

Information for File #2009-04492-CLJ

Applicant: Lance Olson, Enbridge Energy
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Phone: (218) 444-6381
Primary County : Marshall
Sec/Township/Range: Section 16, T. 157N., R. 47W.
Information Complete On: **October 30, 2014**
Posting Expires On: **January 7, 2015**
Authorization Type: LOP-05-MN (B)

This application is being reviewed in accordance with the practices for documenting Corps jurisdiction under Sections 9 & 10 of the Rivers and Harbor Act of 1899 and Section 404 of the Clean Water Act (CWA) identified in Regulatory Guidance Letter 07-01. We have made a preliminary determination that the aquatic resources that would be impacted by the proposed project are regulated by the Corps of Engineers under Section 404 of the Clean Water Act. The jurisdictional review determines the scope of the projects regulated impacts and compensatory mitigation requirements.

PROJECT PURPOSE & NEED: The Enbridge Energy, Limited Partnership (Enbridge) operates multiple crude oil transmission pipelines(pipelines) crossing the Tamarac River in Marshall County, Minnesota. The proposed project location is located within a highly meandering section of the Tamarac River. Stream bank erosion has exposed Enbridge's pipelines identified as Line 2, 3, and 13. In several locations, large spans have developed, compromising pipeline integrity. Approximate lengths of exposed pipe for Lines 2, 3, and 13 are 80, 295, and 70 feet, respectively. As a temporary solution, repairs have been made to the impacted areas in the form of pipeline supports. These supports are beginning to become undermined and are not considered a permanent solution. The river segment in the vicinity of the pipeline crossings is experiencing lateral instability, evidenced by rapid bank erosion and down-valley channel migration. Lines 2, 3, and 13 were originally installed away from and below the stream bank in the early 1950's. Over time the stream has shifted, primarily due to land use changes in the watershed, exposing the three lines in the project area. The unprotected pipelines are at risk of increased exposure to the environment, physical impacts due to floating debris and ice, third party damage, and stresses caused by lack of support. The purpose of this project is to reduce or eliminate the risk of pipeline failure of Enbridge transmission lines that are exposed at Tamarac River crossings within the project area.

PROJECT DESCRIPTION: The project proposed seeks to remedy hazards to existing Enbridge pipelines, which have been exposed at multiple locations along the Tamarac River due to stream-bank erosion. The applicant would install rock riprap at various locations to provide protection to the pipes, until they can be rerouted from their current location and realigned to cross with neighboring pipelines near bend 14 (Site 8). The following work is proposed:

Site 1 (Downstream of Bend 14): This most downstream site would consist of installing a rock riffle in the streambed to prevent any potential head cutting and provide additional protection to the pipes immediately upstream of this location. Riprap would be placed along 35 linear feet of the stream and would impact a total of 2,800 square feet.

Site 2 (Bend 14): This site would include installation of rock riprap along 119 linear feet of the bank to provide protection for the realignment of lines 2 and 13 (see Site 8 description below). Two rock stream barbs would be installed along the bank to divert flows from the bank, providing additional protection of the bank and pipes.

Site 3 (Bend 13): This site would consist of stream bank reshaping and riprap installation, as the existing river bend is highly susceptible to erosion. The eroded bank would be restored using sandbar material from the southern part of the bend. This material would build back the bend that has eroded away and would allow for the placement rock riprap at this location. The bank stabilization at this location would include 5 rock stream barbs and rock riprap along 320 feet of the stream bank.

Site 4 (Bend 12): Activities at this site would include bank stabilization and the placement of rock riprap along 178 linear feet of the stream bank.

Site 5 (Pipe Exposure Site 3-2): A rock riffle was initially proposed at this site but has recently been withdrawn from the proposal.

Site 6 (Pipe Exposure Site 3-1): This site is an area where line 3 is currently exposed. Stabilization of the bank would involve installing rock riprap along 210 total linear feet of stream bank.

Site 7(Pipe Exposure Site 3-3): This site includes another exposure area of line 3. Bank stabilization would include placement of rock riprap along 100 linear feet.

Site 8: This existing crossing of the Tamarac River is populated with pipelines 1, 4, 65 and 67. The hazard prone lines 2 and 13 would be rerouted along this crossing to minimize the risk of future exposures. As proposed, this site would be excavated for the placement of 1,000 feet of new pipe sections for the future crossing, which would be installed via open cut. The width of the Tamarac River at this location is approximately 30 feet.

NAME, AREA AND TYPES OF WATERS (INCLUDING WETLANDS) SUBJECT TO LOSS: A total of approximately 0.58 acres of the Tamarac River would be impacted as a result of placing fill material required to protect the exposed pipes. No wetlands adjacent to the Tamarac River would be impacted.

ALTERNATIVES CONSIDERED: The No Action alternative would not address the basic purpose of this project to reduce or eliminate the risk of pipeline failure of Enbridge pipelines that are exposed at Tamarac River crossings within the project area. Impact to the environment as a result of construction would be avoided; however, the risk of pipeline failure would not be addressed. The pipelines in their current position will also continue to cause localized bank erosion at the site further exacerbating turbidity and sedimentation for which the Tamarac River is already impaired. As such, the No Action alternative was dismissed by the applicant.

Enbridge also assessed re-routing the Tamarac River so that the water would bypass the pipe exposure locations. The exposed pipes would be stabilized but this alternative would result in the loss of approximately 2,000 linear feet of the Tamarac River. Due to the environmental impacts, this alternative was dismissed.

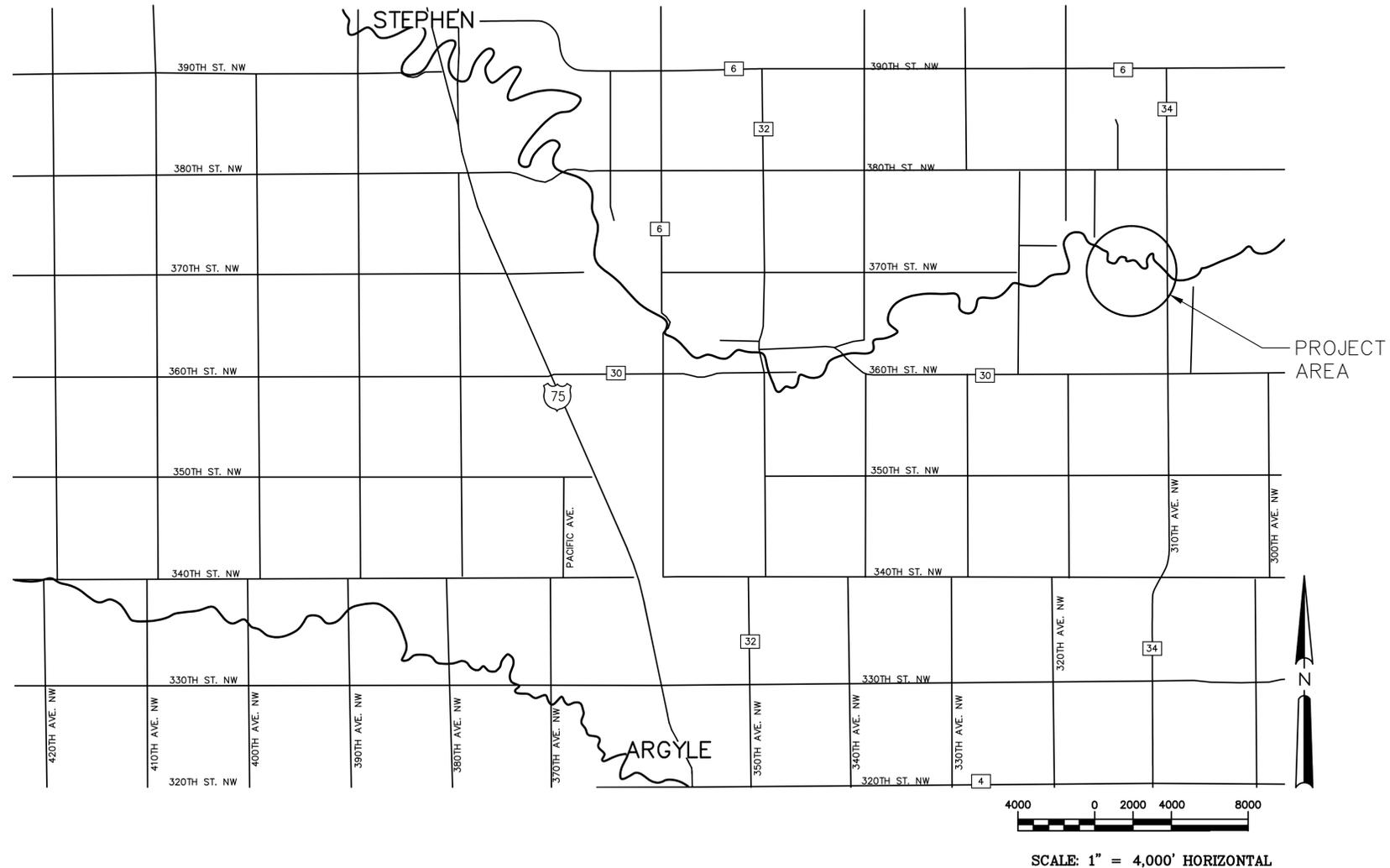
COMPENSATORY MITIGATION: The applicant has not proposed additional compensatory mitigation. The applicant has indicated that the proposal would not result in a loss of waters, would provide additional coarse substrate for fish spawning and habitat, and would reduce the amount of stream bank erosion thus reducing sedimentation and turbidity in the Tamarac River.

