUBBARDTON ER STP 0161(27)
BRIDGE NO. 98
J.A. McDONALD, INC.
PROPOSED IMPROVEMENT BRIDGE PROJECT
HUBBARDTON, VT

SHOP DRAWING B1 | REV 1
C | Drawing No. C21377-B1
Quantity: 1 | Project No: ER STP 0161(27) | SHEET 1B OF 3B

SHOP DRAWING REVIEW

■ REVIEWED AS REQUIRED BY THE CONSTRUCTION CONTRACT DOCUMENTS AND APPROVED, BUT ONLY FOR CONFORMANCE TO THE DESIGN CONCEPT OF THE WORK, AND SUBJECT TO FURTHER LIMITATIONS AND REQUIREMENTS CONTAINED IN THE CONSTRUCTION CONTRACT DOCUMENTS.

☐ REJECTED ☐ REVISE AND RESUBMIT ☐ FURNISH AS CORRECTED

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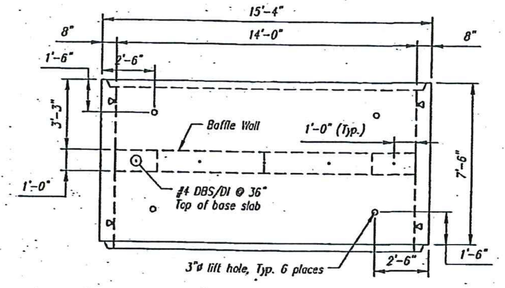
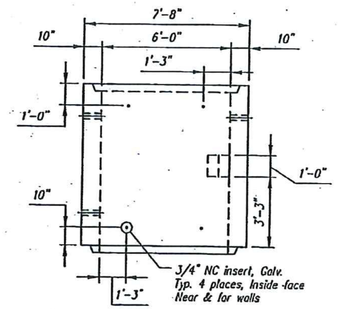
VHB Vanasse Hangen Brustlin, Inc.
7056 US Route 7
North Ferrisburgh, VT 05473
802.425.7788

Job Number: HUBBARDTON ERSTP 0161(27)
Reviewed By: S. G. FARNSWORTH
Date: 10-2-2012



PLAN



R. SIDE

B2 CULVERT PIECE - BILL OF MATERIALS / EMBEDS				
CSI ID#	DESCRIPTION	QTY	UM	COMMENTS
EM-00011	DBSAE #4 X 18" EPOXY	5	EA	DOWEL BAR SPLICER
EM-00033	3" FOAM CORE PVC	5	FT	
EM-00112	3/4" NC. GALV. FERRULE INSERT	8	EA	
JS-00002	1"X1"CLOSED NEOP GASKET	46	FT	AROUND BELL
RM-00014	REBAR #4 EPOXY- GR 60 40'	617	LB	
RM-00016	REBAR #5 EPOXY- GR 60 40'	1064	LB	
MX-FA5000SC20	MIX DESIGN - FLY ASH 5000 SELF COMPACTIN	9.57	CY	
B2 BAFFLE WALL - BILL OF MATERIALS / EMBEDS				
EM-00019	DI #4 X 18" EPOXY	5	EA	DOWEL IN
RM-00014	REBAR #4 EPOXY- GR 60 40'	18	LB	
MX-FA5000SC20	MIX DESIGN - FLY ASH 5000 SELF COMPACTIN	0.41	CY	

All Rebar to be Epoxy Coated

Culvert Rebar Schedule

MK		QTY	LENGTH
401	#4	16	7' 4"
402	#4	18	15' 0"
403	#4	74	7' 3"
501	#5	36	13' 4"
502	#5	36	15' 0"

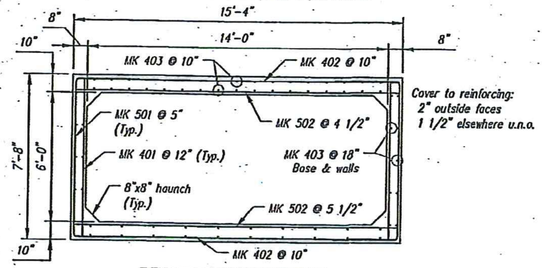
All Rebar to be Epoxy Coated

Baffle Wall Rebar Schedule

MK		QTY	LENGTH
404	#4	1	13' 10"
405	#4	1	12' 8"

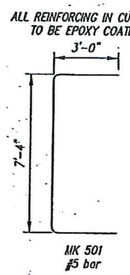
QTY = 3
WEIGHT = 20.21 TONS

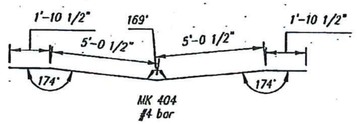
ALL REINFORCING IN CULVERT TO BE EPOXY COATED



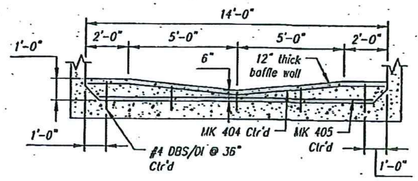
REINFORCING DETAIL

ALL REINFORCING IN CULVERT TO BE EPOXY COATED





BENDING SCHEDULE



⚠ BAFFLE WALL SECTION

Rev.	Date	By	DESCRIPTION
1	10/02/12	MS	Miscellaneous revisions; See revision triangles
2			
3			
4			
5			
6			
7			
8			
9			
10			

REVISIONS

STATE OF VERMONT
CHRISTOPHER ALVICK
NO. 77928
Structural
LICENSED
PROFESSIONAL ENGINEER
10/2/12

Stamp for structural design only

This drawing is based upon information provided from the following documents and/or sources:
Engineer:
Project No:
Drawings:
Specifications:
Other:

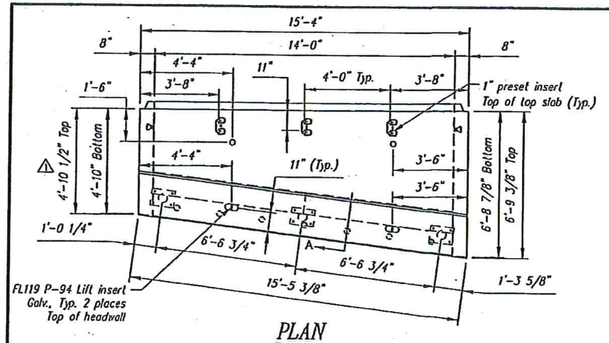
Concrete Systems Inc.
9 Commercial St., Hudson, NH, 03051
Phone 603-889-4163
Fax 603-889-2417

STATE AGENCY
VTrans

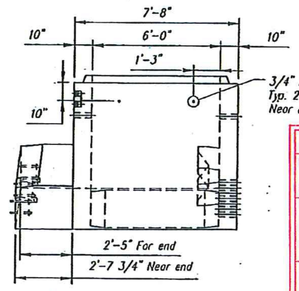
Drawn By	Date
M SCOTT	09/21/2012
Checked By	Date
Approved By	Date

HUBBARDTON ER STP 0161(27)
BRIDGE NO. 98
J.A. McDONALD, INC.
PROPOSED IMPROVEMENT BRIDGE PROJECT
HUBBARDTON, VT

C | SHOP DRAWING B2 | REV 1
Drawing No. C21377-B2
Quantity: 3 | Project No: ER STP 0161(27) | SHEET 2B OF 3B



PLAN



R. SIDE

QTY = 1
WEIGHT = 21.93 TONS

SHOP DRAWING REVIEW

☐ REVIEWED AS REQUIRED BY THE CONSTRUCTION CONTRACT DOCUMENTS AND APPROVED, BUT ONLY FOR CONFORMANCE TO THE DESIGN CONCEPT OF THE WORK, AND SUBJECT TO FURTHER LIMITATIONS AND REQUIREMENTS CONTAINED IN THE CONSTRUCTION CONTRACT DOCUMENTS.

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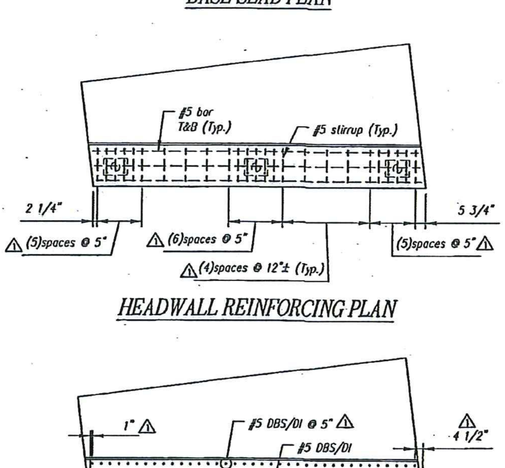
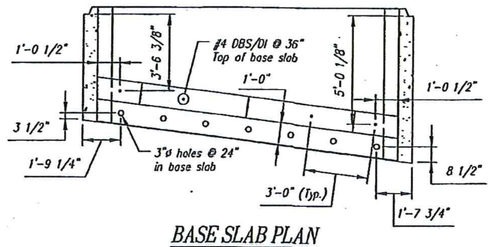
Vanasse Hangen Brustlin, Inc. 7056 US Route 7 North Ferrisburgh, VT 05473 802.425.7788

HUBBARDTON ER STP 0161(27) Jon Bouton Reviewed By: S. FARNSWORTH Date: 10-2-2012



PLAN

SECTION



BASE SLAB PLAN

HEADWALL REINFORCING PLAN

CSHD#	DESCRIPTION	QTY	UM	COMMENTS
	B3 CULVERT PIECE - BILL OF MATERIALS / EMBEDS			
⚠ DTJ	CONSOLIDECK SALTGUARD (PENSEAL 244)	0.55	GA	
EM-00005	1" X 8" PRESET WING INSERTS	3	EA	
⚠ EM-00011	DBSAE #4 X 18" EPOXY	5	EA	DOWEL BAR SPLICER
EM-00013	DBSAE #5 X 18" EPOXY	62	EA	DOWEL BAR SPLICER
EM-00033	3" FOAM CORE PVC	9.17	FT	
EM-00112	3/4" NC. GALV. FERRULE INSERT	4	EA	
RM-00014	REBAR #4 EPOXY- GR 60 40'	516	LB	
RM-00016	REBAR #5 EPOXY- GR 60 40'	812	LB	
MX-FA5000SC20	MIX DESIGN - FLY ASH 5000 SELF COMPACTIN	7.58	CY	
	B3 BAFFLE WALL - BILL OF MATERIALS / EMBEDS			
EM-00019	DI #4 X 18" EPOXY	5	EA	DOWEL IN
RM-00014	REBAR #4 EPOXY- GR 60 40'	18	LB	
MX-FA5000SC20	MIX DESIGN - FLY ASH 5000 SELF COMPACTIN	0.42	CY	
	B3 HEADWALL - BILL OF MATERIALS / EMBEDS			
⚠ DTJ	CONSOLIDECK SALTGUARD (PENSEAL 244)	0.5	GA	
⚠ EM-00021	DI #5 X 18" EPOXY	62	EA	DOWEL IN
EM-00078	BT SPREAD ANCHOR W/FL119/P94	2	EA	
⚠ RM-00016	REBAR #5 EPOXY- GR 60 40'	307	LB	
SBO	GUARDRAIL ANCHOR ASSY - 4 BOLTS PER	3	EA	
MX-FA5000SC20	MIX DESIGN - FLY ASH 5000 SELF COMPACTIN	2.83	CY	

All Rebar to be Epoxy Coated
Culvert Rebar Schedule

MK	QTY	LENGTH
401 #4	12	7' 4"
402 #4	14	15' 0"
403 #4	74	6'-5" max. ⚠
501 #5	28	13' 4"
502 #5	27	15' 0"

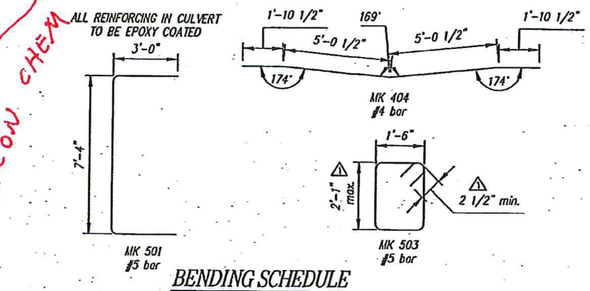
All Rebar to be Epoxy Coated
Headwall Rebar Schedule

MK	QTY	LENGTH
502 #5	6	15' 0"
503 #5	25	8' 2"

All Rebar to be Epoxy Coated
Baffle Wall Rebar Schedule

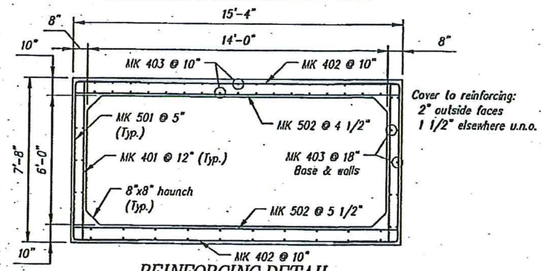
MK	QTY	LENGTH
404 #4	1	13' 10"
405 #4	1	12' 8"

ALL REINFORCING IN CULVERT TO BE EPOXY COATED



BENDING SCHEDULE

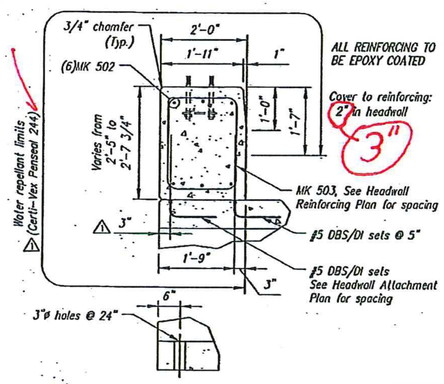
ALL REINFORCING IN CULVERT TO BE EPOXY COATED



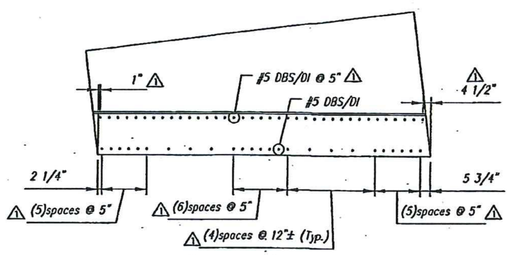
REINFORCING DETAIL

SILANE - VEXICON CHEM

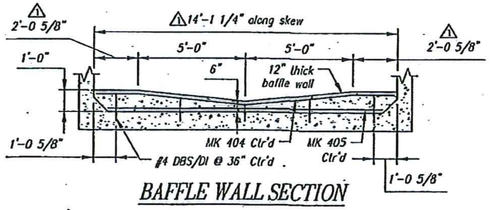
GUARDRAIL ANCHOR DETAILS



SECTION A



DBS LAYOUT DETAIL



BAFFLE WALL SECTION

Rev.	Date	By
1	10/02/12	MS

Miscellaneous revisions: See revision triangles

REVISIONS

DESCRIPTION

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This drawing is based upon information provided from the following documents and/or sources:

Engineer:
Project No:
Drawings:

Specifications:

Other:

CSI Concrete Systems Inc.
9 Commercial St., Hudson, NH,03051
Phone 603-889-4163
Fax 603-889-2417

STATE AGENCY
VTrans

Drawn By	Date
M. SCOTT	09/21/2012
Checked By	Date
Approved By	Date

HUBBARDTON ER STP 0161(27)
BRIDGE NO. 98
J.A. McDONALD, INC.
PROPOSED IMPROVEMENT BRIDGE PROJECT
HUBBARDTON, VT

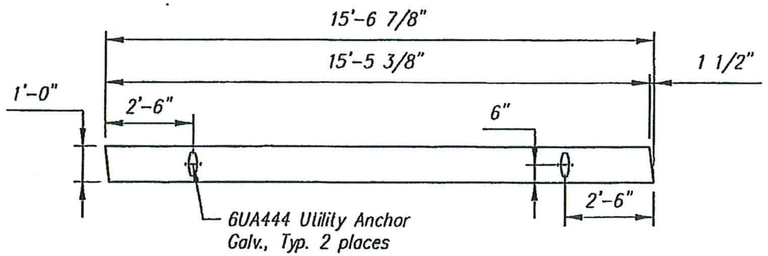
C — SHOP DRAWING B3 — REV 1
Drawing No. C21377-B3

Quantity: 1 | Project No: ER STP 0161(27) | SHEET 3B OF 3B

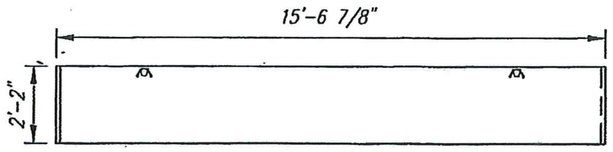
STATE OF VERMONT
CHRISTOPHER M. VICK
NO. 77928
Structural
LICENSED
PROFESSIONAL ENGINEER

10/2/12

Stamp for structural design only



PLAN



ELEVATION

CW1 - BILL OF MATERIALS / EMBEDS				
CSI ID#	DESCRIPTION	QTY	UM	COMMENTS
EM-00116	UTILITY ANCHOR 6UA444-GALVANIZED	2	EA	
RM-00014	REBAR #4 EPOXY- GR 60 40'	93	LB	
MX-FA4000SM	MIX DESIGN - FLY ASH 4000 SUMMER MIX	1.24	CY	

All Rebar to be Epoxy Coated

Rebar Schedule			
MK		QTY	LENGTH
401	#4	8	6 '- 0 "
402	#4	6	15 '- 1 "

SHOP DRAWING REVIEW

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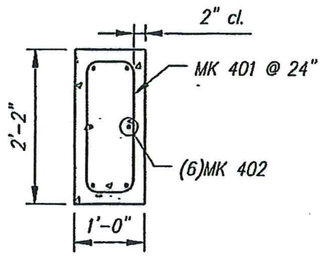
VHB Vanasse Hangen Brustlin, Inc.
7056 US Route 7
North Ferrisburgh, VT 05473
802.425.7788

