

Unified Development Ordinance

Greenville County, South Carolina



Article 12: Access & Connectivity

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CONTENTS

- ARTICLE 12: ACCESS & CONNECTIVITY 4**
- 12.1 GENERAL PROVISIONS 4**
 - 12.1.1 PURPOSE 4
 - 12.1.2 APPLICABILITY 4
- 12.2 DRIVEWAYS..... 4**
 - 12.2.1 APPLICABILITY 4
 - 12.2.2 UNPAVED SHARED PRIVATE DRIVEWAYS 5
 - 12.2.3 ACCESS MANAGEMENT..... 8
- 12.3 CONNECTIVITY 10**
 - 12.3.1 PURPOSE & APPLICABILITY 10
 - 12.3.2 EXTERNAL CONNECTIVITY 12
 - 12.3.3 INTERNAL CONNECTIVITY 13
 - 12.3.4 VEHICULAR CROSS-ACCESS..... 15
 - 12.3.5 EMERGENCY & FIRE ACCESS 16
- 12.4 INTERSECTION SIGHT DISTANCE 17**
 - 12.4.1 APPLICABILITY 17
 - 12.4.2 CLEAR SIGHT DISTANCE..... 17
 - 12.4.3 SIGHT TRIANGLES 19
- 12.5 SIDEWALKS & MULTI-USE PATHS 20**
 - 12.5.1 APPLICABILITY 20
 - 12.5.2 SIDEWALKS & CROSSWALKS IN MAJOR SUBDIVISIONS 20
 - 12.5.3 WALKWAYS & SIDEWALKS IN GROUP DEVELOPMENTS 23
 - 12.5.4 MULTI-USE PATHS..... 24
- 12.6 TRANSIT 24**
 - 12.6.1 PURPOSE 24
 - 12.6.2 APPLICABILITY 24
 - 12.6.3 PARKING REDUCTION..... 24
 - 12.6.4 DIMENSIONAL STANDARDS BONUS..... 25
- 12.7 STREET CLASSIFICATION & DESIGN..... 25**
 - 12.7.1 APPLICABILITY 25
 - 12.7.2 STREET CLASSIFICATION..... 25
 - 12.7.3 DESIGN STANDARDS FOR PUBLIC STREETS..... 29
 - 12.7.4 DESIGN STANDARDS FOR PRIVATE ROADS..... 40
 - 12.7.5 TRAFFIC CALMING..... 42
 - 12.7.6 HALF STREETS..... 43
 - 12.7.7 RESERVATION OF RIGHT-OF-WAY ON COUNTY ROADS 43
 - 12.7.8 CONFORMITY TO THE MAJOR THOROUGHFARE/TRANSPORTATION PLANS 43
 - 12.7.9 STREET NAMES 43

12.8 STREET CONSTRUCTION STANDARDS..... 44

- 12.8.1 CONSTRUCTION PLAN SUBMITTAL REQUIREMENTS 44
- 12.8.2 CONSTRUCTION PLAN REVIEW/INSPECTION FEES 46
- 12.8.3 MINIMUM SPECIFICATIONS FOR ALL ROADWAYS..... 47
- 12.8.4 CONSTRUCTION STANDARDS FOR PUBLIC ROADS 47
- 12.8.5 TESTING & INSPECTIONS..... 60

ARTICLE 12: ACCESS & CONNECTIVITY

12.1 GENERAL PROVISIONS

12.1.1 PURPOSE

The purpose of this Article is to promote safe transportation facilities, improved mobility and access, and increased business and/or land value in the County. Access management reduces the potential for accidents and improves travel conditions by minimizing conflicts between through and turning vehicles. Research has shown that accident rates increase consistently with an increase in the density of access points, while accident rates decrease with the implementation of access management standards. Accordingly, access to collector and arterial streets and highways shall be managed according to the standards of this Article.

12.1.2 APPLICABILITY

The provisions of this Article apply to all lots in unincorporated Greenville County where development meets or exceeds the following thresholds:

- A. **New Development.** New development on previously undeveloped land;
- B. **Change in Use.** A change in use from a residential to a non-residential use; and
- C. **Expansions.**
 - 1. *Expansion of Multi-Family.* Expansion of multi-family use by more than 5 units;
 - 2. *Expansion of Gross Floor Area.* Expansion of the gross floor area of a building by more than 25%; or
 - 3. *Expansion of Paved Surface.* Expansion of a paved surface by more than 25%.

12.2 DRIVEWAYS

12.2.1 APPLICABILITY

Every building erected or moved after the effective date of this UDO shall be located on a lot adjacent to and have access to a public street, highway, road, or other public way or private road, except in group developments and as provided in Section 12.2.2: *Unpaved Shared Private Driveways*, below. All

new driveways shall meet the requirements in Section 12.2.2: *Unpaved Shared Private Driveways* or in Section 12.2.3: *Access Management*.

12.2.2 UNPAVED SHARED PRIVATE DRIVEWAYS

- A. **Purpose.** The intent of this Subsection is to provide affordable access to developments with a limited number of lots created in rural areas, without having to construct a road to County public or private road standards while providing for the safety of property owners by requiring adequate access for fire, emergency medical, and law enforcement vehicles. By consolidating multiple driveway connections, the standards of this Subsection provide for safer access to existing public roads, the continued uninterrupted use of the access for all of the owners by establishing a durable easement, and assigns responsibility for continuing maintenance of the access.
- B. **Recording Requirements.**
1. *Criteria.* For the purpose of dividing property one acre or greater in area in the un-zoned area or properties zoned AG, ESD-PM, RR-1, RR-3, RU-V, and RU-C, the Planning Commission may authorize the creation of lots utilizing unpaved private drives under the following conditions:
 - (a) No more than 6 lots are created; and
 - (b) The unpaved private drive shall:
 - (1) Be shown on a Preliminary Plan;
 - (2) Meet all the criteria for a Preliminary Plan as set forth in the provisions of [Article 17: Land Development Procedures](#); and
 - (3) Be defined with metes and bounds.
 2. *Additional Lots.* The Planning Commission may allow more than 6 lots if it finds that the lots are configured so that the use of unpaved shared driveways are not detrimental to the public health, safety, or welfare.
 3. *No Acceptance of Maintenance.* The recorded plat shall carry a statement that the unpaved private drive shall not be accepted and/or maintained as a public right-of-way until such time as it meets minimum County standards for a public road, as reflected in this Article. This includes but is not limited to paving, establishing proper drainage, meeting horizontal and vertical curve requirements, and dedicating 50 feet of right-of-way.
 4. *Unpaved Private Drive Standards.* The unpaved private drive shall be established by the creation and legal establishment of a minimum 40-foot wide driveway:

- (a) Which is appurtenant;
 - (b) Which is non-exclusive;
 - (c) In which all property owners own an undivided interest in the drive; and
 - (d) Names a person, persons, or an entity responsible for ownership and maintenance of the drive.
5. *Unrecorded Agreement.* An unrecorded copy of the Unpaved Private Drive Easement Agreement or other legal documentation, which addresses items (a) through (d) listed above, and a Stormwater Pollution Prevention Plan (SWPPP) shall be provided to the Subdivision Advisory Committee¹ for review and approval prior to recording the plat.
- C. **Minimum Construction Standards.** In addition to meeting all the County and/or SCDOT encroachment permit requirements for offsets and construction within a public right-of-way, the unpaved private drive shall also conform to the following minimum construction standards for the passage of emergency vehicles:
- 1. *All-Weather Surface.* An all-weather surface consisting of a minimum of 4-inch compacted stone base;
 - 2. *Surface Width.* A minimum improved surface width of 20 feet for its entire length;
 - 3. *Vertical Clearance.* A minimum vertical clearance of 13 feet, 6 inches of vertical clearance along its entire length;
 - 4. *Turn-Around.* A turn-around opportunity at its terminus, to be approved by the Fire Marshall or the Chief of the respective Fire Protection District, that adequately provides for storm water drainage and with pipes for stream crossings or storm water drainage that shall be sized appropriately for the passage of at least the 10-year design storm and be able to withstand the anticipated loads of emergency vehicles without deforming;
 - 5. *Drainage.* The unpaved private drive shall have adequate drainage;
 - 6. *SWPPP.* An approved storm SWPPP shall be in effect for the subdivision;
 - 7. *Length.* The maximum length of the drive may exceed 1,200 linear feet only if the Planning Commission finds that:
 - (a) The lots and the driveway are configured so as not to be detrimental to the public health, safety, or welfare;

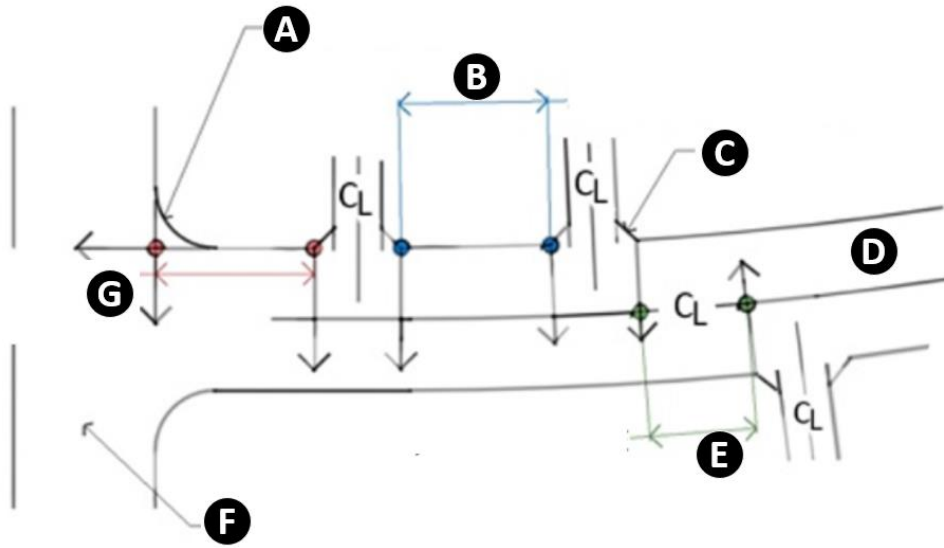
¹ This draft shows “Subdivision Advisory Committee” rather than Subdivision Administrator when existing language is used.

- (b) The Fire Protection District supports the extended length of the driveway; and
 - (c) The shared driveway serves a maximum of 6 lots.
 - 8. *Curves and Grades.* Vertical and horizontal curves and grades shall meet the minimum requirements for private roads as established in Subsection 12.7.3: *Design Standards for Public Streets.*;
 - 9. *Signs.* If the drive is to serve more than 2 lots, the subdivider shall furnish appropriate traffic control signs and road name signs; and
 - 10. *Frontage.* Each lot created on such an unpaved private drive shall have a minimum of 20 feet of road frontage on the unpaved private drive.
- D. **Driveway Access Summary Plat.** Before the summary final plat can be filed, the required regulatory signage shall be in place and the drive shall be constructed. A design load calculation by a registered professional civil engineer, hired by the developer, shall be provided to the Fire Marshall or Chief of the respective Fire Protection District. A letter documenting that the drive meets the Fire Code requirements shall be furnished to the Subdivision Advisory Committee by the Fire Marshall or Chief of the respective Fire Protection District.
- E. **Recording Limitations.** Plats utilizing this unpaved private drive shall not be recorded under Financial Security.
- F. **Future Subdivision of Lots.** Without the authorization of the Planning Commission, lots created on unpaved private drives shall not be further subdivided until such time as the drive is brought into compliance with the County's public or private road standards, as specified in this Article. This includes but is not limited to paving, establishing proper drainage, meeting horizontal and vertical curve requirements, and dedicating 50 feet of right-of-way.
- G. **Maintenance Responsibility.**
- 1. Continued maintenance of these access ways shall be provided by the owner(s).
 - 2. Upon written notification by the Local Fire Authority having jurisdiction, the owner(s) shall correct any cited deficiencies within 60 days of receipt of notification of the need for maintenance.
 - 3. County Code Enforcement is responsible for ensuring the owner(s) corrects the deficiencies.
- H. **Waivers.** Waivers, as provided in [Section 17.9: Waivers](#), from the standards pertaining to maximum number of lots and maximum driveway length, but not for procedural or other requirements, may be allowed upon recommendation of the respective Fire Protection District.

12.2.3 ACCESS MANAGEMENT

- A. **Generally.** The standards of this Subsection apply to driveways that are not addressed in Subsection 12.2.2: *Unpaved Shared Private Driveways*.
- B. **Driveway Access and Widths.**
1. *Single- and Two-Family Driveway Widths.* Driveways for single and two-family lots shall be a minimum of 12 feet wide and a maximum of 24 feet wide at the property line. One driveway is required per dwelling unit. New single and two-family lots shall not take access from arterial streets.
 2. *Triplex, Fourplex, Multi-Family, Non-Residential, and Mixed Use Driveway Widths.* Driveways for triplexes, fourplexes, multi-family, non-residential, and mixed use lots shall be a minimum of 24 feet wide at the property line, and configured to direct traffic safely into and out of the property. The County Engineer may require median separation between ingress lanes and egress lanes.
 3. *Alternative Access for Corner Lots.* Lots that abut intersections of streets of different classifications (Principal Arterial, Minor Arterial, Major Collector, Minor Collector, and Local in descending classification) shall take access from the street of lesser classification if the access meets the corner clearance requirements of Paragraph C, *Driveway Spacing and Corner Clearance*, below.
- C. **Driveway Spacing and Corner Clearance.**
1. Generally, the requirements of this Subparagraph are measured along the edge of the street, from the closest edge of pavement of the first driveway to the closest edge of pavement of the second driveway, including curb returns. This type of spacing is shown in Figure 12.2.3-1, *Driveway Spacing and Corner Clearance Measurements*, as "spacing, same side" and "spacing, opposite side."

Figure 12.2.3-1: Driveway Spacing and Corner Clearance Measurements



Key:

- A = Curb Radius
- B = Spacing, Same Side of Street
- C = Driveway Apron
- D = Accessed Street
- E = Spacing, Opposite Side of Street
- F = Intersecting Street
- G = Corner Clearance

2. *Driveway Spacing, Same Side of Street.* Table 12.2.3-2: *Minimum Driveway Spacing, Same Side of the Street*, sets out the minimum spacing for driveways on the same side of the street, whether on successive properties or the same property.

