

SECTION 2 - TABLE OF CONTENTS

2.1	GENERAL	2-1
2.1.1	Description	2-1
2.1.2	Extra Materials	2-1
2.2	PRODUCTS	2-2
2.2.1	Steel Casing Pipe.....	2-2
2.2.2	Manholes and Catch Basins	2-2
2.2.3	Cast Iron Castings.....	2-2
2.2.4	Granular Materials.....	2-2
2.2.5	Piling	2-3
2.3	EXECUTION	2-3
2.3.1	General	2-4
2.3.2	Excavation and Preparation of Trench	2-5
2.3.3	Installation of Pipe and Fittings	2-7
2.3.4	Manhole and Catch Basin Structures	2-8
2.3.5	Adjust Casting	2-9
2.3.6	Jack-Bore Steel Casing Pipe and Reinforced Concrete Pipe.....	2-9
2.3.7	Pipeline Backfilling Operations	2-9
2.3.8	Television Inspection.....	2-10
2.3.9	Restoration of Surface Improvements	2-10
2.3.10	Maintenance and Final Cleanup	2-11
2.4	METHOD OF MEASUREMENT AND PAYMENT	2-11
2.4.1	Jacking/Boring Pipe	2-11
2.4.2	Granular Materials.....	2-12
2.4.3	Piling	2-12
2.4.4	Television Inspection.....	2-12
2.4.5	Dewatering	2-12
2.4.6	Adjust Frames and Ring Castings and Gate Valves.....	2-12

SECTION 2 - PIPELINE INSTALLATION REQUIREMENTS

2.1 GENERAL

2.1.1 Description – This work shall consist of the general requirements for the installation of storm drainage, water distribution, and sanitary sewer collection systems and appurtenances. This section shall include the material specifications, excavation, handling, backfilling and additional activities related to all pipeline installations. More specific requirements for execution and material specifications are included for each type of pipeline in Section 3: Storm Drainage Construction; Section 4: Water System Construction; and Section 5: Sanitary Sewer System Construction.

All work must be performed in accordance to these specifications, the Blaine Standard Detail Plates, the plans, and applicable MNDOT Standard Plates.

2.1.2 Extra Materials – Extra materials are required for each project and shall be supplied and delivered to the City's Public Works facility, located at 1801-101st Avenue NE. The amount of extra material supplied shall be as defined herein. The City will determine which types of items are needed at the time of construction. The number and type of items will vary, depending on the size of the project.

A. Developer Installed Improvements

Prior to infrastructure plan approval the City will provide the developer a list of required items from the list contained herein. The cost of these materials is to be covered by the developer.

B. Public Improvements

A list of items will be included in the Special Conditions. The cost of these items shall be incidental to the project cost.

C. Materials List:

Group No.	Item	Quantity Required
1	Hydrant Wrenches	5
2	Curb Box Keys	5
3	Hydrant Extension (6")	1
4	Hydrant Extension (12")	1
5	Hydrant Flag	5
6	Hydrant Traffic Repair Kit	1
7	Sanitary Manhole Cover	2
8	Storm Manhole Cover	2
9	Storm Catch Basin Grate	2
10	Kleen Break Model 425 Sign Post Coupler	2

SECTION 2 - PIPELINE INSTALLATION REQUIREMENTS

D. Items per Developer Installed Improvement project:

Number of Lots	Number of Groups Required
1-15	1
16-30	2
31-50	3
50 and above	4

For example, a plat with 37 lots would require the selection of three groups, which could be No. 1 (5 hydrant wrenches), No. 4 (1 – 16” hydrant extension), and No. 8 (2 storm manhole covers).

2.2 **PRODUCTS**

2.2.1 **Steel Casing Pipe** – Steel casing pipe for jacking/boring shall have a wall thickness of 0.375 inches for casing pipe up to 24 inches in diameter, and a wall thickness of 0.5 inches for casing pipe 24 inches in diameter and larger.

Casing spacers shall be stainless steel, Style CCS, as manufactured by Cascade Waterworks Mfg. Co., Yorkville, IL, or approved equal.