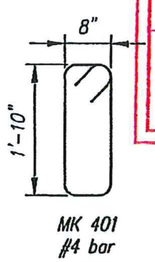
Job Number: HUBBARDTON ER STP 0161(27)
Reviewed By: S. FARNSWORTH
Date: 10-2-2012

STATE OF VERMONT
CHRISTOPHER M. VICK
NO. 77928
Structural
LICENSED
PROFESSIONAL ENGINEER
10/3/12

Stamp for structural design only



REINFORCING DETAIL



BENDING SCHEDULE

Rev.	Date	DESCRIPTION	By
5			
4			
3			
2			
1			

REVISIONS

CSI Concrete Systems Inc.
9 Commercial St., Hudson, NH,03051
Phone 603-889-4163
Fax 603-889-2417

STATE AGENCY
VTrans Working To Get You There

Drawn By: M SCOTT	Date: 09/21/2012
Concrete Cu. Yd.: 1.24	Weight in Tons: 2.51
Approved By:	Date:

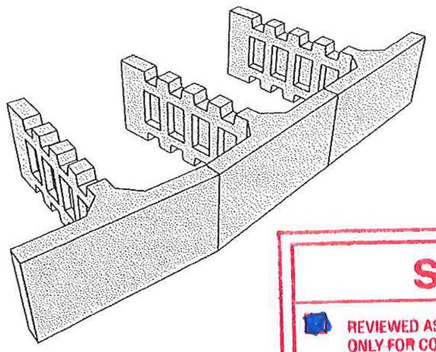
HUBBARDTON ER STP 0161(27)
BRIDGE NO. 98

J.A. McDONALD, INC.
PROPOSED IMPROVEMENT BRIDGE PROJECT
HUBBARDTON, VT

B | SHOP DRAWING CW1 | REV 0

Drawing No. C21377-CW1

Quantity: 2 | Project No: ER STP 0161(27) | SHEET 1 OF 1



RTE. 30 BRIDGE IMPROVEMENTS
BRIDGE NO. 96
TOWN OF HUBBARDTON, VT
ER STP 0161 (26)

T-WALL®
RETAINING WALL SYSTEM

SHOP DRAWING REVIEW

☒ REVIEWED AS REQUIRED BY THE CONSTRUCTION CONTRACT DOCUMENTS AND APPROVED, BUT ONLY FOR CONFORMANCE TO THE DESIGN CONCEPT OF THE WORK, AND SUBJECT TO FURTHER LIMITATIONS AND REQUIREMENTS CONTAINED IN THE CONSTRUCTION CONTRACT DOCUMENTS.

☐ REJECTED ☐ REVISE AND RESUBMIT ☐ FURNISH AS CORRECTED

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Vanasse Hangen Brustlin, Inc.
7056 US Route 7
North Ferrisburgh, VT 05473
802.425.7788

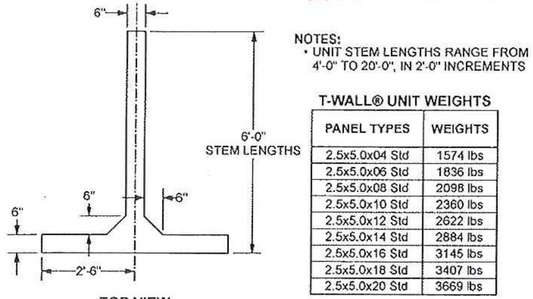
Job Number: ER STP 0161 (26)
Reviewed By: S. FARNSWORTH
Date: 10-4-2012

DESIGNER

THE NEEL COMPANY
8328-D TRAFORD LANE
SPRINGFIELD, VIRGINIA 22152
PH: (703) 913-7858
FX: (703) 913-7859
WEB: WWW.NEELCO.COM

PRECASTER

CSI
Concrete Systems Inc.
9 Commercial St., Hudson, NH,03051
Phone 603-889-4163
Fax 603-889-2417
Web www.csigroup.biz

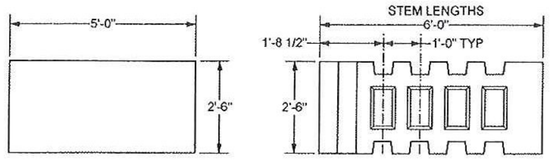


TOP VIEW

NOTES:
- UNIT STEM LENGTHS RANGE FROM 4'-0" TO 20'-0", IN 2'-0" INCREMENTS

T-WALL® UNIT WEIGHTS

PANEL TYPES	WEIGHTS
2.5x5.0x04 Std	1574 lbs
2.5x5.0x06 Std	1836 lbs
2.5x5.0x08 Std	2098 lbs
2.5x5.0x10 Std	2360 lbs
2.5x5.0x12 Std	2622 lbs
2.5x5.0x14 Std	2884 lbs
2.5x5.0x16 Std	3145 lbs
2.5x5.0x18 Std	3407 lbs
2.5x5.0x20 Std	3669 lbs



FRONT VIEW SIDE VIEW

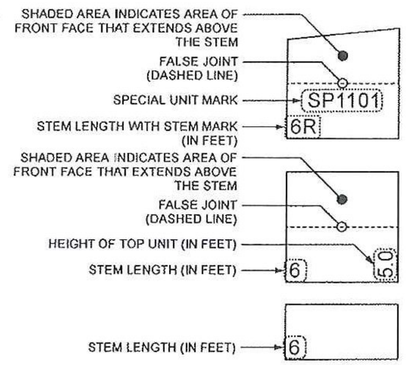
TYPICAL 2'-6" x 5'-0" x 6'-0" STEM T-WALL® UNIT

0 1/2" 1" 1 1/2" 2"
SHEET SCALE

INDEX OF DRAWINGS

SHEET	TITLE	REV	DATE
1	COVER SHEET		9-27-2012
2	T-WALL® NOMENCLATURE AND TYPICAL SYSTEM DETAILS		9-27-2012
3	GENERAL T-WALL® NOTES		9-27-2012
4	PLAN, ELEVATIONS, SECTION & QUANTITIES		9-27-2012
5	STANDARD UNITS		9-27-2012
6	SLOPED TOP SPECIAL UNITS		9-27-2012

LEGEND



TYPICAL PANEL NOTATION
NO SCALE

PRECASTER: CONCRETE SYSTEMS INC. HUDSON, NH
PROJECT #: T21377

CONTRACTOR: J. A. MCDONALD INC. LYNDON CENTER, VERMONT
PROJECT #:

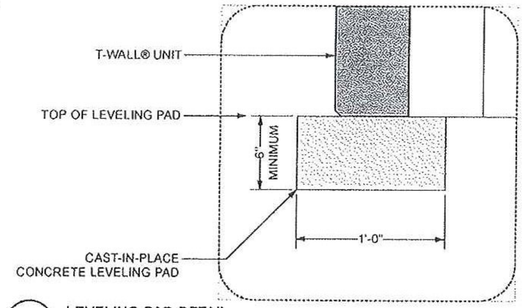
DESIGNER
THE NEEL COMPANY
8328-D TRAFORD LANE
SPRINGFIELD, VIRGINIA 22152
PH: (703) 913-7858
FX: (703) 913-7859
WEB: WWW.NEELCO.COM
PROJECT #: TW4083

STATE OF VERMONT
CERTIFIED WITH RESPECT TO INTERNAL STABILITY FOR T-WALL® STRUCTURES ONLY
THOMAS C. NEEL
6584
PROFESSIONAL ENGINEER

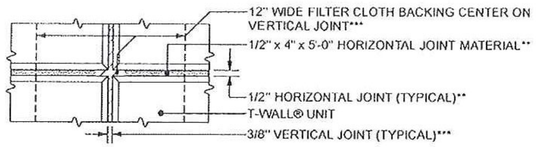
REVISIONS

RTE. 30 BRIDGE IMPROVEMENTS
BRIDGE NO. 96
TOWN OF HUBBARDTON, VT
ER STP 0161 (26)
SHOP DRAWINGS
COVER SHEET
T-WALL® RETAINING WALL SYSTEM

SCALE:	NO SCALE
DATE:	9-27-2012
DESIGNED BY:	NN
DRAWN BY:	HS
CHECKED BY:	NN
SHEET:	1



4 LEVELING PAD DETAIL
Scale: 2" = 1'-0"



3 HORIZONTAL AND VERTICAL JOINT DETAIL
Scale: 2" = 1'-0"
** SEE GENERAL NOTE 4 ON SHEET 3 FOR ADDITIONAL DETAILS
*** SEE GENERAL NOTE 5 ON SHEET 3 FOR ADDITIONAL DETAILS

NOMENCLATURE NOTE:

THIS SHEET IS PROVIDED FOR GENERAL INFORMATION PURPOSES ONLY, REFERENCING STANDARD DETAILS APPLICABLE TO ANY T-WALL® STRUCTURE. THIS SHEET IS NOT INTENDED TO PROVIDE DETAILS SPECIFIC TO THE WALL STRUCTURES CONTAINED IN THIS DRAWING PACKAGE. FOR INFORMATION SPECIFIC TO THESE WALLS, SEE THE APPLICABLE DRAWING SHEETS.

SHEAR KEY NOTES:

1. WALL IS DESIGNED FOR SPECIFIC NUMBER OF SHEAR KEYS AS SHOWN IN "TYPICAL SECTION AT MAXIMUM HEIGHT" FOR SPECIFIC WALLS. LOCATION OF SHEAR KEYS CAN BE ADJUSTED IF NECESSARY AT A SPECIFIC LEVEL.
2. ALL EXTENDED FACE TOP UNITS REQUIRE A MINIMUM OF 2 SHEAR KEYS, OR 1 SHEAR KEY FOR EVERY 6' OF STEM LENGTH (OR FRACTION THEREOF), WHICHEVER IS GREATER.

SHOP DRAWING REVIEW

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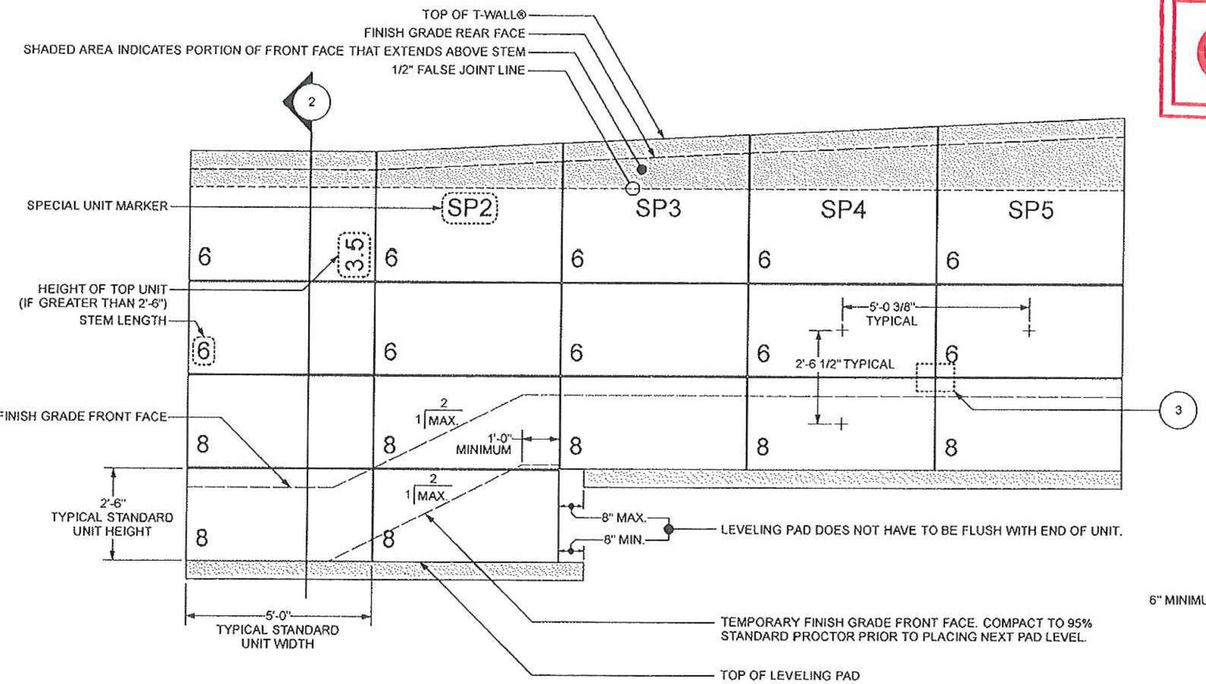
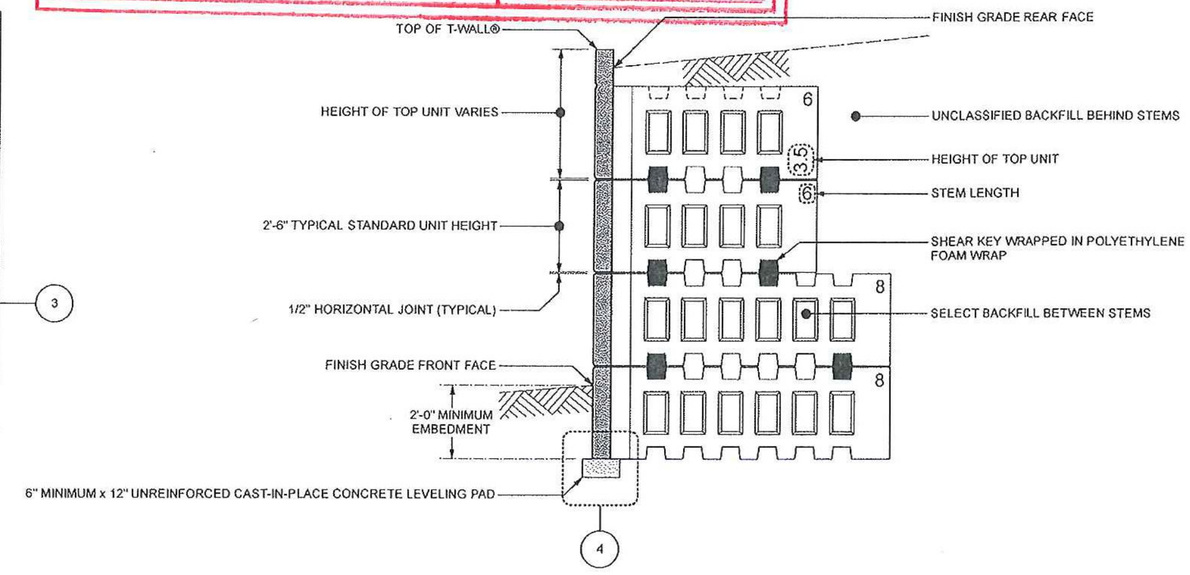
VHB Vanasse Hangen Brustlin, Inc.
7056 US Route 7
North Ferrisburgh, VT 05473
802.425.7788

Job Number: ER STP 0161 (26)
Reviewed By: S. FARNSWORTH
Date: 10-4-2012



1 PARTIAL ELEVATION SHOWN - TYPICAL DETAILS
Scale: 1/2" = 1'-0"
NOT ALL DETAILS APPLY. SEE SPECIFIC WALL ELEVATIONS



2 PARTIAL ELEVATION SHOWN - TYPICAL DETAILS
Scale: 1/2" = 1'-0"
NOT ALL DETAILS APPLY. SEE SPECIFIC WALL ELEVATIONS

0 1/2" 1" 1 1/2" 2"
SHEET SCALE

PRECASTER: CONCRETE SYSTEMS INC. HUDSON, NH
PROJECT #: T21377

CONTRACTOR: J. A. MCDONALD INC. LYNDON CENTER, VERMONT
PROJECT #:

DESIGNER
THE NEEL COMPANY
8328-D TRAFORD LANE
SPRINGFIELD, VIRGINIA 22153
PH: (703) 913-7858
FX: (703) 913-7859
WEB: WWW.NEELCO.COM
PROJECT #: TW4083

STATE OF VERMONT
CERTIFIED WITH RESPECT TO INTERNAL STABILITY OF T-WALL® STRUCTURES ONLY
THOMAS C. NEEL
6584
PROFESSIONAL ENGINEER

REVISIONS

RTE. 30 BRIDGE IMPROVEMENTS
BRIDGE NO. 96
TOWN OF HUBBARDTON, VT
ER STP 0161 (26)
SHOP DRAWINGS
T-WALL® NOMENCLATURE AND TYPICAL SYSTEM DETAILS
T-WALL® RETAINING WALL SYSTEM

SCALE:	AS NOTED
DATE:	9-27-2012
DESIGNED BY:	NN
DRAWN BY:	HS
CHECKED BY:	NN
SHEET:	2

UTILITIES NOTES:

1. THE CONTRACTOR SHALL VERIFY LOCATION OF ALL EXISTING UTILITIES (HORIZONTAL AND VERTICAL) PRIOR TO CONSTRUCTION.
2. CONTRACTOR SHALL NOTIFY OTHER PUBLIC UTILITIES (GAS, PHONE, ELECTRIC, CABLE TV, WATER, SEWER, ETC.) TO MAKE ALL NECESSARY ADJUSTMENTS TO RESPECTIVE FACILITIES BEFORE START OF CONSTRUCTION OF T-WALL®S LEVELING PAD.
3. ANY EXISTING UTILITIES THAT ARE LOCATED WITHIN THE STEM AREA OF THE T-WALL® UNITS MUST BE RELOCATED. ALL UTILITIES MUST STAY CLEAR OF T-WALL® STEM BY 2'-0".
4. T-WALL® UNIT AND UTILITY CONFLICTS:
   - FIELD CUTTING OF T-WALL® UNITS TO AVOID UTILITY CONFLICTS (NOT SHOWN ON CONTRACT DRAWINGS) IS PROHIBITED UNTIL IT IS BROUGHT TO THE DESIGNER'S ATTENTION. THE NEEL COMPANY SHALL PROVIDE DIRECTION AND / OR REDESIGN T-WALL® UNITS TO AVOID CONFLICTS.