Table 12.2.3-2: Minimum Driveway Spacing, Same Side of the Street

| Land Use | Street Type | | | | | |
|---|-------------|-----------------------------|--------------------------------|----------|----------|-----------------------|
| | Local | Collector (Major and Minor) | Arterial (Principal and Minor) | | | |
| <i>Posted Speed (mph)</i> | <i>Any</i> | <i>Any</i> | ≤30 | 35 to 40 | 45 or 50 | 55 or 60 ¹ |
| Access serves single- and two-family lots | 20 ft | 40 ft | -- | -- | -- | -- |
| Access serves quadrplexes, triplexes, multi-family, non-residential, or mixed use | 40 ft | 200 ft | 200 ft | 250 ft | 360 ft | 425 ft |

Key: mph = miles per hour | ft – feet

¹ Driveway spacing on streets with a speed limit of greater than 60 miles per hour is subject to the County Engineer's requirements or to the requirements of the South Carolina Department of Transportation, as appropriate.

3. *Driveway Spacing, Opposite Side of Street.* In order to prevent conflicting left-turn movements, connections on opposite sides of arterial and collector streets shall be directly opposite each other or offset by a distance of a minimum of 125 feet, unless a median or divider prevents the potential conflicts.
4. *Corner Clearance.*
 - (a) Table 12.2.3-2: *Minimum Corner Clearance*, sets out the minimum corner clearance for driveways. Since site and intersection design shall be considered on an individual basis, greater clearance lengths may be required by the County Engineer if necessary to protect public safety.
 - (b) If the dimensions of an existing lot and the absence of a reasonable opportunity for shared access make compliance with this Subsection impractical, then right-in, right-out access may be permitted at the farthest available point away from the intersection. For example, a corner lot that cannot establish shared access with neighboring properties may be permitted to have two right-in, right-out access points (one on each frontage), provided that they are located as far away from the intersection as possible.

| Table 12.2.3-2: Minimum Corner Clearance | | | |
|--|------------------------------------|---------------------------|---------------------|
| Accessed Street Classification | Intersecting Street Classification | Minimum Corner Clearances | |
| | | Accessed Street | Intersecting Street |
| Local | Local | 20 feet | 20 feet |
| Local | Collector | 20 feet | 30 feet |
| Local | Arterial | 50 feet | 75 feet |
| Collector | Collector | 75 feet | 75 feet |
| Collector | Arterial | 75 feet | 150 feet |
| Arterial | Arterial | 150 feet | 150 feet |

12.3 CONNECTIVITY

12.3.1 PURPOSE & APPLICABILITY

- A. **Purpose.** The purpose of this Section is to:
 1. Support the creation of a highly connected transportation system in order to protect the public health, safety, and welfare in order to ensure adequate access for emergency and

service vehicles, connect neighborhoods to each other and to local destinations such as schools, parks, and shopping centers, reduce vehicle miles of travel and travel times;

2. Improve air quality;
3. Reduce emergency response times;
4. Encourage connections to redevelopable property; and
5. Free up arterial road capacity to better serve regional long distance travel needs.

B. **Applicability.** This Section applies to all non-residential single-building developments, all group developments, and all subdivisions except Summary Plat subdivisions, as indicated in Table 12.3.1: *Applicability of Section 12.3.*

Table 12.3.1: Applicability of Section 12.3

| Development or Subdivision Type | 12.3.2: External Connectivity | 12.3.3: Internal Connectivity | 12.3.4: Vehicular Cross-Access | 12.3.5: Emergency & Fire Access |
|--|-------------------------------|-------------------------------|--------------------------------|---------------------------------|
| Non-Residential Single-Building Developments | X | X | • | • |
| Group Developments (without subdivision) | X | X | • | • |
| Group Developments (with subdivision) | X | X | • | • |
| Summary Plat Subdivisions | X | X | X | X |
| Major Residential Subdivisions | • | • | X | X |
| Major Non-Residential Subdivisions | X | X | • | X |

Key: • = Applies for development/ subdivision type | X = Does not apply for development/ subdivision type

12.3.2 EXTERNAL CONNECTIVITY²

In order to create a more connected transportation system and accommodate emergency and service vehicles, the following external connectivity standards apply to major residential subdivisions.

A. **Stubbed Streets.**

1. All collector or residential streets shall be stubbed to the boundary of the subdivision. Stub streets within previously platted subdivisions shall be connected with streets in the proposed subdivision, except as provided in Paragraph 2, below. The subdivider may only utilize cul-de-sacs where necessary as established in Paragraph 2.
2. Upon review of a Preliminary Plan, the Subdivision Advisory Committee may determine that connections are not appropriate between incompatible uses or where floodplains, wetlands, riparian buffers, green space, slopes exceeding 11 percent, or other unique site conditions prevent a street connection. In such instances, a cul-de-sac designed in accordance with 12.7.3.H: *Non-Through Streets, Cul-de-Sacs, and Turnarounds*, may be utilized.
3. A temporary turnaround may be required where the dead end exceeds 150 feet in length.
4. When a stub-out is required, the right-of-way shall be extended to the property line.
5. The stub-out shall consist of the right-of-way and apron, which includes up to seven feet of paved area. The existing developer is required to set aside the right-of-way and construct a five-foot apron to the stub-out. The connecting developer is required to build the connection to the apron.
6. Stub streets will be clearly marked with signage indicating future connections. In addition, a notation shall be made on the final subdivision plat that states that the land outside the street right-of-way shall revert to the abutting property owners.

B. **30 or Fewer Units.** Any subdivision of 30 or fewer dwelling units shall provide at least one external access point to the existing street network.

C. **31 to 100 Units.**

1. Any subdivision of 31 to 100 dwelling units shall provide at least two external access points to the existing or future street network. The second access point may consist of an access point that is only accessible by emergency vehicles if approved through a Waiver as established in Section 17.9: *Waivers*, and designed according to Section 12.7.4.C: *Gates*. If the configuration of the property does not allow for a secondary

² These are adapted from Section 8.8.1 in the current LDRs.

access, the paved surface of the single external access point shall be at least 26 feet wide to the first intersection.

2. If the emergency access will not be a road or driveway, then the access shall be shown on the SWPPP. The access will have appropriately designed drainage and a plan/profile to ensure constructability. LID features are encouraged for these types of emergency access points.

D. 101 to 250 Units.

1. Any subdivisions of 101 dwelling to 250 dwelling units shall provide at least two access roads to the collector and thoroughfare street network to be built in accordance with this Article.
2. No more than the number of lots that accommodate 100 dwelling units shall be approved on a Final Plat(s) until the required secondary access has been constructed.

E. 251 Units or More.

1. Subdivisions of 251 dwelling units or more shall provide at least three separate access points. With recommendation from the Traffic Engineer, the Planning Commission may waive the requirement for construction of one access point provided that subdivision design and phasing illustrates the additional required access in a future phase.
2. For subdivisions of 250 lots or more, stub streets may be credited for one of the required access points if two access roads are connected to the existing collector and thoroughfare street network.

- F. Waiver.** Waivers, as provided in [Section 17.9: Waivers](#), may be allowed during Preliminary Plan review if there are extreme cases where limited road frontage, floodplains, wetlands, riparian buffers, slopes exceeding 11%, or other unique site conditions prevent access and will not substantially impact emergency service delivery.

- G. Connection.** Subdivisions shall be designed in a manner that streets providing the external access required in this Subsection only connect to minor collectors or residential streets.

12.3.3 INTERNAL CONNECTIVITY³

- A.** Major residential subdivisions shall be designed in a manner to provide for multiple street connections to and between local destinations, such as parks, schools, and shopping, without

³ **Definitions:**

Connectivity Ratio: The number of street links divided by the number of nodes or link ends, including cul-de-sac heads.

Link: That portion of a street defined by a node at each end or at one end. Approved stubs to adjacent property are considered links. However, alleys are not considered links.

requiring the use of arterial streets. As such, this Subsection provides an internal connectivity index that new subdivisions shall achieve.

- B. The street network for any subdivision shall achieve the internal connectivity ratios required in Table 12.3.3-1: *Internal Connectivity Ratio Requirements* (see example in Figure 12.3.3-1: *Internal Connectivity Example*).

| Table 12.3.3-1: Internal Connectivity Ratio Requirements | |
|--|--------------------|
| Subdivision Type | Connectivity Ratio |
| SRCD Rural Estate Lot | 0.0 |
| SRCD Conservation Subdivision | 0.0 |
| Open Space | 1.0 |
| Conventional | 1.4 |

Figure 12.3.3-1: Internal Connectivity Example

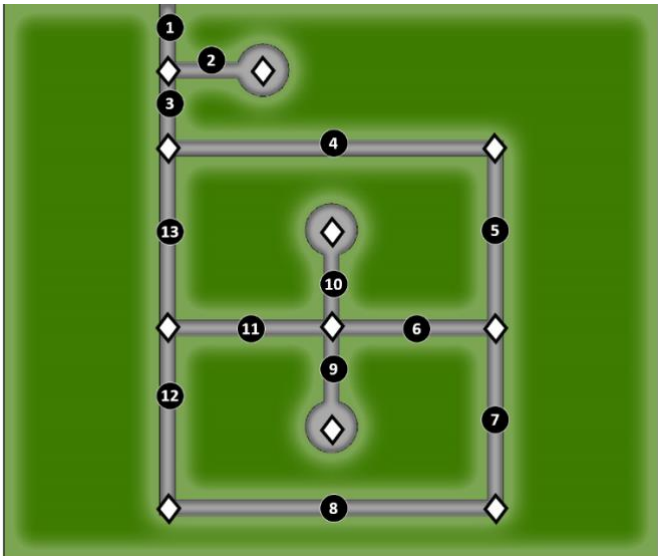


Figure Notes: Subdivision that does not meet the Ratio for Conventional subdivisions (13 links/ 11 nodes = 1.18 ratio)

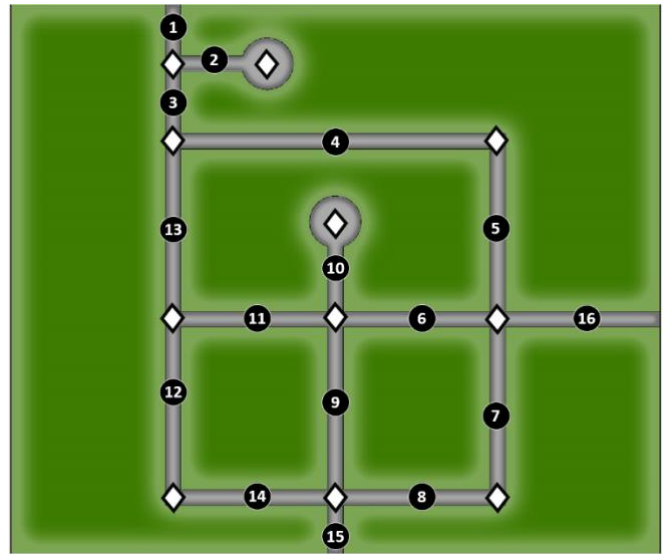


Figure Notes: Same development modified to meet Ratio for Conventional subdivisions (16 links/11 nodes = 1.45 ratio)

Note: The terminus of a street or the intersection of two or more streets, except that intersections that use a roundabout shall not be counted as a node.

12.3.4 VEHICULAR CROSS-ACCESS

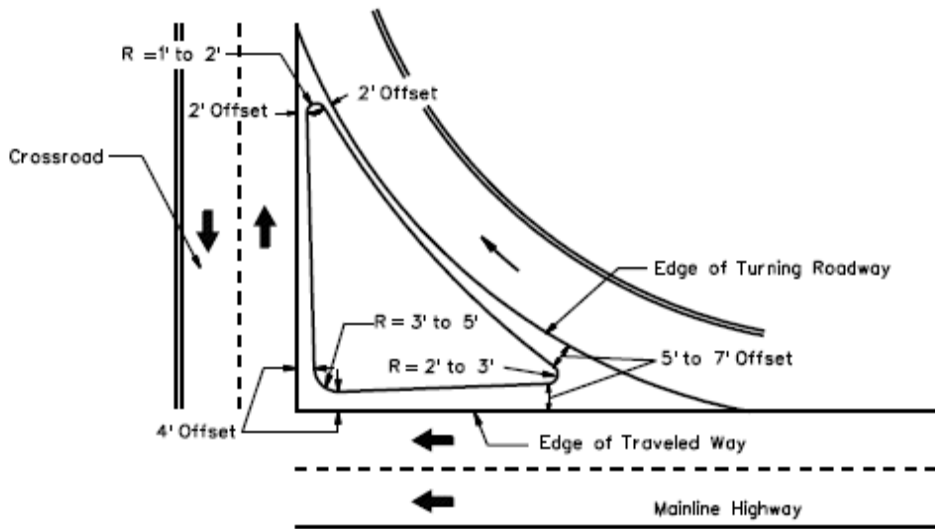
- A. **Generally.** Vehicular cross-access requirements apply in un-zoned areas to the following land use groups defined in [Article 23: Definitions & Acronyms](#) and, in zoned areas, to the following zoning districts:
1. Land Use Group 1;
 2. Land Use Group 2;
 3. Multi-Family Residential (R-MA);
 4. Office (OD);
 5. Neighborhood Commercial (NC);
 6. Commercial (C-1, C-2, and C-3); and
 7. Services (S-1).
- B. **Standards.** To encourage shared access points and shared parking for adjacent applicable uses and districts along Principal Arterials, Minor Arterials, and Major Collectors, site plans prepared for all new multi-family, commercial, and mixed-use development shall comply with the following standards:
1. *Adjacent Lots.* Internal vehicular circulation areas shall be designed to allow for cross-access to adjacent lots with multifamily residential, non-residential, or mixed-uses.
 2. *Stubs.* A stub for future cross access shall be provided and constructed to the property line from the vehicular use area to all adjacent vacant land designated for multifamily residential, non-residential, or mixed-uses.
 3. *Separation.* A minimum distance of 40 feet shall be required between a cross-access way and driveway entrance apron.
 4. *Width.* Cross-access ways shall allow for two-way traffic between parcels through the use of a single drive aisle with a minimum width of 24 feet or through two one-way aisles each with a minimum width of 12 feet. The maximum median separation width shall be 15 feet with a left-turn pocket or 4 feet without a left-turn pocket.
 5. *Recordation.* A cross-access easement shall be recorded as a condition of approval for the Final Plat of the development or prior to issuance of Certificate of Occupancy.
 6. *Waivers.* Waivers, as provided in [Section 17.9: Waivers](#), from these standards, but not for procedural requirements, may be granted for these cross-access requirements in cases where floodplains, wetlands, riparian buffers, slopes exceeding 11%, vehicular

safety factors, or other unique site conditions prevent cross-access. The applicant shall provide proof of these conditions.

