

CITY OF AUBURN STANDARD SPECIFICATIONS

SECTION 10 STREETS

10.01 GENERAL

Specifications in this section shall apply to the construction and installation of streets including excavation, backfill, materials, and testing. The work shall be done under the advisement of a certified Geotechnical Engineering firm, capable of performing tests, analyses, and recommendations as required by this document.

These specifications are intended to supplement the Alabama Department of Transportation Standard Specifications for Highway Construction. They shall take precedence over the Alabama Department of Transportation Standard Specifications except on State Highways. For items not covered by these specifications, the Alabama Department of Transportation standard specifications shall apply.

Drainage structures and other utilities within streets will be specified under the appropriate section of the specifications.

10.02 TESTING RESPONSIBILITY

The cost of testing will be borne by the Contractor, unless otherwise noted in the contract documents. Testing for street components will be as outlined in Section 9 or within this section.

10.03 CONTRACTOR RESPONSIBILITY

The Contractor is responsible for subsurface investigation, construction, testing, etc. and perform all work required to complete the project. The plans show certain features of topography and certain underground utilities, but they do not purport to show in complete detail all such lines or underground features. Such topography and notes on the plans are inserted from records available and are for the Contractor's convenience only and shall not be used as a basis for claims of extra compensation. Wherever necessary to determine the location of existing pipes, valves, or other underground structures, the Contractor shall examine all available records and shall make all explorations and excavations for such purpose. The Contractor at no cost to the Owner shall immediately repair any damage to existing facilities resulting from the Contractor's operations.

10.04 SUBGRADE PREPARATION

A. Clearing and Grubbing

All trees, stumps, roots, and other objectionable obstructions shall be cleared and grubbed from all areas within the street right-of-way. All topsoil shall be removed from areas to be paved, excavated, or filled and stockpiled for future use. Burning perishable

materials shall be kept to a minimum and shall be done only with prior approval of and in compliance with the City of Auburn Fire Department Rules and Regulations.

B. Backfill and Embankments

Excavation shall not be made below grade except where rock or stone masonry is encountered or removal of unsuitable material is directed by the Engineer of record or the Geotechnical representative. Material removed below grade shall be replaced with approved materials and thoroughly compacted. Fills shall not be started until the area has been inspected and approved by the City of Auburn or the Geotechnical representative.

Where excavated material is required for construction of embankments and the material encountered in the excavation consists of earth, soft rock, and hard rock, the Contractor shall construct the fill in such a manner to avoid exposure in finished grade. Care shall be exercised throughout to provide a well-compacted and void-free embankment.

Ledge rock, boulders, concrete or masonry structures shall be removed to minimum depth of six-inches (6") below subgrade and backfilled with approved material thoroughly compacted. Loose rocks in embankments shall be removed and disposed of by the Contractor.

Spring or seepage water encountered shall be reported to the Engineer of record or the Geotechnical representative if drainage is not provided for on the drawings. The Engineer of record or the Geotechnical shall make adequate provisions for handling the water as determined representative.

Embankment and fill material shall be free from frost, stumps, trees, roots, sod, or muck. Only approved material from excavation or borrow pits shall be used.

Where borrow material is required to complete the embankment or fill, the Contractor shall provide materials approved by the Engineer. On projects with state and/or federal funding, appropriate clearances are required for the borrow pit as required by the Alabama Department of Transportation. In all cases, the borrow source must be provided, with the appropriate material analysis, before use.

Embankment and fill material shall not be placed on frozen ground. When fill is to be placed over wet ground that will not support the weight of trucks or other equipment, the lower part of the fill shall be made with coarse sand, gravel, or other selected material

deposited in a blanket layer no deeper than necessary to support the operating equipment. The top nine inches (9") of blanket layer shall be compacted to 95% before subsequent layers are placed. The work shall be done per the direction of the Geotechnical representative.

Sandy soils shall be placed in four-inch (4") to six-inch (6") layers and compacted with appropriate compaction equipment. Clay soils shall be placed in eight-inch (8") maximum layers and compacted with appropriate compaction equipment. Places inaccessible to roller shall be compacted with mechanical or hand tampers.

