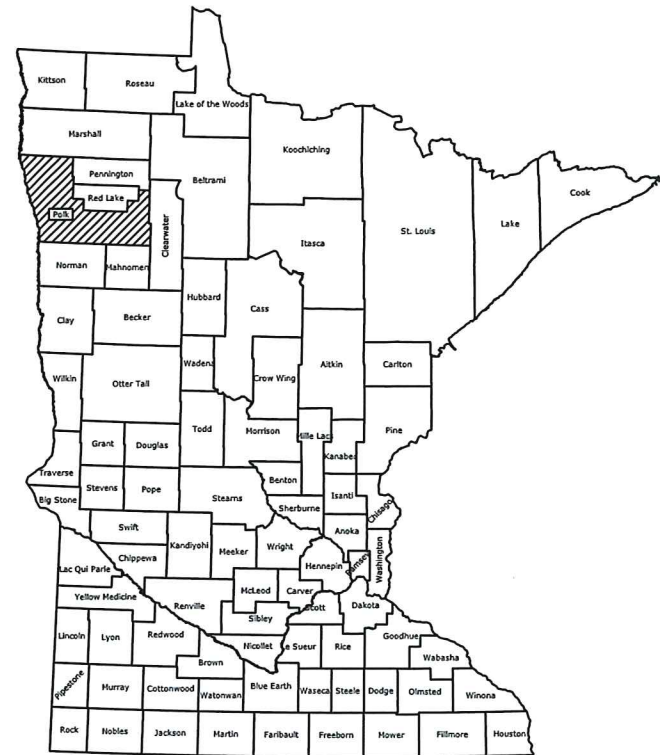
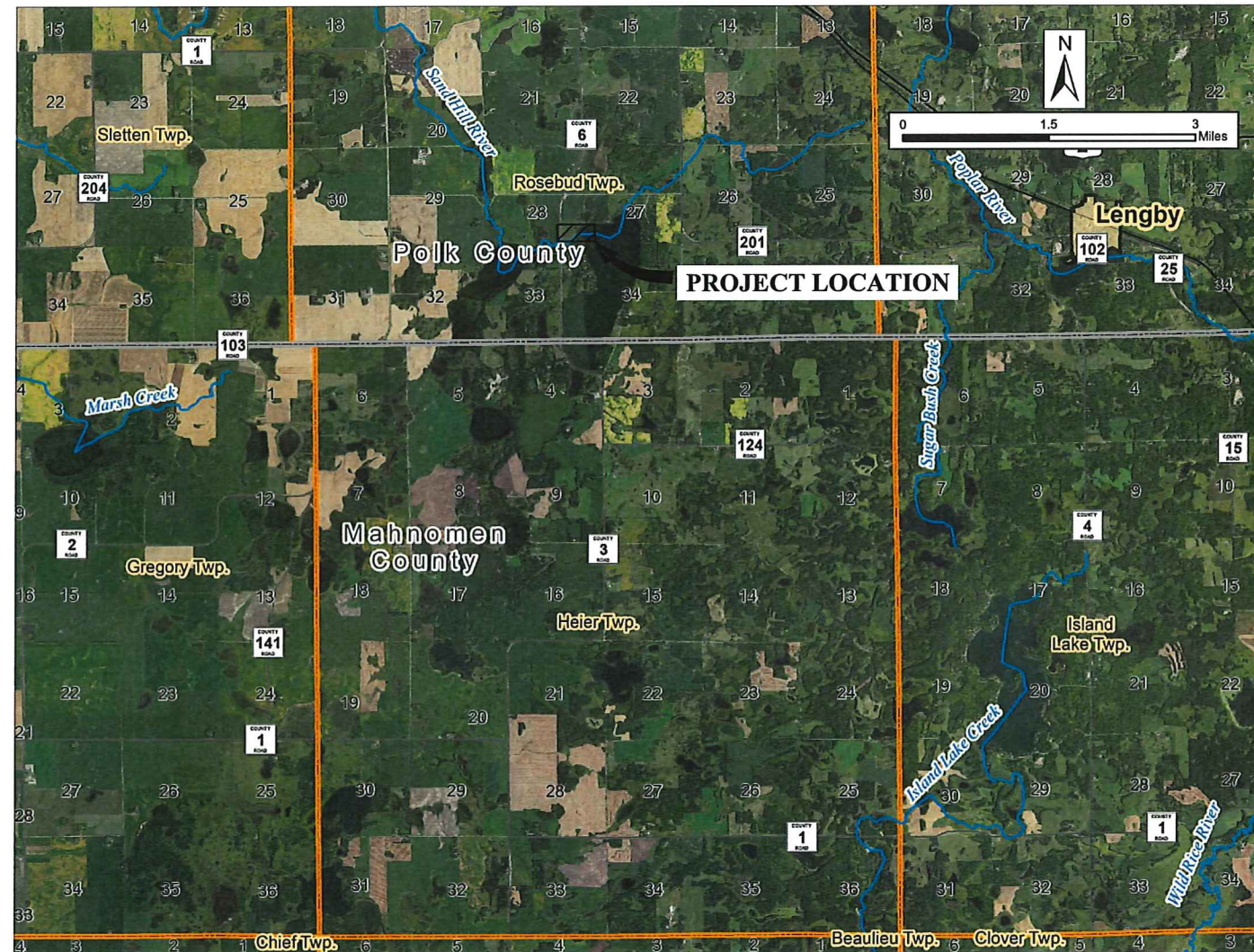