12.3.5 EMERGENCY & FIRE ACCESS

- A. **Access or Sprinkler.** Each structure greater than 30 feet or three stories in height shall be accessible by fire apparatus from three sides, as outlined below. This Section shall not apply if the building is equipped with an approved automatic sprinkler system.
1. *Two Access Points.* Two accesses suitable for emergency vehicles shall be provided when buildings or facilities have a gross area of more than 62,000 square feet.
 2. *Single Access Point.* When all buildings of a project are equipped with an approved automatic sprinkler system, a single approved fire apparatus access way is allowed provided the gross building area does not exceed 124,000 square feet.
- B. **SCDOT.** When two emergency accesses are required, they shall comply with the minimum applicable County or SCDOT standards.
- C. **Aerial Apparatus.**
1. *Lowest Fire Department Access.* Emergency accesses capable of accommodating aerial apparatus shall be constructed when buildings exceed 30 feet in height above the lowest level of Fire Department access. Such accesses shall be a minimum of 26 feet unobstructed width.
 2. *Buildings over 30 Feet.* For buildings exceeding 30 feet in height, at least one aerial apparatus access route (minimum 26-ft width) shall begin between 15 and 30 feet from the building. This route shall extend to within 150 feet of any combustible construction.
- D. **SWPPP.** If the emergency access will not be a road or driveway, then the access shall be shown on the SWPPP. The access will have appropriately designed drainage and a plan/profile to ensure constructability. Low Impact Development (LID) features are encouraged for these types of emergency access points.
- E. **Channelization Island Plan.** When required, a detailed channelization island plan shall be submitted for review prior to construction. Channelization island design will be reviewed on a case-by-case basis due to differing roadway and traffic characteristics. (See Figure 12.3.5-1: *Channelization Island*)

Figure 12.3.5-1: Channelization Island



12.4 INTERSECTION SIGHT DISTANCE

12.4.1 APPLICABILITY⁴

This Section applies to...

12.4.2 CLEAR SIGHT DISTANCE

- A. As illustrated in Figure 12.4.1-1: *Intersection Sight Distance Illustration*, a minimum corner sight distance is required to permit drivers entering the higher order street to see approaching traffic from a long enough distance to allow the driver to decide when to enter the higher order street, turn onto the higher order street, and accelerate in advance of the approaching traffic.
- B. The entire area of the clear sight triangle shall be shown on Preliminary Plans and Final Plans and shall be designed to provide the driver of the entering vehicle with an unobstructed view to all points 3.5 feet above the roadway along the centerline from point A to point B.
- C. The sight distance in feet is determined using the chart below (taken from the [SCDOT Roadway Design Manual](#)):

⁴ Need to confirm applicability for these provisions. For example, do they apply to single-family dwellings? This Section may need to be relocated.

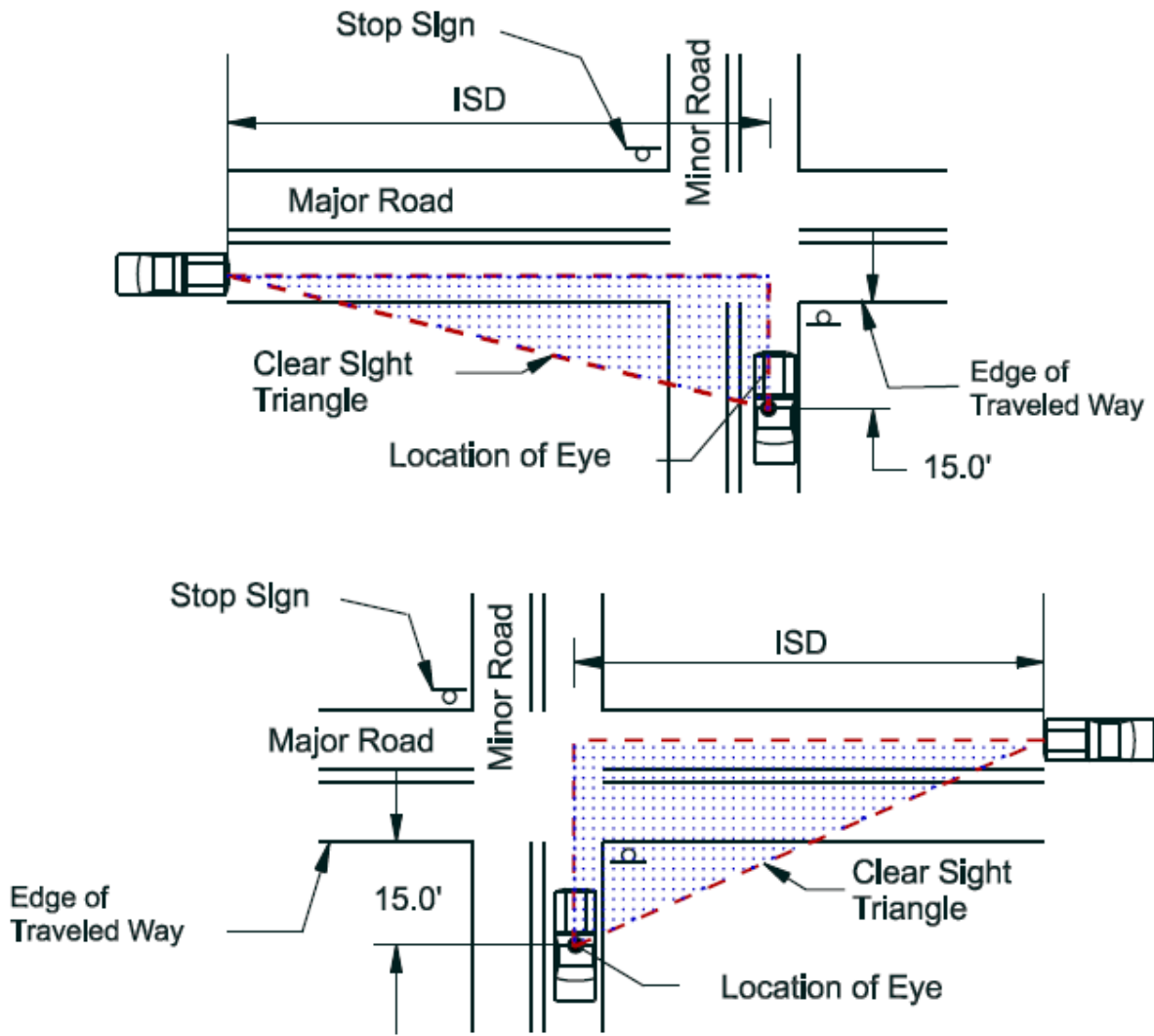
| Table 12.4.1-1: Intersection Sight Distances¹ | | | |
|---|---|--------------------|-----------------------|
| Design Speed (miles per hour) | Intersection Sight Distance (feet)² | | |
| | Passenger Cars | Single-Unit Trucks | Tractor/Semi-Trailers |
| 15 | 170 | 210 | 255 |
| 20 | 225 | 280 | 340 |
| 25 | 280 | 350 | 425 |
| 30 | 335 | 420 | 510 |
| 35 | 390 | 490 | 595 |
| 40 | 445 | 560 | 680 |
| 45 | 500 | 630 | 765 |
| 50 | 555 | 700 | 850 |
| 55 | 610 | 770 | 930 |
| 60 | 665 | 840 | 1,015 |
| 65 | 720 | 910 | 1,100 |
| 70 | 775 | 980 | 1,185 |
| 75 | 830 | 1,050 | 1,270 |
| 80 | 885 | 1,115 | 1,350 |

Table Notes:

¹Applies to vehicles approaching from the left and to vehicles approaching from the right on a two-lane road only

²The ISD values assume a minor road approach grade less than or equal to 3%. For grades greater than 3%, increase the ISD value by 10%.

Figure 12.4.1-1: Intersection Sight Distance Illustration



**CLEAR SIGHT TRIANGLE FOR VIEWING TRAFFIC
APPROACHING FROM THE RIGHT AND LEFT**

12.4.3 SIGHT TRIANGLES

- A. As illustrated in Figure 12.4.3-1: *Sight Triangles*, the property lines at all intersections shall have a 25-foot setback from the Point of Intersection (PI) to the Point of Tangent (PT).
 - 1. Each PT shall be connected to the PI with a straight line.
 - 2. There shall be no radius placed on property lines at any intersection.

3. The triangles shall allow for unobstructed lines of sight.
- B. Plantings and structures exceeding 30 inches in height, but less than 72 inches in height, that would obstruct the clear sight across the area are prohibited. The County has the right to remove anything that obstructs the clear sight triangle.

Figure 12.4.3-1: Sight Triangles

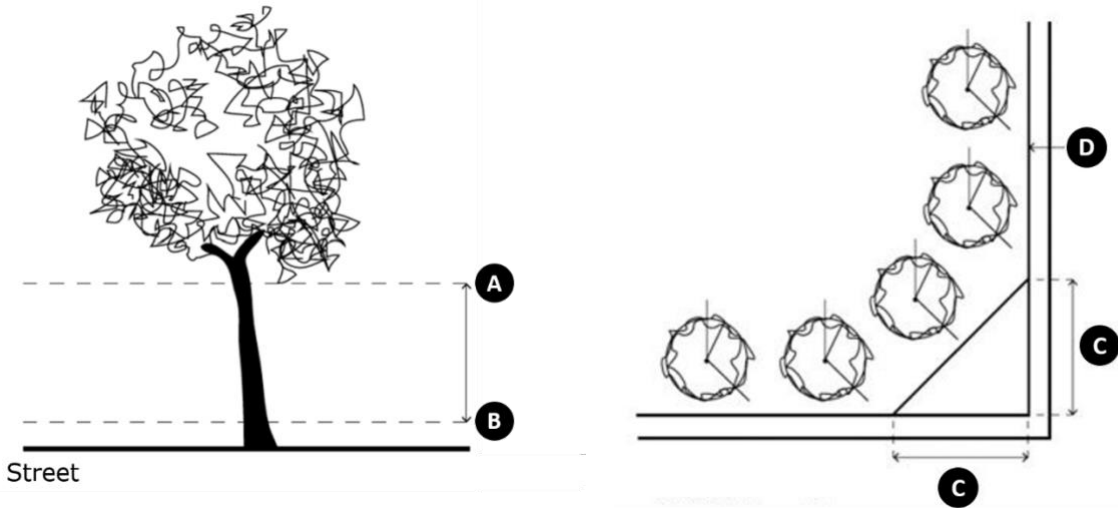


Figure Notes: A = 72 inches; B = 30 inches; C = 25 feet; D = Property Line

12.5 SIDEWALKS & MULTI-USE PATHS

12.5.1 APPLICABILITY

This Section applies to minor subdivisions (except family subdivisions and simple plat subdivisions), major subdivisions, and group developments.

12.5.2 SIDEWALKS & CROSSWALKS IN MAJOR SUBDIVISIONS

- A. **Where Required.** Sidewalks will be required within all subdivisions within the County under any of the following conditions:
1. *Public Schools.* Within one and one-half miles of a public school (measured along the road from the entrance);
 2. *Lots.*

- (a) On any proposed street with 40 or more lots; and
 - (b) On all proposed streets servicing 75 or more lots (see design standards chart).
3. *Subdivision Entrance.* On the entrance road(s) of any subdivision meeting the above requirements.
 4. *Plans.* Additionally, sidewalks are required in any residential subdivision that connects to an adjacent sidewalk or a planned sidewalk as listed in the County's Safe Routes to School, Recreation & Work Plan, GPATS Long Range Plan, or any other County- or SCDOT-approved plan.
- B. Exceptions.** Sidewalks are not required:
1. On streets where grades exceed 15%; or
 2. In R-R1, R-R3, and R-S zoning districts, unless it is an open space subdivision.
- C. Sidewalk Standards.**
1. *Width.* A minimum 5-foot wide concrete sidewalk shall be constructed on at least one side of any residential streets where they are required. Other alternative walkways and surfaces may be approved on a case-by-case basis that meets the intent of providing connectivity.
 2. *Location.* Such sidewalks shall be located within the public right-of-way unless otherwise approved.
 3. *Grass Strips.* Sidewalks shall have a grass strip a minimum of 2 feet in width located between the curb and sidewalk.
 4. *Catch Basins.* Catch basins shall be designed to accommodate the sidewalk and stay within the right-of-way.
 5. *Curb Ramps.* Curb ramps with ADA approved brick-colored or yellow tactile warning devices imbedded in concrete shall be provided where a sidewalk intersects with a street. All sidewalks shall match the associated road grades and curb ramps shall be compliant with the most recent edition of ADA guidelines (Title II).
- D. Fee-in-Lieu Program.⁵**
1. *Waiver.* Waivers, as provided in **Section 17.9: Waivers**, may be allowed during Preliminary Plan review if, where a new sidewalk is required to be constructed, the

⁵ This Paragraph carries forward LDR Section 8.18 C. but revises to authorize the Planning Commission, rather than the Subdivision Administrator, to approve requests through the Waiver process.

applicant makes a written request to the Planning Commission for a waiver and requests to pay a fee-in-lieu of providing a sidewalk.

2. **Conditions.** The Planning Commission may grant the waiver under the conditions that the Commission determines that one or more of the following conditions exists and that the applicant pays a fee-in-lieu of constructing the sidewalk as determined by the average linear foot cost of County sidewalk projects for the most recent two-year period:
 - (a) The sidewalk is not identified in any current County-approved plan as a needed pedestrian linkage;
 - (b) The sidewalk is proposed to be constructed within an existing right-of-way where sufficient right-of-way or easement width does not exist or cannot be dedicated to build the sidewalk;
 - (c) The sidewalk is identified on any current County-approved plan or is a part of a SCDOT- or County-funded project that includes sidewalks; or
 - (d) The sidewalk cost is financially or environmentally prohibitive.
3. **Easement.** In the event that a fee-in-lieu of constructing a sidewalk is approved, the developer shall provide a recorded easement, if necessary, for the future development of the sidewalk (if outside of the right-of-way). Fees-in-lieu shall be paid prior to recording of the Final Plat.
4. **Use of Fees.** All fees collected by the County pursuant to these provisions shall be:
 - (a) Accounted for separately from other monies,
 - (b) Expended only for the construction of sidewalks or other pedestrian improvements in the County;
 - (c) Expended within the timeframe as outlined in state law regarding “Fee-in-lieu-of;”
 - (d) Expended within the same County Council district in which they were collected.
- E. **Costs.** Prior to the recording of the Final Plat, the costs of all sidewalks shown on the plans and as noted on the Final Plat that have not yet been installed shall be included in the financial security. The developer may elect to have the builder of that lot to construct the sidewalks adjacent (front and side) to that lot. In such cases, the developer shall be responsible for installing all handicap ramps prior to recording the Final Plat.
- F. **Access to Community Facilities.**

1. Pedestrian walkways shall be designed to ensure convenient access to parks, playgrounds, schools, transit stops, cluster box units, and other community facilities.
 2. Walkway easements shall not be less than 12 feet in width.
 3. Walkway or access easements to community facilities shall be shown on the Final Plat of the subdivision; accordingly such shall be delineated both with signage and with on-site physical means such as gravel, asphalt, planted screenings, or other appropriate delineators.
 4. Drainage should be provided for in accordance with Chapter 8: Flood Control, Drainage, Stormwater Management.
 5. Pet stations are required for all walking trails within common areas. Pet stations will be placed at each end of walking trail if not a loop trail.
- G. **Crosswalks.** Where sidewalks terminate at roadway intersections adjacent to other sidewalk-adorned intersections, thermoplastic crosswalks shall be provided. Crosswalks shall be white parallel bars (rails) at least 12 inches wide and 6 feet in length separated no more than 24 inches apart, thus connecting adjacent sidewalks crossing asphalt, or concrete roadway intersections. Alternate materials such as pavers or pervious pavement may be considered for crosswalks with approval from the County Engineer. Alternate materials shall be maintained by the Homeowners Association.