SHOP DRAWING REVIEW

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Vanasse Hangen Brustlin, Inc.
7056 US Route 7
North Ferrisburgh, VT 05473
802.425.7788

Job Number: ER STP 0161 (26)
Reviewed By: S. FARNSWORTH
Date: 10-4-2012

SPECIAL NOTES:

1. THESE DRAWINGS WERE PREPARED BASED ON INFORMATION GIVEN IN THE FOLLOWING:
   - CONTRACT DRAWINGS:
     - STATE OF VERMONT, AGENCY OF TRANSPORTATION PROPOSED IMPROVEMENT BRIDGE PROJECT 96 PREPARED BY VHB DATED 7/16/2012
     - CAD DRAWING OF CULVERT FOR BRIDGE 98 PREPARED BY CSI, RECEIVED ELECTRONICALLY ON SEPT. 14 2012
   - GEOTECHNICAL REPORT:
     - BASED ON CONTRACT DRAWINGS. NO GEOTECHNICAL REPORT PROVIDED FOR SHOP DRAWINGS.
2. REPORT DISCREPANCIES BETWEEN CONTRACT INFORMATION AND ACTUAL CONDITIONS AS SITE WORK PROGRESSES TO THE NEEL COMPANY FOR REDESIGN. NO LIABILITY IS ACCEPTED FOR INACCURATE INFORMATION SUPPLIED BY OTHERS.
3. THE FOLLOWING ASSUMPTIONS WERE MADE:
   - FOUNDATION IS ABLE TO SUPPORT BEARING PRESSURE SHOWN IN SPECIAL NOTES 4 WITH AN ACCEPTABLE FACTOR OF SAFETY.
4. APPLIED BEARING PRESSURE AT MAXIMUM HEIGHT: ALL WINGWALLS = 3,258 PSF (FACTORED)
5. THE DESIGN CONTAINED ON THESE DRAWINGS IS BASED UPON INFORMATION PROVIDED BY THE OWNER. ON THE BASIS OF THIS INFORMATION, THE NEEL COMPANY HAS DESIGNED, AND IS RESPONSIBLE FOR, THE INTERNAL STABILITY OF THE STRUCTURE ONLY. EXTERNAL STABILITY, INCLUDING FOUNDATION AND SLOPE STABILITY, IS THE RESPONSIBILITY OF THE OWNER.
6. THE NEEL COMPANY HAS NOT PERFORMED GLOBAL STABILITY SETTLEMENT AND BEARING CAPACITY ANALYSIS FOR THE WALL FOUNDATION. THESE ANALYSES WILL BE THE RESPONSIBILITY OF OTHERS.
7. DRAINAGE:
   - THE NEEL COMPANY HAS NOT PERFORMED A DRAINAGE ANALYSIS FOR THIS WALL SITE. IT IS THE OWNER'S RESPONSIBILITY TO ASSURE THAT SURFACE RUN-OFF IS DIVERTED AWAY FROM THE WALL.
8. SELECT BACKFILL GRADATION AND COMPACTION:
   - BACKFILL GRADATION AND COMPACTION BETWEEN STEMS AND AROUND PIPES ARE IMPORTANT TO THE WALL STABILITY. THE OWNER'S GEOTECHNICAL ENGINEER SHOULD PROVIDE SUFFICIENT TESTING TO INSURE COMPLIANCE WITH THE SELECT BACKFILL GRADATION AND COMPACTION SPECIFICATIONS NOTED ON THIS SHEET. PLACEMENT OF LOOSE LIFT OF BACKFILL SHALL NOT EXCEED 12 INCHES.
9. T-WALL® FACE FORM FINISH.
   - PLAIN STEEL FORM FINISH

GENERAL NOTES:

1. PRIMARY REFERENCE:
   - AASHTO, LRFD BRIDGE DESIGN SPECIFICATIONS, 4th EDITION 2004 (WITH INTERIMS)
2. SELECT BACKFILL BETWEEN STEMS:
   - ANGLE OF INTERNAL FRICTION - 34° (MINIMUM)
   - DENSITY - 120 pcf (MINIMUM)
   - 5% MAXIMUM PASSING #200 SIEVE
   - 100% PASSING 3" SIEVE
   - 95% STANDARD COMPACTION (ASTM D-698)
3. UNCLASSIFIED BACKFILL BEHIND STEMS:
   - ANGLE OF INTERNAL FRICTION - 30°
   - DENSITY - 120 pcf
   - 95% STANDARD COMPACTION (ASTM D-698)
4. HORIZONTAL JOINT:
   - 1/2 INCH ASPHALT EXPANSION JOINT MATERIAL PER ASTM D-994 AS SHOWN ON DEVELOPED ELEVATIONS
5. VERTICAL JOINT:
   - 3/8 INCH SPACE
   - 12 INCHES WIDE FILTER CLOTH BACKING CENTERED AT JOINT, UNLESS OTHERWISE NOTED.
   - FILTER CLOTH BACKING: MIRAFI 160N OR EQUAL
6. OVERALL DIMENSIONAL TOLERANCES FOR FINISHED WALL:
   - VERTICAL ALIGNMENT (PLUMBNESS) - 3/4 INCH IN 10 FEET
   - HORIZONTAL ALIGNMENT (LINE) - 3/4 INCH IN 10 FEET
7. FOUNDATION:
   - PROOF-ROLL THE FOUNDATION SUBGRADE ALONG THE ENTIRE WALL LENGTH PRIOR TO CONSTRUCTION OF THE T-WALL®. A GEOTECHNICAL ENGINEER MUST INSPECT THE EXCAVATED FOUNDATION SUBGRADE AND PROOF-ROLLING ACTIVITIES. ANY SOFT OR UNSUITABLE MATERIALS IDENTIFIED BY INSPECTION SHALL BE REMOVED AND REPLACED WITH COMPACTED STRUCTURAL BACKFILL AS DIRECTED BY THE ENGINEER. CONTRACTOR TO PROVIDE SUFFICIENT DEWATERING SO THAT THE EXCAVATIONS ARE DRY ENOUGH FOR INSPECTION, TESTING AND CONSTRUCTION.
8. CAST-IN-PLACE CONCRETE LEVELING PAD:
   - 6 INCHES MINIMUM x 12 INCHES
   - CONCRETE STRENGTH: 2500 psi (MINIMUM) @ 28 DAYS
   - NO REBAR
   - GRADE TOLERANCE - 1/4 INCH IN 10 FEET
9. T-WALL® UNIT REBAR:
   - ASTM A615
   - Fy = 60 ksi (GRADE 60)
   - EPOXY COATED
   - WELDING IS NOT PERMITTED
10. T-WALL® UNIT CONCRETE STRENGTH:
    - 5000 psi (MINIMUM) @ 28 DAYS
11. SHEAR KEYS:
    - NO REBAR
    - CONCRETE STRENGTH: 5000 psi (MINIMUM) @ 28 DAYS
    - WALL IS DESIGNED FOR SPECIFIC NUMBER OF SHEAR KEYS AS SHOWN IN TYPICAL SECTION FOR SPECIFIC WALLS. LOCATION OF SHEAR KEYS CAN BE ADJUSTED IF NECESSARY AT A SPECIFIC LEVEL.
    - SHEAR KEY WRAP:
      - 1/4 INCH POLYETHYLENE FOAM WRAP TWO TIMES AROUND THE SHEAR KEY.
      - SHEAR KEY WRAP: AF250 POLYETHYLENE FOAM
12. CONSTRUCTION:
    - TO BE IN ACCORDANCE WITH T-WALL® CONSTRUCTION MANUAL (v07.04) AND TYPICAL T-WALL® NOMENCLATURE ON SHEET TW-2.
    - T-WALL® CONSTRUCTION MANUAL (v07.04) CAN BE DOWNLOADED FROM OUR WEB SITE AT www.neelco.com, UNDER "Downloads".
    - CONTRACTOR IS RESPONSIBLE FOR THE STABILITY OF ALL EXCAVATED SLOPES. DESIGN AND CONSTRUCTION OF ANY REQUIRED TEMPORARY SUPPORT OF EXCAVATION SHALL ALSO BE THE RESPONSIBILITY OF THE CONTRACTOR.
    - ALL SURFACE RUNOFF IS TO BE DIVERTED AWAY FROM EXCAVATIONS TO AVOID THE DETERIORATION OF THE SUBGRADE SOILS DUE TO EXPOSURE TO MOISTURE.

0 1/2" 1" 1 1/2" 2"
SHEET SCALE

PRECASTER: CONCRETE SYSTEMS INC. HUDSON, NH
PROJECT #: T21377

CONTRACTOR: J. A. MCDONALD INC. LYNDON CENTER, VERMONT
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DESIGNER
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PROJECT #: TW4083

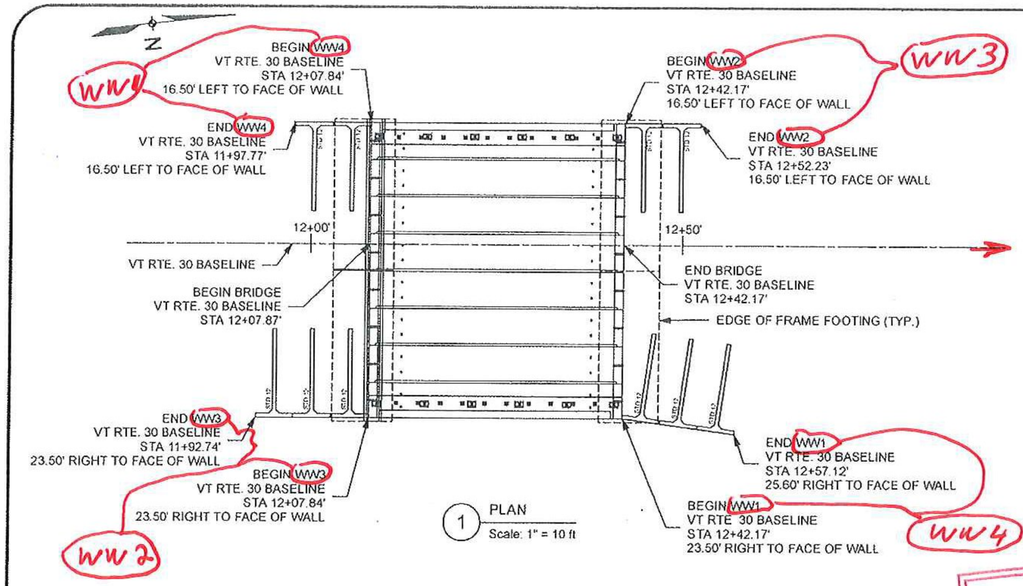
STATE OF VERMONT — CERTIFIED with respect to INTERNAL STABILITY of T-WALL® STRUCTURES ONLY — THOMAS C. NEEL — 6584 — PROFESSIONAL ENGINEER

REVISIONS

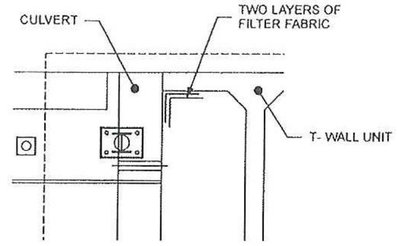
RTE. 30 BRIDGE IMPROVEMENTS
BRIDGE NO. 96
TOWN OF HUBBARDTON, VT
ER STP 0161 (26)
SHOP DRAWINGS
GENERAL T-WALL® NOTES

T-WALL® RETAINING WALL SYSTEM

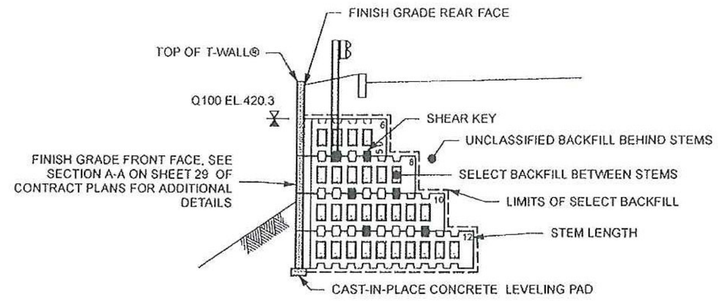
SCALE:	NO SCALE
DATE:	9-27-2012
DESIGNED BY:	NN
DRAWN BY:	HS
CHECKED BY:	NN
SHEET:	3



1 PLAN
Scale: 1" = 10 ft



7 INTERFACE DETAIL (TYP. ALL WALLS)
Scale: 1/2" = 1'-0"



6 TYPICAL SECTION @ MAXIMUM HEIGHT
Scale: 1" = 5 ft.

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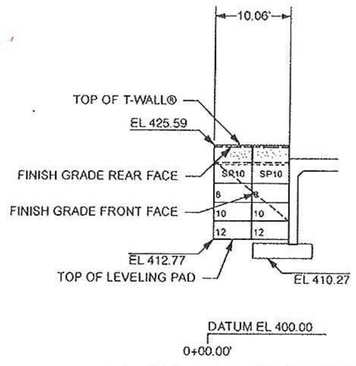
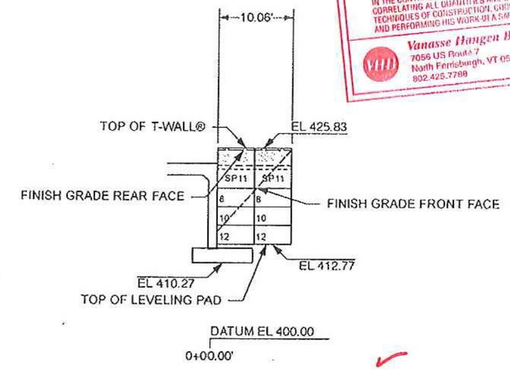
Job Number: ER STP 0161(26)
Reviewed By: S. FARNSWORTH
Date: 10-4-2012

SHIP LOOSE LIST FOR RETAINING WALL:

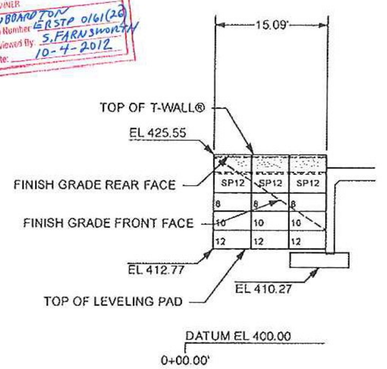
ITEM	QNTY
Shear Keys	56 ea.
AF250 Polyethylene Foam*	1.00 Rolls
1/2" x 4" x 5.00' Horizontal Joint Material**	140.00 LF
Filler Cloth (12" wide)***	73.00 LF



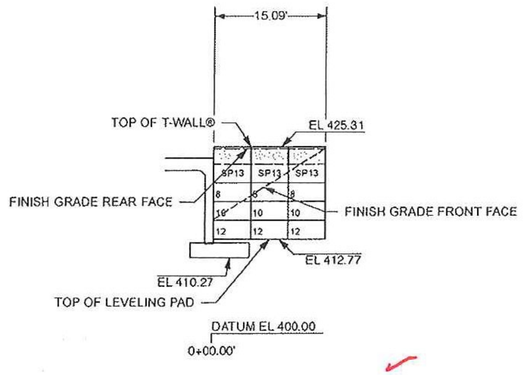
2 WW3 - ELEVATION (FRONT FACE)
Scale: 1" = 10 ft



3 WW1 - ELEVATION (FRONT FACE)
Scale: 1" = 10 ft



4 WW2 - ELEVATION (FRONT FACE)
Scale: 1" = 10 ft



5 WW4 - ELEVATION (FRONT FACE)
Scale: 1" = 10 ft

T-WALL Unit Count for 96-WW3 9/28/12 9:50:49 AM

PANEL TYPE	QNTY (ea)	AREA (sf)	SELECT FILL (cy)
2.5 x 5.0 x 08 Std	2	25.00	6
2.5 x 5.0 x 10 Std	2	25.00	8
2.5 x 5.0 x 12 Std	2	25.00	10
Special Units	2	51.94	5
TOTALS:	8 ea	126.94 sf	29 cy

NOTE: Select backfill quantities are between stems only.

T-WALL Unit Count for 96-WW1 9/28/12 9:52:58 AM

PANEL TYPE	QNTY (ea)	AREA (sf)	SELECT FILL (cy)
2.5 x 5.0 x 08 Std	2	25.00	6
2.5 x 5.0 x 10 Std	2	25.00	8
2.5 x 5.0 x 12 Std	2	25.00	10
Special Units	2	54.30	5
TOTALS:	8 ea	129.30 sf	29 cy

NOTE: Select backfill quantities are between stems only.

T-WALL Unit Count for 96-WW2 9/28/12 9:53:48 AM

PANEL TYPE	QNTY (ea)	AREA (sf)	SELECT FILL (cy)
2.5 x 5.0 x 08 Std	3	37.50	10
2.5 x 5.0 x 10 Std	3	37.50	12
2.5 x 5.0 x 12 Std	3	37.50	15
Special Units	3	77.25	7
TOTALS:	12 ea	189.75 sf	43 cy

NOTE: Select backfill quantities are between stems only.

T-WALL Unit Count for 96-WW4 9/28/12 9:57:03 AM

PANEL TYPE	QNTY (ea)	AREA (sf)	SELECT FILL (cy)
2.5 x 5.0 x 08 Std	3	37.50	10
2.5 x 5.0 x 10 Std	3	37.50	12
2.5 x 5.0 x 12 Std	3	37.50	15
Special Units	3	73.65	7
TOTALS:	12 ea	186.15 sf	43 cy

NOTE: Select backfill quantities are between stems only.