CONSTRUCTION PLANS FOR SAND HILL LAKE DAM MODIFICATIONS 2019

SAND HILL RIVER WATERSHED DISTRICT POLK COUNTY MINNESOTA



STATE COUNTY MAP



VICINITY MAP

GOVERNING SPECIFICATIONS

STANDARD SPECIFICATIONS FOR CONSTRUCTION ADOPTED BY THE MINNESOTA DEPARTMENT OF TRANSPORTATION, 2018 EDITION, STANDARD DRAWINGS CURRENTLY IN EFFECT, AND OTHER CONTRACT PREVISIONS SUBMITTED HEREIN.

**VERTICAL DATUM
BASED ON NAVD88**

SHEET INDEX:

SHEET NO.	DESCRIPTION
1	COVER SHEET
2	ACCESS ROUTE
3	ROCK ARCH PLAN AND PROFILE
4	ROCK WEIR LAYOUT
5	ROCK WEIR DETAILS

I hereby certify that this plan, specification, or report 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.

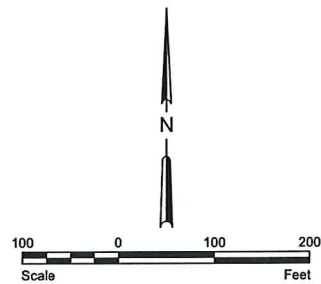
Erik S. Jones
Erik S. Jones
License No. 41161

Date: 9/12/2019

PREPARED BY:



FARGO, NORTH DAKOTA



NOTES:

1. THE CONTRACTOR SHALL USE THE ACCESS ROUTE AS INDICATED. PRIOR TO ACCESSING THE SITE THE CONTRACTOR SHALL COORDINATE WITH THE ENGINEER AND LAND OWNER.
2. ALL DAMAGES INCLUDING BUT NOT LIMITED TO RUTTING AND DAMAGE TO GRASS AREAS SHALL BE RESTORED BY THE CONTRACTOR TO THE CONDITION OF OR EXCEEDING PRECONSTRUCTION CONDITIONS AS DETERMINED BY THE ENGINEER. ALL COSTS TO RESTORE THE SITE SHALL NOT BE PAID FOR SEPARATELY BUT INCLUDED IN THE PRICE OF OTHER ITEMS.
3. 210 TON OF AGGREGATE CLASS V HAS BEEN INCLUDED IN THE PLANS TO BE USED AS SURFACING MATERIAL FOR THE ACCESS ROUTE TO BE USED AS NEEDED TO IMPROVE ACCESS CONDITIONS. PLACEMENT SHOULD BE APPROVED BY ENGINEER PRIOR TO PLACEMENT. ANY CLASS V PLACED SHALL REMAIN AT THE END OF CONSTRUCTION UNLESS OTHERWISE DIRECTED BY THE FIELD REPRESENTATIVE.
4. 2 WEEKS PRIOR TO THE COMMENCEMENT OF CONSTRUCTION ACTIVITIES, THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR APPROVAL, AN ACCESS ROUTE MODIFICATION PLAN DETAILING LOCATION OF PROPOSED REMOVALS, AGGREGATE PLACEMENT, AND CONSTRUCTION STAGING AREA.
5. NO WORK SHALL BE COMPLETED WITHIN SAND HILL LAKE, THE SAND HILL RIVER, OR POLK COUNTY DITCH NO. 83 BETWEEN MARCH 15 AND JUNE 15 TO ALLOW FOR FISH SPAWNING AND MIGRATION.