2.2.2 **Manholes and Catch Basins** – All precast concrete structures, concrete block masonry, mortar, and cast-in-place concrete shall meet the requirements of ASTM C478, MNDOT 2506 and all applicable Blaine Detail Plates, and MNDOT Standard Plates, except as modified or supplemented herein.

A. Unless otherwise indicated, manholes shall be a minimum 48 inches inside diameter. Cone sections shall be eccentric with a minimum 27 inches inside diameter opening.

B. Joints between sectional precast concrete sections shall be rubber gasketed conforming to MNDOT Standard Plate 3006G. The joints exterior shall be sealed on the outside lip with 1-1/4 inch round equivalent "EZ-Stick" premium butyl joint seal as manufactured by Press-Seal Gasket Corp. or approved equal.

C. Manhole and catch basin steps shall meet the requirements on MNDOT Standard Plate 4180J, Typical Reinforced Plastic Step.

D. Mortar for all structures shall be "Underground Utility Mortar" as manufactured by Spec Mix, Mendota Heights MN, or approved equal.

2.2.3 **Cast Iron Castings** – Cast iron castings shall meet the requirements of MNDOT 3321 except as modified or supplemented herein.

A. All castings shall be Class 35B or better.

B. Casting type shall be as designated on the plans.

C. Steel adjusting rings shall be as manufactured by Ess Bros. & Sons, Inc. or approved equal.

2.2.4 **Granular Materials** – Granular materials for use in foundation, bedding, encasement and backfill shall meet the requirements of MNDOT 3149 for each type listed except as modified or supplemented herein.

SECTION 2 - PIPELINE INSTALLATION REQUIREMENTS

- A. Granular foundation material shall meet the gradation requirements of MNDOT 3149.2H and is defined as material placed below the bottom of pipe grade as replacement for unsuitable or unstable soils to achieve better foundation support.
- B. Granular bedding material shall meet the gradation requirements of MNDOT 3149.2G.1 and is defined as material placed below the pipe midpoint, prior to pipe installation, to facilitate proper shaping and achieve uniform pipe support.
- C. Granular encasement material shall meet the gradation requirements of MNDOT 3149.2G.1 and is defined as material placed from the midpoint of the pipe to one foot above the top of the pipe, after pipe installation, for protection of the pipe and to assure proper filling of voids and thorough consolidation of backfill.
- D. Granular backfill material shall meet the gradation requirements of MNDOT 3149.2E and is defined as material placed below subgrade, if any, as the second stage of backfill, to minimize trench settlement and provide support for surface improvements.
- E. In each case above, unless otherwise indicated, the lower limits of any particular zone shall be the top surface of the next lower course as constructed. The upper limits of each zone are established to define variable needs for material gradation and compaction or void content, taking into consideration the sequence of construction and other conditions. The material use and zone designations described above shall only serve to fulfill the objectives and shall not be constructed to restrict the use of any particular material in other zones where the gradation requirements are met.

2.2.5 Piling – Piling for pipe construction shall meet the requirements of MNDOT 3471 for treated timber piles except as modified or supplemented herein.

2.3 EXECUTION

2.3.1 General

- A. Line and Grade – The primary line and grade will be established by the Engineer. The Contractor shall install the proposed pipeline in accordance to the set line and grade. Line and grade stakes will be set parallel to the proposed pipeline at an appropriate offset and interval as will best serve the Contractor's operations wherever practical; at each change in line or grade; and as needed for pipeline appurtenances and services lines.

The Contractor shall arrange his operations to avoid unnecessary interference with the establishment of the primary line and grade stakes; and shall render whatever assistance may be required by the Engineer to accomplish the staking. The Contractor shall be responsible for preservation of the primary stakes and shall bear the full cost of any restaking necessitated by his negligence.

The Contractor shall be solely responsible for the correct transfer of the primary line and grade from the stakes to all working points and for construction of the work to the prescribed lines and grades.

- B. Protection of Surface Structures – All surface structures and features located outside the excavation limits for underground installations, together with those within the construction areas which are indicated in the Plans as being saved, shall be properly protected against damage and shall not be disturbed or removed without approval of the Engineer. Within the construction limits, as required, the removal of improvements such as paving, curbing, walks, turf, etc., shall be subject to acceptable replacement after completion of underground work, with all expense of removal and replacement being borne by the Contractor unless separate compensation is specifically provided for in the Contract.

