

May 2, 2023

Re: Water System Improvements  
Stratford, South Dakota  
A-8992

Bid Opening: May 4, 2023  
1:00 pm Local Time @ Helms & Associates

**ADDENDUM NUMBER 1**

The following modifications become a part of the original plans and specifications, taking precedence over the items that may conflict. The bidder shall note receipt and make acknowledgement of the addendum on his bid form, incorporating its provisions in his bid.

**CONTRACT DOCUMENTS AND TECHNICAL SPECIFICATIONS**

- 1. PART II, SECTION 33 00 00:** *Add the attached specification for the forcemain repair bid item.*
- 2. The two gate valves on page 32 of the Plans will need to say “SEWER” and not WATER.**

**ALL OTHER ITEMS OF THE PLANS AND SPECIFICATIONS REMAIN UNCHANGED**

By:   
Brandon D. Smid, P.E.



PROJECT ENGINEER – HELMS & ASSOCIATES

**Acknowledge receipt of the Addendum by inserting its number on the Bid Form. Failure to do so may subject bidder to disqualification. This Addendum forms a part of the Contract Documents. It modifies them as above.**

# **SECTION 33 31 00 – SANITARY SEWER PIPING AND FITTINGS**

## **PART 1 GENERAL**

### 1.01 RELATED DOCUMENTS

- A. The general provisions of the Contract, including General and Supplementary Conditions shall apply to the Work covered in this section.
- B. Related Work Specified Elsewhere:
  - 1. Trenching, Backfilling and Compacting - Section 31 23 33
  - 2. Wastewater Valves and Appurtenances - Section 33 31 12
  - 3. Pressure Piping Tied Joint Restraint System - Section 33 05 19
  - 4. Standard Drawing: 33 31 00
  - 5. Pipeline Testing - Section 33 31 01

### 1.02 DESCRIPTION OF WORK

- A. The work covered under these specifications shall include the furnishing of all labor, material, tools, and equipment necessary to furnish and install, complete in place, all piping and fittings as shown on the drawings and as specified herein.

### 1.03 SUBMITTALS

- A. The Contractor shall submit for review 5 copies of shop drawings for materials specified herein as hereinafter specified.
- B. Certificates from the manufacturer that the materials meet or exceed specified requirements.
- C. The manufacturer's installation recommendations, including types and amounts of gasket lubricant, where applicable, to be used.

### 1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. All materials shall be packed, loaded, transported, unloaded, and handled in such a manner so as to prevent damage to the materials.
- B. All material shall be loaded and unloaded by lifting with slings or hoists or skidding so as to avoid shock or damage. Dropping or rolling will not be permitted. The use of end hooks to install or move piping will not be allowed.
- C. All materials shall be stored on the site in accordance with the manufacturer's recommendations. Do not store materials directly on the ground.
- D. All materials shall be kept clean and dry. The insides of all piping and fittings shall be kept free of dirt and debris.

## **PART 2 PRODUCTS**

### 2.01 PRESSURIZED POLYVINYL CHLORIDE (PVC) PIPE

- A. Polyvinyl Chloride pipe shall be pressure Class 200, SDR 21 rated pipe.
- B. The pipe shall be made from Type 1, Grade 1, Class 12454-B compounds conforming to ASTM D1784 with a hydrostatic design basis (HDB) of 4,000 psi as per ASTM 2837.
- C. All pipe shall be marked with the following: Nominal pipe size, material code designation, SDR, pressure rating, manufacturer's name or trademark, NSF seal and ASTM numbers. All sanitary sewer forcemain pipes shall be installed with a locating tape to distinguish forcemain sewer from potable water.
- D. The PVC pipe shall be furnished in 20 foot laying lengths. Longer lengths will be allowed only if the Contractor certifies that he will provide equipment on the project to fully support the pipe while being transported and distributed over the project.
- E. All PVC pipe shall be furnished with gasket joints conforming to ASTM D 3139. Rubber gaskets shall conform to the requirement of ASTM F 477.
- F. Manufacturer's proof of design tests and joint dimensions shall be submitted to the Engineer for gasket joints, which do not maintain SDR throughout the joint.
- G. Gasket joint couplings used for plain end pipe shall have a pressure rating equal to the pipe on which used. Centering of pipe within the coupling will be assured by means of an integral positive stop in the coupling. All couplings must be of the double gasket type. Couplings requiring welds will not be allowed.
- H. All gasket joints shall have a seating depth equal to at least 50% of the nominal pipe diameter.
- I. The ends of the pipe to be inserted into couplings or joints shall be factory marked to allow field checking of the depth of setting of the pipe in the joint socket.

