

City of Birmingham

Department of Capital Projects

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for the Construction of Public Works Projects, 2005 edition:

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**SPECIAL CONDITION**  
**SC2009-001**

Section 23, Storm Sewers, of the City of Birmingham's Standard Specifications for the Construction of Public Works Projects, 2005 edition, is hereby amended to include the following:

High Density Polyethylene (HDPE) Type S Thermoplastic Pipe  
(For Gravity Flow Applications Only)

1. Description.

- a. This item shall govern the furnishing and installation of all HDPE Type S pipe and all related connections and fittings, all of which shall conform to ASTM F2306 and AASHTO M294, latest editions. The pipes shall be of the sizes, types, and dimensions shown on the plans. In addition, it shall include all connections and joints to new or existing pipes, storm sewer manholes, inlets, headwalls, and other appurtenances as may be required to complete the work.
- b. HDPE Type S pipe shall only be used in the following locations unless otherwise approved, in writing, by the City Engineer:
  - i. Storm sewers outside the right-of-way such as yard drains, outfall lines, etc.
  - ii. Storm sewers inside the right-of-way but outside of the roadway prism and no closer than three feet to the edge of pavement or to the back of curb such as side ditch enclosures parallel to the roadway, storm sewer applications behind the curb, etc.
- c. HDPE Type S pipe shall not be placed under a roadway or subject to continuous traffic within the City of Birmingham's rights-of-way.
- d. No HDPE pipe larger than 36 inches in diameter shall be used without written approval from the City Engineer.

2. Materials.

Unless otherwise specified on the plans or herein, HDPE Type S pipe and joint fittings shall conform to the following:

- a. HDPE Type S pipe & fittings shall be manufactured in accordance with requirements of ASTM F2306, AASHTO M294, or AASHTO M252, latest editions.
- b. Virgin material for pipe and fitting production shall be high density polyethylene conforming with the minimum requirements of cell classification 424420C for four through ten inch diameters, or 435400C for twelve through sixty inch diameters, as defined and described in the latest version of ASTM D3350, except that carbon black content should not exceed four percent. The twelve through sixty inch virgin pipe material shall comply with the notched constant ligament-stress (NCLS) test as specified in Sections 9.5 and 5.1 of AASHTO M294 and ASTM F2306, respectively.
- c. Minimum Pipe Stiffness (PS) at five percent deflection shall be as described in ASTM F2306, Section 6.3 when tested in accordance with ASTM D2412.

3. Installation.

Installation shall be in accordance with ASTM D2321, "Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity Flow Applications" and applicable provisions of Section 23.

a. Trench Widths.

Minimum trench width, regardless of the type of backfill material used, shall not be less than 1.25 times the pipe's outside diameter plus twelve inches ( $[1.25 \times \text{O.D.}] + 12$ ").

Note: On multiple pipe barrel runs, the clear distance between pipes shall be as follows:

18 and 24 inch diameters: clear distance = twelve inches.

Diameters greater than 24 inches: clear distance = one half of the pipe diameter.

b. Bedding, Foundation and Backfilling.

i. All Class I or Class II materials as defined in Table 1 of ASTM D2321 are acceptable as bedding, foundation, backfill and embedment materials. Bedding is required as indicated on the standard detail sheet. A minimum of four inches of bedding for diameters up to and including 24 inches, six inches of bedding for diameters over 24 inches, shall be provided prior to placement of the pipe in the trench. Bedding material shall be loosely compacted under the centerline of the pipe. The maximum aggregate size for bedding, foundation, backfill and embedment materials shall be limited to 1.5 inches.

ii. Backfill material shall meet the same requirements as bedding material and shall extend to 12 inches above the top of pipe as shown on the standard detail sheet. Backfill material shall be placed in six inch lifts and compacted to a minimum of ninety percent of the AASHTO T-99 maximum dry density (standard proctor).

c. Minimum Cover.

i. The minimum cover in areas not subject to vehicular traffic shall be one foot for diameters up to 48 inches and two feet for larger diameters up to 60 inches.

ii. The minimum cover in areas subject to vehicular traffic shall be 18 inches for diameters up to 48 inches and three feet for larger diameters up to 60 inches.

iii. If the passage of construction equipment over an installed HDPE Type S pipeline is necessary during construction, compacted fill in the form of a ramp shall be constructed to a minimum depth of three feet over the top of the pipe. Any resulting pipe damage shall be replaced at the contractor's expense.

d. Installation Deflection.

The internal diameter of the pipe barrel shall not be reduced by more than 7.5 percent of its base inside diameter when measured. All in-situ pipe deflection testing or measurements shall not take place until 30 days have elapsed from the time the installation of the pipe is completed.

e. Joints.

Pipe shall be joined using a bell & spigot joint meeting AASHTO M252, AASHTO M294, or ASTM F2306. Bell and spigot connections shall utilize a spun-on or welded bell and valley or saddle gasket meeting the soil-tight joint performance requirements of AASHTO M252, AASHTO M294, or ASTM F2306. Bells shall cover at least two full corrugations on each section of pipe. The joint shall be soil-tight.

Gaskets, when applicable, shall meet the requirements of ASTM F477. Gaskets shall be installed by the pipe manufacturer and covered with a removable wrap to ensure the gasket is free from debris. A joint lubricant supplied by the manufacturer shall be used on the gasket and bell during assembly.

Joints shall be installed such that the connection of pipe sections will form a continuous line free from irregularities in the flow line.

4. Post Installation Inspection.
  - i. All pipe shall be tested for excessive deflection. Testing shall not take place until 30 days have elapsed from the time the installation of the pipe is completed.
  - ii. Pipe deflection for all diameters up to 36 inches shall be made manually or, if so ordered by the Engineer, the Contractor shall provide a "go/no-go" mandrel test. The mandrel size shall be 92.5 percent of the base inside diameter of the pipe. For pipes greater than 36 inches in diameter, deflection measurements shall be made manually.
  - iii. The Contractor shall replace, at no cost to the City of Birmingham, all pipe that fails to pass the prescribed tests.
5. Measurement shall be as specified in Section 23.04.
6. Basis of payment shall be as specified in Section 23.05.

**END OF SECTION**

**SPECIAL CONDITION  
SC-2011-001**

**CONTINGENCY**

The General Requirements and Conditions are hereby amended to include the following language.

**Section XXXXI. Contingency Allowance**

- a) The Form of Proposal will include a line item for a ten percent (10%) contingency allowance.
- b) The purpose of the contingency allowance is to account for potential overruns, if any, of the items of work stated in the contract.
- c) The amount of the contingency allowance shall be determined by the Contractor who shall multiply the subtotal of all other items of work by 10% (0.1). The amount so determined shall be entered on the Form of Proposal.
- d) The total amount of the Contractor's bid shall be the sum of the subtotal of all other items of work plus the 10% contingency. The amount so determine shall be entered on the Form of Proposal.
- e) The unit of payment for the contingency allowance shall be lump sum.
- f) The Contractor shall be not entitled to receive any portion of the contingency allowance amount unless payment from the contingency is authorized by the City Engineer. The City Engineer shall be the sole judge as to whether such payment to the contractor for any overrun is justified.
- g) Amounts deducted from the contingency allowance shall be based on the unit prices stated in the contract for items of work that overrun, if any.
- h) If any or all of the contingency allowance amount is unused at the conclusion of the project, Contractor acknowledges that the City shall retain and hold that amount for its own account.

**END OF SECTION**

**SPECIAL CONDITION  
SP2011-002**

The following special condition replaces in its entirety Section 21 of the Standard Specifications.

**SECTION 21 - EXCAVATION AND EMBANKMENT**

**21.1 Description.** The work specified in this section includes the excavation, hauling, compaction and/or disposal of all material, not otherwise being removed and paid for under another item of work, which is encountered within the limits of the work, and is necessary for all construction in accordance with these specifications and in close conformity with the lines, grades, thickness and typical cross-section shown in the contract or established by the Engineer. All excavation covered in this section shall be classified either as Unclassified Excavation, Borrow, or Rock Excavation - Pipe Trench Only.

**21.02 Materials.**

- a) Unclassified Excavation. Unclassified excavation shall consist of the excavation, disposal or placement in embankments of all materials of whatever character encountered in the work including, but not limited to, soil, rock, concrete paving, streetcar tracks, cobblestone, asphalt paving, concrete, etc.
- b) Borrow. Borrow shall consist of approved material required for the construction of embankment, or for other portions of the work, in excess of the quantity of usable material available from required excavations on the project.
- c) Rock Excavation - Pipe Trench Only.
  - i) Rock excavation shall include the removal of sound, solid rock which occurs in its original position within the excavation pay limits and which is of such hardness or texture that, in the opinion of the Engineer, it cannot be loosened or broken down and removed with conventional soil excavating equipment. The removal of boulders, pieces of stone and old masonry masses one cubic yard or larger in volume shall be classified as Rock Excavation - Pipe Trench Only.
  - ii) The removal of hardpan, chert, clay, soft or disintegrated shale, and other like materials, and boulders less than one cubic yard in volume shall not be classified as Rock Excavation - Pipe Trench Only although the Contractor may elect to remove such material by drilling and blasting methods.