12.5.3 WALKWAYS & SIDEWALKS IN GROUP DEVELOPMENTS⁶⁶

- A. **Applicability.** The provisions of this Subsection apply all group developments.
- B. **Walkways.** Pedestrian walkways shall be provided on the site and shall provide safe, all weather, efficient, and aesthetically pleasing means of on-site movement and shall be an integral part of the overall site design concept. Walkway connections to parking areas, buildings, other amenities, residential areas, commercial areas, and between on-site and perimeter pedestrian systems shall be planned and installed wherever feasible. All walkways shall be a minimum of 5 feet in width, and paved.
- C. **Sidewalks.** Sidewalks that meet the standards of this Subsection are required along all roads, and where determined necessary by the Subdivision Advisory Committee.

⁶⁶ This is a modification of existing standards in ZO 12:1.4: *Pedestrian Access*. The current standards only apply in PD, NC, POD, and FRD.

12.5.4 MULTI-USE PATHS

- A. A developer may achieve alternative compliance with the standards of this Section upon approval by the Subdivision Advisory Committee of an alternative sidewalk or trail plan that provides equal or greater pedestrian circulation and that avoids the requirement to provide sidewalks in locations that are not likely to be used or that do not connect to other sidewalks. The subdivider shall submit such plan at the time of Preliminary Plan review.
- B. The Committee may approve such plan if better pedestrian and bicycle access and connectivity is provided through the use of off-street trails or multi-use paths that connect to sidewalks or off-street trails or multi-use paths on the perimeter of the parcel proposed for development.

12.6 TRANSIT⁷

12.6.1 PURPOSE

The following incentives are provided in order to encourage the location of new developments in close proximity to existing stops and to encourage the provision of new transit stops with new development.

12.6.2 APPLICABILITY

The incentives in this Section are available for lots located in zoned areas. The parking and dimensional incentives in this Section are cumulative and may both apply to a single site.

12.6.3 PARKING REDUCTION

- A. *Existing Transit Stops.* Developments within 1,320 feet of an operating transit stop may reduce the number of parking spaces required in **Article 5: Parking & Loading** by 10%.
- B. *New Transit Stops.* Developments that provide new transit stops, in coordination with Greenlink, may reduce the number of parking spaces required in **Article 5: Parking & Loading**, by 15%.
- C. *Shuttle to Transit Facility.* With authorization of the Director, on a legal affidavit approved by the County Attorney, and reauthorized on a bi-annual basis, Government & Civic and Business, Professional, Scientific, & Technical uses that provide regularly scheduled shuttle transit to and from a transit facility such as a park and ride facility may receive up to a 5% reduction in the number of required off-street parking spaces required in **Article 5: Parking & Loading**.

⁷ The incentives in this Section are new and they implement Plan Greenville County Objective I-3, Strategy 2.

12.6.4 DIMENSIONAL STANDARDS BONUS

- A. **Height.** Developments within 1,320 feet of an existing transit stop or that provide a new transit stop on-site, in coordination with Greenlink, may have an additional 10% building height based on the maximum height requirement of the zoning district, as established in [Article 2: Zoning Districts](#).
- B. **Gross Floor Area.** Developments within 1,320 feet of an existing transit stop or that provide a new transit stop on-site, in coordination with Greenlink, may have an additional 10% gross floor area, where applicable, based on the maximum gross floor area requirement of the zoning district, as established in [Article 2: Zoning Districts](#).

12.7 STREET CLASSIFICATION & DESIGN

12.7.1 APPLICABILITY

This Section applies to all major subdivisions and all group developments.

12.7.2 STREET CLASSIFICATION

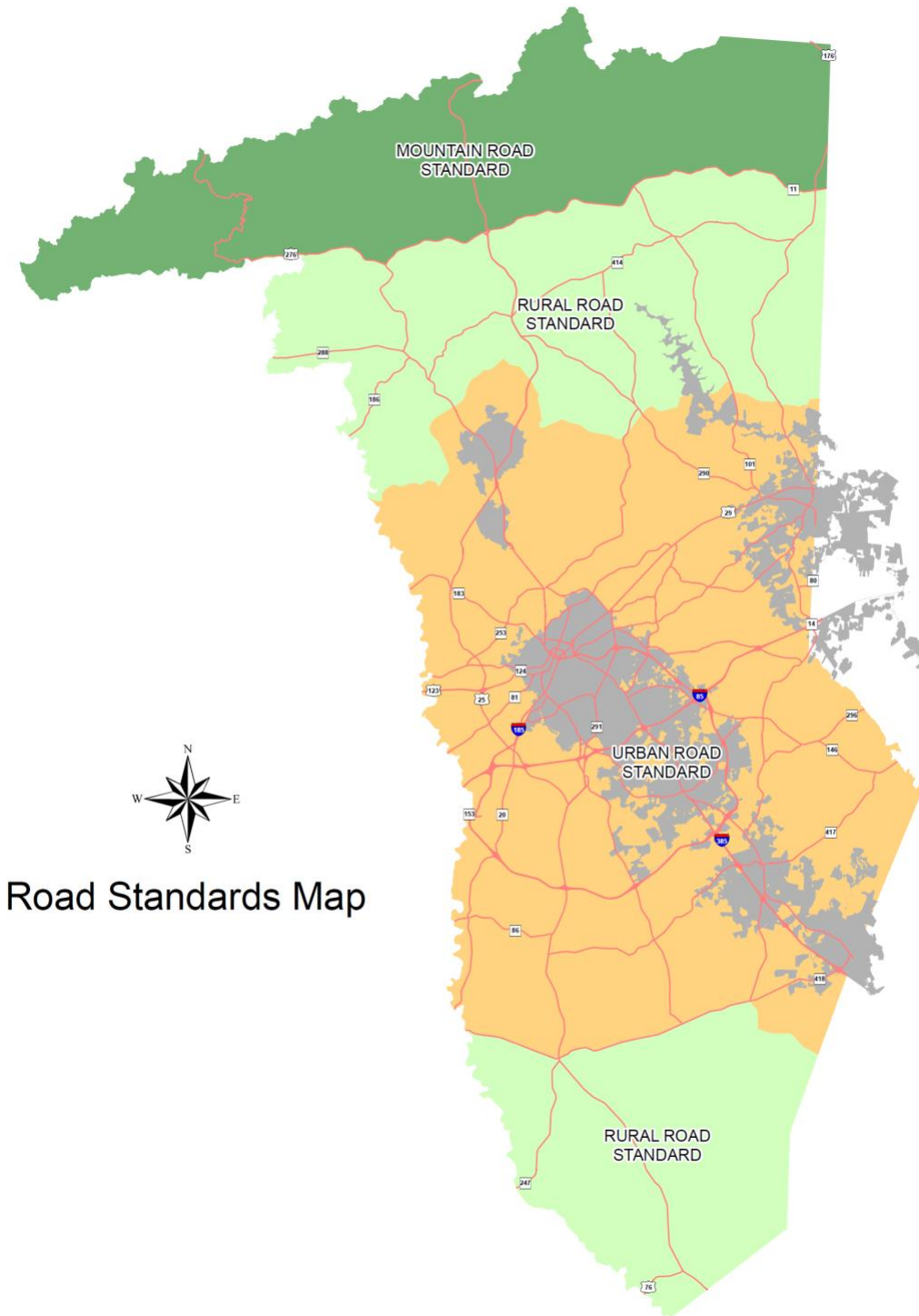
For the purpose of this UDO, all streets are classified based upon the projected traffic volume on the street. These classifications and the required design speed for each are listed below:

- A. **Arterial Streets.** High volume streets that carry traffic between commercial centers or communities and may connect to freeways.
 - 1. *Interstates.* the highest classification of arterials and designed for mobility and long distance travel with limited access. These are also known as principal arterials. Development cannot directly access the interstate system and these are owned and maintained by SCDOT.
 - 2. *Major.* High volume streets that carry traffic between commercial centers or communities. Shall be built to SCDOT standards (e.g., Wade Hampton Boulevard, Woodruff Road)
 - 3. *Minor.* Principal traffic arteries within residential or commercial areas that carry traffic from arterials to lower order residential streets. Shall be built to SCDOT standards (e.g., Edwards Road, Haywood Road)
- B. **Collector Streets.** Streets that primarily connect residential streets to arterial streets.

1. *Major.* Streets that provide direct connections between arterials or to arterials from residential streets and carry more than 4,000 vehicles per day. (e.g., East Standing Springs Road, Bridges Road)
 2. *Minor.* Streets that provide access to arterials from residential streets and carry 1,250 to 4,000 vehicles per day. (e.g., Neely Ferry Road, Ansel School Road)
- C. **Residential Streets.** Streets used primarily to provide access from major or minor collector streets to residential units. By nature of their design, these streets serve vehicles passing through the area with either origin or destination within the area. The three classes of residential streets are listed below:
1. *Collector.* A street which provides access to residential dwelling units and carries 750 to 1,250 vehicles per day.
 2. *Sub-collector.* A street which provides access to residential dwelling units and carries 250 to 750 vehicles per day. A street may not be classified as a sub-collector street if it is designed in such a way that it may carry at any future date more than 750 vehicles per day.
 3. *Access.* A street providing access and/or road frontage to residential dwelling units and carries less than 250 vehicles per day. A street may not be classified as an access street if it is designed in such a way that it may carry at any time more than 250 vehicles per day.
- D. **Non-Residential Streets.** Streets used for access to commercial, service, office, multifamily, mixed use, and industrial properties as designated by the zoning classification or to those areas exhibiting this character or intent.
- E. **Private Roads.** Private roads shall be designed to the County's public road standards except as noted below. All liability, maintenance, and upkeep of the travel surface, and all incidental structures shall be the responsibility of the landowners, developer, or homeowners association.
- F. **Mountainous Roads.** A roadway is eligible for this designation if it lies within the area so defined, in Figure 12.7.1-1: *Road Standards Map* or if the immediate and surrounding terrain has an average minimum slope of 20%.
- G. **Alleys.**
1. The purpose of an alley is to provide vehicular access to developments that cannot be adequately served by existing streets or as a means of reducing or eliminating individual driveway accesses.
 2. All alleys are to be privately maintained with measures to ensure the travel way is not obstructed in any manner, including parking.

3. The pavement design shall meet private alley standards (see Table 12.7.3-3: *Design Standards*). The geometry of the alley shall be adequate to accommodate traffic if the alley will be used for public services (e.g. sanitation).
4. Garages and fences should be set back from the alley right-of-way a minimum of 5 feet to provide an adequate turning area for vehicles. Alley intersections, sharp changes in alignment, and dead-ends shall not be permitted if alleys are to be used by service vehicles.
5. Design speed is 15 miles per hour.
6. The County shall not be responsible for damage occurring to the pavement structure due to use of the alley for access in providing public services.
7. Private alleys are not eligible for being accepted into the County public road inventory.

Figure 12.7.1-1: Road Standards Map



Road Standards Map

12.7.3 DESIGN STANDARDS FOR PUBLIC STREETS

All public streets and roads within Figure 12.7.1-1: *Road Standards Map*, jurisdiction area shall comply with design standards as defined in this document. To determine which standards apply to any specific classification, refer to Table 12.7.3-3: *Design Standards*. In all instances where reference is made to a section of the South Carolina Department of Transportation (SCDOT) specifications for highway construction (SCDOT specifications), it is the most recent edition.

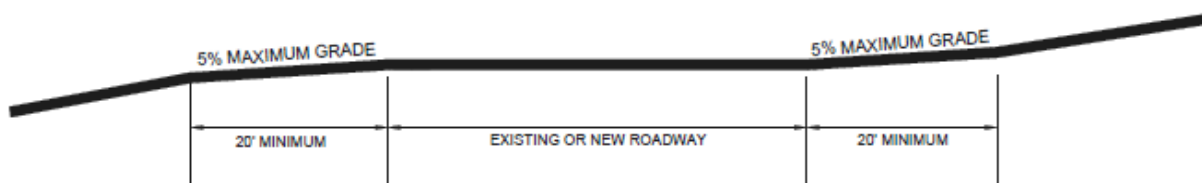
A. Rights-of-Way and Cross-Sections.

1. A proposed right-of-way shall be of sufficient width to accommodate the required street cross-section, including sidewalks, catch basins, utilities, and on-street parking lanes, if provided. The required right-of-way width is listed in the Table 12.7.3-3: *Design Standards*. If on-street parking is provided, the right-of-way width shall be increased by at least 11 feet for each parking lane.
2. Pavement width shall be sufficient to serve the projected traffic on and use of the street, but in no way shall the pavement width be less than that required in Table 12.7.3-3: *Design Standards*.

B. Grades.

1. *Vertical Tangent Grade*. The minimum vertical tangent grade on any proposed street shall not be less than 1% and the maximum grade shall not exceed those listed in Table 12.7.3-3: *Design Standards*.
2. *Intersections*. All proposed street grades when intersecting an existing and/or proposed street or highway shall be constructed as to meet the same horizontal grade of the existing intersection and shall have a maximum approach grade of 5% for a distance of 20 feet from the edge of pavement of the existing street to which the proposed connection is being made.