SECTION 2 - PIPELINE INSTALLATION REQUIREMENTS

Obstructions such as street signs, guard posts, mailboxes, small culverts, and other items of prefabricated construction may be temporarily removed during construction provided essential service is maintained in a relocated setting as approved by the Engineer and nonessential items are properly stored for the duration of construction. Upon completion of the underground work, all such items shall be replaced in their proper setting at the sole expense of the Contractor.

In the event of damage to any surface improvement, either privately or publicly owned, the Contractor will be required to replace or repair the damaged property to the satisfaction of the Engineer and at the Contractor's expense.

- C. Interference of Underground Structures – When any underground structure interferes with the planned placement of pipe or appurtenances and requires alterations in the work to eliminate the conflict or avoid endangering effects on either the existing or proposed facilities, the Contractor shall immediately notify the Engineer and the Owner of the affected structure. When any existing facilities are endangered by the Contractor's operations, he shall cease his operations at the site and take such precautions as may be necessary to protect the in-place structures until a decision is made as to how the conflict will be resolved.

Without specific authorization from the Engineer, no essential utility service shall be disrupted, nor shall any change be made in either the existing structures or the planned installations to overcome the interference. Alterations to existing facilities will be allowed only when that service will not be curtailed unavoidably and then only when the encroachment or relocation will satisfy all applicable regulations and conditions.

Wherever alterations are required as a result of unforeseen underground interference not due to any fault or negligence of the Contractor, the Engineer will issue a written change order covering any additional or extra work involved and specifying the revised basis of payment, if any. Any alterations made strictly for the convenience of the Contractor shall be subject to prior approval and shall be at the Contractor's expense.

No extra compensation will be allowed for delays caused by the interference of underground structures unless approved by the Engineer and included in a change order.

- D. Removal of Surface Improvements – Removal of surface improvements in connection with trench excavation shall be limited to actual needs for installation of the pipeline and appurtenances. Removal operations shall be coordinated effectively with the excavation and installation operations as will cause the least practical disruption of traffic or inconvenience to the public. Removed debris shall not be deposited at locations that will block access to fire hydrants, private driveways, or other essential service areas. Removal and final disposal of debris shall be accomplished as a single operation wherever possible and the debris shall be removed from the site before starting the excavating operations.

Refer to Section 1: Street Construction/Site Work for removal specifications.

- E. Dewatering – Dewatering shall be required for all pipeline or structure installations that will occur at or below groundwater elevation. Dewatering operations must use a well point system unless otherwise approved by the Engineer.

Discharge water from dewatering pumping operations shall be discharged from the outlet pipe directly into a catch basin or drainage ditch unless otherwise allowed by the Engineer. Sand bags, sedimentation basins or other measures shall be used to

SECTION 2 - PIPELINE INSTALLATION REQUIREMENTS

collect sediment and reduce turbidity to meet applicable regulations or requirements prior to discharge into storm sewer, ditches or surface water.

2.3.2 Excavation and Preparation of Trench

- A. Operational Limitations and Requirements – Excavating operations shall proceed only as far in advance of pipe laying as will satisfy the needs for coordination of work and permit advance verification of unobstructed line and grade as planned. Where interference with existing structures is possible or in any way indicated, and where necessary to establish elevation or direction for connections to in-place structures, the excavating shall be done at those locations in advance of the main operation so actual conditions will be exposed in sufficient time to make adjustments without resorting to extra work or unnecessary delay.

All installations shall be accomplished by open trench construction except boring and jacking or tunnel construction methods shall be employed where so specifically required by the Plans. Surface structures must be properly supported and the backfill restored to the satisfaction of the Engineer.

The excavation operations shall be conducted to carefully expose all in-place underground structures without damage. Wherever the excavations extends under or approaches close to an existing structure as to endanger it in any way, precautions and protective measures shall be taken as necessary to preserve the structure and provide temporary support. Hand methods of excavating shall be utilized to probe for and expose such critical or hazardous installations as gas pipe and power or telephone cables.