**21.03 Construction Requirements.**

- a) General.
  - i) Prior to beginning excavation and embankment operations in any area, all required clearing and grubbing of the area should have been completed in accordance with the requirements of Section 20.
  - ii) The excavation and embankment for the work shall be constructed and maintained so as to properly drain and have reasonably smooth and uniform surfaces. The final elevation shall be in conformity to that shown in the contract or as approved by the Engineer.
  - iii) Special attention is directed to Section 45 of these specifications regarding soil erosion control measures.

- iv) No material shall be wasted without the permission of the Engineer.
  - v) The Contractor shall be responsible for disposing of excess material.
  - vi) Excavation operations shall be so conducted that material outside the limits of construction are not disturbed.
  - vii) Choice of equipment to perform the work shall be that of the Contractor. The type and number of units shall be adequate to perform the excavation and embankment operations in conformity with the contract and to obtain the required compaction. Supplemental equipment shall be furnished by the Contractor as necessary to keep the work properly shaped, without additional compensation.
  - viii). All hauling shall be considered a necessary and incidental part of the work. No payment shall be made for hauling on any part of the work.
- b) The removal and disposal of existing improvements is considered an incidental part of the work and no additional compensation shall be allowed there for.
- c) Roadway and Drainage Excavation.
- i) General. All intersecting roads, approaches, entrances and driveways shall be kept graded, completed concurrently with the roadway grading, and be passable at all times, as directed by the Engineer. During the grading operation, the area being graded shall be maintained reasonably smooth and well drained.
  - ii) Removal and Replacement of Topsoil. Topsoil within the construction limits shall be removed in the areas and to the depth specified by the Engineer. It shall be stockpiled in approved locations for use in the final finishing of slopes or other areas to be re-vegetated. The work of removing and stockpiling topsoil shall be measured and paid for as Unclassified Excavation.
  - iii) Selective Grading.
    - (1) Certain designated zones or portions of cuts which afford the more suitable soils for roadway construction shall be reserved as directed by the Engineer for use in forming the upper graded earth layer or layers for embankments or cuts, for backfilling, or for other purposes as determined by the Engineer. Should it become necessary to stockpile selected material for later use, it shall be stockpiled in a location approved by the Engineer.
    - (2) Selective grading shall include, but not be limited to, excavating, stockpiling, removing from the stockpile, and re-handling selected material. It shall also include the disposal of all or part of the stockpiled selected material that is not used. Selective grading as described in this paragraph shall be measured and paid for as Unclassified Excavation.
    - (3) The Contractor may, without additional compensation, elect to use material from offsite sources in lieu of using selected material as described above.
  - iv) Undercutting.
    - (1) Soils that are determined by the Engineer to be unsuitable for the intended purpose shall be undercut to the depth specified by the Engineer. The Contractor

shall dispose of unsuitable material without additional compensation. The undercut areas shall then be backfilled with a suitable material, obtained from stockpiles as described in paragraph 21.03c)iii) or from borrow sources, and compacted to the density specified for embankments. Undercutting as described in this paragraph shall be measured and paid for as Unclassified Excavation.

- (2) Material, other than stockpiled selected material as described in paragraph 21.03c)iii), used to backfill undercut areas shall be paid for in the respective unit of the material comprising the backfill (i.e., crushed stone - cy, borrow - cy, etc.).
- (3) No additional compensation shall be allowed for using stockpiled selected material, as described in paragraph 21.03c)iii), from the job site as backfill.

v) Excavation of Rock.

- (1) The excavation of rock from all areas, except pipe trenches, shall be measured and paid for as Unclassified Excavation.
- (2) Any blasting necessary to complete the work shall be done in accordance with Title 4, Chapter 1, Article D of the General City Code and any other applicable federal, state and local regulations, laws and ordinances. The Contractor shall exercise the utmost care not to endanger life and property. Any claims of damage as a result of the blasting operation shall be the Contractor's responsibility. The Contractor shall be responsible for obtaining a City of Birmingham blasting permit prior to commencing with any blasting.

- vi) Overbreak, including slides, shall be defined as that portion of any material displaced or loosened beyond the finished work as shown in the contract or authorized by the Engineer. The Engineer shall determine if the displacement of such material was unavoidable and his decision shall be final. All overbreak shall be graded or removed by the Contractor as directed by the Engineer; however, no separate payment shall be made for the removal and disposal of overbreak, which the Engineer determines, as avoidable. Unavoidable overbreak shall be measured and paid for as Unclassified Excavation.

d) Borrow.

- i) The Contractor shall be responsible for locating suitable borrow sources. The Contractor must have written approval from the Engineer of the borrow source prior to using any material from the source. Such approval shall not relieve the Contractor of the responsibility for the quality and quantity of the material used.
- ii) The Contractor shall, without additional compensation, secure the services of a testing laboratory to perform applicable tests as to the suitability of the borrow material for the intended purpose. The Contractor shall submit to the Engineer the results of the tests made on the borrow material prior to its use in the work.

e) Embankment.

i) General.

- (1) Only suitable, approved materials shall be used in the work. The Engineer shall be the sole judge as to the suitability of the materials to be used in the embankment and his decision shall be final.



- (2) Operations on embankment work shall be suspended at any time when satisfactory results cannot be obtained because of rain, freezing temperatures or other unsatisfactory conditions in the field. Frozen material shall not be placed in the embankment nor shall embankment be placed on frozen material.
  - (3) Rock, broken concrete or other solid material shall not be placed in embankment areas where piles are to be driven.
- ii) Formation of Embankments.
- 1) The Contractor shall, without additional compensation, secure the services of a geotechnical testing laboratory approved by the Engineer to sample the proposed embankment material and determine the maximum density and optimum moisture content in accordance with ASTM D 698 (AASHTO T 99) prior to the placement and compaction of any embankment material. A copy of the results of the tests shall be furnished to the Engineer prior to placement of any material. No material shall be placed until after the laboratory test results have been furnished to the Engineer. Material placed prior to the Engineer receiving the stipulated laboratory tests shall be removed and replaced by the Contractor in the presence of the Engineer at no additional cost to the City.
  - (2) Embankments shall be formed in successive horizontal layers of not more than eight inches in loose depth for the full width of the cross-section. Layer placement shall begin in the deepest portion of the fill. As placement progresses, layers shall be constructed approximately parallel to the finished grade line.
  - (3) During construction of the embankment, the Contractor shall, without additional compensation, secure the services of a geotechnical testing laboratory approved by the Engineer to test for the required compaction for each layer. Each layer shall be compacted, at a minimum, to 95 percent of the ASTM D 698 (AASHTO T 99) maximum dry density. The material in each layer shall be within  $\pm$  three percent of the optimum moisture content, as determined from the ASTM D 698 (AASHTO T 99) density test, to obtain the prescribed compaction. Based on the results of these tests, the Contractor shall make the necessary adjustments and corrections in methods, materials or moisture content to achieve the correct embankment density. No layer shall be covered by a successive layer until the specified density of the preceding layer is obtained. A copy of the results of the compaction tests shall be furnished to the Engineer before an exposed layer is covered. If the Contractor fails to place material as required in this embankment specification or does not comply with the procedures in this provision for testing, verification, and reporting of compaction levels, the City reserves the right to require that any material that was placed without complying with these procedures be removed and replaced by the Contractor in the presence of the Engineer at no additional cost to the City. A minimum of one compaction (density) test shall be performed for every 500 square yards of fill layer or two tests per layer which ever is greater. Additional density tests may be required by the Engineer where compaction of the fill appears questionable or whenever a change in fill layer is detectable. Test locations shall be randomly selected.
  - (4) In order to achieve uniform moisture content throughout the layer, wetting or drying of the material may be required. Should the material be too wet to permit proper compaction, all work on all of the affected portions of the embankment shall be delayed until the material has dried to the required moisture content. Wetting of dry

material to obtain the proper moisture content shall be done with approved equipment that shall sufficiently distribute the water.

- (5) During construction of the embankment, the Contractor shall route his equipment at all times, both when loaded and empty, over the layers as they are placed and shall distribute the travel evenly over the entire width of the embankment.
- (6) Stones or fragmentary rocks larger than four inches in their greatest dimensions shall not be allowed in the top six inches of embankment that serves as the subgrade for a roadway.
- (7) When the excavated material consists predominantly of rock fragments of such size that the material cannot be placed in layers of the prescribed thickness without crushing, pulverizing or further breaking down the pieces, such material may be placed in the embankment as directed by the Engineer in layers not to exceed two feet in thickness. Each layer shall be leveled and smoothed with suitable leveling equipment and by distribution of spalls and finer fragments of rock. These type lifts shall not be constructed above an elevation of four feet below the finished grade or elevation. Density requirements shall not apply to portions of embankments constructed of materials that cannot be tested in accordance with specified methods.
- (8) Embankment over, under and around structures (pipes, culverts, etc.) shall be selected embankment material placed and compacted or tamped in a manner and by methods that shall avoid unbalanced loading, cause movement or place undue strain on any structure. The Contractor shall be responsible for protecting the structures and any damage to any part of a structure due to not providing proper protection shall be cause for ordering its replacement without additional compensation.
- (9) When new embankment is to be placed against an existing slope steeper than 4:1, the existing slope shall be continuously benched and the new work brought up in layers. Benching shall be of sufficient width to permit the operation of equipment but in no case less than six feet. Material thus removed shall be re-compacted along with the new embankment material.
- (10) When new embankment is to be placed against an existing slope of 4:1 or flatter, the slope shall be scarified to a depth of six inches to provide a bond between the new embankment and the existing surface.