## 2.02 FITTINGS FOR PRESSURIZED PVC PIPE

- A. Repair couplers and gaskets will be pressure rated 200 psi if not otherwise indicated and meet the following specifications, standards and approvals:
  - 1. NSF Standards 14 & 61
  - 2. ASTM D-1784 materials
  - 3. ASTM D-3139 joints
  - 4. SDR 21 dimensions and pressure ratings per ASTM D2241
  - 5. ASTM F-477 gaskets
- B. All other fittings for use on four (4) inches and larger PVC pipe will be ductile iron fittings conforming to the requirements of paragraph 2.01 above, with the exception of transition couplers as specified in paragraph 2.08 below.
- C. Fittings for use on 3" or smaller PVC pipe shall be gasket PVC push-on style fittings conforming to ASTM D 2241, ASTM F-477, and ASTM D 3139. Fittings shall be made to the same quality as the piping furnished.

## 2.03 GRAVITY PVC PIPE

- A. Polyvinyl Chloride (PVC) gravity pipe shall be Type I, Grade I, conforming to the

requirements of ASTM Specification D 3034 for Rigid Poly (Vinyl Chloride) Sewer pipe. The pipe shall have the following minimum wall thickness:

4-inch diameter	SDR 35	0.120-inch wall thickness
6-inch diameter	SDR 35	0.180-inch wall thickness
8-inch diameter	SDR 35	0.240-inch wall thickness
10-inch diameter	SDR 35	0.300-inch wall thickness
12-inch diameter	SDR 35	0.360-inch wall thickness
15-inch diameter	SDR 35	0.437-inch wall thickness

- B. Solvent Cement for PVC pipe joints shall conform to ASTM Specification ASTM D 2564 and shall be applied in conformance with ASTM D 2855. Solvent weld joints will be allowed on PVC cleanout risers only.
- C. Gasket type joints shall be made with rubber gaskets conforming to the requirements of ASTM F-477.
- D. The pipe shall be capable of withstanding trench loads imposed on it.

#### 2.04 GRAVITY PVC PIPE FITTINGS

- A. Repair couplers, tees, wyes, and bends for Polyvinyl Chloride (PVC) gravity pipe fittings shall be of PVC with material and dimensions conforming to the requirements of ASTM Specification D 3034.
- B. Gaskets for elastomeric joints shall conform to the requirements of ASTM F-477.
- C. Solvent Cement for solvent weld joints shall conform to the requirements of ASTM Specification D 2564 and shall be applied in conformance with ASTM D 2855. Solvent weld joints will be allowed on PVC cleanout risers only.
- D. Sewer "Wyes" for service connections shall be in-line sewer wyes. Saddle wyes will not be permitted for use without permission from Project Engineer.

#### 2.05 TRANSITION COUPLINGS (PRESSURE PIPING)

- A. The couplings used for transitions between piping of different materials shall be a wide-range flexible coupler with a sleeve type design meeting the requirements of AWWA C219.
  - 1. The coupling body shall be a center sleeve fabricated of high strength carbon steel tubing equivalent to ANSI/AWWA C200. The transition couplers will be readily available in nominal diameter ranges from 1.5 to 24 inches on all pipe classes.
  - 2. Compression End Rings: One gasket compression end ring per coupling end. End rings to be of either one or two bolt design, fabricated of carbon steel equivalent to ASTM A576. (One bolt per end in Nominal Size ranges of 2 to 12 inches and two bolts per end on the 16 to 24 inch nominal diameter coupling.)
  - 3. Hydraulic Wide Range Gasket: Chloramine Resistant NSF-61 approved EPDM gasket designed with a multi-layered wide range removable outer layer. Gasket hydraulically actuated with a pressure-equalizing dam, pressure cavity and sealing lip for working pressure of 260 psi (1.5 to 16 inches) and 232 psi (18 to 24 inch nominal diameter coupling).
  - 4. Fasteners shall be grade 304 (A2) or 316 (A4) stainless steel with yield strengths that

conform to all nationally recognized standards. Bolts to be coated with an anti-seize type coating to prevent galling.