Final rolling of top layer shall be with a smooth-wheel power roller weighing eight (8) to ten (10) tons or approved pneumatic roller.

Each layer shall be free of organic material and shall meet compaction requirements as outlined on the standard details before succeeding layer is placed. Layers shall be maintained with crown or slope to provide drainage and prevent erosion.

Culverts, headwalls, and other structures shall be constructed before fill is placed. Fill around culverts, headwalls, or other structures shall be carefully and symmetrically placed in six inch (6") to eight inch (8") layers and shall be compacted to the degree specified compaction requirements. Where drainage pipes are to be built in fill, the fill shall be constructed to one foot (1') above the top of the pipe and then excavated for the pipe unless an alternative is approved by the Engineer.

C. Grading

In cut and fill areas, the subgrade shall be scarified and compacted to ninety eight percent (98%) of standard compaction as determined by AASHTO T-99 or T-180 for a depth of at least six-inches (6").

Rough subgrade shall be formed and compacted in accordance with the drawings, within a tolerance of one and one half inches (1½"), and maintained to provide proper drainage. Establishing grades are the responsibility of the Contractor, unless otherwise noted in the contract documents.

Soft areas in subgrade shall be removed and replaced with crushed stone, gravel, as directed by the Engineer of record or the Geotechnical representative. These areas shall be drained as directed by the Engineer.

Rough subgrade, including slopes and ditches, shall be formed and maintained to provide proper drainage.

Finished surface shall be smooth and even and shall not vary more than three eighths of an inch (3/8") in ten feet (10') from true profile and cross section or more than one-half of an inch (1/2") from true elevation.

Shoulder material shall be placed in uniform layers for full width and thickness. Each layer shall be compacted by rolling. Roller shall overlap shoulder when rolling both base course and pavement. Finished shoulder shall be firm against pavement, or against the back of curb where curb and gutter is installed.

Slopes and surfaces shall be finished to smooth, compact surface. Slopes, shoulders, ditches, pipes, gutters, and other appurtenances shall be maintained until final acceptance.

In construction of embankments and preparation of subgrade, all soils shall be compacted to ninety-five percent (95%) with the top six inches (6") to ninety-eight percent (98%) of maximum density at optimum moisture as determined by AASHTO T-99 or T-180.

All material within the roadbed must have a maximum dry density unit weight of at least one hundred pounds per cubic foot as determined by standard proctor. Soils, which do not meet this requirement, shall be wasted or mixed with heavier soils to obtain the required weight. If mixing is desired, an analysis by the Geotechnical Engineering firm is required for submission to the Public Works Department prior to continuing with the work. Any recommendations by the Geotechnical Engineer must be approved and tested in accordance with the recommendations submitted.

When material varies from optimum moisture content, it shall be worked until optimum moisture content is attained.

Compaction must be such that no creeping or weaving appears ahead of the roller.

In cut areas where the Contractor is required to achieve compaction of ninety-eight percent (98%) as called for above, the Contractor will undercut material, which is not compactable, and replace it with compactable granular material. Material will be deemed not compactable if the required compaction percentage cannot be attained by the use of twenty-five (25) passes by the adequate compaction equipment. To attain specified compaction, the Contractor may use tamping rollers, vibro-tampers, or smooth rollers.

10.05 **BASES**

A. Materials

This work shall consist of construction of a crushed aggregate base course or graded aggregate material compacted in layers upon a previously prepared subgrade or sub-base, to a finished thickness in accordance with the design approved by the Engineer.

Graded aggregate base shall consist of a natural or processed mixture of hard, durable particles of coarse aggregate. Crushed aggregate base shall consist of 100 percent crushed stone conforming to the requirements of the ALDOT Standard Specifications for Highway Construction, latest edition. The materials shall be relatively free from soft or decomposed particles and clay and shall be uniformly graded so that it can be compacted into a hard, dense mass. The processed mixture shall conform to the gradation requirements for Type B, Section 825 of ALDOT Standard Specifications for Highway Construction, latest edition. It should be noted that due to the various sources of material in the area (Granite and Limestone), mixing the two on the same roadway is not recommended. The varying material properties can make achieving compaction difficult.

