EROSION AND SEDIMENT CONTROL TYPICALS LEGEND

DETAIL NUMBER	DESCRIPTION	ACRONYM
1	CULVERT EQUIPMENT CROSSING	CEC
2	WETLAND EQUIPMENT CROSSING	WEC
3	BORED ROAD/RAILROAD CROSSING	BRRC
4	DAM AND PUMP CROSSING	DPC
5A, B	FLUME CROSSING	FC
6	DRY WATERBODY CROSSING	DWC
7	TYPE I "NON-SATURATED WETLAND" INSTALLATION PROCEDURE	WIP1
8	TYPE II "SATURATED WETLAND" INSTALLATION PROCEDURE	WIP2
9	TYPE III "INUNDATED WETLAND" INSTALLATION PROCEDURE	WIP3
10	STABILIZED CONSTRUCTION ENTRANCE	CE
11	STABILIZED CONSTRUCTION ENTRANCE WITH WASHRACK	CEW
12	WATER BAR	WB
13	TRENCH PLUG (TRENCH BREAKER)	TP
14	CHECK DAM	CD
15	STRAW BALE BARRIER	SBD
16	SEDIMENT FENCE	GSF
17	REINFORCED SEDIMENT FENCE	RSF
18	REINFORCED SEDIMENT BARRIER HOOK OUTLET STRUCTURE	SBH
19	WATERBAR OUTLET APRON	WOA
20	TURBIDITY CURTAIN	TC
21A, B	ELEVATED WASHRACK	EW
22	WELL POINT/SUMP PIT	WP
23	TRENCH DEWATERING	TDW
24A, B	EROSION CONTROL BLANKET	ECB
25	DEWATERING STRUCTURE	DW
26	FILTER BAG	FB
27A, B	HYDROSTATIC DEWATERING STRUCTURE	HDS
28	ROAD CULVERT EXTENSION ACROSS PIPELINE TRENCH	RCE
29	TEMPORARY CULVERT ACROSS OPEN TRENCH	TCOP
30	ENERGY DISSIPATER	ED
31	TYPICAL EXTRA WORK SPACES AT WATERBODY CROSSINGS	WC
32	RIGHT-OF-WAY CROWNING	ROWC
33	TRENCH DEWATERING SEDIMENT CORRAL	TDSC
34	DUST CONTROL	DC
35	GRASS OUTLET SEDIMENT TRAP	GOST
36	SEDIMENT TRAP PIPE OUTLET	STPO
37	VEGETATED FILTER STRIPS	VF
38	TYPICAL EROSION CONTROL FABRIC	ECF
39	COMPOST FILTER SOCK	CFS
40	COMPOST SOCK SEDIMENT TRAP	CSST
41	SURFACE ROUGHENING	SR
42	PERMANENT DIVERSION (SLOPE BREAKER)	PD
43	TEMPORARY DIVERSION	TD
44	BRIDGE EQUIPMENT CROSSING	EC
45	PUMP INTAKE AND OUTLET PROTECTION	PuP
46	PUMPING SETTLING BASIN	PSB
47	TEMPORARY SEDIMENT TRAP	TST
48	TEMPORARY SEDIMENT BASIN	TSB
49	TEMPORARY STREAM CROSSING	TSC
50	TOPSOIL SEGREGATION	TO
51	TYPICAL CONSTRUCTION HORIZONTAL DIRECTION DRILL	HDD
52	PIPE SLOPE DRAIN	PSD
53	PIPE ENERGY DISSIPATOR	PED
54	RIPRAP OUTLET PROTECTION	RROP
55	SUPER SILT FENCE	SSF
56	TEMPORARY SWALE	TS
57	TYPICAL DRAIN TILE REPAIR ACROSS TRENCH	DTR
58	LATERAL INTERCEPT DRAIN	LID
59	DRIVEWAY DIVERSION BERM	DDB
60	ROCK FILTER	RF
61	ROCK FILTER OUTLET	RFO
62A, B	TYPICAL ACCESS ROAD CROSS SECTION	ARCS
63	TYPICAL OPEN CUT PAVED ROAD CROSSING	OCRC
64	TYPICAL UTILITY LINE CROSSING WITH COFFERDAM	ULC
65	TYPICAL ACCESS FORD	AF
66	TEMPORARY WOODEN MAT PIPELINE CROSSING	WMPC
67	TYPICAL 100 FT. CONSTRUCTION WORKSPACE INSIDE POWERLINE EASEMENT	ROW01
68	TYPICAL 95 FT. CONSTRUCTION WORKSPACE ADJACENT TO POWERLINE EASEMENT	ROW02
69	100' CORRIDOR PARALLEL TO DEFINING LINE (EXISTING TGP)	ROW03
70	100' CORRIDOR (GREENFIELD 50/50)	ROW04
71	100' CORRIDOR PARALLEL TO NON DEFINING LINE (EXISTING TGP)	ROW05
72	TYPICAL 100' CORRIDOR CONSTRUCTION WORKSPACE ADJACENT TO POWERLINE EASEMENT	ROW06
73	100' CORRIDOR (GREEN FIELD) STANDARD	ROW07
74	90' CORRIDOR PARALLEL TO 300-1 LINE FOR 24" PROPOSED PIPELINE SEGMENT S	ROW08
75	LEVEL SPREADER	LS
76	CONDUIT LEVEL SPREADER	CLS
77A, B, C, D	PERMANENT SEEDING	PS

EROSION AND SEDIMENT CONTROL NOTES:

1. EROSION CONTROLS WILL BE INSTALLED IMMEDIATELY FOLLOWING EARTH DISTURBANCE AND WILL BE MAINTAINED UNTIL PERMANENT STABILIZATION. PERMANENT STABILIZATION IS DEFINED AS A MINIMUM UNIFORM, PERENNIAL 70% VEGETATIVE COVER OR OTHER PERMANENT NON-VEGATATED COVER WITH A DENSITY SUFFICIENT TO RESIST ACCELERATED EROSION THROUGHOUT THE SITE.
2. ALL WETLAND AND WATERBODY BOUNDARIES WILL BE CLEARLY MARKED/FLAGGED IN THE FIELD PRIOR TO THE COMMENCEMENT OF EARTH DISTURBANCE ACTIVITIES.
3. ALL EROSION CONTROL BEST MANAGEMENT PRACTICES (BMPs) MUST BE INSPECTED DAILY IN ACTIVE CONSTRUCTION AREAS AND AT LEAST WEEKLY OR WITHIN ONE DAY FOLLOWING A PRECIPITATION EVENT THAT RESULTS IN STORMWATER RUNOFF IN NON-ACTIVE AREAS. MAINTENANCE, REPAIR OR REPLACEMENT OF FAILING BMPs SHALL BE PERFORMED IMMEDIATELY.
4. SUBSOIL EXCAVATED AS PART OF THE PROJECT AND SEDIMENT REMOVED FROM BMPs WILL BE COMBINED AND USED TO BACKFILL THE TRENCH. TYPICALY, EXCESS SOIL IS MINIMAL AND WILL EITHER BE USED TO CREATE A CROWN OVER THE TRENCH TO COUNTERACT SETTLING OR WILL BE SPREAD EVENLY ACROSS THE ROW, WHICH WILL HAVE A NEGLIGIBLE EFFECT ON THE OVERALL GRADE. ALSO, ANY EXCESS EXCAVATED MATERIALS OR MATERIALS UNSUITABLE FOR BACKFILL WILL BE HANDLED, AS APPROVED BY LANDOWNER OR LAND MANAGEMENT AGENCY, OR DISPOSED OF IN ACCORDANCE WITH APPLICABLE REGULATIONS.
5. IT IS ACCEPTABLE FOR E&S BMPs TO BE TEMPORARILY REMOVED FROM EQUIPMENT CROSSING PATHWAYS DURING PERIODS OF ACTIVE CONSTRUCTION IF THESE CONTROLS WILL BE PROPERLY REINSTALLED AT THE END OF EACH WORK DAY.
6. WETLAND MATS WILL BE PERMANENTLY REMOVED AFTER CLEAN-UP/RESTORATION. MATS WILL BE AT LEAST 12 FEET WIDE AND LENGTH IS DEPENDENT ON THE WETLAND CROSSING LENGTH FROM START TO END.
7. WHEN WETLAND AREAS ARE TEMPORARILY DISTURBED, TOPSOIL WILL BE ISOLATED AND STOCKPILED FOR REPLACEMENT AFTER GRADING IS COMPLETED. NO SOIL AMENDMENTS SHOULD BE USED ON WETLAND AREAS.
8. TEMPORARY SEEDING SHOULD BE APPLIED WHERE EXPOSED SOIL SURFACES WILL NOT BE BROUGHT TO FINAL GRADE FOR A PERIOD OF MORE THAN 30 WORKING DAYS. APPLICATIONS OF THIS PRACTICE INCLUDE EXCAVATED AREAS, SOIL STOCKPILES, BERMS, EMBANKMENTS AND SIDES OF SEDIMENT BASINS, TEMPORARY ROAD BANKS, AND OTHER EARTHWORKS. IN AN AREA OF GREATER THAN 2:1 SLOPE, MULCHING SHALL IMMEDIATELY FOLLOW SEEDING. APPLY TEMPORARY SEEDING IN ACCORDANCE WITH CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL.
9. A COPY OF THE APPROVED EROSION AND SEDIMENT CONTROL PLAN MUST BE AVAILABLE AT THE PROJECT SITE AT ALL TIMES.
10. IMMEDIATELY UPON DISCOVERING UNFORESEEN CIRCUMSTANCES POSING THE POTENTIAL FOR ACCELERATED EROSION AND/OR SEDIMENT POLLUTION, THE CONTRACTOR SHALL IMPLEMENT APPROPRIATE BMPs TO MINIMIZE THE POTENTIAL FOR ACCELERATED EROSION AND/OR SEDIMENT POLLUTION AND NOTIFY THE CTDEP.
11. ALL PUMPING OF SEDIMENT LADEN WATER SHALL BE THROUGH A SEDIMENT CONTROL BMP, SUCH AS A PUMPED WATER FILTER BAG OR EQUIVALENT SEDIMENT REMOVAL FACILITY, OVER UNDISTURBED VEGETATED AREAS.
12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL OF ANY EXCESS MATERIAL AND MAKE SURE THE SITE(S) RECEIVING THE EXCESS HAS AN APPROVED AND FULLY IMPLEMENTED EROSION AND SEDIMENT CONTROL PLAN THAT MEETS APPLICABLE STATE OR FEDERAL REGULATIONS.
13. MAJOR EARTHMOVING ACTIVITIES SHOULD NOT BE CONDUCTED DURING MAJOR RAINSTORMS OR WHEN SPRING THAW IS OCCURRING.
14. THE LENGTH OF TIME FOR OPEN TRENCH SHOULD BE MINIMUM TIME NECESSARY TO EFFICIENTLY EXCAVATE THE TRENCH, INSTALL THE PIPE, BACKFILL THE TRENCH, AND BEGIN STABILIZATION OF THE DISTURBED AREAS. THIS TIME PERIODS SHOULD NOT EXCEED 30 DAYS FOR STEEL PIPELINES.
15. ADDITIONS AND/OR MODIFICATIONS TO THE PROPOSED EROSION AND SEDIMENT CONTROLS MAY BE REQUIRED BASED ON ACTUAL FIELD CONDITIONS ENCOUNTERED AT THE TIME OF CONSTRUCTION. REVIEWING AGENCY SHALL BE NOTIFIED OF ANY SUBSTANTIVE CHANGES TO THE APPROVED PLAN PRIOR TO IMPLEMENTATION OF THOSE CHANGES. THE REVIEWING AGENCY MAY REQUIRE A WRITTEN SUBMITTAL OF THOSE CHANGES.
16. SEDIMENT TRACKED ONTO ANY PUBLIC ROADWAY OR SIDEWALK SHALL BE RETURNED TO THE CONSTRUCTION SITE BY THE END OF EACH WORK DAY AND DISPOSED IN THE MANNER DESCRIBED IN THE PLAN. IN NO CASE SHALL THE SEDIMENT BE WASHED SHOVELED, OR SWEPT INTO ANY ROADSIDE DITCH, STORM SEWER, OR SURFACE WATER.
17. AT NO TIME SHALL CONSTRUCTION VEHICLES BE ALLOWED TO ENTER AREAS OUTSIDE THE LIMIT OF DISTURBANCE BOUNDARIES SHOWN ON THE PLAN MAPS. THESE AREAS MUST BE CLEARLY MARKED BEFORE CLEARING AND GRUBBING OPERATIONS BEGIN.
18. VEHICLES AND EQUIPMENT SHALL ENTER AND EXIT THE WORKSPACE DIRECTLY ONLY FROM ACCESS POINTS SHOWN ON THE APPROVED E&S PLANS.
19. AFTER FINAL SITE STABILIZATION HAS BEEN ACHIEVED, TEMPORARY E&S BMPs MUST BE REMOVED OR CONVERTED TO PERMANENT POST CONSTRUCTION STORMWATER MANAGEMENT BMPS. AREAS DISTURBED DURING REMOVAL OR CONVERSION OF THE BMPs MUST BE STABILIZED IMMEDIATELY. IN ORDER TO ENSURE RAPID REVEGETATION OF DISTURBED AREAS, SUCH REMOVAL/CONVERSIONS SHOULD BE PERFORMED ONLY DURING THE GERMINATING SEASON.
20. ALL CHANNELS SHALL BE KEPT FREE OF OBSTRUCTIONS INCLUDING BUT NOT LIMITED TO FILL, ROCKS, LEAVES, WOODY DEBRIS, ACCUMULATED SEDIMENT, EXCESS VEGETATION, AND CONSTRUCTION MATERIAL/WASTES.
21. UNDERGROUND UTILITIES CUTTING THROUGH ANY ACTIVE CHANNEL SHALL BE IMMEDIATELY BACKFILLED AND THE CHANNEL RESTORED TO ITS ORIGINAL CROSS-SECTION AND PROTECTIVE LINING. ANY BASE FLOW WITHIN THE CHANNEL SHALL BE CONVEYED PAST THE WORK AREA IN THE MANNER DESCRIBED IN THIS PLAN UNTIL SUCH RESTORATION IS COMPLETE.
22. PLANNING FOR SEEDING AND RESTORATION ACTIVITIES SHALL TAKE PLACE PRIOR TO COMMENCING FINAL RESTORATION ACTIVITIES.
23. UPON FINAL COMPLETION OF ANY EARTH DISTURBANCE ACTIVITY OR ANY STAGE OR PHASE OF AN ACTIVITY, THE SITE SHALL IMMEDIATELY HAVE TOPSOIL RESTORED, REPLACED, OR AMENDED, SEEDED, MULCHED OR OTHERWISE PERMANENTLY STABILIZED AND PROTECTED FROM ACCELERATED EROSION AND SEDIMENTATION.
19. TOPSOIL SHALL BE SPREAD AT A DEPTH OF 2 TO 4 INCHES. MORE TOPSOIL WILL BE NEEDED IF THE SUBSOIL IS ROCKY. TOPSOIL REQUIRED FOR THE ESTABLISHMENT OF VEGETATION SHALL BE STOCKPILED AT THE LOCATION(S) SHOWN ON THE PLAN DRAWINGS IN THE AMOUNT NECESSARY TO COMPLETE THE FINISH GRADING OF ALL EXPOSED AREAS THAT ARE TO BE STABILIZED BY VEGETATION. SURROUND ALL TOPSOIL STOCKPILES WITH AN INTERCEPTOR DIKE OR WATER BAR WITH GRAVEL OUTLET AND SILT FENCE. TOPSOIL STOCKPILE HEIGHTS SHALL NOT EXCEED 35 FEET. MAINTAIN PROTECTIVE COVER ON STOCKPILES UNTIL NEEDED. STOCKPILE SIDE SLOPES MUST BE 2:1 OR FLATTER.
20. TOPSOIL SHOULD NOT BE PLACED WHILE THE TOPSOIL OR SUBSOIL IS IN A FROZEN OR MUDDY CONDITION, WHEN THE SUBSOIL IS EXCESSIVELY WET, OR IN A CONDITION THAT MAY OTHERWISE BE DETRIMENTAL TO PROPER GRADING AND SEEDBED PREPARATION. TOPSOIL SHALL BE WORKED INTO THE LAYER BELOW FOR A DEPTH OF AT LEAST 6 INCHES MINIMUM.
21. IMMEDIATELY AFTER EARTH DISTURBANCE ACTIVITIES CEASE, THE OPERATOR SHALL STABILIZE THE DISTURBED AREAS. AREAS WHICH CANNOT BE SEEDED BECAUSE OF THE SEASON, OR ARE OTHERWISE UNFAVORABLE FOR PLANT GROWTH, SHALL BE MULCHED. MULCH MUST BE APPLIED AT THE SPECIFIED RATES AS OUTLINED IN THE CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL.
22. AN EROSION CONTROL BLANKET SHALL BE APPLIED AT THE BASE OF GRASSED WATERWAYS, ON STEEP SLOPES (> 15%), AND ON ANY DISTURBED SOIL WITHIN 100 FEET OF LAKES, STREAMS, AND WETLANDS.
23. IRREGULARITIES IN THE SOIL SURFACE SHALL BE CORRECTED TO PREVENT THE FORMATION OF DEPRESSIONS.

PROJECT SEQUENCE AND SCHEDULE:

GENERAL CONDITIONS:

ALL EARTH DISTURBANCE ACTIVITIES SHALL PROCEED IN ACCORDANCE WITH THE FOLLOWING SEQUENCE. EACH STAGE SHALL BE COMPLETED AND IMMEDIATELY STABILIZED BEFORE ANY FOLLOWING STAGE IS INITIATED. CLEARING, GRUBBING AND TOPSOIL STRIPPING SHALL BE LIMITED ONLY TO THOSE AREAS DESCRIBED IN EACH STAGE. ANY DEVIATION FROM THE FOLLOWING SEQUENCE MUST BE APPROVED IN WRITING FROM THE HARTFORD COUNTY SOIL CONSERVATION DISTRICT (HCCD).

CONSTRUCTION WILL TAKE PLACE IN A SINGLE SPREAD. PIPELINE CONSTRUCTION CREWS WILL BE IN CLOSE PROXIMITY TO EACH OTHER AND WILL BE ABLE TO EFFICIENTLY COMMUNICATE DURING THE ENTIRE CONSTRUCTION PHASE OF THE PROJECT. THE LENGTH OF EACH CONSTRUCTION SPREAD WILL NOT REQUIRE CONSTRUCTION CREWS TO BE SEPARATED BY SIGNIFICANT DISTANCES DURING PIPELINE CONSTRUCTION.

WORK EFFORT WILL BE SUBDIVIDED INTO CATEGORIES AND PERFORMED BY SPECIALIZED CREWS (E.G, SITE PREPARATION/CLEARING, TRENCHING, PIPE CONSTRUCTION, ETC). EACH CREW WILL PROGRESS IN A LOGICAL MANNER, GENERALLY FROM THE BEGINNING TO END OF THE PIPELINE. THE TIME PERIOD BETWEEN TRENCH EXCAVATION AND FINAL STABILIZATION SHALL BE MINIMIZED TO THE EXTENT PRACTICABLE. NO ONE SEGMENT OF AREA OF THE PIPELINE ALIGNMENT SHALL GO WITHOUT STABILIZATION (TEMPORARY OF PERMANENT) FOR A PERIOD GREATER THAN 30 DAYS IN ACCORDANCE WITH THE REQUIREMENTS DESCRIBED IN CHAPTER 5-3 OF THE CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL 2002. THE FOLLOWING DESCRIBES THE TYPICAL SEQUENCE OF CONSTRUCTION ACTIVITIES THAT SHALL OCCUR WITHIN THE TYPES OF AREAS DESCRIBED BELOW, WHICH WILL BE ENCOUNTERED DURING CONSTRUCTION.

SOIL DISTURBANCE (E.G., GRUBBING, AND TOPSOIL STRIPPING) SHALL BE MINIMIZED PRIOR TO INSTALLING EROSION AND SEDIMENT CONTROLS IN THE VICINITY OF THE DISTURBANCE IN ACCORDANCE WITH THIS PLAN. SIGNIFICANT DEVIATION FROM THE FOLLOWING SEQUENCE OF CONSTRUCTION MUST BE APPROVED IN WRITING (E.G. VIA E-MAIL) BY THE HARTFORD COUNTY SOIL CONSERVATION DISTRICT. TEMPORARY WATERBARS/BROAD-BASED DIPS SHALL BE INSTALLED AT THE END OF EACH WORKDAY.

1. CONSTRUCTION PREPARATION ACTIVITIES

A. AT LEAST 7 DAYS PRIOR TO INITIATING ANY EARTH DISTURBANCE ACTIVITIES, INCLUDING CLEARING, GRUBBING, THE OWNER AND/OR OPERATOR SHALL INVITE ALL CONTRACTORS, THE LANDOWNER, ALL APPROPRIATE MUNICIPAL OFFICIALS, THE E&S PLAN PREPARER, THE PCSM PLAN PREPARER, THE LICENSED PROFESSIONAL RESPONSIBLE FOR OVERSIGHT OF CRITICAL STAGES OF IMPLEMENTATION OF THE PCSM PLAN, AND A REPRESENTATIVE OF THE HCCD TO AN ON-SITE PRE-CONSTRUCTION MEETING.
B. AT LEAST 3 DAYS PRIOR TO STARTING ANY EARTH DISTURBANCE ACTIVITIES, ALL CONTRACTORS INVOLVED IN THOSE ACTIVITIES SHALL NOTIFY THE CONNECTICUT CALL BEFORE YOU DIG AT 1-800-922-4455 FOR THE LOCATION OF EXISTING UNDERGROUND UTILITIES.
C. ESTABLISH CONSTRUCTION SUPPORT FACILITIES.
D. IDENTIFY UTILITIES AND OTHER CRITICAL SITE FEATURES TO BE PROTECTED.
E. FLAG AND/OR STAKE WETLAND AND OTHER SENSITIVE AREAS TO BE PROTECTED.
F. FLAG AND/OR STAKE PROPOSED CONSTRUCTION LIMITS OF DISTURBANCE.
G. INSTALL ROCK CONSTRUCTION ENTRANCES.
H. INSTALL ACCESS ROAD(S).
I. BRUSH HOG/MOW EXISTING VEGETATION OF FACILITATE INSTALLATION OF TEMPORARY EROSION AND SEDIMENT CONTROLS.
J. INSTALL VEHICULAR TEMPORARY STREAM CROSSING (E.G., BRIDGE OR MULTIPLE PIPE
K. CROSSING) AND TIMBER MAT WETLAND CROSSING.
L. INSTALL TEMPORARY EROSION AND SEDIMENT CONTROL IN ACCORDANCE WITH THIS PLAN. EROSION AND SEDIMENT CONTROL INSTALLATION, SIMILAR TO OTHER ACTIVITIES, MAY BE CONDUCTED AS PIPELINE CONSTRUCTION ACTIVITIES PROGRESS, HOWEVER, SOIL DISTURBANCE SHALL BE MINIMIZED UNTIL THE APPROPRIATE TEMPORARY EROSION AND SEDIMENT CONTROLS HAVE BEEN INSTALLED IN THE PROPOSED WORK AREA.

2. SITE CLEARING (TREE CUTTING) & GRUBBING

A. INITIATE CLEARING AND GRUBBING OF RIGHT-OF-WAY AND ACCESS ROADS AS NEEDED.
B. WOODY VEGETATION CLEARING OF THE ROW, ATWS AND STAGING AREAS WILL TAKE PLACE IN A SINGLE PASS. NO GRADING OR GRUBBING WILL OCCUR DURING CLEARING OPERATIONS.
C. HAUL MERCHANTABLE TIMBER OFF-SITE OR STACK AT A DESIGNATED LOCATION. AS DETERMINED BY LANDOWNER SPECIAL CONDITIONS OR CPC CHIEF INSPECTOR.
D. CHIP UNMERCHANTABLE MATERIALS AND SPREAD EVENLY WITHIN THE RIGHT-OF-WAY LIMITS, EXCEPT IN WETLANDS, AGRICULTURE FIELDS, AND MANICURED LAWNS.
E. GRUB TREE STUMPS IN CLEARED ROW. GRIND STUMPS AND REMOVE FROM ROW AND HAUL OFF SITE OR STOCKPILED AT STAGING AREAS FOR USE AS MULCH STABILIZATION AFTER EARTH DISTURBING ACTIVITIES ARE COMPLETED.
F. NOTIFY THE HARTFORD COUNTY CONSERVATION DISTRICT AFTER INSTALLATION OR STABILIZATION OR ALL PERIMETER SEDIMENT CONTROL BMPS (INCLUDING TOPSOIL PILES) WITHIN A NEW WORK AREA AND AT LEAST 3 DAYS PRIOR TO PROCEEDING WITH BULK EARTH DISTURBANCE ACTIVITIES.

3. SITE GRADING AND STABILIZATION

A. RE-STAKE THE ROW TO REPLACE ANY SIGNAGE OR FLAGGING THAT WAS REMOVED OR DAMAGED DURING CLEARING ACTIVITIES.
B. INSTALL ROCK CONSTRUCTION ENTRANCES WHERE VEHICLES WILL ENTER CONSTRUCTION AREAS FROM ACCESS ROADS. INSTALL WASH RACKS AS DIRECTED BY COLUMBIA IF ROCK CONSTRUCTION ENTRANCES ARE NOT FUNCTIONING AS INTENDED.
C. CLEAR, GRADE AND IMPROVE ACCESS ROAD AS NEEDED AS THEIR USE BECOMES REQUIRED.
D. STOCKPILE TOPSOIL ALONG THE EDGE OF THE RIGHT-OF-WAY WHERE INDICATED AND TEMPORARILY STABILIZED.
E. ROUGH GRADE SITE, REMOVE AND STOCKPILE TOPSOIL AS APPROPRIATE. INSTALL SILT FENCE, OR COMPOST FILTER SOCK AROUND STOCKPILED TOPSOIL AS SHOWN ON E&S DRAWINGS.
F. THE MIXING OF TOPSOIL WITH SUBSOIL SHALL BE PREVENTED BY STRIPPING TOPSOIL FROM THE WORK AREA WITHIN DESIGNATED AREAS AND IN COORDINATION WITH THE APPLICABLE ACCESS AGREEMENTS.
G. INSTALL TEMPORARY SLOPE BREAKERS AS SHOWN ON E&S DRAWINGS.
H. INSTALL TEMPORARY FLOW DIVERSION, FLUME STRUCTURES AND TEMPORARY BRIDGES AT STREAM CROSSINGS AS STREAM CROSSINGS ARE ENCOUNTERED.
I. INSTALL APPROPRIATE TRENCH DEWATERING FILTER AND SURROUNDING SEDIMENT BARRIERS (STRAW BALES, SILT FENCE AND/OR COMPOST FILTER SOCKS AS DETERMINED IN THE FIELD) IN PREPARATION OF DEWATERING ACTIVITIES. THIS SHALL BE COMPLETED PRIOR TO PERFORMING EXCAVATION ACROSS WATERBODIES.
J. INSTALL TIMBER MATS FOR EQUIPMENT ACCESS AS SHOWN ON E&S DRAWINGS AS WETLANDS / STREAMS ARE ENCOUNTERED.
K. UTILIZED WOOD CHIPS IN HEAVILY TRAFFICKED AREAS TO REDUCE THE POTENTIAL FOR RUTTING EXCEPT IN WETLANDS

4. PIPELINE CONSTRUCTION

UPLAND LOCATIONS:

A. ENSURE THE APPROPRIATE UPLAND EROSION AND SEDIMENT CONTROLS ARE IN PLACE.
B. GRADE/EXCAVATE PIPELINE TRENCH AND RIGHT-OF-WAY.
C. SEGREGATE TOPSOIL IN AGRICULTURAL FIELDS AND MANICURED LAWNS FOR RESTORATION ACTIVITIES DURING FINAL CLEAN UP.
D. STRING PIPE AND PREPARE THE PIPE JOINTS FOR WELDING.
E. WELD PIPE JOINTS AND PERFORM NDT (NON-DESTRUCTIVE TESTING).
F. DISCHARGE ALL WATER FROM TRENCH USING FILTER BAGS OR COMPOST SOCK SEDIMENT TRAP.
G. INSTALL THE PIPELINE IN THE TRENCH.
H. INSTALL TRENCH PLUGS.
I. BACKFILL THE PIPELINE TRENCH
J. PERFORM PERMANENT STABILIZATION, INCLUDING:
   1. GRADE AREAS AS CLOSELY AS POSSIBLE TO ORIGINAL CONTOURS.
   2. REPLACE TOPSOIL.
   3. APPLY PERMANENT SEEDING, SOIL AMENDMENTS AND MULCH OR EROSION CONTROL BLANKET.

ROADWAY, DRIVEWAYS AND RAILROADS CROSSINGS:

A. STRING PIPE OUTSIDE OF ROAD/DRIVEWAY AND PREPARE THE PIPE JOINTS FOR WELDING AND NON-DESTRUCTIVE TESTING.
B. EXCAVATE PIPELINE TRENCH FOR THE OPEN TRENCH CROSSING OR EXCAVATE BORE PITS FOR CONVENTIONAL BORED CROSSING.
C. DISCHARGE ALL WATER FROM TRENCH USING FILTER BAGS OR COMPOST SOCK SEDIMENT TRAP.
D. MOVE THE PIPE SECTIONS TO THE TRENCH OR PERFORM CONVENTIONAL BORE.
E. INSTALL THE PIPELINE IN THE TRENCH.
F. INSTALL TRENCH PLUGS.
G. BACKFILL THE PIPELINE TRENCH.

STREAM CROSSING (LESS THAN 24 HOURS FOR STREAM LESS THAN 10 FEET WIDE, LESS THAN 48 HOURS FOR STREAMS BETWEEN 10 AND 100 FEET WIDE):

A. ADJUST EROSION AND SEDIMENT CONTROLS AS NEEDED TO PERFORM WORK AT STREAM CROSSING LOCATIONS.
B. INSTALL SANDBAG DIVERSION DAM OR CTDEP APPROVED WATER-INFLATED DAM AROUND CHANNEL WORK AREA.
C. ALL NON-PERENNIAL STREAMS AND DITCHES WILL BE FLUMED ONLY IF WATER IS PRESENT.
D. DEWATER OPEN-CUT TRENCH WORK AREA WITH THE STREAM USING FILTER BAG OR COMPOST SOCK SEDIMENT TRAP AS NEEDED.
E. EXCAVATE PIPELINE TRENCH.
F. TEMPORARY TOPSOIL AND SUBSOIL STOCKPILES SHALL BE LOCATED AT LEAST 10 FEET AWAY FROM TOP OF STREAM BANKS.
G. IN AN UPLAND LOCATION, STRING PIPE AND PREPARE THE PIE JOINTS FOR WELDING AND NON-DESTRUCTIVE TESTING.
H. DISCHARGE ALL WATER FROM TRENCH USING FILTER BAGS OR COMPOST SOCK SEDIMENT TRAP.
I. INSTALL THE PIPELINE IN TRENCH.
J. INSTALL TRENCH PLUGS AT TOP OF STREAM BANKS.
K. BACKFILL THE PIPELINE TRENCH.
L. PERFORM PERMANENT STABILIZATION, INCLUDING:
   1. GRADE AREAS AS CLOSELY AS POSSIBLE TO ORIGINAL CONTOURS.
   2. REPLACE TOPSOIL.
   3. APPLY PERMANENT SEEDING, SOIL AMENDMENTS AND EROSION CONTROL BLANKET.
M. REMOVE TEMPORARY CONTROL MEASURES.

WETLAND CROSSING:

A. ADJUST EROSION AND SEDIMENT CONTROLS AS NEEDED TO WORK IN STREAM CROSSING LOCATIONS.
B. EXCAVATE THE TOP 1-FOOT OF TOPSOIL AND STOCKPILE SEPARATELY FROM THE SUBSOIL.
C. IN AN UPLAND LOCATION, STRING PIPE AND PREPARE THE PIPE JOINTS FOR WELDING AND NON-DISTRUCTIVE TESTING.
D. DISCHARGE ALL WATER FROM TRENCH USING FILTER BAGS OR COMPOST SOCK SEDIMENT TRAP.
E. INSTALL THE PIPELINE IN THE TRENCH.
F. INSTALL TRENCH PLUGS AT EDGE OF WETLAND.
G. BACKFILL THE PIPELINE TRENCH.
H. PERFORM PERMANENT STABILIZATION, INCLUDING:
   1. REPLACE SUBSOIL MATERIAL
   2. REPLACE TOPSOIL SUCH THAT THERE IS NO CROWNING OF SOIL MATERIAL
   3. APPLY TEMPORARY SEEDING.

5. DEMOBILIZATION AND SITE CLEAN UP

A. COMPLETE PERMANENT STABILIZATION OF ALL REMAINING AREAS OF DISTURBANCE, INCLUDING:
   1. GRADE AREAS AS CLOSELY AS POSSIBLE TO ORIGINAL CONTOURS.
   2. REPLACE TOPSOIL
   3. APPLY PERMANENT SEEDING, SOIL AMENDMENT, AND MULCH OR EROSION CONTROL BLANKET.
B. UPON COMPLETION OF ALL EARTH DISTURBANCE ACTIVITIES AND PERMANENT STABILIZATION OF ALL DISTURBED ARES, THE OWNER.OR OPERATOR SHALL CONTACT THE HCCD FOR AN INSPECTION PRIOR TO THE REMOVAL/CONVERSATION OF THE EROSION AND SEDIMENT CONTROL BMPS
C. REMOVE TEMPORARY CONTROL MEASURES UPON APPROVAL OF THE HARTFORD COUNTY CONSERVATION DISTRICT AGENT.
D. UPON COMPLETION OF ALL EARTH DISTURBANCE ACTIVITIES, REMOVAL OF ALL TEMPORARY BMPS, INSTALLATIONS OF ALL PERMANENT PCSM BMPS, AND PERMANENT STABILIZATION OF ALL DISTURBED AREAS, THE OWNER AND/OR OPERATOR SHALL CONTACT THE HARTFORD COUNTY CONSERVATION DISTRICT FOR A FINAL INSPECTION.
E. ANY MATERIALS NOT INCORPORATED AS TRENCH BACKFILL OR GENERAL GRADING (E.G. UNCONTAMINATED SOIL, ROCK, STONE, GRAVEL, BRICK AND BLOCK, CONCRETE AND USED ASPHALT; AND WASTE FROM LAND CLEARING, GRUBBING AND EXCAVATION, INCLUDING TREES, BRUSH, STUMPS AND VEGETATIVE MATERIAL) WILL BE REUSED, RECYCLED OR REMOVED FROM THE CONSTRUCTION WORK LIMITS IN ACCORDANCE WITH GENERAL EROSION AND SEDIMENT CONTROL NOTE #6 ON THIS SHEET.
F. CONTRACTOR DEMOBILIZATION.

6. POST-CONSTRUCTION

A. CONTINUE TO CONDUCT INSPECTIONS UNTIL THE SITE HAS REACHED, PERMANENT STABILIZATION.
B. PERMANENT STABILIZATION IS DEFINED AS A MINIMUM UNIFORM, PERENNIAL 70% VEGETATIVE COVER OR OTHER NON-VEGETATIVE COVER WITH A DENSITY SUFFICIENT TO RESIST ACCELERATED CUT AND FILL SLOPES SHALL BE CAPABLE OF RESISTING FAILURE DUE TO SLUMPING, SLIDING, OR OTHER MOVEMENTS.
C. TEMPORARY E&S BMPS MAY BE REMOVED AFTER THE ENTIRE CONTRIBUTARY AREA TO EACH BMP REACHES PERMANENT STABILIZATION.
D. REMOVE ANY REMAINING TEMPORARY WATERBODY AND WETLAND EQUIPMENT CROSSINGS.
E. REMOVE ANY REMAINING STABILIZED CONSTRUCTION ENTRANCES.
F. PRIOR TO APPLICATION OF THE SEED IN ALL SUPPORT & STAGING AREAS, THE SEEDBED WILL BE PREPARED TO A DEPTH OF 3 TO 4 INCHES USING APPROPRIATE EQUIPMENT TO PROVIDE A FIRM, SMOOTH SEEDBED THAT IS FREE OF DEBRIS AND SCARIFIED TO ENSURE SEEDS LODGE AND GERMINATE. THE SEED MIXTURE WILL BE APPLIED UNIFORMLY PER THE CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL 2002, CHAPTER 5-3 FOR VEGETATIVE SOIL COVER.

