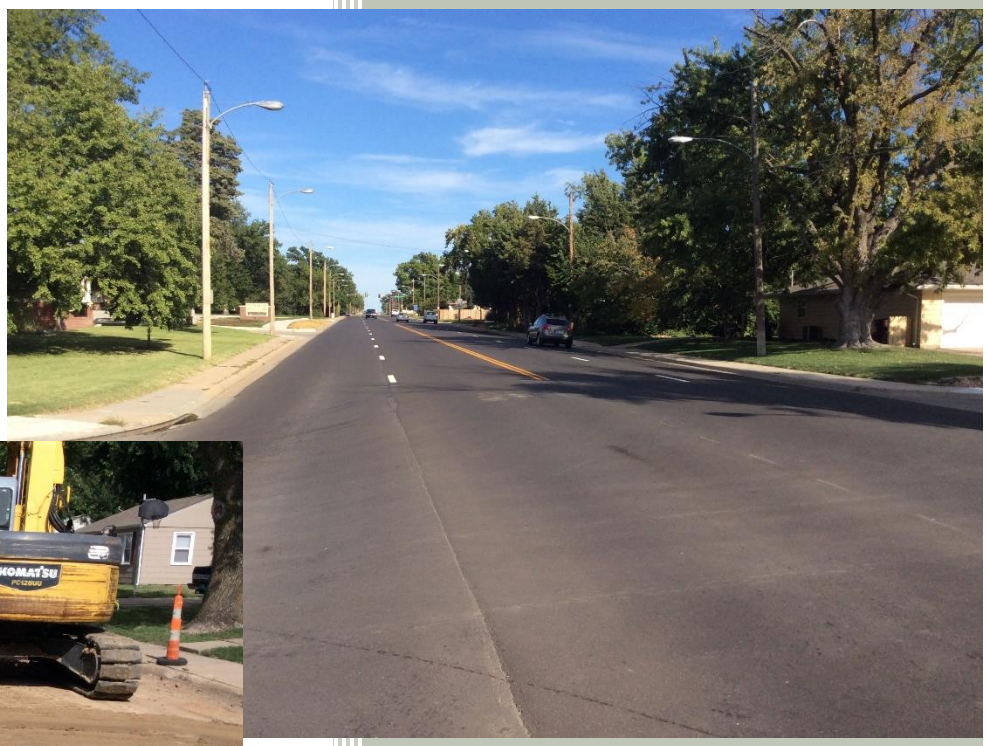
CITY OF McPHERSON PUBLIC WORKS DEPT

2021

Standard Technical Specifications



Street, Stormwater &

Sanitary Sewer Construction

Department of Public Works

City of McPherson

2/10/2021

STANDARD TECHNICAL SPECIFICATIONS

Table of Contents

SECTION 100
GENERAL REQUIREMENTS

100 General Requirements

100.1 Specifications

Any work not specifically covered in these specifications shall be governed by the standards, specifications and special provisions of the most recent edition of the Kansas Department of Transportation, Specifications for Road and Bridge Construction, with all modifications.

100.2 Reference Initials

Accredited authorities for quality of materials and standards of practice will be referred to by their initials with the specific reference indicated by the respective reference number. It shall be understood that, unless specifically noted otherwise, the latest edition of the respective reference, at the time of advertising for bids, shall govern.

AASHTO	American Assoc. of State Highway & Transp. Officials
ACI	American Concrete Institute
AISC	American Institute of Steel Construction
AGC	Association of General Contractors
AREA	American Railway Engineering Association
ASA	American Standard Association
ASTM	American Society for Testing and Materials
AWWA	American Water Works Association
ANSI	American National Standards Institute
KDOT	Standard Specifications for State Road and Bridge Construction of the Kansas Dept. of Transportation Latest Edition

100.3 Conflict in Plans and Specifications

Where a discrepancy may exist between the documents included in the Contract such as Plans, Specifications, etc., the order of precedence shall be as follows:

1) Contract
2) Information for Bidders
3) Addenda
4) General Notes
5) Standard Technical Specifications
6) Special Provisions
7) Detailed Plans
8) Standard Details
9) Certificate of Non-Discrimination, Appointment of Process Agent, Statutory Bond, Performance Bond, Certificate of Insurance.

100.4 Location

The Work is located at the sites shown on the Drawings.

100.5 Drawings

The Drawings governing the work are titled as listed on the Cover Sheet of the Drawings.

100.6 Shop Drawing/Engineering Drawings Transmittal

CONTRACTOR shall include a completed transmittal form with each submittal of Shop Drawings, catalog data and samples. When submitted for review, Shop Drawings shall bear CONTRACTOR's certification that he has reviewed, checked and approved the Shop Drawings and that they are in conformance with requirements of the Contract Documents. Transmittal forms will be furnished to CONTRACTOR by ENGINEER. Shop Drawings shall be submitted to ENGINEER in such quantities that ENGINEER may retain three electronic copies; all other submitted copies will be returned to CONTRACTOR. If CONTRACTOR requires more than three (3) copies of "approved" or "approved if corrected as noted" drawings, additional copies shall be included in original submittal.

Action by Engineer	Received/Retained by Engineer	Returned to Contractor/Consultant	No. Required for Resubmittal
Approved Submittals	1	1	1
Approved if Corrected as Noted	1	1	0
Revise and Resubmit	1	1	2
Not Approved*	1	1	2
Preliminary Plans	3 (Half Size)	1 (Electronic Redlined)	3
Field Check Plans	3 (Half Size)	1 (Electronic Redlined)	3
Office Check Plans	3 (Half Size)	1 (Electronic Redlined)	3
Final Check Plans	3 (Half Size)(1 Full)	1 (Electronic Redlined)	3
Bid Set Plans	3 (Half Size)(1 Full)	1 (Electronic Sealed)	NA

*Only one copy of "revise and resubmit" and "not approved" shop drawings or engineered drawings returned to CONTRACTOR will be electronically stamped or signed.
Shop Drawings shall be provided for the following items: (As it pertains to the project.)

a. Letters of Certification of Compliance on materials, etc., for:
    1. Concrete Mix Design
    2. Cement Treated Base (CTB)
    3. Asphalt Mix Designs
    4. Pipes
    5. Inlets
    6. Expansion Joint Material
    7. Reinforcing Steel
    8. Wire
    9. Dowell Bars
    10. Flowable Fill Mix Design
    11. Conduit

100.7 Utility Crossing

The approximate locations of buried utility lines are shown on the Drawings. The exact location and depth of each utility line shall be determined by CONTRACTOR prior to trenching or excavation operations at the crossing sites. CONTRACTOR shall use extreme care in performing his work at each utility crossing site. CONTRACTOR shall pay all costs necessary to repair or replace utility lines damaged, broken or destroyed by his operations; whether or not the line is shown on the Drawings. CONTRACTOR shall assume full financial responsibility for all damages to private or public property as the direct result of such damage, breakage or destruction.

100.8 Surface Drainage

Surface drainage shall be diverted away from site of open excavations and trenches. Surface water, which enters or accumulates in open excavations or trenches, shall be removed and the subgrade or pipe bed restored to original bearing value and condition at no additional expense to OWNER.

100.9 Obstructions

Care shall be used while excavating, trenching or performing other work adjacent to any facilities intended to remain in place; except as otherwise specified, CONTRACTOR shall be responsible for any damage to existing items and any repairs shall be promptly made at his expense.

100.10 Retainage Table

TABLE 100-1: Table of Retainage

Percent of Original Contract Amount Completed	**% Retained On Pay Estimate**
0% - 10%	10%
50% - 79%	5%
80% - 99%	1%
Accepted	0%

100.11 Liquidated Damages Table

TABLE 100-2: Table of Liquidated Damages (*KDOT Table 108-01*)		
Amounts of Liquidated Damages to be Deducted for Each Day Over Contract Time, Project Open Time or Cleanup Time		
Original Contract Amount Total	**Project Not Completed after Contract Times Expires Or Project Not Open to Unrestricted Traffic After Project Open time Expires.**	**Project Open to Unrestricted Traffic, But Not Complete after Cleanup time Expires**
$0.00 - $500,000.00	$800.00	$400.00
$500,000.01 - $1,000,000.00	$1000.00	$500.00
$1,000,000.01 - $2,500,000.00	$1200.00	$600.00
$2,500,000.01 - $5,000,000.00	$1500.00	$750.00
$5,000,000.01 - $10,000,000.00	$2,000.00	$1,000.00
$10,000,000.01 - $25,000,000.00	$2,500.00	$1,250.00
Over $25,000,000.01	$3,000.00	$1,500.00

100.12 Cleanup Time Table

TABLE 100-3: Determining Cleanup Days on a Working Day Project (KDOT Table 108-A)	
Project Open Time in Working Days – Range	**Number of Cleanup Working Days**
1 to 50	10
51 to 100	20
101 to 200	30
200+	40

SECTION 101
INCIDENTAL CONSTRUCTION

101 Mobilization

Unless otherwise specified herein, these items shall conform to Division 800 of the most recent edition of the Kansas Department of Transportation, Specifications for Road and Bridge Construction, with all modifications.

BID ITEMS	UNITS
Mobilization	Lump Sum

101.1 Mobilization

Move required personnel, equipment, materials, supplies and incidentals to the project site prior to beginning work. Include other work and cost incurred before the project starts.

Unless otherwise specified herein, these items shall conform to Division 800 of the most recent edition of the KDOT Specifications, with all modifications.

101.2 Measurement and Payment

Mobilization. The Engineer will make partial payments according to latest Table 101-1. (*KDOT Table 801-1*)

TABLE 101-1: Mobilization Partial Payments (KDOT Table 801-1)		
Percent of Original Contract Amount Completed	**Pay Lesser of the Two**	
	% of Mobilization	**% of Original Contract Amount**
5	25	2.5
10	50	5
25	60	7.5
50	100	10
Accepted	100	NA

The Percent of Original Contract Amount Completed = the amount earned by the Contractor* divided by the total dollar value of the original contract (all bid items).

*Do not include monies earned for "Mobilization", "Traffic Control (Lump Sum)", "Contractor Construction Staking".

102 Contractor Construction Staking

Unless otherwise specified herein, these items shall conform to Division 800 of the most recent edition of the Kansas Department of Transportation, Specifications for Road and Bridge Construction, with all modifications.

BID ITEMS	UNITS
Contractor Construction Staking	Lump Sum
Monument Box	Each

102.1 Materials

General: Provide the necessary materials to complete the specified surveying services. Provide materials and equipment that comply with the current requirements of the Kansas Statutes, Kansas State Board of Technical Profession's Regulations and the Contract Documents.

Monument Box: Provide a monument box of the brand and type shown in the Contract Documents.

102.2 Construction Requirements

Contractor shall be required to set all construction stakes or locate any property pins required to allow for construction. All reference points and project stakes shall be the responsibility of the Contractor. Any property pins or stakes lost to construction shall be replaced at contractor's expense. Property Pins lost or obliterated but shown on the plans as existing shall be reset at the end of the project by a Professional Land Surveyor licensed in the State of Kansas providing materials and equipment that comply with the current requirements of the Kansas Statutes, Kansas State Board of Technical Profession's Regulations and the Contract Documents. Notification shall be given to property owners before entry to private property for courtesy of performing survey work.