5. The interior and exterior coatings shall NSF-61 approved fusion bonded epoxy coating conforming to AWWA C213.
  6. When properly installed the coupling will provide a minimum deflection of 8 degrees, up to 260 psi working pressure and 3/8 inch longitudinal pipe movement without leakage. (Flanged adapters will provide half the longitudinal movement and deflection.)
  7. All products will be proof tested to a minimum of 1.5 times working pressure.
- B. Flanged couplers shall consist of one compression end and gasket, coupling center sleeve, and AWWA Class "D" Flange (per AWWA C207).
- C. Pre-Approved transition couplers are: Hymax-2000 Series wide range coupling; Hymax-2100 Series wide range flanged coupling adapter; "Macro" extended range coupling by Romac Industries, Inc.; or Engineer approved equal.

## 2.06 TRANSITION COUPLINGS (GRAVITY PIPING)

### A. GASKET

1. Manufactured to meet the material requirements of:
  - a. CSA B602 - mechanical couplings for drain, waste, vent pipe and sewer pipe
  - b. ASTM D 5926 - Standard Specification for Poly Vinyl Chloride (PVC) Gaskets for Drain, Waste, and Vent (DWV), Sewer, Sanitary, and Storm Plumbing Systems
  - c. ASTM C 1173 - Standard Specification for Flexible Transition Couplings for Underground Piping Systems
  - d. Hardness, Shore "A", Inst. +5.....65
  - e. Tensile Strength, Min. psi .....1000
  - f. Elongation at Rupture, Min. %.....250
  - g. Tear Strength, Min..... 150 lb/in.
  - h. Brittleness Temperature..... -40°F

### B. CLAMPS

1. Manufactured to the requirements of CSA B602
2. Clamp Housing- 301 Stainless Steel
3. Clamp Band - 301 Stainless Steel
4. Clamp Screw - 305 Stainless Steel
5. Installation torque 60" lbs

### C. SHEAR RING

1. 0.012" Thick, 300 Series Stainless Steel
2. Width manufactured according to coupling width (1.50", 2.13", or 4")

3. Length manufactured according to coupling diameter
4. Clamps spot welded in place

D. COUPLING

1. Manufactured to conform to the performance requirements of:
  - a. ASTM C 1173 - standard specification for flexible transition couplings for underground piping systems
  - b. CSA B602 - mechanical couplings for drain, waste, vent pipe and sewer pipe
  - c. Maximum test pressure: 4.3 PSI (29.6KPA)
  - d. Maximum operating temperature: 140° F nonconsistent
- E. Pre-Approved transition couplers are Strong Back RC Series Repair Couplings manufactured by Fernco Inc. or Engineer approved equal.

2.07 BEDDING MATERIAL

- A. Borrowed granular bedding material shall conform to the gradation indicated below.

<u>Sieve Opening</u>	<u>Bedding Material (Percent Passing)</u>
1"	95-100
No. 200	< 15

- B. Borrowed granular bedding material for unstable trench bottom shall conform to the gradation indicated of size 67 Course Aggregate, ASTM C33 which is indicated below.

<u>Sieve Opening</u>	<u>Bedding Material (Percent Passing)</u>
1-1/2"	100
3/4"	90-100
3/8"	20-55
No. 4	0-10
No. 8	0-5

- C. Bedding material excavated from the job site shall be finely divided material free from organic material and clods, lumps of frozen material or stones larger than 1 1/2" in maximum diameter. Bedding material shall be of proper moisture content to form a firm bed for the pipe.

2.08 FASTENERS

- A. All fasteners in buried locations shall be Grade 304 (A2) or Grade 316 (A4) stainless steel. Anti-Seize shall be applied to all threads prior to installation.

2.09 LUBRICANT FOR GASKETED PIPE

- A. Lubricant shall be an emulsified polymer based product, specifically formulated to be water-soluble without causing turbidity. Lubricant shall not transfer taste and/or odor to new water main installations. Lubricant must not promote bacterial growth and be safe for use on all metal and plastic pipes. Lubricant shall be easily flushed from the line and be non-reactive to

chlorinated water. Lubricant should work easily on both wet and dry surfaces.

#### 2.10 POLYETHYLENE WRAP

- A. All ductile fittings shall be wrapped with polyethylene plastic film having a minimum thickness of 0.008 inches or with a cross woven polyethylene plastic film having a minimum thickness of 0.004 inches.