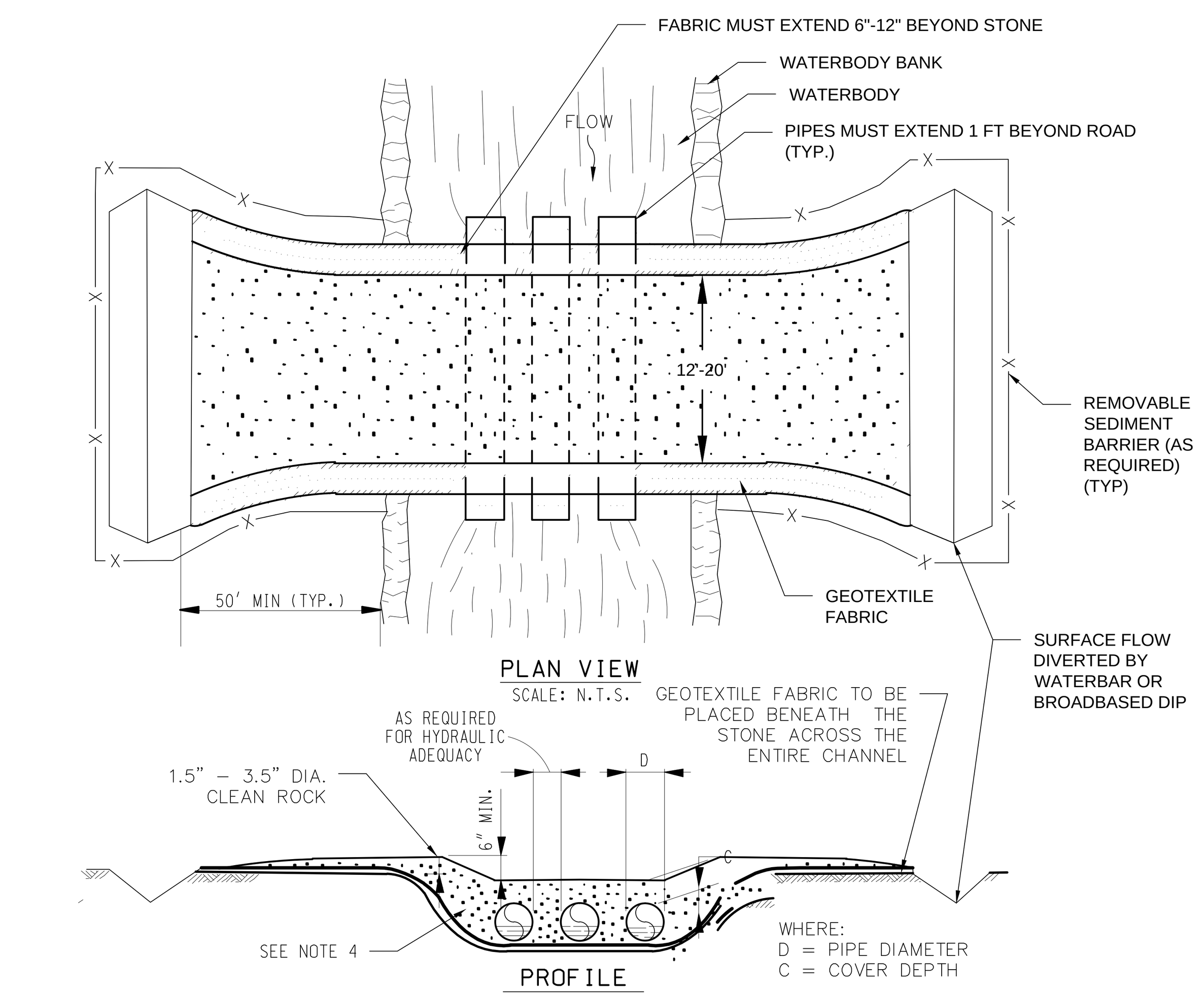
NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

NORTHEAST ENERGY DIRECT PROJECT
LEGEND, NOTES, PROJECT SEQUENCE AND SCHEDULE
MASSACHUSETTS

Section:	Township:	Range:
Co./Par.:	State: CONNECTICUT	
Division:	Op. Area:	
Drafter: BZ	Date:	Project ID:
Chk'd:	Date:	Scale:
Approved:	Date:	Filename: CT_ES_NOTES_DETAILS
		Sheet:
		Type:

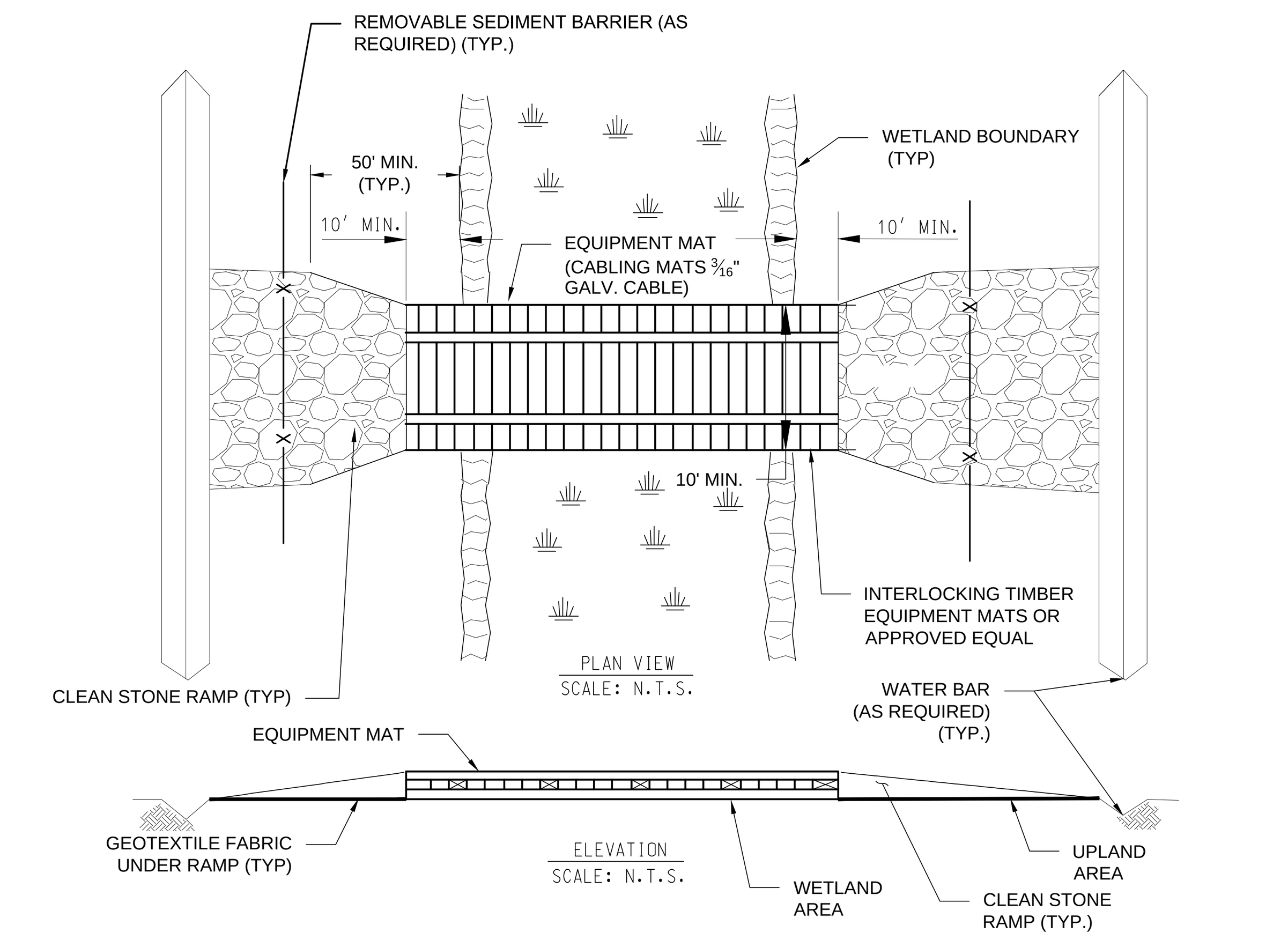


NOTES:

1. TEMPORARY STREAM CROSSING SHALL BE INSPECTED ON A DAILY BASIS AND BUILD–UP OF SEDIMENT OR DEBRIS ON BRIDGE SHALL BE REMOVED.
2. CULVERTS SHALL BE PLACED AT LEAST ONE– HALF (1/2) THEIR DIAMETER APART.
3. ALL MATERIAL AND EQUIPMENT PLACED IN THE WATERBODY CHANNEL SHALL BE COMPLETELY REMOVED DURING FINAL CLEAN–UP. REMOVAL OF THESE ITEMS ARE NOT CONTINGENT UPON ESTABLISHMENT OF PERMANENT VEGETATION.
4. ONLY CLEAN ROCK WILL BE USED. THE ROCK MUST BE SIZED ACCORDING TO THE ANTICIPATED FLOW CONDITIONS. THE ROCK SIZE USED SHALL CONFORM TO CHAPTER 105 GENERAL PERMIT REQUIREMENTS. THE ROCK FILL SHOULD BE EXTENDED A MINIMUM OF 50' FROM THE TOP OF BANK ON EACH SIDE OF THE CROSSING. THE FILL SHOULD BE DEPRESSED A MINIMUM OF 6" OVER THE CHANNEL TO ALLOW FOR OVERFLOW. THE MAXIMUM DEPTH OF FILL OVER THE CULVERT IS THE MINIMUM THE MANUFACTURER REQUIRES.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL LOAD CALCULATIONS REQUIRED TO ENSURE THE INSTALLED PIPES CAN STRUCTURALLY SUPPORT THE CONSTRUCTION EQUIPMENT. THIS SHALL INCLUDE, BUT IS NOT LIMITED TO, PIPE MATERIAL SELECTION AND REQUIRED PIPE COVER DEPTH.

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

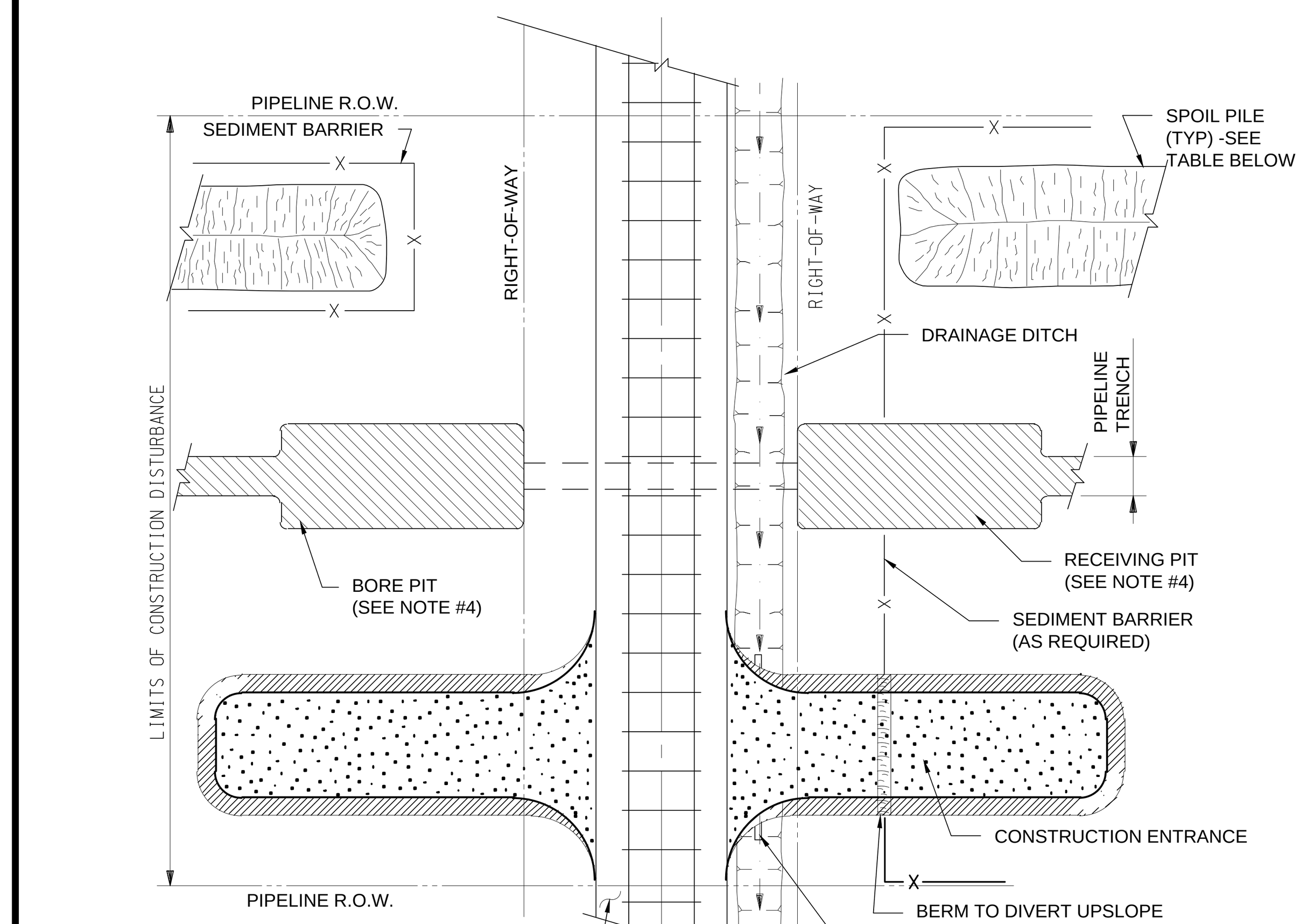
DESCRIPTION: CULVERT EQUIPMENT CROSSING
DRAWING NO.: CEC
FIGURE NO.: 1



NOTES:
1. INSPECT ON A DAILY BASIS AND REMOVE BUILD–UP OF SEDIMENT AND DEBRIS.
2. MATERIALS PLACED IN WETLANDS SHALL BE COMPLETELY REMOVED DURING FINAL CLEAN–UP. REMOVAL OF THESE MATERIALS IS NOT CONTINGENT UPON ESTABLISHMENT OF PERMANENT VEGETATION.
3. IF A WATERBODY IS LOCATED WITHIN A WETLAND, EXTEND EQUIPMENT MATS TO THE BRIDGE EQUIPMENT CROSSING CONSTRUCTED TO CROSS THE WATERBODY IN ORDER TO ALLOW FOR CONTINUOUS EQUIPMENT MAT COVERAGE THROUGH THE WETLAND AND WATERBODY AREA.
4. USE ADDITIONAL EQUIPMENT MATS TO RAISE THE CROSSING ABOVE THE ELEVATION WHERE POOR SOIL CONDITIONS EXIST. A MAXIMUM OF 2 TIMBER MAT LAYERS MAY BE USED WITHIN WETLANDS UNLESS OTHERWISE APPROVED BY THE ENVIRONMENTAL INSPECTOR.
5. EQUIPMENT MATS SHALL EXTEND A MINIMUM OF 10 FEET OUTSIDE OF THE WETLAND AND WATERBODY BOUNDARIES.
6. INSTALL CLEAN STONE RAMP APPROACHES TO EQUIPMENT MATS IN WETLAND AREAS.
7. EQUIPMENT MATS ARE TO BE CONSTRUCTED OF 4'X4' WOOD MEMBERS, LINKED WITH 3/16 GALVANIZED STEEL CABLE TO ENSURE REMOVAL OF ALL MATS.

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

DESCRIPTION: WETLAND EQUIPMENT CROSSING
DRAWING NO.: WEC
FIGURE NO.: 2



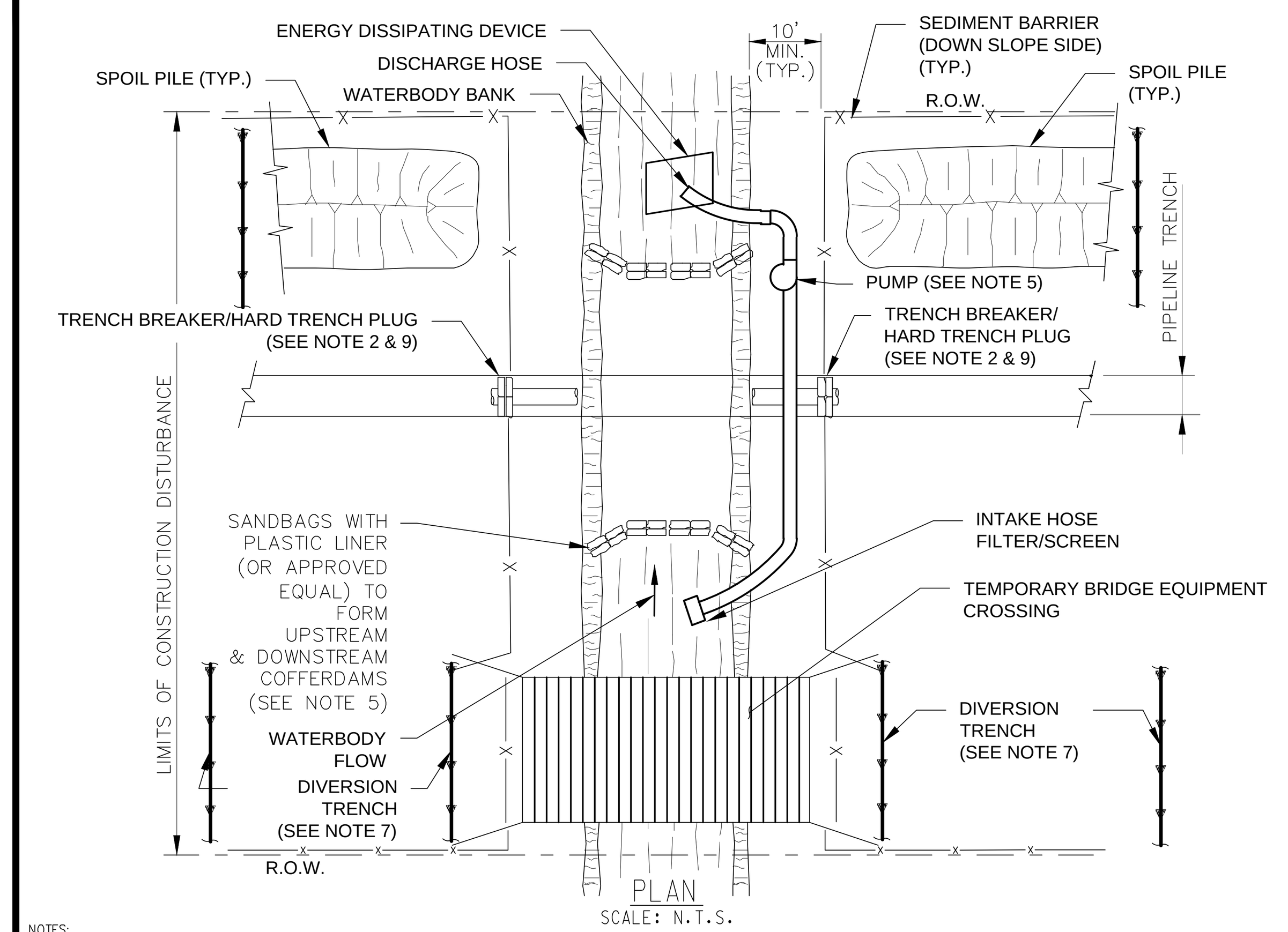
SPOIL PLACEMENT SETBACK REQ.

HT. FILL (FT)	MIN. SETBACK (FT)
<10	10
10-25	25
25-50	50
>50	1 FT/FT HEIGHT

NOTES:
1. A SEDIMENT BARRIER SHALL BE INSTALLED AT THE BASE OF SLOPES ADJACENT TO THE CROSSING WHERE VEGETATION IS DISTURBED TO INTERCEPT SURFACE RUNOFF.
2. PROTECTION FOR SPOIL PILES SHALL BE INSTALLED ONLY WHERE SEDIMENT BARRIERS ACROSS THE ENTIRE DISTURBED AREA ARE NOT REQUIRED.
3. SEDIMENT BARRIERS SHALL BE MAINTAINED IN PLACE UNTIL PERMANENT REVEGETATION IS ESTABLISHED.
4. ANY WATER REMOVED FROM THE BORE PIT OR RECEIVING PIT SHALL BE FILTERED THROUGH AN APPROVED DEWATERING STRUCTURE OR FILTER BAG.
5. IF WELL POINTING IS REQUIRED, THE CONTRACTOR SHALL CONSULT WITH THE ENVIRONMENTAL INSPECTOR PRIOR TO COMMENCEMENT OF WORK IN ORDER TO DETERMINE PROPER DEWATERING LOCATIONS AND METHODS.
6. THE CONTRACTOR SHALL BE REQUIRED TO KEEP THE CROSSING CLEAR OF DEBRIS AT ALL TIMES.
7. THE CONTRACTOR MAY ELECT TO UTILIZE SHEET PILING IN ORDER TO STABILIZE THE BORE PITS AND RECEIVING PITS.
8. DEPENDING ON TOPOGRAPHY AND STATE AGENCY REQUIREMENTS, A SEDIMENT BARRIER MAY BE REQUIRED ACROSS THE ENTIRE CONSTRUCTION RIGHT OF WAY AT THE EDGE OF CROSSING. IN ADDITION TO THIS DETAIL, REFER TO THE ENVIRONMENTAL ALIGNMENT DRAWINGS FOR PLACEMENT OF SEDIMENT BARRIERS.

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

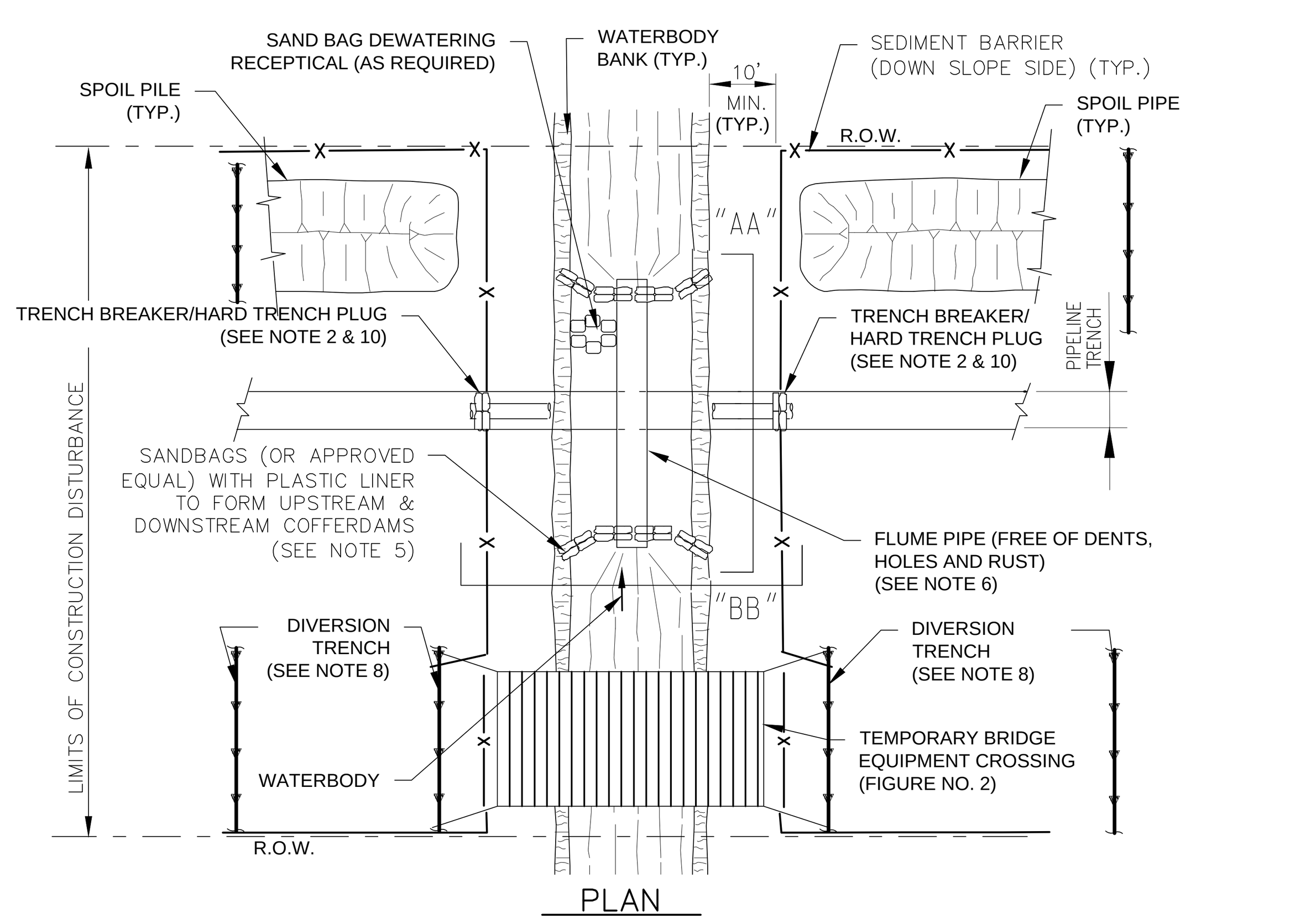
DESCRIPTION: BORED ROAD/RAILROAD CROSSING
DRAWING NO.: BRC
FIGURE NO.: 3



NOTES:
1. SEDIMENT BARRIERS SHALL BE INSTALLED AS DEPICTED AND ALONG DOWN GRADIENT SIDES OF WORK AREAS AND STAGING AREAS SUCH THAT NO HEAVY SILT LADEN WATER ENTERS THE WATERBODY OR LEAVES THE CONSTRUCTION RIGHT–OF–WAY
2. HARD TRENCH PLUGS MUST REMAIN IN PLACE AT CONVENIENT LOCATIONS TO SEPARATE THE MAINLINE DITCH FROM THE WATERBODY CROSSING UNTIL THE WATERBODY CROSSING IS INSTALLED AND BACKFILLED.
3. EQUIPMENT OPERATING IN THE WATERBODY SHALL BE LIMITED TO THAT NEEDED TO PERFORM CONSTRUCTION. IF OTHER TYPES OF EQUIPMENT MUST CROSS THE WATERBODY, THE CONTRACTOR SHALL PROVIDE AND USE A TEMPORARY BRIDGE EQUIPMENT CROSSING.
4. STAGING AREA(S) FOR WATERBODY CROSSING(S), WHEN REQUIRED, SHALL BE LOCATED AT LEAST 50 FEET FROM WATER'S EDGE AND SHALL BE OF A MINIMUM SIZE NEEDED FOR PREPARATION TO SAFELY AND EFFICIENTLY CONSTRUCT THE CROSSING.
5. IMPLEMENTATION OF THE DAM–AND–PUMP CROSSING METHOD MUST MEET THE FOLLOWING PERFORMANCE CRITERIA:
   (A) USE SUFFICIENT PUMPS, INCLUDING ON–SITE BACKUP PUMPS, TO MAINTAIN DOWNSTREAM FLOWS.
   (B) CONSTRUCT DAMS WITH MATERIALS THAT PREVENT SEDIMENT AND OTHER POLLUTANTS FROM ENTERING THE WATERBODY (E.G., SANDBAGS OR CLEAN GRAVEL WITH PLASTIC LINER).
   (C) SCREEN PUMP INTAKES;
   (D) PREVENT STREAM BED SCOUR AT PUMP DISCHARGE WITH AN ENERGY DISSIPATING DEVICE..
   (E) MONITOR THE DAM AND PUMPS TO ENSURE PROPER OPERATION THROUGHOUT THE WATERBODY CROSSING. INTAKE SHALL BE MAINTAINED A SUFFICIENT DISTANCE FROM THE BOTTOM TO PREVENT PUMPING OF SUBSTRATE MATERIALS.
(F) INTAKE SHALL BE MAINTED AT A SUFFICIENT DISTANCE FROM THE CHANNEL BOTTOM TO PREVENT PUMPING OF SUBSTRATE MATERIALS.
6. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSPECTED DAILY AND REPAIRED IF NECESSARY.
7. INSTALL DIVERSION TRENCHES AT THE BASE OF ALL SLOPES ADJACENT TO THE WATERBODY AND AT MINIMUM 50' FROM WATERBODY BANK.
8. CHEMICALS, FUELS AND LUBRICATING OILS SHALL NOT BE STORED AND EQUIPMENT SHALL NOT BE REFUELED WITHIN 100 FEET OF THE WATERBODY, UNLESS OTHERWISE APPROVED BY THE ENVIRONMENTAL INSPECTOR. ANY WATER ACCUMULATING IN THE WORK SPACE SHALL BE PUMPED TO A FILTER BAG PRIOR TO DISCHARGE TO WATERBODY.
9. INSTALL TRENCH BREAKERS ON BOTH SIDES OF THE WATERBODY TO PREVENT DIVERSION OF WATER INTO UPLAND PORTIONS OF THE PIPELINE TRENCH AND TO KEEP ANY ACCUMULATED TRENCH WATER OUT OF THE WATERBODY.
10. THE CONTRACTOR SHALL POSTPONE GRUBBING AND ROUGH GRADING OF THE RIGHT–OF–WAY WITIN 50' OF TOP OF BANK UNTIL ALL MATERIALS REQUIRED TO COMPLETE CROSSING ARE ON SITE , THE STAGING AREA IS PREPARED, AND WORK IN THE WATERBODY IS READY TO COMMENCE. ALL DISTURBED AREAS WITHIN 50' OF TOP OF BANK SHALL BE STABILIZED WITHIN 24 HOURS OF INITIAL DISTURBANCE FOR MINOR STREAMS OR 48 HOURS OF INITIAL DISTURBANCE FOR MAJOR STREAMS UNLESS OTHERWISE AUTHORIZED. APPROPRIATE STREAMBANK PROTECTION SHALL BE PROVIDED WITHIN THE CHANNEL.
11. ANY WATER ACCUMULATING IN THE WORKSPACE SHALL BE PUMPED TO A FILTER BAG PRIOR TO DISCHARGE.

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

DESCRIPTION: DAM AND PUMP CROSSING
DRAWING NO.: DPC
FIGURE NO.: 4

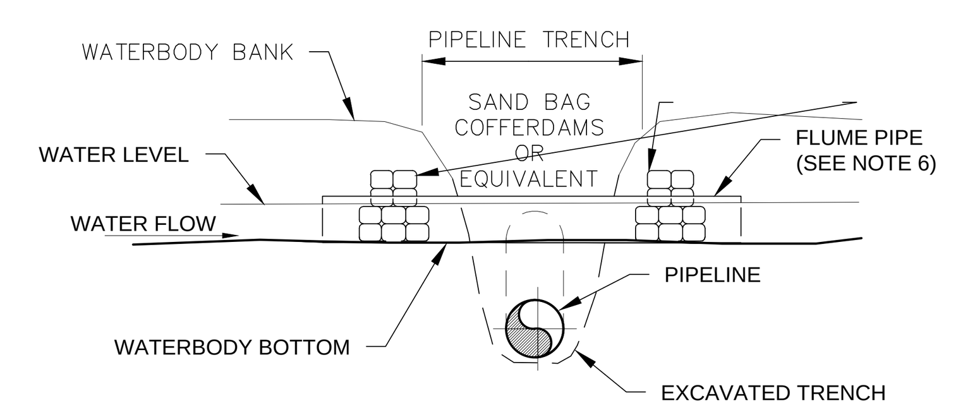


NOTES:

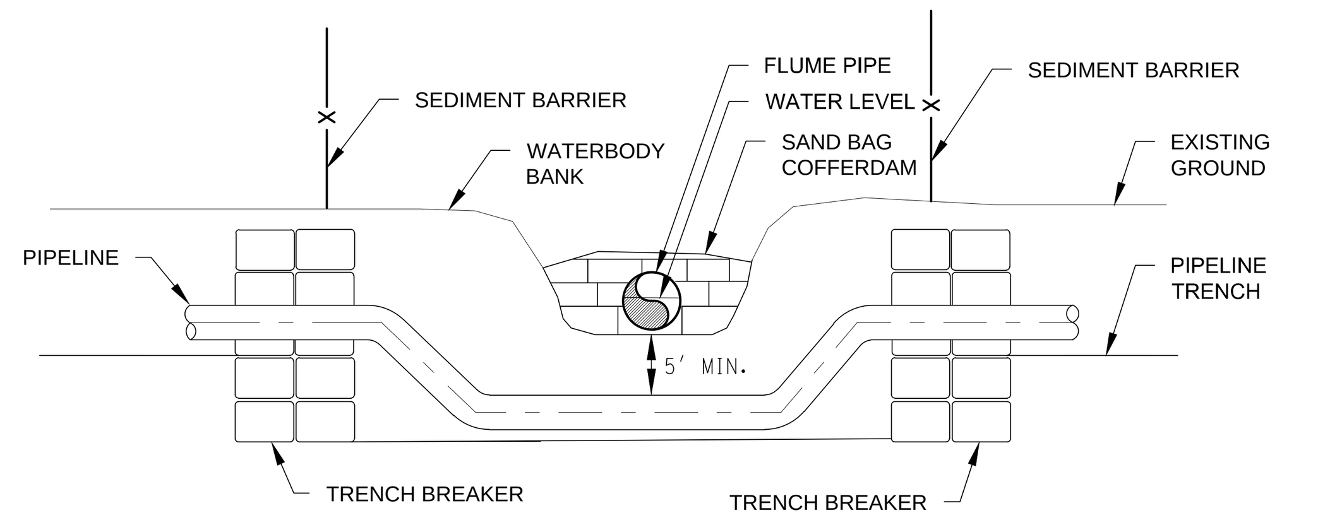
1. SEDIMENT BARRIERS SHALL BE INSTALLED AS DEPICTED AND ALONG DOWN GRADIENT SIDES OF WORK AREAS AND STAGING AREAS SUCH THAT NO HEAVY SILT LADEN WATER ENTERS THE WATERBODY OR LEAVES THE CONSTRUCTION RIGHT–OF–WAY.
2. HARD TRENCH PLUGS MUST REMAIN IN PLACE AT CONVENIENT LOCATIONS TO SEPARATE THE MAINLINE DITCH FROM THE WATERBODY CROSSING UNTIL THE WATERBODY CROSSING IS INSTALLED AND BACKFILLED.
3. EQUIPMENT OPERATING IN THE WATERBODY SHALL BE LIMITED TO THAT NEEDED TO PERFORM CONSTRUCTION. IF OTHER TYPES OF EQUIPMENT MUST CROSS THE WATERBODY, THE CONTRACTOR SHALL PROVIDE AND USE A TEMPORARY BRIDGE EQUIPMENT CROSSING.
4. STAGING AREA(S) FOR WATERBODY CROSSING(S), WHEN REQUIRED, SHALL BE LOCATED AT LEAST 50 FEET FROM THE WATER'S EDGE AND SHALL BE OF A MINIMUM SIZE NEEDED FOR CONVENIENT PREPARATION.
5. FLUME CROSSING METHOD REQUIREMENTS INCLUDE:
   (A) INSTALL FLUME PIPE(S) AFTER BLASTING (IF NECESSARY), BUT BEFORE ANY TRENCHING.
   (B) USE SAND BAG OR SAND BAG AND PLASTIC SHEETING DIVERSION STRUCTURES OR EQUIVALENT TO DEVELOP AN EFFECTIVE SEAL AND TO DIVERT WATERBODY FLOW THROUGH THE FLUME PIPE (SOME MINOR MODIFICATIONS TO THE WATERBODY BOTTOM MAY BE REQUIRED TO ACHIEVE AN EFFECTIVE SEAL).
   (C) PROPERLY ALIGN FLUME PIPE(S) TO PREVENT BANK EROSION AND WATERBODY CHANNEL BED SCOUR.
   (D) DO NOT REMOVE FLUME PIPE DURING TRENCHING, PIPE LAYING, OR BACKFILLING ACTIVITIES, OR INITIAL STREAM BED RESTORATION EFFORTS.
   (E) REMOVE ALL FLUME PIPES AND DAMS THAT ARE NOT ALSO PART OF THE EQUIPMENT BRIDGE AS SOON AS FINAL CLEANUP OF THE STREAM BED AND BANK IS COMPLETE.
6. THE FLUME PIPE MUST BE SIZED TO ADEQUATELY CONVEY MAXIMUM ANTICIPATED FLOW RATES AT THE TIME OF THE CROSSING WITHOUT FLOODING THE TRENCH, WHILE TO MAINTAINING ADEQUATE FLOW RATES TO PROTECT AQUATIC LIFE AND PREVENT THE INTERRUPTION OF EXISTING DOWNSTREAM USES.

