SECTION 8000 - MATERIALS TESTING

8001 SCOPE. This section shall apply to all required testing services for soils, asphalt, concrete and other materials, as required by the City Engineer.

8002 GENERAL. All materials testing shall be conducted by a testing laboratory qualified and approved by the city to perform the required sampling, analysis, testing and report writing services. Reports shall be prepared by or under the supervision of and bear the seal and signature of a professional engineer licensed in the state of Kansas. Improperly completed or certified reports will not be accepted.

8003 RESPONSIBILITIES OF THE CONTRACTOR. The Contractor shall be responsible for all costs associated with the required sampling and testing unless otherwise specified. The Contractor shall allow the testing agency access to the job site and shall furnish any labor required to obtain and handle samples at the source of the material and at the project site. Adequate facilities shall be provided at the project site for the safe storage and proper curing of specimens. The use of a testing agency's service does not relieve the Contractor of the responsibility to furnish the required materials and to perform the required construction in full compliance with the City of Gardner *Technical Specifications for Public Improvement Projects*. The successful passing of a test does not constitute acceptance of the work or materials represented by the test or any portion of the work or materials. Final acceptance of the project shall be granted only through the acceptance of the Project Completion Certificate by the City Council and the expiration of the two (2) year maintenance period as established in these specifications.

8004 RESPONSIBILITIES OF THE TESTING AGENCY. All testing agencies shall meet the requirements of ASTM E329. A representative shall inspect, sample, and test the materials and work as required by the City Engineer. Any material furnished or work performed by the Contractor failing to conform to the specification requirements shall be immediately brought to the attention of the City Engineer and the Contractor. Preliminary written field reports of all tests and inspection results shall be given to the Contractor and City Engineer immediately after they are performed. Results of all tests taken, including failing tests, shall be reported. The testing agency and its representative are not authorized to modify any requirement of the specifications, nor to approve or accept any portion of the work.

8005 ASPHALT TESTING. Sampling and testing of the asphalt mix shall be required on all asphalt paving projects constructed in the city of Gardner.

Sampling and testing of asphalt mixes for modified Superpave surface and base shall be performed as required in the Technical Specifications.

Sampling and testing of asphalt mixes utilized for the construction of local and collector streets, bicycle paths, trails, parking areas, and other areas where modified Superpave is not specified shall be performed as follows:

Samples of the actual asphalt mix being used shall be acquired by a qualified testing laboratory technician at either the construction site or the batching plant per ASTM Standards D979 and D3665. These samples shall be used to perform the following tests:

- Aggregate Gradation in accordance with ASTM C136
- Asphalt Content on total mix basis with dust to binder ratio reported in accordance with ASTM D6307, Ignition or ASTM D2172, Extraction.
- Stability and Flow per ASTM D5581.
- Bulk Specific Gravity in accordance with ASTM D2726

A minimum of one complete group of tests shall be conducted on both the base material and the surface material for each paving project. Additional sampling and testing shall be as required by the City Engineer.

The Contractor shall be required to secure, at his expense, the services of an approved independent testing laboratory to verify the test results submitted by the Contractor's laboratory. The Contractor's laboratory will coordinate with the laboratory performing verification testing to ensure the samples are taken at the same location and time. A minimum of one verification test shall be conducted on both the base material and the surface material for each paving project. Additional verification testing shall be as required by the City Engineer. The Contractor's laboratory shall furnish the verification laboratory other items such as the Job Mix Formula (JMF) mix gradation, plant setting, bulk specific gravity of the aggregate and specific gravity of the asphalt. Laboratories shall compare final test results when the mix is out of specification. The test results shall indicate whether adjustments are required to bring the mix design into conformance with specification tolerances.

In-place density tests shall be conducted with a nuclear density gauge during the course of the work. Density tests may be performed by City Engineer to verify compliance with compaction requirements. The asphalt shall be compacted to a density equal to or greater than 95% of maximum density as determined by the fifty (50) blow Marshall procedure. The number and locations of tests to be taken shall be determined by the City Engineer. Tests performed with a nuclear density gauge shall be conducted in accordance with ASTM D2950.

8006 <u>CONCRETE TESTING</u>. Sampling and testing shall be required on all concrete work including curb and gutter, sidewalk, slope paving, retaining walls, inlets, manholes or any other structures. See table 8006-1 for frequencies and required tests.

Table 8006-1 *- Portland Cement Concrete Testing Requirements, Methods and Frequencies*

Type of Construction	Required Test	Method	Frequency
Portland Cement Concrete structures and miscellaneous construction	Temperature Slump Air Content Unit Weight Cylinders (4 per set)	KT-17 KT-21 KT-18 or KT-19 KT-20 KT-22	Minimum of 1 set per 50 cubic yard placed or fraction thereof as directed by the City Engineer
Portland Cement Concrete pavement	Temperature Slump Air Content Unit Weight Cylinders (4 per set) Profilograph	KT-17 KT-21 KT-18 or KT-19 KT-20 KT-23 KT-46	Minimum of 1 set per 100 cubic yard placed or fraction thereof as directed by the City Engineer. Profilograph as required by the City Engineer

If samples of fresh concrete have not been obtained and tested, a minimum of three (3) cores shall be taken per ASTM C42 and broken as directed by the City Engineer. Air content in accordance with ASTM C457 and cement content per ASTM C1084 shall also be determined. The test results will be considered adequate if the average strength of the cores is equal to a minimum of 95% of the specified strength (f'c) and if the strength of any single core is not less than 80% of f'c. All core holes shall be completely filled with a low-slump, high strength concrete at the Contractor's expense.

All reports by testing laboratories shall include the type of structure or pavement and information on obtaining, transporting, storing, curing, time between obtaining and casting cylinders (when applicable), supplier, finisher and batch as well as the specific test data.

8007 SOIL TESTING. Sampling and testing shall be required on all subgrade preparation for street construction and all trench backfilling operations within the city of Gardner.

Prior to beginning any work on street subgrade the Contractor shall secure the services of a qualified testing agency to acquire samples of the material to be used for subgrade construction. These samples shall be analyzed to determine Proctor values, liquid limits and plasticity index. The technician will take the samples at locations determined by the City Engineer. Copies of the analysis shall be provided to the City Engineer for review prior to commencing any subgrade preparation.

Tests for subgrade material requiring fly-ash modification shall be in accordance with the requirements of the Technical Specifications.

The City Engineer shall designate the locations and depths at which a qualified technician shall perform moisture-density testing of the subgrade material in accordance ASTM D698 for cohesive soils and ASTM D4253 and D4254 for non-cohesive soils. The number of tests taken shall be as directed by the City Engineer. Reports for moisture-density tests shall include the following:

- Project name and number
- Date
- Location of test
- Depth or elevation of test
- Soil/Proctor description
- Proctor density
- Density-% of Proctor
- Wet density
- Dry density
- Optimum moisture %
- Actual moisture %
- Weight of water

Results of these tests shall indicate whether or not the performance specifications stated in the Technical Specifications have been achieved. If the tests indicate the compaction is not sufficient, the Contractor shall rework the area to achieve satisfactory compaction. Tests performed with a nuclear density gauge shall be conducted per the requirements of ASTM D6938.

During trench backfilling, in-place density tests may be required by the City Engineer. The number and locations of tests to be taken shall be determined by the City Engineer. Results of these tests shall indicate whether or not the performance specifications stated in the Technical Specifications have been achieved. If the tests indicate the compaction is not sufficient, the Contractor shall rework the material to achieve satisfactory compaction.