Grade Stakes or "Hubs" shall be made from pine or oak; and must have a minimum length of six inches (6") from tip to end unless otherwise approved by the Engineer. Hubs shall be driven in until they are flush with the adjacent ground. If the hub cannot be securely set into the ground because of an obstacle or because of the nature of the soil, then a hub must be set at a different location or horizontal offset. All hubs must be clearly marked by either a 36 inch (36") wood lath or a wood "cut stake" that describes stationing, offset distance, "cut" or "fill", and to what the grade is being measured from, (i.e. 4' O/S to BOC or CL of Pipe). **The use of flags for marking grade is prohibited**; however, flags can/should be used in conjunction with hubs.

102.3 Measurement and Payment

Contractor Construction Staking. The Engineer will make payment to the latest Table 102-1 (KDOT Table 802-2)

Table 102-1: Construction Staking Payment Schedule (KDOT Table 802-2)	
Percent of Original Contract Amount*	**Percent of Bid Item Paid**
Work Started	25%
5%	40%
25%	60%
50%	80%
70%	95%

All Field Books and Records Have Been Submitted to Engineer	100%

The percentage of Original Contract Amount Completed equals the amount earned by the Contractor* divided by the total dollar value of the original contract (all bid items).

*Do not include monies earned for "Mobilization", "Traffic Control (Lump Sum)", "Contractor Construction Staking".

SECTION 200
EARTHWORK

201 Earthwork

Unless otherwise specified herein, these items shall conform to Division 200 of the most recent edition of the Kansas Department of Transportation, Specifications for Road and Bridge Construction, with all modifications.

BID ITEMS	UNITS
Removal of Existing Structures	Lump Sum
Clearing and Grubbing	Lump Sum
Common Excavation	Cubic Yard
Rock Excavation	Cubic Yard
Contractor Furnished Borrow	Cubic Yard

201.1 General

Prior to any excavation operations, the CONTRACTOR shall notify Kansas One Call.

All excess excavated materials or materials unsuitable for use on the project shall become the property of the CONTRACTOR and shall be removed from the construction site. No work for the above bid items shall be accepted until all surplus material has been removed from the construction site.

201.2 Common Excavation

This work shall include removal of all soil, vegetable matter, concrete, asphalt and other loose or granular material necessary, not included in Rock Excavation, to achieve the desired lines and grades shown on the plans.

201.3 Rock Excavation

This work shall include removal of all natural rock, concrete pavement greater than or equal to six inches (≥6”), or bituminous pavement greater than or equal to six inches (≥6”) as required to complete construction or in accordance with the Engineer’s instructions.

201.4 Earthwork Embankment

EMBANKMENTS shall be constructed of material, free from objectionable matter, and shall be brought to approximate optimum moisture content, then manipulated and compacted to uniform density of 95% ± 2% of optimum. Depth of lifts or layers shall be controlled by methods of compaction and shall be such as to obtain a uniform density throughout the entire embankment or fill, not exceeding 6”. All field tests for determination of density shall be performed by OWNER at no additional expense to CONTRACTOR.

201.5 Contractor Furnished Borrow

This work shall consist of excavation to be furnished by the CONTRACTOR in accordance with the notes on the plans. The CONTRACTOR shall furnish this material from sites provided by the CONTRACTOR. All borrow sites shall be subject to approval by the ENGINEER.

Wildlife and archaeological clearances must be obtained by the CONTRACTOR prior to any excavation on CONTRACTOR furnished borrow areas.

The CONTRACTOR shall furnish the Field Engineer a copy of the agreement with the landowner for borrow sites. The agreement shall contain stipulations for temporary seeding, water pollution control, and erosion protection.

Borrow material shall be free of all debris, organic or otherwise, rock, sand or other unsuitable materials for use in the fill. The ENGINEER reserves the right to reject any and all borrow material provided by the CONTRACTOR.

201.6 Clearing and Grubbing

Trees smaller than 6" in diameter as well as vegetation and shrubs within the grading and excavation limits or within the limits of the permanent easement, shall be removed and disposed of at CONTRACTOR'S expense. CONTRACTOR shall have the option of removing and clearing the construction area only as required to proceed with his work, or he may clear the area, as directed by the Engineer, completely up to but not beyond the permanent easement lines. Clearing and tree removal will not be permitted beyond the permanent easement lines. Grass and weed growths shall be stripped and in no case covered by or incorporated in fills, embankments or backfills. All tree stumps and any roots greater than 1" in diameter shall be grubbed out, removed and disposed of at the CONTRACTOR'S expense. Additional excavation or fill materials required to complete this work shall be subsidiary to the bid item, "Clearing and Grubbing".

201.7 Method of Measurement

The quantities shall be measured by the Lump Sum or Cubic Yard of completed work. The quantities of material shown on the plans are for estimation purposes only.

The amount of completed work for which payment shall be made shall be measured by the quantities shown on the plans for the various balances, provided that the project is constructed essentially to the various lines and grades shown on the plans.

Where the plans have been altered or in case of disagreement between the CONTRACTOR and ENGINEER as to the accuracy of the plan quantities in any balance or the entire project, either party shall have the right to request and cause the quantities involved to be measured as provided below.

When the quantities are measured for payment, the original cross sections or contour data shall be used as field cross sections, unless errors are found or the ground has been disturbed prior to commencing work. Additional cross sections may be interpolated or determined by other means to more accurately determine the quantities. Finished grade sections shall be measured in the field and the volume of each balance calculated using the average end area method.

In the event of alteration of the plans, or discovery of material that is unsuitable for use in the project, the CONTRACTOR shall provide sufficient notice to the ENGINEER so that any necessary measurements can be made and quantities determined as described above prior to commencement of the additional work. Failure to provide such notice to the ENGINEER shall result in forfeiture of the CONTRACTOR'S right to claim additional quantities and payment for the work.

No measurement or payment shall be made for water used in placement of any fill material or for dust control on the project.

201.8 Measurement and Payment

The amount of completed and accepted work measured as provided above shall be paid for at the contract unit price which prices and payments shall be full compensation for all equipment, labor, materials and incidentals necessary to complete the work.

202 Subgrade Preparation and Modification

Unless otherwise specified herein, these items shall conform to Division 200 of the most recent edition of the Kansas Department of Transportation, Specifications for Road and Bridge Construction, with all modifications.

BID ITEMS	UNITS
Compaction of Subgrade (Type**) (MR***)	Square Yard
Geo-grid Reinforced Aggregate Base (*)	Square Yard
Cement Treated Base (****)	Square Yard
Lime Treated Subgrade Manipulation (****)	Square Yard
Hydrated Lime	Ton
Water (Lime Treated Subgrade)(Set Price)	M Gallon

* Indicates type of aggregate to be used
** Type of Compaction
*** Moisture Range
**** Thickness

202.1 Materials

Geogrid Material: A geogrid reinforcing material shall be placed on the compacted subgrade prior to placement of the crushed aggregate base material. Geogrid fabric shall be BX-1100 as manufactured by TENSAR corporation or approved equal.

Crushed Aggregate Base Rock: Aggregate for base rock shall be virgin crushed limestone or crushed concrete and shall conform to KDOT Specifications subsection 1102 Class I for durability. Maximum absorption for virgin crushed limestone shall be 4%. Aggregate provided shall conform to the following gradations:

Sieve Size	Percent Passing
2 ½"	**100%**
¾"	**40% - 80%**
#4	**20% - 50%**
#40	**6% - 20%**
#200	**2% - 10%**

Cement Treated Base Modification: Materials shall conform to the requirements specified in the materials division of the most recent edition of the Kanas department of Transportation, specifications for State Road and Bridge Construction, with all modifications. CTB is estimated @ XX% (min). Cement percentage will be increased or decreased based on site conditions and sampling to meet design requirements as directed by Engineer and certified testing laboratory. Cement treated mix design shall be submitted before construction begins to accept and establish criteria and mix design percentages.

Portland Cement and Blended Hydraulic Cement KDOT Division 2000

Lime Treated Subgrade Manipulation: Materials shall conform to the requirements specified in the materials division of the most recent edition of the Kansas Department of Transportation, Specifications for State Road and Bridge Construction, with all modifications.

Hydrated Lime	**KDOT Section 2000**
Water	**KDOT Section 2400**

202.2 Construction Methods

The existing ground cover and vegetation shall be removed to a minimum depth of six inches (6") prior to placement of any fill material as shown on the plans. This material may be stockpiled on site for use in finish grading operations. No vegetative matter larger than ½" diameter or construction debris will be permitted in the fill. Any excess material or material that is not suitable for use in the project shall become the property of the CONTRACTOR and removed from the site at the CONTRACTOR'S expense. This work, including all labor and equipment shall be subsidiary to the other bid items.

After completing any cuts required to establish the design sub-grade elevations, but before placement of any fill material, the exposed ground surface shall be proof-rolled. The proof-rolling shall be performed under the observation of the ENGINEER. Proof-rolling shall consist of several passes with a loaded, tandem axle dump truck, loaded wheel loader or other heavy, rubber tired construction vehicle weighing at least twenty-five (25) tons in order to locate zones that are soft, unstable, or exhibit pumping. Vehicles equipped with flotation tires are not acceptable. Any unstable materials observed that cannot be satisfactorily densified in place shall be removed and replaced with approved compacted fill material as directed by the ENGINEER. Such removal shall be to the extent necessary to eliminate the unstable area(s); however, required depth of removal shall not exceed 1.5 feet in fill areas or 2.0 feet below the desired subgrade design elevation. The objective is to achieve a compacted stable surface on which compacted fill and pavement can be constructed.

202.3 Compaction of Subgrade

This work shall consist of scarification of the existing soil surface, prepared as described above, to the depth specified on the plans. The scarified surface shall be wetted or aerated as necessary to adjust the moisture as specified in bid item or content to not less than 5% below optimum and not more the 5% above optimum. The surface shall then be compacted by mechanical means to at least 95% of the standard Proctor maximum dry density (ASTM D-698). Compacted fill material placed on the prepared surface shall be placed in lifts not exceeding nine (9) inches loose thickness and compacted to 95% of Standard Proctor max dry density within 2% of optimum moisture. Excess compacted material shall then be trimmed to the lines and grades shown on the plans.

202.4 Geogrid Reinforced Aggregate Base Process

Geo-grid material shall be positioned and rolled out over the surface of the sub-base. Geo-grid shall be cut to conform to manhole covers, water valves, or other utility structures not relocated beyond the limits of paving. Geogrid rolls should overlap a minimum of two feet (2'). Excess overlapping material at curves, etc. may be trimmed. Geogrid shall be overlapped in the direction fill will be spread. Wire, plastic ties or hog rings shall be used as required to secure the overlaps.