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

DESCRIPTION: FLUME CROSSING
DRAWING NO.: FC
FIGURE NO.: 5A



SECTION "A–A"
SCALE: N.T.S.

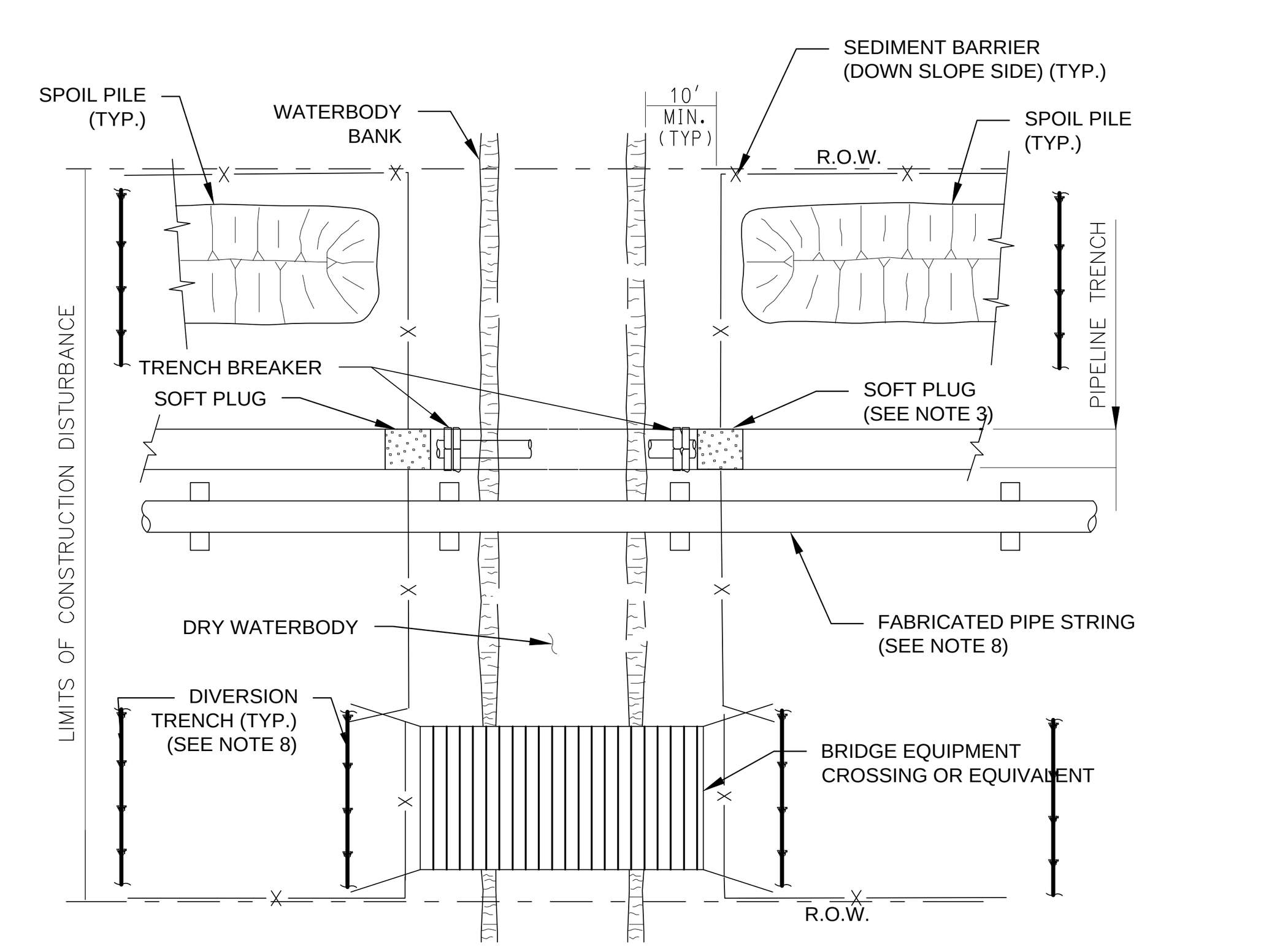


SECTION "B–B"
SCALE: N.T.S.

7. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSPECTED DAILY AND REPAIRED IF NECESSARY.
8. INSTALL DIVERSION TRENCHES AT THE BASE OF ALL SLOPES ADJACENT TO THE WATERBODY AND AT 50' FROM WATERBODY BANKS.
9. CHEMICALS, FUELS AND LUBRICATING OILS SHALL NOT BE STORED AND EQUIPMENT SHALL NOT BE REFUELED WITHIN 100 FEET OF THE WATERBODY UNLESS OTHERWISE APPROVED BY THE ENVIRONMENTAL INSPECTOR.
10. ANY WATER ACCUMULATING IN THE WORK SPACE SHALL BE PUMPED TO A FILTER BAG PRIOR TO DISCHARGE TO A WATERBODY.
10. INSTALL TRENCH BREAKERS ON BOTH SIDES OF THE WATERBODY TO PREVENT DIVERSION OF WATER INTO UPLAND PORTIONS OF THE PIPELINE TRENCH AND TO KEEP ANY ACCUMULATED TRENCH WATER OUT OF THE WATERBODY.
11. ALL MATERIAL AND EQUIPMENT PLACED IN THE WATERBODY CHANNEL SHALL BE COMPLETELY REMOVED DURING FINAL CLEAN–UP. REMOVAL OF THESE ITEMS ARE NOT CONTINGENT UPON ESTABLISHMENT OF PERMANENT VEGETATION.
12. THE CONTRACTOR SHALL POSTPONE ROUGH GRADING AND GRUBBING OF THE RIGHT OF WAY WITHIN 50' OF TOP OF BANK UNTIL THE STAGING AREA IS PREPARED AND WORK IN THE WATERBODYIS READY TO COMMENCE. ALL DISTURBED AREAS WITHIN 50 FEET OF TOP OF BANK SHALL BE BLANKETED OR MATTED WITHIN 24 HOURS OF INITIAL DISTURBANCE FOR MINOR STREAMS OR 48 OF INITIAL DISTURBANCE FOR MAJOR STREAMS UNLESS OTHERWISE AUTHORIZED.
13. EXCEPT FOR BLASTING AND OTHER ROCK BREAKING MEASURES, THE CONTRACTOR SHALL COMPLETE IN WATERBODY CONSTRUCTION ACTIVITIES (INCLUDING TRENCHING, PIPE INSTALLATION, BACKFILL, AND RESTORATION OF THE WATERBODY CHANNEL CONTOURS) WITHIN 24 HOURS. WATERBODY BANKS AND UNCONSOLIDATED WATERBODY CHANNELS MAY REQUIRE ADDITIONAL RESTORTION AFTER THIS PERIOD.
14. THE CONTRACTOR SHALL COORDINATE THE ENVIRONMENTAL INSPECTOR TO DETERMINE THE APPROPAITE DRY CROSSING METHOD THAT SHOULD BE UTILIZED DURING CONSTRUCTION.

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

DESCRIPTION: FLUME CROSSING
DRAWING NO.: FC
FIGURE NO.: 5B



NOTES:
1. THIS METHOD APPLIES TO WATERBODIES THAT ARE DRY AT THE TIME OF CROSSING.
2. SEDIMENT BARRIERS SHALL BE INSTALLED AS DEPICTED AND ALONG DOWN GRADIENT SIDES OF WORK AREAS SUCH THAT NO HEAVILY SILT LADEN WATER ENTERS THE WATERBODY OR LEAVES THE CONSTRUCTION RIGHT OF WAY.
3. SOFT PLUGS SHALL BE INSTALLED FOLLOWING EXCAVATION OF THE MAINLINE TRENCH THROUGH THE WATERBODY.
4. INSTALL TRENCH BREAKERS ON BOTH SIDES OF THE WATERBODY TO PREVENT DIVERSION OF WATER INTO UPLAND PORTIONS OF THE PIPELINE TRENCH AND TO KEEP ANY ACCUMULATED TRENCH WATER OUT OF THE WATERBODY.
5. EQUIPMENT OPERATING IN THE WATERBODY SHALL BE LIMITED TO THAT NEEDED TO PERFORM CONSTRUCTION. IF OTHER TYPES OF EQUIPMENT MUST CROSS THE WATERBODY, THE CONTRACTOR SHALL PROVIDE AND USE A TEMPORARY BRIDGE EQUIPMENT CROSSING OR EQUIVALENT AS APPROVED BY THE ENVIRONMENTAL INSPECTOR.
6. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED DAILY AND REPAIRED IF NECESSARY.
7. CHEMICALS, FUELS AND LUBRICATING OILS SHALL NOT BE STORED AND EQUIPMENT SHALL NOT BE REFUELED WITHIN 100 FEET OF WATERBODY, UNLESS OTHERWISE APPROVED BY THE REGULATORY AUTHORITY. ANY WATER ACCUMULATING IN THE WORKSPACE SHALL BE PUMPED TO A FILTER BAG PRIOR TO DISCHARGE TO A WATERBODY.
8. INSTALL DIVERSION TRENCHES AT THE BASE OF ALL SLOPES ADJACENT TO THE WATERBODY AND AT MINIMUM 50' FROM WATERBODY BANK.
9. THE FABRICATED PIPE STRING MAY SPAN THE DRY WATERBODY CROSSING IN PREPARATION FOR THE LOWERING–IN PHASE OF CONSTRUCTION.
10. THE DRY WATERBODY MAY BE TRENCHED IN SEQUENCE WITH NORMAL TRENCHING OPERATIONS AND THE PIPE INSTALLED THROUGH THE DRY WATERBODY CROSSING IN CONJUCTION WITH UPSTREAM AND DOWN STREAM PIPE.
11. THE CONTRACTOR SHALL POSTPONE GRUBBING AND ROUGH GRADING OF THE RIGHT–OF–WAY WITHIN 50' OF TOP OF BANK UNTIL ALL MATERIALS REQUIRED TO COMPLETE CROSSING ARE ON SITE, THE STAGING AREA IS PREPARED AND WORK IN THE WATERBODY IS READY TO COMMENCE. ALL DISTURBED AREAS WITHIN 50 FEET OF TOP OF BANK SHALL BE BLANKETED OR MATTED WITHIN 24 HOURS OF INITIAL DISTURBANCE OR MINOR STREAMS OR 48 HOURS OF INITIAL DISTURBANCE FOR MAJOR STREAMS UNLESS OTHERWISE AUTHORIZED. APPROPRIATE STREAMBANK PROTECTION SHALL BE PROVIDED WITHIN THE CHANNEL.
12. ANY WATER ACCUMULATING IN THE WORKSPACE SHALL BE PUMPED TO A FILTER BAG PRIOR TO DISCHARGE.

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

DESCRIPTION: DRY WATERBODY CROSSING
DRAWING NO.: DWC
FIGURE NO.: 6

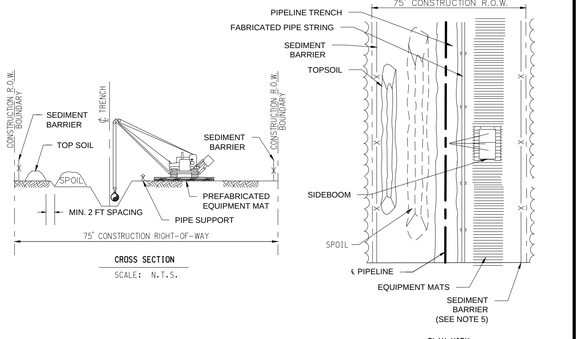
NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

NORTHEAST ENERGY DIRECT PROJECT
EROSION & SEDIMENT CONTROL TYPICALS
CONNECTICUT

Section:	Township:	Range:	
Co./Par.:		State:	CONNECTICUT
Division:		Op. Area:	
Drafter: GV	Date:	Project ID:	
Chk'd:	Date:	Scale:	
Approved:	Date:	Filename: CT_ES_DETAILS_001	
		Sheet:	
		Type:	



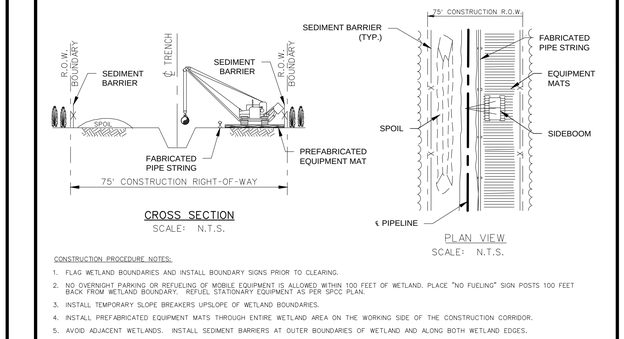
CROSS SECTION
SCALE: N.T.S.

PLAN VIEW
SCALE: N.T.S.

CONSTRUCTION PROCEDURE NOTES:

1. FLAG WETLAND BOUNDARIES AND INSTALL BOUNDARY SIGNS PRIOR TO CLEARING.
2. NO OVERNIGHT PARKING OR REFUELING OF MOBILE EQUIPMENT IS ALLOWED WITHIN 100 FEET OF WETLAND. PLACE "NO FUELING" SIGN POSTS 100 FEET BACK FROM WETLAND BOUNDARY. REFUEL STATIONARY EQUIPMENT AS PER SPCC PLAN.
3. INSTALL TEMPORARY SLOPE BREAKERS UPSLOPE OF WETLAND BOUNDARIES.
4. INSTALL PREFABRICATED EQUIPMENT MATS THROUGH THE ENTIRE WETLAND AREA ON THE WORKING SIDE OF THE CONSTRUCTION CORRIDOR.
5. AVOID ADJACENT WETLANDS. INSTALL SEDIMENT BARRIERS AT THE OUTER BOUNDARIES OF THE WETLAND. INSTALL SEDIMENT BARRIERS ALONG THE EDGE OF THE SPOIL SIDE OF THE CONSTRUCTION CORRIDOR THROUGH THE WETLAND AND ALONG THE DOWN SLOPE EDGE OF THE WETLAND. IF THE DOWN SLOPE EDGE OF THE WETLAND IS THE SPOIL SIDE, THEN SEDIMENT BARRIERS ARE NOT REQUIRED ON THE WORKING SIDE OF THE CORRIDOR UNLESS EQUIPMENT TRAVERSING THROUGH THE WETLAND CAUSES SPOIL AND SEDIMENT TO EXIT THE CONSTRUCTION CORRIDOR.
6. LIMIT PULLING OF TREE STUMPS AND GRADING ACTIVITIES TO DIRECTLY OVER THE TRENCH LINE. DO NOT GRADE OR REMOVE STUMPS OR ROOT SYSTEMS FROM THE REST OF THE RIGHT-OF-WAY IN WETLANDS UNLESS THE CHIEF INSPECTOR AND COMPANY ENVIRONMENTAL INSPECTOR DETERMINE THAT SAFETY RELATED CONSTRUCTION CONSTRAINTS REQUIRE REMOVAL OF TREE STUMPS FROM UNDER THE WORKING SIDE OF THE RIGHT-OF-WAY.
7. CONDUCT TRENCH-LINE TOPSOIL STRIPPING OF TOPSOIL IS NOT SATURATED OR FROZEN). SALVAGE TOPSOIL TO ACTUAL DEPTH OR A MAXIMUM DEPTH OF 12 INCHES, AS DETERMINED BY THE ENVIRONMENTAL INSPECTOR. SEGREGATED TOPSOIL PILE MAY BE LOCATED ON SPOIL SIDE, AS REQUIRED.
8. LEAVE HARD PLUGS AT THE EDGES OF WETLAND UNTIL JUST PRIOR TO TRENCHING.
9. TRENCHING THROUGH WETLANDS MAY PROCEED WHEN THE PIPE SECTION IS FABRICATED AND READY TO LAY. ONCE TRENCHING COMMENCES, CONSTRUCTION THROUGH THE WETLAND IS TO PROCEED CONTINUOUSLY UNTIL THE CROSSING IS COMPLETED, BACK FILLED AND RESTORED IN ORDER TO MINIMIZE THE LENGTH OF TIME THE TRENCH IS OPEN.
10. PIPE SECTION MAY BE FABRICATED WITHIN THE WETLAND ADJACENT TO PIPE TRENCH, OR IN STAGING AREA OUTSIDE THE WETLAND AND WALKED IN. NO CONCRETE COATING ACTIVITY SHALL OCCUR WITHIN 100 FEET OF WETLAND BOUNDARY UNLESS APPROVED BY ENVIRONMENTAL INSPECTOR.
11. LOWER-IN PIPE. PRIOR TO BACK FILLING TRENCH, INSTALL TRENCH BREAKERS IN ACCORDANCE WITH DRAWINGS AND SPECIFICATIONS.
12. RESTORE GRADE TO NEAR PRE-CONSTRUCTION TOPOGRAPHY, REPLACE TOPSOIL AND INSTALL PERMANENT EROSION CONTROL MEASURES.
13. REMOVE PREFABRICATED MATS FROM WETLANDS UPON COMPLETION.
14. SEED DISTURBED WETLAND AREAS (UNLESS STANDING WATER IS PRESENT) AS DETERMINED BY THE ENVIRONMENTAL INSPECTOR AND AS SHOWN ON DRAWINGS AND ECP. 48 LB PLS/ACRE ANNUAL RYE GRASS AND STRAW MULCH AT 3T/ACRE OR AS APPROVED BY THE APPLICABLE PERMITTING AGENCY.
15. NO FERTILIZER OR LIME IS PERMITTED.
16. DO NOT USE LIQUID MULCH BINDERS WITHIN 100 FT OF WETLANDS OR WATERBODIES.

Tennessee Gas Pipeline Company, L.L.C. a Kinder Morgan company	DESCRIPTION: TYPE I "NON-SATURATED WETLAND" INSTALLATION PROCEDURE		
	DRAWING NO.: WIP1	SCALE: NTS	DATE: 2015
		FIGURE NO.: 7	



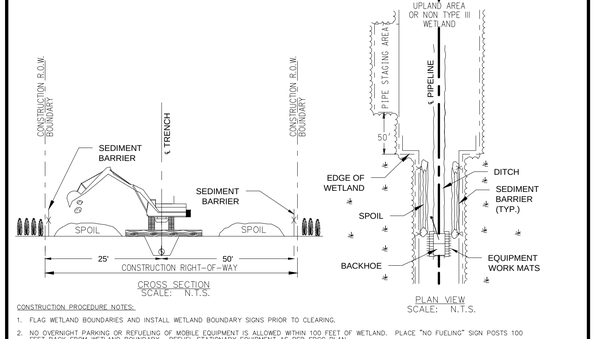
CROSS SECTION
SCALE: N.T.S.

PLAN VIEW
SCALE: N.T.S.

CONSTRUCTION PROCEDURE NOTES:

1. FLAG WETLAND BOUNDARIES AND INSTALL BOUNDARY SIGNS PRIOR TO CLEARING.
2. NO OVERNIGHT PARKING OR REFUELING OF MOBILE EQUIPMENT IS ALLOWED WITHIN 100 FEET OF WETLAND. PLACE "NO FUELING" SIGN POSTS 100 FEET BACK FROM WETLAND BOUNDARY. REFUEL STATIONARY EQUIPMENT AS PER SPCC PLAN.
3. INSTALL TEMPORARY SLOPE BREAKERS UPSLOPE OF WETLAND BOUNDARIES.
4. INSTALL PREFABRICATED EQUIPMENT MATS THROUGH ENTIRE WETLAND AREA ON THE WORKING SIDE OF THE CONSTRUCTION CORRIDOR.
5. AVOID ADJACENT WETLANDS. INSTALL SEDIMENT BARRIERS AT OUTER BOUNDARIES OF WETLAND AND ALONG BOTH WETLAND EDGES.
6. LIMIT PULLING OF TREE STUMPS AND GRADING ACTIVITIES TO DIRECTLY OVER THE TRENCHLINE. DO NOT GRADE OR REMOVE STUMPS OR ROOT SYSTEMS FROM THE REST OF THE RIGHT-OF-WAY IN WETLANDS UNLESS THE CHIEF INSPECTOR AND COMPANY ENVIRONMENTAL INSPECTOR DETERMINE THAT SAFETY RELATED CONSTRUCTION CONSTRAINTS REQUIRE REMOVAL OF TREE STUMPS FROM UNDER THE WORKING SIDE OF THE RIGHT-OF-WAY.
7. TOPSOIL STRIPPING SHALL NOT BE REQUIRED IN SATURATED SOIL CONDITIONS.
8. LEAVE HARD PLUGS AT THE EDGES OF WETLAND UNTIL JUST PRIOR TO TRENCHING.
9. TRENCHING THROUGH WETLANDS MAY PROCEED WHEN THE PIPE SECTION IS FABRICATED AND READY TO LAY. ONCE TRENCHING COMMENCES, CONSTRUCTION THROUGH THE WETLAND IS TO PROCEED CONTINUOUSLY UNTIL THE CROSSING IS COMPLETED, BACKFILLED AND RESTORED IN ORDER TO MINIMIZE THE LENGTH OF TIME THE TRENCH IS OPEN.
10. PIPE SECTION MAY BE FABRICATED WITHIN THE WETLAND ADJACENT TO PIPE TRENCH, OR IN STAGING AREA OUTSIDE THE WETLAND AND WALKED IN. NO CONCRETE COATING ACTIVITY WITHIN 100 FEET OF WETLAND BOUNDARY, UNLESS APPROVED BY COMPANY ENVIRONMENTAL INSPECTOR.
11. LOWER-IN PIPE PRIOR TO BACKFILLING, INSTALL TRENCH PLUGS IN ACCORDANCE WITH DRAWINGS AND SPECIFICATIONS.
12. RESTORE GRADE TO NEAR PRE-CONSTRUCTION TOPOGRAPHY AND INSTALL PERMANENT EROSION CONTROL MEASURES.
13. REMOVE PREFABRICATED MATS FROM WETLANDS UPON COMPLETION.
14. SEED DISTURBED WETLAND AREA (UNLESS STANDING WATER IS PRESENT) AS DETERMINED BY THE ENVIRONMENTAL INSPECTOR AND AS SHOWN ON DRAWINGS AND ECP. 48 LB PLS/ACRE ANNUAL RYE GRASS AND STRAW MULCH AT 3T/ACRE OR AS APPROVED BY THE APPLICABLE PERMITTING AGENCY.
15. NO FERTILIZER OR LIME IS PERMITTED.
16. DO NOT USE LIQUID MULCH BINDERS WITHIN 100 FT OF WETLANDS OR WATERBODIES.

Tennessee Gas Pipeline Company, L.L.C. a Kinder Morgan company	DESCRIPTION: TYPE II "SATURATED WETLAND" INSTALLATION PROCEDURE		
	DRAWING NO.: WIP2	SCALE: NTS	DATE: 2015
		FIGURE NO.: 8	



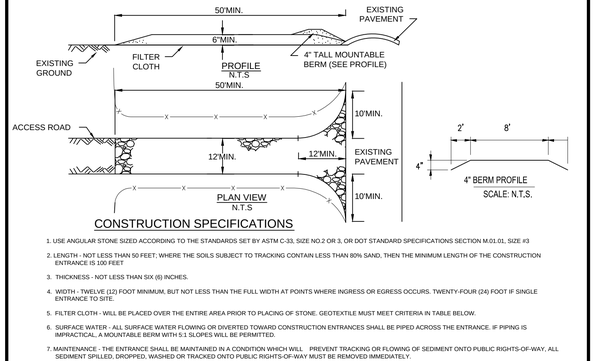
CROSS SECTION
SCALE: N.T.S.

PLAN VIEW
SCALE: N.T.S.

CONSTRUCTION PROCEDURE NOTES:

1. FLAG WETLAND BOUNDARIES AND INSTALL WETLAND BOUNDARY SIGNS PRIOR TO CLEARING.
2. NO OVERNIGHT PARKING OR REFUELING OF MOBILE EQUIPMENT IS ALLOWED WITHIN 100 FEET OF WETLAND. PLACE "NO FUELING" SIGN POSTS 100 FEET BACK FROM WETLAND BOUNDARY. REFUEL STATIONARY EQUIPMENT AS PER SPCC PLAN.
3. INSTALL TEMPORARY SLOPE BREAKERS WITHIN 50' UPSLOPE OF WETLAND BOUNDARIES.
4. AVOID ADJACENT WETLANDS. INSTALL SEDIMENT BARRIERS AT OUTER BOUNDARIES OF WETLAND AND ALONG BOTH WETLAND EDGES.
5. LIMIT PULLING OF TREE STUMPS AND GRADING ACTIVITIES TO DIRECTLY OVER TRENCH LINE. DO NOT REMOVE STUMPS OR ROOT SYSTEMS FROM THE REST OF THE RIGHT-OF-WAY IN WETLANDS UNLESS THE CHIEF INSPECTOR AND COMPANY ENVIRONMENTAL INSPECTOR DETERMINE THAT SAFETY RELATED CONSTRUCTION CONSTRAINTS REQUIRE REMOVAL OF TREE STUMPS FROM UNDER THE WORKING SIDE OF THE RIGHT-OF-WAY.
6. TOPSOIL STRIPPING SHALL NOT BE REQUIRED IN SATURATED SOIL CONDITIONS.
7. UTILIZE AMPHIBIOUS EXCAVATORS (PONTOON MOUNTED BACKHOES) OR TRACKED BACKHOES SUPPORTED BY PREFABRICATED EQUIPMENT MATS OR FLOATS, TO EXCAVATE TRENCH. IF PREFABRICATED EQUIPMENT MATS ARE USED FOR STABILIZATION, THE BACKHOE SHALL GRADUALLY MOVE ACROSS THE WETLAND BY MOVING THE MATS FROM IMMEDIATELY BEHIND TO IMMEDIATELY IN FRONT OF THE BACKHOE'S PATH.
8. FABRICATE PIPE IN A STAGING AREA OUTSIDE THE TYPE III WETLAND AS INDICATED ON THE CONSTRUCTION DRAWINGS. NO CONCRETE COATING ACTIVITY SHALL OCCUR WITHIN 100 FEET OF THE WETLAND BOUNDARY, UNLESS APPROVED BY THE ENVIRONMENTAL INSPECTOR.
9. LEAVE HARD PLUGS AT THE EDGE OF TYPE III WETLAND UNTIL JUST PRIOR TO PIPE PLACEMENT.
10. FLOAT PIPE IN PLACE, LOWER-IN, INSTALL TRENCH PLUGS IN ACCORDANCE WITH DRAWINGS AND SPECIFICATIONS, AND BACKFILL.
11. RESTORE GRADE TO NEAR PRE-CONSTRUCTION TOPOGRAPHY AND INSTALL PERMANENT EROSION CONTROL.
12. REMOVE ANY MATS UTILIZED TO SUPPORT AMPHIBIOUS EQUIPMENT FROM WETLANDS UPON COMPLETION.
13. WETLANDS CROSSED USING PUSH/PULL METHOD TEND TO BE TOO WET FOR EFFECTIVE SEEDING AND WILL NOT BE SEEDED IF STANDING WATER IS PRESENT.
14. NO FERTILIZER OR LIME IS PERMITTED.
15. DO NOT USE LIQUID MULCH BINDERS WITHIN 100 FT OF WETLANDS OR WATERBODIES.

Tennessee Gas Pipeline Company, L.L.C. a Kinder Morgan company	DESCRIPTION: TYPE III "INUNDATED WETLAND" INSTALLATION PROCEDURE		
	DRAWING NO.: WIP3	SCALE: NTS	DATE: 2015
		FIGURE NO.: 9	



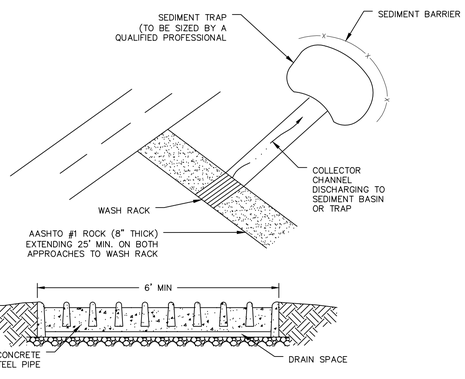
CONSTRUCTION SPECIFICATIONS

1. USE ANGULAR STONE SIZED ACCORDING TO THE STANDARDS SET BY ASTM C-33, SIZE NO.2 OR 3, OR DOT STANDARD SPECIFICATIONS SECTION M.01.01, SIZE #3
2. LENGTH - NOT LESS THAN 50 FEET; WHERE THE SOILS SUBJECT TO TRACKING CONTAIN LESS THAN 80% SAND, THEN THE MINIMUM LENGTH OF THE CONSTRUCTION ENTRANCE IS 100 FEET
3. THICKNESS - NOT LESS THAN SIX (6) INCHES.
4. WIDTH - TWELVE (12) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS. TWENTY-FOUR (24) FOOT IF SINGLE ENTRANCE TO SITE.
5. FILTER CLOTH - WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE. GEOTEXTILE MUST MEET CRITERIA IN TABLE BELOW.
6. SURFACE WATER - ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
7. MAINTENANCE - THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY, ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
8. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE. (SEE STABILIZED CONSTRUCTION ENTRANCE WITH WASH RACK DETAIL)
9. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN EVENT.

TABLE: CRITERIA FOR GEOTEXTILE

FABRIC PROPERTIES	LIGHT DUTY ROADS GRADE SUBGRADE	HEAVY DUTY HAUL ROADS ROUGH GRADED	TEST METHOD
GRAB TENSILE STRENGTH (LBS)	200	220	ASTM D1682
ELONGATION AT FAILURE (%)	50	60	ASTM D1682
MULLEN BRUST STRENGTH (LBS)	190	430	ASTM D3786
PUNCTURE STRENGTH (LBS)	40	125	ASTM D3786 MODIFIED
EQUIVALENT OPENING SIZE	40-80	40-80	US STD SIEVE CW-02215
AGGREGATE DEPTH	6	10	

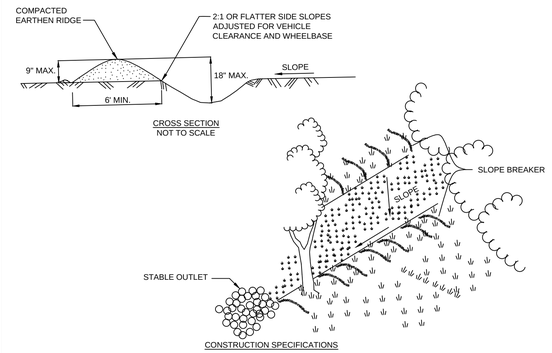
Tennessee Gas Pipeline Company, L.L.C. a Kinder Morgan company	DESCRIPTION: STABILIZED CONSTRUCTION ENTRANCE		
	DRAWING NO.: CE	SCALE: NTS	DATE: 2015
		FIGURE NO.: 10	



NOTES:

1. WASH RACK SHALL BE 20 FEET (MIN.) WIDE OR TOTAL WIDTH OF ACCESS.
2. WASH RACK SHALL BE DESIGNED AND CONSTRUCTED TO ACCOMMODATE ANTICIPATED CONSTRUCTION VEHICULAR TRAFFIC.
3. A WATER SUPPLY SHALL BE MADE AVAILABLE TO WASH THE WHEELS OF ALL VEHICLES EXITING THE SITE.
4. MAINTENANCE: ROCK CONSTRUCTION ENTRANCE THICKNESS SHALL BE CONSTANTLY MAINTAINED TO THE SPECIFIED DIMENSIONS BY ADDING ROCK. A STOCKPILE OF ROCK MATERIAL SHALL BE MAINTAINED ON SITE FOR THIS PURPOSE. DRAIN SPACE UNDER WASH RACK SHALL BE KEPT OPEN AT ALL TIMES. DAMAGE TO THE WASH RACK SHALL BE REPAIRED PRIOR TO FURTHER USE OF THE RACK. ALL SEDIMENT DEPOSITED ON ROADWAYS SHALL BE REMOVED AND RETURNED TO THE CONSTRUCTION SITE IMMEDIATELY. WASHING THE ROADWAY OR SWEEPING THE DEPOSITS INTO ROADWAY DITCHES, SEWERS, CULVERTS, OR OTHER DRAINAGE COURSES IS NOT ACCEPTABLE.

Tennessee Gas Pipeline Company, L.L.C. a Kinder Morgan company	DESCRIPTION: STABILIZED CONSTRUCTION ENTRANCE WITH WASHRACK		
	DRAWING NO.: CEW	SCALE: NTS	DATE: 2015
		FIGURE NO.: 11	



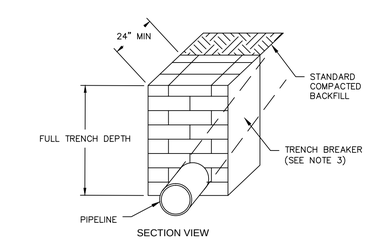
CONSTRUCTION SPECIFICATIONS

1. INSTALL THE SLOPE BREAKER AS SOON AS THE RIGHT OF WAY IS CLEARED AND GRADED.
2. DISK OR STRIP THE SOD FROM THE BASE FOR THE CONSTRUCTED RIDGE BEFORE PLACING FILL.
3. TRACK THE RIDGE TO COMPACT IT TO THE DESIGN CROSS SECTION.
4. SLOPE BREAKERS MAY BE CURVED ALONG THE SLOPE TO CONFORM TO THE CONTOURS. REGARDLESS OF CURVATURE, ALL SLOPE BREAKERS SHALL BE CONSTRUCTED WITH A POSITIVE SLOPE TOWARDS A STABLE OUTLET.
5. THE OUTLET SHALL BE LOCATED ON AN UNDISTURBED AREA. FIELD SPACING WILL BE ADJUSTED TO USE THE MOST STABLE OUTLET AREAS. OUTLET PROTECTION WILL BE PROVIDED WHEN NATURAL AREAS ARE NOT ADEQUATE.
6. VEHICLE CROSSING SHALL BE STABILIZED WITH GRAVEL. EXPOSED AREAS SHALL BE IMMEDIATELY SEEDED AND MULCHED.
7. PERIODICALLY INSPECT SLOPE BREAKERS FOR EROSION DAMAGE AND SEDIMENT. CHECK OUTLET AREAS AND MAKE REPAIRS AS NEEDED TO RESTORE OPERATION.
8. THE POSITIVE GRADE OF THE SLOPE BREAKER SHALL NOT EXCEED 2%. A CROSSING ANGLE OF APPROX. 60 DEGREES IS PREFERRED. SLOPE BREAKERS FLOW MUST BE CONVEYED TO STABLE OUTLETS.