Drawings: 2014-04118-CLJ 1 of 9 through 9 of 9. See attached

ENBRIDGE TAMARAC RIVER PHASE I GEO-HAZARDS REMEDICATION MARSHALL COUNTY, MINNESOTA

RIVER & PIPELINE IMPROVEMENTS AT BENDS 12, 13, 14 & LINE 3 CROSSINGS 3-1, 3-2 & 3-3

(CONSTRUCTION DOCUMENTS)



- DRAWING LIST**
- 1 - COVER SHEET
 - 2 - SITE ACCESS PLAN - SCOPE OF WORK
 - 3 - ROCK PROTECTION NOTES
 - 4 - PLANTING PLAN NOTES
 - 5 - PIPE SUPPORT DETAIL SHEET
 - 6 - SITE PLAN SHEET - BENDS 12, 13 & 14
 - 7 - SITE PLAN SHEET - LINE 3 CROSSINGS 3-1 & 3-2
 - 8 - SITE PLAN SHEET - LINE 3 CROSSING 3-3
 - 9 - PLANTING PLAN SHEET - BENDS 12, 13 & 14
 - 10 - PLANTING PLAN SHEET - LINE 3 CROSSINGS 3-1 & 3-2
 - 11 - PLANTING PLAN SHEET - LINE 3 CROSSING 3-3
 - 12 - DETAIL SHEET 1 - BENDS 12, 13 & 14
 - 13 - DETAIL SHEET 2 - BENDS 13 & 14
 - 14 - DETAIL SHEET 3 - CROSSINGS 3-1, 3-2 & 3-3

HORIZONTAL DATUM: NAD 83
VERTICAL DATUM: NAVD 88

SITE CONTROL POINT:
Mn/DOT NAME: A 373
COUNTY:
MARSHALL COUNTY, MN

MONUMENT TYPE:
STEEL ROD (IN SLEEVE) DEPTH 28'

DESCRIPTION: (2014) **STAMPING:** A 373 1981

4.35 MILES NORTHWEST OF ARGYLE, 4.35 MILES NORTHWEST ALONG TRUNK HIGHWAY 75 FROM JUNCTION OF TRUNK HIGHWAY 75 AND COUNTY ROAD 4 IN ARGYLE, AT TRUNK HIGHWAY 75 MILEPOINT 364.95, AT JUNCTION OF COUNTY ROAD 30 EAST, DIRT ROAD WEST AND TRUNK HIGHWAY 75, 77.5 FEET SOUTHEAST OF TRUNK HIGHWAY 75, 68.0 FEET NORTH OF COUNTY ROAD 30, 28.8 FEET NORTHWEST OF UNDERGROUND TELEPHONE JUNCTION BOX AND SIGN POLE, 4.4 FEET SOUTHWEST OF POWER POLE WITH 3 GUY WIRES, 0.5 FOOT NORTH OF WITNESS POST.

COORDINATES:
MN STATE PLANE-NORTH ZONE NORTHING 1714614.352 EASTING 1042794.973 ELEV. NAVD88 835.914

amec
AMEC ENVIRONMENT & INFRASTRUCTURE, INC.
15933 CLAYTON ROAD, SUITE 215
BALLWIN, MISSOURI 63011
PHONE: 636.386.3800
FAX: 636.386.3804

NO	REVISION	BY	DATE	APPR	APPR

ENBRIDGE
ENBRIDGE TAMARAC RIVER PROJECT
ENBRIDGE LINE 3 PIPELINE PROTECTION
& BENDS 12, 13 & 14
RIVER EROSION PROTECTION
MARSHALL COUNTY, MINNESOTA

PROJECT:	
SCALE:	1"=30'
DATE:	10/13/2014
DRAWN:	RH
CHECK:	TB
APPR:	
APPR:	

D-X-X.031-XXXXX-X-XXX-1

90% ISSUE FOR BID

COVER SHEET

TAMARAC RIVER GEO-HAZARDS PHASE I REMEDIATION -- SCOPE OF WORK.

THE REMEDIATION TO BE CARRIED OUT IS TO SUPPORT AND INSTALL "ROCK SHIELD" ON CERTAIN EXPOSED SECTIONS OF LINE 3 (34" DIAMETER) IN ORDER TO PROTECT IN-SITU FOR THE NEXT FEW YEARS UNTIL IT IS REPLACED AS PART OF A SEPARATE PROJECT; IN ADDITION, ROCK TOE AND BANK PROTECTION, ROCK BARBS, A ROCK RIFLE AND A ROCK BLANKET WILL BE INSTALLED AT SPECIFIC AREAS OF THE RIVER TO FURTHER PROTECT LINE 3 AND ADJACENT ENBRIDGE PIPELINES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ACCESS TO ALL THE WORK LOCATIONS WHILE PROTECTING ALL ENBRIDGE PIPELINES IN THE AREA. ONCE WORK IS COMPLETE, THE CONTRACTOR WILL RESTORE THE AREA TO PRE-CONSTRUCTION ACTIVITY CONDITION. PIPELINE LOCATIONS 3-1 & 3-3 SHALL HAVE NEW PIPE SUPPORTS (A TOTAL OF SEVEN) INSTALLED AS SPECIFIED ON THE PLANS. ANCHORPIPE IS THE ENGINEER AND MANUFACTURER OF THE SUPPORTS SPECIFIED FOR THIS WORK. THEY ARE RESPONSIBLE FOR THE SHOP FABRICATION AND SHIPPING OF THESE MATERIALS TO MINOOKA, ILLINOIS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOADING THESE SUPPORTS AT MINOOKA, ILLINOIS AND TRANSPORTING AND UNLOADING AT THE JOB SITE FOR INSTALLATION. ANCHORPIPE SHALL PROVIDE THE TORQUE MOTOR AND INSTALLATION ASSISTANCE. THE SEQUENCING OF THE SUPPORT INSTALLATION WILL BE UNDER THE DIRECTION OF ANCHOR PIPE AND ENBRIDGE SITE REPRESENTATIVE. ANCHORPIPE IS INTENDED TO BE CONTRACTED DIRECTLY WITH ENBRIDGE. VISUAL INSPECTION OF THE COATING WILL BE CONDUCTED BY THE CONTRACTOR ON ALL EXPOSED PIPELINES. THERE ARE A TOTAL OF 10 EXPOSED PIPELINE SECTIONS AS SHOWN BELOW ON THIS SHEET. THE CONTRACTOR SHALL PROVIDE QUALIFIED (OQED) PERSONNEL FOR THIS TASK AND ANY OTHER COVERED TASK FOR ANY, AND ALL, ACTIVITIES ASSOCIATED WITH THIS REMEDIATION WORK. COATING AND PIPE INSPECTION REQUIREMENTS WILL BE PROVIDED BY ENBRIDGE PIPELINE INTEGRITY. IF ANY COATING OR PIPE INTEGRITY ISSUES ARE FOUND DURING INSPECTION, IT WILL BE ESCALATED TO ENBRIDGE PIPELINE INTEGRITY FOR DIRECTION AND A REPAIR RECOMMENDATION. IF ANY INTEGRITY ISSUE OR ANOMALY IS FOUND DURING INSPECTION THAT REQUIRES INSTALLATION OF A FULL ENCIRCLED WELDED STEEL REPAIR SLEEVE, THE CONTRACTOR SHALL INSTALL THAT STEEL REPAIR SLEEVE PER ENBRIDGE'S REQUIREMENTS.

PHASE 1 SCOPE:

LOCATION 3-1

INSTALL 3 PIPE SUPPORTS AT LOCATIONS SPECIFIED ON THE PLANS. THE ENBRIDGE CONTRACTED SURVEYOR SHALL STAKE THE LOCATIONS OF THE NEW PIPE SUPPORTS. THERE MAY BE A REQUIREMENT TO EXCAVATE UNDER THE PIPE TO GET WORKING ROOM FOR INSTALLING THE SUPPORTS. DAMMING AND PUMPING MAY ALSO BE REQUIRED TO KEEP THE WORK AREA CLEAR OF WATER WHILE INSTALLING THE SUPPORTS. ADJACENT TIMBER CRIBBING (OR OTHER APPROVED SUPPORT METHODS) OF THE PIPELINE WILL BE NEEDED TO SUPPORT THE ADDITIONAL WEIGHT AND MOVEMENT DURING THE INSTALLATION PROCESS.

FOR THE THREE NEW PIPE SUPPORTS TO BE INSTALLED, THE EXISTING COATING WILL NEED TO BE REMOVED AND THE PIPE SANDBLASTED TO A NACE 3 W/ANCHOR PATTERN FOR A LENGTH OF FOUR FEET AND CENTERED AT THE SUPPORT LOCATION. THE PIPE SHALL BE ASSESSED BY OTHERS AND IF NO ISSUES ARE FOUND, THE CONTRACTOR SHALL INSTALL CLOCKSRING COMPOSITE PIPE SUPPORT MATERIAL (3 LAYER SYSTEM) PER THE MANUFACTURERS SPECIFICATIONS. THE WRAP WILL BE THREE SECTIONS WIDE TOTALING ~36" (EACH IS 11.5" +/- 0.5") AND WILL BE INSTALLED IN A "BRICK-LAY" (STAGGERED OFFSET OVERLAY) METHOD. THIS WILL NEED TO BE COMPLETELY CURED PRIOR TO BEGINNING THE INSTALLATION OF THE ANCHORPIPE SUPPORT. THE ANCHORPIPE SUPPORT INSTALLATION SHALL BE UNDER DIRECTION OF AN ANCHORPIPE REPRESENTATIVE(S) AND/OR ENBRIDGE REPRESENTATIVE ON SITE. ONCE THE SUPPORT INSTALLATION IS COMPLETE, THE AREA OF THE PIPE OUTSIDE OF THE SUPPORT CLAMP AND BETWEEN THE EXPOSED CLOCKSRING PIPE SUPPORT AND ORIGINAL PIPE COATING THAT HAD BEEN STRIPPED EARLIER WILL BE RE-COATED WITH THE COATING SYSTEM SPECIFIED BY ENBRIDGE.

