

CITY OF OVERLAND PARK
TURKEY CREEK BICYCLE AND PEDESTRIAN TRAIL
PROJECT SPECIAL PROVISIONS

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1 - GENERAL REQUIREMENTS

1.1 SCOPE OF WORK

The work provided for in these Specifications shall consist of furnishing all labor, materials, appliances, and equipment, and performing all work and operations in connection with the construction of items and all other incidental and related work as set forth in these Specifications and as directed by the Engineer to make a complete and finished job.

1.2 STANDARD SPECIFICATIONS

The work shall conform to these Specifications and to the "Standard Specifications" where reference is made herein. Where reference is made in the Specifications and Contract Documents to "Standard Specifications," it shall mean that the reference is made to the current edition of the Standard Specifications for State Road and Bridge Construction, Kansas Department of Transportation, Chapters 13.02, 13.03, 13.08, and 15.08 of the Overland Park Municipal Code, current edition of City of Overland Park Traffic Signal Specifications, current edition of the Manual On Uniform Traffic Control Devices, and The City of Overland Park Traffic Control Handbook for Street Maintenance and Construction Operations with such revisions, amendments, and supplements as are contained herein.

Sanitary Sewer construction shall be in accordance with the "Construction and Materials Specification" as prepared by the Johnson County Unified Wastewater Districts, and on file with the State of Kansas, Department of Health and Environment, Permit No. 20969.

All sanitary sewer service line work shall conform to requirements of the Johnson County Unified Wastewater Districts Service Line Design and Construction Standards, and the most recent edition of the BOCA National Plumbing Code.

1.3 MEASUREMENT AND PAYMENT

a. Method of Measurement

The completed work shall be measured by the units described in the Proposal under each bid item that is satisfactorily completed by the Contractor. At monthly intervals, beginning one month after the Notice to Proceed, the Contractor shall submit to the City Engineer an accurate record of the work completed.

b. Basis of Payment

The amount of completed work, measured as set forth above, shall be paid for at the contract unit price bid per item described in the Proposal and shall be full compensation for furnishing all materials, labor, equipment, tools, supplies and incidental related items necessary to complete the work in accordance with the Specifications. Work not measured separately for payment is subsidiary to the item to which it pertains.

1.4 MOBILIZATION OF EQUIPMENT

(1) All equipment used by the Contractor having metal tracks shall not be driven over City streets other than those streets being constructed. Such equipment must be transported from one milling area to the next milling area.

(2) Observe legal load restrictions when operating equipment, hauling equipment, or hauling materials on public roads; newly constructed/reconstructed base, pavement, and structures; and any existing base, pavement or structures that will remain in place. Assume responsibility for changes in legal load restrictions that occur after the project was let. Obtain the Engineer's written approval and a special permit to exceed legal load restrictions on the City street system and on newly constructed/reconstructed portions of the project.

(3) Protect roadways and structures within project limits from damage. Observe curing periods before operating equipment or hauling loads on newly constructed pavement, reconstructed pavement, or structures. Do not haul loads of any size on pavement base, except when operations require equipment on pavement base to place material. Assume responsibility for damages to roadways and structures the Contractor causes when operating equipment or hauling loads.

1.5 INSPECTION OF WORK

The Contractor shall not commence placing concrete or backfilling of pipe/structures until such time as the City Engineer or his authorized representative has made inspection. Form location, grades, slopes and subgrade shall have been approved prior to placing of any concrete.

1.6 BRACING AND SHORING

It shall be the contractor's responsibility to brace and shore existing structures during construction. Any additional damage to or collapse of existing structures during the contract period shall be the sole responsibility of the Contractor.

The Contractor shall brace and shore all trenches in full accordance with Occupational Safety and Health Standards - Excavations; Final Rule 29 CFR Part 1926.

Bracing and shoring shall not be paid for directly but shall be considered subsidiary to other bid items. No additional payment shall be considered for increased quantities of earthwork, asphalt removal and replacement, or increases in other items as a result of compliance with this specification.

1.7 TRENCH BACKFILL

Flowable Fill is required for all trenches within all paved portions of the ROW including future paving, if they are known, per the Manual for Infrastructure Standards For Right of Way Restoration and City of Overland Park Standard Details.

1.8 SAMPLING AND TESTING

All sampling and testing deemed necessary by the Engineer shall be performed by a Testing Laboratory selected by the City, except that all Asphaltic Concrete mix design and tests shall be performed by a Certified Testing Laboratory selected by the Contractor, as stated in specification section "Asphaltic Concrete Surface and Intermediate Course". The costs of all such tests, showing compliance with the Specifications, shall be paid by the City, except that all Asphaltic Concrete mix design and testing costs shall be paid by the Contractor. However, in the event that any test indicates non-compliance with the Specifications, additional testing will be paid for by the Contractor to determine acceptability of the material or methods. City reserves the right to weigh any selected truck as determined by the Engineer. The City shall only pay weighing costs and any additional costs shall be at the Contractor's expense.

1.9 TRAFFIC SAFETY

When working in the traveled way, the Contractor shall provide adequate and suitable barriers, signs, warning lights, flaggers, and all other equipment necessary to direct and reroute traffic and protect the public from moving or stationary vehicles, equipment, and materials, and other obstructions. Also, adequate protective warning lights and signs shall be provided to warn of any obstruction or excavation in the street, and easement area. All barricades, signs, lights and other protective devices in public right-of-way and easements shall be installed and maintained in conformity with applicable statutory requirements, the latest edition of the "Manual on Uniform Traffic Control Devices", and the "Overland Park Traffic Control Handbook for Street Maintenance and Construction Operations".

The Police Department, Fire Department, and Med-Act shall be notified prior to closing a street with the approval of the City Engineer.

1.10 NOTIFICATION OF PROPERTY OWNERS

The Contractor will provide advance notification to the adjacent property owners on all phases of the operations.

1.11 TREE AND PLANT PROTECTION

All trees and other vegetation which must be removed to perform the work shall be removed and disposed of by the Contractor; however, no trees or cultured plants shall be unnecessarily removed unless their removal is indicated on the drawings. All trees and plants not removed shall be protected against injury from construction operations.

The Contractor shall take extra measures to protect trees designated to be preserved, such as erecting barricades or fences around the drip line, and trimming low hanging branches to prevent damage from construction equipment. Barricade or fence shall not be removed without consent of the Engineer. When installing a pipe, or any other work that may damage the tree, hand excavating or tunneling methods shall be used. Where encroachment by vehicles or equipment is expected within the drip line of the tree, the contractor will be required to place at least a 6 inches layer of organic mulch on top of the affected area to offset possible compaction. Such trees shall not be endangered by stockpiling excavated material or storing equipment within the drip line of the tree. No backfill material exceeding 4 inches in depth shall be placed within the drip line area of any tree designated to be preserved without prior consent from the Engineer.

When excavation is required within the drip line of any protected tree, the contractor shall take extra measures to protect as many roots as possible. All roots to be cut or removed shall be "cut" with a chain saw, trencher, or other methods as approved by the engineer that will leave a smooth cut surface. All roots exposed during excavation shall be protected to prevent the roots from drying out by covering the exposed area with canvas or burlap, peat moss, or mulch, and kept damp until the area has been backfilled. Where shown on the plans, trees requiring root removal of one third or more of the circumference of the root system, may require the pruning of limbs on the opposite side of the root removal or thinning the entire tree equally as directed by the Engineer. All pruning, repair, and replacement of trees and plants shall be performed by qualified nurserymen or arborists. Trees requiring trimming are as noted on the plans. This work shall not be paid for directly but shall be considered subsidiary to other bid items.

When the injury or removal of trees designated to be preserved cannot be avoided; each tree injured beyond repair or removed shall be replaced with a similar tree, or provide compensation to the City as determined by the Engineer.

1.12 WEEDS

The Contractor shall restrict the excessive growth of weeds, grasses, and other uncultivated vegetations within the project limits in accordance with the Overland Park Municipal Code. The Contractor shall cut down any excessive growth by mowing or trimming or as directed by the engineer.

No direct payment will be made for this work as it shall be considered subsidiary to other bid items in the contract.

2 - MAINTENANCE BOND

2.1 BOND REQUIREMENTS

Before entering into a Contract and within 10 business days of the notice of the award of the Contract, execute a maintenance bond on the form included in these Contract Documents. Provide the maintenance bond in an amount equal to 100% of the construction cost. Execute the maintenance bond with a surety authorized to do business in Kansas by the Kansas Commissioner of Insurance.

Keep the Maintenance Bond in full force for the bond period. If the surety fails or becomes financially insolvent, file a new bond within 5 days of such failure or insolvency that complies with the requirements of these Contract Documents

2.2 MEASUREMENT AND PAYMENT

The City will pay the premium portion of the lump sum price after the Contractor submits the surety's invoice depicting the actual premium costs owed. The City will pay the remaining portion of the lump sum price after issuing final acceptance of the Project.

Payment for "Maintenance Bond" at the contract lump sum price bid is full compensation for providing the maintenance bond, paying the maintenance bond premium, and performing any work required under the maintenance bond.

3 - FORCE ACCOUNT

3.1 DESCRIPTION

This work shall cover miscellaneous extra work required during the course of construction.

3.2 MEASUREMENT AND PAYMENT

Before the extra work is performed, the Contractor shall submit a proposed price in accordance with Paragraph (e) of "Changes in the Work" in the General Conditions for approval by the Engineer, and shall have received the written approval of the Engineer prior to commencing the proposed extra work.

The Engineer will measure each Force Account item as defined in the proposed price approved in accordance with Paragraph (e) of "Changes in the Work" in the General Conditions.

Payment for each Force Account item will be in accordance with the pre-approved proposed price.

Payment for Force Account (SET) shall be paid for on an extra work basis not to exceed the contract set price.

4 - CLEARING AND GRUBBING

4.1 DESCRIPTION

This work shall consist of clearing, grubbing, removing and disposing of all vegetation and debris as shown on the plans and in accordance with Section 201 of the Standard Specifications, except as otherwise modified herein.

4.2 CONSTRUCTION REQUIREMENTS

Erosion control measures shall be in place prior to the commencing of any work on the site in accordance with the "Temporary Erosion and Pollution Control" section. If the erosion control measures are not effective or are not approved by the City Engineer, all clearing, grubbing, and other site work shall be halted until such time as the erosion control measures are approved.

All cleared vegetation and debris including sod, stumps, shrubs, trees, and roots located within the grading limits in cut or fill sections shall be completely removed from the project site and disposed of in accordance with all applicable Federal, State and local ordinances.

Clearing shall consist of removal to the ground surface of all trees, shrubs, and stumps, down timber, snags, brush, rubbish, and other obstructions which are objectionable in the opinion of the City Engineer. In areas to receive more than four (4) feet of embankment, trees, stumps, and brush shall be cut off no more than eight (8) inches above the original ground surface or low water level. Clearing operations shall be conducted so as to prevent damage to trees left standing, to existing structures, to structures under construction, as well as to provide for the safety of employees and others.

Areas within the limits of rights-of-way, construction limits, easements, and side street approaches shall be cleared. Individual trees, groups of trees, and other vegetation within the above limits shall be left standing and undamaged as directed by the City Engineer.

Grubbing shall consist of the removal of all stumps, logs, roots larger than three (3) inches in diameter, matted roots, and other debris, to a depth not less than 18 inches below the excavated surface.

Except in areas to be excavated, stump holes and other holes from which obstructions are removed, shall be backfilled with suitable material and compacted in accordance with the "Compaction of Earthwork" section.

Material shall be disposed of off the site of the public improvements, except in the case in which permission from a private property owner is obtained. If the disposal is on private property, the Contractor shall obtain written permission of the property owner on whose property the material is placed. Copies of all agreements with property owners are to be submitted to the City Engineer.

4.3 MEASUREMENT AND PAYMENT

The Engineer will measure the clearing and grubbing as a lump sum.

Payment for "Clearing and Grubbing" at the contract lump sum price is full compensation for the specified work.

5 - TREE REMOVAL

5.1 DESCRIPTION

Tree removal shall consist of the felling, cutting up, and disposal of trees greater than 12 inches in diameter, measured 24 inches above the natural ground level. The method of disposal shall be accomplished in accordance with all applicable Federal, State, and local ordinances.

5.2 MEASUREMENT AND PAYMENT

The Engineer will measure each large tree that is removed, cut up, and disposed as shown on the plans.

Payment for "Tree Removal" shall not be paid for directly but shall be considered subsidiary to Clearing and Grubbing.

6 - REMOVAL OF EXISTING STRUCTURES

6.1 DESCRIPTION

This work shall conform to Section 202 of the Standard Specifications except as otherwise modified herein and shall include the removal of subsurface structures such as all existing drainage structures, head walls, pipe, inlets, manholes, retaining walls, conduits, foundations, cables, and other obstructions which are encountered during construction. This item shall include any items which may not be specifically listed in the Plans but are in conflict with the new construction and which would normally be encountered upon a careful examination of the site of the work. This includes repair, plugging, or removal of existing pipe after removal of structures.

The work shall also include removal and wasting of surface structures such as concrete curb, pavement of all types, sidewalk, signs and markers, fencing, and abandoned utilities as directed by the Engineer. Excluded are utilities currently in service and structures for which other provisions are made for removal.

6.2 CONSTRUCTION REQUIREMENTS

Erosion control measures shall be in place prior to the commencing of any work on the site in accordance with the "Temporary Erosion and Pollution Control" section. If the erosion control measures are not effective or are not approved by the City Engineer, all removal of existing structures shall be halted until such time as the erosion control measures are approved.

Fences that have portions of the fence removed and not replaced shall be left in a useable condition. The remaining fencing shall be terminated at an existing post, or a new corner post shall be set as shown on the plans or at the direction of the City Engineer.

Existing pavement shall be removed to provide match points as directed by the City Engineer.

Unless otherwise provided, all pipe designated for removal shall be removed and every precaution taken to avoid breaking or damaging those pipes which are to remain. The Contractor shall be held responsible for the repair of any damaged pipe and any such pipe will be replaced at the Contractor's expense. All damaged drainage pipe shall be replaced with the same type, grade and class as exists prior to the damage.

6.3 MEASUREMENT AND PAYMENT

"Removal of Existing Structures" shall not be paid for directly but shall be considered subsidiary to other bid items.

7 - EXCAVATION

7.1 DESCRIPTION

Excavation of the specified materials shown on the plans shall be done in accordance with Section 205 of the Standard Specifications except as otherwise modified herein.

7.2 CONSTRUCTION REQUIREMENTS

Erosion control measures shall be in place prior to the commencing of any work on the site in accordance with the "Temporary Erosion and Pollution Control" section. If the erosion control measures

are not effective or are not approved by the City Engineer, all excavation and other site work shall be halted until such time as the erosion control measures are approved.

a. Rough grading

Areas to be graded shall be cut to the approved subgrade elevations. The graded area shall have adequate drainage at all times. All ditches and channels shall be kept free of debris or obstructions. Erosion control measures shall be taken to protect downstream drainage systems from pollution, sedimentation or erosion caused by grading operations. Any pollution or damage occurring shall be the responsibility of the contractor.

b. Excavation

Excavation to the finish graded section for construction shall be considered Unclassified Excavation.

All stable and suitable materials from excavation shall be used as far as practicable for fills as shown on the drawings.

Suitable materials shall be defined as entirely imperishable material with that portion passing the No. 40 Sieve having a liquid limit not exceeding 40 and a plasticity index not exceeding 25 when tested in accordance with ASTM D 4318.

For privately funded street improvements, the Engineer shall provide a geotechnical report as required in Section 5.3.c.(2) for approval by the City Engineer. The Contractor shall follow the approved recommendations regarding subgrade treatment set forth in the report.

Unsuitable material encountered in the subgrade during construction shall be removed, wasted, and suitable backfill placed in accordance with "Compaction of Earthwork". All waste sites shall be provided by the Contractor and approved by the City Engineer.

Unstable material is considered to be material that has moisture content above the plastic limit of the soil. Suitable material with excess moisture caused by the Contractor's negligent operations is not classified as unstable excavation. Excavate and use unstable material in accordance with Subsection 205.4.d.

Where rock, shale or similar material is found, the excavation shall be carried 15 inches below the subgrade for the full width of the paved area, plus an additional width for form work for curbs, catch basins, curb inlets, etc. The excavated area shall be backfilled to the subgrade and shoulder elevations with suitable materials, and compacted as described in "Compaction of Earthwork".

No separate payment will be made for undercutting and overbreakage in rock excavation and for backfilling and compacting this area with the materials as shown in the plans.

c. Boring Logs

The logs of the soil borings are included in the Appendix section of these specifications. The logs are furnished by the Owner for information only and are not guaranteed to be accurate or representative of all subsurface materials and conditions that will be encountered.

7.3 MEASUREMENT AND PAYMENT

Payment for this work shall be based on plan quantity and will be paid for at the contract unit price bid per cubic yard for "Unclassified Excavation".

The Engineer will measure excavation of unstable and unsuitable material by the cubic yard. The Contractor shall conduct his operation in such a way that the Engineer can take the necessary cross sectional measurements before the backfill is placed.

Payment for Excavation ("Unsuitable") and Excavation ("Unstable") at the contract unit prices bid is full compensation for the specified work. No additional payment will be made for backfilling and compacting these areas with suitable material.

8 - EXCAVATION AND BACKFILL FOR STRUCTURES

8.1 DESCRIPTION

Work under this item shall consist of all necessary excavation for structures including the removal and disposal of all excess excavated materials, backfill around the completed structural element and related work. All work shall be done in accordance with Section 204 of the Standard Specifications and the following requirements.

8.2 CONSTRUCTION REQUIREMENTS

a. Excavation and Removals

All removal work which might endanger the new structure shall be completed before any work on the new structure is started. Partial removals of any structure or adjustments of any utility shall be made with care to preserve the value of the retained portions. Work around any live utility shall be done in such a manner that uninterrupted service can be maintained, or relocated. Excavated material which is unsuitable for backfill and excess material not required for backfill shall be disposed of off-site at an approved disposal site in compliance with local, federal and state regulations.

b. Backfill

Backfill material shall be free from large or frozen lumps greater than 3 inches, wood, or other extraneous material. All spaces excavated and not occupied by the new structure or by porous backfill shall be refilled with earth to the original ground surface or to the finished ground lines shown on the plans. No measurement will be made of backfill or compaction of backfill around structures except that portion above the original ground line which is situated within an embankment designated to be compacted. All backfill shall be thoroughly compacted and its top surface neatly graded. The backfill at abutments which fall within the limits of the roadbed, shall be placed in successive 6 inch lifts and uniformly compacted to a minimum of Type AA, MR 3-3 in accordance with Section 205 of the Standard Specifications. Backfill placed adjacent to walls shall be compacted with light equipment to prevent over stressing the walls. Backfill placed around piers shall be kept at approximately the same elevation on opposing sides. Areas to receive fill shall be stripped of all vegetation and topsoil prior to placement of fill. Existing slopes greater than 4 horizontal to 1 vertical shall be benched to assure adequate bonding between existing slope and the fill.

8.3 MEASUREMENT AND PAYMENT

Excavation and backfill around any structure will not be paid for directly, but shall be considered subsidiary to other bid items in the contract.

9 - EMBANKMENT (CONTRACTOR FURNISHED)

9.1 DESCRIPTION

If required borrow is needed to complete the earthwork, the Contractor shall furnish from an off-site source as approved by the Engineer.

9.2 MEASUREMENT AND PAYMENT

The Engineer will measure contractor furnished embankment by the cubic yard. The Engineer will measure quantities for the embankment by cross-sectioning the area and compute the volume by the average end area method. Where it is impractical to measure material by the cross section method, the Engineer may use 3-dimensional measurements or other methods agreed to by both the Engineer and Contractor. No payment will be made for quantities beyond the limits of the Contract Documents.

Payment for "Embankment (Contractor Furnished)" at the contract unit price bid is full compensation for the specified work.

Payment for compaction of the "Embankment (Contractor Furnished)" will be paid for at the appropriate contract unit price bid.

10 - COMPACTION OF EARTHWORK

10.1 DESCRIPTION

All subgrade shall be uniformly compacted as indicated on the plans and in accordance with Section 205 of the Standard Specifications.

10.2 CONSTRUCTION REQUIREMENTS

The embankment fill area shall be cleared and grubbed prior to placing the fill layers. Suitable materials, as specified in "Excavation", shall be used within the top three feet of subgrade. Where the fill is less than four feet below the subgrade, all sod and vegetable matter shall be removed from the surface upon which the fill is to be placed. The cleared surface shall be completely broken up by plowing, scarifying or stepping to a minimum depth of six inches. The material shall be recompacted. The fill shall be spread in layers not to exceed eight inches loose, free from clods, bladed or disced to an even surface, and compacted. In no case shall rocks, larger than three inches in any dimension be deposited within one foot of subgrade elevation. In no instance shall any lift or layer exceed six inches of compacted thickness. The entire embankment fill shall be spread in layers and compacted as hereinafter specified.