The beginning of the geogrid roll shall be pinned to the sub-base using six-inch "U" staples or other approved fasteners. Geogrid fabric shall be pulled tight by hand as required to remove any slack from the fabric layer. All edges, overlaps and center of roll width shall be pinned at twenty five foot (25') intervals (or less if specified by the manufacturer) along the roll length. Overlaps should be pinned at five to ten feet (5'-10') intervals across

the roll width as necessary to secure the overlaps. The terminal ends of the roll shall be pinned in the same manner.

Should the geogrid fabric be damaged during or after installation, repair by patching. Remove the aggregate from the fabric surface within three feet (3') of the area to be repaired (if required). Place a geogrid fabric patch of sufficient size to cover the damaged area and extend three feet (3') beyond in all directions. Replace aggregate and recompact as required.

Do NOT operate equipment directly on the fabric. Aggregate should be back or end dumped adjacent to the fabric and spread over fabric layer. Ensure at least four-inches (4") of aggregate fill are between the grid and the vehicle. Grade the aggregate fill to the specified thickness on the plans. The aggregate shall be spread in such a manner that it minimizes the stresses on the geogrid fabric and sub-base. Subsequent loads shall be back or end dumped onto the leveled fill and advanced forward by spreading as described above.

Crushed aggregate shall be compacted after spreading by use of a rubber tired roller or other approved methods. The material shall be compacted to not less than 98% of the standard Proctor dry density. The compacted material shall be graded smooth before it is opened to truck traffic.

202.5 Lime Treated Subgrade Manipulation

When so specified in this section, materials, equipment and construction shall conform to Division 300 of the most recent edition of the Kansas Department of Transportation, Specifications for Road and Bridge Construction. This work shall consist of mixing soil and hydrated lime slurry in accordance with the KDOT standard specifications, as shown on the plans or established by the Engineer.

202.5.a RATES OF APPLICATION

Rates of application shall be as follows:

Hydrated Lime – 5.00% by weight of the top (*2) of soil*3

Water – 30% by weight of the top (*2) of soil*3

*2(The thickness of soil shall be equal to the desired thickness of the lime treated subgrade)

*3(Soil @ 110lbs./cubic foot)

202.6 Removal of Standing Water (Dewatering)

The sub-base and fabric layer shall be kept free of standing water at all times during construction. No separate payment will be made for dewatering of project areas during construction. The CONTRACTOR shall be required to provide pumps and remove all standing water to prevent weakening of the sub-base or crushed aggregate base.

202.7 Measurement and Payment

The quantity of completed Compaction of Subgrade shall be measured by the square yard of completed work as shown on the plans.

The quantity of completed Geo-grid Reinforced Aggregate Base or Lime Treated Subgrade Manipulation or Cement Treated Base shall be measured by the square yard of completed work as shown on the plans.

The quantity of Hydrated Lime and Water shall be paid as described in the KDOT Standard Specifications.

The completed and accepted quantity for each item shall be paid at the contract unit price, which price shall be full compensation for all materials, tools, equipment, labor and other incidentals required to complete the work as described.

203 Milling

Unless otherwise specified herein, these items shall conform to Division 612 of the most recent edition of the Kansas Department of Transportation, Specifications for Road and Bridge Construction, with all modifications.

BID ITEMS	UNITS
Machine Milling (*)	Square Yard
Machine Milling – Concrete (*)	Square Yard

* approximate uniform thickness of material to be removed

203.1 Scope of Work

The work provided for in these specifications shall consist of furnishing all labor, materials, and equipment and performing all work necessary to accomplish milling on existing hot or cold asphaltic concrete, or Portland cement concrete street surfaces. Together with other incidental and related work as set forth in these specifications and as directed by the Engineer to make a complete and finished milling job.

203.2 Materials Equipment and Construction Methods.

The milling machine to be used in this contract shall be designed and built for milling work, shall be self-propelled and shall have a means of milling of the old pavement surfaces. A dust suppression system must be a part of the equipment. The drum patterns shall permit a grooved or smooth surface finish as selected by the Engineer and the drum shall be totally enclosed to prevent discharge of any loosened material on adjacent work areas. Maximum width of the milling machine will not be restricted, however, a minimum of five (5) feet is preferred. Milling machine must be capable of milling entire lane in one plane leaving no inflection points or secondary crown mid-lane. Smaller machines may be used for auxiliary purposes only.

The milling machine shall have adequate power to force the cutting edge(s) of the drum teeth to the desired depth below the surface of the pavement without causing undue irregularities in the surface of the planed pavement.

The planer shall be so designed and constructed that it is capable of cutting flush to all curbs, inlets, manholes or other similar obstruction within the paved area.

Drum lacing patterns shall permit a smooth surface finish after milling with groove depths not to exceed one-fourth (1/4) inch and groove spacing not to exceed one (1) inch unless otherwise approved by the Engineer.

All equipment used by the Contractor having metal tracks shall not be driven over any City street other than those streets to be milled and planed. Such equipment must be transported.

The nature and condition of the milling equipment and the manner of performance of the work shall be such that the finished planed surface of the pavement is not torn, gouged, shoved, broken or oil coated or otherwise injured by the milling operation.

In all areas designated for milling, sufficient passes or cuts shall be made at a depth and width as shown to the satisfaction of the Engineer. The milling operation shall provide a smooth profile and cross section that does not require a leveling course prior to the overlay operation. The maximum tolerance for milling (Total Width Cut) in a longitudinal direction shall be ¼'' under 10' straight edge and shall be 3/8" under an 8' straight edge in a transverse direction.

The Contractor shall mill around and over manholes and utility valves within the limits of the work specified. This work must be done during or after milling work on the streets involved. Any damage to manholes or valves by the milling operation area shall be the responsibility of the Contractor to correct. All manholes and valves in the milling area shall be cut as directed by the Engineer. This work shall be subsidiary to the bid item square yards of Machine Milling.

The milling shall provide for pick-up of cuttings and elevating into dump trucks all in a single lane operation. Use of front end loaders as the primary means of pick-up will not be construed as a single lane operation nor will side loading of dump trucks be permitted.

All cuttings and debris shall be removed from the street and loaded on dump trucks provided by and driven by the Contractor. The millings shall be stock piled at a location designated by the Engineer and the millings shall be the property of the City of McPherson.

The areas to be milled are as designated in the "Schedule of Quantities" or as otherwise directed by the Engineer. The areas designated in the "Schedule of Quantities" do not in all cases include the entire area between limits given, but represent the estimated square yards of the area within those limits that are to be milled. This milling work is in preparation for surfacing work. In the event two (2) machines are used, they will be run in tandem so as to occupy only one lane. Milling work shall be limited to a maximum of one lane, 500 running foot length to the last operated piece of equipment in said lane or where circumstances warrant. Operation distance may be increased with the approval of the Engineer.

203.3 Traffic Control.

The Contractor is to plane straight through intersections unless directed otherwise by the Engineer. Work on cross street intersection areas outside the through traveled way will be required in certain areas as may be directed by the Engineer.

Construction operations shall be coordinated to result in the least practicable delay to traffic. One-way traffic shall be carried through construction on all routes listed in the "Schedule of Quantities" unless specifically waived by the Engineer.

The Contractor will furnish all signs, barricades, warning lights and all other equipment necessary to direct and re-route traffic and will furnish flagmen and other personnel necessary to provide the required traffic control.

Vehicles obstructing milling operations can only be moved by legal owner or by the City of McPherson Police Department. In order for the Police Department to assist with vehicle removal, the Contractor must contact them at least 48 hours prior to needing vehicle moved. The Contractor shall notify the City 10 days prior to milling operation to allow the City to notify the Commission. The contractor shall place door notices in the

neighborhood prior to construction. Notices shall be approved by the Engineer. The Engineer shall approve Milling operations on major trafficways.

203.4 Clean Up Operation.

Immediately after the milling operation has been completed on a street it shall be the contractor's responsibility to clean up and remove all spills, excess materials and debris caused by the milling operation within 24 hours to the Engineer's satisfaction. The contractor shall also be responsible for insuring that his personnel do not trespass on or damage any private property during the milling operation.

203.5 Measurement and Payment.

Method of measurement for milling hot or cold asphaltic concrete or concrete shall be by the square yards of surface actually milled.

Basis of payment hot or cold asphaltic concrete or Portland cement concrete for the amount of completed and accepted work, measured as provided above, shall be paid for at the contract unit price bid per square yard for milling, which price will be full compensation for removal, all labor, tools, cleanup, equipment and incidentals necessary to complete the work.

SECTION 300
ASPHALT PAVING

301 Asphalt Work

Unless otherwise specified, the mixing, placement, finishing and curing of all asphaltic concrete placed shall conform to Division 600 of the Kansas Department of Transportation Standard Specifications for Road and Bridge Construction, most recent edition as amended.

BID ITEMS		UNITS
HMA Base (*)(**)		Tons
HMA Overlay (#)(##)		Tons
Material for HMA Patching (*)(**)		Tons
# Thickness	*Mix Designation	
## Type of Surface Course HMA mixture	** Grade of Asphalt Binder	

301.1 General Requirements

The Contractor shall submit a list of the proposed asphaltic concrete compaction equipment along with the specifications and ratings of each piece of proposed equipment. This list shall be submitted ten (10) days prior to the beginning of construction. Vibratory equipment shall be included in the proposed equipment.

Ten (10) days prior to the start of construction, the Contractor shall submit his proposed mix design to the City Engineer for preliminary approval. **The proposed mix design shall include recommendation by the asphaltic supplier.** When preliminary approval is obtained, the Contractor shall perform marshal stability and asphalt extraction tests. The results of these tests shall be submitted to the City Engineer for final approval of the mix design. If the Engineer is not satisfied with the final installed product the Engineer may stop construction, consult with the Contractor and make adjustments deemed necessary to obtain a satisfactory end product.

301.2 Quality Assurance

An independent testing laboratory, selected and paid by Owner, will be retained to perform construction testing of in-place asphaltic concrete courses for compliance with requirements for thickness and compaction shall be reported to City.

301.3 Field Quality Control

Field density test for in-place materials shall be performed by examination nuclear density tests accordance with one of following standards:

301.3.a AASHTO Test Method T 245 (Percent of Laboratory Density)

i Temperature equal to temperature at paving machine with reheating.

ii Compactive blows (35, 50, or 75) equal to mix design blows.

iii Minimum density = 96% of laboratory density.

301.3.b AASHTO Test Method T 209 (Percent of Theoretical Maximum Density)

Minimum density = 92% of Theoretical Maximum Density.

301.4 Weather Limitations

Apply prime and tack coats when ambient or base surface temperature is above 40 degrees Fahrenheit (40°), and when temperature has been above 35 degrees Fahrenheit (35°) for twelve (12) hours immediately prior to application. Do not apply when base is wet, contains excess moisture, during rain, or frozen.

Asphaltic concrete paving may only be constructed when atmospheric temperature is above 40 degrees Fahrenheit (40°).

301.5 Materials

301.5.a Prime Coat

Medium curing cut-back asphalt or asphalt penetrating prime coat consisting of materials that comply with **KDOT DIVISION 1200** shall be used, other type of oil must be approved by the project engineer.

