Exhibit VGS-AG-029 Part 3

RIGHT-OF-WAY

MATCHLINE

84 N/F TOWN OF ST. GEORGE

84.03 N/F PHELPS, LOUIS

84.02 N/F PHELPS, LOUIS D. IV

58.01 ROUTE 2A

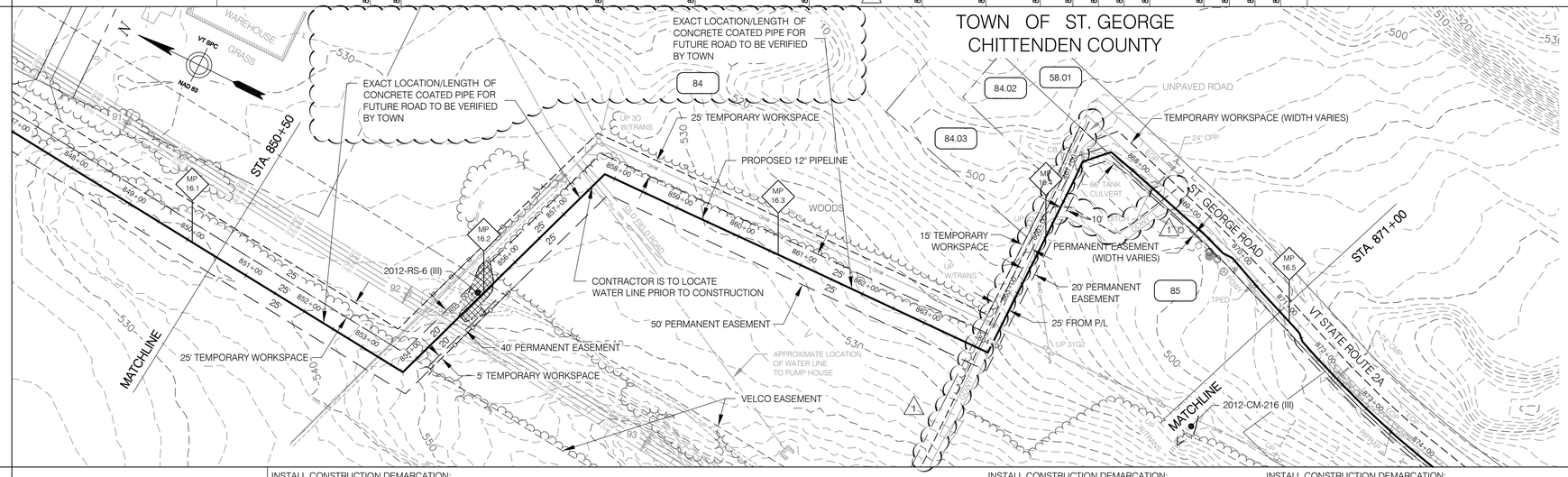
85 N/F BOVAT, CLYDE & MARY ANN

MATCH LINE

SURVEY DATA

	S 01° 41' E	00'05" RT	S 01° 36' E	76'09" LT	S 77° 46' E	68'23" RT	S 08° 23' E	00'07" LT	S 08° 30' E	00'18" RT	S 08° 11' E	00'00" LT	S 08° 21' E	88'16" LT	N 83° 23' E	00'17" RT	N 83° 06' E	01'56" LT	N 81° 15' E	46'56" RT	S 51° 54' E	59'27" RT	S 07° 33' W	00'50" RT	S 08° 24' W	03'51" RT	S 12° 15' W	18'54" LT	S 06° 40' E	22'29" RT	S 15° 50' W	01'55" LT	S 13° 54' W
		853+17		853+70		857+84		859+33		861+17		862+99		864+03		865+80		866+87		867+14		867+59		868+09		869+43		869+79		869+95		870+62	

ALIGNMENT DETAIL



EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

- PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- CENTERLINE OF STREAM
- TEMPORARY STREAM CROSSING
- WETLAND
- 50' WETLAND BUFFER
- TEMPORARY WETLAND MATTING
- WETLAND BUFFER WITHIN PROJECT AREA
- REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL

INSTALL CONSTRUCTION DEMARCATION:
STA. 850+50 TO 864+15 RT - 25' FROM NEW 12" PIPE ℄
STA. 850+50 TO 864+52 LT - 50' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 864+15 TO 867+66 RT - 10' FROM NEW 12" PIPE ℄
STA. 864+52 TO 867+14 LT - 25' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 867+66 TO 871+00 RT - WIDTH VARIES FROM NEW 12" PIPE ℄
STA. 867+14 TO 867+35 LT - WIDTH VARIES FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 854+39 TO 856+00 RT - 25' FROM NEW 12" PIPE ℄
STA. 854+73 TO 856+25 LT - 50' FROM NEW 12" PIPE ℄

INSTALL STABILIZED CONSTRUCTION ENTRANCE:
STA. 851+17

INSTALL MATTING:
STA. 854+87 TO 855+79

INSTALL STABILIZED CONSTRUCTION ENTRANCE:
STA. 867+42

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

HORIZONTAL SCALE
100 50 0 100 200 300 feet
VERTICAL SCALE
100 50 0 100 200 300 feet

CONST. TYPE	1A			1H	W	1A										3A		4B		4F				
SOIL TYPE	MyB (PAS)		FaC			MuD										MuD								
						MyB (PAS)																		
LC/LU	FORESTED/POWERLINE															GRAVEL		GRASS						
	NOT CLASSIFIED															RESIDENTIAL								
STREAMS																								
WETLANDS	WETLAND 2012-RS-6 - STATION 854+87 TO 855+79 CLASS III																							
VERNAL POOLS																								
SIGNIFICANT NATURAL COMMUNITIES																								
RTE SPECIES																								
NRC WILDLIFE HABITAT																								
ARCHAEOLOGY SITES																								

MATCH LINE

							BID		CONSTRUCTION	
						ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
						DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
						DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
ANGP-T-G-07-010	ACCESS ROAD DETAILS					DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
ANGP-T-C-033	ALIGNMENT SHEET	1	GJM	BCK	IFC 2016 EDITS (05/2016)	DESIGN MANAGER	SAB	06/28/13	JEO	05/2016
DWG. NO.	REFERENCE DWG.	REV	DSN	CK	DESCRIPTION		INITIALS	DATE	INITIALS	DATE

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. CHITTENDEN COUNTY, VERMONT

YEAR: 2016 | W.O. | SCALE: 1" = 100' | DWG. ANGP-EPSC-033 | REV. 1

Vermont Gas

VHB Vanasse Hangen Brustlin, Inc.

CHA
38 Eastwood Drive, Suite 105
South Burlington, VT 05403
Main: (802) 735-0372 · www.chacompanies.com

RIGHT-OF-WAY

MATCHLINE

58.01	86.04	85.05
ST. GEORGE ROAD VT STATE ROUTE 2A	ROCKY RIDGE CIRCLE	N/F BOVAT, CLYDE & MARY ANN

85	86	87	86	90	58.01
N/F BOVAT, CLYDE & MARY ANN	N/F PEET, TIMOTHY	N/F BISSONETTE, JOHN P. & MELISSA A.	N/F PEET, TIMOTHY	N/F FROST, ROBERT & ANNE	ST. GEORGE ROAD VT STATE ROUTE 2A

MATCHLINE

SURVEY DATA

871+27	S 13° 54' W	01°05' RT
871+42	S 15° 00' W	22°29' RT
Bck: 871+56	S 37° 30' W	
Ahd: 871+65 22°29' LT 871+93	S 15° 00' W	-9.0 ft. 01°37' LT
872+43	S 13° 23' W	01°27' LT
872+91	S 11° 55' W	01°53' LT
873+29	S 10° 02' W	00°40' LT
873+62	S 09° 21' W	02°36' LT
874+17	S 06° 45' W	01°41' LT
875+07	S 05° 03' W	01°59' LT
875+44	S 03° 04' W	03°24' LT
876+01	S 00° 21' E	01°45' RT
876+53	S 01° 25' W	00°40' LT
877+30	S 00° 44' W	00°45' RT
877+78	S 01° 30' W	17°23' RT
877+78	S 18° 53' W	14°02' LT
877+91	S 04° 51' W	25°09' RT
878+11	S 30° 00' W	22°29' LT
878+43	S 07° 30' W	01°44' RT
878+60	S 09° 15' W	22°29' LT
878+83	S 13° 15' E	22°29' RT
878+95	S 09° 15' W	03°41' LT
879+06	S 05° 33' W	00°04' LT
879+25	S 05° 28' W	10°22' RT
879+27	S 15° 51' W	06°02' LT
880+14	S 09° 48' W	16°25' LT
880+46	S 06° 37' E	00°00' LT
880+49	S 06° 37' E	16°27' RT
883+02	S 09° 50' W	00°01' LT
884+27	S 09° 49' W	01°16' RT
885+66	S 11° 05' W	00°05' RT
886+84	S 11° 10' W	00°56' RT
886+96	S 12° 07' W	63°42' LT
Bck: 887+46	S 51° 36' E	
Ahd: 887+50 888+00	S 51° 36' E	-4.3 ft. 59°22' RT
888+76	S 07° 47' W	03°04' RT
888+88	S 10° 51' W	00°11' RT
	S 11° 02' W	

ALIGNMENT DETAIL

EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

- PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- CENTERLINE OF STREAM
- TEMPORARY STREAM CROSSING
- WETLAND
- 50' WETLAND BUFFER
- TEMPORARY WETLAND MATTING
- WETLAND BUFFER WITHIN PROJECT AREA
- REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL

INSTALL CONSTRUCTION DEMARCATION:
STA. 871+00 TO 887+02 RT - WIDTH VARIES FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 887+85 TO 890+00 RT - 25' FROM NEW 12" PIPE ℄
STA. 887+62 TO 890+00 LT - 50' FROM NEW 12" PIPE ℄

INSTALL STABILIZED CONSTRUCTION ENTRANCE:
887+74

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

HORIZONTAL SCALE
100 50 0 100 200 300 feet
100 50 0 100 200 300 feet
VERTICAL SCALE

CONST. TYPE	4F	4D		9	1A
SOIL TYPE	MuD	FaC	GrC		MyB (PAS)
LC/LU	GRASS RESIDENTIAL	FORESTED RESIDENTIAL	GRASS RESIDENTIAL	PAVED TRAVEL	GRASS RESIDENTIAL
STREAMS					
WETLANDS					
VERNAL POOLS					
SIGNIFICANT NATURAL COMMUNITIES					
RTE SPECIES					
NRC WILDLIFE HABITAT					
ARCHAEOLOGY SITES					

MATCH LINE

MATCH LINE

DWG. NO.	REFERENCE DWG.	REV	DSN	CK		DESCRIPTION
ANGP-T-C-034	ALIGNMENT SHEET	1	GJM	BCK		IFC 2016 EDITS (05/2016)

	BID INITIALS	BID DATE	CONSTRUCTION INITIALS	CONSTRUCTION DATE
ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
DESIGN MANAGER	SAB	06/28/13	JEO	05/2016

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. CHITTENDEN COUNTY, VERMONT

YEAR: 2016 | W.O. | SCALE: 1" = 100' | DWG. ANGP-EPSC-034 | REV. 1

Vermont Gas

VHB Vanasse Hangen Brustlin, Inc.

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38 Eastwood Drive, Suite 105
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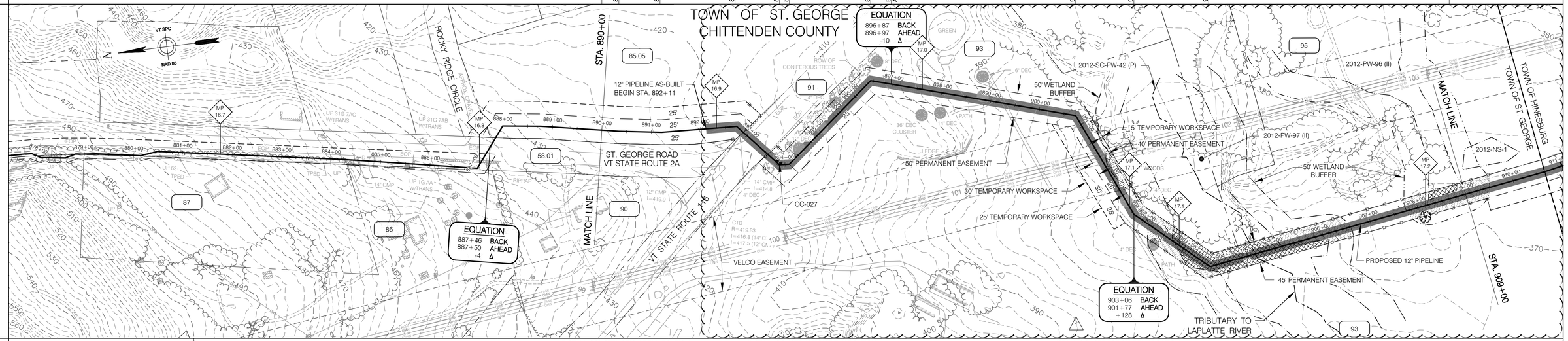
RIGHT-OF-WAY

MATCH LINE | 85.05 N/F BOVAT, CLYDE & MARY ANN | 58.01 ST. GEORGE ROAD VT STATE ROUTE 2A | 91 VT STATE ROUTE 116 | 93 N/F BURNETT, JENIFER M. & NORMAN L. | 95 N/F LAJOICE, SUZANNE | MATCH LINE

SURVEY DATA

890+34	891+21	892+73	893+89	894+09	895+44	BAK: 896+87 AHD: 896+97	900+74	901+77	903+64
S 11° 02' W	S 08° 48' W	S 02° 54' W	S 49° 13' W	S 04° 13' W	S 38° 20' E	S 17° 04' W	S 66° 49' W	S 41° 47' W	S 08° 26' E
02'13" LT	05'24" LT	46'19" RT	45'00" LT	42'34" LT	55'24" RT	-10 ft.	49'45" RT	25'31" LT	59'00" LT

ALIGNMENT DETAIL



EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

- PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- CENTERLINE OF STREAM
- TEMPORARY STREAM CROSSING
- WETLAND
- 50' WETLAND BUFFER
- TEMPORARY WETLAND MATTING
- WETLAND BUFFER WITHIN PROJECT AREA
- REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL

INSTALL CONSTRUCTION DEMARCATION:
STA. 890+00 TO 892+88 RT - 25' FROM NEW 12" PIPE ℄
STA. 890+00 TO 892+95 LT - 50' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 892+16 TO 892+88 RT - 25' FROM NEW 12" PIPE ℄
STA. 892+73 TO 892+95 LT - 50' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 893+54 TO 893+89 RT - 25' FROM NEW 12" PIPE ℄
STA. 893+89 TO 894+09 RT - WIDTH VARIES FROM NEW 12" PIPE ℄
STA. 894+09 TO 900+30 RT - 25' FROM NEW 12" PIPE ℄
STA. 893+59 TO 909+00 LT - 25' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 893+54 TO 893+89 RT - 25' FROM NEW 12" PIPE ℄
STA. 893+59 TO 894+49 LT - 25' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 900+30 TO 901+77 RT - 50' FROM NEW 12" PIPE ℄
STA. 901+77 TO 903+64 RT - 25' FROM NEW 12" PIPE ℄
STA. 903+64 TO 909+00 RT - 20 FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 901+77 TO 903+64 RT - 25' FROM NEW 12" PIPE ℄
STA. 900+74 TO 909+00 LT - 25' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 903+64 TO 909+00 RT - 20' FROM NEW 12" PIPE ℄

INSTALL STABILIZED CONSTRUCTION ENTRANCE:
STA. 892+93 & 893+54

INSTALL MATTING:
STA. 902+55 TO 906+21

INSTALL MATTING:
STA. 908+37 TO 909+00

HORIZONTAL SCALE
100 50 0 100 200 300 feet
VERTICAL SCALE
100 50 0 100 200 300 feet

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

CONST. TYPE	1A	9	2A	1J	W 2A / W
SOIL TYPE	MyB (PAS)			MyB (PAS)	Cv (PAS)
LC/LU	PARKING LOT / LEISURE	GRASS / LEISURE	PAVED / ROAD	GRASS / LEISURE	FORESTED
STREAMS					STREAM 2012-SC-PW-42 (P) - STA. 904+67 TO 904+83
WETLANDS					WETLAND 2012-PW-97 - STA. 901+20 TO 906+70 CLASS II; WETLAND 2012-PW-96 - STA. 907+87 TO 909+00 CLASS II
VERNAL POOLS					
SIGNIFICANT NATURAL COMMUNITIES					
RTE SPECIES					
NRC WILDLIFE HABITAT					
ARCHAEOLOGY SITES					

MATCH LINE

DWG. NO.	REFERENCE DWG.	REV	DSN	CK	DESCRIPTION
ANGP-T-G-07-010	ACCESS ROAD DETAILS				
ANGP-T-C-035	ALIGNMENT SHEET	1	GJM	BCK	IFC 2016 EDITS (05/2016)

	BID		CONSTRUCTION	
	INITIALS	DATE	INITIALS	DATE
ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
DESIGN MANAGER	SAB	06/28/13	JEO	05/2016

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. CHITTENDEN COUNTY, VERMONT

YEAR: 2016 | W.O. | SCALE: 1" = 100' | DWG. ANGP-EPSC-035 | REV. 1

Vermont Gas

VHB Vanasse Hangen Brustlin, Inc.

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South Burlington, VT 05403
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RIGHT–OF–WAY

MATCH LINE

95 N/F LAJOICE, SUZANNE

93 N/F BURNETT, NORMAN L. & JENIFER

TOWN OF ST. GEORGE / TOWN OF HINESBURG

96 N/F FORTIN, LIONEL & MARY

97 N/F GARVEY, LARRY

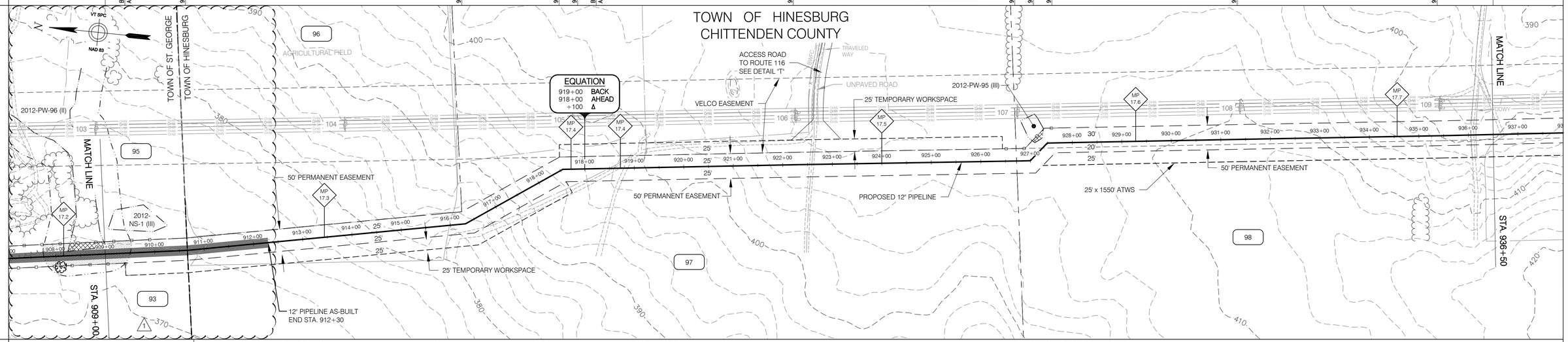
98 N/F LAFRENIERE, SISTER JOANNE T., TRUSTEE; LAFRENIERE FAMILY REVOCABLE TRUST

MATCH LINE

SURVEY DATA

39.4 ft.	00'00" RT	23'39" LT	28'04" RT	00'20" RT	110.8 ft.	00'10" RT	00'07" LT	44'56" LT	45'36" RT	00'03" RT	00'17" LT
S 27° 04' E	S 11° 25' E	S 11° 25' E	S 35° 05' E	S 07° 10' E	S 06° 58' E	S 06° 58' E	S 06° 47' E	S 06° 55' E	S 15° 15' E	S 06° 55' E	S 06° 52' E	S 07° 09' E
Bc: 909+97 Ahd: 909+57 15°58' RT	910+80	916+41	918+67	918+89	Bc: 919+11 Ahd: 918+00	922+29	926+76	927+00	927+49	931+41	936+45	

ALIGNMENT DETAIL



EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

- PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- CENTERLINE OF STREAM
- TEMPORARY STREAM CROSSING
- WETLAND
- 50' WETLAND BUFFER
- TEMPORARY WETLAND MATTING
- WETLAND BUFFER WITHIN PROJECT AREA
- REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL

INSTALL CONSTRUCTION DEMARCATION:
STA. 909+00 TO 909+39 RT - 25' FROM NEW 12" PIPE ℄
STA. 909+00 TO 918+67 LT - 25' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 909+39 TO 918+60 RT - 50' FROM NEW 12" PIPE ℄
STA. 918+67 TO 926+44 LT - 50' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 918+60 TO 927+11 RT - 25' FROM NEW 12" PIPE ℄
STA. 926+44 TO 927+49 LT - 25' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 927+11 TO 936+50 RT - 45' FROM NEW 12" PIPE ℄
STA. 927+49 TO 936+50 LT - 30' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 909+00 TO 909+40 RT - 25' FROM NEW 12" PIPE ℄
STA. 909+00 TO 910+02 LT - 25' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 909+40 TO 909+65 RT - 50' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 926+44 TO 927+49 LT - 25' FROM NEW 12" PIPE ℄
STA. 927+49 TO 927+91 LT - 30' FROM NEW 12" PIPE ℄

INSTALL MATTING:
STA. 909+00 TO 909+15

INSTALL STABILIZED CONSTRUCTION ENTRANCE:
STA. 922+68

INSTALL MATTING:
STA. 927+29 TO 927+49

HORIZONTAL SCALE
100 50 0 100 200 300 feet
VERTICAL SCALE
100 50 0 100 200 300 feet

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

CONST. TYPE	2A	1E			1A			2A	W	2D		
SOIL TYPE	CV (PAS)		VeB (PAS)					CV (PAS)		VeB (PAS)		VeC (PAS)
LC/LU	PASTURE											
	LEISURE	AGRICULTURE	RESIDENTIAL	AGRICULTURE					AGRICULTURE			
STREAMS												
WETLANDS	WETLAND 2012-PW-96 - STA. 909+00 TO 909+52 CLASS II								WETLAND 2012-PW-95 - STA. 927+29 TO 927+49 CLASS III			
VERNAL POOLS												
SIGNIFICANT NATURAL COMMUNITIES												
RTE SPECIES												
NRC WILDLIFE HABITAT												
ARCHAEOLOGY SITES												

MATCH LINE (left) — MATCH LINE (right)

Vanasse Hangen Brustlin, Inc.

DWG. NO.	REFERENCE DWG.	REV	DSN	CK	DESCRIPTION
ANGP–T–G–07–010	ACCESS ROAD DETAILS				
ANGP–T–C–036	ALIGNMENT SHEET	1	GJM	BCK	IFC 2016 EDITS (05/2016)

	BID		CONSTRUCTION	
	INITIALS	DATE	INITIALS	DATE
ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
DESIGN MANAGER	SAB	06/28/13	JEO	05/2016

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. CHITTENDEN COUNTY, VERMONT

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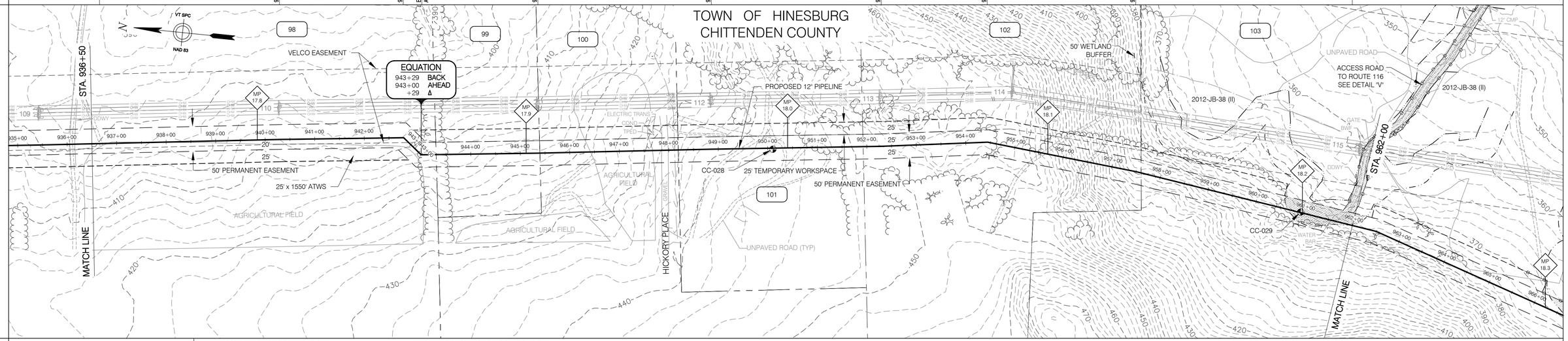
YEAR: 2016 | W.O. | SCALE: 1" = 100' | DWG. ANGP–EPSC–036 | REV. 1

RIGHT–OF–WAY								
	MATCH LINE	98 N/F LAFRENIERE, JOANNE T.	99 N/F LUMBRA, LINDA P.	100 N/F PRENGLER, HERSCHEL	101 N/F DATTILIO, DANA & KIMBERLY	102 N/F LAVALETTE, BERNARD & EI	103 N/F BALLARD, TIMOTHY & KAY	MATCH LINE
SURVEY DATA		S 07° 09' E · 00°31' RT · S 06° 38' E · 45°00' RT · S 38° 22' W · 29.1 Ft. · S 06° 38' E · 00°30' LT · S 07° 08' E · 00°21' RT · S 06° 47' E · 01°15' LT · S 08° 03' E · 13°26' RT · S 05° 24' W · 00°45' RT · S 08° 09' W						
		940+30 · 942+80 · Beg. 943+29 Arc. 944+00 · 945+37 · 948+87 · 952+30 · 954+44 · 957+90						

ALIGNMENT DETAIL



EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

- PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- CENTERLINE OF STREAM
- TEMPORARY STREAM CROSSING
- WETLAND
- 50' WETLAND BUFFER
- TEMPORARY WETLAND MATTING
- WETLAND BUFFER WITHIN PROJECT AREA
- REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL

INSTALL CONSTRUCTION DEMARCATION:
STA. 936+50 TO 942+75 RT - 45' FROM NEW 12" PIPE ℄
STA. 942+75 TO 943+18 RT - WIDTH VARIES FROM NEW 12" PIPE ℄
STA. 936+50 TO 942+75 LT - 30' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 943+18 TO 962+00 RT - 25' FROM NEW 12" PIPE ℄
STA. 942+75 TO 943+00 LT - WIDTH VARIES FROM NEW 12" PIPE ℄
STA. 943+00 TO 960+53 LT - 50' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 960+53 TO 962+00 LT - 25' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 957+83 TO 960+53 LT - 50' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 960+53 TO 962+00 LT - 25' FROM NEW 12" PIPE ℄

INSTALL STABILIZED CONSTRUCTION ENTRANCE:
STA. 947+92

INSTALL STABILIZED CONSTRUCTION ENTRANCE:
STA. 961+85

HORIZONTAL SCALE
100 50 0 100 200 300 feet
VERTICAL SCALE
100 50 0 100 200 300 feet

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

CONST. TYPE	2D	1A	11	1A		2A
SOIL TYPE	VeC (PAS)	Cv (PAS)		FaC	FaE	SxC	MuD
LC/LU	PASTURE		UNPAVED	PASTURE	FORESTED		
	AGRICULTURE	RESIDENTIAL	NOT CLASSIFIED	TRAVEL	RESIDENTIAL	RESIDENTIAL	AGRICULTURE
STREAMS							
WETLANDS					WETLAND 2012-JB-38 - STA. 958+33 TO 958+94 CLASS II		WETLAND 2012-JB-38 - STA. 960+53 TO 962+00 CLASS II
VERNAL POOLS							
SIGNIFICANT NATURAL COMMUNITIES							
RTE SPECIES							
NRC WILDLIFE HABITAT							
ARCHAEOLOGY SITES							

MATCH LINE

Vanasse Hangen Brustlin, Inc.

DWG. NO.	REFERENCE DWG.	REV	DSN	CK	DESCRIPTION
ANGP–T–G–07–010	ACCESS ROAD DETAILS				
ANGP–T–C–037	ALIGNMENT SHEET				

		BID		CONSTRUCTION	
	INITIALS	DATE		INITIALS	DATE
ENVIRONMENTAL	JLS	06/28/13		JLS	05/2016
DRAFTING DESIGNER	GIL	06/28/13		GJM	05/2016
DRAFTING SUPERVISOR	BZD	06/28/13		BCK	05/2016
DESIGN ENGINEER	MDF	06/28/13		GEW	05/2016
DESIGN MANAGER	SAB	06/28/13		JEO	05/2016

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. CHITTENDEN COUNTY, VERMONT

Vermont Gas

CHA
38 Eastwood Drive, Suite 105
South Burlington, VT 05403
Main: (802) 735-0372 · www.chacompanies.com

YEAR: 2016	W.O.	SCALE: 1" = 100'	DWG. ANGP–EPSC–037	REV. 0

RIGHT–OF–WAY

MATCH LINE

103
N/F
BALLARD, TIMOTHY

104
N/F
TOWN OF HINESBURG

MATCH LINE

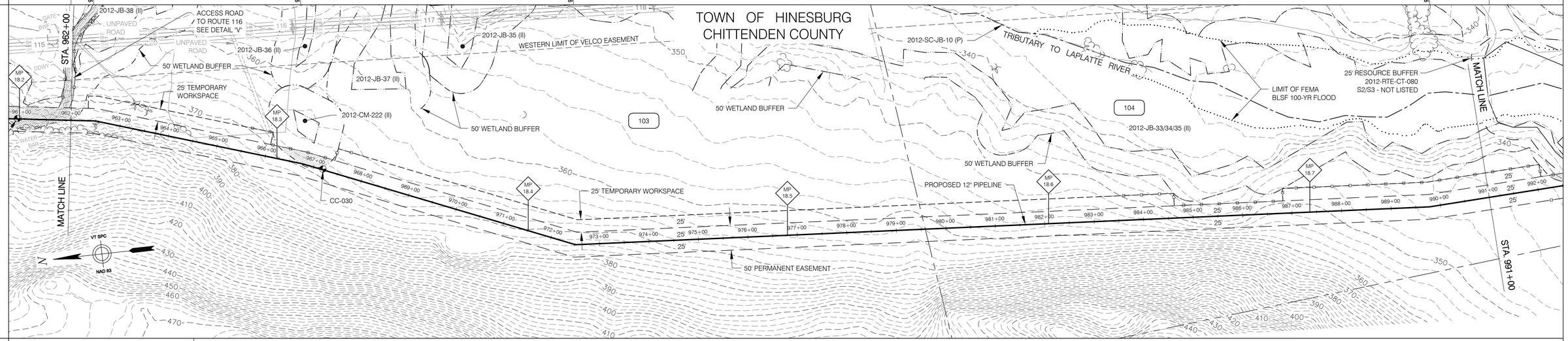
SURVEY DATA

10°12' RT | 04°48' RT | 19°02' LT | 05°28' LT

S 08° 09' W | S 18° 22' W | S 23° 11' W | S 04° 08' W | S 02° 19' E

962+50 | 965+76 | 972+51 | 989+78

ALIGNMENT DETAIL



EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

- PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- CENTERLINE OF STREAM
- TEMPORARY STREAM CROSSING
- WETLAND
- 50' WETLAND BUFFER
- TEMPORARY WETLAND MATTING
- WETLAND BUFFER WITHIN PROJECT AREA
- REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL

INSTALL CONSTRUCTION DEMARCATION:
STA. 962+00 TO 991+00 RT - 25' FROM NEW 12" PIPE ℄
STA. 962+00 TO 962+34 LT - 25' FROM NEW 12" PIPE ℄
STA. 962+34 TO 966+06 LT - 50' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 962+00 TO 962+34 LT - 25' FROM NEW 12" PIPE ℄
STA. 962+34 TO 962+75 LT - 50' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 966+06 TO 967+37 LT - 25' FROM NEW 12" PIPE ℄
STA. 967+37 TO 984+63 LT - 50' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 965+55 TO 966+06 LT - 50' FROM NEW 12" PIPE ℄
STA. 966+06 TO 967+37 LT - 25' FROM NEW 12" PIPE ℄
STA. 967+37 TO 967+98 LT - 50' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 984+63 TO 986+83 LT - 25' FROM NEW 12" PIPE ℄
STA. 986+83 TO 991+00 LT - 50' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 983+21 TO 984+63 LT - 50' FROM NEW 12" PIPE ℄
STA. 984+63 TO 986+83 LT - 25' FROM NEW 12" PIPE ℄
STA. 986+83 TO 991+00 LT - 50' FROM NEW 12" PIPE ℄

HORIZONTAL SCALE
100 50 0 100 200 300 feet
VERTICAL SCALE
100 50 0 100 200 300 feet

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

CONST. TYPE	2A	1A	2A	1A		2A	1A
SOIL TYPE	MuD	MuD	MuD	MuD	SxE	Cv (PAS)	EwB (PAS)
LC/LU	FORESTED	PASTURE					
	AGRICULTURE					LEISURE	
STREAMS							
WETLANDS	WETLAND 2012-JB-38 - STA. 962+00 TO 962+24 CLASS II		WETLAND 2012-CM-222 - STA 966+22 TO 967+32 CLASS II				
VERNAL POOLS							
SIGNIFICANT NATURAL COMMUNITIES							
RTE SPECIES							
NRC WILDLIFE HABITAT							
ARCHAEOLOGY SITES							

MATCH LINE

MATCH LINE

Vanasse Hangen Brustlin, Inc.

DWG. NO.	REFERENCE DWG.	REV	DSN	CK	DESCRIPTION
ANGP–T–C–038	ALIGNMENT SHEET				

	BID		CONSTRUCTION	
	INITIALS	DATE	INITIALS	DATE
ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
DESIGN MANAGER	SAB	06/28/13	JEO	05/2016

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. CHITTENDEN COUNTY, VERMONT

Vermont Gas

CHA
38 Eastwood Drive, Suite 105
South Burlington, VT 05403
Main: (802) 735-0372 · www.chacompanies.com

YEAR: 2016 | W.O. | SCALE: 1" = 100' | DWG. ANGP–EPSC–038 | REV. 0

RIGHT-OF-WAY		
MATCH LINE	104 N/F TOWN OF HINESBURG	
	105 SHELBURNE FALLS ROAD	
	105.01 N/F NOONAN, ROBERT C. & MICHAEL L.	
	106 N/F FORTIN, MICHAEL A. & LINDA N.	
	107 N/F HAYSTACK CROSSING LLC	MATCH LINE

SURVEY DATA

S 02° 19' E

39°43' LT — 1010+20

S 41° 24' E

00°00' RT — 1013+21

44°18' RT — 1013+71

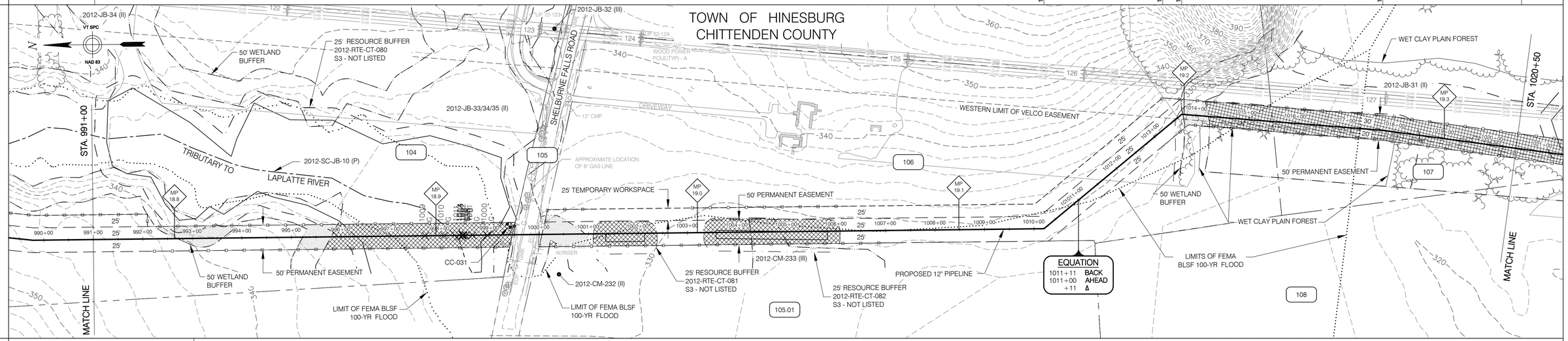
S 41° 24' E

S 02° 54' W

03°04' RT — 1017+79

S 05° 59' W

ALIGNMENT DETAIL



EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

- PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- CENTERLINE OF STREAM
- TEMPORARY STREAM CROSSING
- WETLAND
- 50' WETLAND BUFFER
- TEMPORARY WETLAND MATTING
- WETLAND BUFFER WITHIN PROJECT AREA
- REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL

INSTALL CONSTRUCTION DEMARCATION:
STA. 991+00 TO 999+41 RT - 25' FROM NEW 12" PIPE ℄
STA. 991+00 TO 992+10 LT - 50' FROM NEW 12" PIPE ℄
STA. 992+10 TO 999+53 LT - 25' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 992+07 TO 999+41 RT - 25' FROM NEW 12" PIPE ℄
STA. 991+00 TO 992+10 LT - 50' FROM NEW 12" PIPE ℄
STA. 992+10 TO 999+53 LT - 25' FROM NEW 12" PIPE ℄

INSTALL MATTING:
STA. 995+66 TO 999+53 & STA. 1000+21 TO 1000+36

INSTALL CONSTRUCTION DEMARCATION:
STA. 1000+00 TO 1013+86 RT - 25' FROM NEW 12" PIPE ℄
STA. 1000+18 TO 1013+63 LT - 50' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1000+00 TO 1007+34 RT - 25' FROM NEW 12" PIPE ℄
STA. 1000+18 TO 1001+12 LT - 50' FROM NEW 12" PIPE ℄
STA. 1002+98 TO 1006+38 LT - 50' FROM NEW 12" PIPE ℄

INSTALL STABILIZED CONSTRUCTION ENTRANCE:
STA. 999+47 & 1000+06

INSTALL MATTING:
STA. 1001+11 TO 1002+57

INSTALL MATTING:
STA. 1003+32 TO 1006+09

INSTALL CONSTRUCTION DEMARCATION:
STA. 1013+86 TO 1020+50 RT - 20' FROM NEW 12" PIPE ℄
STA. 1013+63 TO 1013+71 LT - WIDTH VARIES' FROM NEW 12" PIPE ℄
STA. 1013+71 TO 1020+50 LT - 30' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1013+08 TO 1013+86 RT - 25' FROM NEW 12" PIPE ℄
STA. 1013+86 TO 1020+50 RT - 20' FROM NEW 12" PIPE ℄
STA. 1013+47 TO 1013+71 LT - WIDTH VARIES' FROM NEW 12" PIPE ℄
STA. 1013+71 TO 1020+50 LT - 30' FROM NEW 12" PIPE ℄

INSTALL MATTING:
STA. 1014+04 TO 1020+50

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

HORIZONTAL SCALE
100 50 0 100 200 300 feet
100 50 0 100 200 300 feet
VERTICAL SCALE

CONST. TYPE	1A 2A W 7 9 W 1A W 2D
SOIL TYPE	EwB (PAS) Cv (PAS) Le (PAS) VeB (PAS) Lf FaE Lf
LC/LU	PASTURE / LEISURE PAVED / TRAVEL PASTURE / RESIDENTIAL PASTURE / AGRICULTURE
STREAMS	STREAM 2012-SC-JB-10 (P) - STATION 998+04 TO 998+44
WETLANDS	WETLAND 2012-JB-33/34/35 - STATION 992+26 TO 993+92 CLASS II WETLAND 2012-JB-33/34/35 - STATION 995+09 TO 999+53 CLASS II WETLAND 2012-CM-232 - STATION 1000+00 TO 1001+04 CLASS II WETLAND 2012-CM-233 - STATION 1004+30 TO 1005+02 CLASS III WETLAND 2012-JB-31 - STATION 1013+62 TO 1020+50 CLASS II
VERNAL POOLS	
SIGNIFICANT NATURAL COMMUNITIES	WET CLAY PLAIN FOREST
RTE SPECIES	2012-RTE-CT-080 2012-RTE-CT-080 2012-RTE-CT-081 2012-RTE-CT-082
NRC WILDLIFE HABITAT	
ARCHAEOLOGY SITES	

MATCH LINE

MATCH LINE

						BID		CONSTRUCTION	
					ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
					DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
					DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
					DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
ANGP-T-C-039	ALIGNMENT SHEET				DESIGN MANAGER	SAB	06/28/13	JEO	05/2016
DWG. NO.	REFERENCE DWG.	REV	DSN	CK	DESCRIPTION	INITIALS	DATE	INITIALS	DATE

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. CHITTENDEN COUNTY, VERMONT

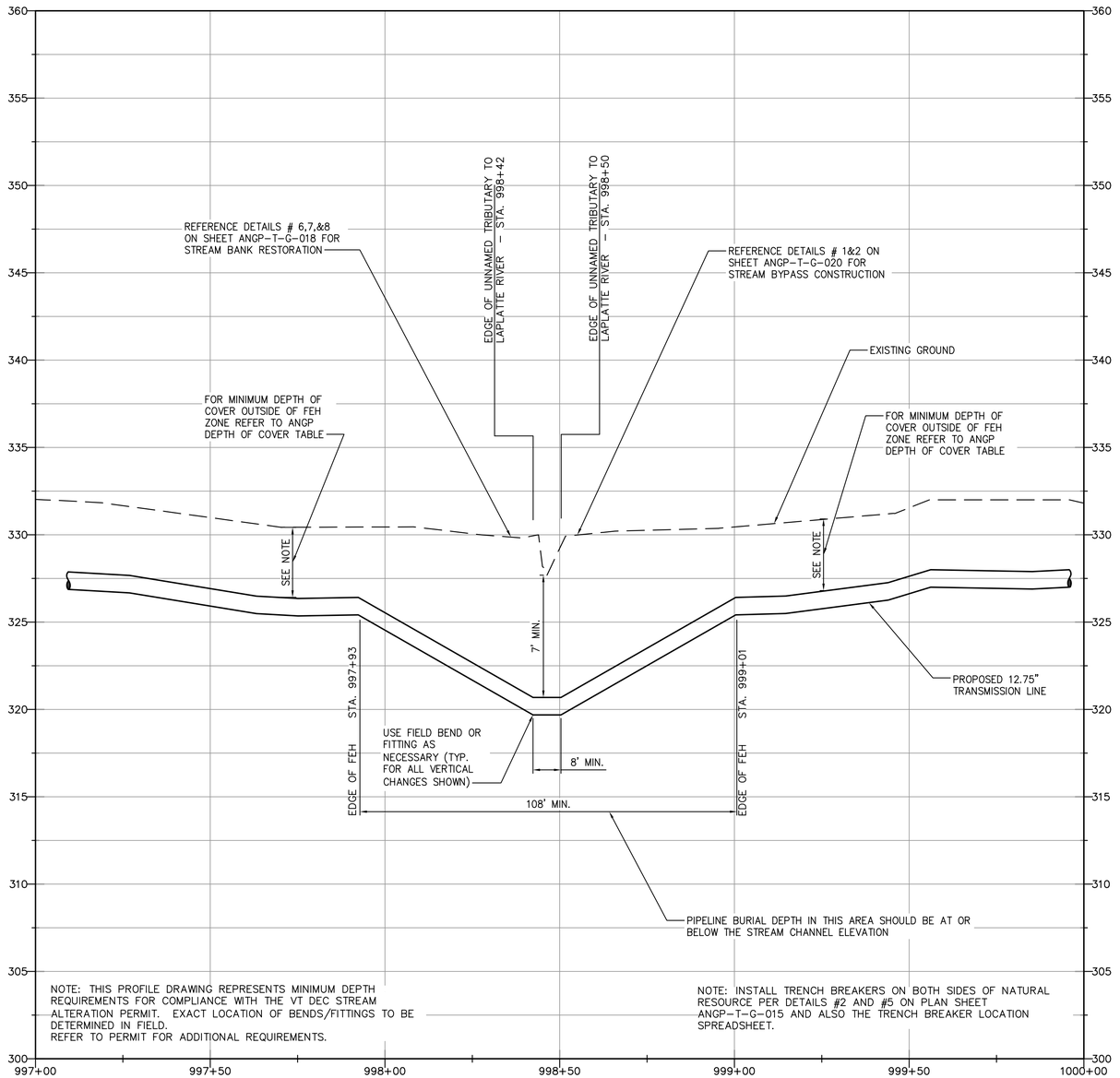
Vermont Gas

VHB Vanasse Hangen Brustlin, Inc.

CHA
38 Eastwood Drive, Suite 105
South Burlington, VT 05403
Main: (802) 735-0372 · www.chacompanies.com

YEAR: 2016	W.O.	SCALE: 1" = 100'	DWG. ANGP-EPSC-039	REV. 0

PROFILE



STREAM CROSSING PROFILE
UNNAMED TRIBUTARY TO
LAPLATTE RIVER
STATION 998+46±
MILE POST 18.91

SCALE: HORIZ. 1"=20'
VERT. 1"=4'

NOTE: STREAM CROSSING MUST BE CONSTRUCTED BETWEEN JUNE 1 AND OCTOBER 1

HORIZONTAL SCALE
20 10 0 20 40 60 feet
4 2 0 4 8 12 feet
VERTICAL SCALE

STATE OF VERMONT
JEFFREY E. HOLCOMBE
NO. 97764
CIVIL
LICENSED PROFESSIONAL ENGINEER

DWG. NO.	REFERENCE DWG.	REV	DSN	CK		DESCRIPTION		BID INITIALS	BID DATE	CONSTRUCTION INITIALS	CONSTRUCTION DATE
						ENVIRONMENTAL		JLS	06/28/13	JLS	05/2016
						DRAFTING DESIGNER		GIL	06/28/13	GJM	05/2016
						DRAFTING SUPERVISOR		BZD	06/28/13	BCK	05/2016
						DESIGN ENGINEER		MDF	06/28/13	GEW	05/2016
						DESIGN MANAGER		SAB	06/28/13	JEO	05/2016

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
OPEN TRENCH STREAM CROSSING PROFILE
LOC. CHITTENDEN COUNTY, VERMONT

Vermont Gas

VHB Vanasse Hangen Brustlin, Inc.

CHA
38 Eastwood Drive, Suite 105
South Burlington, VT 05403
Main: (802) 735-0372 · www.chacompanies.com

YEAR: 2016 | W.O. | SCALE: AS NOTED | DWG. ANGP-T-C-039A | REV. 0

RIGHT-OF-WAY

MATCH LINE

107
N/F
HAYSTACK CROSSING LLC

108
N/F
CLARK, GARY C.

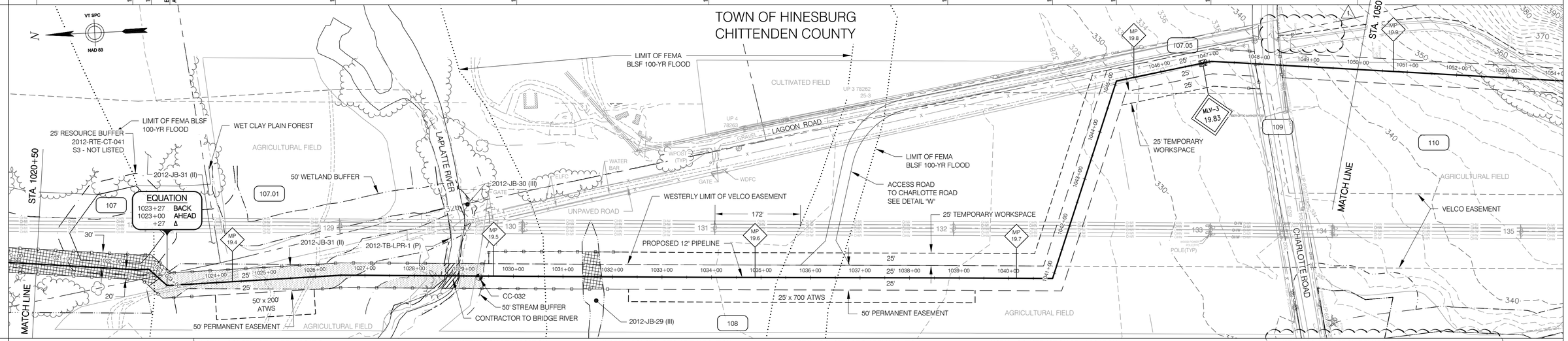
109
CHAR-
LOTTE
ROAD

MATCH LINE

SURVEY DATA

S 05° 59' W | 08°37' LT | 10221+56 | S 00° 39' E | 44°59' RT | 10221+77 | S 44° 21' W | 26.5 ft. Bk: 1023+27 Ahd: 1023+00 45°00' LT | S 00° 39' E | 03°40' RT | 10226+53 | S 03° 01' W | 00°00' RT | 10230+19 | S 03° 02' W | 00°10' LT | 10234+07 | S 02° 51' W | 00°08' RT | 10238+89 | S 03° 00' W | 72°23' LT | 10240+89 | S 69° 22' E | 60°25' RT | 10245+08 | S 08° 57' E | 14°51' RT | 10247+04 | S 05° 53' W

ALIGNMENT DETAIL



EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

- PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- CENTERLINE OF STREAM
- TEMPORARY STREAM CROSSING
- WETLAND
- 50' WETLAND BUFFER
- TEMPORARY WETLAND MATTING
- WETLAND BUFFER WITHIN PROJECT AREA
- REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL

INSTALL CONSTRUCTION DEMARCATION:
STA. 1020+50 TO 1022+62 RT - 20' FROM NEW 12" PIPE ℄
STA. 1020+50 TO 1022+77 LT - 30' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1020+50 TO 1022+62 RT - 20' FROM NEW 12" PIPE ℄
STA. 1020+50 TO 1022+77 LT - 30' FROM NEW 12" PIPE ℄

INSTALL MATTING:
STA. 1020+50 TO 1023+01

INSTALL CONSTRUCTION DEMARCATION:
STA. 1022+62 TO 1023+96 RT - 25' FROM NEW 12" PIPE ℄
STA. 1023+96 TO 1025+96 RT - 75' FROM NEW 12" PIPE ℄
STA. 1025+96 TO 1032+33 RT - 25' FROM NEW 12" PIPE ℄
STA. 1022+77 TO 1029+50 LT - 25' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1022+62 TO 1023+96 RT - 25' FROM NEW 12" PIPE ℄
STA. 1025+96 TO 1028+39 RT - 25' FROM NEW 12" PIPE ℄
STA. 1022+77 TO 1028+60 LT - 25' FROM NEW 12" PIPE ℄
STA. 1028+91 TO 1029+50 LT - 25' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1029+50 TO 1045+08 LT - 50' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1028+83 TO 1032+33 RT - 25' FROM NEW 12" PIPE ℄
STA. 1029+50 TO 1032+23 LT - 50' FROM NEW 12" PIPE ℄

INSTALL MATTING:
STA. 1031+39 TO 1031+82

INSTALL CONSTRUCTION DEMARCATION:
STA. 1032+33 TO 1039+33 RT - 50' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1029+27 TO 1029+50 LT - 25' FROM NEW 12" PIPE ℄

INSTALL STABILIZED CONSTRUCTION ENTRANCE:
STA. 1036+30

INSTALL CONSTRUCTION DEMARCATION:
STA. 1039+33 TO 1044+65 RT - 25' FROM NEW 12" PIPE ℄
STA. 1044+65 TO 1047+93 RT - 50' FROM NEW 12" PIPE ℄
STA. 1045+08 TO 1047+93 LT - 25' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1047+35 TO 1047+93 RT - 50' FROM NEW 12" PIPE ℄
STA. 1047+35 TO 1047+93 LT - 25' FROM NEW 12" PIPE ℄

INSTALL STABILIZED CONSTRUCTION ENTRANCE:
STA. 1047+93 & 1048+44

INSTALL CONSTRUCTION DEMARCATION:
STA. 1048+44 TO 1050+00 RT - 25' FROM NEW 12" PIPE ℄
STA. 1048+44 TO 1050+00 LT - WIDTH VARIES FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1048+44 TO 1048+95 RT - 25' FROM NEW 12" PIPE ℄
STA. 1048+44 TO 1048+95 LT - WIDTH VARIES' FROM NEW 12" PIPE ℄

HORIZONTAL SCALE
100 50 0 100 200 300 feet
VERTICAL SCALE
100 50 0 100 200 300 feet

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

CONST. TYPE	2D	W	2A	8	W	1A	1E	9	1A														
SOIL TYPE	Lf	Lf	Wo (PAS)	Le (PAS)	Wo (PAS)	Le (PAS)	Cv (PAS)																
LC/LU	AGRICULTURE		PASTURE	PASTURE		OPEN WATER	AGRICULTURE	PASTURE		PAVED TRAVEL	PASTURE AGRICULTURE												
STREAMS				STREAM 2012-TB-LPR-1 (P) - STATION 1027+24 TO 1029+44																			
WETLANDS			WETLAND 2012-JB-31 - STATION 1020+50 TO 1027+21 CLASS II					WETLAND 2012-JB-29 - STATION 1031+39 TO 1031+82 CLASS III															
VERNAL POOLS																							
SIGNIFICANT NATURAL COMMUNITIES																							
RTE SPECIES	2012-RTE-CT-041																						
NRC WILDLIFE HABITAT																							
ARCHAEOLOGY SITES																							

MATCH LINE

DWG. NO.	REFERENCE DWG.	REV	DSN	CK	DESCRIPTION
ANGP-T-G-07-010	ACCESS ROAD DETAILS				
ANGP-T-G-021	STATION AND VALVE DETAILS				
ANGP-T-C-040	ALIGNMENT SHEET	1	BCK	TDB	VHB EDITS (6/09/15)

		BID		CONSTRUCTION	
	INITIALS	DATE	INITIALS	DATE
ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
DESIGN MANAGER	SAB	06/28/13	JEO	05/2016

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. CHITTENDEN COUNTY, VERMONT

YEAR: 2016 | W.O. | SCALE: 1" = 100' | DWG. ANGP-EPSC-040 | REV. 1

Vermont Gas

VHB Vanasse Hangen Brustlin, Inc.

CHA
38 Eastwood Drive, Suite 105
South Burlington, VT 05403
Main: (802) 735-0372 · www.chacompanies.com

RIGHT-OF-WAY

MATCH LINE

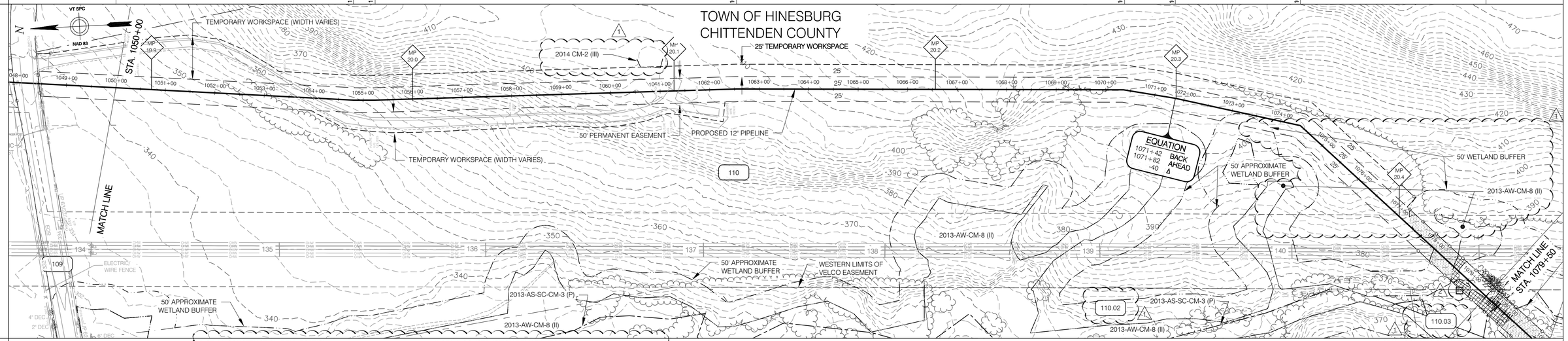
110
N/F
CARSE, DAVID

MATCH LINE

SURVEY DATA

S 05° 53' W	2°58' LT / S 02° 55' W / 1°46' LT	S 01° 09' W	1°53' RT	S 03° 02' W	6°10' RT	S 12° 11' W	3°00' RT	S 15° 11' W	30°17' RT	S 45° 28' W
1054+80	1054+24	1062+54			1070+36	1071+82			1074+41	

ALIGNMENT DETAIL



EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

- PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- CENTERLINE OF STREAM
- TEMPORARY STREAM CROSSING
- WETLAND
- 50' WETLAND BUFFER
- TEMPORARY WETLAND MATTING
- WETLAND BUFFER WITHIN PROJECT AREA
- REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL

INSTALL CONSTRUCTION DEMARCATION:
STA. 1050+00 TO 1054+00 RT - 25' FROM NEW 12" PIPE ℄
STA. 1054+00 TO 1062+30 RT - WIDTH VARIES FROM NEW 12" PIPE ℄
STA. 1062+30 TO 1079+50 RT - 25' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1050+00 TO 1053+25 LT - WIDTH VARIES FROM NEW 12" PIPE ℄
STA. 1053+25 TO 1077+10 LT - 50' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1077+10 TO 1079+50 LT - 25' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1077+68 TO 1079+50 RT - 25' FROM NEW 12" PIPE ℄
STA. 1076+61 TO 1077+10 LT - 50' FROM NEW 12" PIPE ℄
STA. 1077+10 TO 1079+50 LT - 25' FROM NEW 12" PIPE ℄

INSTALL MATTING:
STA. 1078+60 TO 1079+50

HORIZONTAL SCALE
100 50 0 100 200 300 feet

VERTICAL SCALE
100 50 0 100 200 300 feet

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

CONST. TYPE	1A									2A	W
SOIL TYPE	Cv	Le (PAS)	VeC (PAS)	FaE (PAS)	VeE	VeB	FaC	VeC (PAS)	FaE	VeE (PAS)	
LC/LU	FORESTED			GRASS			FORESTED				
	AGRICULTURE										
STREAMS											
WETLANDS										WETLAND 2013-AW-CM-8 - STATION 1077+18 TO 1079+50 CLASS II	
VERNAL POOLS											
SIGNIFICANT NATURAL COMMUNITIES											
RTE SPECIES											
NRC WILDLIFE HABITAT											
ARCHAEOLOGY SITES											

MATCH LINE

MATCH LINE

VHB Vanasse Hangen Brustlin, Inc.

DWG. NO.	REFERENCE DWG.	REV	DSN	CK		DESCRIPTION		BID INITIALS	BID DATE	CONSTRUCTION INITIALS	CONSTRUCTION DATE
							ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
							DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
							DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
ANGP-T-G-021	STATION AND VALVE DETAILS	2	GJM	BCK		IFC 2016 EDITS (05/2016)	DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
ANGP-T-C-041	ALIGNMENT SHEET	1	BCK	TDB		ENV. EDITS (6/08/15)	DESIGN MANAGER	SAB	06/28/13	JEO	05/2016

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. CHITTENDEN COUNTY, VERMONT

Vermont Gas

CHA
38 Eastwood Drive, Suite 105
South Burlington, VT 05403
Main: (802) 735-0372 · www.chacompanies.com

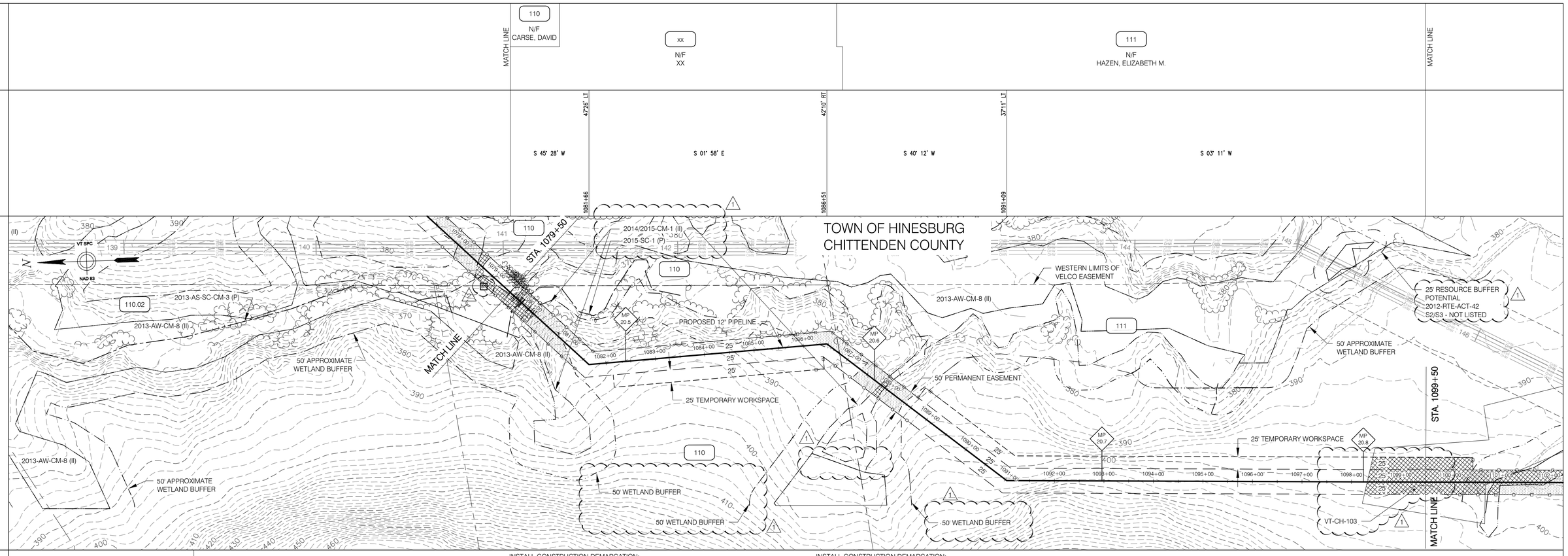
YEAR: 2016 | W.O. | SCALE: 1" = 100' | DWG. ANGP-EPSC-041 | REV. 2

RIGHT-OF-WAY

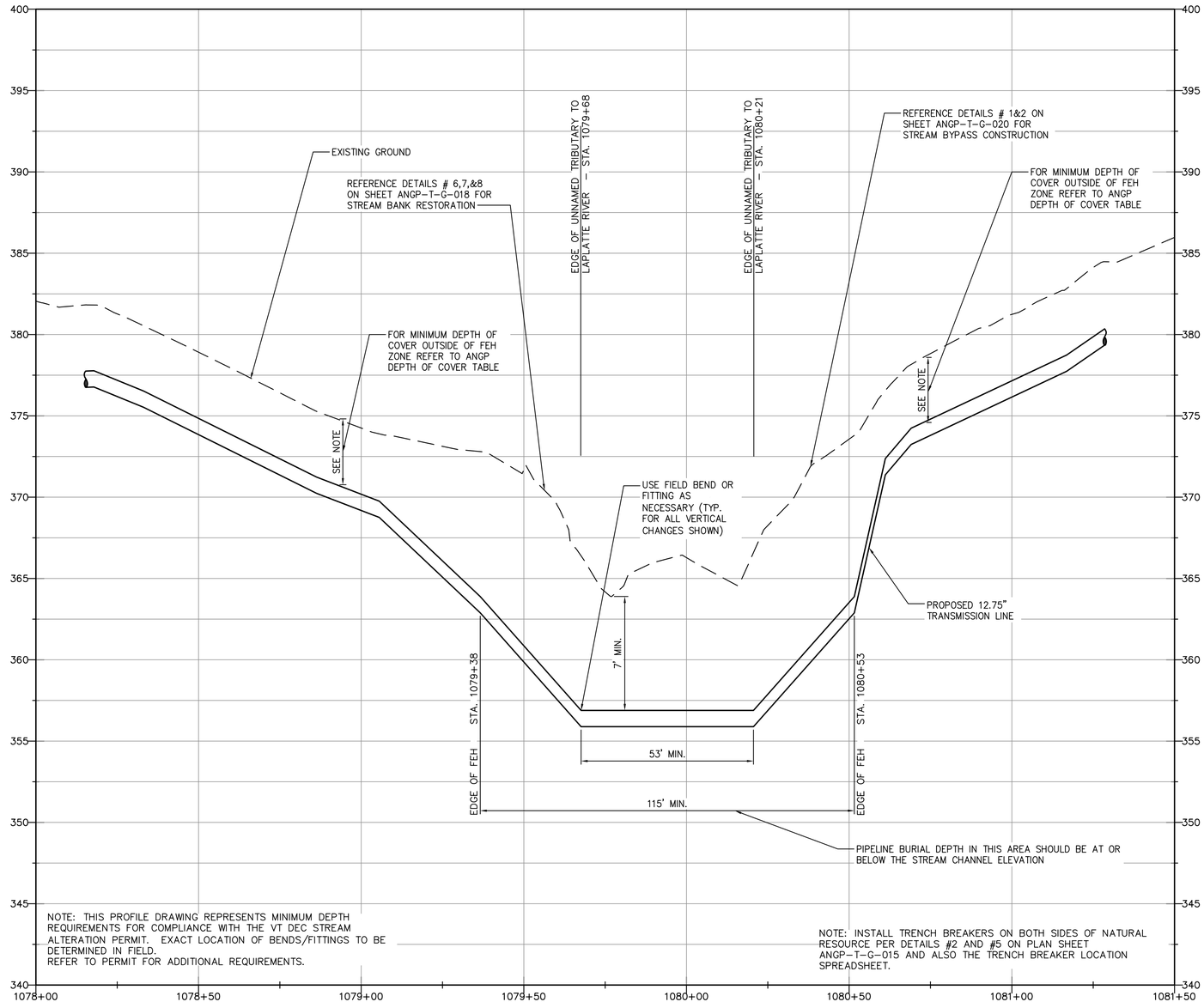
SURVEY DATA

ALIGNMENT DETAIL

EROSION PREVENTION & SEDIMENT CONTROL


110
N/F
CARSE, DAVID
MATCH LINE
xx
N/F
XX
111
N/F
HAZEN, ELIZABETH M.
MATCH LINE
S 45° 28" W
47'26" LT
S 01° 58" E
42'10" RT
S 40° 12" W
37'11" LT
S 03° 11" W
1081+66
1086+51
1091+09
TOWN OF HINESBURG
CHITTENDEN COUNTY
STA. 1079+50
STA. 1099+50
MATCH LINE
MATCH LINE
110
110.02
111
2014/2015-CM-1 (II)
2015-SC-1 (P)
2013-AS-SC-CM-3 (P)
2013-AW-CM-8 (II)
2013-AW-CM-8 (II)
2013-AW-CM-8 (II)
2013-AW-CM-8 (II)
PROPOSED 12" PIPELINE
WESTERN LIMITS OF VELCO EASEMENT
25' RESOURCE BUFFER POTENTIAL 2012-RTE-ACT-42 S2/S3 - NOT LISTED
50' APPROXIMATE WETLAND BUFFER
50' APPROXIMATE WETLAND BUFFER
50' APPROXIMATE WETLAND BUFFER
50' PERMANENT EASEMENT
25' TEMPORARY WORKSPACE
25' TEMPORARY WORKSPACE
50' WETLAND BUFFER
50' WETLAND BUFFER
50' WETLAND BUFFER
VT-CH-103
MP 20.5
MP 20.6
MP 20.7
MP 20.8
1082+00
1083+00
1084+00
1085+00
1086+00
1087+00
1088+00
1089+00
1090+00
1091+00
1092+00
1093+00
1094+00
1095+00
1096+00
1097+00
1098+00
1099+00
1100+00
1101+00
1102+00
1103+00
1104+00
1105+00
1106+00
1107+00
1108+00
1109+00
1110+00
1111+00
1112+00
1113+00
1114+00
1115+00
1116+00
1117+00
1118+00
1119+00
1120+00
1121+00

PROFILE



STREAM CROSSING PROFILE
UNNAMED TRIBUTARY TO LAPLATTE RIVER
STATION 1079+97±
MILE POST 20.45

SCALE: HORIZ. 1"=20'
VERT. 1"=4'

NOTE: STREAM CROSSING MUST BE CONSTRUCTED BETWEEN JULY 1 AND OCTOBER 1

HORIZONTAL SCALE
20 10 0 20 40 60 feet
4 2 0 4 8 12 feet
VERTICAL SCALE

STATE OF VERMONT
MICHAEL E. HOLLOWAY
NO. 97764
CIVIL
LICENSED PROFESSIONAL ENGINEER

VHB Vanasse Hangen Brustlin, Inc.

DWG. NO.	REFERENCE DWG.	REV	DSN	CK	DESCRIPTION		BID INITIALS	BID DATE	CONSTRUCTION INITIALS	CONSTRUCTION DATE
						ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
						DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
						DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
						DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
						DESIGN MANAGER	SAB	06/28/13	JEO	05/2016

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
OPEN TRENCH STREAM CROSSING PROFILE
LOC. CHITTENDEN COUNTY, VERMONT

Vermont Gas

CHA
38 Eastwood Drive, Suite 105
South Burlington, VT 05403
Main: (802) 735-0372 - www.chacompanies.com

YEAR: 2016 | W.O. | SCALE: AS NOTED | DWG. ANGP-T-C-042A | REV. 0

RIGHT-OF-WAY

MATCH LINE

111 N/F HAZEN, ELIZABETH M.

112 N/F CARSE LAND COMPANY, LLC

113 N/F LAVALLEE, RONALD & CONSTANCE

114 BALDWIN ROAD

116 N/F THIBAULT FARM PROPERTIES, LLC

MATCH LINE

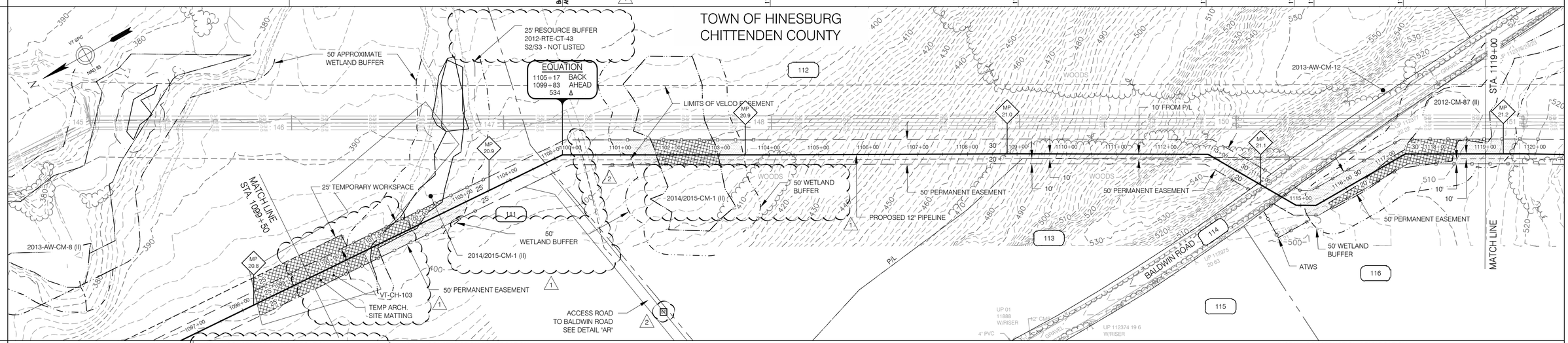
SURVEY DATA

S 03° 11' W | 534' Rt. | S 29° 09' W | 00°14' Lt. | S 28° 54' W | 00°22' Rt. | S 29° 17' W | 29°58' Rt. | S 59° 16' W | 29°59' Lt. | 30°00' Lt. | S 29° 16' W | S 00° 44' E | 29°46' Rt. | S 29° 02' W

Back: 1105+17
Ahead: 1099+83
25°59' Rt

1104+06 | 1109+06 | 1112+85 | 1114+90 | 1115+30 | 1117+38

ALIGNMENT DETAIL



EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

- PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- CENTERLINE OF STREAM
- TEMPORARY STREAM CROSSING
- WETLAND
- 50' WETLAND BUFFER
- TEMPORARY WETLAND MATTING
- WETLAND BUFFER WITHIN PROJECT AREA
- REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL

INSTALL CONSTRUCTION DEMARCATION:
STA. 1099+50 TO 1105+17 RT - 25' FROM NEW 12" PIPE ℄
STA. 1099+50 TO 1105+17 LT - 25' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1099+83 TO 1113+93 RT - 20' FROM NEW 12" PIPE ℄
STA. 1099+83 TO 1114+15 LT - 30' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1114+49 TO 1115+13 RT WIDTH VARIES FROM NEW 12" PIPE ℄
STA. 1115+13 TO 1119+00 RT - 20' FROM NEW 12" PIPE ℄
STA. 1114+71 TO 1119+00 LT - 30' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1099+75 TO 1103+29 RT - 25' FROM NEW 12" PIPE ℄
STA. 1100+02 TO 1100+45 LT - 50' FROM NEW 12" PIPE ℄
STA. 1100+45 TO 1103+25 LT - 25' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1100+76 TO 1104+06 RT - 20' FROM NEW 12" PIPE ℄
STA. 1100+30 TO 1103+92 LT - 30' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1113+43 TO 1113+93 RT - 20' FROM NEW 12" PIPE ℄
STA. 1113+65 TO 1114+15 LT - 30' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1114+49 TO 1119+00 RT - 20' FROM NEW 12" PIPE ℄
STA. 1114+71 TO 1119+00 LT - 30' FROM NEW 12" PIPE ℄

INSTALL MATTING:
STA. 1099+50 TO 1102+60

INSTALL MATTING:
STA. 1101+61 TO 1103+01

INSTALL STABILIZED CONSTRUCTION ENTRANCE:
STA. 1114+02 & 1114+58

INSTALL MATTING:
STA. 1115+55 TO 1119+00

HORIZONTAL SCALE
100 50 0 100 200 300 feet
100 50 0 100 200 300 feet
VERTICAL SCALE

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

CONST. TYPE	1A	A	W	2A	W	2D	9	W	2D						
SOIL TYPE	Cv (PAS)	VeB (PAS)	Cv (PAS)	SuD	SuC (PAS)	FaC	FaE	MnC	GeB (PAS)						
LC/LU	AGRICULTURE	GRASS	NOT CLASSIFIED	RESIDENTIAL	UNPAVED TRAVEL	GRASS	RESIDENTIAL								
STREAMS															
WETLANDS	WETLAND 2014/2015-CM-1 (II) STATION 1100+25 TO 1103+25 CLASS II	WETLAND 2014/2015-CM-1 (II) STATION 1100+80 TO 1103+52 CLASS II	WETLAND 2012-CM-87 - STATION 1115+07 TO 1119+00 CLASS II												
VERNAL POOLS															
SIGNIFICANT NATURAL COMMUNITIES															
RTE SPECIES															
NRC WILDLIFE HABITAT															
ARCHAEOLOGY SITES	VT-CH-103 STATION 1099+50 TO 1095+77														

MATCH LINE

DWG. NO.	REFERENCE DWG.	REV	DSN	CK	DESCRIPTION
ANGP-T-G-007-010	ACCESS ROAD DETAILS	2	GJM	BCK	IFC 2016 EDITS (05/2016)
ANGP-T-C-043	ALIGNMENT SHEET	1	BCK	TDB	ADDED ARCH. SITE AND ENV. EDITS (6/08/15)

	BID		CONSTRUCTION	
	INITIALS	DATE	INITIALS	DATE
ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
DESIGN MANAGER	SAB	06/28/13	JEO	05/2016

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. CHITTENDEN COUNTY, VERMONT

YEAR: 2016 | W.O. | SCALE: 1" = 100' | DWG. ANGP-EPSC-043 | REV. 2

Vermont Gas

VHB Vanasse Hangen Brustlin, Inc.

CHA
38 Eastwood Drive, Suite 105
South Burlington, VT 05403
Main: (802) 735-0372 • www.chacompanies.com

RIGHT-OF-WAY

MATCHLINE

116
N/F
THIBAULT FARM PROPERTIES, LLC

117
N/F
BALDWIN-HAULENBEEK, ANDREA;
DONELLY-HAULENBEEK, FREDERICK

MATCHLINE

SURVEY DATA

S 29° 02' W	1119+76	01°11' RT
S 30° 14' W	1123+00	22°30' RT
S 52° 44' W	1123+51	22°30' LT
S 30° 14' W	1124+17	27°34' LT
S 2° 40' W	1112+97	22°30' LT
S 19° 50' E	1125+70	22°30' RT
S 02° 39' W	1131+56	00°39' RT
S 03° 19' W	1135+94	00°02' RT
S 03° 21' W		

ALIGNMENT DETAIL

EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

PERMANENT EASEMENT	— — —
TEMPORARY WORKSPACE	- - - -
CENTERLINE OF STREAM	- — —
TEMPORARY STREAM CROSSING	▨
WETLAND	-·-·-
50' WETLAND BUFFER	—··—
TEMPORARY WETLAND MATTING	▩
WETLAND BUFFER WITHIN PROJECT AREA	░
REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL	—○—○—

INSTALL CONSTRUCTION DEMARCATION:
STA. 1119+00 TO 1140+50 RT - 20' FROM NEW 12" PIPE ℄
STA. 1119+00 TO 1140+50 LT - 30' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1119+00 TO 1119+76 RT - 20' FROM NEW 12" PIPE ℄
STA. 1119+00 TO 1120+12 LT - 30' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1127+11 TO 1130+14 RT - 20' FROM NEW 12" PIPE ℄
STA. 1127+46 TO 1129+28 LT - 30' FROM NEW 12" PIPE ℄

INSTALL MATTING:
STA. 1128+23 TO 1128+64

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

HORIZONTAL SCALE
100 50 0 100 200 300 feet

100 50 0 100 200 300 feet
VERTICAL SCALE

CONST. TYPE	(2D)
SOIL TYPE	MnC; GeB (PAS); FaE; FaC; FaE; SuB (PAS); GeB (PAS); SuD; SuB
LC/LU	GRASS RESIDENTIAL; AGRICULTURAL
STREAMS	
WETLANDS	WETLAND 2012-CM-87 - STATION 1119+00 TO 1119+63 CLASS II WETLAND 2012-RS-20 - STATION 1127+61 TO 1129+64 CLASS II
VERNAL POOLS	
SIGNIFICANT NATURAL COMMUNITIES	
RTE SPECIES	
NRC WILDLIFE HABITAT	
ARCHAEOLOGY SITES	

MATCH LINE

MATCH LINE

DWG. NO.	REFERENCE DWG.	REV	DSN	CK	DESCRIPTION
ANGP-T-C-044	ALIGNMENT SHEET				

	BID INITIALS	BID DATE	CONSTRUCTION INITIALS	CONSTRUCTION DATE
ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
DESIGN MANAGER	SAB	06/28/13	JEO	05/2016

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. CHITTENDEN COUNTY, VERMONT

Vermont Gas

VHB Vanasse Hangen Brustlin, Inc.