After each fill layer has been spread as outlined above, the entire area shall be compacted as set forth in these specifications. The Contractor shall have available adequate hand or mechanical compaction equipment to accomplish the compaction .

All subgrade shall be uniformly compacted to a minimum of Type AA, MR-3.

Filling and compacting operations shall continue alternately until the fill conforms with the lines, grades, and typical cross-sections shown on the approved drawings.

10.3 MEASUREMENT AND PAYMENT

No separate payment will be made for water required for compaction of subgrade.

The amount of completed and accepted work shall be paid for based on plan quantity at the contract unit price bid per cubic yard for "Compaction of Earthwork" of the specified type and moisture range.

11 - SOLDIER PILE

11.1 DESCRIPTION

The work covered under this section includes the furnishing of all materials, labor, tools, equipment, and other incidental items for the designing, detailing, and construction of a permanent soldier pile wall. All other items included in the construction of the soldier pile wall not specifically discussed herein shall conform to all applicable sections of the Kansas Department of Transportation Standard Specifications for State Road and Bridge Construction.

The Contractor performing the design and construction of the work shall have a minimum of five (5) years of experience in soldier pile wall design and construction and shall submit evidence of successful completion of at least five (5) similar projects. The design of the wall shall be performed by a registered Professional Engineer licensed in the State of Kansas.

11.2 MATERIALS

a. Design Criteria

Unless otherwise directed, the Contractor shall select the type of wall element to be used. The wall shall be designed for shear, moment, lateral and axial capacity in accordance with industry accepted design procedures. The Contractor shall be responsible for determining the length of the wall element and required section necessary to resist loadings due to earth and water forces while controlling ground movements. The wall elements shall be suitably protected from corrosion to achieve a design life of 75 years. Soil properties, wall finish and color requirements, and appurtenance locations are given in the contract plans or specifications.

Tie back anchors will not be permitted due to property owner constraints. The use of interior bracing or struts shall be discussed with the Engineer and the City of Overland Park.

The wall system shall be designed to resist any anticipated loadings, including traffic surcharges, as shown on the contract plans. The wall shall be designed to ensure stability against passive failure of the embedded portion of the vertical wall elements (below the base of excavation). The minimum FS shall be 1.5. The axial load carrying capacity of the embedded portion of the vertical wall elements (below the base of the excavation) shall be evaluated. The minimum FS shall be 2.5 for elements terminating in soil and 2.0 for elements terminating in rock. The wall shall be designed to resist vertical loads including the weight of the lagging and the vertical wall elements. Relying on transfer of vertical load into the soil behind the wall by friction shall not be permitted, unless approved by the Engineer.

Permanent facing shall be precast or cast-in-place reinforced concrete. Architectural facing treatments, if required, shall be as indicated on the contract drawings. The facing shall extend a minimum of 2.0 ft below the ground line adjacent to the wall.

The external stability of the wall shall be evaluated. Failure surfaces extending below the bottom of the wall shall be checked using slope stability calculations. The minimum FS with respect to external stability shall be 1.5 for critical wall systems as designated in the contract plans.

b. Wall Drainage

The wall drainage system shall operate by gravity and shall be capable of relieving water pressures on the back face of the wall under anticipated worst case water pressure conditions. When drainage systems are incorporated into the specific design, hydrostatic head on the back of the wall shall not exceed 6 inches above the elevation of the drainage collection pipe.

c. Submittals

Detailed calculations for all load cases showing wall shears and bending moments. Calculations for the lateral and axial capacity of the embedded portion of the wall and external stability shall also be provided.

Details, dimensions, and schedules of all reinforcing steel, including dowels and/or studs for attaching the concrete facing to the permanent ground anchor wall.

Details of the wall elements including spacing, length, and size of soldier beams, including corrosion protection requirements.

All details for construction of drainage facilities associated with the wall.

11.3 CONSTRUCTION REQUIREMENTS

a. Soldier Beam Installation in Pre-drilled Holes

Excavations required for soldier beam placement shall be performed to the dimensions and elevations on the approved working drawings. The methods and equipment used shall be selected by the Contractor.

The Contractor shall ensure that the sidewalls of the pre-drilled holes (i.e. shafts) do not collapse during drilling. Uncased shafts may be used where the sides and the bottom of the shaft are stable and may

be visually inspected prior to placing the soldier beam and concrete. Casing or drilling muds shall be used where the sides of the shaft require additional support.

The Contractor shall provide equipment for checking the dimensions and alignment of each shaft excavation. The dimensions and alignment shall be determined by the Contractor but shall be observed by the Inspector. The Inspector will check the alignment of the drilling equipment at the beginning of shaft construction and periodically thereafter. Final shaft depth shall be measured after final cleaning by the Contractor.

Loose material shall be removed from the bottom of the shaft. No more than 2 feet of standing water shall be left in the bottom of the shaft prior to beginning soldier beam installation.

The soldier beam shall be placed in the shaft without difficulty and aligned prior to general placement of concrete. The Contractor may place up to 2 feet of concrete at the bottom of the shaft to assist in aligning the soldier beam. The soldier beam shall be blocked or clamped in place at the ground surface, prior to placement of concrete.

For shafts constructed without casing or drilling muds, concrete (either structural or lean-mix backfill) may be placed by free-falling the concrete from the ground surface down the shaft and around the soldier beam. If casing is used, the placement of concrete shall begin prior to casing removal. Remove the casing while the concrete remains workable. For shafts constructed using slurry, concrete shall be placed using the tremie method from the bottom of the shaft. The tremie pipe shall be withdrawn slowly as the level of the concrete rises in the shaft and the level of the tremie pipe outlet shall never exceed the height of the slurry.

b. Wall Tolerances

Soldier beams shall be placed at the locations shown on the approved working drawings and shall not deviate by more than 1 foot along the horizontal alignment of the wall. The wall shall not deviate from the vertical alignment shown on the contract drawings by more than 4 inches in each plane.

The soldier beam or sheet pile tip shall be installed to within 1 foot of the specified tip elevation shown on the approved working drawings.

Whenever a soldier beam deviates in location or plumbness by more than the tolerance given in these guidelines, the Contractor, at his option, may provide corrective measures such as: 1) rebuilding soldier beams; 2) redesigning soldier beam; 3) adjust soldier beam spacing by adding additional soldier beams; 4) redesigning concrete facing; 5) building up the soldier beam section, or 6) other methods.

c. Welding and Splicing

Splicing of soldier beams shall not be permitted, unless approved by the Engineer. All structural welding of steel and steel reinforcement shall be performed by certified welders qualified to perform the type of welding shown on the shop drawings. All soldier beams shall be cutoff to a true plane at the elevations shown on the approved working drawings. All cutoff lengths shall remain the property of the Contractor and shall be properly disposed.

d. Wall Drainage

The Contractor shall handle preformed permeable geocomposite drains in such a manner as to ensure the geocomposite drain is not damaged in any way. Care shall be taken during placement of the geocomposite drain not to entrap dirt or excessive dust in the geocomposite drain that could cause clogging of the drainage system. Delivery, storage, and handling of the geocomposite drains shall be as provided in the plans or based on the manufacturer's recommendations.

Drainage geocomposite strips shall be placed and secured tightly. A continuous sheet of drainage geocomposite that spans between adjacent soldier beams shall not be allowed. Seams and overlaps between adjacent composites shall be made according to the special provisions or the manufacturer's recommendations and specifications. Repairs shall be performed at no additional cost to the Department and shall conform to the plans or the manufacturer's recommendation.

Where drainage aggregate is used to construct a vertical drain behind the permanent wall and in front of the lagging, the drainage aggregate shall be placed in horizontal lifts. The construction of the vertical drain should closely follow the construction of the precast facing elements. Care should be exercised to ensure that connection devices between wall elements and facing elements are not damaged during the placement of the drainage aggregate.

Perforated collector pipe shall be placed within the permeable material to the flow line elevations and at the location shown on the approved working drawings. Outlet pipes shall be placed at the low end of the collector pipe and at other locations shown or specified in the approved working drawings.

e. Concrete Facing Installation

For permanent cast-in-place and precast concrete facings, concrete manufacture, handling, placement, and finishing shall conform to the project plans. Connections used to secure the facing to wall elements shall conform to the details shown on the approved working drawings. The exposed surface of the concrete facing shall receive an anti-graffiti finish. Contractor to submit product data for such finish for approval by the owner.

11.4 MEASUREMENT AND PAYMENT

The Engineer will measure soldier pile walls by the square foot area of the wall face, measured from the top of footing (or bottom of wall for walls without footings) to the top of the wall excluding any appurtenances.

Payment for "Permanent Soldier Pile Wall" at the unit price bid is full compensation for specified work. The Contractor shall include all costs for concrete, reinforcing steel, excavation, backfill, lagging, piles, anchors, labor, design and all other materials and equipment including grouting, drilling holes.

Additional area of wall required due to unforeseen foundation conditions or other reasons and approved by the Engineer will be paid for on the basis of the unit price bid.

12 - ROCK EXCAVATION AND BLASTING

12.1 DESCRIPTION

Where solid rock, shale, or similar material is found, the excavation shall be as shown in the plans or as directed by the Engineer. The excavated areas shall be backfilled to the subgrade and shoulder elevation with materials shown in the plans. **ABSOLUTELY NO BLASTING OF ANY KIND WILL BE ALLOWED ON THIS PROJECT.**

12.2 CONSTRUCTION REQUIREMENTS

Based on the boring logs, rock excavation will be required in some areas of the project.

The Contractor shall excavate rock encountered by use of track propelled equipment equipped with ripping teeth or rock excavation buckets. The Contractor shall be prepared to provide equipment of sufficient capabilities to conduct rock excavation operations in this manner. Only in the event that this method is deemed inadequate, as determined by the Project Engineer, shall other methods of excavation be allowed. These methods may include rock splitting, operation of hydraulic "hoe ram" equipment, or other methods, at the sole discretion of the Engineer.

12.3 MEASUREMENT AND PAYMENT

No separate payment will be made for rock excavation, as it will be considered subsidiary to other bid items.

13 - AGGREGATE BASE COURSE (OP SPECIAL)

13.1 DESCRIPTION

This work shall consist of furnishing and placing aggregate base course in accordance with the following specifications and as shown on the plans.

13.2 MATERIALS

a. Compaction

Compaction requirements shall be based on the results of a test section constructed by the Contractor, using the materials, methods, and equipment proposed for use in the work. The test section shall meet the requirements of paragraph "Test Section" and shall be observed by the City Engineer.

(1) Compaction Equipment

A dual or single smooth drum roller with vibratory capability and static weight not less than 150 lbs/in width of drum.

b. Sampling and Testing

(1) Samples

Samples for material gradation, liquid limit, and plastic limit tests shall be taken in conformance with ASTM D 75.

(2) Initial Test

One of each of the following tests shall be performed on the proposed material, prior to commencing construction for each source (geological unit) of material: Sieve analysis, wear test, soundness, absorption, specific gravity, liquid limit and plasticity index, and moisture-density relationships. Certified test results shall be submitted to the City Engineer prior to commencing construction.

(3) Sieve Analyses

Sieve analyses shall be made in conformance with ASTM C 117 and C 136. Sieves shall conform to ASTM E 11.

(4) Liquid Limit and Plasticity Index:

Liquid Limit and plasticity index shall be determined in accordance with ASTM D 4318.

(5) Testing Frequency

Testing frequency for sieve analysis, liquid limit and plasticity index -- Results shall verify that the material complies with the specifications. After the initial test, a minimum of one analysis shall be performed for each 835 tons of material placed, with a minimum of one analysis for each day's placement until the base course is completed. When the source of materials is changed or deficiencies are found, the initial analysis shall be repeated and the material already placed shall be re-tested to determine the extent of unacceptable material. All in-place unacceptable material shall be replaced.

(6) Density

Density will be determined by roller pattern. The City Engineer may perform check density test as specified herein at random times.

(7) Soundness, Wear, Absorption, and Specific Gravity Test shall conform to the requirements of Section 1104 of the standard specifications. The above test shall be performed in accordance with test methods stated in Section 1115 of the standard specifications.

c. Approval of Material

(1) Aggregates

Aggregates shall consist of clean, sound, durable particles of crushed limestone stone. The Contractor shall obtain materials that meet the specification and can be used to meet the grade and smoothness requirements specified herein, after all compaction operations have been completed. The

aggregates shall be free of silt and clay as defined by ASTM D 2487, vegetable matter, and other objectionable materials or coatings. The portion retained on the No. 4 sieve shall be known as coarse aggregate; that portion passing the No. 4 sieve shall be known as fine aggregate.

(2) Coarse Aggregates

Coarse aggregates shall be angular particles of uniform density. The percentage of flat and/or elongated particles shall not exceed 20 in the fraction retained on the 1/2 inch sieve and in the fraction passing the 1/2 inch sieve. A flat particle is one having a ratio of width to thickness greater than 3; an elongated particle is one having a ratio of length to width greater than 3. When the coarse aggregate is supplied from more than one source, aggregate from each source shall meet the requirements set forth herein.

(3) Fine Aggregate

Fine aggregate shall be natural sand or angular particles produced by crushing stone or gravel that meets the requirements for wear and soundness specified for coarse aggregate.

(4) Gradation Requirements

Gradation requirements specified herein shall apply to the completed compacted base course. The aggregates shall have a maximum size of 2 inches and be graded continuously well within the limits specified in Table I. Sieves shall conform to ASTM E 11.

TABLE I. GRADATION OF AGGREGATES

Percentage by Weight Passing Square-Mesh Sieve:

Sieve Designation	Percent Passing
50 mm (2 inches)	100
37.5 mm (1 ½ inches)	70-100
25 mm (1 inch)	45-80
12.5 mm (1/2 inch)	30-60
4.75 mm (No. 4)	10-35
2.36 mm (No. 8)	5-25
425 µm (No. 40)	4-18
75 µm (No. 200)	0-10

Liquid limit and plasticity index requirements stated herein shall apply to any aggregate component that is blended to meet the required gradation and also to the aggregate in the completed base course. The portion of the aggregate passing the No. 40 sieve shall be either non-plastic or have a liquid limit not greater than 25 and a plasticity index not greater than 5.

(5) Stockpiling Material

Prior to stockpiling of material, storage sites shall be cleared and leveled by the Contractor. Aggregates shall be stockpiled on the cleared and leveled areas designated by the City Engineer so as to prevent segregation. Materials obtained from different sources shall be stockpiled separately.

13.3 CONSTRUCTION REQUIREMENTS

a. Preparation Of Surface

Immediately prior to placing aggregate base course, the previously constructed underlying surface course shall be cleaned of all foreign substances; if the surface of the underlying material has been

damaged after placement or has inadequate compaction or other deviations from this contract specification requirements, such defects shall be repaired immediately prior to placement of this course.

b. Grade Control

During construction, the lines and grades including crown and cross slope indicated for the base course shall be maintained by means of line and grade stakes placed by the Contractor.

c. Weather Limitation

Base courses shall be placed when the atmospheric temperature is above 36° F. Areas of completed base course that are damaged by freezing, rainfall, or other weather conditions shall be corrected to meet specified requirement.

d. Mixing of Materials

The coarse and fine aggregates shall be mixed in a stationary plant. **Water shall also be added to the aggregate prior to placement at a stationary mixing plant. The amount of water added shall be considerably above optimum moisture.** The Contractor shall make such adjustments in mixing procedures or in equipment as may be directed to obtain true grades, to minimize segregation or degradation, to obtain the required water content, and to insure a satisfactory base course meeting all requirements of this specification.

e. Placing

The mixed material shall be placed on the prepared sub-grade or sub-base in layers of uniform thickness with an approved spreader box when possible as directed by City Engineer. Tracked equipment operated on base course material shall have street tracks. When a compacted layer 6 inches or less in thickness is required, the material shall be placed in a single layer. When a compacted layer in excess of 6 inches is required, the material shall be placed in layers of equal thickness. No layer shall exceed 6 inches or be less than 3 inches when compacted. The layers shall be so placed that when compacted they will be true to the grades or levels required with the least possible surface disturbance. Where the base course is placed in more than one layer, the previously constructed layers shall be cleaned of loose and foreign matter by sweeping with power sweepers, power brooms, or hand brooms, as directed. Such adjustments in placing procedures or equipment shall be made as may be directed to obtain true grades, to minimize segregation and degradation, to adjust the water content, content, and to insure an acceptable base course. Mixed material shall not be placed on or above frozen material.

f. Test Section

(1) General

A test section shall be constructed to evaluate placement and compaction procedures. Test section data will be used by the City Engineer to determine the required number of passes and the field dry density requirements for full scale production. The test section shall be located with the limits of the base course construction area at a location approved by the City Engineer. The underlying courses shall be completed, inspected and approved in the test section prior to constructing the base course. The test section shall be 12 feet wide and contain approximately 100 tons of completed base course. Whenever the quarry starts producing the base course material from a different geological unit, a new test section shall be constructed.

(2) Mixing, Placement, and Compaction

Mixing, placement, and compaction shall be accomplished using equipment meeting the requirements stated hereinbefore. Compaction equipment speed shall be no greater than 1.5 miles/hour.

(a) Procedure

The test section shall be constructed with aggregate in a moist state so as to establish a correlation between number of roller passes and dry density achievable during field production. Density and moisture content tests shall be conducted at the surface and at intervals of 2 inches of depth down for the total layer thickness, in accordance with ASTM D 2922 and ASTM D 3017. Sieve analysis tests shall be conducted on composite samples, taken adjacent to the density test locations, which represent the total layer thickness. One set of tests (i.e. density, moisture, and sieve analysis) shall be taken before compaction and after each

subsequent compaction pass at three separate locations as directed by the City Engineer. Compaction passes and density readings shall continue until the difference between the average dry densities of any two consecutive passes is less than or equal to 0.5 pcf.

(3) Evaluation

Within 5 working days of completion of the test section, the Contractor shall submit to the City Engineer a Test Section Construction Report complete with all required test data and correlations. The City Engineer will evaluate the data and provide to the Contractor the required number of passes of the roller, the dry density for field density control during construction, the depth at which to check the density, and the need for a final static pass of the roller.

g. Compaction

Compaction shall be accomplished using rollers meeting the requirements of paragraph "Compaction Equipment" and operating at a rolling speed of no greater than 1.5 miles per hour. Each lift of material, including shoulders, shall be compacted with the number of passes of the roller as specified by the City Engineer. In addition, a minimum field dry density, as specified by the City Engineer, shall be maintained. If the required field dry density is not obtained, the number of roller passes shall be adjusted. Excessive rolling resulting in crushing of aggregate particles shall be avoided. In all places not accessible to the rollers, the material shall be compacted with mechanical hand operated tampers.

h. Finishing

The surface of top layer of base course shall be finished after final compaction, by cutting any overbuild to grade and rolling with a steel-wheeled roller. In no case will thin layers of material be added to the top layer of base course to meet grade. If the elevation of top layer of base course is 1/2 inch or more below the grade, the top layer of base shall be scarified to a depth of at least 3 inches, new material shall be added, and the layer shall be blended and recompacted to bring to grade. Adjustments in rolling and finishing procedures shall be made as may be directed to obtain grades, to minimize segregation and degradation of base course material, to adjust the water content, and to insure an acceptable base course. Material found unacceptable shall be removed and replaced, as directed, with acceptable material. As stated here in before the gradation applies to the completed compacted base.

i. Edges of Base Course

Acceptable material shall be placed along the edges of the base course in such quantity as will compact to the thickness of the course being constructed. When the course is being constructed in two or more layers, at least a 1 foot width of the shoulder shall be rolled and compacted simultaneously with the rolling and compacting of each layer of the base course, as directed.

j. Smoothness Test

The surface of the top layer shall not deviate more than 1/2 inch when tested with 10 foot straightedge applied parallel with and at right angles to the centerline of the area to be paved. Deviations exceeding 1/2 inch shall be corrected as directed. Measurements taken at right angles to the centerline shall be taken at a minimum of 50 foot intervals.

k. Thickness Control

The completed thickness of the base course shall be within 1/2 inch of the thickness indicated. The thickness of the base course shall be measured at intervals providing at least one measurement for at least each 500 square yards of base course. The depth measurement shall be made by test holes at least 3 inches in diameter. Where the measured thickness of the base course is more than 1/2 inch deficient, such areas shall be corrected by excavating to the required depth and replacing with new material. Where the measured thickness of the base course is 1/2 inch more than indicated, it will be considered as conforming with the requirements plus 1/2 inch, provided the surface of the base course is within 1/2 inch below established grade and not above the established grade. The average job thickness shall be the average of the job measurements as specified above but within 1/4 inch of the thickness indicated.

I. Maintenance

The base course shall be maintained in a condition that will meet all specification requirements until accepted. As directed by the City Engineer and at the Contractor's expense, aggregate base course that is contaminated by foreign material or sediment shall be removed and replaced.

Within 15 days after completion of the aggregate base course it shall be covered with asphaltic concrete intermediate course. The aggregate base course shall not be used as a haul road except for curb construction.

