SECTION 4

OBSTRUCTIONS AND INCIDENTAL CONSTRUCTION

4.01 GENERAL.

The work covered in Section 4 consists of incidental construction and clearing of obstructions to permit construction of public, developer, and utility company projects through, past and around existing properties and utilities.

The requirements of Section 4 shall apply to all types of work including but not limited to underlying public and private utilities installation, reconstruction or repair. The requirements of Section 4 also apply to any person, agency, company, organization, private contractor, plumber, electrician, DOT, Public Works Department, utility company or any other such persons, businesses, or agencies that disturb public right-of-ways and easements, for any reason. For the purpose of brevity the party responsible for disturbing the public right-of-way and easements shall be referred to herein as the "Contractor."

"Utilities" or "Utility" as used in these Standard Specifications shall mean any overhead or underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, poles, towers, pedestals, boxes or other such facilities or attachments which have been installed underground, on the surface, or overhead to furnish any of the following services or materials: electricity, gases, steam, liquid petroleum products, telephone, communications, digital information, cable television, drainage, traffic control, sewage, or water.

"Utility owner" or "utility company" shall mean the party responsible for operating a utility, as defined above, within the public right-of-way and easements, or their contractor.

"Utility Project" shall mean the planned construction, reconstruction, maintenance, or repair of utilities initiated by a Utility Owner and at least partially taking place on public right-of-way or easements or property owned by the City or County.

4.02 PRIVATE PROPERTY

A. Easements. No work shall be performed on private property unless an easement or right of entry has been obtained for the purpose of doing the work. See Subsection 1.06.

B. Fences and Retaining Walls. Where fences or retaining walls interfere with the construction work, and the Project Documents do not call for their removal, the Contractor shall be responsible for notifying the Engineer prior to removal of any fence or wall for a decision on the limits of removal and the payment for this work. The Engineer may request that the Contractor contact the property owner to coordinate the work. In areas used for livestock, fences not shown for removal shall be maintained in good condition at all times or temporarily relocated in order to contain the livestock during construction. Such temporarily relocated fence shall be re-erected in the original location after the construction is complete. The replacement, re-erection, and/or re-setting of fences and walls shall be made in a manner that results in conditions as good as or better than existed prior to the start of construction as determined by the Engineer.

C. Septic Tank Systems. Where septic tanks or septic tank lateral systems, which are to remain in service on private property, interfere with or are in the line of construction, the Contractor shall be responsible for notifying the Engineer prior to any removal so that a decision can be made on the removal limits and payment for the work. The Contractor will be responsible for replacement of any part of the system removed in such a manner as to restore the system to a condition as good as or better than existed prior to the start of construction as determined by the Engineer.

D. Sprinkler Systems. Sprinkler systems for lawn and landscaped areas affected by construction shall be neatly cut and capped at the limits of the construction by the Contractor. The Contractor shall coordinate this work with the affected property owner(s). Sprinkler systems located within existing right-of-way will not be repaired. However, the Contractor shall carefully remove and salvage to the property owner any sprinkler heads or sprinkler system controls that may have been located on the public right-of-way. If a sprinkler system located on private property is damaged, it shall be replaced by the Contractor prior to permanent seeding or sodding of the area. The Engineer shall notify the Contractor if any special agreements have been made with the property owner regarding the sprinkler system. Sprinkler system work shall be considered subsidiary to other items of the Contract.

4.03 EXISTING UTILITIES

A. Contractor Responsibilities. The Contractor shall provide their contact information in writing to responsible representatives of utilities, railroads, or any other facilities or property that will be affected by their operations. Such notice shall be given not less than seven days before starting work in any area. The Contractor shall thereafter coordinate their work with the work necessary to protect or relocate such utilities, property or facilities, and cooperate to the fullest extent to avoid damage or service interruptions.

The Contractor shall have the locations of existing utilities marked in the field prior to the commencement of grubbing or excavating. For obtaining underground utility locations, the Contractor shall utilize the Kansas One Call service, telephone no. (800) 344-7233.

The Contractor shall furnish all necessary information to the utility companies involved as to the nature and extent of the work and shall obtain their cooperation and instructions in locating and protecting all overhead and underground pipes, cables, and other utilities. All utility line locations shown on the Drawings are approximate. House connections are generally not shown.

B. Protection. The Contractor shall protect utilities from damage by workers, equipment, and natural causes. Where utility poles interfere with construction, the Contractor shall arrange with the utility companies concerned to relocate or properly anchor and tie back the poles.

C. Damaged Utilities. Any damage to utility lines, house connections or structures by action or negligence of the Contractor shall be repaired or replaced by the Utility Owner at the Contractor's expense. This shall also apply to utilities installed after the award of the contract and utilities not shown on the Drawings but marked in the field.

D. Conflicting Utilities. Wherever the proposed sewers, waterlines, or appurtenances in this project cross or are to be located over or under underground pipes, cables or conduits, the Contractor shall uncover the pipes, cables or conduits at least 3 days prior to construction to allow the Engineer sufficient time to check grades and the Utility sufficient time to move their lines or appurtenances, should it be necessary. If utility lines or their appurtenances obstruct construction of sewers and

appurtenances, they will be relocated by the Utility Owner. Ample notice shall be given to permit the required relocation to be accomplished without delaying construction of the project. Any delay in construction resulting from the relocation of utility lines or their appurtenances will not be grounds for modification of the contract unless agreed upon by the Engineer. In cases of utility conflicts, the Contractor may elect to tunnel in lieu of open cut, at no additional cost.

4.04 RESTORATION OF PUBLIC RIGHT– OF–WAY FOLLOWING UTILITY WORK.

The requirements set forth in this Section apply to the work of private or public utility companies, as defined in Subsection 4.01, working within public right-of-way.

A. Hydro Excavation Process. The maximum diameter of a cored hole in pavement for a hydro excavation procedure shall be six inches. After completion of the hydro-excavation process, each hole shall be backfilled with flowable fill to the bottom of the adjacent pavement and then filled with high strength non-shrink grout to the same level as the existing pavement. For concrete pavements, if the hydro excavation process results in more than 2 holes in a single panel, then the entire panel shall be replaced as specified in Subsection 4.06.

For asphalt pavements and concrete pavement overlain with asphalt, if the hydro-excavation process results in holes within 4 feet of each other (measured from center to center of the holes), then a rectangular full depth asphalt patch shall be constructed normal to centerline of the roadway by full depth sawcutting and removal within limits one foot beyond the edge of each hole. Should the patch area as defined above be within **three** feet of the gutter toe or lane line, the patch shall be extended to the respective gutter toe or lane line. Asphalt pavement and asphalt on concrete pavement patches required due to hydro-excavation shall be finish milled and overlaid as specified in Paragraph 4.06 C (3).

This restoration process shall also be followed for exploratory “pothole” excavations to expose existing utilities.

The work and cost of restoring pavements following hydro excavation shall be the responsibility of the party initiating the excavation.

B. Utility Project Restoration (Projects within City Limits Only).

(1) Permitting Requirements. All planned utility projects shall be coordinated with the City in order to ensure the preservation of new pavement or new overlay for a minimum of 36 months after new pavement or overlay is constructed. The City will notify the utility companies of all planned street improvement or repair projects at regularly scheduled utility coordination meetings to enable utility companies to complete their planned projects before new pavement or overlays are constructed. Non-emergency utility repair work that removes and replaces pavement less than 3 years old will not normally be approved and will only be allowed with the approval of the City Engineer.

To excavate in the public right-of-way, franchise utility companies must obtain a permit from the Public Works Department. Patches that are made as a result of utility cuts shall be restored as noted in each utility’s franchise agreement and as specified herein. The utility shall pay the entire cost of right-of-way and public infrastructure restoration necessitated by the Utility Company’s actions.

Utility projects shall provide for erosion and water pollution control as required by Section 4.20 of these Specifications and all applicable laws.

The City of Topeka Brick Street, Alley and Sidewalk Policy applies to all utility companies and any other party working within City right-of-way and easements. A copy of this policy may be obtained from the Office of Public Works Administration.

All Projects within the public right-of-way require work zone traffic control. The utility company or their contractor shall provide traffic control in compliance with the MUTCD, Section 4.24 of these Standard Specifications, the City Standard Detail Drawings for Traffic Control, and as directed by the City Traffic Engineer. A "Traffic Disruption Permit" is required prior to the start of work. This permit may be obtained by contacting the City of Topeka Engineering Division – Traffic Section at phone number (785) 368-3842 a minimum of 72 hours in advance of starting work.

(2) Materials. All materials used for the restoration of the public right-of-way and easements shall meet the requirements of these Standard Specifications.

(3) Construction Requirements.

i. Initial Removal of Pavement. When trenches for the installation or repair of utilities are excavated in paved areas, the existing pavement shall initially be removed only to the limits required to permit safe trench excavation as specified in Subsections 2.02, 2.03, and 2.04.

Concrete and asphalt pavements shall be full depth sawcut at the planned limits of the trench prior to the removal of pavement. The Contractor shall remove and dispose of the pavement as specified in Subsection 3.13.

ii. Brick Streets, Alleys and Sidewalks. If the trench or other excavation encroaches upon stone curbs or streets, alleys or sidewalks in the public right-of-way that have an exposed brick surface or one or more underlying layers of brick, the requirements of Subsection 4.05 and the City of Topeka Brick Street, Alley and Sidewalk Policy shall apply. Upon encountering stone curb or pavement containing bricks, the utility company shall contact the City Street Maintenance Section and request instruction relative to preservation of the brick. The utility company shall not proceed with any excavation of pavement containing brick until authorization from the Street Maintenance Section is received.

The utility company and the Street Maintenance Section shall review Figure 4.5"City of Topeka Brick Street Inventory Map" and Section 4.04 of these Standard Specifications to determine necessary preservation measures for the restoration of the brick street, alley or sidewalk, and/or stone curbs following completion of the utility work.

Anytime a street, sidewalk or alley that has an exposed brick surface is disturbed, all restoration, subject to certain specific exceptions, shall be completed using brick of like kind and color, and in accordance with the City of Topeka Brick Street, Alley and Sidewalk Policy and as specified herein.

Any bricks that require removal and will not be used in the subsequent restoration shall be carefully removed and salvaged to the City Street Maintenance Section in accordance with the City of Topeka Brick Street, Alley and Sidewalk Policy and as specified herein. The brick salvage requirement includes those bricks found at depth in an existing pavement structure.

When pavements containing brick and/or stone curbs require removal to allow excavation of trenches, the utility company shall mark the planned limits of the excavation. After a representative of the Department of Public Works approves the limits as marked, the utility company may proceed with removal of the bricks and/or curbs using care, as specified in Subsection 4.05, to not damage the bricks or stones. The bricks shall either be salvaged to the Street Maintenance Section or be used in preserving and restoring the brick pavement as specified in Subsection 4.05.

iii. Backfill. During the course of removing pavement and installing or repairing the utilities and backfilling, the utility company shall protect the pavement beyond the edges of the trench or excavated area from being damaged.

The preferred material for backfilling an excavation under pavement is flowable fill, meeting the requirements of Section 5.09. The utility company, or their contractor, shall verify de-watering/curing is complete prior to covering flowable fill material.

If flowable fill is not used in backfilling an excavation, the City may require Standard Proctor Curves and soil density tests to be provided to the City Construction Manager on the backfill material to show that the required compaction is achieved at each excavation. The backfill material shall be deposited in loose layers not more than 6 inches thick and compacted. Type A Compaction, as specified in Subsection 2.09, shall be achieved in all areas to be paved except sidewalks. Sidewalk subgrades shall be compacted to the requirements of Type AB Compaction.

If the disturbed pavement had subgrade treatment beneath it, then subgrade treatment to the requirements of Subsection 3.11 must be performed as part of the restoration process. The subgrade additive shall be the same material as the adjacent undisturbed subgrade unless approved otherwise.

iv. Final Removal of Pavement and Patching. After the utility facility is installed or repaired, and backfilling is completed as specified, additional existing pavement shall be carefully removed to provide a minimum shoulder width of 9 inches of undisturbed subgrade on each side of the trench. If the subgrade is unstable, it shall be excavated to a depth determined by the Engineer and backfilled with Aggregate Base – Type AB-3 as specified in Subsection 3.12.

Asphalt pavements shall be full depth sawcut to neat lines at locations which will result in the specified minimum 9-inch subgrade shoulder. The width from sawcut to sawcut shall be filled with asphalt (referred to in the following as “the patch”) as specified in the Standard Detail Drawings DT-007 or DT-008 and **Section 7**, and match the thickness of the existing pavement minus the final overlay. Pavements consisting of an asphalt overlay on concrete shall be replaced in kind as specified in Standard Detail Drawing DT-007 or DT-008 and in **Section 7**.

Concrete pavements shall be full depth sawcut, removed and replaced to the limits of the panels partially disturbed unless otherwise directed by a representative of the Department of Public Works. The entire width from sawcut to sawcut shall be replaced with concrete as specified in Standard Detail Drawing DT-017 and Section 5.

Brick pavements shall have additional pavers removed to provide the specified 9-inch subgrade shoulder. Following the establishment of the subgrade shoulder, brick pavements and stone curbs shall be restored as specified in Subsection 4.04.

v. Finishing Asphalt Patching. The area surrounding the full depth repair area (the patch) shall be milled to a depth of 2 inches. Final mill and overlay limits shall be perpendicular to the centerline of the roadway unless approved otherwise.

(1) Asphalt Pavements Less Than Three Years Old. When the existing asphalt pavement is less than three years old, the area milled shall surround the patch to the width of the affected lane in the transverse direction and at least 10 feet in the longitudinal directions with at least one foot of milled surface surrounding all squared edges of the patch. If the milled area, as described above, extends into the adjacent lane, then the entire adjacent lane width shall also be milled. If the distance between two milled areas is closer than 20 feet, then the mill and overlay operation shall be extended to combine the areas into one area. If there are more than three repair areas in a 100 foot section of street, then the areas shall be combined into one large mill and overlay area. The requirements set forth in this paragraph also apply to asphalt on concrete pavements that have an asphalt surface course less than three years old.

(2) Asphalt Pavements More Than Three Years Old. When the existing asphalt pavement is more than three years old, the area milled shall extend one foot beyond each squared edge of the patch. If the squared edge of patch is within three feet of the gutter toe, then the milled area shall be extended to the gutter toe. If the distance between two milled areas is closer than 10 feet then the mill and overlay operation shall be extended to combine the areas into one area. If there are more than three repair areas in a 50 foot section of street, then the areas shall be combined into one large mill and overlay area.

Where pavement markings are removed or disturbed, the company shall replace the markings in kind and meeting the requirements of Subsection 4.22.

Should company's construction activities damage any pavement surface, whether new or existing, the damaged pavement shall be repaired and/or full concrete panels removed and replaced at the utility company's sole expense.

The use of temporary steel traffic plates to cover areas that have not been patched and are open to traffic shall be limited to 30 calendar days. When permanent patches cannot be completed within a 30 day period, temporary patches shall be constructed.

Temporary patches shall be constructed by backfilling the trench from a depth 4 inches below the pavement surface with a minimum of a 12-inch thickness of Aggregate Base – Type AB-3 meeting the requirements of Section 3.12. The aggregate base and the vertical edges of the patch area shall be covered with a minimum 5 mill thickness of plastic sheeting to serve as a bond breaker. The upper 4 inches of the temporary patch area shall be filled with a rapid set concrete or similar material. The patch surface shall be capable of supporting traffic without chucking or permitting excessive moisture to enter the subgrade for the period the temporary patch is needed.

The utility company shall maintain the temporary patches and make any necessary repairs should chucking or excessive settlement occur.

The utility company is responsible for final cleaning, grading and seeding of all disturbed areas immediately after completion of work in a particular area and as the project progresses.

The work and cost of restoring pavements and right-of-way following utility company projects shall be the responsibility of the utility company.

4.05 BRICK PAVEMENTS. This section provides guidance and establishes the requirements for the salvage, preservation, and maintenance of existing brick streets, alleys, and sidewalks and the construction of new brick sidewalks.

A. Scope. Anytime a street, sidewalk or alley that has an exposed brick surface is disturbed all construction or restoration shall be completed, subject to certain specific exceptions, using brick of like kind and color in accordance with the City of Topeka Brick Street, Alley and Sidewalk Policy and as specified herein.

Any bricks that require removal and that will not be used in the subsequent construction, reconstruction, or patching shall be carefully removed and salvaged to the City Street Maintenance Section in accordance with the City of Topeka Brick Street, Alley and Sidewalk Policy and as specified herein. The brick salvage requirement applies to all bricks including those overlain with asphalt and those found at depth in an existing pavement structure.
The streets with exposed brick surfaces designated on the map shown in Figure 4.1 – "City of Topeka Brick Inventory Map" will be subject to the preservation, repair and reconstruction provisions of this Standard Specification. Other streets and alleys which have a brick base but have been overlain with asphalt will be subject to the brick salvage provisions. This requirement does not apply to City Improvement Projects where brick elements may be replaced with a different material after appropriate approvals. Any excavation within the right-of-way must be repaired in accordance with (IAW) Topeka *Municipal Code 12.30.120 Right-of-way repair and restoration.*

B. Criterion for Determination of Required Preservation of Brick Streets, Brick Alleys, Brick Sidewalks and Stone Curb.

(1) Brick Streets Designated for Preservation. Any person, agency, company, or organization that disturbs or excavates the surface of an existing exposed brick street, alley or sidewalk designated for preservation on Figure 4.1, "City of Topeka Brick Inventory Map", for any purpose including maintenance, surface repairs, or repair or replacement of underlying utilities, shall replace or restore the surface in the same installation pattern and with brick of like kind and color.

(2) Brick Streets Not Designated for Preservation. Streets with exposed brick surfaces which are not designated for preservation are subject to the brick salvage requirements specified herein. Following completion of the construction or utility work, the party responsible for disturbing the street shall repair the street using asphaltic concrete or other approved material.

(3) Asphalt Overlay on Brick Streets. Streets with brick bases but overlain with asphalt are subject to the brick salvage requirements contained herein. Following completion of the construction or utility work, the party responsible for disturbing the street shall repair the street using asphaltic concrete or other approved material.

(4) Brick Alleys. All brick alleys are subject to the brick salvage requirements contained herein. Following completion of utility work or construction, the party responsible for disturbing the alley shall repair the alley with asphaltic concrete. However, if the exposed brick alley is a contributing factor to a registered state or national historic property and its surrounding environs, or a Historic District, the alley shall be preserved as much as possible in accordance with the requirements stated herein. The Contractor completing the work in the alley shall contact the City Office of Public Works Administration to request a determination of whether or not the alley requires preservation on the basis of historic environs.

(5) Brick Sidewalks. When reconstruction or repair of brick sidewalks located in the public right-of-way is required in a localized area or spot repair of 15 feet in length or less, the sidewalk shall be reconstructed using brick of like type and color and laid in the same pattern as the adjacent sidewalk. In larger areas, the sidewalk shall be replaced but may be replaced with concrete unless the particular section of brick sidewalk meets one of five Conditions defined in Table 4.05 B (5) below.

Table 4.05 B (5)
Criterion for Determination of Required Brick Sidewalk Preservation

Condition 1	The brick sidewalk or stone curb is located on a block within the vicinity of a designated state or national historic property and its environs and has not received approval of the Topeka Landmarks Commission for concrete or similarly approved alternative.
Condition 2	The brick sidewalk or stone curb is located within or adjacent to a Historic District or designated Local Landmark.
Condition 3	The brick sidewalk or stone curb is located on a block within a Neighborhood Plan Element of the City's Comprehensive Plan and is recommended to be preserved as a brick sidewalk or stone curb as applicable consistent with said plan.
Condition 4	Any brick sidewalk location not covered by Conditions 1,2, or 3 but located on a block where at least 60% of the sidewalk on one side of the street is brick and maintained in level and safe condition.
Condition 5	The property owner adjacent to the public sidewalk does not agree to replace the brick sidewalk with a concrete sidewalk and said property owner has demonstrated a history of adequately maintaining the existing brick sidewalk to level and safe conditions.

