Vermont Agency of Transportation

REQUEST FOR PROJECT REVIEW

RFPR version 4.0.a.

PROJECT INFORMATION

Proj. Name and Number: Middlebury WCRS(23)

EA No.: WCRS023-101 PPMS: 16B046

Project Manager: Joel Perrigo

Program: Structure Phase: Final

District: District 5 If Multiple Districts Specify

DOCUMENTS FOR REVIEW AND FILES LOCATION

PLANS FILE LOCATION : Z:\Highways\MUN\LCL\TemporarySharing\Middlebury WCRS(23) - C1 Final Plans

ESTIMATE FILE LOCATION :

FILE LOCATION :

FILE LOCATION :

FILE LOCATION :

TIME LINES

SUBMITTED: 10-20-2016

DEADLINE: 11-03-2016

COMPLETED:

INVITEES FOR REVIEW

- [x] MOB Districts
  - REVIEWED By Dick Hosking (dick.hosking@vermont.gov) at 9:00 am, Oct 31, 2016
  - D5
- [ ] MAB Bicycle and Pedestrian Program Unit
- [ ] PDB Utility Section
- [x] CMB Construction Section
  - REVIEWED By Heather Voisin (heather.voisin@vermont.gov) at 3:04 pm, Nov 01, 2016
  - REVIEWED By Timothy Pockette, P.E. (tim.pockette@state.vt.us) at 12:52 pm, Nov 03, 2016
- [ ] Integral Abutment
- [x] Rail Bureau
- [ ] PDB Right-of-Way
- [ ] PDB Highway Safety & Design
- [ ] Civil Rights
- [ ] Policy and Planning Bureau
- MOB TSMO Traffic Operations
  - REVIEWED By Nancy L. Avery, P.E. (nancy.avery@vermont.gov) at 9:35 am, Oct 25, 2016
  - Include on all projects
- [x] PDB Structural Section
  - REVIEWED By kristin higgins (kristin.higgins@vermont.gov) at 11:54 am, Oct 26, 2016
- [ ] PDB Environmental Section
- [x] CMB Materials Testing and Certification Section
  - REVIEWED By Nick Van Den Berg (nick.vandenberg@vermont.gov) at 11:33 am, Nov 02, 2016
- Others:
  - Contract Admin. will receive all final plans
  - Chris Williams, RCE
  - Tim Pockette
  - Guyette, Aaron <AGuyette@VHB.com>
  - Mark Alexander <malexander@dacollins.com>
  - Jim Gish <JGish@TownOfMiddlebury.org>
- [x] MOB Technical Services
  - REVIEWED By Tyler Hanson (tyler.hanson@vermont.gov) at 8:03 am, Oct 25, 2016
- [ ] PDB Survey Section
- [ ] PDB Hydraulics Section
- [x] CMB Geotechnical Engineering Section
- [x] FHWA
  - Include on all PoDI and WCRS Projects

Review Focus Notes:

CMGC project, early work package.

Print Form

Clear Form

Submit by Email

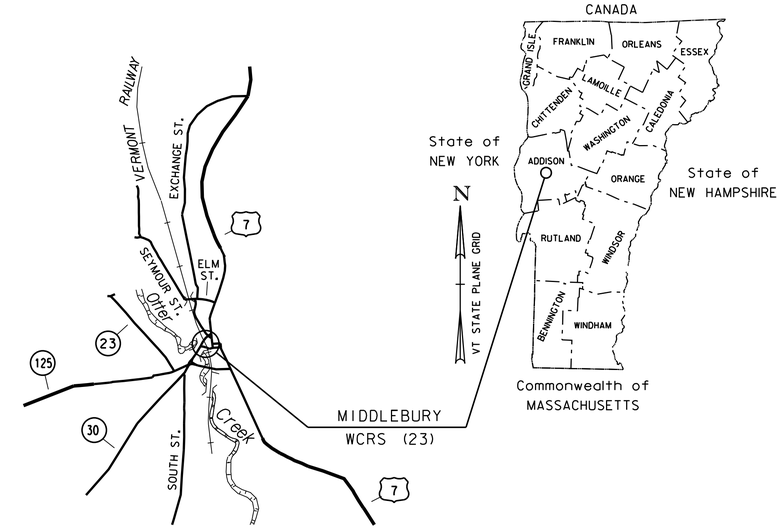
Online Shared Review

REVIEWER NOTES

1. THIS IS CONTRACT 1 OF A TWO CONTRACT PROJECT.
2. WORK TO BE COMPLETED UNDER CONTRACT 1 WILL BE LEFT IN PLACE FOR USE IN CONTRACT 2.
3. FOR CONTRACT 2 THERE ARE TWO CONSTRUCTION SCENARIOS POSSIBLE:
   - 8 WEEK CLOSURE OF RAILROAD TRAFFIC FOR RAPID REPLACEMENT OF MERCHANTS ROW AND MAIN STREET BRIDGES IN CONTRACT 2
   - 20 HOUR WORK WINDOWS WITH CLOSURE AND REPLACEMENT OF MERCHANTS ROW BRIDGE FOLLOWED BY CLOSURE AND REPLACEMENT OF MAIN STREET BRIDGE
4. THESE PLANS ARE ADAPTABLE TO BOTH SCENARIOS WITH MINOR CHANGES.

TOWN OF MIDDLEBURY

PROPOSED IMPROVEMENT BRIDGE PROJECT



TOWN OF MIDDLEBURY
COUNTY OF ADDISON
MAIN ST (MINOR ARTERIAL), BRIDGE NO. 102 - MERCHANTS ROW (MINOR ARTERIAL), BRIDGE NO. 2
CONTRACT 1

PROJECT LOCATION: LOCATED IN THE COUNTY OF ADDISON, TOWN OF MIDDLEBURY, ON MAIN STREET (TH 2); BRIDGE NO. 102 OVER VERMONT RAILWAY, APPROXIMATELY 400 FT SOUTHWEST OF THE INTERSECTION OF MAIN STREET AND US ROUTE 7, AND ON MERCHANTS ROW (TH 8); BRIDGE NO. 2 OVER VERMONT RAILWAY, APPROXIMATELY 230 FT WEST OF THE INTERSECTION OF MERCHANTS ROW AND SOUTH PLEASANT STREET (TH 47).

PROJECT DESCRIPTION: WORK TO BE PERFORMED UNDER THIS PROJECT INCLUDES THE REMOVAL AND REPLACEMENT OF BRIDGE NO. 102 AND BRIDGE NO. 2 WITH A TUNNEL ALONG THE EXISTING RAILROAD ALIGNMENT, LOWERING OF TRACKS, CONSTRUCTION OF APPROACH RETAINING WALLS, AND ASSOCIATED ROADWAY AND UTILITY WORK.

The overall description of the project is handy to have, but if the project is being phased out then the specific description of work that will be conducted should be supplied. Otherwise additional TTC should be included with this submittal.

CONTRACT 1 LOCATION: TEMPORARY ACCESS ROAD LOCATION IS FROM WATER STREET TO APPROXIMATELY 200 FT SOUTHWEST OF MERCHANTS ROW. MICROTUNNELING LOCATION IS IN TRIANGLE PARK, THE FORMER LAZARUS BUILDING SITE, APPROXIMATELY 190 FT NORTH OF THE FORMER LAZARUS BUILDING SITE, AND WEST TO THE OTTER CREEK.

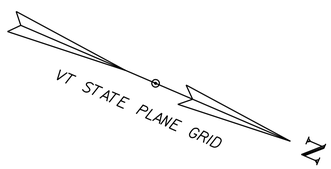
CONTRACT 1 DESCRIPTION: WORK TO BE PERFORMED UNDER THIS CONTRACT INCLUDES MICROTUNNELING FOR SELECT DRAINAGE IMPROVEMENTS, CONSTRUCTING AN OUTFALL MAINTENANCE ROAD, AND CONSTRUCTION OF THE TEMPORARY ACCESS ROAD. WORK UNDER THIS CONTRACT IS IN PREPERATION FOR FUTURE CONTRACT 2 WORK WHICH INCLUDES THE REMOVAL AND REPLACEMENT OF BRIDGE NO. 102 AND BRIDGE NO. 2.

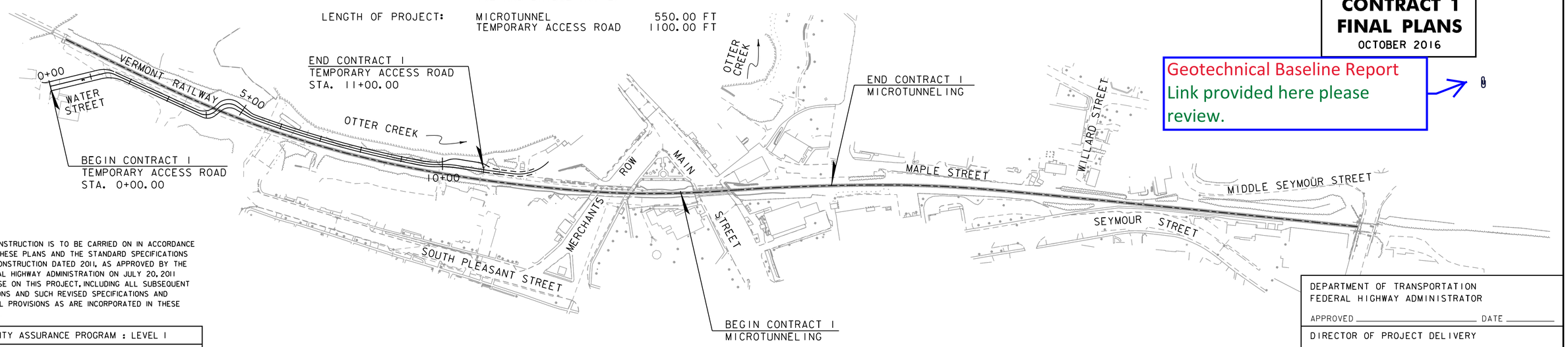
LENGTH OF PROJECT:

MICROTUNNEL	550.00 FT
TEMPORARY ACCESS ROAD	1100.00 FT

CONTRACT 1
FINAL PLANS
OCTOBER 2016

Geotechnical Baseline Report
Link provided here please review.





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

QUALITY ASSURANCE PROGRAM : LEVEL 1

SURVEYED BY : VHB
SURVEYED DATE : MAY 2013

DATUM
VERTICAL NAVD 88
HORIZONTAL NAD 83

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATOR
APPROVED _____ DATE _____

DIRECTOR OF PROJECT DELIVERY
APPROVED _____ DATE _____

PROJECT MANAGER : JOEL PERRIGO

PROJECT NAME : MIDDLEBURY
PROJECT NUMBER : WCRS (23)

SHEET 1 OF 116 SHEETS

INDEX OF SHEETS

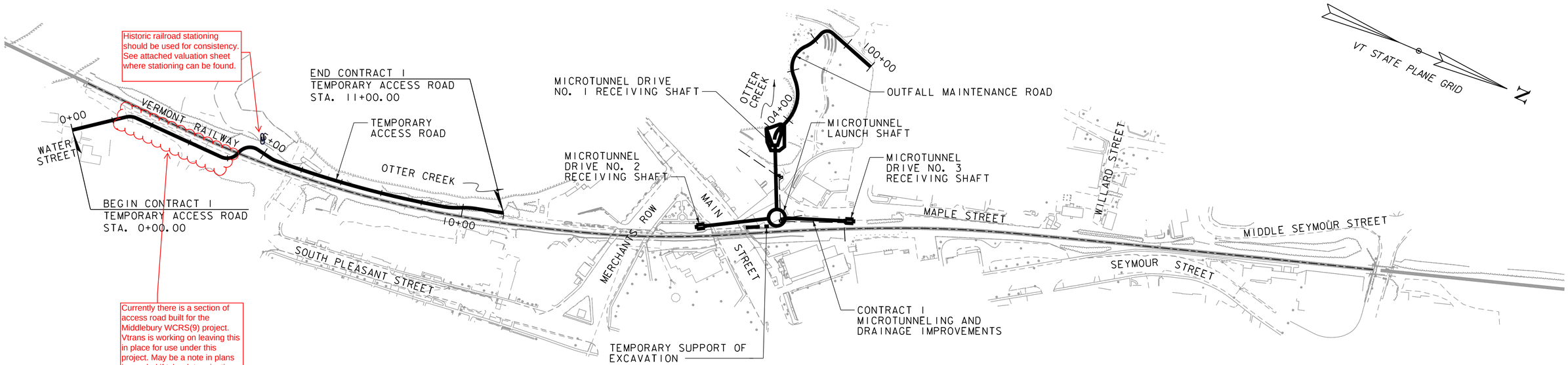
1	TITLE SHEET
2	INDEX OF SHEETS
3	CONTRACT BREAKOUT
4-5	TYPICAL SECTIONS AND DETAILS (2 SHEETS)
6	PROJECT NOTES
7-8	QUANTITY SHEETS (2 SHEETS)
9	CONVENTIONAL SYMBOLOGY LEGEND
10	TIE SHEET
11-14	ALIGNMENT LAYOUT SHEETS (4 SHEETS)
15-17	LAYOUT SHEETS (3 SHEETS)
18-20	PROFILE SHEETS (3 SHEETS)
21	TRAFFIC SIGN SUMMARY SHEET
22	MAIN STREET TEMP BRIDGE PLAN & PROFILE
23	MAIN STREET TEMP BRIDGE ALIGNMENT
24	MERCHANTS ROW TEMP BRIDGE PLAN & PROFILE
25	MERCHANTS ROW TEMP BRIDGE ALIGNMENT
26	TEMPORARY BRIDGE DETAILS
27	OUTFALL MAINTENANCE ROAD LAYOUT
28	OUTFALL MAINTENANCE ROAD PROFILE
29-32	TRAFFIC CONTROL PLANS (4 SHEETS)
33-38	BORING INFORMATION SHEETS (6 SHEETS)
39-66	BORING LOGS (28 SHEETS)
67	MICROTUNNEL LAYOUT SHEET
68	DRAINAGE LAYOUT SHEET
69-71	MICROTUNNEL PROFILE SHEETS (3 SHEETS)
72	PIPE DETAILS
73	SHAFT DETAILS
74	HEADWALL DETAILS
75-80	ROADWAY CROSS SECTIONS (6 SHEETS)
81-85	OUTFALL MAINTENANCE ROAD CROSS SECTIONS (5 SHEETS)
86-87	EPSC NARRATIVES (2 SHEETS)
88-96	EPSC EXISTING SITE PLANS (9 SHEETS)
97-105	EPSC CONSTRUCTION SITE PLANS (9 SHEETS)
106-114	EPSC FINAL SITE PLANS (9 SHEETS)
115-116	EROSION CONTROL DETAILS (2 SHEETS)

STANDARD SHEETS

T-1	TRAFFIC CONTROL GENERAL NOTES	04-25-2016
T-2	TRAFFIC SIGN GENERAL NOTES	04-25-2016
T-10	CONVENTIONAL ROADS CONSTRUCTION APPROACH SIGNING	08-06-2012
T-45	SQUARE TUBE SIGN POST AND ANCHOR	01-02-2013
E-190	RAILROAD CROSSING AND PAVEMENT MARKINGS	06-30-2003
E-193	PAVEMENT MARKING DETAILS	08-18-1995
T-56	STANDARD SIGN PLACEMENT	10-26-2015
D-1	PRECAST REINFORCED DROP INLET DETAILS	06-01-2004
D-15	PRECAST REINF CONC. MH-GRATES, CAST IRON GRATE WITH FRAME, TYPE D & E	06-01-1994
D-16	DRAINAGE DETAILS INCLUDING DROP INLETS, IRON GATE TYPE B & C, CONC END SECTION, ETC.	06-01-1994

Railroad mileposts should be listed to describe the extents of the rail work itself.

Historic railroad stationing should be used for consistency. See attached valuation sheet where stationing can be found.

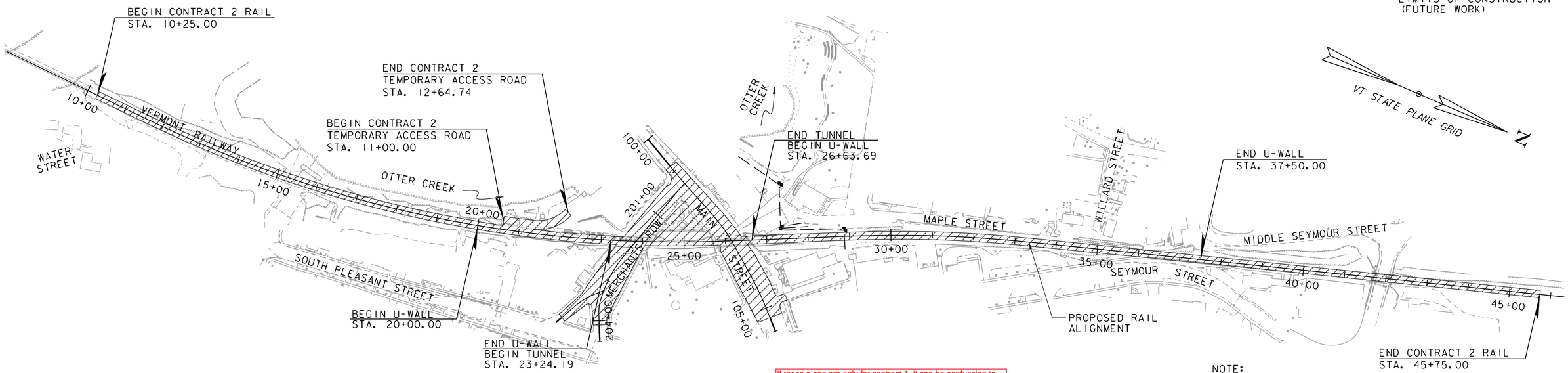


Currently there is a section of access road built for the Middlebury WCRS(9) project. Vtrans is working on leaving this in place for use under this project. May be a note in plans is needed if tyhe determination to leave the access road in place is not made prior to these plans being finalized.

CONTRACT 1

LEGEND

- APPROXIMATE CONTRACT 1 LIMITS OF CONSTRUCTION
- APPROXIMATE CONTRACT 2 LIMITS OF CONSTRUCTION (FUTURE WORK)



CONTRACT 2

If these plans are only for contract 1, it can be confussing to have contract 2 shown. If you want to keep the contract 2 layout it would be better to place a box around it and shade it in.

NOTE:

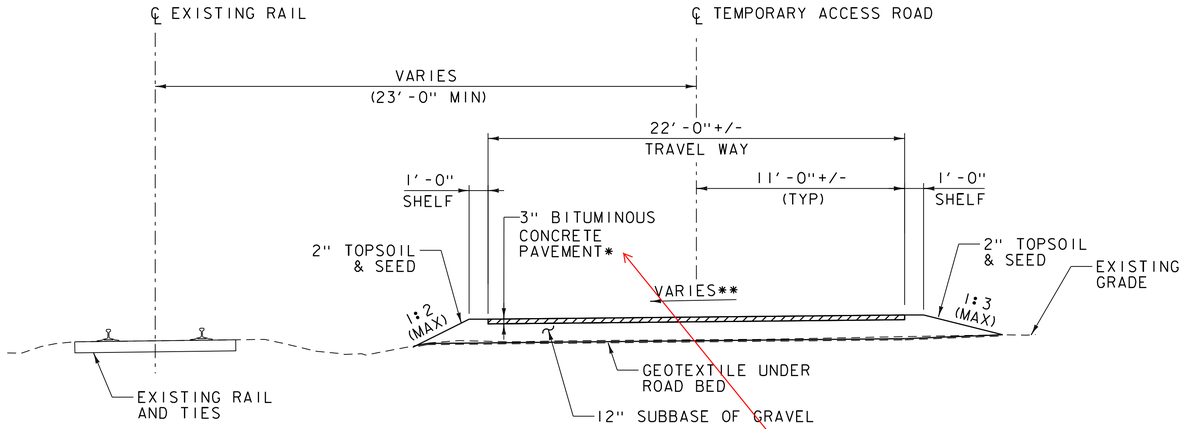
1. THIS PLAN SET DETAILS ALL WORK INCLUDED IN CONTRACT 1. CONTRACT 2 PLANS TO BE RELEASED AT A LATER DATE.

CONTRACT BREAKOUT

120 0 120
SCALE IN FEET

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044key_plan_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: K.D. WENTWORTH
DESIGNED BY: J.A. WHITMORE	CHECKED BY: G.S. GOODRICH
CONTRACT BREAKOUT	SHEET 3 OF 116

VHB 57603.00

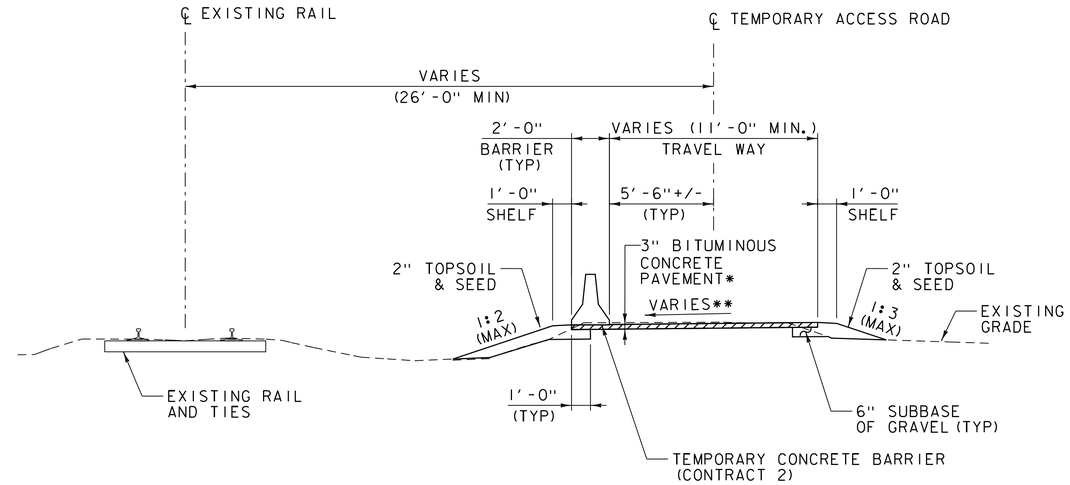


Pavement needs to be added to C2 as contractor will use the road through 2018

* (2) - 1½" LIFTS OF TYPE IIIS
** SEE CROSS SECTIONS

TYPICAL TEMPORARY ACCESS ROAD SECTION

(STA. 0+00 - 1+00)
SCALE ¼" = 1'-0"

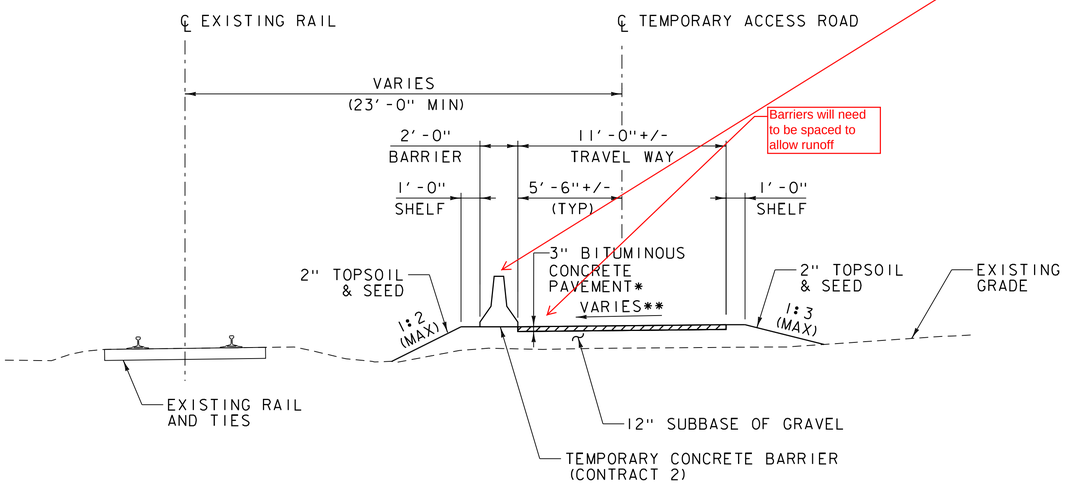


* (2) - 1½" LIFTS OF TYPE IIIS
** SEE CROSS SECTIONS

TYPICAL TEMPORARY ACCESS ROAD STEP BOX SECTION

(STA. 1+00 - 3+00)
SCALE ¼" = 1'-0"

Contract 2?

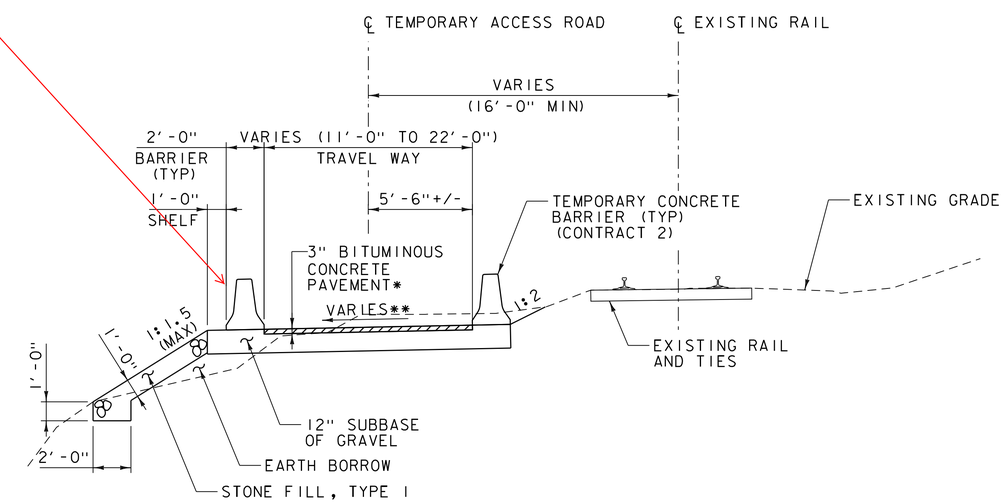


Barriers will need to be spaced to allow runoff

* (2) - 1½" LIFTS OF TYPE IIIS
** SEE CROSS SECTIONS

TYPICAL TEMPORARY ACCESS ROAD SECTION

(STA. 3+00 - 4+25)
SCALE ¼" = 1'-0"



* (2) - 1½" LIFTS OF TYPE IIIS
** SEE CROSS SECTIONS

TYPICAL TEMPORARY ACCESS ROAD SECTION

(STA. 4+25 - 11+00)
SCALE ¼" = 1'-0"

MATERIAL TOLERANCES

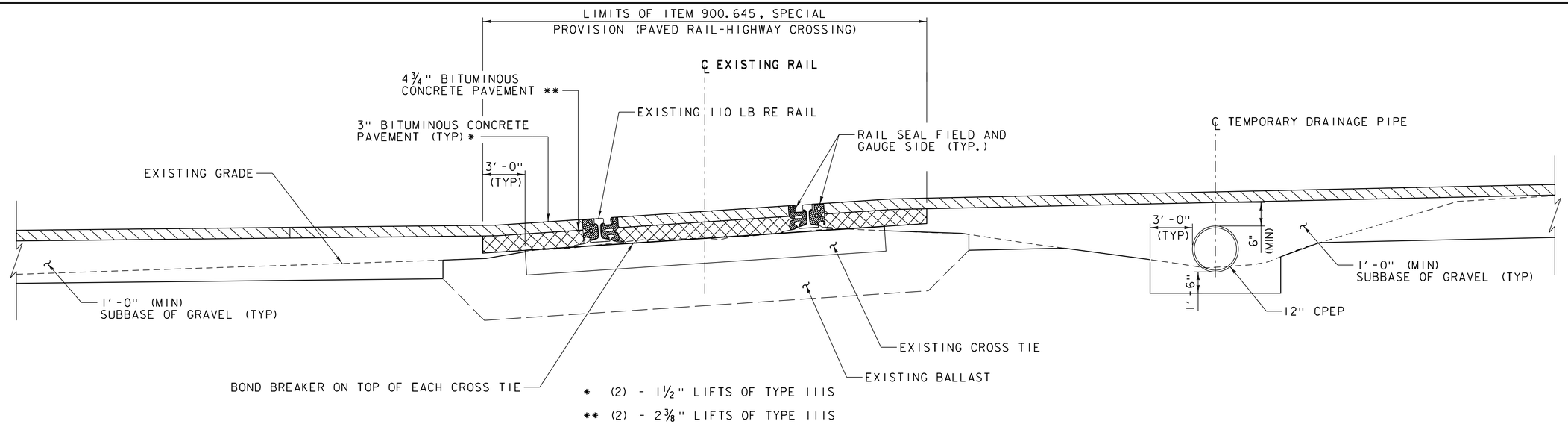
(IF USED ON PROJECT)

SURFACE	
- PAVEMENT (TOTAL THICKNESS)	+/- ¼"
- AGGREGATE SURFACE COURSE	+/- ½"
SUBBASE	+/- 1"
SAND BORROW	+/- 1"

PROJECT NAME:	MIDDLEBURY
PROJECT NUMBER:	WCRS(23)

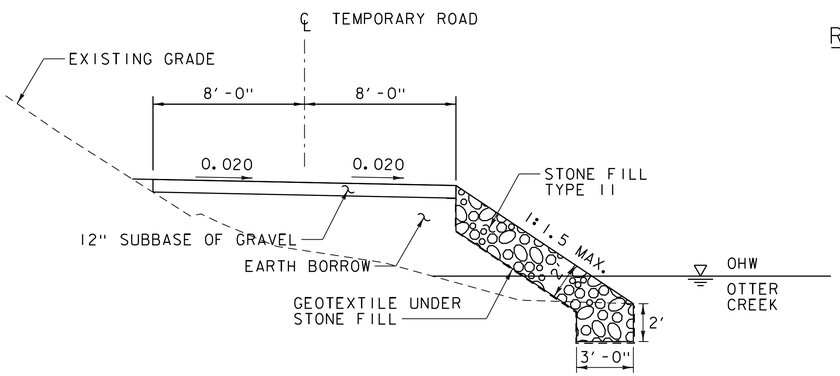
FILE NAME: z10g044typ_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: K.D. WENTWORTH
DESIGNED BY: J.A. WHITMORE	CHECKED BY: D.M. PECK
TYPICAL SECTIONS AND DETAILS (1 OF 2)	SHEET 4 OF 116

VHB 57603



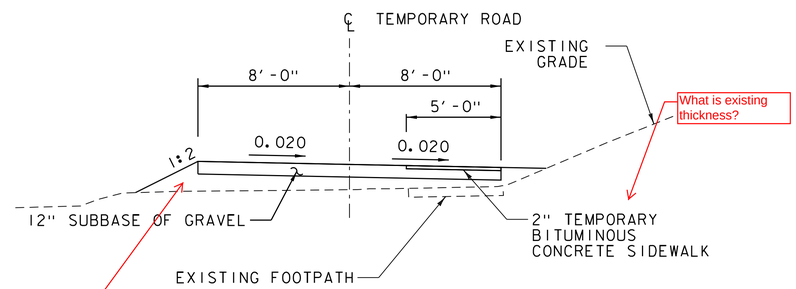
RAIL CROSSING AT TEMPORARY ACCESS ROAD

NOT TO SCALE



TEMPORARY DRAINAGE OUTFALL ACCESS ROAD

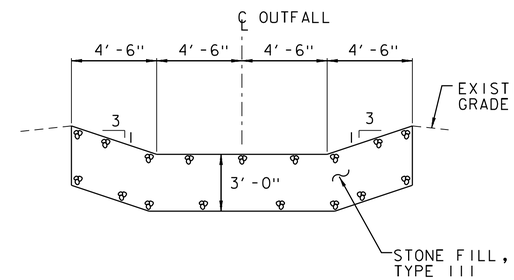
STA. 101+28 - 104+60
NOT TO SCALE



TEMPORARY DRAINAGE OUTFALL ACCESS ROAD

STA. 100+00 - 101+28
NOT TO SCALE

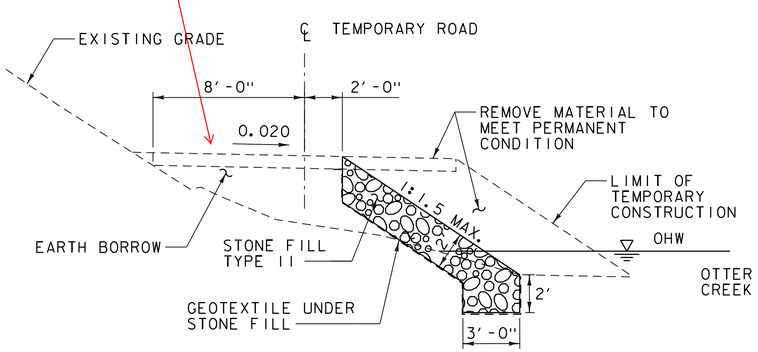
What is this material? Does it get removed for permanent conditions?



OUTFALL DRAINAGE APRON

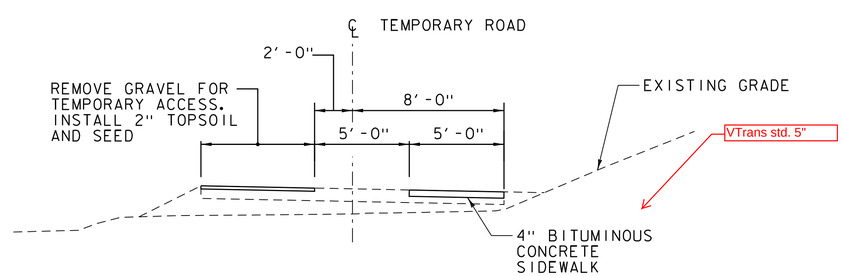
NOT TO SCALE

What happens here in permanent condition?



PERMANENT DRAINAGE OUTFALL ACCESS ROAD

STA. 101+28 - 104+60
NOT TO SCALE



PERMANENT DRAINAGE OUTFALL ACCESS ROAD

STA. 100+00 - 101+28
NOT TO SCALE

MATERIAL TOLERANCES

(IF USED ON PROJECT)

SURFACE	
- PAVEMENT (TOTAL THICKNESS)	+/- ¼"
- AGGREGATE SURFACE COURSE	+/- ½"
SUBBASE	+/- 1"
SAND BORROW	+/- 1"

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044typ_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: D.A. PECK
DESIGNED BY: D.A. PECK	CHECKED BY: S.E. BURBANK
TYPICAL SECTIONS AND DETAILS (2 OF 2)	SHEET 5 OF 116

VHB 57603

PROJECT NOTES

GENERAL

1. ALL MATERIALS 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, 7TH EDITION, AND ITS LATEST REVISIONS.

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

3. THE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL BURIED AND AERIAL UTILITIES AND POLES PRIOR TO STARTING THE WORK. SOME UTILITIES HAVE BEEN RELOCATED DURING THE PREPARATION OF THESE PLANS AND THE CONTRACTOR WILL NEED TO COORDINATE WITH ALL UTILITY OWNERS TO CONFIRM ACTUAL LOCATIONS PRIOR TO CONSTRUCTION.

4. ALL ITEMS LISTED AS CONTRACT 2 ARE NOT A PART OF THIS CONTRACT AND WILL BE INSTALLED AND PAID FOR UNDER CONTRACT 2.

Agreed, we will need to work through this in which case, much of this wording is likely to change

TRAFFIC CONTROL

I thought we talked about doing a site specific plan now so the contractor who is already at the table does not have to deal with this during the summer months. By the time they get a site specific plan stamped by a PE and through the approval process it will be mid August. I suggest working with TSMO now to get a site specific traffic control plan in contract documents. Especially since you are using 641.10.

5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN AND IMPLEMENTATION OF A SITE SPECIFIC TRAFFIC CONTROL PACKAGE IDENTIFYING CONSTRUCTION ACTIVITIES BEFORE, DURING, AND AFTER CONSTRUCTION. THE CONTRACTOR SHALL SUBMIT A DETAILED TRAFFIC CONTROL PLAN TO THE PROJECT MANAGER FOR ALL STAGES OF CONSTRUCTION FOR APPROVAL PER SUBSECTION 105.03. ALL COSTS SHALL BE INCLUDED IN ITEM 641.10, "TRAFFIC CONTROL".

6. FULL ACCESS TO ALL DRIVES WITHIN THE PROJECT LIMITS SHALL BE MAINTAINED AT ALL TIMES WITH THE EXCEPTION OF PRINTERS ALLEY WHICH MAY BE CLOSED IN ACCORDANCE WITH THE TRAFFIC MANAGEMENT PLAN (TMP). THIS WORK SHALL BE CONSIDERED INCIDENTAL TO ITEM 641.10, "TRAFFIC CONTROL".

7. UNLESS COVERED UNDER INDIVIDUAL PAY ITEMS OR NOTED OTHERWISE, ALL COSTS FOR TEMPORARY TRAFFIC CONTROL DEVICES FOR MICROTUNNELING OPERATIONS AND CONSTRUCTION OF THE TEMPORARY ACCESS ROAD WILL BE INCLUDED IN THE CONTRACT LUMP SUM PRICE FOR ITEM 641.10, "TRAFFIC CONTROL". THIS INCLUDES, BUT IS NOT LIMITED TO, THE FOLLOWING ITEMS:

   TEMPORARY TRAFFIC BARRIERS
   RETROREFLECTIVE DRUMS & CONES
   ENERGY ABSORPTION ATTENUATORS
   SIGNS
   SIGN POSTS
   INSTALLATION OF SIGNS AND SIGN POSTS

   TEMPORARY TRAFFIC BARRIERS AND ENERGY ABSORPTION ATTENUATORS SHALL BE FURNISHED IN ACCORDANCE WITH SECTION 621.

8. ALL SIGNS SHALL BE IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD) AND THE "STANDARD HIGHWAY SIGNS AND MARKINGS" BOOK (SHSM) PUBLISHED BY THE FEDERAL HIGHWAY ADMINISTRATION (FHWA).

EARTHWORK

9. ALL EXCAVATION OF EXISTING GROUND WILL BE PAID FOR UNDER ITEM 900.608 "SPECIAL PROVISION (MANAGEMENT AND DISPOSAL OF CONTAMINATED SOILS)".

10. ALL COSTS FOR REMOVAL AND DISPOSAL OF CONTAMINATED SOILS AND GROUNDWATER SHALL BE INCLUDED IN THE UNIT BID PRICE FOR CONTRACT ITEM 900.608, "SPECIAL PROVISION (MANAGEMENT AND DISPOSAL OF CONTAMINATED SOILS)" AND ITEM 900.625 "SPECIAL PROVISION (MANAGEMENT AND DISPOSAL OF GROUNDWATER)".

respectively

11. ANY WASTE MATERIAL THAT WILL BE TAKEN OFF SITE SHALL BE REMOVED AND HAULED TO AN APPROVED FACILITY IN ACCORDANCE WITH THE CORRECTIVE ACTION PLAN.

where is corrective action plan?

12. IN THE EVENT GROSS CONTAMINATED SOIL, GROUNDWATER, AND OTHER MEDIA ARE ENCOUNTERED DURING EXCAVATION AND CONSTRUCTION ACTIVITIES BASED ON VISUAL, OLFACTORY, OR OTHER EVIDENCE, THE CONTRACTOR SHALL STOP WORK IN THE VICINITY OF THE SUSPECT MATERIAL TO AVOID FURTHER SPREADING OF THE MATERIAL, AND SHALL NOTIFY THE ENGINEER IMMEDIATELY SO THAT THE APPROPRIATE TESTING AND SUBSEQUENT ACTION CAN BE TAKEN.

13. ALL PROJECT SOIL EXCAVATION AND HANDLING SHALL BE COMPLETED IN ACCORDANCE WITH THE CORRECTIVE ACTION PLAN FOR CONTRACT 1 OF THE MIDDLEBURY WCRS(23) BRIDGE PROJECT.

14. ALL CONTRACTORS WORKING IN DIRECT CONTACT WITH SOILS FOR EXCAVATING, REGRADING, AND OTHER PROJECT TASKS SHALL BE OSHA-HAZWOPER CERTIFIED.

15. COMMON EXCAVATION AND CHANNEL EXCAVATION OF EARTH WILL BE FOR THE REMOVAL OF MATERIAL ON THE TEMPORARY DRAINAGE OUTFALL ACCESS ROAD TO CONSTRUCT THE PERMANENT DRAINAGE OUTFALL ACCESS ROAD.

16. EXCAVATION OF SURFACES AND PAVEMENTS WILL BE FOR THE EXCAVATION OF THE EXISTING 4" BITUMINOUS CONCRETE SIDEWALK TO BE REPAVED AS PART OF THE CONSTRUCTION OF THE PERMANENT DRAINAGE OUTFALL ACCESS ROAD.

Format page so the section title is with notes.

TEMPORARY ACCESS ROAD

17. THE POSTED SPEED LIMIT SHALL BE 15 MPH FOR THE TEMPORARY ACCESS ROAD.

18. ENERGY ABSORPTION ATTENUATORS RATED FOR 35 MPH SHALL BE LOCATED AS SHOWN ON THE PLANS.

19. THE DESIGN VEHICLE FOR THE TEMPORARY ACCESS ROAD IS A THE MIDDLEBURY FIRE DEPARTMENT LADDER TRUCK.

CONCRETE

20. CONCRETE FOR THE HEADWALL SHALL BE ITEM 501.34, "CONCRETE, HIGH PERFORMANCE CLASS B".

21. ALL EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 1" X 1" UNLESS OTHERWISE NOTED.

22. MINIMUM COVER FOR REINFORCING SHALL BE 2" ALONG THE BACK FACES OF WALLS AGAINST EARTH AND 3" ELSEWHERE. UNLESS OTHERWISE NOTED.

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

24. ITEM 514.10, "WATER REPELLENT, SILANE", SHALL BE APPLIED TO ALL EXPOSED CONCRETE SURFACES.

25. ALL REINFORCEMENT SHALL MEET THE REQUIREMENTS OF LEVEL I EPOXY COATED REINFORCING STEEL IN ACCORDANCE WITH SECTION 507. PAYMENT FOR STEEL REINFORCEMENT WILL BE INCLUDED IN THE UNIT PRICE BID FOR CONTRACT ITEM 507.11, "REINFORCING STEEL, LEVEL I".

26. PRIOR TO ANY COLD WEATHER CONCRETE PLACEMENT AS DEFINED IN SECTION 501, THE CONTRACTOR SHALL SUBMIT A PLAN TO THE ENGINEER FOR APPROVAL. THE PLAN SHALL PROVIDE METHODS FOR INSULATING, CURING, AND HEATING, TEMPERATURE MONITORING, AND ANY WEATHER RESTRICTIONS FOR CONCRETE PLACEMENT. THE PLAN SHALL BE SPECIFIC TO THE LOCATION OF THE PLACEMENT AND BE SUBMITTED A MINIMUM OF 14 DAYS PRIOR TO THE ANTICIPATED PLACEMENT DATE. COLD WEATHER CONCRETE SHALL NOT BE PLACED PRIOR TO APPROVAL OF THE PLAN.

RAILROAD

27. ALL CONTRACTOR DESIGN, CONSTRUCTION AND FABRICATION SHALL CONFORM TO THE "AMERICAN RAILWAY ENGINEERING & MAINTENANCE OF WAY ASSOCIATION (AREMA) MANUAL FOR RAILWAY ENGINEERING, 2009" AND THE "STATE OF VERMONT AGENCY OF TRANSPORTATION (VTRANS) STANDARD SPECIFICATIONS FOR CONSTRUCTION, 2011" AND ITS LATEST REVISIONS.

28. THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT CONTINUOUS COORDINATION WITH THE OPERATOR, VERMONT RAILWAYS, INC. (VTR), WILL BE REQUIRED THROUGHOUT CONSTRUCTION. VTR WILL PROVIDE THE CONTRACTOR WITH FLAGGERS FOR PROTECTION OF RAILROAD TRAFFIC WHILE WORK IS BEING PERFORMED WITHIN THE RAILROAD RIGHT OF WAY (R.O.W.). THE CONTRACTOR SHALL NOT ENTER THE R.O.W. AT ANY TIME WITHOUT VTR AUTHORIZATION. ALL COSTS FOR RAILROAD FLAGGER PROTECTION AND RAILROAD COORDINATION SHALL BE INCLUDED UNDER ITEM 900.650, "SPECIAL PROVISION (MAINTENANCE OF RAILROAD TRAFFIC)(N.A.B.I.)". SEE THE SPECIAL PROVISIONS FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

29. ALL WORK WITHIN THE RAILROAD R.O.W. SHALL BE PERFORMED DURING THE TIME SEGMENTS IN THE CONTRACT DOCUMENTS. SEE THE SPECIAL PROVISIONS FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

MICROTUNNELING AND SUPPORT OF EXCAVATION

30. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGNS OF THE SHAFT SUPPORTS TO PROVIDE A SYSTEM THAT IS IN COMPLIANCE WITH THE CONTRACT SPECIFICATIONS AND COMPATIBLE WITH THEIR SELECTED EQUIPMENT, MEANS, AND METHODS.

31. THE INTERNAL LIMITS OF EXCAVATION SUGGESTED ON THE DRAWINGS ARE APPROXIMATE DIMENSIONS REQUIRED TO INSTALL AND RETRIEVE THE ANTICIPATED TUNNELING EQUIPMENT REQUIRED FOR THIS CONSTRUCTION. THE FINAL SHAFT DIMENSIONS SHALL BE DETERMINED BY THE CONTRACTOR AND SUBJECT TO APPROVAL BY THE ENGINEER.

32. SEE GEOTECHNICAL BASELINE REPORT AND BORINGS FOR THE BEDROCK LOCATION AND ANTICIPATED GROUND AND GROUNDWATER CONDITIONS.

33. THE CONTRACTOR SHALL DESIGN THE SHAFT SUPPORT OF EXCAVATION SYSTEMS TO ACCOMMODATE THE MAXIMUM ANTICIPATED CONSTRUCTION OR LIVE LOAD SURCHARGE.

34. SEAL ANNULAR SPACE BETWEEN TUNNEL CASING PIPE AND SHAFT SUPPORT OF EXCAVATION AT INTERFACE. CONTRACTOR SHALL DESIGN OPENING AND SEAL BASED ON ACTUAL CASING SIZE, HYDROSTATIC PRESSURE, LUBRICATION AND GROUT PRESSURE. SEE THE SPECIAL PROVISIONS FOR ADDITIONAL INFORMATION.

Be consistent in terminology and specify location of action plan.

I was of the understanding that no hazmat was required

TEMPORARY BRIDGE

Leave in place and reconstruct at the end? We had discuss leaving for peds

35. THE TEMPORARY BRIDGES AT MAIN STREET AND MERCHANTS ROW ARE NOT INTENDED TO BE USED FOR THIS CONTRACT UNLESS ONE OR BOTH OF THE BRIDGES ARE CLOSED BY VTRANS STATE BRIDGE INSPECTORS DURING ANNUAL BRIDGE INSPECTIONS.

36. THE CONTRACTOR SHALL IMPLEMENT THE ROAD CLOSURE, TRAFFIC CONTROL, AND DETOUR AS SHOWN ON THE PLANS IN THE EVENT OF A BRIDGE CLOSURE.

37. IF A TEMPORARY BRIDGE IS REQUIRED DUE TO BRIDGE CLOSURE, TRAFFIC SHALL BE MAINTAINED ON A TWO-WAY TEMPORARY BRIDGE LOCATED AS SHOWN ON THE PLANS.

38. UNLESS COVERED UNDER INDIVIDUAL PAY ITEMS OR NOTED OTHERWISE, ALL COSTS FOR WORK SHOWN ON THE TEMPORARY BRIDGE SHEETS WILL BE CONSIDERED TO BE INCLUDED IN THE CONTRACT LUMP SUM PRICE FOR ITEM 528.11, "TWO-WAY TEMPORARY BRIDGE (MAIN STREET)(1300 SF - EST.)" OR ITEM 528.11, "TWO-WAY TEMPORARY BRIDGE (MERCHANTS ROW)(1560 SF - EST.)". THIS INCLUDES, BUT IS NOT LIMITED TO, THE FOLLOWING ITEMS:

   TEMPORARY TRAFFIC BARRIERS
   RETROREFLECTIVE DRUMS
   PORTABLE LUMINAIRE
   TYPE III BARRICADES
   SIGNS
   SIGN POSTS
   STRIPING
   BITUMINOUS CONCRETE PAVEMENT
   SUBBASE
   EARTH BORROW

   TEMPORARY TRAFFIC BARRIER SHALL BE FURNISHED IN ACCORDANCE WITH SECTION 621.

39. ALL SIGNS SHALL BE IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD) AND THE "STANDARD HIGHWAY SIGNS AND MARKINGS" BOOK (SHSM) PUBLISHED BY THE FEDERAL HIGHWAY ADMINISTRATION (FHWA).

40. ALL TEMPORARY PORTABLE TRAFFIC CONTROL SIGNALS AND PORTABLE LIGHT TOWERS SHALL BE IN ACCORDANCE WITH SECTION 678 AND THE CURRENT ADDITION OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MUTCD).

Are there notes needed or monitoring of buildings?

the materials for the access road are to be installed under contract 1 and will be removed under contact 2. there should be a note indicating this. Contract 2 will have to have a pay item for removal of temporary access road..

STATE OF VERMONT
AGENCY OF TRANSPORTATION

QUANTITY SHEET 1

SUMMARY OF ESTIMATED QUANTITIES				TOTALS		DESCRIPTIONS			
ROADWAY	EROSION CONTROL	UTILITIES	RAILROAD ITEMS	GRAND TOTAL	FINAL	UNIT	ITEMS	ITEM NUMBER	ROUND
1				1		LS	CLEARING AND GRUBBING, INCLUDING INDIVIDUAL TREES AND STUMPS	201.10	
330				330		CY	COMMON EXCAVATION	203.15	
10				10		CY	SOLID ROCK EXCAVATION	203.16	
125				125		CY	CHANNEL EXCAVATION OF EARTH	203.25	
10				10		CY	EXCAVATION OF SURFACES AND PAVEMENTS	203.28	
1840				1840		CY	EARTH BORROW	203.30	
		25		25		CY	TRENCH EXCAVATION OF EARTH	204.20	
		1		1		CY	TRENCH EXCAVATION OF EARTH, EXPLORATORY (N.A.B.I.)	204.22	
		210		210		CY	GRANULAR BACKFILL FOR STRUCTURES	204.30	
1000				1000		CY	SUBBASE OF GRAVEL	301.15	
		19		19		CY	CONCRETE, HIGH PERFORMANCE CLASS B	501.34	
		2080		2080		LB	REINFORCING STEEL, LEVEL I	507.11	
		50		50		LF	DRILLING AND GROUTING DOWELS	507.16	
		1		1		GAL	WATER REPELLENT, SILANE	514.10	
1				1		LS	TWO-WAY TEMPORARY BRIDGE (MAIN STREET)(1300 SF - EST.)	528.11	
1				1		LS	TWO-WAY TEMPORARY BRIDGE (MERCHANTS ROW)(1560 SF - EST.)	528.11	
		475		475		CY	CONTROLLED DENSITY (FLOWABLE) FILL	541.45	
9				9		LF	18" RCP CLASS IV	601.0816	
120				120		LF	12" CPEP	601.0905	
2				2		EACH	PRECAST REINFORCED CONCRETE DROP INLET WITH CAST IRON GRATE	604.18	
		3		3		EACH	PRECAST REINFORCED CONCRETE MANHOLE WITH CAST IRON COVER (8' DIAMETER)	604.21	
8				8		EACH	CHANGING ELEVATION OF DROP INLETS, CATCH BASINS, OR MANHOLES	604.40	
		7		7		EACH	CHANGING ELEVATION OF SEWER MANHOLES	604.42	
	1			1		MGAL	DUST CONTROL WITH WATER	609.10	
	160			160		CY	STONE FILL, TYPE I	613.10	
	220			220		CY	STONE FILL, TYPE II	613.11	
	40			40		CY	STONE FILL, TYPE III	613.12	
270				270		LF	TEMPORARY TRAFFIC BARRIER	621.90	
500		Quantity seems low		500		HR	FLAGGERS	630.15	
1				1		LS	MOBILIZATION/DEMOBILIZATION	635.11	
1				1		LS	TRAFFIC CONTROL	641.10	
290				290		LF	TEMPORARY 4 INCH YELLOW LINE	646.610	
25				25		LF	TEMPORARY 24 INCH STOP BAR	646.680	
2				2		EACH	TEMPORARY RAILROAD CROSSING SYMBOL	646.710	
500				500		SY	GEOTEXTILE FOR ROADBED SEPARATOR	649.11	
	290			290		SY	GEOTEXTILE UNDER STONE FILL	649.31	
	900			900		SY	GEOTEXTILE FOR SILT FENCE	649.51	
	365			365		SY	GEOTEXTILE FOR SILT FENCE, WOVEN WIRE REINFORCED	649.515	
	150			150		SY	GEOTEXTILE FOR FILTER CURTAIN	649.61	
	35			35		LB	SEED	651.15	

DETAILED SUMMARY OF QUANTITIES

QUANTITIES	UNIT	ITEMS

Some of these items are to be installed under C1 and removed under C2. Do we need to specify this in the special provisions? Current specifications indicate payment for installation, removal, and restoration of existing areas.

Utility items? Done under contract or by utility companies?
Conduit
Trench Excavation
Trench Rock
Sand Borrow

PROJECT NAME: MIDDLEBURY
PROJECT NUMBER: WCRS (23)

FILE NAME: z10g044qs_p1.dgn
PROJECT LEADER: A.P. GUYETTE
DESIGNED BY: J.A. WHITMORE
QUANTITY SHEET #1

PLOT DATE: 10/18/2016
DRAWN BY: E.F. LAWES
CHECKED BY: G.S. GOODRICH

VHB 57603

STATE OF VERMONT
AGENCY OF TRANSPORTATION

QUANTITY SHEET 2

SUMMARY OF ESTIMATED QUANTITIES				TOTALS		DESCRIPTIONS			
ROADWAY	EROSION CONTROL	UTILITIES	RAILROAD ITEMS	GRAND TOTAL	FINAL	UNIT	ITEMS	ITEM NUMBER	ROUND
	275			275		LB	FERTILIZER	651.18	
	1.5			1.5		TON	AGRICULTURAL LIMESTONE	651.20	
	1.5			1.5		TON	HAY MULCH	651.25	
	240			240		CY	TOPSOIL	651.35	
	400			400		SY	GRUBBING MATERIAL	651.40	
	1			1		LS	EPSC PLAN	652.10	
	480			480		HR	MONITORING EPSC PLAN	652.20	
	1			1		LU	MAINTENANCE OF EPSC PLAN (N.A.B.I.)	652.30	
	360			360		SY	TEMPORARY EROSION MATTING	653.20	
	50			50		CY	VEHICLE TRACKING PAD	653.35	
	3			3		EACH	INLET PROTECTION DEVICE, TYPE I	653.40	
	4			4		EACH	FILTER BAG	653.45	
	1900			1900		LF	BARRIER FENCE	653.50	
	2000			2000		LF	PROJECT DEMARCATION FENCE	653.55	
85				85		SF	TRAFFIC SIGNS, TYPE A	675.20	
135				135		LF	SQUARE TUBE SIGN POST AND ANCHOR	675.341	
120				120		LF	ELECTRICAL CONDUIT (4" RIGID GALVANIZED STEEL)	678.21	
2				2		EACH	PULL BOX, STANDARD	678.25	
1				1		LU	PRICE ADJUSTMENT, FUEL (N.A.B.I.)	690.50	
1325				1325		EACH	SPECIAL PROVISION (MANAGEMENT AND DISPOSAL OF CONTAMINATED SOILS)	900.620	
361500				361500		GAL	SPECIAL PROVISION (MANAGEMENT AND DISPOSAL OF CONTAMINATED GROUNDWATER)	900.625	
		423		423		LF	SPECIAL PROVISION (MICROTUNNEL)	900.640	
		1		1		LS	SPECIAL PROVISION (MICROTUNNEL SHAFT CONSTRUCTION)(LAUNCH SHAFT 1)	900.645	
		1		1		LS	SPECIAL PROVISION (MICROTUNNEL SHAFT CONSTRUCTION)(RECEIVING SHAFT 1)	900.645	
		1		1		LS	SPECIAL PROVISION (MICROTUNNEL SHAFT CONSTRUCTION)(RECEIVING SHAFT 2)	900.645	
		1		1		LS	SPECIAL PROVISION (MICROTUNNEL SHAFT CONSTRUCTION)(RECEIVING SHAFT 3)	900.645	
		1		1		LS	SPECIAL PROVISION (MOBILIZATION OF MICROTUNNEL EQUIPMENT)	900.645	
			1	1		LS	SPECIAL PROVISION (PAVED RAIL-HIGHWAY CROSSING)	900.645	
		1		1		LS	SPECIAL PROVISION (REMOVE AND STORE FOUNTAIN)	900.645	
		1		1		LS	SPECIAL PROVISION (SURVEY, INSTRUMENTATION AND MONITORING)	900.645	
			1	1		LU	SPECIAL PROVISION (MAINTENANCE OF RAILROAD TRAFFIC)(N.A.B.I.)	900.650	
1				1		LU	SPECIAL PROVISION (MAT DENSITY PAY ADJUSTMENT, SMALL QUANTITY) (N.A.B.I.)	900.650	
1				1		LU	SPECIAL PROVISION (MIXTURE PAY ADJUSTMENT) (N.A.B.I.)	900.650	
295				295		TON	SPECIAL PROVISION (BITUMINOUS CONCRETE PAVEMENT, SMALL QUANTITY)	900.680	

DETAILED SUMMARY OF QUANTITIES

QUANTITIES	UNIT	ITEMS

Should check this against special provision for "reconstruct rail-highway crossing" for additional language that will likely be helpful.

Is this meant to include railroad flagger hours?

item not needed as most pavement is temporary and the contractor will be responsible for maintianing the surface condition of the detours. Statisitical cores will not be taken.

item not needed for 295 tons of mix.

PROJECT NAME: MIDDLEBURY
PROJECT NUMBER: WCRS (23)

FILE NAME: z10g044qs_p1.dgn
PROJECT LEADER: A.P. GUYETTE
DESIGNED BY: J.A. WHITMORE
QUANTITY SHEET #2

PLOT DATE: 10/18/2016
DRAWN BY: E.F. LAWES
CHECKED BY: G.S. GOODRICH

VHB 57603

GENERAL INFORMATION

SYMBOLOGY LEGEND NOTE

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

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

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

COMMON TOPOGRAPHIC POINT SYMBOLS

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

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

PROPOSED GEOMETRY CODES

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

UTILITY SYMBOLOGY

UNDERGROUND UTILITIES

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

ABOVE GROUND UTILITIES (AERIAL)

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

PROJECT CONSTRUCTION SYMBOLOGY

PROJECT DESIGN & LAYOUT SYMBOLOGY

CZ	CLEAR ZONE
	PLAN LAYOUT MATCHLINE

PROJECT CONSTRUCTION FEATURES

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

CONVENTIONAL BOUNDARY SYMBOLOGY

BOUNDARY LINES

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

EPSC LAYOUT PLAN SYMBOLOGY

EPSC MEASURES

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

ENVIRONMENTAL RESOURCES

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

ARCHEOLOGICAL & HISTORIC

ARCH	ARCHEOLOGICAL BOUNDARY
HISTORIC DIST	HISTORIC DISTRICT BOUNDARY
HISTORIC	HISTORIC AREA
H	HISTORIC STRUCTURE

CONVENTIONAL TOPOGRAPHIC SYMBOLOGY

EXISTING FEATURES

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

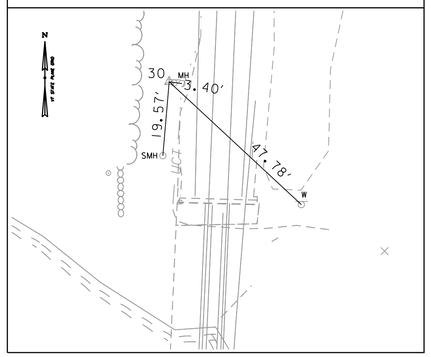
PROJECT NAME:	MIDDLEBURY
PROJECT NUMBER:	WCRS(23)
FILE NAME: z10g044LegendSheet_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: M.LONGSTREET
DESIGNED BY: M.LONGSTREET	CHECKED BY: M.LONGSTREET
CONVENTIONAL SYMBOLOGY LEGEND	SHEET 9 OF 116

VHB 57603

TRAVERSE TIES

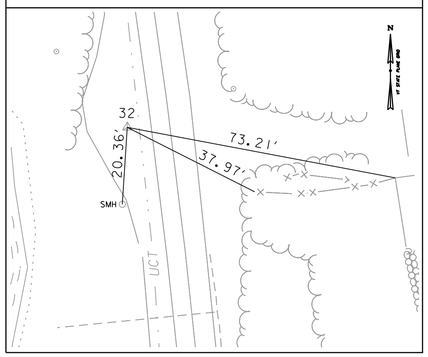
HVCTRL #30

NORTH = 551103.82
EAST = 1464954.18



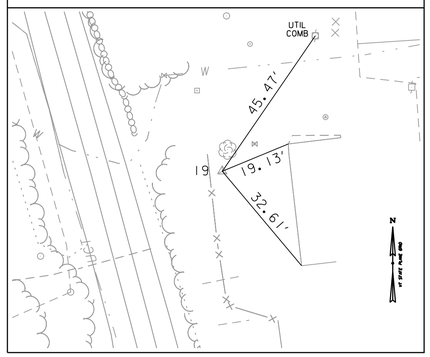
HVCTRL #32

NORTH = 551746.97
EAST = 1464950.79



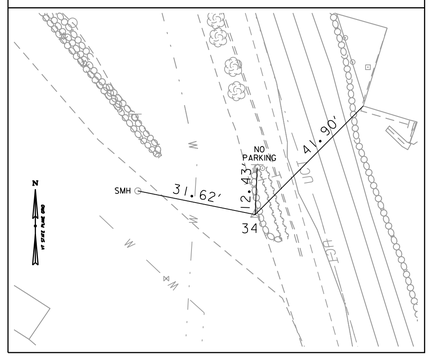
HVCTRL #19

NORTH = 552142.90
EAST = 1464910.03



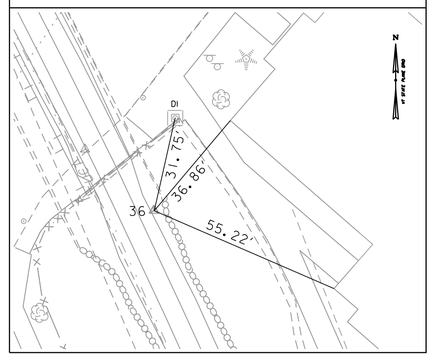
HVCTRL #34

NORTH = 552269.42
EAST = 1464815.75



HVCTRL #36

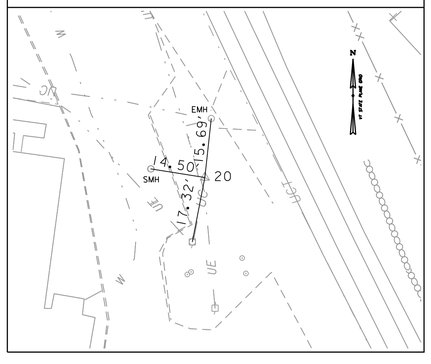
NORTH = 552596.18
EAST = 1464721.40



TRANSVERSE TIES

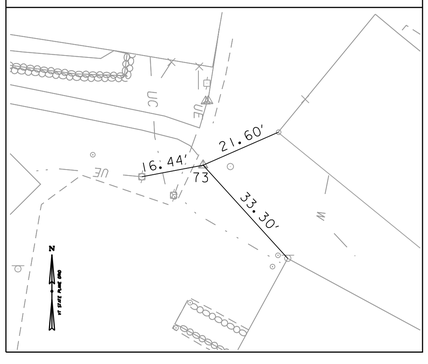
HVCTRL #20

NORTH = 552802.82
EAST = 1464581.94



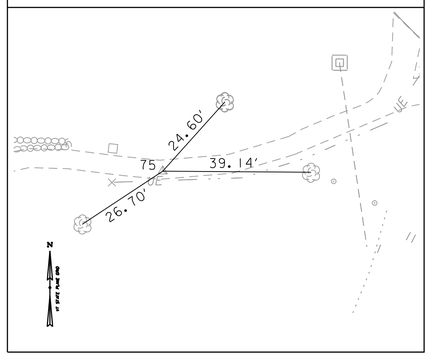
HVCTRL #73

NORTH = 552711.99
EAST = 1464545.58



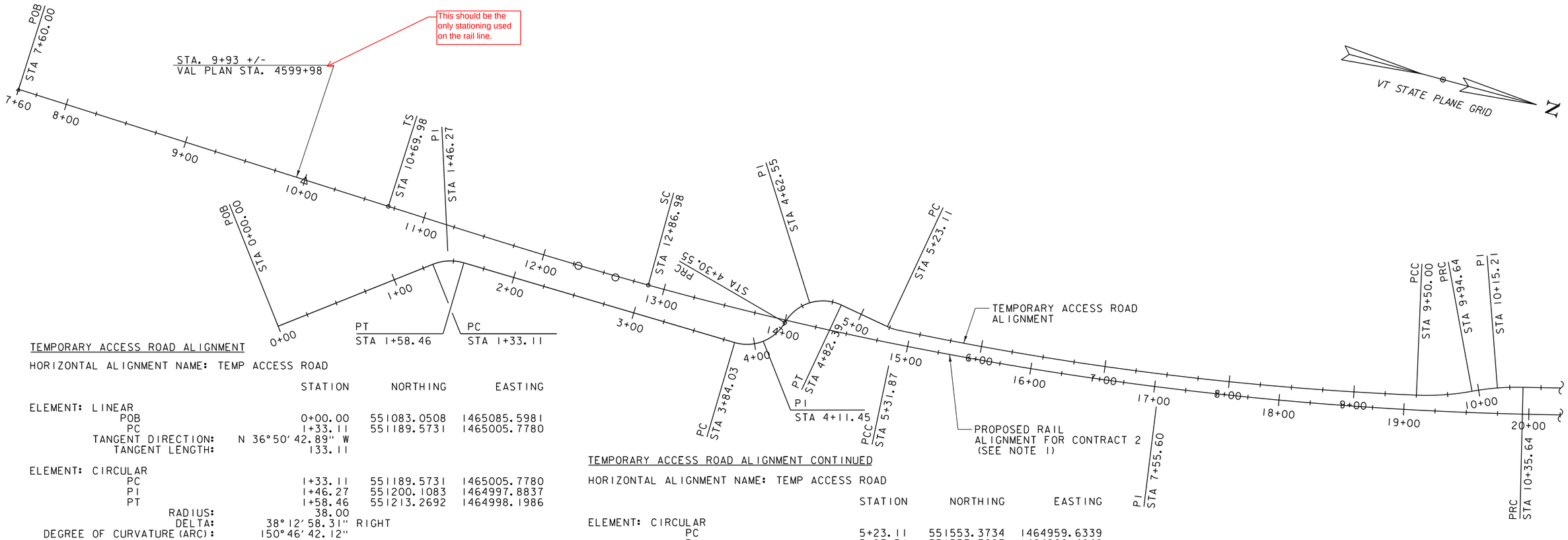
HVCTRL #75

NORTH = 552730.09
EAST = 1464355.52



PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044ti_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: B.J. MASSE
DESIGNED BY: B.J. MASSE	CHECKED BY: J.F. VEAR
TIE SHEET	SHEET 10 OF 116

VHB 57603.00



TEMPORARY ACCESS ROAD ALIGNMENT

HORIZONTAL ALIGNMENT NAME: TEMP ACCESS ROAD

	STATION	NORTHING	EASTING
ELEMENT: LINEAR			
POB	0+00.00	551083.0508	1465085.5981
PC	1+33.11	551189.5731	1465005.7780
TANGENT DIRECTION:	N 36°50′42.89″ W		
TANGENT LENGTH:	133.11		
ELEMENT: CIRCULAR			
PC	1+33.11	551189.5731	1465005.7780
PI	1+46.27	551200.1083	1464997.8837
PT	1+58.46	551213.2692	1464998.1986
RADIUS:	38.00		
DELTA:	38°12′58.31″ RIGHT		
DEGREE OF CURVATURE (ARC):	150°46′42.12″		
LENGTH:	25.35		
TANGENT:	13.16		
CHORD:	24.88		
MIDDLE ORDINATE:	2.09		
EXTERNAL:	2.22		
ELEMENT: LINEAR			
PT	1+58.46	551213.2692	1464998.1986
PC	3+84.03	551438.7782	1465003.5956
TANGENT DIRECTION:	N 1°22′15.42″ E		
TANGENT LENGTH:	225.57		
ELEMENT: CIRCULAR			
PC	3+84.03	551438.7782	1465003.5956
PI	4+11.45	551466.1937	1465004.2517
PRC	4+30.55	551473.3893	1464977.7891
RADIUS:	35.00		
DELTA:	76°09′33.12″ LEFT		
DEGREE OF CURVATURE (ARC):	163°42′08.02″		
LENGTH:	46.52		
TANGENT:	27.42		
CHORD:	43.17		
MIDDLE ORDINATE:	7.45		
EXTERNAL:	9.46		
ELEMENT: CIRCULAR			
PRC	4+30.55	551473.3893	1464977.7891
PI	4+62.55	551481.7841	1464946.9162
PT	4+82.39	551513.2848	1464952.5122
RADIUS:	35.00		
DELTA:	84°51′41.89″ RIGHT		
DEGREE OF CURVATURE (ARC):	163°42′08.02″		
LENGTH:	51.84		
TANGENT:	31.99		
CHORD:	47.23		
MIDDLE ORDINATE:	9.17		
EXTERNAL:	12.42		
ELEMENT: LINEAR			
PT	4+82.39	551513.2848	1464952.5122
PC	5+23.11	551553.3734	1464959.6339
TANGENT DIRECTION:	N 10°04′24.19″ E		
TANGENT LENGTH:	40.72		

TEMPORARY ACCESS ROAD ALIGNMENT CONTINUED

HORIZONTAL ALIGNMENT NAME: TEMP ACCESS ROAD

	STATION	NORTHING	EASTING
ELEMENT: CIRCULAR			
PC	5+23.11	551553.3734	1464959.6339
PI	5+27.51	551557.7087	1464960.4040
PCC	5+31.87	551562.1052	1464960.1624
RADIUS:	38.00		
DELTA:	13°13′08.25″ LEFT		
DEGREE OF CURVATURE (ARC):	150°46′42.12″		
LENGTH:	8.77		
TANGENT:	4.40		
CHORD:	8.75		
MIDDLE ORDINATE:	0.25		
EXTERNAL:	0.25		
ELEMENT: CIRCULAR			
PCC	5+31.87	551562.1052	1464960.1624
PI	7+41.41	551771.3292	1464948.6643
PCC	9+50.00	551975.8108	1464902.9023
RADIUS:	2530.00		
DELTA:	9°28′08.73″ LEFT		
DEGREE OF CURVATURE (ARC):	2°15′52.76″		
LENGTH:	418.13		
TANGENT:	209.54		
CHORD:	417.65		
MIDDLE ORDINATE:	8.63		
EXTERNAL:	8.66		
ELEMENT: CIRCULAR			
PCC	9+50.00	551975.8108	1464902.9023
PI	9+72.41	551997.6810	1464898.0079
PRC	9+94.64	552017.9254	1464888.3943
RADIUS:	200.00		
DELTA:	12°47′14.33″ LEFT		
DEGREE OF CURVATURE (ARC):	28°38′52.40″		
LENGTH:	44.64		
TANGENT:	22.41		
CHORD:	44.54		
MIDDLE ORDINATE:	1.24		
EXTERNAL:	1.25		

NOTE:

1. PROPOSED TEMPORARY ACCESS ROAD ALIGNMENT INFORMATION CONTINUED ON ALIGNMENT LAYOUT SHEET 2 OF 4.

40 0 40
SCALE IN FEET

vhb

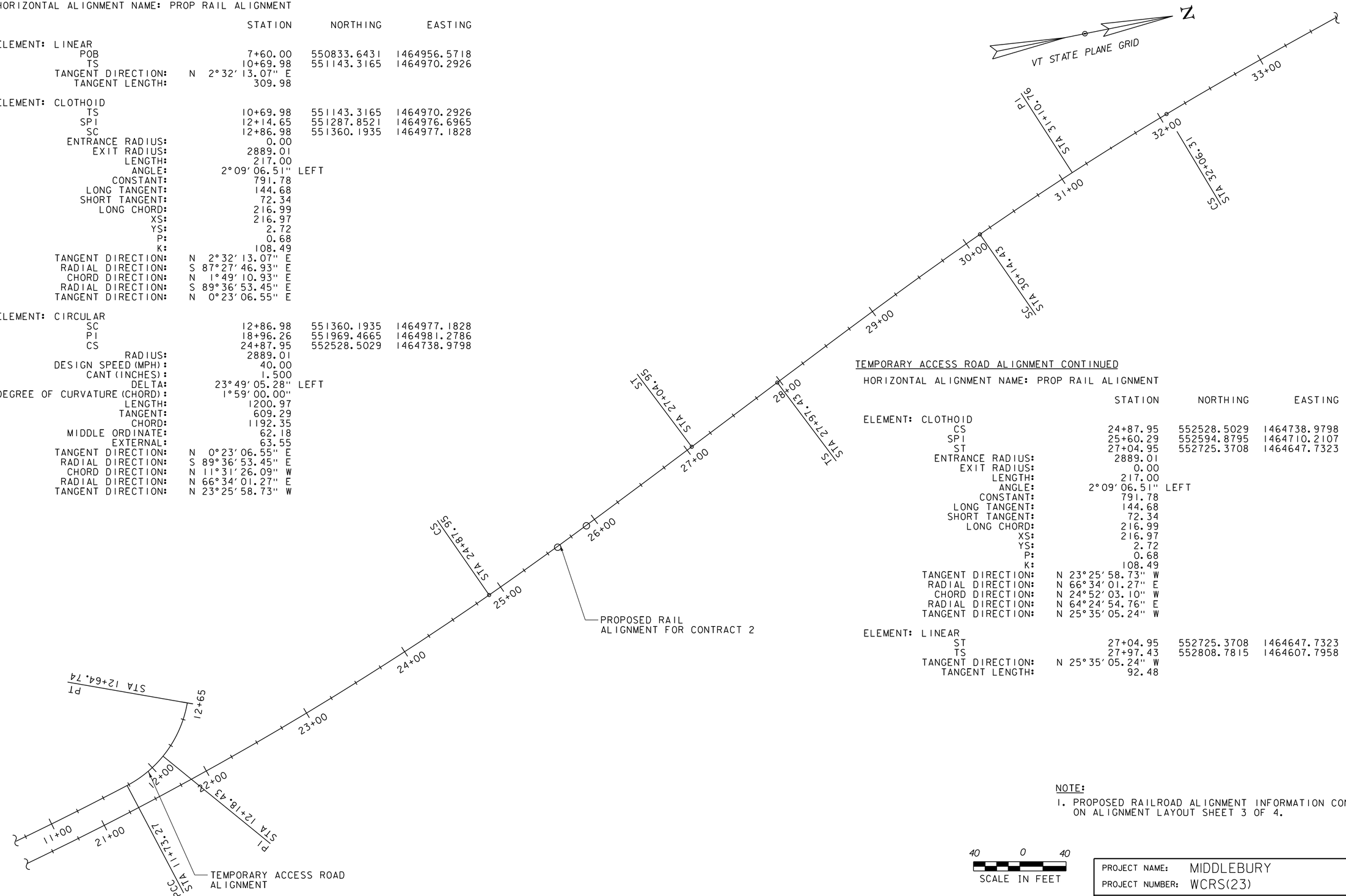
PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044align_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: B.J. MASSE
DESIGNED BY: J.A. WHITMORE	CHECKED BY: D.M. PECK
ALIGNMENT LAYOUT SHEET (1 OF 4)	SHEET 11 OF 116

VHB 57603

RAILROAD ALIGNMENT

HORIZONTAL ALIGNMENT NAME: PROP RAIL ALIGNMENT

	STATION	NORTHING	EASTING
ELEMENT: LINEAR			
POB	7+60.00	550833.6431	1464956.5718
TS	10+69.98	551143.3165	1464970.2926
TANGENT DIRECTION:	N 2°32′13.07″ E		
TANGENT LENGTH:	309.98		
ELEMENT: CLOTHOID			
TS	10+69.98	551143.3165	1464970.2926
SPI	12+14.65	551287.8521	1464976.6965
SC	12+86.98	551360.1935	1464977.1828
ENTRANCE RADIUS:	0.00		
EXIT RADIUS:	2889.01		
LENGTH:	217.00		
ANGLE:	2°09′06.51″ LEFT		
CONSTANT:	791.78		
LONG TANGENT:	144.68		
SHORT TANGENT:	72.34		
LONG CHORD:	216.99		
XS:	216.97		
YS:	2.72		
P:	0.68		
K:	108.49		
TANGENT DIRECTION:	N 2°32′13.07″ E		
RADIAL DIRECTION:	S 87°27′46.93″ E		
CHORD DIRECTION:	N 1°49′10.93″ E		
RADIAL DIRECTION:	S 89°36′53.45″ E		
TANGENT DIRECTION:	N 0°23′06.55″ E		
ELEMENT: CIRCULAR			
SC	12+86.98	551360.1935	1464977.1828
PI	18+96.26	551969.4665	1464981.2786
CS	24+87.95	552528.5029	1464738.9798
RADIUS:	2889.01		
DESIGN SPEED (MPH):	40.00		
CANT (INCHES):	1.500		
DELTA:	23°49′05.28″ LEFT		
DEGREE OF CURVATURE (CHORD):	1°59′00.00″		
LENGTH:	1200.97		
TANGENT:	609.29		
CHORD:	1192.35		
MIDDLE ORDINATE:	62.18		
EXTERNAL:	63.55		
TANGENT DIRECTION:	N 0°23′06.55″ E		
RADIAL DIRECTION:	S 89°36′53.45″ E		
CHORD DIRECTION:	N 11°31′26.09″ W		
RADIAL DIRECTION:	N 66°34′01.27″ E		
TANGENT DIRECTION:	N 23°25′58.73″ W		



TEMPORARY ACCESS ROAD ALIGNMENT CONTINUED

HORIZONTAL ALIGNMENT NAME: PROP RAIL ALIGNMENT

	STATION	NORTHING	EASTING
ELEMENT: CLOTHOID			
CS	24+87.95	552528.5029	1464738.9798
SPI	25+60.29	552594.8795	1464710.2107
ST	27+04.95	552725.3708	1464647.7323
ENTRANCE RADIUS:	2889.01		
EXIT RADIUS:	0.00		
LENGTH:	217.00		
ANGLE:	2°09′06.51″ LEFT		
CONSTANT:	791.78		
LONG TANGENT:	144.68		
SHORT TANGENT:	72.34		
LONG CHORD:	216.99		
XS:	216.97		
YS:	2.72		
P:	0.68		
K:	108.49		
TANGENT DIRECTION:	N 23°25′58.73″ W		
RADIAL DIRECTION:	N 66°34′01.27″ E		
CHORD DIRECTION:	N 24°52′03.10″ W		
RADIAL DIRECTION:	N 64°24′54.76″ E		
TANGENT DIRECTION:	N 25°35′05.24″ W		
ELEMENT: LINEAR			
ST	27+04.95	552725.3708	1464647.7323
TS	27+97.43	552808.7815	1464607.7958
TANGENT DIRECTION:	N 25°35′05.24″ W		
TANGENT LENGTH:	92.48		

NOTE:

1. PROPOSED RAILROAD ALIGNMENT INFORMATION CONTINUED ON ALIGNMENT LAYOUT SHEET 3 OF 4.

40 0 40
SCALE IN FEET

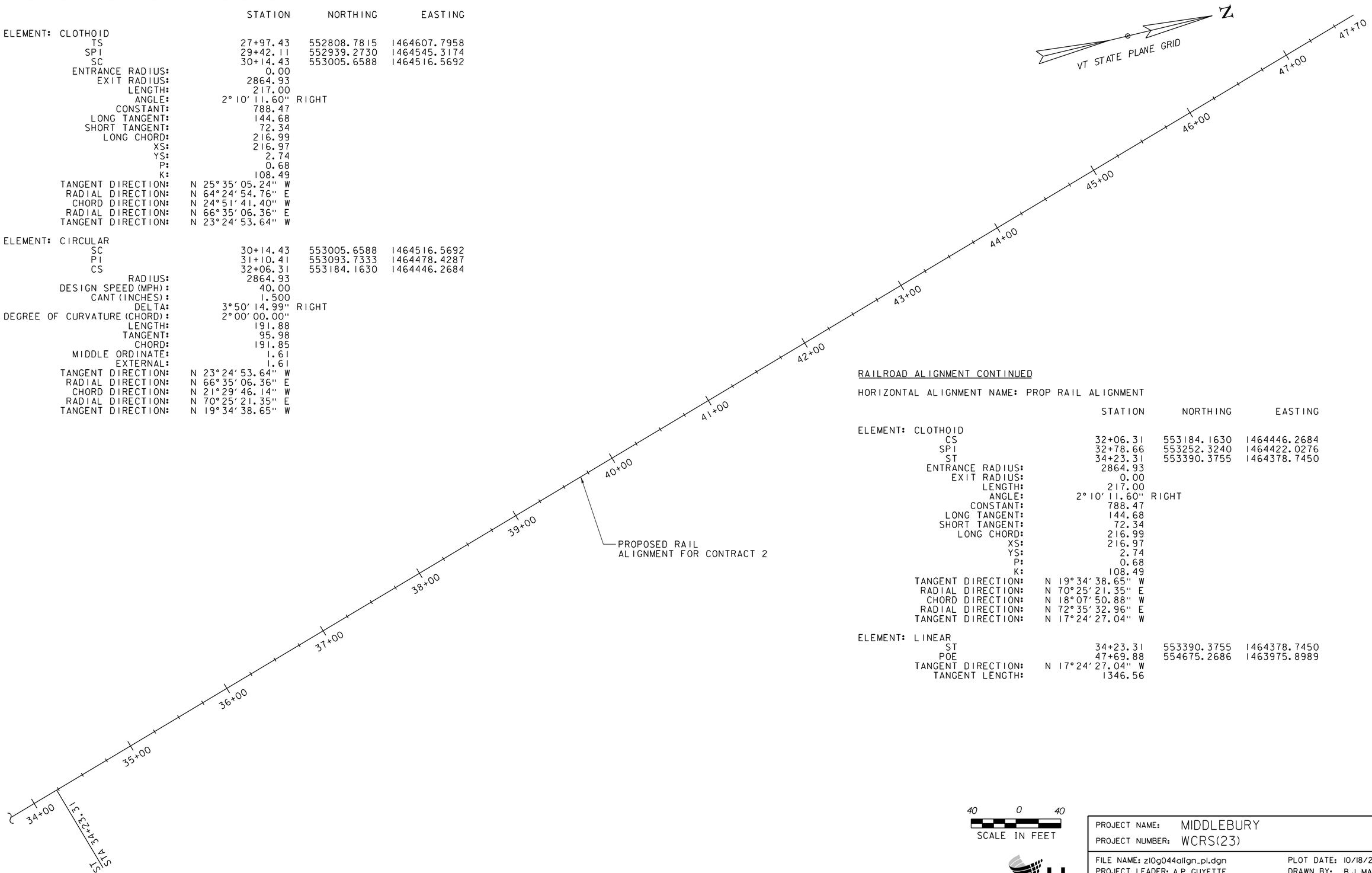
vhb

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044align_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: B.J. MASSE
DESIGNED BY: J.A. WHITMORE	CHECKED BY: D.M. PECK
ALIGNMENT LAYOUT SHEET (2 OF 4)	SHEET 12 OF 116

RAILROAD ALIGNMENT CONTINUED

HORIZONTAL ALIGNMENT NAME: PROP RAIL ALIGNMENT

	STATION	NORTHING	EASTING
ELEMENT: CLOTHOID			
TS	27+97.43	552808.7815	1464607.7958
SPI	29+42.11	552939.2730	1464545.3174
SC	30+14.43	553005.6588	1464516.5692
ENTRANCE RADIUS:	0.00		
EXIT RADIUS:	2864.93		
LENGTH:	217.00		
ANGLE:	2°10′11.60″ RIGHT		
CONSTANT:	788.47		
LONG TANGENT:	144.68		
SHORT TANGENT:	72.34		
LONG CHORD:	216.99		
XS:	216.97		
YS:	2.74		
P:	0.68		
K:	108.49		
TANGENT DIRECTION:	N 25°35′05.24″ W		
RADIAL DIRECTION:	N 64°24′54.76″ E		
CHORD DIRECTION:	N 24°51′41.40″ W		
RADIAL DIRECTION:	N 66°35′06.36″ E		
TANGENT DIRECTION:	N 23°24′53.64″ W		
ELEMENT: CIRCULAR			
SC	30+14.43	553005.6588	1464516.5692
PI	31+10.41	553093.7333	1464478.4287
CS	32+06.31	553184.1630	1464446.2684
RADIUS:	2864.93		
DESIGN SPEED (MPH):	40.00		
CANT (INCHES):	1.500		
DELTA:	3°50′14.99″ RIGHT		
DEGREE OF CURVATURE (CHORD):	2°00′00.00″		
LENGTH:	191.88		
TANGENT:	95.98		
CHORD:	191.85		
MIDDLE ORDINATE:	1.61		
EXTERNAL:	1.61		
TANGENT DIRECTION:	N 23°24′53.64″ W		
RADIAL DIRECTION:	N 66°35′06.36″ E		
CHORD DIRECTION:	N 21°29′46.14″ W		
RADIAL DIRECTION:	N 70°25′21.35″ E		
TANGENT DIRECTION:	N 19°34′38.65″ W		



RAILROAD ALIGNMENT CONTINUED

HORIZONTAL ALIGNMENT NAME: PROP RAIL ALIGNMENT

	STATION	NORTHING	EASTING
ELEMENT: CLOTHOID			
CS	32+06.31	553184.1630	1464446.2684
SPI	32+78.66	553252.3240	1464422.0276
ST	34+23.31	553390.3755	1464378.7450
ENTRANCE RADIUS:	2864.93		
EXIT RADIUS:	0.00		
LENGTH:	217.00		
ANGLE:	2°10′11.60″ RIGHT		
CONSTANT:	788.47		
LONG TANGENT:	144.68		
SHORT TANGENT:	72.34		
LONG CHORD:	216.99		
XS:	216.97		
YS:	2.74		
P:	0.68		
K:	108.49		
TANGENT DIRECTION:	N 19°34′38.65″ W		
RADIAL DIRECTION:	N 70°25′21.35″ E		
CHORD DIRECTION:	N 18°07′50.88″ W		
RADIAL DIRECTION:	N 72°35′32.96″ E		
TANGENT DIRECTION:	N 17°24′27.04″ W		
ELEMENT: LINEAR			
ST	34+23.31	553390.3755	1464378.7450
POE	47+69.88	554675.2686	1463975.8989
TANGENT DIRECTION:	N 17°24′27.04″ W		
TANGENT LENGTH:	1346.56		

40 0 40
SCALE IN FEET

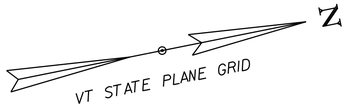
vhb

PROJECT NAME: MIDDLEBURY
PROJECT NUMBER: WCRS(23)

FILE NAME: z10g044align_pl.dgn
PROJECT LEADER: A.P. GUYETTE
DESIGNED BY: J.A. WHITMORE
ALIGNMENT LAYOUT SHEET (3 OF 4)

PLOT DATE: 10/18/2016
DRAWN BY: B.J. MASSE
CHECKED BY: D.M. PECK
SHEET 13 OF 116

VHB 57603



OUTFALL MAINTENANCE ROAD ALIGNMENT

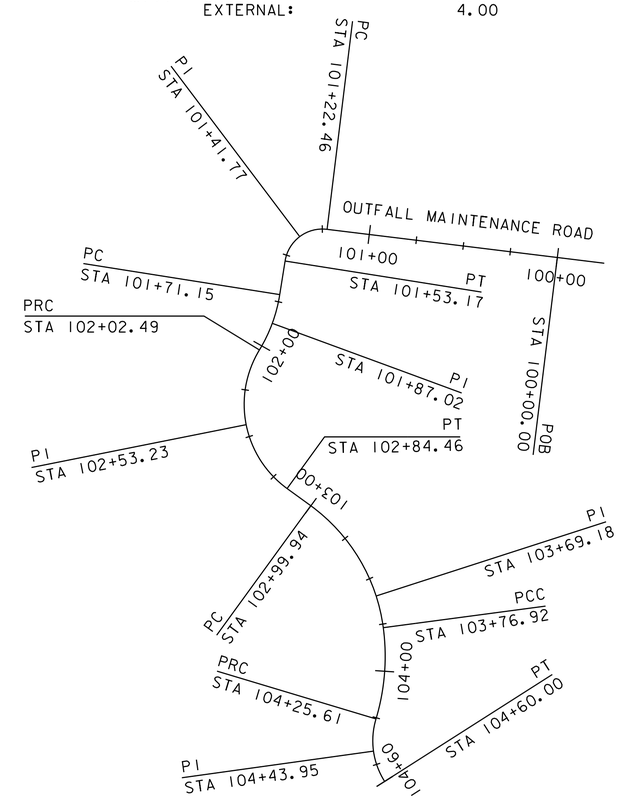
HORIZONTAL ALIGNMENT NAME: CONSTRUCTION ACCESS OUTFALL

	STATION	NORTHING	EASTING
ELEMENT: LINEAR			
POB	100+00.00	552793.7141	1464184.2643
PC	101+22.46	552677.4432	1464145.8276
TANGENT DIRECTION:	S 18°17′34.10″ W		
TANGENT LENGTH:	122.46		
ELEMENT: CIRCULAR			
PC	101+22.46	552677.4432	1464145.8276
PI	101+41.77	552659.1077	1464139.7662
PT	101+53.17	552652.4079	1464157.8783
RADIUS:	20.00		
DELTA:	87°59′35.31″ LEFT		
DEGREE OF CURVATURE (ARC):	286°28′44.03″		
LENGTH:	30.72		
TANGENT:	19.31		
CHORD:	27.78		
MIDDLE ORDINATE:	5.61		
EXTERNAL:	7.80		
ELEMENT: LINEAR			
PT	101+53.17	552652.4079	1464157.8783
PC	101+71.15	552646.1704	1464174.7409
TANGENT DIRECTION:	S 69°42′01.21″ E		
TANGENT LENGTH:	17.98		
ELEMENT: CIRCULAR			
PC	101+71.15	552646.1704	1464174.7409
PI	101+87.02	552640.6648	1464189.6247
PRC	102+02.49	552629.8948	1464201.2799
RADIUS:	80.00		
DELTA:	22°26′23.85″ RIGHT		
DEGREE OF CURVATURE (ARC):	71°37′11.01″		
LENGTH:	31.33		
TANGENT:	15.87		
CHORD:	31.13		
MIDDLE ORDINATE:	1.53		
EXTERNAL:	1.56		
ELEMENT: CIRCULAR			
PRC	102+02.49	552629.8948	1464201.2799
PI	102+53.23	552595.4540	1464238.5512
PT	102+84.46	552629.8395	1464275.8735
RADIUS:	55.00		
DELTA:	85°23′39.96″ LEFT		
DEGREE OF CURVATURE (ARC):	104°10′26.92″		
LENGTH:	81.97		
TANGENT:	50.75		
CHORD:	74.59		
MIDDLE ORDINATE:	14.58		
EXTERNAL:	19.84		
ELEMENT: LINEAR			
PT	102+84.46	552629.8395	1464275.8735
PC	102+99.94	552640.3262	1464287.2557
TANGENT DIRECTION:	N 47°20′42.69″ E		
TANGENT LENGTH:	15.48		
ELEMENT: CIRCULAR			
PC	102+99.94	552640.3262	1464287.2557
PI	103+40.68	552667.9361	1464317.2237
PCC	103+76.92	552665.2522	1464357.8831
RADIUS:	95.00		
DELTA:	46°25′53.07″ RIGHT		
DEGREE OF CURVATURE (ARC):	60°18′40.85″		
LENGTH:	76.99		
TANGENT:	40.75		
CHORD:	74.90		
MIDDLE ORDINATE:	7.69		
EXTERNAL:	8.37		

OUTFALL MAINTENANCE ROAD ALIGNMENT CONTINUED

HORIZONTAL ALIGNMENT NAME: CONSTRUCTION ACCESS OUTFALL

	STATION	NORTHING	EASTING
ELEMENT: CIRCULAR			
PCC	103+76.92	552665.2522	1464357.8831
PI	104+01.64	552663.6242	1464382.5456
PRC	104+25.61	552652.0070	1464404.3614
RADIUS:	115.00		
DELTA:	24°15′33.70″ RIGHT		
DEGREE OF CURVATURE (ARC):	49°49′20.70″		
LENGTH:	48.69		
TANGENT:	24.72		
CHORD:	48.33		
MIDDLE ORDINATE:	2.57		
EXTERNAL:	2.63		
ELEMENT: CIRCULAR			
PRC	104+25.61	552652.0070	1464404.3614
PI	104+43.95	552643.3882	1464420.5464
PT	104+60.00	552650.0250	1464437.6400
RADIUS:	40.00		
DELTA:	49°15′18.86″ LEFT		
DEGREE OF CURVATURE (ARC):	143°14′22.02″		
LENGTH:	34.39		
TANGENT:	18.34		
CHORD:	33.34		
MIDDLE ORDINATE:	3.64		
EXTERNAL:	4.00		



PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044align_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: B.J. MASSE
DESIGNED BY: J.A. WHITMORE	CHECKED BY: D.M. PECK
ALIGNMENT LAYOUT SHEET (4 OF 4)	SHEET 14 OF 116

VHB 57603

VT STATE PLANE GRID

N

T1 STA. 0+50.0, 15.5′ RT - STA. 0+50.0. 16.8′ LT
CONST. 32 LF x 12" CPEP
12" INV. ELEV. AT STA. 0+50.0, 15.5′ RT = 348.68
12" INV. ELEV. AT STA. 0+50.0, 16.8′ LT = 347.88

T2 STA. 3+41.0, 8.6′ LT - STA. 3+41.5, 13.6′ LT
CONST. 5 LF x 12" CPEP
MATCH EXISTING INV. AT STA. 3+41.0, 8.6′ LT
12" INV. ELEV. AT STA. 3+41.5, 13.6′ LT = 350.20

T3 STA. 4+22.6, 10.3′ RT - STA. 3+90.0, 12.7′ LT
CONST. 37 LF x 12" CPEP
12" INV. ELEV. AT STA. 4+22.6, 10.3′ RT = 350.45
12" INV. ELEV. AT STA. 4+90.0, 12.7′ LT = 350.40

TEMPORARY TRAFFIC BARRIER (CONTRACT 2)
STA. 0+10.0, 11′ LT - STA. 0+10.0, 11.0′ RT
STA. 4+10.9, 9.1′ LT - STA. 4+10.9, 9.0′ RT
STA. 4+44.4, 9.2′ LT - STA. 4+44.4, 10.0′ RT

TRAFFIC SIGNS TYPE A
STA. 0+52.5, RT (3)
STA. 0+99, RT
STA. 3+50.8, RT (3)
STA. 3+99.8, RT
STA. 4+59.6, LT

ELECTRICAL CONDUIT (4" RIGID GALVANIZED STEEL)
STA. 4+07.3, LT & RT
STA. 4+24.2, LT & RT
STA. 4+35.0, LT & RT

PULL BOX, STANDARD
STA. 4+11.7, LT
STA. 4+26.4, LT

ENERGY ABSORPTION ATTENUATOR (CONTRACT 2)
STA. 1+56, LT
STA. 4+05, LT
STA. 4+36, LT
STA. 4+52, RT

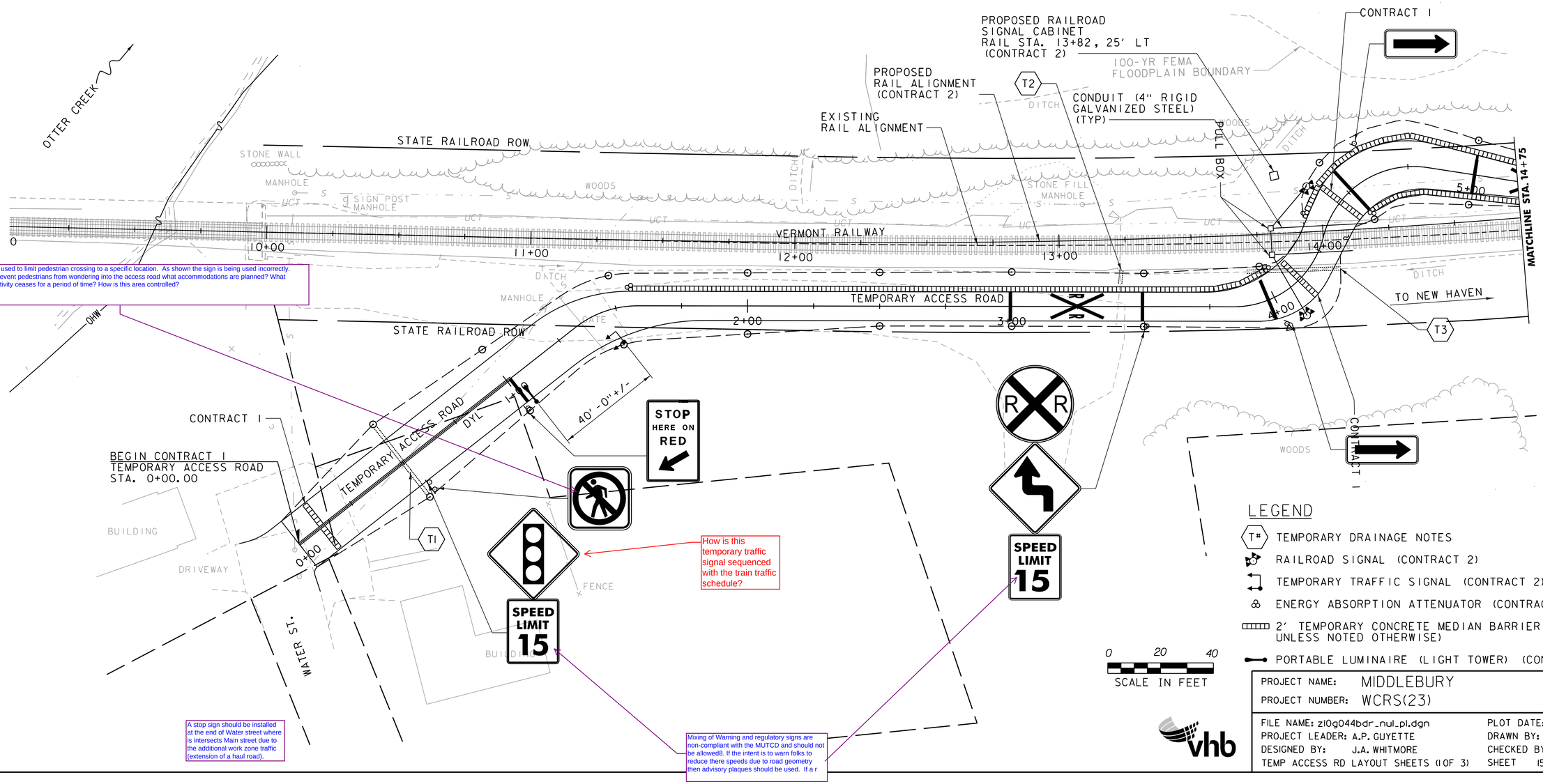
TEMPORARY 24 INCH STOP BAR
STA. 1+01.0, 0.0′ LT - 11.0′RT

TEMPORARY 4 INCH YELLOW LINE
STA. 00+00 - 1+02, LT & RT

PAVED RAIL-HIGHWAY CROSSING CROSSING
STA. 3+50, LT & RT
STA. 5+00, LT & RT

Pavement will need to be placed as part of C2 so will markings

why including items specific to C2?



This sign is specifically used to limit pedestrian crossing to a specific location. As shown the sign is being used incorrectly. If the contractor is to prevent pedestrians from wondering into the access road what accommodations are planned? What happens when work activity ceases for a period of time? How is this area controlled?

How is this temporary traffic signal sequenced with the train traffic schedule?

A stop sign should be installed at the end of Water street where is intersects Main street due to the additional work zone traffic (extension of a haul road).