301.5.b Tack Coat

Emulsified asphalt; AASHTO M 140 or AASHTO M 208, CSS-1h, or CRS-1hp diluted with 1 part water to 1 part emulsified asphalt, any other oil must first be approved by engineer.

301.5.c Mineral Filler

Rock or slag dust, hydraulic cement, or other inert material complying with AASHTO M 117.

301.5.d SIEVE ANALYSIS OF MIX

Sieve No.	Total Percent Passing	Percent Tolerance
¾”	100	7
½”	90-100	5
4	44-74	4
8	28-58	4
50	5-21	2
200	2-10	0

Percent bitumen by weight of total mix: 5.0 – 8.5 percent
Air voids: 3-6 percent
Aggregate voids filled with asphalt cement: 70-82 percent
Allowable variance of bitumen by weight of total mix = 0.4 percent

301.6 Traffic Control

Traffic Control shall conform to the requirements of Section 700 Traffic Control.

301.7 Preparation

Proof roll prepared base material surface to check for unstable areas. Paving work shall begin only after unsuitable areas have been corrected and are ready to receive paving.

Remove loose material from compacted base material surface immediately before applying prime/tack coat.

Establish and maintain required lines and elevations.

Cover the surfaces of curbs, gutters, manholes and other structures the asphaltic concrete mixture will be placed against with a thin, uniform coat of tack coat. Where the asphaltic concrete mixture will be placed against the vertical face of an existing pavement, clean the vertical face to remove foreign substances and apply a coating of t at a rate of approximately 0.25 gallons per square yard.

301.8 Hauling

The CONTRACTOR shall schedule his hauling operations and equipment to minimize travel over milled pavement surfaces and base courses. The Engineer MAY SUSPEND the paving operation if the milled pavement surface or base course is excessively damaged by the hauling operation.

301.9 Applications

301.9.a Prime Coat:

Apply bituminous prime coat to base material surfaces in advance, where asphaltic concrete paving will be constructed.

Apply at minimum rate of 0.25 gal per sq. yd. over compacted base material. Apply to penetrate and seal, but not flood surface.

Take necessary precautions to protect adjacent areas from over spray.

Cure and dry as long as necessary to attain penetration of compacted base and evaporation.

301.9.b Tack Coat:

Apply to contact surfaces of previously constructed asphaltic concrete base courses or portland cement concrete and surfaces abutting or projecting into asphaltic concrete or into asphaltic concrete pavement.

Apply tack coat to asphaltic concrete base course or sand asphalt base course. Apply emulsified asphalt tack coat between each lift or layer of full depth asphaltic concrete and sand asphalt bases and on surface of bases where asphaltic concrete paving will be constructed.

Apply at a rate of 0.05 to 0.07 gal per sq. yd. of surface.

Allow tack to break and dry until at proper condition to receive paving.

301.10 HMA Asphaltic Concrete Placement

301.10.a General

Place asphaltic concrete mixture on completed compacted subgrade surface, spread, and strike off. Spread mixture at following minimum temperatures:

301.10.a.i

Ambient temperature between 40 degrees Fahrenheit and 50 degrees Fahrenheit, minimum mixture temp. = 285 degrees Fahrenheit.

301.10.a.ii

Ambient temperature between 50 degrees Fahrenheit and 60 degrees Fahrenheit, minimum mixture temp. = 280 degrees Fahrenheit.

301.10.a.iii

Ambient temperature higher than 60 degrees Fahrenheit, minimum mixture temp. = 275 degrees Fahrenheit.

Whenever possible spread pavement by finishing machine; over inaccessible or irregular areas may be placed by hand methods. Spread hot mixture uniformly to required depth with hot shovels and rakes. After spreading, carefully smooth hot mixture to remove segregated course aggregate and rake marks. Rakes and lutes used for hand spreading shall be typed designed for use on asphalt mixtures. Do not dump loads faster that they can be properly spread. Workers shall not stand on loose mixture while spreading.

301.10.b Paving Machine Placement

Apply successive lifts of asphaltic concrete in transverse directions with surface course placed parallel to flow of traffic. Place asphaltic paving in typical strips not less than 10'-0" wide. Two (2) or more equal lifts required if same materials are used, each lift being no thicker than three inches (3"), not less than one inch (1"). Under no circumstances will only one lift of asphalt concrete paving be allowed for overlays greater than two inches (2").

301.10.c Joints

Make joints between old and new pavements, or between successive days and work in manner that will provide continuous bond between adjoining work. Construction joints shall have same texture, density, and smoothness as other sections of asphaltic concrete surface course. Clean contact surfaces of joints and apply tack coat.

301.11 Rolling And Compaction

Mixture, after being spread, shall be thoroughly compacted by rolling as soon as it will bear the weight of rollers without undue displacement. Number, weight, types of rollers, and sequences of rolling operations shall be such that the required density and surface are consistently attained while the mixture is in workable condition.

Compact mixture with hot hand tampers or vibrating plate compactors in areas inaccessible to rollers.

301.11.a Breakdown Rolling

Accomplish breakdown or initial rolling immediately following rolling of joints and outside edge. Check surface after breakdown rolling and repair displaced areas by loosening and filling with hot material.

301.11.b Second Rolling

Follow breakdown rolling as soon as possible, while mixture is hot. Continue second rolling until mixture has been thoroughly compacted.

301.11.c Finish Rolling

Perform finish rolling while mixture is still warm enough for removal of roller marks. Continue rolling until roller marks are eliminated and course has attained maximum density.

301.11.d Surface Patching

Remove and replace paving areas mixed with foreign materials and defective areas. Cut out such areas and fill with fresh, hot asphaltic concrete. Compact by rolling to maximum surface density and smoothness. Patching is to be square as possible, to lanes and curb lines to make uniform patch patterns.

301.11.e Protection

After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked. Any masked or marred finish surfaces shall be repaired or smoothed.

301.12 Joints

301.12.a General

Place each asphaltic paving layer as continuous as possible to keep the number of joints to a minimum. Create joints between old and new pavement, between successive days' work, and where the mixture has become cold (less than one-hundred forty degrees Fahrenheit (140° F). Make these joints in such a manner as to create a continuous bond between the old and new pavement construction courses.

Offset successive courses by at least 6 inches.

301.12.b Transverse Joints

If placing of material is discontinued or if material in place becomes cold, make a joint running perpendicular to the direction traveled by the paver. Before placement continues, trim the edge of the previously placed pavement to a straight line perpendicular to the paver and cut back to expose an even vertical surface for the full thickness of the course. When placement continues, position the paver on the transverse joint so that sufficient hot mixture will be spread in order to create a joint after rolling that conforms to the required smoothness. If the temperature of the previously placed pavement material drops below one-hundred forty degrees Fahrenheit (140° F) before paving is resumed, give the exposed vertical face a thin coat of tack oil just before paving is continued.

301.12.c Longitudinal Joints

Coat longitudinal joints that are not completed before the previously laid mixture has cooled to a temperature below one-hundred forty degrees Fahrenheit (140°F), with tack coat just before paving is continued.

301.13 Clean Up Operation

Immediately after the paving operation has been completed on a street it shall be the Contractor's responsibility to clean up and remove all spills, excess materials and debris caused by the paving operation within twenty-four (24) hours to the Engineer's satisfaction. The contractor shall also be responsible for insuring that his personnel do not trespass on or damage any private property during the paving operation.

301.14 Measurement and Payment

The quantities of bituminous materials shall be measured by the ton accepted in place, for which payment will be made as shown on the plans for each travel lane or lanes, provided the project is constructed essentially to details shown on the plans or in accordance with the Engineer's instructions. The amount of completed and accepted work measured as provided above shall be paid for at the contract unit price per ton of Bituminous Pavement. This includes bituminous material, aggregates, and emulsified asphalt used for tack. The above shall be full compensation for furnishing the material, measuring, hauling, storage, heating and for all labor, equipment and tools incidental thereto for completion of the contracted work.

SECTION 400
CONCRETE PAVING

401 Concrete Work

Unless otherwise specified, the mixing, placement, finishing and curing of all concrete placed shall conform to Division 500 of the Kansas Department of Transportation Standard Specifications for Road and Bridge Construction, most recent edition as amended.

BID ITEMS	UNITS
Concrete Pavement (*)(AE)	Square Yard
Entrance Pavement (*)	Square Yard
Combined Curb & Gutter	Linear Foot
Valley Gutter (*)	Square Yard
Sidewalk Construction (*)	Square Yard

* - Denotes nominal pavement thickness

401.1 General

Concrete work shall consist of furnishing and placing a concrete mixture from a supplier approved by the OWNER. Installing reinforcement and embedded items as detailed and specified herein.

401.2 Pavement Thickness

Unless otherwise specified in the plans or directed by the ENGINEER, minimum thickness for the type of pavement specified shall be as follows:

Bid Item	Minimum Pavement Thickness
Concrete Pavement	six inches (6”)
Entrance Pavement	six inches (6”)
Valley Gutter	seven inches (7”)
Sidewalk Construction	four inches (4”)

401.3 Materials

Concrete used shall be “City Mix – 6 Sack 900lb Rock” (AE) or as directed by the ENGINEER. CONTRACTOR shall certify the mix design and materials to be used are the same used on previous projects and meet the following conditions:

All materials shall be those normally used for the production and sale of concrete in the vicinity of this project.

Type I or II cement may be used.

Air entraining agent shall be used.

401.4 Reinforcement

Remove rust, scale, grease or any coating that might impair bond. Steel bar reinforcement shall conform to ASTM A 615, A 616, or A 617. Welded wire fabric reinforcement shall conform to ASTM A 185 or A 497.

All concrete pavement in streets and alleyways shall be reinforced with 6"x6"xW2.9xW2.9 wire. Where new concrete pavement abuts existing concrete, install two-foot (2') number four (No. 4) reinforcing bars on thirty inch (30") centers doweled a minimum of six inches (6") into existing pavement. Reinforcement provided shall meet or exceed these specifications unless otherwise shown on the plans or as directed by the Engineer.

401.5 Metal Accessories

Metal accessories shall be spacers, chairs, ties and other devices for properly spacing, placing, supporting and fastening reinforcement in place.

401.6 Embedded Items

Before placing concrete, remove coatings of oil, rust, scale or other foreign matter. Kerf and thoroughly soak wood strips used to form grooves, key joints and bevels.

401.7 Forms

Forms shall be mortar tight, of suitable materials free from surface irregularities; true to lines, grades and dimensions shown; rigid and properly braced; internal ties so arranged that metal will not show or discolor surface. Provide a formed chamfer at corners exposed to view. Design forms to permit proper installation of reinforcement; easy placement and manipulation of concrete; and removal of forms without damaging concrete. Apply water or non-staining mineral oil to forms in exposed locations. Concrete may be placed directly against undisturbed excavated surfaces if concrete as placed provides a minimum of two-inches outside cover over reinforcement.

