

## DRAINAGE SYSTEM OUTLETS - DESIGN TABLE

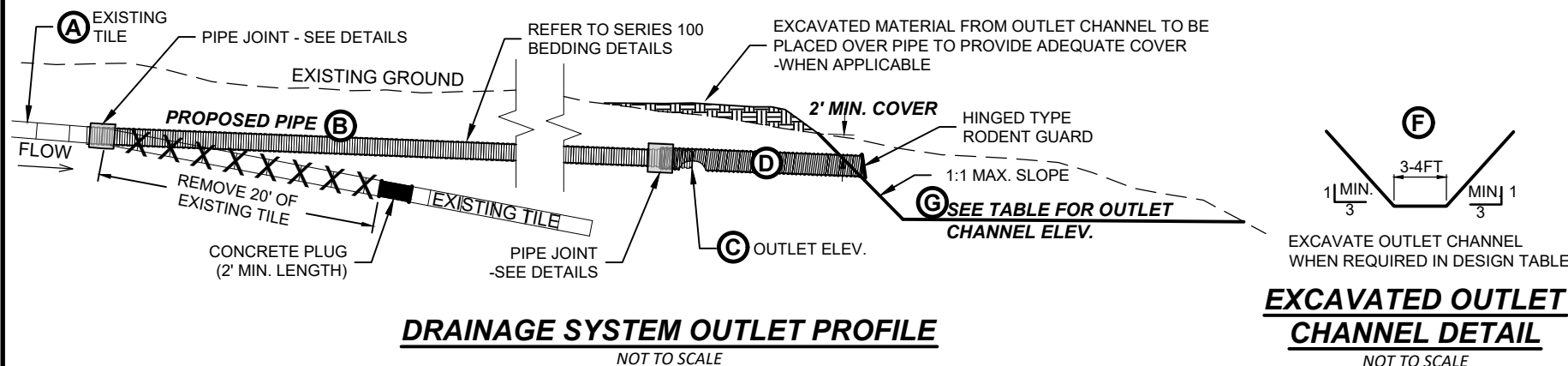
LOCATION	EXISTING TILE (A)		PROPOSED PIPE (B)				SLEEVE (D)	RIPRAP (E)	OUTLET CHANNEL (F)			
	DIA. (IN)	VERIFIED (Y/N)	MATERIAL	DIA. (IN)	APPROX. LENGTH (FEET)		REQ'D (Y/N)	REQ'D (Y/N)	REQ'D (Y/N)	CHANNEL ELEV. (G)	EST. LENGTH (FEET)	EST. QTY. (C.Y.)
					PERF.	NON-PERF.						
<b>NORTH</b>												
<b>GOOD DESCRIPTION</b>												
<b>PIPE #1</b>												

20 L.F. OF THE EXISTING TILE IMMEDIATELY DOWNSTREAM OF THE UPSTREAM PIPE JUNCTION SHALL BE REMOVED (SEE DETAIL). THE OPEN END OF THE DOWNSTREAM TILE SHALL BE EFFECTIVELY PLUGGED/SEALED AS PER REQUIREMENTS IN CONSTRUCTION SPECIFICATION 2.260 (SEE DETAIL).

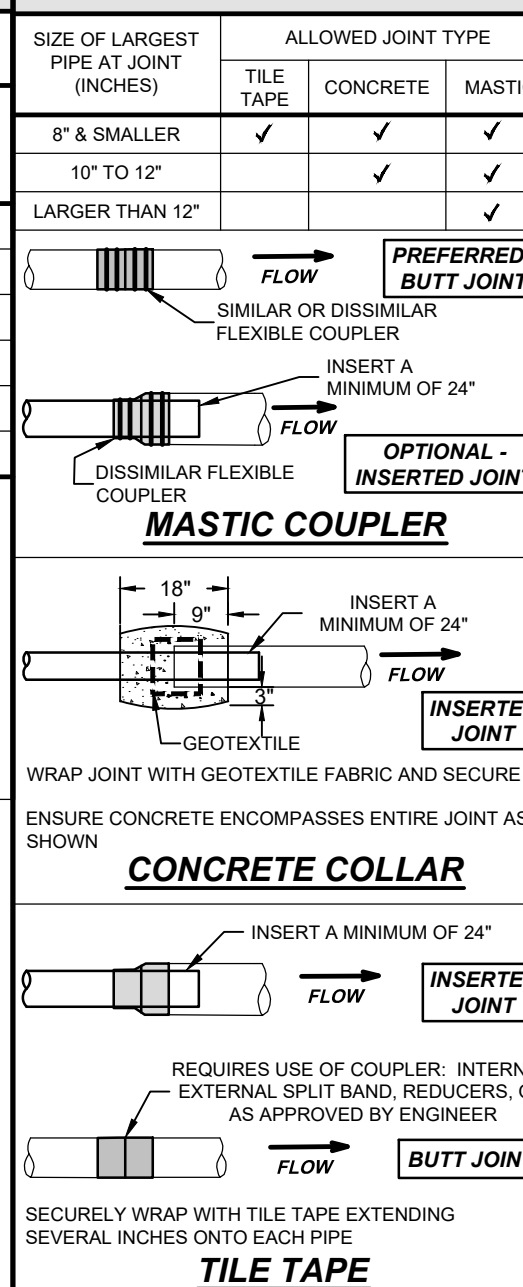
LENGTH OF PROPOSED PIPE (B) WILL BE A SEPERATE BID ITEM. UNLESS OTHERWISE INDICATED, REMAINING ITEMS ASSOCIATED WITH CONSTRUCTING THE OUTLET SHALL BE INCIDENTAL TO THE ASSOCIATED TILE OUTLET BID ITEM. THIS WILL INCLUDE TILE REMOVAL, FURNISHING AND INSTALLING PIPE JOCTIONS, TILE PLUG/SEAL, CMP SLEEVE AND RODENT GUARD, RIPRAP (IF REQUIRED), AND EXCAVATED OUTLET CHANNEL (IF REQUIRED)