0 1/2" 1" 1 1/2" 2"
SHEET SCALE

The design contained on these drawings is based upon information provided by the owner. On the basis of this information, The Neel Company has designed, and is responsible for, the internal stability of the structure only. External stability, including foundation and slope stability, is the responsibility of the owner.

This drawing contains information proprietary to The Neel Company. T-WALL® is a registered trademark owned by The Neel Company.

PRECASTER: CONCRETE SYSTEMS INC.
HUDSON, NH
PROJECT #: T21377

CONTRACTOR: J. A. MCDONALD INC.
LYNDON CENTER, VERMONT
PROJECT #:

DESIGNER
THE NEEL COMPANY
8328-D TRAFORD LANE
SPRINGFIELD, VIRGINIA 22152
PH: (703) 913-7858
FX: (703) 913-7859
WEB: WWW.NEELCO.COM
PROJECT #: TW4083

STATE OF VERMONT
LICENSED WITH RESPECT TO INTERNAL STABILITY OF T-WALL® STRUCTURES ONLY
THOMAS C. NEEL
6584
PROFESSIONAL ENGINEER

REVISIONS

RTE. 30 BRIDGE IMPROVEMENTS
BRIDGE NO. 96
TOWN OF HUBBARDTON, VT
ER STP 0161 (26)
SHOP DRAWINGS
PLAN, ELEVATIONS, SECTION & QUANTITIES
T-WALL® RETAINING WALL SYSTEM

SCALE:	AS NOTED
DATE:	9-27-2012
DESIGNED BY:	NN
DRAWN BY:	HS
CHECKED BY:	NN
SHEET:	4

BORDER-TNC T-WALL HWY v4.1
USER NAME: N/A
VECTORWORKS 2011
PLOT DATE & TIME: Friday, September 28, 2012 1:22:20 PM
CAD FILE NAME: 03 WALLS 96.vwx
VW SHEET NAME: TW-3

BORDER-TNC T-WALL HWY v4.1

SHOP DRAWING REVIEW

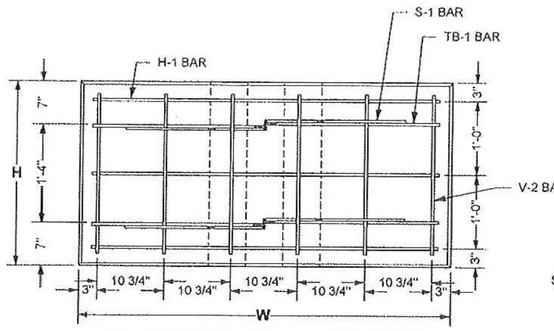
■ REVIEWED AS REQUIRED BY THE CONSTRUCTION CONTRACT DOCUMENTS AND APPROVED, BUT ONLY FOR CONFORMANCE TO THE DESIGN CONCEPT OF THE WORK, AND SUBJECT TO FURTHER LIMITATIONS AND REQUIREMENTS CONTAINED IN THE CONSTRUCTION CONTRACT DOCUMENTS

☐ REJECTED ☐ REVISE AND RESUBMIT ☐ FURNISH AS CORRECTED

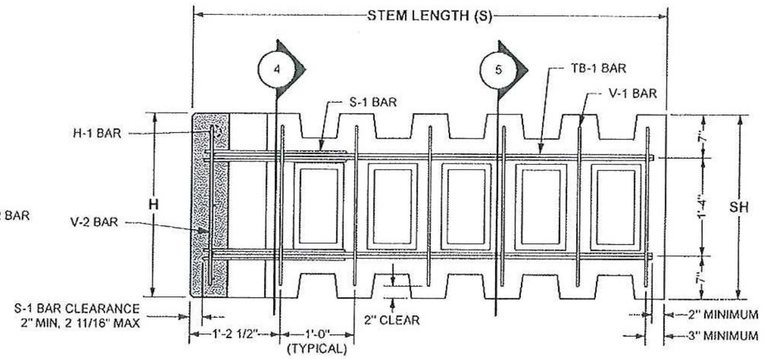
CORRECTIONS OR COMMENTS MADE ON THE SHOP DRAWINGS DURING THIS REVIEW DO NOT RELIEVE CONTRACTOR FROM COMPLIANCE WITH REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS. THIS CHECK IS ONLY FOR REVIEW OF GENERAL CONFORMANCE WITH THE DESIGN CONCEPT OF THE PROJECT AND GENERAL COMPLIANCE WITH THE INFORMATION GIVEN IN THE CONTRACT DOCUMENTS. THE CONTRACTOR IS RESPONSIBLE FOR: CONFIRMING AND CORRELATING ALL QUANTITIES AND DIMENSIONS; SELECTING FABRICATION PROCESSES AND TECHNIQUES OF CONSTRUCTION; COORDINATING HIS WORK WITH THAT OF ALL OTHER TRADES; AND PERFORMING HIS WORK IN A SAFE AND SATISFACTORY MANNER.

VHB *Vanasse Hangen Brustlin, Inc.*
7056 US Route 7
North Ferrisburgh, VT 05473
802.425.7788

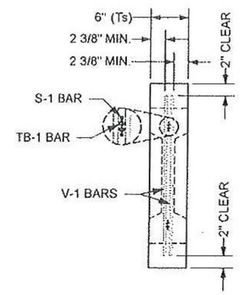
ER STP 0161 (26)
Job Number:
Reviewed By: S. FARNSWORTH
Date: 10-4-2012



3 FRONT VIEW - 2.5 x 5.0 x 06 Std SHOWN
Scale: 1" = 1'-0" *(V-1 BARS IN STEM OMITTED FOR CLARITY)*



2 SIDE VIEW - 2.5 x 5.0 x 06 Std SHOWN
Scale: 1" = 1'-0"



4 SECTION AT STEM
Scale: 1" = 1'-0"

T-WALL UNIT PROPERTIES

UNIT TYPE	H	W	S	Tf*	Ts	SH	VOLUME*	WEIGHT*
2.5x5.0x08 Std	2'6"	5'0"	8'4 1/2"	6"	6"	2'6"	0.52 cy	2,088 lbs
2.5x5.0x10 Std	2'6"	5'0"	10'4 1/2"	6"	6"	2'6"	0.58 cy	2,349 lbs
2.5x5.0x12 Std	2'6"	5'0"	12'4 1/2"	6"	6"	2'6"	0.64 cy	2,610 lbs

* VOLUMES AND WEIGHTS ON THIS TABLE ARE BASED ON 6" FACE THICKNESS (Tf)

REBAR SCHEDULES

2.5x5.0x08 Std — HIGHWAY REBAR

Unit Dims	Bar Mark	Qnty	Size	Length	Dim "A"	Bar Weight	Bend Dia	Remarks
H=2'6"	H-1	3 ea	#4	4'8"		9.35 lbs		
W=5'0"	V-1	16 ea	#3	2'2"		13.03 lbs		
S=8'4 1/2"	V-2	6 ea	#3	2'2"		4.89 lbs		
SH=2'6"	S-1	4 ea	#3	3'4 1/2"		5.08 lbs	D= 2 1/4"	
	TB-1	4 ea	#4	10'2"	7'11"	27.16 lbs	D= 3"	
						59.51 lbs		

2.5x5.0x10 Std — HIGHWAY REBAR

Unit Dims	Bar Mark	Qnty	Size	Length	Dim "A"	Bar Weight	Bend Dia	Remarks
H=2'6"	H-1	3 ea	#4	4'8"		9.35 lbs		
W=5'0"	V-1	20 ea	#3	2'2"		16.29 lbs		
S=10'4 1/2"	V-2	6 ea	#3	2'2"		4.89 lbs		
SH=2'6"	S-1	4 ea	#3	3'4 1/2"		5.08 lbs	D= 2 1/4"	
	TB-1	4 ea	#4	12'2"	9'11"	32.50 lbs	D= 3"	
						68.11 lbs		

2.5x5.0x12 Std — HIGHWAY REBAR

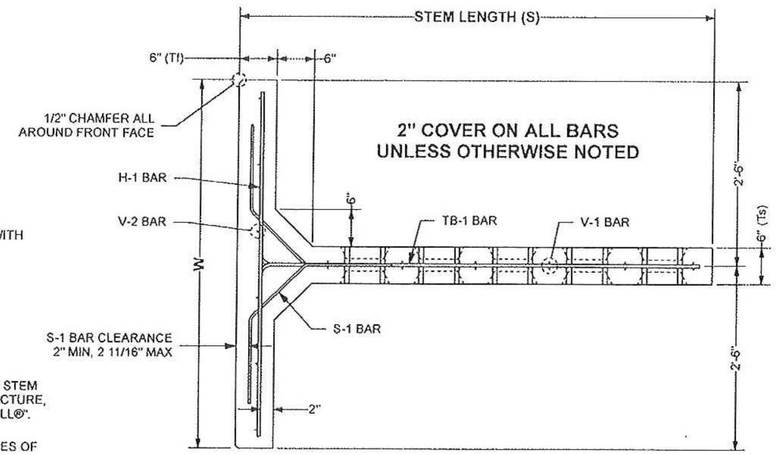
Unit Dims	Bar Mark	Qnty	Size	Length	Dim "A"	Bar Weight	Bend Dia	Remarks
H=2'6"	H-1	3 ea	#4	4'8"		9.35 lbs		
W=5'0"	V-1	24 ea	#3	2'2"		19.55 lbs		
S=12'4 1/2"	V-2	6 ea	#3	2'2"		4.89 lbs		
SH=2'6"	S-1	4 ea	#3	3'4 1/2"		5.08 lbs	D= 2 1/4"	
	TB-1	4 ea	#4	14'2"	11'11"	37.84 lbs	D= 3"	
						76.71 lbs		

SPECIAL NOTES:

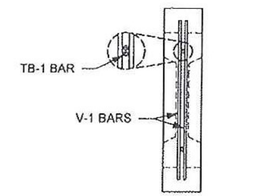
1. FRONT FACE OF T-WALL® UNITS FINISH TREATMENT:
   - PLAIN STEEL FORM FINISH
   - 1/2" CHAMFER ALL AROUND FRONT FACE

GENERAL NOTES:

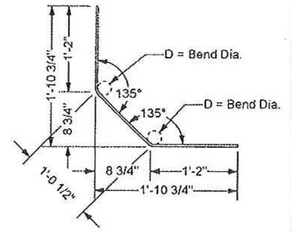
1. PRIMARY REFERENCE:
   - 2004 AASHTO LRFD BRIDGE SPECIFICATIONS 4th EDITION WITH INTERIMS.
2. T-WALL® CONCRETE:
   - F'c = 5000 psi (MINIMUM) @ 28 DAYS
   - MINIMUM STRIPPING STRENGTH: 2500 psi
3. T-WALL® REINFORCING STEEL:
   - ASTM A615 GRADE 60 EPOXY COATED
   - Fy = 60 ksi (GRADE 60)
   - WELDING IS NOT PERMITTED
4. MARKING OF PRECAST UNITS:
   - CLEARLY MARK EACH PRECAST UNIT ON THE BUTT END OF THE STEM WITH THE UNIT TYPE (i.e. 2.5x5.0x06 STD), THE DATE OF MANUFACTURE, THE LOT NUMBER (IF APPLICABLE), AND THE TRADEMARK "T-WALL®".
5. REINFORCING FABRICATION AND PLACEMENT TOLERANCES:
   - THE STRUCTURAL DESIGN OF PRECAST UNITS ASSUMES 2 INCHES OF CONCRETE COVER OVER ALL REINFORCING BARS.
   - UNLESS OTHERWISE NOTED IN CONTRACT DOCUMENTS OR REFERENCED SPECIFICATIONS, TOLERANCES ON CONCRETE COVER SHALL BE ± 3/8 INCHES.
   - UNLESS OTHERWISE NOTED IN CONTRACT DOCUMENTS OR REFERENCED SPECIFICATIONS, TOLERANCES ON BAR PLACEMENT SHALL BE:
     - VERTICAL LOCATION OF TB-1 BARS: ± 3/8 INCHES
     - LOCATION / SPACING OF H-1, V-1 & V-2 BARS: ± 1 INCH
   - REGARDLESS OF THE SPECIFIED PLACEMENT TOLERANCES, CONCRETE COVER SHALL BE MAINTAINED WITHIN ± 3/8 INCHES AS PREVIOUSLY NOTED.
   - ALL REINFORCING BARS SHALL BE CUT AND BENT FOLLOWING REQUIREMENTS OF THE CRSI MANUAL OF STANDARD PRACTICE.
   - UNLESS NOTED OTHERWISE, TOLERANCES FOR BAR FABRICATION SHALL MEET REQUIREMENTS OF STANDARD ACI 318 AND THE CRSI MANUAL OF STANDARD PRACTICE.



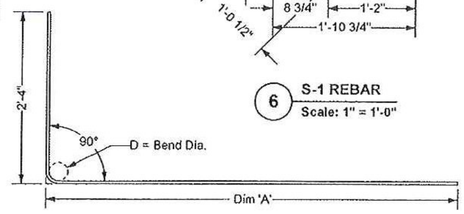
1 PLAN VIEW - 2.5 x 5.0 x 06 Std SHOWN
Scale: 1" = 1'-0"



5 SECTION AT STEM
Scale: 1" = 1'-0"



6 S-1 REBAR
Scale: 1" = 1'-0"



7 TB-1 REBAR
Scale: 1" = 1'-0"

0 1/2" 1" 1 1/2" 2"
SHEET SCALE

PRECASTER: CONCRETE SYSTEMS INC.
HUDSON, NH
PROJECT #: T21377

CONTRACTOR: J. A. MCDONALD INC.
LYNDON CENTER, VERMONT
PROJECT #:

DESIGNER

THE NEEL COMPANY
8328-D TRAFORD LANE
SPRINGFIELD, VIRGINIA 22152
PH: (703) 913-7858
FX: (703) 913-7859
WEB: WWW.NEELCO.COM

PROJECT #: TW4083

STATE OF VERMONT — CERTIFIED WITH RESPECT TO INTERNAL STABILITY OF T-WALL® STRUCTURES ONLY — THOMAS C. NEEL — 6584 — PROFESSIONAL ENGINEER

REVISIONS

RTE. 30 BRIDGE IMPROVEMENTS
BRIDGE NO. 96
TOWN OF HUBBARDTON, VT
ER STP 0161 (26)
SHOP DRAWINGS
STANDARD UNITS
REBARS & DIMENSIONS
T-WALL® RETAINING WALL SYSTEM

SCALE:	1" = 1'
DATE:	9-27-2012
DESIGNED BY:	NN
DRAWN BY:	HS
CHECKED BY:	NN
SHEET:	5

PLOT DATE & TIME: Friday, September 28, 2012 12:55:08 PM
CAD FILE NAME: C5 REBAR - STD UNITS.vwx
VH SHEET NAME: TW-08

USER NAME: N/A
VECTORWORKS 2011

BORDER-TNC T-WALL HWY v4.1

SPECIAL NOTES:

1. FRONT FACE OF T-WALL® UNITS FINISH TREATMENT:
   - PLAIN STEEL FORM FINISH
   - 1/2" CHAMFER AROUND FRONT FACE
2. LIFTING INSERTS CAPACITY:
   - TWO QUICKLIFT 'QL050G' LIFTING INSERTS OR EQUAL, SPACED AT LEAST 30" APART.
   - 2000 LBS (1 TON) MINIMUM RATED WORKING LOAD CAPACITY.
   - MINIMUM CONCRETE STRENGTH SHALL BE 3,500 psi PRIOR TO STRIPPING AND LIFTING OPERATIONS.
3. 1/2" FALSE JOINT LOCATION:
   - IF H-1 IS GREATER THEN 2'-6", THEN FIRST FALSE JOINT WILL BE 2'-6" FROM THE BOTTOM OF THE UNIT.
   - IF H-1 IS GREATER THEN 5'-0", THEN SECOND FALSE JOINT WILL BE 2'-6" ABOVE THE FIRST FALSE JOINT.
   - THE FALSE JOINT WILL 1/2" HIGH AND 1/2" DEEP.

