Exhibit VGS-AG-032

CONSTRUCTION DEMARCATION:

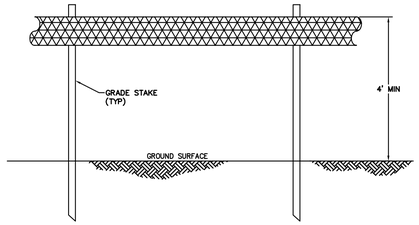
1. CONSTRUCTION DEMARCATION TO BE INSTALLED ALONG PERIMETER OF LIMITS OF DISTURBANCE PER THE EPSC PLAN.
2. DEMARCATION IS NOT TO CROSS ACTIVE ACCESS ROUTES.
3. WITHIN AT LEAST 50 FEET OF A WATER RESOURCE AREA, DEMARCATION MUST INCLUDE:
   a. 2 TO 3 ROWS OF STAKED (OR STAPLED) 3 INCH ORANGE BARRIER MESH TAPE OR ROPE,
   b. ORANGE CONSTRUCTION FENCE, OR
   c. ORANGE SNOW FENCE.
   d. OTHER INTERCHANGEABLE AND/OR DEC APPROVED MEASURE.
4. GREATER THAN AT LEAST 50 FEET FROM WATER RESOURCE AREAS, DEMARCATION MAY INCLUDE:
   a. ONE ROW OF STAKED (OR STAPLED) 3 INCH ORANGE BARRIER MESH TAPE OR ROPE, OR
   b. ORANGE FLAGGING OR PAINT.
   c. OTHER INTERCHANGEABLE AND/OR DEC APPROVED MEASURE.

1 Construction Demarcation Table 12/12
N.T.S. Source: VHB LD_

PERIMETER CONTROLS:

1. PERIMETER CONTROLS ARE TO BE INSTALLED ON DOWNSLOPE SIDE OF AREAS OF DISTURBANCE WHERE THERE IS POTENTIAL FOR SEDIMENT RUNOFF AND/OR SOIL EROSION.
2. PERIMETER CONTROLS ARE NOT TO CROSS ACTIVE ACCESS ROUTES (E.G., ROADS) OR ACTIVE FLOW PATHS (E.G., A STREAM).
3. PARTICULAR CARE IS TO BE TAKEN WHEN INSTALLING PERIMETER CONTROLS IN A WETLAND.
4. WITHIN AT LEAST 50 FEET OF WATER RESOURCE AREAS, PERIMETER CONTROLS MUST INCLUDE:
   a. REINFORCED SILT FENCE – TO BE REINFORCED WITH WIRE MESH, STAKED HAYBALES, STAKED FIBER ROLLS, EROSION CONTROL MIX BERMS, OR WOOD CHIP BERMS.
   b. STONE BERMS
   c. OTHER INTERCHANGEABLE AND/OR DEC–APPROVED MEASURE.
5. GREATER THAN AT LEAST 50 FEET FROM WATER RESOURCE AREAS, PERIMETER CONTROLS MAY INCLUDE:
   a. SILT FENCE (NON–REINFORCED)
   b. STAKED FIBER ROLLS
   c. EROSION CONTROL MIX BERMS
   d. OTHER INTERCHANGEABLE AND/OR DEC–APPROVED MEASURE.

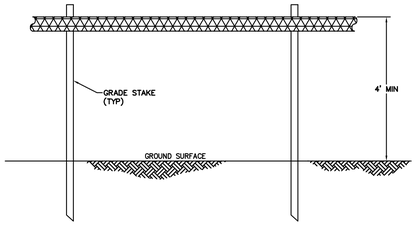
2 Perimeter Control Table 12/12
N.T.S. Source: VHB LD_



Notes:

1. BARRIER MESH TAPE OR ROPE SHALL BE INSTALLED ALONG THE PERIMETER OF THE PROJECT AREA TO DEMARCATE THE LIMIT OF DISTURBANCE. NO EARTHWORK OR STORAGE OF MATERIALS SHALL BE CONDUCTED BEYOND THIS LIMIT WITHOUT PRIOR APPROVAL FROM THE OSPC.
2. USE 3" ORANGE BARRIER MESH TAPE OR 1/2" YELLOW POLYPROPYLENE ROPE.
3. WITHIN 50' OF WATER RESOURCE AREAS, USE 2–3 ROWS OF TAPE OR ROPE. BEYOND 50' OF WATER RESOURCE AREAS USE 1 ROW OF TAPE OR ROPE.
4. TAPE OR ROPE MAY BE FASTENED TO STAKES, TREES, OR OTHER APPROPRIATE FIXED OBJECTS.
5. PROJECT DEMARCATION SHALL NOT CROSS ACTIVE ACCESS ROUTES (E.G. ROADS). PROJECT DEMARCATION MAY CROSS RESOURCE AREAS WITH EXCEPTION OF LARGER WATER BODIES WHERE IT IS NOT FEASIBLE OR ADVISABLE.
6. PROJECT DEMARCATION SHALL REMAIN IN PLACE AND BE MAINTAINED/REPLACED AS NEEDED UNTIL FINAL STABILIZATION IN THE AREA HAS BEEN ACHIEVED.

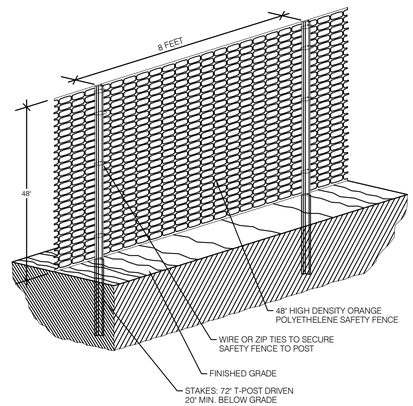
3 Barrier Mesh Tape or Rope 12/12
N.T.S. Source: VHB LD_



Notes:

1. BARRIER FLAGGING OR PAINT SHALL BE INSTALLED ALONG THE PERIMETER OF THE PROJECT AREA TO DEMARCATE THE LIMIT OF DISTURBANCE. NO EARTHWORK OR STORAGE OF MATERIALS SHALL BE CONDUCTED BEYOND THIS LIMIT WITHOUT PRIOR APPROVAL FROM THE OSPC.
2. FLAGGING OR PAINT MAY BE FASTENED TO STAKES, TREES, OR OTHER APPROPRIATE FIXED OBJECTS.
3. PROJECT DEMARCATION SHALL NOT CROSS ACTIVE ACCESS ROUTES (E.G. ROADS). PROJECT DEMARCATION MAY CROSS RESOURCE AREAS WITH THE EXCEPTION OF LARGER WATER BODIES WHERE IT IS NOT FEASIBLE OR ADVISABLE.
4. PROJECT DEMARCATION SHALL REMAIN IN PLACE AND BE MAINTAINED/REPLACED AS NEEDED UNTIL FINAL STABILIZATION IN THE AREA HAS BEEN ACHIEVED.

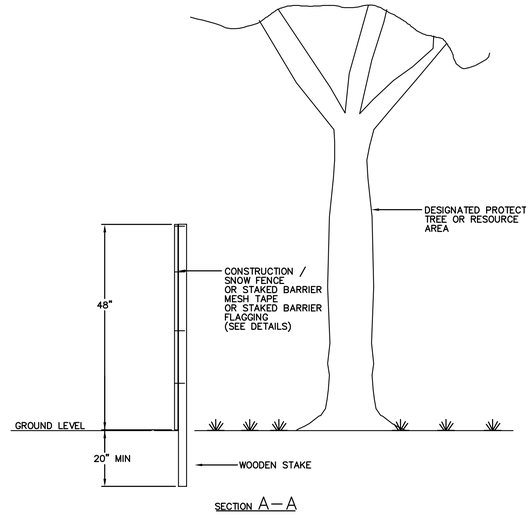
4 Barrier Flagging or Paint 12/12
N.T.S. Source: VHB LD_

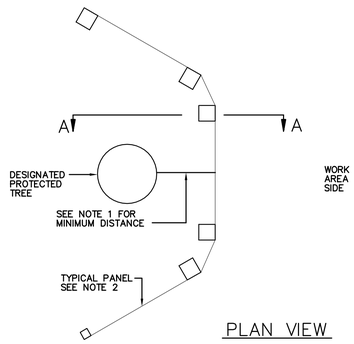


Notes:

1. CONSTRUCTION/SNOW FENCE SHALL BE INSTALLED WITHIN 50' OF A WATER RESOURCE, (STREAM, BROOK, LAKE, POND, ETC.) UNLESS THE AREA IS DENSELY WOODED, IN WHICH CASE 2 TO 3 ROWS OF ORANGE BARRIER MESH TAPE OR ROPE MAY BE USED.
2. CONSTRUCTION/SNOW FENCE SHALL NOT CROSS ACTIVE ACCESS ROUTES (E.G. ROADS). CONSTRUCTION/SNOW FENCE MAY CROSS RESOURCE AREAS WITH THE EXCEPTION OF LARGER WATER BODIES WHERE IT IS NOT FEASIBLE OR ADVISABLE.
3. CONSTRUCTION/SNOW FENCE SHALL REMAIN IN PLACE AND BE MAINTAINED/REPLACED AS NEEDED UNTIL FINAL STABILIZATION IN THE AREA HAS BEEN ACHIEVED.

5 Construction/Snow Fence 12/12
N.T.S. Source: VHB LD_651

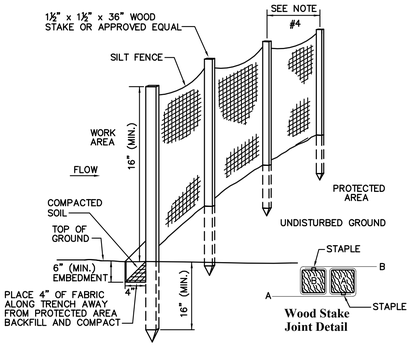




NOTES:

1. MINIMUM DISTANCE BETWEEN RESOURCE AND BARRIER SHALL BE 25' UNLESS OTHERWISE DIRECTED BY OSPC.
2. RESOURCES REQUIRING PROTECTION FOR ALL SIDES WILL BE BOXED WITH A MINIMUM OF 4 PANELS.
3. BARRIER MAY BE CONSTRUCTION/SNOW FENCE, STAKED BARRIER MESH TAPE, OR STAKED BARRIER FLAGGING. (SEE DETAILS.)
4. BARRIER TO REMAIN IN PLACE UNTIL CONSTRUCTION ACTIVITIES IN AREA ARE COMPLETE OR AS AS OTHERWISE DIRECTED BY OSPC.

6 Wetland, RTE, and Vegetation Protection Barrier 12/12
N.T.S. Source: CHA LD_



Notes:

1. SEE DETAIL # 2 ON SHEET ANGP–T–G–012 FOR LIST OF APPROPRIATE PERIMETER CONTROLS TO USE.
2. FILTER CLOTH SHALL BE EITHER FILTER X, MIRAFI 100X, STABILINKA T140N OR APPROVED EQUIVALENT.
3. FOR FILTER CLOTH FENCE WHEN ELONGATION IS >50%, POST SPACING SHALL NOT EXCEED 4 FT. FOR FILTER CLOTH FENCE WHEN ELONGATION IS <50%, POST SPACING SHALL NOT EXCEED 6 FT.
4. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVER–LAPPED BY 6 INCHES AND FOLDED.
5. PREFABRICATED UNITS SHALL BE GEOFAB, ENVIROFENCE OR APPROVED EQUIVALENT.
6. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN SEDIMENT REACHES HALF OF FABRIC HEIGHT AND DISPOSED OF IN AN UPLAND AREA.
7. PERIMETER CONTROLS SHALL NOT CROSS ACTIVE ACCESS ROUTES (E.G., ROADS) IR ACTIVE FLOW PATHS (E.G., LARGER STREAMS/RIVERS).
8. PERIMETER CONTROLS SHALL REMAIN IN PLACE AND BE MAINTAINED/REPLACED AS NEEDED UNTIL FINAL STABILIZATION IN THE AREA HAS BEEN ACHIEVED.

7 Silt Fence 12/12
N.T.S. Source: VHB LD_650VT

DWG. NO.	REFERENCE DWG.	REV	DSN	CK		DESCRIPTION		BID INITIALS	BID DATE	CONSTRUCTION INITIALS	CONSTRUCTION DATE
							ENVIRONMENTAL	JLS	06/28/13		
							DRAFTING DESIGNER	GIL	06/28/13		
							DRAFTING SUPERVISOR	BZD	06/28/13		
							DESIGN ENGINEER	MDF	06/28/13		
		0	MDF	SAB		ISSUED FOR CONSTRUCTION	DESIGN MANAGER	SAB	06/28/13		

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
CONSTRUCTION DETAILS

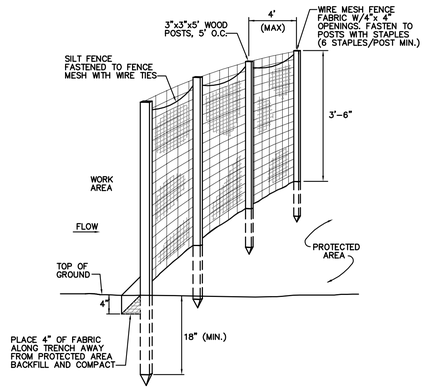
LOC. CHITTENDEN & ADDISON COUNTIES

Vermont Gas

VHB Vanasse Hangen Brustlin, Inc.

CHA
36 Cordage Park Circle , Suites 321, 326, 329, 336
Plymouth, MA 02360
Main: (781) 982-7700 - www.chacompanies.com

YEAR: 2013	W.O.	SCALE: NOTED	DWG. ANGP–T–G–012	REV. 0



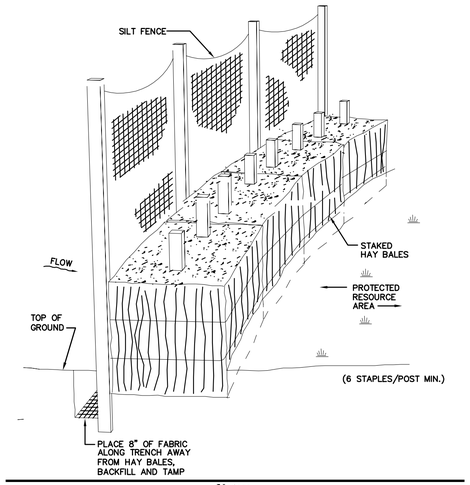
Notes:

1. SEE DETAIL #2 ON SHEET ANGP-T-G-012 FOR LIST OF APPROPRIATE PERIMETER CONTROLS TO USE
2. FILTER CLOTH SHALL BE EITHER FILTER X, MIRAFI 100X, STABILINKA T140N OR APPROVED EQUIVALENT.
3. FOR FILTER CLOTH FENCE WHEN ELONGATION IS >50% POST SPACING SHALL NOT EXCEED 4 FT. FOR FILTER CLOTH FENCE WHEN ELONGATION IS <50% POST SPACING SHALL NOT EXCEED 6 FT.
4. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVER-LAPPED BY 6 INCHES AND FOLDED.
5. PREFABRICATED UNITS SHALL BE GEOFAB, ENVIROFENCE OR APPROVED EQUIVALENT.
6. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN SEDIMENT REACHES HALF OF FABRIC HEIGHT AND DISPOSED OF IN AN UPLAND AREA.
7. PERIMETER CONTROLS SHALL NOT CROSS ACTIVE ACCESS ROUTES (E.G., ROADS) OR ACTIVE FLOW PATHS (E.G., LARGER STREAMS/RIVERS).
8. PERIMETER CONTROLS SHALL REMAIN IN PLACE AND BE MAINTAINED/REPLACED AS NEEDED UNTIL FINAL STABILIZATION IN THE AREA HAS BEEN ACHIEVED.