Figure 12.7.3-1: Maximum Approach Grade



C. **K Factors/Vertical Curves.** See Table 12.7.3-3: *Design Standards*, for acceptable K factors.

D. **Horizontal Curves.**

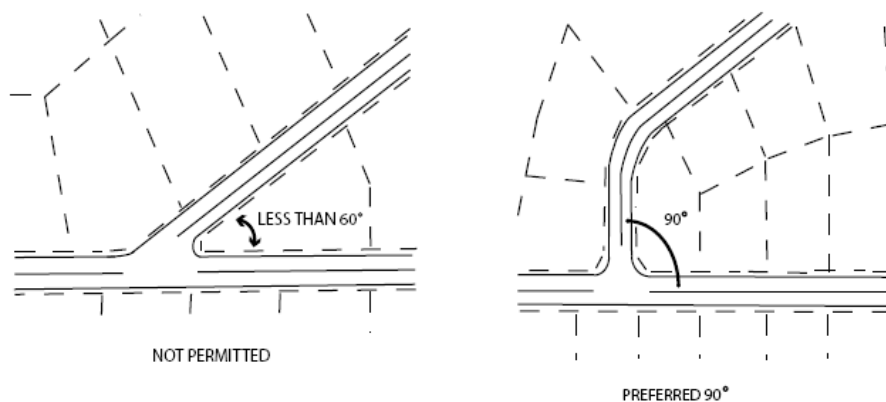
1. *Generally.* See the Table 12.7.3-3: *Design Standards*, for minimum horizontal curve radii. Where a deflection angle of more than 10 degrees in the alignment of the street occurs, the right-of-way shall be curved. At subdivision entrances there should be a minimum of 100-foot tangent prior to the start of any curve.
2. *Rural Mountainous.* For rural mountainous roads, additional pavement shall be provided in accordance with Table 12.7.3-1: *Horizontal Curves*.

| Table 12.7.3-1: Horizontal Curves | |
|-----------------------------------|-----------------|
| Radius | Increased Width |
| 70' – 90' | 25% |
| 60' – 70' | 35% |
| 50' – 60' | 45% |
| Less Than 50' | 50% |

E. Intersections.

1. *Angles.* All new roads shall intersect other streets at, preferably, right angles whenever possible. No street shall intersect any other street at an angle less than 60 degrees in relation to alignment of the intersecting road.
2. *Alignment.* Four-way intersections shall be designed such that lanes on opposing streets line up with each other.

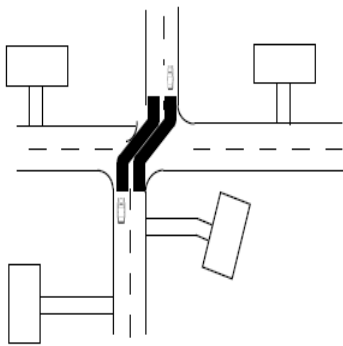
Figure 12.7.3-2: Intersection Angles



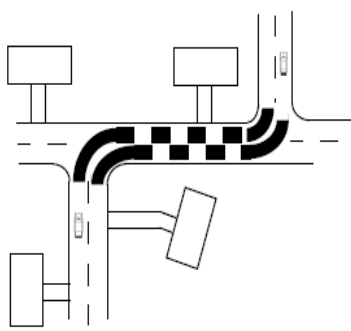
- F. **Intersection Offsets.** The minimum distance between intersections shall be as established in Table 12.7.3-2: *Intersection Offsets*, and illustrated in Figure 12.7.3-3: *Street Jogs/Offsets*.

| Table 12.7.3-2: Intersection Offsets | |
|--------------------------------------|----------------|
| Speed Limit on Main Through Street | Offset in Feet |
| 25 mph | 125 |
| 35 mph | 150 |
| 45 mph | 175 |
| 55 mph | 200 |

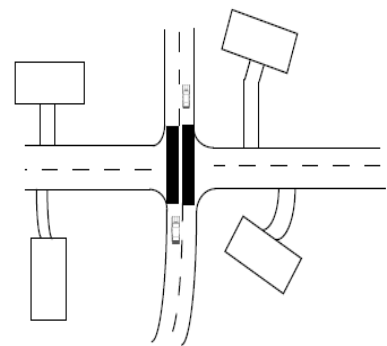
Figure 12.7.3-3: Street Jogs/Offsets



Sharp street jogs create hazardous driving conditions. Not Acceptable



See chart for exact offset.



Street jogs are eliminated with proper design.

Table 12.7.3-3: Design Standards

| Street Classification (Corresponding Volume) | Street Width (ft)+ | ROW Width (ft)^* with Sidewalk | Design Speed (mph) | K Factor | | Curb Radii (ft) | Grade Maximum (%) | Minimum Horizontal Radius (ft) | Tangent Between Reverse Curves (ft) |
|--|--------------------------|--|--------------------------|----------|-----|-----------------------|-------------------------|--------------------------------------|--|
| | | | | Crest | Sag | | | | |
| Residential Streets (Public & Private) | | | | | | | | | |
| Access (<250 VPD) | 20 | 42 | 20 | 7 | 17 | 25 | 11 | 100** | 50 |
| Subcollector (250 - 750 VPD) | 22 | 44 | 25 | 12 | 26 | 25 | 10 | 155** | 50 |
| Collector (750 -1250 VPD) | 24 | 46 | 25 | 14 | 26 | 30 | 10 | 155 | 100 |
| Other Streets (Public & Private) | | | | | | | | | |
| Minor Collector (1250-4000 VPD) | 26 | 48 | 30 | 16 | 26 | 30 | 10 | 250 | 100 |
| Non-Residential | 28 | 50 | 35 | 29 | 49 | 40 | 8 | 300** | 150 |
| **Rural Mountainous (Public & Private) | | | | | | | | | |
| Paved (≤ 250 VPD) | 20 | 52 | 20 | 7 | 17 | 25 | 18 | 75*** | 75 |
| Paved (>250 VPD) | 22 | 52 | 25 | 12 | 26 | 25 | 18 | 75*** | 75 |
| Private | | | | | | | | | |
| Alleys -One Way | 12 | 20 | 15 | 2 | 15 | 20 | 8 | 50** | 25 |
| Alleys -Two Way | 18 | 26 | 15 | 2 | 15 | 20 | 8 | 50** | 25 |
| Private Mountainous | | | | | | | | | |
| Unpaved | 20 | 50 | 20 | 7 | 17 | 20 | 15*** | 50 | 50 |

Key: ft = feet | mph = miles per hour | VPD = vehicles per day

Table Notes:

For alley intersections, sharp changes in alignment and dead ends shall not be permitted.

+ Minimum street width must be 24 feet when connecting to a state road. A minimum 100-ft taper shall be used to taper down to the appropriate width based on street classification.

^ Right-of-way may be reduced by 2 feet if using traditional 18” curb and gutter without sidewalk.

* Right-of-way for rural cross sections is 50 feet

** Based on crown of 1/4"/ft - no superelevation

*** Extra Pavement required in accordance with 12.7.3-1: *Horizontal Curves*

- G. **Drainage.** All public roads shall be designed with proper drainage systems to collect roadway runoff (and runoff from adjacent properties depending on topography) and convey the flows to

a suitable discharge point. Roadway drainage design shall comply with County Code [Chapter 8: Flood Control, Drainage, Stormwater Management](#) and the most recent edition of the Stormwater Design Manual.

H. Non-Through Streets, Cul-de-Sacs, and Turnarounds.

1. *T-Type and Hammerhead Turnarounds.* T-type or hammerhead turnarounds, as approved by the County Engineer, are encouraged for stub-out streets. If a stub-out street is less than 200 feet long or the depth of the lot, no turnaround is required. Stub-outs greater than 200 feet long and serving more than two lots require a turnaround. (See also Section 12.3.2: *External Connectivity*)
2. *Temporary Turnarounds.* In phased subdivisions, temporary turnarounds are required for through streets planning to continue into a new phase. The temporary turnaround will begin beyond the property line of the last lot shown on that phase's final plat. Temporary turnarounds shall have a minimum slope of one% as measured from the center. When a temporary turnaround is required, the right-of-way shall be extended to the property line. A notation shall be made on the final subdivision plat that states that the land outside the street right-of-way shall revert to the abutting property owners.
3. *Cul-de-Sacs.*
 - (a) *Street Dimensions.* Cul-de-sacs are required to have the dimensions established in Table 12.7.3-4: *Standard Cul-de-Sac Dimensions*, as illustrated in Figure 12.7.3-4: *Standard Cul-de-Sac Dimensions*.
 - (b) *Cul-de-Sac Island.*
 - (1) Pavement widths shall be in accordance with the most current AASHTO Policy on Geometric Design of Highways and Streets standards for vehicles with a 40-foot wheelbase. A minimum width of 25 feet of paved surface shall surround the island.
 - (2) A minimum 10 foot right-of-way shall be dedicated beyond the outside edge of pavement regardless of the shape or size of the cul-de-sac.
 - (3) Rolled curb is required to allow adequate turning radius for Public Service vehicles.
 - (4) Cul-de-sac islands other than those shown in this UDO shall be approved by the Director.
 - (5) Except in the case of offset cul-de-sac pavements, all cul-de-sac islands shall be directly centered in the right-of-way and under drained.

- (6) See Figure 12.7.3-6: *Subsurface Drainage Detail* or **Article 14: Stormwater Management** (as applicable).

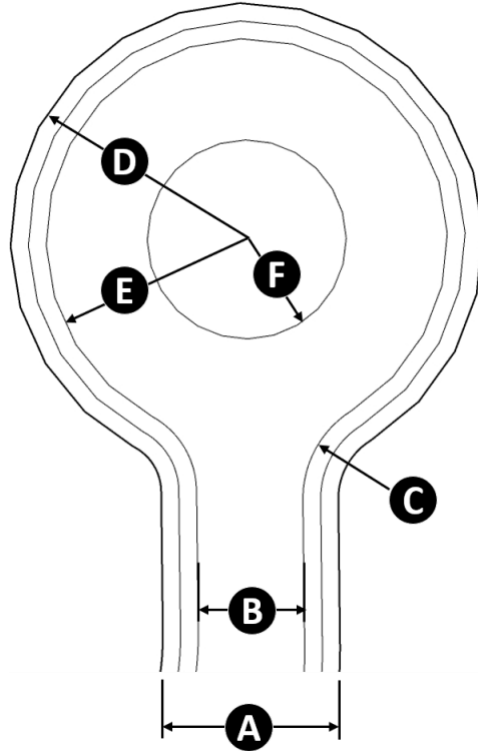
Table 12.7.3-4: Standard Cul-de-Sac Dimensions

| Measurement | Residential | | | Non-Residential ⁸ |
|--|-------------|---------|---------|------------------------------|
| | | | | |
| Right-of-Way Width (A) | 42 feet | 44 feet | 46 feet | 50 feet |
| Street Width (B) | 20 feet | 22 feet | 24 feet | 28 feet |
| Back-of-Curb Radius (C) | 35 feet | 35 feet | 35 feet | 35 feet |
| Bulb Radius Including Right-of-Way (D) | 60 feet | 60 feet | 60 feet | 70 feet |
| Bulb Radius Not Including Right-of-Way (E) | 48 feet | 48 feet | 48 feet | 50 feet |
| Island Right-of-Way (F) ¹ | 10 feet | 10 feet | 10 feet | 12 feet |

Table Note:

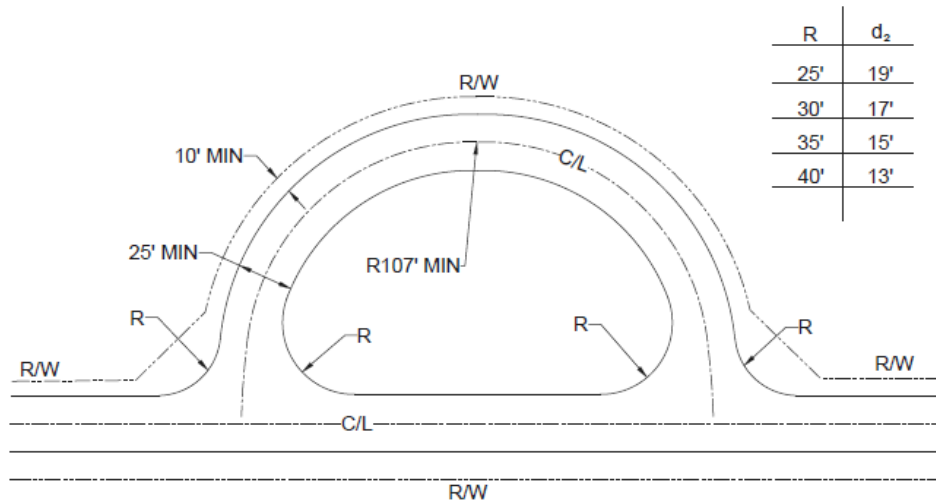
¹See Subparagraph (b), *Cul-de-Sac Island*, above

⁸ In current code this column has really large numbers in it. These are shrunk down.

Figure 12.7.3-4: Standard Cul-de-Sac Dimensions

- I. **Eyebrows.** For a temporary turnaround, an eyebrow, as illustrated in Figure 12.7.3-5: *Eyebrow Dimensions*, can be used.
1. *Paved Width.* Pavement width design shall be in accordance with most current AASHTO Policy on Geometric Design of Highways and Streets standards for WB-40 vehicles. A minimum paved surface width of 25 feet is required.
 2. *Right-of-Way.* A minimum 10 feet right-of-way shall be dedicated beyond the outside edge of pavement.
 3. *Dimensions.* Detail dimensions are shown on the following example:

Figure 12.7.3-5: Eyebrow Dimensions



J. **Standard Islands.** A detailed design plan for proposed roadway islands shall be shown on the road plan and profile and shall adhere to the following standards:

1. *General Standards.*

- (a) The plant materials in the entrance island shall be maintained to provide a sight tunnel between the height of 30 inches and 72 inches above the adjacent roadway surface for a minimum distance of 35 feet from the intersecting right-of-way. Taller items may be placed in the entrance island beyond the point of 35 feet.
- (b) In cul-de-sac islands, eyebrow islands, and any island except entrance islands, no plant material with a mature height in excess of one foot are allowed within five feet of the face of curbing.
- (c) Signs within entrance islands may be allowed upon review by the Traffic Engineer. Entrance island signs shall be placed at least 3 feet from the edge of curbs paralleling the travel lanes. No above-ground structures shall be permitted in the last 5 feet of the entrance island. Sign maintenance within the islands are the sole responsibility of the Property Owners Association.
- (d) No above-ground structures, such as retaining walls, raised planter beds, or water features and/or fountains, are allowed in any island or within right-of-way of a public road. Lighting and flagpoles may be allowed if placed in accordance with the requirements in 12.7.3 J. 1. (c), above. Lighting, neighborhood signs, flagpoles are the sole responsibility of the Property Owners Association.