GENERAL NOTES:

1. PRIMARY REFERENCE:
   - 2004 AASHTO LRFD BRIDGE SPECIFICATIONS 4th EDITION WITH INTERIMS.
2. T-WALL® CONCRETE:
   - F'c = 5000 psi (MINIMUM) @ 28 DAYS
   - MINIMUM STRIPPING STRENGTH: 2500 psi
3. T-WALL® REINFORCING STEEL:
   - ASTM A615 GRADE 60 EPOXY COATED
   - Fy = 60 ksi (GRADE 60)
   - WELDING IS NOT PERMITTED
4. MARKING OF PRECAST UNITS:
   - CLEARLY MARK EACH PRECAST UNIT ON THE BUTT END OF THE STEM WITH THE UNIT TYPE (i.e. 2.5x5.0x06 STD), THE DATE OF MANUFACTURE, THE LOT NUMBER (IF APPLICABLE), AND THE TRADEMARK "T-WALL®".
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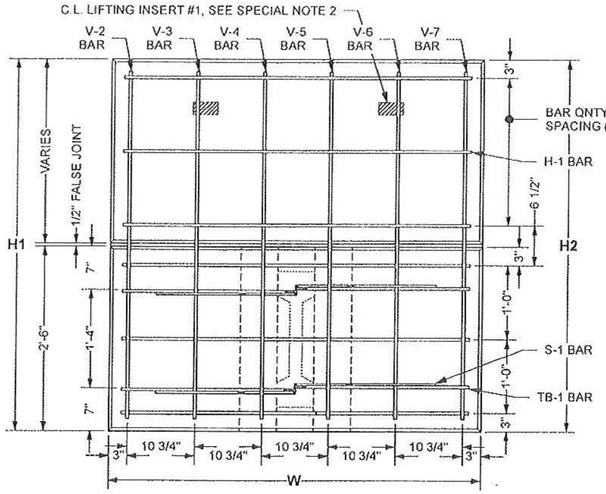
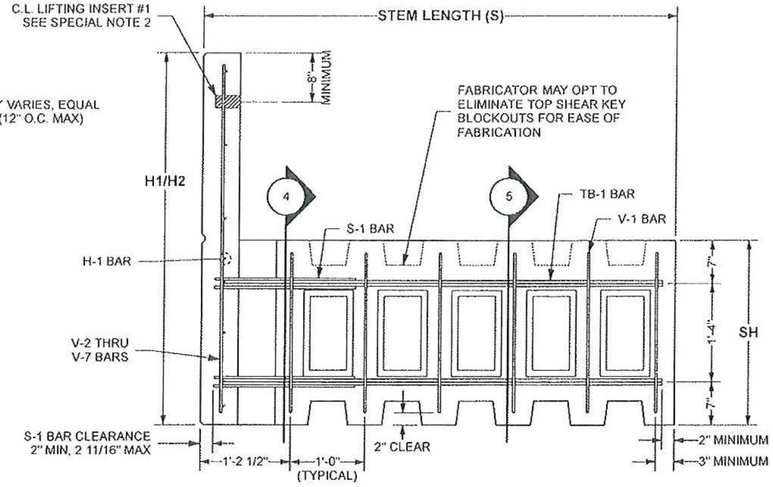
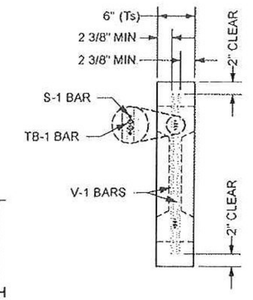


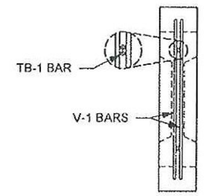
3 FRONT VIEW - 6' STEM UNIT SHOWN
Scale: 1" = 1'-0" *(V-1 BARS IN STEM OMITTED FOR CLARITY)*



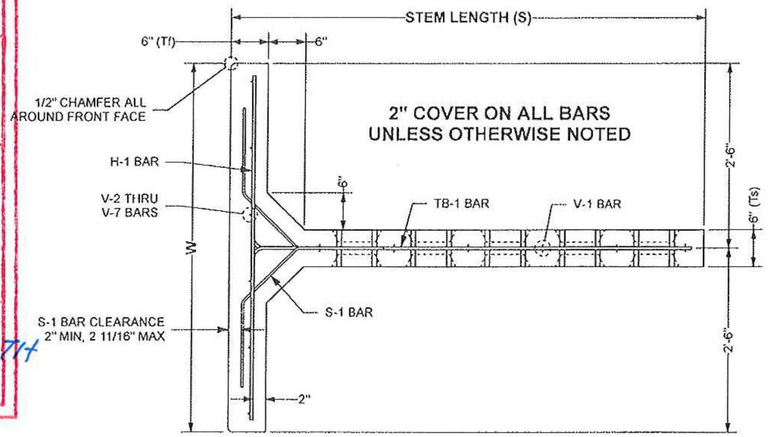
2 SIDE VIEW - 6' STEM UNIT SHOWN
Scale: 1" = 1'-0"



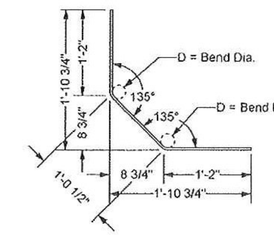
4 SECTION AT STEM
Scale: 1" = 1'-0"



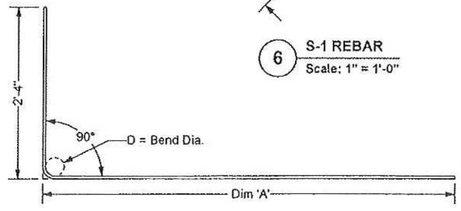
5 SECTION AT STEM
Scale: 1" = 1'-0"



1 PLAN VIEW - 6' STEM UNIT SHOWN
Scale: 1" = 1'-0"



6 S-1 REBAR
Scale: 1" = 1'-0"



7 TB-1 REBAR
Scale: 1" = 1'-0"

SHOP DRAWING REVIEW

REVIEWED AS REQUIRED BY THE CONSTRUCTION CONTRACT DOCUMENTS AND APPROVED, BUT ONLY FOR CONFORMANCE TO THE DESIGN CONCEPT OF THE WORK, AND SUBJECT TO FURTHER LIMITATIONS AND REQUIREMENTS CONTAINED IN THE CONSTRUCTION CONTRACT DOCUMENTS.

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Vanasse Hangen Brustlin, Inc.
7056 US Route 7
North Ferrisburgh, VT 05473
802.425.7799

ER STP 016 (26)
Job Number:
Reviewed By: S. FARNSWORTH
Date: 10-4-2012

REBAR SCHEDULES
6' STEM SPECIAL UNITS

Unit Dims	Bar Mark	Qnty	Size	Length	Dim "A"	Bar Weight	Bend Dia	Remarks
H=5'5 1/8" MAX W=5'0" S=6'4 1/2" SH=2'6"	H-1	VARIES	#4	4'8"				
	V-1	12 ea	#3	2'2"		9.78 lbs		
	V-2 THRU V-7	1 ea	#5	VARIES				
	S-1	4 ea	#3	3'4 1/2"		5.08 lbs	D= 2 1/4"	
	TB-1	4 ea	#4	8'3"	5'11"	22.04 lbs	D= 3"	

HIGHWAY REBAR

MARK No.	QNTY	STEM	WIDTH	H1	H2	H-1 BAR	V-2 BAR	V-3 BAR	V-4 BAR	V-5 BAR	V-6 BAR	V-7 BAR	VOL	WEIGHT	AREA
SP10	2 ea	6'0"	5'0"	5'2 3/8"	5'2 3/8"	6 ea	4'10 3/8"	4'10 3/8"	4'10 3/8"	4'10 3/8"	4'10 3/8"	4'10 3/8"	0.70 cy	2,846 lbs	25.97 sf
SP11	2 ea	6'0"	5'0"	5'5 1/8"	5'5 1/8"	6 ea	5'1 1/8"	5'1 1/8"	5'1 1/8"	5'1 1/8"	5'1 1/8"	5'1 1/8"	0.72 cy	2,935 lbs	27.15 sf
SP12	3 ea	6'0"	5'0"	5'1 3/4"	5'1 3/4"	6 ea	4'9 3/4"	4'9 3/4"	4'9 3/4"	4'9 3/4"	4'9 3/4"	4'9 3/4"	0.70 cy	2,830 lbs	25.75 sf
SP13	3 ea	6'0"	5'0"	4'10 7/8"	4'10 7/8"	6 ea	4'6 7/8"	4'6 7/8"	4'6 7/8"	4'6 7/8"	4'6 7/8"	4'6 7/8"	0.68 cy	2,740 lbs	24.55 sf

0 1/2" 1" 1 1/2" 2"
SHEET SCALE

PRECASTER: CONCRETE SYSTEMS INC. HUDSON, NH
PROJECT #: T21377

CONTRACTOR: J. A. MCDONALD INC. LYNDON CENTER, VERMONT
PROJECT #:

DESIGNER
THE NEEL COMPANY
8328-D TRAFORD LANE
SPRINGFIELD, VIRGINIA 22152
PH: (703) 913-7858
FX: (703) 913-7859
WEB: WWW.NEELCO.COM
PROJECT #: TW4083

STATE OF VERMONT
CERTIFIED WITH RESPECT TO INTERNAL STABILITY OF T-WALL® STRUCTURES ONLY
THOMAS C. NEEL
6584
PROFESSIONAL ENGINEER

REVISIONS

RTE. 30 BRIDGE IMPROVEMENTS
BRIDGE NO. 96
TOWN OF HUBBARDTON, VT
ER STP 0161 (26)
SHOP DRAWINGS
SLOPED TOP SPECIAL UNITS
REBARS & DIMENSIONS
T-WALL® RETAINING WALL SYSTEM

SCALE:	1" = 1'
DATE:	9-27-2012
DESIGNED BY:	NN
DRAWN BY:	HS
CHECKED BY:	NN
SHEET:	6

PLOT DATE & TIME: Friday, September 28, 2012 10:25:00 AM
CAD FILE NAME: 06 REBAR - SLOPED TOP UNITS.wx
VW SHEET NAME: TW-08
USER NAME: N/A
VECTORWORKS 2011

VHB Vanasse Hangen Brustlin, Inc.
Transportation | Land Development | Environmental Services

September 19, 2012

Ref: 57478.01 & 57478.02

Mr. Paul Radice
Chief Engineer
Highway Safety Corp
P.O. Box 358
Glastonbury, CT 06033

Re: HSC Job No. 1896
Hubbardton ER STP 0161(26) and Hubbardton ER STP 0161(27)
F R Lafayette - subcontractor

Dear Mr. Radice:

The following **bridge railing and approach railing details** [Item #s 525.33 (BRIDGE RAILING, GALVANIZED 2 RAIL BOX BEAM) and 621.72 (GUARDRAIL APPROACH SECTION, GALVANIZED 2 RAIL BOX BEAM)] for the above project transmitted with your email to Doug Ford – F. R. Layette on Sept 11, 2012 at 11:30 AM have been reviewed and are being returned herewith.

1. These plans sheets 1 to 5 of 5 and dated 9-10-2012 are being transmitted as; Furnish as Corrected.

2. Please provide an updated copy to us for our files.

You must provide notice to VTrans fabrication inspector, Jeff Clark, as to the date fabrication represented by these drawings will begin. **Jeff must receive and acknowledge your notice at least seven days prior to that date, as per Specification 506.03.** You may contact Jeff by phone at (802)828-0044 or email at jeff.clark@state.vt.us. **Any material fabricated prior to the notification date is subject to rejection without further cause.**

Should you need further information or have any questions, please feel free to reach me at sfarnsworth@vhb.com or at (802) 425-7788 x6423.

Very truly yours,

VANASSE HANGEN BRUSTLIN, INC.

Sherward G. Farnsworth

Sherward G. Farnsworth, P.E.
Senior Project Manager

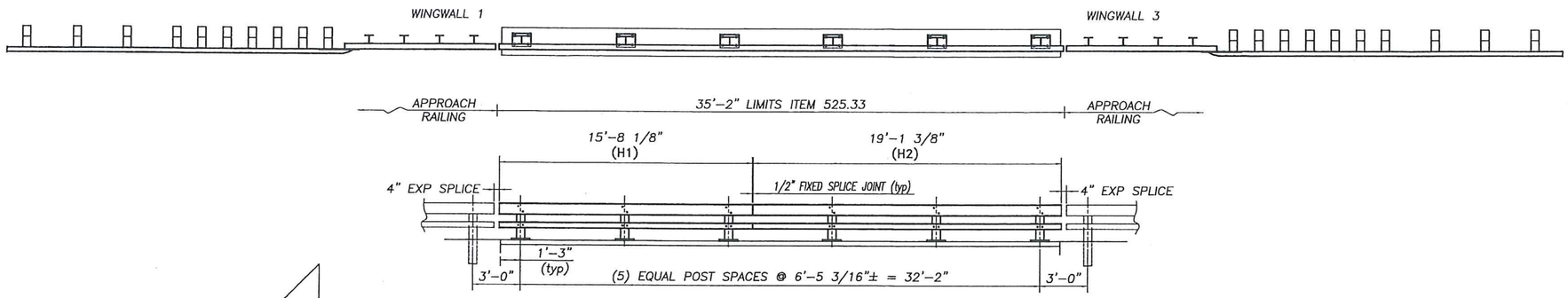
SGF/sgf
Enclosures

7056 US Route 7
Post Office Box 120
North Ferrisburgh, VT 05473
802.425.7788 • FAX 802.425.7799
www.vhb.com

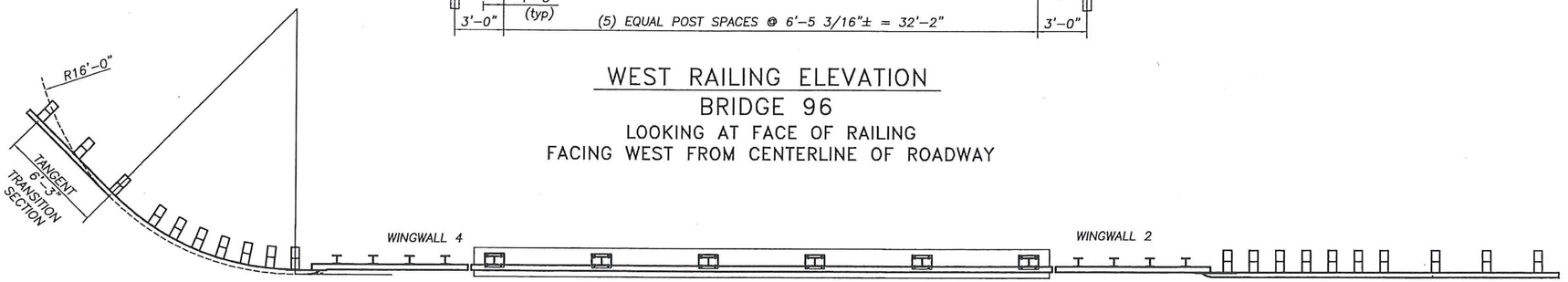
Vanasse Hangen Brustlin, Inc.

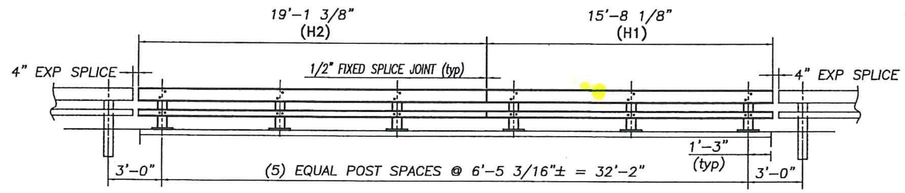
Re: HSC Job No. 1896
Hubbardton ER STP 0161(26) and Hubbardton ER STP 0161(27)
F R Lafayette - subcontractor

Copy
[X] VTrans Resident Engineer Tim Pockette (prints & welding procedures) via email & US mail
[X] Contractor JA MacDonald Att: Eric Boyden (prints & welding procedures) via email & US mail
[X] Subcontractor – F.R. Lafayette Att: Doug Ford (prints) via email & US mail
[X] VTrans Regional Construction Engineer – Mark Mackintosh (letter) via email & US mail
[X] VTrans Consultant Project Manager - Mark Sargent (prints) via email & US mail
[X] VTrans Materials & Research Section (C&IA Unit) Att: Chris Rea – (Letter only)) via email & US mail
[X] VTrans Structures Section – Shop Inspector Jeff Clark (prints & welding procedures) via email & US mail
[X] VHB Project Manger – Sherward Farnsworth - Project electronic files 57478.01 & 57478.02



WEST RAILING ELEVATION
BRIDGE 96
LOOKING AT FACE OF RAILING
FACING WEST FROM CENTERLINE OF ROADWAY





EAST RAILING ELEVATION
BRIDGE 96
LOOKING AT FACE OF RAILING
FACING EAST FROM CENTERLINE OF ROADWAY

BILL OF MATERIAL
APPROACH RAILING

Qty	mk	Description	Spec.
4	01	W6x25 APPROACH POST - #1 x 8'-0" OAL (GALV)	A709 gr 50
4	02	W6x25 APPROACH POST - #2 x 8'-0" OAL (GALV)	A709 gr 50
4	03	W6x25 APPROACH POST - #3 x 8'-0" OAL (GALV)	A709 gr 50
4	04	W6x25 APPROACH POST - #4 x 8'-0" OAL (GALV)	A709 gr 50
4		UPPER RAIL APPROACH TUBE HSS 8 x 4 x 5/16 x 9'-4.000" w/ 3.500 SLOTS FOR 4" EXP GAP (GALV)	A500 gr B
4		LOWER RAIL APPROACH TUBE HSS 4 x 4 x 5/16 x 9'-4.000" w/ 3.500 SLOTS FOR 4" EXP GAP (GALV)	A500 gr B
4		CONNECTION PLATE PL 0.375" x 20.000" x 27.000" (GALV)	A709 gr 36
2		DEFLECTOR PLATE (RIGHT) PL 0.375 x 4.000 x 13.375 (GALV)	A709 gr 36
2		DEFLECTOR PLATE (LEFT) PL 0.375 x 4.000 x 13.375 (GALV)	A709 gr 36
4		END CAP FOR 8x4 TUBE 0.187 THICK PLATE 8.000 x 4.000 w/ WELDED TABS (GALV)	A709 gr 36
4		END CAP FOR 4x4 TUBE 0.187 THICK PLATE 4.000 x 4.000 w/ WELDED TABS (GALV)	A709 gr 36
4		(ANGLED) SPLICE TUBE (EXPANSION) FOR 8x4 UPPER RAIL HSS 7 x 3 x 3/8 x 1'-11.750" OAL (GALV)	A500 gr B
4		SPLICE TUBE (EXPANSION) FOR 4x4 LOWER RAIL HSS 3 x 3 x 5/16 x 1'-11.750" OAL (GALV)	A500 gr B
32		WOOD POST (WP1) 6 x 8 x 7'-0"	TIMBER
32		WOOD BLOCKOUT (WB1) 6 x 8 x 1'-6"	TIMBER
4		WOOD POST (WP2) 6 x 8 x 7'-0"	TIMBER
4		WOOD BLOCKOUT (WB2) 6 x 8 x 1'-6"	TIMBER
4		WOOD POST (WP3) 6 x 8 x 7'-0"	TIMBER
4		WOOD BLOCKOUT (WB3) 6 x 8 x 1'-2"	TIMBER
4		THRIE FLAT LIP BRIDGE SHOE (MODIFIED) 10 GA. GALV	aashto M180 B2
4		THRIE TRANSITION PANEL 6'-3" / 3'-1 1/2" 10 GA. GALV.	aashto M180 B2
6		THRIE PANEL 12'-6" / 1'-6 3/4" 12 GA. GALV.	aashto M180 A2
2	NE	THRIE PANEL 12'-6" / 1'-6 3/4" 12 GA. GALV. (CURVED FOR 16 FT RADIUS)	aashto M180 A2
92		ROUND HEAD POST BOLT slot or wrench head - no shoulder 3/4" DIA x 6" LG. (GLV) w/ LOCK NUT & FLAT WASHER	A449
4		ROUND HEAD POST BOLT slot or wrench head - no shoulder 3/4" DIA x 2" LG. (GLV) w/ HEXNUT	A449
8		ROUND HEAD POST BOLT - oval shoulder 5/8" DIA x 1'-8" LG. (GALV) w/ DBL RECESS NUT, FLAT WASHER	A307
98		ROUND HEAD POST BOLT - oval shoulder 5/8" DIA x 1'-6" LG. (GALV) w/ DBL RECESS NUT, FLAT WASHER	A307
32		HEX HEAD BOLT 5/8 x 1-3/4" (GALV) w/ FLAT WASHER	A325
128		PANEL SPLICE BOLT 5/8 x 1-1/4" (GALV) w/ DOUBLE RECESSED NUT	A307
76		RECTANGULAR PLATE WASHER 0.187 x 1.750 x 3.000 (GALV)	A709 gr 36
32		SPACER PIPE - GALVANIZED 3/4" SCH. 40 x 1/2" LONG (GLV)	A53 gr B

SHOP DRAWING REVIEW

☐ REVIEWED AS REQUIRED BY THE CONSTRUCTION CONTRACT DOCUMENTS AND APPROVED, BUT ONLY FOR CONFORMANCE TO THE DESIGN CONCEPT OF THE WORK, AND SUBJECT TO FURTHER LIMITATIONS AND REQUIREMENTS CONTAINED IN THE CONSTRUCTION CONTRACT DOCUMENTS.

