

PIPE SIZE (in)	CONNECTOR AND BOLT SIZE (in.)	HOLE FOR CONNECTOR (in.)
12 to 27	5/8	7/8
30 to 60	3/4	1.0
66 to 132	1.0	1 1/4

Wrap all joints on concrete roadway pipe culverts.  
Use Type 3 Connections on all culvert pipes, unless specified otherwise. Refer to Materials I.M. 445.01 for Connector requirements.

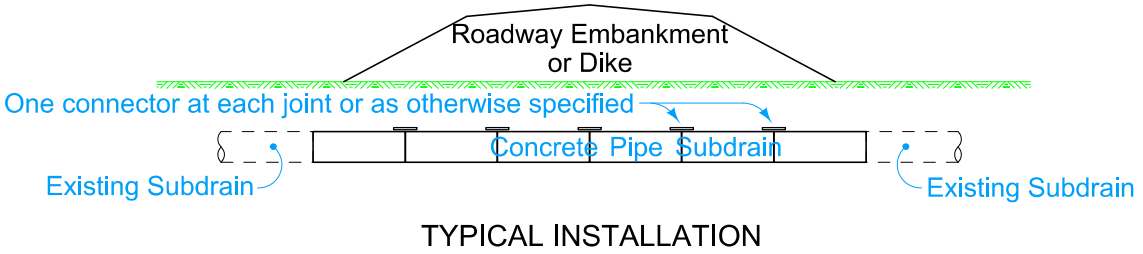
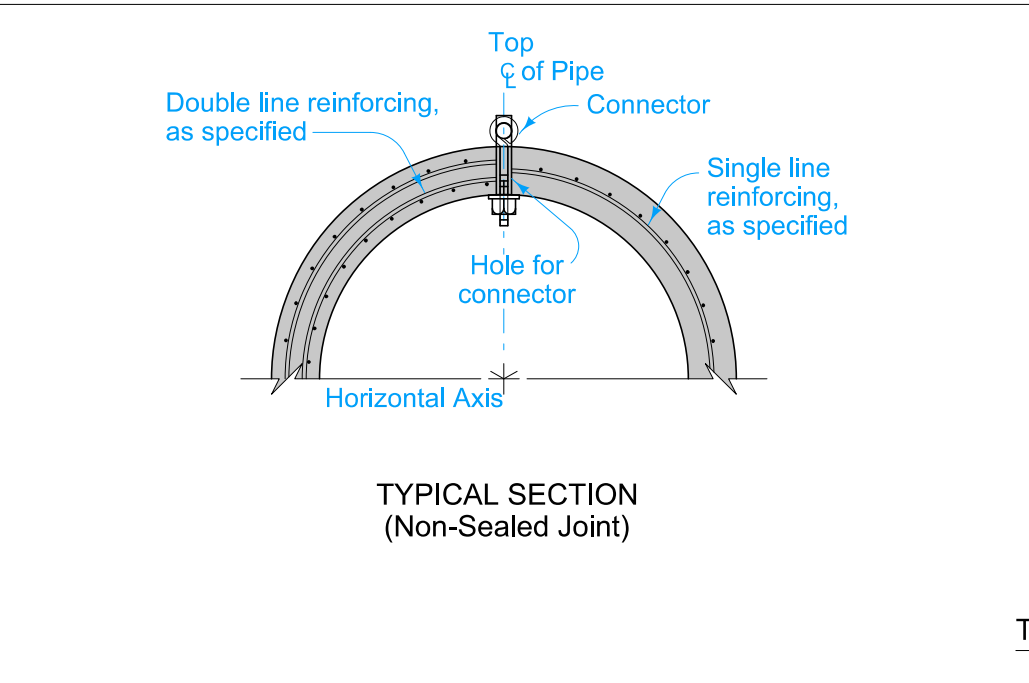
Minimum 2 threads showing at all threaded ends.  
Connections not required on pipe sections installed by trenchless methods.  
For belled concrete pipe joints, connectors may be installed on the inside of the pipe.

**TYPE 1**  
One connector at the top of the pipe section.  
**TYPE 2 (Sealed Joint)**  
Two connectors near the top of the pipe section. For details of reinforcement, refer to AASHTO M 170 for the class of pipe required. Refer to Materials I.M. 491.09 for seal requirements.

**TYPE 3 (Non - Sealed Joint)**  
Two connectors near the top of the pipe section. For details of reinforcement, refer to AASHTO M 170 for the class of pipe required.