401.8 Sampling & Testing

Tests shall be made at intervals designated by the ENGINEER to determine the acceptability of the concrete. All concrete, reinforcing steel, and other materials required for sampling and testing shall be provided at CONTRACTOR'S expense.

401.8.a Cylinders

Cylinders shall be made by the OWNER as required and tested at Seven (7) & twenty (28) days for compressive strength, or as otherwise directed by the ENGINEER.

401.9 Equipment

Good judgment shall be exercised in determining what equipment will be used in proportioning, mixing, transporting, placing, consolidating and finishing the concrete.

401.10 Construction Requirements

Construction and placing requirements shall be in accordance with the best current industry practices and techniques.

The concrete supplier shall provide with each load of concrete, before unloading at the site, a delivery ticket containing the following information:

a) Name and location of plant
b) Time of batching concrete
c) Mix proportions of concrete (or a mix designation)
d) Number of cubic yards of concrete batched

401.11 Consolidation

The concrete shall be sufficiently and uniformly vibrated across the full width and depth of the pavement thickness. Consolidation of these areas shall be attained by the use of approved vibrators. Vibrators, either of the surface type (pan or screed) or the immersion type (tube or spud) may be attached to the spreader, paver, or finishing machines, or may be mounted on a separate carriage. The vibrators shall be operated only when the machine to which they are attached is moving forward. In no case shall hand vibrators be operated longer than fifteen (15) seconds or less than five (5) seconds in any one location. Vibrators shall be placed in and withdrawn vertically from concrete in a slow deliberate manner. Vibrator frequencies will be checked when the vibrator is under load and shall operate at frequencies listed below.

Type	Frequency Minimum Cycles per Minute
Surface, Pan, Screed	3,500
Immersion Tube, Paving Machine Attachment	3,000
Immersion Spud, Hand Operated	9,000
Immersion Spud, Gang Operated	9,000

Failure to properly consolidate concrete during placement will result in rejection of concrete. Rejected concrete shall be removed and replaced at CONTRACTOR'S expense.

401.12 Finishing

401.12.a Exposed Surfaces

Bevel all exposed corners and edges of structures with three-quarter-inch (3/4") molding. Remove all unsightly ridges and lips. Remedy local bulging by tooling and rubbing. Ream, chip and fill with mortar all voids and holes, including those left by the removal of form rods.

401.12.b Lift Surfaces

Manipulation adjacent to the surface of any lift shall be the minimum necessary to produce the degree of consolidation desired in the surface layer and a surface with the desired degree of roughness for bond with the next lift. Excessive surface vibration or working, including screeding, will not be permitted. Top surfaces not

covered by forms, and which are not to be covered by additional concrete or backfill, shall be carried slightly above grade and struck off by board finish or other industry standard finish apparatus.

401.13 Joints

Joints shall be constructed in accordance with the details shown on the plans and these specifications and with the best of workmanship. **Failure to construct the joints called for in the best possible manner will be cause for suspension of work until the cause of the defective work is remedied.**

401.13.a Contraction Joints:

All contraction joints not formed with an approved edging tool, both transverse and longitudinal, shall be sawed without delay as soon as the concrete has gained sufficient strength to permit sawing without spalling and without the sawing machine "tracking" the fresh concrete. The ENGINEER may reject concrete that cracks before sawing is performed.

401.13.b Construction Joints:

At locations shown, at the close of each pour, or where placing of concrete is suspended for more than two hours, make provisions for joining future work. Arrange work so that a section begun on any day shall be finished during daylight of the same day. Joints shall be of the type shown or prescribed. Before depositing fresh concrete broom the surface of hardened concrete, roughen slightly, wet and coat with neat cement paste or grout. Carefully rod fresh concrete into grooves and recesses, around bars, plates and embedded items.

401.13.c Expansion Joints:

Expansion joint material shall be preformed joint filler, non-extruding type, of the specified thickness shown on the plans, conforming to AASHTO M 213. Construct at locations shown and extend entirely through the concrete.

401.13.d Sealing Joints:

All joints shall be sealed with hot applied joint sealant conforming to KDOT "Standard Specification" Section 1501.

401.14 Protection and Curing

Maintain a moist condition and at a temperature between forty degrees Fahrenheit (40° F) and ninety degrees Fahrenheit (90° F) for seven (7) days. Concrete damaged by improper curing shall be removed and replaced. Any of the following curing methods may be used. Cold weather and hot weather curing procedures shall be followed when applicable. Curing methods shall be applied to the finished surface immediately after finishing or as soon as possible for the type of method used. **Failure to provide proper curing will be considered as sufficient cause for immediate suspension of concrete placement operations.**

Walking on the pavement to place the curing material shall not be permitted and walking or operating equipment on the curing material shall not be permitted until the pavement has sufficiently hardened to prevent damage to the surface.

The curing material shall be left in place for a minimum of four (4) days unless otherwise directed by the ENGINEER. Any tears, holes, or other damage to the curing material shall immediately be repaired or replaced by material in good condition.

401.14.a Burlap or Concrete Curing Blankets

Burlap or Concrete Curing Blankets to be used for curing protection shall be approved by the ENGINEER prior to placement of concrete.

.

Apply to concrete when it has hardened sufficiently to prevent marring or damage of the finished surface. Burlap shall be damp when placed on the surface and shall be placed with the dampened side down. Burlap shall be kept damp throughout the curing period.

401.14.b Polyethylene Sheeting

Polyethylene Sheeting shall be white sheeting not less than four thousandths of an inch (0.004") thick. Lap a minimum of four inches and seal with tape. Apply sheeting to concrete when it has hardened sufficiently to prevent marring or damage of the finished surface.

401.14.c Liquid Membrane Curing

In no case will the use of liquid membrane curing be permitted on a surface to which other concrete is to be bonded.

1. Material: Shall be Type 2 white pigmented conforming to ASTM C 309. When tested for water retention under ASTM C 145, the film shall have an efficiency index of at least ninety (90). The manufacturer shall submit certified test reports by an approved testing laboratory for each lot or run of material from which shipment is made. Deliver to the site in original containers plainly labeled with the manufacturer's name, trade name and lot identification. Thinning of the membrane will not be permitted.

2. Application: Apply by hand operated or power-driven equipment at the rate of one gallon (1g) to not more than one-hundred fifty square feet (150 sq. ft.) of finished surface. The surface shall be moist, but without free water at time of application. Apply one or more coats as required to provide a smooth, uniformly textured coating of the required density. Apply succeeding coats at approximate right angles to the previous coat. Surfaces that have developed shrink cracks shall be reworked and refinished prior to application of the compound. Repair formed surfaces immediately upon removal of forms and apply compound only to surfaces to which future concrete will not be bonded.

401.15 Frost Protection

Provide frost protection as follows when ambient temperature is forty degrees Fahrenheit (40° F) or below. Forms, reinforcement and subgrade shall be free from ice or frost. To ensure temperatures of forty degrees Fahrenheit (40° F) to ninety degrees Fahrenheit (90° F) when placing mixture, heat aggregate or water, or both.

To maintain temperatures within the above range during the entire curing period, protect with suitable covering or heated enclosure.

401.16 Form Removal

At temperatures of forty degrees Fahrenheit (40° F) or above, allow thirty (30) hours minimum before removing forms from vertical faces, walls or similar structures. For slabs, beams, girders and similar construction, allow concrete to develop sixty percent (60%) of design strength before removing falsework and forms. If tests are not made to determine strength, falsework and forms shall remain in place not less than seven (7) days after placement of the concrete mixture.

401.17 Opening to Traffic

Traffic or heavy stationary loads shall not be permitted on any new concrete surface or structure for a minimum of seven (7) days unless otherwise approved by the Engineer.

401.18 Patching Concrete

Remove and replace defective areas or areas out of level or alignment which cannot be patched satisfactorily. Patched areas unsatisfactory in workmanship or appearance shall be re-patched or removed and replaced. Fill tie holes and patch defective areas immediately upon removal of the forms. Chip defective areas to solid concrete or to a minimum depth of one inch (1”), wet liberally, and force and compact mortar into place. Mortar shall be finished flush to match adjacent areas and cured as specified hereinbefore.

401.19 Removal of Standing Water (Dewatering)

The CONTRACTOR shall ensure that standing water is removed from areas behind curb & gutter and adjacent to the pavement. The CONTRACTOR shall be required to provide pumps and remove all standing water to prevent weakening of the sub-base or crushed aggregate base. No separate payment will be made for dewatering of project areas during construction.

401.20 Measurement and Payment

The quantity of Concrete Pavement shall be measured by the square yard of completed and accepted work.

The quantity of Entrance Pavement shall be measured by the square yard of completed and accepted work.

The quantity of Curb & Gutter shall be measured by the linear foot of completed and accepted work.

The quantity of Valley Gutter shall be measured by the square yard of completed and accepted work.

The quantity of Sidewalk Construction shall be measured by the square yard of completed and accepted work.

The completed and accepted quantities, measured as provided above, shall be paid at the contract unit price, which price shall be full compensation for all tools, equipment, materials, labor and other incidentals required to complete the work.

SECTION 500
SEWERS

501 Excavation, Trenching, Backfilling, And Grading

BID ITEMS	UNITS
Trench and Native Backfill (*)	Linear Foot
Flowable Fill (Low Strength)	Cubic Yard
Jetted Sand Backfill	Cubic Yard

* Denotes the range of depths for excavation. Depth ranges shall conform to the following standard ranges:

Depth Range	
0-8'	Zero to Eight Feet
8'-10'	Eight Feet to Ten Feet
10'-12'	Ten Feet to Twelve Feet
12'-14'	Twelve Feet to Fourteen Feet
14'-16'	Fourteen Feet to Sixteen Feet
...	Continuing in two foot (2') intervals to reach the required depth shown on the plans

501.1 General

This section covers excavation, trenching, backfilling and grading for underground pipelines and appurtenances, miscellaneous structures, together with all incidental work in connection therewith, including disposing of surplus and waste materials as well as site grading.

501.2 Pavement Removal

Concrete or asphalt pavement shall be removed as required to facilitate the trenching operation. Saw cutting of pavement may be required to control cracking and prevent damage to adjacent pavement that shall remain. All work required for pavement removal shall not be paid for directly, but shall be subsidiary to the other bid items unless otherwise specified on the plans or by the Engineer.

501.3 Shoring and Bracing

CONTRACTOR shall be responsible for providing, installing and maintaining all shoring, bracing and blocking to preserve and maintain exposed excavation faces, to protect existing facilities, and to provide for the safety of workmen and the general public. All items of shoring and bracing shall be progressively removed as backfilling proceeds.

501.3.a Shoring Requirements

All shoring, trenching, and bracing will follow latest OSHA standards and practices set forth by federal laws.

