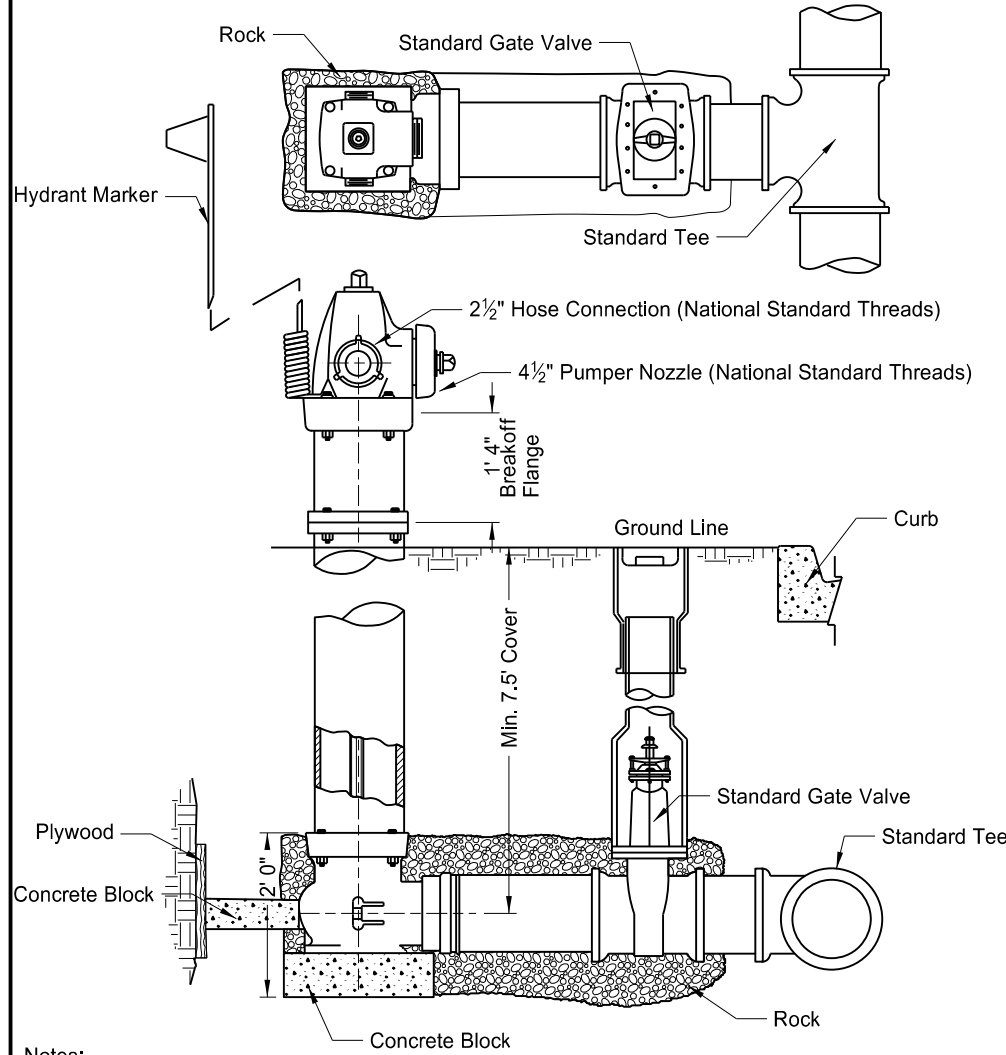
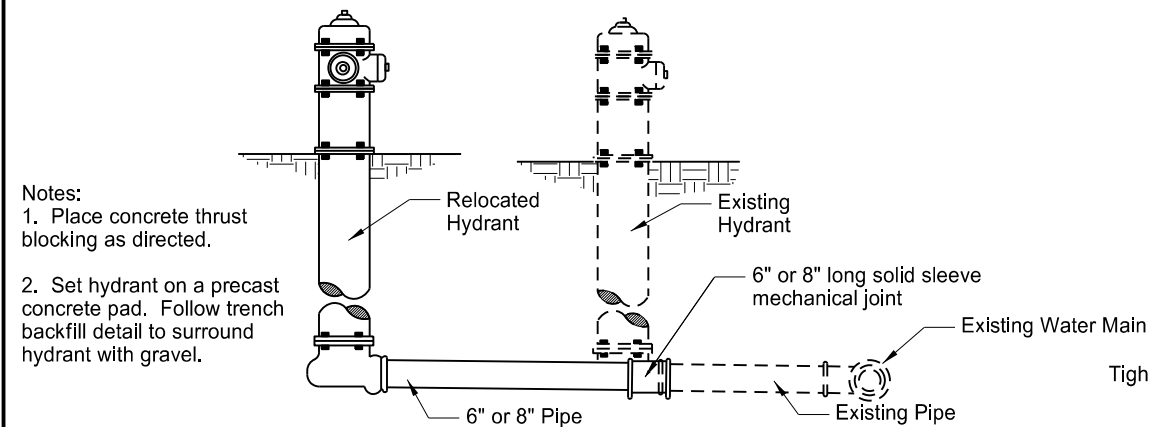