Mixing of Warning and regulatory signs are non-compliant with the MUTCD and should not be allowed8. If the intent is to warn folks to reduce there speeds due to road geometry then advisory plaques should be used. If a r

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044bdr_nul_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: K.D. WENTWORTH
DESIGNED BY: J.A. WHITMORE	CHECKED BY: G.S. GOODRICH
TEMP ACCESS RD LAYOUT SHEETS (1 OF 3)	SHEET 15 OF 116

VHB 57603

T4 STA. 7+50.0, 8.5' RT - STA. 7+50.0, 12.2' LT
CONST. 20 LF x 12" CPEP
12"INV. AT OUTLET ELEV. = 347.07
CONST. DI WITH TYPE D GRATE AND FRAME AT STA. 7+50.0, 8.5' RT
12"INV. OUT = 347.76
TOP GRATE ELEV. = 349.88

T5 STA. 8+66.9, 10.7' LT - STA. 8+67.7, 17.6' LT
CONST. 5 LF x 12" CPEP
MATCH EXISTING INV. AT STA. 8+66.9, 10.7' LT
GRADE TO DAYLIGHT

T6 STA. 9+00.0, 8.5' RT - STA. 9+00.0, 11.9' LT
CONST. 20 LF x 12" CPEP
12" INV. AT OUTLET ELEV. = 347.09
CONST. DI WITH TYPE D GRATE AND FRAME AT STA. 9+00.0, 8.5' RT
12" INV. OUT = 347.28
TOP OF GRATE = 349.46

STONE FILL, TYPE I
STA. 7+00 TO STA. 10+88, LT

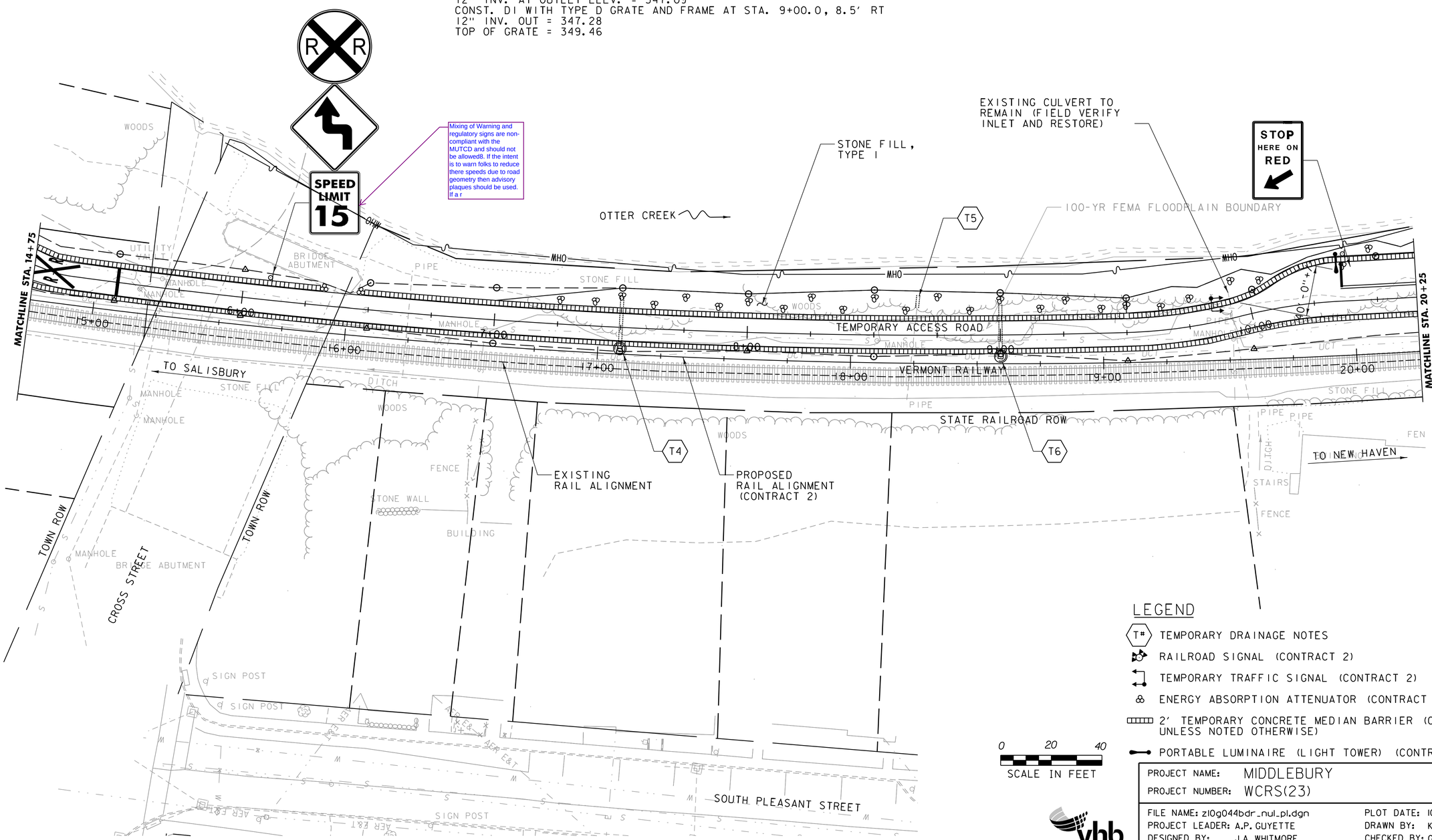
TRAFFIC SIGNS TYPE A
STA. 6+10.0, LT (3)
STA. 10+38.5, LT

ENERGY ABSORPTION ATTENUATOR (CONTRACT 2)
STA. 6+32, LT
STA. 6+46, LT

TEMPORARY 24 INCH STOP BAR
STA. 10+36.9, 5.5' LT - 17.0' LT

TEMPORARY 4 INCH YELLOW LINE
STA. 10+36 - 10+50, LT & RT

ADJUST ELEVATION OF MANHOLES
STA. 5+60, 1.7' RT, ELEV. = 350.78
STA. 5+68, 3.4' LT, ELEV. = 350.53
STA. 6+97, 4.0' RT, ELEV. = 350.47
STA. 8+51, 2.4' RT, ELEV. = 349.71
STA. 9+92, 4.2' RT, ELEV. = 349.16



LEGEND

- T# TEMPORARY DRAINAGE NOTES
- RAILROAD SIGNAL (CONTRACT 2)
- TEMPORARY TRAFFIC SIGNAL (CONTRACT 2)
- ENERGY ABSORPTION ATTENUATOR (CONTRACT 2)
- 2' TEMPORARY CONCRETE MEDIAN BARRIER (CONTRACT 2 UNLESS NOTED OTHERWISE)
- PORTABLE LUMINAIRE (LIGHT TOWER) (CONTRACT 2)

0 20 40
SCALE IN FEET

vhb

PROJECT NAME: MIDDLEBURY
PROJECT NUMBER: WCRS(23)

FILE NAME: z10g044bdr_nul_pl.dgn
PROJECT LEADER: A.P. GUYETTE
DESIGNED BY: J.A. WHITMORE
TEMP ACCESS RD LAYOUT SHEETS (2 OF 3)
PLOT DATE: 10/18/2016
DRAWN BY: K.D. WENTWORTH
CHECKED BY: G.S. GOODRICH
SHEET 16 OF 116

VHB 57603

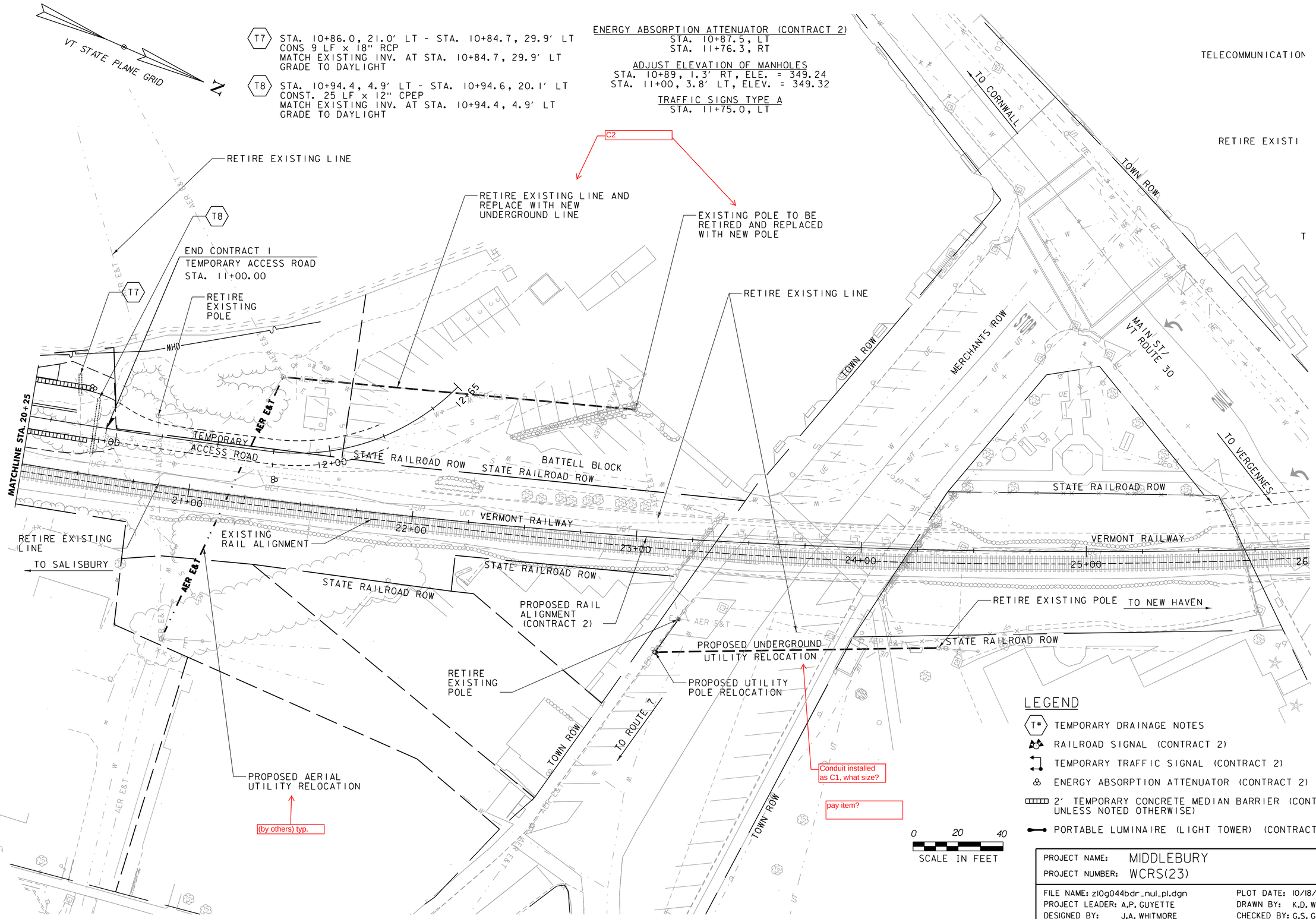
T7 STA. 10+86.0, 21.0' LT - STA. 10+84.7, 29.9' LT
CONS 9 LF x 18" RCP
MATCH EXISTING INV. AT STA. 10+84.7, 29.9' LT
GRADE TO DAYLIGHT

T8 STA. 10+94.4, 4.9' LT - STA. 10+94.6, 20.1' LT
CONST. 25 LF x 12" CPEP
MATCH EXISTING INV. AT STA. 10+94.4, 4.9' LT
GRADE TO DAYLIGHT

ENERGY ABSORPTION ATTENUATOR (CONTRACT 2)
STA. 10+87.5, LT
STA. 11+76.3, RT

ADJUST ELEVATION OF MANHOLES
STA. 10+89, 1.3' RT, ELE. = 349.24
STA. 11+00, 3.8' LT, ELEV. = 349.32

TRAFFIC SIGNS TYPE A
STA. 11+75.0, LT

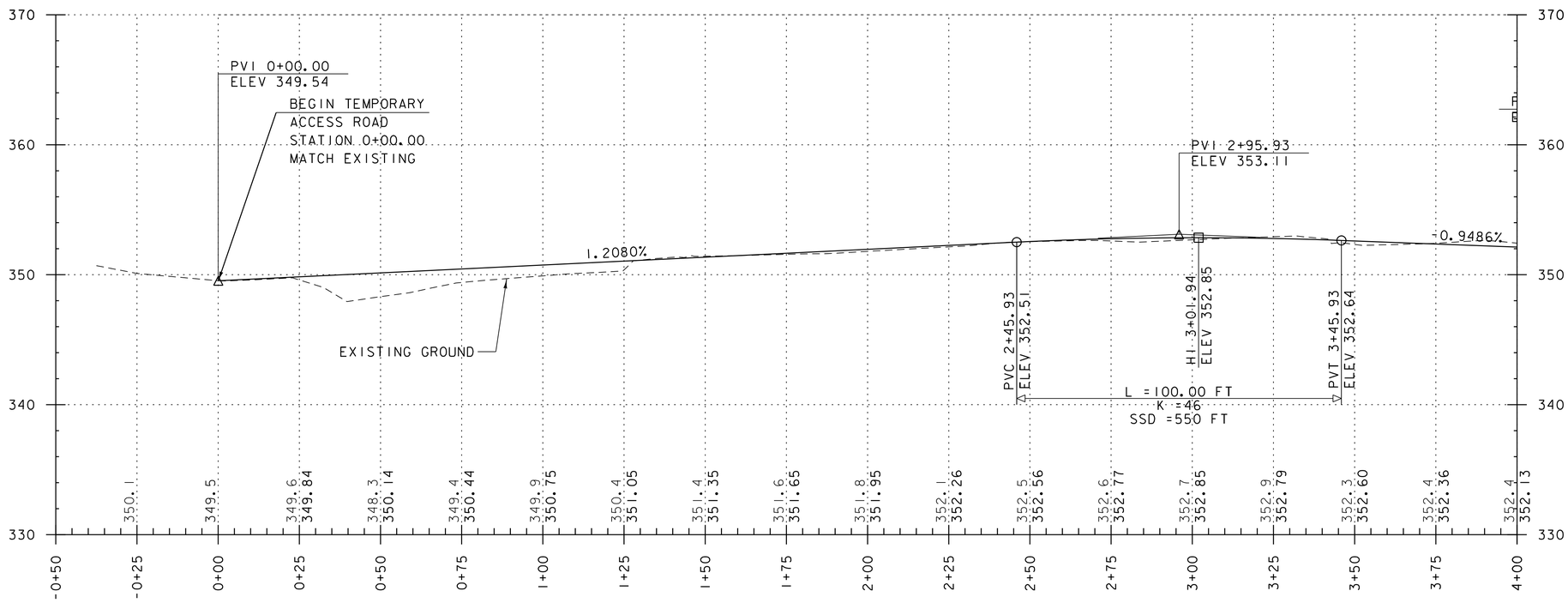


LEGEND

- T# TEMPORARY DRAINAGE NOTES
- RAILROAD SIGNAL (CONTRACT 2)
- TEMPORARY TRAFFIC SIGNAL (CONTRACT 2)
- ENERGY ABSORPTION ATTENUATOR (CONTRACT 2)
- 2' TEMPORARY CONCRETE MEDIAN BARRIER (CONTRACT 2 UNLESS NOTED OTHERWISE)
- PORTABLE LUMINAIRE (LIGHT TOWER) (CONTRACT 2)

PROJECT NAME: MIDDLEBURY
PROJECT NUMBER: WCRS(23)

FILE NAME: z10g044bdr_nul_pl.dgn
PROJECT LEADER: A.P. GUYETTE
DESIGNED BY: J.A. WHITMORE
TEMP ACCESS RD LAYOUT SHEETS (3 OF 3)
PLOT DATE: 10/18/2016
DRAWN BY: K.D. WENTWORTH
CHECKED BY: G.S. GOODRICH
SHEET 17 OF 116



TEMPORARY ACCESS ROAD PROFILE

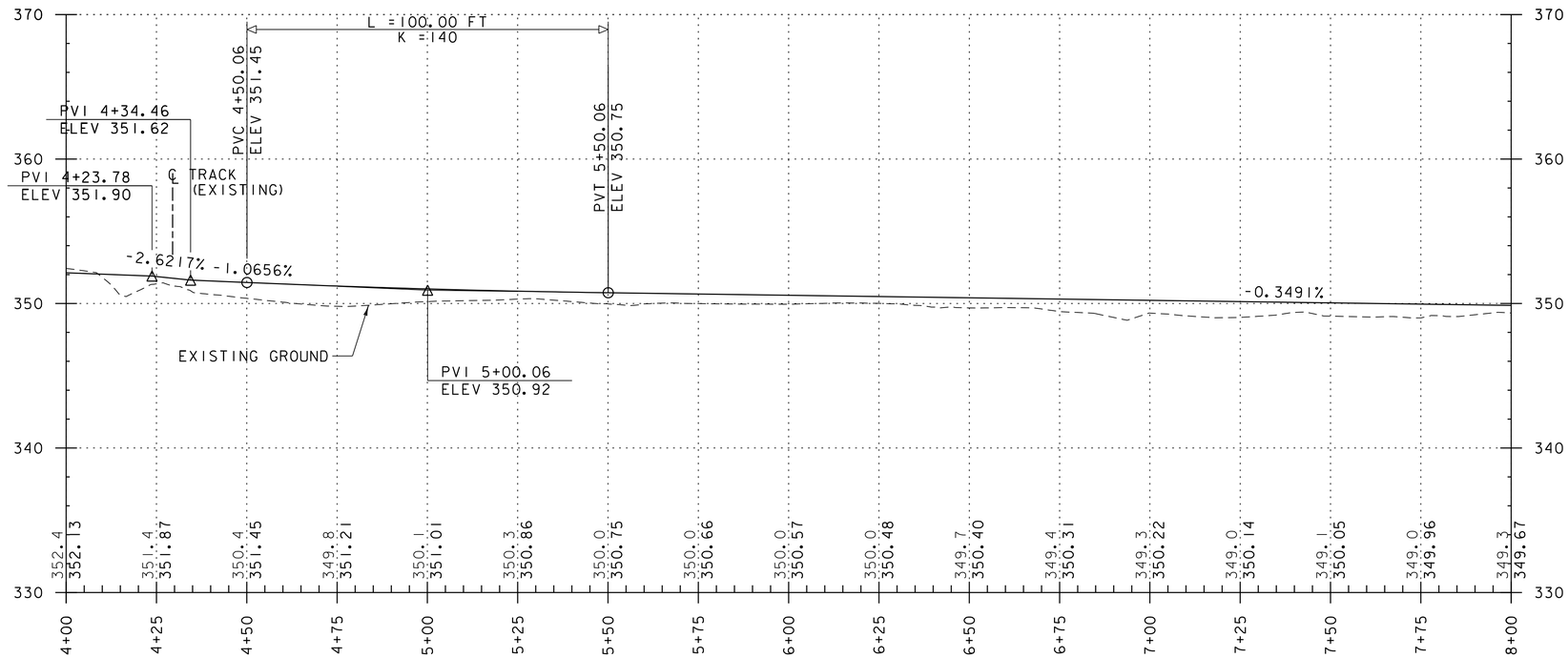
STA. 0+00 - 4+00
SCALE 1" = 20' HORIZONTAL
1" = 10' VERTICAL

NOTE:

GRADES SHOWN TO THE NEAREST TENTH ARE EXISTING GROUND ALONG ℄
GRADES SHOWN TO THE NEAREST HUNDREDTH ARE THE FINISHED GRADE ALONG ℄

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044pro_access_rd_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: K.D. WENTWORTH
DESIGNED BY: J.A. WHITMORE	CHECKED BY: D.M. PECK
PROFILE SHEET (1 OF 3)	SHEET 18 OF 116

VHB 57603



TEMPORARY ACCESS ROAD PROFILE

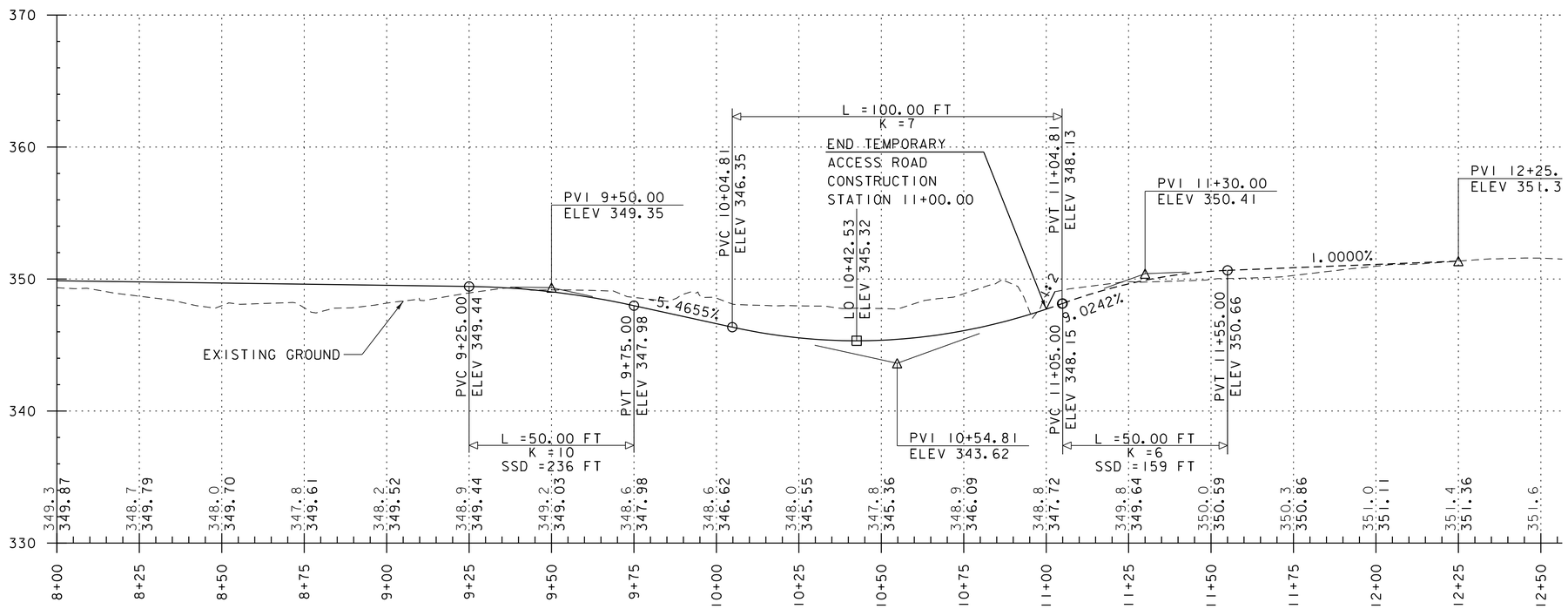
STA. 4+00 - 8+00
SCALE 1" = 20' HORIZONTAL
1" = 10' VERTICAL

NOTE:

GRADES SHOWN TO THE NEAREST TENTH ARE EXISTING GROUND ALONG ℄
GRADES SHOWN TO THE NEAREST HUNDREDTH ARE THE FINISHED GRADE ALONG ℄

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044pro_access_rd_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: K.D. WENTWORTH
DESIGNED BY: J.A. WHITMORE	CHECKED BY: D.M. PECK
PROFILE SHEET (2 OF 3)	SHEET 19 OF 116

VHB 57603



TEMPORARY ACCESS ROAD PROFILE

STA. 8+00 - 12+25
SCALE 1" = 20' HORIZONTAL
1" = 10' VERTICAL

NOTE:

GRADES SHOWN TO THE NEAREST TENTH ARE EXISTING GROUND ALONG ℄
GRADES SHOWN TO THE NEAREST HUNDREDTH ARE THE FINISHED GRADE ALONG ℄

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044pro_access_rd_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: K.D. WENTWORTH
DESIGNED BY: J.A. WHITMORE	CHECKED BY: D.M. PECK
PROFILE SHEET (3 OF 3)	SHEET 20 OF 116

VHB 57603

STATE OF VERMONT
AGENCY OF TRANSPORTATION

TRAFFIC SIGN SUMMARY SHEET

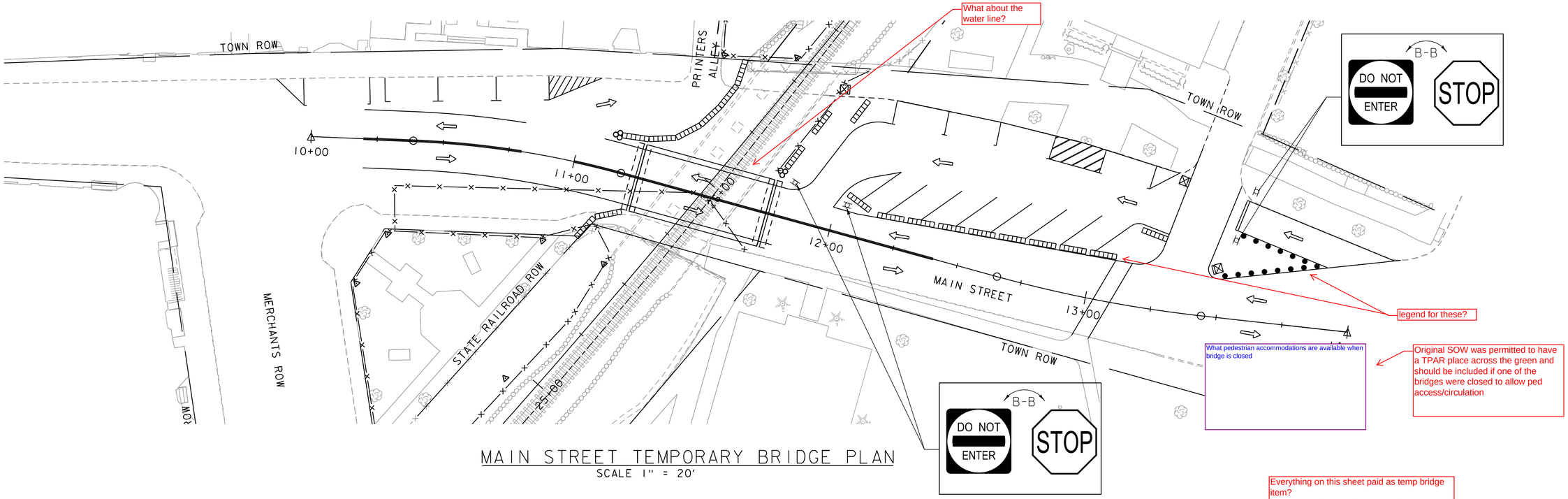
advisory plaque 18x18 (W13-1P)

MILE MARKER, STATION, OR SIGN NUMBER	SIGN LEGEND	SIGN DIMENSIONS EA	SIGN DIMENSIONS WIDTH (IN)	SIGN DIMENSIONS HEIGHT (IN)	NEW & SALVAGED SIGNS "A"	NEW & SALVAGED SIGNS "B"	NEW & SALVAGED SIGNS SALV SIGN	NEW & SALVAGED SIGNS SALV TIS	EXIST POST RETAIN	EXIST POST SALVAGE	NEW SIGN POSTS NO. OF POSTS	FLANGED CHANNEL LB/FT 1.12	FLANGED CHANNEL LB/FT 2.0	FLANGED CHANNEL LB/FT 3.0	SQUARE STEEL (IN) LB/FT 1.75	SQUARE STEEL (IN) LB/FT 2.0	SQUARE STEEL (IN) LB/FT 2.5	ANCHOR	SLEEVE	TUBULAR ALUMINUM Ø (IN) LB/FT 3.0	TUBULAR ALUMINUM Ø (IN) LB/FT 4.0	TUBULAR ALUMINUM Ø (IN) LB/FT 4.0 MOD	FOUND-ATION	TUBULAR STEEL Ø (IN) LB/FT 3.0	TUBULAR STEEL Ø (IN) LB/FT 3.5	TUBULAR STEEL Ø (IN) LB/FT 4.0	TUBULAR STEEL Ø (IN) LB/FT 5.0	W-SHAPE STEEL FTG. SIZE 24"	W-SHAPE STEEL FTG. SIZE 30"	W-SHAPE STEEL WEIGHT	W-SHAPE STEEL POST SIZE	SIGN FRAME REQUIRED	REMARKS	SIGN DETAIL DETAIL ON SHEET NUMBER	SIGN DETAIL STD. SHEET NUMBER
											OPTION ITEMS																									
TEMPORARY ACCESS ROAD																																				
0+07, RT 3+51, RT 6+10, LT		3	24	30	15.0						1					X		X															R2-1(15)		SHSM
1+08, RT 10+38, LT		2	24	36	12.0						2					X		X															R10-6		SHSM
4+00, RT 4+60, LT		2	48	24	16.0						2					X		X															W1-6R		SHSM
3+51, RT 6+10, LT		2	30	30	12.5						0																						W1-3		SHSM
0+07, RT		1	30	30	6.25						0																						W3-3		SHSM
3+51, RT 6+10, LT		2	36		14.14						2																						W10-1, 36" DIA.		SHSM
0+07, RT 11+75, LT		2	18	18	4.5						2					X		X															R9-3		SHSM
AVERAGE POST LENGTH = 15 FEET 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 135	FT		EA	LB	LB	LB		LB	LB	LB	LB						SHSM = STANDARD HIGHWAY SIGNS AND MARKINGS BOOK		
			TOTALS		SF 80.39	SF	EA.	SF			FT				FT 135				LB			EA.	LB				EA.	EA.	LB					

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044tcpl_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: K.D. WENTWORTH
DESIGNED BY: J.A. WHITMORE	CHECKED BY: C. BOBAY
TRAFFIC SIGN SUMMARY SHEET	SHEET 21 OF 116

vhb

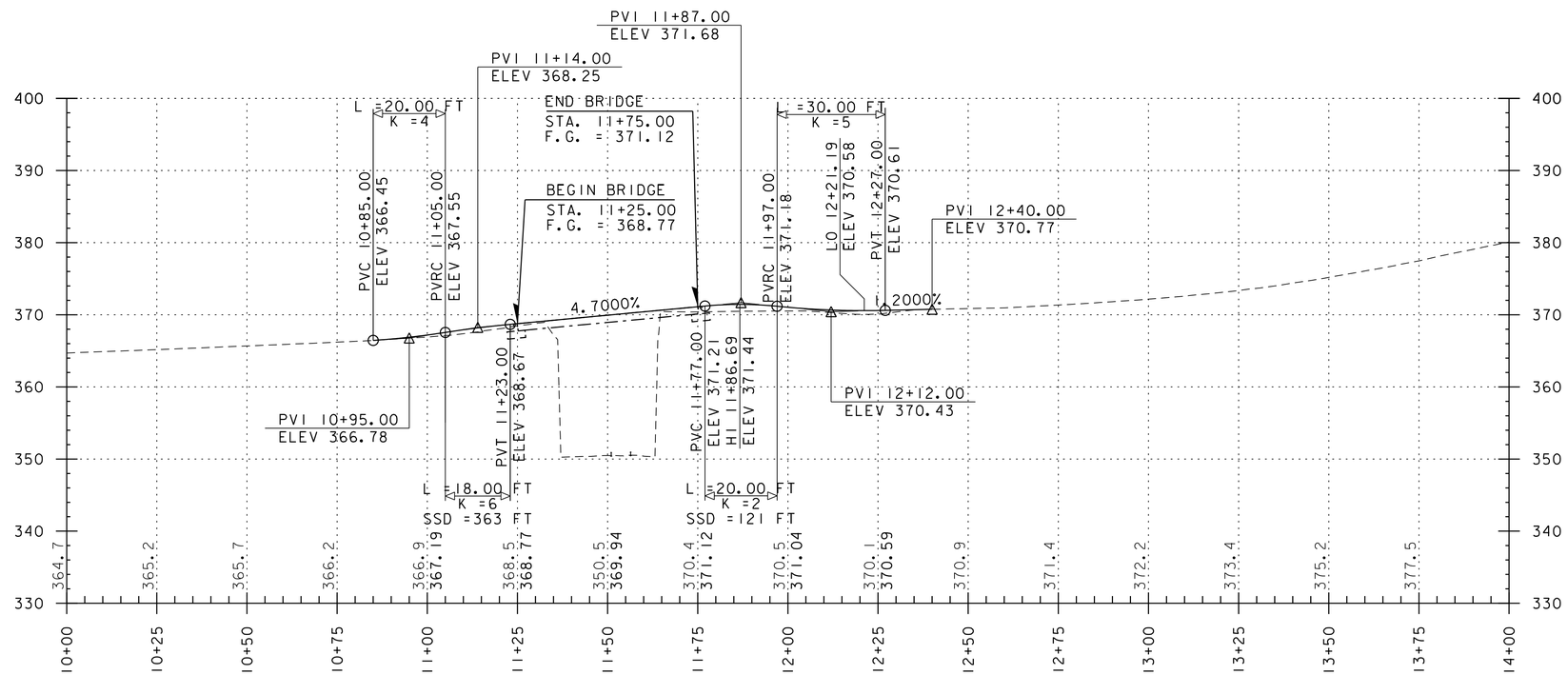
VHB 57603



MAIN STREET TEMPORARY BRIDGE PLAN

SCALE 1" = 20'

Everything on this sheet paid as temp bridge item?
Removal limits of existing bridge?

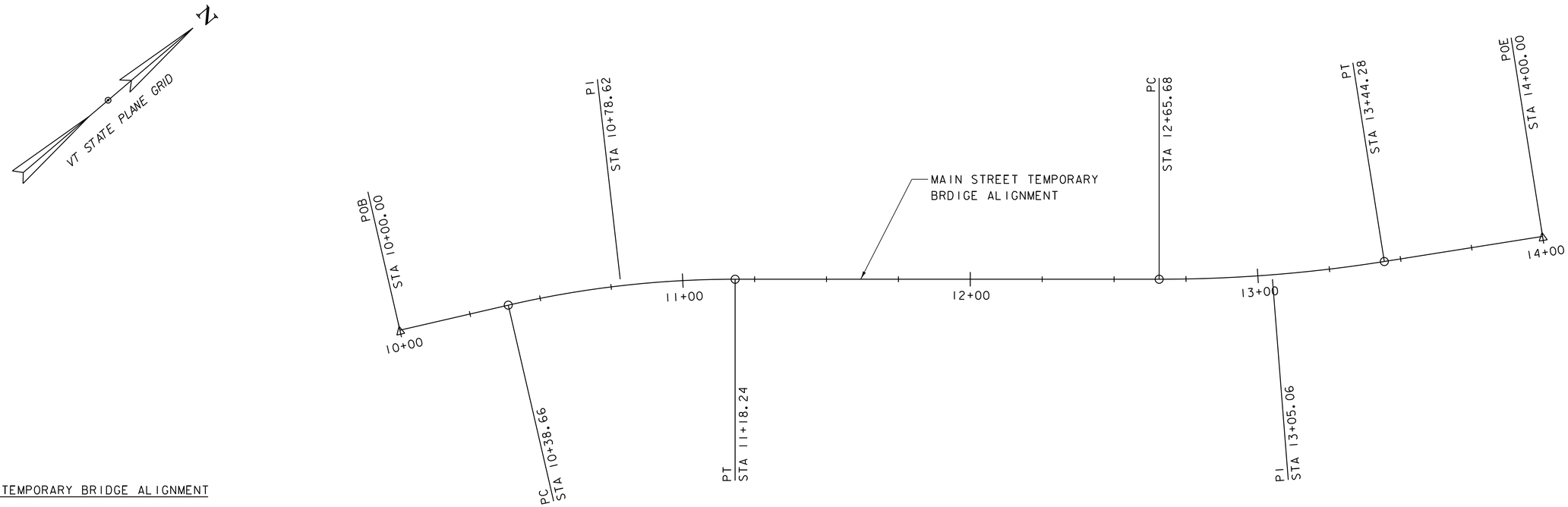


MAIN STREET TEMPORARY BRIDGE PROFILE

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

PROJECT NAME: MIDDLBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044temp_bridge_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: K.C. BARRY
DESIGNED BY: D.M. PECK	CHECKED BY: S.E. BURBANK
MAIN STREET TEMP BRIDGE PLAN & PROFILE	SHEET 22 OF 116

VHB 57603.00



MAIN STREET TEMPORARY BRIDGE ALIGNMENT

HORIZONTAL ALIGNMENT NAME: TEMP MAIN STREET - OPT 2

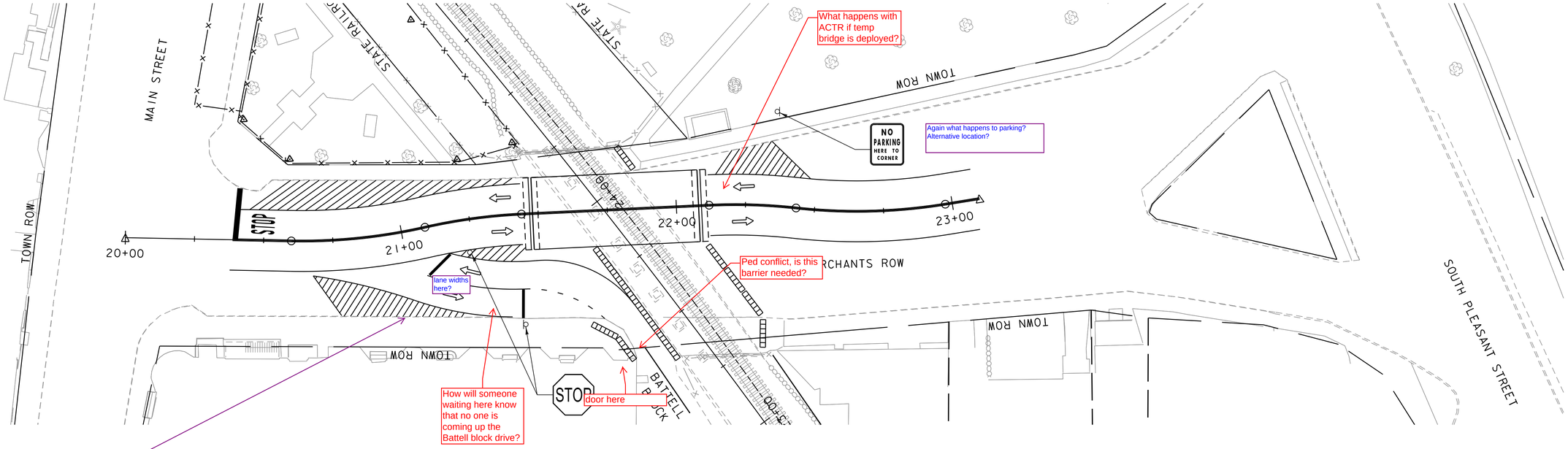
	STATION	NORTHING	EASTING
ELEMENT: LINEAR			
POB	10+00.00	552501.5035	1464613.0857
PC	10+38.66	552535.8296	1464630.8710
TANGENT DIRECTION:	N 27°23′23.96″ E		
TANGENT LENGTH:	38.66		
ELEMENT: CIRCULAR			
PC	10+38.66	552535.8296	1464630.8710
PI	10+78.62	552571.3104	1464649.2546
PT	11+18.24	552601.7342	1464675.1628
RADIUS:	350.00		
DELTA:	13°01′36.62″ RIGHT		
DEGREE OF CURVATURE (ARC):	16°22′12.80″		
LENGTH:	79.58		
TANGENT:	39.96		
CHORD:	79.41		
MIDDLE ORDINATE:	2.26		
EXTERNAL:	2.27		
ELEMENT: LINEAR			
PT	11+18.24	552601.7342	1464675.1628
PC	12+65.68	552713.9867	1464770.7539
TANGENT DIRECTION:	N 40°25′00.58″ E		
TANGENT LENGTH:	147.44		
ELEMENT: CIRCULAR			
PC	12+65.68	552713.9867	1464770.7539
PI	13+05.06	552743.9692	1464796.2863
PT	13+44.28	552777.5792	1464816.8099
RADIUS:	500.00		
DELTA:	9°00′24.61″ LEFT		
DEGREE OF CURVATURE (ARC):	11°27′32.96″		
LENGTH:	78.60		
TANGENT:	39.38		
CHORD:	78.52		
MIDDLE ORDINATE:	1.54		
EXTERNAL:	1.55		
ELEMENT: LINEAR			
PT	13+44.28	552777.5792	1464816.8099
POE	14+00.00	552825.1382	1464845.8515
TANGENT DIRECTION:	N 31°24′35.97″ E		
TANGENT LENGTH:	55.72		

PROJECT NAME: MIDDLEBURY
PROJECT NUMBER: WCRS(23)

FILE NAME: z10g044temp_bridge_pl.dgn
PROJECT LEADER: A.P. GUYETTE
DESIGNED BY: D.M. PECK
MAIN STREET TEMP BRIDGE ALIGNMENT

PLOT DATE: 10/18/2016
DRAWN BY: K.C. BARRY
CHECKED BY: S.E. BURBANK
SHEET 23 OF 116

VHB 57603.00

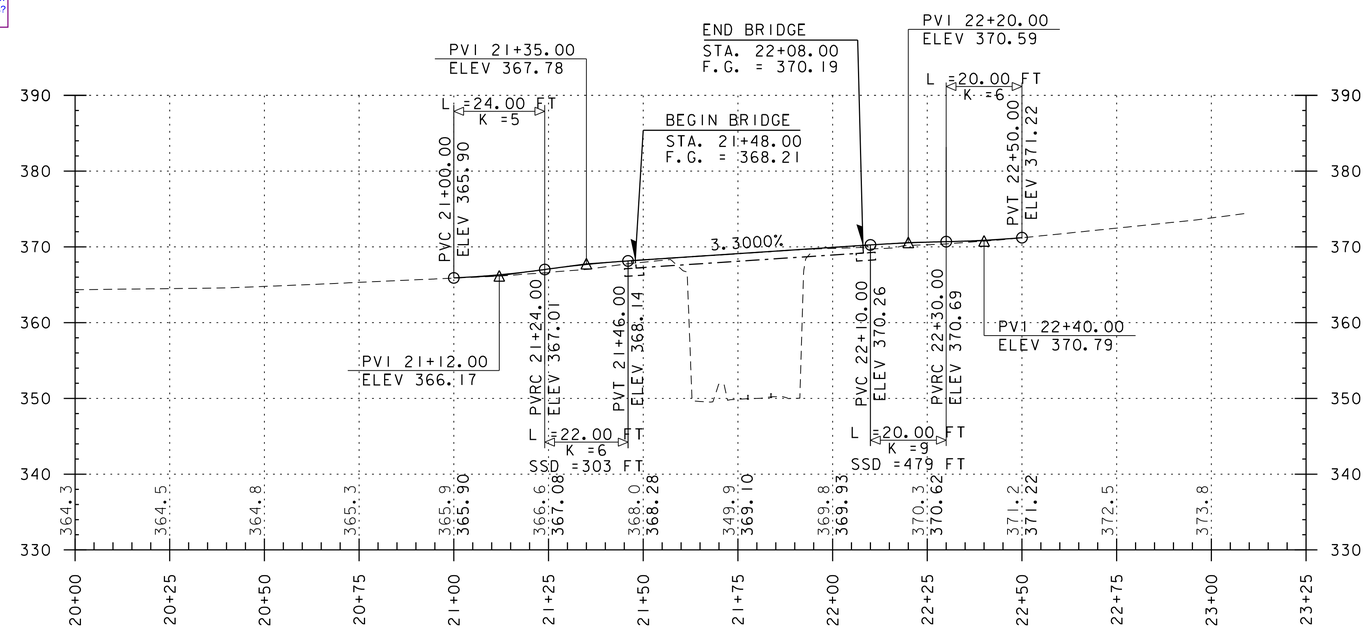


MERCHANTS ROW TEMPORARY BRIDGE PLAN

SCALE 1" = 20'

What happens to the parking that existed here? Will businesses be compensated and an alternative parking location b provided for their clients?

Public parking, businesses are not compensated for public parking. These temp bridge plans are more or less a contingency plan built into a construction project in the event that one of the bridges fail during the time that the contractor is under contract. They would be installed under emergency conditions.



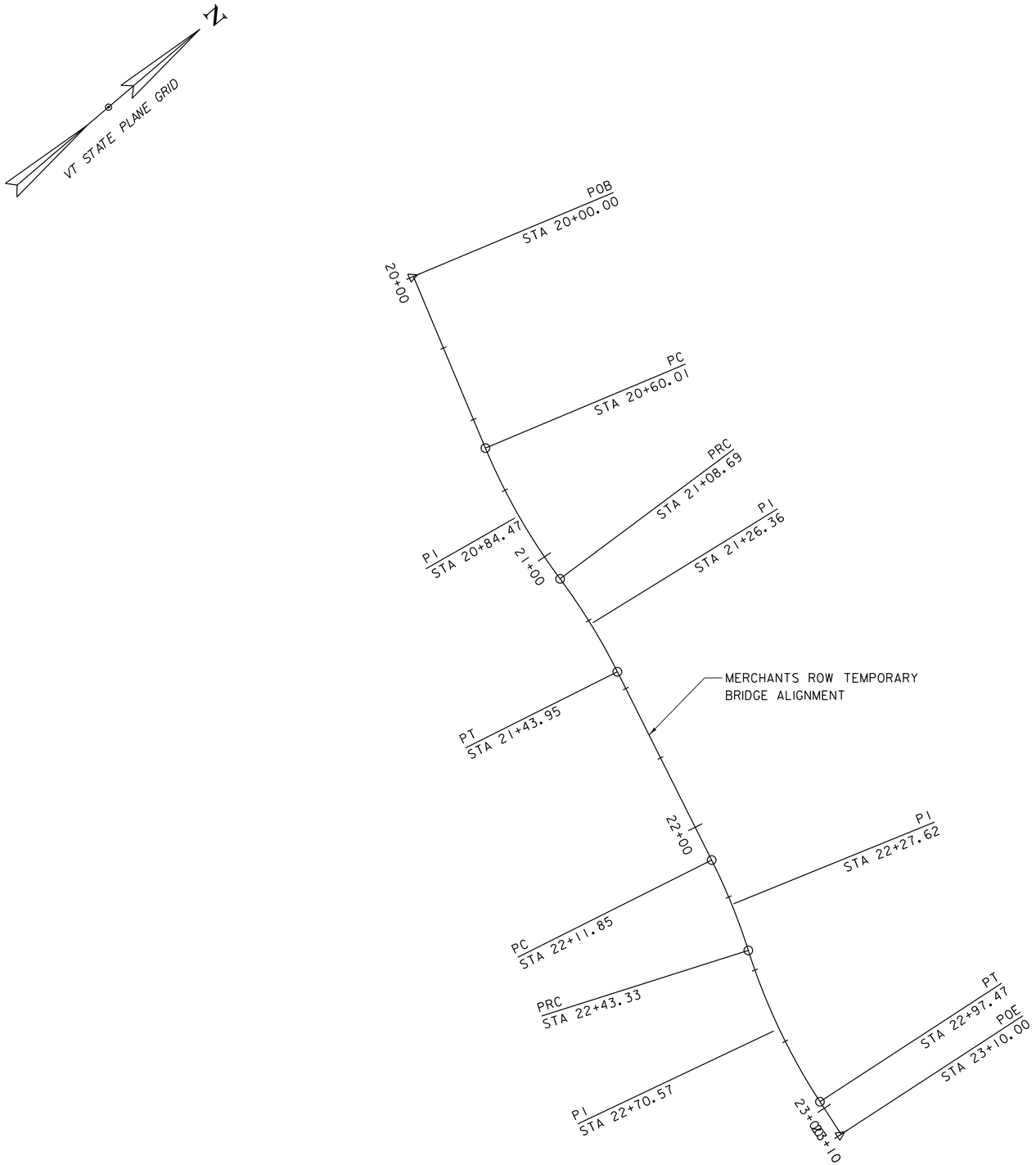
MERCHANTS ROW TEMPORARY BRIDGE PROFILE

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

vhb

PROJECT NAME: MIDDLBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044temp_bridge_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: K.C. BARRY
DESIGNED BY: D.M. PECK	CHECKED BY: S.E. BURBANK
MERCHANTS ROW TEMP BRIDGE PLAN&PROFILE	SHEET 24 OF 116

VHB 57603.00



MERCHANTS ROW TEMPORARY BRIDGE ALIGNMENT

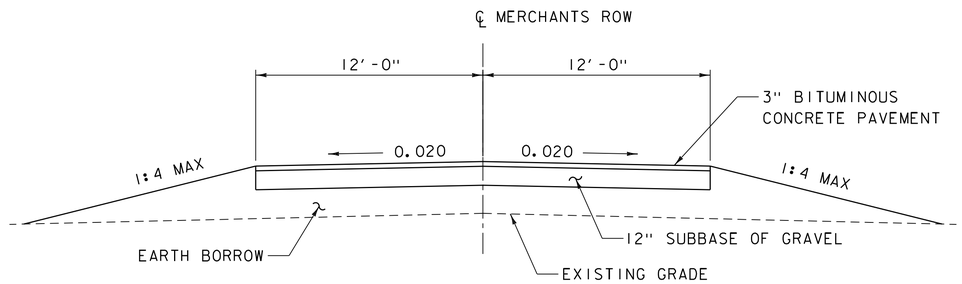
HORIZONTAL ALIGNMENT NAME: TEMP MERCHANTS ROW OPT 2

		STATION	NORTHING	EASTING
ELEMENT:	LINEAR			
	POB	20+00.00	552483.2533	1464605.5185
	PC	20+60.01	552465.0579	1464662.6994
	TANGENT DIRECTION:	S 72°20'54.61" E		
	TANGENT LENGTH:	60.01		
ELEMENT:	CIRCULAR			
	PC	20+60.01	552465.0579	1464662.6994
	PI	20+84.47	552457.6407	1464686.0085
	PRC	21+08.69	552456.0597	1464710.4181
	RADIUS:	200.00		
	DELTA:	13°56'44.64" LEFT		
	DEGREE OF CURVATURE (ARC):	28°38'52.40"		
	LENGTH:	48.68		
	TANGENT:	24.46		
	CHORD:	48.56		
	MIDDLE ORDINATE:	1.48		
	EXTERNAL:	1.49		
ELEMENT:	CIRCULAR			
	PRC	21+08.69	552456.0597	1464710.4181
	PI	21+26.36	552454.9173	1464728.0568
	PT	21+43.95	552450.6990	1464745.2217
	RADIUS:	200.00		
	DELTA:	10°06'04.19" RIGHT		
	DEGREE OF CURVATURE (ARC):	28°38'52.40"		
	LENGTH:	35.26		
	TANGENT:	17.68		
	CHORD:	35.21		
	MIDDLE ORDINATE:	0.78		
	EXTERNAL:	0.78		
ELEMENT:	LINEAR			
	PT	21+43.95	552450.6990	1464745.2217
	PC	22+11.85	552434.4938	1464811.1629
	TANGENT DIRECTION:	S 76°11'35.06" E		
	TANGENT LENGTH:	67.90		
ELEMENT:	CIRCULAR			
	PC	22+11.85	552434.4938	1464811.1629
	PI	22+27.62	552430.7298	1464826.4795
	PRC	22+43.33	552424.6114	1464841.0167
	RADIUS:	200.00		
	DELTA:	9°01'05.56" RIGHT		
	DEGREE OF CURVATURE (ARC):	28°38'52.40"		
	LENGTH:	31.48		
	TANGENT:	15.77		
	CHORD:	31.45		
	MIDDLE ORDINATE:	0.62		
	EXTERNAL:	0.62		
ELEMENT:	CIRCULAR			
	PRC	22+43.33	552424.6114	1464841.0167
	PI	22+70.57	552414.0444	1464866.1236
	PT	22+97.47	552410.5770	1464893.1420
	RADIUS:	200.00		
	DELTA:	15°30'42.89" LEFT		
	DEGREE OF CURVATURE (ARC):	28°38'52.40"		
	LENGTH:	54.15		
	TANGENT:	27.24		
	CHORD:	53.98		
	MIDDLE ORDINATE:	1.83		
	EXTERNAL:	1.85		
ELEMENT:	LINEAR			
	PT	22+97.47	552410.5770	1464893.1420
	POE	23+10.00	552408.9826	1464905.5651
	TANGENT DIRECTION:	S 82°41'12.38" E		
	TANGENT LENGTH:	12.53		

PROJECT NAME: MIDDLEBURY
PROJECT NUMBER: WCRS(23)

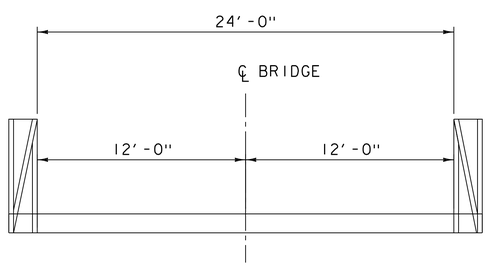
FILE NAME: z10g044temp_bridge_pl.dgn
PROJECT LEADER: A.P. GUYETTE
DESIGNED BY: D.M. PECK
MERCHANTS ROW TEMP BRIDGE ALIGNMENT

PLOT DATE: 10/18/2016
DRAWN BY: K.C. BARRY
CHECKED BY: S.E. BURBANK
SHEET 25 OF 116



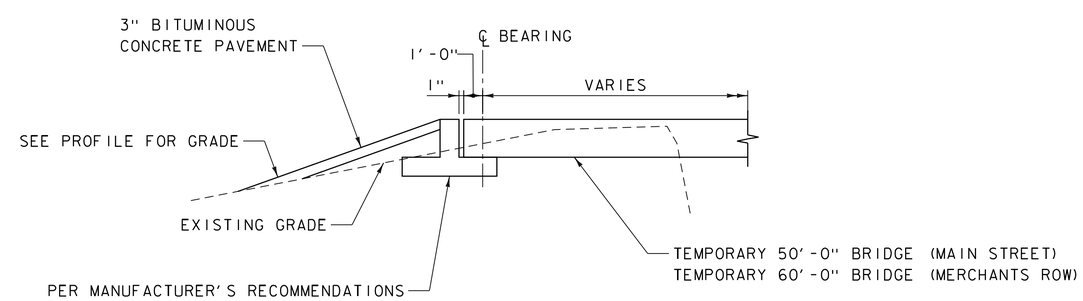
APPROACH TYPICAL SECTION

NOT TO SCALE



TEMPORARY BRIDGE TYPICAL SECTION

NOT TO SCALE



TEMPORARY BRIDGE END DETAIL

NOT TO SCALE

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044temp_bridge_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A. P. GUYETTE	DRAWN BY: M.F. SUFFEL
DESIGNED BY: K.C. BARRY	CHECKED BY: K.C. BARRY
TEMPORARY BRIDGE DETAILS	SHEET 26 OF 116

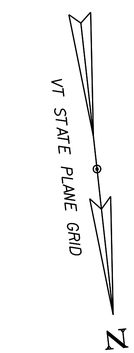
VHB 57603.00

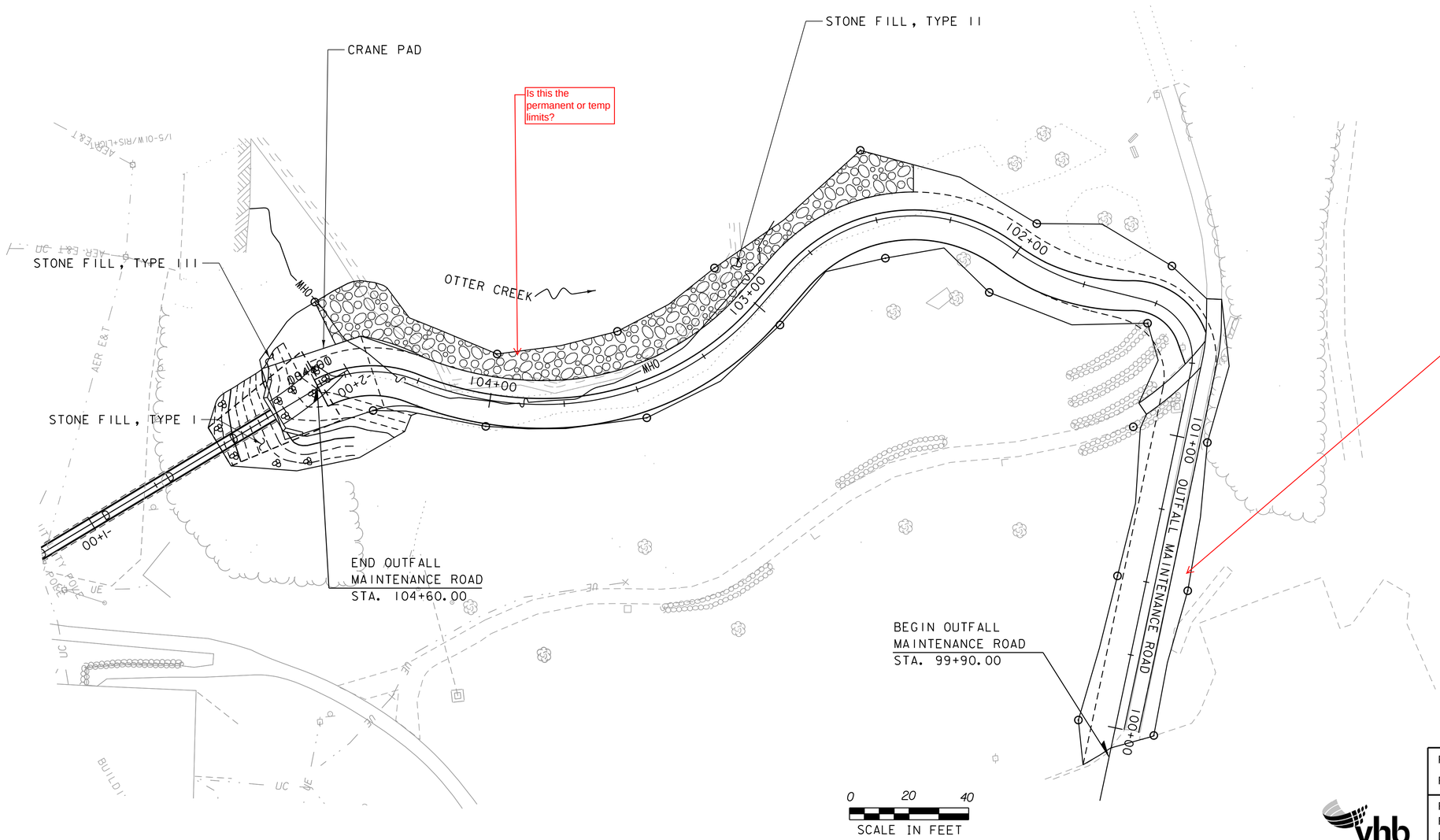
CHANGING ELEVATION OF DROP INLETS, CATCH BASINS, OR MANHOLES
STA. 101+31, 5' LT

STONE FILL, TYPE I
STA. 104+26 TO STA. 104+60, LT & RT

STONE FILL, TYPE II
STA. 102+37 TO STA. 104+39, RT

STONE FILL, TYPE III
STA. 104+22 TO STA. 104+60, LT & RT

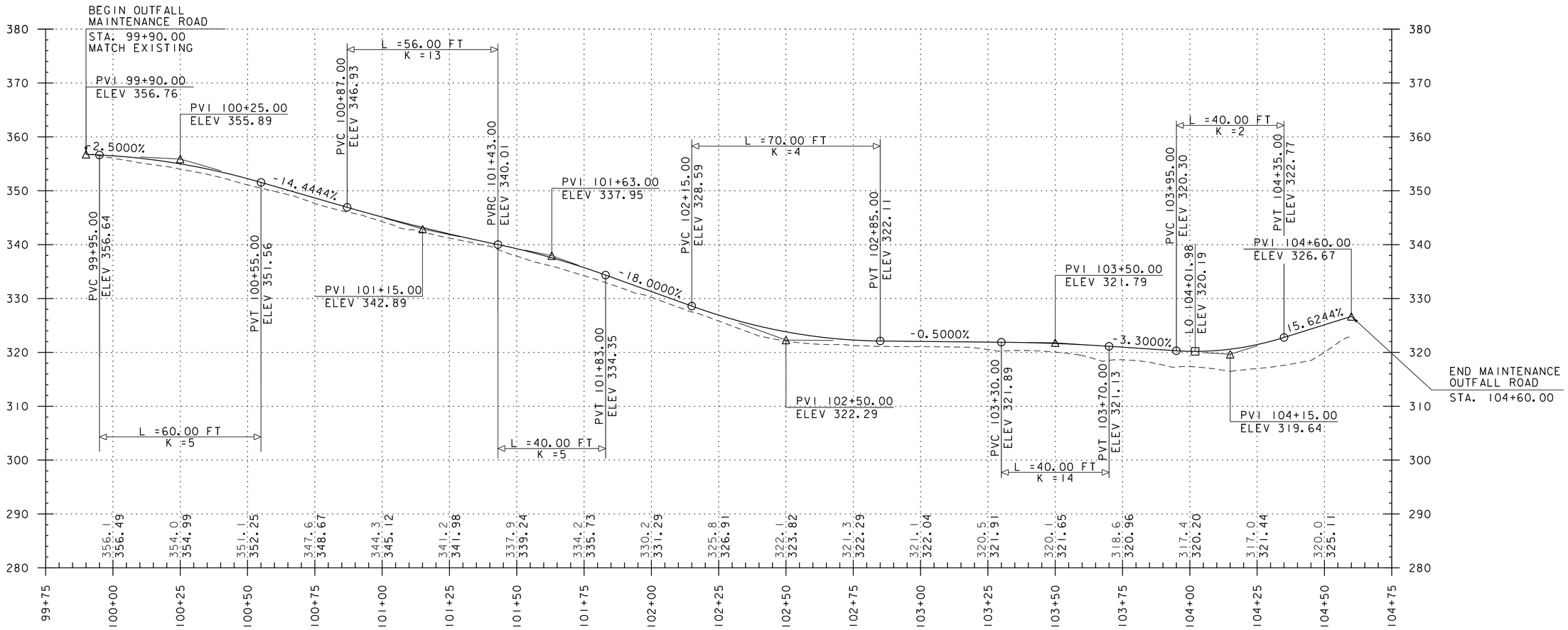




How will peds be directed during the few times that equipment will be using the road? If pavement becomes unstable than an alternative surface/route will need to be provided.

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044bdr_nul_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: K.C. BARRY
DESIGNED BY: E.F. LAWES	CHECKED BY: S.E. BURBANK
OUTFALL MAINTENANCE ROAD LAYOUT	SHEET 27 OF 116

VHB 57603



OUTFALL MAINTENANCE ROAD PROFILE

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

NOTE:

GRADES SHOWN TO THE NEAREST TENTH ARE EXISTING GROUND ALONG ℄
GRADES SHOWN TO THE NEAREST HUNDREDTH ARE THE FINISHED GRADE ALONG ℄

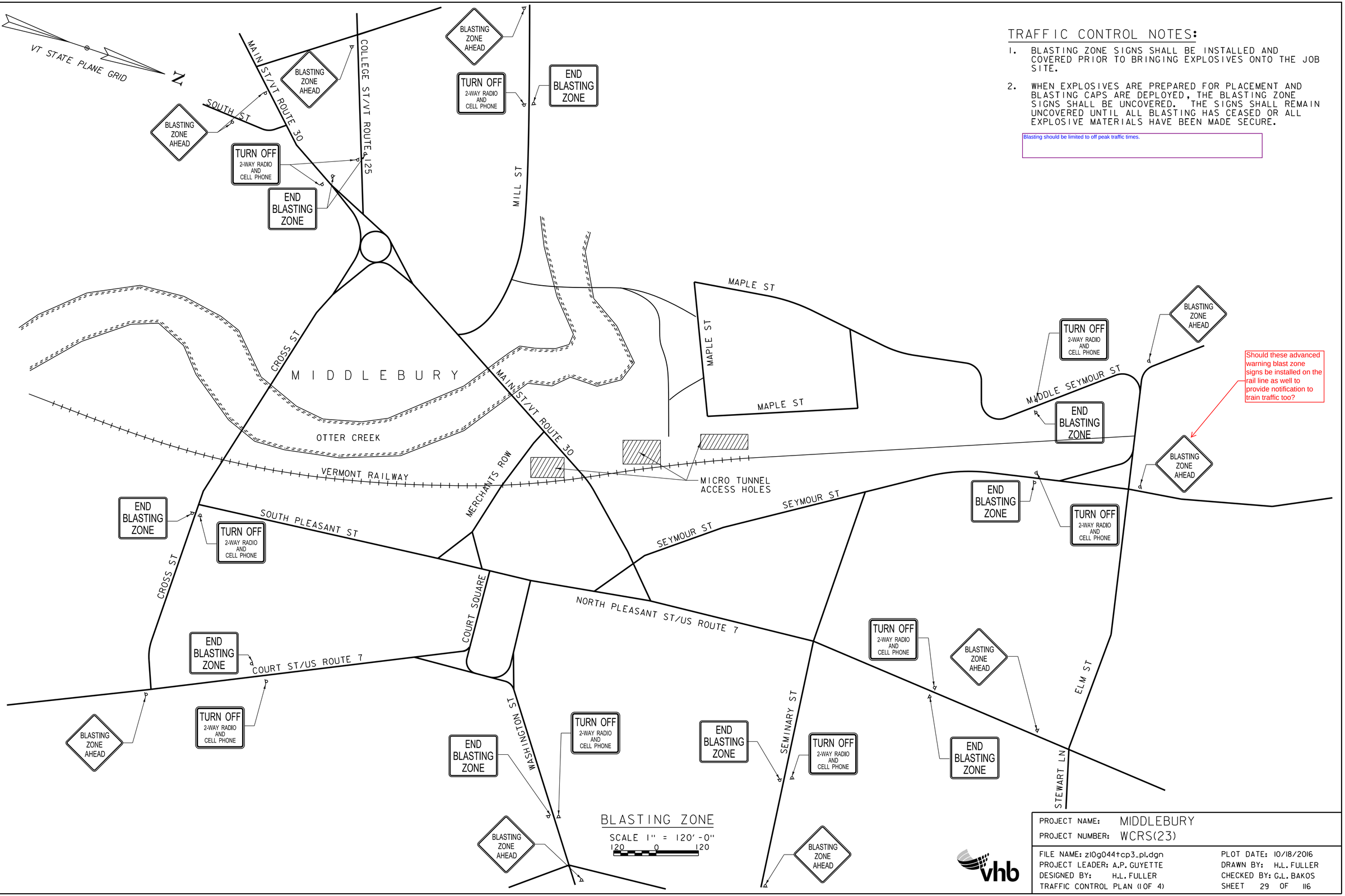
PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044pro_outfall_rd_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: K.C. BARRY
DESIGNED BY: E.F. LAWES	CHECKED BY: S.E. BURBANK
OUTFALL MAINTENANCE ROAD PROFILE SHEET	SHEET 28 OF 116

VHB 57603

TRAFFIC CONTROL NOTES:

1. BLASTING ZONE SIGNS SHALL BE INSTALLED AND COVERED PRIOR TO BRINGING EXPLOSIVES ONTO THE JOB SITE.
2. WHEN EXPLOSIVES ARE PREPARED FOR PLACEMENT AND BLASTING CAPS ARE DEPLOYED, THE BLASTING ZONE SIGNS SHALL BE UNCOVERED. THE SIGNS SHALL REMAIN UNCOVERED UNTIL ALL BLASTING HAS CEASED OR ALL EXPLOSIVE MATERIALS HAVE BEEN MADE SECURE.

Blasting should be limited to off peak traffic times.

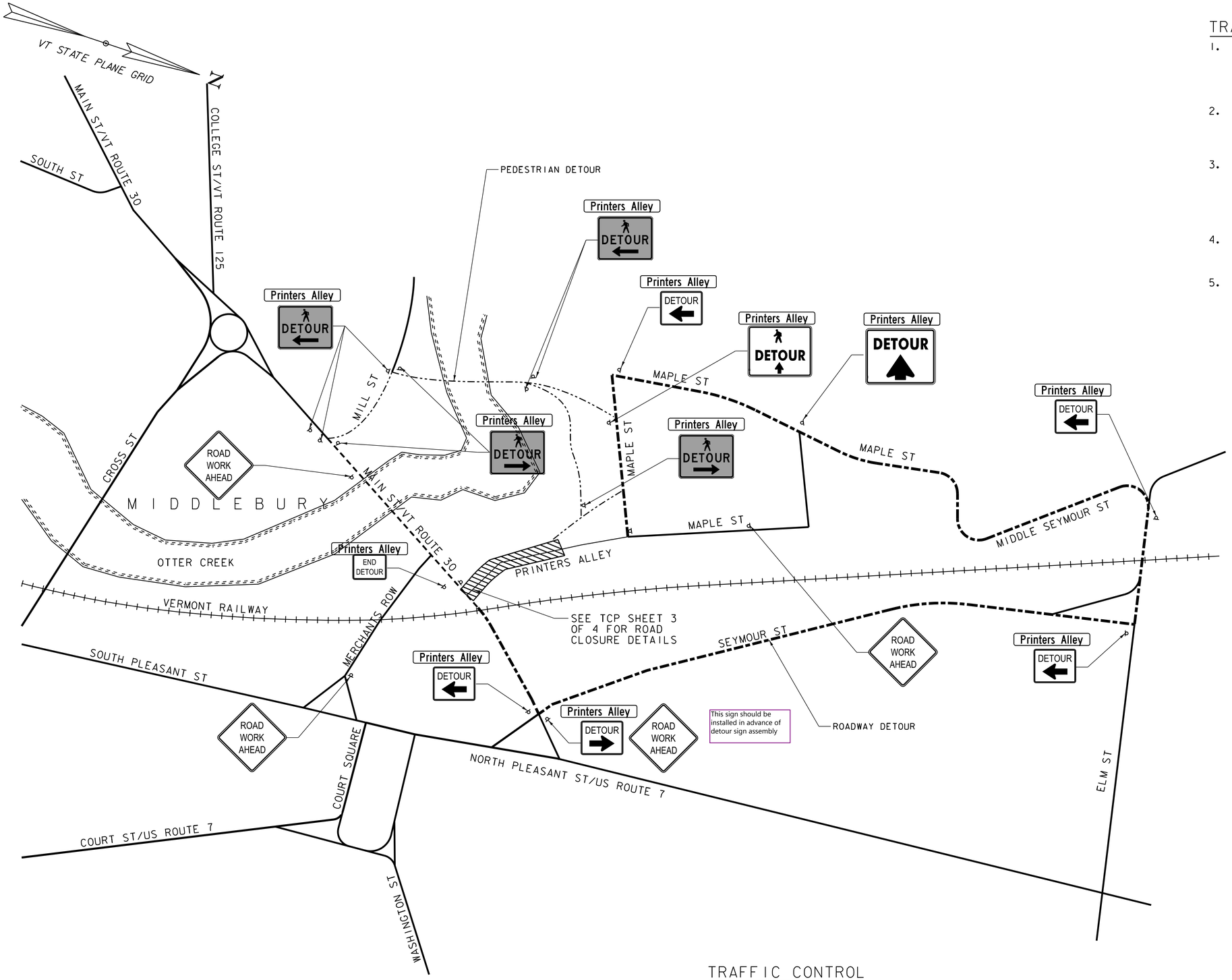


BLASTING ZONE

SCALE 1" = 120'-0"
120 0 120

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044tcp3_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: H.L. FULLER
DESIGNED BY: H.L. FULLER	CHECKED BY: G.L. BAKOS
TRAFFIC CONTROL PLAN (1 OF 4)	SHEET 29 OF 116

VHB 57603



TRAFFIC CONTROL NOTES:

1. WHEN EXISTING ROUTE MARKER ASSEMBLIES ARE LOCATED AT THE INTERSECTIONS OR ALONG THE DETOUR ROUTE, THE DETOUR ROUTE MARKER ASSEMBLIES SHALL BE INSTALLED ADJACENT TO THE EXISTING ROUTE MARKER ASSEMBLIES.
2. 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.
3. 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.
4. THE COSTS OF ALL DETOUR SIGNS AND REQUIRED SIGN POSTS AND INSTALLATION SHALL BE INCLUDED IN ITEM 641.10.
5. ALL DETOUR SIGNS SHALL BE COVERED COMPLETELY WHEN NOT APPLICABLE FOR THE SPECIFIED DETOUR.

Since these TC plans are going to be what the contractor uses during construction design team needs to start meeting with TSMO to make sure they are acceptable. The general note stating the contractor will develop the plan is not accurate. The contractor plans on sending in a letter stating the intent to use the details provided.

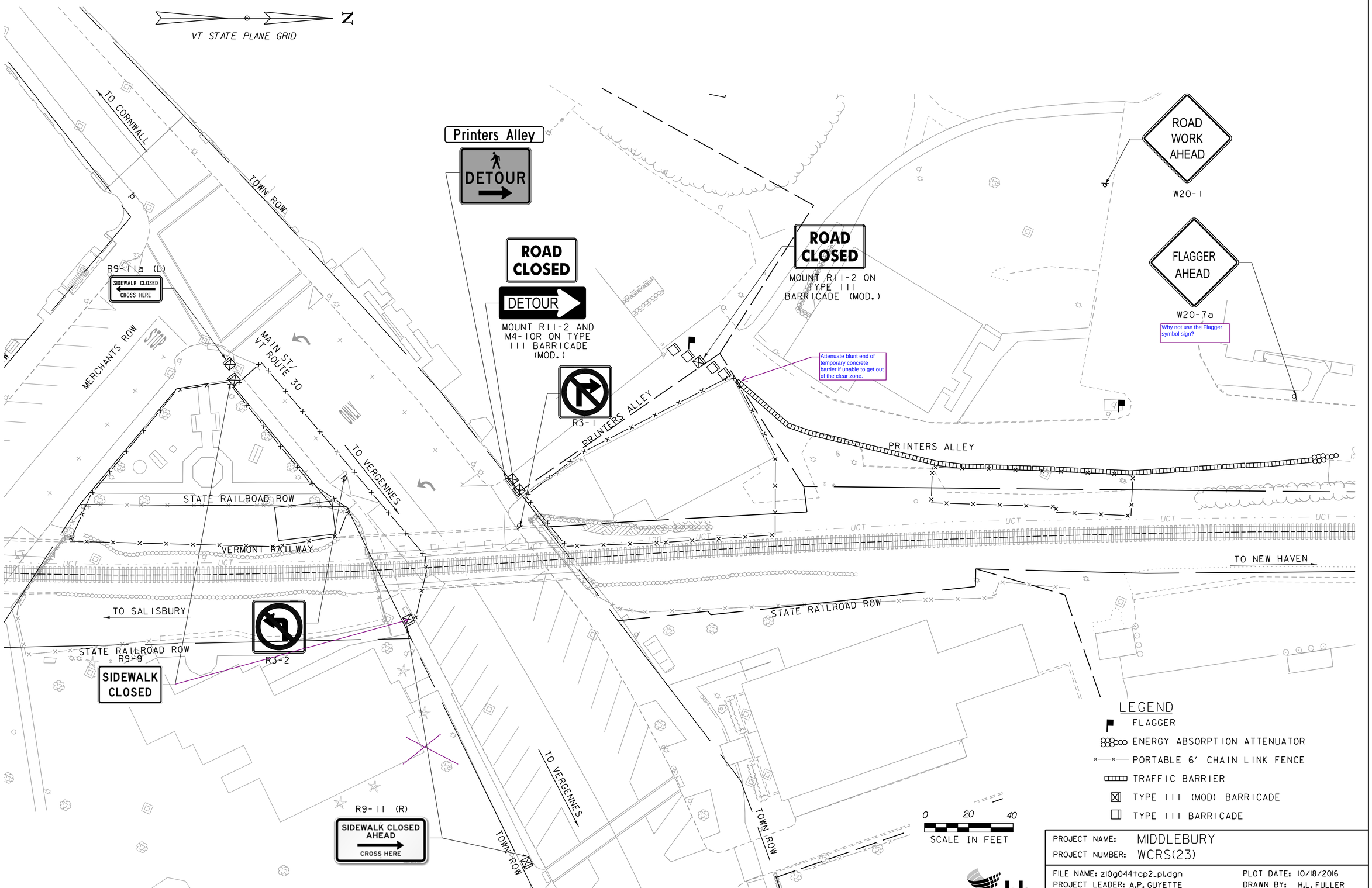
TRAFFIC CONTROL

SCALE 1" = 120'-0"
120 0 120

vhb

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044tcp3_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: H.L. FULLER
DESIGNED BY: H.L. FULLER	CHECKED BY: G.L. BAKOS
TRAFFIC CONTROL PLAN (2 OF 4)	SHEET 30 OF 116

VHB 57603



PROJECT NAME: MIDDLEBURY
PROJECT NUMBER: WCRS(23)

FILE NAME: z10g044tcp2_pl.dgn
PROJECT LEADER: A.P. GUYETTE
DESIGNED BY: H.L.FULLER
TRAFFIC CONTROL PLAN (SHEET 3 OF 4)

PLOT DATE: 10/18/2016
DRAWN BY: H.L. FULLER
CHECKED BY: G.S. GOODRICH
SHEET 31 OF 116

VHB 57603

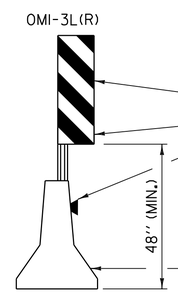
IDENTIFICATION NUMBER	SIZE OF SIGN WIDTH (IN)	SIZE OF SIGN HEIGHT (IN)	TEXT	NUMBER OF SIGNS REQ'D	REMARKS
D3-1	36	9	Printers Alley	13	SEE NOTE 3
M4-8A	24	18	END DETOUR	1	MOUNT ON ONE POST
M4-9bR	30	24	DETOUR →	3	MOUNT ON ONE POST
M4-9bL	30	24	DETOUR ←	2	MOUNT ON ONE POST
M4-9-bT	30	24	DETOUR ↑	1	MOUNT ON ONE POST
M4-9L	30	24	DETOUR ←	4	MOUNT BELOW THE D3-1
M4-9R	30	24	DETOUR →	1	MOUNT BELOW THE D3-1
M4-10	48	18	DETOUR	1	MOUNTED ON TYPE III (MOD) BARRICADE
R3-1	24	24		1	MOUNT ON ONE POST
R3-1	24	24		1	MOUNT ON ONE POST
R9-9	24	12	SIDEWALK CLOSED	1	MOUNTED ON TYPE III (MOD) BARRICADE
R9-11a	24	24	SIDEWALK CLOSED ← CROSS HERE	1	MOUNTED ON TYPE III (MOD) BARRICADE
M4-9	30	24	DETOUR ↑	1	MOUNT ON ONE POSTS
R9-11R	24	12	SIDEWALK CLOSED AHEAD → CROSS HERE	1	MOUNT ON TYPE III BARRICADE (MOD)
R11-2	48	24	ROAD CLOSED	2	MOUNT ON TYPE III BARRICADE
W20-1	36	36	ROAD WORK AHEAD	5	MOUNT ON ONE POSTS
W20-7a	36	36	FLAGGER AHEAD	1	MOUNT ON ONE POSTS

Per VTrans 2011 Spec book all diamond shaped construction sign are to be 48"x48"

IDENTIFICATION NUMBER	SIZE OF SIGN WIDTH (IN)	SIZE OF SIGN HEIGHT (IN)	TEXT	NUMBER OF SIGNS REQ'D	REMARKS
W22-1	36	36	BLASTING ZONE AHEAD	9	MOUNT ON ONE POST
W22-2	42	36	TURN OFF 2-WAY RADIO AND CELL PHONE	9	MOUNT ON ONE POST
W22-3	42	36	END BLASTING ZONE	9	MOUNT ON ONE POST

NOTES:

1. COLORS FOR THE M4-9bT, M4-9bL, M4-9bR, D3-1, M4-9L, AND M4-9R SIGNS SHALL BE A BLACK ARROW, TEXT, AND BORDER ON RETROREFLECTIVE ORANGE BACKGROUND.
2. COLORS FOR THE R9-9, R9-11a, R9-11L AND R9-11R SIGNS SHALL BE BLACK TEXT AND BORDER ON RETROREFLECTIVE WHITE BACKGROUND.



12" X 36" OBJECT MARKER TO BE INSTALLED AT BEGINNING OF BARRIER TANGENT. STRIPES SLOPE DOWNWARD TOWARD THE SIDE OF THE BARRIER ON WHICH TRAFFIC IS TO PASS. MOUNTING IS DETERMINED BY THE ENGINEER.

BLACK

FLUORESCENT ORANGE

GUARDRAIL DELINEATORS SHALL BE MOUNTED EVERY 20 FEET ALONG THE SIDE OF THE BARRIER, WITH YELLOW ON THE DRIVER'S LEFT AND WHITE ON THE DRIVER'S RIGHT. SEE STD. G-1 FOR GUARDRAIL DELINEATOR SPECIFICATIONS.

TEMPORARY BARRIER

TEMPORARY TRAFFIC BARRIER DETAILS

N. T. S.

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044tcp2_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: K.C. BARRY
DESIGNED BY: K.C. BARRY	CHECKED BY: S.E. BURBANK
TRAFFIC CONTROL PLAN (SHEET 4 OF 4)	SHEET 32 OF 116

VHB 57603

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)

N	DESCRIPTIVE TERM
<5	Very Loose
5-10	Loose
11-24	Med. Dense
25-50	Dense
>50	Very Dense

CONSISTENCY (COHESIVE SOILS)

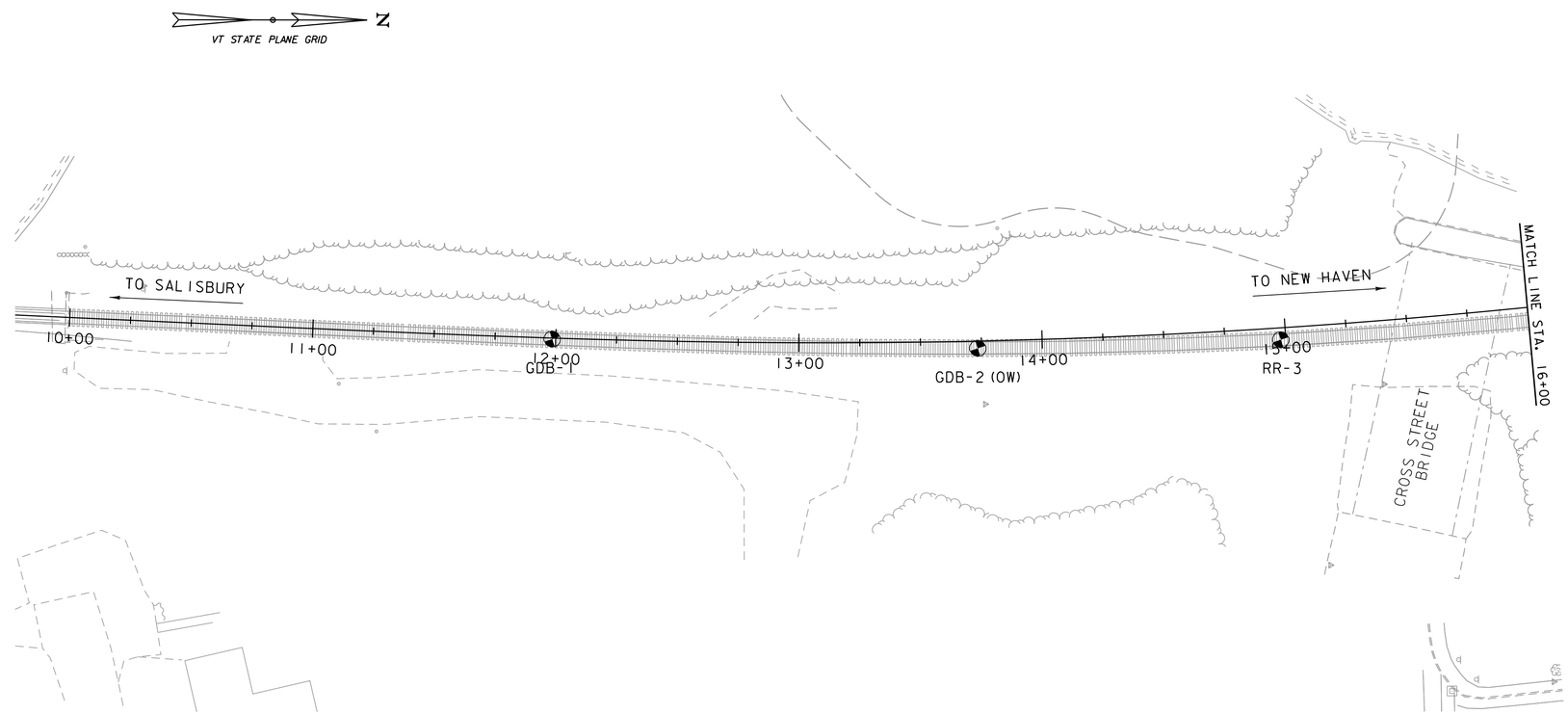
N	DESCRIPTIVE TERM
<2	Very Soft
2-4	Soft
5-8	Med. Stiff
9-15	Stiff
16-30	Very Stiff
31-60	Hard
>60	Very Hard

COMMONLY USED SYMBOLS

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

COLOR

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



BORING LAYOUT

SCALE 1" = 30'-0"
30 0 30

BORING CHART

HOLE NO.	SURV. STATION	OFFSET	GROUND ELEV.	ELEV. TLOB	NORTHING	EASTING
GBD-1	11+98.54	0.42 RT	350.78'	N/A	551271.76	1464975.84
GBD-2(OW)	13+73.48	2.97 RT	351.24'	N/A	551446.76	1464979.44
RR-3	14+97.95	4.87 RT	351.06'	N/A	551571.35	1464975.76

DEFINITIONS (AASHTO)

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

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

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

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

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

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

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

VARVED - Alternate layers of silt and clay.

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

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

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

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

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

DIP - Inclination of bed with a horizontal plane.

GENERAL NOTES

1. The subsurface explorations shown herein were made between March 2013 and December 2015 by GeoDesign, Inc.
2. Soil and rock classifications, properties and descriptions are based on engineering interpretation from available subsurface information by GeoDesign, Inc. 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 survey feet.

vhb

PROJECT NAME: MIDDLEBURY
PROJECT NUMBER: WCRS(23)

FILE NAME: z10g044bor_pl.dgn
PROJECT LEADER: A.P. GUYETTE
DESIGNED BY: GEODESIGN
BORING INFORMATION SHEET (1 OF 6)

PLOT DATE: 10/18/2016
DRAWN BY: C.J. HAKEY
CHECKED BY: GEODESIGN
SHEET 33 OF 116

VHB 57603

SOIL CLASSIFICATION

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

ROCK QUALITY DESIGNATION

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

SHEAR STRENGTH

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

CORRELATION GUIDE OF "N" TO DENSITY/CONSISTENCY

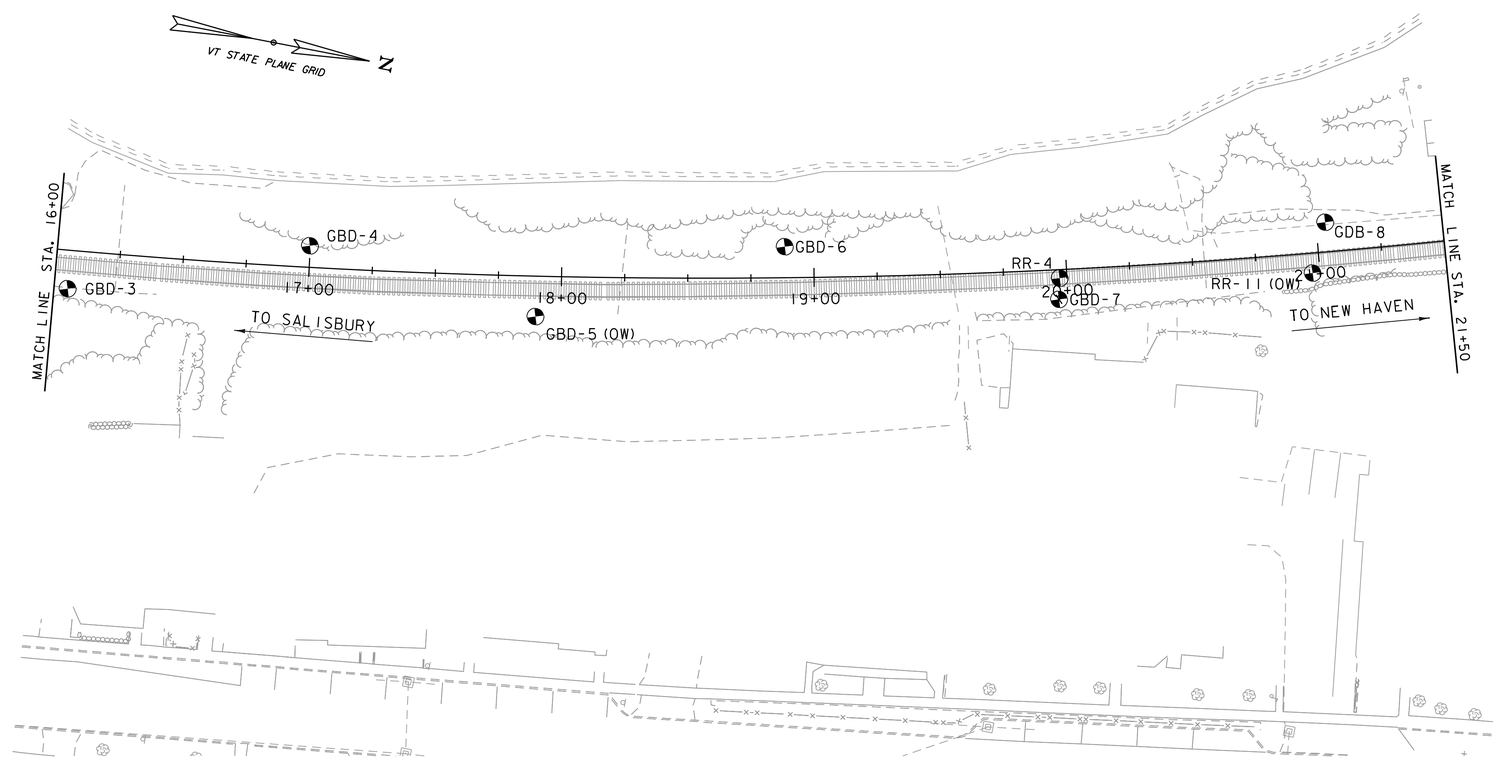
DENSITY (GRANULAR SOILS)		CONSISTENCY (COHESIVE SOILS)	
N	DESCRIPTIVE TERM	N	DESCRIPTIVE TERM
<5	Very Loose	<2	Very Soft
5-10	Loose	2-4	Soft
11-24	Med. Dense	5-8	Med. Stiff
25-50	Dense	9-15	Stiff
>50	Very Dense	16-30	Very Stiff
		31-60	Hard
		>60	Very Hard

COMMONLY USED SYMBOLS

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

COLOR

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



BORING LAYOUT

SCALE 1" = 30'-0"
30 0 30

BORING CHART

HOLE NO.	SURV. STATION	OFFSET	GROUND ELEV.	ELEV. TLOB	NORTHING	EASTING
GBD-3	16+05.40	15.23 RT	350.23'	N/A	551679.66	1464976.94
GBD-4	16+99.82	8.54 LT	349.48'	N/A	551770.66	1464942.04
GBD-5(OW)	17+90.03	16.00 RT	349.65'	N/A	551863.66	1464952.64
GBD-6	18+88.54	12.31 LT	349.07'	N/A	551955.36	1464906.74
GBD-7	19+96.50	11.76 RT	349.86'	N/A	552065.96	1464906.64
GBD-8	21+03.72	11.72 LT	349.86'	N/A	552163.66	1464856.64
RR-4	19+97.18	3.34 RT	350.23'	N/A	552064.62	1464898.30
RR-11(OW)	20+97.08	7.93 RT	350.50'	N/A	552162.61	1464877.36

DEFINITIONS (AASHTO)

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

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

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

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

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

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

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

VARVED - Alternate layers of silt and clay.

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

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

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

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

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

DIP - Inclination of bed with a horizontal plane.

GENERAL NOTES

1. The subsurface explorations shown herein were made between March 2013 and December 2015 by GeoDesign, Inc.
2. Soil and rock classifications, properties and descriptions are based on engineering interpretation from available subsurface information by GeoDesign, Inc. 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 survey feet.

PROJECT NAME: MIDDLEBURY
PROJECT NUMBER: WCRS(23)

FILE NAME: z10g044bor_pl.dgn
PROJECT LEADER: A.P. GUYETTE
DESIGNED BY: GEODESIGN
BORING INFORMATION SHEET (2 OF 6)

PLOT DATE: 10/18/2016
DRAWN BY: C.J. HAKEY
CHECKED BY: GEODESIGN
SHEET 34 OF 116

VHB 57603

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)

N	DESCRIPTIVE TERM
<5	Very Loose
5-10	Loose
11-24	Med. Dense
25-50	Dense
>50	Very Dense

CONSISTENCY (COHESIVE SOILS)

N	DESCRIPTIVE TERM
<2	Very Soft
2-4	Soft
5-8	Med. Stiff
9-15	Stiff
16-30	Very Stiff
31-60	Hard
>60	Very Hard

COMMONLY USED SYMBOLS

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

COLOR

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

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.

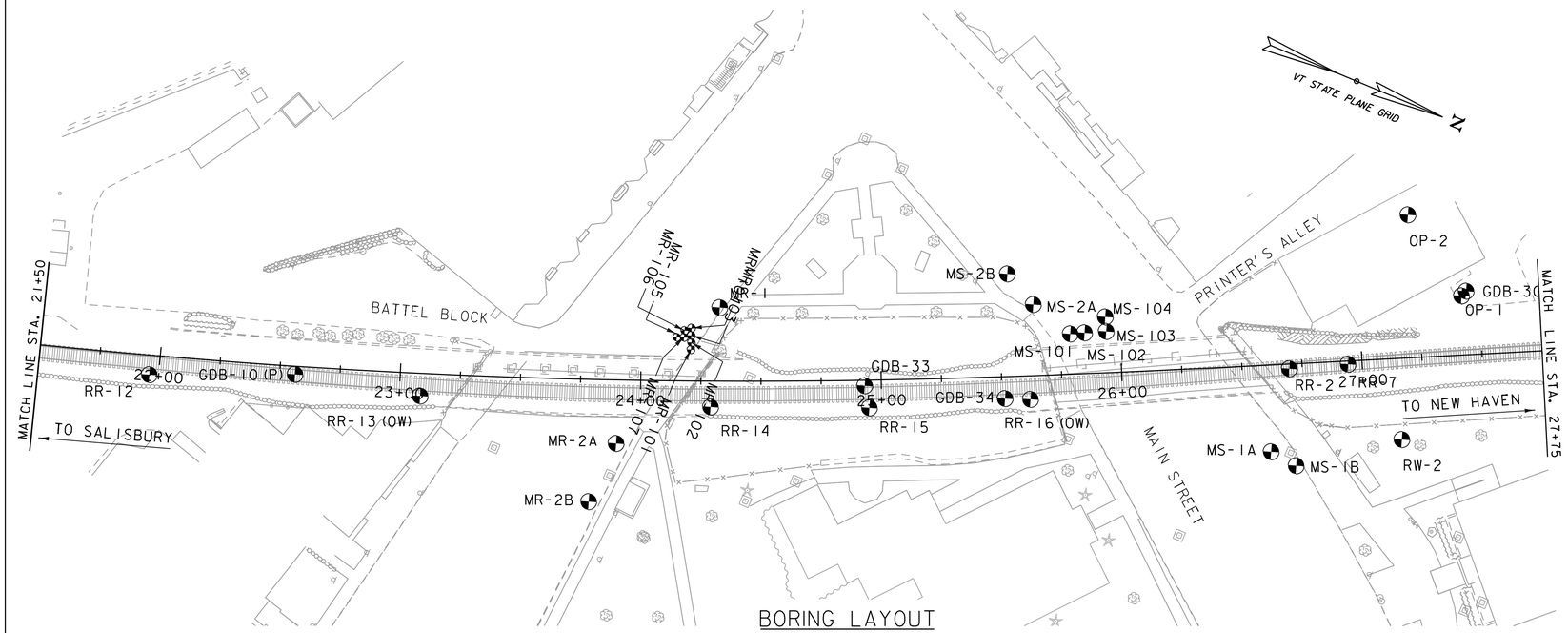
MUCK - Soft organic soil (containing > 10% organic material.

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 LAYOUT

SCALE 1" = 30'-0"
30 0 30

BORING CHART

HOLE NO.	SURV. STATION	OFFSET	GROUND ELEV.	ELEV. TLOB	NORTHING	EASTING
GBD-10(P)	22+56.38	3.36 RT	350.03'	N/A	552313.66	1464825.64
GDB-30	27+44.74	26.40 LT	361.17'	N/A	552749.86	1464606.74
GDB-33	24+93.11	2.31 RT	350.10'	N/A	552534.16	1464739.04
GDB-34	25+51.20	9.10 RT	350.33'	N/A	552590.06	1464721.54
MR-1	24+32.73	30.55 LT	366.71'	N/A	552466.01	1464732.20
MR-2A	23+90.26	26.41 RT	369.77'	N/A	552447.91	1464800.88
MR-2B	23+79.52	50.80 RT	370.18'	N/A	552446.67	1464827.56
MS-1A	26+60.38	35.99 RT	370.29'	N/A	552700.66	1464699.45
MS-1B	26+70.46	42.34 RT	370.30'	N/A	552712.50	1464700.82
MS-2A	25+64.31	29.53 LT	366.97'	N/A	552585.87	1464680.97
MS-2B	25+53.89	42.61 LT	366.23'	N/A	552571.03	1464673.37
MS-101	25+79.28	16.74 LT	368.68'	N/A	552604.76	1464686.34
MS-102	25+85.24	16.96 LT	368.80'	N/A	552610.06	1464683.64
MS-103	25+94.30	17.16 LT	369.00'	N/A	552618.16	1464679.64
MS-104	25+94.16	23.19 LT	368.57'	N/A	552615.47	1464674.23

BORING CHART

HOLE NO.	SURV. STATION	OFFSET	GROUND ELEV.	ELEV. TLOB	NORTHING	EASTING
RR-2	26+69.67	1.94 RT	350.92'	349.42'	552694.38	1464664.71
RR-7	26+94.17	1.34 RT	351.06'	N/A	552716.22	1464653.60
RR-12	21+96.11	8.08 RT	350.30'	332.10'	552257.78	1464849.03
RR-13(OW)	23+08.67	9.38 RT	350.19'	333.10'	552365.10	1464813.95
RR-14	24+29.08	10.75 RT	350.31'	326.30'	552478.33	1464771.79
RR-15	24+94.87	11.51 RT	350.32'	327.32'	522539.45	1464746.77
RR-16(OW)	25+61.72	9.79 RT	350.37'	338.40'	552599.93	1464717.78
RW-2	27+14.88	33.75 RT	369.60'	349.29'	552748.90	1464673.88
OP-1	27+42.76	24.58 LT	361.25'	N/A	552748.86	1464609.24
OP-2	27+22.26	59.34 LT	360.68'	N/A	552715.36	1464586.74
MR-101	24+20.76	13.00 LT	367.28'	N/A	552461.66	1464752.94
MR-102	24+20.95	15.96 LT	367.96'	N/A	552460.72	1464750.13
MR-103	24+20.88	18.88 LT	367.80'	N/A	552459.56	1464747.44
MR-104	24+20.96	21.98 LT	367.59'	N/A	552458.46	1464744.54
MR-105	24+17.83	18.06 LT	367.91'	N/A	552457.06	1464749.34
MR-106	24+18.05	20.93 LT	367.74'	N/A	552456.18	1464746.60
MR-107	24+14.81	18.09 LT	367.95'	N/A	552454.26	1464750.44

GENERAL NOTES

1. The subsurface explorations shown herein were made between March 2013 and December 2015 by GeoDesign, Inc.
2. Soil and rock classifications, properties and descriptions are based on engineering interpretation from available subsurface information by GeoDesign, Inc. 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 survey feet.

PROJECT NAME: MIDDLEBURY
PROJECT NUMBER: WCRS(23)

FILE NAME: z10g044bor_pl.dgn
PROJECT LEADER: A.P. GUYETTE
DESIGNED BY: GEODESIGN
BORING INFORMATION SHEET (3 OF 6)

PLOT DATE: 10/18/2016
DRAWN BY: C.J. HAKEY
CHECKED BY: GEODESIGN
SHEET 35 OF 116

VHB 57603

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)

N	DESCRIPTIVE TERM
<5	Very Loose
5-10	Loose
11-24	Med. Dense
25-50	Dense
>50	Very Dense

CONSISTENCY (COHESIVE SOILS)

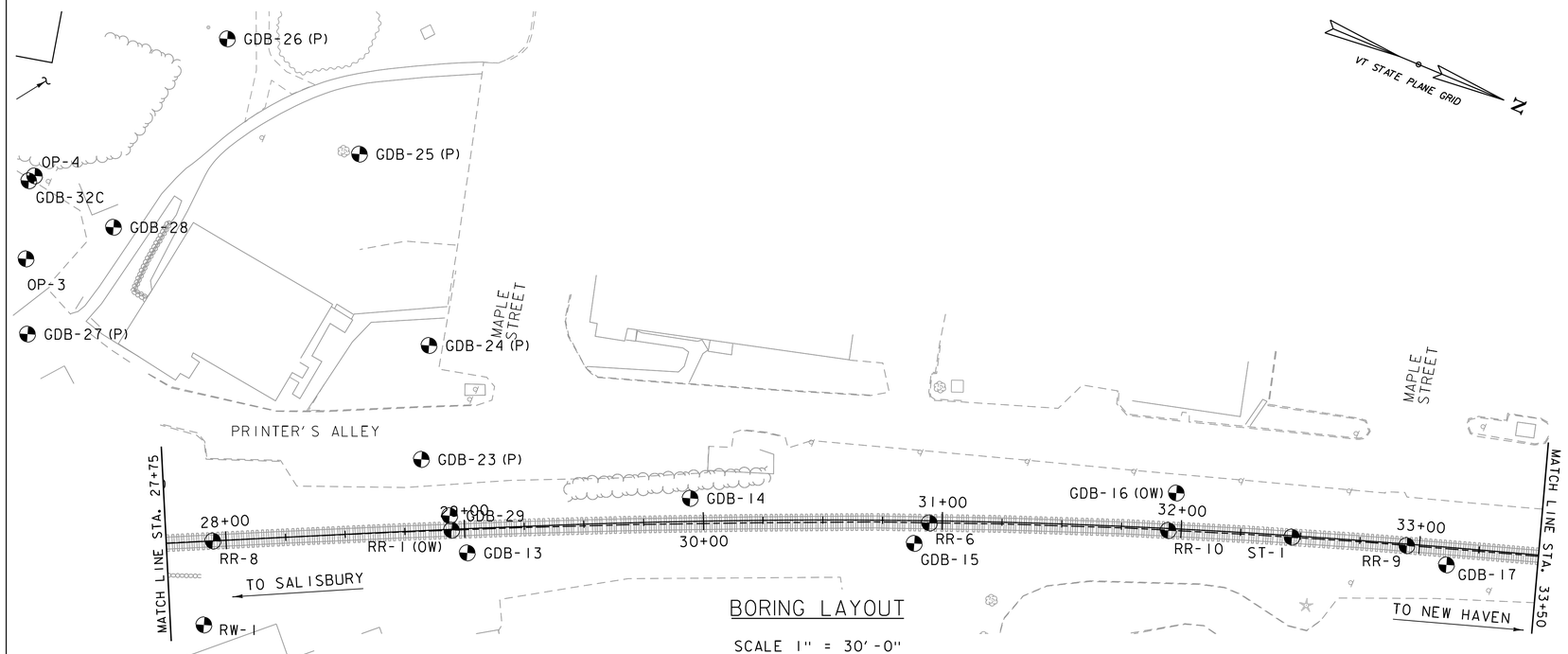
N	DESCRIPTIVE TERM
<2	Very Soft
2-4	Soft
5-8	Med. Stiff
9-15	Stiff
16-30	Very Stiff
31-60	Hard
>60	Very Hard

COMMONLY USED SYMBOLS

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

COLOR

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



BORING LAYOUT

SCALE 1" = 30'-0"
30 0 30

BORING CHART

HOLE NO.	SURV. STATION	OFFSET	GROUND ELEV.	ELEV. TLOB	NORTHING	EASTING
GDB-13	29+00.71	10.13 RT	352.23'	338.70'	552906.36	1464572.64
GDB-14	29+94.67	9.66 LT	354.29'	N/A	552983.66	1464515.64
GDB-15	30+88.37	9.57 RT	355.63'	N/A	553077.46	1464496.94
GDB-16(OW)	31+97.24	14.96 LT	355.88'	N/A	553170.56	1464435.24
GDB-23(P)	28+83.26	29.79 LT	353.77'	N/A	552873.56	1464543.94
GDB-17	33+11.91	7.37 RT	357.02'	N/A	553286.46	1464419.44
GDB-24(P)	28+88.55	77.24 LT	353.78'	N/A	552858.16	1464498.74
GDB-25(P)	28+63.54	158.59 LT	352.22'	N/A	552800.46	1464436.04
GDB-26(P)	28+11.31	209.49 LT	350.34'	N/A	552730.86	1464412.84
GDB-27(P)	27+21.50	90.41 LT	360.20'	N/A	552701.26	1464559.04
GDB-28	27+59.73	133.20 LT	357.57'	352.40'	552717.26	1464503.94
GDB-29	28+94.00	5.71 LT	352.97'	N/A	552893.56	1464561.14
GDB-30	27+44.74	26.40 LT	361.17'	N/A	552749.86	1464606.74

BORING CHART

HOLE NO.	SURV. STATION	OFFSET	GROUND ELEV.	ELEV. TLOB	NORTHING	EASTING
GDB-32C	27+25.33	154.44 LT	358.06'	N/A	552677.06	1464499.64
OP-1	27+42.76	24.58 LT	361.25'	N/A	552748.86	1464609.24
OP-2	27+22.26	59.34 LT	360.68'	N/A	552715.36	1464586.74
OP-3	27+22.49	121.87 LT	359.02'	N/A	552688.56	1464530.24
OP-4	27+27.80	156.36 LT	357.92'	N/A	552678.46	1464496.84
RR-1(OW)	28+94.56	0.33 RT	353.05'	N/A	552896.63	1464566.37
RR-6	30+94.60	0.93 RT	355.04'	N/A	553080.01	1464486.61
RR-8	27+94.56	0.03 RT	352.04'	N/A	552806.20	1464609.06
RR-9	32+94.65	0.66 RT	356.74'	N/A	553267.98	1464418.41
RR-10	31+94.63	0.85 RT	355.92'	N/A	553173.45	1464451.01
RW-1	27+88.99	34.89 RT	362.81'	350.28'	552816.23	1464642.91
ST-1	32+46.45	0.60 RT	356.37'	N/A	553222.26	1464433.64

DEFINITIONS (AASHTO)

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

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

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

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

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

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

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

VARVED - Alternate layers of silt and clay.

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

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

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

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

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

DIP - Inclination of bed with a horizontal plane.

GENERAL NOTES

1. The subsurface explorations shown herein were made between March 2013 and December 2015 by GeoDesign, Inc.
2. Soil and rock classifications, properties and descriptions are based on engineering interpretation from available subsurface information by GeoDesign, Inc. 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 survey feet.

vhb

PROJECT NAME: MIDDLEBURY
PROJECT NUMBER: WCRS(23)

FILE NAME: z10g044bor_pl.dgn
PROJECT LEADER: A.P. GUYETTE
DESIGNED BY: GEODESIGN
BORING INFORMATION SHEET (4 OF 6)

PLOT DATE: 10/18/2016
DRAWN BY: C.J. HAKEY
CHECKED BY: GEODESIGN
SHEET 36 OF 116

SOIL CLASSIFICATION

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

ROCK QUALITY DESIGNATION

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

SHEAR STRENGTH

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

CORRELATION GUIDE OF "N" TO DENSITY/CONSISTENCY

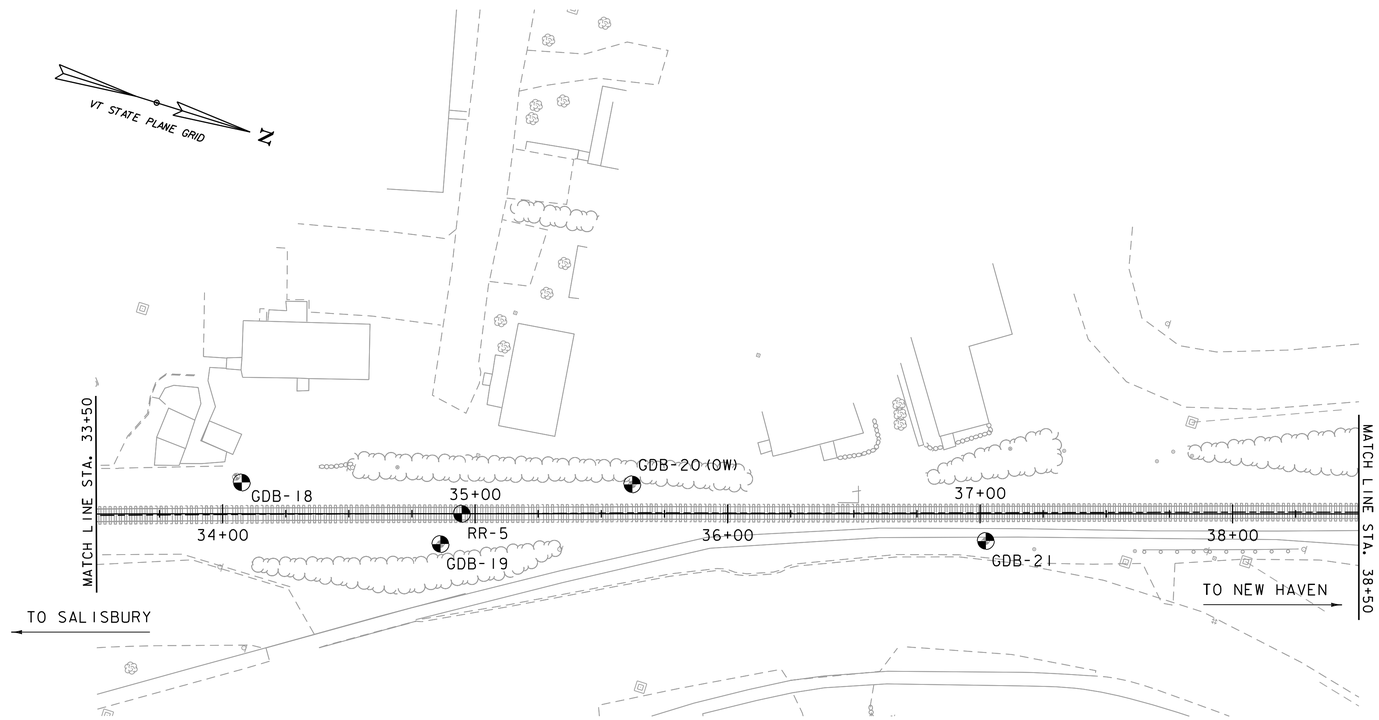
DENSITY (GRANULAR SOILS)		CONSISTENCY (COHESIVE SOILS)	
N	DESCRIPTIVE TERM	N	DESCRIPTIVE TERM
<5	Very Loose	<2	Very Soft
5-10	Loose	2-4	Soft
11-24	Med. Dense	5-8	Med. Stiff
25-50	Dense	9-15	Stiff
>50	Very Dense	16-30	Very Stiff
		31-60	Hard
		>60	Very Hard

COMMONLY USED SYMBOLS

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

COLOR

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



BORING LAYOUT

SCALE 1" = 30'-0"
30 0 30

BORING CHART

HOLE NO.	SURV. STATION	OFFSET	GROUND ELEV.	ELEV. TLOB	NORTHING	EASTING
GDB-20(OW)	35+62.25	11.67 LT	359.55'	N/A	553519.46	1464326.04
GDB-18	34+07.58	12.38 LT	357.31'	N/A	553371.66	1464371.64
GDB-19	34+86.30	11.99 RT	358.72'	N/A	553454.06	1464371.34
GDB-21	37+02.26	10.74 RT	360.36'	N/A	553659.76	1464305.54
RR-5	34+94.73	0.03 LT	358.24'	N/A	553458.51	1464357.36

DEFINITIONS (AASHTO)

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

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

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

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

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

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

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

VARVED - Alternate layers of silt and clay.

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

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

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

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

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

DIP - Inclination of bed with a horizontal plane.

GENERAL NOTES

1. The subsurface explorations shown herein were made between March 2013 and December 2015 by GeoDesign, Inc.
2. Soil and rock classifications, properties and descriptions are based on engineering interpretation from available subsurface information by GeoDesign, Inc. 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 survey feet.

PROJECT NAME: MIDDLEBURY
PROJECT NUMBER: WCRS(23)

FILE NAME: z10g044bor_pl.dgn
PROJECT LEADER: A.P. GUYETTE
DESIGNED BY: GEODESIGN
BORING INFORMATION SHEET (5 OF 6)

PLOT DATE: 10/18/2016
DRAWN BY: C.J. HAKEY
CHECKED BY: GEODESIGN
SHEET 37 OF 116

VHB 57603

SOIL CLASSIFICATION

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

ROCK QUALITY DESIGNATION

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

SHEAR STRENGTH

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

CORRELATION GUIDE OF "N" TO DENSITY/CONSISTENCY

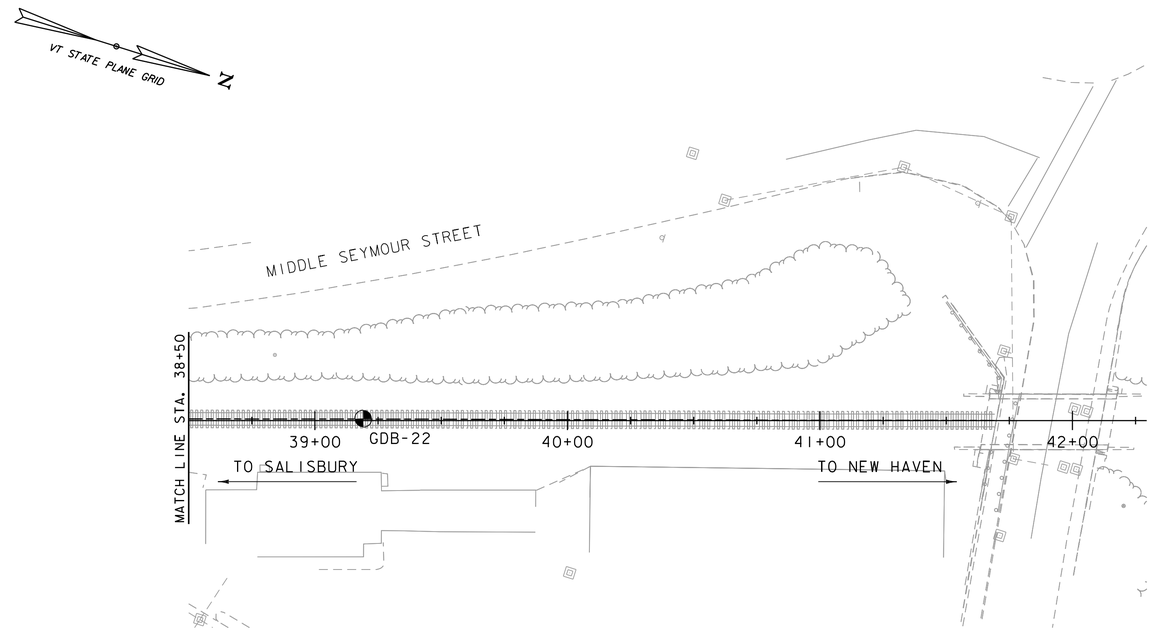
DENSITY (GRANULAR SOILS)		CONSISTENCY (COHESIVE SOILS)	
N	DESCRIPTIVE TERM	N	DESCRIPTIVE TERM
<5	Very Loose	<2	Very Soft
5-10	Loose	2-4	Soft
11-24	Med. Dense	5-8	Med. Stiff
25-50	Dense	9-15	Stiff
>50	Very Dense	16-30	Very Stiff
		31-60	Hard
		>60	Very Hard

COMMONLY USED SYMBOLS

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

COLOR

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



BORING LAYOUT

SCALE 1" = 30'-0"
30 0 30

BORING CHART

HOLE NO.	SURV. STATION	OFFSET	GROUND ELEV.	ELEV. TLOB	NORTHING	EASTING
GDB-22	39+19.14	0.78 LT	359.70	N/A	553863.26	1464229.67

DEFINITIONS (AASHTO)

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

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

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

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

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

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

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

VARVED - Alternate layers of silt and clay.

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

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

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

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

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

DIP - Inclination of bed with a horizontal plane.

GENERAL NOTES

1. The subsurface explorations shown herein were made between March 2013 and December 2015 by GeoDesign, Inc.
2. Soil and rock classifications, properties and descriptions are based on engineering interpretation from available subsurface information by GeoDesign, Inc. 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 survey feet.

vhb

PROJECT NAME: MIDDLEBURY
PROJECT NUMBER: WCRS(23)

FILE NAME: z10g044bor_pl.dgn
PROJECT LEADER: A.P. GUYETTE
DESIGNED BY: GEODESIGN
BORING INFORMATION SHEET (6 OF 6)

PLOT DATE: 10/18/2016
DRAWN BY: C.J. HAKEY
CHECKED BY: GEODESIGN
SHEET 38 OF 116

BORING LOG

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
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

Project Name: Middlebury WCRS (23) Phase B, Middlebury, VT

Boring No.: **GDB-1**
Page No.: 1 of 1
File No.: 837-65.1
Checked By: DTH

Boring Company: TransTech Drilling Services
Foreman: John Leonhardt
GeoDesign Rep.: Jacob Wimett
Date Started: October 31, 2013 — Date Finished: October 31, 2013
N. Coordinate: — E. Coordinate:
Ground Surface Elevation (feet): 350.3
Station: 12+00 — Offset: 0 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 550X ATV	
Hammer Type: Automatic	

Groundwater Observations

Date	Depth (ft)	Elev. (ft)	Notes
▼ 10/31/13, 8:00	12.0	338.3	Wet sampler tip.

Sample Information

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	Casing Time (min./ft)	Moisture Content (%)
		S1	SS	24	10	0	5	7	9	9		
		S2	SS	24	12	2	5	4	8	7		
5		S3	SS	24	15	4	2	3	3	4		
		S4	SS	24	24	6	3	5	6	6		
		S5	SS	24	2	8	3	4	5	5		
10		S6	SS	24	21	10	5	12	9	14		
15		S7	SS	24	3	14	8	9	6	2		
20		S8	SS	24	10	19	8	8	9	9		9.4
25		S9	SS	24	24	24	WOR	1	4	5		
30		S10	SS	16	16	29	26	50	50/4"			
35												

Strata Description (Depth & Elevation(feet)) / Sample Description (Classification System: Burmister)

- Fill — S1) Medium dense, black fine to coarse SAND, some Silt, some fine to coarse Gravel, trace Ash, slightly moist.
- 2 Possible Reworked Subsoil (Clayey Silt) 348.3 — S2) Stiff, gray with brown Clayey SILT, little fine Sand, trace fine Gravel, trace Organic Matter, moist.
- 6 Silt & Clay with Organics 344.3 — S3) Medium / Loose, dark brown and gray SILT and Clayey SILT, little fine to medium Sand, trace fine Gravel, trace Organic Matter, moist. Organic odor.
- 8 Gravelly Sand & Silt 342.3 — S4) Stiff, blue-gray with orange mottling SILT & CLAY, trace fine Sand, trace Organic Fibers, moist. Slight Organic Odor.
- S5) Loose, tan-brown SILT, some fine Sand, moist (Possible Auger Cuttings).
- S6) Medium dense, tan-brown SILT , some fine to coarse Sand, little (+) fine Gravel, very moist to wet.
- 16 Gravelly Sand & Silt (with Inferred Cobbles) 334.3 — S7) Medium dense / stiff, gray fine to coarse SAND and SILT & CLAY, little fine Gravel, wet.
- S8) Medium dense, light gray fine to coarse SAND and SILT, little fine Gravel, trace Clay & Silt (in one 1/8" thick layer), wet.
- S9) Loose, gray fine to medium SAND, little (+) Silt, little fine to coarse Gravel, wet.
- 28 Glacial Till 322.3
- 30.3 Bottom of Exploration at 30.3 ft 320.0 — S10) Refusal, gray fine to medium SAND, some (+) Silt, little fine Gravel, wet.

Remarks
1) Northing, Easting, and Elevation based on survey by VHB.
2) Sampling of S2, S4, and S6 was not performed in accordance with ASTM D 1586 requirements (borehole was not cleared with augers between consecutive samples) and blow counts do not represent SPT N values.
3) Frequent auger grinding on inferred cobbly soils below 16' deep.
4) Sample S9 at 24' deep appears to have partially liquefied upon sampling. SPT N-values likely reflect a looser condition than that of the undisturbed in-situ soil.
5) Driller maintained a head of water on the borehole beginning at 24' deep.
6) Driller noted an increase in auger resistance at 28' deep on inferred transition to glacial till soils.
7) Boring terminated with split spoon refusal at approximately 30.3 feet deep.

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.: **GDB-1**

SMALL BORING # - SMALL REMARK 837-65.1 MIDDLEBURY PHASE B.GPJ GEODESIGN STANDARD .GDT 1/10/14

BORING LOG

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
P.O. Box 699, Windsor, VT 05089, Phone: 802-674-2033/Fax: 802-674-5943
40 Farrell Street, S. Burlington, VT 05403, Phone: 802-652-5140

Project Name: Middlebury WCRS (23) Additional Drilling 2016, Middlebury, VT

Boring No.: **GDB-2(OW)**
Page No.: 1 of 1
File No.: 837-65.4
Checked By: DTH

Boring Company: TransTech Drilling Services
Foreman: John Leonhardt
GeoDesign Rep.: Jacob Wimett
Date Started: October 31, 2013 — Date Finished: October 31, 2013
N. Coordinate: — E. Coordinate:
Ground Surface Elevation (feet): 351
Station: 13+75 — Offset: 0 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 550X ATV	
Hammer/Rod Type: Automatic	

Groundwater Observations

Date	Depth (ft)	Elev. (ft)	Notes
▼ 10/31/13, 11:15	7.7	343.3	In augers (20 min.)
▼ 11/12/13, 16:00			Dry well (to 9.6')?
▼ 2/3/14, 12:00	3.9	347.1	In well
▼ 6/24/14, 0:00	3.2	347.8	In well
▼ 12/4/15, 10:00	2.7	348.3	In well
▼ 4/7/16, 9:20	1.7	349.3	In well

Sample Information

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	Casing Time (min./ft)	Moisture Content (%)
		S1	SS	24	16	0	4	8	16	15		
		S2	SS	24	18	2	10	6	9	12		
5		S3	SS	24	15	4	5	7	6	9		
		S4	SS	24	18	6	4	7	18	27		
		S5	SS	24	9	8	5	14	75	27		
10		S6	SS	24	12	10	16	14	8	7		9.8
15		S7	SS	24	4	14	5	14	15	19		
20		S8	SS	24	11	19	4	8	20	35		
25		S9	SS	12	6	24	28	56/6"				10.2
30												

Strata Description (Depth & Elevation(feet)) / Sample Description (Classification System: Burmister)

- Fill — S1) Medium dense, black-brown fine to coarse SAND, some (+) fine to coarse Gravel, some Silt, slightly moist.
- 3 Sandy Silt 348.0 — S2) Medium dense, S2A - Top 7": Brown fine to medium SAND, trace fine Gravel, trace Silt, slightly moist. S2B - Bottom 11": Brown to olive brown SILT, some fine Sand, trace Organic Matter (concentrated at top of sample), slightly moist.
- 7 Sand & Gravel 344.0 — S3) Medium dense, brown SILT, little fine Sand, moist.
- 10 Gravelly Sand & Silt (with Inferred Cobbles) 341.0 — S4) Medium dense, S4A - Top 9": Olive brown with orange mottling SILT, some fine Sand, little Clayey Silt, very moist. S4B - Bottom 9": Brown fine to coarse SAND, some fine to coarse gravel, some(-) Silt, wet.
- S5) Refusal, brown, fine to coarse SAND and fine to coarse GRAVEL, little (+)Silt, wet.
- S6) Medium dense, gray SILT, some (+) fine to coarse Sand, little fine Gravel, wet.
- 20 Glacial Till 331.0 — S7) Medium dense, gray fine to coarse SAND and SILT, trace fine Gravel, wet.
- S8) Medium dense, light brown fine to medium SAND and SILT, trace fine Gravel, wet.
- 25 Bottom of Exploration at 25.0 ft 326.0 — S9) Refusal, gray fine to coarse SAND and SILT, little fine Gravel, wet.

Remarks
1) Northing, Easting, and Elevation based on survey by VHB.
2) Sampling of S2, S4, and S6 was not performed in accordance with ASTM D 1586 requirements (borehole was not cleared with augers between consecutive samples) and blow counts do not represent SPT N values.
3) Frequent auger grinding and chatter below 10' deep through inferred cobbly or gravelly soils.
4) Removed augers and backfilled hole. Offset 2' north and drilled to 10' deep to install observation well. Placed flush mount cover at rail tie level.
5) Boring terminated with split spoon refusal at approximately 25.0 feet deep.

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%

Boring No.: **GDB-2(OW)**

ADDITIONAL WLS SMALL REMARK FONT 837-65.4 MIDDLEBURY ADDL 2016.GPJ GEODESIGN STANDARD .GDT 5/27/16

BORING LOG

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
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

Project Name: Middlebury WCRS (23) Phase B, Middlebury, VT

Boring No.: **GDB-3**
Page No.: 1 of 1
File No.: 837-65.1
Checked By: DTH

Boring Company: TransTech Drilling Services
Foreman: John Leonhardt
GeoDesign Rep.: Jacob Wimett
Date Started: October 31, 2013 — Date Finished: October 31, 2013
N. Coordinate: — E. Coordinate:
Ground Surface Elevation (feet): 350.3
Station: 16+08 — Offset: 10 ft Right

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 550X ATV	
Hammer Type: Automatic	

Groundwater Observations

Date	Depth (ft)	Elev. (ft)	Notes
▼ 10/31/13, 2:15	3.0	347.3	Wet sample.

Sample Information

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	Casing Time (min./ft)	Moisture Content (%)
		S1	SS	24	12	0	1	2	3	3		
		S2	SS	24	12	2	10	4	5	3		
5		S3	SS	24	5	4	1	2	2	3		
		S4	SS	24	24	6	1	2	14	24		
		S5	SS	24	12	8	12	14	16	13		
10		S6	SS	24	16	10	14	12	19	21		
15		S7	SS	23	23	14	16	23	40	50/5"		
20												
25												
30												

Strata Description (Depth & Elevation(feet)) / Sample Description (Classification System: Burmister)

- 1 Topsoil — S1) Loose, black-brown SILT, little fine to coarse SAND, little fine Gravel, trace Organics, moist. (Topsoil).
- Reworked Silt/Clay/Sand Fill 349.3 — S2) Loose / stiff, dark brown SILT & CLAY and fine to coarse SAND, little fine Gravel, trace Organics, moist to wet.
- 4 Probable Fill (Gravelly Silt & Sand) 346.3 — S3) Very loose / medium, dark brown fine to coarse SAND and SILT & CLAY, little fine to coarse Gravel, wet.
- 7 Glacial Till 343.3 — S4) Medium dense / stiff, S4A - Top 18": Brown fine to coarse SAND and SILT & CLAY, little fine Gravel, wet. S4B - Bottom 6": Tan-brown SILT and fine to coarse SAND, some fine to coarse Gravel (fractured), wet.
- S5) Dense, tan-brown fine to coarse SAND, some Silt, some fine to coarse Gravel (occasionally fractured), wet.
- S6) Dense, tan-brown SILT and fine to coarse SAND, little (+) fine to coarse Gravel, wet.
- 15.9 Bottom of Exploration at 15.9 ft 334.4 — S7) Very dense, tan-brown fine to coarse SAND, some (+) Silt, little (+) fine Gravel, wet.

Remarks
1) Northing, Easting, and Elevation based on survey by VHB.
2) Sampling of S2, S4, and S6 was not performed in accordance with ASTM D 1586 requirements (borehole was not cleared with augers between consecutive samples) and blow counts do not represent SPT N values.
3) Frequent auger grinding and chatter below 7' deep through inferred cobbly or gravelly soils.
4) Boring terminated without refusal at approximately 15.9 feet deep.

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.: **GDB-3**

SMALL BORING # - SMALL REMARK 837-65.1 MIDDLEBURY PHASE B.GPJ GEODESIGN STANDARD .GDT 1/10/14

*NOTE: SEE BORING CHART ON BORING INFORMATION SHEETS FOR NORTHING AND EASTING INFORMATION

vhb

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044borlogs_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: C.J. HAKEY
DESIGNED BY: GEODESIGN	CHECKED BY: GEODESIGN
BORING LOGS (1 OF 28)	SHEET 39 OF 116

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
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: Middlebury WCRS (23) Phase B Middlebury, VT

Boring No.: **GDB-4** | Page No.: 1 of 1 | File No.: 837-65.1 | Checked By: DTH

Boring Company: TransTech Drilling Services
Foreman: John Leonhardt
GeoDesign Rep.: Joshua Gilman
Date Started: November 5, 2013 | Date Finished: November 5, 2013
N. Coordinate: | E. Coordinate:
Ground Surface Elevation (feet): 349.7
Station: 17+02 | Offset: 14 ft Left

	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 550X ATV	
Hammer Type:	Automatic	

Groundwater Observations

Date	Depth (ft)	Elev. (ft)	Notes
11/5/13, 13:45	6.0	343.7	Wet sample

Sample Information

Depth (ft)	Casing Blows/ft	Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	0 - 6	6 - 12	12 - 18	18 - 24	Coring Time (min./ft)	Moisture Content (%)
		S1	SS	24	8	0	3	3	3	3		
		S2	SS	24	14	2	7	7	9	17		10.0
5		S3	SS	24	8	4	6	10	4	3		
		S4	SS	24	17	6	2	2	2	2		
		S5	SS	24	6	8	4	5	6	4		14.6
10		S6	SS	24	8	10	3	31	44	26		
15		S7	SS	18	16	14	20	43	55/6"			
20												
25												
30												

Strata Description (Depth & Elevation (feet)):
- Fill
- 2 — Fill (Gravelly Sand and Silt) 347.7
- 10 — Glacial Till 339.7
- 15.5 — Bottom of Exploration at 15.5 ft 334.2

Sample Description (Classification System: Burmister)
- S1) Loose, dark brown SILT and fine to coarse SAND, little fine to coarse Gravel, trace Glass, trace Organics, wet.
- S2) Medium dense, tan and gray (areas dark brown) fine to coarse SAND, some Silt, some fine to coarse Gravel, moist. Pockets dark brown fine to coarse SAND and SILT, organic odor.
- S3) Medium dense, tan and gray fine to coarse SAND, some Silt, trace fine Gravel, trace Roots moist.
- S4) Loose, tan & gray fine to coarse SAND, some Silt, trace fine Gravel, trace Roots, wet.
- S5) Medium dense, brown fine to coarse SAND, little Silt, trace fine Gravel, trace Synthetic Fiber/ Grout Chips, wet.
- S6) Very dense, light brown fine to coarse SAND, some fine to coarse Gravel, some Silt, wet.
- S7) Refusal, tan with gray mottling fine to coarse SAND and Silt, wet.

Remarks:
1) Northing, Easting, and Elevation based on survey by VHB.
2) Sampling of S2, S4, and S6 was not performed in accordance with ASTM D 1586 requirements (borehole was not cleared with augers between consecutive samples) and blow counts do not represent SPT N values.
3) Flowing sand observed in Sample S6 upon recovery. Driller maintained head of water in augers for remainder of boring.
4) Boring terminated with split spoon refusal at approximately 15.5 feet deep.

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.: **GDB-4**

SMALL BORING # - SMALL REMARK 837-65.1 MIDDLEBURY PHASE B.GPJ GEODESIGN STANDARD .GDT 1/10/14

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
P.O. Box 699, Windsor, VT 05089, Phone: 802-674-2033/Fax: 802-674-5943
40 Farrell Street, S. Burlington, VT 05403, Phone: 802-652-5140

BORING LOG

Project Name: Middlebury WCRS (23) Additional Drilling 2016 Middlebury, VT

Boring No.: **GDB-5(OW)** | Page No.: 1 of 1 | File No.: 837-65.4 | Checked By: DTH

Boring Company: TransTech Drilling Services
Foreman: John Leonhardt
GeoDesign Rep.: Jacob Wimett / Joshua Gilman
Date Started: November 1, 2013 | Date Finished: November 1, 2013
N. Coordinate: | E. Coordinate:
Ground Surface Elevation (feet): 349
Station: 17+93 | Offset: 11 ft Left

	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 550X ATV	
Hammer/Rod Type:	Automatic	

Groundwater Observations

Date	Depth (ft)	Elev. (ft)	Notes
11/1/13, 9:00	1.0	348.0	In augers (30 min.)
11/4/13, 8:00	1.0	348.0	In open borehole
11/12/13, 15:50	1.7	347.3	In well
2/3/14, 12:00	2.9	346.1	In well
6/24/14, 0:00	1.0	348.0	See note 7
12/4/15, 10:22	2.6	346.5	In well
4/7/16, 9:15	1.5	347.5	In well

Sample Information

Depth (ft)	Casing Blows/ft	Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	0 - 6	6 - 12	12 - 18	18 - 24	Coring Time (min./ft)	Moisture Content (%)
		S1	SS	24	12	0	1	1	3	2		
		S2	SS	24	13	2	2	2	3	3		
5		S3	SS	24	12	4	2	3	3	4		23.5
		S4	SS	13	6	6	2	34	50/1"			
		S5	SS	24	18	8	7	12	20	23		
10		S6	SS	24	11	10	12	21	24	24		
15		S7	SS	2	2	14	50/2"					
20		S8	SS	14	14	19	37	71	50/2"			
25												
30												

Strata Description (Depth & Elevation (feet)):
- Topsoil
- 1 — Fill 348.0
- 7 — Silty Sand & Gravel (with Inferred Cobbles & Boulders) 342.0
- 10 — Glacial Till 339.0
- 20.2 — Bottom of Exploration at 20.2 ft 328.8

Sample Description (Classification System: Burmister) | Well Log
- S1) Very loose, black SILT, some fine to coarse Sand, trace fine to coarse Gravel, trace Organics, moist. (Topsoil).
- S2) Medium / loose, brown SILT & CLAY and fine to coarse SAND, trace Organics, trace fine Gravel, wet.
- S3) Medium / loose, brown SILT & CLAY and fine to coarse SAND, trace fine Gravel, trace Organics, wet.
- S4) Refusal, brown SILT & CLAY and fine to coarse GRAVEL (fractured), little fine to coarse Sand, trace Organics, wet.
- S5) Dense, tan-brown fine to coarse SAND, little fine Gravel, little Silt, wet.
- S6) Dense, tan-brown fine to coarse SAND, some Silt, little fine Gravel, wet.
- S7) Refusal, tan-brown fractured fine to coarse GRAVEL and SILT, little fine to coarse Sand, wet.
- S8) Refusal, tan-brown SILT and fine to coarse SAND, little fine Gravel, wet.

Remarks:
1) Northing, Easting, and Elevation shown based on visual estimates by GeoDesign personnel and an electronic site plan provided by VHB.
2) Sampling of S2, S4, and S6 was not performed in accordance with ASTM D 1586 requirements (borehole was not cleared with augers between consecutive samples) and blow counts do not represent SPT N values.
3) Well installed in adjacent borehole drilled between the rails. First two attempted well locations were abandoned based on refusals on inferred boulders at approximately 4 feet deep.
4) Auger grinding at 7' deep on inferred boulder.
5) Frequent auger grinding and rig chatter below 7' deep through inferred bouldery / cobbly soils.
6) Boring terminated with split spoon refusal at approximately 20.2 feet deep.
7) On 6/24/14 - Water in flush mount box 0.2' below grade.

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%

Boring No.: **GDB-5(OW)**

ADDITIONAL WLS SMALL REMARK FONT 837-65.4 MIDDLEBURY ADDL 2016.GPJ GEODESIGN STANDARD .GDT 5/27/16

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
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: Middlebury WCRS (23) Phase B Middlebury, VT

Boring No.: **GDB-6** | Page No.: 1 of 1 | File No.: 837-65.1 | Checked By: DTH

Boring Company: TransTech Drilling Services
Foreman: John Leonhardt
GeoDesign Rep.: Joshua Gilman
Date Started: November 5, 2013 | Date Finished: November 5, 2013
N. Coordinate: | E. Coordinate:
Ground Surface Elevation (feet): 349.1
Station: 18+91 | Offset: 17 ft Left

	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 550X ATV	
Hammer Type:	Automatic	

Groundwater Observations

Date	Depth (ft)	Elev. (ft)	Notes
11/5/13, 15:00	7.7	341.4	Wet Sample

Sample Information

Depth (ft)	Casing Blows/ft	Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	0 - 6	6 - 12	12 - 18	18 - 24	Coring Time (min./ft)	Moisture Content (%)
		S1	SS	24	0	0	2	2	4	4		
		S2	SS	24	18	2	4	3	4	7		
5		S3	SS	24	14	4	3	4	9	5		9.3
		S4	SS	24	18	6	3	2	2	2		
		S5	SS	24	8	8	1	14	2	2		
10		S6	SS	24	12	10	3	9	9	14		
15		S7	SS	24	16	14	2	14	18	50		
20		S8	SS	8	8	19	50	70/2"				
25												
30												

Strata Description (Depth & Elevation (feet)):
- Fill
- 10 — Gravelly Sand & Silt 339.1
- 17.5 — Glacial Till 331.6
- 19.6 — Bottom of Exploration at 19.6 ft 329.5

Sample Description (Classification System: Burmister)
- S1) Loose, no recovery.
- S2) Loose, gray-brown fine to coarse SAND, some Silt, little fine to coarse Gravel, trace Roots, moist (strong petroleum odor).
- S3) Medium dense, tan and gray fine to coarse SAND, some Silt, little fine to coarse Gravel, trace Roots, moist.
- S4) Loose, tan-gray fine to coarse SAND, some Silt, trace fine Gravel, moist to wet. Slight petroleum odor.
- S5) Medium dense, tan-gray fine to coarse SAND and SILT (slightly plastic), some fine to coarse Gravel, trace Wood, wet.
- S6) Medium dense, tan-gray fine to coarse SAND and fine to coarse GRAVEL, some Silt, wet.
- S7) Dense, brown fine to medium SAND and SILT, trace fine to coarse Gravel, wet.
- S8) Refusal, gray fine to medium SAND and SILT, trace fine Gravel, wet.

Remarks:
1) Northing, Easting, and Elevation based on survey by VHB.
2) Sampling of S2, S4, and S6 was not performed in accordance with ASTM D 1586 requirements (borehole was not cleared with roller bit between consecutive samples) and blow counts do not represent SPT N values.
3) Boring terminated with split spoon refusal at approximately 19.6 feet deep.

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.: **GDB-6**

SMALL BORING # - SMALL REMARK 837-65.1 MIDDLEBURY PHASE B.GPJ GEODESIGN STANDARD .GDT 1/10/14

---

*NOTE: SEE BORING CHART ON BORING INFORMATION SHEETS FOR NORTHING AND EASTING INFORMATION

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
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: Middlebury WCRS (23) Phase B, Middlebury, VT

Boring No.: GDB-7 | Page No.: 1 of 1 | File No.: 837-65.1 | Checked By: DTH

Boring Company: TransTech Drilling Services
Foreman: John Leonhardt
GeoDesign Rep.: Jacob Wirnett
Date Started: October 30, 2013 — Date Finished: October 30, 2013
N. Coordinate: — E. Coordinate:
Ground Surface Elevation (feet): 350.1
Station: 20+00 — Offset: 9 ft Right

	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 550X ATV	
Hammer Type:	Automatic	

Groundwater Observations

Date	Depth (ft)	Elev. (ft)	Notes
▼ 10/30/13, 12:30	1.5	348.6	Wet sample.

Sample Information

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	Casing Time (min./ft)	Moisture Content (%)	Strata Description Depth & Elevation(feet)	Symbol	Sample Description (Classification System: Burmister)
		S1	SS	24	10	0	2	4	8	6			Fill		S1) Medium dense, brown fine to medium SAND, some Silt, little fine Gravel, wet.
		S2	SS	24	2	2	5	4	5	8			4		S2) Medium dense, coarse GRAVEL, little Silt, trace fine Sand (rail ballast). Piece of gravel stuck in spoon tip.
5		S3	SS	24	14	4	5	8	8	6			Gravelly Sand & Silt 346.1		S3) Medium dense, yellow brown mottled with gray and orange fine to coarse SAND and SILT, little fine to coarse Gravel, wet.
		S4	SS	24	12	6	9	14	21	25			8		S4) Dense, brown fine to coarse SAND, some Silt, some (-) fine to coarse Gravel, wet.
		S5	SS	16	14	8	18	54	100/4"				Glacial Till 342.1		S5) Refusal, tan-brown SILT and fine to medium SAND, little fine Gravel, wet.
10		S6	SS	10	10	10	77	100/4"							S6) Refusal, tan-brown SILT, some fine to medium SAND, little fine Gravel (fractured and pulverized), wet.
15		S7	SS	4	4	14	50/4"					9.4			S7) Refusal, gray SILT and fine to medium SAND, little fine Gravel, wet.
20		S8	SS	4	3	19	50/4"								S8) Refusal, gray SILT and coarse GRAVEL (stuck in spoon tip), some fine to medium Sand, wet.
25		S9	SS	4	0	24	50/4"						24.3 Bottom of Exploration at 24.3 ft 325.8		S9) Refusal, no recovery.
30															

Remarks
1) Northing, Easting, and Elevation based on survey by VHB.
2) Sampling of S2 and S4 was not performed in accordance with ASTM D 1586 requirements (borehole was not cleared with roller bit between consecutive samples) and blow counts do not represent SPT N values.
3) Advanced casing to 10' deep. Performed boring open hole below 10' deep.
4) Occasional rig chatter on inferred cobbles/boulders below 15' deep.
5) BOE at 24.3' deep with SS refusal in glacial till. Bedrock not encountered.
5) Boring terminated with split spoon refusal at approximately 24.3 feet deep.

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.

SMALL BORING # SMALL REMARK 837-65.1 MIDDLEBURY PHASE B.GPJ GEODESIGN STANDARD .GDT 1/10/14

Boring No.: GDB-7

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
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: Middlebury WCRS (23) Phase B, Middlebury, VT

Boring No.: GDB-8 | Page No.: 1 of 1 | File No.: 837-65.1 | Checked By: DTH

Boring Company: TransTech Drilling Services
Foreman: John Leonhardt
GeoDesign Rep.: Joshua Gilman
Date Started: November 5, 2013 — Date Finished: November 5, 2013
N. Coordinate: — E. Coordinate:
Ground Surface Elevation (feet): 349
Station: 21+07 — Offset: 15 ft Left

	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 550X ATV	
Hammer Type:	Automatic	

Groundwater Observations

Date	Depth (ft)	Elev. (ft)	Notes
▼ 11/5/13, 12:00			See Remark No. 3.

Sample Information

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	Casing Time (min./ft)	Moisture Content (%)	Strata Description Depth & Elevation(feet)	Symbol	Sample Description (Classification System: Burmister)
		S1	SS	24	0	0	2	2	4	4			Fill		S1) Loose, no recovery.
		S2	SS	24	13	2	9	8	8	8			4		S2) Medium dense, tan and brown (top 2" bluish gray) fine to coarse SAND, some Silt, little fine to coarse Gravel, moist to wet.
5		S3	SS	24	8	4	3	5	8	25			Gravelly Sand & Silt 345.0		S3) Medium dense, tan-brown fine to coarse SAND, some fine to coarse Gravel, some Silt, wet.
		S4	SS	9	9	6	44	100/3"					6 Glacial Till 343.0		S4) Refusal, tan-brown fine to coarse SAND, some fine to coarse GRAVEL, little Silt, moist.
		S5	SS	12	10	8	34	100/6"				5.5			S5) Refusal, tan-brown fine to coarse SAND, some fine to coarse Gravel, some Silt, damp.
10		S6	SS	4	4	10	100/4"								S6) Refusal, tan fine to coarse SAND and SILT, some fine to coarse Gravel, wet.
		C2	C	18	5	12	[REC= 28%; RQD= 28%]						12 Boulder 337.0 13 Glacial Till 336.0		C1) Poor quality, moderately hard, fresh, blue-gray, fine grained DOLOMITE (Boulder). Reaction of powder to dilute HCl.
15		S7	SS	6	6	14	100/6"				1.1 -0.3				S7) Refusal, gray SILT and fine to coarse SAND, trace fine Gravel, wet.
20		S8	SS	16	12	19	24	28	50/4"						S8) Refusal, gray SILT, some fine to coarse SAND, little fine to coarse Gravel, wet.
25		S9	SS	2	0	24	50/2"						24.1 Bottom of Exploration at 24.1 ft 324.9		S9) Refusal, no recovery.
30															

Remarks
1) Northing, Easting, and Elevation shown based on visual estimates by GeoDesign personnel and an electronic site plan provided by VHB.
2) Sampling of S2, S4, and S6 was not performed in accordance with ASTM D 1586 requirements (borehole was not cleared with roller bit between consecutive samples) and blow counts do not represent SPT N values.
3) Driller advanced hole with 3.25" I.D. hollow stem augers to 10 feet deep, then switched to wash-and-drive drilling method. Sample moisture descriptions may not accurately reflect in-situ conditions due to water being continuously added to the borehole during roller bit advance.
4) Driller attempted C1 following roller bit refusal at 12 feet deep. Core barrel penetrated boulder at approximately 12 feet, and borehole was continued.
5) Boring terminated with split spoon refusal at approximately 24.1 feet deep.

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.

SMALL BORING # SMALL REMARK 837-65.1 MIDDLEBURY PHASE B.GPJ GEODESIGN STANDARD .GDT 1/10/14

Boring No.: GDB-8

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
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: Middlebury WCRS (23) Phase B, Middlebury, VT

Boring No.: GDB-10(P) | Page No.: 1 of 1 | File No.: 837-65.1 | Checked By: DTH

Boring Company: TransTech Drilling Services
Foreman: John Leonhardt
GeoDesign Rep.: Jacob Wirnett
Date Started: November 11, 2013 — Date Finished: November 11, 2013
N. Coordinate: — E. Coordinate:
Ground Surface Elevation (feet): 350
Station: 22+60 — Offset: 0 ft

	Casing:	Sampler:
Type:	SSA	N/A
I.D.:	2.5 in.	in.
Hammer Wt.:	NA	
Hammer Fall:	NA	
Rig Type:	CME 550X ATV	
Hammer Type:		

Groundwater Observations

Date	Depth (ft)	Elev. (ft)	Notes
▼			
▼			
▼			
▼			

Sample Information

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	Casing Time (min./ft)	Moisture Content (%)	Strata Description Depth & Elevation(feet)	Symbol	Sample Description (Classification System:)
													No sampling		
5															
10															
15															
													18.5 Bottom of Exploration at 18.5 ft 331.5		
20															
25															
30															

Remarks
1) Northing, Easting, and Elevation based on taped measurements made in the field by GeoDesign personnel and an electronic topographic plan provided by VHB.
2) Solid stem auger probe performed at an approximate 12 degree angle (from vertical) due to driller being unable to put outrigger down on rail track.
3) Boring terminated with solid stem auger refusal at approximately 18.5' deep on inferred bedrock. (19' of augers at a 12 degree angle. Borehole bottom approximately 4' west of borehole top due to auger angle).

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.

SMALL BORING # SMALL REMARK 837-65.1 MIDDLEBURY PHASE B.GPJ GEODESIGN STANDARD .GDT 1/10/14

Boring No.: GDB-10(P)

*NOTE: SEE BORING CHART ON BORING INFORMATION SHEETS FOR NORTHING AND EASTING INFORMATION

vhb

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044borlogs_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: C.J. HAKEY
DESIGNED BY: GEODESIGN	CHECKED BY: GEODESIGN
BORING LOGS (3 OF 28)	SHEET 41 OF 116

VHB 57603

BORING LOG

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
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

Project Name: Middlebury WCRS (23) Phase B, Middlebury, VT

Boring No.: GDB-13
Page No.: 1 of 1
File No.: 837-65.1
Checked By: DTH

Boring Company: TransTech Drilling Services
Foreman: John Leonhardt
GeoDesign Rep.: Jacob Wimett
Date Started: October 30, 2013 — Date Finished: October 30, 2013
N. Coordinate: — E. Coordinate:
Ground Surface Elevation (feet): 352.2
Station: 29+05 — Offset: 10 ft Right

Casing: Type	HSA/FJ	Sampler: SS
I.D.:	in.	1.38 in.
Hammer Wt.:	N/A	140 lbs
Hammer Fall:	N/A	30 in.
Rig Type:	CME 550X ATV	
Hammer Type:	Automatic	

Groundwater Observations			
Date	Depth (ft)	Elev. (ft)	Notes
▼ 10/30/13, 7:30	2.0	350.2	Wet sample.

Sample Information

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	Casing Time (min./ft)	Moisture Content (%)
		S1	SS	24	3	0	1	1	1	2		
		S2	SS	16	15	2	1	2	100/4"			
5		S3	SS	24	11	4	1	2	2	2		
		S4	SS	24	15	6	2	5	5	12		
		S5	SS	24	14	8	5	4	7	14		10.4
10		S6	SS	24	12	10	22	36	31	23		
		C1	C	60	60	13.5	[REC= 100%; RQD= 100%]					
15												
		C2	C	60	58	18.5	[REC= 97%; RQD= 97%]					
20												
25												
30												

Strata Description

Depth & Elevation(feet)	Strata
Topsoil 351.9	
Fill (with inferred Cobbles / Boulders)	
6	
Silty Clay with Organics (Probable Fill) 346.2	
8	
Clayey Silt and Sand 344.2	
10	
Glacial Till 342.2	
13.5	
Bedrock (Limestone) 338.7	
23.5	
Bottom of Exploration at 23.5 ft 328.7	

Sample Description (Classification System: Burmister)

- S1) Very loose, brown SILT, some fine to coarse Sand, trace Organic Matter, moist. (Topsoil).
- S2) Refusal, dark brown CLAY & SILT and fine to coarse SAND, some fine Gravel, wet.
- S3) Medium, dark brown CLAY & SILT, some fine to coarse Sand, trace fine Gravel, trace Organic Matter, wet.
- S4) Stiff, dark gray-brown Silty CLAY, little fine to coarse SAND, trace fine Gravel, trace Organic Matter, wet.
- S5) Medium dense, tan-brown with gray Clayey SILT and fine to coarse SAND, trace fine to coarse Gravel, wet.
- S6) Very dense, tan-brown fine to coarse SAND, some Silt, some fine to coarse Gravel, wet.
- C1) Excellent quality, moderately hard, fresh, moderate jointing, light gray with dark gray swirls and white bands and swirls LIMESTONE. Strong reaction to dilute HCl. Jointing near horizontal.
- C1) Excellent quality, moderately hard, fresh, moderate jointing, light gray white bands and swirls LIMESTONE. Strong reaction to dilute HCl. Jointing approximately 5 to 30 degrees from horizontal.

Remarks
1) Northing, Easting, and Elevation based on survey by VHB.
2) Sampling of S2, S4, and S6 was not performed in accordance with ASTM D 1586 requirements (borehole was not cleared with augers between consecutive samples) and blow counts do not represent SPT N values.
3) Inferred sample S2 refusal on a boulder or cobble at approximately 3 feet deep.
4) Removed augers and switched to flush joint casing with wash-drive drilling methods after sampling S6 at 10 feet deep.
5) Casing driven to refusal at approximately 13.5 feet deep. Roller bit refusal at 13.5 feet deep and borehole continued with rock core to approximately 23.5 feet deep.

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.: GDB-13

SMALL BORING # - SMALL REMARK 837-65.1 MIDDLEBURY PHASE B.GPJ GEODESIGN STANDARD .GDT 11/10/14

BORING LOG

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
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

Project Name: Middlebury WCRS (23) Phase B, Middlebury, VT

Boring No.: GDB-14
Page No.: 1 of 1
File No.: 837-65.1
Checked By: DTH

Boring Company: TransTech Drilling Services
Foreman: John Leonhardt
GeoDesign Rep.: Jacob Wimett
Date Started: November 12, 2013 — Date Finished: November 12, 2013
N. Coordinate: — E. Coordinate:
Ground Surface Elevation (feet): 355
Station: 29+99 — Offset: 11 ft Left

Casing: Type	Flush	Sampler: SS
I.D.:	4.0 in.	1.38 in.
Hammer Wt.:	140 lbs	140 lbs
Hammer Fall:	30 in.	30 in.
Rig Type:	CME 550X ATV	
Hammer Type:	Automatic	

Groundwater Observations			
Date	Depth (ft)	Elev. (ft)	Notes
▼ 11/12/13, 0:00			See Remark No. 3

Sample Information

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	Casing Time (min./ft)	Moisture Content (%)
		S1	SS	24	6	0	2	2	4	3		
		S2	SS	24	11	2	3	4	2	4		
5		S3	SS	24	0	4	3	3	4	5		
		S4	SS	24	19	6	2	4	5	6		
		S5	SS	24	24	8	3	3	5	5		
10		S6	SS	24	24	10	7	6	7	6		
15		S7	SS	24	24	14	2	2	3	4		43.0
20		S8	SS	24	24	19	1	2	2	2		
25		S9	SS	24	24	24	WOH	WOH	WOH	1		26.3
30		S10	SS	19	12	29	7	25	26	50/1"		

Strata Description

Depth & Elevation(feet)	Strata
Fill	
5	
Layered Clay & Silt 350.0	
19	
Silty Clay 336.0	
29	
30.1 Glacial Till 326.0	
Bottom of Exploration at 30.1 ft 324.9	

Sample Description (Classification System: Burmister)

- S1) Loose, dark brown SILT and fine to coarse SAND, trace Coal Ash, trace organics, very moist.
- S2) Medium / Loose, olive brown and black CLAY & SILT and fine to coarse SAND, trace (+) Coal Ash, trace fine Gravel, very moist.
- S3) Medium, no recovery.
- S4) Stiff, light brown mottled with purple-gray and gray occasionally parted CLAY & SILT, trace fine to coarse Sand, wet.
- S5) Stiff, brown mottled with orange and gray Silty CLAY, trace gray fine Sand partings, wet.
- S6) Stiff,
  Upper 12": Fibrous Wood Roller Bit Cuttings (no sample).
  Lower 12": Brown finely parted Silty CLAY, trace gray Silt and fine Sand seams up to 1/16" thick, wet.
- S7) Medium, brown occasionally parted Silty CLAY, little Clayey Silt seams (up to 1" thick), wet.
- S8) Medium, purple gray Silty CLAY, trace fine to medium Sand, trace fine Gravel (in seams up to 1/4" thick), wet.
- S9) Very soft, gray Silty CLAY, trace fine Sand, trace Silt (in seams up to 3/4" thick), wet.
- S10) Very dense, gray fine to coarse SAND and SILT, some (+) fine Gravel, wet.

Remarks
1) Northing, Easting, and Elevation based on taped measurements made in the field by GeoDesign personnel and an electronic topographic plan provided by VHB.
2) Sampling of S2 and S6 was not performed in accordance with ASTM D 1586 requirements (borehole was not cleared with roller bit between consecutive samples) and blow counts do not represent SPT N values.
3) Sample moisture descriptions may not accurately reflect in-situ conditions due to water being continuously added to the borehole during roller bit advance.
4) Inferred sample S3 at 6' deep to have been pushing piece of wood. Wood cuttings observed in wash water.
5) Casing advanced to approximately 6 feet deep. Borehole advanced below 6 feet deep open hole with the roller bit.
6) Samples below 6 feet deep occasionally had wood fibers on the outside of the sample. Not included in the sample description since it was obvious the wood fibers were carried down with the roller bit.
7) Boring terminated without split spoon refusal at approximately 30.1 feet deep.

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.: GDB-14

SMALL BORING # - SMALL REMARK 837-65.1 MIDDLEBURY PHASE B.GPJ GEODESIGN STANDARD .GDT 11/10/14

BORING LOG

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
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

Project Name: Middlebury WCRS (23) Phase B, Middlebury, VT

Boring No.: GDB-15
Page No.: 1 of 2
File No.: 837-65.1
Checked By: DTH

Boring Company: TransTech Drilling Services
Foreman: John Leonhardt
GeoDesign Rep.: Jacob Wimett
Date Started: October 29, 2013 — Date Finished: October 29, 2013
N. Coordinate: — E. Coordinate:
Ground Surface Elevation (feet): 355.6
Station: 30+92 — Offset: 8.5 ft Right

Casing: Type	H.S.A.	Sampler: SS
I.D.:	3.25 in.	1.38 in.
Hammer Wt.:	NA	140 lbs
Hammer Fall:	NA	30 in.
Rig Type:	CME 550X ATV	
Hammer Type:	Automatic	

Groundwater Observations			
Date	Depth (ft)	Elev. (ft)	Notes
▼ 10/29/13, 11:30	4.0	351.6	Wet sample.

Sample Information

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	Casing Time (min./ft)	Moisture Content (%)
		S1	SS	24	2	0	1	2	2	2		
		S2	SS	24	16	2	2	3	2	3		
5		S3	SS	24	16	4	1	25	5	2		
		S4	SS	24	24	6	3	3	2	3		
		S5	SS	24	24	8	1	1	2	2		
10		S6	SS	24	24	10	3	2	2	3		
15		S7	SS	24	24	14	WOH	WOH	WOH	1		
20		S8	SS	24	24	19	WOH	WOH	WOH	WOH		43.7
25		S9	SS	24	24	24	WOH	WOH	WOH	WOH		
30		S10	SS	24	3	29	WOR	WOH	2	3		
35		S11	SS	24	9	34	3	5	8	9		

Strata Description

Depth & Elevation(feet)	Strata
1 Topsoil	
Silt/Clay /Sand Re-Worked Fill 354.6	
5	
Layered Clay & Silt / Silty Clay 350.6	
10	
Silty Clay 345.6	
30	
Clay/Silt /Sand Mixture 325.6	

Sample Description (Classification System: Burmister)

- S1) Loose, dark brown SILT and fine to coarse Sand, trace fine Gravel, trace Organic Matter, moist. (Topsoil)
- S2) Medium, dark brown to black CLAY & SILT and fine to coarse SAND, trace fine Gravel, trace Ash, trace Plastic Debris, moist.
- S3) See remark No. 3 regarding consistency
  S3A - Top 10": Gray CLAY & SILT and fine to coarse SAND, little fine Gravel, wet.
  S3B - Bottom 4": Light purple-brown layered Silty CLAY, moist. Rolls < 1/16" thread.
- S4) Medium, brown occasionally layered Silty CLAY, trace (-) fine to coarse Sand, trace (-) fine Gravel, moist.
- S5) Soft, brown and gray layered Silty CLAY, trace fine to coarse Sand, moist.
- S6) Soft, gray Silty CLAY, wet.
- S7) Very soft, gray Silty CLAY, trace (-) fine to coarse Sand, wet.
- S8) Very soft, gray Silty CLAY, trace Clayey Silt (in one 2" thick seam), wet.
- S9) Very soft, gray Silty CLAY, trace fine Sand, wet.
- S10) Soft, gray Silty CLAY, trace fine to medium Sand, wet.
- S11) Medium dense / Stiff, gray fine to coarse

Remarks
1) Northing, Easting, and Elevation based on survey by VHB.
2) Sampling of S2, S4, and S6 was not performed in accordance with ASTM D 1586 requirements (borehole was not cleared with augers between consecutive samples) and blow counts do not represent SPT N values.
3) SPT N-values for sample S3 at 4 feet deep do not accurately reflect the soft soil consistency observed in the spoon. Infer sampler may have hit the side of a possible cobble while sampling.
4) Inferred that sampler pushed a piece of gravel during sampling S10 at 29 feet deep.
5) Boring terminated without split spoon refusal at approximately 45.9 feet deep.

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.: GDB-15

SMALL BORING # - SMALL REMARK 837-65.1 MIDDLEBURY PHASE B.GPJ GEODESIGN STANDARD .GDT 11/10/14

*NOTE: SEE BORING CHART ON BORING INFORMATION SHEETS FOR NORTHING AND EASTING INFORMATION

vhb

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044borlogs_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: C.J. HAKEY
DESIGNED BY: GEODESIGN	CHECKED BY: GEODESIGN
BORING LOGS (4 OF 28)	SHEET 42 OF 116

GEODESIGN INCORPORATED — BORING LOG (Boring No.: GDB-15)

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
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: Middlebury WCRS (23), Phase B, Middlebury, VT

Boring No.: GDB-15
Page No.: 2 of 2
File No.: 837-65.1
Checked By: DTH

Boring Company: TransTech Drilling Services
Foreman: John Leonhardt
GeoDesign Rep.: Jacob Wimett
Date Started: October 29, 2013 Date Finished: October 29, 2013
N. Coordinate: E. Coordinate:
Ground Surface Elevation (feet): 355.6
Station: 30+92 Offset: 8.5 ft Right

	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 550X ATV	
Hammer Type:	Automatic	

Groundwater Observations

Date	Depth (ft)	Elev. (ft)	Notes
10/29/13, 11:30	4.0	351.6	Wet sample.

Sample Information

Depth (ft)	Casing Blows/ft	Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	Blows 0 - 6	Blows 6 - 12	Blows 12 - 18	Blows 18 - 24	Coring Time (min./ft)	Moisture Content (%)
40		S12	SS	24	11	39	2	6	6	4		19.1
45		S13	SS	23	16	44	13	38	37	50/5"		
50												
55												
60												
65												
70												

Strata Description (Depth & Elevation (feet))

- Clay/Silt /Sand Mixture *(Continued)*
- 44 — Glacial Till 311.6
- 45.9 — Bottom of Exploration at 45.9 ft 309.7

Sample Description (Classification System: Burmister)

- SAND and SILT & CLAY, little (-) fine to coarse Gravel, wet.
- S12) Medium dense / Stiff, gray fine to coarse SAND and SILT & CLAY, little fine Gravel, wet.
- S13) Very dense, gray SILT, some (+) fine to coarse Sand, little fine to coarse Gravel, wet.

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=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.: GDB-15

GEODESIGN INCORPORATED — BORING LOG (Boring No.: GDB-16(OW), Page 1 of 2)

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
P.O. Box 699
Windsor, VT 05089
Phone: 802-674-2033/Fax: 802-674-5943
40 Farrell Street
S. Burlington, VT 05403
Phone: 802-652-5140

BORING LOG

Project Name: Middlebury WCRS (23), Additional Drilling 2016, Middlebury, VT

Boring No.: GDB-16(OW)
Page No.: 1 of 2
File No.: 837-65.4
Checked By: DTH

Boring Company: TransTech Drilling Services
Foreman: John Leonhardt
GeoDesign Rep.: Jacob Wimett
Date Started: November 8, 2013 Date Finished: November 8, 2013
N. Coordinate: E. Coordinate:
Ground Surface Elevation (feet): 355.6
Station: 32+00 Offset: 16 ft Left

	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 550X ATV	
Hammer/Rod Type:	Automatic	

Groundwater Observations

Date	Depth (ft)	Elev. (ft)	Notes
11/12/13, 15:40	3.3	352.3	In well
2/3/14, 12:00	1.9	353.7	In well
6/24/14, 0:00	4.6	351.0	In well
12/4/15, 11:35	1.8	353.8	In open hole
4/7/16, 8:41	2.3	353.3	In open hole

Sample Information

Depth (ft)	Casing Blows/ft	Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	Blows 0 - 6	Blows 6 - 12	Blows 12 - 18	Blows 18 - 24	Coring Time (min./ft)	Moisture Content (%)
		S1	SS	24	11	0	2	2	4	6		13.6
		S2	SS	24	7	2	4	4	5	6		35.9
5		S3	SS	24	11	4	2	3	3	2		57.1
		S4	SS	24	19	6	3	2	3	3		55.7
		S5	SS	24	24	8	1	2	2	2		43.6
10		S6	SS	24	24	10	3	2	2	2		43.2
15		S7	SS	24	24	14	WOH	WOH	WOH	1		49.5
20		S8	SS	24	24	19	WOH	WOH	WOH	WOH		36.3
25		S9	SS	24	24	24	WOR	WOH	WOH	WOH		68.9
30		S10	SS	24	24	29	WOR	WOH	WOH	2		35.0 / 14.8
35		S11	SS	24	16	34	4	2	3	5		33.1

Strata Description (Depth & Elevation (feet))

- Fill
- 2 — Layered Silty Clay 353.6
- 14 — Silty Clay 341.6
- 30.5 — Sandy Gravelly Clay & Silt 325.1

Sample Description (Classification System: Burmister)

- S1) Loose, brown-black fine to coarse SAND, some Silt, little fine to coarse Gravel, trace Coal Ash, trace Organics, slightly moist.
- S2) Stiff / Loose, gray mottled with light brown SILT and brown layered CLAY & SILT, little (-) fine Sand, moist.
- S3) Medium, brown finely parted Silty CLAY, trace fine Sand, trace Root Pinholes, wet.
- S4) Medium, light brown with occasional orange and gray finely parted Silty CLAY, trace fine Sand, trace Silt seams, trace Root Pinholes and decayed Roots, wet.
- S5) Medium, purple gray to brown occasionally parted Silty CLAY, trace Silt, trace fine Sand (partings), wet.
- S6) Medium, purple gray Silty CLAY, trace gray Silt seams, wet.
- S7) Very soft, gray Silty CLAY, wet.
- S8) Very soft, gray Silty CLAY, wet.
- S9) Very soft, gray Silty CLAY, wet.
- S10) Very soft,
- S10A - Top 18": Gray Silty CLAY, wet.
- S10B - Bottom 6": Gray Silty CLAY, some fine to coarse Sand, little fine Gravel, wet.
- S11) Medium, gray CLAY & SILT, some (+)

Remarks:
1) Northing, Easting, and Elevation based on survey by VHB.
2) Sampling of S2, S4, and S6 was not performed in accordance with ASTM D 1586 requirements (borehole was not cleared with roller bit between consecutive samples) and blow counts do not represent SPT N values.
3) Moisture observations in the sample descriptions may not accurately reflect in-situ conditions due to continuously adding water to the borehole during roller bit advance.
4) Sample S3 at 4' deep appeared disturbed as if the sampler was pushing a piece of gravel.
5) Driller advanced casing to 5' deep. Borehole was advanced open hole with the roller bit for the remainder of the borehole.
6) Driller noted an increase in roller bit resistance with rig chatter beginning at 31.5' deep.

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%

Boring No.: GDB-16(OW)

ADDITIONAL WLS SMALL REMARK FONT 837-65.4 MIDDLEBURY ADDL 2016.GPJ GEODESIGN STANDARD.GDT 5/27/16

GEODESIGN INCORPORATED — BORING LOG (Boring No.: GDB-16(OW), Page 2 of 2)

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
P.O. Box 699
Windsor, VT 05089
Phone: 802-674-2033/Fax: 802-674-5943
40 Farrell Street
S. Burlington, VT 05403
Phone: 802-652-5140

BORING LOG

Project Name: Middlebury WCRS (23), Additional Drilling 2016, Middlebury, VT

Boring No.: GDB-16(OW)
Page No.: 2 of 2
File No.: 837-65.4
Checked By: DTH

Boring Company: TransTech Drilling Services
Foreman: John Leonhardt
GeoDesign Rep.: Jacob Wimett
Date Started: November 8, 2013 Date Finished: November 8, 2013
N. Coordinate: E. Coordinate:
Ground Surface Elevation (feet): 355.6
Station: 32+00 Offset: 16 ft Left

	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 550X ATV	
Hammer/Rod Type:	Automatic	

Groundwater Observations

Date	Depth (ft)	Elev. (ft)	Notes
11/12/13, 15:40	3.3	352.3	In well
2/3/14, 12:00	1.9	353.7	In well
6/24/14, 0:00	4.6	351.0	In well
12/4/15, 11:35	1.8	353.8	In open hole
4/7/16, 8:41	2.3	353.3	In open hole

Sample Information

Depth (ft)	Casing Blows/ft	Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	Blows 0 - 6	Blows 6 - 12	Blows 12 - 18	Blows 18 - 24	Coring Time (min./ft)	Moisture Content (%)
40		S12	SS	24	2	39	3	5	5	4		17.5
45		S13	SS	24	18	44	2	2	4	2		11.6
50		S14	SS	4	1	49	100/4"					7.4
55												
60												
65												
70												

Strata Description (Depth & Elevation (feet))

- Sandy Gravelly Clay & Silt *(Continued)*
- 47 — Glacial Till 308.6
- 49.3 — Bottom of Exploration at 49.3 ft 306.3

Sample Description (Classification System: Burmister)

- fine to coarse Sand, little fine Gravel, wet.
- S12) Medium dense, gray fine GRAVEL and fine to coarse SAND, little Silt, wet. (Likely roller bit cuttings).
- S13) Medium / very loose, gray SILT & CLAY and fine to coarse SAND, little fine Gravel, wet.
- S14) Refusal, fractured fine GRAVEL, some fine to coarse Sand, trace Silt, wet. (Possible roller bit cuttings).

Remarks:
7) Sample S12 at 39' deep appears to be entirely composed of roller bit cuttings. Infer spoon to be pushing piece of gravel.
8) Driller noted increase in roller bit resistance at 47' deep on inferred transition to glacial till soils.
9) Boring terminated with split spoon refusal at approximately 49.3 feet deep.
10) Upon completion, offset 2.5' north and set well to 15' deep.

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%

Boring No.: GDB-16(OW)

*NOTE: SEE BORING CHART ON BORING INFORMATION SHEETS FOR NORTHING AND EASTING INFORMATION

BORING LOG

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
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

Project Name: Middlebury WCRS (23) Phase B, Middlebury, VT

Boring No.: GDB-17
Page No.: 1 of 2
File No.: 837-65.1
Checked By: DTH

Boring Company: TransTech Drilling Services
Foreman: John Leonhardt
GeoDesign Rep.: Jacob Wimett
Date Started: October 28, 2013 Date Finished: October 29, 2013
N. Coordinate: E. Coordinate:
Ground Surface Elevation (feet): 357.2
Station: 33+16 Offset: 7 ft Right

	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 550X ATV	
Hammer Type:	Automatic	

Groundwater Observations

Date	Depth (ft)	Elev. (ft)	Notes
▼ 10/28/13, 13:00	10.0	347.2	Wet sample.

Sample Information

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	Casing Time (min./ft)	Moisture Content (%)	Strata Description Depth & Elevation(feet)	Sample Description Classification System: Burmister
		S1	SS	24	6	0	6	4	6	7			Sand / Gravel Fill	S1) Medium dense, brown fine to coarse SAND and fine to coarse GRAVEL, little Silt, moist.
		S2	SS	24	13	2	7	11	14	4			4	S2) Medium dense, brown fine to coarse SAND, little fine Gravel, little Silt, moist.
5		S3	SS	24	0	4	2	3	2	3			Layered Clay & Silt 353.2	S3) Medium, no recovery.
		S4	SS	24	21	6	4	5	5	4			8	S4) Medium, brown layered CLAY & SILT, trace (+) fine to coarse Sand, very moist.
		S5	SS	24	24	8	2	2	2	2			Silty Clay 349.2 ▼	S5) Medium, brown layered Silty CLAY, trace fine Sand, very moist.
10		S6	SS	24	16	10	3	3	3	3				S6) Medium, purple gray with brown Silty CLAY, trace fine to medium Sand, wet.
15		S7	SS	24	24	14	WOH	WOH	WOH	2				S7) Very soft, purple gray Silty CLAY, trace (-) fine Sand, wet.
20		S8	SS	24	24	19	WOH	WOH	WOH	1				S8) Very soft, purple gray Silty CLAY, trace (-) gray Clayey Silt in two 1" thick layers, wet.
25		S9	SS	24	24	24	WOH	WOH	WOH	WOH		51.0		S9) Very soft, purple gray Silty CLAY, wet.
30		S10	SS	24	24	29	WOR	WOH	WOH	WOH				S10) Very soft, purple gray Silty CLAY, wet.

Remarks:
1) Northing, Easting, and Elevation based on survey by VHB.
2) Sampling of S2, S4, and S6 was not performed in accordance with ASTM D 1586 requirements (borehole was not cleared with augers between consecutive samples) and blow counts do not represent SPT N values.
3) Samples S3 and S4 at 4' and 6' deep respectively appeared disturbed in the sampler as if the spoon was pushing a piece of gravel during sampling.

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.: GDB-17

SMALL BORING # - SMALL REMARK 837-65.1 MIDDLEBURY PHASE B.GPJ GEODESIGN STANDARD .GDT 11/10/14

BORING LOG

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
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

Project Name: Middlebury WCRS (23) Phase B, Middlebury, VT

Boring No.: GDB-17
Page No.: 2 of 2
File No.: 837-65.1
Checked By: DTH

Boring Company: TransTech Drilling Services
Foreman: John Leonhardt
GeoDesign Rep.: Jacob Wimett
Date Started: October 28, 2013 Date Finished: October 29, 2013
N. Coordinate: E. Coordinate:
Ground Surface Elevation (feet): 357.2
Station: 33+16 Offset: 7 ft Right

	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 550X ATV	
Hammer Type:	Automatic	

Groundwater Observations

Date	Depth (ft)	Elev. (ft)	Notes
▼ 10/28/13, 13:00	10.0	347.2	Wet sample.

Sample Information

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	Casing Time (min./ft)	Moisture Content (%)	Strata Description Depth & Elevation(feet)	Sample Description Classification System: Burmister
													Silty Clay *(Continued)*	
35		S11	SS	24	24	34	WOR	WOR	WOH	WOH				S11) Very soft, purple gray Silty CLAY, wet.
40		S12	SS	24	24	39	WOR	WOH	1	1				S12) Very soft, purple gray Silty CLAY, wet.
45		S13	SS	15	12	44	6	16	50/3"				43 Glacial Till 314.2 / 45.3	S13) Refusal, gray fine to coarse SAND, some (+) Silt, little fine Gravel, wet.
50													Bottom of Exploration at 45.3 ft 311.9	
55														
60														

Remarks:
4) Driller noted increase in auger resistance with grinding beginning at 43' deep on top of inferred Glacial Till.
5) Boring terminated with split spoon refusal at approximately 45.3 feet deep.

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.: GDB-17

SMALL BORING # - SMALL REMARK 837-65.1 MIDDLEBURY PHASE B.GPJ GEODESIGN STANDARD .GDT 11/10/14

BORING LOG

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
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

Project Name: Middlebury WCRS (23) Phase B, Middlebury, VT

Boring No.: GDB-18
Page No.: 1 of 2
File No.: 837-65.1
Checked By: DTH

Boring Company: TransTech Drilling Services
Foreman: John Leonhardt
GeoDesign Rep.: Jacob Wimett
Date Started: November 11, 2013 Date Finished: November 11, 2013
N. Coordinate: E. Coordinate:
Ground Surface Elevation (feet): 357
Station: 34+11 Offset: 13 ft Left

	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 550X ATV	
Hammer Type:	Automatic	

Groundwater Observations

Date	Depth (ft)	Elev. (ft)	Notes
▼ 11/11/13, 14:00			See Remark No. 3.

Sample Information

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	Casing Time (min./ft)	Moisture Content (%)	Strata Description Depth & Elevation(feet)	Sample Description Classification System: Burmister
		S1	SS	24	15	0	1	3	5	6			Fill	S1) Loose, black fine to coarse SAND, some Silt, trace fine Gravel, trace Coal Ash, trace Organics, moist.
		S2	SS	24	19	2	4	3	4	4			2.2 Layered Clay & Silt / Silty Clay 354.8	S2) Medium, S2A - Top 2": Black COAL ASH and fine to coarse SAND, little Silt, moist.
5		S3	SS	24	24	4	3	2	4	3				S2B - Bottom 17": Brown mottled with orange and gray CLAY & SILT, trace fine Sand, trace Root Fibers, moist.
		S4	SS	24	24	6	3	4	6	6				S3) Medium, brown with purple and gray mottling finely parted Silty CLAY, trace (-) fine Gravel (clay nodules), trace fine to coarse Sand, moist.
		S5	SS	24	24	8	2	2	2	2		59.3		S4) Stiff, brown mottled with purple and gray finely layered Silty CLAY, little (-) gray-olive Clayey Silt (in seams up to 1.5" thick), trace (-) fine Gravel, wet.
10		S6	SS	24	24	10	2	3	4	3			12 Silty Clay 345.0	S5) Medium, finely parted brown mottled with gray and purple grading to purple-gray Silty CLAY, trace fine to medium Sand, trace fine Gravel, moist to wet.
15		S7	SS	24	24	14	1	2	1	1				S6) Medium, purple-gray to gray Silty CLAY, trace fine to coarse Sand, trace fine Gravel (in seams), wet.
														S7) Soft, purple gray Silty CLAY, trace (-) light gray Clayey Silt (in seams up to 1/4" thick), wet.
20		S8	SS	24	24	19	WOH	WOH	WOH	WOH				S8) Very soft, gray Silty CLAY, trace fine Sand, trace Silt (in seams up to 1/16" thick), trace fine Gravel, wet.
25		S9	SS	24	24	24	WOH	WOH	WOH	WOH				S9) Very soft, gray Silty CLAY, trace fine Sand, wet.
30		S10	SS	24	24	29	WOR	WOR	WOH	WOH				S10) Very soft, gray Silty CLAY, trace fine Sand,

Remarks:
1) Northing, Easting, and Elevation based on taped measurements made in the field by GeoDesign personnel and an electronic topographic plan provided by VHB.
2) Sampling of S2, S4, and S6 was not performed in accordance with ASTM D 1586 requirements (borehole was not cleared with roller bit between consecutive samples) and blow counts do not represent SPT N values.
3) Sample moisture descriptions may not accurately reflect in-situ conditions due to water being continuously added to the borehole during roller bit advance.
4) Casing advanced to 5' deep. Borehole advanced open hole with the roller bit below 5' deep.

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.: GDB-18

SMALL BORING # - SMALL REMARK 837-65.1 MIDDLEBURY PHASE B.GPJ GEODESIGN STANDARD .GDT 11/10/14

*NOTE: SEE BORING CHART ON BORING INFORMATION SHEETS FOR NORTHING AND EASTING INFORMATION

vhb

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044borlogs_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: C.J. HAKEY
DESIGNED BY: GEODESIGN	CHECKED BY: GEODESIGN
BORING LOGS (6 OF 28)	SHEET 44 OF 116

BORING LOG

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
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

Project Name: Middlebury WCRS (23) Phase B, Middlebury, VT

Boring No.: GDB-18
Page No.: 2 of 2
File No.: 837-65.1
Checked By: DTH

Boring Company:	TransTech Drilling Services		
Foreman:	John Leonhardt		
GeoDesign Rep.:	Jacob Wimett		
Date Started:	November 11, 2013	Date Finished:	November 11, 2013
N. Coordinate:		E. Coordinate:	
Ground Surface Elevation (feet):	357		
Station: 34+11	Offset: 13 ft Left		

	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 550X ATV	
Hammer Type:	Automatic	

Groundwater Observations			
Date	Depth (ft)	Elev. (ft)	Notes
▼ 11/11/13, 14:00			See Remark No. 3.

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	Casing Time (min./ft)	Moisture Content (%)	Strata Description Depth & Elevation(feet)	Symbol	Sample Description (Classification System: Burmister)
													Silty Clay (Continued)		wet.
35		S11	SS	24	24	34	WOR	WOR	WOR	WOH					S11) Very soft, gray Silty CLAY, trace fine to coarse Sand, trace (-) fine Gravel, wet.
40		S12	SS	24	0	39	WOR	WOH	WOH	WOH					S12) Very soft, no recovery.
													41.5 Glacial Till 315.5		
45		S13	SS	11	3	44	26	50/5"					44.9 Bottom of Exploration at 44.9 ft 312.1		S13) Refusal, gray fine to coarse GRAVEL and SILT, some fine to coarse Sand, wet.
50															
55															
60															

Remarks:
5) Driller notes increase in roller bit resistance with significant rig chatter beginning at 41.5' deep at the inferred transition to glacial till.
6) Boring terminated with split spoon refusal at approximately 44.9 feet deep.

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.: GDB-18

BORING LOG

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
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

Project Name: Middlebury WCRS (23) Phase B, Middlebury, VT

Boring No.: GDB-19
Page No.: 1 of 2
File No.: 837-65.1
Checked By: DTH

Boring Company:	TransTech Drilling Services		
Foreman:	John Leonhardt		
GeoDesign Rep.:	Jacob Wimett		
Date Started:	October 28, 2013	Date Finished:	October 28, 2013
N. Coordinate:		E. Coordinate:	
Ground Surface Elevation (feet):	358.1		
Station: 34+90	Offset: 12 ft Right		

	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 550X ATV	
Hammer Type:	Automatic	

Groundwater Observations			
Date	Depth (ft)	Elev. (ft)	Notes
▼ 10/28/13, 9:45	6.0	352.1	Wet sample.

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	Casing Time (min./ft)	Moisture Content (%)	Strata Description Depth & Elevation(feet)	Symbol	Sample Description (Classification System: Burmister)
		S1	SS	24	11	0	2	3	5	7			Topsoil		S1) Loose, black-brown SILT and fine to medium SAND, trace fine Gravel, trace Leaves and Roots, moist.
		S2	SS	24	5	2	7	6	8	7			Re-Worked Silt & Clay Fill 357.1		S2) Stiff, dark brown SILT & CLAY, little fine Sand, trace Root Fibers, trace possible Brick Fragments, slightly moist.
5		S3	SS	24	18	4	3	4	4	2					S3) Stiff,
		S4	SS	24	18	6	2	4	4	4			Layered Clay & Silt 353.1 ▼		S3A - Top 10": Dark brown SILT & CLAY, little fine to coarse Sand, trace fine Gravel, trace Brick and Ash, trace Root Fibers, slightly moist.
		S5	SS	24	24	8	2	3	3	4					S3B - Bottom 8": Mottled gray-brown-orange layered CLAY & SILT, trace fine Sand, trace Root Fibers, moist.
10													Silty Clay 348.1		S4) Stiff, mottled and layered gray-brown-orange CLAY & SILT, trace 1" layers of Silt, trace (-) fine Sand, wet.
															S5) Medium, brown with gray Silty CLAY, little Silt (gray layers), moist.
15		S6	SS	24	24	14	1	2	2	3					S6) Soft, purple-gray Silty CLAY, trace fine Sand, trace Organics (mold), wet.
20		S7	SS	24	24	19	WOH	1	2	2					S7) Soft, purple-gray Silty CLAY, little tan-gray Clayey Silt in one 6" seam mid sample,wet.
25		S8	SS	24	24	24	WOH	WOH	WOH	1					S8) Very soft, purple-gray Silty CLAY, wet.
30		S9	SS	24	24	29	WOH	WOH	2	1					S9) Soft, purple-gray Silty CLAY, trace (-) fine to

Remarks:
1) Northing, Easting, and Elevation based on survey by VHB.
2) Sampling of S2 and S4 was not performed in accordance with ASTM D 1586 requirements (borehole was not cleared with augers between consecutive samples) and blow counts do not represent SPT N values.

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.: GDB-19

BORING LOG

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
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

Project Name: Middlebury WCRS (23) Phase B, Middlebury, VT

Boring No.: GDB-19
Page No.: 2 of 2
File No.: 837-65.1
Checked By: DTH

Boring Company:	TransTech Drilling Services		
Foreman:	John Leonhardt		
GeoDesign Rep.:	Jacob Wimett		
Date Started:	October 28, 2013	Date Finished:	October 28, 2013
N. Coordinate:		E. Coordinate:	
Ground Surface Elevation (feet):	358.1		
Station: 34+90	Offset: 12 ft Right		

	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 550X ATV	
Hammer Type:	Automatic	

Groundwater Observations			
Date	Depth (ft)	Elev. (ft)	Notes
▼ 10/28/13, 9:45	6.0	352.1	Wet sample.

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	Casing Time (min./ft)	Moisture Content (%)	Strata Description Depth & Elevation(feet)	Symbol	Sample Description (Classification System: Burmister)
													Silty Clay (Continued)		coarse Sand, trace (-) fine Gravel, trace (-) Clayey Silt in one 1" layer, wet.
													31.5 Glacial Till 326.6		
35		S10	SS	23	13	34	16	24	30	36/5"			35.9 Bottom of Exploration at 35.9 ft 322.2		S10) Very dense, gray SILT and fine to medium SAND, little fine to coarse Gravel, moist to wet.
40															
45															
50															
55															
60															

Remarks:
3) Driller noted increase in auger resistance with occasional light grinding beginning at 31.5' deep on inferred top of Glacial Till stratum.
4) Boring terminated without split spoon refusal at approximately 35.9 feet deep.

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.: GDB-19

SMALL BORING # - SMALL REMARK 837-65.1 MIDDLEBURY PHASE B.GPJ GEODESIGN STANDARD .GDT 1/10/14

*NOTE: SEE BORING CHART ON BORING INFORMATION SHEETS FOR NORTHING AND EASTING INFORMATION

vhb

PROJECT NAME: MIDDLEBURY
PROJECT NUMBER: WCRS(23)

FILE NAME: z10g044borlogs_pl.dgn
PROJECT LEADER: A.P. GUYETTE
DESIGNED BY: GEODESIGN
BORING LOGS (7 OF 28)

PLOT DATE: 10/18/2016
DRAWN BY: C.J. HAKEY
CHECKED BY: GEODESIGN
SHEET 45 OF 116

ADDITIONAL WLS SMALL REMARK FONT 837-65.4 MIDDLEBURY ADDL 2016.GPJ GEODESIGN STANDARD .GDT 5/27/16

GEODESIGN INCORPORATED

Geotechnical / Construction / Environmental Engineers and Scientists

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

40 Farrell Street
S. Burlington, VT 05403
Phone: 802-652-5140

BORING LOG

Project Name: Middlebury WCRS (23) Additional Drilling 2016 Middlebury, VT

Boring No.: **GDB-20(OW)**
Page No.: 1 of 1
File No.: 837-65.4
Checked By: DTH

Boring Company:	TransTech Drilling Services
Foreman:	John Leonhardt
GeoDesign Rep.:	Jacob Wimett
Date Started:	November 6, 2013
Date Finished:	November 6, 2013
N. Coordinate:	
E. Coordinate:	
Ground Surface Elevation (feet):	358.9
Station:	35+66
Offset:	11 ft Left

	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 550X ATV	
Hammer/Rod Type:	Automatic	

Groundwater Observations

Date	Depth (ft)	Elev. (ft)	Notes
11/6/13, 9:30	5.0	353.9	Perched in silt seams.
11/6/13, 14:00	23.0	335.9	Stabilized in augers (3 hrs)
11/12/13, 15:30	7.8	351.2	In well
2/3/14, 12:00	6.9	352.0	In well
6/24/14, 0:00	6.0	352.9	In well
12/4/15, 11:15	7.1	351.8	In well
4/7/16, 8:36	4.6	354.3	In well

Sample Information

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 (%)
		S1	SS	24	10	0	1	3	3	3		
		S2	SS	24	17	2	4	4	5	6		
5		S3	SS	24	24	4	2	3	5	5		
		S4	SS	24	24	6	3	3	3	3		
		S5	SS	24	24	8	1	2	2	3		
10												
		S6	SS	24	24	10	2	2	3	4		
15		S7	SS	24	24	14	1	2	2	3		40.8
20		S8	SS	24	24	19	WOH	WOH	WOH	1		
25		S9	SS	24	24	24	WOR	WOH	WOH	2		
30		S10	SS	24	4	29	8	12	22	24		
		S11	SS	24	24	31	12	27	43	40		
35												

Strata Description (Depth & Elevation (feet))

- 1 — Fill
- Layered Clay & Silt / Silty Clay — 357.9
- 14 — Silty Clay — 344.9
- 27 — Glacial Till — 331.9
- 33 — Bottom of Exploration at 33.0 ft — 325.9

Sample Description (Classification System: Burmister)

- S1) Loose, black fine to medium SAND and SILT, little Coal Slag, trace fine Gravel, trace Organics, moist.
- S2) Stiff, brown mottled with gray, olive, and orange layered CLAY & SILT, trace fine Sand, trace (-) fine Gravel, trace (-) Organic Fibers (concentrated in top 5" of sample), moist.
- S3) Stiff, light brown layered CLAY & SILT, little light gray SILT (seams), trace Organic Fibers (in Silt seams), moist with wet seams.
- S4) Medium, light brown parted Silty CLAY, trace fine Gravel, trace fine Sand, trace Root Pinholes and decayed Roots, moist.
- S5) Medium, light brown parted Silty CLAY, trace (-) fine Gravel, trace fine Sand, trace Root Pinholes and decayed Roots, moist.
- S6) Medium, light brown occasionally parted with gray Silty CLAY, trace gray Silt (seams), trace (-) fine Sand (in Silt seams), moist.
- S7) Medium, gray Silty CLAY, trace (-) light gray Silt lenses, moist.
- S8) Very soft, gray Silty CLAY, trace (-) Silt, trace (-) fine Sand seams, wet.
- S9) Very soft, gray Silty CLAY, trace fine to medium Sand (seams to 1/8" thick), wet.
- S10) Dense, gray SILT, some fine to coarse Sand, little fine Gravel, wet.
- S11) Very dense, gray SILT, some fine to coarse Sand, trace fine Gravel, wet.

Well Log

Remarks:
1) Northing, Easting, and Elevation based on survey by VHB.
2) Sampling of S2, S4, S6, and S11 was not performed in accordance with ASTM D 1586 requirements (borehole was not cleared with augers between consecutive samples) and blow counts do not represent SPT N values.
3) Driller noted an increase in auger resistance beginning at 27' at inferred transition to glacial till soils.
4) Boring terminated without split spoon refusal at approximately 33 feet deep.
5) Installed observation well to bottom of borehole. Set flush mount well cover at ground surface.

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%

Boring No.: **GDB-20(OW)**

SMALL BORING # - SMALL REMARK 837-65.1 MIDDLEBURY PHASE B.GPJ GEODESIGN STANDARD .GDT 1/10/14

GEODESIGN INCORPORATED

Geotechnical / Construction / Environmental Engineers and Scientists

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: Middlebury WCRS (23) Phase B Middlebury, VT

Boring No.: **GDB-21**
Page No.: 1 of 1
File No.: 837-65.1
Checked By: DTH

Boring Company:	TransTech Drilling Services
Foreman:	John Leonhardt
GeoDesign Rep.:	Joshua Gilman
Date Started:	October 25, 2013
Date Finished:	October 25, 2013
N. Coordinate:	
E. Coordinate:	
Ground Surface Elevation (feet):	360
Station:	37+06
Offset:	11 ft Right

	Casing:	Sampler:
Type:	Flush	SS
I.D.:	3.0 in.	1.38 in.
Hammer Wt.:	300 lbs	140 lbs
Hammer Fall:	24 in.	30 in.
Rig Type:	CME 550X ATV	
Hammer Type:	Automatic	

Groundwater Observations

Date	Depth (ft)	Elev. (ft)	Notes
10/25/13, 0:00			See Remark No. 2

Sample Information

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 (%)
		S1	SS	24	8	0	1	3	3	4		
		S2	SS	24	11	2	6	5	4	3		
5		S3	SS	24	14	4	5	2	4	3		
		S4	SS	24	18	6	3	4	5	4		
		S5	SS	24	24	8	2	2	2	3		46.5
10												
15		S6	SS	24	24	14	WOH	WOH	WOH	1		
20		S7	SS	14	11	19	43	40	50/2"			
25												
30												

Strata Description (Depth & Elevation (feet))

- Fill & Reworked Native
- 5 — Clay & Silt — 355.0
- 18 — Glacial Till — 342.0
- 20.2 — Bottom of Exploration at 20.2 ft — 339.8

Sample Description (Classification System: Burmister)

- S1) Loose, dark brown fine to coarse SAND, some Silt, trace fine Gravel, trace Roots and Grass, moist.
- S2) Loose, tan, light brown, and gray fine to coarse SAND and CLAY & SILT, trace fine Gravel, moist.
- S3) Loose / Medium;
- S3A (upper 4"): brown fine to coarse SAND and CLAY & SILT,wet.
- S3B (lower 10"): tan and gray layers, CLAY & SILT, trace fine to coarse Sand, trace fine Gravel, wet.
- S4: Stiff, tan brown CLAY & SILT, wet.
- S5: Medium, tannish gray CLAY & SILT, trace coarse Gravel, wet.
- S6: Very soft, purple-gray CLAY & SILT, wet.
- S7: Refusal, gray fine to coarse GRAVEL and fine to coarse SAND (angular, reaction to dilute HCl), little Clay & Silt, wet.

Remarks:
1) Northing, Easting, and Elevation based on survey by VHB.
2) Sample moisture descriptions may not accurately reflect in-situ conditions due to water being continuously added to the borehole during roller bit advance.
3) Driller noted increased roller bit resistance from 18 to 19 feet deep.
4) Boring terminated with split spoon refusal at approximately 20.2 feet deep.

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.: **GDB-21**

SMALL BORING # - SMALL REMARK 837-65.1 MIDDLEBURY PHASE B.GPJ GEODESIGN STANDARD .GDT 1/10/14

GEODESIGN INCORPORATED

Geotechnical / Construction / Environmental Engineers and Scientists

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: Middlebury WCRS (23) Phase B Middlebury, VT

Boring No.: **GDB-22**
Page No.: 1 of 1
File No.: 837-65.1
Checked By: DTH

Boring Company:	TransTech Drilling Services
Foreman:	John Leonhardt
GeoDesign Rep.:	Joshua Gilman
Date Started:	October 25, 2013
Date Finished:	October 25, 2013
N. Coordinate:	
E. Coordinate:	
Ground Surface Elevation (feet):	359.4
Station:	39+23
Offset:	0 ft

	Casing:	Sampler:
Type:	Flush	SS
I.D.:	3.0 in.	1.38 in.
Hammer Wt.:	300 lbs	140 lbs
Hammer Fall:	24 in.	30 in.
Rig Type:	CME 550X ATV	
Hammer Type:	Automatic	

Groundwater Observations

Date	Depth (ft)	Elev. (ft)	Notes
10/24/13, 0:00			See Remark No. 2

Sample Information

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 (%)
		S1	SS	24	13	0	3	3	10	14		
		S2	SS	24	18	2	16	19	20	12		
5		S3	SS	24	6	4	3	3	4	5		
		S4	SS	24	24	6	4	5	5	6		
		S5	SS	24	20	8	2	3	3	3		
10												
15		S6	SS	24	13	14	3	3	3	3		
20												
25												
30												

Strata Description (Depth & Elevation (feet))

- Fill
- 6.7 — Clay & Silt — 352.7
- 16 — Bottom of Exploration at 16.0 ft — 343.4

Sample Description (Classification System: Burmister)

- S1) Medium dense, black fine to coarse SAND, some Silt, little fine to coarse Gravel, trace (-) Coal, moist.
- S2) Dense, tan brown fine to coarse SAND, some fine to coarse Gravel, little Silt, trace (+) Wood (pieces > 1" thick, partially decayed), moist.
- S3) Loose, brown/tan/gray fine GRAVEL (fractured), some fine to coarse Sand, trace Silt, wet.
- S4) Medium dense / Stiff;
- S4A (upper 8"): brown fine to coarse SAND and SILT & CLAY, little fine to coarse Gravel, wet.
- S4B (lower 16"): tannish gray with darker layers, CLAY & SILT, little fine to coarse Sand, trace fine Gravel, wet.
- S5) Medium, tannish gray with darker layers, CLAY & SILT, trace fine to coarse Sand, wet.
- S6) Medium, tan and purple-gray layers, CLAY & SILT, wet.

Remarks:
1) Northing, Easting, and Elevation based on survey by VHB.
2) Sample moisture descriptions may not accurately reflect in-situ conditions due to water being continuously added to the borehole during roller bit advance.
3) Boring terminated without split spoon refusal at approximately 16 feet deep.

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.: **GDB-22**

---

*NOTE: SEE BORING CHART ON BORING INFORMATION SHEETS FOR NORTHING AND EASTING INFORMATION

BORING LOG

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
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

Project Name: Middlebury WCRS (23) Phase B, Middlebury, VT

Boring No.: GDB-23(P)
Page No.: 1 of 1
File No.: 837-65.1
Checked By: DTH

Boring Company: TransTech Drilling Services
Foreman: John Leonhardt
GeoDesign Rep.: Joshua Gillman
Date Started: November 4, 2013 — Date Finished: November 4, 2013
N. Coordinate: -------- — E. Coordinate: -------
Ground Surface Elevation (feet): 353.6
Station: N/A — Offset: ft

Casing: Type	Casing: I.D.	Sampler: Type	Sampler: I.D.
SSA	2.5 in.	N/A	in.

Hammer Wt.: NA — Hammer Fall: NA — Rig Type: CME 550X ATV — Hammer Type:

Groundwater Observations: Date	Depth (ft)	Elev. (ft)	Notes
▼ 11/4/13, 0:00			See remark No. 3

Sample Information: 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 (%)

Strata Description — Depth & Elevation(feet): Inferred Fill Soil; Bottom of Exploration at 5.0 ft (348.6)

Symbol

Sample Description — Classification System:

Remarks:
1) Northing, Easting, and Elevation based on survey by VHB.
2) Boring terminated with solid stem auger refusal at approximately 5' deep on inferred bedrock.
3) Unable to discern water elevation from augers upon removal.

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.: GDB-23(P)

SMALL BORING # - SMALL REMARK 837-65.1 MIDDLEBURY PHASE B.GPJ GEODESIGN STANDARD .GDT 1/10/14

BORING LOG

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
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

Project Name: Middlebury WCRS (23) Phase B, Middlebury, VT

Boring No.: GDB-24(P)
Page No.: 1 of 1
File No.: 837-65.1
Checked By: DTH

Boring Company: TransTech Drilling Services
Foreman: John Leonhardt
GeoDesign Rep.: Jacob Wimett
Date Started: November 6, 2013 — Date Finished: November 6, 2013
N. Coordinate: -------- — E. Coordinate: -------
Ground Surface Elevation (feet): 353.6
Station: N/A — Offset: ft

Casing: Type	Casing: I.D.	Sampler: Type	Sampler: I.D.
SSA	2.5 in.	N/A	in.

Hammer Wt.: NA — Hammer Fall: NA — Rig Type: CME 550X ATV — Hammer Type:

Groundwater Observations: Date	Depth (ft)	Elev. (ft)	Notes
▼ 11/6/13, 12:00	13.0	340.6	Wet augers.

Sample Information: 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 (%)

Strata Description — Depth & Elevation(feet): No sampling; Bottom of Exploration at 23.0 ft (330.6)

Symbol

Sample Description — Classification System:

Remarks:
1) Northing, Easting, and Elevation based on survey by VHB.
2) Boring terminated with solid stem auger refusal at approximately 23' deep on inferred bedrock.
3) Noted wet augers at 13' deep upon removal.

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.: GDB-24(P)

SMALL BORING # - SMALL REMARK 837-65.1 MIDDLEBURY PHASE B.GPJ GEODESIGN STANDARD .GDT 1/10/14

BORING LOG

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
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

Project Name: Middlebury WCRS (23) Phase B, Middlebury, VT

Boring No.: GDB-25(P)
Page No.: 1 of 1
File No.: 837-65.1
Checked By: DTH

Boring Company: TransTech Drilling Services
Foreman: John Leonhardt
GeoDesign Rep.: Jacob Wimett
Date Started: November 6, 2013 — Date Finished: November 6, 2013
N. Coordinate: -------- — E. Coordinate: -------
Ground Surface Elevation (feet): 352
Station: N/A — Offset: ft

Casing: Type	Casing: I.D.	Sampler: Type	Sampler: I.D.
SSA	2.5 in.	N/A	in.

Hammer Wt.: NA — Hammer Fall: NA — Rig Type: CME 550X ATV — Hammer Type:

Groundwater Observations: Date	Depth (ft)	Elev. (ft)	Notes
▼ 11/6/13, 1:00			See Remark No. 3

Sample Information: 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 (%)

Strata Description — Depth & Elevation(feet): No sampling; Bottom of Exploration at 21.5 ft (330.5)

Symbol

Sample Description — Classification System:

Remarks:
1) Northing, Easting, and Elevation based on survey by VHB.
2) Boring terminated with solid stem auger refusal at approximately 21.5' deep on inferred bedrock.
3) Unable to discern water elevation from augers upon removal.
4) Noted slight petroleum odor while drilling.

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.: GDB-25(P)

SMALL BORING # - SMALL REMARK 837-65.1 MIDDLEBURY PHASE B.GPJ GEODESIGN STANDARD .GDT 1/10/14

---

*NOTE: SEE BORING CHART ON BORING INFORMATION SHEETS FOR NORTHING AND EASTING INFORMATION

vhb

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044borlogs_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: C.J. HAKEY
DESIGNED BY: GEODESIGN	CHECKED BY: GEODESIGN
BORING LOGS (9 OF 28)	SHEET 47 OF 116

BORING LOG

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
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

Project Name: Middlebury WCRS (23) Phase B, Middlebury, VT

Boring No.: **GDB-26(P)**
Page No.: 1 of 1
File No.: 837-65.1
Checked By: DTH

Boring Company:	TransTech Drilling Services		
Foreman:	John Leonhardt		
GeoDesign Rep.:	Jacob Wimett		
Date Started:	November 6, 2013	Date Finished:	November 6, 2013
N. Coordinate:	---.---.---	E. Coordinate:	---.---.---
Ground Surface Elevation (feet):	350.7		
Station: N/A	Offset: ft		

Casing:	Sampler:
Type: SSA	N/A
I.D.: 2.5 in.	in.
Hammer Wt.: NA	
Hammer Fall: NA	
Rig Type: CME 550X ATV	
Hammer Type:	

Groundwater Observations			
Date	Depth (ft)	Elev. (ft)	Notes
▼ 11/6/13, 1:30			See Remark No. 3
▼			
▼			
▼			

Sample Information: 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 (%)

Strata Description: Depth & Elevation(feet) | Symbol | Sample Description: Classification System:

No sampling

Bottom of Exploration at 25.0 ft (325.7)

Remarks:
1) Exploration performed ~2 to 3 feet west of location marked in the field by GeoDesign and VHB to avoid storm drainage.
2) Boring terminated with solid stem auger refusal at approximately 25' deep on inferred bedrock.
3) Unable to discern water elevation from augers upon removal.

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.

SMALL BORING # - SMALL REMARK 837-65.1 MIDDLEBURY PHASE B.GPJ GEODESIGN STANDARD .GDT 1/10/14

Boring No.: **GDB-26(P)**

BORING LOG

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
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

Project Name: Middlebury WCRS (23) Phase B, Middlebury, VT

Boring No.: **GDB-27(P)**
Page No.: 1 of 1
File No.: 837-65.1
Checked By: DTH

Boring Company:	TransTech Drilling Services		
Foreman:	John Leonhardt		
GeoDesign Rep.:	Joshua Gilman		
Date Started:	November 4, 2013	Date Finished:	November 4, 2013
N. Coordinate:	---.---.---	E. Coordinate:	---.---.---
Ground Surface Elevation (feet):	360.3		
Station: N/A	Offset: ft		

Casing:	Sampler:
Type: SSA	N/A
I.D.: 2.5 in.	in.
Hammer Wt.: NA	
Hammer Fall: NA	
Rig Type: CME 550X ATV	
Hammer Type:	

Groundwater Observations			
Date	Depth (ft)	Elev. (ft)	Notes
▼ 11/4/13, 0:00			See Remark No. 3
▼			
▼			
▼			

Sample Information: 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 (%)

Strata Description: Depth & Elevation(feet) | Symbol | Sample Description: Classification System:

Inferred Fill Soil

Bottom of Exploration at 7.0 ft (353.3)

Remarks:
1) Exploration performed at location marked in the field by GeoDesign and VHB.
2) Boring terminated with solid stem auger refusal at approximately 7' deep on inferred bedrock.
3) Unable to discern water elevation from augers upon removal.

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.

SMALL BORING # - SMALL REMARK 837-65.1 MIDDLEBURY PHASE B.GPJ GEODESIGN STANDARD .GDT 1/10/14

Boring No.: **GDB-27(P)**

BORING LOG

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
P.O. Box 699, Windsor, VT 05089, Phone: 802-674-2033/Fax: 802-674-5943
40 Farrell Street, S. Burlington, VT 05403, Phone: 802-652-5140

Project Name: Middlebury WCRS (23) Additional Drilling 2016, Middlebury, VT

Boring No.: **GDB-28**
Page No.: 1 of 1
File No.: 837-65.4
Checked By: DTH

Boring Company:	TransTech Drilling Services		
Foreman:	John Leonhardt		
GeoDesign Rep.:	Joshua Gilman/Jacob Wimett		
Date Started:	November 4, 2013	Date Finished:	November 13, 2013
N. Coordinate:	---.---.---	E. Coordinate:	---.---.---
Ground Surface Elevation (feet):	357.9		
Station: N/A	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 550X ATV	
Hammer Type: Automatic	

Groundwater Observations			
Date	Depth (ft)	Elev. (ft)	Notes
▼ 11/4/13, 0:00			See Remark No. 3
▼			
▼			
▼			

Sample Information: 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 (%)

Strata Description: Depth & Elevation(feet) | Symbol | Sample Description: Classification System: Burmister

Inferred Fill Soil

Inferred Weathered Bedrock (352.9)

Bedrock (Marble) (352.4)

C1) Fair quality, moderately hard, moderately to slightly weathered, close to moderately jointed, gray with frequent white banding and swirls MARBLE. Moderate to strong reaction to dilute HCl. Fracturing near 45 degrees from horizontal.

C2) Excellent quality, moderately hard, moderately jointed, slightly weathered to fresh, light gray with white banding MARBLE. Mild to strong reaction to dilute HCL/ Fracturing near 45 degrees from horizontal.

C3) Excellent quality, moderately hard, fresh, close to moderately jointed, light to dark gray with occasional white banding MARBLE with occasional thin darker bedding. Strong reaction to HCl on lighter portions. Fractures typically along darker bedding near 45 degrees from horizontal.

C4) Good quality, moderately hard, fresh to slightly weathered, very close to moderately jointed, dark gray with occasional white banding and splotches MARBLE with occasional darker bedding and infrequent white Quartz intrusions. Strong reaction to dilute HCL in lighter beds, no reaction in darker beds. Fracturing from approximately 15 to 50 degrees from horizontal.

C5) Good quality, moderately hard, fresh, close to moderately jointed light gray with white banding MARBLE with occasional darker bedding. Strong reaction to dilute HCl in lighter portions, no reaction in darker beds. Fracturing at approximately 15 to 45 degrees from horizontal.

C6) Fair quality, moderately hard, fresh, closely jointed, dark gray MARBLE. Interbedded with light gray Marble. Strong reaction to dilute HCl in lighter portions, no reaction in darker portions.

Bottom of Exploration at 31.0 ft (326.9)

Remarks:
1) Exploration performed at location marked in the field by GeoDesign and VHB.
2) Borehole began as 2" O.D. solid stem auger probe on 11/4/13. Driller reported SSA refusal at 5 feet deep.
3) Returned on 11/12/13 to advance borehole beyond 5' SSA refusal depth using wash-drive drilling methods. Groundwater levels not discernible due to addition of drilling fluid.
4) Four-inch flush joint casing driven to refusal at 5.5' deep. Driller estimated approximately 6" of penetration into weathered rock.
5) Noted loss of water through inferred seam in the bedrock while coring C1 between 5.5' and 10' deep.
6) Upon beginning core run C2 at 10' deep, driller noted complete loss of water through seam inferred at approximately 6.5' below grade. Driller removed core barrel, reamed hole with the roller bit, and telescoped 3" F.J casing to 9.5' deep through the 4" F.J casing prior to continuing borehole advancement with C2.
7) Water lost continuously through seams in rock during borehole advance. Estimated approximately 30 to 40 gallons of water loss per core run.

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%

SMALL REMARK FOR STANDARD 837-65.4 MIDDLEBURY ADDL 2016.GPJ GEODESIGN STANDARD .GDT 4/29/16

Boring No.: **GDB-28**

*NOTE: SEE BORING CHART ON BORING INFORMATION SHEETS FOR NORTHING AND EASTING INFORMATION

vhb

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044borlogs_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: C.J. HAKEY
DESIGNED BY: GEODESIGN	CHECKED BY: GEODESIGN
BORING LOGS (10 OF 28)	SHEET 48 OF 116

VHB 57603

BORING LOG — GDB-29

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
P.O. Box 699, Windsor, VT 05089, Phone: 802-674-2033/Fax: 802-674-5943
40 Farrell Street, S. Burlington, VT 05403, Phone: 802-652-5140

Project Name: Middlebury WCRS (23) Additional Drilling 2016, Middlebury, VT

Boring No.: GDB-29
Page No.: 1 of 1
File No.: 837-65.4
Checked By: JAG

Boring Company: QC/QA Laboratories, Inc.
Foreman: John Leonhardt
GeoDesign Rep.: Alan Baribault/Hilary Jones
Date Started: February 16, 2016 — Date Finished: February 18, 2016
N. Coordinate: ---.-- — E. Coordinate: ---.--
Ground Surface Elevation (feet): 352.8
Station: — Offset: ft

Casing: Type	Casing: I.D.	Sampler: Type	Sampler: I.D.
Flush	4.0 in.	N/A	in.

Hammer Wt.: 140 lbs; Hammer Fall: 30 in.; Rig Type: CME 550X ATV; Hammer Type: Automatic

Groundwater Observations: Date | Depth (ft) | Elev. (ft) | Notes

Depth (ft)	Casing Blows/ft	Sample 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:)
													Fill (Inferred; no sampling. See log of RR-13)		
5															
10															
15													15		
		C1	C	60	56	15	[REC= 93%; RQD= 32%]				2.5		Bedrock (Marble) 337.8		C1) Poor quality, hard, slightly weathered to moderately weathered (open joints), very closely to closely jointed gray with 1/16-1/4" light gray to white bands MARBLE. Fracturing approximately 0 to 15 degrees from horizontal. Strong reaction to dilute HCl.
											3.25				
											2.5				
											3				
20											3.5				
		C2	C	34	32	20	[REC= 94%; RQD= 65%]				4.75				C2) Fair quality, hard, slightly weathered, closely to moderately jointed gray with 1/4-3/4" light gray to white bands MARBLE. Fracturing approximately 10 to 20 degrees from horizontal. Moderate reaction to dilute HCl.
											4				
											7/10"				
		C3	C	60	60	22.8	[REC= 100%; RQD= 93%]				4				C3) Excellent quality, hard, fresh to slightly weathered, moderately jointed gray with 3" white band and white swirls MARBLE. Fracturing approximately 0 to 45 degrees from horizontal. Strong reaction to dilute HCl.
25											3.5				
											4.5				
											5				
		C4	C	24	23	26.8	[REC= 96%; RQD= 71%]				5				C4) Fair quality, hard, fresh to slightly weathered, closely to moderately jointed gray with white swirls MARBLE. Fracturing approximately 10 to 20 degrees from horizontal. Strong reaction to dilute HCl.
											4.25				
30											4		29.8 Bottom of Exploration at 29.8 ft 323.0		
35															

Remarks:
1) Casing driven to 13.5' deep, washed to 15' and then seated on becrock at 15' deep. Casing blows approximately 30 to 50 per foot (not recorded).
2) Wash water brown to 15 feet, becoming brownish-gray by 16' and gray by 18' deep during C1.
3) Boring advanced to 15 feet on 2/16 with CME 550X ATV rig; returned on 2/18 with CME 55 track rig.
4) Approximately full wash water recovery observed during coring.

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%

Boring No.: GDB-29

SMALL REMARK FONT STANDARD 837-65.4 MIDDLEBURY ADDL 2016.GPJ GEODESIGN STANDARD .GDT 5/19/16

BORING LOG — GDB-30 (1 of 2)

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
P.O. Box 699, Windsor, VT 05089, Phone: 802-674-2033/Fax: 802-674-5943
40 Farrell Street, S. Burlington, VT 05403, Phone: 802-652-5140

Project Name: Middlebury WCRS (23) Additional Drilling 2016, Middlebury, VT

Boring No.: GDB-30
Page No.: 1 of 2
File No.: 837-65.4
Checked By: JAG

Boring Company: QC/QA Laboratories, Inc.
Foreman: James Burrowbridge
GeoDesign Rep.: Alan Baribault/Hilary Jones
Date Started: February 9, 2016 — Date Finished: February 15, 2016
N. Coordinate: ---.--- — E. Coordinate: ---.---
Ground Surface Elevation (feet): 361.5
Station: — Offset: ft

Casing: Type	Casing: I.D.	Sampler: Type	Sampler: I.D.
Flush	4.0 in.	N/A	in.

Hammer Wt.: 140 lbs; Hammer Fall: 30 in.; Rig Type: CME 550X ATV; Hammer Type: Automatic

Groundwater Observations: ▼ 2/9/16, 15:30 — See note 2. | Date | Depth (ft) | Elev. (ft) | Notes

Depth (ft)	Casing Blows/ft	Sample 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:)
	45												Possible Fill (No sampling)		
	60														
	90														
	105														
5	23												5		
		C1	C	60	55	5	[REC= 92%; RQD= 53%]				7.5		Bedrock (Marble) 356.5		C1) Fair quality, hard, slightly weathered along fracture surfaces, fine-grained dark to light gray, very closely to moderately jointed MARBLE. Fracturing approximately 45 to 60 degrees from horizontal. Slickenside and pyrite inclusions noted on fracture surfaces bottom 24". Strong reaction to dilute HCl.
											5.5				
											4.25				
											9.5				
10											3.5				
		C2	C	60	60	10	[REC= 100%; RQD= 55%]				4.5				C2) Fair quality, hard, slightly weathered, fine-grained gray and dark gray with white bands and swirls, very closely to moderately jointed MARBLE. Fracturing approximately 35 to 60 degrees from horizontal. Strong reaction to dilute HCl. Slickenside and pyrite inclusions noted on fracture surfaces bottom 12".
											3.25				
											4.5				
											4.25				
15											3.5				
		C3	C	60	60	15	[REC= 100%; RQD= 57%]				4.75				C3) Fair quality, hard, slightly weathered (except 2" moderately weathered at 17.5 feet), fine-grained dark gray (15 to 16') and lighter gray (16 to 20'), very closely to closely jointed MARBLE. Fracturing approximately 45 degrees (15-16') and 10 to 20 degrees (16 to 20') from horizontal. Strong reaction to dilute HCl.
											3				
											3.75				
											3				
											4.5				
20															
		C4	C	8	8	20	[REC= 100%; RQD= 50%]				11				C4) Fair quality, hard, slightly weathered, fine-grained light gray, very closely jointed MARBLE. Fracturing approximately 10 to 20 degrees from horizontal. Strong reaction to dilute HCl.
		C5	C	52	50	20.7	[REC= 96%; RQD= 21%]				5				C5) Very poor quality, hard, moderately weathered (upper 20") to slightly weathered along fracture surfaces (lower 30") gray and light gray with occasional white bands (~1/4" to 3" thick in upper
											5.5				
											6				
25											4				

Remarks:
1) Boring located 16' from N corner of old Lazrus bldg, 9' offset from E wall.
2) Drilling performed with drive and wash method; wash water brown, light brown, and occasionally black to 3 feet, becoming brown to 5 feet deep. Four-inch FJ casing driven to refusal at 4.8 feet deep on 2/9/16 and set up for rock coring.
3) Wash water return brown, becoming gray 6.5 to 7 feet deep (light gray with clear water) on 2/9/16.
4) Recirculation pump malfunctioned 2/10 and lack of return water caused excessibe coring bit wear; Lost return water below 17.5 feet deep, est. 75% loss to 18 feet. Fresh water return est. 25% and white. Total loss of water at 19 feet deep.
5) Attempted core advance from 20.7 to 21 feet and removed to inspect for wear (no water return and unclear whether pump was circulating).
6) Partial wash water return at approximately 22.8 feet.
7) Lost water return at 25 feet deep.

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%

Boring No.: GDB-30

SMALL REMARK FONT STANDARD 837-65.4 MIDDLEBURY ADDL 2016.GPJ GEODESIGN STANDARD .GDT 5/19/16

BORING LOG — GDB-30 (2 of 2)

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
P.O. Box 699, Windsor, VT 05089, Phone: 802-674-2033/Fax: 802-674-5943
40 Farrell Street, S. Burlington, VT 05403, Phone: 802-652-5140

Project Name: Middlebury WCRS (23) Additional Drilling 2016, Middlebury, VT

Boring No.: GDB-30
Page No.: 2 of 2
File No.: 837-65.4
Checked By: JAG

Boring Company: QC/QA Laboratories, Inc.
Foreman: James Burrowbridge
GeoDesign Rep.: Alan Baribault/Hilary Jones
Date Started: February 9, 2016 — Date Finished: February 15, 2016
N. Coordinate: ---.--- — E. Coordinate: ---.---
Ground Surface Elevation (feet): 361.5
Station: — Offset: ft

Casing: Type	Casing: I.D.	Sampler: Type	Sampler: I.D.
Flush	4.0 in.	N/A	in.

Hammer Wt.: 140 lbs; Hammer Fall: 30 in.; Rig Type: CME 550X ATV; Hammer Type: Automatic

Groundwater Observations: ▼ 2/9/16, 15:30 — See note 2. | Date | Depth (ft) | Elev. (ft) | Notes

Depth (ft)	Casing Blows/ft	Sample 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:)
		C6	C	60	60	25	[REC= 100%; RQD= 100%]				4.5		Bedrock (Marble) (Continued)		20 inches), shattered to closely jointed MARBLE. Fracturing approximately 20 to 65 degrees from horizontal. Strong reaction to dilute HCl.
											4				C6) Excellent quality, hard, fresh to slightly weathered, gray, moderately to widely jointed MARBLE, with occasional white bands up to ~1/4" thick. Fracturing approximately 30 to 50 degrees from horizontal. Strong reaction to dilute HCl.
											4				
											5				
30											4.5				
		C7	C	60	60	30	[REC= 100%; RQD= 100%]				4				C7) Excellent quality, hard, fresh, gray (with one, 1" thick white band at 42 inches), moderately to widely jointed MARBLE. Fracturing approximately 30 degrees from horizontal. Strong reaction to dilute HCl.
											6				
											6				
											5.5				
											6.5				
35															
		C8	C	2	2	35.5	[REC= 100%; RQD= 0%]				5				C8) Similar to C7.
		C9	C	18	18	35.7	[REC= 100%; RQD= 55%]				25				C9) Fair quality, hard, fresh to slightly weathered, fine grained gray banded with 1/4" to 1.5" thick white bands, shattered to closely jointed MARBLE. Fracturing approximately 0 to 5 degrees from horizontal. Strong reaction to dilute HCl.
											33				
		C10	C	29	29	37.2	[REC= 100%; RQD= 83%]				18				C10) Good quality, hard, fresh to slightly weathered along fracture surfaces, gray with 1/2" to 2" thick white bands, very closely to moderately jointed MARBLE. Fracturing approximately 0 to 60 degrees from horizontal. Strong reaction to dilute HCl.
											20				
											9		39.5 Bottom of Exploration at 39.5 ft 322.0		
40															
45															
50															

Remarks:
8) At 35.5 feet on 2/11/16, CME 550X drill rig replaced with CME 55 and continued advance on 2/12/16.
9) Approximately 1/2 wash water return during coring of C9 and C10 (35.7 to 39.5 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%

Boring No.: GDB-30

*NOTE: SEE BORING CHART ON BORING INFORMATION SHEETS FOR NORTHING AND EASTING INFORMATION

vhb

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044borlogs_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: C.J. HAKEY
DESIGNED BY: GEODESIGN	CHECKED BY: GEODESIGN
BORING LOGS (11 OF 28)	SHEET 49 OF 116

BORING LOG

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
P.O. Box 699 — 40 Farrell Street
Windsor, VT 05089 — S. Burlington, VT 05403
Phone: 802-674-2033/Fax: 802-674-5943 — Phone: 802-652-5140

Project Name: Middlebury WCRS (23) Additional Drilling 2016, Middlebury, VT

Boring No.: **GDB-32C**
Page No.: 1 of 2
File No.: 837-65.4
Checked By: JAG

Boring Company:	QC/QA Laboratories, Inc.		
Foreman:	James Burrowbridge / John Leonhardt		
GeoDesign Rep.:	Alan Baribault/Hilary Jones		
Date Started:	February 16, 2016	Date Finished:	February 17, 2016
N. Coordinate:	---.---	E. Coordinate:	---.---
Ground Surface Elevation (feet):	358.5		
Station:	Offset: ft		

Casing:	Sampler:
Type: Flush	N/A
I.D.: 3.0 in.	in.
Hammer Wt.: 300 lbs	
Hammer Fall: 24 in.	
Rig Type: CME 55 Track	
Hammer Type: Automatic	

Groundwater Observations: Date | Depth (ft) | Elev. (ft) | Notes

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 (%)	Strata Description Depth & Elevation(feet)	Symbol	Sample Description Classification System:
													Asphalt (2") 358.3 / Fill (Inferred)		
													3		
		C1	C	42	37	3				[REC= 88%; RQD= 83%]		11	Bedrock (Marble) 355.5		C1) Good quality, hard, slightly weathered gray with white bands moderately jointed MARBLE. Fracturing approximately 25 to 55 degrees from horizontal. Strong reaction to dilute HCl.
5												14			
												12			
		C2	C	42	32	6.5				[REC= 76%; RQD= 42%]		13			C2) Poor quality, hard, slightly to moderately weathered gray with white bands closely to moderately jointed MARBLE. Fracturing approximately 20 to 35 degrees from horizontal. Strong reaction to dilute HCl.
												13			
												11			
10												13			
		C3	C	24	22	10				[REC= 92%; RQD= 92%]		12			C3) Good quality, hard, slightly weathered gray with 1/16" to 1/2" thick white bands closely to moderately jointed MARBLE. Fracturing approximately 20 to 30 degrees from horizontal. Strong reaction to dilute HCl.
												9			
		C4	C	36	36	12				[REC= 100%; RQD= 86%]		7.5			C4) Good quality, hard, fresh to slightly weathered gray with 1/2" thick white band at approx. 14.5' closely to moderately jointed MARBLE. Fracturing approximately 30 to 40 and 70 degrees from horizontal. Strong reaction to dilute HCl.
												7.75			
15												6.75			
		C5	C	60	60	15				[REC= 100%; RQD= 58%]		6.5			C5) Excellent quality, hard, fresh (top 2/3) to slightly weathered (lower 1/3) dark and light gray with occasional white bands very closely to widely jointed MARBLE. Fracturing approximately 40 to 60 degrees from horizontal. Increasing fissility and phyllitic texture with depth (typical bottom 30"). Strong reaction to dilute HCl.
												4			
												5.5			
												7.5			
20												6			
		C6	C	48	46	20				[REC= 96%; RQD= 58%]		6			C6) Fair quality (top half very poor, bottom half excellent), hard, very closely to moderately jointed, slightly weathered gray with white bands MARBLE. Fracturing approximately 40 to 60 degrees from horizontal. Strong reaction to dilute HCl. Top 15" has some slickenside surfaces.
												5.25			
												5.25			
												7.5			
25		C7	C	60	60	24				[REC= 100%; RQD= 90%]		4.75			C7) Good quality, hard, fresh to slightly weathered, closely to moderately jointed gray with

Remarks:
1) Attempted location A, but unable to seat 4" FJ casing on inferred sloping surface at 5.3 feet. Abandon hole and offset 6 feet South for location B. Casing driven fo refusal at 3 feet deep. Attempted core at location B, lost water return at 3.5 feet from bottom of casing. Attempted to drive casing, unable to seat. Attempted roller bit advance, but carbide buttons damaged upon removal. Casing shoe damaged upon removal. Hole abandoned due to concern of metal debris.
2) Location C offset 2' East and advanced with 3" FJ casing to refusal at 3 feet deep. Water water return brown, becoming white-gray by approximately 3.5 feet during core C1. Wash water return lost completely at 7.5 feet.
3) Advanced stopped at 12 feet on 2/16; return 2/17 and attempt to seal fractures at 7.5 feet with bentonite chips. Wash water return gray.
4) During advance of C4 at approximately 15.5 feet, increased throttle/engine governor to hasten coring (low speed/high torque rig gearing).
5) Core block at 24 feet, unable to continue coring C6.

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%

Boring No.: **GDB-32C**

SMALL REMARK FONT STANDARD, 837-65.4 MIDDLEBURY ADDL 2016.GPJ, GEODESIGN STANDARD, GDT 5/19/16

BORING LOG

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
P.O. Box 699 — 40 Farrell Street
Windsor, VT 05089 — S. Burlington, VT 05403
Phone: 802-674-2033/Fax: 802-674-5943 — Phone: 802-652-5140

Project Name: Middlebury WCRS (23) Additional Drilling 2016, Middlebury, VT

Boring No.: **GDB-32C**
Page No.: 2 of 2
File No.: 837-65.4
Checked By: JAG

Boring Company:	QC/QA Laboratories, Inc.		
Foreman:	James Burrowbridge / John Leonhardt		
GeoDesign Rep.:	Alan Baribault/Hilary Jones		
Date Started:	February 16, 2016	Date Finished:	February 17, 2016
N. Coordinate:	---.---	E. Coordinate:	---.---
Ground Surface Elevation (feet):	358.5		
Station:	Offset: ft		

Casing:	Sampler:
Type: Flush	N/A
I.D.: 3.0 in.	in.
Hammer Wt.: 300 lbs	
Hammer Fall: 24 in.	
Rig Type: CME 55 Track	
Hammer Type: Automatic	

Groundwater Observations: Date | Depth (ft) | Elev. (ft) | Notes

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 (%)	Strata Description Depth & Elevation(feet)	Symbol	Sample Description Classification System:
												7.25	Bedrock (Marble) (Continued)		white bands and swirls MARBLE. Fracturing approximately 20 to 50 and 70 degrees from horizontal. Strong reaction to dilute HCl.
												4			
												3.5			
												4			
30		C8	C	60	60	29				[REC= 100%; RQD= 78%]		4.25			C8) Good quality, hard, fresh gray with white bands and swirls (primarily 31.5 to 32 feet), closely to moderately jointed MARBLE. Fracturing approximately 40 to 50 degrees from horizontal. Slickensides noted typically bottom 24". Strong reaction to dilute HCl.
												3.75			
												3.5			
												4			
												3.5			
35		C9	C	24	24	34				[REC= 100%; RQD= 75%]		4.75			C9) Fair quality, hard, slightly weathered gray and dark gray and white bands closely to moderately jointed MARBLE. Fracturing approximately 10 to 30 degrees from horizontal. Strong reaction to dilute HCl.
												5.25			
													36 Bottom of Exploration at 36.0 ft 322.5		
40															
45															
50															

Remarks:
6) Lost water at 27 feet: partial return for approximately 1 minute then complete loss.
7) Borehole terminated at approximately 36 feet deep. Backfilled with cement-bentonite grout (1 bag cement, ~10 pounds of hydrated bentonite chips from prior attempt to plug fracture at 7.5 feet). Tremie grouted to 7 feet and removed casing. Added partially hydrated chips and topped off with grout.
8) Borehole topped off with concrete and asphalt patch on 2/18/16. Borehole location A backfilled with cuttings and bentonite, capped with soil/grass/leaves, and borehole location B backfilled with bentonite, sand, and capped with asphalt patch on 2/17.

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%

Boring No.: **GDB-32C**

SMALL REMARK FONT STANDARD, 837-65.4 MIDDLEBURY ADDL 2016.GPJ, GEODESIGN STANDARD, GDT 5/19/16

BORING LOG

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
P.O. Box 699 — 40 Farrell Street
Windsor, VT 05089 — S. Burlington, VT 05403
Phone: 802-674-2033/Fax: 802-674-5943 — Phone: 802-652-5140

Project Name: Middlebury WCRS (23) Additional Drilling 2016, Middlebury, VT

Boring No.: **GDB-33**
Page No.: 1 of 1
File No.: 837-65.4
Checked By: JAG

Boring Company:	QC/QA Laboratories, Inc.		
Foreman:	John Leonhardt		
GeoDesign Rep.:	Hilary Jones		
Date Started:	February 18, 2016	Date Finished:	February 18, 2016
N. Coordinate:	---.---	E. Coordinate:	---.---
Ground Surface Elevation (feet):	350.5		
Station:	Offset: ft		

Casing:	Sampler:
Type: Flush	N/A
I.D.: 4.0 in.	in.
Hammer Wt.: 140 lbs	
Hammer Fall: 30 in.	
Rig Type: CME 55 Track	
Hammer Type: Automatic	

Groundwater Observations: Date | Depth (ft) | Elev. (ft) | Notes

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 (%)	Strata Description Depth & Elevation(feet)	Symbol	Sample Description Classification System:
													Fill (Inferred)		
5															
10															
15															
20		C1	C	60	60	19.5				[REC= 100%; RQD= 90%]		6.5	19.5 Bedrock (Marble) 331.0		C1) Excellent quality, hard, fresh to slightly weathered, closely to moderately joined gray with 1/4" to 1.5" thick white bands MARBLE. Fracturing approximately 5 to 40 degrees from horizontal. Moderate to strong reaction to dilute HCl.
												5			
												3.5			
												3.75			
												4	24.5 Bottom of Exploration at 24.5 ft 326.0		
25															
30															

Remarks:
1) Casing driven to 19' deep and washed out. Casing blows approximately 50 to 75 per foot (not recorded).
2) Wash water brown to 20.5 feet, becoming gray. Approximately full wash water return.

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%

Boring No.: **GDB-33**

SMALL REMARK FONT STANDARD, 837-65.4 MIDDLEBURY ADDL 2016.GPJ, GEODESIGN STANDARD, GDT 5/19/16

*NOTE: SEE BORING CHART ON BORING INFORMATION SHEETS FOR NORTHING AND EASTING INFORMATION

vhb

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044borlogs_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: C.J. HAKEY
DESIGNED BY: GEODESIGN	CHECKED BY: GEODESIGN
BORING LOGS (12 OF 28)	SHEET 50 OF 116

BORING LOG — GDB-34

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
P.O. Box 699, Windsor, VT 05089 — Phone: 802-674-2033/Fax: 802-674-5943
40 Farrell Street, S. Burlington, VT 05403 — Phone: 802-652-5140

Project Name: Middlebury WCRS (23) Additional Drilling 2016, Middlebury, VT

Boring No.: GDB-34 | Page No.: 1 of 1 | File No.: 837-65.4 | Checked By: JAG

Boring Company:	QC/QA Laboratories, Inc.		
Foreman:	John Leonhardt		
GeoDesign Rep.:	Hilary Jones		
Date Started:	February 22, 2016	Date Finished:	February 23, 2016
N. Coordinate:		E. Coordinate:	
Ground Surface Elevation (feet):	350.5		
Station:		Offset:	ft

	Casing:	Sampler:
Type:	Flush	N/A
I.D.:	4.0 in.	in.
Hammer Wt.:	140 lbs	
Hammer Fall:	30 in.	
Rig Type:	CME 55 Track	
Hammer Type:	Automatic	

Groundwater Observations: Date | Depth (ft) | Elev. (ft) | Notes — (none recorded)

Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	Blows / 6 inch Interval	Coring Time (min./ft)	Moisture Content (%)
C1	C	18	18	7	[REC= 100%; RQD= 33%]	4.5	
						3.5	
C2	C	37	37	15	[REC= 100%; RQD= 43%]	8	
						4.75	
						5	
C3	C	23	22	18.1	[REC= 96%; RQD= 56%]	6.25	
						4	

Strata Description (Depth & Elevation (feet)):
- 0 – 7: Fill (Inferred; no sampling. See log of RR-16)
- 7 – 15: Glacial Till (Inferred) 343.5
- 15 – 20: Bedrock (Marble) 335.5
- 20: Bottom of Exploration at 20.0 ft, 330.5

Sample Description (Classification System:)
- C1) Upper 11": Poor quality, hard, fresh to slightly weathered, gray with thin white bands possible, closely jointed MARBLE. Fracturing approximately 45 degrees from horizontal. No reaction to dilute HCl
  Lower 7": Fine to coarse GRAVEL (Inferred Glacial Till).
- C2) Poor quality, hard, fresh to slightly weathered, dark gray with thin white bands, shattered to moderately jointed MARBLE with occasional thin (<1/8" thick) beds of carbonaceous inclusions. Top 24" phyllitic with fissile fracture. Fracturing approximately 5 - 60 degrees from horizontal. Strong reaction to dilute HCl. Bottom 16" lighter gray, less fractured.
- C3) Fair quality, hard, fresh to slightly weathered, gray with thin white bands, very closely to closely jointed MARBLE. Fracturing approximately 30 - 60 degrees from horizontal. Strong reaction to dilute HCl.

Remarks:
1) 4" flush joint casing driven to refusal at 7' deep. Casing blows approximately 30 to 50 per foot (not recorded). Following core C1, 3" casing advanced with spin shoe telescopically to 15' deep.
2) Wash water brown to 15 feet, becoming gray at 16' deep during C2.
3) Nearly full wash water return observed during coring (slight water loss between 3" and 4" casing).

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%

Boring No.: GDB-34

SMALL REMARK FONT STANDARD 837-65.4 MIDDLEBURY ADDL 2016.GPJ GEODESIGN STANDARD.GDT 5/19/16

BORING LOG — MR-1

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
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

Project Name: Middlebury WCRS (23) Bridges 2 and 102, Middlebury, VT

Boring No.: MR-1 | Page No.: 1 of 1 | File No.: 837-65 | Checked By: JFW

Boring Company:	TransTech Drilling Services		
Foreman:	James Burrowbridge		
GeoDesign Rep.:	Jesse McIntyre		
Date Started:	March 13, 2013	Date Finished:	March 13, 2013
N. Coordinate:		E. Coordinate:	
Ground Surface Elevation (feet):	366.71		
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 550X ATV	
Hammer Type:	Automatic	

Date	Depth (ft)	Elev. (ft)	Notes
3/13/13, 9:30	21.0	345.7	Wet sample
3/13/13, 10:35	23.4	343.3	In open hole (30 min.)

Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	0 - 6	6 - 12	12 - 18	18 - 24	Coring Time (min./ft)	PID Reading (ppm)
S1	SS	24	11	1	6	5	4	4		0.7
S2	SS	24	11	2	3	4	8	13		0.6
S3	SS	24	1	5	9	5	3	4		1.1
S4	SS	24	11	7	5	3	4	5		0.5
S5	SS	24	21	10	3	4	5	8		0.1
S6	SS	24	24	15	12	21	32	45		0.5
S7	SS	24	18	17	22	31	29	32		0.2
S8	SS	24	12	19	14	16	29	58		0.2
S9	SS	24	13	21	14	18	23	9		1.1
S10	SS	24	24	23	10	23	57	33		0.6
S11	SS	24	13	25	14	33	20	18		1.2
S12	SS	24	13	27	13	48	59	50		1.1
S13	SS	2	1	29	100/2"					2.3

Strata Description (Depth & Elevation (feet)):
- Asphalt 366.46
- Fill
- 15: Gravelly Sand & Silt 351.71
- 21: Silty Sand & Gravel 345.71
- 29.2: Bottom of Exploration at 29.2 ft, 337.51

Sample Description (Classification System: Burmister)
- S1: Loose, brown-gray fine to coarse SAND and SILT, little Silt & Clay, little fine to coarse Gravel, trace Root Fibers, dry.
- S2: Medium Dense, brown-gray fine to coarse SAND and SILT, little fine to coarse Gravel, trace Clayey Silt, moist.
- S3:Loose, black-gray fine to coarse SAND, some Silt, little fine to coarse Gravel, moist.
- S4: Medium, brown CLAY & SILT, some fine to coarse Sand, little fine to coarse Gravel, trace Concrete Debris, moist.
- S5: Stiff, brown CLAY & SILT and fine to coarse SAND, little fine to coarse Gravel, moist.
- S6: Very dense, brown fine to coarse SAND and SILT, little fine to coarse Gravel, moist.
- S7: Very dense, brown fine to coarse SAND and SILT, some (+) fine to coarse Gravel, moist.
- S8: Dense, gray brown fine to coarse SAND and SILT, some fine to coarse Gravel, moist.
- S9: Dense, brown fine to coarse SAND and fine to coarse GRAVEL, some Silt, wet.
- S10: Very Dense, brown fine to coarse SAND, some fine to coarse Gravel, little Silt, wet.
- S11: Very dense, brown fine to coarse SAND, some fine to coarse Gravel, some (-) Silt, wet.
- S12: Very dense, brown fine to coarse SAND, some fine to coarse Gravel, little (+) Silt, wet.
- S13: Stone Chips

Remarks:
1) Northing, easting, and ground surface elevation shown are from survey data provided by VHB.
2) All samples screened in the field using an Ion Science Phocheck Model 1000 PID calibrated onsite to a 100 ppm isobutylene standard.
3) Driller maintained a head of water on the borehole beginning at 27' deep.
4) HSAR at 29' deep.

Notes:
1) Soil Samples screened in the field using a Thermal Environmental Systems Model 580S Photoionization Detector (unless otherwise noted in Remarks). The meter was calibrated relative to a benzene in air standard. N.D. = None Detected; N. R. = Not Recorded; N.A. = Not Applicable; O.R. = Out of Range
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 Sample; 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.: MR-1

VT BORING LOG PID 5/21/04 837-65 MIDDLEBURY WCRS (23).GPJ GEODESIGN PIDAFTER7-12-04.GDT 4/23/13

BORING LOG — MR-2A

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
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

Project Name: Middlebury WCRS (23) Bridges 2 and 102, Middlebury, VT

Boring No.: MR-2A | Page No.: 1 of 1 | File No.: 837-65 | Checked By: JFW

Boring Company:	TransTech Drilling Services		
Foreman:	James Burrowbridge		
GeoDesign Rep.:	Jesse McIntyre		
Date Started:	March 13, 2013	Date Finished:	March 13, 2013
N. Coordinate:		E. Coordinate:	
Ground Surface Elevation (feet):	369.66		
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 550X ATV	
Hammer Type:	Automatic	

Date	Depth (ft)	Elev. (ft)	Notes
3/13/13, 12:00	15.0	354.7	Wet sample

Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	0 - 6	6 - 12	12 - 18	18 - 24	Coring Time (min./ft)	PID Reading (ppm)
S1	SS	18	18	0.25	6	3	4			0
S2	SS	24	11	2	6	6	5	4		0.6
S3	SS	24	13	5	4	3	3	3		0
S4	SS	24	6	7	2	3	3	4		1.1
S5	SS	24	17	10	2	4	4	45		0
S6	SS	24	11	15	9	27	23	34		0.2
S7	SS	24	13	17	21	24	28	25		1.5
S8	SS	24	16	19	12	21	24	30		0.1
S9	SS	17	14	21	31	79	100/5"			1.1
S10	SS	10	10	23	63	100/4"				1.5

Strata Description (Depth & Elevation (feet)):
- Asphalt 369.41
- Fill
- 15: Glacial Till (Silt & Sand) 354.66
- 20: Glacial Till (Silty Sand) 349.66
- 23.8: Bottom of Exploration at 23.8 ft, 345.86

Sample Description (Classification System: Burmister)
- S1: Medium, dark brown fine to coarse SAND and SILT & CLAY, little fine to coarse Gravel, trace Cinders, trace Root Fibers, moist.
- S2: Medium dense, dark brown fine to coarse SAND and SILT & CLAY, little fine to coarse Gravel, trace Cinders, moist.
- S3: Loose, brown fine to coarse SAND and CLAY & SILT, little fine to coarse Gravel, moist.
- S4: Loose, brown fine to coarse SAND and CLAY & SILT, little fine to coarse Gravel, moist.
- S5: Loose,
  S5A - Top 14": Brown CLAY & SILT and fine to coarse SAND, little fine to coarse Gravel, moist.
  S5B - Bottom 3": Tan/brown SILT and fine to coarse SAND.
- S6: Very dense, gray brown fine to coarse SAND and SILT, little fine to coarse Gravel, wet.
- S7: Very dense, gray brown fine to coarse SAND and SILT, little fine to coarse Gravel, wet.
- S8: Top 8": Similar to S7
  Bottom 8": Dense, gray brown fine to medium SAND, some(+) Silt, trace fine Gravel, wet.
- S9: Very dense, gray brown fine to coarse SAND, some Silt, little fine to coarse Gravel, wet.
- S10: Very dense, gray brown fine to coarse SAND, some Silt, little fine to coarse Gravel, stone chips in spoon tip wet.

Remarks:
1) Northing, easting, and ground surface elevation shown are from survey data provided by VHB.
2) All samples screened in the field using an Ion Science Phocheck Model 1000 PID calibrated onsite to a 100 ppm isobutylene standard.
3) Auger grinding on inferred boulders at 10 feet deep.
4) Refusal of split spoon at 23.8 feet on assumed bridge abutment stone blocks.

Notes:
1) Soil Samples screened in the field using a Thermal Environmental Systems Model 580S Photoionization Detector (unless otherwise noted in Remarks). The meter was calibrated relative to a benzene in air standard. N.D. = None Detected; N. R. = Not Recorded; N.A. = Not Applicable; O.R. = Out of Range
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 Sample; 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.: MR-2A

VT BORING LOG PID 5/21/04 837-65 MIDDLEBURY WCRS (23).GPJ GEODESIGN PIDAFTER7-12-04.GDT 4/23/13

*NOTE: SEE BORING CHART ON BORING INFORMATION SHEETS FOR NORTHING AND EASTING INFORMATION

BORING LOG

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
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

Project Name: Middlebury WCRS (23) Bridges 2 and 102 Middlebury, VT

Boring No.: **MR-2B**
Page No.: 1 of 1
File No.: 837-65
Checked By: JFW

Boring Company:	TransTech Drilling Services		
Foreman:	James Burrowbridge		
GeoDesign Rep.:	Jesse McIntyre		
Date Started:	March 14, 2013	Date Finished:	March 14, 2013
N. Coordinate:		E. Coordinate:	
Ground Surface Elevation (feet):	370.25		
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 550X ATV	
Hammer Type:	Automatic	

Groundwater Observations

Date	Depth (ft)	Elev. (ft)	Notes
▼ 3/14/13, 12:00			See Note 4

Sample Information

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	PID Reading (ppm)	Moisture Content (%)	Strata Description Depth & Elevation(feet)	Symbol	Sample Description Classification System: Burmister
													Asphalt 370.0		
													No sampling performed in upper 10' of borehole.		
5															
10															
		S1	SS	24	24	10	3	4	7	8	0.4		Sandy Clay & Silt 360.3		S1: Stiff, olive brown Silty CLAY, little fine Sand, moist.
15															
		S2	SS	2	0	15	100/2"						Glacial Till (Silt & Sand) 355.3		S2: No Recovery
20															
		S3	SS	3	0	20	100/3"								S3: No Recovery
		S4	SS	5	7	22	100/5"				1.4				S4: Gray brown fine to coarse SAND and SILT, trace fine to coarse Gravel, wet.
		S5	SS	3	3	23	100/3"				0.7				S5: Gray brown fine to coarse SAND and SILT, little fine to coarse Gravel, wet.
25															
		S6	SS	3	0	25	100/3"-								S6: No Recovery, stone chip in spoon tip.
		S7	SS	5	6	27	100/5"				2.1				S7: Gray brown fine to coarse SAND and SILT, little fine to coarse Gravel, wet.
30		S8	SS	1	1	29	100/1"				0.7		Bottom of Exploration at 29.0 ft 341.2		S8: No Recovery, Stone chips in spoon tip.

Remarks:
1) Northing, easting, and ground surface elevation shown are from survey data provided by VHB.
2) All samples screened in the field using an Ion Science Phocheck Model 1000 PID calibrated onsite to a 100 ppm isobutylene standard.
3) Strata shown is inferred from nearby Boring MR-2A. Strata changes were not observed in spoon samples or inferred during auger advance.
4) Auger grinding and walking to the west on inferred boulders at 5' deep.
5) Driller began maintaining a head of water on the borehole at 10' deep to prevent possible flowing sands. No groundwater was observed prior to maintaining a head of water on the borehole.
6) HSAR at 29 feet deep.
7) One 5 foot auger section was lost in the hole during auger removal.

Notes:
1) Soil Samples screened in the field using a Thermal Environmental Systems Model 580B Photoionization Detector (unless otherwise noted in Remarks). The meter was calibrated relative to a benzene in air standard. N.D. = None Detected; N. R. = Not Recorded;
N.A. = Not Applicable; O.R. = Out of Range
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 Sample; 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.: **MR-2B**

VT BORING LOG MC-PID WITH SMALLER REMARK FONT 837-65 MIDDLEBURY WCRS (23) GPJ GEODESIGN STANDARD .GDT 4/16/13

BORING LOG

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
P.O. Box 699, Windsor, VT 05089, Phone: 802-674-2033/Fax: 802-674-5943
40 Farrell Street, S. Burlington, VT 05403, Phone: 802-652-5140

Project Name: Middlebury WCRS (23) Phase C Middlebury, VT

Boring No.: **MR-101**
Page No.: 1 of 1
File No.: 837-65.2
Checked By: SPK

Boring Company:	TransTech Drilling Services		
Foreman:	John Leonhardt		
GeoDesign Rep.:	Jesse McIntyre		
Date Started:	April 8, 2014	Date Finished:	April 8, 2014
N. Coordinate:		E. Coordinate:	
Ground Surface Elevation (feet):	367		
Station:	Offset: ft		

	Casing:	Sampler:
Type:	None	None
I.D.:	N/A in.	in.
Hammer Wt.:	N/A	
Hammer Fall:	N/A	
Rig Type:	CME 550X ATV	
Hammer Type:	n/a	

Groundwater Observations

Date	Depth (ft)	Elev. (ft)	Notes
▼ 4/8/14, 0:00			None Observed

Sample Information

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	Casing Time (min./ft)	Moisture Content (%)	Strata Description Depth & Elevation(feet)	Symbol	Sample Description Classification System:
			VAC	65		0							No Sampling Performed		
5													5.4 Bottom of Exploration at 5.4 ft 361.6		
10															
15															
20															
25															
30															

Remarks:
1) Location determined by taped measurements and visual estimates to existing site features. Elevation estimated based on topographic plan provided by VHB.
2) Water used to jet material during vacuum excavation, all soils encountered were moist to wet. Vacuum truck cleared hole to approximately 65 inches deep.
3) A pipe approximately 4" in diameter crossed the hole in line with the abutment. Top of pipe at 56" from ground surface.

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.: **MR-101**

VT BORING LOG MC 5/21/04 837-65.2 MIDDLEBURY PHASE C.GPJ GEODESIGN STANDARD .GDT 5/21/14

BORING LOG

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
P.O. Box 699, Windsor, VT 05089, Phone: 802-674-2033/Fax: 802-674-5943
40 Farrell Street, S. Burlington, VT 05403, Phone: 802-652-5140

Project Name: Middlebury WCRS (23) Phase C Middlebury, VT

Boring No.: **MR-102**
Page No.: 1 of 1
File No.: 837-65.2
Checked By: SPK

Boring Company:	TransTech Drilling Services		
Foreman:	John Leonhardt		
GeoDesign Rep.:	Jesse McIntyre		
Date Started:	April 8, 2014	Date Finished:	April 8, 2014
N. Coordinate:		E. Coordinate:	
Ground Surface Elevation (feet):	367		
Station:	Offset: ft		

	Casing:	Sampler:
Type:	None	None
I.D.:	N/A in.	in.
Hammer Wt.:	N/A	
Hammer Fall:	N/A	
Rig Type:	CME 550X ATV	
Hammer Type:	n/a	

Groundwater Observations

Date	Depth (ft)	Elev. (ft)	Notes
▼ 4/8/14, 0:00			None Observed

Sample Information

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	Casing Time (min./ft)	Moisture Content (%)	Strata Description Depth & Elevation(feet)	Symbol	Sample Description Classification System:
			VAC	28		0							No Sampling Performed		
													2.3 Bottom of Exploration at 2.3 ft 364.7		
5															
10															
15															
20															
25															
30															

Remarks:
1) Location determined by taped measurements and visual estimates to existing site features. Elevation estimated based on topographic plan provided by VHB.
2) Water used to jet material during vacuum excavation, all soils encountered were moist to wet. Vacuum truck cleared hole to approximately 28 inches deep.
3) Refusal at 28 inches deep at top of 14" stone.

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.: **MR-102**

VT BORING LOG MC 5/21/04 837-65.2 MIDDLEBURY PHASE C.GPJ GEODESIGN STANDARD .GDT 5/21/14

*NOTE: SEE BORING CHART ON BORING INFORMATION SHEETS FOR NORTHING AND EASTING INFORMATION

vhb

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044borlogs_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: C.J. HAKEY
DESIGNED BY: GEODESIGN	CHECKED BY: GEODESIGN
BORING LOGS (14 OF 28)	SHEET 52 OF 116

BORING LOG — MR-103

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
P.O. Box 699, Windsor, VT 05089, Phone: 802-674-2033/Fax: 802-674-5943
40 Farrell Street, S. Burlington, VT 05403, Phone: 802-652-5140

Project Name: Middlebury WCRS (23) Phase C, Middlebury, VT

Boring No.: MR-103 | Page No.: 1 of 1 | File No.: 837-65.2 | Checked By: SPK

Boring Company: TransTech Drilling Services
Foreman: John Leonhardt
GeoDesign Rep.: Jesse McIntyre
Date Started: April 8, 2014 | Date Finished: April 8, 2014
N. Coordinate: | E. Coordinate:
Ground Surface Elevation (feet): 367
Station: | Offset: ft

Casing: Type: None	Sampler: None
I.D.: N/A in.	in.
Hammer Wt.: N/A	
Hammer Fall: N/A	
Rig Type: CME 550X ATV	
Hammer Type: n/a	

Groundwater Observations			
Date	Depth (ft)	Elev. (ft)	Notes
▼ 4/8/14, 0:00			None Observed

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 (%)	Strata Description Depth & Elevation(feet)	Symbol	Sample Description Classification System:
			VAC	46		0							No Sampling Performed		
													3.8 Bottom of Exploration at 3.8 ft	363.2	
5															
10															
15															
20															
25															
30															

Remarks:
1) Location determined by taped measurements and visual estimates to existing site features. Elevation estimated based on topographic plan provided by VHB.
2) Water used to jet material during vacuum excavation, all soils encountered were moist to wet. Vacuum truck cleared hole to 46 inches deep.
3) Refusal at 46 inches deep at top of 16" stone.

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.: MR-103

VT BORING LOG MC 5/21/04 837-65.2 MIDDLEBURY PHASE C.GPJ GEODESIGN STANDARD .GDT 5/21/14

BORING LOG — MR-104

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
P.O. Box 699, Windsor, VT 05089, Phone: 802-674-2033/Fax: 802-674-5943
40 Farrell Street, S. Burlington, VT 05403, Phone: 802-652-5140

Project Name: Middlebury WCRS (23) Phase C, Middlebury, VT

Boring No.: MR-104 | Page No.: 1 of 1 | File No.: 837-65.2 | Checked By: SPK

Boring Company: TransTech Drilling Services
Foreman: John Leonhardt
GeoDesign Rep.: Jesse McIntyre
Date Started: April 8, 2014 | Date Finished: April 8, 2014
N. Coordinate: | E. Coordinate:
Ground Surface Elevation (feet): 367
Station: | Offset: ft

Casing: Type: S.S.A.	Sampler: None
I.D.: 3.5 in.	in.
Hammer Wt.: NA	
Hammer Fall: NA	
Rig Type: CME 550X ATV	
Hammer Type: n/a	

Groundwater Observations			
Date	Depth (ft)	Elev. (ft)	Notes
▼ 4/8/14, 0:00			None Observed

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 (%)	Strata Description Depth & Elevation(feet)	Symbol	Sample Description Classification System:
			VAC	120		0							No Sampling Performed		
5															
10			A	180		10									
15															
20															
25													25 Bottom of Exploration at 25.0 ft	342.0	
30															

Remarks:
1) Location determined by taped measurements and visual estimates to existing site features. Elevation estimated based on topographic plan provided by VHB.
2) Water used to jet material during vacuum excavation, all soils encountered were moist to wet. Vacuum truck cleared hole to approximately 10 feet deep.
3) Exploration advanced with 3.5" diameter solid stem augers below 10 feet deep.
4) Driller noted decrease in auger resistance at approximately 13 feet, then auger chatter approximately from 18 to 19 feet deep.
5) Exploration terminated at 25 feet deep without 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=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.: MR-104

SMALL REMARK FONT STANDARD 837-65.2 MIDDLEBURY PHASE C.GPJ GEODESIGN STANDARD .GDT 5/21/14

BORING LOG — MR-105

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
P.O. Box 699, Windsor, VT 05089, Phone: 802-674-2033/Fax: 802-674-5943
40 Farrell Street, S. Burlington, VT 05403, Phone: 802-652-5140

Project Name: Middlebury WCRS (23) Phase C, Middlebury, VT

Boring No.: MR-105 | Page No.: 1 of 1 | File No.: 837-65.2 | Checked By: SPK

Boring Company: TransTech Drilling Services
Foreman: John Leonhardt
GeoDesign Rep.: Jesse McIntyre
Date Started: April 8, 2014 | Date Finished: April 8, 2014
N. Coordinate: | E. Coordinate:
Ground Surface Elevation (feet): 367
Station: | Offset: ft

Casing: Type: None	Sampler: None
I.D.: N/A in.	in.
Hammer Wt.: N/A	
Hammer Fall: N/A	
Rig Type: CME 550X ATV	
Hammer Type: n/a	

Groundwater Observations			
Date	Depth (ft)	Elev. (ft)	Notes
▼ 4/8/14, 0:00			None Observed

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 (%)	Strata Description Depth & Elevation(feet)	Symbol	Sample Description Classification System:
			VAC	48		0							No Sampling Performed		
													4 Bottom of Exploration at 4.0 ft	363.0	
5															
10															
15															
20															
25															
30															

Remarks:
1) Location determined by taped measurements and visual estimates to existing site features. Elevation estimated based on topographic plan provided by VHB.
2) Water used to jet material during vacuum excavation, all soils encountered were moist to wet. Vacuum truck cleared hole to approximately 48 inches deep.
3) Refusal at 48 inches deep at top of 14" stone.

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.: MR-105

VT BORING LOG MC 5/21/04 837-65.2 MIDDLEBURY PHASE C.GPJ GEODESIGN STANDARD .GDT 5/21/14

*NOTE: SEE BORING CHART ON BORING INFORMATION SHEETS FOR NORTHING AND EASTING INFORMATION

vhb

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044borlogs_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: C.J. HAKEY
DESIGNED BY: GEODESIGN	CHECKED BY: GEODESIGN
BORING LOGS (15 OF 28)	SHEET 53 OF 116

BORING LOG — MR-106

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
P.O. Box 699, Windsor, VT 05089, Phone: 802-674-2033/Fax: 802-674-5943
40 Farrell Street, S. Burlington, VT 05403, Phone: 802-652-5140

Project Name: Middlebury WCRS (23) Phase C, Middlebury, VT

Boring No.: MR-106 | Page No.: 1 of 1 | File No.: 837-65.2 | Checked By: SPK

Boring Company: TransTech Drilling Services
Foreman: John Leonhardt
GeoDesign Rep.: Jesse McIntyre
Date Started: April 8, 2014 | Date Finished: April 8, 2014
N. Coordinate: | E. Coordinate:
Ground Surface Elevation (feet): 367
Station: | Offset: ft

Casing: Type	Casing: I.D.	Sampler: Type	Sampler: I.D.	Hammer Wt.	Hammer Fall	Rig Type	Hammer Type
S.S.A.	3.5 in.	None	in.	NA	NA	CME 550X ATV	n/a

Groundwater Observations: Date	Depth (ft)	Elev. (ft)	Notes
▼ 4/8/14, 0:00			None Observed

Sample Information

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 (%)
		1	VAC	94		0						
		2	A	206		7.83						

Strata Description (Depth & Elevation(feet)): No Sampling Performed; Bottom of Exploration at 25.0 ft (342.0)

Symbol | Sample Description — Classification System:

Remarks:
1) Location determined by taped measurements and visual estimates to existing site features. Elevation estimated based on topographic plan provided by VHB.
2) Water used to jet material during vacuum excavation, all soils encountered were moist to wet. Vacuum truck cleared hole to approximately 94 inches deep.
3) Exploration advanced with 3.5" diameter solid stem augers below 94 inches deep.
4) Exploration terminated at 25 feet deep without 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=Drivess; 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.: **MR-106**

VT BORING LOG MC 5/21/04 837-65.2 MIDDLEBURY PHASE C.GPJ GEODESIGN STANDARD .GDT 5/21/14

BORING LOG — MR-107

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
P.O. Box 699, Windsor, VT 05089, Phone: 802-674-2033/Fax: 802-674-5943
40 Farrell Street, S. Burlington, VT 05403, Phone: 802-652-5140

Project Name: Middlebury WCRS (23) Phase C, Middlebury, VT

Boring No.: MR-107 | Page No.: 1 of 1 | File No.: 837-65.2 | Checked By: SPK

Boring Company: TransTech Drilling Services
Foreman: John Leonhardt
GeoDesign Rep.: Jesse McIntyre
Date Started: April 8, 2014 | Date Finished: April 8, 2014
N. Coordinate: | E. Coordinate:
Ground Surface Elevation (feet): 367
Station: | Offset: ft

Casing: Type	Casing: I.D.	Sampler: Type	Sampler: I.D.	Hammer Wt.	Hammer Fall	Rig Type	Hammer Type
None	N/A in.	None	in.	N/A	N/A	CME 550X ATV	n/a

Groundwater Observations: Date	Depth (ft)	Elev. (ft)	Notes
▼ 4/8/14, 0:00			None Observed

Sample Information

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 (%)
		1	VAC	58		0						

Strata Description (Depth & Elevation(feet)): No Sampling Performed (4.8); Bottom of Exploration at 4.8 ft (362.2)

Symbol | Sample Description — Classification System:

Remarks:
1) Location determined by taped measurements and visual estimates to existing site features. Elevation estimated based on topographic plan provided by VHB.
2) Water used to jet material during vacuum excavation, all soils encountered were moist to wet. Vacuum truck cleared hole to approximately 58 inches deep.
3) Refusal at 58 inches deep at top of stone or boulder (did not appear to be a dimensional / ashlar stone of the abutment).

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=Drivess; 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.: **MR-107**

VT BORING LOG MC 5/21/04 837-65.2 MIDDLEBURY PHASE C.GPJ GEODESIGN STANDARD .GDT 5/21/14

BORING LOG — MS-1A

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
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

Project Name: Middlebury WCRS (23) Bridges 2 and 102, Middlebury, VT

Boring No.: MS-1A | Page No.: 1 of 1 | File No.: 837-65 | Checked By: JFW

Boring Company: TransTech Drilling Services
Foreman: James Burrowbridge
GeoDesign Rep.: Joshua Gilman
Date Started: March 12, 2013 | Date Finished: March 12, 2013
N. Coordinate: | E. Coordinate:
Ground Surface Elevation (feet): 370.35
Station: | Offset: ft

Casing: Type	Casing: I.D.	Sampler: Type	Sampler: I.D.	Hammer Wt.	Hammer Fall	Rig Type	Hammer Type
H.S.A.	3.25 in.	SS	1.38 in.	NA	NA	CME 550X ATV	Automatic

Groundwater Observations: Date	Depth (ft)	Elev. (ft)	Notes
▼ 3/12/13, 9:00	-	370.4	None observed

Sample Information

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)	PID Reading (ppm)
		S1	SS	18	10	0.5	8	12	6			3.1
		S2	SS	24	14	2	5	6	6	6		1.0
		S3	SS	24	22	5	5	7	5	6		2.2
		S4	SS	24	24	7	2	3	5	7		0.3
		S5	SS	24	24	10	3	3	4	5		1.0

Strata Description (Depth & Elevation(feet)): 0.8 Asphalt; Fill (369.55); 13 Bottom of Exploration at 13.0 ft (357.35)

Symbol | Sample Description — Classification System: Burmister

S1: Medium dense, brownish black fine to coarse SAND, little Silt, trace fine Gravel, dry.
S2: Top 2" similar to S1. Bottom 12" Stiff, tan brown CLAY & SILT and fine to coarse SAND, trace fine Gravel, moist.
S3: Top 11" Stiff, tan brown CLAY & SILT, some fine to coarse Sand, trace Wood, moist. Bottom 11" Stiff, gray CLAY & SILT, some fine to coarse Sand, trace Brick, moist.
S4: Stiff, gray to brown with gray seams, CLAY & SILT (finely parted), trace fine to coarse Sand, moist.
S5: Top 2" similar to S4. Bottom 22" Stiff, tan brown CLAY & SILT, trace fine to coarse Sand, moist. With 2 to 3" fine to coarse Sand seams.

Remarks:
1) Northing, easting, and ground surface elevation shown are from survey data provided by VHB.
2) All samples screened in the field using an Ion Science Phocheck Model 1000 PID calibrated onsite to a 100 ppm isobutylene standard.
2) HSAR at 13 feet deep. Driller offset 12 feet northeast to resume advance on MS-1B.

Notes:
1) Soil Samples screened in the field using a Thermal Environmental Systems Model 580S Photoionization Detector (unless otherwise noted in Remarks). The meter was calibrated relative to a benzene in air standard. N.D. = None Detected; N. R. = Not Recorded; N.A. = Not Applicable; O.R. = Out of Range
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 = Drivess; G = Grab; PS = Piston Sample; 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.: **MS-1A**

VT BORING LOG PID 5/21/04 837-65 MIDDLEBURY WCRS (23).GPJ GEODESIGN PRDAFTERP 12-04.GDT 4/16/13

*NOTE: SEE BORING CHART ON BORING INFORMATION SHEETS FOR NORTHING AND EASTING INFORMATION

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044borlogs_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: C.J. HAKEY
DESIGNED BY: GEODESIGN	CHECKED BY: GEODESIGN
BORING LOGS (16 OF 28)	SHEET 54 OF 116

BORING LOG — MS-1B

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
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

Project Name: Middlebury WCRS (23), Bridges 2 and 102, Middlebury, VT

Boring No.: MS-1B | Page No.: 1 of 1 | File No.: 837-65 | Checked By: JFW

Boring Company: TransTech Drilling Services
Foreman: James Burrowbridge
GeoDesign Rep.: Joshua Gilman
Date Started: March 12, 2013 — Date Finished: March 12, 2013
N. Coordinate: — E. Coordinate:
Ground Surface Elevation (feet): 370.27
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 550X ATV	
Hammer Type:	Automatic	

Groundwater Observations

Date	Depth (ft)	Elev. (ft)	Notes
3/12/13, 9:30	17.8	352.5	Wet sample
3/12/13, 11:00	21.5	348.8	In augers

Sample Information

Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	0 - 6	6 - 12	12 - 18	18 - 24	Coring Time (min./ft)	PID Reading (ppm)
S6	SS	24	18	16	4	11	10	7		0.2
S7	SS	24	24	18	5	4	3	7		0.2
S8	SS	24	9	20	2	2	2	4		0
S9	SS	24	6	22	1	3	4	6		0
S10	SS	24	9	24	3	40	43	70		0.1

Strata Description (Depth & Elevation (feet)):
- 0.8 — Asphalt
- Fill — 369.47
- 16 — Silt/ Sand/Clay Mixture — 354.27
- 24.5 — Possible Weathered Bedrock — 345.77
- 26 — Bottom of Exploration at 26.0 ft — 344.27

Sample Description (Classification System: Burmister):
- S6: Medium dense, tan brown fine to coarse SAND and Clayey SILT, little fine to coarse Gravel, wet bottom 3"'.
- S7: Loose, tan brown fine to coarse SAND and Clayey SILT, little fine to coarse Gravel, wet.
- S8: Loose, tan brown Clayey SILT and fine to coarse SAND, little fine to coarse Gravel, wet.
- S9: Loose, tan brown Clayey SILT and fine to coarse SAND, trace fine Gravel, wet.
- S10: Top 3": Similar to S9 Bottom 6": Very dense, gray brown Clayey SILT and fine to coarse SAND, little fine to coarse Gravel, wet. Stone chips in spoon tip.

Remarks:
1) Northing, easting, and ground surface elevation shown are from survey data provided by VHB.
2) All samples screened in the field using an Ion Science Phocheck Model 1000 PID calibrated onsite to a 100 ppm isobutylene standard.
2) Refer to MS-1A for data from 0 to 13 feet deep.
3) HSAR at 25 feet deep.

Notes: 1) Soil Samples screened in the field using a Thermal Environmental Systems Model 580S Photoionization Detector (unless otherwise noted in Remarks). The meter was calibrated relative to a benzene in air standard. N.D. = None Detected; N. R. = Not Recorded; N.A. = Not Applicable; O.R. = Out of Range
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 Sample; 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.: MS-1B

VT BORING LOG PID 5/21/04 837-65 MIDDLEBURY WCRS (23).GPJ GEODESIGN PIDAFTER7-12-04.GDT 4/16/13

BORING LOG — MS-2A

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
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

Project Name: Middlebury WCRS (23), Bridges 2 and 102, Middlebury, VT

Boring No.: MS-2A | Page No.: 1 of 1 | File No.: 837-65 | Checked By: JFW

Boring Company: TransTech Drilling Services
Foreman: James Burrowbridge
GeoDesign Rep.: Jesse McIntyre
Date Started: March 12, 2013 — Date Finished: March 11, 2013
N. Coordinate: — E. Coordinate:
Ground Surface Elevation (feet): 366.98
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 550X ATV	
Hammer Type:	Automatic	

Groundwater Observations

Date	Depth (ft)	Elev. (ft)	Notes
3/12/13, 14:15	15.0	352.0	Wet sample

Sample Information

Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	0 - 6	6 - 12	12 - 18	18 - 24	Coring Time (min./ft)	PID Reading (ppm)
S1	SS	24	15	0.33	15	20	17	16		0.2
S2	SS	24	13	2.33	31	12	6	6		0.2
S3	SS	24	10	5	4	3	3	5		0.1
S4	SS	24	23	7	5	10	11	17		0.1
S5	SS	24	23	10	3	20	17	16		0.1
S6	SS	24	10	15	6	7	7	8		0.0
S7	SS	24	12	17	3	3	4	11		0.0
S8	SS	17	13	19	27	21	100/5"			0.1
S9	SS	3	1	21	100/3"					

Strata Description (Depth & Elevation (feet)):
- Asphalt — 366.65
- Fill
- 19 — Glacial Till — 347.98
- 21.25 — Bottom of Exploration at 21.3 ft — 345.73

Sample Description (Classification System: Burmister):
- S1: Dense light brown fine to coarse SAND, some fine to coarse Gravel, little Silt, dry.
- S2: Medium Dense, light brown fine to coarse SAND and fine to coarse GRAVEL, little Silt, dry.
- S3: Medium, tan brown Clayey SILT and fine to coarse SAND, little fine Gravel, trace Concrete Debris, moist.
- S4: Medium dense, tan brown SILT and fine to coarse SAND, some fine to coarse Gravel, moist.
- S5: Dense, tan brown SILT and fine to coarse SAND, trace fine Gravel, moist.
- S6: Medium dense, tan brown Clayey SILT, some fine to coarse Sand, some fine to coarse Gravel, moist.
- S7: Loose, gray brown SILT and fine to coarse SAND, little fine to coarse Gravel, wet.
- S8: Very dense, gray brown SILT and fine to coarse SAND, some fine to coarse Gravel, wet. Stone chips in spoon tip.
- S9: Refusal. Stone chips in spoon tip.

Remarks:
1) Northing, easting, and ground surface elevation shown are from survey data provided by VHB.
2) All samples screened in the field using an Ion Science Phocheck Model 1000 PID calibrated onsite to a 100 ppm isobutylene standard.
3) HSAR at 21 feet deep. Hole terminated at 21.25 feet deep (bottom of final SS sample).

Notes: 1) Soil Samples screened in the field using a Thermal Environmental Systems Model 580S Photoionization Detector (unless otherwise noted in Remarks). The meter was calibrated relative to a benzene in air standard. N.D. = None Detected; N. R. = Not Recorded; N.A. = Not Applicable; O.R. = Out of Range
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 Sample; 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.: MS-2A

VT BORING LOG PID 5/21/04 837-65 MIDDLEBURY WCRS (23).GPJ GEODESIGN PIDAFTER7-12-04.GDT 4/16/13

BORING LOG — MS-2B

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
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

Project Name: Middlebury WCRS (23), Bridges 2 and 102, Middlebury, VT

Boring No.: MS-2B | Page No.: 1 of 1 | File No.: 837-65 | Checked By: JFW

Boring Company: TransTech Drilling Services
Foreman: James Burrowbridge
GeoDesign Rep.: Jesse McIntyre
Date Started: March 14, 2013 — Date Finished: March 14, 2013
N. Coordinate: — E. Coordinate:
Ground Surface Elevation (feet): 366.22
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 550X ATV	
Hammer Type:	Automatic	

Groundwater Observations

Date	Depth (ft)	Elev. (ft)	Notes
3/14/13, 0:00			See Note 3

Sample Information

Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	0 - 6	6 - 12	12 - 18	18 - 24	Coring Time (min./ft)	PID Reading (ppm)
S1	SS	24	24	10	11	29	13	41		0.3
S2	SS	24	16	13	46	33	15	22		1.1
S3	SS	2	0	18	100/2"					
S4	SS	2	0	19	100/2"					

Strata Description (Depth & Elevation (feet)):
- Asphalt — 365.89
- No sampling performed in upper 10' of borehole.
- 10 — Glacial Till — 356.22
- 19.2 — Bottom of Exploration at 19.2 ft — 347.02

Sample Description (Classification System: Burmister):
- S1: Dense, brown SILT and fine to coarse SAND, little fine to coarse Gravel, moist.
- S2: Dense, brown SILT and fine to coarse SAND, little fine to coarse Gravel, moist.
- S3: Refusal, no recovery.
- S4: Refusal, stone chip in spoon tip.

Remarks:
1) Northing, easting, and ground surface elevation shown are from survey data provided by VHB.
2) All samples screened in the field using an Ion Science Phocheck Model 1000 PID calibrated onsite to a 100 ppm isobutylene standard.
3) Driller began maintaining a head of water on the borehole to prevent possible heaving sands prior to making note of any groundwater.
4) HSAR at 19 feet deep. Hole terminated at 19.16 feet deep (bottom of final SS sample).

Notes: 1) Soil Samples screened in the field using a Thermal Environmental Systems Model 580S Photoionization Detector (unless otherwise noted in Remarks). The meter was calibrated relative to a benzene in air standard. N.D. = None Detected; N. R. = Not Recorded; N.A. = Not Applicable; O.R. = Out of Range
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 Sample; 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.: MS-2B

VT BORING LOG PID 5/21/04 837-65 MIDDLEBURY WCRS (23).GPJ GEODESIGN PIDAFTER7-12-04.GDT 4/22/13

*NOTE: SEE BORING CHART ON BORING INFORMATION SHEETS FOR NORTHING AND EASTING INFORMATION

PROJECT NAME:	MIDDLEBURY		
PROJECT NUMBER:	WCRS(23)		
FILE NAME:	z10g044borlogs_pl.dgn	PLOT DATE:	10/18/2016
PROJECT LEADER:	A.P. GUYETTE	DRAWN BY:	C.J. HAKEY
DESIGNED BY:	GEODESIGN	CHECKED BY:	GEODESIGN
BORING LOGS (17 OF 28)		SHEET	55 OF 116

VHB 57603

BORING LOG — MS-101

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
P.O. Box 699, Windsor, VT 05089, Phone: 802-674-2033/Fax: 802-674-5943
40 Farrell Street, S. Burlington, VT 05403, Phone: 802-652-5140

Project Name: Middlebury WCRS (23) Phase C, Middlebury, VT

Boring No.: MS-101
Page No.: 1 of 1
File No.: 837-65.2
Checked By: SPK

Boring Company: TransTech Drilling Services
Foreman: John Leonhardt
GeoDesign Rep.: Jesse McIntyre
Date Started: April 9, 2014 — Date Finished: April 9, 2014
N. Coordinate: — E. Coordinate:
Ground Surface Elevation (feet): 368
Station: — Offset: ft

	Casing:	Sampler:
Type:	S.S.A.	SS
I.D.:	3.5 in.	1.38 in.
Hammer Wt.:	NA	140 lbs
Hammer Fall:	NA	30 in.
Rig Type:	CME 550X ATV	
Hammer Type:	Automatic	

Groundwater Observations

Date	Depth (ft)	Elev. (ft)	Notes
▼ 4/9/14, 0:00			None Observed
▼			
▼			
▼			

Sample Information

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	Casing Time (min./ft)	Moisture Content (%)
			VAC	96		0						
			A	180		8						
		S1	SS	1	1	23	60/1"					

Strata Description — Depth & Elevation(feet) — Symbol — Sample Description — Classification System: Burmister

- No Sampling Performed (0 – 8)
- No Sampling Performed (8 – 22, 360.0)
- Fill (with Wood) (22 – 23, 346.0)
- Glacial Till (23 – 23.1, 345.0)
- Bottom of Exploration at 23.1 ft (344.9)

Refusal, gray SILT and coarse GRAVEL, trace fine to coarse Sand, trace Wood Fibers, moist, slight organic decay odor.

Remarks:
1) Location determined by taped measurements and visual estimates to existing site features. Elevation estimated based on topographic plan provided by VHB.
2) Water used to jet material during vacuum excavation, all soils encountered were moist to wet. Vacuum truck cleared hole to approximately 96 inches deep. Slope of back face appears to be approximately 3H:12V. Refusal of vacuum equipment between back of wall and large stone.
3) Exploration advanced with 3.5" diameter solid stem augers below approximately 8 feet deep.
4) Encountered auger refusal at approximately 22 feet deep. Upon removal of auger, flights were coated with wood fibers and auger tip cutting teeth were sheared off. Auger tip replaced and resumed advance to refusal at approximately 23 feet deep.
5) Following auger refusal at approximately 23 feet deep, augers were removed and a split spoon sampler was advanced to refusal at approximately 23.1 feet deep on inferred 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=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.: MS-101

SMALL REMARK FONT STANDARD 837-65.2 MIDDLEBURY PHASE C.GPJ GEODESIGN STANDARD.GDT 5/21/14

BORING LOG — MS-102

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
P.O. Box 699, Windsor, VT 05089, Phone: 802-674-2033/Fax: 802-674-5943
40 Farrell Street, S. Burlington, VT 05403, Phone: 802-652-5140

Project Name: Middlebury WCRS (23) Phase C, Middlebury, VT

Boring No.: MS-102
Page No.: 1 of 1
File No.: 837-65.2
Checked By: SPK

Boring Company: TransTech Drilling Services
Foreman: John Leonhardt
GeoDesign Rep.: Jesse McIntyre
Date Started: April 9, 2014 — Date Finished: April 9, 2014
N. Coordinate: — E. Coordinate:
Ground Surface Elevation (feet): 368
Station: — Offset: ft

	Casing:	Sampler:
Type:	S.S.A.	None
I.D.:	3.5 in.	in.
Hammer Wt.:	NA	
Hammer Fall:	NA	
Rig Type:	CME 550X ATV	
Hammer Type:	n/a	

Groundwater Observations

Date	Depth (ft)	Elev. (ft)	Notes
▼ 4/9/14, 0:00			None Observed
▼			
▼			
▼			

Sample Information

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	Casing Time (min./ft)	Moisture Content (%)
			VAC	72		0						

Strata Description — Depth & Elevation(feet) — Symbol — Sample Description — Classification System:

- No Sampling Performed (0 – 6)
- Bottom of Exploration at 6.0 ft (362.0)

Remarks:
1) Stratification lines represent approximate boundary between material types, transitions may be gradual.
2) Water used to jet material during vacuum excavation, all soils encountered were moist to wet. Vacuum truck cleared hole to approximately 72 inches deep.
3) Refusal at 72 inches deep on on timbers assumed to be remnants of formwork.

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.: MS-102

VT BORING LOG MC 5/21/04 837-65.2 MIDDLEBURY PHASE C.GPJ GEODESIGN STANDARD.GDT 5/21/14

BORING LOG — MS-103

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
P.O. Box 699, Windsor, VT 05089, Phone: 802-674-2033/Fax: 802-674-5943
40 Farrell Street, S. Burlington, VT 05403, Phone: 802-652-5140

Project Name: Middlebury WCRS (23) Phase C, Middlebury, VT

Boring No.: MS-103
Page No.: 1 of 1
File No.: 837-65.2
Checked By: SPK

Boring Company: TransTech Drilling Services
Foreman: John Leonhardt
GeoDesign Rep.: Jesse McIntyre
Date Started: April 9, 2014 — Date Finished: April 9, 2014
N. Coordinate: — E. Coordinate:
Ground Surface Elevation (feet): 368
Station: — Offset: ft

	Casing:	Sampler:
Type:	S.S.A.	None
I.D.:	3.5 in.	in.
Hammer Wt.:	NA	
Hammer Fall:	NA	
Rig Type:	CME 550X ATV	
Hammer Type:	n/a	

Groundwater Observations

Date	Depth (ft)	Elev. (ft)	Notes
▼ 4/9/14, 0:00			None Observed
▼			
▼			
▼			

Sample Information

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	Casing Time (min./ft)	Moisture Content (%)
			VAC	98		0						
			A	142		8.16						

Strata Description — Depth & Elevation(feet) — Symbol — Sample Description — Classification System:

- No Sampling Performed (0 – 8)
- No Sampling Performed (8 – 20.5, 360.0)
- Bottom of Exploration at 8.2 ft (347.5)

Remarks:
1) Location determined by taped measurements and visual estimates to existing site features. Elevation estimated based on topographic plan provided by VHB.
2) Water used to jet material during vacuum excavation, all soils encountered were moist to wet. Vacuum truck cleared hole to approximately 98 inches deep. Refusal of vacuum equipment at top of multiple 8" to 10" cobbles. Back of ashlar stones of abutment visible on sidewall of excavation. Stone abutment appears to be approximately 4 feet thick and stacked vertically.
3) Exploration advanced with 3.5" diameter solid stem augers below approximately 98 inches deep.
4) Exploration terminated at approximately 20.5 feet deep with refusal on inferred 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=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.: MS-103

SMALL REMARK FONT STANDARD 837-65.2 MIDDLEBURY PHASE C.GPJ GEODESIGN STANDARD.GDT 5/21/14

*NOTE: SEE BORING CHART ON BORING INFORMATION SHEETS FOR NORTHING AND EASTING INFORMATION

vhb

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044borlogs_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: C.J. HAKEY
DESIGNED BY: GEODESIGN	CHECKED BY: GEODESIGN
BORING LOGS (18 OF 28)	SHEET 56 OF 116

VHB 57603

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
P.O. Box 699, Windsor, VT 05089, Phone: 802-674-2033/Fax: 802-674-5943
40 Farrell Street, S. Burlington, VT 05403, Phone: 802-652-5140

BORING LOG

Project Name: Middlebury WCRS (23) Phase C, Middlebury, VT

Boring No.: **MS-104**
Page No.: 1 of 1
File No.: 837-65.2
Checked By: SPK

Boring Company: TransTech Drilling Services
Foreman: John Leonhardt
GeoDesign Rep.: Jesse McIntyre
Date Started: April 9, 2014 Date Finished: April 9, 2014
N. Coordinate: E. Coordinate:
Ground Surface Elevation (feet): 368
Station: Offset: ft

Casing: Type: S.S.A. I.D.: 3.5 in.	Sampler: None in.
Hammer Wt.: NA	
Hammer Fall: NA	
Rig Type: CME 550X ATV	
Hammer Type: n/a	

Groundwater Observations			
Date	Depth (ft)	Elev. (ft)	Notes
▼ 4/9/14, 0:00			None Observed
▼			
▼			
▼			

Sample Information

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 (%)	Strata Description Depth & Elevation(feet)	Symbol	Sample Description Classification System:
			VAC	111		0							No Sampling Performed		
5															
10			A	135		9.25									
15															
20													20 Bottom of Exploration at 20.0 ft 348.0		
25															
30															

Remarks
1) Location determined by taped measurements and visual estimates to existing site features. Elevation estimated based on topographic plan provided by VHB.
2) Water used to jet material during vacuum excavation, all soils encountered were moist to wet. Vacuum truck cleared hole to approximately 111 inches deep. Refusal of vacuum equipment at top of multiple 8" to 10" cobbles.
3) Exploration advanced with 3.5" diameter solid stem augers below approximately 111 inches deep.
4) Exploration terminated at approximately 20 feet deep with refusal on inferred 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.: **MS-104**

VT BORING LOG MS 5/21/04 837-65.2 MIDDLEBURY PHASE C.GPJ GEODESIGN STANDARD .GDT 5/21/14

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
P.O. Box 699, Windsor, VT 05089, Phone: 802-674-2033/Fax: 802-674-5943
40 Farrell Street, S. Burlington, VT 05403, Phone: 802-652-5140

BORING LOG

Project Name: Middlebury WCRS (23) Phase C, Middlebury, VT

Boring No.: **OP-1**
Page No.: 1 of 1
File No.: 837-65.2
Checked By: SPK

Boring Company: TransTech Drilling Services
Foreman: John Leonhardt
GeoDesign Rep.: Jesse McIntyre
Date Started: April 11, 2014 Date Finished: April 11, 2014
N. Coordinate: E. Coordinate:
Ground Surface Elevation (feet): 361
Station: ~200+25 Offset: 15 ft North

Casing: Type: S.S.A. I.D.: 3.5 in.	Sampler: None in.
Hammer Wt.: NA	
Hammer Fall: NA	
Rig Type: CME 550X ATV	
Hammer Type: n/a	

Groundwater Observations			
Date	Depth (ft)	Elev. (ft)	Notes
▼			
▼			
▼			
▼			

Sample Information

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 (%)	Strata Description Depth & Elevation(feet)	Symbol	Sample Description Classification System:
													No Sampling Performed		
5															
			A	78		6.5							6.5 Bottom of Exploration at 6.5 ft 354.5		
10															
15															
20															
25															
30															

Remarks
1) Location determined by taped measurements and visual estimates to existing site features. Elevation estimated based on topographic plan provided by VHB.
2) Exploration advanced with 3.5" diameter solid stem augers to refusal at approximately 6.5 feet deep on inferred 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.: **OP-1**

VT BORING LOG MS 5/21/04 837-65.2 MIDDLEBURY PHASE C.GPJ GEODESIGN STANDARD .GDT 5/21/14

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
P.O. Box 699, Windsor, VT 05089, Phone: 802-674-2033/Fax: 802-674-5943
40 Farrell Street, S. Burlington, VT 05403, Phone: 802-652-5140

BORING LOG

Project Name: Middlebury WCRS (23) Phase C, Middlebury, VT

Boring No.: **OP-2**
Page No.: 1 of 1
File No.: 837-65.2
Checked By: SPK

Boring Company: TransTech Drilling Services
Foreman: John Leonhardt
GeoDesign Rep.: Jesse McIntyre
Date Started: April 9, 2014 Date Finished: April 9, 2014
N. Coordinate: E. Coordinate:
Ground Surface Elevation (feet): 360
Station: ~200+75 Offset: 10 ft North

Casing: Type: S.S.A. I.D.: 3.5 in.	Sampler: None in.
Hammer Wt.: NA	
Hammer Fall: NA	
Rig Type: CME 550X ATV	
Hammer Type: n/a	

Groundwater Observations			
Date	Depth (ft)	Elev. (ft)	Notes
▼			
▼			
▼			
▼			

Sample Information

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 (%)	Strata Description Depth & Elevation(feet)	Symbol	Sample Description Classification System:
													No Sampling Performed		
5															
			A	103		8.58							8.6 Bottom of Exploration at 8.6 ft 351.4		
10															
15															
20															
25															
30															

Remarks
1) Stratification lines represent approximate boundary between material types, transitions may be gradual.
2) Exploration advanced with 3.5" diameter solid stem augers to refusal at approximately 8.6 feet deep on inferred 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.: **OP-2**

VT BORING LOG MS 5/21/04 837-65.2 MIDDLEBURY PHASE C.GPJ GEODESIGN STANDARD .GDT 5/21/14

*NOTE: SEE BORING CHART ON BORING INFORMATION SHEETS FOR NORTHING AND EASTING INFORMATION

vhb

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044borlogs_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: C.J. HAKEY
DESIGNED BY: GEODESIGN	CHECKED BY: GEODESIGN
BORING LOGS (19 OF 28)	SHEET 57 OF 116

BORING LOG — OP-3

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
P.O. Box 699, Windsor, VT 05089, Phone: 802-674-2033/Fax: 802-674-5943
40 Farrell Street, S. Burlington, VT 05403, Phone: 802-652-5140

Project Name: Middlebury WCRS (23) Phase C, Middlebury, VT

Boring No.: OP-3
Page No.: 1 of 1
File No.: 837-65.2
Checked By: SPK

Boring Company: TransTech Drilling Services
Foreman: John Leonhardt
GeoDesign Rep.: Jesse McIntyre
Date Started: April 11, 2014 — Date Finished: April 11, 2014
N. Coordinate: — E. Coordinate:
Ground Surface Elevation (feet): 359
Station: ~201+75 — Offset: 0 ft

Casing:	Sampler:
Type: S.S.A.	None
I.D.: 3.5 in.	in.
Hammer Wt.: NA	
Hammer Fall: NA	
Rig Type: CME 550X ATV	
Hammer Type: n/a	

Groundwater Observations: Date | Depth (ft) | Elev. (ft) | Notes

Sample Information: 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 | Casing Time (min./ft) | Moisture Content (%)

Strata Description: Depth & Elevation(feet) | Symbol | Sample Description: Classification System:

Depth (ft)	Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)
5	A	57		4.7	

No Sampling Performed

4.7 — Bottom of Exploration at 4.7 ft (354.3)

Remarks:
1) Location determined by taped measurements and visual estimates to existing site features. Elevation estimated based on topographic plan provided by VHB.
2) Exploration advanced with 3.5" diameter solid stem augers to refusal at approximately 4.7 feet deep on inferred 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.: OP-3

VT BORING LOG MC 5/21/04 837-65.2 MIDDLEBURY PHASE C.GPJ GEODESIGN STANDARD .GDT 5/21/14

BORING LOG — OP-4

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
P.O. Box 699, Windsor, VT 05089, Phone: 802-674-2033/Fax: 802-674-5943
40 Farrell Street, S. Burlington, VT 05403, Phone: 802-652-5140

Project Name: Middlebury WCRS (23) Phase C, Middlebury, VT

Boring No.: OP-4
Page No.: 1 of 1
File No.: 837-65.2
Checked By: SPK

Boring Company: TransTech Drilling Services
Foreman: John Leonhardt
GeoDesign Rep.: Jesse McIntyre
Date Started: April 11, 2014 — Date Finished: April 11, 2014
N. Coordinate: — E. Coordinate:
Ground Surface Elevation (feet): 358
Station: ~201+58 — Offset: 0 ft

Casing:	Sampler:
Type: S.S.A.	None
I.D.: 3.5 in.	in.
Hammer Wt.: NA	
Hammer Fall: NA	
Rig Type: CME 550X ATV	
Hammer Type: n/a	

Groundwater Observations: Date | Depth (ft) | Elev. (ft) | Notes

Sample Information: 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 | Casing Time (min./ft) | Moisture Content (%)

Strata Description: Depth & Elevation(feet) | Symbol | Sample Description: Classification System:

Depth (ft)	Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)
5	A	60		6	

No Sampling Performed

5 — Bottom of Exploration at 5.0 ft (353.0)

Remarks:
1) Location determined by taped measurements and visual estimates to existing site features. Elevation estimated based on topographic plan provided by VHB.
2) Exploration advanced with 3.5" diameter solid stem augers to refusal at approximately 5 feet deep on inferred 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.: OP-4

VT BORING LOG MC 5/21/04 837-65.2 MIDDLEBURY PHASE C.GPJ GEODESIGN STANDARD .GDT 5/21/14

BORING LOG — RR-1(OW)

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
P.O. Box 699, Windsor, VT 05089, Phone: 802-674-2033/Fax: 802-674-5943
40 Farrell Street, S. Burlington, VT 05403, Phone: 802-652-5140

Project Name: Middlebury WCRS (23) Additional Drilling 2016, Middlebury, VT

Boring No.: RR-1(OW)
Page No.: 1 of 1
File No.: 837-65.4
Checked By: AJB

Boring Company: TransTech Drilling Services
Foreman: James Burrowbridge
GeoDesign Rep.: Joshua Gilman
Date Started: March 19, 2013 — Date Finished: March 19, 2013
N. Coordinate: — E. Coordinate:
Ground Surface Elevation (feet): 353.05
Station: 19+00 — Offset: 0 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 550X ATV	
Hammer/Rod Type: Automatic	

Groundwater Observations: Date | Depth (ft) | Elev. (ft) | Notes

Date	Depth (ft)	Elev. (ft)	Notes
3/28/13, 8:45	1.2	351.9	In well
5/1/13, 8:10	1.4	351.7	In well
10/30/13, 11:15	1.8	351.3	In well
11/12/13, 16:30	1.5	351.6	In well
2/3/14, 12:00	1.3	351.8	In well
6/24/14, 0:00	1.7	351.4	In well
12/4/15, 10:46	1.0	352.1	In well
4/7/16, 8:48	1.4	351.7	In well

Sample Information: 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 | Casing Time (min./ft) | Moisture Content (%)

Strata Description: Depth & Elevation(feet) | Symbol | Sample Description: Classification System: Burmister | Well Log

Depth (ft)	Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	0 - 6	6 - 12	12 - 18	18 - 24
	S1	SS	24	10	2	6	12	13	7
5	S2	SS	24	16	4	2	3	5	6
	S3	SS	24	6	6	3	3	3	4
	S4	SS	24	12	8	4	8	7	6

Ballast — 2

Clay & Silt 351.1

S1: Medium dense, dark brown fine to coarse SAND, some Clayey Silt, trace fine Gravel, moist.

S2: Stiff, gray CLAY & SILT, some fine to coarse Sand, trace fine Gravel, wet.

S3: Medium, gray CLAY & SILT and fine to coarse SAND, trace fine Gravel, wet.

S4: Very stiff, brown CLAY & SILT and fine to coarse SAND, trace fine Gravel, wet.

10 — Bottom of Exploration at 10.0 ft (343.1)

Remarks:
1) Station and offset shown are based on taped measurements made in the field by GeoDesign personnel from stationing marked in the field by VHB. Ground surface elevation shown is estimated from a topographic site plan provided by VHB.
2) All samples screened in the field using an Ion Science Phocheck Model 1000 PID calibrated onsite to a 100 ppm isobutylene standard.
3) Exploration terminated at 10 feet with no refusal.
4) Monitoring well installed to bottom of borehole, with PVC cover flush with adjacent ties.

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%

Boring No.: RR-1(OW)

ADDITIONAL VHB SMALL REMARK FONT 837-65.4 MIDDLEBURY ADDL 2016.GPJ GEODESIGN STANDARD .GDT 5/27/16

*NOTE: SEE BORING CHART ON BORING INFORMATION SHEETS FOR NORTHING AND EASTING INFORMATION

vhb

PROJECT NAME: MIDDLEBURY
PROJECT NUMBER: WCRS(23)

FILE NAME: z10g044borlogs_pl.dgn
PROJECT LEADER: A.P. GUYETTE
DESIGNED BY: GEODESIGN
BORING LOGS (20 OF 28)

PLOT DATE: 10/18/2016
DRAWN BY: C.J. HAKEY
CHECKED BY: GEODESIGN
SHEET 58 OF 116

BORING LOG — RR-2

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
P.O. Box 699
Windsor, VT 05089
Phone: 802-674-2033/Fax: 802-674-5943
40 Farrell Street
S. Burlington, VT 05403
Phone: 802-652-5140

Project Name: Middlebury WCRS (23) Additional Drilling 2016 Middlebury, VT

Boring No.: RR-2 | Page No.: 1 of 1 | File No.: 837-65.4 | Checked By: AJB/JFW

Boring Company:	TransTech Drilling Services
Foreman:	James Burrowbridge
GeoDesign Rep.:	Joshua Gilman
Date Started:	March 19, 2013
Date Finished:	March 19, 2013
N. Coordinate:	
E. Coordinate:	
Ground Surface Elevation (feet):	350.92
Station:	16+75
Offset:	0 ft

	Casing:	Sampler:
Type:	Flush	SS
I.D.:	4.0 in.	1.38 in.
Hammer Wt.:	N/A	140 lbs
Hammer Fall:	N/A	30 in.
Rig Type:	CME 550X ATV	
Hammer Type:	Automatic	

Groundwater Observations: Date	Depth (ft)	Elev. (ft)	Notes
3/19/13, 0:00			No observation

Sample Information

Depth (ft)	Casing Blows/ft	Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	Blows 0 - 6	Blows 6 - 12	Blows 12 - 18	Blows 18 - 24	Coring Time (min./ft)	Moisture Content (%)
		C1	C	24	24	2	[REC= 100%; RQD= 17%]					
											8	
5		C2	C	24	22	4	[REC= 92%; RQD= 17%]				8	
											6.5	
		C3	C	54	53	6	[REC= 98%; RQD= 62%]				8	
											6.5	
											6.5	
10											7	
											10	
15												
20												
25												
30												

Strata Description (Depth & Elevation (feet))	Sample Description (Classification System: Burmister)
Ballast (0 – 1.5)	
Bedrock (Marble) 349.4 (1.5 – 10)	C1: Very poor quality, moderately hard, fresh to slightly weathered, shattered (upper 12") to very close to closely jointed (lower 12"), gray with occasional white banding MARBLE. Fracturing approximately 35 degrees from horizontal. Strong reaction to dilute HCl. (Possibly overblasted rock).
	C2: Very poor quality, moderately hard, fresh to slightly weathered, very close to closely jointed, light gray with thin white banding MARBLE transitioning to dark gray with pyrite inclusions in bottom 6" of core. Fracturing at ~35 to 45 degrees from horizontal. Strong reaction to dilute HCl in limestone portions with no reaction in darker portions.
	C3: Fair quality, moderately hard, fresh to slightly weathered, closely jointed light gray with white bands and swirls MARBLE with thin (<1/2" thick) beds of dark gray (upper 15") grading to interbedded (beds from 1/2" to 5" thick) light gray and dark gray (middle 28") grading to dark gray with occasional pyrite inclusions (bottom 10"). Fracturing typically occuring along darker beds at ~50 to 60 degrees from horizontal. Strong reaction to dilute HCl in lighter gray portions with no reaction in the darker portions.
Bottom of Exploration at 10.0 ft 340.9	

Remarks:
1) Station and offset shown are based on taped measurements made in the field by GeoDesign personnel from stationing marked in the field by VHB. Ground surface elevation shown is estimated from a topographic site plan provided by VHB.
2) Driller noted top of bedrock encountered at 1.5 feet deep. Spun casing to 2 feet prior to start of rock coring.
3) Core runs C1, C2, and C3 were terminated prior to 5-foot run due to core barrel blockages caused by highly fractured rock (mechanical breaks as well as natural fractures). Core C2 recovered 12" that was not of recovered from C1.
4) Exploration terminated at 10 feet deep after coring 8 feet of rock.

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%

Boring No.: RR-2

SMALL REMARK FONT STANDARD 837-65.4 MIDDLEBURY ADDL 2016.GPJ GEODESIGN STANDARD .GDT 4/28/16

BORING LOG — RR-3

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
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

Project Name: Middlebury WCRS (23) Bridges 2 and 102 Middlebury, VT

Boring No.: RR-3 | Page No.: 1 of 1 | File No.: 837-65 | Checked By: AJB

Boring Company:	TransTech Drilling Services
Foreman:	James Burrowbridge
GeoDesign Rep.:	Joshua Gilman
Date Started:	March 20, 2013
Date Finished:	March 20, 2013
N. Coordinate:	
E. Coordinate:	
Ground Surface Elevation (feet):	351.06
Station:	5+00
Offset:	0 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 550X ATV	
Hammer Type:	Automatic	

Groundwater Observations: Date	Depth (ft)	Elev. (ft)	Notes
3/20/13, 0:00			No observation

Sample Information

Depth (ft)	Casing Blows/ft	Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	Blows 0 - 6	Blows 6 - 12	Blows 12 - 18	Blows 18 - 24	Coring Time (min./ft)	PID Reading (ppm)
		S1	SS	24	18	2	8	6	4	5		0
5		S2	SS	24	16	4	7	5	9	8		0.1
		S3	SS	24	24	6	4	7	11	13		0.1
		S4	SS	24	18	8	6	13	21	36		0.2
10												
15												
20												
25												
30												

Strata Description (Depth & Elevation (feet))	Sample Description (Classification System: Burmister)
Ballast (0 – 2)	
Possible Fill 349.06 (2 – 6)	S1: Medium dense / Stiff; S1A (Top 11"): Tan brown fine to coarse SAND, trace Silt, dry. S1B (Bottom 7"): Tan, mottled CLAY & SILT, moist.
Gravelly Sand and Silt 345.06 (6 – 10)	S2: Medium dense tan brown fine to coarse SAND and SILT, trace fine Gravel, moist.
	S3: Medium dense, tan fine to coarse SAND and SILT, trace fine Gravel, moist.
	S4: Dense, gray fine to coarse SAND and SILT, some fine to coarse Gravel, moist.
Bottom of Exploration at 10.0 ft 341.06	

Remarks:
1) Station and offset shown are based on taped measurements made in the field by GeoDesign personnel from stationing marked in the field by VHB. Ground surface elevation shown is estimated from a topographic site plan provided by VHB.
2) All samples screened in the field using an Ion Science Phocheck Model 1000 PID calibrated onsite to a 100 ppm isobutylene standard.
3) Exploration terminated at 10 feet deep with no refusal.

Notes:
1) Soil Samples screened in the field using a Thermal Environmental Systems Model 580S Photoionization Detector (unless otherwise noted in Remarks). The meter was calibrated relative to a benzene in air standard. N.D. = None Detected; N. R. = Not Recorded; N.A. = Not Applicable; O.R. = Out of Range
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 Sample; 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.: RR-3

VT BORING LOG PID 5/21/04 837-65 MIDDLEBURY WCRS (23).GPJ GEODESIGN PIDAFTER7-12-04.GDT 4/16/13

BORING LOG — RR-4

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
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

Project Name: Middlebury WCRS (23) Bridges 2 and 102 Middlebury, VT

Boring No.: RR-4 | Page No.: 1 of 1 | File No.: 837-65 | Checked By: AJB

Boring Company:	TransTech Drilling Services
Foreman:	James Burrowbridge
GeoDesign Rep.:	Joshua Gilman
Date Started:	March 20, 2013
Date Finished:	March 20, 2013
N. Coordinate:	
E. Coordinate:	
Ground Surface Elevation (feet):	350.23
Station:	10+00
Offset:	0 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 550X ATV	
Hammer Type:	Automatic	

Groundwater Observations: Date	Depth (ft)	Elev. (ft)	Notes
3/20/13, 9:30	8.0	342.2	Wet sample

Sample Information

Depth (ft)	Casing Blows/ft	Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	Blows 0 - 6	Blows 6 - 12	Blows 12 - 18	Blows 18 - 24	Coring Time (min./ft)	PID Reading (ppm)
		S1	SS	24	12	2	9	8	4	5		1.2
5		S2	SS	24	12	4	3	3	3	4		0.2
		S3	SS	24	14	6	9	20	18	25		0.2
		S4	SS	24	18	8	4	16	12	31		0.2
10												
15												
20												
25												
30												

Strata Description (Depth & Elevation (feet))	Sample Description (Classification System: Burmister)
Ballast (0 – 2)	
Silt & Sand 348.23 (2 – 6)	S1: Medium dense, tan gray SILT, some fine Sand, trace (-) fine Gravel, moist.
	S2: Loose, tan with mottling, SILT and fine SAND, trace Clayey Silt, very moist.
Silty Gravelly Sand 344.23 (6 – 10)	S3: Dense, tan fine to coarse SAND, little fine to coarse Gravel, little Silt, moist.
	S4: Medium dense, tan fine to coarse SAND, little fine to coarse Gravel, little (-) Silt, wet.
Bottom of Exploration at 10.0 ft 340.23	

Remarks:
1) Station and offset shown are based on taped measurements made in the field by GeoDesign personnel from stationing marked in the field by VHB. Ground surface elevation shown is estimated from a topographic site plan provided by VHB.
2) All samples screened in the field using an Ion Science Phocheck Model 1000 PID calibrated onsite to a 100 ppm isobutylene standard.
3) Exploration terminated at 10 feet deep with no refusal.

Notes:
1) Soil Samples screened in the field using a Thermal Environmental Systems Model 580S Photoionization Detector (unless otherwise noted in Remarks). The meter was calibrated relative to a benzene in air standard. N.D. = None Detected; N. R. = Not Recorded; N.A. = Not Applicable; O.R. = Out of Range
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 Sample; 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.: RR-4

VT BORING LOG PID 5/21/04 837-65 MIDDLEBURY WCRS (23).GPJ GEODESIGN PIDAFTER7-12-04.GDT 4/16/13

*NOTE: SEE BORING CHART ON BORING INFORMATION SHEETS FOR NORTHING AND EASTING INFORMATION

PROJECT NAME:	MIDDLEBURY
PROJECT NUMBER:	WCRS(23)
FILE NAME:	z10g044borlogs_pl.dgn
PROJECT LEADER:	A.P. GUYETTE
DESIGNED BY:	GEODESIGN
BORING LOGS (21 OF 28)	
PLOT DATE:	10/18/2016
DRAWN BY:	C.J. HAKEY
CHECKED BY:	GEODESIGN
SHEET	59 OF 116

BORING LOG

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
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

Project Name: Middlebury WCRS (23) Bridges 2 and 102 Middlebury, VT

Boring No.: **RR-5**
Page No.: 1 of 1
File No.: 837-65
Checked By: AJB

Boring Company: TransTech Drilling Services
Foreman: James Burrowbridge
GeoDesign Rep.: Joshua Gilman
Date Started: March 20, 2013 Date Finished: March 20, 2013
N. Coordinate: E. Coordinate:
Ground Surface Elevation (feet): 358.27
Station: 25+00 Offset: 0 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 550X ATV	
Hammer Type:	Automatic	

Groundwater Observations			
Date	Depth (ft)	Elev. (ft)	Notes
▼ 3/20/13, 0:00			No observation

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)	PID Reading (ppm)	Strata Description Depth & Elevation(feet)	Symbol	Sample Description Classification System: Burmister
													Ballast 2		
		S1	SS	24	17	2	7	9	16	12		0.2	Fill 356.27		S1: Medium dense, tan fine to coarse SAND, little Silt, trace fine Gravel, slightly moist.
5		S2	SS	24	6	4	9	7	6	5		0.6	6		S2: Medium dense, tan and gray fine to coarse SAND, little Silt, trace Wood (in spoon tip), moist.
		S3	SS	24	24	6	3	3	2	3		0.1	Silty Clay 352.27		S3: Medium, gray and reddish brown CLAY & SILT, trace (-) fine Gravel, moist.
		S4	SS	24	24	8	2	2	3	5		0.3			S4: Medium, reddish brown with gray CLAY & SILT, trace (-) fine Gravel, moist.
10													10 Bottom 348.27 of Exploration at 10.0 ft		
15															
20															
25															
30															

Remarks:
1) Station and offset shown are based on taped measurements made in the field by GeoDesign personnel from stationing marked in the field by VHB. Ground surface elevation shown is estimated from a topographic site plan provided by VHB.
2) All samples screened in the field using an Ion Science Phocheck Model 1000 PID calibrated onsite to a 100 ppm isobutylene standard.
3) Exploration terminated at 10 feet deep with no refusal.

Notes: 1) Soil Samples screened in the field using a Thermal Environmental Systems Model 580S Photoionization Detector (unless otherwise noted in Remarks). The meter was calibrated relative to a benzene in air standard. N.D. = None Detected; N. R. = Not Recorded; N.A. = Not Applicable; O.R. = Out of Range
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 Sample; 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 boundaries between material types, transitions may be gradual.

Boring No.: **RR-5**

VT BORING LOG PID 5/21/04 837-65 MIDDLEBURY WCRS (23).GPJ GEODESIGN PIDAFTER7-12-04.GDT 4/16/13

BORING LOG

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
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

Project Name: Middlebury WCRS (23) Bridges 2 and 102 Middlebury, VT

Boring No.: **RR-6**
Page No.: 1 of 1
File No.: 837-65
Checked By: AJB

Boring Company: TransTech Drilling Services
Foreman: James Burrowbridge
GeoDesign Rep.: Joshua Gilman
Date Started: March 20, 2013 Date Finished: March 20, 2013
N. Coordinate: E. Coordinate:
Ground Surface Elevation (feet): 355.04
Station: 21+00 Offset: 0 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 550X ATV	
Hammer Type:	Automatic	

Groundwater Observations			
Date	Depth (ft)	Elev. (ft)	Notes
▼ 3/20/13, 12:20	2.0	353.0	Wet sample

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)	PID Reading (ppm)	Strata Description Depth & Elevation(feet)	Symbol	Sample Description Classification System: Burmister
													Ballast 2		
		S1	SS	24	9	2	6	5	6	7		0.4	Fill 353.04 4		S1: Medium dense, brown and black fine to coarse SAND, little fine to coarse Gravel, little Silt, wet.
5		S2	SS	24	24	4	2	2	2	4		0.1	Clay & Silt 351.04		S2: Medium, reddish brown (top and bottom 2" gray) CLAY & SILT, trace fine to coarse Sand (on outside likely remaining on split spoon from above), slightly moist.
		S3	SS	24	24	6	1	2	2	3		0.2			S3: Medium, reddish brown Silty CLAY, trace (-) fine to coarse Sand, Trace (-) fine Gravel, moist.
		S4	SS	24	24	8	WOH	2	2	3		0.0			S4: Medium, reddish brown Silty CLAY, trace (-) fine Sand, moist.
10													10 Bottom 345.04 of Exploration at 10.0 ft		
15															
20															
25															
30															

Remarks:
1) Station and offset shown are based on taped measurements made in the field by GeoDesign personnel from stationing marked in the field by VHB. Ground surface elevation shown is estimated from a topographic site plan provided by VHB.
2) All samples screened in the field using an Ion Science Phocheck Model 1000 PID calibrated onsite to a 100 ppm isobutylene standard.
3) Exploration terminated at 10 feet deep with no refusal.

Notes: 1) Soil Samples screened in the field using a Thermal Environmental Systems Model 580S Photoionization Detector (unless otherwise noted in Remarks). The meter was calibrated relative to a benzene in air standard. N.D. = None Detected; N. R. = Not Recorded; N.A. = Not Applicable; O.R. = Out of Range
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 Sample; 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 boundaries between material types, transitions may be gradual.

Boring No.: **RR-6**

VT BORING LOG PID 5/21/04 837-65 MIDDLEBURY WCRS (23).GPJ GEODESIGN PIDAFTER7-12-04.GDT 4/16/13

BORING LOG

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
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

Project Name: Middlebury WCRS (23) Bridges 2 and 102 Middlebury, VT

Boring No.: **RR-7**
Page No.: 1 of 1
File No.: 837-65
Checked By: AJB

Boring Company: TransTech Drilling Services
Foreman: James Burrowbridge
GeoDesign Rep.: Joshua Gilman
Date Started: March 20, 2013 Date Finished: March 20, 2013
N. Coordinate: E. Coordinate:
Ground Surface Elevation (feet): 351.07
Station: 17+00 Offset: 0 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 550X ATV	
Hammer Type:	Automatic	

Groundwater Observations			
Date	Depth (ft)	Elev. (ft)	Notes
▼ 3/20/13, 1:25	2.0	349.1	Wet sample

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)	PID Reading (ppm)	Strata Description Depth & Elevation(feet)	Symbol	Sample Description Classification System: Burmister
													Ballast 2		
		S1	SS	5	5	2	100/5"					0.5	Fill 349.07 Bottom 348.57 of Exploration at 2.5 ft		S1: Refusal, gray fine to coarse SAND (pulverized rock fragments, reaction to dilute HCl), some Silt, wet.
5															
10															
15															
20															
25															
30															

Remarks:
1) Station and offset shown are based on taped measurements made in the field by GeoDesign personnel from stationing marked in the field by VHB. Ground surface elevation shown is estimated from a topographic site plan provided by VHB.
2) All samples screened in the field using an Ion Science Phocheck Model 1000 PID calibrated onsite to a 100 ppm isobutylene standard.
3) Exploration terminated at 2.5 feet deep SSR and HSAR on inferred bedrock.

Notes: 1) Soil Samples screened in the field using a Thermal Environmental Systems Model 580S Photoionization Detector (unless otherwise noted in Remarks). The meter was calibrated relative to a benzene in air standard. N.D. = None Detected; N. R. = Not Recorded; N.A. = Not Applicable; O.R. = Out of Range
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 Sample; 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 boundaries between material types, transitions may be gradual.

Boring No.: **RR-7**

VT BORING LOG PID 5/21/04 837-65 MIDDLEBURY WCRS (23).GPJ GEODESIGN PIDAFTER7-12-04.GDT 4/16/13

*NOTE: SEE BORING CHART ON BORING INFORMATION SHEETS FOR NORTHING AND EASTING INFORMATION

vhb

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044borlogs_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: C.J. HAKEY
DESIGNED BY: GEODESIGN	CHECKED BY: GEODESIGN
BORING LOGS (22 OF 28)	SHEET 60 OF 116

BORING LOG — RR-8

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
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

Project Name: Middlebury WCRS (23) Bridges 2 and 102 Middlebury, VT

Boring No.: RR-8 | Page No.: 1 of 1 | File No.: 837-65 | Checked By: AJB

Boring Company: TransTech Drilling Services
Foreman: James Burrowbridge
GeoDesign Rep.: Joshua Gilman
Date Started: March 20, 2013 — Date Finished: March 20, 2013
N. Coordinate: — E. Coordinate:
Ground Surface Elevation (feet): 352.04
Station: 18+00 — Offset: 0 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 550X ATV	
Hammer Type:	Automatic	

Groundwater Observations

Date	Depth (ft)	Elev. (ft)	Notes
3/20/13, 13:50	2.0	350.0	Wet sample

Sample Information

Depth (ft)	Casing Blows/ft	Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	0 - 6	6 - 12	12 - 18	18 - 24	Coring Time (min./ft)	PID Reading (ppm)
		S1	SS	15	10	2	14	44	100/3"			0.6
		S2	SS	0	0	3.5	50/0"					

Strata Description (Depth & Elevation (feet))	Sample Description (Classification System: Burmister)
Ballast	
2 — Weathered Bedrock 350.04	S1: Refusal, gray fine to coarse GRAVEL and fine to coarse SAND, some Silt, wet (reaction to dilute HCl, possible overblast material).
3.5 — Bottom of Exploration at 3.5 ft 348.54	S2: Refusal, no recovery.

Remarks:
1) Station and offset shown are based on taped measurements made in the field by GeoDesign personnel from stationing marked in the field by VHB. Ground surface elevation shown is estimated from a topographic site plan provided by VHB.
2) All samples screened in the field using an Ion Science Phocheck Model 1000 PID calibrated onsite to a 100 ppm isobutylene standard.
3) Exploration terminated at 3.5 feet deep SSR and HSAR on inferred bedrock.

Notes: 1) Soil Samples screened in the field using a Thermal Environmental Systems Model 580S Photoionization Detector (unless otherwise noted in Remarks). The meter was calibrated relative to a benzene in air standard. N.D. = None Detected; N. R. = Not Recorded; N.A. = Not Applicable; O.R. = Out of Range
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 Sample; 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.: RR-8

VT BORING LOG PID 5/21/04 837-65 MIDDLEBURY WCRS (23).GPJ GEODESIGN PIDAFTER7-12-04.GDT 4/16/13

BORING LOG — RR-9

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
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

Project Name: Middlebury WCRS (23) Bridges 2 and 102 Middlebury, VT

Boring No.: RR-9 | Page No.: 1 of 1 | File No.: 837-65 | Checked By: AJB

Boring Company: TransTech Drilling Services
Foreman: James Burrowbridge
GeoDesign Rep.: Joshua Gilman
Date Started: March 20, 2013 — Date Finished: March 20, 2013
N. Coordinate: — E. Coordinate:
Ground Surface Elevation (feet): 356.74
Station: 23+00 — Offset: 0 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 550X ATV	
Hammer Type:	Automatic	

Groundwater Observations

Date	Depth (ft)	Elev. (ft)	Notes
3/20/13, 14:25	4.0	352.7	Wet sample

Sample Information

Depth (ft)	Casing Blows/ft	Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	0 - 6	6 - 12	12 - 18	18 - 24	Coring Time (min./ft)	PID Reading (ppm)
		S1	SS	24	16	2	9	11	14	6		0.3
5		S2	SS	24	16	4	4	3	3	5		0.2
		S3	SS	24	24	6	2	2	2	3		0.7
		S4	SS	24	24	8	WOH	2	2	2		0.1

Strata Description (Depth & Elevation (feet))	Sample Description (Classification System: Burmister)
Ballast	
2 — Fill 354.74	S1: Medium dense, brown fine to coarse SAND, little Silt, trace fine Gravel, moist.
4 — Silt & Clay 352.74	S2: Medium, tan SILT & CLAY, trace fine to medium Sand, trace fine Gravel, wet.
	S3: Medium, tan SILT & CLAY, moist.
	S4: Medium, reddish brown SILT & CLAY, moist.
10 — Bottom of Exploration at 10.0 ft 346.74	

Remarks:
1) Station and offset shown are based on taped measurements made in the field by GeoDesign personnel from stationing marked in the field by VHB. Ground surface elevation shown is estimated from a topographic site plan provided by VHB.
2) All samples screened in the field using an Ion Science Phocheck Model 1000 PID calibrated onsite to a 100 ppm isobutylene standard.
3) Exploration terminated at 10 feet deep with no refusal.

Notes: 1) Soil Samples screened in the field using a Thermal Environmental Systems Model 580S Photoionization Detector (unless otherwise noted in Remarks). The meter was calibrated relative to a benzene in air standard. N.D. = None Detected; N. R. = Not Recorded; N.A. = Not Applicable; O.R. = Out of Range
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 Sample; 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.: RR-9

VT BORING LOG PID 5/21/04 837-65 MIDDLEBURY WCRS (23).GPJ GEODESIGN PIDAFTER7-12-04.GDT 4/16/13

BORING LOG — RR-10

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
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

Project Name: Middlebury WCRS (23) Bridges 2 and 102 Middlebury, VT

Boring No.: RR-10 | Page No.: 1 of 1 | File No.: 837-65 | Checked By: AJB/JFW

Boring Company: TransTech Drilling Services
Foreman: James Burrowbridge
GeoDesign Rep.: Joshua Gilman
Date Started: March 20, 2013 — Date Finished: March 20, 2013
N. Coordinate: — E. Coordinate:
Ground Surface Elevation (feet): 355.92
Station: 22+00 — Offset: 0 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 550X ATV	
Hammer Type:	Automatic	

Groundwater Observations

Date	Depth (ft)	Elev. (ft)	Notes
3/20/13, 0:00			No observation

Strata Description (Depth & Elevation (feet))	Sample Description (Classification System: Burmister)
Auger Probe (no Sampling Performed)	
10 — Bottom of Exploration at 10.0 ft 345.92	

Remarks:
1) Station and offset shown are based on taped measurements made in the field by GeoDesign personnel from stationing marked in the field by VHB. Ground surface elevation shown is estimated from a topographic site plan provided by VHB.
2) Exploration terminated at 10 feet deep with no refusal.

Notes: 1) Soil Samples screened in the field using a Thermal Environmental Systems Model 580S Photoionization Detector (unless otherwise noted in Remarks). The meter was calibrated relative to a benzene in air standard. N.D. = None Detected; N. R. = Not Recorded; N.A. = Not Applicable; O.R. = Out of Range
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 Sample; 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.: RR-10

VT BORING LOG PID 5/21/04 837-65 MIDDLEBURY WCRS (23).GPJ GEODESIGN PIDAFTER7-12-04.GDT 4/16/13

*NOTE: SEE BORING CHART ON BORING INFORMATION SHEETS FOR NORTHING AND EASTING INFORMATION

BORING LOG

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
P.O. Box 699, Windsor, VT 05089 — Phone: 802-674-2033/Fax: 802-674-5943
40 Farrell Street, S. Burlington, VT 05403 — Phone: 802-652-5140

Project Name: Middlebury WCRS (23) Additional Drilling 2016, Middlebury, VT

Boring No.: RR-11(OW) | Page No.: 1 of 1 | File No.: 837-65.4 | Checked By: AJB

Boring Company: TransTech Drilling Services
Foreman: James Burrowbridge
GeoDesign Rep.: Joshua Gilman
Date Started: March 21, 2013 — Date Finished: March 21, 2013
N. Coordinate: — E. Coordinate:
Ground Surface Elevation (feet): 350.5
Station: 11+00 — Offset: 5 ft RT

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 550X ATV	
Hammer/Rod Type: Automatic	

Groundwater Observations

Date	Depth (ft)	Elev. (ft)	Notes
3/27/13, 9:15	1.2	349.3	in well
5/1/13, 8:15	0.9	349.6	in well
10/30/13, 11:30	0.8	349.7	in well
11/12/13, 16:10	1.0	349.5	in well
2/3/14, 12:00	0.8	349.7	in well
6/24/14, 0:00	0.8	349.7	in well
12/4/15, 12:05	0.7	349.9	in well
4/7/16, 9:07	0.5	350.0	in well

Sample Information

Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	Blows 0 - 6	Blows 6 - 12	Blows 12 - 18	Blows 18 - 24	Casing Time (min./ft)	Moisture Content (%)
S1	SS	24	10	2	9	12	13	21		
S2	SS	24	9	4	6	14	39	100/6"		
S3	SS	14	13	6	31	42	100/2"			
S4	SS	5	5	8	100/5"					

Strata Description — Depth & Elevation(feet)

- Ballast
- Fill 348.5
- Glacial Till 344.5
- Bottom of Exploration at 10.0 ft 340.5

Sample Description — Classification System: Burmister

S1: Medium dense, brown fine to coarse SAND, some Silt, some fine to coarse Gravel, moist.

S2: Very dense, brown fine to coarse SAND and fine to coarse GRAVEL, some Silt, moist (wet top 3").

S3: Refusal, brown fine to coarse SAND and SILT, some fine to coarse Gravel, slightly moist.

S4: Refusal, brown fine to coarse SAND and SILT, some fine to coarse Gravel, wet.

Well Log

Remarks:
1) Stationing and offset shown are based on taped measurements made in the field by GeoDesign personnel from stationing marked in the field by VHB. Ground surface elevation shown is estimated from a topographic site plan provided by VHB.
2) All samples screened in the field using an Ion Science Phocheck Model 1000 PID calibrated onsite to a 100 ppm isobutylene standard.
3) Driller noted hard resistance to auger advance from 6 to 10 feet deep (possible cobbles/boulders).
4) Exploration terminated at 10 feet (No Refusal).
5) Monitoring well installed to bottom of borehole, with 6-inch protective flush mount cover.

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 Sample; 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%

Boring No.: RR-11(OW)

BORING LOG

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
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

Project Name: Middlebury WCRS (23) Bridges 2 and 102, Middlebury, VT

Boring No.: RR-12 | Page No.: 1 of 2 | File No.: 837-65 | Checked By: AJB/JFW

Boring Company: TransTech Drilling Services
Foreman: James Burrowbridge
GeoDesign Rep.: Joshua Gilman
Date Started: March 21, 2013 — Date Finished: March 22, 2013
N. Coordinate: — E. Coordinate:
Ground Surface Elevation (feet): 350.3
Station: 12+00 — Offset: 5 ft RT

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 550X ATV	
Hammer Type: Automatic	

Groundwater Observations

Date	Depth (ft)	Elev. (ft)	Notes
3/12/13, 16:00	15.0	335.3	Wet sample

Sample Information

Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	Blows 0 - 6	Blows 6 - 12	Blows 12 - 18	Blows 18 - 24	Casing Time (min./ft)	PID Reading (ppm)
S1	SS	24	14	2	16	26	13	8		0.5
S2	SS	24	14	4	5	4	11	16		0.2
S3	SS	24	24	6	28	49	84	100/6"		0.2
S4	SS	12	12	8	29	100/6"				1.3
S5	SS	24	12	14	28	17	13	16		0.2
S6	SS	0	0	18	50/0"					
C1	C	18	13	18.5	[REC= 72%; RQD= 0%]					

Strata Description — Depth & Elevation(feet)

- Ballast
- Fill 348.3
- Glacial Till 344.3
- 18.2
- Bedrock 332.1

Sample Description — Classification System: Burmister

S1: Dense, brown and gray fine to coarse SAND and fine to coarse GRAVEL, some Silt, trace Wood, moist.

S2: Medium dense, gray SILT and fine to coarse SAND, some fine to coarse Gravel, moist.

S3: Very dense, tan SILT and fine to coarse SAND, trace fine to coarse Gravel, slightly moist.

S4: Refusal, tan SILT, some fine to coarse Sand, little fine to coarse Gravel, slightly moist.

S5: Dense, gray SILT and fine to coarse SAND, some fine to coarse Gravel, moist (to wet bottom half and spoon tip).

S6: Refusal, no recovery.

C1: Very poor quality, moderately hard, slightly weathered, very close jointed, gray with white banding and vertical stripes LIMESTONE.

Remarks:
1) Station and offset shown are based on taped measurements made in the field by GeoDesign personnel from stationing marked in the field by VHB. Ground surface elevation shown is estimated from a topographic site plan provided by VHB.
2) All samples screened in the field using an Ion Science Phocheck Model 1000 PID calibrated onsite to a 100 ppm isobutylene standard.
3) Driller noted increase auger resistance and grinding from 16 to 18 feet deep prior to HSAR. Driller removed HSA and advanced with 4" FJ spin casing for bedrock coring.
4) Driller ended C1 at 18" penetration because of train traffic. Resumed with C2.

Notes:
1) Soil Samples screened in the field using a Thermal Environmental Systems Model 580S Photoionization Detector (unless otherwise noted in Remarks). The meter was calibrated relative to a benzene in air standard. N.D. = None Detected; N. R. = Not Recorded; N.A. = Not Applicable; O.R. = Out of Range
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 Sample; 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.: RR-12

BORING LOG

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
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

Project Name: Middlebury WCRS (23) Bridges 2 and 102, Middlebury, VT

Boring No.: RR-12 | Page No.: 2 of 2 | File No.: 837-65 | Checked By: AJB/JFW

Boring Company: TransTech Drilling Services
Foreman: James Burrowbridge
GeoDesign Rep.: Joshua Gilman
Date Started: March 21, 2013 — Date Finished: March 22, 2013
N. Coordinate: — E. Coordinate:
Ground Surface Elevation (feet): 350.3
Station: 12+00 — Offset: 5 ft RT

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 550X ATV	
Hammer Type: Automatic	

Groundwater Observations

Date	Depth (ft)	Elev. (ft)	Notes
3/12/13, 16:00	15.0	335.3	Wet sample

Sample Information

Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	Blows 0 - 6	Blows 6 - 12	Blows 12 - 18	Blows 18 - 24	Casing Time (min./ft)	PID Reading (ppm)
C2	C	20	20	20	[REC= 100%; RQD= 65%]					
C3	C	60	55	21.7	[REC= 92%; RQD= 21%]					
C4	C	36	36	26.7	[REC= 100%; RQD= 28%]					

Strata Description — Depth & Elevation(feet)

- Bedrock *(Continued)*
- 29.7 Bottom of Exploration at 29.7 ft 320.6

Sample Description — Classification System: Burmister

Fracturing ~0 to 10 degrees from horizontal. Strong reaction to dilute HCl. Top 2" quartzite cobble with no reaction to dilute HCl. (Possibly overblasted rock).

C2: Fair quality, moderately hard, fresh to slightly weathered, very close to close jointed, gray with white banding LIMESTONE. Fracturing ~0 to 45 degrees. Strong reaction to dilute HCl.

C3: Very poor quality, moderately hard, fresh to slightly weathered, close jointed (upper 22") to very close jointed / shattered (lower 33"), gray and white LIMESTONE. Fracturing ~0 to 20 degrees from horizontal. Strong reaction to dilute HCl.

C4: Poor quality, moderately hard, fresh to slightly weathered, very close jointed / shattered (upper 12") to close jointed (lower 24"), gray and white LIMESTONE. Fracturing ~0 to 20 degrees from horizontal. Strong reaction to dilute HCl.

Remarks:

Notes:
1) Soil Samples screened in the field using a Thermal Environmental Systems Model 580S Photoionization Detector (unless otherwise noted in Remarks). The meter was calibrated relative to a benzene in air standard. N.D. = None Detected; N. R. = Not Recorded; N.A. = Not Applicable; O.R. = Out of Range
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 Sample; 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.: RR-12

*NOTE: SEE BORING CHART ON BORING INFORMATION SHEETS FOR NORTHING AND EASTING INFORMATION

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044borlogs_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: C.J. HAKEY
DESIGNED BY: GEODESIGN	CHECKED BY: GEODESIGN
BORING LOGS (24 OF 28)	SHEET 62 OF 116

VHB 57603

ADDITIONAL WS SMALL REMARK FONT 837-65.4 MIDDLEBURY ADDL 2016.GPJ GEODESIGN STANDARD .GDT 5/27/16

VT BORING LOG PID 5/21/04 837-65 MIDDLEBURY WCRS (23).GPJ GEODESIGN PIDAFTER7-12-04.GDT 4/23/13

BORING LOG — RR-13(OW)

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
P.O. Box 699
Windsor, VT 05089
Phone: 802-674-2033/Fax: 802-674-5943
40 Farrell Street
S. Burlington, VT 05403
Phone: 802-652-5140

Project Name: Middlebury WCRS (23) Additional Drilling 2016 Middlebury, VT

Boring No.: RR-13(OW)
Page No.: 1 of 1
File No.: 837-65.4
Checked By: AJB/JFW

Boring Company: TransTech Drilling Services
Foreman: James Burrowbridge
GeoDesign Rep.: Joshua Gilman
Date Started: March 25, 2013 Date Finished: March 25, 2013
N. Coordinate: E. Coordinate:
Ground Surface Elevation (feet): 350.1
Station: 13+13 Offset: 5 ft RT

	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 550X ATV
Hammer/Rod Type: Automatic

Groundwater Observations

Date	Depth (ft)	Elev. (ft)	Notes
3/25/13, 0:00	16.0	334.1	Wet spoon tip
5/1/13, 8:20	1.2	348.9	In well
10/30/13, 13:00	1.3	348.8	In well
11/12/13, 16:20	1.8	348.3	In well
2/3/14, 12:00	1.8	348.3	In well
6/24/14, 0:00	1.6	348.5	In well

Sample Information

Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	0 - 6	6 - 12	12 - 18	18 - 24	Coring Time (min./ft)	Moisture Content (%)
S1	SS	24	16	2	9	29	27	39		
S2	SS	24	16	4	21	23	20	26		
S3	SS	20	18	6	17	60	70	100/2"		
S4	SS	11	11	8	31	100/5"				
S5	SS	24	24	14	35	55	57	67		
S6	SS	0	0	16.9	50/0"					
C1	C	60	60	17	[REC= 100%; RQD= 51%]				4, 5, 5, 5, 5	
C2	C	60	60	22	[REC= 100%; RQD= 81%]				4, 4, 4, 4, 4	

Strata Description

Depth (feet)	Strata	Elevation (feet)
0	Ballast	
2	Fill	348.1
4	Glacial Till	346.1
17	Bedrock	333.1
27	Bottom of Exploration at 27.0 ft	323.1

Sample Description (Classification System: Burmister)

S1: Dense, tan gray fine to coarse GRAVEL (including marble chips) and SILT, some fine to coarse Sand, moist.

S2: Very dense, tan fine to coarse SAND and SILT, trace fine to coarse Gravel, moist.

S3: Very dense, tan gray SILT and fine to coarse SAND, some fine to coarse Gravel, moist to dry (tan, mottled and moist top half of sample, gray and dry bottom half).

S4: Refusal, gray SILT and fine to coarse SAND, little fine to coarse Gravel, dry.

S5: Very dense, gray SILT and fine to coarse SAND, some fine to coarse Gravel, dry (spoon tip wet).

S6: Refusal, no recovery.

C1: Fair quality, moderately hard, fresh to slightly weathered, very close to moderate jointing, gray and white banded MARBLE. Fracturing ~0 to 20 degrees from horizontal. Strong reaction to dilute HCl.

C2: Good quality, moderately hard, fresh, close to moderate jointing, gray and white banded MARBLE. Strong reaction to dilute HCl.

