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Cynthia B. Forte  
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As  
Agreement

Recorded On: August 06, 2008

Parties: GOOSE CREEK CITY OF

To  
CARNES CROSSROADS ASSOCIATES LLC

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*Cynthia B. Forte*  
Cynthia B Forte - Register of Deeds

FIRST AMENDMENT TO  
DEVELOPMENT AGREEMENT  
BETWEEN CITY OF GOOSE CREEK  
AND CARNES CROSSROADS ASSOCIATES, LLC  
(Book 5647, Page 1)

This First Amendment ("Amendment") is entered into as of July 8, 2008 by and between the City of Goose Creek, a municipal corporation organized and existing under the laws of the State of South Carolina ("City"), and Carnes Crossroads Associates, LLC, a South Carolina Limited Liability Company ("Developer") to amend that certain Development Agreement between the City, the Developer and Carnes Water Tower, LLC, a South Carolina limited liability company, Harmon Crossing, LLC, a South Carolina limited liability company, Harmon Run One, LLC, a South Carolina limited liability company, Harmon Run Two, LLC, a South Carolina limited liability company, Harmon Run Three, LLC, a South Carolina Limited Liability Company and Harmon Run Four, LLC, a South Carolina limited liability company (collectively "Harmon") dated May 9, 2006 and recorded in Book 5647 at Page 1 in the Berkeley County Register of Deeds Office (the "Development Agreement").

RECITALS

- A. The entities defined as Harmon above have transferred all of their interest in the Real Property to the Developer and no longer have an interest in the Agreement.
- B. The City and the Developer desire to amend the Agreement to modify certain provisions of the Agreement and the Carnes Crossroad Master.

**NOW, THEREFORE, the Parties agree:**

1. The definitions in Section are amended to include the following:

**POA shall mean Carnes Crossroads Community Association, Inc., a South Carolina non profit corporation and Carnes Crossroads Town Association, Inc., a South Carolina non profit corporation**

2. Section 18(a) and 18(b) of the Development Agreement are deleted and replaced with the following:

18. (a) Drainage.

Property Owner shall provide adequate drainage for the Development of the Real Property in accord with Current Regulations, except as amended herein, and other applicable regulatory guidelines, including those of the Department of Ocean and Coastal Resource Management. Property Owner agrees to dedicate to the City after completion all

drainage easements directly related to the roads in a form of easement mutually acceptable to the Property Owner and the City; however, the storm water facilities into which the road drainage easements drain shall belong to the POA. Property Owner shall have the right to place plantings, fencing, signs, parking lots and anything else that is not a habitable structure within the drainage easements, provided they do not impair drainage and provided Property Owner will timely and competently clean around these if requested by the City.

(b) The Project's Roads.

The Developer shall at its expense develop and provide roads and their related infrastructure in accordance with the Carnes Crossroads PUD. All roads, alleys, related drainage easements, street signs and sidewalks within the road right of ways shall be publicly dedicated to the City in accordance with the provisions of the Carnes Crossroads PUD. The City may elect to convey such public roads to the County.

The City shall contract with the POA to maintain the City's roads and drainage easements within the Real Property and the POA shall be responsible for the cost of such maintenance. In the event that the City transfers the roads in the Development to the County or if the City elects to maintain other City owned roads, the POA's maintenance obligations shall cease.

3. Section 8 of the Carnes Crossroads Master Plan is deleted and replaced with the following:

**8.1 General Street Design Standards.**

**8.1(a) Layout.** The layout and design of streets as to arrangement, character, width, grade and location shall be required to conform to the Carnes Crossroads Master Plan, to adjoining street systems of adjoining properties, to the topography, natural features and drainage systems to be provided, adjoining land uses and anticipated traffic capacity. The neighborhoods are to relate to each other in an interconnected system where other streets also tie parcels together. The plat for a parcel shall take such streets to the parcel's boundary line; the subsequent design of the adjacent parcel should continue the development of these streets.

**8.1(b) Street Types** The streets, including pavement widths, right of way widths, and locations of sidewalks, will be in accordance with the typical details provided herein and elsewhere in this Master Plan.

**8.1(c) Design Standards** The streets shall be constructed in accordance with the Carnes Crossroads Road and Drainage Development Standards which are attached as **Exhibit \_\_\_** and incorporated by reference ("Road Code"). In the event of conflict between the text of this Master Plan and the text of the Road Code, the text of the Road Code shall control.

## **8.2 Easements**

**8.2(a) Drainage Easements.** Drainage easements adequate to allow for maintenance will be provided where needed. Easements may be private or public.

**8.2(b) Utility Easements:** Adequate areas of suitable size and location shall be allocated for utility easements. The location and size of such easements shall be agreed to by the public and private utilities involved.

**8.2(c) Maintenance:** Easements shall be deeded to the City of Goose Creek for the purpose intended, as shown on the plat and stated in the deed of dedication, or may be between private entities. The easement grants to the City to the right to enter, inspect, survey, and conduct needed activities related to the easements' purpose. The City has no obligation to repair, replace or compensate the easement owner for the trees, plants, grass, shrubs or other elements damaged or destroyed during the course of its activities.

**8.3 Storm Drainage.** A drainage system shall be designed and constructed by the developer to provide for the proper drainage of the surface water of the subdivision, and the drainage area of which it is a part, to permit the unimpeded flow of natural watercourses.

**8.3(a) Design and construction standards.** Drainage systems shall be designed and constructed by the developer consistent with the design principals and standards contained herein and established by SCDHEC-OCRM. Drainage systems in all cases shall conform to cross sections, dimensions, erosion control measures and grades as shown on the approved construction plans.

**8.3(b) Off-Street drainage.** The off-street drainage system shall include the watershed affecting the subdivision, and shall be extended to a natural watercourse or publicly maintained drainage facility that is adequate to receive the storm drainage.