#### 2.11 TRACER WIRE (FORCEMAIN)

- A. Tracer wire shall be 12-gauge solid copper or high strength stainless steel wire with a 45-mil polyethylene coating. Provide sufficient length to be continuous over each separate run of nonmetallic pipe.
- B. All tracer wires are to be connected to a cast iron or ABS/PVC tamper proof tracer wire access box. The cover is to be manufactured of cast iron and ABS/PVC components produced in the USA. Cast iron collar & cover is to be manufactured in accordance with ASTM A48 Class 25. The ABS is to be manufactured in accordance with ASTM D 1788. The cover shall be lettered "Sewer" and shall have a standard AWWA size cast-in pentagonal bolt. Box will be a minimum of 3 inches in diameter and adjustable from 18 to 24 inches.

### **PART 3 EXECUTION**

#### 3.01 GENERAL

- A. The areas to receive piping shall be examined for defects that may adversely affect the execution and quality of Work. Prior to the start of piping installation, all measurements shall be checked for deviations from allowable tolerances for piping. **Minimum bury for all forcemain piping shall be six (6) foot as measured from the final ground surface to the top of pipe.**

#### 3.02 BURIED PIPING INSTALLATION

- A. All piping and fittings shall be laid true to line and grade as shown on the plans. Each section of pipe shall be so laid and fitted together that when complete the piping will have a smooth uniform flow line. The inside of all pipe shall be cleaned before installation and kept thoroughly clean during and after the laying. Pipe ends shall be cleaned inside and outside.
- B. Apply lubricant liberally to the inside of the pipe bell and spigot. Make sure lubricated surfaces remain free of dirt, gravel, or other debris. Assemble the pipe joint immediately after application of the lubricant.
- C. All pipe and fitting shall be examined for defects before being lowered into the trench. The interior and exterior protective coating shall be inspected and field repaired, if required.
- D. The pipe shall be handled and installed in accordance with manufacturer's recommendations and the requirements of AWWA C 600 for Ductile Iron pipe, ASTM D 2774 for PVC pressure piping and ASTM D 2321 for PVC gravity sewer piping.
- E. When pipe laying is not in progress, including the noon hours, the open ends of pipe shall be closed. No trench water, animals, or foreign material shall be permitted to enter the pipe.
- F. Class "C" Bedding shall be used with all piping. The bedding material shall conform to the requirements of Part 2 above. General requirements for placement are shown on Standard

Drawing 333100-1. On all non-rigid piping, care will be taken to provide maximum support in the haunch area of the pipe. This area extends from the bedding material to the center of the pipe. If coarse materials with voids have been used for bedding materials, the same bedding materials will be used for haunching. When a trench box or similar device is used during excavation, the box will be raised sufficiently to recompact the haunch area in the natural trench to 95% maximum dry density as determined by ASTM D 698.

- G. After each pipe has been graded, aligned, and placed in final position on the bedding material and shoved home, sufficient pipe embedment material shall be deposited and compacted under and around each side of the pipe and back of the bell or end thereof to hold the pipe in proper position and alignment during subsequent pipe joining and embedment operations.
- H. The pipe shall be laid upon properly placed bedding material so that the barrel of the pipe will have a bearing for its full length. No blocking will be allowed to bring the piping up to grade. Bell holes and depressions for joints shall be excavated after the trench bedding has been graded to provide uniform support for the entire pipe.
- I. The Contractor shall provide and maintain all necessary means and devices at all times to remove and dispose of all water entering the trench during the process of pipe laying. The trench shall be kept dry until the pipe laying and jointing are completed. Removal of water shall comply with Section 31 23 33.
- J. Thrust blocks or restraining fittings to restrain pressurized piping shall be provided at all abrupt changes in direction, tees, bends, dead ends and hydrants, and shall be in accordance with the pipe manufacturer's recommendations.
- K. The Contractor shall place backfill material in lifts not exceeding 1-foot and compact to 95% Standard Proctor Density. Stones equal to or larger than 3-inches in diameter shall not be placed within 2-feet of the pipe.

### 3.03 MECHANICAL JOINTS AND COUPLINGS

- A. Mechanical joints shall be carefully assembled in accordance with the manufacturer's recommendations. If effective sealing is not obtained, the joint shall be disassembled, thoroughly cleaned, and reassembled or replaced. Over tightening bolts to compensate for poor installation practice will not be permitted.
- B. The holes in mechanical joints with tie rods shall be carefully aligned to permit installation of the tie rods. In flange and mechanical joint pieces, holes in the mechanical joint bells and the flanges shall straddle the top (or side for vertical piping) centerline. The top (or side) centerline shall be marked on each flange and mechanical joint piece at the foundry.