If one of the five conditions listed above exists, the sidewalk shall be reconstructed or replaced in brick. However, on City funded projects, if the property owner adjacent to the City- owned sidewalk does not agree to replace the brick sidewalk with a concrete sidewalk (Condition 5 above) and none of the other conditions are applicable, the owner shall be required to pay the additional cost to reconstruct the sidewalk in brick versus concrete.

(6) Stone Curbs. Stone curbs and brick gutters shall be preserved "in place" as much as possible. In areas where existing curbs are constructed of stone, the stone curb shall be preserved if any of the Conditions 1, 2, or 3 of Table 4.05 B (5) are present. Preservation shall be accomplished by resetting existing stone curb, replacing the existing curb stone with stone of like kind or casting concrete curbs made to match the height, color, and characteristics of the adjacent stone. In areas where preservation of stone curb is not required, stone curbs shall be carefully removed and salvaged to the City.

C. Materials.

(1) Brick Pavers for Streets and Alleys. Paving bricks shall be salvaged from the site or brick pavers of like kind and color imported to the site. Unless otherwise specified in the Project Documents or approved by the Engineer, paving bricks imported to the site shall meet the requirements of ASTM C1272 Application PS (Type F) and have a minimum compressive strength of 10,000psi. The Contractor shall provide a manufacturer's certification to the Engineer that the material satisfies the requirements specified.

(2) Brick Pavers for Sidewalks. Paving bricks for sidewalks shall be salvaged from the site or brick pavers of like kind and color imported to the site. Unless otherwise specified in the Project Documents or approved by the Engineer, paving bricks imported to the site shall meet the requirements of ASTM C902 Application PS (Type F) and have a minimum compressive strength of 8,000psi. The Contractor may also construct sidewalks using brick meeting the requirements for street and alley pavers as specified above. The Contractor shall provide a manufacturer's certification to the Engineer that the material satisfies the requirements specified.

(3) Setting Bed / Leveling Base Sand. Sand for brick setting beds and leveling bases shall be type FA-A as defined in Section 1102 of the KDOT Standard Specifications and as stated in Subsection 5.01.

(4) Reinforced Concrete Pavement. Materials for reinforced concrete pavement shall meet the requirements of Pavement Class A Concrete and welded wire mesh specified in Subsections 5.01 and 5.03, respectively.

D. Construction Requirements.

(1) Removal and Salvage of Bricks. When bricks are removed, care shall be taken by the Contractor or utility company to prevent damage to the bricks. Any bricks not used in restoration or construction shall be salvaged, cleaned and neatly stacked on pallets by the Contractor or utility company. The Contractor or utility company shall transport the salvage bricks to a location designated by the Street Maintenance Section.

The Contractor or utility company shall safely secure bricks that have been removed to prevent theft or damage until the bricks are reset or transported to the City.

Providing pallets and removing, salvaging, cleaning, stacking, transporting, and stockpiling of the bricks is subsidiary.

(2) Brick Streets. This Subsection pertains to exposed brick streets or alleys that will be preserved and repaired or reconstructed to their original brick surface appearance. Prior to removal of any brick street or alley surface the Contractor or the Project Surveyor shall mark the limits of the brick street replacement for the Engineer's approval. During removal of the existing brick street surface, due care shall be exercised to prevent damage to the bricks removed and the adjacent remaining brick pavement.

The reconstructed brick street shall have the following pavement structure from top to bottom:

- One course of brick pavers
- Setting bed or leveling base of non-plastic, clean, FA-A Sand
- 7" Reinforced Concrete Pavement
- 12" Subgrade Preparation to the requirements of Type A compaction as defined in Subsections 3.10 and 2.09 respectively.

i. Subgrade. Upon excavation to the depth required for the concrete base course, the existing subgrade shall be removed an additional 6 inches, scarified, and recompacted. A lift of soil shall then be placed and compacted resulting in a 12" thickness of subgrade preparation. Compaction shall be Type A as specified in Subsection 2.09. If the subgrade is unstable after this compactive effort, it shall be re-excavated to a depth of 6" and a 6" Aggregate Base - Type AB-3 placed and compacted as specified in Subsection 3.12, or Flowable Fill as specified in Subsection 5.09, shall be placed below the concrete base course.

ii. Reinforced Concrete Base. A base of 7" reinforced concrete pavement shall be constructed on the prepared subgrade. The pavement surface shall be sloped to match the desired slope of the final brick surface. Reinforced concrete pavement shall be constructed as specified in Subsection 5.05 except for the following:

- The requirement for a 10 foot straightedge shall be waived should the area be too small for its application.
- Texturing is not required.
- At the Contractor's option, Contraction joints may be tooled rather than sawcut.
- Joints shall be sealed with Hot Type joint sealant material as specified in Section 5.05.
- Transverse contraction joints shall be constructed at intervals of 1.5 times the pavement width or at 14 foot maximum intervals, whichever is less.

iii. Sand Leveling Base. Following curing of the concrete, an uncompacted leveling base of FA-A, non-plastic, clean sand shall be screeded over the concrete base course to a thickness of 1" to 1 1/2". The bricks are expected to settle 1/4" to 1/2" after compaction.

iv. Laying Pavers. Brick pavers shall be laid to follow the brick pattern of adjacent pavement with generally the same spacing between bricks as the adjacent bricks.

Where new brick surfaces are being constructed and there are no adjacent brick surfaces, the brick shall be laid in a non-diagonal Herringbone pattern. As the bricks are laid they shall be moved back and forth to solidly bed them into the sand leveling base.

When it is necessary to cut bricks, cutting shall be performed to leave a clean edge to the traffic surface. Bricks shall be cut with either a block splitter or a masonry saw. Excess bricks shall be salvaged to the City.

Once the bricks are in place, sand shall be placed over the area and worked into the joints between the bricks with a broom, leaving a thin sand layer 1/8" to 1/4" thick over the brick surface. A vibratory plate compaction shall be applied to the brick surface. The compactor shall be a plate type soil compactor capable of 3,500 to 5,000 lb. centrifugal compaction force. Additional passes of the vibratory plate compactor shall be made over the area while additional sand is simultaneously brushed into the joints until the sand is even with the top of the bricks.

The brick surface shall then be watered while additional sand is applied on the surface and broomed into the joints. A thin layer (1/4" maximum) of sand shall be left over the brick surface. All other excess sand shall be removed from the site.

After 30 days, or another period of time as determined by the Engineer, sand shall again be applied to the surface and broomed and watered into the joints. Excess sand shall be removed from the site.

Removal of bricks, salvage of bricks, imported bricks, subgrade preparation, reinforced concrete pavement, aggregate base, sand and water shall be subsidiary to the bid items, “Brick Street” and “Brick Alley”.

(3) Brick Sidewalks. The Contractor shall preserve, replace or install brick sidewalks in compliance with the requirements set forth in DT-022. Where brick sidewalks cross residential or commercial entrances, or alleys, the entrances and alleys shall be constructed of standard materials meeting the normal requirements for entrances and alleys as required by the Standard Specifications.

Brick sidewalk shall be constructed by excavating to the required depth, preparing the subgrade by scarifying to a depth of 6 inches and compacting the subgrade to the requirements of Type AB compaction as defined in Subsection 2.09. Aggregate Base – Type AB-3 material shall be placed on the subgrade, compacted and trimmed to result in a 4” thickness of aggregate base – all as specified in Subsection 3.12. Clean FA-A sand, as defined in Subsection 5.01, shall be screeded over the aggregate to establish a uniform 1” thick setting bed. Bricks shall be laid following the procedures specified in Subsection 4.05 D.2.iv.

Removal, salvage, and cleaning of existing brick, subgrade preparation, aggregate base, sand, water, and imported bricks shall not be paid for directly, but shall be subsidiary to the bid item, “Brick Sidewalk.”

(4) Brick Pavement Adjacent to Concrete Curb and Gutter. Concrete curbs and combined concrete curb and gutter shall be repaired or replaced as specified in Subsections 5.05 and

5.08. Re-laid bricks shall be laid to abut the new concrete curb and gutter curbs in compliance with the requirements set forth in Standard Detail DT-022 or as otherwise detailed in the Project Documents.

(5) Brick Pavement adjacent to Stone Curbs. On brick streets where existing or newly installed stone curbs are constructed, brick pavers abutting stone curbs shall be installed in compliance with the requirements set forth in Standard Drawing DT-022 or as otherwise detailed in the Project Documents.

(6) Preservation and Replacement of Existing Stone Curbs. Any existing stone curbs within the public right-of-way that require removal shall either be salvaged to the City or reset upon restoration of the street. This includes stone curbs that are eligible for replacement with standard concrete curbs or curb and gutter.

i. Removal and Salvage of Stone Curbs. The Contractor or utility company shall notify the City Street Maintenance Section of their intention to remove stone curbs and receive authorization for the removal prior to disturbing any stone curb. The curb stones in good condition shall be removed, salvaged and inventoried. The Contractor or utility company shall adhere to the following requirements when salvaging stone curbs:

(1) No metal tools, equipment, or implements shall be used to pry, loosen, move or lift the curb stones unless the attachments are protected to prevent damage to the stone.

(2) All marks of any kind imposed by the Contractor or utility company on the curb stone's exposed face or top shall be removed by soft cloth, nylon brush and water.

(3) All earth shall be hand-water-washed from the curb stone.

(4) All mortar shall be hand removed by wooden or hard, rubberized tools.

(5) Salvaged stones not used in restoration shall be neatly stacked on pallets, and transported to a location designated by the Street Maintenance Section.

(6) Stones shall be secured to prevent theft or damage until the stones are reset or transported to the City.

ii. Stone Curbs and Resetting Stone Curbs. Stone curbs that are reset or new stone curbs shall be constructed in compliance with the requirements set forth in Standard Drawing DT-022. When stone curbs are to be reset from materials removed from the site and the existing stones are weathered or damaged to such an extent that they should not be reset, they shall be replaced with stone of similar kind and dimensions or with pre-cast concrete curbs manufactured to match the existing stones color, texture, dimensions, and characteristics. Prior to the pre-cast curbs being delivered to the site, the Contractor or utility company shall provide a single pre-cast curb segment/block for the Engineer's review and approval.

The concrete base, compacted asphalt millings, crushed rock, any replacement stones, or any precast concrete curb shall be subsidiary to "Reset Stone Curb" or "Stone Curb."

iii. Stone Curbs (Concrete). When the Project Documents indicate that stone curb is to be removed and replaced with a cast in place colored and textured concrete curb, or when a new cast in place colored and textured concrete curb is to be constructed, the new concrete curb shall meet the requirements set forth in Standard Drawing DT-022. The concrete used for the curb shall meet the requirements for Pavement Class A Concrete as specified in Subsection 5.01. Where removal of an existing stone curb is required, this work shall be subsidiary to "Stone Curb (Concrete)".

(7) Crosswalks on Brick Streets. Where a Crosswalk provides access by sidewalks, sidewalk ramps that meet ADAAG or current applicable guidelines must be provided at both ends of the crosswalk.

i. On brick street surfaces, the installation of colored and textured pavement may be used to enhance the aesthetics of the crosswalks. Alternative surface construction applications will be considered by the Engineer.

ii. Any alternative crosswalk material must be approved by the Director of Public Works and application must be completed by an appropriately trained city personnel or licensed contractor. Installation shall be as per the manufacturer's specifications and methods.

E. Bid Items, Measurement and Payment.

(1) Bid Items:

BRICK STREET	Unit: Square Yard (nearest S.Y.)
BRICK ALLEY	Unit: Square Yard (nearest S.Y.)
BRICK SIDEWALK	Unit: Square Foot (nearest S.F.)
RESET STONE CURB	Unit: Linear Feet (nearest foot)
STONE CURB	Unit: Linear Feet (nearest foot)
STONE CURB (CONCRETE)	Unit: Linear Feet (nearest foot)

(2) Measurement. Measurement for "Brick Street" and "Brick Alley" shall be by the square yard for the total area of brick pavement removed and replaced or constructed. Dimensions of individual areas shall be measured to the nearest 0.1 foot, the areas computed, summed and rounded to the nearest square yard for each pay application.

Measurement for "Brick Sidewalk" shall be by the square foot for the total area of brick sidewalk removed and replaced or constructed. Dimensions of individual areas shall be

measured to the nearest 0.1 foot, the areas computed, summed and rounded to the nearest square foot for each pay application.

Measurement for "Reset Stone Curb", "Stone Curb", and "Stone Curb (Concrete)" shall be along the face of the curb in linear feet. Measurement of individual curb segments will be made to the nearest 0.1 foot and the segment lengths summed and rounded to the nearest foot for each pay application.

(3) Payment. The amount of completed and accepted brick pavement or stone curb, measured as stated above, shall be made at the Contract unit price per each specific type of pavement or curb removed and replaced or constructed, which payment shall be full compensation for materials, labor, tools, equipment and incidentals necessary to complete the work as specified.

4.06 PAVEMENT REMOVAL AND REPLACEMENT FOR EXCAVATIONS.

A. Scope. "Pavements" as used in this Section 4.06 refers to the hard concrete, brick or bituminous surface of highways, streets, alleys, roads, sidewalks, driveways and parking lots.

B. Materials. Except for brick streets, pavements removed for excavations shall be replaced in-kind -- meaning concrete for concrete and asphalt for asphalt. Materials for the replacement of concrete pavements shall be either Pavement Class A or Pavement Class B concrete as determined by the application criterion and meeting the requirements set forth in Subsection 5.01. Asphaltic Concrete shall be as specified in Subsection 7.02. Subgrade Preparation, Subgrade Treatments, and Aggregate Base shall meet the requirements set forth in Subsections 3.10, 3.11, and 3.12, respectively.

Materials for the restoration and preservation of brick streets are specified in Subsection 4.05.

C. Construction Requirements.

(1) Initial Removal of Pavement. When excavations for the installation or repair of utilities or other underground facilities are performed in paved areas, the existing pavement shall initially be removed only to the limits required to permit safe excavations as specified in Subsections 2.02, 2.03, and 2.04.

Concrete and asphalt pavements shall be full depth sawcut at the planned limits of the excavation prior to the removal of pavement. The Contractor shall remove and dispose of the pavement as Specified in Subsection 3.13.

If the excavation encroaches upon stone curbs or streets, alleys or sidewalks in the public right-of-way that have an exposed brick surface or one or more underlying layers of brick, the requirements of Subsection 4.05 and the City of Topeka Brick Street, Alley and Sidewalk Policy shall apply. Upon encountering stone curb or pavement containing bricks, the Contractor shall contact the City Street Maintenance Section and request instruction relative to preservation of the brick. The Contractor shall not proceed with any excavation of pavement containing brick until authorization from the Street Maintenance Section is received.

When pavements containing brick and/or stone curbs require removal for the excavation, the Contractor shall mark the planned limits of the excavation. After the Engineer approves the

limits as marked, the Contractor may proceed with removal of bricks and stone curbs using care to not damage the bricks or stones as specified in Subsection 4.05. The bricks, including those overlain with asphalt shall either be salvaged to the Street Maintenance Section or be used in preserving and restoring the brick pavement as specified in Subsection 4.05.

The Contractor shall all times take careful action to prevent breaking or cracking of the existing pavement beyond the limits of the excavation.

(2) Final Removal of Pavement and Patching. After the utility facility is installed or repaired, and backfilling is completed as specified in Section 2, additional existing pavement shall be carefully removed to provide a minimum shoulder width of 9 inches of undisturbed subgrade on each side of the trench. If the subgrade is unstable, it shall be excavated to a depth determined by the Engineer and backfilled with Aggregate Base – Type AB-3 as specified in Subsection 3.12.

Asphalt pavements shall be full depth sawcut to neat lines at locations which will result in the specified minimum 9-inch subgrade shoulder. The width from sawcut to sawcut shall be filled with asphalt (referred to in the following as "the patch") matching the thickness of the adjacent pavement minus the final overlay and as specified in Standard Detail Drawing DT-007, DT-008 and Section 7. Pavements consisting of an asphalt overlay on concrete shall be replaced in kind as specified in Standard Detail Drawing DT-007, DT-008 and Subsection 7.04.

Concrete pavements shall be full depth sawcut, removed and replaced to the limits of the full panels that have been partially disturbed unless otherwise directed by the Engineer. The entire width from sawcut to sawcut shall be replaced with concrete as specified in Standard Detail Drawing DT-007, DT-008 and Subsection 5.08

Brick pavements shall have additional pavers removed to provide the specified 9-inch minimum subgrade shoulder. Following the establishment of the subgrade shoulder, brick pavements and stone curbs shall be restored as specified in Subsection 4.05.

(3) Finishing Asphalt Patching. The area surrounding the full depth repair area (the patch) shall be milled to a depth of 2 inches. Final mill and overlay limits shall be perpendicular to the centerline of the roadway unless approved otherwise by the Engineer

i. Asphalt Pavements Less Than Three Years Old. When the existing asphalt pavement is less than three years old, the area milled shall surround the patch to the width of the affected lane in the transverse direction and at least 10 feet in longitudinal directions with at least 1 foot of milled surface surrounding all squared edges of the patch. If the milled area, as described above, extends into the adjacent lane, then the entire adjacent lane width shall also be milled. If the distance between two milled areas is closer than 20 feet, then the mill and overlay operation shall be extended to combine the areas into one area. If there are more than 3 repair areas in a 100 foot section of street, then the areas shall be combined into one large mill and overlay area. The requirements set forth in this paragraph also apply to asphalt on concrete pavements that have an asphalt surface course less than three years old.

ii. Asphalt Pavements More Than Three Years Old. When the existing asphalt pavement is more than 3 years old, the area milled shall extend 1 foot beyond each squared edge of the patch. If the squared edge of patch is within three feet of the gutter toe, then the milled area shall be extended to the gutter toe. If the distance between two milled areas is closer than 10 feet then the mill and overlay operation shall be extended to combine the areas into one area. If there are more than 3 repair areas in a 50 foot section of street, then the areas shall be combined into one large mill and overlay area.

Where pavement markings are removed or disturbed, the Contractor shall replace the markings in kind, meeting the requirements of Subsection 4.23.

Should the Contractor's construction activities damage any pavement surface, whether new or existing, the damaged pavement shall be repaired and/or full concrete panels removed and replaced at the Contractor's sole expense.

D. Bid Items, Measurement, and Payment.

(1) Bid Items:

REMOVE AND REPLACE (*) " CONCRETE PAVEMENT
Unit: Lineal Feet (nearest foot)

REMOVE AND REPLACE 2" ASPHALT ON (*) " CONCRETE PAVEMENT Unit: Lineal Feet (nearest foot)

REMOVE AND REPLACE BRICK PAVEMENT
Unit: Linear Feet (nearest foot)

REMOVE AND REPLACE (*)" ASPHALTIC CONCRETE PAVEMENT
Unit: Linear Feet (nearest foot)

REMOVE AND REPLACE (*)" CONCRETE (@)
Unit: Linear Feet (nearest foot)

REMOVE AND REPLACE (*) " ASPHALTIC CONCRETE (@)
Unit: Linear Feet (nearest foot)

REMOVE AND REPLACE (*) " CONCRETE SIDEWALK
Unit: Square Feet (nearest square foot)

REMOVE AND REPLACE CURB AND GUTTER
Unit: Linear Feet (nearest foot)

(*) - Pavement Thickness
(@) - Parking Area or Driveway

(2) Measurement. Measurement for "Remove and Replace (*)" Concrete Pavement", "Remove and Replace 2" Asphalt on (*) " Concrete Pavement", "Remove and Replace Brick Pavement", "Remove And Replace (*) " Asphaltic Concrete Pavement", "Remove and Replace (*)" Concrete (@) ", and "Remove and Replace (*)" Asphaltic Concrete (@)" shall be by the linear foot, to the nearest foot, along the center line of the excavation for the total area of paving removed and replaced, regardless of width of paving removed.