B. Construction Methods

The installation of crushed aggregate base shall conform to the Alabama Department of Transportation Standard Specifications for Highway Construction, Latest edition, Section 300 and 800.

Base course shall not be constructed during freezing weather or on a wet or frozen sub-grade or sub-base.

In reconditioning previously constructed subgrade or sub-base, all loose or foreign material shall be removed. Subgrade or sub-base material shall be added and compacted to restore surface to proper grade and cross section. Any ruts or soft yielding places that appear on the subgrade or sub-base shall be corrected and rolled until compacted.

The maximum thickness of a compacted layer of aggregate base shall be six-inches (6"). When it is necessary to construct the base in more than one layer to conform to the required finished thickness, each layer shall be constructed as described below.

The material shall be deposited and spread in lanes in a uniform layer and without

segregation or size to such loose depth that when compacted, making due allowances for any admixture that is to be blended, the layer will have the required thickness.

When the required amount of admixture has been spread, it shall be thoroughly mixed and blended by means of grader or mixing equipment. The mixing shall continue until the mixture is uniform throughout. When required, water shall be uniformly applied before and during the mixing operations, in order to provide optimum moisture. When the mixing and blending have been completed, the mixture shall be spread to a uniform depth sufficient to give the required thickness of layer when compacted.

Places in accessible to roller shall be compacted with mechanically operated hand tampers.

The base shall be compacted to not less than one hundred percent (100%) as determined by AASHTO T-99 or T-180.

When the material varies from optimum moisture content, it shall be worked until optimum is attained.

Surface shall be true to established grade. Thickness shall not be less than 1-inch from that required for the layer being constructed. Surface shall not vary more than three-eighths of an inch (3/8") in ten feet (10') from true profile and cross section. Any finished base surface shall not vary more than one-fourth of an inch (1/4") from taut ten-foot (10') string placed parallel to the road surface, either parallel or at a right angle to the centerline. The finished elevation shall be within one-fourth of an inch (1/4") of the proposed elevation as shown on the plans.

Should the subgrade or sub-base at any time become soft or churned up with the base course material, the Contractor shall remove the mixture from the affected portion, reshape and compact the subgrade or sub-base, and replace the removed section in accordance with the foregoing requirements.

The surface of any layer shall be maintained in its finished condition until the succeeding layer or pavement is placed. The base shall be properly drained at all times.

C. Testing

The aggregate base shall be tested to ensure a compaction to at least one hundred percent (100%) as determined by AASHTO T-99 or T-180.

Defective or deficient areas shall be remedied, if possible, while the material is still workable. Otherwise, the defective areas shall be removed and replaced to meet the requirements.

Contaminated base, as deemed by the City of Auburn or the Geotechnical representative, shall be completely removed and replaced with suitable material. Material shall be placed and compacted as outlined above.

10.06 SURFACING AND PAVEMENT

All bituminous treatments, tack coat, and plant mixed pavement layers shall be in accordance with the ALDOT Standard Specifications for Highway Construction, latest edition

A. Prime Coat

Not required on City streets, but can be placed at the option of the engineer.

B. Base

Can be placed in lieu of binder, with prior approval by the City of Auburn.

C. Binder

Placed per the City of Auburn standard drawings. Mix design must be submitted prior to placement of any asphalt. Lift thickness shall not exceed three inches.

D. Tack Coat

Tack coat shall be used in all locations where existing pavements are to be surfaced. Areas such as adjoining curb and gutter, sidewalks, or yards shall be protected from the spray. Application shall not be done on windy days when mist may be carried. Damage resulting from the improper application of the prime or tack coat shall be the responsibility of the Contractor. Warning signs or other devices shall be used to notify motorists and other traffic of the wet tar conditions.