- (e) Trees within islands or the public road right-of-way will be allowed only upon approval of the landscape plan. Plant material and the maintenance of the plant material is the sole responsibility of the Homeowners Association (see list of approved plant material in [Article 6: Tree Preservation, Buffers, & Screening](#)).
 - (f) Any nonconforming structure or plant within any island may be removed at the discretion of the County Engineer.
 - (g) Planter islands can be used to meet post construction water quality requirements by using low impact development principles as specified in [Article 14: Low Impact Development](#).
2. *Landscaping Plans.* A detailed landscape plan for all roadway island(s) shall be submitted to the Land Development Division for review during the roadway plan review process.
3. *Roadway Entrance Islands.*
- (a) The minimum width shall be four feet measured from the outside face of the curb to the direct opposite outside face of the curb.
 - (b) Minimum pavement width shall be 20 feet in the lane exiting the subdivision and 16 feet in the lane entering the subdivision. The width of the road at SCDOT right-of-way shall be determined by the latest edition of the SCDOT ARMS Manual. Pavement width beyond the end of the island shall be tapered at a rate of 8:1 to the typical pavement width. A double yellow centerline shall be provided when the island is more than five feet from the right-of-way.
 - (c) No taper shall be allowed across the width of intersecting roadways. Road widths across intersections shall be equal.
 - (d) Curb radius at the intersection shall be no less than 35 feet.
 - (e) No driveway curb cuts shall be allowed within five feet of the end (rear) of the entrance island.
 - (f) There shall be 100 feet of tangent roadway separating the entrance from a curve in the roadway.
 - (g) The island shall be curbed with the ends rounded.
 - (h) The island shall be under drained in accordance with Figure 12.7.3-6: *Subsurface Drainage Detail*.
 - (i) The minimum length shall be 20 feet measured from the outside face of the curb.

- (j) The maximum length shall be 50 feet measured from the outside face of the curb.
- (k) Figure 12.7.3-7: *Entry Island and Planting*, shows detailed dimensions for planting islands.

Figure 12.7.3-6: Subsurface Drainage Detail

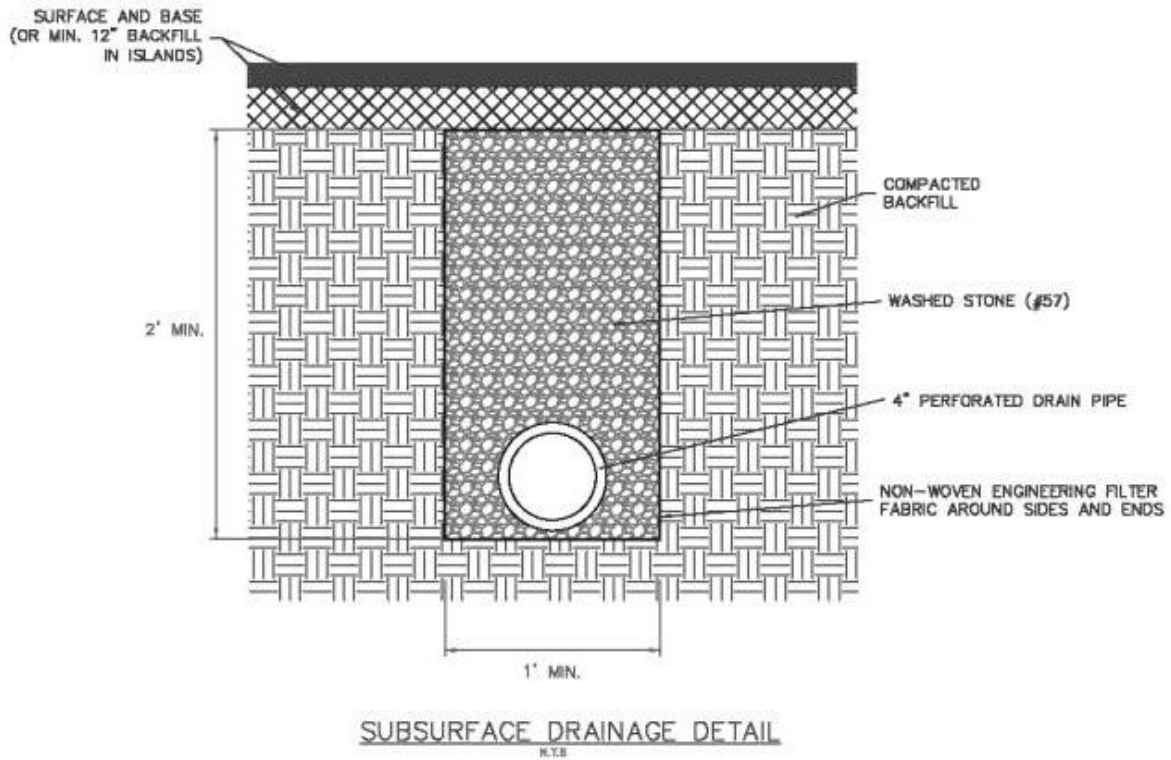
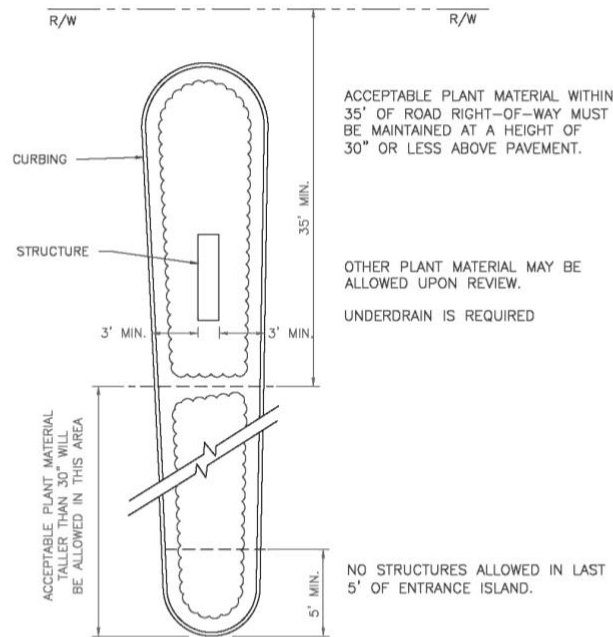
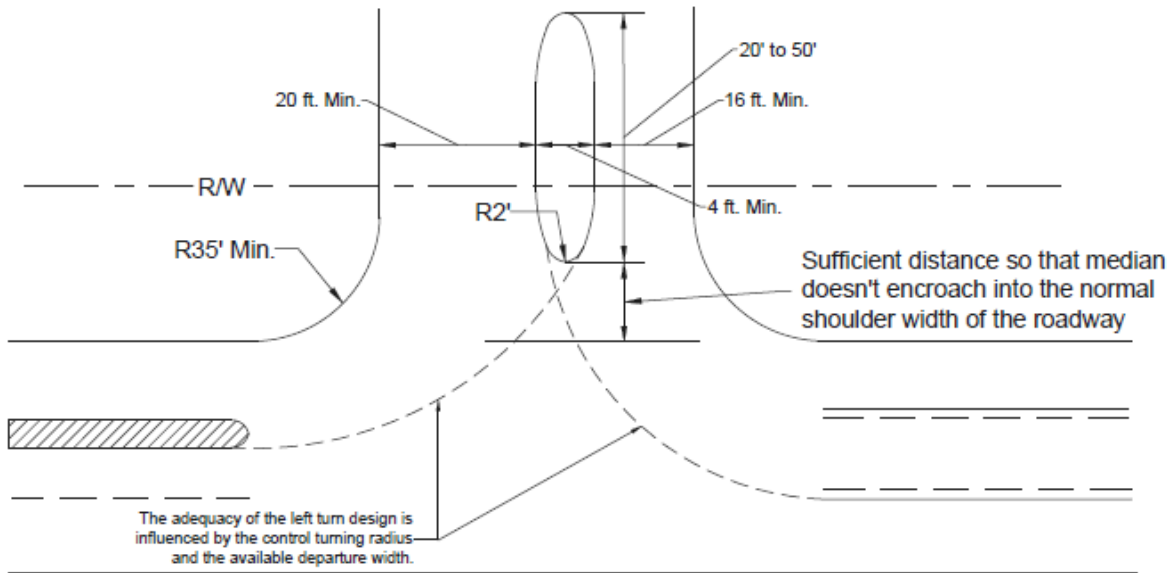
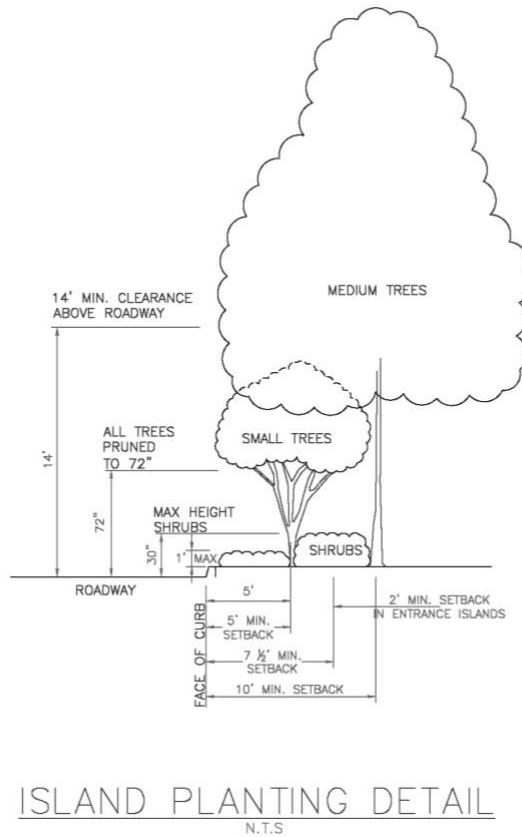


Figure 12.7.3-7: Entry Island and Planting



ENTRANCE ISLAND PLANTING
 N.T.S

Figure 12.7.3-7: Entry Island and Planting



12.7.4 DESIGN STANDARDS FOR PRIVATE ROADS

- A. **Design Standards for Private Roads.** All private roads shall be designed to public standards, except as provided in this Subsection. Pavement design may consist of 1.5” of surface with 2” binder or 4” of stone.
- B. **Landscaping and Structures Within Islands.**
 - 1. *Landscaping.* A detailed landscape plan for all roadway island(s) shall be submitted to the Subdivision Advisory Committee for review during the roadway plan review process. The plan should adhere to the same standards as those for public roads; however, Waivers for the use of differing plant material and inclusion of non-standard configurations of islands may be granted in accordance with [Section 17.9: Waivers](#), if no safety hazards will exist. At no time may the plant material or above-ground structure(s) restrict the entrance of emergency vehicles into or along the roadway. The maintenance

of plant material and structures within islands in private roads is the responsibility of the homeowners' association or covered by the restrictive covenants.

2. *Emergency Access.* If any plant material or structures(s) restricts the passage of emergency vehicles into or along the roadway, it will be removed by the developer or Property Owners Association within 30 days of receipt of notification from the appropriate fire district.
3. *LID.* Planter islands can be used to meet post construction water quality requirements by using low impact development principles. [See [Article 14: Stormwater Management](#)]

C. **Gates.**

1. *Gating Required.* Private residential roads that connect and provide through access to two public roads shall be gated.
2. *Standards.* When gates or other approved methods of securing access roads are used, all of the following, where applicable, shall apply.
 - (a) Minimum gate width shall be 20 feet; however, if there are single gates in each direction, the minimum width of each gate is 16 feet;
 - (b) Gates shall either swing in the direction of apparatus travel or shall be of a sliding variety;
 - (c) Gates in which manual operation is allowed by the authority having jurisdiction shall be of a type construction so that they can be operated by one person. A padlock or chain and padlock shall not be used on manual gates unless an approved key box containing all key(s) is installed at the gate location or the locking devices are capable of being opened with the use of common forcible entry tools;
 - (d) Electric opening devices shall be readily accessible by fire department personnel for emergency access;
 - (e) All locking device specifications, whether located on manual or electric gates, shall be approved by the authority having jurisdiction prior to being installed;
 - (f) All components of gates and other approved securing devices shall be maintained and kept in proper working order at all times; and
 - (g) Stacking length for vehicles shall be at least 50' from the edge of pavement.

- D. **Mountainous - Private Unpaved.** Private, unpaved roads located in areas subject to mountain road standards (see Figure 12.7.1-1: *Road Standards Map*) shall meet the following minimum standards:

1. A minimum right-of-way of 50 feet.
 2. A minimum all weather surface width of 20'.
 3. Shall be surfaced with a minimum of 4" of compacted stone base.
 4. A minimum overhead clearance of 13 feet 6 inches.
 5. Minimum intersection offset requirements as set forth in Section 5.2.7.
 6. Comply with the drainage design and construction standards outlined in Section 12.8: *Street Construction Standards* and **Article 14: Stormwater Management**.
 7. Horizontal and vertical alignment to comply with the Table 12.7.3-3: *Design Standards*.
 8. Meet property line and intersection requirements as set forth in Section 12.4: *Intersection Sight Distance*.
- E. **Maintenance.** All liability, maintenance, and upkeep of the travel surface, and all incidental structures shall be the responsibility of the landowners, developer, or property owners association. Installation and maintenance of driveway pipe, drainage features, street name signs, and traffic control signs shall be the responsibility of the landowners, developer, or property owners association.
- F. **Final Plats.** The Final Plat on which a private road is established shall contain the following statement:
- "Each property owner is provided access to a public road by a private road of which each property owner has an undivided interest. The private access road will not be accepted and maintained as a public right-of-way until such time as it meets minimum County standards as reflected in the most current Unified Development Ordinance."
- G. **Certification of Completeness.** Design certification shall be provided by a registered Professional Engineer. Prior to recording a Final Plat or releasing the Financial Security, as-built certification of the completed roadways and drainage system to be furnished to the Land Development Division.

12.7.5 TRAFFIC CALMING

Every effort shall be made to produce a design that will encourage appropriate residential speeds. On residential collectors on which there is a combination of expected traffic volume, length, straight alignment, and/or a design hardship, traffic calming devices will be required. Acceptable traffic calming devices on new streets include but are not limited to raised crosswalks, bulb-outs, chicanes, traffic circles, raised intersections, and median islands. See **Appendix C** for details.

12.7.6 HALF STREETS

New half streets are prohibited. Whenever an existing half street is adjacent to a tract of land to be subdivided, the other half of the street shall be platted within such tract.