1 Reinforced Silt Fence with Wire Mesh

12/12

N.T.S. Source: VHB LD_651



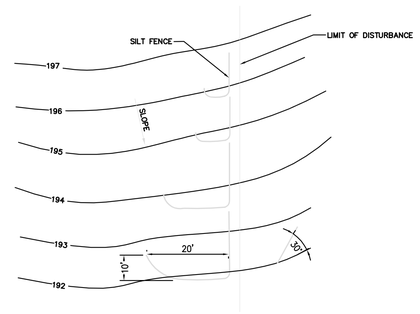
Notes:

1. SEE DETAIL # 2 ON SHEET ANGP-T-G-012 FOR LIST OF APPROPRIATE PERIMETER CONTROLS TO USE
2. SEE SILT FENCE DETAIL AND NOTES FOR INSTALLATION SPECIFICATIONS FOR SILT FENCE.
3. SEE STAKED HAY BALE DETAIL AND NOTES FOR INSTALLATION SPECIFICATIONS FOR STAKED HAY BALES.
4. STAKED HAY BALES MAY BE INTERCHANGED WITH STAKED FIBER ROLLS, EROSION CONTROL MIX BERM, WOOD CHIP BERM, OR STONE BERM. IN WATER RESOURCE AREAS USE OF BERMS IS NOT RECOMENDED.
5. PERIMETER CONTROLS SHALL NOT CROSS ACTIVE ACCESS ROUTES (E.G., ROADS) OR ACTIVE FLOW PATHS (E.G., LARGER STREAMS/RIVERS).
6. PERIMETER CONTROLS SHALL REMAIN IN PLACE AND BE MAINTAINED/REPLACED AS NEEDED UNTIL FINAL STABILIZATION IN AREA HAS BEEN ACHIEVED.

2 Reinforced Silt Fence with Staked Hay Bales

12/12

N.T.S. Source: VHB LD_



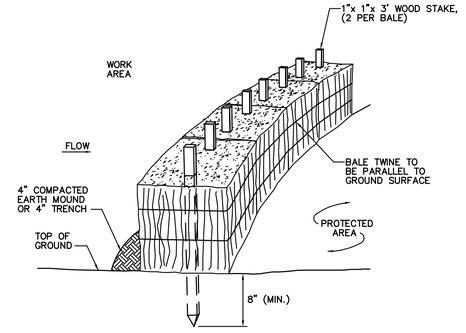
Notes:

1. SILT FENCE SHALL BE INSTALLED IN SHORTER RUNS WITH "J-HOOKS" TO AVOID CONCENTRATION OF FLOWS AT ONE LOCATION BY TRAPPING RUNOFF AT MULTIPLE POINTS ALONG A SLOPE.
2. MINIMUM WIDTH OF J-HOOK RECOMMENDED AT 20 FT WITH A DEPTH OF 10 FT. WHERE SPACE IS LIMITED (E.G., ALONG NARROW RIGHTS OF WAY), NARROWER HOOKS CAN BE USED WITH A HIGHER SPACING FREQUENCY.
3. START DOWN-GRADIENT SILT FENCE LINE AS CLOSE AS POSSIBLE TO UP-GRADIENT J-HOOK.
4. SEE SILT FENCE NOTES FOR INSTALLATION SPECIFICATIONS.

3 Silt Fence "J-Hooks"

12/12

N.T.S. Source: VHB LD_



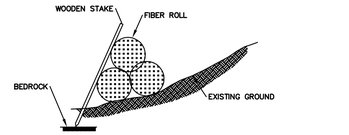
Notes:

1. ENSURE BALES ARE TRENCHED INTO THE GROUND (4" MIN) OR A 4" COMPACTED EARTH MOUND IS PRESENT ON UP GRADIENT SIDE OF BARRIER.
2. ENSURE BALES ARE INSTALLED SO ROPE RUNS PARALLEL TO GROUND.
3. ENSURE STAKES ARE PROPERLY HAMMERED IN, LEAVING ~ 4" OF EXPOSURE ABOVE THE BALE.
4. REMOVE ACCUMULATED SEDIMENT WHEN IT REACHES ½ OF THE OVERALL HEIGHT. DISPOSE OF IN AN UPLAND AREA AWAY FROM WATER FLOW.
5. MAINTAIN AND REPLACE HAY BALES AS NEEDED.

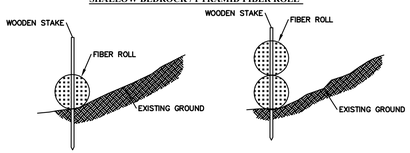
4 Staked Hay Bales

12/12

N.T.S. Source: VHB LD_653



SHALLOW BEDROCK / PYRAMID FIBER ROLL



SINGLE STAKED FIBER ROLL

STACKED STAKED FIBER ROLL

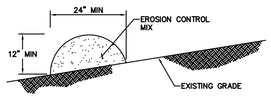
Notes:

1. SEE DETAIL # 2 ON SHEET ANGP-T-G-012 FOR LIST OF APPROPRIATE PERIMETER CONTROLS TO USE.
2. FIBER ROLL SHALL BE PLACED IN SHALLOW TRENCH UP TO 4", WHERE FEASIBLE, PLACING SOIL REMOVED FROM TRENCH BEHIND THE ROLL.
3. FIBER ROLLS SHALL BE ANCHORED WITH 2" BY 2" WOODEN STAKES (36" LONG), OR SIMILAR, WHERE FEASIBLE, EITHER INSTALLED THROUGH CENTER OF ROLL (AS SHOWN) OR PLACED ON BOTH SIDES OF ROLL.
4. STAKES TO BE PLACED 4 FT APART, MINIMUM.
5. SINGLE OR DOUBLE STACKED STAKED FIBER ROLLS TO BE INSTALLED WHERE SOIL DEPTH ALLOWS. WHERE SHALLOW TO BEDROCK, PYRAMID FIBER ROLLS TO BE UTILIZED WITH STAKES, AS FEASIBLE.
6. FIBER ROLLS TO BE REPLACED OR REPLENISHED AS NEEDED DURING ACTIVE EARTH WORK.
7. PERIMETER CONTROLS SHALL NOT CROSS ACTIVE ACCESS ROUTES (E.G., ROADS) OR ACTIVE FLOW PATHS (E.G., STREAMS/RIVERS).
8. PERIMETER CONTROLS SHALL REMAIN IN PLACE AND BE MAINTAINED/REPLACED AS NEEDED UNTIL FINAL STABILIZATION IN AREA HAS BEEN ACHIEVED.

5 Staked Fiber Roll

12/12

N.T.S. Source: VHB LD_



Notes:

COMPOSITION

EROSION CONTROL MIX BERM SHALL CONSIST PRIMARILY OF ORGANIC MATERIAL AND MAY INCLUDE: SHREDDED BARK, STUMP GRINDINGS, COMPOSTED BARK AND/OR ACCEPTABLE MANUFACTURED PRODUCTS. WOOD AND BARK CHIPS, GROUND CONSTRUCTION DEBRIS, OR REPROCESSED WOOD PRODUCTS ARE NOT ACCEPTABLE AS THE ORGANIC COMPONENT OF THE MIX.

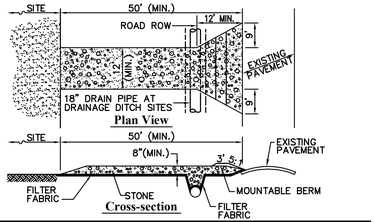
INSTALLATION

1. SEE DETAILS # 2 ON SHEET ANGP-T-G-012 FOR LIST OF APPROPRIATE PERIMETER CONTROLS TO USE.
2. THE BERM SHALL BE PLACED ALONG A RELATIVELY LEVEL CONTOUR.
3. EXISTING GROUND SHALL BE PREPARED AS NEEDED SUCH THAT THE BERM LIES NEARLY FLAT ALONG THE GROUND TO AVOID THE CREATION OF VOIDS AND BRIDGES IN ORDER TO MINIMIZE THE POTENTIAL OF WASH OUTS UNDER THE BERM.
4. ON SLOPES < 5% OR AT THE BOTTOM OF STEEPER SLOPES (<2:1) UP TO 20' LONG, THE BERM MUST BE A MINIMUM OF 12" HIGH, AS MEASURED ON THE UPHILL SIDE OF THE BERM, AND A MINIMUM OF 2 FT. WIDE. ON LONGER OR STEEPER SLOPES, THE BERM SHALL BE WIDER TO ACCOMMODATE ADDITIONAL FLOW.
5. BERM MAY BE INSTALLED IN PLACE OF SILT FENCE EXCEPT IN, BUT NOT LIMITED TO, THE FOLLOWING AREAS: WETLAND AREAS, AT POINTS OF CONCENTRATED FLOW, BELOW STORMWATER OUTFALLS, AROUND CATCH BASINS AND CLOSED STORM SYSTEMS AND AT THE BOTTOM OF STEEP SLOPES THAT ARE MORE THAN 50 FEET FROM TOP TO BOTTOM. BERM MAY BE USED IN WETLAND BUFFER AREAS BUT MAY NOT BE USED IN WETLANDS AREA.
6. PERIMETER CONTROLS SHALL NOT CROSS ACTIVE ACCESS ROUTES (E.G., ROADS) OR ACTIVE FLOW PATHS (E.G., LARGER STREAMS RIVERS).
7. PERIMETER CONTROLS SHALL REMAIN IN PLACE AND BE MAINTAINED/REPLACED AS NEEDED UNTIL FINAL STABILIZATION IN AREA HAS BEEN ACHIEVED.

6 Erosion Control Mix Berm

12/12

N.T.S. Source: VHB LD_



Notes:

1. STONE SIZE: USE 1 TO 4 INCH DIAMETER STONE, OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
2. LENGTH: NOT LESS THAN 50 FEET.
3. THICKNESS: NOT LESS THAT 8 INCHES.
4. WIDTH: EXIT WIDTH SHALL BE A TWELVE (12) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS.
5. GEOTEXTILE: MUST BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING STONE.
6. SURFACE WATER: ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION EXITS SHALL BE PIPED BENEATH THE EXIT. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
7. MAINTENANCE: THE EXIT SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY. MAINTENANCE MAY REQUIRE TOP DRESSING W/ADDITIONAL AGGREGATE.
8. WHEN WHEEL/EQUIPMENT WASHING IS REQUIRED IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
9. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED ACCORDING TO PERMIT REQUIREMENTS.
10. STABILIZED CONSTRUCTION EXIT SHALL BE REMOVED PRIOR TO FINAL FINISH MATERIALS BEING INSTALLED.

7 Stabilized Construction Exit

12/12

N.T.S. Source: VHB LD_

SPACE INTENTIONALLY LEFT BLANK

DWG. NO.	REFERENCE DWG.	REV	DSN	CK		DESCRIPTION
		0	MDF	SAB		ISSUED FOR CONSTRUCTION

		BID		CONSTRUCTION	
		INITIALS	DATE	INITIALS	DATE
ENVIRONMENTAL	JLS		06/28/13		
DRAFTING DESIGNER	GIL		06/28/13		
DRAFTING SUPERVISOR	BZD		06/28/13		
DESIGN ENGINEER	MDF		06/28/13		
DESIGN MANAGER	SAB		06/28/13		

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
CONSTRUCTION DETAILS

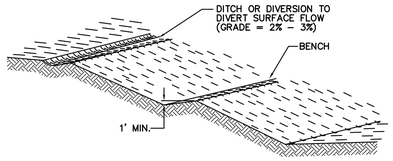
LOC. CHITTENDEN & ADDISON COUNTIES

Vermont Gas

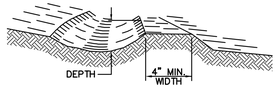
VHB Vanasse Hangen Brustlin, Inc.

CHA
36 Cordage Park Circle, Suites 321, 326, 329, 336
Plymouth, MA 02360
Main: (781) 982-7700 - www.chacompanies.com

YEAR: 2013	W.O.	SCALE: NOTED	DWG. ANGP-T-G-013	REV. 0



PLAN VIEW
N.T.S.

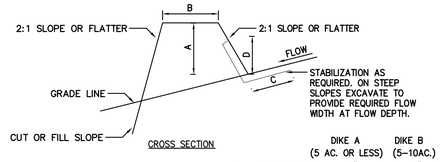


CROSS–SECTION
N.T.S.

Notes:

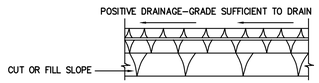
1. ALL TREES, BRUSH, STUMPS, OBSTRUCTIONS, AND OTHER OBJECTIONABLE MATERIAL SHALL BE REMOVED AND DISPOSED OF SO AS NOT TO INTERFERE WITH THE PROPER FUNCTIONING OF THE DIVERSION.
2. THE DIVERSION SHALL BE EXCAVATED OR SHAPED TO LINE, GRADE, AND CROSS SECTION AS REQUIRED TO MEET CRITERIA SPECIFIED HEREIN, AND BE FREE OF BANK PROJECTIONS OR OTHER IRREGULARITIES WHICH WILL IMPEDE NORMAL FLOW.
3. FILLS SHALL BE COMPACTED AS NEEDED TO PREVENT UNEQUAL SETTLEMENT THAT WOULD CAUSE DAMAGE IN THE COMPLETED DIVERSION.
4. ALL GRADED AREAS SHALL BE PERMANENTLY STABILIZED FOLLOWING FINISHED GRADING.
5. SILT FENCE OR HAY BALES SHALL BE PLACED AT THE OUTLET OF EACH STRUCTURE.

1 Diversion Swale and Bench
12/12
N.T.S. Source: VHB LD_



CROSS SECTION

	DIKE A (5 AC. OR LESS)	DIKE B (5–10AC.)
A – DIKE HEIGHT	18"	36"
B – DIKE WIDTH	24"	36"
C – FLOW WIDTH	48"	60"
D – FLOW DEPTH	8"	15"

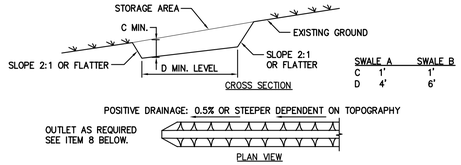


CONSTRUCTION SPECIFICATIONS

1. ALL DIKES SHALL BE COMPACTED BY EARTH–MOVING EQUIPMENT.
2. ALL DIKES SHALL HAVE POSITIVE DRAINAGE TO AN OUTLET.
3. TOP WIDTH MAY BE WIDER AND SIDE SLOPES BE FLATTER IF DESIRED TO FACILITATE CONSTRUCTION TRAFFIC.
4. FIELD LOCATION SHOULD BE ADJUSTED AS NEEDED TO UTILIZE A STABILIZED SAFE OUTLET.
5. EARTH DIKES SHALL HAVE AN OUTLET THAT FUNCTIONS WITH A MINIMUM OF EROSION. RUNOFF SHALL BE CONVEYED TO A SEDIMENT TRAPPING DEVICE SUCH AS A SEDIMENT TRAP OR SEDIMENT BASIN WHERE EITHER THE DIKE CHANNEL OR THE DRAINAGE AREA ABOVE THE DIKE ARE NOT ADEQUATELY STABILIZED.
6. STABILIZATION SHALL BE: (A) IN ACCORDANCE WITH STANDARD SPECIFICATIONS FOR MULCH IF NOT IN SEEDING SEASON, (B) PER THE FOLLOWING CHART

TYPE OF TREATMENT	CHANNEL GRADE	A(5 AC OR LESS)	B(5 AC – 10 AC)
1	0.5%–3.0%	SEED AND STRAW MULCH	SEED AND STRAW MULCH
2	3.1%–5.0%	SEED AND STRAW MULCH	SEED AND COVER USING RECP
3	5.1%–8.0%	SEED AND COVER WITH RECP	LINED WITH 4–8" RIP–RAP OR GEOTEXTILE
4	8.1%–20.0%	LINED WITH 4–8" RIP–RAP	ENGINEERED DESIGN

2 Earth Dike
12/12
N.T.S. Source: VHB / VT S+S EPSC LD_



CROSS SECTION

SWALE A	SWALE B
C 1'	1'
D 4'	6'