#### **21.04 Method of Measurement.**

- a) Measurement for all accepted unclassified excavation shall be by the cubic yard of the material in its original position computed from cross-sections by the average-end-area method.
- b) Measurement for borrow shall be by the cubic yard of the material in place, as indicated by the cross-sections, computed from the cross-sections by the average-end-area method.
- c) Embankment shall not be measured for payment.
- d) Measurement for rock excavation shall be by the cubic yard of the material removed from pipe trenches only unless an item for rock excavation in areas other than pipe trenches is included in the contract.

## **21.05 Basis of Payment.**

### **a) Unit Price Coverage.**

- i) **Unclassified Excavation.** The accepted yardage of unclassified excavation, measured as provided above, shall be paid for at the unit price bid per cubic yard, which price shall be payment in full for furnishing all materials, materials testing, labor, equipment, tools and incidentals necessary to complete the item.
- ii) **Borrow.** The accepted yardage of borrow material, measured as provided above, shall be paid for at the unit price bid per cubic yard, which price shall be payment in full for furnishing all materials, materials testing , labor, equipment, tools and incidentals necessary to complete the item.
- iii) **Rock Excavation - Pipe Trench Only.** The accepted yardage of rock excavation, measured as provided above, shall be paid at the unit price bid per cubic yard, which price shall be payment in full for furnishing all materials, labor, equipment, tools and incidentals necessary to complete the item.
- iv) **Embankment.** There shall be no direct payment for embankment. All of the operations required for embankment formation described previously shall be considered necessary work incidental to and for which compensation is included in the unit prices for the pay items of the materials composing the embankment.

### **b) Exceptions.**

- i) If no item for unclassified excavation or borrow appears in the contract, it shall be understood that the price for this work shall be included in the prices bid for other items of the contract.
- ii) If no item for rock excavation appears in the contract and rock excavation is necessary, then rock excavation shall be paid for at a price agreed upon, in writing, by the Engineer and the Contractor.

**END OF SECTION**

**SPECIAL CONDITION  
SC2011-003**

**The following special condition replaces in its entirety Section 27 of the Standard Specifications.**

**SECTION 27 - SUBGRADE**

**27.01 Description.** The work specified in this section includes the preparation of the subgrade to make it ready to receive the pavement structure. The subgrade shall be considered that portion of the roadbed on which the crushed stone base course is to be placed.

**27.02 Materials.** Materials furnished to construct the subgrade shall comply with the requirements of Section 21.

**27.03 Construction Requirements.**

a) General.

- i) Grading of the subgrade shall be conducted so that berms of earth or other material do not prevent drainage of water to side ditches or gutters. Gutters, drains and ditches along the subgrade shall be maintained at all times so as to drain effectively.
- ii) All boulders, brick, concrete, ledge rock or similar solid items appearing in the earth excavation shall be removed or broken off to a depth of not less than nine inches below the subgrade.
- iii) After all earthwork has been substantially completed and all drains have been laid the subgrade shall be brought to the lines, grades and cross-sections shown in the contract or as established by the Engineer.
- iv) The Contractor shall be responsible for the establishment and correctness of any and all elevations relative to intermediate and final grades. The City of Birmingham shall not be responsible for the accuracy or maintenance of any grade elevations beyond the control points placed by the Engineer.
- v) It shall be the Contractor's responsibility to verify that the subgrade elevation is in agreement with the contract.

b) Compaction.

- i) The Contractor shall, without additional compensation, secure the services of a geotechnical testing laboratory approved by the Engineer to sample the proposed subgrade material and determine the maximum dry density and optimum moisture content in accordance with ASTM D 698 (AASHTO T 99) prior to the placement, plowing, scarifying and compaction of any subgrade material. A copy of the results of the tests shall be furnished to the Engineer prior to the placement, plowing, scarifying and compaction of any subgrade material. No subgrade material shall be placed, plowed, scarified or compacted until after the stipulated laboratory test results have been furnished to the Engineer. Subgrade material placed, plowed, scarified or compacted prior to the Engineer receiving the stipulated laboratory test results shall be reworked by the Contractor in the presence of the Engineer at no additional cost to the City.
- ii) The Contractor shall, without additional compensation, secure the services of a geotechnical testing laboratory approved by the Engineer to test for the required

compaction of the subgrade. The subgrade shall be compacted, at a minimum, to 95 percent of the ASTM D 698 (AASHTO T 99) maximum dry density. The subgrade material shall be within  $\pm$  three percent of the optimum moisture content, as determined from the ASTM D 698 (AASHTO T 99) density test, to obtain the prescribed compaction. Based on the results of these tests, the Contractor shall make the necessary adjustments and corrections in methods, materials or moisture content to achieve the correct subgrade density. No base course, surfacing or pavement layer shall be placed until the specified density of the subgrade is obtained. A copy of the results of the compaction tests shall be furnished to the Engineer before any base course, surfacing or pavement layer is placed. If the Contractor fails to comply with the requirements of this specification or does not comply with the procedures in this provision for testing, verification, and reporting of compaction levels, the City reserves the right to require that any portion of the subgrade placed, plowed, scarified or compacted without complying with these procedures be reworked by the Contractor in the presence of the Engineer at no additional cost to the City.

- iii) Sections of the subgrade that pump or are otherwise shown to be unsatisfactory shall be excavated to the depth specified by the Engineer. Removal of unsatisfactory material shall be measured and paid for as Unclassified Excavation.
  - iv) Areas excavated to remove unsuitable material shall be backfilled and compacted to the required elevation, in accordance with Section 21, with a material approved by the Engineer. This backfilling work shall be measured and paid for according to the type of material used. If no item for the type of material used is included in the contract, the Contractor and the Engineer shall agree, in writing, to a unit price for the material prior to its use.
  - v) After compaction, all portions of the subgrade not at the established elevation shall be brought to the proper elevation by adding (or removing) and compacting sufficient material to bring the subgrade to the correct elevation.
  - vi) No base course, surfacing or pavement shall be placed on the subgrade until satisfactory compaction is obtained.
- c) Protection of the Subgrade. The subgrade shall be maintained free from ruts and other depressions, in a smooth and compacted condition true to the lines and grades established and in compliance with the compaction requirements until the base course, surfacing or pavement are placed. When hauling results in forming ruts or other objectionable irregularities, the Contractor shall reshape and re-compact the subgrade before any surfacing is placed.

**27.04 Compensation.** No measurement or direct payment shall be made for subgrade work, except as noted herein, but it shall be considered necessary work the cost of which shall be included in the unit prices of other items of work in the contract.

**END OF SECTION**

**SPECIAL CONDITION  
SP2011-004**

The following special condition replaces in its entirety Section 28 of the Standard Specifications.

**SECTION 28 - CRUSHED STONE BASE**

**28.01 Description.** The work specified in this section includes the construction of crushed stone base courses complete in place on the approved roadbed.

**28.02 Materials.**

- a) General. Crushed stone shall be from approved ledges or working strata within an approved source and shall consist of clean, tough, durable fragments, reasonably free of shale. Material suspected of containing deleterious substances shall be examined in the laboratory and shall be rejected if the amount is considered objectionable.
  
- b) Physical Tests.
  - i) Crushed stone shall meet the following requirements for the respective physical tests:
    - (1) Percent Wear Los Angeles Test (AASHTO T 96): 60 Max.
    - (2) Percent Sound, Soundness Test: 90 Min.  
(AASHTO T 104 using sodium sulfate and five cycles)
    - (3) Gradation:

SIEVE	% PASSING BY WEIGHT
2"	100
1.5"	90-100
1"	75-98
1/2"	55-80
#4	40-70
#8	28-54
#16	19-42
#50	9-32
#200	7-18

The fraction passing the #40 sieve shall not have a plasticity index in excess of 6 nor a liquid limit in excess of 25, and contain not more than 2/3 by weight passing the #200 sieve.

### **28.03 Construction Requirements.**

- a) General. The Engineer shall approve the roadbed before placement of any base or subbase course will be permitted. Approval shall be based on satisfactory completion of the roadbed in accordance with the requirements of Section 27.
- b) Equipment. In general, it shall be the Contractor's responsibility to select and furnish the proper size and amount of equipment that shall produce, deliver to the roadbed, mix, spread, shape, and compact the base or subbase material.
- c) Plant Mixing.
  - i) The following are mixing plant general requirements; however, any other mixing plant equipment developed that shall produce equally satisfactory results shall be acceptable for use with the approval of the Engineer.
  - ii) The plant shall be an approved contra-rotating twin-shaft pug-mill type central mixing plant of proven performance and adequate capacity. The plant shall be equipped to proportion accurately by volume or weight. During the mixing operation the aggregate shall be introduced into the mixer in a way that shall insure the proportion of each type of material to be used shall be in the mixture.
  - iii) Water shall be added to the mix in an amount that shall produce a uniform moisture content, based on dry weight of the mixture, within two percentage points of optimum, as established by the required laboratory test.
- d) Placing of Crushed Stone Base Materials. Typical cross-section, thickness, and limits of the course or layer shall be shown in the contract. The operational procedure must be such that placement and processing of a layer shall not damage the underlying layer or layers. Premixed base and subbase materials shall be placed and spread by spreading equipment that shall produce uniform layers of the required cross-sections and thickness. The base course material shall be placed in not more than six inch compacted layers. Any base layer shown in the contract greater than six inches shall be placed and compacted in two or more layers.