13.4 MEASUREMENT AND PAYMENT

The Engineer will measure the aggregate base course (OP Special) by the square yard of placed material.

Payment for "Aggregate Base Course (OP Special)" at the contract unit price bid is full compensation for the specified work.

14 - AB-3 OVERLAND PARK MODIFIED

14.1 DESCRIPTION

AB-3 Overland Park Modified shall be supplied in accordance with Section 1104 of the Standard Specifications, except as otherwise modified herein.

14.2 MATERIALS

Paragraph 1104.2(a) composition shall be modified so that the AB-3 Overland Park modified shall consist of 100% limestone or dolomite produced by mechanical crushing.

Table 1104-1: Gradation and Plasticity of Aggregates for Aggregate Base Construction shall be modified so that the AB-3 Overland Park modified shall have the gradation shown on line AB-3; however, the P.I. shall be between 0 and 5 and the liquid limit shall be 25 maximum.

The material shall be mixed with water in a stationary plant, before delivery to the project site, to obtain the moisture content as directed by the City Engineer.

14.3 CERTIFICATION OF THE MATERIAL

The Contractor shall submit with the delivery of the material to the project, a certificate indicating the gradation, plasticity index, and the moisture-density relationships of the material using ASTM D698 complies with the above material specification.

15 - CONCRETE CONSTRUCTION

15.1 DESCRIPTION

All concrete construction shall meet the requirements of Section 410 of the Standard Specifications except as otherwise modified herein.

15.2 MATERIALS

a. Mix Designs

The mix designs shall be approved by the Kansas City Metro Materials Board as meeting the designation "KCMMB 4K" or "KCMMB 5K".

b. Ready-mixed Concrete

Ready-mixed concrete shall be mixed and placed in accordance with the requirements of the Standard Specifications, except that ready-mixed concrete shall be transported with agitation, and such

concrete shall not be used when the cement has been in contact with the water more than one hour before it is placed. All concrete shall meet the slump requirements specified, and the City Engineer will require additional slump tests if, in their opinion, it appears that excessive water has been added. Concrete which does not meet this requirement will be rejected.

A diligent effort shall be made by the Contractor and the ready-mix concrete producer to deliver concrete at regular intervals, and to maintain a uniform mix throughout each concrete pour. Concrete shall be delivered at intervals frequent enough to prevent any cold joints.

c. KCMMB 4K Construction

All concrete used in construction on this project shall be classified as KCMMB 4K. The actual mixed proportions of cement, aggregates and water shall be determined by the Contractor.

d. High Early Strength KCMMB 4K Concrete

High Early Strength KCMMB 4K shall conform to the requirements of KCMMB 4K Concrete, except that it shall have a minimum compressive strength of 3,000 pounds per square inch in 24 hours. Early strength may be achieved by the addition of non-chloride accelerating admixture.

e. Curing

Wet covering and waterproof covering shall conform to KDOT Sections 1405- 1407 of the Standard Specifications. Provide liquid membrane forming compound that complies with as specified in AASHTO M148 for Type 1-D, clear or translucent with fugitive dye, or Type 2, White Pigmented Compound.

f. Reinforcing Steel

(1) Reinforcing bars shall be in accordance with “Reinforcing Steel”.

(2) Welded wire fabric shall conform to the requirements of ASTM A 185, Grade 60 and shall be supplied in sheets. Rolls shall not be used.

g. Water

Water shall be clean and free from deleterious substances.

15.3 CONSTRUCTION REQUIREMENTS

a. Placement and Curing

The Contractor shall provide 24 hours notice of his intention to place concrete to allow for adequate supervision.

Apply a waterborne monomolecular evaporation retarder to concrete surfaces, as recommended by ACI 305R, ACI 308, and ACI 345R if hot, dry, or windy weather conditions cause moisture loss approaching 0.1 lb/sf/hr as determined using the Menzel Evaporation Rate chart. Apply according to the manufacturer’s written instructions after placing, screeding, and bull floating or darbying concrete, but before final finishing operations. The engineer will confirm evaporation rate calculations. Failure to use an evaporation retarder will be grounds for rejection of concrete. The engineer shall approve all evaporation retarding materials. Evaporation retarders are not required where water-fogging equipment is in use.

Table 710-1 of the Standard Specifications shall be modified to require a minimum curing period of 5 days for Other Formed Surfaces.

b. Admixtures

KCMMB Concrete shall not be supplied with any admixtures designated as (Optional) in the Mix Design Testing Data without prior approval of the City Engineer.

Concrete admixtures will not be added to concrete after leaving the batch plant without approval of the City Engineer.

c. Forms

Forms shall be of steel or wood, free from warp and shall be sufficiently strong and rigid and securely staked and braced to obtain a finished product correct to the dimensions, lines and grades

required. All forms must be cleaned and oiled before each use. In no case shall forms obstruct the waterways of the storm sewer system.

d. Special Weather Conditions

(1) Cold Weather

The Contractor shall comply fully with the provisions of ACI 306.1-90 as modified below:

(a) Average daily temperatures as defined in ACI 306.1-90 will be determined and recorded by the City Engineer.

(b) Concrete temperatures will be determined through the use of high-low thermometers placed and operated by the City below insulated blankets, or where the concrete is uncovered, by checking air temperatures. Uncovered concrete, which has been subjected to freezing temperatures of any duration during the first 24 hours will be considered “frozen,” and shall be rejected.

(c) The months of December, January and February will be considered “Cold Weather” and will require concrete protection, regardless of temperature.

(d) Concrete shall reach 75% of its design strength prior to backfilling. This strength can be determined through the use of field-cured cylinders, made and tested at contractor’s expense. Concrete must have 5 days where the average daily temperature is above 50 degrees F prior to backfilling unless field cured cylinders are taken. These days do not need to be consecutive.

(2) Concrete operations in hot weather shall conform to Section 402.07 (a) of the Standard Specifications.

e. Backfill

Backfill of concrete structures shall be in accordance with Section 204.3.f of the Standard Specifications.

15.4 MEASUREMENT AND PAYMENT

The Engineer will measure the KCM MB 5K and KCM MB 4K structural concrete construction by the cubic yard.

Payment for “KCM MB 5K Concrete” and “KCM MB 4K Concrete” at the contract unit prices bid is full compensation for the specified work.

16 - REINFORCING STEEL

16.1 DESCRIPTION

All fabrication and placement of reinforcing steel shall be in conformance with Section 711 of the Standard Specifications. All reinforcing shall be as shown on the drawings and shall be held in place and positioned by pins or bar chairs or other approved devices or methods.

16.2 MATERIALS

Reinforcement shall be new billet ASTM A615 Grade 60 for KCM MB 5K concrete construction, or as shown on the plans. Reinforcing shall be new billet ASTM A615 Grade 40 for all other construction, or as shown on the plans.

16.3 CONSTRUCTION REQUIREMENTS

Reinforcing steel shall not be inserted into fresh concrete.

16.4 MEASUREMENT AND PAYMENT

No direct payment shall be made for reinforcing steel, as it shall be considered subsidiary to other bid items.

17 - CURB CONSTRUCTION

17.1 DESCRIPTION

Concrete curb shall be installed, or removed and replaced as shown on the plans and in accordance with the requirements of the "Concrete Construction" specification and Section 825 of the Standard Specifications except as otherwise modified herein.

17.2 MATERIALS

a. Reinforcing Steel

Reinforcement for curb and gutter shall be three No. 4 bars in accordance with "Reinforcing Steel".

b. Concrete

Concrete for curb and gutter shall be in accordance with "Concrete Construction".

17.3 CONSTRUCTION REQUIREMENTS

a. Concrete Placement

A slip form curb machine, with electronic control, shall be required on all continuous curb construction of lengths greater than 100 feet.

The concrete shall not be placed until the subgrade has been inspected for compaction and moisture. The concrete shall be consolidated with an approved internal type vibrator. The surface shall be shaped by use of a steel tool to produce the sections shown on the drawings. The edges shall be rounded with edgers to form the radii indicated on the drawings.

The surfaces shall be finished with a wooden or metallic float and brushed. All concrete shall be cured in accordance with the "Concrete Construction" specification.

b. Reinforcement

No reinforcement shall be required when curb and gutter is laid on four inches or more of asphaltic concrete base.

c. Joints

All joints shall be formed at right angles to the alignment of the curbing.

(1) Expansion Joints

Expansion joints shall be placed at points of curvature, curb returns, curb inlet transitions, and at intervals not to exceed 250 feet. The expansion joints shall consist of one-half inch premoulded bituminous, nonextruding and resilient expansion joint material cut to the configuration of the curb section. The material shall extend through the full curb section. The edges of the joints shall be rounded with an edging tool of one-quarter inch radius.

After curing, the joints shall be sealed with urethane sealant meeting ASTM C 920. The sealant shall be Class 35 ($\pm 35\%$ Joint Movement), Type S and Grade NS.

(2) Contraction Joints

Curbing shall have contraction joints formed at 15 feet intervals. They shall extend across the entire curb section. The cut shall be approximately 1/4 inch wide, and the depth shall be one-third the thickness of the curb (minimum) or as shown in the plans. The contraction joints may be formed by any approved method. If sawing joints, the contractor shall begin as soon as the concrete hardens sufficiently to

prevent excessive raveling along the saw cut and shall finish before conditions induce uncontrolled cracks, regardless of the time or weather.

d. Line and Grade

The new concrete curb and gutter shall be accurately placed in accordance with the line and grade as established by the Engineer. Curbs shall be formed to the cross section as shown on the drawings with a mule; or templates supported on the side forms and with a float not less than 4 feet in length, for hand placed curb.

The finished surface of the curb and gutter shall be checked for no more than 1/4 inch deviation, by the use of a 10 foot straightedge, and corrected if necessary. Where grades are flat and while the concrete is still plastic, the drainage of the gutter should be checked with a 4 foot carpenter's level.

e. Finish

The surfaces of curb and gutter shall be finished with a wooden or steel float and broomed. Brooming shall be perpendicular to the curb line. The brooming operation shall be so executed that the marks will be uniform in appearance and not more than one-sixteenth inch in depth. Brooming shall be completed before the concrete is in such condition that it will be torn or unduly roughened and before the concrete has attained its initial set.

f. Curing and Backfilling

(1) Curing

Concrete curbs and gutters shall be cured in accordance with "Concrete Construction".

(2) Backfilling

Backfilling operations shall not commence prior to the completion of the curing period, or until the concrete attains 75% design strength, as shown by compressive tests of field cured cylinders. All backfill material shall consist of soil suitable for vegetation. The area shall be prepared such that sod can be placed on bare soil.

g. Removal and Replacement

(1) Removal

Excavation, removal of concrete, concrete curbing, sidewalks, pavement material, or any other items required to be removed for the completion of this project shall be removed from the construction site and disposed of by the Contractor. The pavement shall be saw cut full depth in a true line a minimum of 2 inches in front of the section of curb marked to be removed. The concrete curb shall be sawed at each end of the section of curb marked to be removed. The curb shall be removed as not to disturb the adjacent pavement and adjacent curb. The Contractor will be responsible for repairing all damage to the pavement and curb and gutter resulting from his operations beyond the limits marked for repair.

(2) Replacement

The subgrade shall be compacted as required by the plans and specifications, but not less than Type AA (MR-5), clean of any foreign material, and moistened prior to placing concrete. If additional fill is required for subgrade, aggregate designated as AB-3 shall be used in accordance with Section 1104 of the Standard Specifications, or as approved by the Engineer, and 95% compacted. The Contractor shall have available adequate hand or mechanical compaction equipment to accomplish the compaction as set forth in these Specifications. Concrete, as a base material, shall be placed in front of the new curb and shall have obtained 75% design strength, as shown by compressive tests of field cured cylinders, prior to placement of asphalt surface. The concrete shall be left below the existing surface by the surface thickness, and an asphaltic concrete surface shall be placed over the concrete and compacted. Concrete and asphalt in front of the new curb shall not be paid for directly but shall be considered subsidiary to the contract price bid per linear foot of the concrete curb type.

h. Notification of Property Owner

The City will give advance notice to property owners whose curb has been marked for repairs. The Contractor shall notify each property owner when the work will actually commence.

17.4 MEASUREMENT AND PAYMENT

The Engineer will measure the curb and gutter of the specified type by linear foot along the lip of gutter.

Payment for “Curb and Gutter, Combined” and “Curb” at the contract unit prices bid is full compensation for the specified work. Curb in front of sidewalk ramps, curb transitions, Type C curbs, and other locations not a standard width or section, will be paid for as "Curb and Gutter, Combined" of the more prevalent type unless otherwise specified.

Curbs constructed in front of existing inlets shall be paid for at the contract unit price bid per linear foot of concrete curb. (See Standard Curb Inlet Detail).

No direct payment shall be made for sawing as it shall be considered subsidiary to “Curb Replacement”

18 - CONCRETE SIDEWALK CONSTRUCTION

18.1 DESCRIPTION

All sidewalk construction shall be constructed to the lines and grades shown on the Drawings or established by the City Engineer.

18.2 MATERIALS

All sidewalks shall be constructed using Portland Cement Concrete or concrete paver brick. Portland Cement Concrete and concrete paver brick shall conform to “Concrete Construction” and “Concrete Paver Stones”, respectively.

All concrete used in construction of sidewalks shall be classified as KCMMB 4K.

18.3 CONSTRUCTION REQUIREMENTS

All sidewalks shall be constructed in compliance with the American with Disabilities Act of 1990, 42 U.S.C. 12101 et seq.

a. Location

All public sidewalks constructed within the City shall be located in the public right-of-way or within a public sidewalk easement. The standard location shall be one foot from the right-of-way or easement line, except when a ditch section is used in RE Districts where they shall be one foot from the shoulder. Sidewalks shall be constructed to allow access to all pedestrian signal actuation devices.

b. Dimensions

The width of any sidewalk repair shall be the same as that being replaced. The width of new sidewalk construction shall be as indicated on the plans. The minimum width of public sidewalks shall be four feet with a five foot square passing space every 200 feet. The minimum width of public sidewalks along thoroughfare corridors shall be five feet. The minimum allowable thickness shall be four inches, except within a driveway approach area, where the minimum allowable thickness shall be six inches. Sidewalks constructed with concrete paver brick shall meet the following specifications: Four inches of concrete shall be used as a base plus one inch of bedding sand for the pavers. Edge restraint must be provided in any case to confine the paved section to the design dimensions.

c. Grades and Slopes

The grade or slope along the length of the walk shall be as near parallel to the street gradient as practical. The maximum longitudinal slope shall be one inch per foot, except where a variance from street grade has been approved by the City Engineer. The cross slope shown on the Overland Park Standard Details is one foot per 100 feet or 1%; with the intention of enforcing a 2% maximum with absolutely no

tolerance for exceeding 2%, due to Federal requirements. This maximum cross slope standard also applies when the walk crosses drives and shall slope toward the street, except in RE Districts where a ditch section is used. The finish grade of the sidewalk shall be such that the slope of the finish grade between the curb and the sidewalk will not exceed one-half inch per foot and will not be less than one-quarter inch per foot and shall slope toward the street, except in RE Districts where a ditch section is used.

d. Subgrade Preparation

The subgrade shall be uniformly compacted to a Type B density of 90% with a moisture range of MR-90. The subgrade shall be evenly graded to the required subgrade elevation. All loose or extraneous material shall be removed from the subgrade and soft spots shall be uniformly recompacted prior to placement of concrete. Sidewalk concrete material shall not be placed on frozen subgrade. The Contractor shall have available adequate hand or mechanical compaction equipment to accomplish the compaction as set forth in these specifications. The subgrade shall be properly moistened prior to placing concrete.

e. Forms

All forms shall be sufficiently strong and rigid and securely staked and braced to obtain a finished product correct to the dimensions, lines and grades required. Forms may be of steel or wood at the option of the contractor.

Each form shall not vary more than one-quarter inch in longitudinal and vertical alignment for each ten feet in length. All forms must be cleaned and oiled before each use. A slip-form machine, equipped with electronics, may be used in lieu of forms. The machine shall be equipped with mechanical internal vibrators and shall be capable of placing the finished sidewalk to the correct cross section, line and grade as required in this section. Adjustments of the string line and/or slip-form machine shall be made to give a smooth and accurate line and grade.

f. Reinforcing

Reinforcing of sidewalks will not be required except in unusual conditions where the City Engineer may require reinforcing or welded wire fabric. When welded wire fabric is used it shall be placed two inches (2") from the finished surface of the sidewalk. The reinforcement shall be supported using set spacing such that between the supports, the reinforcement does not deflect or sag excessively. There will be no direct payment for this item, and it shall be subsidiary to the unit price bid for sidewalk replacement.

g. Placing and Finishing Concrete

The contractor shall provide adequate tools and equipment to produce quality workmanship in placing and finishing concrete. The sidewalk and ramps shall be finished to the top of the forms and the surface finished with a wood or steel float and surface texture shall be a course broom finish transverse to the slope of the sidewalk or ramp. No "plastering" of the surface shall be permitted.

(1) Contraction Joints

The sidewalk surface shall be marked off into nominal squares of dimensions equal to the width of the sidewalk with a maximum distance between joints of seven feet.

All joints in formed concrete sidewalks shall be tooled. Joints shall be tooled after brooming to provide a "picture frame" appearance. A standard joint tool having a width of one-eighth inch and one inch deep having a lip radius of one-eighth inch to one-quarter inch shall be used in forming the joints.

All joints in slip-formed concrete sidewalks shall be sawed. If sawing joints, the contractor shall begin as soon as the concrete hardens sufficiently to prevent excessive raveling along the saw cut and shall finish before conditions induce uncontrolled cracks, regardless of the time or weather.

(2) Expansion Joints

Expansion joints shall be constructed at locations where the sidewalk abuts existing concrete curbs, driveways, and similar structures, and every two hundred fifty feet and as shown on approved plans. Expansion joints shall be formed with one-half inch prefabricated non-extruding filler and shall extend the full depth of the slab.

h. Curing Concrete

Sidewalk slabs shall be cured either by wet covering, waterproof covering, or liquid membrane-forming compound in accordance with "Concrete Construction". The curing period shall be a minimum of five days. Curing shall be commenced as soon as possible after the finishing operation and when the concrete has set sufficiently so that it will not be damaged in the process.

i. Backfilling Concrete

Backfilling operations shall not commence prior to the completion of the five day curing period, or until the concrete attains 75% of design strength. All backfill material shall consist of soil suitable for vegetation. The area shall be prepared such that sod can be placed on bare soil.

18.4 MEASUREMENT AND PAYMENT

The Engineer will measure the sidewalk construction by the square foot of exposed surface of specified thickness.

Payment for "Sidewalk Construction" at the contract unit price bid is full compensation for the specified work.

19 - SIDEWALK RAMPS

19.1 DESCRIPTION

This work shall be constructed in accordance with the lines and grades shown on the Drawings.

19.2 CONSTRUCTION REQUIREMENTS

a. Wheelchair Accessible Curb Ramps

Wheelchair accessible curb ramps shall be constructed at all street crossings. Maximum desirable slope of ramps shall be one inch per foot. Minimum width shall be four feet, except along thoroughfare corridors where the width shall be five feet. The minimum allowable thickness for wheelchair accessible curb ramps shall be six inches. Curbs at ramp locations must provide a gradual transition from gutter line to back of curb, not exceeding one inch in height or slopes of greater than one inch per foot. Side slopes of ramps shall not exceed one inch per foot where such side slopes are in the normal path of pedestrians on adjacent portions of sidewalk. If the street curb has not been constructed to receive the sidewalk ramp, the sidewalk constructor shall remove a section of the curb and reconstruct as required.

Ramps shall be constructed with or without a detectable warning surface as specified on the plans. Type M mortar shall be used for the setting bed and grouted joints for the detectable warning surface paver bricks in accordance with ASTM C270, Table 1 (Masonry Cement Type only).

19.3 MEASUREMENT AND PAYMENT

The Engineer will measure sidewalk ramps by the square foot of final exposed area of the entire ramp.

The Engineer will measure sidewalk ramps with a detectable warning surface by the square foot of final exposed area of the entire ramp including any detectable warning areas.

The Engineer will measure the detectable warning surface by the square foot of final exposed area. Final exposed area shall be that area exposed after installation of detectable warning surfaces and backfill operations are complete.

Payment for "Sidewalk Ramp (6")", Sidewalk Ramp with Detectable Warning Surface, and "Detectable Warning Surface" at the contract unit prices bid is full compensation for the specified work.

20 - ASPHALT SIDEWALK CONSTRUCTION

20.1 DESCRIPTION

At the locations shown on the plans the Contractor shall construct an asphalt sidewalk. The asphaltic mix to be used for this construction shall conform to the requirements for mix designation "Asphaltic Concrete Intermediate Course" as specified in specification section "OVERLAND PARK SUPERPAVE ASPHALTIC CONCRETE SURFACE AND INTERMEDIATE COURSE".