CHA
38 Eastwood Drive, Suite 105
South Burlington, VT 05403
Main: (802) 735-0372 · www.chacompanies.com

YEAR: 2016 | W.O. | SCALE: 1" = 100' | DWG. ANGP-EPSC-044 | REV. 0

RIGHT-OF-WAY

MATCHLINE

117
N/F
BALDWIN-HAULENBEEK, ANDREA;
DONELLY-HAULENBEEK, FREDERICK

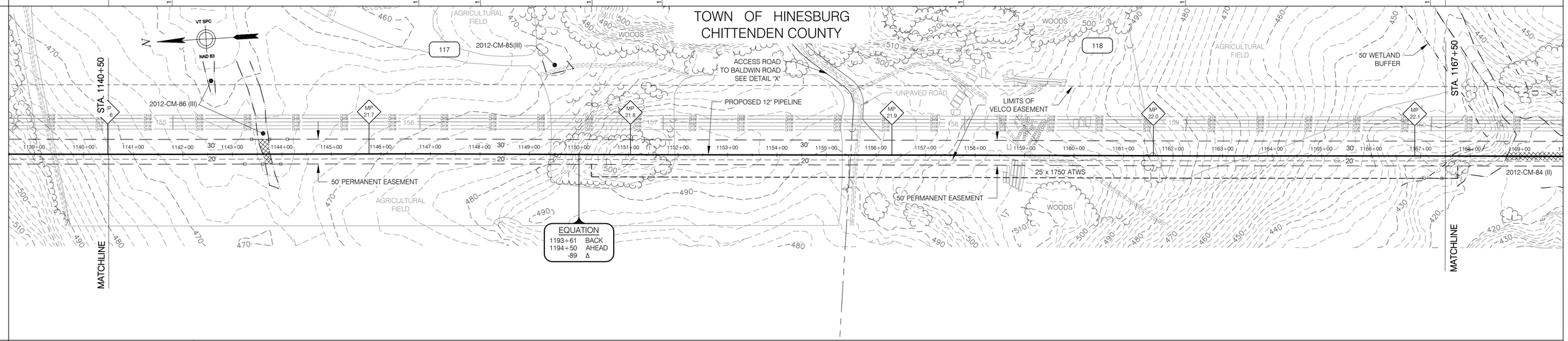
118
N/F
BALDWIN, DANIEL P.

MATCHLINE

SURVEY DATA

LT 00'10"	RT 81.00'	LT 00.00'	RT 00.00'	LT 90.00'	LT 00.00'	LT 69.00'	RT 00.00'
S 03° 21' W	S 03° 11' W	S 03° 29' W	S 03° 29' W	S 03° 29' W	S 03° 23' W	S 03° 28' W	S 03° 19' W	S 03° 26' W
1141+81	1146+79	1148+04	1150+29	1151+71	1157+79	1162+27	1167+22	

ALIGNMENT DETAIL



EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

- PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- CENTERLINE OF STREAM
- TEMPORARY STREAM CROSSING
- WETLAND
- 50' WETLAND BUFFER
- TEMPORARY WETLAND MATTING
- WETLAND BUFFER WITHIN PROJECT AREA
- REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL

INSTALL CONSTRUCTION DEMARCATION:
STA. 1140+50 TO 1150+25 RT - 20' FROM NEW 12" PIPE ℄
STA. 1140+50 TO 1167+50 LT - 30' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1150+25 TO 1167+50 RT - 45' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1143+16 TO 1144+31 RT - 20' FROM NEW 12" PIPE ℄
STA. 1143+02 TO 1144+23 LT - 30' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1166+61 TO 1167+50 RT - 45' FROM NEW 12" PIPE ℄

INSTALL MATTING:
STA. 1143+52 TO 1143+81

INSTALL STABILIZED CONSTRUCTION ENTRANCE:
STA. 1155+63

HORIZONTAL SCALE
100 50 0 100 200 300 feet

VERTICAL SCALE
100 50 0 100 200 300 feet

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

CONST. TYPE		2D	
SOIL TYPE	SuD (PAS)	SuB (PAS)	MyB (PAS)	VeC (PAS)	FaC	VeB (PAS)	VeD
LC/LU	GRASS	FORESTED	GRASS AGRICULTURAL
STREAMS			
WETLANDS	WETLAND 2012-CM-86 - STATION 1143+52 TO 1143+81 CLASS III	WETLAND 2012-CM-84 - STATION 1167+11 TO 1167+50 CLASS II
VERNAL POOLS			
SIGNIFICANT NATURAL COMMUNITIES			
RTE SPECIES			
NRC WILDLIFE HABITAT			
ARCHAEOLOGY SITES			

MATCH LINE

MATCH LINE

Vanasse Hangen Brustlin, Inc.

DWG. NO.	REFERENCE DWG.	REV	DSN	CK		DESCRIPTION
ANGP-T-G-07-010	ACCESS ROAD DETAILS					
ANGP-T-C-045	ALIGNMENT SHEET					

	BID		CONSTRUCTION	
	INITIALS	DATE	INITIALS	DATE
ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
DESIGN MANAGER	SAB	06/28/13	JEO	05/2016

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. CHITTENDEN COUNTY, VERMONT

YEAR: 2016 | W.O. | SCALE: 1" = 100' | DWG. ANGP-EPSC-045 | REV. 0

Vermont Gas

CHA
38 Eastwood Drive, Suite 105
South Burlington, VT 05403
Main: (802) 735-0372 · www.chacompanies.com

RIGHT-OF-WAY

MATCHLINE

118
N/F
BALDWIN, DANIEL P.

119
DRINKWATER ROAD

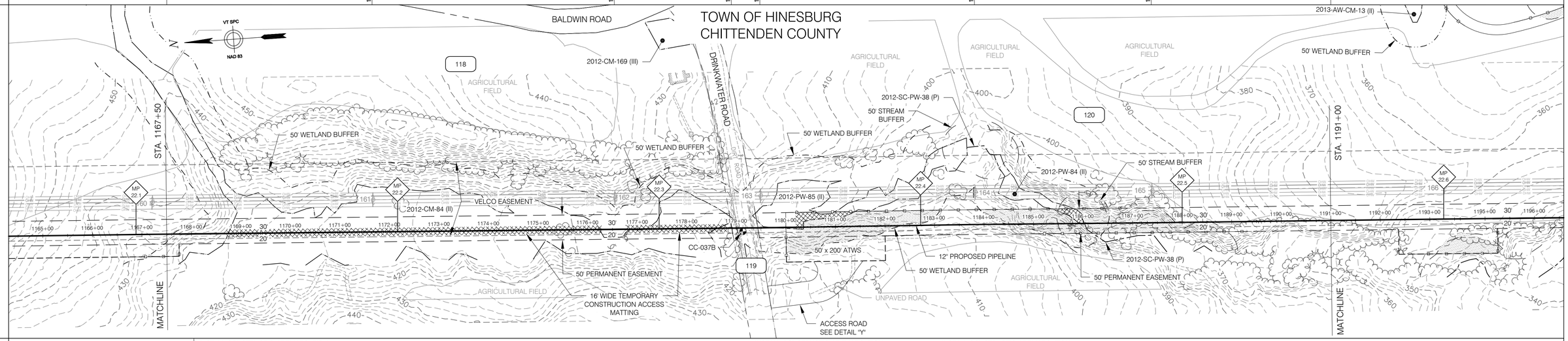
120
N/F
BALDWIN, MATTHEW T.

MATCH LINE

SURVEY DATA

LT .00'00	RT .00'00		LT .00'00	RT .00'00	LT .18'00	RT .00'20	LT .00'10	RT .00'00
S 03° 26' W	S 03° 26' W	S 03° 29' W	S 03° 29' W		S 03° 10' W	S 03° 30' W	S 03° 20' W	
1171+67	1176+56		1178+92	1179+50	1183+83		1187+40	

ALIGNMENT DETAIL



EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

- PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- CENTERLINE OF STREAM
- TEMPORARY STREAM CROSSING
- WETLAND
- 50' WETLAND BUFFER
- TEMPORARY WETLAND MATTING
- WETLAND BUFFER WITHIN PROJECT AREA
- REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL

INSTALL CONSTRUCTION DEMARCATION:
STA. 1167+50 TO 1167+75 RT - 45' FROM NEW 12" PIPE ℄
STA. 1167+50 TO 1178+86 LT - 30' FROM NEW 12" PIPE ℄
STA. 1167+75 TO 1178+94 RT - 20' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1167+50 TO 1167+75 RT - 45' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1179+46 TO 1180+00 RT - 20' FROM NEW 12" PIPE ℄
STA. 1179+38 TO 1191+00 LT - 30' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1180+00 TO 1182+00 RT - 70' FROM NEW 12" PIPE ℄
STA. 1182+00 TO 1191+00 RT - 20' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1180+00 TO 1180+32 RT - 70' FROM NEW 12" PIPE ℄
STA. 1180+00 TO 1186+95 LT - 30' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1184+99 TO 1189+40 RT - 20' FROM NEW 12" PIPE ℄

INSTALL MATTING:
STA. 1168+70 TO 1176+28

INSTALL MATTING:
STA. 1176+76 TO 1178+83

INSTALL STABILIZED CONSTRUCTION ENTRACE:
STA. 1181+00

HORIZONTAL SCALE
100 50 0 100 200 300 feet
VERTICAL SCALE
100 50 0 100 200 300 feet

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

CONST. TYPE	2D	8			2D	W	7	2D
SOIL TYPE	VeD, FaE	Lf		VeB (PAS)	VeD			VeB (PAS)
LC/LU	FORESTED / AGRICULTURAL			UNPAVED TRAVEL	FORESTED / AGRICULTURAL			
STREAMS					STREAM 2012-SC-PW-38 (P) - STATION 1185+97 TO 1188+90			
WETLANDS	WETLAND 2012-CM-84 - STATION 1167+50 TO 1179+00 CLASS II				WETLAND 2012-PW-85 - STATION 1179+33 TO 1183+12 CLASS II			WETLAND 2012-PW-84 - STATION 1183+92 TO 1186+50 CLASS II
VERNAL POOLS								
SIGNIFICANT NATURAL COMMUNITIES								
RTE SPECIES								
NRC WILDLIFE HABITAT								
ARCHAEOLOGY SITES								

MATCH LINE (left) — MATCH LINE (right)

VHB Vanasse Hangen Brustlin, Inc.

DWG. NO.	REFERENCE DWG.	REV	DSN	CK	DESCRIPTION	BID INITIALS	BID DATE	CONSTRUCTION INITIALS	CONSTRUCTION DATE
					ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
					DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
					DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
ANGP-T-G-07-010	ACCESS ROAD DETAILS				DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
ANGP-T-C-046	ALIGNMENT SHEET				DESIGN MANAGER	SAB	06/28/13	JEO	05/2016

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. CHITTENDEN COUNTY, VERMONT

Vermont Gas

CHA
38 Eastwood Drive, Suite 105
South Burlington, VT 05403
Main: (802) 735-0372 · www.chacompanies.com

YEAR: 2016 | W.O. | SCALE: 1" = 100' | DWG. ANGP-EPSC-046 | REV. 0

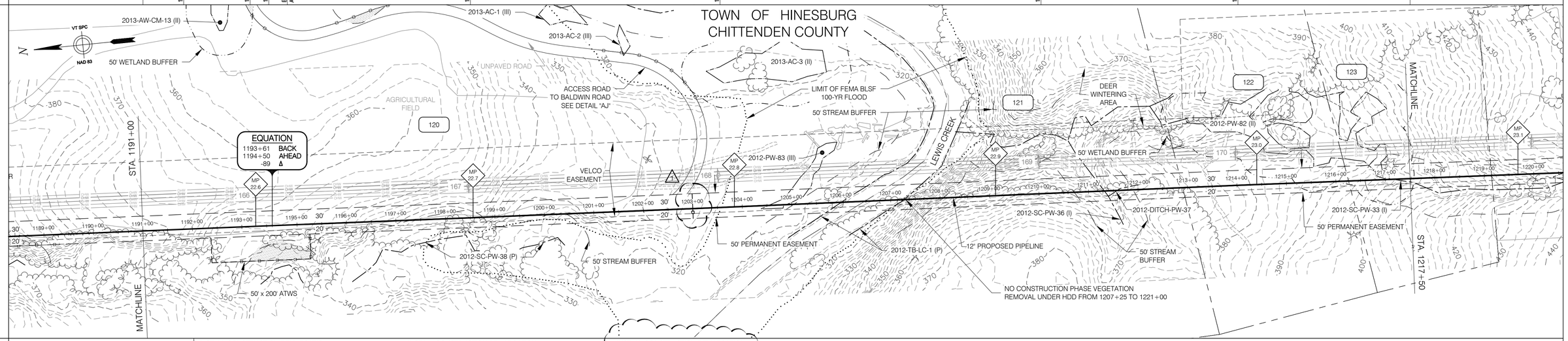
RIGHT-OF-WAY

MATCHLINE | 120 N/F BALDWIN, MATTHEW T. | 121 N/F BALDWIN, DANIEL P. | 122 N/F LAROCK, BRIAN | 123 N/F DAVIS, REBECCA L | MATCHLINE

SURVEY DATA

00'00" RT	S 03° 20' W	00'00" LT	S 03° 20' W	00'00" RT	S 03° 26' W	~88.7 ft.	S 03° 26' W	00'05" LT	S 03° 20' W	00'04" LT	S 03° 15' W	00'00" LT	S 03° 15' W	00'14" RT	S 03° 29' W
1191+81		1193+16		1193+31		Bck: 1193+61 Ahd: 1194+50		1198+49		1203+54		1210+03		1214+01	

ALIGNMENT DETAIL



EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

- PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- CENTERLINE OF STREAM
- TEMPORARY STREAM CROSSING
- WETLAND
- 50' WETLAND BUFFER
- TEMPORARY WETLAND MATTING
- WETLAND BUFFER WITHIN PROJECT AREA
- REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL

INSTALL CONSTRUCTION DEMARCATION:
STA. 1191+00 TO 1192+40 RT - 20' FROM NEW 12" PIPE ℄
STA. 1191+00 TO 1217+50 LT - 30' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1192+40 TO 1195+25 RT - 70' FROM NEW 12" PIPE ℄
STA. 1195+25 TO 1217+50 RT - 20' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1203+00

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1192+62 TO 1195+25 RT - 70' FROM NEW 12" PIPE ℄

INSTALL STABILIZED CONSTRUCTION ENTRANCE:
STA. 1192+63

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

HORIZONTAL SCALE
100 50 0 100 200 300 feet
VERTICAL SCALE
100 50 0 100 200 300 feet

CONST. TYPE		2D		8	
SOIL TYPE		VeB (PAS); VeC (PAS); VeB; W; VeC (PAS); FaC			
LC/LU		GRASS AGRICULTURAL		RESIDENTIAL	UNCLASSIFIABLE
STREAMS		STREAM 2012-SC-PW-38 (P) - STATION 1194+59 TO 1198+99; STREAM 2012-SC-PW-38 (P) - STATION 1199+31 TO 1200+68; STREAM 2012-TB-LC-1 (P) - STATION 1204+70 TO 1208+42; STREAM 2012-SC-PW-36 (I) - STATION 1210+50 TO 1212+00			STREAM 2012-SC-PW-33 (I) - STATION 1216+60 TO 1217+50
WETLANDS	MATCH LINE	WETLAND 2012-PW-83 - STATION 1204+37 TO 1205+36 CLASS III		WETLAND 2012-PW-82 - STATION 1214+22 TO 1217+50 CLASS II	MATCH LINE
VERNAL POOLS					
SIGNIFICANT NATURAL COMMUNITIES					
RTE SPECIES					
NRC WILDLIFE HABITAT					
ARCHAEOLOGY SITES					

VHB Vanasse Hangen Brustlin, Inc.

DWG. NO.	REFERENCE DWG.	REV	DSN	CK	DESCRIPTION
ANGP-T-G-07-010	ACCESS ROAD DETAILS				
ANGP-T-C-047	ALIGNMENT SHEET	1	GJM	TDB	VHB HDD AREA REVISIONS (6/24/15)

	BID		CONSTRUCTION	
	INITIALS	DATE	INITIALS	DATE
ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
DESIGN MANAGER	SAB	06/28/13	JEO	05/2016

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. CHITTENDEN COUNTY, VERMONT

YEAR: 2016 | W.O. | SCALE: 1" = 100' | DWG. ANGP-EPSC-047 | REV. 1

Vermont Gas

CHA
38 Eastwood Drive, Suite 105
South Burlington, VT 05403
Main: (802) 735-0372 · www.chacompanies.com

RIGHT-OF-WAY

MATCHLINE

123 N/F DAVIS, REBECCA L.

124 N/F AMES, MARK A.

125 N/F MCCAY, CAROLE H.

126 N/F MENEILLEY, JILL

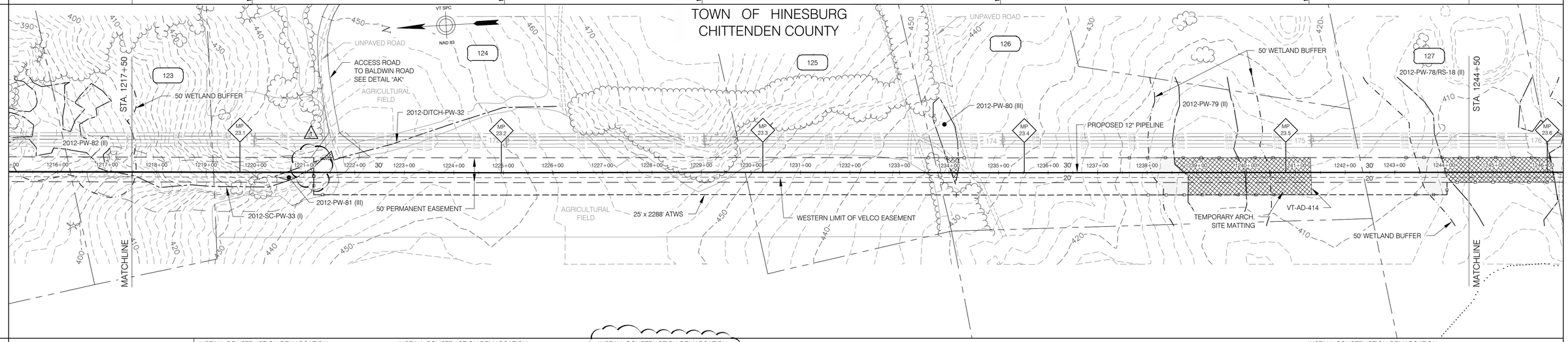
127 N/F LEUSCHNER, EDWARD T. JR. & DAWN

MATCH LINE

SURVEY DATA

123	124	125	126	127
S 03° 29" W	S 03° 28" W	S 03° 13" W	S 03° 27" W	S 03° 19" W	S 03° 18" W
0.00' LT	0.00' LT	0.00' RT	0.00' LT	0.00' LT	
1219+98	1225+08	1229+07	1235+09	1241+33	

ALIGNMENT DETAIL



EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

- PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- CENTERLINE OF STREAM
- TEMPORARY STREAM CROSSING
- WETLAND
- 50' WETLAND BUFFER
- TEMPORARY WETLAND MATTING
- WETLAND BUFFER WITHIN PROJECT AREA
- REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL

INSTALL CONSTRUCTION DEMARCATION:
STA. 1217+50 TO 1221+18 RT - 20' FROM NEW 12" PIPE ℄
STA. 1217+50 TO 1244+50 LT - 30' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1221+18 TO 1244+05 RT - 45' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1221+18

1

INSTALL CONSTRUCTION DEMARCATION:
STA. 1244+05 TO 1244+50 RT - 20' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1221+18 TO 1221+67 RT - 45' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1233+45 TO 1234+69 LT - 30' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1237+83 TO 1240+99 RT - 45' FROM NEW 12" PIPE ℄
STA. 1237+54 TO 1240+89 LT - 30' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1243+20 TO 1244+05 RT - 45' FROM NEW 12" PIPE ℄
STA. 1242+92 TO 1244+50 LT - 30' FROM NEW 12" PIPE ℄
STA. 1244+05 TO 1244+50 RT - 20' FROM NEW 12" PIPE ℄

INSTALL MATTING:
STA. 1221+17 TO 1221+58

INSTALL STABILIZED CONSTRUCTION ENTRANCE:
STA. 1221+66

INSTALL MATTING:
STA. 1233+95 TO 1234+20

INSTALL MATTING:
STA. 1238+55 TO 1241+33

INSTALL MATTING:
STA. 1243+94 TO 1244+50

HORIZONTAL SCALE
100 50 0 100 200 300 feet

VERTICAL SCALE
100 50 0 100 200 300 feet

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

CONST. TYPE		8															2D	W				W	A					W	
SOIL TYPE	VeC	FaC			VeB (PAS)			FaC			SuB (PAS)		VeB (PAS)			VeC (PAS)				W		Cv (PAS)		VeB (PAS)					
LC/LU	PASTURE																							
	UNCLASSIFIABLE	AGRICULTURAL																		RESIDENTIAL				RESIDENTIAL					
STREAMS	STREAM 2012-SC-PW-33 (I) - STATION 1217+50 TO 1220+67																							
WETLANDS	WETLAND 2012-PW-81 - STATION 1220+39 TO 1221+58 CLASS III												WETLAND 2012-PW-80 - STATION 1233+95 TO 1234+20 CLASS III			WETLAND 2012-PW-79 - STATION 1238+04 TO 1240+49 CLASS II				WETLAND 2012-PW-78/RS-18 - STATION 1243+42 TO 1244+50 CLASS II								
VERNAL POOLS																								
SIGNIFICANT NATURAL COMMUNITIES																								
RTE SPECIES																								
NRC WILDLIFE HABITAT																								
ARCHAEOLOGY SITES																							VT-AD-414	

MATCH LINE

MATCH LINE

DWG. NO.	REFERENCE DWG.	REV	DSN	CK	DESCRIPTION
ANGP-T-G-07-010	ACCESS ROAD DETAILS				
ANGP-T-C-048	ALIGNMENT SHEET	1	GJM	TDB	VHB HDD AREA REVISIONS (6/24/15)

	BID		CONSTRUCTION	
	INITIALS	DATE	INITIALS	DATE
ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
DESIGN MANAGER	SAB	06/28/13	JEO	05/2016

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. CHITTENDEN COUNTY, VERMONT

YEAR: 2016 | W.O. | SCALE: 1" = 100' | DWG. ANGP-EPSC-048 | REV. 1

Vermont Gas

VHB Vanasse Hangen Brustlin, Inc.

CHA
38 Eastwood Drive, Suite 105
South Burlington, VT 05403
Main: (802) 735-0372 - www.chacompanies.com

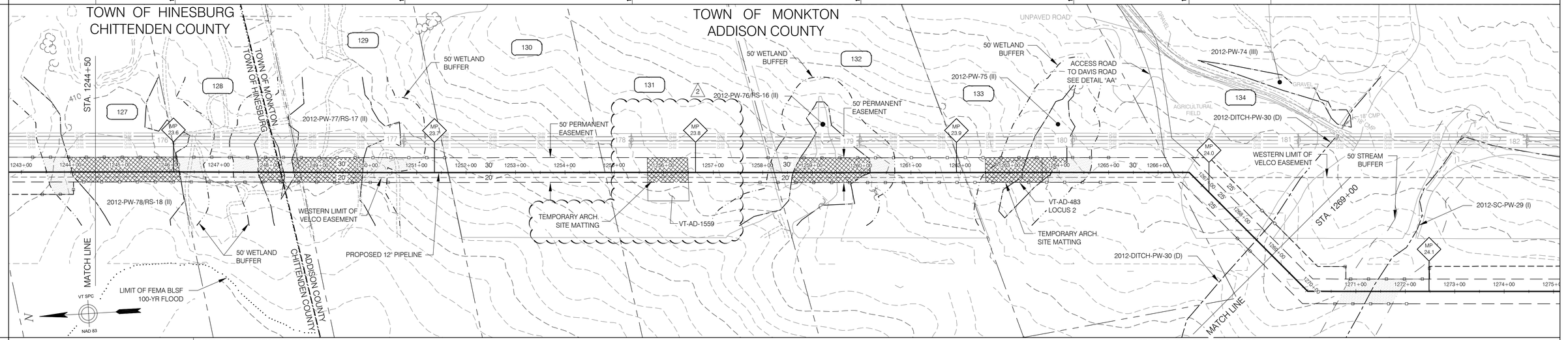
RIGHT–OF–WAY

MATCH LINE | 127 N/F LEUSCHNER, EDWARD T. JR. & DAWN | 128 N/F DERRICK, DIANE M. | TOWN OF HINESBURG / TOWN OF MONKTON | 129 N/F WEAVER, TODD & TAMMY | 130 N/F ALMOND, DAIVD | 131 N/F STEIN, PHILIP J. | 132 N/F MAY, PETER M. & SANDRA | 133 N/F NOLAN, KATHLEEN | 134 N/F NORRIS, NORMA | MATCH LINE

SURVEY DATA

00'12" RT	S 03° 18" W	00'11" LT	S 03° 31" W	00'05" RT	S 03° 19" W	00'07" LT	S 03° 25" W	00'08" RT	S 03° 17" W	S 03° 26" W	45' 00" RT	S 48° 26" W
1248+09		1250+75		1255+35		1259+97		1264+28			1266+63	

ALIGNMENT DETAIL



EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

- PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- CENTERLINE OF STREAM
- TEMPORARY STREAM CROSSING
- WETLAND
- 50' WETLAND BUFFER
- TEMPORARY WETLAND MATTING
- WETLAND BUFFER WITHIN PROJECT AREA
- REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL

INSTALL CONSTRUCTION DEMARCATION:
STA. 1244+50 TO 1266+50 RT - 20' FROM NEW 12" PIPE ℄
STA. 1244+50 TO 1266+12 LT - 30' FROM NEW 12" PIPE ℄
STA. 1266+65 LT - 1269+00 LT 25' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1244+50 TO 1250+89 RT - 20' FROM NEW 12" PIPE ℄
STA. 1244+50 TO 1251+62 LT - 30' FROM NEW 12" PIPE ℄

INSTALL MATTING: STA. 1244+50 TO 1246+24
INSTALL MATTING: STA. 1247+79 TO 1249+93

INSTALL CONSTRUCTION DEMARCATION:
STA. 1266+50 TO 1269+00 RT - 25' FROM NEW 12" PIPE ℄
STA. 1268+63 TO 1269+00 LT - 50' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1257+58 TO 1264+96 RT - 20' FROM NEW 12" PIPE ℄
STA. 1257+70 TO 1265+16 LT - 30' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1268+06 TO 1269+00 RT - 25' FROM NEW 12" PIPE ℄
STA. 1268+02 TO 1269+00 LT - 50' FROM NEW 12" PIPE ℄

INSTALL MATTING: STA. 1255+67 TO 1256+50
INSTALL MATTING: STA. 1258+61 TO 1260+17
INSTALL MATTING: STA. 1262+51 TO 1264+31

INSTALL STABILIZED CONSTRUCTION ENTRANCE: STA. 1266+25

HORIZONTAL SCALE
100 50 0 100 200 300 feet
VERTICAL SCALE
100 50 0 100 200 300 feet

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

CONST. TYPE		W		W		2D	A		W		A	W	1A	1A
SOIL TYPE		VoB (PAS)		VgB (PAS)		AdB (PAS)					VgB (PAS)			EIB
LC/LU		PASTURE / AGRICULTURE												
STREAMS													2012-DITCH-PW-30 (D)	
WETLANDS	MATCH LINE	WETLAND 2012-PW-78/RS-18- STATION 1244+50 TO 1246+79 CLASS II		WETLAND 2012-PW-77/RS-17- STATION 1247+30 TO 1251+12 CLASS II					WETLAND 2012-PW-76/RS-16- STATION 1258+08 TO 1260+67 CLASS II		WETLAND 2012-PW-75- STATION 1262+39 TO 1264+65 CLASS II			MATCH LINE
VERNAL POOLS														
SIGNIFICANT NATURAL COMMUNITIES														
RTE SPECIES														
NRC WILDLIFE HABITAT														
ARCHAEOLOGY SITES							VT-AD-1559				VT-AD-483 LOCUS 2			

DWG. NO.	REFERENCE DWG.	REV	DSN	CK	DESCRIPTION
ANGP–T–G–07–010	ACCESS ROAD DETAILS	2	GJM	BCK	IFC PLAN SET EDITS (05/2016)
ANGP–T–C–049	ALIGNMENT SHEET	1	BCK	TDB	ROTAX ROAD REROUTE (10/26/15)

	BID		CONSTRUCTION	
	INITIALS	DATE	INITIALS	DATE
ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
DESIGN MANAGER	SAB	06/28/13	JEO	05/2016

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. ADDISON COUNTY, VERMONT

YEAR: 2016 | W.O. | SCALE: 1" = 100' | DWG. ANGP–EPSC–049 | REV. 2

Vermont Gas

VHB Vanasse Hangen Brustlin, Inc.

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RIGHT-OF-WAY

MATCH LINE

133
N/F
NORRIS,
NORMA

135
N/F
MAYO,
KEITH

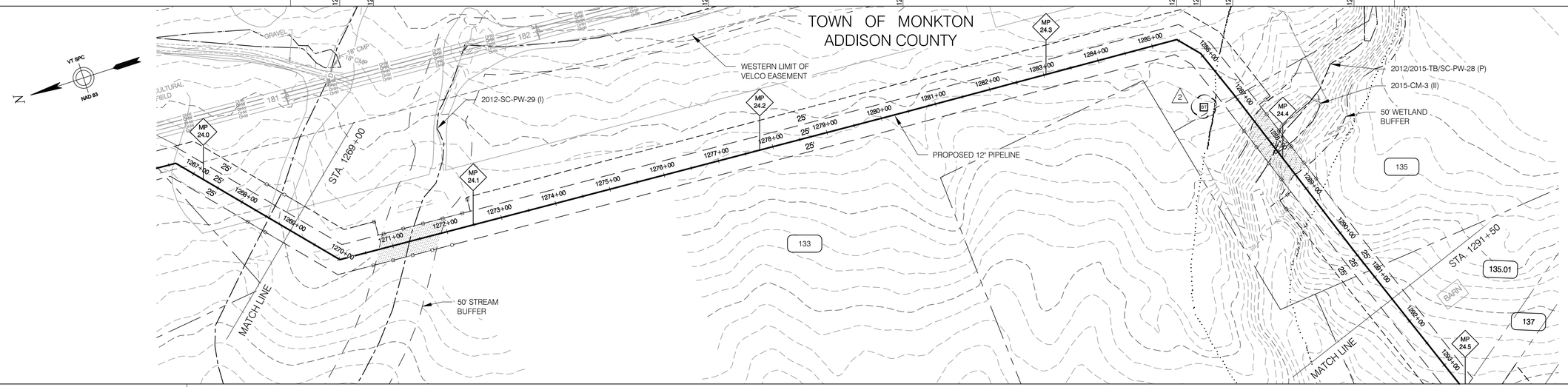
MATCH LINE

135.01
N/F
LATREILLE,
RAYMOND

SURVEY DATA

S 48° 26" W	45°00" LT	00°02" RT	S 03° 25" W	S 03° 23" W	00°01" RT	S 03° 21" W	00°19" RT	S 03° 02" W	45°00" RT	21°03" RT	S 48° 02" W	S 69° 06" W	01°21" RT	S 70° 27" W	00°49" RT	S 69° 38" W
1270+02		1270+64			1276+52		1280+41		1285+45	1285+95		1286+67			1290+43	

ALIGNMENT DETAIL



EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

- PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- CENTERLINE OF STREAM
- TEMPORARY STREAM CROSSING
- WETLAND
- 50' WETLAND BUFFER
- TEMPORARY WETLAND MATTING
- WETLAND BUFFER WITHIN PROJECT AREA
- REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL

INSTALL CONSTRUCTION DEMARCATION:
STA. 1269+00 TO 1288+89 RT - 25' FROM NEW 12" PIPE ℄
STA. 1288+89 TO 1291+50 RT - 50' FROM NEW 12" PIPE ℄
STA. 1269+00 TO 1270+78 LT - 50' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1269+00 TO 1269+08 RT - 25' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1270+14 TO 1272+24 RT - 25' FROM NEW 12" PIPE ℄
STA. 1287+17 TO 1288+89 RT - 25' FROM NEW 12" PIPE ℄
STA. 1288+89 TO 1289+19 RT - 50' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1270+78 TO 1272+50 LT - 25' FROM NEW 12" PIPE ℄
STA. 1272+50 TO 1287+31 LT - 50' FROM NEW 12" PIPE ℄
STA. 1287+31 TO 1291+50 LT - 25' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1270+43 TO 1270+79 LT - 50' FROM NEW 12" PIPE ℄
STA. 1270+79 TO 1272+49 LT - 25' FROM NEW 12" PIPE ℄
STA. 1272+49 TO 1272+55 LT - 50' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1286+49 TO 1287+31 LT - 50' FROM NEW 12" PIPE ℄
STA. 1287+31 TO 1289+19 LT - 25' FROM NEW 12" PIPE ℄

INSTALL MATTING:
STA. 1287+90 TO 1288+19

HORIZONTAL SCALE
100 50 0 100 200 300 feet
VERTICAL SCALE
100 50 0 100 200 300 feet

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

CONST. TYPE	1A	2A	1A	2A	W	1A
SOIL TYPE	ElB	VgB (PAS)		ArnB (PAS)	AsD	AsC
LC/LU	PASTURE / AGRICULTURE					
STREAMS		STREAM 2012-SC-PW-29 (I) STATION 1270+74 TO 1271+88		STREAM 2012/2015-TB/SC-PW-28 (P) STATION 1287+46 TO 1288+67		
WETLANDS				WETLAND 2015-CM-3 (II) STATION 1287+46 TO 1288+67		
VERNAL POOLS						
SIGNIFICANT NATURAL COMMUNITIES						
RTE SPECIES						
NRC WILDLIFE HABITAT						
ARCHAEOLOGY SITES						

MATCH LINE (left) / MATCH LINE (right)

VHB Vanasse Hangen Brustlin, Inc.

DWG. NO.	REFERENCE DWG.	REV	DSN	CK	DESCRIPTION
		2	GJM	BCK	IFC 2016 EDITS (05/2016)
ANGP-T-C-050	ALIGNMENT SHEET	1	BCK	TDB	ROTAX ROAD REROUTE (10/26/15)

	BID		CONSTRUCTION	
	INITIALS	DATE	INITIALS	DATE
ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
DESIGN MANAGER	SAB	06/28/13	JEO	05/2016

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. ADDISON COUNTY, VERMONT

YEAR: 2016 | W.O. | SCALE: 1" = 100' | DWG. ANGP-EPSC-050 | REV. 2

Vermont Gas

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RIGHT-OF-WAY

MATCH LINE

135.01	137	138	140
N/F LATREILLE, RAYMOND	ROTAX ROAD	N/F LATREILLE, LEONARD	N/F VERMONT GAS SYSTEMS

MATCH LINE

SURVEY DATA

1293+68	1296+83	1297+50	1298+36	1308+00
00°23' LT	00°47' RT	44°10' LT	28°11' LT	07°41' RT

S 69° 38' W — S 69° 16' W — S 70° 03' W — S 25° 53' W — S 02° 18' E — S 05° 22' W

ALIGNMENT DETAIL

EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

PERMANENT EASEMENT	— — —
TEMPORARY WORKSPACE	- - - -
CENTERLINE OF STREAM	— - —
TEMPORARY STREAM CROSSING	▨
WETLAND	·–·–·
50' WETLAND BUFFER	— · —
TEMPORARY WETLAND MATTING	▩
WETLAND BUFFER WITHIN PROJECT AREA	░
REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL	—o—□—o—

INSTALL CONSTRUCTION DEMARCATION:
STA. 1291+50 TO 1293+57 RT - 50' FROM NEW 12" PIPE ℄
STA. 1294+09 TO 1309+22 RT - 25' FROM NEW 12" PIPE ℄
STA. 1309+22 TO 1310+10 RT - 50' FROM NEW 12" PIPE ℄
STA. 1310+10 TO 1310+50 RT - 25' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1296+15 TO 1309+22 RT - 25' FROM NEW 12" PIPE ℄
STA. 1309+22 TO 1310+10 RT - 50' FROM NEW 12" PIPE ℄
STA. 1310+10 TO 1310+50 RT - 25' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1291+50 TO 1293+57 LT - 25' FROM NEW 12" PIPE ℄
STA. 1294+09 TO 1294+88 LT - 100' FROM NEW 12" PIPE ℄
STA. 1294+88 TO 1296+68 LT - 50' FROM NEW 12" PIPE ℄
STA. 1296+68 TO 1310+50 LT - 25' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1296+24 TO 1296+68 LT - 50' FROM NEW 12" PIPE ℄
STA. 1296+68 TO 1309+49 LT - 25' FROM NEW 12" PIPE ℄
STA. 1309+73 TO 1310+50 LT - 25' FROM NEW 12" PIPE ℄

INSTALL MATTING:
STA. 1297+25 TO 1300+92

INSTALL MATTING:
STA. 1301+81 TO 1303+60

INSTALL MATTING:
STA. 1303+72 TO 1306+57

INSTALL MATTING:
STA. 1307+87 TO 1308+73

HORIZONTAL SCALE
100 50 0 100 200 300 feet
100 50 0 100 200 300 feet
VERTICAL SCALE

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

CONST. TYPE	(1A) (11) (1A) (W) (W) (2A) (W) (W) (1A) ● (2A)
SOIL TYPE	AsC — Lk — Cw (PAS) — RaB (PAS) — Mv
LC/LU	PASTURE / AGRICULTURE — ● UNPAVED / ● TRAVEL — PASTURE / AGRICULTURE
STREAMS	
WETLANDS	WETLAND 2014-CM-3 STATION 1296+63 TO 1307+21 CLASS II — WETLAND 2012/2013-PW-71/72/73 STATION 1307+21 TO 1309+22 CLASS II — ● WETLAND 2012/2013-PW-71/72/73 STATION 1310+30 TO 1310+50 CLASS II
VERNAL POOLS	
SIGNIFICANT NATURAL COMMUNITIES	
RTE SPECIES	2013-RTE-CT-083 S3/NL
NRC WILDLIFE HABITAT	
ARCHAEOLOGY SITES	

MATCH LINE

MATCH LINE

								BID		CONSTRUCTION	
						ENVIRONMENTAL		JLS	06/28/13	JLS	05/2016
						DRAFTING DESIGNER		GIL	06/28/13	GJM	05/2016
		3	BCK	GEW	MLV-4 RELOCATION (05/01/16)	DRAFTING SUPERVISOR		BZD	06/28/13	BCK	05/2016
ANGP-T-G-07-010	ACCESS ROAD DETAILS	2	BCK	TDB	ROTAX ROAD REROUTE (10/26/15)	DESIGN ENGINEER		MDF	06/28/13	GEW	05/2016
ANGP-T-C-051	ALIGNMENT SHEET	1	BCK	TDB	ADDED ARCH. SITE AND ENV. EDITS (6/08/15)	DESIGN MANAGER		SAB	06/28/13	JEO	05/2016
DWG. NO.	REFERENCE DWG.	REV	DSN	CK	DESCRIPTION			INITIALS	DATE	INITIALS	DATE

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. ADDISON COUNTY, VERMONT

Vermont Gas

VHB Vanasse Hangen Brustlin, Inc.

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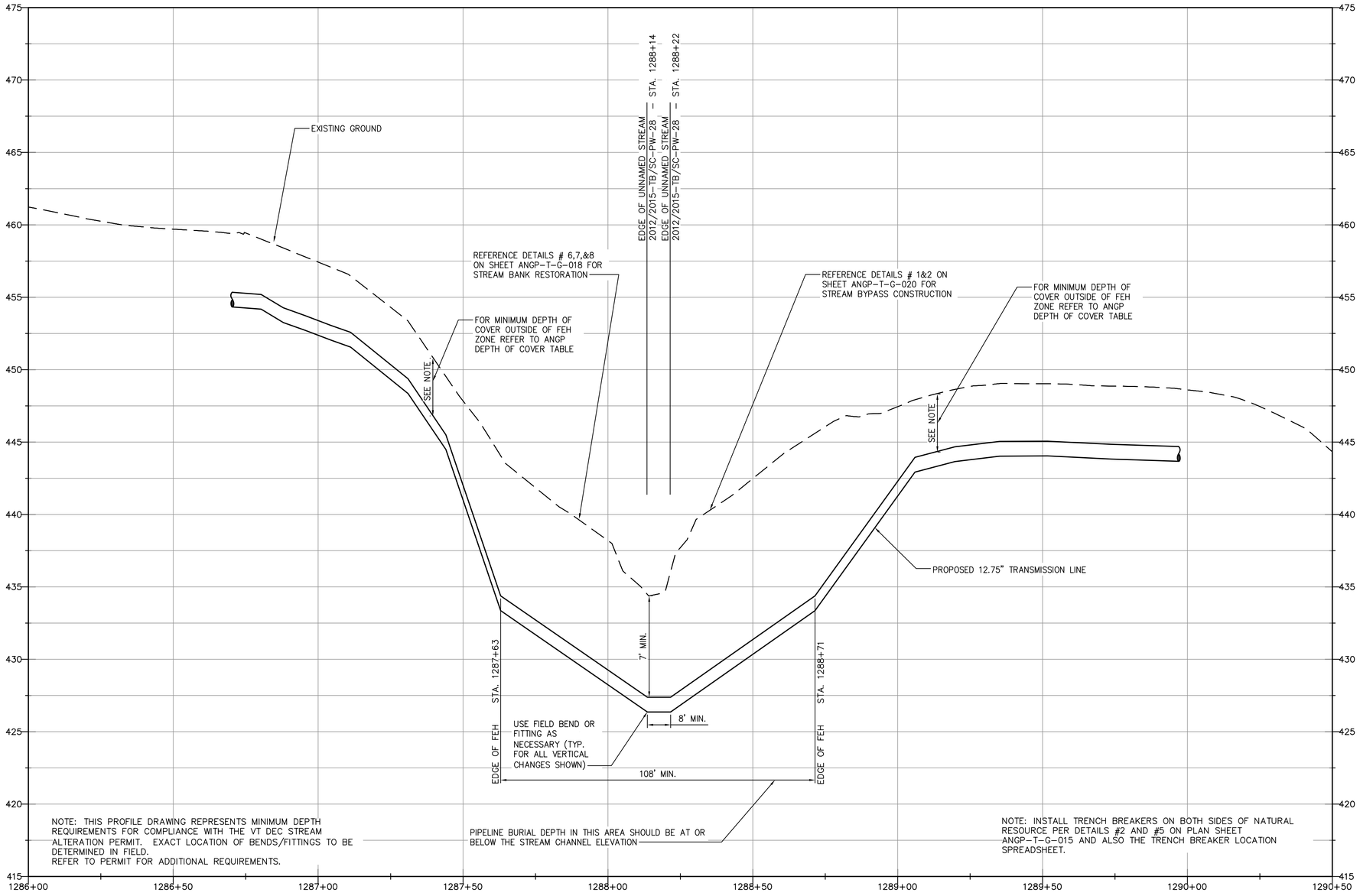
YEAR: 2016	W.O.	SCALE: 1" = 100'	DWG. ANGP-EPSC-051	REV. 3

PROFILE



STREAM CROSSING PROFILE
STREAM 2012/2015-TB/SC-PW-28
STATION 1288+14±
MILE POST 24.39

SCALE: HORIZ. 1"=20'
VERT. 1"=4'

HORIZONTAL SCALE
20 10 0 20 40 60 feet
4 2 0 4 8 12 feet
VERTICAL SCALE

NOTE: STREAM CROSSING MUST BE CONSTRUCTED BETWEEN JULY 1 AND OCTOBER 1

STATE OF VERMONT
JEFFREY E. OSTERMAN
NO. 97764
CIVIL
LICENSED
PROFESSIONAL ENGINEER

DWG. NO.	REFERENCE DWG.	REV	DSN	CK		DESCRIPTION		BID INITIALS	BID DATE	CONSTRUCTION INITIALS	CONSTRUCTION DATE
							ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
							DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
							DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
							DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
							DESIGN MANAGER	SAB	06/28/13	JEO	05/2016

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
OPEN TRENCH STREAM CROSSING PROFILE
LOC. ADDISON COUNTY, VERMONT

Vermont Gas

VHB Vanasse Hangen Brustlin, Inc.

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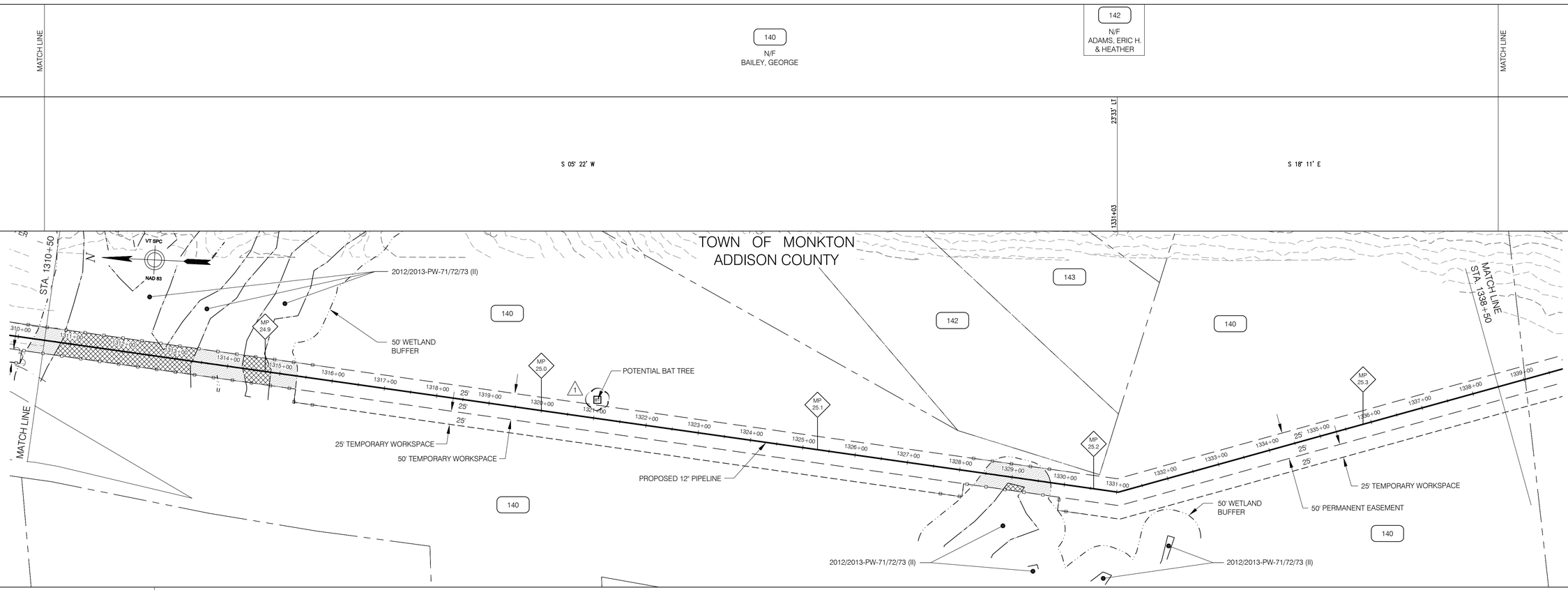
YEAR: 2016 | W.O. | SCALE: AS NOTED | DWG. ANGP-T-C-051A | REV. 0

RIGHT–OF–WAY

SURVEY DATA

ALIGNMENT DETAIL



EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

- PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- CENTERLINE OF STREAM
- TEMPORARY STREAM CROSSING
- WETLAND
- 50' WETLAND BUFFER
- TEMPORARY WETLAND MATTING
- WETLAND BUFFER WITHIN PROJECT AREA
- REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL

INSTALL CONSTRUCTION DEMARCATION:
STA. 1310+50 TO 1315+40 RT - 25' FROM NEW 12" PIPE ℄
STA. 1310+50 TO 1338+50 LT - 25' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1315+40 TO 1328+10 RT - 50' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1328+10 TO 1329+95 RT - 25' FROM NEW 12" PIPE ℄
STA. 1329+95 TO 1338+50 RT - 50' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1310+50 TO 1315+40 RT - 25' FROM NEW 12" PIPE ℄
STA. 1310+50 TO 1315+79 LT - 25' FROM NEW 12" PIPE ℄
STA. 1315+40 TO 1315+84 RT - 50' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1327+61 TO 1328+10 RT - 50' FROM NEW 12" PIPE ℄
STA. 1328+10 TO 1330+06 LT - 25' FROM NEW 12" PIPE ℄
STA. 1328+10 TO 1329+95 RT - 25' FROM NEW 12" PIPE ℄
STA. 1329+95 TO 1330+44 RT - 50' FROM NEW 12" PIPE ℄

INSTALL MATTING:
STA. 1310+62 TO 1313+40
STA. 1314+38 TO 1314+82

INSTALL MATTING:
STA. 1328+75 TO 1329+25

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

HORIZONTAL SCALE
100 50 0 100 200 300 feet
VERTICAL SCALE
100 50 0 100 200 300 feet

CONST. TYPE		W	2A	W	1E		W	2A	1E					
SOIL TYPE		RaB (PAS)	Cw (PAS)	RaB (PAS)	Cw (PAS)	RaB (PAS)	VgC (PAS)	AsC						
LC/LU	Mv	FORESTED	AGRICULTURAL		RESIDENTIAL		AGRICULTURAL							
STREAMS														
WETLANDS	MATCH LINE	WETLAND 2012/2013-PW-71/72/73 STATION 1310+50 TO 1315+33 CLASS II					WETLAND 2012/2013-PW-71/72/73 STATION 1328+10 TO 1329+95 CLASS II							MATCH LINE
VERNAL POOLS														
SIGNIFICANT NATURAL COMMUNITIES														
RTE SPECIES														
NRC WILDLIFE HABITAT														
ARCHAEOLOGY SITES														

VHB Vanasse Hangen Brustlin, Inc.

							BID		CONSTRUCTION	
						ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
						DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
						DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
						DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
ANGP–T–C–052	ALIGNMENT SHEET	1	GJM	BCK	IFC 2016 EDITS (05/2016)	DESIGN MANAGER	SAB	06/28/13	JEO	05/2016
DWG. NO.	REFERENCE DWG.	REV	DSN	CK	DESCRIPTION		INITIALS	DATE	INITIALS	DATE

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. ADDISON COUNTY, VERMONT

YEAR: 2016 | W.O. | SCALE: 1" = 100' | DWG. ANGP–EPSC–052 | REV. 1

Vermont Gas

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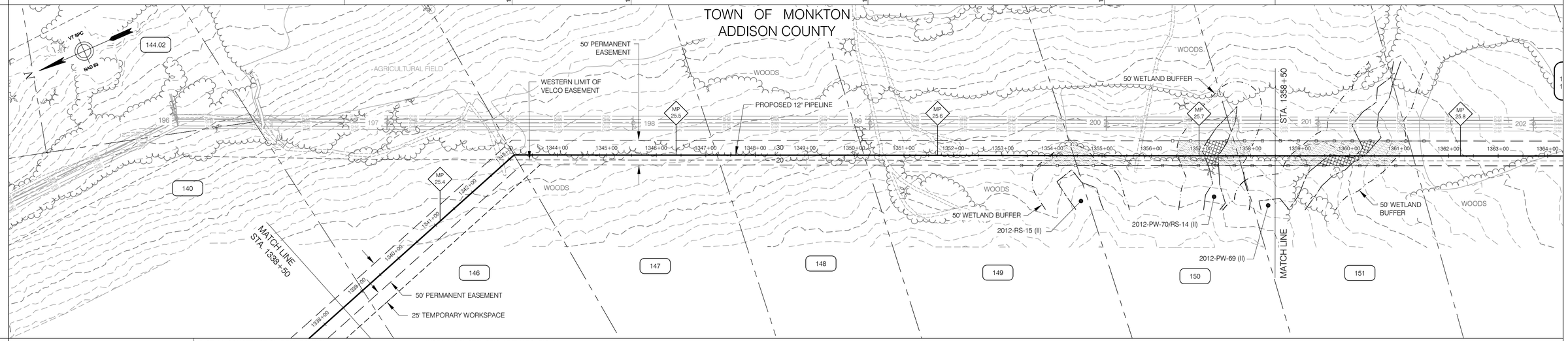
RIGHT–OF–WAY	MATCH LINE	140 N/F BAILEY, GEORGE	146 N/F MALZAC, PAUL E. & KATHY	147 N/F BURRITT, MARK A. & MICHELLE	148 N/F NICOLAY, WILLIAM & HELENA	149 N/F BROUGHTON, CLAIRE TRUSTEE	150 N/F MORROW, JAMES F.	151 N/F MEJIA, JOHNY; LAUER, JESSE	MATCH LINE
SURVEY DATA		S 18° 11' E	41.55' RT 1343+13	S 23° 44' W	13.00' LT 1345+54	S 23° 41' W	39.00' RT 1350+32	S 23° 47' W	39.00' LT 1355+09	S 23° 40' W	



EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

- PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- CENTERLINE OF STREAM
- TEMPORARY STREAM CROSSING
- WETLAND
- 50' WETLAND BUFFER
- TEMPORARY WETLAND MATTING
- WETLAND BUFFER WITHIN PROJECT AREA
- REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL

INSTALL CONSTRUCTION DEMARCATION:
STA. 1338+50 TO 1343+13 RT - 50' FROM NEW 12" PIPE ℄
STA. 1338+50 TO 1343+13 LT - 25' FROM NEW 12" PIPE ℄
STA. 1343+13 TO 1343+66 RT - WIDTH VARIES FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1343+66 TO 1358+50 RT - 20' FROM NEW 12" PIPE ℄
STA. 1343+13 TO 1358+50 LT - 30' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1353+21 TO 1355+61 RT - 20' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1356+11 TO 1358+50 RT - 20' FROM NEW 12" PIPE ℄
STA. 1356+05 TO 1358+50 LT - 30' FROM NEW 12" PIPE ℄

INSTALL MATTING:
STA. 1357+00 TO 1357+54

HORIZONTAL SCALE
100 50 0 100 200 300 feet

VERTICAL SCALE
100 50 0 100 200 300 feet

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

CONST. TYPE	MATCH LINE	1E	2D				W	MATCH LINE
SOIL TYPE		AsC	RaC (PAS)	AsC			Cn (PAS)	
LC/LU		FORESTED						
		AGRICULTURAL	RESIDENTIAL					
STREAMS								
WETLANDS				WETLAND 2012-RS-15- STATION 1353+71 TO 1355+11 CLASS II		WETLAND 2012-PW-70/RS-14- STATION 1357+56 TO 1358+08 CLASS II		
VERNAL POOLS								
SIGNIFICANT NATURAL COMMUNITIES								
RTE SPECIES								
NRC WILDLIFE HABITAT								
ARCHAEOLOGY SITES								

VHB Vanasse Hangen Brustlin, Inc.

DWG. NO.	REFERENCE DWG.	REV	DSN	CK	DESCRIPTION		BID INITIALS	BID DATE	CONSTRUCTION INITIALS	CONSTRUCTION DATE
ANGP–T–C–053	ALIGNMENT SHEET				ENVIRONMENTAL		JLS	06/28/13	JLS	05/2016
					DRAFTING DESIGNER		GIL	06/28/13	GJM	05/2016
					DRAFTING SUPERVISOR		BZD	06/28/13	BCK	05/2016
					DESIGN ENGINEER		MDF	06/28/13	GEW	05/2016
					DESIGN MANAGER		SAB	06/28/13	JEO	05/2016

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. ADDISON COUNTY, VERMONT

Vermont Gas

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38 Eastwood Drive, Suite 105
South Burlington, VT 05403
Main: (802) 735-0372 · www.chacompanies.com

YEAR: 2016 | W.O. | SCALE: 1" = 100' | DWG. ANGP–EPSC–053 | REV. 0

RIGHT-OF-WAY

MATCHLINE

151 — N/F MEJIA, JOHNY & LAUER, JESSE

152 — N/F LESAGE, RICHARD L.; RICHARD E. LESAGE REVOCABLE LIVING TRUST

153 — N/F PEYSER, LOUISE SELINA

154 — STILLSON ROAD

155 — N/F PEYSER, LOUISE SELINA

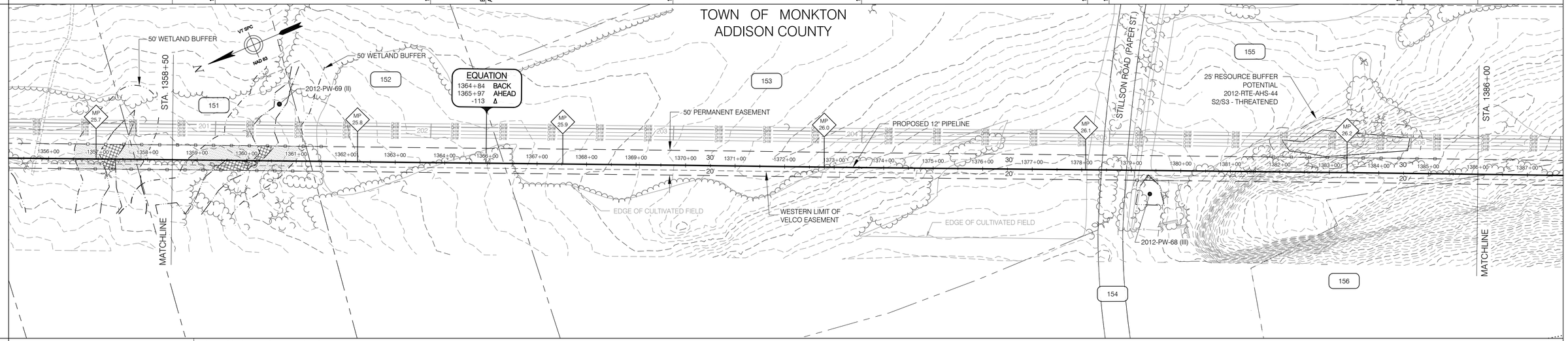
156 — N/F MENARD, GERALD & NANCY

MATCH LINE

SURVEY DATA

1359+37	1363+72	Beg.: 1364+84 Aht.: 1365+97	1369+75	1373+56	1378+13	1378+56	1384+47
S 23° 40' W	00.02' RT S 23° 43' W 00.01' LT	-113.3 ft. S 23° 41' W	00.08' RT S 23° 41' W	00.10' LT S 23° 49' W	00.10' LT S 23° 39' W	00.15' RT S 23° 28' W	00.07' RT S 23° 43' W S 23° 51' W

ALIGNMENT DETAIL



EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

- PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- CENTERLINE OF STREAM
- TEMPORARY STREAM CROSSING
- WETLAND
- 50' WETLAND BUFFER
- TEMPORARY WETLAND MATTING
- WETLAND BUFFER WITHIN PROJECT AREA
- REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL

INSTALL CONSTRUCTION DEMARCATION:
STA. 1358+50 TO 1386+00 RT - 20' FROM NEW 12" PIPE ℄
STA. 1358+50 TO 1386+00 LT - 30' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1358+50 TO 1361+30 RT - 20' FROM NEW 12" PIPE ℄
STA. 1358+50 TO 1361+63 LT - 30' FROM NEW 12" PIPE ℄

INSTALL MATTING:
STA. 1359+33 TO 1360+58

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1378+89 TO 1379+96 RT - 20' FROM NEW 12" PIPE ℄

INSTALL MATTING:
STA. 1379+27 TO 1379+46

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1381+48 TO 1385+27 LT - 30' FROM NEW 12" PIPE ℄

HORIZONTAL SCALE
100 50 0 100 200 300 feet
VERTICAL SCALE
100 50 0 100 200 300 feet

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

CONST. TYPE		W		2D				11	W		2D	
SOIL TYPE	Cn (PAS)	RaC (PAS)	Cn (PAS)	BsC	BeB (PAS)	RaB (PAS)	Cn (PAS)			BeB (PAS)	FaC	
LC/LU	FORESTED					GRASS	UNPAVED	FORESTED				
	AGRICULTURAL/POWERLINES		RESIDENTIAL				TRAVEL	AGRICULTURAL/POWERLINES				
STREAMS												
WETLANDS	WETLAND 2012-PW-69 - STATION 1358+67 TO 1361+14 CLASS II						WETLAND 2012-PW-68 - STATION 1379+27 TO 1379+46 CLASS III					
VERNAL POOLS												
SIGNIFICANT NATURAL COMMUNITIES												
RTE SPECIES											POTENTIAL 2012-RTE-AHS-44	
NRC WILDLIFE HABITAT												
ARCHAEOLOGY SITES												

MATCH LINE (left) — MATCH LINE (right)

VHB Vanasse Hangen Brustlin, Inc.

ANGP-T-C-054	ALIGNMENT SHEET										
DWG. NO.	REFERENCE DWG.	REV	DSN	CK		DESCRIPTION		BID		CONSTRUCTION	
								INITIALS	DATE	INITIALS	DATE
							ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
							DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
							DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
							DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
							DESIGN MANAGER	SAB	06/28/13	JEO	05/2016

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. ADDISON COUNTY, VERMONT

YEAR: 2016 | W.O. | SCALE: 1" = 100' | DWG. ANGP-EPSC-054 | REV. 0

Vermont Gas

CHA
38 Eastwood Drive, Suite 105
South Burlington, VT 05403
Main: (802) 735-0372 · www.chacompanies.com

EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

PERMANENT EASEMENT	— — — —
TEMPORARY WORKSPACE	- - - - - - -
CENTERLINE OF STREAM	—— - —— - ——
TEMPORARY STREAM CROSSING	▨
WETLAND	— · · — · · —
50' WETLAND BUFFER	— · · — · · —
TEMPORARY WETLAND MATTING	▩
WETLAND BUFFER WITHIN PROJECT AREA	░
REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL	—□—□—□—

INSTALL CONSTRUCTION DEMARCATION:
STA. 1386+00 TO 1397+34 RT - 20' FROM NEW 12" PIPE ℄
STA. 1386+00 TO 1397+37 LT - 30' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1397+84 TO 1415+00 RT - 20' FROM NEW 12" PIPE ℄
STA. 1397+88 TO 1415+00 LT - 30' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1396+84 TO 1397+34 RT - 20' FROM NEW 12" PIPE ℄
STA. 1396+87 TO 1397+37 LT - 30' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1397+84 TO 1400+09 RT - 20' FROM NEW 12" PIPE ℄
STA. 1397+88 TO 1400+36 LT - 30' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1404+74 TO 1406+85 RT - 20' FROM NEW 12" PIPE ℄
STA. 1404+90 TO 1407+13 LT - 30' FROM NEW 12" PIPE ℄

1

INSTALL STABILIZED CONSTRUCTION ENTRANCE:
STA. 1397+34 & STA. 1397+88

INSTALL MATTING:
STA. 1398+15 TO 1399+21

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

HORIZONTAL SCALE
100 50 0 100 200 300 feet
100 50 0 100 200 300 feet
VERTICAL SCALE

CONST. TYPE	2D 9 W 2D
SOIL TYPE	FaC BsC BsC BsE RaD BsC RaD FaE FaC FaE
LC/LU	FORESTED AGRICULTURAL/POWERLINES PAVED TRAVEL FORESTED AGRICULTURAL/POWERLINES
STREAMS	STREAM 2012-TB/SC-RS-3 (P) - STATION 1405+24 TO 1406+63
WETLANDS	WETLAND 2012-RS-3 - STATION 1397+63 TO 1399+88 CLASS II
VERNAL POOLS	
SIGNIFICANT NATURAL COMMUNITIES	
RTE SPECIES	
NRC WILDLIFE HABITAT	
ARCHAEOLOGY SITES	

MATCH LINE
MATCH LINE

DWG. NO.	REFERENCE DWG.	REV	DSN	CK	DESCRIPTION
ANGP-T-C-055	ALIGNMENT	1	BCK	GEW	MLV-4 RELOCATION (05/01/16)

	BID INITIALS	BID DATE	CONSTRUCTION INITIALS	CONSTRUCTION DATE
ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
DESIGN MANAGER	SAB	06/28/13	JEO	05/2016

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. ADDISON COUNTY, VERMONT

YEAR: 2016
W.O.
SCALE: 1" = 100'
DWG. ANGP-EPSC-055
REV. 1

Vermont Gas

VHB Vanasse Hangen Brustlin, Inc.

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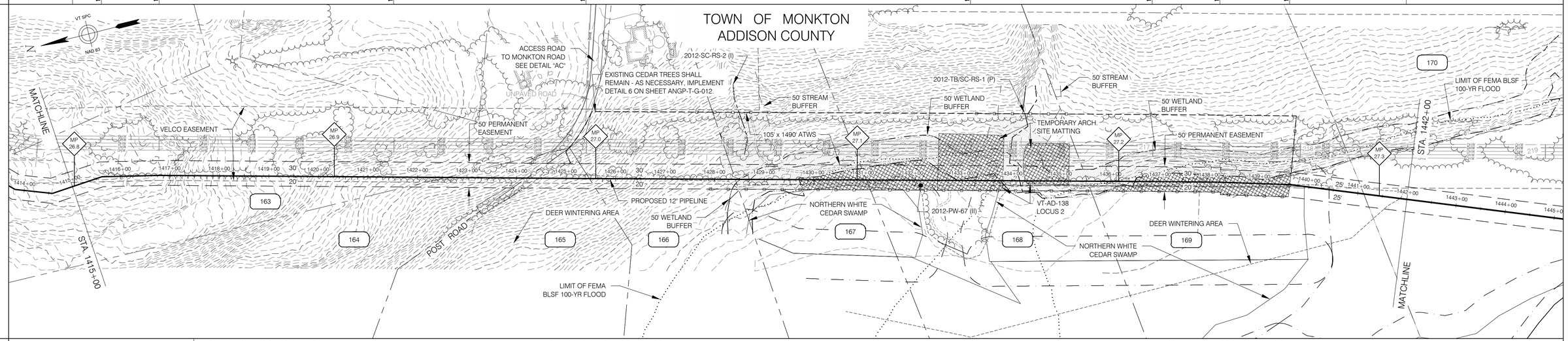
RIGHT-OF-WAY

MATCHLINE | 163 N/F HENDRY, MARTHA M. | 164 N/F RADLER, ROBERT & BUSCAGLIA, CATHIE M. | 165 N/F CHARNLEY, JACQUELINE & THOMAS A. | POST ROAD | 166 N/F BOWEN, MICHAEL H. & ELLEN L. | 167 N/F LITTLE, ROBERT A. & FAITH E. | 168 N/F COTA, ROGER & ALYSON | 169 N/F CLARK, RICKY D. & MAREN E. | 170 N/F ALDERMAN, MICHAEL J. | MATCH LINE

SURVEY DATA

17'08" RT	01'46" RT		00'03" RT	00'10" LT		00'02" RT	00'14" RT	01'25" RT	05'10" RT	
S 04° 33' E	S 12° 36' W	S 14° 22' W	S 14° 26' W	S 14° 15' W		S 14° 18' W	S 14° 32' W	S 15° 58' W	S 21° 08' W	
1415+63	1416+79		1421+53	1425+42		1433+18	1436+65	1438+22	1439+62	

ALIGNMENT DETAIL



EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

- PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- CENTERLINE OF STREAM
- TEMPORARY STREAM CROSSING
- WETLAND
- 50 WETLAND BUFFER
- TEMPORARY WETLAND MATTING
- WETLAND BUFFER WITHIN PROJECT AREA
- REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL

INSTALL CONSTRUCTION DEMARCATION:
STA. 1415+00 TO 1438+22 RT - 20' FROM NEW 12" PIPE ℄
STA. 1415+00 TO 1424+50 LT - 30' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1424+75 TO 1425+53 LT - WIDTH VARIES FROM NEW 12" PIPE ℄
STA. 1425+53 TO 1438+22 LT - 135' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1438+22 TO 1439+60 RT - 25' FROM NEW 12" PIPE ℄
STA. 1438+22 TO 1439+62 LT - WIDTH VARIES FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1427+86 TO 1438+22 RT - 20' FROM NEW 12" PIPE ℄
STA. 1427+46 TO 1429+52 LT - 135' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1433+21 TO 1435+42 LT - 135' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1438+22 TO 1439+60 RT - 25' FROM NEW 12" PIPE ℄

INSTALL STABALIZED CONSTRUCTION ENTRANCE:
STA. 1425+40

INSTALL MATTING:
STA. 1429+70 TO 1433+95

INSTALL MATTING:
STA. 1434+23 TO 1435+27

INSTALL MATTING:
STA. 1435+90 TO 1439+60

HORIZONTAL SCALE
100 50 0 100 200 300 feet
100 50 0 100 200 300 feet
VERTICAL SCALE

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

CONST. TYPE	2D		11	2D		W	A	A	W	8
SOIL TYPE	FaC	FaE		BsE			BsC		Mv	
LC/LU	FORESTED									
	AGRICULTURAL/POWERLINES									
STREAMS				STREAM 2012-SC-RS-2 (I) - STATION 1427+96 TO 1429+06			STREAM 2012-TB/SC-RS-1 (P) - STATION 1433+51 TO 1434+92			
WETLANDS	MATCH LINE						WETLAND 2012-PW-67 - STATION 1428+36 TO 1442+00 CLASS II			MATCH LINE
VERNAL POOLS										
SIGNIFICANT NATURAL COMMUNITIES					NORTHERN WHITE CEDAR SWAMP			NORTHERN WHITE CEDAR SWAMP		
RTE SPECIES										
NRC WILDLIFE HABITAT			DEER WINTERING AREA						DEER WINTERING AREA	
ARCHAEOLOGY SITES						VT-AD-138 LOCUS 2		VT-AD-138 LOCUS 2		

DWG. NO.	REFERENCE DWG.	REV	DSN	CK	DESCRIPTION		BID INITIALS	BID DATE	CONSTRUCTION INITIALS	CONSTRUCTION DATE
					ENVIRONMENTAL		JLS	06/28/13	JLS	05/2016
					DRAFTING DESIGNER		GIL	06/28/13	GJM	05/2016
					DRAFTING SUPERVISOR		BZD	06/28/13	BCK	05/2016
ANGP-T-G-07-010	ACCESS ROAD DETAILS				DESIGN ENGINEER		MDF	06/28/13	GEW	05/2016
ANGP-T-C-056	ALIGNMENT				DESIGN MANAGER		SAB	06/28/13	JEO	05/2016

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. ADDISON COUNTY, VERMONT

YEAR: 2016 | W.O. | SCALE: 1" = 100' | DWG. ANGP-EPSC-056 | REV. 0

Vermont Gas

VHB Vanasse Hangen Brustlin, Inc.

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RIGHT–OF–WAY

MATCH LINE

170
N/F
ALDERMAN, MICHAEL J.

171
N/F
BOISSE, HENRY

171
N/F
BOISSE, HENRY

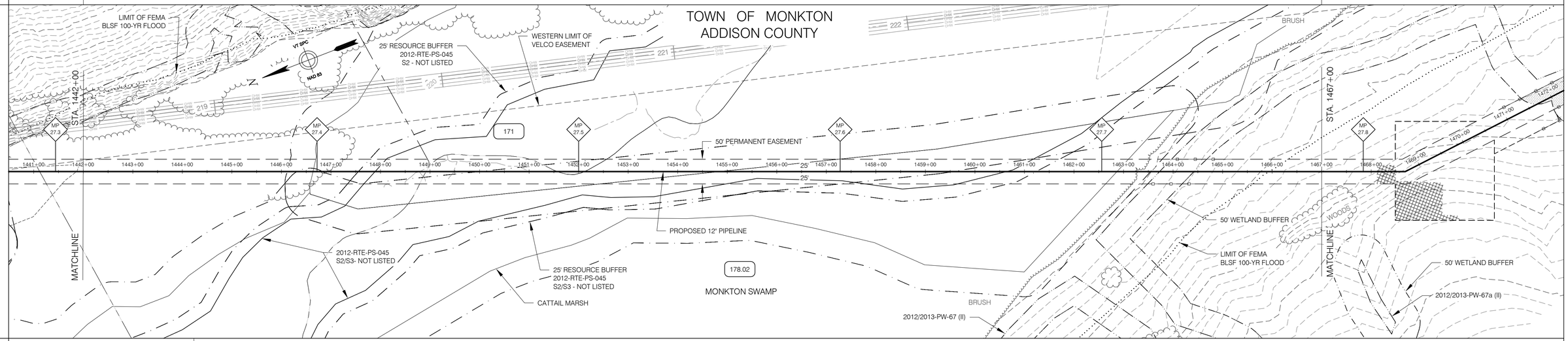
178.02
N/F
BOISSE, JOSEPH A.; WILLIAMS, DAVID L.

MATCH LINE

SURVEY DATA

S 21° 08' W

ALIGNMENT DETAIL



EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

- PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- CENTERLINE OF STREAM
- TEMPORARY STREAM CROSSING
- WETLAND
- 50' WETLAND BUFFER
- TEMPORARY WETLAND MATTING
- WETLAND BUFFER WITHIN PROJECT AREA
- REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1463+49 TO 1464+68 RT - 25' FROM NEW 12" PIPE ℄
STA. 1463+97 TO 1465+18 LT - 25' FROM NEW 12" PIPE ℄

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

HORIZONTAL SCALE
100 50 0 100 200 300 feet
VERTICAL SCALE
100 50 0 100 200 300 feet

CONST. TYPE			8		
SOIL TYPE		Mv	Lh / Sw (PAS)	Cn (PAS)	
LC/LU		CEDAR SWAMP / WETLAND		GRASS / AGRICULTURE	
STREAMS	MATCH LINE				MATCH LINE
WETLANDS		WETLAND 2012/2013-PW-67 - STATION 1442+00 TO 1465+22 CLASS II			
VERNAL POOLS					
SIGNIFICANT NATURAL COMMUNITIES		CATTAIL MARSH			
RTE SPECIES		2012-RTE-PS-045 S2/S3 - NOT LISTED			
NRC WILDLIFE HABITAT					
ARCHAEOLOGY SITES					

VHB Vanasse Hangen Brustlin, Inc.

DWG. NO.	REFERENCE DWG.	REV	DSN	CK	DESCRIPTION		BID INITIALS	BID DATE	CONSTRUCTION INITIALS	CONSTRUCTION DATE
						ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
						DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
						DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
						DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
ANGP–T–C–057	ALIGNMENT SHEET					DESIGN MANAGER	SAB	06/28/13	JEO	05/2016

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. ADDISON COUNTY, VERMONT

YEAR: 2016 | W.O. | SCALE: 1" = 100' | DWG. ANGP–EPSC–057 | REV. 0

Vermont Gas

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RIGHT-OF-WAY

MATCHLINE

178.02
N/F
BOISSE, JOSEPH A.
& WILLIAMS, DAVID L.

178.05
N/F
HUIZENGA, RAYMOND J.
& BONITA

MATCH LINE

SURVEY DATA

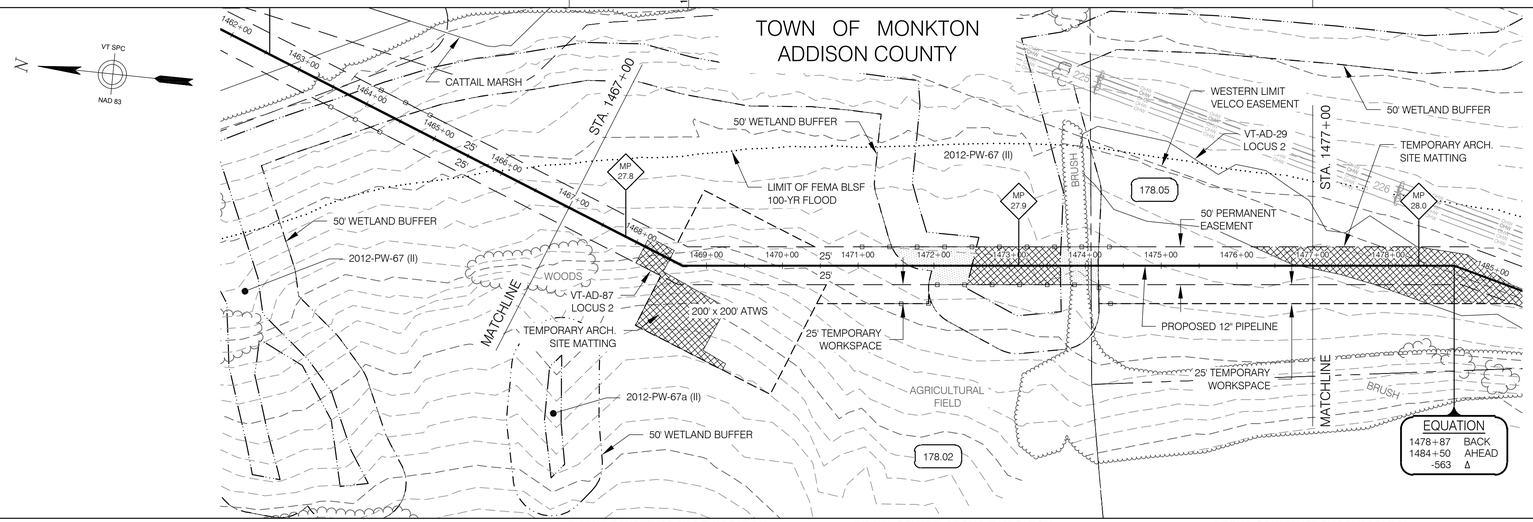
27.05' LT

S 21° 08' W

1468+69

S 05° 57' E

ALIGNMENT DETAIL



EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

- PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- CENTERLINE OF STREAM
- TEMPORARY STREAM CROSSING
- WETLAND
- 50' WETLAND BUFFER
- TEMPORARY WETLAND MATTING
- WETLAND BUFFER WITHIN PROJECT AREA
- REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL

INSTALL CONSTRUCTION DEMARCATION:
STA. 1467+00 TO 1468+49 RT - 50' FROM NEW 12" PIPE ℄
STA. 1467+00 TO 1468+49 LT - 25' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1468+49 TO 1470+46 RT - WIDTH VARIES FROM NEW 12" PIPE ℄
STA. 1468+49 TO 1470+43 LT - WIDTH VARIES FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1470+46 TO 1471+90 RT - 50' FROM NEW 12" PIPE ℄
STA. 1470+43 TO 1477+00 LT - 25' FROM NEW 12" PIPE ℄
STA. 1471+90 TO 1474+20 RT - 25' FROM NEW 12" PIPE ℄
STA. 1474+20 TO 1477+00 RT - 50' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1471+47 TO 1471+90 RT - 50' FROM NEW 12" PIPE ℄
STA. 1470+94 TO 1474+68 LT - 25' FROM NEW 12" PIPE ℄
STA. 1471+90 TO 1474+20 RT - 25' FROM NEW 12" PIPE ℄
STA. 1474+20 TO 1474+68 RT - 50' FROM NEW 12" PIPE ℄

INSTALL MATTING:
STA. 1468+12 TO 1469+25

INSTALL MATTING:
STA. 1472+43 TO 1473+68

HORIZONTAL SCALE
100 50 0 100 200 300 feet
VERTICAL SCALE
100 50 0 100 200 300 feet

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

		MATCH LINE		MATCH LINE
CONST. TYPE	8 | A | 2A | 1E | 2A W | 1E			
SOIL TYPE	CrA (PAS) | RaB (PAS)			
LC/LU	PASTURE / AGRICULTURE			
STREAMS				
WETLANDS	WETLAND 2012-PW-67 - STATION 1471+44 TO 1474+17 CLASS II			
VERNAL POOLS				
SIGNIFICANT NATURAL COMMUNITIES				
RTE SPECIES				
NRC WILDLIFE HABITAT				
ARCHAEOLOGY SITES	VT-AD-87 LOCUS 2			

DWG. NO.	REFERENCE DWG.	REV	DSN	CK	DESCRIPTION
ANGP-T-C-058	ALIGNMENT SHEET				

		BID		CONSTRUCTION	
	INITIALS	DATE	INITIALS	DATE
ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
DESIGN MANAGER	SAB	06/28/13	JEO	05/2016

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. ADDISON COUNTY, VERMONT

YEAR: 2016 | W.O. | SCALE: 1" = 100' | DWG. ANGP-EPSC-058 | REV. 0

Vermont Gas

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RIGHT-OF-WAY

MATCHLINE

178.05
N/F
HUIZENGA, RAYMOND J.
& BONITA

178.04
N/F
HUIZENGA, RAYMOND J.
& BONITA

182
MONKTON ROAD

176
N/F
HUIZENGA, CHARLES
& RAYMOND

MATCH LINE

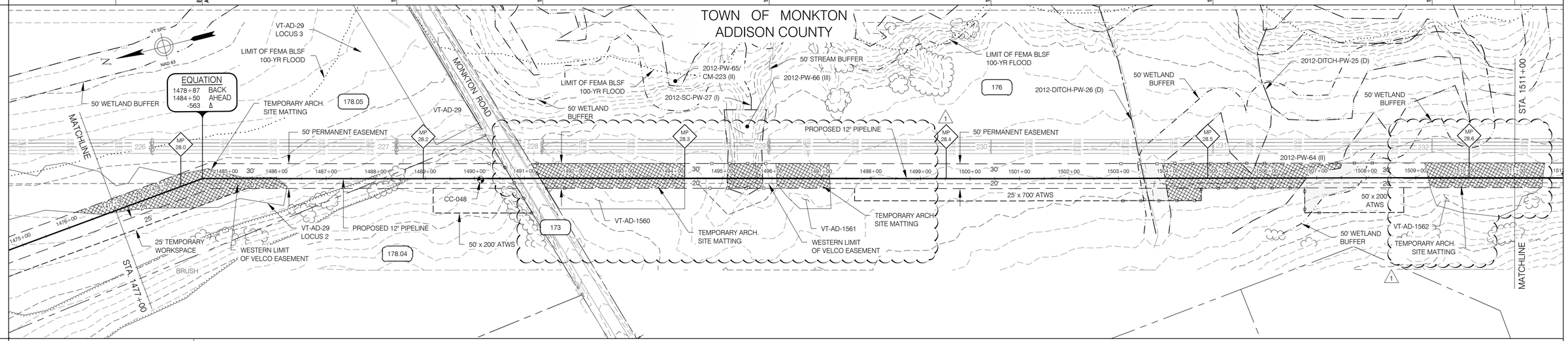
SURVEY DATA

S 05° 57' E | -553.4 ft. | S 14° 22' W | 00°10' LT | S 14° 12' W | 00°08' RT | S 14° 20' W | 00°04' RT | S 14° 25' W | 00°11' LT | S 14° 13' W | 00°02' LT | S 14° 10' W | 00°12' RT | S 14° 23' W

Beg: 1478+87
Arc: 1484+50
2019' RT

1488+42 | 1491+38 | 1495+95 | 1500+43 | 1504+91 | 1509+34

ALIGNMENT DETAIL



EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

- PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- CENTERLINE OF STREAM
- TEMPORARY STREAM CROSSING
- WETLAND
- 50' WETLAND BUFFER
- TEMPORARY WETLAND MATTING
- WETLAND BUFFER WITHIN PROJECT AREA
- REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL

INSTALL CONSTRUCTION DEMARCATION:
STA. 1477+00 TO 1478+87 RT - 50' FROM NEW 12" PIPE ℄
STA. 1477+00 TO 1478+87 LT - 25' FROM NEW 12" PIPE ℄
STA. 1478+87 TO 1485+40 RT - WIDTH VARIES FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1485+40 TO 1489+16 RT - 20' FROM NEW 12" PIPE ℄
STA. 1478+87 TO 1490+56 LT - 30' FROM NEW 12" PIPE ℄
STA. 1489+16 TO 1491+16 RT - 70' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1491+44 TO 1497+67 RT - 20' FROM NEW 12" PIPE ℄
STA. 1491+14 TO 1511+00 LT - 30' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1497+67 TO 1504+67 RT - 45' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1504+67 TO 1506+76 RT - 20' FROM NEW 12" PIPE ℄
STA. 1506+76 TO 1508+76 RT - 70' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1506+76 TO 1511+00 RT - 20' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1490+66 TO 1491+16 RT - 70' FROM NEW 12" PIPE ℄
STA. 1490+06 TO 1490+56 LT - 30' FROM NEW 12" PIPE ℄
STA. 1491+44 TO 1491+94 RT - 20' FROM NEW 12" PIPE ℄
STA. 1491+14 TO 1491+64 LT - 30' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1494+59 TO 1496+24 RT - 20' FROM NEW 12" PIPE ℄
STA. 1494+61 TO 1496+30 LT - 30' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1503+01 TO 1504+67 RT - 45' FROM NEW 12" PIPE ℄
STA. 1502+89 TO 1508+53 LT - 30' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1504+67 TO 1506+76 RT - 20' FROM NEW 12" PIPE ℄
STA. 1506+76 TO 1507+38 RT - 70' FROM NEW 12" PIPE ℄

INSTALL MATTING:
STA. 1477+00 TO 1486+22

INSTALL STABILIZED CONSTRUCTION ENTRANCE:
STA. 1490+65 & STA. 1491+23

INSTALL MATTING:
STA. 1491+25 TO 1494+24

INSTALL MATTING:
STA. 1495+09 TO 1495+82
STA. 1496+08 TO 1497+18

INSTALL MATTING:
STA. 1503+89 TO 1507+51

INSTALL MATTING:
STA. 1509+23 TO 1511+00

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

HORIZONTAL SCALE
100 50 0 100 200 300 feet
VERTICAL SCALE
100 50 0 100 200 300 feet

CONST. TYPE	1E	2D		8	W							2D	W			8	A		
SOIL TYPE	RaB (PAS)			RaB		RaD	RaB	Cn	Cn (PAS)						RaB (PAS)				
LC/LU	PASTURE				PAVED	PASTURE													
	AGRICULTURAL				TRAVEL	AGRICULTURAL													
STREAMS	MATCH LINE													STREAM 2012-DITCH-PW-26 (D) - STATION 1503+45 TO 1503+61					MATCH LINE
WETLANDS					WETLAND 2012-PW-66 - STATION 1495+09 TO 1495+82 CLASS III										WETLAND 2012-PW-64 - STATION 1503+39 TO 1508+03 CLASS II				
VERNAL POOLS																			
SIGNIFICANT NATURAL COMMUNITIES																			
RTE SPECIES																			
NRC WILDLIFE HABITAT																			
ARCHAEOLOGY SITES	VT-AD-29 LOCUS 2						VT-AD-1560			VT-AD-1561								VT-AD-1562	

							BID		CONSTRUCTION	
						ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
						DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
						DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
						DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
ANGP-T-C-059	ALIGNMENT SHEET	1	GJM	BCK	IFC 2016 EDITS (05/2016)	DESIGN MANAGER	SAB	06/28/13	JEO	05/2016
DWG. NO.	REFERENCE DWG.	REV	DSN	CK	DESCRIPTION		INITIALS	DATE	INITIALS	DATE

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. ADDISON COUNTY, VERMONT

YEAR: 2016 | W.O. | SCALE: 1" = 100' | DWG. ANGP-EPSC-059 | REV. 1

Vermont Gas

VHB Vanasse Hangen Brustlin, Inc.