### **28.04 Sampling and Testing.**

- a) General.
  - i) The Contractor shall, without additional compensation, secure the services of a geotechnical testing laboratory to test for proper gradation of and perform a laboratory compaction test on any proposed crushed stone base material in accordance with ASTM D 1557 (AASHTO T 180). Gradation testing shall be performed for each 500 cubic yards of material delivered to the job site. The Contractor shall furnish the results of these tests to the Engineer prior to the placement of any base material. No base material shall be placed until after the stipulated laboratory test results are furnished to the Engineer. Base material placed prior to the Engineer receiving the stipulated laboratory tests results shall be removed and replaced by the Contractor in the presence of the Engineer at no additional cost to the City.
  - ii) The Engineer reserves the right to perform tests on any material delivered to or in place on the jobsite to determine if the specifications have been met. Any necessary sample holes or the like required to satisfactorily establish the acceptability of any base layer shall be immediately repaired by the Contractor with like material. The cost of such repairs shall be considered incidental to the work and no specific payment therefore shall be allowed.

- b) **Gradation and Density.**
- i) The gradation of each layer may be checked by the Engineer to determine compliance with the specifications. Material falling outside of the specified gradation band shall be corrected to comply with the specified gradation band.
  - ii) The Contractor shall, without additional compensation, secure the services of a geotechnical testing laboratory to perform compaction tests on each base layer. Each layer of base material shall be compacted at the optimum moisture content with equipment capable of obtaining the desired density to the full depth of the layer. Compaction shall continue until the base material is compacted to not less than 100 percent of the maximum laboratory density as determined by ASTM D 1557 (AASHTO T 180). Additional watering in connection with compaction shall be required to obtain required density at a uniform moisture content within two percentage points of optimum as determined by the required laboratory tests. The Contractor shall promptly furnish the Engineer with all compaction test results. Each layer shall be brought to the required density before the next layer is placed. Layers covered by a successive layer prior to the Engineer receiving the stipulated compaction test results shall be removed and replaced by the Contractor in the presence of the Engineer at no additional cost to the City.
  - iii) A minimum of one compaction verification test (density test) shall be performed per layer of base for every 500 square yards of roadway or two tests per layer, whichever is greater. Additional density tests may be required by Engineer where compaction of the base layer appears to be questionable or where the base layer has been contaminated by construction activities. Test locations shall be randomly selected.
- c) **Surface Requirements.** The finished general surface of each base layer shall not vary more than 1/2 inch in any 25-foot section from a taut string placed parallel to the surface and the roadbed centerline one foot inside the edges of the base, at the centerline, and at other points designated, nor shall it vary more than 1/2 inch from a template placed at right angles to the roadbed centerline. The template shall be of a rigid frame adjustable metal type, accurately set and at least as long as the width of base layer being checked up to 24 feet. Additional widths may be checked by the use of string and Engineer's level. The Contractor shall furnish template, string and necessary personnel to check the surface as described and under the direction of the Engineer.
- d) **Thickness.** The thickness of each layer shall be checked at intervals as determined by the Engineer. The compacted thickness of the layer shall be within  $\pm 1/2$  inch of the thickness specified in the contract or as directed by the Engineer. There shall be no payment for material thickness in excess of the thickness specified in the contract. The Contractor shall furnish labor and tools to check thickness as an incidental part of the work. The elevations to grade shall be the sole responsibility of the Contractor and no payment shall be made for incidental or extraneous material required to establish, hold or maintain any elevation beyond the plan dimensions.
- e) **Widths.** The widths of each layer shall be checked at intervals as determined by the Engineer. No deviation in excess of 0.3 feet less than the designated dimension for the width of the roadway shall be acceptable. There shall be no payment for material widths in excess of the widths specified in the contract. The Contractor shall furnish labor and tools to check widths as an incidental part of the work.

#### **28.05 Maintenance of the Work.**

- a) Each base layer shall be maintained as provided herein without extra compensation until covered by a succeeding layer or upon substantial completion. The surface shall be kept free of ruts, ridges, and holes and substantially true to profile, grade and cross-section. Each base layer must have the



required density. No layer of base shall be covered by another layer or primed until approved by the Engineer.

- b) The Engineer may require the retesting of a primed layer where it is suspected that it does not have the required density and moisture content. All areas found deficient shall be corrected by the Contractor, without additional compensation, prior to the placement of the next overlying layer.
- c) It shall be the Contractor's responsibility to protect the base from damage, to protect the prime from being picked up or damaged by traffic, and to promptly replace any base or prime so damaged.

**28.06 Method of Measurement.** Measurement by the cubic yard shall be the compacted volume in place computed from the dimensions as shown in the contract.

**28.07 Basis of Payment.** The unit price bid shall be full compensation for furnishing crushed stone base material, in accordance with the requirements specified, complete in place on the roadbed. It shall include all costs for procurement, operations, compaction, watering, equipment, tools, labor, materials testing and incidentals necessary to complete the work.

**END OF SECTION**

**SPECIAL CONDITION  
SC2011-005**

The following special condition replaces in its entirety Section 29 of the Standard Specifications.

**SECTION 29 - ASPHALT SEAL, ASPHALT BINDER, PRIME AND TACK COAT**

**29.01 Description.** The work specified in this section includes one or more courses of asphalt plant mix constructed in accordance with these specifications and in reasonably close conformity with the lines, grades, thickness, and cross-sections shown by the contract or as directed by the Engineer. This work includes, but is not limited to, new paving, resurfacing, patching, leveling, and widening, as indicated on the typical sections and details or as directed by the Engineer.

**29.02 Materials.**

- a) Prime and Tack Coat. Bituminous material for prime and tack coats shall conform to the requirements of ALDOT's *Standard Specifications for Highway Construction*.
- b) Aggregates. Coarse and fine aggregates shall conform to the requirements of ALDOT's *Standard Specifications for Highway Construction*.
- c) Reclaimed Asphalt Pavement (RAP)
  - i) The maximum percentage of RAP allowed in asphalt binder and seal shall be the current maximum allowed by ALDOT specifications.
  - ii) Regardless of the ratio of reclaimed asphalt pavement to new material, the mixture delivered to the roadway shall meet the gradation requirements and the asphalt cement required in the job mix formula.
  - iii) The recycled asphalt concrete mixture shall be homogeneous mixture of reclaimed asphalt pavement, new fine and/or coarse aggregate and new bituminous material and/or asphalt rejuvenator.
- d) Mix Composition.
  - i) Asphalt Seal material shall meet ALDOT Specification 424-A Superpave Bituminous Concrete Wearing Surface Layer, 1/2 inch Maximum Aggregate Size Mix, ESAL Range C/D.
  - ii) Asphalt Binder material shall meet ALDOT Specification 424-B Superpave Bituminous Concrete Upper Binder Layer, 1 inch Maximum Aggregate Size Mix, ESAL Range C/D.
  - iii) Asphalt Patching material shall meet ALDOT Specification 424-B Superpave Bituminous Concrete Lower Binder Layer, 1.5 inch Maximum Aggregate Size Mix, ESAL Range C/D.
  - iv) Asphalt Open Graded Friction Course material shall meet ALDOT Specification 420-A Polymer Modified Open Graded Friction Course.
- e) Material Sources. All material sources shall be on the ALDOT List of Qualified Materials, Sources, and Devices.
- f) Job Mix Formula.
  - i) No asphalt plant mix for payment shall be produced until the Engineer has approved a

job mix formula. The Contractor shall submit to the Engineer a job mix for each mixture to be supplied from a specific plant. The Contractor shall submit the job mix formula, in writing, to the Engineer at least 15 days prior to the start of paving operations. The job mix formula for each mixture shall establish a single percentage of aggregate passing each required sieve size, a single percentage of bitumen material to be added to the aggregate, a single percentage of any additive, and a mixing temperature range suitable for the type, grade, etc., of bitumen to be used in the mix. All test data used to develop the job mix formula shall also be submitted.