### 3.04 TRACER WIRE INSTALLATION

- A. Tracer wire shall be installed in the trench at the same time as the pipe or immediately prior to starting the backfill of the trench.
- B. Install a continuous length of tracer wire for the full length of each run of nonmetallic pipe. Attach wire to top of pipe in such manner that it will not be displaced during construction operations.
- C. Splices will be allowed at pipeline intersections, manholes, bored crossings, and at other locations as agreed upon by the Resident Project Representative. Splices in tracer wire will



be made with split bolt or compression-type connectors. Wire nuts may not be used. A waterproof connection is necessary to prevent corrosion. Splices shall be completed in accordance with the manufacturer's recommendations.

- D. Prior to final acceptance, all tracer wire shall be electrically tested for continuity from one exposed end to another.
- E. Bring the wire to the ground surface at each manhole connection and loop the wire in a tracer wire terminal box. These boxes shall be located perpendicular to the manhole on the north side in the boulevard with at least two feet of extra wire inside the box. The tracer wire terminal box must be installed flush with the finished grade.

### 3.05 TESTING

- A. All piping shall be cleaned and flushed after completion of installation.

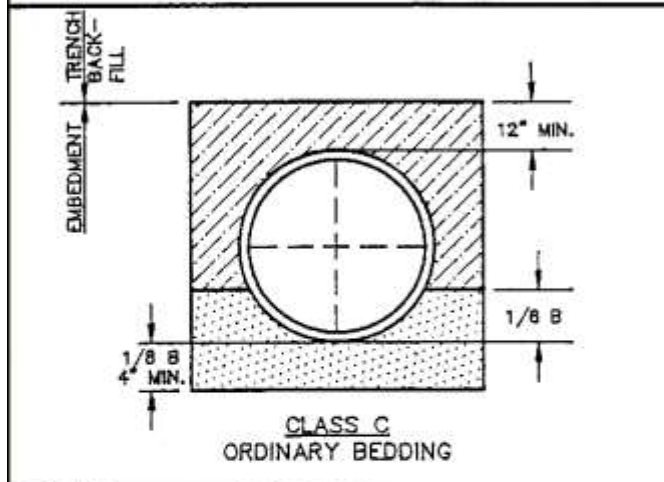
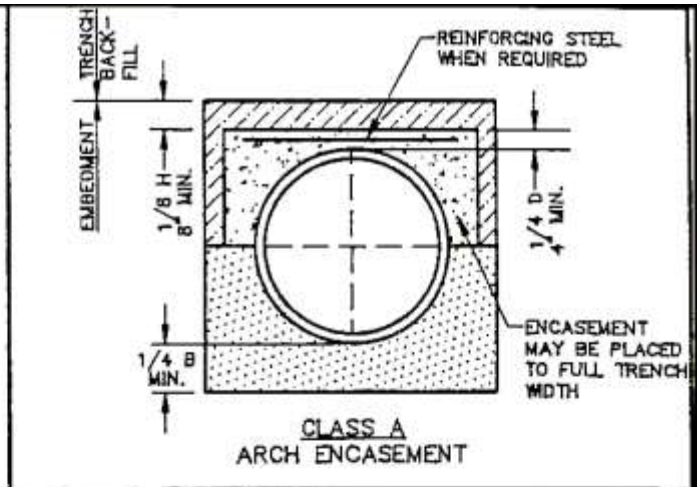
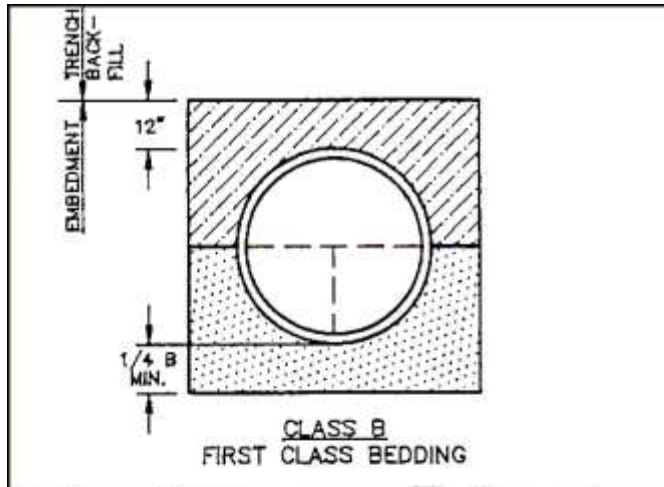
## **PART 4 MEASUREMENT AND PAYMENT**