THE TWO EXISTING PIPE SUPPORT STRUCTURES WILL BE RE-USED IN PLACE BUT THE SUPPORT BEAM AND PIPE CLAMP ASSEMBLY SHALL BE REMOVED FROM THE PIPELINE TO ALLOW FOR PIPE CLEANING AND INSPECTION. FOLLOW THE SAME COATING SYSTEM AS DETAILED ABOVE AND USED FOR THE NEW SUPPORTS.

INSTALL ROCK TOE PROTECTION ON THE OUTSIDE OF BEND 3 ON BOTH THE UPSTREAM AND DOWNSTREAM ENDS OF THE EXPOSED 34" PIPE AS SPECIFIED ON SHEET 7. NEW ROCK SHIELD SHALL BE PLACED AT BOTH ENDS OF THE PIPELINE TO A POINT BEHIND THE EXISTING BANKS IN ORDER TO PROTECT THE PIPELINE DURING PLACEMENT OF THE ROCK.

THE CONTRACTOR SHALL ALSO REMOVE THE EXISTING ROCK-SHIELD, INSPECT THE PIPE COATING AND SUBSEQUENTIALLY REPAIR ANY DAMAGE AND INSTALL A DOUBLE LAYER OF NEW ROCK-SHIELD (TO BE SPECIFIED BY ENBRIDGE) SECURED A MINIMUM OF EVERY 12" OVER THE ENTIRE LENGTH OF THE EXPOSED PIPE SECTIONS BETWEEN THE PIPE SUPPORTS.

LOCATION 3-2

INSTALL A ROCK BLANKET OVER THE PIPELINE IN THIS LOCATION TO PREVENT FUTURE EXPOSURE. REMOVE THE LAYER OF SEDIMENT OVER THE PIPE; INSTALL ROCK-SHIELD (TO BE SPECIFIED BY ENBRIDGE) OVER THE PIPE BEFORE THE ROCK BLANKET IS INSTALLED. NEW ROCK SHIELD SHALL BE PLACED AT BOTH ENDS OF THE PIPELINE TO A POINT BEHIND THE EXISTING BANKS IN ORDER TO PROTECT THE PIPELINE DURING PLACEMENT OF THE ROCK.

LOCATION 3-3

REMOVE ALL SET-ON RIVER WEIGHTS FROM THE PIPELINE, REMOVE THEM FROM THE SITE AND DISPOSE OF PROPERLY. A TOTAL OF 8 RIVER WEIGHTS HAVE BEEN CONFIRMED. PERFORM COATING INSPECTION (BY ENBRIDGE) AT THE LOCATIONS OF EACH RIVER WEIGHT AS EACH ONE OF THE RIVER WEIGHTS ARE REMOVED. THE SEQUENCING OF RIVER WEIGHT REMOVAL AND SUPPORT INSTALLATION WILL BE DETERMINED ON SITE BY ENBRIDGE AND IS BASED ON CONDITIONS AT THE TIME OF INSTALLATION.

INSTALL 4 PIPE SUPPORTS AT LOCATIONS SPECIFIED ON THE PLANS (LOCATED BY OTHERS). EXCAVATION UNDER THE PIPE AND ADJACENT TO THE RIVER BANK WILL BE REQUIRED TO GET WORKING ROOM FOR INSTALLING THE SUPPORTS. DAMMING AND PUMPING MAY BE REQUIRED TO KEEP THE WORK AREA CLEAR OF WATER WHILE INSTALLING THE SUPPORTS. ADJACENT TIMBER CRIBBING (OR OTHER APPROVED SUPPORT METHODS) OF THE PIPELINE WILL BE NEEDED TO SUPPORT THE ADDITIONAL WEIGHT AND MOVEMENT DURING THE INSTALLATION PROCESS. CONTRACTOR SHALL RESTORE THE COMPLETE RIVER BANK BY INSTALLING ROCK TOE PROTECTION, EROSION BLANKET AND NATIVE GRASS SEED. PER THE SITE PLAN ON SHEET 8 AND THE DETAIL ON SHEET 14. NEW ROCK SHIELD SHALL BE PLACED AT BOTH ENDS OF THE PIPELINE TO A POINT BEHIND THE EXISTING BANKS IN ORDER TO PROTECT THE PIPELINE DURING PLACEMENT OF THE ROCK.

FOR THE FOUR NEW ANCHORPIPE SUPPORTS TO BE INSTALLED, THE EXISTING COATING WILL NEED TO BE REMOVED AND THE PIPE SANDBLASTED TO A NACE 3 W/ANCHOR PATTERN FOR A LENGTH OF FOUR FEET AND CENTERED AT THE SUPPORT LOCATION. THE PIPE SHALL BE INSPECTED BY OTHERS AND IF NO ISSUES ARE FOUND, THE CONTRACTOR SHALL INSTALL CLOCKSRING COMPOSITE PIPE SUPPORT MATERIAL (3 LAYER SYSTEM) PER THE MANUFACTURERS SPECIFICATIONS. THE WRAP WILL BE THREE SECTIONS WIDE TOTALING ~36" (EACH IS 11.5" +/- 0.5") AND WILL BE INSTALLED IN A "BRICK-LAY" (STAGGERED OFFSET OVERLAY) METHOD. THIS WILL NEED TO BE COMPLETELY CURED PRIOR TO BEGINNING THE INSTALLATION OF THE ANCHOR PIPE SUPPORT. THE ANCHORPIPE SUPPORT INSTALLATION SHALL BE UNDER DIRECTION OF AN ANCHORPIPE REPRESENTATIVE(S) AND/OR ENBRIDGE REPRESENTATIVE ON SITE. ONCE THE SUPPORT INSTALLATION IS COMPLETE, THE AREA OF THE PIPE OUTSIDE OF THE SUPPORT CLAMP AND BETWEEN THE CLOCKSRING PIPE SUPPORT AND ORIGINAL PIPE COATING THAT HAD BEEN STRIPPED EARLIER WILL BE RE-COATED WITH THE COATING SYSTEM SPECIFIED BY ENBRIDGE.

THE CONTRACTOR SHALL PERFORM A FEATURE INVESTIGATION AS DIRECTED BY AN ENBRIDGE REPRESENTATIVE (SEE DIG PACKAGE PROVIDED IN CONTRACT DOCUMENTS). CONTRACTOR SHALL REMOVE EXISTING COATING AND SANDBLAST. ASSESSMENT WILL BE PERFORMED BY OTHERS. DEPENDING ON ASSESSMENT RESULTS, CONTRACTOR MAY BE REQUIRED TO PROVIDE LABOR AND MATERIALS TO INSTALL A SPLIT SLEEVE REPAIR ON THAT FEATURE AND RECOAT PER ENBRIDGE SPECIFICATIONS. SPLIT SLEEVE MATERIAL SHALL BE PROVIDED BY ENBRIDGE.

THE CONTRACTOR SHALL ALSO INSPECT THE PIPE COATING AND SUBSEQUENTLY REPAIR ANY DAMAGE FOR THIS ENTIRE AREA, AND INSTALL A DOUBLE LAYER OF NEW ROCK-SHIELD (TO BE SPECIFIED BY ENBRIDGE) SECURED A MINIMUM OF EVERY 12" OVER THE ENTIRE LENGTH OF THE EXPOSED PIPE SECTIONS BETWEEN THE PIPE SUPPORTS.

BEND 12 (DEPENDING ON AVAILABLE ACCESS TO THE LOCATION)

INSTALL ROCK TOE AND BANK PROTECTION ON THE OUTSIDE OF BEND 12 AS SPECIFIED ON THE PLANS.

BEND 13

USE SANDBAR MATERIAL FROM THE OPPOSITE SIDE OF THE RIVER AS FILL FOR RECONSTRUCTION OF THE OUTSIDE BANK ON BEND 13. COMPACT THE SANDBAR MATERIAL IN 12 INCH LAYERS AND CAP WITH 12 INCHES OF TOPSOIL FOR FINISHED GRADE. INSTALL ROCK TOE AND BANK PROTECTION ON THE RECONSTRUCTED BANK AND THE OUTSIDE OF THE BEND AS SPECIFIED ON THE PLANS.

INSTALL ROCK BARBS TO PROTECT THE BANK AS SPECIFIED ON THE PLANS.

BEND 14

INSTALL ROCK TOE AND BANK PROTECTION ON THE UPSTREAM END OF THE OUTSIDE OF BEND 14, ADJACENT TO WHERE THE EXISTING ROCK CURRENTLY PROTECTS THE LOCATION WHERE THE FOUR EXISTING PIPELINES CROSS THE TAMARAC RIVER AND AS SPECIFIED ON THE PLANS.

INSTALL ROCK BARBS TO PROTECT THE BANK AS SPECIFIED ON THE PLANS.