☐ REJECTED ☐ REVISE AND RESUBMIT ■ FURNISH AS CORRECTED

CORRECTIONS OR COMMENTS MADE ON THE SHOP DRAWINGS DURING THIS REVIEW DO NOT RELIEVE CONTRACTOR FROM COMPLIANCE WITH REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS. THIS CHECK IS ONLY FOR REVIEW OF GENERAL CONFORMANCE WITH THE DESIGN CONCEPT OF THE PROJECT AND GENERAL COMPLIANCE WITH THE INFORMATION GIVEN IN THE CONTRACT DOCUMENTS. THE CONTRACTOR IS RESPONSIBLE FOR: CONFIRMING AND CORRELATING ALL QUANTITIES AND DIMENSIONS; SELECTING FABRICATION PROCESSES AND TECHNIQUES OF CONSTRUCTION; COORDINATING HIS WORK WITH THAT OF ALL OTHER TRADES; AND PERFORMING HIS WORK IN A SAFE AND SATISFACTORY MANNER.

VHB
Vanasse Hangen Brustlin, Inc.
7056 US Route 7
North Ferrisburgh, VT 05473
802.425.7788

HUBBARTON ER STP 0161(26)
Job Number ER STP 0161(26)
Reviewed By: S. FARNSWORTH
Date: 9-19-2012

No.	Remarks	Date
0	Initial submittal	9/11/12

REVISIONS

BILL OF MATERIAL
EAST AND WEST SIDE BRIDGE RAIL COMBINED

Qty	mk	Description	Spec.
12		BRIDGE RAILING POST W6 x 25 x 2'-2.375" OAH WITH 1 x 10 x 14 BASE PLATE (GLV)	A709 gr 50
2		SPLICE TUBE (FOR 8X4 RAIL) HSS 7 x 3 x 3/8 x 1'-8.000" OAL w/ TAPPED HOLES & 2 WELDED NUTS (GLV)	A500 gr B
2		SPLICE TUBE (FOR 4X4 RAIL) HSS 3 x 3 x 5/16 x 1'-8.000" OAL w/ TAPPED HOLES & 2 WELDED NUTS (GLV)	A500 gr B
2	H1	UPPER RAIL TUBE 8 x 4 x 5/16 x 15'-8.125" OAL 1 END EXP SLOTS / 1 END SPLICE HOLES	A500 gr B
2	H2	UPPER RAIL TUBE 8 x 4 x 5/16 x 19'-1.375" OAL 1 END EXP SLOTS / 1 END SPLICE HOLES	A500 gr B
2	H1	LOWER RAIL TUBE 4 x 4 x 1/4 x 15'-8.125" OAL 1 END EXP SLOTS / 1 END SPLICE HOLES	A500 gr B
2	H2	LOWER RAIL TUBE 4 x 4 x 1/4 x 19'-1.375" OAL 1 END EXP SLOTS / 1 END SPLICE HOLES	A500 gr B
12		ANCHOR SPACER PLATE PL 0.375 x 13.000 x 9.375	A709 gr 36
48		ANCHOR STUD DBL END PART THREAD - 1" DIA x 12.000 w/ 2.250" THD EACH END (GLV)	A449
96		HEAVY HEX NUT 1" (GLV)	A563 DH
48		ROUND WASHER (SAE) - 1" DIA SMALL (GLV)	F436
48		JAM NUT 1" (GALV)	A563 DH
48		ROUND HEAD POST BOLT slot or wrench head - no shoulder 3/4" DIA x 6" LG. FULL BODY (GLV)	A449 / A325
48		LOCK NUT 3/4" (GLV)	A563 DH
48		ROUND WASHER (SAE) 3/4" (GLV)	F436
16		HEX HEAD BOLT 5/8" DIA x 1.75" LG. (GLV)	A325
16		ROUND WASHER (SAE) 5/8" (GLV)	F436
12		BEARING PAD 0.125" THICK x 10.000 x 14.000 (NEOPRENE 80 duro +/-10)	aashto M251

ER STP 0161 (26) BRIDGE #96
ITEM 525.33 BRIDGE RAIL GALVANIZED 2 RAIL BOX BEAM = 70.4 LF
ITEM 621.72 GUARDRAIL APPROACH SECTION 2 RAIL BOX BEAM = 4 UNITS

BRIDGE RAILING, GALVANIZED 2 RAIL BOX BEAM

GUARDRAIL APPROACH SECTION, GALVANIZED 2 RAIL BOX BEAM

HIGHWAY SAFETY CORP
GLASTONBURY, CT
860-633-9445

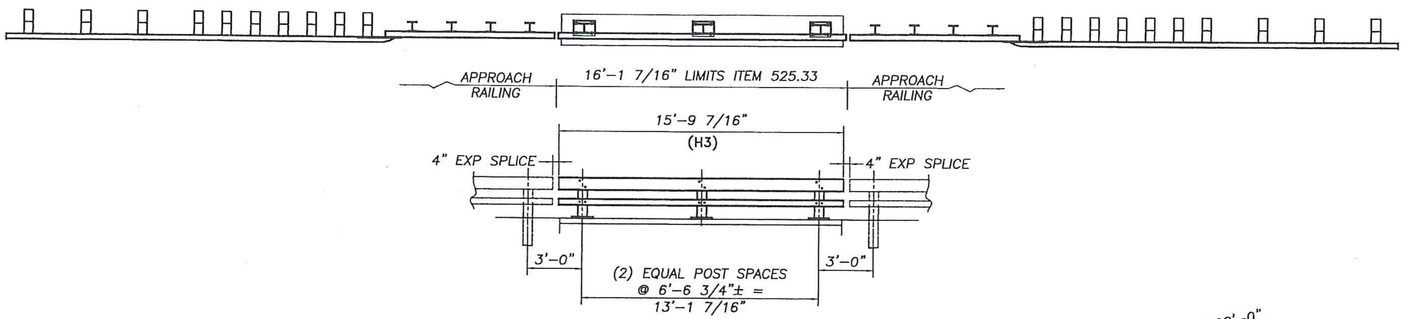
ITEM 525.33 NETC 2 RAIL BRIDGE RAILING (S-360A)
ITEM 621.72 NETC 2 RAIL APPROACH RAILING (S-360B)
HUBBARDTON, VERMONT BRIDGE 96 & 98
ER STP 0161 (26) & ER STP 0161 (27)

AISC CERTIFIED FABRICATOR

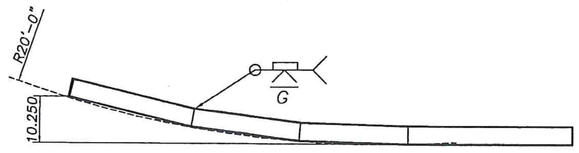
GENERAL CONTRACTOR
SUB CONTRACTOR LAFAYETTE

HSC JOB NO. 1896
SHEET NO. 1 of 5

DRAWN	CHECKED	DATE	SCALE	SIZE
PAR		09-10-12	NONE	D



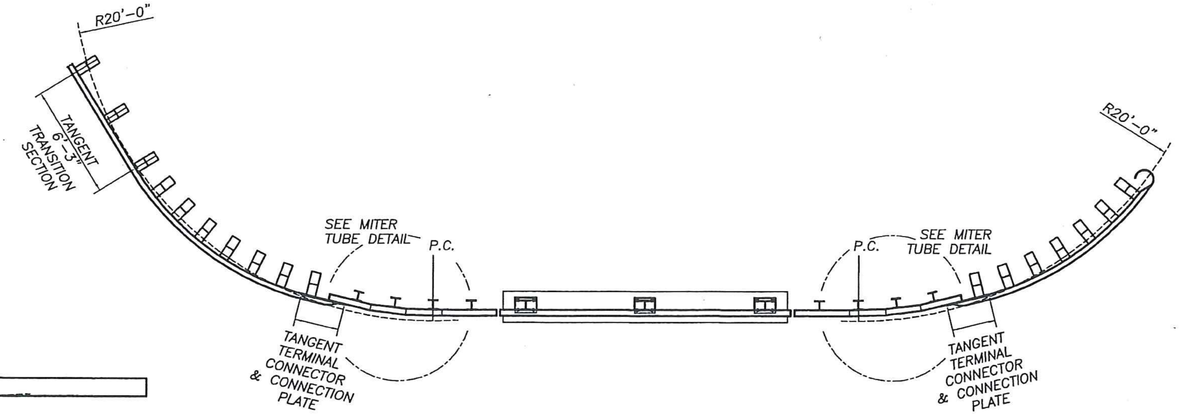
EAST RAILING ELEVATION
BRIDGE 98
LOOKING AT FACE OF RAILING
FACING EAST FROM CENTERLINE OF ROADWAY



MITER CUT & WELD DETAIL
APPROACH RAIL TUBE – WEST SIDE

BILL OF MATERIAL
EAST AND WEST SIDE BRIDGE RAILING COMBINED

Qty	mk	Description	Spec.
6		BRIDGE RAILING POST W6 x 25 x 2'-2.375" OAH WITH 1 x 10 x 14 BASE PLATE (GLV)	A709 gr 50
2	H3	UPPER RAIL TUBE 8 x 4 x 5/16 x 15'-9.4375" OAL EXP SLOTS BOTH ENDS	A500 gr B
2	H3	LOWER RAIL TUBE 4 x 4 x 1/4 x 15'-9.4375" OAL EXP SLOTS BOTH ENDS	A500 gr B
6		ANCHOR SPACER PLATE PL 0.375 x 13.000 x 9.375	A709 gr 36
24		ANCHOR STUD DBL END PART THREAD - 1" DIA x 12.000 w/ 2.250" THD EACH END (GLV)	A449
48		HEAVY HEX NUT 1" (GLV)	A563 DH
24		ROUND WASHER (SAE) - 1" DIA SMALL (GLV)	F436
24		JAM NUT 1" (GALV)	A563 DH
24		ROUND HEAD POST BOLT slot or wrench head - no shoulder 3/4" DIA x 6" LG. FULL BODY (GLV)	A449 / A325
24		LOCK NUT 3/4" (GLV)	A563 DH
24		ROUND WASHER (SAE) 3/4" (GLV)	F436
6		BEARING PAD 0.125" THICK x 10.000 x 14.000 (NEOPRENE 80 duro +/-10)	aashto M251



BILL OF MATERIAL
APPROACH RAILING

Qty	mk	Description	Spec.
4	01	W8x25 APPROACH POST - #1 x 8'-0" OAL (GALV)	A709 gr 50
4	02	W8x25 APPROACH POST - #2 x 8'-0" OAL (GALV)	A709 gr 50
4	03	W8x25 APPROACH POST - #3 x 8'-0" OAL (GALV)	A709 gr 50
4	04	W8x25 APPROACH POST - #4 x 8'-0" OAL (GALV)	A709 gr 50
2		UPPER RAIL APPROACH TUBE HSS 8 x 4 x 5/16 x 19'-4.000" w/ 3.500 SLOTS FOR 4" EXP GAP (GALV)	A500 gr B
2		LOWER RAIL APPROACH TUBE HSS 4 x 4 x 5/16 x 19'-4.000" w/ 3.500 SLOTS FOR 4" EXP GAP (GALV)	A500 gr B
2	99W	UPPER RAIL APPROACH TUBE HSS 8 x 4 x 5/16 x 19'-4.000" w/ 3.500 SLOTS FOR 4" EXP GAP (GALV) C&W 20FT RADIUS	A500 gr B
2	99W	LOWER RAIL APPROACH TUBE HSS 4 x 4 x 5/16 x 19'-4.000" w/ 3.500 SLOTS FOR 4" EXP GAP (GALV) C&W 20 FT RADIUS	A500 gr B
4		CONNECTION PLATE PL 0.378" x 20.000" x 27.000" (GALV)	A709 gr 36
2		DEFLECTOR PLATE (RIGHT) PL 0.375 x 4.000 x 13.375 (GALV)	A709 gr 36
2		DEFLECTOR PLATE (LEFT) PL 0.375 x 4.000 x 13.375 (GALV)	A709 gr 36
4		END CAP FOR 8x4 TUBE 0.187 THICK PLATE 8.000 x 4.000 w/ WELDED TABS (GALV)	A709 gr 36
4		END CAP FOR 4x4 TUBE 0.187 THICK PLATE 4.000 x 4.000 w/ WELDED TABS (GALV)	A709 gr 36
4		(ANGLED) SPLICE TUBE (EXPANSION) FOR 8x4 UPPER RAIL HSS 7 x 3 x 3/8 x 1'-11.750" OAL (GALV)	A500 gr B
4		SPLICE TUBE (EXPANSION) FOR 4x4 LOWER RAIL HSS 3 x 3 x 5/16 x 1'-11.750" OAL (GALV)	A500 gr B
31		WOOD POST (WP1) 8 x 8 x 7'-0"	TIMBER
31		WOOD BLOCKOUT (WB1) 8 x 8 x 1'-8"	TIMBER
3		WOOD POST (WP2) 8 x 8 x 7'-0"	TIMBER
3		WOOD BLOCKOUT (WB2) 8 x 8 x 1'-8"	TIMBER
3		WOOD POST (WP3) 8 x 8 x 7'-0"	TIMBER
3		WOOD BLOCKOUT (WB3) 8 x 8 x 1'-2"	TIMBER
4		THRIE FLAT LIP BRIDGE SHOE (MODIFIED) 10 GA. GALV	aashto M180 B2
3		THRIE TRANSITION PANEL 6'-3" / 3'-1 1/2" 10 GA. GALV.	aashto M180 B2
4		THRIE PANEL 12'-8" / 1'-8 3/4" 12 GA. GALV.	aashto M180 A2
2	SW	THRIE PANEL 12'-8" / 1'-8 3/4" 12 GA. GALV. (CURVED FOR 20 FT RADIUS)	aashto M180 A2
2	NW	THRIE PANEL 9'-4 1/2" / 1'-8 3/4" 12 GA. GALV. (CURVED FOR 20 FT RADIUS)	aashto M180 A2
1		THRIE BUFFER END SECTION 10 GA	aashto M180 B2
62		ROUND HEAD POST BOLT slot or wrench head - no shoulder 3/4" DIA x 8" LG. (GLV) w/ LOCK NUT & FLAT WASHER	A449
4		ROUND HEAD POST BOLT slot or wrench head - no shoulder 3/4" DIA x 2" LG. (GLV) w/ HEX NUT	A449
8		ROUND HEAD POST BOLT - oval shoulder 5/8" DIA x 1'-8" LG. (GALV) w/ DBL RECESS NUT, FLAT WASHER	A307
63		ROUND HEAD POST BOLT - oval shoulder 5/8" DIA x 1'-8" LG. (GALV) w/ DBL RECESS NUT, FLAT WASHER	A307
32		HEX HEAD BOLT 5/8 x 1-3/4" (GALV) w/ FLAT WASHER	A325
120		PANEL SPLICE BOLT 5/8 x 1-1/4" (GALV) w/ DOUBLE RECESSED NUT	A307
71		RECTANGULAR PLATE WASHER 0.187 x 1.750 x 3.000 (GALV)	A709 gr 36
32		SPACER PIPE - GALVANIZED 3/4" SCH. 40 x 1/2" LONG (GLV)	A53 gr B

SHOP DRAWING REVIEW

☐ REVIEWED AS REQUIRED BY THE CONSTRUCTION CONTRACT DOCUMENTS AND APPROVED, BUT ONLY FOR CONFORMANCE TO THE DESIGN CONCEPT OF THE WORK, AND SUBJECT TO FURTHER LIMITATIONS AND REQUIREMENTS CONTAINED IN THE CONSTRUCTION CONTRACT DOCUMENTS.