- ii) All mixes shall be tested to determine if an anti-stripping agent is needed. All mixes shall have a tensile strength ratio (TSR) of at least 0.80 when tested in accordance with AASHTO T 283 as modified by ALDOT-361.
- iii) The amount of anti-stripping agent, when required, shall be 1/4 to 1 percent by weight of the liquid asphalt binder content for liquid agents and 1/2 to 2 percent by weight of the total aggregate for powdered agents.
- iv) All mixtures furnished for use on the project shall conform to the approved job mix formula within the following ranges of tolerances:
  - (1) Liquid asphalt binder content:  $\pm 1/2$  percent
  - (2) Air voids:  $\pm 1$  percent
  - (3) #4 and larger sieve requirements:  $\pm 7$  percent
  - (4) #8 through #100 sieve requirement:  $\pm 4$  percent
  - (5) #200 sieve requirement:  $\pm 2$  percent
- v) The initial setting of the controls for all materials shall be those amounts shown on the job mix formula. The above tolerances are provided for slight variations inherent in job control applications. The Engineer shall require the Contractor to make changes as necessary in order that the mixture shall run as close as practical to the percentage designated on the job mix formula.
- vi) The job mix formula for each mixture shall be in effect for one year unless the Engineer withdraws approval in writing. Should a change in sources of materials be made, a new job mix formula must be established before the new material is used. If a Contractor has current approval of a job mix from a specific plant, the Contractor may use this mix on more than one City of Birmingham project provided the materials have not changed.
- ix) All testing and engineering needed to develop an acceptable job mix formula shall be considered as an incidental part of the work and no direct payment for this work shall be made to the Contractor. The laboratory and personnel used to develop the job mix formula shall meet the approval of the Engineer.

e) Preparation of Mixtures.

- i) Bitumen. The bituminous material shall be heated in a manner that insures the even heating of the entire mass under efficient and positive control at all times. Any bituminous material which in the opinion of the Engineer has been damaged shall be rejected.
- ii) Aggregate. All aggregates shall be dried so that the moisture content at the time of mixing is less than 1/2 percent by weight. The temperature of the aggregate at the dryer shall not

exceed 350°F. The aggregate, immediately after being heated, shall be screened into three or more sizes and conveyed into separate bins, ready for batching and mixing with bituminous material. However, for mixes using aggregate of 1/2 inch maximum size, the number of bins may be reduced to two.

iii) Mixing.

(1) Batch Mixing. The dried mineral aggregate shall be combined in uniform batches by weighing and conveying into the mixer the proportionate amounts of each aggregate required to meet the job mix formula. The mineral components shall be thoroughly mixed. The required quantity of bituminous material for each batch shall be measured by weight or metering device. The bituminous material shall be added and the mixing continued for a period of at least 45 seconds, or longer if necessary, to produce a homogeneous mixture. Each batch must be kept separate through the weighing and mixing operations. The mixture shall be uniform in composition, free from lumps or balls of material containing an excess quantity of asphalt, or from pockets deficient in asphalt.

(2) Continuous Mixing. The amounts of aggregate and bituminous material entering the mixer, and the rate of travel through the mixer shall be so coordinated that a uniform mixture of specified gradation and bitumen content will be produced.

iv) Recycled Mixtures. The temperature of the new aggregate shall be superheated to the point where, when combined with the reclaimed material, the specified discharge or delivery temperature is produced. However, in no case shall the temperature of the new aggregate exceed 600°F.

v) The plant shall be so designed and operated so that heat transfer shall take place in the mixing unit without damage to or vaporization of the bituminous material. For batch type plants, a minimum dry mixing cycle of 15 seconds shall be required for the new bituminous material.

f) Sampling and Testing

i) The production of the job mix formula shall be the Contractor's responsibility.

ii) The Engineer reserves the right to take samples of aggregates from stockpiles and asphalt from storage tanks at the asphalt plant and to make further tests as needed as a basis for continued acceptance of the materials.

iii) The Contractor shall submit ALDOT Form BMT-20 for each mix for each day mixes are produced. The Contractor shall have samples of the mixture taken and tested at least once each day, but as many times daily as deemed necessary by the Engineer to assure the specifications are met. The mixture must be maintained uniform throughout the project within the given tolerances. Unless otherwise directed by the Engineer, composition limits (by weights) of the completed mixture shall be based upon the total mineral aggregate remaining after extraction of bitumen. Testing the mix shall be considered as an incidental part of the work and no direct payment for this work shall be made to the Contractor

iv) As directed by the Engineer, the Contractor shall cut or cause samples no smaller than four inches in diameter to be cut with mechanical equipment from the compacted pavement for the purpose of testing the mix for compliance with the specifications. Samples so cut shall be tested by a geotechnical testing laboratory under contract to the

Contractor. The Contractor shall immediately repair the sample holes with a similar type of material. Sampling and testing the mix, as well as patching sample holes, shall be considered an incidental part of the work and no direct payment for this work shall be made to the Contractor.

### **29.03 Construction Requirements**

- a) Weather and Temperature. Asphalt plant mix shall be laid only upon an approved underlying course which is dry and only when weather conditions are suitable, as determined by the Engineer. Asphalt paving shall not be placed when the air temperature is below 40°F. The air temperature must be 40°F and rising before the spreading operation will be allowed to start. Spreading operations shall be stopped when the air temperature is below 45°F and falling.
- b) Equipment.
  - i) In general, choice of equipment shall be left to the Contractor. It shall be the Contractor's responsibility to provide proper sized and amounts of equipment that shall produce, deliver to the roadbed, spread, and compact the plant mixed material in sufficient quantities for the continuous movement of the spreader under normal operating conditions.
  - ii) The Contractor shall secure approval from the Engineer of all equipment prior to its use. Any equipment found to be unsatisfactory by the Engineer shall be promptly replaced or supplemented.
  - iii) Trucks used for hauling asphalt plant mix shall have tight, clean, smooth metal beds that have been thinly coated with a minimum amount of paraffin oil, lime solution or other approved material to prevent the mixture from adhering to the beds. The use of gasoline, kerosene or other volatile material is prohibited. Each truck shall be equipped with a cover of canvas or other suitable material of such size as to protect the mixture from adverse conditions. When the air temperature is below 60 °F, or hauling time exceeds 30 minutes, or threatening weather exists, no mixture shall leave the plant unless it is covered entirely and the cover securely fastened. Each truck shall have a hole in the side of the body, approximately 5/16 inch in diameter and suitably located to allow for temperature measurement of the asphalt plant mix.
  - iv) Asphalt plant mix pavers or spreaders shall be self-contained and of sufficient size, power and stability to receive, distribute, and strike-off the asphalt plant mix material at rates and widths consistent with the specified typical sections and details.
  - v) Compaction equipment shall be self-propelled and capable of compacting the mixture to the required density throughout the depth of the layer while it is still in a workable condition without damage to the material. The Contractor shall be responsible for the selection of the types and number of rollers to be used.
- c) Preparation of Underlying Surface.
  - i) The Engineer shall approve the underlying surface before the placing of a plant mix application will be allowed.
  - ii) Preparation for Asphalt Resurfacing.

- (1) The old pavement surface shall be thoroughly cleaned of all foreign or loose material, cold-mix asphalt patches, and broken and improperly bonded asphalt surfaces as directed by the Engineer. Depressions shall be brought to grade with binder and compacted in accordance with these specifications.
- (2) Existing storm manholes shall be adjusted to grade as directed by the Engineer. Payment shall be made as Storm Manholes Adjusted per each. The Contractor shall contact and coordinate with other utilities any adjustment that is necessary to their appurtenances. The coordination of utility adjustments shall be considered as an incidental part of the work and the cost shall be included in the payment for asphalt plant mix.
- (3) After the surface has been prepared, a bituminous tack coat shall be applied to the entire surface. Tack coat material shall be applied in an amount directed by the Engineer up to a maximum of 0.1 gallon per square yard. An asphalt distributor shall be provided for use on all accessible areas. Inaccessible areas such as around manholes, etc., may be coated by other approved methods. When applying tack coat, it shall be applied to all contact surfaces of curbs, gutters, manholes and adjacent pavement edges, as directed by the Engineer.
- (4) Adjacent surfaces that are not to be in contact with the mix shall be adequately protected from the tack coat spray. Any surface soiled by tack coat material shall be cleaned and restored to its previous condition without additional compensation. Tack coat shall be spread only far enough in advance to permit the construction to progress consistently, uniformly, and continuously.
- (5) The application of tack coat shall be paid per gallon of material placed as directed by the Engineer.

iii) Preparation for Asphalt Paving on Stone Base.

- (1) Loose material, dust, dirt, caked clay, or any foreign material shall be removed from the surface of the compacted base material.
- (2) A prime coat shall be applied after the Engineer has approved the surface. The application of the prime material shall be by means of a pressure distributor of an approved type. The prime material shall have a temperature of between 80 °F and 150 °F and shall be applied at a rate of 0.3 to 0.5 gallon per square yard.
- (3) After the prime coat has been applied, the Contractor shall keep all traffic off the road until, in the opinion of the Engineer, the prime is dry and cured. When directed by the Engineer, the Contractor shall, without additional compensation, spread the minimum necessary amount of approved clean, coarse sand over the primed area to prevent it from breaking up under traffic or to speed curing. No overlying surface shall be placed until the prime coat has been approved by the Engineer. The Contractor shall, without additional compensation, maintain the prime treatment and the surface of the base intact until it is covered by an application of a surfacing material.
- (4) The application of prime coat shall be paid per gallon of material placed as directed by the Engineer.

d) Placement of Asphalt Plant Mix.

