

CITY OF AUBURN STANDARD SPECIFICATIONS

SECTION 9 TESTING/TESTING MATERIALS

9.01 GENERAL

This section provides guidance and prescribes policies and procedures for Contractors and external testing laboratories in the testing of infrastructure constructed within the Planning Jurisdiction and/or the city limits of the City of Auburn. This section also provides Contractors of subdivisions and commercial developments, and city projects the required testing requirements involved during the construction of public utilities associated with their development.

The provisions of this section apply to all public and private development of infrastructure. Conformity is mandatory for the acceptance of infrastructure by the City of Auburn for maintenance. All Contractors (owners) will be responsible for assuring compliance of all subcontractors associated with the project.

9.02 RESPONSIBILITY

A. City Engineer/Director of Public Works

The City Engineer/Director of Public Works administers command and control of the policies and procedures listed within this document. He reserves the right to alter or require additional tests as necessary.

B. Inspection Manager/Project Manager

The Inspection Manager or Project Manager monitors the operations of the external testing labs, in close contact with the Contractor, to insure compliance of the required testing procedures. The Inspection Manager or Project Manager will assign an inspector to the said project for close contact with Contractor.

C. Inspector

The inspector will monitor the operations of the Contractor, and ensure all required test are conducted. The inspector will insure failed tests are readdressed in a timely manner.

D. Contractor

The Contractor is responsible for the hiring of the external testing laboratory to be used for testing on private developments. For private developments, the Contractor is responsible for all costs associated with the testing, assuring all tests are conducted, ensuring failed tests are readdressed in a timely manner, and notifying the inspector at least twenty four (24) hours prior to a requested test.

For city projects, specific hiring of the external testing laboratory will be addressed in the contract documents. Under city projects, the Contractor is responsible for notifying the inspector at least twenty-four (24) hours prior to a requested test and for the payment of failed tests. When testing services are scheduled on “per day” basis, the Contractor must perform work at least six (6) consecutive hours on a controlling item or be responsible for cost associated with the testing.

E. Testing Laboratories

It is the responsibility of the Developer/Contractor or City of Auburn, as indicated above, to hire a qualified testing laboratory. The testing laboratory must be professionally certified in Geotechnical Engineering, Subsurface Investigations, Construction Materials Testing, and Environmental Engineering; insure prompt response and monitoring of required services rendered; provide timely reports of testing to the Inspection Manager and the Contractor; and must insure compliance with all prescribed standards.

9.03 TESTING REQUIREMENTS

The following outlines minimum testing requirements for various components involved in the construction of embankment, backfill, streets, concrete, water lines and appurtenances, and sewer lines and appurtenances. The guidelines are presented as minimums and should not be construed as exhaustive. The City, at its discretion, may require additional tests at any time.

A. Subgrade

1. Soil borings – not required; if required, shall be conducted at an interval of one per five hundred (500) linear feet of roadway, at least four (4) feet below finished grade.
2. Soil properties – verification of maximum unit weight, optimum moisture, etc. All material within the roadbed must have a unit weight of at least one hundred pounds per cubic foot.
3. One test required per two hundred (200) linear feet of subgrade and one foot of vertical fill per two hundred feet.
4. Proof rolling will be required in the presence of the Inspector with the following load limits: 20,000 lbs./per rear axle, 10,000 for front axle

B. Backfill/Borrow/Embankment

1. Cut and fill areas - the subgrade 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.
2. 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.
3. One test required per two hundred (200) linear feet of per one foot of vertical fill
4. Proof rolling will be required in the presence of the Inspector with the following load limits: 20,000 pounds per rear axle, 10,000 for front axle.

C. Crushed Aggregate Base

1. Maximum thickness - Six-inches per compacted layer.
2. The base shall be compacted to not less than one hundred percent (100%) as determined by AASHTO T-99 or T-180.
3. One test required per two hundred (200) linear feet of per one foot of vertical fill.
4. Proof rolling will be required in the presence of the Inspector with the following load limits: 20,000 pounds/per rear axle, 10,000 for front axle prior to the placement of curb and gutter and prior to the placement of any bituminous mixes.