**8.3(c) Filling, Grading.** Filling, grading, permanent erosion control features, and installation of drainage systems for lots and streets shall be provided prior to final plat approval

#### **8.4 Erosion, Runoff and Sedimentation Control**

**8.4(a)** Engineering and construction on any land within the City shall be carried out in such a manner as to protect neighboring persons and property from damage or loss resulting from excessive stormwater runoff, soil erosion, or deposition upon private property or public streets of water-transported silt and debris.

**8.4(b)** Drainage plans and studies shall be submitted for review by the Department of Public Works. These plans and studies shall be prepared by a design professional currently registered to practice in the state, with his or her stamp affixed. Profile for drainage pipes shall be included and will show existing ground line, finished grade, drainage structures, intersecting sanitary sewers and other intersecting underground utilities. Existing and proposed utility lines crossing the storm drain pipe shall be shown in the profile on their proper elevation. Pipes that conflict at crossings shall be adjusted with adequate details included.

#### **8.5 Coordination Required.**

**8.5(a)** All land development activity must comply with the applicable sections of the latest edition of the *South Carolina Stormwater Management and Sediment Control Handbook for Land Disturbance Activities*.

**8.5(b)** A land disturbance permit must be issued and submitted to the City before construction approval or a Clearing and Grading Permit will be issued.

#### **8.6 Markers.**

**8.6(a)** Street Markers. All changes in direction (P.C., P.T., and the like) of street centerlines shall be marked with a large nail or spike in the pavement. The radius center point of cul-de-sacs shall be marked with a large nail or spike. The points thus marked in divisions (A)(1) and (A)(2) above shall be shown on the final plat, along with such bearings and distance ties as needed for their use in locating lot corners

**8.6(b)** Drainage Easement Markers. All changes in direction and all intersections with street right-of-way and lot lines shall be marked as directed in division (C)(1).

**8.6(c)** Lot Markers. Lot corners shall be marked with 1/2-inch diameter, 18-inch long iron rods, except that where the distance, as measured along the street right-of-way, exceeds 500 feet between markers, additional markers shall be installed. Intervisible corner markers shall be shown on the final plat, along with the bearing and distance for these intervisible markers noted on the plans. The intersection of lot lines and right-of-way lines of drainage easements shall be marked with 1/2-inch iron rods as in division (C)(1) above.

**8.6(d) Benchmarks.** Benchmarks shall be monumented and complete descriptions and elevations given on the final plat.

**8.6(e) Buffer and critical line attachment markers.** All changes in direction of buffers and the OCRM Critical Line shall be marked with 1/2-inch iron rods.

## **8.7 Streets**

**8.7(a) General** Street names proposed by the sub-divider shall be approved by The City of Goose Creek. Alleys shall be permitted. Alleys will conform to details in the Road Code. Prior to acceptance by the City streets and drainage systems shall be cleaned. Traffic control devices shall conform to the requirements of latest edition of the South Carolina Manual on Uniform Traffic Control Devices.

**8.7(b) Street Names** Landscaping, signs, or other objects shall not interfere with needed sight distance. Street name signs, pavement markings and other traffic-control devices shall be installed at all intersections and other locations by the sub-divider. The design, construction, materials, and placement of all street name signs shall conform to the Carnes Crossroads Standard Details.

**8.8 Licenses and Permits Required and Complete Plans to be Furnished.** Before commencing any construction, clearing, or grading on any commercial or residential tract lot, streets, road or any lands within Carnes Crossroads. All necessary licenses and permits shall be obtained; and complete plans, consisting of general and specific drawings, specifications, and analysis, together with details to provide a comprehensive plan of the construction contemplated, shall be furnished to, and approved by, the City.

**8.9 Subdivision Plans.** Subdivision plans shall show: Alignment, Street and right of way width, street name, a typical section, North arrow; and original and proposed center and right-of-way line elevations.

**8.10 Elevation and Grades.** Elevations are not to be assumed, but are to be tied into the closest Coast and Geodetic Survey benchmark, or to an approved benchmark that has been previously tied to the same. Data shall be platted to NGVD 1929 Datum. Road profiles shall be a minimum scale of one inch equals 100 feet horizontal, and one inch equals two feet vertical.

**8.10(a) Paving and Grading.** Details shall be furnished for all projects and shall include, as required, typical pavement sections, curb and gutter, inlet, manhole, frame, grate, sewer, painted stripes, signs, and walks. Pavement sections shall show the typical location of all utilities. Curb and gutter inlets will be used to intercept runoff from vehicular pavements where curb and gutter is used to

control drainage. Grate or weir type inlets will be used in turf areas. The log shall be provided at the time of request for acceptance of the work by the City. As-built plans, including road center lines and drainage system shall be furnished to the City of Goose Creek upon completion of the work prior to final acceptance.

**8.10(b) Licensed Professional To Do Work.** Plans and specifications covering road, street, parking areas, drainage, and grading work will be accepted only from registered professionals qualified under state law. When submitting plans and analyses for road, street, drainage, and grading work, the professional shall place his or her seal on all documents. All work shall be based on surveys prepared by a professional licensed in the state and shall conform to Class "A" surveys, as defined by the State Board of Registration for Land Surveys.

**8.11 Specifications for Streets.**

**8.11(a)** All streets public and private, shown on the final plat shall be graded, constructed, and surfaced in accordance with standards and specifications contained in the Road Code. The developer shall be responsible for correcting any and all deficiencies in streets, resulting from faulty design or construction, for a period of one year from the time the streets are accepted by the City, as evidenced by the recording of the final plat into the City's system.

**8.11(b)** Where private development facilities tie into public facilities, the work shall meet the requirements of the Road Code and this section.

**8.11(c) Permitted Encroachments Within Street Right-Of-Way.** The following encroachments are permitted within that portion of the street right-of-way which is not paved or curbed: Signs, arcades, bay windows, stairs, stoops and other similar features.

4. Section 6.8 of the Carnes Crossroads Master Plan is deleted and replaced with the following:

**Section 6.8 Rear and Side Setbacks.**

No side yards or rear yards are required in the Town Center Zone unless mandated by the applicable fire code requirements. If a side setback or rear setback is provided, its minimum width shall be 3 feet.