POSITIVE DRAINAGE: 0.5% OR STEEPER DEPENDENT ON TOPOGRAPHY

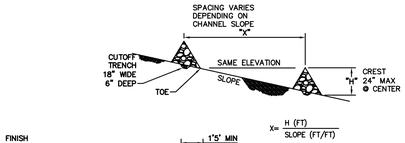
PLAN VIEW

CONSTRUCTION SPECIFICATIONS

1. ALL TEMPORARY SWALES SHALL HAVE UNINTERRUPTED POSITIVE GRADE TO AN OUTLET.
2. DIVERTED RUNOFF FROM A DISTURBED AREA SHALL BE CONVEYED TO A SEDIMENT TRAPPING DEVICE.
3. DIVERTED RUNOFF FROM AN UNDISTURBED AREA SHALL OUTLET DIRECTLY INTO AN UNDISTURBED STABILIZED AREA AT NON–EROSIVE VELOCITY.
4. ALL TREES, BRUSH, STUMPS, OBSTRUCTIONS, AND OTHER OBJECTIONABLE MATERIAL SHALL BE REMOVED AND DISPOSED OF SO AS NOT TO INTERFERE WITH THE PROPER FUNCTIONING OF THE SWALE.
5. THE SWALE SHALL BE EXCAVATED OR SHAPED TO LINE, GRADE, AND CROSS SECTION AS REQUIRED TO MEET THE CRITERIA SPECIFIED HEREIN AND BE FREE OF BANK PROJECTIONS OR OTHER IRREGULARITIES WHICH WILL IMPEDE NORMAL FLOW.
6. FILLS SHALL BE COMPACTED BY EARTH MOVING EQUIPMENT.
7. ALL EARTH REMOVED AND NOT NEEDED FOR CONSTRUCTION SHALL BE PLACED SO THAT IT WILL NOT INTERFERE WITH THE FUNCTIONING OF THE SWALE.
8. STABILIZATION SHALL BE AS PER THE FLOW CHANNEL STABILIZATION CHART BELOW:

TYPE OF TREATMENT	CHANNEL GRADE	A(5 AC OR LESS)	B(5 AC – 10 AC)
1	0.5%–3.0%	SEED AND STRAW MULCH	SEED AND STRAW MULCH
2	3.1%–5.0%	SEED AND STRAW MULCH	SEED AND COVER USING RECP
3	5.1%–8.0%	SEED AND COVER WITH RECP	LINED WITH 4–8" RIP–RAP OR GEOTEXTILE
4	8.1%–20.0%	LINED WITH 4–8" RIP–RAP	ENGINEERED DESIGN

3 Temporary Swale
12/12
N.T.S. Source: VHB / VT S+S EPSC LD_



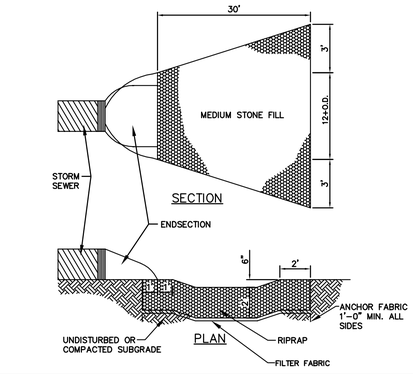
SECTION 'A-A'

SECTION 'B-B'

Notes:

1. STONE WILL BE PLACED ON A FILTER FABRIC FOUNDATION TO THE LINES, GRADES AND LOCATIONS SHOWN IN THE PLAN USING A WELL GRADED STONE MATRIX 2 TO 9 INCHES IN SIZE.
2. SET SPACING OF CHECK DAMS TO ASSUME THAT THE ELEVATIONS OF THE CREST OF THE DOWNSTREAM DAM IS AT THE SAME ELEVATION OF THE TOE OF THE UPSTREAM DAM.
3. EXTEND THE STONE A MINIMUM OF 1.5 FEET BEYOND THE DITCH BANKS TO PREVENT CUTTING AROUND THE DAM.
4. PROTECT THE CHANNEL DOWNSTREAM OF THE LOWEST CHECK DAM FROM SCOUR AND EROSION WITH STONE OR LINER AS APPROPRIATE.
5. ENSURE THAT CHANNEL APPURTENANCES SUCH AS CULVERT ENTRANCES BELOW CHECK DAMS ARE NOT SUBJECT TO DAMAGE OR BLOCKAGE FROM DISPLACED STONE.
6. MAXIMUM DRAINAGE AREA ABOVE CHECK DAM SHALL NOT EXCEED 2 AC.

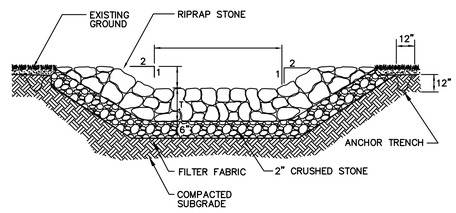
4 Stone Check Dam
12/12
N.T.S. Source: VHB / VT S+S EPSC LD_



Notes:

1. OUTLET PROTECTION MAY BE DONE BY USING ROCK RIP–RAP, GROUTED RIP–RAP, OR GABIONS.
2. STONE SIZE SHALL BE A WELL GRADED MIXTURE SO THAT 50% OF THE STONE SIZE, BY WEIGHT, SHALL BE LARGER THAN THE d50 SIZE DETERMINED USING THE CHARTS.

5 Outlet Protection
12/12
N.T.S. Source: CHA LD_



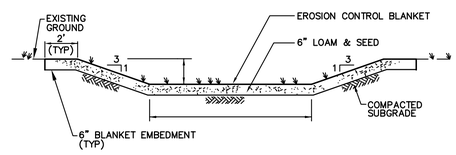
Notes:

1. MIN. CAPACITY SHALL CARRY PEAK FLOW RATE DURING 10–YR, 24–HR STORM EVENT.
2. MAX SIZE OF RIPRAP STONE SHALL BE:

VEL. (FPS)	DMAX (IN.)
5.0	6
8.5	12
10	18
12	24
15	36

3. FOUNDATION AREA SHALL BE CLEARED OF TREES, STUMPS, ROOTS, SOD, LOOSE ROCK, OR OTHER OBJECTIONABLE MATERIAL.
4. OUTLET STABILIZATION MAY BE NEEDED TO PREVENT EROSION.

6 Stone-lined Swale
12/12
N.T.S. Source: VHB LD_358



Notes:

1. NOT TO BE USED IN AREAS WHERE FLOW VOLUME AND RATES MAY CAUSE EROSION AND SHOULD OTHERWISE BE CONVEYED VIA STONE–LINED SWALE.
2. FOUNDATION AREA SHALL BE CLEARED OF TREES, STUMPS, ROOTS, SOD, LOOSE ROCK, OR OTHER OBJECTIONABLE MATERIAL.
3. INSTALL TEMPORARY COVER (E.G., MULCH) TO PROTECT AREA WHILE SEED IS GERMINATING.
4. SEE SEEDING SPECIFICATIONS FOR SEED TYPES AND SEED APPLICATION RATES.

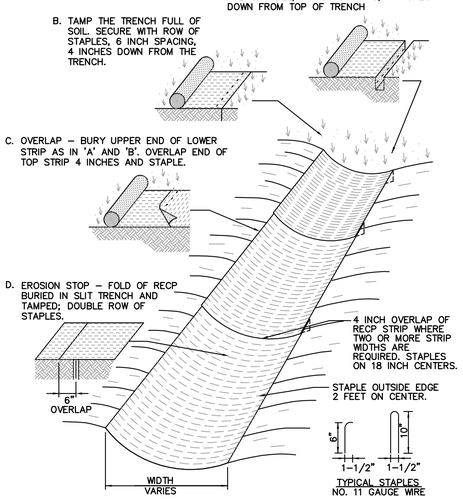
7 Grassed Swale
12/12
N.T.S. Source: VHB LD_171

A. BURY THE TOP END OF THE RECP STRIPS IN A TRENCH 6 INCHES OR MORE IN DEPTH. SECURE WITH ROW OF STAPLES IN VERTICAL TRENCH WALL, 6 INCH SPACING, 4 INCHES DOWN FROM TOP OF TRENCH

B. TAMP THE TRENCH FULL OF SOIL. SECURE WITH ROW OF STAPLES, 6 INCH SPACING, 4 INCHES DOWN FROM THE TRENCH.

C. OVERLAP – BURY UPPER END OF LOWER STRIP AS IN 'A' AND 'B'. OVERLAP END OF TOP STRIP 4 INCHES AND STAPLE.

D. EROSION STOP – FOLD OF RECP BURIED IN SLIT TRENCH AND TAMPED; DOUBLE ROW OF STAPLES.



1. INSTALLATION SHALL BE AS PER MANUFACTURER'S RECOMMENDATIONS
2. RECP TO BE BIODEGRADABLE; NO NYLON MESH. SEE SHEET ANGP–T–G–017 FOR RECP SPECIFICATIONS.

8 Rolled Erosion Control Blanket (RECP) - Swale Installation
12/12
N.T.S. Source: VHB LD_

Vanasse Hangen Brustlin, Inc.

DWG. NO.	REFERENCE DWG.	REV	DSN	CK		DESCRIPTION
		0	MDF	SAB		ISSUED FOR CONSTRUCTION

		BID		CONSTRUCTION	
	INITIALS	DATE	INITIALS	DATE
ENVIRONMENTAL	JLS	06/28/13		
DRAFTING DESIGNER	GIL	06/28/13		
DRAFTING SUPERVISOR	BZD	06/28/13		
DESIGN ENGINEER	MDF	06/28/13		
DESIGN MANAGER	SAB	06/28/13		

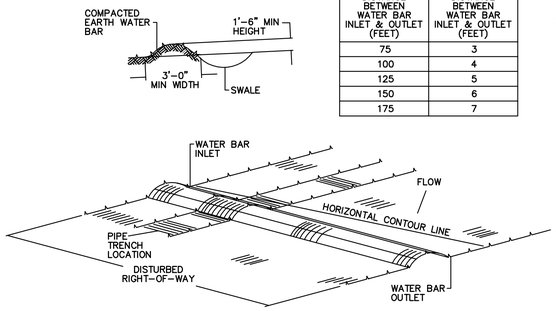
VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
CONSTRUCTION DETAILS

LOC. CHITTENDEN & ADDISON COUNTIES

Vermont Gas

CHA
36 Cordage Park Circle , Suites 321, 326, 329, 336
Plymouth, MA 02360
Main: (781) 982-7700 - www.chacompanies.com

YEAR: 2013 | W.O. | SCALE: NOTED | DWG. ANGP–T–G–014 | REV. 0



4% SLOPE CHART	
HORIZONTAL DISTANCE BETWEEN WATER BAR INLET & OUTLET (FEET)	ELEVATION DISTANCE BETWEEN WATER BAR INLET & OUTLET (FEET)
75	3
100	4
125	5
150	6
175	7

NOTES:

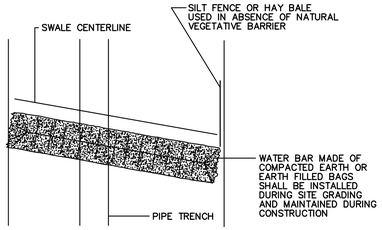
1. SPACE WATERBARS AS INDICATED IN TABLE OR AS DIRECTED BY OSPC.

Notes:

1. SPACE WATERBARS AS INDICATED IN TABLE OR AS DIRECTED BY OSPC.
2. COMPACT THE BAR.
3. THE OUTLET SHALL BE LOCATED ON AN UNDISTURBED AREA. OUTLET PROTECTION WILL BE PROVIDED WHEN NATURAL AREAS ARE NOT ADEQUATE.
4. EXPOSED AREAS SHALL BE IMMEDIATELY SEEDED AND STABILIZED.

NOTES:

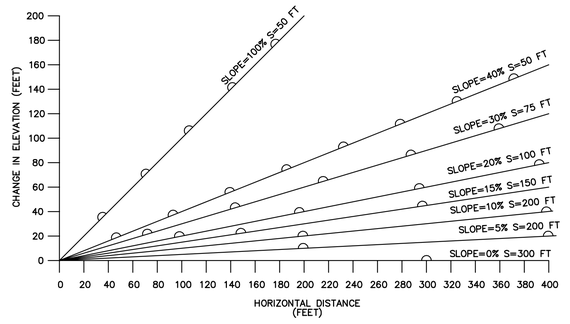
1. WATERBARS ARE TO BE SPACED ALONG THE RIGHT-OF-WAY IN ACCORDANCE WITH WATERBAR SPACING CHART OR AS SHOWN ON THE PLANS.
2. WATER SHALL BE DIVERTED OFF THE DISTURBED RIGHT-OF-WAY AT AN OUTSLOPE OF THREE TO FIVE PERCENT BY CONSTRUCTING WATERBARS ACCORDING TO THE FOLLOWING PROCEDURE:
   - 2.A. AT THE PROPOSED WATERBAR INTERCEPTOR LOCATION ESTABLISH A HORIZONTAL CONTOUR LINE (USING A POCKET TRANSIT OR HAND HELD LEVEL) WHICH EXTENDS COMPLETELY ACROSS THE DISTURBED RIGHT-OF-WAY. THIS LINE WILL ALWAYS BE PERPENDICULAR TO THE DIRECTION OF WATER FLOW AND SHOULD BE PARALLEL TO MAP CONTOURS SHOWN ON THE PLAN DRAWINGS.
   - 2.B. DETERMINE WHICH SIDE OF THE RIGHT-OF-WAY IS BEST SUITED FOR THE WATERBAR OUTLET (EVALUATE VEGETATION DENSITY, LOCAL TOPOGRAPHY, ETC.) AND DEVIATE WATERBARS AWAY FROM THE HORIZONTAL CONTOUR LINE SLIGHTLY DOWNWARD TOWARD THE SELECTED OUTLET SIDE MAINTAINING A THREE TO FIVE PERCENT OUT SLOPE.
   - 2.C. WHEN OUTLETING NEAR WATER BODIES, STREAMS, DITCHES AND CROP FIELDS, A SILT FENCE OR HAY BALES SHALL BE PLACED ON THE OUTLET END OF THE INTERCEPT WATERBAR.
3. SPACING SHOWN ARE RECOMMENDED GUIDELINES. OSPC REPRESENTATIVE MAY ADJUST SPACING IN THE FIELD.
4. ONE TRENCH BREAKER IS REQUIRED AT ALL STREAM BANKS AND AT WETLAND BOUNDARIES.



OVERHEAD VIEW OF WATERBAR AND SILTFENCE

1 Waterbar and Waterbar with Silt Fence

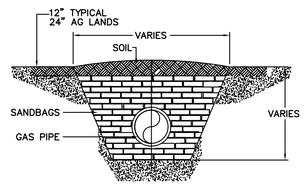
N.T.S. Source: CHA 12/12 LD_



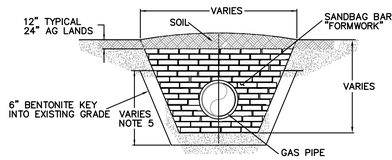
NOTE: S = WATERBAR SPACING

2 Waterbar Spacing Guideline

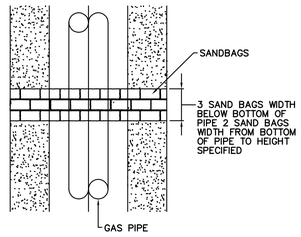
N.T.S. Source: CHA 12/12 LD_



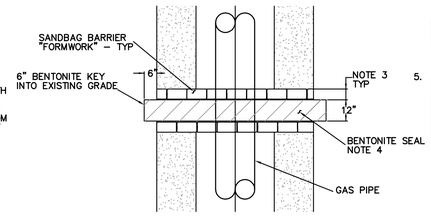
PROFILE VIEW



PROFILE VIEW



PLAN VIEW
SAND BAG TRENCH BREAKER



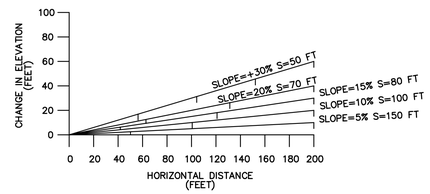
PLAN VIEW
TRENCH BREAKER WITH BENTONITE

NOTES:

1. PERMANENT TRENCH BREAKER WITH BENTONITE SEAL IS INTENDED TO PROHIBIT WATER FLOW THROUGH THE BREAKER.
2. PERMANENT TRENCH BREAKER WITH BENTONITE SEAL TO BE INSTALLED AT EDGE OF WETLANDS AND STREAMS.
3. SAND BAG BARRIER WIDTH SHALL BE MINIMUM 1 BAG WIDE AND/OR AS FIELD DETERMINED TO PROVIDE STABILITY.
4. BENTONITE IS TO BE INSTALLED IN THE VOID SPACE BETWEEN THE SANDBAG BARRIER "FORMWORK" IN SUCH A MANNER TO COMPLETELY SURROUND THE PIPE AND FILL THE VOID FROM THE BOTTOM OF THE TRENCH TO A HEIGHT 6" ABOVE THE LEVEL OF IMPORTED PADDING MATERIAL WHICH IS INSTALLED ON THE EXTERIOR SIDE OF THE SANDBAG BARRIER IN THE WETLAND ZONE.
5. AFTER BENTONITE PLACEMENT, INSTALL SAND BAGS ON TOP OF THE PERMANENT TRENCH BREAKER AND BENTONITE SEAL TO THE REQUIRED HEIGHT PER DETAIL 2 AND BACKFILL EXTERIOR SIDES OF SAND BAG BARRIERS.