ROGER HEMMINGSEN AND
MCGEE ARDELLA

SECTION 28
T147N, R40W
ROSEBUD TOWNSHIP
ORAN UNDERDAHL

POLK COUNTY
DITCH NO. 83

SECTION 27
T147N, R40W
ROSEBUD TOWNSHIP

EXISTING DAM LOCATION

SAND HILL LAKE

STAGING AREA

← FLOW DIRECTION

ACCESS ROAD

KENNETH AND MICHAEL OSTMAN

SECTION 33
T147N, R40W
ROSEBUD TOWNSHIP
RICHARD AND SANDRA JOHNSON

339TH AVE SE

COUNTY HWY 6

SAND HILL RIVER

ROGER HEMMINGSEN AND
MCGEE ARDELLA

SECTION 34
T147N, R40W
ROSEBUD TOWNSHIP

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No.	Revision	Date	By

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Erk S. Jones 9/12/2019

Erk S. Jones License No. 41161

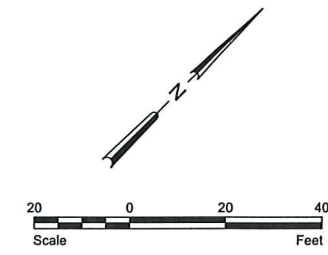


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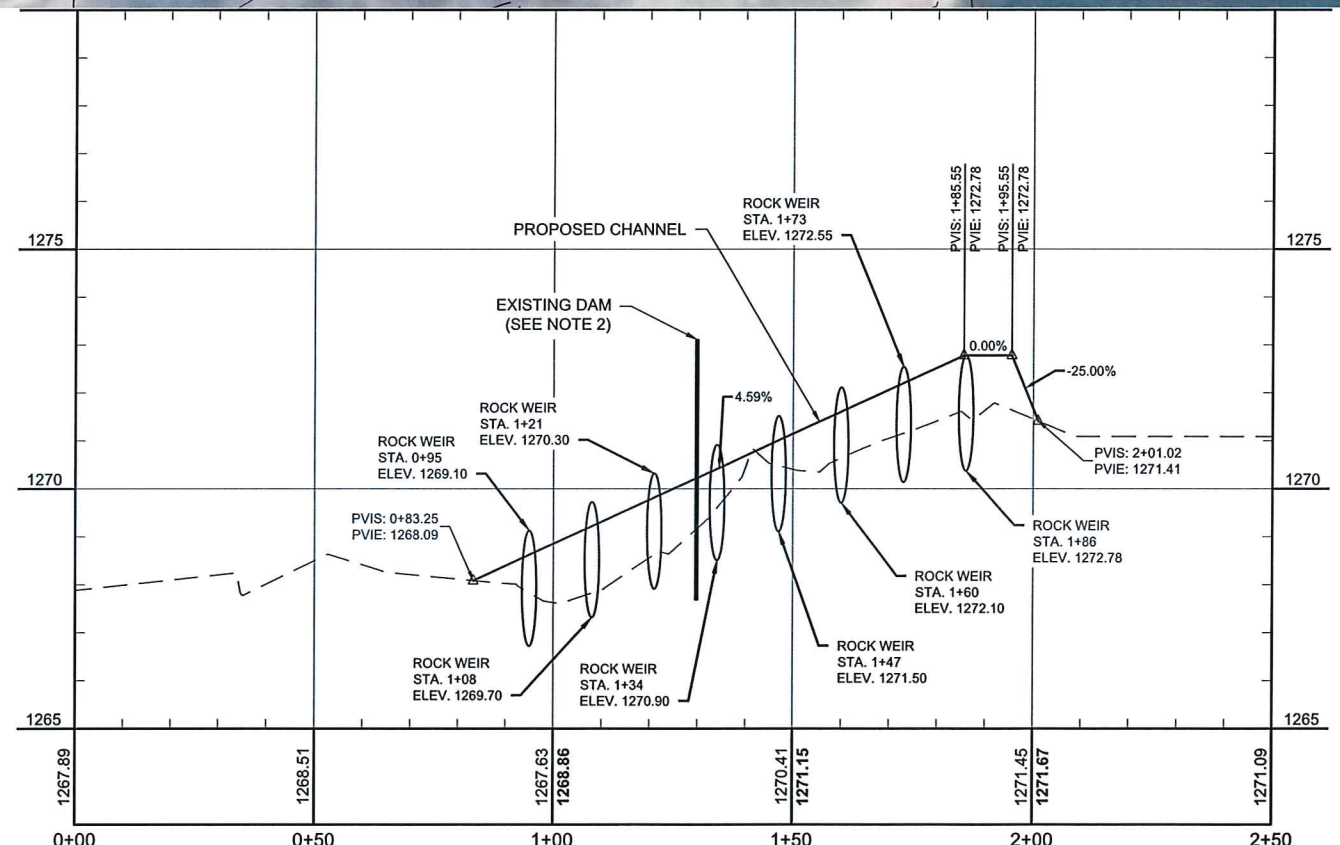
SAND HILL LAKE DAM MODIFICATIONS
SAND HILL RIVER WATERSHED DISTRICT
FERTILE, MINNESOTA