- B. Classification and Disposition of Materials – All materials encountered in the excavations, with the exception of items classified for payment as structure removals, will be considered as Unclassified Excavation. Unclassified materials shall include muck, rubble, wood debris, boulder stone, masonry or concrete fragments less than one cubic yard in volume, together with other miscellaneous matter that can be removed effectively with power-operated excavators.

Excavated materials will be classified for reuse as being either Suitable or Unsuitable for backfill or other specific use, subject to selective controls. All suitable materials shall be reserved for backfill to the extent needed, and any surplus remaining shall be utilized for other construction on the project as may be specified or ordered by the Engineer. To the extent practical, granular materials and topsoil shall be segregated from other materials during the excavating and stockpiling operations so as to permit best use of the available materials at the time of backfilling.

All excavated materials reserved for backfill or other use on the project shall be stored at locations approved by the Engineer that will cause a minimum of inconvenience to public travel, adjacent properties, and other special interests. The material shall not be deposited so close to the edges of the excavations as would create hazardous conditions, nor shall any material be placed so as to block access to emergency services. All materials considered unsuitable by the Engineer, for any use on the project, shall be immediately removed from the project and be disposed of as arranged for by the Contractor.

- C. Excavation Limitations and Requirements – Trench excavating shall be to a depth that will permit preparation of the foundation as specified and installation of the pipeline and appurtenances at the prescribed line and grade, except where alterations are specifically authorized. Trench widths shall be sufficient to permit the pipe to be laid and joined properly and the backfill to be placed and compacted as specified. Extra width shall be provided as necessary to permit convenient

SECTION 2 - PIPELINE INSTALLATION REQUIREMENTS

placement of sheeting and shoring and to accommodate placement of appurtenances.

Excavations shall be extended below the bottom of structure grade as necessary to accommodate any required Granular Bedding material. When unstable foundation materials are encountered at the established grade, additional materials shall be removed as specified or ordered by the Engineer to produce an acceptable foundation. All excavations below grade shall be to a minimum width equal to the outside diameter plus two feet.

The maximum allowable trench width at the level of the top of pipe may be exceeded only by approval of the Engineer, after his consideration of pipe strength and loading relationships. Any alternate proposals made by the Contractor shall be in writing, giving the pertinent soil weight data and proposed pipe strength alternate, at least seven days prior to the desired date of decision. Approval of alternate pipe designs shall be with the understanding that there will be no extra compensation allowed for any increase in material or construction costs.

- D. Sheeting and Bracing Excavations – All excavations shall be sheeted, shored and braced as will meet all requirements of the applicable safety codes and regulations; comply with any specific requirements of the Contract; and prevent disturbance or settlement of adjacent surfaces, foundations, structures, utilities, and other properties. Any damages to the work under contract or to adjacent structures or property caused by settlement, water or earth pressures, slides, cave-ins, or other causes due to failure or lack of sheeting, shoring, or bracing or through negligence or fault of the Contractor in any manner shall be repaired by the Contractor at his expense and without delay.

Where conditions warrant extreme care, the Contract may require special precautions to protect life or property, or the Engineer may order the installation of sheet piling of the interlocking type or direct that other safety measures be taken as he deems necessary. Failure of the Engineer to order correction of improper or inadequate sheeting, shoring, or bracing shall not relieve the Contractor of his responsibilities for protection of life, property, and the work.

The Contractor shall assume full responsibility for proper and adequate placement of sheeting, shoring, or bracing, wherever and to such depths that soil stability may dictate the need for support to prevent displacement. Bracing shall be so arranged as to provide ample working space and so as not to place stress or strain on the in-place structures to any extent that may cause damage.

Sheeting, shoring, and bracing materials shall be removed only when and in such a manner as will assure adequate protection of the in-place structures and prevent displacement of supported grounds. Sheeting and bracing shall be left in place only as required by the Contract or ordered by the Engineer. Otherwise, sheeting and bracing may be removed as the backfilling reaches the level of respective support. Wherever sheeting and bracing is left in place, the upper portions shall be cut and removed to an elevation of three feet or more below the established surface grade as the Engineer may direct.

All costs of furnishing, placing, and removing sheeting, shoring, and bracing materials, including the value of materials left in place as required by the Contract, shall be included in the prices bid for pipe installation and will not be compensated for separately. When any sheeting, shoring, or bracing materials are left in place by written order of the Engineer, in the absence of specific requirements of the Contract to do so, payment may be made for those materials as an Extra Work item, including waste material resulting from upper cut-off requirements.