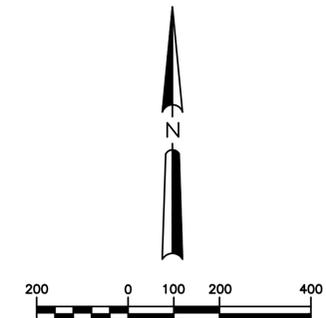
INSTALL THE ROCK RIFLE BETWEEN BEND 14 AND BEND 15 AT THE LOCATION AS SPECIFIED ON THE PLANS.



PIPELINE PROTECTION NOTE:
CONTRACTOR TO PROVIDE PROTECTION TO EXISTING PIPELINES PER ENBRIDGE SPECIFICATIONS AT ALL LOCATIONS WHERE EQUIPMENT IS PLANNED TO CROSS A PIPELINE OR WORK OVER A PIPELINE.



EXPOSED CROSSING LOCATIONS
NOT TO SCALE



SCALE: 1" = 200' HORIZONTAL

90% ISSUE FOR BID

NO	REVISION	BY DATE	APPR	APPR	
ENBRIDGE TAMARAC RIVER PROJECT ENBRIDGE LINE 3 PIPELINE PROTECTION & BENDS 12, 13 & 14 RIVER EROSION PROTECTION MARSHALL COUNTY, MINNESOTA					
PROJECT:	-				
SCALE:	1"=30'	DATE:	10/13/2014	DRAWN:	RH
CHECK:	TB	APPR:	-	DATE:	-
APPR:	-	D-X-X.031-XXXXX-X-XXX-2			
APPR:	-	-			

SITE ACCESS PLAN - SCOPE OF WORK

**ENBRIDGE - TAMARAC RIVER RESTORATION
PLANTING SPECIFICATIONS**

TAMARAC RIVER RESTORATION PLANTING PLAN

THE TAMARAC RIVER RESTORATION PROJECT IS CONSIDERED A TEMPORARY PIPELINE PROTECTION PROJECT AS EXISTING PIPELINES 2, 3 AND 13 WILL BE REMOVED AND RELOCATED TO BE ADJACENT AND PARALLEL TO PIPELINES 1 AND 67 OVER THE NEXT 1 TO 3 YEARS. AS SUCH, THE PLANTING PLAN CONSISTS OF SEEDING WITH NATIVE GRASS SEED AND USING EROSION MAT ON ALL DISTURBED OR GRADED SLOPES STEEPER THAN 3:1 ABOVE THE NEW ROCK PROTECTION AREAS AS CALLED OUT ON THE PLANS.

CONTRACTOR QUALIFICATIONS

1. CONTRACTOR SHALL HAVE AT LEAST 5 YEARS EXPERIENCE SEEDING NATIVE GRASSES WITH DEMONSTRATED SUCCESSFUL ESTABLISHMENT NATIVE GRASSLAND OR PRAIRIE ECOSYSTEMS.

TOPSOIL

1. ALL TOPSOIL SHALL BE STRIPPED AND SALVAGED FOR REUSE. TOPSOIL SHALL NOT BE BROUGHT IN FROM OFF-SITE.
2. ALL DISTURBED AREAS (FOR USE IN ACCESS ROADS, MATERIAL STAGING, OR ACTIVE CONSTRUCTION AREAS) TO RECEIVE A MINIMUM OF 4 INCHES OF TOPSOIL SALVAGED FROM ON-SITE PRIOR TO SEEDING/PLANTING.

SEEDING

1. AREAS TO BE SEEDED SHALL BE FIRM BUT NOT COMPACTED AND SHALL BE FINE GRADED TO A SMOOTH AND NATURAL CONTOUR PRIOR TO SEEDING/PLANTING. ALL ROCKS, STICKS, ROOTS, SOIL CLOUDS, AND DEBRIS GREATER THAN TWO INCHES IN DIAMETER SHALL BE REMOVED AND DISPOSED OF OFF-SITE.
2. ALL NATIVE PLANT MATERIAL (I.E., SEED, TREES, ETC.) USED FOR RESTORATION WILL HAVE ITS SOURCE OF ORIGIN WITHIN 250 MILES OF THE PROJECT SITE. A LIST OF SUGGESTED SUPPLIERS IS PROVIDED HEREIN.
3. ALL PLANT MATERIALS SHALL BE TRUE NATIVE SPECIES (NOT HORTICULTURAL VARIETIES OF NATIVE SPECIES)
4. SEED WILL BE FRESH, FREE OF DELETERIOUS MATERIAL AND DISEASE, AND DELIVERED TO THE SITE IN THE ORIGINAL, UNOPENED BAGS SHOWING A CERTIFIED NET WEIGHT, DATE OF TESTING, LOT NUMBER CORRESPONDING TO SPECIFIC SEED TEST RESULTS, SUPPLIER'S NAME, AND CERTIFIED GUARANTEE OF ANALYSIS INCLUDING THE COMPOSITION, PLS INFORMATION, AND PERCENT WEED SEED. SEED WILL BE KEPT DRY AND UNOPENED UNTIL NEEDED FOR USE. DAMAGED OR FAULTY PACKAGES WILL NOT BE ALLOWED .
5. SEED MIX SHALL BE APPLIED AT THE RATES PROVIDED IN TABLE 1 BELOW.
6. IMMEDIATELY FOLLOWING SEED APPLICATION, THE SITE SHALL BE HARROWED OR LIGHTLY RAKED TO ENSURE SEED-TO-SOIL CONTACT. IT IS ESSENTIAL THAT STEPS BE TAKEN TO ENSURE GOOD SEED TO SOIL CONTACT AND PROPER PLANTING DEPTH. NOTE: IT IS IMPERATIVE THAT NATIVE GRASS SEED BE PLANTED H' 57< 0J9C998!H!GC-@7CBF57H6I HBC 899D9F H-5B' -B7< 69@CK H-9GC-@GI F: 579"
7. STRAW MULCH FOR SEEDING SHALL CONSIST OF CLEAN GRAIN STRAW OF RECENTLY HARVESTED OATS, WHEAT, OR NATIVE GRASSES. STRAW PRODUCED FROM CEREAL RYE, INTRODUCED PASTURE GRASSES, LEGUMES, OR HAY IS NOT ACCEPTABLE. STRAW BALES SHALL NOT BE WET, MUSTY, MOLDY, CAKED, OR DARK IN COLOR. STRAW SHALL APPLIED ON TOP OF SEEDED AREAS AT A RATE OF 1,500 LBS PER ACRE (ABOUT 1 INCH THICK) AND SHALL BE CRIMPED INTO THE GROUND USING A DISC OR SIMILAR AGRICULTURAL EQUIPMENT TO HOLD IT IN PLACE.
8. AREAS ABOVE ALL ROCK PROTECTION STEEPER THAN 3:1 REQUIRE EROSION CONTROL BLANKET NORTH AMERICAN GREEN (SCBN 150 OR EQUIVALENT) INSTEAD OF STRAW MULCH.

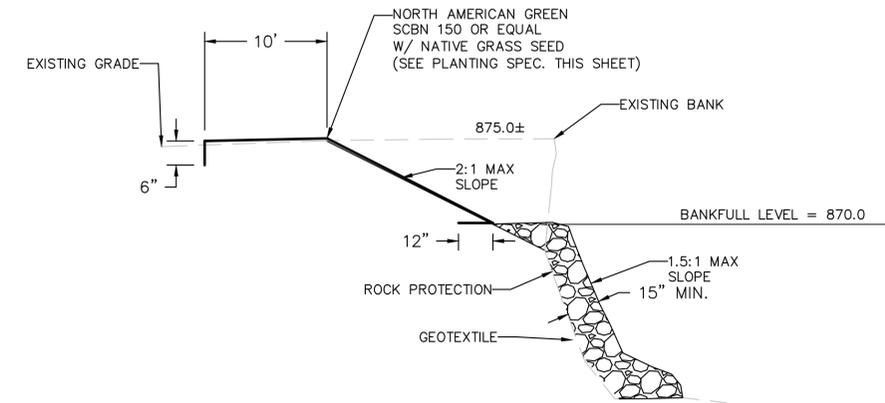
SUGGESTED NATIVE PLANT VENDOR

PRAIRIE MOON NURSERY
32115 PRAIRIE LANE
WINONA, MN 55987
TOLL FREE: (866) 417-8156
TEL: (507) 452-1362
FAX: (507) 454-5238
EMAIL: INFO@PRAIRIEMOON.COM

Table 1 Native Seed Mix ^{1,2}

Botanical Name	Common Name	Percent of Mix	PLS ³ Pounds Per Acre
<i>Andropogon gerardii</i>	Big bluestem	20	5
<i>Elymus canadensis</i>	Canada wild rye	35	8.75
<i>Elymus virginicus</i>	Virginia wildrye	20	5
<i>Panicum virgatum</i>	Switchgrass	10	2.5
<i>Sorghastrum nutans</i>	Indiangrass	5	1.25
<i>Sporobolus asper</i> *	Tall dropseed	10	2.5
Total Native Seed		100	25

¹ Contractor shall include 25 bulk pounds of Annual Ryegrass as a nurse crop
² Based on commercially availability, Contractor may substitute (with approval of Engineer) with additional Canada wild rye or big bluestem if other species not available
³ Pure Live Seed (PLS) is the viable/sproutable seed of particular native species. Therefore, when ordering one PLS pound of a given species, more than one bulk pound may be delivered to make up for any inert material (stems, hulls or seed that won't germinate). Pure Live Seed is defined by the formula:
 PLS = (Percent Purity of the Seed x Germination Percentage)/100