ACCESS ROUTE
PROJECT NO. 1812-0063

SHEET
2 of 5



- NOTES:
1. DURING REMOVAL OF THE DAM, AND THROUGHOUT CONSTRUCTION OF THE ROCK ARCH RAPIDS, THE EXISTING LAKE RUNOUT LEVEL SHALL BE MAINTAINED AT THE PROPOSED CREST ELEVATION OF THE PROPOSED ROCK ARCH RAPIDS STRUCTURE (ELEVATION 1272.78).
 2. THE EXISTING SHEETPILE DAM SHALL BE REMOVED COMPLETELY. NO SHEETPILE SHALL REMAIN, EITHER ABOVE GRADE OR BELOW GRADE, AFTER REMOVAL. ALL WORK ASSOCIATED WITH REMOVING THE EXISTING SHEETPILE DAM SHALL BE PAID UNDER THE BID ITEM "REMOVE EXISTING DAM".
 3. CONTRACTOR SHALL INSTALL BIOROLL ACROSS POLK COUNTY DITCH NO. 83 AT APPROXIMATELY STATION 0+00. EXACT LOCATION TO BE DETERMINED IN FIELD BY ENGINEER OR ON-SITE REPRESENTATIVE.



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No.	Revision	Date	By
1	REVISED ROCK FISH PASSAGE SURFACE ELEVATIONS	10-28-2019	BAU

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Erik S. Jones
 Erik S. Jones
 License No. 41161

Date: 10/28/2019



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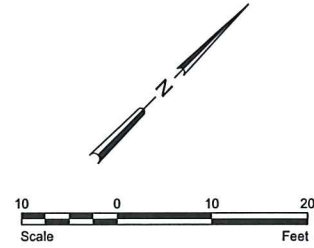
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Date: 10-28-19
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SAND HILL LAKE DAM MODIFICATIONS
 SAND HILL RIVER WATERSHED DISTRICT
 FERTILE, MINNESOTA