SECTION 2 - PIPELINE INSTALLATION REQUIREMENTS

- E. Preparation and Maintenance of Foundations – Foundation preparations shall be constructed to produce a stable foundation and provide continuous and uniform pipe bearing between bell holes. The initial excavating or backfilling operations shall produce a subgrade level slightly above finished grade to permit hand shaping to finished grade by trimming of high spots and without the need for filling of low spots to grade. Final subgrade preparations shall produce a finished grade at the centerline of the pipe that is within 0.03 foot of a straight line between manholes and to provide bell hole excavation at each joint to permit proper joining of pipe and fittings.

In excavations made below grade to remove unstable materials, the backfilling to grade shall be made with available suitable materials unless placement of Granular Foundation or Bedding materials is specified and provided for or is ordered by the Engineer as an Extra Work Item. Placement of the backfill shall be in relatively uniform layers not exceeding 8 inches in loose thickness. Each layer of backfill shall be compacted thoroughly, by means of approved vibratory mechanical compaction equipment to produce uniform pipe support throughout the full pipe length and to facilitate proper shaping of the pipe bed.

Where the foundation soil is found to consist of materials that the Engineer considers to be unstable as to preclude removal and replacement to a reasonable depth to achieve solid support, a suitable foundation shall be constructed as the Engineer directs in the absence of special requirements therefor in the Contract. The Contractor may be required to furnish and drive piling and construct concrete or timber bearing supports or other work as may be provided for in the General Conditions. Piling shall be constructed in accordance to MNDOT 2452 except as modified herein.

Care shall be taken during final subgrade shaping to prevent any over-excavation. Should any low spots develop, they shall only be filled with approved material, which shall have optimum moisture content and be compacted thoroughly. The finished subgrade shall be maintained free of water and shall not be disturbed during pipe lowering operations except as necessary to remove pipe slings. The discharge of trench dewatering pumps shall be directed to natural drainage channels or storm water drains.

All costs of excavating below grade and placing foundation or bedding aggregates as required shall be included in the bid prices for pipe items provided the need for such work is indicated in the Contract provisions and the Proposal does not provide for payment under separate Contract Items. Any excavation below grade and any foundation or bedding aggregates required by order of the Engineer in the absence of Contract requirements will be compensated for separately as may be provided for in the General Conditions.

- 2.3.3 Installation of Pipe and Fittings – Inspection, handling, and all aspects of the installation of pipe and appurtenances shall be in accordance with the manufacturer's recommendations, and as supplemented as follows:

- A. Inspection and Handling – Proper and adequate implements, tools and facilities shall be provided and used by the Contractor for the safe and convenient prosecution of the work. Unloading, distribution, and storage of pipe and appurtenant materials on the job site shall be at location approved by the Engineer. All materials shall be handled carefully, as will prevent damage to protective coatings, linings, and joint fittings; preclude contamination of interior areas; and avoid jolting contact, dropping, or dumping.

SECTION 2 - PIPELINE INSTALLATION REQUIREMENTS

Before being lowered into laying position, the contractor shall make a thorough visual inspection of each pipe section and appurtenant units to detect damage and unsound conditions that may need corrective action or be cause for rejection. Inspection procedure shall be as approved by the Engineer, with special methods being required as he deems necessary to check out suspected defects more definitely. The Contractor shall inform the Engineer of any defects discovered and the Engineer will prescribe the required corrective actions or order rejection.

Immediately before placement, the joint surfaces of each pipe section and fitting shall be inspected for the presence of foreign matter, coating blisters, rough edges or projections, and any imperfections so detected shall be corrected by cleaning, trimming, or repair as needed.

All foreign matter or dirt shall be removed from the inside of the pipe fittings before it is lowered into its position in the trench, and it shall be kept clean by approved means during and after laying.

When connecting to existing stubs, the contractor shall take every precaution necessary to prevent dirt or debris from entering the existing lines. All necessary work to make the connection shall be done at no additional compensation, except where noted otherwise.