20.2 CONSTRUCTION REQUIREMENTS

a. Subgrade Preparation

The subgrade shall be uniformly compacted and evenly graded to the required subgrade elevation. All loose or extraneous material shall be removed from the subgrade and soft spots shall be uniformly recompacted prior to placement of asphalt. Asphalt sidewalks shall be constructed on a prepared subgrade, compacted to Type AA MR-3-3 standards for a minimum depth of 6 inches unless otherwise indicated on the plans. The Contractor shall have available adequate hand or mechanical compaction equipment to accomplish the compaction as set forth in these specifications.

b. Dimensions

The width of the asphalt sidewalk shall be as indicated on the plans, and the thickness shall be 4 inches unless otherwise indicated on the plans.

c. Finish

The Contractor shall provide adequate paving equipment and tools to produce quality workmanship in placing and compacting asphalt. Compaction shall be as specified in specification section "OVERLAND PARK SUPERPAVE ASPHALTIC CONCRETE SURFACE AND INTERMEDIATE COURSE".

20.3 MEASUREMENT AND PAYMENT

The Engineer will measure the asphalt sidewalk of specified thickness by the ton.

Payment for "Asphalt Sidewalk (Intermediate Course)" at the contract unit price bid is full compensation for the specified work.

21 - STORM SEWERS

21.1 DESCRIPTION

All storm sewers, structures and appurtenances shall be located as shown on the plans and as determined by the Engineer.

21.2 MATERIALS

a. Concrete Pipe

(1) Pipe

Except as modified or otherwise provided in this chapter, the manufacture of concrete pipe shall be governed by ASTM C-76, ASTM C-506 and ASTM C-507. Except for fittings and closure pieces, each piece of the pipe shall not be less than eight feet long for pipe diameters 48 inches or less and shall not be less than six feet long for pipe diameters larger than 48 inches.

The wall thickness of concrete pipe shall be not less than Wall B.

The pipe class in each case shall be as designated on the plans, and shall not be less than Class III.

(2) Reinforcement

Circumferential reinforcement shall be full-circle type. Elliptical or part-circle reinforcement will not be approved. All reinforcing shall be located and spaced as recommended by the pipe manufacturers.

(3) Joints

Rubber gasket joints shall be required for all round pipe. Mastic joints shall be required for all other pipe shapes.

The City Engineer reserves the right to require joint testing on pipe sections, either at the plant or in place, as designated by the City Engineer to demonstrate compliance.

(4) Rubber Gasket Joints

Rubber gasket joints shall conform to ASTM C 1628-06 with the following additions and exceptions:

(a) Replace ASTM C 1628-06 5.1.1 with: Circular Cross-Section or “O-Ring” Gaskets for standard use shall meet Class A requirements. Non-Circular Cross-Section or “Profile” Gaskets for standard use shall meet Class E requirements.

(b) Replace ASTM C 1628-06 9.4 with: The manufacturer shall conduct concurrently the hydrostatic test described in 9.2 and the structural test described in 9.3. If proven watertight under these combined conditions, hairline cracks that do not leak shall not be cause for rejection. A vacuum test, run in accordance with the current written plant certification procedures of the American Concrete Pipe Association, may be used in lieu of the hydrostatic test referenced above.

(c) Joint design details shall be submitted for approval together with design data and test results verifying the adequacy of the joint design.

(5) Fine aggregate shall consist of clean natural sand conforming to ASTM C-33. Artificial or manufactured sand will not be approved.

(6) Lift Holes

Lift holes are prohibited for all concrete storm sewer pipes.

(7) No concrete pipe shall be delivered to the site of the work until concrete control cylinders representing such pipe shall have attained a compressive strength of at least 80% of the specified minimum 28 day strength.

b. Corrugated Metal Pipe

(1) All corrugated metal pipe shall be fabricated from galvanized iron corrugated metal sheets, aramid polymeric fiber bonded on both sides and bituminous coated. The U.S. Gauge number shall, in each case, be as designated on the plans, and as recommended by the manufacturer of the pipe for the depth of installation and classification of soil.

(2) The aramid polymeric fiber mat shall be embedded in the zinc on both sides of the metal sheets at the time of galvanizing and before the zinc has solidified. All work shall conform to AASHTO M-36 for base metal and galvanizing and to AASHTO M-190 for bituminous coating. All joints in corrugated metal pipe shall be made using watertight coupling bands, not less than twelve inches wide, fabricated from the same material as the pipe and coated in the same manner. Each coupling band shall be lubricated sufficiently to insure that the corrugation of the band seats into the corrugations of the two pipes being joined, when the bolts are tightened.

(3) Corrugated Metal Pipe manufacturer’s certification shall be submitted to the City Engineer.

c. Concrete Lined Ditch

Concrete shall be as specified in “Concrete Construction”. Wire fabric shall conform to ASTM A-185. Wire fabric shall be supplied in flat sheet form.

d. Embedment

Embedment materials both below and above the bottom of the pipe, the classes of embedment to be used, and the placement and compaction of embedment materials shall conform to the requirements shown in the current Standard Details and to the supplementary requirements in this section.

e. Tamped Backfill

All backfill materials shall be in conformance with the City's Manual of Infrastructure Standards for Right of Way Restoration as promulgated by the City Engineer.

f. Special Pipe

All special pipe sections necessary to complete the storm sewer system as shown on the plans shall be furnished by the Contractor. These sections shall include, but not be limited to, drop joint or radius pipe, bends, tees, and Type III end sections. The pipe manufacturer shall provide shop drawings indicating the exact methods to be used to achieve the lines and grades indicated on the plans, including a pipe laying schedule, and the configuration and number of any special pipe sections. All special pipe sections used shall be subsidiary to other bid items.

21.3 CONSTRUCTION REQUIREMENTS

a. Location and Grade of Sewers

The grade and alignment of the pipe shall be determined and maintained from tacked offset stakes located alongside the trench upon which cuts and elevations have been established by the Contractor. Pipe alignment during construction shall be maintained by the use of laser alignment equipment. A minimum of eighteen inches of cover shall be maintained over the storm sewer pipe.

b. Post Construction Video

Once installation and backfill of the proposed storm sewer has been completed and all grading over and around the storm sewer is completed, the Contractor shall be responsible for video taping each run of storm sewer pipe, less than 42 inches in diameter, to verify that the segment of pipe is in sound, stable condition and that no failures have occurred during construction. This video shall be delivered to the City Engineer for approval prior to any permanent pavement being placed over any said storm sewer. The development and delivery of this video shall be considered subsidiary to other bid items.

c. Blasting

The contractor shall comply with all laws, ordinances, applicable safety code requirements, and regulations relative to the handling, storage, and use of explosives and the protection of life and property. He shall be responsible for all damage caused by his blasting operations. All blasting within the City shall conform to City Ordinance Chapter 5.36 for Explosive and Blasting Agents.

Suitable weighted plank coverings or mattresses where required shall be provided to confine all materials lifted by blasting within the limits of the excavation or trench.

All rock which cannot be handled and compacted as earth shall be kept separate from other excavated materials and shall not be mixed with backfill or embankment materials except as specified or directed.

d. Unauthorized Excavation

Except where otherwise authorized, shown or specified, all material excavated below the bottom of concrete walls, footings, slabs on grade, and foundations shall be replaced by and at the expense of the contractor, with concrete placed at the same time and monolithic with the concrete above.

e. Removal of Water

The contractor shall provide and maintain adequate dewatering equipment to remove and dispose of all surface and ground water entering excavations, trenches, or other parts of the work. Each excavation shall be kept dry during subgrade preparation and continually thereafter until the structure to be built, or the pipe to be installed, therein is completed to the extent that no damage from hydrostatic pressure, flotation, or other causes will result.

All excavations for concrete structures or trenches which extend down to or below the static ground water elevations shall be dewatered by lowering and maintaining the ground water surface beneath such excavations a distance of not less than 12 inches below the bottom of the excavation.

Surface water shall be diverted or otherwise prevented from entering excavated areas or trenches to the greatest extent practicable without causing damage to adjacent property.

The contractor will be held responsible for the condition of any pipe or conduit which he may use for drainage purposes, and all such pipes or conduits shall be left clean and free from sediment.

f. Sheeting and Shoring

Except where banks are cut back on a stable slope, excavation for structures and trenches shall be properly and substantially sheeted, braced, and shored, as necessary, to prevent caving or sliding, to provide protection for the workmen and the work, and to provide protection for existing structures and facilities. Sheeting, bracing and shoring shall be designed and built to withstand all loads that might be caused by earth movement or pressure, and shall be rigid, maintaining shape and position under all circumstances. The contractor shall brace and shore all trenches in full accordance with Occupational Safety and Health Standards - Excavations; Final Rule 29 CFR Part 1926.

g. Stabilization

Trench bottoms and subgrades for concrete structures shall be firm, dense and thoroughly compacted and consolidated; shall be free from mud and muck; and shall be sufficiently stable to remain firm and intact under the feet of the workmen.

Trench bottoms or subgrades for concrete structures which are otherwise solid, but which become mucky on top due to construction operations, shall be reinforced with one or more layers of crushed stone or gravel. Not more than one-half inch depth of mud or muck shall be allowed to remain on stabilized trench bottoms when the pipe bedding material is placed thereon. The finished elevation of stabilized subgrades for concrete structures shall not be above the subgrade elevations shown on the plans.

h. Crushed Rock or Gravel Fills

Crushed rock or gravel fills shall be placed on a suitably prepared subgrade and tamped to the extent necessary for consolidation. Crushed rock or gravel shall be free from dust, clay, or trash and shall be graded one and one-half inches to No. 4 as defined in ASTM C 33-05.

Where crushed rock or gravel fills are to be covered with concrete after the fills have been installed, the top surface thereof shall be graded to the required subgrade surface and covered with polyethylene film.

i. Trench Excavation

The contractor shall not open more trench in advance of pipe laying than is necessary to expedite the work. One block or 400 feet (whichever is the shorter) shall be the maximum length of open trench permitted on any line under construction. Except where tunneling is shown on the plans or is permitted by the City Engineer, all trench excavation shall be open cut from the surface.

j. Alignment, Grade and Minimum Cover

The alignment and grade or elevation of each pipeline shall be fixed and determined by means of offset stakes. An approved laser beam may be used in addition to offset stakes. Vertical and horizontal alignment of pipes, and the maximum joint deflection used in connection therewith, shall be in conformity with the requirements of the specification covering the installation of the pipe being laid in each case.

Where pipe grades or elevations are not definitely fixed by the contract drawings, trenches shall be excavated to a depth sufficient to provide a minimum depth of backfill cover over the top of the pipe of eighteen inches.

k. Limiting Trench Widths and Pipe Clearances

Trenches shall be excavated to a width which will provide adequate working space and pipe clearances for proper pipe installation, jointing, and embedment. However, the limiting trench widths below an elevation six inches above the top of the installed pipe, and minimum permissible clearances

between the installed pipe and either trench wall, shall be as shown in the current Standard Details, and in the table in this Chapter, Subsection 1.3.w.

The stipulated minimum clearances shown in the table are not minimum average clearances, but are minimum clear distances which will be permitted between any part of the pipe as laid and any part, projection or point of rock, shale, stone or boulder.

Where necessary to reduce the earth load on trench banks to prevent sliding and caving, the banks may be cut back on slopes which shall not extend lower than one foot above the top of the pipe.

l. Unauthorized Trench Widths

Where for any reason, the width of the lower portion of the trench as excavated at any point exceeds the maximum permitted either pipe of adequate strength, special pipe embedment, or arch concrete encasement, as required by loading conditions and as determined by the City Engineer, shall be furnished and installed.

m. Mechanical Excavation

The use of mechanical equipment will not be permitted in locations where its operations would cause damage to trees, buildings, or other existing property, utilities, or structures above or below ground; in all such locations, hand-excavating tools and methods shall be used.

Mechanical equipment used for trench excavation shall be of a type, design, and construction, and shall be so operated that the rough trench excavation bottom elevation can be controlled, that uniform trench widths and vertical side walls are obtained at least from an elevation one foot above the top of the installed pipe to the bottom of the trench, and that the trench alignment is such that the pipe when accurately laid to specified alignment, will be centered in the trench with adequate clearance between the pipe and side walls of the trench. Undercutting of the trench sidewall to obtain clearance will not be permitted.

All mechanical trenching equipment, its operating condition, and the manner of its operation, shall be subject at all times to the approval of the City Engineer.

n. Excavation Below Pipe Subgrade

Except where otherwise required, pipe trenches shall be excavated below pipe subgrade elevations, as shown in the current Standard Details on file in the office of the City Engineer, to provide for the installation of granular foundation material.

o. Artificial Foundations in Trenches

Whenever so ordered by the City Engineer, the contractor shall excavate to such depth below grade as the City Engineer may direct, and the trench bottom shall be brought to grade with such materials as the City Engineer may order installed. All timber, concrete foundations, wooden inverts, pipes, posts, stringers, and/or saddles, made necessary by quicksand or other treacherous soil, shall be installed as directed by the City Engineer.

p. Bell Holes

Bell holes shall provide adequate clearance for the tools and methods used in installing the pipe. No part of any bell or coupling shall be in contact with the trench bottom, trench walls, or the granular fill when the pipe is jointed.

q. Placement and Compaction

All granular fill material beneath the pipe shall be spread and the surface graded to provide a uniform and continuous support beneath the pipe at all points between bell holes or pipe joints. It will be permissible to slightly disturb the finished subgrade surface by the withdrawal of pipe slings or other lifting tackle.

After each pipe has been graded, aligned, placed in final position on the bedding material, and shoved home, sufficient pipe embedment material shall be deposited and compacted under and around each side of the pipe and back of the bell or end thereof to firmly hold and maintain the pipe in proper position and alignment during subsequent pipe jointing, embedment, and backfilling operations.

Embedment material shall be deposited and compacted uniformly and simultaneously on each side of the pipe to prevent lateral displacement of the pipe. Tamped backfill materials shall be placed in uniform layers and shall have a moisture content ensuring that the maximum density will be obtained with the compaction method used.

r. Trench Backfill

All trench backfill above pipe embedment shall conform to the following requirements.

(1) Tamped Backfill

Tamped Backfill is only allowable within unpaved areas of the ROW. It may also be used outside of the ROW and when backfilling Sanitary Sewer installations.

Materials for tamped backfill and the method of placement and compaction thereof shall be as specified for tamped backfill for pipe embedment, Subsection 2.1.e.

(2) Flowable Fill

Flowable Fill is required within all paved portions of the ROW including future paving, if they are known, per the Manual for Infrastructure Standards For Right of Way Restoration and City of Overland Park Standard Details.

(3) Structure Backfill

Backfill around structures shall be compacted, to the extent necessary to prevent future settlement, by tamping or other means approved by the City Engineer. Backfill for curb inlets and/or manholes in or adjacent to the roadway shall be compacted the same as a trench beneath the roadway.

Material for backfill shall be as specified in this Chapter, Subsection 2.1. and shall contain no wood, grass, roots, broken concrete, stones, trash, or debris of any kind. No tamped or otherwise mechanically compacted backfill shall be deposited or compacted in water.

s. Drainage Maintenance

Trenches across roadways, driveways, walks, or other trafficways adjacent to drainage ditches or water courses shall not be backfilled prior to the completion of backfilling of the trench on the upstream side of the trafficway to prevent the impounding of water after the pipe has been laid. Bridges and other temporary structures required to maintain traffic across such unfilled trenches shall be constructed and maintained by the contractor. Backfilling shall be done so that water will not accumulate in unfilled or partially filled trenches. All material deposited in roadway ditches or other water courses crossed by the line of trench shall be removed immediately after backfilling is completed and the section grades and contours of ditches or water courses shall be restored to their original condition. Surface drainage shall not be obstructed longer than necessary.

t. Protection of Trench – Backfill in Drainage Courses

Where trenches are constructed in or across roadway ditches or other watercourses, the backfill shall be protected from surface erosion by adequate means. Where the grade of the ditch exceeds one percent, suitable ditch checks as approved by the City Engineer shall be installed as directed. Ditch checks may be creosote lumber, stone, or concrete as authorized. In any case, the ditch check shall extend not less than two feet below the original ditch or watercourse bottom for the full bottom width and not less than 18 inches into the side slopes thereof.

u. Disposal of Excess Excavated Materials

Except as otherwise permitted, all excess excavated materials shall be disposed of away from the site of the work.

Excess earth from excavations located in unimproved property shall be distributed directly over the pipe trench and within the pipe line right-of-way to a maximum depth of six inches above the original ground surface elevation at and across the trench, and sloping uniformly each way therefrom. Material thus wasted shall be carefully finished with a drag, blade machine, or other suitable tool to a smooth uniform surface without obstructing drainage at any point. Wasting of excess excavated material in the above

manner will not be permitted where the line of trench crosses or is within a railroad, public road, or highway right-of-way.

v. Maximum Trench Widths

Plans or specifications submitted to the City Engineer for approval shall show the maximum trench width for the sizes and classes of pipe at the various cover depths for the particular project.

w. Minimum Trench Widths

The following table shows the minimum trench widths for reinforced concrete pipe:

Pipe Size In ches	Minimum Trench Width- Inches	Minimum Side Wall Clearance- Inches
12	28	6
15	30	6
18	35	6
21	39	6.5
24	44	7
27	49	8
30	54	8.5
33	58	9
36	64	10
42	73	11
48	83	12.5
54	92	13.5
60	102	15
66	109	15
72	117	15.5
78	124	15.5
84	132	16
90	139	16.5
96	147	17
10	154	17.5
2		
10	162	18
8		

x. Settlement

Whenever trenches or other excavations made by the Contractor in the performance of the work have not been properly filled, or where settlement has occurred at any time prior to final acceptance of the entire public improvement project, to the extent that the top of the backfill is below the original ground surface, such trenches shall be refilled and the surface compacted and smoothed to conform to the elevations of the adjacent ground surface. All sod in lawns and parks removed or damaged by reason of such settlement, and the repair thereof shall be restored to their original conditions.

y. Concrete Pipe

- (1) Rubber Gasket Joints

Non-Circular Cross-Section or “Profile” Gaskets shall be installed in strict accordance with the pipe and gasket manufacturer's recommendations.

For Circular Cross-Section or “O-Ring” Gaskets, immediately before jointing the pipe, the outside of the spigot and gasket and the inside of the receiving bell shall be thoroughly cleaned and coated with a suitable lubricant. The position and conditions of the rubber gasket shall be checked with a feeler gauge after the piping unit is installed.

(2) Mastic Joints

Mastic joints will be required for all non-round pipe shapes. Mastic joints shall be constructed to attain a watertight joint. Sufficient mastic will be applied so as to completely fill any space between the spigot end of one pipe and the bell end of the adjoining pipe.

(3) Marking

Each pipe, fitting, or special section shall have plainly and permanently marked thereon:

- (a) Pipe class;
- (b) Date of manufacture;
- (c) Manufacturer's name or trademark;
- (d) On mitered pipe, amount of miter and point of maximum miter.

Markings shall be indented in the pipe or painted thereon with waterproof paint. Each end of each mitered pipe, fitting or special section shall be marked with a stripe of paint approximately one and one-half inches wide and two feet long, applied along the top center line.

(4) Joint Openings

Round pipe shall have rubber gasketed joints in accordance with ASTM C 1628-06 with noted exceptions above in this Chapter, Subsection 1.2.a.(4). Other shapes shall use mastic joints as follows. In laying pipe, the maximum mastic joint opening shall not exceed the manufacturers’ recommendations, or the following table, which ever is less.

Pipe Size (Round equivalent)	Maximum Joint Opening
12"-24"	1/4"
27"-84"	1/8"/ft. of equivalent internal diameter, max. 5/8"
90" and larger	3/4"

The above maximum openings are for the purpose of compensating for minor irregularities in the manufacture of the pipe joints. The pipe is to be laid to line and grade so that the sections are pushed completely home at least one point around the circumference of the joint, without spalling the concrete. Permissible openings may exist at other points around the circumference of the pipe.

In laying pipe, the maximum rubber gasket joint pull and deflection shall not exceed the manufacturer recommendations.

(5) Bends

When special engineering conditions exist, the City Engineer may allow bends. Bends for concrete pipe shall be fabricated from segments of a steel cylinder with concrete or mortar lining and reinforced concrete exterior covering or from segments of concrete pipe miter cut while the pipe is still green. The deflection angle between adjacent segments shall not exceed 30°.

Steel cylinders shall be at least U.S. 10 gauge and shall be lined with concrete or mortar at least three-quarters inch thick. Bends fabricated from steel cylinders shall be designed for the same three-edge bearing loads as the adjacent pipe.

In bends fabricated from miter cut segments of concrete pipe, the reinforcing steel shall be welded and the entire bend shall be encased in concrete after installation. Concrete encasement shall be at least eight inches thick all around and shall extend the full length of the bend.

(6) Handling

Pipe, fittings, and accessories shall be handled in a manner that will insure installation in sound, undamaged condition.