ROCK ARCH
 PLAN AND PROFILE
 PROJECT NO. 1812-0063

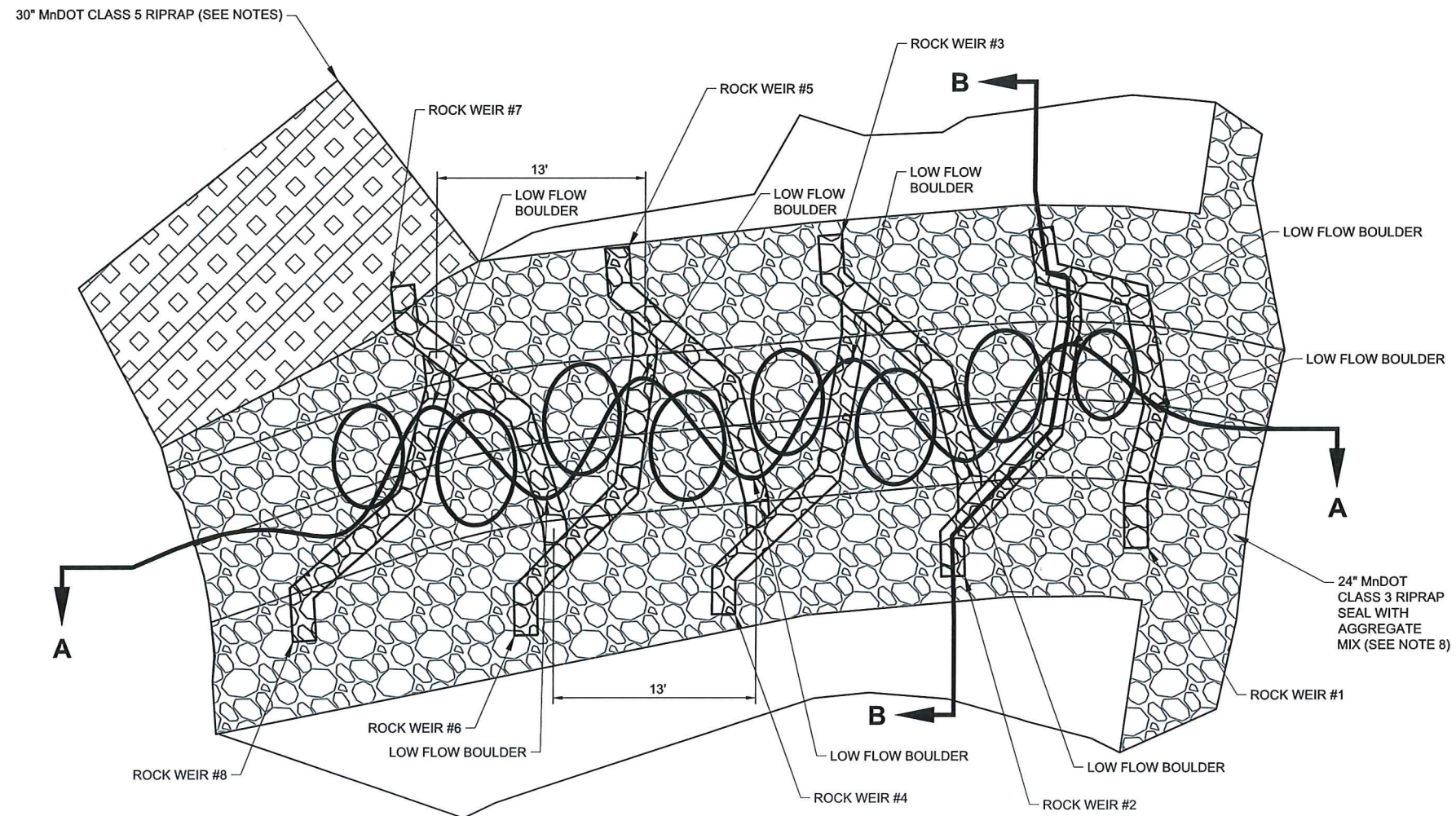
SHEET
 3 of 5



ROCK WEIR	LOW FLOW BOULDER ELEVATION	HIGH BOULDER ELEVATION (SOUTH)	HIGH BOULDER ELEVATION (NORTH)
1	1272.78	1275.00	1275.00
2	1272.55	1274.50	1275.00
3	1272.10	1274.50	1274.75
4	1271.50	1273.70	1274.75
5	1270.90	1273.70	1273.20
6	1270.30	1272.30	1273.20
7	1269.70	1272.30	1271.60
8	1269.10	1271.30	1271.60

NOTES:

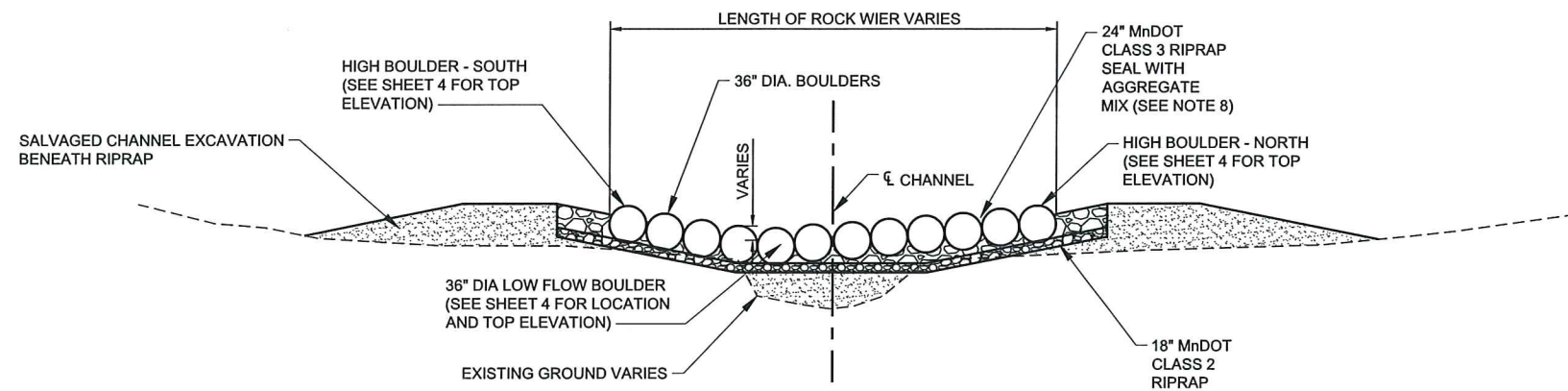
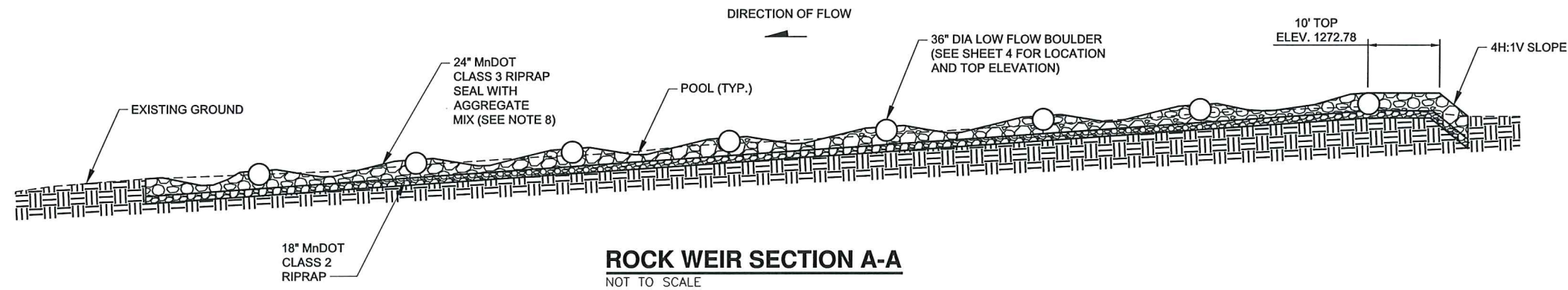
- NUMBER OF BOULDERS FOR EACH ROCK-ARCH IS DEPENDENT ON SIZE AND SPACING OF BOULDERS.
- ROCK WEIRS SHALL CONSIST OF 36" BOULDERS. TOP OF BOULDERS SHALL BE SET ABOVE MNDOT CL. 3 RIPRAP AS SHOWN ON THE PROFILE TO RESULT IN WEIRS SPACED AT APPROXIMATELY 13' INTERVALS BETWEEN LOW FLOW ROCKS.
- BOULDER WEIRS ARE TO BE FILLED WITH SMALLER STONE (MNDOT CL. 2 ROCK RIPRAP) TO REDUCE LEAKAGE AND CREATE POOLS.
- ADDITIONAL BOULDERS WILL BE ADDED RANDOMLY TO ADD TO AESTHETICS AS DIRECTED BY THE ENGINEER OR REPRESENTATIVE IN THE FIELD (ESTIMATED AT 20 ADDITIONAL BOULDERS). THE LINEAR FOOTAGE OF THE ADDITIONAL BOULDERS SHALL BE MEASURED AS THE AVERAGE OF THE CENTERLINE LENGTH IN ALL 3 AXIS PLANES AND PAID FOR UNDER THE BID ITEM "ADDITIONAL BOULDERS (36" DIAMETER)".
- THE WEIRS FUNCTION TO PROVIDE ADDED STABILITY TO THE RAPIDS, RESTING AREA FOR THE MIGRATION OF FISH, DIRECTING FLOW TOWARDS MID-CHANNEL (REDUCING STRESS ON BANKS) AND INCREASING SAFETY BY CREATING LOW VELOCITIES NEAR BANKS.
- WEIRS ARE TO BE INTEGRATED INTO THE CONSTRUCTED BANKS, THE GAPS BETWEEN BOULDERS SHALL TYPICALLY RANGE FROM 0 TO 6 INCHES.
- ALL FILL MATERIAL UNDER RIPRAP RAMP TO BE EITHER GRANULAR FILL OR EXCAVATED CHANNEL MATERIAL.
- VOIDS IN THE PLACED RIPRAP SHALL BE FILLED WITH A WELL GRADED MIX OF AGGREGATE VARYING FROM THE NO. 40 SIEVE UP TO 3 INCH STONES. THE MIX OF AGGREGATE SHOULD BE SUCH THAT IT IS NOT BLOWN OUT OF THE RIPRAP BY THE RIVERS CURRENT BUT INSTEAD FORCES FLOW OVER THE RIPRAP. EXCESS CHANNEL EXCAVATION CAN BE USED FOR FILLING VOIDS WITH ENGINEERS APPROVAL.
- CONTRACTOR SHALL STRIP AND SALVAGE TOPSOIL FROM EMBANKMENT AREA OUTSIDE OF EXISTING CHANNEL AREA. SALVAGED TOPSOIL SHALL BE SPREAD EVENLY OVER EMBANKMENT AREAS (INCIDENTAL TO OTHER ITEMS).
- CONTRACTOR SHALL INSTALL CLASS 5 RIPRAP WITHIN POLK COUNTY DITCH NO. 83 AS SHOWN ON THE PLANS.