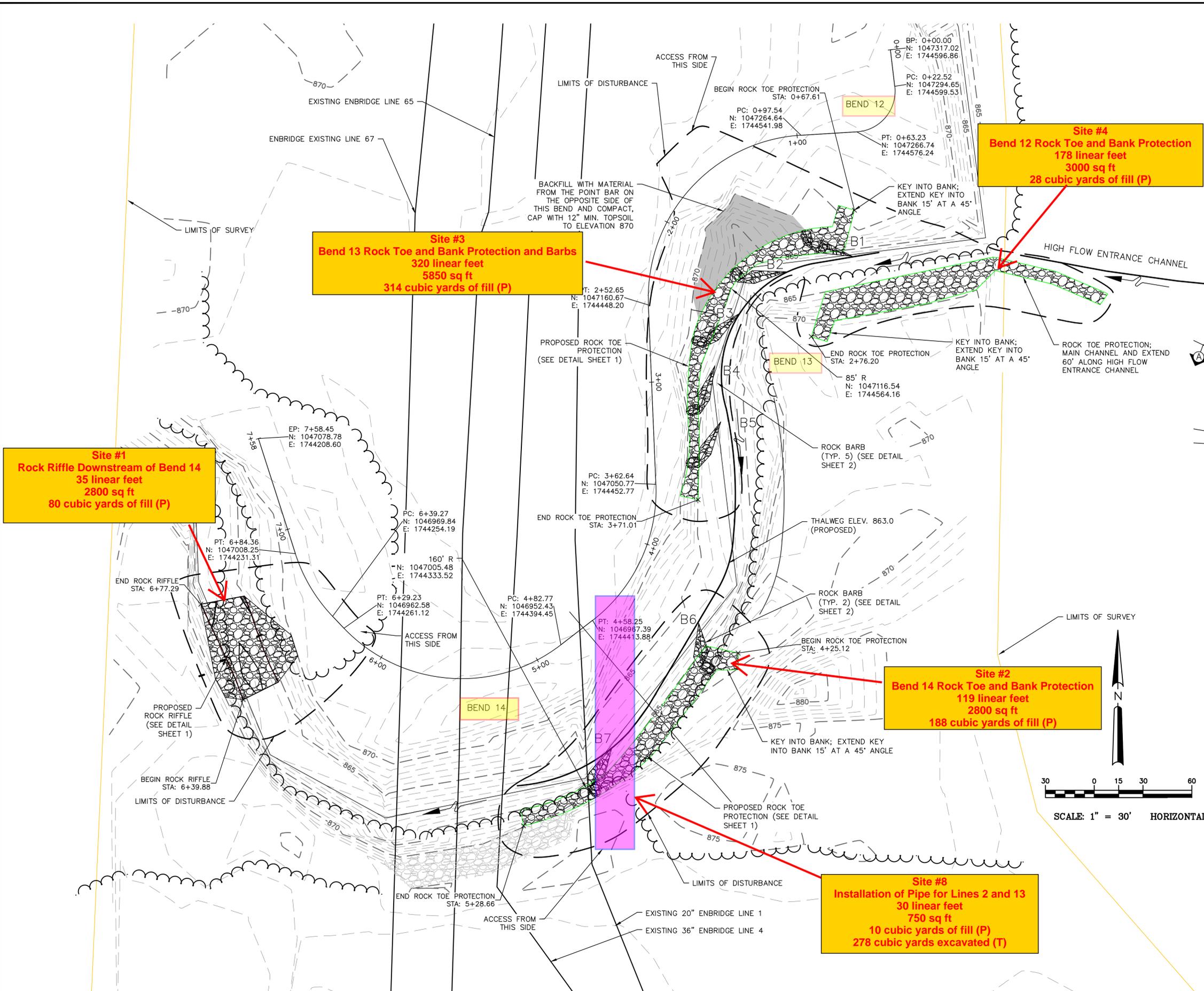
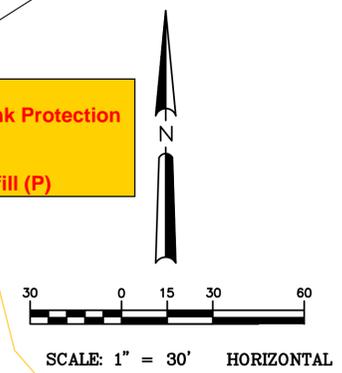
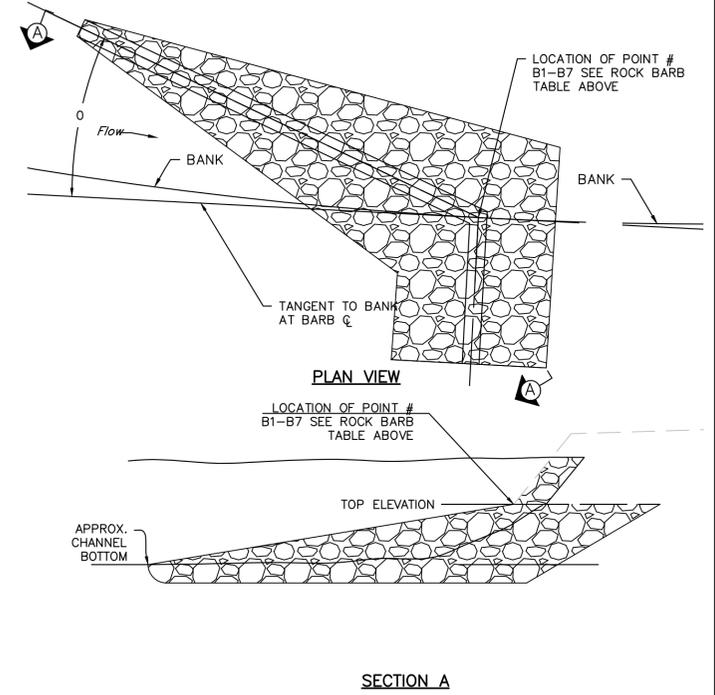


TYPICAL SECTION—EROSION CONTROL MAT
NOT TO SCALE

NO	REVISION	BY DATE	APPR	APPR
ENBRIDGE TAMARAC RIVER PROJECT ENBRIDGE LINE 3 PIPELINE PROTECTION & BENDS 12, 13 & 14 RIVER EROSION PROTECTION MARSHALL COUNTY, MINNESOTA				
PROJECT: -				
SCALE: 1"=30'	DATE: 10/13/2014	DRAWN: RH		
CHECK: TB	APPR: -	DATE: -		
APPR: -	D-X-X.031-XXXXX-X-XXX-4			
APPR: -				

ROCK BARB TABLE		
POINT #	NORTHING	EASTING
B1	1047198.67	1744546.52
B2	1047176.51	1744505.17
B3	1047137.26	1744482.85
B4	1047096.70	1744482.74
B5	1047065.44	1744488.29
B6	1046940.36	1744481.50
B7	1046866.86	1744413.67

NOTE:
SEE BARB PLAN VIEW DETAIL, THIS SHEET,
FOR LOCATION OF BARB POINT NUMBER.



Site #1
Rock Riffle Downstream of Bend 14
35 linear feet
2800 sq ft
80 cubic yards of fill (P)

Site #3
Bend 13 Rock Toe and Bank Protection and Barbs
320 linear feet
5850 sq ft
314 cubic yards of fill (P)

Site #4
Bend 12 Rock Toe and Bank Protection
178 linear feet
3000 sq ft
28 cubic yards of fill (P)

Site #2
Bend 14 Rock Toe and Bank Protection
119 linear feet
2800 sq ft
188 cubic yards of fill (P)

Site #8
Installation of Pipe for Lines 2 and 13
30 linear feet
750 sq ft
10 cubic yards of fill (P)
278 cubic yards excavated (T)

NOTE:
SEE "SITE ACCESS PLAN - SCOPE OF WORK" FOR DESCRIPTION OF SCOPE OF WORK AT BEND 12, BEND 13, AND BEND 14.