501.4 Trenching

Trenching shall be open cut, with banks kept as nearly vertical as practicable. Width of trenching below top of pipe shall not be less than twelve inches (12”) or more than twenty-four inches (24”) wider than outside diameter of pipe to be installed or removed. Particular care shall be used to avoid overdepth excavation except to remove material considered unstable or otherwise unsuitable for placement of pipe bedding material. Overdepth excavation occurring from any cause shall be corrected as describe in Section Overdepth Excavation.

a. “Select Materials” shall be defined as excavated materials or materials shaved from the trench walls, containing no stones, frozen earth, clods, clay balls, or other debris. MATERIAL MUST BE GRANULAR IN NATURE.

b. “Excavated Materials” shall consist of any earth or sandy material removed by the excavating equipment. These materials shall be used for backfilling the top portion of the trench, but shall be unfrozen and free of large clods, stones, tree roots, or other debris.

501.5 Open Trenches

Except when otherwise approved by the Engineer, trenches shall not be opened more than two-hundred feet (200') in advance of laying pipe.

Trenches across streets and alleys shall be backfilled as soon as possible after pipe laying.

Substantial steel plates with adequate trench bracing shall be used to bridge across trenches at street crossings where trench backfill and temporary patches have not been completed during regular work hours. Safe passage for pedestrians shall also be provided.

501.6 Trench Stabilization

The CONTRACTOR shall make adequate subsurface soil explorations to be satisfied as to the character of the work prior to submitting his bid.

Where groundwater or unstable soil conditions are encountered during trenching operations, the trench shall be further excavated to a minimum depth of twelve inches (12") below the flow line of the pipe or to a depth required to stabilize the trench bottom. The trench shall then be backfilled with Improved Bedding material appropriate for the type of pipe being installed as outlined in these specifications. Following installation of pipeline, the trench shall be backfilled to an elevation of six inches (6") above the top of pipe with similar bedding material. Material for trench stabilization will not be paid for directly but shall be subsidiary to the other bid items unless otherwise noted on the plans or as directed by the Engineer. Remainder of trench shall be backfilled in accordance with these specifications unless otherwise noted on the plans or as directed by the Engineer.

501.7 Pipe Bedding

501.7.a Type 1 Pipe Bedding Material

Shall be crushed rock conforming to ASTM C 33, Gradation No. 67.

501.7.b Type 2 Pipe Bedding Material

Shall be a sand-gravel mix conforming to KDOT Standard Specifications for Type UD-1 underdrain aggregate.

501.7.c Type 3 Pipe Bedding Material

May, at the option of the Contractor, be the same as Type 1 or Type 2; or it may be pit-run sand; or it may be select earth material, which is free from stones larger than two inches in the longest dimension or trash and contains proper moisture content for compaction.

501.7.d Sand

Sand used as bedding material shall be clean washed sand with one-hundred percent (100%) passing the three quarters inch (3/4") sieve, not more than twenty-five percent (25%) retained on a No. 4 sieve, and not more than ten percent (10%) passing the No. 200 sieve.

501.8 Improved Bedding

Improved bedding shall be defined as the initial pipe backfill to a depth of twelve inches (12") above the top of the pipe. All pipe bedding shall be improved bedding, except where flowable fill is specified or required, and shall be hand placed and tamped under the haunches and around the pipe in uniform, maximum six-inch (6") lifts. The improved bedding shall be worked simultaneously on each side of the pipe to ensure equal fill heights at all times. Particular care shall be taken to obtain uniform bearing along the length of pipe without causing joint damage or displacement.

All bedding shall be brought to proper moisture content and compacted to not less than ninety-percent (90%) of maximum dry density as determined by AASHTO Method T99.

501.8.a Improved Bedding for Rigid Pipe

Shall consist of Type 1 or 2 Pipe Bedding Material under the barrel of the pipe extending up to a level equal to one-sixth (1/6) the outside pipe diameter. Type 3 pipe bedding material shall be used from this level to a level twelve inches (12") above the top of the pipe.

501.8.b Improved Bedding for Flexible Pipe

Shall consist of Type 1 or 2 Pipe Bedding Material under the barrel of the pipe extending up to a level twelve inches (12") above the top of the pipe.

501.8.c Improved Bedding for Semi-Rigid Pipe

Shall consist of Type 1 or 2 Pipe Bedding Material under the barrel of the pipe extending up to a level equal to one-half (1/2) the outside diameter. Type 3 Pipe Bedding Material shall be used from this level to a level twelve inches (12") above the top of the pipe.

501.9 Standard Backfill

All trenches and excavations shall be backfilled immediately after the installation of Improved Bedding. Trench backfill, beginning twelve inches (12") above the top of the pipe shall be as described herein, unless shown otherwise on the plans and/or directed by the Engineer.

Trenches not under existing or proposed pavement and having less than seven feet (7') of cover over the pipe shall be backfilled with excavated material mechanically compacted to a density equal to or greater than ninety percent (90%) of standard density. Such trenches with cover over the pipe equal to or greater than seven feet (7') may be either backfilled with excavated material compacted to a density equal to or greater than ninety percent (90%) of standard density or consolidated by flushing and vibrating sand, upon approval of the Engineer.

The top two feet (2') of trenches within alley or street right-of-way shall be backfilled with excavated material mechanically compacted to a density equal to or greater than ninety-five percent (95%) of standard density. The CONTRACTOR will be required to furnish other approved backfill material suitable for mechanical compaction when laboratory tests indicate the CONTRACTOR is not able to obtain the required density by mechanical compaction of the material excavated from the trench. Tests to determine density will be the responsibility of the OWNER.

501.10 Flowable Fill

Trenches under existing or proposed pavement, or where shown elsewhere on the plan, shall be backfilled with Flowable Fill to an elevation flush with the bottom of the existing or proposed pavement and/or subgrade modification. The Engineer may waive the requirement for Flowable Fill when the distance between the top of the pipe and the bottom of the existing or proposed pavement is less than four feet (4'). Flowable fill used for backfill shall be “City of McPherson, 80lb. Winter Mix” or approved equal. **Jetted Sand Backfill** may be used when approved by the Engineer.

501.11 Jetted Sand Backfill

Trenches to be consolidated by flushing shall be sand backfilled when the excavated material is not suitable for backfill material as determined by the Engineer. The top one foot (1') of trenches to be flushed shall be earth backfill compacted to a density equal to or greater than the existing adjacent undisturbed material. Backfill material to be flushed shall be placed in six-foot (6') maximum lifts when the trench is within alley or street right-of-way, and in twelve-foot (12') lifts when the trench is outside of alley or street right-of-way. Each lift must be thoroughly consolidated by using water jets and vibrators. Consolidation of backfill by flushing and vibrating shall result in a final density which equals or exceeds ninety percent (90%) of the standard density. Water shall be applied so that effective settlement is obtained with a minimum amount of water. Trenches shall not be permitted to overflow. Special care must be taken during backfilling, flushing, and compacting operations to prevent the pipe from floating. Water shall be introduced into the layer being flushed through a long pipe nozzle and in such a manner that the granular fill, tamped material or the previously placed layer will not be disturbed, and in no case shall the nozzle end be inserted closer than three feet (3') above the top of the pipe.

501.12 Overdepth Excavation

Except for the usual variations normally occurring in trenching and structure excavation, and within the tolerance specified or customarily permitted in work of this type, trenches and excavation shall not be carried below the depths to permit construction to the elevations, grades and dimensions shown on the Drawings. Inadvertent over depth excavation of trenches occurring through oversight or inattention of CONTRACTOR shall be corrected at no additional expense to OWNER. Overdepth trenching shall be corrected in accordance with

the Section 501.4 Trenching. Overdepth excavation under manholes shall be filled with concrete with a minimum design strength of three-thousand pounds per square inch (3,000 psi).

501.13 Site Restoration

Excavated areas resulting from removal of obstructions below finish grade shall be backfilled and compacted as specified for the area immediately adjacent. Excavations along edges of structures or base shall be backfilled and compacted as specified for backfills. Areas behind curbs shall be finished to smooth planes controlled by the location of such structures or conforming to typical sections in the Drawings. All other slopes shall be left smooth and uniform, conforming to typical sections, to grade stakes as set, or to match adjacent contours. Areas that may have been disturbed or affected by construction shall be restored to a graded condition equal to or better than the original, and graded to drain.

501.14 Pavement Replacement

All pavement or driveway repair shall extend a minimum of one foot (1') beyond the edge of the trench. All pavement patches in paved areas shall be replaced with Concrete, or Hot Mix Asphalt, matching the type of surface material adjacent to the trench. The edges of the pavement patch shall be saw cut prior to patching.

Existing concrete pavement within the public right-of-way shall be removed and replaced to the nearest existing concrete joint a minimum of one foot outside the trench walls unless otherwise approved by the Engineer.

The pavement for patching shall conform to Section 401 Concrete Work.

In unpaved areas, new surfacing shall be minimum of nine inches (9") of compacted asphalt millings or durable, dustless gravel placed and compacted as directed by the Engineer.

All costs related to saw cutting and replacing the pavement shall be subsidiary to the other bid items unless otherwise shown on the plans or as directed by the Engineer.

501.15 Measurement and Payment

The quantity of Trench and Native Backfill will be paid for at the contract unit price per linear foot, measured in place for all excavation of specified size actually placed as shown and specified in the drawings. This item shall include all costs in connection with excavating, trenching, and backfilling, including clean-up and restoration of the site and removal and disposal of waste and surplus materials.

The quantity of Flowable Fill and Jetted Sand shall be measured by the cubic yard of completed and accepted work.

Payment for the completed and accepted work shall be made at the contract unit prices, measured as described above, which prices shall be full compensation for all labor, tools, equipment, materials, trenching, backfilling and other incidentals required to complete the work as described herein and in accordance with the plans.

502 Storm Sewer Construction

Unless otherwise specified herein, these items shall conform to Division 800 of the most recent edition of the Kansas Department of Transportation, Specifications for Road and Bridge Construction, with all modifications.

BID ITEMS	UNITS
Storm Sewer – (*)(**)	Linear Ft
Storm Sewer End Section – (*)(**)	Each
Storm Sewer Manhole – (*)(**)	Each
Inlet – (*)(***)	Each

* denotes size of storm sewer
** denotes type of storm sewer
*** denotes type of inlet

502.1 General

This work shall consist of furnishing, constructing and installing storm sewer pipe, end sections, inlets and manholes of the types and sizes designated on the plans.

502.2 Trenching and Backfilling

Trenching and Backfilling for storm sewer shall be in accordance with Section Section 501.4 Trenching. Trenching and Backfilling for storm sewer shall not be paid for directly, but shall be "subsidiary" to the other bid items unless otherwise shown on the plans or as directed by the Engineer.

502.3 Pipe Bedding

Pipe bedding shall be in accordance with section Pipe Bedding. Storm sewer pipe shall be placed on Type 1 or Type 2 bedding unless otherwise specified on the plans or by the Engineer. After installation of the storm sewer, additional bedding material shall be compacted around the haunches of the pipe to the spring line. The remainder of the trench shall be backfilled and compacted in accordance with the plans.

502.4 Flowable Fill

Flowable fill used for backfill shall be in accordance with section Flowable Fill.