### 4.01 METHOD OF MEASUREMENT

- A. Piping of the different types and classes, as shown on the plans, and as called for on the Bid Form shall be measured on a per lineal foot, in-place basis.
- B. Bedding material shall be measured to the nearest 0.1 ton. Measurement shall be considered full compensation for all labor, materials, and equipment necessary to furnish and install the material, as needed, to obtain the appropriate grades as specified herein.
- C. The Contractor shall provide certified weight tickets for each load of bedding material hauled and placed in accordance with the plans and specifications. Quantities provided without scale tickets will not be included for payment unless preauthorized by the Engineer.
- D. All fittings specifically called for on the Bid Form will be measured on a per each basis for each type and size of fitting, including all fasteners, gaskets, coatings, blocking, and miscellaneous hardware to install the fitting properly in the locations designated on the plans.
- E. Incidental items associated with the piping materials for which no separate measurement will be made include but are not limited to:
  - 1. Gaskets, Lubricants, Protective Coatings, Linings, Tracer Wire
- F. Nitrile Butadiene gaskets will be measured on a per each basis if authorized by the Engineer for use in contaminated soil areas.

### 4.02 BASIS OF PAYMENT

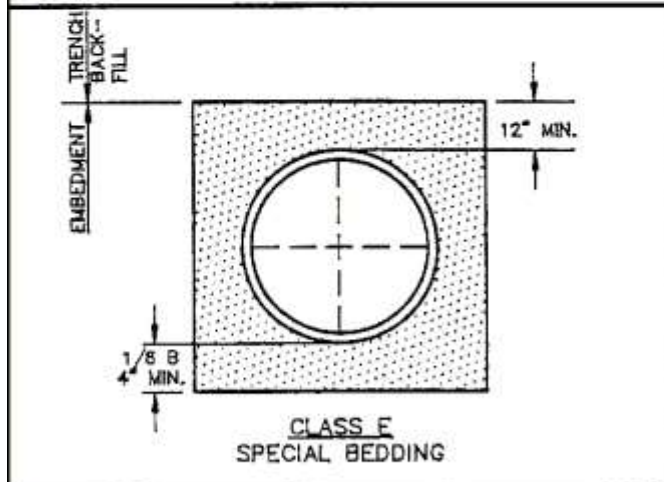
- A. Piping of the different types and classes as called for on the Bid Form shall be paid at the contract unit price provided in the Bid Form.
- B. Fittings listed in the Bid Form shall be paid at the contract unit price provided in the Bid Form.
- C. Nitrile Butadiene gaskets will be paid at the contract unit price per each provided in the Bid Form.



**NOTES:**

GRANULAR EMBEDMENT SHALL BE SIZE 87 COARSE AGGREGATE ASTM D-33 (SEE SPECIFICATIONS) TO BE PLACED IN NOT MORE THAN 6" LAYERS AND COMPACTED BY SLICING WITH A SHOVEL OR VIBRATING.

COMPACTED EMBEDMENT SHALL BE FINELY DIVIDED JOB EXCAVATED MATERIAL, AND STONES, PLACED IN UNIFORM LAYERS NOT MORE THAN 8" THICK AND COMPACTED TO 95% MAXIMUM DENSITY AS DETERMINED BY ASTM D698; INUNDATED SAND; OR GRADED GRAVEL. GRANULAR EMBEDMENT MAY BE SUBSTITUTED FOR ALL OR PART OF COMPACTED EMBEDMENT.



**LEGEND**

B    OUTSIDE DIAMETER OF PIPE  
H    COVER ABOVE TOP OF PIPE  
D    NOMINAL PIPE SIZE

   COMPACTED EMBEDMENT  
    GRANULAR BEDDING  
    CONCRETE

## EMBEDMENTS FOR CONDUITS

HELMS AND ASSOCIATES  
CONSULTING ENGINEERS  
ABERDEEN, SOUTH DAKOTA

STANDARD DRAWING  
02730-1

\*\*\* END OF SECTION \*\*\*