MAXIMUM SPACING OF PERMANENT AND TEMPORARY SLOPE BREAKERS

PERCENT SLOPE	SPACING (FT)
1	400
1–2	245
2–5	125
5–10	78
10–15	58
15–35	50
>35	25

Tennessee Gas Pipeline Company, L.L.C. a Kinder Morgan company	DESCRIPTION: WATERBAR		
	DRAWING NO.: WB	SCALE: NTS	DATE: 2015
		FIGURE NO.: 12	



TRENCH BREAKER SPACING IN AGRICULTURAL LAND	
SLOPE (%)	SPACING (L) (FT)
< 5	AS REQUIRED
5 – 10	150
>10 – 15	100
>15 – 20	80
>20 – 30	70
>30 – 40	50
>40 – 100	40
>100	25

NOTES

1. TOPSOIL SHALL NOT BE USED TO FILL SACKS.
2. IMPERVIOUS TRENCH BREAKERS ARE REQUIRED FOR ALL STREAM, RIVER, WETLAND, OR OTHER WATER BODY CROSSINGS.
3. BREAKER MATERIAL MAY CONSIST OF STACKED CLAY, BENTONITE, SAND BAGS OR FOAM.

TRENCH BREAKER SPACING IN NON-AGRICULTURAL LAND	
SLOPE (%)	SPACING (L) (FT)
< 5	AS REQUIRED
5 – 10	150
>10 – 20	100
>20 – 35	80
<35 –	70

Tennessee Gas Pipeline Company, L.L.C. a Kinder Morgan company	DESCRIPTION: TRENCH PLUG/TRENCH BREAKER		
	DRAWING NO.: TP	SCALE: NTS	DATE: 2015
		FIGURE NO.: 13	

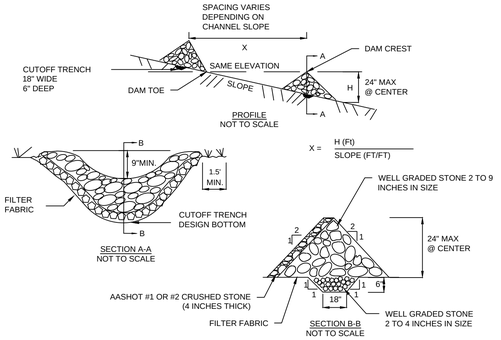
NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

NORTHEAST ENERGY DIRECT PROJECT
EROSION & SEDIMENT CONTROL TYPICALS
CONNECTICUT

Section:	Township:	Range:
Co./Par.:	State: CONNECTICUT	
Division:	Op. Area:	
Drafter: GV	Date:	Project ID:
Chk'd:	Date:	Scale:
Approved:	Date:	Filename: CT_ES_DETAILS_002
		Sheet:
		Type:



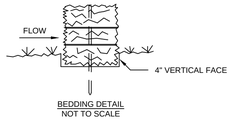
CONSTRUCTION SPECIFICATIONS

1. STONE WILL BE PLACED ON A FILTER FABRIC FOUNDATION TO THE LINES, GRADES AND LOCATIONS SHOWN IN THE PLAN.
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 2 ACRES.

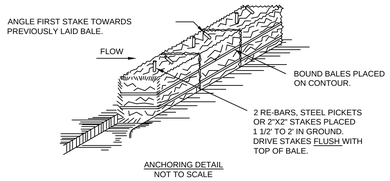
Tennessee Gas Pipeline Company, L.L.C. a Kinder Morgan company

DESCRIPTION: CHECK DAM
DRAWING NO.: CD | SCALE: NTS | DATE: 2015 | FIGURE NO.: 14

CONSTRUCTED SLOPE	PERCENT SLOPE	LENGTH (FT)
2:1	50	25
3:1	33	50
4:1	25	75



DRAINAGE AREA NO MORE THAN 1/4 ACRE PER 100 FEET OF STRAW BALE DIKE FOR SLOPES LESS THAN 25%.

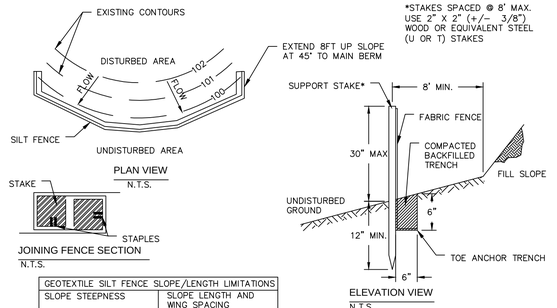


CONSTRUCTION SPECIFICATIONS

1. BALES SHALL BE PLACED AT THE TOE OF A SLOPE OR ON THE CONTOUR AND IN A ROW WITH ENDS TIGHTLY ABUTTING THE ADJACENT BALES.
2. EACH BALE SHALL BE EMBEDDED IN THE SOIL A MINIMUM OF (4) INCHES, AND PLACED SO THE BINDINGS ARE HORIZONTAL.
3. BALES SHALL BE SECURELY ANCHORED IN PLACE BY EITHER TWO STAKES OR RE-BARS DRIVEN THROUGH THE BALE. THE FIRST STAKE IN EACH BALE SHALL BE DRIVEN TOWARD THE PREVIOUSLY LAID BALE AT AN ANGLE TO FORCE THE BALES TOGETHER. STAKES SHALL BE DRIVEN FLUSH WITH THE BALE.
4. INSPECTION SHALL BE FREQUENT AND REPAIR REPLACEMENT SHALL BE MADE PROMTLY AS NEEDED.
5. BALES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFULLNESS SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.
6. BALES SHALL NOT BE USED AS A SEDIMENT BARRIER IN LOCATIONS WHERE THEY ARE EXPECTED TO LAST LONGER THAN 3 MONTHS DUE TO NATURAL DEGRADATION.
7. LENGTH OF SLOPE ABOVE THE STRAW BALE DIKE SHOULD NOT EXCEED THE LIMITS BELOW.

Tennessee Gas Pipeline Company, L.L.C. a Kinder Morgan company

DESCRIPTION: STRAW BALE DIKE
DRAWING NO.: SBD | SCALE: NTS | DATE: 2015 | FIGURE NO.: 15



GEOTEXTILE SILT FENCE SLOPE/LENGTH LIMITATIONS	
SLOPE STEEPNESS	SLOPE LENGTH AND WING SPACING
5:1 OR FLATTER	100 FEET
3:1 TO 5:1	75 FEET
2:1 TO 3:1	50 FEET

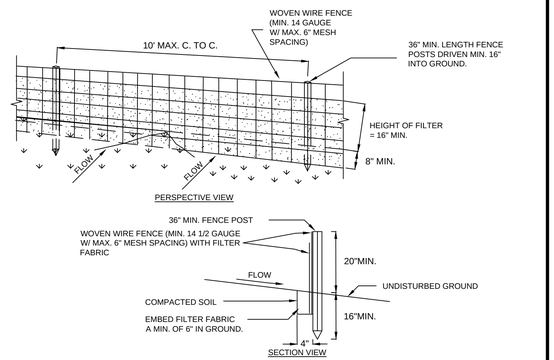
NOTES:

1. FABRIC SHALL HAVE THE MINIMUM PROPERTIES AS SHOWN IN THE TABLE BELOW.
2. FABRIC WIDTH SHALL BE 30" MINIMUM. STAKES SHALL BE HARDWOOD OR EQUIVALENT STEEL (U OR T) STAKES.
3. SILT FENCE SHALL BE PLACED AT LEVEL EXISTING GRADE. BOTH ENDS OF THE FENCE SHALL BE EXTENDED AT LEAST 8 FEET UP SLOPE AT 45 DEGREES TO THE MAIN FENCE ALIGNMENT.
4. SEDIMENT SHALL BE REMOVED WHEN ACCUMULATIONS REACH HALF THE ABOVEGROUND HEIGHT OF THE FENCE.
5. ANY SECTION OF SILT FENCE WHICH HAS BEEN UNDERMINED OR TOPPED SHALL BE IMMEDIATELY REPLACED WITH A ROCK FILTER OUTLET
6. FENCE SHALL BE REMOVED AND PROPERLY DISPOSED OF WHEN TRIBUTARY AREA IS PERMANENTLY STABILIZED.
7. SILT FENCE SHOULD NOT BE INSTALLED ON UNCOMPACTED FILLS OR IN EXTREMELY LOOSE SOILS (E.G. SANDY LOAM). IN ROCKY SOIL WHERE ANCHORING MAY BE DIFFICULT, OR IN FORESTED AREAS WHERE TREE ROOTS MAY BE SEVERED DURING INSTALLATION.
8. MAXIMUM ALLOWABLE SLOPE LENGTHS FOR RUNOFF CONTRIBUTING TO SILT FENCING ARE SHOWN ABOVE.

FABRIC PROPERTIES FOR SILT FENCE		
FABRIC PROPERTY	MINIMUM ACCEPTABLE VALUE	TEST METHOD
GRAB TENSILE STRENGTH (LB)	120	ASTM D1682
ELONGATION AT FAILURE (%)	50% MAX.	ASTM D1682
MULLEN BURST STRENGTH (PSI)	200	ASTM D3786
TRAPEZOIDAL TEAR STRENGTH (LB)	50	
PUNCTURE STRENGTH (LB)	40	ASTM D751 (MODIFIED)
SLURRY FLOW RATE (GAL/MIN/SF)	0.3	ASTM 5141
EQUIVALENT OPENING SIZE	40 - 80	US STD. SIEVE CW-02215
ULTRAVIOLET RADIATION STABILITY (%)	90	ASTM G-26

Tennessee Gas Pipeline Company, L.L.C. a Kinder Morgan company

DESCRIPTION: GEOTEXTILE SILT FENCE
DRAWING NO.: GSF | SCALE: NTS | DATE: 2015 | FIGURE NO.: 16



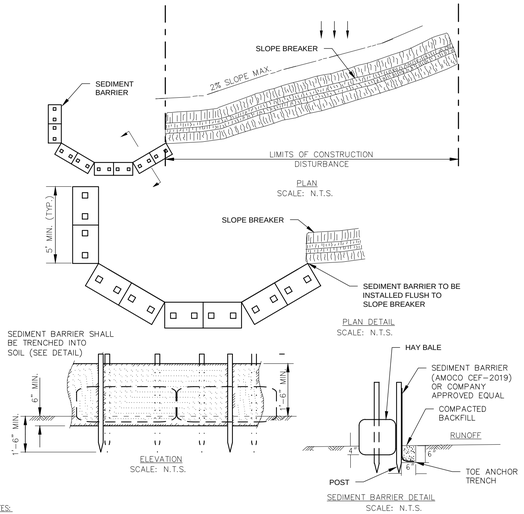
CONSTRUCTION SPECIFICATIONS

1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES. POSTS SHALL BE STEEL EITHER "T" OR "U" TYPE OR HARDWOOD.
2. FILTER CLOTH TO BE TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION. FENCE SHALL BE WOVEN WIRE, 14 GAUGE, 6" MAXIMUM MESH OPENING.
3. WHEN TWO SECTIONS OF FILTER FABRIC ADJOIN EACH OTHER THEY SHALL BE OVER-LAPPED BY SIX INCHES AND FOLDED. FILTER FABRIC SHALL BE EITHER FILTER X, MIRAFI 100X, STABILINKA T140N, OR APPROVED EQUIVALENT.
4. PREFABRICATED UNITS SHALL BE GEOFAB, ENVIROFENCE, OR APPROVED EQUIVALENT.
5. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.
6. MAXIMUM DRAINAGE AREA FOR OVERLAND FLOW TO A SILT FENCE SHALL NOT EXCEED 1/4 ACRE PER 100 FEET OF FENCE.
7. MAXIMUM ALLOWABLE SLOPE LENGTHS CONTRIBUTING RUNOFF TO SILT FENCE PLACED ON A SLOPE ARE AS FOLLOWS:

SLOPE STEEPNESS	MAXIMUM LENGTH (FT)
2:1	25
3:1	50
4:1	75
5:1 OR FLATTER	100

Tennessee Gas Pipeline Company, L.L.C. a Kinder Morgan company

DESCRIPTION: REINFORCED SILT FENCE
DRAWING NO.: RSF | SCALE: NTS | DATE: 2015 | FIGURE NO.: 17

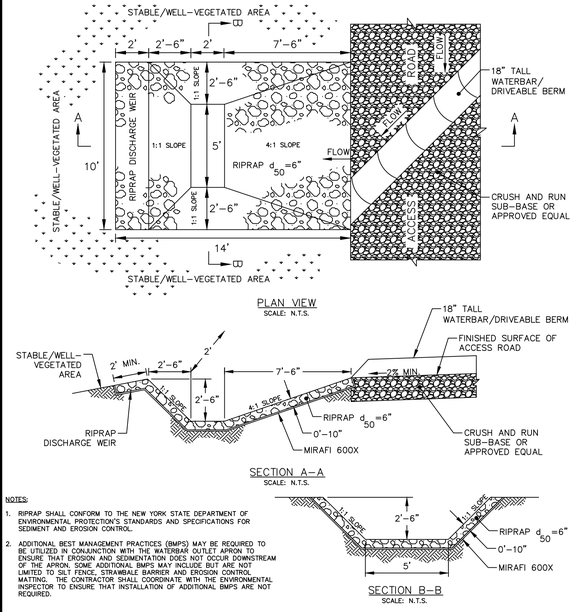


NOTES:

1. REINFORCED SEDIMENT BARRIER HOOKS SHALL BE PLACED AT THE OUTLET OF SLOPE BREAKERS IF A SUFFICIENT VEGETATED STRIP IS NOT PRESENT.
2. ONCE THE DISTURBED AREA IS STABILIZED, THE REINFORCED SEDIMENT BARRIER HOOK SHALL BE REMOVED AND ANY DISTURBED AREAS CAUSED BY REMOVAL SHALL BE RETURNED TO ORIGINAL CONDITION AND REVEGETATED.
3. SEDIMENT SHALL BE REMOVED WHEN IT REACHES HALF THE HEIGHT OF THE SEDIMENT BARRIER.
4. STAKES SHALL BE 2"X2"X48" HARDWOOD OR EQUIVALENT STEEL ("U" OR "T") STAKES.

Tennessee Gas Pipeline Company, L.L.C. a Kinder Morgan company

DESCRIPTION: REINFORCED SEDIMENT BARRIER HOOK OUTLET STRUCTURE
DRAWING NO.: SBH | SCALE: NTS | DATE: 2015 | FIGURE NO.: 18

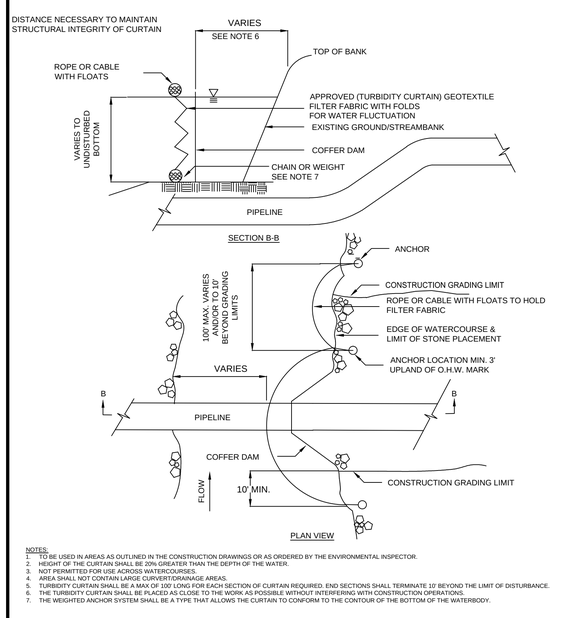


NOTES:

1. RIPRAP SHALL CONFORM TO THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL PROTECTION'S STANDARDS AND SPECIFICATIONS FOR SEDIMENT AND EROSION CONTROL.
2. ADDITIONAL BEST MANAGEMENT PRACTICES (BMPS) MAY BE REQUIRED TO BE UTILIZED IN CONJUNCTION WITH THE WATERBAR OUTLET APRON TO ENSURE THAT EROSION AND SEDIMENTATION DOES NOT OCCUR DOWNSTREAM OF THE APRON. SOME ADDITIONAL BMPS MAY INCLUDE BUT ARE NOT LIMITED TO SILT FENCE, STRAWBALE BARRIER AND EROSION CONTROL MATTING. THE CONTRACTOR SHALL COORDINATE WITH THE ENVIRONMENTAL INSPECTOR TO ENSURE THAT INSTALLATION OF ADDITIONAL BMPS ARE NOT REQUIRED.

Tennessee Gas Pipeline Company, L.L.C. a Kinder Morgan company

DESCRIPTION: WATERBAR OUTLET APRON
DRAWING NO.: WOA | SCALE: NTS | DATE: 2015 | FIGURE NO.: 19



NOTES:

1. TO BE USED IN AREAS AS OUTLINED IN THE CONSTRUCTION DRAWINGS OR AS ORDERED BY THE ENVIRONMENTAL INSPECTOR.
2. HEIGHT OF THE CURTAIN SHALL BE 20% GREATER THAN THE DEPTH OF THE WATER.
3. NOT PERMITTED FOR USE ACROSS WATERCOURSES.
4. AREA SHALL NOT CONTAIN LARGE CURVERT/DRAINAGE AREAS.
5. TURBIDITY CURTAIN SHALL BE A MAX OF 100' LONG FOR EACH SECTION OF CURTAIN REQUIRED. END SECTIONS SHALL TERMINATE 10' BEYOND THE LIMIT OF DISTURBANCE.
6. THE TURBIDITY CURTAIN SHALL BE PLACED AS CLOSE TO THE WORK AS POSSIBLE WITHOUT INTERFERING WITH CONSTRUCTION OPERATIONS.
7. THE WEIGHTED ANCHOR SYSTEM SHALL BE A TYPE THAT ALLOWS THE CURTAIN TO CONFORM TO THE CONTOUR OF THE BOTTOM OF THE WATERBODY.

Tennessee Gas Pipeline Company, L.L.C. a Kinder Morgan company

DESCRIPTION: TURBIDITY CURTAIN
DRAWING NO.: TC | SCALE: NTS | DATE: 2015 | FIGURE NO.: 20

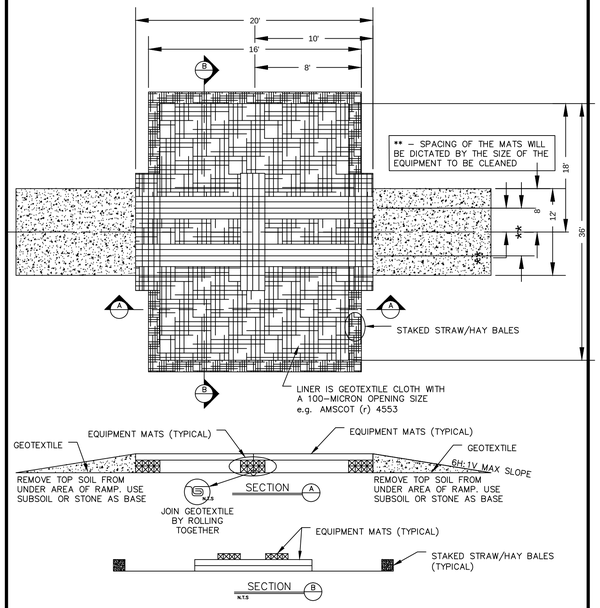
NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

Tennessee Gas Pipeline Company, L.L.C. a Kinder Morgan company

NORTHEAST ENERGY DIRECT PROJECT
EROSION & SEDIMENT CONTROL TYPICALS
CONNECTICUT

Section:	Township:	Range:
Co./Par.:	State: CONNECTICUT	
Division:	Op. Area:	
Drafter: GV	Date:	Project ID:
Chk'd:	Date:	Scale:
Approved:	Date:	Filename: CT_ES_DETAILS_003
		Sheet:
		Type:



Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

DESCRIPTION: ELEVATED WASHRACK
DRAWING NO.: EW
SCALE: NTS
DATE: 2015
FIGURE NO.: 21A

ELEVATED WASHRACK STATION LOCATIONS

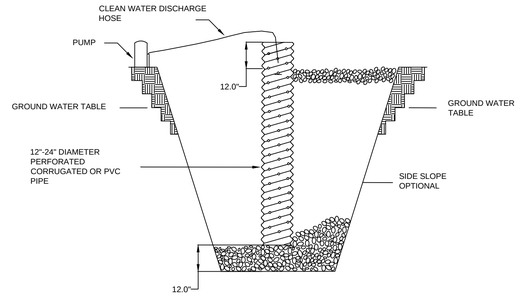
	MILEPOST	LL	WETLAND ID	INVASIVE WETLANDS SPECIES IDENTIFIED	STATION POSITION COMMENTS

THIS TABLE WAS INTENTIONALLY LEFT BLANK AND SHOULD BE COMPLETED BY THE PLAN PREPARER

NOTES:
1. WASH STATION MUST BE WITHIN THE ENVIRONMENTALLY CLEARED RIGHT–OF–WAY AND OUTSIDE THE 100' WETLAND BUFFER ZONE.
2. IF WASH STATION IS IN AGRICULTURAL LANDS, REMOVE THE TOPSOIL AND STOCKPILE BEFORE THE TOPSOIL IS REPLACED. THE SUBSOIL MUST BE DECOMPACTED AND ROCKS REMOVED. THE TOPSOIL MOISTURE MUST PASS THE ATTERBERG TEST PRIOR TO SPREADING THE TOPSOIL.
3. THE LOCATION OF THE PUMPING EQUIPMENT, WATER SUPPLY AND SPRAY EQUIPMENT WILL BE DICTATED BY THE LOCATION OF THE WASH STATION.
4. AFTER THE EQUIPMENT WASHING IS COMPLETE, FOLD OR ROLL THE GEOTEXTILE (CAUTION WILL BE EXCERCISED NOT TO SPILL ANY OF THE CONTAINED MATERIAL) AND REMOVE TO AN APPROPRIATE DISPOSAL SITE. REMOVE THE CLEANING EQUIPMENT, RAMPS AND STRAW/HAY BALES AND COMPLETE THE CLEANUP.

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

DESCRIPTION: ELEVATED WASHRACK
DRAWING NO.: EW
SCALE: NTS
DATE: 2015
FIGURE NO.: 21B



CONSTRUCTION SPECIFICATIONS

1. PIT DIMENSIONS ARE OPTIONAL.
2. THE STANDPIPE SHOULD BE CONSTRUCTED BY PERFORATING A 12-24" DIAMETER CORRUGATED OR PVC PIPE.
3. A BASE OF 2" AGGREGATE SHOULD BE PLACED IN THE PIT TO A DEPTH OF 12". AFTER INSTALLING THE STANDPIPE, THE PIT SURROUNDING THE STANDPIPE SHOULD BE BACKFILLED WITH 2" AGGREGATE.
4. THE STANDPIPE SHOULD EXTEND 12" ABOVE THE LIP OF THE PIT.
5. THE OUTLET SHALL BE FILTERED THROUGH AN APPROVED DEWATERING DEVICE TO PREVENT HEAVY SILT LADEN WATER FROM DIRECTLY ENTERING A WATERBODY OR WETLAND.
6. THE OUTLET SHOULD BE SITUATED IN A WELL VEGETATED AREA.

Tennessee Gas Pipeline Company, L.L.C.
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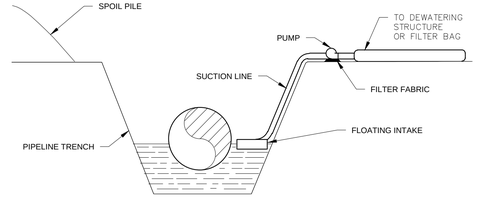
DESCRIPTION: WELL POINT / SUMP PIT
DRAWING NO.: WP
SCALE: NTS
DATE: 2015
FIGURE NO.: 22



NOTES:

1. WATER PUMPED OUT OF TRENCH SHALL NOT BE DISCHARGED DIRECTLY INTO WATERBODIES. WATER SHALL BE DISCHARGED INTO A FILTER BAG OR DEWATERING STRUCTURE.
2. PUMP SHALL BE CONTROLLED SO THAT THE DISCHARGE DOES NOT OVERFLOW DEWATERING STRUCTURE. THE DEWATERING STRUCTURE SHALL BE RESIZED IF ADDITIONAL FLOW IS REQUIRED.
3. PUMP SUCTION HOSE MUST NOT BE ALLOWED TO COME IN CONTACT WITH TRENCH BOTTOM. PROVISIONS MUST BE MADE TO ELEVATE THE SUCTION HOSE TO AT LEAST ONE FOOT ABOVE THE BOTTOM OF THE PIPE TRENCH UNTIL BOTTOM DEWATERING IS NECESSARY.
4. DEWATERING SHALL NOT OCCUR DURING TIMES OF HEAVY RAINFALL EXCEPT AS REQUIRED TO PREVENT FLOODING OF CONSTRUCTION EQUIPMENT LOCATED IN BORE PITS AND TRENCHES.
5. PUMPS UTILIZED DURING DEWATERING SHALL BE PLACED WITHIN SECONDARY CONTAINMENT IF POSITIONED WITHIN 100 FEET OF A WETLAND OR WATERBODY.

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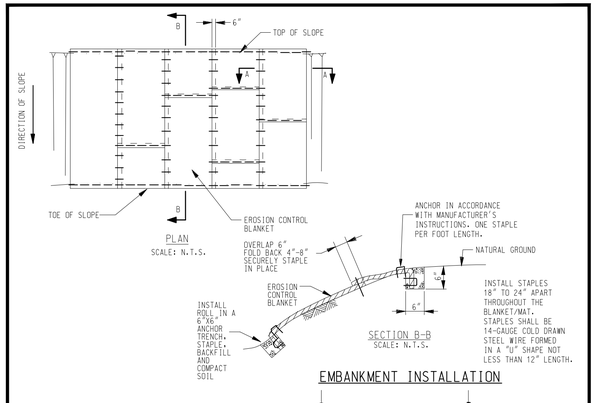
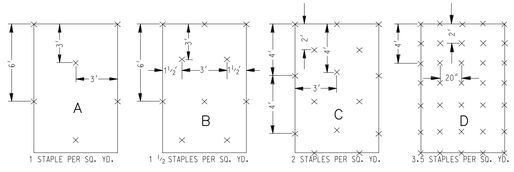
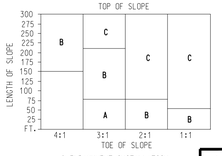
DESCRIPTION: TRENCH DEWATERING
DRAWING NO.: TDW
SCALE: NTS
DATE: 2015
FIGURE NO.: 23



EMBANKMENT INSTALLATION





STAPLE PATTERN GUIDE

A EMBANKMENT INSTALLATION – STAPLE PATTERN TABLE (SEE STAPLE PATTERN GUIDE)

NOTES:
1. EROSION CONTROL BLANKETS SHALL EXTEND COMPLETELY ACROSS DISTURBED AREA TO PROTECT ERODIBLE SURFACES. THE SOIL SHALL BE PROPERLY PREPARED, SEEDED AND MULCHED PRIOR TO INSTALLATION.
2. INSTALL EROSION CONTROL BLANKETS ON FRESHLY GRADED EMBANKMENTS ON SLOPES IN EXCESS OF 3:1 (H:V) TO SUPPORT VEGETATION.
3. INSTALL BLANKETS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
4. BLANKET SHALL BE LOOSELY INSTALLED AND TAMPED OR ROLLED IN PLACE AFTER INSTALLATION. STAPLES SHALL BE DRIVEN FLUSH WITH THE GROUND.

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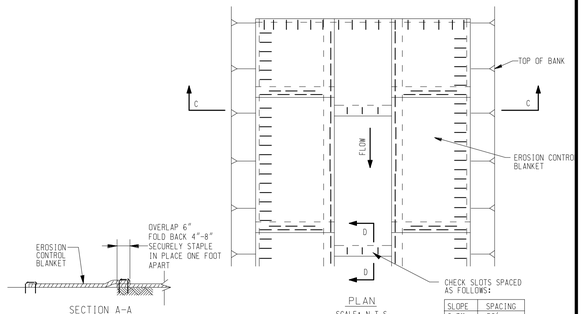
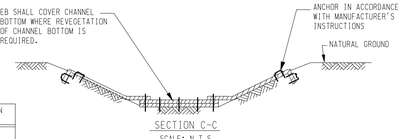
DESCRIPTION: EROSION CONTROL BLANKET
DRAWING NO.: ECB
SCALE: NTS
DATE: 2015
FIGURE NO.: 24A



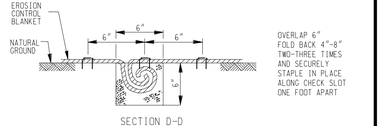
SLOPE	SPACING
0-3%	50'
> 3%	25'



FLOW	STAPLE PATTERN TYPE
LOW VELOCITY	C
MED. TO HIGH VELOCITY	D

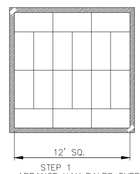
CHANNEL INSTALLATION – STAPLE PATTERN TABLE (SEE STAPLE PATTERN GUIDE)

CHANNEL INSTALLATION

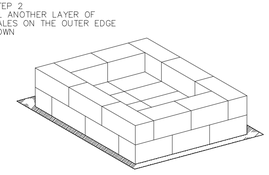


Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

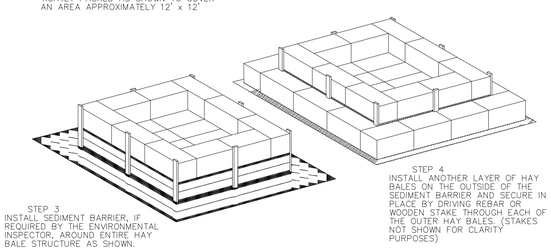
DESCRIPTION: EROSION CONTROL BLANKET
DRAWING NO.: ECB
SCALE: NTS
DATE: 2015
FIGURE NO.: 24B



STEP 1
ARRANGE HAY BALES OVER GEOTEXTILE FABRIC OR STONE BASE ON LEVEL LAND TIGHTLY PACKED AS SHOWN TO COVER AN AREA APPROXIMATELY 12' x 12'



STEP 2
INSTALL ANOTHER LAYER OF HAY BALES ON THE OUTER EDGE AS SHOWN



STEP 3
INSTALL SEDIMENT BARRIER, IF REQUIRED BY THE ENVIRONMENTAL INSPECTOR, AROUND ENTIRE HAY BALE STRUCTURE AS SHOWN.

STEP 4
INSTALL ANOTHER LAYER OF HAY BALES ON THE OUTSIDE OF THE SEDIMENT BARRIER AND SECURE IN PLACE BY DRIVING REBAR OR WOODEN STAKE THROUGH EACH OF THE OUTER HAY BALES. (STAKES NOT SHOWN FOR CLARITY PURPOSES)

NOTES:

1. WHERE POSSIBLE, THE STRUCTURE SHALL BE PLACED ON A LEVEL, WELL VEGETATED UPLAND SITE SUCH THAT WATER WILL FLOW AWAY FROM STRUCTURE AND ANY WORK AREAS.
2. THE CONTRACTOR SHALL PROPERLY REMOVE AND PROPERLY DISPOSE OF THE DEWATERING STRUCTURE IMMEDIATELY UPON COMPLETION OF DEWATERING OPERATIONS. UNDER NO CIRCUMSTANCES SHALL USED DEWATERING STRUCTURES BE LEFT IN PLACE FOR A PERIOD OF TIME GREATER THAN 48 HOURS AFTER DEWATERING OPERATIONS ARE COMPLETE.
3. THE STRUCTURE SHOULD BE POSITIONED SUCH THAT WATER WILL NOT FLOW DIRECTLY INTO ANY WETLANDS OR WATERBODIES.

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

DESCRIPTION: DEWATERING STRUCTURE
DRAWING NO.: DW
SCALE: NTS
DATE: 2015
FIGURE NO.: 25

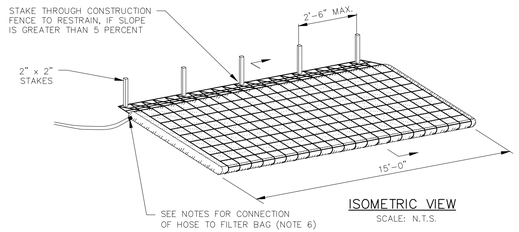
NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

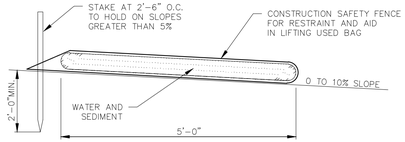
Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

NORTHEAST ENERGY DIRECT PROJECT
EROSION & SEDIMENT CONTROL TYPICALS
CONNECTICUT

Section:	Township:	Range:	
Co./Par.:	State: CONNECTICUT		
Division:	Op. Area:		
Drafter: GV	Date:	Project ID:	
Chk'd:	Date:	Scale:	
Approved:	Date:	Filename: CT_ES_DETAILS_004	
		Sheet:	
		Type:	



ISOMETRIC VIEW
SCALE: N.T.S.



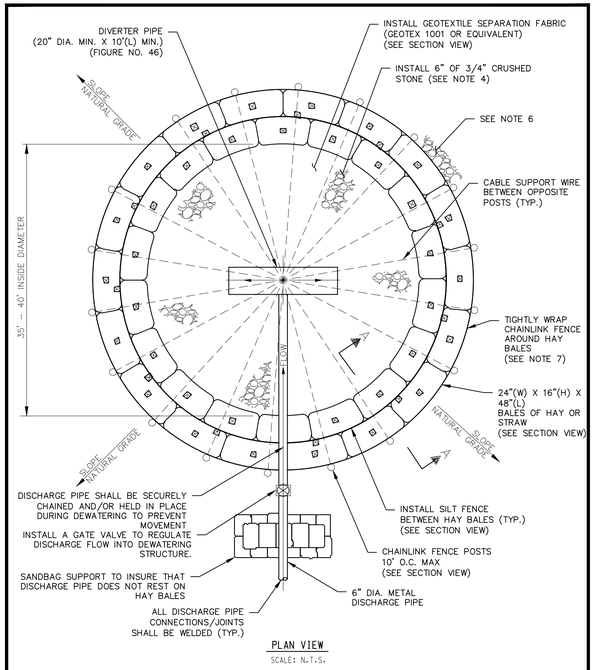
SECTION
SCALE: N.T.S.

NOTES:

1. FILTER BAG SHALL BE PLACED ON A SLOPING OR LEVEL, WELL VEGETATED SITE SUCH THAT WATER WILL FLOW AWAY FROM THE DEVICE AND ANY WORK AREAS.
2. THE FILTER BAG MUST BE STAKED IN PLACE IF THE FILTER BAG IS PLACED ON A SLOPE GREATER THAN 5 PERCENT.
3. THE FILTER BAG SHALL NOT BE USED FOR DISCHARGE FLOWS GREATER THAN 300 GPM OR AS RECOMMENDED BY THE MANUFACTURER.
4. THE CONTRACTOR SHALL PROPERLY REMOVE AND PROPERLY DISPOSE OF USED FILTER BAGS IMMEDIATELY UPON COMPLETION OF DEWATERING OPERATIONS. UNDER NO CIRCUMSTANCES SHALL USED FILTER BAGS BE LEFT IN PLACE FOR A PERIOD OF TIME GREATER THAN 48 HOURS AFTER DEWATERING OPERATIONS ARE COMPLETE.
5. SEDIMENT FROM BAG, AT THE DISCRETION OF THE ENVIRONMENTAL INSPECTOR, MAY BE SPREAD IN UPLAND AREAS WITHIN THE CONSTRUCTION CORRIDOR AND THE AREA SHALL BE STABILIZED AND REVEGETATED.
6. TO ATTACH HOSE, CUT OPEN CORNER OF FILTER BAG, GATHER UP MATERIAL AND CLAMP TO A SHORT SECTION OF STEEL PIPE. CLAMP HOSE TO OTHER END OF PIPE. BOTH CONNECTIONS SHALL BE WATERTIGHT.
7. CONTRACTOR SHALL ONLY INSTALL ONE DEWATERING HOSE PER FILTER BAG.