All lift holes or penetrations shall be gasketed or sealed with a plug and butyl joint wrap prior to backfilling.

- B. Pipe Laying Operations – Every reasonable precaution shall be taken to prevent foreign materials from entering the pipe while it is being placed in the trench. All materials shall be carefully lowered into laying position by the use of suitable restraining devices. Under no circumstances shall the pipe be dropped or dumped into the trench.

Unless otherwise noted in the Special Provisions, pipe bedding shall be Class C as shown on the Blaine detail plates.

At the time of pipe placement, the bedding conditions shall provide uniform and continuous support for the pipe between bell holes. No pipe material shall be laid in water not when the trench or bedding conditions are otherwise unsuitable or improper. Unless otherwise permitted by the Engineer, bell and spigot pipe shall be laid with the bell ends facing upgrade and the laying shall start at the downgrade end and proceed upgrade.

Joint areas shall remain exposed and precautions shall be taken to prevent the soil from entering the joint space, until the joint seal is effected.

2.3.4 Manhole and Catch Basin Structures

- A. Manholes, catch basins and other special access structures shall be constructed at designated locations as required by the plans and in accordance to all applicable detail plates.
- B. Concrete cast-in-place bases shall be poured on undisturbed or firmly compacted foundation material which shall be trimmed to proper elevation. The bottom riser section shall be set in fresh concrete or mortar and all other riser section joints of the tongue and groove design shall be sealed with rubber gaskets.
- C. All lift holes or penetrations shall be gasketed or sealed with a plug and butyl joint wrap prior to backfilling.

SECTION 2 - PIPELINE INSTALLATION REQUIREMENTS

- D. All annular space surroundings in the in place pipes shall be completely filled with mortar or concrete, and the inside bottom of each structure shall be shaped with fresh concrete to provide free flow through invert troughs.
 - E. All units shall be properly fitted and sealed to form a completely watertight structure. Barrel and cone height shall be such as to permit placement of at least two and not more than five standard 2-inch precast concrete adjusting rings, each set in a full ¼-inch to ½-inch mortar bed (See Blaine Detail Plates).
 - F. When a manhole is not installed in the street right-of-way, a metal post and sign meeting Blaine Standard Detail Plates shall be installed adjacent to the manhole. The sign shall be 6" high green background, with 4" high white letters "MH" and no border. The cost of this sign shall be incidental to the cost of the manhole.
- 2.3.5 Adjust Casting – The Contractor shall adjust casting on structures as specified and a located on the plans.
- A. Adjust casting within the roadway surface prior to placement of final bituminous wear course (or base course if directed by the Engineer). Adjustment shall be done no earlier than 72 hours prior to paving operations unless approved by the Engineer.
 - B. Contractor shall install and maintain rubber manhole safety ramps on all raised manhole castings within the roadway until paving of the final wear course has commenced.
 - C. Keep excavations for adjustments to a minimum and restore disturbed surfaces to match existing.
 - D. Provided adjusting rings in accordance with plan details and specifications to establish required casting elevation. No metal paving/adjusting rings shall be allowed for establishing final casting elevation.
 - E. Castings shall be set 0.25 inches (0.02 feet) below finished grade.
- 2.3.6 Jack-Bore Steel Casing Pipe and Reinforced Concrete Pipe – The Contractor shall jack-bore steel casing pipe or reinforced concrete pipe (RCP) in place as specified and a located on the plans.
- A. A 1½-inch pipe shall be forced along the top of the steel casing pipe or RCP. The end of this 1½-inch pipe shall be 18 inches back from the lead edge of the jacking pipe. Bentonite grout under pressure shall be forced through this pipe at all times during the jacking operation to fill any voids that might develop about the pipe.
 - B. When a steel casing pipe is installed, the pipe shall then be installed in the casing with casing spacers per 2.2.1 and the ends sealed with concrete or cement mortar.
 - C. The Contractor shall be responsible for obtaining or paying any special permit fees or bonds, etc. required.
- 2.3.7 Pipeline Backfilling Operations
- A. All pipeline excavations shall be backfilled to restore preexisting conditions as the minimum requirement, and fulfill all supplementary requirements indicated in the Plans and specifications. The backfilling operations shall be started as soon as conditions will permit on each section of pipeline, so as to provide continuity in subsequent operations and restore normal public service as soon as practicable on a section-by-section basis. All operations shall be pursued diligently, with proper and adequate equipment, as will assure acceptable results.