Measurement For "Remove and Replace (*) " Concrete Sidewalk" shall be by the square foot for the total area of sidewalk removed and replaced. Dimensions of individual areas shall be measured to the nearest 0.1 foot, the areas computed, summed and rounded to the nearest square foot.
Measurement for "Remove and Replace Curb and Gutter" shall be along the face of the curb in lineal feet regardless of the type of curb and gutter. Measurement of individual curb segments will be made to the nearest 0.1 foot and the segment lengths summed and rounded to the nearest foot for each pay application.

(3) Payment. The amount of completed and accepted pavement, measured as stated above, shall be made at the Contract unit price bid for each specific type of pavement removed and placed, which payment shall be full compensation for all cutting, breaking, sawing, removal of existing pavement, placement of new pavement at the specified thickness, finishing, curing, and protection as specified and all materials, equipment, labor, tools and incidentals necessary to complete the work.

4.07 CRUSHED ROCK SURFACING

A. Materials. Crushed Rock Surfacing material shall conform to the requirements of Aggregate Base AB-3 specified in Section 3.12 or to ¾-inch Asphalt Stone with the following gradation :

Sieve Size	Percent Retained
3/4"	0
1/2"	25
3/8"	52
#4	93
#8	97
#100	97
#200	98

Projects within City Limits Only – When AB-3 is specified for temporary surfacing of access roads, or on driveways, parking areas or pedestrian walkways, it shall be gray in color unless otherwise indicated in the Project Documents.

The surfacing material shall be delivered to the project fully mixed to a uniform condition with moisture content at or above optimum.

B. Construction Requirements. Where the aggregate surfacing of existing traveled ways has been disturbed by construction or construction equipment, the Contractor shall resurface the disturbed area with four inches of crushed rock or as otherwise directed by the Project Documents or the Engineer. Crushed rock surfacing shall also be used for temporary surfacing of access roads, on driveways, parking areas or pedestrian walkways as indicated in the Project Documents or as directed by the Engineer.

The surfacing shall be spread and rolled until a dense and tight surface is obtained. Water shall be applied to the surfacing, as determined by the Engineer, until the project is accepted for maintenance by the City or County.

C. Removal of Temporary Surfacing. When temporary surfacing material is used for access roads, driveways, parking areas, pedestrian walkways or any other usage as indicated in the Project Documents, it shall be removed. As part of the site restoration, the temporary surface shall be removed at the width and length of the temporary surfacing plus an additional 2" below and besides the temporary surfacing. This is to help prevent leftover aggregates or millings on the construction site. The Contractor shall furnish top soil to replace the temporary surfacing plus the existing 2" that was removed. Refer to sections 3.03 and 4.19. Any leftover construction debris from temporary surfacing material is unacceptable and shall be removed in full.

D. Bid Item, Measurement, and Payment.

(1) Bid Item:

CRUSHED ROCK SURFACING	Unit: Ton (nearest 0.1 Ton)
REMOVAL OF TEMPORARY SURFACING	Unit: $Yd.^3$ (nearest $Yd.^3$)

(2) Measurement. "Crushed Rock Surfacing" shall be measured by the ton as provided by load tickets. Measurement shall be to the nearest 0.1 ton.

"Removal of Temporary Surfacing" shall be measured by the nearest cubic yard. The measurement shall be provided by measuring the volume of the temporary access road in place plus the volume of the 2" of top soil below and around it.

(3) Payment. The amount of completed and accepted work, measured as provided above, shall be paid for at the Contract unit price per Ton for "Crushed Rock Surfacing", which payment shall be full compensation for all excavation, crushing, mixing with water, furnishing, hauling, placing, and maintaining the materials as specified, and for all equipment, tools, labor, and incidentals necessary to complete the work.

When "Removal of Temporary Surfacing" is included as a pay item in the Project Documents, the amount of completed and accepted work, measured as provided above, shall be paid for at the Contract unit price per Cubic Yard for "Removal of Temporary Surfacing", which payment shall be full compensation for all excavation of temporary surfacing, excavation of the top 2" of top soil, hauling, placing, furnishing new top soil, restoring the surface as specified in 3.03 and 4.19, and for all equipment, tools, labor, and incidentals necessary to complete the work.

4.08 CLEARING AND GRUBBING

A. General. This work shall consist of clearing, grubbing, removing, and disposing of all vegetation and debris within the construction limits shown on the Project Drawings or other trees as may be indicated in the Project Documents. Disposal of all materials shall be accomplished as specified in Subsection 3.13.

B. Construction Requirements. Trees designated on the Drawings "To Be Removed" and other trees, hedges, brush, and shrubs which are wholly within the excavation areas shall be removed to a minimum depth of 2 feet below the ground surface and disposed of as approved by the Engineer.

Where hedges and trees have limbs and branches which overhang and interfere with the construction, these limbs and branches may be trimmed by sawing and coating the cut with an approved pruning sealer, or they may be removed with the written approval of the property owner and Engineer.
Trees, shrubs, and other vegetation specifically indicated in the Project Documents to be saved or protected shall not be removed and shall be protected from the Contractor's construction activities to the extent necessary to prevent damage thereto.

C. Bid Items, Measurement and Payment.

(1) Bid Items.

CLEARING AND GRUBBING Unit: Lump Sum

REMOVE LARGE TREES Unit: Each

(2) Measurement. Clearing and grubbing and the removal of trees shall not be measured or paid for directly, but shall be subsidiary to other items of the Contract unless "Clearing and Grubbing" or "Remove Large Trees" are listed as pay items in the Project Documents.

When "Clearing and Grubbing" is listed as a pay item in the Project Documents the clearing and grubbing work shall be measured by the lump sum. The removal of all trees and stumps, regardless of size, shall be incidental to "Clearing and Grubbing" unless "Remove Large Trees" is included as a pay item in the Project Documents.

When "Remove Large Trees" is included as a pay item in the Project Documents, the removal of those trees which measure 40 inches or more in circumference at a point 2 feet above the natural ground level, and/or stumps of the same circumference measured 1 foot above natural ground level, or at the top of the stump if it does not extend to that elevation, shall be measured per each tree of such size removed.

When "Remove Large Trees" is included as a pay item in the Project Documents, the removal of those trees which measure less than 40 inches in circumference shall be incidental to "Clearing and Grubbing" or subsidiary to other items of the Contract if "Clearing and Grubbing" is not included as a pay item in the Contract Documents.

(3) Payment. When listed in the Project Documents as a pay item, "Clearing and Grubbing" shall be paid for at the Contract lump sum price for "Clearing and Grubbing." Payment shall be full compensation for all felling, grubbing, root removal, grinding, and disposal as specified, and for all equipment, tools, labor, and incidentals necessary to complete the work.

When "Remove Large Trees" is listed in the Project Documents as a pay item, the amount of completed and accepted tree removal work, measured as provided above, shall be paid for at the Contract unit price **per each** for "Remove Large Trees". Payment shall be full

compensation for all felling, grubbing, root removal, grinding, and disposal as specified, and for all equipment, tools, labor, and incidentals necessary to complete the work.

4.09 REMOVAL OF EXISTING STRUCTURES

A. General. The Contractor shall remove and dispose of existing structures as specified in the Project Documents. Existing structures include the structures identified in the Project Documents for removal, and man-made structures not specifically identified in the Project Documents which are in conflict with the new construction and apparent upon a careful examination of the work site and normally encountered in similar work.

(1) Salvaged Materials. The Contractor shall remove, clean, and store on the project site at locations determined by the Engineer any materials designated for salvage. If the transporting of salvaged materials is included as a part of the work specified in the Project Documents, the Contractor shall transport salvaged material to the designated offsite location(s) and stockpile the salvaged material as approved by the Engineer. Materials designated to be salvaged will remain the property of the Owner. Unless otherwise shown in the Project Documents, the Contractor shall salvage and clean all existing pipes determined usable by the Engineer.

B. Materials.

(1) Backfill Material. The Contractor shall backfill cavities created by the removal of existing structures using granular material or loose friable soil from the project. Backfill material shall be free of excess moisture, frozen lumps, roots, sod, clods and rocks greater than 3 inches in diameter, or any other deleterious material. The Engineer will accept the backfill material based on visual inspection.

(2) Flowable Fill. Flowable Fill used to backfill storm sewers and culverts, if approved by the Engineer, shall meet the requirements of Subsection 5.09.

C. Construction Requirements.

(1) General. The Contractor shall remove and dispose of all existing man-made structures and debris located within the project limits and not designated to remain. If the substructure of an existing structure lies wholly or partly within the limits of a new structure, the existing substructure shall be removed to accommodate the new structure. Existing structures shall be removed to 12 inches below the natural ground surface or new finished lines, whichever is lower. At streambed locations, existing structures shall be removed to the natural stream bottom.

Unless the area is to be excavated during the new construction, the Contractor shall backfill and compact all cavities left by the removal of structures. Compaction shall be completed as the backfilling progresses. Backfilling and compaction shall be completed to the level of the surrounding ground.

If the backfill area is within the limits of the new construction, the Contractor shall compact the backfill to the requirements of the type of compaction designated for the area in the Contract Documents.

(2) Storm Sewers and Culverts. Existing storm sewers and culverts to be abandoned after completion of the project shall be removed and the resulting cavity backfilled. With the Engineer's approval, the Contractor may fill abandoned sewers or culverts with flowable fill in lieu of removal. Filling of abandoned sewers or culverts shall be accomplished by blocking off the ends of the remaining segments and filling from an opening created in the top of the culvert or sewer at the high end of the segment to remain. Other means of filling abandoned sewers or culverts may be used if approved by the Engineer. This work and material shall not be paid for separately but shall be subsidiary to "Removal of Existing Structures." Any portion of an abandoned culvert or storm sewer that is within 12 inches of the finished ground line or top of subgrade shall be removed.

(3) Public Property. Removal of highway markers, posts, guard fence, standards or other similar obstructions shall be coordinated with the KDOT Area 4 Utilities Coordinator. With approval from KDOT, these items shall be removed and properly stored and reset by the Contractor as determined by the Engineer.

All City owned street signs and traffic signs in conflict with the project and not in use shall be removed by the Contractor, transported to the City storage facility, and stockpiled as directed by the Engineer. Traffic signing will be reset by the Contractor unless removal and replacement of permanent traffic control signs is designated in the Project Documents as work to be performed by City of Topeka Transportation Operations Division.
All county owned street signs and traffic signs shall be removed by the Contractor and stored onsite for pickup by the Shawnee County Public Works Department.

The covering of existing traffic control signing that is in conflict with the temporary traffic control for the project is the responsibility of the Contractor.

D. Bid Item, Measurement, and Payment.

(1) Bid Item:

REMOVAL OF EXISTING STRUCTURES Unit: Lump Sum

(2) Measurement. The removal of existing structures as specified shall not be measured or paid for directly, but shall subsidiary to other items of the Contract unless "Removal of Existing Structures" is listed as a pay item in the Project Documents.

When "Removal of Existing Structures" is listed as a pay item in the Project Documents, the work shall be measured by the lump sum.

(3) Payment. When listed in the Project Documents as a pay item, "Removal of Existing Structures" shall be paid for at the Contract lump sum price for "Removal of Existing Structures" which payment shall be full compensation for all removal, backfilling, and

compaction as specified, and for all equipment, tools, labor, and incidentals necessary to complete the work.

4.10 MAILBOXES.

A. Materials. All materials utilized shall meet the requirements of the US Postal Service.

B. Construction Requirements. It is the Contractor's responsibility to coordinate construction activities with the U.S. Postal Service and to complete the work in such a manner that mail service is not interrupted during the course of the project. The Contractor shall carefully remove any mailbox interfering with construction and shall reset it in good condition in accordance with U. S. Postal Regulation P.O.D. Form 4056 as soon as practical after the completion of construction activities in the area and minimize inconvenience to residents, businesses, and the U.S. Postal Service.

To provide for continuous and convenient mail service, the Contractor shall temporarily set any mailboxes removed to a location accessible for delivery of mail as determined by the US Postal Service. Temporary mailboxes shall be considered subsidiary to other items of the contract.

Mailboxes and their supports damaged by the Contractor shall be replaced with equivalent new material and set at no additional cost to the Owner or landowner.

C. Bid Item, Measurement, and Payment.

(1) Bid Item:

MAILBOX REMOVED AND RESET Unit: Each

(2) Measurement. The removal and resetting of mailboxes shall be measured per each mailbox removed from its pre-construction location and reset at a final permanent location. Resetting of mailboxes in temporary locations or installing temporary mailboxes shall not be measured or paid for directly, but shall be shall be subsidiary to other items of the Contract.

(3) Payment. Payment for the completed and accepted removal and resetting of mailboxes, measured as described above, shall be at the Contract unit price for "Mailbox Removed and Reset", which payment shall be full compensation for the work as specified and for all equipment, tools, labor, and incidentals necessary to complete the work.

4.11 REMOVE AND RESET CULVERTS AND END SECTIONS

A. Construction Requirements. Existing Culverts and/or End Sections that are designated in the Project Documents to be removed and reset shall be carefully removed, cleaned, and reset at the locations indicated in the Contract Documents or indicated by the Engineer. Resetting of the culverts and end sections shall meet the construction requirements for storm sewer installation in Subsection 6.03.

Culverts, end sections, or pipes found not salvageable due to deterioration or damage not the fault of the Contractor, shall be replaced with new Reinforced Concrete Pipe or Aluminized Steel Type 2 Corrugated Steel Pipe conforming to the requirements of Subsection 6.03. The size of pipe installed shall be the size removed or as directed by the Engineer. When new culverts, end sections or pipes are installed, measurement and payment shall be as provided for in Subsection 6.03.

B. Bid Items, Measurement, and Payment.

(1) Bid Items.

REMOVE AND RESET (*)" CULVERT (Type)	Unit: Lineal Foot (nearest L.F.)
REMOVE AND RESET (*)" END SECTION (RCP)	Unit: Each
REMOVE AND RESET (*)" X (*)" CULVERT (Type#)	Unit: Lineal Foot (nearest L.F.)
REMOVE AND RESET (*)" X (*)" END SECTION (Type#)	Unit: Each

(*) - inside diameter of pipe
Type - (CMP) corrugated metal pipe or (RCP) reinforced concrete pipe
Type # - (RCPHE) for reinforced concrete pipe horizontal elliptical or (CMPA) for corrugated metal pipe arch.

(2) Measurement. The removal and resetting of pipes shall be measured by the linear foot, to the nearest foot, from end of pipe to end of pipe, excluding any portion of an end section, for each combination of inside pipe diameter and type of pipe.

The removal and resetting of pipe end sections shall be measured per each end section removed and reset for each combination of inside pipe diameter and type of pipe.

(3) Payment. Payment for "Remove and Reset (*) inch Culvert (Type)" and "Remove and Reset (*) inch x (*) inch Culvert (Type #)" shall be made at the Contract unit price per linear foot for each combination of inside pipe diameter and type of pipe removed, reset, and accepted, which payment shall be full compensation for all removal, excavation, placing, backfilling and compaction as specified, and the furnishing of all equipment, tools, labor, and incidentals necessary to complete the work.

Payment for "Remove and Reset (*) inch End Section (Type)" and "Remove and Reset (*) inch x (*) inch End Section (Type #)" shall be made at the Contract unit price per each combination of inside pipe diameter and type of end section removed, reset, and accepted, which payment shall be full compensation for all removal, excavation, placing, backfilling, and compaction as specified, and the furnishing of all equipment, tools, labor, and incidentals necessary to complete the work.

4.12 RIPRAP.

A. Materials.

(1) Aggregate. Stone riprap shall be pit run limestone or dolomite meeting the quality and product control requirements for "Stone for Riprap" in Section 1114 of the KDOT Standard Specifications. When approved by the Engineer or stated in the Project Documents, broken concrete may be used in lieu of limestone or dolomite, provided the concrete is free of all wire mesh and steel. The classes of riprap are defined as follows:

i. Class I shall have a maximum size of 100 pounds (1.0 foot dia.) and a minimum size of 12 pounds (0.5 foot dia.).

ii. Class II shall have a maximum size of 700 pounds (2.0 feet dia.) and a minimum size of 25 pounds (0.7 foot dia.).

iii. Class III shall have a maximum size of 2,000 pounds (3.0 feet dia.) and a minimum size of 40 pounds (0.8 foot dia.).

(2) Filter Fabric. Filter fabric shall be a pervious sheet of nonwoven needle punched fabric. Weight of fabric shall be at least 6.0 ounces per square yard. The water flow rate shall be approximately 110 gallons per minute per square foot. Fabric shall have a minimum puncture resistance of 100 pounds and be resistant to freeze-thaw cycles, soil chemicals and ultraviolet light exposure.

B. Construction Requirements. Riprap shall be installed in accordance with the details on the Standard Drawings DT-015 and DT-016. Riprap shall be placed over filter fabric when fabric is called for on the Project Drawings. Sheets of fabric shall be overlapped a minimum of 18 inches.

C. Bid Items, Measurement, and Payment.

(1) Bid Items:

CLASS (*) STONE RIPRAP Unit: Square Yard (nearest S.Y.)

CLASS (*) BROKEN CONCRETE RIPRAP Unit: Square Yard (nearest S.Y.)
(*) – Class I, II, or III

(2) Measurement. Each of the various classes and types of riprap shall be measured by the square yard in place. Individual areas of stone riprap shall be determined by measuring the slope dimensions of the riprapped area to the nearest 0.1 foot, computing individual areas square feet, summing the areas, converting the total three dimensional area of the plane of the riprap's surface to square yards and rounding to the nearest square yard for each pay application.

(3) Payment. The amount of completed and accepted work, measured as provided above, shall be paid for at the Contract unit price per square yard for "Class (*) Stone Riprap" and "Class (*) Broken Concrete Riprap" for each class of riprap, which payment shall be full compensation for all excavation, crushing, furnishing, hauling, placing, spreading and maintaining the materials as specified, and for all equipment, tools, labor, and incidentals necessary to complete the work.

4.13 UNDERDRAINS

A. General. The Contractor shall construct an underdrain system to the lines, grades and requirements specified in the Project Documents.

B. Materials.

(1) Aggregate. Underdrain aggregate shall conform to the requirements of BD-1 as specified in Section 1107.2 (d) of the KDOT Standard Specifications or an approved equal.

(2) Underdrain Pipe. Underdrain pipe (outside of roadway) shall be perforated polyethylene pipe complying with AASHTO M252 or polyvinyl chloride pipe complying with AASHTO M278. Underdrain pipe (under roadway) shall be perforated polyethylene or polyvinyl chloride pipe having a minimum pipe stiffness value of **46** psi at 5% deflection.

(3) Geotextile Fabric. Geotextile fabric shall meet the requirements of Section 2210 of the KDOT Standard Specifications.

C. Construction Requirements. The Contractor shall construct an underdrain system that will collect and transport subsurface water from under the roadway. The perforated underdrain pipe shall have a minimum diameter of 4 inches and shall be laid on a minimum grade of 1%, unless shown otherwise in the Project Documents. Underdrain pipe shall be non-perforated within 5 feet of connection to an inlet. The minimum trench width shall be 8 inches plus the exterior diameter of the underdrain pipe. The Contractor shall not backfill the underdrain system prior to the Engineer's approval. The trench shall be backfilled with underdrain aggregate and enveloped with geotextile fabric to within one foot of finished grade or as shown on the plans. Trenching, backfilling, aggregate, fitting and outlet appurtenances, and filter fabric are incidental to the underdrain system.

D. Bid Item, Measurement, and Payment.

(1) Bid Item:

UNDERDRAINS Unit: Lineal Feet (nearest Ft.)

(2) Measurement. Underdrains shall be measured by the slope lengths of pipe installed. Measurement will be to the nearest foot.