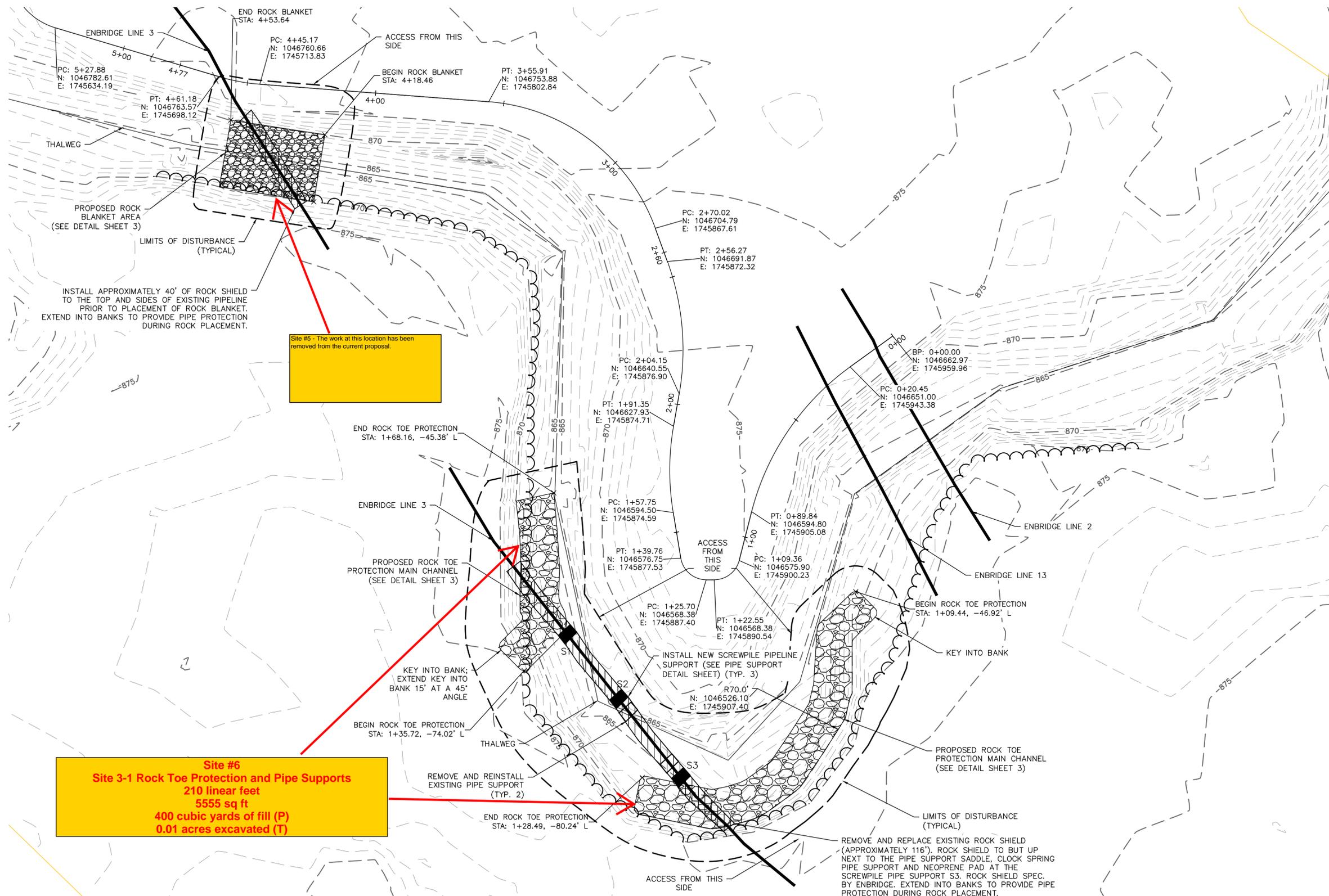
90% ISSUE FOR BID

NO	REVISION	BY DATE	APPR	APPR	
ENBRIDGE TAMARAC RIVER PROJECT ENBRIDGE LINE 3 PIPELINE PROTECTION & BENDS 12, 13 & 14 RIVER EROSION PROTECTION MARSHALL COUNTY, MINNESOTA					
PROJECT:	-				
SCALE:	1"=30'	DATE:	10/13/2014	DRAWN:	RH
CHECK:	TB	APPR:	-	DATE:	-
APPR:	-				
APPR:	-				
D-X-X.031-XXXXX-X-XXX-6					

SITE PLAN SHEET - BENDS 12, 13, & 14

STRUCTURAL SUPPORT LOCATIONS

POINT TABLE		
POINT #	NORTHING	EASTING
S1	1046547.14	1745833.50
S2	1046522.09	1745853.34
S3	1046491.75	1745877.48



INSTALL APPROXIMATELY 40' OF ROCK SHIELD TO THE TOP AND SIDES OF EXISTING PIPELINE PRIOR TO PLACEMENT OF ROCK BLANKET. EXTEND INTO BANKS TO PROVIDE PIPE PROTECTION DURING ROCK PLACEMENT.

Site #5 - The work at this location has been removed from the current proposal.

Site #6
Site 3-1 Rock Toe Protection and Pipe Supports
 210 linear feet
 5555 sq ft
 400 cubic yards of fill (P)
 0.01 acres excavated (T)

3-1 & 3-2 EXPOSURE

NOTE:
 SEE "SITE ACCESS PLAN - SCOPE OF WORK" FOR DESCRIPTION OF SCOPE OF WORK AT 3-1 AND 3-2 EXPOSURE.

NO	REVISION	BY DATE	APPR	APPR

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ENBRIDGE TAMARAC RIVER PROJECT
 ENBRIDGE LINE 3 PIPELINE PROTECTION & BENDS 12, 13 & 14
 RIVER EROSION PROTECTION
 MARSHALL COUNTY, MINNESOTA

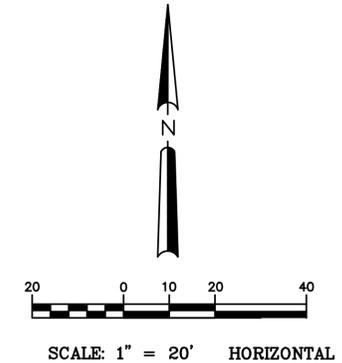
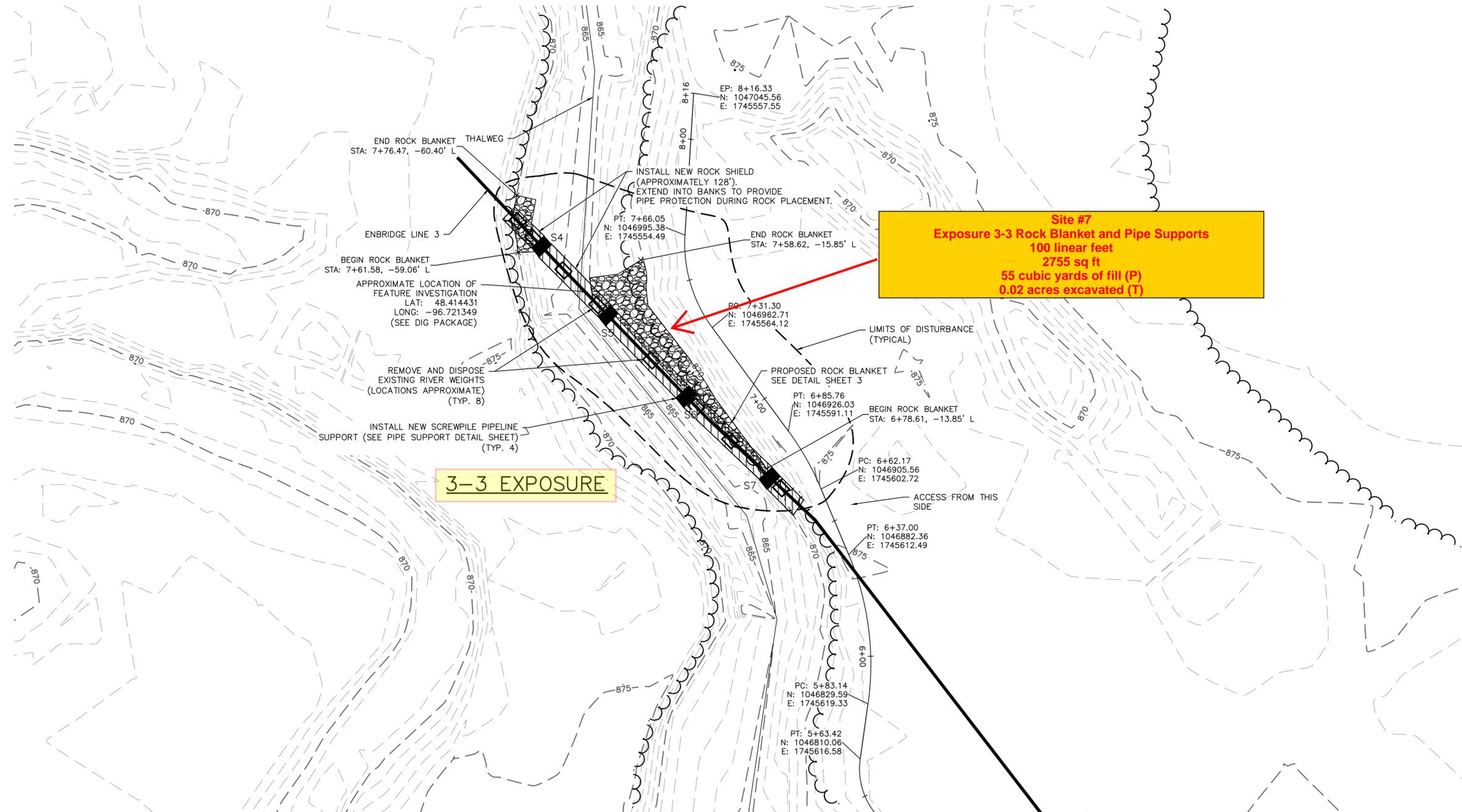
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 CHECK: TB
 APPR: -
 DATE: 10/13/2014
 DRAWN: RH
 DATE: -
 APPR: -

D-X-X.031-XXXXX-X-XXX-7

SITE PLAN SHEET - LINE 3 CROSSINGS 3-1 & 3-2

STRUCTURAL SUPPORT LOCATIONS

POINT TABLE		
POINT #	NORTHING	EASTING
S4	1046991.36	1745503.62
S5	1046966.94	1745527.10
S6	1046938.27	1745555.01
S7	1046909.62	1745584.59