Remarks:
1) Station and offset shown are based on taped measurements made in the field by GeoDesign personnel from stationing marked in the field by VHB. Ground surface elevation shown is estimated from a topographic site plan provided by VHB.
2) All samples screened in the field using an Ion Science Phocheck Model 1000 PID calibrated onsite to a 100 ppm isobutylene standard.
3) HSAR and SSR at 17 feet deep. Driller pulled augers, spun 4" FJ casing and set up to core C1.
4) Groundwater monitoring well installed 3/28/13 by augering adjacent to exploration. Well installed to bottom of borehole, with 6-inch protective flush mount cover.

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%

Boring No.: RR-13(OW)

ADDITIONAL WLS SMALL REMARK FONT 837-65.4 MIDDLEBURY ADDL 2016.GPJ GEODESIGN STANDARD .GDT 5/27/16

BORING LOG — RR-14

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
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

Project Name: Middlebury WCRS (23) Bridges 2 and 102 Middlebury, VT

Boring No.: RR-14
Page No.: 1 of 1
File No.: 837-65
Checked By: JFW

Boring Company: TransTech Drilling Services
Foreman: James Burrowbridge
GeoDesign Rep.: Joshua Gilman
Date Started: March 26, 2013 Date Finished: March 28, 2013
N. Coordinate: E. Coordinate:
Ground Surface Elevation (feet): 350.3
Station: 14+33 Offset: 5 ft RT

	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 550X ATV
Hammer Type: Automatic

Groundwater Observations

Date	Depth (ft)	Elev. (ft)	Notes
3/26/13, 9:00	6.0	344.3	Wet sample
3/27/13, 9:20	1.0	349.3	In open hole overnight
3/28/13, 8:20	1.2	349.1	In open hole overnight

Sample Information

Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	0 - 6	6 - 12	12 - 18	18 - 24	Coring Time (min./ft)	PID Reading (ppm)
S1	SS	24	12	2	9	16	28	40		1.7
S2	SS	24	14	4	16	47	14	13		1.1
S3	SS	24	5	6	7	10	16	21		1.2
S4	SS	24	12	8	8	25	50	44		0.9
S5	SS	9	9	14	55	100/3"				0.5
S6	SS	5	5	19	100/5"					0.9
C1	C	60	60	23	[REC= 100%; RQD= 47%]				4, 12, 6, 6, 7	

Strata Description

Depth (feet)	Strata	Elevation (feet)
0	Ballast	
2	Silty Sand & Gravel	348.3
14	Glacial Till	336.3
23	Boulder	327.3
24	Bedrock	326.3
28	Bottom of Exploration at 28.0 ft	322.3

Sample Description (Classification System: Burmister)

S1: Very dense, light brown fine to coarse SAND and SILT, little fine to coarse Gravel, moist.

S2: Very dense, brown fine to coarse SAND and fine to coarse GRAVEL, some Silt, moist to wet.

S3: Medium dense, brown fine to coarse GRAVEL, some fine to coarse Sand, some Silt, wet.

S4: Very dense, tan fine to coarse SAND and fine to coarse GRAVEL, little Silt, moist.

S5: Refusal, gray fine to coarse SAND and SILT, some fine to coarse Gravel, moist.

S6: Refusal, gray fine to coarse SAND and SILT, some fine to coarse Gravel, wet.

C1: Top 6": Boulder Fragments.
Bottom 54": Poor quality, moderately hard, fresh to slightly weathered, gray 10" white Calcite seam LIMESTONE. Fracturing ~30 to 50 degrees from horizontal. Strong reaction to dilute HCl.

Remarks:
1) Station and offset shown are based on taped measurements made in the field by GeoDesign personnel from stationing marked in the field by VHB. Ground surface elevation shown is estimated from a topographic site plan provided by VHB.
2) All samples screened in the field using an Ion Science Phocheck Model 1000 PID calibrated onsite to a 100 ppm isobutylene standard.
3) Driller maintained head of water in HSA to prevent flowing sands.
4) Driller noted increased auger grinding and rig chatter advancing from approx 6 to 10 feet deep.
5) HSAR and SSR at 23.5 feet deep. Driller pulled augers and spun 4" FJ casing to set up for coring C1.

Notes:
1) Soil Samples screened in the field using a Thermal Environmental Systems Model 580S Photoionization Detector (unless otherwise noted in Remarks). The meter was calibrated relative to a benzene in air standard. N.D. = None Detected; N. R. = Not Recorded; N.A. = Not Applicable; O.R. = Out of Range
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 Sample; 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.: RR-14

VT BORING LOG PID 5/21/04 837-65 MIDDLEBURY WCRS (23).GPJ GEODESIGN PIDAFTER7-12-04.GDT 4/16/13

BORING LOG — RR-15

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
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

Project Name: Middlebury WCRS (23) Bridges 2 and 102 Middlebury, VT

Boring No.: RR-15
Page No.: 1 of 2
File No.: 837-65
Checked By: JFW

Boring Company: TransTech Drilling Services
Foreman: James Burrowbridge
GeoDesign Rep.: Joshua Gilman
Date Started: March 26, 2013 Date Finished: March 27, 2013
N. Coordinate: E. Coordinate:
Ground Surface Elevation (feet): 350.32
Station: 15+00 Offset: 6 ft RT

	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 550X ATV
Hammer Type: Automatic

Groundwater Observations

Date	Depth (ft)	Elev. (ft)	Notes
3/26/13, 13:45	6.0	344.3	Wet sample
3/27/13, 9:20	0.5	349.8	In open hole overnight

Sample Information

Number	Type	Penetration (inches)	Recovery (inches)	Depth (ft)	0 - 6	6 - 12	12 - 18	18 - 24	Coring Time (min./ft)	PID Reading (ppm)
S1	SS	24	12	2	16	13	15	22		1.1
S2	SS	24	8	4	17	22	25	27		2.0
S3	SS	24	11	6	75	31	23	42		0.5
S4	SS	24	6	8	50	21	51	30		0.7
S5	SS	24	16	14	46	67	55	51		0.1
S6	SS	11	10	19	50	100/5"				

Strata Description

Depth (feet)	Strata	Elevation (feet)
0	Ballast	
2	Silty Sand & Gravel	348.32
14	Glacial Till	336.32

Sample Description (Classification System: Burmister)

S1: Medium dense, tan brown fine to coarse SAND and fine to coarse GRAVEL, some Silt, moist (wet to 2").

S2: Dense, tan fine to coarse GRAVEL and fine to coarse SAND, little Silt, moist.

S3: Very dense, tan fine to coarse GRAVEL and fine to coarse SAND, some Silt, wet.

S4: Very dense, tan fine to coarse GRAVEL, some fine to coarse Sand, some Silt, wet.

S5: Very dense, gray SILT and fine to coarse SAND, little fine to coarse Gravel, dry.

S6: Refusal, gray SILT and fine to coarse SAND, some fine to coarse Gravel, dry.

Remarks:
1) Station and offset shown are based on taped measurements made in the field by GeoDesign personnel from stationing marked in the field by VHB. Ground surface elevation shown is estimated from a topographic site plan provided by VHB.
2) All samples screened in the field using an Ion Science Phocheck Model 1000 PID calibrated onsite to a 100 ppm isobutylene standard.
3) Driller maintained head of water in HSA to prevent flowing sands.
4) Driller noted increased auger grinding and rig chatter advancing from approx 6 to 10 feet deep.

Notes:
1) Soil Samples screened in the field using a Thermal Environmental Systems Model 580S Photoionization Detector (unless otherwise noted in Remarks). The meter was calibrated relative to a benzene in air standard. N.D. = None Detected; N. R. = Not Recorded; N.A. = Not Applicable; O.R. = Out of Range
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 Sample; 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.: RR-15

VT BORING LOG PID 5/21/04 837-65 MIDDLEBURY WCRS (23).GPJ GEODESIGN PIDAFTER7-12-04.GDT 4/16/13

*NOTE: SEE BORING CHART ON BORING INFORMATION SHEETS FOR NORTHING AND EASTING INFORMATION

BORING LOG

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
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

Project Name: Middlebury WCRS (23) Bridges 2 and 102 Middlebury, VT

Boring No.: RR-15
Page No.: 2 of 2
File No.: 837-65
Checked By: JFW

Boring Company: TransTech Drilling Services
Foreman: James Burrowbridge
GeoDesign Rep.: Joshua Gilman
Date Started: March 26, 2013 Date Finished: March 27, 2013
N. Coordinate: E. Coordinate:
Ground Surface Elevation (feet): 350.32
Station: 15+00 Offset: 6 ft RT

	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 550X ATV	
Hammer Type:	Automatic	

Groundwater Observations

Date	Depth (ft)	Elev. (ft)	Notes
▼ 3/26/13, 13:45	6.0	344.3	Wet sample
▼ 3/27/13, 9:20	0.5	349.8	In open hole overnight

Sample Information

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)	PID Reading (ppm)
		C1	C	60	60	23	[REC= 100%; RQD= 60%]				4.5	
25											4	
											4	
											4.5	
											4.5	
		C2	C	60	60	28	[REC= 100%; RQD= 67%]				5	
30											5	
											6	
											6	
											6	
35												
40												

Strata Description (Depth & Elevation(feet)) / Symbol / Sample Description (Classification System: Burmister)

Glacial Till *(Continued)*

23 — Bedrock 327.32

C1: Fair quality, moderately hard, fresh to slightly weathered, gray with frequent white banding and vertical stripes, LIMESTONE. Fracturing ~20 to 40 degrees from horizontal. Strong reaction to dilute HCl.

C2: Fair quality, moderately hard, fresh, gray with white laminates LIMESTONE. Fracturing ~10 to 45 degrees from horizontal. Strong reaction to dilute HCl.

33 — Bottom of Exploration at 33.0 ft 317.32

Remarks: 5) HSAR at 23 feet deep. Driller to drove 4" FJ casing and cored Day 2.

Notes: 1) Soil Samples screened in the field using a Thermal Environmental Systems Model 580S Photoionization Detector (unless otherwise noted in Remarks). The meter was calibrated relative to a benzene in air standard. N.D. = None Detected; N/ R. = Not Recorded; N.A. = Not Applicable; O.R. = Out of Range
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 Sample; 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.: RR-15

BORING LOG

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
P.O. Box 699, Windsor, VT 05089, Phone: 802-674-2033/Fax: 802-674-5943
40 Farrell Street, S. Burlington, VT 05403, Phone: 802-652-5140

Project Name: Middlebury WCRS (23) Additional Drilling 2016 Middlebury, VT

Boring No.: RR-16(OW)
Page No.: 1 of 2
File No.: 837-65.4
Checked By: JFW

Boring Company: TransTech Drilling Services
Foreman: James Burrowbridge
GeoDesign Rep.: Joshua Gilman
Date Started: March 26, 2013 Date Finished: March 27, 2013
N. Coordinate: E. Coordinate:
Ground Surface Elevation (feet): 350.37
Station: 15+67 Offset: 6 ft RT

	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 550X ATV	
Hammer/Rod Type:	Automatic	

Groundwater Observations

Date	Depth (ft)	Elev. (ft)	Notes
▼ 3/26/13, 15:30	6.0	344.4	Wet sample
▼ 3/27/13, 9:20	0.0	350.4	In open hole overnight
▼ 3/28/13, 8:20	1.6	348.8	In well
▼ 5/1/13, 8:30	1.9	348.5	In well
▼ 10/30/13, 13:40	1.8	348.6	In well
▼ 2/3/14, 12:00	0.0	350.4	Frozen @ G.S.
▼ 6/24/14, 0:00	1.6	348.8	Standing H2O 0.1' below tie
▼ 4/7/15, 9:20	1.0	349.4	Below tie

Sample Information

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 (%)
		S1	SS	24	4	2	9	7	7	3		
5		S2	SS	24	12	4	1	3	4	9		
		S3	SS	24	12	6	18	19	13	12		
		S4	SS	13	3	8	11	14	50/1"			
10												
		C1	C	26	26	11	[REC= 100%; RQD= 0%]				4	
											10	
		C2	C	34	34	13.2	[REC= 100%; RQD= 12%]				5.5	
15											4.5	

Strata Description (Depth & Elevation(feet)) / Symbol / Sample Description (Classification System: Burmister) / Well Log

Ballast

2 — Silty Sand & Gravel 348.4

S1: Medium dense, gray fine to coarse SAND and fine to coarse GRAVEL, some Silt, moist to wet.

S2: Loose, gray fine to coarse SAND and SILT, little fine Gravel, moist to wet.

S3: Dense, tan fine to coarse SAND and fine to coarse GRAVEL, little Silt, wet.

S4: Refusal, tan fine to coarse SAND and fine to coarse GRAVEL, some Silt, wet.

9 — Boulder/ Cobbles 341.4

C1:Top 6" Boulder fragments.
Bottom 20": Very poor quality, moderately hard, fresh to slightly weathered, closely jointed light gray with white banding MARBLE (upper 7") grading to very close jointed dark gray MARBLE with occasional thin (<1/8" thick) darker gray beds with pyrite inclusions. Fracturing near horizontal in light gray portions and at ~65 degrees from horizontal in dark gray portions. Strong reaction to HCl in light gray portions with no reaction in dark gray portions.

12 — Bedrock (Marble) 338.4

Remarks: 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) Driller noted increased auger grinding and rig chatter advancing from approximately 9 to 11 feet deep (possible fractured/weathered 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%

Boring No.: RR-16(OW)

ADDITIONAL WLS SMALL REMARK FONT 837-65.4 MIDDLEBURY ADDL 2016.GPJ GEODESIGN STANDARD .GDT 5/27/15

BORING LOG

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
P.O. Box 699, Windsor, VT 05089, Phone: 802-674-2033/Fax: 802-674-5943
40 Farrell Street, S. Burlington, VT 05403, Phone: 802-652-5140

Project Name: Middlebury WCRS (23) Additional Drilling 2016 Middlebury, VT

Boring No.: RR-16(OW)
Page No.: 2 of 2
File No.: 837-65.4
Checked By: JFW

Boring Company: TransTech Drilling Services
Foreman: James Burrowbridge
GeoDesign Rep.: Joshua Gilman
Date Started: March 26, 2013 Date Finished: March 27, 2013
N. Coordinate: E. Coordinate:
Ground Surface Elevation (feet): 350.37
Station: 15+67 Offset: 6 ft RT

	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 550X ATV	
Hammer/Rod Type:	Automatic	

Groundwater Observations

Date	Depth (ft)	Elev. (ft)	Notes
▼ 3/26/13, 15:30	6.0	344.4	Wet sample
▼ 3/27/13, 9:20	0.0	350.4	In open hole overnight
▼ 3/28/13, 8:20	1.6	348.8	In well
▼ 5/1/13, 8:30	1.9	348.5	In well
▼ 10/30/13, 13:40	1.8	348.6	In well
▼ 2/3/14, 12:00	0.0	350.4	Frozen @ G.S.
▼ 6/24/14, 0:00	1.6	348.8	Standing H2O 0.1' below tie
▼ 4/7/15, 9:20	1.0	349.4	Below tie

Sample Information

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 (%)
												10
		C3	C	6	6	16	[REC= 100%; RQD= 0%]					10
		C4	C	36	35	16.5	[REC= 97%; RQD= 63%]					6
												6
20												10
25												
30												

Strata Description (Depth & Elevation(feet)) / Symbol / Sample Description (Classification System: Burmister) / Well Log

Bedrock (Marble) *(Continued)*

C2: Very poor quality, moderately hard fresh to slightly weathered, shattered to close jointed, interbedded dark gray and light gray with occasional white bands MARBLE. Fracturing typically occuring along dark gray beds at ~65 degrees from horizontal. Strong reaction to HCl in light gray beds with no reaction in the dark gray beds.

C3: Very poor quality, moderately hard, fresh to slightly weathered, shattered, gray MARBLE with thin (~1/8" thick) darker bedding. Strong reaction to HCl on lighter surfaces with no reaction on darker bedding.

19.5 — Bottom of Exploration at 19.5 ft 330.9

C4: Fair quality, moderately hard, fresh, close to moderate jointing, interbedded dark gray MARBLE with pyrite inclusions and light gray/white MARBLE (upper 12") grading to light gray with occasional white banding (bottom 24"). Fracturing up to ~ 20 degrees from horizontal. Strong reaction to HCL on lighter gray surfaces with no reaction on darker gray surfaces.

Remarks: 4) HSAR at 11 feet deep. Driller advanced 4" FJ casing with spin shoe and cored Day 2.
5) Monitoring well installed to bottom of borehole, with 6-inch protective flush mount cover.

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%

Boring No.: RR-16(OW)

---

*NOTE: SEE BORING CHART ON BORING INFORMATION SHEETS FOR NORTHING AND EASTING INFORMATION

vhb

PROJECT NAME: MIDDLEBURY
PROJECT NUMBER: WCRS(23)

FILE NAME: z10g044borlogs_pl.dgn
PROJECT LEADER: A.P. GUYETTE
DESIGNED BY: GEODESIGN
BORING LOGS (26 OF 28)

PLOT DATE: 10/18/2016
DRAWN BY: C.J. HAKEY
CHECKED BY: GEODESIGN
SHEET 64 OF 116

BORING LOG — RW-1

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
P.O. Box 699, Windsor, VT 05089, Phone: 802-674-2033/Fax: 802-674-5943
40 Farrell Street, S. Burlington, VT 05403, Phone: 802-652-5140

Project Name: Middlebury WCRS (23) Additional Drilling 2016, Middlebury, VT

Boring No.: RW-1 | Page No.: 1 of 1 | File No.: 837-65.4 | Checked By: JFW

Boring Company: TransTech Drilling Services
Foreman: James Burrowbridge
GeoDesign Rep.: Joshua Gilman
Date Started: March 11, 2013 | Date Finished: March 11, 2013
N. Coordinate: | E. Coordinate:
Ground Surface Elevation (feet): 363.28
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 550X ATV	
Hammer Type:	Automatic	

Groundwater Observations			
Date	Depth (ft)	Elev. (ft)	Notes
▼ 3/11/13, 14:15	12.0	351.3	Wet sample

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 (%)	Strata Description / Depth & Elevation(feet)	Symbol	Sample Description (Classification System: Burmister)
		S1	SS	23	9	0	1	3	5	100/5"			Topsoil Fill 363.0		S1: Loose, dark brown fine to coarse SAND, some Silt, little fine to coarse Gravel, moist (3" of red brick in top of sample, 4" of Clayey SILT at bottom).
		S2	SS	1	1	2	100/1"								S2: Refusal, dark brown fine to coarse SAND and SILT, trace Root Fibers, rock fragments in spoon tip, moist.
5		S3	SS	24	1	4	2	5	4	6					S3: Stiff, brown Clayey SILT, some fine to coarse Sand, some fine to coarse Gravel moist.
		S4	SS	24	18	6	7	6	16	14					S4: Medium dense, brown fine to coarse SAND and Clayey SILT, trace Root Fibers, moist.
		S5	SS	24	16	8	6	13	12	13			9		S5: Top 4.5" brown fine to coarse SAND, some Clayey Silt, some fine to coarse Gravel, moist. Bottom 11.5" gray fine to coarse SAND and SILT, some fine to coarse Gravel, moist.
10		S6	SS	21	10	10	19	22	77	100/3"			Glacial Till 354.3		
		S7	SS	5	5	12	100/5"						12 ▼ Weathered Bedrock 351.3		S6: Very dense, gray and brown fine to coarse SAND, some Silt, some fine to coarse Gravel, moist.
		C1	C	17	17	13	[REC= 100%; RQD= 74%]				5		13 Bedrock (Marble) 350.3		S7: Refusal, gray fine to coarse SAND, some fine to coarse Gravel, some Clayey SILT, wet.
15		C2	C	42	39	14.5	[REC= 93%; RQD= 64%]				NR NR				C1: Fair quality, moderately hard, fresh, close jointed, gray with white swirls MARBLE. Jointing approximately 30 to 40 degrees. Strong reaction to dilute HCl.
											5				
											5		18		C2: Fair quality, moderately hard, fresh, close jointed gray MARBLE (upper 18") grading to thin (< 1/8" thick) darker beds with occasional pyrite inclusions. Jointing approximately 30 to 65 degrees with fracturing typically occuring along darker beds. Strong reaction to dilute HCl in lighter portions, no reaction along darker portions.
											5		Bottom of Exploration at 18.0 ft 345.3		
20															
25															
30															

Remarks:
1) Northing, easting, and ground surface elevation shown are from survey data provided by VHB.
2) All samples screened in the field using an Ion Science Phocheck Model 1000 PID calibrated onsite to a 100 ppm isobutylene standard.
3) HSAR at approximately 2 feet deep (inferred boulder). Driller offset 5 feet east to resume advance.
4) HSAR at 13 feet deep. Driller pulled HSA and drove 3" FJ casing to 13 feet deep to attempt coring C1.
5) Driller terminated core C1 after 1.5 feet due to core barrel blockage.
6) Exploration terminated after coring C2.

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,10=Weight of Rod/Hammer
4) Proportions Used: Trace = 1-10%; Little = 10-20%; Some = 20-35%; And = 35-50%

Boring No.: RW-1

SMALL REMARK FONT STANDARD 837-65.4 MIDDLEBURY ADDL 2016.GPJ GEODESIGN STANDARD .GDT 4/29/16

BORING LOG — RW-2

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
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

Project Name: Middlebury WCRS (23) Bridges 2 and 102, Middlebury, VT

Boring No.: RW-2 | Page No.: 1 of 1 | File No.: 837-65 | Checked By: AJB/JFW

Boring Company: TransTech Drilling Services
Foreman: James Burrowbridge
GeoDesign Rep.: Jesse McIntyre
Date Started: March 15, 2013 | Date Finished: March 15, 2013
N. Coordinate: | E. Coordinate:
Ground Surface Elevation (feet): 369.29
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 550X ATV	
Hammer Type:	Automatic	

Groundwater Observations			
Date	Depth (ft)	Elev. (ft)	Notes
▼ 3/15/13, 12:00	16.0	353.3	Wet sample

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)	PID Reading (ppm)	Strata Description / Depth & Elevation(feet)	Symbol	Sample Description (Classification System: Burmister)
		S1	SS	24	11	0	3	2	2	2		0	Fill		S1: Very loose
		S2	SS	24	6	2	2	2	3	4		0			S1A - Top 4": Brown SILT and fine to coarse SAND, some Silty Clay, trace fine Gravel, trace Roots, trace Cinders, moist. (Topsoil).
5		S3	SS	24	11	4	2	4	4	7		0			S1B - Bottom 7": Mottled Brown Clayey SILT and fine to medium SAND, little (+) fine Gravel, trace Roots, moist.
		S4	SS	24	1	6	3	3	3	5		0			S2: Loose, brown Clayey SILT, some fine to coarse Sand, little fine Gravel (angular), moist.
		S5	SS	24	24	8	3	5	7	9		0	8 Sand/ Silt/Clay Mixture 361.29		S3: Loose, dark brown SILT and fine to coarse SAND, trace fine to coarse Gravel, trace Root Fibers and Brick Fragments, moist.
10		S6	SS	24	19	10	5	8	11	12		0			S4: Loose, red Brick Fragments, moist.
		S7	SS	24	14	12	5	8	7	5		0			S5: Stiff, brown and tan Clayey SILT, trace fine to coarse Sand, moist.
15		S8	SS	6	6	14	100/6"	-	-	-		1.9			S6: Very Stiff, brown and tan Clayey SILT (layered), some fine to coarse Sand, little fine Gravel, moist.
		S9	SS	24	14	16	3	5	5	6		.2			S7: Very Stiff, brown and tan Clayey SILT, some fine to medium Sand, trace fine Gravel, moist.
		S10	SS	23	23	18	1	1	3	100/6"		.2			S8: Refusal, tan fine to coarse SAND and Clayey SILT, some fine to coarse Gravel, moist.
20													20		S9: Medium Dense, tan fine to coarse SAND and Clayey SILT, some fine to coarse Gravel, wet.
		C1	C	60	60	20.2	[REC= 100%; RQD= 27%]						Bedrock 349.29		S10: Refusal, tan fine to coarse SAND, some fine to coarse Gravel, some Clayey SILT, moist.
25													25.2		S11) Refusal, no recovery (100 blows / 0" penetration). C1: Poor quality, moderately hard, slightly weathered, very close jointed, gray with white bands, LIMESTONE. Jointing approximately 25 to 90 degrees. Strong reaction to dilute HCl. (Possibly overblasted rock).
													Bottom of Exploration at 25.2 ft 344.09		
30															

Remarks:
1) Northing, easting, and ground surface elevation shown are from survey data provided by VHB.
2) All samples screened in the field using an Ion Science Phocheck Model 1000 PID calibrated onsite to a 100 ppm isobutylene standard.

Notes:
1) Soil Samples screened in the field using a Thermal Environmental Systems Model 580S Photoionization Detector (unless otherwise noted in Remarks). The meter was calibrated relative to a benzene in air standard. N.D. = None Detected; N. R. = Not Recorded; N.A. = Not Applicable; O.R. = Out of Range
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 Sample; SS = Split Barrel (Split Spoon); ST = Shelby Tube; Geo = Geoprobe; V = Vane; WOR,10 = 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.: RW-2

VT BORING LOG PID 5/21/04 837-65 MIDDLEBURY WCRS (23).GPJ GEODESIGN PIDALTERT-12-24.GDT 4/16/13

BORING LOG — ST-1

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
P.O. Box 699, Windsor, VT 05089, Phone: 802-674-2033/Fax: 802-674-5943
40 Farrell Street, S. Burlington, VT 05403, Phone: 802-652-5140

Project Name: Middlebury WCRS (23) Phase C, Middlebury, VT

Boring No.: ST-1 | Page No.: 1 of 1 | File No.: 837-65.2 | Checked By: SPK

Boring Company: TransTech Drilling Services
Foreman: John Leonhardt
GeoDesign Rep.: Jesse McIntyre
Date Started: April 10, 2014 | Date Finished: April 10, 2014
N. Coordinate: | E. Coordinate:
Ground Surface Elevation (feet): 357
Station: ~31+50 | Offset: 0 ft

	Casing:	Sampler:
Type:	FJ	SS
I.D.:	3.0 in.	1.38 in.
Hammer Wt.:	140 lbs	140 lbs
Hammer Fall:	30 in.	30 in.
Rig Type:	CME 550X	
Hammer Type:	Automatic	

Groundwater Observations			
Date	Depth (ft)	Elev. (ft)	Notes
▼ 4/10/14, 8:45	19.0	338.0	Wet Sample

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 (%)	Strata Description / Depth & Elevation(feet)	Symbol	Sample Description (Classification System: Burmister)
													No Sampling Performed		
5															
10															
15															
													19 ▼ Clay 338.0		
20		S1	SS	24	24	19	WOR	WOR	WOH	WOH					S1) Very Soft, gray CLAY, 1.5" layer of light gray Silty CLAY, trace fine to medium Sand, wet.
		S2	ST	24	24	21	P	U	S	H		48 - 77			S2) Dark gray, brittle CLAY layered with gray SILT, trace fine Sand partings (laboratory sub-sample.
		S3	SS	24	24	23	WOR	WOR	WOH	1					S3) Very Soft, gray CLAY, trace fine Sand, wet.
25													25 Bottom of Exploration at 25.0 ft 332.0		
30															

Remarks:
1) Location determined by taped measurements and visual estimates to existing site features. Elevation estimated based on topographic plan provided by VHB.
2) Boring advanced with drive-and wash method with 4-inch flush joint casing to approximately 25 feet deep without 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=Driven; G=Grab; PS=Piston Sampler; SS=Split Barrel (Split Spoon); ST=Shelby Tube; Geo=GeoProbe V=Vane; WOR,10=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.: ST-1

VT BORING LOG MC 5/21/04 837-65.2 MIDDLEBURY PHASE C.GPJ GEODESIGN STANDARD .GDT 5/21/14

*NOTE: SEE BORING CHART ON BORING INFORMATION SHEETS FOR NORTHING AND EASTING INFORMATION

vhb

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044borlogs_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: C.J. HAKEY
DESIGNED BY: GEODESIGN	CHECKED BY: GEODESIGN
BORING LOGS (27 OF 28)	SHEET 65 OF 116

VHB 57603

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
P.O. Box 699 — Windsor, VT 05089 — Phone: 802-674-2033/Fax: 802-674-5943
40 Farrell Street — S. Burlington, VT 05403 — Phone: 802-652-5140

BORING LOG

Project Name: Middlebury WCRS (23) Phase C, Middlebury, VT

Boring No.: ST-2 | Page No.: 1 of 2 | File No.: 837-65.2 | Checked By: SPK

Boring Company: TransTech Drilling Services
Foreman: John Leonhardt
GeoDesign Rep.: Jesse McIntyre
Date Started: April 10, 2014 — Date Finished: April 10, 2014
N. Coordinate: — E. Coordinate:
Ground Surface Elevation (feet): 357.5
Station: ~33+50 — Offset: 0 ft

	Casing:	Sampler:
Type:	FJ	SS
I.D.:	3.0 in.	1.38 in.
Hammer Wt.:	140 lbs	140 lbs
Hammer Fall:	30 in.	30 in.
Rig Type:	CME 550X	
Hammer Type:	Automatic	

Groundwater Observations: Date | Depth (ft) | Elev. (ft) | Notes

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	Casing Time (min./ft)	Moisture Content (%)	Strata Description: Depth & Elevation(feet)	Symbol	Sample Description: Classification System: Burmister
													No Sampling Performed		
5															
10															
15															
													17 Clay 340.5		
		S1	SS	24	24	17	WOH	WOH	WOH	WOH					S1) Very Soft, gray CLAY, trace fine to medium Sand, wet.
20		S2	ST	24	24	19	P	U	S	H		43 - 44			S2) Dark gray, Silty CLAY layered with gray SILT and dark gray, brittle CLAY, trace fine Sand partings (laboratory sub-sample).
		S3	SS	24	24	21	WOH	1	1	2					S3) Very Soft, gray CLAY, 1" layer light gray Silty CLAY, trace fine to medium Sand, wet.
25															
30															

Remarks:
1) Location determined by taped measurements and visual estimates to existing site features. Elevation estimated based on topographic plan provided by VHB.
2) Boring advanced with drive-and wash method with 4-inch flush joint casing to approximately 39 feet deep without 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.: ST-2

VT BORING LOG MC 5/21/04 837-65.2 MIDDLEBURY PHASE C.GPJ GEODESIGN STANDARD .GDT 5/21/14

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
P.O. Box 699 — Windsor, VT 05089 — Phone: 802-674-2033/Fax: 802-674-5943
40 Farrell Street — S. Burlington, VT 05403 — Phone: 802-652-5140

BORING LOG

Project Name: Middlebury WCRS (23) Phase C, Middlebury, VT

Boring No.: ST-2 | Page No.: 2 of 2 | File No.: 837-65.2 | Checked By: SPK

Boring Company: TransTech Drilling Services
Foreman: John Leonhardt
GeoDesign Rep.: Jesse McIntyre
Date Started: April 10, 2014 — Date Finished: April 10, 2014
N. Coordinate: — E. Coordinate:
Ground Surface Elevation (feet): 357.5
Station: ~33+50 — Offset: 0 ft

	Casing:	Sampler:
Type:	FJ	SS
I.D.:	3.0 in.	1.38 in.
Hammer Wt.:	140 lbs	140 lbs
Hammer Fall:	30 in.	30 in.
Rig Type:	CME 550X	
Hammer Type:	Automatic	

Groundwater Observations: Date | Depth (ft) | Elev. (ft) | Notes

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	Casing Time (min./ft)	Moisture Content (%)	Strata Description: Depth & Elevation(feet)	Symbol	Sample Description: Classification System: Burmister
													Clay (Continued)		
		S4	SS	24	24	33	WOR	WOR	WOH	WOH					S4) Very Soft, gray CLAY, trace fine to medium Sand, wet.
35															
		S5	ST	24	24	35	P	U	S	H		39 - 46			S5) Dark gray, Silty CLAY, trace Sand and Gravel up to 15mm (laboratory description).
		S6	SS	24	24	37	WOH	WOH	WOH	WOH					S6) Very Soft, gray CLAY, trace fine to medium Sand, wet.
													39 Bottom of Exploration at 39.0 ft 318.5		
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.: ST-2

VT BORING LOG MC 5/21/04 837-65.2 MIDDLEBURY PHASE C.GPJ GEODESIGN STANDARD .GDT 5/21/14

GEODESIGN INCORPORATED
Geotechnical / Construction / Environmental Engineers and Scientists
P.O. Box 699 — Windsor, VT 05089 — Phone: 802-674-2033/Fax: 802-674-5943
40 Farrell Street — S. Burlington, VT 05403 — Phone: 802-652-5140

BORING LOG

Project Name: Middlebury WCRS (23) Phase C, Middlebury, VT

Boring No.: ST-3 | Page No.: 1 of 1 | File No.: 837-65.2 | Checked By: SPK

Boring Company: TransTech Drilling Services
Foreman: John Leonhardt
GeoDesign Rep.: Jesse McIntyre
Date Started: April 10, 2014 — Date Finished: April 10, 2014
N. Coordinate: — E. Coordinate:
Ground Surface Elevation (feet): 359.5
Station: ~38+50 — Offset: 4 ft Right

	Casing:	Sampler:
Type:	FJ	SS
I.D.:	3.0 in.	1.38 in.
Hammer Wt.:	140 lbs	140 lbs
Hammer Fall:	30 in.	30 in.
Rig Type:	CME 550X	
Hammer Type:	Automatic	

Groundwater Observations: Date | Depth (ft) | Elev. (ft) | Notes

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	Casing Time (min./ft)	Moisture Content (%)	Strata Description: Depth & Elevation(feet)	Symbol	Sample Description: Classification System: Burmister
													No Sampling Performed		
5															
10															
													11 Clay & Silt 348.5		
		S1	SS	24	24	11	1	1	2	3					S1) Soft, light brown (w/ occasional gray) CLAY, trace fine to medium Sand, damp, slight organic decay odor, 1/16" to 1/4" partings.
		S2	ST	24	24	13	P	U	S	H		38 - 55			S2) Stiff, dark gray CLAY (laboratory sub-sample).
15															
		S3	SS	24	24	15	2	2	2	3					S2) Soft, gray-brown CLAY, trace fine to medium Sand, damp, 1/16" to 1/4" partings.
													17 Bottom of Exploration at 17.0 ft 342.5		
20															
25															
30															

Remarks:
1) Location determined by taped measurements and visual estimates to existing site features. Elevation estimated based on topographic plan provided by VHB.
2) Boring advanced with drive-and wash method with 4-inch flush joint casing to approximately 17 feet deep without 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.: ST-3

VT BORING LOG MC 5/21/04 837-65.2 MIDDLEBURY PHASE C.GPJ GEODESIGN STANDARD .GDT 5/21/14

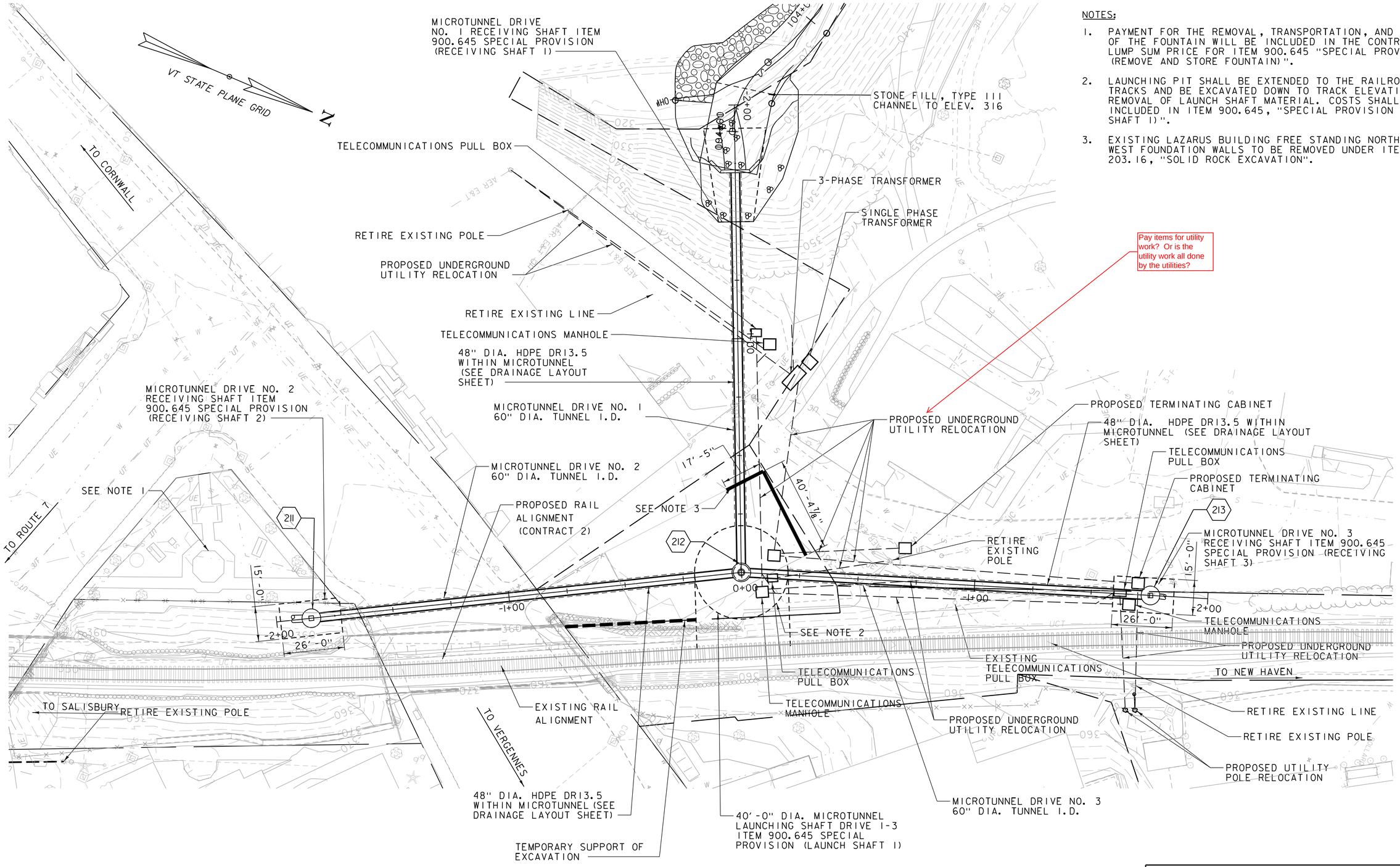
*NOTE: SEE BORING CHART ON BORING INFORMATION SHEETS FOR NORTHING AND EASTING INFORMATION

vhb

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044borlogs_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: C.J. HAKEY
DESIGNED BY: GEODESIGN	CHECKED BY: GEODESIGN
BORING LOGS (28 OF 28)	SHEET 66 OF 116

NOTES:

1. PAYMENT FOR THE REMOVAL, TRANSPORTATION, AND STORAGE OF THE FOUNTAIN WILL BE INCLUDED IN THE CONTRACT LUMP SUM PRICE FOR ITEM 900.645 "SPECIAL PROVISION (REMOVE AND STORE FOUNTAIN)".
2. LAUNCHING PIT SHALL BE EXTENDED TO THE RAILROAD TRACKS AND BE EXCAVATED DOWN TO TRACK ELEVATION FOR REMOVAL OF LAUNCH SHAFT MATERIAL. COSTS SHALL BE INCLUDED IN ITEM 900.645, "SPECIAL PROVISION (LAUNCH SHAFT 1)".
3. EXISTING LAZARUS BUILDING FREE STANDING NORTH AND WEST FOUNDATION WALLS TO BE REMOVED UNDER ITEM 203.16, "SOLID ROCK EXCAVATION".



Pay items for utility work? Or is the utility work all done by the utilities?

MICROTUNNEL PLAN

SCALE 1" = 20'-0"

20 0 20

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044site_plan.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: R. A. LORENZO
DESIGNED BY: A. STONE	CHECKED BY: J.A. PITTSINGER
MICROTUNNEL LAYOUT SHEET	SHEET 67 OF 116

Hatch Mott MacDonald

vhb

VHB 57603.00

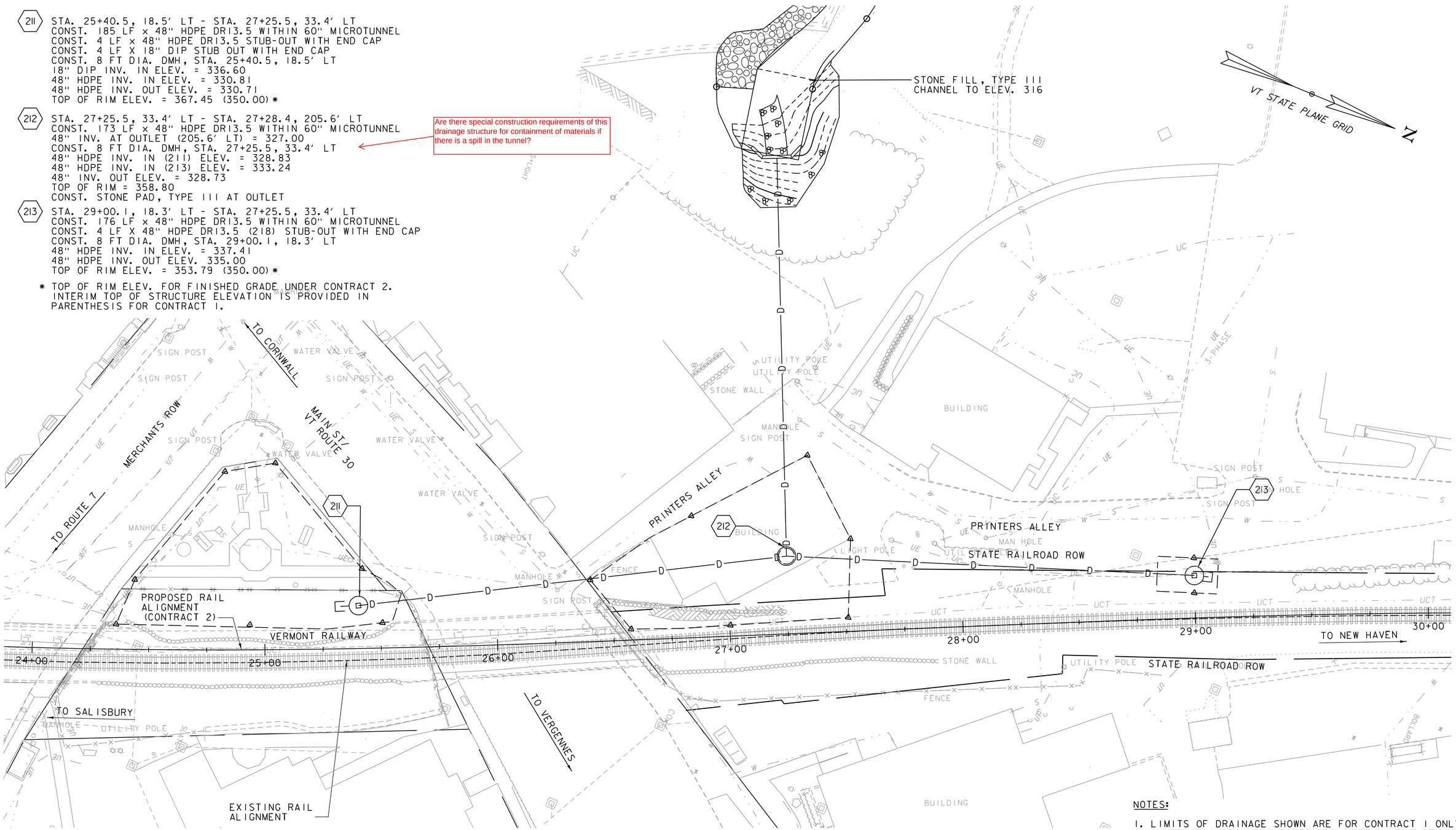
211 STA. 25+40.5, 18.5' LT - STA. 27+25.5, 33.4' LT
CONST. 185 LF x 48" HDPE DR13.5 WITHIN 60" MICROTUNNEL
CONST. 4 LF x 48" HDPE DR13.5 STUB-OUT WITH END CAP
CONST. 4 LF X 18" DIP STUB OUT WITH END CAP
CONST. 8 FT DIA. DMH, STA. 25+40.5, 18.5' LT
18" DIP INV. IN ELEV. = 336.60
48" HDPE INV. IN ELEV. = 330.81
48" HDPE INV. OUT ELEV. = 330.71
TOP OF RIM ELEV. = 367.45 (350.00)*

212 STA. 27+25.5, 33.4' LT - STA. 27+28.4, 205.6' LT
CONST. 173 LF x 48" HDPE DR13.5 WITHIN 60" MICROTUNNEL
48" INV. AT OUTLET (205.6' LT) = 327.00
CONST. 8 FT DIA. DMH, STA. 27+25.5, 33.4' LT
48" HDPE INV. IN (211) ELEV. = 328.83
48" HDPE INV. IN (213) ELEV. = 333.24
48" INV. OUT ELEV. = 328.73
TOP OF RIM = 358.80
CONST. STONE PAD, TYPE III AT OUTLET

213 STA. 29+00.1, 18.3' LT - STA. 27+25.5, 33.4' LT
CONST. 176 LF x 48" HDPE DR13.5 WITHIN 60" MICROTUNNEL
CONST. 4 LF X 48" HDPE DR13.5 (218) STUB-OUT WITH END CAP
CONST. 8 FT DIA. DMH, STA. 29+00.1, 18.3' LT
48" HDPE INV. IN ELEV. = 337.41
48" HDPE INV. OUT ELEV. 335.00
TOP OF RIM ELEV. = 353.79 (350.00)*

* TOP OF RIM ELEV. FOR FINISHED GRADE UNDER CONTRACT 2. INTERIM TOP OF STRUCTURE ELEVATION IS PROVIDED IN PARENTHESIS FOR CONTRACT 1.

Are there special construction requirements of this drainage structure for containment of materials if there is a spill in the tunnel?



NOTES:

1. LIMITS OF DRAINAGE SHOWN ARE FOR CONTRACT 1 ONLY. CONTRACT 2 DRAINAGE TO BE INCLUDED IN FUTURE WORK.

UTILITY SYMBOLOGY:

—D— PROPOSED DRAINAGE
PROPOSED DRAINAGE STRUCTURE

UTILITY ABBREVIATIONS:

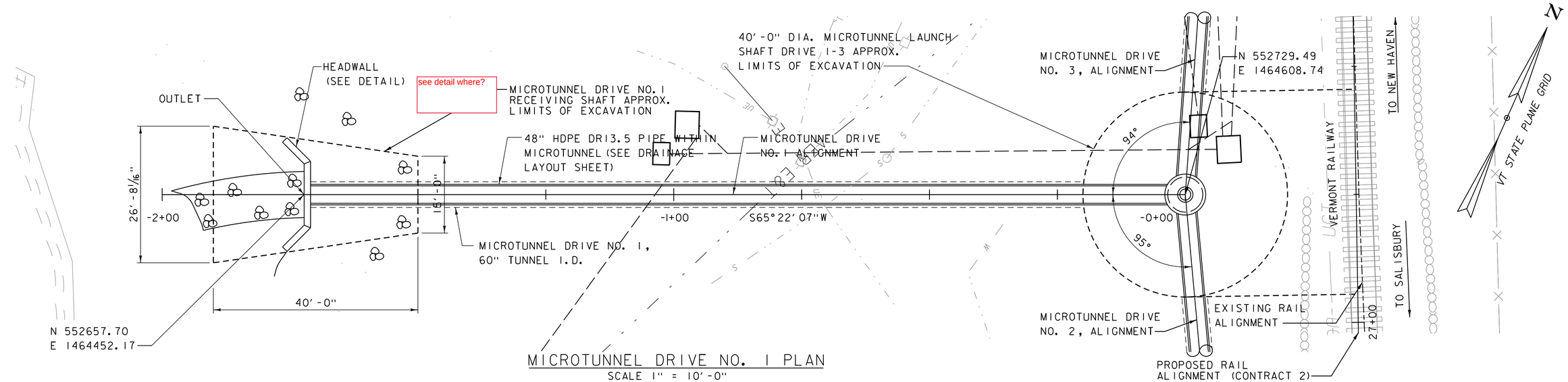
DMH DRAINAGE MANHOLE

0 20 40
SCALE IN FEET

vhb

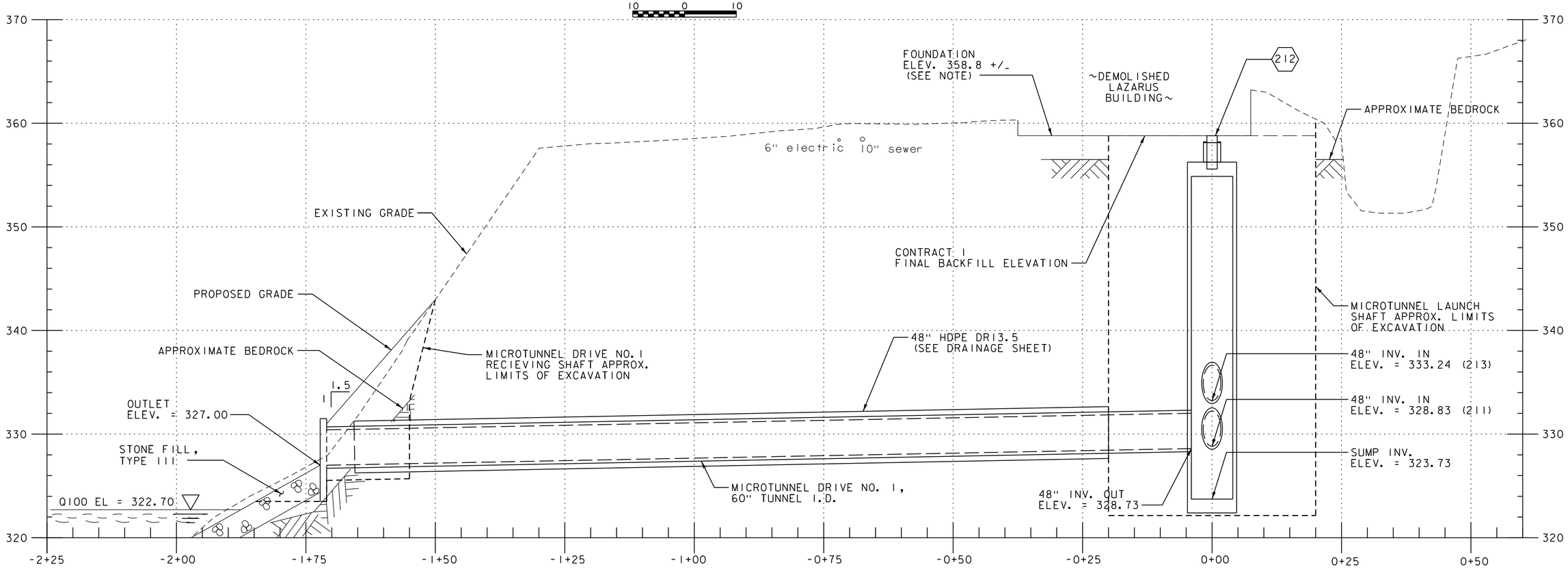
PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044bdr_nul_util_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: K.D. WENTWORTH
DESIGNED BY: M. KEENE	CHECKED BY: P. SMIAR
DRAINAGE LAYOUT SHEET	SHEET 68 OF 116

VHB 57603



MICROTUNNEL DRIVE NO. 1 PLAN

SCALE 1" = 10'-0"



NOTE:

TOP OF STRUCTURE ELEVATION BASED ON FOUNDATION LEFT-IN-PLACE FOLLOWING DEMOLITION OF LAZARUS BUILDING. FINAL ELEVATION TO BE DETERMINED IN CONTRACT 2.

MICROTUNNEL DRIVE NO. 1 PROFILE

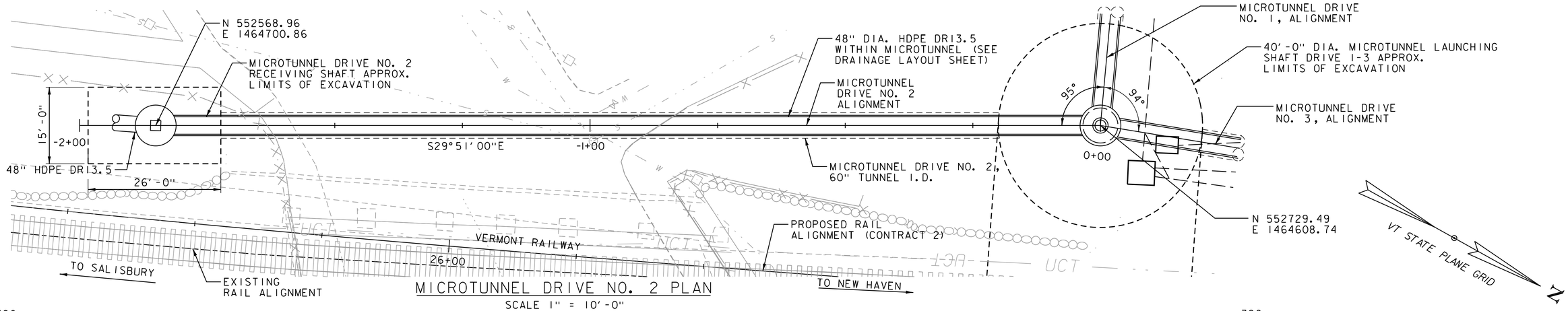
STA. 0+50 - 2+25
SCALE 1" = 10' HORIZONTAL
1" = 5' VERTICAL

Hatch Mott MacDonald

vhb

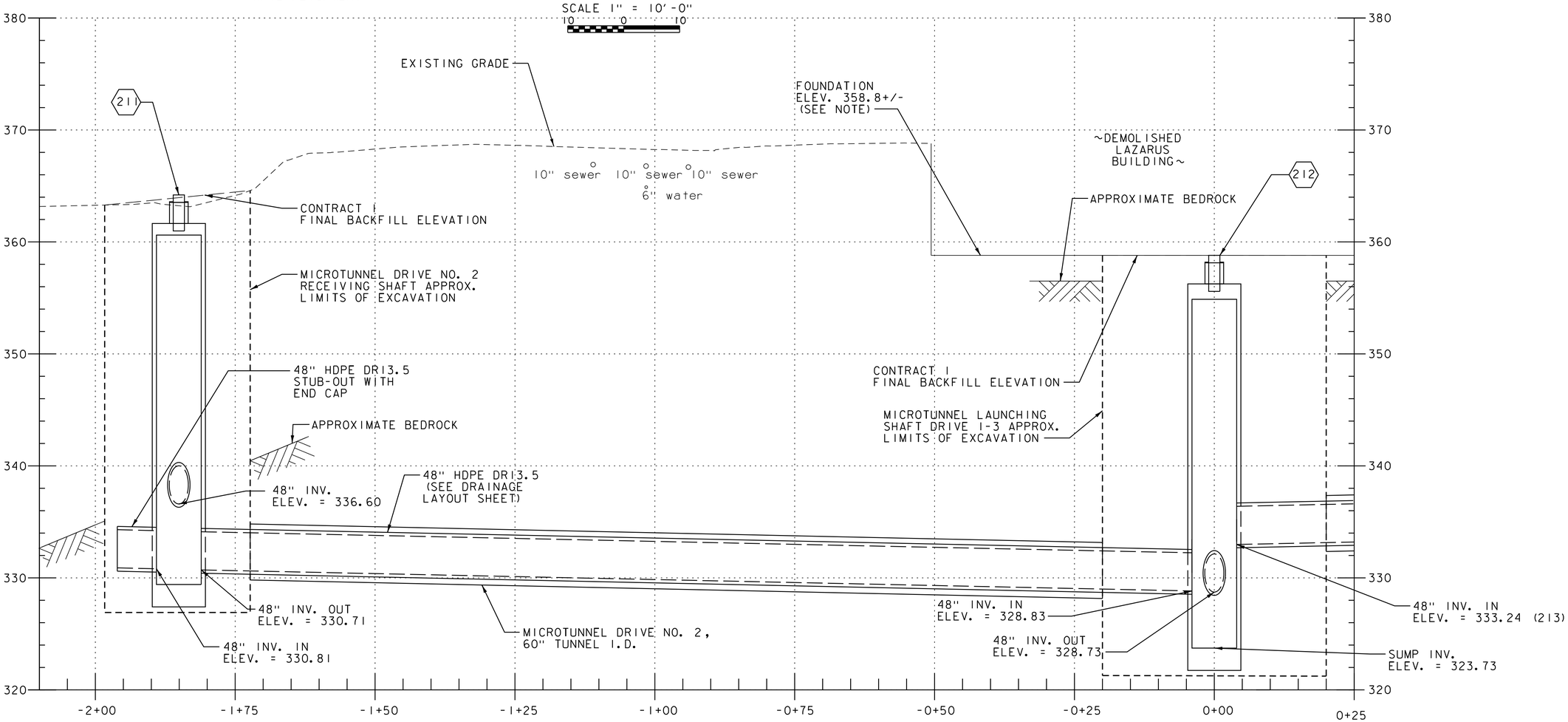
PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044mic_tun_Dr1.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: R. A. LORENZO
DESIGNED BY: A. STONE	CHECKED BY: J. A. PITTSINGER
MICROTUNNEL PROFILE SHEET (1 OF 3)	SHEET 69 OF 116

VHB 57603.00



MICROTUNNEL DRIVE NO. 2 PLAN

SCALE 1" = 10'-0"



NOTE:

TOP OF STRUCTURE ELEVATION BASED ON FOUNDATION LEFT-IN-PLACE FOLLOWING DEMOLITION OF LAZARUS BUILDING. FINAL ELEVATION TO BE DETERMINED IN CONTRACT 2.

MICROTUNNEL DRIVE NO. 2 PROFILE

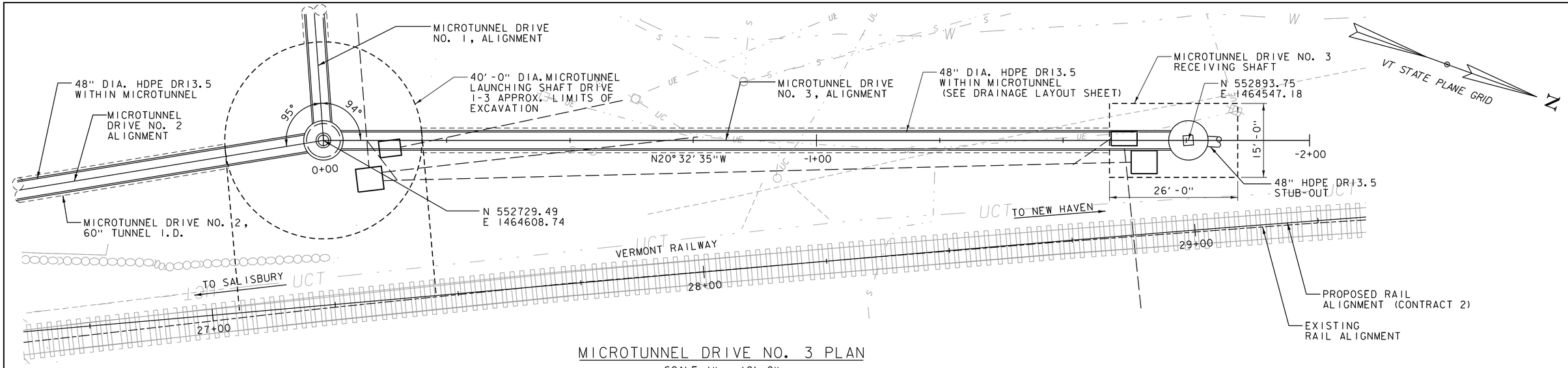
SCALE 1" = 10' HORIZONTAL
1" = 5' VERTICAL

Hatch Mott MacDonald

vhb

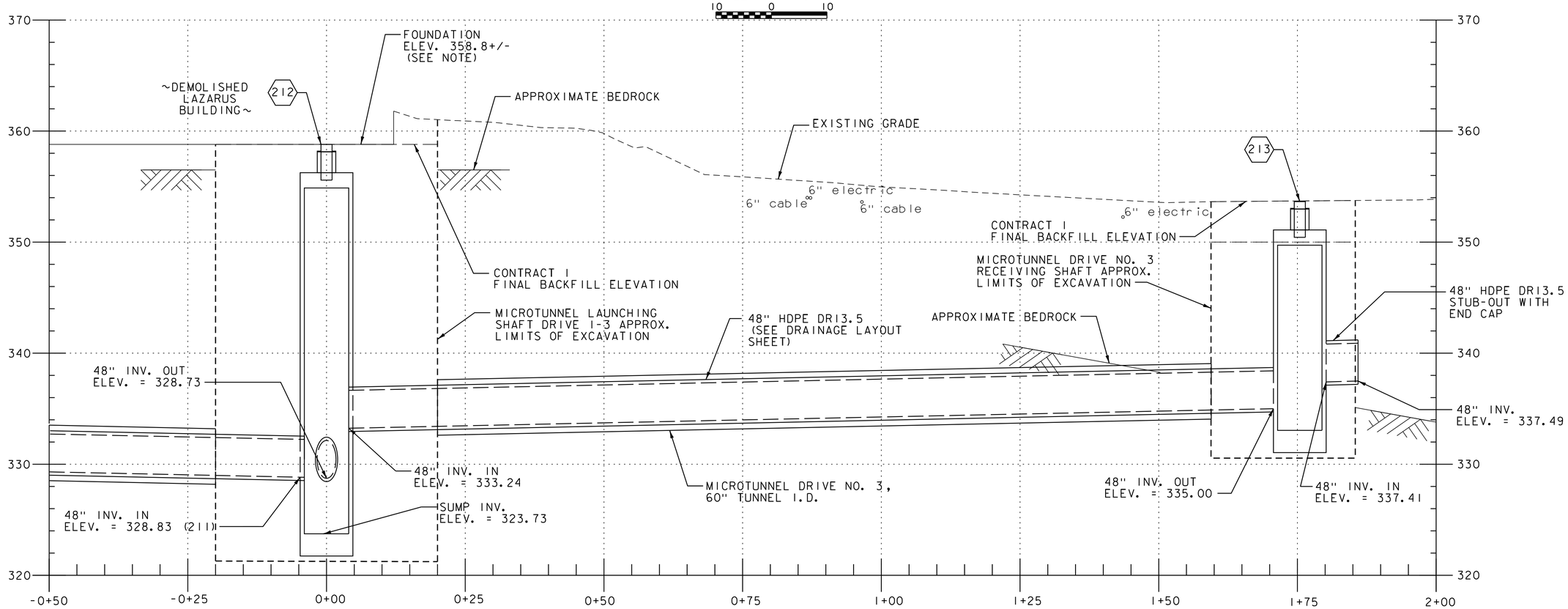
PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044mic_tun_Dr2.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: R. A. LORENZO
DESIGNED BY: A. STONE	CHECKED BY: J. A. PITTSINGER
MICROTUNNEL PROFILE SHEET (2 OF 3)	SHEET 70 OF 116

VHB 57603.00



MICROTUNNEL DRIVE NO. 3 PLAN

SCALE 1" = 10'-0"



NOTE:

TOP OF STRUCTURE ELEVATION BASED ON FOUNDATION LEFT-IN-PLACE FOLLOWING DEMOLITION OF LAZARUS BUILDING. FINAL ELEVATION TO BE DETERMINED IN CONTRACT 2.

MICROTUNNEL DRIVE NO. 3 PROFILE

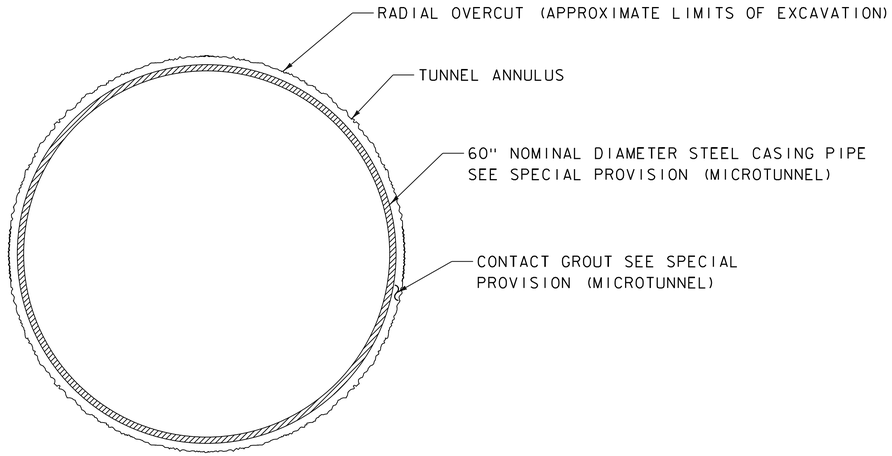
SCALE 1" = 10' HORIZONTAL
1" = 5' VERTICAL

Hatch Mott MacDonald

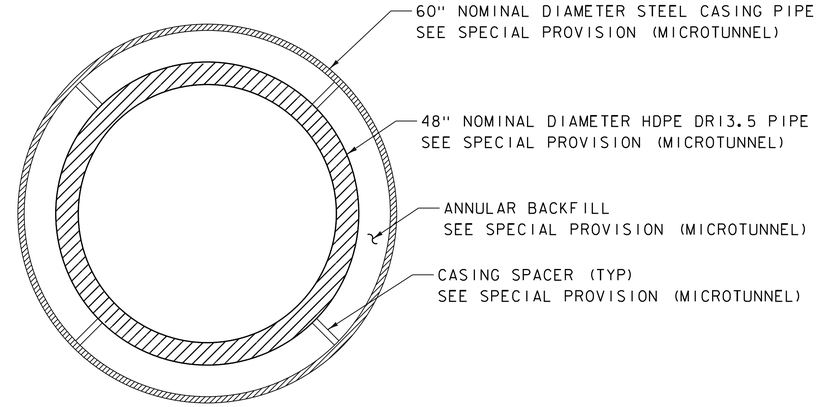
vhb

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044mic_tun_Dr3.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: R. A. LORENZO
DESIGNED BY: A. N. CASTILLO	CHECKED BY: J. A. PITTSINGER
MICROTUNNEL PROFILE SHEET (3 OF 3)	SHEET 71 OF 116

VHB 57603.00



DOUBLE PASS PIPE JACKING
INITIAL SUPPORT DETAIL
SCALE 1" = 1'-0"

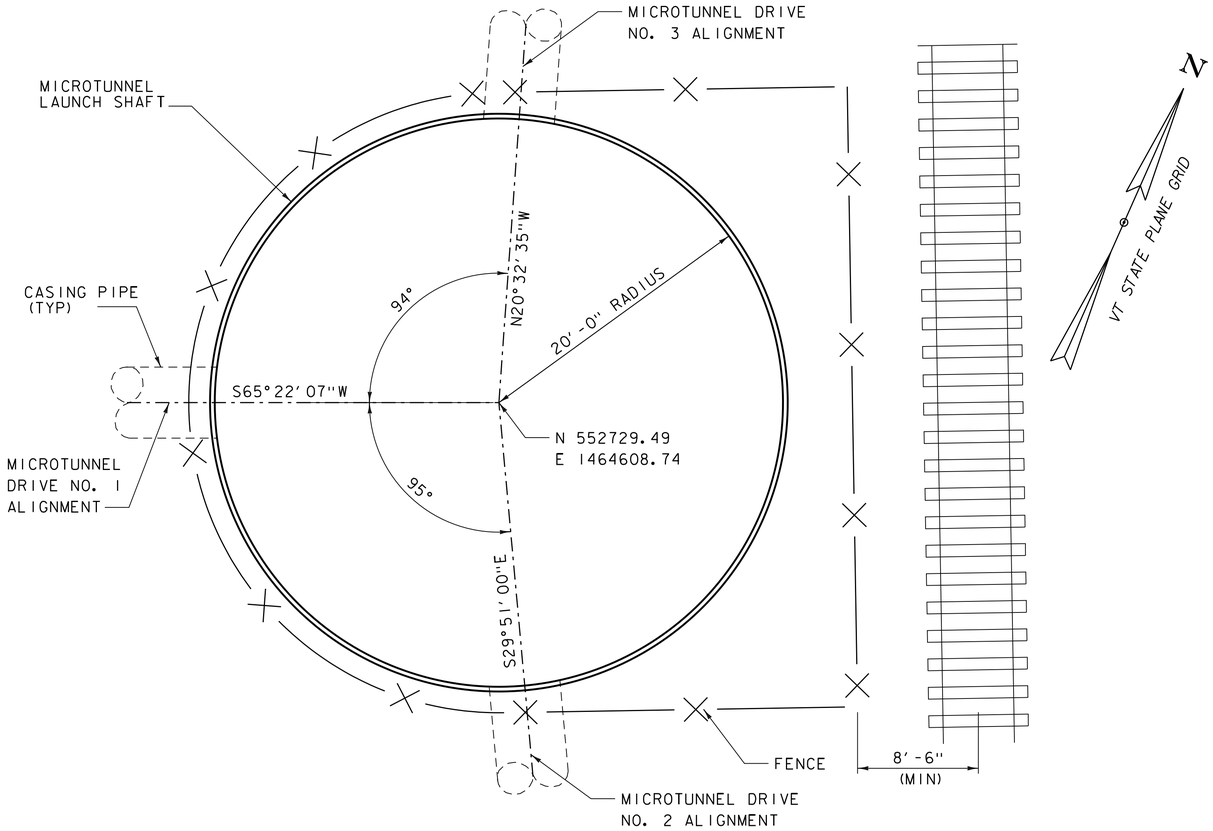


DOUBLE PASS PIPE JACKING
FINAL SUPPORT DETAIL 1
SCALE 1" = 1'-0"

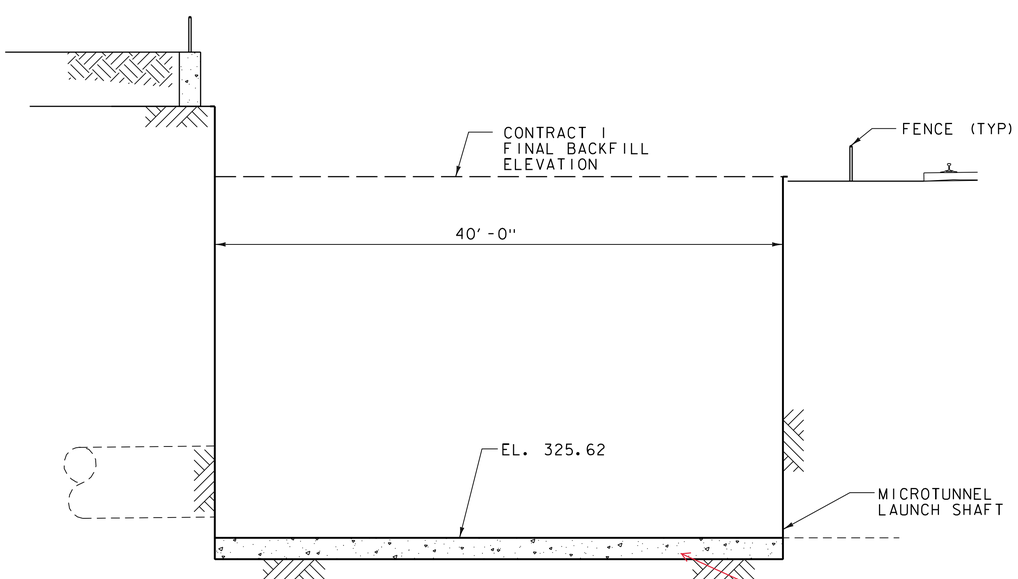
Hatch Mott MacDonald
vhb

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044h_pipe_dt.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: R. A. LORENZO
DESIGNED BY: A. STONE	CHECKED BY: J.A. PITTSINGER
PIPE DETAILS	SHEET 72 OF 116

VHB 57603.00



LAUNCH SHAFT PLAN
SCALE 3/16" = 1'-0"



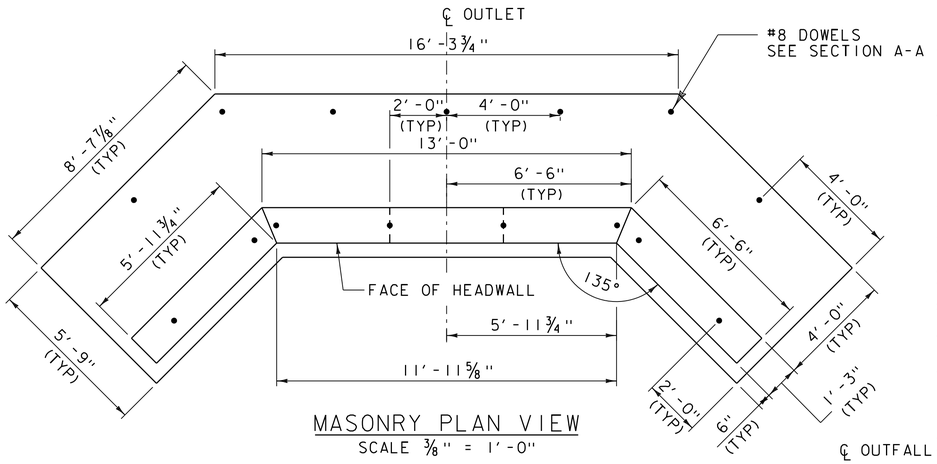
What is this material? Why shown like this?

LAUNCH SHAFT ELEVATION
SCALE 3/16" = 1'-0"

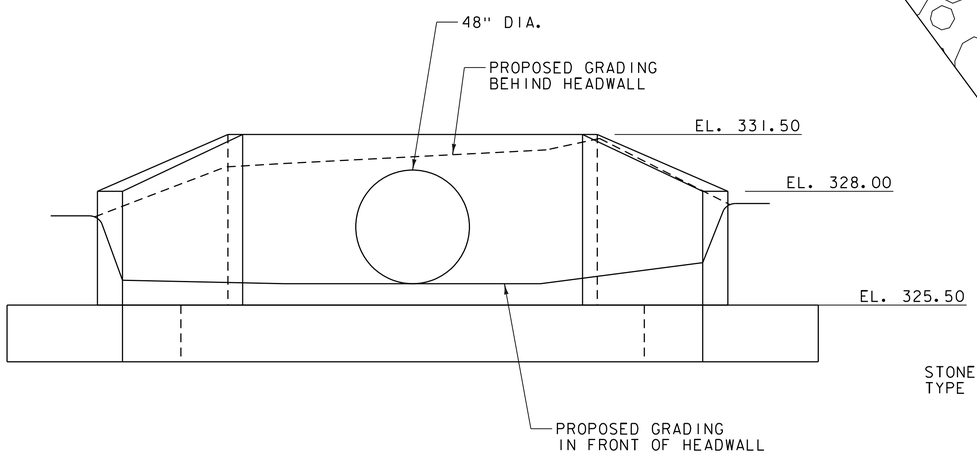
Hatch Mott MacDonald
vhb

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044lau_shaft_pl_el.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: R. A. LORENZO
DESIGNED BY: A. STONE	CHECKED BY: J.A. PITTSINGER
SHAFT DETAILS	SHEET 73 OF 116

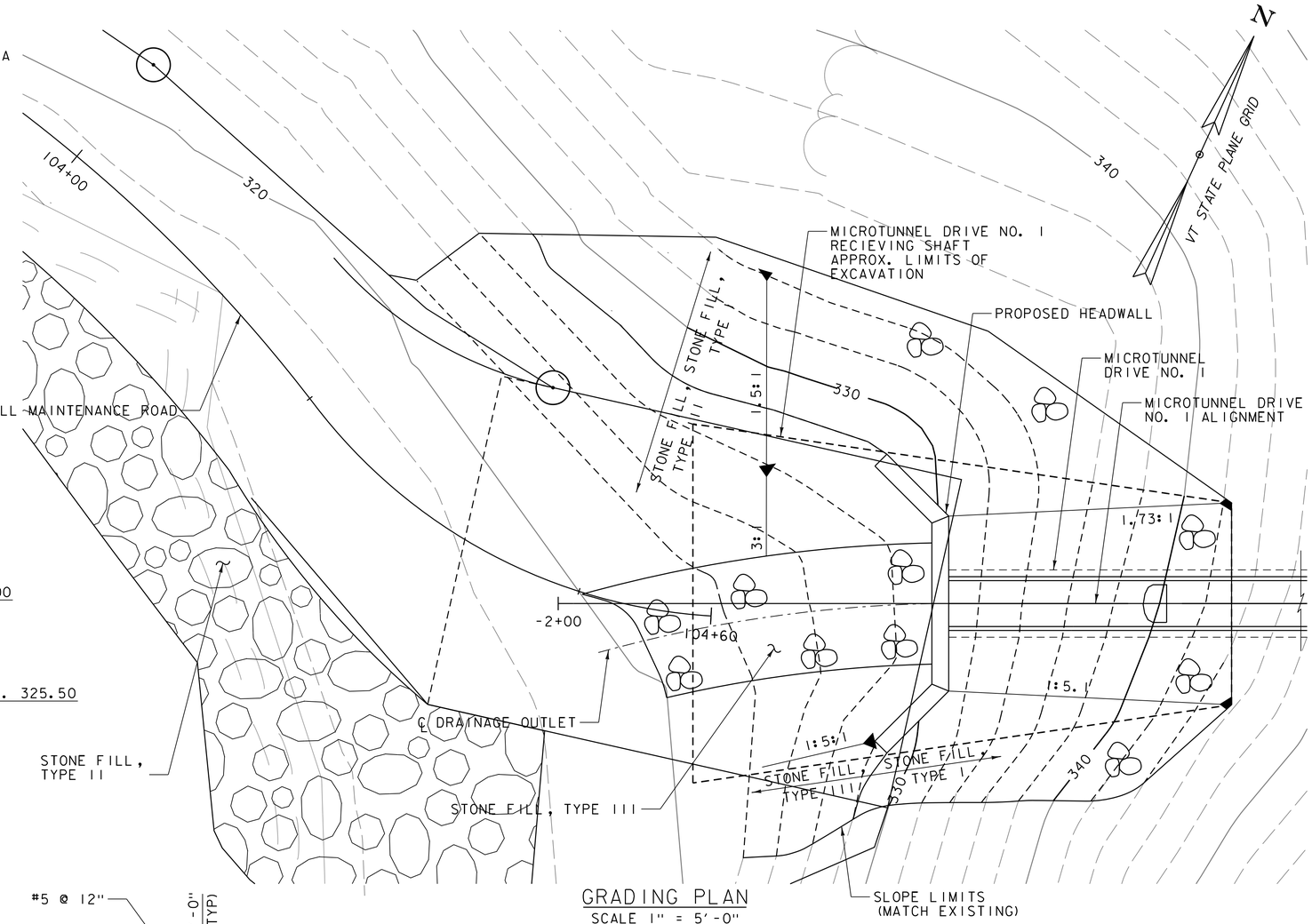
VHB 57603.00



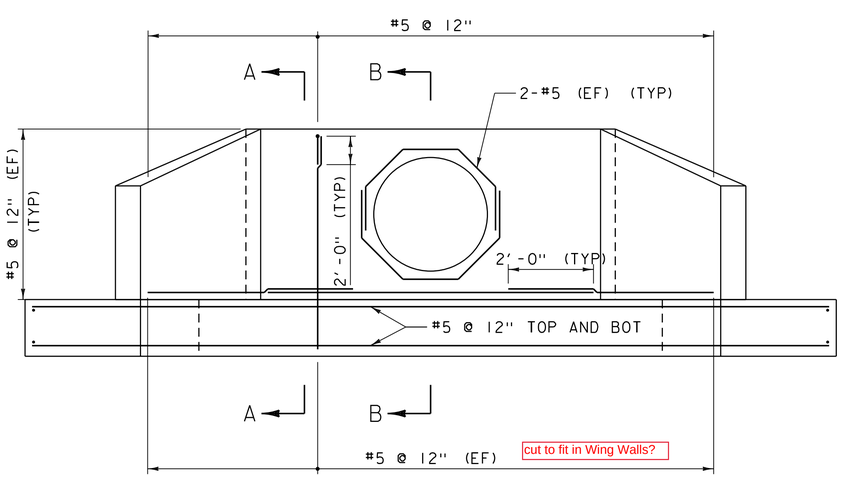
MASONRY PLAN VIEW
SCALE ⅜" = 1'-0"



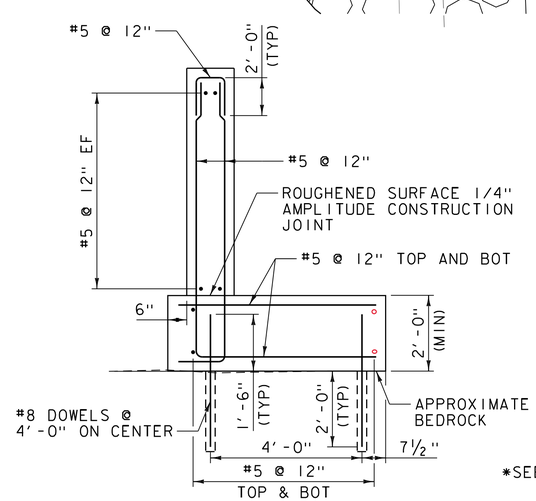
MASONRY ELEVATION
SCALE ⅜" = 1'-0"



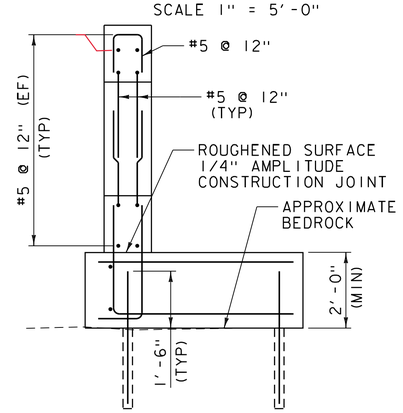
GRADING PLAN
SCALE 1" = 5'-0"



REINFORCING ELEVATION
SCALE ⅜" = 1'-0"



SECTION A-A
SCALE ½" = 1'-0"



SECTION B-B
SCALE ½" = 1'-0"

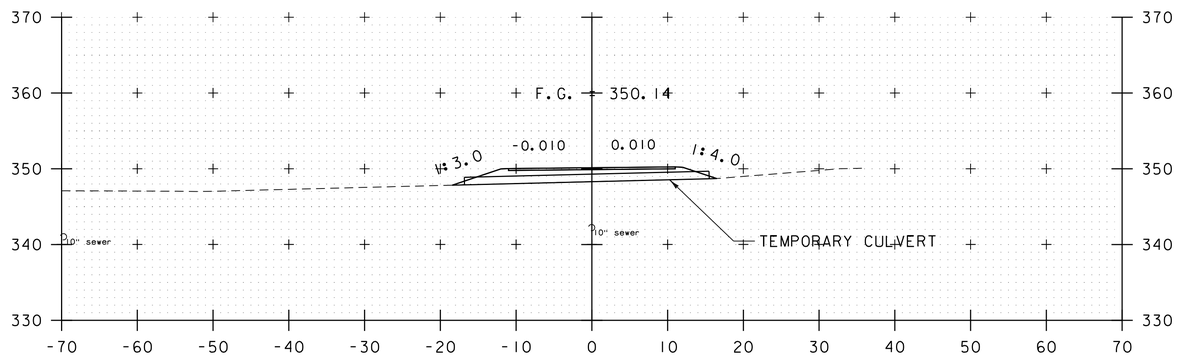
*SEE SECTION A-A FOR FOOTING REINFORCING

NOTE:

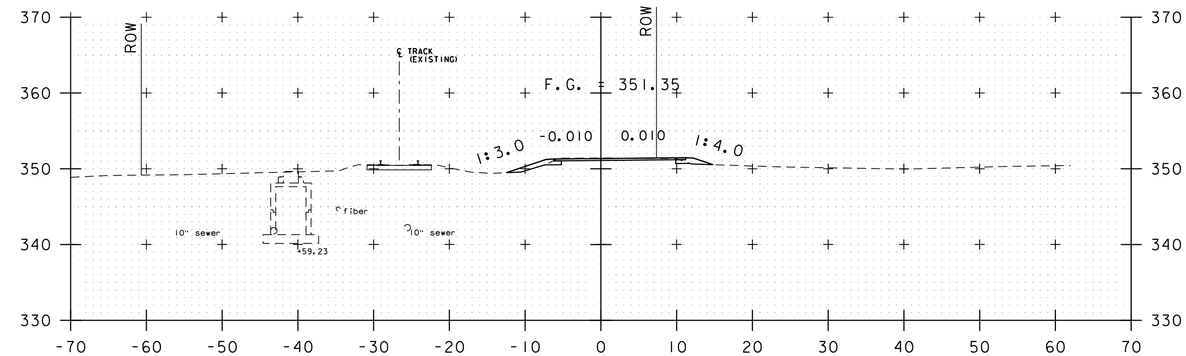
NF = NEAR FACE
FF = FAR FACE
EF = EACH FACE
▲ = CUT TO FIT IN FIELD
3" CLEAR, UNLESS OTHERWISE SPECIFIED ON THE PLANS.
2'-2" BAR LAP UNLESS OTHERWISE SPECIFIED ON THE PLANS.

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044headwall_details_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: K.D. WENTWORTH
DESIGNED BY: J.A. WHITMORE	CHECKED BY: G.S. GOODRICH
HEADWALL DETAILS	SHEET 74 OF 116

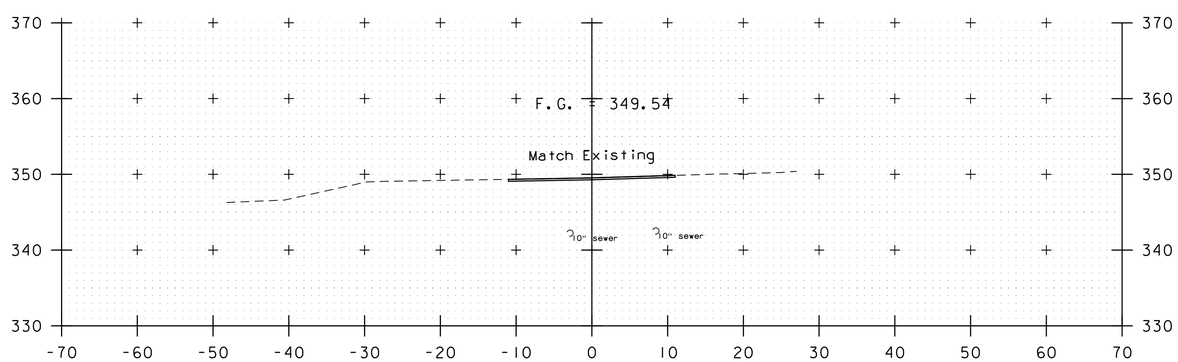
VHB 57603



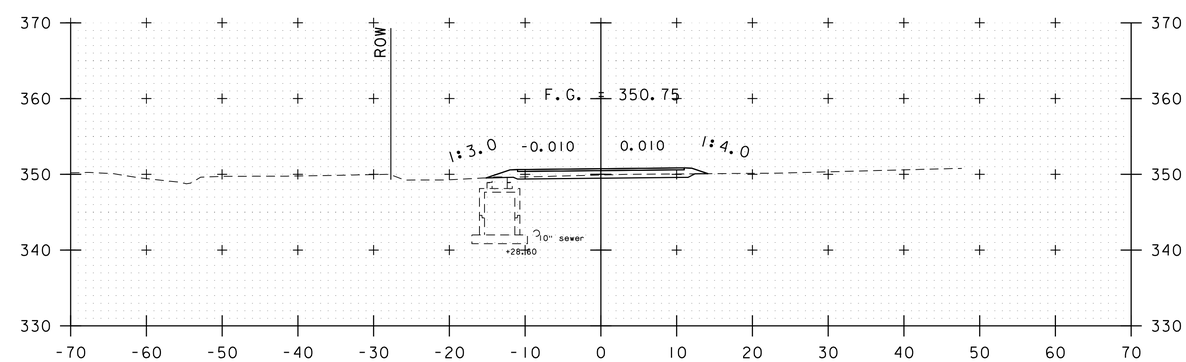
0+50



1+50



0+00
BEGIN TEMPORARY ACCESS ROAD
STA. 0+00.00



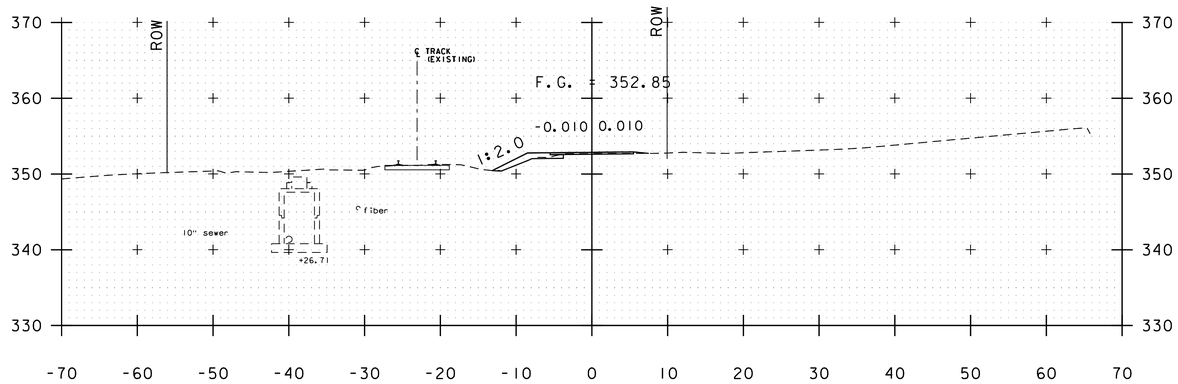
1+00

TEMPORARY ACCESS ROAD CROSS SECTIONS

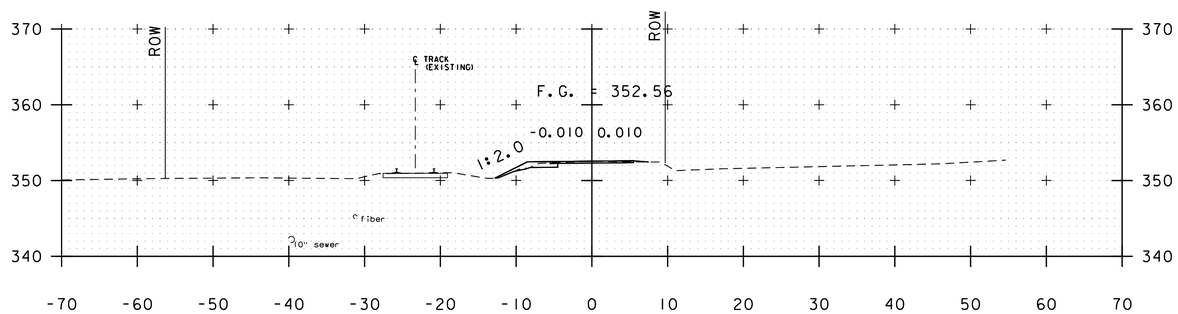
STA. 0+00 - 1+50
SCALE 1" = 10'-0"

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044xs_access_rd_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: K.D. WENTWORTH
DESIGNED BY: J.A. WHITMORE	CHECKED BY: D.M. PECK
ROADWAY CROSS SECTIONS (1 OF 6)	SHEET 75 OF 116

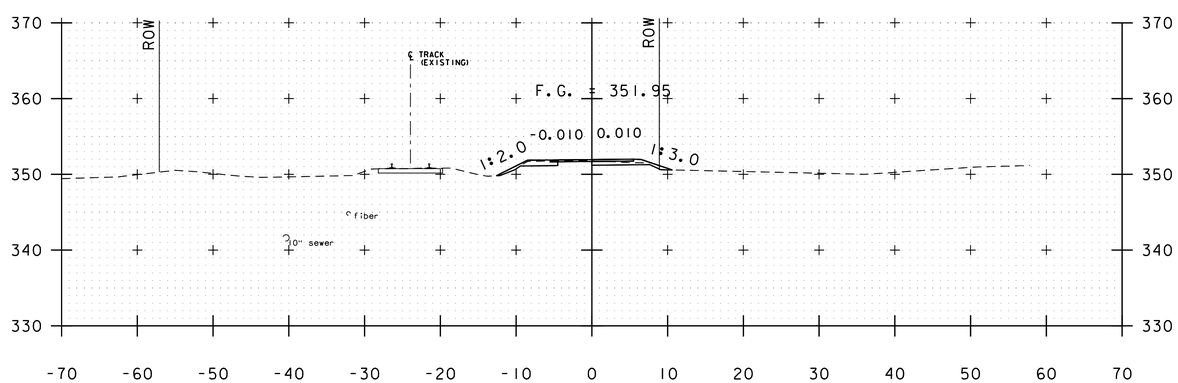
VHB 57603



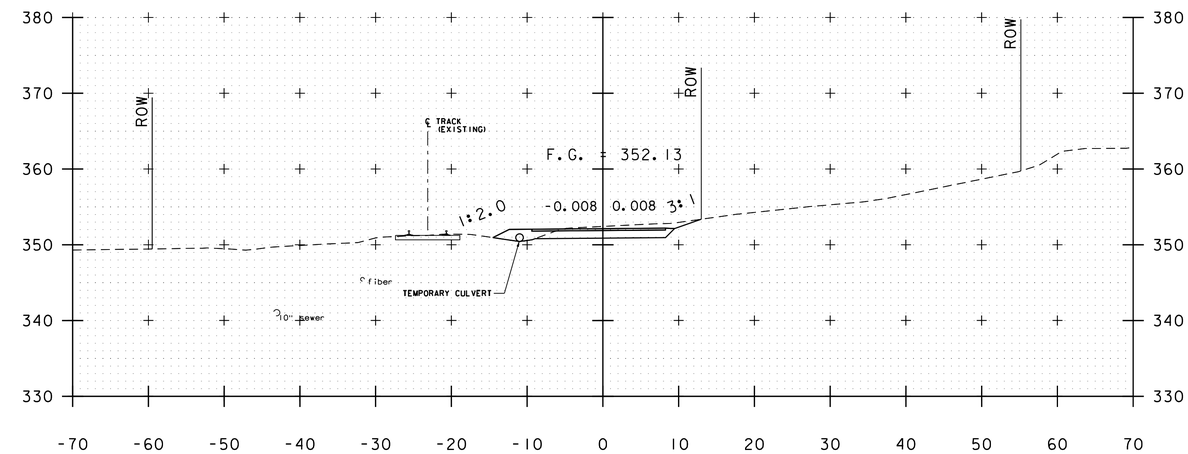
3+00



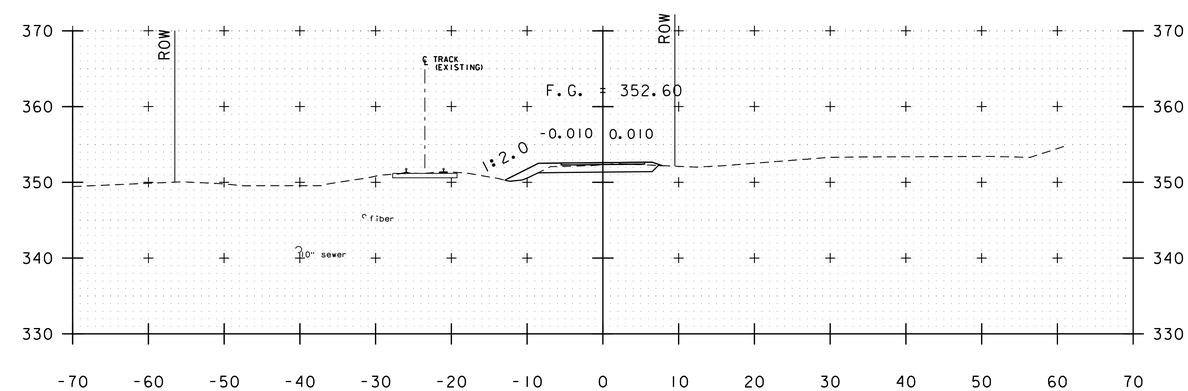
2+50



2+00



4+00



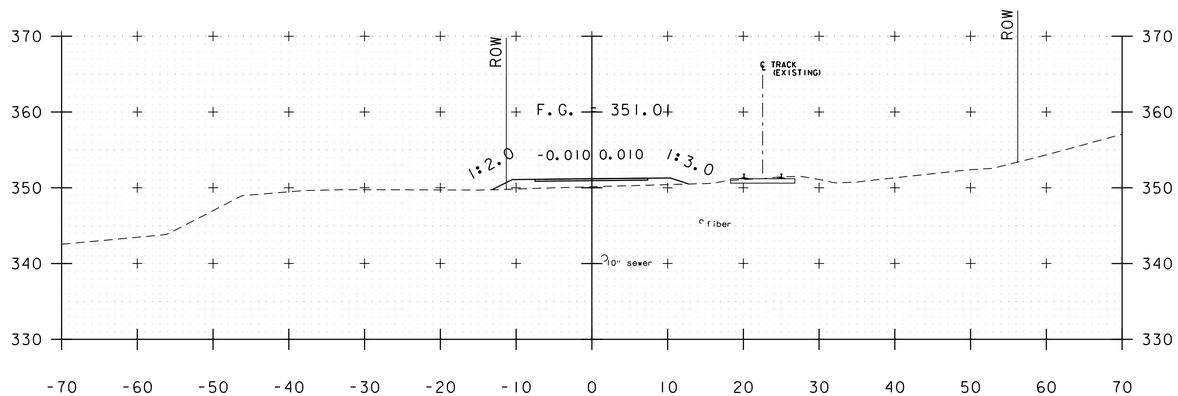
3+50

TEMPORARY ACCESS ROAD CROSS SECTIONS

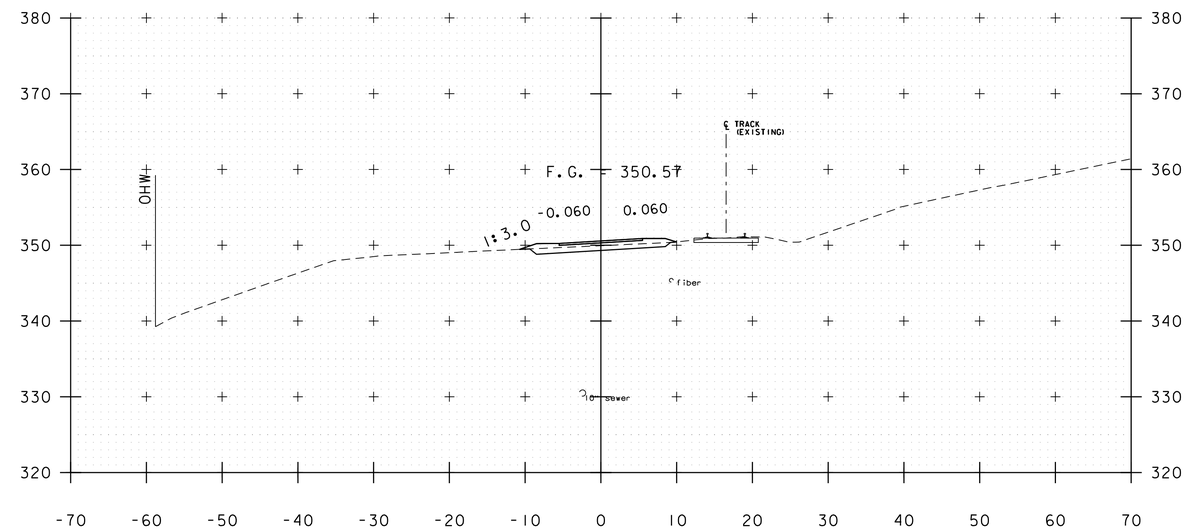
STA. 2+00 - 4+00
SCALE 1" = 10'-0"

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044xs_access_rd_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: K.D. WENTWORTH
DESIGNED BY: J.A. WHITMORE	CHECKED BY: D.M. PECK
ROADWAY CROSS SECTIONS (2 OF 6)	SHEET 76 OF 116

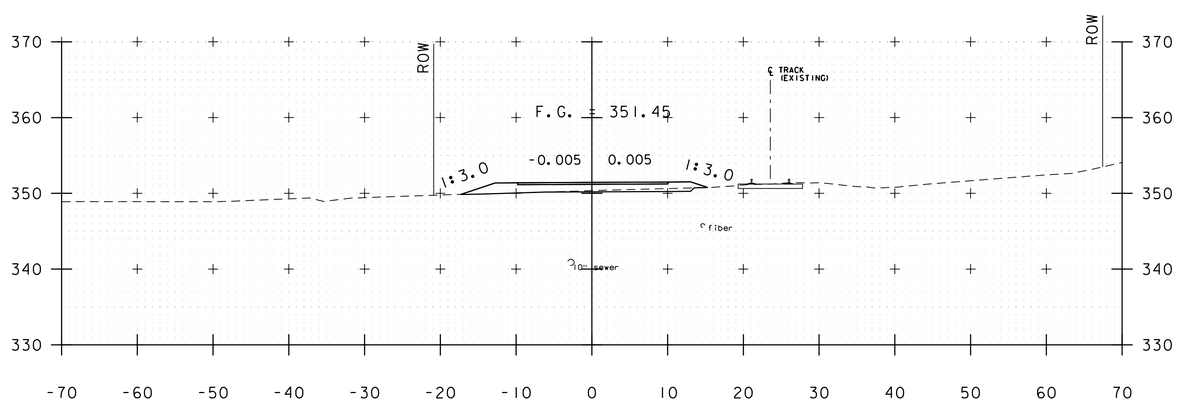
VHB 57603



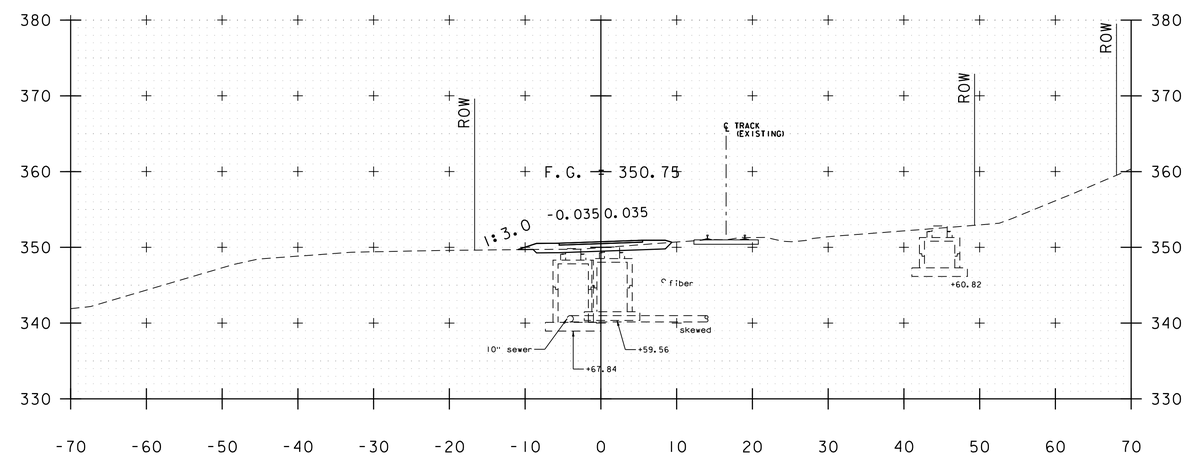
5+00



6+00



4+50



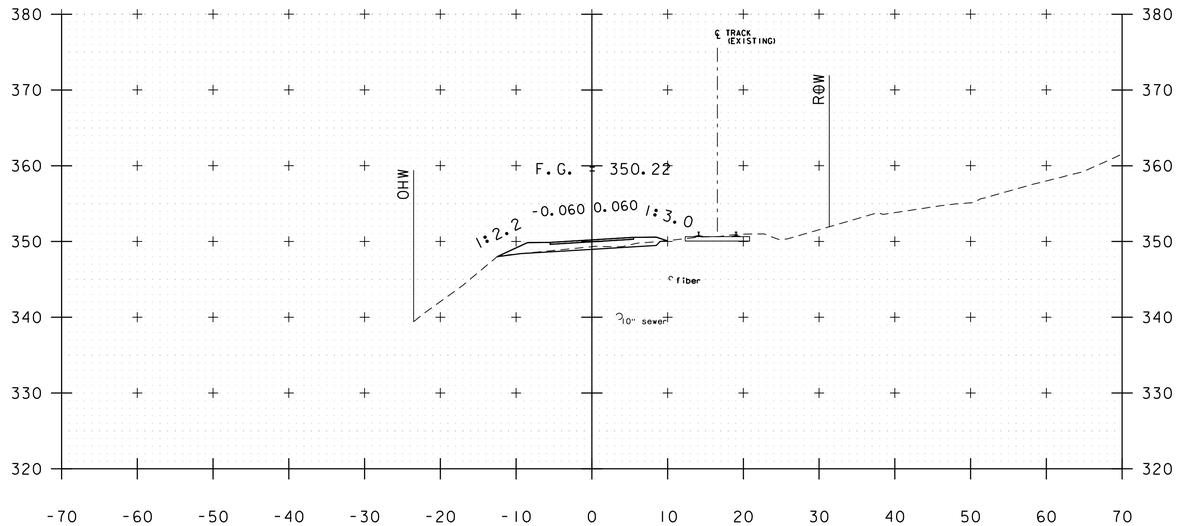
5+50

TEMPORARY ACCESS ROAD CROSS SECTIONS

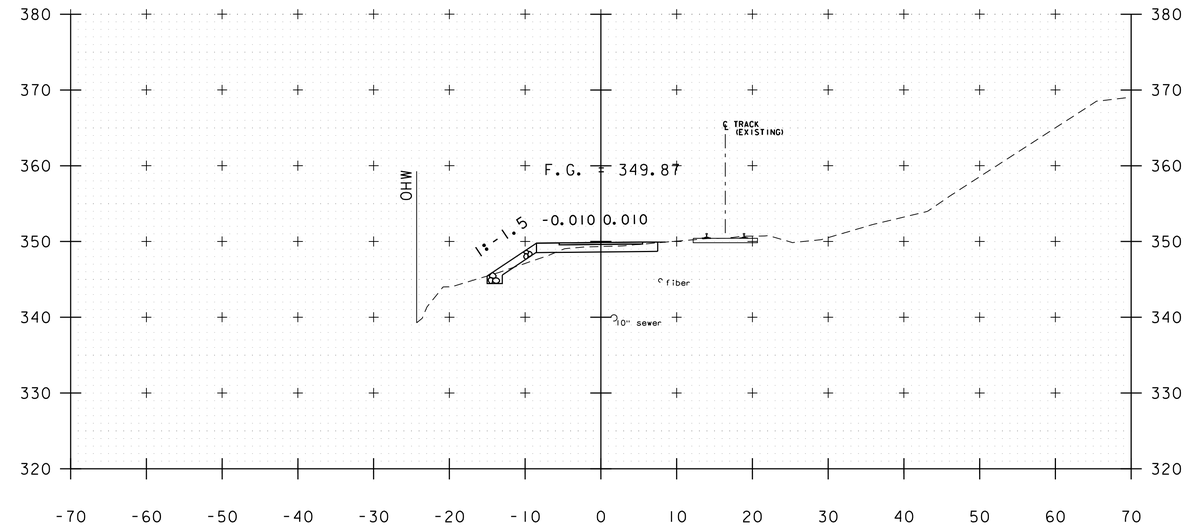
STA. 4+50 - 6+00
SCALE 1" = 10'-0"

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044xs_access_rd_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: K.D. WENTWORTH
DESIGNED BY: J.A. WHITMORE	CHECKED BY: D.M. PECK
ROADWAY CROSS SECTIONS (3 OF 6)	SHEET 77 OF 116