(3) Payment. Completed and accepted underdrains, measured as provided for above, shall be paid for at the Contract unit price for "Underdrains", which payment shall be full compensation for all materials, trenching, backfilling, placing, pipes, joining, aggregate, fitting and outlet appurtenances, and filter fabric, and all labor, tools, equipment, and incidentals necessary to complete the work as specified.

4.14 GUARDRAIL AND GUIDEPOSTS

A. Materials. Guardrail and guidepost materials shall meet the requirements of Section 827, Division 1600, Division 1800, and Division 2300 of the KDOT Standard Specifications except as follows:

(1) Basis of Acceptance. The Engineer shall accept the materials based upon visual inspection of the materials, manufacturer's certifications that the materials meet the requirements of the specifications, catalog cuts, and/or shop drawings submitted by the Contractor.

B. Construction Requirements. The Contractor shall construct guardrail and install guideposts at the locations shown in the Project Documents. Guardrail and guidepost construction and installation shall meet the requirements of Section 827 of the KDOT Standard Specifications.

C. Bid Items, Measurement, and Payment. The bid items, measurement, and payment for guardrail and guideposts shall be as set forth in Section 827 of the KDOT Standard Specifications and as shown in the Contract Documents.

4.15 CHAIN LINK FENCE.

A. General. Chain link fence shall be installed in locations shown in the Project Documents as marked in the field by the Engineer. Fence shall consist of galvanized or aluminum coated steel fabric, with top rail and bottom tension wire, and with fabric heights as indicated in the Project Documents. Posts shall be set in concrete or on galvanized steel base plates as shown in the Project Documents.

B. Materials. All steel or malleable iron parts and accessories shall be hot-dip galvanized or aluminum coated after fabrication.

(1) Fabric shall be 9 gauge, 2-inch mesh; galvanized, ASTM A392, Class 2, or aluminum coated, ASTM A491; knuckled selvage on top, twist selvage on bottom.

(2) Bottom Tension Wire shall be 7 gauge, galvanized or aluminum coated coil spring wire.

(3) Stretcher Bars shall be steel, ASTM F626, 3/16 inch by 3/4 inch, or equivalent area.

(4) Fabric Ties shall be aluminum bands or wires, ASTM F626.

(5) Concrete for post foundations shall be Structure Class as defined in Section 5.01.
(6) Post caps may be aluminum or galvanized steel.

(7) Posts: Minimum post sizes shall be as listed below:

Type of Post	6 foot fence		4 foot fence	
	O.D.	Weight per Ft.	O.D.	Weight per Ft.
Line post	2 3/8"	3.11 lb.	1 7/8"	2.72 lb.
Corner or pull post	2 7/8"	4.64 lb.	2 3/8"	3.65 lb.
Top rail & bracing	1 5/8	2.27 lb.	1 5/8"	2.27 lb.
Gate post	4"	9.10 lb	2 7/8"	5.79 lb.
Gate frame	1 7/8”	2.72 lb.	1 7/8”	2.72 lb.
Vehicle gate post	6 5/8"	18.97 lb.	4"	9.10 lb.

C. Construction Requirements.

(1) Gates. Gate frames shall be constructed of galvanized pipe of the size and weight shown above and to the dimensions shown on the Drawings. Frames shall be welded at all joints to provide watertight construction or the pipe shall be connected with watertight heavy malleable iron corner fittings. All weld-damaged areas shall be painted with zinc rich paint. All gates shall be equipped with approved hinges, latches, stops, locking devices and satisfactory fittings for padlocking. The same type and weight of fabric shall be used in the gate as is used in the fence in which the gate will be installed. Hinges shall be heavy pattern with large bearing surfaces and shall not twist or turn under the action of the gate. The length of pedestrian and vehicular gates shall be as shown in the Project Documents.

2) Fence Construction. Posts shall be set plumb, spaced approximately 10 feet apart. Posts set in earth shall be provided with concrete foundations 36 inches deep. Foundations for line posts shall be 10 inches in diameter. For terminal and gateposts, the foundations shall be the post OD plus 9 inches in diameter. Foundations shall extend 1 inch above the ground surface and be crowned. Concrete shall cure for 72 hours before additional work is done on the posts.

Where posts are set in rock, post excavation shall be continued to the 36-inch depth or 18 inches into the rock, whichever is less. Diameter of foundations in rock shall be a minimum of 6 inches larger than the OD of the post.

Top rails and bottom tension wires shall be installed before the fabric. Top rails shall be securely connected to gate and terminal posts.
Tension wires shall be attached to each post and securely anchored at terminal and gateposts. Tension wires shall be stretched taut and anchored so that a perpendicular horizontal pull of 150 lbs. at the middle of a panel will not move the tension wire more than 3 inches from its original position.

Fabric shall be attached to top rail and bottom tension wire on 24-inch centers, and to the line posts on 15-inch centers. Stretcher bars shall be provided at each gate and terminal post. Each stretcher bar shall be threaded through the fabric and anchored to the post at 15 inch centers by positive mechanical means.

Each gate and terminal post shall be braced by a horizontal pipe brace and an adjustable truss extending to an adjacent line post. Corner posts shall be braced in both directions. Fabric shall be stretched taut and anchored so that a pull of 150 pounds at the middle of a panel will not move the fabric more than 3 inches from its original position.

Completed fence shall conform to the alignment and finish grade indicated in the Project Documents. Ground surface shall be graded as required to maintain no more than a 2-inch clearance below the bottom of the fence fabric.

D. Bid Items, Measurement, and Payment.

(1) Bid Items:

(*) FOOT CHAIN LINK FENCE	Unit: Lineal Feet (nearest Ft.)
(*) FOOT PEDESTRIAN GATE	Unit: Each
(*) FOOT VEHICULAR GATE	Unit: Each

(*) Height of fence in feet

(2) Measurement. The various heights of fence installed shall be measured to the nearest foot along the slope of the fence at the top rail and excluding gates. Gates shall be measured per each installed.

(3) Payment. The amount of completed and accepted fence, measured as provided above shall be paid for at the Contract unit price per linear foot for "(*) Foot Chain Link Fence" of the various heights specified. Completed and accepted gates, measured as provided above, shall be paid for at the Contract Unit Price for "(*) Foot Pedestrian Gate" and "(*) Foot Vehicular Gate per each gate of the various heights specified. Payment shall be full compensation for furnishing and erecting all materials, for all clearing, excavation, embankment, concrete footings, and for all labor tools, equipment and incidentals necessary to complete the work as specified.

4.16 FIELD OFFICE

A. General. When specified in the Project Documents, a Field Office or Field Office and Laboratory shall be provided at the job site meeting the requirements for the specified type as shown in Section 803, Field Office and Laboratory, KDOT Standard Specifications.

(1) Field Office. The Field Office will be set up and maintained by Contractor for the exclusive use of the Project Field Representative at a location designated by the Project Field Representative. **Field Office shall remain in place until project is accepted (final). All weather access shall be provided with approved temporary surfacing material. Placement and removal of temporary surfacing is subsiding to bid item, Field Office. Sanitary facilities and high speed internet service shall be supplied with Field Office for the duration of the project at contractor's expense.**

B. Bid Items, Measurement and Payment.

(1) Bid Items:

FIELD OFFICE	Unit: Each
FIELD OFFICE AND LABORATORY (*)	Unit: Each

(*) Type: A, B, or C.

(2) Measurement. Measurement will be made per each Field Office and per each of the various types of Field Office and Laboratory provided.

(3) Payment. Partial payments will be made at specified intervals during the project – 40% of the Contract unit price after the unit is installed and accepted, 70% after 3 months of use, and 100% at the completion of the Project and release by the Engineer. Said payments shall be full compensation shall for providing and installing the field office, and for all materials, labor, tools, equipment, and incidentals necessary to complete the work as specified.

4.17 MONUMENT BOX.

A. Materials. Monument box castings shall be **Cover No. 2193-01-1003 and Ring No. 2093-01-2050 Clay and Bailey Manufacturing Co., (these may also be approved equal, but must be compatible with each other)** with the utility designation omitted from the lid. A concrete support ring that is compatible with the casting shall be supplied with each monument box.

B. Construction Requirements. Monument boxes shall be installed at the locations shown in the Project Documents and/or marked in the field by the Engineer or Project Surveyor.

Installation shall be as depicted in the Project Drawings with the top cover and ring set true to the line and slopes of the finished surface or pavement. If an existing monument box is located at the location shown in the Project Documents for a new monument box installation, the Contractor shall notify the Engineer and request a determination from the Engineer regarding the need for removal and replacement. Castings of old monument boxes replaced shall be salvaged to the Owner at no additional cost.

The Contractor shall be responsible for coordinating the installation of monument boxes with the Engineer or Project Surveyor. The Contractor shall also be responsible for any traffic control necessary for monument box installation unless otherwise stated in the Project Documents.

The Contractor shall carefully protect all monuments and benchmarks of the City, County, State or Federal government from disturbance or injury and shall not excavate nearer than 5 feet to any monument or benchmark without permission of the Engineer or Project Surveyor, or until the monuments and/or benchmarks have been removed, witnessed or otherwise disposed of by the Project Surveyor.

C. Bid Item, Measurement and Payment.

(1) Bid Item:

MONUMENT BOX Unit: Each

(2) Measurement. Measurement of Monument Boxes shall be per each installed.

(3) Payment. Installed and accepted Monument Boxes shall be paid for at the Contract unit price per each "Monument Box", which payment shall be full compensation for salvaging and removing the existing monument box casting, and furnishing all materials, labor, equipment, tools, supplies, and incidentals necessary to complete the work as specified.

4.18 CONTRACTOR CONSTRUCTION STAKING.

A. General. Contractor Construction Staking shall consist of establishing the project centerline, referencing or re-referencing all control points, running a level circuit to check or re-establish plan benchmarks, setting additional benchmarks as needed, staking right-of-way, and performing all construction layout and reference staking necessary for the proper control and construction of the Project.

B. Contractor's Survey Personnel. Before performing any surveying operations on the Project, the Contractor shall inform the Engineer of the personnel responsible for land surveying, construction surveying, and staking. The Contractor's personnel performing the construction staking shall work under the direct supervision of engineering or surveying personnel trained and experienced in construction staking and layout of the types necessary for the construction of the Project and shall be acceptable to the Engineer. The Contractor's personnel shall work under the direct supervision of a Land Surveyor licensed by the Kansas State Board of Technical Professions when performing land surveys, setting section corners, and setting permanent points on the right-of way lines.

C. Construction Requirements. The Contractor shall be responsible for fulfilling the duties of the "Project Surveyor" as defined in Subsection 1.12.

All stakes, reference points, lines, grades, control points, and batter boards required for the construction operations shall be furnished, set, and properly referenced by the Contractor in a manner consistent with standard engineering practices. The Contractor shall be solely responsible for the accuracy of the line and grade of all features of the work. Any errors, omissions, or discrepancies found in previous surveys or in any of the Project Documentation shall be immediately brought to the attention of the Engineer for correction or interpretation prior to proceeding with the work.

Field notes shall be kept in bound field notebooks and shall be presentable in a neat, clear, and orderly manner consistent with standard engineering practices. The Contractor shall allow the Engineer to review the field notes immediately upon the Engineer's request.

The Contractor is responsible for any deficiencies or inaccuracies in the Work which may be the result of inaccuracies, errors or omissions in the construction staking or layout.

(1) Equipment and staking tolerances.

i. Slope Staking. Horizontal and Vertical tolerance of ± 0.10 feet. Use a GPS system, a Total Station, or a Level & Transit.

ii. Finish Staking and Structures. Horizontal = ± 0.05 feet; Vertical = ± 0.01 feet. For Horizontal, use a GPS system or a Total Station. For Vertical, use a Level. The tolerances apply to grade hubs and string lines.

iii. Critical Bridge Member Staking. Horizontal = ± 0.02 feet; Vertical = ± 0.01 feet. For Horizontal, use a GPS system or a Total Station. For Vertical, use a Level.

iv. Land Surveying. Comply with the Kansas Minimum Standards for Boundary Surveys. Use a GPS system or Total Station.

v. Project Control Points. The relative precision of any project control point ± 0.05 feet from the project coordinate data. Use a GPS system or Total Station.

D. Bid Item, Measurement and Payment.

(1) Bid Item:

CONTRACTOR CONSTRUCTION STAKING Unit: Lump Sum

(2) Measurement. "Contractor Construction Staking" shall be measured by the Lump Sum.

(3) Payment. Contractor Construction Staking shall be paid for on a lump sum basis, which payment shall be full compensation for all personnel, engineering equipment, supplies, materials filing fees, and transportation, and for all labor, equipment, tools and incidentals necessary to complete the work as specified. Partial payment will be made as follows:

Percent of Original Project Contract Amount Completed	Percent of Contractor Construction Staking That May Be Paid.

Work Started	25%
5%	40%
25%	60%
50%	80%
70%	90%
100%	100%

4.19 FINISHING DISTURBED AREAS.

A. General. The rates of seed, fertilizer, and water applications required by this Subsection 4.19 are minimums, and the Contractor shall be solely responsible for the establishment of 70% grass coverage of all unpaved or otherwise uncovered areas of soil within the limits of the Project. Additional labor, materials, equipment and incidentals to establish the 70% coverage shall be subsidiary to the pay items "Seeding and Fertilizing" and/or "Sodding".

All unpaved areas within the construction limits shall be seeded or sodded, fertilized and mulched. Mulching may be deleted with the approval of the Engineer.

The finishing of disturb areas, either with temporary erosion and water pollution control measures, permanent sodding, or permanent seeding shall be completed as the work progresses and as soon as grading of a particular area of the work is completed regardless of the number of sub-contractor mobilizations involved. The Contractor's work sequence shall allow for the finishing of disturbed area to be completed in a timely manner which limits exposure to erosion.

All areas which have been disturbed by the Contractor during construction shall be graded and shaped to the grades shown on the Drawings, and shall be finished with 4 inches of topsoil to be provided by the Contractor and approved by the Engineer. Topsoil may be either material selected from the site or imported material.
Paved streets and other paved areas shall be cleaned. Mud, trash, and debris in streets shall not be washed into storm sewer systems or waterways. This work shall be subsidiary to other items of the Contract unless listed as a pay item.

B. Materials. Seeds and Fertilizers shall be delivered to the site in convenient waterproof containers. Each container shall be fully labeled and bear the name, trade name, or trade mark of the producer. Each container shall also bear a warranty from the producer.

(1) Topsoil. Topsoil is defined in Subsection 3.03.

(2) Seeds. Seed shall comply with the seed and noxious weed laws of the State of Kansas. Seed containers shall bear the producer's certificate of the percentage of the purity and germination of each kind of seed specified.

(3) Sod. Sod shall be a Tall Turf Fescue/Bluegrass Blend (90% / 10%) unless otherwise specified. The sod shall be cut in strips not less than 18 inches wide and of uniform thickness with a topsoil thickness of ¼ inch to ½ inch. Badly torn, broken or dry sod will not be accepted. Sod containing noxious weeds or excessive quantities of foreign grass will not be accepted.

(4) Fertilizer.

i. Seeded Areas. Fertilizer for seeded areas shall be inorganic 15-30-15 grade, uniform in composition, free flowing and suitable for application with approved equipment or shall be an approved substitute. The Contractor shall request approval of substitute materials prior to the material being delivered to the site.

ii. Sodded Areas. Fertilizer shall be inorganic 12-12-12 grade, uniform in composition, free flowing and suitable for application with approved equipment.

(5) Mulch. Mulch shall be straw or hay delivered to the site in bales meeting the North America Weed Free Forage Standards. Prairie hay is the preferred mulch.

(6) Mulch Tacking Slurry. Mulch tacking slurry shall be used only where approved by the Engineer. Tacking materials and/or tacking agents that are toxic to vegetation, hazardous to the germination of seed, may stain concrete or other surfaces, or may be injurious to personnel handling and applying the materials shall not be used or accepted. Mulch tacking material shall comply with the following:

- A blend of fibers of recycled slick paper containing wood cellulose, and kaolin clay
- Free of synthetic or plastic materials or other foreign material
- Biodegradable
- Disperses in water and forms a homogeneous slurry, and remains in suspension when agitated by hydraulic slurry equipment
- When sprayed uniformly over the mulch, forms an absorbent cover allowing percolation of water in the underlying soil
- Packaged in moisture resistant bags with the net weight (mass) of the packaged material plainly shown on each bag
- Non-water soluble fibers

Mulch tacking Slurry shall comply with the following minimum requirements for wood cellulose mulch:

Applied Color..... Green
Organic Matter, percent by weight..... Min. 80
Tacking Agents, percent by weight ..... >4
Moisture Content, percent by weight ..... 12 ± 3
Water Holding Capacity ..... >1200 grams of H_2O per 100 grams of fiber
pH Range ..... 5 ± 3

Guar Gum based tacking agent shall be added to the tacking material in the hydraulic slurry at a rate and manner recommended by the manufacturer. The tacking agent must be biodegradable and comply with following:

Density…….. 30 grams per cc
Hazardous Components ……..... None
Percent Volatile ..... 0 at 70°F
Appearance ..... Cream Colored Powder
Water Miscibility ..... Thickener
Odor …..... Mild

C. Construction Requirements.

(1) Seeding, Fertilizing and Mulching.

i. Equipment. The seeding operation shall be accomplished with equipment suitable for preparing the seed bed and sowing the seed and fertilizer in accordance with the applicable requirements of these Standard Specifications.
ii. Preparation of the Seed Bed. Areas to be seeded shall be cleared and graded as required preparatory to tilling the surface. The top 4 inches shall consist of good quality black topsoil sufficiently free of stones, gravel, trash, large lumps of earth, and ruts to permit normal mowing with hand equipment. Residual soil not suitable for the germination of seeds and the growth of grass, as determined by the Engineer's visual inspection, shall be replaced with suitable topsoil.

iii. Application of Fertilizer. Following the proper tilling of the soil, the fertilizer shall be distributed uniformly at the rate of 100 pounds per acre and incorporated into the soil to a depth of at least 2 inches by disking, harrowing or drilling methods.

iv. Planting Seeds. The seed shall be uniformly planted by a seed drill unless otherwise approved. The Contractor shall use a drill that can apply commercial grass seed and wildflower seed, or a drill with attachments that would allow the application of fertilizer and grass seeds at the rate and depth specified. The drill must be approved by the Engineer. The width of the drill will be approved on the basis of the area to be seeded. The space of seed-tubes, disks and boots shall be a maximum of 8 inches. Drills shall accurately control the depth of seeding and fertilizer placement to a maximum depth of ½ inch. The drill's seed and fertilizer compartments shall have partitions to prevent the seed or fertilizer from sliding to one side of the drill while operating on steep slopes.

A seed mixture and suggested rates of application are listed below. The Contractor shall be responsible for adapting the seed mixture and rate of application to the site conditions so as to insure a uniform stand of healthy grass with a density of 70% coverage within 12 months from the date of project acceptance and in reasonable conformity with adjacent areas. Seed mixtures and rates, if different from those given herein, shall be approved by the Engineer.

Seed Type and Rate of Application

Seed Type	Rate of Application (PLS lbs/acre)
Kentucky Blue Grass Seed	65
Tall Turf Fescue	348

v. Seeding Season. The Spring Seeding Season shall be between February 15th and April 30th. The Fall Seeding Season shall be between August 15th and September 30th. These seeding seasons may be extended with the approval of the Engineer. The Engineer reserves the right to vary the seeding seasons shown above due to weather or soil conditions or for other causes.

vi. Compaction. Immediately following the completion of seeding operations, the entire area shall be compacted with a roller weighing not less than 60 but not more than 90 pounds per linear foot of roller.

vii. Hydro-seeding. On steep slopes or other areas inaccessible with a seed drill or broadcast seeder, a hydro-seeder may be used when approved by the Engineer. Apply the seed-fertilizer-water slurry within 1 hour after the seed is added to the hydro-seeder tank. Apply seed evenly over the entire site. Use a fan-type nozzle with approximately 500 gallons of water per acre. Add 75 pounds of hydro-mulch per 500 gallons of water for a visual tracer. After the seeding, but before mulching, hand rake the seeded areas inaccessible by a cultipacker. Immediately apply bonded fiber matrix hydromulching as specified herein. Hydro-seed and bonded fiber matrix mulch shall not be completed in one application. Hydro-seeding shall be considered "Seeding" and no adjustment shall be made to the unit prices or measured quantities due to the Contractor's election to use hydro-seeding materials and methods to accomplish the work.

viii. Mulching. Straw or hay mulch shall be applied uniformly to seeded areas at the rate of not less than two (2) tons per acre. Baled straw or hay shall be broken up and loosened sufficiently before being fed into the blower hopper to avoid the placing of matted or unbroken clumps. The use of wet straw or hay is prohibited.