502.5 Measurement and Payment

The quantity of Storm Sewer will be paid for at the contract unit price per linear foot, measured in place for all pipe of specified size and type actually placed as shown and specified in the drawings. This item shall include all costs in connection with excavating, trenching, grouting, and backfilling, including clean-up and restoration of the site and removal and disposal of waste and surplus materials; preparing the pipe bed, furnishing and installing the pipe, making all joints and connections, and all incidental work to complete the item.

The quantity of Storm Sewer End Section, Storm Sewer Manhole, and Inlet shall be measured by the quantity of Each structure installed, sealed, grouted and backfilled in accordance with the details shown on the plans.

Payment for the completed and accepted work shall be made at the contract unit prices, measured as described above, which prices shall be full compensation for all labor, tools, equipment, materials, trenching, backfilling and other incidentals required to complete the work as described herein and in accordance with the plans.

503 Sanitary Sewer Lines

BID ITEMS	UNITS
Sanitary Sewer Main (*)(**)(***)	Linear Foot
Sanitary Sewer Service (*)(**)	Linear Foot
Wye Fittings (*)	Each
Flowable Fill	Cubic Yard
Concrete Encasement	Cubic Yard
Air, Vacuum, and Deflection Testing	Lump Sum

* Denotes Size
** Denotes Type
*** Denotes Grade of Pipe

503.1 General

This work shall consist of furnishing, and installing sanitary sewer pipe to the grades and elevations as designated on the plans. At all points where sanitary sewers cross water mains and the water main is less than two feet above the sewer, the sewer line shall be constructed of ductile iron pipe or plastic pipe with solvent welded joints and be concrete encased. The concrete encasement shall extend not less than ten feet (10') each way from the point of intersection. A minimum horizontal distance of ten feet (10') distance shall be maintained between the new sewer lines and existing parallel water lines. Water and sewer lines shall not be placed in the same trench. Sewer lines constructed of cast iron or solvent welded plastic pipe materials may be constructed within ten feet (10') of a private water supply well.

a. Concrete encasement: wherever pipe cover measured from top of pipe to original ground surface is less than 30 inches (30"), or at creek crossings where cover is less than five feet (5'), the line shall be cast iron or the trench shall be excavated to depth detailed and shall be filled with concrete to an elevation at least six inches (6") above top of pipe. Concrete shall be tamped and screeded approximately level, then allowed to set and harden before backfill is placed.

503.2 Trenching and Backfilling

This work shall conform to applicable requirements of Section Section 501.4 Trenching.

503.3 Flowable Fill

Flowable fill used for backfill shall be in accordance with the requirements of Section Flowable Fill.

503.4 Pipe Bedding

Pipe bedding shall be in accordance with section Pipe Bedding.

503.5 Pipe Material

POLYVINYL CHLORIDE (PVC) GRAVITY SEWER PIPE shall conform to the latest revisions of ASTM D 3034 for 15-inch (15") and smaller, ASTM F 679 for 18-inch (18") and larger and shall be rated SDR 35 with rubber gasket type joints. All pipe and fittings shall be made from virgin PVC compounds and having cell classification as defined in ASTM D 1784.

503.6 Pipe Installation

Pipe installation shall proceed upgrade, with spigots pointing in direction of flow. Pipe shall be installed and bedded as herein before specified with the entire run of pipe straight and true to grade. Pipe shall be inspected by contractor for defects prior to being placed, and interior of bell and exterior of spigot cleaned carefully. Pipe bedding shall be placed and compacted simultaneously on each side of pipe using particular care to obtain uniform bedding throughout the length of pipe without causing displacement of or damage to joints.

503.7 Pipe Stubs

Pipeline stubs of the indicated size and material shall be installed where shown on the drawings. Each stub shall be measured from the outside face of the manhole to the end of pipe as measured along the centerline of pipe. This item shall not be paid as a separate item but will be integral to the bid item "Sanitary Sewer Main". Each stub shall be sealed by contractor in a manner acceptable to Engineer which will result in a watertight, yet removable plug.

503.8 Wye Fittings

Wye fittings of the indicated size and material shall be installed where shown on the drawings. Where a section of pipe is cut to install a wye fitting the spigot end shall be beveled by mechanical means or hand then carefully cleaned; so as the pipe edge will not damage the rubber gasket when installing. Gaskets shall be lubricated adequately with a pipe lube prior to connecting joints.

503.9 Air, Vacuum, and Deflection Testing

All tests shall be witnessed by a City representative in order for testing to be accepted. Testing shall be done in accordance with ASTM Standards; Section UNI-B-6-90: Recommended Practice for Low-Pressure Air Testing of Installed Sewer Pipe, and shall conform specifically to the "Time-Pressure Drop Method".

Air - Pressure Testing - All gravity lines shall be tested using air pressure equipment. In general, the equipment shall consist of movable bulkheads which will isolate sections of the pipeline between any two adjacent manholes. Air shall be supplied to the test section so that the pressure inside the pipe is approximately four (4) psi. The air supply at this point shall be throttled so the pressure in the pipe is maintained between four (4.0) and Three and one-half (3.5) psi for a period of two (2) minutes or until the air pressure has stabilized at a pressure of three and one-half (3.5) psi as indicated by the pressure gauge. Once the pressure has stabilized at three and one-half (3.5) psi; a stop watch shall be started to determine the time required for the pressure to drop to three (3.0) psi. If the time required for the pressure to drop from three and one-half (3.5) to three (3.0) psi is greater than shown in the following table, the test section shall be presumed free from defects.
RETESTING: If the pressure drops from three and one-half (3.5) psi to three (3.0) psi in a shorter period of time than listed below, the point of leakage shall be determined, repaired at contractor's expense, and the test reapplied until acceptable results are obtained.

Minimum Time Table	
Pipe Diameter	Minimum Time
8”	3 minutes 57 seconds
10”	4 minutes 50 seconds
12”	5 minutes 40 seconds

Vacuum Testing - Manholes shall be tested in accordance with the specifications noted in Section Sanitary Sewer Manholes.

Deflection Testing - When flexible (PVC) gravity sewer pipeline is used; a deflection test shall be made on the entire length of the installed pipeline on completion of all work. Deflection shall be determined by use of a deflection device or by use of a spherical, spheroidal, or elliptical ball, a cylinder, or circular sections fused to a common shaft. These apparatuses shall have a diameter, or minor diameter as applicable, of 95 percent (95%) of the nominal inside diameter of the pipe. A tolerance of 0.5 percent will be permitted. Failure of the apparatus to pass freely through a pipe run, either by being pulled through or flushed through with water, shall be cause for rejection. Any pipe showing deflection in excess of 5 percent (5%) will be replaced at no cost to OWNER.

503.10 Removal of Standing Water (Dewatering)

The CONTRACTOR shall ensure that standing water is removed from all trenches prior to sewer pipe or manhole installation. The CONTRACTOR shall be required to provide pumps and remove all standing water to prevent flooding of installed pipe and manholes. No separate payment will be made for dewatering of project areas during construction.

504 Sanitary Sewer Manholes

BID ITEMS	UNITS
Standard Manhole (0-6')	Each
Inside Drop Manhole (0-6')	Each
Additional Depth Manhole (*)	Vertical Ft
(*) Diameter of Manhole	

504.1 General

This work shall consist of furnishing, constructing and installing sanitary sewer manholes of the types and sizes designated on the plans.

504.2 Trenching and Backfilling

This work shall conform to applicable requirements of Section Section 501.4 Trenching.

504.3 Flowable Fill

Flowable fill used for backfill shall be in accordance with the requirements of Section Flowable Fill.

504.4 Precast Reinforced Concrete Manholes shall conform to ASTM C 478, with the following modifications:

a) Cement shall conform to requirements of ASTM C 150, Type II.
b) Concrete shall be air-entrained.
c) Minimum shell thickness for precast concrete reinforced manholes shall be:

At a depth of 0-16 feet:	One-twelfth (1/12) internal shell diameter or four inches (4"), whichever is greater.
At a depth of 16 feet +:	One-twelfth (1/12) internal shell diameter plus one inch (1"), or 5 inches (5"), whichever is greater.

Joints between precast sections shall be designed so that leakage and infiltration can be eliminated by the use of a preformed flexible plastic pipe joint and expansion joint sealing compound conforming to applicable requirements of Fed. Spec. SS-S-00210. Jointing material shall be installed in conformance with the manufacturer's recommendations.

Resilient Connectors between the manhole structure and pipes meeting the requirements of ASTM C-923-00 are permitted.

504.5 Installation of Manholes

Set manhole to desired grade on brick or blocks. After connecting all pipes, fill base of manhole with concrete to flow line. Concrete shall be "City Paving Mix"- 6 sack/900# Rock (AE)(FA) with a maximum slump of 4 inches (4"). Concrete may be vibrated by mechanical means or hand tamped. The base shall have a minimum diameter twelve inches (12") greater than the outside diameter of the manhole. The base shall have a minimum eight inch (8") thickness beneath the manhole wall.

The invert flow channel shall be hand formed during or immediately after the pouring of the manhole base. The flow channel through the manholes shall be made to conform in shape and in grade to that of the sewer pipelines. After the concrete has cured, the top half of the pipe shall be cut out to allow for future maintenance of the sewer pipelines. The inside bottom of the manhole shall rise a minimum of one inch (1") per foot from flowline to the wall of the manhole. All sewers shall be encased with concrete for a distance of one foot (1') from the outside wall of the manhole. The use of precast concrete attached integral cast manhole bases are approved.

504.6 Rings and Covers

Rings and covers shall be solid manhole lids similar to a Deeter Type "C" lid. **Frame and lid shall be Deeter 1010 unless otherwise approved by the Engineer.**

504.7 Testing of Manholes

All tests shall be witnessed by a City representative in order for testing to be accepted.

All pipes entering the manhole shall be plugged, as to not be drawn into the manhole during testing. The test head shall be placed at the inside of the frame or in some instances atop the frame. Once a Vacuum of 10 psig has been drawn, the valve shall be closed and the vacuum pump shut off. This test times the amount of vacuum loss due to infiltration. If the time required for the vacuum to drop from 10.0 psig to 9.0 psig is greater than shown in the following table, the manhole shall be presumed free from defects. **RETESTING**: If the pressure drops from 10.0 psig to 9.0 psig in a shorter period of time than listed below, the point of leakage shall be determined, repaired at contractor's expense, and the test reapplied until acceptable results are obtained.

Minimum Time Table	
Manhole Inside Diameter	Minimum Time
48"	60 seconds
60"	75 seconds
72"	90 seconds

SECTION 600
EROSION CONTROL

601 Slope Protection (Grade > 3:1)

BID ITEMS	UNIT
Riprap (*1)	Tons
Filter Fabric	Square Yard
Sediment Removal	Cubic Yard
Turf Reinforcement Matting	Square Yard

*1- Median Stone Diameter (d50)

601.1 Materials

601.1.a Stone for Riprap:

Stone for Riprap shall consist of field stone or rough quarried stone., Individual stones shall have approximately equal dimension in all orientations, free of elongated and flat slab shapes. Stone shall be angular and not rounded. Stone shall be hard, durable, sound, dense, resistant to abrasion, and free of cracks, seams, and other defects that would tend to reduce the rock's resistance to action of freeze-thaw, air, and water, and suitability for the purpose intended. The stone shall be free of any deleterious substances such as vegetable matter, earth, soapstone, shale, shale-like, or other easily disintegrated material that will tend to decrease the durability of the material after placement. Riprap shall be reasonably well graded to achieve the specified placement results. Maximum stone size shall be according to the values in the following table based on the median stone diameter (d50) specified.

Median Stone Diameter (d50)	Maximum Stone Size
6”	9”
9”	14”
12”	18”
15”	23”
18”	27”

Table 1 - Maximum Riprap Stone Size

The CONTRACTOR shall furnish the ENGINEER with the proposed stone gradation, name of supplier, location of production, and type and characteristics of the stones prior to construction for approval.

Upon the written approval of the gradations by the ENGINEER, the CONTRACTOR shall furnish a Type "C" certification. All stone delivered to the project shall be accompanied by a certification from the aggregate/stone producer. Stone not accompanied by a certification may be rejected at the Engineer's discretion. The approval of some rock from a particular source or quarry shall not be construed as constituting the approval of all rock taken from that source or quarry. Approval will be given only for rock delivered of the specified quality.

601.1.b Geotextile Fabric

Geotextile fabric shall be placed under all riprap areas as shown on the plans. Fabric shall be a single layer, non-woven, needle punched polyester (preferred) or polypropylene type fabric. The fabric shall have a hydraulic permeability equivalent to U.S. sieve size 100 or coarser (ASTM D 4751) and puncture strength of 175 pounds or greater (ASTM D 4833).

601.2 Construction

The area to be lined with riprap shall be excavated to the proposed depth, lines and grades shown on the plans. The Engineer shall approve the prepared area and geotextile installation prior to Contractor placing riprap.

Geotextile fabric shall be installed in accordance with the details on the plans and in accordance with the manufacturers recommendations. Edges of fabric shall be overlapped a minimum of 24-inches and securely pinned in place to prevent displacement of fabric during rock placement. Fabric shall be placed against earth slopes and concrete surfaces up to the design top of riprap layer. For laps parallel to the slope, the lower course shall lap over the top to the upper course. For laps perpendicular to the slope, the downstream course shall lap over the top of the upstream course.

Stone shall be placed in a single layer, and shall be manipulated to provide a uniform distribution of the various sizes of stones. Larger sizes shall be uniformly distributed, with the smaller rock fragments filling the spaces between the larger rocks to produce a well-keyed, densely placed, uniform layer of rip-rap of the specified thickness. Hand placing may be required in some instances to secure the specified results. Along the perimeter of the area to receive riprap, the riprap shall be placed against vertical or near-vertical slopes. Stone shall be placed from the bottom of the embankment upward. Fill open surface voids with spalls as required to provide a uniform final surface within 3" of the proposed lines and grades on the plans.

601.3 Measurement and Payment

The quantity of Filter Fabric shall be measured by the area of completed and installed filter fabric. No adjustment to the quantities will be made for overlaps of adjacent fabric or wrapping of fabric at the limits of the installation. The quantity measured as described above shall be paid the contract unit price per Square Yard, which price shall be full compensation for furnishing and installing geotextile fabric, stakes, equipment, tools and other incidentals necessary to complete the work.

The quantity of Riprap (*) shall be paid at the contract unit price Per Ton delivered to the project for the completed and accepted work, which price shall be full compensation for all excavation, compaction, grading, furnishing and placing rip-rap, furnishing and installing geotextile fabric, equipment, tools, materials and all incidentals necessary to complete the work.

Sediment Removal as specified herein shall be paid for on a Cubic Yard basis which shall be full compensation for all materials, labor, tools, equipment and other incidentals necessary to complete the work as described herein and shown on the plans.

602 Erosion Control

Unless otherwise specified herein, these items shall conform to Division 900 of the most recent edition of the Kansas Department of Transportation, Specifications for Road and Bridge Construction, with all modifications.

BID ITEM	UNIT
Seeding (*)(**)	Acres
Mulching (*)(**)	Acres
Hydro-Seeding	Acres
Hydro-Mulching	Acres
Silt Fence	Linear Foot
Biodegradable Logs (***)	Linear Foot
Inlet Protection	Each
Erosion Control Matting (*)(**)	Square Yard
Sediment Removal	Cubic Yard
Concrete Washout	Lump Sum

* Denotes Type
** Denotes Class
*** Denotes Diameter/Size

602.1 General

This work shall consist of all costs in connection with furnishing, placing, inspecting, and maintaining temporary control measures as shown on the plans or further so ordered by the Director of Public Works in order to control erosion and water pollution, through use of straw or hay bales, silt fence, biodegradable log barriers, and other erosion control devices or methods. The temporary pollution control shall be coordinated with the permanent erosion control items; where applicable, to assure effective and continuous erosion control throughout the construction and post construction period.

602.2 Maintenance

The contractor shall maintain the integrity of temporary erosion control devices during the life of the Contract for the areas disturbed by construction. The contractor shall inspect the devices every seven (7) calendar days, and within twenty-four (24) hours after rainfall equal to or more than ¼ inch, and daily during prolonged rainfall. The contractor shall correct any deficiencies immediately. Where construction activity has been halted due to frozen conditions, no inspections are required until one month before thawing is expected.

602.3 Construction Requirements

Erosion and sediment control measures shall be in place before any/all construction activities begin! The slope barriers shall be placed along contour lines, with a short section turned upgrade at each end of the barrier. At culverts, the straw or hay bales or silt fence shall be placed perpendicular to the flowline of the culvert, not through the streambed flowline. Barriers damaged by CONTRACTOR'S negligence, including improper maintenance or lack of maintenance, shall be repaired by CONTRACTOR at no additional cost to OWNER.

602.4 Sediment Removal

Sediment that has accumulated from behind the control device shall be removed when the sediment reaches 1/2 the device's height. The apparatus shall be cleared of the silt accumulation and properly disposed of either off site or in an area approved by the engineer. Control devices disturbed during removal shall be restored to their original condition.

602.5 Measurement and Payment

Seeding & Hydro-Seeding as specified herein shall be paid for on a Per Acre basis which shall be full compensation for all materials, labor, tools, equipment and other incidentals necessary to complete the work as described herein and shown on the plans. Temporary seeding shall be initiated within fourteen (14) days after grading activities have temporarily or permanently ceased. Areas disturbed by construction will be considered stabilized when vegetation has been established on 70% of the area disturbed by construction.

Place and punch the mulch immediately after the seeding operations. Do not allow the mulching operations to lag behind the seeding operations more than twenty-four (24) hours. If rain is forecast, make every effort to mulch areas the same day as seeding. Mulching & Hydro-Mulching as specified herein shall be paid for on a per Acre basis which shall be full compensation for all materials, labor, tools, equipment and other incidentals necessary to complete the work as described herein and shown on the plans.

Silt Fence as specified herein shall be paid for on a Linear Foot basis which shall be full compensation for all materials, labor, tools, equipment and other incidentals necessary to complete the work as described herein and shown on the plans

Bio Degradable Logs as specified herein shall be paid for on a Linear Foot basis which shall be full compensation for all materials, labor, tools, equipment and other incidentals necessary to complete the work as described herein and shown on the plans

Sediment Removal as specified herein shall be paid for on a Cubic Yard basis which shall be full compensation for all materials, labor, tools, equipment and other incidentals necessary to complete the work as described herein and shown on the plans.

Inlet Protection as specified herein shall be paid for on a per Each basis which shall be full compensation for all materials, labor, tools, equipment and other incidentals necessary to complete the work as described herein and shown on the plans.

Erosion Control Matting as specified herein shall be paid for on a Square Yard basis which shall be full compensation for all materials, labor, tools, equipment and other incidentals necessary to complete the work as described herein and shown on the plans. No Overlapping material will be paid. Only Square yards in place.

Concrete Washout as specified herein shall be paid for on a Lump Sum basis which shall be full compensation for all materials, labor, tools, equipment and other incidentals necessary to complete the work as described herein and shown on the plans.

SECTION 700
TRAFFIC CONTROL

701 Traffic Control

BID ITEM	UNIT
Traffic Control	Lump Sum

701.1 General

This work shall consist of furnishing, placing, and maintaining temporary or permanent traffic control apparatuses as shown on the Plans or ordered by the Engineer during the life of the Contract.

Traffic control shall conform to the most recent edition of the Manual of Uniform Traffic Control Devices. Barricades shall be such that after being placed the treated area of the street will be closed to all traffic except for construction equipment and personnel, including advance warning signs as outlined in the MUTCD. These barricades shall remain in place until the construction has satisfactorily cured and the inspector has authorized them to be removed.

It shall be the Contractor's responsibility to maintain at least one (1) open intersection for cross traffic where construction runs are continuous in excess of 1000 feet without the approval of CITY.

701.2 Barricades and Warning Signs

CONTRACTOR shall be totally responsible for providing, installing and maintaining in place all barricades, warning signs, lights and other safety devices to protect the work, divert traffic and warn the general public of open excavations, unfilled trenches and other areas or conditions which might be hazardous or dangerous during the daylight or dark.

701.3 Removal of Parked Vehicles

Vehicles obstructing paving operations can only be moved by the legal owner or by the City of McPherson Police Department. In order for the Police Department to assist with vehicle removal, the Contractor must contact them at least 48 hours prior to needing the vehicle moved. The Contractor shall notify the City 10 days prior to paving operation to allow the City to notify the Commission. The Contractor shall place door notices in the neighborhood prior to construction. Notices shall be approved by the Engineer. The Engineer shall approve paving operations on major trafficways.

701.4 Maintenance

The contractor shall maintain the integrity of temporary traffic control devices until project is complete. The contractor shall inspect the devices daily during the project, and shall correct any deficiencies immediately.

701.5 Maintenance of Traffic

All detours and street or intersection closures for construction shall be scheduled by CONTRACTOR with OWNER, and their approval obtained, prior to start of construction.

701.6 Construction Requirements

Traffic Control damaged by CONTRACTOR'S negligence, including improper maintenance or lack of maintenance, shall be repaired by CONTRACTOR at no additional cost to OWNER.

701.7 Measurement and Payment

Traffic Control as specified herein shall be paid for on a lump sum basis which shall be full compensation for all materials, labor, tools, equipment and other incidentals necessary to complete the work as described herein and shown on the plans.

701.8 Basis of Payment

TABLE 701-1: Mobilization Partial Payments (KDOT Table 805-5)		
Percent of Original Contract Amount Completed*	**Pay Lesser of the Two**	
	% of Traffic Control	**% of Original Contract Amount**
10	50	2.5
80	100	10
100	100	NA

*The percent of Original Contract Amount Completed = the amount earned by the Contractor** divided by the total dollar value of the original contract (all bid items).

** Do not include monies earned for *Mobilization*, *Traffic Control*, *Contractor Construction Staking* and *Stored Materials*.