- i) The mixture, when delivered to the jobsite, shall be within  $\pm 20$  °F of the established delivery temperature but in no case shall the delivery temperature exceed 350 °F. The Engineer shall regulate the temperature of the mixture within these limits according to its workability and the air temperature.
  - ii) The mixture shall be spread in a uniform layer of such depth that, when compacted, the surface course shall have the required thickness and shall conform to the grade and surface contour required. Immediately adjacent to curbs, gutter, manholes, etc., the surface mixture shall be spread in a uniform thickness so that after compaction it shall be 1/4 inch above the edges of such structures.
  - iii) Spreading operations shall be correlated with plant and hauling equipment so that the spreading operation, once begun, shall provide an uninterrupted forward movement of the spreaders.
  - iv) Areas inaccessible to mechanical spreading equipment shall be spread by hand without additional compensation.
  - v) Placing of asphalt plant mix layers shall be as continuous as possible. All joints shall be made in a careful manner so as to provide a smooth, well-bonded and sealed joint meeting the density and surface requirements. Longitudinal joints in the wearing surface shall conform to the edges of proposed traffic lanes insofar as practical. Any necessary longitudinal joints in underlying layers shall be offset so as to be at least six inches from the joint in the next overlying layer. Transverse joints shall be carefully constructed and rollers shall not pass over the unprotected edge of the freshly laid mixture unless laying operations are to be discontinued. Upon resumption of the work a neat joint shall be formed by sawing back vertically into the previously laid material to expose the full depth of the layer. The fresh mixture shall be raked and tamped to provide a well bonded and sealed joint meeting the surface and density requirements.
- e) Compacting.
- i) As soon as the mixture has been spread and has set sufficiently to prevent undue cracking or shoving, rolling shall begin. A delay in the initial rolling shall not be tolerated. In general, the initial breakdown rolling should be performed by rolling longitudinally, beginning at the sides and proceeding toward the center of the surface. The roller shall not compact within six inches of the edge of the surface where an adjacent lane is to follow while the surface is still hot. When paving abuts a previously placed lane, the longitudinal joint shall be rolled in the first pass. On superelevated curves, rolling shall begin at the low side and progress toward the high side.
  - ii) If any displacement occurs during rolling, it shall be corrected at once. To prevent adhesion of surface mixture to the rollers, the wheels shall be kept adequately moistened with water and a non-foaming detergent. However, an excess of water shall not be permitted.
  - iii) In places inaccessible to a roller, compaction shall be obtained with hand or mechanical tampers of adequate weight to produce the required density.
  - iv) Rolling shall continue until all roller marks are eliminated and the specified density is obtained, unless directed otherwise by the Engineer.
  - v) It shall be the Contractor's responsibility to ensure that all asphalt plant mix layers are compacted in accordance with the requirements of the ALDOT's Standard Specifications

for Highway Construction. Deficiencies in the density shall be corrected while the mixture is still workable. Areas of deficient density that are not corrected shall be removed and replaced by the Contractor without additional compensation.

**29.04 Surface Smoothness.**

- a) Wearing Surface. The finished surface of the pavement shall not vary more than 1/4 inch from the required section measured at right angles to the pavement centerline. The finished surface of the layer shall not vary more than 1/4 inch from a 15-foot straightedge and not more than 3/8 inch from a taut string 25 feet in length placed parallel to the centerline at points directed by the Engineer. The variance from the designated grade shall not increase or decrease more than 1/2 inch in 100 feet.
- b) Binder Surface. The finished surface of the layer shall not vary more than 3/8 inch from the required section measured at right angles to the pavement centerline. The finished surface of the layer shall not vary more than 1/4 inch from a ten-foot straightedge and not more than 3/8 inch from a taut string 25 feet in length placed parallel to the centerline at points directed by the Engineer.

**29.05 Defective or Deficient Areas.**

- a) Deficiencies in surface smoothness shall be remedied to the extent practicable by rolling while the material is still workable. Otherwise, the layer shall be removed and replaced as necessary to obtain required smoothness and without additional compensation to the Contractor. Skin-patching of a surface layer to correct low areas, or heating and scraping to correct high areas, shall not be permitted. Overlays of not less than one inch in thickness may be authorized by the Engineer to correct surface smoothness deficiencies provided, however, that this work shall be done without additional compensation to the Contractor.
- b) All areas containing excessive or deficient amounts of bitumen, all areas showing segregation of materials, and all areas un-bonded after rolling shall be removed and replaced without additional compensation to the Contractor.

**29.06 Maintenance and Protection.** Sections of newly finished work shall be protected from all traffic until they become properly hardened. Maintenance shall include immediate repairs of any defects that may occur on the work. Such repairs shall be repeated as often as necessary to maintain the work in a continuously satisfactory condition. The Contractor shall be responsible for the protection of the work and protection of any traffic passing through or over the worksite. No additional compensation shall be allowed for maintenance and protection of newly finished work.

**29.07 Method of Measurement.**

- a) The accepted quantity of asphalt binder and asphalt seal used as directed shall be measured in tons of 2000 pounds. The weight measurement shall include all components contained in the mixture.
- b) The accepted quantity of prime and tack coat used as directed shall be measured in gallons.
- c) Deductions in measurement shall be made for all material wasted or lost due to negligence of the Contractor or applied beyond the limits of the work.

**29.08 Basis of Payment.**

- a) Compensation for asphalt binder and asphalt seal, measured as provided above, shall be made on a tonnage basis. The unit price per ton shall be full compensation for construction of the asphalt plant mix layers, complete in place, as indicated or directed, including all materials, materials testing



as indicated in specifications, hauling, spreading, compacting, and incidentals required to complete the work.

- b) Compensation for prime and tack coat, measured as provided above, shall be made on a volume basis. The unit price per gallon shall be full compensation for construction of the prime and tack coat, complete in place, as indicated or directed, including all materials, hauling, application, maintenance of surface, and incidentals required to complete the work.

**END OF SECTION**

**SPECIAL CONDITION  
SC2011-006**

**The following special condition replaces in its entirety Section 31 of the Standard Specifications.**

**SECTION 31 - STRUCTURAL CONCRETE**

**31.01 Description.** The work specified in this section includes the furnishing of Portland cement reinforced concrete structures. Structures shall include but are not limited to culverts, junction boxes, headwalls, concrete steps, retaining walls, and other items that are referenced to this section.

**31.02 Materials.**

- a) All materials shall conform to the requirements of the following referenced standards:
- i) ALDOT's Standard Specifications for Highway Construction.
  - ii) City of Birmingham's Standard Specifications for the Construction of Public Works Projects.
  - iii) Coarse Aggregate: ALDOT, Section 801
  - iv) Fine Aggregate: ALDOT, Section 802
  - v) Fly Ash: ALDOT, Section 806
  - vi) Water: ALDOT, Section 807
  - vii) Air Entraining Agents: ALDOT, Section 808
  - viii) Retarders and Reducers: ALDOT, Section 809
  - ix) Cement: ALDOT, Section 815
  - x) Concrete Curing Agents: ALDOT, Section 830
  - xi) Concrete Joint Filler, Sealers & Water-Stop Material: City of Birmingham, Section 57 and ALDOT, Section 832
  - xii) Reinforcing Steel: City of Birmingham, Section 33
- b) Special Requirements. The Contractor may be required to adjust the size of the coarse aggregate for the concrete used in heavily reinforced structures. There shall be no additional compensation for this adjustment.
- c) Proportioning Materials.
- i) General. The Contractor shall be responsible for the concrete meeting the minimum design strength at 28 days. The City of Birmingham does not endorse the concrete mix or materials used by the Contractor.
  - ii) Minimum Design Standards.
    - (1) Design Strength: 4000 psi as per ASTM C 39-86.

- (2) Cement: Type I, IP, or III.
- (3) Entrained Air: 3 to 5 percent (by volume).
- (4) Slump: Not to exceed five inches. Water reducing and/or retarding agents may be used to obtain the necessary slump.
- (5) Coarse Aggregate: Shall not exceed the smaller of: maximum size of 100 percent passing the 1½ inch sieve and 95 to 100 percent passing the #1 sieve; and:
  - (a) 1/5 the dimension of non-reinforced members
  - (b) 3/4 the clear spacing between reinforcing bars
  - (c) 1/3 the depth of slabs.

c) Admixtures: The following admixtures are acceptable:

- i) Flyash/Pozzolan: Maximum of 20 percent by weight of the total of the cement/fly ash mixture. Flyash shall not be used with Type IP cement.
- ii) Water Reducers and Retarders: Per manufacturer recommendations and amounts determined by ASTM C 494-86.
- iii) Air-entraining Agents: Amount required to produce design air content.
- iv) Pumping Aids: Amount to aid in the pumping process without injuring the concrete.
- v) Other: For admixtures not listed here or to be developed at a later date: Amount to be determined by appropriate ASTM or ACI standard.

d) Sampling and Inspection.

- i) The City of Birmingham shall have the right to inspect and/or sample materials used for the concrete. Testing per ASTM standards shall be performed on materials as needed to assure quality control.
- ii) The Contractor shall pay for the tests specified in 31.02d)i).

e) Submittals.

- i) Prior to beginning work, the Contractor shall submit information about the concrete to be supplied. This information shall identify all materials used in the concrete, amounts of these materials used, and certification that these materials meet the standards identified in this section.
- ii) Alternatively, the Contractor may submit a statement from the concrete supplier, designating a particular mix to be supplied if such mix is on file in the Department of Planning, Engineering and Permits. Concrete mixes on file shall contain the same information as the above paragraph and be renewed at least once annually. The design mix information shall be renewed each time there is a change in the supplier(s) of raw material(s).

f) Pre-cast Concrete Units - Units shall meet applicable ASTM or AASHTO standards.