Tennessee Gas Pipeline Company, L.L.C. a Kinder Morgan company

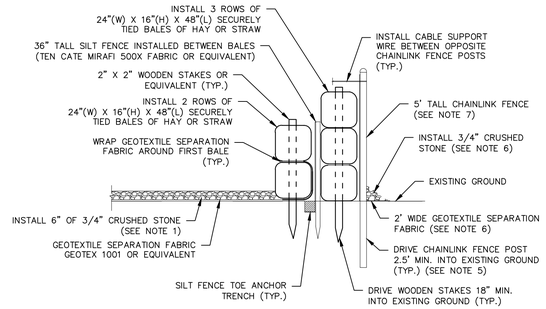
DESCRIPTION: FITER BAG
DRAWING NO.: FB | SCALE: NTS | DATE: 2015 | FIGURE NO.: 26



PLAN VIEW
SCALE: N.T.S.

Tennessee Gas Pipeline Company, L.L.C. a Kinder Morgan company

DESCRIPTION: HYDROSTATIC DEWATERING STRUCTURE
DRAWING NO.: HDS | SCALE: NTS | DATE: 2015 | FIGURE NO.: 27A



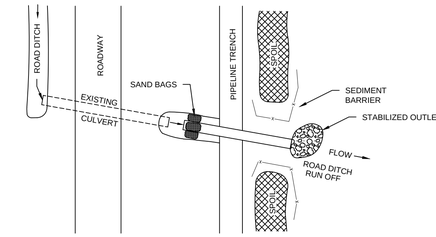
SECTION "A-A" VIEW
SCALE: N.T.S.

NOTES:

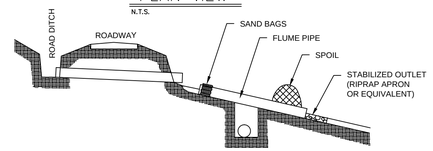
1. STRUCTURE SHALL BE PLACED ON A LEVEL WELL VEGETATED SITE SUCH THAT WATER WILL FLOW AWAY FROM STRUCTURE AND ANY WORK AREAS AND MINIMIZE EROSION OF THE SURROUNDING AREA TO THE EXTENT PRACTICABLE.
2. AT THE DISCRETION OF THE ENVIRONMENTAL INSPECTOR, ADDITIONAL EROSION AND SEDIMENTATION CONTROL DEVICES (E.G. RIPRAP CHECK DAMS, COMPOST FILTER SOCKS, ETC.) MAY BE REQUIRED TO BE INSTALLED DOWNSTREAM OF THE STRUCTURE IF EROSION BECOMES APPARENT DURING DEWATERING.
3. FLOW RATES THROUGH DISCHARGE AND DIVERTER PIPES SHALL BE SUCH THAT STRUCTURE WILL NOT OVERFLOW. A MINIMUM FREEBOARD OF 3", MEASURED FROM THE TOP OF THE THIRD ROW OF HAYBALES TO THE WATER SURFACE ELEVATION, SHALL BE MAINTAINED AT ALL TIMES.
4. THE 3/4" CRUSHED STONE INSTALLED WITHIN THE BASIN SHALL BE WASHED TO REMOVE ALL DIRT/FINE PARTICLES PRIOR TO INSTALLATION.
5. THE CHAINLINK FENCE POSTS SHALL BE DRIVEN A MINIMUM OF 2.5 FT. INTO STABLE, EXISTING GROUND. THE CONTRACTOR MAY BE REQUIRED TO INSTALL THE POLES DEEPER IF STABLE SUBSOILS ARE NOT ACHIEVED WITHIN 2.5 FT.
6. AT THE DISCRETION OF THE ENVIRONMENTAL INSPECTOR, ADDITIONAL GEOTEXTILE SEPARATION FABRIC AND 3/4" CRUSHED STONE MAY BE REQUIRED TO BE INSTALLED AROUND THE OUTSIDE EDGE OF THE DEWATERING STRUCTURE.
7. CHAINLINK FENCE SHALL INSTALLED TIGHTLY AGAINST THE HAY BALES AND SECURELY FASTENED TOGETHER AT ALL JOINTS WITH CABLE TENSION WIRE AND STRETCHER BARS.
8. THE ENVIRONMENTAL INSPECTOR SHALL HAVE THE AUTHORITY TO MODIFY THE DESIGN AS REQUIRED TO PREVENT EROSION AND SEDIMENTATION DOWNSTREAM OF THE STRUCTURE.
9. HAY BALES SHALL BE STACKED SUCH THAT THE JOINTS ARE STAGGERED.

Tennessee Gas Pipeline Company, L.L.C. a Kinder Morgan company

DESCRIPTION: HYDROSTATIC DEWATERING STRUCTURE
DRAWING NO.: HDS | SCALE: NTS | DATE: 2015 | FIGURE NO.: 27B



PLAN VIEW
N.T.S.



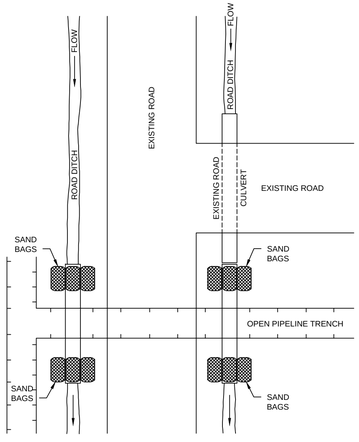
NOTES:

1. INSTALL THE TEMPORARY CULVERT ACROSS THE PIPELINE TRENCH AT ROAD CULVERT LOCATIONS WHERE THE PIPELINE TRENCH IS LOCATED BELOW THE ROAD SURFACE. AN 8" MINIMUM DIAMETER CULVERT IS TO BE INSTALLED, HOWEVER, THE TEMPORARY PIPE SHALL BE SIZED TO ADEQUATELY CONVEY THE MAXIMUM ANTICIPATED FLOW AT THE TIME OF CROSSING.
2. REMOVE CULVERT WHILE BACK FILLING AND RESTORE AND STABILIZE ROAD DITCH RUN OFF TO ORIGINAL CONDITION.

SECTION VIEW
N.T.S.

Tennessee Gas Pipeline Company, L.L.C. a Kinder Morgan company

DESCRIPTION: ROAD CULVERT EXTENSION ACROSS PIPELINE TRENCH
DRAWING NO.: RCE | SCALE: NTS | DATE: 2015 | FIGURE NO.: 28

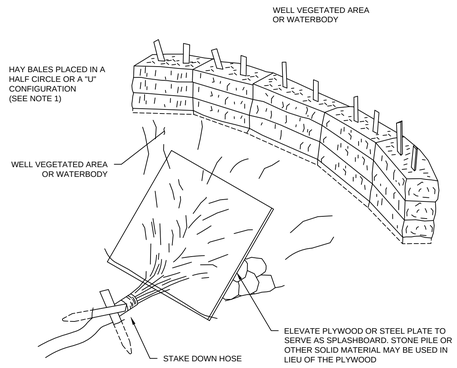


NOTES:

1. INSTALL TEMPORARY CULVERT IN ROAD DITCH, ACROSS OPEN PIPELINE TRENCH. AN 8" MINIMUM DIAMETER CULVERT IS TO BE INSTALLED. HOWEVER, THE TEMPORARY PIPE SHALL BE SIZED TO ADEQUATELY CONVEY THE MAXIMUM ANTICPATED FLOW AT THE TIME OF CROSSING.
2. REMOVE CULVERT WHEN BACK FILLING AND RESTORE AND STABILIZE ROAD DITCH TO ORIGINAL CONDITION.

Tennessee Gas Pipeline Company, L.L.C. a Kinder Morgan company

DESCRIPTION: TEMPORARY CULVERT ACROSS OPEN TRENCH
DRAWING NO.: TCOP | SCALE: NTS | DATE: 2015 | FIGURE NO.: 29



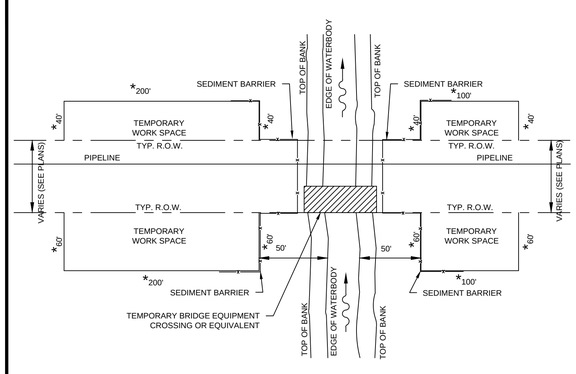
USED FOR TRENCH DE-WATERING AND DAM AND PUMP WATERBODY CROSSINGS

NOTE:

1. THIS DISSIPATER MAY BE USED WITHIN A WATERBODY DURING A DAM AND PUMP DEWATERING OPERATION. THE HAYBALES WILL NOT BE INSTALLED IF UTILIZED IN A WATERBODY.
2. THIS SHALL NOT BE USED WHEN TRENCH DEWATERING IS REQUIRED AND THERE IS SILT LADEN WATER THAT WILL DISCHARGE DIRECTLY INTO A WETLAND OR WATERBODY.

Tennessee Gas Pipeline Company, L.L.C. a Kinder Morgan company

DESCRIPTION: ENERGY DISSIPATER
DRAWING NO.: ED | SCALE: NTS | DATE: 2015 | FIGURE NO.: 30



* FOOTAGES SHOWN ARE FOR EXAMPLE PURPOSES ONLY. ACTUAL EXTRA WORK SPACE AREAS WILL VARY DEPENDING ON INDIVIDUAL PROJECTS.

NOTES:
1) ALL EXTRA WORK SPACES SHALL BE LOCATED AT LEAST 50 FEET FROM THE WATERS EDGE, EXCEPT WHERE THE ADJACENT UPLAND CONSISTS OF ACTIVELY CULTIVATED OR ROTATED CROPLAND OR OTHER DISTURBED LAND.
2) THE CONSTRUCTION ROW SHALL BE LIMITED TO 75 FT WIDE WITHIN 50 FT FROM THE WATERS EDGE UNLESS APPROVED OTHERWISE ON THE CERTIFICATE.

Tennessee Gas Pipeline Company, L.L.C. a Kinder Morgan company

DESCRIPTION: TYPICAL ADDITIONAL WORKSPACE AT WATERBODY CROSSINGS
DRAWING NO.: WC | SCALE: NTS | DATE: 2015 | FIGURE NO.: 31

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

Tennessee Gas Pipeline Company, L.L.C. a Kinder Morgan company

NORTHEAST ENERGY DIRECT PROJECT
EROSION & SEDIMENT CONTROL TYPICALS
CONNECTICUT

Section:	Township:	Range:
Co./Par.:	State: CONNECTICUT	
Division:	Op. Area:	
Drafter: GV	Date:	Project ID:
Chk'd:	Date:	Scale:
Approved:	Date:	Filename: CT_ES_DETAILS_005
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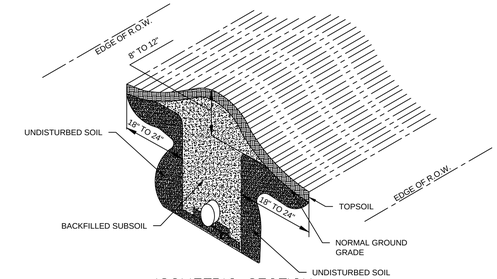
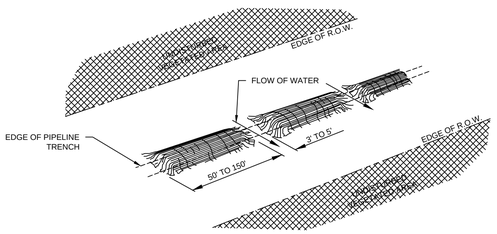
		Type:



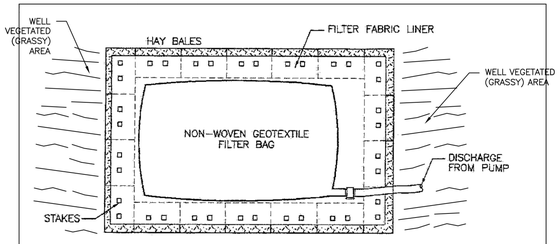
ISOMETRIC SECTION

N.T.S.

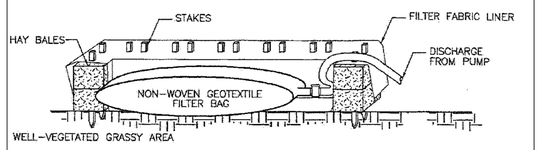


ISOMETRIC VIEW

N.T.S.



PLAN VIEW



ELEVATION VIEW

NOTES:

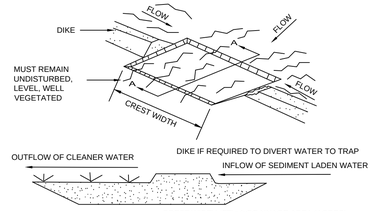
1. RECTANGULAR DEWATERING DISCHARGE AREA CONSTRUCTED OUT OF HAY BALES STACKED ONE OR TWO ROWS HIGH AND SECURED WITH WOODEN STAKES.
2. FILTER FABRIC LINER INSTALLED COVERING ENTIRE INTERIOR OF STRUCTURE AND SECURED ON TOP OF THE HAY BALES WITH WOODEN STAKES.
3. THE DEWATERING DEVICE SHALL BE LOCATED IN A WELL-VEGETATED (GRASSY) AREA AND DISCHARGE ONTO STABLE, EROSION RESISTANT AREAS. WHERE THIS IS NOT POSSIBLE, A GEOTEXTILE FLOW PATH SHALL BE PROVIDED. A DISCHARGE DEVICE SHALL NOT BE PLACED ON SLOPES GREATER THAN 5%.
4. FOR LESS TURBID WATER DISCHARGE, THE GEOTEXTILE FILTER BAG IS OPTIONAL AND THE STRUCTURE MAY UTILIZE JUST FILTER FABRIC LINER WITH NO FILTER BAG.

NOTES:

1. THE CONTRACTOR IS RESPONSIBLE FOR DUST CONTROL ALONG THE SITE. THE CONTRACTOR SHALL COORDINATE WITH THE ENVIRONMENTAL INSPECTOR TO DETERMINE WHICH PRACTICES ACCOMMODATE THEIR NEEDS BASED ON SPECIFIC SITE AND WEATHER CONDITIONS. SOME OF THE TYPICAL PRACTICES INCLUDE THE FOLLOWING:
   - SPRINKLING/IRRIGATION. SPRINKLING THE GROUND SURFACE WITH WATER UNTIL IT IS MOIST IS AN EFFECTIVE DUST CONTROL METHOD FOR HAUL ROADS AND OTHER TRAFFIC ROUTES (SMOLEN ET AL., 1988). THIS PRACTICE CAN BE APPLIED TO ALMOST ANY SITE.
   - VEGETATIVE COVER. IN AREAS NOT EXPECTED TO HANDLE VEHICLE TRAFFIC, VEGETATIVE STABILIZATION OF DISTURBED SOIL IS OFTEN DESIRABLE. VEGETATIVE COVER PROVIDES COVERAGE TO SURFACE SOILS AND SLOWS WIND VELOCITY AT THE GROUND SURFACE, THUS REDUCING THE POTENTIAL FOR DUST TO BECOME AIRBORNE.
   - MULCH. MULCHING CAN BE A QUICK AND EFFECTIVE MEANS OF DUST CONTROL FOR A RECENTLY DISTURBED AREA (SMOLEN ET AL., 1988).
   - WIND BREAKS. WIND BREAKS ARE BARRIERS (EITHER NATURAL OR CONSTRUCTED) THAT REDUCE WIND VELOCITY THROUGH A SITE AND THEREFORE REDUCE THE POSSIBILITY OF SUSPENDED PARTICLES. WIND BREAKS CAN BE TREES OR SHRUBS LEFT IN PLACE DURING SITE CLEARING OR CONSTRUCTED BARRIERS SUCH AS A WIND FENCE, SNOW FENCE, TARP CURTAIN, HAY BALE, CRATE WALL, OR SEDIMENT WALL (USEPA, 1992).
   - TILLAGE. DEEP TILLAGE IN LARGE OPEN AREAS BRINGS SOIL CLODS TO THE SURFACE WHERE THEY REST ON TOP OF DUST, PREVENTING IT FROM BECOMING AIRBORNE.
   - STONE. STONE MAY BE AN EFFECTIVE DUST DETERRENT FOR CONSTRUCTION ROADS AND ENTRANCES OR AS A MULCH IN AREAS WHERE VEGETATION CANNOT BE ESTABLISHED.
   - SPRAY-ON CHEMICAL SOIL TREATMENTS. THE PENNSYLVANIA DIRT AND GRAVEL ROAD PROGRAM HAS PLACED STRICT LIMITATIONS ON THE USE OF PRODUCTS THAT MAY CAUSE DAMAGE TO THE ENVIRONMENT. WITH THIS IN MIND, IT HAS APPROVED A NUMBER OF CHEMICAL DUST SUPPRESSANTS. WHEN CONSIDERING CHEMICAL APPLICATION TO SUPPRESS DUST, CONSIDERATION SHOULD BE TAKEN AS TO WHETHER THE CHEMICAL IS BIODEGRADABLE OR WATER-SOLUBLE AND WHAT EFFECT ITS APPLICATION COULD HAVE ON THE SURROUNDING ENVIRONMENT, INCLUDING WATERBODIES AND WILDLIFE.
2. TABLE H.1 SHOWS APPLICATION RATES FOR SOME COMMON DUST SUPPRESSANTS, AS RECOMMENDED BY THE PENNSYLVANIA DIRT AND GRAVEL ROAD PROGRAM.

TABLE H.1. APPLICATION RATES FOR DUST SUPPRESSANTS

PRODUCT	WATER DILUTION	TYPE
PENN SUPPRESS "D"	1:4 EMULSION TO WATER (MINIMUM)	PETROLEUM EMULSION
ULTRABOND 2000	1:4 EMULSION TO WATER (MINIMUM)	PETROLEUM EMULSION
COHEREX	1:10 EMULSION TO WATER (MINIMUM)	PETROLEUM EMULSION
DUST BOND	1:10 EMULSION TO WATER (MINIMUM)	PETROLEUM EMULSION
EK 35	100% ACTIVE, NOT WATER REQUIRED FOR APPLICATION	SYNTHETIC FLUID
ENVIROKLEEN	100% ACTIVE, NOT WATER REQUIRED FOR APPLICATION	SYNTHETIC FLUID
PAVE-CYRL SUPPRESS	AS RECEIVED (51% SOLIDS)	ACRYLIC POLYMER (PVA)
PAVE-CYRL SUPPRESS PLUS	AS RECEIVED (51% SOLIDS)	ACRYLIC POLYMER (PVA)
DIRT GLUE	AS RECEIVED (51% SOLIDS)	ACRYLIC POLYMER (PVA)



SECTION A - A

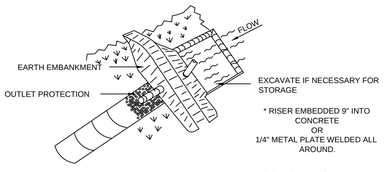
EXCAVATED GRASS OUTLET SEDIMENT TRAP

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

NOTE: THE ELEVATIONS AND DIMENSIONS WILL BE COMPLETED AS REQUIRED FOR THE FINAL SUBMISSION.



EMBANKMENT SECTION THRU RISER

SIZES OF PIPE NEEDED:

BARREL DIAMETER: _____
RISER DIAMETER: _____

NOTE:
CONSTRUCTION SPECIFICATION SHOULD BE ATTACHED TO THIS DETAIL TO COMPLETE DESIGN.

MAXIMUM DRAINAGE AREA: 5 ACRES

NOTE: THE ELEVATIONS AND DIMENSIONS WILL BE COMPLETED AS REQUIRED FOR THE FINAL SUBMISSION.

VEGETATED FILTER STRIPS

FILTER STRIPS ARE VEGETATED AREAS ALONG WATER BODIES, DESIGNED TO SLOW THE MOVEMENT OF OVERLAND FLOW OF WATER SO THAT SEDIMENT WILL BE LEFT BEHIND, PROVIDE AN OPPORTUNITY FOR VEGETATION TO REMOVE NUTRIENTS FROM SUBSURFACE FLOW, PROVIDE SHADE TO THE ADJACENT WATER BODY TO MAINTAIN COOL WATER TEMPERATURE, AND PROTECT BANK STABILITY AND PREVENT EROSION.

REQUIRED BMPS

FILTER STRIPS ARE REQUIRED ALONG ALL PONDS, LAKES, REGULATED STREAMS, AND CERTIFIED VERNAL POOLS.

FILTER STRIPS WILL EXTEND 50 FEET BACK FROM THE BANK, MEASURED ALONG THE SLOPE. EXCEPTIONS TO THIS FILTER STRIP WIDTH ARE:

1. SLOPES GREATER THAN 30%: FILTER STRIPS SHALL BE 100 FEET IN WIDTH, OR TO THE POINT BETWEEN 50 AND 100 FEET FROM THE BANK, WHERE A BREAK IN THE TOPOGRAPHY REDUCES THE SLOPE TO LESS THAN 30%.

2. STREAMS GREATER IN WIDTH THAN 25 FEET BANK TO BANK, PONDS 10 ACRES OR LARGER IN AREA, AND ALONG OUTSTANDING RESOURCE WATERS AND THEIR TRIBUTARIES: IN THESE CIRCUMSTANCES, VARIABLE-WIDTH FILTER STRIPS MUST BE USED IN ACCORDANCE WITH TABLE 4.

SLOPE (%)	FILTER STRIP WIDTH (FT)
0	50
10	90
20	130
30	170
40	210
50	250
60	290
70	330
80	370
90	410
100	450

NO LOGGING EQUIPMENT MAY OPERATE IN A FILTER STRIP UNLESS IT IS INCLUDED IN AN APPROVED FOREST CUTTING PLAN, AND IT:

- WILL REDUCE ENVIRONMENTAL DAMAGE;
- IS AT AN APPROVED STREAM CROSSING;
- IS ON A PRE-EXISTING LOGGING ROAD, OR;
- IS IN FILTER STRIPS GREATER THAN 50 FEET IN WIDTH, EQUIPMENT CAN OPERATE BEYOND 50 FEET OF THE WATERBODY. HOWEVER, NO PRINCIPAL SKID TRAILS MAY BE LOCATED IN THIS AREA, THE DISTURBANCE OF THE FORREST FLOOR MUS T BE MINIMIZED, AND ANY DISTRIBUTED SOIL MUST BE PROMPTLY STABILIZED.

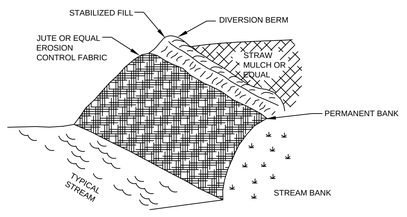
NO MORE THAN 50% OF THE BASAL AREA MAY BE CUT AT ANY ONE TIME, AND A WAITING PERIOD OF FIVE YEARS MUST ELAPSE BEFORE ANOTHER CUT IS MADE. THE RESIDUAL STAND WILL BE COMPOSED OF HEALTHY GROWING TREES WELL DISTRIBUTED OVER THE AREA. EXCEPTIONS TO THIS STANDARD MAY BE MADE BY THE SERVICE FORESTER IF IT IS SHOWN IN THE FOREST CUTTING PLAN THAT A HEAVIER CUT IS NECESSARY TO PROTECT THE STREAM, BANK, OR WATER QUALITY.

CUT TREES WILL BE PULLED OUT OF THE FILTER STRIP AND SLASH WILL BE DISPOSED OF ACCORDING TO THE SLASH LAW OF MASSACHUSETTS.

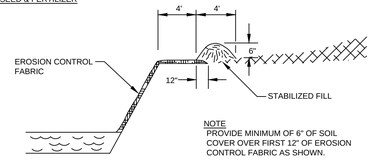
THE FOLLOWING GUIDELINES MAY BE USED TO PROVIDE ADDITIONAL PROTECTION TO SENSITIVE STREAMS (E.G., TRIBUTARIES TO WATER SUPPLY RESERVOIRS, COLDWATER FISH RESOURCES, AND WILDLIFE HABITAT IN RIPARIAN CORRIDORS):

- LEAVE A 15 FOOT NO CUT BUFFER.
- AVOID SOIL COMPACTION AND RUTTING WITHIN 200 FEET OF A STREAM.
- MAINTAIN AREAS WITHIN 200 FEET OF A STREAM IN A FORRESTED CONDITION.
- PRESERVE IMPORTANT HABITAT CHARACTERISTICS WITHIN 200 FEET OF A STREAM, SUCH AS TREES WITH CAVITIES, DOWNED LOGS, STONE WALLS, AND ROCK JUMBLES.
- USE VARIABLE-WIDTH FILTER STRIP GUIDELINES ABOVE.
- MINIMIZE THE CUTTING OF TREES DIRECTLY ON THE STREAM BANK.

STAKE TO THE SLOPE WITH WOOD PEGS OR STAPLE PER MANUFACTURERS SPECIFICATION



STRAW MULCH OR EQUAL OVER SEED & FERTILIZER



NOTE
PROVIDE MINIMUM OF 6" OF SOIL COVER OVER FIRST 12" OF EROSION CONTROL FABRIC AS SHOWN.

NOTES:

1. **EROSION CONTROL MATTING WILL BE INSTALLED WITHIN 50' OF BANK FOR ALL HQ/EV WATERSHEDS.**
2. **INSPECT AT LEAST ONCE PER WEEK & WITHIN 24 HOURS OF THE END OF A STORM WITH 0.5 INCHES OR GREATER.**

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

NORTHEAST ENERGY DIRECT PROJECT
EROSION & SEDIMENT CONTROL TYPICALS
CONNECTICUT

Section:	Township:	Range:
Co./Par.:	State: CONNECTICUT	
Division:	Op. Area:	
Drafter: GV	Date:	Project ID:
Chk'd:	Date:	Scale:
Approved:	Date:	Filename: CT_ES_DETAILS_006
		Sheet:
		Type:

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company
DESCRIPTION: RIGHT-OF-WAY CROWNING
DRAWING NO. ROWC | SCALE: NTS | DATE: 2015 | FIGURE NO. 32

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company
DESCRIPTION: TRENCH DEWATERING SEDIMENT CORRAL
DRAWING NO. TDS | SCALE: NTS | DATE: 2015 | FIGURE NO. 33

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company
DESCRIPTION: DUST CONTROL
DRAWING NO. DC | SCALE: NTS | DATE: 2015 | FIGURE NO. 34

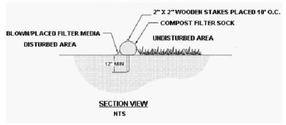
Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company
DESCRIPTION: GRASS OUTLET SEDIMENT TRAP
DRAWING NO. GOST | SCALE: NTS | DATE: 2015 | FIGURE NO. 35

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company
DESCRIPTION: SEDIMENT TRAP PIPE OUTLET
DRAWING NO. STPO | SCALE: NTS | DATE: 2015 | FIGURE NO. 36

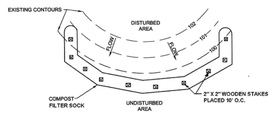
Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company
DESCRIPTION: VEGETATED FILTER STRIP
DRAWING NO. VF | SCALE: NTS | DATE: 2015 | FIGURE NO. 37

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company
DESCRIPTION: TYPICAL EROSION CONTROL FABRIC
DRAWING NO. ECF | SCALE: NTS | DATE: 2015 | FIGURE NO. 38

COMPOST FILTER SOCK



SECTION VIEW
NTS



PLAN VIEW
NTS

Adapted from Filtrexx

Sock fabric shall meet standards of Table 4.1. Compost shall meet the following standards:

Organic Matter Content	80% - 100% (dry weight basis)
Organic Portion	Fibrous and elongated
pH	5.5 – 8.0
Moisture Content	35% – 55%
Particle Size	98% pass through 1" screen
Soluble Salt Concentration	5.0 dS Maximum

NOTES:

COMPOST FILTER SOCK SHALL BE PLACED AT EXISTING LEVEL GRADE. BOTH ENDS OF THE SOCK SHALL BE EXTENDED AT LEAST 8 FEET UP SLOPE AT 45 DEGREES TO THE MAIN SOCK ALIGNMENT. MAXIMUM SLOPE LENGTH ABOVE ANY SOCK SHALL NOT EXCEED 500 FEET.

TRAFFIC SHALL NOT BE PERMITTED TO CROSS FILTER SOCKS.

ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT REACHES 1/2 THE ABOVE GROUND HEIGHT OF THE SOCK AND DISPOSED IN THE MANNER DESCRIBED ELSEWHERE IN THE PLAN.

SOCKS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUN OFF EVENT. DAMAGED SOCKS SHALL BE REPAIRED ACCORDING TO MANUFACTURE'S SPECIFICATIONS OR REPLACED WITHIN 24 HOURS OF INSPECTION.

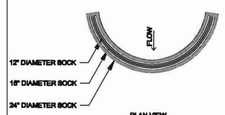
BIODEGRADABLE FILTER SOCK SHALL BE REPLACED AFTER 6 MONTHS; PHOTODEGRADABLE SOCKS AFTER 1 YEAR. POLYPROPYLENE SOCKS SHALL BE REPLACED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.

UPON STABILIZATION OF THE AREA TRIBUTARY TO THE SOCK, STAKES SHALL BE REMOVED. THE SOCK MAY BE LEFT IN PLACE AND VEGETATED OR REMOVED. IN THE LATTER CASE, THE MESH SHALL BE CUT OPEN AND MULCH SPREAD AS SOIL SUPPLEMENT.

Tennessee Gas Pipeline Company, L.L.C. a Kinder Morgan company

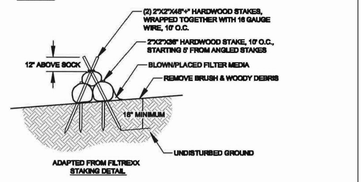
DESCRIPTION: COMPOST FILTER SOCK
DRAWING NO.: CFS | SCALE: NTS | DATE: 2015 | FIGURE NO.: 39

COMPOST SOCK SEDIMENT TRAP



PLAN VIEW

1. COMPOST SOCK SEDIMENT TRAP SHALL BE SIZED TO PROVIDE 2,000 CUBIC FEET OF STORAGE CAPACITY FOR EACH ACRE TRIBUTARY TO THE TRAP.
2. MINIMUM BASE WIDTH IS EQUIVALENT TO THE HEIGHT.
3. SEDIMENT ACCUMULATION SHALL NOT EXCEED 1/8 THE TOTAL HEIGHT OF THE TRAP.
4. SOCKS SHALL BE OF LARGER DIAMETER AT THE BASE OF THE TRAP AND DECREASE IN DIAMETER FOR SUCCESSIVE LAYERS AS INDICATED TO THE LEFT.
5. ENDS OF THE TRAP SHALL BE A MINIMUM OF 1 FOOT HIGHER IN ELEVATION THAN THE MID-SECTION, WHICH SHALL BE LOCATED AT THE POINT OF DISCHARGE.



ADAPTED FROM FILTREXX
STAKING DETAIL

SOCK MATERIAL SHALL MEET THE STANDARDS OF TABLE 4.1 COMPOST SHALL MEET THE FOLLOWING STANDARDS:

ORGANIC MATTER CONTENT	80%-100% (DRY WEIGHT BASIS)
ORGANIC PORTION	FIBROUS AND ELONGATED
pH	5.5-8.0
MOISTURE CONTENT	30%-55%
PARTICLE SIZE	98% PASS THROUGH 1" SCREEN
SOLUBLE SALT CONCENTRATION	5.0 dS MAXIMUM

COMPOST SOCK TRAPS SHALL NOT EXCEED THREE SOCKS IN HEIGHT AND SHALL BE STACKED IN PYRAMIDAL FORM AS SHOWN ABOVE. MINIMUM TRAP HEIGHT IS ONE SOCK THICK FOR ONE SOCK. ADDITIONAL STORAGE MAY BE PROVIDED BY MEANS OF AN EXCAVATED SUMP 18" DEEP EXTENDING 1 TO 3 FEET UPSLOPE OF THE SOCKS.

COMPOST SOCK TRAPS SHALL PROVIDE 2,000 CUBIC FEET STORAGE CAPACITY WITH 12" FREEBOARD FOR EACH TRIBUTARY DRAINAGE AREA.

THE MAXIMUM TRIBUTARY DRAINAGE AREA IS 0.5 ACRES. SINCE COMPOST SOCKS ARE "FLOW-THROUGH", NO SPILLWAY IS REQUIRED.

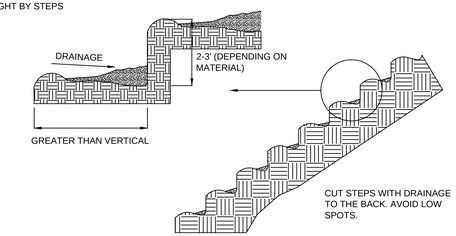
COMPOST SOCK TRAPS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT. SEDIMENT SHALL BE REMOVED WHEN IT REACHES 1/2 THE HEIGHT OF THE SOCK.

PHOTODEGRADABLE AND BIODEGRADABLE SOCKS SHALL NOT BE USED FOR MORE THAN 1 YEAR.

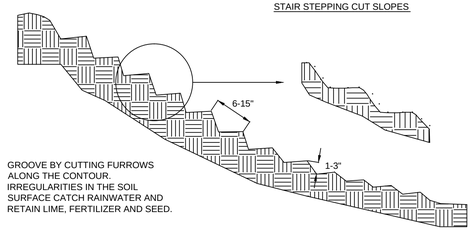
Tennessee Gas Pipeline Company, L.L.C. a Kinder Morgan company

DESCRIPTION: COMPOST SOCK SEDIMENT TRAP
DRAWING NO.: CSST | SCALE: NTS | DATE: 2015 | FIGURE NO.: 40

DEBRIS FROM SLOPE ABOVE IS CAUGHT BY STEPS



STAIR STEPPING CUT SLOPES



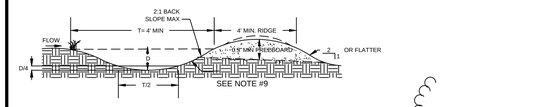
GROOVING SLOPES

NOTES:

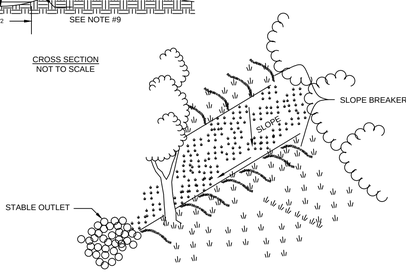
1. ON DISTURBED SLOPES WHOSE GRADIENTS ARE BETWEEN 2:1 AND 4:1, INCLUSIVE.
2. NOT FOR SLOPE THAT ARE TO BE FINISHED WITH A STABLE ROCK FACE, STONE SLOPE PROTECTION, OR SOD
3. IMMEDIATELY FOLLOWING SURFACE ROUGHENING, PROTECT THE SOIL FROM EROSION BY SEEDING AND/OR MULCHING

Tennessee Gas Pipeline Company, L.L.C. a Kinder Morgan company

DESCRIPTION: SURFACE ROUGHENING
DRAWING NO.: SR | SCALE: NTS | DATE: 2015 | FIGURE NO.: 41



CROSS SECTION
NOT TO SCALE



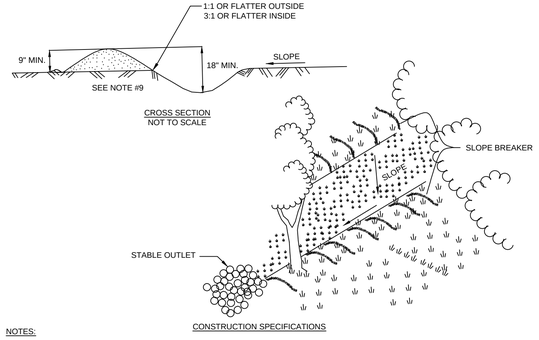
CONSTRUCTION SPECIFICATIONS

NOTES:

1. INSTALL THE SLOPE BREAKER AS SOON AS THE RIGHT OF WAY IS CLEARED AND GRADED.
2. DIVERTED RUNOFF SHOULD OUTLET ONTO A STABILIZED OUTLET AREA, INTO A PROPERLY DESIGNED WATERWAY, GRADE STABILIZATION STRUCTURE OR SEDIMENT TRAPPING FACILITY.
3. TRACK THE RIDGE TO COMPACT IT TO THE DESIGN CROSS SECTION.
4. VEHICLE CROSSING SHALL BE STABILIZED WITH GRAVEL. EXPOSED AREAS SHALL BE IMMEDIATELY SEEDED AND MULCHED.
5. PERIODICALLY INSPECT DIVERSIONS FOR EROSION DAMAGE AND SEDIMENT. CHECK OUTLET AREAS AND MAKE REPAIRS AS NEEDED TO RESTORE OPERATION.
6. THE GRADE MAY BE VARIABLE DEPENDING UPON THE TOPOGRAPHY AND MUST HAVE A POSITIVE GRADE TO THE OUTLET.
7. CHANNEL MAY BE PARABOLIC OR TRAPEZOIDAL.
8. MINIMUM DESIGN CAPACITY SHALL CONVEY A 10 YR. - 24 HOUR PEAK FLOW WITHOUT EROSION.
9. INSTALL EROSION CONTROL BLANKETS OR TURF REINFORCEMENT MATS AS NEEDED FOR EROSION RESISTANCE
10. THE DESIGN SHALL INCLUDE A 10% SETTLEMENT FACTOR.