Mulching shall be performed within 24 hours after seeding, but shall not be performed when wind speeds are greater than 15 mph or when it is raining. Mulching shall be started at the windward side of relatively flat areas, or at the upper part of steep slopes, and shall continue until the area is covered. The mulch shall be applied loose enough to allow sunlight to penetrate and air to circulate, but thick enough to partially shade the ground, reduce water evaporation, and reduce wind and water erosion.

Immediately after applying the mulch, the Contractor shall anchor it to the soil using a mulch crimper/puncher or other approved equipment with perpendicular, dull, disc blades. This process to partially cover the mulch will protect it from erosion by wind or water. The mulch tilling operation shall be performed parallel to the ground contours.

In areas where slopes are too steep for use of a mulch crimper/puncher, the Contractor shall "pat" the mulch with forks as it is placed on the slope.

To reduce wind loss, cover the mulch on the upper ⅓ of slope by hand spreading a light application of soil or sand on the mulch. If in the opinion of the Engineer these methods do not result in proper anchoring of the mulch, the Contractor may be required to provide additional anchorage of the mulch by the application of a mulch tacking slurry at no additional cost to the Owner.

(1) Hydro-mulching. The Contractor may elect to apply bonded fiber matrix mulch in lieu of straw or hay if approved by the Engineer. The Contractor shall use a test area to demonstrate to the Engineer's satisfaction and approval that the Contractor's hydro-mulching equipment and methods will result in the desired results of controlling erosion and establishing grass.

The bonded fiber matrix shall be mixed at the rate of 5 pounds per 10 gallons of water and apply the bonded fiber matrix at the rate of (dry) 3,500

pounds per acre of seeded and compacted slope, immediately after the seeding and compaction to maximize adhesion and minimize slumping. The Contractor shall obtain complete coverage from a consistent angle of approach while applying bonded fiber matrix with no less than 65% coverage from the primary angle of application, and 35% coverage from the secondary angle of coverage. Maintain secondary angles of coverage of between 175º and 185º from the primary angle.

Hydro-mulching shall be considered "Mulching" and no adjustment shall be made to the unit prices or measured quantities due to the Contractor's election to use hydro-mulch materials and methods to accomplish the work.

ix. Watering. Immediately following compaction and mulching, the seeded area shall be watered in sufficient amount to penetrate the seed bed to a depth of at least ¼ inch. The seed bed shall not be allowed to dry out. Watering shall be performed in a manner not to cause erosion or damage to the seeded surface, and shall be repeated daily for a period of thirty (30) days after seeding, except when thoroughly wetted by rain.

(2) Sodding.

i. Preparation of the Sod Bed. The sod bed shall have a uniform surface free from washes, depressions, rocks, clods, ruts and other vegetation and shall conform to the finished grade and cross section shown on the Drawings. The soil, except where fresh topsoil has just been applied and compacted, shall be thoroughly tilled to a depth of 2 inches, and rolled with a roller weighing not less than 60 and not more than 90 pounds per linear foot of roller.

ii. Fertilizing. After tilling operations are completed, fertilizer shall be spread uniformly at the rate of 7 pounds per 1,000 square feet (Note: Projects outside City limits shall use 3 pounds per 1,000 square feet), and mixed 2 inches deep into the soil by disking, harrowing, cultivating or drilling.

iii. Placing Sod. Tall Turf Fescue/Bluegrass Blend sod shall not be placed during drought conditions nor during the period from June 15th to September 1st, unless authorized by the Engineer, and shall not be placed on frozen ground. Zoysia sod shall be placed only during the period from May 15th to August 15th. The sod shall be moist when it is placed. Dry or frozen sod will not be accepted.

The fertilized sod beds shall be in a firm but not overly compacted condition, with a relatively fine texture at the time of sodding. Transverse joints between sod strips shall be staggered. The sod shall be carefully placed to produce tight joints. The sod shall be firmed, watered, and refirmed immediately after it is placed. "Firming" shall be accomplished by rolling the newly placed sod with a roller weighing not less than 60 or more than 90 pounds per linear foot of roller.
When sod is to be placed on slopes 2:1 or steeper, the sod shall be pegged with ½ inch by 12 inch wooden pegs driven into the ground on about 3 foot centers, leaving about 1- ½ inch of the peg above the sod. Pegging shall be done immediately after the sod is firmed.

iv. Watering. The sodded area shall be thoroughly watered daily, for a period of not less than 21 days after placing. Any portion of sod that is not in good growing condition shall be replaced with fresh live sod and shall be maintained in good live condition until final acceptance of the turf.

D. Basis of Acceptance. The Engineer shall review the density of the grass coverage and the condition of the turf for a period of 12 months following the Contractor's Application for Final Payment. If at any time during this 12 - month period, any portion of the seeded or sodded surface becomes gullied or otherwise damaged or eroded, or the seeding is damaged or destroyed, or the seed has not germinated su
fficiently to establish the required grass coverage, the affected area shall be repaired, reworked, and re-seeded or re-sodded as necessary to establish the specified conditions. The Engineer shall make a final inspection of the turf at the end of the 12 month period. The Contractor shall correct any deficiencies identified at the inspection.

At the end of the 12 - month period and following the correction of deficiencies, if all unpaved areas within the Project limits have 70% grass coverage the Contractor shall be released from further responsibility for the seeding or sodding. If at the end of the 12 - month period areas still exist that have less than 70% grass coverage, the Contractor, at no additional cost to the Owner, shall continue to rework, re-seed and or re-sod deficient areas until the required coverage is attained.

(1) Final Payment and Acceptance. During the period erosion and pollution control measures are still required and grass coverage is being established, if the Work of the Project is otherwise complete, the Engineer will make recommendation for Final Payment and present the Final Application for Payment to the Owner conditional to the requirements of Article 14 Paragraph 14.13 of Document 700 General Conditions. However, the work specified in Subsections 4.19 and 4.20 of these Standard Specifications is specifically identified as requiring the Contractor's Continuing Obligations as defined in Article 14 Paragraph 14.15 of Document 700 General Conditions.

After Final Application for Payment is submitted by the Contractor, the maintenance, replacement, and installation of any erosion control devices or measures necessary to prevent erosion while the required grass coverage is being established shall no longer be paid for directly but shall be completed at the sole expense of the Contractor. The Contractor shall provide work zone traffic control for any seeding or erosion control work completed during this period at no additional cost to the Owner.

(2) Cost of Corrective Actions. If the Contractor fails to initiate measures to correct deficiencies to the seeding and/or erosion control measures during and/or at the end of the 12- month period within 7 calendar days of notice that deficiencies have been identified, then the seeding, fertilizing and mulching shall be considered defective work and the conditions of Article 13 of Document 700 General Conditions shall apply.

E. Bid Items, Measurement, and Payment.

(1) Bid Items:

SEEDING, FERTILIZING AND MULCHING Unit: Acre (nearest 0.1 Ac.)

SODDING Unit: Square Yard (nearest S.Y.)

(2) Measurement. The area receiving "Seeding, Fertilizing and Mulching" shall be computed using the trapezoidal method with the horizontal dimensions measured to the nearest foot. The horizontal area of individual trapezoids shall be summed, converted to Acres, and rounded to the nearest 0.1 Acre for each pay application.

Areas receiving "Sodding" shall be computed using the trapezoidal method with the horizontal dimensions measured to the nearest foot. The horizontal area of individual trapezoids shall be summed, converted to square yards, and rounded to the nearest square yard for each pay application.

Alternatively, if acceptable to both the Engineer and the Contractor, the above areas may be measured by traversing the perimeters of the disturbed areas with a handheld or other GPS device, downloading the perimeter points to a computer, and computing the area utilizing either CAD or coordinate geometry.

(3) Payment. The amount of completed and accepted seeding, fertilizing and mulching measured as provided above shall be paid for at the Contract unit price per acre for "Seeding, Fertilizing and Mulching". Completed sodding, measured as provided above, shall be paid for at the Contract unit price per square yard for "Sodding". Said payments shall be full compensation for preparation of the ground, furnishing and planting all seeds and sods, fertilizing, compacting, watering, and staking, and for all labor tools, equipment and incidentals necessary to complete the work as specified.

4.20 TEMPORARY EROSION AND POLLUTION CONTROL

A. General. The Contractor shall take all necessary measures to prevent erosion on the project and pollution of any drainage course. Any earth moving activity shall minimize the amount of exposed soil and maintain as much vegetative cover as possible. Erosion and pollution control measures shall include berms, ditch checks, silt fence, sediment basins, inlet sediment barriers, temporary seeding, and erosion control blankets, **and shall meet the requirements of the State Of Kansas Stormwater Runoff from Construction Activities General Permit No. S-MCST-0312-1.**

B. Regulatory Requirements. A project or construction activity disturbing any size area of soil will require an erosion control plan to be implemented to prevent soil loss and other pollutants from entering any storm water system.

Owners or operators of any construction project which will disturb one (1) or more acres must receive an "Authorization to Discharge Stormwater Runoff from Construction Activities In accordance with the Kansas Water Pollution Control General Permit Under the National Pollutant Discharge Elimination System (NPDES)" from the Kansas Department of Health and Environment (KDHE). Construction shall not start until this authorization, referred to herein as the "NPDES general permit", is received.

Application for the NPDES general permit is made by submitting a "Notice of Intent for Discharge of Stormwater Runoff from Construction Activities" (NOI) and the required supporting documentation and fees to KDHE at least 60 days prior to the scheduled start of construction. A primary requirement for receiving the NPDES general permit is that a Stormwater Pollution

Prevention Plan (SWPPP) is designed and implemented. Upon authorization of the construction activity KDHE will provide the Permittee a signed copy of the first page of the NOI with the indication of KDHE authorization and the Kansas and Federal permit numbers added. This document serves as the NPDES general permit certificate.

On developer projects, the developer is responsible for obtaining the NPDES general permit. On City funded projects, the City will obtain the NPDES general permit. The County will obtain the NPDES general permit on County funded projects.
Upon execution of the Construction Contract Agreement and prior to the issuance of a Start Work Order, the City or County will transfer the permit to the Contractor by submitting a jointly executed copy of a "Notice of Transfer of Owner/Operator" (NOTO) form to KDHE. The Contractor then becomes the "permittee" and assumes all responsibility for adhering to the requirements of the permit. The SWPPP is a part of the Project Documents.

When the soil disturbing activity is completed, all areas are restored, and all requirements of the NPDES permit are complete, then the permittee must submit a Notice of Termination (NOT) form to KDHE to terminate the authorization to discharge. The Engineer will not release the Contractor from the obligation of providing erosion and pollution control and establishing grass in unpaved areas of the Project until KDHE accepts the NOT and a copy of KDHE notice of acceptance is provided to the Engineer. The Contractor shall also not be released from the obligation of providing erosion and pollution control and establishing a stand of grass until the requirements of Subsection 4.19 D. are satisfied.

C. Materials.

(1) Devices. Erosion control devices shall meet the requirements shown on the Standard Detail Drawings, as stipulated in the SWPPP, and as included in the Project Documents.

(2) Seeds. Winter wheat and ryegrass seeds used for temporary seeding shall be delivered to the site in convenient containers. Each container shall be fully labeled and bear the name, trade name, or trade mark of the producer. Seed containers shall also bear the producer's certificate of the percentage of the purity and germination of each kind of seed specified and a warranty from the producer. Seed shall comply with the seed and noxious weed laws of the State of Kansas.

(3) Mulch. Mulch shall be straw or hay delivered to the site in bales meeting the North America Weed Free Forage Standards. Prairie hay is the preferred mulch. Hydro-mulching shall meet the requirements of Paragraph 4.19 B (6).

D. Construction Requirements.

(1) Contractor's Responsibilities. The Contractor shall thoroughly review the SWPPP or erosion control plan in detail. The Contractor shall provide the Engineer and Design Consultant with a written description of any modifications to the SWPPP or erosion control plan. Erosion control devices must be installed to establish a perimeter control of the project in areas where it is anticipated that storm water runoff will leave the project site. The SWPPP or erosion control plan shall cover all areas that the Contractor's work may affect including outside the project limits, disposal sites, haul roads, and nearby bodies of water.

All erosion control devices shall be installed according to the approved SWPPP and the Project Documents. The Contractor shall be responsible for updating the SWPPP or erosion control plan during construction to reflect any changes of erosion control devices which have been installed and not originally included in the SWPPP or erosion control plan.

All disturbed areas with no activity on them for a period of 14 calendar days shall be temporarily seeded and mulched.

Any soil stockpiled for more than 7 calendar days shall have silt fence or another type of sediment barrier placed around it to trap sediment.

(2) Contractor's Schedule. The Contractor shall provide a schedule for implementing the SWPPP or erosion control plan to the Engineer. If the erosion control schedule changes, the Contractor shall notify the Engineer in writing before making the schedule change. The Contractor's work sequence shall allow for erosion control measures to be completed in a timely manner and shall limit exposure to erosion.

Regardless of the number of sub-contractor mobilizations involved, erosion and sediment control measures, permanent sodding, or permanent seeding shall be completed as the work progresses and as soon as grading on a particular area of the work is completed. The temporary erosion and pollution control provisions contained herein shall be coordinated with the permanent erosion control features, to the extent practical, to assure economical, effective and continuous erosion control throughout the construction and post construction period.

Erosion Control shall be established prior to, or simultaneously with, the clearing and grubbing operations. Grading shall not be performed until the erosion control devices are installed and approved by the Engineer.

Temporary or permanent ditches graded on site shall either be stabilized or have temporary sediment control installed immediately after their grading.

(3) Silt Fence and Hay Bales. Either silt fence or hay bales may be used as temporary slope barriers as shown in Standard Drawings DT-021. They shall be placed following the contour of the slopes. Hay bales for slope protection shall be embedded into the soil a minimum of 6 inches and fixed with a 2" x 2" x 4' stake in the **outside 1/3 sections of the bale**. The Contractor shall remove and dispose of the sediment when deposits reach approximately ½ the height of the bale.

Silt Fence for slope protection shall be installed with the fabric trenched into the ground as shown in the Project Documents. When conditions warrant, the Contractor shall supplement the temporary silt fence with a support fence. The Contractor shall reduce the post spacing and drive the posts further in the ground in low and soft, swampy areas. The Contractor shall remove and dispose of sediment deposits when the deposit approaches ½ the height of the silt fence. Sediment removal at slope barriers is subsidiary to the barrier.

(4) Inlet Protection (Curb or Area). Any soil disturbing activity upstream from an inlet shall require protection at the inlet. The Contractor shall install inlet protection as shown in the Project Documents. When inlets are located in sumps, care shall be taken that flooding does not occur due to blockage of the inlet. Inlet protection devices may be placed in

gutters upstream of inlets to collect sediment before it reaches inlets. As an alternative to protecting curb inlets at the front, silt fence may be installed along the soil disturbing activity at the back of curb.

The Contractor shall remove and dispose of sediments when they reach ½ the height of the devices providing protection. Removal of sediment at inlets is subsidiary to Inlet Protection (Curb or Area).

(5) Temporary Ditch Checks. Ditch Checks shall be constructed of the materials and at the locations shown in the Project Documents or determined by the Engineer. Ditch checks shall extend up ditch slopes a sufficient distance to prevent water from running around the outside edge of the ditch checks. When deposits reach approximately ½ the height of the temporary ditch check, the Contractor shall remove and dispose of the accumulated sediment. Removal of sediment at ditch checks is subsidiary to the ditch check.

(6) Sediment Traps or Basins. Sediment traps or basins shall be constructed as shown in the Project Documents or as determined by the Engineer. Sediment traps are for drainage areas less than 5 acres and contain a section of rock embankment lined with gravel on the upstream face for dewatering. A sediment trap does not include an overflow channel. Sediment basins are for drainage areas greater than 5 acres and include outlet works that will drain or partially drain the basin in one or two days. A sediment basin does include a spillway to pass larger flows.

A sediment basin is required for every 10 acres of drainage area. Basins with a large surface area-to-volume ratio are the most effective. A sediment basin should not be used with an earthen embankment or a rock dam in an area of continuously running water (live streams). A sediment basin should also not be used in areas where failure will prevent the use of public roads or utilities. Routine inspection and maintenance of sediment traps or basins is essential to their continued effectiveness. They should be inspected after each storm event to ensure proper drainage from the collection pool and to determine any need for structural repairs. Material eroded from earthen embankments or stones moved from rock dams should be replaced immediately.

Before constructing a temporary sediment trap or basin, the Contractor shall clear the area of all vegetation and construct the temporary sediment trap or basin with a wide cross-section and a minimum grade. The Contractor shall remove and dispose of accumulated sediment when deposits reach approximately ½ the depth of the trap or basin as originally excavated. Removal of sediment from sediment traps or basins shall be considered "Sediment Removal".

(7) Erosion Control Blanket. The Contractor shall install erosion control blankets according to the manufacturer's requirements.

(8) Construction Entrances. The Contractor shall construct Construction Entrances of the material and to the lines and grades shown in the Project Documents. Roads shall be kept clean and free of mud, dust, dirt, trash and debris. If the construction site entrance crosses a stream, swale, or other depression, a bridge or culvert must be provided to prevent erosion from unprotected banks. Stone and/or gravel used to stabilize the construction entrance shall be large enough so to not be carried offsite by vehicles. Sharp edged stone shall be

avoided to reduce the possibility of puncturing tires. At sites with wash racks at each entrance, sediment traps shall be constructed and maintained for the life of the project.

(9) Temporary Berms. The Contractor shall construct temporary berms to divert storm runoff towards stabilized slopes, temporary slope drains, or sediment traps. Temporary berms shall be constructed to the lines and grades shown in the Project Documents or determined by the Engineer. Temporary berms shall be compacted until no further consolidation is observed by using a dozer track, grader wheel or other equipment approved by the Engineer.

(10) Temporary Seeding and Mulching. Temporary seeding shall consist of 120 lbs. (pls) per acre of winter wheat and 75 lbs. (pls) per acre of ryegrass unless stated otherwise in the SWPPP or other Project Documents. Seed shall be evenly applied with a broadcast seeder, drill, or hydro-seeder over the prepared area. Temporary Mulching shall follow the temporary seeding operation, unless approved otherwise. Temporary Mulching shall meet the construction requirements in Subsection 4.19.C.h).

(11) Dust Control. The Contractor shall take measures to control dust and the movement of wind-borne soil particles from disturbed soil surfaces. Such measures may include disturbing the smallest area possible at any one time, establishing surface stabilization immediately after completion of grading, temporary or permanent seeding and mulching, and sprinkling disturbed areas and haul roads with water. Dust Control is subsidiary to other items of the Contract.

(12) Concrete Washout. The Environmental Protection Agency requires the capture of washout water used in concrete mixer rinse out operations. This slurry contains toxic metals and is corrosive, having a high pH value. Concrete washout water must be collected and retained so that it does not migrate to surface waters or into the ground water. Collection methods can vary from using a chute washout box or bucket on the ready mix truck, providing a washout pit with an impermeable liner or using a portable washout container. Concrete washout facilities should not be placed within 50 feet of storm drains, open ditches, or water bodies. These facilities should also be inspected daily and after heavy rains to check for leaks or damage. When the facility is filled to over 75 percent capacity, the wash water should be vacuumed off or allowed to evaporate to avoid overflows. Concrete washout water collection is subsidiary to other items of the Contract.