12.7.7 RESERVATION OF RIGHT-OF-WAY ON COUNTY ROADS

Any subdivision accessing a County road and/or having lots adjacent to County roads shall accommodate a 25-foot right-of-way from the centerline of the County roadway for future projects, regardless of existing right-of-way.

12.7.8 CONFORMITY TO THE MAJOR THOROUGHFARE/TRANSPORTATION PLANS⁹

- A. The GPATS Transportation Improvement Program lists roadway projects that are planned for the next six years. Subdivisions along these routes shall accommodate the future right-of-way. The developer may reserve the future right-of-way or shall reserve the right-of-way as long as the reserved right-of-way is accommodated in the subdivision plan. Protected GPATS setbacks are available on GIS.
- B. If conceptual design plans indicating right-of-way for a project have been developed by Greenville County or SCDOT (preliminary plans), then that right-of-way shall be reserved by the developer. If final right-of-way plans have been developed, or if the project is under construction or completed, no additional rights-of-way need to be reserved. If right-of-way plans have not been developed, then the following rights-of-way shall be reserved:
 - 1. Planned three lanes-30 feet from centerline;
 - 2. Planned five lanes-50 feet from centerline; and
 - 3. Planned seven lanes-70 feet from centerline

12.7.9 STREET NAMES

Proposed public and private street names shall not duplicate or be phonetically similar to existing street names in Greenville County. All street names shall be approved by the Greenville County E-911 Office.

- A. **Street Signs and Markers.** The owner or developer initially shall install all required signage including but not limited to street identification signs, regulatory and warning signs, i.e., speed limit signs, and stop signs. Size, placement, and reflectivity shall conform to requirements of the most recent edition of the Manual on Uniform Traffic Control Devices, or otherwise approved

⁹ This Section may be incorporated with Article 12: *Transportation Corridor Preservation*.

by the Greenville County Traffic Engineer. Preferred font is Highway EM at minimum 4.55 inches high with use of capital and lower case lettering. Road numbers and prefixes shall be at least 1.5 inches high. Streets may not be named for living persons, per SC Code of Laws. All sign plans shall be submitted as a part of the road plan approval submittal process and approved by the Traffic Engineer.

- B. **Non-Typical Street Signs.** The use of non-typical street identification signs, that do not comply with the Manual of Uniform Traffic Control Devices, is allowed in conformance with the following:
1. *Dimensions.* Street name lettering shall be mixed-case, 6" (inches) in height for upper-case letters and 4.5" (inches) in height for lower-case letters, evenly spaced and centered. Road ID Numbers shall be at least 1.5" (inches) in height and shall follow the street name.
 2. *No Abbreviations.* Abbreviations of street names are not permissible.
 3. *Colors and Reflectability.* Lettering and background shall be contrasting colors and provide reflectability equivalent to engineering grade reflective Scotchlite, Series C as used with traditional greenblade signs. Alternative sign designs shall be approved by the Traffic Engineer.
 4. *Maintenance.* The Final Plat shall contain a statement designating that the Property Owners Association is responsible for maintenance of non-typical street identification signs. Any replacement of street identification signs by Greenville County will be with County standard materials, unless the Property Owners Association pays for their replacement.
 5. *Inspection.* All signage will be inspected by the County Engineer as a part of the final punch list to approve the road for acceptance. No streets will be given final approval without the installation of signage that meets minimum County standards. Traffic control/regulatory and warning signs (stop/speed limit signs) shall be standard face and in accordance with MUTCD guidelines for color, shape, size, and retro reflectivity.

12.8 STREET CONSTRUCTION STANDARDS

12.8.1 CONSTRUCTION PLAN SUBMITTAL REQUIREMENTS

After preliminary approval is granted, detailed construction drawings shall be submitted for review and approval to other departments or agencies prior to construction.

- A. **Drainage Plan.**

1. A detailed drainage plan shall be submitted to the County Engineer.
 2. The detailed drainage plan shall have a separate topographic map with not greater than 12 foot contour intervals showing the overall drainage conveyance system, the layout of the storm drain system (both open conveyance system and closed piped system(s)) and the delineation of the drainage areas of the proposed storm drainage conveyance system.
 3. Calculations for pipe and channel conveyance designs shall be submitted or shown on the plans.
 4. Individual lot drainage patterns, stormwater conveyance channels and/or pipe conveyance systems shall be shown within easements or rights-of-way.
 5. This detailed drainage plan will be considered as a component of a stormwater management and sediment control plan included as a part of the subdivision's comprehensive stormwater pollution prevention plan (SWPPP).
 6. This drainage plan shall be in compliance with SCDHEC's Regulation 72-300 and the NPDES (National Pollutant Discharge Elimination System) General Permit for Stormwater Discharges for Construction Activities, Greenville County's Flood Damage Prevention Ordinance and Stormwater Management Ordinance.
 7. Specific design criteria for the drainage plan can be found in the [Stormwater Management Design Manual](#).
- B. **Road Centerline Plan and Street Profile.** At the time the drainage plan is submitted, a road centerline plan and profile for each street shall be prepared with the plan view immediately above the profile. The horizontal scale should be no greater than one inch equals 50 feet and vertical scale no greater than one inch equals 10 feet. The following will be shown:
1. Alignment information;
 2. Existing and proposed centerline elevations at no less than 100 foot stations; and
 3. The storm drain system shall be shown on the road profile plan with type of inlet, station with offset, slope, and invert elevation.
- C. **Subdivisions With Lakes or Ponds.** Where the subdivision includes a lake or pond (existing or to be constructed) in connection with the development, the subdivider shall verify with DHEC that it meets the standards of the Dam and Reservoir Safety Act Regulations. If these water impoundments are additionally a part of the stormwater management of a subdivision, such plans shall also be reviewed by the Land Development Division.
- D. **Entrance and Cul-de-Sac Islands.** Detailed plans of any proposed entrance islands and any proposed cul-de-sac islands shall be submitted to the Land Development Division and

applicable Fire Department prior to construction. These plans shall include any proposed or existing plant materials. (See **Section 6.1.3: Plant Materials Standards** and Figure 12.7.3-6: *Entry Island and Planting*)

12.8.2 CONSTRUCTION PLAN REVIEW/INSPECTION FEES¹⁰

- A. **Fee Table.** These fees are applied to cover construction plan review and field inspection and can be found on the Subdivision Administration website.

| Table 12.8.2-1: Fee Table | |
|---------------------------|--|
| Items Covered by Fees | |
| Plan Review | |
| | First Review and First Resubmittal |
| | Additional Plan Revisions |
| | Variance Fee |
| Field Inspection | |
| | Pre-Construction |
| | Clearing and Grubbing |
| | Rough Grading |
| | Drainage |
| | Subgrade |
| | Binder |
| | Surface Asphalt |
| | Final Punch List |
| | Final Signoff |
| | Additional Re-Inspection of any of the above items |

- B. **Inspection Schedule.** Greenville County field inspection schedule allows for one inspection for each of the stages of construction listed above with the exception of the subgrade and surface asphalt inspection where one additional re-inspection is allowed without incurring the additional re-inspection fee. This schedule applies for all the roads shown in that phase of construction as documented on the final recorded plat for that phase.

¹⁰ This Section will be relocated to Article 23: *Submittal Requirements*.

12.8.3 MINIMUM SPECIFICATIONS FOR ALL ROADWAYS

- A. **Technical Standards.** Roadways for access to buildings, facilities, or property shall be capable of supporting a minimum of 80,000 pounds (DOT CFR 2007) before any combustible products are allowed to be brought on site and be constructed using asphalt, concrete, or other permitted surface as approved by the authority having jurisdiction. This is equivalent to six inches of gravel with the subgrade at 98% compaction of a Standard Proctor (ASTM D-698) or two and one-half inches of binder course based on road type.
- B. **Water Lines and Hydrants.** Water lines and hydrants shall be installed and in working order prior to roadways being built, final plat recorded and combustible products being allowed on site. A model home may be constructed if there is a hydrant within 600 linear feet and a fire truck can get within 150 feet. A statement of approval from the respective fire department shall be submitted to support the model home construction.
- C. **Width and Unobstructed Height.** Roadways shall have a minimum width in accordance with Table 12.7.3-3: *Design Standards* and a minimum unobstructed height of 13 feet, 6 inches.

12.8.4 CONSTRUCTION STANDARDS FOR PUBLIC ROADS

In addition to all the design standards previously listed, the following construction standards are required. Miscellaneous design details are provided in [Appendix F](#).

- A. **Clearing and Grubbing.** All work shall be required to conform to requirements and standards as set forth in the Division 200: *Clearing and Grubbing* of the most recent edition of the SCDOT Construction Manual.
- B. **Subgrade.** Subgrade shall be constructed as specified in the "Subgrade" section, in the SCDOT Specifications, or sound, undisturbed residual soils. In fill areas, all subgrade soils shall be compacted in accordance with the "Construction Requirements" section of the SCDOT Specifications.
- C. **Base Course.**
 - 1. **Granular Base Courses.** The granular base course shall be one of the following types, compacted and tested in accordance with the "Compaction and Testing Requirements" section of this Ordinance. The minimum compacted thickness requirements are given in Table 12.8.4-1: *Paving Standards Chart*.
 - (a) Sand Clay Base Course as specified in SCDOT Specifications.
 - (b) Soil-Aggregate Base Course as specified in SCDOT Specifications.
 - (c) Macadam Base Course as specified in SCDOT Specifications.

- (d) Stabilized Aggregate Base Course as specified in SCDOT Specifications.
 - (e) Cement Stabilized Base Course as specified in SCDOT Specifications.
2. *Asphaltic Base Courses.* An asphaltic base may be used in place of or in conjunction with granular bases. The asphalt base is to be one of the following types, constructed in accordance with the requirements set forth in the appropriate sections of the most current edition of the SCDOT Specifications. The minimum compacted thickness requirements are given in Table 12.8.4-1: *Paving Standards Chart 7* & Table 12.8.52: *Composition Limits for Hot Mix Asphalt Surface Courses.*
- (a) Hot Laid Sand Asphalt Base Course as specified in SCDOT Specifications.
 - (b) Hot Laid Asphalt Aggregate Base Course as specified in SCDOT Specifications.
 - (c) Hot Laid Asphalt Concrete Binder Course as specified in SCDOT Specifications.
3. *Surface Course.* The surface course is to be one of the following types while adhering to general specifications set forth in the SCDOT Specifications for bituminous pavement and for rigid pavement.
- (a) Hot Laid Asphaltic Concrete Surface Course, Type C, or latest equivalent approved by the SCDOT. Type D or latest equivalent approved by the SCDOT may be used with the prior authorization of the County Engineer. The required compacted thickness requirements are given in Table 12.8.4-1: *Paving Standards Chart* and Table 12.8.5-2: *Composition Limits for Hot Mix Asphalt Surface Courses.*
 - (b) Portland Cement Concrete. As specified in the SCDOT Specifications, with a minimum thickness of six inches for residential streets and seven inches for commercial / industrial streets. Reinforcing fabric shall be used.
- D. **Site Specific Paving Designs.** At the discretion of the Engineer of Record, he or she may provide the County with a pavement design report from a geotechnical engineer recommending the pavement thickness(es) for each road in the subdivision based on appropriate CBR values and anticipated traffic volumes. This report should include enough samples to provide a true representation of the soil type variations throughout the subdivision, with special attention to the appropriate pavement design in areas of fill.
- E. **Restrictions on Asphalt Paving Work.**
- 1. *Weather Conditions for Installation.* No surface asphalt paving shall be installed on a wet surface or when the weather conditions are otherwise unfavorable. To pave the binder and/or surface course, temperature shall be 45 degrees Fahrenheit and rising in the shade.

2. *Delivery and Placement.* The asphalt shall be delivered and placed in accordance with the SCDOT Specifications, with the exception that prime shall be cured for a minimum of 24 hours if used.
3. *Asphalt Temperature.* The asphalt shall be delivered to the spreader at a temperature between 250 degrees Fahrenheit and 325 degrees Fahrenheit and, with the exception of sand asphalt mixture for base course construction, within 20 degrees Fahrenheit of the temperature set at the plant.
4. *Prime Coat.* Where prime coat is used, the prime coat shall cure for a minimum of 24 hours prior to paving and shall be applied as specified in the SCDOT Specifications. Prime will be used at the discretion of the County Engineer or his/her authorized representative and not required if stone base is paved within 24 hours of being set up and approved.
5. *Equipment Size.* Equipment Size requirements:
 - (a) Steel Wheel Roller – 5 to 8 ton
 - (b) Back Roller – 5 to 8 ton
 - (c) Rubber Tire Roller – 9-wheel rubber tire
 - (d) Paving Train – self-propelled asphalt paver w/vibratory screed capability and standard 10-foot screed.
6. *Final Surface Course.* Final surface course shall be applied 90 days after the first surface course or once 25% of the homes within that phase of the subdivision have been constructed, whichever is greater. In order to apply the final surface course prior to this requirement and ensure no construction traffic damage to the final surface, a thicker alternate paving standard may be approved on a case by case basis.

Table 12.8.4-1: Paving Standards Chart

| Street Classification (Corresponding Volume) | Full Depth Asphalt (in) | | Asphalt with Binder and Stone Base | | |
|---|-------------------------|----------------------|------------------------------------|--------|-------|
| | Surface | Binder & Surface (!) | Surface | Binder | Stone |
| Residential Streets (Public and Private) | | | | | |
| Access (<250 VPD) | 1 ½" | 2 ½", 1 ½" | 1 ½" | 2 ½" | 6" |
| Subcollector (250 - 750 VPD) | 1 ½" | 2 ½", 1 ½" | 1 ½" | 2 ½" | 6" |
| Collector (750 -1250 VPD) | 1 ½" | 2 ½", 1 ½" | 1 ½" | 2 ½" | 6" |
| Minor Collector (1250-4000 VPD) | 1 ½" | 2 ½", 1 ½" | 1 ½" | 2 ½" | 6" |

Table 12.8.4-1: Paving Standards Chart

| Street Classification (Corresponding Volume) | Full Depth Asphalt (in) | | Asphalt with Binder and Stone Base | | |
|---|-------------------------|----------------------|------------------------------------|-------------|-------|
| | Surface | Binder & Surface (!) | Surface | Binder | Stone |
| Non-Residential | 1 ½" | 6" (*) | 1 ½" | 4" (*) | 8" |
| Access (<250 VPD) | 1 ½" | 2 ½", 1 ½" | 1 ½" | 2 ½" | 6" |
| Rural Mountainous | | | | | |
| Paved (<250 VPD) | 1 ½" | 2 ½", 1 ½" | 1 ½" | 2 ½" | 6" |
| Paved (>250 VPD) | 1 ½" | 2 ½", 1 ½" | 1 ½" | 2 ½" | 6" |
| Private Mountainous | | | | | |
| Unpaved | 6" Stone** | | | 6" Stone ** | |

Key: in = inches | VPD = vehicles per day

Table Note:

- / 1st surface lift shall be placed within seven days of placement of binder (unless inclement weather prohibits)
- * shall be placed in two lifts
- ** may use other approved base material, RAP is preferred

F. **Storm Drainage.** Except as noted, the latest SCDOT Standard Specifications shall be used. All lines will be laid in accordance with the "Pipe Culverts" County Standards. Strict compliance to backfilling and compaction restrictions and regulations are required.