### 31.03 Construction Requirements.

- a) General. The Contractor shall plan the work to provide a finished product meeting all specified requirements of this section. No exceptions shall be made because of materials, weather, time, light, manpower, equipment, or other restrictions.
- b) Time Limits. Final placing of concrete shall occur no later than the time after its initial mixing that the concrete maintains the design slump and can be placed, without the addition of water to the mix. Concrete shall be placed before it takes its initial set.
- c) Weather. The Contractor shall place concrete as the weather permits. Contractor shall not place concrete when weather conditions will not allow proper curing and temperature control of the concrete for at least five days (ten days for pozzolan-cement mixtures) after placement.
- d) Temperature.
  - i) The temperature of the concrete shall not be less than 50 °F or more than 90 °F at the time of placement. No concrete shall be placed when the ambient air temperature is below 35 °F or below 40 °F and falling without written permission of the Engineer. If there are indications that there shall be temperatures below 40 °F during the first five days after placement of concrete, it shall be protected from cold temperatures by keeping the surface at a temperature above 50 °F for the first five days. Additionally, concrete shall not be placed on ground with a temperature below 35 °F.
  - ii) The Contractor shall assume all risk and added cost connected with mixing, placing and protecting concrete during cold weather. Permission given by the Engineer to place concrete during such time shall in no way relieve the Contractor of responsibility for satisfactory work. Should it be determined at any time that concrete placed under such conditions is found to be unsatisfactory, it shall be removed and replaced with satisfactory concrete by the Contractor without extra compensation.
  - iii) Hot Weather Operations. The Contractor shall submit in writing at the pre-construction conference his proposed plan for controlling the concrete mix temperature during hot weather operations for approval by the Engineer. When the temperature of the plastic concrete mix is above 90°F but below 96°F, an approved retarder shall be used in the mix. However, in no instance shall a superstructure concrete mix be placed when the temperature of the plastic concrete is above 90°F.
- e) Handling and Placing Concrete.
  - i) General. All debris and extraneous matter shall be removed from the interior of forms prior to placing of concrete. All struts, stays, and braces to be left in the concrete and other embedded items shall be non-injurious to the concrete. During each pour, concrete shall be placed in horizontal layers not to exceed 12 inches in thickness. Each additional layer of concrete shall be placed and consolidated before the preceding layer has taken its initial set.
  - ii) Chutes or Power Belts. Chutes or power belts shall be used when concrete is to be dropped more than five feet. Chutes and belts shall be constructed and operated to prevent segregation of the concrete.
  - iii) Pumping. Direct placement of concrete by a pumping device shall be permitted if the device pumps a continuous stream of concrete without introducing air pockets into the concrete.

- iv) Consolidation. Concrete shall be consolidated during and immediately after placement by spading and mechanical vibration. Consolidation shall produce smooth surfaces and dense concrete and shall not cause segregation in the concrete. Vibration shall not be applied to formwork or steel reinforcement.
- f) Construction Joints.
  - i) General. The Contractor shall plan his work to locate construction joints only as shown in the contract. Construction joints may be placed at locations other than those shown in the contract in case of an emergency; however, no joints shall be allowed in areas of maximum moment or shear.
  - ii) Bonding. A keyway shall be placed in the concrete during finishing operations, or the concrete may be scarified after hardening to provide a suitable shear interface with the adjoining concrete pour. Fresh grout shall be applied to the construction joint immediately prior to the placement of concrete.
  - iii) Forms.
    - (1) General.
      - (a) Forms shall be substantial and unyielding and so designed and constructed that the finished concrete shall conform to the plan dimensions and contours within tolerances listed in other portions of these specifications or as shown in the contract. Removable forms shall be removed without damage to the concrete.
      - (b) Forms shall be mortar-tight. For narrow walls, columns, etc., the Engineer may require daylight and inspection holes at vertical intervals as directed. The inside of forms shall be coated with non-staining oil or other suitable material to prevent the concrete from adhering to the forms. Form oil shall not come in contact with reinforcing steel or structural steel.
    - (2) Falsework. All spans shall be given a temporary camber to allow for deflection, shrinkage and settlement. If adequate test cylinders have been made, falsework may be removed when the cylinders indicate that the concrete has developed a minimum compressive strength of 3200 psi, otherwise falsework shall remain in place for the following time limits:
      - (a) Falsework under slabs of greater than six foot spans may be removed after 14 days exclusive of days when for four hours or more the air temperature is below 40 °F.
      - (b) Falsework under slabs of less than six foot spans may be removed after seven days exclusive of days when for four hours or more the air temperature is below 40 °F.
- g) Curing Concrete.
  - i) The Contractor shall give careful attention to the proper curing of the concrete. All surfaces not covered by forms shall be protected by one or more of the following methods:
    - (1) Membrane curing compound meeting ASTM C 309-86 with minimum 18 percent

solids and applied at a rate not greater than one gallon per 200 square feet.

- (2) Dampened burlap kept in place and wetted continuously for seven days.
- (3) Polyethylene film placed to maintain a moisture tight enclosure for seven days.
- (4) Non-reactive sand wetted continuously for seven days.
- (5) Any other industry accepted method approved by the Engineer.

h) Protection of Concrete. No traffic or other superimposed load, including construction equipment, shall be allowed on concrete structures until a compressive strength of 4000 psi is attained in the concrete. The Engineer may designate a shorter time period for non-structural concrete, such as sidewalks and driveways, when such concrete reaches a compressive strength of 2500 psi unless otherwise specified in these specifications.

i) Finishing Concrete.

- i) Concrete surface shall be free from all objectionable projections, depressions, holes and other appearance defects. Immediately after removal of forms all form ties shall be removed to one inch below the surface of the concrete. The resulting cavities shall be filled and pointed with a mortar of sand and cement and the surface left smooth and even. The mortar used shall be one-part cement to two-parts sand by volume.
- ii) This finish shall apply unless otherwise specified in another section.

j) Site Quality Control.

- i) Quality control checks shall be made at the job site using the following methods. Other methods may be specified in the contract or in supplemental specifications. Quality control exercised by the Engineer does not constitute approval of the materials or construction methods used at the site to provide a concrete structure. Concrete may be rejected for failure to meet quality control standards.
- ii) Concrete.
  - (1) Air Content. Taken as needed, at least one test per eight hour shift or 50 cubic yards, whichever occurs first. Range is three to five percent, tolerance of  $\pm$  one percent allowed.
  - (2) Cylinders. Test cylinders per ASTM C 31-85 shall be taken as needed, at least one set per eight hour shift or 50 cubic yards placed, whichever occurs first. The Contractor shall pay for the cost of cylinder tests. There shall be no additional compensation for these tests.
  - (3) Slump Test. Taken as needed, at least one test per eight hour shift or 50 cubic yards placed, whichever occurs first. Maximum slump is five inches, no tolerance allowed.
  - (4) Temperature. Taken as needed, at least one test per eight hour shift or 50 cubic yards placed, whichever occurs first. Range is 50 °F – 90 °F, tolerance of  $\pm$  2 °F allowed.

- (5) The Contractor shall, at no cost to the City, secure the services of a geotechnical testing laboratory to perform the tests listed in 31.03j)(1) through 31.03j)(4). The results of the tests shall be furnished to the Engineer.

**31.04 Method of Measurement.** Accepted structural concrete shall be calculated from dimensions shown on original or revised contract, as applicable.

**31.05 Basis of Payment.**

- a) Concrete meeting all design and specification requirements shall be measured as noted herein and shall be paid for at the unit price bid per cubic yard.
- b) The unit price shall be payment in full for ground preparation, finished concrete structure as shown in the contract or described in the specifications, excavation (except rock), backfill if available on the job from construction activities, materials testing and other related incidental items that are not included in the contract as pay items. Where separate items and unit prices for any of the above work or materials are included in the contract, such work or materials shall be paid for separately as provided.**
- c) Concrete failing to meet the design strength as shown from results of the ASTM C 39-86 cylinder breaks shall be replaced unless the Engineer elects to retain the work. The Engineer may elect to keep the part of the work that corresponds to the failed cylinders and pay the Contractor 70 percent of the unit price for this work. The Contractor may replace this work instead of receiving partial payment.

**END OF SECTION**

**SPECIAL CONDITION  
SC2012-001**

**The following special condition replaces in its entirety Section 34 of the Standard Specifications.**

**SECTION 34 - CONCRETE SIDEWALK PAVING AND CURB RAMPS**

**34.01 Description.** The work specified in this section includes constructing sidewalks or curb ramps in one course on a prepared subgrade in accordance with these specifications. The term "subgrade" as used in this section shall mean the prepared foundation on which the sidewalk or curb ramp is constructed. Sidewalks shall be laid to a thickness of four (4) inches and to the width as shown in the contract. Curb ramps shall be laid to the dimensions as shown in the contract.

**34.02 Materials.**

- a) Concrete. All materials, tests, proportions, methods of mixing, and ultimate compressive strength shall conform in every respect to the requirements of Section 31.
- b) Joint fillers, caulking and sealants shall meet the requirements of Section 58.
- c) Other materials shall conform to the requirements of the appropriate sections of these specifications.