E. Maintenance and Inspections. The Contractor shall maintain the effectiveness and performance of all erosion control devices and measures as long as it is required to properly contain sediment runoff and until both the Notice of Termination is accepted by KDHE and the specified density of permanent grass coverage is present as determined by the Engineer. If erosion and pollution control measures are not implemented and maintained, the Engineer may order that all work on the project shall cease until conditions are brought into compliance. Additionally, the Engineer may order defective erosion control measures immediately corrected or cause the correction to be made by a third party, costs of which shall be paid by Contractor in accordance with Paragraph G below. Failure to implement and/or maintain all or part of the erosion control plan shall not make the City/County or Engineer liable to the Contractor for any work delays.

The Contractor shall perform all inspections and complete all inspection and maintenance reports required by the NPDES general permit. During the construction period, the Contractor shall inspect the erosion and pollution control devices and complete the inspection and maintenance reports every

7 days and within 24 hours of a precipitation event of ½ inch or more. During inactive periods, such as winter shutdowns, inspection of the site condition shall be made at least once a month. The devices shall be monitored at least daily during periods of prolonged rainfall. Corrective action must begin within 48 hours of any deficiencies being found and must be completed within 7 calendar days.

Each of the Contractor's inspection reports shall contain, at a minimum, the name of the Contractor's representative, date of inspection, observations relative to the effectiveness of the erosion and pollution control measures, actions taken or necessary to correct deficiencies, and areas where activities have been completed. The Contractor's site inspection reports shall be maintained onsite with the SWPPP or erosion control plans. Copies of the reports shall be provided to the Engineer at a minimum of once a month with the pay requests.

When the Engineer and the Contractor agree that erosion control is no longer required, 70% of the permanent ground cover is established, and the Notice of Termination has been accepted by KDHE, then the erosion control measures shall be removed by the Contractor. After removing the erosion and pollution control devices, the Contractor shall remove and dispose of any silt accumulations; clean inlets, culverts and storm sewers; and perform any reseeding needed.

When erosion and pollution control devices are installed according to the SWPPP or erosion control plan, or as required by the Engineer and such devices are ineffective because of normal deterioration or functional incapacity, these devices shall be replaced as required or requested by the Engineer. The requirement for the Engineer's approval prior to the replacement of ineffective devices does not release the Contractor from any responsibility for inspection or maintenance or erosion control devices. Payment will be made for replacement of the ineffective devices at the established Contract unit prices. All devices should be reviewed for continued effectiveness prior to determining final quantities and payment since quantities will not be adjusted after Final Payment. No payment will be made for replacing erosion and pollution control devices that become ineffective because of improper installation, lack of maintenance, or the Contractor's failure to pursue timely installation of permanent erosion control devices according to the Project Documents. Further, no payment shall be made to repair or replace erosion control devices damaged by the negligent or intentional acts of the Contractor.

F. Final Payment and Acceptance. During the period that erosion and pollution control measures are still required and grass coverage is being established, if the Work of the Project is otherwise complete, the Engineer will make recommendation for Final Payment and present the Final Application for Payment to the Owner conditional to the requirements of Document 700, General Conditions of the Project Manual. However, the work specified in Subsections 4.19 and 4.20 of these Standard Specifications is specifically identified as requiring the Contractor's Continuing Obligations as defined in Document 700, General Conditions of the Project Manual.

After Final Application for Payment is submitted by the Contractor, the maintenance, replacement, and installation of any erosion control devices or measures necessary to prevent erosion and/or pollution shall continue to be the Contractors responsibility. However, this work shall not be paid for directly but shall be considered a part of the Contractor's Continuing Obligations as defined in Article 14 Paragraph 14.15 of Document 700 General Conditions. This obligation shall continue until both the specified permanent grass coverage is present as determined by the Engineer, and until the Notice of Termination has been accepted by KDHE.

G. Cost of Corrective Action.

(1) Prior to Final Payment. If the Contractor fails to complete corrective actions to the erosion control measures within 7 calendar days of notice that deficiencies have been identified, then the City/County will deduct from final payment to the Contractor all costs incurred due to the Contractor's failure to establish the specified grass coverage, prevent erosion or pollution at the site, or to prevent or remedy a violation of any term or condition of the NPDES permit, specifically including but not limited to, correction of defective erosion and pollution control devices. All direct, indirect and consequential costs to correct a deficiency will be added together, and a Change Order will be issued incorporating the necessary deductive revisions to the Contract Amount into the Contract Documents.

(2) After Final Payment. If the Contractor fails to initiate measures to correct deficiencies to the erosion control measures during and/or at the end of the 12 month warranty period within 7 calendar days of notice that deficiencies have been identified, then the erosion control shall be considered defective work and the conditions of Article 13 of Document 700 General Conditions shall apply.

H. Bid Items, Measurement and Payment

(1) Bid Items.

SILT FENCE OR HAY BALES	Unit: Lineal Feet (Nearest Ft.)
INLET PROTECTION (CURB)	Unit: Each Inlet
INLET PROTECTION (AREA)	Unit: Each Inlet
DITCH CHECK	Unit: Lineal Feet (Nearest Ft.)
SEDIMENT TRAP OR BASIN	Unit: Cubic Yard (nearest C.Y.)
SEDIMENT REMOVAL	Unit: Cubic Yard (nearest C.Y.)
EROSION CONTROL BLANKET	Unit: Square Yard (nearest S.Y.)
CONSTRUCTION ENTRANCE	Unit: Each
TEMPORARY BERM	Unit: Lineal Feet (Nearest Ft.)
TEMPORARY SEEDING AND MULCHING	Unit: Acre (nearest 0.1 Acre)

(2) Measurement. "Silt Fence or Hay Bales", "Temporary Berm", and "Ditch Check" shall be measured by the slope distance along the face of the device installed to the nearest foot.

"Inlet Protection (Curb)" and Inlet Protection (Area) will be measured per each inlet protected from sediment as specified. When silt fence or hay bales are placed at the back of curb behind inlets, the hay bales or silt fence shall not be considered "Inlet Protection" but shall be measured as "Silt Fence or Hay Bales".

The areas receiving "Temporary Seeding and Mulching " shall be computed using the trapezoidal method with the horizontal dimensions of individual trapezoids measured to the

nearest foot. The horizontal area of individual trapezoids shall be summed, converted to Acres, and rounded to the nearest 0.1 Acre for each pay application. Alternatively, if acceptable to both the Engineer and the Contractor, "Temporary Seeding and Mulching" areas may be measured by traversing the perimeters of the disturbed areas with a handheld or other GPS device, downloading the perimeter points to a computer, and computing the area utilizing either CAD or coordinate geometry.

"Sediment Trap or Basin" shall be measured by the volume of excavation completed to construct the trap or basin(s). "Sediment Removal" shall be measured by the volume of sediment removed from a sediment trap or basin. Sediment removed from inlet protection devices, slope barriers and ditch checks shall not be measured. Measured volumes shall be computed by the average end area method. Trapezoidal end areas and the distance between end areas shall be measured to the nearest 0.1 foot as can be reasonably accomplished with a 100 foot cloth tape and level. The volume in cubic feet, thus computed, shall be converted to cubic yards and rounded to the nearest cubic yard for each pay application.

"Construction Entrance" shall be measured per each entrance installed.

"Erosion Control Blanket" shall be measured by the sloped surface area covered by the material. Overlaps between sheets of the mat and buried edges of the mat shall not be measured. Individual areas of the mat shall be determined by measuring the slope dimensions of the matted area to the nearest 0.1 foot, computing individual areas square feet, summing the areas, converting the slope area of the mat's surface to square yards and rounding to the nearest square yard for each pay application.

(3) Payment. Temporary erosion and pollution control shall be paid for at the Contract unit prices for the items listed and measured as provided for above, which payment shall be full compensation for all grading, removal, disposal, planting seeds, fertilizing, mulching, erosion control devices, furnishing, staking and maintaining, and for all labor tools, equipment and incidentals necessary to complete the work as specified.

Conditional to the Engineer's approval prior to the Contractor's Application for Final Payment, if an erosion and water pollution control device requires replacement due to normal deterioration or functional incapacity or if additional devices are required, the new item(s) shall be paid for at the Contract unit price established for the particular device or work.

The required maintenance, replacing, and provision for additional erosion and water pollution control devices subsequent to the Contractor's Application for Final Payment shall not be paid for directly but shall be considered a part of the Contractor's Continuing Obligations as defined in Article 14 Paragraph 14.15 of Document 700 General Conditions. This obligation shall continue until both the specified permanent grass coverage is present as determined by the Engineer, and until the Notice of Termination has been accepted by KDHE. The Contractor shall provide work zone traffic control when completing erosion and water pollution control work after the Contractor's Application for Final Payment at no additional cost to the Owner.

4.21 PROJECT SIGN

A. General. When specified in the Project Documents, project signs shall be installed at locations determined by the Engineer.

B. Materials. Materials for Project Signs, and the posts, hardware other incidentals necessary for their erection shall be as specified in the Project Documents.

(1) Projects Located within the City Limits Only. The City will have a yearly contract with one sign vendor to provide a standard "Project Sign Type A" or "Project Sign Type B" at a set price. The Contractor shall order project signs from the City's sign vendor and shall purchase the sign from the vendor at the set price.

C. Construction Requirements. When signs are required, the signs shall be installed prior to any construction activity and maintained by the Contractor throughout construction. Signs shall be removed by the Contractor within two weeks of project completion. The unit price bid by the Contractor for each type of sign shall include the sign (at the set price on projects within the City) plus any additional costs to install, maintain, and remove after project completion.

D. Bid Item, Measurement and Payment.

(1) Bid Item.

PROJECT SIGN TYPE (*) Unit: Each

(*) Type of Sign: A or B.

(2) Measurement. Projects Signs shall be measured per each sign installed.

(3) Payment. Installed and accepted project signs, measured as provided for above, shall be paid for at the Contract unit price for the various types of "Project Signs (*)", which payment shall be full compensation for all materials, hardware and erection, labor, tools, equipment, and incidentals necessary to complete the work as specified.

4.22 PAVEMENT MARKINGS

A. General. Prepare the pavement and apply the pavement markings as shown in the Contract Documents.

B. Materials. Provide new, first run durable pavement marking materials that comply with DIVISION 2200 of the latest edition of KDOT Standard Specifications for State Road and Bridge Construction, except as modified in paragraphs (1) and (2) below.

(1) Basis of Acceptance. The Engineer shall accept the materials based upon visual inspection of the materials, manufacturer's certifications that the materials meet the requirements of the specifications and verification that the proposed product and manufacturer appear on the current KDOT PQL.

(2) Testing. After delivery to the site, materials for pavement markings shall not be tested for compliance with the specifications unless testing is necessary to resolve a dispute between the Engineer and the Contractor relative to the acceptability of a material either before or after installation. If testing determines that a material does not

comply with the specifications, then the Contractor shall be responsible for all costs associated with the testing. If testing determines that the material complies with the specifications, then the Owner shall be responsible for all costs associated with the testing.

C. Construction Requirements. If additional temporary pavement markings are required due to Contractor's operations, the placement and removal will be subsidiary to the durable pavement marking bid items.

(1) Equipment. Use equipment designed for the preparation and application of the appropriate type of pavement marking material.

(2) Certification. Provide a letter of certification from the pavement marking manufacturer indicating Contractor's qualifications to install their product.

(3) Surface Preparation

i. On existing pavements, remove the existing pavement markings according to the recommendations of the manufacturer of the new pavement markings.

ii. On aged asphalt pavements, thoroughly remove all dirt, grit, grease, residue of prior pavement markings application (including adhesives or primers that may have been used in their application), and any other foreign matter from the roadway surface prior to the application of the new markings.

iii. On new Portland cement concrete pavement and on new concrete bridge decks, use shot blasting to remove curing compound and laitance from the surfaces to which the pavement markings will be applied.

(4) Temperature. All permanent markings, except preformed thermoplastic and waterborn traffic line paint, shall be installed when the temperature of both surface and air has reached fifty five (55) degrees Fahrenheit and is rising - or as per the manufacturer's recommendations. Installation temperatures for preformed thermoplastic shall be in strict compliance with the manufacturer's specification, with no exception allowed.

(5) Traffic Control. The Contractor must provide traffic and pedestrian control when applying pavement markings under traffic. All traffic and pedestrian control shall conform to the MUTCD and the Project Documents. All costs for traffic and pedestrian control for pavement marking installation are subsidiary to other pavement marking bid items of the Contract unless otherwise specified in the Project Documents.

(6) Alignment. Lay out the pavement marking as detailed in the Contract Documents. If the Contract Documents do not provide details, submit to the Engineer for approval a layout plan for the pavement markings that complies to the MUTCD. Provide adequate guide marks (approximately 2 inches by 12 inches at approximately 30 to 50-foot intervals) for the application of the pavement markings.

(7) Application.

i. Provide the Engineer with a copy of the manufacturer's application instructions. Apply the pavement markings according to the manufacturer's recommendations. Follow the manufacturer's recommendations regarding pavement and ambient temperature at the time of application.

ii. The Engineer will verify the pavement and ambient temperatures before beginning work and when deemed necessary.

iii. Apply pavement markings straight and close to the intended alignment without abrupt changes that result in an unacceptable appearance.
iv. Lane lines are required to be 10' long with 30' long gaps in between.
v. On new asphalt surfaces, permanent marking tapes shall be inlaid in the asphalt. Other permanent markings shall be installed immediately after surface course paving unless approved otherwise by the Engineer in advance.
vi. Pavement markings shall be installed prior to opening a project or lane to traffic, unless otherwise approved by the Engineer. If the pavement markings cannot be installed and thus the roadway would be unmarked overnight, temporary removable markings shall be installed and remain until the permanent markings can be installed. Temporary markings shall be raised pavement markers or foil type. Cost for such temporary markings shall be borne by the Contractor, including all removal of such markings in order to place permanent markings. Make every effort to remove the temporary markings and install the permanent markings within 48 hours. Under no circumstance shall the temporary pavement markings be in place for more than 14 days. The temporary removable markings shall be removed prior to the installation of the permanent pavement markings. Under emergency situations, the Engineer may authorize the use of traffic control devices in lieu of temporary pavement marking and related costs shall be borne by the Contractor.

(8) Cold Plastic/Patterned Cold Plastic Pavement Marking.

i. Grind an inset for the pavement marking into the surface of the pavement 0.08 inch (+ 0.01 inch tolerance) deep, with the width and length of the inset a maximum of 2 inches greater than the dimensions of the pavement marking.
ii. On new or existing PCCP, cut the marking tape at any joint in the pavement that is crossed by the tape.
iii. Apply adhesive-sealer primer of a type recommended by the manufacturer. Primer is required on all tape applications regardless of temperature, date or season.

(9) Epoxy Liquid Pavement Marking.

i. When pavement markings are applied to PCCP (including concrete bridge decks) less than 1 year old, remove all curing compounds and laitance by shot, sand or water-blasting.
ii. Use a slower curing epoxy material (40 minutes) for pavement markings applied to PCCP. For other surfaces, fast setting (10 minutes) epoxy material may be used with approval of the Engineer.
iii. Apply the epoxy liquid material closely behind the surface cleaning procedures.
iv. Before mixing the components of the pavement marking material, heat the individual components to the temperature ranges recommended by the manufacturer of the material. Do not exceed the maximum recommended temperature at any time.
v. Apply the epoxy liquid pavement marking material at a thickness of 20-25 mils on all pavements. Immediately apply all glass beads (double drop system or blended bead) to the epoxy liquid pavement marking at the glass bead gradation and bead drop rate recommended by the manufacturer to obtain the required level of retro-reflectivity.

(10) Multi-Component Liquid Pavement Marking. Requirements here also apply to the intersection grade Multi-Component materials.

i. When pavement markings are applied to PCCP (including concrete bridge decks) less than 1 year old, remove all curing compounds and laitance by shot, sand or water-blasting. For intersection grade multi-component, grind the inset 15 mil (+10 mil tolerance) deep, with the width and length of the inset a maximum of 2 inches greater than the dimensions of the pavement marking on concrete surfaces.

ii. Multi-component liquid pavement marking will only be allowed for use on surfaces recommended by the manufacturer.

iii. Apply the multi-component liquid material closely behind the surface cleaning procedures.

iv. Before mixing the components of the pavement marking material, heat the individual components to the temperature ranges recommended by the manufacturer of the material. Do not exceed the maximum recommended temperature at any time.

v. Apply the multi-component liquid pavement marking material (at a thickness of 20-25 mils) to the pavement. Immediately apply the glass beads (double drop system or blended drop) to the multi-component liquid pavement marking at the glass bead gradation and bead drop rate recommended by the manufacturer.

(11) Intersection Grade Pavement Marking.

i. Multi-component materials: See Section C (12) above.

ii. High Durability Tape. Grind an inset for the pavement marking into the surface of the pavement 80 mil (+10 mil tolerance) deep, with the width and length of the inset a maximum of 2 inches greater than the dimensions of the pavement marking. Apply adhesive-sealer primer of a type recommended by the manufacturer. Primer is required on all tape applications regardless of temperature, date or season. On new or existing PCCP, cut the marking tape on either side of any joint in the pavement that is crossed by the tape.

iii. Preformed Thermoplastic. Grind an inset 40 mil (+ 20 mil tolerance) deep, with the width and length of the inset a maximum of 2 inches greater than the dimensions of the pavement marking on concrete surfaces. Use a heating device recommended by the material manufacturer to fuse the preformed thermoplastic to the pavement. Apply adhesive-sealer primer of a type recommended by the manufacturer. Primer is required on all preformed applications on concrete regardless of temperature, date or season. Apply the pavement markings as recommended by the manufacturer.

(12) All Thermoplastic Pavement Marking. Apply thermoplastic pavement markings between April 15 and October 15. If the manufacturer's recommendations allow, the Engineer may waive the date restrictions.

i. For transverse markings, stop bars, crosswalk markings, & symbols on concrete and asphalt, grind the inset 40 mil (+20 mil tolerance) deep, with the width and length of the inset a maximum of 2 inches

greater than the dimensions of the pavement marking on concrete surfaces.

ii. Apply the binder-sealer according to the manufacturer's recommendations. Primer is required on all transverse applications on concrete regardless of temperature, date or season. The Engineer will not approve the application of the thermoplastic material until the binder-sealer applied to the pavement is devoid of all solvent or water.

iii. Apply prepared thermoplastic material in a molten state within a temperature range of 400 to 440ºF. The Engineer will not approve the use of scorched material or prepared material that has been maintained at 440ºF for a period exceeding 4 hours.

iv. Apply glass beads (double drop system or blended bead) to the thermoplastic pavement marking at the glass bead gradation and bead drop rate recommended by the manufacturer to obtain the required level of retro-reflectivity.

(13) Unsatisfactory Pavement Marking. Removal and replacement of unsatisfactory pavement markings shall be at the expense of the Contractor. The Contractor shall remove and replace pavement markings that were unsatisfactorily installed and or display evidence of failure of the pavement marking material.

i. General: Remove and replace pavement markings that:
- have drag marks, gashes, gouges, foreign covering, discolored areas or areas that have failed to solidify
- have improper adhesion, length or thickness
- have areas that present a ragged appearance, areas that do not present sharply defined edges, or areas with abrupt unintended changes in alignment.

ii. Alignment: Lines that deviate laterally from the intended alignment more than 2 inches in 200 feet may be rejected.

iii. Width: Markings shall be the width specified in the Project Document. If markings are more than ½ inch narrower than specified, the deficient marking shall either be corrected by an approved method at the expense of the Contractor, or left in place and Contractor will accept a deduction in pricing as described in the Measurement and Payment section below.