Tennessee Gas Pipeline Company, L.L.C. a Kinder Morgan company

DESCRIPTION: PERMANENT DIVERSION
DRAWING NO.: PD | SCALE: NTS | DATE: 2015 | FIGURE NO.: 42



CROSS SECTION
NOT TO SCALE

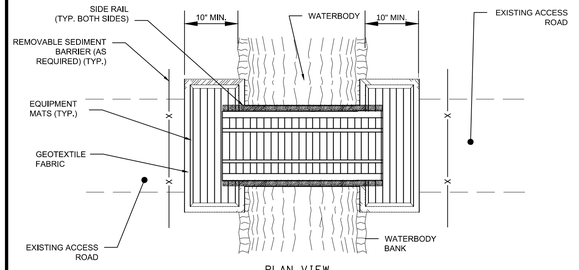
CONSTRUCTION SPECIFICATIONS

NOTES:

1. INSTALL THE SLOPE BREAKER AS SOON AS THE RIGHT OF WAY IS CLEARED AND GRADED.
2. DIVERTED RUNOFF SHOULD OUTLET ONTO A STABILIZED OUTLET AREA, INTO A PROPERLY DESIGNED WATERWAY, GRADE STABILIZATION STRUCTURE OR SEDIMENT TRAPPING FACILITY.
3. TRACK THE RIDGE TO COMPACT IT TO THE DESIGN CROSS SECTION.
4. VEHICLE CROSSING SHALL BE STABILIZED WITH GRAVEL. EXPOSED AREAS SHALL BE IMMEDIATELY SEEDED AND MULCHED.
5. PERIODICALLY INSPECT DIVERSIONS FOR EROSION DAMAGE AND SEDIMENT. CHECK OUTLET AREAS AND MAKE REPAIRS AS NEEDED TO RESTORE OPERATION.
6. THE GRADE MAY BE VARIABLE DEPENDING UPON THE TOPOGRAPHY AND MUST HAVE A POSITIVE GRADE TO THE OUTLET. THE MAXIMUM CHANNEL GRADE SHOULD BE LIMITED TO 2%. IF GREATER THAN 2%, CHANNEL SHALL BE STABILIZED TO PREVENT EROSION TO SPECIFICATIONS OF PERMANENT DIVERSION.
7. SIDE SLOPE: 3:1 OR FLATTER INSIDE 1:1 OR FLATTER OUTSIDE. THE TOP WIDTH OF THE BERM SHALL BE 1 FOOT.
8. NO ENGINEERED DESIGN IS REQUIRED IF CONTRIBUTING DRAINAGE AREA IS 1 ACRE OR LESS. IF DRAINAGE AREA IS BETWEEN 1 & 5 ACRES, DESIGN TEMPORARY DIVERSION TO PERMANENT DIVERSION MEASURE STANDARDS USING 2-YR FREQUENCY DESIGN STORM.
9. CROSS SECTION SHOULD BE TRAPEZOIDAL OR PARABOLIC.

Tennessee Gas Pipeline Company, L.L.C. a Kinder Morgan company

DESCRIPTION: TEMPORARY DIVERSION
DRAWING NO.: TD | SCALE: NTS | DATE: 2015 | FIGURE NO.: 43



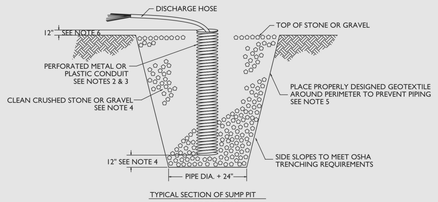
NOTES:

1. TIMBER BRIDGES SHALL BE ADEQUATELY ANCHORED AT BOTH ENDS.
2. TEMPORARY STREAM CROSSINGS SHALL BE INSPECTED ON A DAILY BASIS AND BUILD UP OF SEDIMENT OR DEBRIS SHALL BE REMOVED.
3. BRIDGE APPROACHES SHALL BE SUPPORTED WITH EQUIPMENT MATS OR APPROVED EQUAL.
4. SIDE RAILS SHALL BE INSTALLED ON BOTH SIDES OF THE BRIDGE EQUIPMENT CROSSING IN ORDER TO PREVENT SEDIMENT FROM ENTERING THE WATERBODY. SIDE RAILS ARE TO BE CONSTRUCTED OF PLYWOOD NAILED TO THE OUTER EDGES OF THE EQUIPMENT MATS.
5. EQUIPMENT MATS SHALL EXTEND A MINIMUM OF 10 FEET OUTSIDE OF THE WATERBODY OR WETLAND BOUNDARIES.
6. UNLESS OTHERWISE INDICATED ON PLAN, CROSSING SHALL BE REMOVED IMMEDIATELY AFTER CONSTRUCTION IS COMPLETED.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL LOAD CALCULATIONS REQUIRED TO ENSURE THE INSTALLED MATS/EQUIPMENT BRIDGE CAN STRUCTURALLY SUPPORT THE CONSTRUCTION EQUIPMENT TO BE UTILIZED.

Tennessee Gas Pipeline Company, L.L.C. a Kinder Morgan company

DESCRIPTION: BRIDGE EQUIPMENT CROSSING
DRAWING NO.: EC | SCALE: NTS | DATE: 2015 | FIGURE NO.: 44

Figure PuP-1 Pump Intake Protection Using Stone Filled Sump with Standpipe



TYPICAL SECTION OF SUMP PIT
NOT TO SCALE

1. OVERALL SUMP PIT DIMENSIONS SHALL BE COMPATIBLE WITH ANTICIPATED SEEPAGE RATES AND PUMP SIZE TO BE USED.
2. THE STANDPIPE DIAMETER AND NUMBER OF PERFORATIONS SHALL BE COMPATIBLE WITH THE PUMP SIZE BEING USED.
3. PERFORATIONS IN THE STANDPIPE SHALL BE EITHER CIRCULAR OR SLOTS. PERFORATION SIZE SHALL NOT EXCEED 1/2" IN DIAMETER.
4. CRUSHED STONE OR GRAVEL SHALL BE NO SMALLER THAN CT DOT #67 SIZE NOR LARGER THAN CT DOT #3 SIZE. CRUSHED STONE SHALL EXTEND A MINIMUM OF 12" BELOW THE BOTTOM OF THE STANDPIPE.
5. IF EXCESSIVE MOVEMENT OF FINE SOIL PARTICLES FROM THE SURROUNDING EXISTING SOILS IS ANTICIPATED, A PROPERLY DESIGNED GEOTEXTILE SHALL BE PLACED BETWEEN THE EXISTING SOILS AND THE CRUSHED STONE OR GRAVEL BACKFILL.
6. THE STANDPIPE SHALL EXTEND A MINIMUM OF 12" ABOVE THE SURROUNDING GROUND.

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DESCRIPTION: PUMP INTAKE AND OUTLET PROTECTION
DRAWING NO.: PuP | SCALE: NTS | DATE: 2015 | FIGURE NO.: 45

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

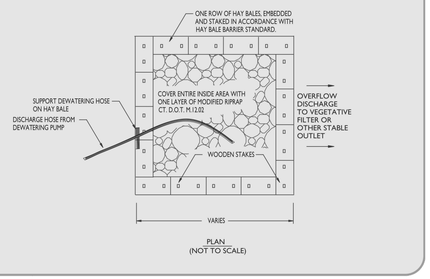
REVISIONS

Tennessee Gas Pipeline Company, L.L.C. a Kinder Morgan company

NORTHEAST ENERGY DIRECT PROJECT
EROSION & SEDIMENT CONTROL TYPICALS
CONNECTICUT

Section:	Township:	Range:
Co./Par.:	State: CONNECTICUT	
Division:	Op. Area:	
Drafter: GV	Date:	Project ID:
Chk'd:	Date:	Scale:
Approved:	Date:	Filename: CT_ES_DETAILS_007
		Sheet:
		Type:

Figure PSB-1 Example of Type I Pumping Settling Basin



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DESCRIPTION: PUMPING SETTLING BASIN
DRAWING NO.: PSB | SCALE: NTS | DATE: 2015 | FIGURE NO.: 46

Figure TST-1 Formula for Figuring Temporary Sediment Trap Storage Requirements

Wet storage volume may be approximated as follows:

$$Vtw = 0.85 \times A_W \times D_W$$

where,

V_W = the wet storage volume in cubic feet
A_W = the surface area of the flooded area at the base of the stone outlet in square feet
D_W = the maximum depth in feet, measured from the low point in the trap to the base of the stone outlet.

Dry storage volume may be approximated as follows:

$$V_d = \frac{(A_W + A_d)}{2} \times D_d$$

where,

V_d = the dry storage volume
A_W = the surface area of the flooded area at the base of the stone outlet in square feet.
A_d = the surface area of the flooded area at the top of the stone outlet (over flow mechanism), in square feet
D_d = the depth in feet, measured from the base of the stone outlet to the top of the stone outlet

Note: Conversion between cubic feet and cubic yards is: cubic feet x 0.037 = cubic yards.

Slope Limitations
All cut and fill slopes shall be 2:1 or flatter except for the excavated wet storage area where slopes shall not exceed 1.5:1. The maximum depth of excavation within the wet storage area should not exceed 3 feet to facilitate clean-out and for site safety considerations.

Inlet / Outlet Configuration
The outlet shall be located at the most distant hydraulic point from the inlet. In cases where a long narrow site runs perpendicular to the direction of flow, baffles consisting of stone dikes or other structurally sufficient barriers should be added along the long axis of the trap to increase travel distance through the trap (see **Figure TST-3**).

Outlet
Plan the outlet in such a manner that the minimum wet storage and dry storage volumes are created (see Trap Capacity section above) and 1 foot of free board between the top of the outlet and the crest of the embankment is established. The outlet consists of a pervious stone dike with a core of modified riprap and faced on the upstream side with DOT #3 stone. Temporary sediment traps must outlet onto stabilized (preferably undisturbed) ground, into a watercourse, stabilized channel, or into a storm drain system. **Figure TST-4** shows an example of an outlet for a temporary sediment trap.

Embankment
The maximum height of a temporary sediment trap embankment is limited to 5 feet as measured vertically from the crest of the embankment to the down slope base of the embankment or toe of the stone dike, whichever is lower. Minimum top widths (W) and outlet heights (Ho) for various embankment heights (H) are shown in **Figure TST-2**. Side slopes of the embankment shall be 2:1 or flatter.

Materials
Modified Riprap: shall meet the requirements of DOT Standard Specifications Section M.12.02.

DOT #3 Stone: shall meet the requirements of DOT Standard Specifications Section M.01.01 for #3 Aggregate.

Construction
Clear, grub and strip any vegetation and root mat from any proposed embankment and outlet area. Remove stones and rocks whose diameter is greater than 3 inches and other debris.

Excavate wet storage and construct the embankment and/or outlet as needed to attain the necessary storage requirements. Use only fill material for the embankment that is free from excessive organics, debris, large rocks (over 6 inches) or other unsuitable materials. Compact the embankment in 9-inch layers by traversing with equipment while it is being constructed.

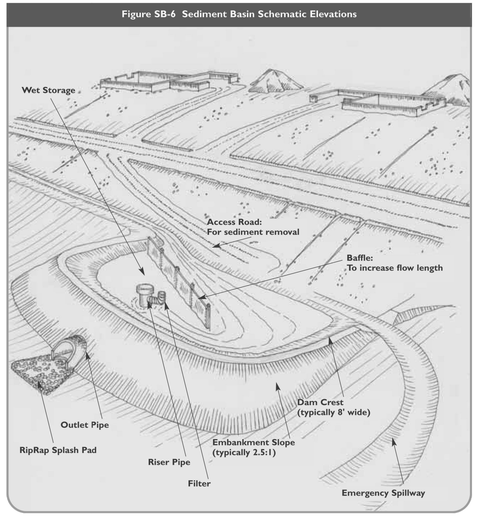
Stabilize the earthen embankment using any of the following measures: **Temporary Seeding**, **Permanent Seeding**, or **Stone Slope Protection** immediately after installation.

Carry out construction operations in such a manner that erosion and water pollution are minimized.

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

DESCRIPTION: TEMPORARY SEDIMENT TRAP
DRAWING NO.: TST | SCALE: NTS | DATE: 2015 | FIGURE NO.: 47

Figure SB-6 Sediment Basin Schematic Elevations



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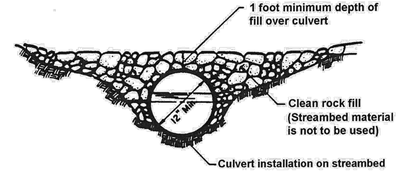
DESCRIPTION: TEMPORARY SEDIMENT BASIN
DRAWING NO.: TSB | SCALE: NTS | DATE: 2015 | FIGURE NO.: 48

Temporary Stream Crossing



SECTION

PA DEP

Provide 50' stabilized access to crossing on both sides of stream channel (see Standard Construction Detail #3-12).

Pipes shall extend beyond the toe of the roadway.

Runoff from the roadway shall be diverted off the roadway and into a sediment removal BMP before it reaches the rock approach to the crossing.

MAINTENANCE

1. **Temporary stream crossings shall be inspected on a daily basis.**
2. **Damaged crossings shall be repaired within 24 hours of the inspection and before any subsequent use.**
3. **Sediment deposits on the crossing or its approaches shall be removed within 24 hours of the inspection**

As soon as the temporary crossing is no longer needed, it shall be removed. All materials shall be disposed of properly and disturbed areas stabilized.

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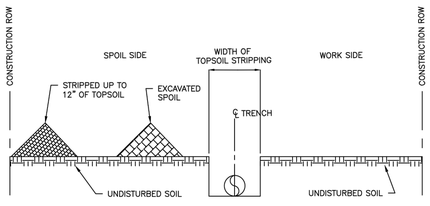
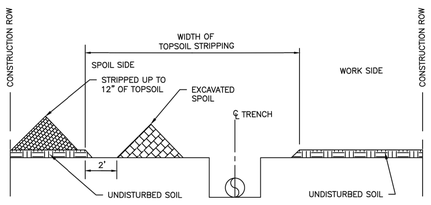
DESCRIPTION: TEMPORARY STREAM CROSSING
DRAWING NO.: TSC | SCALE: NTS | DATE: 2015 | FIGURE NO.: 49



DITCH LINE TOPSOIL STRIPPING
N.T.S.

ALSO USED IN NON-SATURATED WETLANDS



DITCH PLUS SPOIL SIDE SEGREGATION
N.T.S.

NOTES:
1. ALLOW FOR A 3' SEPERATION BETWEEN THE TOPSOIL PILE AND THE TRENCH SPOIL.
2. RETURN TRENCH SPOIL TO TRENCH AND COMPACT. FEATHER OUT EXCESS SPOIL OVER STRIPPED AREA LEAVING A LOW CROWN CENTERED OVER THE TRENCH. ALLEVIATE COMPACTION OF SUBSOILS OVER THE STRIPPED AREA.
3. RETURN TOPSOIL EVENLY OVER THE STRIPPED AREA AFTER TRENCH HAS SUFFICIENTLY SETTLED OR HAS BEEN COMPACTED.
4. ALLEVIATE COMPACTION OF TOPSOIL OVER ENTIRE RIGHT-OF-WAY.
5. SEGREGATED TOPSOIL MAY NOT BE USED FOR PADDING THE PIPE.
6. INSTALL SEDIMENT BARRIER AS REQUIRED.

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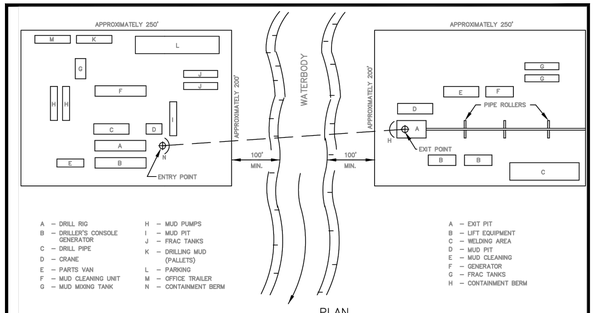
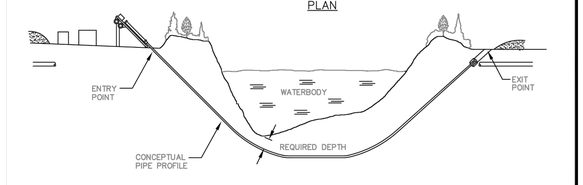
DESCRIPTION: TOPSOIL SEGREGATION
DRAWING NO.: TO | SCALE: NTS | DATE: 2015 | FIGURE NO.: 50



PLAN



PROFILE

NOTES:

1. SET UP DRILLING EQUIPMENT A MINIMUM OF 100 FEET FROM THE EDGE OF THE WATERCOURSE. DO NOT CLEAR OR GRADE WITHIN THE 100 FOOT ZONE.
2. ENSURE THAT ONLY BENTONITE BASED DRILLING MUD IS USED. DO NOT ALLOW THE USE OF ANY ADDITIVES TO THE DRILLING MUD WITHOUT THE APPROVAL OF COMPANY'S INSPECTOR.
3. INSTALL SUITABLE DRILLING MUD TANKS OR SUMPS TO PREVENT CONTAMINATION OF WATERCOURSE.
4. INSTALL BERMS DOWNSLOPE FROM THE DRILL ENTRY AND ANTICIPATED EXIT POINTS TO CONTAIN ANY RELEASE OF DRILLING MUD.
5. DISPOSE OF DRILLING MUD IN ACCORDANCE WITH THE APPROPRIATE REGULATORY AUTHORITY REQUIREMENTS.

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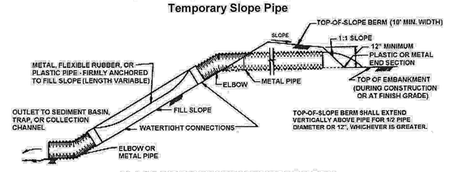
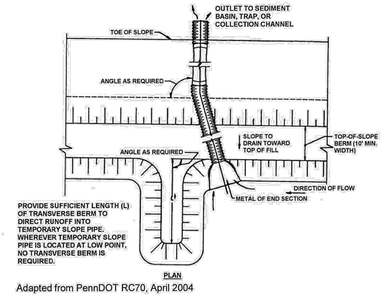
DESCRIPTION: TYPICAL CONSTRUCTION HORIZONTAL DIRECTION DRILL
DRAWING NO.: HDD | SCALE: NTS | DATE: 2015 | FIGURE NO.: 51

Temporary Slope Pipe



SLOPE PIPE WITH TRANSVERSE BERM



PLAN

Adapted from PennDOT RC70, April 2004

NOTE: This table is intentionally blank and should be filled in by the plan preparer.

Slope Pipe No.	Outlet Protection Type	R-size or Material	Apron Length (ft)	Apron Width (ft)

The maximum distance between anchor stakes shall be 10 feet.

Transverse berm shall be used whenever temporary slope pipe is not located at low point.

Slope pipes shall be inspected weekly and after each runoff event. Any accumulated sediment shall be removed from the inlet immediately.

Damaged pipe sections shall be replaced within 24 hours. Leaking connections shall be repaired immediately.

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DESCRIPTION: PIPE SLOPE DRAIN
DRAWING NO.: PSD | SCALE: NTS | DATE: 2015 | FIGURE NO.: 52

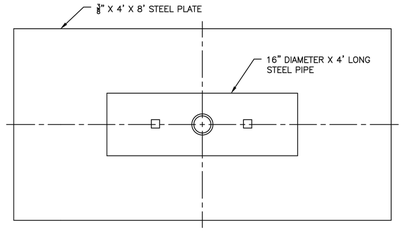
NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

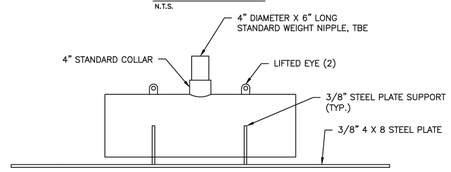
Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

NORTHEAST ENERGY DIRECT PROJECT
EROSION & SEDIMENT CONTROL TYPICALS
CONNECTICUT

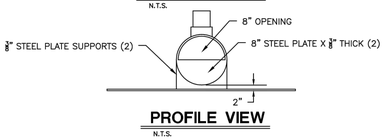
Section:	Township:	Range:
Co./Par.:	State: CONNECTICUT	
Division:	Op. Area:	
Drafter: GV	Date:	Project ID:
Chk'd:	Date:	Scale:
Approved:	Date:	Filename: CT_ES_DETAILS_008
		Sheet:
		Type:



PLAN VIEW
N.T.S.

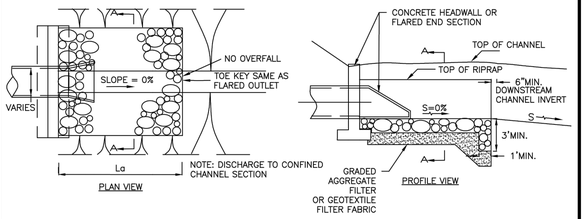


SECTION VIEW
N.T.S.

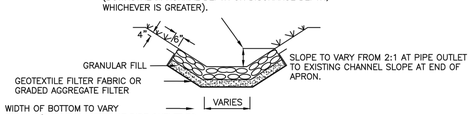


PROFILE VIEW
N.T.S.

Tennessee Gas Pipeline Company, L.L.C. a Kinder Morgan company	DESCRIPTION: PIPE ENERGY DISSIPATER
DRAWING NO.: PED	SCALE: NTS; DATE: 2015
	FIGURE NO.: 53



MINIMUM DEPTH OF RIPRAP = MAXIMUM DEPTH OF FLOW (DOWNSTREAM NORMAL DEPTH OR DISCHARGE DEPTH, WHICHEVER IS GREATER).



CROSS SECTION A–A

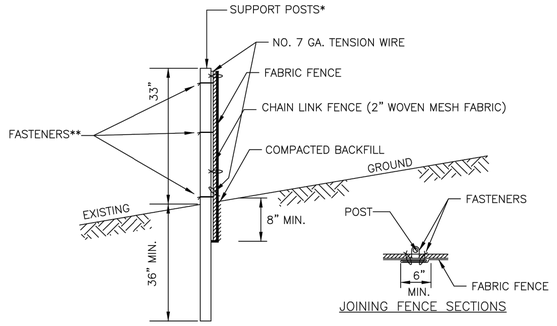
NOTES:

1. THE OUTLET PROTECTION MAY BE DONE USING ROCK RIPRAP, GROUTED RIPRAP, OR GABIONS. RIPRAP SHALL BE COMPOSED OF A WELL–GRADED MIXTURE OF STONE SIZE SO THAT 50 PERCENT OF THE PIECES, BY WEIGHT, SHALL BE LARGER THAN THE D50 SIZE DETERMINED BY USING THE CHART. A WELL–GRADED MIXTURE, AS USED HEREIN, IS DEFINED AS A MIXTURE COMPOSED PRIMARILY OF LARGER STONE SIZES, BUT WITH A SUFFICIENT MIXTURE OF OTHER SIZES TO FILL THE SMALLER VOIDS BETWEEN THE STONES. THE DIAMETER OF THE LARGEST STONE SIZE IN SUCH A MIXTURE SHALL BE 1.5 TIMES THE D50 SIZE.
2. THE MINIMUM THICKNESS OF THE RIPRAP LAYER SHALL BE 1.5 TIMES THE MAXIMUM STONE DIAMETER FOR D50 OF 15 INCHES OR LESS; AND 1.2 TIMES THE MAXIMUM STONE SIZE FOR D50 GREATER THAN 15 INCHES.

D 50 (IN)	d max (in)	MIN. BLANKET THICKNESS (IN)
4	6	9
6	9	14
9	14	20
12	18	27
15	22	32
18	27	32
21	32	38
24	36	43

Tennessee Gas Pipeline Company, L.L.C. a Kinder Morgan company	DESCRIPTION: RIP RAP OUTLET PROTECTION - GENERAL
DRAWING NO.: RROP	SCALE: NTS; DATE: 2015
	FIGURE NO.: 54

Super Filter Fabric Fence



JOINING FENCE SECTIONS

* POSTS SPACED @ 10' MAX. USE 2 1/2" DIA. GALVANIZED OR ALUMINUM POSTS.

** CHAIN LINK TO POST FASTENERS SPACED @ 14" MAX. USE NO. 6 GA. ALUMINUM WIRE OR NO. 9 GALVANIZED STEEL PRE–FORMED CLIPS. CHAIN LINK TO TENSION WIRE FASTENERS SPACED @ 60" MAX. USE NO. 10 GA. GALVANIZED STEEL WIRE. FABRIC TO CHAIN FASTENERS SPACED @ 24" MAX. C TO C.

NO. 7 GA. TENSION WIRE INSTALLED HORIZONTALLY AT TOP AND BOTTOM OF CHAIN–LINK FENCE.

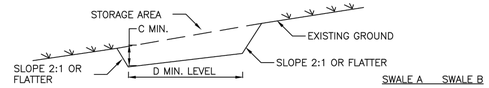
FILTER FABRIC FENCE MUST BE PLACED AT EXISTING LEVEL GRADE. BOTH ENDS OF THE BARRIER MUST BE EXTENDED AT LEAST 8 FEET UPSLOPE AT 45 DEGREES TO THE MAIN BARRIER ALIGNMENT.

SEDIMENT MUST BE REMOVED WHEN ACCUMULATIONS REACH 1/2 THE ABOVE GROUND HEIGHT OF THE FENCE.

MAXIMUM SLOPE LENGTH (FT.) ABOVE FENCE [1]

SLOPE STEEPNESS	SLOPE PERCENT (%)	SUPER SILT FENCE
2:1	50	50
-	45	60
-	40	75
-	35	85
-	30	100
4:1	25	135
5:1	20	275
-	15	215
10:1	10	325
20:1	5	500
50:1	2	1000

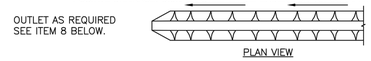
Tennessee Gas Pipeline Company, L.L.C. a Kinder Morgan company	DESCRIPTION: SUPER SILT FENCE
DRAWING NO.: SSF	SCALE: NTS; DATE: 2015
	FIGURE NO.: 55



CROSS SECTION

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

POSITIVE DRAINAGE: 0.5% OR STEEPER DEPENDENT ON TOPOGRAPHY



PLAN VIEW

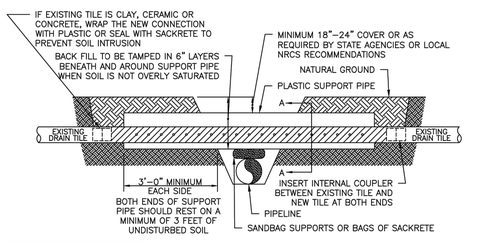
CONSTRUCTION SPECIFICATIONS

1. ALL TEMPORARY SWALES SHALL HAVE UNINTERUPTED 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 –10AC)
1	0.5–3.0%	SEED AND STRAW MULCH	SEED AND STRAW MULCH
2	3.1–5.0%	SEED AND STRAW MULCH	SEED USING JUTE OR EXCELSIOR
3	5.1–8.0%	SEED WITH JUTE OR EXCELSIOR, SOD	LINED WITH 4–8" RIP–RAP OR RECYCLED CONCRETE EQUIVALENT
4	8.1–20.%	LINED WITH 4–8" RIP–RAP	ENGINEERED DESIGN

9. PERIODIC INSPECTION AND REQUIRED MAINTENANCE MUST BE PROVIDED AFTER EACH RAIN EVENT.

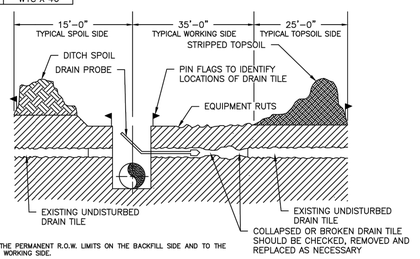
Tennessee Gas Pipeline Company, L.L.C. a Kinder Morgan company	DESCRIPTION: TEMPORARY SWALE
DRAWING NO.: TS	SCALE: NTS; DATE: 2015
	FIGURE NO.: 56



DRAINAGE TILE	SUPPORT SIZE
3" TO 5"	6" PIPE
6"	8" PIPE
7" TO 8"	10" PIPE
9" TO 10"	12" PIPE
12"	W12 X 14
15" TO 18"	W16 X 26
OVER 18"	W18 X 46

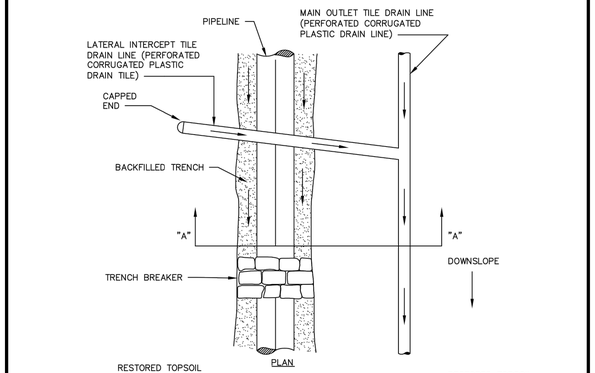
SECTION A–A FOR UP TO 10" DRAIN TILE

NOTES:
1. SUPPORT PIPE TO BE OF 0.250" WALL THICKNESS OR HEAVIER. WHERE THE SUPPORT PIPE IS OVER 30" IN LENGTH OR IN SATURATED AREAS. PERFORATIONS TO THE SUPPORT PIPE MAY BE REQUESTED.
2. REPLACEMENT TILE TO BE HEAVY DUTY HIGHWAY GRADE PERFORATED PLASTIC DRAIN TUBING (ADS TYPE N–12) CONFORMING TO THE AASHTO M.252 SPECIFICATION.
3. IF THE TRENCH WIDTH EXCEEDS 10 FEET, SUFFICIENT STABILITY SHALL BE PROVIDED TO THE SUPPORT PIPE TO PREVENT SAGGING.



NOTES:
1. CLEAN OUT DRAIN TILES TO THE PERMANENT R.O.W. LIMITS ON THE BACKFILL SIDE AND TO THE TEMPORARY R.O.W. LIMIT ON THE WORKING SIDE.
2. REPLACE DAMAGED TILES AND REPAIR TILES AND JOINTS THAT REQUIRE WORK AND ARE WITHIN THE AREAS OF CONSTRUCTION ACTIVITIES.

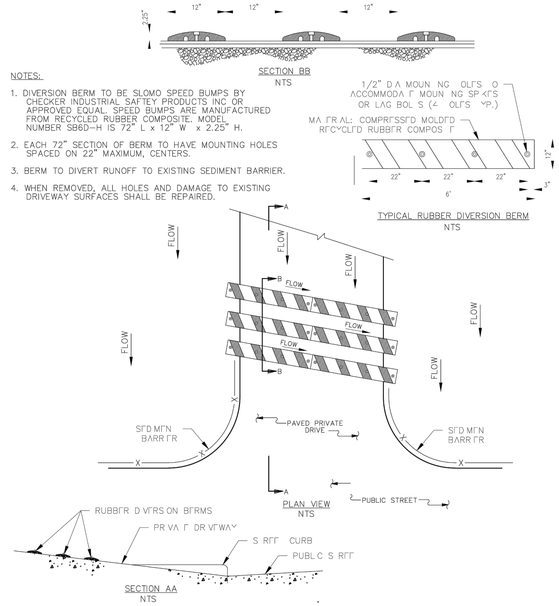
Tennessee Gas Pipeline Company, L.L.C. a Kinder Morgan company	DESCRIPTION: TYPICAL DRAIN TILE REPAIR ACROSS TRENCH
DRAWING NO.: DTR	SCALE: NTS; DATE: 2015
	FIGURE NO.: 57



PROFILE – SECTION "A"–"A"

NOTES:
1. TRENCH BREAKERS PREVENT GULLY EROSION WHILE THE TRENCH IS OPEN AND HELP INHIBIT WATER PIPING AND WATER BLOWOUTS DOWN THE COURSE OF THE PIPELINE AFTER BACKFILLING.
2. INTERCEPT DRAIN LINES ABSORB THE WATER WHICH DRAIN NATURALLY FROM THE UNDISTURBED SOIL PROFILE INTO THE DISTURBED BACKFILL SOIL MATERIAL OF THE TRENCH. THE INTERCEPT DRAIN LINES HELP PREVENT SATURATED SOIL CONDITIONS.
3. AGRICULTURAL CROPLAND MAY REQUIRE CROSS TRENCH DRAINAGE OR PARALLEL DRAINAGE.
4. ALL DRAIN TILE REPAIRS CONSISTING OF PLASTIC PIPE SHALL CONFORM TO THE AASHTO M.252 SPECIFICATION.

Tennessee Gas Pipeline Company, L.L.C. a Kinder Morgan company	DESCRIPTION: LATERAL INTERCEPT DRAIN
DRAWING NO.: LID	SCALE: NTS; DATE: 2015
	FIGURE NO.: 58



SECTION BB
NTS

NOTES:
1. DIVERSION BERM TO BE SLOMO SPEED BUMPS BY CHECKER INDUSTRIAL SAFTEY PRODUCTS INC OR APPROVED EQUAL. SPEED BUMPS ARE MANUFACTURED FROM RECYCLED RUBBER COMPOSITE, MODEL NUMBER SB60–H IS 72" L x 12" W x 2.25" H.
2. EACH 72" SECTION OF BERM TO HAVE MOUNTING HOLES SPACED ON 22" MAXIMUM, CENTERS.
3. BERM TO DIVERT RUNOFF TO EXISTING SEDIMENT BARRIER.
4. WHEN REMOVED, ALL HOLES AND DAMAGE TO EXISTING DRIVEWAY SURFACES SHALL BE REPAIRED.