E. Wearing Surface

Placed per the City of Auburn standard drawings. Mix design must be submitted prior to

placement of any asphalt. Lift thickness shall not exceed three inches.

10.07 CONCRETE

All concrete structures shall be constructed of Portland Cement Concrete, which complied with the following specifications:

20-Day Compressive Strength	3000 psi
Sacks cement per Cubic Yard	not less than 5
Slump	not less than 4
W/C	6 gallons/sack mix
Soil Aggregate Ratio	60-70 percent

A. Curb and gutter – standard

Shall be placed on all streets as outlined in the Public Works Design and Construction Manual and as shown on the City of Auburn standard details. Curb and gutter shall be cast in place with expansion joints every fifty (50) feet and dummy joints every ten (10) feet.

B. Curb and gutter – ALDOT

Shall be placed on streets within the Alabama Department of Transportation right of way, according to the ALDOT Standard and Special drawings book, latest edition.

C. Roll curb

Can be placed on streets, but must be identified on the construction drawings at the time of review. The appropriate mold must be reviewed and approved by the City of Auburn prior to installation. Any deviations from the drawings shown on the standard details must be accompanied with appropriate drainage calculations identifying inlet capacity.

D. Header curb

Placed as necessary as a temporary street end.

E. Sidewalk

Sidewalk shall be placed on all streets as outlined in the Public Works Design and

Construction Manual and as shown on the City of Auburn standard details.

Metal forms shall be staked to hold true to line and grade. The depth of the forms shall be equal to the thickness of the sidewalk. Sidewalks shall be six-inches (6") thick where abutting a driveway turnout, four-inches (4") elsewhere. Handicap ramps shall be six-inches (6") thick.

Sidewalks shall only be placed on prepared subgrade that has no loose, soft, or other unsuitable materials.

F. Driveway Turnout

Driveway turnouts shall be a minimum of ten feet wide for residential uses, 4' radius, and twelve feet wide minimum for all other uses as outlined in the Public Works Design and Construction Manual and as shown on the City of Auburn Standard Details. Driveway turnouts should be installed for all driveways, unless otherwise called for on the construction drawings, and shall be installed per City of Auburn standard details.

Any existing curb and gutter, which has to be removed, shall be removed totally. The curb and gutter shall be removed to the nearest construction or expansion joint outside the turnout radius, if within three feet (3') from turnout radius.

Driveway turnouts shall be given a broom finish.

10.08 SEEDING/SODDING

All seeding and solid sod shall be placed in accordance with the ALDOT Standard Specifications for Highway Construction, latest edition Section 860. The type of seeding to be placed shall be determined by the seed charts based on the time of year. When sod is to be placed, it shall match the existing sod, unless otherwise noted in the construction documents.

Areas to be seeded shall include all disturbed areas. The ground shall be graded and scarified before application of the seed.

Slopes, except for rocky areas, shall also be protected with mulching materials such as erosion control netting, hay, straw, wood chips, or other suitable mulching materials.

10.09 UNDERDRAIN

Underdrain shall be placed as identified on the drawings or as deemed necessary by the Geotechnical representative.

A. Materials:

Underdrain pipe shall be rigid; a minimum of four inches (4") in diameter and in accordance with the ALDOT Standard Specifications for Highway Construction, latest edition, Section 853. One of the following types may be used:

- Concrete Pipe
- Corrugated Iron or Steel Pipe
- Coated Corrugated Iron or Steel Pipe
- Corrugated Aluminum Pipe
- Coated Corrugated Aluminum Pipe
- Poly (Vinyl Chloride) (P.V.C.) Pipe
- Acrylonitrile-Butadiene-Styrene (A.B.S.) Pipe
- Polyethylene (P.E.) Pipe

B. Construction Methods:

Trenches shall be a maximum of three feet (3') deep. The bottom of the trench shall be filled with at least three-inches (3") of filter material. The pipe shall be installed, perforations down. Filter material shall then be placed to a point twelve-inches (12") above the top of the pipe underdrain and compacted. The remaining portion of the trench shall be filled with granular or perilous material and compacted.