Concrete pipe and fittings shall be handled carefully and shall not be bumped or dropped. No hooks shall be permitted to come in contact with joint surfaces. Pipe units shall be kept from contact with adjacent units during handling and storage.

Lift holes are prohibited for all concrete storm sewer pipe.

(7) Cleaning

The interior of all pipe and fittings shall be thoroughly cleaned of foreign matter before being installed and shall be kept clean until the work has been approved. All joint contact surfaces shall be kept clean until the jointing is completed.

Every precaution shall be taken to prevent foreign material from entering the pipe during installation. No debris, tools, clothing, or other materials shall be placed in the pipe. Whenever pipe laying is stopped, the open end of the line shall be suitably closed. Culverts, sewers, and drains shall have the upper end closed with an end board closely fitting the end of the pipe and having a number of small holes drilled near the center to prevent the trench from filling with water. All water that may have entered the trench shall be pumped out before the closure is removed. It is essential that no mud, sand or other material shall be placed in the pipe.

(8) Alignment

Piping shall be laid to the lines and grades shown on the drawings. Storm sewers shall be designed with straight pipe runs between structures. Where warranted by special engineering conditions, the City Engineer may approve the design of curved sections. Pipe lines or runs intended to be straight shall be laid straight. Curves may be formed by using fittings or mitered joints or by opening the joints for pipe 36 inches in diameter and larger. Complete curve data shall be shown on the plans. The contractor shall erect hub stakes to determine and check pipe subgrades. Not less than three hub stakes shall be maintained in proper position at all times when trench grading is in progress. If a laser beam is not used, batter boards shall be used at intervals of not more than 25 feet.

(9) Laying Pipe

Pipe shall be protected from lateral displacement by pipe embedment material. Under no circumstances shall pipe be laid in water and no pipe shall be laid under unsuitable weather or trench conditions.

Pipe shall be laid with the bell ends facing upstream unless an exception is granted by the City Engineer. Prior to assembling each joint, the new pipe section being added to the already installed pipe(s), shall be on line and grade to help insure uniform gasket contact around the entire perimeter of the bell end.

z. Corrugated Metal Pipe

All pipe, pipe couplings, and accessories therefore shall be unloaded, stockpiled, hauled, distributed, and otherwise handled in a manner which will prevent damage thereto. Care shall be taken to insure that no damage will occur to coating of pipe and pipe couplings. All hooks or other tools inserted in the ends of the pipe, and slings if used in contact with the outside of the pipe, shall be well padded.

All pipe coating which has been damaged prior to laying the pipe or placing the backfill shall be repaired in strict conformity with the pipe manufacturer's instructions and recommendations, using materials of a type and quality equal to that used in originally coating the pipe.

Special care shall be taken to lay all pipe to exact grade and line. All pipe, when jointed, shall form a true line of sewer. Any pipe that has a grade or joint disturbed after laying shall be taken up and re-laid. All pipes shall be laid with the separate sections joined firmly together, with outside laps of circumferential joints pointing upstream, and the center line of the invert coinciding with the specified alignment of the pipe.

The interior surfaces of all pipe shall be thoroughly cleaned of all foreign matter before being lowered in the trenches and shall be kept clean during laying operations. In addition, the exterior surfaces of the ends of corrugated metal pipe over which the coupling bands are to be installed, and all interior and exterior surfaces of the bands shall be both clean and dry when the pipe is laid and the joints coupled as required.

Coupled joints shall be made in strict conformity with the corrugated metal pipe manufacturer's recommendations and instructions, using watertight coupling bands and accessories as specified above.

aa. Concrete Lined Ditch

(1) Reinforcing

The reinforcing for the concrete shall be designed to withstand all earth and water pressures imposed upon the sides. The minimum amount of reinforcing placed in any section of the concrete paving shall be six inch by six-inch spacing welded wire fabric, W3 thickness. Wire fabric shall be supplied in flat sheet form. Wire fabric shall be supported on fabricated steel bar supports at three foot maximum spacing.

(2) Joints

Transverse expansion joints shall be placed at maximum intervals of 250 feet, and where new construction adjoins existing liners or other structures. Smooth dowel bars, two feet long by five-eighths inch diameter, sleeved, at 18-inch centers, shall be carried through the expansion joints. Expansion joints shall consist of one-half inch premolded, non-extruding expansion joint material. Cut-off walls shall be placed at the downstream side of all expansion joints.

Contraction joints shall be sawed or tooled to a minimum depth of one and one-half inches, at ten-foot maximum centers. No longitudinal joints shall be placed at the flow line. Joints shall be filled with an approved joint sealer material.

(3) Weep Holes

Two inch diameter plastic weep holes shall be placed at 15 foot centers and backfilled with three-quarter inch clean rock, 15 inches in all directions above the flow line. Weep holes shall be flush with the face of the concrete and the back screened.

bb. Concrete Box Culverts

(1) Lifting Inserts

Embedded lifting inserts shall provide a water tight lift point, which does not require patching or grouting. Insert type, size, and location shall be on the shop drawing.

(2) Rigging

Rigging and installation guidelines shall follow the manufacturer's recommendations.

(3) Pre-cast Box Joint Openings

In laying pre-cast box culverts, the maximum mastic joint opening shall not exceed the manufacturers' recommendations, or the following table, which ever is less.

Box Size (Internal span)	Maximum Joint Opening
$\leq 7'$	1/2"
$> 7'$	3/4"

(4) Handrails

Fabricated steel handrail and guard fence shall be hot dip zinc coated in accordance with the latest edition of ASTM A 123. Hardware for handrail and guard fence shall be hot dip zinc coated in accordance with the latest edition of ASTM A 123.

21.4 MEASUREMENT AND PAYMENT

The Engineer will measure the various sizes of storm sewer pipe by the linear foot, along the centerline of the pipe, from the center to center of structures , unless otherwise noted on the plans.

The Engineer will measure each end section by the specified size and type.

Payment for “Storm Sewer” and “End Section” at the contract unit prices bid is full compensation for the specified work. Concrete toe walls and/or bar grates shall be considered subsidiary to end sections.

Prices shall be full compensation for excavation (including rock, if necessary), bedding, backfill, asphalt repair, sawing, and for furnishing all materials necessary to complete the work and shall include all costs in modifying the existing damaged pipes or structures affected by the work.

22 - STORM SEWER INLETS AND MANHOLES

22.1 DESCRIPTION

Storm sewer inlets and manholes shall be constructed to the lines, grades, and dimensions shown on the Drawings.

22.2 MATERIALS

a. Mix Designs

All concrete used in construction of storm sewer structures shall be KCM MB 4K.

b. Concrete Structures

(1) Concrete structures shall be constructed of reinforced concrete as specified in “Concrete Construction”.

(2) The entire surface of all steel frames shall be thoroughly cleaned and hot dip zinc galvanized in accordance with the latest edition of ASTM A 123.

c. Gray-Iron Castings

Gray-iron casting shall conform to ASTM A 48.

d. Steel Castings

Steel castings shall conform to ASTM A 27, Grade 65-35, fully annealed.

e. Structural Steel

All structural steel shall conform to ASTM A 36.

f. Reinforcing Steel

Reinforcing steel used in inlets and manholes shall be ASTM A 615 grade 40.

g. Steps

Steps used in inlets and manholes shall conform to ASTM C 478

h. Shop Drawings

The details for curb inlets, junction boxes, manholes, area inlets and all other cast structures, either site constructed or pre-cast, shall be submitted to the City Engineer for approval.

22.3 CONSTRUCTION REQUIREMENTS

All storm sewer structures used on this project shall be of precast concrete, or poured in place concrete type. If precast concrete structures are used, the tops shall be poured in place, and a minimum of 6 inches of the wall steel shall be left exposed, and poured into the tops. Precast shop drawings shall be submitted and approved by the Engineer. All pipes entering or exiting precast structures shall be encased in a minimum of 6 inches of concrete all around the pipe for a distance of 24 inches adjacent to each structure.

a. Curb Inlets

Curb inlets shall be set back from the normal curb line one foot and the top of the slab for the curb inlet shall be at the same elevation as the top of the curb.

Curb inlets shall have a ten-inch opening per the current Standard Detail and a minimum size horizontal bar of three-quarters inch diameter approximately centered in the opening. Where warranted by

special engineering conditions, the City Engineer may approve the use of a six-inch opening steel frame, in which case the inlet will not be set back from the curb line as indicated in this Chapter Subsection 3.6.A.3.

The top of the curb inlet shall be cast in place and anchored to the walls. All curb inlet tops shall include an access manhole frame and cover. Access cover design shall be submitted for approval by the City Engineer.

The bottom of the curb inlet shall have concrete so placed that the invert through the curb inlet will conform in shape and slope to that of the storm sewer, and the minimum thickness of the invert shall be four inches, or two inches below the bottom of the lowest pipe.

The curb inlet shall be constructed on a reinforced concrete slab at least eight inches thick.

The curb shall transition to the inlet in ten feet on the upstream side and five feet on the downstream side; inlets located in a sump condition shall have both transitions five feet in length.

b. Area Inlets

Area inlets shall be constructed the same as stipulated under curb and gutter inlets where applicable, with the following additional items:

Area inlets shall be of the side opening type with a frame as specified in this Chapter Subsection 3.4.A.4. Each side of the area inlet with a frame shall have a minimum two feet concrete apron with vertical wing walls to contain grade around the inlet.

The City Engineer may approve area inlets with a top inlet grate where warranted by special engineering conditions. The top inlet grate shall be heavy cast iron, or fabricated steel and as manufactured for this particular purpose. The fabricated steel grate shall be hot dip zinc coated in accordance with the latest edition of ASTM A 123-02.

Area inlets shall be located and designed to adequately convey and transport the storm water into the storm sewer system.

c. Manholes and Junction Boxes.

Manholes and junction boxes shall be constructed the same as stipulated under curb inlets where applicable. Manholes shall also conform to the latest edition of ASTM C478-07. Manholes and junction boxes shall be constructed in accordance with the following additional items:

Manhole and junction box frames and covers shall be heavy duty where located in streets and trafficways. Access cover design shall be submitted for approval by the City Engineer.

Manholes shall be equipped with eccentric cones, except that flat slab tops may be used in shallow structures as approved by the City Engineer.

Junction boxes may be used with pipe sizes of any diameter.

Minimum inside diameter of manholes shall be four feet for pipe size 24 inches or less. When pipe size exceeds 24 inches in size, junction boxes shall be used. Where warranted by special engineering conditions, the City Engineer may approve junction boxes or manholes with alternate design elements.

22.4 MEASUREMENT AND PAYMENT

The Engineer will measure each inlet, manhole and junction box of the specified size and type.

Payment for "Area Inlet", "Inlet", "Junction Box" and "Manhole" at the contract unit prices bid is full compensation for the specified work.

The Engineer will measure each reconstruction of existing structure or connection to proposed storm sewer systems.

Payment for "Modification of Structure", "Adjustment of Curb Inlet", "Adjustment of Area Inlet", "Adjustment of Manhole", and "Adjustment of Junction Box" at the contract unit price bid is full compensation for the specified work.

23 - STONE RIPRAP

23.1 DESCRIPTION

This work shall consist of furnishing and placing a layer of stone riprap on properly compacted subgrade for protection of the channel slopes. Riprap shall be placed to reasonably conform to the lines and grades shown on the plans and in accordance with Section 829 of the Standard Specifications, except as otherwise modified herein.

23.2 MATERIALS

Stone for riprap shall be sound durable limestone free from cracks, seams, shale partings, and overburden spoil. Deleterious substances which include soft friable particles, objectionable materials, and other foreign matter shall not exceed 5 percent by weight. Geotextile, if specified, shall meet the requirements of Subsection 1710 of the Standard Specifications, unless modified on the plans.

Stone for riprap shall conform to the requirements of Section 1114, for the designation as indicated on the plans.

23.3 CONSTRUCTION REQUIREMENTS

a. Placement

Slope protection work shall not begin until all construction within the channel and all channel grading is complete and approved by the Engineer. In a designated FEMA floodplain the approval shall be based on a survey of the channel to insure that the grading complies with the lines and grades shown on the Drawings.

Riprap shall be placed to its full layer thickness in one operation and in such a manner as to minimize segregation and avoid displacing the underlying material. The finished surface of riprap shall blend smoothly into surrounding slope lines.

Riprap placing procedures shall result in a reasonable distribution of the stone from the largest to the smallest sizes, free from clusters of the large stones and pockets of the small stones. Placement shall begin at the bottom and proceed up the slope in a progressive manner. Dumping of stone at the top of the slope and rolling into place will not be permitted. Moving stone by drifting and pounding of rock into place will not be permitted. Final finishing of the slope shall be done as the material is being placed. Hand placing shall be employed to the extent necessary to secure the results specified herein.

The contractor shall maintain the riprap protection until accepted by the Engineer and any material displaced by any cause shall be replaced at his expense to the requirements specified herein.

23.4 MEASUREMENT AND PAYMENT

The Engineer will measure riprap by the square yard of materials acceptably placed as computed from the neat lines and grades shown on the plans. No measurement will be made of any excavation, backfill, filter fabric, or other appurtenances necessary to complete the work.

Payment for "Riprap" at the contract unit price bid is full compensation for the specified work.

24 - LARGE BLOCK GRAVITY RETAINING WALL

24.1 DESCRIPTION

This work includes furnishing and installing large block gravity retaining walls to the lines, grades, and typical sections shown on the plans and in accordance with Special Provision 07-08018 of the Standard Specifications except as otherwise modified herein.

24.2 MATERIALS

Concrete constructed of KCMMB 4K concrete conforming to the requirements of “Concrete Construction” or clean aggregate for the leveling pad shall be constructed,

Granular backfill material shall be used behind the retaining wall and shall be free draining crushed stone with a maximum size of 1/2 inch and with not more than 5% by weight of material passing the 75 µm (No. 200) sieve. Gradation of the backfill shall be submitted to the City Engineer for approval.

Large Block Wall Manufacturers and products shall be selected from one of the following:

- Redi-Rock International
- ReCon Retaining Walls
- Big Block, Inc.

24.3 CONSTRUCTION REQUIREMENTS

Work shall include preparing the wall foundation, furnishing and installing concrete leveling pad with 1/2 inch leveling sand bedding, unit fill and granular backfill. The color of the units shall be approved by the City Engineer.

Design of retaining walls shall be in accordance with an accepted design methodology, such as AASHTO or NCMA, including a global stability analysis. Construction of retaining walls shall be in accordance with the manufacturers’ written instructions and as directed by the Engineer. Design calculations and shop drawings shall be submitted to the Engineer with a Professional Engineer’s Seal (in Kansas) and shall be approved by the Engineer.

Vertical tolerances shall not exceed ¼ inch when measured with a 10 foot straightedge.

24.4 MEASUREMENT AND PAYMENT

The Engineer will measure modular retaining walls by the square foot of exposed surface and will be based on plan quantity.

Payment for “Large Block Gravity Retaining Wall” at the contract unit price bid is full compensation for the specified work, which price shall constitute full compensation for furnishing and installing all wall materials, leveling pad, granular backfill and underdrain pipe, and for all labor, materials, and equipment necessary to complete the item of work.

25 - ADJUSTMENT OF MANHOLE AND VALVES

25.1 DESCRIPTION

This item includes raising or lowering of existing manholes as required due to construction under this contract. Construction of storm sewer manholes, of both brick masonry and concrete type construction, shall be in accordance with Section 816 of the Standard Specifications except as otherwise modified herein.

Construction of sanitary sewer manholes shall be in accordance with “Construction and Materials Specification” as prepared by the Johnson County Unified Wastewater Districts, and on file with the State of Kansas, Department of Health and Environment, Permit No. 20969. Where existing sanitary sewer manhole frames and covers require raising or lowering due to construction under this contract, such adjustment shall be accomplished in accordance with the requirements of the owner.

25.2 MATERIALS

a. Brick

Brick for manholes shall be of uniform texture, hand burned throughout, and free from lime, gypsum, or other substance which would affect the brick under wet or freezing conditions.

[Section 816 references ASTM C-32 – do we need to have this section in here?] Have Nancy get ASTM standard.

b. Mortar

Mortar for all manholes shall be mixed in the proportions of 1 part by volume of Portland Cement, 1/4 part by volume of hydrated lime, and 3 parts by volume of sand. The cement, lime and sand shall be thoroughly mixed dry and only enough water added to form a mortar of proper consistency for its intended use. All mortar shall be used within 40 minutes after mixing. Mortar which has begun to take on initial set shall be discarded and shall not be mixed with additional cement or new mortar.

c. Rings and Covers

The Contractor shall furnish new manhole frames with O-ring gasket and bolted cover (Clay & Bailey No. 2014 or approved equal) for all sanitary manholes located within limits of ditch liners, and as noted on the plans. Removed rings and covers shall become the property of the Johnson County Unified Wastewater Districts.

d. Steps

The existing steps may be reused except when they have been found to be unacceptable as determined by the Engineer. If required, replacement steps will be Clay & Bailey No. 2102 or approved equal.

e. Maintenance

The Contractor shall be responsible for keeping all debris and waste material out of sewers during manhole adjustments. Should any waste material, debris, earth or other foreign material enter sewers during adjustments or other construction operations, the Contractor shall be responsible for removal of such material and shall maintain sewer flow at all times.

f. Manhole Spraying

All manhole covers shall be sprayed with a releasing agent prior to the overlay by the Contractor. Release agent spraying and asphalt removal around manholes shall be subsidiary to other bid items.

25.3 CONSTRUCTION REQUIREMENTS

a. Brick Manholes

Brick masonry manholes may be adjusted upward to accommodate construction by adding brick to obtain the proper dimension to match finish grade or surface as approved by the owner; adjustments downward will be limited to the removal of courses of brick to the top of the existing manhole cone. When greater adjustments are required, the manholes shall be reconed as indicated in the plans.

b. Precast Concrete Manholes

Precast concrete manholes may be adjusted upward by a combination of adding barrel sections and/or a maximum of one foot of concrete riser rings. Adjustments downward may be accomplished by a combination of removing barrel sections and/or a maximum of one foot of concrete riser rings.

All sanitary sewer manhole wall sections to be over 16 foot in depth shall meet the requirements of the owner for deep manholes. The Contractor shall be responsible for inspection of existing manholes to determine the extent of reconstruction necessary to meet these requirements.

25.4 MEASUREMENT AND PAYMENT

The Engineer will measure each manhole adjustment.

Payment for “Adjustment of Manholes” at the unit price bid is full compensation for the specified work.

26 - STREET LIGHTING INSTALLATION

26.1 DESCRIPTION

This work shall consist of furnishing all labor, materials and equipment to complete in place the street lighting system as shown on the plans (including standard details), as specified in the following specifications, as directed by the City Engineer, and in those sections of the standard specifications of the City of Overland Park, Kansas, and the Kansas Department of Transportation, that are either directly or by reference included herewith.

a. Plans

The plans that accompany these specifications shall be considered a part thereof. Whenever any part of the plans shall be in conflict with any other part or parts of the plans, or any part of these specifications shall be in conflict with any other part or parts of these specifications or any of the items proposed to be constructed shall appear to be impracticable, or impossible to construct, then the matter shall be immediately brought to the attention of the City Engineer or his agent. The City Engineer's decision in the matter shall be final, and the Contractor shall follow his directions to avoid any such conflict in the plans or specifications.

All incidental parts which are not shown on the plans or specified herein and which are necessary to complete the street lighting system shall be furnished and installed as though such parts were shown on the plans or specified herein. All systems shall be complete and in operation to the satisfaction of the City Engineer at the time of acceptance of the work.

All appurtenances shall be located as shown on the plans. Any deviations must be established by the City Engineer in the field. The Contractor shall have a copy of the plans and specifications at the job location at all times and accessible to the City Engineer or his authorized representative.

Prior to the acceptance of the work, the Contractor shall submit an "As Built" or corrected plan showing in detail all construction changes, especially location and depth of conduit.

b. Grades

All work shall conform to line, elevation and grades as shown on the plans.

c. Preliminary schedule of equipment and material

Prior to commencement of construction activities, the Contractor shall submit a complete schedule of materials and equipment proposed for installation for the approval of the City Engineer. This schedule shall include catalog cuts, diagrams, drawings, and other such descriptive data as may be required by the City Engineer. In the event any items of material or equipment contained in the schedule fail to comply with specification requirements, such items may be rejected.

d. Rejected materials

Rejected materials shall be immediately removed from the project site by the Contractor and shall not again be brought upon the project site. Work shall be commenced and continued at such points as may be approved by the City Engineer and shall be carried on diligently and without unnecessary or unreasonable delay.

e. Coordination with existing utilities

All existing conduit/conductor runs and other utility information were obtained from existing office records. It shall be the Contractor's responsibility to locate all utilities, whether above, on, or below the ground, and to protect the City against any and all damages arising from work under this project.