CHA
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South Burlington, VT 05403
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RIGHT-OF-WAY

MATCHLINE

176
N/F
HUZIENGA, CHARLES;
HUZIENGA, RAYMOND

181
N/F
HURLBURT, HERRICK & CHARLOTTE

MATCH LINE

SURVEY DATA

S 14° 23' W

00'03" LT

1514+07

S 14° 20' W

00'01" LT

1518+06

S 14° 18' W

00'03" RT

1523+00

S 14° 22' W

ALIGNMENT DETAIL

TOWN OF MONKTON
ADDISON COUNTY

VT SPC
NAD 83

STA. 1511+00

STA. 1525+00

INSTALL TEMPORARY
ARCHAEOLOGICAL SITE MATTING

CC-049

30'

20'

1511+00 1512+00 1513+00 1514+00 1515+00 1516+00 1517+00 1518+00 1519+00 1520+00 1521+00 1522+00 1523+00 1524+00 1525+00

MP 28.7

MP 28.8

PROPOSED 12" PIPELINE

50' PERMANENT EASEMENT

25' X 380' ATWS

WESTERN LIMITS OF VELCO EASEMENT

WOODS

AGRICULTURAL FIELD

50' x 170'
ATWS

TEMPORARY ARCH.
SITE MATTING

ARCH. SITE

VT-AD-1562

MATCHLINE

GRAVEL

OLD STAGE ROAD

MATCHLINE

12" DECIDUOUS

EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

- PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- CENTERLINE OF STREAM
- TEMPORARY STREAM CROSSING
- WETLAND
- 50 WETLAND BUFFER
- TEMPORARY WETLAND MATTING
- WETLAND BUFFER WITHIN PROJECT AREA
- REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL

INSTALL CONSTRUCTION DEMARCATION:
STA. 1511+00 TO 1512+06 RT - 20' FROM NEW 12" PIPE ℄
STA. 1511+00 TO 1525+00 LT - 30' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1512+06 TO 1515+86 RT - 45' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1515+86 TO 1523+68 RT - 20' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1523+68 TO 1524+60 RT - 70' FROM NEW 12" PIPE ℄
STA. 1524+60 TO 1525+00 RT - WIDTH VARIES FROM NEW 12" PIPE ℄

INSTALL MATTING:
STA. 1511+00 TO 1511+58

INSTALL MATTING:
STA. 1514+87 TO 1515+87
(IN ATWS)

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

HORIZONTAL SCALE
50 25 0 50 100 150 feet

VERTICAL SCALE
50 25 0 50 100 150 feet

CONST. TYPE	A	B				A		2D		
SOIL TYPE	RaB		RaB (PAS)		BeB (PAS)		BeB (PAS)	Rk	RaB (PAS)	Cn (PAS) / AmC (PAS)
LC/LU	PASTURE / AGRICULTURAL									
STREAMS										
WETLANDS										
VERNAL POOLS										
SIGNIFICANT NATURAL COMMUNITIES										
RTE SPECIES										
NRC WILDLIFE HABITAT										
ARCHAEOLOGY SITES	VT-AD-1562					ARCH. SITE				

MATCH LINE

MATCH LINE

							BID		CONSTRUCTION	
						ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
						DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
						DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
						DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
ANGP-T-C-060	ALIGNMENT SHEET	1	GJM	BCK	IFC 2016 EDITS (05/2016)	DESIGN MANAGER	SAB	06/28/13	JEO	05/2016
DWG. NO.	REFERENCE DWG.	REV	DSN	CK	DESCRIPTION		INITIALS	DATE	INITIALS	DATE

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. ADDISON COUNTY, VERMONT

YEAR: 2016 | W.O. | SCALE: 1" = 50' | DWG. ANGP-EPSC-060 | REV. 1

Vermont Gas

VHB Vanasse Hangen Brustlin, Inc.

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RIGHT-OF-WAY

MATCHLINE

181
N/F
HURLBURT, HERRICK & CHARLOTTE

182
OLD STAGE ROAD

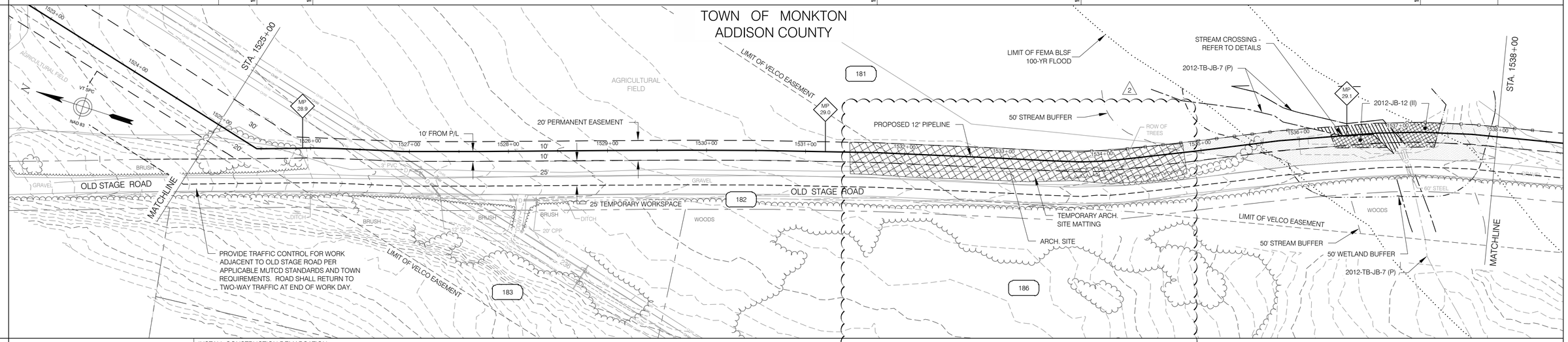
MATCH LINE

SURVEY DATA

PIPE ALIGNMENT PARALLELS ROAD RIGHT-OF-WAY, FOR CLARITY, NOT ALL SURVEY DATA IS SHOWN

S 14° 22' W	32.59' LT	S 18° 36' E	00.44' RT	S 17° 52' E	02.31' RT	S 15° 21' E	09.34' LT	S 24° 55' E	12.00' RT	S 12° 55' E		
1525+46		1526+02		1531+72		1533+78		1537+23				

ALIGNMENT DETAIL



EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

- PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- CENTERLINE OF STREAM
- TEMPORARY STREAM CROSSING
- WETLAND
- 50' WETLAND BUFFER
- TEMPORARY WETLAND MATTING
- WETLAND BUFFER WITHIN PROJECT AREA
- REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL

INSTALL CONSTRUCTION DEMARCATION:
STA. 1525+00 TO 1525+83 LT - 30' FROM NEW 12" PIPE ℄
STA. 1525+83 TO 1538+00 LT - 10' FROM NEW 12" PIPE ℄
STA. 1525+00 TO 1538+00RT - WIDTH VARIES FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1533+71 TO 1536+12 LT - 10' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1536+88 TO 1538+00 LT - 10' FROM NEW 12" PIPE ℄

INSTALL MATTING:
1531+45-1534+83

INSTALL MATTING:
STA. 1536+32 TO 1536+44
STA. 1536+97 TO 1537+40

HORIZONTAL SCALE
50 25 0 50 100 150 feet

VERTICAL SCALE
50 25 0 50 100 150 feet

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

CONST. TYPE	2D		4A		A		2		7	W	4A	
SOIL TYPE	AmC (PAS)		CwA (PAS)				VgC (PAS)		Cv (PAS)			
LC/LU	FORESTED / AGRICULTURAL		PASTURE / TRAVEL						WATER		PASTURE	
STREAMS								STREAM 2012-TB-JB-7 - (P) STATION 1536+10 TO 1537+04				
WETLANDS									WETLAND 2012-JB-12 - STATION 1536+31 TO 1537+42 CLASS II			
VERNAL POOLS												
SIGNIFICANT NATURAL COMMUNITIES												
RTE SPECIES												
NRC WILDLIFE HABITAT												
ARCHAEOLOGY SITES							ARCH. SITE					

MATCH LINE

DWG. NO.	REFERENCE DWG.	REV	DSN	CK	DESCRIPTION
		2	GJM	BCK	IFC 2016 EDITS (05/2016)
ANGP-T-C-061A	ALIGNMENT SHEET	1	VGS	VGS	OLD STAGE ROAD RE-ROUTE (11/13/15)

	INITIALS	BID DATE	INITIALS	CONSTRUCTION DATE
ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
DESIGN MANAGER	SAB	06/28/13	JEO	05/2016

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. ADDISON COUNTY, VERMONT

YEAR: 2016 | W.O. | SCALE: 1" = 50' | DWG. ANGP-EPSC-061A | REV. 2

Vermont Gas

VHB Vanasse Hangen Brustlin, Inc.

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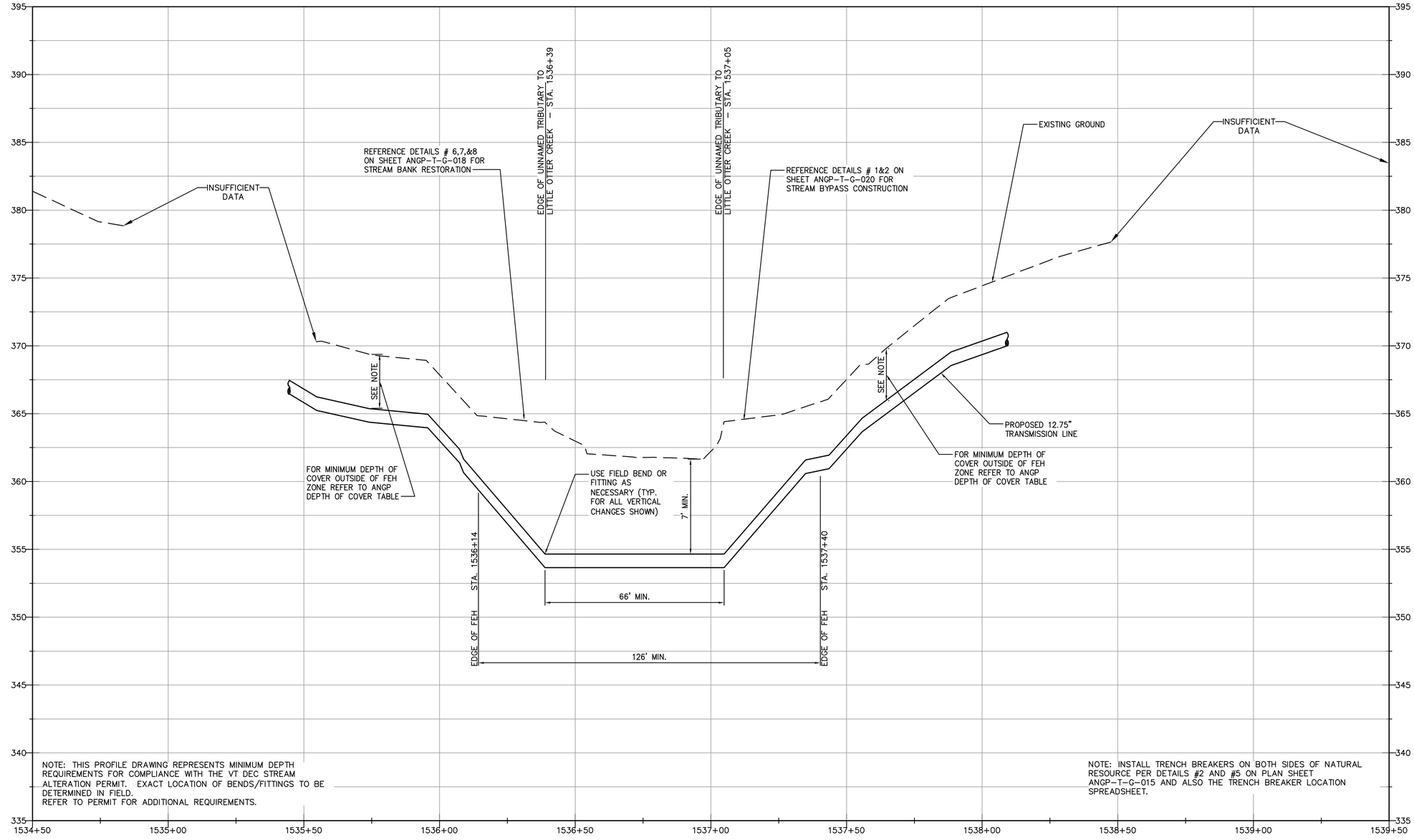
PROFILE



NOTE: THIS PROFILE DRAWING REPRESENTS MINIMUM DEPTH REQUIREMENTS FOR COMPLIANCE WITH THE VT DEC STREAM ALTERATION PERMIT. EXACT LOCATION OF BENDS/FITTINGS TO BE DETERMINED IN FIELD.
REFER TO PERMIT FOR ADDITIONAL REQUIREMENTS.

NOTE: INSTALL TRENCH BREAKERS ON BOTH SIDES OF NATURAL RESOURCE PER DETAILS #2 AND #5 ON PLAN SHEET ANGP-T-G-015 AND ALSO THE TRENCH BREAKER LOCATION SPREADSHEET.

STATE OF VERMONT ROBERT E. HOLLINGSWORTH NO. 97764 CIVIL LICENSED PROFESSIONAL ENGINEER

NOTE: STREAM CROSSING MUST BE CONSTRUCTED BETWEEN JUNE 1 AND OCTOBER 1

STREAM CROSSING PROFILE
UNNAMED TRIBUTARY TO LITTLE OTTER CREEK
STATION 1536+73±
MILE POST 29.10

SCALE: HORIZ. 1"=20'
VERT. 1"=4'

HORIZONTAL SCALE
20 10 0 20 40 60 feet
4 2 0 4 8 12 feet
VERTICAL SCALE

NOTE: THE LIMITS SHOWN FOR THIS STREAM DO NOT MATCH UP WITH WHAT IS SHOWN ON THE ALIGNMENT SHEET PLAN VIEW. FULL FEH COMPLIANCE IS NOT REQUIRED DUE TO THE PROXIMITY TO THE ROADWAY, THEREFORE A TRANSITION BACK TO NORMAL BURIAL DEPTH CAN OCCUR ONCE OUTSIDE OF APPARENT TOP OF BANK (1536+39 AND 1537+05).

DWG. NO.	REFERENCE DWG.	REV	DSN	CK	DESCRIPTION

	BID		CONSTRUCTION	
	INITIALS	DATE	INITIALS	DATE
ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
DESIGN MANAGER	SAB	06/28/13	JEO	05/2016

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
OPEN TRENCH STREAM CROSSING PROFILE

LOC. ADDISON COUNTY, VERMONT

YEAR: 2016 | W.O. | SCALE: AS NOTED | DWG. ANGP-T-C-061AA | REV. 0

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Vermont Gas

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RIGHT-OF-WAY

MATCHLINE

181
N/F
HURLBURT, HERRICK & CHARLOTTE

182
OLD STAGE ROAD

188.01
N/F
VERMONT GAS SYSTEMS, INC.

MATCH LINE

SURVEY DATA

PIPE ALIGNMENT PARALLELS ROAD RIGHT-OF-WAY, FOR CLARITY, NOT ALL SURVEY DATA IS SHOWN

Station	Deflection	Bearing to next station
		S 12° 55' E
1540+08	01°56' RT	S 10° 59' E
1541+48	02°36' LT	S 13° 35' E
1543+25	05°12' LT	S 18° 47' E
1547+08	45°00' RT	S 24° 14' W
1547+23	45°00' RT	S 69° 14' W
1547+72	45°00' LT	S 24° 14' W
1547+88	45°00' LT	S 17° 44' E
1548+15	6°10' RT	S 11° 34' E
1549+64	09°15' RT	S 02° 19' E
1550+96	01°35' RT	S 00° 44' E
1553+17	45°00' LT	S 42° 44' E

ALIGNMENT DETAIL

EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

PERMANENT EASEMENT	— — — —
TEMPORARY WORKSPACE	- - - - - -
CENTERLINE OF STREAM	—— - —— - ——
TEMPORARY STREAM CROSSING	▨
WETLAND	- · · - · · -
50' WETLAND BUFFER	— · · — · · —
TEMPORARY WETLAND MATTING	▩
WETLAND BUFFER WITHIN PROJECT AREA	░
REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL	—□—□—□—□—

INSTALL CONSTRUCTION DEMARCATION:
STA. 1538+00 TO 1547+09 LT - 10' FROM NEW 12" PIPE ℄
STA. 1538+00 TO 1547+00 RT - WIDTH VARIES FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1538+00 TO 1538+44 LT - 10' FROM NEW 12" PIPE ℄

2
INSTALL MATTING:
1540+51-1540+95

INSTALL CONSTRUCTION DEMARCATION:
STA. 1547+00 TO 1547+88 RT - WIDTH VARIES FROM NEW 12" PIPE ℄
STA. 1547+88 TO 1553+17 RT - 10' FROM NEW 12" PIPE ℄
STA. 1547+09 TO 1548+00 LT - WIDTH VARIES FROM NEW 12" PIPE ℄
STA. 1548+00 TO 1553+25 LT - WIDTH VARIES FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1553+17 TO 1553+25 RT - WIDTH VARIES FROM NEW 12" PIPE ℄

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

HORIZONTAL SCALE
50 25 0 50 100 150 feet
50 25 0 50 100 150 feet
VERTICAL SCALE

CONST. TYPE	Ⓐ 2	④A	⑪	④B	
SOIL TYPE	Cv (PAS)	VgB (PAS)	VgD	VgB (PAS)	
LC/LU	PASTURE TRAVEL			TRAVEL FORESTED	
STREAMS					
WETLANDS	MATCH LINE				MATCH LINE
VERNAL POOLS					
SIGNIFICANT NATURAL COMMUNITIES				MESIC MAPLE ASH HICKORY OAK FOREST	
RTE SPECIES					
NRC WILDLIFE HABITAT				DEER WINTERING AREA	
ARCHAEOLOGY SITES	ARCH. SITE 2				

DWG. NO.	REFERENCE DWG.	REV	DSN	CK	DESCRIPTION
		2	GJM	BCK	IFC 2016 EDITS (05/2016)
ANGP-T-C-061B	ALIGNMENT SHEET	1	VGS	VGS	OLD STAGE ROAD RE-ROUTE (11/13/15)

	BID		CONSTRUCTION	
ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
DESIGN MANAGER	SAB	06/28/13	JEO	05/2016
	INITIALS	DATE	INITIALS	DATE

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. ADDISON COUNTY, VERMONT

Vermont Gas

VHB Vanasse Hangen Brustlin, Inc.

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Main: (802) 735-0372 · www.chacompanies.com

YEAR: 2016 | W.O. | SCALE: 1" = 50' | DWG. ANGP-EPSC-061B | REV. 2

RIGHT-OF-WAY

MATCHLINE

188.01
N/F
VERMONT GAS
SYSTEMS, INC.

181
N/F
HULBURT, HERRICK & CHARLOTTE

182
OLD STAGE ROAD

192
N/F
HERRICK JR; MICHAEL, DAVID
& HURLBURT, JOSHUA

MATCH LINE

SURVEY DATA

PIPE ALIGNMENT PARALLELS ROAD RIGHT-OF-WAY,
FOR CLARITY, NOT ALL SURVEY DATA IS SHOWN

Station	Deflection	Bearing
1553+31	45°00' LT	S 42° 44' E
1553+81	45°00' RT	S 87° 44' E
1553+95	45°00' RT	S 42° 44' E
1554+01	05°55' LT	S 02° 16' W
		S 03° 39' E
1555+04	05°41' LT	S 09° 20' E
1556+11	04°29' RT	S 04° 51' E
1559+38	14°26' LT	S 19° 17' E
1562+30	04°48' RT	S 14° 29' E
1565+19	07°59' LT	S 22° 28' E
1565+25	45°00' RT	S 22° 32' W
1565+40	45°00' RT	S 67° 32' W

ALIGNMENT DETAIL

EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

- PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- CENTERLINE OF STREAM
- TEMPORARY STREAM CROSSING
- WETLAND
- 50' WETLAND BUFFER
- TEMPORARY WETLAND MATTING
- WETLAND BUFFER WITHIN PROJECT AREA
- REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL

INSTALL CONSTRUCTION DEMARCATION:
STA. 1553+25 TO 1554+40 RT - WIDTH VARIES FROM NEW 12" PIPE ℄
STA. 1553+40 TO 1565+75 RT - WIDTH VARIES FROM NEW 12" PIPE ℄
STA. 1553+25 TO 1553+95 LT - WIDTH VARIES FROM NEW 12" PIPE ℄
STA. 1553+95 TO 1565+26 LT - 10' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1555+06 TO 1556+81 RT - 35' FROM NEW 12" PIPE ℄

INSTALL MATTING:
STA. 1555+20 TO 1556+46

INSTALL CONSTRUCTION DEMARCATION:
STA. 1565+75 TO 1565+50 RT - 25' FROM NEW 12" PIPE ℄
STA. 1565+26 TO 1565+41 LT - WIDTH VARIES FROM NEW 12" PIPE ℄
STA. 1565+41TO 1565+50 LT - 50' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1565+75 TO 1565+50 RT - 25' FROM NEW 12" PIPE ℄

INSTALL STABALIZED CONSTRUCTION ENTRANCE:
STA. 1565+90

HORIZONTAL SCALE
50 25 0 50 100 150 feet
50 25 0 50 100 150 feet
VERTICAL SCALE

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

CONST. TYPE	11 W 4A 11 1H
SOIL TYPE	VgB (PAS) VgC (PAS) VgD VgC (PAS) VgB (PAS) FaC VgB (PAS)
LC/LU	FORRESTED TRAVEL AGRICULTURAL
STREAMS	STREAM 2013-AS-SC-RS-1 (I) - STATION 1565+26 TO 1565+50
WETLANDS	WETLAND 2012-JB-10 - STATION 1555+20 TO 1556+46 CLASS III
VERNAL POOLS	
SIGNIFICANT NATURAL COMMUNITIES	
RTE SPECIES	
NRC WILDLIFE HABITAT	DEER WINTERING AREA
ARCHAEOLOGY SITES	

MATCH LINE

MATCH LINE

DWG. NO.	REFERENCE DWG.	REV	DSN	CK	DESCRIPTION
		2	GJM	BCK	IFC 2016 EDITS (05/2016)
ANGP-T-C-062	ALIGNMENT SHEET	1	VGS	VGS	OLD STAGE ROAD RE-ROUTE (11/13/15)

	BID		CONSTRUCTION	
	INITIALS	DATE	INITIALS	DATE
ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
DESIGN MANAGER	SAB	06/28/13	JEO	05/2016

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. ADDISON COUNTY, VERMONT

YEAR: 2016 | W.O. | SCALE: 1" = 50' | DWG. ANGP-EPSC-062 | REV. 2

Vermont Gas

Vanasse Hangen Brustlin, Inc.

38 Eastwood Drive, Suite 105
South Burlington, VT 05403
Main: (802) 735-0372 · www.chacompanies.com

RIGHT-OF-WAY

MATCHLINE

192
N/F
HURLBURT, HERRICK & CHARLOTTE

194
N/F
GRACE, LAWRENCE JR. & SANDRA L.

195
PARKS - HURLBURT ROAD

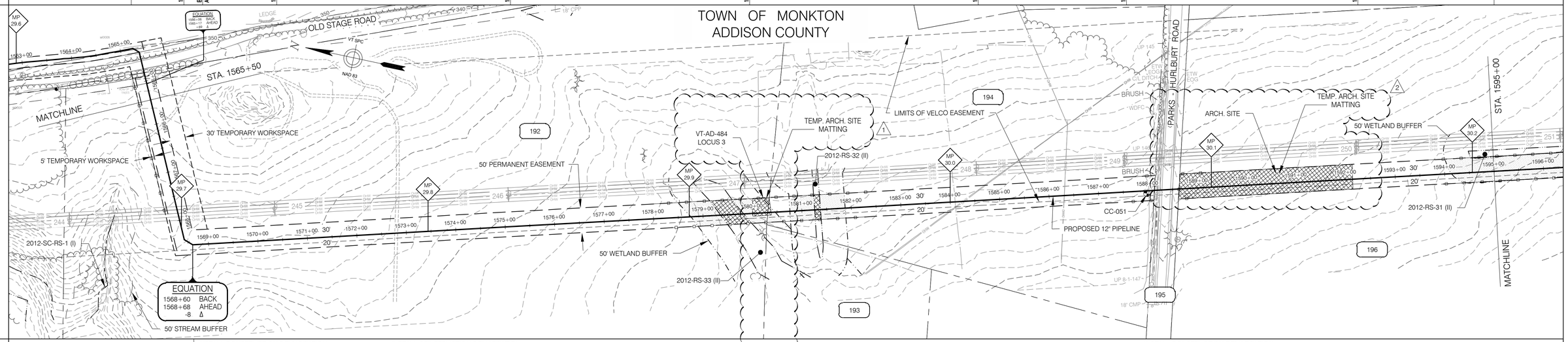
196
N/F
HURLBURT, HERRICK & CHARLOTTE

MATCH LINE

SURVEY DATA

1568+40	Bgc. 1568+60 Ahd. 1568+68 34'40" LT	1570+39	1575+12	1579+95	1584+58	1587+58	1592+26
S 67° 32' W	S 22° 32' W	S 12° 09' E	S 12° 10' E	S 12° 03' E	S 12° 08' E	S 12° 13' E	S 12° 09' E	S 12° 06' E
45'06" LT	8.2 ft.	00'01" LT	00'07" RT	00'00" LT	00'04" LT	00'03" RT	00'03" RT	

ALIGNMENT DETAIL



EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

- PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- CENTERLINE OF STREAM
- TEMPORARY STREAM CROSSING
- WETLAND
- 50' WETLAND BUFFER
- TEMPORARY WETLAND MATTING
- WETLAND BUFFER WITHIN PROJECT AREA
- REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL

INSTALL CONSTRUCTION DEMARCATION:
STA. 1565+50 TO 1568+40 RT - 25' FROM NEW 12" PIPE ℄
STA. 1565+50 TO 1568+30 LT - 50' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1565+50 TO 1566+00 RT - 25' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1568+40 TO 1568+68 RT - WIDTH VARIES FROM NEW 12" PIPE ℄
STA. 1568+30 TO 1568+99 LT - WIDTH VARIES FROM NEW 12" PIPE ℄
STA. 1568+68 TO 1588+11 RT - 20' FROM NEW 12" PIPE ℄
STA. 1568+99 TO 1588+16 LT - 30' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1578+39 TO 1582+38 RT - 20' FROM NEW 12" PIPE ℄
STA. 1578+01 TO 1582+37 LT - 30' FROM NEW 12" PIPE ℄

INSTALL MATTING:
STA. 1579+15 TO 1579+97

INSTALL MATTING:
STA. 1580+00 TO 1580+37

INSTALL MATTING:
STA. 1581+26 TO 1581+37

INSTALL STABILIZED CONSTRUCTION ENTRANCE:
STA. 1588+15 TO 1588+65

INSTALL CONSTRUCTION DEMARCATION:
STA. 1588+61 TO 1595+00 RT - 20' FROM NEW 12" PIPE ℄
STA. 1588+66 TO 1595+00 LT - 30' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1587+61 TO 1588+11 RT - 20' FROM NEW 12" PIPE ℄
STA. 1587+66 TO 1588+16 LT - 30' FROM NEW 12" PIPE ℄
STA. 1588+61 TO 1589+11 RT - 20' FROM NEW 12" PIPE ℄
STA. 1588+66 TO 1589+16 LT - 30' FROM NEW 12" PIPE ℄

INSTALL MATTING:
STA. 1588+63 TO 1592+12

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1593+92 TO 1595+00 RT - 20' FROM NEW 12" PIPE ℄
STA. 1593+52 TO 1595+00 LT - 30' FROM NEW 12" PIPE ℄

INSTALL MATTING:
STA. 1594+54 TO 1595+00

HORIZONTAL SCALE
100 50 0 100 200 300 feet
100 50 0 100 200 300 feet
VERTICAL SCALE

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

| | | |

RIGHT-OF-WAY

MATCHLINE

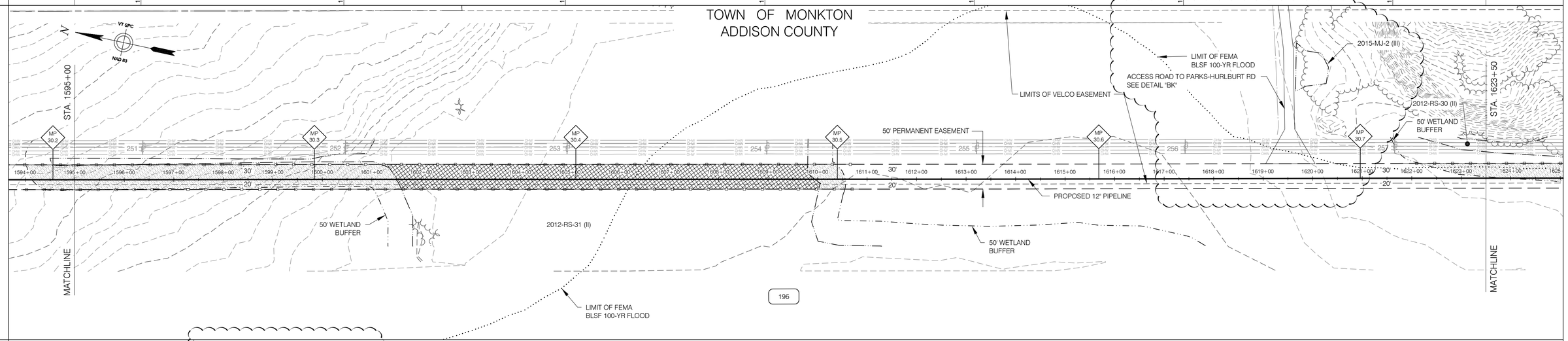
196
N/F
HURLBURT, HERRICK & CHARLOTTE

MATCH LINE

SURVEY DATA

1596+39	00.00' LT	1600+48	00.00' RT	1604+96	00.00' LT	1608+99	00.00' RT	1613+22	00.00' LT	1617+44	00.00' LT	1621+67	00.00' RT
S 12° 06' E		S 12° 12' E		S 12° 04' E		S 12° 08' E		S 12° 06' E		S 12° 12' E		S 12° 14' E		S 12° 08' E

ALIGNMENT DETAIL



EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

- PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- CENTERLINE OF STREAM
- TEMPORARY STREAM CROSSING
- WETLAND
- 50' WETLAND BUFFER
- TEMPORARY WETLAND MATTING
- WETLAND BUFFER WITHIN PROJECT AREA
- REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL

INSTALL CONSTRUCTION DEMARCATION:
STA. 1595+00 TO 1623+50 RT - 20' FROM NEW 12" PIPE ℄
STA. 1595+00 TO 1619+03 LT - 30' FROM NEW 12" PIPE ℄
STA. 1620+03 TO 1623+50 LT - 30' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1595+00 TO 1611+05 RT - 20' FROM NEW 12" PIPE ℄
STA. 1595+00 TO 1610+88 LT - 30' FROM NEW 12" PIPE ℄

INSTALL MATTING:
STA. 1601+18 TO 1610+07

CONSTRUCTION ENTRANCE:
STA. 1619+50

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1621+67 TO 1623+50 LT - 30' FROM NEW 12" PIPE ℄

HORIZONTAL SCALE
100 50 0 100 200 300 feet

VERTICAL SCALE
100 50 0 100 200 300 feet

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

CONST. TYPE					W		2D	
SOIL TYPE	VgB (PAS)	Cw (PAS)	VgC (PAS)	Cw (PAS)	Lh		AmB (PAS)	
LC/LU	WETLAND	AGRICULTURAL			PASTURE			WETLAND
STREAMS								
WETLANDS	WETLAND 2012-RS-31 - STATION 1595+00 TO 1610+57 CLASS II						WETLAND 2012-RS-30 - STATION 1622-16 TO 1623+50 CLASS II	
VERNAL POOLS								
SIGNIFICANT NATURAL COMMUNITIES								
RTE SPECIES								
NRC WILDLIFE HABITAT								
ARCHAEOLOGY SITES								

MATCH LINE

MATCH LINE

Vanasse Hangen Brustlin, Inc.

DWG. NO.	REFERENCE DWG.	REV	DSN	CK	DESCRIPTION
ANGP-T-C-064	ALIGNMENT SHEET	1	VGS	VGS	ACCESS ROAD "BK" ADDED (11/13/15)

	BID		CONSTRUCTION	
	INITIALS	DATE	INITIALS	DATE
ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
DESIGN MANAGER	SAB	06/28/13	JEO	05/2016

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. ADDISON COUNTY, VERMONT

YEAR: 2016 | W.O. | SCALE: 1" = 100' | DWG. ANGP-EPSC-064 | REV. 1

Vermont Gas

CHA
38 Eastwood Drive, Suite 105
South Burlington, VT 05403
Main: (802) 735-0372 · www.chacompanies.com

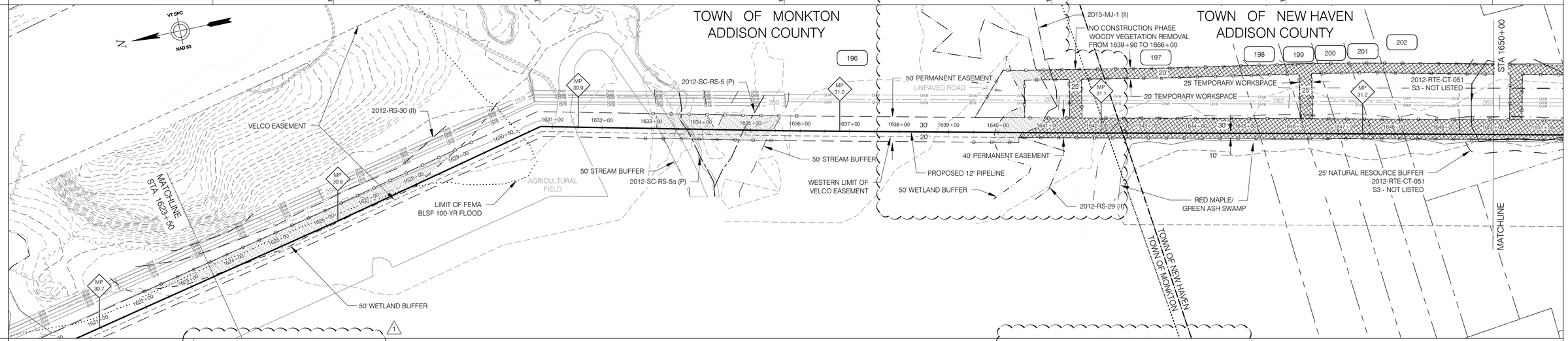
RIGHT-OF-WAY

MATCHLINE | 196 N/F HURLBERT, HERRICK; & CHARLOTTE | TOWN OF MONKTON / TOWN OF NEW HAVEN | 197 N/F MERRITT, MARGARET | 198 N/F MERRITT, MARGARET | 199 N/F MERRITT, MARGARET | 200 N/F MERRITT, MARGARET | 201 N/F MERRITT, MARGARET | 202 N/F EVEREST, DOUGLAS A. | MATCH LINE

SURVEY DATA

S 12° 08' E | 00°49' LT | 1626+16 | S 12° 57' E | 26°00' RT | 1630+76 | S 13° 03' W | 00°34' LT | 1635+69 | S 12° 29' W | 00°17' LT | 1641+10 | S 12° 12' W | 00°08' RT | 1645+82 | S 12° 21' W

ALIGNMENT DETAIL



EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

- PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- CENTERLINE OF STREAM
- TEMPORARY STREAM CROSSING
- WETLAND
- 50' WETLAND BUFFER
- TEMPORARY WETLAND MATTING
- WETLAND BUFFER WITHIN PROJECT AREA
- REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL

INSTALL CONSTRUCTION DEMARCATION:
STA. 1623+50 TO 1640+42 RT - 20' FROM NEW 12" PIPE ℄
STA. 1623+50 TO 1639+52 LT - 30' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1623+50 TO 1629+55 LT - 30' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1632+73 TO 1635+81 RT - 20' FROM NEW 12" PIPE ℄
STA. 1632+59 TO 1636+11 LT - 30' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1640+42 TO 1650+00 RT - 10' FROM NEW 12" PIPE ℄
STA. 1639+52 TO 1650+00 LT - WIDTH VARIES FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1639+43 TO 1640+42 RT - 20' FROM NEW 12" PIPE ℄

INSTALL STABALIZED CONSTRUCTION ENTRANCE:
STA. 1640+00

INSTALL MATTING:
STA. 1640+42 TO 1650+00

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1640+42 TO 1650+00 RT - 10' FROM NEW 12" PIPE ℄
STA. 1640+51 TO 1641+44 LT - 30' FROM NEW 12" PIPE ℄
STA. 1641+69 TO 1646+10 LT - 30' FROM NEW 12" PIPE ℄
STA. 1646+35 TO 1650+00 LT - 30' FROM NEW 12" PIPE ℄

HORIZONTAL SCALE
100 50 0 100 200 300 feet
VERTICAL SCALE
100 50 0 100 200 300 feet

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

CONST. TYPE			2D				7				2D			W		
SOIL TYPE		Rk	AmB (PAS)				Wo (PAS)			Cw (PAS)			Lk			
LC/LU		PASTURE / AGRICULTURE											FORESTED / POWERLINE			
STREAMS						STREAM 2012-SC-RS-5a (P) - STATION 1633+09 TO 1634+30			STREAM 2012-SC-RS-5 (P) - STATION 1634+30 TO 1635+61							
WETLANDS	MATCH LINE	WETLAND 2012-RS-30 - STATION 1623+50 TO 1629+05 CLASS II											WETLAND 2012-RS-29 - STATION 1639+92 TO 1650+00 CLASS II			MATCH LINE
VERNAL POOLS																
SIGNIFICANT NATURAL COMMUNITIES																
RTE SPECIES															2012-RTE-CT-051	
NRC WILDLIFE HABITAT																
ARCHAEOLOGY SITES																

VHB Vanasse Hangen Brustlin, Inc.

							BID		CONSTRUCTION	
						ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
						DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
						DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
ANGP-T-G-07-010	ACCESS ROAD DETAILS					DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
ANGP-T-C-065	ALIGNMENT SHEET	1	VGS	VGS		DESIGN MANAGER	SAB	06/28/13	JEO	05/2016
DWG. NO.	REFERENCE DWG.	REV	DSN	CK		DESCRIPTION	INITIALS	DATE	INITIALS	DATE

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

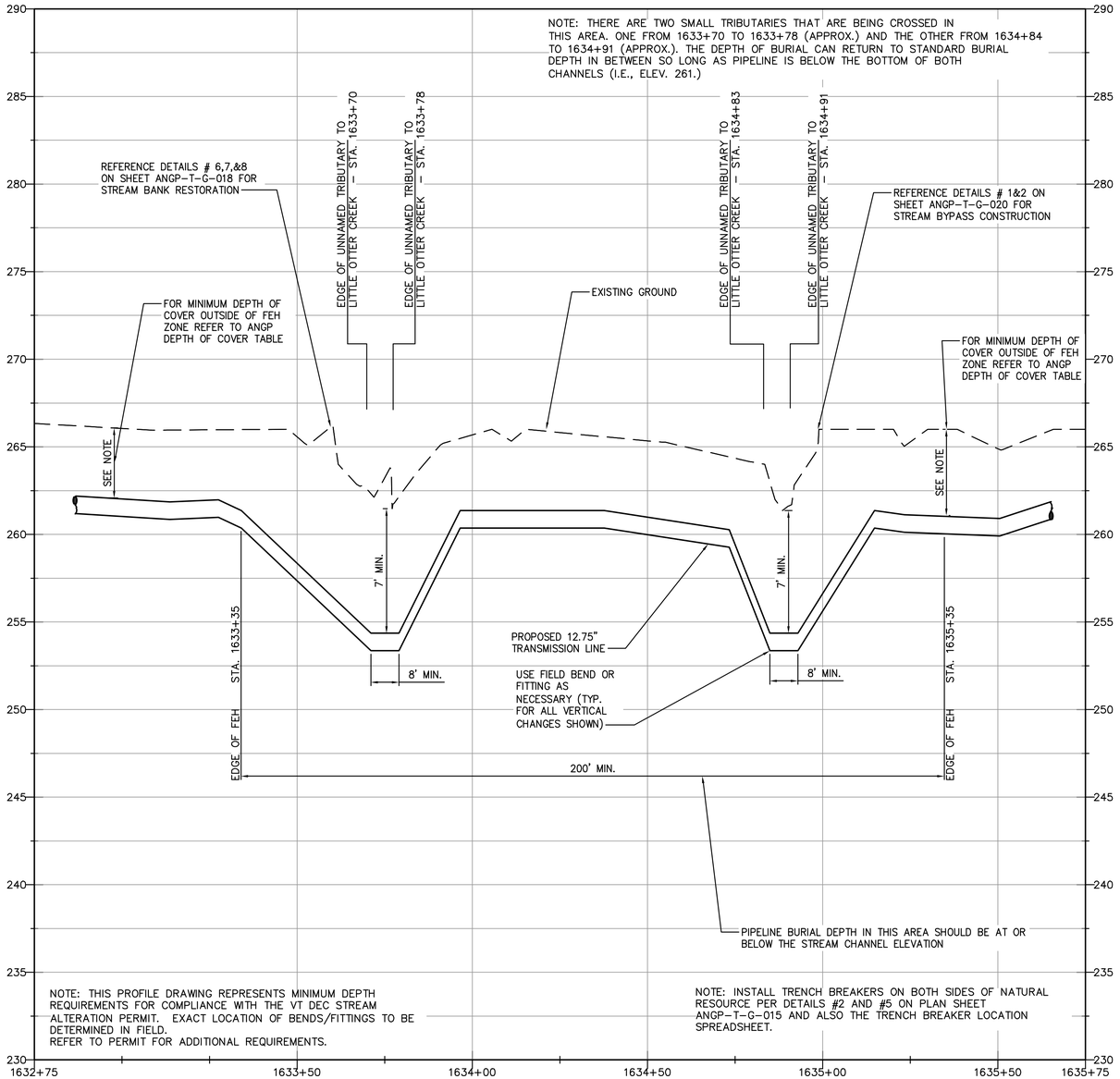
LOC. ADDISON COUNTY, VERMONT

YEAR: 2016 | W.O. | SCALE: 1" = 100' | DWG. ANGP-EPSC-065 | REV. 1

Vermont Gas

CHA
38 Eastwood Drive, Suite 105
South Burlington, VT 05403
Main: (802) 735-0372 · www.chacompanies.com

PROFILE



STREAM CROSSING PROFILE
UNNAMED TRIBUTARY TO LITTLE OTTER CREEK
STATION 1634+27±
MILE POST 30.95

SCALE: HORIZ. 1"=20'
VERT. 1"=4'

NOTE: STREAM CROSSING MUST BE CONSTRUCTED BETWEEN JUNE 1 AND OCTOBER 1

HORIZONTAL SCALE
20 10 0 20 40 60 feet
4 2 0 4 8 12 feet
VERTICAL SCALE

STATE OF VERMONT
ROBERT E. HOLLENBECK
NO. 97764
CIVIL
PROFESSIONAL ENGINEER

DWG. NO.	REFERENCE DWG.	REV	DSN	CK		DESCRIPTION	BID		CONSTRUCTION	
							INITIALS	DATE	INITIALS	DATE
						ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
						DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
						DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
						DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
						DESIGN MANAGER	SAB	06/28/13	JEO	05/2016

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
OPEN TRENCH STREAM CROSSING PROFILE

LOC. ADDISON COUNTY, VERMONT

YEAR: 2016 | W.O. | SCALE: AS NOTED | DWG. ANGP-T-C-065A | REV. 0

Vermont Gas

VHB Vanasse Hangen Brustlin, Inc.

CHA
38 Eastwood Drive, Suite 105
South Burlington, VT 05403
Main: (802) 735-0372 · www.chacompanies.com

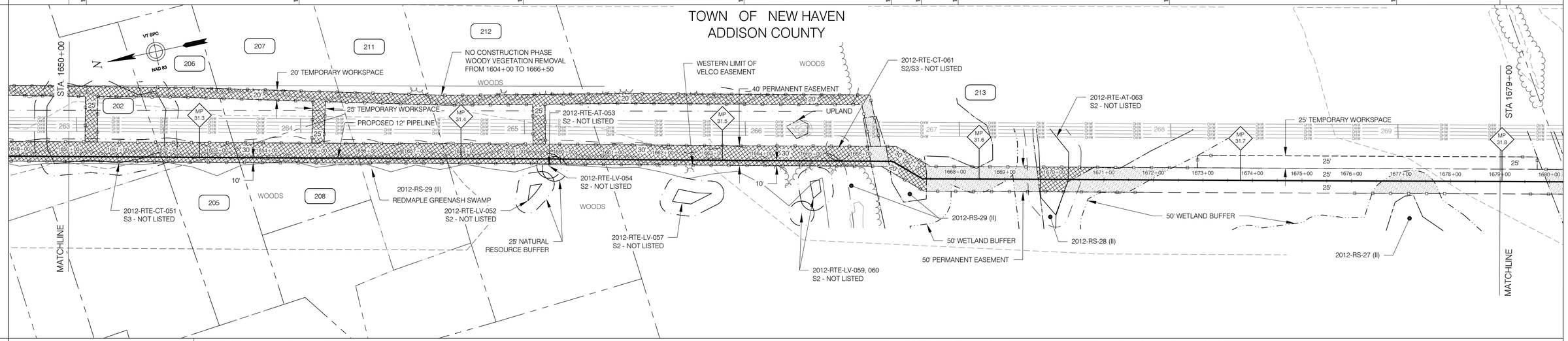
RIGHT-OF-WAY

MATCHLINE | 202 N/F EVEREST, JEFFREY | 206 N/F MERRITT, MARGARET | 205 N/F PECK, JOHN | 207 N/F MERRITT, MARGARET | 208 N/F PECK, JOHN | 211 N/F LEGAULT, JOHN & ANN | 212 N/F MERRITT, MARGARET | 213 N/F CHOINIERE, JAMES & SHERRY | MATCH LINE

SURVEY DATA

RT 20.00' LT 0.00'	RT 0.00' LT 0.00'	RT 0.00' LT 0.00'	RT 91.00' LT 0.00'	RT 0.00' LT 0.00'	RT 29.59' LT 29.52'	RT 0.00' LT 0.00'	RT 0.00' LT 0.00'	RT 0.00' LT 0.00'
S 12° 21' W	S 12° 23' W	S 12° 16' W	S 12° 32' W	S 12° 19' W	S 42° 19' W	S 12° 18' W	S 12° 21' W	S 12° 19' W	S 12° 17' W
1650+15	1654+67	1659+20	1663+66	1666+63	1667+33	1668+08	1672+35	1676+93	

ALIGNMENT DETAIL



EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

- PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- CENTERLINE OF STREAM
- TEMPORARY STREAM CROSSING
- WETLAND
- 50' WETLAND BUFFER
- TEMPORARY WETLAND MATTING
- WETLAND BUFFER WITHIN PROJECT AREA
- REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL

INSTALL CONSTRUCTION DEMARCATION:
STA. 1650+00 TO 1666+41 RT - 10' FROM NEW 12" PIPE ℄
STA. 1650+00 TO 1667+50 LT - 30' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1650+00 TO 1666+41 RT - 10' FROM NEW 12" PIPE ℄
STA. 1650+00 TO 1650+33 LT - 30' FROM NEW 12" PIPE ℄
STA. 1650+58 TO 1654+91 LT - 30' FROM NEW 12" PIPE ℄
STA. 1655+16 TO 1659+37 LT - 30' FROM NEW 12" PIPE ℄

INSTALL MATTING:
STA. 1650+00 TO 1666+19

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1659+62 TO 1666+19 LT - 30' FROM NEW 12" PIPE ℄
STA. 1666+40 TO 1667+50 LT - 30' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1666+41 TO 1667+37 RT - 20' FROM NEW 12" PIPE ℄
STA. 1667+50 TO 1672+89 LT - 25' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1666+41 TO 1667+37 RT - 20' FROM NEW 12" PIPE ℄
STA. 1667+50 TO 1672+89 LT - 25' FROM NEW 12" PIPE ℄
STA. 1672+89 TO 1673+39 LT - 50 FROM NEW 12" PIPE ℄

INSTALL MATTING:
STA. 1666+56 TO 1667+42

INSTALL CONSTRUCTION DEMARCATION:
STA. 1667+37 TO 1679+00 RT - 25' FROM NEW 12" PIPE ℄
STA. 1672+89 TO 1679+00 LT - 50' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1667+37 TO 1671+96 RT - 25' FROM NEW 12" PIPE ℄

INSTALL MATTING:
STA. 1669+67 TO 1671+80

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1675+92 TO 1678+28 RT - 25' FROM NEW 12" PIPE ℄

HORIZONTAL SCALE
100 50 0 100 200 300 feet
VERTICAL SCALE
100 50 0 100 200 300 feet

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

CONST. TYPE	2D W		W	2A	1A
SOIL TYPE	Lk		Sw (PAS)		Cv
LC/LU	FORESTED/POWERLINES NOT CLASSIFIED		GRASS AGRICULTURAL		
STREAMS					
WETLANDS	WETLAND 2012-RS-29 - STATION 1650+00 TO 1669+20 CLASS II		WETLAND 2012-RS-28 - STATION 1669+20 TO 1672+90 CLASS II		WETLAND 2012-RS-27 - STATION 1676+42 TO 1677+78 CLASS II
VERNAL POOLS					
SIGNIFICANT NATURAL COMMUNITIES					
RTE SPECIES	2012-RTE-CT-051	2012-RTE-AT-053, 2012-RTE-LV-053, 2012-RTE-LV-054, 2012-RTE-LV-057, 2012-RTE-LV-059, 060, 2012-RTE-CT-061		2012-RTE-AT-063	
NRC WILDLIFE HABITAT					
ARCHAEOLOGY SITES					

MATCH LINE | MATCH LINE

VHB Vanasse Hangen Brustlin, Inc.

DESCRIPTION		BID INITIALS	BID DATE	CONSTRUCTION INITIALS	CONSTRUCTION DATE
	ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
	DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
	DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
	DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
	DESIGN MANAGER	SAB	06/28/13	JEO	05/2016

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. ADDISON COUNTY, VERMONT

Vermont Gas

CHA
38 Eastwood Drive, Suite 105
South Burlington, VT 05403
Main: (802) 735-0372 · www.chacompanies.com

DWG. NO.	REFERENCE DWG.	REV	DSN	CK
ANGP-T-C-066	ALIGNMENT SHEET			

YEAR: 2016 | W.O. | SCALE: 1" = 100' | DWG. ANGP-EPSC-066 | REV. 0

RIGHT-OF-WAY

MATCHLINE

213
N/F
CHOINIERE, JAMES & SHERRY

214
N/F
ELGIN SPRING FARM

215
N/F
SMITH, HARVEY

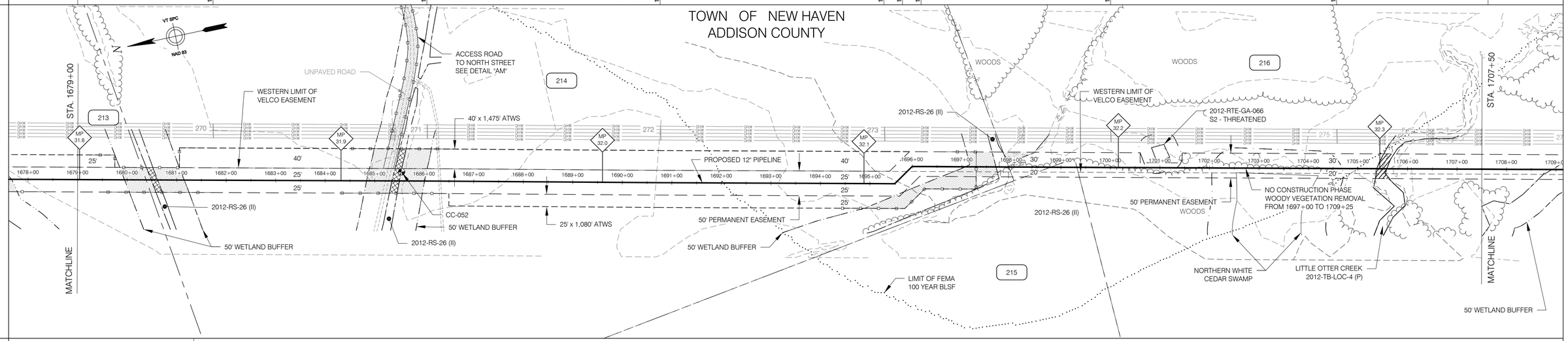
216
N/F
FOUR-HILLS FARM PARTNERSHIP

MATCH LINE

SURVEY DATA

S 12° 17' W — 00°00' LT — 1681+74
S 12° 17' W — 00°10' RT — 1686+06
S 12° 28' W — 00°10' LT — 1690+77
S 12° 17' W — 00°02' RT — 1695+29
S 12° 20' W — 44°59' LT — 1695+50
S 32° 40' E — 45°00' RT — 1695+89
S 12° 20' W — 00°01' LT — 1700+01
S 12° 19' W — 00°00' RT — 1704+57
S 12° 19' W

ALIGNMENT DETAIL



EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

PERMANENT EASEMENT	— — — —
TEMPORARY WORKSPACE	- - - - - -
CENTERLINE OF STREAM	—·—·—
TEMPORARY STREAM CROSSING	▨
WETLAND	···
50' WETLAND BUFFER	—··—··—
TEMPORARY WETLAND MATTING	▩
WETLAND BUFFER WITHIN PROJECT AREA	░
REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL	—□—□—□—

INSTALL CONSTRUCTION DEMARCATION:
STA. 1679+00 TO 1686+50 RT - 25' FROM NEW 12" PIPE ℄
STA. 1679+00 TO 1679+75 LT - 50' FROM NEW 12" PIPE ℄
STA. 1679+75 TO 1681+05 LT - 25' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1679+55 TO 1681+74 RT - 25' FROM NEW 12" PIPE ℄
STA. 1679+25 TO 1681+46 LT - 50' FROM NEW 12" PIPE ℄

INSTALL MATTING:
STA. 1680+48 TO 1680+62

INSTALL CONSTRUCTION DEMARCATION:
STA. 1686+50 TO 1696+25 RT - 50' FROM NEW 12" PIPE ℄
STA. 1681+05 TO 1695+50 LT - 65' FROM NEW 12" PIPE ℄
STA. 1696+25 TO 1697+29 RT - 45' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1684+29 TO 1686+46 RT - 25' FROM NEW 12" PIPE ℄
STA. 1684+46 TO 1685+23 LT - 50' FROM NEW 12" PIPE ℄
STA. 1685+44 TO 1686+56 LT - 50' FROM NEW 12" PIPE ℄

INSTALL STABALIZED CONSTRUCTION ENTRANCE:
STA. 1685+33

INSTALL MATTING:
STA. 1685+34 TO 1685+50

INSTALL CONSTRUCTION DEMARCATION:
STA. 1697+29 TO 1707+50 RT - 20' FROM NEW 12" PIPE ℄
STA. 1695+50 TO 1695+99 LT - WIDTH VARIES' FROM NEW 12" PIPE ℄
STA. 1695+99 TO 1700+60 LT - 30' FROM NEW 12" PIPE ℄
STA. 1700+60 TO 1701+45 LT - 10' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1694+38 TO 1696+25 RT - 50' FROM NEW 12" PIPE ℄
STA. 1696+25 TO 1697+29 RT - 45' FROM NEW 12" PIPE ℄
STA. 1696+59 TO 1697+29 LT - 30' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1701+45 TO 1707+50 LT - 30' FROM NEW 12" PIPE ℄

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

HORIZONTAL SCALE
100 50 0 100 200 300 feet
100 50 0 100 200 300 feet
VERTICAL SCALE

CONST. TYPE: (1A) (2A) (W) (W) (1A) (W) (8)

SOIL TYPE: Cv (PAS) — Cv (PAS) — Lk — Sw (PAS) — Cv (PAS) — Lk — Wo (PAS) — DaA

LC/LU: GRASS — PASTURE — FORESTED/POWERLINES
AGRICULTURE — NOT CLASSIFIED

STREAMS: STREAM 2012-TB-LOC-4 (P) STATION 1705+35 TO 1705+73 "LITTLE OTTER CREEK"

WETLANDS: WETLAND 2012-RS-26 - STATION 1679+75 TO 1681+25 CLASS II — WETLAND 2012-RS-26 - STATION 1684+79 TO 1686+07 CLASS II — WETLAND 2012-RS-26 - STATION 1694+92 TO 1707+50 CLASS II

VERNAL POOLS

SIGNIFICANT NATURAL COMMUNITIES

RTE SPECIES: 2012-RTE-GA-066

NRC WILDLIFE HABITAT

ARCHAEOLOGY SITES

MATCH LINE

MATCH LINE

DWG. NO.	REFERENCE DWG.
ANGP-T-G-07-010	ACCESS ROAD DETAILS
ANGP-T-C-067	ALIGNMENT SHEET

REV	DSN	CK	DESCRIPTION

	BID INITIALS	BID DATE	CONSTRUCTION INITIALS	CONSTRUCTION DATE
ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
DESIGN MANAGER	SAB	06/28/13	JEO	05/2016

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. ADDISON COUNTY, VERMONT

Vermont Gas

VHB Vanasse Hangen Brustlin, Inc.

CHA
38 Eastwood Drive, Suite 105
South Burlington, VT 05403
Main: (802) 735-0372 • www.chacompanies.com

YEAR: 2016 | W.O. | SCALE: 1" = 100' | DWG. ANGP-EPSC-067 | REV. 0

RIGHT-OF-WAY

MATCHLINE

216 N/F FOUR-HILLS FARM

216.01 PLANK ROAD

217 N/F ELGIN SPRING FARM

219 N/F LUTTON, DAVID

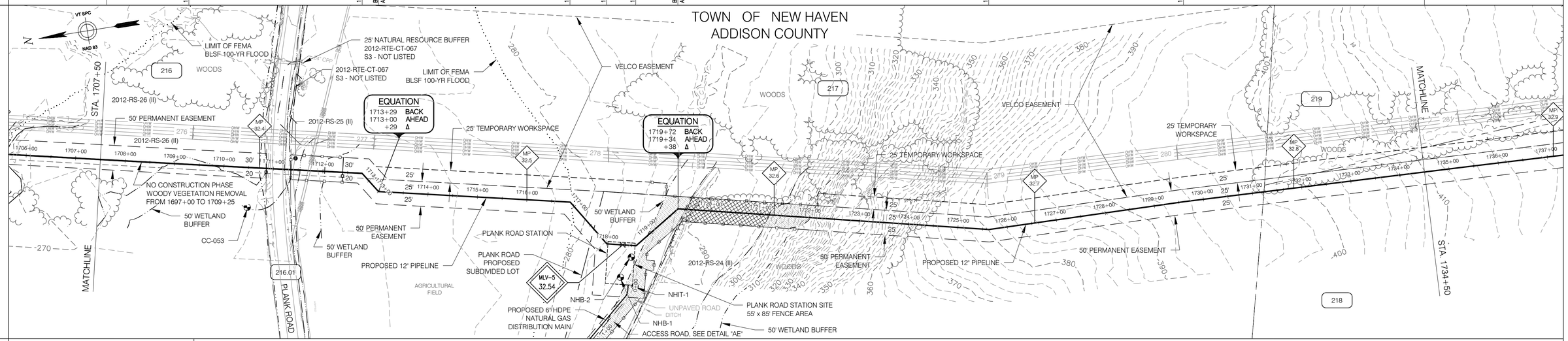
218 N/F ELGIN SPRING FARM

MATCHLINE

SURVEY DATA

1709+29	00°14" RT	1712+79	45°01" RT	29 ft.	1716+88	45°33" RT	44°59" LT	1718+00	45°00" LT	1718+59	38.4 ft.	1725+63	11°55" LT	1729+60	01°05" RT
S 12° 19" W		S 12° 06" W		S 57° 07" W	S 12° 18" W		S 57° 52" W	S 12° 52" W		S 32° 08" E	S 12° 57" W		S 01° 01" W		S 02° 07" W
				Bck: 1713+29 Ahd: 1713+00 44°59" LT							Bck: 1719+72 Ahd: 1719+34 45°05" RT				

ALIGNMENT DETAIL



EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

- PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- CENTERLINE OF STREAM
- TEMPORARY STREAM CROSSING
- WETLAND
- 50' WETLAND BUFFER
- TEMPORARY WETLAND MATTING
- WETLAND BUFFER WITHIN PROJECT AREA
- REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL

INSTALL CONSTRUCTION DEMARCATION:
STA. 1707+50 TO 1710+86 RT - 20' FROM NEW 12" PIPE ℄
STA. 1707+50 TO 1710+84 LT - 30' FROM NEW 12" PIPE ℄
STA. 1711+36 TO 1713+00 RT - 20' FROM NEW 12" PIPE ℄
STA. 1711+34 TO 1712+88 LT - 30' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1711+36 TO 1712+52 RT - 20' FROM NEW 12" PIPE ℄
STA. 1711+34 TO 1712+70 LT - 30' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1710+85

INSTALL CONSTRUCTION DEMARCATION:
STA. 1712+40

INSTALL MATTING:
STA. 1711+21 TO 1711+39

INSTALL CONSTRUCTION DEMARCATION:
STA. 1713+00 TO 1717+92 RT - 25' FROM NEW 12" PIPE ℄
STA. 1712+88 TO 1713+00 LT - WIDTH VARIES FROM NEW 12" PIPE ℄
STA. 1713+00 TO 1716+87 LT - 50' FROM NEW 12" PIPE ℄

INSTALL MATTING:
STA. 1719+57 TO 1721+60

INSTALL CONSTRUCTION DEMARCATION:
STA. 1717+92 TO 1718+66 RT - WIDTH VARIES' FROM NEW 12" PIPE ℄
STA. 1716+87 TO 1719+34 LT - WIDTH VARIES' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1718+00 TO 1718+66 RT - WIDTH VARIES' FROM NEW 12" PIPE ℄
STA. 1718+66 TO 1722+12 RT - 25' FROM NEW 12" PIPE ℄
STA. 1719+60 TO 1719+72 LT - WIDTH VARIES FROM NEW 12" PIPE ℄
STA. 1719+34 TO 1722+20 LT - 25' FROM NEW 12" PIPE ℄
STA. 1722+20 TO 1722+64 LT - 50' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1718+66 TO 1734+50 RT - 25' FROM NEW 12" PIPE ℄
STA. 1719+34 TO 1722+20 LT - 25' FROM NEW 12" PIPE ℄
STA. 1722+20 TO 1734+50 LT - 50' FROM NEW 12" PIPE ℄

HORIZONTAL SCALE
100 50 0 100 200 300 feet
VERTICAL SCALE
100 50 0 100 200 300 feet

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

CONST. TYPE		W	8		W	1A		W	2A		1A					
SOIL TYPE		Wo	DaA	Wo (PAS)		Cw (PAS)	NsD	NeC	NeC (PAS)	NeB (PAS)	NsC					
LC/LU		FORESTED / AGRICULTURAL/POWERLINE		PAVED / TRAVEL	CROPS		FORESTED		CROPS / AGRICULTURAL/POWERLINE							
STREAMS																
WETLANDS	MATCH LINE	WETLAND 2012-RS-26 - STATION 1707+50 TO 1710+85 CLASS II		WETLAND 2012-RS-25 - STATION 1710+85 TO 1712+18 CLASS II			WETLAND 2012-RS-24 - STATION 1718+88 TO 1722+14 CLASS II									MATCH LINE
VERNAL POOLS																
SIGNIFICANT NATURAL COMMUNITIES																
RTE SPECIES																
NRC WILDLIFE HABITAT																
ARCHAEOLOGY SITES																

VHB Vanasse Hangen Brustlin, Inc.

DWG. NO.	REFERENCE DWG.	REV	DSN	CK		DESCRIPTION		BID INITIALS	BID DATE	CONSTRUCTION INITIALS	CONSTRUCTION DATE
							ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
ANGP-T-G-07-010	ACCESS ROAD DETAILS						DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
ANGP-D1-C-01	EPSC PLAN						DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
ANGP-T-G-021	STATION AND VALVE DETAILS						DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
ANGP-T-C-068	ALIGNMENT SHEET	1	GJM	TDB		VHB HDD AREA REVISIONS (6/24/15)	DESIGN MANAGER	SAB	06/28/13	JEO	05/2016

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. ADDISON COUNTY, VERMONT

Vermont Gas

CHA
38 Eastwood Drive, Suite 105
South Burlington, VT 05403
Main: (802) 735-0372 · www.chacompanies.com

YEAR: 2016 | W.O. | SCALE: 1"=100' | DWG. ANGP-EPSC-068 | REV. 1

EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

PERMANENT EASEMENT	— — — — —
TEMPORARY WORKSPACE	- - - - - - - -
CENTERLINE OF STREAM	—— - —— - ——
TEMPORARY STREAM CROSSING	▨
WETLAND	—·—·—
50' WETLAND BUFFER	— · · — · · —
TEMPORARY WETLAND MATTING	▩
WETLAND BUFFER WITHIN PROJECT AREA	░
REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL	—□—□—□—

INSTALL CONSTRUCTION DEMARCATION:
STA. 1734+50 TO 1747+05 RT - 25' FROM NEW 12" PIPE ℄
STA. 1734+50 TO 1755+51 LT - 50' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1747+05 TO 1748+05 RT - 75' FROM NEW 12" PIPE ℄

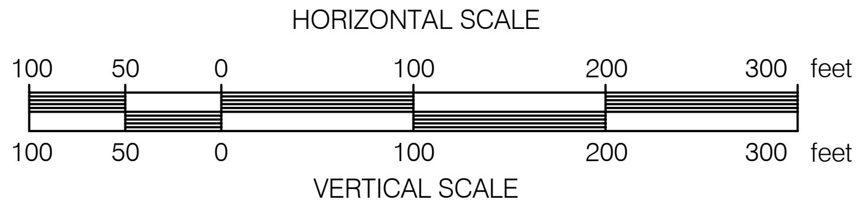
INSTALL CONSTRUCTION DEMARCATION:
STA. 1748+05 TO 1755+51 RT - 50' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1755+51 TO 1761+96 RT - 25' FROM NEW 12" PIPE ℄
STA. 1755+51 TO 1761+97 LT - 25' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1761+96 TO 1763+96 RT - 50' FROM NEW 12" PIPE ℄
STA. 1763+96 TO 1764+00 RT - 25' FROM NEW 12" PIPE ℄
STA. 1761+97 TO 1764+00 LT - 50' FROM NEW 12" PIPE ℄

INSTALL STABILIZED CONSTRUCTION ENTRANCE:
STA. 1747+59

INSTALL MATTING:
STA. 1757+59 TO 1759+88



1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

CONST. TYPE	(1A)		(2A) (A)	(1A)
SOIL TYPE	NsC	MrB (PAS)		AdB (PAS)
LC/LU	CROPS AGRICULTURAL/POWERLINE			
STREAMS				
WETLANDS				
VERNAL POOLS				
SIGNIFICANT NATURAL COMMUNITIES				
RTE SPECIES				
NRC WILDLIFE HABITAT				
ARCHAEOLOGY SITES			VT-AD-446	

MATCH LINE

MATCH LINE

DWG. NO.	REFERENCE DWG.	REV	DSN	CK	DESCRIPTION
ANGP-T-G-07-010	ACCESS ROAD DETAILS				
ANGP-T-C-069	ALIGNMENT SHEET	1	GJM	BCK	IFC 2016 EDITS (05/2016)

	BID INITIALS	BID DATE	CONSTRUCTION INITIALS	CONSTRUCTION DATE
ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
DESIGN MANAGER	SAB	06/28/13	JEO	05/2016

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. ADDISON COUNTY, VERMONT

Vermont Gas

VHB Vanasse Hangen Brustlin, Inc.

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South Burlington, VT 05403
Main: (802) 735-0372 · www.chacompanies.com

YEAR: 2016	W.O.	SCALE: 1"=100'	DWG. ANGP-EPSC-069	REV. 1

RIGHT-OF-WAY

MATCHLINE

218	220.02	221	222
N/F ELGIN SPRING FARM	QUARRY ROAD	N/F FARNSWORTH, RALPH & YVONNE	N/F SMITH, JEAN

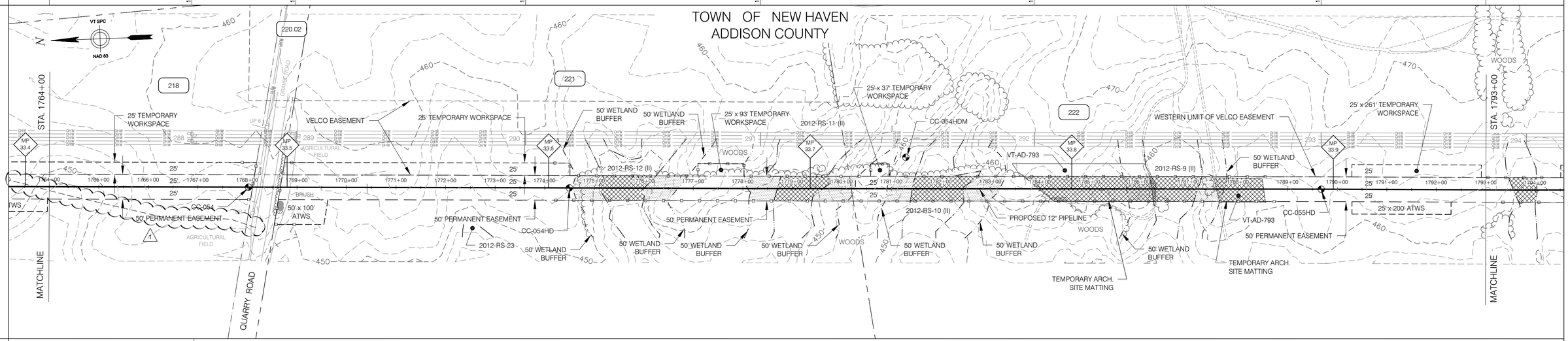
MATCHLINE

SURVEY DATA

S 02° 12' W	S 02° 11' W	S 02° 11' W	S 02° 18' W	S 02° 07' W	S 02° 09' W	S 02° 17' W

00°01' LT 1766+88; 00°00' LT 1768+98; 00°06' RT 1773+62; 00°10' LT 1778+36; 00°01' RT 1783+88; 00°08' RT 1789+68

ALIGNMENT DETAIL



EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

PERMANENT EASEMENT	— — —
TEMPORARY WORKSPACE	- - - -
CENTERLINE OF STREAM	— - —
TEMPORARY STREAM CROSSING	▨
WETLAND	
50' WETLAND BUFFER	— - - —
TEMPORARY WETLAND MATTING	▩
WETLAND BUFFER WITHIN PROJECT AREA	░
REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL	—□—□—

INSTALL CONSTRUCTION DEMARCATION:
STA. 1764+00 TO 1768+06 RT - 25' FROM NEW 12" PIPE ℄
STA. 1764+00 TO 1768+18 LT - 50' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1768+54 TO 1769+54 RT - 75' FROM NEW 12" PIPE ℄
STA. 1768+75 TO 1774+51 LT - 50' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1769+54 TO 1790+30 RT - 25' FROM NEW 12" PIPE ℄
STA. 1774+51 TO 1777+09 LT - 25' FROM NEW 12" PIPE ℄
STA. 1777+09 TO 1778+02 LT - 50' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1778+02 TO 1780+58 LT - 25' FROM NEW 12" PIPE ℄
STA. 1780+58 TO 1780+95 LT - 50' FROM NEW 12" PIPE ℄
STA. 1780+95 TO 1790+29 LT - 25' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1790+30 TO 1792+30 RT - 50' FROM NEW 12" PIPE ℄
STA. 1792+30 TO 1793+00 RT - 25' FROM NEW 12" PIPE ℄
STA. 1790+29 TO 1792+91 LT - 50' FROM NEW 12" PIPE ℄
STA. 1792+91 TO 1793+00 LT - 25' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1767+56 TO 1768+06 RT - 25' FROM NEW 12" PIPE ℄
STA. 1767+68 TO 1768+18 LT - 50' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1768+54 TO 1769+04 RT - 75' FROM NEW 12" PIPE ℄
STA. 1768+75 TO 1769+25 LT - 50' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1774+15 TO 1789+05 RT - 25' FROM NEW 12" PIPE ℄
STA. 1774+01 TO 1774+51 LT - 50' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1774+51 TO 1777+09 LT - 25' FROM NEW 12" PIPE ℄
STA. 1777+09 TO 1778+02 LT - 50' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1778+02 TO 1780+58 LT - 25' FROM NEW 12" PIPE ℄
STA. 1780+58 TO 1780+95 LT - 50' FROM NEW 12" PIPE ℄
STA. 1780+95 TO 1788+99 LT - 25' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1792+91 TO 1793+00 LT - 25' FROM NEW 12" PIPE ℄

INSTALL STABILIZED CONSTRUCTION ENTRANCE:
STA. 1768+14 & STA. 1768+61

INSTALL MATTING:
STA. 1775+08 TO 1776+25

INSTALL MATTING:
STA. 1778+62 TO 1779+78

INSTALL MATTING:
STA. 1781+38 TO 1782+75

INSTALL MATTING:
STA. 1783+66 TO 1787+24

INSTALL MATTING:
STA. 1787+50 TO 1788+55

HORIZONTAL SCALE
100 50 0 100 200 300 feet
100 50 0 100 200 300 feet
VERTICAL SCALE

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

CONST. TYPE	1A, 11, 1A, W 2A, 1A, W 2A, 1A, 2A W, 2A, A, W, A, 1A, 2A
SOIL TYPE	AdB (PAS), VgB (PAS), AdB (PAS), MrB (PAS), VgB (PAS), Sw (PAS), MrB (PAS), NsD (PAS)
LC/LU	CROPS / AGRICULTURAL/POWERLINE; UNPAVED / TRAVEL; PASTURE / AGRICULTURAL; FORESTED / POWERLINE/NOT CLASSIFIED; PASTURE / AGRICULTURAL; FORESTED / NOT CLASSIFIED; PASTURE / AGRICULTURAL
STREAMS	
WETLANDS	WETLAND 2012-RS-12 - STATION 1774+58 TO 1776+89 CLASS II; WETLAND 2012-RS-11 - STATION 1778+02 TO 1780+33 CLASS II; WETLAND 2012-RS-10 - STATION 1780+87 TO 1783+29 CLASS II; WETLAND 2012-RS-9 - STATION 1785+68 TO 1787+77 CLASS II
VERNAL POOLS	
SIGNIFICANT NATURAL COMMUNITIES	
RTE SPECIES	
NRC WILDLIFE HABITAT	
ARCHAEOLOGY SITES	VT-AD-793; VT-AD-793

MATCH LINE

MATCH LINE

DWG. NO.	REFERENCE DWG.	REV	DSN	CK	DESCRIPTION
ANGP-T-C-070	ALIGNMENT SHEET	1	GJM	BCK	IFC 2016 EDITS (05/2016)

	BID INITIALS	BID DATE	CONSTRUCTION INITIALS	CONSTRUCTION DATE
ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
DESIGN MANAGER	SAB	06/28/13	JEO	05/2016

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. ADDISON COUNTY, VERMONT

Vermont Gas

VHB Vanasse Hangen Brustlin, Inc.