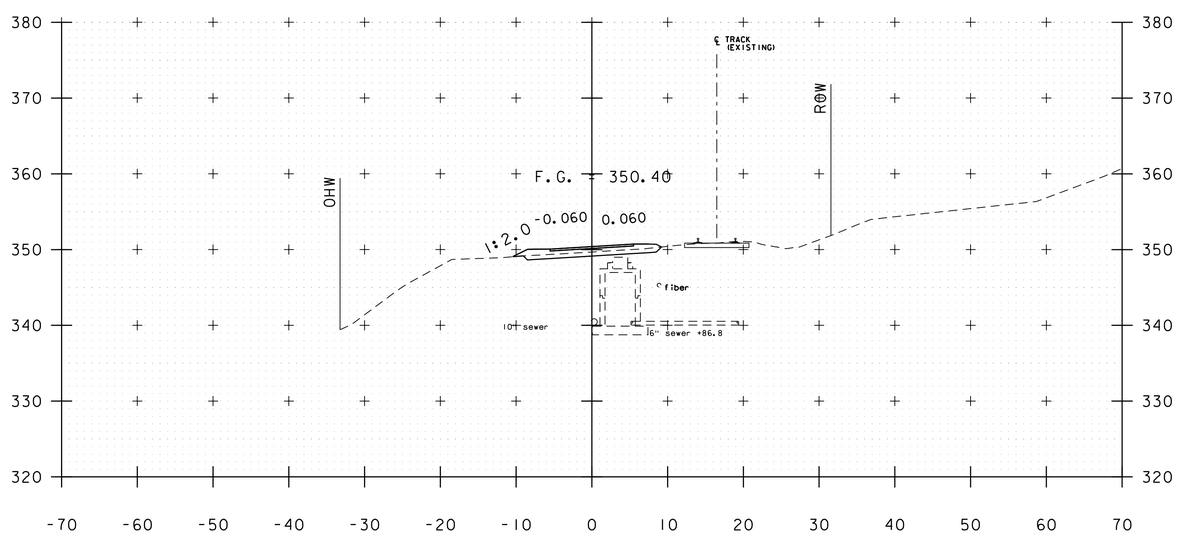
VHB 57603



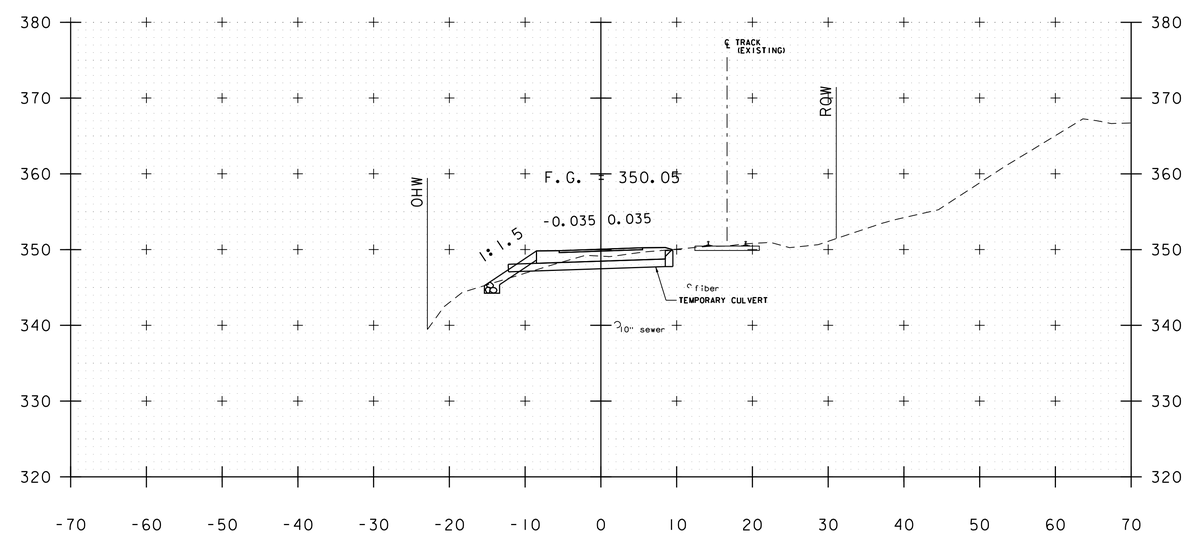
7+00



8+00



6+50



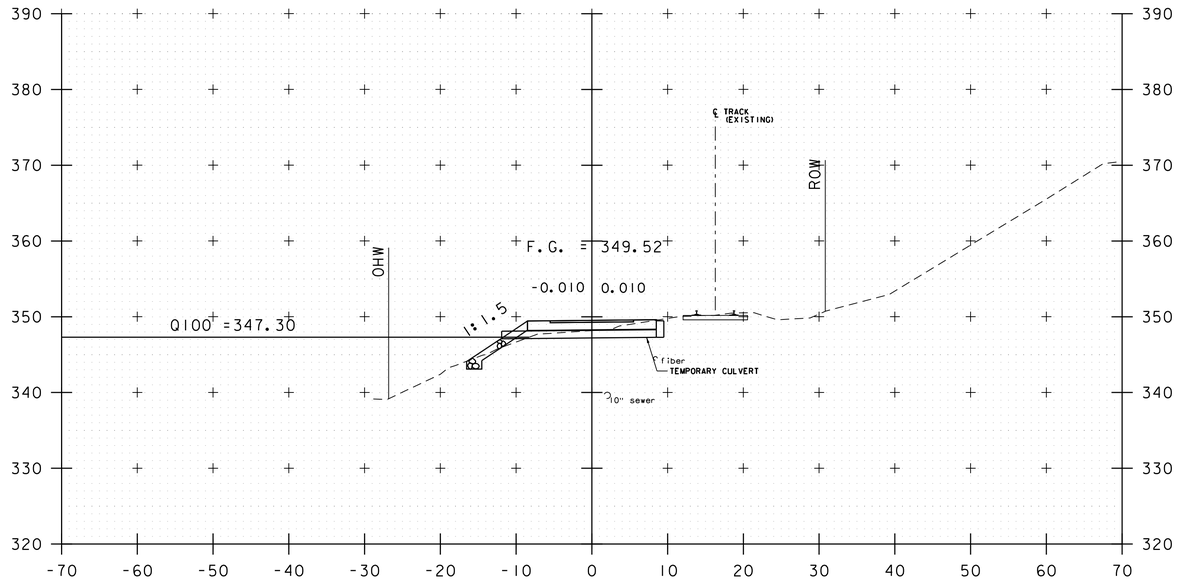
7+50

TEMPORARY ACCESS ROAD CROSS SECTIONS

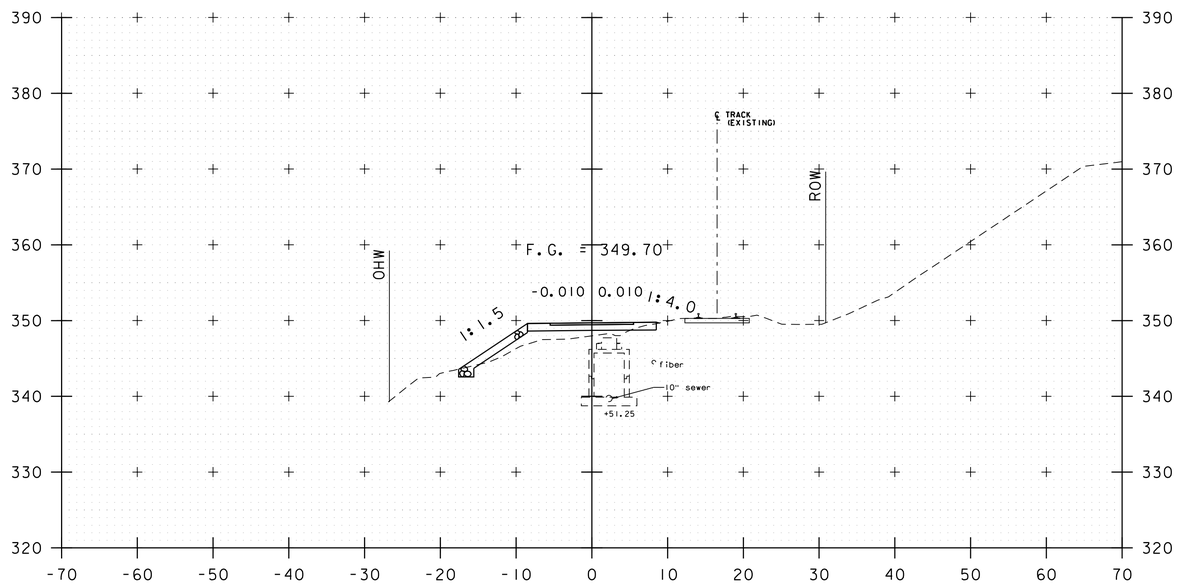
STA. 6+50 - 8+00
SCALE 1" = 10'-0"

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044xs_access_rd_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: K.D. WENTWORTH
DESIGNED BY: J.A. WHITMORE	CHECKED BY: D.M. PECK
ROADWAY CROSS SECTIONS (4 OF 6)	SHEET 78 OF 116

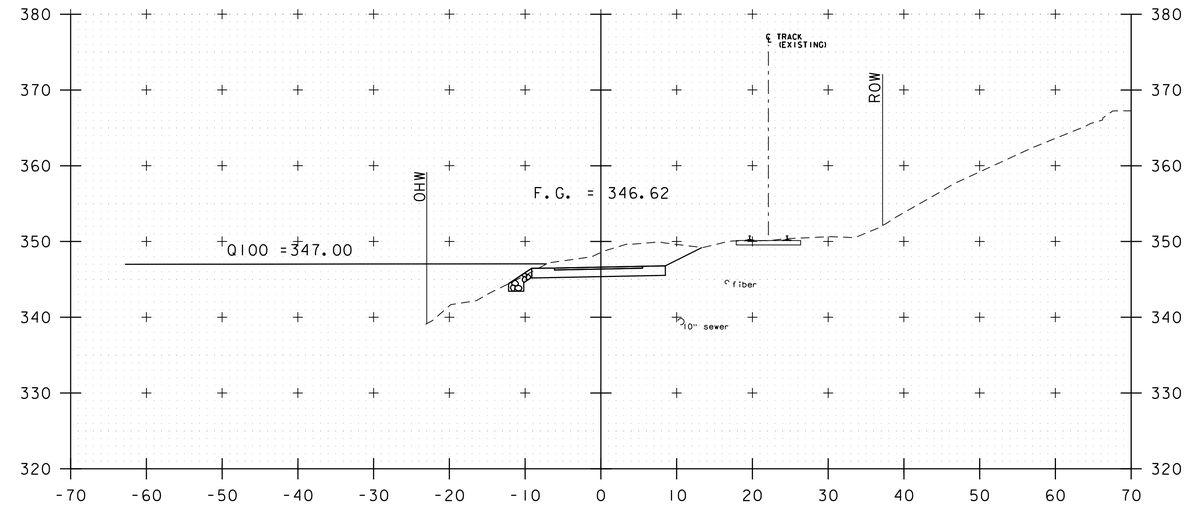
VHB 57603



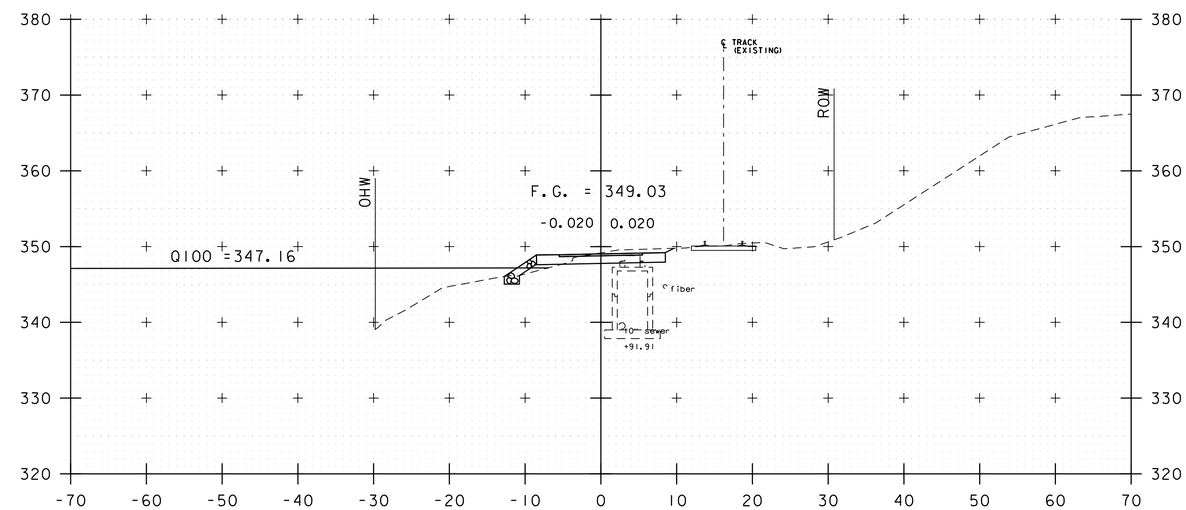
9+00



8+50



10+00



9+50

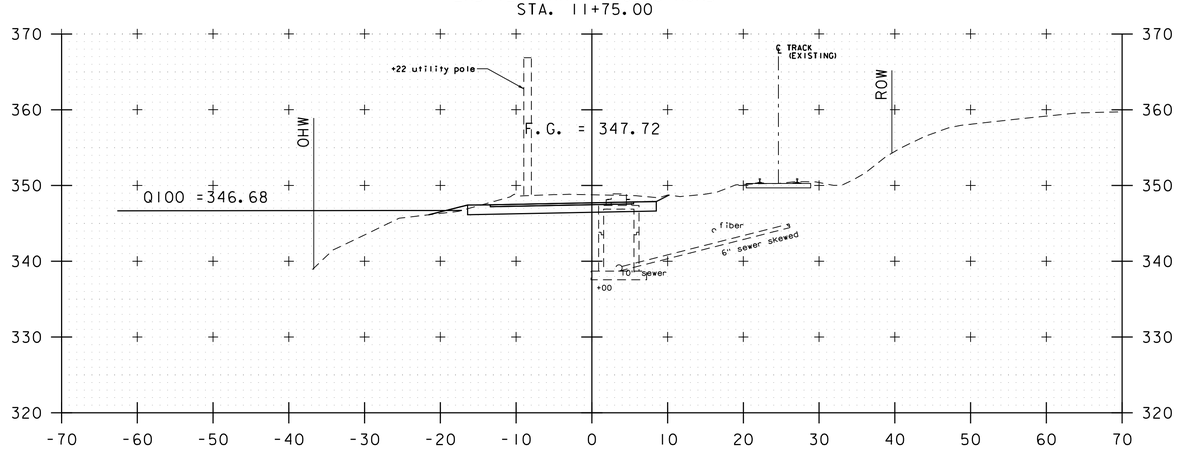
TEMPORARY ACCESS ROAD CROSS SECTIONS

STA. 8+50 - 10+00
SCALE 1" = 10'-0"

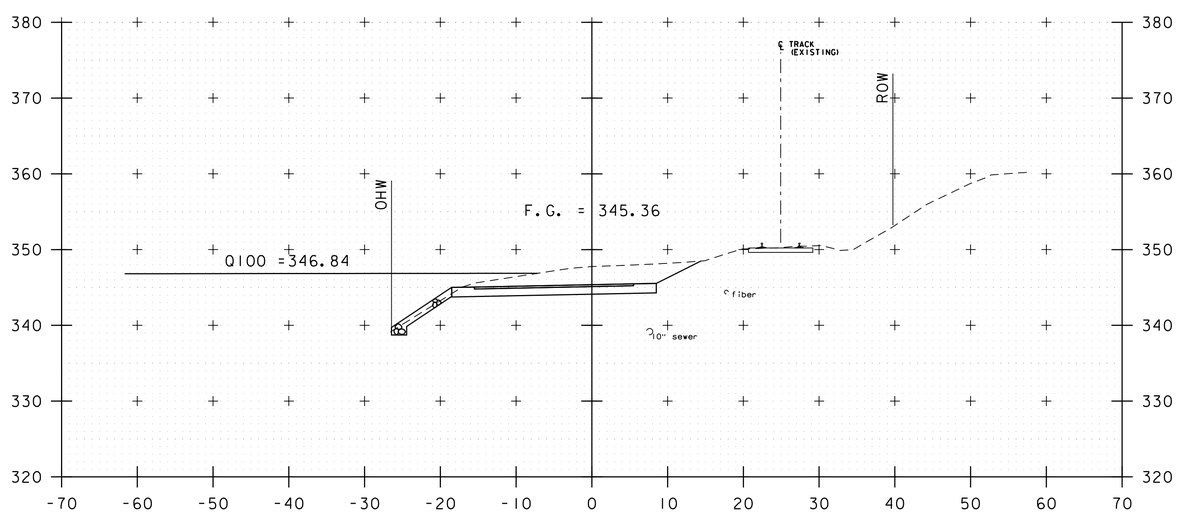
PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044xs_access_rd_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: K.D. WENTWORTH
DESIGNED BY: J.A. WHITMORE	CHECKED BY: D.M. PECK
ROADWAY CROSS SECTIONS (5 OF 6)	SHEET 79 OF 116

VHB 57603

END TEMPORARY ACCESS ROAD
STA. 11+75.00



11+00



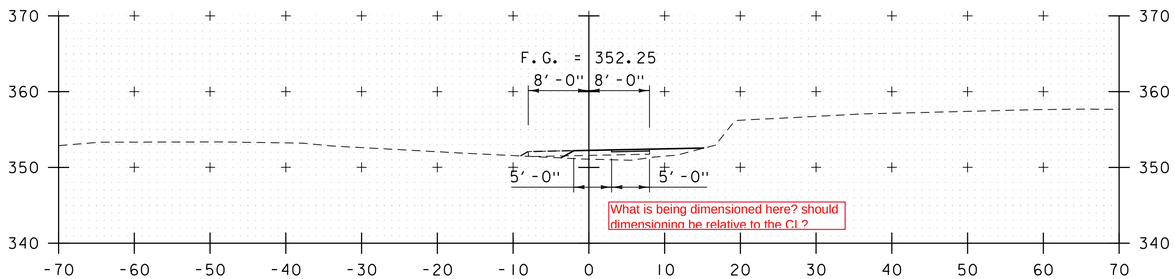
10+50

TEMPORARY ACCESS ROAD CROSS SECTIONS

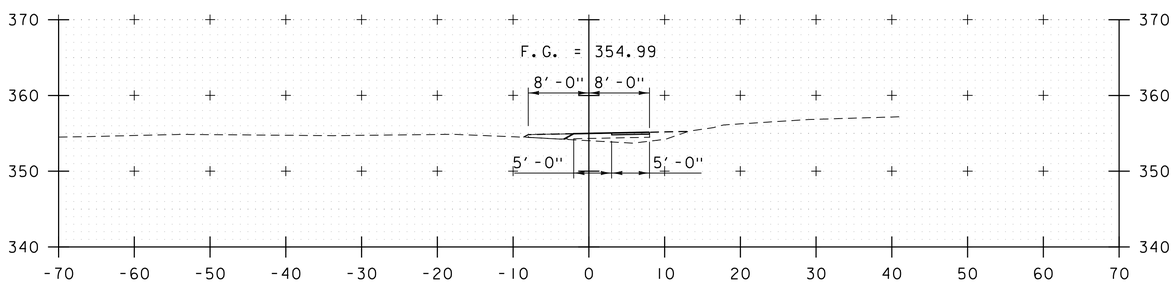
STA. 10+50 - 12+00
SCALE 1" = 10'-0"

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044xs_access_rd_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: K.D. WENTWORTH
DESIGNED BY: J.A. WHITMORE	CHECKED BY: D.M. PECK
ROADWAY CROSS SECTIONS (6 OF 6)	SHEET 80 OF 116

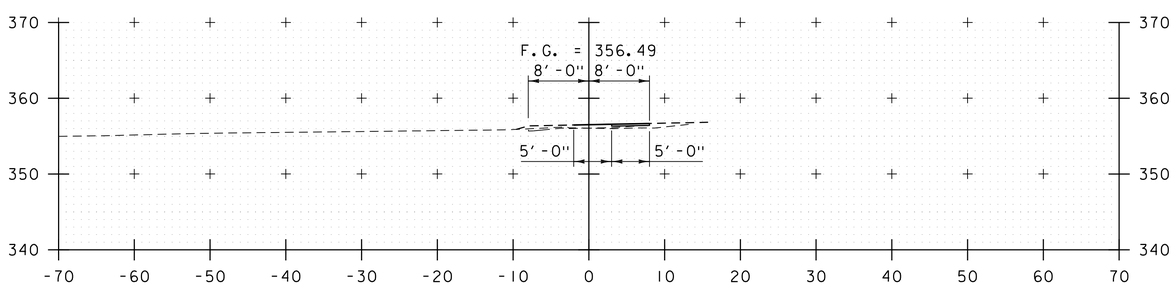
VHB 57603



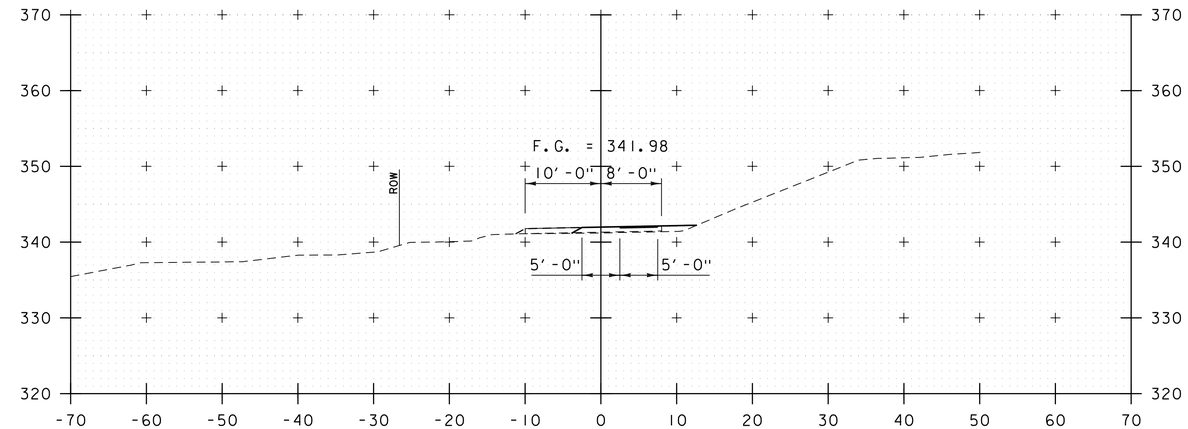
100+50



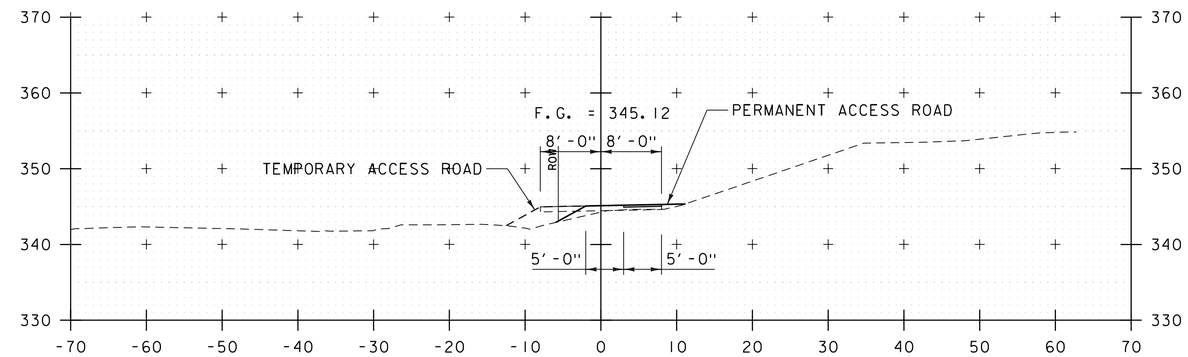
100+25



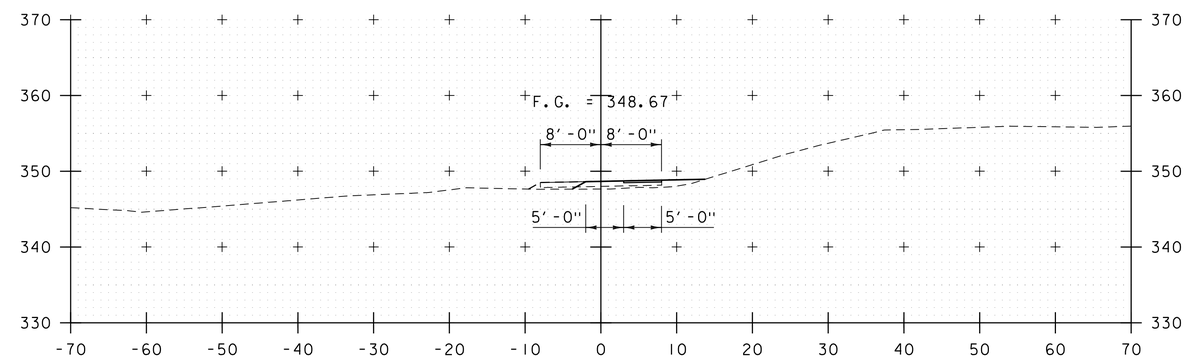
100+00



101+25



101+00



100+75

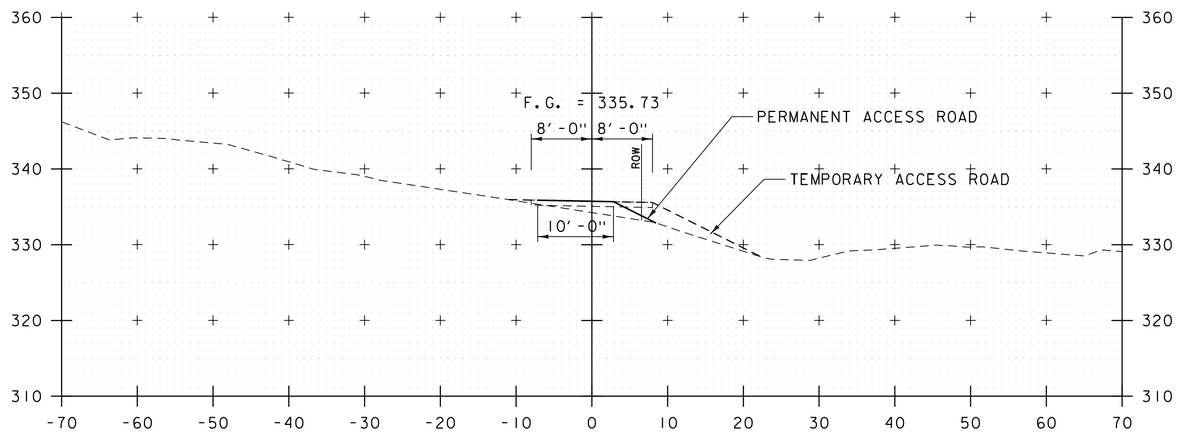
OUTFALL MAINTENANCE ROAD CROSS SECTIONS

STA. 100+00 - 101+25
SCALE 1" = 10'-0"

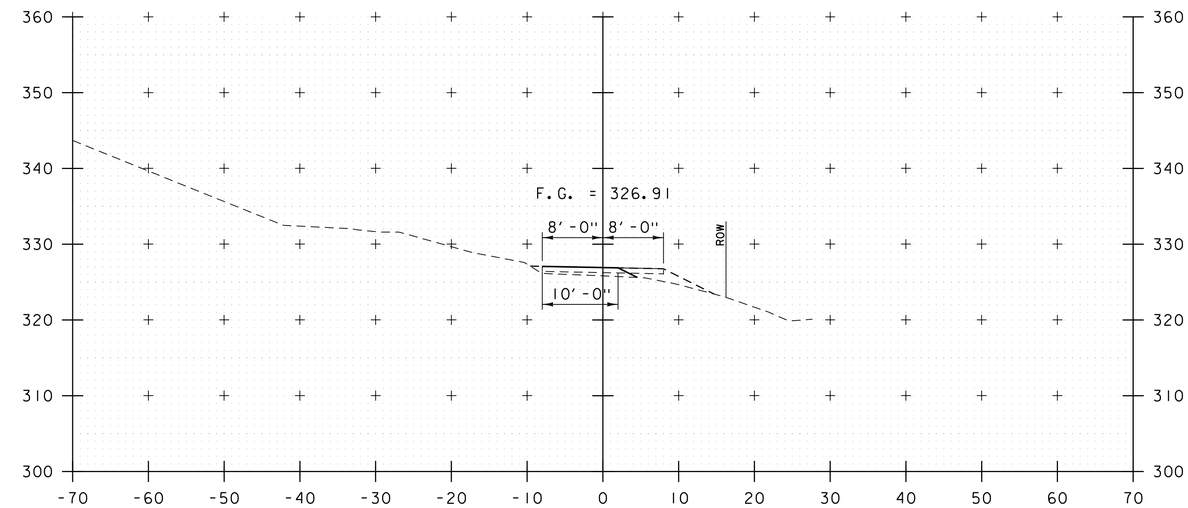
STA. 100+00 TO STA. 101+25

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044xs_outfall_rd_Pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: K.C. BARRY
DESIGNED BY: D.M. PECK	CHECKED BY: ---
OUTFALL MAINTENANCE ROAD XS (1 OF 5)	SHEET 81 OF 116

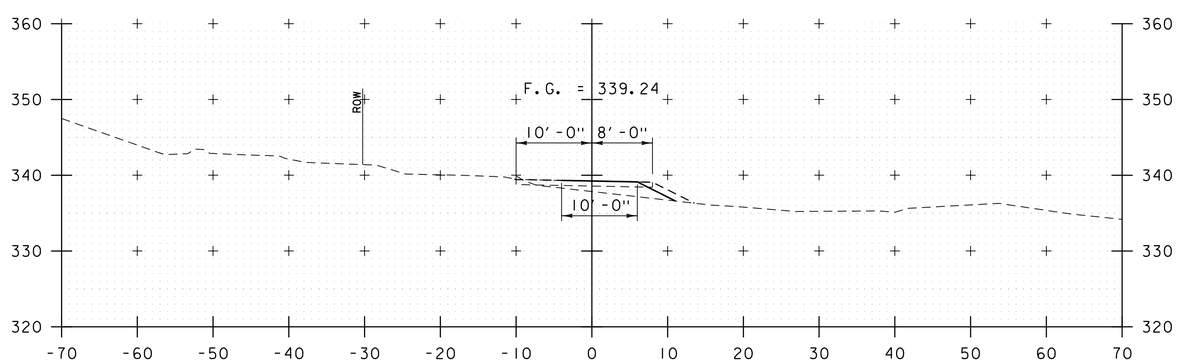
VHB 57603.00



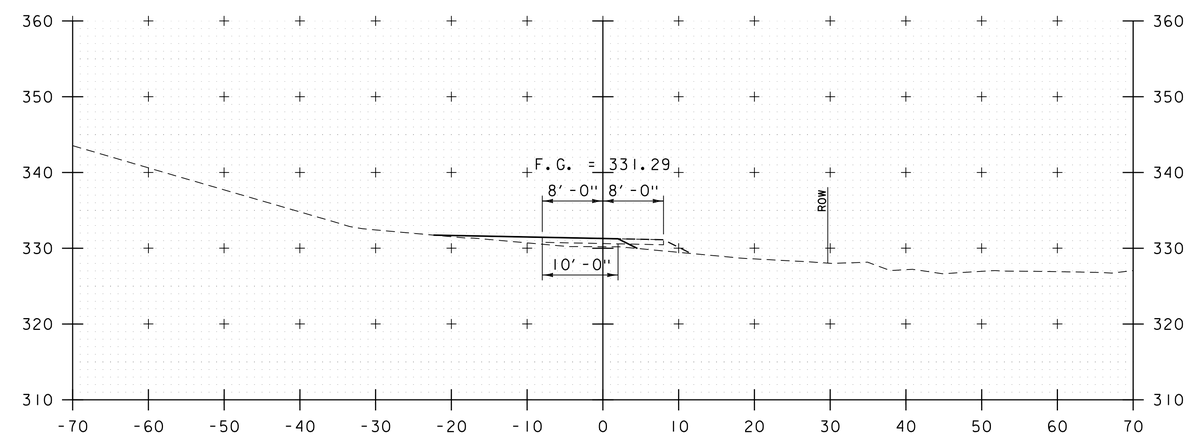
101+75



102+25



101+50



102+00

OUTFALL MAINTENANCE ROAD CROSS SECTIONS

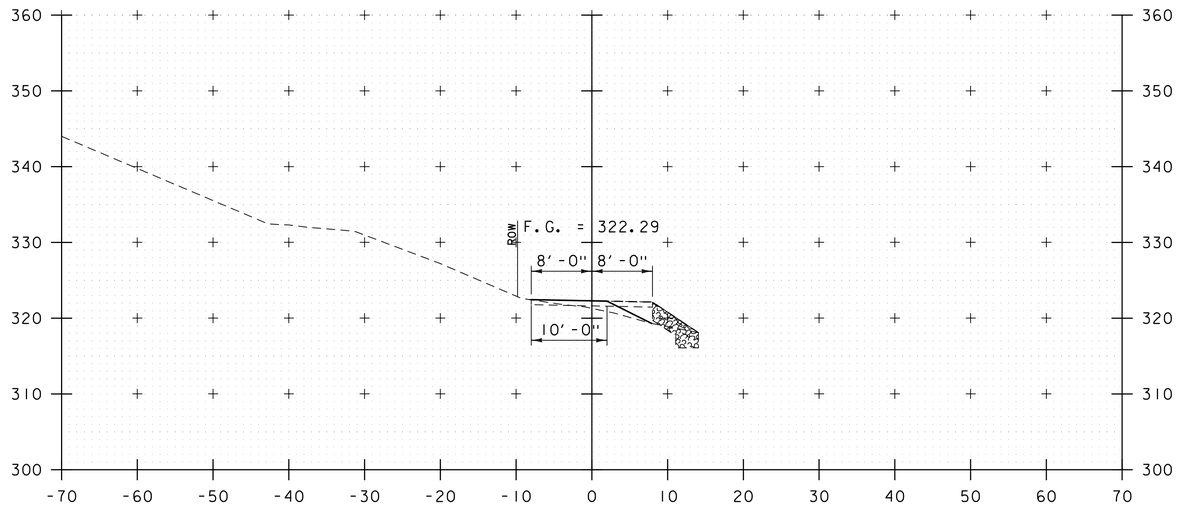
STA. 101+50 - 102+25
SCALE 1" = 10'-0"

Remove these on all sheets.

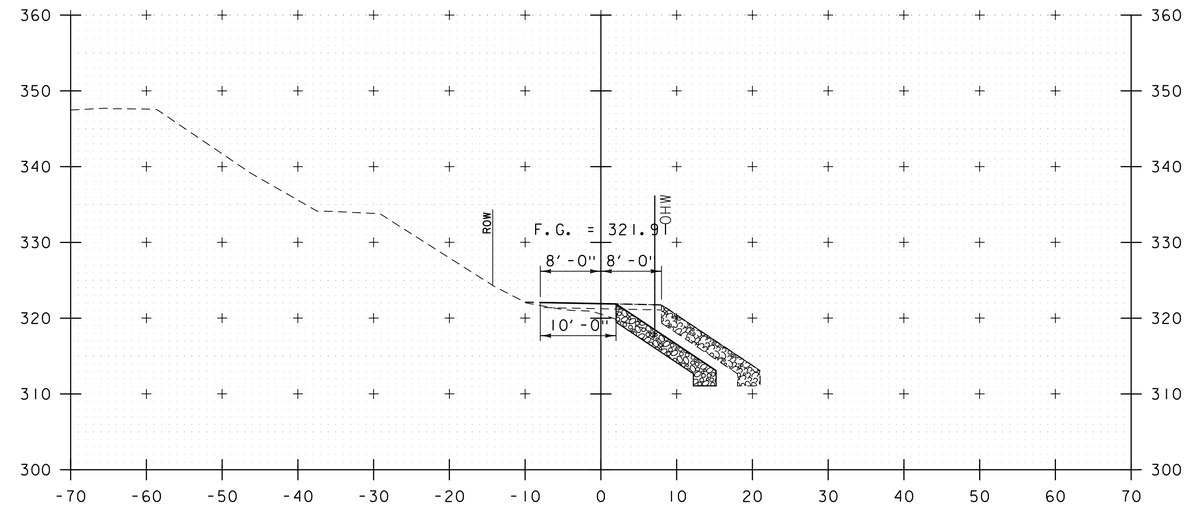
STA. 101+50 TO STA. 102+25

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044xs_outfall_rd_Pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: K.C. BARRY
DESIGNED BY: D.M. PECK	CHECKED BY: ---
OUTFALL MAINTENANCE ROAD XS (2 OF 5)	SHEET 82 OF 116

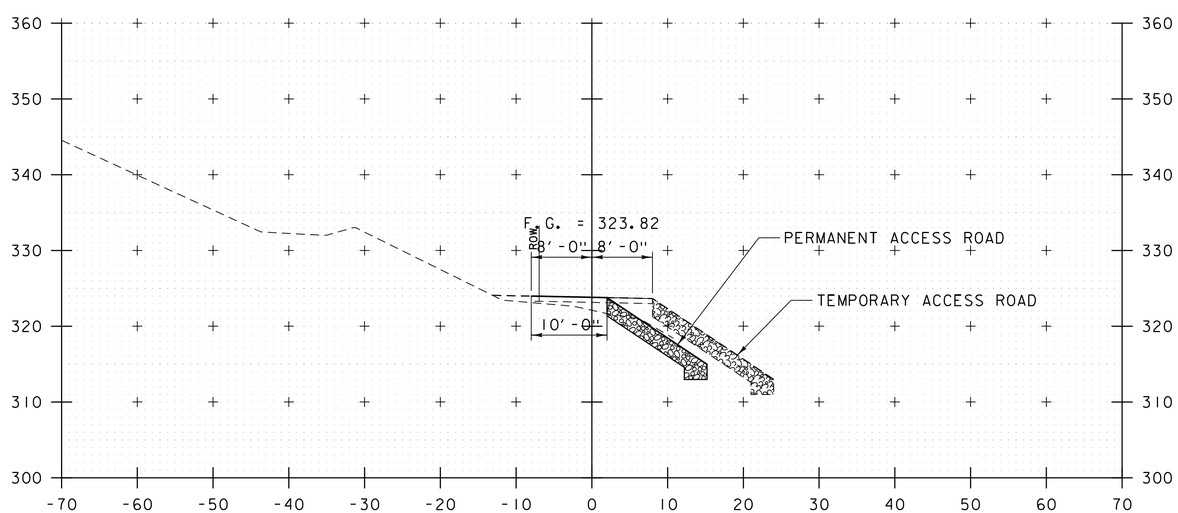
VHB 57603.00



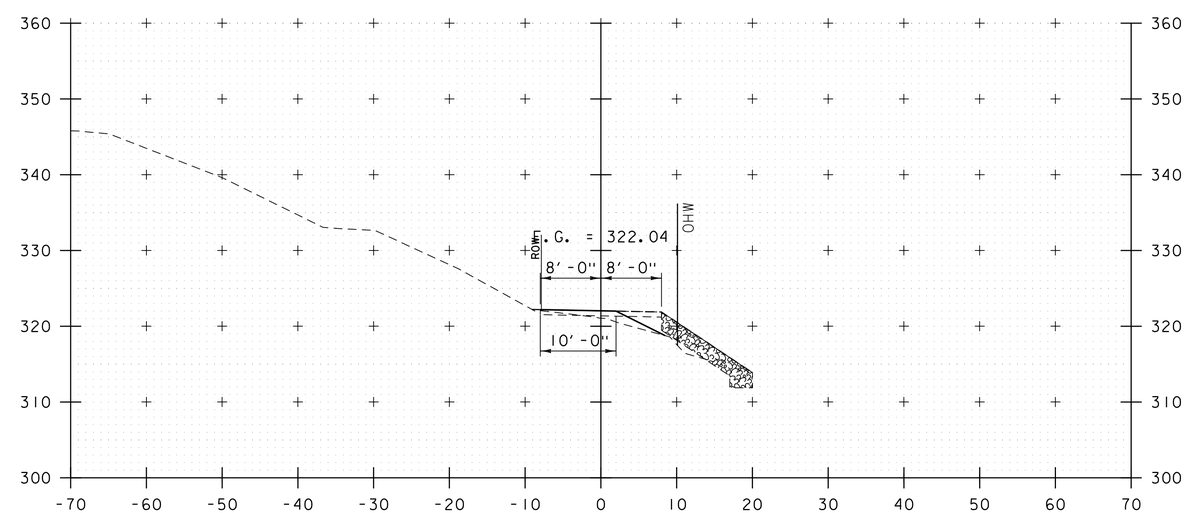
102+75



103+25



102+50



103+00

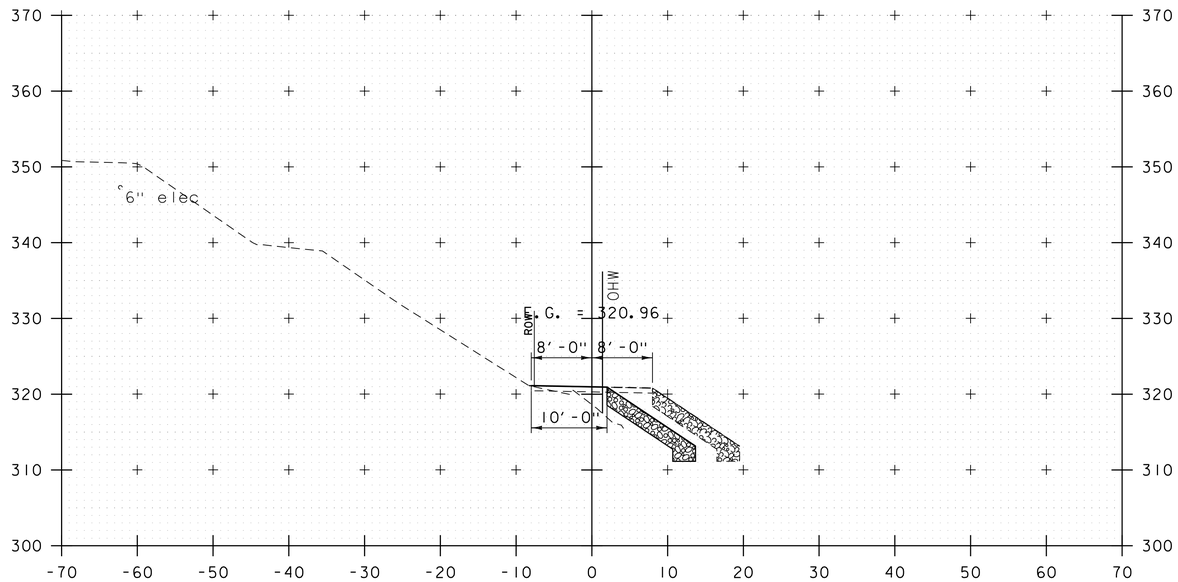
OUTFALL MAINTENANCE ROAD CROSS SECTIONS

STA. 1012+50 - 103+25
SCALE 1" = 10'-0"

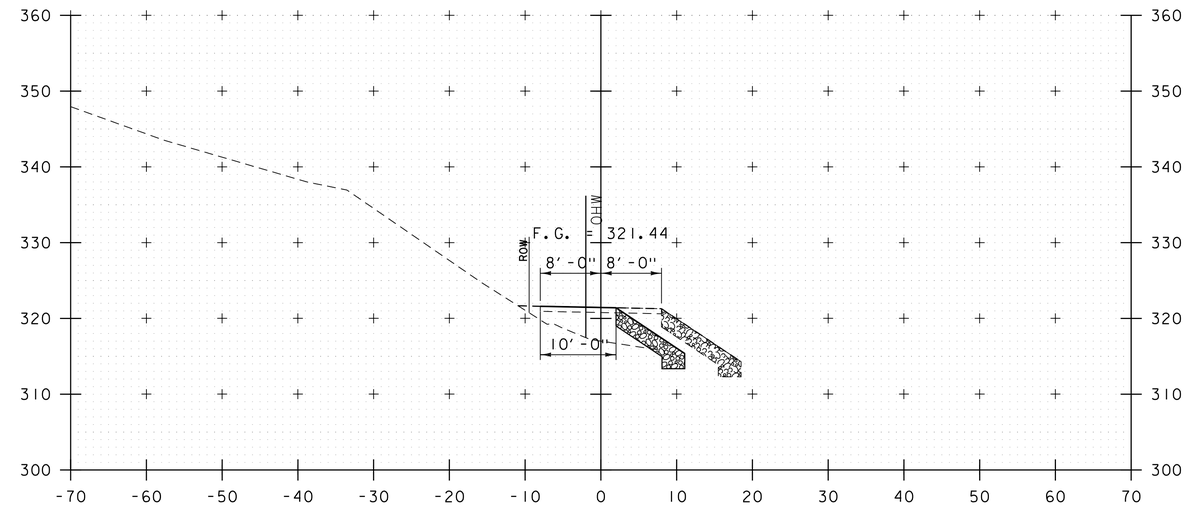
STA. 102+50 TO STA. 103+25

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044xs_outfall_rd_Pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: K.C. BARRY
DESIGNED BY: D.M. PECK	CHECKED BY: ---
OUTFALL MAINTENANCE ROAD XS (3 OF 5)	SHEET 83 OF 116

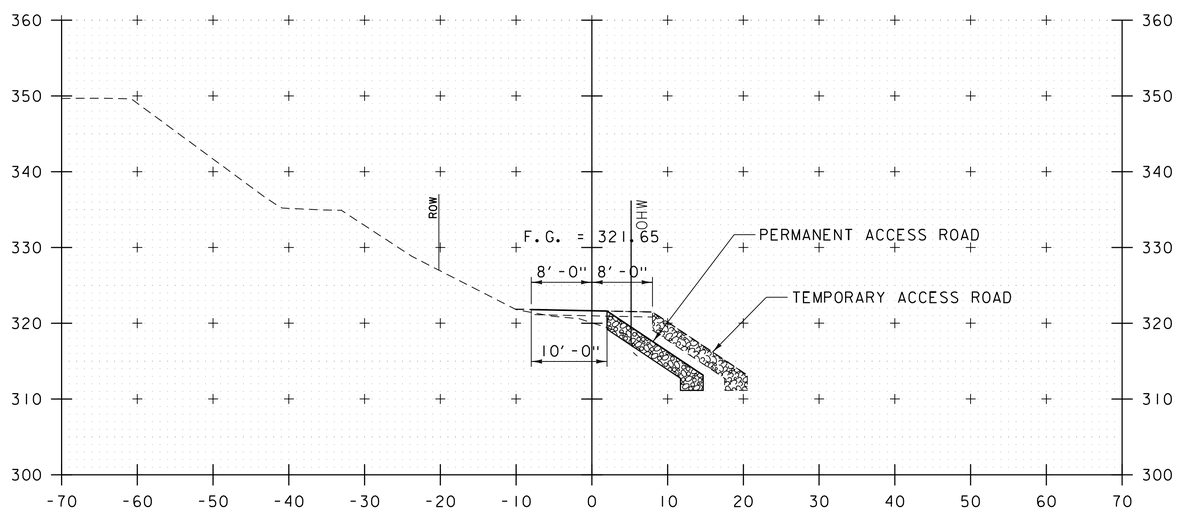
VHB 57603.00



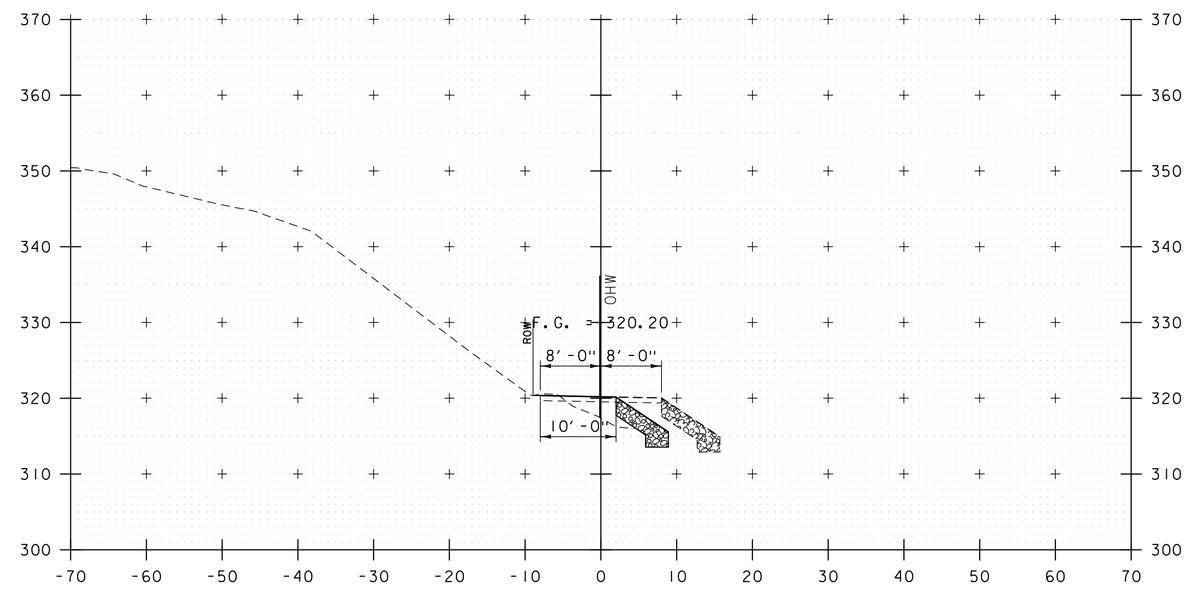
103+75



104+25



103+50



104+00

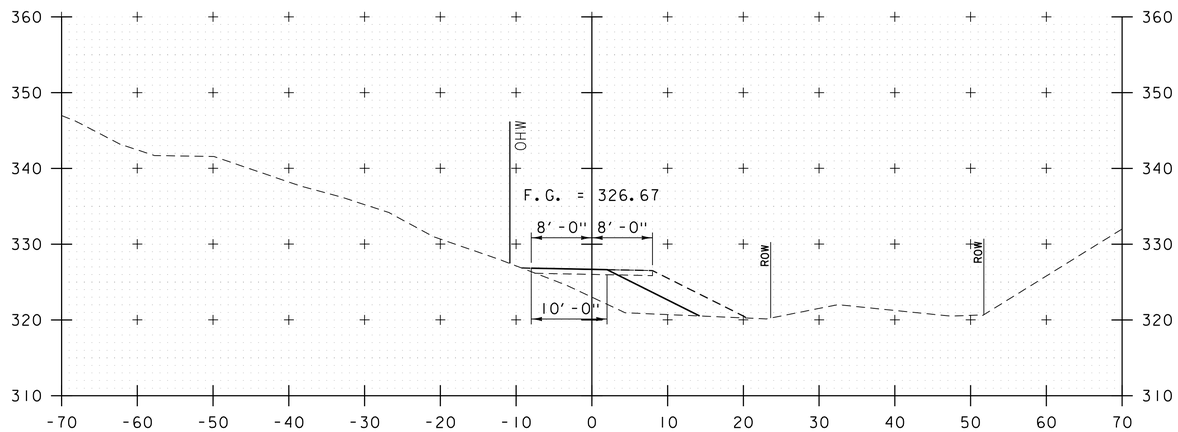
OUTFALL MAINTENANCE ROAD CROSS SECTIONS

STA. 103+50 - 104+25
SCALE 1" = 10'-0"

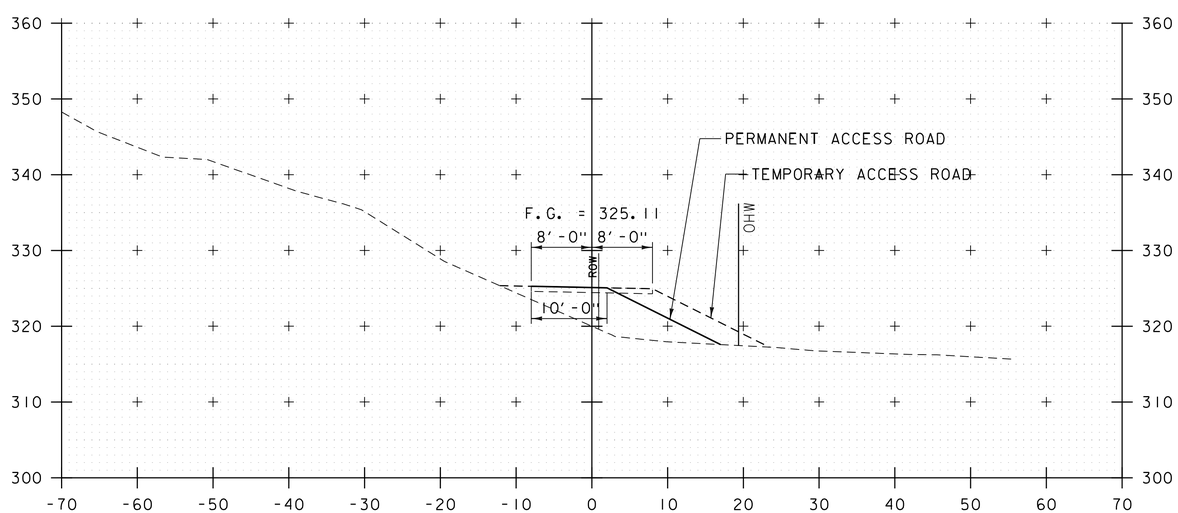
STA. 103+50 TO STA. 104+25

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044xs_outfall_rd_Pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: K.C. BARRY
DESIGNED BY: D.M. PECK	CHECKED BY: ---
OUTFALL MAINTENANCE ROAD XS (4 OF 5)	SHEET 84 OF 116

VHB 57603.00



104+60



104+50

OUTFALL MAINTENANCE ROAD CROSS SECTIONS

STA. 104+50 - 104+60
SCALE 1" = 10'-0"

STA. 104+50 TO STA. 104+60

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044xs_outfall_rd_Pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: K.C. BARRY
DESIGNED BY: D.M. PECK	CHECKED BY: ---
OUTFALL MAINTENANCE ROAD XS (5 OF 5)	SHEET 85 OF 116

VHB 57603.00

EPSC PLAN NARRATIVE

1.1 PROJECT DESCRIPTION

PROJECT MIDDLEBURY WCRS (23) IS LOCATED IN MIDDLEBURY ALONG VERMONT RAILROAD (VTR) IN THE VICINITY OF MAIN STREET AND MERCHANTS ROW IN DOWNTOWN MIDDLEBURY. THE PROJECT WILL BE COMPLETED IN TWO CONTRACTS. THIS NARRATIVE WILL FOCUS ON CONTRACT 1. CONTRACT 1 WILL INCLUDE MICROTUNNELING ADJACENT TO THE RAIL AND OUT TO THE OTTER CREEK FOR DRAINAGE IMPROVEMENTS AND CONSTRUCTING A TEMPORARY ACCESS ROAD ADJACENT TO THE EXISTING RAILROAD FROM WATER STREET TO THE BATTEL BLOCK.

DURING CONSTRUCTION, THERE IS NO ANTICIPATED DELAY TO TRAFFIC. IF THERE IS A DELAY, TRAFFIC WILL BE MAINTAINED WITH FLAGGERS.

FOR CONTRACT 1, THE TOTAL AMOUNT OF PROJECT DISTURBANCE IS 1.10 ACRES. THE TOTAL AMOUNT OF PROJECT DISTURBANCE FOR BOTH CONTRACTS 1 AND 2 IS 8.6 ACRES, WHICH INCLUDES AN ADDITIONAL 3.0 ACRES FOR STAGING AND BORROW AREAS.

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.

IT IS ANTICIPATED THAT CONTRACT 1 WILL LAST ONE CONSTRUCTION SEASON.

1.2 SITE INVENTORY

1.2.1 TOPOGRAPHY
THE TOPOGRAPHY OF THE AREA IS ROLLING HILLS IN A DOWNTOWN VILLAGE SETTING WITH HISTORIC 3-4 STORY BRICK BUILDINGS ON BOTH SIDES OF THE ROAD. MAIN STREET (VT ROUTE 30), MERCHANTS ROW, PAVED DRIVES, AND THE RAILROAD (VTR) ARE LOCATED WITHIN THE PROJECT SITE. THERE ARE SEVERAL BUSINESSES LOCATED ALONG MAIN ST AND MERCHANTS ROW WITH A PARK LOCATED AT THE INTERSECTION OF THE TWO STREETS.

1.2.2 DRAINAGE, WATERWAYS, BODIES OF WATER, AND PROXIMITY TO NATURAL OR MAN-MADE WATER FEATURES
THE ONLY STATE OR FEDERALLY REGULATED SURFACE WATER IN THE VICINITY OF THE PROJECT IS OTTER CREEK, LOCATED IMMEDIATELY WEST OF THE RAIL CORRIDOR AND FLOWING FROM SOUTH TO NORTH. THE DRAINAGE AREA FOR OTTER CREEK AT THIS LOCATION IS APPROXIMATELY 746 SQUARE MILES. IT IS A LOW-GRADIENT C-TYPE STREAM. THE STREAMBED CONSISTS OF CLAYEY, SILTY, AND POORLY DRAINED SOILS (MOST SOILS WITHIN THE LOWER OTTER CREEK WATERSHED AREA HYDROLOGIC GROUP "D"). THERE ARE A NUMBER OF ON-SITE DROP INLETS DRAINING FROM THE ROADWAY TO THE CREEK. ONE JURISDICTIONAL WETLAND (PRESUMED CLASS II) HAS BEEN DELINEATED BETWEEN THE OTTER CREEK AND THE RAILROAD TRACKS; NORTH OF THE TRUSS BRIDGE AND SOUTH OF CROSS STREET BRIDGE; AND IS LOCATED WITHIN 90 FEET OF THE EXISTING RAILROAD TRACKS.

1.2.3 VEGETATION
THE VEGETATION IN THE PROJECT AREA IS INTERMITTENT AND RESTRICTED TO THE FLANKS OF THE RAIL CORRIDOR. CANOPY TREES ARE PRESENT ALONG THE BANK OF OTTER CREEK AS WELL AS TO THE EAST OF THE TRACK SOUTH OF MERCHANTS ROW. A THIN SWATH OF HARDWOOD SHRUBS AND TREES ARE PRESENT BETWEEN THE MAIN STREET AND MERCHANTS ROW BRIDGES. NORTH OF MAIN STREET, A PATCH OF CANOPY TREES SEPARATES THE POST OFFICE FROM THE RAIL CORRIDOR ON THE EAST SIDE. A THIN STRIP OF TREES IS PRESENT ALONG THE WEST SIDE. CONTINUING TO THE NORTH, VEGETATION BECOMES SPARSE.

THE PROJECT WILL RESULT IN SOME VEGETATION REMOVAL WITHIN THE LIMITS OF CONSTRUCTION, INCLUDING ALONG OTTER CREEK. A GRASSED PARK WILL BE CREATED IN PLACE OF THE RAILROAD GULLY BETWEEN MERCHANTS ROW AND MAIN STREET. ADDITIONAL CLEARING MAY BE REQUIRED FOR UTILITY INSTALLATION AND WILL BE MINIMIZED TO THE EXTENT FEASIBLE. UPON PROJECT COMPLETION, DISTURBED VEGETATION WILL BE REESTABLISHED WITH STANDARD SEED AND MULCH PRACTICES. GRASS-LINED CHANNELS WILL BE SEEDED AND MULCHED.

1.2.4 SOILS
ALL SOIL DATA CAME FROM THE U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE FOR THE COUNTY OF WINDSOR, VERMONT. SOILS ON THE PROJECT SITE ARE VERGENNES CLAY, 2% TO 6% SLOPES, "K FACTOR" = 0.49. THE SOIL IS CONSIDERED HIGHLY ERODIBLE.

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

HISTORIC RESOURCES: YES, THE PROJECT LIES WITHIN THE MIDDLEBURY VILLAGE HISTORIC DISTRICT AND WITHIN THE NATIONAL REGISTER-ELIGIBLE RUTLAND RAILROAD HISTORIC DISTRICT. THE EXISTING MAIN STREET AND MERCHANTS ROW BRIDGES AS WELL AS THE RAILROAD CORRIDOR RETAINING WALLS ARE CONSIDERED CONTRIBUTING RESOURCES TO BOTH DISTRICTS. IMPACTS TO THESE FEATURES AND STIPULATIONS REGARDING THESE RESOURCES HAVE BEEN DOCUMENTED IN THE PROJECT'S SECTION 106 DETERMINATION OF EFFECT, PROGRAMMATIC SECTION 4(F) EVALUATION (BRIDGE USE), AND DE MINIMIS SECTION 4(F) EVALUATION.

ARCHEOLOGICAL RESOURCES: YES, LIMITED PRE-CONTACT RESOURCES ARE ANTICIPATED WITHIN THE PROJECT AREA DUE TO PRIOR DISTURBANCES FOR RAILROAD CONSTRUCTION AND PRIOR DEVELOPMENT. HISTORIC PERIOD ARCHAEOLOGICAL RESOURCES MAY BE PRESENT AT DEPTH AND BEHIND BRIDGE ABUTMENTS. POTENTIAL IMPACTS TO ARCHEOLOGICAL RESOURCES HAVE BEEN DOCUMENTED IN THE PROJECT'S SECTION 106 DETERMINATION OF EFFECT, PROGRAMMATIC SECTION 4(F) EVALUATION (BRIDGE USE), AND DE MINIMIS SECTION 4(F) EVALUATION.

Do these documents contain any stipulations that need to be addressed as part of construction? If yes, but will be included elsewhere in the contract documents, it is helpful to have that stated here. If no, stating that there is also helpful.

PRIME AGRICULTURAL LANDS: NO.

RARE, THREATENED, AND ENDANGERED SPECIES: YES, THE PRO[illegible]D WITHIN THE KNOWN RANGE OF THE FEDERALLY AND STATE-ENDANGERED INDIANA BA[illegible]*US*) AND THE FEDERALLY-THREATENED AND STATE-ENDANGERED NORTHERN LONG-EARED [illegible]*NALIS*). THERE ARE NO CONCERNS REGARDING IMPACTS TO THESE SPECIES WITH RESPEC[illegible]RING ASSOCIATED WITH THE PROJECT. CONCERN HAS BEEN RAISED ABOUT BATS THAT MA[illegible]BRIDGE STRUCTURES DURING THE SUMMER, INCLUDING THE INDIANA BAT, NORTHERN LONG-EARED BAT AND THE STATE-ENDANGERED LITTLE BROWN BAT (*M. LUCIFICUS*). THE LITTLE BROWN BAT IS KNOWN TO ROOST IN OTHER BRIDGES WITHIN THE TOWN OF MIDDLEBURY. FIELD STUDIES WILL BE NECESSARY TO DETERMINE WHETHER ANY OF THESE BAT SPECIES UTILIZE THE BRIDGES. RESULTS OF FIELD STUDIES WILL DETERMINE WHICH MEASURES CAN BE TAKEN TO AVOID AND MINIMIZE IMPACTS, IF NECESSARY.

Field studies don already?

WATER RESOURCES: OTTER CREEK.

WETLANDS: YES, THERE IS A PRESUMED CLASS II WETLAND APPROXIMATELY 90-FT WEST OF THE RAILROAD AND EAST OF THE OTTER CREEK.

Any impacts anticipated? (Plans suggest possible buffer impacts only.)

FLOODPLAIN: PORTIONS OF THE PROJECT CORRIDOR LIE WITHIN THE ZONE A SPECIAL FLOOD HAZARD AREA FOR OTTER CREEK, SPECIFICALLY THE TEMPORARY ACCESS ROAD TO THE BATTELL BLOCK.

HAZARDOUS MATERIAL: SOIL AND GROUNDWATER THAT ARE ANTICIPATED TO BE DISTURBED AS A PART OF THIS PROJECT HAVE BEEN LABORATORY TESTED IN ACCORDANCE WITH A VT DEC APPROVED WORK PLAN TO DETERMINE IF CONTAMINATES ARE PRESENT IN THE PROJECT AREA. TESTING WAS COMPLETED DUE TO THE POTENTIAL OF CONTAMINATES TO EXIST ALONG RAILROAD CORRIDORS AND DUE TO A GASOLINE SPILL THAT OCCURRED DURING A 2007 TRAIL DERAILMENT. [illegible] THE LABORATORY TESTING AND HANDLING, STORING, AND DISPOSAL PROCEDURES FOR [illegible] MEDIA ARE PRESENTED IN THE CORRECTIVE ACTION PLAN.

Any stipulations regarding construction that need to be shown on these plans? If info will be conveyed elsewhere in the contract documents (such as special provisions), stating as such here is helpful.

1.3 RISK EVALUATION

THIS PROJECT FALLS UNDER THE JURISDICTION OF GENERAL PERMIT 3-9020 FOR STORMWATER RUNOFF FROM CONSTRUCTION SITES FOR MODERATE RISK PROJECTS. ANY MODIFICATIONS TO THE PROJECT THAT INCREASE THE RISK TO ENVIRONMENTAL RESOURCES SHALL BE EVALUATED IN ACCORDANCE WITH THE PERMIT REQUIREMENTS. THE CONTRACTOR WILL BE RESPONSIBLE FOR ANY ADDITIONAL PERMITTING.

1.4 EROSION PREVENTION AND SEDIMENT CONTROL

THE EROSION CONTROL PLANS ARE MEANT AS A GUIDELINE FOR PREVENTING EROSION AND CONTROLLING SEDIMENT TRANSPORT. THE PRINCIPLES OUTLINED IN THIS NARRATIVE CONSIST OF APPLYING MEASURES THROUGHOUT CONSTRUCTION OF THE PROJECT IN ORDER TO MINIMIZE SEDIMENT TRANSPORT TO THE RECEIVING WATERS. THE MEASURES INCLUDE STABILIZATION AND STRUCTURAL PRACTICES, STORMWATER CONTROLS AND OTHER POLLUTION PREVENTION PRACTICES. THEY HAVE BEEN PROPOSED BY THE DESIGNER AS A BASIS FOR PROTECTING RESOURCES AND WILL NEED TO BE BUILT UPON BASED ON THE SPECIFIC MEANS AND METHODS OF THE CONTRACTOR. REFER TO THE SPECIFICATIONS FOR EROSION PREVENTION AND SEDIMENT CONTROL (2006) 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 IN ACCORDANCE WITH THE CORRECTIVE ACTION PLAN, AND 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. BECAUSE THIS PROJECT FALLS UNDER THE CGP 3-9020, BARRIER FENCE SHALL BE USED INSTEAD OF PROJECT DEMARCATION FENCE WITHIN 100 FEET OF A WATER RESOURCE (STREAM, BROOK, LAKE, POND, WETLAND, ETC).

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. 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 CONTRACTOR'S PROPOSED 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.

STABILIZED CONSTRUCTION ENTRANCES SHALL BE REGULARLY MAINTAINED TO CONTROL EQUIPMENT AND VEHICLES FROM TRACKING MATERIAL OFF SITE. PUBLIC ROADWAYS ACCESS LOCATIONS SHALL BE INSPECTED DAILY AND SWEPT AS NEEDED TO PREVENT SEDIMENT TRANSPORT.

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.

SILT FENCE WILL BE INSTALLED AS PROPOSED ON THE EPSC PLAN. BECAUSE THIS PROJECT FALLS UNDER THECGP3-9020, WOVEN WIRE REINFORCED SILT FENCE SHALL BE USED INSTEAD OF SILT FENCE WITHIN 100 FEET UPSLOPE OF RECEIVING WATERS.

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 CONTRACT 1 AREA IS RELATIVELY FLAT. THEREFORE, IT IS NOT ANTICIPATED THAT DIVERSION MEASURES WILL BE NECESSARY. EFFLUENT FROM DEWATERING OPERATIONS FOR MICROTUNNELING WILL BE FILTERED OR PASSED THROUGH A SEDIMENT TRAPPING DEVICE AND DISCHARGED IN A MANNER THAT DOES NOT RESULT IN IMPACTS TO WATER QUALITY OR CONTRIBUTE TO EROSION. SEE SECTION 1.4.12 FOR DISCUSSION OF TURBIDITY MONITORING REQUIREMENTS.

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.

STONE CHECK DAMS ARE NOT ANTICIPATED FOR THIS CONTRACT.

1.4.7 CONSTRUCT PERMANENT CONTROLS
PERMANENT EROSION CONTROL STRUCTURES ARE NOT ANTICIPATED FOR THIS CONTRACT.

1.4.8 STABILIZE EXPOSED SOILS DURING CONSTRUCTION
THE MAXIMUM ALLOWABLE AMOUNT OF DISTURBANCE AT ANY GIVEN TIME IS 2 ACRES. ALL AREAS OF DISTURBANCE MUST HAVE TEMPORARY STABILIZATION IN PLACE WITHIN 48 HOURS OF DISTURBANCE OR IN ACCORDANCE WITH THE CGP3-9020.

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

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

DUST CONTROL SHALL BE HANDLED VIA WATER OR CALCIUM CHLORIDE APPLICATION TO ROADWAYS AND OTHER AREAS WHERE DUST MAY BE GENERATED.

1.4.9 WINTER STABILIZATION
WINTER CONSTRUCTION SEASON IS DEFINED BY VT DEC AS OCTOBER 15 TO APRIL 15.

THE FOLLOWING WINTER CONSTRUCTION CONDITIONS APPLY TO THOSE CONSTRUCTION ACTIVITIES INVOLVING EARTH DISTURBANCE BETWEEN OCTOBER 15 AND APRIL 15:

a. FOR AREAS STABILIZED BY VEGETATION, SEED SHALL BE APPLIED NO LATER THAN SEPTEMBER 15.
b. MULCH SHALL BE APPLIED AT DOUBLE THE REGULAR CONSTRUCTION SEASON RATE OR ROUGHLY 3 INCHES OF MULCH WITH 80 TO 90% COVER (SEE MULCH DETAIL). MULCH SHALL BE TRACKED IN OR STABILIZED WITH NETTING.
c. ENLARGE ACCESS POINTS TO PROVIDE SPACE FOR SNOW STOCKPILING.
d. LIMITS OF DISTURBANCE SHALL BE MOVED OR REPLACED TO REFLECT BOUNDARY OF WINTER WORK.
e. CLEARED SNOW SHALL BE PLACED DOWN GRADIENT OF ALL AREAS OF DISTURBANCE.
f. SNOW SHALL NOT BE PLACED IN STORMWATER TREATMENT STRUCTURES. (E.G. BASINS)
g. A MINIMUM 25-FOOT BUFFER FROM PERIMETER CONTROLS (E.G., SILT FENCE) SHALL BE MAINTAINED TO ALLOW FOR SNOW CLEARING AND MAINTENANCE.
h. FOR AREAS OF DISTURBANCE WITHIN 100 FEET OF A RECEIVING WATER, SILT FENCE SHALL BE REINFORCED OR ELSE REPLACED WITH PERIMETER DIKES, SWALES, OR OTHER PRACTICES RESISTANT TO THE FORCES OF SNOW LOADS.
i. DRAINAGE STRUCTURES ARE TO BE KEPT OPEN AND FREE OF SNOW AND ICE DAMS AS DETERMINED BY THE ON SITE PROJECT COORDINATOR.
j. EPSC MEASURES THAT REQUIRE SOIL DISTURBANCE TO INSTALL (E.G., SILT FENCE) SHALL BE INSTALLED PRIOR TO GROUND FREEZING.
k. SNOW AND ICE SHALL BE REMOVED TO LESS THAN 1 INCH THICKNESS PRIOR TO STABILIZATION.
l. A 10 TO 20-FOOT WIDE STONE PAD SHALL BE USED IN AREAS WHERE CONSTRUCTION VEHICLE TRAFFIC IS ANTICIPATED (E.G., AROUND THE PERIMETER OF A BUILDING).
m. TO ENSURE COVER OF DISTURBED SOIL IN ADVANCE OF A SNOWMELT EVENT, AREAS OF DISTURBED SOIL SHALL BE STABILIZED AT THE END OF EACH WORKDAY, UNLESS
    i. WORK IS TO CONTINUE WITHIN THE AREA WITHIN THE NEXT 24 HOURS AND THERE IS NO PRECIPITATION FORECAST OF THE NEXT 24 HOURS OR
    ii. WORK IS OCCURRING IN A SELF-CONTAINED EXCAVATION (I.E., NO OUTLET) WITH A DEPTH OF 2 FEET OR GREATER (E.G., UTILITY TRENCHES).

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

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

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

TREATMENT OF DEWATERING FOR MICROTUNNELING IS ANTICIPATED. A LOCATION FOR TREATMENT HAS BEEN PROPOSED AND IS SHOWN ON THE PLANS. HOWEVER, THE SPECIFIC MEANS FOR TREATMENT OF DISCHARGE SHALL BE PROVIDED BY THE CONTRACTOR.

Might be worth noting that these activities need to comply with SP on Management and Disposal of Contaminated Media.

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

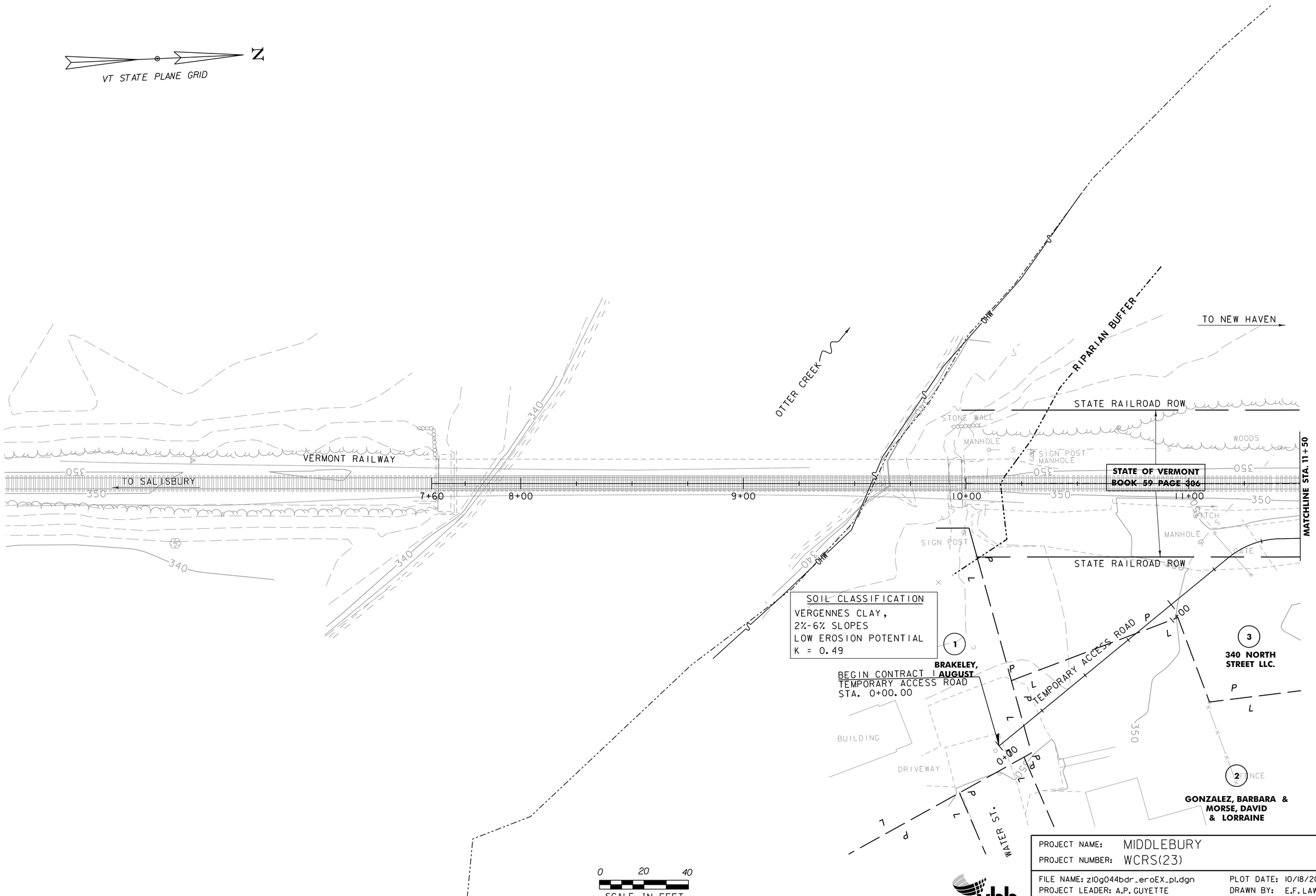
THIS SECTION WILL BE DEVELOPED BY THE CONTRACTOR USING THE GUIDANCE OUTLINED IN THE VTRANS EPSC PLAN CONTRACTOR CHECKLIST.

1.5.1 CONSTRUCTION SEQUENCE

1.5.2 OFF-SITE ACTIVITIES
IN ADDITION TO THE CONTRACTOR CHECKLIST AND THE CONDITIONS OF THE CGP 3-9020, ANY ACTIVITIES OUTSIDE THE CONSTRUCTION LIMITS SHALL FOLLOW SPECIFICATIONS 105.23 - 105.29 OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION.

1.5.3 UPDATES

ALTERATIONS AND CHANGES TO THE EPSC PLAN ARE TO BE DOCUMENTED AND COMMUNICATED WITH THE ENGINEER AND DEC STORMWATER DIVISION PRIOR TO GOING INTO EFFECT. A COPY OF THE EPSC PLANS IS TO BE MAINTAINED ON SITE AT ALL TIMES.

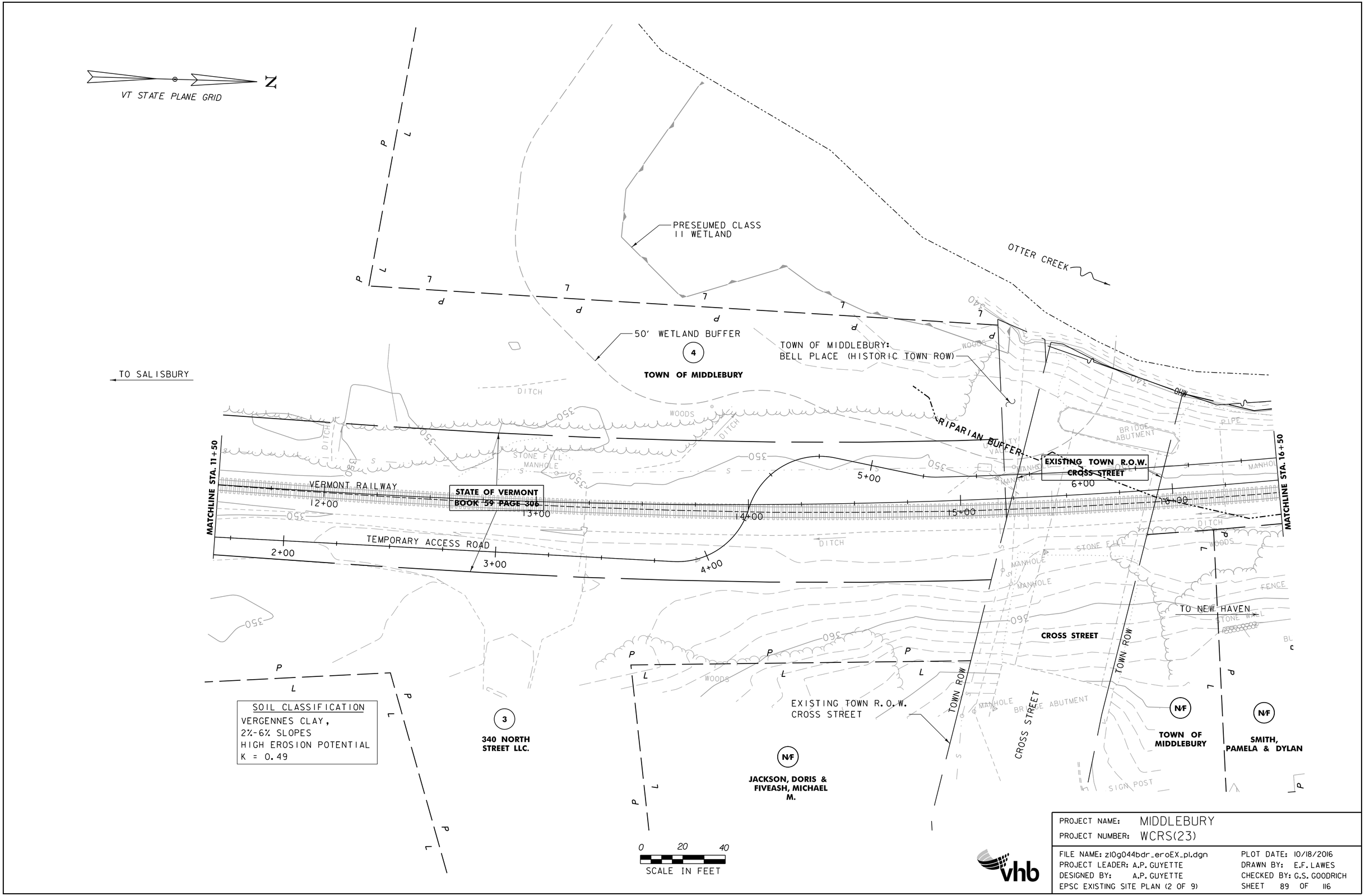


PROJECT NAME: MIDDLEBURY
PROJECT NUMBER: WCRS(23)

FILE NAME: z10g044bdr_eroEX_pl.dgn
PROJECT LEADER: A.P. GUYETTE
DESIGNED BY: A.P. GUYETTE
EPSC EXISTING SITE PLAN (1 OF 9)

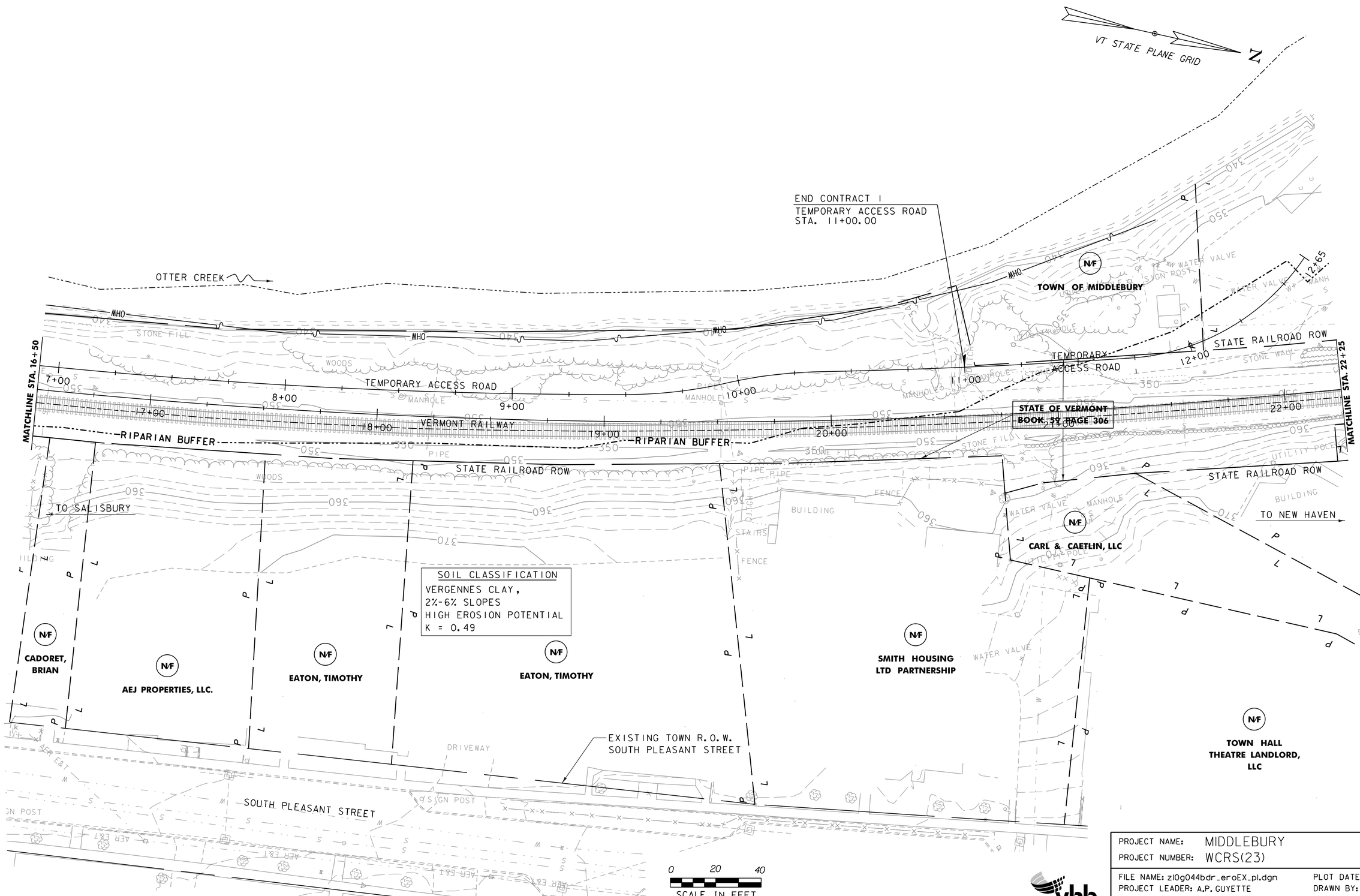
PLOT DATE: 10/18/2016
DRAWN BY: E.F. LAWES
CHECKED BY: G.S. GOODRICH
SHEET 88 OF 116

VHB 57603



PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044bdr_eroEX_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: E.F. LAWES
DESIGNED BY: A.P. GUYETTE	CHECKED BY: G.S. GOODRICH
EPSC EXISTING SITE PLAN (2 OF 9)	SHEET 89 OF 116

VHB 57603



PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044bdr_eroEX_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: E.F. LAWES
DESIGNED BY: A.P. GUYETTE	CHECKED BY: G.S. GOODRICH
EPSC EXISTING SITE PLAN (3 OF 9)	SHEET 90 OF 116

VHB 57603

VT STATE PLANE GRID

N

TO CORNWALL

TOWN ROW

NATIONAL BANK OF MIDDLEBURY

EXISTING TOWN R.O.W. MERCHANTS ROW

EXISTING TOWN R.O.W. MAIN STREET

BUILDING

MANHOLE

BATTELL LLC.

UTILITY POLE

STONE WALL

BATTELL BLOCK

STATE RAILROAD ROW

MATCHLINE STA. 22+25

MATCHLINE SHEET 9 OF 9

MATCHLINE STA. 28+00

MIDDLEBURY NATIONAL CORPORATION

MERCHANTS ROW

MAIN ST/ VT ROUTE 30

SIGN POST

WATER VALVE

TOWN OF MIDDLEBURY

TO VERGENNES

PRINTER'S ALLEY

PRINTERS ALLEY

MARBLE WORKS PARTNERSHIP

BUILDING

LIGHT POLE

FENCE

23+00

24+00

25+00

26+00

27+00

STATE OF VERMONT
BOOK 59 PAGE 306

BOURDON, J ANDRE & ELIZABETH C.

TO SALISBURY

MERCHANTS ROW

MAIN STREET

TO NEW HAVEN

GRACE BAPTIST CHURCH

TO ROUTE 7

TOWN OF MIDDLEBURY

UNITED STATES OF AMERICA

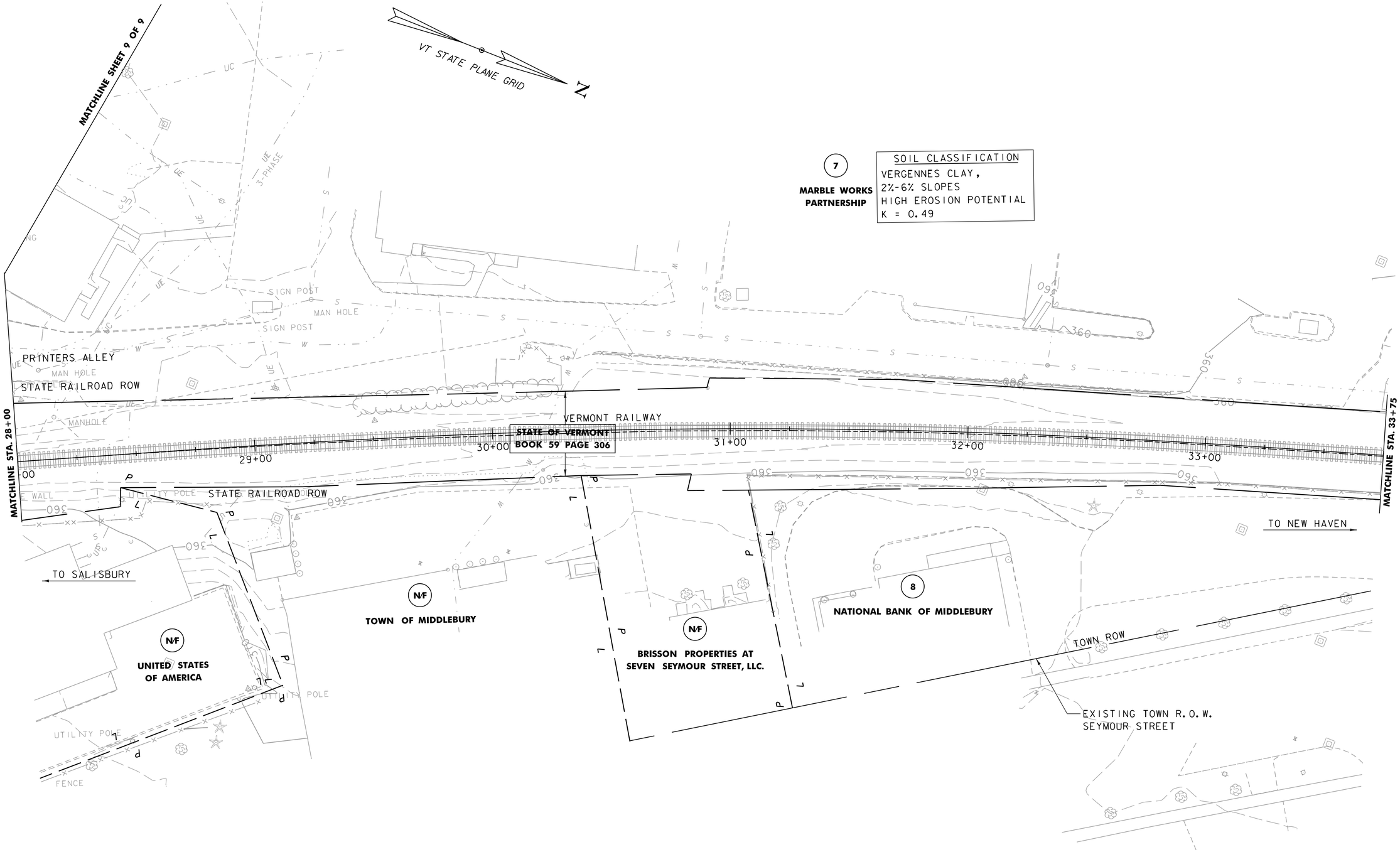
SOIL CLASSIFICATION
VERGENNES CLAY,
2%-6% SLOPES
HIGH EROSION POTENTIAL
K = 0.49

0 20 40
SCALE IN FEET

vhb

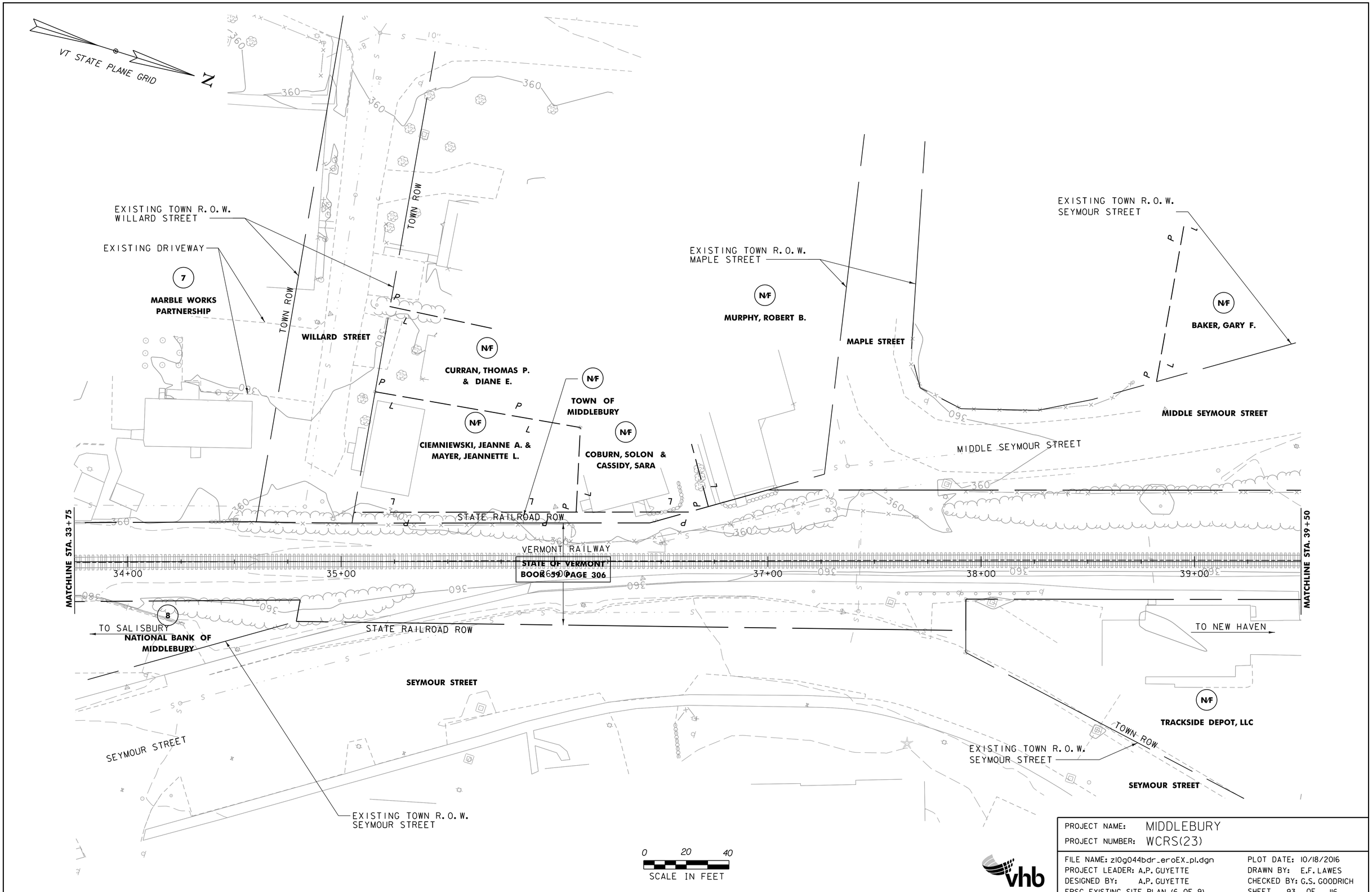
PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044bdr_eroEX_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: E.F. LAWES
DESIGNED BY: A.P. GUYETTE	CHECKED BY: G.S. GOODRICH
EPSC EXISTING SITE PLAN (4 OF 9)	SHEET 91 OF 116

VHB 57603



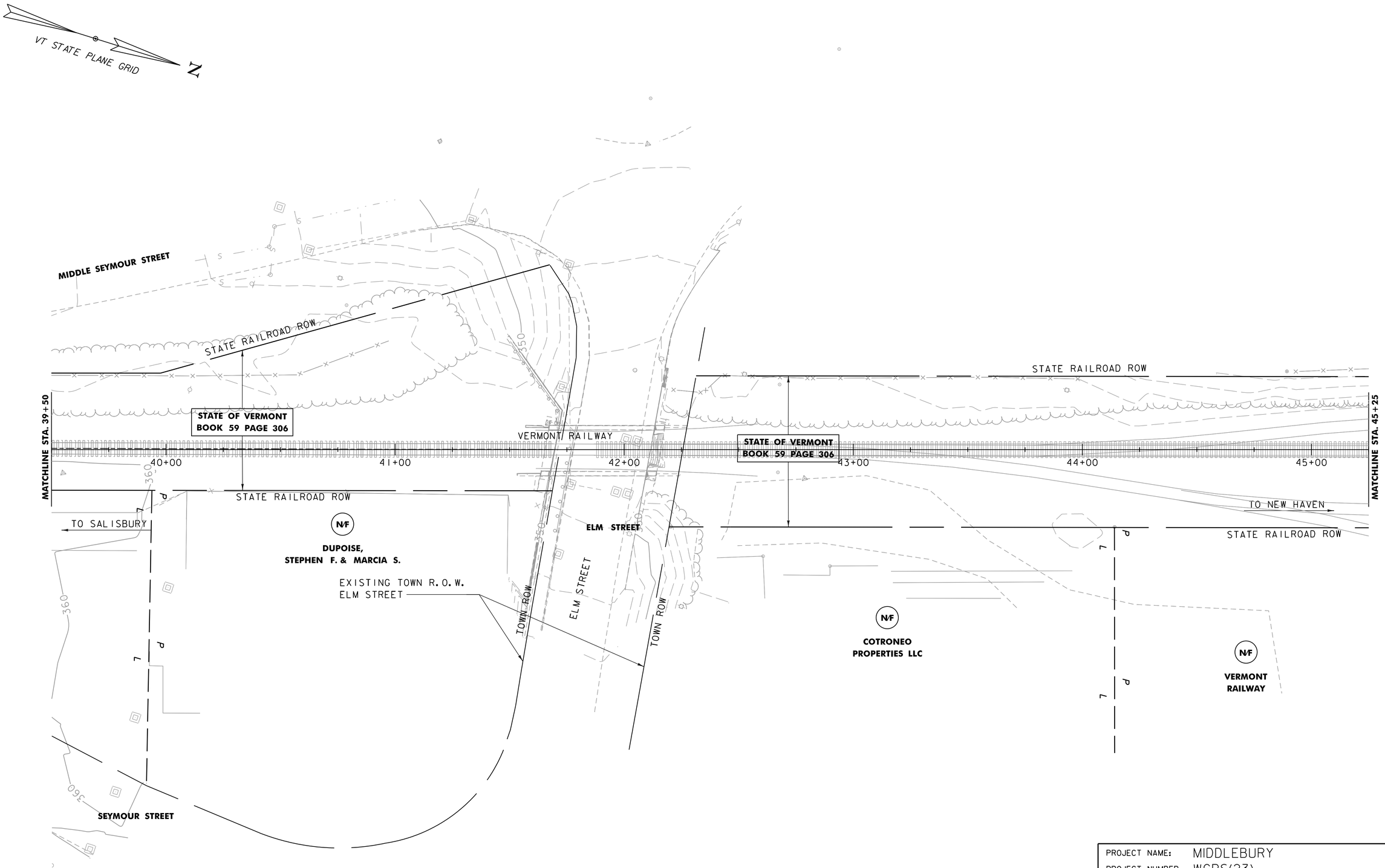
PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044bdr_eroEX_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: E.F. LAWES
DESIGNED BY: A.P. GUYETTE	CHECKED BY: G.S. GOODRICH
EPSC EXISTING SITE PLAN (5 OF 9)	SHEET 92 OF 116

VHB 57603



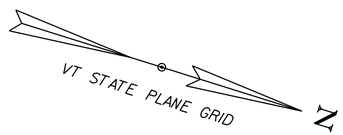
PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044bdr_eroEX_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: E.F. LAWES
DESIGNED BY: A.P. GUYETTE	CHECKED BY: G.S. GOODRICH
EPSC EXISTING SITE PLAN (6 OF 9)	SHEET 93 OF 116

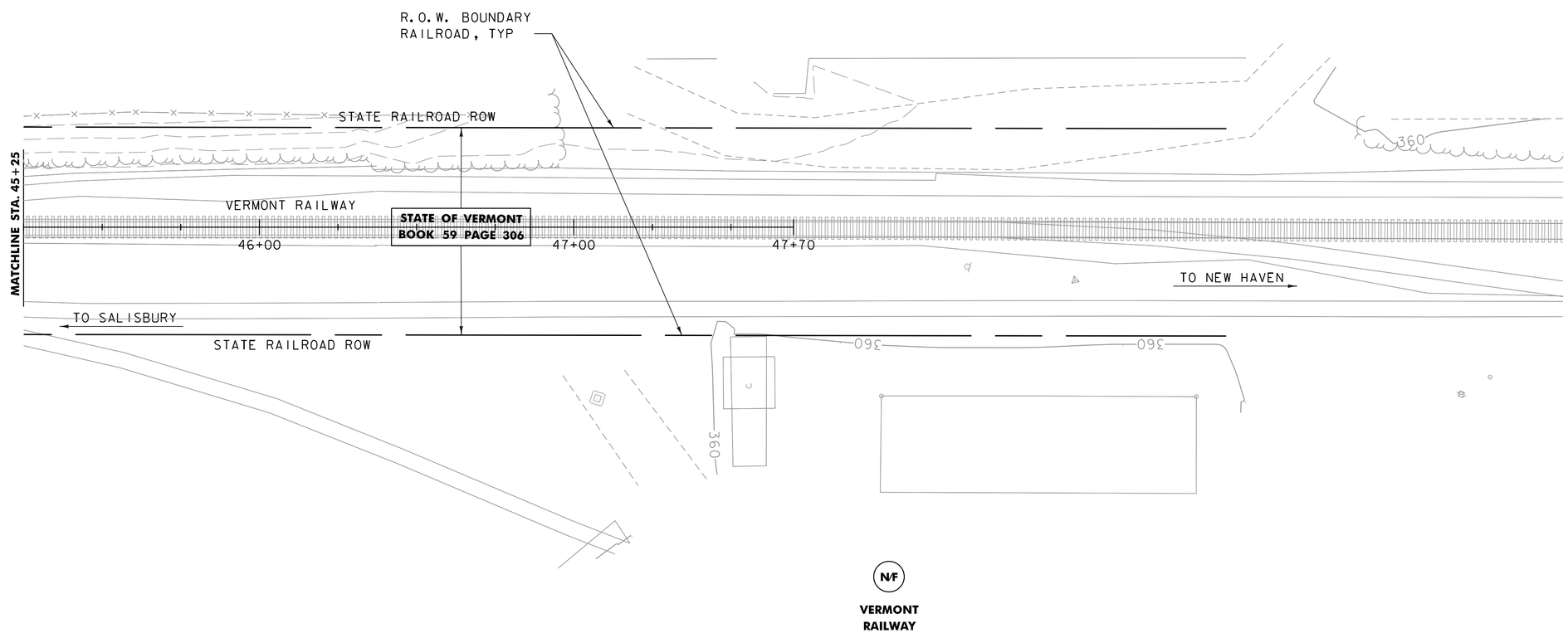
VHB 57603



PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044bdr_eroEX_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: E.F. LAWES
DESIGNED BY: A.P. GUYETTE	CHECKED BY: G.S. GOODRICH
EPSC EXISTING SITE PLAN (7 OF 9)	SHEET 94 OF 116

VHB 57603

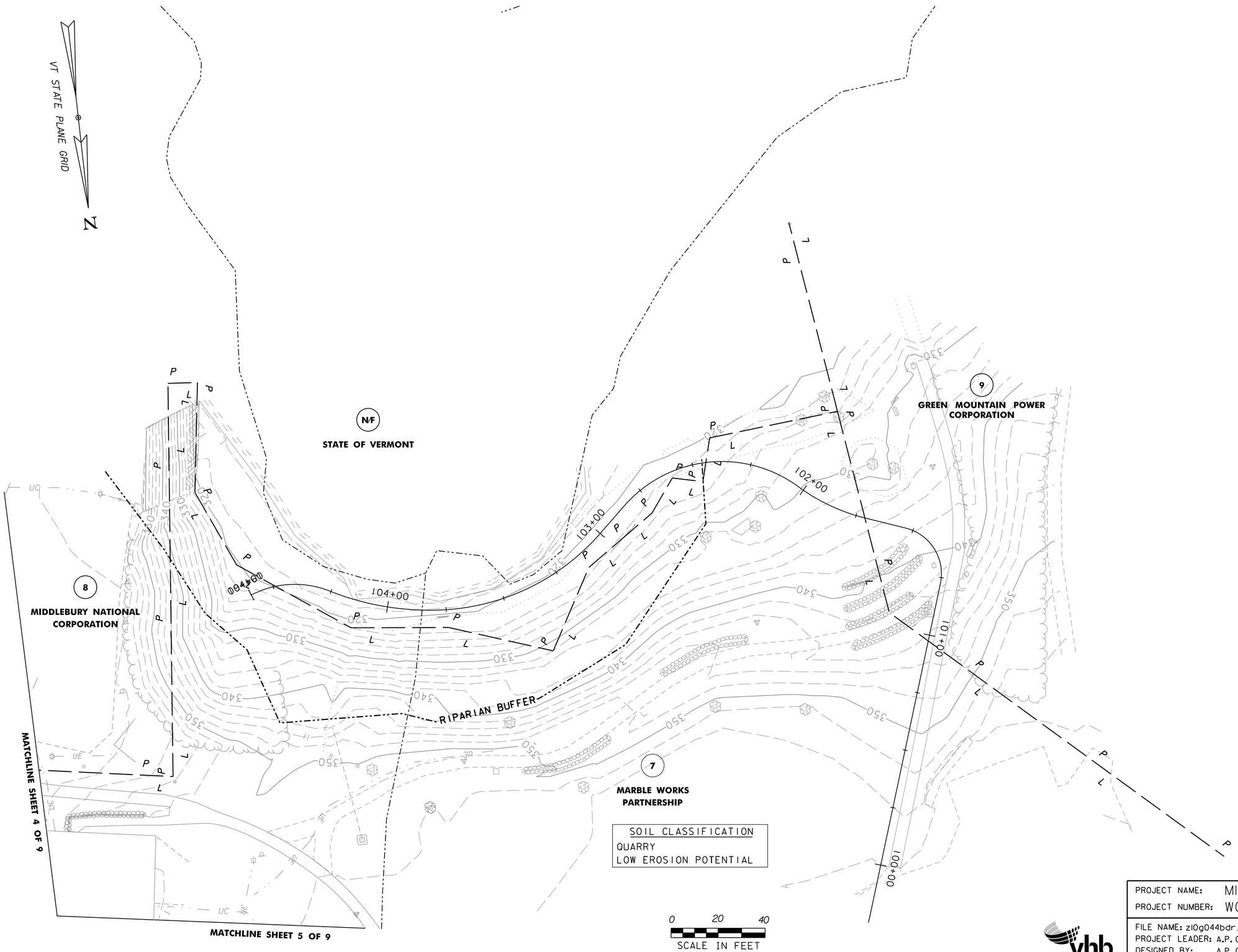




0 20 40
SCALE IN FEET

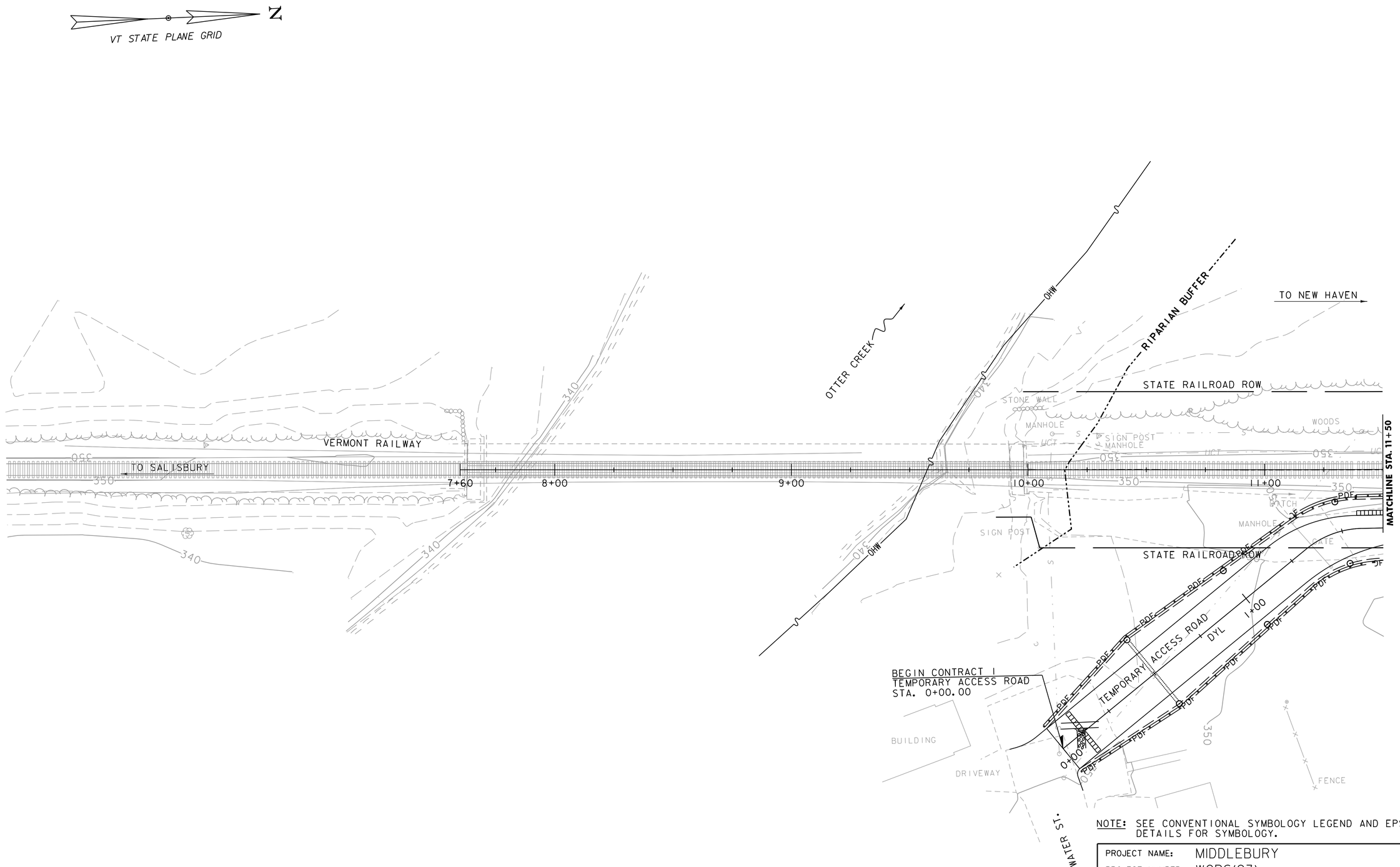
PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044bdr_eroEX_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: E.F. LAWES
DESIGNED BY: A.P. GUYETTE	CHECKED BY: G.S. GOODRICH
EPSC EXISTING SITE PLAN (8 OF 9)	SHEET 95 OF 116

VHB 57603



PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044bdr_eroEX_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: E.F. LAWES
DESIGNED BY: A.P. GUYETTE	CHECKED BY: G.S. GOODRICH
EPSC EXISTING SITE PLAN (9 OF 9)	SHEET 96 OF 116

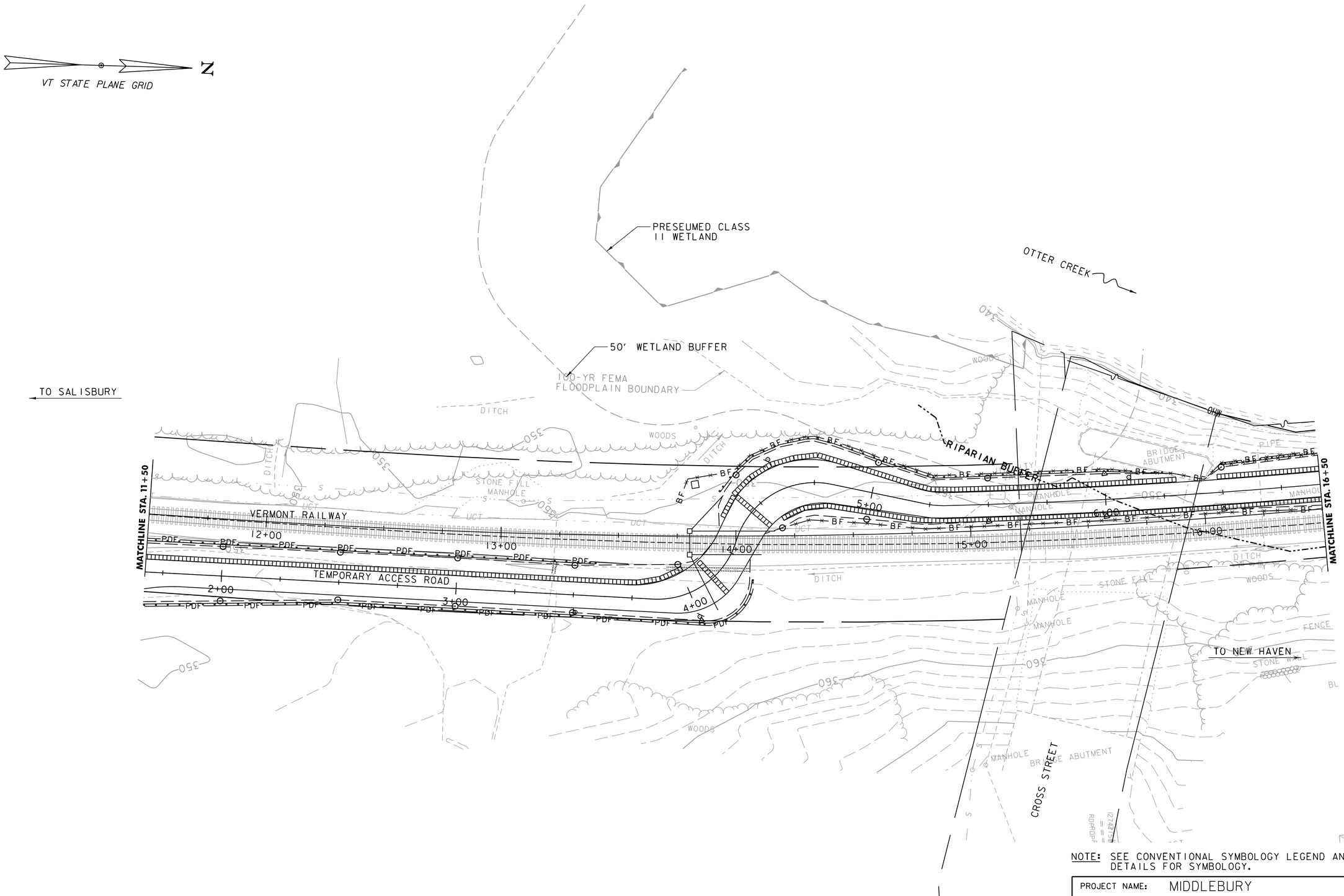
VHB 57603



NOTE: SEE CONVENTIONAL SYMBOLOGY LEGEND AND EPSC DETAILS FOR SYMBOLOGY.

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044bdr_eroCONSTR_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: E.F. LAWES
DESIGNED BY: A.P. GUYETTE	CHECKED BY: G.S. GOODRICH
EPSC CONSTRUCTION SITE PLAN (1 OF 9)	SHEET 97 OF 116

VHB 57603



NOTE: SEE CONVENTIONAL SYMBOLOGY LEGEND AND EPSC DETAILS FOR SYMBOLOGY.

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044bdr_eroCONSTR_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: E.F. LAWES
DESIGNED BY: A.P. GUYETTE	CHECKED BY: G.S. GOODRICH
EPSC CONSTRUCTION SITE PLAN (2 OF 9)	SHEET 98 OF 116

VHB 57603

VT STATE PLANE GRID

N

END CONTRACT 1
TEMPORARY ACCESS ROAD
STA. 11+00.00

OTTER CREEK

100-YR FEMA FLOODPLAIN BOUNDARY

MATCHLINE STA. 16+50

MATCHLINE STA. 22+25

TEMPORARY ACCESS ROAD

VERMONT RAILWAY

RIPARIAN BUFFER

STATE RAILROAD ROW

TO SALISBURY

TO NEW HAVEN

BUILDING

FENCE

STAIRS

WOODS

PIPE

MANHOLE

WATER VALVE

UTILITY POLE

SIGN POST

STONE FILL

STONE WALL

AER E&T

MHO

BF

7+00 8+00 9+00 10+00 11+00 12+00 17+00 18+00 19+00 20+00 21+00 22+00

Not sure that BF between jersey barriers and rail line is necessary. (Jersey barriers and rail line both provide obvious project limits already.) If BF is to remain, adjust in this specific location so it doesn't conflict with rail line.

DRIVEWAY

SOUTH PLEASANT STREET

0 20 40
SCALE IN FEET

NOTE: SEE CONVENTIONAL SYMBOLOGY LEGEND AND EPSC DETAILS FOR SYMBOLOGY.

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044bdr_eroCONSTR_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: E.F. LAWES
DESIGNED BY: A.P. GUYETTE	CHECKED BY: G.S. GOODRICH
EPSC CONSTRUCTION SITE PLAN (3 OF 9)	SHEET 99 OF 116

VHB 57603

VT STATE PLANE GRID

N

PROVIDE AND MAINTAIN TEMPORARY INLET FILTERS DURING CONSTRUCTION, TYP FOR ALL EXISTING INLETS TAKING CONSTRUCTION RUNOFF

POTENTIAL LOCATIONS FOR PORTABLE DEWATERING TREATMENT DEVICES (TYP)

Has deed research been completed to defend these limits and this statement?

TO CORNWALL

TOWN ROW

MERCHANTS ROW

MAIN ST/ VT ROUTE 30

TO VERGENNES

PRINTERS ALLEY

BATTELL BLOCK

STATE RAILROAD ROW

VERMONT RAILWAY

MATCHLINE STA. 22+25

MATCHLINE STA. 28+00

MATCHLINE SHEET 9 OF 9

23+00 24+00 25+00 26+00 27+00 28

PROPOSED RAIL ALIGNMENT (CONTRACT 2)

TO SALISBURY

TO NEW HAVEN

TO ROUTE 7

BUILDING

MANHOLE

UTILITY POLE

STONE WALL

SIGN POST

WATER VALVE

FENCE

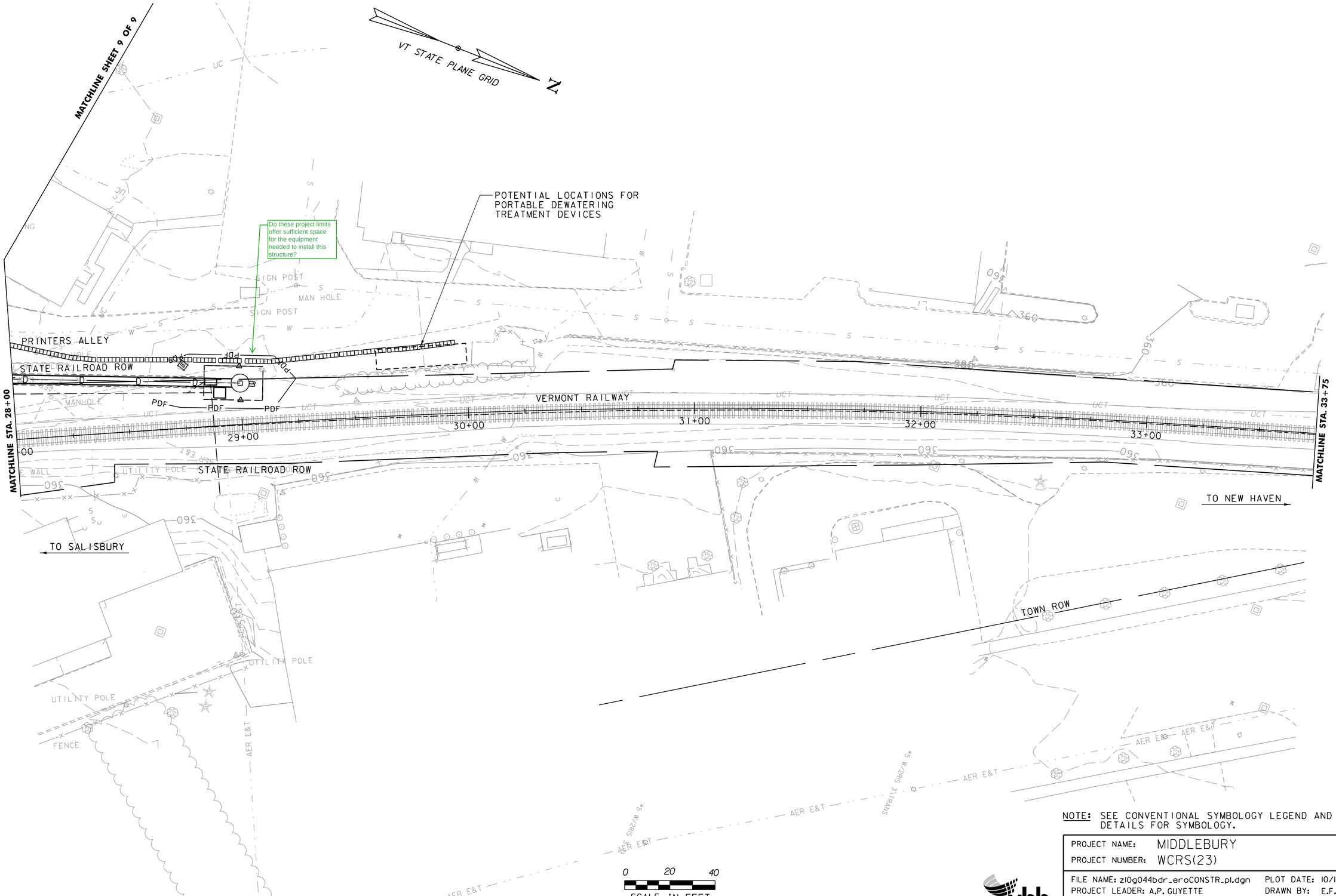
0 20 40

SCALE IN FEET

NOTE: SEE CONVENTIONAL SYMBOLOGY LEGEND AND EPSC DETAILS FOR SYMBOLOGY.

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044bdr_eroCONSTR_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: E.F. LAWES
DESIGNED BY: A.P. GUYETTE	CHECKED BY: G.S. GOODRICH
EPSC CONSTRUCTION SITE PLAN (4 OF 9)	SHEET 100 OF 116

VHB 57603



NOTE: SEE CONVENTIONAL SYMBOLOGY LEGEND AND EPSC DETAILS FOR SYMBOLOGY.

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044bdr_eroCONSTR_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: E.F. LAWES
DESIGNED BY: A.P. GUYETTE	CHECKED BY: G.S. GOODRICH
EPSC CONSTRUCTION SITE PLAN (5 OF 9)	SHEET 101 OF 116

VHB 57603

VT STATE PLANE GRID

N

TOWN ROW

TOWN ROW

AER E&T

MIDDLE SEYMOUR STREET

STATE RAILROAD ROW

VERMONT RAILWAY

UCT

MATCHLINE STA. 33+75

MATCHLINE STA. 39+50

34+00 35+00 36+00 37+00 38+00 39+00

TO SALISBURY

TO NEW HAVEN

STATE RAILROAD ROW

SEYMOUR STREET

TOWN ROW

If this contract doesn't include any construction or disturbance on sheets 6-8 of 9, can these EPSC sheets be omitted (for ex cond, construction, and final

0 20 40

SCALE IN FEET

NOTE: SEE CONVENTIONAL SYMBOLOGY LEGEND AND EPSC DETAILS FOR SYMBOLOGY.

PROJECT NAME: MIDDLEBURY

PROJECT NUMBER: WCRS(23)

FILE NAME: z10g044bdr_eroCONSTR_pl.dgn

PROJECT LEADER: A.P. GUYETTE

DESIGNED BY: A.P. GUYETTE

EPSC CONSTRUCTION SITE PLAN (6 OF 9)

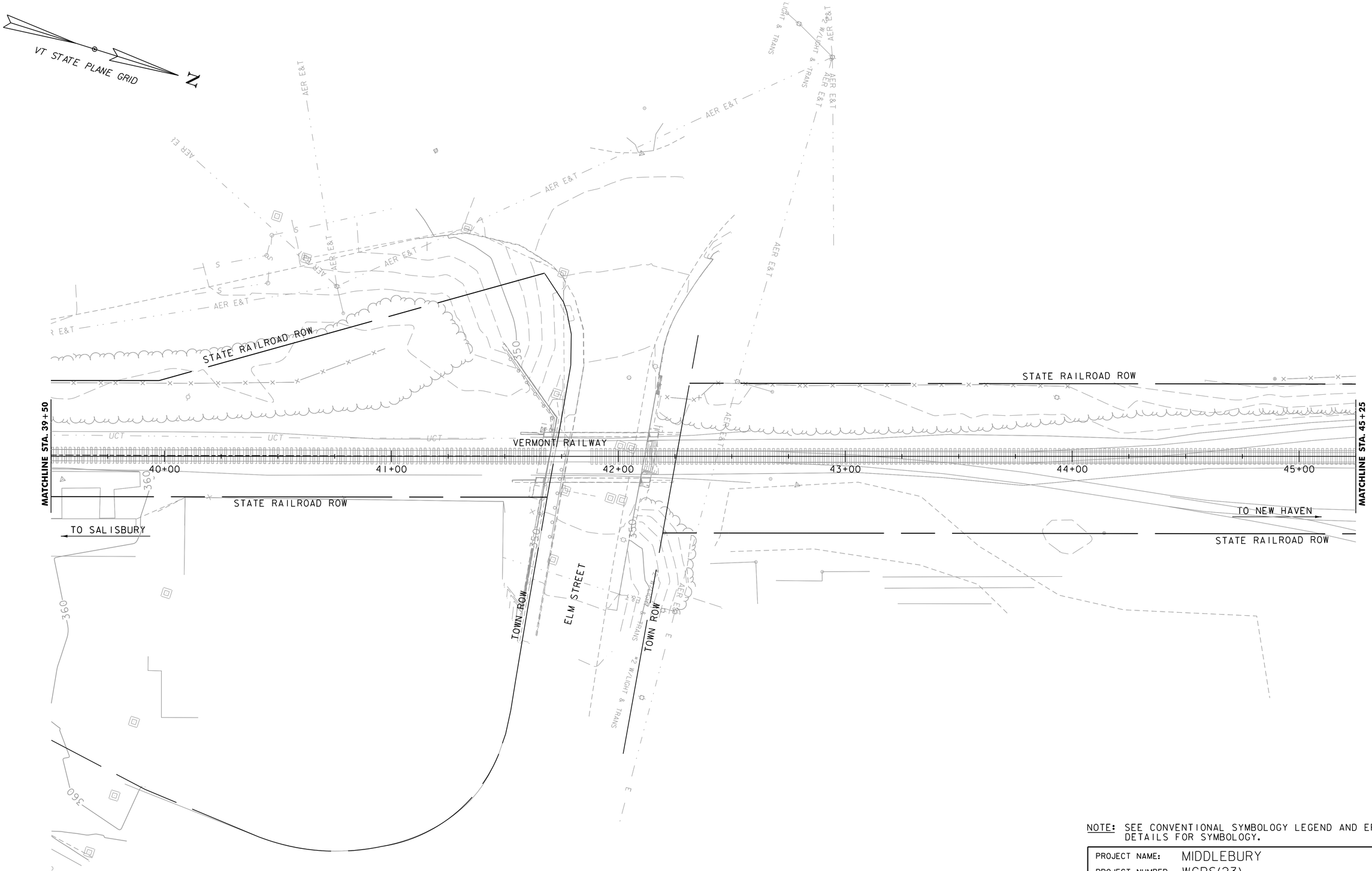
PLOT DATE: 10/18/2016

DRAWN BY: E.F. LAWES

CHECKED BY: G.S. GOODRICH

SHEET 102 OF 116

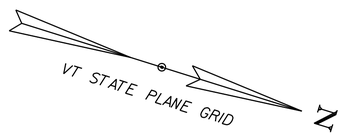
VHB 57603

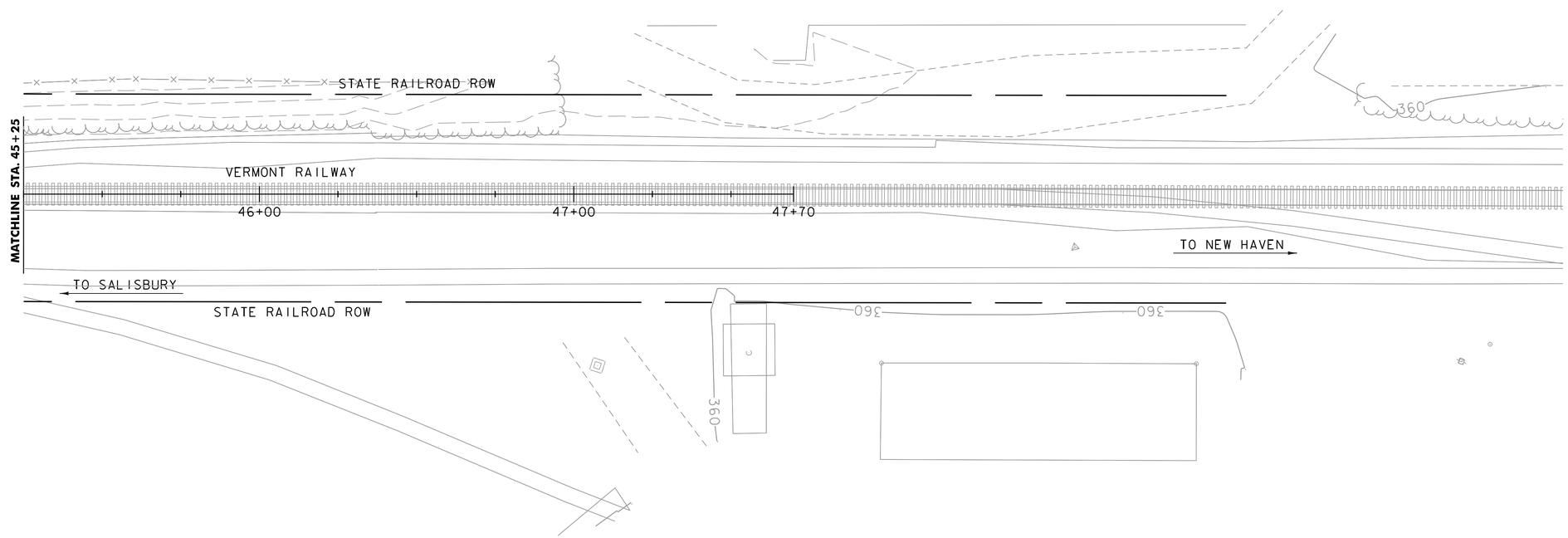


NOTE: SEE CONVENTIONAL SYMBOLOGY LEGEND AND EPSC DETAILS FOR SYMBOLOGY.

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044bdr_eroCONSTR_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: E.F. LAWES
DESIGNED BY: A.P. GUYETTE	CHECKED BY: G.S. GOODRICH
EPSC CONSTRUCTION SITE PLAN (7 OF 9)	SHEET 103 OF 116

VHB 57603



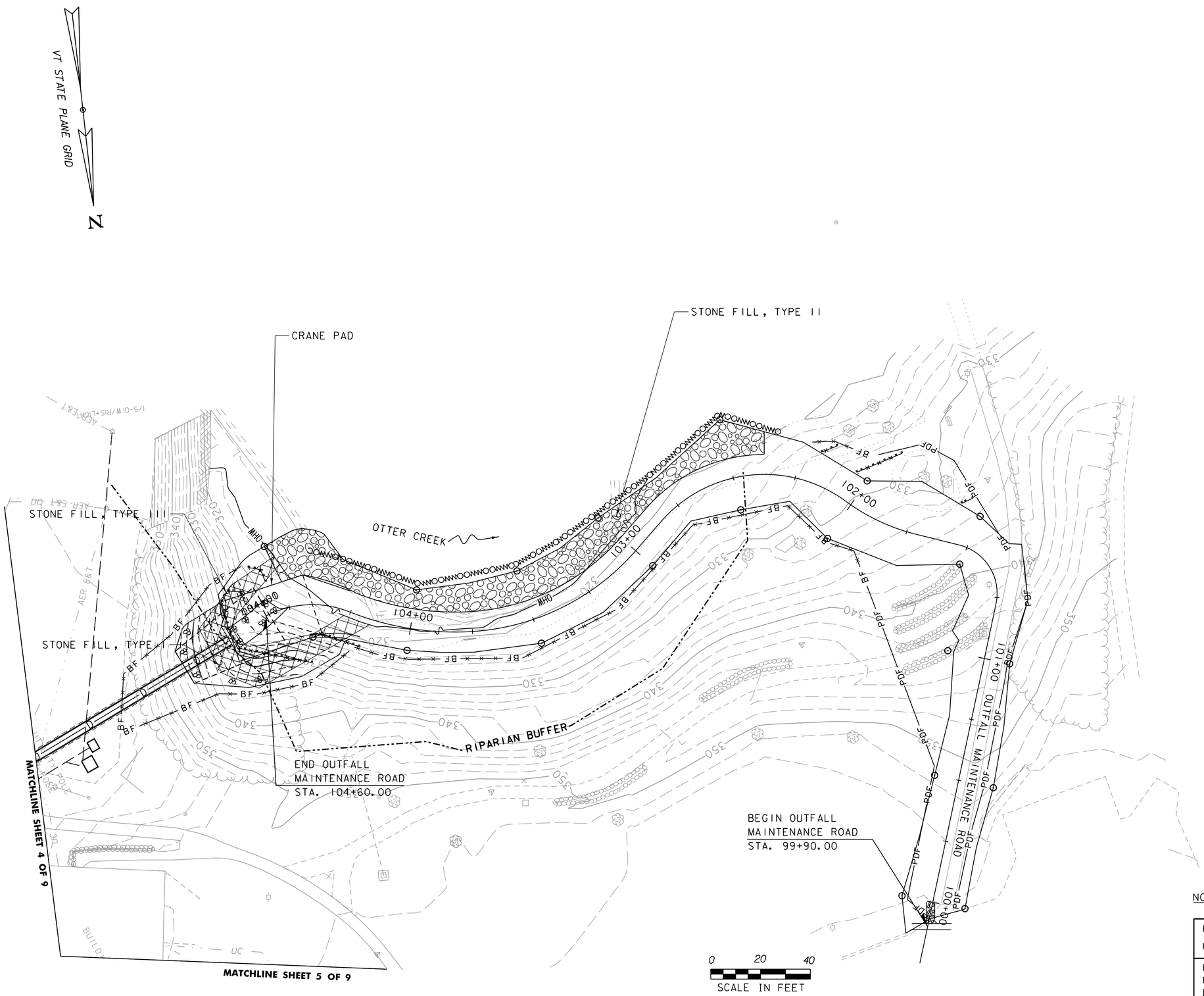


0 20 40
SCALE IN FEET

NOTE: SEE CONVENTIONAL SYMBOLOGY LEGEND AND EPSC DETAILS FOR SYMBOLOGY.

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044bdr_eroCONSTR_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: E.F. LAWES
DESIGNED BY: A.P. GUYETTE	CHECKED BY: G.S. GOODRICH
EPSC CONSTRUCTION SITE PLAN (8 OF 9)	SHEET 104 OF 116

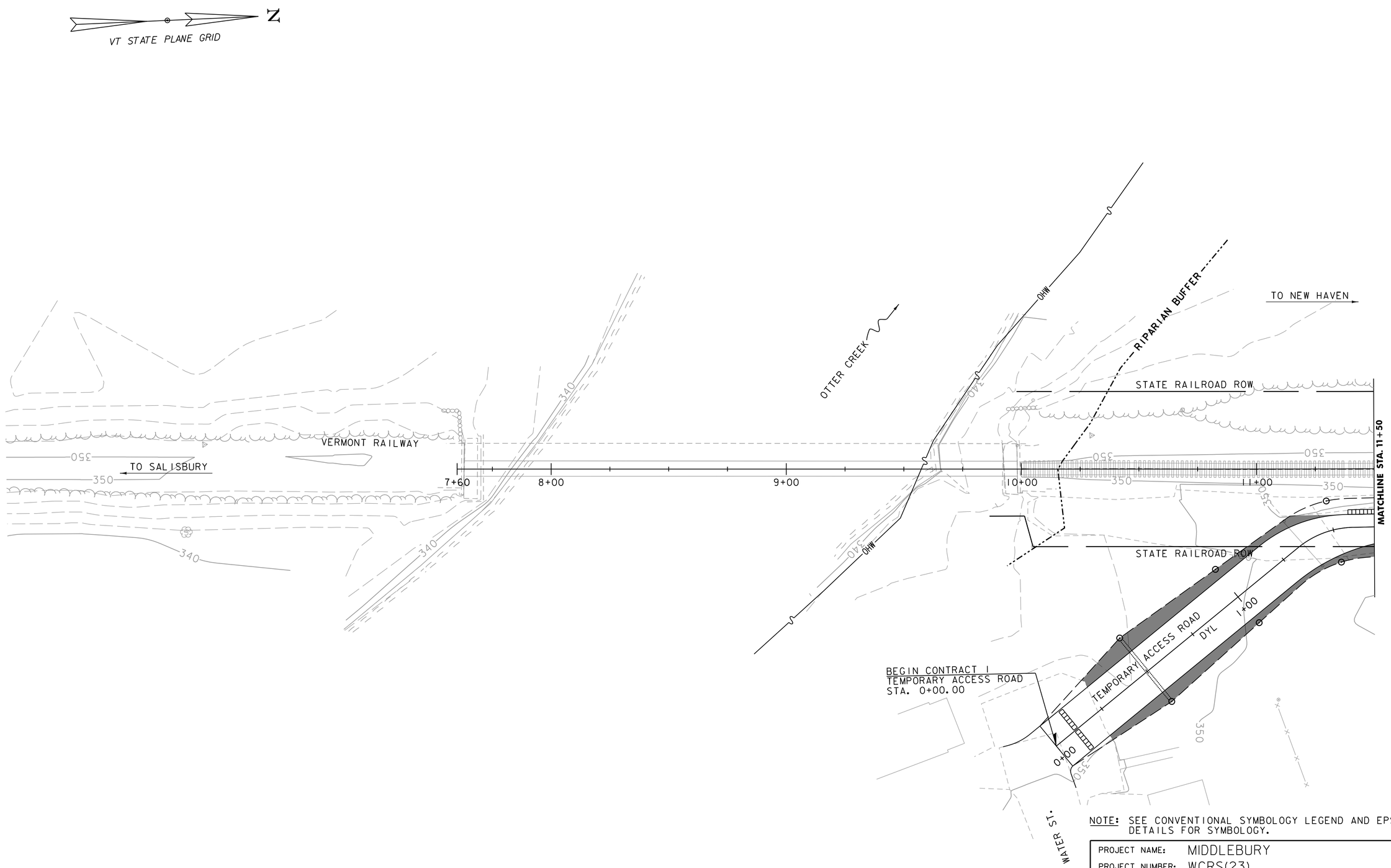
VHB 57603



NOTE: SEE CONVENTIONAL SYMBOLOGY LEGEND AND EPSC DETAILS FOR SYMBOLOGY.

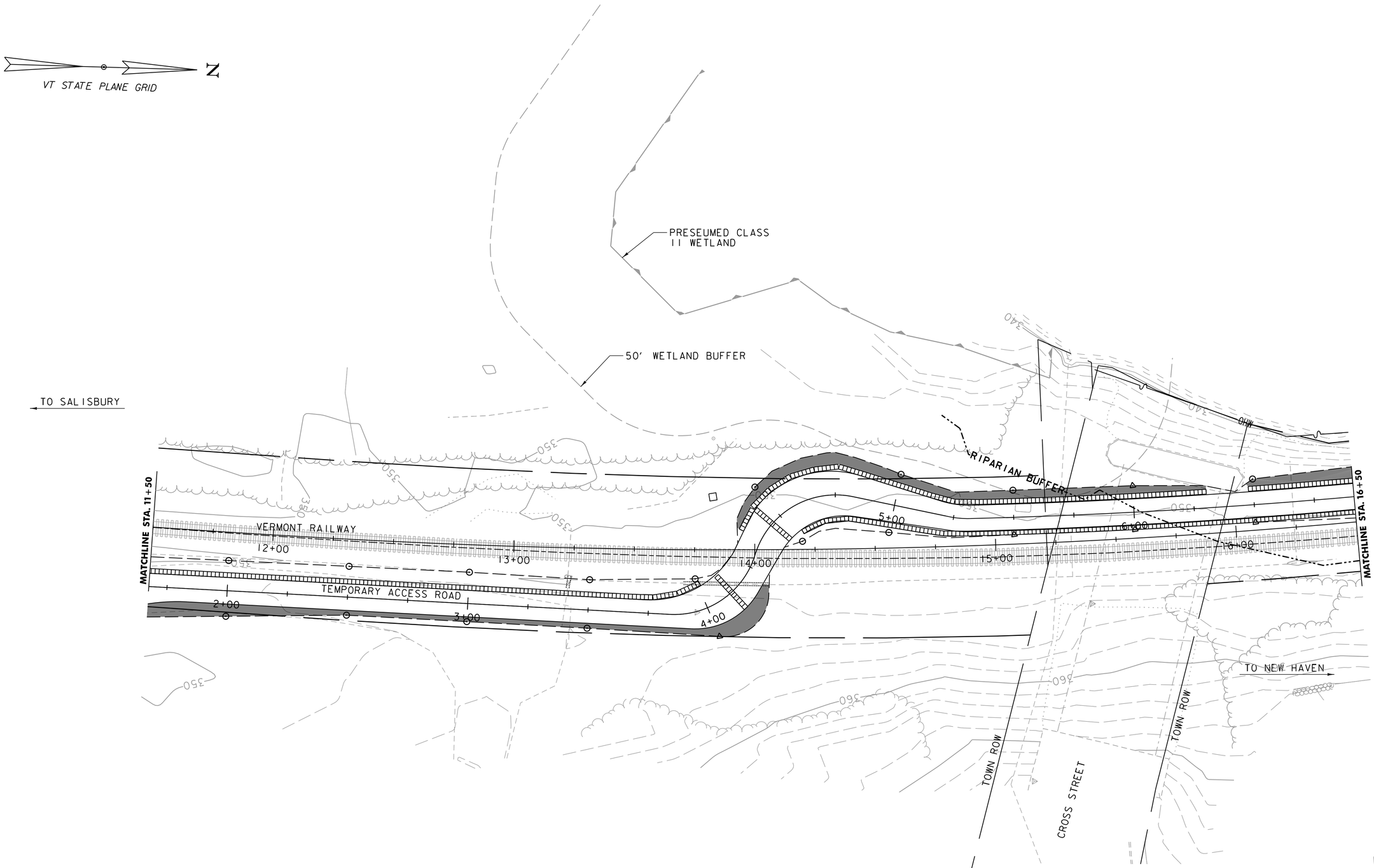
PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044bdr_eroCONSTR_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: E.F. LAWES
DESIGNED BY: A.P. GUYETTE	CHECKED BY: G.S. GOODRICH
EPSC CONSTRUCTION SITE PLAN (9 OF 9)	SHEET 105 OF 116

VHB 57603



NOTE: SEE CONVENTIONAL SYMBOLOGY LEGEND AND EPSC DETAILS FOR SYMBOLOGY.

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044bdr_eroFINAL_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: E.F. LAWES
DESIGNED BY: A.P. GUYETTE	CHECKED BY: G.S. GOODRICH
EPSC FINAL SITE PLAN (1 OF 9)	SHEET 106 OF 116



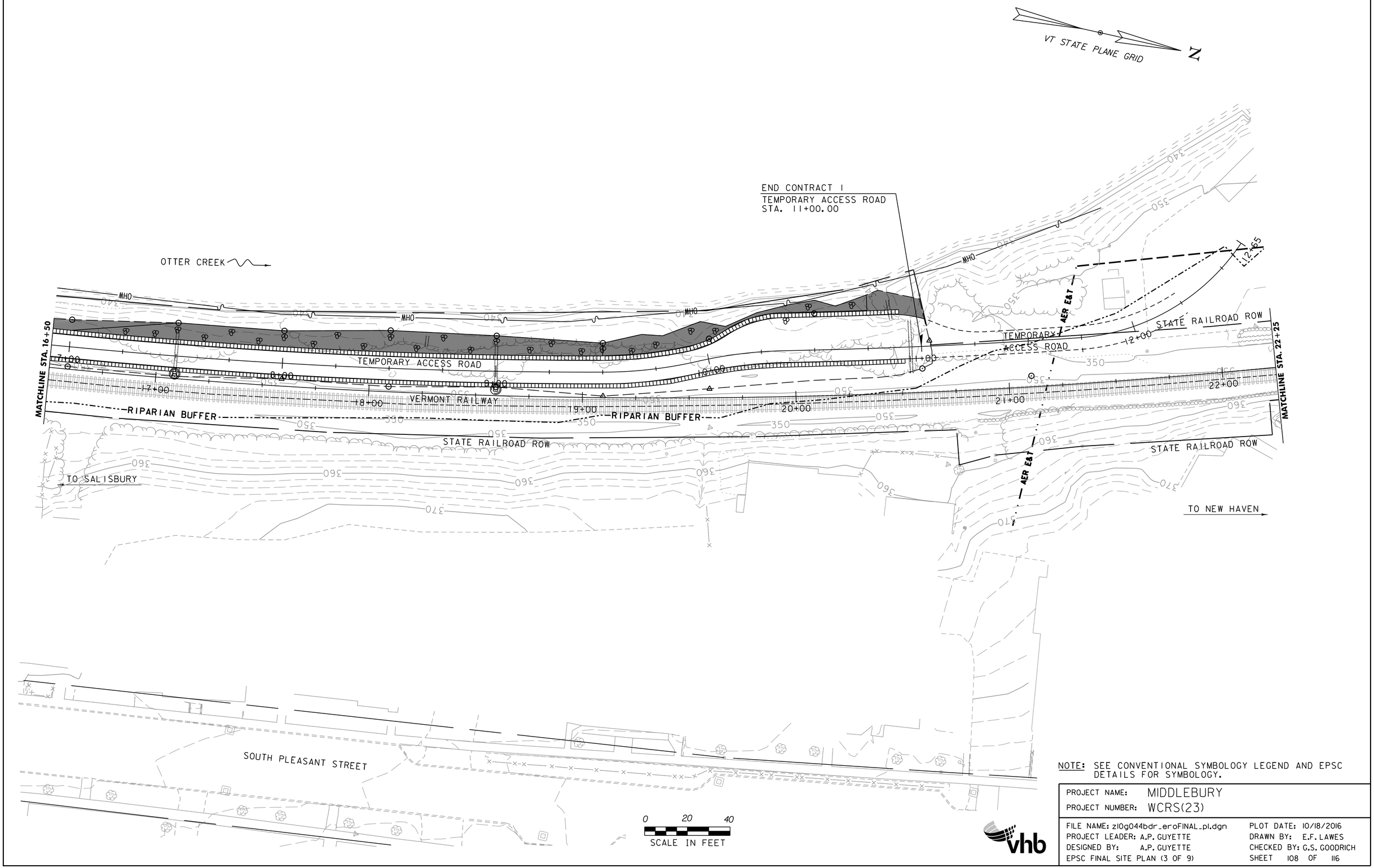
NOTE: SEE CONVENTIONAL SYMBOLOGY LEGEND AND EPSC DETAILS FOR SYMBOLOGY.

0 20 40
SCALE IN FEET

vhb

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044bdr_eroFINAL_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: E.F. LAWES
DESIGNED BY: A.P. GUYETTE	CHECKED BY: G.S. GOODRICH
EPSC FINAL SITE PLAN (2 OF 9)	SHEET 107 OF 116

VHB 57603



NOTE: SEE CONVENTIONAL SYMBOLOGY LEGEND AND EPSC DETAILS FOR SYMBOLOGY.

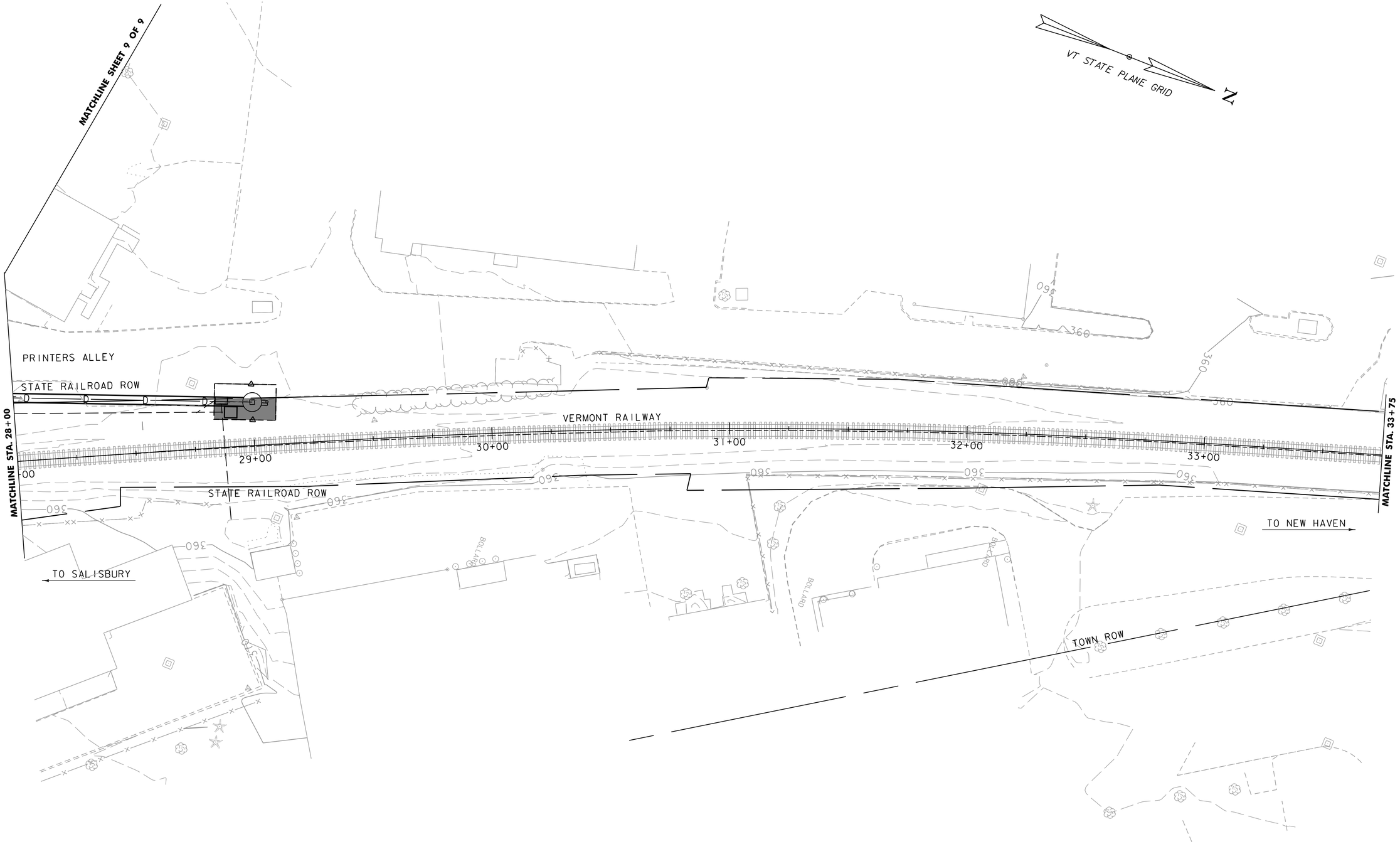
PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044bdr_eroFINAL_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: E.F. LAWES
DESIGNED BY: A.P. GUYETTE	CHECKED BY: G.S. GOODRICH
EPSC FINAL SITE PLAN (3 OF 9)	SHEET 108 OF 116

VHB 57603

NOTE: SEE CONVENTIONAL SYMBOLOGY LEGEND AND EPSC DETAILS FOR SYMBOLOGY.

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044bdr_eroFINAL_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: E.F. LAWES
DESIGNED BY: A.P. GUYETTE	CHECKED BY: G.S. GOODRICH
EPSC FINAL SITE PLAN (4 OF 9)	SHEET 109 OF 116

VHB 57603



NOTE: SEE CONVENTIONAL SYMBOLOGY LEGEND AND EPSC DETAILS FOR SYMBOLOGY.

0 20 40
SCALE IN FEET

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044bdr_eroFINAL_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: E.F. LAWES
DESIGNED BY: A.P. GUYETTE	CHECKED BY: G.S. GOODRICH
EPSC FINAL SITE PLAN (5 OF 9)	SHEET 110 OF 116

VHB 57603

VT STATE PLANE GRID

N

TOWN ROW

TOWN ROW

TOWN ROW

BOLLARD

BOLLARD

360

MIDDLE SEYMOUR STREET

STATE RAILROAD ROW

VERMONT RAILWAY

MATCHLINE STA. 33+75

MATCHLINE STA. 39+50

34+00

35+00

36+00

37+00

38+00

39+00

TO SALISBURY

TO NEW HAVEN

STATE RAILROAD ROW

SEYMOUR STREET

TOWN ROW

NOTE: SEE CONVENTIONAL SYMBOLOGY LEGEND AND EPSC DETAILS FOR SYMBOLOGY.

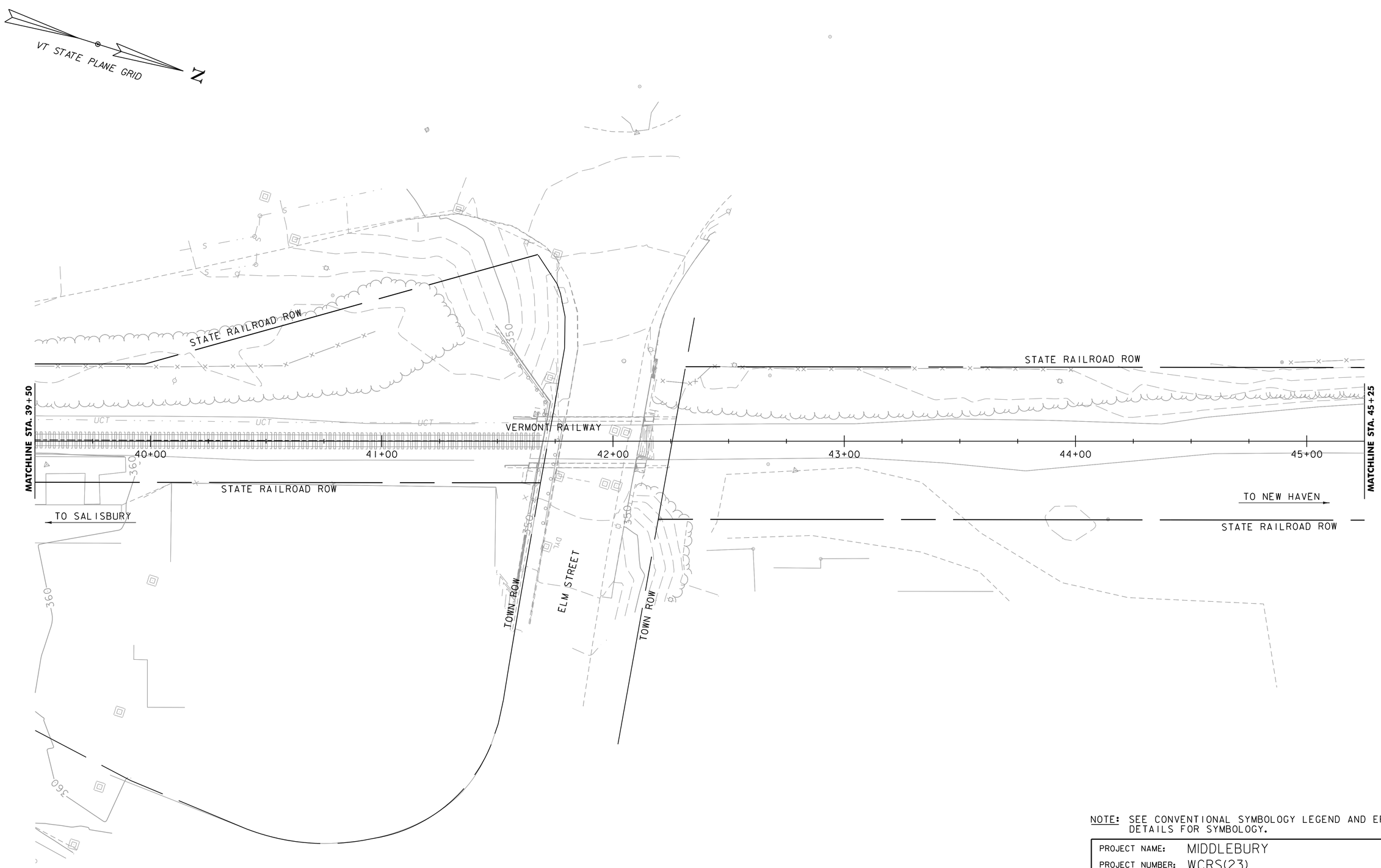
0 20 40

SCALE IN FEET

vhb

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044bdr_eroFINAL_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: E.F. LAWES
DESIGNED BY: A.P. GUYETTE	CHECKED BY: G.S. GOODRICH
EPSC FINAL SITE PLAN (6 OF 9)	SHEET III OF 116

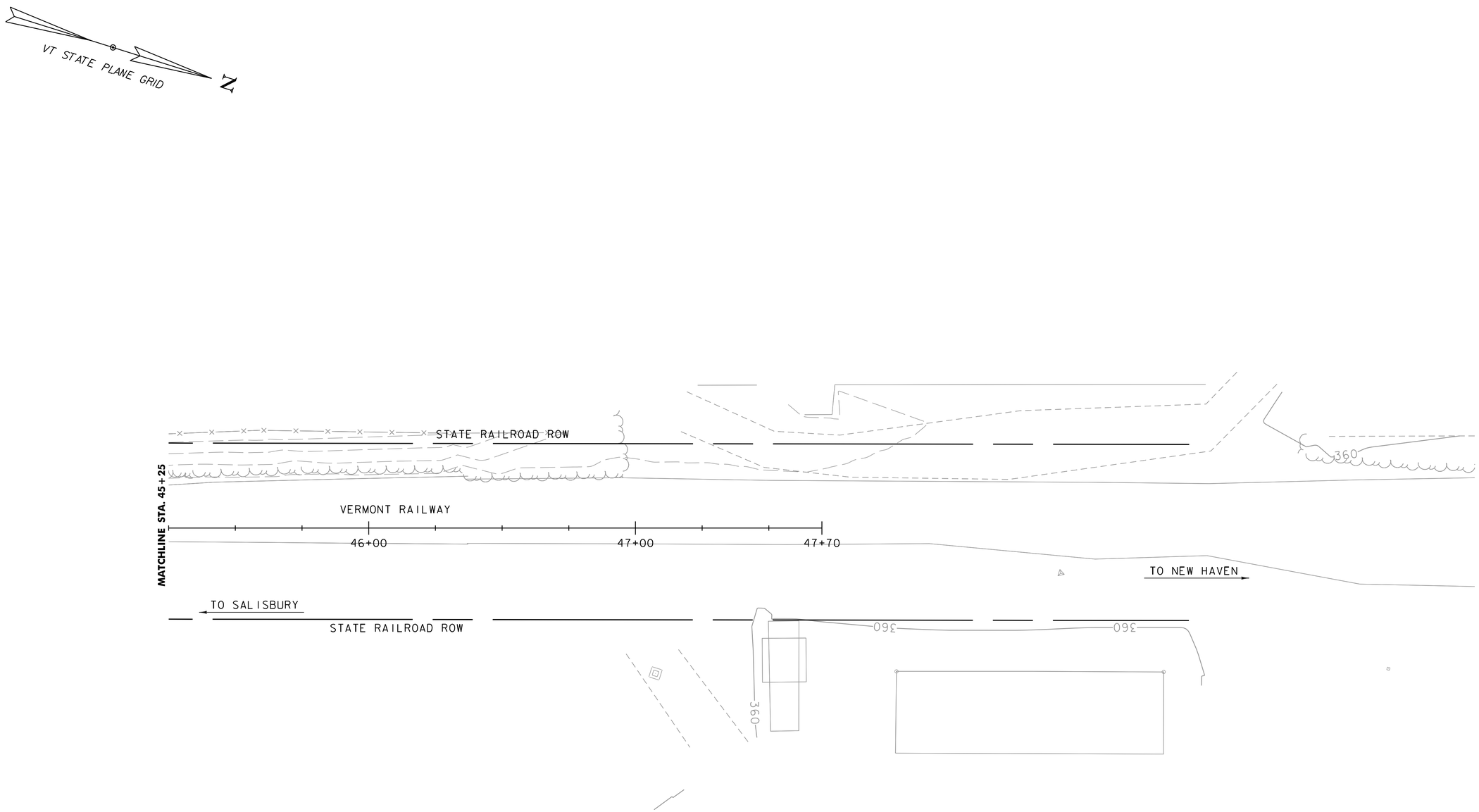
VHB 57603



NOTE: SEE CONVENTIONAL SYMBOLOGY LEGEND AND EPSC DETAILS FOR SYMBOLOGY.

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044bdr_eroFINAL_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: E.F. LAWES
DESIGNED BY: A.P. GUYETTE	CHECKED BY: G.S. GOODRICH
EPSC FINAL SITE PLAN (7 OF 9)	SHEET 112 OF 116

VHB 57603

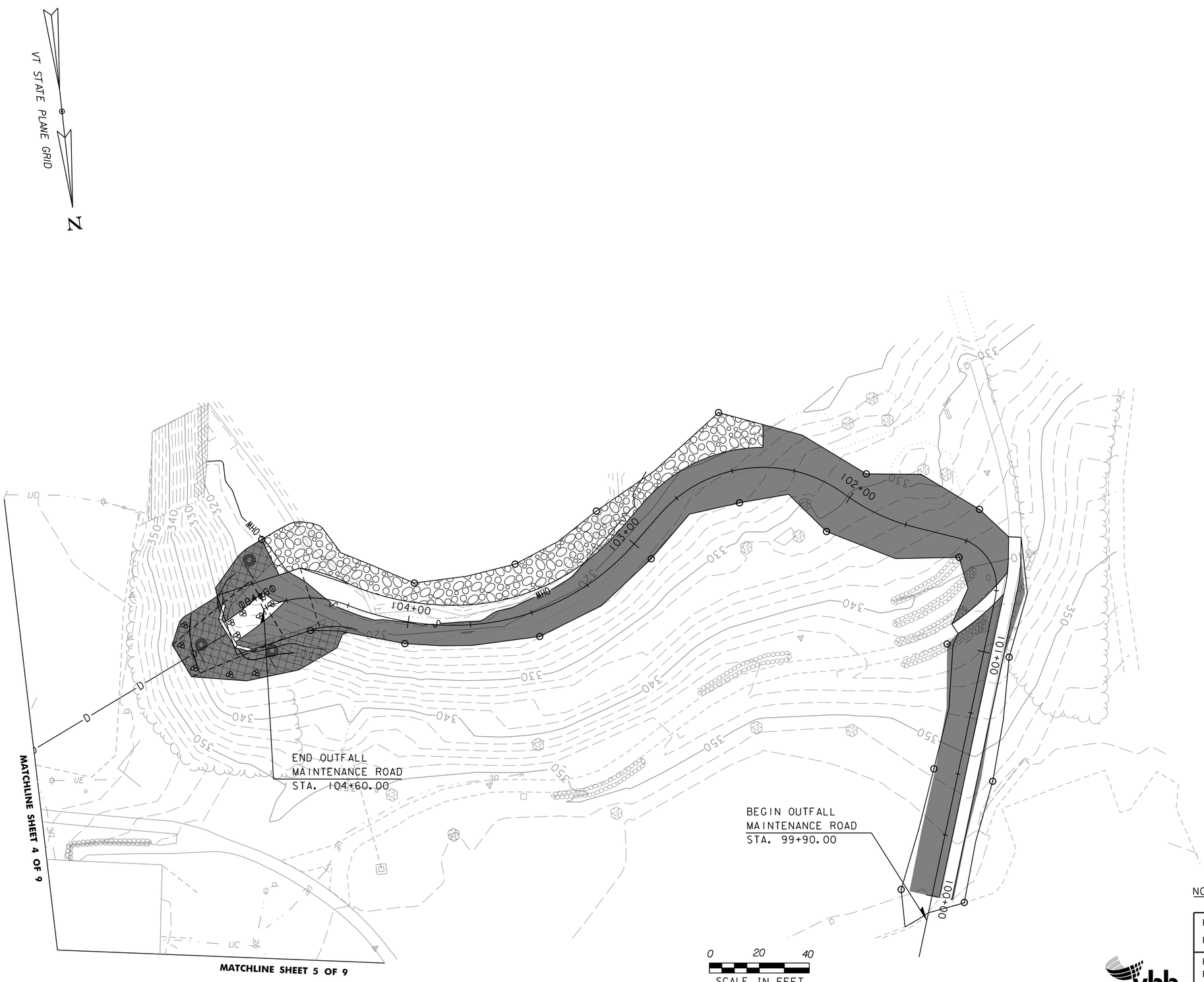


NOTE: SEE CONVENTIONAL SYMBOLOGY LEGEND AND EPSC DETAILS FOR SYMBOLOGY.

0 20 40
SCALE IN FEET

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044bdr_eroFINAL_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: E.F. LAWES
DESIGNED BY: A.P. GUYETTE	CHECKED BY: G.S. GOODRICH
EPSC FINAL SITE PLAN (8 OF 9)	SHEET 113 OF 116

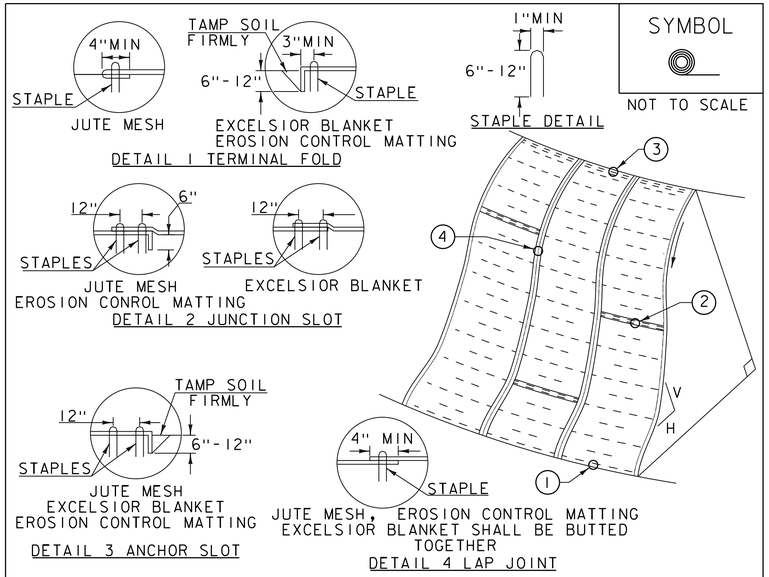
VHB 57603



NOTE: SEE CONVENTIONAL SYMBOLOGY LEGEND AND EPSC DETAILS FOR SYMBOLOGY.

PROJECT NAME: MIDDLEBURY	
PROJECT NUMBER: WCRS(23)	
FILE NAME: z10g044bdr_eroFINAL_pl.dgn	PLOT DATE: 10/18/2016
PROJECT LEADER: A.P. GUYETTE	DRAWN BY: E.F. LAWES
DESIGNED BY: A.P. GUYETTE	CHECKED BY: G.S. GOODRICH
EPSC FINAL SITE PLAN (9 OF 9)	SHEET 114 OF 116

VHB 57603



CONSTRUCTION SPECIFICATIONS

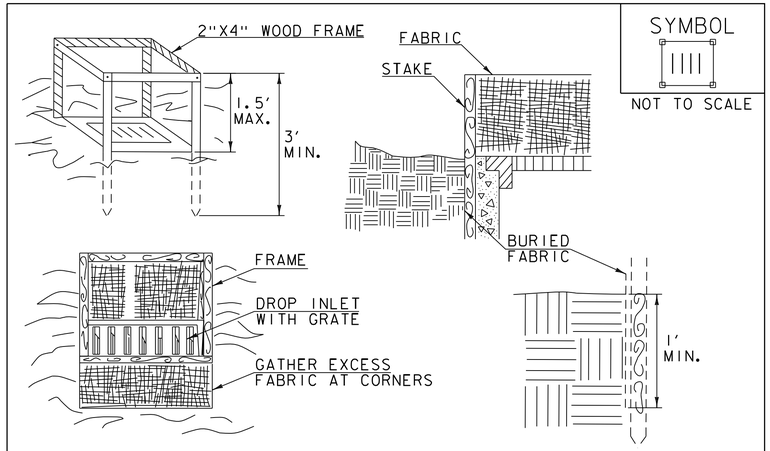
1. APPLY TO SLOPES GREATER THAN 3H:1V OR WHERE NECESSARY TO AID IN ESTABLISHING VEGETATION.
2. APPLY FERTILIZER, LIME SEED PRIOR TO PLACING MATTING.
3. STAPLES ARE TO BE PLACED ALTERNATELY, IN COLUMNS APPROXIMATELY 2' APART AND IN ROWS APPROXIMATELY 3' APART. APPROXIMATELY 175 STAPLES ARE REQUIRED PER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

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

ROLLED EROSION CONTROL PRODUCT (RECP) SIDE SLOPE

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

REVISIONS	
APRIL 16, 2007	JMF
JANUARY 13, 2009	WHF



CONSTRUCTION SPECIFICATIONS

1. FILTER FABRIC SHALL HAVE AN APPARENT OPENING SIZE OF 40-85. BURLAP MAY BE USED FOR SHORT TERM APPLICATIONS.
2. CUT FABRIC FROM A CONTINUOUS ROLL TO ELIMINATE JOINTS. IF JOINTS ARE NEEDED THEY WILL BE OVERLAPPED TO THE NEXT STAKE.
3. STAKE MATERIALS WILL BE STANDARD 2"x 4" WOOD OR EQUIVALENT METAL WITH A MINIMUM LENGTH OF 3'.
4. SPACE STAKES EVENLY AROUND INLET 3' APART AND DRIVE A MINIMUM 18" DEEP. SPANS GREATER THAN 3' MAY BE BRIDGED WITH THE USE OF WIRE MESH BEHIND THE FILTER FABRIC FOR SUPPORT.
5. FABRIC SHALL BE EMBEDDED 1' MINIMUM BELOW GROUND AND BACKFILLED. IT SHALL BE SECURELY FASTENED TO THE STAKES AND FRAME.
6. A 2" x 4" WOOD FRAME SHALL BE COMPLETED AROUND THE CREST OF THE FABRIC FOR OVER FLOW STABILITY.
7. MAXIMUM DRAINAGE AREA 1 ACRE

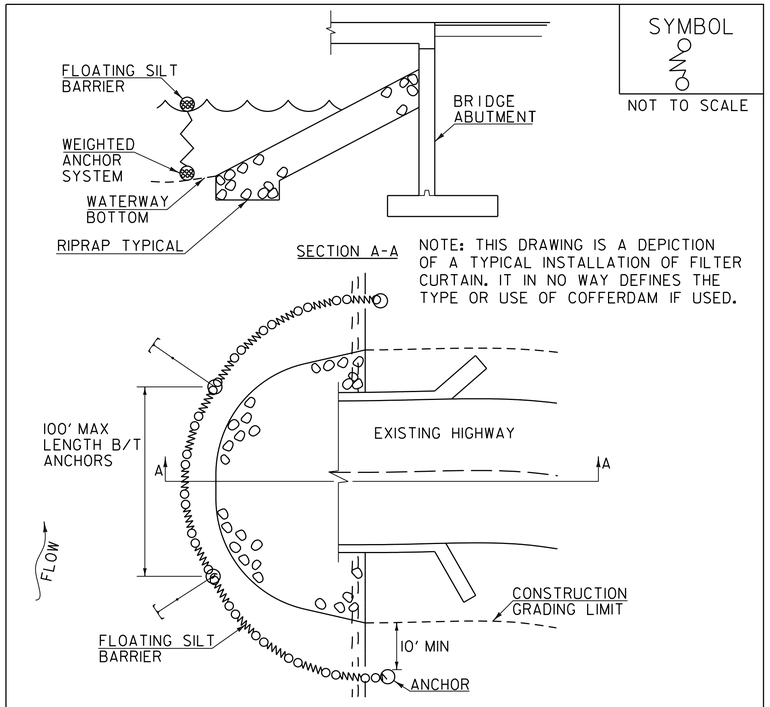
ADAPTED FROM DETAILS PROVIDED BY: NEW YORK STATE DEC
ORIGINALLY DEVELOPED BY USDA-NRCS
VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION

FILTER FABRIC DROP INLET PROTECTION

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 INLET PROTECTION DEVICE, TYPE I (PAY ITEM 653.40).

REVISIONS	
MARCH 7, 2008	WHF
JANUARY 13, 2009	WHF



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

vhb

PROJECT NAME: MIDDLEBURY
PROJECT NUMBER: WCRS(23)

FILE NAME: z10g044details_ero_pl.dgn
PROJECT LEADER: A.P. GUYETTE
DESIGNED BY: VTRANS
EROSION CONTROL DETAILS (1 OF 2)

PLOT DATE: 10/18/2016
DRAWN BY: E.F. LAWES
CHECKED BY: S.E. BURBANK
SHEET 115 OF 116

VHB 57603

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

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

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

CONSTRUCTION GUIDANCE

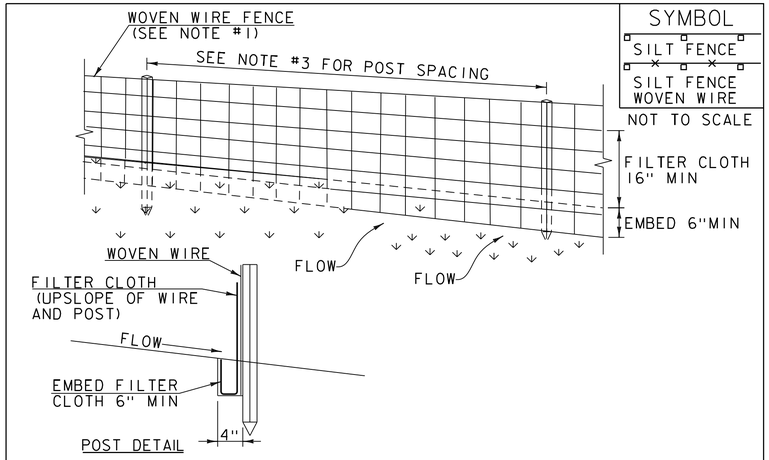
1. SEED MIX: THE CONTRACTOR SHALL COORDINATE WITH THE RESIDENT ENGINEER ON WHICH SEED MIX TO USE.
2. SEED MIX: USE AS INDICATED IN THE PLANS AND/OR FOR ALL ESTABLISHED UPLAND (NON WETLAND) AREAS DISTURBED BY THE CONTRACTOR.
3. ALL SEED MIXTURES: SHALL NOT HAVE A WEED CONTENT EXCEEDING 0.40% BY WEIGHT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

ADAPTED FROM VTRANS TECHNICAL LANDSCAPE MANUAL FOR ROADWAYS AND TRANSPORTATION FACILITIES

TURF ESTABLISHMENT

THIS WORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 651 FOR SEED (PAY ITEM 651.15)

REVISIONS	
JANUARY 12, 2015	WHF



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.

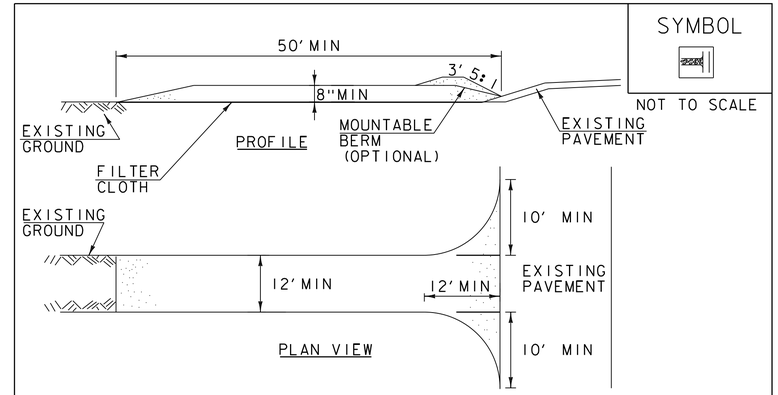
ADAPTED FROM DETAILS PROVIDED BY: NEW YORK STATE DEC
ORIGINALLY DEVELOPED BY USDA-NRCS
VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION

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



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

Consider adding turf establishment detail with urban area mix.

PROJECT NAME: MIDDLEBURY
PROJECT NUMBER: WCRS(23)

FILE NAME: z10g044details_ero_pl.dgn
PROJECT LEADER: A.P. GUYETTE
DESIGNED BY: VTRANS
EROSION CONTROL DETAILS (2 OF 2)

PLOT DATE: 10/18/2016
DRAWN BY: E.F. LAWES
CHECKED BY: S.E. BURBANK
SHEET 116 OF 116

VHB 57603

STATE OF VERMONT
AGENCY OF TRANSPORTATION

Transportation Management Plan

FOR

Middlebury WCRS(23) / Contract 1

MAIN STREET BRIDGE NO. 102 &
MERCHANTS ROW BRIDGE NO. 2

October 18, 2016

Train on railroad between bridges (Photo by VHB)

Table of Contents

1.0 Project Description 4
Drainage Improvement Preparation 4
Access Roadway (to Battel Block parking) 4
Project Information and Specific Traffic Restrictions 5
Work Zone Limits/Affected Roadways 5
Construction Schedule 5
Regional Project Impacts 5
2.0 TMP Team—Roles and Responsibilities 6
TMP Development Managers 6
TMP Implementation Managers 6
TMP Monitoring Task Leaders 7
Public Information Officer 8
Emergency Contacts 8
3.0 Preliminary Work Zone Impact Assessment 10
Railroad Facilities 11
Pedestrian and Bicycle Facilities 11
On-Street Parking Impacts 11
Utility Impacts 12
Right of Way Impacts 12
Roadway Restrictions 12
4.0 Existing Conditions 12
Existing Traffic Operations 13
Crash Data 13
Pedestrian and Bicycle Facilities 14
Regional and Local Transit 14
Community and Business Impacts 16
5.0 TCP Traffic Operations Analysis 17
Safety Analysis 17
Crash Data Analysis *17*
Traffic Analysis 17
Alternatives Analysis 17
6.0 Work Zone Impact Management Strategies 17
Temporary Traffic Control (TTC) 17
Traffic Control Strategy *18*
Traffic Control Devices *18*
Project Coordination Strategies *18*
Innovative Contracting Strategies *18*
Innovative or Accelerated Construction Techniques *18*
Transportation Operations (TO) 20

Incident Management (IM) Plans 20
Public Information and Outreach (PI&O) Plan 20
Public Awareness Strategies *21*
Road User Information Strategies *21*
7.0 Notes 22
8.0 TMP Implementation/Monitoring 22
9.0 TMP Review/Approvals and Change Process 23
10.0 Appendices 24

1.0 Project Description

The Vermont Agency of Transportation (VTrans) has proposed Project Middlebury WCRS(23) (Middlebury Bridge project) to replace the existing deteriorated bridges along VT Route 30/Main Street (Bridge No. 102) and Merchants Row (Bridge No. 2) over the Vermont Railway, originally begun as a Town of Middlebury project. The overall project includes the removal and replacement of both bridges with a tunnel along the existing railroad alignment, lowering of the railroad tracks, construction of several hundred feet of approach retaining walls, and associated roadway and utility work. The project will be phased into two independent construction contracts: Contract 1 consists of the construction of drainage improvement preparation using microtunneling and temporary access roadways to prepare the area for the track work; and Contract 2 which consists of the construction of the tunnel, retaining walls, and the lowering of the railroad tracks to provide a minimum of 21 feet of vertical clearance within the tunnel.

The overall project is considered significant based on the criteria specified in the *Vermont Work Zone Safety & Mobility Guidance Document*[1] and based on the Federal Highway Administration (FHWA) determination that this is a Project of Division Interest (PODI). It is noted the work most impacting the transportation system and the community occurs in Contract 2 while the work in Contract 1 has more limited impacts. Contract 1 is expected to have a moderate impact on traffic operations, impacting a limited number of travelers, either pedestrian, vehicular, or rail. Therefore, the transportation management plan (TMP) for Contract 1 described in this document is comprised of only two of the three primary components: a Temporary Traffic Control Plan (TTC) and a Public Information Component (PI). The Agency determined that this project would be developed as a Construction Manager/General Contractor (CM/GC) for both Contract 1 and Contract 2; therefore, this Draft TMP has been developed with input from the CM/GC for Contract 1. A separate TMP will be developed for Contract 2.

Drainage Improvement Preparation

Contract 1 includes the construction of drainage improvements that are necessary for the ultimate lowering of the railroad tracks. Specifically, the contract includes the construction of two branch drainage pipes using microtunneling techniques leading to a third branch pipe that includes an outfall at Otter Creek. All three proposed microtunnels consist of a 60-inch tunnel bore with a 36-inch PVC drainage pipe. The launch pit for the three microtunnels will be located along Printers Alley off of VT Route 30 (Main Street). The proposed drainage outfall will require the construction of a maintenance roadway of about 450 feet that begins at the parking area behind Marbleworks.

Access Roadway (to Battel Block parking)

Contract 1 includes the construction of a temporary roadway to access the Battel Block parking normally accessed from a driveway along Merchants Row adjacent to the railroad bridge. The approximately 1,200 foot paved roadway parallels the railroad tracks from STA 11+35 to STA 21+50, with a southern

[1] Work Zone Safety & Mobility Guidance Document, Vermont Agency of Transportation, August 2007. Page 4 of this document lists criteria.

connection to Water Street and a northern connection to the lower end of the Battel Block parking area. The access roadway has been designed as an alternating one way roadway using temporary traffic signals. While the access roadway will be constructed in Contract 1, it is expected to be blocked to prohibit public access until it is needed in Contract 2. The access roadway includes a nearly perpendicular crossing of the railroad tracks at approximately STA 14+00.

Project Information and Specific Traffic Restrictions

The construction associated with Contract 1 has moderate impact to traffic flow and operations. The construction of the drainage outfall and the two access roadways are intended to be constructed off-line; therefore, the impact to traffic will primarily be the entering and exiting construction vehicles required to construct these elements. The biggest construction impacts will be in the area of Main Street at the Printers Alley intersection. For the duration of construction, at least five (5) parking spaces along Main Street and up to two (2) additional parking spaces at Marble Works will be unavailable. Through pedestrian traffic along the east side of Main Street will be detoured to the west side of Main Street. All traffic controls shall be in conformance with the *Vermont Work Zone Safety & Mobility Guidance Document Appendix A: Temporary Traffic Control Devices* and shall be coordinated with VTrans for approvals.

Construction Zone Limits/Affected Roadways

The construction zones for Contract 1 will include Main Street, Printers Alley, Maple Street and Water Street. Parking along the east side of Main Street will be closed between Merchants Row and the north side of the railroad bridge while the adjacent sidewalk will be closed and detoured to the west side of Main Street. Printers Alley will be closed to all traffic (vehicular and pedestrian) between Main Street and Maple Street. There is also a work zone at the end of Water Street where the proposed access roadway will connect to Water Street.

Construction Schedule

Construction for Contract 1 is scheduled to begin during the 2017 construction season. It is important that the work associated with Contract 1 is complete prior to the beginning of Contract 2. Based on an expected start for Contract 2 in the Spring of 2018, Contract 1 is expected to finish prior to the winter shutdown in 2017.

Regional Project Impacts

VTRANS TO PROVIDE INFORMATION

2.0 TMP Team—Roles and Responsibilities

TMP Development Managers

TMP Development Managers	
Agency of Transportation (AOT)	**Consultant/Contractor**
Name/Title: Joel Perrigo, PE Unit: Project Manager Phone: 802-828-2583 Email: joel.perrigo@vermont.gov	Name/Title: Mark Suennen, PE, PTOE Unit: VHB Traffic Engineer Phone: 603-391-3980 Email: msuennen@vhb.com

The TMP Development Managers are Agency and designer personnel that are responsible for the creation of the TMP. The Development Managers are required to prepare the TMP based on the anticipated needs of the project based on the finding of moderate impacts to the traveling public associated with Contract 1. The Development Managers for the first contract of the Middlebury Bridges/Tunnel project are required to analyze the feasibility of maintaining efficient transportation through the project construction area, accounting for the effects the maintenance of traffic will have on downtown vehicle, bicycle and pedestrian flow as well as maintaining existing railroad traffic. The Development Managers have created a Temporary Traffic Control (TTC) plan and provided a conceptual layout of the Public Information and Outreach (PI&O) requirements for the TMP Implementation Managers, Task Leaders and Monitoring Managers. As the project is being developed under the Construction Manager/General Contractor (CM/GC) model, the selected CM/GC (Kubricky Construction) has been involved in the development of the TTC plans through the design process.

TMP Implementation Managers

TMP Implementation Managers	
AOT	**Contractor**
Name/Title: Chris Williams / Regional Construction Engineer Unit: Construction Phone: 802-654-0766 Email: chris.williams@vermont.gov	Name/Title: Mark Alexander Unit: Kubricky Construction Phone: TBD Email: TBD

The TMP Implementation Managers are Agency and Contractor personnel that are responsible for implementing the TMP once the project reaches construction. The TMP transitions from Development to Implementation after the Agency selects a Contractor (either the CM/GC or an alternative Contractor) and the construction period commences. In addition to implementing the TMP, the Agency and Contractor Implementation Managers must have sufficient authority to make adjustments and changes

to the TMP by following the *Manual of Uniform Traffic Control Devices*[2] (MUTCD) and *Vermont Work Zone Safety & Mobility Guidance Document*. These Managers must observe and document changes to the TMP in the field, prepare evaluations, and refine the work zone impact process through continuous monitoring.

TMP Monitoring Task Leaders

TMP Monitoring Task Leaders	
AOT	**Contractor**
Name/Title: Tim Pockette / Resident Engineer Unit: Construction Phone: 802-793-4027 (mobile) Email: tim.pockette@vermont.gov	Name/Title: TBD / Superintendent Unit: Kubricky Construction Phone: TBD Email: TBD

The TMP Monitoring Task Leaders are Agency and Contractor personnel that are responsible for day-to-day TMP oversight. The Agency's Monitoring Task Leader should be an on-site inspector, typically the Resident Engineer of the project with a working knowledge of the TMP, its goals and its performance standards, who can report deficiencies and recommend adjustments to improve the operation of the TMP. The Contractor's TMP Monitoring Task Leader should be the Contractor's personnel who is primarily responsible for the temporary traffic control and traffic operations within the work zones. This individual, typically a Superintendent or Traffic Control Manager, should have sufficient authority to implement changes to the TMP in accordance with the TMP Implementation Managers, the *Manual of Uniform Traffic Control Devices,* the *Vermont Work Zone Safety & Mobility Guidance Document* and direction from VTrans. The Contractor's TMP Monitoring Task Leader should be available 24/7 for on-site support, observation, and adjustment of the temporary traffic control and traffic operations. The TMP Monitoring Task Leaders are required to report the effectiveness of the TMP against the performance standards and make changes to the traffic control and traffic operations on a regular basis. Near the completion of Contract 1, the TMP Monitoring Task Leaders should hold a lessons learned discussion at one of the final construction progress meetings, prior to the finalization of the TMP for Contract 2.

The TMP Monitoring Task Leaders are the primary contract personnel for identifying, verifying and reporting incidents in the work zone. The TMP Monitoring Task Leaders report to the TMP Implementation Managers, and the Public Information Officer and emergency services, as needed.

[2] *Manual of Uniform Traffic Control Devices* (MUTCD) for Streets and Highways, USDOT and FHWA, 2009 Edition with 2012 Revisions

Public Information Officer

TMP Public Information Officer	
AOT	**Contractor**
Name/Title: Jill Barrett / Public Information Officer Unit: Fitzgerald & Halliday, Inc. Phone: 860-570-0740 Email: jbarrett@fhiplan.com	Name/Title: TBD Unit: TBD Phone: TBD Email: TBD

The TMP Public Information (PI) Officers are Agency (and Contractor personnel as required) that are responsible for distributing information, notifications and warnings to the public regarding the project as a whole, and specifically the traffic impacts of the project. Prior to construction, the PI Officer will notify local town and state officials of the proposed work plan and project schedule. The PI Officers will also be responsible for coordination with the railroad in the event any work activities will impact rail operations. In the days prior to the closure of parking spaces, the PI Officers will coordinate a local public outreach to alert local business owners to the pending construction.

As construction continues, the PI Officers will be notified by the TMP Monitoring Task Leaders of changes to the TMP implementation and of incidents that may have impact to pedestrians, bicyclists, local businesses and the railroad. When incidents occur, the PI Officers will be responsible for crafting messages and implementing notifications to the public about the situation and provide direction to travelers when changes in travel patterns are required (ie. detours for closed roadway(s)).

Emergency Contacts

Emergency Service Contacts	
Middlebury Rescue Team	**Middlebury Fire Department**
Name/Title: Middlebury Fire Department Technical Rescue Team Address: 5 Seymour Street, Middlebury, VT 05753 Phone: 802-388-4462 Email: dshaw@middleburyfiredept.org	Name/Title: Chief David Shaw Address: 5 Seymour Street, Middlebury, VT 05753 Phone: 802-388-3652 Email: dshaw@middleburyfiredept.org

Middlebury Police Department	Vermont Railway
Name/Title: Chief Thomas Hanley Address: 1 Lucius Shaw Lane, Middlebury, VT 05753 Phone: 802-388-4363 Email: thanley@middleburypolice.org	Name/Title: VRS Dispatcher (non-emergency contact: Matt Young – 802-775-4356 - myoung@vrs.us.com) Address: 118 Post Street, Rutland, VT 05701 Phone: 1-888-265-2735 Email: dispatcher@vrs.us.com
Middlebury Operations/Public Works Dept.	**Gas Utility – Vermont Gas Systems**
Name/Title: Dan Werner / Director of Operations Address: 1020 South Route 7, Middlebury, VT 05753 Phone: 802-388-4045 Email: dwerner@townofmiddlebury.org	Name/Title: Matt Anderson / Vermont Gas Address: Phone: 802-318-0260 Email 1: MAnderson@vermontgas.com Email 2: customerservice@vermontgas.com
Electric Utility – Green Mountain Power	**Telecom Utility - Fairpoint**
Name/Title: Theresa Dessureault / GMP Address: 163 Acorn Ln, Colchester, VT 05446 Phone: 802-382-8718 Email 1: Theresa.Dessureault@greenmountainpower.com Email 2: callcenter@greenmountainpower.com	Name/Title: Tucker Peterson / Fairpoint Address: Phone: 802-747-1071 Email: tpeterson@fairpoint.com
Telecom Utility – FirstLight Fiber	**Telecom Utility - Comcast**
Name/Title: Bill Gray / FirstLight Fiber Address: 45 Krupp Dr, Williston, VT 05495 Phone: 802-373-4319 Email: wgray@firstlight.net	Name/Title: Jeremy Cota / Comcast Address: 96 Avenue B, Williston, VT 05495 Phone: 802-846-2412 Email: Jeremy_Cota@cable.comcast.com
Telecom Utility - Sovernet	**Middlebury College**
Name/Title: Mark Tessier / Sovernet Communications Address: 5 Canal Street, PO Box 495, Bellows Falls, VT 05101 Phone: 802-460-9213 Email: mtessier@sover.net	Name/Title: Howie McCausland / Middlebury College Address: Phone: 802-443-5754 Email: mccausla@middlebury.edu

VTrans Maintenance District 5 - Colchester	Vermont Agency of Natural Resources – Department of Environmental Conservation – Waste Management and Prevention Division
Name/Title: David Blackmore, District Transportation Administrator Address: PO Box 168, Essex Junction, VT 05453 Physical: 189 Troy Ave, Colchester, VT, 05446 Phone: 802-655-1580 Email: David.Blackmore@vermont.gov	Name/Title: Charles Schwer, Director Address: One National Life Dr, Montpelier, VT 05620 Office Phone: 802-828-1138 24 Hour Phone (Spills): 800-641-5005
Vermont Department of Public Safety – Division of Emergency Management and Homeland Security	**Addison County Transit Resources (ACTR)**
Name/Title: Christopher Herrick, Director HQ Address: 45 State Dr, Waterbury, VT 05671 HQ Phone: 800-347-0488 Haz Mat Phone: 1-800-641-5005 Email: mark.bosma@vermont.gov	Name/Title: Community Transportation Center Address: 297 Creek Road, Middlebury, VT 05753 Phone: 802-388-2287 Email: info@actr-vt.org

The emergency contacts are for local agencies, utilities, and First Responders that may need to be alerted in the event of an incident that occurs within the work zone. The TMP Implementation Manager and Public Information Officers shall make preliminary contact with these services at the beginning of the construction effort to coordinate processes and procedures in the event of an incident. Additional emergency contacts may be required during TMP implementation or based on the nature of the incident. For major incidents, additional support may be required from VTrans officials, neighboring communities and other State of Vermont agencies.

3.0 Preliminary Work Zone Impact Assessment

The preliminary assessment of the work zone impact of the project found that the overall project (Contract 1 and Contract 2) constitutes a significant impact to traffic and requires a TMP. It was further determined that a separate TMP should be prepared for each breakout contract.

The preliminary assessment of the work zone impact of Contract 1 finds that the impact to traffic is moderate, both in the degree of impact and the time the impact occurs. No road closures along Main Street or Water Street are anticipated; however, Printers Alley will be closed for an extended period during the demolition of the existing building foundation and during the microtunneling operations. A vehicular detour shall be available using Main Street, Seymour Street and Elm Street to Middle Seymour Street which leads to Maple Street and intersects Printers Alley. A separate pedestrian detour shall be available using Main Street to Mill Street to the pedestrian bridge over Otter Creek to Maple Street.

Railroad Facilities

There is one affected railroad corridor on the project. The single track shortline railroad track passing through downtown Middlebury is owned by VTrans and operated by the Vermont Railway (VTR). It is part of the Vermont Rail System serving the north-south corridor between Burlington and Bennington. The existing tracks are proposed to be replaced at a lower elevation, in some areas as much as three feet below existing grade, to provide improved vertical clearance under the new bridges. This railroad profile change requires additional track modifications to a distance of 1,300 feet south of Merchants Row at the north side of the Otter Creek railroad bridge and to a distance of 1,500 feet north of Main Street at the south side of the Elm Street bridge.

In order to build the new tracks and tunnel segments, it is anticipated that the track will require daily closures. The current agreement between Vermont Railway and the Town of Middlebury is that the track must remain open at least four hours each day to run freight traffic but will be closed to rail traffic the remaining 20 hours per day to allow track and bridge construction.

In Contract 1, there will be limited impacts to the railroad facilities. The construction of the access roadway is occurring on the State's railroad right-of-way just outside of the rail's dynamic envelope. The access roadway does cross-over the rail near the midpoint of the access roadway; therefore, the construction of this access roadway includes constructing/improving an at-grade rail crossing. The microtunneling will also require excavation work adjacent to a segment of track around STA 27+25.

Pedestrian and Bicycle Facilities

The Main Street corridor includes sidewalks along both sides of the roadway but no specific bicycle facilities; however, it is noted that the Main Street corridor currently includes sharrow bicycle markings. The sidewalk on the west side of Main Street abuts several buildings and store fronts while the sidewalk on the east side of Main Street abuts Triangle Park and St. Stephen's Episcopal Church, both adjacent to the railroad corridor. In addition, it is anticipated that Triangle Park will be closed to the public throughout Contracts 1 and 2.

There are existing marked crosswalks across Main Street at the north and south sides of the Merchants Road intersection as well as a midblock crosswalk connecting the Post Office to a paved path in the Village Green. There are also marked crosswalks across Merchants Row and across Printers Alley at the Main Street intersection. There are no bicycle or pedestrian facilities along the affected segments of Water Street or Printers Alley.

As noted previously, the proposed pedestrian detour will take advantage of the existing pedestrian bridge over Otter Creek off of Mill Street.

On-Street Parking Impacts

It is anticipated that up to five on-street parking spaces will be unavailable to the public during the microtunneling construction. The location of these parking spaces is along the east side of Main Street between Merchants Row and the St. Stephen's Episcopal Church. These parking spaces will be closed to the public for construction access to Triangle Park throughout Contracts 1 and 2.

Utility Impacts

The proposed TMP strategies are not expected to have impact to existing utilities in Contract 1. The Contractor shall contact the local utility companies and Dig Safe prior to construction regarding any impacts to utilities that could be affected by the access roadways or the microtunneling operations.

Right of Way Impacts

The proposed work is expected to have several right-of-way impacts. The construction of the temporary access road along the railroad right-of-way will require access from Water Street, a Town roadway. The construction along Printers Alley and at the microtunneling access pits will require construction access rights from the adjacent bank and from Marble Works. Additional property impacts are anticipated along Town of Middlebury rights-of-way.

Roadway Restrictions

The Main Street corridor is a primary downtown corridor for businesses and through travel in Middlebury. Therefore, Main Street cannot be closed during the construction of Contract 1.

4.0 Existing Conditions

The following table shows the existing characteristics of the project area, including geometrics and traffic volumes.

Table 1 - Existing Conditions of Project Roadways

Roadway Characteristics						
Roadway/Street Name	**Functional Classification**	**Number of Directional Lanes**	**Roadway Dimensions [in Feet]**	**Sidewalks**	**Bike Lane**	**Other**
VT Route 30 / Main St	Minor Arterial	1+	55’ (includes parking lane)	5’	N/A	
Painters Alley	Alleyway	1	Varies – 11’ to 24.5’ (no shoulders)	N/A	N/A	
Water Street	Local	1	24’ (no shoulders)	N/A	N/A	

TO BE COMPLETED UPON RECEIPT OF TRAFFIC VOLUME DATA

Table 2 - Traffic Volumes

	VT Route 30 / Main Street	Water Street	Printers Alley (one way)	Maple Street
Traffic Data (Anticipated)	2017	2017	2017	2017
AADT	xxxx	<400	<400	xxx
DHV	xxx	xx	xx	xx
ADTT	xx	xx	xx	xx
%T	xx	xx	xx	xx
%D	xx	xx	100	xx

Existing Traffic Operations

TO BE COMPLETED UPON RECEIPT OF TRAFFIC VOLUME DATA

Crash Data

TO BE COMPLETED UPON RECEIPT OF CRASH DATA

Table 3 - Crash Summary

Crash Data Summary						
Year	2011	2012	2013	2014	2015	Total
						100%
Severity	Fatality	Personal Injury	Property Damage	Unknown		
						100%
Day of Week	Monday through Friday	Saturday/Sunday				
						100%
Time of Day	Morning (6 AM – 10 AM)	Midday (10 AM – 1 PM)	Afternoon (1 PM – 4 PM)	Evening (4 PM – 8 PM)	Night (8 PM – 6 AM)	
						100%

Season	Winter (Dec-Feb)	Spring (Mar-May)	Summer (Jun-Aug)	Autumn (Sept-Nov)		
						100%
Surface Condition	**Dry**	**Wet/Snow/Ice**	**Obstruction**	**Other/Unknown**		
						100%
Lighting Condition	**Daylight**	**Dawn**	**Dusk**	**Dark**	**Other**	
						100%

Pedestrian and Bicycle Facilities

The downtown environment coupled with the nearby college (Middlebury College) means that the project area has a significant population of pedestrians and bicyclists. There are sidewalks throughout the downtown area, including paved walking paths through the Village Green. There are several existing crosswalks in the Contract 1 construction area including:

- A crosswalk across Main Street between the Post Office and the park;
- A crosswalk across Printers Alley at the Main Street intersection;
- Three crosswalks across each of the three approaches to the Main Street at Merchants Row intersection;
- A crosswalk across Merchants Row between the park bus shelter and the northeast corner of the Battelle Block; and
- A crosswalk across Water Street at the Charles Avenue intersection.

While bicycling is a popular activity in Middlebury, there are no bicycle-specific facilities within the project area. However, the Main Street corridor does include sharrow pavement markings and the ACTR buses provide bicycle racks.

Regional and Local Transit

Middlebury acts as the hub of the Addison County Transit Resources (ACTR) regional transit system. Beginning at the Merchants Row bus shelter, ACTR provides five shuttle routes throughout the Town of Middlebury as well as regional connections to the neighboring communities of Bristol, Burlington, Rutland and Vergennes. A system map of the ACTR routes is shown below in Figure 1. Schedules for the various bus routes are available on the ACTR website.

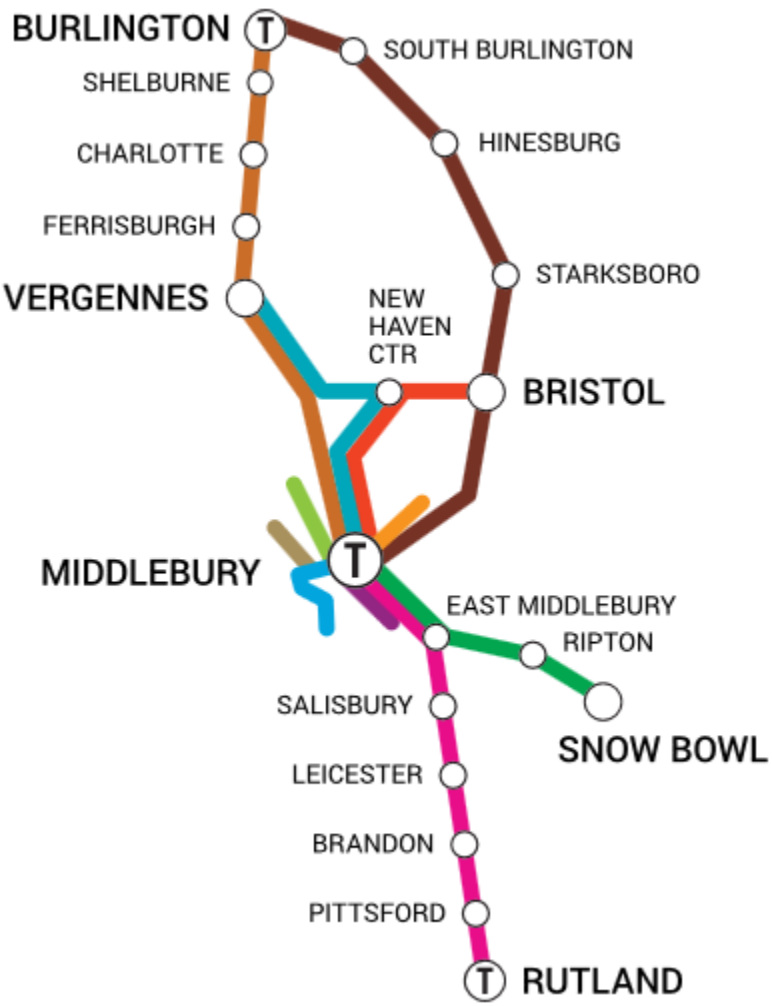


Figure 1: ACTR Reginoal System Map (courtesy of www.actr-vt.org)

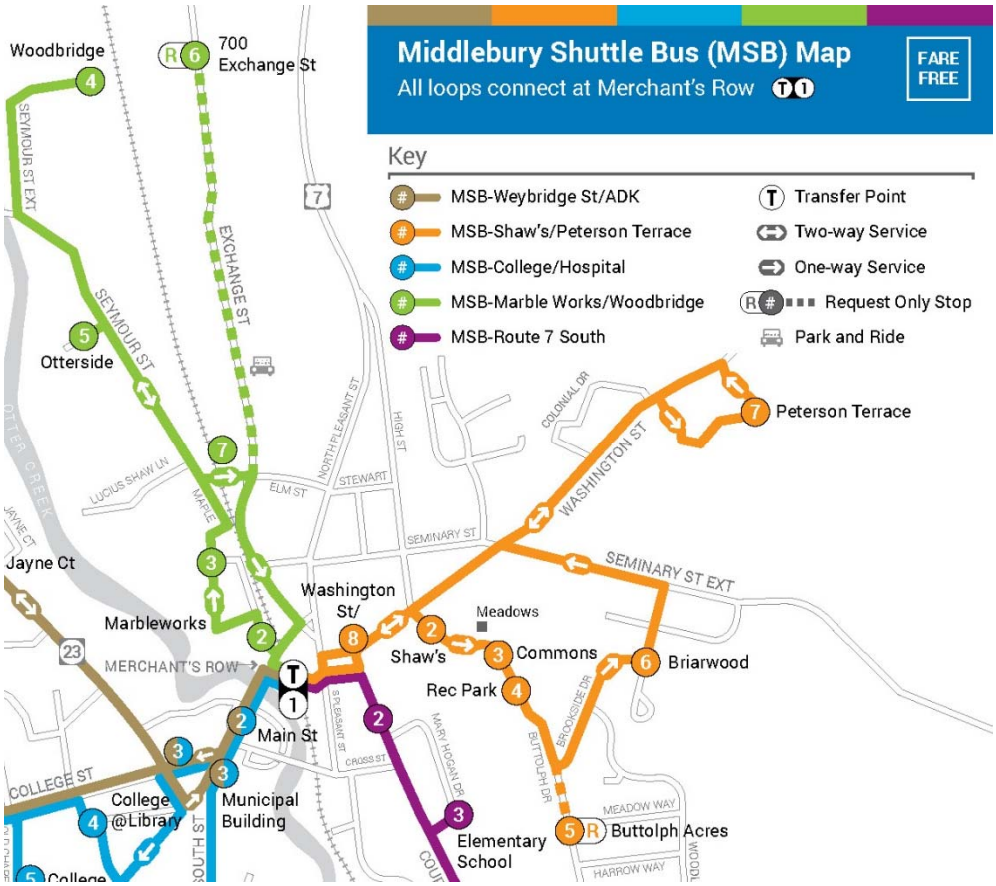


Figure 2: ACTR (Partial) Middlebury Shuttle Map (courtesy of www.actr-vt.org)

As shown in Figure 2, the Middlebury Shuttle Bus (MSB) route labeled Marble Works/Woodbridge currently uses Printers Alley to access the Marbleworks area. Bus stop #2 is located at the base of the Printers Alley hill, which will be in the construction zone for Contract 1. With Printers Alley closed, this MSB route will have to detour to access Maple Street and the Marbleworks area.

The sidewalk along Merchants Row will remain open adjacent to Triangle Park, allowing for unrestricted flow of pedestrians to and from the Merchants Row bus shelter. The highest levels of impact to the transit system may occur during blasting operations when the buses two-way radios must be turned off and on the occasions when the blasting requires temporary road closures adjacent to the blast area.

Community and Business Impacts

During Contract 1, there will be some inconvenience to the community and some business impacts. The parking area behind the Bank will not be allowed free flowing access but will require flagging control around the work area. All buildings in proximity to one of the microtunneling access pits will be subject to construction noise, dust and occasional blasting.

5.0 TCP Traffic Operations Analysis

Safety Analysis

Crash Data Analysis

TO BE COMPLETED UPON RECEIPT OF CRASH DATA

Traffic Analysis

The extent of the traffic analysis conducted for this TMP is to note that vehicular traffic detoured from Printers Alley to the detour route along Main Street, Seymour Street, Middle Seymour Street and Maple Street will have nominal impact to the detour roadways. The traffic volume along Printers Alley is less than 400 vehicles per day with an estimated design hour volume of about 55 vehicles. During the peak hours for the road network, the addition of 55 vehicles along Main Street, Seymour Street, Middle Seymour Street and Maple Street is expected to have little impact to the operations and level of service along the detour roadways.

Alternatives Analysis

The work associated with Contract 1 is expected to have limited impact to overall traffic flow through the town. The scope and nature of the work involved allows limited alternatives to consider for traffic control. Each of the three work areas associated with the microtunneling operations are located adjacent to rail and vehicular facilities and have been contained as much as feasible to isolate the work area from the rail and vehicular traffic. The proposed outfall area is isolated from any traffic impacts, although the access roadway to reach the outfall area begins at a parking lot along Maple Street and is adjacent to the pedestrian walking path that will act as part of the pedestrian detour route for Printers Alley.

6.0 Work Zone Impact Management Strategies

Temporary Traffic Control (TTC)

A temporary traffic control (TTC) plan has been prepared for this project. The TTC plan describes traffic control measures to be implemented to facilitate vehicular and pedestrian traffic flow through the work areas. This TTC plan includes the identification and location of signs, channelizing devices, temporary concrete barrier wall, portable temporary fencing, and other associated equipment necessary to provide positive guidance to the motorists and pedestrians through the work zone. The CM/GC has been involved in the development of the TTC and is therefore expected to accept and implement the proposed TTC plans as their approved traffic control plan. The CM/GC may supplement the TTC plans with additional details as to the methods and tools required by the Contractor to accomplish specific work activities. These changes shall be considered as modifications to the TMP through the TMP revision process.

Traffic Control Strategy

Much of the construction associated with Contract 1 is off-line from the vehicular, bicycle and pedestrian corridors in Middlebury. Where construction activity will impact traffic flow, the traffic control strategy is to deploy traffic control devices to maintain traffic flow where possible or detour traffic flow where necessary. Road closures such as Printers Alley will be signed to detour traffic to access the area using Middle Seymour Street and Maple Street. Sidewalk closures will include signing to re-direct pedestrians to alternative pedestrian paths using existing or interim crosswalks. The construction work will be conducted using best practices for work adjacent to railroad corridors, using rail flaggers to briefly halt work and allow rail traffic to proceed.

Traffic Control Devices

The Contractor will be required to use several traffic control devices to provide adequate warning and positive guidance through the work zone for vehicles and pedestrians. Temporary signs, channelization devices, flaggers, and uniformed police officers may all be necessary elements of the TTC plan for Contract 1.

Project Coordination Strategies

Although impacts to utilities, other adjacent transportation projects, and the infrastructure along the detour routes and within the local communities are not anticipated, the Contractor will be required to coordinate with all stakeholders during the execution of the project.

Innovative Contracting Strategies

This project will follow the CM/GC method for project development and delivery. A contractor has been involved in the design phase of the project. When the design plans are completed, the CM/GC will negotiate a price with the Agency. If the Agency fails to come to agreement with the CM/GC they shall cease negotiation and advertise the project as a traditional Design-Bid-Build contract. It is anticipated that the final selection of a contractor will occur before the start of the 2017 construction season.

Innovative or Accelerated Construction Techniques

No innovative or accelerated construction techniques are proposed for Contract 1.

Table 4 - Temporary Traffic Control Strategies and Devices Required

Temporary Traffic Control (TTC)	√	Cost
Control Strategies		
1. Construction phasing/staging	√	
2. Full roadway closures	√	
3. Lane shifts or closures	√	
4. One-lane, two-way controlled operation		
5. Two-way, one-lane traffic/reversible lanes		

6. Ramp closures/relocation		
7. Freeway-to-freeway interchange closures		
8. Night work	√	
9. Weekend work	√	
10. Work hour restrictions for peak travel	√	
11. Pedestrian/bicycle access improvements		
12. Business access improvements		
13. Off-site detours/use of alternate routes		
Traffic Control Devices		
14. Temporary signs	√	
15. Arrow boards	√	
16. Channelizing devices	√	
17. Temporary pavement markings		
18. Flaggers and uniformed traffic control officers	√	
19. Temporary traffic signals		
20. Lighting devices	√	
Project Coordination Strategies		
21. Other area projects	√	
22. Utilities	√	
23. Right-of-Way		
24. Other transportation infrastructure	√	
Innovative Contracting Strategies		
25. Design-Build		
26. A+B Bidding		
27. Incentive/Disincentive clauses		
28. Lane rental		
29. Performance specifications	√	
Innovative or Accelerated Construction Techniques		
30. Prefabricated/precast elements		
31. Rapid cure materials		

Transportation Operations (TO)

While the overall project is expected to include transportation operations strategies, the Contract 1 project is not expected to employ any of these strategies. However, the work involved in Contract 1 is suited to consideration of incident management plans.

Incident Management (IM) Plans

A critical component of the Transportation Operations plan is to think about incident management (IM) before it is needed. As such, this TMP includes two hypothetical incidents that are described within this section: a minor incident and a major incident. Each scenario is described to provide a sense of scale for the incident, along with some incident management tactics that could be considered for this project to prepare for that type of incident.

Minor Incident Management

TO BE COMPLETED IN COORDINATION WITH THE CM/GC

Major Incident Management

TO BE COMPLETED IN COORDINATION WITH THE CM/GC

Public Information and Outreach (PI&O) Plan

A comprehensive and consistent public information and outreach (PI&O) plan will be critical to the success of the whole project, through both Contract 1 and Contract 2. The Middlebury community is aware of the project and will be looking to VTrans and the Contractor for project updates regularly. The goal will be to proactively provide information to the community so that the businesses, residents, transit operators, rail operator, and travelers can make informed decisions throughout the project. To that end the Agency's Public Information consultant (Fitzgerald & Halliday, Inc) is preparing a PI&O Plan that describes the flow of information for the whole project. It is expected that the PI&O Plan for Contract 1 will include the following elements:

- Public Outreach campaign: Consists of collecting and maintaining a list of the key project stakeholders and introducing the project to them directly. This effort should be initiated well in advance of the Contractor's arrival on site; perhaps 3-6 weeks prior to the start of construction. Some of this effort may already have been started by the Agency's Public Information Officer (PIO) through attendance at public meetings and answering questions submitted by key stakeholders.
- Public Relations plan: Consists of a uniform message to the key project stakeholders and the public about setting expectations for the project. The Public Relations plan should include contingency planning for unplanned events that could embarrass the Contractor, VTrans, or the project as a whole.
- Communications plan: Consists of the various forms of communication that will be employed by the Contractor and VTrans through the life of the project. The communications plan should

incorporate the communication needs of the various users of the roadway, including motorist and pedestrian-level signing.

- Transition plan: Consists of the messaging that will describe what happens between the end of Contract 1 and the start of the more significant Contract 2.

Previous PI&O Plans have found the following strategies to be effective in communicating with other communities affected by VTrans construction projects.

Public Awareness Strategies

It is anticipated that even before construction, the Agency's Public Information Officer (PIO) will begin publicizing the project in the community to increase awareness of the project. The Agency will develop a consistent message about the whole Middlebury Bridge/Tunnel project and attend public meetings and workshops in the community to set expectations and answer questions. The public outreach will be targeted to those groups that may be most affected by the work, including local businesses, emergency services, and transit providers.

Road User Information Strategies

Once construction is underway, the PI&O strategies turn to directing information to the road users, residents, and businesses directed affected by the work. Normal construction activities can be shared via changeable message signs or a project kiosk centrally located for residents and pedestrians. Unusual or unexpected information requires a more direct approach, including radio traffic news and email alerts.

Project Website

Oftentimes, a project website has been developed to describe the project and why it is taking place, and answer other frequently asked questions about the project. The PI&O Plan should consider the creation and maintenance of a project website for the whole project.

Table 5 - Public Information and Outreach Strategies and Techniques

Public Information and Outreach (PI&O)	√	Cost
Public Awareness Strategies		
1. Branding		
2. Press kits		
3. Brochures and mailers		
4. Press releases/media alerts	**√**	
5. Mass media (earned and/or paid)		
6. Paid advertisements		
7. Project Information Center		
8. Telephone hotline		

Public Information and Outreach (PI&O)	√	Cost
9. Planned lane closure website		
10. Project website	√	
11. Public meetings/hearings, workshops	√	
12. Community task forces		
13. Coordination with media/schools/business/emergency services	√	
14. Work zone education and safety campaigns		
15. Work zone safety highway signs		
16. Rideshare promotions		
17. Visual information	√	
Motorist Information Strategies		
18. Radio traffic news	√	
19. Changeable message signs	√	
20. Temporary motorist information signs		
21. Dynamic speed message sign		
22. Highway Advisory Radio (HAR)		
23. Extinguishable Signs		
24. Highway information network (web-based)		
25. Traveler information systems(wireless, handheld)		
26. Transportation Management Center (TMC)		
27. Live traffic camera(s) on a website		
28. Project information hotline		
29. Email alerts	√	

7.0 Notes

This section is reserved for responses to review comments or issues related to the development or modification of this TMP.

8.0 TMP Implementation/Monitoring

The TMP is intended to be implemented, monitored, and updated throughout construction. It is important that the Contractor's TMP Implementation Manager has sufficient authority to implement the TMP as approved, and to make adjustments to the traffic control to maintain the mobility and safety of

the work zones. The TMP should be monitored and reported on at each project meeting throughout the construction phase.

Both the Contractor and the Agency have a role in monitoring the TMP. The Contractor's TMP Monitoring Task Leader has the primary responsibility to maintain the elements of the TMP throughout construction. The Agency's TMP Monitoring Task Leader should be providing independent verification of the TMP implementation. The Agency's TMP Implementation Manager should have sufficient authority to review and approve changes to the TMP as needed throughout construction.

Monitoring the TMP consists of two parts: verification that the approved TMP is being followed; and reviewing the effects of the TMP on travel behavior and operations. An approved TMP that is not being followed is a liability to both the Contractor and the Agency. Similarly, an approved TMP that is creating unusual or unsafe travel behaviors or violates a driver's expectations has the potential to cause driver confusion and may lead to work zone crashes that should be avoided.

At the completion of the construction project, the TMP Implementation Managers and the TMP Monitoring Task Leaders should participate in a "lessons learned" discussion to discuss the elements of the TMP that worked and those areas that could be improved in future contracts.

9.0 TMP Review/Approvals and Change Process

The Regional Construction Engineer and Traffic Operations Engineer have the primary authority to review and approve the TMP. It is anticipated that the TMP will be formally reviewed at the completion of the Final Design phase in consultation with the CMCG. Once approved in writing by the Agency, any changes to the TMP must follow the TMP Change Process indicated below.

There are two types of changes that may be required to the TMP throughout construction: minor modifications and major modifications. An example of a minor modification could be modifying the location of a traffic control device. Any minor modification shall be discussed between the TMP Monitoring Task Leaders and approved by the Resident. Any approved minor modification should be documented in the next project meeting notes. An example of a major modification could be changes to the sequence of construction, traffic control phasing, or allowable times for lane closures. Major modifications shall be prepared in writing and submitted to the TMP Implementation Managers for review and discussion. Upon the Agency's written approval, the TMP shall be updated with the next Revision number and the modification shall be implemented.

Table 6 - Transportation Management Plan Approval Signatures

Regional Construction Engineer			Traffic Operations Engineer		
All approvals must be obtained prior to the start of work					
Signature: Name: Date:			Signature: Name: Date:		
Revision#	Initials	Date	Revision#	Initials	Date
1					
2					

10.0 Appendices

- Traffic Counts
- Crash Data
- Public Information and Outreach Plan (Needed for final)
- TMP Review Notes

MICROTUNNELING

xx. DESCRIPTION. This work shall consist of furnishing and installing HDPE product pipe for stormwater drainage utilizing trenchless construction as shown on the plans and as directed by the Engineer.

xx. DEFINITIONS. Wherever in these provisions or in other Contract Documents the following terms or pronouns in place of them are used, the intent and the meaning shall be interpreted as follows:

ANNULAR BACKFILL – Cementitious material placed in the space (annulus) between the steel casing pipe and the product pipe used for a two-pass culvert lining system.

CASING PIPE – Steel pipe utilized to advance the boring machine and support the bore within which the product pipe will be placed.

CONTACT GROUT – Grout injected into the annular space between the casing pipe and the ground in a one-pass or two-pass culvert lining system.

CUTTER HEAD - Rotating cutter wheel and system of cutting tools located at the front of the boring machine.

GROUT PORT – A port location in the casing pipe utilized to inject lubricant or grout into the annular space between the pipe and ground.

JACKING FRAME – Structural component housing hydraulic cylinders used to advance the steel casing pipe and boring machine. The jacking frame will distribute jacking loads to casing pipe and reaction loads to the thrust block.

JACKING PIPE - A pipe that is used to advance the jacking shield and which provides ground support within a bore. The jacking pipe consists of a steel casing pipe for a two-pass culvert lining system.

LAUNCH SHAFT – Excavation from which the boring machine will be driven from.

LUBRICATION - A fluid, normally bentonite and/or polymers, used to reduce jacking loads on the jacking pipe.

MICROTUNNEL BORING MACHINE (MTBM) – A remotely-controlled, laser-guided, steerable tunneling and pipe jacking system in which personnel entry is not required for routine excavation.

OVERCUT - The radial distance between the excavated hole and the outside radius of the jacking pipe.

PIPE JACKING - Construction of a pipeline by hydraulically jacking consecutive sections of jacking pipe through the ground behind a tunnel boring machine.

PIPE RAMMING SITE - Location from which pipe ramming is performed and the pipe penetrates into the side of the embankment.

PRODUCT PIPE – A permanently installed drainage pipe inserted into casing pipe used for conveyance of drain water.

RECEIVING SHAFT – Excavation from which the boring machine will be recovered from at the end of a tunnel drive.

SPACERS - Fabricated items for positioning carrier pipe inside a steel casing pipe. Commonly contains wheels or skids to aid in the carrier pipe placement and positioning.

SPOILS/MUCK – Earth, rock, and other materials excavated from the tunnel face during installation.

THRUST BLOCK – Structural element that transfers and distributes jacking load from the jacking frame to the shaft wall or slab. The elements may be incorporated into the support of excavation.

THRUST REACTION SCHEME - A Contractor designed structure used to transfer the jacking loads to the ground at the pipe jacking location.

THRUST RING - A fabricated ring that is mounted on the face of the jacking frame. It is intended to transfer the jacking load from the jacking frame to the thrust bearing area of the pipe section being jacked.

TWO-PASS CULVERT LINING SYSTEM - A culvert liner consisting of a carrier pipe installed within a steel casing. The annulus between the steel casing and the ground is then grouted, as is the annular space between the steel casing and carrier pipe.

xx. DESIGN REQUIREMENTS.

(a) Microtunneling. The drainage tunnel shall be installed to the alignment grade and dimensions shown on the Plans. The tunnel will be constructed utilizing a two-pass operation where the product pipe is installed within a casing pipe. The specific type of machine used to excavate the rock will be at the discretion of the Contractor and subject to the Engineer’s Approval. The Contractor shall employ tunneling equipment and technology that will be capable of excavating the various anticipated ground conditions as described on the Geotechnical Baseline Report (GBR). Microtunnling shall be performed in accordance with ASCE 36-01 Standard Construction Guidelines for Microtunneling.

(b) Lubricant. Lubricant shall be designed by the Contractor to adequately minimize pipe friction and maintain annulus around casing pipe. Bentonite shall be commercially processed powdered bentonite in accordance with API Spec 13A. Additives may be added to the pipe lubricant with the approval of the Engineer. Restrict the

use of polymers and additive and their disposal to all applicable laws, ordinances and regulations.

(c) Casing Pipe. The Contractor shall account for the properties of the steel, their specific means and methods for installation and the subsurface conditions as described within the GBR. The pipe shall be designed by the Contractor and structurally capable of resisting maximum anticipated earth loads, jacking loads and grouting pressures determined by the Contractor.

Steel casing pipe ends shall be square and smooth so that jacking loads are evenly distributed around the entire pipe joint.

Steel casing joints shall be water tight and capable of withstanding the maximum anticipated jacking loads. Joints shall be square cut with beveled ends for welding. Steel pipe joints shall be full penetration butt welded or Permalock™ T5. Welds shall be performed in accordance with ASTM A139 Standard Specifications for Electric-Fusion (Arc)-Welded Steel Pipe and the AWS D1.1 Structural Welding Code.

Casing pipe shall be fitted with cast iron 2 inch threaded grout holes and plugs. Three grout ports spaced at 120 degrees on center shall be installed at minimum intervals of 6 feet along the axis of the pipe.

(d) Contact Grout. Contact Grout shall meet the requirements of subsection 707.03.

(e) Product Pipe.

(1) ASTM D3035 Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter.

(2) ASTM D3261 Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.

(3) ASTM D3350 Standard Specification for Polyethylene (PE) Plastic Pipe and Fittings Materials.

(4) ASTM F2620 Standard Practice for Heat Fusion Joining of Polyethylene Pipe and Fittings.

(5) ASTM F714 Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Outside Diameter.

(6) AWWA C906 Polyethylene (PE) Pressure Pipe Fittings, 4 in. through 65 in., for Waterworks Code of Federal Regulations 29 CFR 1926

(e) Annular Backfill. Annular backfill shall have an unconfined compressive strength between 100 to 150 psi in 28 days and have a slump in the range of 6 to 10 inches. The Contractor shall determine by calculation the maximum backfill pressure that may be used to achieve complete filling of the annular space and prevent damage to the installed pipe. Calculations shall consider the pipe material, properties, and geometry. The Contractor shall estimate the temperature increase in the placed annular backfill due to heat of hydration and ensure that the product pipe characteristics will not be degraded. Casing spacers shall be designed and arranged to provide adequate support to the installed product pipe prior and during annular backfill placement, as well as after the placement until the material has set. The Contractor shall determine the maximum annular backfill placement lift height to prevent damage to the product pipe due to flotation. A monolithic placement of annular backfill will be allowed if the Contractor can show by calculation that no damage to the product pipe will occur due to flotation or other loading.

xx. MATERIALS.

(a) Casing Pipe.

(1) The steel casing pipe shall meet ASTM A53/A53M, Grade B and have a minimum yield strength of 35,000 psi. Casing pipe shall have manufacturing tolerances including but not limited to:

a. Pipe ends to have roundness such that the difference between major and minor outside diameter does not exceed one percent of the specified nominal outside diameter or 0.25-inch, whichever is less.

b. Outside circumference must be within +/- one percent of the nominal circumference or within +/- 0.50-inch, whichever is less.

c. Steel casing pipe shall have a maximum allowable straightness deviation in any 10 foot length of 1/8-inch.

(b) Product Pipe. Product pipe for this application is defined as High Density Polyethylene Pipe (HDPE).

(1) Resin and Material. All material shall be manufactured from a PE4710 resin with the Plastic Pipe Institute (PPI) as TR-4. The resin material shall meet the specifications of ASTM D3350 with a minimum Cell Classification of 445574C. HPDE pipe and fittings shall contain no recycled compounds except

that generated in the manufacturer's own plant from resin of the same specifications from the same raw material. HDPE products shall be homogeneous throughout and free of visible cracks, holes, foreign inclusions, voids, or other injurious defects.

(2) HDPE Pipe. Pipe shall be made of HDPE material with a minimum designation code of PE4710 and with a minimum Cell Classification as noted above. The polyethylene compound shall be suitably protected against degradation by ultraviolet light by means of carbon black of not less than 2 percent. The manufacture of the HDPE resin shall certify the cell classification indicated.

Pipe sizes 3 inches and larger shall have a manufacturing standard of ASTM F714. Dimension Ratio (DR) and Outside Diameter (IPS/DIPS) shall be as specified on the plans.

Pipe shall meet AWWA C906 (4 inches to 65 inches) and shall be listed as NSF-61.

(3) HDPE Fittings. Butt Fusion Fittings shall be made of HDPE material with a minimum designation code of PE4710 and with a minimum Cell Classification as noted above. Fittings shall have a minimum pressure rating equal to or greater than the pipe to which they are joined unless otherwise specified on the plans or accepted by the Engineer. All fittings shall meet the requirements of AWWA C906.

Molded fittings shall comply with the requirements of ASTM D3261.

Socket fittings shall meet ASTM D 2683.

Electrofusion Fittings shall be made of HDPE material with a minimum material designation code of PE4710 and with a minimum Cell Classification as noted above. Electrofusion fittings shall have a manufacturing standard of ASTM F1055. Fittings shall have a minimum pressure rating equal to or greater than the pipe to which they are joined unless otherwise specified on the plans.

Bolted Connections such as flanges and MJ adapters shall be fused onto the pipe and have a minimum pressure rating equal to or greater than the pipe to which they are joined unless otherwise specified on the plans.

Metallic back-up rings (Van-Stone style lap joint flanges), shall have a radius on the inside diameter of the bore so as to be compatible with the HDPE flanges. Back up rings shall have a bolt pattern that

will mate with AWWA C207 Class D (generically known as 150 pound patterns).

Mechanical Fittings, consisting of mechanical coupling and saddles shall be approved by the Engineer prior to installation. Mechanical fittings shall be designed for use and compatible with HPDE pipe, including SS stiffeners when required by the manufacturer. Mechanical fittings shall have a pressure rating equal to or greater than the pipe.

(4) Pipe Spacers. Pipe Spacers shall be a two-piece 14-gauge (1.90 mm) T-304 stainless steel assembly with stainless steel bolts. Assembly shall be the restrained positioning type. The runners shall be an ultra-high molecular weight polymer with a maximum coefficient of friction of 0.12. The assembly shell liner shall be 0.090" (2.3 mm) ribbed PVC with 85-90 durometer. Spacer assembly shall be as manufactured by Cascade Waterworks MFG. Co. or approved equal.

(5) Certification. A Type D certification shall be furnished in accordance with Subsection 700.02 for all specified materials.

(c) Annular Backfill.

a. Cement. Cement shall meet the requirements of Subsection 701.02.

b. Fly Ash. Fly ash shall meet the requirements of Subsection 725.03(a).

c. Aggregate. Aggregate, if used, shall meet the requirements of Subsection 704.01.

d. Water. Water shall meet the requirements of Section 745.

e. Certification. A Type D certification shall be furnished in accordance with Subsection 700.02 for all specified materials.

xx. SUBMITTALS. All approvals are subject to satisfactory field performance. Approval of a submittal does not relieve the Contractor and/or subcontractor of their responsibilities to satisfactorily complete the work detailed in the Contract Documents. If the approved submittal procedures do not produce satisfactory field performance, the Contractor will be responsible for submitting revised procedures. No further tunneling, casing pipe, contact grout, product pipe, or annular backfill work will be allowed until the revised procedures have been approved.

The Contractor shall submit proof and details of the following:

Three projects in the past five years where the Contractor or subcontractor performing the work has successfully installed a MTBM tunnel of similar diameter, length and ground conditions as required for this project.

A complete description of projects for which actual work was performed by the Contractor or subcontractor backfilling or grouting the annulus of a product pipe installed within a casing or tunnel. This list is to include project locations, dates of projects, owner, owner's construction representative, owner's construction representative's current telephone number, type of equipment utilized, type and size of pipe, contract or subcontract amount, description of all litigation and/or unresolved claims in connection with these projects, and any other information relevant to the issue of the successful completion of the projects. Include projects where the grouting contractor was prime contractor or a subcontractor.

The on-site Supervisory personnel shall have a minimum of five years of experience in supervising construction of MTBM pipe jacking projects of similar size (diameter and depth) and difficulty to those shown on the Plans, and in similar geotechnical conditions. The work experience shall be direct supervisory responsibility for the on-site tunnel construction operations. Project management level positions indirectly supervising on-site tunnel construction operations shall not be considered to be acceptable for this experience requirement. For each project cited, include the name and telephone number of someone who can be contacted as a reference.

The contractor and field supervisor shall have a minimum of 3 years recent experience in backfilling pipes for trenchless or tunnel pipeline installation on at least 5 similar projects. The grouting engineer shall be a Professional Engineer registered in the State of Vermont. Experience shall include five projects within the last five years performing the type of calculations specified herein.

The MTBM operators shall have a minimum of five years of experience installing MTBM tunnels with similar diameters and lengths in similar conditions. Include details describing the equipment and methods used, difficulties encountered and how they were overcome, and the results of any testing performed. For each project cited, include the name and telephone number of someone who can be contacted as a reference.

The Contractor shall submit this information to the Engineer for review, evaluation, and approval prior to submitting the information required below. The Engineer will render a decision within 10 working days after receipt of the submission. The Contractor or subcontractor will not be permitted to install tunneling equipment or annular backfill without this approval.

The Engineer may suspend the drainage tunnel construction if the Contractor substitutes unapproved field personnel without prior approval by the Engineer. The Contractor shall be fully liable for the additional costs resulting from the suspension of work

and no adjustments in contract time resulting from such suspension of work will be allowed.

After the Engineer has approved the qualifications documents and individual resumes for the key personnel the contractor shall submit the following to the Engineer for review and approval prior to commencing the work:

(a) Microtunneling.

(1) Drainage Tunnel Installation Plan; (hereafter “plan” for the purposes of this Section). The plan shall document the proposed procedures and equipment for constructing the drainage tunnel. Supporting calculations shall be stamped by a qualified Licensed Professional Civil or Structural Engineer registered in the State of Vermont. The submittal shall include, but not be limited to, the following information:

a. Schematic of work site layout

b. Product data, details and supporting calculations identifying the MTBM equipment including cutter head configuration, steering mechanism, mechanical specifications, electrical specifications, physical dimensions and weight. Submit modifications to the manufactured equipment, component maintenance or replacement.

c. Product data, details and supporting calculations identifying the pipe jacking equipment including jacking frame, diagram of jacking frame, thrust ring, jacking controls and pressure gages. Provide maximum jacking capacity.

d. Product data, details and supporting calculations identifying the pipe jacking equipment including jacking frame, diagram of jacking frame, thrust ring, jacking controls and pressure gages. Provide maximum jacking capacity.

e. Product data, details and supporting calculations identifying the alignment control and steering system. Provide statements confirming the system can achieve the required tolerances for tunnel line and grade.

f. Description of spoils/muck handling, transport and disposal.

g. Description of lubricant including lubricant composition and applicable manufacturer literature and recommendations.

h. Description of lubrication system including injection system, injection port location and orientation.

i. Description of the sequence of operation including mining cycles and any scheduled shutdowns.

j. Design calculations determining and verifying required jacking thrust, MTBM torque, cutter head configuration and casing pipe capacity.

k. Methods for collecting, treating, and discharging groundwater and construction water associated with drainage tunnel installation. Provide a layout showing water collection points, designated water flow paths, pumps, sumps, water storage and settlement containers, treatment facilities and discharge points.

(2) Daily Tunneling Records to be submitted to the Engineer for review within one working day from the end of each shift. These records shall include:

a. Name of the operator

b. Tunnel drive identification

c. Date and time

d. Rate of advancement

e. MTBM position (chainage, line and grade deviations)

f. Jacking forces

g. MTBM torque and roll

h. Steering adjustments

i. Tunnel spoils quantity excavated per pipe section

j. Any movement of the alignment laser

k. Duration of stops

l. Any problems encountered

m. Lubrication records outlining volume pumped per pipe segment installed and per shift.

(c) Drainage Tunnel Pre-Construction Meeting. A meeting shall be held after the approval of the submittal

detailing the installation procedure, but prior to commencing construction of the drainage tunnel. The purpose of the meeting will be to review all aspects of the tunnel construction and testing and to facilitate coordination between all parties involved.

Individuals attending the meeting representing the Owner shall include the Engineer, the Project Manager, the Design Engineer, the Soils and Foundation Engineer, and the Geologist.

Individuals attending the meeting representing the Contractor and subcontractor shall include the project Superintendent and all foremen in charge of advancing the boring machine, removing the spoils, and installing casing. All parties shall be notified a minimum of 7 days in advance of the meeting date.

(d) Drainage Tunnel Construction Sequencing and Scheduling.

a. The Contractor shall provide a schedule illustrating the sequence and duration of tunneling activities.

b. Schedule shall demonstrate that the receiving shafts for each respective drive will be installed prior to the commencement of specific drive.

(e) Safety Plan. Submit safety plan for personnel conducting the MBTM pipe jacking operations including but not limited to lighting, ventilation, and electrical system safeguards. Include a copy of emergency response procedures and a mine rescue plan in accordance with OSHA requirements

(f) Contingency Plan. Submit contingency plans for line and grade out of tolerance, jacking forces exceeding the maximum anticipated jacking load, excessive ground movement, significant increases of groundwater inflows, and pipe advance halted due to subsurface obstructions.

(g) Repair Plan. Pipe repair procedures shall be submitted for review prior to performing any repairs.

(b) Product Pipe.

(1) Fabrication Drawings. Submit complete Fabrication Drawings for all HDPE, fittings, and specials showing dimensions, strength, and material specifications and standards, and joint details for review prior to manufacture.

(2) Material Compliance. Submit notarized affidavit of material compliance with ASTM F714.

(3) Product Compliance. Submit notarized affidavit of pipe compliance with ASTM D3261 and these specifications.

(4) Joint Compliance. Submit notarized affidavit of joint compliance with ASTM F2620 and ASTM D3261 as applicable and these specifications.

(5) Quality Control. Submit certified results of shop tests for approval.

(6) Certification from the pipe manufacturer meeting ASTM Standards of the pipe material to be used.

(7) The contractor shall provide details on their procedures for the installation of the product pipe into the casing pipe and how they intend to meet the specified tolerance noted herein.

(8) Contingency plans for line and grade out of tolerance.

(9) Pipe repair procedures shall be submitted for review prior to performing any repairs.

(10) The Contractor shall submit daily field reports from the prior day by 10:00 a.m. each work day. At a minimum, daily field reports shall contain:

a. The position of the pipe in relation to the design line and grade.

b. The date, starting time, and finish time.

c. Inclination.

Contact Grout requirements? Same as Annular Backfill submittals?

(11) The Contractor shall submit the following additional information:

a. As-builts at the end of pipe installation.

b. Pipe repair certifications.

(c) Annular Backfill.

a. Working plans and methods statements, which shall include the following:

a. Means and methods for proportioning, mixing, batching, and delivering annular backfill, including the storage of raw materials.

b. Details for transporting and placing annular backfill.

c. Lift plans showing details of delivery pipes, slicklines, injection ports, bulkheads, vent holes, and other materials.

d. Calculations for preventing flotation and deformation of the final lining. Provide calculation for each lift planned to place backfill, and scaled, dimensioned cross sections of pipe showing details of blocking, bracing, and stulling. Provide calculation for maximum safe backfilling pressure. Calculations should be stamped by a qualified Professional Engineer registered in the State of Vermont.

f. Descriptions of labor, equipment, and supplies required to perform the work.

g. Cross-sections and profiles showing the arrangement of transportation, handling, and placing equipment including passing clearances.

h. Layout of surface facilities for storing materials and batching, and details for transporting annular backfill to placement areas.

i. Details of pumping pressures and rates, placement sequences and volumes, and lift thicknesses, including the theoretical quantity for each placement.

j. Methods for controlling heat of hydration temperature rises.

k. Procedure for disposing unused annular backfill and flushing lines.

(b) An annular backfill mix design meeting the requirements specified herein. The submittal shall include:

(1) Type, brand, source, and amounts of cement, Pozzolans, and admixtures.

(2) Source and amount of water.

(3) Representative samples of materials for materials testing and mix proportion testing.

(4) Combined grading of each mix design.

(5) Specific gravity of all materials.

(6) Results of laboratory tests including unit weight, compressive strength, slump, and initial set time.

(7) A certificate of compliance signed by the supplier identifying the type of fly ash and stating that the fly ash is in accordance with ASTM C618 and these specifications. Supporting test data shall be furnished when requested by the Owner.

(8) Material specifications and instructions for use of admixtures.

(9) All material certifications of compliance. Submit mill test reports for cement.

(c) Detailed drawing of one-way injection valve.

(d) Certificate, dated within the last six months, from an independent laboratory that the pressure calibration gauge is accurate to 1 psi. In addition, the Contractor shall submit daily logs listing placement lift number, volume pumped and rate, maximum pressure, annular backfill mix, and crew for following workday by 10:00 a.m. The Contractor shall notify the Engineer at least 24 hours in advance of starting annular backfilling operations.

xx. EQUIPMENT.

(a) Microtunneling. The type and size of the MTBM equipment selected for the project shall be compatible with the geologic and subsurface conditions described within the GBR. The equipment shall be capable of advancing through, excavating, handling and removing rock as described within the GBR. When directed by the Engineer, unsatisfactory equipment shall be removed from the project and replaced with satisfactory equipment.

The Contractor shall furnish all necessary equipment, power, water and utilities for the MTBM operation including lubricant mixing and pumping, removing spoils and all other work consistent with the Contractor’s means and methods.

The MTBM shall be operated, guided and monitored continuously by the operator. The MTBM guidance system shall be designed to function at the required drive length without loss of accuracy or function.

The cutter head shall have provisions for mounting disc cutters. They shall be replaceable from the rear of the cutter head. The cutter head shall have fresh hard-facing in order to reduce cutter head wear. The Contractor is responsible for inspection and regular maintenance of the MTBM.

The MTBM shall be equipped with an articulated shield that is steerable in both vertical and horizontal directions to maintain line and grade within the specified tolerances. The MTBM shall be equipped to minimize rotation or roll of the machine during operation.

A lubricant injection system shall be provided to inject lubricant around the casing pipe to decrease the required jacking forces.

The MTBM shall be equipped for continuous gas monitoring.

The MTBM shall include a spoils removal system to transport tunnel spoils through the installed casing pipe.

The radial overcut shall be less than 2.0 inches. The radial overcut shall be determined by the measuring the difference between the maximum diameters created by the cutting teeth or overcut band on the cutter head and the outer diameter of the casing pipe, divided by two.

(b) Casing Pipe. The type and size of the pipe jacking equipment selected for the project shall be compatible with the selected MTBM and able to provide the required thrust to advance the MTBM through the geologic and subsurface conditions described within the GBR.

The Contractor shall furnish all necessary equipment, power, water and utilities for the tunnel jacking operation including hydraulic pumps and controls, power packs, jacking frame, thrust blocks all other work consistent with the Contractor’s means and methods.

Contractor shall position jacking from and thrust blocks normal to the proposed pipeline alignment. If a concrete thrust block is used, concrete or other materials shall have attained the required strength before jacking.

(c) Product Pipe.

(1) Fusion Equipment Requirements. Butt fusion equipment must be in satisfactory working order and the hydraulic system must be leak free. Heater plates shall be free from scrapes, gouges, and have a consistent clean coated surface. The pressure gage and thermometer should be checked for accuracy. When requested by the Engineer, records showing maintenance service/inspection within 3 months prior to use for this project shall be provided.

Rental fusion equipment must be maintained by a McElroy Authorized Service and Repair Center with at least one McElroy Certified Master Mechanic on staff

and inspected within 3 months prior to arrival at the jobsite.

For 6 inch and larger pipe sizes, the pipe butt fusion machine shall be a hydraulic fusion machine capable of butt fusing HDPE pipe. The carriage must be removable from the chassis for in-shaft use. The machine must be compatible with an electronic data recording device, McElroy Data Logger or equal. Accessories will include all butt fusion inserts for the specified range of pipe sizes, a pyrometer kit for checking the surface temperature of the heater, extension cord (25’ minimum), and hydraulic extension hoses (minimum of four). The butt fusion machine will be McElroy or approved equivalent.

(d) Annular Backfill. Furnish equipment of sufficient size to batch and pump the required volume of annular backfill over the distance required and through injection ports at a uniform flow rate and under the required constant pressure in an underground environment. Configure equipment to flush system with intake valves closed, with water supply valve open, and with pump running at full speed. Provide a system capable of generating annular backfill meeting specified acceptance criteria. Maintain equipment in good operating condition and provide an adequate inventory of spare parts and backup equipment on site to assure that the equipment is available at all times.

Batching equipment shall utilize a mechanical system to ensure consistency of the mix. Batching equipment shall provide digital printout record of batch scale readings, accurate to one pound of dry mix ingredients before delivery to mixer.

Mixer is to be compatible with the pump to assure continuous and uniform flow at the point of placement. Mixer shall be capable of providing a super-wetted, homogenized mix. Equip mixer with a water meter with an accuracy of plus or minus one gallon for measuring the amount of mixing water to be added to the dry mix ingredients.

Provide equipment capable of pumping the amounts of annular backfill to be conveyed without pulsation or segregation. Operate pump to uniformly convey a continuous stream of annular backfill, without air pockets. Equip the pump with pressure limit device to limit pumping pressure as required to prevent damage to pipe and initial support systems.

Piping, Injection Hoses, Ports, Valves, and Connections. Convey annular backfill to the point of placement in steel piping or rubber hoses. Provide piping, injection hoses, valves, and connections of no less than two inch I.D. Furnish a system of valves in the line at or near the points of discharge through the lining to facilitate collecting samples. Provide a flow meter to determine the

volume of annular backfill injected. The meter shall be calibrated in cubic feet to the nearest 0.1 of a cubic foot. Incorporate suitable stop valves at injection points for use in venting air or maintaining pressure, as required. Annular backfill injection valves shall be one-way valves.

Pressure Gauges. Pressure gauges shall be capable of displaying up to 150 percent of the maximum allowable pressure, and accurate to within 0.5 percent over the full range of the gauge. Gauges shall be certified and calibrated in accordance with ANSI B40.1, Grade 2A. Oil-filled type gauges attached to a saddle-type diaphragm seal.

xx. CONSTRUCTION/INSTALLATION REQUIREMENTS.

(a) Microtunneling. The Contractor's methods shall be suitable for the intended purpose and materials encountered and as detailed in the GBR.

The Contractor shall ensure that each casing pipe segment is continuously advanced forward such that no part of the tunnel excavation is unsupported at any time.

The Contractors operations shall prevent settlement or heave of the ground surface. The Contractor shall repair any damage resulting from surface settlement or heave caused by the jacking operations at no additional cost to the owner. Contractor will modify any practices that caused or contributed to the ground disturbance to avoid continuing or reoccurring problems.

The Contractor shall provide a jacking reaction system and casing pipe with a safety factor of at least 2.5 times the anticipated jacking forces.

The Contractor shall evaluate the need for an Intermediate Jacking Station (IJS) based on a calculated assessment of the anticipated jacking forces and the Contractor's operations and work plan. If an IJS is required Contractor shall install the system on the casing pipe and actuate the IJS to distribute jacking forces along the length of the casing pipe. Upon completion of the tunnel drive, the IJS hydraulic jacks shall be fully removed and the adjacent pipe sections shall be pushed together.

The Contractor shall furnish and install steel casing pipe the meets or exceeds the minimum requirements contained herein and any Federal State or Local Highway requirements.

The Contractor shall survey the location and orientation of the jacking frame and guide rails prior to starting jacking operations to ensure they are on the proper line and grade

The MTBM guidance system shall be securely mounted and be independent of the jacking frame and thrust block. The

Contractor must stop operations if the MTBM guidance system malfunctions, is non-operational or is disturbed and must be reset.

The Contractor shall use a lubrication injection system to provide continuous lubrication of the casing pipe. Lubrication material shall be pumped in sufficient volume to completely fill the annular space around the casing pipe.

Prior to the launch of the MTBM, the Contractor shall conduct a start-up inspection of all mechanical and electrical systems associated with MTBM and pipe jacking operations. The system shall be tested on the surface to ensure the MTBM and support equipment is functioning properly. The Engineer shall be notified at least 72 hours prior to the start-up inspection and a site inspector representing the Owner shall be present during the start-up inspection.

Once the casing pipe has been jacked into its final location the annular space around the casing shall be grouted through the grout ports in the casing pipe.

The casing pipe shall be installed to ensure the Contractor will be able to install the product pipe to the prescribed construction tolerance defined herein. Otherwise the casing pipe shall be installed to the following tolerances:

(1) Horizontal Tolerance (Line): 50 mm (2 inches)

(2) Vertical Tolerance (Grade): 25 mm (1 inch)

(3) Corrections shall be less than 25 mm (1 inch) over 30 feet

(b) Contact Grout. Contact grouting shall be completed immediately after the completion of the tunnel drive. The Contractor shall perform contact grouting as necessary to fill the annular space along the entire drive, this includes but is not limited to; Injecting grout under sufficient pressure to displace the lubricant and if required, fill all voids including those outside the limits of the annular space created by caving or collapsing of earth cover over the tunnel excavation.

The Contractor shall furnish and operate suitable equipment for any required grouting operations. Grouting pressure shall be controlled so as not to damage the already installed pipe and joints, adjacent utilities, and other properties. Maximum grout pressure shall be submitted to the Engineer for approval prior to initiation of contact grouting.

Grouting shall be started on the lowest connections and shall proceed until grout begins to flow from upper

connections. Connections shall then be made to these holes and the operation continued to completion. Lower connections must be plugged to allow for grout to sufficiently set and resist continued pressure grouting.

After completion of the contact grouting the grout ports shall have a threaded plug installed and interior of the pipe finished to a smooth, even surface and watertight condition.

(c) Casing Pipe. The casing pipe will be installed by jacking it from the specified launch shaft location to the respective receiving shaft locations.

(d) Product Pipe. Product pipe and fittings shall be cut, joined, and installed in accordance with the manufacturer's recommendations. Joining, laying, and pulling of polyethylene pipe shall be accomplished by personnel experienced in working with polyethylene pipe systems.

Operations shall be performed in accordance with the following requirements:

(1) Transportation, Unloading, and Storage. The transportation carriers shall use appropriate methods and intermittent checks to ensure the pipe is properly supported, stacked, and restrained during transportation such that the pipe is not nicked, gouged, or physically damaged.

During loading, transportation, and unloading, every precaution should be taken to prevent damage to the pipe. Handle the pipe in accordance with the PPI Handbook of Polyethylene Pipe (latest edition), Chapter 2.

Pipe shall not be stacked higher than the limits recommended by the manufacturer. The bottom tiers shall be kept off the ground on timbers, rails, or concrete. Pipe shall not be stored close to heat sources.

(2) Pipe Inspection. All pipe and fittings shall be subjected to visual inspection at the time of delivery and before installation. Defective, damaged, or unused pipe will be rejected. Cuts, punctures, or gouges that penetrate or reduce the wall thickness by 10 percent or more are not acceptable and must be removed and discarded.

(3) Handling Pipe. The handling of the pipe shall be in such a manner that the pipe is not damaged by dragging it over sharp and cutting objects. Sections of the pipes with cuts and gouges exceeding 10 percent of the pipe wall thickness or kinked sections shall be removed and the ends rejoined.

Refer to the PPI Material Handling Guide for HDPE Pipe and Fittings for recommendations, guidelines, and instructions regarding the handling, lifting, loading, storing, and installing polyethylene pipe and fittings.

(4) Fusion Joining Requirements. All HDPE pipe shall be joined to itself by the heat fusion process which produces homogeneous, sealed, leak tight joints. Tien-ins between sections of HDPE pipe shall be made by butt fusion whenever possible.

a. Butt Fusion. The pipe shall be joined by the butt fusion Procedure outlined in ASTM F2620 or PPI TR-33. A record or certificate of training for the fusion operator must be provided that documents training to the fundamentals of ASTM F2620. Considerations should be given to and provisions made for adverse weather conditions, such as temperatures below freezing, precipitation, or wind, which is accepted by the Engineer.

b. Electrofusion. Electrofusion joining shall be done in accordance with the manufacturer's recommended procedure. Other sources of electrofusion joining information are ASTM F1290 or PPI TN 34. The electrofusion processor must be capable of reading and storing the input parameters and the fusion results for later download to a record file. Qualification of the fusion technician shall be demonstrated by evidence of training within the past year on the equipment to be utilized for this project.

(5) Fusion Operators. The employer of the fusion machine operator is responsible for the quality of the fusion joint made by the individual. The employer is responsible for documenting all qualification and training records of that individual.

All HDPE fusion equipment operators shall be qualified to the procedure used to perform the pipe joining. Fusion equipment operators shall have current, formal training on all fusion equipment employed on the project. Training received more than two years prior to the operation with no evidence of activity within the past 6 months shall not be considered current.

(6) Establishing Line and Grade. The Contractor shall establish the baseline and benchmarks indicated on the Plans. Baselines and benchmarks shall be checked at the beginning of the Contract period and any errors or discrepancies reported to the Engineer.

Use these baselines and benchmarks to furnish and maintain all reference lines and grades for the pipe installation. Use these lines and grades to establish the exact starting location of the product pipe.

The Contractor shall submit to the Engineer copies of field notes used to establish all lines and grades; however, the Contractor remains fully responsible for the accuracy of the work and the correction of the work as required.

After installation is complete, the Contractor shall provide the Engineer with access to both pipe ends for visual inspection of the line and grade of the pipe.

The product pipe shall be installed to ensure continuous gravity flow. Additionally the product pipe shall be installed to the following tolerances:

a. Horizontal Tolerance (Line): 25 mm (1 inch)

b. Vertical Tolerance (Grade): 12 mm (1/2 inch)

c. Corrections shall be less than 25 mm (1 inch) over 25 feet

(7) Product Pipe Installation. Visually inspect the installed pipe. No groundwater leakage will be permitted. Clean the inside of the pipe and leave it free of debris.

After casing pipe has been cleaned of dirt and debris, pipe spacers shall be attached to carrier pipe. As carrier pipe is fused, it shall be pushed into position inside the casing pipe. Support the product pipe within the casing pipe to the design line and grade while maintaining an actual minimum annular space of 2 inches. Install blocking supports at the crown to prevent flotation of the pipe during annular backfilling. Bulkheads shall be constructed at each end of the casing pipe.

All mains shall be cleaned and flushed to remove all foreign matter.

(e) Annular Backfil. Establish the limits of each annular backfill placement based on size and capacity of batching and placing equipment, and mix parameters such as initial set time. Arrange and route utilities to provide ready and available services during backfill placement.

(1) Preparation. Verify that locations where grout is to be placed are clean and free of standing or running water. Verify that the pipe has been installed meeting the required line and grade tolerances.

Bulkheads shall be erected to full-height, vertically forming a tight contact between the casing and product pipe. Provide an opening in the crown in addition to other vent outlets.

(2) Placement. Limit lift heights to those specified in the working plans submittal to prevent damage to the pipe. Complete each lift for a particular section of the culvert being backfilled prior to beginning the next lift in that length of culvert being backfilled. Grout pressure shall be controlled so as to avoid damaging the pipe, and to avoid movement of the surrounding ground or existing culverts or other improvements. Unused annular backfill and flushed grout shall be disposed of in accordance with approved procedures. Clean the inside of the pipe of all annular backfill waste and other debris, and properly dispose all waste.

(3) Field Quality Control. Measure and record the volume of annular backfill placed. Compare actual volume placed for each length of tunnel being backfilled with the theoretical volume for that length of tunnel being backfilled. Use grout hole connections in the pipe to monitor the backfill placement operations. Collect samples of annular backfill at the injection point or discharge point, as the case may be. Take two sets of two cylinders for every 100 cubic yards batched, but no less than two sets per day. Determine the compressive strength in accordance with ASTM D 4832. Test two of the cylinders at 28 calendar days. If a test cylinder does not meet one or more of the compressive strength requirements specified herein, the Engineer may require additional testing, or removal and replacement with new annular backfill, at no additional cost to the Owner. Two pressure gauges shall be provided, one at the annular backfill pump and one at the injection point. The accuracy of the gauges shall be checked daily with an accurately calibrated pressure gauge.

xx. METHOD OF MEASUREMENT. The quantities of Special Provision (Microtunnel) shall be measured for payment by the number of linear feet of product pipe placed in the complete and accepted work.

The quantity of Special Provision (Mobilization of Microtunnel Equipment) to be measured for payment will be on a lump sum basis in the complete and accepted work.

xx. BASIS OF PAYMENT. The accepted quantities of Special Provision (Microtunnel) will be paid for at the Contract unit price per linear foot. Payment will be full compensation for drainage tunnel excavation, dewatering, casing pipe, contact grouting, product pipe, annular backfill and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

including any necessary treatment of waste water.

The accepted quantity of Special Provision (Mobilization of Microtunnel Equipment) (used for the construction of the drainage tunnel) will be paid for at the Contract lump sum price. Payment will be full compensation for mobilization, remobilization, and demobilization of tunneling equipment from the project including the erecting, dismantling, and all incidental tasks necessary to complete the work, and the furnishing of all supervision, equipment, labor, tools, and incidentals necessary to complete the work. When tunneling equipment has been set up and mining operations start, 75 percent of the Contract lump sum price will be paid. The remaining 25 percent of the Contract lump sum price will be paid when the mining operations are complete and the equipment has been removed from the site.

Costs associated with providing all submittals required as part of the work, and any necessary modifications thereto, will be considered incidental to the Contract items in this Section.

Payment will be made under:

Pay Item	Pay Unit
900.640 Special Provision (Microtunnel)	Linear Foot
900.645 Special Provision (Mobilization of Microtunnel Equipment)	Lump Sum

MICROTUNNEL SHAFT CONSTRUCTION

xx. DESCRIPTION. This work shall consist of mobilizing and furnishing all materials, equipment, labor, and services necessary to construct the receiving and launching shafts support systems in soil and rock in accordance with these provisions, the Contract Plans, and as directed by the Engineer.

xx. GENERAL REQUIREMENTS. The Contractor is expected to furnish the launch and receiving shafts as indicated by the horizontal and vertical limits shown on the Plans with the understanding that the final shaft dimensions required shall be based on the Contractors specific means and methods and subject to approval by the Engineer.

This work shall be conducted in strict conformance with all applicable Federal, State and Local regulations and permits.

The Contractor is responsible for configuring the shafts to allow the installation of the Microtunnel Boring Machine (MTBM) and jacking equipment as well as the permanent drainage structure. The Contractor is responsible for all aspects of the shaft construction including soil support, rock support, excavation, MTBM thrust reaction structures, permanent structures and backfilling.

Abandonment: At the completion of the project the permanent drainage structures will be installed to the limits indicated on the Plans and shafts will be backfilled to the elevation indicated on the Plans.

xx. DEFINITIONS.

TUNNEL LAUNCH AND RECEIVING SEAL – A watertight mechanical seal that the MTBM is launched through and retrieved from to limit the inflow of groundwater and control the placement of tunnel lubricant and contact grout.

xx. SUBMITTALS AND PRECONSTRUCTION REQUIREMENTS.

(a) Submittals. All approvals are subject to satisfactory field performance. If the approved submittal procedures do not produce satisfactory field performance as defined herein and in accordance with Special Provision 900.645 (Survey, Instrumentation, and Monitoring), the Contractor will be responsible for submitting revised procedures. No further shaft construction or excavation will be allowed until the revised procedures have been approved and corrected.

The Contractor shall submit drawings, details and calculations, stamped by a Professional Structural I or Civil Engineer Registered in the State of Vermont, to the Engineer for review and approval prior to commencing the work. The submittal shall document the proposed procedures, equipment and materials for installing the

launch and receiving shafts. Submittals shall include, but are not be limited to, the following information:

(1) Plans and cross sections of each shaft detailing the type of earth and rock support systems including:
   a. General arrangement of temporary structures
   b. Design loading
   c. Dimensions and elevations of shaft support systems
   d. Installation and deflection tolerance
   e. Material sizes, designations and grades
   f. Relationships of shaft support systems to new and existing structures, services and utilities
   g. Method and details of installation of shaft support systems
   h. Location of temporary support elements relative to the permanent structure
   i. Schedule for the removal of temporary support elements.

(2) Plans and cross sections of the temporary thrust reaction system including configurations for each tunnel drive.

(3) Calculations including assumptions of loading criteria supporting the proposed earth and rock support system.

(4) Calculations identifying anticipated shaft wall deflection and movement as well as surface settlement.

(5) A sequence of construction coordinated with the project schedule.

xx. CONSTRUCTION REQUIREMENTS.

(a) Furnishing Equipment for Shaft Construction. The type and size of the equipment for constructing shaft support shall be approved by the Engineer prior to being moved onto the project. When directed by the Engineer, unsatisfactory equipment shall be removed from the project and replaced with satisfactory equipment.

(b) Control of Water. The Contractor shall maintain excavations free from water during the shaft excavation and tunneling activities.

(c) Shaft Support Systems. The Contractor shall install the shaft support systems and perform the excavations required for the shafts in accordance with the applicable requirements of 29 CFR Part 1926 and to the geotechnical conditions outlined in the Geotechnical Baseline Report (GBR). The Contractor’s methods and equipment shall be suitable for the intended purpose and materials encountered. The shaft support systems shall meet the following minimum performance requirements:

(1) Installation of the shaft support systems shall not cause settlement or heave of the ground surface nor produce construction vibrations that could damage adjacent utilities or structures.

(2) Installation of the shaft support systems shall be performed in accordance with applicable local, State,

and Federal codes, ordinances, statutes and governing rules and regulations.

(3) Brace shaft support systems or provide ground improvement as required to limit lateral deflections to limits defined by the contractor's designer or 3 inches, whichever is less.

(4) Allow for entry and exit of the MTBM in accordance with Special Provision (Microtunneling).

(5) Allow for abandonment of the shaft support system in a manner that does not damage the drainage structures cause settlement or loosening of compacted ground. Unless otherwise noted temporary shaft support shall be de-tensioned and removed to four feet below final grade.

(6) Support System:

i. Prevent disturbance, destabilization or failure of sides and bottom of excavation including prevention of soil piping and basal instability.

ii. Resist lateral earth pressures, hydrostatic pressures and lateral loads from traffic, construction equipment and spoils.

(b) Contractor's Records. The Contractor shall keep a record, independent of that which may be kept by the Engineer, of all data relative to the installation of the shafts. This record shall be available for the Engineer's inspection until the completion of the project. This record is to include for each shaft:

(1) Log of construction activities for each shift

(2) Movements or deflections detected and measured

(3) Groundwater elevations

xx. METHOD OF MEASUREMENT. The quantity of Special Provision (Microtunnel Shaft Construction) to be measured for payment, will be on a lump sum basis for each shaft specified on the Plans or in the Contract.

xx. BASIS OF PAYMENT. The accepted quantities of Special Provision (Microtunnel Shaft Construction) will be paid for at the Contract Lump Sum price, which shall be full compensation for the preparation of detailed plans and schedule of operations, performing the work specified, and furnishing all labor, tools, equipment, materials, and incidentals necessary to complete the work, including the cost of altering the shaft, foundation seals, sheeting, bracing, dewatering, installation and maintenance of siltation and sedimentation control measures for treating shaft discharge, incidentals necessary for properly maintaining the shaft in a dewatered condition, and removing the shaft when no longer required, unless indicated otherwise herein, on the plans, or in the Contract.

Payment for Special Provision (Microtunnel Shaft Construction) will be made as follows:

A payment of 75% of the lump sum bid price will be made when excavation within the limits of the structural unit is completed, and the shaft has been successfully dewatered.

The remaining 25% of the lump sum price will be paid:

a) When the shaft is completely removed; or

b) If the Contract Documents require the shaft to be left in place, when the associated drainage system or other component of infrastructure is completed to the limits shown on the plans or as otherwise stated herein.

Payment will be made under:

Pay Item		Pay Unit
900.645	Special Provision (Microtunnel Shaft Construction)(Launch Shaft 1)	Lump Sum
900.645	Special Provision (Microtunnel Shaft Construction)(Receiving Shaft 1)	Lump Sum
900.645	Special Provision (Microtunnel Shaft Construction)(Receiving Shaft 2)	Lump Sum
900.645	Special Provision (Microtunnel Shaft Construction)(Receiving Shaft 3)	Lump Sum

PAVED RAIL-HIGHWAY CROSSING

xx. DESCRIPTION. This work shall consist of constructing a paved rail-highway crossings at the locations indicated in the Plans and as directed by the Engineer, including but not limited to paving and installing rail seals.

xx. MATERIALS. Materials shall meet the requirements specified in the Plans and as recommended by the manufacturer.

All materials shall be approved by the Engineer prior to use.

xx. CONSTRUCTION REQUIREMENTS. The crossing shall be constructed to the configuration shown in the Plans, as recommended by the manufacturer and as directed by the Engineer.

xx. METHOD OF MEASUREMENT. The quantity of Special Provision (Paved Rail Highway-Crossing) to be measured for payment will be on a lump sum basis for each crossing constructed in the complete and accepted work, measured within the limits shown on the Plans.

xx. BASIS OF PAYMENT. The accepted quantity of Special Provision (Paved Rail-Highway Crossing) at the location specified will be paid for at the Contract lump sum price. Payment will be full compensation for performing the work specified, including paving and installing rail seal; and for furnishing all materials, labor, tools, equipment, and incidentals necessary to complete the work.

Payment will be made under:

Pay Item		Pay Unit
900.645	Special Provision (Paved Rail-Highway Crossing)	Lump Sum

REMOVE AND STORE FOUNTAIN

xx. DESCRIPTION. This work shall consist of removing, transporting, and storing the existing fountain in Triangle Park as indicated in the Plans and as directed by the Engineer.

243 Industrial Avenue

xx. CONSTRUCTION REQUIREMENTS. The fountain shall be removed and transported to the Town Wastewater Treatment Plan at 243 Industrial Avenue and stored at that location in an area designated by the Town. The Contractor shall coordinate with Bob Wells, The Wastewater Division Supervisor; Phone: (802) 388-6514, Email: rwells@townofmiddlebury.org to determine the location the fountain is to be stored and the time the fountain will be transported to its storage location.

The Contract shall develop a written procedure for the removal, transportation, storage, and protection (during removal, transportation and storage) of the fountain. The written procedure shall be submitted to the Engineer for approval two weeks prior to the removal of the fountain. The fountain shall not be removed until the written procedure for the removal, transportation, storage and protection (during removal, transportation, and storage) of the fountain is approved by the Engineer. No work shall be performed within Triangle Park prior to the removal of the fountain.

xx. METHOD OF MEASUREMENT. The quantity of Special Provision (Remove and Store Fountain) to be measured for payment will be on a lump sum basis in the complete and accepted work.

xx. BASIS OF PAYMENT. The accepted quantity of Special Provision (Remove and Store Fountain) will be paid for at the Contract lump sum price. Payment will be full compensation for coordinating with the Town, development of a written procedure for removal, transportation, storage, and protection (during removal, transportation and storage) of the fountain, removing, transporting and storing the existing fountain as specified by the Contractor’s written procedure and in the location specified by the Town and for furnishing all materials, labor, tools, equipment, and incidentals necessary to complete the work.

Payment will be made under:

Pay Item	Pay Unit
900.645 Special Provision (Remove and Store Fountain)	Lump Sum

SURVEY, INSTRUMENTATION AND MONITORING

xx. DESCRIPTION. The Work specified in this Section includes furnishing, delivering, installing, operating, monitoring, and removing instrumentation to measure and monitor ground, structure and temporary earth support movements within, around and above open excavations, shafts, tunnel excavations and to monitor groundwater levels as required under the Contract Documents. This work shall include the acquisition and monitoring of readings and measurements obtained from the instrumentation.

xx. GENERAL REQUIREMENTS. The Work specified in this Section includes, but is not limited to the following:

(A) Pre-construction and post-construction condition surveys, including photographic and video documentation.

(B) Furnishing, delivering, installing, operating, monitoring, maintaining and abandoning surface settlement points, settlement monitoring markers, displacement monitoring points, inclinometers, crack gauges, and seismographs.

(C) Furnishing, delivering and operating associated monitoring equipment and software.

(D) Drilling boreholes for instrumentation installation.

(E) Locations for the drilling and installation of instrumentation are shown on the Contract Drawings represent minimum instrumentation requirements. The Contractor may at their discretion install more instruments. The Contractor shall coordinate instrumentation locations and installation with the earthwork operations, shaft and tunnel excavations, and open cut excavation.

(F) Secure applicable permits and secure written permission from property owners for access and installation of monitoring systems.

(G) Familiarity with the applicable ground conditions are described in the Geotechnical Baseline Report (GBR).

xx. RELATED SECTIONS. Carefully examine all of the Contract Documents for requirements which affect the work of this Section. Other specification sections which directly relate to the work of this section include, but are not limited to the following:

(A) Section 900.640 Microtunneling

(B) Section 900.645 Microtunneling Shaft Construction

xx. APPLICABLE STANDARDS AND REFERENCES. Materials and installation shall be in accordance with the latest revisions of the following codes, standards and specifications, except where more stringent requirements have been specified herein.

(A) American Society for Testing and Materials (ASTM):

A 120 Standard Specifications for Pipe, Steel, Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless, for Ordinary Uses

C 778 Standard Specification for Standard Sand

D 1586 Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils

xx. DEFINITIONS.

(A) SURFACE SETTLEMENT POINT (SSP): Instrument installed in a drilled borehole near the ground surface to monitor vertical ground deformations during construction. The end of the rod at depth bears on the soil. The end of the rod at the ground surface is monitored by optical survey methods.

(B) SETTLEMENT MONITORING MARKER (SMM): SMM are control points as indicated on the Drawings and are used to determine settlement of pavement, concrete, or rigid material in relation to existing, pre-construction vertical elevations through vertical control survey.

(C) DISPLACEMENT MONITORING POINT (DMP): A control point consisting of an optical target, non-destructively and firmly attached or established on vertical and/or horizontal exterior surface(s) of a structure, used to monitor horizontal and vertical deformations and inclinations of structures.

(D) INCLINOMETER (IS): Inclinometer casing installed in a drilled hole in soil and rock or preinstalled in a soldier pile. Inclinometers are used to monitor lateral movements in and around the ground using an inclinometer probe and readout unit.

(E) CRACK GAUGE (CG): Also referred as flat crack monitor. Typically mounted on interior and exterior vertical wall faces of buildings. The device is used to monitor the relative displacement of existing cracks or distress features of limited width (<1.00 inches) in structures.

(F) SEISMOGRAPH (SG): An electronic module capable of monitoring and recording ground vibrations in 3-channels (horizontal, vertical and transverse) with a triaxial geophone. Typically the module is battery powered with A/C or solar charging capability. The module is rugged and waterproof, has expansive internal memory capable of storing several weeks of data, and may be capable of transmitting data by cellular connection to enable remote monitoring.

(G) REVIEW LEVEL: Value of instrumentation readings at which the Owner and Contractor jointly assess necessity of altering methods, rate or sequence of construction to control the apparent effects of the construction.

(H) ALERT LEVEL: Value of instrumentation readings at which the Owner may direct the Contractor to cease construction operations, make site and affected properties secure, and take necessary and agreed upon measures to mitigate unacceptable movements and to assure the safety of the work and the public.

(I) BASELINE READING: Value of instrumentation readings taken prior to construction to provide a consistent, repeatable established baseline against which all subsequent readings are compared.

xx. MATERIALS.

(A) General: All instrumentation materials, including readout units and cables, shall remain the property of the Owner following completion of the Contract.

(B) Surface Settlement Points (SSP): Surface settlement points shall be installed at locations as directed by the Owner and as shown on the Drawings.

(1) Surface settlement points shall consist of steel pipe casing of 2-1/2-inch outside diameter; 1-1/2-inch inside diameter black steel pipe conforming to ASTM A120, standard weight as shown on the Drawings; welded or threaded bottom steel tip; and steel pipe cap for read point. The combined length of the 1-1/2-inch black steel pipe and the bottom steel tip shall be 5 feet unless otherwise shown on the Drawings.

(2) Provide 18 x 18 x 5/16-inch steel plate with a central hole and steel pipe clamp to fit the 2-1/2-inch steel pipe casing. Steel plate and pipe clamp assembly shall be capable of transferring the total weight of the 2-1/2-inch pipe to the soil underlying the steel plate. The assembly shall also be capable of maintaining its position on the 1-1/2-inch steel pipe over time.

(3) Protect surface settlement points with 6-inch minimum dimension cast iron valve box installed flush with the ground surface and extending at least 9-inches below grade. Provide locking iron cover and lifting rod or pull-up device for lifting top covers.

(4) Sand, 6 inches thick shall fill the hole from the base of the steel plate. Grout shall fill the space above the sand to the level of the ground surface. Grout the annular space between the borehole and pipe casing.

(C) Settlement Monitoring Markers (SMM): Settlement monitoring markers shall be installed at the locations as directed by the Engineer and as shown on the Drawings.

(1) Settlement monitoring markers shall be ¼-inch x 2-inch long masonry nail, as shown on the Drawings, or 3/8 inch x

5-1/8 inch long bolt equivalent to HAS Threaded Rods Super A193 B7 Steel with adhesive capsules equivalent to HVU (M10) manufactured by Hilti Fastening Systems, Tulsa, OK. All SMM shall be installed with an identification tag as shown on the Drawings.

(D) Seismographs (SG): Shall be installed at the locations directed by the Engineer and/or Owner and as shown on the Drawings. Seismographs shall be placed at the perimeter of construction sites during excavation and/or blasting operations. Seismographs may also be placed on or within structures adjacent to the project, this may include private dwellings, historic buildings, commercial structures, and utilities. The Contractor may install additional seismographs at their own discretion.

(1) Each seismograph shall consist of an autonomous, programmable digital unit with an accompanying triaxial geophone capable of monitoring and recording ground vibrations in 3-channels (horizontal, vertical and transverse).

(2) The module shall be battery powered and capable of operating continuously for up to two weeks without external power.

(3) Each unit shall be of rugged construction and capable of operating continuously outdoors throughout the year typical to the project site.

(4) The general specifications of a seismograph shall include the following:

(a) Range: Up to 10 in/s (254 mm/s)

(b) Resolution: Minimum 0.005 in/s (0.127 mm/s)

(c) Accuracy: +/- 5% or 0.02 in/s (0.5 mm/s)

(d) Frequency Range: 2 to 250 Hz

(E) Inclinometers (IS): Inclinometers shall be installed at the locations directed by the Owner and as shown on the Drawings. Contractor may install additional inclinometers at their discretion.

(1) Provide inclinometer casing, probe, cable, readout unit, spider magnets, datum ring magnets, and accessories as manufactured by Slope Indicator Company or Engineer-approved equivalent.

(2) Inclinometer casing shall be 2.75-inch outside diameter ABS or acceptable equivalent with broached internal keyways and twist tolerance better than 1-degree per 10-foot length. Couplings shall be of the flush-joint, non-telescoping type. Provide proper joint sealing associated

with the selected type of casing such as solvent cement and tape or O-ring seals.

(3) Probe shall be a Slope Indicator Company Model 5032500 or Engineer-approved equivalent. Probe shall be biaxial, consisting of two force balance accelerometers mounted at 90 degrees, with a 2-foot wheelbase. Probe shall be supplied in a carrying case.

(4) Cable shall be 200 feet long, sheathed with neoprene and have vulcanized rubber markers, and an internal wire rope core. Minimum cable outside diameter shall be 0.40 inches. Cable shall be supplied with Slope Indicator Company Model 50503100 slip-ring wheel or approved equivalent.

(5) Inclinometer readout unit shall be a Slope Indicator Company "Digitilt DataMate" or Engineer-approved equivalent. The time interval between recordings 2-feet apart in the casing shall be such that the reading stabilizes to within plus or minus 1 unit of display within eight seconds. Readout unit shall include a battery charger.

(6) Readout probe and reel for spider magnets shall be 300-foot long Slope Indicator model 51817330 or approved equivalent.

(7) Provide all necessary accessories for installation, monitoring, and maintenance. These accessories include, but are not limited to, end caps, tools and materials for attaching coupling and taking readings.

(8) Provide inclinometer software such as Slope Indicator Company "DigiPro for Windows" or Engineer-approved equivalent.

(9) Factory calibrations of inclinometers shall include comprehensive calibrations of the force balance accelerometers before assemble in the probe. A final calibration shall include measurements made at 10 degree vertical intervals from minus 30 to plus 30 degrees with respect to vertical, and a comprehensive repeatability check over a smaller zone near vertical.

(10) Grout for inclinometer casings shall consist of Type II Portland cement, bentonite and water. The grout shall have approximately the same shear strength and compressibility as the surrounding ground.

(11) Surface protection shall have a diameter adequate to follow attachment of cable support assembly, or shall allow for an inclinometer casing extension while readings are being taken. The length of the inclinometer casing extension shall not vary by more than 0.05-inch. Provide cap end consist of threaded pipe cap with hasp and padlock. Cap end shall be 3 inches above the inclinometer casing.

(F) Crack Gauges (CG): Crack gauges shall be installed at locations on building walls, retaining walls, floor slabs, and other structure elements as directed by the Engineer to monitor existing cracks and distress features prior to and during construction.

(1) Crack gauges shall be the Avongard Crack Monitor manufactured by Avongard Products USA, Ltd., of Santa Monica, California, and Model C-197 distributed by Durham Geo Slope Indicator of Stone Mountain, Georgia.

(2) Up to 100 crack gauges shall be installed and monitored by the Contractor at locations as directed by the Engineer.

(G) Displacement Monitoring Points (DMP): DMPs shall be installed at locations necessary to monitor for damage to structures, as directed by the Engineer and as shown on the Drawings.

(1) Each DMP shall be weather, water, dust, and UV resistant, proprietary brand of survey target suitable for use with the survey instrument proposed to achieve the specified movement measurements.

(2) DMPs shall be a survey target for measurement of horizontal movement, vertical settlement, and tilt monitoring of structural elements, including but not limited to building walls, facades, columns, and pillars.

(3) DMPs shall be installed using a non-destructive, removable adhesive, per the manufacturer's requirements.

(4) DMPs shall be the Rothbucher System Smart Target RS41, or approved equivalent.

xx. PREQUALIFICATION.

(A) Personnel Qualifications and Instrument Installation:

(1) Employ qualified technicians with a minimum of two (2) years' experience in the installation of instrumentation similar to that specified herein. Written documentation of qualifications shall be submitted to the Engineer before installation of instrumentation devices begins.

(2) Employ a registered Professional Engineer licensed in the State of Vermont, with a minimum of five (5) years' experience in the installation and maintenance of instrumentation specified herein, to supervise and direct technicians and be responsible for instrument installation as required by the Drawings and Specifications. This person shall have experience on at least two prior projects similar in scope and size to this project. This person shall prepare and stamp instrumentation shop drawings and be physically present at the installation site(s) to directly supervise the installations.

(B) Installation of instrumentation shall, at all times, be performed in the presence of the Owner's Representative.

(C) Provide the services of an authorized manufacturer's representative who shall visit the site and provide training as necessary for the Contractor's personnel to properly install these devices. The authorized representative shall inspect and approve at least the first two installations for each type of instrumentation.

(D) Each instrument specified herein shall be the product of an acceptable manufacturer currently engaged in manufacturing instrumentation hardware of the specified types.

(E) The Contractor shall submit this information to the Engineer for review, evaluation and approval prior to submitting detailed information required under the SUBMITTALS AND PRECONSTRUCTION REQUIREMENTS Section herein.

xx. SUBMITTALS AND PRECONSTRUCTION REQUIREMENTS.

(A) The Contractor shall conduct a pre-construction condition survey of any buildings, structures, or utilities within a 750 foot radius of project limits. The survey methods used shall be acceptable to the Contractor's insurance company, the Agency, and local authorities. The Contractor shall be responsible for any damage resulting from construction activities. The pre-construction survey records shall be made available to the Engineer for review. Occupants of local buildings shall be notified by the Contractor prior to the commencement of construction.

(B) All reviews are subject to satisfactory field performance. If the approved submittal procedures do not produce satisfactory field performance, the Contractor will be responsible for submitting revised procedures.

(C) The Contractor shall submit Shop Drawings as prepared by approved qualified specialists submitted in accordance with the PREQUALIFICATION Section herein:

(1) Instrument Installation Schedule: Submit the proposed schedule for installing instruments with reference to project construction activities, meeting the requirements specified herein or as approved by the Engineer. The Engineer shall be informed no later than 48 hours before installation operations commence for each instrument being installed.

(2) Methods and equipment to be used for drilling and grouting, including manufacturer and model number of drill rigs, and method to be used for cleaning inside of casing or augers.

(3) Methods related to the installation and protection of all geotechnical instruments specified in this Section.

(4) Method for overcoming buoyancy of instrumentation components during grouting.

(5) Method of sealing joints in pipes and casings to prevent ingress of all fluids.

(6) Materials and mix portions for grout for installation of instruments.

(7) Method for conducting post-installation acceptance test.

(8) Following installation of the instruments, submit As-Built drawings showing the exact installed location, the instrument identification number, the instrument type, the installation date and time, the heading station, or portal or shaft excavation depth on the installation date, and the anchor, sensor or tip elevation and instrument length, when and where applicable. Include details of installed instruments, accessories and protective measures including all dimensions and materials used.

(9) Forms for reporting instrumentation data.

(10) Construction logs shall be in accordance with the requirements specified in this Section.

(D) Reports and Records. Provide reports of monitoring data to the Engineer in accordance with the frequency and format requirements of this Section.

(E) Product Data and Samples:

(1) Submit all applicable manufacturer's literature describing the instrumentation manufacturer’s recommendations and instruction for installation, post-installation acceptance testing, monitoring, operation and maintenance procedures for the geotechnical instrumentation specified in this Section and as shown on the Drawings, including readout units, sensors, cables, micrometers, and probes. Provide manufacturer's brochures on each product and all related equipment and accessories.

(2) Certificates: For each instrument to be installed submit, as applicable, a certificate issued by the instrument's manufacturer stating that the manufacturer has inspected and tested each instrument before it leaves the factory to see that the instrument is working correctly and has no defects or missing parts.

xx. CONSTRUCTION TOLERANCES

(A) Tolerances specified herein may be modified by the Owner at any time, depending on location, construction progress,

scheduling and efficiency of temporary Works, construction rates of movement, and other factors affecting of earth or structures that are subject to monitoring.

(B) Install instrumentation within five (5) feet of the horizontal locations shown on the Drawings unless otherwise approved by the Owner. Inclinometers installed within soldier piles are to be coordinated with the Owner. Instrumentation for private property to be coordinated with the Owner and approved in writing by property owners prior to installation.

(C) Install inclinometer (IS) casings within 2 degrees of vertical for the entire length.

(D) Notify the Owner if actual field conditions prohibit installation at the location and elevations specified on the Drawings.

(E) Establish the initial horizontal coordinates of each in ground instrument installation to 0.10 feet accuracy. Establish the initial horizontal coordinates of each building mounted instrument installation to 0.005 feet accuracy.

(F) Establish the initial elevation of all instruments and their associated casings, probes, sensors, and reference heads/plates/magnets to 0.005 feet vertical accuracy.

(G) Survey, record, and report the subsequent elevations of all instruments to 0.005 feet vertical accuracy.

xx. CONSTRUCTION REQUIREMENTS

(A) General.

(1) Instrumentation shall be installed in accordance with each respective manufacturer's recommendations at the locations shown on the Drawings, prior to start of any tunneling, shaft or open excavation construction and as approved and directed by the Owner. Instruments shall be installed in accordance with the approved instrument installation schedule as required in this Section and be installed such that baseline readings are made as specified herein.

(2) Existing Conditions: Locate conduits and underground utilities in all areas where any subsurface instrumentation are to be drilled and installed. Notify all Utility Owner's prior to instrumentation installation below ground surface. Locations of instrumentation, described in this Section shall be modified, as approved by the Owner, to avoid interference with the existing conduits and utilities. Repair damage to existing utilities resulting from instrument installations at no additional cost to the Owner.

(3) All instruments shall be clearly marked, labeled, and protected to avoid being covered, obstructed or otherwise damaged by construction operations or vandalism. Both protective housing and box or vault covers shall be clearly marked.

(4) Surveying: Immediately following installation, the location of the top of all instruments shall be surveyed to provide horizontal and vertical coordinates.

(5) Drilling from the Ground Surface: Boreholes drilled from the ground surface for geotechnical instrumentation, described in this Section, shall be subject to the same permitting and drilling requirements as those for geotechnical exploration boreholes. Obtain necessary permits for each such instrument and conform to the permit requirements during drilling and installation.

(6) Where instrumentation is located within five (5) feet horizontally of existing underground utilities, vacuum excavation methods shall be used to excavate and clear utilities within the maximum anticipated depth below ground surface.

(B) Installation Schedule.

(1) Install settlement monitoring markers, surface settlement points, displacement monitoring points, and crack gauges a minimum of 15 days prior to start of excavation near the installation site.

(2) Install inclinometers a minimum of 30 days prior to start of excavation near the installation sites. Inclinometers within soldier and/or secant piles are to be installed concurrently with pile reinforcement placement.

(C) Baseline Readings.

(1) Baseline readings for all instrumentation requiring surveying shall be taken by a registered Professional Surveyor licensed in the State of Vermont. All baseline readings shall be submitted to the Engineer for review and acceptance by the Owner prior to the start of construction operations or continuation of construction, as applicable.

(2) Baseline readings for settlement monitoring markers, surface settlement points, optical survey targets, displacement monitoring points, and crack gauges consist of two consistent sets of readings made on separate days, within 10 days of installation.

(3) Baseline readings for inclinometers shall consist of a minimum of three readings taken within a two week period on three separate days and within 30 days of installation but before shaft development and within a maximum deviation of 20% from their numerical average.

(4) Any construction activities that have affected the performance of monitoring devices prior to the start of excavations shall be immediately reported to the Owner. Replacement and/or base-lining shall be conducted at the direction and to the satisfaction of the Owner.

xx. MONITORING FREQUENCY.

(A) Minimum monitoring frequencies for the specified monitoring points shall follow the requirements herein and are in addition to the base-lining requirements of this Section.

(B) For SMMs, SSPs, DMPs, CGs, monitor as follows:

(1) Daily for one week prior to dewatering and excavation activities.

(2) Once per shift during dewatering and excavation activities.

(3) Weekly until final structure is completed and excavation is backfilled.

(4) Any additional readings as directed by the Engineer.

(C) For inclinometers (IS) monitor as follows:

(1) Daily starting one week in advance of the start of any excavation.

(2) Daily upon start excavation activities and extending until the end of each excavation.

(3) Weekly until the final structures are completed and backfilled or until directed by the Owner to end monitoring.

(D) For seismographs (SG) monitor as follows:

(1) For a one-week period prior to the start of construction activities.

(2) Daily upon start excavation activities and extending until the end of each excavation.

(3) Weekly until final structure is completed and excavation is backfilled.

(4) Any additional readings as directed by the Engineer.

xx. REVIEW AND ALERT LEVELS.

(A) Review and Alert Levels on this Project are defined by a two-tier process for each monitoring point and are established as an initial basis for eliminating or minimizing potential

disturbances or damages to adjacent structures, buildings, utilities, roadways and other facilities.

(B) The Review and Alert levels specified herein can be adjusted at the request of the Contractor but subject to the written approval of the Engineer as construction progress, actual field conditions and observed data trends warrant.

(C) Regardless of the specified instrumentation and the measured quantities in reference to the established Review and Alert Levels, the Contractor shall take immediate actions should observed ground or structural deformation of any kind in reaction to the related construction activities, regardless of its magnitude, be deemed by the Contractor or the Engineer to cause an unsafe condition.

(D) Review Level and Alert Level

(1) Review Level – When the monitoring data at any monitoring point indicate that the differential readings (from the baseline) are closely approaching or equal to the Review Levels specified herein, the Review Level is said to have been reached. At this time, the Contractor shall review the construction operations and keep a more active review of the trend of the monitored movement and increase the frequency of monitoring as deemed necessary or as directed by the Engineer. The Contractor shall provide measures to improve the construction operations to limit further increases in the differential readings and provide justification for any operational deviations from the approved submittals.

(2) Alert Level– When the monitoring data at any monitoring point indicate that the differential readings (from the baseline) are closely approaching or equal to 100% of the Alert Levels specified herein, the Alert Level is said to have been reached. At this time, the Contractor shall issue a stop work order to cease all related construction activities, and protect all structures against potential damages. The Contractor shall investigate and correct the excessive movement before work can be resumed. The Contractor shall submit in writing results of the investigation and what additional mitigation measures are to be implemented. The Contractor shall install and monitor additional monitoring points as deemed necessary or as directed by the Engineer.

(E) Immediately inform the Engineer when the following Review and Alert Levels are reached:

(1) SMMs and SSPs:
- (a) Review Level: 0.50 in. (vertical)
- (b) Alert Level: 1.00 in. (vertical)

(2) CGs:
- (a) Review Level: 0.075 in.

(b) Alert Level: 0.125 in.

(3) DMPs:

(a) Horizontal (in- and out-of-plane) and Vertical:

i. Review Level: 0.125 in.

ii. Alert Level: 0.25 in.

(b) Angular Distortion:

i. Review Level: 0.0012 in.

ii. Alert Level: 0.0020 in.

(4) Inclinometers (IS) outside of soldier pile walls:

(a) Horizontal and Vertical:

i. Review Level: 1.00 in. (horizontal)

ii. Alert Level: 2.00 in. (horizontal)

(b) Angular Distortion:

i. Review Level: 0.0012

ii. Alert Level: 0.0020

(5) Inclinometers (IS) installed within soldier pile walls:

(a) Horizontal and Vertical:

i. Review Level: 1.00 in. (horizontal)

ii. Alert Level: 2.00 in. (horizontal)

(b) Angular Distortion:

i. Review Level: 0.0001

ii. Alert Level: 0.0003

(6) Seismographs (SG) placed off-site, the following step functions shall apply:

(a) Review Level: 0.12 in/s { ≤ 10 Hz}
0.12 to 0.30 in/s {10 to 40 Hz}
0.30 in/s { ≥ 40 Hz}

(b) Alert Level: 0.25 in/s { ≤ 10 Hz}
0.25 to 0.50 in/s {10 to 40 Hz}
0.50 in/s { ≥ 40 Hz}

(7) Seismographs (SG) placed on-site, the following step functions shall apply:

(a) Review Level: 0.20 in/s { ≤ 1 Hz}
0.20 to 0.75 in/s {1 to 4 Hz}
0.75 in/s {4 to 15 Hz}
0.75 to 2.00 in/s { 15 to 40 Hz}
2.00 in/s { ≥ 40 Hz}

(b) Alert Level: 0.30 in/s { ≤ 1 Hz}
0.30 to 1.13 in/s { 1 to 4 Hz}
1.13 in/s { 4 to 15 Hz}
1.13 to 3.00 in/s { 15 to 40 Hz}
3.00 in/s { ≥ 40 Hz}

xx. RESPONSE TO PUBLIC COMMENTS AND OBSERVATIONS.

(A) Upon receiving comments or observations from the public, in any format, regarding defects or other impact related to construction induced ground movement, groundwater levels, vibrations or structural damages, the Contractor shall provide a report immediately to the Owner.

(B) The Contractor shall take immediate and concrete actions to measure, quantify, monitor or correct the observed defects reported by the public, as deemed necessary, or at the direction of the Owner, to protect the public.

xx. REPORTING FREQUENCY AND FORMAT.

(A) Submit three (3) copies of the instrument monitoring reading data to the Engineer, on forms approved by the Engineer within 24 hours after the observation readings are made.

(B) Submit reduced data and updated data plots of reading results within two (2) working days after observation readings are made. Data is to be submitted in an electronic format that can be manipulated acceptable to the Owner and Engineer.

(C) The monitoring records shall be presented in both data table format and cumulative time history trend plots. The records shall be submitted in an electronic format acceptable to the Engineer. Sample data presentation formats for each monitoring device shall be submitted to the Engineer for review. The monitoring record in both data table and graphs form shall clearly report the following:

(1) Locations and identification of the monitoring devices.

(2) Labor and equipment used to take readings.

(3) Data and time readings and personnel who conducted the monitoring.

(4) Conditions under which the readings are taken including progress of construction activities, weather conditions including temperature and rainfall, and note any potential factors that may have affected the readings.

(5) Instrument readings, both absolute and differential values from the corresponding baseline readings, and the Review and Alert Levels specified herein. All plots shall be differentiated using a combination of varying line types, data point symbols, or colored lines.

(D) The Contractor’s registered Professional Engineer in charge of instrumentation and monitoring shall make his/her own interpretation of the monitoring data. The Contractor shall inform the Owner immediately if the Review and Alert Levels specified herein are being closely approached or have been reached or exceeded. Data or interpretations shall not be

published or disclosed to parties other than the Engineer without prior written permission of the Owner.

(E) Inform the Owner immediately when the Review Level is reached for any instrument.

(F) Inform the Owner immediately when the Alert Level is reached for any instrument.

xx. INSTRUMENT PROTECTION, MAINTENANCE AND REPAIR

(A) Protect the instruments from damage. Damaged instruments shall be replaced or repaired prior to continuing work, or as required by the Engineer at no additional cost to Owner.

(B) Maintain the instruments by draining water and flushing debris from under protective covers and keeping covers locked and sealed at all times.

xx. DISPOSITION OF INSTRUMENTS.

(A) Settlement Monitoring Markers, Surface Settlement Points, Displacement Monitoring Points, Crack Gauges, and Seismographs:

(1) All settlement and displacement monitoring instruments on public property shall remain in-place at the completion of the Contract.

(2) Remove all settlement and displacement monitoring instruments on private property during the cleanup and restoration Work, or as required by the Engineer and/or Owner. Fill open holes with cement grout to the written satisfaction of the Engineer.

(3) Restore pavement, sidewalks, and landscaped areas in kind or better than existing adjacent conditions.

(B) Inclinometers:

(1) Inclinometer casings and associated protective vaults shall be removed within two feet below ground surface at the completion of the Contract. Fill open holes with cement grout using a tremie method.

(2) Conform to the requirements for Well and Installation Abandonment established elsewhere in the Contract Documents for grouting.

(3) Restore pavement, sidewalks, and landscaped areas in kind or better than existing adjacent conditions.

xx. METHOD OF MEASUREMENT. The quantity of Special Provision (Survey, Instrumentation, and Monitoring) to be measured for payment will be on a lump sum basis in the complete and accepted work. Costs associated with providing all submittals required as part of the

work, all necessary modifications thereto, furnishing all equipment, materials, personnel as required to complete the Work as required herein, will be considered incidental to the Contract items in this Section and shall be included in the Contractor's Lump Sum price.

xx. BASIS FOR PAYMENT. The accepted quantities for Special Provision (Survey, Instrumentation, and Monitoring) will be paid for at the Contract Lump Sum price. Payment will be full compensation for furnishing all labor, equipment, materials, and incidentals necessary to complete the work.

Payment will be made under:

Pay Item	Pay Unit
900.645 Special Provision (Survey, Instrumentation, and Monitoring)	Lump Sum

We need a pay schedule for this item. Something like:
20% upon approved plan
20% upon installation of equipment
40% prorated over monitoring time
20% upon removal of instrumentation
How do we carry this from Contract 1 to Contract 2?

TRAFFIC CONTROL

XX. DESCRIPTION. This work shall consist of establishing and maintaining traffic control measures to protect the traveling public and construction operations as indicated in the Plans and as directed by the Engineer.

The work under this Section shall be performed in accordance with these provisions, the Plans, and Section 641 of the Standard Specifications.

XX. SUBMITTALS. The Contractor shall submit to the Project Manager for acceptance a site-specific traffic control plan in accordance with Subsection 105.03. The traffic control plan shall conform to the requirements of the MUTCD and all applicable Agency Standard Drawings. Where conflicts exist, the MUTCD will govern. Each phase of construction shall be included in the submitted traffic control plan. The Contractor shall allow the Agency 14 calendar days to review and respond to the proposed traffic control plan.

XX. TRAFFIC CONTROL DEVICES. Temporary traffic barrier shall meet the requirements of Section 621. Traffic control devices shall meet the requirements of Section 641.

XX. METHOD OF MEASUREMENT. The quantity of Special Provision (Traffic Control, All-Inclusive) to be measured for payment will be on a lump sum basis for providing traffic control in the complete and accepted work.

The quantities for Uniformed Traffic Officers, Flaggers, Portable Changeable Message Signs will be measured separately in accordance with Section 630 and 641.

XX. BASIS OF PAYMENT. The accepted quantity of Special Provision Traffic Control, All-Inclusive) will be paid for at the Contract lump sum price.

Partial payments will be made as follows:

(a) The first 15% of the Contract lump sum price will be paid upon approval of the Contractor’s traffic control plan.

(b) The remaining 85% of the Contract lump sum price will be paid on a prorated basis for the estimated duration of the Contract work remaining.

Payment will be full compensation for preparing, implementing, inspecting, maintaining, and removing the applicable traffic control plan and required traffic control devices, including but not limited to temporary traffic barrier, temporary pavement markings, and signing; and for furnishing all labor, tools, materials, equipment, and incidentals necessary to complete the work.

Uniformed Traffic Officers, Flaggers, and Portable Changeable Message Signs will be paid for separately under Contract items 630.10, 630.15, and 641.15 respectively.

Payment will be made under:

Pay Item	Pay Unit
900.645 Special Provision (Traffic Control, All-Inclusive)	Lump Sum

We need all of the special provisions which pertain to the railroad. The rail agreement, the flagging rates, delay rates ...

MAINTENANCE OF RAILROAD TRAFFIC

xx. DESCRIPTION. This work shall consist of maintaining railroad traffic and coordinating with the Agency and the Railroad for inspection and review of the Contractor's work in conjunction with construction operations to be performed within the Railroad right-of-way, in accordance with the Contract Documents and as directed by the Engineer.

xx. GENERAL REQUIREMENTS. When, as stipulated in the Contract Documents, or in the opinion of the Engineer and the Chief Engineering Officer of the Railroad, the construction work would cause hazard to the safe operation of trains and other facilities of the Railroad, including signal and communication lines, the Railroad will furnish the necessary qualified employees to protect their trains and other facilities.

Protection services will be required whenever the Contractor is performing work over, under, or adjacent to the railroad tracks or right-of-way such as excavation, sheeting, shoring, erection, or removal of forms; handling material; using equipment which by swinging or by failure could foul the track; and when any other type of work being performed, in the opinion of the Railroad, requires such service.

The Contractor is advised that although the cost for protective services will be paid for on a lump unit basis by the Agency, the Contractor shall be required to plan, coordinate, and organize the work effort in a way that shall absolutely minimize the use and number of railroad protective personnel required. The Agency and a Railroad representative will review and approve all Contractor work schedules prior to the commencement of work and prior to the assignment of protective personnel. Misuse of these protective services by the Contractor due to inadequate work procedures will not be allowed and shall be sufficient cause for the Agency to require the Contractor to bear all inappropriate costs.

Railroad train crews necessary for the operation of Contractor scheduled work trains or Contractor owned or leased locomotive equipment shall not be paid by the Agency under this Section; all such costs will be considered incidental to the Contractor's work and therefore shall be entirely borne by the Contractor.

All existing signs, markers, and other informational indicators associated with the operations of the Agency or the Railroad that are removed by the Contractor in the performance of this work shall be preserved and reinstalled as soon as possible. Reinstallation shall precede any train operation at the same locations as they are removed. Any sign, marker, or other information indicator that is damaged by the Contractor's operations shall be considered a charge against the Contractor and shall be paid for by the Contractor or deducted from any monies due or that may become due the Contractor under this Contract.

Railroad traffic shall be maintained at all times with safety and continuity, and the Contractor shall conduct all operations on or over the railroad right-of-way fully within the rules, regulations, and requirements of the Agency and the Railroad. The Contractor shall be responsible for becoming acquainted with such requirements as the Railroad and/or Agency demands.

Existing train operations may include, but are not limited to, the following:

(a) Regularly scheduled passenger trains.

(b) Regularly scheduled freight trains.

(c) Other unscheduled trains or equipment being moved by the various Railroads.

xx. SUBMITTALS.

(a) At the preconstruction meeting, the Contractor shall submit for approval by the Agency a detailed description of proposed methods for accomplishing the construction work required under the Contract, to include methods for protecting Railroad traffic. Approval by the Agency shall not serve in any way to relieve the Contractor of complete responsibility for the adequacy and safety of the proposed methods.

(b) Prior to beginning work, the Contractor shall submit for the approval of the Engineer a detailed description of the procedure(s) for work to be performed over, under, within, or adjacent to the Railroad right-of-way. Work shall not proceed until the proposed procedure(s) have been approved by the Agency.

xx. CONSTRUCTION REQUIREMENTS. The Contractor shall obtain verification of the time and schedule of track occupancy from the Railroad before proceeding with any construction or demolition work over, under, within, or adjacent to the Railroad right-of-way.

All work to be done under, upon, or over the Railroad right-of-way shall be performed by the Contractor in a manner satisfactory to the Engineer and shall be performed at such times and in such manner as to not interfere with the movement of trains or traffic upon the tracks. The Contractor shall use all necessary care and precaution to avoid accidents, delay, or interference with the trains or other property.

The Contractor shall give notice to the Railroad at least fifteen (15) days prior to the commencement of any work, or any portion of the work, over or adjacent to the Railroad right-of-way, so that necessary arrangements can be made promptly by the Railroad to protect railroad traffic.
The Contractor shall conduct the work and handle equipment and materials so that no part of any equipment should foul an operated track or wire line without the written permission of the Railroad.

When it is noted that the work will foul an operating track, the Contractor shall give the Railroad written notice fifteen (15) days in advance so that, if approved, arrangements can be made for proper

protection of the railroad.

Cranes, shovels, or any other equipment shall be considered to be fouling the track when located in such position that failure of same, with or without load, brings the equipment within the fouling limit.

Equipment of the Contractor to be used adjacent to the tracks shall be in first-class condition so as to fully prevent failures of defective equipment that might cause delay in the operation of trains or damage to Railroad facilities. The Contractor's equipment shall not be placed or put into operation adjacent to tracks without first obtaining permission from the Railroad. Under no circumstance shall any equipment or materials be placed or stored within 25 feet from the centerline of the track, unless otherwise directed.

Materials and equipment belonging to the Contractor shall not be stored adjacent to tracks without first obtaining permission from the Railroad. The Agency and/or Railroad will not be liable for damage to such materials and equipment from any cause. The Contractor shall keep the tracks adjacent to the site clear of all refuse and debris and shall leave the property in the condition existing before the start of construction operations.

The Contractor shall consult with the Railroad to determine the type of protection required to ensure safety and continuity of Railroad traffic incidental to the particular methods of operation and equipment to be used in the work. Any Construction Inspectors, track foremen or track watchmen, signalmen, or other employees deemed necessary for protective services by the Railroad, or its duly authorized representative to ensure the safety of trains contingent upon the Contractor's operations, shall be obtained from the Railroad by the Contractor.

The providing of such watchmen and other precautionary measures shall not, however, relieve the Contractor from liability for payment of damages caused by the Contractor’s operations.

xx. FLAGGING AND PROTECTIVE SERVICES. The Contractor shall make all arrangements with the Agency and the Railroad, as applicable, for railroad employees required for flagging and protective services.

Railroad flaggers shall be furnished in accordance with Section 630.

xx. METHOD OF MEASUREMENT. The quantity of Special Provision (Maintenance of Railroad Traffic) (N.A.B.I.) to be measured for payment will be on a lump unit basis for the specified railroad flagging and protective services provided.

xx. BASIS OF PAYMENT. Payment for Special Provision (Maintenance of Railroad Traffic)(N.A.B.I.) will be as follows:

(a) A lump unit of ninety thousand dollars ($90,000) has been included in the bid proposal for flagging and protective services. Payment will be for reimbursing the Contractor for the actual invoice amounts paid to the Railroad by the Contractor for flagging and protective services. The Contractor shall submit four copies of paid receipted itemized bills from the Railroad for the flagging and protective services charges to the Agency

for review and approval. The Contractor's overhead will not be reimbursed.

(b) The lump unit will be adjusted to the actual amount paid to the Railroad for flagging and protective services, after review and approval of paid invoices.

No additional payment will be made under this Contract item. All other costs for coordination and maintenance of rail traffic in accordance with these provisions will be considered incidental to Special Provision (Maintenance of Railroad Traffic)(N.A.B.I.).

If the Contract is not completed within the specified time limit for completion of the Contract (or authorized extended time), no payment will be made for any costs incurred beyond the specified time of completion.

Payment will be made under:

Pay Item	Pay Unit
900.650 Special Provision (Maintenance of Railroad Traffic)(N.A.B.I.)	Lump Unit

BITUMINOUS CONCRETE PAVEMENT, SMALL QUANTITY

XX. DESCRIPTION. This work shall consist of constructing one or more courses of bituminous mixture on a prepared foundation in accordance with these specifications and the specific requirements of the type of surface being placed, and in reasonably close conformity with the lines, grades, thicknesses, and typical cross sections shown on the Plans or established by the Engineer.

The work under this Section shall be performed in accordance with these provisions, the Plans, and the appropriate provisions of Section 406 or Section 490 of the Standard Specifications.

XX. MATERIALS. Materials shall meet the requirements of the following Subsections:

Performance-Graded Asphalt Binder.....702.02
Emulsified Asphalt, RS-1H or CRS-1H.....702.04
Aggregate for Marshall Bituminous Concrete Pavement....704.10(a)
Aggregate for Superpave Bituminous Concrete Pavement...704.10(b)

Aggregate shall meet requirements relating to Section 406 or 490, where so specified.

The grade of PG asphalt binder used to produce bituminous concrete pavement shall be 58-28. Substitutions will be accepted based on availability where the upper end temperature value is greater than 58°C (136°F) and/or the lower end temperature value is less than -28°C (-18°F).

XX. DESIGN MIX TYPES. Design mix types may be substituted based on mix availability. Allowable mix type substitutions will be accepted on a one to one thickness relationship, except as listed in Tables A and B below.

TABLE A – ALLOWABLE 40 MM (1½") MIX TYPE IVS SUBSTITUTIONS

Design ESALs (millions)	Design	Allowable Substitution	
	490.30 Superpave Bituminous Concrete Pavement	406.25 Bituminous Concrete Pavement*	406.27 Med. Duty Bituminous Concrete Pavement*
< 0.3	TYPE IVS	TYPE III	TYPE III
0.3 to < 10	TYPE IVS	TYPE III	-

*Per Section 406.

TABLE B – ALLOWABLE 90 MM (3½") MIX TYPE IIS SUBSTITUTIONS

Design ESALs (millions)	Design	Allowable Substitution	
	490.30 Superpave Bituminous	406.25 Bituminous Concrete	406.27 Med. Duty Bituminous

	Concrete Pavement	Pavement*	Concrete Pavement*
< 0.3	TYPE IIS	TYPE I	TYPE I
0.3 to < 10	TYPE IIS	TYPE I	-

*Per Section 406

XX. COMPOSITION OF MIXTURE.

(a) Gradation. Gradation shall meet the requirements of Section 406 or 490, as appropriate.

(b) Design Criteria. Design Criteria shall meet the requirements of Section 406 or 490, as appropriate.

(c) Mix Design. Standard mix design will be in accordance with Subsection 490.03 with an n value of 65 gyrations. Allowable substitutions based on pre-existing approved mix designs and/or n values for intended Contract suppliers are listed in Table C below. A request for substitutions must be submitted in writing to the Engineer a minimum of 10 working days prior to production. Any substitutions from the standard mix design or mix types as detailed in the Plans shall not result in any increase in cost to the Agency.

TABLE C – ALLOWABLE SPECIFICATION SUBSTITUTIONS

Design ESALs (millions)	Acceptable Specification Substitution		
	Superpave Bituminous Concrete Pavement (Gyrations)	Bituminous Concrete Pavement* (75 Blow)	Med. Duty Bituminous Concrete Pavement* (50 Blow)
< 0.3	50	✓	✓
0.3 to < 10	65[1]	✓	-

[1]Standard mix design specification.
*Per Section 406

(d) Quality Acceptance.

(1) General. Acceptance sampling and testing will be conducted in accordance with the Agency's Quality Assurance Program as approved by FHWA. Bituminous concrete mixtures designated under these specifications will be sampled a minimum of once per day of production or 500 metric tons (sublot), or other sublot size deemed appropriate, and evaluated by the Agency for each mix type (each mix design) in accordance with the following acceptance guidelines.

(2) Acceptance Guidelines. Temperature of the bituminous mixture shall be tested using the Verified Thermometer test method and PG Asphalt Binder content determined from the batch slip. Gradation shall be tested in accordance with AASHTO T 30. Mixture volumetric properties (air voids and VMA) shall be

calculated in accordance with Subsections 406.03(b) or 490.03(b), as appropriate.

(3) Non-Compliant Material.

a. Rejection by Contractor. The Contractor may, prior to sampling, elect to remove any defective material and replace it with new material at no expense to the Agency. Any such new material will be sampled, tested, and evaluated for acceptance.

b. For any non-compliant material outside the production testing tolerances contained in the applicable Table 406.03C or 490.03C, the representative material (sublot) shall be assessed a mixture pay adjustment factor, PF(mix), of (-0.200).

(e) Boxed Samples. If Agency plant inspectors are not available for daily testing and inspection functions, then box samples will be taken by the Engineer at the project site to afford verification of mixture volumetrics/properties. Boxed samples will be processed and results reported to the Engineer within ten working days of being received at the Agency Central Laboratory in Berlin, Vermont. Gradation shall be tested in accordance with AASHTO T 30. Maximum Specific Gravity shall be tested in accordance with AASHTO T 209. Boxed samples will be assessed a mixture pay adjustment factor of 0.000.

XX. COMPACTION. Special Provision (Bituminous Concrete Pavement, Small Quantity) will be analyzed for density according to the procedure specified below.

The density of the compacted pavement shall be at least 92.0%, but not more than 97.0%, of the corresponding daily average maximum specific gravity for each mix type (each mix design) of bituminous mix placed during each day. For material that falls outside of this range, payment will be made by adjusting the daily production totals in accordance with Table D:

TABLE D – DENSITY PAY FACTORS

AVERAGE DENSITY	DENSITY PAY FACTOR, PF(d)
89.0% - 90.4%	- 0.150
90.5% - 91.9%	- 0.100
92.0% - 93.4%	0.000
93.5% - 95.4%	0.150
95.5% - 97.0%	0.000
97.1% - 98.5%	- 0.100

When the Contract allows for a pay adjustment for mat density and the Agency elects to not take cores of any pavement course, the Density Pay Factor (PF(d)) will be considered equal to 0.000.

Bridges with a length equal to, or greater than, six meters (20 feet) will be cored for analyzing density of the bridge deck pavement. The minimum number of cores (taken from the center of the travel lane) shall be two, or as directed by the Engineer. Bridges with a length less than six meters (20 feet) will not be cored. Bridge decks or approaches will not be cored within three meters (10 feet) of a bridge or construction joint.

Bridge deck core areas shall be repaired with hot bituminous mix to the satisfaction of the Engineer at no additional cost to the Agency.

The cores taken for acceptance testing will be the final cores taken for determination of densities.

When the Contract does not allow for a pay adjustment for mat density the Contractor shall, prior to performing any construction operations, submit to the Engineer for approval the proposed rolling pattern and compaction equipment to be used on the project. Random investigative cores will be taken by Agency personnel on the first day's production of any pavement course, with the exception of the leveling course, to verify effectiveness of the proposed rolling pattern and equipment.

Pending results of the investigative cores, necessary adjustments to the proposed rolling pattern and/or equipment shall be made by the Contractor to achieve densities as directed by the Engineer.

XX. METHOD OF MEASUREMENT. The quantity of Special Provision (Bituminous Concrete Pavement, Small Quantity) to be measured for payment will be the number of metric tons (tons) for a lot of mixture (each type) complete in place in the accepted work (Q) as determined from the weigh tickets.

The quantities of all applicable Pay Adjustments calculated for the project will be determined as specified below.

When applicable, and when the mixture pay factor, PF(mix), for a lot of Special Provision (Bituminous Concrete Pavement, Small Quantity) is less than 0.000, the measured quantity of Special Provision (Bituminous Concrete Pavement, Small Quantity) placed will be multiplied by such pay factor to determine a Mixture Pay Adjustment, (PA(mix)), to the accepted tonnage placed (Q) for that lot based on the Contract bid price (B), as follows:

$$PA(mix) = PF(mix) \times Q \times B$$

When applicable, and when the density pay factor, PF(d), for a lot of Special Provision (Bituminous Concrete Pavement, Small Quantity) is less than 0.000, the measured quantity of Special Provision (Bituminous Concrete Pavement, Small Quantity) placed that day, or placed per bridge for any bridge project, will be multiplied by such pay factor to determine

a Mat Density Pay Adjustment, (PA(d)), to the accepted tonnage placed (Q) for that lot based on the Contract bid price (B), as follows:

$$PA(d) = PF(d) \times Q \times B$$

XX. BASIS OF PAYMENT. The measured quantity of Special Provision (Bituminous Concrete Pavement, Small Quantity) will be paid for at the Contract unit price per metric ton (ton). Payment shall be full compensation for furnishing, mixing, hauling, and placing the material specified and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

Payment for Pay Adjustments shall be debited against the Contract prices (Lump Units) bid for the Pay Adjustment items.

The cost of repairing bridge deck core areas will not be paid for separately, but will be considered incidental to Special Provision (Bituminous Concrete Pavement, Small Quantity).

The costs of furnishing testing facilities and supplies at the plant will be considered included in the Contract unit price of Special Provision (Bituminous Concrete Pavement, Small Quantity).

The costs of obtaining, furnishing, transporting, and providing the straightedges required by Subsection 406.16 or Subsection 490.16, as appropriate, will be paid for under the appropriate Section 631 pay item included in the Contract.

The costs associated with obtaining samples for acceptance testing will be incidental to the cost of Special Provision (Bituminous Concrete Pavement, Small Quantity).

When not specified as items in the Contract, the costs of cleaning and filling joints and cracks, sweeping and cleaning existing paved surfaces, the emulsified asphalt applied to tack these surfaces, and tacking of manholes, curbing, gutters, and other contact surfaces will not be paid for directly, but will be incidental to Special Provision (Bituminous Concrete Pavement, Small Quantity).

Special Provision (Bituminous Concrete Pavement, Small Quantity) mixture approved by the Engineer for use in correcting deficiencies in the base course constructed as part of the Contract will not be paid for as Special Provision (Bituminous Concrete Pavement, Small Quantity), but will be incidental to the Contract item for the specified type of base course.

Special Provision (Bituminous Concrete Pavement, Small Quantity) mixture used to correct deficiencies in an existing pavement or to adjust the grade of a bituminous concrete surface completed under the Contract will be paid for at the Contract unit price for Special Provision (Bituminous Concrete Pavement, Small Quantity).

Payment will be made under:

Pay Item	Pay Unit
900.650 Special Provision (Mat Density Pay Adjustment, Small Quantity)(N.A.B.I.)	Lump Unit

item not needed as most pavement is temporary pavement.

Item not needed as there is only 295 tons on project.

900.650	Special Provision (Mixture Pay Adjustment) (N.A.B.I.)	Lump Unit
900.680	Special Provision (Bituminous Concrete Pavement, Small Quantity)	Ton

MANAGEMENT AND DISPOSAL OF CONTAMINATED MEDIA

XX. DESCRIPTION. This work shall consist of excavating, managing and properly disposing of contaminated soils from all project areas in reasonably close conformity with the lines, grades, and typical cross sections shown on the Plans or established by the Engineer. The work shall include proper identification, classification, excavation, management, treatment, transportation, and final placement or disposal of contaminated soils. All management of contaminated soils will be completed in accordance with the Middlebury WRCS(23) Bridge Project – Contract 1 Corrective Action Plan ("Corrective Action Plan") which is included in the contract documents.

This work shall also include management, treatment, and disposal of contaminated groundwater. All management of contaminated groundwater will be completed in accordance with the Corrective Action Plan which is included in the contract documents.

XX. CLASSIFICATION.

a. Soils. Soils have been characterized within the project area as reported in the Corrective Action Plan.

Soils identified in the project area shall be managed in accordance with the Corrective Action Plan and shall be disposed of at a certified solid waste disposal facility, pending authorization by the facility. Soils shall be managed according to engineering controls and erosion prevention measures included in the Corrective Action Plan.

During excavation activities, observations and field screening will be completed by a qualified environmental professional ("Environmental Manager") and will include visual observations, olfactory observations, and soil headspace readings using a calibrated photo ionization detector ("PID"). The Environmental Manager will aid the contractor in determining if soils do not comply with the findings of the Corrective Action Plan, and if other handling and disposal activities are warranted.

b. Groundwater.
Groundwater has been characterized in the project area, as reported in the Corrective Action Plan.

All management, dewatering and disposal of contaminated groundwater shall be completed in accordance with the Corrective Action Plan which is included in the contract documents.

During groundwater dewatering activities, observations will be completed by the Environmental Manager and will include visual observations, olfactory observations, and turbidity readings using a calibrated turbidimeter. The Environmental Manager will aid the contractor in determining if groundwater does not comply with the findings of the Corrective Action Plan, and if other handling and disposal activities are warranted.

XX. GENERAL CONSTRUCTION REQUIREMENTS. Complete copies of the details of the Plans and site-specific Corrective Action Plan shall be provided to

the Contractor. The Contractor shall either follow the site-specific Corrective Action Plan or submit an alternate plan which must be approved by the VT DEC WMPD and the Owner in conjunction with the Engineer and the Environmental Manager, prior to implementation.

The Owner shall hire a qualified environmental professional, known as the Environmental Manager, who shall monitor contamination during excavation activities and groundwater dewatering activities, in accordance with the Corrective Action Plan. The Environmental Manager shall ensure that the Corrective Action Plan is followed throughout construction and that proper notifications to the Vermont Department of Environmental Conservation ("VT DEC") Waste Management and Prevention Division ("WMPD") are completed.

If during the excavation of soil or dewatering operations, the Contractor encounters any condition or situation which is different from that expected, work shall stop in the vicinity of this new condition and the Owner, Engineer and Environmental Manager shall be notified. All construction operations in the contaminated area shall cease until the condition or situation can be evaluated. Any further testing or deviations from the management strategies in the Corrective Action Plan will be coordinated with the VT DEC WMPD.

No additional compensation or allowance for additional Contract time will be made for any delays incurred waiting for an agreement(s) to be executed, for failure to make an agreement(s), nor for any delays incurred in executing the Corrective Action Plan or amendments to the Corrective Action Plan.

The Contractor shall develop and follow their own Health & Safety Plan and shall ensure that all personnel working in direct contact with soil, groundwater and other contaminated media are notified of the contamination in accordance with OSHA standards.

XX. METHOD OF MEASUREMENT. The quantities of Special Provision (Management and Disposal of Soils) to be measured for payment will be the number of cubic yards (cubic meters) of material removed and designated for remediation and/or disposal, as indicated in the Corrective Action Plan or as directed by the Engineer, as measured in its original position by cross sections, in the complete and accepted work. The quantity shall be computed by the method of average end areas, or when impractical, by other acceptable methods involving three-dimensional measurement. The limits for payment shall not exceed those indicated on the Plans or designated by the Engineer in writing. The method of mass centers for computing volumes will be allowed only when the method has been used in the original design computations. Note that some of these material could be in solid, or semi-solid form.

Excavation requiring more than one handling prior to final placement will not be measured for payment for the additional handling unless specifically called for in the Contract Documents.

The quantities of Special Provision (Management and Disposal of Groundwater), to be measured for payment will be the number of gallons (liters) removed and designated for remediation and/or disposal, as indicated in the Corrective Action Plan or as directed by the Engineer. The quantity shall be computed by metering the amount of groundwater

pumped from the ground or by measuring the volume of pumped groundwater that is collected.

XX. BASIS OF PAYMENT. The accepted quantities of Special Provision (Management and Disposal of Soils), and Special Provision (Management and Disposal of Groundwater) will be paid for at the Contract unit price per cubic yard (cubic meter) or per gallon (liter), as appropriate. Payment shall be full compensation for performing the work specified, including research; employee training; monitoring; and developing and complying with the Health and Safety Plan; satisfactorily storing, transporting and disposing of materials and for providing all materials, labor, tools, equipment, and incidentals necessary to complete the work.

Payment for contaminated soils re-used on the project will be made as follows:

(a) The first payment of 50% of the actual quantity will be paid when the material is placed at the designated stockpile site.

(b) The remaining 50% of the actual quantity will be paid when the material has been incorporated back into the project and fully stabilized.

Payment for contaminated soils not re-used on the project, groundwater and other contaminated media will be made as follows:

(a) The first payment of 67% of the actual quantity will be paid when the material is placed at a treatment site or otherwise properly removed from the project area.

(b) The remaining 33% of the actual quantity will be paid when proper disposal in accordance with the Corrective Action Plan has been completed documented to the owner by submission of waste manifests, as appropriate. The remaining 33% of the actual quantity will not be paid if proper disposal of the contaminated soil, or groundwater is not accomplished prior to Final Inspection.

Payment will be made under:

Pay Item	Pay Unit
900.608 Special Provision (Management and Disposal of Contaminated Soils)	Cubic Yard
900.625 Special Provision (Management and Disposal of Contaminated Groundwater)	Gallons

Risk Register (not carried)

Middlebury WCRS(23) - CMGC

(Replacement of Merchants Row and Main Street Bridges)

Updated: 27 September 2016
By: J.D. Keener

These Probable Risk Amounts are NOT included in budgetary pricing

VTrans Project No.: WCRS(23) **FULL PROJECT NAME: Middlebury WCRS(23)** **VTRANS PROJECT MANAGER: Joel Perrigo** **VHB PROJECT MANAGER: Aaron Guyette** **KCC PROJECT MANAGER: Mark Alexander**

PRINT ON 11x17 PAPER

Item #	Owner of Risk	Risk Type:	Risk Element	Total Potential Risk Amount	% Chance of Occurring	Probable Risk Value	Time Impact (Days)	Mitigation Strategy	Mitigation Cost	STATUS	Comments (Include Logic/Calculations of Cost Impact)
1			Federally Listed Bat Habitat/Section 7 Consultation	$ 100	25%	25	1 Days				
2			Incident Management Plan								
3			Closure of Existing Bridge Due to Safety Condition								
4			RTE Mussel Presence								
5			Crane Setup Locations								
6			Interruption of Power to National Bank of Middlebury								
7			Railroad Agreement								
8			Right-of-Way Acquisition								
9			Microtunneling Equipment Lead Time								
10			Microtunneling Machine Gets Stuck Mid Drive								
11			Support of Excavation Installation								
12			Dewatering/Contaminated Groundwater								
13			Weather Delays								
14			Unknown Utilities								
15			Use of Non-stainless Steel Spacers in B/W casing pipe and carrier								
16			Differing conditions soil contamination								
17			Vibration Damage to Buildings								
18			Overbreakage of rock during excavation								
19			Open Cut Railroad Utility Crossing								
20			Fountain Removal and Storage								

Notes:
Risk or Opportunity Type = Design, Quantity, Schedule, Contractual, Owner, Escalation, Other
Status - Open = Still investigating/analyzing risk or opportunity in construction phase
Status - Closed = No longer a risk/opportunity or included in forecast

Based on information presently available and furnished to the project team by individual project team members, and various assumptions which have been made as to facts not yet known, this construction cost estimate has been prepared and furnished for the sole purpose of providing approximation of anticipated construction cost. This construction estimate should not, at this time, be relied upon as a commitment that the contemplated project can or will be constructed for the estimated cost.