

# CITY OF DURHAM

## Pavement Design Requirements

Minimum pavement cross sections are required for residential and commercial streets. Arterials, Minor Thoroughfares, and Major Thoroughfares require a design following the requirements below. A pavement design may be required for any new street based on site conditions and traffic parameters. Alternative pavement sections that provide the same structural number may be requested and will be considered. Lime additives may be considered as part of alternative pavement designs.

### MINIMUM PAVEMENT SECTION

#### Residential Street:

##### SURFACE COURSE

1"SF9.5a (Or Type I-2 BCSC)

Final lift to be applied after 75% development occupancy

or 1 year from intermediate course placement or (whichever comes first)

##### INTERMEDIATE COURSE

1 ½ S9.5A (Or Type I-2 BCSC)

##### BASE COURSE

8" Compacted base course

Note: Depending on the selected mix, minimum thickness may require adjustment of the Intermediate and Surface courses.

#### Residential Collector: (Serves more than 150 residential units)

##### SURFACE COURSE

1"SF9.5a (Or Type I-2 BCSC)

Final lift to be applied after 75% development occupancy

or 1 year from intermediate course placement or (whichever comes first)

##### INTERMEDIATE COURSE

2" S9.5A (Or Type H BCSC)

##### BASE COURSE

10" Compacted base course

Note: This section may be required for the first 300 feet (entrance) of any new residential street. Depending on the selected mix, minimum thickness may require adjustment of the Intermediate and Surface courses.

### **Average Commercial Street:**

#### SURFACE COURSE

1" SF9.5a (Or Type I-2 BCSC)

Final lift to be applied after 75% development occupancy or 1 year from intermediate course placement or (whichever comes first)

#### INTERMEDIATE COURSE

3" S9.5A (Or Type H BCSC)

#### BASE COURSE

10" Compacted base course

Note: Depending on the selected mix, minimum thickness may require adjustment of the Intermediate and Surface courses.

### **PAVEMENT DESIGN**

A pavement design will be required for all other streets. The pavement design shall be in accordance with these specifications.

- The pavement design and traffic analysis shall be signed and sealed by a NCPE, and shall be submitted for approval prior to placement of curb and gutter or pavement material. In the absence of actual counts approved by the City, truck volumes for the design of new residential streets shall be 4% for single frame trucks and 1% for multiple frame trucks. All streets maintained by the NCDOT must receive approval of the pavement design from the NCDOT prior to the placement of curb and gutter or pavement material.
- Approved pavement design methods include those most current as proposed by NCDOT, AASHTO and the Asphalt Institute MS I document. Other design methods will not be accepted.
  - + The AASHTO method will require use of a terminal serviceability index of 2.0 for collectors and 2.5 for thoroughfares,  $S^o = 0.49$  for flexible pavement or  $S^o = 0.39$  for rigid pavements, and a reliability of 98 percent for thoroughfares and 95 percent for collectors.
  - + Rigid pavement design shall follow the most current AASHTO Method or the Portland Cement Association Method.
- Pavement design shall be based on subgrade conditions, a 20 year design life and pre-approved projected traffic loading.
- Subgrade conditions shall be based upon corrected soaked CBR values at 0.1 inch penetration per ASTM D1883.

- Soil samples used for these CBR tests shall be obtained at intervals not greater than 500 feet typically; a subdivision will require 2 to 3 soil samples as a part of the pavement design.
- Larger subdivisions, greater than 150 equivalent lots, may require additional soil samples at the discretion of the City Construction Engineer.
- Boring logs and scaled drawings designating boring locations with CBR tests and other pertinent data shall accompany the pavement design.

## **SOIL TESTING AND COMPACTION**

- The top (12) twelve inches of subgrade under any proposed roadway shall be compacted to a density of 100 percent maximum Standard Proctor dry density as determined by AASHTO method T99. For that portion of fill under roadways and extending to a slope of and extending to a slope of 1 to 1 beyond the back of curb, and for areas under proposed sidewalks, compact to a density of no less that 95 percent of the Maximum Standard Proctor dry density as determined by AASHTO method T99. Fill material shall be placed in lifts of 8 inches or less of uncompacted soil.
- Other fill material shall be compacted to a density of no less than 90 percent of the Maximum Standard Proctor dry density as determined by AASHTO method T99. Backfill material shall be placed in lifts of 12 inches or less of uncompacted soil. This criteria applies only outside the pavement box.
- Subgrade Dry Density tests as described above shall be conducted at intervals no greater than 300 feet. No street shall have less than 2 tests. Certified reports from a professional testing firm shall be submitted and approved prior to placement of any base material. The City Inspector may require additional tests at specific locations.
- The subgrade shall be compacted as described above. Inspection of the subgrade prior to the placement of base course shall be performed by proof rolling at the direction of the City Inspector.
- No base material shall be placed on a roadway until the storm sewer, subgrade, utilities, and all appurtenances have been inspected and approved by the City Inspector.

- Base Course Dry Density tests as described above shall be conducted at intervals no greater than 300 feet. Base Course shall be compacted to a density of 100 percent of the Maximum Standard Proctor dry density as determined by AASHTO method T-180 as amended by NCDOT. No street shall have less than 2 tests. Certified reports from a professional testing firm shall be submitted and approved prior to placement of any base material. The City Inspector may require additional tests at specific locations.
- Special attention shall be given to the compaction around manholes, valves, and water and sewer services. The fill around those structures should be placed in lifts as described above. The City Inspector may require intermediate compaction tests as described below around those structures.
- At any time the City may require pipeline and utility backfill in the pavement box to be density tested at the rate of one test per 200 feet of trench per foot of fill placed and the results provided to the City prior to proof-rolling. If trench backfill is determined to be inadequately compacted it shall be repaired as directed by the City prior to the replacement of any base course material.