DIAMETER (SIZE) OF CMP SLEEVE (D) WILL BE DEPENDANT ON CONTRACTOR'S CHOICE OF PIPE JOINT TYPE THAT WILL BE USED.

WHERE EXISTING TILE SIZE IS SHOWN AS NOT BEING VERIFIED, IT IS RECOMMENDED TO FIELD VERIFY THE SIZE, LOCATION, AND ELEVATIONS OF THE EXISTING TILE PRIOR TO ORDERING MATERIALS AND INSTALLING THE OUTLET. IF THE DIAMETER OF THE EXISTING TILE DIFFERS FROM WHAT IS SHOWN, THE ENGINEER SHALL BE CONTACTED TO DISCUSS NECESSARY CONSTRUCTION MODIFICATIONS AND ASSOCIATED COST ADJUSTMENTS, WHEN NECESSARY.



## PIPE JOINT DETAILS



## CMP SLEEVE DETAILS

CMP SLEEVE SIZE (INCHES)	MINIMUM LENGTH (FEET)
8" & SMALLER	10
10" TO 12"	12
15" TO 18"	16
LARGER THAN 18"	20

CORRUGATED METAL PIPE (CMP) SHALL BE A MINIMUM OF 16 GAUGE GALVANIZED PIPE. OTHER COATINGS AS APPROVED BY ENGINEER

CONTRACTOR TO DETERMINE CMP SLEEVE DIAMETER FROM JOINT TYPE SELECTED

EITHER ANNULAR OF HELICAL PIPE IS ACCEPTABLE. FIELD CUTTING OF HELICAL PIPE WILL NOT BE ALLOWED

REFER TO SPECIFICATION 2.310 - CORRUGATED METAL PIPE

## ROCK RIPRAP DETAILS

CMP SLEEVE SIZE (INCHES)	GEOTEXTILE QUANTITY (S.Y.)	ROCK QUANTITY (C.Y.)
6" TO 15"	±12 S.Y.	±2 C.Y.
LARGER THAN 15"	±20 S.Y.	±4 C.Y.