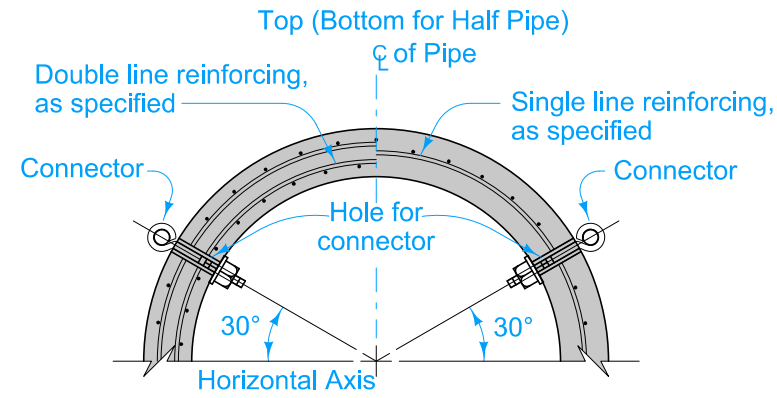
- ① If holes are field drilled, place a ribbon of butyl sealant around bolts before placing 3 in. x 3 in. x 1/4 in. plate on bolts through corrugated metal pipe and tightening nuts.
- ② 1 3/4 inch round x 9/64 inch thick washer or 3 in. x 3 in. x 1/4 in. square plate (shaped to pipe radius).
- ③ Connectors with One Bend End and Bell End spacers allowed per Materials I.M. 451. Refer to Optional Bolts detail.
- ④ Engineering fabric for embankment erosion control.

Possible Tabulations:  
104-3  
104-5B

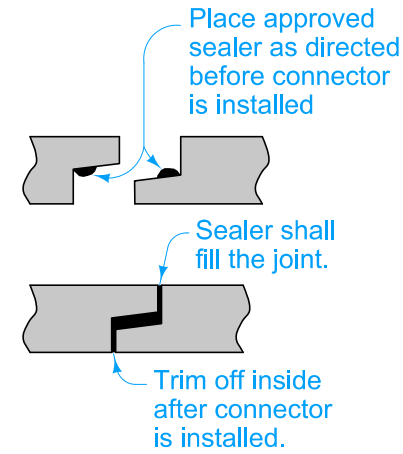


**TYPE 1 CONNECTION**

	REVISION	
	4	04-18-23
STANDARD ROAD PLAN		DR-121
REVISIONS: Corrected title.		SHEET 1 of 2
 APPROVED BY DESIGN METHODS ENGINEER		
CONNECTED PIPE JOINTS		

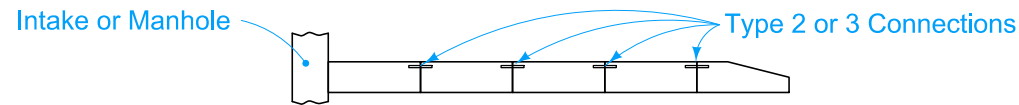


TYPICAL SECTION  
TYPE 2 CONNECTION  
TYPE 3 CONNECTION

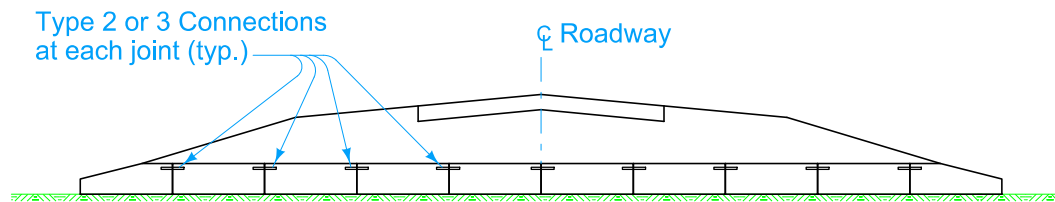


SEALED JOINT  
TYPE 2 CONNECTION

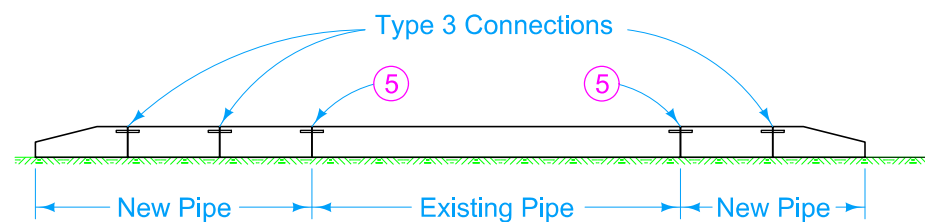
5 On culvert extensions, connect all new joints including the joint between the old and new culvert pipe. Holes may need to be drilled into existing pipes.



TYPICAL INSTALLATION  
STORM SEWER OUTLET - TYPE 2 OR TYPE 3 CONNECTION



TYPICAL INSTALLATION  
NEW CONSTRUCTION - TYPE 2 or 3 CONNECTION



TYPICAL INSTALLATION  
PIPE EXTENSION - TYPE 3 CONNECTION

TYPE 2 AND TYPE 3 CONNECTIONS

	REVISION	
	4	04-18-23
<b>STANDARD ROAD PLAN</b>		<b>DR-121</b>
		SHEET 2 of 2

REVISIONS: Corrected title.

*Shawn Miller*  
APPROVED BY DESIGN METHODS ENGINEER

**CONNECTED PIPE JOINTS**