☐ REJECTED ☐ REVISE AND RESUBMIT ☑ FURNISH AS CORRECTED

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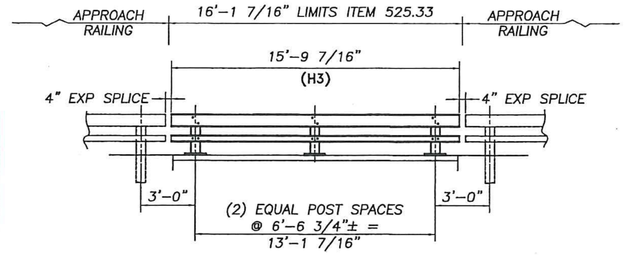
Vanasse Hangen Brustlin, Inc.
7056 US Route 7
North Ferrisburgh, VT 05473
802.425.7788

HUBBARTON ER STP 0161(26)
Job Number: ER STP 0161(27)
Reviewed By: S.G. FARNSWORTH
Date: 9/18/2012

No.	Remarks	Date
0	Initial submittal	

REVISIONS



WEST RAILING ELEVATION
BRIDGE 98
LOOKING AT FACE OF RAILING
FACING WEST FROM CENTERLINE OF ROADWAY

32.24

ER STP 0161 (27) BRIDGE #98
ITEM 525.33 BRIDGE RAIL GALVANIZED 2 RAIL BOX BEAM = 32 LF
ITEM 621.72 GUARDRAIL APPROACH SECTION 2 RAIL BOX BEAM = 4 UNITS

DITO FROM sheet 1 OF 5

HIGHWAY SAFETY CORP
GLASTONBURY, CT
860–633–9445

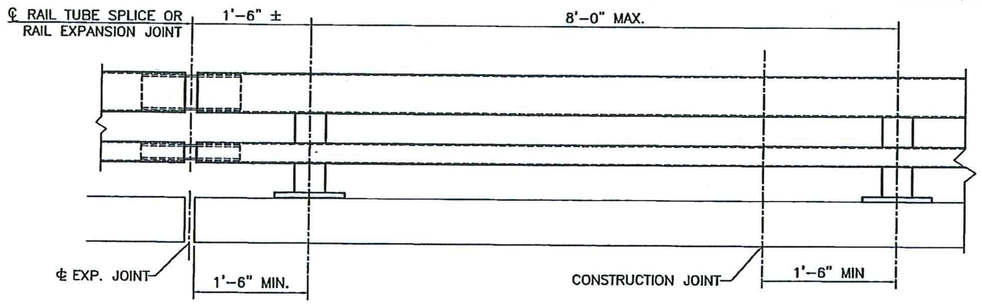
ITEM 525.33 NETC 2 RAIL BRIDGE RAILING (S-360A)
ITEM 621.72 NETC 2 RAIL APPROACH RAILING (S-360B)
HUBBARDTON, VERMONT BRIDGE 96 & 98
ER STP 0161 (26) & ER STP 0161 (27)

CERTIFIED FABRICATOR

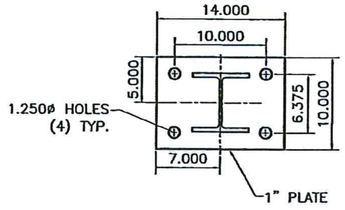
GENERAL CONTRACTOR
SUB CONTRACTOR LAFAYETTE

HSC JOB NO. 1896
SHEET NO. 2 of 5

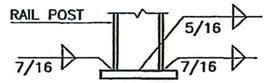
DRAWN	CHECKED	DATE	SCALE	SIZE
PAR		09–10–12	NONE	D



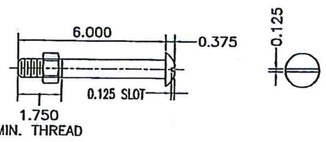
BRIDGE RAILING ELEVATION



POST AND BASE PLATE



BASE WELD DETAIL



3/4" DIA. A449
ROUND HEAD BOLT

(WITH WASHER AND PREVAILING TORQUE TYPE LOCK NUT)
(SEE NOTE #8)
ONLY FULL DIAMETER BODY BOLTS WILL BE ALLOWED.

SHOP DRAWING REVIEW

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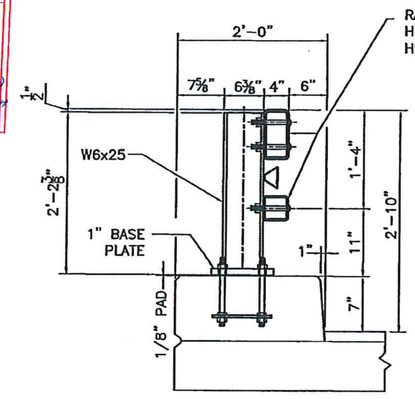
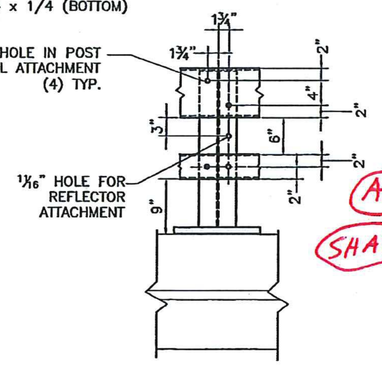
VHB Vanasse Hangen Brustlin, Inc.
7056 US Route 7
North Pomfret, VT 05473
802.425.7768

Job Number: HUBBARTON ERSTP 0161(26) ERSTP 0161(27)
Reviewed By: S. PARASHCHATT
Date: 9-18-2012



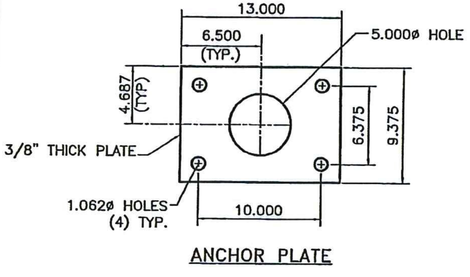
TYPICAL SECTION



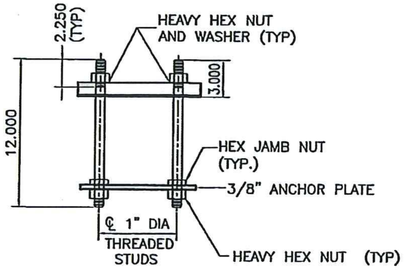
ELEVATION

RAIL TUBES
HSS 8 x 4 x 5/16 (TOP)
HSS 4 x 4 x 1/4 (BOTTOM)

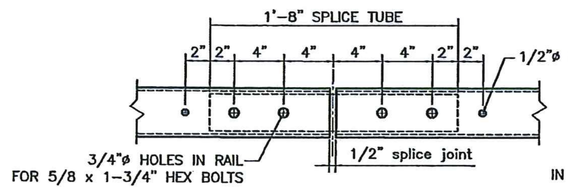
1⅜"ø HOLE IN POST
FOR RAIL ATTACHMENT
(4) TYP.



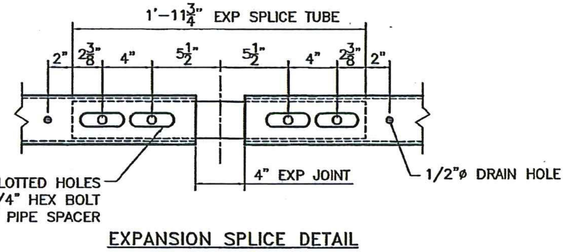
ANCHOR PLATE



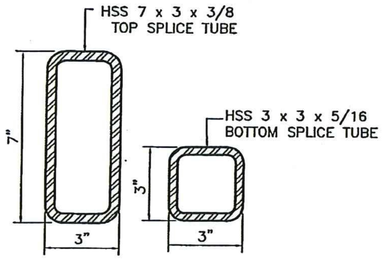
RAIL POST ANCHORAGE



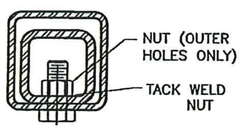
FIXED SPLICE JOINT DETAIL
BOTTOM VIEW



EXPANSION SPLICE DETAIL
BOTTOM VIEW

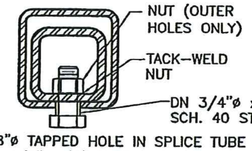


RAIL TUBE SPLICE SECTION



5/8"ø TAPPED HOLE IN SPLICE TUBE &
3/4"ø HOLE IN RAIL TUBE FOR BOLT &
PLAIN HARDENED WASHER

FIXED SPLICE JOINT SECTION



5/8"ø TAPPED HOLE IN SPLICE TUBE
AND 1 1/8" x 'C' SLOT IN RAIL TUBE FOR
BOLT AND PLAIN HARDENED WASHER

EXPANSION JOINT SECTION

NOTES:

1. ALL WORK AND MATERIALS SHALL CONFORM TO SECTION 525.
2. PRIOR TO GALVANIZING, ALL EXPOSED CUT OR SHEARED EDGES SHALL BE ROUNDED TO A 1/16" RADIUS AND BE FREE OF BURRS.
3. ALL POSTS SHALL BE SET NORMAL TO GRADE.
4. SECTIONS OF RAIL TUBE SHALL BE ATTACHED TO A MINIMUM OF TWO (2) RAIL POSTS AND PREFERABLY TO AT LEAST FOUR (4) POSTS.
5. RAIL TUBE EXPANSION JOINT SHALL BE PROVIDED IN ANY RAIL BAY SPANNING THE END OF AN INTEGRAL ABUTMENT BRIDGE AND AT ALL SUPERSTRUCTURE EXPANSION JOINTS. EXPANSION JOINT WIDTH SHALL BE 4" AT 45°F AND WILL BE ADJUSTED IN THE FIELD BY THE ENGINEER FOR OTHER TEMPERATURES.
6. HOLES IN RAILS FOR RAIL TUBE ATTACHMENT SHALL BE FIELD–DRILLED. HOLES SHALL BE COATED WITH AND APPROVED ZINC–RICH PAINT DURING INSTALLATION.
7. RAIL POST ANCHORING NUTS SHALL BE TIGHTENED TO A SNUG FIT AND GIVEN AN ADDITIONAL ONE–EIGHTH TURN.
8. RAIL TUBES SHALL BE ATTACHED USING 3/4" FULL DIAMETER BODY ASTM A449 ROUND HEAD BOLTS INSERTED THROUGH THE FACE OF THE TUBE. HOLES IN POSTS SHALL BE 1/16" LARGER THAN THE BOLT SIZE.
9. ANY BENDING OR CURVING OF RAIL SHALL BE DONE IN A FABRICATION PLANT IN ACCORDANCE WITH SUBMITTED PROCEDURES.
10. THE MINIMUM DISTANCE FROM A POST TO AN EXPANSION JOINT SHALL BE SUCH TO MAINTAIN MINIMUM EDGE DISTANCE OF 5" FROM ANY ANCHOR STUD TO THE END OF THE SLAB, OR TO THE EXPANSION JOINT RECESS POUR, IF ONE IS USED.
11. A DELINEATOR (SEE VAOT STANDARD DRAWING G–1 FOR DETAILS) SHALL BE INSTALLED AT NEAREST POST TO 30 FT SPACING. WHITE IS TO BE INSTALLED ON THE DRIVER'S RIGHT. FOR ONE WAY BRIDGES, YELLOW IS TO BE INSTALLED ON THE DRIVER'S LEFT. PAYMENT SHALL BE INCIDENTAL TO OTHER ITEMS.
12. THIS RAILING MEETS THE REQURIEMENTS FOR A TL–4 SERVICE LEVEL.

MATERIALS
RAIL TUBES.....ASTM A500 GRADE B OR ASTM A501
RAIL POSTS AND BASE PLATES.....ASTM A709/A709M, GRADE 50
ALL OTHER SHAPES AND PLATES.....ASTM A709/A709M, GARDE 36
ANCHOR STUDS.....ASTM A449
ALL OTHER BOLTS (UNLESS NOTED).....AASHTO M164, TYPE1

ALL
SHAPES

NUTS FOR AASHTO M164 BOLTS AND FOR ANCHOR STUDS SHALL COMPLY WITH AASTHO M291 (ASTM A563).

WASHERS SHALL COMPLY WITH AASHTO M293 (ASTM F436) SPECIFCATIONS.

1/8" PAD SHALL COMPLY WITH STANDARD SPECIFICATION SUBSECTION 731.01 OR 731.02.

RAIL POSTS AND BASE PLATES SHALL BE TESTED FOR IMPACT PROPERTIES IN ACCORDANCE WITH ASTM A370 CHARPY IMPACT TESTING USING TYPE A SPECIMEN.

No.	Remarks	Date
	REVISIONS	
0	Initial submittal	

P120 From Sheet 10 of 5

HIGHWAY SAFETY CORP
GLASTONBURY, CT
860–633–9445

ITEM 525.33 NETC 2 RAIL BRIDGE RAILING (S–360A)
ITEM 621.72 NETC 2 RAIL APPROACH RAILING (S–360B)
HUBBARDTON, VERMONT BRIDGE 96 & 98
ER STP 0161 (26) & ER STP 0161 (27)

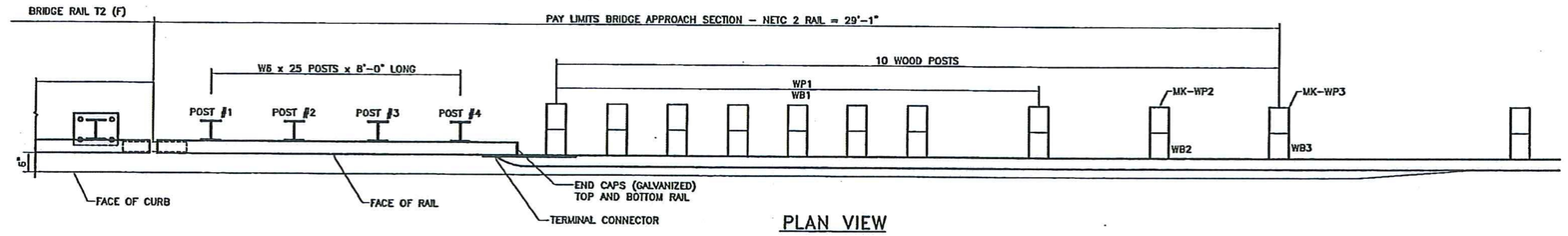
AISC CERTIFIED FABRICATOR

AISC JOB NO. 1896

GENERAL CONTRACTOR
SUB CONTRACTOR LAFAYETTE

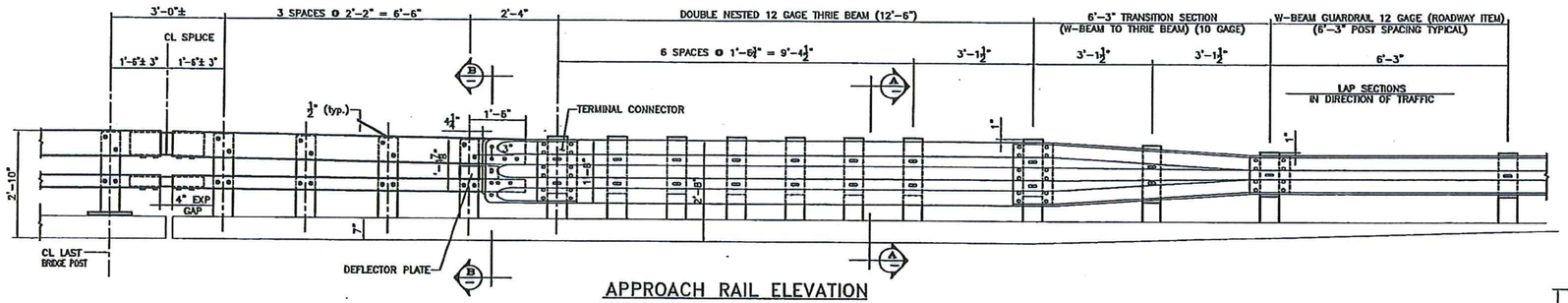
SHEET NO. 3 of 5

DRAWN	CHECKED	DATE	SCALE	SIZE
PAR		09–10–12	NONE	D



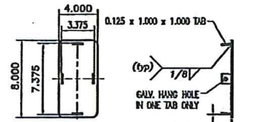
PLAN VIEW

SHOWN STRAIGHT FOR FABRICATION CLARITY
SEE SHEETS 1 & 2 FOR VARIABLE RADIUS LOCATIONS

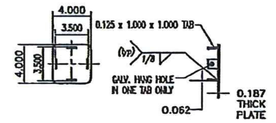


APPROACH RAIL ELEVATION

RIGHT HAND APPROACH SHOWN – LEFT HAND OPPOSITE
(7) LOCATIONS (typ)
2R/2L @ BR #96 – 1R/2L @ BR #98



END CAP (8x4)
0.187 x 4.000 x 8.000 (A709 gr 36)



END CAP (4x4)
0.187 x 4.000 x 4.000 (A709 gr 36)

SHOP DRAWING REVIEW

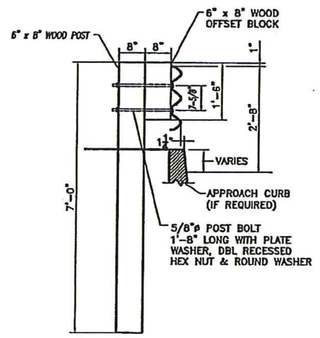
☐ REVIEWED AS REQUIRED BY THE CONSTRUCTION CONTRACT DOCUMENTS AND APPROVED, BUT ONLY FOR CONFORMANCE TO THE DESIGN CONCEPT OF THE WORK AND SUBJECT TO FURTHER LIMITATIONS AND REQUIREMENTS CONTAINED IN THE CONSTRUCTION CONTRACT DOCUMENTS.
☐ REJECTED ☐ REVISE AND RESUBMIT ■ FURNISH AS CORRECTED

CORRECTIONS OR COMMENTS MADE ON THE SHOP DRAWINGS DURING THIS REVIEW DO NOT RELIEVE CONTRACTOR FROM COMPLIANCE WITH REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS. THIS CHECK IS ONLY FOR REVIEW OF GENERAL CONFORMANCE WITH THE DESIGN CONCEPT OF THE PROJECT AND GENERAL COMPLIANCE WITH THE INFORMATION GIVEN IN THE CONTRACT DOCUMENTS. THE CONTRACTOR IS RESPONSIBLE FOR: CONFIRMING AND CORRELATING ALL QUANTITIES AND DIMENSIONS; SELECTING FABRICATION PROCESSES AND TECHNIQUES OF CONSTRUCTION; COORDINATING HIS WORK WITH THAT OF ALL OTHER TRADES; AND PERFORMING HIS WORK IN A SAFE AND SATISFACTORY MANNER.