CHA
38 Eastwood Drive, Suite 105
South Burlington, VT 05403
Main: (802) 735-0372 · www.chacompanies.com

YEAR: 2016 | W.O. | SCALE: 1"=100' | DWG. ANGP-EPSC-070 | REV. 1

RIGHT-OF-WAY

MATCHLINE

222
N/F
SMITH, JEAN

223
N/F
SMITH, JEAN

224
N/F
FOUR-HILLS FARM

225
N/F
FOUR-HILLS FARM

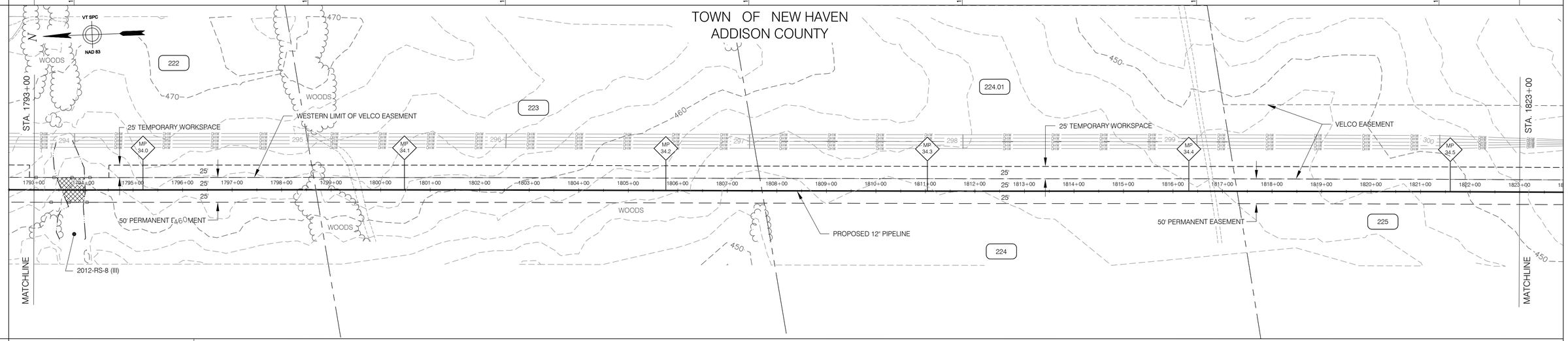
MATCHLINE

SURVEY DATA

S 02° 17' W | 00°15' LT | 00°06' RT | S 02° 02' W | 00°06' RT | S 02° 08' W | 00°05' LT | S 02° 15' W | 00°05' LT | S 02° 10' W | 00°06' RT | S 02° 05' W | 00°09' RT | S 02° 12' W | S 02° 21' W

1793+82 | 1798+54 | 1802+53 | 1807+44 | 1811+76 | 1816+49 | 1821+38

ALIGNMENT DETAIL



EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

- PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- CENTERLINE OF STREAM
- TEMPORARY STREAM CROSSING
- WETLAND
- 50' WETLAND BUFFER
- TEMPORARY WETLAND MATTING
- WETLAND BUFFER WITHIN PROJECT AREA
- REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL

INSTALL CONSTRUCTION DEMARCATION:
STA. 1793+00 TO 1823+00 RT - 25' FROM NEW 12" PIPE ℄
STA. 1793+00 TO 1794+51 LT - 25' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1794+51 TO 1823+00 LT - 50' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1793+16 TO 1794+50 RT - 25' FROM NEW 12" PIPE ℄
STA. 1793+00 TO 1794+51 LT - 25' FROM NEW 12" PIPE ℄

INSTALL MATTING:
STA. 1793+46 TO 1794+04

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

HORIZONTAL SCALE
100 50 0 100 200 300 feet
VERTICAL SCALE
100 50 0 100 200 300 feet

CONST. TYPE	2A	W	1A											
SOIL TYPE	NsD		MrB (PAS)			Cw (PAS)						RaB (PAS)		
LC/LU	PASTURE/FORESTED	POWERLINE	CROPS	AGRICULTURAL/POWERLINE	PASTURE/FORESTED	POWERLINE	CROPS	AGRICULTURAL/POWERLINE			CROPS		PASTURE	
STREAMS														
WETLANDS	MATCH LINE	WETLAND 2012-RS-8 - STATION 1793+46 TO 1794+04 CLASS III												MATCH LINE
VERNAL POOLS														
SIGNIFICANT NATURAL COMMUNITIES														
RTE SPECIES														
NRC WILDLIFE HABITAT														
ARCHAEOLOGY SITES														

Vanasse Hangen Brustlin, Inc.

DWG. NO.	REFERENCE DWG.	REV	DSN	CK	DESCRIPTION		BID INITIALS	BID DATE	CONSTRUCTION INITIALS	CONSTRUCTION DATE
ANGP-T-C-071	ALIGNMENT SHEET				ENVIRONMENTAL		JLS	06/28/13	JLS	05/2016
					DRAFTING DESIGNER		GIL	06/28/13	GJM	05/2016
					DRAFTING SUPERVISOR		BZD	06/28/13	BCK	05/2016
					DESIGN ENGINEER		MDF	06/28/13	GEW	05/2016
					DESIGN MANAGER		SAB	06/28/13	JEO	05/2016

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. ADDISON COUNTY, VERMONT

Vermont Gas

CHA
38 Eastwood Drive, Suite 105
South Burlington, VT 05403
Main: (802) 735-0372 · www.chacompanies.com

YEAR: 2016 | W.O. | SCALE: 1"=100' | DWG. ANGP-EPSC-071 | REV. 0

RIGHT-OF-WAY

MATCHLINE

225	226	226.01	229	231
N/F FOUR-HILLS FARM	N/F ELGIN SPRING FARM	ROUTE 17	N/F VERMONT TRANSCO, LLC	N/F VERMONT TRANSCO, LLC

MATCHLINE

SURVEY DATA

Station	Angle / offset	Bearing
		S 02° 21' W
1824+59	44°59' RT	S 47° 21' W
1824+79	35°32' RT	S 82° 54' W
1826+30	00°00' LT	S 82° 54' W
1829+69	33°15' LT	S 49° 38' W
1829+91	45°00' LT	S 04° 38' W
Bck: 1830+30 Ahd: 1830+44	-14.0 ft.	S 04° 38' W
1835+49	00°00' LT	S 04° 38' W
1836+37	28°10' RT	S 32° 48' W
1841+64	19°31' LT	S 13° 17' W
Bck: 1842+98 Ahd: 1843+00	-2.2 ft. 18°29' LT	S 05° 13' E
1851+40	17°59' RT	S 12° 46' W

ALIGNMENT DETAIL

EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

PERMANENT EASEMENT	— — —
TEMPORARY WORKSPACE	- - - -
CENTERLINE OF STREAM	— - —
TEMPORARY STREAM CROSSING	▨
WETLAND	
50' WETLAND BUFFER	— · — · —
TEMPORARY WETLAND MATTING	▩
WETLAND BUFFER WITHIN PROJECT AREA	⁘
REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL	—□—□—

INSTALL CONSTRUCTION DEMARCATION:
STA. 1823+00 TO 1824+49 RT - 25' FROM NEW 12" PIPE ℄
STA. 1823+00 TO 1824+59 LT - 50' FROM NEW 12" PIPE ℄
STA. 1824+49 TO 1824+85 RT - WIDTH VARIES FROM NEW 12" PIPE ℄
STA. 1824+59 TO 1824+79 LT - WIDTH VARIES FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1824+85 TO 1829+69 RT - 25' FROM NEW 12" PIPE ℄
STA. 1824+79 TO 1829+44 LT - 50' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1829+69 TO 1829+91 RT - WIDTH VARIES FROM NEW 12" PIPE ℄
STA. 1829+44 TO 1830+19 LT - WIDTH VARIES FROM NEW 12" PIPE ℄
STA. 1829+91 TO 1839+33 RT - 25' FROM NEW 12" PIPE ℄
STA. 1830+19 TO 1839+33 LT - 50' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1841+75 TO 1842+24 RT - WIDTH VARIES FROM NEW 12" PIPE ℄
STA. 1840+50 TO 1841+00 LT - WIDTH VARIES FROM NEW 12" PIPE ℄

INSTALL STABILIZED CONSTRUCTION ENTRANCE:
STA. 1841+78

INSTALL CONSTRUCTION DEMARCATION:
STA. 1839+33 TO 1841+60 RT - 75' FROM NEW 12" PIPE ℄
STA. 1839+33 TO 1841+00 LT - 125' FROM NEW 12" PIPE ℄
STA. 1841+60 TO 1842+24 RT - WIDTH VARIES FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1842+77 TO 1843+20 RT - WIDTH VARIES FROM NEW 12" PIPE ℄
STA. 1842+50 TO 1843+17 LT - WIDTH VARIES FROM NEW 12" PIPE ℄

INSTALL STABILIZED CONSTRUCTION ENTRANCE:
STA. 1842+59

INSTALL CONSTRUCTION DEMARCATION:
STA. 1842+77 TO 1843+00 RT - WIDTH VARIES FROM NEW 12" PIPE ℄
STA. 1842+50 TO 1843+00 LT - WIDTH VARIES FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1843+00 TO 1851+50 RT - 25' FROM NEW 12" PIPE ℄
STA. 1843+00 TO 1851+50 LT - 50' FROM NEW 12" PIPE ℄

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

HORIZONTAL SCALE
100 50 0 100 200 300 feet
100 50 0 100 200 300 feet
VERTICAL SCALE

CONST. TYPE	(1A)	(1H)	(1A)		(9)	(1H)		
SOIL TYPE	RaB (PAS)	NeB (PAS)	Cw (PAS)	NeB (PAS)	VgB (PAS)	NsC	VgB	
LC/LU	PASTURE AGRICULTURAL/POWERLINE				PAVED TRAVEL	CROPS/FORESTED AGRICULTURAL/POWERLINE	FORESTED POWERLINE	
STREAMS								
WETLANDS								
VERNAL POOLS								
SIGNIFICANT NATURAL COMMUNITIES								
RTE SPECIES								
NRC WILDLIFE HABITAT								
ARCHAEOLOGY SITES								

MATCH LINE

MATCH LINE

DWG. NO.	REFERENCE DWG.	REV	DSN	CK	DESCRIPTION
ANGP-T-C-072	ALIGNMENT SHEET				

	BID INITIALS	BID DATE	CONSTRUCTION INITIALS	CONSTRUCTION DATE
ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
DESIGN MANAGER	SAB	06/28/13	JEO	05/2016

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. ADDISON COUNTY, VERMONT

Vermont Gas

Vanasse Hangen Brustlin, Inc.

CHA
38 Eastwood Drive, Suite 105
South Burlington, VT 05403
Main: (802) 735-0372 · www.chacompanies.com

YEAR: 2016 | W.O. | SCALE: 1"=100' | DWG. ANGP-EPSC-072 | REV. 0

RIGHT-OF-WAY

MATCHLINE

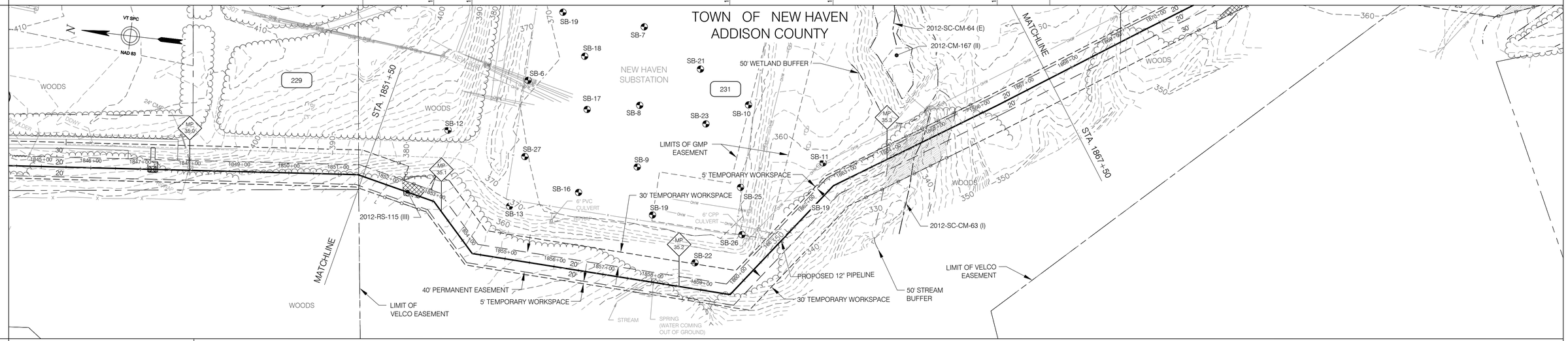
231
N/F
VERMONT TRANSCO

MATCH LINE

SURVEY DATA

1853+02	34°15" RT	S 12° 46" W	1854+33	44°39" LT	S 47° 02" W	S 02° 22" W	1859+60	55°34" LT	S 53° 12" E	1862+63	20°23" RT	S 32° 49" E	1866+33	01°03" LT	S 33° 52" E

ALIGNMENT DETAIL



EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

- PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- CENTERLINE OF STREAM
- TEMPORARY STREAM CROSSING
- WETLAND
- 50' WETLAND BUFFER
- TEMPORARY WETLAND MATTING
- WETLAND BUFFER WITHIN PROJECT AREA
- REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL

INSTALL CONSTRUCTION DEMARCATION:
STA. 1851+50 TO 1859+60 RT - 25' FROM NEW 12" PIPE ℄
STA. 1851+50 TO 1852+31 LT - 50' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1852+31 TO 1852+89 LT - 25' FROM NEW 12" PIPE ℄
STA. 1852+89 TO 1859+60 LT - 50' FROM NEW 12" PIPE ℄
STA. 1859+60 TO 1859+64 RT - WIDTH VARIES FROM NEW 12" PIPE ℄
STA. 1859+60 TO 1860+04 LT - WIDTH VARIES FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1859+64 TO 1867+50 RT - 50' FROM NEW 12" PIPE ℄
STA. 1860+04 TO 1867+50 LT - 25' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1851+94 TO 1853+28 RT - 25' FROM NEW 12" PIPE ℄
STA. 1851+90 TO 1852+31 LT - 50' FROM NEW 12" PIPE ℄
STA. 1852+31 TO 1852+89 LT - 25' FROM NEW 12" PIPE ℄
STA. 1852+89 TO 1853+11 LT - 50' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1863+02 TO 1865+29 RT - 50' FROM NEW 12" PIPE ℄
STA. 1863+62 TO 1866+00 LT - 20' FROM NEW 12" PIPE ℄

INSTALL MATTING:
STA. 1852+29 TO 1852+30

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

HORIZONTAL SCALE
100 50 0 100 200 300 feet
VERTICAL SCALE
100 50 0 100 200 300 feet

CONST. TYPE		W	1H	1J
SOIL TYPE	MATCH LINE	VgB (PAS); NsD		VgB (PAS)
LC/LU		FORESTED / NOT CLASSIFIED		PASTURE / AGRICULTURAL/POWERLINE
STREAMS				STREAM 2012-SC-CM-63 - (I) STATION 1863+47 TO 1865+48
WETLANDS		WETLAND 2012-RS-115 - STATION 1852+29 TO 1852+30 CLASS III		MATCH LINE
VERNAL POOLS				
SIGNIFICANT NATURAL COMMUNITIES				
RTE SPECIES				
NRC WILDLIFE HABITAT				
ARCHAEOLOGY SITES				

DWG. NO.	REFERENCE DWG.	REV	DSN	CK	DESCRIPTION
ANGP-T-C-073	ALIGNMENT SHEET				

	BID		CONSTRUCTION	
	INITIALS	DATE	INITIALS	DATE
ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
DESIGN MANAGER	SAB	06/28/13	JEO	05/2016

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. ADDISON COUNTY, VERMONT

YEAR: 2016 | W.O. | SCALE: 1"=100' | DWG. ANGP-EPSC-073 | REV. 0

Vermont Gas

VHB Vanasse Hangen Brustlin, Inc.

CHA
38 Eastwood Drive, Suite 105
South Burlington, VT 05403
Main: (802) 735-0372 · www.chacompanies.com

RIGHT-OF-WAY						
MATCHLINE	231 N/F VERMONT TRANSCO	232 N/F COUSINO, EUGENE & LINDA	233.01 TOWN HILL ROAD	234.01 N/F SHORTSLEEVE, GEORGE & JANE	234 N/F SHORTSLEEVE, GEORGE & JANE	236 N/F MAINE DRILLING AND BLASTING

MATCHLINE

SURVEY DATA

S 33° 52' E — 1869+68 — 00°25' RT

S 33° 26' E — 1872+80 — 35°19' RT

S 01° 54' W — Bck: 1877+11 Ahd: 1877+27 22.54' LT — −15.9 ft.

S 21° 01' E — 1881+19 — 21°37' LT

S 42° 38' E — 1883+51 — 14°07' RT

S 28° 30' E — 1885+33 — 30°38' RT

S 02° 09' W — 1886+46 — 00°03' RT

S 02° 12' W

2

ALIGNMENT DETAIL

EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

PERMANENT EASEMENT	— — —
TEMPORARY WORKSPACE	– – – –
CENTERLINE OF STREAM	— · —
TEMPORARY STREAM CROSSING	▨
WETLAND	
50' WETLAND BUFFER	— · · —
TEMPORARY WETLAND MATTING	▩
WETLAND BUFFER WITHIN PROJECT AREA	░
REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL	—□—

INSTALL CONSTRUCTION DEMARCATION:
STA. 1867+50 TO 1881+68 RT - 50' FROM NEW 12" PIPE ℄
STA. 1867+50 TO 1881+56 LT - 25' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1870+55 TO 1872+07 RT - 50' FROM NEW 12" PIPE ℄
STA. 1871+12 TO 1872+67 LT - 25' FROM NEW 12" PIPE ℄

INSTALL MATTING:
STA. 1871+00 TO 1872+20

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1876+70 TO 1881+68 RT - 50' FROM NEW 12" PIPE ℄

INSTALL MATTING:
STA. 1878+62 TO 1880+08

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1880+97 TO 1881+56 LT - 25' FROM NEW 12" PIPE ℄

INSTALL STABILIZED CONSTRUCTION ENTRANCE:
STA. 1881+63 & STA. 1882+30

INSTALL CONSTRUCTION DEMARCATION:
STA. 1882+34 TO 1888+98 RT - 50' FROM NEW 12" PIPE ℄
STA. 1882+14 TO 1883+14 LT - 75' FROM NEW 12" PIPE ℄
STA. 1883+14 TO 1886+98 LT - 25' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1882+34 TO 1883+25 RT - 50' FROM NEW 12" PIPE ℄
STA. 1882+14 TO 1882+65 LT - 75' FROM NEW 12" PIPE ℄
STA. 1884+63 TO 1886+64 LT - 25' FROM NEW 12" PIPE ℄

INSTALL MATTING:
STA. 1885+84 TO 1886+14

INSTALL CONSTRUCTION DEMARCATION:
STA. 1888+98 TO 1895+00 RT - 25' FROM NEW 12" PIPE ℄
STA. 1886+98 TO 1888+98 LT - 50' FROM NEW 12" PIPE ℄
STA. 1888+98 TO 1895+00 LT - 25' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1888+98

INSTALL MATTING:
STA. 1889+59 TO 1891+09

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

HORIZONTAL SCALE
100 50 0 100 200 300 feet
100 50 0 100 200 300 feet
VERTICAL SCALE

CONST. TYPE	1J W — 1E — 1J W — 9 — 1J — 1E — A — 8
SOIL TYPE	VgB (PAS) — Cv (PAS) — VgC (PAS)
LC/LU	PASTURE / AGRICULTURAL/POWERLINE — PAVED / TRAVEL — PASTURE — FORESTED — PASTURE / AGRICULTURAL/POWERLINE — FORESTED
STREAMS	STREAM 2012-TB-CM-62 - (P) STATION 1892+38 TO 1895+00
WETLANDS	WETLAND 2012-CM-165 - STATION 1871+03 TO 1872+16 CLASS III WETLAND 2012-CM-163 - STATION 1877+15 TO 1881+19 CLASS II WETLAND 2012-RS-110 - STATION 1885+13 TO 1885+60 CLASS II WETLAND 2012-CM-162 - STATION 1882+28 TO 1882+75 CLASS II WETLAND 2012-RS-113 - STATION 1885+84 TO 1886+14 CLASS III WETLAND 2012-CM-162 - STATION 1891+60 TO 1895+00 CLASS II
VERNAL POOLS	
SIGNIFICANT NATURAL COMMUNITIES	
RTE SPECIES	2012-RTE-CT-074, 076
NRC WILDLIFE HABITAT	
ARCHAEOLOGY SITES	VT-AD-806

MATCH LINE

MATCH LINE

DWG. NO.	REFERENCE DWG.	REV	DSN	CK	DESCRIPTION
		3	GJM	BCK	IFC 2016 EDITS (05/2016)
		2	BCK	BCK	SUPPLEMENTAL SURFACE INFO ADDED (3/16/16)
ANGP-T-C-074	ALIGNMENT SHEET	1	GJM	TDB	VHB HDD AREA REVISIONS (6/24/15)

	BID INITIALS	BID DATE	CONSTRUCTION INITIALS	CONSTRUCTION DATE
ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
DESIGN MANAGER	SAB	06/28/13	JEO	05/2016

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. ADDISON COUNTY, VERMONT

Vermont Gas

VHB Vanasse Hangen Brustlin, Inc.

CHA
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South Burlington, VT 05403
Main: (802) 735-0372 · www.chacompanies.com

YEAR: 2016 | W.O. | SCALE: 1"=100' | DWG. ANGP-EPSC-074 | REV. 3

RIGHT-OF-WAY

MATCHLINE

236
N/F
MAINE DRILLING AND BLASTING

237
N/F
PALMER, JOHN &
CARMEN

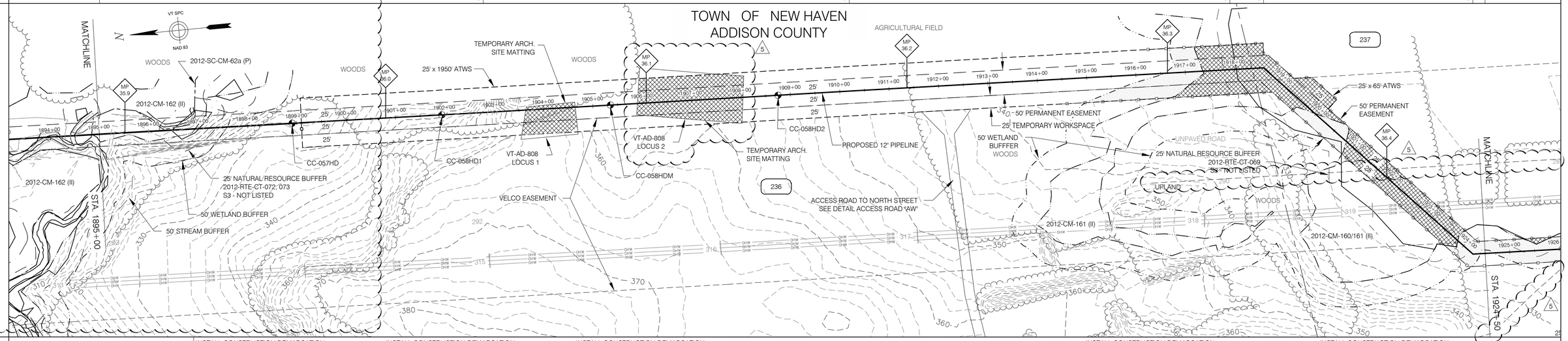
MATCHLINE

SURVEY DATA

S 02° 16' E | 00.00' LT | S 02° 09' E | 00.07' LT | S 02° 16' E | 00.07' LT | S 02° 09' E | 44.58' LT | S 47° 07' W | 44.54' LT | S 02° 13' W

1902+78 | 1910+19 | 1917+91 | 1918+59 | 1924+25

ALIGNMENT DETAIL



EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

- PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- CENTERLINE OF STREAM
- TEMPORARY STREAM CROSSING
- WETLAND
- 50' WETLAND BUFFER
- TEMPORARY WETLAND MATTING
- WETLAND BUFFER WITHIN PROJECT AREA
- REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL

INSTALL CONSTRUCTION DEMARCATION:
STA. 1895+00 TO 1899+09 RT - 25' FROM NEW 12" PIPE ℄
STA. 1895+00 TO 1899+10 LT - 25' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1899+09 TO 1919+04 RT - 50' FROM NEW 12" PIPE ℄
STA. 1899+10 TO 1918+59 LT - 50' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1899+09

INSTALL CONSTRUCTION DEMARCATION:
STA. 1919+04 TO 1924+50 RT - 25' FROM NEW 12" PIPE ℄
STA. 1918+59 TO 1919+19 LT - 25' FROM NEW 12" PIPE ℄
STA. 1919+19 TO 1919+44 LT - WIDTH VARIES FROM NEW 12" PIPE ℄
STA. 1919+44 TO 1920+12 LT - 50' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1920+12 TO 1924+50 LT - 25' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1914+46 TO 1919+04 RT - 50' FROM NEW 12" PIPE ℄
STA. 1916+21 TO 1919+04 LT - 50' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1919+04 TO 1924+50 RT - 25' FROM NEW 12" PIPE ℄
STA. 1919+19 TO 1919+44 LT - WIDTH VARIES FROM NEW 12" PIPE ℄
STA. 1919+44 TO 1920+12 LT - 50' FROM NEW 12" PIPE ℄
STA. 1920+12 TO 1924+50 LT - 25' FROM NEW 12" PIPE ℄

INSTALL MATTING:
STA. 1903+52 TO 1904+67
STA. 1905+87 TO 1908+08

INSTALL STABILIZED CONSTRUCTION ENTRANCE:
STA. 1912+00

INSTALL MATTING:
STA. 1916+67 TO 1923+91

HORIZONTAL SCALE
100 50 0 100 200 300 feet
VERTICAL SCALE
100 50 0 100 200 300 feet

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011) FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

CONST. TYPE	8							A			A		5	1E				W			W	2A	
SOIL TYPE	VgE			VgC (PAS)			VgE					VgD							Cw (PAS)				
LC/LU	WATER	FORESTED		CROP	PASTURE		FORESTED			PASTURE				CROP						PASTURE			CROP
	NOT CLASSFIED			AGRICULTURAL			NOT CLASSIFIED					POWER LINE		AGRICULTURAL						AGRICULTURAL/POWERLINE		AGRICULTURAL	
STREAMS	STREAM 2012-SC-CM-62a - (P) STATION 1896+00 TO 1896+90																						
WETLANDS	MATCH LINE	WETLAND 2012-CM-162 - STATION 1895+00 TO 1898+16 CLASS II																WETLAND 2012-CM-161 & 2012-CM-160 - STATION 1914+96 TO 1924+50 CLASS II						MATCH LINE
VERNAL POOLS																							
SIGNIFICANT NATURAL COMMUNITIES																							
RTE SPECIES	2012-RTE-CT-074		2012-RTE-CT-072, 073																2012-RTE-CT-069				
NRC WILDLIFE HABITAT																							
ARCHAEOLOGY SITES									VT-AD-808		VT-AD-808												

DWG. NO.	REFERENCE DWG.	REV	DSN	CK	DESCRIPTION		BID INITIALS	BID DATE	CONSTRUCTION INITIALS	CONSTRUCTION DATE
		5	GJM	BCK	IFC 2016 EDITS (05/2016)	ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
		4	BCK	BCK	SUPPLEMENTAL SURFACE INFO ADDED (3/16/16)	DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
		3	GJM	TDB	VHB HDD AREA REVISIONS (6/24/15)	DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
ANGP-T-G-07-010	ACCESS ROAD DETAILS	2	BCK	TDB	VHB EDITS (6/09/15)	DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
ANGP-T-C-075	ALIGNMENT SHEET	1	BCK	TDB	ACCESS ROAD "AG" REMOVED (5/14/15)	DESIGN MANAGER	SAB	06/28/13	JEO	05/2016

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. ADDISON COUNTY, VERMONT

YEAR: 2016 | W.O. | SCALE: 1"=100' | DWG. ANGP-EPSC-075 | REV. 5

Vermont Gas

VHB Vanasse Hangen Brustlin, Inc.

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RIGHT-OF-WAY

MATCHLINE

237
N/F
PALMER, JOHN & CARMEN

238
N/F
MIDDLEBURY AREA LAND TRUST

239
N/F
SARAH VIRGINIA
DeGANAHL VENTURE LLC.

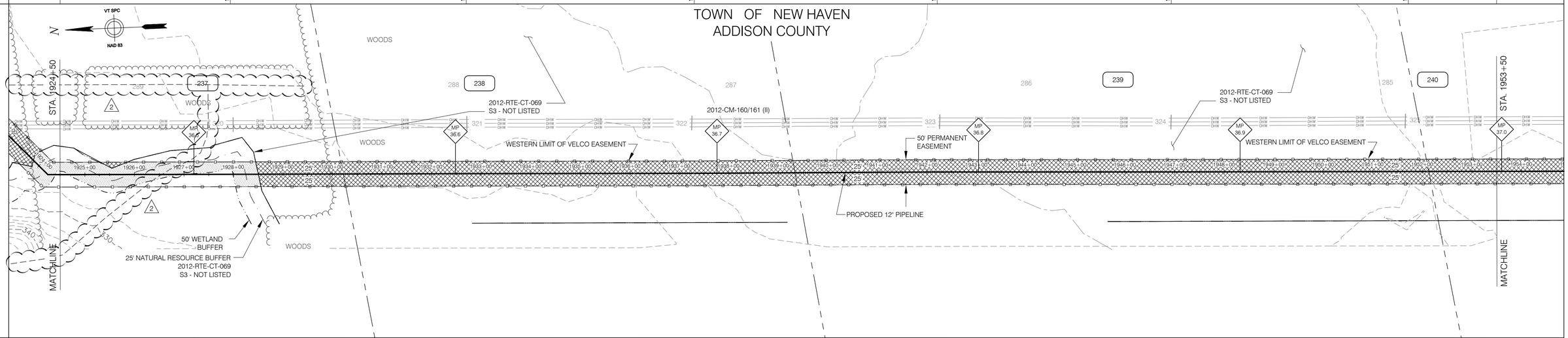
240
N/F
LIVINGSTON, PHIL

MATCHLINE

SURVEY DATA

00'02" LT		00'03" RT		00'13" LT		00'17" RT		00'05" LT		00'00" LT	
S 02° 12' W	1927+84	S 02° 10' W	1932+70	S 02° 14' W	1937+31	S 02° 00' W	1942+21	S 02° 18' W	1946+94	S 02° 13' W	1951+72	S 02° 12' W

ALIGNMENT DETAIL



EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

- PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- CENTERLINE OF STREAM
- TEMPORARY STREAM CROSSING
- WETLAND
- 50' WETLAND BUFFER
- TEMPORARY WETLAND MATTING
- WETLAND BUFFER WITHIN PROJECT AREA
- REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL

INSTALL CONSTRUCTION DEMARCATION:
STA. 1924+50 TO 1953+50 RT - 25' FROM NEW 12" PIPE ℄
STA. 1924+50 TO 1953+50 LT - 25' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1924+50 TO 1924+59 RT - WIDTH VARIES FROM NEW 12" PIPE ℄
STA. 1924+99 TO 1925+15 RT - WIDTH VARIES FROM NEW 12" PIPE ℄
STA. 1925+15 TO 1953+50 RT - 25' FROM NEW 12" PIPE ℄
STA. 1924+50 TO 1953+50 LT - 25' FROM NEW 12" PIPE ℄

INSTALL STABILIZED CONSTRUCTION ENTRANCE:
STA. 1924+96

INSTALL MATTING:
STA. 1925+28 TO 1925+86

INSTALL MATTING:
STA. 1928+45 TO 1953+50

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

HORIZONTAL SCALE
100 50 0 100 200 300 feet
VERTICAL SCALE
100 50 0 100 200 300 feet

CONST. TYPE	2A	W	2A		2A	W
SOIL TYPE	Cw (PAS)				Lh	
LC/LU	CROP / AGRICULTURAL				PASTURE / NOT CLASSIFIED	
STREAMS						
WETLANDS					WETLAND 2012-CM-160 STATION 1924+50 TO 1953+50 CLASS II	
VERNAL POOLS						
SIGNIFICANT NATURAL COMMUNITIES						
RTE SPECIES		2012-RTE-CT-069			2012-RTE-CT-069	
NRC WILDLIFE HABITAT						
ARCHAEOLOGY SITES						

MATCH LINE

MATCH LINE

VHB Vanasse Hangen Brustlin, Inc.

DWG. NO.	REFERENCE DWG.	REV	DSN	CK		DESCRIPTION		BID INITIALS	BID DATE	CONSTRUCTION INITIALS	CONSTRUCTION DATE
							ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
							DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
							DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
ANGP-T-G-07-010	ACCESS ROAD DETAILS	2	GJM	BCK		IFC 2016 EDITS (05/2016)	DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
ANGP-T-C-076	ALIGNMENT SHEET	1	BCK	TDB		ACCESS ROAD "AG" REMOVED (5/14/15)	DESIGN MANAGER	SAB	06/28/13	JEO	05/2016

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. ADDISON COUNTY, VERMONT

YEAR: 2016 | W.O. | SCALE: 1"=100' | DWG. ANGP-EPSC-076 | REV. 2

Vermont Gas

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RIGHT-OF-WAY

MATCHLINE

240
N/F
LIVINGSTON, PHIL

241
N/F
PIDGEON, DAVID

242
N/F
HALL, DOUG

246
N/F
SWEENEY, MICHAEL
& LINDA

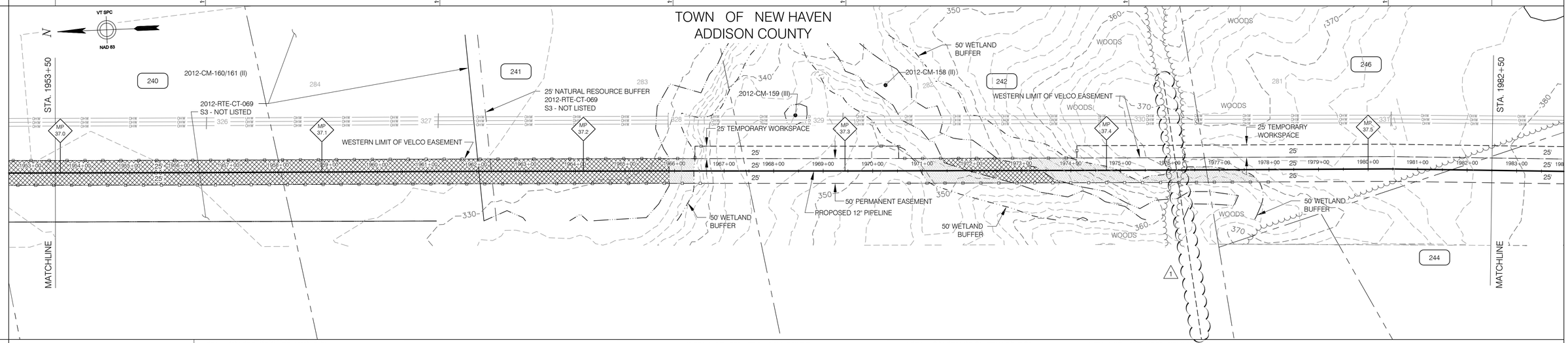
244
N/F
GREEN, DARIN,
HAYES & NANCY

MATCHLINE

SURVEY DATA

S 02° 12' W
1956+54 00°09' LT
S 02° 03' W
1961+27 00°08' RT
S 02° 11' W
1965+98 00°09' RT
S 02° 20' W
1969+47 00°09' LT
S 02° 10' W
1975+18 00°09' LT
S 02° 01' W
1980+42 01°06' RT
S 03° 08' W

ALIGNMENT DETAIL



EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

PERMANENT EASEMENT	— — — —
TEMPORARY WORKSPACE	- - - - - -
CENTERLINE OF STREAM	—— - ——
TEMPORARY STREAM CROSSING	▨
WETLAND	- · · - · · -
50' WETLAND BUFFER	— · · — · · —
TEMPORARY WETLAND MATTING	▩
WETLAND BUFFER WITHIN PROJECT AREA	░
REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL	—□—□—□—

INSTALL CONSTRUCTION DEMARCATION:
STA. 1953+50 TO 1982+50 RT - 25' FROM NEW 12" PIPE ℄
STA. 1953+50 TO 1966+41 LT - 25' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1953+50 TO 1966+89 RT - 25' FROM NEW 12" PIPE ℄
STA. 1953+50 TO 1966+41 LT - 25' FROM NEW 12" PIPE ℄

INSTALL MATTING:
STA. 1953+50 TO 1965+91

INSTALL CONSTRUCTION DEMARCATION:
STA. 1966+41 TO 1970+52 LT - 50' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1966+41 TO 1966+85 LT - 50' FROM NEW 12" PIPE ℄
STA. 1970+02 TO 1970+52 LT - 50' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1970+52 TO 1974+12 LT - 25' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1970+66 TO 1978+30 RT - 25' FROM NEW 12" PIPE ℄
STA. 1970+52 TO 1974+12 LT - 25' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1974+12 TO 1982+50 LT - 50' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1974+12 TO 1974+42 LT - 50' FROM NEW 12" PIPE ℄

INSTALL MATTING:
STA. 1971+40 TO 1973+91

HORIZONTAL SCALE
100 50 0 100 200 300 feet
100 50 0 100 200 300 feet
VERTICAL SCALE

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

CONST. TYPE	(2A) (W) | (1A) | (2A) | (W) | (1A)
SOIL TYPE	Lh | Cw (PAS) | VgD | VgB (PAS) | VgB (PAS) | VgD | VgB (PAS) | Cw (PAS)
LC/LU	PASTURE | CROP | PASTURE | CROP | PASTURE | FORESTED | CROP | FORESTED | CROP NOT CLASSIFIED | AGRICULTURAL | POWER LINE | AGRICULTURAL | POWER LINE
STREAMS	
WETLANDS	WETLAND 2012-CM-160 - STATION 1953+50 TO 1966+41 CLASS II | WETLAND 2012-CM-158 - STATION 1970+80 TO 1977+80 CLASS II
VERNAL POOLS	
SIGNIFICANT NATURAL COMMUNITIES	
RTE SPECIES	2012-RTE-CT-069
NRC WILDLIFE HABITAT	
ARCHAEOLOGY SITES	

MATCH LINE

MATCH LINE

Vanasse Hangen Brustlin, Inc.

							BID		CONSTRUCTION	
						ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
						DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
						DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
						DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
ANGP-T-C-077	ALIGNMENT SHEET	1	GJM	BCK	IFC 2016 EDITS (05/2016)	DESIGN MANAGER	SAB	06/28/13	JEO	05/2016
DWG. NO.	REFERENCE DWG.	REV	DSN	CK	DESCRIPTION		INITIALS	DATE	INITIALS	DATE

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. ADDISON COUNTY, VERMONT

Vermont Gas

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YEAR: 2016 | W.O. | SCALE: 1"=100' | DWG. ANGP-EPSC-077 | REV. 1

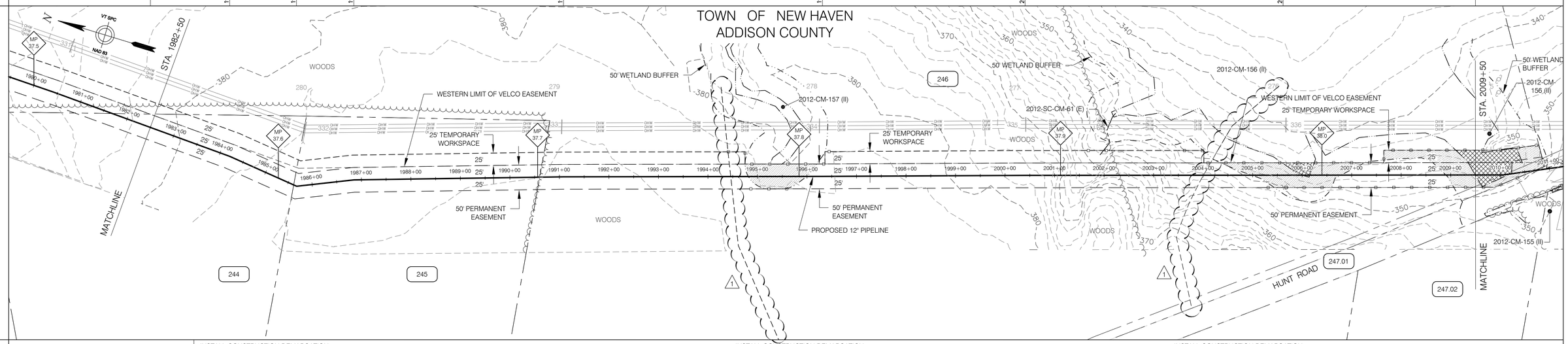
RIGHT-OF-WAY

MATCHLINE | 246 N/F SWEENEY, MICHAEL & LINDA | 244 N/F GREEN, DARIN, HAYES & NANCY | 245 N/F REISS, SCOTT & LYNDA | 246 N/F SWEENEY, MICHAEL & LINDA | MATCHLINE

SURVEY DATA

S 03° 08' W	04°03' RT	S 07° 11' W	30°24' LT	S 23° 14' E	05°31' RT	S 17° 42' E	07°43' RT	S 16° 59' E	00°12' LT	S 17° 11' E	00°16' RT	S 16° 55' E	00°02' LT	S 16° 57' E
1984+21		1985+69		1986+85		1991+08		1996+31		2000+41		2005+62		

ALIGNMENT DETAIL



EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

- PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- CENTERLINE OF STREAM
- TEMPORARY STREAM CROSSING
- WETLAND
- 50' WETLAND BUFFER
- TEMPORARY WETLAND MATTING
- WETLAND BUFFER WITHIN PROJECT AREA
- REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL

INSTALL CONSTRUCTION DEMARCATION:
STA. 1982+50 TO 2009+45 RT - 25' FROM NEW 12" PIPE ℄
STA. 1982+50 TO 1994+75 LT - 50' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 1994+75 TO 1996+35 LT - 25' FROM NEW 12" PIPE ℄
STA. 1996+35 TO 2004+01 LT - 50' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 2009+45 TO 2009+50 RT - WIDTH VARIES FROM NEW 12" PIPE ℄
STA. 2004+01 TO 2007+65 LT - 25' FROM NEW 12" PIPE ℄
STA. 2007+65 TO 2009+50 LT - 50' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 1994+25 TO 1994+75 LT - 50' FROM NEW 12" PIPE ℄
STA. 1994+75 TO 1996+36 LT - 25' FROM NEW 12" PIPE ℄
STA. 1996+36 TO 1996+86 LT - 50' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 2001+49 TO 2002+49 LT - 50' FROM NEW 12" PIPE ℄
STA. 2003+50 TO 2004+01 LT - 50' FROM NEW 12" PIPE ℄
STA. 2004+01 TO 2007+65 LT - 25' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 2004+94 TO 2009+45 RT - 25' FROM NEW 12" PIPE ℄
STA. 2009+45 TO 2009+50 RT - WIDTH VARIES FROM NEW 12" PIPE ℄
STA. 2007+65 TO 2009+50 LT - 50' FROM NEW 12" PIPE ℄

INSTALL MATTING:
STA. 2005+59 TO 2006+24
STA. 2009+10 TO 2009+50

HORIZONTAL SCALE
100 50 0 100 200 300 feet

VERTICAL SCALE
100 50 0 100 200 300 feet

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

CONST. TYPE	1A	2A	1A	2A	W	1A / W
SOIL TYPE	Cw (PAS)	Cn (PAS)	VgC (PAS)	VgB (PAS)		Cw (PAS)
LC/LU	CROP / FORESTED / CROP / FORESTED / CROP					
	POWERLINE	AGRICULTURAL	POWERLINE			
STREAMS			STREAM 2012-SC-CM-61 (E) - STATION 2001+92 TO 2001+99			
WETLANDS		WETLAND 2012-CM-157 - STATION 1994+75 TO 1996+19 CLASS II		WETLAND 2012-CM-156 - STATION 2004+36 TO 2007+26 CLASS II		WETLAND 2012-CM-156 - STATION 2007+65 TO 2009+50 CLASS II
VERNAL POOLS						
SIGNIFICANT NATURAL COMMUNITIES						
RTE SPECIES						
NRC WILDLIFE HABITAT						
ARCHAEOLOGY SITES						

MATCH LINE | MATCH LINE

VHB Vanasse Hangen Brustlin, Inc.

DWG. NO.	REFERENCE DWG.	REV	DSN	CK	DESCRIPTION
ANGP-T-C-078	ALIGNMENT SHEET	1	GJM	BCK	IFC 2016 EDITS (05/2016)

		BID		CONSTRUCTION	
	INITIALS	DATE	INITIALS	DATE
ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
DESIGN MANAGER	SAB	06/28/13	JEO	05/2016

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. ADDISON COUNTY, VERMONT

Vermont Gas

CHA
38 Eastwood Drive, Suite 105
South Burlington, VT 05403
Main: (802) 735-0372 - www.chacompanies.com

YEAR: 2016 | W.O. | SCALE: 1"=100' | DWG. ANGP-EPSC-078 | REV. 1

EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

- PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- CENTERLINE OF STREAM
- TEMPORARY STREAM CROSSING
- WETLAND
- 50' WETLAND BUFFER
- TEMPORARY WETLAND MATTING
- WETLAND BUFFER WITHIN PROJECT AREA
- REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL

INSTALL CONSTRUCTION DEMARCATION:
STA. 2009+50 TO 2009+88 RT - 50' FROM NEW 12" PIPE ℄
STA. 2009+88 TO 2010+71 RT - WIDTH VARIES FROM NEW 12" PIPE ℄
STA. 2009+50 TO 2010+85 LT - 50' FROM NEW 12" PIPE ℄
STA. 2010+85 TO 2010+91 LT - WIDTH VARIES FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 2009+50 TO 2009+88 RT - 50' FROM NEW 12" PIPE ℄
STA. 2009+88 TO 2010+71 RT - WIDTH VARIES FROM NEW 12" PIPE ℄
STA. 2009+50 TO 2010+85 LT - 50' FROM NEW 12" PIPE ℄
STA. 2010+85 TO 2010+91 LT - WIDTH VARIES FROM NEW 12" PIPE ℄

INSTALL MATTING:
STA. 2009+50 TO 2010+48

INSTALL STABILIZED CONSTRUCTION ENTRANCE:
STA. 2010+88 & STA. 2011+88

INSTALL CONSTRUCTION DEMARCATION:
STA. 2010+94 TO 2016+98 RT - 45' FROM NEW 12" PIPE ℄
STA. 2013+22 TO 2021+27 LT - 30' FROM NEW 12" PIPE ℄
STA. 2016+98 TO 2018+16 RT - 20' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 2010+94 TO 2012+32 RT - 45' FROM NEW 12" PIPE ℄
STA. 2013+22 TO 2013+72 LT - 30' FROM NEW 12" PIPE ℄

INSTALL STABILIZED CONSTRUCTION ENTRANCE:
STA. 2019+43

INSTALL CONSTRUCTION DEMARCATION:
STA. 2018+16 TO 2020+97 RT - 45' FROM NEW 12" PIPE ℄
STA. 2020+97 TO 2021+12 RT - WIDTH VARIES FROM NEW 12" PIPE ℄
STA. 2021+21 TO 2021+71 RT - 20 FROM NEW 12" PIPE ℄
STA. 2021+27 TO 2021+71 LT - WIDTH VARIES FROM NEW 12" PIPE ℄
STA. 2021+71 TO 2038+00 LT - 50' FROM NEW 12" PIPE ℄
STA. 2021+71 TO 2038+00 RT - 25' FROM NEW 12" PIPE ℄

2

INSTALL REINFORCED PERIMETER CONTROL:
STA. 2016+48 TO 2016+98 RT - 45' FROM NEW 12" PIPE ℄
STA. 2016+98 TO 2017+55 RT - 20' FROM NEW 12" PIPE ℄
STA. 2017+55 TO 2017+88 RT - WIDTH VARIES FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 2017+88 TO 2018+29 RT - 20' FROM NEW 12" PIPE ℄
STA. 2018+29 TO 2018+79 RT - 45' FROM NEW 12" PIPE ℄

INSTALL STABILIZED CONSTRUCTION ENTRANCE:
STA. 2030+00

HORIZONTAL SCALE
100 50 0 100 200 300 feet
100 50 0 100 200 300 feet
VERTICAL SCALE

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

CONST. TYPE	(1A) (W) (11) (2D) (1A)
SOIL TYPE	Cw (PAS) VgB (PAS) NeB (PAS) VgB (PAS) Cw (PAS) VgB (PAS)
LC/LU	CROP / AGRIC. GRAVEL / TRAVEL FORESTED / NOT CLASSIFIED CROP / POWER LINE / AGRICULTURAL GRAVEL / TRAVEL CROP / POWER LINE / AGRICULTURAL GRAVEL / TRAVEL POWER LINE / AGRICULTURAL GRAVEL / TRAVEL CROP / POWER LINE / AGRICULTURAL
STREAMS	
WETLANDS	WETLAND 2012-CM-155 - STATION 2010+94 TO 2011+81 CLASS II
VERNAL POOLS	WETLAND 2012-CM-156 - STATION 2009+50 TO 2010+94 CLASS II
SIGNIFICANT NATURAL COMMUNITIES	
RTE SPECIES	
NRC WILDLIFE HABITAT	
ARCHAEOLOGY SITES	

MATCH LINE

MATCH LINE

DWG. NO.	REFERENCE DWG.	REV	DSN	CK		DESCRIPTION
ANGP-T-G-07-010	ACCESS ROAD DETAILS	2	BCK	TDB		EASEMENT ADJUSTMENT & EPSC MEASURES ADDED (5/18/15)
ANGP-T-C-079	ALIGNMENT SHEET	1	BCK	TDB		PERMANENT EASEMENT ADJUSTMENT (5/14/15)

	BID		CONSTRUCTION	
	INITIALS	DATE	INITIALS	DATE
ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
DESIGN MANAGER	SAB	06/28/13	JEO	05/2016

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. ADDISON COUNTY, VERMONT

Vermont Gas

VHB Vanasse Hangen Brustlin, Inc.

CHA
38 Eastwood Drive, Suite 105
South Burlington, VT 05403
Main: (802) 735-0372 · www.chacompanies.com

YEAR: 2016 | W.O. | SCALE: 1"=100' | DWG. ANGP-EPSC-079 | REV. 2

RIGHT-OF-WAY

MATCHLINE

252
N/F
HILL, RON, BRIAN, KEVIN & JOANNE
dba FOUR HILLS FARM

253
N/F
PALMER, PATRICK,
MICHAEL & CATHERINE

254
N/F
CAROTHERS, PETER F.

MATCHLINE

SURVEY DATA

Station	Angle	Bearing
		S 16° 56′ E
2040+14	00°06′ LT	S 17° 02′ E
2044+82	00°03′ RT	S 16° 59′ E
2047+00	44°59′ LT	S 61° 59′ E
2047+50	44°59′ RT	S 16° 59′ E
2049+65	00°07′ RT	S 16° 51′ E
2054+83	00°14′ LT	S 17° 06′ E
2057+79	45°00′ RT	S 27° 54′ W
Bck. 2058+29 Ahd. 2058+00 45°00′ LT	28.9 ft.	S 17° 06′ E
2060+10	00°10′ RT	S 16° 55′ E
2064+50	00°01′ LT	S 16° 57′ E

ALIGNMENT DETAIL

EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

- PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- CENTERLINE OF STREAM
- TEMPORARY STREAM CROSSING
- WETLAND
- 50' WETLAND BUFFER
- TEMPORARY WETLAND MATTING
- WETLAND BUFFER WITHIN PROJECT AREA
- REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL

INSTALL CONSTRUCTION DEMARCATION:
STA. 2038+00 TO 2047+65 RT - 25' FROM NEW 12" PIPE ℄
STA. 2038+00 TO 2047+00 LT - 50' FROM NEW 12" PIPE ℄
STA. 2047+00 TO 2047+45 LT - WIDTH VARIES FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 2047+65 TO 2057+64 RT - 20' FROM NEW 12" PIPE ℄
STA. 2047+45 TO 2057+80 LT - 30' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 2057+64 TO 2066+50 RT - 25' FROM NEW 12" PIPE ℄
STA. 2057+80 TO 2059+10 LT - 25' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 2059+10 TO 2066+50 LT - 50' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 2058+23 TO 2059+31 RT - 25' FROM NEW 12" PIPE ℄
STA. 2057+91 TO 2059+10 LT - 25' FROM NEW 12" PIPE ℄

INSTALL MATTING:
STA. 2058+37 TO 2058+68

HORIZONTAL SCALE
100 50 0 100 200 300 feet
100 50 0 100 200 300 feet
VERTICAL SCALE

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

CONST. TYPE	(1A) · (2D) · (2A) (W) · (1A)
SOIL TYPE	VgB (PAS) · VgC (PAS) · Cw (PAS) · VgC (PAS)
LC/LU	CROP / AGRICULTURAL · POWER LINE · FORESTED / NOT CLASSIFIED · CROP / AGRICULTURAL · FORESTED / NOT CLASSIFIED · CROP / POWER LINE / AGRICULTURAL
STREAMS	STREAM 2012-SC-CM-59 - (E) STATION 2058+69 TO 2058+81
WETLANDS	WETLAND 2012-CM-151 - STATION 2058+37 TO 2058+68 CLASS III
VERNAL POOLS	
SIGNIFICANT NATURAL COMMUNITIES	VALLEY CLAYPLAIN FOREST
RTE SPECIES	
NRC WILDLIFE HABITAT	
ARCHAEOLOGY SITES	

MATCH LINE

MATCH LINE

DWG. NO.	REFERENCE DWG.	REV	DSN	CK	DESCRIPTION
ANGP-T-C-080	ALIGNMENT SHEET				

	BID		CONSTRUCTION	
	INITIALS	DATE	INITIALS	DATE
ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
DESIGN MANAGER	SAB	06/28/13	JEO	05/2016

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. ADDISON COUNTY, VERMONT

Vermont Gas

Vanasse Hangen Brustlin, Inc.

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YEAR: 2016 | W.O. | SCALE: 1"=100' | DWG. ANGP-EPSC-080 | REV. 0

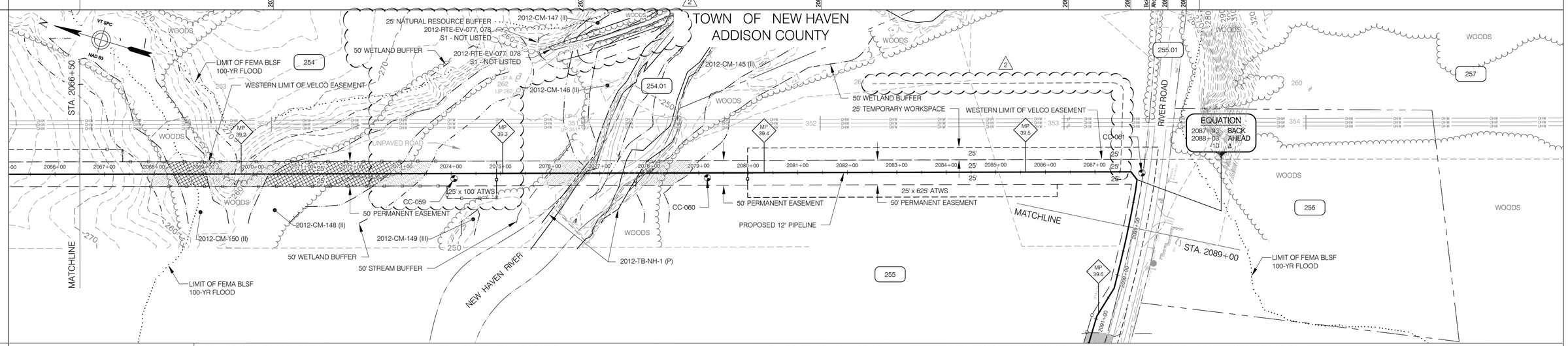
RIGHT-OF-WAY

MATCHLINE | 254 N/F CAROTHERS, PETER F. | 254.01 NEW HAVEN RIVER | 255 N/F HILL, RON, BRIAN, KEVIN & JOANNE dba FOUR HILLS FARM | 255.01 RIVER ROAD | MATCHLINE

SURVEY DATA

S 16° 57' E	00°04' LT	S 17° 01' E	00°02' LT	S 17° 04' E	00°02' RT	S 17° 01' E	00°01' RT	S 16° 60' E	53°01' RT	S 36° 02' W	~10.4 ft.	S 81° 02' W	02°33' RT	S 83° 36' W	01°19' RT	S 84° 55' W
2070+42		2076+68		2081+49		2086+47		2087+73	Bck: 2087+93	Ahd: 2088+03		2088+50		2088+73		

ALIGNMENT DETAIL



EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

- PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- CENTERLINE OF STREAM
- TEMPORARY STREAM CROSSING
- WETLAND
- 50' WETLAND BUFFER
- TEMPORARY WETLAND MATTING
- WETLAND BUFFER WITHIN PROJECT AREA
- REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL

INSTALL CONSTRUCTION DEMARCATION:
STA. 2066+50 TO 2073+92 RT - 25' FROM NEW 12" PIPE ℄
STA. 2066+50 TO 2076+80 LT - 50' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 2073+92 TO 2074+92 RT - 50' FROM NEW 12" PIPE ℄
STA. 2074+92 TO 2076+40 RT - 25' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 2074+92

INSTALL CONSTRUCTION DEMARCATION:
STA. 2077+65 TO 2079+99 RT - 25' FROM NEW 12" PIPE ℄
STA. 2077+97 TO 2079+99 LT - 25' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 2079+99

INSTALL CONSTRUCTION DEMARCATION:
STA. 2079+99 TO 2086+24 RT - 50' FROM NEW 12" PIPE ℄
STA. 2079+99 TO 2087+73 LT - 50' FROM NEW 12" PIPE ℄
STA. 2086+24 TO 2087+73 RT - 25' FROM NEW 12" PIPE ℄
STA. 2087+73 TO 2088+14 RT - WIDTH VARIES FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 2088+14 TO 2089+00 RT - 10' FROM NEW 12" PIPE ℄
STA. 2087+73 TO 2087+93 LT - WITH VARIES FROM NEW 12" PIPE ℄
STA. 2088+03 TO 2089+00 LT - 35' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 2067+45 TO 2073+92 RT - 25' FROM NEW 12" PIPE ℄
STA. 2066+87 TO 2067+37 LT - 50' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 2073+92 TO 2074+92 RT - 50' FROM NEW 12" PIPE ℄
STA. 2067+37 TO 2073+72 LT - 25' FROM NEW 12" PIPE ℄
STA. 2073+72 TO 2074+12 LT - WIDTH VARIES FROM NEW 12" PIPE ℄

INSTALL MATTING: STA. 2068+14 TO 2069+17

INSTALL MATTING: STA. 2070+20 TO 2073+19

INSTALL STABILIZED CONSTRUCTION ENTRANCE:
STA. 2087+87

HORIZONTAL SCALE
100 50 0 100 200 300 feet
VERTICAL SCALE
100 50 0 100 200 300 feet

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

CONST. TYPE		W	1A	W		8		1A		4B	
SOIL TYPE		VgC (PAS)	VgD	Lf	Wo (PAS)	Hh (PAS)	w	Lf	Wo	Hh (PAS)	Rk
LC/LU		CROP AGRICULTURAL	FORESTED NOT CLASSIFIED	CROP AGRICULTURAL	FORESTED NOT CLASSIFIED	CROP AGRICULTURAL	CROP GRAVEL AGRICULTURAL TRAVEL	FORESTED NOT CLASSIFIED	WATER WATER	FORESTED NOT CLAS.	CROP AGRICULTURAL
STREAMS						STREAM 2012-TB-NH-1 - (P) STATION 2075+77 TO 2078+78					
WETLANDS	MATCH LINE	WETLAND 2012-CM-150 STATION 2067+37 TO 2069+66 CLASS II		WETLAND 2012-CM-148 STATION 2069+66 TO 2073+73 CLASS II					WETLAND 2012-CM-145 STATION 2077+65 TO 2079+02 CLASS II		MATCH LINE
VERNAL POOLS											
SIGNIFICANT NATURAL COMMUNITIES											
RTE SPECIES											
NRC WILDLIFE HABITAT											
ARCHAEOLOGY SITES											

DWG. NO.	REFERENCE DWG.	REV	DSN	CK	DESCRIPTION
ANGP-T-G-07-010	ACCESS ROAD DETAILS	2	GJM	BCK	IFC 2016 EDITS (05/2016)
ANGP-T-C-081	ALIGNMENT SHEET	1	GJM	TDB	VHB HDD AREA REVISIONS (6/24/15)

	BID		CONSTRUCTION	
	INITIALS	DATE	INITIALS	DATE
ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
DESIGN MANAGER	SAB	06/28/13	JEO	05/2016

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. ADDISON COUNTY, VERMONT

YEAR: 2016 | W.O. | SCALE: 1"=100' | DWG. ANGP-EPSC-081 | REV. 2

Vanasse Hangen Brustlin, Inc.

Vermont Gas

CHA
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RIGHT-OF-WAY

MATCHLINE

255.01
RIVER ROAD

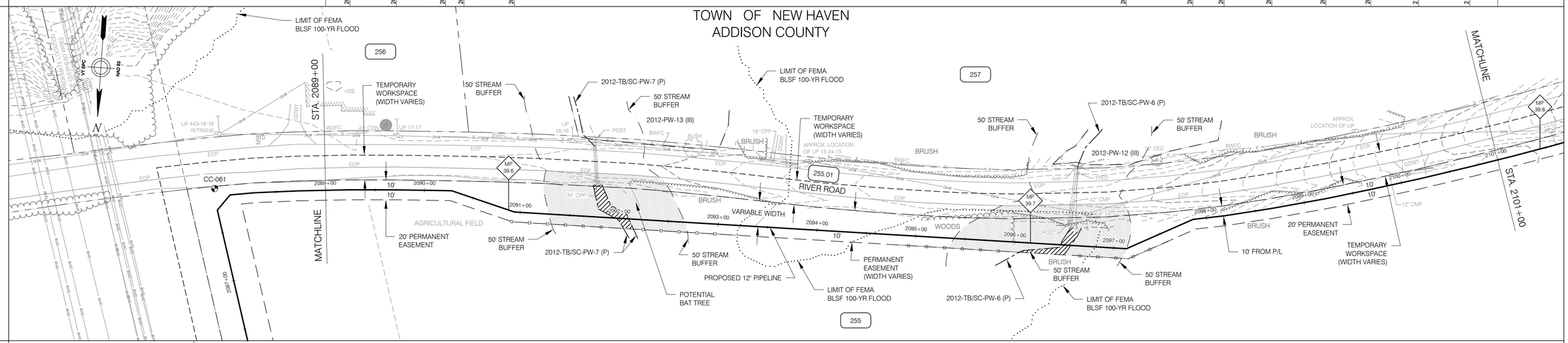
255
N/F
FOUR-HILLS FARM PARTNERSHIP

MATCHLINE

SURVEY DATA

S 84° 55' W	0°11'14" RT	S 86° 10' W	0°0'45" RT	S 86° 56' W	0°0'24" RT	S 87° 20' W	1°7'28" RT	N 75° 11' W	15°17' LT	S 89° 31' W	2°7'08" LT	S 62° 23' W	17°12' RT	S 79° 35' W	0°2'17" LT	S 77° 17' W	0°1'25" LT	S 75° 52' W	0°1'27" LT	S 74° 24' W	0°0'28" LT	S 73° 55' W	0°1'13" LT	S 72° 42' W	0°0'32" LT	S 72° 09' W
2089+25		2089+72		2090+21		2090+27		2090+94		2097+13		2097+66		2098+18		2098+67		2099+22		2099+69		2100+18		2100+71		

ALIGNMENT DETAIL



EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

- PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- CENTERLINE OF STREAM
- TEMPORARY STREAM CROSSING
- WETLAND
- 50' WETLAND BUFFER
- TEMPORARY WETLAND MATTING
- WETLAND BUFFER WITHIN PROJECT AREA
- REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL

INSTALL CONSTRUCTION DEMARCATION:
STA. 2089+00 TO 2101+00 RT - 10' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 2090+73 TO 2092+05 RT - 10' FROM NEW 12" PIPE ℄
STA. 2092+14 TO 2093+20 RT - 10' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 2094+87 TO 2096+01 RT - 10' FROM NEW 12" PIPE ℄
STA. 2096+50 TO 2097+55 RT - 10' FROM NEW 12" PIPE ℄

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

HORIZONTAL SCALE
50 25 0 50 100 150 feet
VERTICAL SCALE
50 25 0 50 100 150 feet

CONST. TYPE			4B				7			4B						7			4B							
SOIL TYPE		Hh (PAS)			Lh				FaE					VgD						VgB (PAS)						
LC/LU		GRASS					WATER			GRASS						WATER			GRASS							
		TRAVEL																								
STREAMS					STREAM 2012-TB/SC-PW-7 - (P) STATION 2091+14 TO 2092+70									STREAM 2012-TB/SC-PW-6 - (P) STATION 2095+37 TO 2097+30												
WETLANDS	MATCH LINE																								MATCH LINE	
VERNAL POOLS																										
SIGNIFICANT NATURAL COMMUNITIES																										
RTE SPECIES																										
NRC WILDLIFE HABITAT																										
ARCHAEOLOGY SITES																										

							BID		CONSTRUCTION	
						ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
						DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
						DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
						DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
ANGP-T-C-082A	ALIGNMENT SHEET					DESIGN MANAGER	SAB	06/28/13	JEO	05/2016
DWG. NO.	REFERENCE DWG.	REV	DSN	CK		DESCRIPTION	INITIALS	DATE	INITIALS	DATE

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. ADDISON COUNTY, VERMONT

YEAR: 2016 | W.O. | SCALE: 1" = 50' | DWG. ANGP-EPSC-082A | REV. 0

VHB Vanasse Hangen Brustlin, Inc.

Vermont Gas

CHA
38 Eastwood Drive, Suite 105
South Burlington, VT 05403
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RIGHT-OF-WAY

MATCHLINE

255.01
RIVER ROAD

Parcel	Owner
255	N/F FOUR-HILLS FARM PARTNERSHIP
257.01	N/F LANDON, BEVERLY; & WILLIAM
255	N/F FOUR-HILLS FARM PARTNERSHIP
259.01	N/F CUNNINGHAM, BARBARA

MATCHLINE

SURVEY DATA

Station	Deflection	Bearing ahead
		S 72° 09' W
2101+17	00°53' LT	S 71° 16' W
2101+60	00°52' LT	S 70° 23' W
2102+12	02°28' LT	S 67° 54' W
2102+61	03°51' LT	S 64° 03' W
2102+98	03°38' LT	S 60° 25' W
2103+55	06°23' LT	S 54° 01' W
2104+12	07°35' LT	S 46° 25' W
2104+62	03°55' LT	S 42° 30' W
2105+08	01°05' LT	S 41° 24' W
2105+39	00°00' LT	S 41° 24' W
2105+49	00°14' RT	S 41° 39' W
2105+89	01°36' RT	S 43° 15' W
2106+35	03°44' RT	S 47° 00' W
2106+73	05°09' RT	S 52° 10' W
2107+24	05°55' RT	S 58° 05' W
2107+72	03°59' RT	S 62° 04' W
2108+22	02°13' RT	S 64° 17' W
2108+37	15°16' RT	S 79° 33' W
2108+72	12°28' LT	S 67° 05' W
2112+85	16°12' LT	S 50° 52' W
2113+24	18°26' RT	S 69° 18' W
2113+26	00°00' RT	S 69° 18' W
2113+39	00°43' RT	S 70° 02' W
2113+85	00°50' RT	S 70° 52' W
2114+32	00°46' RT	S 71° 39' W
2114+81	00°03' RT	S 71° 43' W
2115+30	00°04' LT	S 71° 38' W

ALIGNMENT DETAIL

EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

PERMANENT EASEMENT	— — — —
TEMPORARY WORKSPACE	– – – – – –
CENTERLINE OF STREAM	—— - —— - ——
TEMPORARY STREAM CROSSING	▨
WETLAND	— · · — · · —
50' WETLAND BUFFER	— · · — · · —
TEMPORARY WETLAND MATTING	▩
WETLAND BUFFER WITHIN PROJECT AREA	░
REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL	—□—□—□—

INSTALL CONSTRUCTION DEMARCATION:
STA. 2101+00 TO 2115+50 RT - 10' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 2108+05 TO 2110+28 RT - 10' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 2112+02 TO 2113+05 RT - 10' FROM NEW 12" PIPE ℄
STA. 2113+18 TO 2114+22 RT - 10' FROM NEW 12" PIPE ℄

HORIZONTAL SCALE
50 25 0 50 100 150 feet
50 25 0 50 100 150 feet
VERTICAL SCALE

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

CONST. TYPE	4B		7	4B	7	4B	
SOIL TYPE	VgB (PAS)	FaC		VgB (PAS)			AmB (PAS)
LC/LU	GRASS TRAVEL				WATER	FORESTED	
STREAMS			STREAM 2012-SC-PW-5 - (I) STATION 2108+60 TO 2111+00		STREAM 2012-TB-PW-4 - (I) STATION 2112+47 TO 2113+72		
WETLANDS							
VERNAL POOLS							
SIGNIFICANT NATURAL COMMUNITIES							
RTE SPECIES							
NRC WILDLIFE HABITAT							
ARCHAEOLOGY SITES							

MATCH LINE

MATCH LINE

DWG. NO.	REFERENCE DWG.	REV	DSN	CK	DESCRIPTION
ANGP-T-C-082B	ALIGNMENT SHEET				

	BID		CONSTRUCTION	
ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
DESIGN MANAGER	SAB	06/28/13	JEO	05/2016
	INITIALS	DATE	INITIALS	DATE

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. ADDISON COUNTY, VERMONT

Vermont Gas

VHB Vanasse Hangen Brustlin, Inc.

CHA
38 Eastwood Drive, Suite 105
South Burlington, VT 05403
Main: (802) 735-0372 · www.chacompanies.com

YEAR: 2016 | W.O. | SCALE: 1" = 50' | DWG. ANGP-EPSC-082B | REV. 0

RIGHT-OF-WAY

MATCHLINE

255.01
RIVER ROAD

265.01
ROUTE 7

259.01
N/F
CUNNINGHAM, BARBARA

261.01
N/F
LAFRAMBOISE, EDWARD;
& BONNIE

263.01
N/F
MANY, BRUCE;
& BECKY

267.01
NERI,
ANTHONY; &
NANCY

271.01
BELDEN
ROAD

273.01
N/F
DUPOISE, STEPHEN;
& MARCIA

MATCHLINE

SURVEY DATA

S 71° 38' W	00°08' LT	2115+79
S 71° 29' W	00°05' LT	2116+28
S 71° 24' W	00°14' LT	2116+77
S 71° 09' W	00°24' RT	2117+25
S 71° 33' W	00°00' LT	2117+44
S 71° 33' W	00°09' LT	2117+78
S 71° 24' W	00°07' RT	2118+26
S 71° 32' W	00°07' RT	2118+85
S 71° 40' W	00°21' LT	2119+36
S 71° 18' W	24°34' RT	2119+39
N 84° 08' W	24°08' LT	2119+73
S 71° 44' W	00°42' LT	2125+19
S 71° 01' W	00°13' RT	2125+41
S 71° 15' W	00°15' LT	2125+89
S 70° 59' W	47°09' LT	2126+25
S 23° 49' W	47°09' RT	2126+46
S 70° 59' W	00°02' RT	2126+61
S 71° 01' W	45°00' LT	2128+95
S 26° 01' W		Bck: 2129+05
S 21° 60' E	−4.5 ft. 48°01' LT 00°00' LT	Ahd: 2129+09 2129+38
S 21° 60' E	00°01' LT	2129+61
S 22° 02' E	09°32' LT	2129+88
S 31° 34' E		

ALIGNMENT DETAIL

EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

PERMANENT EASEMENT	— — — —
TEMPORARY WORKSPACE	– – – – – –
CENTERLINE OF STREAM	—·—·—
TEMPORARY STREAM CROSSING	▨
WETLAND	·–·–
50' WETLAND BUFFER	—··—··—
TEMPORARY WETLAND MATTING	▩
WETLAND BUFFER WITHIN PROJECT AREA	░
REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL	–□–□–□–

INSTALL CONSTRUCTION DEMARCATION:
STA. 2115+50 TO 2126+70 RT - 10' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 2119+83 TO 2122+30 RT - 10' FROM NEW 12" PIPE ℄

INSTALL MATTING:
STA. 2120+80 TO 2121+33

INSTALL STABALIZED CONSTRUCTION ENTRANCE:
STA. 2126+78
STA. 2128+62 & 2129+87

HORIZONTAL SCALE
50 25 0 50 100 150 feet

50 25 0 50 100 150 feet
VERTICAL SCALE

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

CONST. TYPE	W 4B 9 11
SOIL TYPE	AmB (PAS) Cw (PAS) VgB (PAS)
LC/LU	FORESTED GRASS PAVED GRASS GRAVEL GRASS TRAVEL
STREAMS	
WETLANDS	WETLAND 2012-PW-9 & 2012-PW-10 - STATION 2120+30 TO 2122+45 CLASS II
VERNAL POOLS	
SIGNIFICANT NATURAL COMMUNITIES	
RTE SPECIES	
NRC WILDLIFE HABITAT	
ARCHAEOLOGY SITES	

MATCH LINE

MATCH LINE

DWG. NO.	REFERENCE DWG.	REV	DSN	CK	DESCRIPTION
ANGP-T-C-083A	ALIGNMENT SHEET				

	BID		CONSTRUCTION	
ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
DESIGN MANAGER	SAB	06/28/13	JEO	05/2016
	INITIALS	DATE	INITIALS	DATE

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. ADDISON COUNTY, VERMONT

YEAR: 2016 | W.O. | SCALE: 1" = 50' | DWG. ANGP-EPSC-083A | REV. 0

Vermont Gas

Vanasse Hangen Brustlin, Inc.

CHA
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South Burlington, VT 05403
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RIGHT-OF-WAY

MATCHLINE

265.01
ROUTE 7

273.01
N/F
DUPOISE, STEPHEN;
& MARCIA

MATCH LINE

SURVEY DATA

S 31° 34' E

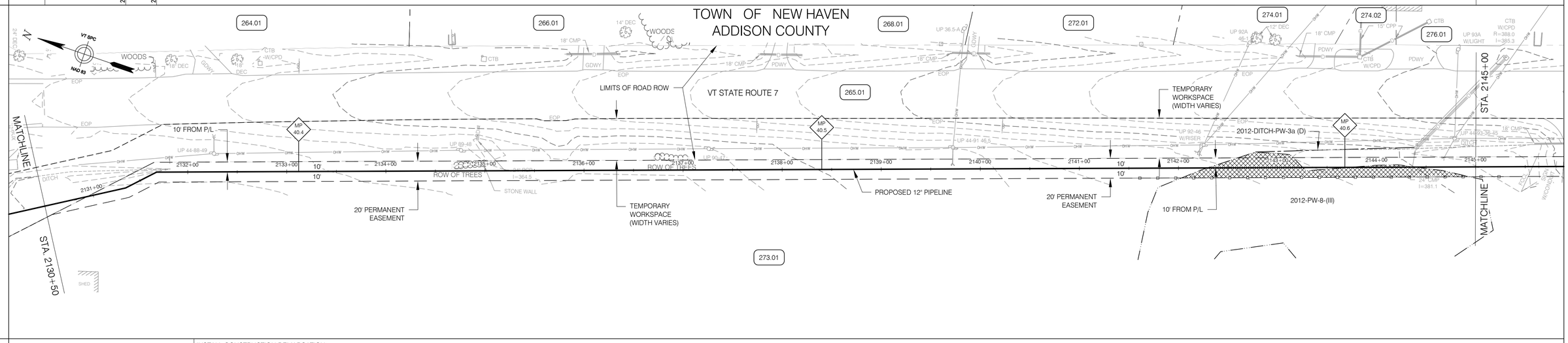
14°29' LT
2131+34

S 46° 03' E

26°55' RT
2131+69

S 19° 08' E

ALIGNMENT DETAIL



EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

- PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- CENTERLINE OF STREAM
- TEMPORARY STREAM CROSSING
- WETLAND
- 50' WETLAND BUFFER
- TEMPORARY WETLAND MATTING
- WETLAND BUFFER WITHIN PROJECT AREA
- REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL

INSTALL CONSTRUCTION DEMARCATION:
STA. 2130+55 TO 2130+93 RT - WIDTH VARIES FROM NEW 12" PIPE ℄
STA. 2130+93 TO 2145+00 RT - 10' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 2141+53 TO 2145+00 RT - 10' FROM NEW 12" PIPE ℄

INSTALL MATTING:
STA. 2141+92 TO 2144+84

HORIZONTAL SCALE
50 25 0 50 100 150 feet
VERTICAL SCALE
50 25 0 50 100 150 feet

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

CONST. TYPE	(11)	(4B)	(W)
SOIL TYPE		VgB (PAS)	
LC/LU		GRASS / TRAVEL	
STREAMS			STREAM 2012-DITCH-PW-3a (D) - STATION 2142+30 TO 2144+10
WETLANDS			WETLAND 2012-PW-8 - STATION 2141+92 TO 2144+84 CLASS III
VERNAL POOLS			
SIGNIFICANT NATURAL COMMUNITIES			
RTE SPECIES			
NRC WILDLIFE HABITAT			
ARCHAEOLOGY SITES			

MATCH LINE

MATCH LINE

VHB Vanasse Hangen Brustlin, Inc.