ROCK WEIR LAYOUT
NOT TO SCALE

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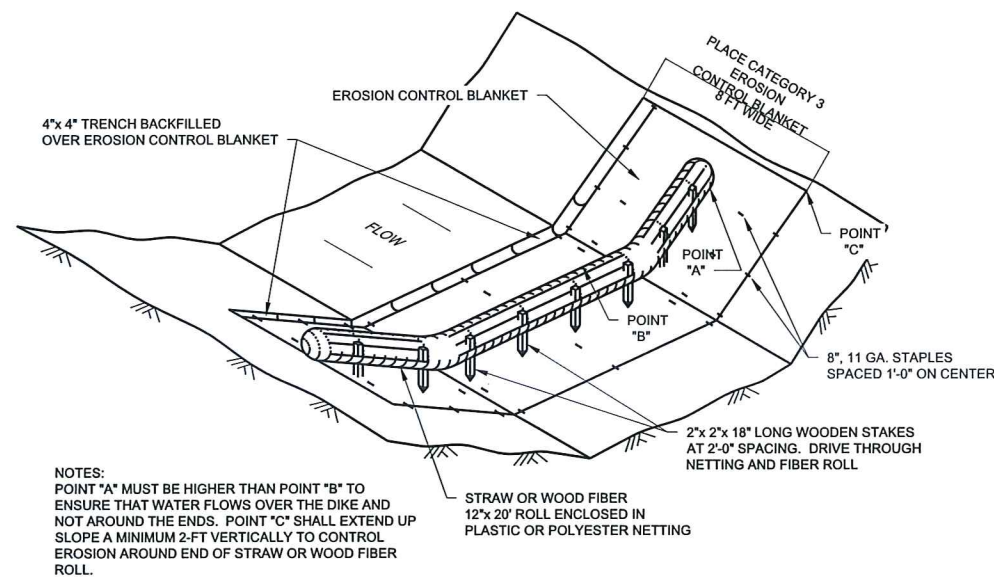
1		REVISED LOW FLOW BOULDER ELEVATIONS	10-28-2019	BAU	Erik S. Jones Erik S. Jones License No. 41161	10/28/2019			Fargo	Drawn by BAU	Date 10-28-19	SAND HILL LAKE DAM MODIFICATIONS SAND HILL RIVER WATERSHED DISTRICT FERTILE, MINNESOTA	ROCK WEIR LAYOUT PROJECT NO. 1812-0063	SHEET 4 of 5
No.	Revision	Date	By						Checked by ESJ	Scale AS SHOWN				