No new fixture shall be constructed as part of this contract which is in conflict with any existing utilities' facility or the code required thereby, unless approved by the City Engineer.

f. Permit

The Contractor is responsible for obtaining an electrical Building Permit from the City of Overland Park, Building Safety Division, 8500 Santa Fe Drive. The permit shall be taken out before any excavation for the controller foundation takes place.

g. Notification

The Contractor shall notify the City Engineer before beginning work on the project. The Contractor shall keep the City Engineer advised as to the progress of the project and the Contractor's proposed schedule. The Inspector or City Engineer may, at their option, cause any work completed without their knowledge or inspection to be dismantled and inspected to their satisfaction.

The contractor shall notify each property owner at least one day in advance of construction activity being started in front of the respective property. The City will provide notices for the contractor's distribution.

h. Protection of work and cleanup

The Contractor shall care for all work until final completion and acceptance by the City. All damage done to existing improvements by the Contractor shall be repaired by the Contractor. The Contractor shall remove all surplus material and rubbish from the work as it accumulates and before the Contractor makes application for the acceptance of the work.

i. Traffic control

Reasonable access to and egress from property adjacent to the project shall be maintained at all times throughout the duration of this project. If a traffic control plan is not included in the plans for the project, the following will apply:

During non-working hours, all lanes of traffic in all directions shall be maintained. During non-peak traffic hours, the Contractor may, with the authorization of the City Engineer, close such traffic lanes at the project location(s), as approved, using traffic cones, portable barricades, or any other traffic control devices the City Engineer may designate.

The Contractor is advised that no work that will restrict traffic in any way will be performed between the hours of 7 A.M. to 8:30 A.M. or 4 P.M. to 6 P.M. at the project location(s).

The Contractor shall provide proper signing and protective devices as required by the latest edition of the Overland Park Traffic Control Handbook for Street Maintenance and Construction Operations. The Contractor shall place the required signing and protective devices prior to beginning construction activity each day and patrol the work area as frequently as needed during the day and at the end of the working day. All traffic cones, signs, barricades, drums, and other devices shall be immediately properly reset if they are accidentally moved.

j. Turn-on and testing

The Contractor shall notify the Inspector for a Field Safety Inspection as soon as the system(s) is (are) ready. Upon approval with this inspection, the Contractor shall contact the City of Overland Park, Community Standards Division, for an Electrical Inspection as soon as the control center(s) is (are) ready. The Kansas City Power & Light Company should be notified in advance as to when the system would need to be energized.

All street lighting system elements shall function properly as a complete system for a minimum period of fifteen (15) days before acceptance by the City. The fifteen (15) day test period shall be continuous. Any malfunction observed or recorded shall stop the test period as of the time of the malfunction. A period shall start when the malfunction has been repaired to the satisfaction of the Inspector.

26.2 MATERIALS

The material for street lighting shall be in accordance with this specification. All materials used in the fabrication or assembly of the items listed below shall be new and of the best grade and shall be approved by the City Engineer and comply with the applicable parts of Section 814, "Electrical Lighting and Traffic Signals" and Section 1703, "Electrical Lighting and Traffic Signal Equipment" of the "Standard Specifications" with the additions as stated herein. All lighting equipment shall

a. Approved Manufacturer's List

All material for street lighting used by the Contractor shall be from the City's approved list of vendors. It is important that users be completely knowledgeable of all application requirements and procedures prior to product application. It is the responsibility of the installer to contact the supplier of all street lighting materials if questions regarding application procedures or conditions arise.

b. Regulations and code

All electrical equipment shall conform to the standards of the National Electrical Manufacturers Association (NEMA). In addition to the requirement of these specifications, the plans and the lighting specifications, all material and work shall conform to the requirements of the National Electrical Code, the Standards of the American Society for Testing Materials (ASTM), the American Standards Association (ASA), and local ordinances.

Wherever reference is made in these specifications or in the standard provisions to the code, the safety orders, the general order, or the standards mentioned above, the reference shall be construed to mean the code, order, or standard that is in effect at the date of advertising of these specifications.

c. Aluminum standards

The type of pole and length of luminaire arm (if any) shall be as specified on the plans. This pole specification is in addition to the pole detail sheet included in the plans - refer to the pole detail sheet, which describes the material specifications and pertinent design details.

(1) Pole shafts 30' and 40' in length

The aluminum lighting shaft assembly shall be spun from one piece of seamless tubing and after fabrication, it shall have mechanical strength of not less than T6 temper. The cross section of the pole shall be round, and the shaft shall be fabricated in a continuous true taper from at least 6" above the handhole to the top of the shaft. The shaft shall have no longitudinal or circumferential welds, except at the lower end joining the shaft to the base. To protect the shaft during shipping, the assembly shall be tire wrapped with a non-staining paper.

Pole dimensions shall be as specified in the City of Overland Park Standard Details. It is the responsibility of the fabricator to verify and attest that the material sizes proposed are structurally adequate and in full compliance with this specification and the pole detail sheet.

The shoe base shall be a permanent mold casting. The base shall be free of cracks, pits, and blow holes and of sufficient size and strength to withstand full design loads. The base shall telescope the shaft; and the one weld shall be on the inside of the base at the end of the shaft, while the other weld shall be on the outside at the top of the base. The shoe base and the two (2) welds shall develop the full strength of the pole assembly.

The single member arm shall be tapered by cold working from round tubing. After tapering, the member shall be flattened to produce an elliptical cross-section with the major diameter in the vertical plane, perpendicular to the wind. The outboard end of the arm shall remain round with a two-inch (2") slipfitter for mounting the luminaire. The single member arm shall be designed to meet given design factors and mounting dimensions.

The truss type member arm assembly shall be a one piece welded assembly consisting of an upper arm and lower arm (brace) securely joined by a vertical strut and a connector or weld at the outboard end of the arm assembly. The upper arm shall be tapered by cold working from round tubing. After tapering, the upper arm shall then be flattened to produce an elliptical cross-section with the major diameter in the horizontal plane, parallel to the wind. The outboard end of the upper arm shall remain round with a two-inch (2") slipfitter for mounting the luminaire. The outboard end of the lower arm (brace) shall be covered by an end cap.

(2) Pole shafts 14' in length

The 14' aluminum lighting shaft shall be spun from one piece of seamless tubing and after fabrication; it shall have mechanical strength of not less than T6 temper. The cross section of the pole shall

be round, and the shaft shall be fabricated in a continuous true taper from at least 6" above the handhole to the top of the shaft. The shaft shall have no longitudinal or circumferential welds, except at the lower end joining the shaft to the base. To protect the shaft during shipping, the shaft shall be tire wrapped with a non-staining paper.

Pole dimensions shall be as specified in the City of Overland Park Standard Details. It is the responsibility of the fabricator to verify and attest that the material sizes proposed are structurally adequate and in full compliance with this specification and pole detail sheet. The pole shall have a 3" O.D. slipfitter end, without a tenon, for mounting the post-top luminaire.

The aluminum shoe base shall be a permanent mold casting. The base shall be free of cracks, pits, and blow holes and of sufficient size and strength to withstand full design loads. The base shall telescope the shaft; and the one weld shall be on the inside of the base at the end of the shaft while the other weld shall be on the outside at the top of the base. The shoe base and the two (2) welds shall develop the full strength of the pole assembly.

The base shall be cast with four (4) slotted holes to receive the anchor bolts-threaded studs and tapped holes for attaching the four (4) cast aluminum alloy removable bolt covers provided for each pole. The bolt covers shall attach to the upright portion of the body of the base. The bolt circle is provided in Table 1 of the pole detail sheet.

d. Cobra Head Luminaire

Cobra Head style luminaires shall be constructed of a single piece die-cast aluminum upper housing and two-piece bottom door, hinged at the back and latched on the street side. The luminaire shall be equipped with an integral slipfitter for 2-inch luminaire arm mounting. The mounting device shall allow the luminaire to be mounted absolutely level and shall have no more than four (4) fasteners serving both the leveling and clamping functions. It shall allow one man to install the luminaire by simultaneously holding it in position and tightening the fasteners, such that the luminaire will be properly level at the first attempt. The luminaire shall be equipped with a 'trigger latch' for easy, one-hand, no-tools opening of the fixture for installation and servicing. A factory installed bird guard shall fit snugly around the mounting device. The luminaire shall provide a moisture proof and dust proof chamber and weather protection for the ballast.

A removable power-pad/module with quick-connect electrical hookup for easy installation of the electrical system and easy access to the ballast compartment shall be mounted on the door. Top housing mounting or a bridge assembly configuration will not be accepted.

The lens shall be a single piece of optically clear, flat, heat-resistant, impact resistant glass. The sealed optical assembly shall be a true 90° cutoff. The reflector shall be natural unpainted alzak aluminum and shall be secured to the top housing. The lamp socket shall be preset at the factory to provide I.E.S. Type III Medium Cutoff light distribution. The luminaire shall not be provided with a photocell receptacle unless otherwise noted on the plans or special provisions.

(1) Luminaires, 250 Watt and Above:

The luminaire shall be pre-wired, requiring only connection of service wires to a terminal board. The luminaire shall be equipped with a regulator, high power factor of 0.90 or better, ballast for high-pressure sodium at a voltage of 120/208/240/277 volts. The ballast shall be capable of reliably operating the lamp with a line voltage varying plus or minus 10 percent from normal. The entire ballast, including condensers, shall be easily removable and replaceable with gloved hands and without tools through the use of quick disconnecting mechanical devices and electrical plugs.

(2) Luminaries, 150 Watt:

The luminaire shall be pre-wired, requiring only connection of service wires to a terminal board. The luminaire shall be equipped with a HPF reactor, high power factor of 0.90 or better, ballast for high-pressure sodium at a voltage of 120/208/240/277 volts. The ballast shall be capable of reliably operating the lamp with a line voltage varying plus or minus 5 percent from normal. The entire ballast, including

condensers, shall be easily removable and replaceable with gloved hands and without tools through the use of quick disconnecting mechanical devices and electrical plugs.

e. Post Top Luminaire

The luminaire housing shall be constructed of cast aluminum and painted black. The ballast shall be a regulator type, high power factor, for high-pressure sodium at a voltage of 120/208/240/277 volts. The ballast components shall be housed in a totally enclosed integral compartment, and the optical section of the unit shall be completely sealed and gasketed. The pressed prismatic refractor shall be one piece polycarbonate plastic. The refractor shall be for I.E.S. Type III distribution or Type V if specified on the plans.

f. Lamps

Lamps shall be high pressure sodium (HPS) rated with a 24,000 hour average life. The wattages and lumen rating shall be as follows:

- (1) 400 watt lamps shall be rated at 50,000 lumens
- (2) 250 watt lamps shall be rated at 30,000 lumens
- (3) 150 watt lamps shall be rated at 16,000 lumens
- (4) 100 watt lamps shall be rated at 9,500 lumens
- (5) 70-watt lamps shall be rated at 5,800 lumens

g. Secondary Cable and Power Lead-In Cable

Power lead-in cable shall be #2 A.W.G. and secondary cable shall be #4 A.W.G. stranded annealed copper, single conductor cables for operation at 600 volts maximum with black insulation. Material shall meet the applicable requirements of I.P.C.E.A. Standard S-19-81, with thermoplastic insulation of GRS-Rubber base meeting Appendix K (A) of I.P.C.E.A. and listed by U.L. as Type U.S.E. for direct burial; or material shall meet the applicable requirements of I.P.C.E.A. Standard S-66-524, interim standard #2, with thermo setting insulation of cross link polyethylene meeting requirements of Column "A" of I.P.C.E.A. and listed by U.L. as Type U.S.E. RHW-75°C.

h. Pole Wiring

Pole wiring above handhole in pole to luminaire(s) shall be single conductor cable with minimum 600 volt rating, No. 10 A.W.G. Type THHN/THWN. Conductor shall be stranded annealed copper. The pole wiring cables for twin luminaire poles shall be colored red for the north or west oriented luminaire and colored black for the south or east oriented luminaire.

i. Control Center

Control center shall be an underground service type, rated for 100 A or 200 A (as specified on the plans), 240 volts, unless otherwise noted. Pedestal shall be 0.125 Aluminum raintight construction with individual meter, panel, contactor, and rear service pull "compartments". Meter and panel/contactor compartments shall have piano hinged doors with padlocking provisions. The panel and contactor compartments shall have an inside panel door. The outer front and inside panel doors shall be equipped with an approved doorstop. Meter base shall be of the type used by the local utility. Panelboard shall have silver plated copper buss and shall accept twelve 1 inch plug in breakers. Panelboard compartment shall contain a photocell and test switch. All factory installed wire shall be copper. Pedestal finish shall be natural aluminum unless otherwise indicated in the plans.

j. Conduit:

Conduit shall meet the following specifications for the type of conduit material as indicated on the plans.

- (1) PVC Conduit Material

Rigid nonmetallic conduit shall be Schedule 40 polyvinyl chloride (PVC) conduit. The conduit shall bear an Underwriters' Laboratories label and shall conform to Federal Specification WC 1094A (latest version).

- (2) HDPE Conduit Material

Conduit shall be of a flexible type conforming to the provisions specified in and on the plans. Installation shall conform to the appropriate articles of the National Electrical Safety Code.

The conduit shall be 2” Schedule 40, high-density polyethylene conduit (HDPE) with a 0.154” minimum wall thickness. It shall be constructed in accordance to the following table and having a minimum ASTM cell classification 334470EC. The conduit shall be smooth walled inside and out. The conduit shall be gray in color, and equipped with a polypropylene pull rope.

The conduit shall be manufactured to ASTM D2447 specifications and shall meet the following applicable requirements:

Density	0.940 to 0.955 g/cc	ASTM D-1505
Melt Index	0.4 to 0.15 gm/10 min.	ASTM D-1238(E)
Flexural Modulus	80 to 110 ksi	ASTMD-790
Tensile Strength	3000 to 3500 psi	ASTM D-638
Slow Crack Growth ESCR (Bell Test)	10% Igepal	ASTM D-1693
Test Duration	96 hours minimum	ASTM D-1693
Failure	10% max	ASTM D-1693
Molded Plaque	3	ASTM D-1693
Hydrostatic Strength	NPR	ASTM D-2837
Class		
Color and UV	E > 2%	ASTM D-1603
Stabilizer		
Rockwell Hardness L	49	ASTM D-785
Shore Hardness D	61	ASTM D-2240
Ultimate Elongation	>400 %	ASTM D-638

(3) HDPE Conduit Fittings

An approved factory coupling as listed in the Overland Park Approved Equipment List shall be used for connection of the HDPE conduit to a 90° factory PVC elbow or between two lengths of HDPE conduit.

26.3 CONSTRUCTION REQUIREMENTS

The contractor shall only use qualified laborers who are well trained to perform functions related to street lighting, including familiarity with applicable sections of the National Electric Code.

a. Excavation

The Contractor shall perform all excavations for installing underground conduits, cable, boxes and pole bases in whatever substances encountered, to the depths indicated on the drawings or as otherwise approved. During excavation, material suitable for backfilling shall be piled in an orderly manner a sufficient distance from the excavation to avoid slides. All excavated materials not required or unsuitable for backfill shall be removed and wasted on site obtained by the Contractor.

(1) **Rock Excavation and Blasting**

Where solid rock, shale, or similar material is found, the excavation shall be as shown in the plans or as directed by the City Engineer. The areas shall be excavated in accordance with "Rock Excavation and Blasting". ABSOLUTELY NO BLASTING OF ANY KIND WILL BE ALLOWED.

b. Backfilling

All areas excavated shall be backfilled and compacted in accordance "Compaction of Earthwork". After backfilling, all disturbed areas shall be kept well filled and maintained in a smooth and well-drained condition until permanent repairs are made.

c. Replacing Damaged Improvements

Improvements such as sidewalks, curbs, gutters, Portland Cement concrete and asphaltic concrete pavement, bituminous surfacing base material and any other improvements removed, broken or damaged by the Contractor shall be replaced or reconstructed with the same kind of materials as found on the work or with materials of equal quality. The new work shall be left in a serviceable condition satisfactory to the City Engineer. Whenever a part of a square or slab of existing concrete sidewalk, driveway or pavement is broken or damaged, the entire square or slab shall be removed and the concrete reconstructed as above specified.

d. Screw-In Foundation Anchors

Screw-in foundation anchors shall be of the size and type required for the pole. The anchors shall be screwed into the ground. Pre-drilling of holes for the anchor is not allowed. During installation the foundation shall be plumbed with a level. The foundation shall be screwed straight into the ground and the base plate shall be level.

Minor leveling adjustments on poles with breakaway connectors shall be made with the connectors. On other poles, minor leveling adjustments may be made with the use of leveling shims or washers. Shims and washers shall be galvanized or cadmium-plated steel no more than 1/4 inch thick. Only one shim or washer will be allowed at any one anchor bolt with a maximum of two on any pole.

If screw-in foundation anchors are not able to be used for any reason, concrete foundations shall be installed at the contractor's expense.

e. Concrete Foundations

All concrete used for concrete foundations shall meet the requirements of "Concrete Construction" and shall be KCMMB4K concrete.

The bottom of the concrete foundations shall rest on firm ground; foundations shall be poured monolithic. The exposed portions shall be formed to present a neat appearance. Forms shall be true to line and grade. Top of footing for standards, except special foundations, shall be finished to curb, or sidewalk grade or as directed by the City Engineer. Forms shall be rigid and securely braced in place. Conduit ends and anchor bolts shall be placed in proper position, to proper heights, and held in place by means of a template until the concrete sets. Anchor bolts shall be provided with hex head nut, flat washer and lock washer. Both forms and ground which will contact the concrete shall be thoroughly moistened before placing concrete.

Concrete shall not be placed until forms and reinforcing steel have been checked and approved by the City Engineer. Placement of concrete shall be witnessed by the City Engineer.

Concrete foundations shall be consolidated by an internal type vibrator. The vibrator shall operate at frequencies of vibration not less than 4,500 cycles per minute under load. The amplitude of vibration

shall be adequate to consolidate concrete properly. The concrete shall be cured with an approved moisture barrier such as wet burlap, polyethylene, etc., for a period of seventy-two (72) hours. Cold weather curing shall be such that the concrete temperature shall be maintained above freezing for the entire curing period. Forms shall not be removed until the concrete is thoroughly set.

Control center foundations shall have four conduits for exiting cable. The direction of the exiting conduit and the orientation of the control center shall be determined by the City Engineer.

f. Conduit

It shall be the privilege of the Contractor at his own expense to use larger size conduit if desired; and where larger size conduit is used, it shall be for the entire length of the run from outlet to outlet. No reducing couplings will be permitted.

The location of all conduits installed or used in this project shall be marked by aluminum markers placed in the face of curb, gutter, or wall, directly above the conduit. The City will provide the markers.

The location of conduit runs shown on the plans are for bidding purposes only and may be changed with permission of the City Engineer in charge of construction to avoid underground obstructions. The conduit shall be installed continuous between the light poles, junction boxes, controllers, etc. and between all street lighting appurtenances generally within an area behind the back of curb and the right-of-way or within the street light easements. Snaking the conduit under the road will not be permitted.

Continuous conduit shall be installed under all pavement crossings between street lighting appurtenances.

The conduit installed under all roadway surfaces shall be placed a minimum of forty-eight (48) inches below the top of curb elevation; under drives at a depth of between twenty-four (24) and thirty-six (36) inches below top of pavement; and within shoulders or park areas at a depth of between twenty-four (24) and thirty-six (36) inches below finished grade. Street lighting conduit may be installed in the same trench with traffic signal or fiber optic conduit as long as the minimum depth requirements are met according to the standard details and a minimum of twelve (12) inches of vertical separation between the top of one conduit and the bottom of the other is maintained.

Conduit set in standard bases shall extend approximately three (3) inches above the foundation vertically. Conduit entering through the bottom of a junction box shall be located near the ends to leave the major portion of the box clear. Conduit entering service boxes shall terminate two (2) inches inside the box wall and shall be sloped to facilitate pulling of cable. At all outlets, conduit shall enter from the direction of the run.

Existing underground conduit to be incorporated into a new system shall be cleaned with a mandrel and blown out with compressed air.

(1) PVC Conduit

Conduit installed or used on this project between the street lighting control center and the Kansas City Power and Light Company service point shall be PVC and shall be made continuous. All joints in PVC conduit shall be glued. Connections from PVC conduit to HDPE conduit shall be by approved HDPE connectors as specified in section B "HDPE Conduit" and by the City Engineer. A factory 90° PVC conduit elbow shall be used for installation into a control center. At a light pole or junction box, a factory 90° PVC elbow may be used at the approval of the Streetlighting Inspector.

All PVC conduits shall be installed by the trenching method. Directional boring of PVC conduit will not be permitted.

(2) HDPE Conduit

It is desirable that the conduit be directional bored to minimize disruption to the existing improvements. Conduit shall be placed under existing pavement by approved boring methods. Pavement shall not be disturbed without the written permission of the City Engineer and then only in the event insurmountable obstructions are encountered. Boring pits shall be kept twenty-four (24) inches clear of the edge of any type of pavement wherever possible. Excessive use of water such that pavement might be undermined, or subgrade softened, will not be permitted.