3 Permanent Trench Break or Sandbags

N.T.S. Source: CHA 12/12 LD_



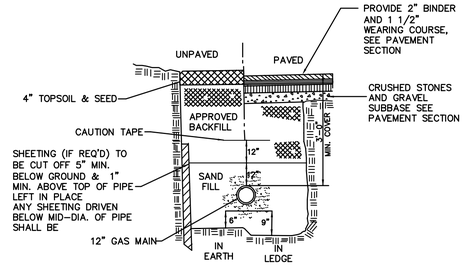
NOTE: S = TRENCH BREAKER SPACING

NOTES:

1. PERMANENT TRENCH BREAKER SANDBAGS SHALL NOT BE FILLED WITH TOPSOIL.
2. SPACINGS SHOWN ARE RECOMMENDED GUIDELINES. OSPC REPRESENTATIVE MAY ADJUST SPACING IN THE FIELD.
3. ONE TRENCH BREAKER IS REQUIRED AT ALL STREAM BANKS AND AT WETLAND BOUNDARIES.

4 Permanent Trench Break Spacing Guideline

N.T.S. Source: CHA 12/12 LD_



NOTES:

1. BACKFILL MATERIAL TO CONSIST OF GRANULAR MATERIAL CONTAINING NO STONES OR CLODS LARGER THAN 3" IN GREATEST DIMENSION. IN RESOURCE AREAS BACKFILL TO CONSIST OF NATIVE SUBSOIL AND TOPSOIL.
2. BACKFILL WITH CLEAN SAND TO 12" OVER PIPE.
3. REMOVE UNSUITABLE MATERIAL BELOW GRADE IF ENCOUNTERED, TO SUITABLE DEPTHS AS DIRECTED BY ENGINEER AND REPLACE WITH CLEAN GRANULAR FILL.
4. IN RESOURCE AREAS (E.G., WETLANDS AND PAS AREAS) SUBSOIL TO BE BACKFILLED TO MATCH DEPTH OF ADJACENT NATIVE, UNDISTURBED SUBSOIL/TOPSOIL INTERFACE FOLLOWED BY BACKFILL OF NATIVE TOPSOIL. EXCESS SUBSOIL TO BE PROPERLY DISPOSED OF AND STABILIZED.
5. ALL TRENCH CONSTRUCTION TO CONFORM TO APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS.
6. ALL BACKFILL MATERIAL, WITH THE EXCEPTION OF RESOURCE AREAS (SEE NOTE #4), SHALL BE COMPACTED AT NEAR OPTIMUM MOISTURE CONTENT IN LAYERS NOT EXCEEDING 6 INCHES IN COMPACTED THICKNESS BY PNEUMATIC TAMPERS, VIBRATOR COMPACTORS, OR OTHER APPROVED MEANS.
7. THE CONTRACTOR SHALL PROVIDE TESTING TO INSURE THAT THE INPLACE DENSITY OF THE BACKFILL MEETS THE ABOVE REQUIREMENTS.

5 Typical Trench Detail

N.T.S. Source: CHA 2/13 LD_

DWG. NO.	REFERENCE DWG.	REV	DSN	CK	DESCRIPTION
		0	MDF	SAB	ISSUED FOR CONSTRUCTION

	BID		CONSTRUCTION	
	INITIALS	DATE	INITIALS	DATE
ENVIRONMENTAL	JLS	06/28/13		
DRAFTING DESIGNER	GIL	06/28/13		
DRAFTING SUPERVISOR	BZD	06/28/13		
DESIGN ENGINEER	MDF	06/28/13		
DESIGN MANAGER	SAB	06/28/13		

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
CONSTRUCTION DETAILS

LOC. CHITTENDEN & ADDISON COUNTIES

YEAR: 2013 | W.O. | SCALE: NOTED | DWG. ANGP-T-G-015 | REV. 0

Vermont Gas

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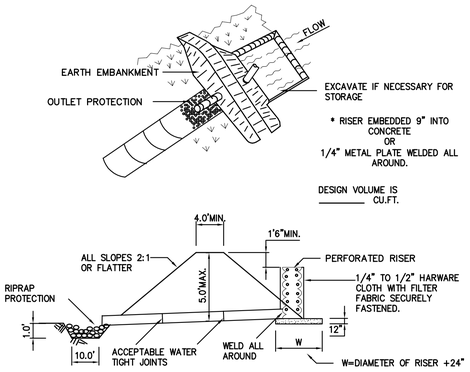


EMBANKMENT SECTION THRU RISER

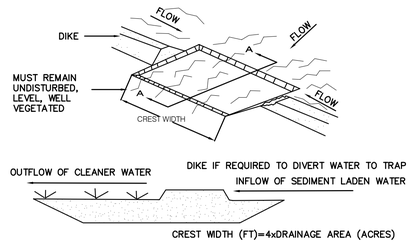
CONSTRUCTION SPECIFICATIONS

1. AREA UNDER EMBANKMENT SHALL BE CLEARED, GRUBBED AND STRIPPED OF ANY VEGETATION AND ROOT MAT. THE POOL AREA SHALL BE CLEARED.
2. THE FILL MATERIAL FOR THE EMBANKMENT SHALL BE FREE OF ROOTS OR OTHER WOODY VEGETATION AS WELL AS OVER-SIZED STONES, ROCKS, ORGANIC MATERIAL, OR OTHER OBJECTIONABLE MATERIAL. THE EMBANKMENT SHALL BE COMPACTED BY TRAVERSING WITH EQUIPMENT WHILE IT IS BEING CONSTRUCTED.
3. VOLUME OF SEDIMENT STORAGE SHALL BE 3600 CUBIC FEET PER ACRE OF CONTRIBUTORY DRAINAGE.
4. SEDIMENT SHALL BE REMOVED AND TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND STABILIZED.
5. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRS MADE AS NEEDED.
6. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND SEDIMENT ARE CONTROLLED.
7. THE STRUCTURE SHALL BE REMOVED AND AREA STABILIZED WHEN THE DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.
8. ALL FILL SLOPES SHALL BE 2:1 OR FLATTER; CUT SLOPES 1:1 OR FLATTER.
9. ALL PIPE CONNECTIONS SHALL BE WATERTIGHT.
10. THE TOP 2/3 OF THE RISER SHALL BE PERFORATED WITH ONE (1) INCH DIAMETER HOLES OR SLITS SPACED SIX (6) INCHES VERTICALLY AND HORIZONTALLY AND PLACED IN THE CONCAVE PORTION OF PIPE. NO HOLES WILL BE ALLOWED WITHIN SIX (6) INCHES OF THE HORIZONTAL BARREL.
11. THE RISER SHALL BE WRAPPED WITH 1/4 TO 1/2 INCH HARDWARE CLOTH WIRE THEN WRAPPED WITH FILTER CLOTH (HAVING AN EQUIVALENT SIEVE SIZE OF 40-80). THE FILTER CLOTH SHALL EXTEND SIX (6) INCHES ABOVE THE HIGHEST HOLE AND SIX (6) INCHES BELOW THE LOWEST HOLE. WHERE ENDS OF THE FILTER CLOTH COME TOGETHER, THEY SHALL BE OVER-LAPPED, FOLDED AND STAPLED TO PREVENT BYPASS.
12. STRAPS OR CONNECTING BANDS SHALL BE USED TO HOLD THE FILTER CLOTH AND WIRE FABRIC IN PLACE. THEY SHALL BE PLACED AT THE TOP AND BOTTOM OF THE CLOTH.
13. FILL MATERIAL AROUND THE PIPE SPILLWAY SHALL BE HAND COMPACTED IN FOUR (4) INCH LAYERS. A MINIMUM OF TWO (2) FEET OF HAND COMPACTED BACKFILL SHALL BE PLACED OVER THE PIPE SPILLWAY BEFORE CROSSING IT WITH CONSTRUCTION EQUIPMENT.
14. THE RISER SHALL BE ANCHORED WITH EITHER A CONCRETE BASE OR STEEL PLATE BASE TO PREVENT FLOTATION. FOR CONCRETE BASED THE DEPTH SHALL BE TWELVE (12) INCHES WITH THE RISER EMBEDDED NINE (9) INCHES. A 1/4 INCH MINIMUM THICKNESS STEEL PLATE SHALL BE ATTACHED TO THE RISER BY A CONTINUOUS WELD AROUND THE BOTTOM TO FORM A WATERTIGHT CONNECTION AND THEN PLACE TWO (2) FEET OF STONE, GRAVEL, OR TAMPED EARTH ON THE PLATE.

1 Pipe Outlet Sediment Trap

12/12

N.T.S. Source: VHB / VT S+S EPSC LD_



SECTION A – A
EXCAVATED GRASS OUTLET SEDIMENT TRAP

CONSTRUCTION SPECIFICATIONS

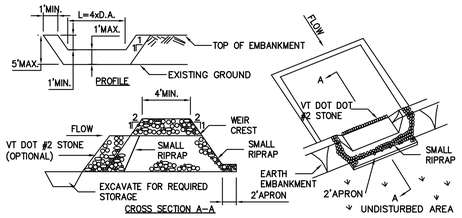
1. VOLUME OF SEDIMENT STORAGE SHALL BE 1800 CUBIC FEET PER ACRE OF CONTRIBUTORY DRAINAGE AREA.
2. MINIMUM CREST WIDTH SHALL BE 4 x DRAINAGE AREA
3. SEDIMENT SHALL BE REMOVED AND TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND IN SUCH A MANNER THAT IT WILL NOT ERODE.
4. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRS MADE AS NEEDED.
5. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND WATER POLLUTION SHALL BE MINIMIZED.
6. THE SEDIMENT TRAP SHALL BE REMOVED AND AREA STABILIZED WHEN THE REMAINING DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.
7. ALL CUT SLOPES SHALL BE 1:1 OR FLATTER.

MAXIMUM DRAINAGE AREA: 5 ACRES

2 Grass Outlet Sediment Trap

12/12

N.T.S. Source: VHB / VT S+S EPSC LD_



CONSTRUCTION SPECIFICATIONS

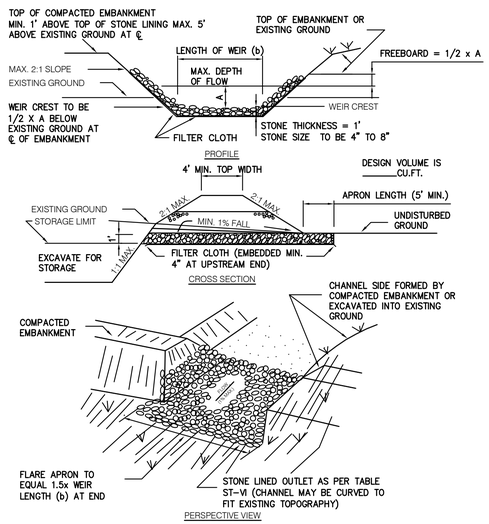
1. AREA UNDER EMBANKMENT SHALL BE CLEARED, GRUBBED AND STRIPPED OF ANY VEGETATION AND ROOT MAT. THE POOL AREA SHALL BE CLEARED.
2. THE FILL MATERIAL FOR THE EMBANKMENT SHALL BE FREE OF ROOTS AND OTHER WOODY VEGETATION AS WELL AS OVER-SIZED STONES, ROCKS, ORGANIC MATERIAL OR OTHER OBJECTIONABLE MATERIAL. THE EMBANKMENT SHALL BE COMPACTED BY TRAVERSING WITH EQUIPMENT WHILE IT IS BEING CONSTRUCTED.
3. ALL CUT AND FILL SLOPES SHALL BE 2:1 OR FLATTER.
4. THE STONE USED IN THE OUTLET SHALL BE SMALL RIPRAP 4"-8" ALONG WITH A 1' THICKNESS OF 2" AGGREGATE PLACED ON THE UP-GRADE SIDE ON THE SMALL RIPRAP OR EMBEDDED FILTER CLOTH IN THE RIPRAP.
5. SEDIMENT SHALL BE REMOVED AND TRAP RESTORED TO ITS ORIGINAL DIMEN- SIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP.
6. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND AS REQUIRED BY THE PERMIT.
7. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND WATER POLLUTION IS MINIMIZED.
8. THE STRUCTURE SHALL BE REMOVED AND THE AREA STABILIZED WHEN THE DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.

MAXIMUM DRAINAGE AREA 5 ACRES

3 Stone Outlet Sediment Trap

12/12

N.T.S. Source: VHB / VT S+S EPSC LD_



MAXIMUM DRAINAGE AREA = 15 ACRES

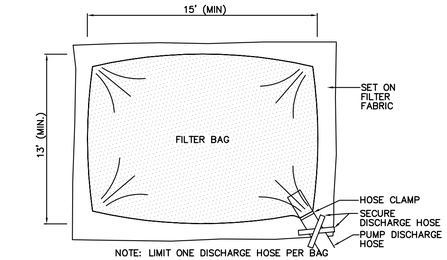
CONSTRUCTION SPECIFICATIONS

1. THE AREA UNDER EMBANKMENT SHALL BE CLEARED, GRUBBED AND STRIPPED OF ANY VEGETATION AND ROOT MAT. THE POOL AREA SHALL BE CLEARED.
2. THE FILL MATERIAL FOR THE EMBANKMENT SHALL BE FREE OF ROOTS OR OTHER WOODY VEGETATION AS WELL AS OVER-SIZED STONES, ROCKS, ORGANIC MATERIAL OR OTHER OBJECTIONABLE MATERIAL. THE EMBANKMENT SHALL BE COMPACTED BY TRAVERSING WITH EQUIPMENT WHILE IT IS BEING CONSTRUCTED. MAXIMUM HEIGHT OF EMBANKMENT SHALL BE FIVE (5) FEET, MEASURED AT CENTERLINE OF EMBANKMENT.
3. ALL FILL SLOPES SHALL BE 2:1 OR FLATTER, CUT SLOPES 1:1 OR FLATTER.
4. ELEVATION OF THE TOP OF ANY DIKE DIRECTING WATER INTO TRAP MUST EQUAL OR EXCEED THE HEIGHT OF EMBANKMENT.
5. STORAGE AREA PROVIDED SHALL BE FIGURED BY COMPUTING THE VOLUME AVAILABLE BEHIND THE OUTLET CHANNEL UP TO AN ELEVATION OF ONE (1) FOOT BELOW THE LEVEL WEIR CREST.
6. FILTER CLOTH SHALL BE PLACED OVER THE BOTTOM AND SIDES OF THE OUTLET CHANNEL PRIOR TO PLACEMENT OF STONE. SECTIONS OF FABRIC MUST OVERLAP AT LEAST ONE (1) FOOT WITH SECTION NEAREST THE ENTRANCE PLACED ON TOP. FABRIC SHALL BE EMBEDDED AT LEAST SIX (6) INCHES INTO EXISTING GROUND AT ENTRANCE OUTLET CHANNEL.
7. STONE USED IN THE OUTLET CHANNEL SHALL BE FOUR (4) TO EIGHT (8) INCH RIPRAP. TO PROVIDE A FILTERING EFFECT, A LAYER OF FILTER CLOTH SHALL BE EMBEDDED ONE (1) FOOT WITH SECTION NEAREST ENTRANCE PLACED ON TOP. FABRIC SHALL BE EMBEDDED AT LEAST SIX (6) INCHES INTO EXISTING GROUND AT ENTRANCE OF OUTLET CHANNEL.
8. SEDIMENT SHALL BE REMOVED AND TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND IN SUCH A MANNER THAT IT WILL NOT ERODE.
9. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRED AS NEEDED.
10. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND SEDIMENT ARE CONTROLLED.
11. THE STRUCTURE SHALL BE REMOVED AND THE AREA STABILIZED WHEN DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.
12. DRAINAGE AREA FOR THIS PRACTICE IS LIMITED TO 15 ACRES OR LESS.