TYPICAL RUBBER DIVERSION BERM
NTS

PLAN VIEW
NTS

SECTION AA
NTS

Tennessee Gas Pipeline Company, L.L.C. a Kinder Morgan company	DESCRIPTION: DRIVEWAY DIVERSION BERM
DRAWING NO.: DDB	SCALE: NTS; DATE: 2015
	FIGURE NO.: 59

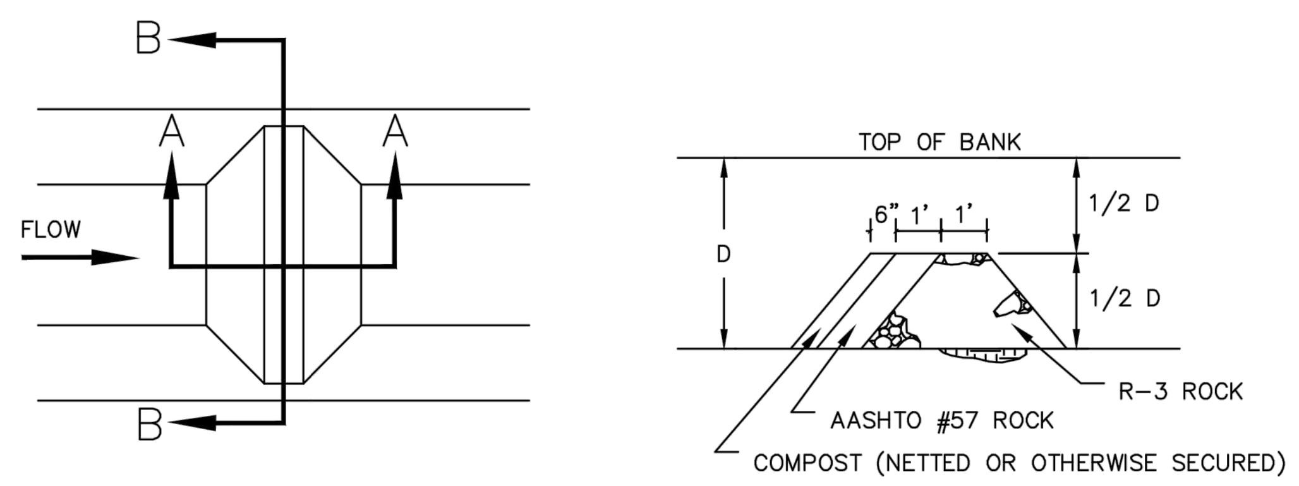
NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

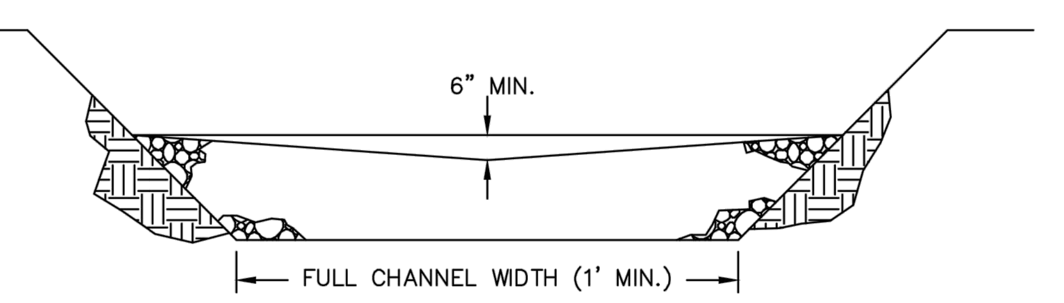
REVISIONS

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

NORTHEAST ENERGY DIRECT PROJECT
EROSION & SEDIMENT CONTROL TYPICALS
CONNECTICUT

Section:	Township:	Range:
Co./Par.:		State: CONNECTICUT
Division:		Op. Area:
Drafter: GV	Date:	Project ID:
Chk'd:	Date:	Scale:
Approved:	Date:	Filename: CT_ES_DETAILS_009
		Sheet:
		Type:





FOR 3' ≤ D USE R-4
FOR 2' ≤ D < 3' USE R-3
NOT APPLICABLE FOR D<2'

ROCK FILTER NO.	LOCATION	D (FT.)	RIPRAP SIZE

THIS TABLE IS INTENTIONALLY LEFT BLANK AND SHOULD BE FILLED IN BY THE PLAN PREPARER.

NOTES:

1. SEDIMENT SHALL BE REMOVED WHEN ACCUMULATIONS REACH 1/2 THE HEIGHT OF THE FILTER.
2. IMMEDIATELY UPON STABILIZATION OF EACH CHANNEL, INSTALLER SHALL REMOVE ACCUMULATED SEDIMENT, REMOVE ROCK FILTER, AND STABILIZE DISTURBED AREAS.

Tennessee Gas Pipeline Company, L.L.C.
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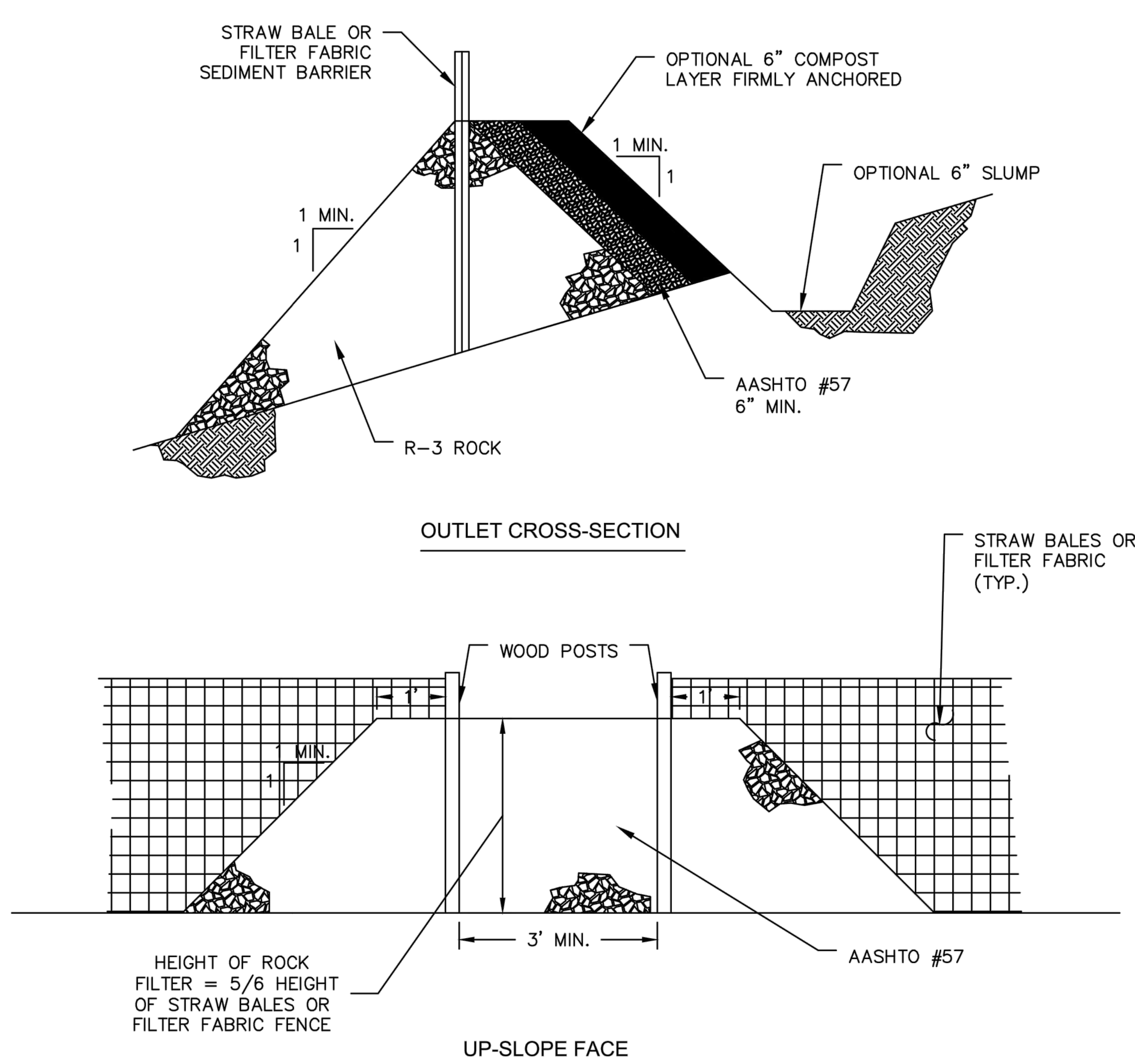
DESCRIPTION: ROCK FILTER | DRAWING NO.: RF | FIGURE NO.: 60



NOTES:

1. A ROCK FILTER OUTLET SHALL BE INSTALLED WHERE FAILURE OF A SILT FENCE OR STRAW BALE BARRIER HAS OCCURRED DUE TO CONCENTRATED FLOW. ANCHORED COMPOST LAYER SHALL BE USED ON UPSLOPE FACE IN HIGH QUALITY AND EXCEPTIONAL VALUE WATERSHEDS.
2. SEDIMENT SHALL BE REMOVED WHEN ACCUMULATIONS REACH 1/3 THE HEIGHT OF THE OUTLET.

Tennessee Gas Pipeline Company, L.L.C.
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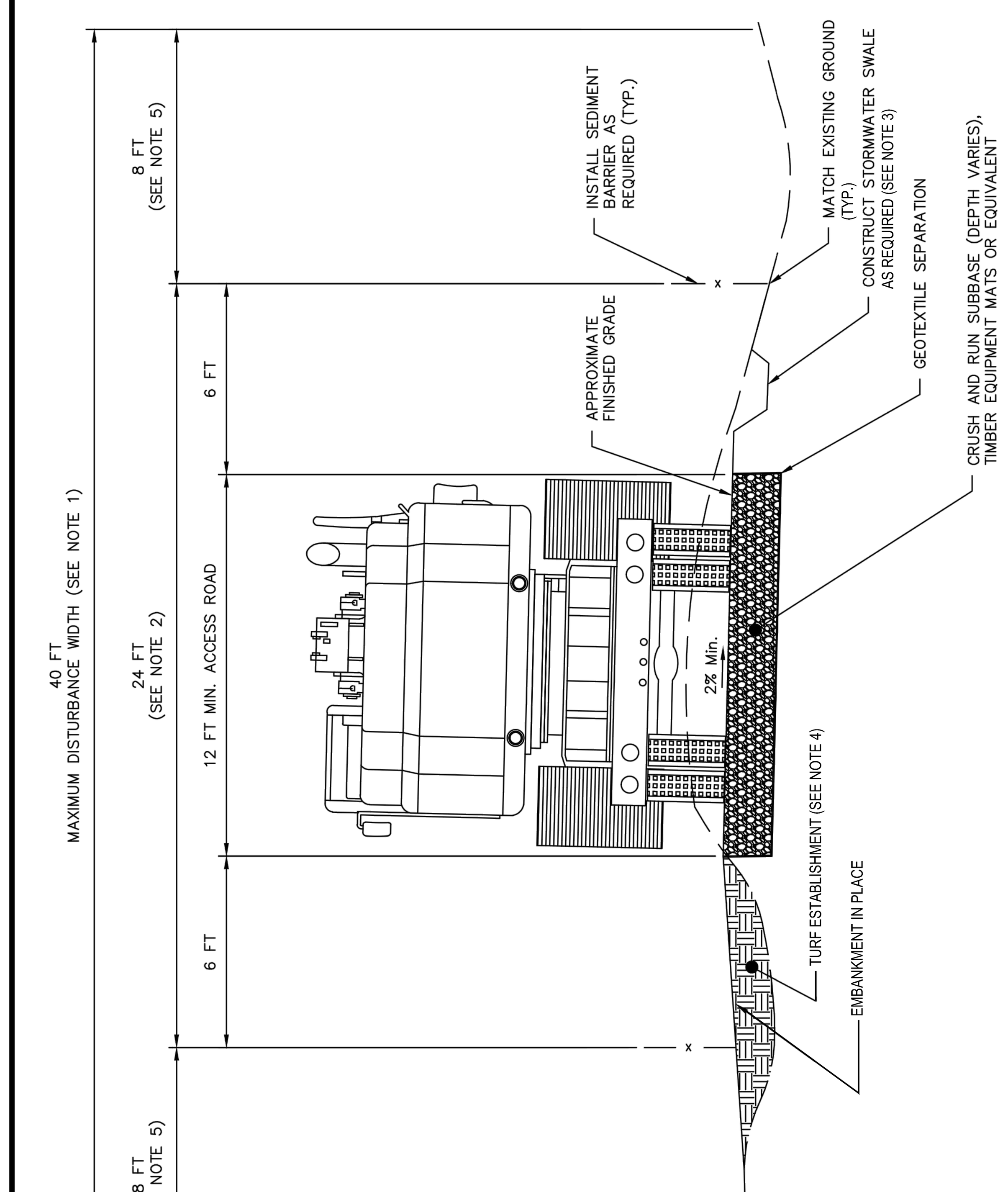
DESCRIPTION: ROCK FILTER OUTLET | DRAWING NO.: RFO | FIGURE NO.: 61



Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

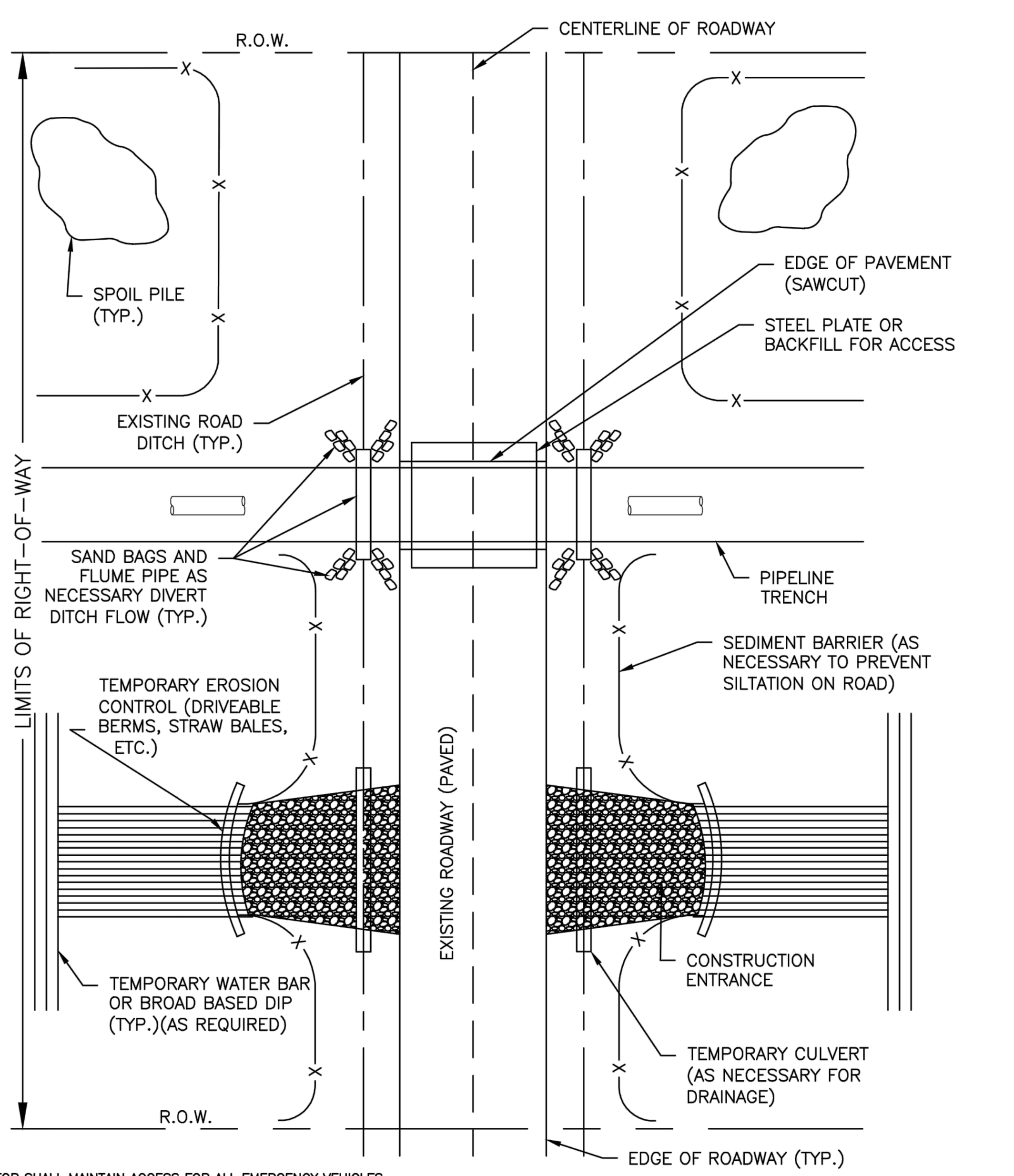
DESCRIPTION: TYPICAL ACCESS ROAD CROSS SECTION | DRAWING NO.: ARCS | FIGURE NO.: 62A

NOTES:

1. THE MAXIMUM DISTURBANCE WIDTH ASSOCIATED WITH THE CONSTRUCTION OF ACCESS ROADS WILL BE 40FT.
2. ACCESS ROADS WILL TYPICALLY INCLUDE A 12 FT TRAVEL LANE AND 12 FT OF GRADING DISTURBANCE. THE GRADING DISTURBANCE WILL BE REQUIRED TO MATCH INTO EXISTING GROUND AND CONSTRUCT REQUIRED EROSION CONTROL MEASURES (E.G. SILT FENCE) AND SEDIMENT CONTROL DEVICES (E.G. STORMWATER SWALE). ADDITIONAL CONSTRUCTION WIDTH MAY BE REQUIRED IN AREAS THAT REQUIRED TRUCK PULL OFFS, TRUCK TURNAROUNDS, AND AROUND SHARP CURVES WHERE EQUIPMENT TRAILERS HAVE LARGE TURNING RADIUSES.
3. REFER TO THE STORMWATER SWALE TABLES FOR LOCATIONS AND SIZES OF ALL SWALES REQUIRED ALONG ACCESS ROADS.
4. SEED MIXES TO BE UTILIZED FOR TURF ESTABLISHMENT ALONG ACCESS ROADS SHALL CONFORM TO THE SEED MIXES OUTLINED IN THE ENVIRONMENTAL CONSTRUCTION PLANS (ECPs).
5. THE ADDITIONAL 16 FT OF DISTURBANCE MAY BE REQUIRED TO ACCOMMODATE TRUCK PULL-OFFS, TRUCK TURNAROUNDS, AND INCREASED TRAVEL LANE WIDTHS AROUND CURVES DUE TO THE LARGE TRUCK TURNING RADIUSES.

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

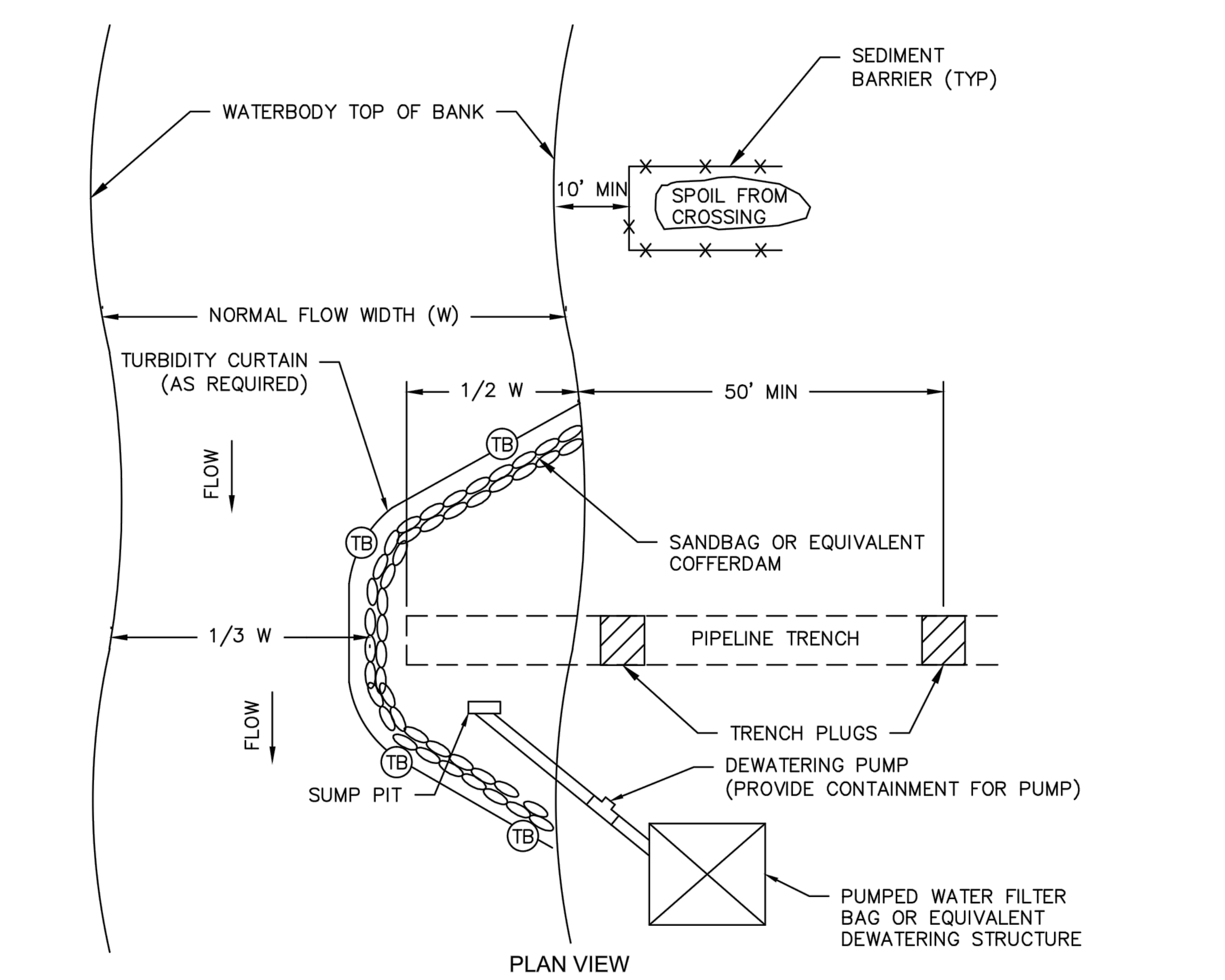
DESCRIPTION: TYPICAL ACCESS ROAD CROSS SECTION | DRAWING NO.: ARCS | FIGURE NO.: 62B



NOTES:
1. THE CONTRACTOR SHALL MAINTAIN ACCESS FOR ALL EMERGENCY VEHICLES.
2. THE CONTRACTOR SHALL COORDINATE ACCESS RESTRICTIONS WITH ALL IMPACTED PARTIES PRIOR TO CROSSING THE ROAD.
3. THE CONTRACTOR SHALL MAINTAIN ONSITE ADEQUATELY SIZED STEEL PLATES TO COVER THE OPEN TRENCH AND ALLOW FOR EMERGENCY OR GENERAL ACCESS IN THE EVENT THAT CONSTRUCTION ACTIVITIES HAVE TO BE HALTED.

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

DESCRIPTION: TYPICAL OPEN CUT PAVED ROAD CROSSING | DRAWING NO.: OCRC | FIGURE NO.: 63

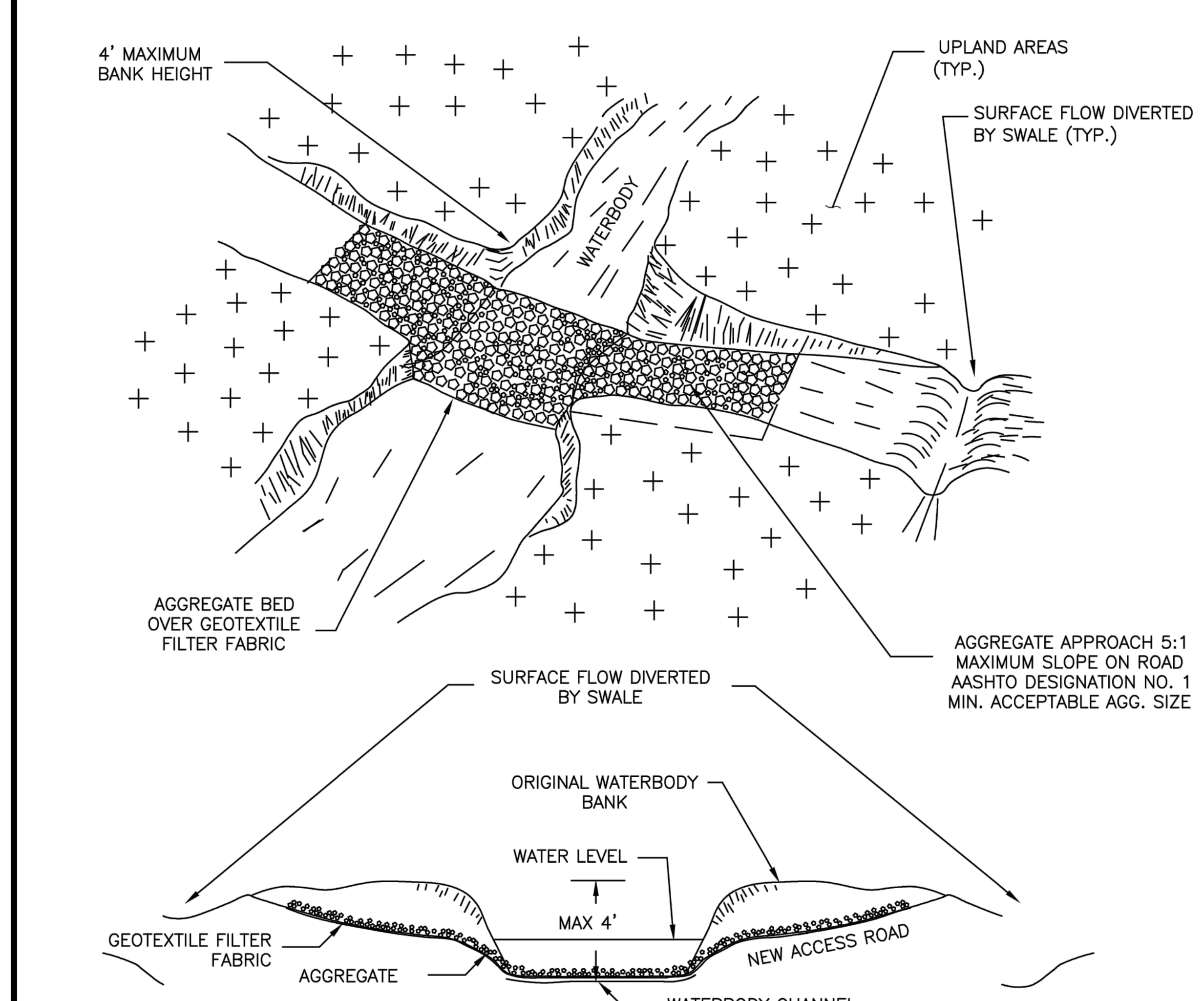


NOTES:

1. GRUBBING SHALL NOT TAKE PLACE WITHIN 50 FEET OF TOP-OF-BANK UNTIL ALL MATERIALS REQUIRED TO COMPLETE CROSSING ARE ON SITE AND PIPE IS READY FOR INSTALLATION.
2. TRENCH BREAKER SHALL BE INSTALLED WITHIN THE TRENCH ON BOTH SIDES OF THE WATERBODY CHANNEL.
3. WATER ACCUMULATING WITHIN THE WORK AREA SHALL BE PUMPED TO A PUMPED WATER FILTER BAG OR SEDIMENT TRAP PRIOR TO DISCHARGING INTO ANY SURFACE WATER.
4. HAZARDOUS OR POLLUTANT MATERIAL STORAGE AREAS SHALL BE LOCATED AT LEAST 100 FEET BACK FROM THE TOP OF WATERBODY BANK.
5. ALL EXCESS EXCAVATED MATERIAL SHALL BE IMMEDIATELY REMOVED FROM THE WATERBODY CROSSING AREA.
6. ALL DISTURBED AREAS WITHIN 50 FEET OF TOP-OF-BANK SHALL BE BLANKETED OR MATTED WITHIN 24 HOURS OF INITIAL DISTURBANCE FOR MINOR WATERBODIES OR 48 HOURS OF INITIAL DISTURBANCE FOR INTERMEDIATE WATERBODIES UNLESS OTHERWISE AUTHORIZED.
7. APPROPRIATE WATERBODY BANK PROTECTION SHALL BE PROVIDED WITHIN THE CHANNEL.
8. THE WATERBODY CROSSING WILL GENERALLY BE COMPLETED IN 2 STAGES. THE DETAIL DEPICTS STAGE 1. STAGE 2 WILL GENERALLY BE COMPLETED USING THE SAME CONFIGURATION FROM THE OPPOSITE BANK.

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

DESCRIPTION: TYPICAL UTILITY LINE CROSSING WITH COFFERDAM | DRAWING NO.: ULC | FIGURE NO.: 64



NOTES
1. THIS METHOD IS INTENDED FOR USE BY CLEARING EQUIPMENT AND CONSTRUCTION EQUIPMENT REQUIRED TO CONSTRUCT A TEMPORARY BRIDGE CROSSING PRIOR TO PIPE INSTALLATION (E.G. TRENCHING), UNLESS OTHERWISE APPROVED BY THE APPLICABLE REGULATORY AGENCY. UNLESS OTHERWISE APPROVED, THE CONTRACTOR SHALL LIMIT THE NUMBER OF CROSSINGS TO ONE PER PIECE OF EQUIPMENT.
2. THIS METHOD SHALL ONLY BE USED IF IT WILL NOT AFFECT AQUATIC LIFE SUCH AS FISH MIGRATION OR SPAWNING. COORDINATION WITH THE APPLICABLE PERMITTING AGENCY WILL BE REQUIRED PRIOR TO INSTALLATION.
3. THE ACCESS FORD SHALL BE CONSTRUCTED PERPENDICULAR TO THE WATERBODY BANKS TO MINIMIZE IMPACTS
4. A SWALE SHALL BE CONSTRUCTED AT BOTH APPROACHES A MAXIMUM OF 50' FROM THE EDGE OF THE WATERBODY BANK TO DIVERT RUNOFF AND PREVENT IT FROM DIRECTLY ENTERING THE WATERBODY.
5. THE MAXIMUM HEIGHT BETWEEN THE INVERT OF THE WATERBODY AND THE WATERBODY TOP OF BANK IS 4'. THIS METHOD SHALL NOT BE USED IF THE BANK HEIGHT EXCEEDS 4'.
6. ALL AREAS DISTURBED BY THE ACCESS FORD SHALL BE STABILIZED AS SOON AS PRACTICAL, BUT NO LATER THAN 14 CALENDAR DAYS AFTER REMOVAL.

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

DESCRIPTION: TYPICAL ACCESS FORD | DRAWING NO.: AF | FIGURE NO.: 65

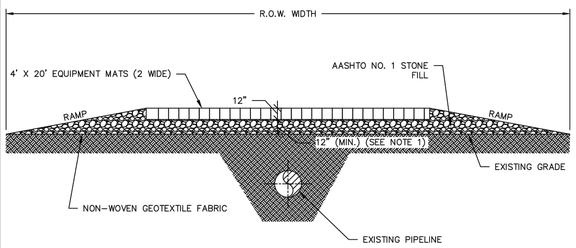
NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

NORTHEAST ENERGY DIRECT PROJECT
EROSION & SEDIMENT CONTROL TYPICALS
CONNECTICUT

Section:	Township:	Range:
Co./Par.:		State: CONNECTICUT
Division:		Op. Area:
Drafter: GV	Date:	Project ID:
Chk'd:	Date:	Scale:
Approved:	Date:	Filename: CT_ES_DETAILS_010
		Sheet:
		Type:

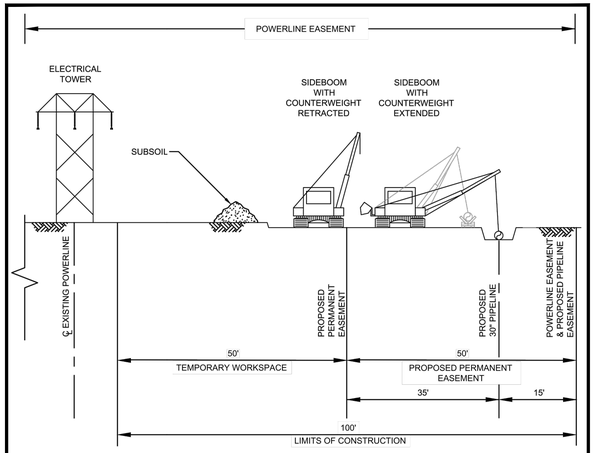


NOTES:

1. ADDITIONAL STONE DEPTH MAY BE REQUIRED DEPENDING ON THE DEPTH OF COVER OVER THE EXISTING PIPE. THE CONTRACTOR SHALL COORDINATE WITH THE ENGINEER FOR THE REQUIRED DEPTH OF STONE.
2. INSTALL 1 (ONE) LAYER OF NON-WOVEN GEOTEXTILE FABRIC PRIOR TO INSTALLING THE STONE.
3. THE CONTRACTOR SHALL COORDINATE WITH THE ENGINEER TO DETERMINE THE NUMBER OF EQUIPMENT MATS REQUIRED.

Tennessee Gas Pipeline Company, L.L.C. a Kinder Morgan company

DESCRIPTION: TEMPORARY WOODEN MAT PIPELINE CROSSING
DRAWING NO.: WMPC | BOAZ MTS | DATE 2015 | FIGURE NO.: 66

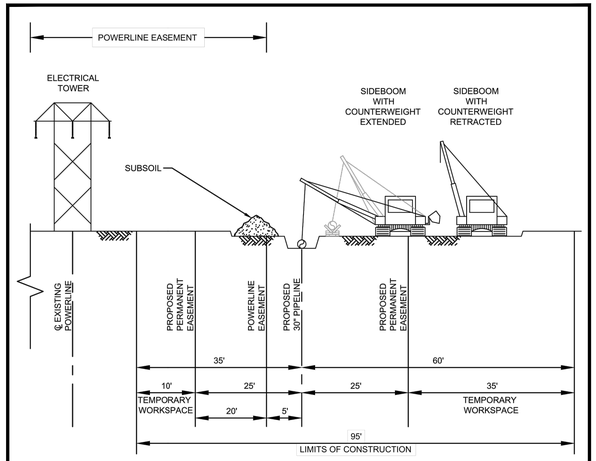


PROFILE
(NOT TO SCALE)

NOTE:
1. CONSTRUCTION RIGHT-OF-WAY WILL TYPICALLY BE 100 FEET WIDE CONSISTING OF 50 FEET OF PROPOSED PERMANENT EASEMENT AND 50 FEET OF TEMPORARY WORKSPACE. ADDITIONAL TEMPORARY WORKSPACE (ATWS) WILL BE NECESSARY AT MAJOR ROADS, RAILROADS, RIVER CROSSINGS AND OTHER SPECIAL CIRCUMSTANCES, AS REQUIRED. CERTAIN SITUATIONS MAY REQUIRE A NARROWER WIDTH.
2. ADD 25 FEET OF ATWS ON WORKING SIDE (TYPICALLY) FOR TOPSOIL STORAGE IN AGRICULTURAL FIELDS, RESIDENTIAL YARDS, ETC.
3. LEAVE GAPS IN SPOIL PILES AT OBVIOUS DRAINAGES. DO NOT PUSH UPLAND SOILS INTO CREEKS OR WETLANDS. DO NOT USE TOPSOIL FOR PADDING. AVOID SCALPING VEGETATED GROUND SURFACE WHEN BACKFILLING TOPSOIL AND SPOIL PILES.

Tennessee Gas Pipeline Company, L.L.C. a Kinder Morgan company

DESCRIPTION: TYPICAL 100 FT. CONSTRUCTION WORKSPACE INSIDE POWERLINE EASEMENT
DRAWING NO.: ROW01 | BOAZ MTS | DATE 2015 | FIGURE NO.: 67

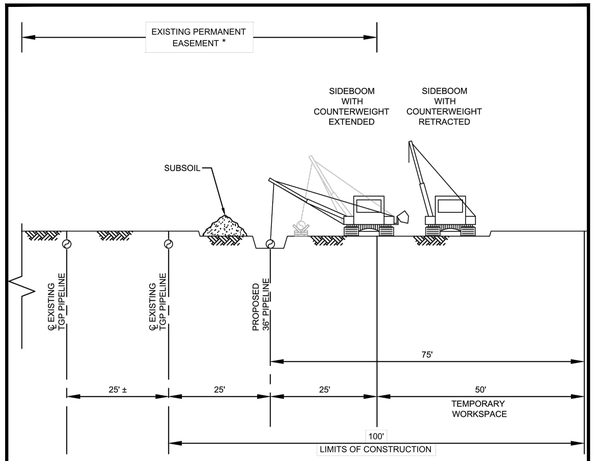


PROFILE
(NOT TO SCALE)

NOTE:
1. CONSTRUCTION RIGHT-OF-WAY WILL TYPICALLY BE 95 FEET WIDE CONSISTING OF 50 FEET OF PROPOSED PERMANENT EASEMENT (20 FEET OF THE PROPOSED PERMANENT EASEMENT BEING SHARED WITH THE POWERLINE'S EASMENT) AND 45 FEET OF TEMPORARY WORKSPACE. ADDITIONAL TEMPORARY WORKSPACE (ATWS) WILL BE NECESSARY AT MAJOR ROADS, RAILROADS, RIVER CROSSINGS AND OTHER SPECIAL CIRCUMSTANCES, AS REQUIRED. CERTAIN SITUATIONS MAY REQUIRE A NARROWER WIDTH.
2. ADD 25 FEET OF ATWS ON WORKING SIDE (TYPICALLY) FOR TOPSOIL STORAGE IN AGRICULTURAL FIELDS, RESIDENTIAL YARDS, ETC.
3. LEAVE GAPS IN SPOIL PILES AT OBVIOUS DRAINAGES. DO NOT PUSH UPLAND SOILS INTO CREEKS OR WETLANDS. DO NOT USE TOPSOIL FOR PADDING. AVOID SCALPING VEGETATED GROUND SURFACE WHEN BACKFILLING TOPSOIL AND SPOIL PILES.