5. All other provisions of the Development Agreement and the Carnes Crossroads Master Plan remain in full force and effect.







## CARNES CROSSROADS ROAD AND DRAINAGE DEVELOPMENT STANDARDS

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## **SECTION 1: GENERAL**

In order to achieve the objectives stated in the Introduction of the CC-PUD, development standards are needed to provide design guidance and construction standards for the type of development the Carnes Crossroads PUD seeks to implement. In addition, these standards attempt to provide a finished product that the City and the Carnes Crossroads residents can be proud of and have the confidence that exceptional workmanship was provided.

## **SECTION 2: PURPOSE**

The purpose of the design standards are:

1. Provide the developer, the City, design professionals, and the future residents with a set of technical criteria for use in the design and construction of quality road and drainage systems needed to create the Carnes Crossroads community;
2. Promote the orderly development of property within Carnes Crossroads;
3. Obtain safe, adequate, functional road and drainage systems;
4. Ensure adequate maintenance capabilities for the road and drainage systems;
5. Enhance land use planning and design.

## **SECTION 3: ADMINISTRATION**

### **1. Revisions**

- A. The City or the developer may, from time to time, request that revisions be made to this guidance document with the agreement of both parties.

### **2. Project Inspections**

All work required by the City for the development being considered can be inspected by the Director of Public Works, or his designee, for compliance with the approved plans and specifications. The Director of Public Works may make inspections when:

- A. Appropriate plats have been approved by the Planning Director;
- B. Construction plans and specifications have been approved by the Director of Public Works;
- C. Sufficient notice is given. The developer shall give one (1) week notice prior to the beginning of any construction project. After the initial notice, twenty-four (24) hours notice should be given prior designated inspection milestones.

## **SECTION 4: GENERAL REQUIREMENTS FOR CONSTRUCTION PLANS**

### **1. Construction Plans and Specifications**

The developer shall provide construction plans which indicate a comprehensive outline

of the development proposal. The construction plans shall include plan, road profiles, cross-section views, storm drain profiles and details and specifications of the development proposal.

## 2. Procedure for Obtaining Approval of Construction Plans

- A. Prior to the beginning of construction of the streets and drainage system, including clearing and grubbing, the design professional shall prepare and submit construction plans based on these standards. Submittals will be made in accordance with current City submittal guidelines. With the agreement of both parties, the City may review the construction plans and specifications in-house or require the construction plans and specifications be reviewed by a third party reviewer, at the Developer's expense. This provision is not intended to prevent the clearing of minor trails required to access the property.
- B. Upon satisfactorily addressing the City's comments, the design professional shall resubmit the required number of revised plans and supporting documentation to the Director of Public Works. At the discretion of the Director of Public Works, after review of the proposed plans and supporting documentation, having found them to be satisfactory, the Director of Public Works shall place upon the construction drawing an appropriate stamp of approval.

## 3. Construction Plan Standards

The following standards shall be observed in the design and preparation of construction plans:

- A. Plans shall be prepared on Standard 24" X 36" sheets;
- B. All elevations shall be in the datum of NGVD 1929;
- C. Profile scales shall be:
  - 1) Vertical – 1" = 2' minimum; and
  - 2) Horizontal – 1" = 50' minimum;
- D. Plan View Sheets shall include the following at a minimum:
  - 1) Cover Sheet describing the project, sheet index, and vicinity map;
  - 2) General Legend Sheet
  - 3) Existing Conditions Sheet showing existing utility lines, drainage structures, streets and right of ways, property lines, easements, structures, topography and other natural features; to include type and size;
  - 4) Storm Water Management Plan Sheets
  - 5) Overall proposed Water, Sewer, and Drainage features (these sheets may be eliminated should the project's size dictate they are unnecessary);

- 6) Staking, Striping, and Signage Sheets showing:
  - i. Proposed right of way widths and street names
  - ii. Applicable street, sidewalk, easement, and median widths
  - iii. Bench marks with locations, description and datum, etc.
  - iv. Station numbers along the center line (or geometry line) of proposed roadways, with appropriate ties at intersections
  - v. Alignment information, including curve data with PC, PT and PI, and other pertinent information
- 7) Detailed plan sheets showing appropriate ties to existing features, proposed roadway and utility features to include line lengths, sizes, materials, elevations, etc as are normally associated with Civil Site Work Drawings
- 8) Appropriate detail sheets for Paving, Grading, Drainage, Water, Sewer, and appropriate typical cross sections

**E. Road Profiles shall show:**

- 1) The existing street center line plotted from elevations taken, showing all breaks in grade, but in no case more than one hundred (100) feet apart;
- 2) The existing street to which tie is being made for a minimum distance of fifty (50) feet;
- 3) Proposed street centerline profile with centerline elevation every fifty (50) feet;
- 4) Vertical curve data;
- 5) Corresponding station numbers;

**F. Drainage Profiles shall show:**

- 1) Proposed and existing storm drains;
- 2) Appropriate water, sewer, utility line, etc crossings;
- 3) Appropriate drainage line sizes, lengths, materials, and related drainage structure information to include frame and pipe elevations;

**G. Each sheet shall contain the design professionals seal, signature, and South Carolina registration number.**

## **SECTION 5: DESIGN ELEMENTS FOR STREETS**

### **Introduction**

This section is intended to serve as a construction and layout guide for streets and roads.

## **Use of Guidelines**

A street geometric design is based on the type of development it is to serve. This includes single family residential, multi-family residential and commercial. Each may require a different type design. The design professional shall prepare a design for the development's roadways utilizing the criteria included within these design standards as a guide. Site or project conditions requiring special geometric requirements of roadway and/or right-of-way shall be approved by the Director of Public works.

## **Types of Streets**

For the purpose of these standards, streets are considered to be paved streets. Paved streets are those in which the traveled roadway is constructed of a layer or layers of materials, with the surface usually being constructed of asphalt.