NOTES:

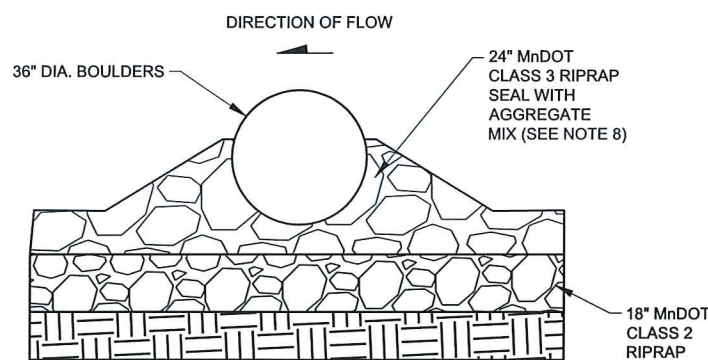
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10. CONTRACTOR SHALL INSTALL CLASS 5 RIPRAP WITHIN POLK COUNTY DITCH NO. 83 AS SHOWN ON THE PLANS.

ROCK WEIR SECTION B-B
NOT TO SCALE

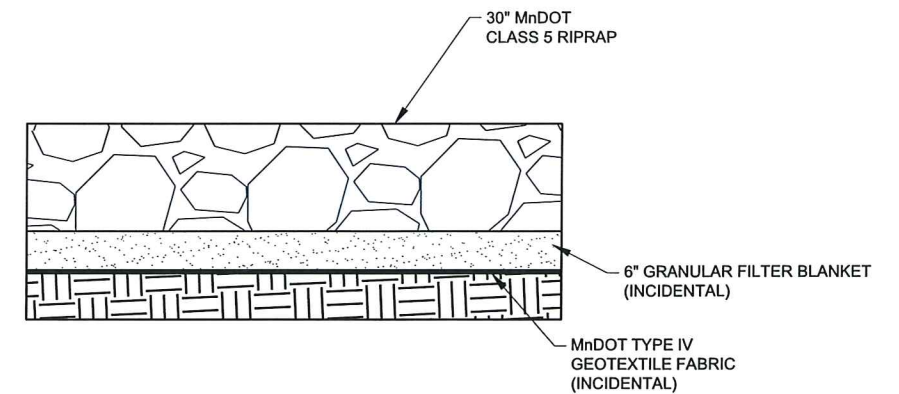


NOTES:
POINT "A" MUST BE HIGHER THAN POINT "B" TO ENSURE THAT WATER FLOWS OVER THE DIKE AND NOT AROUND THE ENDS. POINT "C" SHALL EXTEND UP SLOPE A MINIMUM 2-FT VERTICALLY TO CONTROL EROSION AROUND END OF STRAW OR WOOD FIBER ROLL.

TEMPORARY DITCH CHECK
NOT TO SCALE



ROCK WEIR DETAIL
NOT TO SCALE



CLASS 5 RIPRAP DETAIL
NOT TO SCALE

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1		REVISED ROCK WEIR SECTION A-A DETAIL	10-28-2019	BAU	I hereby certify that this plan, specification, or report 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. <i>Erik S. Jones</i> Erik S. Jones License No. 41161				Fargo	Drawn by BAU	Date 10-28-19	SAND HILL LAKE DAM MODIFICATIONS SAND HILL RIVER WATERSHED DISTRICT FERTILE, MINNESOTA	ROCK WEIR DETAILS PROJECT NO. 1812-0063	SHEET 5 of 5
No.	Revision	Date	By	Date	P: 701.237.5065 F: 701.237.5101	Checked by ESJ	Scale AS SHOWN							