SECTION 2 - PIPELINE INSTALLATION REQUIREMENTS

- B. The backfilling shall be accomplished with the use of Suitable Materials selected from the excavated materials to the extent available and practical.
- C. Suitable Material shall be defined as a mineral soil reasonably free of foreign materials (rubbish, debris, etc.), frozen clumps, organic matter, stone or rock or concrete or bituminous chunks larger than 4 inch, and other unsuitable materials, that may damage the pipe installation, prevent thorough compaction, or increase the risks of settlement. Material selection shall make the best and fullest utilization of what is available, taking into consideration particular needs of different backfill zones. Unsuitable material, as described above, shall only be utilized where and to the extent there will be no detrimental effects and with the approval of the Engineer.
- D. Backfill materials shall be carefully placed in relatively uniform depth layers spread over the full width and length of the trench section to provide simultaneous support on both sides of the pipeline. Each layer shall be compacted effectively, by approved vibratory mechanical methods before placing material for a succeeding layer thereon. Within the pipe bedding zone compaction shall be in a minimum of three lifts: invert to spring line, spring line to top of pipe, and top of pipe to 1.0 foot over top of pipe. Maximum thickness of any lift shall be eight inches compacted thickness. Compaction requirements are: 95 percent standard proctor density from the pipe zone to within 3 feet of the ground surface, and 100 percent standard proctor density in the final 3 feet.
- E. All surplus or waste material remaining after completion of the backfilling operations shall be disposed of outside the City of Blaine. Disposal at any location within the project limits shall be as specified, or as approved in writing by the Engineer.

2.3.8 Television Inspection – After completion of all sewer construction (storm and sanitary), the Contractor shall televise sewer sections.

The pipe shall be cleaned prior to any televising. The Contractor will be responsible for cleaning the pipe, and keeping it free of debris until final project acceptance by the City.

The televising camera shall be mounted on a skid so that it is centered laterally in the pipe. The camera shall be equipped with sufficient lights to completely illuminate the interior of the pipe within the range of the camera.

A monitor shall be provided with seating facilities to allow three or more persons to view the picture continuously. The television camera, transmitting equipment, and monitoring equipment shall combine to provide a picture on the monitor screen which is free from distortion and clean enough to distinguish between hairline cracks, "pipe marks", etc.

A digital recording shall be made of the entire footage of pipe televised. The linear footage of pipe televised shall be integrated into the recording for ease of identification of pipe being viewed. A written report shall be prepared identifying pertinent data as shown on the videotape. A diagram of the project with all televising indexed on it shall be provided in triplicate within five working days following the last day of televising on the project. If televising is interrupted for more than five days, an interim index diagram shall be furnished. Recording(s) and report(s) of the entire footage shall be provided to the City, after recording is completed, of the same quality as the original recording. The blank disks shall be provided for this purpose by the Contractor. Recording shall be in "CD" or "DVD" digital format.

2.3.9 Restoration of Surface Improvements – Wherever any surface improvement such as pavement, curbing, pedestrian walks, fencing, or turfing have been removed, damaged or otherwise disturbed by the Contractor's operations, they shall be repaired or replaced in kind and structure to the preexisting condition or better. Each item of restoration work

SECTION 2 - PIPELINE INSTALLATION REQUIREMENTS

shall be done as soon as practical after completion of installation and backfilling operations on each section of pipeline.

In the absence of specific payment provisions, as separate Contract Items, the restoration work shall be compensated for as part of the work required under those Contract Items which necessitated the destruction and replacement or repair, and there will be no separate payment therefore. If separate pay items are provided for restoration work, only that portion of the repair or reconstruction which was necessitated by the Contract work will be measured for payment. Any improvements removed or damaged unnecessarily shall be replaced or repaired at the Contractor's expense.

A proper foundation shall be prepared before reconstructing concrete or bituminous improvements. Unless otherwise directed, granular material shall be placed to a depth of at least four inches under all concrete and bituminous items. No direct compensation will be made for furnishing and placing this material even though such course was not part of the original construction.