4 Riprap Outlet Sediment Trap

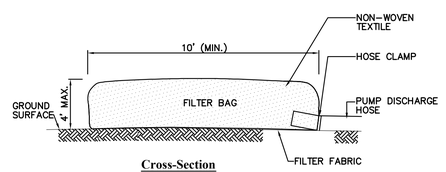
12/12

N.T.S. Source: VHB / VT S+S EPSC LD_



NOTE: LIMIT ONE DISCHARGE HOSE PER BAG

Plan View



Cross-Section

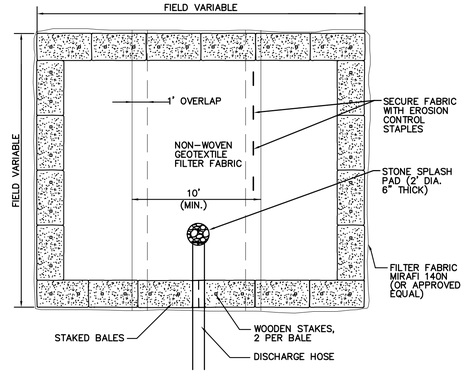
Notes:

1. BAG TO BE USED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.
2. MUST BE PLACED MIN. OF 50' FROM WETLAND OR STREAM ON STONE PAD. INSTALL DOWNGRADIENT OF BMPS INCLUDING SILT FENCE OR COMPOST LOGS AS NECESSARY.
3. INSPECT AND MAINTAIN BAG AS NECESSARY. EXPOSE OF ACCUMULATED SEDIMENT IN AN UPLAND AREA > 50' FROM WETLAND OR STREAM. STABILIZE, SEED, AND MULCH IMMEDIATELY.

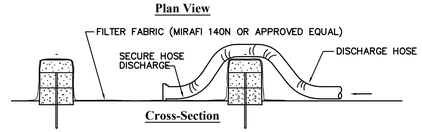
5 Dewatering Filter Bag

12/12

N.T.S. Source: VHB LD_



Plan View



Cross-Section

Notes:

1. NUMBERS OF BALES MAY VARY DEPENDING ON SITE CONDITIONS.
2. BASIN TO BE SIZED TO PREVENT DISCHARGE WATER FROM OVERTOPPING BASIN.
3. MUST BE PLACED MIN OF 50' FROM WETLAND OR STREAM, PREFERABLY IN A VEGETATED AREA.

6 Dewatering Straw Bale Basin

12/12

N.T.S. Source: VHB LD_

DWG. NO.	REFERENCE DWG.	REV	DSN	CK		DESCRIPTION
		0	MDF	SAB		ISSUED FOR CONSTRUCTION

	BID		CONSTRUCTION	
ENVIRONMENTAL	JLS	06/28/13		
DRAFTING DESIGNER	GIL	06/28/13		
DRAFTING SUPERVISOR	BZD	06/28/13		
DESIGN ENGINEER	MDF	06/28/13		
DESIGN MANAGER	SAB	06/28/13		
	INITIALS	DATE	INITIALS	DATE

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
CONSTRUCTION DETAILS

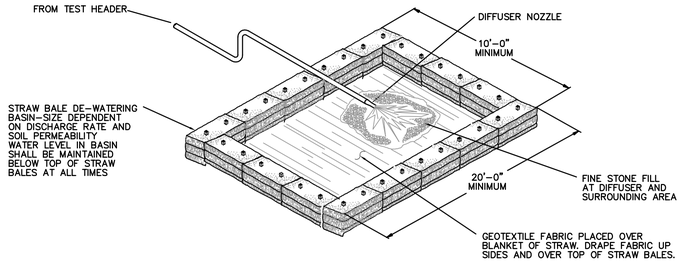
LOC. CHITTENDEN & ADDISON COUNTIES

YEAR: 2013 | W.O. | SCALE: NOTED | DWG. ANGP-T-G-016 | REV. 0

Vermont Gas

VHB Vanasse Hangen Brustlin, Inc.

CHA
36 Cordage Park Circle , Suites 321, 326, 329, 336
Plymouth, MA 02360
Main: (781) 982-7700 - www.chacompanies.com



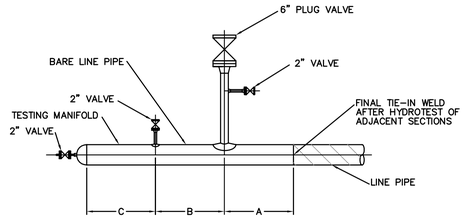
Notes:

1. MUST BE PLACED MIN. 50' FROM WETLAND OR STREAM
2. HAY BALES TO BE STAKED IN PLACE.

1 Hydrotest Discharge Detail

12/12

N.T.S. Source: CHA LD_



(ANSI CLASS 600 MINIMUM)
SEE NOTES 1-6

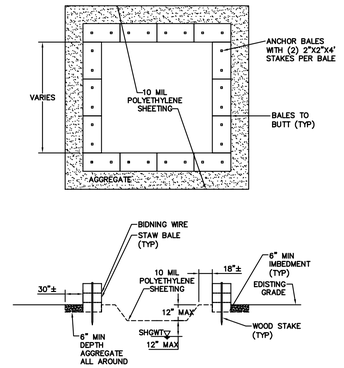
NOTES:

1. DIMENSIONS A, B & C ARE DEPENDENT ON PIPE DIAMETER & PIG LENGTH AND ARE TO BE DETERMINED BY CONTRACTOR.
2. FOR MANIFOLD TEST LOCATIONS & DISCHARGE LOCATIONS REFER TO EM&CP DRAWINGS.
3. TEST WATER SHALL BE TRANSFERRED BY PUMPING FROM ONE TEST SECTION TO THE NEXT ADJACENT TEST SECTION THROUGH THE 6" PIPE BRANCH AND MAKE-UP PIPING BETWEEN TEST SECTIONS. USE OF "HARD PIPING" & UNIONS IS RECOMMENDED.
4. FINAL TIE-IN WELD(S) BETWEEN TEST SECTIONS TO BE 100% RADIOGRAPHED.
5. TAP AND BRANCH SIZES AND VALVES FOR MANIFOLD ARE CONCEPTUAL AND SHALL BE DESIGNED BY CONTRACTOR TO BE COMPATIBLE WITH TEST EQUIPMENT AND PIPING.

2 Typical Hydrastatic Test Manifold

12/12

N.T.S. Source: CHA LD_



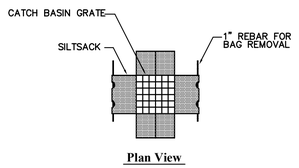
Notes:

1. CONTAINMENT MUST BE STRUCTURALLY SOUND AND LEAK FREE AND CONTAIN ALL LIQUID WASTES.
2. CONTAINMENT DEVICES MUST BE SUFFICIENT QUANTITY OR VOLUME TO COMPLETELY CONTAIN THE LIQUID WASTES GENERATED.
3. WASHOUT MUST BE CLEANED OR NEW FACILITIES CONSTRUCTED AND READY TO USE ONCE WASHOUT IS 75% FULL.
4. WASHOUT AREA(S) SHALL BE INSTALLED IN A LOCATION EASILY ACCESSIBLE BY CONCRETE TRUCKS.
5. ONE OR MORE AREAS MAY BE INSTALLED ON THE CONSTRUCTION SITE AND MAY BE RELOCATED AS CONSTRUCTION PROGRESSES.
6. AT LEAST WEEKLY REMOVE ACCUMULATION OF SAND AND AGGREGATE AND DISPOSE OF PROPERLY.
7. PLACE 50' FROM RIVER OR STREAM.

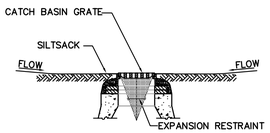
3 Concrete Washout Area

12/12

N.T.S. Source: VHB LD_



Plan View



Section View

Notes:

1. INSTALL SILTSACK IN ALL CATCH BASINS WHERE INDICATED ON THE PLAN BEFORE COMMENCING WORK OR IN PAVED AREAS AFTER BINDER COURSE IS PLACED AND HAY BALES HAVE BEEN REMOVED.
2. GRATE TO BE PLACED OVER SILTSACK.
3. SILTSACK SHALL BE INSPECTED PERIODICALLY AND AFTER ALL STORM EVENTS AND CLEANING OR REPLACEMENT SHALL BE PERFORMED PROMPTLY AS NEEDED. MAINTAIN UNTIL UPSTREAM AREAS HAVE BEEN PERMANENTLY STABILIZED
4. INLET PROTECTION MAY BE EXCAVATED, FILTER FABRIC DROP, STONE AND BLOCK, CURB DROP, OR OTHER INTERCHANGEABLE OR DEC-APPROVED MEASURE.

4 Storm Drain Inlet Protection

12/12

N.T.S. Source: VHB LD_

PRODUCT DESCRIPTION	MATERIAL COMPOSITION	LONGEVITY (MONTHS)	SLOPE APPLICATIONS*		CHANNEL APPLICATIONS*	MINIMUM TENSILE STRENGTH 1 kN/m(lbs/ft)
			MAXIMUM GRADIENT (H:V)	C FACTOR 2,5	MAXIMUM SHEAR STRESS 3,4,6 Pa (lbs/ft²)	
MULCH CONTROL NETS	MESH OR WOVEN BIODEGRADABLE NATURAL FIBER NETTING.	3	5:1	≤ 0.10	12 (0.25)	0.073 (5)
		12	5:1	≤ 0.10	12 (0.25)	0.073 (5)
		24	5:1	≤ 0.10	12 (0.25)	0.36 (25)
NETLESS ROLLED EROSION CONTROL BLANKETS	NATURAL FIBERS MECHANICALLY INTERLOCKED TOGETHER TO FORM A RECP.	3	4:1	≤ 0.10	24 (0.5)	0.073 (5)
		12	4:1	≤ 0.10	24 (0.5)	0.073 (5)
SINGLE-NET EROSION CONTROL BLANKETS	PROCESSED BIODEGRADABLE NATURAL FIBERS MECHANICALLY BOUND TOGETHER BY A SINGLE NATURAL FIBER NETTING OF PROCESSED NATURAL YARNS OR TWINES WOVEN INTO A CONTINUOUS MATRIX.	3	3:1	≤ 0.15	72 (1.5)	0.73 (50)
		12	3:1	≤ 0.15	72 (1.5)	0.73 (50)
DOUBLE-NET EROSION CONTROL BLANKETS	PROCESSED BIODEGRADABLE NATURAL FIBERS MECHANICALLY BOUND TOGETHER BETWEEN TWO NATURAL FIBER NETTING OF PROCESSED NATURAL YARNS OR TWINES WOVEN INTO A CONTINUOUS MATRIX.	3	2:1	≤ 0.20	84 (1.75)	1.09 (75)
		12	2:1	≤ 0.20	84 (1.75)	1.09 (75)
		24	1.5:1	≤ 0.25	96 (2.00)	1.45 (100)
		36	1:1	≤ 0.25	108 (2.25)	1.82 (125)

* "C" FACTOR AND SHEAR STRESS FOR MULCH CONTROL NETTINGS MUST BE OBTAINED WITH NETTING USED IN CONJUNCTION WITH PRE-APPLIED MATERIAL.
1 MINIMUM AVERAGE ROLL VALUES, MACHINE DIRECTION USING EROSION CONTROL TECHNOLOGY COUNCIL (ECTC) MOD. ASTM D 5035.
2 "C" FACTOR CALCULATED AS RATIO OF SOIL LOSS FROM RECP PROTECTED SLOPE (TESTED AT SPECIFIED OR GREATER GRADIENT, H:V) TO RATIO OF SOIL LOSS FROM UNPROTECTED (CONTROL) PLOT IN LARGE-SCALE TESTING. THESE PERFORMANCE TEST VALUES SHOULD BE SUPPORTED BY PERIODIC BENCH SCALE TESTING UNDER SIMILAR TEST CONDITIONS AND FAILURE CRITERIA USING ECTC TEST METHOD #2.
3 REQUIRED MINIMUM SHEAR STRESS RECP (UNVEGETATED) CAN SUSTAIN WITHOUT PHYSICAL DAMAGE OR EXCESS EROSION (> 12.7mm (0.5 IN) SOIL LOSS) SURING A 30-MINUTE FLOW EVENT IN LARGE-SCALE TESTING. THESE PERFORMANCE TEST VALUES SHOULD BE SUPPORTED BY PERIODIC BENCH SCALE TESTING UNDER SIMILAR TEST CONDITIONS AND FAILURE CRITERIA USING ECTC TEST METHOD #3.
4 THE PERMISSIBLE SHEAR STRESS LEVELS ESTABLISHED FOR EACH PERFORMANCE CATEGORY ARE BASED ON HISTORICAL EXPERIENCE WITH PRODUCTS CHARACTERIZED BY MANNINGS ROUGHNESS COEFFICIENTS IN THE RANGE OF 0.01 – 0.05.
5 ACCEPTABLE LARGE SCALE TEST METHODS MAY INCULDE ASTM D 6459, ECTC TEST METHOD #2 OR OTHERINDEPENDENT TESTING DEEMED ACCEPTABLE BY THE DEC.
6 RECOMMENDED ACCEPTABLE LARGE-SCALE TESTING PROTOCOL MAY INCLUDE ASTM D 6440, ECTC TEST METHOD #3 OR OTHER INDEPENDENT TESTING DEEMED ACCEPTABLE BY THE DEC.

5 Specifications for Temporary RECP

N.T.S. Source: VT S+S EPSC

TYPE	PRODUCT DESCRIPTION	MATERIAL COMPOSITION	SLOPE APPLICATIONS	CHANNEL APPLICATIONS	MINIMUM TENSILE STRENGTH2,3 kN/m (lbs/ft)
			MAXIMUM GRADIENT	MAXIMUM SHEAR STRESS4,6 Pa(lbs/ft²)	
A	TURF REINFORCED MAT	NON-DEGRADABLE SYNTHETIC FIBERS, FILAMENTS, NETS, WIRE MESH AND/OR OTHER ELEMENTS, PROCESSED INTO A PERMANENT THREE-DIMENSIONAL MATRIX OF SUFFICIENT THICKNESS. TRM'S, WHICH MAY BE SUPPLEMENTED WITH DEGRADABLE COMPONENTS ARE DESIGNED TO IMPART IMMEDIATE EROSION PROTECTION, ENHANCED VEGETATION ESTABLISHMENT AND PROVIDE LONG-TERM FUNCTIONALITY BY PERMANENTLY REINFORCING VEGETATION DURING AND AFTER MATURATION. NOTE: TRM'S ARE TYPICALLY USED IN HYDRAULIC APPLICATIONS, SUCH AS HIGH FLOW DITCHES AND CHANNELS, STEEP SLOPES, STREAM BANKS, AND SHORELINES, WHERE EROSIVE FORCES MAY EXCEED THE LIMITS OF NATURAL, UNREINFORCED VEGETATION OR IN AREAS WHERE LIMITED VEGETATION ESTABLISHMENT IS ANTICIPATED.	0.5:1	288 (6.0)	1.82 (125)
B	TURF REINFORCED MAT		0.5:1	384 (8.0)	2.19 (150)
C	TURF REINFORCED MAT		0.5:1	480 (10.0)	2.55 (175)

PERMANENT1 – ALL CATEGORIES OF TURF REINFORCEMENT MAT (TRM) MUST HAVE A MINIMUM THICKNESS OF 6.35mm (0.25 INCHES) PER ASTM D 6525 AND U.V. STABILITY OF 80% PER ASTM D 4355 (500 HOURS EXPOSURE)

1. FOR TRMS CONTAINING DEGRADABLE COMPONENTS ALL PROPERTY VALUES MUST BE OBTAINED ON THE NON-DEGRADABLE PORTION OF THE MATTING ALONE.
2. MINIMUM AVERAGE ROLL VALUES, MACHINE DIRECTION ONLY FOR TENSILE STRENGTH DETERMINATION USING ASTM D 6818 (SUPERSEDES MOD. ASTM D 5035 FOR RECP'S).
3. FIELD CONDITIONS WITH HIGH LOADING AND/OR HIGH SURVIVABILITY REQUIREMENTS MAY WARRANT THE USE OF A TRM WITH A TENSILE STRENGTH OF 44 k/N/m(3,000 lb/ft) OR GREATER.
4. REQUIRED MINIMUM SHEAR STRESS TRM (FULLY VEGETATED) CAN SUSTAIN WITHOUT PHYSICAL DAMAGE OR EXCESS EROSION (>12.7mm (0.5 IN.) SOIL LOSS) DURING A 30-MINUTE FLOW EVENT IN LARGE SCALE TESTING. THESE PERFORMANCE TEST VALUES SHOULD BE SUPPORTED BY PERIODIC BENCH SCALE TESTING UNDER SIMILAR TEST CONDIDTIONS AND FAILURE CRITERIA USING ECTC TEST METHOD #3.
5. ACCEPTABLE LARGE-SCALE TESTING PROTOCOL MAY INCLUDE ASTM D 6460 ECTC TEST METHOD #3 OR OHER INDEPENDENT TESTING DEEMED ACCEPTABLE BY THE DEC.

6 Specifications for Permanent RECP

N.T.S. Source: VT S+S EPSC

SPACE INTENTIONALLY LEFT BLANK

DWG. NO.	REFERENCE DWG.	REV	DSN	CK		DESCRIPTION
		0	MDF	SAB		ISSUED FOR CONSTRUCTION

	BID		CONSTRUCTION	
	INITIALS	DATE	INITIALS	DATE
ENVIRONMENTAL	JLS	06/28/13		
DRAFTING DESIGNER	GIL	06/28/13		
DRAFTING SUPERVISOR	BZD	06/28/13		
DESIGN ENGINEER	MDF	06/28/13		
DESIGN MANAGER	SAB	06/28/13		

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
CONSTRUCTION DETAILS

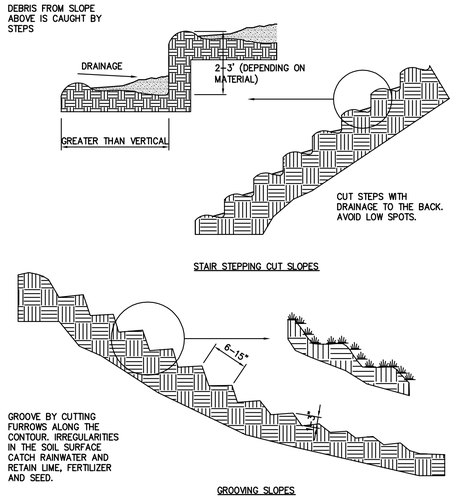
LOC. CHITTENDEN & ADDISON COUNTIES

Vermont Gas

VHB Vanasse Hangen Brustlin, Inc.

CHA
36 Cordage Park Circle, Suites 321, 326, 329, 336
Plymouth, MA 02360
Main: (781) 982-7700 · www.chacompanies.com

YEAR: 2013	W.O.	SCALE: NOTED	DWG. ANGP-T-G-017	REV. 0



1 Surface Roughening

12/12

N.T.S. Source: VHB LD_

MULCH MATERIAL AND APPLICATION				
MULCH MATERIAL	*QUALITY STANDARDS*	*PER 1,000 SQ-FT*	*PER ACRE*	*DEPTH OF APPLICATION*
WOOD CHIPS OR SHAVINGS	*AIR DRIED, FREE OF OBJECTIONABLE MATERIAL*	*500 – 900 LBS*	*10 – 20 TONS*	*2" – 7"*
WOOD FIBER CELLULOSE (PARTIALLY DIGESTED WOOD FIBERS)	*MADE FROM NATURAL WOOD USUALLY WITH GREEN DYE AND DISPERSING AGENT*	*50 LBS*	*2,000 LBS*	*N/A*
GRAVEL, CRUSHED STONE OR SLAG	*WASHED; SIZE 2B OR 3A – 1 1/2"*	*9 CY*	*405 CY*	*3"*
HAY OR STRAW	*AIR-DRIED; FREE OF UNDESIRABLE SEEDS AND COARSE MATERIALS*	*90 – 100 LBS, 2–3 BALES*	*2 TONS (100–120 BALES)*	*COVER ABOUT 90% SURFACE*
COMPOST	*UP TO 3" PIECES, MODERATELY TO HIGHLY STABLE*	*3 – 9 CY*	*3 – 9 CY*	*1–3"*
Erosion Control Mix	*WELL-GRADED MIXTURE OF PARTICLE SIZES. ORGANIC CONTENT BETWEEN 80–100% DRY WEIGHT. PARTICLE SIZE SHALL PASS 6" SCREEN (100%)*	**Slopes 3(Hz.):1(Vert.) = 2 inch depth plus additional 1/2 inch depth per 20 ft. of slope up to 100 ft. **Slopes between 3(Hz.):1(Vert.) and 2(Hz.):1(Vert.) = 4 inch depth plus additional 1/2 inch per 20 ft. of slope up to 100 ft. ***Slopes steeper than 2(Hz.):1(Vert.) applicability to specific site and mulch depth to be reviewed and approved prior to use by OPSC or EPSC Specialist*		

Notes:

1. APPLY TACKIFIER AS NEEDED TO MINIMIZE POTENTIAL FOR MULCH TO BLOW AWAY.
2. MULCH MUST NOT CONTAIN INVASIVE PLANT SPECIES. (SEEDS OR SEEDLINGS)
3. TACKIFIER MAY BE WATER, NETTING, OR SIMILAR.
4. OTHER THAN EROSION CONTROL MIX, MULCH IS NOT TO BE INSTALLED ON SLOPES > 3:1.

2 Mulch Table

12/12

N.T.S. Source: VHB LD_

TEMPORARY SEEDING

1. AREA TO BE SEEDED MUST BE ROUGH GRADED AND SLOPES PHYSICALLY STABLE.
2. SEEDING METHOD TO RESULT IN GOOD SOIL TO SEED CONTACT.
3. AFTER SEEDING, MULCH THE AREA WITH HAY OR STRAW AT 2 TONS/AC (APPROX 90 LBS/1,000 SF OR 2 BALES/1,000 SF); SEE MULCH DETAIL AND SPECIFICATIONS.
4. MULCH ANCHORING MAY BE NEEDED WHERE WIND OR AREAS OF CONCENTRATED WATER ARE POSSIBLE.
5. WOOD FIBER HYDROMULCH OR OTHER SPRAYABLE PRODUCTS APPROVED FOR EROSION CONTROL MAY BE USED IF APPLIED ACCORDING TO MANUFACTURERS' SPECIFICATIONS.

PERMANENT SEEDING

1. SEE SEEDDING SPECIFICATIONS FOR RECOMMENDED SEED MIXES. USE RIPARIAN AND WETLAND SEEDING MIX WITHIN 50 FEET OF STREAM CROSSINGS AND IN DISTURBED WETLAND AREAS. USE UPLAND NATURAL COMMUNITY MIX WITHIN AREAS IDENTIFIED AS SIGNIFICANT NATURAL COMMUNITIES. USE PERMANENT SEEDING MIX FOR ALL OTHER DISTURBED UPLAND AREAS. SEE VERMONT STANDARDS AND SPECIFICATIONS FOR EROSION PREVENTION AND SEDIMENT CONTROL FOR ADDITIONAL SEED MIXTURES.
2. AREA TO BE SEEDED MUST BE ROUGH GRADED AND SLOPES PHYSICALLY STABLE; CHISELING OR DISKING MAY BE NEEDED IF SOIL IS COMPACTED.
3. SEEDING METHOD TO RESULT IN GOOD SOIL TO SEED CONTACT.
4. PERMANENT SEEDING TO OCCUR PRIOR TO SEPTEMBER 15TH UNLESS WEATHER PERMITS SEEDING BEYOND SEPTEMBER 15TH.
5. AFTER SEEDING, MULCH THE AREA WITH HAY OR STRAW AT 2 TONS/AC (APPROX 90 LBS/1,000 SF OR 2 BALES/1,000 SF); SEE MULCH DETAIL AND SPECIFICATIONS.
6. MULCH ANCHORING MAY BE NEEDED WHERE WIND OR AREAS OF CONCENTRATED WATER ARE POSSIBLE.
7. WOOD FIBER HYDROMULCH OR OTHER SPRAYABLE PRODUCTS APPROVED FOR EROSION CONTROL MAY BE USED IF APPLIED ACCORDING TO MANUFACTURERS' SPECIFICATIONS.
8. IRRIGATION MAY BE NEEDED TO FACILITATE GRASS GROWTH AND ESTABLISH ADEQUATE GRASS COVER.

3 Seeding Notes

12/12

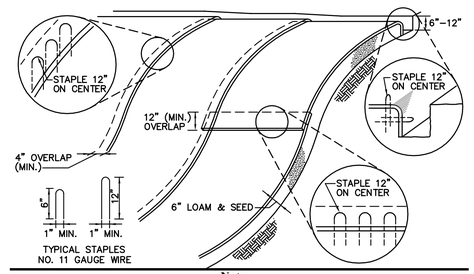
N.T.S. Source: VHB LD_

TEMPORARY SEEDING MIX		
TYPE	SEASON	RATE (LBS/ACRE)
RYEGRASS (ANNUAL OR PERENNIAL)	APRIL 15 – SEPTEMBER 15	20
"AROOSTOOK" WINTER RYE	SEPTEMBER 15 – APRIL 15	90
PERMANENT SEEDING MIX*		
TYPE	SEASON	RATE (LBS/ACRE)
BIRDSFOOT TREFOIL(1)**	APRIL 15 – SEPTEMBER 15	5
COMMON WHITE CLOVER (1)**	APRIL 15 – SEPTEMBER 15	8
TALL FESCUE (2)	APRIL 15 – SEPTEMBER 15	10
REDTOP (3)	APRIL 15 – SEPTEMBER 15	2
RYEGRASS (PERENNIAL) (3)	APRIL 15 – SEPTEMBER 15	5
*PERMANENT SEEDING MIX IS A COMBINATION OF BIRDSFOOT TREFOIL OR COMMON WHITE CLOVER PLUS TALL FESCUE PLUS REDTOP OR RYEGRASS (PERENNIAL). I.E. PERMANENT SEEDING MIX = (1) + (2) + (3). (SEE PAGE 4.27 OF THE VERMONT STANDARDS AND SPECIFICATIONS FOR EROSION PREVENTION AND SEDIMENT CONTROL.) ** ADD INOCULANT IMMEDIATELY PRIOR TO SEEDING		
RIPARIAN AND WETLAND SEEDING MIX		
TYPE	SEASON	RATE (LBS/ACRE)
"WET MEADOW AND DETENTION BASIN"* OR APPROVED EQUAL	APRIL 15 –SEPTEMBER 15	35
*SEED SPECIFIED IS FROM VERMONT WETLAND PLANT SUPPLY AND COMPOSED OF THE FOLLOWING SPECIES: PANICUM VIRGATUM, ELYMUS VIRGINICUS, FESTUCA RUBRA, CAREX VULPINOIDEA, CAREX SCOPARIA, SCIRPUS CYPERINUS, SCIRPUS ATROVIRENS, BIDENS CERNUA, EUPATORIUM PERFOLIATUM, EUPATORIADELPHUS MACULATUS, JUNCUS EFFUSUS, ONOCLEA SENSIBILIS, VERBENA HASTATA, SYMPHYOTRICHUM NOVA-ANGLIAEA		
UPLAND NATURAL COMMUNITY MIX		
TYPE	SEASON	RATE (LBS/ACRE)
"VERMONT CONSERVATION AND WILDLIFE"* OR APPROVED EQUIVALENT	APRIL 15 –SEPTEMBER 15	25
*SEED SPECIFIED IS FROM VERMONT WETLAND PLANT SUPPLY AND COMPOSED OF THE FOLLOWING SPECIES: ELYMUS VIRGINICUS, FESTUCA RUBRA, SCHIZACHYRIUM SCOPARIUM, ANDROPOGON GERARDII, CHAMAECRISTA FASCICULATA, PANICUM CLANDESTINUM, SORGHASTRUM NUTANS, HELIOPSIS HELIANTHOIDES, ASCLEPIA SYRIACA, VERBENA HASTATA, EUPATORIUM FISTULOSUM, EUTHAMIA GRAMINIFOLIA, SOLIDAGO JUNCEA, SYMPHYOTRICHUM NOVAE-ANGLIAE		

4 Seeding Specifications

06/13

N.T.S. Source: VHB LD_



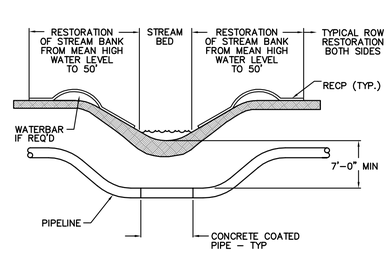
Notes:

1. APPLY TO SLOPES GREATER THAN 3H:1V OR WHERE NECESSARY TO AID IN ESTABLISHING VEGETATION.
2. APPLY TOP SOIL, FERTILIZER, LIME AND SEED PRIOR TO PLACING MATTING.
3. STAPLES ARE TO BE PLACED ALTERNATELY, IN COLUMNS APPROXIMATELY 2' APART AND IN ROWS APPROXIMATELY 3' APART. APPROXIMATELY 175 STAPLES ARE REQUIRED PER 4'x225' ROLL OF MATERIAL AND 125 STAPLES ARE REQUIRED PER 4'x150' ROLL OF MATERIAL.
4. DISTURBED AREAS SHALL BE SMOOTHLY GRADED. EROSION PREVENTION AND SEDIMENT CONTROL MATERIAL SHALL BE PLACED LOOSELY OVER GROUND SURFACE, DO NOT STRETCH AND ENSURE CLOSE CONTACT WITH THE GROUND SURFACE..
5. ALL TERMINAL ENDS AND TRANSVERSE LAPS SHALL BE STAPLED AT APPROXIMATELY 12" INTERVALS.
6. BEGIN AT THE TOP OF BLANKET INSTALLATION AREA BY ANCHORING BLANKET IN A 6" TO 12" DEEP TRENCH BACKFILL AND COMPACT TRENCH AFTER STAPLING.
7. ROLL THE BLANKET DOWN IN THE DIRECTION OF THE WATER FLOW.
8. THE EDGES OF BLANKETS MUST BE STAPLED WITH APPROX. 4" OVERLAP WHERE 2 OR MORE STRIP WIDTHS ARE REQUIRED.
9. WHEN BLANKETS MUST BE SPLICED, PLACE UPPER BLANKET END OVER LOWER END WITH 12" (MIN.) OVERLAP AND STAPLE BOTH TOGETHER.
10. METHOD OF INSTALLATION SHALL BE AS PER MANUFACTURER'S RECOMMENDATIONS. SEE SHEET ANGP-T-G-017 FPR RECP SPECIFICATIONS

5 Rolled Erosion Control Blanket (RECP) - Slope Installation

12/12

N.T.S. Source: VHB LD_680-vt



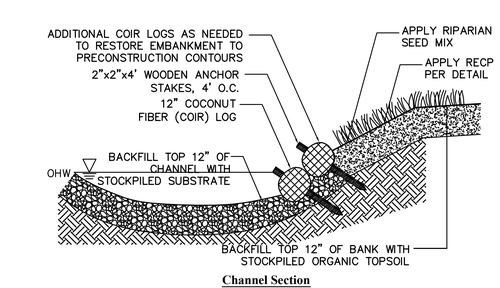
Notes:

1. SEE SHEET ANGP-T-G-017 FOR RECP SPECIFICATIONS

6 Streambank Restoration with RECP

12/12

N.T.S. Source: CHA LD_



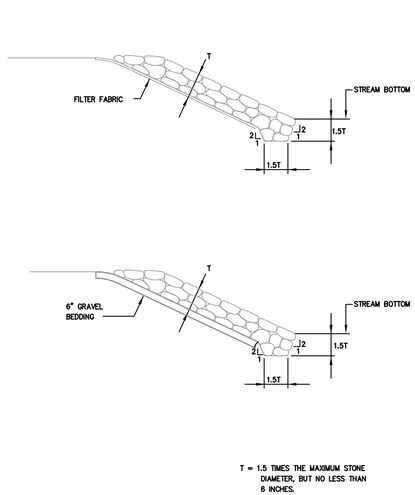
Notes:

1. APPLY COIR LOG DETAIL TO SITES WHERE STREAMBANK IS DISTURBED OR TRENCHED THROUGH DURING PIPELINE INSTALLATION AND BANK COMPOSITION PERMITS STAKES TO BE DRIVEN
2. INSTALL ROLLED EROSION CONTROL PRODUCT (RECP) PRIOR TO INSTALLATION OF COIR LOGS
3. PLACE COIR LOG IN 2" DEEP TRENCH ALONG SLOPE OF EMBANKMENT AND STAKE INTO PLACE THROUGH RCEP
4. KEY-IN COIR LOG BOTH UPSTREAM AND DOWNSTREAM FROM PIPELINE TRENCH TO MAKE COIR LOG FLUSH WITH STREAMBANK IN ORDER TO PREVENT UNRAVELING OF BANK DURING HIGH FLOW EVENTS.
5. COIR LOG MESH TO CONSIST OF BIODEGRADABLE MATERIAL.

7 Streambank Restoration with Coir Logs

6/13

N.T.S. Source: VHB



8 Streambank Stabilization with Rip Rap

12/12

N.T.S. Source: VHB LD_

VHB Vanasse Hangen Brustlin, Inc.

CHA

36 Cordage Park Circle , Suites 321, 326, 329, 336
Plymouth, MA 02360
Main: (781) 982-7700 - www.chacompanies.com

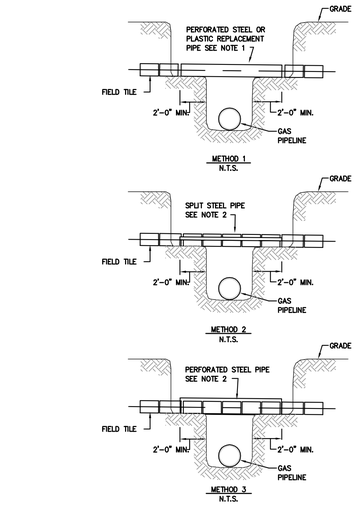
DWG. NO.	REFERENCE DWG.	REV	DSN	CK		DESCRIPTION		BID INITIALS	BID DATE	CONSTRUCTION INITIALS	CONSTRUCTION DATE
							ENVIRONMENTAL	JLS	06/28/13		
							DRAFTING DESIGNER	GIL	06/28/13		
							DRAFTING SUPERVISOR	BZD	06/28/13		
							DESIGN ENGINEER	MDF	06/28/13		
		0	MDF	SAB		ISSUED FOR CONSTRUCTION	DESIGN MANAGER	SAB	06/28/13		

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
CONSTRUCTION DETAILS

LOC. CHITTENDEN & ADDISON COUNTIES

Vermont Gas

YEAR: 2013	W.O.	SCALE: NOTED	DWG. ANGP-T-G-018	REV. 0

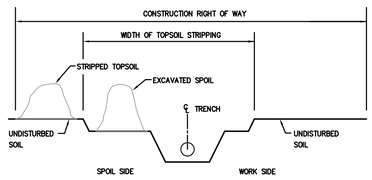


NOTES:
1. REPLACEMENT PIPE TO BE AS NEAR AS POSSIBLE TO THE DIAMETER OF THE FIELD TILE.
2. STEEL CARRIER PIPE TO HAVE INSIDE DIAMETER AS NEAR AS POSSIBLE TO THE OUTSIDE DIAMTER OF THE FIELD TILE.
3. MAINTAIN ORIGINAL FLOW LINE OF FIELD TILE IN ALL METHODS.

1 Typical Drain Tile Protection

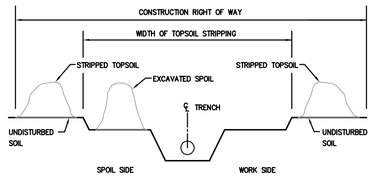
12/12

N.T.S. Source: VHB LD_



DITCH PLUS SPOILSIDE TOPSOIL SEGREGATION

N.T.S.



FULL RIGHT OF WAY TOPSOIL STRIPPING

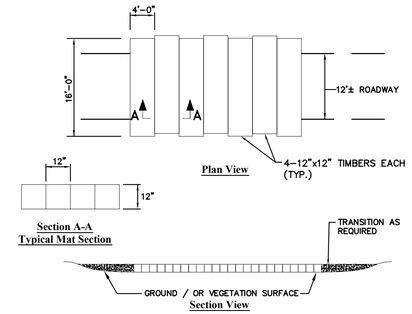
N.T.S.

NOTES: 1. TOPSOIL MAY BE STORED IN LOCATIONS AS SHOWN ABOVE OR AT OTHER LOCATIONS WITHIN THE CONSTRUCTION ROW.
2. SEE SHEET ANGP-T-G-015 FOR TRENCH BACK-FILLING DETAIL AND SPECIFICATIONS

2 Topsoil Segregation

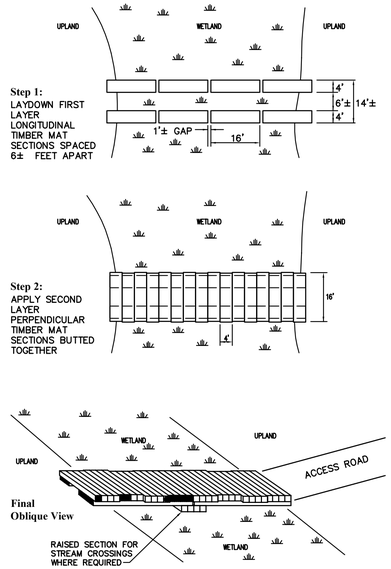
12/12

N.T.S. Source: VHB LD_



Notes:

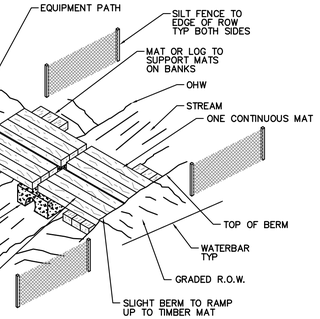
1. TO BE INSTALLED WHERE NECESSARY IN WETLAND FOR ACCESS FOR CONSTRUCTION. ALTERNATIVE CONSTRUCTION MATTING (E.G., RUBBER MATS) MAY BE SUBSTITUTED FOR TIMBER MATTING.
2. PREPARATION FOR INSTALLATION OF TIMBER MATS WILL CONSIST OF CUTTING TALL WOODY SPECIES AND TRIMMING SHRUBS IF CONDITIONS REQUIRE. VEGETATION ROOT MASS IS TO REMAIN UNDISTURBED. MATS TO BE PLACED TO MAINTAIN NATURAL SOIL CONTOURS/CONDITIONS.
3. TIMBER SECTIONS TO BE SECURED TOGETHER WITH NO SPACES BY BOLTS, NAILS, STRAPS OR OTHER APPROPRIATE METHODS.
4. TIMBER MATS TO BE REMOVED UPON COMPLETION OF PROJECT AND AREA RESTORED TO NEAR ORIGINAL CONDITIONS PER EPSC PLANS
5. SNOW/ICE REMOVAL BY MECHANICAL METHODS: NO DEICING SALT OR CHEMICALS TO BE USED. LIGHT APPLICATION OF SAND FOR TRACTION ACCEPTABLE SO AS RESIDUE DOES NOT ACCUMULATE IN WETLAND.
6. MATS ARE TO BE IN PLACE FOR MINIMUM DURATION FEASIBLE.



3 Construction Matting - Timber Mat Typ.

12/12

N.T.S. Source: VHB LD_

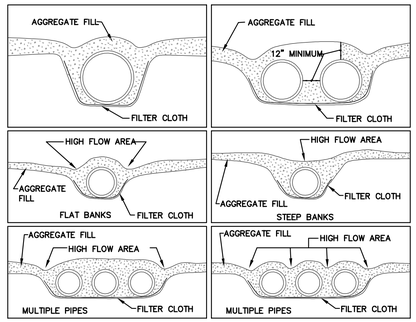


NOTES:
1. THERE IS TO BE NO UNNECESSARY MOVEMENT OF EQUIPMENT THROUGH WATER.
2. TIMBER MATS TO BE POSITIONED TO RUN FROM TOP OF BANK TO TOP OF BANK WHERE POSSIBLE. AT MINIMUM, THE TIMBER MAT BRIDGE SHALL SPAN THE ORDINARY HIGH WATER (OHW) WIDTH OF THE CHANNEL.
3. TIMBER MATS SHALL BE CLEANED OF SEDIMENT PRIOR TO EACH INSTALLATION.
4. TIMBER MATS SHOULD BE INSTALLED SO THERE ARE NO GAPS BETWEEN MATS.

4 Construction Mat Bridge

12/12

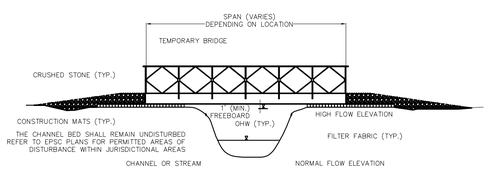
N.T.S. Source: CHA LD_



5 Temporary Access Culverts

12/12

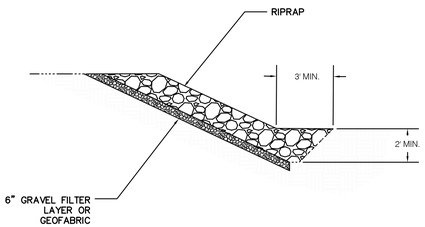
N.T.S. Source: VHB LD_



NOTES:
1. BRIDGE SHALL BE DESIGNED TO PROVIDE A CLEAR SPAN THAT IS EQUAL TO OR GREATER THAN OHW AT THE CROSSING SITE.
2. NO MATERIALS SHALL BE PLACED IN THE CHANNEL BELOW OHW WITHOUT PRIOR AUTHORIZATION.
3. BRIDGE SHALL BE DESIGNED TO CARRY THE MAXIMUM ANTICIPATED CONSTRUCTION LOADS. HOWEVER SHALL NOT BE LESS THAN AASHTO HS-25 LOADING CRITERIA.
4. BRIDGE SHALL BE DESIGNED SUCH THAT A MINIMUM ONE FOOT (1 FT) OF FREE BOARD EXISTS BETWEEN THE LOWEST MEMBER AND THE ANTICIPATED HIGH FLOW (Q25) WATER ELEVATION.
5. ADDITIONAL LOAD BEARING DEVICES BEYOND CONSTRUCTION MATTING MAY BE REQUIRED. THE CONTRACTOR SHALL CONDUCT A GEOTECHNICAL ANALYSIS OF EACH BRIDGE SITE TO DETERMINE THE NECESSARY BEARING CAPACITY OF SOILS AND TO DETERMINE THE MINIMUM DISTANCE BETWEEN BEARING SURFACES AND THE TOP OF STREAM/CHANNEL BANK.
6. APPROACH GRADES SHALL BE AS DEEMED NECESSARY BY THE CONTRACTOR.

6 Temporary Bridge Detail

N.T.S. Source: VHB LD_



Notes:

1. MINIMUM THICKNESS SHALL BE 1.5X MAX STONE DIAMETER, BUT IN NO CASE < 6".
2. THE TOE OF RIP RAP SHALL BE KEYED IN STABLE FOUNDATION @ IT'S BASE.
3. STONE SIZE SHOULD BE BASED ON ANGLE OF REPOSE FOR SPECIFIC SIZE. (FIG 4.3 P 4.38)

6 Riprap Slope Protection

12/12

N.T.S. Source: VHB LD_

DWG. NO.	REFERENCE DWG.	REV	DSN	CK		DESCRIPTION		BID INITIALS	BID DATE	CONSTRUCTION INITIALS	CONSTRUCTION DATE
							ENVIRONMENTAL	JLS	06/28/13		
							DRAFTING DESIGNER	GIL	06/28/13		
							DRAFTING SUPERVISOR	BZD	06/28/13		
							DESIGN ENGINEER	MDF	06/28/13		
		0	MDF	SAB		ISSUED FOR CONSTRUCTION	DESIGN MANAGER	SAB	06/28/13		

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
CONSTRUCTION DETAILS

LOC. CHITTENDEN & ADDISON COUNTIES

YEAR: 2013 | W.O. | SCALE: NOTED | DWG. ANGP-T-G-019 | REV. 0

Vermont Gas

VHB Vanasse Hangen Brustlin, Inc.

CHA
36 Cordage Park Circle , Suites 321, 326, 329, 336
Plymouth, MA 02360
Main: (781) 982-7700 - www.chacompanies.com

NOTES:

1. USE DIVERSION FLUME STREAM CROSSING ON WATER COURSES WITH LIMITED STREAM FLOW TO PREVENT SEDIMENTATION AND INTERRUPTION OF STREAM FLOW DURING CONSTRUCTION. THIS METHOD IS APPROPRIATE IN LOCATIONS WHERE FISH PASSAGE IS A CONCERN.

2. SCHEDULE CONSTRUCTION DURING LOW FLOW PERIOD, IF POSSIBLE.

3. THIS DETAIL REPRESENTS ONE POSSIBLE CONFIGURATION OF CONSTRUCTION ELEMENTS WITHIN THE TEMPORARY AND PERMANENT ROW. ALTERNATE CONFIGURATIONS OF CONSTRUCTION ELEMENTS BETWEEN THE UPSTREAM AND DOWNSTREAM DIVERSION STRUCTURES ARE ALLOWABLE SO LONG AS APPROPRIATE MEASURES ARE MAINTAINED TO PROTECT WATER QUALITY .

4. SET UP STEEL OR HDPE PIPE AS SHOWN, OR USE PRACTICAL ALTERNATIVES. PIPE (OR PIPES) MUST BE SIZED TO HAVE TWICE THE CAPACITY OF ANTICIPATED FLOW. DEPENDING ON STREAM FLOW, DIG SUMP HOLE TO CONCENTRATE WATER AT INTAKE.

5. INSTALL UPSTREAM DAM COMPOSED OF SANDBAGS, METAL PLATING OR A COMBINATION OF BOTH, INSTALL DOWNSTREAM DAM, IF REQUIRED, TO KEEP STREAM BED DRY.

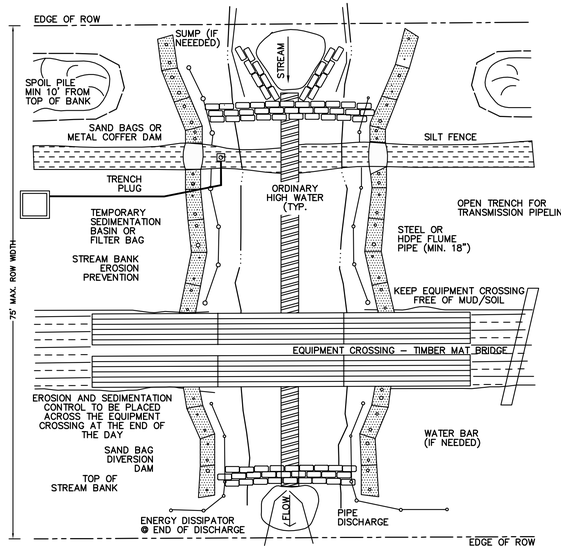
6. AFTER DAMS ARE IN PLACE, IT MAY BE NECESSARY TO USE A SUMP PUMP AND DEWATERING FILTER BAG TO KEEP WORK AREA DRY.

7. ALL MECHANIZED EQUIPMENT TO PERFORM WORK FROM ADJACENT TOP OF BANK AREAS. MAT STREAM IF WORK TO OCCUR IN STREAM CHANNEL.

8. EXCAVATE TRENCH AND LOWER IN PIPE UNDER DIVERSION FLUME. MOVE FLUME AS REQUIRED OR DISCONNECT IF TEMPORARY FLOW BLOCKAGE IS ACCEPTABLE. BACKFILL TRENCH.

9. DISMANTLE DOWNSTREAM DAM, THEN UPSTREAM DAM.

10. RESTORE DISTURBED CHANNEL, STREAM BANKS AND APPROACHES FOR A MINIMUM DISTANCE OF AT LEAST 50 FT. FROM THE STREAM EDGES AND PERMANENTLY STABILIZE WITHIN 1 DAY OF INITIAL RESTORATION. REFER TO THE STREAMBANK RESTORATION DETAIL FOR RESTORATION REQUIREMENTS.



1 Diversion Flume Stream Crossing

12/12

N.T.S.

Source: VHB

LD_

NOTES:

1. USE DAM AND PUMP METHOD ON WATER COURSES WITH LIMITED STREAM FLOW TO PREVENT SEDIMENTATION AND INTERRUPTION OF STREAM FLOW DURING CONSTRUCTION.

2. SCHEDULE CONSTRUCTION DURING LOW FLOW PERIOD, IF POSSIBLE.

3. THIS DETAIL REPRESENTS ONE POSSIBLE CONFIGURATION OF CONSTRUCTION ELEMENTS WITHIN THE TEMPORARY AND PERMANENT ROW. ALTERNATE CONFIGURATIONS OF CONSTRUCTION ELEMENTS BETWEEN THE UPSTREAM AND DOWNSTREAM DIVERSION STRUCTURES ARE ALLOWABLE SO LONG AS APPROPRIATE MEASURES ARE MAINTAINED TO PROTECT WATER QUALITY .

4. SET UP PUMP AND HOSE AS SHOWN, OR USE PRACTICAL ALTERNATIVES. PUMP SHOULD HAVE TWICE THE PUMPING CAPACITY OF ANTICIPATED FLOW. HAVE STANDBY PUMP ON SITE. DEPENDING ON STREAM FLOW, DIG SUMP HOLE TO CONCENTRATE WATER AT INTAKE.

5. USE TEMPORARY SEDIMENTATION BASIN OR FILTER BAG PRIOR TO DISCHARGING WATER BACK TO STREAM.

6. INSTALL UPSTREAM DAM COMPOSED OF SANDBAGS, METAL PLATING OR A COMBINATION OF BOTH, INSTALL DOWNSTREAM DAM, IF REQUIRED, TO KEEP STREAM BED DRY.

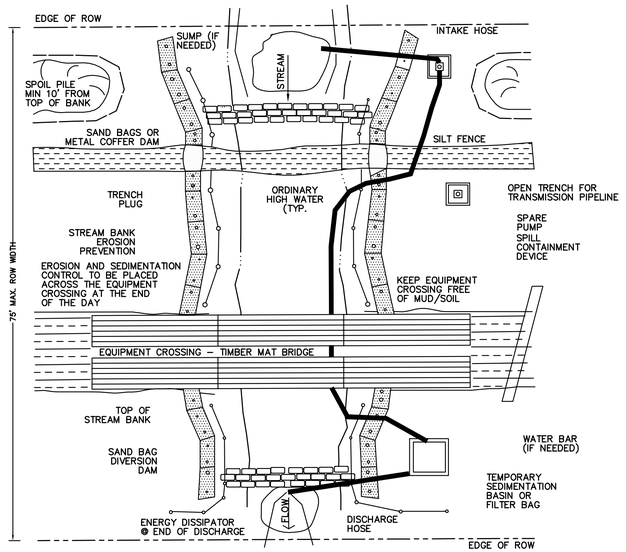
7. AFTER DAMS ARE IN PLACE, IT MAY BE NECESSARY TO USE ADDITIONAL PUMPS TO HANDLE STREAM FLOW.

8. EXCAVATE TRENCH AND LOWER IN PIPE UNDER HOSE. BACKFILL TRENCH.

9. ALL MECHANIZED EQUIPMENT TO PERFORM WORK FROM TEMPORARY BRIDGE OR ADJACENT TOP OF BANK AREAS. USE TIMBER MATS IS TO OCCUR IN STREAM CHANNEL.

10. DISMANTLE DOWNSTREAM DAM, THEN UPSTREAM DAM.

11. RESTORE DISTURBED CHANNEL, STREAM BANKS AND APPROACHES FOR A MINIMUM DISTANCE OF AT LEAST 50 FT. FROM THE STREAM EDGES AND PERMANENTLY STABILIZE WITHIN 1 DAY OF INITIAL RESTORATION. REFER TO THE STREAMBANK RESTORATION DETAIL FOR RESTORATION REQUIREMENTS.



2 Open Trench Stream Crossing - Dam and Pump Around

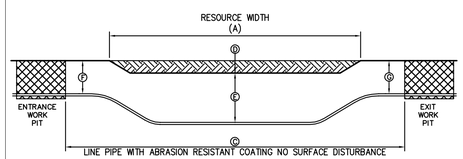
12/12

N.T.S.

Source: VHB

LD_

MILEPOST	RESOURCE NAME	RESOURCE AREA WIDTH (A)	HDD LENGTH (C)	DEPTH OF RESOURCE AREA. (D)	ELEV. BELOW RESOURCE (E)	ENTRY ELEV. (F)	EXIT ELEV. (G)
28.2	VT–AD–1560 VT–AD–1561	300	775	400	< 393	396	396
28.57	VT–AD–1562	200	375	406	< 399	412	412
33.25	VT–AD–446	230	700	438	< 431	436	446
33.72	VT–AD–793	320	980	454	< 447	456	452
35.77	VT–AD–806	160	950	310	< 303	323	323
36.0	VT–AD–808 (1), (2)	320	520	350	< 346	346	350



Notes:

1. THIS CONFIGURATION IS FOR HORIZONTAL DIRECTIONAL DRILL OF UPLAND NATURAL AND CULTURAL (ARCHAEOLOGICAL) RESOURCE SITES AS SHOWN ON PROJECT PLANS. SEE ALIGNMENT SHEETS FOR LOCATIONS OF THIS CONFIGURATION.
2. MINIMUM SEPARATION BETWEEN THE TOP OF PIPELINE AND THE CHANNEL RESOURCE BOTTOM (DIMENSION E) MUST BE AT LEAST 2 FEET.
3. ELEVATIONS PROVIDED ARE BASED ON APPROXIMATE NAVD 88 DATUM AND MUST BE FIELD VERIFIED PRIOR TO INSTALLATION OF PIPELINE.

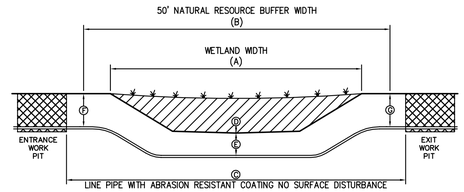
3 Horizontal Directional Drill (HDD) Upland Natural / Cultural Resource - Typical Section

04/13

N.T.S.

Source: VHB

MILEPOST	WETLAND ID	WETLAND WIDTH (A)	BUFFER WIDTH (B)	HDD LENGTH (C)	UNCON. MATERIAL ELEV. (D)	CONSOL. MATERIAL ELEV. (E)	ENTRY ELEV. (F)	EXIT ELEV. (G)
22.1	2012–CM–84 2012–PW–85	1,110	1,520	1,600	398	< 391	424	404
27.3	2012–PW–67 RTE–PS–045	2,300	2,450	2,270	358	< 356	< 376	< 400



Notes:

1. THIS CONFIGURATION IS FOR HORIZONTAL DIRECTIONAL DRILL OF WETLAND CROSSINGS AS SHOWN ON PROJECT PLANS. SEE ALIGNMENT SHEETS FOR LOCATIONS OF THIS CONFIGURATION.
2. TOP OF PIPELINE MUST BE BELOW THE DEPTH OF PEAT OR OTHER UNCONSOLIDATED ORGANIC MATERIALS (DIMENSION D) THROUGHOUT THE LENGTH OF THE DRILL.
3. MINIMUM SEPARATION BETWEEN THE UNCONSOLIDATED MATERIAL AND THE TOP OF PIPELINE (DIMENSION E) MUST BE AT LEAST 2 FEET.
4. ELEVATIONS PROVIDED ARE BASED ON APPROXIMATE NAVD 88 DATUM AND MUST BE FIELD VERIFIED PRIOR TO INSTALLATION OF PIPELINE.

4 Horizontal Directional Drill (HDD) Wetland Crossing - Typical Section

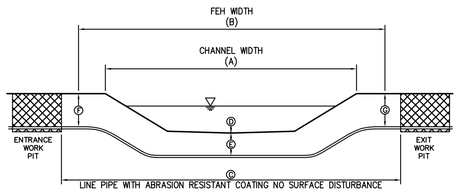
04/13

N.T.S.

Source: VHB

MILEPOST	STREAM NAME	CHANNEL WIDTH (A)	FEH WIDTH (B)	HDD LENGTH (C)	CHANNEL ELEV. (D)	ELEV. BELOW CHANNEL (E)	ENTRY ELEV. (F)	EXIT ELEV. (G)
0.99	INDIAN BROOK	4	100	1,150	208 [1]	< 198	< 208	< 208
1.52	INDIAN BROOK	15	125	1,530	188 [2]	< 178	< 188	< 188
6.75	WINOOSKI RIVER (SECTION 10 WATERS)	320	N/A (1,195)	900	263 [3]	< 238	< 275	< 275
19.47	LAPLATTE RIVER	30	360	640	317 [2]	< 307	< 317	< 317
22.86	LEWIS CREEK	80	435	2,500	310 [1]	< 300	< 310	< 310
35.85	UNNAMED TRIB. TO LITTLE OTTER CREEK	4	640	1,010	303 [2]	< 293	< 303	< 303
39.30	NEW HAVEN RIVER	120	785	530	245 [2]	< 235	< 245	< 245

1. CHANNEL ELEVATION BASED ON CONTOURS SHOWN ON EPSC PLAN PROVIDED BY CHA, INC. DATED 02/28/2013 AND NOT ASSESSED IN THE FIELD BY VHB.
2. CHANNEL ELEVATION BASED ON CONTOURS SHOWN ON EPSC PLAN PROVIDED BY CHA, INC. DATED 02/28/2013 AND MODIFIED BASED ON FIELD ASSESSMENT BY VHB.
3. CHANNEL ELEVATION BASED ON BATHYMETRIC SURVEY PROVIDED BY COLER & COLANTONIO DATED 12/12/2012 AND NOT ASSESSED IN THE FIELD BY VHB.



Notes:

1. THIS CONFIGURATION IS FOR HORIZONTAL DIRECTIONAL DRILL OF STREAM CROSSINGS AS SHOWN ON PROJECT PLANS. SEE ALIGNMENT SHEETS FOR LOCATIONS OF THIS CONFIGURATION.
2. TOP OF PIPELINE MUST BE AT LEAST AS DEEP AS THE CHANNEL BOTTOM (DIMENSION D) THROUGHOUT THE FLUVIAL EROSION HAZARD (FEH) CORRIDOR.
3. MINIMUM SEPARATION BETWEEN THE TOP OF PIPELINE AND THE CHANNEL BOTTOM (DIMENSION E) MUST BE AT LEAST 7 FEET.
4. ELEVATIONS PROVIDED ARE BASED ON APPROXIMATE NAVD 88 DATUM AND MUST BE FIELD VERIFIED PRIOR TO INSTALLATION OF PIPELINE.
5. FEH CORRIDOR IS LISTED AS NOT APPLICABLE (N/A) WHERE THE STREAM CROSSES OR IS ADJACENT TO AN EXISTING ROADWAY OR OTHER INFRASTRUCTURE THAT RESULTS IN RIVER MANAGEMENT CONSTRAINTS AT THAT LOCATION. FEH CORRIDOR WIDTHS AT THESE LOCATIONS ARE SHOWN FOR INFORMATION PURPOSES ONLY.

5 Horizontal Directional Drill (HDD) Stream Crossing - Typical Section

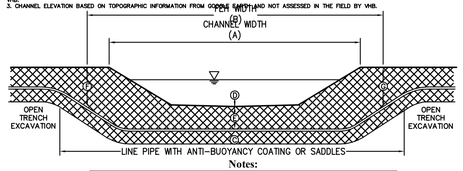
04/13

N.T.S.

Source: VHB

MILEPOST	STREAM NAME	CHANNEL WIDTH (A)	FEH WIDTH (B)	CHANNEL ELEV. (C)	ELEV. BELOW CHANNEL (D)	ENTRY ELEV. (E)	EXIT ELEV. (F)
3.62	INDIAN BROOK	7	N/A (185)	430 [2]	< 420	< 430	< 430
6.60	ALDER BROOK	35	N/A (150)	281 [1]	< 274	< 281	< 281
10.32	ALLEN BROOK	35	360	376 [2]	< 366	< 376	< 376
13.79	SUCKER BROOK	15	120	367 [2]	< 360	< 367	< 367
18.93	UNNAMED TRIBUTARY TO LAPLATTE RIVER	4	N/A (310)	328 [1]	< 321	< 328	< 328
19.94	UNNAMED TRIBUTARY TO LAPLATTE RIVER	4	125	330 [2]	< 323	< 330	< 330
24.52	UNNAMED TRIBUTARY TO LEWIS CREEK	8	N/A (200)	407 [3]	< 400	< 407	< 407
29.11	UNNAMED TRIBUTARY TO LITTLE OTTER CREEK	8	N/A (400)	362 [2]	< 355	< 362	< 362
30.94	UNNAMED TRIBUTARY TO LITTLE OTTER CREEK	4	200	267 [2]	< 260	< 267	< 267
32.30	LITTLE OTTER CREEK	35	240	267 [1]	< 260	< 267	< 267

1. CHANNEL ELEVATION BASED ON CONTOURS SHOWN ON EPSC PLAN PROVIDED BY CHA, INC. DATED 02/28/2013 AND MODIFIED BASED ON FIELD ASSESSMENT BY VHB.
2. CHANNEL ELEVATION BASED ON CONTOURS SHOWN ON EPSC PLAN PROVIDED BY CHA, INC. DATED 02/28/2013 AND NOT ASSESSED IN THE FIELD BY VHB.
3. CHANNEL ELEVATION BASED ON TOPOGRAPHIC INFORMATION FROM GOOGLE EARTH AND NOT ASSESSED IN THE FIELD BY VHB.



Notes:

1. THIS CONFIGURATION IS FOR OPEN TRENCH EXCAVATION OF STREAM CROSSINGS AS SHOWN ON PROJECT PLANS. SEE ALIGNMENT SHEETS FOR LOCATIONS OF THIS CONFIGURATION.
2. TOP OF PIPELINE MUST BE AT LEAST AS DEEP AS THE CHANNEL BOTTOM (DIMENSION D) THROUGHOUT THE FLUVIAL EROSION HAZARD (FEH) CORRIDOR.
3. MINIMUM SEPARATION BETWEEN THE TOP OF PIPELINE AND THE CHANNEL BOTTOM (DIMENSION E) MUST BE AT LEAST 7 FEET.
4. ELEVATIONS PROVIDED ARE BASED ON APPROXIMATE NAVD 88 DATUM AND MUST BE FIELD VERIFIED PRIOR TO INSTALLATION OF PIPELINE.
5. FEH CORRIDOR IS LISTED AS NOT APPLICABLE (N/A) WHERE THE STREAM CROSSES OR IS ADJACENT TO AN EXISTING ROADWAY OR OTHER INFRASTRUCTURE THAT RESULTS IN RIVER MANAGEMENT CONSTRAINTS AT THAT LOCATION. FEH CORRIDOR WIDTHS AT THESE LOCATIONS ARE SHOWN FOR INFORMATION PURPOSES ONLY.
6. RESTORE DISTURBED CHANNEL, STREAM BANKS, AND APPROACHES FOLLOWING PIPELINE INSTALLATION PER EPSC PLAN.

6 Open Trench Stream Crossing - Typical Section

04/13

N.T.S.

Source: VHB

DWG. NO.	REFERENCE DWG.	REV	DSN	CK		DESCRIPTION
		0	MDF	SAB		ISSUED FOR CONSTRUCTION

	BID		CONSTRUCTION	
ENVIRONMENTAL	JLS	06/28/13		
DRAFTING DESIGNER	GIL	06/28/13		
DRAFTING SUPERVISOR	BZD	06/28/13		
DESIGN ENGINEER	MDF	06/28/13		
DESIGN MANAGER	SAB	06/28/13		
	INITIALS	DATE	INITIALS	DATE

VERMONT GAS
PROPOSED 12" PIPELINE
ADDISON NATURAL GAS PROJECT
CONSTRUCTION DETAILS

LOC. CHITTENDEN & ADDISON COUNTIES

YEAR: 2013 | W.O. | SCALE: NOTED | DWG. ANGP–T–G–020 | REV. 0

Vermont Gas

VHB Vanasse Hangen Brustlin, Inc.

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Main: (781) 982-7700 - www.chacompanies.com

May 20, 2013 Supplemental Attachments
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