DESCRIPTION		BID		CONSTRUCTION	
		INITIALS	DATE	INITIALS	DATE
ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016	
DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016	
DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016	
DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016	
DESIGN MANAGER	SAB	06/28/13	JEO	05/2016	

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. ADDISON COUNTY, VERMONT

Vermont Gas

CHA
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Main: (802) 735-0372 - www.chacompanies.com

DWG. NO.	REFERENCE DWG.	REV	DSN	CK	DESCRIPTION
ANGP-T-C-083B	ALIGNMENT SHEET				

YEAR: 2016 | W.O. | SCALE: 1" = 50' | DWG. ANGP-EPSC-083B | REV. 0

RIGHT-OF-WAY

MATCHLINE

273.01
N/F
DUPOISE, STEPHEN;
& MARCIA

265.01
ROUTE 7

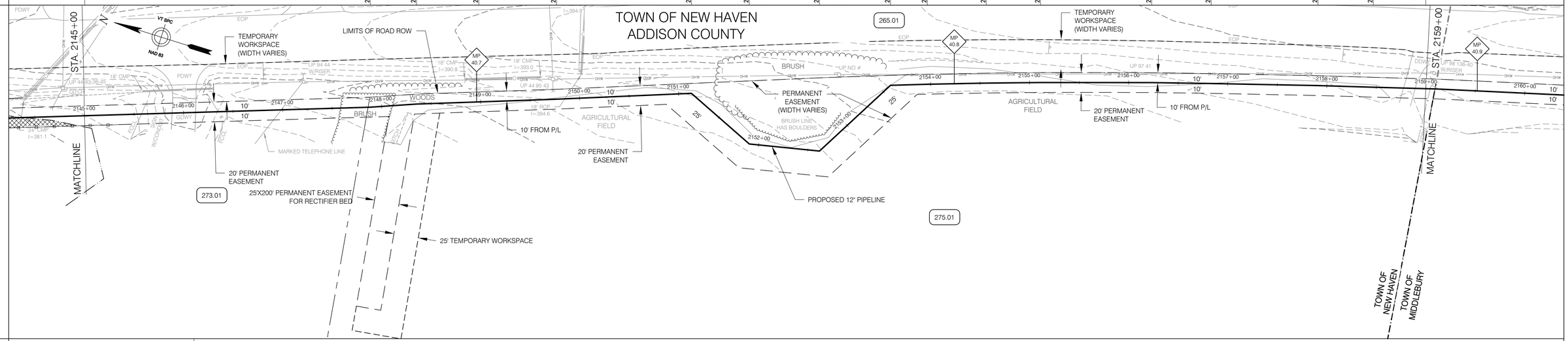
275.01
N/F
DELINEATION CORPORATION;
WEBER, STEVE

MATCHLINE

SURVEY DATA

273.01	02°08" RT	01°52" RT	00°02" RT	00°32" LT	43°42" RT	35°22" LT	48°40" LT	41°14" RT	00°28" RT	00°33" RT	00°39" RT	00°50" RT	00°16" RT	00°37" RT	00°12" RT	275.01
S 19° 08" E	2147+89	S 21° 16" E 2148+35	S 19° 24" E 2148+98	S 19° 22" E 2149+77	S 19° 54" E 2151+13	S 23° 47" W 2151+91	S 11° 35" E 2152+62	S 60° 16" E 2153+60	S 19° 02" E 2153+97	S 18° 33" E 2154+56	S 18° 01" E 2155+11	S 17° 22" E 2156+23	S 16° 32" E 2156+83	S 16° 17" E 2157+91	S 15° 40" E 2158+47	S 15° 52" E

ALIGNMENT DETAIL



EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

- PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- CENTERLINE OF STREAM
- TEMPORARY STREAM CROSSING
- WETLAND
- 50' WETLAND BUFFER
- TEMPORARY WETLAND MATTING
- WETLAND BUFFER WITHIN PROJECT AREA
- REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL

INSTALL CONSTRUCTION DEMARCATION:
STA. 2145+00 TO 2148+07 RT - 10' FROM NEW 12" PIPE ℄
STA. 2148+07 TO 2148+32 RT - WIDTH VARIES FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 2148+32 TO 2150+87 RT - 10' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 2150+87 TO 2153+86 RT - 25' FROM NEW 12" PIPE

INSTALL CONSTRUCTION DEMARCATION:
STA. 2153+86 TO 2159+00 RT - 10' FROM NEW 12" PIPE ℄

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

HORIZONTAL SCALE
50 25 0 50 100 150 feet
VERTICAL SCALE
50 25 0 50 100 150 feet

	MATCH LINE		MATCH LINE
CONST. TYPE		4B	
SOIL TYPE		VgB (PAS)	
LC/LU		PASTURE / TRAVEL	
STREAMS			
WETLANDS			
VERNAL POOLS			
SIGNIFICANT NATURAL COMMUNITIES			
RTE SPECIES			
NRC WILDLIFE HABITAT			
ARCHAEOLOGY SITES			

VHB Vanasse Hangen Brustlin, Inc.

DWG. NO.	REFERENCE DWG.	REV	DSN	CK	DESCRIPTION		BID INITIALS	BID DATE	CONSTRUCTION INITIALS	CONSTRUCTION DATE
						ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
						DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
						DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
						DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
ANGP-T-C-084A	ALIGNMENT SHEET					DESIGN MANAGER	SAB	06/28/13	JEO	05/2016

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. ADDISON COUNTY, VERMONT

YEAR: 2016 | W.O. | SCALE: 1" = 50' | DWG. ANGP-EPSC-084A | REV. 0

Vermont Gas

CHA
38 Eastwood Drive, Suite 105
South Burlington, VT 05403
Main: (802) 735-0372 · www.chacompanies.com

RIGHT-OF-WAY

MATCHLINE

265.01
ROUTE 7

275.01
N/F
DELINEATION CORPORATION;
CORBIN, THOMAS

TOWN OF NEW HAVEN
TOWN OF MIDDLEBURY

277.01
N/F
DELINEATION CORPORATION;
CORBIN, THOMAS

265.02
ROUTE 7

279.01
N/F
DRAGON, SANDRA JEANNE

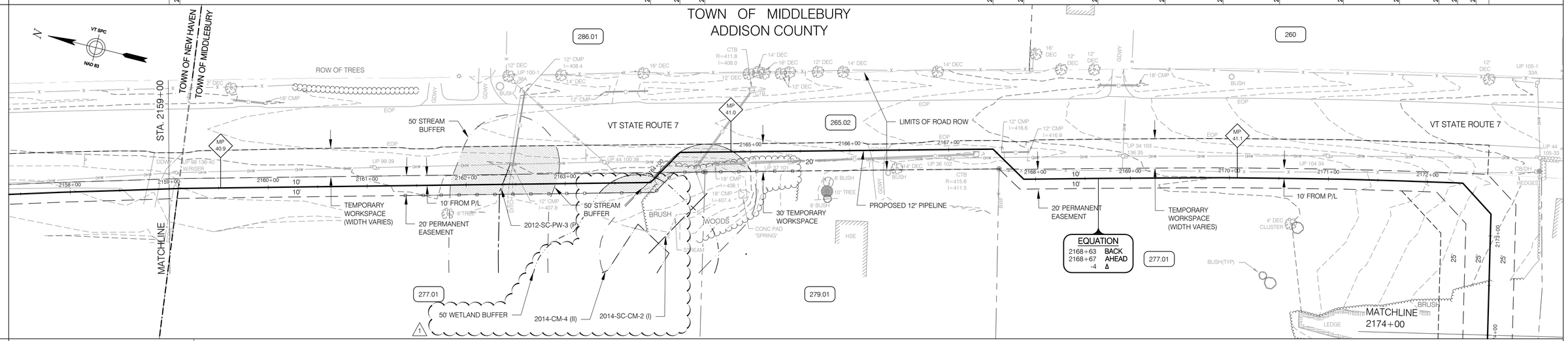
277.01
N/F
DELINEATION CORPORATION;
CORBIN, THOMAS

MATCHLINE

SURVEY DATA

Station	Bearing	Deflection
2159+15	S 15° 52' E	01°12' LT
2163+90	S 14° 40' E	44°55' LT
2164+32	S 59° 35' E	44°55' RT
2164+32	S 14° 40' E	00°08' RT
2167+63	S 14° 32' E	44°58' LT
2167+94	S 30° 25' W	44°59' LT
2168+68	S 14° 34' E	00°15' RT
2169+35	S 14° 20' E	00°06' RT
2169+94	S 14° 13' E	00°53' RT
2170+51	S 13° 20' E	00°11' RT
2171+16	S 13° 08' E	00°51' RT
2171+72	S 12° 16' E	00°18' RT
2172+29	S 11° 58' E	00°41' RT
2172+36	S 11° 16' E	44°59' RT
2172+78	S 33° 43' W	43°55' RT
	S 77° 39' W	

ALIGNMENT DETAIL



EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

PERMANENT EASEMENT	— — — —
TEMPORARY WORKSPACE	– – – – –
CENTERLINE OF STREAM	—— - ——
TEMPORARY STREAM CROSSING	▨
WETLAND	— · · —
50' WETLAND BUFFER	— · · — · · —
TEMPORARY WETLAND MATTING	▩
WETLAND BUFFER WITHIN PROJECT AREA	░
REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL	—□—□—□—

INSTALL CONSTRUCTION DEMARCATION:
STA. 2159+00 TO 2164+10 RT - 10' FROM NEW 12" PIPE ℄

INSTALL REINFORCED PERIMETER CONTROL:
STA. 2161+34 TO 2164+00 RT - 10' FROM NEW 12" PIPE ℄
STA. 2164+00 TO 2165+50 RT - 20' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 2164+10 TO 2167+63 RT - 20' FROM NEW 12" PIPE ℄
STA. 2167+63 TO 2171+75 RT - 10' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 2171+75 TO 2172+36 RT - WIDTH VARIES' FROM NEW 12" PIPE ℄
STA. 2172+36 TO 2174+00 RT - 50' FROM NEW 12" PIPE ℄
STA. 2172+46 TO 2174+00 LT - 25' FROM NEW 12" PIPE ℄

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

HORIZONTAL SCALE
50 25 0 50 100 150 feet
50 25 0 50 100 150 feet
VERTICAL SCALE

CONST. TYPE	4B 7 4B 4E 4B 1E
SOIL TYPE	VgB (PAS) NeB (PAS) NeB (PAS) VgB (PAS)
LC/LU	GRASS TRAVEL
STREAMS	STREAM 2012-SC-PW-3 - (P) STATION 2161+78 TO 2162+89 STREAM 2014-SC-CM-2 (I) 1
WETLANDS	WETLAND 2014-CM (II)
VERNAL POOLS	
SIGNIFICANT NATURAL COMMUNITIES	
RTE SPECIES	
NRC WILDLIFE HABITAT	
ARCHAEOLOGY SITES	

MATCH LINE

MATCH LINE

		BID		CONSTRUCTION	
ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
DESIGN MANAGER	SAB	06/28/13	JEO	05/2016
	INITIALS	DATE	INITIALS	DATE

DWG. NO.	REFERENCE DWG.	REV	DSN	CK	DESCRIPTION
ANGP-T-C-084B	ALIGNMENT SHEET	1	BCK	TDB	ENV. EDITS (6/08/15)

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. ADDISON COUNTY, VERMONT

YEAR: 2016 | W.O. | SCALE: 1" = 50' | DWG. ANGP-EPSC-084B | REV. 1

Vermont Gas

VHB Vanasse Hangen Brustlin, Inc.

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South Burlington, VT 05403
Main: (802) 735-0372 · www.chacompanies.com

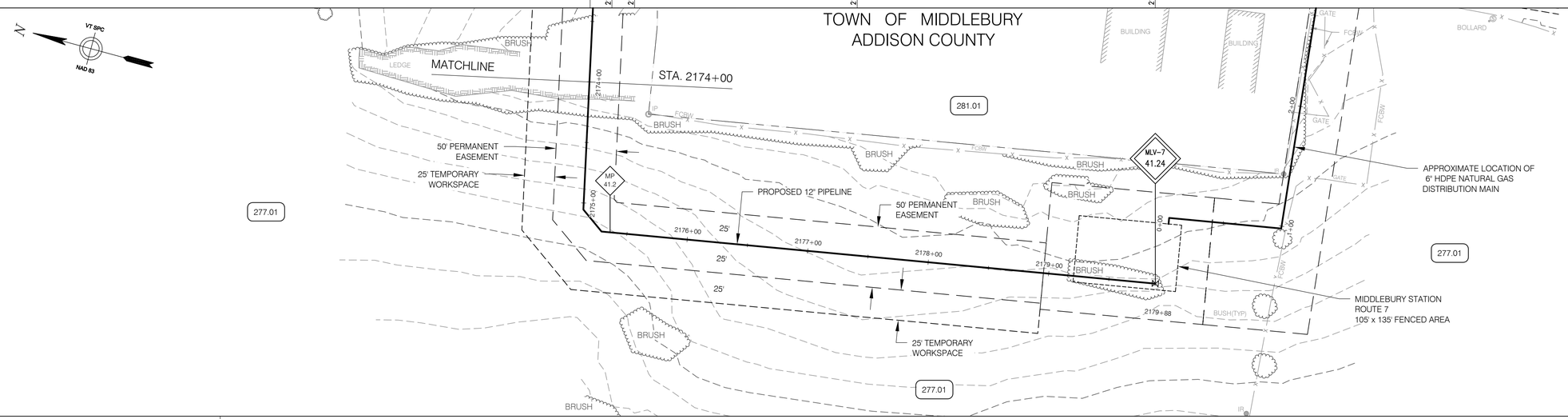
RIGHT-OF-WAY

SURVEY DATA

MATCHLINE | 277.01 N/F DELINEATION CORPORATION CORBIN, THOMAS | END

S 77° 39' W 42'14" LT 2175+05 | S 35° 24' W 45'07" LT 2175+29 | S 09° 43' E | 00'22" LT 2177+41 | S 10° 05' E | 2179+91

ALIGNMENT DETAIL



EROSION PREVENTION & SEDIMENT CONTROL

LEGEND

- PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- CENTERLINE OF STREAM
- TEMPORARY STREAM CROSSING
- WETLAND
- 50' WETLAND BUFFER
- TEMPORARY WETLAND MATTING
- WETLAND BUFFER WITHIN PROJECT AREA
- REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROL

INSTALL CONSTRUCTION DEMARCATION:
STA. 2174+00 TO 2178+96 RT - 50' FROM NEW 12" PIPE ℄
STA. 2174+00 TO 2178+96 LT - 25' FROM NEW 12" PIPE ℄

INSTALL CONSTRUCTION DEMARCATION:
STA. 2178+96 TO 2179+88 RT - 30' FROM NEW 12" PIPE ℄
STA. 2178+96 TO 2179+88 LT - 75' FROM NEW 12" PIPE ℄

1. REINFORCED CONSTRUCTION DEMARCATION AND REINFORCED PERIMETER CONTROLS ARE ONLY SHOWN WITHIN 50 FT. OF WATER RESOURCE AREAS AND AT CONSTRUCTION ENTRANCES - SEE "CONSTRUCTION EPSC NOTES" - NOTE #6. CONSTRUCTION DEMARCATION AND PERIMETER CONTROLS ARE NOT TO CROSS ACCESS WAYS OR ACTIVE FLOW PATHS. FOR AREAS THAT ARE > 50 FT. FROM WATER RESOURCE AREAS, CONSTRUCTION DEMARCATION IS TO BE INSTALLED ALONG PERIMETER OF PROJECT AREA / LIMITS OF DISTURBANCE AND PERIMETER CONTROLS ARE TO BE INSTALLED ON THE DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SOIL EROSION AND/OR SEDIMENT RUNOFF - SEE NOTE #6.
2. FOR AREAS DESIGNATED AS PRIME AGRICULTURAL SOILS (PAS), SEE "CONSTRUCTION WITHIN PRIME AGRICULTURAL SOILS (PAS) AREAS" (ANGP-T-G-011), FOR SOIL SEGREGATION AND ASSOCIATED CONSTRUCTION PROCEDURES.

HORIZONTAL SCALE
50 25 0 50 100 150 feet
VERTICAL SCALE
50 25 0 50 100 150 feet

	MATCH LINE		END
CONST. TYPE		1E	
SOIL TYPE		VgB (PAS)	
LC/LU		GRASS (TRAVEL / AGRICULTURAL)	
STREAMS			
WETLANDS			
VERNAL POOLS			
SIGNIFICANT NATURAL COMMUNITIES			
RTE SPECIES			
NRC WILDLIFE HABITAT			
ARCHAEOLOGY SITES			

DWG. NO.	REFERENCE DWG.	REV	DSN	CK	DESCRIPTION		BID INITIALS	BID DATE	CONSTRUCTION INITIALS	CONSTRUCTION DATE
						ENVIRONMENTAL	JLS	06/28/13	JLS	05/2016
						DRAFTING DESIGNER	GIL	06/28/13	GJM	05/2016
ANGP-EPSC-M-001	EPSC PLAN					DRAFTING SUPERVISOR	BZD	06/28/13	BCK	05/2016
ANGP-T-G-021	STATION AND VALVE DETAILS					DESIGN ENGINEER	MDF	06/28/13	GEW	05/2016
ANGP-T-C-085	ALIGNMENT SHEET					DESIGN MANAGER	SAB	06/28/13	JEO	05/2016

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
EPSC PLAN

LOC. ADDISON COUNTY, VERMONT

YEAR: 2016 | W.O. | SCALE: 1" = 50' | DWG. ANGP-EPSC-085 | REV. 0

Vanasse Hangen Brustlin, Inc.

Vermont Gas

CHA
38 Eastwood Drive, Suite 105
South Burlington, VT 05403
Main: (802) 735-0372 · www.chacompanies.com

TECHNICAL SPECIFICATIONS

FOR

Vermont Gas Systems, Inc.
85 Swift Street
South Burlington, VT 05403

Addison Natural Gas Project (ANGP)
Phase 1

PREPARED BY:

38 Eastwood Drive, Suite 105
South Burlington, VT 05403

April 29, 2015
Sections 137000, 138000 and 312333 Revised 05/2016

PROJECT NO.: 28757

TABLE OF CONTENTS

SECTION 011000 - SUMMARY & SCOPE OF WORK

PART 1 - GENERAL

1.1 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Identification:

1. Addison-Rutland Natural Gas Project (ARNGP) Phase 1: Approximately 41.4 total miles of 12-inch natural gas transmission piping (including approximately 3.7 miles of horizontal directional drills, approximately 5.5 miles of open-cut previously installed and 32.2 miles of remaining open-cut and jack & bore installation). MAOP will be 1,440 psi. Additional project components are indicated on the Construction Plans, including, but not limited to the following:

a. Mainline valve sites,

b. Colchester Tie-in site,

c. 3 Meter & Regulation Stations (previously completed and not in this contract)

2. Vermont Gas Phase 7 Looping: Approximately 3 mile extension of 16-inch natural gas transmission piping, paralleling an existing 10-inch transmission main, including one mainline valve site. MAOP will be 1,440 psi.

3. Project Location:

a. Phase 1: Chittenden County, Vermont (Towns of Colchester, Essex, Williston, St. George, Hinesburg) and Addison Counties, Vermont (Monkton, New Haven and Middlebury)

b. Phase 7: Franklin County, Vermont (Town of Georgia)

4. Owner: Vermont Gas Systems, Inc., 85 Swift Street, South Burlington, Vermont 05403

B. Engineer Identification:

1. Phase 1: The technical specifications (dated 4/29/15) and design plans were prepared for Phase 1 by CHA, 38 Eastwood Drive, Suite 105, South Burlington, Vermont 05403.

2. Phase 7: The design plans dated 9/10/13 (Sheets C-207, 208, 209 have a different date of 5/25/12) were prepared for Phase 7 by consultants noted on plans.

C. Project/Construction Manager: The Owner has engaged with Pricewaterhouse Coopers to function as the Project/Construction Manager for this Project, to serve as an advisor to Owner, and to provide assistance in administering the Construction Contract between Owner and Contractor.

1.2 CONTRACT**S**

A. The Project will be constructed under multiple contracts.

B. Multiple contracts are separate agreements, representing significant construction activities, between Owner and separate contractors. See narrative below for a description of work included under each separate contract. Each contract is performed concurrently and shall be coordinated closely with construction activities performed on Project under other contracts. Contracts for this Project include the following:

1. Phase 1 Horizontal Directional Drilling (HDD) Design-Build Contract – Engineers Construction, Inc. (ECI), of Williston, Vermont, has been retained to complete all HDD's noted on the project plans.

2. Construction of three (3) meter and regulating gate stations – Frank Lill and Sons of Victor, New York has been retained to complete all work associated with the construction of the three gate stations.

3. All remaining construction activities associated with Phase 1 and Phase 7 (excluding scopes described items 1 and 2 above), which is described in these technical specifications, contract terms & conditions, project construction permit conditions, and indicated on the Construction Plans. The Phase 1 and 7 Contract includes, but is not necessarily limited to, the following general scope of work:

    a. Job site safety including compliance with OSHA/VOSHA Laws and Regulations,

    b. Safety training for all appropriate personnel (e.g. VELCO, Owner)

    c. Implementing and maintaining all environmental permit conditions. Fines/penalties imposed on the Owner for Contractor violations of these conditions will be borne exclusively by the Contractor,

    d. Implementing and maintaining all other project permit conditions,

    e. Maintaining construction line list requirements,

    f. Call Dig Safe at 811 before starting any excavation or verify that a Dig Safe ticket exists and is valid for the area. Contractor shall maintain Dig Safe marks and follow all Dig Safe laws. Contractor is responsible for contacting and complying with municipal and private utilities that are not members of Dig Safe. Excavate with care to avoid damage to structures and utilities - excavations shall be completed by hand if necessary. Promptly report any damages to utilities to Utility Owner and Construction Management Team, do not attempt repairs without the Utility Owners consent.Protection of existing Owner gas transmission main and distribution facilities.

    g. Protection and repairs/replacements of all public and private property within the work limits, including, but not limited to the following: existing utilities and infrastructure, structures, drain tiles, and vehicles,

    h. Mobilization/Demobilization of all required equipment, personnel, and materials,

    i. Construction, maintenance, environmental controls and restoration of all staging areas and pipe laydown yards,

    j. Installation, removal and restoration of access roads,

    k. Clearing, grubbing and removal/disposal of any construction debris,

    l. Handling, transportation, unloading/stringing of all transmission pipe and appurtenances,

    m. Trenching, including maintaining soils segregation per permitting conditions,

    n. Jobsite dewatering,

    o. Rock removal and disposal,

    p. Furnishing and installation of rock shield,

    q. Furnishing materials and installation of trench breakers,

    r. Furnishing materials, filling, transportation and installation of "pipesaks"

s. Pipeline (including fittings) welding, field coating, field bending, and lowering into trench,

t. Pipeline welding (including fittings) and field coating repairs and/or replacements,

u. Pipe padding, select backfill, general backfill,

v. Jack & bore installations as noted on project plans,

w. Installation of concrete coating pipe in areas noted on plans (e.g. road crossings and wetlands/streams),

x. Installation of test leads,

y. Contracting with ARK Engineering & Technical Services of Braintree MA for a complete installation of all cathodic protection and AC mitigation project components.

z. Hydrostatic testing of the entire Phase 1 transmission main from the Colchester Tie-in Site to the Middlebury M&R Station. This includes testing pipeline installed by the HDD Contractor and the previous Transmission Main Contractor,

aa. Hydrostatic testing of the Phase 7 transmission main from Sta. 264+40 to 419+81 (entire length of Phase 7),

bb. Pigging (cleaning, drying, geometry/caliper) the transmission mains,

cc. Mainline Valve Sites and Colchester Tie-In construction including all civil/site, mechanical, and electrical work required for a comprehensive installation,

dd. All transmission piping and appurtenances downstream of MLV7 up to 12-inch isolation valve and blind flange at Middlebury M&R Station,

ee. Tie-Ins to previously constructed Metering and Regulation Stations and tie-ins to previously installed transmission main segments,

ff. All construction activities related to gas-up of newly installed transmission line segments, excluding purging and gas up (by Owner),

gg. Installation of pipeline markers,

hh. Coordination with and support for ARK Technical Services (designer and installer of AC Mitigation and Cathodic Protection Systems),

ii. Coordination with and support for ECI for completion of the HDD construction activities,

(1) Load and transport pipe from Swanton, VT to HDD locations in accordance with HDD Contractor's scheduling needs and project permitting requirements. Unload, handle, and string pipe at the HDD site,

(2) Clear and grade HDD sites,

(3) Install timber mats as needed,

(4) Install temporary access roads,

(5) Align, weld, and coat HDD pull back pipe field joints,

(6) Place HDD pipe pull back on rollers,

(7) Install hydrostatic test manifolds on HDD pipe pull back section,

(8) Fill HDD pipe pull back section with water,

(9) Complet successful 4 hour hydrostatic test of HDD pipe pull back section (pre and post-installation). Refer to hydrostatic testing specification for additional requirements,

(10) Provide holiday detector to inspect HDD pipe pull back section for coating holidays during pipe pull back operations,

(11) Repair coating holidays during HDD pipe pull back operations,

(12) Provide all necessary equipment, operators, and laborers to assist HDD Contractor with the installation of HDD pipe pull back section,

(13) Provide all necessary equipment, operators, and laborers to run a 95% ID aluminum sizing plate through HDD pipe pull back section,

(14) Coordinate final tie-ins of HDD pipe pull back section with HDD Contractor,

(15) Remove timber mats from site,

(16) Restore stie to finish grade,

(17) Complete clean up and final restoration.

jj. Coordination and cooperation with all inspection and construction management consultants, NDE personnel, and layout crews/as-built surveyors,

kk. Jobsite and right-of-way cleanup of all debris, trash and deleterious materials,

ll. All traffic control required by permitting conditions, as well as local/state/federal regulations.

mm. Commissioning and startup assistance,

nn. Completion of all warranty items after substantial completion.

1.3 USE OF PREMISES

A. General: The Contractors shall have use of the project right-of-way and defined work limits for construction operations as described below. The Contractor's use of premises is limited only by Owner's right to perform work or to retain other contractors on portions of Project.

1. Phase 1 HDD Contractor (ECI) shall have use of the Williston and Plank Road pipe yards.

2. The contractor retained to complete the remaining Phase 1 transmission main activities as well as Phase 7, will have use of the Williston and Plank Road pipe yards. Coordination and cooperation with the other Phase 1 contractors is a requirement of this transmission contractor.

1.4 FUTURE WORK

A. Future Contracts: Owner will award separate contracts for additional work to be performed at the site after Substantial Completion. Completion of that work will depend on successful completion of preparatory work under this Contract. The Contract for future work will include the following:

1. Landscaping: All landscaping around mainline valve sites and the Colcheter Tie-in Site.

2. Fencing: All fencing around mainline valve sites and the Colchester Tie-in Site.

1.5 OWNER-FURNISHED PRODUCTS AND SERVICES

A. Owner will furnish (delivered to the pipe yards) or has provided the following project components and services. When applicable, the Contractor shall be responsible for transportation (from the designated construction yards to the right-of-way), protection, installation, testing and commissioning, as well as all labor and equipment necessary for a complete installation.

1. 12-inch transmission piping, 12" ell fittings and/or induction bends, valves and appurtenances.

2. 16-inch transmission piping, 16" ell fittings and/or induction bends, valves and appurtenances.

3. Mainline Valve Sites: Fencing, valves, piping, fittings, actuators and all other mechanical appurtenances 2-inches and larger in nominal size.

4. Colchester Tie-In Site: Fencing, valves, piping, fittings, actuators and all other mechanical appurtenances 2-inches and larger in nominal size.

5. AC mitigation and cathodic protection materials.

6. 3,600 timber mats (4'x16'). All additional mats that are required by the Contractor for the complete installation of all contract components shall be furnished, installed, washed (if required by permit conditions), removed and disposed of (if necessary) by the Contractor. If mats are in acceptable working condition (as determined by the Construction Management Team) at the end of the construction phase, contractor shall wash, transport (to Williston Pipe Yard), and unload/stack mats with cribbing/wood to prevent dry rot.

7. Pipeline markers, warning signs, and tape.

8. Hot –tapping materials including tee, plug, blind flange, and valve.

9. Items indicated as by Owner on project plans.

B. The Owner has provided the following construction components and services:

1. The construction of the Williston Road Pipe Yard.

2. Hot-tap of existing 10" steel Natural Gas Transmission Line adjacent to the Colchester Tie-in Site.

3. Construction of the following access roads:

a. Access Road B – Partially constructed.

b. Access Road E – Timber mat road installed.

c. Access Road F – Completed, but may require minor improvements.

d. Access Road D2 – Partially constructed.

e. Access Road D3 – Partially constructed.

f. Access Road H – Installed, but partially restored.

g. Access Road I – Timber mat road installed.

4. Open-cut/jack and bore installation of 12” Steel Transmission Pipe in the following areas:
    a. Mill Pond Road Jack and Bore in Colchester
    b. STA. 126+66 to 158+08
    c. STA. 184+76 to 212+11
    d. STA. 219+57 to 240+37
    e. STA. 322+44 to 356+50
    f. STA 366+15 to 387+97
    g. STA. 400+30 to 553+16
5. Tree clearing of the following areas:
    a. STA. 0+00 to 39+00
    b. STA. 106+00 to 554+00
6. Installation of 12-inch transmission main and associated components as indicated on project plans.
7. Survey Stake-out and as-built of the entire pipeline route, including pipeline centerline and work spaces.
8. Non-destructive examination (NDE) inspection services for welding.

C. The Contractor shall provide support systems to receive Owner’s equipment and furnished products at the construction yards.

1. Owner will arrange and pay for delivery (to the Williston pipe yard) of Owner-furnished items according to Contractor's Construction Schedule.
2. Contractor shall be responsible for providing all labor, materials, equipment, supervision, dunnage, and necessary appurtenances for the unloading and storage of all remaining materials delivered to the Project site. All Project materials are delivered FOB tailgate to the jobsite.
3. After delivery, Owner and Contractor will jointly inspect delivered items for damage. Contractor and Owner shall jointly sign off on material receiving inspection forms indicating the condition of the materials delivered to the Project Site. In the event of a future issue with the condition of any materials the material receiving inspection form shall be governing document to determine responsibility for any repair or replacement costs.
4. If Owner-furnished items are damaged, defective, or missing, Owner will arrange for replacement.
5. Owner will arrange for manufacturer's field services and for delivery of manufacturer's warranties to Contractor.
6. Owner will furnish Contractor the earliest possible delivery date for Owner-furnished products. Using Owner-furnished earliest possible delivery dates, Contractor shall designate delivery dates of Owner-furnished items in Contractor's Construction Schedule. From this schedule the Contractor shall provide the Owner with a delivery schedule of materials needed.

7. Contractor shall review Shop Drawings, Product Data, and Samples and return them to Construction Management Team noting conditions which will preclude the Contractor from adhering to the Project design and construction requirements. Failure by the Contractor to adequately assess the materials provided by the Owner for the intended use in the construction of this Project shall not result in an extension of the Project Schedule or additional costs to the Owner.

8. Contractor is responsible for protecting Owner-furnished items from damage during storage and handling, including damage from exposure to the elements as required by the manufacturer of the materials or coating requirements of the pipe.

9. If Owner-furnished items are damaged as a result of Contractor's operations, Contractor shall repair or replace them at no additional cost to the Owner and without any schedule extensions.

10. Contractor shall collect and deliver (to a location determined by Owner) all unused and scrap Owner supplied materials at the end of Construction. Materials shall be property of the Owner.

D. Contractor shall furnish (subject to Construction Management Team review and approval) all materials, products and services not listed in 1.5A above for a complete installation. All materials and equipment shall be in accordance with applicable specifications and Owner standards. Including, but not limited to, the following:

1. Field coating materials,
2. Rockshield,
3. Geotechnical materials (geotextiles, select backfill, common backfill, other aggregate materials),
4. PipeSaks,
5. Trench breaker materials,
6. Pipe, valves and fittings less than 2-inches in nominal size,
7. EPSC measures and other environmental protection/restoration materials and equipment,
8. Access road materials,
9. All incidental equipment and materials required for pigging operations and for hydrotesting,
10. Insulating Joints as required.
11. Materials and products shown on project plans that are noted to be provided by Contractor.
12. All additional necessary materials required to complete construction in accordance with all Contract Documents.

1.6 SPECIFICATION FORMATS AND CONVENTIONS

A. Specification Format: The Specifications are organized into Divisions and Sections using the 48-division format and CSI/CSC's "MasterFormat" numbering system.

1. Section Identification: The Specifications use section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of sections in the Contract Documents.

B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.

2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.

a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Preliminary Construction Schedule.
2. Contractor's Construction Schedule.
3. Submittals Schedule.
4. Plan of the day reports.
5. Daily construction reports.
6. Material location reports.
7. Field condition reports.
8. Special reports as directed by the Construction Management Team.
9. Construction pictures and videos.

1.2 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.

1. Critical activities are activities on the critical path. They must start and finish on the planned early start and finish times.
2. Predecessor activity is an activity that must be completed before a given activity can be started.

B. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.

C. Critical Path: The longest continuous chain of activities through the network schedule that establishes the minimum overall Project duration and contains no float.

D. Event: The starting or ending point of an activity.

E. Float: The measure of leeway in starting and completing an activity.

1. Float time is for the exclusive use or benefit of the Owner.
2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the following activity.
3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

F. Fragnet: A partial or fragmentary network that breaks down activities into smaller activities for greater detail.

G. Major Area: A story of construction, a separate building, or a similar significant construction element.

H. Milestone: A key or critical point in time for reference or measurement.

I. Network Diagram: A graphic diagram of a network schedule, showing activities and activity relationships.

1.3 SUBMITTALS

A. Qualification Data: For firms and persons specified in "Quality Assurance" Article and in-house scheduling personnel to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects, engineers, owners, and other information specified.

B. Submittals Schedule: Submit a digital copy of the schedule. Arrange the following information in a tabular format:

1. Scheduled date for first submittal.
2. Specification Section number and title.
3. Submittal category (action or informational).
4. Name of subcontractor.
5. Description of the Work covered.
6. Scheduled date for Construction Management Team final release or approval.

C. Preliminary Construction Schedule: Submit a digital copy of the preliminary schedule prior to beginning construction.

D. Contractor's Construction Schedule: Submit a digital copy of initial schedule large enough to show entire schedule for entire construction period.

1. Submit an electronic copy of schedule. Include type of schedule (Initial or Updated) and date on label.

E. CPM Reports: Concurrent with CPM schedule, submit a digital copy of each of the following computer-generated reports. Format for each activity in reports shall contain activity number, activity description, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float.

1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity number and then early start date, or actual start date if known.
3. Total Float Report: List of all activities sorted in ascending order of total float.
4. Earnings Report: Compilation of Contractor's total earnings from the Notice to Proceed until most recent Application for Payment.

F. Construction Pictures and Videos: Submit digital pictures and videos as requested by Owner.

G. Daily Construction Reports: Submit digital copies daily. Contractor construction reporting forms shall be reviewed and approved by the Construction Management Team and Owner prior to construction.

H. Material Location Reports: Submit digital copies at weekly intervals.

I. Field Condition Reports: Submit digital copies at time of discovery of differing conditions.

J. Special Reports: Submit digital copies at time of unusual event.

1.4 QUALITY ASSURANCE

A. Scheduling Personnel Qualifications: An experienced specialist in CPM scheduling and reporting with at least 5 years of experience in scheduling and tracking of work on projects of this type and magnitude.

B. Prescheduling Conference: Conduct conference at Project site. Review methods and procedures related to the Preliminary Construction Schedule and Contractor's Construction Schedule, including, but not limited to, the following:

1. Review software limitations and content and format for reports.

2. Verify availability of qualified personnel needed to develop and update schedule.

3. Discuss constraints, including phasing, work, stages and interim milestones.

4. Review delivery dates for Owner-furnished products.

5. Review schedule for work of Owner's separate contracts.

6. Review time required for review of submittals and resubmittals.

7. Review requirements for tests and inspections by independent testing and inspecting agencies.

8. Review time required for completion and startup procedures.

9. Review and finalize list of construction activities to be included in schedule.

10. Review submittal requirements and procedures.

11. Review procedures for updating schedule.

1.5 COORDINATION

A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.

B. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from parties involved.

2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 SUBMITTALS SCHEDULE

A. Preparation: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, resubmittal, ordering, manufacturing, fabrication, and delivery when establishing dates.

1. Coordinate Submittals Schedule with list of subcontracts, the Schedule of Values, and Contractor's Construction Schedule.

2. Initial Submittal: Include submittals required during the first 60 days of construction. List those required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.

a. At Contractor's option, show submittals on the Preliminary Construction Schedule, instead of tabulating them separately.

3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's Construction Schedule.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Procedures: Comply with procedures contained in AGC's "Construction Planning & Scheduling."

B. Time Frame: Extend schedule from date established for the Notice of Award to date of Final Completion.

1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

C. Activities: Treat each separate area as a separate numbered activity for each principal element of the Work. Comply with the following:

1. Activity Duration: Define activities so no activity is longer than 3**0** days, unless specifically allowed by Construction Management Team.

2. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.

3. Submittal Review Time: Include review and resubmittal times indicated in Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.

4. Gas up: Provide Owner not less than 14 days notice prior to substantial completion.

5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Construction Management Team's administrative procedures necessary for certification of Substantial Completion.

D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.

1. Phasing: Arrange list of activities on schedule by phase.

2. Work under More Than One Contract: Include a separate activity for each contract.

3. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.

4. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.

5. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.

6. Work Restrictions: Show the effect of the following items on the schedule:

   a. Coordination with existing construction.

   b. Limitations of continued occupancies.

   c. Partial operation before Substantial Completion.

   d. Use of premises restrictions.

   e. Provisions for future construction.

   f. Seasonal variations.

   g. Environmental control.

   h. State/Federal Holidays.

   i. Seasonal restrictions of the Permits.

   j. State/environmental permit date restrictions.

7. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:

   a. Subcontract awards.

   b. Submittals.

   c. Purchases.

   d. Fabrication.

   e. Sample testing.

   f. Deliveries.

   g. Installation.

   h. Tests and inspections.

   i. Adjusting.

   j. Startup/commissioning and placement into final use and operation.

E. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to the Notice to Proceed, Substantial Completion, and Final Completion for Phase 1 and 7.

F. Cost Correlation: At the head of schedule, provide a cost correlation line, indicating planned and actual costs. On the line, show dollar volume of the Work performed as of dates used for preparation of payment requests.

G. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using fragnets to demonstrate the effect of the proposed change on the overall project schedule.

H. Computer Software: Prepare schedules using a program that has been developed specifically to manage construction schedules. Program shall be approved by Owner prior to Notice of Award.

2.3 PRELIMINARY CONSTRUCTION SCHEDULE

A. Bar-Chart Schedule: Submit preliminary horizontal bar-chart-type construction schedule within 14 days of date established for the Notice of Award.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first 60 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

2.4 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)

A. General: Prepare network diagrams using AON (activity-on-node) format.

B. Preliminary Network Diagram: Submit diagram within **14** days of date established for the Notice to Proceed. Outline significant construction activities for the first 60 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

C. CPM Schedule: Prepare Contractor's Construction Schedule using a CPM network analysis diagram.

1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than **30** days after date established for the Notice to Proceed.

2. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.
3. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
4. Use "one workday" as the unit of time.

D. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the preliminary network diagram, prepare a skeleton network to identify probable critical paths.

1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:

a. Preparation and processing of submittals.

b. Purchase of materials.

c. Delivery.

d. Fabrication.

e. Installation.

2. Processing: Process data to produce output data or a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.

3. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.

a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.

E. Initial Issue of Schedule: Prepare initial network diagram from a list of straight "early start-total float" sort. Identify critical activities. Prepare tabulated reports showing the following:

1. Contractor or subcontractor and the Work or activity.

2. Description of activity.

3. Principal events of activity.

4. Immediate preceding and succeeding activities.

5. Early and late start dates.

6. Early and late finish dates.

7. Activity duration in workdays.

8. Total float or slack time.

9. Average size of workforce.

10. Dollar value of activity (coordinated with the Schedule of Values).

F. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:

1. Identification of activities that have changed.

2. Changes in early and late start dates.

3. Changes in early and late finish dates.

4. Changes in activity durations in workdays.

5. Changes in the critical path.

6. Changes in total float or slack time.

7. Changes in the Contract Time.

G. Value Summaries: Prepare two cumulative value lists, sorted by finish dates.

1. In first list, tabulate activity number, early finish date, dollar value, and cumulative dollar value.

2. In second list, tabulate activity number, late finish date, dollar value, and cumulative dollar value.

3. In subsequent issues of both lists, substitute actual finish dates for activities completed as of list date.

4. Prepare list for ease of comparison with payment requests; coordinate timing with progress meetings.

   a. In both value summary lists, tabulate "actual percent complete" and "cumulative value completed" with total at bottom.

   b. Submit value summary printouts one week before each regularly scheduled progress meeting.

2.5 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

1. List of subcontractors at Project site.
2. List of separate contractors at Project site.
3. Approximate count of personnel at Project site.
4. High and low temperatures and general weather conditions.
5. Accidents.
6. Meetings and significant decisions.
7. Unusual events (refer to special reports).
8. Stoppages, delays, shortages, and losses.
9. Meter readings and similar recording.
10. Emergency procedures.
11. Orders and requests of authorities having jurisdiction.
12. Change Orders received and implemented.
13. Work Change Directives received.
14. Equipment or system tests and startups.
15. Partial Completions.
16. Substantial Completions authorized.

B. Material Location Reports: At monthly intervals, prepare a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with lit a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site.

C. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare a detailed report. Submit with a request for information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.6 SPECIAL REPORTS

A. General: Submit special reports directly to Owner within one day of an occurrence. Distribute copies of report to parties affected by the occurrence.

B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Scheduling Engineer: Provide a scheduling engineer with a minimum of 5 years relevant experience working with an electronic CPM Software package with particular experience in the scheduling and execution of the construction of linear pipeline projects..

1. Meetings: Scheduling Engineer shall attend all meetings related to Project progress, alleged delays, and time impact.

B. Contractor's Construction Schedule Updating: At weekly intervals, update schedule to reflect actual construction progress and activities. Issue schedule 24 hours before each regularly scheduled progress meeting.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.

2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.

3. As the Work progresses, indicate Actual Completion percentage for each activity.

C. Distribution: Distribute copies of approved schedule to Engineer**,** Construction Management Team**,** Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

1. Post copies in Project meeting rooms and temporary field offices.
2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

3.2 CONSTRUCTION DIGITAL PICTURES AND VIDEOS

A. Date Stamp: Unless otherwise indicated, date and time stamp each photograph as it is being taken so stamp is integral to photograph.

B. Preconstruction Pictures and Videos: Before starting construction, take adequate photographs and/or videos of Project site and surrounding properties from different vantage points, as directed by Construction Management Team. Show existing conditions adjacent to property.

C. Periodic Construction Pictures: Provide as requested by Owner.

D. Final Completion Construction Pictures and Videos: Take adequate pictures and videos after date of Substantial Completion for submission as Project Record Documents.

END OF SECTION

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, and other miscellaneous submittals.

1.2 DEFINITIONS

A. Action Submittals: Written and graphic information that requires Construction Management Team's responsive action.

B. Informational Submittals: Written information that does not require Engineer's and Construction Management Team's approval. Submittals may be rejected for not complying with requirements.

C. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.

D. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

1.3 SUBMITTAL ADMINISTRATIVE REQUIREMENTS:

A. Engineer's Digital Data Files: Electronic digital data files of the Contract Drawings will be provided by Engineer for Contractor's use in preparing submittals, if required.

1. Engineer will furnish Contractor one set of digital data drawing files of the Contract Drawings, pending a returned executed CAD release form, for use in preparing Shop Drawings and Project record drawing.

a. Engineer makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.

b. Digital Drawing Software Program: The Contract Drawings are available in AutoCAD 2013.

c. Contractor shall execute data licensing agreement.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.

2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.

3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.

4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

   a. Engineer and Construction Management Team reserve the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Engineer's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Construction Management Team will advise Contractor when a submittal being processed must be delayed for coordination.

2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.

3. Resubmittal Review: Allow 15 days for review of each resubmittal.

4. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Engineer and to Engineer's consultants, allow 15 days for review of each submittal. Submittal will be returned to Construction Management Team, through Engineer, before being returned to Contractor.

D. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:

1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.

2. Name file with submittal number or other unique identifier, including revision identifier.

   a. File name shall use project identifier, phase identifier and Specification Section number followed by a decimal point and then a sequential number (e.g., the first submittal for Phase 1 regarding painting: ARNGP-PH1-099000.01). Resubmittals shall include a numerical suffix after another decimal point (e.g., the third submittal, second revision for Phase 2 regarding trenching and backfilling: ARNGP-PH2-312333.03-R2).

3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Engineer and Construction Management Team.

4. Transmittal Form for Electronic Submittals: Use electronic form acceptable to Owner, containing the following information:

   a. Project name.

   b. Date.

   c. Name and address of Engineer.

   d. Name of Construction Management Team.

   e. Name of Contractor.

   f. Name of firm or entity that prepared submittal.

   g. Names of subcontractor, manufacturer, and supplier.

   h. Category and type of submittal.

   i. Submittal purpose and description.

   j. Specification Section number and title.

   k. Specification paragraph number or drawing designation and generic name for each of multiple items.

   l. Drawing number and detail references, as appropriate.

   m. Location(s) where product is to be installed, as appropriate.

   n. Indication of full or partial submittal.

   o. Transmittal number

   p. Submittal and transmittal distribution record.

   q. Other necessary identification.

   r. Remarks.

E. Deviations and Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Engineer and Construction Management Team on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.

F. Resubmittals: Make resubmittals in same form as initial submittal.

   1. Note date and content of previous submittal.

   2. Note date and content of revision in label or title block and clearly indicate extent of revision.

3. Resubmit submittals until they are marked with approval notation from Construction Management Team's action stamp.

G. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

H. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Engineer's action stamp.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Submit electronic submittals via email as PDF electronic files.

    a. Engineer, through Construction Management Team, will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.

2. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.

    a. Provide a digital signature with digital certificate on electronically submitted certificates and certifications where indicated.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.

2. Mark each copy of each submittal to show which products and options are applicable.

3. Include the following information, as applicable:

    a. Manufacturer's catalog cuts.

    b. Manufacturer's product specifications.

    c. Statement of compliance with specified referenced standards.

    d. Testing by recognized testing agency.

    e. Application of testing agency labels and seals.

    f. Notation of coordination requirements.

g. Availability and delivery time information.

h. Inspection Test Plan

4. Submit Product Data in the following format:

a. PDF electronic file.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data, unless submittal based on Engineer's digital data drawing files is otherwise permitted.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

a. Identification of products.

b. Schedules.

c. Compliance with specified standards.

d. Notation of coordination requirements.

e. Notation of dimensions established by field measurement.

f. Relationship and attachment to adjoining construction clearly indicated.

g. Seal and signature of professional engineer if specified.

h. Inspection Test Plan

2. Submit Shop Drawings in the following format:

a. PDF electronic file.

D. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation."

E. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Division 01 Section "Quality Requirements."

F. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Division 01 Section "Closeout Procedures."

G. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of Engineers and owners, and other information specified. Assignments of specified subcontractors or personnel on project components shall be clearly defined. Owner reserves the right to reject any proposed firm/subcontractor or personnel as their discretion without assigning any reason whatsoever.

H. Welding Procedures/Certificates: Contractor shall coordinate and comply with all Owner requirements for welding procedures and/or certificates, and associated documentation.

I. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

J. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

K. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

L. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

M. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.

N. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

O. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.

P. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

Q. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

R. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

S. Calibration Equipment

T. Construction Pictures and Videos: Comply with requirements in Division 1 Section "Construction Progress Documentation"

2.2 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Engineer.

B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF electronic file copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

2.3 CONTRACTOR'S PROJECT HEALTH & SAFETY PLAN

A. No later than the Pre-construction meeting, the Contractor shall submit to the Construction Management Team a written Project Health & Safety Plan which states the Contractor's company policy relative to safety. The plan must also address specific health and safety concerns which are expected to be encountered on the project. As a minimum this plan shall include:

1. Listing of full time on-site project and company safety officers

2. Specific company safety policies

3. Employee Safety Training Program

4. Administrative procedures to handle employee health & safety concerns

5. Procedures for insuring worker compliance with health and safety requirements.

B. The Contractor shall be responsible to insure that each Subcontractor employed on the project complies with the requirements of this section either by submitting a copy of the subcontractor's Project Health & Safety Plan or by submitting a letter from the Subcontractor stating that they will comply with the provisions of the Contractor's Project Health & Safety Plan.

C. In addition to the Contractor's project health and safety plan, Contractor and all subcontractors shall comply with all additional Owner and Construction Management Team health and safety requirements.

D. Submission of the required Project Health & Safety Plan information for Construction Management Team review and approval.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Review each submittal and check for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to the Construction Management Team.

B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ENGINEER'S AND CONSTRUCTION MANAGEMENT TEAM'S ACTION

A. General: Engineer and Construction Management Team will not review submittals that do not bear Contractor's approval stamp and will return them without action.

B. Action Submittals: Engineer and Construction Management Team will review each submittal, make marks to indicate corrections or modifications required, and return it. Engineer and Construction Management Team will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:

1. Final Unrestricted Release: Where submittals are marked "No Exceptions Taken," that part of the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents; final acceptance will depend upon that compliance.

2. Final-But-Restricted Release: When submittals are marked "Make Corrections Noted," that part of the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents; final acceptance will depend on that compliance.

3. Returned for Resubmittal: When submittal is marked "Revise and Resubmit," "Rejected," or "Submit Specified Item," do not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the notations; resubmit without delay. Repeat if necessary to obtain a different action mark.

a. Do not permit submittals marked "Revise and Resubmit," "Rejected," or "Submit Specified Item" to be used at the Project site, or elsewhere where Work is in progress.

4. Other Action: Where a submittal is primarily for information or record purposes, special processing or other activity, the submittal will be returned, marked "Action Not Required."

C. Informational Submittals: Engineer and Construction Management Team will review each submittal and will not return it, or will reject and return it if it does not comply with requirements. Engineer and Construction Management Team will forward each submittal to appropriate party.

D. Submittals not required by the Contract Documents will not be reviewed and may be discarded.

END OF SECTION

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specific quality-control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.

2. Specified tests, inspections, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with the Contract Document requirements.

3. Requirements for Contractor to provide quality-control services required by Engineer, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

1.2 DEFINITIONS

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and ensure that proposed construction complies with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that completed construction complies with requirements. Services do not include contract enforcement activities performed by Engineer.

C. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

1.3 DELEGATED DESIGN

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Construction Management Team

1.4 SUBMITTALS

A. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

B. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

C. Reports: Prepare and submit certified written reports, that include the following:

1. Date of issue.

2. Project title and number.

3. Name, address, and telephone number of testing agency.

4. Dates and locations of samples and tests or inspections.

5. Names of individuals making tests and inspections.

6. Description of the Work and test and inspection method.

7. Identification of product and Specification Section.

8. Complete test or inspection data.

9. Test and inspection results and an interpretation of test results.

10. Ambient conditions at time of sample taking and testing and inspecting.

11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.

12. Name and signature of laboratory inspector.

13. Recommendations on retesting and reinspecting.

D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

B. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

C. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

D. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or products that are similar to those indicated for this Project in material, design, and extent.

F. Specialists: Certain sections of the Specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.

1. Requirement for specialists shall not supersede building codes and similar regulations governing the Work, nor interfere with local trade-union jurisdictional settlements and similar conventions.

G. Testing Agency Qualifications: An agency with the experience and capability to conduct testing and inspecting indicated, as documented by ASTM E 548, and that specializes in types of tests and inspections to be performed. Each testing agency shall be authorized by the authorities having jurisdiction in the state in which the project is located.

H. Preconstruction Testing: Testing agency shall perform preconstruction testing for compliance with specified requirements for performance and test methods.

1. Contractor responsibilities include the following:
   a. Provide test specimens and assemblies representative of proposed materials and construction. Provide sizes and configurations of assemblies to adequately demonstrate capability of product to comply with performance requirements.
   b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
   c. Fabricate and install test assemblies using installers who will perform the same tasks for Project.
   d. When testing is complete, remove assemblies; do not reuse materials on Project.

2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to the Construction Management Team, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

1.6 QUALITY CONTROL

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of the types of testing and inspecting they are engaged to perform.

2. Payment for these services will be made from testing and inspecting allowances, as authorized by Change Orders.

3. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor**,** and the Contract Sum will be adjusted by Change Order.

B. Contractor Responsibilities: Unless otherwise indicated, provide quality-control services specified and required by authorities having jurisdiction.

1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
   a. Contractor shall not employ the same entity engaged by Owner, unless agreed to in writing by Owner.

2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.

3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.

4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.

5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing.

D. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that revised or replaced Work that failed to comply with requirements established by the Contract Documents.

E. Testing Agency Responsibilities: Cooperate with the Construction Management Team and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Construction Management Team and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.

2. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.

3. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.

4. Do not release, revoke, alter, or increase requirements of the Contract Documents or approve or accept any portion of the Work.

5. Do not perform any duties of Contractor.

F. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.

2. Incidental labor and facilities necessary to facilitate tests and inspections.

3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.

4. Facilities for storage and field-curing of test samples.

5. Delivery of samples to testing agencies.

6. Preliminary design mix proposed for use for material mixes that require control by testing agency.

7. Security and protection for samples and for testing and inspecting equipment at Project site.

G. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

H. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Submit schedule within 30 days of date established for commencement of the Work (i.e., Notice to Proceed).

1. Distribution: Distribute schedule to Owner, Construction Management Team, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 014200 - REFERENCES

PART 1 - GENERAL

1.1 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. "Shall": The term “shall”, in all uses within the contract documents, means “must”, “will”, “required”. “Shall” does NOT mean “optional” or “recommended”.

C. “Approved": The term "approved," when used in conjunction with Engineer's action on Contractor's submittals, applications, and requests, is limited to Engineer's duties and responsibilities as stated in the Conditions of the Contract.

D. "Directed": Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean directed by Engineer, requested by Engineer, and similar phrases.

E. "Indicated": The term "indicated" refers to graphic representations, notes, or schedules on Drawings; or to other paragraphs or schedules in Specifications and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the user locate the reference.

F. "Regulations": The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.

G. "Furnish": The term "furnish" is used to mean supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

H. "Install": The term "install" is used to describe operations at Project site including unloading, temporary storage, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

I. "Provide": The term "provide" means to furnish and install, complete and ready for the intended use.

J. "Installer": An installer is the Contractor or another entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier, to perform a particular construction operation, including installation, erection, application, and similar operations. Installers are required to be experienced in the operations they are engaged to perform.

K. The term "experienced," when used with the term "installer," means having successfully completed previous projects similar in size and scope to this Project; being familiar with the special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1. Trades: Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name.

2. Assignment of Specialists: Certain Sections of the Specifications require that specific construction activities shall be performed by specialists who are recognized experts in the

operations to be performed. The specialists must be engaged for those activities, and assignments are requirements over which the Contractor has no choice or option. Nevertheless, the ultimate responsibility for fulfilling Contract requirements remains with the Contractor.

a. This requirement shall not be interpreted to conflict with enforcement of building codes and similar regulations governing the Work. It is also not intended to interfere with local trade union jurisdictional settlements and similar conventions.

L. "Project site" is the space available to the Contractor for performing construction activities, either exclusively or in conjunction with others performing other work as part of Project. The extent of Project site is shown on the Drawings and may or may not be identical with the description of the land on which Project is to be built.

M. Testing Laboratories: A “testing laboratory” is an independent entity engaged to perform specific inspections or tests, either at the Project Site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

1.2 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference, including the following:

1. US Department of Transportation Title 49CFR Part 192 – Transportation of Natural Gas and Other Gas by Pipeline

2. American Society for Mechanical Engineers (ASME) B31.8: Gas Transmission and Distribution Piping Systems

3. ASME Boiler and Pressure Vessel Code (BPVC) Section IX

4. American Petroleum Institute (API) 1104: Welding of Pipelines and Related Facilities

5. Vermont Agency of Transportation (VTrans) Standard Specifications and Construction Standards

6. Vermont Agency of Natural Resources (ANR)/Army Corps of Engineers (ACOE) – Refer to project environmental permits for applicable rules/standards.

7. Occupational Safety and Health Administration (OSHA) / Vermont Occupational Safety and Health Administration (VOSHA)

8. American Society for Testing and Materials (ASTM)

9. National Electric Safety Code (NESC)

10. NACE International

B. Publication Dates: Comply with standards in effect as of the date of the Contract Documents, unless otherwise indicated.

C. Conflicting Requirements: Where compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Engineer for a decision before proceeding.

1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. In complying with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements. Refer uncertainties to Engineer for a decision before proceeding.

D. Copies of Standards: Each entity engaged in construction on Project must be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, the Contractor shall obtain copies directly from the publication source and make them available on request.

E. Abbreviations and Names: Abbreviations and acronyms are frequently used in the Specifications and other Contract Documents to represent the name of a trade association, standards-developing organization, authorities having jurisdiction, or other entity in the context of referencing a standard or publication. Where abbreviations and acronyms are used in the Specifications or other Contract Documents, they mean the recognized name of these entities. Refer to Gale Research's "Encyclopedia of Associations" or Columbia Books' "National Trade & Professional Associations of the U.S.," which are available in most libraries.

1.3 QUALITY ASSURANCE

A. Regulatory Requirements

1. The Engineer has contacted authorities having jurisdiction where necessary to obtain information necessary for preparation of Contract Documents. Contact authorities having jurisdiction directly for information and decisions having a bearing on the Work.

2. Copies of applicable regulations shall be retained at the Project Site and available for reference.

1.4 SUBMITTALS

A. Permits, Licenses, and Certificates: For the Owner’s records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, and similar documents, correspondence, and records established for compliance with standards and regulations bearing upon performance of the Work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes requirements for temporary services, facilities and controls, including temporary utilities, support facilities, and security and protection facilities. Owner will be responsible for previously installed temporary facilities and Contractor shall be responsible for their own and any new temporary facilities.

B. Temporary utilities include, but are not limited to, the following:

1. Water service if determined necessary for Contractor’s use during construction.
2. Sanitary facilities, including toilets, wash facilities, and drinking-water facilities.
3. Electric power service.
4. Telephone service.
5. High speed internet.

C. Temporary construction and support facilities include, but are not limited to, the following:

1. Temporary roads, driveways and gravel parking/storage areas.
2. Dewatering facilities and drains.
3. Waste disposal facilities.
4. Contractor field offices.
5. Storage and fabrication sheds.

D. Security and protection facilities include, but are not limited to, the following:

1. Environmental protection.
2. Stormwater control.
3. Tree and plant protection.
4. Security fence enclosure and lockup areas.
5. Barricades, warning signs, and lights.
6. Temporary enclosures.
7. Temporary fire protection as may be required by site conditions.

1.2 USE CHARGES

A. General: The contractor shall be responsible for paying all use charges until the project is substantially complete. Allow other entities to use temporary services and facilities without cost, including, but not limited to, the following:

1. Owner's Construction Team, which includes, but is not limited to the Construction Manager, operations safety personnel, permit compliance inspectors, inspection and survey teams.
2. Engineer.

3. Testing agencies.

4. Personnel of authorities having jurisdiction.

B. Sewer Service: Pay sewer service use charges for sewer usage, by all parties engaged in construction, at Project site.

C. Water Service: Pay water service use charges, whether metered or otherwise, for water used by all entities engaged in construction activities at Project site.

D. Electric Power Service: Pay electric power service use charges, whether metered or otherwise, for electricity used by all entities engaged in construction activities at Project site.

E. Contractor shall provide an on-site ice machine for the use of the Contractor's personnel as well as the Owner's construction Team.

1.3 SUBMITTALS

A. Temporary Utility Reports: Submit reports of tests, inspections, utility billings, and similar procedures performed on temporary utilities.

B. Implementation and Termination Schedule: Within 15 days of date established for submittal of Contractor's Construction Schedule, submit a schedule indicating implementation and termination of each temporary utility.

1.4 QUALITY ASSURANCE

A. Standards: Comply with ANSI A10.6, NECA's "Temporary Electrical Facilities," and NFPA 241.

1. Trade Jurisdictions: Assigned responsibilities for installation and operation of temporary utilities are not intended to interfere with trade regulations and union jurisdictions.

2. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

3. Refer to Guidelines for Bid Conditions for Temporary Job Utilities and Services, prepared jointly by AGC and ASC, for industry recommendations.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

C. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction, including but not limited to:

1. Building Code requirements.

2. Health and safety regulations.

3. Utility company regulations.

4. Police, Fire Department and Rescue Squad rules.

1.5 PROJECT CONDITIONS

A. Temporary Utilities: Prepare a schedule indicating date for implementation and terminations of each temporary facility.

B. Conditions of Use: The following conditions apply to use of temporary services and facilities by all parties engaged in the Work:

1. Keep temporary services and facilities clean and neat.

2. Relocate temporary services and facilities as required by progress of the Work.

3. Operate in a safe and efficient manner.

4. Take necessary fire prevention measures.

5. Dot not overload facilities or permit them to interfere with progress.

6. Do not allow hazardous, dangerous or unsanitary conditions or public nuisances to develop or persist on the site.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Provide new materials. Undamaged, previously used materials in serviceable condition may be used if approved by Construction Management Team. Provide materials suitable for use intended.

B. Chain-Link Fencing: Minimum 2-inch, 0.148-inch thick, galvanized steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized steel pipe posts; minimum 2-3/8-inch OD line posts and 2-7/8-inch OD corner and pull posts.

C. Water: Provide potable water approved by local health authorities

2.2 EQUIPMENT

A. General: Provide new equipment; if acceptable to the Construction Management Team, undamaged, previously used equipment in serviceable condition may be used. Provide equipment suitable for use intended.

B. Field Offices:

1. Owner/Construction Management Team has already provided their own field office facilities.

2. Contractor shall provide their own field office facilities in order to properly complete the project. Field office shall be equipped with the minimum following equipment:

a. First Aid Kit: The Contractor shall keep the kit properly stocked with appropriate first aid supplies at all times.

b. Fire Extinguishers: Provide hand-carried, portable UL-rated, class "A" fire extinguishers for temporary offices and similar spaces. In other locations provide hand-carried, portable, UL-rated, class "ABC" dry chemical extinguishers, or a combination of extinguishers of NFPA recommended classes for the exposures.

1) Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.

C. Self-Contained Toilet Units: Contractor shall provide single-occupant units of chemical, aerated recirculation, or combustion type; vented; fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material. Number of self-contained toilet units shall be reviewed and approved by the Construction Management Team.

D. Drinking-Water Fixtures: Containerized bottled-water drinking-water units, including paper cup supply shall be supplied by Contractor at field office. If Contractor requires temporary municipal water service(s), they shall coordinate installation with local water authority and bear all connection costs.

E. First Aid Supplies: Comply with governing regulations at each temporary facility site.

F. Storage and Fabrication Sheds: Install storage and fabrication sheds, sized, furnished and equipped to accommodate materials and equipment involved, including temporary utility service. Sheds may be open shelters or fully enclosed spaces within the building or elsewhere on the site.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Use qualified personnel for installation of temporary facilities. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.

B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

A. General: Engage appropriate local utility company to install temporary service or connect to existing service. Where utility company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with utility company recommendations.

1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

2. Provide adequate capacity at each stage of construction. Before temporary utility is available, provide trucked-in services.

3. Obtain easements to bring temporary utilities to Project site where Owner's easements cannot be used for that purpose.

B. Drainage: Provide drainage ditches, stabilization ponds, and similar facilities to do the following. Drainage measures shall comply with applicable environmental permitting regulations and conditions.

1. Filter out excessive soil, construction debris, chemicals, oils, and similar contaminants that might pollute waterways before discharge.

2. Maintain temporary drainage facilities in a clean, sanitary condition. After heavy use, restore normal conditions promptly.

3. Provide temporary filter beds, settlement tanks, separators, and similar devices to purify effluent to levels acceptable to authorities having jurisdiction.

C. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking-water fixtures. Comply with regulations and health codes for type, number, location, operation, and maintenance of fixtures and facilities.

1. Disposable Supplies: Provide toilet tissue, paper towels, paper cups, and similar disposable materials for each facility. Maintain adequate supply. Provide covered waste containers for disposal of used material.

2. Toilets: Install self-contained toilet units. Shield toilets to ensure privacy. Provide separate facilities for male and female personnel as required by jurisdictional agency. In any case, a separate female personnel only facility shall be provided at any location where office trailers are located. Retain subparagraph below for large projects, particularly if showers are required. See Evaluations.

3. Wash Facilities: Install wash facilities supplied with potable water at convenient locations for personnel who handle materials that require wash up. Dispose of drainage properly. Supply cleaning compounds appropriate for each type of material handled.

a. Provide safety showers, eyewash fountains, and similar facilities for convenience, safety, and sanitation of personnel.

D. Electric Power Service: Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Include meters, transformers, overload-protected disconnecting means, automatic ground-fault interrupters, and main distribution switchgear.

1. Install electric power service underground, unless overhead service must be used.

2. Install power distribution wiring overhead and rise vertically where least exposed to damage.

E. Electric Distribution: Provide receptacle outlets adequate for connection of power tools and equipment.

1. Provide waterproof connectors to connect separate lengths of electrical power cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.

2. Provide warning signs at power outlets other than 110 to 120 V.

3. Provide metal conduit, tubing, or metallic cable for wiring exposed to possible damage. Provide rigid steel conduits for wiring exposed on grades, floors, decks, or other traffic areas.

4. Provide metal conduit enclosures or boxes for wiring devices.

5. Provide 4-gang outlets, spaced so 100-foot (30-m) extension cord can reach each area for power hand tools and task lighting. Provide a separate 125-V ac, 20-A circuit for each outlet.

F. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations and traffic conditions, when requested by the Construction Management Team.

1. If night-work is approved by Construction Management Team and authorities having jurisdiction, install exterior-yard site lighting that will provide adequate illumination for construction operations, traffic conditions, and signage visibility when the Work is being performed.

G. Telephone Service: In Contractor's field trailer(s), provide temporary telephone service throughout construction period. Install separate telephone line for each contractor field office and first-aid station.

1. At each telephone, post a list of important telephone numbers.
   a. Police and fire departments.
   b. Ambulance service.
   c. Contractor's home office.
   d. Engineers' offices.
   e. Owner's office.
   f. Principal subcontractors' field and home offices.
2. Provide voice-mail service on each phone line.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Locate field offices, storage sheds, sanitary facilities, and other temporary construction and support facilities for easy access.

2. Provide incombustible construction for offices, shops, and sheds located within construction area. Comply with NFPA 241.

3. Maintain support facilities until near Substantial Completion. Remove after Substantial Completion, but prior to Final Completion.

B. Temporary Roads and Gravel Areas: Construct and maintain temporary roads and gravel areas adequate to support loads and to withstand exposure to traffic during construction period. Locate temporary roads and gravel areas within construction limits indicated on Drawings.

1. Provide a reasonably level, graded, well-drained subgrade of satisfactory soil material that has been adequately compacted to accommodate construction equipment.

2. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust. Fugitive dust shall not be permitted to exit the work zone as defined by the limits of disturbance.

3. Provide temporary culverts and drainage features to allow surface water to travel across/under temporary access roads, as necessary.

4. Temporary roads and gravel areas shall be removed after construction and areas shall be restored to pre-construction conditions, or better, as determined by Construction Management Team.

C. Traffic Controls: Provide temporary traffic controls at junction of temporary roads with public roads. Include warning signs for public traffic and "STOP" signs for entrance onto public roads. Comply with requirements of authorities having jurisdiction. Follow Town and/or VTrans permitting conditions when applicable.

D. Dewatering Facilities: Comply with requirements in applicable environmental permits and EPSC drawings for temporary drainage and dewatering facilities and operations not directly associated with construction activities included in individual Sections. Where feasible, use same facilities. Maintain Project site, excavations, and construction free of water.

1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining property nor endanger permanent Work or temporary facilities.

2. Before connection and operation of permanent drainage piping system, provide temporary drainage where roofing or similar waterproof deck construction is completed.

3. Remove snow and ice as required to minimize accumulations and to preclude ice or snow jams in stormwater control channels or ditches.

E. Waste Disposal Facilities: Collect waste from construction areas and elsewhere daily. Provide waste-collection containers in sizes adequate to handle waste from construction operations. Containerize and clearly label hazardous, dangerous, or unsanitary waste materials separately from other waste. Comply with Division 1 Section "Execution Requirements" for progress cleaning requirements.

1. If required by authorities having jurisdiction, provide separate containers, clearly labeled, for each type of waste material to be deposited.

2. Develop a waste management plan for Work performed on Project. Indicate types of waste materials Project will produce and estimate quantities of each type. Provide detailed information for on-site waste storage and separation of recyclable materials. Provide information on destination of each type of waste material and means to be used to dispose of all waste materials.

F. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment involved, including temporary utility services. Sheds may be open shelters or fully enclosed spaces within building or elsewhere on-site. Any permitting or construction of such sheds shall be in accordance with all jurisdictional authorities.

G. Lifts and Hoists: Provide facilities for hoisting materials and personnel. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects. Avoid using tools and equipment that produce harmful noise. Restrict use of noisemaking tools and equipment to hours that will minimize complaints from persons or firms near Project site.

B. Stormwater Control: Comply with all applicable permitting conditions.

C. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from construction damage. Protect tree root systems from damage, flooding, and erosion.

D. Site Enclosure Fence: If directed by the Construction Management Team, before construction operations begin, install chain-link enclosure fence with lockable entrance gates. Locate where indicated, or enclose entire Project site or portion determined sufficient to accommodate construction operations. Install in a manner that will prevent people, dogs, and other animals from easily entering site except by entrance gates.

1. Set fence posts in compacted mixture of gravel and earth.

2. Provide gates in sizes and at locations necessary to accommodate delivery vehicles and other construction operations.

3. Maintain security by limiting number of keys and restricting distribution to authorized personnel.

E. Security Enclosure and Lockup: Install substantial temporary enclosure around partially completed areas of construction when storing Owner materials. Provide secure entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.

1. Storage: Where owner materials and equipment must be stored, and are of value or attractive for theft, provide a secure lockup. Enforce discipline in connection with the installation and release of material to minimize the opportunity for theft and vandalism.

F. Barricades, Warning Signs, and Lights: Comply with standards and code requirements for erecting structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and public of possible hazard. Where appropriate and needed, provide lighting, including flashing red or amber lights.

3.5 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage caused by freezing temperatures and similar elements.

1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

2. Prevent water-filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.

C. Termination and Removal: Unless the Construction Management Team requests that it be maintained longer, remove each temporary facility when need for its service has ended, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are the property of Contractor.

2. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.

3. At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements in Division 1 Section "Closeout Procedures."

END OF SECTION

SECTION 015700 - MAINTENANCE AND PROTECTION OF TRAFFIC

PART 1 - GENERAL

1.1 SUMMARY

A. This section specifies the requirements for maintenance and protection of Traffic during construction of the Project. Contractor shall adhere to maintenance and protection of traffic conditions in all Town and VTrans work permits.

B. General:

1. All streets and travel ways shall remain open to the passage of vehicular and pedestrian traffic during the construction period, unless prior written consent is obtained from the Construction Management Team and the governing body having jurisdiction over the street or travel way.

2. Maintenance and protection of traffic shall be provided in accordance with the Manual of Uniform Traffic Control Devices (MUTCD) and any provisions contained in the plans or the contract documents.

3. Safe and adequate ingress and egress to and from intersecting highways, homes and commercial establishments shall be provided and maintained at all times to the satisfaction of the Construction Management Team.

4. The traffic maintenance schemes shown in the MUTCD describe the minimum methods and control devices necessary. The Construction Management Team may order additional devices and/or methods to meet field conditions. No additional payment will be made for additional devices ordered.

5. The Contractor shall give the required advance notice, as indicated in the contract document or by agreement with the Construction Management Team, of his proposed operations to affected police, fire, and other emergency response departments. The Contractor shall give reasonable notice of his proposed operations to owners and tenants of private properties which will be affected by the construction operations.

C. Submittals:

1. Prior to the start of work, the Contractor must submit any proposed changes to the traffic control plan to the Construction Management Team, Engineer, and agency having authority for approval. Any changes which alters the basic concept of the plan must be approved by the agency having authority prior to implementation.

PART 2 - PRODUCTS

2.1 DEVICES AND EQUIPMENT

A. All signing, operations, safety, and directive devices shall conform to the MUTCD and the Authority having jurisdiction.

1. VTrans Standard Construction Details and the Traffic Control Plans shall be referenced for signing and directive devices.

2. Street Plates: If street plates are used to cover narrow excavations. Street plates shall be secured/anchored to ensure that traffic does not cause plates to shift/move or cause un-safe conditions.

PART 3 - EXECUTION

3.1 MAINTENANCE OF TRAFFIC

A. The Contractor shall provide signs, signals, barricades, flares, lights, and all other equipment, service, and personnel necessary to regulate and protect traffic and warn of hazards. The Contractor shall remove temporary equipment and facilities when no longer required, and restore area to original or specified conditions upon removal.

B. When crossings, obstructions, or the temporary closures of street or travelway are required, the Contractor shall provide and maintain suitable bridges, detours or other temporary measures, all of which must be to the satisfaction of the Construction Management Team, for the accommodation of traffic. The duration of the operation shall be for the minimum time practical. Traffic shall be restored as soon as the street or travelway is safely passable. At least one lane of traffic shall be maintained at all times during working hours. During non-working hours, traffic shall revert to pre-construction conditions.

3.2 WORK ZONES

A. Work zones on opposite sides of the road shall not overlap. A work zone is defined as that area in which traffic is restricted because of construction activities, or that area which involves a drop-off within 10 feet of the edge of pavement.

B. The Contractor shall delineate areas where there is a drop-off near the edge of the traveled way and areas on which it is unsafe to travel. The provisions for delineation shall be as approved by the Construction Management Team, and the governing body having jurisdiction over the street, travelway, or site.

C. Excavations that produce drop-offs on both sides of the traveled way at the same time shall not be permitted, unless explicitly shown on project drawings (e.g. Jack and Bore Pits).

D. The Contractor shall provide 1-inch steel plates to provide for traffic movement over narrow, open excavations. Excavations made for the installation of the pipes will be backfilled at the close of each day. Steel plates shall be anchored or secured to ensure that traffic does not move/shift plates to create an unsafe environment.

E. No material is to be stored on the shoulder or within the 20-foot roadside clear area except that which is to be placed that day, or as allowable by applicable project permitting conditions.

F. The roadside clear area is a strip along the length of the road extending 20 feet from the edge of the travel lane. This distance may be greater along limited access roads (I-289), verify requirements with the VTrans 1111 permit requirements, prior to beginning work.

G. Construction equipment shall be removed from the roadside clear area of all highway pavement during the hours that the Contractor is not working. This requirement shall not be limited to the contract limits.

H. Traffic Signals and Signs:

1. The Contractor shall provide and operate traffic control and directional signals required to direct and maintain an orderly flow of traffic in areas affected by the Contractor's operations.

2. The Contractor shall provide traffic control and direction signs, mounted on barricades or standard posts at each change of direction of a roadway, at each crossroad, at detours, at hazardous areas, and at parking areas.

3. The correct sequence and spacing of signs, either permanent or temporary must be maintained at all times in accordance with MUTCD unless shown otherwise on the plans. All signs, including guide signs, shall indicate actual conditions at all times and shall be covered, moved, removed, or changed immediately as ordered by the Construction Management Team or authority having jurisdiction.

4. In order to maintain effective traffic control, the contractor shall be responsible for the maintenance of all signs, cones, flashers, barrels, and other devices the Contractor shall ensure that they are in place and in good condition.

I. Flag Personnel:

1. The Contractor shall provide suitably qualified and equipped flag personnel when construction operations encroach on traffic lanes. The regulation of traffic by flag personnel shall be in accordance with the requirements of the MUTCD and/or the Authority having jurisdiction. All flag personnel shall have their certification cards present on their body at any time they are performing flagging duties.

J. Flares and Lights:

1. During periods of low visibility the Contractor shall provide flares and lights to guide traffic, to clearly delineate traffic lanes, and to warn of hazardous areas. Flag personnel shall use lights in directing traffic during periods of low visibility. Illumination of critical traffic and parking areas shall be provided by the Contractor during periods of low visibility.

K. Parking Control:

1. The Contractor shall control all Contractor related vehicular parking such that it does not interfere with public traffic and parking, access to emergency vehicles, Owner's operations, or construction operations.

2. The Contractor shall provide parking areas for workman's private vehicles that comply with applicable laws, regulations, codes, and ordinances. The Contractor shall ensure free vehicular access to and through the parking areas. The Contractor shall not permit parking on or adjacent to access roads or in non-designated areas.

L. Haul Routes:

1. The Contractor shall consult with governing authorities and establish thorough fares which shall be used as haul routes and site access. The Contractor shall confine construction traffic to designated haul routes. The Contractor will be required to provide traffic control at critical points of haul routes to expedite traffic flow and minimize interference with normal public traffic. Where required by governing authorities, the Contractor shall prepare and submit traffic control plans for approval by the Construction Management Team and the governing Authority prior to commencement of work.

M. Contractor Operations:

1. If the Construction Management Team or authority having jurisdiction notifies the Contractor or his superintendent of any hazardous construction practices, all operations in that area shall be discontinued and immediate remedial action shall be taken to the satisfaction of the Construction Management Team or authority having jurisdiction before work is resumed.

END OF SECTION

SECTION 017300- EXECUTION REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. Field engineering and surveying.
3. General installation of products.
4. Coordination of Owner-installed products.
5. Progress cleaning.
6. Starting and adjusting.
7. Protection of installed construction.
8. Correction of the Work.

B. Data provided in tender documents are for guidance only and hence indicative. Revalidation of such data is required to be done by Contractor and Construction of the project will be carried on the revalidated data, and such revalidated data needs to be approved by Owner. No additional compensation in form of time and/or cost will be provided for any such variations between data provided in this document and data after revalidation.

1.2 SUBMITTALS

A. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

1.3 QUALITY ASSURANCE

A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

B. Engineer's Qualifications: A professional Engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.

1. Before construction, verify the location and points of connection of utility services.

B. Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction affecting the Work.

1. Call Dig Safe at 811 before starting any excavation or verify that a Dig Safe ticket exists and is valid for the area. Contractor shall maintain Dig Safe marks and follow all Dig Safe laws. Contractor is responsible for contacting and complying with municipal and private utilities that are not members of Dig Safe. Excavate with care to avoid damage to structures and utilities - excavations shall be completed by hand if necessary. Promptly report any damages to utilities to Utility Owner and Construction Management Team, do not attempt repairs without the Utility Owners consent.

C. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:

a. Description of the Work.

b. List of detrimental conditions, including substrates.

c. List of unacceptable installation tolerances.

d. Recommended corrections.

2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

3. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.

4. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.

5. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to local utility and Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Construction Management Team and Owner not less than 7 days in advance of proposed utility interruptions.

2. Do not proceed with utility interruptions without Construction Management Team's written permission.

C. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

D. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

E. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Construction Management Team. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents. Submit requests on CSI Form 13.2A, "Request for Interpretation."

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to site features and existing benchmarks. If discrepancies are discovered, notify Construction Management Team promptly.

B. General: The Owner will engage a land surveyor to lay out the Work using accepted surveying practices, which are generally as follows.

1. Establish benchmarks and control points to set alignments and workspaces and elsewhere as needed to locate each element of Project. Layout stakes shall be set at all centerline PI’s, as well as at 50’ station intervals along centerline and at 100’ station intervals along edge of clearing limits (limits of easements). Access Easements will be staked at minimum 100’ intervals along clearing limits.

C. Site Improvements: Owner’s land surveyor will layout driveway and fence corners of proposed facilities. Contractor shall layout the remaining required components.

D. Building Lines and Levels: Contractor shall locate and lay out control lines and levels for structures, building foundations, and floor elevations, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Engineer and Construction Management Team.

3.4 FIELD ENGINEERING

A. Identification: Owner will identify existing benchmarks, control points, and property corners.

B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.

1. Do not change or relocate existing benchmarks or control points without prior written approval of Engineer or Construction Management Team. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Engineer and Construction Management Team before proceeding.

2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points. Replacement shall be completed by a licensed land surveyor.

C. Certified Facilities Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, CONTRACTOR shall coordinate with the Owner to provide a certified survey showing dimensions, locations, angles, and elevations of construction and sitework. This is required for all above ground facilities.

D. Certified Pipeline As-built Survey: Owner shall contract with a land surveyor to complete pipeline as-built survey. Contractor is required to coordinate and communicate with the selected land survey to ensure that the pipeline is properly surveyed. The contractor shall provide a minimum of 24 hours' notice to the survey team for as-built survey needs.

3.5 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.

2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Contractor shall comply with all Owner required Operator Qualification testing, certifications and training.

D. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

E. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

F. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Construction Management Team.

2. Allow for building movement, including thermal expansion and contraction.

G. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

H. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.

2. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly. All Vermont Agency of Natural Resources, Hazardous Waste Management Regulations, shall be adhered to for spills (24-hour reporting at 800-641-5005).

2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Cutting and Patching: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

1. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged pipe covering to its original condition. Refer to coating specification for requirements.

H. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.

I. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

J. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

K. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.7 STARTING UP AND ADJUSTING

A. Prior to Owner gas-up, Contractor shall verify that equipment/materials installed are in proper working condition. Any adjustments required shall be completed prior to gas up.

B. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 1 Section "Quality Requirements."

3.8 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.9 CORRECTION OF THE WORK

A. Repair or remove and replace defective construction. Restore damaged substrates and finishes in accordance with manufacturers' requirements and the specifications.

1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.

B. Restore permanent facilities used during construction to their specified condition.

C. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.

END OF SECTION

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Project Record Documents.

2. Warranties.

3. Final restoration of site.

1.2 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.

1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.

2. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents, if necessary.

3. Prepare and submit Project Record Documents, final reports, Final Completion construction photographs, and similar final record information.

4. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable. Coordinate first subparagraph below with Division 8 door hardware Sections. Revise if Owner makes final changeover or if key-control system manufacturer delivers keys directly to Owner.

5. Submit test records.

6. Terminate and remove temporary facilities from Project site, along with construction tools and equipment, and similar elements.

7. Submit information related to Owner's use, operation, and maintenance.

8. Complete final cleaning requirements.

9. Restoration of site in accordance with project plans and applicable environmental permits.

B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Construction Manager will either proceed with inspection or notify Contractor of unfulfilled requirements. Construction Manager will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Construction Manager, that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

2. Results of completed inspection will form the basis of requirements for Final Completion.

1.3 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:

1. Submit a final Application for Payment.

2. Submit copy of Construction Manager's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Construction Manager. The copy of the list shall state that each item has been completed or otherwise resolved for acceptance.

B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Construction Manager will either proceed with inspection or notify Contractor of unfulfilled requirements. Construction Manager will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

C. Contractor shall submit Material reconciliation report for Owner furnished products/materials.

1.4 PROJECT RECORD DOCUMENTS

A. General: Do not use Project Record Documents for construction purposes. Protect Project Record Documents from deterioration and loss. Provide access to Project Record Documents for Construction Manager's reference during normal working hours.

B. Record Drawings Pipeline and Facilities: Will be completed by a land surveyor retained by Owner and Construction Manager.

C. Record Product Data: Submit one digital copy of each Product Data submittal. Mark one set to indicate the actual product installation where installation varies substantially from that indicated in Product Data.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.

2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.

3. Note related Change Orders, Record Drawings where applicable.

D. Miscellaneous Record Submittals: Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

1.5 WARRANTIES

Submittal Time: Submit written warranties on request of Construction Manager for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers for final cleaning. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:

a. Clean Project site, rights-of-way, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.

b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.

c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.

d. Remove tools, construction equipment, machinery, and surplus material from Project site. Return owner supplied materials to the owner’s headquarters or other designated site.

e. Remove snow and ice to provide safe access to building.

f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.

g. Remove debris and surface dust from limited access spaces, including roofs, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.

h. Sweep concrete floors broom clean in unoccupied spaces.

i. Remove labels that are not permanent.

j. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.

1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.

k. Wipe surfaces of mechanical and electrical equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.

l. Replace parts subject to unusual operating conditions.

m. Ensure all proper line markers and signage is installed.

n. Leave Project clean and properly restored to original conditions.

C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

3.2 FINAL RESTORATION

A. For all final restoration activities, Contractor shall comply with applicable environmental permits and conditions.

END OF SECTION

SECTION 023219 - EXPLORATORY EXCAVATION

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes exploratory excavations for the purpose of verifying the exact locations of underground utilities, structures, and other subsurface conditions.

1.2 SUBMITTALS

A. Sketches: Submit a sketch showing the location of the subsurface features which were uncovered in the test pit, including the following information:

1. horizontal location of the subsurface feature relative to three individual surface features.
2. depth of feature below ground surface.
3. diameter, type, material, and condition of pipe or conduit.
4. orientation of pipe, conduit or structure relative to other site features.
5. other pertinent dimensions.
6. exploratory excavation identification number.
7. discrepancies from design plan

1.3 JOB CONDITIONS

A. Call Dig Safe at 811 before starting any excavation or verify that a Dig Safe ticket exists and is valid for the area. Contractor shall maintain Dig Safe marks and follow all Dig Safe laws. Contractor is responsible for contacting and complying with municipal and private utilities that are not members of Dig Safe. Excavate with care to avoid damage to structures and utilities - excavations shall be completed by hand if necessary. Promptly report any damages to utilities to Utility Owner and Construction Management Team, do not attempt repairs without the Utility Owners consent.

B. Contractor shall adhere to all applicable OSHA/VOSHA rules.

C. Perform exploratory excavations only within the limits of the work, easements and rights of way.

D. Work shall conform to all project permit (Local and State) conditions.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 GENERAL

A. Exploratory excavations shall be performed in advance of construction, where necessary, at the locations shown on the Drawings, or in locations that the Contractor and the Construction Management Team deem necessary. For exploratory excavations intended for verifying underground utilities, the necessary approval of each utility company shall be obtained. The exploratory excavation will be completed in the presence of a utility company representative. Upon completion, excavated areas shall be backfilled to the satisfaction of the existing utilities, or the authority having jurisdiction. Determine the exact location of all pipes, conduits, duct, or other interfering structures in both horizontal and vertical locations. Excavate to the depth and width necessary to accurately determine the locations of the utilities of interest.

B. Contractor shall notify the Construction Management Team immediately if an obstruction or foreign material is encountered. Unanticipated obstructions or foreign materials that are to be removed (as determined by the Construction Management Team or authority having jurisdiction) shall be removed, backfilled, and compacted in accordance with the trenching and backfilling specification.

C. Unanticipated obstructions or utilities that are to remain in place/service shall be carefully exposed and adequately protected to avoid any damage. Backfilling around these items shall meet the requirements of the authority having jurisdiction.

D. If potentially contaminated soils are found, stop work and notify Construction Management Team and Owner.

E. Upon satisfactory execution of the required exploratory excavations the Engineer shall adjust pipe elevations, alignment or design as he feels necessary to minimize interferences.

F. Backfill exploratory excavations in accordance with Section “Trenching and Backfilling”

G. Exploratory excavations performed in areas to be further disturbed shall be graded for temporarily traffic or use.

H. Exploratory Excavations performed in areas not to be further disturbed shall be restored to pre construction conditions.

I. Upon completion of the excavation work, Contractor shall document all findings and provide the information to the Construction Management Team.

END OF SECTION

SECTION 130000 - MINIMUM REQUIREMENTS FOR PIPELINE CONSTRUCTION PARALLELING OVERHEAD ELECTRIC LINES

PART 1 - GENERAL

1.1 MINIMUM REQUIREMENTS FOR PIPELINE CONSTRUCTION PARALLELING OVERHEAD ELECTRIC LINES

A. VELCO requirements shall be maintained at all times. In the event of a conflict between this specification and VELCO requirements, VELCO shall govern,

B. This construction specification applies to pipeline construction that parallels overhead high voltage electric transmission lines and represents minimum requirements only.

C. The purpose of this specification is to cover the procedures and construction techniques which must be used during the construction period to reduce potentials on the pipe and construction equipment to a level less than 15 volts Root Mean Square (RMS) measured between the structure and ground. This is measured using a digital voltmeter.

D. This specification is not all inclusive and is intended to remind the installer of the potential hazards which may be associated with pipeline construction in the vicinity of induced voltage, fault current, and contact to high voltage electric transmission lines.

E. The Contractor should review the project and initiate additional requirements deemed necessary to ensure the safety of persons and property affected thereby. The Contractor shall furnish any special materials required to comply with this section. Consult with the Electrical Transmission & Distribution Utility for specific applications and requirements.

1.2 REFERENCES

A. National Electric Code (NEC)

B. Occupational Safety and Health Administration (OSHA)

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 STEEL PIPE INSTALLATIONS PARALLELING HIGH VOLTAGE ELECTRIC LINES

A. When exposed metallic piping is run parallel to overhead A.C. electric lines, the pipe is subject to induced voltages and currents that are the result of electromagnetic, electrostatic and resistive coupling.

B. Induced voltages and currents may cause coating damage as well as damage to cathodic protection and electronic monitoring equipment.

C. Induced voltages and current can be hazardous to personnel working on the pipeline during the construction period when long sections of pipe are exposed above ground. Lightning and faults on the transmission line can be especially dangerous.

3.2 ELECTRICAL SAFETY

A. The contractor will furnish a responsible person that can understand and follow the Technical Specifications and Electrical Safety required for the specific project. The responsible person for electrical safety must be approved by the Owner.

1. The person in charge of electrical safety shall:

a. Assure that all electrical safety requirements and devices are fully understood by all members of the construction forces.

b. Be fully aware of proper grounding procedures and with the dangers associated with electromagnetic and electrostatic couplings, resistive coupling, ground fault current discharge, lightning, etc.

c. Know the proper OSHA and NEC safeguards for the construction equipment being used related to the Owner's "limit of approach" regulations to the specific overhead transmission circuits that will be paralleled.

d. Have the necessary instrumentation, equipment and authority to implement and maintain safe working conditions.

e. Assure all safety devices and practices are properly employed during all periods of construction activity in the proximity of electric overhead transmission systems. This includes the choice of the appropriate rubber gloves for the situation.

f. Communicate at least daily with the dispatcher controlling the involved electric lines to ascertain any scheduled changes in loading, outages and switching operations and to notify of work on their Right-of-Way.

B. The Contractor shall adhere to all safety requirements of the electric utilities. This includes, but is not limited to, the following: training, safety certifications, daily reporting, and other applicable documentation as determined necessary by the electric utility.

3.3 EQUIPMENT SAFETY

A. Each piece of equipment utilized to handle pipe in any way such as unloading, picking up, transporting, bending or setting-in shall be grounded and shall be equipped with a cable assembly capable of grounding the sections of pipe to the piece of equipment handling that pipe.

B. Before any section of pipe is picked up or moved in any way, the ground shall be completed between the section of pipe and the equipment moving that pipe. "Setting-In" booms shall be equipped with ground cable and the ground must be maintained at least until the stringer bead is completed. The ground connection on cranes shall be also made to the upper rotating structure supporting the boom.

C. Pipe shall be unloaded from stringing trucks by a side boom equipped with grounding cable as described above. A ground shall be completed between all sections of pipe to be unloaded and the side boom before unloading cables or slings are attached to the pipe.

3.4 GROUNDING

A. Each continuous segment of pipeline being worked on should be grounded to at least two separate points. This grounding should consist of one of the following alternatives:

B. Grounding should be established by driving one or more ground rods to at least a four-foot depth and connecting these ground rods to each other and the pipeline with a #2 A.W.G. stranded copper cable. Suitable connectors should be utilized to connect the #2 A.W.G. cable to the individual ground rods and to the pipeline. No ground connections should be removed without the knowledge and concurrence of the person responsible for electric safety.

C. Should sub-surface conditions prohibit the driving of ground rods, temporary grounding can be established with one or more ground rods, conduits of aluminum foil installed horizontally and covered with a minimum 4 inches of dirt. The segment of the pipeline being worked on should be bonded to the temporary grounding. This bond should consist of an insulated #2 A.W.G. jumper cable. The grounding cable should first be securely attached to the temporary grounding and then attached to the pipeline. Removal should be in reverse order.

D. It is of the utmost importance that the person making or breaking the connection at the ground rod connection not "bridge the gap" between the ground rod and bond clamp.

E. When installing or removing a grounding or bonding facility, personnel shall wear the class of rubber insulating gloves selected by the person responsible for electrical safety. The following procedures for making and breaking grounding connections shall be strictly adhered to:

1. Using Jumper Cable with End Clamps

a. Making grounding connections

1) Establish temporary grounds (ground rods, bare casings, other appropriate ground).

2) Using jumper cable with end clamps, connect one end clamp to the temporary ground.

3) Using rubber gloves, connect the other end clamp to the structure to be grounded.

b. Disconnecting grounding connections

1) Using rubber gloves, disconnect the clamp attached to the structure end.

2) Disconnect the clamp connected to the temporary ground.

2. Using Clamp Around the Pipe and Jumper Cable with End Clamps

a. Making ground connections

1) Establish temporary ground (ground rods, bare casing, other appropriate ground).

2) Using rubber gloves, connect grounding clamp around the pipe.

3) Connect one end of the grounding cable to the temporary ground.

4) Using rubber gloves, connect the other end of the grounding cable to the grounding clamp around the pipe.

b. Disconnecting grounding connections

1) Using rubber gloves, disconnect the grounding cable from the grounding clamp around the pipe.

2) Using rubber gloves, disconnect the grounding clamp around the pipe.

3) Disconnect the grounding cable from the temporary ground.

4) Proper work procedures related to electrical safety shall be established for all construction activities associated with this project.

F. The person in charge of electrical safety shall check the integrity of each connection by measuring the resistance from a near point on the copper cable to the ground rod or pipeline steel using a suitable Ohm Meter. A good electrical connection will have a resistance of 0.1 Ohm or less.

G. Pipe shall be hauled to the right-of-way and stored in stacks of ten sections or less. Each section of pipe in the stack shall be grounded with a 5/8" min. diameter ground rod driven into the ground at least four (4) feet. All sections in one stack shall be grounded together. This ground shall be maintained until each individual section of pipe has been removed from the stack.

H. When grounding sections of pipe, the ground rod shall be driven and the grounding cable connected to the ground rod first. The grounding cable shall then be connected to the pipe. Cables used for temporary grounding attachments shall have good mechanical strength as well as high conductivity. The cable shall be single conductor #2 A.W.G. stranded copper, cable or equivalent. Cable attachments to temporary grounding systems shall be made by a method that assures good electrical contact while applying firm pressure to the pipe metal. This method of attachment should have a current carrying capacity of at least 200 amperes. When removing grounding cable, the cable shall be removed from the pipe or equipment first and then from the ground rod.

I. All grounding attachments and removals shall be made by or under the direct supervision of the person responsible for electrical safety.

J. Temporary ground connections should be made by electrically connecting the pipeline to each casing. Prior to the installation of the cathodic protection test leads, a bond should be installed using an insulated #2 A.W.G. jumper cable with suitable clamps. Connection shall be made first to the casing and then to the pipe. Removal of bond shall be made on reverse order.

K. If electrolytic grounding cells are to be installed between the pipe and casing as part of the final installation, the bonds shall not be removed until the grounding cells are installed.

L. Before any casing-pipeline temporary bond is removed, the person in charge of electrical safety shall determine that all permanent test wire connections to the pipeline and casing are intact. This shall be done by measuring the potential of the wire to a close copper-sulfate reference electrode using a suitable high resistance volt-meter. A wire connection with good metallic contact will show a potential of from 0.3 to 0.7 volt. A broken or disconnected wire connection will show a potential of 0.2 volt or less.

M. Insulating joints shall be installed with a bond cable shorting out the insulating material. This bond cable shall remain in place until the insulating joint has been welded into the pipeline and a grounding cell has been connected across the insulating flange. The grounding cell with test station must be in service and the bond cable removed before the insulating joint is buried.

1. Each person coming in contact with the pipeline during construction should do so only when:

a. Using rubber-insulating gloves. The person in charge of electrical safety should be in charge of insuring that all rubber-insulating gloves are kept in good insulating condition by following accepted test procedures. All gloves that are damaged (punctured, ripped, torn, etc.) shall be immediately replaced.

b. Standing on a grounding mat that is electrically connected to the pipeline at two separate locations. The grounding mat could consist of a copper weld wire mesh of #8 A.W.G. wire with a 4" x 4" mesh spacing. The mat should be electrically connected to the pipeline through a minimum #2 A.W.G. insulated jumper cables thermo welded to the mat and connected to the pipe using suitable clamps.

N. Temporary gradient control mats shall extend a minimum of 1 meter in all directions outside the work area. There shall be no contact between persons over the gradient mat and those not over the mat, including the handing over of tools, instruments or other materials.

1. Regardless of the approach selected, it is always advisable to handle the pipe (whenever possible) by the coated area of the pipe.

O. All piping at tie-ins shall be bonded across the gap. All piping at cut-outs shall be bonded across before the cut-out is started. Prior to installing the cable bond at tie-ins and prior to removing the cable bond across cut-outs, each side shall be properly grounded as indicated in Item 6.1.

P. Whenever a section of pipe must be lifted free of the earth on a web sling or equivalent for transport, the pipe steel so lifted should be electrically connected to a metallic portion of the tractor doing the lifting and transporting. This requirement may be waived if the lifting and/or transporting of the pipe can be accomplished with connections called for in Item 6 of these recommendations.

Q. A grounding strap or chain shall be attached to each rubber tired vehicle with a secure electrical connection to provide a ground contact for the vehicle during both mobile and stationary operations. The grounding strap or chain shall be of sufficient length to provide three (3) feet of earth contact immediately after the vehicle comes to a stop within 200 feet from the centerline of high voltage overhead conductors.

R. If steel chain is used for the grounding connection, it shall be of a minimum 1/4" size. If a strap is used for the grounding connection, it must be approved by the Owner before utilization.

S. All bonding connections shall be made to driven ground rods as described above. Bonding connections shall not be made between the pipeline and the electric transmission line ground. Such a connection can result in high pipeline potentials during power line faults with current flow through the pipeline that could damage the steel as well as the coating.

T. The pipeline shall not be bonded or grounded to foreign structures without permission of the Owner of the foreign structure. If permission is not granted, the foreign structure shall be electrically isolated from the pipeline under construction.

U. Workers shall avoid at all times making simultaneous contact to a grounded and ungrounded structure.

V. Other grounding materials and suppliers can be used subject to approval by Owner. Examples of other cable jumpers that could be used are:

1. Cable jumpers using 50 lb. minimum pull magnet for connection to pipe, heavy equipment, fuel trucks and general use.

2. Standard welding or battery jumper clamps with well-insulated handles, and teeth to bite into the metal.

W. All grounding attachments and removals should be made by or under the direct supervision of the person in charge of electrical safety.

3.5 VOLTAGE MEASUREMENT

A. The voltage to ground of any string of pipe exposed to contact by personnel shall be measured periodically by reading the voltage between the pipe and a clean steel pin driven in the ground.

B. If the A-C voltage exceeds 15 volts above ground, supplementary grounds must be used to reduce this voltage to less than 15 volts. In the event that measured A-C voltage above ground exceeds 15 volts, the person in charge of electrical safety shall issue appropriate warnings and all work on the pipe string shall be suspended until potential is reduced to less than 15 volts.

C. These grounds shall be maintained at all times. A record of a periodic measurement of induced voltage shall be obtained and the record of these readings maintained. The bonding entities shall be as widely separated as is possible. As the "still-above ground" portion of the construction advances, bonds should be kept close to the construction end. This may only be done by installation of a third or higher number bond near the "construction end" before removing a bond near the completed end.

3.6 VEHICLES

A. Rubber tired equipment parked for any appreciable time on a power line right-of-way can obtain a significant static charge. Vehicles should be parked no closer than 200 feet from the centerline of high voltage overhead conductors.

B. Refueling of any motor vehicles or construction equipment shall not be permitted within 100 yards of any electric overhead transmission facility unless right-of-way conditions are such that this distance is unobtainable, and the electric utility approves. If the 100 yards minimum cannot be complied with, the maximum distance possible shall be obtained, then each fuel truck shall be grounded and shall be equipped with a cable assembly capable of completing an electrical bond between the truck and any piece of equipment to be fueled. This bond must be made each and every time the refueling takes place within 100 yards of any electric overhead transmission facility prior to any part of refueling operation. This bond shall not be removed until all refueling operations are completed. Care should be taken where the cable attachments are made so that good electrical continuity is established. No fueling operations shall be carried out within 50 feet of the power transmission line.

C. At all times during construction, care must be exercised to assure that booms, cables and other equipment are no closer than 25 feet (or greater if stated in OSHA requirements or by the electrical utility) from overhead power lines. Height of conductors above ground shall never be taken for granted but should be investigated in each case. Where operator of equipment is unable to personally assess that minimum distance is maintained, a second person shall be designated to guide the operator. Consideration must also be given to the possibilities of broken cables whip lashing close to power lines. It is recommended that each piece of equipment be positioned so that, should this occur, the cable would not come closer than 25 feet to a power line.

3.7 WEATHER LIMITATIONS

A. All construction work shall be suspended in the area of overhead high voltage power lines during any potential lightning activity.

3.8 WARNING SIGNS

A. The Contractor should post adequate signs warning of possible electrical hazards at each access to the right-of-way and any other measures required to prevent public access to temporary grounding installations.

B. Warning signs shall be posted on all cranes and other hoisting equipment at locations that will always be in plain view of the operator. Said signs shall state: "Danger, do not operate any part of this equipment within 25 feet of the High-Voltage Lines." Similar warning signs shall be posted on various parts of the equipment.

END OF SECTION

SECTION 136000 - MAINLINE VALVE & FACILITY PIPING FABRICATION

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. The Contractor shall furnish all labor, materials as shown on project drawings, tools, and equipment necessary to complete the piping fabrication requirements of the project. Owner supplied materials are shown on project drawings. Included in the piping fabrication work is the following:

1. All above and below ground piping inside Mainline Valve Station and Colchester Tie-in Site boundary limits as shown on project drawings.

B. This specification defines the minimum requirements for shop and field fabrication, erection, inspection and testing of process and utility piping by the CONTRACTOR.

C. The construction drawings and OWNER specifications indicate the required piping class, materials and valve type. CONTRACTOR shall strictly adhere to the requirements of the OWNER specifications for the materials, fabrication erection, inspection and testing procedures.

D. This specification covers the fabrication of metallic pipe only.

1.2 REFERENCES

A. 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:

1. Part 192, Title 49, Code of Federal Regulation, including section 192.112 covering additional design requirements for steel pipe.

2. API 1104 – Welding of Pipelines and Related Facilities

3. ASME B31.8 – Gas Transmission and Distribution Piping Systems

4. ASME Boiler & Pressure Vessel Code (BPVC) Section IX "Welding and Brazing Qualifications"

5. ASTM material standards as shown in Mainline Valve station drawings.

1.3 CONTRACT DRAWINGS

A. The Owner shall provide the contractor with one set of general construction drawings for the mainline valve stations and Colchester Tie-in Site.

1.4 SHOP AND AS-BUILT DRAWINGS

A. If not provided by OWNER, the CONTRACTOR shall prepare piping isometrics and spool drawings for all piping. The isometric drawings shall show all spool numbers, welded attachments, location and type of welds (shop or field), type of pressure test and test pressure, other notes on construction, post weld heat treatment requirements, NDE requirements and a complete bill of materials. Where the OWNER has supplied isometrics the CONTRACTOR shall review, annotate and prepare all additional isometrics in accordance with the above to fully define the piping spool fabrication and piping installation scope of work. The OWNER will carry out spot checks on the isometrics to ensure that the correct materials are called out.

B. The CONTRACTOR shall ensure that all positions and locations of piping components, piping runs and terminal points are maintained.

C. The CONTRACTOR shall verify that all spools, whether built from isometrics or shop drawings, are of a length which will enable the spool to be trucked if necessary and enable spools to be easily installed. Spools requiring field weld connections shall have ample length at weld connection ends to allow for trim for proper fit and weld bevel preparation.

D. CONTRACTOR shall maintain an up to date, complete and accurate record of all minor changes made to design drawings during the fabrication and erection of the piping. Upon completion of the project, the CONTRACTOR shall mark all changes on one set of shop drawings and "As Built" construction drawings. OWNER will not consider that Work is completed until the as-built drawings are received. If CONTRACTOR was responsible for piping design, the as-built marks shall be incorporated into CONTRACTOR’s drawings for issue with final documentation.

PART 2 - MATERIALS

2.5 GENERAL

A. Upon delivery of any OWNER supplied material, the CONTRACTOR shall assume responsibility of the materials and the certification covering the materials. The CONTRACTOR shall be responsible for the supply of all other materials including temporary material and consumables to enable the work to be completed.

B. The CONTRACTOR shall be responsible for ensuring that all materials fully comply with applicable OWNER specifications. Materials shall not be considered for use unless the CONTRACTOR is in possession of the necessary documentation, e.g., Material Test Reports and other specialized test data as required by the references shown in section 1.2 of this specification.

C. No substitution of materials shall be permitted unless prior written approval is obtained from the OWNER.

D. Should the OWNER discover that "out of specification" material has been utilized, or material has been substituted without the written approval of the OWNER, the CONTRACTOR shall replace all non-specification materials and take remedial actions as required to ensure compliance with specifications. The cost of this work shall be borne by the CONTRACTOR.

E. Material Test Reports (MTR's) shall be provided by CONTRACTOR for all pipe and fittings. Complete traceability of piping material, is required for all piping. Traceability shall be recorded by noting heat number of piping components on piping isometric on spool drawing markups. Heat numbers shall also be marked on the piping components, and be maintained until shop fabrication is completed and numbers are recorded on isometrics.

F. All piping materials must comply with Part 192, Title 49, Code of Federal Regulation, including section 192.112 covering additional design requirements for steel pipe.

2.2 GENERAL FABRICATION

A. All materials which require documentation in use during fabrication or installation that cannot be identified with documentation shall be immediately removed from the area and replaced at the CONTRACTOR's expense.

B. The CONTRACTOR shall maintain "clean" fabrication areas for the fabrication of stainless steel and nickel alloy piping to minimize the possibility of contamination.

C. The CONTRACTOR shall pay specific attention to the segregation of tools and the protection of materials.

D. The CONTRACTOR shall utilize shop tools and equipment compatible with materials in fabrication, including but not limited to grinding discs and power brushes designed for use with stainless steel and/or other high alloy materials.

E. All spools shall have their piece number clearly designated on each spool piece, corresponding to the appropriate drawing.

2.3 PIPING FABRICATION & ASSEMBLY

A. All pipe, fittings, flanges, in-line, on-line and piping specialty items shall be provided and installed in accordance with the OWNER construction drawings.

B. Flange bolt holes shall straddle horizontal and vertical center lines unless noted otherwise on the construction drawings.

C. All flanged connections shall be made up by tightening the flange bolts in an accepted pattern to an even torque. CONTRACTOR shall torque all flange connections with a calibrated torque wrench per a OWNER approved procedure. CONTRACTOR shall hang a torque tag on the flange connection after torquing.

D. Dimensional tolerances for fabrication and installation of piping shall be plus or minus 1/8" at equipment tie-in points unless otherwise noted on the drawings.

E. Flange faces shall be aligned within ± ½º from square with pipe, regardless of orientation.

F. The CONTRACTOR shall be responsible for locating required assembly/field welds. Inclusion of field welds on OWNER provided piping drawings shall not relieve the CONTRACTOR of the responsibility of providing additional assembly/field welds which may be required.

G. CONTRACTOR shall also be responsible for allowing additional cut length at field/assembly welds adequate to accommodate normal fabrication variations in both CONTRACTOR's fabrication and fabrication of OWNER supplied equipment. Unless otherwise noted, minimum 6" of extra cut length shall be provided at field welds indicated on OWNER provided piping isometrics.

H. Piping shall be installed plumb, level and square unless designated otherwise on the construction drawings.

I. Screwed threads shall be clean cut with no burrs or stripping. Dies shall be new, sharp, and properly designed for the piping material. Immediately before erecting the piping, all pipe threads and fittings shall be thoroughly cleaned of cuttings, dirt, oil or other foreign matter. Teflon tape shall be used for all screwed connections. Care shall be taken to ensure that the tape is wound in the correct direction and that the tape does not enter the inside of the pipe.

J. Piping shall be erected and supported in a manner that will not put undue strain on equipment. All equipment, prefabricated piping, and appurtenances shall be fitted and assembled strain-free. The CONTRACTOR shall be prepared to demonstrate, by disassembly of the spool, the strain-free state of all fabricated piping.

K. For screwed or socketweld pipe installations, CONTRACTOR shall install sufficient unions to allow for convenient removal of any spool or component without disassembly or removal of any piece of equipment or major inline instrumentation.

L. Valve handles and wrenches shall be modified by CONTRACTOR where necessary for proper valve operation, and when the valve cannot be otherwise rotated to clear the obstruction.

M. Thread-O-Lets shall not be installed on elbows. Elbow-Lets shall be used for branch connections at elbows.

2.4 PIPE SUPPORT FABRICATION

A. CONTRACTOR shall procure, fabricate, and install all pipe supports as noted on project drawings. CONTRACTOR shall also design pipe supports, if this design is not provided by OWNER, or for supports required which are not included in OWNER designed items.

B. Welding of attachments for the purposes of supports shall be carried out as part of the piping fabrication in accordance with the applicable codes and standards. All other parts shall be fabricated in accordance with ANSI/AWS D1.1 and the guidelines in AISC, "Manual of Steel Construction".

C. If not provided by OWNER, the CONTRACTOR shall purchase and install all support specialty items in accordance with construction drawings, OWNER specifications, and good engineering practice.

D. All relief, blowdown and safety head discharge piping shall be securely braced for relieving conditions.

2.5 WELDING

A. General

1. The CONTRACTOR may utilize either API 1104 or ASME Section IX welding codes to complete mainline valve and facility piping fabrication work.

2. In addition to this specification, all necessary requirements stated in “Section 137000 – Welding” shall be followed. Where there is a difference in requirements, the most stringent shall apply.

3. Where the OWNER does not have an applicable weld procedure for the work to be completed, all costs related to procedure and welder qualification shall be borne by the CONTRACTOR as detailed in the following sections.

B. Cutting and Preparation

1. The ends of all pipe to be butt welded shall be prepared in accordance with ASME B31.8 and the governing welding procedure specification.

2. Bevels shall be made by machine tool or machine thermal cutting. Manual thermal cutting shall not be permitted unless specifically approved by OWNER on a one by one basis. The bevelled ends shall be smooth and uniform, and dimensions shall be in accordance with the qualified welding procedure/drawing requirements. Burrs, small scuff marks, indentations or small defects within the joint preparation area shall be blended out by grinding, otherwise the joint should be re-prepared.

3. The pipe ends and faces forming part of a welded joint shall be cleaned down to sound metal immediately prior to making the joint. All paint, grease, scale, rust, and other extraneous matter shall be removed. The cleaning shall extend for at least 1” from the edge of the bevel on both the internal and external faces of the components to be welded.

C. Weld Procedure Specifications

1. All welding shall be carried out to approved welding procedure specifications. Each welding procedure specification and supporting procedure qualification records shall be submitted to OWNER for approval prior to starting any fabrication.

2. Welding procedures shall be in accordance with ASME Boiler & Pressure Vessel Code (BPVC) Section IX "Welding and Brazing Qualifications" or API 1104.

3. The CONTRACTOR shall bear all costs for preparation and qualification of all weld procedures required for the work.

4. CONTRACTOR shall employ a welding procedure that provides a smooth, regular fully penetrated inner surface for meter tubes.

D. Welder Qualifications

1. Welders to be used on the project shall be qualified for each welding process they will use in the position they will use it in accordance with ASME B31.8 and CFR Title 49, Part 192 Code requirements.

2. The CONTRACTOR shall bear all costs for qualifying all welders. For each welder qualification test, laboratory tests shall be carried out as required by the applicable code.

E. Identification of Welders and Welds

1. Each welder shall be assigned a unique identifying number or symbol that identifies each individual welder's work.

2. All welds shall be stenciled (stamped) with the welder's number or symbol within 1½" of the weld using low stress concentration dies. Pipe with wall thickness too thin to apply stencils without deforming or alloy pipe is to be marked with approved markers or engraved. Stencils are to be recorded on the weld map or spool drawings and included in manufacturing data Welds not stenciled shall be removed and replaced at the CONTRACTOR's expense.

F. Pipe Welding Requirements

1. Preheat shall be in accordance with ASME B31.8 requirements.

2. When the ambient temperature is less than 40 ºF, carbon steel shall be pre-heated to a minimum of 150 ºF prior to welding. Preheat temperatures for low and high alloy steels shall be stated in the welding procedure specifications. Preheat and interpass heating requirements and methods shall be addressed in the appropriate Welding Procedure Specifications. The temperature shall be monitored with the use of temperature indicating crayons placed a minimum of 3" from the edge of the heat affected zone.

3. Any pinholes, cold lap, slag, flux, or other impurities that appear on any surface during or after welding shall be removed by grinding or chipping before depositing the next successive bead.

4. All passes of all welds shall have all oxides and slag removed to permit clear visual inspection and to prevent unacceptable slag indications in radiography film.

G. Weld Repairs

1. All weld repairs shall be carried out to an approved weld repair procedure. The approved procedure shall include for the mechanical removal of defective material, and blending of excavation.

2. Weld repairs shall be inspected and tested in accordance with Section 5. NDE of repairs to be completed using the same method that detected the defect.

3. Additional examination of welds completed by the welding operator is to be completed as required by the governing ASME / API welding code.

PART 3 - EXECUTION

3.1 INSPECTION

A. General

1. OWNER reserves the right to inspect all materials, fabrication, workmanship, welding of materials and fabricated components. OWNER or its representative shall have free entry at all times to any part of the CONTRACTOR's or subcontractor's facility where manufacture of OWNER components occurs.

2. The approval of any work by OWNER and their release of piping for shipment shall in no way relieve CONTRACTOR of any responsibility for carrying out the provisions of this specification, or for compliance with applicable codes.

3. The OWNER shall be responsible for Non-Destructive Testing (NDT) as stated in this specification.

4. The inspection and NDT requirements of this section are those required by the OWNER and are not intended to restrict in any way whatsoever the good working practice and internal QA / QC of the CONTRACTOR.

5. The OWNER reserves the right to carry out NDT in addition to that required by the scope of work. Where the additional NDT shows unacceptable defects then all remedial works for rectification shall be considered wholly within the CONTRACTOR's scope of work.

6. OWNER NDT operators will be trained and qualified in accordance with guidelines SNT-TC-1A of the American Society of Non-Destructive Testing.

B. Non Destructive Testing (NDT)

The OWNER shall be responsible for Non-Destructive Testing (NDT) and for all other NDT requirements specified herein. NDT will be performed on 100% of the welds at the MLV Sites and Colchester Tie-in Site.

1. If NDT shows unacceptable defects, then all remedial works for rectification shall be considered wholly within the CONTRACTOR's scope of work. Further NDT due to unacceptable defects, shall be charged to the CONTRACTOR.

C. Radiographic Inspection

1. Radiographic inspection methods and acceptance criteria will be in accordance with API 1104. All radiographic inspection shall be at OWNER's expense and performed by a third party.

2. Each radiographic film will be properly identified with a corresponding weld map marked drawing, or NDT map.

D. Ultrasonic Inspection

1. Where a weld is subject to 100% radiography but will not yield an interpretable radiograph then the weld shall be subject to ultrasonic inspection or equivalent in lieu of radiography.

2. Ultrasonic inspection methods and acceptance criteria shall be in accordance with API 1104.

E. Magnetic Particle Inspection

1. Magnetic particle inspection shall be used only on carbon steel.

2. Where magnetic particle inspection is specified, only the "wet" method will be used. MT procedures shall detail types of particle suspension fluids, contrast paints, and types of devices used for the inspection.

3. Welds to be examined by magnetic particle inspection shall be sufficiently smooth to avoid false defect indications.

4. Magnetic Particle inspection methods and acceptance criteria shall be in accordance with API 1104.

3.2 TESTING

A. General

1. A pressure test shall be performed on facilities piping with piping spools assembled and joined in the final location. A minimum number of tie-in welds will be permitted with Owner approval

2. The CONTRACTOR shall develop procedures covering system preparation, flushing, pressure testing, drying and preservation and submit for approval. The procedures shall define the methodology, materials, safety equipment, and instrumentation for documentation, testing media, duration and disposal. The procedures shall provide sufficient detail for the OWNER to evaluate the work to be performed. The CONTRACTOR shall be responsible for ensuring the safety of all personnel engaged in and witnessing of the tests. The safety provisions shall be clearly stated in the hydrostatic and pneumatic testing procedures. Pneumatic testing will only be performed with prior written approval from OWNER. A separate procedure shall be submitted outlining all steps of the testing including a safety plan to protect personnel.

3. The CONTRACTOR shall provide all equipment, materials and consumables required for the system preparation, flushing pressure testing, drying, preservation and reinstatement. All test equipment and temporary materials shall be compatible with the pressure rating and material of the system under test. Gaskets intended for final assembly shall not be used for test purposes. The welding of temporary fittings for test purposes shall be carried out to the same standards as the piping under test. No NDT (except for welding attachments to permanent job piping) will be required by the OWNER on these welds unless otherwise stated by OWNER or required by Construction Management Team.

4. Recorders utilized for testing shall be capable of recording pressure & temperature. Recorders and pressure gauges shall be rated at not more than double the test pressure (300 psi gauge for a 150 psi test, etc.)

5. All pressure tests shall be witnessed and accepted by the OWNER, its representatives or a third party inspector authorized by the OWNER.

6. Hydrotest water shall be clean, fresh, non-corrosive water, free of undissolved solids and available at a minimum of 45 ºF. See Hydrostatic Test Section for more details.

B. System Preparation

1. Prior to system preparation all piping shall have been cleaned to remove mill scale, weld spatter, dirt and other foreign matter. All welding, NDT and stress relieving shall be complete and accepted by OWNER as complete. All welds and flanges shall be clean and exposed for external inspection.

a. All in-line equipment or devices which may be damaged or hamper the test shall be removed from the system. All sensitive in-line and on-line instrumentation items shall be removed or isolated and this shall include, but not limited to the following:

1) Pressure vessels or any mechanical equipment

2) Check valves or check valve flappers

3) Restriction orifices / orifice plates

4) Positive displacement meters

5) Turbine type meters

6) Self regulated controllers

7) Relief valves

8) Rupture Discs

9) Level controls and switches

10) Filter elements

11) Diffusers

12) Transmitters

2. Equipment removed for pressure test shall have documentation of manufacturer's pressure ratings and/or factory test records.

C. Pressure Testing

1. All piping shall be subject to a hydrostatic test or pneumatic test in accordance with CFR Title 49, Part 192, Subpart J. Piping shall be tested to 1.5 times MAOP. Test media shall be approved by OWNER and shall not be harmful to the piping materials or the environment.

D. Hydrostatic Test

1. Valves shall generally be in the open, or half open, position for test. A closed valve may be used as isolation of a test only with specific approval of OWNER, and after confirmation that the valve seats are rated for the test pressure. Provisions to vent air from the test arrangement shall be made prior to filling with test media.

2. The area where testing is to be performed is to be barricaded to prevent access by unauthorized personnel during the testing.

3. The piping shall be slowly filled with water until all air is evacuated. Temperature of the pipe shall be allowed to equalize with that of the test media prior to applying pressure. The vents shall be closed and the piping shall be slowly pressurized to 50% of the test pressure and visually inspected for leaks. When it is confirmed no leaks exist, pressure shall be increased in increments of 25% of test pressure until the test pressure is reached. When leaks are identified, the pressure shall be reduced to the level not greater than the previous increment 0 psi before flange bolts shall be torqued to stop the leak. Flange bolts shall not be torqued over allowable stresses. Where the leak cannot be stopped, pressure shall be relieved from the arrangement and inspection to determine the cause of the leak shall be carried out; this may require disassembling connections.

4. The piping shall be carefully inspected for leaks or distortions during the test. Inspection may require remote observation depending on test pressure and/or test media in order to safeguard personnel. For acceptance, no leaks or distortions in the piping are permitted.

E. Pneumatic Testing

1. All applicable guidelines for hydrostatic testing shall be followed. In addition, the space between the faces of all flanges connections shall be wrapped with duct tape shrink wrap, or other media that will seal the area and a small hole shall be punched through the tape, plastic, or other media at the top of the flange.

2. The piping shall be pressurized to 25 PSI and gross air leaks shall be remedied. The piping shall be slowly pressurized to 50% of the test pressure, then increased in increments of 10% until the test pressure is reached. Leak detector solution shall be applied to all threaded connections, welds, and at the holes in the sealing material applied at flange connections. When leaks are identified, the pressure shall be reduced to 0 PSI before flange bolts are retorqued or threaded connections tightened to stop the leak. Where the leak cannot be stopped. Pressure shall be relieved from the arrangement and inspection carried out; this may require disassembling connections.

F. Reading, Measurements & Test Duration

1. Pressure test duration shall be 8 hours, maintained at a pressure equal to or above the test pressure. Both chart recorders and hydraulic deadweight gauges shall be used for test measurement. Deadweight gauge readings shall be taken every hour. Chart recorders and pressure gauges shall have a valid calibration certificate within 6 months.

G. Records

1. The CONTRACTOR shall provide documentation to record each pressure test. CONTRACTOR shall provide test records in accordance with CFR Title 49, Part 192, Subpart J.

2. If the piping fails the pressure test then no test chart will be signed off. The CONTRACTOR shall be responsible for all remedial work, repairs and retesting of piping that fails during testing. All rework shall be carried out in accordance with the relevant specifications and procedures.

H. Reinstatement

1. After a successful test, the piping shall be emptied of the test medium. Where applicable, pressure tested piping shall be reinstated in accordance with project drawings. Where a hydrotest has been completed, pipe shall be dried post-hydrotest using a suitable method to a dew point of -40° F. The piping shall be subject to preservation to ensure no deterioration prior to system commissioning.

END OF SECTION

SECTION 137000 – WELDING

PART 1 – GENERAL

3.1 SUMMARY

A. This section includes the welding of all OWNER pipelines and pipe segments.

B. The general requirements of pipeline welding shall also apply to the welding of pipeline components such as valves, fittings, flanges, crossovers, tie-ins etc.

C. Welding in compliance with ASME Section IX shall only be completed following OWNER written approval with a procedure submitted to and approved by the Owner. This specification is not intended to cover ASME Section IX welding requirements.

3.2 REFERENCES

A. 49 CFR 192 including (but not limited to) sections:

1. 192.225 – Welding procedures
2. 192.227 – Qualification of welders
3. 192.229 – Limitations on welders
4. 192.231 – Protection from weather
5. 192.233 – Miter joints
6. 192.235 – Preparation for welding
7. 192.241 – Inspection and test of welds
8. 192.243 – Nondestructive testing
9. 192.245 – Repair or removal of defects
10. 192.303 – Compliance with Specifications or Standards
11. 192.309 – Repair of Steel Pipe
12. 192.715 – Transmission lines: Permanent repair of welds
13. 192.719 – Transmission lines: Testing of Repairs

B. API 1104 (Edition as Stated in Department of Transportation Title 49 CFR, Part 192, Transportation of Natural Gas and Other Gas by Pipeline, and any PHMSA final rulings)

3.3 SUBMITTALS

A. Prior to the start of any production welding the CONTRACTOR shall submit the following:

1. Plan & description showing:
   a) Overall approach to work
   b) Information on size, number and specific personnel in each welding crew
   c) Allocated weld numbering given to each welding crew

d) Equipment utilized for crews (i.e. tack rigs, types and sizes of welding machines etc.)

2. Table listings of all approved welders stating (as a minimum):

a) Their full name

b) Last four digits of their Social Security Number

c) Welder initials

d) OWNER allocated welder ID number

e) Weld procedure(s) they are qualified to use

f) Welder qualification test reference numbers

g) Dates each welder was qualified on each welding procedure

h) Model and serial number of welding unit used for each welder qualification test

3. All CONTRACTOR personnel training & certification records, including OQ verification reports.

4. Register of all welding equipment including, make, model, serial number and all associated equipment weekly inspection reports.

5. CONTRACTOR shall continually update and re-submit this information as their project team changes, their welding equipment changes or any other listed items change during natural progression of work.

6. During production, the CONTRACTOR will be asked to provide information on daily weld production, welding issues, preventative measures & corrective measures taken and any other information as requested by the OWNER representative.

3.4 QUALITY ASSURANCE & QUALITY CONTROL

A. The OWNER shall provide approved, qualified welding procedures to be used to complete the WORK.

B. Irrespective of any welder qualifications completed on previous projects, all welders shall re-qualify on the OWNER provided weld procedures at the start of the project administered by a Owner representative.

C. A welder ID number will be assigned to each welder by the OWNER upon the successful completion of the welder qualification test. Subsequent to an acceptable test, the welder shall use this OWNER assigned number to identify all production welds.

D. The OWNER shall supply qualified weld inspectors to conduct visual inspection and auditing of the CONTRACTOR's welding process.

E. The OWNER shall supply a 3rd Party radiographic inspection company for non-destructive testing of welds.

F. The CONTRACTOR is expected to co-ordinate and facilitate ongoing daily interface work between weld production, weld inspection and non-destructive examination activities.

G. The OWNER chief inspector or other designated Owner representative shall be the final judge of acceptability on all welds examined. The CONTRACTOR shall repair or replace, as required, all welds rejected by the chief inspector.

H. All welders to be used on the project must pass a destructive butt qualifying test and branch qualifying test as prescribed by API 1104 section 6, under the OWNER'S supervision or Owner's designee and subject to the OWNER'S approval. For making such test, the OWNER will supply the pipe and the CONTRACTOR shall supply all equipment and supplies, including testing machines and jigs, and labor of the welders being qualified. The tensile testing machine shall be calibrated by an independent laboratory prior to use, and the CONTRACTOR shall present the certificate of calibration to the OWNER prior to its use. The CONTRACTOR shall notify the OWNER of the time and location of the welder qualifications tests; whereupon, the OWNER will witness the welding work and subsequent testing. In the event that either the OWNER or the CONTRACTOR are not satisfied with a Welder's Test results, the welder shall not be employed. No extra test coupons shall be allowed. The OWNER shall promptly notify the CONTRACTOR as to the qualification or disqualification of each welder tested.

I. The CONTRACTOR shall take every precaution to produce welds that meet the requirements of these specifications by the initial welding process. Should the number of welds failing to meet these specifications exceed FIVE (5) percent based on total production for one full working day, the OWNER reserves the right to suspend welding operations until the problem is identified and corrective measures are submitted for the OWNER'S approval. Upon resuming welding operations, the CONTRACTOR shall produce a Controlled Welding Section of twenty welds, having opening at each end, which the OWNER will promptly inspect. During the period the Controlled Welding Section is being inspected, the CONTRACTOR may only continue welding operations with the OWNER'S approval. Should the results of the Inspection of the Controlled Welding Section be unacceptable, the CONTRACTOR shall suspend welding operations. Instructions will then be issued by the OWNER regarding further welding operations.

J. All costs associated with unsatisfactory welding shall be at the CONTRACTOR'S expense.

K. In the case of inclement weather, the CONTRACTOR shall provide protection for the welders at their WORK and care shall be taken to see that no welds are subjected to moisture or sudden variations in temperature. All welded sections of pipe shall be properly supported until the welds are thoroughly cool. The CONTRACTOR shall provide sufficient artificial lighting when necessary at no additional cost to the OWNER.

L. Splatter shields shall be utilized during the welding operations to protect the adjacent pipe coating.

3.5 PROJECT REQUIREMENTS

A. Welding Procedure Specifications will be established, qualified and provided by the OWNER.

B. All welding shall meet the requirements of the latest approved edition of API 1104 Welding of Pipelines and Related Facilities, as approved by the Department of Transportation Title 49 CFR, Part 192, Transportation of Natural Gas and Other Gas by Pipeline, and any PHMSA final rulings.

C. CONTRACTOR shall use the shielded metal-arc welding (SMAW) process on all mainline welds (sometimes called “stick electrode welding” or “shield arc process”). Welding will be performed in the vertical downhill direction, except for hot taps.

3.6 SAFETY

A. The OWNER Prevention of Accidental Ignition Procedure shall be followed. At all times that welding or cutting involving live gas facilities is occurring at a work site, a OWNER employee in addition to the welder must be on site (outside of any excavation) to respond to any unusual circumstances.

B. Arc or flame welding and cutting equipment shall be used only by properly trained personnel.

C. Fire, explosion, toxic fumes and possible electric shock are primary hazards which should be guarded against when welding, burning or brazing.

D. A 20lb to 30lb fire extinguisher shall be ready for immediate use when welding or cutting near flammable materials. In addition, a fire watch will be posted during the welding or cutting operations when combustible materials are in the area. The fire watch will be maintained for a reasonable period of time after welding or cutting operations have ceased to ensure flammable materials do not ignite from source such as smoldering slag, etc.

E. Welding and cutting assignments, whether using arc or flame, shall be shielded or barricaded to protect others in the area from spatter and from harmful rays and to prevent ignition of flammable material if they cannot be moved.

F. Proper protective equipment shall be worn during welding and cutting work. Protective equipment for arc or flame welding includes hard hat, approved goggles or safety glasses and hood, long cuffed gloves and fire retardant or leather clothing – the specific protection depends upon the specific job hazards. Clothing shall be free of excessive oil or grease. Other garments should be fastened at neck and ankles.

G. Grinders and other power tools shall have appropriate guards in place at all times.

H. Blowers should be utilized when welding indoors or in a confined space such as a trench when air quality is significantly impacted.

I. Welding or cutting of any pipeline, tank or empty container shall not be performed until it is certain the area is free from an explosive mixture of gases.

J. Hot material should not be left unguarded unless it is plainly marked as being "hot".

K. When necessary for cables or hoses to cross walkways for extended periods of time, they should be suspended or bridged with planking so as to protect them from traffic.

L. In the case of gas welding equipment, grease or oil should never come in contact with regulators, valves, cylinders or hose connections.

M. An approved igniter should be used to light the torch. Do not relight from hot work.

N. When igniting a torch, it should be held away from the body.

O. In the case of a torch flashback, valves at cylinders shall be closed quickly; then check hose, regulators and torch for damage. Check tip for plugging before attempting to relight.

P. An electric welding machine shall be properly grounded, in accordance with the manufacturer's instructions, before using.

Q. Compressed gases shall be used only by experienced and properly instructed persons.

R. When welding or cutting in elevated positions, precaution shall be taken to prevent sparks or hot metal from falling onto people or flammable material below. A non-flammable tarp or its equivalent shall be used.

S. Fire extinguishing equipment shall be immediately available at all locations where welding and cutting equipment is used. Proper eye protection shall be worn to guard against flying particles of scale when the helmet is raised.

T. All arc welding shall be shielded behind flame-proof screens or all persons in the vicinity shall wear approved tinted eye protection. A welder, unless working behind a screen shall not strike an arc with an electrode until nearby persons who may be exposed to the arc have been given ample warning.

U. When gauges are removed and caps replaced, the oxygen and acetylene bottles shall be separated into storage areas no less than 20 feet apart

V. Compressed gas cylinders shall always be stored in the upright position and secured against falling. They shall also be adequately secured while being transported in a motor vehicle.

PART 2 – PRODUCTS

3.1 MATERIALS

A. The CONTRACTOR shall furnish all consumable materials necessary to weld the pipeline and pipeline components into one complete unit.

B. The CONTRACTOR shall furnish all welding supplies and equipment to perform the necessary work. This includes additional safety and QA/QC items as required by this specification, including but not limited to fire extinguishers, blankets, coupon cutting machines and all required temporary lighting.

C. Electrodes shall conform to American Welding Society AWS Rod Classifications. Flux coated electrodes shall be kept dry, stored to prevent moisture loss or moisture absorption, and shall be handled in such a manner as to prevent any damage thereto. Electrodes in opened containers shall be protected from excessive moisture changes. Electrodes which show signs of deterioration or damage shall not be used in any welding procedure.

D. Useable pipe joints:

1. The CONTRACTOR shall promptly collect, re-bevel, clean, haul ahead and place in the pipeline all usable "pup" joints having a minimum length of five (5) feet. "Pup" joints must be separated by a full-length joint. The CONTRACTOR shall be responsible for transferring all of the pipe stencil information to all pup joints.

2. The CONTRACTOR shall be required to re-bevel and weld all surplus pipe that is five (5) feet or more in length into nominal forty (40) foot lengths of pipe upon job completion at the CONTRACTOR'S expense.

3.2 EQUIPMENT

A. The CONTRACTOR shall furnish and maintain in good working condition sufficient equipment necessary to complete the work within the time specified in the contract. OWNER reserves the right to approve all equipment used by the CONTRACTOR. Any equipment that fails to meet these requirements shall be repaired or replaced by the contractor.

B. A mechanical transition machine shall be used to taper bore pipe transitions for adjoining pipe wall thickness differences that exceed weld procedure requirements. Flame cutting or hand grinding internal transition bevels shall not be permitted, unless otherwise approved by Owner.

C. The Owner may require the CONTRACTOR to furnish a minimum of one tensile testing machine with a calibrated pressure gauge, one API 1104 test bend fixture, one strap cutter and all other necessary equipment supplies and labor for the purpose of testing welders.

PART 3 – EXECUTION

3.1 PREPARATION, SETUP AND END OF SHIFT

A. Prior to welding or cutting in or around a structure or area containing gas facilities, a thorough check should be made with a CGI for the presence of a combustible gas mixture. When working in a confined area or trench, appropriate instruments should be used to ensure there is not an oxygen deficient or combustible atmosphere when such atmospheres are reasonably likely to be present.

B. Welding shall not be done when the quality of the completed weld would be significantly impaired by the prevailing weather conditions, including, but not limited to, airborne moisture, blowing sands, or high winds. Wind/rain shields shall be considered when conditions are harsh.

C. Each beveled end of a joint of pipe shall be cleaned in a manner satisfactory to the OWNER to remove dirt, mill scale, and other foreign substances before being placed in alignment for welding.

D. Cleaning methods shall not in any way alter the bevel design specified in the Welding Procedure Specification. Field beveling and cleaning shall be made in accordance with the Welding Procedure Specification.

E. The open ends of all sections of line pipe shall be securely closed with suitable "Night Caps" supplied by the CONTRACTOR at the end of each day's work to prevent the entrance of small animals, water and obstructions. The pipe ends shall not be reopened until the work recommences. Covers shall be canvas type with an air release hole and tie cord (or secured with duct tape). Any obstructions in the line shall be removed by the CONTRACTOR at its' expense and to the satisfaction and approval of the OWNER. The line must be delivered free, from water, dirt, obstructions, and other foreign substances.

F. Pipe and heat numbers shall be transferred to each end of all pipe lengths of cut from any joint of pipe. Pipe shall not be welded until pipe and heat numbers are verified and transferred to the pipe.

3.2 WELDERS

A. No welder shall weld outside the scope of his qualification.

B. No welder may weld using a particular welding process without a requalification test if more than six (6) calendar months have elapsed since that welder last qualified. To re-qualify, a welder must make a butt-weld in the fixed position within the scope of the welder's qualification. The weld shall be examined according to Section 3 (Destructive Testing) or Section 6 (Non-Destructive Testing) of API 1104.

C. After each welder has been accepted as qualified in accordance with Section 3.4 QUALITY ASSURANCE & QUALITY CONTROL, he shall be permitted to weld on production lines subject to OWNER's privilege to cut an additional test weld from the line.

D. For all pipe diameters the test weld shall be radiographed and then followed by a destructive mechanical test procedure meeting the requirements of API 1104. Defective welds will follow criteria of API 1104 to determine acceptability. Where defective welding involves two or more welders, OWNER and CONTRACTOR's welding foreman shall devise further tests and determine which welder is at fault.

E. Each welder shall identify that portion of the weld performed by him on an area adjacent to the weld and in the top quarter of the pipe. Welder shall use their OWNER assigned ID number. Numbers shall be marked with a OWNER approved material. Die stamping will not be used. In the event any welder leaves the job, his number shall not be used by another welder.

3.3 PRODUCTION WELDING

A. Steel die stamping of welds for any reason will not be allowed. Hammering, jacking, gouging, arc burning or other damage inflicting actions will not be allowed.

B. The adjoining lengths of pipe shall be accurately aligned by the use of a suitable alignment clamp of a type and manufacture satisfactory to OWNER. ***If the use of a weld clamp is not feasible, weld shall be lined up in a suitable manner that does not place undue stress on the weld. This method must be approved by an owner's representative.*** The adjoining lengths of pipe shall be aligned and spaced to provide a root face opening per the qualified Welding Procedure Specification (WPS).

C. Weld seams of adjoining pipe shall be staggered a minimum of 30 degrees. The alignment of abutting ends of longitudinal seam pipe, except in bend section, shall be so as to stagger the longitudinal seams and be within the top half of the pipe as laid.

D. The alignment of abutting pipe ends shall be such as to minimize the offset between pipe surfaces. For pipe of the same nominal wall thickness, the offset shall not exceed one sixteenth (1/16) of an inch. Back welding will not be allowed without the express authorization from the OWNER or qualified designee and in no event shall any back welding be done without preheating to the prescribed temperature.

E. A preheat shall be used according to the WPS. Preheat shall cover a band (4) inches wide on each side of the proposed weld. Heating shall not char the pipe coating. The temperature will be measured by temperature measuring crayons or other acceptable tools to be furnished by the CONTRACTOR and approved by Construction Management Team. This process shall be performed immediately prior to welding.

F. The root bead (stringer bead) shall be applied completely around the pipe followed immediately by a thorough cleaning of all scale, coating, slag, etc. The first bead or "stringer" shall be completed prior to the application of subsequent beads. The second bead (hot pass) shall be started immediately after completion of the stringer within the time limits indicated on the Welding Procedure Specification (WPS). The hot pass shall fully fuse the pipe bevel at each side of the stringer, making the deposit a minimum of one-third the pipe wall thickness. On pipe 16" OD and larger the stringer and hot pass shall each require two or more welders working on opposite sides to equalize stress.

G. No tack welds shall be permitted except when using external line up clamps on tie-ins, transitions, and fabrication piping and then only when preheating requirements are met.

H. When internal line-up clamps shall be used, they shall not be relaxed or removed until 100% of the root bead has been completed. When external line-up clamps are used, the clamp shall be held in place until at least 50% of the root bead circumference is welded in increments spaced equally around the pipe circumference. Skids shall be placed in a manner to prevent stress on completed root beads.

I. When welding concrete coated pipe, internal alignment clamps shall not be relaxed until both the root bead and hot pass have been completed.

J. The start of all weld passes shall overlap and no pass shall start closer than two (2) inches from the start of the preceding pass.

K. The "Stringer Bead" and "Hot Pass" welding operation shall not be advanced ahead of the finished welding operations to the extent that the section of line containing unfinished welds would be likely to fall from skids because of contraction and/or expansion of the line due to change in temperature. When the pipe is laid on skids after welding it shall be blocked and secured from rolling off skids in a manner acceptable to the OWNER. The placing of skids shall be close enough to prevent undue stress on the free spanning pipe. Should a section of the line containing unfinished welds fall from the skids, the CONTRACTOR'S representative shall immediately report the same to the OWNER and all cost of any inspection and/or repairs shall be borne by the CONTRACTOR.

L. Arc burns are not permitted under any circumstances. The CONTRACTOR shall take necessary precautions to insure that no arcing occurs between the ground bevels, leads of the welding machines and the pipe. Striking the arc on the pipe at any point other than the welding groove shall not be permitted. All arc burns occurring outside the welding groove shall be removed from the pipeline by cutting out a cylinder of pipe containing the arc burn or arc burns and replacing it with new pipe at the CONTRACTOR'S sole expense. Said cylinders are the property of the OWNER and shall not be destroyed or tested on by the CONTRACTOR.

M. Grinding shall not be permitted outside of the beveled surfaces, unless pipe wall is verified and approved by Construction Management Team. Grinding marks located outside the bevel shall be removed from cutting out a cylinder of pipe containing the grinding mark and replacing it with new pipe at the CONTRACTOR'S sole expense.

N. Tack welding of grounding clamps and other devices to pipe shall not be permitted.

O. Roll welding, when permitted, shall be carried out in accordance with a qualified welding procedure.

P. Hot weld shall be protected at all times from sudden cooling, water quenching or movement.

Q. Welding rod stubs or unused welding rod shall be carefully removed from the site and shall not be discarded in the ditch, right-of-way or elsewhere on the site.

R. No miter joints allowed.

S. During the final tie-in section the pipe shall be supported by side booms until all filler passes are complete.

3.4 WELD INSPECTION & NON-DESTRUCTIVE EXAMINATION

A. All welds shall be 100% radiographically inspected at the OWNER'S expense according to API 1104. If the results of these inspections indicate the welds to be defective, CONTRACTOR shall replace or repair the defective welds at CONTRACTOR'S expense. If the cut-out method of examination of weld is employed by the OWNER, the OWNER may, in the judgment of its OWNER INSPECTOR, cut-out and test any welds designated by him. Should such cut-out welds pass the requirements of API 1104, the cost of cutting out and subsequent tie-in will be borne by the OWNER. The cost of cutting out and replacing any welds that fail the tests shall be borne by the CONTRACTOR.

B. Liquid dye penetrant inspection, magnetic particle inspection or ultrasonic inspection may be utilized by OWNER on a case-by-case basis. Acceptance criteria for these inspections are as stated in API 1104.

3.5 WELD REPAIRS

A. Any defect found in a weld, which is determined to be detrimental to its serviceability, shall be either ground out and re-welded, or removed from the line as a cylinder and replaced by welding in a new section of pipe.

B. If visual or radiographic inspection indicates a weld to be defective, the CONTRACTOR, at no additional cost to the OWNER, shall cut a cylinder of pipe containing such weld from the pipeline and replace it with new pipe or shall have the defective weld repaired in accordance with API 1104. Correction of an individual bead prior to the laying of a succeeding bead is not considered a repair of a defect under these specifications.

C. Preheating shall be used according to the WPS. Such preheating shall be accomplished by a method acceptable to the OWNER and shall cover at least four (4) inches wide on each side of the weld. Heating shall not char the pipe coating. Preheat temperature shall be checked by use of temperature indicating crayons.

D. All repair and replacement welds shall be 100% radiographically inspected and shall meet the acceptance standards of API 1104.

E. Only one repair shall be allowed per girth weld. The necessity of a second weld repair constitutes a mandatory cut-out.

F. The accumulated length of weld repairs shall not exceed 8% of the total length of the girth weld.

G. Under no circumstances should attempts be made to repair cracks in a weld. All cracks shall be cut outs.

H. When welding the line pipe together at places where cut-outs have been made, one replacement weld will be used if it is practical to pull the line back into position; otherwise, two welds will be made by fitting in a "pup joint", which shall have a length of not less than five (5) feet.

3.6 FINAL WELDING DOCUMENTATION

A. After completion of production welding, CONTRACTOR shall submit all final copies of submittals stated in section 3.3.

END OF SECTION

SECTION 138000 – COATINGS

PART 1 – GENERAL

3.1 SUMMARY

A. This section includes the field coating of all field welded joints and field pipe coating repairs.

B. The CONTRACTOR scope of work shall include, but not be limited to: cleaning and preparing piping for coating, coating application, inspection, testing and making repairs.

C. This section is relevant for epoxy repair coatings and shrink sleeves only. This specification is not intended to cover original fusion bonded epoxy, polyethylene or above ground pipe coatings.

3.2 REFERENCES

A. CFR 49, Part 192, Transportation of Natural Gas and Other Gas by Pipeline: Minimum Federal Safety Standards, including (but not limited to) section:

1. 192.461 External corrosion control: Protective coating

B. NACE RP0105, Latest Edition, Liquid Epoxy Coatings for External Repair, Rehabilitation and Weld Joints on Buried Steel Pipelines

C. NACE SP0490, Latest Edition, Holiday Detection of Fusion Bonded Epoxy External Pipeline Coatings of 10 to 30 mils.

D. NACE RP0274, Latest Edition, High Voltage Electrical Inspection of Pipeline Coatings

E. NACE RP0602, Latest Edition, Field-Applied Coal Tar Enamel Pipe Coating Systems: Application, Performance, and Quality Control.

F. SSPC-10/NACE 2 Near White Blast Cleaning

3.3 SUBMITTALS

A. Prior to the start of coating, the CONTRACTOR shall provide the following submittals to the OWNER for review and approval:

B. Overall quality assurance plan for applying and testing field applied coating

1. Contractor coating personnel employed, training, qualifications and previous experience
2. Crew size & overall approach to coating activities
3. Scheduled dates for training and coating activities

C. CONTRACTOR coating personnel qualification & training records, including Operator Qualification in compliance with the Owner Operator Qualification Plan.

D. Daily coating log template that will be used including:

1. Coating date & contractor foreman
2. Product description, Coating batch numbers (Part A and Part B), Manufacturer and shelf life date
3. Ambient weather conditions
4. Ambient temp
5. % humidity
6. Dew point
7. Substrate temperature (Prior to application)
8. Surface preparation
9. Abrasive type
10. Substrate temperature at application
11. Hours uncoated (The time after surface preparation until application)
12. Method of application
13. Surface profile achieved & check
14. WFT check DFT check
15. Jeep Holiday voltage & pass check
16. Location where work was performed

E. Listing of all inspection and test equipment that will be used by the CONTRACTOR.

F. Proposed coating product data sheets and MSDS

3.4 QUALITY ASSURANCE & QUALITY CONTROL

A. The CONTRACTOR shall provide a representative from the field coating manufacturer to conduct coating product field application training. The following personnel shall attend the organized training:

1. All CONTRACTOR personnel responsible for applying the field joint coating and inspection over the installation and application of the field coating.
2. All CONTRACTOR personnel responsible for repairing the coating holidays.
3. All OWNER inspectors responsible for ongoing inspection and monitoring activities relating to field coating application.

B. All Splattering of coatings falling on nearby surfaces shall be removed by the CONTRACTOR at his expense. Coating damage to automobiles or any other surrounding structures caused by wind drift shall be the CONTRACTOR'S responsibility.

C. All coating shall be completed in accordance with manufacturer's recommendations, standards referenced in Section 3.2 and all other sections of this specification. Where there is a difference in requirements, the most stringent requirement shall apply.

D. CONTRACTOR shall be responsible for conducting and recording all inspections and tests. CONTRACTOR's coating foreman shall inspect and monitor the work of painters and blasters under his direction.

E. Daily coating logs and inspection reports shall be kept by the CONTRACTOR and available for inspection by the Construction Management Team.

F. OWNER inspection personnel will inspect and audit coatings compliance against the requirements of this specification, referenced specifications and industry good practice.

3.5 PROJECT REQUIREMENTS

A. CONTRACTOR shall conduct all below grade coatings in accordance with the stated requirements.

B. All coatings shall be selected in accordance with the following Coating Repair Product Matrix in this section. Coating product shall be selected by the CONTRACTOR after consultation with the coatings manufacturer. All coatings shall comply with coating performance requirements stated in NACE RP0105. CONTRACTOR may only use alternative coating products with prior OWNER approval.

C. The field coating system shall be compatible with any existing coatings. The CONTRACTOR is required to obtain OWNER approval of the selected coating.

D. All coatings shall be applied having a dry film thickness of at least 20 mils or the manufacturer's coating thickness recommendation, whichever is greater.

E. Additional sacrificial coatings and protection over girth welds on HDD pipe strings may be used with approval from an owner's representative.

Coating Repair Product Matrix

~~Material Coated~~	~~Welded Joint Coating~~	~~Holiday Repairs - 2 Sq. In or less~~	~~Holiday Repairs - in excess of 2 Sq. In~~
~~Fusion Bonded Epoxy (FBE) Coated Pipe~~	~~SPC 2888 2-part epoxy~~ ~~-or-~~ ~~DENSO Protal 7200~~ ~~-or-~~ ~~Canusa HBE 95 2-part epoxy~~ ~~-or-~~ ~~Powercrete R95 2-part epoxy (for use in an abrasive environment).~~	~~Patch stick not recommended. Any use of patch stick repairs to be agreed with OWNER before use.~~ ~~All coating repair products to be as per the FBE welded joint coatings.~~	~~All coating repair products to be as per the FBE welded joint coatings.~~
~~Abrasion Resistant Overcoat (ARO) Coated Pipe~~	~~Powercrete R95 2-part epoxy~~ ~~-or-~~ ~~Powercrete J 2-part epoxy~~	~~No patch stick repairs allowed.~~ ~~All coating repair products to be as per the ARO welded joint coatings.~~	~~No patch stick repairs allowed.~~ ~~All coating repair products to be as per the ARO welded joint coatings.~~ ~~.~~

~~Material Coated~~	~~Welded Joint Coating~~	~~Holiday Repairs - 2 Sq. In or less~~	~~Holiday Repairs - in excess of 2 Sq. In~~
~~Below Ground Bare Pipe~~	~~SP 2888 two part epoxy. - on bare pipe and welded joints~~	~~SP 2888 two part epoxy.~~	~~SP 2888 two part epoxy.~~
~~Air/soil Transition Areas (12" above and below grade transition)~~	~~Carboline Bitumastic with Rockshield wrap -or- Tapecoat TC Color Primer, Tapecoat (wax tape) over the primer, Tapecoat Rugged Wrap overcoat~~		

	Welded Joint Coating	***Holiday Repairs –2 Sq. In or less***	***Holiday Repairs –in excess of 2 Sq. In***	***Holiday Repairs – Shrink Sleeve***
Pritec Coated Pipe	***Canusa Shrink Sleeve.*** ***Canusa recommended sleeves are:*** ***Canusa K-60 Shrink Sleeves, "L" Thickness, yellow color. Model K-60/L YE.*** ***Sleeve width to be agreed between Contractor and Owner.***	***Patch repair, in accordance with Liberty Coating Company SOP RM-002 or CRP-65 with melt stick or mastic filler.***	***Patch repair, in accordance with Liberty Coating Company SOP RM-002 or CRP-65 with melt stick or mastic filler.***	***Canusa Shrink Sleeve.*** ***Canusa recommended sleeves are:*** ***Canusa K-60 Shrink Sleeves, "L" Thickness, yellow color. Model K-60/L YE.*** ***Sleeve width to be agreed between Contractor and Owner.***
Fusion Bonded Epoxy (FBE) Coated Pipe	***Approved products from Durabond (FBE Coaters) are:*** ***SPC-2888 2-part epoxy*** ***-or-*** ***DENSO Protal 7200*** ***-or-*** ***Canusa HBE 95 2 part epoxy*** ***-or-*** ***Powercrete R95 2-part epoxy (for use in an abrasive environment).***	***Patch stick not recommended. Any use of patch-stick repairs to be agreed with Owner before use.*** ***All coating repair products to be as per the FBE welded joint coatings.***	***All coating repair products to be as per the FBE welded joint coatings.***	***N/A***
Abrasion Resistant Overcoat (ARO) Coated Pipe	***Approved products from Womble (ARO Coaters) are:*** ***Powercrete R95 2-part epoxy*** ***-or-*** ***Powercrete J 2-part epoxy***	***No patch stick repairs allowed.*** ***All coating repair products to be as per the ARO welded joint coatings.***	***No patch stick repairs allowed.*** ***All coating repair products to be as per the ARO welded joint coatings.*** ***.***	***N/A***
Pritec Pipe to Fusion Bonded Epoxy / Epoxy Pipe Coating	***Canusa Shrink Sleeve. Shrink sleeve type and ordering options to be agreed with Owner.*** ***Any alternatives shall be reviewed and agreed by Owner.***	***N/A***	***N/A***	***N/A***

	Welded Joint Coating	*Holiday Repairs –2 Sq. In or less*	*Holiday Repairs –in excess of 2 Sq. In*	*Holiday Repairs – Shrink Sleeve*
Below Ground Bare Pipe	***SP 2888 two part epoxy. – on bare pipe and welded joints***	***SP 2888 two part epoxy. Repair product and application to be agreed with Owner.***	***SP 2888 two part epoxy. Repair product and application to be agreed with Owner.***	***N/A***
Air/soil Transition Areas	***Carboline Bitumastic with Rockshield wrap -or- Tapecoat TC Color Primer, Tapecoat (wax tape) over the primer, Tapecoat Rugged Wrap overcoat – Use of tape product to comply with VGS Operating Procedure 'Corrosion Control – Protective Coating'.***			

3.6 SAFETY & ENVIRONMENT

A. The CONTRACTOR is responsible for collecting, clean-up and placing into barrels, furnished by the CONTRACTOR, all hazardous grit-blasting waste. The OWNER will mark the barrels as hazardous material and arrange for proper disposal at an approved hazardous waste site. The barrels will become property of the OWNER. All barrels provided by the CONTRACTOR shall be new, clean, rust & dent free, and shall have removable lids.

B. The CONTRACTOR is responsible for collecting clean-up and disposal of all non-hazardous waste. The contractor shall dispose of all material at and approved waste site.

PART 2 – PRODUCTS

3.1 MATERIALS

A. All coating material, coating equipment and inspection & testing equipment shall be supplied by the CONTRACTOR.

B. The CONTRACTOR shall be responsible for the storage and application of all field-coating materials in accordance with the manufacturer's specifications. The CONTRACTOR shall provide necessary coating storage per manufacturer's product information.

C. Crystalline silica sand will not be permitted for use in abrasive blasting operations. The CONTRACTOR shall be permitted to use "Black Beauty" or equivalent.

3.2 EQUIPMENT

A. Any compressed air supplies used for grit blasting shall be free of detrimental amounts of water and oil. Adequate separators and traps shall be provided, kept emptied and operational.

B. CONTRACTOR shall provide and utilize wet and dry film thickness, temperature and humidity gauges as required by the performance of the work and approved by the Construction Management Team.

C. Magnetic dry film thickness (DFT) gauges shall be calibrated using either test blocks bearing nonmagnetic coatings that are traceable to a known standard or plastic shims provided by maker of electronic DFT gauges.

D. Contractor shall furnish two (2) or more holiday detectors, in good condition and properly calibrated in accordance with NACE requirements. All calibration records shall be available for OWNER inspector's review.

E. The holiday detector manufacturers approved by the OWNER are:

1. D.E. Stearns Company
2. SPY Holiday Detectors
3. Tinker & Rasor
4. Other manufacturers can be submitted and approved by the Owner.

F. CONTRACTOR may submit alternate equipment for approval by the OWNER.

G. The OWNER will have the right to inspect or test equipment to determine if it is in proper working condition.

H. CONTRACTOR shall use Press-O-Film tape to verify the piping or substrate surface profile measurement achieved prior to coating.

PART 3 – EXECUTION

3.1 PREPARATION, SETUP AND HANDLING

A. Prior to coating, all oil, grease or other deleterious matter shall be removed prior to blast cleaning.

B. All exterior surfaces of below grade pipe to be coated shall be blast cleaned to NACE 2 / SSPC SP10 (~~or at a minimum to the coating manufacturer's specifications~~) for required cleanliness and profile before any coating is applied.

C. For weld joint repairs, the CONTRACTOR shall utilize blast cleaning to achieve the necessary surface profile. Mechanical abrasion techniques may only be used after full OWNER review and approval.

D. Pinholes and areas less than 1.5 in^2 requiring small spot repairs (not down to bare metal) shall be cleaned using a surface grinder or by sanding the areas with 80 grit sandpaper or carborundum cloth to remove dirt, scale, rust, damaged coating, or any other foreign material. All dust produced by the cleaning and feathering shall be wiped off with a toluene or xylene soaked cloth before patching commences.

E. Areas larger than 1.5 in^2 requiring repairs shall be cleaned by a surface grinder or by grit blasting to remove dirt, scale, rust, damaged coating, or any other foreign material. Edges of the adjacent coating shall be feathered, and all dust produced by the cleaning and feathering shall be wiped off with a toluene soaked cloth before patching commences.

F. Irrespective of repair area, any repair where bare metal is exposed (and/or scale or rust is showing) shall be grit blasted to the appropriate surface profile.

G. Unless otherwise stated by the manufacturer, the angular surface profile achieved shall be 2 to 4 mils, measured from peak to valley.

H. After blasting, Contractor will thoroughly clean all blast grit and dust from both internal and external surfaces, including from crevices, recesses, etc.

I. The edges of the existing coating shall be roughened by sweep (or brush) blasting the existing coating for a distance of 1-inch minimum, or as defined by the coating product data sheet. Existing coating shall be roughened and not removed.

J. Abrasive blasting shall be completed during daylight hours.

K. Blast-cleaned surfaces shall be coated during the same day as blasting and at least one hour prior to sundown of that day and also before any rusting occurs.

L. If required by ambient weather conditions or by the coating product, the pipe or substrate surface shall be preheated prior to coating application.

M. Acceptable methods of heating the pipe surface include the use of an induction coil, a catalytic infra-red heater, or a propane torch. Care shall be exercised to prevent any charring or burning of the mill applied pipe coating adjacent to the cutback. If a propane torch is to be used the following requirements are applicable:

1. Any contamination due to heating shall be removed by wiping with a clean rag and isopropyl alcohol.

2. If heating with a propane torch after blast cleaning, a brush blast will be required if flash rusting occurs prior to coating application.

N. Pipe shall never be heated to above 250°F. Surface preheat shall be measured by thermocouple, temperature 'tempilstik' or approved equal.

3.2 APPLICATION

A. Coating manufacturer's application instructions shall be followed at all times.

B. No coating shall be applied at ambient temperatures below 50 deg. F. or on surface temperatures less than 5 deg. F above the dew point.. If such conditions exist, manufacturer's data on surface heating shall be followed and Contractor shall provide means/methods that are acceptable by the Construction Management Team.

C. No condensation, precipitation, or any other form of contamination is allowed on the blasted surface prior to coating. Coating shall commence immediately after surface preparation has been completed.

D. Application may be performed by brushing, rolling or any other manual techniques as approved by the coating product manufacturer.

E. When liquid epoxy is used as the primary corrosion coating, backfill time shall be determined by the "thumb nail test." The "thumb nail test" is defined by when one can no longer make a permanent indentation in the coating with his/her thumb nail.

F. When liquid epoxy coatings are applied for the purpose of abrasion resistance, or sacrificial coating, a Shore D hardness of 75 or greater must be achieved prior to dry film thickness measurements, holiday detection, handling, backfilling or installation.

G. The coating must achieve a full chemical cure before it is backfilled. An acceptable field test to determine whether the coating has achieved a full chemical cure is to rub a solvent such as Xylene, MEK, or Toluene onto the coating. If the gloss or sheen is removed, the coating is not yet fully cured.

H. Over coating, when necessary, shall follow manufacturer's recommendations.

3.3 INSPECTION AND TESTING

A. CONTRACTOR coating testing and testing frequency shall be in accordance with the following table:

Test	Frequency	Acceptance limits
Daily conditions	At the start of every shift	-
Surface Profile Checks	Once at the start of blasting. Once every 4 hours. Once at the end of blasting.	2 to 4 mils, using press-o-film testing tape.
Cleanliness	Every welded joint repair	Near White (SSPC SP-10) by visual inspection.
Preheat Temperature	Each time preheat is required	Maximum 250°F measured by thermocouple or temperature stick
Wet Film Thickness	Every coating at 3, 6, 9 and 12 O'clock positions	500 microns (20 mils) minimum
Dry Film Thickness	Every coating at 3, 6, 9 and 12 O'clock positions	500 microns (20 mils) minimum
Hardness	All coated areas - prior to lowering in	Thumb nail Test
	ARO coating repairs – prior to pullback or lowering in	Shore D Hardness of 75
Holiday Test	All piping to be buried	As per manufacturer's recommendations or if no recommendation exists, then 125 DC Volts per mil DFT coating
Adhesion Test	***Refer to Field Adhesion Test procedure in Inspection Manual***	***Refer to Field Adhesion Test procedure in Inspection Manual***

B. Wet and dry film thickness readings shall be measured on the 3, 6, 9 and 12 O'clock positions on every girth weld and recorded. Marks made by the wet film gauge shall be smoothed and covered using a brush.

C. The applied coating will be generally smooth and free of excessive material protruding from the surface and holidays. No drips, runs, sags, or other discontinuities are acceptable. "Icicles" on the bottom of the weld will not be acceptable. In the event "icicles" occur at the bottom, they will be smoothed with the adjacent coating to eliminate the possibility of chipping or breakage during lowering in operations.

D. Holiday inspection shall be performed on all pipe and fittings with an electronic holiday detector, supplied by the CONTRACTOR, and operated in such a manner as to audibly and visually detect the presence of all holidays.

E. Excluding voltage settings described above, holiday inspection shall be performed as outlined in NACE Standards RP0105, RP0274 and SP0490, latest revisions, with a certified holiday detector. This inspection shall occur on all piping to be buried.

F. Holiday detectors shall have adequate grounding at all times.

G. If a jeep voltage is not specified by the manufacturer then the holiday detection voltage shall be determined by V = 125 X T, Where T = coating film thickness in mils. Proper voltage settings shall be confirmed by detecting three artificial holidays placed in the initial joint. For fabrication inspection, the electrode shall be a wet sponge detector supplied by the CONTRACTOR. For pipe inspection, the electrode shall be the pipe OD and consist of a rolling spring composed of square stainless steel wire. The spring length shall fit securely to the surface of the pipe.

H. Upon completion of the pipeline construction final clean up, the OWNER may elect to conduct a DCVG (Direct Current Voltage Gradient) Coating Survey. The CONTRACTOR shall uncover all of the holidays detected. The coating shall be cleaned, dried, jeeped, and the uncovered coating defects shall be repaired. Any Coating Integrity indications uncovered that require coating repair will be at the CONTRACTOR'S expense, including the excavation, coating repair, backfill and final clean up. Should the OWNER elect to perform a DCVG Survey the cost to perform the DCVG Survey will be borne by the OWNER.