WATERWORKS



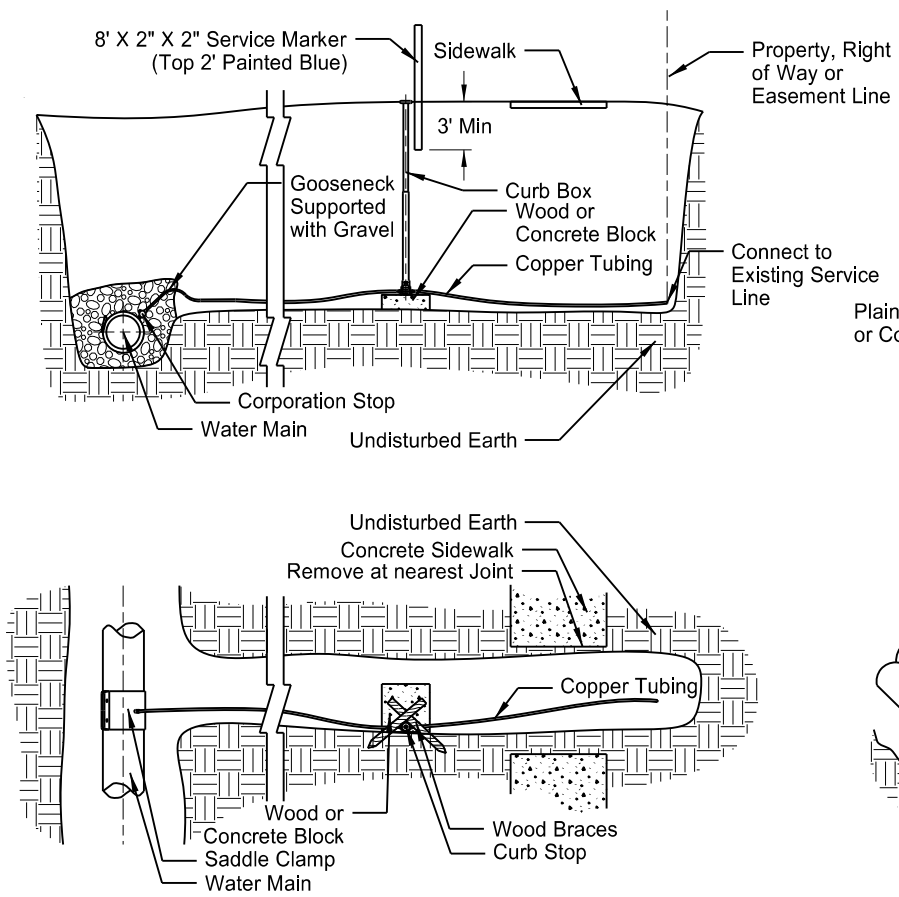
- Notes:
1. Use City Standards for Operating & Cap Nuts.
 2. Supply, furnish, and install hydrant marker. Include costs in the unit bid price for the hydrant. Place hydrant marker current with city standards or as approved by the Engineer.

STANDARD FIRE HYDRANT & CONNECTION



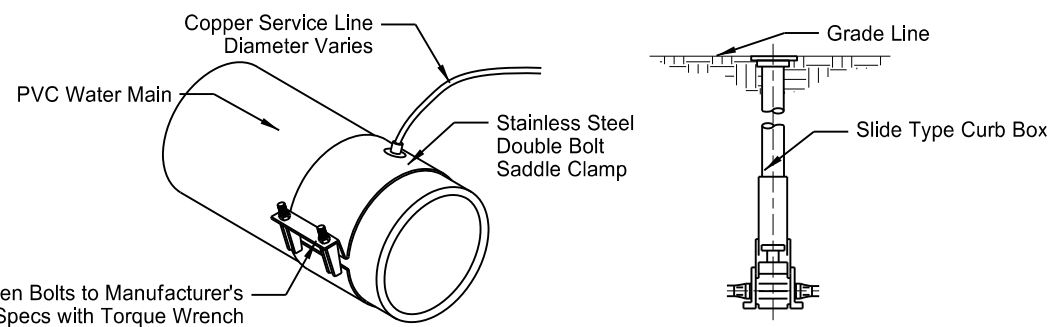
- Notes:
1. Place concrete thrust blocking as directed.
 2. Set hydrant on a precast concrete pad. Follow trench backfill detail to surround hydrant with gravel.