The conduit entering equipment shall be continuous from outlet (junction box, light pole or control center) to outlet or as otherwise shown on the plans. A factory 90° PVC conduit elbow shall be used for installation into a control center. At a light pole or junction box, a factory 90° PVC elbow may be used or be “swept” into the junction box/light pole at the approval of the Streetlighting Inspector. Conduit bends or sweeps shall have a radius of not less than six (6) times the inside diameter of the conduit. Conduit bends shall be made without crimping or flattening, using the longest radius practicable.

An approved factory coupling shall be used for connection of the HDPE conduit to a 90° factory PVC elbow or between two lengths of HDPE conduit. The coupling shall be of high-density polyethylene. The coupling shall have individual reverse-locking threads with a built-in center stop. The ends of the conduit shall be grooved with a grooving tool to match the reverse-locking threads of the coupling to provide for greater pull-out resistance. The coupling shall be installed with a factory recommended coupling tool to ensure an airtight and watertight lock. No couplings or joints will be allowed at intermediate points unless approved by the City Engineer in charge of construction. All joints in HDPE conduit, if approved, shall be PNA E-Loc couplings or approved equal. Electrofusion splices are approved as an alternative to the E-Loc couplings.

The ends of all conduits shall be well reamed to remove burrs and rough edges. Field cuts shall be made square and true so that the ends will butt or come together for the full diameter thereof.

g. Service and Junction Boxes

Service and junction boxes shall be installed at the locations shown on the plans. The Contractor may install, at his own expense, such additional boxes as may be desired to facilitate the work upon approval of the City Engineer.

Service and junction boxes shall be installed on eighteen (18) and eight (8) inches of crushed rock respectively as shown on the plans or as directed by the City Engineer. Boxes shall be installed so that the covers are level with the curb or sidewalk grade or level with the surrounding ground when no grade is established.

h. Wiring

The roadway lighting conductor system shall be installed in HDPE conduit, wired and installed as a 240 volt system where indicated and as required. Wiring shall conform to the appropriate articles of the National Electric Code. Wiring shall be continuous from street lighting appurtenance to street lighting appurtenance. No splices of cable will be permitted in conduit or outside of service boxes, junction boxes or pole bases.

Powdered soapstone, talc or other approved lubricant shall be used when inserting conductors in conduit. All cable to be installed in one conduit shall be pulled by the Contractor in one operation, and all ends shall be taped to exclude moisture and shall be so kept until the splices are made or terminal appliances attached. Ends of spare conductors shall be taped.

All splices in junction boxes and service boxes shall be made with appropriate split bolt connectors and/or 4 AWG copper crimp butt connectors. Such splices shall be carefully wrapped with three successive layers of linerless rubber splicing tape and then wrapped with three layers of electrical tape. The total diameter of the taped splice shall be approximately 1 ½ times the diameter of the spliced conductor covering.

One foot of slack shall be left at all control centers, junction boxes and service boxes for splicing and connecting wires. Wiring within boxes shall be neatly arranged and laced up. Wires shall be color-coded (Black = hot, green = ground) and circuits permanently identified in accordance with designations used on the plans.

All distribution cable connections inside the base of the light pole shall be made with multiple tap connectors provided with a slipover plastic boot. In-line waterproof, breakaway fused and non-fused disconnects, provided with slipover plastic boots, shall be installed in each light pole base. Two disconnects for each hot lead (fused) and one disconnect for the ground ("dummy fuse") shall be used.

Two additional disconnects for the hot leads shall be provided for twin luminaire poles (ground disconnect is shared). Fuses shall be 8-amp high interrupting type. The multiple tap connectors and fuseholders shall be installed convenient to the handhole at the base of the pole. Surplus distribution cable shall be installed at the base of each pole such that, when extended upward, the multiple tap connectors are no less than 2" and no more than 5" above the top of the hand hole cover located at the base of the pole. A 12" to 14" cable surplus in each of the 1c#10 AWG pole and bracket cables is to be provided from the multiple tap connector to the line side of the fuse holder. The length of wire from the load side of the fuseholder to the luminaire shall have 18" of slack.. The connectors for the ground shall be installed with the male end of the connector on the line side. The ground wire shall be fastened to the factory installed ground lug in the base of the light pole by a 3/8" ring terminal and 3/8" - 16 x 3/4" long hex bolt.

Luminaires not equipped with terminal blocks (post-top) shall be connected to the pole wiring with approved butt connectors.

i. Grounding

All poles shall be bonded to form a continuous system. At each multiple service point, a ground electrode shall be installed. The electrode shall be a copper rod not less than one half (1/2) inch in diameter and ten (10) feet in length, unless otherwise noted on the plans, driven to a depth so the top is six (6) inches below the surface of the ground. The service equipment shall be bonded to the driven ground rod by a No. 4 A.W.G. copper wire enclosed in a one (1) inch diameter conduit.

j. Location

Unless otherwise noted on the plans, or physical obstructions exist, equipment installed on this project shall be located as follows:

- (1) Conduit shall be kept a minimum of one foot behind the back of curb.
- (2) Street light poles shall be installed at least three feet behind the back of curb (to center of pole).
- (3) Junction boxes shall be installed at least two feet behind the back of curb (to center of box) and no closer than two feet to any street light pole.
- (4) Control centers shall be located in accordance with the applicable City Ordinances.

k. Street Lighting Completion Time

The street lights shall be installed in time to insure that they will be on and functioning no later than one week after the placing of the final street surface course. The contractor shall not delay the installation of the surface course to comply with this requirement.

26.4 METHOD OF MEASUREMENT

The Engineer will measure the street lighting installation as indicated on the plans, complete-in-place and accepted, as a unit lump sum quantity for all work necessary.

Payment for "Street Lighting Installation" at the contract lump sum price bid is full compensation for the specified work.

27 - TRAFFIC CONTROL

27.1 DESCRIPTION

Traffic Control shall conform to Part VI of the Manual on Uniform Traffic Control Devices (MUTCD), latest adopted revision, the Overland Park Traffic Control Handbook for Street Maintenance and Construction Operations, the City of Overland Park standard details for traffic control and the plans. Construction operations shall be coordinated to result in the least practicable delay to traffic.

27.2 CONSTRUCTION REQUIREMENTS

The Contractor shall furnish and maintain adequate signs, barricades, warning lights, pavement markings as applicable and all other equipment necessary to direct and reroute traffic in a safe and effective movement through and around the work area. The Contractor shall furnish all flaggers and other personnel necessary to provide the required traffic control.

a. Placement

Traffic control devices, barricades, and signs shall be installed at the inception of construction. The traffic control devices, barricades, and signs shall be properly spaced and properly maintained and/or operated during the time construction and/or special conditions exist on the project. Appropriate traffic control shall be provided for all aspects of work, including work by any sub-contractor.

b. Access

Streets with no other outlet shall be open to traffic at all times. Access to private driveways shall be maintained insofar as possible. Businesses with two driveways shall have only one driveway closed at one time. Contractor shall provide access to businesses and residents with only one driveway at all times.

c. Changes

The City Engineer shall approve any variations from the traffic control plans.

27.3 METHOD OF MEASUREMENT

The Engineer will measure traffic control by the lump sum, including all signs, barricades, warning lights, flaggers, temporary pavement markings and all other equipment necessary to safely direct and control traffic..

Payment for "Traffic Control" at the contract lump sum price bid is full compensation for the specified work.

28 - TEMPORARY EROSION AND POLLUTION CONTROL

28.1 DESCRIPTION

At the locations shown on the plans or directed by the Engineer, temporary erosion, sediment and pollution controls shall be installed in accordance with Section 901 of the Standard Specifications except as otherwise modified herein.

The Contractor shall take measures on the project site to prevent and minimize the transport of sediment and pollutants from the project limits, in accordance with the requirements of the KDHE NPDES permit, City Ordinances, and the Stormwater Pollution Prevention Plan (SWPPP) developed for the project. Specifications for temporary erosion, sediment and pollution controls shall conform to [Section 2150, "Erosion and Sediment Control,"](#) of the Construction and Material Specifications as approved by the Kansas City Metropolitan Chapter, American Public Works Association, May 21, 2008 edition. Any future revisions of Section 2150 shall not be in force until adopted by the City in writing. The following exceptions shall apply.

The following exceptions or clarifications to the APWA 2150 specifications shall apply:

(1) The term "Owner" shall mean "City" and the term "Engineer" shall mean "Consulting Engineer" as defined in the General Conditions of these contract documents. The term "Superintendent" shall mean the Contractor's designee as described in the General Conditions of these contract documents.

(2) In **Section 2151.3**, revise the last sentence to state "The Contractor shall complete the required certification forms for the KDHE permit and shall notify all Subcontractors in writing of the

requirements of the SWPPP, obligate them under contract to comply, and enforce compliance during the work.”

(3) In **Section 2151.8**, delete the 2nd, 3rd and 4th sentences and replace with the following: “The Contractor shall submit any documentation required by the Engineer to evaluate the alternative. If agreed to by the Engineer (and subject to KDHE or other agency approval if applicable), payment for such alternate method shall be handled in accordance the General Conditions of these contract documents.”

(4) Delete Section 2151.9.

(5) In **Section 2151.10**, delete the 2nd sentence.

(6) In **Section 2151.11**, replace the last sentence with the following “Controls shall be installed prior to disturbance in an area, unless otherwise indicated in the plans.”

(7) In **Section 2151.14**, add the following to the end of the 1st sentence: “during both active and inactive phases.”

(8) In **Section 2151.14**, regarding the contents of the inspection reports, add the following to the end of the 1st sentence in the 2nd paragraph “and any other item required of an inspection by the KDHE permit, including observations at stormwater discharge locations.”

(9) In **Section 2151.20**, replace the last sentence with the following “Stream crossings shall be limited to those detailed in the plans or as approved by the Engineer.”

(10) In **Section 2152.9**, Revise the first sentence to state “All spills in excess of reportable quantities shall be reported to the appropriate federal, state, and local agencies within 24 hours of their occurrence: KDHE 24-hour spill response center (785) 296-1679; KDHE Northeast District, Lawrence, (785) 842-4600; and the National Spill Response Center 1-800-424-8802.”. Revise the last sentence of this section to state “Spills that pose immediate threat to public safety or contamination of a water body shall be reported immediately to the Overland Park Fire Department at 911. Such spills shall also be reported to the Kansas Division of Emergency Management, (800) 275-0297 or (785) 296-8013.”.

(11) In **Section 2153.1 and 2154.1**, add the following note after the designation of the APWA Standard Drawings: “Where there is a conflict between drawings or details included in the plans and the APWA Standard Drawings, the drawings or details in the plans shall govern.”

(12) Delete **Sections 2153.4 and 2153.5** and all related references in the table **Section 2156.5**. Seeding (permanent and temporary) and sodding shall be governed by the specification Seeding and Sodding contained herein. Where references to sections 2153.4 or 2153.5 remain in other sections of APWA Section 2150, those references shall be interpreted to refer to the respective specification Seeding and Sodding contained herein.

(13) Replace paragraph (A)(4) of **Section 2153.7** with the following: “**Seed and Fertilizer:** Seed and fertilizer shall conform to the requirements for temporary seeding given in the specification Seeding contained herein.” Delete paragraph (A)(5) of the same section.

(14) In **Section 2153.11**, add the following phrase to the end of the first sentence “if so directed by the Engineer.” In the last sentence of the section, delete the phrase “shall be subsidiary to the earthwork” and replace with “shall be subsidiary to the other items of the contract.”

(15) Replace paragraph (D) of **Section 2154.4**, with the following: “**Measurement and Payment:** “Sediment Removal” shall be subsidiary.” Revise the “Sediment Removal” item in **Section 2156.5**, Measurement and Summary Table, to conform.

(16) In **Section 2154.5(D)**, revise the second sentence to state “Initial excavation of depressions on the upstream side of silt fence to create added storage shall be subsidiary.”

(17) In **Section 2154.7(D)**, revise the second sentence to state “Initial excavation of depressions on the upstream side of rock barriers to create added storage shall be subsidiary.”

(18) In **Section 2154.16(B)**, change the first sentence to state “Use the inlet protection systems shown on the plan, as appropriate. Alternate inlet protection methods may be approved by the Engineer.”

(19) In **Section 2154.18(C)**, revise the second sentence to state “Remove sediment and restore the trap to its original dimensions when sediment accumulates to 20% of the design depth”.

(20) In **Section 2154.19(C)**, revise the second sentence to state “Remove sediment and restore the basin to its original dimensions when sediment accumulates to 20% of the design depth”.

(21) In **Section 2154.19(D)**, revise the last sentence of the second paragraph to state “Routine removal of sediment shall be subsidiary.”

(22) In **Section 2154.20 (D)**, revise the first sentence to state ”Temporary Stream Crossing” shall be lump sum and such payment will be full compensation for installation, maintenance, removal and any other work noted on the plans.”

(23) Delete Section 2156.

(24) Specifications for items not covered by these specifications or covered completely by the Standard Drawings shall be developed by the Engineer for each project specifically. Information relevant for such specifications may be taken from manufacturer’s information and may be supplemented by guidance given in other publications and standards, subject to approval by the City.

~~Liquidated Damages~~(0,1)

28.2 MEASUREMENT AND PAYMENT

The Engineer will measure temporary erosion and pollution control items as shown on the plans or described in referenced APWA Section 2150, except as modified herein.

Item Description	Method of Measurement	Basis of Payment
Erosion Control Blanket (Type)	Square Yard	Unit Bid Price
Compost Cover	Cubic Yard	Unit Bid Price
Sediment Removal	Cubic Yard	Unit Bid Price
Silt Fence	Linear Foot	Unit Bid Price
Silt Fence (Wire-Supported)	Linear Foot	Unit Bid Price
Rock Barrier	Each	Unit Bid Price
Open-Flow Ditch Check	Each	Unit Bid Price
Straw Wattles	Linear Foot	Unit Bid Price
Foam Dike	Linear Foot	Unit Bid Price
Gravel Bags	Pound	Unit Bid Price
Compost Filter Berm	Linear Foot	Unit Bid Price
Compost Filter Sock (Diameter)	Linear Foot	Unit Bid Price
Temporary Berm	Linear Foot	Unit Bid Price
Temporary Slope Drain	Linear Foot	Unit Bid Price
Inlet Protection	Each	Unit Bid Price
Stabilized Stone Pad	0.1 Ton	Unit Bid Price
Sediment Trap	Each	Unit Bid Price
Sediment Basin	Lump Sum	Lump Sum Price

Temporary Stream Crossing	Lump Sum	Lump Sum Price
Turbidity Curtain	Linear Foot	Unit Bid Price

Payment for the temporary erosion and pollution control devices at the contract unit and lump sum prices bid is full compensation for the specified work. Repairs to ground cover, including sod and seeding, that are necessary to restore locations disturbed during the removal of erosion and sediment control measures shall be subsidiary to the initial installation. No payment will be made for sediment controls made necessary by the Contractor's failure to provide stabilized ground cover in a timely manner.

28.3 EROSION CONTROL DELAY LIQUIDATED DAMAGES

If the Contractor fails to install erosion and sediment control measures in accordance with time limits required by contract (including any requirements given in the plans, specifications, or applicable permits), the Contractor is liable for an Erosion Control Delay Liquidated Damages assessment, which shall commence on the first calendar day after the violation of the time limit began and end on the day in which the measures are fully installed.

If the Contractor fails to complete corrective actions to existing measures within 7 calendar days of the deficiency being discovered, as required by this specification, then the Contractor is likewise liable for the Erosion Control Delay Liquidated Damages assessment, which shall commence on first calendar day after the 7th day from discovery of the deficiency and end on the day in which all corrective actions are completed.

The Erosion Control Delay Liquidated Damage assessment is \$250.00 for each 24-hour calendar day liable. This assessment shall be in addition to, and may run concurrently with, any other liquidated damage assessment. Administration of this assessment shall be handled in the same manner as for other liquidated damages as specified in the Contract Documents.

The Erosion Control Delay Liquidated Damage assessment is any addition to any other remedies the City may pursue in enforcing the Contractor's obligations. The provisions of this specification shall in no way reduce the Contractor's responsibility for complying with the time requirements of the specification and permits and for identifying and initiating corrective actions.

29 - SEEDING

29.1 DESCRIPTION

This work shall consist of the furnishing and planting of seed at those locations indicated on the plans or as designated by the Engineer.

All materials, bed preparation, and planting shall conform to the applicable requirements of Sections 901, 902, 903 and 904 of the Standard Specifications, except as otherwise modified herein. In general, all disturbed areas should have a minimum of 6 inches of select topsoil uniformly placed. All disturbed areas shall be seeded as soon as practicable after construction.

29.2 CONSTRUCTION REQUIREMENTS FOR PERMANENT SEEDING

a. Seeding Season

Determine seeding rate and season using the following table. Any seeding done outside of the seeding season as specified in the Standard Specifications will be maintained by the Contractor until satisfactory growth is established or reseeded shall be done at the Contractor's expense if the growth is unsatisfactory.

Seed Type	Minimum Pure Live Seed (%)	Rate of Pure Live Seed (lbs/acre)	Seeding Dates
Cool Season Grasses			Feb 15 – April 20 and Aug 15 – Sept 30
Fescue	83	348	
Kentucky Bluegrass	64	120	
Warm Season Grasses			Nov 15 – June 1
Buffalo	72	45	

b. Preparation of Seedbed

All areas to be seeded shall be disked, harrowed, or hand raked to a minimum of 2 to 6 inches before application of seed. The final seedbed shall be well mixed with no large clumps of any kind and shall have no foreign material in it. The seedbed should be uniform and well packed. **Approval of the seed bed shall be obtained from the Engineer before seeding is started.**

c. Seeding

Seed shall be applied with an acceptable seed drill or other equipment approved by the Engineer at a depth of 1/4 inch in a uniform manner at the prescribed rate. Broadcasting and hand raking to a depth of 1/4 inch will only be used on areas where it is impossible to operate a seed drill. Unless a cultipacker type seeder is used, the seed shall be covered to a depth of 1/4 to 1/2 inch with a shallow-set spike tooth harrow or other approved methods. After covering, the areas shall be firmed by rolling.

d. Mulching

Mulch shall be applied within 24 hours following the seeding operation. Vegetative type mulch shall be spread uniformly in a continuous blanket at the rate of 1½ tons per acre by means of a mechanical spreader or other approved means. The mulch shall be anchored in the soil to a depth of three inches by a mulch puncher or straight serrated coulter disk mulch anchor machine designed to force the mulch into the soil surface. The machine shall be weighted and operated in such manner to secure the mulch firmly in the ground to form a soil-binding mulch and prevent loss or bunching by wind. The coulters shall be at least ten inches in diameter. Two passes may be required to anchor the mulch to the satisfaction of the Engineer. No mulch shall be placed unless it can be anchored on the same day.

e. Fertilizer

Starter fertilizer shall be an approved commercial brand composed of a mixture of soluble and insoluble Nitrogen and shall conform to the State Fertilizer Laws. It shall be uniform in composition, dry and free flowing, and shall be delivered to the site guaranteed analysis. Certification shall be submitted to the city on the fertilizer. Any fertilizer which becomes caked or otherwise damaged, making it unsatisfactory for use, will not be accepted. Fertilizer shall be placed prior to seeding at a rate of application of 1 lb. of actual nitrogen per 1000 square feet of planting area unless otherwise determined by a soil test.

f. Seed Maintenance and Acceptance

All seeded areas shall be maintained by the Contractor prior to acceptance by the Engineer. Prior to acceptance, seeded areas shall be kept free of weeds in accordance with Weed Control paragraph in “General Requirements”. The Engineer will issue a written notification of acceptance once a stand of

vegetation free of weeds is present that has a 70% density that covers all of the disturbed area, as measured by the Engineer.

29.3 CONSTRUCTION REQUIREMENTS FOR TEMPORARY SEEDING.

Provide interim stabilization with annual vegetation as a temporary cover to minimize erosion. This item only covers seeding installed by conventional drilling. Temporary seeding shall only be used for periods not to exceed 12 months unless approved by the city. During final stabilization, temporary seeding shall only be used to establish vegetation outside of the permanent seeding or sodding dates as specified in the Standard Specifications.

The following seed mixtures and planting rates shall be used:

Seed Type	Minimum Pure Live Seed (%)	Rate of Pure Live Seed (lbs/acre)	Seeding Dates
Annual Ryegrass	83	90	Anytime
Millet	77	65	May 1 – Aug 15 Heat Tolerance
Winter Wheat	83	120	Sept 15 – Nov 30 Cold Tolerance

a. Preparation and Planting

Preparation, planting and all other construction requirements for temporary seeding shall be as specified for permanent seeding, except as modified herein. Temporary seeding shall be drilled. Prior to application, the soil shall be tilled to a depth of at least 2 inches and gullies, depressions, and large clods eliminated. Roller compaction of the seedbed is not required. Within 24 hours of seeding, mulch or erosion control blankets shall be applied. When mulch is used, it shall be applied in accordance with the same requirements given for permanent seeding. Fertilizer is not required. Contractor shall schedule work so as to provide temporary seeding as early as practical in the construction process. Contractor shall maintain a readiness to perform temporary seeding frequently during the progress of the project. No more than 7 calendar days shall elapse between the Engineer’s request for temporary seeding and its application. Multiple mobilizations to seed areas as construction progresses shall be expected.

b. Maintenance

Mulch shall be replaced or repaired as needed during germination and early growth. Bare spots shall be patched, by hand seeding if necessary. Vehicle and personnel traffic shall be minimized in areas seeded.