**34.03 Construction Requirements.**

- a) Subgrade.
  - i) The subgrade shall be firm, thoroughly compacted, and smoothly dressed before the concrete is laid. Subgrade shall be four (4) inches below grade for sidewalks and six (6) inches below grade for curb ramps. Sidewalks and wheelchair ramps not constructed on the original undisturbed ground surface shall have the subgrade compacted as per Section 21. Mechanical compaction equipment may be used for compacting subgrade if approved by the Engineer.
  - ii) Grading is to be done four (4) inches wider than the walks to be laid to permit forms to be staked down around the work. The Contractor shall, without additional compensation unless items for this work are included in the contract, perform all grading, whether it is excavation or embankment, and all clearing and grubbing. All deleterious or otherwise defective material shall be removed from the work before any concrete is laid. No specific payment shall be made for crushed stone used to level the subgrade.
- b) Forms for sidewalk paving shall be of an approved section and shall have a flat surface on top of not less than one and one-half (1½) inches in width. All forms shall be straight, free from bends and warps at all times. Forms shall be cleaned thoroughly and oiled each time prior to use and before concrete is placed in contact with them. The forms shall be set so that they shall rest firmly upon the thoroughly compacted subgrade throughout their entire length. Forms shall be jointed neatly and tightly. Forms shall be staked securely to line and grade by using at least three (3) bracing pins or stakes to each ten (10) feet length of side form so that they shall resist the pressure of the concrete. Forms shall not be removed until the concrete has attained sufficient set.
- c) Division plates shall be of three-sixteenths (3/16) inch steel and shall exactly conform to the cross-section of the concrete shown in the contract, except that a small lug provided with a hole for a hook shall project above the surface of the concrete to aid in removing the plate. Plates shall be cleaned and oiled each time prior to use. Division plates must be set truly vertical and must not be withdrawn until the concrete has stiffened sufficiently so that concrete shall not run in and fill the joints. For sidewalk widths up to six (6) feet, division



plates shall be set to form a square block. Sidewalks wider than six (6) feet shall be laid in two (2) or more longitudinal sections.

d) Joints.

- i) The edges of the joints formed when division plates are withdrawn shall be tooled with the proper edger and the joint shall be cleaned completely through the section with a long pointed trowel. The center mark forming the squares in the wider sidewalk shall also be made.
- ii) Tooled joints shall be a maximum of one quarter (1/4) inch wide by three-quarter (3/4) inch deep.
- iii) A construction joint one-half (1/2) inch wide the full depth of the sidewalk shall be placed every thirty (30) feet and filled with a sealant.
- iv) An expansion joint one-half (1/2) inch wide shall be placed where new concrete work meets existing concrete work and existing or proposed curb. Expansion joints shall extend entirely through the concrete. Expansion joints shall be comprised of a pre-molded filler recessed one-half (1/2) inch from the surface of the sidewalk with one-half (1/2) inch of a sealant applied on top of the pre-molded filler thus completing the joint.
- v) Joints may be saw cut if desired by the Contractor.
- vi) All lines, joints, etc., shall be clean and straight whether tooled or saw cut.

e) Finishing.

- i) General. The concrete shall be struck off flush with the top of the forms and given a true and even finish with a wooden float and brush, care being taken that none of the coarse aggregate is exposed. Concrete shall not be worked so much as to cause excessive water to come to the surface. Corners and edges shall be rounded with suitable tools. All lines and joints shall be straight, clean and clear cut with no variation in the finished surface greater than one-eighth (1/8) inch.
- ii) Surface. Concrete sidewalks and curb ramps shall be sweat finished by means of a steel trowel followed by a light broom finish applied at a right angle to the centerline of the sidewalk.
- iii) Concrete that is chipped, broken, cracked, spalled, has exposed aggregate, is not flush with adjacent work, has concrete spilled on it, or in any other way is determined to be unacceptable by the Engineer shall be replaced by the Contractor without additional compensation.

f) Curing.

- i) Immediately after the concrete has been finished, all exposed surfaces of concrete shall be covered either with liquid membrane-forming compound, Type 1, ASTM C309, or with burlap. The entire surface shall be sealed by hand or by machine spraying thereon a uniform application of a translucent membrane curing solution that shall be applied in one or two separate applications as may be recommended by the manufacturer or as directed by the Engineer. If the solution is applied in two increments, the second application shall follow the first application within thirty (30) minutes. The curing solution shall be applied so as to result in a uniform coverage on the surface at a rate of one (1) gallon for each two hundred (200) square feet of area. In the event of removal of the coated surface by rainfall or areas cut by finishing tools subsequent to the application of the curing solution, a new application shall immediately be made at the rate specified above.
- ii) In the event burlap is used, it shall be kept thoroughly wetted and shall remain until after the final set, or, in any case, a minimum of twenty-four (24) hours after placement. Burlap shall

remain in place and shall be kept wet for such a period of time as the Engineer may deem necessary. The Contractor shall renew any work damaged by the weather without additional compensation.

g) Protection. The Contractor shall protect the concrete work from all damage by traffic by the use of barricades, fences, flashing yellow lights, or such other means as may be necessary, and shall provide cross-overs for pedestrians at all street crossings. Every reasonable precaution is to be taken to prevent obstructing street traffic.

h) Backfilling. After the concrete has set sufficiently, the side forms shall be removed and the spaces on both sides shall be backfilled with suitable material. This backfill shall be compacted to a level one (1) inch below the walk and left in a neat and workmanlike condition.

j) Cleaning Up. The surplus material, earth, sand, rubbish and stone, except such stones as are retained by order of the Engineer, are to be removed from the lines of the work as rapidly as the work progresses. When material is removed, the curb and gutter must be immediately swept clean by the Contractor, and when public or local inconvenience is caused by dust, the Contractor shall water any piles or surface of earth on the curb and gutter, or pavement foundations, sweeping when and where necessary or whenever required by the Engineer to do so. If the Contractor fails to clean up all surplus material, earth, sand, rubbish and stone along the line of work, day by day, as provided above, the City of Birmingham shall cause such materials to be removed and the expense of such removal deducted from the final payment. After the concrete work has been properly cured, the Contractor shall, without additional compensation, remove any material that might have been used to cover the work, and shall leave the work clean and in a condition satisfactory to the Engineer.

k) Detectable Warnings.

i) Detectable warnings shall be installed on curb ramps and other locations as determined by the Engineer where pedestrian ways blend with vehicular ways without tactile cues. Detectable warnings shall consist of a surface of truncated domes aligned in a square grid pattern and meeting the technical specifications of the *Americans with Disabilities Act Accessibility Guidelines (ADAAG)*.

ii) Detectable warning surfaces shall contrast visually with adjacent walking surfaces - either light on dark or dark-on-light. The domes and the underlying surface shall have a minimum of seventy percent (70%) contrast with the light reflectivity of the adjoining surface. Pigment for pavers and prefabricated products shall be integral to the material. Externally applied pigment shall be heavy-duty grade, color hardener, dry-shake method.

iii) Detectable warnings shall consist of raised truncated domes with a diameter of nominal nine-tenths of an inch (0.9"), a height of nominal two-tenths of an inch (0.2") and a center-to-center spacing of nominal two and thirty-five hundredths of an inch (2.35").

iv) Detectable warning surfaces shall extend twenty-four inches (24") in the direction of pedestrian travel and the full width of the curb ramp, landing or blended transition. The detectable surface shall be located so that the edge nearest the curb line is six inches (6") minimum and eight inches (8") maximum from the curb line.

v). Detectable warning tiles may be any product complying with ADA standards and that has been approved by the Alabama Department of Transportation (ALDOT) with the exception that pre-cast pavers or methods employing the stamping of wet concrete shall not be allowed.

vi.) Proof of acceptance of a detectable warning product by the ALDOT shall be submitted to the City Engineer prior to bid and shall in the form of either an acceptance letter from ALDOT or inclusion of the product on List II-25, Detectable Warning Devices, in ALDOT's *Materials, Sources and Devices with Special Acceptance Requirements Manual*, latest edition.

vii) The cost of providing truncated domes shall be included in the unit price bid for curb ramps.

**34.04 Method of Measurement.**

- a) The area of accepted sidewalk shall be measured in square yards complete in place.
- b) The number of accepted curb ramps shall be measured per each complete in place.

**34.05 Basis of Payment.**

- a) The accepted square yards of sidewalk shall be paid for at the unit price for concrete sidewalk paving, complete in place, which shall be payment in full for furnishing all materials (including joints), for the hauling, preparation and placing of all materials, for the preparation of the subgrade, backfilling and for all labor, equipment, tools and incidentals necessary to complete the work.
- b) The curb ramps shall be paid for at the unit price for each accepted curb ramp, complete in place.

**END OF SECTION**

**SPECIAL CONDITION  
SC-2012-004  
DEMOLITION**

**The General Requirements and Conditions are hereby amended to include the following special condition**

Basis of Payment

There shall be no direct payment for demolition. All of the operations associated with the removal of existing improvements (i.e. sidewalk, ramps, curb & gutter, retaining wall, pavement, etc.) as directed by the Engineer and as shown on the plans shall be considered necessary work incidental to and for which compensation is included in the unit price for other items of work.

**END OF SECTION**