D. Basis of Acceptance. The Engineer shall review the condition of permanent pavement markings for a period of 12 months following the date of Final Acceptance. If at any time during this 12 month period, any pavement markings, except waterborne paint or temporary markings, exhibit any of the defects or deficiencies described in Section C (13) above, those markings shall be replaced by the Contractor at no expense to the Owner. The Engineer will approve the Contractor's Application for Payment for pavement markings at the time of initial acceptable installation. However, repair and replacement of failed or deficient pavement markings, as defined above is specifically identified as a part of the Contractor's continuing Obligations as defined in Article 14 Paragraph 14.15 of Document 700 General Conditions.

E. Cost of Corrective Actions. Unless restricted by weather conditions, if the Contractor fails to initiate measures to correct pavement marking deficiencies within 7 calendar days of notice that pavement marking deficiencies have been identified, then the pavement markings shall be

considered defective work and the conditions of Article 13 of Document 700 General Conditions shall apply.

F. Bid Items, Measurement and Payment

(1) Bid Items.

PAVEMENT MARKING (*) (**) (***)	Unit: Linear Foot (nearest foot)
PAVMENT MARKING SYMBOL (*) (**) (****)	Unit: Each

*Type of Pavement Marking: Cold Plastic, Patterned Cold Plastic, Epoxy, Thermoplastic, Preformed Thermoplastic, Thermoplastic-Spray, Intersection Grade, High Durability or Multi-Component
** Color
*** Width
**** Type of Symbol

(2) Measurement.

i. The Engineer will measure the various widths and colors of pavement markings by the linear foot along the length of each segment installed. The "skipped" portion of broken lines shall not be measured. Double lines shall be measured by the length of material actually installed. The Engineer will measure each symbol.

ii. Deficiency in Lane Line Length/Cycle: Lane lines are required to be 10' long with 30' long gaps in between. When a line or gap deviates more than 2 inches (longer or shorter) but less than 12" from the required length, the established unit price will be reduced by 25%. For example, if a 10' line is measured at 10'2", then the 10' line is paid out at 75% of the established unit price. Lines and gaps deviating from the required length by more than 12" will not be paid (100% deduct) or the Contractor may elect to remove and reinstall the deficient sections for full payment.

iii. Deficiencies in Line Width: Markings shall have the width specified in the Project Documents. If markings are more than ½" narrower than specified, the deficient marking shall either be corrected by an approved method at the expense of the Contractor, or left in place with the deficient segment of the line paid for at 75% of the established unit price.

iv. Correction of out of tolerance markings may require removal and replacement at the Contractor's expense.

(3) Payment. The amount of completed and accepted pavement markings, measured as provided above, shall be paid for at the Contract unit prices for the various pavement marking types, colors, and widths, except when deductions are applied. Said payment(s) shall be full compensation for preparation of pavement surfaces, layout and marking, application, and materials, and for all labor, tools, equipment, and incidentals necessary to complete the work as specified.

4.23 REMOVAL OF EXISTING PAVEMENT MARKINGS

A. Construction Requirements. The Contractor shall remove existing pavement markings at the locations shown in the Project Documents, indicated by the Engineer, and/or where the existing markings conflict with either the temporary or permanent traffic control of the Project. The existing pavement markings and symbols shall be removed without damaging the pavement surface. As the work progresses, all material deposited on the pavement as a result of the removal operations shall be removed. When blast cleaning within 10 feet of the traveling public, all residue and dust shall be removed as the work progresses, and the property and persons of traveling public protected from damage or harm due to the blast cleaning. The Contractor shall use methods approved by the Engineer to repair all pavement damaged during the pavement marking removal operations.

B. Bid Items, Measurement and Payment. Removal of existing pavement markings shall not be paid for directly, but shall be subsidiary to other items of the contract unless "Removal of Existing Pavement Markings" is included as a pay item in the Project Documents.

(1) Bid Items.

REMOVAL OF EXISTING PAVEMENT MARKINGS Unit: Lineal Foot (nearest 1 Ft.)

REMOVAL OF EXISTING PAVEMENT MARKING SYMBOL Unit: Each

(2) Measurement. When "Removal of Existing Pavement Markings" is included as a pay item in the Project Documents, it shall be measured as the length of each line segment removed. Measurement will be to the nearest foot. Removal of existing pavement marking symbols shall be measured per each symbol removed.

(3) Payment. When included as a pay item in the Project Documents, completed and accepted "Removal of Existing Pavement Markings" or "Removal of Existing Pavement Marking Symbol" shall be paid for at its established Contract unit price, which payment shall be full compensation for all labor, tools, equipment, and incidentals necessary to complete the work as specified.

4.24 WORK ZONE TRAFFIC CONTROL.

A. General. Unless otherwise indicated in the Project Documents, the Contractor shall provide, erect, maintain and remove vehicular and pedestrian work zone traffic control throughout the duration of the Project. The size, shape, color and placement of all traffic control devices and appurtenances shall comply with the details shown in the Project Documents, the ADAAG or other applicable accessibility guidelines, and the MUTCD.

B. Materials.

(1) Sign Legends. The size and layout of sign messages or legends shall comply with the latest edition of "Standard Highway Signs and Standard Alphabets for Highway Signs".

(2) Crashworthy Devices. The Contractor shall provide materials as shown in the Project Documents that comply with National Highway Cooperative Research Program (NHCRP) Report 350 or the 2009 AASHTO Manual for Assessing Safety Hardware (MASH 2009)

(3) Reflective Sheeting. Reflective sheeting for work zone traffic control devices shall meet the requirements of Division 2200 of the KDOT Standard Specifications.

(4) Standard Work Zone Signs. Standard Work Zones Signs shall be considered any sign with a standard legend and listed in the MUTCD. A value for speed in a multiple of 5 shall be considered a standard legend. The size of Standard Work Zone Signs shall be as designated in the Project Documents. Signs not included in the Project Documents, but added to the project at the request of the Engineer shall also be considered Standard Work Zone Signs if they have a standard legend and are listed in the MUTCD.

(5) Directional and D-3 Signs. Directional Signs shall be of the size shown in the Project Documents and have the black legend EASTBOUND, WESTBOUND, NORTHBOUND, or SOUTHBOUND on an orange background. D-3 signs shall be black on orange signs fabricated by the Contractor and shall serve as supplemental signs for M-series detour signs. The legend on D-3 signs is the name of the detoured street. The minimum letter height for D-3 and Directional signs shall be 3 inches. The height of a D-3 sign is 9 inches. The Contractor shall determine the length of D-3 signs and shall submit a shop drawing of the legend layout to the Engineer for approval prior to fabrication.

(6) Work Zone Informational Signs. When Work Zone Informational Signs are specifies as a part of the Project, they shall have the project specific legends shown in the Project Documents or determined by the Engineer. Work Zone Informational Signs shall have a minimum letter height of 3 inches and shall be black on orange. The Contractor shall determine the size and legend layout of informational signs and shall submit a shop drawing of the layout to the Engineer for approval prior to fabrication.

(7) Tubular Markers. Tubular Markers shall meet the requirements specified in the Project Documents and comply with NCHRP 350 or MASH 2009.

(8) Portable Channelization Devices. Portable devices for the channelization of work zone traffic shall be 18 inch orange cones, 29 inch to 36 inch reflectorized fluorescent orange cones, reflectorized drums, slimline channelizers, and/or reflectorized vertical panels; all as detailed in the Project Documents and in compliance with NCHRP 350 or MASH 2009.

(9) Flashing or Sequencing Arrow Panels (SAP). When specified, the Contractor shall provide, install and maintain a flashing or sequencing arrow panel capable of being legible for a minimum distance of ½ mile. The flashing or sequencing arrow panels shall comply with Part VI of the MUTCD. Flashing or sequencing arrow panels shall have a control for lamp intensity, using an automatic solar cell switch, backed by a manual switch and capable of dimming 50% from the rated lamp voltage for nighttime operation. The panel shall provide a flashing rate of lamps between 25 and 40 flashes per minute. The minimum lamp "on time" shall be 50% for the flashing arrow and 25% for the sequential chevron. Arrow

panel lamps or lenses shall be recessed, or alternately equipped with a minimum 180º upper hood. The color of light emitted shall be yellow.

(10) Portable Message Board (PMB). When specified, the Contractor shall provide a PMB. The PMB shall comply with Part VI of the MUTCD. The size of each character shown on the PMB panel shall be approximately 18 inches high and 12 inches wide with yellow or orange characters displayed on a black background.

(11) Waterborne Traffic Line Paint. Traffic line paint shall be a sprayed, resinous material that should provide a service life of three to twelve months. The material shall meet the requirements of Section 2215 of the KDOT Standard Specifications. The paint shall be applied at least 0.012 inch thick with glass beads meeting the material requirements and applied as specified in said Section 2215. Waterborne traffic line paint shall be accepted based upon the Engineer's visual inspection of performance and consistency and receipt of manufacturer's certifications that the material meets the requirements specified.

(12) Temporary Pavement Markings. Temporary pavement markings shall provide a service life of four to eight weeks. The material shall meet the requirements of Section 2210 of the KDOT Standard Specifications except as modified herein.

(13) Removable Line Masking Tape. A highly durable, skid resistant, non-reflective black or dark gray, pliant polymer tape designed for temporary obliteration of existing pavement markings. The material shall meet the requirements of Section 2210 of the KDOT Standard Specifications except as modified herein.

(14) Material for Wedges at Edge Drop-offs. Material for Aggregate with a high percentage of fines and cohesive soils are acceptable. The contractor may use other materials if approved in advance by the Engineer. Forming wedges at pavement edge drop-offs shall be suitable for the purpose intended. The Engineer will make final acceptance the material for wedges after satisfactory visual inspection of the material in place. Asphalt millings shall not be used for wedges.

C. Construction Requirements. The safe and satisfactory movement of pedestrian, bicycle, and vehicular traffic through the Project is a high priority and is the responsibility of the Contractor. The Contractor shall use reasonable and appropriate devices and methods to safeguard the persons and property of the traveling public on roads and sidewalks on which construction work is in progress. Failure of the Engineer to notify the Contractor to maintain such devices or use such methods does not relieve the Contractor of responsibility. The Contractor shall obtain the Engineer's approval before erecting traffic control devices, changing traffic control devices, or removing traffic control devices, except if an emergency situation requires immediate action.

The Contractor shall notify the Owner, Engineer and affected businesses, schools and residents of major traffic control changes affecting the location and path of a roadway and or sidewalk access a minimum of 72 hours in advance of the change. The 72 hours does not include Saturdays, Sunday or holidays.

Signs and other vehicular and pedestrian traffic control devices shall be erected as shown in the Project Documents unless determined otherwise by the Engineer. At all times during the progress or temporary suspension of the work, the Contractor shall provide, erect, remove, relocate, clean,

replace and maintain suitable signs, barricades, fences or other necessary traffic control devices and pavement markings shown in the Project Documents.

If traffic control issues come to the attention of the Engineer, the Engineer will notify the Contractor of any required repairs or replacements. It is the Contractor's responsibility to inspect and maintain traffic control devices.

The minimum vehicular lane width shall be 11 feet unless otherwise determined by the Engineer or indicated in the Project Documents.
The Contractor shall perform all work during daylight hours, unless otherwise specified or approved.

When determined necessary and requested by the Engineer, the Contractor shall move any traffic control device from one location to another and re-erect it. The Engineer may require additional traffic control devices or flaggers at any time, or at any place.

When the Project Documents indicate that traffic is to be carried through construction, routing of traffic on a detour is prohibited without written approval from the Engineer.

The City Traffic Engineer will establish work zone speed limits. Reduced speed zones, if any, shall be confined to the immediate vicinity of the work. The spacing and taper rates for the installation of traffic control devices shall be based upon the posted speed of the roadway prior to the start of the Work.

In order to minimize inconvenience for the traveling public and to increase the effectiveness of signs and traffic control devices, the Contractor shall move the traffic control devices ahead as the work allows. For example, suppose the following: A work zone is initially one mile long. Following a weeks' worth of the first half mile of the project is complete. The work zone would then be shortened by moving the advance warning signs ahead and removing the temporary traffic control devised no longer necessary.

When no work is in progress, the Contractor shall remove from the road or completely cover with an opaque, weatherproof material, all devices which are required only when work is actually being performed.

The Contractor may develop an alternate traffic control plan. Such alternate plan requires the approval from the Engineer and Owner and must result in increased benefit to the Owner and or traveling public. Neatly prepared detailed drawings of the alternate traffic control plan must be submitted by the Contractor to the Engineer for review.

On roads closed to through traffic, the Contractor must provide ingress – egress access (including the use of temporary surfacing) for residences and businesses along the road that is closed. Where practical, the Contractor shall park and store all vehicles, equipment, tools and materials off the right-of-way.

When existing pedestrian facilities are disrupted, closed or relocated, the Contractor shall provide temporary accessible pedestrian facilities consistent with the existing facilities.

Work zone signs shall not interfere with pedestrian or bicycle traffic on sidewalks, trails or paths. The minimum width of a pedestrian travel-way shall be four feet unless otherwise determined by the Engineer or indicated in the Project Documents.

The Contractor shall separate pedestrian traffic from the work site activity and vehicular traffic. Unless a reasonable safe route through or adjacent to the work zone that does not involve crossing the roadway can be provided, pedestrians shall be directed by advance signing to cross to the side of the roadway opposite from construction activity. Such advance signing shall be located at intersections unless other locations are indicated in the Project Documents or selected by the Engineer.

(1) Signs. The Contractor shall install signs of the type, and at the locations, shown in the Project Documents. The Contractor shall have utilities located prior to driving sign posts. Signs to be left in place fewer than three days may be mounted one foot above the ground line. Signs left in place for more than three days shall be mounted a minimum of 7 feet above the ground line. If all the conditions of no sidewalks, no pedestrians, and no parking are met, the mounting height may be reduced to five feet. If secondary signs are included, the heights may be reduced by one foot.

(2) Channelization Devices. The Contractor shall install channelization devices of the types, and at the locations, shown in the Project Documents. The Contractor shall continually monitor the condition and position of channelization devices. Any devices damaged or moved shall be replaced and/or reset to the neat lines shown in the Project Documents.

Only fully reflectorized non-metallic drums, tubular markers, slimline channelizers, reflectorized vertical panels or cones shall be used for channelizing vehicular traffic. 18" traffic cones shall only be used during temporary daytime activities where speeds are less than 40 mph. Tubular Markers shall only be used where indicated on the drawings or as approved or directed by the Engineer. When the Project Documents indicate "Channelization Devices" any of the portable channelizers listed herein may be used. However, the different types of Channelizers shall not be intermixed with one another.

(3) Flashing or Sequencing Arrow Panels (SAP). Where specified, the Contractor shall provide, install and maintain an advance warning flashing or sequencing arrow panel mounted on a portable chassis and operating continuously for the period specified. The Contractor shall adjust the lamp intensity of the SAP to compensate for daytime and nighttime light conditions.

Any and all relocations of the SAP, as may be requested by the Engineer, shall be subsidiary.

(4) Portable Message Board (PMB). Where specified, the Contractor shall provide, install and maintain a PMB and operate it continuously for the period specified. The message shall be as provided in the Project Documents or as determined by the Engineer. Any and all relocations of the PMB, or changes to the message as may be requested by the Engineer, shall be subsidiary.

(5) One-Way Traffic and Flaggers. The Contractor shall provide for two-lane traffic on all two-way roadways except when approved by the Engineer or shown in the Project

Documents otherwise. Traffic shall be reduced to one-lane two-way traffic only when specifically shown in the Project Documents or when approved by the Engineer 48 hours in advance of the need. When one-lane traffic is required, the Contractor shall provide courteous, competent flaggers that are able to communicate effectively with the traveling public, and appropriate signage shall be provided. Flaggers shall know and observe all requirements for flaggers listed in the MUTCD. Flaggers shall be equipped with hand signaling signs mounted on suitable staffs, (minimum 60 inches as measured from the bottom of the sign) and wearing reflectorized, headgear and an ANSI Type II vest while on duty. The Contractor may use uniformed law enforcement personnel as flaggers in lieu of the above uniformed flaggers. When used as flaggers, law enforcement personnel shall wear their official uniform, badge and vest. Temporary traffic signals may be used in lieu of flaggers, when approved by the Engineer. Continued use will be based upon satisfactory performance of the system to effectively move traffic through the area.

(6) Traffic Signal Adjustments, If existing traffic signals require adjustment or modification to provide for work zone traffic control, they shall be adjusted by City of Topeka Traffic Operations Division personnel. The Contractor shall request the adjustment a minimum of 72 hours in advance of the time the adjustment is needed.

(7) Temporary Traffic Signal Installation. Where indicated in the Project Documents, the Contractor shall install a temporary traffic signal. When sidewalks are present, temporary traffic signal installations must provide for ADAAG compliant pedestrian phasing. The temporary traffic signal shall be installed to the requirements set forth in the Project Documents.

(8) Temporary Pavement Markings. When traffic is carried through construction, the Contractor shall provide and maintain temporary pavement markings as shown in the Project Documents and specified herein. Temporary pavement markings installed by the Contractor that deviate laterally from the intended alignment more than 12 inches shall be removed and replaced to the proper alignment at no additional cost to the Owner.

i. Waterborne Traffic Line Paint. The surface preparation, alignment, and application of waterborne traffic line paint shall be completed as per the Construction Requirements of Section 807.3 of the KDOT Standard Specifications.

ii. Temporary Pavement Markings and Removable Line Masking Tape. The surface preparation, alignment, and application of temporary pavement markings and line masking tape shall be completed as per the Construction Requirements of Section 805.3 (j) of the KDOT Standard Specification. Temporary pavement markings and removable line masking tape shall not be measured or paid for directly but shall be subsidiary to other items of the Contract unless "Pavement Marking (*) (**) (***)" and/or "Removable Line Masking Tape (***)" are included as pay items in the Project Documents. In all cases, removal of temporary pavement markings and removable line masking tape shall not be paid for directly and shall be considered incidental to the Work.

(9) Barricades. The Contractor shall install barricades of the types and at the locations Indicated in the Project Documents or determined by the Engineer.

i. Type III Barricades shall be used for vehicular road and lane closures. A sufficient number of barricades shall be installed to completely close the roadway or lane. Such barricades may be temporarily staggered to allow construction traffic to enter the site but must be close enough to one another to provide unmistakable guidance to the travelling public that the roadway is closed. When approved signs are mounted on Type III barricades, the signs shall not cover more than 50% of the top two rails or 33% of the total area of the three rails.

ii. Type I or Type II Barricades may be used for the mounting of advanced sidewalk closure signs R9-10, R9-11, and R9-11a. These barricades shall be located on or adjacent to the sidewalk, but shall allow at a 48" width of sidewalk to be available for pedestrian use. Other devices that meet the requirements of the MUTCD may be used in lieu of Type I or II Barricades in this application.

iii. Continuous Detectable Barricades Types I, II, III, or Other Types compliant to the MUTCD shall be used at the point of sidewalk closure and adjacent to the sidewalk shoo-fly, if any.

(10) Uneven Lanes. When a height differential exists between adjacent lanes, 36" x 36" W8-11 Uneven Lanes signs shall be installed. A sign shall be placed at the beginning point of the condition and additional signs at approximately 1000 foot intervals along the affected roadway segment. Uneven Lane signs shall be placed in both directions if applicable.

(11) Surface Drop-off Treatment. On projects that carry traffic through construction the Contractor shall provide for the treatment of vertical or near vertical drop-offs from the driving surface to adjacent areas. When such drop offs are not separated by an approved barrier, the Contractor shall utilize the applicable treatment action specified in Table 4.24 C (11).