D. Bituminous Mixes

All bituminous mixes shall be in accordance with the ALDOT Standard Specifications for Highway Construction, latest edition and the City of Auburn standard details. For private developments, quality control testing by the developer is required, and test reports should be submitted to the City within a reasonable time limit. In addition, the City of Auburn reserves the right to perform quality assurance testing. For City projects, testing for all bituminous layers will be as outlined in the Special Conditions or the Measurement and Payment Section.

Density test for bituminous pavement will be required when density is suspected to be inadequate due to placement and compaction techniques. Cores will be required of the

Contractor.

E. Utility trenches

Utility trenches are classified as any utility, public or private, which crosses an existing or proposed roadway. Trenches shall be tested at the following frequency:

One (1) test per two feet (2') of vertical fill per every three hundred (300) linear feet or roadway.

F. Water lines and appurtenances

All water lines and appurtenances shall be tested in accordance with Section 14 of these standard specifications.

G. Sewer lines and appurtenances

All sewer lines and appurtenances shall be tested in accordance with Section 12 of these standard specifications.

H. Concrete

A design mix shall be computed in accordance with the Portland Cement Association Bulletin SF-100, "Design of Concrete Mixes", and tested by the approved testing laboratory. At least four (4) cylinders shall be made from the design mix for each class of concrete, two (2) shall be tested at seven (7) days, and two (2) shall be tested at twenty eight (28) days in accordance with ASTM C31/C31M-00e1 and C39/C39M-01.

Cylinder Compression Tests shall be made of design mix specimens and samples taken from each day's operation or from each fifty (50) cubic yards poured in a continuous major pour. Samples shall be taken and test specimens prepared in accordance with ASTM C31. Immediately after preparation, test cylinders shall be stored in a safe place and kept under moist curing conditions for at least twenty four (24) hours and then transported to the testing laboratory. Two (2) cylinders shall be tested at seven (7) days and two (2) cylinders shall be tested at twenty eight (28) days for each pour as described above, in accordance with ASTM Test C39. Duplicate copies of the test reports shall be submitted to the Engineer in a timely manner.

Where twenty-five (25) or more cubic yards of concrete are placed, also as necessary to

maintain desired consistency of the concrete, a slump test shall be made per ASTM C143.

Not less than one such test shall be made for each five hundred (500) cubic yards of concrete placed at one operation. Such test shall also be made on each sample on concrete used in fabricating test specimens.

1. Where more than fifty (50) and less than five hundred (500) cubic yards of concrete are required:

At the start of concreting, or before if practicable, make from a single batch a set of four (4) standard ten-inch (10") cylinders per ASTM C31 and cure per paragraphs 8(a) and 8(b) thereof. Test two (2) at seven (7) days and two (2) at twenty-eight (28) days per ASTM C39. Report as for "Concrete Control Tests (Laboratory Curing)" below.

2. Where a total of more than five hundred (500) cubic yards of concrete is required.

Advance tests of the concrete shall be made in an independent laboratory in accordance with ASTM C39. Six (6) standard six-inch (6") compression cylinders, three (3) to be tested at seven (7) days and three (3) at twenty eight (28) days, shall be made with the proportioning and materials including cement of the type, brand and mill source proposed to be used in the major part of the project. The slump should not be less than the greatest slump expected to be used in the structure. The tests made on the aggregates, as required above, may be made a part of these tests if suitably referenced on the reports which shall be issued at seven (7) and twenty eight (28) days to interested parties. These tests shall be repeated if necessary because of changes in materials or unsatisfactory results. Strength requirements shall be stated in the specifications.

I. Storm sewer

Storm sewer placed under the roadway must be reinforced concrete pipe and be ALDOT approved. HDPE may be used for side drains and within easements if approved by the City. The pipes will be visually inspected for proper installation.