I. Immediately prior to and during lowering in, the CONTRACTOR shall check the coating with an electrical holiday inspection instrument supplied by the CONTRACTOR and approved by the OWNER. All pipe shall be inspected for holidays and all holidays shall be repaired in accordance with these specifications.

J. Holiday testing shall be done before any rock shield, pipe saks, concrete coating or any other type of additional materials are applied to the pipe.

~~K. At no time shall the pipe be jeeped or lowered in without a OWNER inspector present.~~ ***Final jeeping and lowering cannot take place without an OWNER inspector present.***

L. During lowering operations, coated pipe shall be handled by use of adequately spaced lowering in belts or cradles. ~~Belts shall be at a minimum equal to the diameter of the pipe width and made of proper material,~~ ***Belts and cradles shall sufficiently support the pipe and be made of proper material,*** which shall be free of protrusions that may cause damage to the protective coating. Roller cradles shall have nylon/neoprene roller wheels.

M. If the OWNER inspector suspects coating was damaged during lowering in, OWNER reserves the right to elect further CONTRACTOR holiday testing while pipe is in the trench.

3.4 COATING REPAIRS

A. All coating repairs required are to follow this specification. Upon completing coating repairs, the CONTRACTOR shall retest the pipe in accordance with section 3.2H.

B. The CONTRACTOR shall be responsible for all damages to pipe or pipe coating caused by equipment, rough treatment, handling or ditch conditions. The CONTRACTOR shall repair coating damage and piping damage at no additional cost to the OWNER.

C. Any field joints or pipe with inadequate or excessive film thickness, uncured coating or disbanded/non-adherent coating shall be completely re-blasted to base pipe and recoated by the CONTRACTOR at no additional cost to the OWNER.

D. Contaminated coatings shall be reblasted by CONTRACTOR to bare metal and reapplied as originally specified.

E. Where joints have excessive holiday detections and coatings cannot be adequately repaired, joint shall be completely replaced at no additional cost to OWNER.

3.5 FINAL COATING DOCUMENTATION

A. The contractor shall supply the following as part of their final Coating documentation:

1. Daily coating and inspection logs
2. Replica tape of surface profile shall be attached to the coating logs
3. Example photos of coating preparation, application and testing
4. Equipment calibration logs
5. List and details of all coating batch numbers used.
6. ***Field Adhesion Test Report***

END OF SECTION

SECTION 139000 – HYDROTESTING

PART 1 – GENERAL

1.1 SUMMARY

A. This section includes the hydrostatic testing of all OWNER pipelines and pipe segments including crossings, horizontal directional drills and piping assemblies fabricated off-site intended for pipeline use.

B. The CONTRACTOR scope of work shall include, but not be limited to: cleaning and preparing pipeline for test, filling and completing the test, dewatering the pipeline, making repairs in the event of failure, drying the pipeline, and reconnecting or capping the pipeline following successful completion of the test.

C. This specification is not intended to cover pneumatic testing.

1.2 REFERENCES

A. 49 CFR 192 – Subpart J: Transportation of Natural and Other Gas By Pipeline: Minimum Federal Safety Standards. Subpart J – Test Requirements.

B. ASME B31.8 – Gas Transmission and Distribution Piping Systems

1.3 SUBMITTALS

A. The following submittals shall be provided by the CONTRACTOR prior to hydrotest:

1. Overall hydrotest plan showing number of hydrotests to be completed, estimated schedule and water fill volumes of each hydrotest.

2. Hydrotest plan and procedure for the specific pipe segment to be tested. This shall include OWNER supplied drawings marked up with:

a) Test section limits

b) Test site & manifold test header elevations and locations.

c) Location and elevation of deadweight pressure recorders and chart recorders

d) Elevation high point of pipe tested

e) Elevation low point of pipe tested

f) Hydrostatic test pressure required at deadweight pressure recorder site and chart recorder sites (potentially at varying heights and pressures) to ensure all piping is tested to the minimum test pressure. All calculations are to be included.

3. Hydrotest temporary evacuation and security plan for each location.

4. Water supply location(s), including necessary permits/approvals if necessary.

5. A list of all instrumentation to be used showing manufacturer rating, range, accuracy, limits, etc., complete with certified copies of all calibration reports. Certification to be current within three months.

6. Test Header certification details including:

a) Material test reports on the header pipe, cap, valves and fittings, with a complete bill of materials.

b) Acceptable radiography report of each weld on the test manifold/header

c) Serial numbers for all valves and other equipment on the test header

7. CONTRACTOR shall submit a marked up drawing indicating the location for dewatering and verification that the dewatering area is acceptable under the Project Permits. CONTRACTOR to also supply calculations indicating the rate at which the pipe will be drained to ensure that the maximum flow of water into and out of the dewatering area does not exceed the permitted velocities. If CONTRACTOR is planning to utilize a non-approved dewatering area for the test, then the coordination and all costs associated with obtaining approval for the use of the alternate dewatering area shall be the responsibility of the CONTRACTOR, including any and all consultant costs, project delay costs, regulatory compliance costs, etc.

8. CONTRACTOR pipeline drying procedure

B. For submittals, records and documentation to be provided post-testing, CONTRACTOR shall comply with section 3.1 of this specification.

1.4 QUALITY ASSURANCE & QUALITY CONTROL

A. The OWNER will supply a designated representative to witness the hydrostatic tests. The OWNER designated representative shall be present for the duration of the test as well as all pressurization and depressurization activities.

B. The CONTRACTOR shall supply sufficient qualified personnel experienced with the operation of all required testing instruments and equipment in accordance with the provisions of this CONTRACT.

C. The CONTRACTOR shall supply a test supervisor, experienced in pipeline hydrotesting to manage all test activities.

D. Test activities shall only commence once all submittals are approved by OWNER, and all safety and quality assurance requirements detailed in this specification and the contract are met. OWNER shall not be responsible or liable for any testing activities which commenced without OWNER approval. CONTRACTOR shall allow for 15 days turn around for the approval of the Test Plan by the OWNER.

E. Test activities shall only commence once all pipeline radiography and other nondestructive examination is complete and approved by the OWNER.

F. Test activities shall only commence after the OWNER designated representative and the CONTRACTOR have had an on-site walk through of the planned test to verify all of the requirements of this section, including any safety issues or concerns.

G. During testing activities, all quality control and safety issues shall be immediately communicated to the CONTRACTOR's test supervisor and OWNER designated representative.

1.5 PROJECT REQUIREMENTS

A. Unless otherwise stated by the OWNER, minimum test pressure shall be 1.5 times pipeline Maximum Allowable Operating Pressure (MAOP). Pipelines shall be tested in accordance with this specification and 49 CFR 192, Subpart J.

B. All buried pipeline and appurtenances shall be tested to the pressure designated by the OWNER for a period of eight and one-half (8.5) continuous hours; whereas, pre installation (above ground) testing shall be for a period of four and one-quarter (4.25) continuous hours.

C. Pipe installed at HDD crossings shall be hydrostatically tested a period of four and one-quarter (4.25) continuous hours at a pressure specified by the OWNER, both prior to, and after installation. All hydrostatic tests at HDD's shall comply with this specification and 49 CFR 192 Subpart J. Any exceptions to this specification shall be agreed with written approval of the OWNER prior to the start of test.

D. Whenever possible, all fabricated assemblies shall be hydrostatically tested as an integral part of the mainline pipeline, in accordance with this specification. However, situations may arise which result in the fabricated assemblies not being in place at the time of mainline testing. With prior written approval of the OWNER, fabricated assemblies may be proof tested above ground for eight and one-half (8.5) hours duration, prior to installation in the pipeline. Such tests shall be performed in general accordance with these specifications, 49 CFR 192 and ASME B31.8.

E. All testing operations involving work on the RIGHT-OF-WAY or on the pipeline, including but not limited to move-in/move-out, cutting fences, handling the OWNER furnished materials, bending, welding, coating, tie-ins and backfilling shall be in accordance with the applicable sections of the project specifications.

F. Once the appropriate submittals have been approved by the Owner, the CONTRACTOR shall provide the OWNER a minimum of 5 working days' notice prior to the date of the scheduled test. Testing shall not be scheduled to occur on a weekend, unless approved by Construction Management Team.

1.6 SAFETY

A. During all testing operations, the CONTRACTOR shall take all necessary safety precautions to protect all persons and property including the temporary evacuation and lodging of property owners/residents/tenants as required by the OWNER'S specifications. This shall include, but not be limited to, keeping all persons not directly engaged in the testing operations off the construction right-of-way of the test section during the pressure stabilization and holding periods. Warning signs shall be placed along the right-of-way at points of public crossings and must remain in place throughout the pressurizing and holding periods.

B. Existing conditions or any, which are unsafe in the opinion of the OWNER representative, shall be corrected immediately. The test shall not proceed until the unsafe conditions have been corrected to the satisfaction of the OWNER.

C. Supply whips for hoses and other necessary appurtenances.

PART 2 – PRODUCTS

2.1 MATERIALS

A. The CONTRACTOR shall furnish all materials and equipment necessary for the completion of all preparation, testing and post-test completion activities.

B. Even if not called out on project drawings, CONTRACTOR shall supply all required properly rated blind flanges, caps, plugs, gaskets, hoses, bolts and temporary valves as required to complete the test activities.

2.2 EQUIPMENT

A. The CONTRACTOR shall furnish equipment which complies with the following specifications:

1. Fill lines and pumps shall be in good operating condition, capable of pumping a minimum of one thousand five hundred (1500) gallons per minute to a pressure of two hundred (200) psi.

2. Filters shall be installed between all unprocessed water sources and the pipeline. Filters shall be equipped with one hundred (100) mesh screen or equivalent and capable of removing particles one hundred sixty (160) microns and larger. Filters shall be installed in such a manner to permit back flushing or change out without interruption of the pumping operation and without bypassing the filtration system.

B. High-pressure pumps shall be in good operating condition, capable of pumping a minimum of fifty (50) gallons per minute, and rated at least fifty-percent (50%) above maximum required test pressures. Pumps shall be equipped with a stroke counter or other means of volume measurement and a variable speed control to reduce capacity to three (3) gallons per minute. High pressure pumps shall be mobile enough to allow movement from one location to another without causing delay.

C. Air compressors required for dewatering shall have a total capacity of not less than 1200 CFM.

D. For test instrumentation and measurement, the following minimum requirements shall be met:

1. Deadweight pressure gauges 0-3000 psig with readings to the nearest 1 psig, complete with a current test certificate in accordance with the requirements of the governing authorities.

2. Pressure recording gauges 0-3000 psig with twelve (12) inch minimum diameter or width chart with pressure increments of 20 psig maximum complete with a current test certificate in accordance with specification requirements.

3. Temperature recording gauges for pipe temperature, soil temperature and air temperature, range 32 °F to 120°F, twelve (12) inch minimum dial diameter with temperature increments 1°F maximum, complete with a current test certificate in accordance with the specification requirements.

PART 3 – EXECUTION

3.1 PREPARATION & SETUP

A. Prior to commencing the Hydrotest activities, CONTRACTOR shall provide, for OWNER approval, all submittals as stated in section 1.3. CONTRACTOR shall provide submittals for review no less than thirty (30) days prior to the first planned hydrotest date.

B. The CONTRACTOR shall ensure that the pipeline and appurtenances are free of dirt and debris prior to filling the test section. The CONTRACTOR shall furnish compressed air to run a minimum of one (1) CONTRACTOR furnished wire brush pig with cups prior to filling the segment with water. The OWNER may request additional runs at no additional cost to the OWNER.

C. A Deadweight pressure gauge shall be installed at one end of each test section, whereas a pressure recorder and ambient and pipe temperature recorders shall be installed at both ends of each test section. Dial-type pressure gauges may be installed as required by the CONTRACTOR, however, they shall not be used for formal test pressure recording.

D. Four temperature recorders total (one in the backfill at pipeline depth and one on the pipe, at each end of the pipeline) shall be set up prior to the start of the test pressurizing.

E. The deadweight pressure gauge, pressure recorder, and dial pressure gauge shall be tied into a common manifold which is connected to the test section by a high pressure hose. This manifold and the instrumentation shall be located a minimum of fifty (50) feet from the test section being tested. The same criteria shall hold true for the pressure recorder and dial pressure gauge located at the other end of the test section. CONTRACTOR shall demonstrate recent calibration (within the previous six (6) months) of the deadweights and chart recorders.

F. The CONTRACTOR shall provide test manifolds with the exception of the line pipe provided by the OWNER. The CONTRACTOR shall install manifolds at locations agreed in the CONTRACTOR submitted test plan. The installed test manifolds and headers shall be 100% visually examined and welding completed, inspected and verified by the CONTRACTOR prior to test in accordance with project specifications. Owner reserves the right to perform NDE on said test headers prior to pressurization.

G. Water used for testing purposes shall comply with water discharge permits and be kept free of additives including acids or other material detrimental to the pipe metal. Unless otherwise specified, the CONTRACTOR shall utilize commercial or public water sources, complying with applicable environmental permitting conditions, unless otherwise approved by the OWNER. All efforts will be made to locate the water source on the Working side of the right-of-way.

H. Filling shall be continuous and accomplished with one (1) of more bi-directional squeegee pigs (four (4) disk minimum) furnished by the CONTRACTOR. The CONTRACTOR shall regulate the speed of travel of the fill pig(s) to the satisfaction of the OWNER in order to prevent water from bypassing the pigs during the filling and dewatering operations. The CONTRACTOR, at no additional cost to the OWNER, shall cut from the line any pig which stops during filling, dewatering or drying, and cannot be dislodged, and repair the line in accordance with the OWNER'S specifications.

I. The temporary piping at the fill point shall include a water meter and a recording pressure gauge for the purpose of estimating the location of the fill pig. A check valve shall be installed at the point where the fill pump discharge piping is tied into the pipeline.

J. Testing against a closed valve is not permitted. All plug valves shall be in full open position and all ball and gate valves shall be in half open position prior to test.

3.2 TESTING

A. All record keeping will be the responsibility of the CONTRACTOR. The original copy of all hydrostatic test records are to be submitted to the OWNER upon completion of each hydrostatic test. Each hydrostatic test must be approved and signed by the OWNER's representative prior to the depressurization of the test station.

B. CONTRACTOR shall commence record keeping at the start of pressurization and provide a full pressure record over the complete ramp-up, 60% test pressure hold period, pressure-volume plot and test pressure hold period.

C. Unless otherwise noted during the pressure-volume plot, Deadweight pressure gauge readings shall be recorded every 15 minutes.

D. The filling and testing operation shall not be commenced or terminated without the OWNER Representative's approval.

E. The CONTRACTOR shall not be permitted to tighten or otherwise disturb any flange or pipeline appurtenance that is under pressure. The piping must be fully depressurized before addressing any leaks.

F. Regular checks shall be made on all instrumentation during the test period to detect any malfunction and ensure continuous legible recordings.

G. Leak tests, pressurizing, and associated yield plotting shall be conducted during daylight hours unless impractical. If testing at night is necessary, adequate lighting acceptable to the OWNER shall be provided by the CONTRACTOR.

H. The CONTRACTOR shall perform and provide a pressure-volume (P-V) plot for all hydrostatic tests. This requirement is not required for the above ground pre-installation hydrostatic test on HDD locations. P-V plots are required on post installation HDD hydrostatic tests, unless otherwise approved by Construction Management Team.

I. The pipeline shall be pressurized to sixty (60) percent of the test pressure at a controlled rate.

J. At Sixty (60) percent of the specified test pressure a stabilization period shall start. The temperature stabilization period of the test medium shall be continued for a minimum of one (1) hour and until a temperature-time plot is asymptotic to the ground temperature. During the stabilization period, all appurtenances (mainline valves, test connections, etc.) shall be checked for leakage and be in the open position for the remainder of the test.

K. Starting at sixty (60) percent of the test pressure specified for the test point location, the pressure shall be continually checked with the deadweight test gauge until the specified test pressure is reached. Also, during this portion of the test, the volume of test medium added shall be measured by one of the following methods:

1. A calibrated turbine meter and totalizer installed in a manner approved by the OWNER.
2. A counting device installed on the positive displacement pump which will record the number of pump strokes.

L. After termination of stabilization period, the pressure-volume plot shall commence. A constant pumping rate will be maintained to obtain a suitable pressurizing rate of not more than 15 psi increase per minute. As each 15 psi increment is indicated on the deadweight gauge, the cumulative volume of test medium added shall be recorded. This pressure and volume information shall be recorded in tabular form and immediately transferred to produce a graph of pressure versus cumulative volume or “yield plot”.

M. The yield plot will form a straight line unless the elastic limit of a portion of the pipe is reached, at which time it will gradually curve to the right of the projected straight line. Pressurizing shall cease when either the required test pressure has been reached or a pressure has been reached which corresponds to a deviation from a straight line proportionality of 0.2 percent (offset method on the pressure volume plot for the section being tested.

N. Upon reaching the required test pressure, the pressure reading shall be monitored until it stabilizes with pipe fluid temperature and ground temperature. The CONTRACTOR shall start the test hold period once stabilization is confirmed.

3.3 TESTING LEAKS AND FAILURES

A. If any leaks or breaks occur during any of the testing operations, the CONTRACTOR shall locate, repair and retest the Test Section in which the failure took place. The CONTRACTOR shall immediately notify the OWNER of all pipe failures and all suspected leaks complete with all particulars.

B. Leaks or breaks occurring in the pipe metal or pipe seam shall be repaired by cutting out and replacing the entire joint. If the leak or break has been caused by construction damage only and is in a straight joint of pipe, it may not be necessary to replace the full joint and repairs shall be as directed by the OWNER. Leaks occurring in the circumferential welds shall be replaced with a 10ft minimum length pup. Failures occurring in field bends shall be replaced with field bends of the same degree. No cuts shall be made closer than twelve (12) inches to a defect.

C. For all leaks and breaks, accurate records shall be kept from the time the leak or break is first indicated until it has been located, repaired, refilled and re-pressurized to the same pressure at which the failure was first indicated.

D. Records shall detail the quantities of materials and supplies used. All supervision, labor, and equipment shall be classified by operational and standby time.

E. All pipeline sections containing leaks or breaks which are cut out of the pipeline shall be handled in accordance with the pipe manufacturer's representatives or the OWNER'S instruction's so as not to damage the defective areas. All such cut out pipe shall be clearly marked with paint immediately after removal from the ditch to show the OWNER stationing and date of failure. The edges of the defect shall be protected with grease. Defective pipe shall be transported as directed by the OWNER.

F. Leaks or breaks occurring in the pipeline during any of the testing operations which are a result of defective permanent materials furnished by the OWNER shall be located, repaired and the repaired test section refilled and re-pressurized to the same pressure which the failure was first indicated, all by the CONTRACTOR at the OWNER'S expense.

3.4 POST – TESTING

A. After successful completion of the test and after approval by the OWNER designated representative, the pressure shall be bled down only to the hydrostatic head at the bleed off point. The bleed off point shall be the highest point of the two ends in the Test Station, the intent being to bleed excess pressure from the pipeline while preventing air from entering the pipeline.

B. Dewatering shall be performed in accordance with the OWNER'S environmental permits, discharge permits, and all applicable Federal, State and local Regulations.

C. Dewatering shall be accomplished with one (1) or more bi-directional OWNER approved four (4) disk squeegee pigs that are not excessively worn or damaged and one (1) or more bi-directional poly pigs furnished by the CONTRACTOR. The bi-directional poly pig may be loaded in the receiving manifold prior to the filling operation such that if may be run in combination with the squeegee fill pig during the initial dewater run.

D. Drying shall be accomplished utilizing compressed air furnished by the CONTRACTOR with OWNER approved directional squeegee or poly pigs furnished by the CONTRACTOR. A minimum of two (2) separate air propelled runs will be run. Additional foam pig drying runs may be requested by the OWNER at the CONTRACTOR'S expense. The CONTRACTOR shall provide pipeline dryers to achieve a minus 40 degree dew point of the finished pipeline. Pipeline dryers and labor to be furnished by the CONTRACTOR at no additional expense to OWNER. CONTRACTOR shall demonstrate recent calibration (within the previous three (3) months) of dew point tester.

E. All areas disturbed by any of the testing operations, including but not limited to filling, pressurizing, failure repairs, buckle repairs, manifold or temporary scraper trap removal and water damage to previously cleaned-up RIGHT-OF-WAY shall be cleaned up immediately after testing operations have been completed in accordance with these Specifications.

3.5 FINAL TEST DOCUMENTATION

A. The OWNER will furnish the forms for and the CONTRACTOR shall prepare the following records for each Test Section:

1. A Log of deadweight pressure readings taken every 15 minutes during stabilization period, yield plot and eight (8) hour hold test.
2. Pressure recording charts for:
    a) Pressurizing and stabilization period
    b) Eight (8) hour hold test.
3. Ambient, Soil and Pipe Temperature recording charts for:
    a) Pressurizing and stabilization period
    b) Eight (8) hour hold test.
4. Report on any leak or break including location, pressure, dimensions of defect, pipe manufacturer heat number and joint number, how repaired, etc. defect, pipe manufacturer heat number and joint number, how repaired, etc.
5. All engineering calculations for the highest and lowest elevations along the tested pipeline that demonstrate that: the lowest elevations were not structurally damaged by excessive pressure and; the highest elevations were equal to, or exceed, the minimum required test pressure.
6. All the above records shall show:
    a) the size and name of the pipeline
    b) OWNER name & OPERATOR name, CONTRACTOR name and names of any 3rd party or subcontracted test companies used.
    c) Names of OPERATOR / OWNER & CONTRACTOR personnel responsible for making the test.
    d) Test medium, pressure and duration
    e) the location of the Test Section, the location of the test gauge, and the quantities of each wall thickness of pipe included in the Test Section, and the starting and ending times/dates of tests. Elevation variations.
    f) Any fittings or other permanent equipment included in the test.

7. These records shall be signed by the authorized representatives of the CONTRACTOR and the OWNER. Original signed copies of all records for each Test Section shall be turned over the OWNER immediately after the successful completion of the test in that section. All records shall be in accordance with DOT Part 192.

3.6 PERMITTING REQUIREMENTS

A. The OWNER will secure hydrostatic test water discharge permits. Copies of the hydrostatic test water discharge permits will be furnished to the CONTRACTOR.

B. The CONTRACTOR shall be required to comply with all applicable water acquisition and dewatering permit requirements furnished by the OWNER and in accordance with the OWNER'S Environmental Mitigation Plan. The CONTRACTOR shall obtain approval from the OWNER Test Engineer before discharging any test water.

END OF SECTION

SECTION 260501 - ELECTRICAL – GENERAL INSTALLATION REQUIREMENTS

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. This specification is for general site electrical work only relating to the CHA design drawings. This specification is not intended to be used with any other project design work/consultants including ARK Engineering.

B. This specification covers the requirements for the supply of equipment, material, labor, tools, services and supervision as required for the installation, testing and placing into satisfactory operation of the electrical systems detailed in this specification and the attached drawings.

C. Any equipment and materials, other than those identified as being pre-purchased by the Owner, necessary for the installation and wiring of the equipment within the scope of this contract shall be supplied by the Contractor.

D. The drawings presented outline the scope of the work required of the Contractor and are to be the basis of the Contractor's bid. The Contractor may offer for consideration alternates that are cost effective so long as these are clearly defined and approved by the Owner.

E. The Contractor shall be responsible for sizing of all junction boxes and splitter boxes, verification of conduit sizes, conduit fill and loadings, cable ampacities and short circuit ratings for all Contractor-supplied equipment and materials.

1.2 REFERENCES

A. 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:

1. Local Building Codes
2. Building Code of Vermont
3. Fire Code of Vermont
4. National Fire Protection Association (NFPA)
5. National Electrical Code(NEC)
6. Underwriters Laboratories, Inc. (UL)
7. National Electrical Manufacturers Association (NEMA)
8. Institute of Electrical and Electronic Engineers (IEEE)
9. American Society of Testing Materials (ASTM)
10. Insulated Cable Engineers Association (ICEA)
11. Association of Edison Illuminating Companies (AEIC)
12. American National Standard Institute (ANSI)

B. In general, all electrical equipment furnished shall be listed and labeled by Underwriters Laboratories, Inc. (UL) or another acceptable organization to the "Authority having Jurisdiction" and the Owner. This requirement will be waived only when the specified equipment is not available from any manufacturer with such a label or listing.

1.3 WORK TO BE DONE

A. The work to be done by the Contractor under this specification consists of the installation, supply of materials, off-loading of equipment, and inspection and testing, as specified.

B. Electrical equipment installed by the Contractor shall include equipment in Vermont Gas Systems – Addison Natural Gas Project Mainline Valve Sites, Colchester Launcher Site and the Phase 7 Looping Project Mainline Valve Site.

C. In general, the equipment to be supplied and installed by the Contractor shall consist of, but not be limited to the following:

1. Supply and installation of all low voltage, control, signal and communication conduits and cabling.
2. Installation of any Owner pre-purchased equipment.
3. Installation and termination of all RTU / DAC Panels in electronics buildings as shown on Drawings.
4. Supply, installation and termination of all junction boxes as shown on Drawings.
5. All conduit and raceway systems.
6. Electrical check-out of all equipment installed and provide assistance to Owner with commissioning and operational testing of all equipment and facility systems.

1.4 QUALITY ASSURANCE

A. Uniformity: Unless otherwise specified, equipment or material of same type of classification, used for the same purpose shall be products of same manufacturer. All material shall be new and of the current design of manufacturer providing equipment or material. All materials shall be as stated on project drawings. Any substitutions by contractor shall be approved by Owner.

B. Design: Equipment and accessories not specifically described or identified by manufacturer's catalog numbers shall be designed in conformity with NEMA, IEEE, or other applicable technical standards and shall have neat and finished appearance.

C. Installation: Erect equipment in neat and workmanlike manner; align, level and adjust for satisfactory operation; install so that parts are easily accessible for inspection, operation, maintenance and repair. Minor deviations from indicated arrangements may be made, but only after obtaining approval from Owner.

1.5 CONTRACT DRAWINGS

A. Location Approximate

1. The locations of equipment, fixtures, outlets and similar devices shown on the Contract Drawings are approximate only.

2. The Contractor shall determine the exact locations of the equipment, outlets, box-outs, sleeves and of similar items required for the coordination of electrical work with the structural, architectural, mechanical and other work as necessary.

B. Drawings Diagrammatic

1. Circuit diagrams shown are diagrammatic and functional only and are not intended to show exact circuit layouts, number of fittings, or other installation details.

2. The Contractor shall furnish all labor and materials necessary to install and place in satisfactory operation all power, lighting and other electrical systems.

1.6 CONTINUITY OF SERVICES

A. Schedules for various phases of Work shall be coordinated with all other trades and with Owner.

B. Provide necessary and temporary connections and relocations as required to maintain systems in operation.

C. When connecting new facilities, do not shut off any Mechanical/Electrical facilities or services without prior written approval of the Owner.

1.7 PROTECTED WORK

A. Hazardous Locations

1. In the areas designated as Hazardous and where explosion-proof work is shown or specified, all work and electrical equipment shall meet the requirements of the NEC for Class I Division 1 and 2 Group D locations unless otherwise noted.

B. Wet Locations

1. Where installed outdoors or in areas designated as Wet Locations, all work and electrical equipment shall meet the requirements of the NEC for Wet Locations.

1.8 INSPECTIONS AND APPROVAL

A. The Contractor shall have all electrical work inspected by the following agencies and this work shall pass such inspection:

1. Vermont Division of Fire Safety

B. The Contractor shall furnish to the Owner a certificate of compliance stating that the completed installation complies with the requirements of the National Electrical Code. This certificate shall be completed by the agency listed above.

C. Any changes required by the authorities resulting from deficiencies in the Contactor's workmanship shall be implemented by the Contractor without cost to the Owner.

1.9 SUBMITTALS

A. Contractor shall supply a submittal for all Contractor-supplied materials and equipment as indicated in the Electrical Technical Specifications.

PART 2 - PRODUCTS

2.1 EQUIPMENT AND MATERIALS SUPPLIED BY CONTRACTOR

A. The Contractor shall supply all equipment and materials needed for the electrical installation as shown on drawings.

2.2 MATERIAL CONTROL

A. The Contractor shall establish a very strict and comprehensive material control scheme, to warn of any potential material shortages.

2.3 DELIVERY, HANDLING AND STORAGE OF MATERIAL

A. Materials and equipment shall be delivered to the site of the work in their original containers, and containers shall not be opened until inspected by the Owner.

B. Electrical equipment shall at all times during construction be adequately protected against mechanical injury or damage by weather.

C. If any materials or apparatus have been damaged, the apparatus or materials shall be restored to a new condition, subject to the inspection and approval of the Owner, or replaced with new materials or apparatus.

D. Equipment shall be stored in accordance with manufacturer's recommendations. Temporary heaters shall be provided as required to prevent buildup of condensation in the equipment.

PART 3 - EXECUTION

3.1 GENERAL EQUIPMENT INSTALLATION

A. The installation of equipment shall be defined as the receiving, off-loading, storing where necessary, moving into its designated location, uncrating, assembly, setting up, connection to other equipment and preparing for operation, all in accordance with the Specification and with the Vendor’s instructions and Installation Manuals.

B. The installation of cables shall be defined as the receiving, off-loading, storing where necessary, pulling out of cables, placing in conduit as required, entering the cables into panels and terminating.

C. The Contractor shall ensure that the cables and equipment are kept clean and are protected against damage, dust and moisture.

D. Cable ends shall be kept sealed to prevent the ingress of moisture.

E. Unless otherwise specified, the Contractor shall supply, fabricate, construct and erect all support brackets on mountings for all equipment supplied by the Contractor.

3.2 MAIN EQUIPMENT INSTALLATION

A. Wall mounted equipment shall be fastened to steel brackets to provide an installation that is true, plumb, secure and safe.

B. Vendor drawings and instructions for the installation of Owner pre-purchased equipment will be made available to the Contractor. It shall be the responsibility of the Contractor to follow these documents during the installation, wiring, testing and energization of the equipment.

C. Installation of safety signs as required by code regulations or stipulated by the Engineer shall be the responsibility of the Contractor.

3.3 IDENTIFICATION

A. Equipment and Devices

1. All electrical equipment shall be clearly identified with its equipment number, function and voltage.

2. Each power and distribution panelboard, circuit breaker, junction box, etc. shall be identified with white lamacoid nameplate with black engraving, mechanically secured to the front with the screws or rivets to indicate function, voltage and equipment number as specified on the drawings. Enclosure ratings shall not be compromised in the attachment of labels. Labeling in accordance with NFPA70E must be applied where required.

3. Each power and distribution panelboard shall be equipped with a directory card, neatly typed with the final circuit designation and placed in the card holder under a transparent cover on the inside of the door of each panelboard.

4. The Contractor shall install “High Voltage” warning signs and “Danger” signs as called for by the safety regulations as required by code.

B. Cables and Conductors

1. All cables in panels, pullboxes, junction boxes and switchboards shall be tagged at both ends with the cable number assigned in the cable schedule/drawings. Tags shall be non-aging, labels which encircle the cable.

2. Both ends of all wires of each cable shall be clearly and permanently identified with wire markers, at the terminal to which they connect, with the proper wire number as shown on the drawings or wire termination sheets. Non-aging approved markers which encircle the wire shall be used.

3. All terminals for external connection shall be plainly and permanently marked, on approved marking strips as shown on the drawings or wire termination sheets.

3.4 AREA CLASSIFICATION

A. If the scope of work includes installations in hazardous area, the Contractor will be issued an area classification drawing indicating the Class, Division and Group designations in accordance with the NFPA classification for the different work areas.

B. The Contractor shall ensure that all equipment, materials and installation methods are suitable for the area classifications and shall report any discrepancies to the Owner for correction.

3.5 SEALS AND FIRE STOPS

A. In hazardous locations, sealing fittings (seal offs) shall be installed in all conduit runs on the outside of buildings/cabinets where the conduits enter the building/cabinets. In addition, approved drain fittings shall be installed at the bottom of these conduit runs and in all outdoor junction boxes to drain off any accumulated moisture.

B. Sealing fittings shall be installed for explosion proof work in accordance with in accordance with the provisions of Article 501 of the National Electric Code for Class 1, Group D, Division 1 and 2 locations. Compound filled seal off fittings as specified shall be installed as required.

C. Seal offs shall be located in conduits not more than 16 inches from points of penetrations through floors or walls and where emerging from earth. Seal offs shall be sized in accordance with the latest requirements of the NEC.

D. Fire stops shall be provided for all cable penetration in floors and walls to prevent spread of fire, dust, water and gases from one area to another. The material used for sealing of all cable penetrations shall be non-combustible and shall have low heat transfer. The sealed opening shall have a fire rating equal to that of the surrounding wall or floor.

E. Use 3M fire Barrier Caulk CP-25 or Putty 303 or equal.

3.6 ELECTRICAL EQUIPMENT PAINTING AND CLEANUP

A. All distribution panels, steel work and similar indoor and outdoor equipment furnished with enameled epoxy or lacquered finish or which are galvanized and which are scratched or defaced during construction shall be refinished and restored to the original finish by the Contractor.

B. All exposed steel surfaces on electrical equipment/panels, unless already supplied galvanized or epoxy painted, shall be cleaned, prime coated and finish coated with an epoxy enamel.

C. The Contractor shall make a thorough inspection of all electrical equipment, remove any left over packing braces, shipping supports and thoroughly clean all equipment by hand operated vacuum machine.

D. The Contractor shall clean up all lighting fixtures. Damaged parts shall be removed and replaced. All burned out lamps shall be replaced.

END OF SECTION

SECTION 260521 - WIRE & CABLE (600V OR LESS)

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. This specification is for general site electrical work only relating to the CHA design drawings. This specification is not intended to be used with any other project design work/consultants including ARK Engineering.

B. Provide a cable system complete with all materials, including cables, wire, connectors, lugs and fittings as indicated in the specification or as indicated on the drawings. All cables and wiring shall be complete with identification tags per this Specification Section.

1.2 STANDARDS

A. Furnish cable, wire and wiring accessories listed by Underwritters' Laboratories (UL) as meeting National Electrical Code requirements and bearing the UL label where available for the equipment specified. In addition, the cable type shall have been submitted to standard tests established or approved by ASTM, ANSI, ICEA and NEMA.

1.3 SUBMITTALS

A. Submit Vendor data for all types and sizes of cables and wires being supplied by the Contractor. Identify material, construction data, color coding, insulation and jacket thickness and typical test data.

B. Submit Vendor data for the cable and wire identification tags to be supplied.

PART 2 - PRODUCTS

2.1 LOW VOLTAGE POWER CABLES (600 VOLTS OR LESS)

A. Multi-conductor low voltage power cables when installed in cable tray shall be type "MC", Class B stranded copper conductor, 600 Volt rated, XHHW or THHN conductor insulation, 90˚C conductor temperature, with bare copper ground wire, binder tape and overall black, flame retardant PVC jacket.

B. Low voltage power cables installed in conduit shall as listed below. A suitable insulated ground conductor shall be installed adjacent to the phase conductors and must not be less than 45% of the phase conductor cross sectional area.

1. THHN (90°C damp or dry) insulation shall be used in damp or dry locations for all sizes.
2. XHHW (75°C wet or 90°C dry) insulation shall be used in wet locations for all sizes.

C. Conductors shall be annealed copper, 98% conductivity.

D. Minimum size conductor for general wiring shall be #12 AWG.

2.2 CONTROL CABLING

A. Multi-conductor control cable shall be 600 Volt rated, type "MC" when installed in cable tray, Class B stranded copper conductor, PVC/nylon insulated, UL type THHN 90°C, with an overall flame retardant PVC jacket rated at 90˚C and overall aluminum mylar shield when indicated on the drawings. Conductors shall be color coded per ICEA S-66-524 Method 1, Table K-2 and shall be number printed.

B. Single conductor control wiring for insulation in conduit shall be of insulation type THHN for damp and dry locations and XHHW when installed in wet locations.

C. Minimum size conductor for control wiring shall be #14 AWG.

2.3 INSTRUMENTATION AND SIGNAL CABLE

A. Instrumentation and signal cables, shall be 300 Volt rated type "MC" when installed in cable tray, Class B stranded copper conductor, flame retardant, 105˚C PVC conductor insulation, color coded, twisted pairs, triplets or quads, with aluminum mylar shield, stranded tinned copper drain wire and overall PVC jacket rated at 90˚C. Belden Type or approved equal.

B. Minimum size of instrumentation and signal wiring shall be #18 AWG.

2.4 THERMOCOUPLE CABLE

A. Thermocouple cable shall be 300 Volt rated type "MC" when installed in cable tray, Class B stranded copper conductor, flame retardant, 105˚C PVC conductor insulation, color coded, twisted pairs, triplets or quads, with aluminum mylar shield, stranded tinned copper drain wire and overall PVC jacket rated at 90˚C. Belden Type or approved equal.

B. Minimum size of instrumentation and signal wiring shall be #18 AWG.

2.5 DIRECT BURIAL CABLES

A. Not used.

2.6 WIRE CONNECTION DEVICES FOR SPLICING

A. No splicing shall be permitted.

2.7 TERMINATING LUGS

A. Lugs for terminating power conductors up to and including #8 AWG shall be color coded, solderless compression or bolted type, unless otherwise indicated.

B. Lugs for terminating power conductors #6 AWG and larger shall be color coded, solderless compression type, one-hole for #6 AWG through #4 AWG inclusive, and two-hole for larger sizes.

C. Lugs for terminating control and switchboard wiring shall be color coded, solderless compression type with tinned copper ring tongue. Spade type lugs are not permitted in any control, protection or alarm circuits.

2.8 WIRE AND CABLE LABELS

A. Labels shall be non-aging, labels which encircle the cable or wire as applicable.

B. Refer to section 26 05 01 for cable and wire identification requirements.

PART 3 - EXECUTION

3.1 INSTALLATION

A. No cables or wires shall be installed in conduits or ducts until the entire installation is completed and cleaned inside and out. When installing cables, the Contractor shall exercise due care to prevent damage to cables and raceways; avoid undue tension, bending and kinks.

B. Only approved cable lubricants, expressly manufactured for this purpose shall be used.

C. The Contractor shall install conductors in such a manner that the bending radius of any wire or cable is not less than the minimum recommended by ICEA and/or the manufacturer. Do not exceed the manufacturer's recommended values for maximum pulling tension applied to any cable or wire.

D. All power conductors and cables shall be run full length without splices and shall be continuous from origin to termination. Where splices are necessary and approved, they shall be made in approved splice boxes with suitable connectors. All splices shall be insulated with heat-shrinkable heavy-wall flame-retardant cable sleeves.

E. Thoroughly clean wire ends before connectors or lugs are applied.

F. Jumpers shall be installed inside the various panels as indicated in the cable termination sheets/drawings.

G. All power conductors in multi-color cables shall be color coded consistently, distinctly and continuously throughout the work. Color coding tape shall be utilized and applied at all terminations, junctions, pull boxes and condulet fittings.

H. Single conductor cables having black insulation for power feeders and sub-feeders shall be identified by colored tape as to phase connections.

I. Conductor terminators for all power cables sizes shall result in a connection both mechanically and electrically secure and approved for the application regarding dissimilar metals.

J. Control and instrument cables shall be terminated at panels, junction boxes and individual device enclosures using approved fittings.

K. The Contractor shall install phase and neutral conductors of each branch or feeder circuit in a single conduit except where paralleling circuits are indicated on the circuit schedule. Install paralleling circuits of identical makeup and length as the paralleled circuit, and terminate conductors at the same location, mechanically and electrically, at both ends, to ensure equal division of the total current between conductors.

L. The Contractor shall connect all AC power wiring to equipment.

END OF SECTION

SECTION 260527 - GROUNDING & BONDING SYSTEMS

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. This specification is for general site electrical work only relating to the CHA design drawings. This specification is not intended to be used with any other project design work/consultants including ARK Engineering.

B. Provide grounding and bonding system as specified or indicated on the drawings.

1.2 STANDARDS

A. Ground the electrical system neutrals and bond the non-current carrying parts of electrical equipment as indicated in the specification or drawings and as a minimum the grounding and bonding must meet the requirements of the National Electrical Code.

1.3 SUBMITTALS

A. Submit product data for conductors, connectors and devices supplied for use with the grounding system.

PART 2 - PRODUCTS

2.1 GROUNDING AND BONDING CONDUCTORS, CONNECTORS AND DEVICES

A. Provide the grounding and bonding conductors, connectors and devices of the type specified on the drawings.

PART 3 - EXECUTION

3.1 EQUIPMENT AND BUILDING BONDING

A. Static grounding (bonding) of equipment shall be by means of bonding the equipment to the embedded ground grid as indicated on the drawings.

B. Bolted connections shall be used on all equipment and building bonding. A washer shall be used between the bolt head and terminal lug. Surfaces shall be free from paint, rust, dirt, grease and corrosion.

C. Holding down bolts or flange bolts shall not be used for bonding connections. Holes, if not provided, shall be drilled and tapped to suit the grounding bolt.

D. Building structural steel, steel structures, vessels, tanks and other similar process equipment, which is not in direct contact with the building steel structures, shall be bonded as noted on the drawing.

3.2 ELECTRICAL SYSTEM SERVICE GROUNDING

A. Service grounding of equipment (grounding) shall be by means of grounding the equipment to a continuous ground conductor, including all connections from source of power to the equipment. All grounding shall meet the requirements of the National Electrical Code.

B. Where UL type "MC" cable is specified, the bare internal copper ground wire shall be used for service grounding.

C. Service grounding shall be provided for all motors, housing of electrical equipment, transformers, transformer neutrals, grounding resistors, distribution equipment, lighting panel board and other similar equipment as required by the National Electrical Code and as indicated on the drawings.

D. The neutral conductor of any electrical distribution system shall not be used as an equipment grounding conductor. System neutrals shall be grounded in accordance with the National Electrical Code.

3.3 INSTALLATION

A. Immediately after installation, the equipment shall be grounded and bonded as indicated on the grounding layout and detail drawings.

B. Exposed grounding or bonding conductors shall not be routed across sections where they may be subject to damage or interfere with the movement of equipment or personnel .In such cases and as required, the conductor may be embedded in the floor, protected by conduit or copper strap of equivalent size shall be used.

C. Ground and bonding conductors shall be installed in a neat manner and rigidly supported by clips or straps at intervals not greater than 5 feet.

D. Install conductors of size required by the National Electrical Code unless otherwise indicated or specified on the drawings.

E. Power, control and instrumentation cable shields and/or sheaths shall be grounded in accordance with instructions contained in the cable schedules or wire termination sheets.

F. When it is indicated on the drawings that the conduit system serves as the equipment service grounding, the means and continuity of ground shall be permanent, effective and maintained throughout. Threaded couplings or double locknuts and bushings shall be used at all boxes and equipment enclosures, including lighting fixtures. All flexible conduits shall be properly grounded through a grounding jumper and the necessary fittings. A separate ground conductor shall be installed in epoxy coated or PVC coated conduit, or other non-metallic duct runs and so connected to maintain the ground continuity of the conduit or duct system.

G. Conduit expansion joints, not thoroughly bonded otherwise, shall be provided with approved bonding jumpers of not less than No. 6 AWG green insulated stranded copper.

H. A minimum No. 6 AWG green insulated stranded copper ground conductor shall be run in all cable tray and bonded to each tray section at intervals not exceeding 50 ft.

END OF SECTION

SECTION 260534 - CONDUITS

PART 1 GENERAL

1.1 SUMMARY

A. This specification is for general site electrical work only relating to the CHA design drawings. This specification is not intended to be used with any other project design work/consultants including ARK Engineering.

B. This Section includes the conduit systems required, specified, and/or shown on Contract Drawings including conduits, fittings, boxes, hangers, and accessories being installed for Vermont Gas Systems, Inc. (Company).

1.2 REFERENCES

A. Material 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:

1. American National Standard Institute (ANSI)
2. National Electric Code (NEC)
3. National Electrical Manufacturers Association (NEMA)
4. Underwriters Laboratories, Inc. (UL)

1.3 QUALITY ASSURANCE

A. Qualifications of Manufacturer

1. All equipment furnished under this Section shall be furnished by manufacturers who meet the quality, workmanship, and experience requirements as specified and approved by Company.

1.4 SUBMITTALS

A. General

1. Submittals and samples shall be submitted upon Company’s request.
2. Prior to obtaining any material in connection with this Section, detailed shop drawings on all material shall be submitted upon Company’s request.
3. Submittals shall contain a material list with manufacturer's name and data describing the material and showing its compliance with specifications and associated standards.

PART 2 PRODUCT

2.1 CONDUIT

A. Rigid Galvanized Steel Conduit (RGS)

1. Rigid metal conduit shall be galvanized steel, hot-dipped with zinc over the entire length, both exterior and interior including threads.

2. Each conduit shall have a coupling on one end and a thread protector on the other.

3. Conduit shall meet ANSI Standards C80.1 and C80.4 latest revisions. The conduit shall be manufactured by Allied Tube & Conduit Corporation, Pittsburgh Standard Conduit Company, Triangle PWC Co. or equal.

B. Rigid PVC Coated Galvanized Steel (RPGS) Conduit

1. The conduit, prior to PVC coating, shall meet the requirements for RGS conduit above.

2. A PVC coating shall be bonded to the outer surface of the galvanized conduit. The bond between the coating and the conduit surface shall be greater than the tensile strength of the coating. The inside surface of the conduit shall have a urethane coating.

3. PVC coating thickness shall be not less than 40 mils.

4. PVC coated RGS shall be manufactured in accordance with ANSI C80.1, UL-6, Federal Specification WW-C-581E and NEMA RN1 – PVC Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit standards.

5. Manufacturers or Equal

a. Robroy

b. Thomas & Betts

C. Electrical Metallic Tubing (EMT)

1. EMT shall be galvanized steel, hot-dipped with zinc over the entire length, both exterior and interior.

2. EMT shall be in accordance with ANSI Standards C80-3 latest revisions.

3. EMT shall be manufactured by Pittsburgh Standard Conduit Co., Allied Tube & Conduit Corporation, Triangle PWC Co., or equal.

D. Flexible Conduit

1. Flexible metallic conduit (Greenfield) - Shall be hot dipped zinc galvanized flexible steel or aluminum and shall comply with UL Standard No. 1, latest revisions. Conduit shall be manufactured by Anaconda Metal Hose Company, Triangle PWC Co. or equal.

2. Liquid-tight flexible metal conduit (Seal-tite) - Shall be constructed of flexible corrosion resistant zinc galvanized steel conduit with an extruded plastic jacket and built-in continuous copper ground strap under the jacket. Conduit shall be Type UA manufactured by Anaconda Metal Hose Company, Type LA manufactured by Electri-Flex Co. or equal.

3. Liquid-tight Flexible Non-Metallic Conduit - Shall be constructed of corrugated flexible PVC. Fittings shall be identified for use with flexible non-metallic conduit. Flexible non-metallic conduit shall be Carflex as manufactured by Carlon or equal.

4. Hazardous Area Flexible Metal Conduits - Flexible metal conduits installed in areas classified as Hazardous shall be Crouse-Hinds Series EC, Killark Series EK or equal.

2.2 JUNCTION, DEVICE AND PULL BOXES

A. Junction Boxes

1. Junction boxes and pull boxes shall be sized as required for the quantity and size of conductors to be installed within the box. Sizes shall comply with the requirements of the National Electric Code for wire bending space and radius.

2. Junction boxes installed in all non-hazardous open, wet areas or outdoors shall be NEMA type 4X with mounting lugs. Junction boxes shall have drilled and tapped holes for conduit terminations, gasketed covers secured by galvanized steel screws and drain holes.

3. Stamped Steel Junction Boxes -Junction boxes installed in areas approved for use with EMT conduit may be constructed of code-gaged galvanized steel.

4. Cast Junction Boxes -Junction boxes for use with RSC shall be constructed of hot dipped galvanized cast iron or copper free aluminum and shall be sized per NEC requirements. Boxes shall be manufactured by Crouse-Hinds Co., Killark Co. or equal.

5. Hazardous Area Junction Boxes - Junction boxes in areas classified as Hazardous shall be Series EJB or GU manufactured by Crouse-Hinds Co., Series XB or GR as manufactured by Killark Co., or equal.

B. Device Boxes for Outlets and Switches

1. Stamped Steel Device Boxes -In areas approved for use with EMT Conduit may be constructed of code-gage galvanized steel with required knockouts. Boxes shall be manufactured by Steel City Co., Raco Co. or equal.

2. Cast Device Boxes -In areas using exposed RSC boxes shall be constructed of hot dipped galvanized cast iron or copper free aluminum and sized per NEC requirements. Boxes shall be Series FD manufactured by Crouse-Hinds Co., Series FD, manufactured by Killark Co., or equal. (Use copper free aluminum boxes with RAC)

3. Hazardous Area Device Boxes -In areas classified as Hazardous, shall be Series ED manufactured by Crouse-Hinds; series SWB manufactured by Killark Co., or equal.

C. Pull Boxes

1. Pull boxes shall be used in dry locations only for pulling. No splicing of conductors shall be allowed. The boxes shall be constructed of galvanized steel, 12 gauge sheet metal, angle and frame members with welded joints. The box cover shall be gasketed and attached with stainless steel screws. A ground lug shall be provided, sized in accordance with the NEC.

2.3 CONDUIT OUTLET BODIES, FITTINGS, COUPLINGS AND EXPANSION COUPLINGS

A. Conduit Outlet Bodies

1. Conduit outlet bodies shall be used where required to permit ready fishing and withdrawing of wires. Conduit bodies not located in areas classified as Hazardous shall be gasketed. Bodies shall be of the cast iron or copper-free aluminum type. Bodies shall be Condulet series manufactured by Crouse-Hinds Co., Electrolet series manufactured by Killark Co., or equal.

B. Fittings and Couplings

1. EMT - All couplings and connectors for EMT shall be of the raintight cadmium plated, malleable iron gland compression type manufactured by O.Z. Gedney Co., Steel City Company, or equal.

2. Hazardous Areas - Seal off fittings in areas classified as Hazardous or Corrosive shall be Series EYS manufactured by Crouse-Hinds Co., Series E manufactured by Killark Co., or equal. Sealing compound shall be Chico manufactured by Crouse-Hinds or series SC manufactured by Killark or equal. Damming material shall be of the ceramic fiber type.

3. Flexible metallic conduit (Greenfield), Liquid-tight flexible metal conduit (Sealtite), and Liquid-tight Flexible Non-Metallic Conduit -Fittings shall be compatible with raceway material and in conformance with NEMA FB-1 and UL 514B. C. Expansion Couplings

1. Expansion couplings shall be a water-tight, corrosion resistant coupling with flexible neoprene outer jacket, stainless steel jacket clamp, flexible copper ground strap, and internal hub bushing.

2. Coupling shall compensate for the following movements:

a. Axial expansion or contraction

b. Angular misalignment

c. Parallel misalignment

3. Coupling shall be Type XD as manufactured by Crouse-Hinds Company, Type DX as manufactured by O-Z Gedney Co., or equal.

2.4 CONDUIT SLEEVES

A. Where conduits pass through the walls of structures, they shall be installed in suitable sleeves. Sleeves, installed in the outside walls of structures or elsewhere where watertightness is required, shall be cast iron and shall be equal to thruwall and floor seals manufactured by O.Z. Gedney Electrical Manufacturing Company, Inc. Types No. FSK, WSK, FSC or WSC as required, or Link-Seal as manufactured by Thunderline Corp. When Link-Seal is used, a wall sleeve, with waterstop, shall be installed. All other sleeves shall be galvanized steel pipe.

2.5 CONDUIT HANGERS AND SUPPORTS

A. General

1. Hangers and supports for conduits shall be adequate to support conduit systems with a minimum safety factor of 10.

2. All steel parts of the conduit support systems shall be galvanized, cadmium plated or PVC coated.

3. Perforated strap hangers will not be accepted.

4. Conduit supports shall be as manufactured by T&B (Steel City-Kindorf or Superstrut), Unistrut, Allied, Globe, or B-Line.

5. One hole malleable iron pipe clamps shall be hot dipped galvanized. Pipe spacers shall be of malleable iron and have a hot dip galvanized finish.

6. Hanger rods shall be continuous thread and galvanized not less than 3/8" inch in diameter.

B. Slotted Channel Framing: Cold-Formed Metal Channels with Continuous Slot.

1. Size of Channels: Nominal 1-5/8 by 1-5/8 inches, 12 gauge unless otherwise indicated or required for the application.

2. Finish:

a. Indoor Dry Applications: Electro-plated zinc coating (Super-strut Gold- Galv, Kindorf Gold Galv-Krom, etc.).

b. Outdoor, wet applications: Hot dipped galvanized (Superstrut HDG, Kindorf HD, etc.).

c. Corrosive applications: PVC coated (Superstrut PVC, Kindorf "P", etc.).

3. Fittings

a. Channel attachment nuts shall be prelocated in channel and be self supporting (spring type).

b. Conduit straps shall be of the notched type to fit channel with captured nut and bolt for tightening.

c. Beam clamps shall be provided with jaw openings to accommodate selected beam and provided with tapped holes and/or captured nuts for support of threaded rods.

4. Manufacturer (refer to Finish above for correct product)

a. Kindorf B-900, 905 series

b. Superstrut A-1200, A-1200P series

c. Globe G-5812, G-5812PO series

d. B-Line B-22, B-22-1-7/8 H series

e. Unistrut P-I000, P-1000-HS series

f. Power Strut PS-200, PS-200-H-1-7/8 series

g. Equal

C. Fasteners

1. All fasteners shall be stainless steel or silicon bronze.

2. All expansion anchors shall be self-drilling type.

2.6 MISCELLANEOUS ACCESSORIES

A. Warning Tape

1. Tape shall be of the detectable type and shall consist of a polyethylene tape with aluminum foil coil. Tape shall be 6" wide and shall have the legend "CAUTION ELECTRIC LINE BURIED BELOW". Lettering shall be black, on a red background. Tape shall be Panduit HTDU6R-E, Seton 37236, or equal.

B. Duct Bank Conduit Spacers

1. Underground ductbank conduit spacers shall provide stability and consistent separation of conduits within duct banks. Spacers shall be sized for the conduits with which they are used. They shall provide both vertical and horizontal spacing with interlocking intermediate and base spacers.

2. The separation between adjacent conduits shall be in accordance with NEC Article 310.

3. Manufacturer:

a. Carlon

b. Equal

PART 3 EXECUTION

3.1 INSTALLATION

A. General

1. All interior conduit work shall be installed exposed except areas in which there is a finished ceiling, or as indicated on the Contract Drawings, "Room Finish Schedule," a finished ceiling will be installed. These areas shall have all conduit work concealed.
2. No exterior conduits shall be run exposed on outside walls of buildings or structures.
3. Minimum size shall be 3/4 inch unless specifically shown otherwise.
4. Terminations of metallic conduits shall be furnished with grounding bushings.
5. Where exposed conduit requires clamping to the building structure, clamps shall consist of galvanized iron one-hole pipe straps and expansion shields.
6. Support outlets; pull boxes and junction boxes separately from building construction, not from conduit.
7. Where exposed conduit is permitted, install conduit parallel to or at right angles with lines of building in neat and organized configurations.
8. Coordinate all conduit installations with other trades in advance of installation.
9. Plug conduit openings until wires are installed.
10. Conduit reducers shall not be allowed.
11. Expansion couplings shall be installed in conduits crossing buildings expansion joints.
12. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
13. Complete raceway installation before starting conductor installation.
14. Install temporary closures to prevent foreign matter from entering raceways.
15. Protect stub-ups from damage where conduits rise through floor slabs. Arrange so curved portions of bends are not visible above the finished slab.
16. Make bends and offsets so ID is not reduced. Keep legs of bends in the same plane and keep straight legs of offsets parallel, unless otherwise indicated.
17. Install exposed raceways parallel or at right angles to nearby surfaces or structural members and follow surface contours as much as possible.
18. Run parallel or banked raceways together on common supports.
19. Make parallel bends in parallel or banked runs. Use factory elbows only where elbows can be installed parallel; otherwise, provide field bends for parallel raceways.
20. Join raceways with fittings designed and approved for that purpose and make joints tight.
21. Provide insulating bushings to meet NEC requirements.

B. Conduit Supports and Hangers

1. Conduit supports shall be spaced at intervals of 8 feet or less as required to obtain rigid construction.

2. Single conduits shall be supported by pipe clamps with clamp backs to raise conduits at least ¼ inch from the surface.

3. Multiple runs of conduits shall be supported on trapeze type hangers with steel horizontal members and threaded hanger rods.

4. Trapeze hangers shall be crossed braced to prevent spreading.

5. Conduit hangers shall be attached to structural steel by means of beam or channel clamps.

6. Supports located in corrosive areas and or where shown shall be PVC coated.

3.2 UNDERGROUND CONDUITS

A. Conduits shall be buried to a minimum depth of 24 inches unless otherwise shown or specified.

B. All buried conduits or groups of conduits shall have a warning tape buried 12 inches under finished grade and located directly over the centerline of the conduits. A second tape shall be buried 12 inches above the top of the highest conduit in the group. Where shown on the drawings, additional tapes shall be provided for ductbanks wider than 30 inches.

C. Underground conduits exiting and entering structures shall have expansion couplings as specified.

D. Where conduit is buried below grade, Contractor shall excavate, install, backfill and compact buried conduit prior to final compaction by General Contractor.

E. Any Earthwork shall be in accordance with Division 31 – Earthworks.

F. All conduits shall be cleaned and tested with a mandrel, prior to pulling cables.

G. The transition from the underground conduit system to the building interior conduit system shall occur at the first junction box, device, or equipment enclosure within the building. Conduit seals shall be provided at this location. Such seals shall minimize the circulation of air between the underground conduit system and the indoor enclosures. Seals shall be composed of Duct Seal sealing compound or similar non-hardening removable sealant.

H. Conduit bends in underground conduits shall have a minimum centerline radius as follows:

Conduit Size	Radius (inches)
3 inch	36
4 inch	42
5 inch	48

I. Conduit spacers shall be used when installing two or more underground conduits. Conduit spacers shall be located at intervals of 8 feet or less.

3.3 CONDUITS IN CORROSIVE AREAS

A. Where conduits pass through Corrosive Area walls and/or floors, seal off fittings as specified shall be installed to prevent gas leakage through conduit system.

3.4 CONDUITS IN HAZARDOUS AREAS

A. All conduit and equipment, in or through areas classified as Hazardous and all conduit and equipment for explosion proof work, shall be in accordance with the provisions of Article 501 of the National Electric Code for Class 1, Group D, Division 1 and 2 locations. Compound filled sealoff fittings as specified shall be installed as required.

3.5 CONDUIT TYPES

A. Rigid steel conduit shall be provided unless specifically noted otherwise on the Contract Drawings.

END OF SECTION

SECTION 260800 - ELECTRICAL ACCEPTANCE TESTING

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. This specification is for general site electrical work only relating to the CHA design drawings. This specification is not intended to be used with any other project design work/consultants including ARK Engineering.

B. All electrical equipment, devices, electrical systems installed or provided by the Contractor under this Section shall be inspected and tested by the Contractor to ensure that they operate correctly for the specific installation and are operating as designed, based on the associated layout drawings.

C. Refer to Section 3.0 for the Contractors' responsibilities related to inspection, testing, and commissioning of Company Furnished equipment.

D. Any defects in the Contractor's workmanship disclosed by such tests shall be corrected by the Contractor at the expense of the Contractor and the work shall be tested again. All changes made in the installation shall be marked by the Contractor on a master set of "As-Built" drawings.

E. When required by the Company, the Contractor shall provide at the Contractor's expense, equipment field Representatives for Contractor supplied equipment to perform equipment tests and train Company's operating staff.

F. The Company will provide specialized commissioning personnel when required to complete the commissioning of Company pre-purchased equipment, wire terminations or for other specialized testing when and as needed. The Contactor will provide support personnel as needed during system checkout, start up, commissioning and acceptance testing.

G. The Contractor shall provide instruments, meters, equipment and qualified personnel required to conduct tests and studies during and at the conclusion of the project.

H. The Contractor shall implement a safety test and commissioning tagging procedure. The tags shall be dated and signed and shall indicate equipment checked, equipment tested, equipment energized and equipment commissioned.

I. The Contractor shall perform all the equipment field tests as required to support Company commissioning plan.

J. In general, the work shall be performed as outlined in Section 3.0 of this Specification.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 INSPECTION

A. The first stage shall be inspection of all equipment associated with the Contractor installation responsibility, including Company Pre-Purchased equipment and prefabricated buildings and Contractor supplied equipment.

B. The Contractor shall confirm that all equipment and required quantities are complete and that equipment make and model specifications comply with the specified Project drawings and documentation.

C. The Contractor shall record that all equipment is without defects or damage. Any deviations shall be recorded and the Company immediately informed of any discrepancy.

3.2 TESTING (PRE-COMMISSIONING)

A. The second stage shall be Testing (Pre-Commissioning), prior to system power up, consisting of the following items.

1. Check that the installation is complete and that all interconnections are correct.

2. Check all power, control and signal wiring for continuity to ensure a clear path has been maintained. A formal sign off list of all wiring checks shall be provided to the Company prior to equipment energization.

3. Perform all equipment testing and correct deficiencies.

4. Provide assistance for third party commissioning and testing of the equipment:

5. Perform function tests to confirm correct operation of all devices, subsystems and systems, and correct all deficiencies.

3.3 COMMISSIONING (START-UP)

A. Commissioning (Start-up) Mainline Valve Station equipment and systems will be carried out by the Company or equipment manufacturer. The Contractor shall provide personnel throughout the commissioning period to assist and carry out any equipment adjustments, corrections or repairs, as required.

3.4 TEST PROCEDURES AND RECORD FORMS

A. The Contractor shall work with Company, develop and submit for approval to the Company's Representative an outline of proposed inspection and test procedures, checklists and test record forms for each system or piece of equipment, prior to the start of testing.

B. Test record forms shall include equipment number and system, method of testing, test equipment used, final readings obtained, adjustments made, test results and associated data.

C. The Contractor shall submit inspection and test results including complete data on actual readings taken and corrected values, to the Company's Representative for approval after each test period.

3.5 TESTING AND PRE-COMMISSIONING OF COMPANY FURNISHED EQUIPMENT

A. The Contractor shall provide testing and pre-commissioning of Company-furnished equipment. The Contractor shall submit for approval to the Company's Representative an outline of proposed tests for approval 30 days prior to the scheduled testing. The Contractor shall be responsible to thoroughly checkout, test and pre-commission all Company-furnished and Contractor supplied equipment and materials.

B. Field Representatives shall be provided by the Company for specialized testing and commissioning of the Company furnished equipment.

C. The Contractor will assist the Manufacturers' field representatives and Company's Field Personnel or commissioning representatives, as required, to complete final commissioning, startup and acceptance testing up to and including placing all equipment into Service.

D. The Contractor shall assist in correcting any manufacturer defects in the Company-furnished equipment, as required by the Company. The Contractor will be reimbursed under the terms of the Contract.

3.6 GENERAL GUIDELINES

A. All inspections and testing shall be performed in accordance with, OEM instructions, applicable codes and standards including but not limited to NEC, ANSI, IEEE, NFPA, NEMA, and OSHA.

B. All testing and commissioning shall also be performed in accordance with the following guidelines, as a minimum:

1. NETA Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

2. Equipment Manufacturer Guidelines

C. In general the Contractor's tests shall include the items listed in this specification and as further detailed in the following sections.

C. Verify that the installed equipment and systems are installed correctly with respect to the site layout and interconnection drawings, schematics, and drawings and specifications, and bill of materials

D. Check that all grounding terminals are connected to the correct grounding terminal and verify there are no ground loops.

3.7 DETAILED GUIDELINES

A. The Contractor shall test all equipment or devices in accordance with the equipment manuals and manufacturer's instructions. The test shall include as a minimum the items covered in the following sections.

3.8 GROUNDING

A. The grounding system shall be tested to ensure that all parts of the steel structures, motor frames, switchgear, trays, conduit and other electrical equipment will be at a potential in accordance with specifications.

3.9 LOW VOLTAGE (POWER & CONTROL) CABLES

A. Testing of all low voltage cable shall be performed by Company personnel. Contractor shall retain the responsibility for correction of any faulty installation or replacement of defective equipment as identified by the Company.

3.10 FINAL TEST REPORTS AND ACCEPTANCE

A. The Contractor shall submit the final approved test reports to the Company at the completion of the work under this Section.

B. Inspection and approval of Contractor tests will not constitute a waiver of his responsibility for the successful operation of the installed systems.

C. When all tests and commissioning have been completed to the satisfaction of the Company, the work shall be released by the Contractor to the Company.

END OF SECTION

SECTION 270000 - DATA & COMMUNICATIONS

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. This specification is for general site electrical work only relating to the CHA design drawings. This specification is not intended to be used with any other project design work/consultants including ARK Engineering.

B. Provide data and communication system raceways, equipment mounting backboards, wall jacks and cabling as specified or indicated on the drawings.

C. Data and communication systems shall include telephone systems and data/computer communications systems, as specified or indicated on the drawings.

1.2 STANDARDS

A. Furnish communication systems cabling, and wall jacks listed by Underwriters' Laboratories as meeting National Electrical Code requirements and bearing the UL label where available for equipment specified.

1.3 SUBMITTALS

A. Submit product data for the communication systems cabling and wall jacks. Include manufacturer model number and detailed product data to evaluate the products.

PART 2 - PRODUCTS

2.1 GENERAL

A. System cabling, wall jacks and raceway systems shall be of the type indicated or specified on the drawings.

PART 3 - EXECUTION

3.1 GENERAL

A. Provide and install the data and communication raceway system, including conduits complete with pull boxes, as specified or indicated on the drawings.

B. All openings for cables or conduit that penetrate exit corridors or as indicated on the drawings shall be sealed to maintain the fire ratings and integrity of these areas.

C. Provide pull lines in all spare conduits or ducts.

END OF SECTION

SECTION 311000 - SITE CLEARING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Protecting existing trees, shrubs, groundcovers, plants, and grass to remain.
2. Removing existing trees, shrubs, groundcovers, plants, crops and grass.
3. Clearing and grubbing.
4. Stripping and stockpiling topsoil.
5. Removing above- and below-grade site improvements.
6. Disconnecting, capping or sealing, and relocating site utilities in place.

1.2 DEFINITIONS

A. Topsoil: Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2 inches (50 mm) in diameter; and free of subsoil and weeds, roots, toxic materials, or other nonsoil materials.

B. Tree Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction, and defined by the drip line of individual trees or the perimeter drip line of groups of trees, unless otherwise indicated.

C. Grubbing: Removal of vegetation and other organic matter including stumps, buried logs, and roots.

D. Clearing: Removal or cutting and disposal of trees, farm crops, bushes or undergrowth vegetation.

1.3 MATERIAL OWNERSHIP

A. Cleared materials shall become Contractor's property, shall be removed from Project site, and disposed of at an approved location, unless otherwise specified by landowner or easement/line list conditions.

1.4 SUBMITTALS

A. Photographs or videotape, sufficiently detailed, of existing conditions of trees and plantings, adjoining construction, and site improvements that might be misconstrued as damage caused by site clearing.

B. Record drawings, according to Section "Project Record Documents," identifying and accurately locating capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.5 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner, Construction Management Team and authorities having jurisdiction.

2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction. Detour routes shall be identified by adequate signs in accordance with the MUTCD and/or Traffic Control Plans and/or the project permits (Local and State).

B. Protect areas outside limits of disturbance from encroachment by construction personnel or equipment, regardless of property Ownership. Access shall be by specific, written permission or easement only

C. Improvements on Adjoining Property: Authority for performing site clearing indicated on property adjoining Owner's property will be obtained by Owner before award of Contract.

1. Do not proceed with work on adjoining property until directed by Construction Management Team.

D. Call Dig Safe at 811 before starting any excavation or verify that a Dig Safe ticket exists and is valid for the area. Contractor shall maintain Dig Safe marks and follow all Dig Safe laws. Contractor is responsible for contacting and complying with municipal and private utilities that are not members of Dig Safe. Excavate with care to avoid damage to structures and utilities - excavations shall be completed by hand if necessary. Promptly report any damages to utilities to Utility Owner and Construction Management Team, do not attempt repairs without the Utility Owners consent.

E. Site clearing operations shall adhere to the "Acceptable Management Practices for Maintaining Water Quality of Logging Jobs in Vermont", 10th Printing, 2009. Prior to any additional work, applicable EPSC measures shall be implemented.

F. Contractor shall verify existing grades prior to performing work under this section. If existing grades are at variance with the drawings, notify the Construction Management Team and Engineer and receive instructions prior to proceeding.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PREPARATION

A. Coordinate all clearing activities with the Construction Management Team and applicable authorities having jurisdiction (e.g. VELCO, Green Mountain Power, VTrans). A minimum notice of seven (7) days is required prior to beginning construction activities in distinct areas.

B. Work near high voltage infrastructure shall follow applicable utility company guidelines, safety procedures, and other applicable specifications.

C. Protect and maintain benchmarks and survey control points from disturbance during all construction activities including clearing.

D. Locate and clearly flag, fence and protect trees and vegetation to remain or to be relocated.

E. Any grading or earthwork required - refer to Technical Specification "Earthwork - 312000"

F. Remove branches from trees that are to remain, if required to clear new construction and only if specifically approved by the Construction Management Team.

1. Where directed by Construction Management Team, extend pruning operation to restore natural shape of entire tree.

2. Cut branches and roots, if required, with sharp pruning instruments; do not break or chop.

G. Protect existing site improvements to remain from damage during construction.

1. Restore damaged improvements to their original condition, as acceptable to Owner and Construction Management Team.

3.2 TREE PROTECTION

A. If noted on the plans or directed by the Construction Management Team, erect and maintain temporary fencing around tree drip line before starting site clearing. Remove fence when construction is complete.

1. Do not store construction materials, debris, or excavated material within fenced area.

2. Do not permit vehicles, equipment, or foot traffic within fenced area.

3. Maintain fenced area free of weeds and trash.

4. Special care shall be taken when work is being completed adjacent to designated bat trees. Trees shall be flagged for avoidance and adequately protected from construction activities.

B. Do not machine excavate within tree drip line (if designated for avoidance).

C. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations, in a manner approved by Construction Management Team and acceptable to the Owner.

1. Employ an arborist, licensed in jurisdiction where Project is located, to submit details of proposed repairs and to repair damage to trees and shrubs.

2. Replace trees that cannot be repaired and restored to full-growth status, as determined by Construction Management Team and acceptable to Owner.

3.3 UTILITIES

A. Construction Management Team will arrange for disconnecting and sealing indicated utilities that serve existing structures before site clearing, when requested by Contractor.

1. Verify that utilities have been disconnected and capped before proceeding with site clearing.

B. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed.

1. Arrange with utility companies to shut off indicated utilities.

2. Construction Management Team will arrange to shut off indicated utilities when requested by Contractor.

C. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Construction Management Team and Owner not less than seven days in advance of proposed utility interruptions.

2. Do not proceed with utility interruptions without Construction Management Team's written permission.

D. Excavate for and remove underground utilities indicated to be removed.

3.4 CLEARING AND GRUBBING

A. Completely remove obstructions, trees, shrubs, stumps, roots, grass, and other vegetation to permit installation of new construction.

1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.

2. If necessary, cut minor roots and branches of trees indicated to remain in a clean and careful manner.

3. Chip removed tree branches and distribute in areas approved by Construction Management Team. If acceptable to the OSPC, EPSC Specialist, and Construction Management Team, chipped vegetation may be utilized for soil stabilization.

B. Fill depressions caused by clearing and grubbing operations to match pre-construction site contours.

C. All conditions listed in the Construction Line List shall be maintained.

3.5 TOPSOIL STRIPPING

A. Remove sod, grass, and crops before stripping topsoil.

B. Where trees are designated to remain, stop topsoil stripping and adequate distance from the trees to prevent damage to the main root system.

C. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials.

1. Remove subsoil and nonsoil materials from topsoil, including trash, debris, weeds, roots, and other waste materials.

2. Soil segregation is further specified and detailed on EPSC plans and in applicable environmental permits.

D. Stockpile topsoil materials away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Do not stockpile topsoil within tree protection zones.

3.6 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and as necessary to facilitate new construction.

B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.

1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut length of existing pavement to remain before removing existing pavement. Saw-cut faces vertically.

3.7 DISPOSAL

A. Burning of debris onsite is not permitted.

B. If directed by the Construction Management Team, remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property/easement.

1. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities.

END OF SECTION

SECTION 312000 - EARTH MOVING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the preparation of the facility sites, protection, excavation, embankment, drainage, dewatering, for facility site grading, as shown on the Drawings, and as herein specified. Specifically, this specification shall be utilized for site work associated with the proposed facilities (Colchester Tie-in Site, and Mainline Valve Sites).

B. This Section includes any required earth moving, excluding the pipe trenching and backfilling, for construction activities within the right-of-way including clearing, grubbing, stringing operations, backfilling, and restoration.

C. This specification is not for pipeline (facility yard piping or mainline construction) trenching and backfilling.

D. The Contractor shall accept the site in the condition in which it exists at the time of the award of the Contract.

E. The Construction Management Team shall determine the suitability of materials that are to be used in the work and should any materials encountered be unsatisfactory for the purpose intended, they shall be removed from the site at the Contractor's expense.

1.2 QUALITY ASSURANCE

A. Reference Standards:

1. The latest edition of the following standards, as referenced herein, shall be applicable.

a. "Standard Specifications for Highway Materials and Methods of Sampling and Testing, American Association of State Highway and Transportation Officials (AASHTO)."

b. Vermont Agency of Transportation, Standard Specifications for Construction

B. The Contractor shall comply with the requirements for soil erosion and sedimentation control, and other requirements of governmental authorities having jurisdiction. .

C. The Contractor shall provide and pay for all costs in connection with an approved independent testing facility to determine conformance of soils and aggregate with the specifications in accordance with Section “Quality Requirements.”

1.3 SUBMITTALS

A. Test Results:

1. The testing laboratory shall submit written reports of all tests, investigations, and recommendations to the Contractor and Construction Management Team.

1.4 PROJECT REQUIREMENTS

A. Call Dig Safe at 811 before starting any excavation or verify that a Dig Safe ticket exists and is valid for the area. Contractor shall maintain Dig Safe marks and follow all Dig Safe laws. Contractor is responsible for contacting and complying with municipal and private utilities that are not members of Dig Safe. Excavate with care to avoid damage to structures and utilities - excavations shall be completed by hand if necessary. Promptly report any damages to utilities to Utility Owner and Construction Management Team, do not attempt repairs without the Utility Owners consent.

B. Notify the Construction Management Team of any unexpected subsurface condition.

C. Protection of Existing Utilities:

1. Locate existing underground utilities in areas of work. If utilities are to remain in place, provide adequate support and protection during earthwork operations, comply with VOSHA/OSHA requirements.

2. Coordinate interruption and/or termination of utilities with the utility companies and the Construction Management Team,..

3. Provide a minimum of seven days notice to the Construction Management Team and receive written notice to proceed before interrupting any utility.

4. Demolish and completely remove from the site any existing underground utilities designated to be removed as shown on the Drawings or as specified in Section "Site Clearing."

D. Protection of Persons and Property:

1. Barricade open excavations occurring as part of this work, and post with warning lights and/or other approved protective measures, as necessary or directed by Construction Manager.

2. Operate warning lights and implement protective measures as recommended or required by authorities having jurisdiction.

3. Protect structures, utilities, sidewalks, pavements, and other facilities (both above and below ground) from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork and construction operations.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Common Fill: Common fill shall not be used under improved surfaces (driveways, gravel pads, buildings, foundations, structures). Common fill shall be clean material not containing contaminants, large amounts of organic materials, trash or stones greater than 6" in any one dimension.

B. Crushed Stone Pad, Driveway, Sub-base Fill Areas: See specification 321500 Crushed Stone Surfacing.

C. Selected Fill/Structural Fill: Sound, durable, sand, gravel, stone, or blends of these materials, free from organic, frozen or other deleterious materials. Material shall be in accordance with VTrans Standard 704.08A "Granular Backfill for Structures", or approved equal, as indicated below.

Sieve	**Percent Passing**
3"	100
No. 4	45 - 75
No. 100	0 – 12
No. 200	0 – 6

1. Fines passing No. 200 shall be non-plastic.

PART 3 - EXECUTION

3.1 PRECONSTRUCTION MATERIAL QUALIFICATION TESTING

A. Each potential borrow source shall be tested and reviewed, prior to use on site, as follows:

1. Particle Size Analysis:
   a. Method: ASTM D422.
   b. Number of Tests: One (1) per potential source.
   c. Acceptance Criteria: Gradation within specified limits.
2. Maximum Density Determination:
   a. Method: ASTM D1557, Modified Proctor.
   b. Number of Tests: One (1) per potential source.
3. Re-establish gradation and maximum density of fill material if source is changed during construction..

3.2 PREPARATION

A. Establish required lines, levels, contours and datum.

B. Maintain benchmarks and other elevation control points. Re-establish, if disturbed or destroyed, at no additional cost to the Owner.

C. Establish location and extent of utilities before commencement of grading operations.

3.3 EXCAVATION

A. Excavation shall consist, in general, of the excavation of whatever substance is encountered to the lines, grades and sections shown on the Drawings, including excavation as necessary for grading and other similar features.

B. All suitable materials removed in excavation shall be used in the construction of embankments, subgrade, shoulders, slopes and at such other places as directed. The Construction Management Team shall be the sole judge of what constitutes suitable material.

C. During construction, the grading operations shall be executed in such a manner that the excavation will be well drained at all times. All grading shall be finished on neat, regular lines conforming to the sections and contours shown on the Plans.

D. Removal of materials beyond the indicated subgrade elevations, without authorization by the Construction Management Team, shall be classified as unauthorized excavation and shall be performed at no additional cost to the Owner.

E. Excavation shall be performed in proper sequence with all other associated operations.

F. Maintain the slopes of excavation in a safe condition until completion of the grading operation.

G. All excavation work shall be inspected and approved by the Construction Management Team before proceeding with construction.

H. Any excess excavation materials shall be removed from the site to approved disposal areas at the Contractor's expense.

3.4 FILL

A. All site fill shall be “selected fill” unless otherwise shown on the Drawings, or directed by the Construction Management Team.

B. Before depositing fills, the surface of the ground shall be cleared of all refuse, brush and large stones. Conform to Section “Site Clearing.”

C. Prior to placing fill over undistributed material, scarify to a minimum depth of six (6) inches or until a depth where all organic material has been removed.

D. Where fills are made on hillsides or slopes, the slope of the original ground upon which the fill is to be placed shall be plowed or scarified deeply or where the slope ratio of the original ground is steeper than 2 horizontal to 1 vertical, the bank shall be stepped or benched.

E. At the facility locations where earthwork is required, the original ground shall be proof rolled until the underlying soil is thoroughly compacted to the satisfaction of the Construction Management Team before any filling is begun. A steel-wheel tandem roller weighing 8 to 10 tons or equipment capable of obtaining the same effort shall be used to obtain a thoroughly compacted subgrade. Remove or recompact any soft or loose soils as determined by the Construction Management Team prior to filling.

F. A thoroughly and satisfactorily compacted subgrade is defined as having a minimum dry density of 95 percent of the maximum density of the material used. The subgrade material shall be compacted at a moisture content suitable for obtaining the required density.

G. Place backfill and fill materials in layers not more than 12" in loose depth unless shown otherwise on the Drawings. Lift height shall be governed by the ability of the compaction equipment to obtain the required compaction with 12" as a maximum lift height. Before compaction, moisten or aerate each layer as necessary to facilitate compaction to the required density. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost, ice, ponded water or extraneous debris.

H. When work is suspended during periods of freezing weather, measures shall be taken to prevent fill already in place from freezing. Upon resumption of work after any inclement weather, prepare the exposed surface by proof rolling to identify any zones of soft/loose soils. Soft/loose materials or frozen soils shall be removed and replaced by compacted select fill.

I. Moisture Control:

1. Where fill or backfill must be moisture conditioned before compaction, uniformly apply water to the surface and to each layer of fill or backfill. Prevent ponding or other free water on surface subsequent to, or during, compaction operations.

2. Remove and replace, or scarify and air dry, soil that is too wet to permit compaction to specified density. Soil that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing or pulverizing, until moisture content is reduced to a value which will permit compaction to the percentage of maximum density specified.