For unusual and justifiable conditions the Engineer may waive the requirement for the pavement edge wedge. Contractor convenience or the need to remove the wedge material immediately prior to paving are not grounds for the waiving the required pavement edge wedge. Spacing of the channelizing devices (distance in feet between devices) shall be approximately equal to the posted speed limit. In no case shall edge drop-offs greater than 4 inches be unprotected overnight without a wedge or channelizing device. To the extent reasonable, the Contractor shall provide an obstruction free recovery area.

TABLE 4.24 C (11): SURFACE DROP-OFF TREATMENT

Condition	Action
The drop-off between the edge of driving lane and the adjacent area is 2 inches or less and the adjacent area is not an open driving lane.	No action required
The drop-off between the edge of driving lane and the adjacent area is 2 inches or less and the adjacent area is an open driving lane.	36" x 36" W8-11 Uneven Lanes signs shall be installed as per Section 4.24 C (11).

The drop-off between the edge of the driving lane and adjacent material is between 2 to 4 inches.	Shoulder Drop-off Signs (W8-9A and W7-3A) shall be installed at the beginning of the condition and at each intersecting roadway. Signs shall be removed or covered when not applicable. Also install channelizers along the pavement's edge with the space between devices feet equal to the posted speed in mph.
The drop-off between the edge of the driving lane and the adjacent material is 4 inches or greater.	Construct a 1:3 or flatter slope wedge (either temporary or permanent, as required) against the pavement edge, using earthen material or other materials approved by the Engineer. Also install channelizers along the pavement's edge with the space between devices feet equal to the posted speed in mph.

(12) Weather and Increased Traffic Volume Conditions. During periods of inclement weather, or during periods of unusually heavy traffic, from any cause, the Engineer may require construction operations to cease in order to adequately handle the traffic. The Engineer has the right to require the suspension and / or delay or acceleration of certain operations to obtain a sequence of operations that will aid the movement of traffic.

(13) Work Zone Traffic Control after Contractor's Application for Final Payment. The Contractor shall provide work zone traffic control whenever the Contractor's activities are taking place within the right-of-way. The Contractor may be required to complete certain work, such as the maintenance or removal of erosion and pollution control devices after the Final Application for Payment has been presented to the Owner. If such instances the Contractor shall provide the necessary work zone traffic control at no additional cost to the Owner.

D. Bid Items, Measurement, and Payment

(1) Bid Items.

TRAFFIC CONTROL	Unit: Lump Sum
STANDARD WORK ZONE SIGNS	Unit: Each
WORK ZONE INFORMATIONAL SIGNS	Unit: Each
DIRECTIONAL SIGNS	Unit: Each
D-3 SIGNS	Unit Each
TUBULAR MARKERS	Unit: Each
PORTABLE CHANNELIZATION DEVICES	Unit: Each
SEQUENCING ARROW PANEL	Unit: Each
PORTABLE MESSAGE BOARD	Unit: Each

TEMPORARY TRAFFIC SIGNAL (#)	Unit: Lump Sum
BARRICADES (TYPE I OR II)	Unit: Each
BARRICADES (TYPE III)	Unit: Each
CONTINUOUS DETECTABLE BARRICADES	Unit: Lineal Feet (nearest 1 Ft.)
TEMPORARY PAVEMENT MARKING (*) (**) (***)	Unit: Lineal Feet (nearest 1 Ft.)
WATERBORNE TRAFFIC LINE PAINT (**) (***)	Unit: Lineal Feet (nearest 1 Ft.)
REMOVABLE LINE MASKING TAPE (***)	Unit: Lineal Feet (nearest 1 Ft.)
SURFACE DROP-OFF TREATMENT"	Unit: Lineal Feet (nearest 1 Ft.)

(#) Location of Temporary Signal Installation: e.g.) (SW 6th & SW Jackson)
(*) Type of Pavement Marking: Type I, Type II, or Type IIA.
(**) Color: White or Yellow.
(***) Width: 4", 6", 12", 18", or 24" or other width designated in the Project Documents.

(2) Measurement. When "Traffic Control" is included as a pay item in the Project Documents, it shall be measured by the lump sum and no measurement of the other items listed in Section 4.23 Paragraph D shall be made unless such item is listed as a pay item in the Project Documents.

"Standard Work Zone Signs", "Barricades (Type I or II)", and "Barricades (Type III)" shall be measured as the sum of the maximum number of the individual types of these devices deployed at any one time during the project. For example: in Phase I of a project, two R2-1signs and four W20-1 signs were installed. Then in Phase II, four R2-1 signs and two W-20-1 signs were installed. In this instance, the Engineer would measure the four W20-1 signs from Phase I and the four R2-1 signs from Phase 2 resulting in a pay quantity for "Standard Work Zone Signs" of 8 Each.

"Work Zone Informational Signs", "Directional Signs" and "D-3 Signs" shall be measured per Each sign of the specified type delivered to the project. The removal and resetting of a these signs to the same or different location as may be necessary for construction sequencing, or as may be requested by the Engineer, shall not be measured.

"Portable Channelization Devices" shall be measured per each of the maximum quantity of devices deployed at any one time during the project. For example: suppose that in Phase I of a project, twenty Portable Channelization Devices are used and that in Phase II, forty Portable Channelization Devices are used. In this instance, the maximum quantity of devices used at any one time during the project is forty, resulting in a final pay quantity for "Portable Channelization Devices" of 40 Each. The removal and resetting of a Portable

Channelization Devices to the same or different location as may be necessary for construction sequencing, or as may be requested by the Engineer, shall not be measured.

"Sequencing Arrow Panel" and "Portable Message Board" shall be measured per Each of the devices deployed for a period of one week or less. If a SAP or PMB is required for subsequent week(s), it shall be measured as an additional unit for each week it is deployed.

"Temporary Traffic Signal (#)" shall be measured by the lump sum for each temporary signal installed. If more than one temporary traffic signal is installed on a project, each temporary traffic signal shall be an individual pay item identified by the signals location. A pair of signals used for controlling one-lane two-way traffic shall be measured as a single installation.

"Continuous Detectable Barricades" shall be measured as the maximum total length of barricades installed on the project at any one time. Continuous Detectable Barricade placements shall be measured to the nearest foot along the face of the barricade. The removal and resetting of a Continuous Detectable Barricades to the same or different location as may be necessary for construction sequencing shall not be measured.

The various types, colors, and widths of "Temporary Pavement Marking (*) (**) (***)", "Waterborne Traffic Line Paint (**) (***)", and "Removable Line Masking Tape" shall be measured to the nearest foot along the length of each segment installed. The "skipped" portion of broken lines shall not be measured. Double lines shall be measured by the length of material actually installed. Removal of the Temporary Pavement Markings and Line Masking Tape shall not be measured and is subsidiary.

"Surface Drop-Off Treatment" shall be measured as the length of edge wedge constructed. Measurement shall be made to the nearest linear foot along the pavement edge protected.

(3) Payment. When included as a pay item in the Project Documents, and the Engineer finds the work to be in compliance with the project documents, the item "Traffic Control" shall be paid for on a lump sum basis, which payment shall be full compensation for providing, installing, adjusting, removing and resetting the work zone traffic control and work zone traffic control devices; and for all labor, equipment, tools and incidentals necessary to complete the work as specified. Partial payments will be made as follows:

Percent of Original Project Contract Amount Completed	***Percent of Traffic Control That May Be Paid.***
Work Started	***30%***
25%	***50%***
50%	***70%***
70%	***90%***
100%	***100%***

Payment for all installed, completed and accepted individual traffic control devices and temporary pavement markings, measured as provided above, shall be made at the Contract

unit prices for the various items, which payment shall be full compensation for all materials labor, tools, equipment, and incidentals necessary to complete the work as specified.

4.25 TRAFFIC SIGNS

A. General. All traffic signs shall be in compliance with the latest edition of the Manual on Uniform Traffic Control Devices (MUTCD) and the City of Topeka Standard Drawings and Specifications. In addition, design details (color, letter height, letter series) of all words and symbols shall conform to the latest edition of the "STANDARD HIGHWAY SIGNS", published by the Federal Highway Administration (FHWA).

B. Materials. Sign posts shall be Perforated Square Steel Tube (PSST) or U-Channel type if approved by the Engineer. All Sign Posts, Post Anchors, and Post Anchor Sleeves shall conform to Section 1621 of the latest edition of KDOT Standard Specifications. In addition, all Sign Posts, Post Anchors, Anchor Sleeves, and Anchor Extensions shall be manufactured from steel sheet or strip that conform to ASTM 1011 SS Grade 50 and zinc coated in accordance to ASTM A653, Coating Designation G90.

U-Channel posts shall have a uniform cross section throughout the entire length, and shall be in compliance with the requirements of AASHTO M281. U-Channel posts may be either 2 lb/ft or 3 lb/ft, as determined by the Engineer. Perforate the web center of the post with 3/8" diameter holes on one-inch centers, initiating at one inch from one end of the post relative to the first hole center.

The PSST Sign Posts shall have 7/16 inch diameter holes or 7/16 inch diameter embossed ring (Die-Cut Knockouts) at 1 inch spacing from center to center on all 4 sides for the total length of the Post. The Post Anchor and the Post Anchor Sleeve may be furnished without the bolt holes on all 4 sides with the exception of the holes immediately above the ground line. All holes shall be drilled or punched and all welds, cuts, burrs, and sharp edges are to be smoothed off before application of finish. The Bolts, Nuts, and Washers shall comply with Section 1616 of the latest edition of KDOT Standard Specifications.

For Object Markers, the Sign Post Anchor may be reduced to 1¾" x 1¾" x 2' and the Sign Post reduced to 1½" x 1½", in line for insertion of the corner bolt.

All sheeting shall be high performance such as high intensity prismatic or diamond grade, in accordance to ASTM D4956. Sheeting shall be reflective with a translucent electra-cut material with the legend cut out. All high intensity retroreflective sheeting shall have a conformable aluminum backing, 0.005 inch to 0.010 inch of thickness. The type of adhesive used for retroreflective sheeting shall be heat activated or pressure sensitive.

The thickness for all aluminum blanks for signs having a size of 30" x 30" or smaller shall be 0.08 inch. The thickness for signs larger than 30" x 30" shall be 0.10 inch. The thickness for all street name signs shall be 0.125 inch.

Provide retroreflective sheeting, process inks and flexible delineator posts and anchoring devices that comply with Division 2200 of the latest edition of the KDOT Standard Specifications. Application of Process Inks and Lettering Films:

Use the color of film or ink to obtain the sign face, legend and border as shown in the Contract Documents. Apply process inks to the sign faces according to the retroreflective sheeting manufacturer's recommendation, or by a method that will produce an equivalent result. Apply lettering films to the sign faces according to the lettering film manufacturer's recommendation, or by a method that will produce an equivalent result. All retroreflective sheeting for permanent signing shall have a minimum of 10 year product warranty.

For all sheeting materials, the Contractor shall submit Catalog Cuts (with warranty information) to the Engineer for review and approval prior to manufacturing the signs.

C. Construction Requirements.

(1) Remove and Reset Existing Signs: Signs in the way of construction and not designated for replacement or removal shall be removed, stored by Contractor and reset after construction. Any signs damaged during construction or storage shall be returned to COT Traffic operations and replaced by Contractor. All intersection controls (Stop or Yield signs) disrupted by Construction shall be temporarily placed as close as practical to the original location until such time that the permanent sign can be re-installed. Contractor may call COT Traffic Operations at 785-368-3913 for questions and coordination.

(2) Installation: Locate and stake each sign installation according to the Plans. Orient the signs in relation to the roadway alignment as shown in the Plans. Position the signs so the sign face is vertical. After the sign is installed, the post shall be plumb and secure in the ground.

Erect the permanent signing as necessary to expedite the completion of the project and the opening of the roadway. If a temporary sign interferes with the installation of a permanent sign, remove and reset the temporary sign to a location designated by the Engineer.

Do not extend the post above the top of the sign, unless street name signs are noted in the plans to be installed "by others". Unless otherwise noted in the Plans, street name signs shall be provided and installed by the Contractor.

In all installations, the first hole above the ground line on the Sign Post, Post Anchor, and Post Anchor Sleeve (if required) must be in line for insertion of the corner bolt.

In business, commercial, and residential districts where parking and/or pedestrian movement are likely to occur or where there are other obstructions to view, the vertical clearance to the bottom of the sign shall be at least 6 feet, with a minimum lateral clearance of 24 inches.

D. Basis of Acceptance. The Engineer shall accept all permanent signs and posts based upon visual inspection, manufacturer's certification and catalog cuts submitted by the Contractor. Contractor's submittal shall also include detailed Product information, including length, unit weight, diameter and spacing of holes and maximum retained deflection under specified load.

After installation, the Engineer shall accept all permanent signs based upon visual observation of the signs in the field with respect to alignment and overall condition.

E. Bid Item, Measurement and Payment

(1) Bid Item.

TRAFFIC SIGN (*) Unit: Each

(*) Type of Sign

(2) Measurement. Traffic signs shall be measured per each sign installed.

(3) Payment. Installed and accepted traffic signs, measured as provided for above, shall be paid for at the Contract unit price for the various types of "traffic signs (*)", which payment shall be full compensation for all materials, hardware and erection, labor, tool, equipment, and incidentals necessary to complete the work as specified.

4.26 ENCASEMENT PIPE

A. General. Furnish and install steel casing pipe of the size and at the location indicated in the Project Documents.

B. Materials. Encasement Pipe shall be steel pipe meeting the requirements of ASTM-139 and having the inside diameter and wall thickness indicated in the Project Documents or as determined by a Kansas licensed Professional Engineer. Encasement pipe shall have welded joints in accordance with AWWA C-206. Steel shall be Grade B under railroads and Grade A for all other locations.

Carrier pipe shall be supported in the encasement pipe with redwood or other preservative treated wood skids. Casing spacers manufactured for this application may be used in lieu of wood skids. Skids and spacers must be approved by the Engineer.
Flowable Fill shall meet the requirements of subsection 5.09.

Trench back fill material shall meet the requirement of the Project Documents and Section 2.10.

Sand shall meet the requirements of fine aggregate for concrete as set forth in Section 5.01.

End caps shall be as specified in the Project Documents or otherwise approved by the Engineer.

C. Construction Requirements. Install encasement pipe by trenching or, when indicated in the project documents or approved by the Engineer, by boring, tunneling or jacking methods. Installation shall be to the lines and grades indicated in the Project Documents. Trenching and

boring shall be completed as specified in Section 2. When encasement pipe is installed by boring or tunneling methods, the encasement pipe shall be jacked as the boring proceeds. Boring without simultaneous jacking of the encasement pipe is not permitted.

After the encasement pipe is installed and its position in the trench or bore tunnel stabilized, the encasement pipe shall be cleaned of all debris.

Wood skids shall be secured to the barrel of the carrier pipe with metal bands in such a manner as to support the weight of the pipe along its full barrel length on the wood skids without any of the weight being supported by the pipe bell and in such a manner as necessary to properly position the carrier pipe to the specified elevations and alignment. If manufactured casing spacers are used they must be located as recommended by the manufacturer and approved by the Engineer. The annular space between the encasement pipe and the carrier pipe shall be filled with sand from end seal to end seal, and in such a manner as not to disturb the alignment or grade of the carrier pipe. Flowable fill may be used on sewers when approved by the Engineer.

End seals shall be constructed on each end of the encasement pipe as shown in the Project Documents or approved by the Engineer.

Trench backfill and compaction shall be as specified in Section 2.09 and 2.10 or otherwise indicated in the Project Documents.

D. Bid Items, Measurement and Payment.

1) Bid Items:

ENCASEMENT PIPE, (*) inch Steel Unit: Lineal foot (nearest 1 foot)

ENCASEMENT PIPE, (*) inch Steel (Bored, Jacked or Tunneled)
Unit: Lineal foot (nearest 1 foot)

2) Measurement. The various sizes of encasements pipes shall be measured to the nearest foot along the centerline of the encasement pipe from end of pipe to end.

3) Payment. Payment for the various sizes of completed and accepted "Encasement Pipe, (*) –inch Steel and "Encasement Pipe (*) –inch Steel (Bored, Jacked or Tunneled)" will be made at the established Contract Unit Prices. Such payments are full compensation for all labor, materials, equipment and incidentals necessary to complete the work as specified.

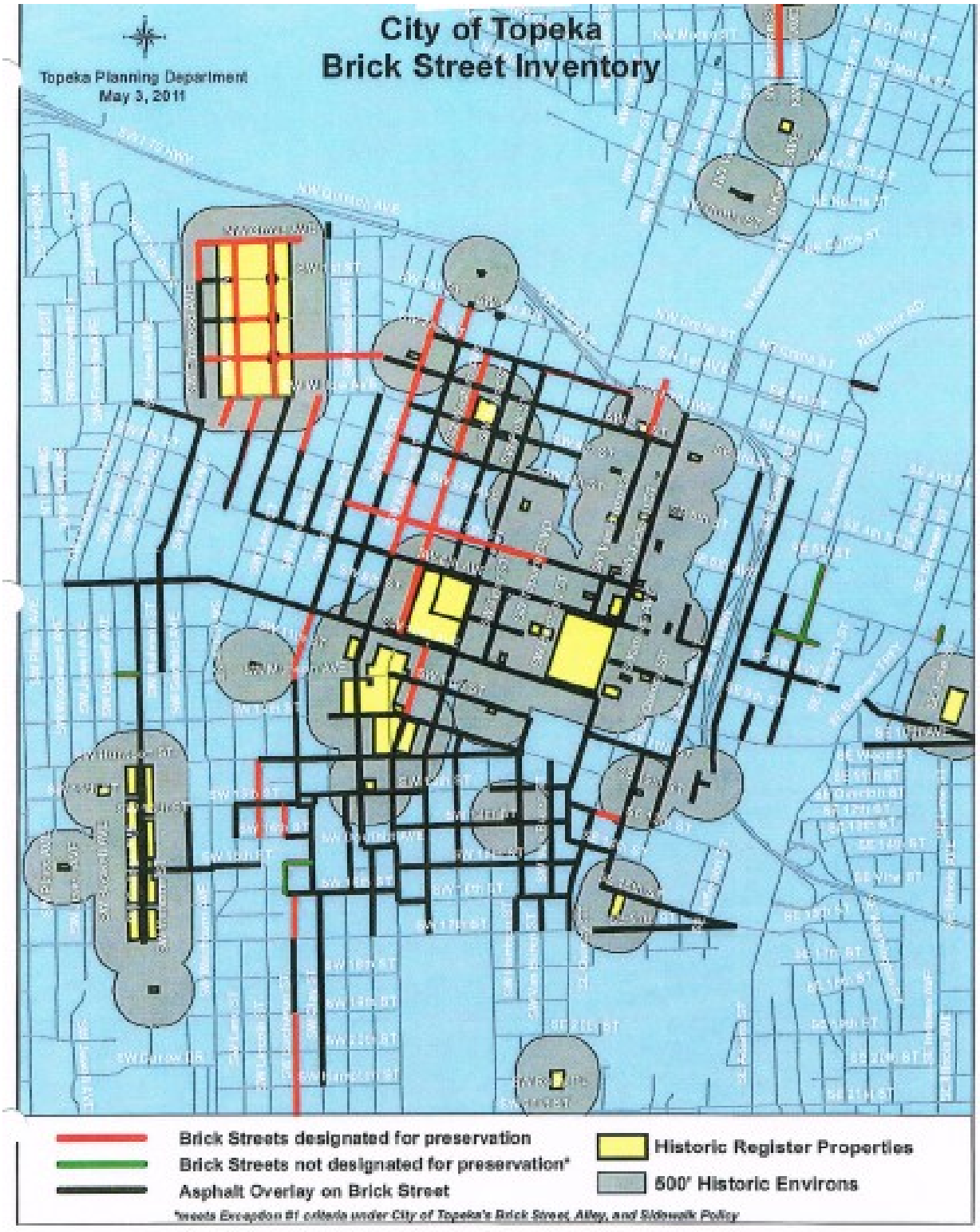


Figure 4.1 – City of Topeka Brick Street Inventory Map

END OF SECTION