## **General Design Requirements**

A. Street widths and right-of-way widths shall be consistent with the cross sections provided in the attached drawings.

B. Requirement Minimum Street Elevation

The minimum street centerline elevation at finished grade shall be above the ten-year storm for residential streets (minor) and above the twenty-five (25) year storm for collector streets as defined in a drainage basin study.

C. Compound curves are not permitted.

D. When connecting street lines deflect from each other at any one point by more than ten degrees, they shall be connected by a curve street centerline radius that shall be a minimum of 100 feet on residential minor streets, and a minimum of 25 feet shall be provided between reversed curves on these streets.

E. Streets shall be laid out so as to avoid acute angles between streets at their intersections. Small radius alignment on the approach to the intersections shall be avoided. Property lines at street intersections shall be rounded with a radius of not less than 20 feet. Larger radii or chambered corners will be required when such design is advisable to permit the construction of curbs of large radii. The minimum street intersection radius shall be 20 feet. Provide a larger radius when so necessary to accommodate truck traffic.

F. The minimum road profile gradient shall be 0.40%.

G. The minimum alley profile gradient shall be 1.00%.

H. The minimum road cross section gradient shall be 2.50%

I. On causeways through wetland areas, the minimum street profile gradient may be 0.1% without curb and gutter.

J. Right-of-way widths and road cross sections are specified in the Carnes Crossroads

PUD. These road sections may be adjusted with the approval of the Planning Director and the Public Works Director.

**K. Required minimum pavement width**

- 1) For a standard residential street with a standard curb and gutter section, a minimum pavement width of twenty (20) feet, exclusive of the twelve (12) inch gutter, is required;
- 2) For divided curb and gutter entrances shorter than 400 LF, a minimum pavement width of twelve (12) feet, exclusive of the twelve (12) inch gutter, is required for each lane. For longer divided entrances the width from face of curb to face of curb shall be eighteen (18) feet.
- 3) For a one-way road section with on-street parking, the minimum pavement width of sixteen (16) feet, exclusive of the twelve (12) inch gutter, is required.
- 4) For a one-way alley section, the minimum pavement width of eleven (11) feet is required.

**L. Pavement striping will not be used on interior neighborhood streets. Collector streets (streets that collect traffic from minor streets) may have striping.**

**M. Temporary endings shall be provided with a circular turn around with a minimum radius of 40 feet. A stable surface of base course material will be provided.**

**N. Dead-end streets, designed to be so permanently, shall be no longer than 800 feet except as noted below. Dead end streets longer than 800 feet will be allowed when dictated by geographical features.**

**Cul-De-Sac Streets**

Cul-de-sac streets are permitted provided the following minimum standards are satisfied:

**A. Circular turn-arounds may be allowed provided:**

1. Minimum right-of-way radius is fifty (50) feet;
2. Minimum road surface radius is forty (40) feet (exclusive of curb and gutter);
3. Minimum pavement width is twenty (20) feet; and
4. Islands, if provided, shall be approved by the Director of Public Works.

**B. Rights-of-way requirements for circular turn-arounds may be reduced provided:**

1. Access is provided to twelve (12) dwelling units or less;
2. Sufficient dimension is provided to insure adequate space for utilities; and
3. A minimum right-of-way width of forty (40) feet may be provided.

### **Minor Streets**

Minor streets shall be constructed as paved streets. A minimum paving width of twenty (20) feet for the surface course with a twenty-one (21)-foot wide base course is required for streets with open roadside drainage swales. Minor streets shall be so laid out that their use by through traffic will be discouraged. Half streets along property lines shall be prohibited.

### **Collector Streets**

Collector streets shall be constructed as paved streets. A minimum of fifty-five (55) feet in width is required for right-of-way. A minimum paving width of twenty-four (24) feet for the surface course with a twenty-five (25) foot wide base course is required for streets with open roadside drainage swales.

### **Arterial Streets**

Arterial streets shall be constructed as paved streets. A minimum lane width of twelve (12) feet for each of the four (4) lanes shall be provided. Arterials may be divided or undivided.

### **Other Streets**

#### **A. Alleyways**

1. Alleyways shall be designed and constructed with the same standards of quality as the standard residential streets.
2. A right-of-way of at least twenty (20) feet shall be provided and a paved roadway width of at least eleven (11) feet (twelve (12) feet for the base course) for all alleyways with one-way traffic shall be constructed. Additional right-of-way or adjacent easements shall be provided as needed for utilities.
3. Minimum pavement section shall conform to the pavement standards of adjacent roadway areas within the development.

#### **B. Causeways**

1. Roads to be constructed on causeways shall meet all of the requirements contained within these standards, including:
  - a. Minimum street centerline elevation at finished grade shall be determined by the approved Stormwater Management Plan and shall be set one (1) foot above the 100 year storm;
  - b. Minimum earthen side slopes shall be 2:1, unless a bulkhead or other means of reinforced slope stabilization is utilized;
  - c. Streets or roads constructed on causeways shall maintain the pavement cross sections of the approaching roadway; and



- d. Guard rails and/or shoulders shall meet the minimum requirements of the South Carolina Department of Transportation, the Institute of Transportation Engineers, or AASHTO, whichever is applicable.

C. On-Street Parking

1. On-street parallel and angled parking shall be permitted in the residential and commercial developments.

**Street Intersection Layout**

Street intersections must satisfy the following regulations:

- A. Street intersections shall not include more than four (4) street approaches
- B. Streets shall be laid out to intersect at right angles
- C. In the case of trees, there shall be no foliage lower than six (6) feet above curb grade. Vertical measurement shall be made from the top of the nearest curb or, if no curb exists, from the edge of the nearest traveled roadway finish-grade surface.
- D. Offsets of minor streets shall have a minimum of 125 feet between centerlines; however with the approval of the Director of Public Works, this dimension may be reduced when expected traffic volumes and turning movements are at a minimum.
- E. Offsets of collector streets shall be increased as required by the Director of Public Works to allow left-turn storage between intersections.
- F. Offsets of arterial streets shall be designed in accordance with AASHTO Standards.

**Intersection Sight Triangles**

Minimum stopping distances should conform to the design speed for the particular street and the stopping distances required for wet pavement conditions, as follows:

20 mph	125 feet
25 mph	150 feet
30 mph	200 feet

These sight distances should be provided by both vertical and horizontal alignment. Where grades vary from level conditions, stopping sight distances can be decreased for uphill grades and may be increased for downhill grades. Within commercial areas, trees and other objects should be restricted from corners for distances of thirty (30) on all sides.

The minimum sight triangle analysis for arterial and collector roads shall be determined based on stopping site distance. Sight triangles shall be measured longitudinally at the center of the nearest travel way and an eight (8) foot driver's eye setback, from the edge of the travel lane, shall be used.

## **SECTION 6: ROADWAY DESIGN**

### **Introduction**

This section, in conjunction with Article 10, is intended to provide guidelines for the design and construction of roadway pavement and roadway drainage, and for construction work that is to be done within the right-of-way.

### **Street Surface Standards**

#### **A. Pavement section for Residential and Commercial Streets**

The standard pavement section for residential streets is a minimum 8-inch compacted base course meeting the SCDOT specification 305 for Bases and Subbases, with a prime coat meeting SCDOT specifications for the particular base material and specification section 305.4.6 with two (2) inches minimum compacted depth of hot laid asphaltic concrete surface course meeting SCDOT specification 403, types C and D.

#### **B. Pavement Section for Collector Streets**

The standard pavement section for residential streets is a minimum 8-inch compacted base course meeting the SCDOT specification 305 for Bases and Subbases, with a prime coat meeting SCDOT specifications for the particular base material and specification section 305.4.6 with two (2) inches minimum compacted depth of hot laid asphaltic concrete surface course meeting SCDOT specification 403, types C and D.

#### **C. Alternative Pavement Design**

The City will consider alternative pavement designs. The design professional shall submit appropriate supporting documentation, including testing and design data for the foundation soils from a geotechnical design professional registered with the State of South Carolina.

### **Clearing and Grubbing**

- A. All streets and roadways shall be cleared a sufficient width to allow the installation of pavement, drainage, and all utilities. Care shall be exercised to minimize the clearing width and damage to remaining vegetation. Clearing shall include the removal and disposal of all trees, stumps, brush, rubbish, roots and other objectionable materials.**
- B. All streets and roadways shall be cleared and grubbed for a width extending out to a minimum of five (5) feet beyond the right-of-way.**
- C. Where there are roadside ditches, clearing and grubbing limits shall be set at the top of the slope on the backside of the roadside swale.**
- D. Drainage easements and pedestrian/bike trails shall be selectively cleared to a minimum width for construction and continued maintenance.**

- E. Selected healthy specimen trees of aesthetic value being firmly rooted, with the natural ground elevation at the base of the tree being approximately the same as that of the finished grade or where a meandering pavement within a minimum 50-foot right-of-way is used, selected healthy specimen trees may be left within the area between the back of curb or edge of pavement and the right-of-way line or within an island. However, provisions must be made to reduce any safety hazard caused by the remaining trees.

### **Grading**

- A. Streets shall be graded to the designed typical section in accordance with the approved plan and profile. Grade stakes shall be set at intervals of not more than 100 feet on straight grades and not more than fifty (50) feet on vertical curves. Additional grade stakes, as necessary, must be provided to ensure that the final grade matches the designed typical system.
- B. Grading work, materials, methods and equipment, unless specifically stated otherwise herein, shall be in accordance with the requirements of the South Carolina Department of Transportation Standard Specifications for Highway Construction.

### **Subgrade**

- A. Construction and preparation of the subgrade includes that part of the roadway intended to receive the base course, pavement, sidewalk, curb and gutter and/or shoulder.
- B. Streets shall be graded to the designed typical section in accordance with the approved plan and profile, and shall be free of roots, trash and other objectionable materials.
- C. A competent soil is required for a minimum depth of eighteen (18) inches immediately below subgrade. Remedial efforts to repair areas that are unstable should be coordinated with a geotechnical design professional. Such efforts may include drying, stabilization with cement or quicklime, or undercutting and replacement.
- D. When unstable material is encountered and it is necessary to perform mucking operations, the roadway shall be mucked-out from back of curb to back of curb, and shall be backfilled with a competent type soil and shall be properly compacted. Third party consultation on necessity of mucking and quantity of mucking shall be obtained if reimbursement from owner will be requested.
- E. The subgrade shall be compacted to not less than 95% of maximum density as determined by modified proctor testing (ASTM D 1557) by a geotechnical design professional. This compaction level shall be obtained and tested for the upper 12 inches of subgrade where native soil will serve as subgrade. Compaction shall be performed at a minimum frequency of 1 test per 300 linear feet of roadway.
- F. The subgrade shall be maintained in a smooth and compacted condition, free from ruts and depressions, and shall be adequately drained. In no case shall any base,

surface course or pavement be placed on a frozen, muddy or unstable subgrade.

- G. No base or surfacing materials shall be placed before the subgrade is checked and approved by the third party inspector, the design engineer, and notification provided to the Director of Public Works.
- H. In general, soils classified as SP, SM, or low plasticity SC according to the Unified Soil Classification System are acceptable for the upper eighteen (18) inches of the subgrade. These sandy soils should have a fines content (percentage passing a standard No. 200 sieve) less than 25%, with less than 15% preferred. Use of soils with more than 15% fines can result in extended drying times after rain and difficulty achieving compaction and stability for proof rolling.
- I. The compacted subgrade shall be proof-rolled prior to placement of any base or surfacing materials. Testing shall be performed in the presence of the developer, his design professional, his contractor, the third party inspector, and/or any other representatives. Notification for testing shall be given to the Director of Public Works or his assigned representative a minimum of twenty-four (24) hours in advance. Testing procedure shall consist of running a loaded tandem truck (10 cubic yards minimum; load capacity 20-30 ton minimum total weight) or equivalent vehicle as determined appropriate by the design professional and the third party inspector, at slow-walking speed longitudinally along the length of the area to be tested a sufficient number of passes that all of the surface area has had coverage of one pass of the vehicle's testing wheels (heaviest axle) per two foot width of roadway. Any areas exhibiting pumping or breaking of the surface shall be stabilized and re-tested until it meets approval of the design engineer and third party inspector. Failing that, the unsuitable material shall be removed to appropriate depths and replaced with suitable material, re-compacted and re-tested.

### **Soil Testing**

- A. The quality of foundation soils will be determined by the third party inspector by visual observations and laboratory and field testing of soils. The third party inspector may utilize judgment and experience to determine the quality of the foundation material without specified soil testing when in his judgment it is appropriate, and shall require appropriate action to repair areas not competent for intended use, including but not limited to undercutting or mucking-out, and replacing the excavated material with competent earth materials or increased stone base.
- B. Soil testing shall be performed by an independent testing laboratory approved by the Director of Public Works. Results of the testing shall be presented to the Director of Public Works upon completion of the tests.
- C. For preliminary site evaluation, a testing program may be established for determination of general soil classifications and water table data. For the design of pavement the testing program shall include, but is not limited to the determination of the maximum elevation of the groundwater table, the soil classification according to the Unified Soil Classification System (laboratory test determination), and the California Bearing Ration (CBR) (laboratory test determination utilizing 96 hour saturation). Minimum pavement sections outlined under Street Surface Standards are based on a minimum CBR value of 8. Proctor testing for determination of

optimum moisture and maximum density using the modified Proctor-Test ASTM D 1557 Method A, and field moisture and density tests may be required at the discretion of the Director of Public Works.

### **Roadway Drainage Design**

#### **A. Roadways within open roadside swale ditches**

1. Roadside swale ditches shall be graded as per the approved construction plans. Roadside swale drainage ditches and driveway pipes shall be designed for a ten (10) year Average Return Frequency. Cross-drains, outfall ditches and piped systems shall be designed for a ten (10) year Average Return Frequency. Roadside swale ditch invert elevations shall be a minimum of twelve (12) inches below grade, and no greater than twenty-four (24) inches below the corresponding centerline street finish grade elevation. Longitudinal grades for roadside swale ditches shall be no less than 0.3% nominal grade. Outfall ditches leading to or from streets shall be piped from the lot depth or 150 feet, whichever is lesser, except where prohibited by regulatory agencies. Drainage shall not be carried in roadside swales for a distance exceeding 700 lineal feet (accumulated distance) excepting as approved by the Director of Public Works. Additionally, drainage outfalls to wetland areas will be piped for minimum length of up to twenty (20) feet except where prohibited by regulatory agencies. A minimum Twelve (12) inch diameter pipe shall be used under driveways.
2. Roadside swales may be reduced to eight (8) inches below the corresponding center line of the road if the following conditions are met:
  - a. A perforated drain will run along the entire length of the ditch between catch basins. The invert of the pipe will be twelve (12) inches below the swale invert.
  - b. The topo of all driveways must match the invert of the swale. The back slope of the ditch may be graded to reduce the driveway slope. A joint will be installed in the driveway along the invert of the swale.
3. No sodding or landscaping will block the flow of water from the street or along the ditch.

#### **B. Roadways with concrete curb and gutter.**

Roadways with concrete curb and gutter shall conform to the details on the approved construction plans. Curb inlet structures shall be located so that drainage shall not be carried in gutters for a distance exceeding 500 feet accumulated distance. Efforts shall be made to avoid culvert piping located longitudinally with the street under the pavement or curb and gutter. An exception shall be made to avoid utility conflicts or to save trees within the right-of-way.

### **Subsurface Drainage**

- A. Where pipe under drains are required, they shall be installed behind the curb and gutter or one foot off of edge of pavement where there is not curb and gutter, and

shall be properly connected to a permanent type drainage outlet, such as a catch basin, junction box or manhole.

- B. Pipe under drains (invert) shall be a minimum of twenty-four (24) inches below the bottom of the curb and installed in accordance with the approved construction drawings.
- C. Suitable outlets for the pipe under drains at the required elevation shall be provided in the design of the drainage system.
- D. Pipe under drains shall be installed on all curb and gutter streets unless supporting documentation can be provided by the design professional, to the satisfaction of the Director of Public Works, providing under drains can be installed only at the low points for a minimum of 100 feet in each direction along the street.
- E. Pipe under drains, where required, shall be installed after the concrete curb has been constructed.
- F. Pipe under drains shall be placed in other locations as determined by the design professional or as required by the Director of Public Works during construction.
- G. Pipe under drains shall be properly laid on grade and in accordance with these specifications and the South Carolina Department of Transportation Standard Specification for Highway Construction, and may be required to be inspected by the Director of Public Works prior to being covered over.

#### **Pavement Base Prime and Surface Courses**

- A. The base course shall meet SCDOT specification Section 300 for bases and subbases.
- B. The width of the base course shall be twelve (12) inches greater than the width of the surface course (Six inches on either side of the roadway without curb and gutter).
- C. The compacted depth of the base course shall be eight (8) inches or greater as approved by the Director of Public Works.
- D. After the base course has been properly blended, mixed, wetted, shaped and compacted to the approved typical section and has been seasoned sufficiently, proof-roll, and tested for density, the prime coat shall be applied. Proof-rolling shall be accomplished as described in proof-rolling of the subgrade.
- E. The prime SCDOT coat material, placement, and protection shall meet the requirements of the specifications Sections 404.4.18. The quantity of the material placed shall be between limits established in Section 305.4.6.
- F. The surface paving course shall be applied no less than twenty-four (24) hours and no more than seven (7) days after the application of the prime coat, except as approved by the Director of Public Works.

### **Soil Erosion and Sediment Control**

- A. In general, the street and stormwater system shall be designed, constructed and maintained in such a manner that will prohibit the movement of soil from the development site as required by the South Carolina Construction General Permit (CGP).
- B. The design professional shall prepare appropriate designs and show sufficient data to ensure the soils will remain onsite.
- C. The developer, design professional, and the construction company shall follow the Storm Water Pollution Prevention Plan (SWPPP) as outlined in the approved construction plans.

### **Utilities Within the Street Right-of-Way**

- A. In general, utilities shall be designed in accordance with the respective agency's design guidelines.
- B. Ditches and trenches dug within the street right-of-ways for utilities and/or other purposes shall be properly backfilled. All backfill material under paved surfaces shall be select material and shall be mechanically compacted in six (6) inch layers. Areas to be paved or areas within four (4) feet of pavement shall be compacted to no less than 95% of maximum density. Remaining areas shall be compacted to 90% of the maximum density. Maximum densities will be determined by ASTM 1557 Method A.

### **Traffic Control Signs and Street Name Signs**

- A. All traffic control signs and street name signs shall be installed as part of the development project. The design professional shall indicate on the construction plans and specifications the location and type of signs to be installed. All traffic signs shall conform to the Manual on Uniform Traffic Control Devices.
- B. All street sign names shall conform to the Carnes Crossroads Standard Street Sign detail.

### **Concrete Curb and Gutter**

- A. Either the upright curb and gutter or the roll curb and gutter may be used. Twelve (12) inch ribbon curb may also be used. The maximum distance between expansion joints shall be fifty (50) feet. The maximum distance between contraction joints is five (5) feet. All work, materials, methods and equipment, unless specifically specified otherwise herein, shall be in accordance with the requirements of the South Carolina Department of Transportation's Standard Specifications for Highway Construction, current edition.
- B. All street sign names shall conform to the Carnes Crossroads Standard Street Sign detail.

### **Concrete Sidewalk**

Concrete sidewalks shall have a minimum thickness of four (4) inches, except at driveways, where the minimum thickness shall be six (6) inches. Transverse expansion joints shall be placed at intervals of not more than fifty (50) feet. The minimum width for sidewalks shall be four (4) feet. All work, materials, methods and equipment, unless specifically specified otherwise herein, shall be in accordance with the requirements of the South Carolina Department of Transportation's Standard Specifications for Highway Construction, current edition.

### **Site Cleanup and Finish Grading**

Prior to acceptance of the street and drainage systems, the right-of-way and drainage easement areas shall be cleared of all trash and debris remaining from the construction of those areas. The property within the development shall be gilled and/or graded as required by the Director of Public Works to ensure that the entire development will drain satisfactorily. All areas within the right-of-way and drainage easement access shall conform to the lines and grades shown on the construction plans or as approved by the Director of Public Works.

### **Landscaping and Planting**

- A. Plants, shrubbery and selected plants of such size of type creating problems with maintenance or problems with sight distances will not be permitted.
- B. When the road section includes curb and gutter, street trees shall be placed between the back of curb and the sidewalk. The street trees shall be a minimum of three (3) feet from the back of curb.
- C. A minimum vertical clearance of six (6) feet shall be maintained between the street centerline finished grade (and sidewalk grade) and the lowest overhanging branches.

### **Seeding and Mulching**

- A. All unpaved areas within the right-of-way and/or drainage easement areas shall be seeded and mulched. The design professional shall show appropriate data including schedules of planting times, quantities of materials for seeding, fertilizing, mulching and reseeding schedules including seed types for winter and/or summer planting.
- B. The developer shall be responsible for maintenance of such seeded and mulched areas until the right-of-way is transferred to the City.

### **Subdivision Entrance Signs Within the Right-of-Way**

- A. Subdivision or commercial development entrances signs shall be approved by the Carnes Crossroads Architectural Review Board. Signs shall be placed a minimum of three (3) feet from the back of curb and shall not be placed in a manner to obstruct sight distances.



## **SECTION 7: STORMWATER DRAINAGE FACILITIES**

### **Introduction**

This section, in conjunction with Article 10, is intended to provide guidelines for the design and construction of stormwater drainage facilities for the Carnes Crossroads development, and is supplemental to requirements of the SCDHEC Office of Ocean and Coastal Resource Management.

### **Stormwater Management**

- A. Stormwater Management as applicable to the design professional involves the design and construction of facilities that will function effectively to control and abate the impact of storm drainage runoff.
- B. The design professional among other obligations, is responsible for the accumulation of accurate data regarding the drainage basins, for the determination of stormwater runoff quantities, and for the design of any facilities determined necessary by the Director of Public Works for the control, containment and/or transportation of anticipated stormwater runoff.

### **General Requirements for Design of Drainage Systems**

The design of drainage facilities for a particular tract of land must be done with consideration for the entire drainage basin directly affected by this tract. Provisions must be made to receive and handle runoff from any upstream areas that naturally drain through any portion of the subject tract. Provisions must be made for the discharge of any runoff from this subject tract through an acceptable outlet. In one drainage basin, acceptable outlet(s) must be provided for the discharge of runoff.

### **General Requirements for Drainage Discharge Outlets**

- A. All street and development drainage shall discharge into either
  1. An appropriate existing drainage way (pipe, ditch, or canal) for which there are adequate easements, which is of adequate size, and which is maintained by Berkeley County, or other responsible party;
  2. An appropriate wetland area designated by the City and SCDHEC-OCRM as acceptable to receive the subject drainage
- B. The outlet must be of sufficient size and grade to receive the anticipated quantity of runoff from any contributing drainage basin along the route of the outlet in addition to the anticipated increase in quantity of runoff from the subject tract.
- C. The entire outlet from source(s) of collection of runoff to final point of discharge shall be upgraded as is considered necessary.
- D. Where detention/retention ponds, lakes, and the other components are incorporated as part of the drainage system, the designing engineer shall designate a minimum flood elevation. The minimum finished flood elevation shall be such that flooding

shall not result from a 100-year flood as determined in a drainage basin study.