J. All fill shall be thoroughly and satisfactorily compacted to 95 percent of the maximum density of material used.

3.5 GRADING

A. The present and finished grade lines are shown on the contract drawings. Grade over the entire area, as shown on the drawings, shall be to the finished subgrade levels. Upon completion of this work, all debris shall be cleaned out and removed from the premises.

B. All cutting, filling, backfilling and grading necessary shall be done to bring the area to the following grade or subgrade levels:

1. For roadway surface areas; to the finished subgrade levels specified on the contract drawings.

2. For areas to be topsoiled and seeded; to within three (3) inches of the finished grade.

3. For other surface treatments; as detailed on the Drawings.

C. Sufficient grading must be done during the progress of the work so that the entire site shall be well drained and free from water pockets.

D. Finish grading, including dressing swales, cleaning up excess footing excavation, dressing terraces, disposing of excess material and all other work necessary to prepare the site for topsoil and seeding shall be done after construction of structures and roadway surface areas are substantially complete.

E. Where the pipeline right-of-way was graded or leveled during clearing or prior to other construction activities, the Contractor shall return the finished grade to the pre-construction contours, as acceptable to the Construction Management Team, after pipeline installation is complete.

3.6 COMPACTION EQUIPMENT

A. Compaction equipment used for the Work is subject to approval by the Construction Management Team. Any equipment not originally manufactured for compaction purposes and equipment which is not in proper working order will not be allowable. If requested, Contractor shall furnish manufacturer's specifications covering data not obvious from a visual inspection of the equipment and necessary to determine its classification and performance characteristics.

B. Do not use vibratory compactors closer than five hundred (500') feet within 24 hours of any concrete placement.

3.7 DRAINAGE AND DEWATERING

A. Prevent surface, subsurface or ground water from flowing into excavation and from flooding project area, as well as surrounding areas.

B. Coordinate all de-watering efforts with the EPSC specialist.

C. Do not allow water to accumulate in excavations. Remove water to prevent soil changes detrimental to the stability of subgrades.

D. Provide and maintain the pumps, well points, sumps, suction and discharge lines, and other dewatering components necessary to convey water away from excavations.

E. Provide and maintain temporary drainage ditches and other diversions outside excavation limits to convey rain water and water removed from excavations by dewatering, to collection or run-off areas.

3.8 FIELD QUALITY CONTROL

A. Notify the Construction Management Team at least three (3) working days in advance of all phases of filling and backfilling operations.

B. When working on the facility sites, compaction testing shall be performed to ascertain the compacted density of the fill and backfill materials in accordance with the following methods:

1. In-place relative density:

a. Method: AASHTO T238, Nuclear Method

b. Number of Tests: One (1) per 8" vertical lift.

c. Test frequency: Testing shall occur at the lesser rate of every day or every 100 C.Y. of fill material.

C. If temporary grading is needed within the pipeline right-of-way, in-place relative density is not required.

D. The Construction Management Team may direct additional tests to establish gradation, maximum density, and in-place density as required by working conditions.

E. Acceptance Criteria: For improved areas (driveways, foundations, buildings, equipment pads, parking areas), the sole criterion for acceptability of in-place fill shall be in situ dry density. Minimum dry density for all fill or backfill shall be 95 percent of the maximum dry density. If a test fails to qualify, the fill shall be further compacted and re-tested. Subsequent test failures shall be followed by removal and replacement of the material.

3.9 CLEAN UP

A. Provide and maintain protections or newly filled areas against damage. Upon completion or when directed, correct all damaged and deficient work by building up low spots and remove temporary protections, fencing, shoring and bracing.

B. Remove all surplus excavated material not required for filling and backfilling and legally dispose of away from premises.

C. Leave the premises and work in clean, satisfactory condition, ready to receive subsequent operations.

END OF SECTION

SECTION 312316.16 - STRUCTURE EXCAVATION FOR MINOR STRUCTURES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the excavation, backfilling, compaction, protection and dewatering for placement of minor structures (e.g. foundations, sono-tubes, equipment pads) as shown on the Drawings and as specified herein.

B. The Contractor shall accept the site in the condition in which it exists at the time of the award of the Contract.

C. The Construction Management Team shall determine the suitability of materials that are to be used in the work and should any materials encountered be unsatisfactory for the purpose intended, they shall be removed from the site at the Contractor's expense.

1.2 QUALITY ASSURANCE

A. Reference Standards:

1. The latest edition of the following standards, as referenced herein, shall be applicable.

a. "Standard Specifications for Highway Materials and Methods of Sampling and Testing, American Association of State Highway and Transportation Officials (AASHTO)."

b. Vermont Agency of Transportation, Standard Specifications for Construction.

B. The Contractor shall provide and pay for all costs in connection with an approved independent testing facility to determine conformance of soils and aggregate with the specifications, in accordance with Section "Quality Requirements."

1.3 SUBMITTALS

A. Test Results:

1. The testing laboratory shall submit written reports of all tests, investigations, and recommendations to the Contractor and Construction Management Team.

1.4 PROJECT REQUIREMENTS

A. Call Dig Safe at 811 before starting any excavation or verify that a Dig Safe ticket exists and is valid for the area. Contractor shall maintain Dig Safe marks and follow all Dig Safe laws. Contractor is responsible for contacting and complying with municipal and private utilities that are not members of Dig Safe. Excavate with care to avoid damage to structures and utilities - excavations shall be completed by hand if necessary. Promptly report any damages to utilities to Utility Owner and Construction Management Team, do not attempt repairs without the Utility Owners consent.

B. Notify the Construction Management Team of any unexpected subsurface condition.

C. All Work shall comply with VOSHA/OSHA regulations or requirements.

D. Protect excavations by shoring, bracing, sheet, piling, underpinning or by other methods, as required to ensure the stability of the excavation.

E. Underpin or otherwise support structure adjacent to the excavation which may be damaged by the excavation. This includes service lines.

F. Protection of Existing Utilities:

1. Locate existing underground utilities in areas of work. If utilities are to remain in place, provide adequate means of support and protection during earthwork operations.

2. Coordinate interruption and/or termination of utilities with the utility companies and the Owner.

3. Provide a minimum of seventy-two (72) hours' notice to the Owner and receive written notice to proceed before interrupting any utility.

4. Demolish and completely remove from the site any existing underground utilities designated to be removed, as shown on the Drawings or as specified in Section "Clearing and Grubbing."

G. Protection of Persons and Property:

1. Barricade open excavations occurring as part of this work and post with warning lights and/or other approved protective measures, as necessary or directed by the Construction Management Team.

2. Operate warning lights and implement protective measures as recommended, or required, by authorities having jurisdiction.

3. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Selected Fill/Structural Fill: Sound, durable, sand, gravel, stone, or blends of these materials, free from organic, frozen or other deleterious materials. Material shall be in accordance with VTrans Standard 704.08A "Granular Backfill for Structures", or approved equal, as indicated below.

Sieve	Percent Passing
3"	100
No. 4	45 - 75
No. 100	0 – 12
No. 200	0 – 6

1. Fines passing No. 200 shall be non-plastic.

B. Geotextile: As noted on project drawings.

PART 3 - EXECUTION

3.1 PRECONSTRUCTION MATERIAL QUALIFICATION TESTING

A. Each potential borrow source shall be tested and reviewed, prior to use on site, as follows:

1. Particle Size Analysis:

a. Method: AASHTO D422.

b. Number of Tests: One (1) per potential source.

c. Acceptance Criteria: Gradation within specified limits.

2. Maximum Density Determination:

a. Method: ASTM D698, Modified Proctor.

b. Number of Tests: One (1) per potential source.

3. Re-establish gradation and maximum density of fill material if source is changed during construction.

3.2 PREPARATION

A. Establish required lines, levels, contours and datum.

B. Maintain benchmarks and other elevation control points. Re-establish, if disturbed or destroyed, at no additional cost to the Owner.

C. Establish location and extent of utilities before commencement of excavation.

3.3 EXCAVATION

A. Excavate subsoil in accordance with the lines and levels as shown on the Drawings and as necessary for installation of the work. The excavation lines shall be such that sufficient clearances exist for the proper execution of the work, including space for formwork and bracing.

B. Maintain the slopes of excavation in safe condition until completion of the backfilling operation, in accordance with VOSHA/OSHA requirements.

C. Trim the bottom of all excavation to the required levels, and leave free from loose or organic matter. Fill over-excavated areas under structure bearing surfaces with concrete as specified for foundations, or other material as approved by the Construction Management Team.

D. When the excavation has been carried to the required depth, the Contractor shall await inspection of the bearing surface by the Construction Management Team and authorization to proceed with the work. A minimum notice of 72 hours will be given to the Construction Management Team prior to inspection.

E. Sloping surfaces under footings and foundations, or other work where required, shall be cut in steps as indicated on the Drawings or as directed by the Construction Management Team.

F. Any excess excavation shall be removed from the site to disposal areas at the Contractor's expense.

G. In the event the Contractor excavates below the correct elevations, they shall backfill to the correct elevation with approved material that is reviewed and acceptable to the Engineer of Record.

3.4 DRAINAGE AND DEWATERING

A. Prevent surface, subsurface or ground water from flowing into excavation and from flooding project area, as well as surrounding areas. Keep the excavated areas dry until the structures, pipes, and appurtenances are constructed and properly backfilled in accordance with the contract documents.

B. Do not allow water to accumulate in excavations. Remove water to prevent soil changes detrimental to the stability of subgrades.

C. Provide and maintain the pumps, well points, sumps, suction and discharge lines, and other dewatering components necessary to convey water away from excavations.

D. Provide and maintain temporary drainage ditches and other diversions outside excavation limits to convey rain water and water removed from excavations by dewatering, to collection or run-off areas.

E. Coordinate all de-watering efforts with the EPSC specialist and in compliance with applicable environmental permit conditions.

3.5 STRUCTURAL FILL, BACKFILL, AND COMPACTION

A. Place fill materials in the types and thicknesses as detailed on the Drawings. All backfill shall be Selected Fill unless otherwise directed by the Construction Management Team, or shown on the Drawings.

B. After approval of the subgrade by the Construction Management Team, the geotextile shall be placed, where shown on the Drawings, upon the subgrade in accordance with the manufacturer's instructions and the following:

1. After acceptance of the subgrade, the fabric shall be installed prior to placement of the first course of structural fill.

2. Geotextile may be joined by either sewing or overlapping. Sewn seams shall be lapped a minimum of 4 inches and double sewn with nylon or polypropylene. Overlapping seams shall have a minimum overlap of 18 inches, except where placed underwater where the overlap shall be a minimum of 3 feet.

3. Fabric which is torn or damaged shall be replaced or patched. The patch shall extend 3 feet beyond the perimeter of the tear of damage.

4. Traffic or construction equipment shall not be permitted directly upon the fabric. Maintain a minimum of 8 inches loose thickness of aggregate above the stabilization fabric subject to traffic.

C. Place backfill and fill materials in layers not more than 12" in loose depth. Lift height shall be governed by the ability of the compaction equipment to obtain the required compaction with 12" as a maximum lift height. Before compaction, moisten or aerate each layer as necessary to facilitate compaction to the required density. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost, ice, ponded water or extraneous debris.

D. When work is suspended during periods of freezing weather, measures shall be taken to prevent fill already in place from freezing. Upon resumption of work after any inclement weather, prepare the exposed surface by proof rolling to identify any zones of soft/loose soils. Soft/loose materials or frozen soils shall be removed and replaced at the Contractor's expense.

E. Moisture Control:

1. Where fill or backfill must be moisture conditioned before compaction, uniformly apply water to the surface and to each layer of fill or backfill. Prevent ponding or other free water on surface subsequent to, or during, compaction operations.

2. Remove and replace, or scarify and air dry, soil that is too wet to permit compaction to specified density. Soil that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing or pulverizing, until moisture content is reduced to a value which will permit compaction to the percentage of maximum density specified.

F. All fill shall be thoroughly and satisfactorily compacted to 95 percent of the maximum density of material used and within 3% of the optimum moisture.

G. If the surface of any layer becomes contaminated by mud or unsuitable materials, the contaminated soil shall be removed.

H. Fill placement shall be suspended when wet weather prevents proper operation of compaction equipment.

I. Adjacent to structures, fill shall be placed in a manner which will prevent damage to the structures and will allow the structures to assume the loads from the fill gradually and uniformly. The height of the fill adjacent to structure shall be increased at approximately the same rate on all sides of the structure.

J. No backfilling or compaction shall take place against any cast-in- place concrete footings or slabs prior to 3 days initial concrete set.

K. Heavy equipment shall not be operated within 4 feet of any structure. Heavy vibratory compactors shall not be operated within 4 feet of any structure.

L. Excavated material meeting the requirements of Selected Fill shall be spread and allowed to dry until obtaining the required moisture content prior to re-use.

3.6 FIELD QUALITY CONTROL

A. Notify the Construction Management Team at least three (3) working day in advance of all phases of filling and backfilling operations.

B. Compaction testing shall be performed to ascertain the compacted density of the fill and backfill materials in accordance with the following methods:

1. In-place relative density:

a. Method: AASHTO T191, Sand Cone Method
AASHTO T238, Nuclear Method

b. Number of Tests: One (1) per 8" vertical lift.

C. The Construction Management Team may direct additional tests to establish gradation, maximum density, and in-place density as required by working conditions, at the Contractor's expense.

D. Acceptance Criteria: The sole criterion for acceptability of in-place fill shall be in situ dry density and optimum moisture content.. Minimum dry density for all fill or backfill shall be 95 percent of the maximum dry density and the moisture shall be +/- 3% of optimum. If a test fails to qualify, the fill shall be further compacted and re-tested. Subsequent test failures shall be followed by removal and replacement of the material.

3.7 CLEAN UP

A. Provide and maintain protections or newly filled areas against damage. Upon completion or when directed, correct all damaged and deficient work by building up low spots and remove temporary protections, fencing, shoring and bracing.

B. Remove all surplus excavated material not required for filling and backfilling and legally dispose of same away from premises, at no additional cost to the Owner.

C. Leave the premises and work in clean, satisfactory condition, ready to receive subsequent operations.

END OF SECTION

SECTION 312316.26 - ROCK REMOVAL

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes drilling, blasting, excavation, removal and disposal of rock as necessary for the installation of the Work, and as indicated and specified herein. This specification shall be used as a supplement to the following documents: "Blasting Plan for Addison Natural Gas Project, Vermont Gas Systems, Inc." dated June 25, 2012. All requirements listed in the "Blasting Plan" and other applicable Contract Documents (e.g. MOU's) shall be followed - in the event of a conflict, the more stringent condition shall apply.

1.2 REFERENCES

A. The latest edition of the following standards, as referenced herein, shall be applicable.

1. "Structure Response and Damage Produced by Ground Vibration From Surface Mine Blasting," U.S. Bureau of Mines Publication RI 8507.

1.3 DEFINITIONS

A. Rock: Limestone, sandstone, shale, granite, quartz, and formations of other varying mineral or aggregate composition in solid beds or masses in its original or stratified position that exceed 2 cubic yards and that cannot be excavated with one of the following

1. A crawler tractor having a minimum draw bar pull rated at not less than 71,000 lbs. (Caterpillar D9N or equivalent), and occupying an original volume of at least 2 cubic yards or more.

2. A backhoe having a break out force rated at not less than 44,000 lbs. (Caterpillar 235D or equivalent), and occupying an original volume of at least 2 cubic yards.

B. Rock Excavation: Removal of rock by means of drilling, blasting, hydraulic machinery, or use of pneumatic tools. Removal of materials which, in the opinion of the Construction Management Team, can be loosened and excavated by mechanical means (ripping, etc.) including frozen materials, soft laminated shale or hardpan, pavements, curbs and similar materials shall be not be classified as rock excavation. Do not proceed with the excavation of this material until the Construction Management Team has classified the materials as common excavation or rock excavation and has taken cross sections as required. Failure on the part of the Contractor to uncover such material, notify the Construction Management Team, and allow ample time for classification and cross sectioning of the undisturbed surface of such material will cause the forfeiture of the Contractor's right of claim to any classification or volume of material to be paid for other than that allowed by the Construction Management Team for the areas of work in which such deposits occur.

C. Unauthorized Excavation: Removal of any material beyond horizontal and vertical limits indicated on the Drawings or as specified herein, without the prior approval of the Construction Management Team.

D. Blasting Specialty Contractor: A subcontractor approved by the Owner and Construction Management Team retained by the Contractor performing all work related to drilling and blasting for rock excavating.

E. Independent Specialty Condition Survey Contractor: A subcontractor approved by the Construction Management Team retained by the Contractor to perform pre and post blast condition surveys of nearby structures.

F. Independent Specialty Condition Seismic Survey Contractor: A subcontractor approved by the Construction Management Team retained by the Contractor to perform seismic vibration monitoring on-site and off-site at locations specified or designated by the Construction Management Team.

G. Line Drilling: A controlled blasting method in which a single row of closely spaced, unloaded holes are drilled along the neat excavation line to create a plane of weakness which the primary blast can break. Center-to-center spacing of line drilled holes shall be no more than twice the hole diameter.

1.4 SUBMITTALS

A. General:

1. Submit Specialty Contractors' qualifications, to the Construction Management Team for approval.

2. Submit work plans, site safety plans, proposed equipment, and a detailed outline of intended rock removal procedures and any other information listed in this specification to the Construction Management Team for approval. This submittal shall not relieve the Contractor of complete responsibility for the successful performance of the method(s) used.

3. A detailed storage plan shall be submitted to the Construction Management Team for approval. Plan shall contain information regarding storage containers, location(s), storage protocol for handling/receiving, blasting material inventory measures, and other applicable practices.

4. The submittal requirements stated herein in no way relieve the Contractor of their responsibility of carrying out safe blasting operations. The Contractor shall be solely responsible for damages and claims thereof.

B. Blast Plan:

1. The Blasting Specialty Contractor shall develop a detailed written blast design plan complying with the applicable requirements in NFPA 495, "Explosive Materials Code". A copy of the blast design plan shall be furnished to the Construction Management Team two weeks prior to blasting operations and shall include the types of explosive and sizes of charge to be used in each area of rock removal, types of blasting mats, sequence of blasting operations, loading of explosives, drilling of new holes/extending existing holes, handling explosives at site, tamping explosives, equipment required, initiation procedures of blasting, safety practices, vibration control and monitoring, blasting pattern and shot size, addressing mis-fires., emergency procedures and other pertinent procedures/protocols that will prevent damage to site improvements and structures on Project site and adjacent properties.

2. The blasting plan shall specifically address blasting in the vicinity of existing gas infrastructure. Owner will provide guidance and seismic requirements depending on the location of the blast.

C. Pre and Post Blast Surveys:

1. Pre- and post-blast conditions surveys shall be completed for all nearby properties where ground vibrations will be perceptible (peak particle velocity greater than 0.1 in./sec.) prior to blasting. This survey shall include, at a minimum, all properties within a 600 ft. radius surrounding the construction area and any critical structures of interest as determined by the Construction Management Team. Prior to execution of the survey, a plan noting structures to be surveyed and survey methods shall be submitted to the Construction Management Team for approval.

2. During these surveys, all structures and installations, buildings, bridges, water sources, storage tanks, utilities and other significant features, etc., shall be examined and photographed or videoed as necessary. Pre and post blast surveys shall include all accessible indoor areas and outdoor sections of surveyed structures. Photographs accompanied by audio tape or written field reports, or narrated video tape shall be included as part of the surveys. A written survey summary shall also be included with all submittals. Within thirty (30) days of completion of this survey and prior to blasting, a pre-blasting conditions survey report shall be submitted to the Construction Management Team and Owner. Within thirty (30) days after completion of blasting operations, the Independent Specialty Condition Survey Contractor shall conduct a post-blasting survey of all the same properties. The post-blast conditions survey report shall be submitted to the Construction Management Team and Owner within thirty (30) days.

3. Well testing shall include both quality and flow testing, both pre-blast and post-blasting, when within 600 feet of the blasting activities. Well quality shall be tested utilizing the Vermont Department of Health "Kit A", "Kit C", and "Kit RA". Well quantity shall be tested by a licensed Vermont Well Driller utilizing the "blow down" method.

D. Seismic Monitoring Plan:

1. The Seismic Specialty Contractor shall develop a written monitoring plan detailing equipment to be used, monitoring locations, seismic event record format example, and schedule. A copy of the seismic monitoring plan shall be furnished to the Construction Management Team two weeks prior to blasting operations.

E. Seismic Monitoring Records:

1. A written seismic monitoring record of each monitoring/blast event shall be submitted to the Construction Management Team the work day following each blast event. Monitoring shall be performed at the nearest point of the nearest structure to the blast, unless directed otherwise by the Construction Management Team. The record shall include at least the following information:

   a. Location of seismic vibration and sound level transducers;

   b. Peak Particle Velocity (PPV), Vibration Frequency (Frq), Peak Displacement (PD) and Peak Particle Acceleration (PPA) in the longitudinal, vertical, and transverse directions as well as Resultant PPV and Peak Sound levels (dB) for each event;

   c. Seismograph printout;

   d. Date and time of blast event;

   e. Distance from seismograph to the blast

   f. Monitored time interval.

2. The Seismic Specialty Contractor shall immediately inform the Construction Management Team if vibration levels or sound levels exceed specified values.

F. Blast Hole Records:

1. Written records of each blast shall be submitted to the Construction Management Team the work day after each blast event and shall include at least the following items:

a. Surface elevation;

b. Location;

c. Number of holes;

d. Depth of holes;

e. Water conditions in each hole (if any);

f. Quantity and type of explosives used;

g. Maximum quantity of explosives per delay and number of delays. A delay shall be considered detonations separated by a minimum of 8 milliseconds;

h. Detonation delay pattern;

i. Stemmed length of hole;

j. Date and blast time.

G. Log of Complaints:

1. A log of all complaints and responses resulting from blasting operations shall be kept by the Contractor's designated contact person. The log should include as a minimum the following information: name and address of person registering complaint/inquiry; time and date when annoyance occurred; time and date when complaint/inquiry filed; nature of complaint/inquiry; action taken by contact person; follow-up action. A copy of all complaints and responses shall be submitted to the Owner and Construction Management Team by the following work day.

H. Site Safety Plan:

1. Site safety shall be coordinated through the Contractor's office. A written safety plan shall be developed and distributed to all subcontractors, the Owner and the Construction Management Team.

I. Certifications/Licenses:

1. One (1) copy of each certificate, license, permit and proof of insurance required by this specification shall be submitted to the Construction Management Team after award of contract and prior to commencement of work.

J. Quality Assurance:

1. The Contractor shall use the services of an experienced Specialty Contractor to perform all blasting operations.

2. The Blasting Specialty Contractor and the blasting foreman shall be regularly engaged in blasting work of similar magnitude and scope and shall be approved by the Construction Management Team to perform this project. A list of prior work experience for the Blasting Specialty Contractor and foreman shall be submitted with the bid.

1.5 REGULATORY REQUIREMENTS

A. The Blasting Specialty Contractor shall obtain all required permits, certificates, and licenses (City, State, Local etc.) prior to the commencement of any blasting operations.

B. Blasting safety procedures and operations shall comply with Title 29 Code of Federal Regulations Part 1910.109, and all other applicable state and local standards and regulations.

1.6 PROJECT/SITE CONDITIONS

A. Existing Conditions: Existing physical conditions as defined for design purposes are noted on the Drawings and are described in the Information Available to Bidders section of the Contract Documents.

1.7 SEQUENCING AND SCHEDULING

A. Work associated with blasting shall be performed in accordance with the following general sequence:

1. Complete and submit pre-blast survey and other pre-blast documentation;
2. Notify all appropriate authorities having jurisdiction of proposed activities;
3. Prepare site for blasting;
4. Notify affected utility owners, operators and nearby residents as required in Part 3 - Execution;
5. Complete test blast program simultaneously with seismic monitoring;
6. Complete production blasting work simultaneously with seismic monitoring;
7. Complete and submit post-blast survey.

1.8 MAINTENANCE

A. Any and all damage caused by the Blasting operations shall be repaired or replaced to the property Owner's and Construction Management Team's satisfaction at the expense of the Blasting Specialty Contractor within thirty (30) days of completion of the Post-Blast Survey.

PART 2 - PRODUCTS (Not Applicable)

2.1 GENERAL

A. No perchlorates shall be acceptable in any blasting products. All caps, charges and other applicable blasting materials shall be perchlorate-free.

B. Materials: All materials such as explosives, detonators, fuses, tamping materials, and other accessories proposed to be used by the Contractor, shall be approved for use by the Construction Management Team.

1. All electric detonators used in the blast shall be of the same electrical sensitivity and be produced/procured from the same manufacturer.

2. The detonators used shall be capable of giving effective blasting of the explosives. Damaged explosive material shall be destroyed by a responsible person as per manufacturer's instructions, or returned to the manufacturer.

3. No explosive materials shall be abandoned.

4. All blasting materials and testing equipment shall be regularly tested for correct performance. The intervals between tests shall be decided based on manufacturer recommendations, but shall always be carried out if the blast materials and/or test equipment have been subjected to abnormal conditions or following any misfires. Guidelines / recommendations of the manufacturer shall be strictly adhered to.

5. Materials shall be stored in accordance with an approved material storage plan.

PART 3 - EXECUTION

3.1 PREPARATION

A. All personnel working on-site shall be instructed as to the nature, times, duration, site safety and warning signals concerning blasting operations.

B. In each Town, a public information hearing shall be conducted a minimum of one month prior to the commencement of blasting activities.

C. Date/time restrictions noted in applicable Contract Documents (e.g. MOU's) shall be strictly followed by the Contractor.

D. Local residents within the Pre-Blast Survey area shall be notified at least one week in advance, then again at 24 hours prior to initial blasting operations and provided with the name and phone number of one full-time, on-site contact person designated by the Contractor for handling all complaints and inquiries. Residents shall be notified of blast schedule and changes on at least a weekly basis throughout the duration of blasting operations. Residents shall also be informed of warning signals identifying an upcoming blast and all-clear signals following completion of a blast as outlined in Site Safety Plan.

E. Blasting contractor shall coordinate with, and obtain approval from, the Construction Management Team and utility authorities in the vicinity of the blasting operations having jurisdiction - this includes overhead powerline/cable utilities.

F. Explosives and blasting caps shall not be brought onto the site or used without appropriate permits, licenses, certificates and/or prior written approval of authorities having jurisdiction. The Specialty Contractor is solely responsible for handling, storage, and use of explosive materials in accordance with regulatory and permit requirements.

3.2 ROCK REMOVAL

A. Remove rock as indicated by the Drawings and as necessary for the installation of the Work. Provide sufficient clearance, within the limits specified, for the proper execution of the Work.

B. Remove rock to lines and subgrade elevations indicated to permit installation of permanent construction without exceeding the following dimensions:

1. 24 inches outside of concrete forms other than at footings.
2. 12 inches outside of concrete forms at footings.
3. 6 inches outside of minimum required dimensions of concrete cast against grade.
4. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
5. 6 inches beneath bottom of concrete slabs on grade.
6. 6 inches beneath pipe in trenches, and 12 inches on each side of the pipe in trenches.

C. Fill areas of over-excavated rock to the proposed subgrade elevations as required by Drawings with selected fill in accordance with Section "Trenching and Backfilling" or Section "Earth Moving". Over-excavation beneath foundations shall be filled with footing concrete (f^1 = 3000 psi minimum). This will be completed at no additional cost to the Owner.

D. A test blast shall be performed and monitored prior to commencement of production blasting. Test blast records and seismic records shall be reported to the Construction Management Team prior to continuation of blasting. If test blast indicates that the blasting plan requires modification, such changes shall be reported to the Construction Management Team immediately. Reporting this information to the Construction Management Team shall not relieve the Contractor(s) of complete responsibility for the successful performance of the method(s) used, nor shall the reporting constitute approval by the Construction Management Team for the proposed plans.

E. The Seismic Specialty Contractor shall monitor the vibrations and sound levels caused by Blasting.

F. Seismic monitoring shall be performed for each blast, unless specified otherwise. Monitoring shall be performed at the nearest structure or at locations designated by the Construction Management Team on each field day.

G. If the ground vibrations exceed specified tolerances the Blasting Specialty Contractor's operations shall cease immediately and remain stopped until the Blasting Specialty Contractor has taken all necessary additional measures to protect adjacent property and personnel.

H. The Blasting Specialty Contractor shall use steel or rubber blasting mats as necessary to control fly-rock. Blasting mats shall be connected to adjacent mats prior to blasting.

3.3 EXCAVATION TOLERANCES

A. Blast hole drilling and overblast beyond the vertical limits indicated shall be less than 2.5 feet.

B. Rock removal limits shall include all materials defined as rock whether removal is accomplished by mechanical means (ripping, etc.) or by drilling and blasting.

3.4 VIBRATION AND SOUND TOLERANCES

A. Blast vibrations shall be maintained within safe limits as defined by the Peak Particle Velocity (in./sec.) vs. Blast Frequency (Hz) as described in the United States Bureau of Mines Publication RI-8507, Appendix B ("Siskind Curve").

B. Sound levels shall not exceed 130dB at the nearest structure.

C. Vibrations levels at new concrete structures shall be limited to the following levels:

Age of Concrete (days)	Maximum Allowable PPV
Less than 3	No blasting
3 to 7	1.0 in./sec
Greater than 7	2.0 in./sec.

END OF SECTION

SECTION 312333 - TRENCHING, PIPE LAYING AND BACKFILLING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the excavation of trenching, pipe laying, backfilling, compacting, dewatering, excavation support and disposal, as shown on the Contract Drawings, and as herein specified.

B. The Construction Management Team will determine the suitability of materials that are to be used in the work and should any materials encountered be unsatisfactory for the purpose intended, they shall be removed from the site at the Contractor's expense.

1.2 QUALITY ASSURANCE

A. Reference Standards:

1. The latest edition of the following standards, as referenced herein, shall be applicable.

a. "Standard Specifications for Highway Materials and Methods of Sampling and Testing, American Association of State Highway and Transportation Officials (AASHTO)."

b. American Society for Testing and Materials (ASTM).

c. Vermont Agency of Transportation (VTrans) Standard Specifications

B. The Contractor shall comply with the requirements for soil erosion and sedimentation control and other requirements of governmental authorities having jurisdiction, including the State.

C. The Owner shall provide and pay for all costs in connection with an approved independent testing facility to determine conformance of soils and aggregate with the specifications, in accordance with Section "Quality Requirements."

1.3 SUBMITTALS

A. The Contractor shall submit certified gradation curves and moisture-density compaction results for each imported material. If multiple sources are utilized, information shall be submitted from each individual supplier.

B. Pipe support systems: Contractor shall submit method of pipe support system(s) to be utilized, including details on how supports will be installed.

C. Contractor shall submit details/designs for all shoring and trench boxes for excavations that exceed 20’ in depth. Details and designs shall be sealed by a registered Vermont Professional Engineer.

1.4 PROJECT REQUIREMENTS

A. Call Dig Safe at 811 before starting any excavation or verify that a Dig Safe ticket exists and is valid for the area. Contractor shall maintain Dig Safe marks and follow all Dig Safe laws. Contractor is responsible for contacting and complying with municipal and private utilities that are not members of Dig Safe. Excavate with care to avoid damage to structures and utilities - excavations shall be completed by hand if necessary. Promptly report any damages to utilities to Utility Owner and Construction Management Team, do not attempt repairs without the Utility Owners consent.

B. Notify the Construction Management Team and Owner of any unexpected subsurface condition.

C. Protect excavations by shoring, bracing, sheet piling, or by other methods, as required to ensure the stability of the excavation. Comply with VOSHA/OSHA requirements.

D. Underpin or otherwise support structures and improved surfaces adjacent to the excavation which may be damaged by the excavation. This includes service lines and existing utilities.

E. Contractor is responsible for protection of Existing Utilities:

1. Specifically, Contractor shall use extreme protection around existing 10-inch transmission main in the vicinity of the Colchester Tie-in Site. This is the primary feed for the Burlington area. Owner will locate/flag the line prior to Contractor beginning work in this area. Contractor shall take all measures necessary to protect this existing transmission main during construction. The Owner must be present for any work or excavation around the existing 10-inch transmission main.

2. Contractor will notify Owner before excavating around, or crossing, any existing natural gas distribution lines. Owner will determine if Owner should be present during any work.

3. Locate existing underground and above ground utilities in areas of work. If utilities are to remain in place, provide adequate means of support and protection during earthwork operations. Comply with OSHA requirements.

4. If necessary, coordinate interruption and/or termination of utilities with the utility companies and the Owner.

5. Provide a minimum of seven days notice to the Owner and receive written notice to proceed before interrupting any utility.

F. Demolish and completely remove from the site any existing underground utilities designated to be removed, as shown on the Drawings or as specified.

G. Repair any damaged utilities as acceptable to the Owner, Construction Management Team, and utility companies at no additional cost to the Owner.

H. Contractor shall comply with maintenance and protection requirements as approved by the authority having jurisdiction.

I. Protection of Persons and Property:

1. Barricade open excavations occurring as part of this work and post with warning lights, if required or comply with any applicable permits.

2. Operate warning lights as recommended by authorities having jurisdiction.

3. Protect structures, utilities, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by construction operations.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Select Backfill/Pipe Padding:

1. ***On-site material: The use of on-site native material for select backfill/pipe padding shall be approved and inspected by the Construction Management Team. Native material shall not contain any stones that are larger than 1.5" in the longest dimension, or that contain sharp/angular pieces that may impact pipe coating integrity. Native material that consists of fractured/processed rock that has been blasted or mechanically removed cannot be utilized as select backfill material due to the angularity of the material, unless used in conjunction with Tuff-N-Nuff 11 mm Rockshield installed per the manufacturer's recommendations. A shaker bucket or screen may be used if native material is too large, given that the characteristics of the material are suitable for successful shaker bucket or screen use.***

2. Borrow Material: If native material is not acceptable, as determined by the Construction Management Team, a sand material shall be imported to the site meeting the following criteria. Alternate select backfill/pipe padding materials may be submitted by the Contractor for review and approval from Construction Management Team.

Sieve	**Percent Passing**
1-1/2"	100
½"	70 - 100
No. 4	60-100
No. 100	0-20

B. General Backfill: Native materials containing no stones or clods larger than ***6***" in the longest dimension are acceptable. If native material is not acceptable, as determined by the Construction Management Team, bank run gravel fill shall be imported to the site meeting the following criteria. General backfill area will be limited to the trench, or a maximum of 12-inches laterally from each side of the pipe. Alternative general backfill materials may be submitted by the Contractor for review and approval from Construction Management Team.

Sieve	**Percent Passing**
6"	100
No. 4	20 - 60
No. 100	0 -12
No. 200	0 - 6

PART 3 - EXECUTION

3.1 PRECONSTRUCTION MATERIAL QUALIFICATION TESTING

A. General:

1. Sufficient size samples shall be obtained from the potential borrow source to allow completion of tests listed in paragraph B below. Samples may be obtained from test borings, test pits, or from borrow pit faces provided that surficial dry or wet soil is removed to expose undisturbed earth. Tests listed below shall be performed on each sample obtained. A minimum of three (3) representative samples from each potential borrow source shall be furnished to the testing laboratory for prequalification testing.

B. Material Tests:

1. Particle Size Analysis:

a. Method: ASTM D422

b. Number of Tests: One (1) per sample; three (3) per potential source.

c. Acceptance Criteria: Gradation within specified limits.

2. Maximum Density Determination:

a. Method: ASTM D1557 - Modified Proctor

b. Number of Tests: One (1) per sample; three (3) per potential source.

3. Re-establish gradation and maximum density of fill material if source is changed during construction.

3.2 PREPARATION

A. Establish required lines, levels, contours and datum.

B. Maintain benchmarks and other elevation control points; re-establish if disturbed or destroyed, at no additional cost to the Owner.

C. Establish location and extent of existing utilities prior to commencement of excavation.

3.3 EXCAVATION

A. All excavation shall be made to such depth/width as required to provide suitable room for laying pipe and for sheeting, shoring, pumping and draining as necessary, and for removing peat, silt, or any other deleterious materials which the Construction Management Team may deem unsuitable. Hand trench excavation may be required to protect existing utilities and structures.

B. Trench excavation for pipes shall be made by open cut to accommodate the pipe or structure at the depths indicated on the Contract Drawings. Excavation shall be made to such a depth and to the width indicated on the Contract Drawings so as to allow a minimum of six (6) inches of select backfill / padding to be placed beneath and on the sides of all pipes installed unless otherwise specified on the drawings. A minimum of twelve (12) inches of select backfill/padding shall be placed above all pipes installed.

C. The bottom of the trench shall be accurately graded to provide a uniform layer of padding/bedding material, as required, for each section of pipe. Trim and shape trench bottoms and leave free of irregularities, lumps, and projections.

D. Stockpile excavated subsoil for reuse where directed or approved.

E. Over excavation/under cut: If, in the opinion of the Construction Management Team, existing material below the trench grade is unsuitable for properly placing select backfill/padding material and laying pipe, the Contractor shall excavate and remove the unsuitable material and replace the same with an approved select backfill/padding material properly compacted.

F. Stability of Excavation: Slope sides of excavations shall comply with local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated. Maintain sides and slopes of excavation in safe condition until completion of backfilling.

G. Removal of materials beyond the indicated elevations, without authorization by the Construction Management Team, shall be classified as unauthorized excavation and shall be performed at no additional cost to the Owner.

H. If a trench excavation crosses a road, sidewalk, bike path, driveway, or other transportation facility, the Contractor shall arrange temporary facilities for ingress/egress of all pedestrians and vehicles. One lane of traffic shall be maintained at all times – refer to VTrans/Local permits for additional construction conditions and traffic management details.

3.4 DEWATERING

A. The Contractor shall remove all water from the excavation promptly and continuously throughout the progress of the work and shall keep the excavation dry at all times until the work is completed and excavation is backfilled or have sufficient weight to resist uplift pressures. Groundwater levels shall be depressed to a minimum of 2 feet below excavation subgrade. No pipe or structure is to be laid in water and water shall not be allowed to rise on or flow over any pipe or structure until such time as approved by the Construction Management Team.

B. Provide a suitable point of discharge from dewatering operations shall be conveyed in a non erosive manner satisfactory to the EPSC Specialist and Construction Management Team and all applicable environmental permit regulations.

C. Precautions shall be taken to protect uncompleted work from flooding during storms or from other causes. All pipe lines not stable against uplift during construction or prior to completion shall be thoroughly braced or otherwise protected to the satisfaction of the Construction Management Team.

3.5 BEDDING AND BACKFILLING

A. Contractor shall take all necessary precautions to ensure that backfill materials are kept free of all skids, stumps, welding rods, cans, bottles, trash and other deleterious debris.

B. Pipe supports may be installed in all locations prior to backfilling as an alternative to continuous pipe bedding for the entire width of the trench. However, areas around pipe shall still be padded with select backfill as shown on the contract drawings and explained in paragraph 3.3.b. above. Stacked sandbags, pipe pillows, or owner approved equal are acceptable methods. Spacing shall be per manufacturer recommendations, if a commercial product, or 15' maximum separation if sandbags.

C. Trench breakers shall be installed per construction plan details prior to backfilling operations begin.

D. All pipe trenches backfill (select backfill/padding, general backfill, subbase) shall be thoroughly compacted by mechanical means as follows:

1. Typical Cross-country areas: Thoroughly compacted by mechanical means to avoid any future trench settlement. ***Use of excavator buckets and equipment tracks is acceptable for compaction in these areas only.***

2. VELCO corridor: All backfill in pipe trenches in the VELCO corridor shall be compacted to a minimum of 90 percent of modified Proctor maximum dry density by installing 12-inch (maximum) loose lifts.

3. Existing and Proposed Road Areas (unpaved and paved): All backfill in pipe trenches in, or directly adjacent to (with 10' of edge of road surfaces – existing or proposed) road surfaces, shall be compacted to a minimum of 95 percent of modified Proctor maximum dry density. Backfill materials shall be placed with water content within plus or minus 3 percent of optimum moisture content per the modified Proctor method (ASTM D1557). Any water used for compaction shall be provided by the Contractor at their own expense. The Contractor is responsible for the repair of any trench settlement at no expense to the Owner for the period of one year after substantial completion of the project.

E. Provide uniform bearing and support for pipe in all locations, except where necessary to excavate for connections, tie-ins, and other required appurtenances. Dig no deeper, longer, or wider than needed to make the joint connection properly.

F. The bedding/padding material shall be placed to the full width of trench. The bedding material shall be placed evenly along the bottom of the trench to provide proper support of the pipe to the elevation shown on the Contract Drawings or directed by the Construction Management Team. . The backfill shall be placed on both sides of the pipe at the same time and to approximately the same elevation. Any pipe that is damaged or moved out of alignment, regardless of cause, shall be replaced or realigned at the Contractor's expense. Bedding/padding shall be thoroughly compacted by hand-tamping or mechanical means being careful not to damage the pipe. When the bedding/padding reaches one (1) foot over the top of the pipe, the entire surface shall be compacted by mechanical means.

3.6 PIPE STRINGING & LAYING

A. Pipe shall be installed per the depth, alignment, and coating type shown on the project design plans. Depth of cover shall be measured from top of pipe to finished/final grade (after site restoration). ***Horizontal tolerance for final location of installed pipe compared to design plans/survey layout shall be +/- 1.0'. Minimum depth of cover shall be strictly adhered to (no vertical tolerance for less cover than noted on plans).***

B. Stringing

1. No pipe shall be strung before the trench is excavated to full depth and accepted by the Owner to meet the requirements of this specification. Pipe shall not be placed directly on the ground, but on wooden skids with proper protective padding. The skids and protective padding material shall be subject to Construction Management Team approval. Dragging, skidding or dropping the pipe is not permitted. Wooden wedges shall be used to prevent movement of each strung pipe.

2. Where possible the skid elevations shall be planned such that minor differences between grade profile and bottom of trench profile (e.g. at locations where an increased trench depth is required) can be accommodated without an additional tie-in. The distance between the trench edge and the pipe string shall be planned such that safe working space is provided. Contractor shall follow applicable OSHA/VOSHA regulations.

3. Contractor shall be responsible for proper stringing and locating of the pipe by coating type.

4. Contractor shall string the pipe in such a manner so as to cause no interference with public roads, sidewalks, or bike paths. Suitable gaps shall be left at intervals as necessary to permit the passage of livestock and/or equipment across the right-of-way and as directed by the Construction Management Team.

5. Contractor shall layout and measure the pipes such that the number of pieces required to be cut-off with less than 5 feet in length is kept to a minimum.

6. Pipe shall be strung with the use of a spreader bar and two guide lines.

C. Bending - Contractor shall make all necessary field pipe bends required in construction of the pipeline. The Contractor shall be responsible for determining the degree of the field bend necessary where a change in direction is necessary.

1. All bending shall be completed using the cold smooth method using a bending machine, approved by the Construction Management Team. Wrinkle bends will not be acceptable. Welded longitudinal pipe seams shall be right angles (neutral axis) to the direction of the bend. The Contractor shall use an internal bending mandrel to achieve smooth and undistorted bends. Padded bending shoes are required for coated pipe. Heating the pipe for bending purposes is not allowable. Prior to beginning work, Contractor shall submit and demonstrate their bending procedure, which shall conform to the recommendations of the manufacture of the bending machine. This procedure shall be approved by the Construction Management Team prior to beginning work.

2. For field cold bends, the longitudinal axis shall not be deflected more than 1-1/2 degrees in any length along the pipe access equal to the diameter of the pipe. The maximum diametrical reduction in a pipe bend shall not exceed 2-1/2% of the nominal pipe diameter. There shall be no deviation from the above requirements without prior written approval from the Construction Management Team. Individual approvals shall be obtained for each application.

3. The distance between centerline of bending points shall be such that there will be no distortion of the pipe or of the bend previously made and in no event shall be closer than seven (7) feet to the end of the joint of the pipe. When pipe is double jointed before bending, the bend shall not be closer than three (3) feet to the butt (girth) weld.

4. Bends shall not be straightened under any circumstances.

5. Pipe that is buckled, wrinkled, flattened, egged or gouged, as determined by the Construction Management Team, by bending operations shall be cut out and replaced at the sole expense of the Contractor. Hammering, the use of jacks, or other mechanical machinery to repair bucked or deformed pipe is prohibited. A buckle shall be defined as any anomaly in the contour of a bend which, when measured with a six (6) inch metal straight edge oriented on the longitudinal axis, yields a depression or void beneath the straight edge equal to, or greater than, 0.06”.

6. For pipe line-up, the pipe shall be placed on skids with sufficient clearance between the bottom of the pipe and ground to accommodate the finishing weld. Pipe shall be handled in a manner to prevent damage to the pipe walls and shall be placed over or parallel to the ditch in such manner that when the pipe is lowered, the bends will rest in the ditch at the proper location. In the laying of the pipe other than seamless pipe, the longitudinal seams shall be offset by 20 degrees on adjoining pipes in the top 120 degrees of the pipe and welded sections shall be assembled and lowered into the trench so that the longitudinal seams will remain on the top 120 degrees of the pipe as laid. Exceptions shall be weld seams on side bends, which shall be located on top of the pipe, and weld seams on sag bends and over bends, which shall be located on either side of the pipe as laid.

7. Contractor shall make all necessary bends required for proper construction of the pipeline, following a trigonometric survey to establish the number and degree of bends required, to ensure that the installed pipe conforms to the contours of the excavated trench.

D. Welding – Refer to Specification 137000

E. Coating Weld Joints and Fittings – Refer to Specification 138000

F. Lowering – Prior to lowering the pipe into the trench, the Contractor shall ensure that all water, debris, skids, rocks, welding rods and other foreign or deleterious material is removed from the trench. During lowering operations coated pipe shall be handled by use of adequately spaced lowering belts or cradles, as determined to be acceptable by the Construction Management Team, but shall be a maximum of 250'. At a minimum, belts shall be equal to the outside diameter of the pipe and shall be made of material that is free of protrusions that may cause damage to the protective coating. Roller cradles shall have nylon/neoprene roller wheels. The pipe shall be lowered into the trench in a manner that will allow proportional distribution of the total weight of the pipeline to all of the lifting points to prevent undue stress or strain on the pipe and to prevent damage to the pipe coating. The pipe shall not be dropped or subjected to jarring or impact. At water crossings or any other locations which may require pulling or dragging of the pipe into place, the coated pipe shall be properly protected from damage using wood lagging or rollers. ~~Welded pipe strings shall be lowered-in within 96 hours of completion of joint coating.~~

G. Holiday Inspection – Holiday inspection ("jeeping") shall be performed on all pipe and fittings with an electronic holiday detector, supplied by the Contractor and operated in such a manner to audibly and visually detect the presence of all holidays in the coatings. Jeeping shall be completed twice (minimum) – once when on skids adjacent to trench, and again as it is lowered into the ditch. Additional jeeping may be required as determined by the Construction Management Team. Refer to Coatings, Specification 138000 for additional jeeping requirements.

H. Rock Shield – Contractor shall furnish and install Tuff N Nuff 11 mm rockshield, or Construction Management Team approved equal, on the pipeline in areas of rock trench or as otherwise directed by Construction Management Team or utility inspector.

I. Trench Breakers – Trench breakers shall be installed as defined on the project design drawings.

J. Electrolysis Test Leads – Locations for test leads are determined on the project design drawings and shall be connected prior to backfilling operations – follow Cathodic Protection Details for installation. If an electrical continuity test fails after backfilling operations, Contractor shall excavate and replace test lead at no cost to the Owner. All test lead cables shall be continuous with without splices.

K. Drainage Tile Repair – Tiles within the limit of disturbance that are damaged shall be repaired by the Contractor.

1. The replacement tile shall be installed to the gradient and alignment of the previous tile. Tile shall be supported at trench crossings as necessary in order for the tile to maintain the gradient/alignment during backfilling operations.

2. Replacement tile materials shall be new. Reusing excavated existing drain tile is not acceptable.

3. Drain tile couplings shall be utilized to splice in new drain tile. Couplings shall be installed per the manufacturer's recommendations.

4. During backfilling operations, soil adjacent to and under tiles shall be compacted to eliminate future settlement.

5. In areas where the tile alignment is parallel and directly adjacent to the pipeline alignment, the tile will be moved/offset to the side of the pipeline alignment.

6. Tile and pipeline separation shall be a minimum of 12-inches.

7. Conditions in construction line list regarding existing and future tile locations shall be adhered to by the Contractor.

8. If directed by Construction Management Team, both existing and replacement tiles shall be inspected to ensure that tiles are not plugged, crushed, mis-aligned, or otherwise damaged. If damage is found, tile shall be repaired at no cost to the Owner.

L. Warning Tape – Contractor shall install Owner provided pipeline warning tape as indicated on project design drawings.

M. Pipeline Markers – After completion of backfilling operations, Contractor shall install Owner supplied pipeline markers as directed by Construction Management Team.

3.7 BACKFILLING AROUND STRUCTURES

A. The Contractor shall not place backfill against any structure without obtaining the approval of the Construction Management Team. No dumping shall be allowed where materials would flow against or around such structures. Backfill material shall be deposited in horizontal layers not exceeding 6 inches in loose thickness or as shown on the Contract Drawings and thoroughly compacted by hand or by mechanical means to the satisfaction of the Construction Management Team.

3.8 SUSPENSION OF WORK

A. Whenever the work is suspended, excavations shall be protected and the roadways, if any, left unobstructed. Within or adjacent to private property, material shall be stored at such locations as will not unduly interfere with traffic of any nature and in no case shall materials be stored in locations which will cause damage to existing improvements.

3.9 DISPOSAL OF MATERIAL

A. Excess and unsuitable materials shall be legally disposed of by the Contractor off site at the Contractor's expense unless otherwise approved by the Owner.

3.10 FIELD QUALITY CONTROL

A. Notify the Construction Management Team at least three (3) working days in advance of all phases of excavation and backfilling operations. The contractor shall not conduct backfilling operations unless the Construction Management Team is present for inspections. Backfilling operations shall commence as soon as possible after the pipe has been lowered into trench. The amount of lowered pipe that is not backfilled shall be kept at a minimum at all times. Contractor shall not backfill trench until the Owner's as-built survey crew has completed their necessary tasks.

B. In-place density testing at road crossings and VELCO corridor shall be performed to ascertain the compacted density of the fill and backfill materials in accordance with the following methods:

1. In-place relative density:

a. Method: AASHTO T238, Nuclear Method

C. Perform initial density testing to verify that contractors proposed compaction effort will obtain the minimum required densities.

D. In-place density tests on trench backfills shall be provided as follows:

1. Open-cut road crossings: One test per lift and at least once daily.
2. Cross-country areas: Visual only – subject to Construction Management Team approval.
3. VELCO corridor: Minimum of one every 500 cubic yards of fill, and not exceeding every 2 feet vertically, or once daily.

E. The Construction Management Team may direct additional tests to establish gradation, maximum density, and in-place density as required by working conditions.

F. Acceptance Criteria: The criteria for acceptability of in-place fill shall be both visual and in-situ dry density and moisture content. If a test fails to qualify, the fill shall be further compacted and re-tested/inspected. Subsequent test failures shall be followed by removal and replacement of the material, at no cost to the Owner. Minimum compaction of backfill materials noted in Section 3.5.D of this specification.

END OF SECTION

SECTION 312500 - EROSION PREVENTION AND SEDIMENT CONTROL

PART 1 - GENERAL

1.1 SUMMARY

A. This Section covers work necessary for erosion prevention and sediment control (EPSC) during and after construction and land disturbing activities. The work shall include the furnishing of all labor, materials, tools, and equipment to perform the work and services necessary as herein specified and as indicated on the Drawings. This shall include installation, maintenance, and final removal of all temporary EPSC measures. All EPSC measures and devices used shall conform to the latest requirements imposed by federal, state and local authorities.

B. Comply with applicable environmental permits for stormwater discharges from construction activities and the EPSC Plans (or Drawings) prepared for the project.

C. Comply with the latest version of the Vermont Agency of Natural Resources, Department of Environmental Conservation construction-phase stormwater discharge guidelines.

D. The minimum areas requiring EPSC measures are indicated on the Drawings. The right is reserved to modify the use, location, and quantities of EPSC measures based on activities of the Contractor and as the Construction Management Team and/or On-Site Plan Coordinator (OSPC) and/or EPSC Specialist considers to be the best interest of the Owner.

E. The Contractor shall be responsible for repair of any damage caused and shall be financially responsible for any penalties imposed.

1.2 QUALITY ASSURANCE

A. EPSC measures shall be implemented in accordance with the requirements and procedures outlined in this specification, contract Drawings and documents, state standards or guidelines for EPSC, and all regulatory authorities having jurisdiction. Where conflicts between requirements exist, the more restrictive/stringent rules shall govern.

B. The Contractor shall provide all temporary EPSC measures shown on the Drawings, or as directed by the Owner, Owner's representative, OSPC or EPSC Specialist for the duration of the contract. EPSC Drawings are intended to be a guide to address the stages of work shown. Additional measures not specified on the Drawings may be necessary and shall be implemented to address intermediary stages of work and any conditions that may develop during construction at no cost to the Owner.

C. Temporary EPSC provisions shall be coordinated with permanent EPSC measures to the extent practical to assure economical, effective and continuous EPSC throughout the construction and post-construction period.

D. EPSC measures shall at all times be satisfactory to the Owner's Representative or EPSC Specialist. Owner's Representative or EPSC Specialist will inform the Contractor of unsatisfactory construction procedures and operations if observed. If the unsatisfactory construction procedures and operations are not responded to and corrected within 48 hours, the Owner's Representative or EPSC Specialist may suspend the performance of any or all other construction until the unsatisfactory condition has been corrected. Such suspension shall not be the basis of any claim by the Contractor for additional compensation nor for an extension of time to complete the work. Any complaints, fines, etc. relating to ineffective EPSC measures, shall be the sole responsibility of the Contractor.

E. The Contractor shall inspect all EPSC measures at least at the beginning and end of each day to ascertain that all devices are functioning properly during construction and as soon as possible during or immediately after a precipitation event (e.g., rainfall or snowmelt). Maintenance of all EPSC measures on the project site shall be the responsibility of the Contractor until final stabilization is complete (>70% uniform grass cover), and until the permanent soil erosion controls are established and in proper working condition. 70% cover shall be determined by the EPSC Specialist and/or the Vermont Department of Environmental Conservation.

F. The Contractor shall protect adjacent properties and watercourses from soil erosion and sediment damage throughout construction.

1.3 GENERAL

A. EPSC measures consist of the following elements:

1. Maintenance of existing permanent or temporary storm drainage piping and channel systems, as necessary.

2. Installation and maintenance of stabilized construction entrances/exits.

3. Construction of temporary storm drainage piping and channel systems, as necessary.

4. Installation of temporary EPSC measures such as silt fences, check dams, and other methods indicated on the EPSC Plans.

5. Topsoil and Seeding: Placement and maintenance of Temporary Seeding on all areas disturbed by construction. Placement of permanent topsoil, fertilizer, and seed, etc., in all areas not occupied by structures or pavement, unless shown otherwise. Topsoil, seeding, mulching and fertilizing shall be in accordance with project environmental permits and EPSC Plans.

B. The Contractor shall be responsible for phasing Work in areas allocated for his exclusive use during this Project, including any proposed stockpile areas, to restrict sediment transport. This will include installation of any temporary EPSC devices, ditches, or other facilities.

C. The areas set aside for the Contractor's use during the Project may be temporarily developed to provide satisfactory working, staging, and administrative areas for his exclusive use. Preparation of these areas shall be in accordance with other requirements contained within these Specifications and shall he done in a manner to both control all sediment transport away from the area in a contained and stabilized manner with installation of EPSC measures.

D. All permanent stockpiles shall be seeded with soil stabilization seed and protected by construction of silt fences completely surrounding stockpiles and located within 10 feet of' the toes of the stockpile slopes.

E. Sediment transport and erosion from working stockpiles shall be controlled and restricted from moving beyond the immediate stockpile area by construction of temporary toe-of-slope ditches and accompanying silt fences as necessary. The Contractor shall keep these temporary facilities in operational condition by regular cleaning, re-grading, and maintenance.

F. The Contractor shall maintain all elements of the EPSC Plans and EPSC facilities to be constructed during this Project for the duration of his activities on this Project.

G. Formal inspections made jointly by the Contractor and the Construction Management Team, Owner's representative, OSPC, and/or EPSC Specialist shall be conducted at intervals specified in the applicable environmental permits.

H. Replacement or repair of failed or overloaded EPSC measures e.g., silt fences, check dams, or other temporary erosion control devices shall be accomplished by the Contractor as soon as possible and no later than 24 hours after receiving written notice from the EPSC Specialist or the Owner's representative.

I. If the Contractor has not complied with any of the above maintenance efforts to the satisfaction of the Construction Management Team within 2 working days after receiving written notification from the Construction Management Team, the Owner shall have the prerogative of engaging others to perform any needed maintenance or cleanup, including removal of accumulated sediment at constructed erosion control facilities, and deduct from the Contractor's monthly partial payment the costs for such efforts in accordance with the General Condition of the Contract.

1.4 SUBMITTALS

A. Submittals shall he made in accordance with Section "Submittal Procedures"

B. Material Certificates signed by material producer and Contractor, certifying that each material item complies with or exceeds specified requirements.

C. Results of all tests and investigations, including recommendations.

D. Submit product data, samples, specifications and manufacturer's installation procedures for approval as directed by Construction Management Team prior to use.

PART 2 - PRODUCTS

2.1 GENERAL

A. Contractor shall provide all materials necessary to perform the work as shown on the Drawings, required by environmental permits, or specified herein.

PART 3 - EXECUTION

3.1 GENERAL

A. The Contractor shall comply with and implement the EPSC requirements provided in the contract documents.

B. Review the EPSC Plans as they apply to current conditions. Minor deviations from the Drawings must be submitted for approval to the Construction Management Team at least 72 hours prior to commencing that work. Some deviations may require Vermont Agency of Natural Resources to review and approve and may take additional time.

C. Initial EPSC devices shall be in place prior to any land disturbing activity, in their proper sequence, and maintained until permanent protection is established. The only acceptable activities prior to EPSC measures installed are surveying/layout and clearing. Clearing contractors and crews shall follow the "Acceptable Management Practices for Maintaining Water Quality on Logging Jobs in Vermont", 10th Printing, 2009.

D. The limit of the area of any earthwork operations in progress shall be commensurate with the Contractor's capability and progress in keeping the finished grading, mulching, seeding, and other such permanent EPSC measures current and in accordance with the accepted schedule for construction phasing. Should seasonal limitations make such coordination unrealistic, as determined by the Owner's Representative, temporary EPSC measures shall be provided immediately by the Contractor at no expense of the Owner.

E. Temporary EPSC measures shall be used to correct conditions which develop during construction that are needed prior to installation of permanent control features, or that are temporarily needed to prevent erosion and control sediment that develops during normal construction practices, but are not associated with permanent control features on the project.

F. The Contractor shall incorporate all permanent EPSC measures (e.g., stabilization) into the project at the earliest practical time to minimize the need for temporary controls.

G. A stabilized construction entrance/exit (SCE) shall be installed and maintained at any point where construction vehicles enter/exit a public right-to-way, street or parking area. The SCE shall be used to eliminate mud from the construction area onto public right-of-way. The SCE shall be constructed as shown on the Drawings. Any mud or debris tracked on streets shall be cleaned up immediately.

H. All existing storm drainage outlets must be stabilized prior to construction activities. Equip all inlets with inlet protection immediately upon construction.

I. Discharge from dewatering operations for the excavated areas shall remain within the Project right-of-way unless otherwise approved by the EPSC Specialist. Discharge from dewatering operations shall not be directed to surface waters without first properly removing the suspended sediment through filtration and/or settlement to turbidity levels that are below 25 NTU. The Contractor shall obtain any required permits associated with dewatering activities.

J. Silt fence shall be installed at locations, or as noted, on the Drawings and any additional locations necessary for proper sediment control. The Contractor shall maintain the silt fence until the project is stabilized.

K. EPSC measures shall include but not be limited to the approved measures on the Project Drawings. The Contractor shall be responsible for providing all additional measures that may be necessary to accomplish the intent of the Drawings.

L. Comply with all other requirements of authorities having jurisdiction.

END OF SECTION

SECTION 315000 - EXCAVATION SUPPORT AND PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes, but is not limited to, the following:

1. Shoring and bracing necessary to protect existing buildings, streets, walkways, utilities, and other improvements and excavation against loss of ground or caving embankments.

2. Maintenance of shoring and bracing.

3. Removal of shoring and bracing, as required.

B. The purpose of this work is to insure the safety of workmen and the public exposed to the hazard of falling or sliding material. It shall be the Contractor's responsibility to provide protection adequate for this purpose. Details of this sheeting must conform with the requirements of Title 29 Code of Federal Regulations, Part 1926, Safety and Health Regulations for Construction (OSHA). The Engineer shall reserve the right to increase the minimum requirements set forth therein, depending on the hazard.

1.2 PERFORMANCE REQUIREMENTS

A. Design**,** furnish, install, monitor, and maintain excavation support and protection system capable of supporting excavation sidewalls and of resisting soil and hydrostatic pressure and superimposed and construction loads.

1. Delegated Design: Design excavation support and protection system, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

2. Prevent surface water from entering excavations by grading, dikes, or other means.

3. Install excavation support and protection systems without damaging existing buildings, structures, and site improvements adjacent to excavation.

4. Monitor vibrations, settlements, and movements.

1.3 SUBMITTALS

A. Delegated-Design Submittal: For excavation support and protection system indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer, registered in the State where the work will be completed, responsible for their preparation.

B. Layout drawings for excavation support system and other data prepared by, or under the supervision of, a qualified professional engineer.

C. System design and calculations must be acceptable to local authorities having jurisdiction.

1.4 QUALITY ASSURANCE

A. Engineer Qualifications: A professional engineer legally authorized to practice in jurisdiction where Project is located, and experienced in providing successful engineering services for excavation support systems similar in extent required for this Project.

B. Regulations: Comply with codes and ordinances of governing authorities having jurisdiction.

1.5 PROJECT CONDITIONS

A. Project-Site Information: A geotechnical report has been prepared for this Project and is available for information only. The opinions expressed in this report are those of geotechnical engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by geotechnical engineer. Owner will not be responsible for interpretations or conclusions drawn from the data

1. Make additional test borings and conduct other exploratory operations necessary for excavation support and protection.

2. The geotechnical report is included elsewhere in the Project Manual.

B. Before starting work, verify governing dimensions and elevations. Verify condition of adjoining properties. Take photographs or video tape to record any existing settlement or cracking of structures, pavements, and other improvements. Prepare a list of such damages, verified by dated photographs or video tape, and signed by Contractor and others conducting investigation.

C. During excavation, resurvey benchmarks weekly, maintaining accurate log of surveyed elevations for comparison with original elevations. Promptly notify Construction Management Team if changes in elevations occur or if cracks, sags, or other damage is evident.

D. Survey Work: Engage a qualified land surveyor or professional engineer to survey adjacent existing buildings, structures, and site improvements; establish exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.

1. During installation of excavation support and protection systems, regularly resurvey benchmarks, maintaining an accurate log of surveyed elevations and positions for comparison with original elevations and positions. Promptly notify Engineer if changes in elevations or positions occur or if cracks, sags, or other damage is evident in adjacent construction.

1.6 EXISTING UTILITIES

A. Call Dig Safe at 811 before starting any excavation or verify that a Dig Safe ticket exists and is valid for the area. Contractor shall maintain Dig Safe marks and follow all Dig Safe laws. Contractor is responsible for contacting and complying with municipal and private utilities that are not members of Dig Safe. Excavate with care to avoid damage to structures and utilities - excavations shall be completed by hand if necessary. Promptly report any damages to utilities to Utility Owner and Construction Management Team, do not attempt repairs without the Utility Owners consent.

B. Interruption of Existing Utilities: Do not interrupt any utility serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility according to requirements indicated:

1. Notify Construction Management Team and Owner no fewer than three working days in advance of proposed interruption of utility.

2. Do not proceed with interruption of utility without Construction Management Team's and Owner's written permission

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 GENERAL

A. In general, this item will be required wherever an excavation exceeds five feet in depth and the side slopes are not laid back to a safe gradient as set forth in Title 29 Code of Federal Requirements, Part 1926, Safety and Health Regulations for Construction (OSHA).

B. Wherever shoring is required, locate the system to clear permanent construction and to permit forming and finishing of concrete surfaces. Provide shoring system adequately anchored and braced to resist earth and hydrostatic pressures.

3.2 REMOVAL AND REPAIRS

A. Remove excavation support and protection systems when construction has progressed sufficiently to support excavation and bear soil and hydrostatic pressures. Remove in stages to avoid disturbing underlying soils or damaging structures, pavements, facilities, and utilities.

1. Remove excavation support and protection systems to a minimum depth of 48 inches below overlaying construction and abandon remainder.

2. Fill voids immediately with approved backfill compacted to density specified in Section "Earth Moving" or “Trenching and Backfilling”.

3. Repair or replace, as approved by Construction Management Team adjacent work damaged or displaced by removing excavation support and protection systems.

END OF SECTION

SECTION 321116 - SUBBASE COURSES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes provisions for prepared subbase courses under pavements.

B. Proof rolling of subgrade for pavements is included in this Section.

C. Replacement of unsuitable subgrade materials is included in another Section.

D. Final grading of pavement subbase is specified in this Section.

1.2 REFERENCES

A. Vermont Agency of Transportation, Standard Specifications for Construction

B. "Standard Specifications for Highway Materials and Methods of Sampling and Testing, American Association of State Highway and Transportation Officials (AASHTO)."

C. "American Society for Testing and Materials (ASTM)."

1.3 SUBMITTALS

A. Source Quality Control Test Reports: Submit test reports directly to Construction Management Team from the testing agency with copy to Contractor.

B. Field Testing Reports: Submit results of field testing directly to Construction Management Team with copy to Contractor. Reference testing location to plan, and cross-reference to all retesting required to accept installed subbase material.

1. Note action taken next to all sub-standard test results.

1.4 QUALITY ASSURANCE

A. Testing Laboratory Qualifications: To qualify for acceptance, the soil testing laboratory must demonstrate to Construction Management Team's satisfaction, based on evaluation of laboratory-submitted criteria conforming to ASTM E 699, that it has the experience and capability to conduct the required testing without delaying the progress of the Work.

B. Field Testing and Inspection Service: Owner shall retain the services of the same independent soil testing laboratory used for source qualification testing to provide soil testing during pavement subbase installation.

PART 2 - PRODUCTS

2.1 SOURCE QUALIFICATION TESTING

A. Contractor shall employ and pay for a qualified independent soil testing laboratory to perform soil testing services for source qualification.

1. Obtain a 100-pound minimum representative sample from each potential aggregate source. Obtain samples for each different material gradation known to exist in the pit. Mix each sample thoroughly in accordance with AASHTO T87, and submit to the testing laboratory for reduction to specimen size. The laboratory shall perform the following tests in the order shown. Each material shall pass all tests in order to qualify.

a. Particle Size Analysis:

Method:	ASTM D422
Number of Tests:	Two (2) per potential source.
Acceptance Criteria:	Gradation within specified limits.

b. Maximum Density Determination:

Method:	ASTM D1557 Modified Proctor
Number of Tests:	Two (2) per potential source.

Re-establish subbase material properties if source is changed during construction.

2.2 MATERIALS

A. Materials for subbase specified on project plans per VTrans Construction Specifications Section 704.04.

PART 3 - EXECUTION

3.1 PREPARATION

A. Establish required lines, levels, contours, and datum.

B. Maintain benchmarks and other elevation control points. Re-establish, if disturbed or destroyed, at no additional cost to Owner.

C. Proof-roll existing subgrade to the satisfaction of the Construction Management Team. Should the subbase course become unstable at any time prior to the placement of the overlying course(s), correct the unstable condition to the satisfaction of the Construction Management Team. Replace unstable or weak subgrade materials with suitable material as provided in the Specifications.

3.2 INSTALLATION

A. Place subbase material in uniform horizontal layers, with a maximum compacted thickness of 12 inches.

B. Place subbase in a manner to avoid segregation. Uncontrolled spreading shall not be permitted.

3.3 COMPACTION

A. Where subbase courses must be moisture-conditioned before compaction, uniformly apply water to the surface. Prevent free water from appearing on the surface during or subsequent to compaction operations.

B. Compact all portions of each layer to a density not less than 95 percent of the maximum dry density based on modified proctor.

C. Final tolerances for the top surface of the subbase course requires that the surface does not extend more than ¼ inch above nor more than ¼ inch below the specified grade at any location.

3.4 TRAFFIC ON SUBBASE

A. The movement of vehicular traffic over the final surface of the subbase may be permitted at locations designated by, and under such restrictions as ordered by the Construction Management Team, provided such movements take place prior to the final finishing of this course to the specified tolerance. The movement of construction equipment on this course may be permitted, at locations designated by and under such restrictions as ordered by the Construction Management Team at locations where permission is granted for such movement, the temporary surface of the course upon which the construction traffic is running, shall be placed and maintained for at least 2 inches above the final surface of this course. Just prior to paving, and after all construction traffic not required for the removal has ceased, remove the 2 inch protective layer, prepare the exposed surface of the course, and compact to the specified tolerance.

B. Should the subbase become mixed with the subgrade or any other material, through any cause whatsoever, remove such mixture and replace it with the specified subbase material.

3.5 FIELD QUALITY CONTROL

A. Notify the Construction Management Team at least three (3) working day in advance of all phases of subbase installation.

B. Comply with the requirements of this Section for in-place relative density testing.

1. In-place relative density:

Method:	AASHTO T238, Nuclear Method
Number of Tests:	One (1) per specified interval.
Acceptance Criteria:	± Two (2) percent of specified percent compactions.

2. Compaction tests shall be provided for each road crossing area. A minimum of one for each lift is required.

3. The Construction Management Team may direct additional tests to establish gradation, maximum density, and in-place density as required by working conditions.

4. Acceptance Criteria: The sole criterion for acceptability of in-place subbase shall be in situ dry density. Minimum dry density for all subbase shall be 95 percent of the maximum dry density. If a test fails to qualify, the fill shall be further compacted and re-tested. Subsequent test failures shall be followed by removal and replacement of the material.

END OF SECTION

SECTION 321216 - ASPHALT PAVING

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes provisions for hot-mixed asphalt concrete paving over prepared subbase.

B. This section includes provisions for replacing pavement removed during the course of the Work, or damaged resulting from Contractor's operations.

1.2 REFERENCES

A. Vermont Agency of Transportation, 2011 Standard Specifications for Construction

B. "Standard Specifications for Highway Materials and Methods of Sampling and Testing, American Association of State Highway and Transportation Officials (AASHTO)."

C. "American Society For Testing and Materials (ASTM)."

1.3 SUBMITTALS

A. Material Certificates signed by material producer and Contractor, certifying that each material item complies with or exceeds specified requirements.

B. Field Test Reports: Submit results of field testing directly to the Construction Management Team.

1.4 SITE CONDITIONS

A. Weather Limitations: VTrans Standard 406.04 shall apply.

B. Grade Control: Establish and maintain required lines and elevations.

C. In no instance shall the materials and thicknesses of pavement and subbase courses replaced be less than that removed, unless approved by the Construction Management Team.

1.5 SEQUENCING AND SCHEDULING

A. Coordinate the placement of asphalt concrete pavement with the completion of underground work by other trades.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Asphalt concrete and all related items shall meet the requirements of VTrans Division 400.

B. Performance Graded Binder: PG 58-28**,** VTrans Specification 406

C. Base Course: VTrans Specification 406, Type I

D. Binder Course: VTrans Specification 406, Type II

E. Top Course: VTrans Specification 406, Type IV

F. Tack Coat: Emulsified asphalt shall meet VTrans 702.04

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

A. General: Remove loose material from compacted subbase surface immediately before commencing paving operations.

B. Proof-roll prepared subbase surface with a ten-ton static, steel-wheel roller to check for unstable areas and areas requiring additional compaction, witnessed by the Construction Management Team at least forty-eight (48) hours prior to scheduled paving operations. If there is precipitation after proof-rolling and prior to pavement installation, contractor shall conduct an additional proof-roll at no additional cost to the Owner.

C. Do not begin paving work until deficient subbase areas have been corrected and are ready to receive paving.

D. Herbicide Treatment: Apply chemical weed control agent in strict compliance with manufacturer's recommended dosages and application instructions. Apply to compacted, dry subbase.

E. Sawcut edges of existing pavement to achieve straight line transitions between old and new pavement. Make a second sawcut through the top course of existing pavement, 18 inches from the first cut to provide a staggered joint.

F. Tack Coat: Apply to contact surfaces of previously constructed asphalt or Portland cement concrete and surfaces abutting or projecting into asphalt concrete pavement. Distribute at rate of 0.03 to 0.07 gallons per square yard of surface.

G. Allow to dry until at proper condition to receive paving.

H. Exercise care in applying bituminous materials to avoid smearing of adjoining surfaces. Remove and clean damaged surfaces.

I. Do not commence pavement replacement operations until all buried work beneath pavement repair has been completed to the satisfaction of the Construction Management Team.

J. Where trench dimensions preclude the use of proof rolling equipment, demonstrate the stability of the subgrade and subbase through other means, as acceptable to the Construction Management Team.

3.2 PLACING AND COMPACTING MIX

A. General: Place and compact asphalt pavement courses in accordance with VTrans Division 400**,** unless otherwise specified.

B. Place inaccessible and small areas by hand, and compact with hot hand tampers or vibrating plate compactors.

C. Chamfer edges of walks at 45° angle where walks do not abut curb.

D. Joints: Make joints between old and new pavements, or between successive days' work, to ensure continuous bond between adjoining work. Construct joints to have same texture, density, and smoothness as other sections of asphalt concrete course. Clean contact surfaces and apply tack coat.

E. Place tack coat between successive courses. Apply tack coat at a rate of 0.03 to 0.07 gallons per square yard of surface.

F. Compaction: Compact asphalt pavement courses with a static steel wheel roller only, unless otherwise approved by the Construction Management Team, based upon work conditions.

G. Remove and patch areas of any asphalt concrete course deemed unsatisfactory by the Construction Management Team, at the Contractor's expense. Remove hardened or set asphalt by saw cutting and/or scarifying.

H. Adhere to VTrans compaction requirements. This, however, shall not relieve the Contractor of his responsibility to provide a well densified pavement. It shall be the Contractor's obligation to recognize difficulties in compacting the mix, and to make appropriate corrections.

I. Roll and compact the asphalt concrete course until the finished surface is free from depressions, waves or other defects that would prevent proper drainage. The finished surface shall be uniform in texture and appearance.

J. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled to 140 degrees F and hardened. The use of water to cool pavement is not permitted.

3.3 FIELD QUALITY CONTROL

A. General: Testing in-place asphalt concrete courses for compliance with requirements for thickness and surface smoothness will be done by Owner's testing laboratory. Repair or remove and replace unacceptable paving as directed by Construction Management Team.

B. Thickness: In-place compacted thickness tested in accordance with ASTM D 3549 will not be acceptable if exceeding following allowable variations:

1. Base Course: Plus or minus 1/2 inch.

2. Binder and Surface Course: Plus or minus 1/4 inch.

3. Cumulative Thickness Tolerances: Plus or minus 1/4 inch for nominal cumulative thicknesses less than or equal to 4 inches. Plus or minus 1/2 inch for nominal cumulative thicknesses greater than 4 inches.

C. Surface Smoothness: Test finished surface of each asphalt concrete course for smoothness, using 10-foot straightedge applied parallel with and at right angles to centerline of paved area. Surfaces will not be acceptable if exceeding the following tolerances for smoothness:

1. Base and Binder Course Surfaces: 1/4 inch.

2. Wearing Course Surface: 3/16 inch.

3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch.

D. Check surface areas at intervals as directed by Construction Management Team.

E. Scuff Resistance: If, in the opinion of the Construction Management Team, the pavement does not demonstrate reasonable resistance to deformation by punching loads and scuffing under horizontally applied shearing loads, after the pavement has cooled and hardened, the Construction Management Team may require laboratory testing of cored pavement samples to determine the properties of the pavement; including aggregate gradation, asphalt content, air void ratio, density and any others deemed appropriate. If laboratory testing indicates that any parameters substantially deviate from the design mix tolerances specified by VTrans, replace the affected areas of pavement at no additional cost, and reimburse the Owner for all costs incurred in procurement and testing of cores.

END OF SECTION

SECTION 321500 - CRUSHED STONE/GRAVEL SURFACING

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes the placement of crushed stone and gravel surface courses.

B. Place crushed stone and gravel in conformance with the lines, grades, thicknesses and typical sections as shown or detailed on the Drawings.

1.2 REFERENCES

A. "Standard Specifications for Highway Materials and Methods of Sampling and Testing, American Association of State Highway and Transportation Officials (AASHTO)."

B. "American Society for Testing and Materials (ASTM)."

C. Vermont Agency of Transportation, Standard Specifications for Construction

1.3 SUBMITTALS

A. Test Reports:

1. The Contractor shall submit written and certified test reports from the quarry regarding the gradation and moisture-density curves of the proposed products.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Bank Run Gravel Subbase Course: Material shall meet VTrans Specification 704.04, or approved equal.

B. Surface Course: Material shall meet VTrans Specification 704.12, or approved equal.

C. It shall be the Contractor's responsibility to provide a material which meets this specification and is within his capabilities to fine grade to the required tolerances. Should the subbase course become unstable at any time prior to the placement of the overlying course due to the gradation of the material furnished, the Contractor shall, at their expense, correct the unstable condition to the satisfaction of the Engineer.

D. All material shall meet the specified gradation prior to placement. All processing shall be completed at the source.

PART 3 - EXECUTION

3.1 PREPARATION

A. Establish required lines, levels, contours, and datum.

B. Maintain benchmarks and other elevation control points. Re-establish, if disturbed or destroyed at no additional cost to the Owner.

C. Place subbase only after subgrade has been proof-rolled and approved by the Construction Management Team. Unstable or weak subgrade materials shall be replaced with suitable material at the Contractor's expense.

3.2 PLACING

A. All subbase material shall be placed in uniform horizontal layers with a maximum compacted thickness of 12 inches.

B. Place the subbase in a manner to avoid segregation.

3.3 COMPACTION

A. Where subbase courses must be moisture-conditioned before compaction, uniformly apply water to the surface. Prevent free water from appearing on the surface during, or subsequent to, compaction operations.

B. All portions of each layer shall be compacted to a density not less than 95 percent of the maximum dry density.

C. After compaction, the top surface of the subbase course shall not extend more than 1 inch above nor more than 1 inch below the specified grade at any location.

3.4 TRAFFIC ON SUBBASE

A. The movement of traffic over the final surface of the subbase may be permitted at locations designated by, and under such restrictions as ordered by the Construction Management Team, provided such movements take place prior to the final finishing of this course to the specified tolerance. The movement of construction equipment on this course may be permitted, at locations designated by and under such restrictions, as ordered by the Construction Management Team. At locations where permission is granted for such movement, the temporary surface of the course, upon which the construction traffic is running, shall be placed and maintained at least 2 inches above the final surface of the course. Just prior to paving and after all construction traffic, not required for the removal, has ceased, the 2 inch protective layer shall be removed, and the exposed surface of the course prepared and compacted to the specified tolerance.

B. Should the subbase become mixed with the subgrade or any other material, through any cause whatsoever, the Contractor shall, at their expense, remove such mixture and replace it with the appropriate subbase material.

3.5 FIELD QUALITY CONTROL

A. Notify the Construction Management Team at least three (3) working days in advance of all phases of filling and backfilling operations.

B. Compaction testing shall be performed to ascertain the compacted dry density of the fill and backfill materials. Compaction testing shall be paid for by the Owner and coordinated by the Construction Management Team.

C. If deemed necessary by the Construction Management Team, compaction testing shall be conducted for each lift of fill at each site.

D. The Construction Management Team may direct additional tests to establish gradation, maximum density, and in-place density as required by working conditions. If the test results show that the installed material does not meet the specification, the Contractor shall remedy at their expense.

E. Acceptance Criteria: Minimum dry density for all subbase materials shall be 95 percent of the maximum dry density based on the modified proctor. If a test fails to qualify, the fill shall be further compacted and re-tested. Subsequent test failures shall be followed by removal and replacement of the material.

END OF SECTION