INSTALL RIPRAP/GEOTEXTILE WHEN REQUIRED IN DESIGN TABLE

GEOTEXTILE TO BE MNDOT TYPE III OR IV

ROCK RIPRAP SHOULD BE A MINIMUM OF MNDOT CLASS II, EITHER FIELD STONE OR ANGULAR ROCK MAY BE USED

THICKNESS OF RIPRAP TO BE 1.25 X D<sub>100</sub>

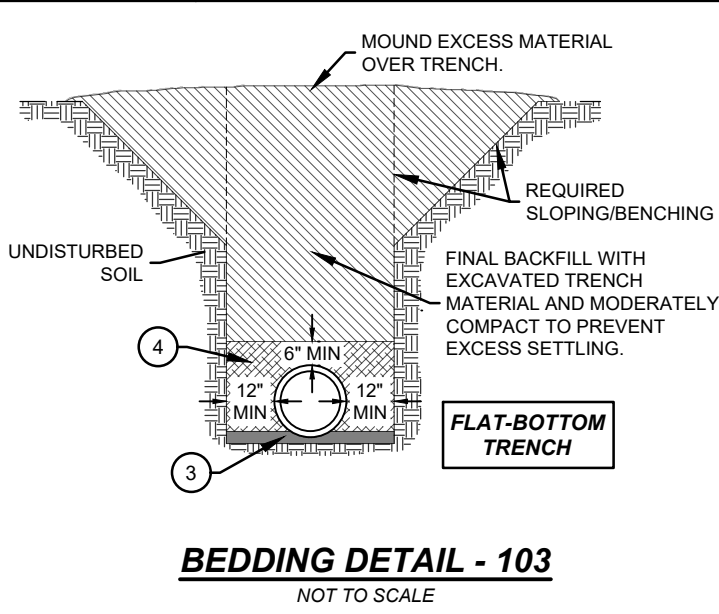
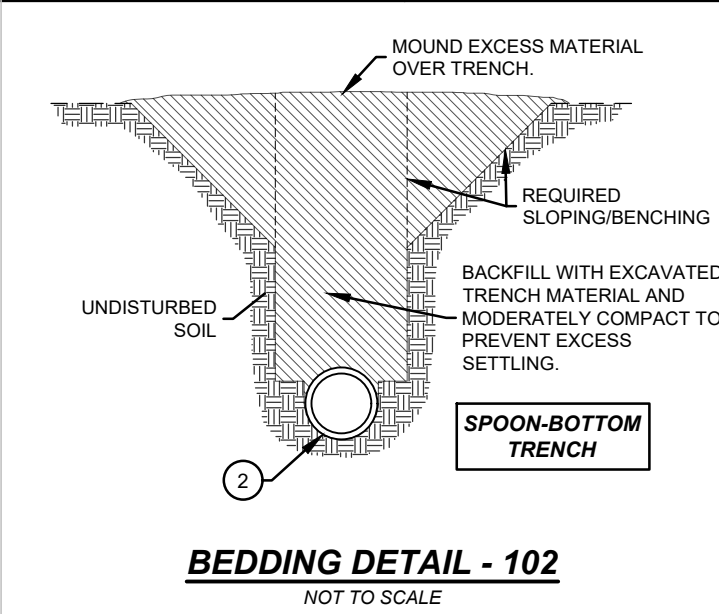
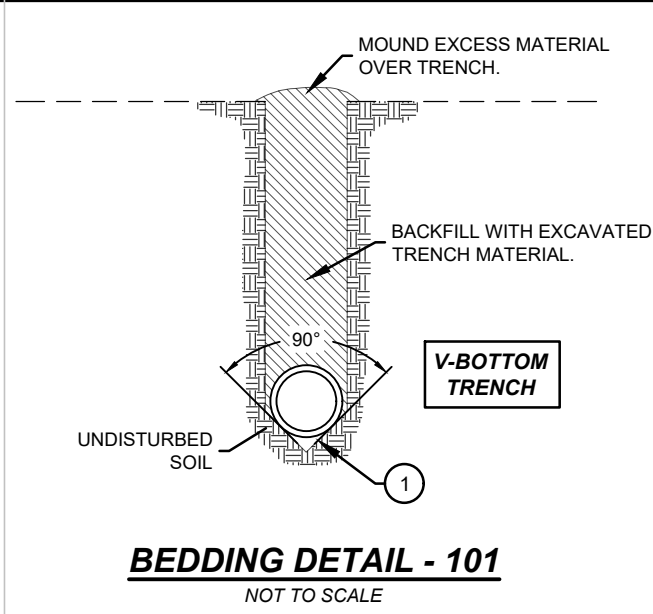
REFER TO SPECIFICATIONS: 2.410 - RIPRAP  
2.440 - GEOTEXTILES

### SERIES 100 BEDDING DETAILS

**PURPOSE:** SERIES 100 BEDDING DETAILS ARE FOR THE GENERAL INSTALLATION OF CORRUGATED HDPE PIPE AND AGRICULTURAL DRAINAGE TILE.

- V-BOTTOM TRENCH TYPICALLY FORMED USING A PLOW ATTACHMENT.
- SPOON TRENCH SHALL BE CUT HALF-CIRCLE TO A DEPTH SUCH THAT THE TOP OF THE SPOONED TRENCH BOTTOM EXTENDS TO PIPE SPRINGLINE, OR HIGHER, WITH UNDISTURBED SOIL HAVING CONTACT WITH THE ENTIRE BOTTOM HALF OF THE PIPE.
- PRIOR TO SETTING PIPE, PLACE 4"-6" OF LOOSE FRIABLE SOILS IN THE TRENCH BOTTOM AS BEDDING.
- THE INITIAL BACKFILL SHALL CONSIST OF LOOSE EXCAVATED TRENCH MATERIAL PLACED IN 3"-4" LIFTS AND HAND OR MECHANICALLY TAMPED AROUND THE PIPE.

SPECIAL CARE MUST BE TAKEN TO COMPLETELY FILL AND COMPACT THE INITIAL BACKFILL UNDER THE LOWER HALF OF THE PIPE.



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.

PRINT NAME / SIGNATURE DATE:

LIC. NO.

STANDARD SHEET BWSR 106

**WETLAND RESTORATION PLAN**  
**DRAINAGE SYSTEM OUTLET DETAILS**

PROJECT #:

SHEET NO. OF