- 2.3.10 Maintenance and Final Cleanup – All subgrade surfaces shall be maintained acceptably until the start of surface construction or restoration work. Additional materials shall be provided and placed as needed to compensate for trench settlement and to serve as temporary construction pending completion of the final surface improvements.

Final disposal of debris, waste materials, and other remains or consequences of construction, shall be accomplished prior to final acceptance of all work. Final acceptance of each contract item can only be made when the cleanup associated with each item is completed. The Engineer may withhold partial payments until such work is satisfactorily pursued or he may deduct the estimated cost of its performance from the partial estimate value.

2.4 METHOD OF MEASUREMENT AND PAYMENT

Measurement and payment for each item shall be in accordance to MNDOT Standard Specifications for Construction, 2016, and current supplements, unless modified or supplemented herein. The specification numbering references used herein shall refer to MNDOT Specifications.

Payment shall be at the Contract Bid price for each item shown on the bid form. The bid price shall include furnishing, installing and removal as specified. All bid items shall include labor and materials for a complete job.

Principal components are listed in each description and do not necessarily include all component parts required. All component parts required by the plans, specifications and detail plates shall be considered included in the Contract Bid Price. Payment for the items shown on the bid form shall be payment in full for a complete job as specified.

Work required by this contract, and obviously necessary for the timely and successful completion of the project, but not specifically provided for in the bid proposal, shall be included in the bid prices of the associated construction items.

- 2.4.1 Jacking/Boring Pipe – Measurement shall be in linear feet for each size and type of pipe jacked/bored.
- A. Steel Casing Pipe – Bid price includes excavation, shoring, dewatering, equipment, stainless steel spacers, materials and labor. Separate payment will be made for each type and size of pipe installed in the casing as specified herein.
 - B. Concrete Pipe – Bid price includes excavation, shoring, dewatering, equipment, spacers, materials and labor. Separate payment will be made for each type and size of concrete pipe jacked/bored as specified herein.

SECTION 2 - PIPELINE INSTALLATION REQUIREMENTS

The Contractor may use a larger diameter casing than shown on the bid form, if approved by the Engineer, at no increase in the unit price bid.

- 2.4.2 Granular Materials – Measurement shall be per ton of each material furnished, installed, and properly compacted. Payment per each material shall be based on load slips for each load delivered to the job site, collected on the day of delivery by a representative of the City. Weight slips will only be collected that contain the following information: truck number, date, leave time, gross weight, tare weight, and net weight.

Granular materials used for dewatering purposes, or in lieu of dewatering shall be at the expense of the Contractor unless there is a bid item for the material in the bid proposal.

- 2.4.3 Piling – Pile bents (including test piles) shall be paid for at the Contract unit price for a bent in place with the number of piles specified or shown on the detail drawings assuming piles to be 20 feet long and shall be complete with caps, cradles, and accessories required. The caps and cradles shall be included as part of the 20 foot minimum length. Any piling required over 20 feet in length shall be paid for at the Contract unit price per lineal foot driven in place over 20 feet. Payment will not be made for piling over the cutoff line for piling over 20 feet long.

Unless otherwise specified, there will be no additional compensation for piling delivered only.

- 2.4.4 Television Inspection - Measurement shall be per linear foot for all types and sizes of pipe televised. Bid price shall include cleaning the pipe, televising the pipe, recording on electronic media, and three copies of the written report and pipe log delivered to the Engineer prior to final acceptance of the project. If there is not item on the Bid Proposal, this item shall be considered incidental to the project cost.

- 2.4.5 Dewatering – Measurement and payment shall be on a lump sum basis and includes furnishing, installing, maintaining, relocating and removal of all necessary equipment to provide dewatering for pipeline or structure installation.

If not provided for in the bid proposal, the cost of dewatering shall be incidental to the project and there will be no additional compensation for dewatering operations.

- 2.4.6 Adjust Frames and Ring Castings (Manholes) and Gate Valves – Measurement and payment shall be per each casting and valve type adjusted to finished grade and shall include excavation, backfilling, sawcutting, rubber manhole safety rings, adjusting rings, materials, labor, equipment and appurtenances necessary to make adjustments.