- E. Open drainage ditches (a ditch is a waterway with side slopes 3:1 or steeper) shall not be permitted in the City except in a temporary situation.
- F. The subdivider/developer shall be responsible for providing positive drainage for each lot individually as a part of the project development. Individual lot drainage shall be detailed on the construction plans and may include, but not be limited to, yard drains for lawn areas, side and rear yard features to include swales and a piped system of inlets and other items necessary for the removal of water from the lot. It is not necessary to provide pad-ready lots during subdivision development. However, positive drainage is required for each lot prior to plat approval. Rear yard pipe systems are allowed and shall be designed to accommodate two-year storm events with minimal flooding. Inlets shall be designed to minimize debris clogging.
- G. Filling, grading, permanent erosion control features, and installation of drainage systems for lots and streets shall be provided prior to final plat approval.
- H. Piped collection systems for public streets (catch basins, inlets, cross drains, and longitudinal piping) shall be designed for the ten-year frequency storm event. Culverts that have an upstream area greater than 10 acres shall be designed for a 25-year frequency flood event. Culverts that have an upstream area greater than 100 acres shall be designed for a 100-year frequency flood event. The design flow, acres drained, and the hydraulic grade line for the design flow shall be shown on the plans. Reinforced concrete pipes shall be used under public streets. High density polyethylene can be used at other locations.

### **General Requirements for Stormwater Runoff**

#### **A. Design Methods and Criteria**

The design engineer may use any of the generally accepted design procedures to determine the runoff quantities. The design engineer shall submit data showing the drainage basin, the location of areas of differential imperviousness, the runoff factors for each zone of imperviousness, and the data for rainfall and time factors used in the determination of peak runoff rates.

#### **B. Rainfall Determination**

The peak runoff rates shall be made based on the storm time/rainfall rate following a pattern Type III Rainfall Hydrograph as defined in the Soil Conservation Service Manual TR-55. The design recurrence interval shall be taken to be ten (10) years for the collection system within the subject development, twenty-five (25) years for any channelized drainage flowing through the development and twenty-five (25) years for any primary outfall drainage way from the development.

### **Easements for Storm Drainage Facilities**

- A. Drainage easements shall be provided for all drainage facilities. The easement shall provide adequate space for access to the facility; adequate space for the operations

involved in clearing, repairing, re-constructing and hauling materials to or from the area; adequate space for turning and maneuvering of the equipment; and adequate space for the sloshing and splashing of the materials being handled.

- B. The portions of the easement within which the equipment is to operate shall be established to provide suitable foundation to support the equipment to be used in the maintenance operations and shall be graded to provide drainage from the working area but not graded to slopes or elevations causing difficulty in the operations of the maintenance equipment.
- C. Minimum drainage easement widths for piped drainage ways shall be no less than that shown as follows:

Pipe Size (Maximum)	Minimum Depth to Invert	Width of Drainage Easement
18"	3.5'	12'
24"	5.0'	16'
42"	7.0'	20'
54"	7.0'	24'
72"	9.0'	30'

- D. For depths greater than shown, larger pipe sizes, or multiple lines of pipe, additional easement width, as required by the Director of Public Works, shall be provided.

#### **Finished Grading, Seeding, Mulching and Soil Erosion and Sediment Control**

Drainage easements areas shall be seeded and mulched in accordance with the Stormwater Pollution Prevention Plan.

#### **Drainage and Erosion Control Structures and Materials**

- A. All work, materials, methods and equipment, unless specifically specified otherwise herein, shall be in accordance with the requirements of the South Carolina Department of Transportation's Standard Specifications for Highway Construction, current edition.
- B. All concrete pipes shall conform to ASTM Specifications C-76, Class II, Wall BN. Joints shall conform to ASTM C-443. Jointing materials shall be all-weather performed joint sealant as approved by the Director of Public Works.
- C. Ample cover shall be provided to properly protect the pipelines during the time of construction as well as for the designed usage. Minimum allowable cover shall be in accordance with the pipe manufacturer's requirements.
- D. All structures shall be shown clearly on the construction plans with details to show clearly all lines, grades, elevations, joints, reinforcing, materials of construction, etc. All appropriate specification data shall be shown on the construction plans.
- E. Driveway drainage pipes shall be a minimum of twelve (12) inches in diameter and constructed of reinforced concrete.

F. Corrugated metal pipe shall not be permitted.

#### **Miscellaneous Drainage Requirements**

- A. Pipeline discharge capacity shall exceed maximum peak runoff rate. Computations for all drainage way size determination shall be provided by the Director of Public Works.
- B. Where a drainage outlet pipe extends into a lake or other similar outlet, rip-rap shall be placed under and around the end joint or joints of pipe as needed and on slopes at end of pipe. Reinforced grass matting shall be provided for the embankment above the rip rap to the top of bank.
- C. Where lakes encroach on the street right-of-way, barriers in accordance with AASHTO requirements shall be provided.
- D. Where drainage is taken into an existing ditch or canal by use of an open ditch or pipeline, the elevation at the bottom of the existing ditch or canal at the point of entry and approximately 100 feet upstream and downstream, and the elevation of the bottom of the inlet ditch or invert elevation of the inlet pipe at the outlet end, shall be shown on the construction plans. Also, the bottom width of the existing ditch or canal shall be shown.
- E. Where drainage ways are piped, catch basins shall be provided as required to appropriately receive and discharge incoming drainage. In no case shall the catch basin be more than 500 feet apart.
- F. Junction boxes with a minimum of eight foot stubs shall be constructed at both ends of cross line pipe for cross-ditches, at outlet end of the cross line pipe at outlet ditches, and at other locations.
- G. Catch basins shall not be located in the radius portion of street intersections. No manhole covers or water valves shall be located within the curb and gutter areas.