Tennessee Gas Pipeline Company, L.L.C. a Kinder Morgan company

DESCRIPTION: TYPICAL 95 FT. CONSTRUCTION WORKSPACE ADJACENT TO POWERLINE EASEMENT
DRAWING NO.: ROW02 | BOAZ MTS | DATE 2015 | FIGURE NO.: 68



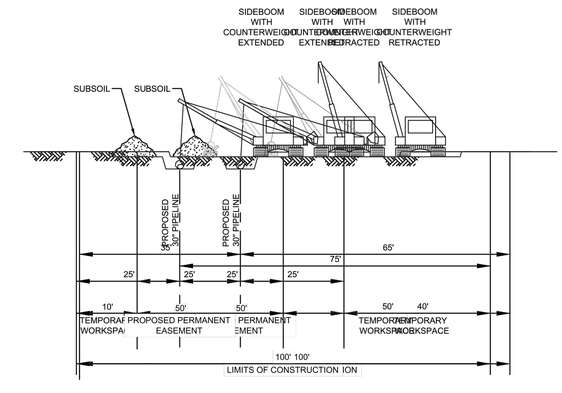
PROFILE
(NOT TO SCALE)

NOTES:
1. CONSTRUCTION RIGHT-OF-WAY WILL TYPICALLY BE 100 FEET WIDE CONSISTING OF 50 FEET OF EXISTING PERMANENT EASEMENT AND 50 FEET OF TEMPORARY WORKSPACE. ADDITIONAL TEMPORARY WORKSPACE (ATWS) WILL BE NECESSARY AT MAJOR ROADS, RAILROADS, RIVER CROSSINGS AND OTHER SPECIAL CIRCUMSTANCES, AS REQUIRED. CERTAIN SITUATIONS MAY REQUIRE A NARROWER WIDTH.
2. ADD 25 FEET OF ATWS ON WORKING SIDE (TYPICALLY) FOR TOPSOIL STORAGE IN AGRICULTURAL FIELDS, RESIDENTIAL YARDS, ETC.
3. LEAVE GAPS IN SPOIL PILES AT OBVIOUS DRAINAGES. DO NOT PUSH UPLAND SOILS INTO CREEKS OR WETLANDS. DO NOT USE TOPSOIL FOR PADDING. AVOID SCALPING VEGETATED GROUND SURFACE WHEN BACKFILLING TOPSOIL AND SPOIL PILES.
4. THE OFFSET FROM AN EXISTING TGP PIPELINE, WHERE APPLICABLE, WILL BE 25 FEET, BUT MAY BE INCREASED OR DECREASED DEPENDING ON THE SITE SPECIFIC CONSTRUCTION REQUIREMENTS.

* EXISTING PERMANENT EASEMENT VARIES BASED ON EXISTING PROPERTY RIGHTS.

Tennessee Gas Pipeline Company, L.L.C. a Kinder Morgan company

DESCRIPTION: 100' CORRIDOR PARALLEL TO DEFINING LINE (EXISTING TGP)
DRAWING NO.: ROW03 | BOAZ MTS | DATE 2015 | FIGURE NO.: 69

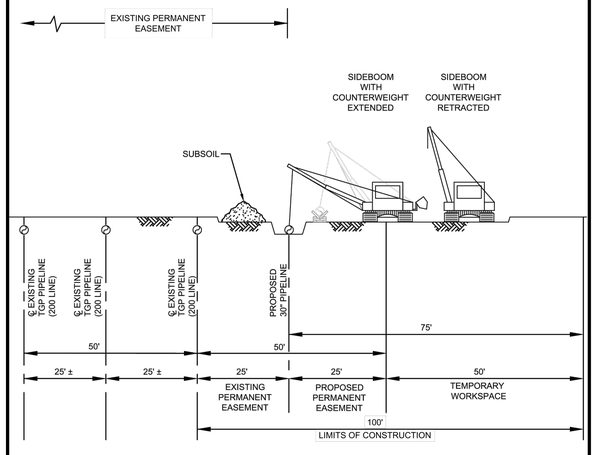


PROFILE
(NOT TO SCALE)

NOTE:
1. CONSTRUCTION RIGHT-OF-WAY WILL TYPICALLY BE 100 FEET WIDE CONSISTING OF 50 FEET OF PROPOSED PERMANENT EASEMENT AND 50 FEET OF TEMPORARY WORKSPACE. ADDITIONAL TEMPORARY WORKSPACE (ATWS) WILL BE NECESSARY AT MAJOR ROADS, RAILROADS, RIVER CROSSINGS AND OTHER SPECIAL CIRCUMSTANCES, AS REQUIRED. CERTAIN SITUATIONS MAY REQUIRE A NARROWER WIDTH.
2. ADD 25 FEET OF ATWS ON WORKING SIDE (TYPICALLY) FOR TOPSOIL STORAGE IN AGRICULTURAL FIELDS, RESIDENTIAL YARDS, ETC.
3. LEAVE GAPS IN SPOIL PILES AT OBVIOUS DRAINAGES. DO NOT PUSH UPLAND SOILS INTO CREEKS OR WETLANDS. DO NOT USE TOPSOIL FOR PADDING. AVOID SCALPING VEGETATED GROUND SURFACE WHEN BACKFILLING TOPSOIL AND SPOIL PILES.

Tennessee Gas Pipeline Company, L.L.C. a Kinder Morgan company

DESCRIPTION: 100' CORRIDOR (GREEN FIELD 50/50)
DRAWING NO.: ROW04 | BOAZ MTS | DATE 2015 | FIGURE NO.: 70

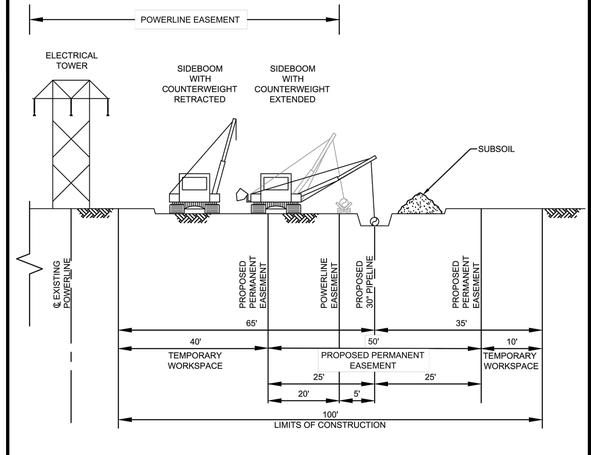


PROFILE
(NOT TO SCALE)

NOTE:
1. CONSTRUCTION RIGHT-OF-WAY WILL TYPICALLY BE 100 FEET WIDE CONSISTING OF 25 FEET OF EXISTING PERMANENT EASEMENT, 25 FEET OF PROPOSED PERMANENT EASEMENT, AND 50 FEET OF TEMPORARY WORKSPACE. ADDITIONAL TEMPORARY WORKSPACE (ATWS) WILL BE NECESSARY AT MAJOR ROADS, RAILROADS, RIVER CROSSINGS AND OTHER SPECIAL CIRCUMSTANCES, AS REQUIRED. CERTAIN SITUATIONS MAY REQUIRE A NARROWER WIDTH.
2. ADD 25 FEET OF ATWS ON WORKING SIDE (TYPICALLY) FOR TOPSOIL STORAGE IN AGRICULTURAL FIELDS, RESIDENTIAL YARDS, ETC.
3. LEAVE GAPS IN SPOIL PILES AT OBVIOUS DRAINAGES. DO NOT PUSH UPLAND SOILS INTO CREEKS OR WETLANDS. DO NOT USE TOPSOIL FOR PADDING. AVOID SCALPING VEGETATED GROUND SURFACE WHEN BACKFILLING TOPSOIL AND SPOIL PILES.
4. THE OFFSET FROM EXISTING PIPELINE, WHERE APPLICABLE, WILL BE 25 FEET, BUT MAY BE INCREASED OR DECREASED DEPENDING ON THE SITE SPECIFIC CONSTRUCTION REQUIREMENTS.

Tennessee Gas Pipeline Company, L.L.C. a Kinder Morgan company

DESCRIPTION: 100' CORRIDOR PARALLEL TO NON DEFINING LINE (EXISTING TGP)
DRAWING NO.: ROW05 | BOAZ MTS | DATE 2015 | FIGURE NO.: 71



PROFILE
(NOT TO SCALE)

NOTE:
1. CONSTRUCTION RIGHT-OF-WAY WILL TYPICALLY BE 100 FEET WIDE CONSISTING OF 50 FEET OF PROPOSED PERMANENT EASEMENT (20 FEET OF THE PROPOSED PERMANENT EASEMENT BEING SHARED WITH THE POWERLINE'S EASEMENT) AND 50 FEET OF TEMPORARY WORKSPACE. ADDITIONAL TEMPORARY WORKSPACE (ATWS) WILL BE NECESSARY AT MAJOR ROADS, RAILROADS, RIVER CROSSINGS AND OTHER SPECIAL CIRCUMSTANCES, AS REQUIRED. CERTAIN SITUATIONS MAY REQUIRE A NARROWER WIDTH.
2. ADD 25 FEET OF ATWS ON THE WORKING SIDE (TYPICALLY) FOR TOPSOIL STORAGE IN AGRICULTURAL FIELDS, RESIDENTIAL YARDS, ETC.
3. LEAVE GAPS IN SPOIL PILES AT OBVIOUS DRAINAGES. DO NOT PUSH UPLAND SOILS INTO CREEKS OR WETLANDS. DO NOT USE TOPSOIL FOR PADDING. AVOID SCALPING VEGETATED GROUND SURFACE WHEN BACKFILLING TOPSOIL AND SPOIL PILES.

Tennessee Gas Pipeline Company, L.L.C. a Kinder Morgan company

DESCRIPTION: TYPICAL 100' CORRIDOR CONSTRUCTION WORKSPACE ADJACENT TO POWERLINE EASEMENT
DRAWING NO.: ROW06 | BOAZ MTS | DATE 2015 | FIGURE NO.: 72

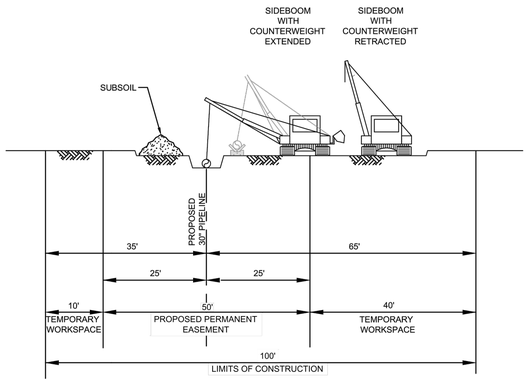
NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

Tennessee Gas Pipeline Company, L.L.C. a Kinder Morgan company

NORTHEAST ENERGY DIRECT PROJECT
EROSION & SEDIMENT CONTROL TYPICALS
CONNECTICUT

Section:	Township:	Range:	
Co./Par.:	State: CONNECTICUT		
Division:	Op. Area:		
Drafter: GV	Date:	Project ID:	
Chk'd:	Date:	Scale:	
Approved:	Date:	Filename: CT_ES_DETAILS_011	
		Sheet:	
		Type:	

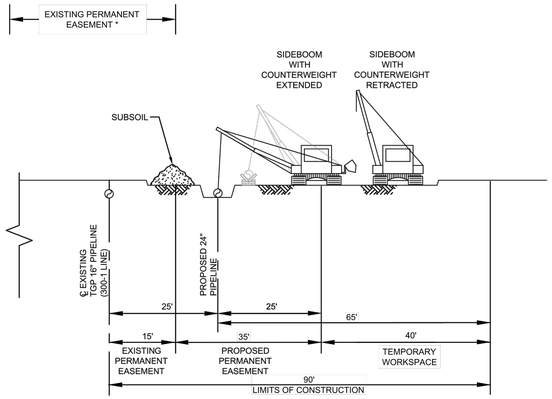


PROFILE
(NOT TO SCALE)

NOTE:
1. CONSTRUCTION RIGHT-OF-WAY WILL TYPICALLY BE 100 FEET WIDE CONSISTING OF 50 FEET OF PROPOSED PERMANENT EASEMENT AND 50 FEET OF TEMPORARY WORKSPACE. ADDITIONAL TEMPORARY WORKSPACE (ATWS) WILL BE NECESSARY AT MAJOR ROADS, RAILROADS, RIVER CROSSINGS AND OTHER SPECIAL CIRCUMSTANCES, AS REQUIRED. CERTAIN SITUATIONS MAY REQUIRE A NARROWER WIDTH.
2. ADD 25 FEET OF ATWS ON WORKING SIDE (TYPICALLY) FOR TOPSOIL STORAGE IN AGRICULTURAL FIELDS, RESIDENTIAL YARDS, ETC.
3. LEAVE GAPS IN SPOIL PILES AT OBVIOUS DRAINAGES. DO NOT PUSH UPLAND SOILS INTO CREEKS OR WETLANDS. DO NOT USE TOPSOIL FOR PADDING. AVOID SCALPING VEGETATED GROUND SURFACE WHEN BACKFILLING TOPSOIL AND SPOIL PILES.

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

DESCRIPTION: 100' CORRIDOR (GREEN FIELD) STANDARD
DRAWING NO.: ROW07
SCALE: NTS
DATE: 2015
FIGURE NO.: 73



PROFILE
(NOT TO SCALE)

NOTE:
1. CONSTRUCTION RIGHT-OF-WAY WILL TYPICALLY BE 90 FEET WIDE CONSISTING OF15 FEET OF EXISTING PERMANENT EASEMENT, 35 FEET OF PROPOSED PERMANENT EASEMENT, AND 40 FEET OF TEMPORARY WORKSPACE. ADDITIONAL TEMPORARY WORKSPACE (ATWS) WILL BE NECESSARY AT MAJOR ROADS, RAILROADS, RIVER CROSSINGS AND OTHER SPECIAL CIRCUMSTANCES, AS REQUIRED. CERTAIN SITUATIONS MAY REQUIRE A NARROWER WIDTH.
2. ADD 25 FEET OF ATWS ON WORKING SIDE (TYPICALLY) FOR TOPSOIL STORAGE IN AGRICULTURAL FIELDS, RESIDENTIAL YARDS, ETC.
3. LEAVE GAPS IN SPOIL PILES AT OBVIOUS DRAINAGES. DO NOT PUSH UPLAND SOILS INTO CREEKS OR WETLANDS. DO NOT USE TOPSOIL FOR PADDING. AVOID SCALPING VEGETATED GROUND SURFACE WHEN BACKFILLING TOPSOIL AND SPOIL PILES.
4. THE OFFSET FROM EXISTING PIPELINE, WHERE APPLICABLE, WILL BE 25 FEET, BUT MAY BE INCREASED OR DECREASED DEPENDING ON THE SITE SPECIFIC CONSTRUCTION REQUIREMENTS.

* EXISTING PERMANENT EASEMENT VARIES BASED ON EXISTING PROPERTY RIGHTS.

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DESCRIPTION: 90' CORRIDOR PARALLEL TO 300-1 LINE FOR 24" PROPOSED PIPELINE SEGMENT S
DRAWING NO.: ROW08
SCALE: NTS
DATE: 2015
FIGURE NO.: 74

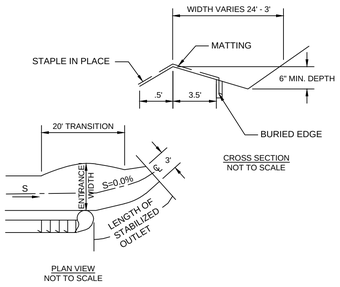

FIGURE LS-2 DISCHARGE LIMITATION	
SPREADER LIP	DESIGN FLOW (cfs)
VEGETATED	0 - 4
RIGID	5 -10

Q(cfs)	E.W.(FT.)	D(FT)	END WIDTH (FT)	LENGTH (FT)
0-10	10	0.5	6	10
10-20	16	0.6	6	20
20-30	24	0.7	6	30

CONSTRUCTION SPECIFICATIONS

1. THE MATTING SHOULD BE A MINIMUM OF 4FT. WIDE EXTENDING 6 INCHES OVER THE LIP AND BURIED 6 INCHES DEEP IN A VERTICAL TRENCH ON THE LOWER EDGE. THE UPPER EDGE SHOULD BUTT AGAINST SMOOTHLY CUT SOD AND BE SECURELY HELD IN PLACE WITH CLOSELY SPACED HEAVY DUTY WIRE STAPLES AT LEAST 12 INCHES IN LENGTH.
2. ENSURE THAT THE LIP IS LEVEL (0.0% GRADE) TO UNIFORMLY SPREAD DISCHARGE.
3. THE LIP SHALL BE CONSTRUCTED ON UNDISTURBED SOIL NOT FILL.
4. A 20 FOOT TRANSITION SECTION WILL BE CONSTRUCTED FROM THE DIVERSION CHANNEL TO THE SPREADER TO SMOOTHLY BLEND THE DIFFERENT DIMENSION AND GRADES.
5. THE RUNOFF DISCHARGE WILL BE OUTLETED ONTO A STABILIZED VEGETATED SLOPE NOT EXCEEDING 10%.
6. SEED AND MULCH THE DISTURBED AREA IMMEDIATELY AFTER CONSTRUCTION.
7. SHAPE THE ENTRANCE TO THE SPREADER IN SUCH A MANNER AS TO ENSURE THAT RUNOFF ENTERS DIRECTLY ONTO THE 0.0%.
8. THE PROTECTIVE COVERING FOR A VEGETATED LIP SHALL BE A MINIMUM OF 4 FEET WIDE EXTENDING 6 INCHES DEEP IN A VERTICAL TRENCH ON THE LOWER EDGE. BUTT THE UPPER EDGE SMOOTHLY CUT SOD, AND SECURELY HOLD IN PLACE WITH CLOSELY SPACED HEAVY DUTY WIRE STAPLES.
9. ENTRENCH THE RIGID LEVEL LIP AT LEAST 2 INCHES BELOW EXISTING GROUND AND SECURELY ANCHOR TO PREVENT DISPLACEMENT. PLACE AN APRON OF DOT #3 STONE OR MODIFIED RIPRAP AT THE TOP OF THE LEVEL LIP AND EXTENDED DOWN SLOPE AT LEAST 3 FEET. PLACE THE GEOTEXTILE UNDER STONE AND USE GALVANIZED WIRE MESH TO HOLD STONE SECURELY IN PLACE.
10. WHEN DISCHARGING FROM A PIPE, USE CONDUIT LEVEL SPREADER MEASURE, CLS.

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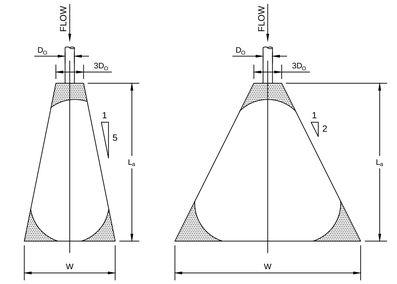
DESCRIPTION: LEVEL SPREADER
DRAWING NO.: LS
SCALE: NTS
DATE: 2015
FIGURE NO.: 75

NOTE:
FOR USE AS CONDUIT OUTLET PROTECTION WHERE THERE IS NO WELL DEFINED CHANNEL IMMEDIATELY DOWNSTREAM



$W = 3D_O + 0.4L_a$
TAILWATER $\geq 0.5D_O$

$W = 3D_O + L_a$
TAILWATER $< 0.5D_O$

DESIGN EXAMPLE

GIVEN: D_O = 1.5 FT, Q= = 14.5 cfs, TW = 0.7 ft.
FIND: L_a . W. d_{50}

$$L_a = \frac{1.7Q}{D_O^{3/2}} + 8D_O \quad \frac{1.7(14.5\ cfs)}{1.5^{3/2}} + 8(1.5) = 25.4$$

$W = 3D_O + L_a + 3(1.5\ ft.) + 25.4\ ft. = 29.9\ ft.$ (Say 30 ft.)

MEDIAN STONE DIAMETER:

$$d_{50} = \left(\frac{0.02}{TW}\right)\left(\frac{Q}{D_O}\right)^{4/3} = \left(\frac{0.02}{0.7}\right)\left(\frac{14.5}{1.5}\right)^{4/3} = 0.58 = 7\ \text{INCHES}$$

1. SHAPE THE ENTRANCE TO THE SPREADER IN SUCH A MANNER AS TO ENSURE THAT RUNOFF ENTERS DIRECTLY ONTO THE 0.0%.
2. THE PROTECTIVE COVERING FOR A VEGETATED LIP SHALL BE A MINIMUM OF 4 FEET WIDE EXTENDING 6 INCHES DEEP IN A VERTICAL TRENCH ON THE LOWER EDGE. BUTT THE UPPER EDGE SMOOTHLY CUT SOD, AND SECURELY HOLD IN PLACE WITH CLOSELY SPACED HEAVY DUTY WIRE STAPLES.
3. ENTRENCH THE RIGID LEVEL LIP AT LEAST 2 INCHES BELOW EXISTING GROUND AND SECURELY ANCHOR TO PREVENT DISPLACEMENT. PLACE AN APRON OF DOT #3 STONE OR MODIFIED RIPRAP AT THE TOP OF THE LEVEL LIP AND EXTENDED DOWN SLOPE AT LEAST 3 FEET. PLACE THE GEOTEXTILE UNDER STONE AND USE GALVANIZED WIRE MESH TO HOLD STONE SECURELY IN PLACE.
4. STABILIZE THE DISTURBED AREA AROUND THE SPREADER IMMEDIATELY AFTER ITS CONSTRUCTION (SEE PERMANENT SEED, MULCH FOR SEED AND /OR STONE SLOPE PROTECTION MEASURES).

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DESCRIPTION: CONDUIT LEVEL SPREADER
DRAWING NO.: CLS
SCALE: NTS
DATE: 2015
FIGURE NO.: 76

Figure PS-2 Selecting Seed Mix to Match Need

Area To Be Seeded	Mixture Number[1]	
	Mowing Desired	Mowing Not Required
BORROW AREAS, ROADSIDES, DIKES, LEVEES, POND BANKS AND OTHER SLOPES AND BANKS		
A) Well or excessively drained soil[2]	1,2,3,4,5 or 8	5, 6, 7, 8, 9, 10, 11, 12, 16, ***22***
B) Somewhat poorly drained soils[2]	2	5, 6
C) Variable drainage soils[2]	2	5, 6, 11
DRAINAGE DITCH AND CHANNEL BANKS		
A) Well or excessively drained soils[2]	1, 2, 3, or 4	9, 10, 11, 12
B) Somewhat poorly drained soils[2]	2	
C) Variable drainage soils[2]	2	
DIVERSIONS		
A) Well or excessively drained soils[2]	2, 3 or 4	9, 10, 11
B) Somewhat poorly drained soils[2]	2	
C) Variable drainage soils[2]	2	
EFFLUENT DISPOSAL		5 or 6
GRAVEL PITS[3]		26, 27, 28
GULLIED AND ERODED AREAS		3, 4, 5, 8, 10, 11, 12
MINESPOIL & WASTE, AND OTHER SPOIL BANKS (If toxic substances & physical properties not limiting)[3]		15, 16, 17, 18, 26, 27, 28
SHORELINES (Fluctuating water levels)		5 or 6
SKI SLOPES		4, 10
SOD WATERWAYS AND SPILLWAYS	1, 2, 3, 4, 6, 7, or 8	1, 2, 3, 4, 6, 7, or 8
SUNNY RECREATION AREAS (Picnic areas and playgrounds or driving and archery ranges, nature trails)	1, 2 or ***23***	
CAMPING AND PARKING, NATURE TRAILS (Shaded)	19, ***21*** or ***23***	
SAND DUNES (Blowing sand)	25	
WOODLAND ACCESS ROADS, SKID TRAILS AND LOG YARDING AREAS		9, 10, 16, ***22***, 26
LAWNS AND HIGH MAINTENANCE AREAS	1, 19, ***21*** or ***29***	

[1]The numbers following in these columns refer to seed mixtures in **Figure PS-3**. Mixes for shady areas are in ***bold-italics*** print (including mixes 20 through 24).
[2]See county soil survey for drainage class. Soil surveys are available from the County Soil and Water Conservation District Office.
[3]Use mix 26 when soil passing a 200 mesh sieve is less than 15% of total weight. Use mix 26 & 27 when soil passing a 200 mesh sieve is between 15 and 20% of total weight. Use mix 26, 27 & 28 when soil passing a 200 mesh sieve is above 20% of total weight.

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DESCRIPTION: PERMANENT SEEDING
DRAWING NO.: PS
SCALE: NTS
DATE: 2015
FIGURE NO.: 77A

Figure PS-3 Seed Mixtures for Permanent Seeding

No.	Seed Mixture (Variety) [1]	Lbs/Acre	Lbs/1,000 Sq. Ft.
1[5]	Kentucky Bluegrass	20	.45
	Creeping Red Fescue (Pennlawn, Wintergreen)	20	.45
	Perennial Ryegrass (Norlea, Manhatten)	5	.10
		Total 45	1.00
2[5]	Creeping Red Fescue (Pennlawn, Wintergreen)	20	.45
	Redtop (Streeker, Common)	2	.05
	Tall Fescue (Kentucky 31) or Smooth Bromegrass (Saratoga, Lincoln)	20	.45
		Total 42	.95
3[5]	Creeping Red Fescue (Pennlawn, Wintergreen)	20	.45
	Bird's-foot Trefoil (Empire, Viking) with inoculant[1]	8	.20
	Tall Fescue (Kentucky 31) or Smooth Bromegrass (Saratoga, Lincoln)	20	.45
		Total 48	1.10
4[5]	Creeping Red Fescue (Pennlawn, Wintergreen) or Tall Fescue (Kentucky 31)	20	.45
	Redtop (Streeker, Common)	2	.05
	Bird's-foot Trefoil (Empire, Viking) with inoculant[1]	8	.20
		Total 30	.70
5[5]	White Clover	10	.25
	Perennial Rye Grass	2	.05
		Total 12	.30
6[5]	Creeping Red Fescue	20	.50
	Redtop (Streeker, Common)	2	.05
	Perennial Rye Grass	20	.50
		Total 42	1.05
7[5]	Smooth Bromegrass (Saratoga, Lincoln)	15	.35
	Perennial Ryegrass (Norlea, Manhatten)	5	.10
	Bird's-foot Trefoil (Empire, Viking) with inoculant[1]	10	.25
		Total 30	.79
8[6]	Switchgrass (Blackwell, Shelter, Cave-in-rock)	10[1]	.25
	Weeping lovegrass	3	.07
	Little Bluestem (Blaze, Aldous, Camper)	10[1]	.25
		Total 23	.57
9[5]	Creeping Red Fescue (Pennlawn, Wintergreen)	10	.25
	Crown Vetch (Chemung, Penngift) with inoculant[1]	15	.35
	(or Flatpea (Lathco) with inoculant[1])	(30)	(.75)
	Tall Fescue (Kentucky 31) or Smooth Bromegrass (Saratoga, Lincoln)	15	.35
	Redtop (Streeker, Common)	2	.05
		Total 42 (or 57)	1.00 (or 1.40)
10[5]	Creeping Red Fescue (Pennlawn, Wintergreen)	20	.45
	Redtop (Streeker, Common)	2	.05
	Crown Vetch (Chemung, Penngift) with inoculant[1]	15	.35
	(or Flatpea (Lathco) with inoculant[1])	(30)	(.75)
		Total 37 (or 52)	.85 (or 1.25)
11[5]	Bird's-foot Trefoil (Empire, Viking) with inoculant[1]	8	.20
	Crown Vetch (Chemung, Penngift) with inoculant[1]	15	.35
	Creeping Red Fescue (Pennlawn, Wintergreen) or Tall Fescue (Kentucky 31) or Smooth Bromegrass (Saratoga, Lincoln)	20	.45
		Total 43	1.00

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DESCRIPTION: PERMANENT SEEDING
DRAWING NO.: PS
SCALE: NTS
DATE: 2015
FIGURE NO.: 77B

Figure PS-3 Seed Mixtures for Permanent Seeding (con't)

No.	Seed Mixture (Variety) [1]	Lbs/1,000 Lbs/Acre	No. Sq. Ft.
12[6]	Switchgrass (Blackwell, Shelter, Cave-in-rock)	101	.25
	Perennial Ryegrass (Norlea, Manhatten)	5	.10
	Crown Vetch (Chemung, Penngift) with inoculant[1]	15	.55
		Total 45	1.05
13[6]	Crown Vetch (Chemung, Penngift) with inoculant[1]	10	.25
	(or Flatpea (Lathco) with inoculant[1])	(30)	(.75)
	Switchgrass (Blackwell, Shelter, Cave-in-rock)	5[1]	.10
	Perennial Ryegrass (Norlea, Manhatten)	5	.10
		Total 20 (or 40)	.45 (or .95)
14[5]	Crown Vetch (Chemung, Penngift) with inoculant[1]	15	.35
	(or (Flatpea (Lathco) with inoculant[1])	(30)	(.75)
	Perennial Ryegrass (Norlea, Manhatten)	10	.25
		Total 25 (or 40)	.60 (or 1.00)
15[6]	Switchgrass (Blackwell, Shelter, Cave-in-rock)	5[1]	.10
	Big Bluestem (Niagra, Kaw) or Little Bluestem (Blaze, Aldous, Camper)	5[1]	.10
	Perennial Ryegrass (Norlea, Manhatten)	5	.10
	Bird's-foot Trefoil (Empire, Viking) with inoculant[1]	5	.10
		Total 20	.40
16[5]	Tall Fescue (Kentucky 31)	20	.45
	Flatpea (Lathco) with inoculant[1]	30	.75
		Total 50	1.20
17[6]	Deer Tongue (Tioga) with inoculant[1]	10[1]	.25
	Bird's-foot Trefoil (Empire, Viking) with inoculant[1]	8	.20
	Perennial Ryegrass (Norlea, Manhatten)	3	.07
		Total 21	.52
18[6]	Deer Tongue (Tioga) with inoculant[1]	10[1]	.25
	Crown Vetch (Chemung, Penngift) with inoculant[1]	15	.35
	Perennial Ryegrass (Norlea, Manhatten)	3	.07
		Total 28	.67
19[3]	Chewings Fescue	35	.80
	Hard Fescue	30	.70
	Colonial Bentgrass	5	.10
	Bird's-foot Trefoil (Empire, Viking) with inoculant[1]	10	.20
	Perennial Ryegrass	20	.50
		Total 100	2.30
20[5]	Deleted due to invasive species		
21[5]	Creeping Red Fescue (Pennlawn, Wintergreen)	Total 60	1.35
22[5]	Creeping Red Fescue (Pennlawn, Wintergreen)	40	.90
	Tall Fescue (Kentucky 31)	20	.45
		Total 60	1.35
23[5]	Creeping Red Fescue (Pennlawn, Wintergreen)	15	.35
	Flatpea (Lathco) with inoculant[1]	30	.75
		Total 45	3.60
24[5]	Tall Fescue (Kentucky 31)	Total 150	3.60

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DESCRIPTION: PERMANENT SEEDING
DRAWING NO.: PS
SCALE: NTS
DATE: 2015
FIGURE NO.: 77C

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

NORTHEAST ENERGY DIRECT PROJECT
EROSION & SEDIMENT CONTROL TYPICALS
CONNECTICUT

Section:	Township:	Range:
Co./Par.:	State: CONNECTICUT	
Division:	Op. Area:	
Drafter: GV	Date:	Project ID:
Chk'd:	Date:	Scale:
Approved:	Date:	Filename: CT_ES_DETAILS_012
		Sheet:
		Type:

Figure PS-3 Seed Mixtures for Permanent Seeding (con't)

No.	Seed Mixture (Variety)[1]	Lbs/Acre	Lbs/1,000 Sq. Ft.
25[5]	American Beachgrass (Cape)	58,500 culms/acre	1,345 culms/ 100 sq. ft.
26[6]	Switchgrass (Blackwell, Shelter, Cave-in-rock)	4.0	.10
	Big Bluestem (Niagra, Kaw)	4.0	.10
	Little Bluestem (Blaze, Aldous, Camper)	2.0	.05
	Sand Lovegrass (NE-27, Bend)	1.5	.03
	Bird's-foot Trefoil (Empire Viking)	2.0	.05
		Total 13.5	.33
27[5]	Flatpea (Lathco)	10	.20
	Perennial Pea (Lancer)	2	.05
	Crown Vetch (Chemung, Penngift)	10	.20
	Tall Fescue (Kentucky 31)	2	.20
		Total 24	.65
28[5]	Orchardgrass (Pennlate, Kay, Potomac)	5	.10
	Tall Fescue (Kentucky 31)	10	.20
	Redtop (Streeker, Common)	2	.05
	Birds-foot Trefoil (Empire Viking)	5	.10
		Total 22	.45
29	Turf Type Tall Fescue (Bonanza, Mustang, Rebel II, Spartan, Jaguar) or Perennial Rye ("Future 2000" mix; Fiesta II, Blazer II, and Dasher II)	175 to 250	6 to 8

[1] Use proper inoculant for legume seeds, use four times recommended rate when hydroseeding.

[2] Use Pure Live Seed (PLS) = $\frac{\%\ \text{Germination X}\ \%\ \text{Purity}}{100}$

EXAMPLE: Common Bermuda seed with 70% germination and 80% purity=

$\frac{70 \times 80}{100}$ or $\frac{56}{100}$ or 56%

$\frac{10\ \text{lbs PLS/acre}}{56\%}$ = 17.9 lbs/acre of bagged seed

[3] DOT All purpose mix

[4] Wild flower mix containing New England Aster, Baby's Breath, Black Eye Susan, Catchfly, Dwarf Columbine, Purple Coneflower, Lance-leaved Coreopsis, Cornflower, Ox-eye Daisy, Scarlet Flax, Foxglove, Gayfeather, Rocky Larkspur, Spanish Larkspur, Corn Poppy, Spurred Snapdragon, Wallflower and/or Yarrow may be added to any seed mix given. Most seed suppliers carry a wild flower mixture that is suitable for the Northeast and contains a variety of both annual and perennial flowers. Seeding rates for the specific mixtures should be followed.

[5] Considered to be a cool season mix.

[6] Considered to be a warm season mix.

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DESCRIPTION: PERMANENT SEEDING

DRAWING NO.: PS

SHEET NO. | DATE: 2013

FIGURE NO.: 77D

NO.	DATE	BY	DESCRIPTION	PROJ. ID	APPR.

REVISIONS

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

NORTHEAST ENERGY DIRECT PROJECT
EROSION & SEDIMENT CONTROL TYPICALS
CONNECTICUT

Section:	Township:	Range:
Co./Par.:	State: CONNECTICUT	
Division:	Op. Area:	
Drafter: GV	Date:	Project ID:
Chk'd:	Date:	Scale:
Approved:	Date:	Filename: CT_ES_DETAILS_013
		Sheet:
		Type: