

CITY OF DULUTH

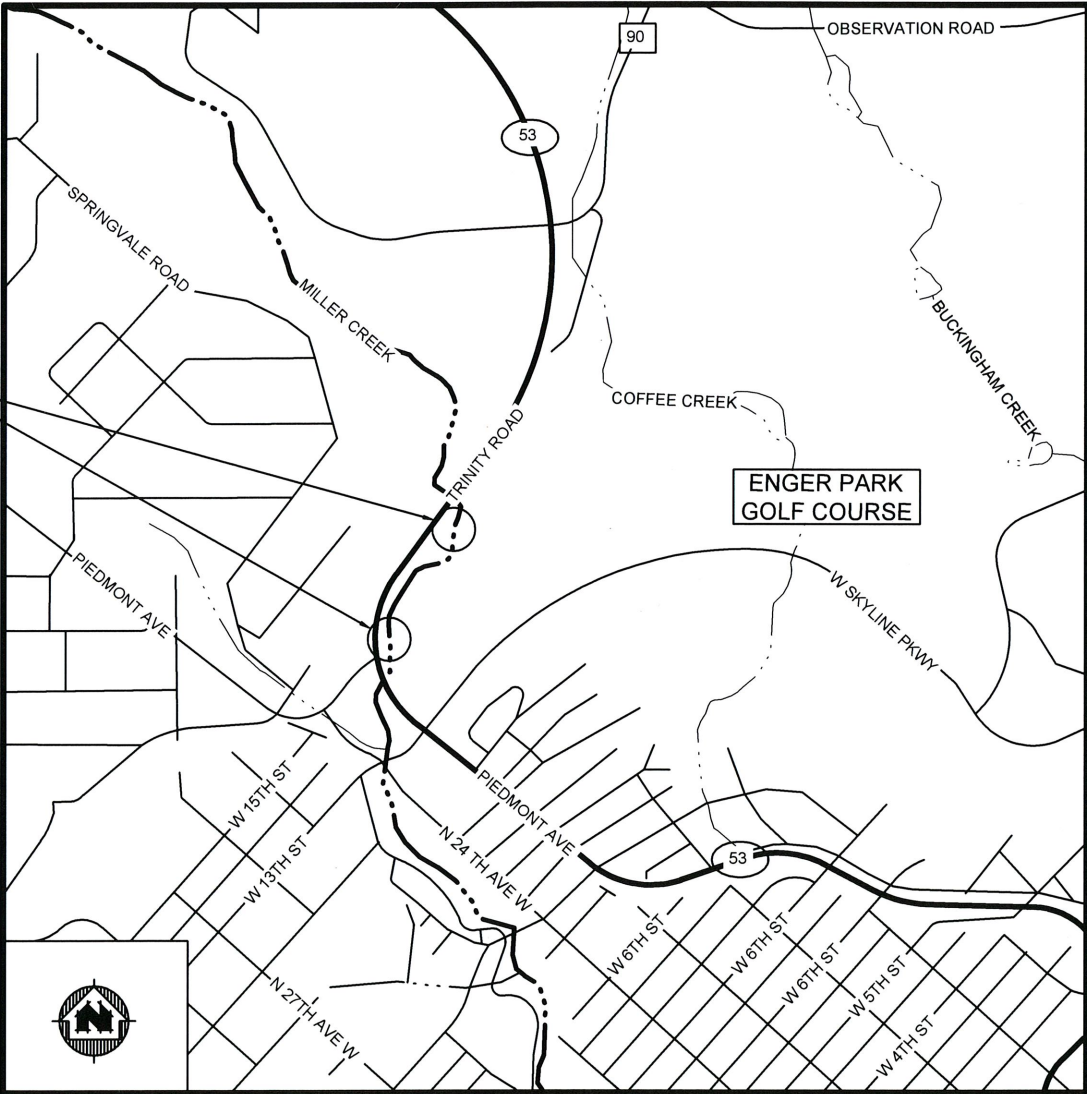
DEPARTMENT OF PUBLIC WORKS AND UTILITIES - ENGINEERING DIVISION

CONSTRUCTION PLANS FOR: MILLER CREEK (REACH #590C) BANK STABILIZATION (2016) CITY PROJECT NO. 1356

LEGEND

	EXISTING WATER MAIN
	EXISTING GATE VALVE & HYDRANT
	WATER SERVICE & CURB STOP
	PROPOSED WATERMAIN, VALVE, & HYDRANT
	PROPOSED WATER SERVICE & CURB STOP
	EXISTING SANITARY SEWER & MANHOLE
	EXISTING FORCEMAIN
	EXISTING STORM SEWER & INLET
	PROPOSED STORM SEWER & INLET
	PROPOSED MANHOLE & SEWER MAIN
	BURIED ELECTRIC
	BURIED GAS & VALVE
	BURIED CABLE TELEVISION
	BURIED TELEPHONE
	BURIED FIBER OPTICS
	RAILROAD TRACKS
	EXISTING CURB & GUTTER
	PROPOSED CURB & GUTTER
	EXISTING SIDEWALK
	PROPOSED SIDEWALK
	EXISTING CULVERT PIPE
	PROPOSED CULVERT PIPE
	FENCE LINE
	DRAINAGE ARROW
	SILT FENCE
	RIGHT-OF-WAY
	BASELINE
	PROPERTY LINE
	TREE LINE
	IRON PIPE
	IRON ROD
	CONTROL POINT
	UTILITY POLE & GUY
	SOIL BORING
	LIGHT POLE
	PEDESTAL
	STREET SIGN
	MAILBOX
	FLAGPOLE
	EROSION BALES
	TREE - DECIDUOUS
	TREE - CONIFEROUS
	TREE TO BE REMOVED

PROJECT LOCATIONS



SITE LOCATION MAP
NOT TO SCALE

WARNING
LOCATION OF UNDERGROUND UTILITIES
TO BE VERIFIED BY CONTRACTOR
GOPHER STATE ONE CALL
CALL BEFORE DIGGING,
1-800-252-1166
REQUIRED BY LAW

GOVERNING SPECIFICATIONS

THE 2016 EDITION OF THE MINNESOTA DEPARTMENT OF
TRANSPORTATION "STANDARD SPECIFICATIONS FOR CONSTRUCTION"
SHALL GOVERN.
AVAILABLE AT: <http://www.dot.state.mn.us/pre-letting/spec/index.html>

THE 2016 EDITION OF THE CITY OF DULUTH PUBLIC WORKS AND UTILITIES
DEPARTMENT CONSTRUCTION STANDARDS AND SUPPLEMENTS OR
ADDENDUMS SHALL APPLY.
AVAILABLE AT:
<http://www.duluthmn.gov/engineering/standard-construction-specifications/>

THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY
QUALITY LEVEL D. THIS QUALITY LEVEL WAS DETERMINED ACCORDING
TO THE GUIDELINES OF C/ASCE 38-2, ENTITLED "STANDARD GUIDELINES
FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE
UTILITY DATA."

WARNING:
LOCATION OF UNDERGROUND UTILITIES TO BE VERIFIED BY
CONTRACTOR. CALL BEFORE DIGGING. GOPHER STATE ONE CALL
1-800-252-1166 AS REQUIRED BY LAW.

SHEET INDEX

SHEET NO.	DESCRIPTION
G 1	TITLE SHEET
G 2	QUANTITIES & SCHEDULES
G 3	DETAILS
G 4	DETAILS
G 5	DETAILS
G 6	DETAILS
G 7	SWPPP NOTES
ST 1	OVERVIEW
ST 2	PLAN VIEW - WORK ZONE A
ST 3	PLAN VIEW - WORK ZONE B
CS 1	CROSS SECTIONS - WORK ZONE A
CS 2	CROSS SECTIONS - WORK ZONE A
CS 3	CROSS SECTIONS - WORK ZONE A
CS 4	CROSS SECTIONS - WORK ZONE B
CS 5	CROSS SECTIONS - WORK ZONE B

THIS PLAN SET CONTAINS 15 SHEETS.

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY
DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL
ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PROJECT ENGINEER: JOSEPH J. JUREWICZ 2/23/16 50396
DATE LIC NO.

CITY APPROVAL

APPROVED 5/9/16
CHIEF ENGINEER OF TRANSPORTATION DATE

APPROVED 5-9-16
CHIEF ENGINEER OF UTILITIES DATE

APPROVED 5-9-16
CITY ENGINEER DATE

PROJECT NO.: 00616087	SCALE: AS SHOWN	NO. 1	DATE 02/12/16	REVISION	BY EDC
PROJECT DATE: 05/20/2015	DRAWN BY: KNN	1		ISSUE FOR BID	
F.B.:	CHECKED BY: EJT				
PLOT DATE: 5/5/16, P:\610s\616\00616087\CADD\CD\616087_Miller Creek_Design-100615.dwg					

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TITLE SHEET

**MILLER CREEK
BANK STABILIZATION**
CITY OF DULUTH PROJECT NO. 1356

FILE NO.
00616087
SHEET
G 1

ESTIMATED QUANTITIES - TABLE 1			CP. No. 1356	
ITEM NO.	SPEC.	ITEM DESCRIPTION	QUANTITY Site 590 C	UNITS
1	A	Project Mobilization	1	LS
2	B	Control of Water	1	LS
3	C	Rock Construction Entrance	1	EA
4	D	Maintenance and Restoration of Access Road/Paths	1	LS
5	E	Clearing and Grubbing	1	LS
6	F	Sediment Removal and On-Site Disposal (P)	310	CY
7	G	Sediment Removal and Off-Site Disposal (P)	260	CY
8	H	Toewood	75	LF
9	I	Vegetated Reinforced Soil Slope (VRSS)	200	SFF
10	J	Live Stake	553	EA
11	K	Import Topsoil (P)	19	CY
12	L	Rip-Rap, Class V	455	TON
13	M	Filter Log	200	LF
14	N	Erosion Control Blanket, Category 3N-2S	67	SY
15	N	Erosion Control Blanket, Category 4N-2S	105	SY
16	O	Seeding, Native Mix	167	SY
17	P	Shrubs	52	EA
18	Q	Root Rap	150	SY
19	R	Deadfall and Debris Removal and Off-Site Disposal	1	LS
20	S	Silt Fence Baffle (P)	75	LF
21	T	Rock Weeper	1	EA

(P) - Payment Based on plan quantity

Planting Schedule - Table 2				
	Common Name	Species Name	Size	Quantity
Shrubs	Pagoda Dogwood	Cornus Alternifolia	#2 Container	7
	Red-Osier Dogwood	Corun Sericea	#2 Container	12
	Bush Honeysuckle	Diervilla Lonicera	#2 Container	14
	Red-berried Elder	Sambucus Pubens	#2 Container	11
	Snowberry	Symphoricarpus Albus	#2 Container	8
Live Stakes	Bebb's Willow	Salix Bebbiana	Live Stakes shall be 4-6' in Length & 1/2-2" in Diameter	139
	Balsam Willow	Salix Pyrifolia		138
	Red-Osier Dogwood	Corun Sericea		138
	Black Willow	Saliz Nigra		138
Cover Crop				Rate
	Oats	Avena Sativa	-	100 lbs/ac
	Winter Wheat	Triticum Aestivum	-	100 lbs/ac

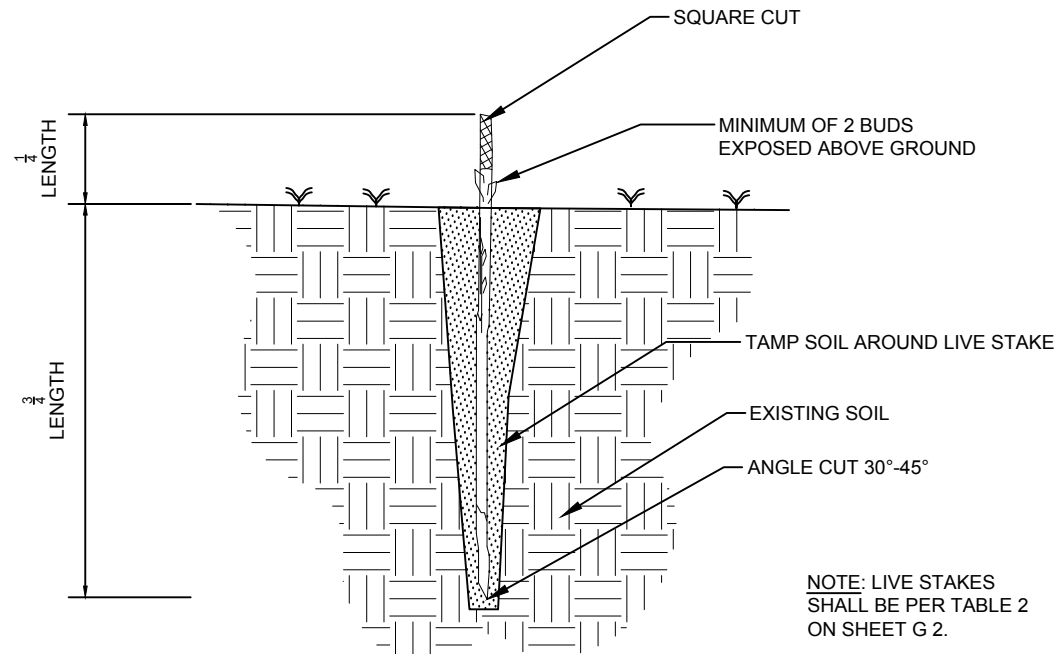
Table 3 - Summary of Work			
Work Zone	Proposed Work	Disturbance Area (SY)	Work in Channel
A	Toe Wood & V.R.S.S. Slope Repair	395	Yes
B	Rip Rap Bank Stabilization	222	No

GENERAL CONSTRUCTION NOTES:

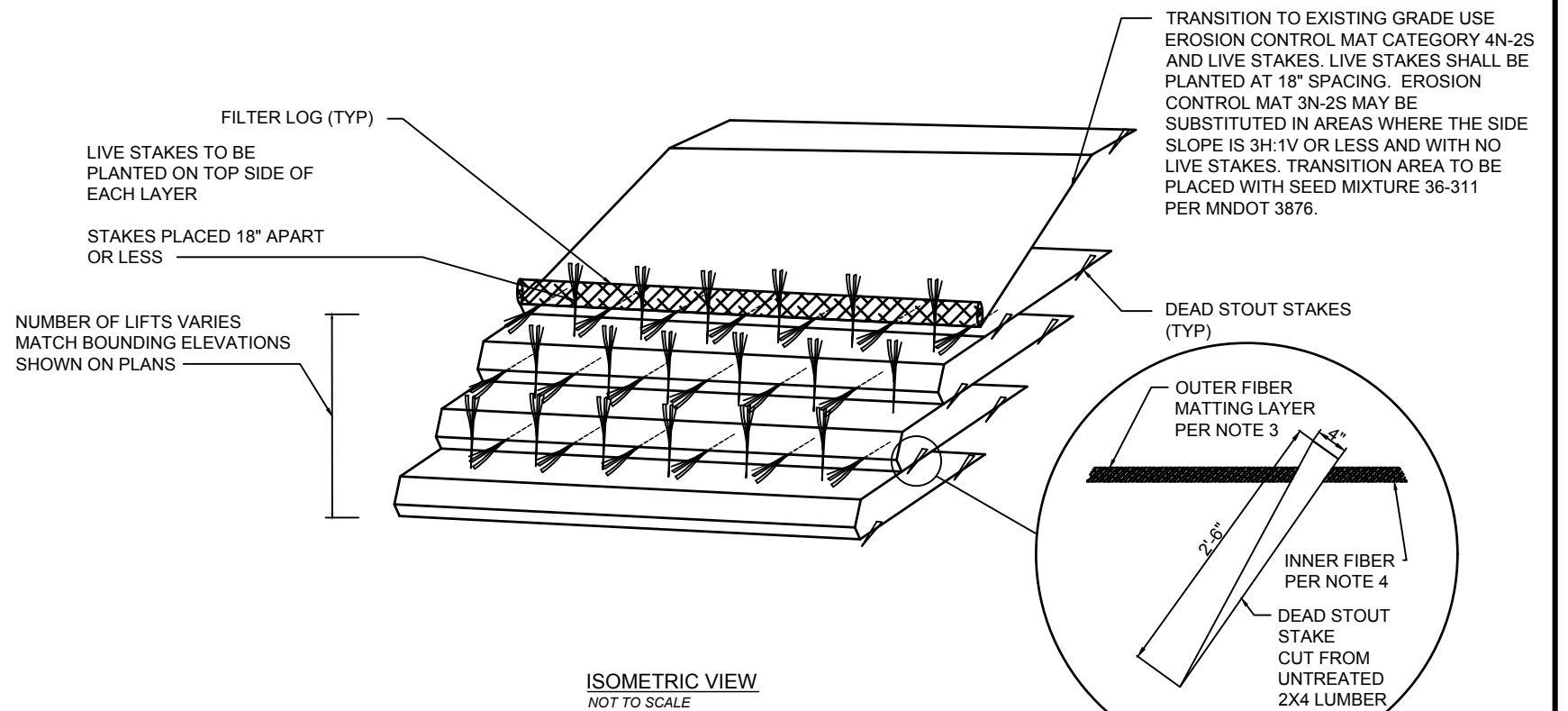
1. ALL EXCAVATION WITHIN OR ADJACENT TO THE STREAM BED SHALL BE UNDERTAKEN IN DRY CONDITIONS. THE CONTRACTOR SHALL INSTALL SANDBAGS, COFFERDAMS, AND BYPASS PIPING AS NECESSARY TO SAFELY ROUTE THE STREAM FLOW AROUND THE EXCAVATION AREA UNTIL CONSTRUCTION IS COMPLETE. THIS WORK ITEM SHALL BE PAID FOR AS A PART OF THE LUMP SUM BID ITEM FOR CONTROL OF WATER.
2. DEBRIS AND DEADFALL REMOVAL SHALL NOT BE INTERPRETED TO MEAN GRUBBING, BUT MAY INCLUDE REMOVAL OF LIVE TIMBER BY CUTTING AND LEAVING STUMP INTACT. LIVE TIMBER CAN BE CUT AT BREAK OR NO CLOSER THAN 2-FEET TO THE GROUND. DEADFALL IS TO BE CONSIDERED ONLY FLOATABLE DEBRIS. DEADFALL OR CUT TIMBER IN GOOD CONDITION MAY BE UTILIZED ON SITE FOR TOE WOOD STABILIZATION AS APPROVED BY THE ENGINEER. DEADFALL IS TO EITHER BE RECYCLED ON SITE AS TOE WOOD OR IS TO BE REMOVED FROM PROJECT LIMITS.
3. COMMON EXCAVATION SHALL INCLUDE TOPSOIL STRIPPING AND STOCKPILING, AND SUBSOIL EXCAVATION AND STOCKPILING. IT IS ANTICIPATED THAT THE EXCAVATED SUBSOIL WILL BE SUITABLE FOR REUSE AS BACKFILL FOR V.R.S.S., TOE WOOD TOE PROTECTION, AND IN OTHER AREAS AS NECESSARY. IT IS ANTICIPATED THAT IMPORTING TOPSOIL OR GENERAL FILL WILL NOT BE NECESSARY. COMMON EXCAVATION SHALL BE INCIDENTAL TO CONSTRUCTION
4. DEADFALL AND DEBRIS REMOVAL IS ASSUMED BETWEEN STATIONS 202+00 AND 204+50, AND BETWEEN STATIONS 212+50 AND 217+00 AND TO BE WITHIN 10-FEET OF THE BANKFULL WIDTH. AS NOTED WITHIN THE PLANS AND SPECIFICATIONS, DEADFALL AND DEBRIS TO BE REMOVED SHALL BE MARKED IN THE FIELD WITH SURVEYORS PAINT AND/OR FLAGGING BY CITY STAFF.
5. OTHER ITEMS WHERE A METHOD OF PAYMENT IS NOT NOTED SHALL BE INCIDENTAL TO CONSTRUCTION.

INVASIVE SPECIES CONTROL MEASURES:

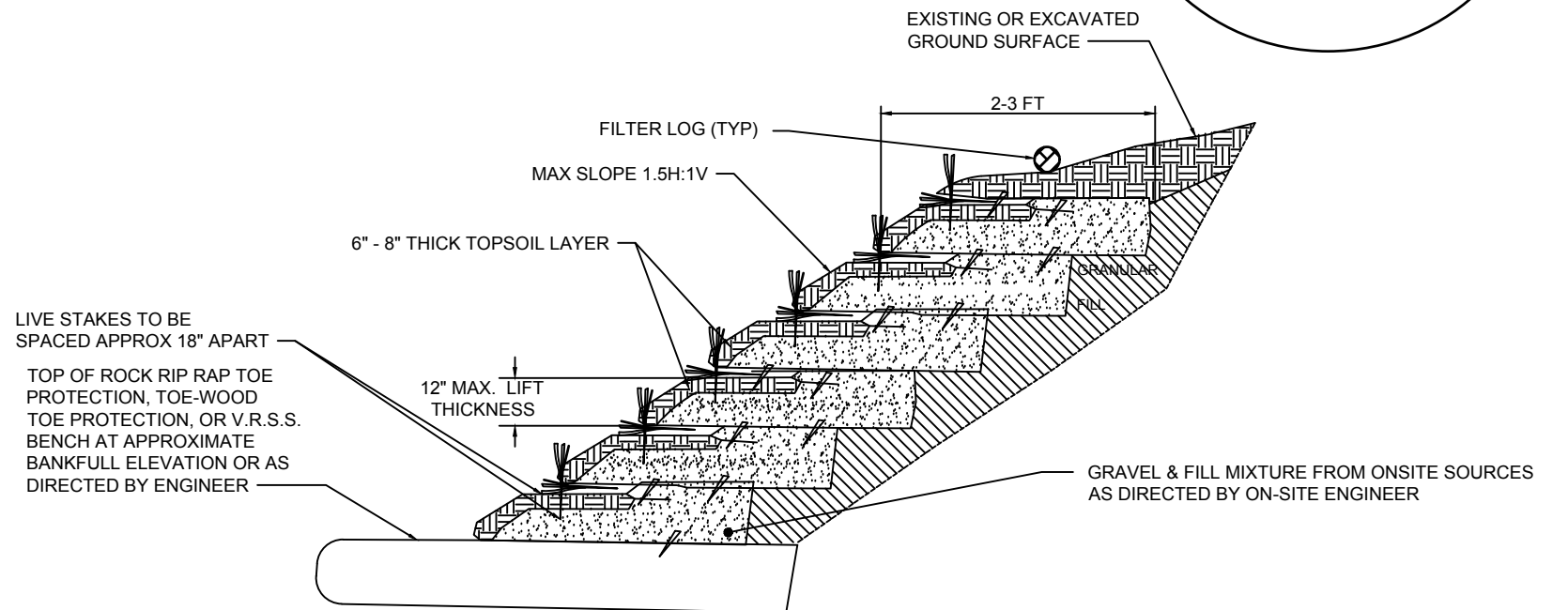
PRIOR TO ENTERING THE PROJECT SITE, THE CONTRACTOR SHALL INSPECT ALL EQUIPMENT AND GEAR AND REMOVE AQUATIC PLANTS, ANIMALS, AND MUD FROM ALL ITEMS. EQUIPMENT AND GEAR SHALL BE DEFINED AS ALL BOATS, MOTORS, TRACKED VEHICLES, AND HEAVY EQUIPMENT, BARGES, HOSES, PUMPS, SHEET PILING, SILT CURTAINS OR TURBIDITY BARRIERS, WADERS, AND ALL OTHER EQUIPMENT WHICH MAY COME INTO CONTACT WITH SURFACE WATERS DURING CONSTRUCTION. THE CONTRACTOR SHALL SCRUB ALL EQUIPMENT AND GEAR WITH A STIFF-BRISTLED BRUSH WHEN FEASIBLE. THE CONTRACTOR SHALL MAINTAIN A MANIFEST DOCUMENTING THE ITEM, DATE, LOCATION AND DISINFECTION METHOD USED TO PERFORM DISINFECTION.



A LIVE STAKES
G3 NOT TO SCALE



ISOMETRIC VIEW
NOT TO SCALE



SECTIONAL VIEW
NOT TO SCALE

B LIVE PLANT VEGETATED REINFORCED SOIL SLOPE (V.R.S.S.) DETAIL
G3 NOT TO SCALE

GENERAL NOTES ON V.R.S.S.

1. THE ENGINEER MUST BE NOTIFIED AT LEAST 3 DAYS PRIOR TO INSTALLATION AND MUST BE ON SITE DURING INSTALLATION.
2. THE BOTTOM OF V.R.S.S. STABILIZATION SHALL BE AT THE BANKFULL ELEVATION OR AS DIRECTED BY THE ENGINEER. THE TOP OF V.R.S.S. STABILIZATION SHALL BE ABOVE THE 100-YR ELEVATION AND AS DIRECTED BY THE ENGINEER.
3. LAY NATURAL FIBER MATTING ON BOTTOM OF THE BENCH, OVERLAPPING ADJACENT MATTING BY 1 FOOT. THE OUTER EXPOSED FIBER MATTING LAYER OF EACH SOIL LIFT SHALL BE GEOCOIR/DEKOWE 900 WOVEN COCONUT FIBER MESH, BIOD-MATTM 90, OR AN ENGINEER APPROVED EQUIVALENT.
4. THE INNER LAYER OF FIBER MATTING FOR EACH SOIL LIFT SHALL BE BIONET C125BN OR AN ENGINEER APPROVED EQUIVALENT AND SHALL BE LAID BENEATH THE TOPSOIL LAYER. LAY THE INNER LAYER OF BIONET ON TOP OF NATURAL FIBER MATTING OF EACH SOIL LIFT. FABRIC SHOULD BE INSTALLED SMOOTH WITH NO UNNECESSARY FOLDS OR WRINKLES. STAKE THE SHOREWARD END OF THE FIBER MATTING IN PLACE WITH WOODEN STAKED SPACED EVERY THREE FEET AS SHOWN ON THE DRAWINGS.
5. THE FIRST 6 TO 8 INCHES OF THE BOTTOM SOIL LIFT SHALL BE FILLED WITH GRANULAR MATERIAL EXCAVATED FROM THE STREAM BED. THE TOP 6 TO 8 INCHES ON THE FRONT OF THE SURFACE LAYER SHOULD BE COMPRISED OF TOPSOIL MIX CONFORMING TO THE REQUIREMENTS OF MNDOT 3877.2A COMMON TOPSOIL BORROW AND SHALL BE WEED SEED FREE.
6. THE TOPSOIL LAYER SHALL BE SEEDED WITH SEED MIXTURE 34-361 PER MNDOT 3876 AT 0.7 POUNDS PER 1,000 SQUARE FEET OF LIFT SURFACE AREA AS SHOWN ON THE DRAWINGS.
7. FOLD THE FIBER MATTING OVER THE FILL MATERIAL AND STAKE IN PLACE SO THE FABRIC IS TAUT AND SMOOTH WITH NO UNNECESSARY FOLDS OR WRINKLES. BACKFILL BEHIND THE BOTTOM SOIL LIFT WITH GRANULAR FILTER MATERIAL TO MEET THE EXISTING SLOPE AS SHOWN ON THE DRAWINGS.
8. SHRUBS SHALL BE SPACED APPROXIMATELY 36-INCHES ON CENTER AND SHALL BE SELECTED FROM TABLE 2 ON SHEET G2. SHRUB INSTALLATION LOCATION IS AS NOTED IN DETAIL A/G5.
9. V.R.S.S. SHALL BE MEASURED FOR PAYMENT BY SQUARE FOOT OF FACE (SFF) WHICH SHALL BE MEASURED IN ACCORDANCE TO SECTION 01 22 00.
10. INSTALLATION OF V.R.S.S. SHALL INCLUDE FILL MIXTURE, OUTER & INNER FABRIC TYPES SPECIFIED ABOVE, TOPSOIL AND SEED MIX SPECIFIED ABOVE. LIVE STAKES ARE TO BE PAID FOR SEPARATELY.

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PLOT DATE: 5/5/16, P:\610s\616\00616087\CADD\IC3D\616087 Miller Creek Design-100615.dwg					

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JOSEPH J. JUREWICZ
Date 05/20/2015 License No. 50396

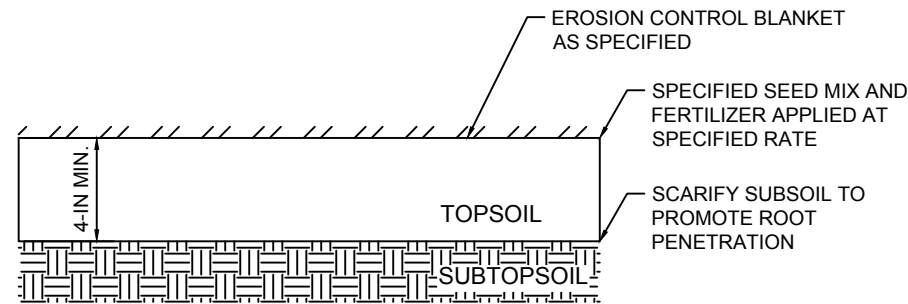


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DETAILS

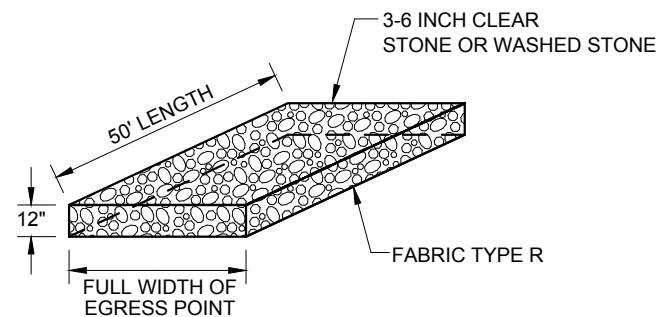
MILLER CREEK
BANK STABILIZATION
CITY OF DULUTH PROJECT NO. 1356

FILE NO.
00616087
SHEET
G 3

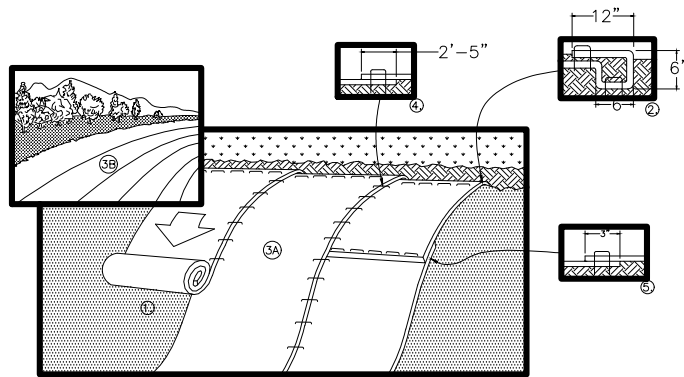


NOTE: WHERE REQUIRED, PLANT HERBACEOUS PLUGS ACCORDING TO PLAN.

A
G4 **TOPSOIL AND SEEDING DETAIL**
NOT TO SCALE



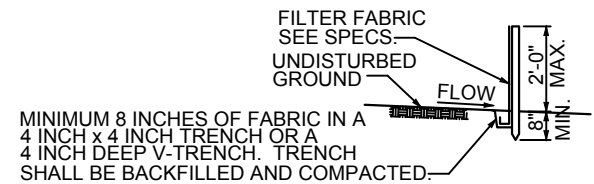
B
G4 **ROCK CONSTRUCTION ENTRANCE DETAIL**
NOT TO SCALE



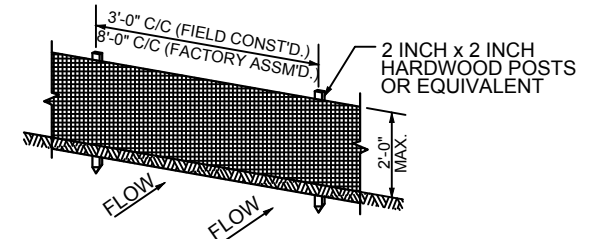
1. PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED.
2. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE BLANKET IN A 6" (15 CM) DEEP X 6" (15 CM) WIDE TRENCH WITH APPROXIMATELY 12" (30cm) OF BLANKET EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE BLANKET WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" (30 CM) APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" (30 CM) PORTION OF BLANKET BACK OVER SEED AND COMPACTED SOIL. SECURE BLANKET OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" (30 CM) APART ACROSS THE WIDTH OF THE BLANKET.
3. ROLL THE BLANKETS (A.) DOWN OR (B.) HORIZONTALLY ACROSS THE SLOPE. BLANKETS WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL BLANKETS MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE.
4. THE EDGES OF PARALLEL BLANKETS MUST BE STAPLED WITH APPROXIMATELY 2"-5" (5 CM-12.5 CM) OVERLAP DEPENDING ON BLANKET TYPE.
5. CONSECUTIVE BLANKETS SPICED DOWN THE SLOPE MUST BE PLACED END OVER END (SHINGLE STYLE) WITH AN APPROXIMATE 3" (7.5 CM) OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" (30 CM) APART ACROSS ENTIRE BLANKET WIDTH.
6. EROSION CONTROL BLANKET SHALL BE CATEGORY 3N-2S OR 4N-2S WITH ALL NATURAL NETTING & STITCHING PER MNDOT 3885 - TABLE 3885-3.

NOTE:
*IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" (15 CM) MAY BE NECESSARY TO PROPERLY SECURE THE BLANKETS.

C
G4 **EROSION CONTROL BLANKET DETAIL**
NOT TO SCALE



SECTION



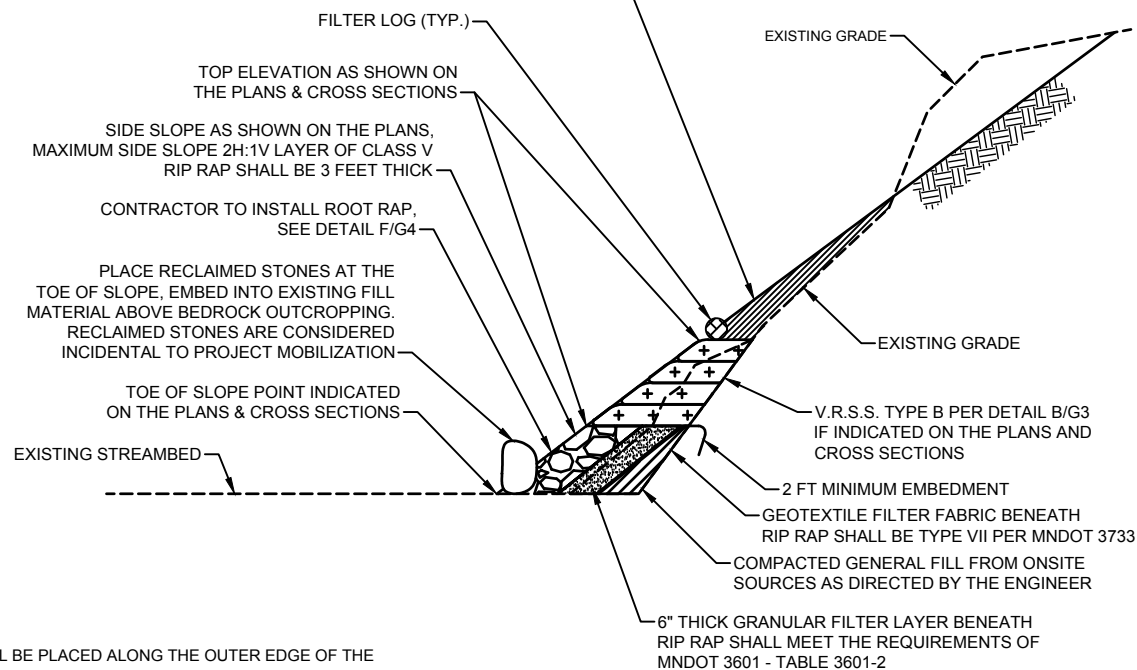
PERSPECTIVE VIEW

GENERAL NOTES:

1. ENDS OF FENCE SHALL BE TURNED UPSLOPE 1 TO 2 FEET IN ELEVATION TO PREVENT FLANKING.
2. STAPLE FABRIC WITH 1/2 INCH (MINIMUM) STAPLES TO THE UPSLOPE SIDE OF THE POSTS.
3. WHEN TWO SECTIONS OF FILTER FABRIC ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED BY SIX INCHES AND FOLDED.
4. SILT FENCE SHALL BE INCIDENTAL TO PROJECT MOBILIZATION.

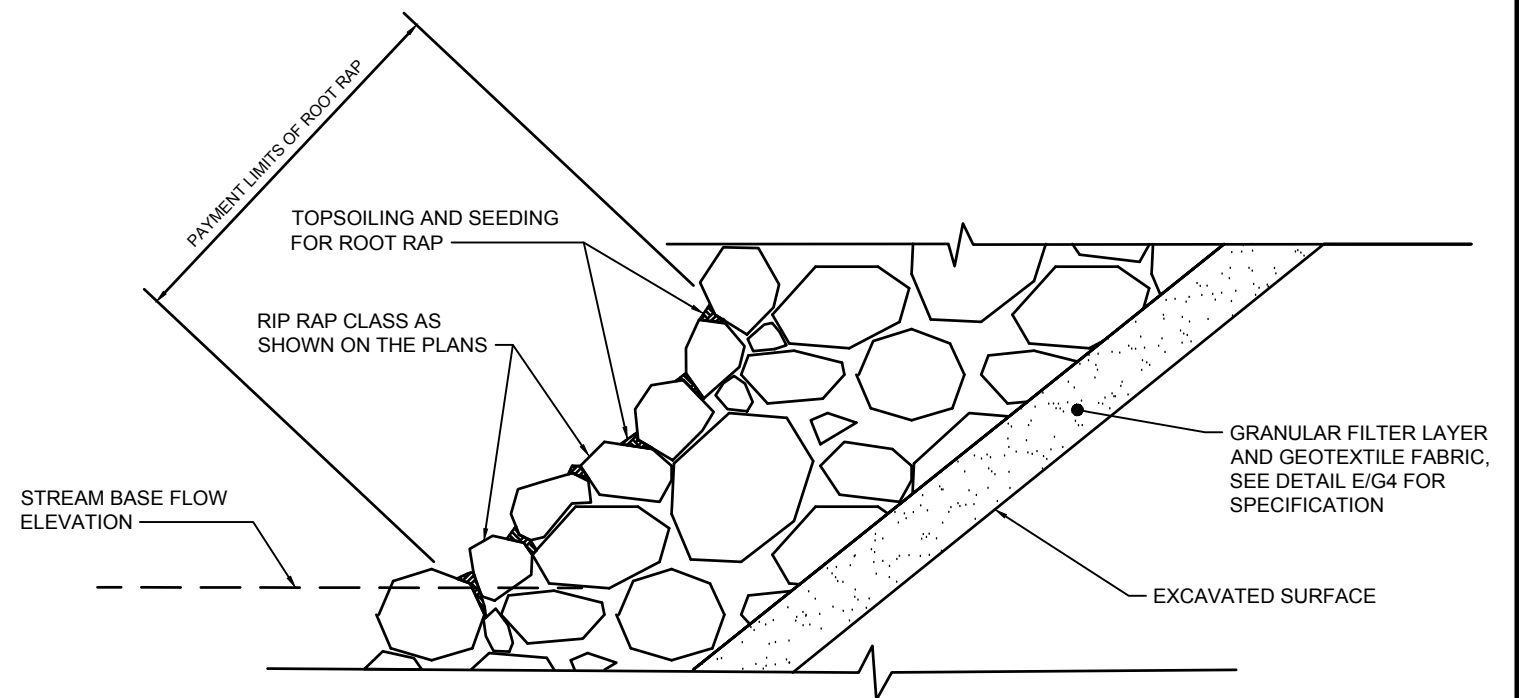
D
G4 **TYPICAL SILT FENCE INSTALLATION AT SITE PERIMETER DETAIL**
NOT TO SCALE

SLOPE STABILIZATION ABOVE RIP RAP AND/OR V.R.S.S. - TYPE B TRANSITION TO EXISTING GRADE USE EROSION CONTROL MAT 4N-2S AND LIVE STAKES. LIVE STAKES SHALL BE PLANTED AT 18" SPACING. EROSION CONTROL MAT 3N-2S WITH NO LIVE STAKES MAY BE SUBSTITUTED IN AREAS WHERE THE SIDE SLOPE IS 3H:1V OR LESS.



E
G4 **RIP RAP TOE PROTECTION**
NOT TO SCALE

- NOTES:
1. LARGER ROCK SHALL BE PLACED ALONG THE OUTER EDGE OF THE TOE.
 2. FOR COMPLETE RIP RAP TOE PROTECTION INSTALLATION, ROOT RAP WILL BE INSTALLED FOR THE RIP RAP SURFACE ABOVE THE STREAM BASE FLOW ELEVATION. SEE DETAIL F/G4 FOR ROOT RAP INSTALLATION.
 3. RIP RAP TYPE V INSTALLATION SHALL INCLUDE GRANULAR FILTER LAYER, GEOTEXTILE FABRIC AND TYPE V RIP RAP.



- NOTE:
1. ROOT RAP INSTALLATION SHALL PLACE A SIX INCH DEPTH OF TOPSOIL WITHIN THE VOID SPACES BETWEEN THE TOP LAYER OF RIP RAP STONES. HAND BROADCAST THE SEED IMMEDIATELY AFTER TOPSOIL PLACEMENT, AND THEN IMMEDIATELY SCARIFY OR PLACE ADDITIONAL TOPSOIL TO ENSURE THE SEED IS COVERED BY A 1/2-INCH TO 1-INCH THICKNESS OF TOPSOIL. INSTALLATION OF ROOT RAP SHALL INCLUDE TOPSOIL AND MNDOT SEED MIXTURE 34-361.

F
G4 **ROOT RAP INSTALLATION DETAIL**
NOT TO SCALE

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DETAILS

MILLER CREEK
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SHEET
G 4

1. SLOPE CHANNEL & PLACE ANCHOR LOGS
-EXCAVATE BASE OF TOE WOOD BENCH TO SPECIFIED WIDTH AND ELEVATION
-EXCAVATION WILL BE DONE IN DRY WEATHER CONDITIONS.

ANCHOR LOGS
SPECIFICATION:
-10" - 12" DIAMETER
-LIMBS REMOVED
-APPROX. 14' LENGTH

PLACEMENT:
-PLACE LOGS PARALLEL TO STREAM IN TOEWOOD TRENCH
-PLACE LOGS IN CROSSED PAIRS,
(CUTTING NOTCHES MAY BE NECESSARY TO STABILIZE ANCHOR LOGS

2. PLACE TOEWOOD, BOULDERS, AND WOODY DEBRIS FILL

TOE WOOD
SPECIFICATION:
-12" MIN DIAMETER
-APPROX. 12' LENGTH
-LIMBS REMOVED
-ROOT WADS LEFT INTACT
-ENDS SHARPENED

PLACEMENT:
-STACK TOE WOOD LOGS ON TOP OF FOOTER LOGS, WITH ROOTS IN TRENCH
-PLACE TOEWOOD LOGS APPROX. 20 FEET ON CENTER
-ANGLE ROOTWADS 30 DEGREES UPSTREAM AS SHOWN
-DRIVE SHARPENED TRUNKS MIN. 3' INTO BANK

BOULDERS:
SPECIFICATION:
-SHALL BE ANGULAR, FRACTURED OR BLOCKY
-SHALL WEIGH BETWEEN 800 AND 3,000 LBS

PLACEMENT:
- BOULDERS SHALL BE PLACED ALONG THE TRANSVERSE EDGE OF THE TOE WOOD EXCAVATION.
- APPROXIMATELY 4 TO 6 BOULDERS SHALL ALSO BE PLACED BETWEEN EACH TOE WOOD LOG.

WOODY DEBRIS:
SPECIFICATION:
-WOODY MATERIAL (COMPOSED OF SMALL LIMBS AND BRANCHES,
APPROX. 4" MIN DIAMETER AND SMALLER)

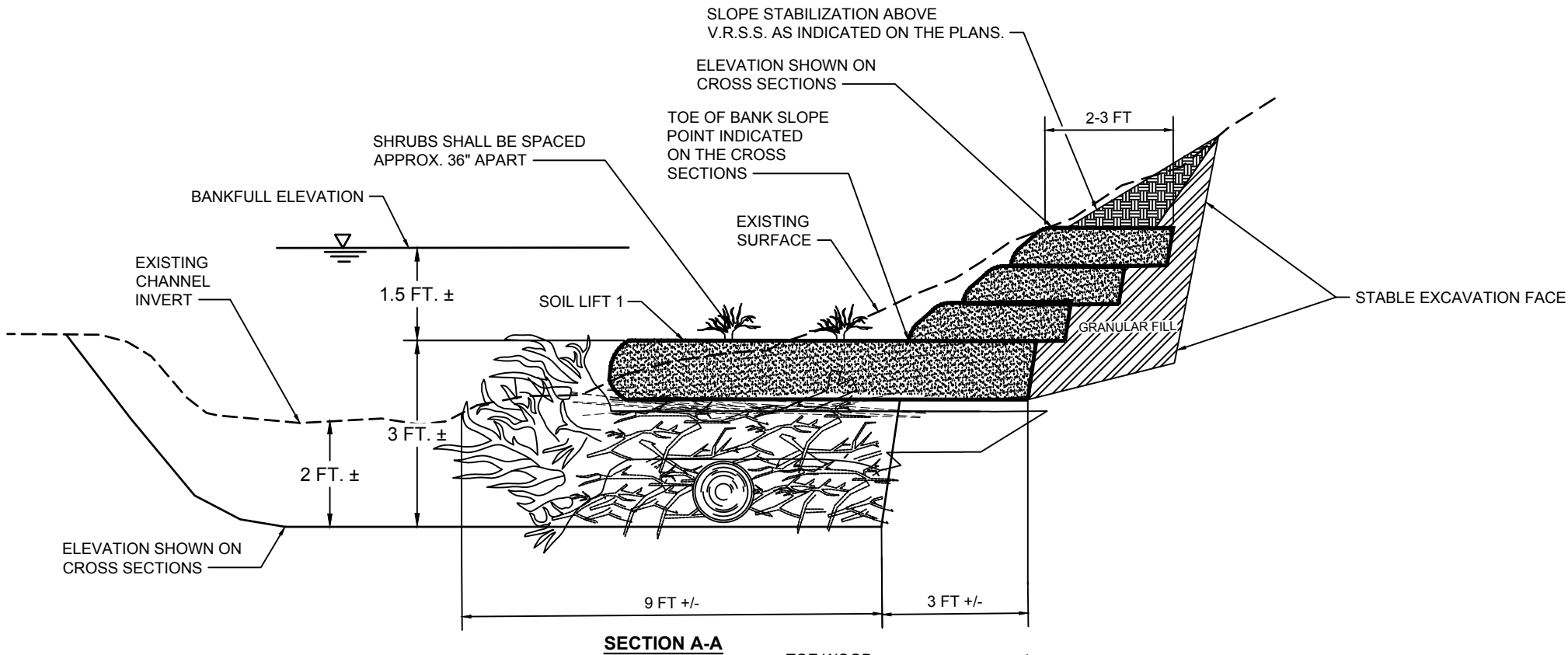
PLACEMENT:
-FILL SPACES BETWEEN FOOTER LOGS AND TOEWOOD
-COMPACT DEBRIS WITH EXCAVATOR BUCKET

3. SOIL LIFT 1
SPECIFICATION:
-USE EXCESS MATERIAL FROM STREAMBED FOR SOIL FILL
-WRAP FILL IN MIN 7' WIDE GEOTEXTILE. GEOTEXTILE SHALL BE GEOCOIR/DEKOWE
900 WOVEN COCONUT FIBER MESH, BIO-MATM 90, OR AN ENGINEER APPROVED EQUIVALENT.
-THE INNER LAYER OF FIBER MATTING SHALL BE BIONET C125BN OR AN ENGINEER APPROVED EQUAL.

PLACEMENT:
-LAY FIRST HALF OF 900 WOVEN COCONUT FIBER MESH ON BENCH
-PLACE 6"-1' OF TOPSOIL ON TOP OF GEOTEXTILE AND ACROSS BENCH
-WRAP 2ND HALF OF GEOTEXTILE OVER PLACED SOIL SO THAT
GEOTEXTILE IS EMBEDDED MIN 3' ABOVE AND BELOW SOIL LIFT.
-SOIL LIFT 1 SHALL BE SEEDED WITH MNDOT SEED MIXTURE 34-361 PER MNDOT 3876.

4. PLACE LIVE CUTTINGS AND BUILD TO BANKFULL ELEVATION

PLACEMENT:
- STABILIZATION ABOVE SOIL LIFT 1 SHALL BE V.R.S.S. PER DETAIL B/G3
OR AS OTHERWISE SHOWN ON THE PLANS.

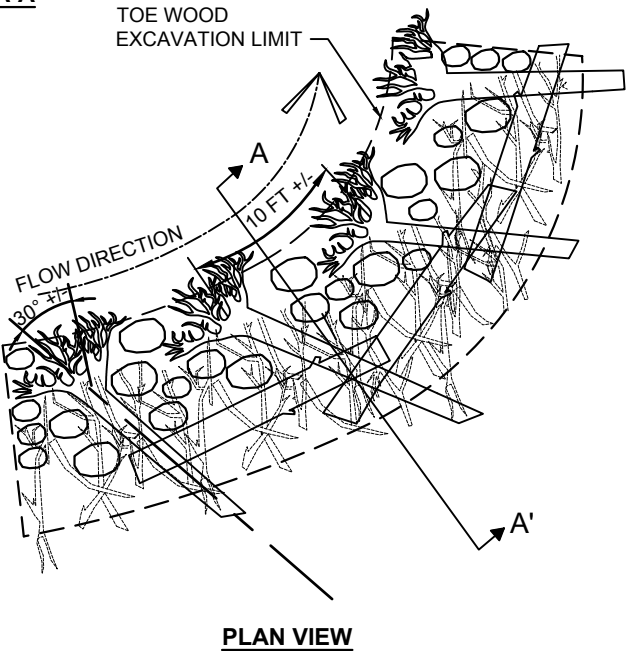


GENERAL NOTES ON TOE WOOD STABILIZATION:

1. SOAK DORMANT CUTTINGS FOR A MINIMUM OF 24 HOURS IN FLOWING WATER BEFORE PLANTING. SOAKING FOR 5-7 DAYS IS CONSIDERED IDEAL. THE DORMANT CUTTINGS SHOULD ONLY BE INSTALLED DURING THE DORMANT SEASON, AFTER LEAF DROP IN THE FALL AND BEFORE BUD BREAK IN THE SPRING. DORMANT CUTTINGS STORED IN COLD STORAGE WITH NO VISIBLE SIGN OF BUD BREAK MAY BE USED INTO LATE SPRING.

2. DORMANT CUTTINGS ARE TO BE PLACED ON THE TOP OF THE BANKFULL BENCH AT 3 BRANCHES PER LINEAR FOOT. THE BASAL END OF THE CUTTINGS SHOULD EXTEND AT LEAST 2 FEET PAST THE BACK OF THE GRADED BENCH. NO MORE THAN 6 INCHES OF THE BUDDING END OF THE LIVE BRANCH SHOULD EXTEND PAST THE FRONT OF THE GRADED BENCH. COVER THE DORMANT CUTTINGS WITH TOPSOIL TO CREATE AN EVEN SURFACE FOR THE CONSTRUCTION OF THE FIRST SOIL LIFT.

3. TOE WOOD STABILIZATION SHALL BE MEASURED LONGITUDINALLY ALONG THE EXCAVATION LIMIT WITHIN THE STREAMBED. THE WORK SHALL INCLUDE ALL ELEMENTS UP TO THE TOP OF SOIL LIFT 1. ALL OTHER V.R.S.S. LIFTS WILL BE COMPENSATED UNDER THE V.R.S.S. PAY ITEM. SHRUB SHALL BE PAID AT THE CONTRACT UNIT PRICE FOR SHRUBS. SEED FOR SOIL LIFT 1 SHALL BE INCIDENTAL TO THE UNIT PRICE FOR TOEWOOD.



A
G5 TOE WOOD STABILIZATION DETAIL
NOT TO SCALE

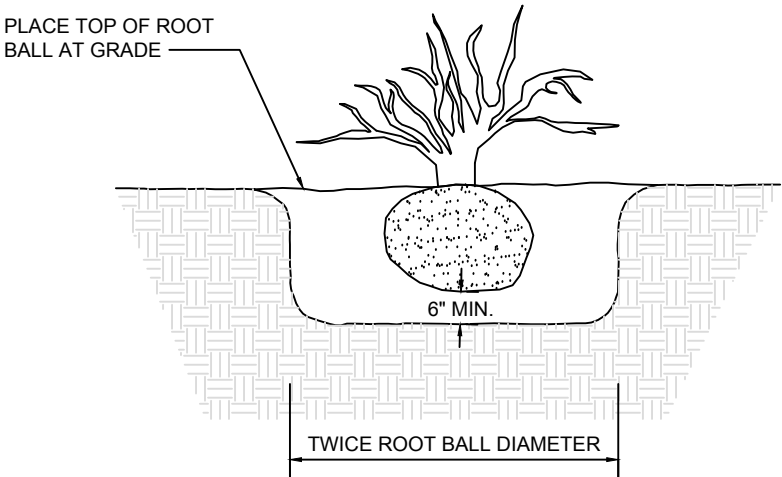
PROJECT NO.:	00616087	SCALE: AS SHOWN	NO.	DATE	REVISION	BY
PROJECT DATE:	05/20/16	DRAWN BY:	KNN	1	02/12/16	EDC
F.B.:		CHECKED BY:	EJT			
PLOT DATE:	5/5/16	P:1610s161600616087/CADD/C3D/616087	Miller Creek	Design-100615.dwg		

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JOSEPH J. JUREWICZ
Date
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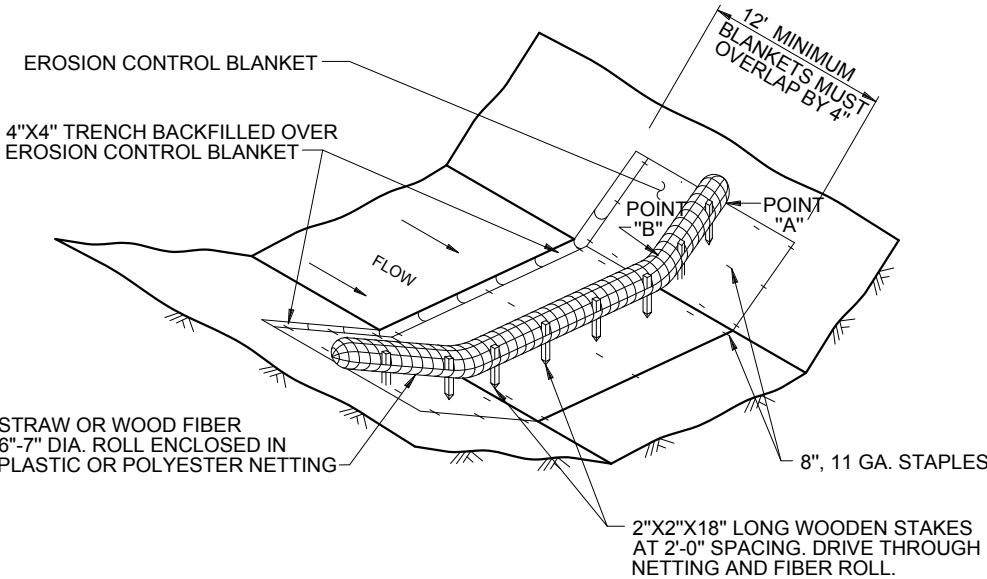
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DETAILS	MILLER CREEK BANK STABILIZATION CITY OF DULUTH PROJECT NO. 1356	FILE NO. 00616087 SHEET G 5
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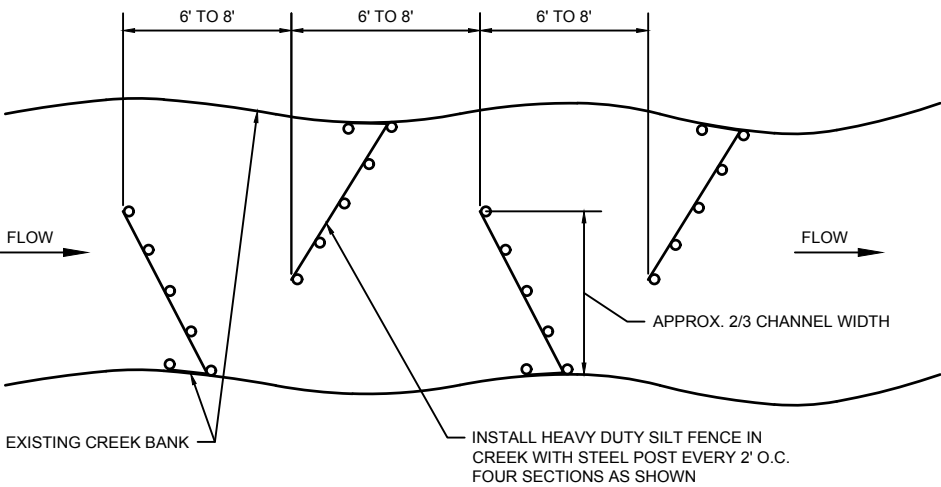


- NOTES:
1. SCARIFY BOTTOM AND SIDES OF PLANTING PIT PRIOR TO PLANTING.
 2. LOOSEN ROOT BALL BEFORE PLANTING.
 3. BACKFILL WITH PLANTING SOIL AND TAMP TO PREVENT SETTLEMENT.

A **SHRUB PLANTING DETAIL**
G6 NOT TO SCALE

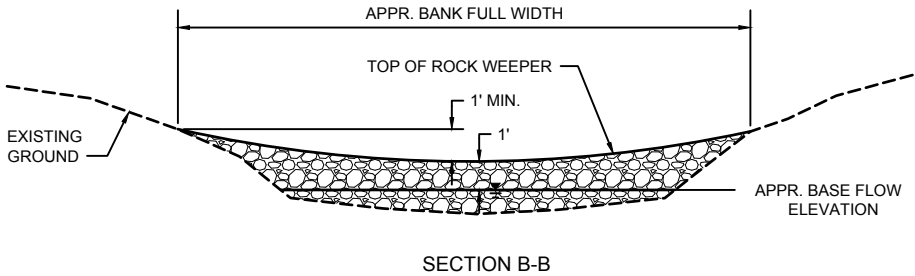
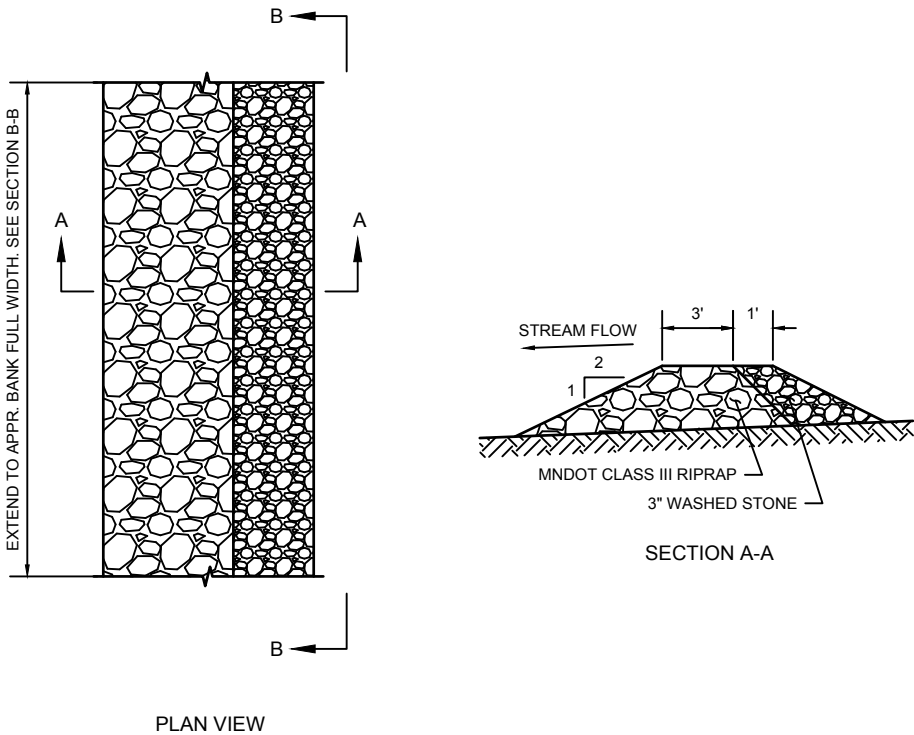


B **FILTER LOG BLANKET SYSTEM DETAIL**
G6 NOT TO SCALE



- NOTES:
- PRIOR TO REMOVAL OF THE SILT FENCE BAFFLE FROM THE STREAM, THE CONTRACTOR SHALL REMOVE ACCUMULATED SEDIMENT FROM THE UPSTREAM SIDE OF THE BAFFLE AND DISPOSE OF AT AN UPLAND LOCATION ABOVE THE ORDINARY HIGH WATER ELEVATION. THE DISPOSAL LOCATION SHALL BE STABILIZED WITH VEGETATION AND EROSION CONTROL MEASURES AS DIRECTED BY THE ENGINEER.

C **SILT FENCE BAFFLE DETAIL**
G6 NOT TO SCALE



D **ROCK WEEPER DETAIL**
G6 NOT TO SCALE

(NOT USED)

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JOSEPH J. JUREWICZ
Date 05/20/2015 License No. 50396



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DETAILS

MILLER CREEK BANK STABILIZATION
CITY OF DULUTH PROJECT NO. 1356

FILE NO. 00616087
SHEET G 6

NPDES STORM WATER POLLUTION PREVENTION PLAN (SWPPP) CONSTRUCTION NOTES

THIS PROJECT INCLUDES THE RECONSTRUCTION AND BANK STABILIZATION OF SELECT SECTIONS OF MILLER CREEK IN DULUTH, MINNESOTA. TWO SITES ALONG THE CREEK HAVE BEEN DETERMINED TO NEED REPAIR OF BANK FAILURES CAUSED BY THE JUNE, 2012 FLOODS. BOTH SECTIONS ARE LOCATED TO THE EAST OF TRINITY ROAD AND TO THE WEST OF ENGER PARK GOLF COURSE. GENERALLY, THE CONSTRUCTION WORK INCLUDES THE EXCAVATION AND PLACEMENT OF FILL MATERIAL OF VARIOUS CLASSES, REMOVAL OF MISCELLANEOUS DEADFALL, DEBRIS OR BRUSH, INSTALLATION OF RIP-RAP OF VARIOUS CLASSES, TOEWOOD AND OTHER WOODY STRUCTURES, VEGETATED REINFORCED SOIL SLOPES (VRSS), LIVE STAKES, AND PERMANENT EROSION CONTROL VIA SEEDING. VARIOUS METHODS OF SLOPE STABILIZATION WILL BE USED IN ORDER TO PROPERLY PROTECT THE FAILED SURFACES FROM SIMILAR ISSUES IN THE FUTURE.

CONTACTS

PROJECT ENGINEER: MSA PROFESSIONAL SERVICES JOSEPH JUREWICZ, P.E. 332 W. SUPERIOR STREET, SUITE 600 DULUTH, MN 55802 (218) 722-3915 jjurewicz@msa-ps.com	AREA HYDROLOGIST: MINNESOTA DNR PATRICIA FOWLER 1568 HIGHWAY 2 TWO HARBORS, MN 55616 (218) 834-1442 patricia.fowler@state.mn.us	PROJECT OWNER: CITY OF DULUTH TOM PFEFFER, P.E. 411 WEST 1ST STREET DULUTH, MN 55802 (218) 730-5104 tpfeffer@Duluth.MN.gov	ST LOUIS COUNTY SOIL AND WATER CONSERVATION DISTRICT: R.C. BOHEIM 215 NORTH 1ST AVENUE EAST DULUTH, MN 55802 (218) 723-4867 RC.Boheim@southstlouisswcd.org
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TIMING OF BMP INSTALLATION

THE EROSION AND SEDIMENTATION CONTROL BMPS SHALL BE INSTALLED AS NECESSARY TO MINIMIZE EROSION FROM DISTURBED SURFACES AND CAPTURE SEDIMENT ON SITE, AND SHALL MEET THE NPDES PERMIT PART IV CONSTRUCTION ACTIVITY REQUIREMENTS.

1. TEMPORARY PERIMETER CONTROL BMPS WILL BE INSTALLED BEFORE ANY UP GRADIENT SOIL DISTURBANCE OCCURS.
2. PERMANENT AND TEMPORARY SEDIMENT TRAPS AND BASINS (IF APPLICABLE) WILL BE CONSTRUCTED BEFORE ANY CONVEYANCE OR DEWATERING OCCURS.
3. TOPSOIL AND TEMPORARY EROSION CONTROL BMPS SHALL BE PLACED WITHIN 3 DAYS OF COMPLETION OF EMBANKMENT.
4. PLACEMENT OF RIPRAP SHALL BE COMPLETED WITHIN 24 HOURS OF SHORELINE DISTURBANCE OR CULVERT PLACEMENTS AND DONE IN ONE CONTINUOUSOPERATION.
5. ONCE CONSTRUCTION ACTIVITY CEASES FOR 3 DAYS OR MORE IN AN AREA, THAT AREA WILL BE STABILIZED WITH TEMPORARY OR PERMANENT BMPS FOR EROSION.

CALCULATIONS

TOTAL DISTURBED AREA = 0.70 ACRES
ACRES POST CONSTRUCTION IMPERVIOUS AREA = 0.00 ACRES
EXISTING IMPERVIOUS AREA = 0.00 ACRES IMPERVIOUS NET = 0.00 ACRES

1. CONSTRUCTION SHALL BE GOVERNED BY THE APPLICABLE DEMOLITION PERMITS AND MN/DOT SPECIFICATIONS (WHERE APPLICABLE).
2. THE CONTRACTOR SHALL KEEP WRITTEN INSPECTION AND MAINTENANCE LOGS (INCLUDING ALL CLEAN OUT AND CORRECTIVE ACTIONS) IN ACCORDANCE WITH THIS SWPPP AND ALL PERMITS.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR IMPLEMENTATION OF THE SWPPP AND THE INSTALLATION, INSPECTION AND MAINTENANCE OF THE EROSION AND SEDIMENT CONTROL BMPS BEFORE AND DURING CONSTRUCTION.
4. ALL MATERIAL SHALL BE MAINTAINED IN STOCKPILE AREAS, PROTECTED AS NOTED. NO ADDITIONAL IMPERVIOUS AREA SHALL BE CREATED THROUGH THE PROPOSED ACTION.

CONSTRUCTION PRACTICES TO MINIMIZE STORM WATER CONTAMINATION

TO PREVENT STORM WATER CONTAMINATION FROM OCCURRING, THE FOLLOWING BMPS WILL BE IMPLEMENTED:

1. ALL AREAS THAT ARE ROUGH GRADED MUST BE KEPT IN A SMOOTH CONDITION TO ALLOW SHEET FLOW OF STORM WATER WHEREVER PRACTICAL AND ALWAYS READY FOR SURFACE APPLICATION OF DEGRADABLE OR NON-DEGRADABLE BLANKETS, MULCH, OR OTHER PROTECTIVE COVERS.
2. A STABILIZED CONSTRUCTION ENTRANCE/EXIT WILL BE CONSTRUCTED TO REDUCE VEHICLE TRACKING OF SEDIMENTS OFF THE PROJECT SITE.
3. ALL SOLID WASTE MATERIALS WILL BE COLLECTED AND STORED IN A SECURELY LIDDED METAL DUMPSTER OR OTHER APPROVED CONTAINMENT METHOD AT THE END OF EACH DAY. ANY ALTERNATIVE TO A METAL DUMPSTER MUST BE SUBMITTED IN WRITING FOR APPROVAL BY THE PROJECT ENGINEER. ALL TRASH AND CONSTRUCTION DEBRIS FROM THE SITE WILL BE DEPOSITED IN THE DUMPSTER. THE DUMPSTER WILL BE EMPTIED AS NECESSARY TO FUNCTION AS INTENDED FOR DEBRIS COLLECTION. NO CONSTRUCTION MATERIALS WILL BE BURIED ON-SITE. THE CONTRACTOR'S EROSION CONTROL SUPERVISOR WILL INSTRUCT ALL PERSONNEL REGARDING THE CORRECT PROCEDURE FOR DISPOSAL.
4. RECYCLABLE MATERIALS MUST BE SEPARATED ON-SITE AND SEGREGATED IN DESIGNATED CONTAINERS.
5. A LICENSED SANITARY WASTE MANAGEMENT CONTRACTOR WILL COLLECT ALL SANITARY WASTE FROM THE PORTABLE UNITS AT A RATE NECESSARY TO MAINTAIN DESIGNED FUNCTION.
6. ALL VEHICLES ON SITE WILL BE MONITORED FOR LEAKS AND RECEIVE REGULAR PREVENTATIVE MAINTENANCE TO REDUCE THE CHANCE OF LEAKAGE.
7. FERTILIZERS WILL BE STORED IN A COVERED SHED AND PARTIALLY USED BAGS WILL BE TRANSFERRED TO A SEALABLE BIN TO REDUCE THE CHANCE OF SPILLAGE.
8. PETROLEUM PRODUCTS WILL BE STORED IN TIGHTLY SEALED CONTAINERS, WHICH ARE CLEARLY LABELED.
9. SPILL KITS WILL BE INCLUDED WITH ALL FUELING SOURCES AND MAINTENANCE ACTIVITIES. SECONDARY CONTAINMENT MEASURES WILL BE INSTALLED AND MAINTAINED BY THE CONTRACTOR.
10. ANY ASPHALT SUBSTANCES USED ON SITE WILL BE APPLIED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.
11. ALL PAINT CONTAINERS AND CURING COMPOUNDS WILL BE TIGHTLY SEALED AND STORED WHEN NOT REQUIRED FOR USE. EXCESS PAINT WILL NOT BE DISCHARGED TO THE STORM WATER SYSTEM BUT WILL BE PROPERLY DISPOSED OF ACCORDING TO MANUFACTURER'S INSTRUCTION.
12. MATERIALS AND EQUIPMENT NECESSARY FOR SPILL CLEAN-UP SHALL BE READILY AVAILABLE AND BE KEPT IN AN ENCLOSED TRAILER OR SHED ON SITE. EQUIPMENT WILL INCLUDE, BUT NOT LIMITED TO, BROOMS, MOPS, DUST PANS, RAGS, GLOVES, GOGGLES, ABSORBENT (KITTY LITTER, OIL ABSORBENT BOOMS AND DIAPERS) AND BUCKETS.
13. ALL SPILLS WILL BE CONTAINED AND CLEANED UP IMMEDIATELY UPON DISCOVERY. SPILLS LARGE ENOUGH TO REACH THE STORM WATER CONVEYANCE SYSTEM WILL BE REPORTED TO THE MPCA DUTY OFFICER AT 1-800-422-0798.
14. CONCRETE TRUCKS WILL NOT BE ALLOWED TO WASH OUT OR DISCHARGE SURPLUS CONCRETE OR DRUM WASH WATER ON THE SITE UNLESS DONE IN AN ENGINEERED CONTAINMENT SYSTEM. THE ENGINEERED SYSTEM MUST INCLUDE SITE DRAWINGS FOR THE PROJECT FILE AND WRITTEN ASSURANCE THAT THE SYSTEM WILL WORK AS DESIGNED AND LEAVE NO DISCHARGE OF CONCRETE OR CONCRETE RESIDUE POTENTIAL TO ENTER WATERS OF THE STATE.
15. FORM RELEASE OIL USED FOR CONCRETE WORK MUST BE APPLIED OVER A PALLET CONTAINING ABSORBENT TO COLLECT EXCESS LIQUID. THE ABSORBENT MATERIAL WILL BE REPLACED AND PROPERLY DISPOSED OF WHEN SATURATED.
16. DISCHARGES FROM BASIN DEWATERING OPERATIONS THAT ARE TURBID OR SEDIMENT LADEN SHALL BE DISCHARGED TO TEMPORARY SEDIMENT BASINS CONSTRUCTED ON THE SITE TO PROVIDE TREATMENT PRIOR TO DISCHARGE TO A WATER OF THE STATE.

TMDL IMPLEMENTATION PLANS CONTAINING STORM WATER REQUIREMENTS

NO TMDL IMPLEMENTATION PLANS CURRENTLY EXIST FOR THE RECEIVING WATERS ON THIS PROJECT.

LOCATION OF SWPPP REQUIREMENTS IN PROJECT PLAN

DESCRIPTION	TITLE	LOCATION
SUMMARY OF PERVIOUS AND IMPERVIOUS	SWPPP NOTES	SHEET G7
DIRECTION OF FLOW/DRAINAGE AREA	OVERVIEW	SHEET ST 1 THRU ST 3
RECEIVING SURFACE WATERS	SWPPP NOTES	SHEET G7
NO DISTURBANCE AREAS AND AREAS OF PHASED CONSTRUCTION	PLAN VIEW WORK ZONE A & B	SHEET ST 1 THRU ST 3
DRAINAGE STRUCTURES	N/A	N/A
DRAINAGE TABULATIONS	N/A	N/A
EROSION CONTROL TABULATIONS	QUANTITIES AND SCHEDULES	SHEET G2
EROSION CONTROL SHEETS	PLAN SHEETS	SHEETS ST 2 & ST 3
EROSION CONTROL DETAILS	DETAILS	SHEET G3 THRU G6
SEDIMENT CONTROL PRACTICES	PLAN SHEETS	SHEET G3 THRU ST 3
FINAL STABILIZATION	PLAN SHEETS	SHEET G3 THRU ST 3
SEDIMENT BASIN (POND) TABULATIONS	NA	NA
POND SHEETS (SEDIMENT BASINS)	NA	NA
LOCATIONS OF PONDS	NA	NA

SWPPP IMPLEMENTATION CONTACTS

AGENCY	PERMIT	NAME	PHONE/E-MAIL
CONTRACTOR'S EROSION CONTROL SUPERVISOR		TO BE DETERMINED	TBD
MPCA	NPDES	JIM DEXTER	218-302-6632 james.dexter@state.mn.us
SWCD	WCA	R.C. BOHEIM	218-723-4867 R.C.Boheim@southstlouisswcd.org
MnDNR WATERS AREA HYDROLOGIST	N/A	PATRICIA FOWLER	218-834-1442 patricia.fowler@state.mn.us
CORPS OF ENGINEERS	SECTION 404	CATHERINE VOCE	218-720-5291 ext. 35402 cartherine.d.voce@usace.army.mil
STATE DUTY OFFICER	N/A	MPCA	800-422-0798

EROSION CONTROL NOTES

1. MNDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION (2016 EDITION) SHALL APPLY.
 - 1.a. SUBMIT INITIAL EROSION CONTROL (EC) SCHEDULE AT OR BEFORE THE PRECONSTRUCTION CONFERENCE.
 - 1.b. SUBMIT EC SCHEDULE ALTERATIONS/ADJUSTMENTS WEEKLY THEREAFTER FOR ENGINEER'S APPROVAL.
2. THE CONTRACTOR IS RESPONSIBLE FOR EROSION CONTROL QUALITY CONTROL (WC) ON THIS PROJECT. CONTRACTOR SHALL PHASE/SEQUENCE THE PROJECT TO MINIMIZE EXPOSURE TO EROSION. CONTRACTOR SHALL PLACE OR OTHERWISE CONSTRUCT EROSION CONTROL AND SEDIMENT CONTAINMENT DEVICES TO MINIMIZE THE RUNOFF, TRACKING, AND SEDIMENT LOSS FROM DISTURBED AREAS OF THE PROJECT SITE.
3. DISTURBED SLOPES NOT ACTIVELY WORKED SHALL BE PROTECTED FROM SOIL EROSION WITH TEMPORARY OR PERMANENT COVER WITHIN3 DAYS OF BEING WORKED. EROSION CONTROL BLANKET AND SOIL STAPLES SHALL BE USED.
4. AT MINIMUM, THE FOLLOWING CONTROLS WILL BE IMPLEMENTED AT THE CONSTRUCTION SITE:
 - 4.a. EROSION CONTROL BLANKETS SHALL BE USED ON ALL SLOPES 1:3(V:H) OR STEEPER
 - 4.b. SILT FENCES SHALL BE USED IN CONJUNCTION WITH OTHER EROSION BMPS
 - 4.c. ROCK DITCH CHECKS OR APPROVED EQUAL ARE TO BE USED TO REDUCE DITCH VELOCITIES AND REDUCE EROSION
 - 4.d. STORM INLET AND OUTLET AREAS SHALL BE CONTINUOUSLY PROTECTED WITH MNDOT APPROVED DEVICES/METHODS
 - 4.e. STABILIZED CONSTRUCTION ENTRANCE, OR REUSABLE MUD MAT SHALL BE USED TO REDUCE SEDIMENT TRACKING
 - 4.f. PERMANENT VEGETATION WILL BE ESTABLISHED IMMEDIATELY AFTER TOPSOIL IS SPREAD
 - 4.g. CONTROL ALL SITE SOLID WASTE, DEBRIS, MATERIAL STORAGE AND CONCRETE WASHOUT ON SITE. NO MIGRATION OF SEDIMENT OFFSITE OR INTO DITCHES/STORM SYSTEMS PERMITTED
5. ALL SLOPES AND DITCHES SHALL BE STABILIZED PRIOR TO OPENING NEW CULVERTS INTO EXISTING DRAINAGE WAYS.
6. IF ANY STOCKPILE IS TO REMAIN IN PLACE FOR MORE THAN
7. WATER PUMPED OR OTHERWISE DISCHARGED FROM THE SITE DURING CONSTRUCTION DEWATERING SHALL BE IN ACCORDANCE WITH SPECIFICATIONS.
8. THE CONTRACTOR SHALL TAKE ALL POSSIBLE PRECAUTIONS TO PREVENT APPRECIABLE SOIL TRACKING ONTO ROADWAYS. APPRECIABLE SOIL, MUD, OR DEBRIS WASHED, TRACKED, OR DEPOSITED ONTO PAVED SURFACES SHALL BE REMOVED PRIOR TO THE END OF EACH WORK DAY.
9. STABILIZED CONSTRUCTION ENTRANCE(S) SHALL BE REMOVED AND AREA RESTORED AFTER GRADING IS COMPLETE.
10. THE CONTRACTOR QC PROGRAM SHALL ENSURE THAT A COMPETENT INDIVIDUAL SHALL INSPECT EROSION AND SEDIMENT CONTROL DEVICES WEEKLY AND AFTER EACH RAIN EVENT. ALL NONFUNCTIONAL DEVICES SHALL BE REPAIRED/REPLACED/CLEANED. MAINTAIN A WRITTEN LOG OF ALL WEEKLY INSPECTIONS AND RAIN EVENTS - INCLUDE THE CORRECTIVE ACTIONS THAT WERE TAKEN.
11. THE CONTRACTOR SHALL MAINTAIN THE CAPABILITY TO IMPLEMENT RAPID STABILIZATION METHOD 4 (MNDOT 2573.4) AT ALL TIMES. INCLUDES CAT III EROSION CONTROL BLANKET (ECB) [N. AMERICAN GREEN S150 OR APPROVED EQUAL] ALONG WITH SEED MIXTURE, FERTILIZER, AND SOIL STAPLES PER 2573-3. THE UPGRADIENT END OF EACH BLANKET STRIP SHALL BE BURIED AT LEAST 6 INCHES IN A VERTICAL CHECK SLOT. STAPLES SHALL BE PLACED AT SEAMS AND THROUGHOUT THE BLANKET AT A MAXIMUM SPACING IN ALL DIRECTIONS OF 2 FEET. PAYMENT ALLOWED SHALL BE PER CONTRACT BID PRICE OR IN ABSENCE OF CONTRACT BID PRICE IN ACCORDANCE WITH MNDOT SPECIFICATION 2575.5
12. COVER DEBRIS AND CRUSHING STOCKPILES. PROVIDE SILT FENCING AROUND PERIMETER OF STOCKPILE AREAS.
13. REPLACE TOPSOIL AND SEED ALL AREAS DISTURBED BY WORK.

TRAINING

TRAINING IS REQUIRED FOR ALL PERMITTED PROJECTS AFTER FEBRUARY 1, 2010. IT MUST BE PROVIDED BY ENTITIES W/ EXPERTISE IN EROSION PREVENTION, SEDIMENT CONTROL OR PERMANENT STORMWATER MANAGEMENT. TRAINING MUST BE FOCUSED ON THE INDIVIDUAL'S JOB DUTIES AS THEY RELATE TO PERMIT REQUIREMENTS (PART III.A.2).

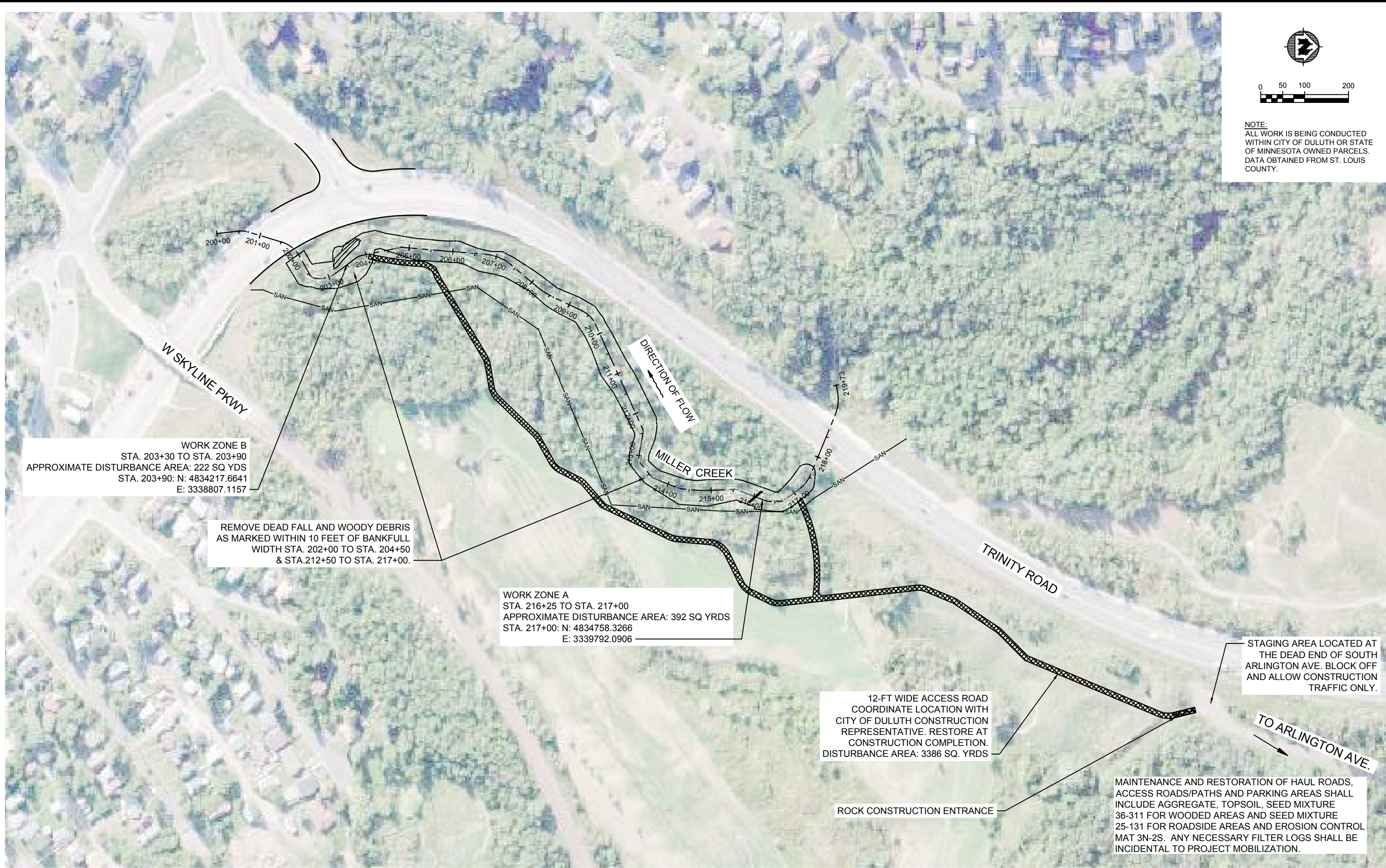
INDIVIDUALS WHO MUST BE TRAINED INCLUDE:

- A. INDIVIDUALS PREPARING THE SWPPP FOR THE PROJECT.

SWPPP DESIGNER:

NAME: JOSEPH J. JUREWICZ
TITLE: PROJECT ENGINEER
COMPANY: MSA PROFESSIONAL SERVICES, INC.
DATE OF TRAINING: NOVEMBER, 2015
TRAINING CERTIFICATION: DESIGN OF CONSTRUCTION SWPPP
EXPIRATION: NOVEMBER 2019
TRAINING ENTITY: U. OF MINNESOTA, DEPT. OF BIOPRODUCTS AND BIOSYSTEMS ENGINEERING
INSTRUCTORS:JOHN CHAPMAN, TODD SMITH
PROFESSIONAL TRAINING HOURS: 12

PROJECT NO.: 00616087	SCALE: AS SHOWN	NO. 11	DATE 02/12/16	REVISION	BY EDC	I HEREBY CERTIFY THAT THIS PLAN, REPORT, OR SPECIFICATION WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA. 05/20/2015 50396 Date License No.	<div><div>MSA</div><div>TRANSPORTATION • MUNICIPAL DEVELOPMENT • ENVIRONMENTAL</div><div>332 W. Superior Street Duluth, MN 55802 218-722-3915 1-800-777-7380 Fax: 218-722-4548 Web Address: www.msa-ps.com © MSA Professional Services, Inc.</div></div>	SWPPP NOTES	MILLER CREEK BANK STABILIZATION CITY OF DULUTH PROJECT NO. 1356	FILE NO. 00616087
PROJECT DATE: 05/20/16	DRAWN BY: KNN	11	02/12/16	ISSUE FOR BID	SHEET G 7					
F.B.:	CHECKED BY: EJT	-	-	-						
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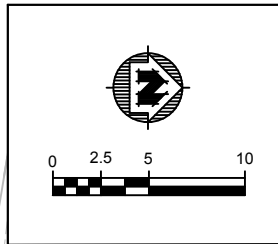
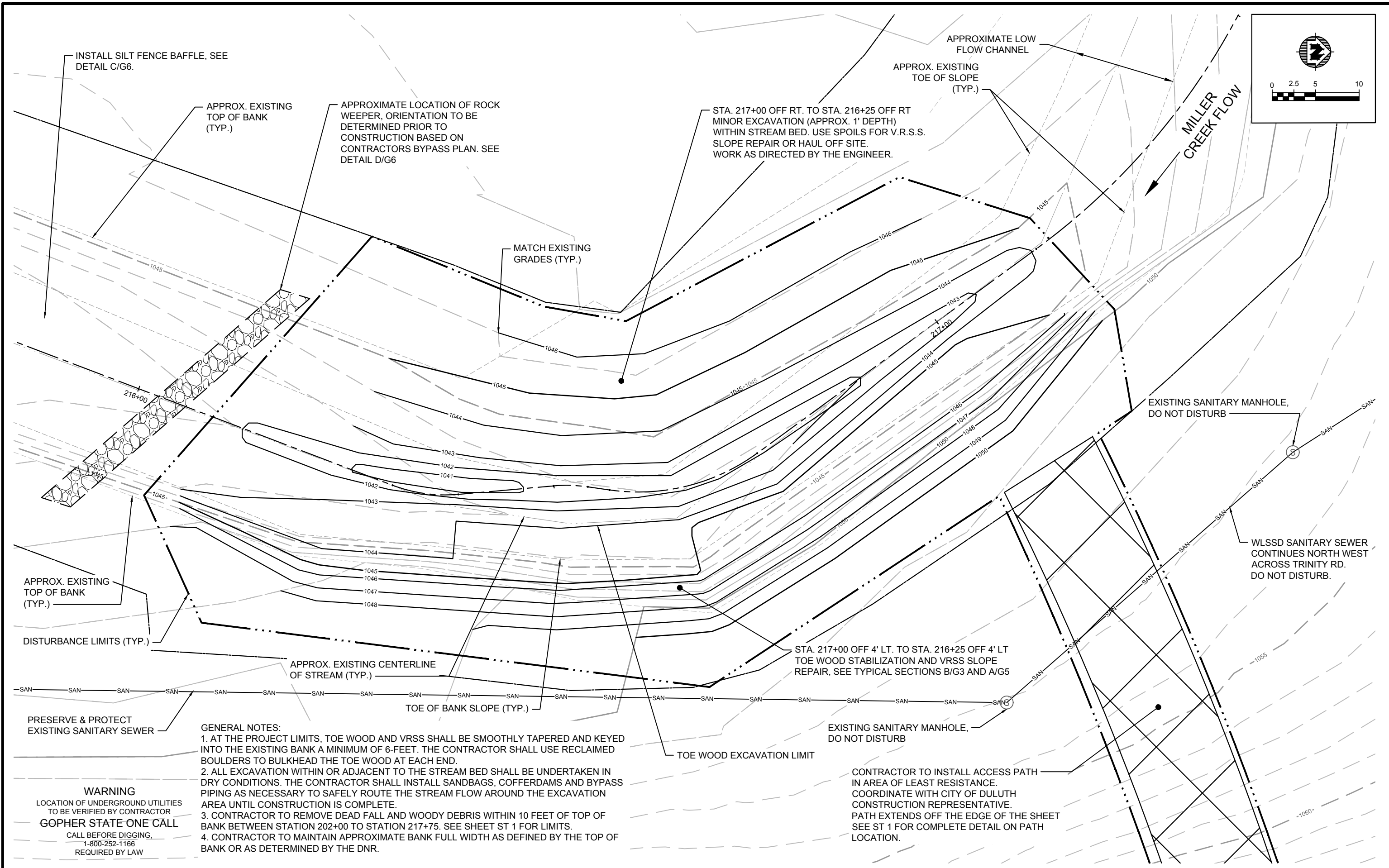
JOSEPH J. JUREWICZ

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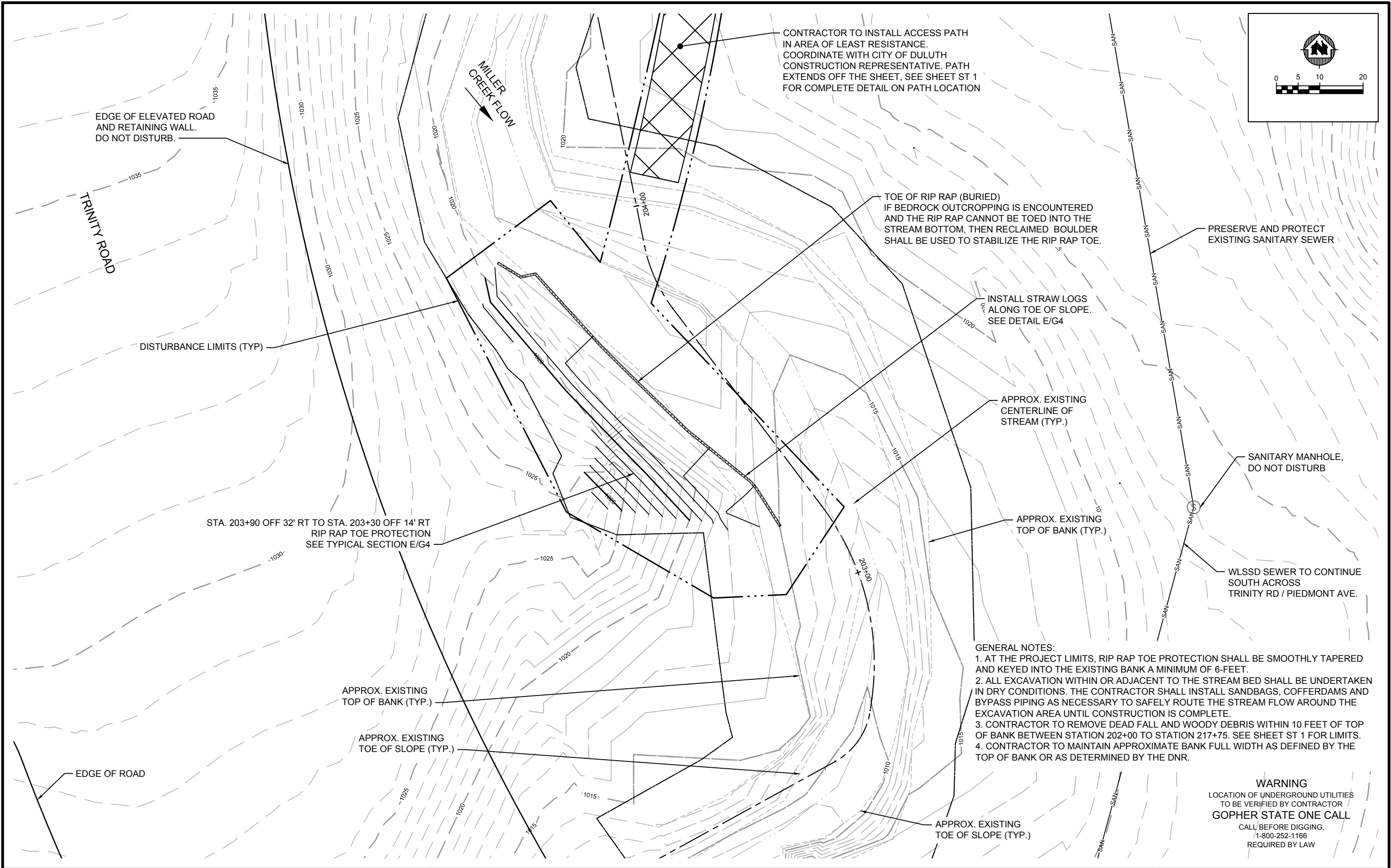
OVERVIEW



MILLER CREEK
BANK STABILIZATION
CITY OF DULUTH PROJECT NO. 1356

FILE NO.
00616087
SHEET
ST 1

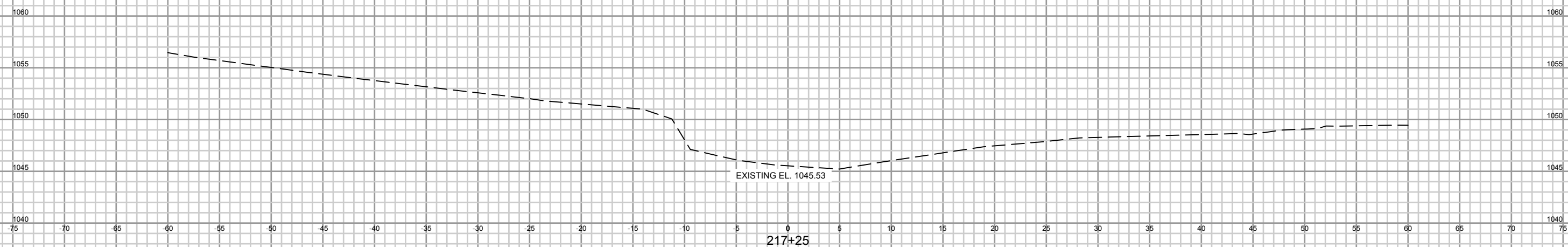
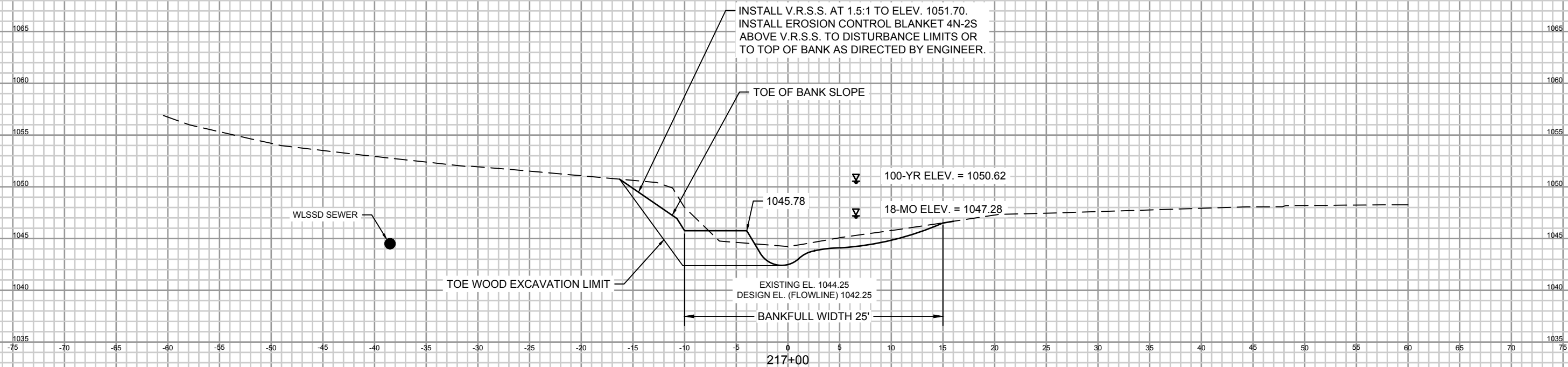


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PROJECT DATE: 05/20/16	DRAWN BY: KNN	1	02/12/16	ISSUE FOR BID	SHEET ST 2					
F.B.:	CHECKED BY: EJT	-	-	-	-					
PLOT DATE: 5/5/16, P:\610s\616\00616087\CADD\IC3D\616087 Miller Creek Design-100615.dwg										



PROJECT NO.: 00616087	SCALE: AS SHOWN	NO. 1	DATE 02/12/16	REVISION	BY EDC	I HEREBY CERTIFY THAT THIS PLAN, REPORT, OR SPECIFICATION WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.  05/20/2015 50396 JOSEPH J. JUREWICZ Date License No.	 TRANSPORTATION • MUNICIPAL DEVELOPMENT • ENVIRONMENTAL 332 W. Superior Street Duluth, MN 55802 218-722-3915 1-800-777-7380 Fax: 218-722-4548 Web Address: www.msa-ps.com © MSA Professional Services, Inc.	PLAN VIEW WORK ZONE B	MILLER CREEK BANK STABILIZATION CITY OF DULUTH PROJECT NO. 1356	FILE NO. 00616087		
PROJECT DATE: 05/20/16	DRAWN BY: KNN	1	02/12/16	ISSUE FOR BID								SHEET ST 3
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PLOT DATE: 5/5/16, P:\610s\616\00616087\CADD\IC3D\616087 Miller Creek Design-100615.dwg												

NOTE:
CROSS SECTIONS ARE
LOOKING DOWNSTREAM.



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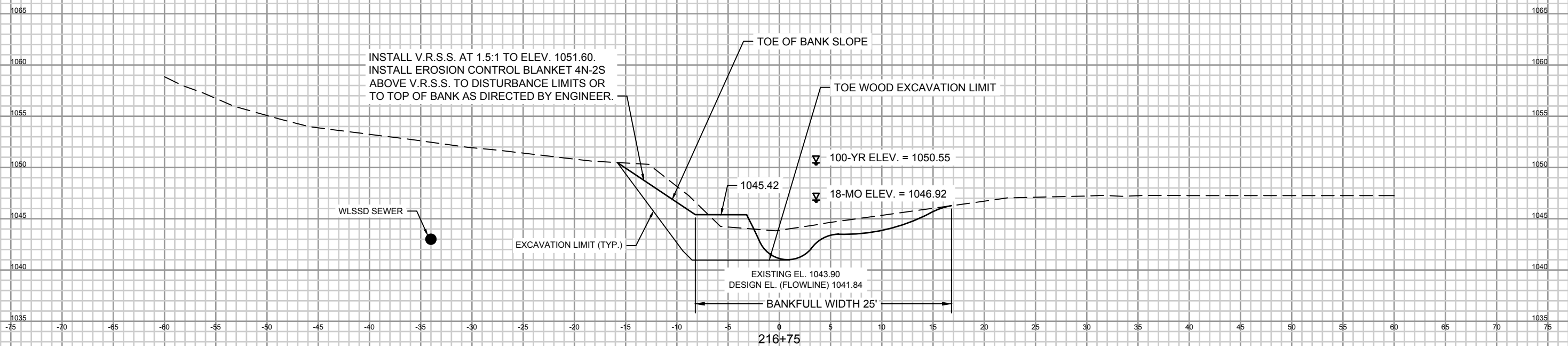
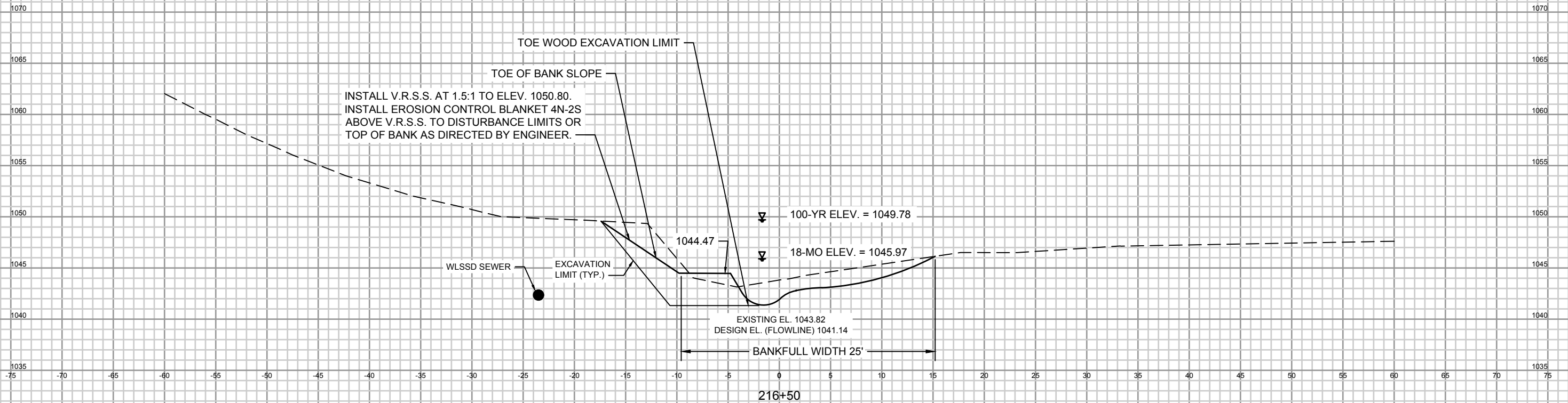
CROSS SECTIONS
WORK ZONE A

MILLER CREEK
BANK STABILIZATION
CITY OF DULUTH PROJECT NO. 1356

FILE NO.
00616087

SHEET
CS 1

NOTE:
1. CROSS SECTIONS ARE
LOOKING DOWNSTREAM.
2. PRE-CONSTRUCTION
DIMENSIONS:
A. LOW FLOW WIDTH =10'
B. BANKFULL WIDTH =25'



PROJECT NO.: 00616087	SCALE: AS SHOWN	NO. 1	DATE 02/12/16	REVISION	BY EDC
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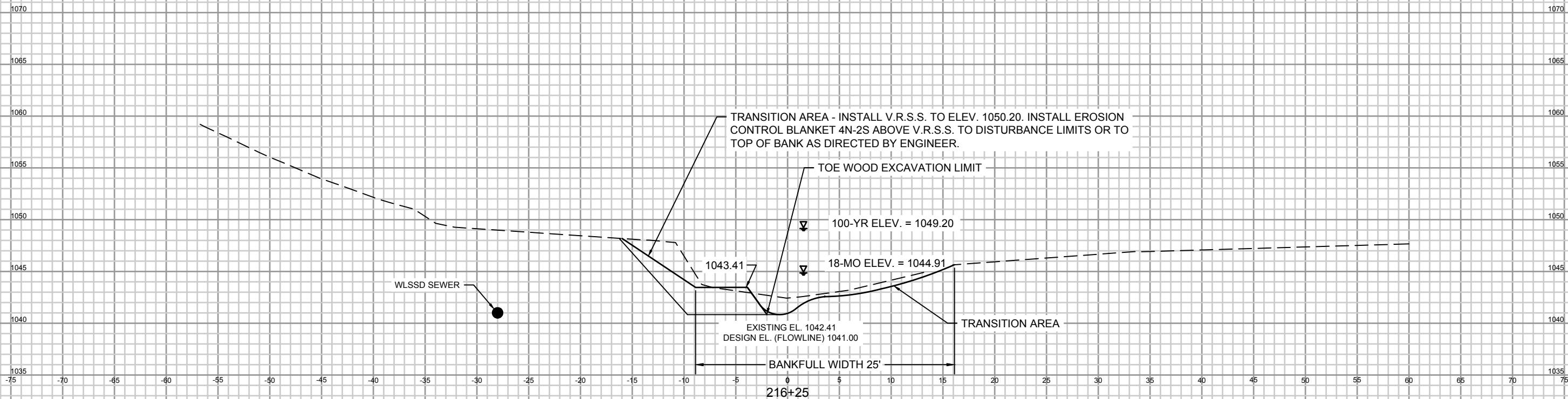
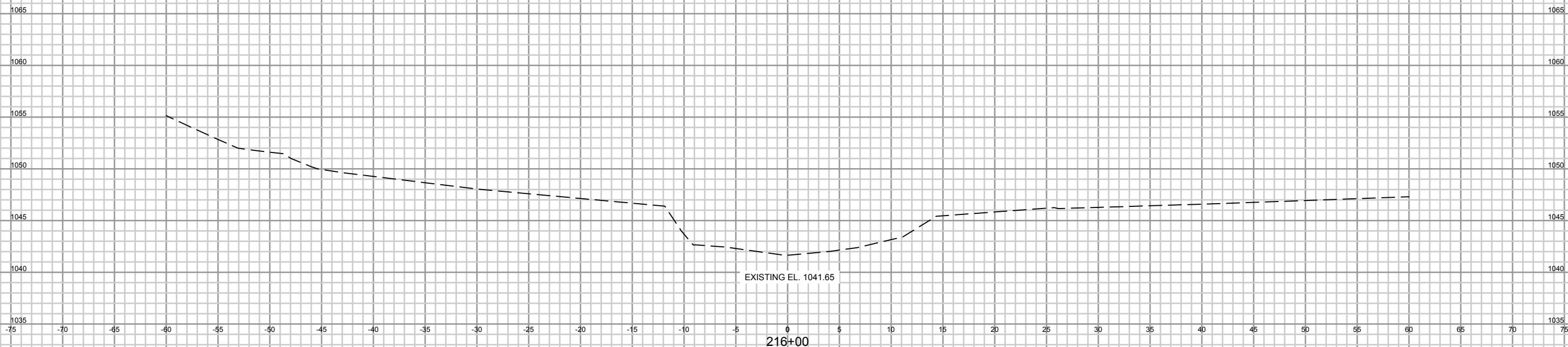
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CROSS SECTIONS
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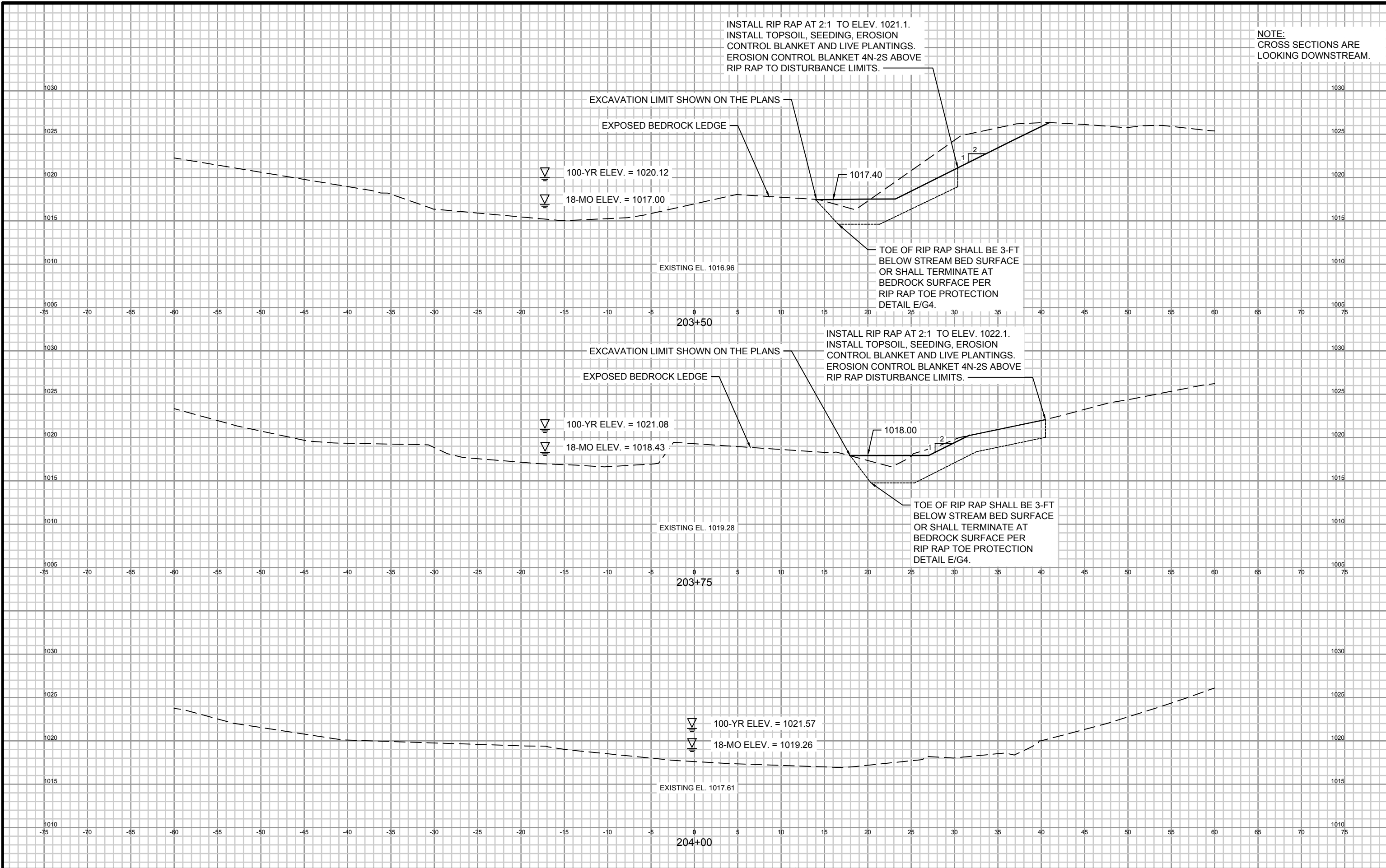
MILLER CREEK
BANK STABILIZATION
CITY OF DULUTH PROJECT NO. 1356

FILE NO.
00616087
SHEET
CS 2

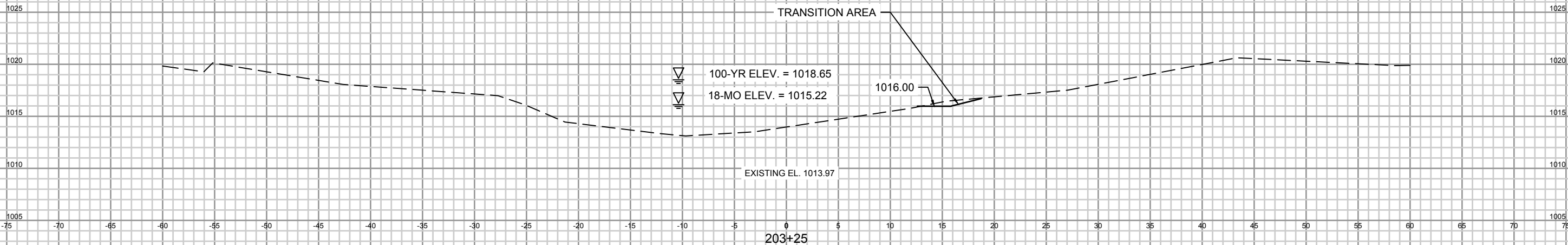
NOTE:
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PROJECT NO.: 00616087	SCALE: AS SHOWN	NO. 1	DATE 02/12/16	REVISION	BY EDC	<div>I HEREBY CERTIFY THAT THIS PLAN, REPORT, OR SPECIFICATION WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.</div> <div><div>JOSEPH J. JUREWICZ</div><div>05/20/2015</div><div>Date</div><div>50396</div><div>License No.</div></div>	<div><div>MSA</div><div>TRANSPORTATION • MUNICIPAL DEVELOPMENT • ENVIRONMENTAL</div><div>332 W. Superior Street Duluth, MN 55802</div><div>218-722-3915 1-800-777-7380 Fax: 218-722-4548</div><div>Web Address: www.msa-ps.com</div><div>© MSA Professional Services, Inc.</div></div>	CROSS SECTIONS WORK ZONE A	MILLER CREEK BANK STABILIZATION CITY OF DULUTH PROJECT NO. 1356	FILE NO. 00616087
PROJECT DATE: 05/20/16	DRAWN BY: KNN	ISSUE FOR BID		SHEET CS 3						
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CROSS SECTIONS
WORK ZONE B

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FILE NO.
00616087
SHEET
CS 5