LAYOUT FOR RELOCATION OF HYDRANTS

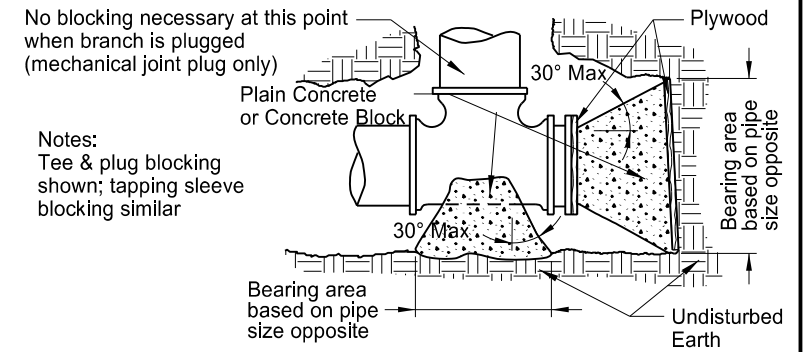


- Notes:
1. Service clamp not required where small size service line connects to large cast iron or ductile iron pipe and three threads of the corporation stop make contact with the wall.
 2. Gravel backfill trench from water main to back of curb line and under sidewalk areas or earth backfill with standard compaction where specified.

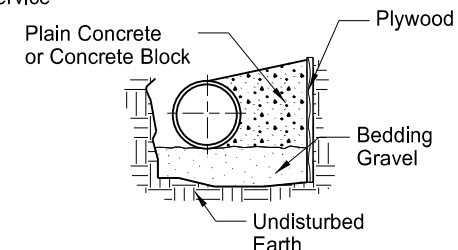
WATER CURB CONNECTION



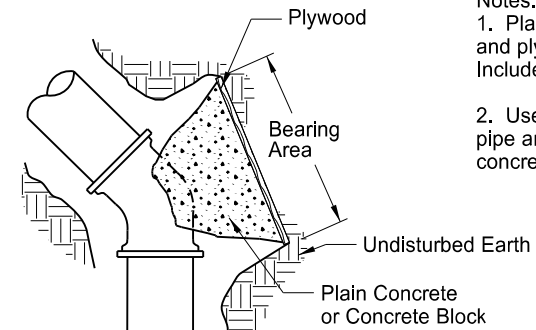
TYPICAL CORPORATION STOP AND CURB STOP



- Notes:
- Tee & plug blocking shown; tapping sleeve blocking similar



TYPICAL SECTION

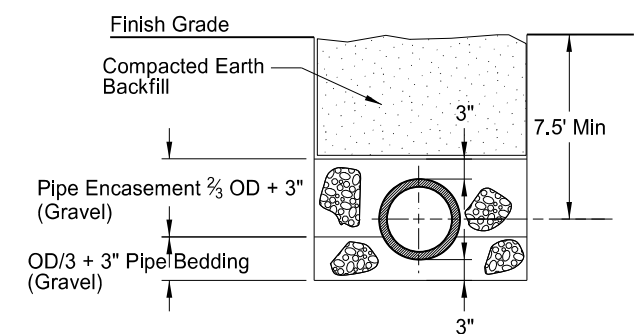


TYPICAL BEND

Table of Required Bearing Areas						
Size of Pipe	90° Bend	45° Bend	22.5° Bend	11.25° Bend	Tees, Plugs & Tapping Sleeves	
4"	2' Sq	2' Sq	2' Sq	2' Sq	2' Sq	2' Sq
6"	3' Sq	2' Sq	2' Sq	2' Sq	3' Sq	3' Sq
8"	5' Sq	3' Sq	2' Sq	2' Sq	4' Sq	4' Sq
10"	8' Sq	4' Sq	3' Sq	2' Sq	6' Sq	6' Sq
12"	11' Sq	6' Sq	3' Sq	2' Sq	8' Sq	8' Sq
16"	20' Sq	11' Sq	6' Sq	4' Sq	15' Sq	15' Sq
18"	25' Sq	14' Sq	7' Sq	4' Sq	18' Sq	18' Sq

- Notes:
1. Place concrete blocking against undisturbed earth and plywood. Keep bells and bolts free of concrete. Include placed concrete in price bid for water main.
 2. Use solid concrete blocks for blocking on 8" Dia. pipe and below, if approved by the Engineer. Place concrete, as shown above, for 10" Dia. pipe and larger.

WATERMAIN THRUST BLOCK DETAILS



TRENCH BACKFILL

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-22-10	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice.
11-01-19	New Design Engineer PE Stamp.

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 11/1/19 and the original document is stored at the North Dakota Department of Transportation