29.4 MEASUREMENT AND PAYMENT

The Engineer will measure the seed of specified type by the acre of accepted vegetation. Payment for "Seeding" at the contract unit price bid is full compensation for the specified work. No separate payment will be made for fertilizer or mulching.

30 - SODDING

30.1 DESCRIPTION

This work shall consist of furnishing and placing sod at those locations indicated on the plans or as designated by the Engineer in accordance with Section 906 of the Standard Specifications except as modified herein.

30.2 MATERIALS

a. Sod Types

The type of sod to be used will be Turf Type Fescue sod, except where Zoysia sod or Kentucky Bluegrass sod is identified under the property owners name and address on the plans, or designated by the Engineer. In the case of mixtures of Bluegrass and Zoysia sod, Zoysia shall be used unless otherwise directed by the Engineer.

b. Sod Material

All materials shall conform to the requirements of these Specifications and to Section 2104 of the Standard Specifications. The Contractor shall retain a person knowledgeable of the different types of sod to ascertain prior to bidding, the location and types of existing sods. Sod shall be of best quality Bluegrass, Zoysia, or Turf Type Fescue, not more than two years old, shall conform to the quality standards of Nursery Grown Sod as defined by the American Sod Producers Association, and shall meet the following standards:

- (1) Thickness of Cut: Sod shall be machine cut at a uniform soil thickness of 5/8 inch, plus or minus 1/4 inch, at the time of cutting. Measurement for thickness shall exclude top growth and thatch.
- (2) Pad Size: Individual pieces of sod shall be cut to the suppliers's standard width and length as approved by the Engineer. Maximum allowable deviation from standard widths and lengths shall be plus or minus 1/2 inch on width and plus or minus 5 percent on length. Broken pads and torn or uneven ends will not be acceptable.
- (3) Strength of Sod Sections: Standard size sections of sod shall be strong enough to support their own weight and should retain their size and shape when suspended vertically from a firm grasp on the upper 10 percent of the section.
- (4) Moisture Content: Sod shall not be harvested or transplanted when moisture content (excessively dry or wet) will adversely affect its survival.
- (5) Mowing Height: Before stripping, sod shall be mowed uniformly at a height of 2 to 3 inches.
- (6) Thatch: Sod shall be relatively free of thatch, up to 1/2 inch allowable (uncompressed).
- (7) Diseases, Nematodes, and Insects: Sod shall be reasonably free of diseases, nematodes, and soil-borne insects. State nursery and/or plant materials' laws require that all sod entering inter-state commerce be inspected and approved for sale. The same applies to sod being shipped intra-state. The inspections and approval must be made by the state agricultural department, office of the state entomologist.
- (8) Weeds: Sod shall be free of objectionable grassy and broad leaf weeds. Sod shall be considered free of such weeds if less than 5 such plants are found per 200 square feet of area. Sod will not be acceptable if it contains any of the following weeds: quackgrass, Johnson grass, poison ivy,

nutsedge, nimblewill, Canada thistle, bindweed, wild garlic, ground ivy, perennial sorrel, brome grass, bentgrass, and Bermuda grass.

c. Fertilizer

Fertilizer shall be of an approved commercial brand composed of "slow release nitrogen", 4-1-2 formula or similar, such as 18-5-9, for Kentucky Bluegrass and Fescue, 25-5-10 for Zoysia, shall conform to the State fertilizer laws, and shall conform to Section 2108 of the Standard Specifications.

Furnishing and placing fertilizer shall be in accordance with Section 902 of the Standard Specifications. Fertilizer shall be uniform in composition, dry and free flowing, and shall be delivered to the site in the original unopened containers, each bearing the manufacturer's guaranteed analysis. Any fertilizer which becomes caked or otherwise damaged, making it unsuitable for use, will not be accepted. Fertilizer shall be placed prior to sodding at not less than 1 lb. of pure nitrogen per 1000 square feet of sodding area. Fertilizer shall be subsidiary to sodding bid items.

30.3 CONSTRUCTION REQUIREMENTS

a. Sod Season

Bluegrass and Fescue sod may be planted during the periods of March 1 to May 15 and September 1 to November 15. Bluegrass and Fescue sod may be planted during the period, November 15 to March 1, when the soil and sod is workable and with the approval of the Engineer. If sod is planted between November 15 and March 1, the Contractor will maintain the sod until 20 days after the beginning of the spring sodding season. The Engineer reserves the right to delay the sodding of all types of sod or to vary the permissible sodding seasons, due to weather, soil conditions, or for other causes.

Zoysia sod may be planted during the period April 1 to October 15.

b. Bed Preparation and Moisture Requirements

Where the width of the disturbed area to be sodded exceeds 18 inches, the area shall be widened to a uniform size by removing enough existing turf from behind the disturbed area, creating an area whose width is a multiple of 18 inches (width of sod roll). A clean edge should be established at the outer limits of the area to be sodded, so that good contact can be made between the new sod and the established turf.

Where the width of the disturbed area is less than 18 inches, enough existing turf shall be removed to create an area of uniform width, no less than six (6) inches.

All backfill shall consist of soil suitable for vegetation. The area shall be prepared such that sodding can be placed on bare soil. This will consist of cultivating, smoothing, removing of clods, surface stones 1 inch in diameter or larger, and weeds. All backfilling shall be subsidiary to other bid items.

Area to be sodded shall consist a minimum of 6 to 8 inches of top soil, free from clods, rocks, trash, and other debris. If the area has been severely compacted by heavy trucks or other equipment, it shall be cultivated to a depth of 6 to 8 inches by tilling or disking. Backfill areas shall be compacted to a sufficient density to prevent excessive settling after placement of sod. If footprints left by an adult walking across the area are more than 1/2 inch deep, the compaction is not sufficient.

Grade of the area shall be approximately 1 inch below desired final grade, to allow for the thickness of the sod.

c. Water

Water used in this work shall be furnished by the Contractor and will be suitable for irrigation and free from ingredients harmful to plant life. All watering equipment required for the work shall be furnished by the Contractor. Under no circumstances shall the Contractor use water except that metered from adjacent fire hydrants or public water lines.

d. Placing Sod

Sod strips shall be laid parallel with the ends staggered in a running bond pattern. Each successively laid strip shall be pressed firmly up against the one next to it or up against the edge of the

existing turf, to ensure good contact with no overlapping. Sod shall be staked in places where the slope exceeds 3:1. Sod shall be staked with a minimum of two to four stakes per square yard or roll, as determined by the Engineer. Stakes shall be of lath or similar materials and shall be driven six inches into the ground, leaving approximately 1/2 inch of the top above the sod line.

After placing sod, the area shall be tamped with a hand tamp or rolled with a lawn roller half filled with water. Rolling shall be done in a direction perpendicular to the direction in which the sod lengths were laid.

e. Sod Watering and Maintenance

After each days sod is placed, it shall be watered sufficiently to wet the sod pads and at least 2 inches of the sod bed. Thereafter in the absence of adequate rainfall, watering shall be performed daily and as often as necessary to keep the sod pads moist at all times. Watering by the Contractor shall continue until the roots of the sod are anchored in place, and the sod is growing and accepted.

All sodded areas shall be mowed immediately prior to the Engineer's inspection for acceptance. Mowing is required to facilitate visual assessment and acceptability of the work. Mowing shall not be attempted until the sod is firmly rooted and secure in place. Not more than 1/3 of the grass leaf shall be removed. Any debris that would interfere with mowing shall be collected and removed.

f. Sod Acceptance

All sodded areas shall be kept free of weeds until the sod has been accepted.

All sodded areas shall be kept thoroughly watered by the Contractor for a period of 20 days after laying and as often as required thereafter, until completion of all other items of work in the contract. If sodding is the last item of work to be performed, the Contractor shall continue watering until all sod is growing and accepted.

The Contractor shall be fully responsible for the condition of the sod work until written notification that his obligation to maintain the sod is terminated, and the sod has been accepted. At that time the property owners shall be notified by the Engineer that further maintenance of the sod is their responsibility.

30.4 MEASUREMENT AND PAYMENT

The Engineer will measure sod of specified type by the square yard.

Payment for "Sod" at the contract unit price bid is full compensation for the specified work, including bed preparation, transporting, placing, firming, watering, cultivating, and maintaining the sod.

31 - TOPSOIL

31.1 DESCRIPTION

Topsoil shall be furnished and placed at the locations shown on the plans, or as directed by the Engineer. Topsoil shall consist of suitable surface soil as stipulated in Section 2101 of the Standard Specifications and as approved by the Engineer. Furnishing topsoil shall be in accordance with Section 905 of the Standard Specifications and placing topsoil shall be in accordance with Section 206 of the Standard Specifications except as otherwise modified herein.

31.2 CONSTRUCTION REQUIREMENTS

The Contractor shall make every reasonable effort to stockpile existing top soil prior to deep excavations and reuse it in the same general locations. No payment will be made for topsoil furnishing and placement necessary due to excessive hauling off of existing top soil on the project site.

All areas to be seeded or sodded shall consist of a minimum of 6 inches - 8 inches of top soil, free from clods, rocks, trash, and other debris. If the area has been severely compacted by heavy trucks or other

equipment, it shall be cultivated to a depth of 6 inches - 8 inches by tilling or disking. At locations where excavation to final grade results in material unsuitable for vegetation, as determined by the Engineer, the Contractor shall undercut and remove the material and place select soil.

31.3 MEASUREMENT AND PAYMENT

The Engineer will measure topsoil by the cubic yard.

No measurement of topsoil obtained onsite will be taken.

Payment for "Topsoil" at the contract unit price bid is full compensation for the specified work, including hauling, stockpiling if required, removing unsuitable soils, scarifying if required, and placement.

No payment will be made for offsite topsoil acquisition and placement that was not specifically authorized and directed by the Engineer. This item does not include any topsoil that is obtained at the project site and reused, pertaining only to any additional soil furnished by the Contractor at the specific request of the Project Engineer.

No direct payment shall be made for undercutting and removing unsuitable materials in cut sections to the required depth of topsoil, or stockpiling and placement of topsoil obtained from the project site, as this work shall be considered subsidiary to other bid items.

32 - CONSTRUCTION VIDEO AND PHOTOGRAPHY

32.1 DESCRIPTION

Furnish all labor, materials and equipment necessary to provide high quality color digital audio/video recording and digital photographs of the Project site surface conditions as specified herein.

Furnish to the Owner an original and one copy of a continuous high quality color audio/video DVD recording of surface conditions along the entire route of the proposed Work. Furnish to the Owner two prints of the high quality color digital photographs and one copy of each data storage media device. The Contractor may keep a copy for his/her own records.

The video recording and photographs shall be taken:

- (1) Prior to any construction activity.
- (2) After completion of all construction activities.

The Owner reserves the right to reject audio/video DVD recordings and digital photographs which do not conform to the project specifications. This includes, but is not limited to, poor quality, unintelligible audio or uncontrolled pan or zoom. Any DVD recording or digital photographs rejected by the Owner will be re-recorded/re-photographed at no cost to the Owner. Under no circumstances shall construction begin until the Owner has received and accepted the audio/video DVD(s) and photographs.

A qualified, established audio/video recording firm knowledgeable in construction practices and experienced in audio/video recording and photographing of construction projects shall perform the video. If requested, the videographer/photographer shall provide examples of prior work and/or references.

32.2 CONSTRUCTION REQUIREMENTS

The Contractor shall submit the required photos and video prior to the issuance of a Notice to Proceed, during construction as directed by the Engineer, and immediately prior to acceptance of the project. Final payment for the project will not occur until the Contractor has completed this item.

a. Color Audio/Video and Digital Photography Survey

- (1) Coverage shall include, but not be limited to, all existing roadways, sidewalks, fences, curbs, driveways, buildings and structures, ditches, above ground utilities, traffic signal and street light cabinets, landscaping, trees, culverts, headwalls, retaining walls, signage and other physical features located within the zone of influence of the construction. Particular and detailed attention

shall be given to any defects noted, such as cracks, disturbed areas, damaged items, or as Owner may direct. The coverage may be expanded if Owner so directs.

(2) All filming or photography will be done during daylight hours. No filming or photography shall be performed if weather is not acceptable, such as rain, fog, snow, etc.

(3) It is the intent of this coverage to accurately and clearly document and define pre-existing, post-construction and/or construction conditions to minimize potential construction claims.

Physically mark the excavation areas with highly visible fluorescent paint prior to audio/video recording and photography. The markings shall include stationing information.

(4) The Owner will have the opportunity to accompany the videographer/photographer.

(5) Sufficient time will be allowed for the Owner to review the Audio/Video recording and the digital photographs prior to construction.

b. Audio and Color Video Recording [Viewable on Windows media]

(1) Audio/Video DVDs shall be commercial grade in a standard write protected format. Video system shall have capability of producing hard copy prints of selected individual still frames.

Video may be captured originally in Digital Video format, but must be transferred to DVD disc for delivery to the Owner, and shall be formatted to be played in the Standard Install Windows Media player.

(2) Video recordings shall be divided into multiple segments, and a field log listing those segments shall be provided with the original tapes and DVD discs of all recordings. A visual recording of the field notes and log (listing the videotape segments) shall be included at the end of each respective original recording tape. Items to note on the field log include, but are not limited too, the tract number, street or road viewed, filming start- and stop-times, side (of street) being viewed, point starting from, traveling direction and ending destination point. Written documentation must coincide with the information on the disk so as to make easy retrieval of locations sought for at a later date. All original video field notes and logs (signed by the photographer) shall be released to the owner.

(3) Audio/Video recordings shall begin with a verbal description of the current date and time, the Owner's name, Project or Contract name and number, Contractor's name, and location information such as street name, direction of travel, viewing side, etc. Translucent information consisting of the month, day, year and time of recording must appear on the viewing screen on all video recordings, by electronic means. Information appearing on the DVD must be continuous and run simultaneously by the computer generated translucent digital information. No editing or overlaying of information at a later date will be acceptable.

(4) Audio shall be recorded at the same time as the video recording and provide the same information as on the video log sheet. Recordings shall include "continuous" narration identifying the viewing direction, street address or station number location, direction of progress, description of features and the existing condition of improvements or damage within the zone of influence shown on the viewing screen. Identify houses and buildings by house number, when visible, in such a manner that structures of the proposed construction, (i.e. manholes, etc.) can be located by reference. Special commentary will be given for unusual conditions of buildings, sidewalks and curbing, foundations, trees and shrubbery, etc.

(5) The zone of influence shall be defined as an area within the temporary construction easement or public right-of-way as Drawings indicate, or within 35 feet of the proposed Work. The Contractor shall obtain permission from the owners of private property prior to entering private property for the purpose of filming.

(6) The rate of speed in the general direction of travel during the recording shall not exceed 100 feet per minute. Panning rates and zoom-in and zoom-out rates shall be controlled sufficiently such that during playback, the picture shall be in focus and maintain clarity at all times.

(7) Adequate lighting, to produce the proper detail and perspective, will be required to fill in the shadow area caused by trees, structures, utility poles, road signs, and other such objects in residential areas, or as directed by the Owner's Representative.

(8) Engineering station numbers recorded, if applicable, must be continuous, be accurate and correspond to Project stationing. The symbols should be the standard engineering symbols (i.e. 16+64).

(9) All DVDs and cases shall bear labels with the following information:

- (a) Disk Number
- (b) Owner's Name
- (c) Date of Recording
- (d) Project Name and Number
- (e) Location of Recording

c. Digital Photography

(1) Photographs shall be captured on digital camera equipment with at least 6-mp memory and delivered on CD-ROM. Original digital image files shall have dimensions of 1500 x 2100 pixels or greater and delivered in TIFF format or JPEG format WITHOUT added compression. Each image must be assigned a unique filename that includes the date of photography.

(2) All digital image files shall be printed on color photographic paper in a size no smaller than 2-1/4 x 3-1/4 inches and two printed copies shall be delivered to the Owner, bound into labeled three-ring binders.

(3) Each digital image file must be delivered with matching descriptive information that accurately describes the direction and location of the individual photograph, plus notation of any noteworthy damage that is not readily visible in the image. This information may not be provided as the (editable) image filename, but must be delivered in a permanent form.

(4) Sufficient digital photographs shall be taken to document existing features such as roadways, sidewalks, fences, curbing, driveways, buildings and structures, ditches, above ground utilities, traffic signal and street light cabinets, landscaping, subdivision monuments, trees, culverts, headwalls, retaining walls, signage and other physical features located within the zone of influence of the construction. Particular and detailed attention shall be given to any defects noted, such as cracks, disturbed areas, damaged items, or as Owner may direct. The coverage may be expanded if Owner so directs.

(5) The zone of influence shall be defined as an area within the temporary construction easement or public right-of-way as Drawings indicate, or within 35 feet of the proposed Work. The Contractor shall obtain permission from the owners of private property prior to entering private property for the purpose of taking photographs.

(6) Adequate lighting, to produce the proper detail and perspective, will be required to fill in the shadow area caused by trees, structures, utility poles, road signs, and other such objects in residential areas, or as directed by the Owner's Representative.

(7) Engineering station numbers recorded (in the image or as a descriptor), if applicable, must be accurate and correspond to Project stationing. The symbols should be the standard engineering symbols (i.e. 16+64).

(8) All CD-ROMS and cases shall bear labels with the following information:

- (a) CD Number
- (b) Owner's Name
- (c) Date of Recording
- (d) Project Name and Number
- (e) Location of Recording

32.3 MEASUREMENT AND PAYMENT

The Engineer will not measure the specified work for separate payment.

Payment for the audio/video recordings and photographs shall be subsidiary to the other contract items.

33 - CONTRACTOR CONSTRUCTION STAKING

33.1 DESCRIPTION

This work shall be performed in accordance with Section 802 of the Standard Specifications as amended herein. The Contractor shall set construction stakes establishing all lines, slopes, continuous profile-grades, centerlines, and benchmarks necessary to control and perform the work.

33.2 CONSTRUCTION REQUIREMENTS

a. Vertical Control

Prior to construction Johnson County Bench Marks that will be damaged or removed by construction shall be replaced by a benchmark outside of construction area. New benchmarks shall be an aluminum cap (caps will be furnished by the County) set in a rigid concrete structure. A hole shall be drilled into concrete and the cap grouted into place. The preferred locations are traffic signal bases, culvert headwalls and bridge handrails. A standard monument record sheet shall be completed for each permanent benchmark. Elevations shall be determined with a double rod level run using digital level and bar code rods and shall tie into Johnson County vertical control network at each end of the level run. Level runs shall close within 0.1 ft. per 4 miles. Level run data shall be furnished in digital and paper format. Mapping grade state plane coordinates shall also be provided. This effort shall be coordinated with the Johnson County Public Works Department County Surveyor.

b. Horizontal Control

Prior to construction Section Corner and quarter section corners shall be referenced to points outside construction and a Land Corner Endangerment Report submitted to the Kansas State Historical Society and the County Engineer within 30 days of the survey as required by state law. During construction the surveyor will coordinate with contractor on the placement of the monument box. After construction the surveyor shall use his previous reference ties and preliminarily mark the aluminum cap. This location shall be checked with coordinates from the design survey to insure that the ties match the previous coordinates. If within tolerance the aluminum cap shall be punched at the proper location. New Land Corner Reference Reports with updated references shall be submitted to the Kansas State Historical Society and the County Engineer within 30 days of the survey as required by state law.

c. Property Corners

The Contractor shall locate all existing property corners within the project limits prior to commencing construction. All existing property corners shall be marked and protected. Property corners anticipated to be disturbed during construction shall be located by ties and shall be reset by the Contractor at the termination of construction activities. All property surveying shall be performed by a qualified land surveyor registered in the State of Kansas.

d. KCP&L Conduits

A stamped sealed survey shall be provided by the Contractor for all conduit installed as part of the contract.

e. Swale Staking

The Contractor shall set cut stakes for all rough swale grading and shall maintain or reset such stakes for checking of the grade as required by the Engineer. Final grade for the swales and berms shall be

established by "blue top" surveying or other approved method, and grade devices shall be maintained for inspection by the Engineer prior to sodding.

33.3 MEASUREMENT AND PAYMENT

The Engineer will measure contractor construction staking by the lump sum.

Payment for "Contractor Construction Staking" at the contract lump sum price bid is full compensation for the specified work, which shall include all staking, establishing vertical and horizontal control points and property corner resetting.