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 RIVER EROSION PROTECTION
 MARSHALL COUNTY, MINNESOTA

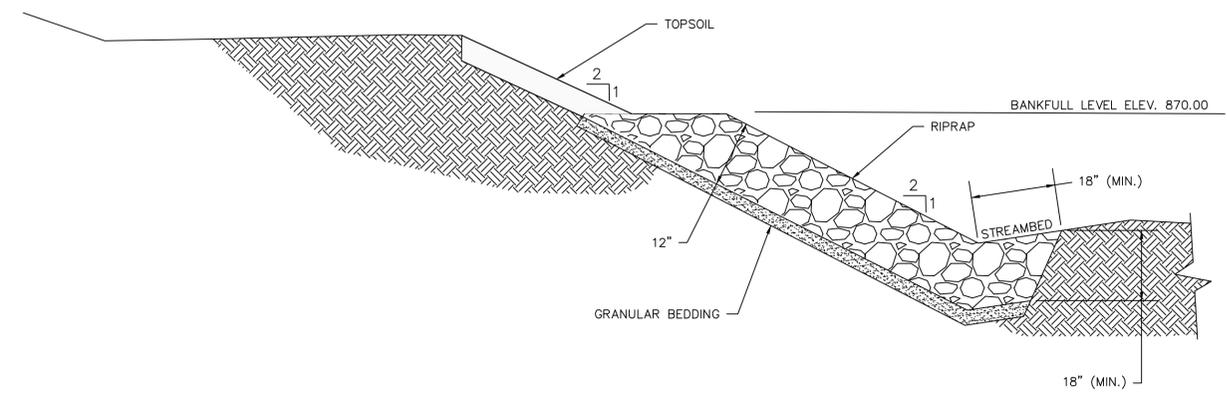
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CHECK: TB	APPR:
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D-X-X.031-XXXXX-X-XXX-8

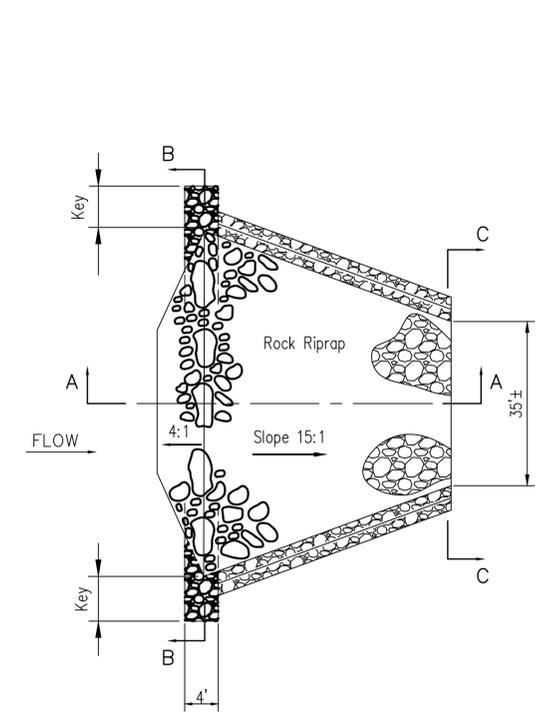
NOTE:
 SEE "SITE ACCESS PLAN - SCOPE OF WORK" FOR DESCRIPTION OF SCOPE OF WORK AT 3-3 EXPOSURE.

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SITE PLAN SHEET - LINE 3 CROSSING 3-3

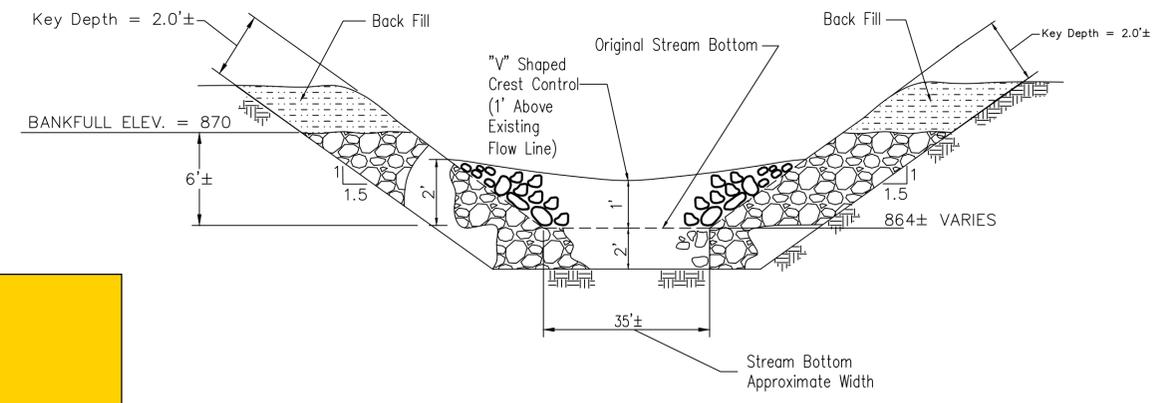


TYPICAL SECTION—ROCK TOE PROTECTION (FOR BENDS 12, 13 & 14)
MNDOT CLASS II RIPRAP
NOT TO SCALE

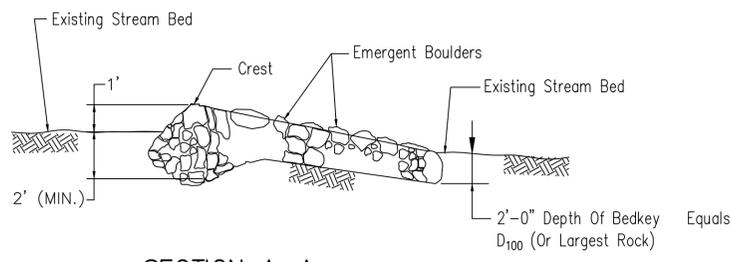


PLAN
PLAN—ROCK RIFFLE (AT BEND 14 DOWNSTREAM)
MNDOT CLASS III RIPRAP
NOT TO SCALE

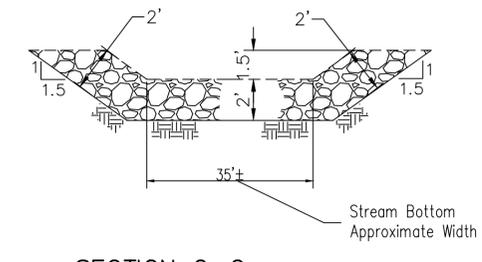
Excavation for Rock Riffle
Width = 35 ft
Length = 35 ft
Height = 2 ft
Total = 2450 cubic feet = 90.7 cubic yards



SECTION B-B



SECTION A-A



SECTION C-C

TYPICAL SECTION—ROCK RIFFLE (AT BEND 14 DOWNSTREAM)
MNDOT CLASS III RIPRAP
NOT TO SCALE

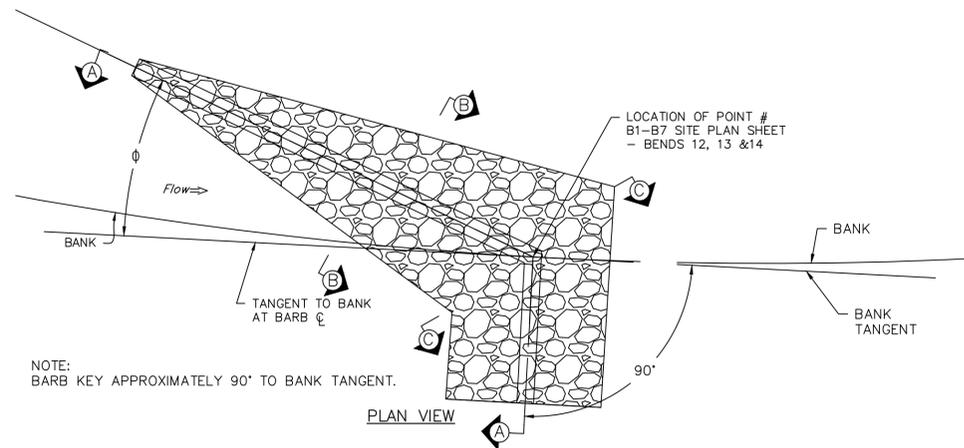
NO	REVISION	BY DATE	APPR	APPR

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ENBRIDGE LINE 3 PIPELINE PROTECTION & BENDS 12, 13 & 14
RIVER EROSION PROTECTION
MARSHALL COUNTY, MINNESOTA

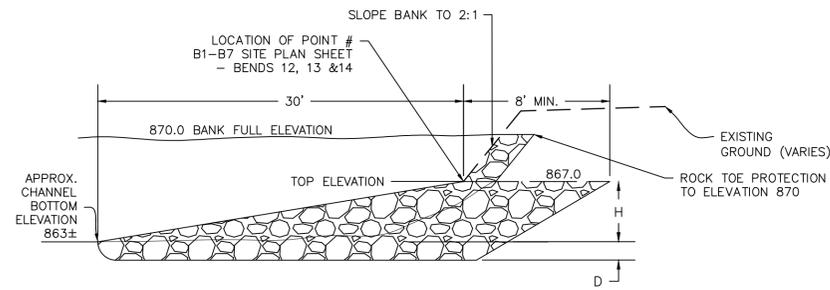
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APPR: -		

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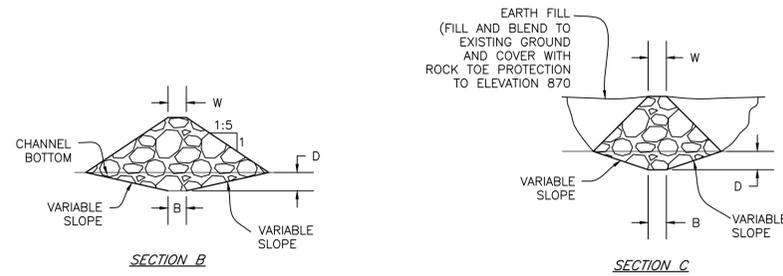
DETAIL SHEET 1 - BENDS 12, 13 & 14



NOTE:
BARB KEY APPROXIMATELY 90° TO BANK TANGENT.



SECTION A

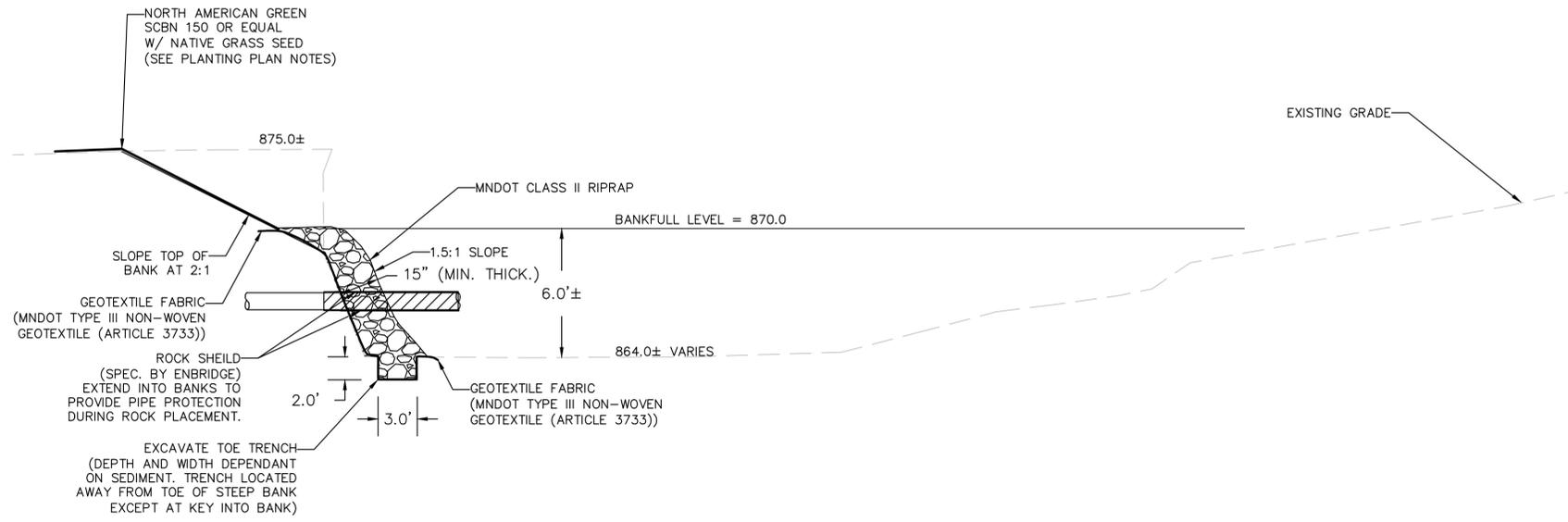


ROCK BARB DETAIL (FOR BENDS 13 & 14)
NOT TO SCALE
MNDOT CLASS IV RIPRAP (MNDOT ARTICLE 3601)

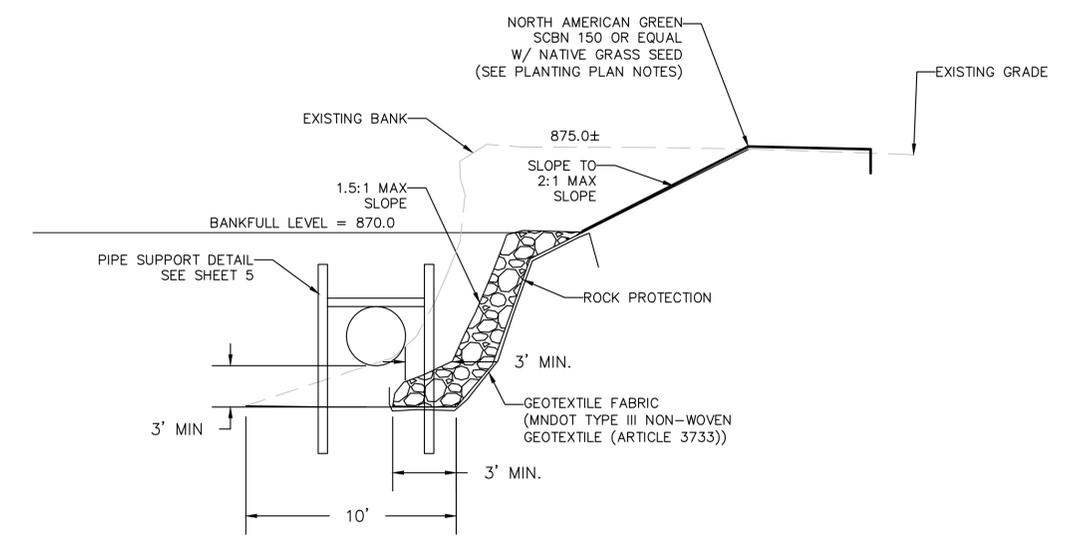
BARB	BANK ⁽¹⁾	BARB LENGTH (L)	BARB CONTROL ELEVATION	B	D	W	H	SLOPE ⁽²⁾	ANGLE ϕ	TONS
1	R	30	867	2.0	2.0	2.0	4.0	15.0	22.5	36.7
2	R	30	867	2.0	2.0	2.0	4.0	15.0	22.5	36.7
3	R	30	867	2.0	2.0	2.0	4.0	15.0	22.5	36.7
4	R	30	867	2.0	2.0	2.0	4.0	15.0	22.5	36.7
5	R	30	867	2.0	2.0	2.0	4.0	15.0	22.5	36.7
6	L	30	867	2.0	2.0	2.0	4.0	15.0	22.5	36.7
7	L	30	867	2.0	2.0	2.0	4.0	15.0	22.5	36.7
TOTAL STONE										256.7

- D₁₀₀ = 2 FT
 1. LEFT OR RIGHT BANK LOOKING DOWNSTREAM
 2. SLOPE = BARB LENGTH / (H - D₁₀₀) (H:1V)

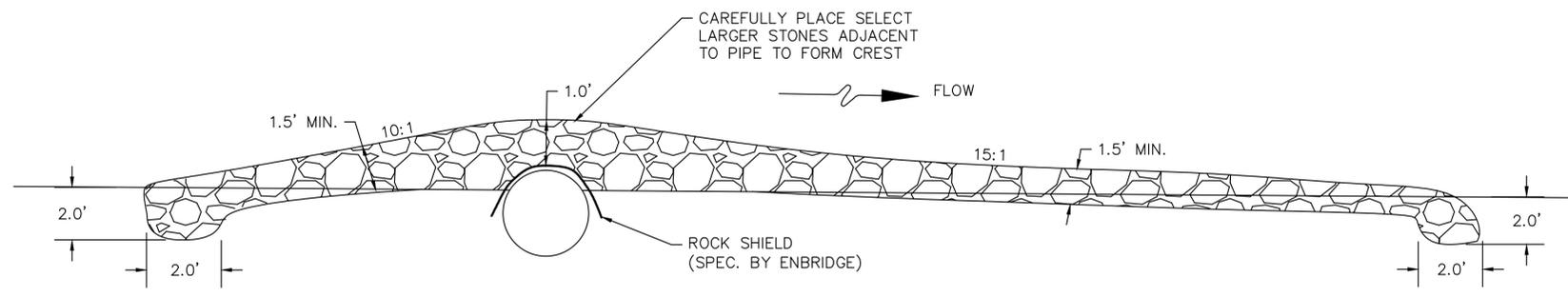
NO	REVISION	BY DATE	APPR	APPR
ENBRIDGE TAMARAC RIVER PROJECT ENBRIDGE LINE 3 PIPELINE PROTECTION & BENDS 12, 13 & 14 RIVER EROSION PROTECTION MARSHALL COUNTY, MINNESOTA				
PROJECT:	-			
SCALE:	-	DATE: 10/13/2014	DRAWN: RH	
CHECK: TB	APPR: -	DATE: -	DATE: -	
APPR: -	D-X-X.031-XXXXX-X-XXX-13			
APPR: -				



TYPICAL SECTION—ROCK TOE PROTECTION CROSSING 3-1 & 3-3
MNDOT CLASS II RIPRAP
NOT TO SCALE



TYPICAL SECTION—ROCK TOE PROTECTION CROSSING 3-3
MNDOT CLASS II RIPRAP
NOT TO SCALE



PROFILE—ROCK BLANKET PROTECTION CROSSING 3-2
MNDOT CLASS II RIPRAP
NOT TO SCALE

NO	REVISION	BY DATE	APPR	APPR

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ENBRIDGE TAMARAC RIVER PROJECT
ENBRIDGE LINE 3 PIPELINE PROTECTION
& BENDS 12, 13 & 14
RIVER EROSION PROTECTION
MARSHALL COUNTY, MINNESOTA

PROJECT:	DATE: 10/13/2014	DRAWN: RH
CHECK: TB	APPR: -	DATE: -
APPR: -	D-X-X.031-XXXXX-X-XXX-14	
APPR: -		

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DETAIL SHEET 3 - CROSSINGS 3-1, 3-2 & 3-3