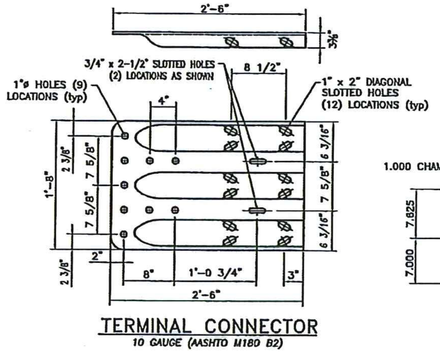
Vanasse Hangen Brustlin, Inc.
7056 US Route 7
North Ferrisburgh, VT 05473
802.425.7766

Job Number: HUBBARTON ERSTP 0161(26) ERSTP 0161(27)
Reviewed By: S. FARNSWORTH
Date: 9-18-2012

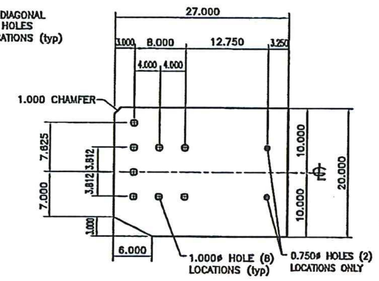
NOTES:
1. PAYMENT FOR GUARDRAIL APPROACH SECTION – GALVANIZED NETC 2 RAIL BEAM SHALL INCLUDE THE TERMINAL CONNECTOR, THE CONNECTION PLATE, THE DEFLECTOR PLATE, RAIL, POSTS, BLOCKS AND ATTACHMENT HARDWARE.
2. ALL APPROACH RAIL SPLICES SHALL BE LAPPED IN THE DIRECTION OF TRAFFIC FLOW.
3. TUBE AND STEEL POST MATERIALS, DIMENSION SIZES AND NOTES SHALL BE THE SAME AS THOSE OF THE BRIDGE RAIL UNLESS OTHERWISE NOTED.
4. APPROACH RAIL BOLTS SHALL BE ASTM A307 GRADE A AND NUTS SHALL BE AASHTO M291 (ASTM 563 GRADE A OR BETTER (GALVANIZED). WASHERS SHALL BE ASTM F844.
5. WELD TOP SPLICE BAR TO FIT BEND. USE COMPLETE PENETRATION WELD (B-U2).



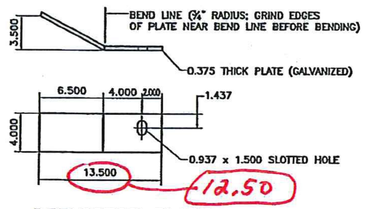
SECTION A–A



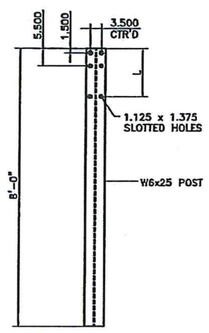
TERMINAL CONNECTOR
10 GAUGE (AASHTO M180 B2)



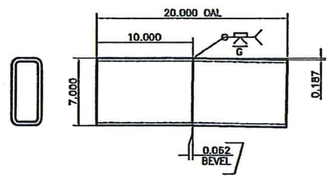
CONNECTION PLATE
0.375 x 20.000 x 27.000 (A709 gr 36)



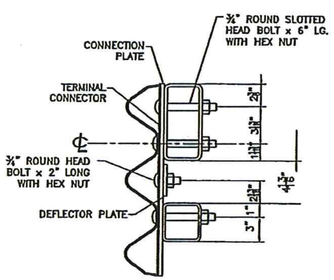
DEFLECTOR PLATE
0.375 x 4.000 x 13.500 (A709 gr 36)
RIGHT HAND APPROACH SHOWN – LEFT HAND BENT OPPOSITE



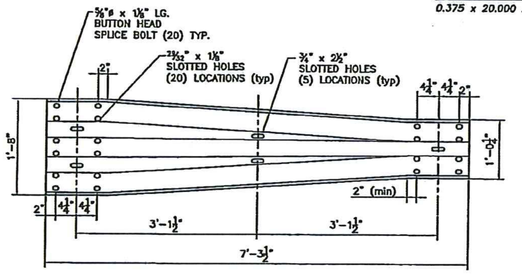
STEEL POST



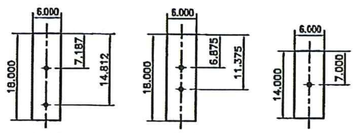
ANGLED SPLICE DETAIL
HSS 7 x 3 x 3/8 – FOR UPPER RAIL SPLICE
SEE BRIDGE RAIL SHEET FOR DETAIL ON LOWER RAIL SPLICE TUBE



SECTION B–B



THRIE TRANSITION PANEL
10 GAUGE (AASHTO M180 B2)



WOOD BLOCK DETAILS

STEEL POST CHART

No.	L
#1	1'-3.250"
#2	1'-3.000"
#3	1'-2.687"
#4	1'-2.375"

No.	Remarks	Date
0	Initial submittal	

REVISIONS

PITO From Sheet 1 of 5

HIGHWAY SAFETY CORP
GLASTONBURY, CT
860-633-9445

ITEM 525.33 NETC 2 RAIL BRIDGE RAILING (S-360A)
ITEM 621.72 NETC 2 RAIL APPROACH RAILING (S-360B)
HUBBARDTON, VERMONT BRIDGE 96 & 98
ER STP 0161 (26) & ER STP 0161 (27)

HSC CERTIFIED FABRICATOR

HSC JOB NO. 1896
SHEET NO. 4 of 5

REMOVAL CONTRACTOR
SUB CONTRACTOR LAFAYETTE

DRAWN	CHECKED	DATE	SCALE	SIZE
PAR		09-10-12	NONE	D

SHOP DRAWING REVIEW

REVIEWED AS REQUIRED BY THE CONSTRUCTION CONTRACT DOCUMENTS AND APPROVED, BUT ONLY FOR CONFORMANCE TO THE DESIGN CONCEPT OF THE WORK, AND SUBJECT TO FURTHER LIMITATIONS AND REQUIREMENTS CONTAINED IN THE CONSTRUCTION CONTRACT DOCUMENTS

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Vanasse Hangen Brustlin, Inc.
7056 US Route 7
North Ferrisburgh, VT 05473
802-425-7788

HVB BRAMPTON ER STP 0161(26)
Job Number ER STP 0161(27)
Reviewed By: S. FARNSWORTH
Date: 4-18-2012

BRIDGE RAIL T2 (F)

PAY LIMITS BRIDGE APPROACH SECTION – NETC 2 RAIL = 19'–10 1/2"

W6 x 25 POSTS x 8'–0" LONG

7 WOOD POSTS

WP1
WB1

POST #1 POST #2 POST #3 POST #4

THRIE BUFFER END SECTION INCLUDED IN APPROACH SECTION

6"

FACE OF CURB

FACE OF RAIL

END CAPS (GALVANIZED) TOP AND BOTTOM RAIL

PLAN VIEW
SHOWN STRAIGHT FOR FABRICATION CLARITY
SEE SHEET 2 FOR RADIUS INSTALLATION

20 FT RADIUS

3'–0"±

3 SPACES @ 2'–2" = 6'–6"

2'–4"

DOUBLE NESTED 12 GAGE THRIE BEAM

6 SPACES @ 1'–6" = 9'–4½"

CL SPLICE

1'–6"± 3"

1'–6"± 3"

½" (typ.)

4½"

1'–6"

TERMINAL CONNECTOR

THRIE BUFFER END SECTION

2'–10"

4" EXP GAP

CL LAST BRIDGE POST

DEFLECTOR PLATE

APPROACH RAIL ELEVATION
(1) LOCATION @ BR #98

NOTES:
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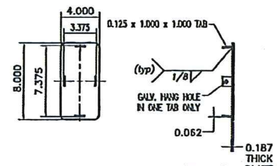
2. ALL APPROACH RAIL SPLICES SHALL BE LAPPED IN THE DIRECTION OF TRAFFIC FLOW.

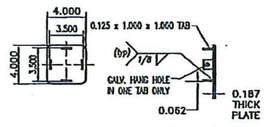
3. TUBE AND STEEL POST MATERIALS, DIMENSION SIZES AND NOTES SHALL BE THE SAME AS THOSE OF THE BRIDGE RAIL UNLESS OTHERWISE NOTED.

4. APPROACH RAIL BOLTS SHALL BE ASTM A307 GRADE A AND NUTS SHALL BE AASHTO M291 (ASTM 563 GRADE A OR BETTER (GALVANIZED). WASHERS SHALL BE ASTM F844.

5. WELD TOP SPLICE BAR TO FIT BEND. USE COMPLETE PENETRATION WELD (B–U2).



END CAP (8x4)
0.187 x 4.000 x 8.000 (A709 gr 36)



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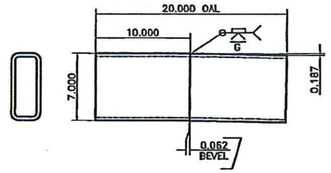
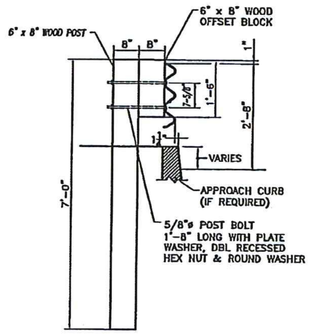
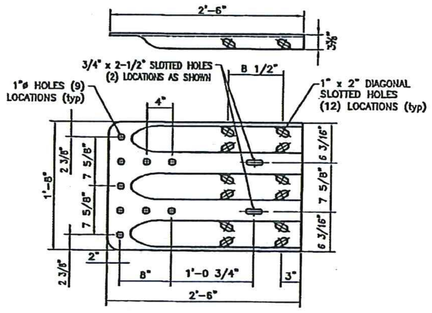


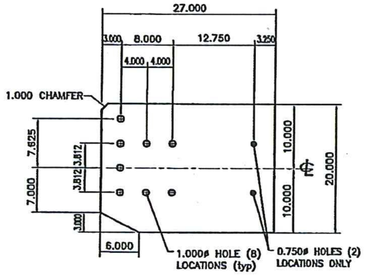
ANGLED SPLICE DETAIL
HSS 7 x 3 x 3/8 – FOR UPPER RAIL SPLICE
SEE BRIDGE RAIL SHEET FOR DETAIL ON LOWER RAIL SPLICE TUBE



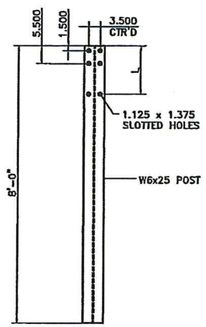
SECTION A–A



TERMINAL CONNECTOR
10 GAUGE (AASHTO M180 B2)



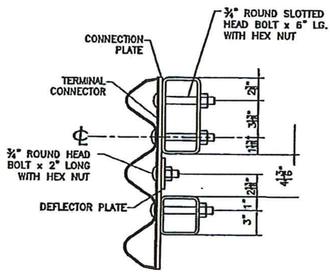
CONNECTION PLATE
0.375 x 20.000 x 27.000 (A709 gr 36)



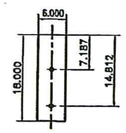
STEEL POST

STEEL POST CHART

No.	L
#1	1'–3.250"
#2	1'–3.000"
#3	1'–2.687"
#4	1'–2.375"

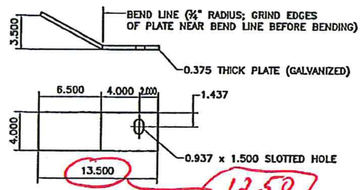


SECTION B–B



WB1
TIMBER BLOCKOUT
6 X 8 X 1'–6"

WOOD BLOCK DETAILS



DEFLECTOR PLATE
0.375 x 4.000 x 13.500 (A709 gr 36)
RIGHT HAND APPROACH SHOWN – LEFT HAND BENT OPPOSITE

No.	Remarks	Date
0	Initial submittal	

REVISIONS

D170 from Sheet 10 of 5

HIGHWAY SAFETY CORP
GLASTONBURY, CT
860-633-9445

ITEM 525.33 NETC 2 RAIL BRIDGE RAILING (S-360A)
ITEM 621.72 NETC 2 RAIL APPROACH RAILING (S-360B)
HUBBARDTON, VERMONT BRIDGE 96 & 98
ER STP 0161 (26) & ER STP 0161 (27)

AISC CERTIFIED FABRICATOR

GENERAL CONTRACTOR

SUB CONTRACTOR LAFAYETTE

AISC JOB NO. 1896

SHEET NO. 5 of 5

DRAWN	CHECKED	DATE	SCALE	SIZE
PAR		09-10-12	NONE	D

Highway Safety Corporation

Glastonbury, CT

Welding Procedure Specification

Material specification: **ASTM A500 gr B**

Welding process: **Gas Metal Arc Welding (GMAW)**

Manual, semi-automatic, or automatic: **Semi-Automatic**

Position of welding: **Flat (1F) or Horizontal (2F)**

Filler metal specification: **AWS A5.18**

Filler metal classification: **ER70S-6**

Electrode and manufacturer: **Lincoln Electric Lincoln Weld L-56**

Flux and manufacturer: **N/A**

Shielding gas: **86% Argon / 14% CO2** Flow rate: **35-45 CFM**

Single or multiple pass: **Single**

Single or multiple arc: **Single**

Welding current: **DCEP**

Polarity: **Reverse - electrode positive**

Welding progression: **Stringers**

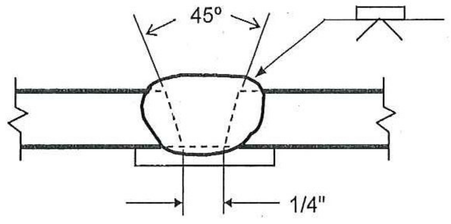
Root treatment: **clean base metal**

Preheat and interpass temperature: **base metal up to 3/4" (50°F)**

Postheat treatment: **None**

Electrode extension: **3/4" ± 1/4"**

WELDING PROCEDURE

Weld size	Pass no.	Electrode size	Welding parameters Amperes	Welding parameters Volts	Travel speed	Joint detail
	1	0.063"	300 A ± 30	29 V ± 2	15 ipm ± 2	B-U2a-GF 

Vtrans Received SEP 19 2012 CK'D JLK OK'd BY Resubmit APPROVED DATE 9/19/12

This procedure may vary due to fabrication sequence, fit-up, pass size, etc. within the limitation of variables given in section 5 of latest edition AWS D1.1

WPS no. **W-VGwBCK**

Revision no. **0**

Supporting PQR no. **Pre-Qualified**

Project Name **Hubbardton, VT**

Fabricator **Highway Safety Corporation**

Prepared By: **Paul Radice**

Date **9/11/12**

Project Number **ER STP 0161 (26+27)**

Highway Safety Corporation

Glastonbury, CT

Welding Procedure Specification

Material specification: A572 gr 50, A709 Gr 50

Welding process: Gas Metal Arc Welding (GMAW) Spray Transfer

Manual, semi-automatic, or automatic: Semi-Automatic

Position of welding: Flat (1F) or Horizontal (2F)

Filler metal specification: AWS A5.18

Filler metal classification: ER70S-6

Electrode and manufacturer: Lincoln Electric Lincoln Weld L-56

Flux and manufacturer: N/A

Shielding gas: 86% Argon / 14% CO2 Flow rate: 35-45 CFM

Single or multiple pass: Single or Multiple

Single or multiple arc: Single

Welding current: DCEP

Polarity: Reverse - electrode positive

Welding progression: Stringers

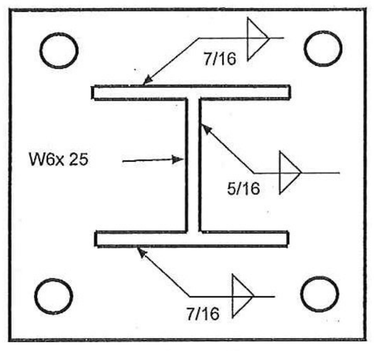
Root treatment: clean base metal

Preheat and interpass temperature: base metal up to 3/4" (50°F) ; over 3/4 thru 1-1/2" (150°F) : over 1-1/2" thru 2-1/2" (225°F)

Postheat treatment: None

Electrode extension: 3/4" ± 1/4"

WELDING PROCEDURE

Weld size	Pass no.	Electrode size	Welding parameters		Travel speed	Joint detail
			Amperes	Volts		
5/16"	1	0.062"	300 A ± 30	29 V ± 2	15 ipm ± 2	
7/16"	1 & 2	0.062"	↓	↓	15 ipm ± 2	

This procedure may vary due to fabrication sequence, fit-up, pass size, etc. within the limitation of variables given in section 5 of latest edition AWS D1.5

WPS no. W-VTPEDPOST1

Revision no. 0

Supporting PQR no. Pre-Qualified

Project Name Hubbardton, VT

Fabricator Highway Safety Corporation

Prepared By: Paul Radice

Date 9/11/12

Project Number ER STP 0161 (26+27)