1. *Storm Drain Pipe.* Shall conform to the following standards:
 - (a) *Reinforced Concrete Pipe.* Shall be Class III or better, as specified in the SCDOT Specifications.
 - (b) *Corrugated Metal Pipe.* Shall be aluminized steel, Type II, or other approved by the SCDOT. All aluminized steel pipe shall be Type II, with re-rolled ends having not more than two corrugations per end. All corrugated metal pipe shall also be of sufficient thickness to meet the design load requirements for the proposed cover height. Connectors for corrugated metal pipe shall be fully corrugated bands with an integral flange or higher quality connector. Band material shall be the same as the pipe provided and shall be of adequate gauge to accommodate the loading and cover requirements. When corrugated metal pipes are used in outfall conditions, a headwall is required.
 - (c) *Polypropylene Pipe (PP).*
 - (1) *General Limitations - PP*

- (i) Corrugated PP pipe, with diameter from 15 inches to 60 inches, shall be installed in accordance with the County-approved construction plans and to County specification. PP pipe is allowed for use with all county rights-of-way. All outfall pipes will have a headwall installed. Inspections by a geo-technical firm during pipe installation may be required. PP pipe be approved by the County Engineer or his/her designee on a case-by-case basis for driveway culverts.
- (2) *Materials - PP*
 - (i) Corrugated polypropylene pipe (15-inch diameter and greater) shall meet the requirements of AASHTO M 330 and ASTM F2881 (latest editions).
 - (ii) These specifications cover the requirements and methods of tests for dual wall corrugated polypropylene pipe, couplings, and fittings for use in surface and subsurface drainage applications.
- (3) *Construction Requirements - PP*
 - (i) *Installation.* Corrugated polypropylene pipe shall be installed in accordance with the latest SCDOT Standard Specifications for Highway Construction, the manufacturer's specifications, and/or ASTM D2321, whichever is more stringent.
 - (ii) *Joints.* Corrugated polypropylene pipe joints shall be designed/installed per ASTM D3212 using materials meeting the requirements of AASHTO M 330 and ASTM F2881.
- (4) *Testing Requirements- PP.* Testing shall include compaction and density testing of backfill within trenches, but may include other material tests as required by the County Engineer or his/her authorized representative.
- (5) *Compaction Testing – PP.*
 - (i) *Applicability.* The grading contractor and utility installation contractor, including public utilities and their subcontractors, shall be responsible for providing compaction testing and reporting as described below.
 - (ii) *Compaction Requirements.* Testing by a geotechnical engineering company shall be performed for all backfill over polypropylene pipes within the right-of-way. The minimum required compaction shall be 95% Standard Proctor for all trenches within the right-of-way.

- (iii) *Location and Frequency of Tests.* Compaction tests shall be taken at 100-foot intervals and at depths indicated in the “backfilling” section of the specification at each location. The geotechnical testing firm shall determine the location for tests, and shall obtain prior approval from the County Engineer or his/her authorized representative if the proposed testing frequency is less than shown above. Additional testing in problem areas may be required as directed by the County Engineer or his/her authorized representative.
 - (iv) *Reporting.* The results of all compaction tests shall be reviewed by the Engineer of Record and forwarded to the County Engineer or his/her representative with comments as necessary. A copy of the overall site plan or the appropriate road plan sheets, showing the test locations and depth below sub-grade elevation, shall be submitted with the test results. The report shall also include the geotechnical testing firm’s observations regarding soil condition, weather conditions, moisture content and total stone used as backfill during the installation process. No roadways shall be paved until the County has reviewed and approved the compaction tests results for the section of roadway to be paved.
- (6) *Inspection Requirements- PP.*
- (i) Inspections should consist of field visits during pipe installation activities for the purposes of observing activities, and documenting all substandard methods, materials, or conditions. Periodic (key) inspections by the Engineer of Record shall be required during the course of the project, and shall be conducted jointly with the County representative at critical stages of construction. Contractor is responsible for notifying the Engineer of Record prior to the start of installation.
 - (ii) If rain occurred during a period when the polypropylene pipe was uncovered, the geotechnical testing firm shall inspect the pipe prior to work resuming to ensure that pipe floating has not occurred during the rain event.
- (7) *Inspection Procedures – PP.*
- (i) *Inspection by Geotechnical Firm.* A geotechnical firm shall be employed by the contractor for the purpose of providing inspections & testing during the installation of pipe.

- (ii) *Inspection by Engineer of Record.* The Engineer of Record will inspect at completion of sub-grade and after major utility installation. The Engineer of Record will verify that all major utilities are installed and trenches are backfilled and compacted. The Engineer of Record will check the catch basin locations and configurations to identify any possible deviations from the plans. The Engineer of Record will review all compaction tests reports and verify the necessary number and location of tests and the required compaction at each location.
 - (iii) *Inspections by the County.* After installation of the PP pipe and prior to the asphalt binder installation, the County Engineer or his/her authorized representative will perform an inspection of the storm drainage system. All lids and covers will be required to be removed for the inspection. The results of the compaction test and geotechnical site inspection report will be provided to the County prior to the installation of binder.
 - (iv) Engineers wishing to use PP pipe on County roads shall include the above specification on the construction plans.
- (d) *High Density Polyethylene (HDPE) Pipe.* HDPE pipe is not acceptable for use within the County's rights-of-way.

2. *General Inspection Procedures.*

- (a) *Design Loading.* As a minimum, all pipe materials shall be capable of supporting H-20 loading under minimum cover. All pipe shall also be of sufficient thickness to meet the design load requirements for the proposed cover height. Greater design loadings shall apply to industrial, commercial, or special situations as appropriate.
- (b) *Minimum Cover.* Two feet minimum cover shall be required for all pipe materials in the right-of-way, measured from the outside top of the pipe to the finished subgrade at the lowest point. The County Engineer or his/her authorized representative will approve variances only if extenuating circumstances exist. In these cases, Class IV or ductile iron will be required.
- (c) *Grade.* The Engineer of Record should make all efforts not to design pipe over a 10% slope, especially in the road right-of-way. In cases where the right-of-way where steep grades are inevitable, the Engineer of Record should use concrete anchors or other factory recommended anchor systems. These details will be required on the construction plans.
- (d) *Minimum Size.* No pipe less than 15 inches in diameter will be allowed.

- (e) *Installation.* All storm drain lines shall be installed in accordance with SCDOT Specifications or County Specifications (stricter specifications will take precedence). A vibratory roller, trackhoe-mounted sheepsfoot roller, or other mechanical tamping device shall be used for compacting all utility trenches in the right-of-way.
 - (f) *Single and Duel Piped Drainage Systems.* Greenville County Engineering will support the design and installation of single piped drainage systems. In the case where the Engineer of Record has no choice due to cover restrictions to use dual pipes (double barrel), headwalls will be required. No more than two pipes will be allowed at a crossing if a larger pipe or structure cannot be installed due to cover restrictions. The Engineer of Record should make every effort to provide alternatives to dual piped systems.
3. *Catch Basins.* Shall conform to the following standards:
- (a) *Construction.* Catch basins and aprons shall be constructed as shown in **Appendix F**, Miscellaneous Design Details, or an alternative configuration may be used upon approval by the County Engineer or his/her authorized representative.
 - (b) *Materials.* Construction materials for catch basins shall be as specified in SCDOT Specifications.
 - (c) *Deep Catch Basins.* All catch basins deeper than 4½ feet shall be constructed with steps.
 - (d) *Drop from Roadway.* The minimum drop from the edge of the roadway to the throat of the basin shall be 6 inches for the standard (2 inches) offset from the road. Greater offsets shall require greater drops to achieve the desired 25% cross-slope for the apron.
 - (e) *Manhole Lids Required.* All catch basins along the roadway shall have manhole lids.
4. *Subsurface Drainage.* The following construction requirements shall apply to pipe underdrains:
- (a) *Construction.* Underdrains shall be constructed as shown in **Appendix F**, Miscellaneous Design Details, or an alternative manufactured product such as strip or edge drain may be used upon approval by the County Engineer or his/her authorized representative.
 - (b) *Location From Curb.* Underdrains shall be installed within 2½ feet of the back of the curb and shall be properly connected to a permanent drainage structure such as a catch basin, or daylighted to a suitable location off the right-of-way.

- (c) *Cover.* All underdrains shall have a minimum of 2 feet of cover.
 - (d) *Timeline.* Underdrains shall be installed prior to the base course.
 - (e) *When Required.* Underdrains are required on both sides of the street where mucking out and backfilling have been done, or where the water table is within two feet of the road centerline elevation.
 - (f) *Inspections.* Underdrains shall be inspected and approved by the County Engineer or representative during installation.
 - (g) *Additional Underdrains.* Additional underdrains may be required as determined by the County Engineer or his/her authorized representative.
5. *Miscellaneous Drainage Requirements.*
- (a) *Stormwater Management and Permanent Water Quality.* For properties being subdivided or developed as part of a larger common plan, Stormwater management and permanent water quality features will be incorporated into the plan. For specific design criteria, see the Stormwater Design Manual.
 - (b) *Lake Water Elevations.* The water elevation in lakes shall not be higher than three feet below the centerline elevation of the roadway at any time.
 - (c) *Damming Structures.* No dams or structures serving as dams to impound water, or any portion of such a structure shall be allowed in the right-of-way. This further means that no County road shall pass over such a structure without approval from the appropriate agencies (Greenville County Land Development Division, SCDHEC, Greenville County Community Planning, Development and Public Works Department, and Greenville County Engineering).
 - (d) *Drainage Outfall into a Lake.* The outfall invert elevation shall be at least 1 foot above the normal pool elevation of the lake.
 - (e) *Stabilization of Open Channels.* All open channels used for conveyance of roadway drainage shall be properly stabilized to prevent erosion.
 - (f) *Headwall.* All discharge pipe 36 inches and over shall have a pre-cast headwall or site-built reinforced concrete or masonry headwall.
 - (g) *Drainage Easements.* Drainage easements of the following widths shall be provided and dedicated for maintenance and public use. All attempts should be made to install pipes in the center of the easement.

| Table 12.8.4-2: Drainage Easement Widths | |
|--|-------------------------------|
| Pipe Size | Required Easement Width (min) |
| 15 inches - 30 inches | 15 feet |
| 36 inches - 54 inches | 22 feet |
| Over 54 inches | 30 feet |

Key: min = minimum required

- (1) For major ditches or channels, the easement width shall be equal to the top width of the ditch plus 12.5 feet on each side (total easement width may vary).
- (2) For minor ditches with open channel flow, the required easement width shall be determined from the equivalent pipe size required to carry the flow and the easement width (listed above) corresponding to that calculated pipe size.
- (3) The following statement shall be included on the construction plans and final plat: "There is a 5-foot drainage and utility easement along either side of all side lot lines and front lot line. There is a 10-foot drainage and utility easement along all rear lot lines except where otherwise noted."
- (h) *Rip Rap.* Stone shall be hard quarry or fieldstone which will withstand exposure to water and weathering. Refer to Stormwater Design Manual for design.
- (i) *Stormwater Management for Amenity Areas.* Any areas noted for future development, which may be intended to contain amenities, will be considered separately from the residential development itself. Therefore, all subsequent drainage plans for these areas shall be reviewed and approved by the appropriate County agencies. If, or when, alterations are made to the submitted subdivision drainage plans to meet the requirements for the amenities area, the Engineer of Record shall submit a revised drainage plan showing the effects of such revisions on all phases of the existing drainage system.
- (j) See [Article 14](#): *Stormwater Management* for additional stormwater management requirements.

G. Bridges.

- 1. All bridges, tunnels, and underpasses intended for vehicular traffic shall have a minimum length of 20 feet and a clear width of 28 feet. Greenville County reserves the right to request greater widths based on the street classification. All bridge designs shall

be subject to the prior approval of the County Engineer or his/her authorized representative.

2. All bridges, tunnels, and underpasses intended for vehicular traffic shall be designed in accordance with the most current edition of the AASHTO "Standard Specifications for Highway Bridges," including any interim specifications and the alternate military loading. Roads & Bridge elevations shall be a minimum 2 feet above Base Flood Elevation in an Area of Special Flood Hazard.
3. A drainage analysis and shop drawings of the proposed bridge will be required for construction review.

H. Construction Standards for Sidewalks, Curbs, Joints, Patching.

1. *Sidewalks and Curbing.* All proposed street connections to existing streets or highways having existing sidewalks shall be constructed by removal of the sidewalk to the new proposed curb radii. All intersections and curb ramps shall conform to the requirements of the most recent edition of the ADA guidelines.
 - (a) The concrete shall be batched and mixed in accordance with the provisions in the "Portland Cement Concrete for Structures" section of the SCDOT specifications.
 - (b) Curbs and gutters shall be constructed in uniform sections 10 to 15 feet in length except where shorter sections are necessary for closure, but none less than 4 feet in length.
 - (c) Forms shall not be displaced during concrete pouring and the concrete shall be spaded or vibrated throughout the entire volume especially against forms and joints. The surface of the concrete shall be floated, troweled, broomed, corners edged and finished to the typical cross-section used, i.e. crown sections and/or superelevation.
 - (d) *Rolled Curb or Stand Up Curb and Gutter.*
 - (1) Curb shall provide a 6-inch face against the pavement and the cross sectional shape is approved by the County Engineer or his/her authorized representative.
 - (2) When slip forms are used, the aggregate size, amount of cement, and proportions of all materials for the concrete may vary from previous requirements as necessary to provide a workable and satisfactory mix.
 - (3) Expansion and contraction joints shall be constructed at the same locations as required with formed construction. These joints, spaced at 10 to 15 foot intervals, shall be made by cutting the concrete by an

acceptable method. The manner of construction of all joints shall meet the approval of the County Engineer or his/her authorized representative and shall present a workmanlike finish. See sketch as provided in this article.

- (4) No obstructions shall be allowed within the limits of the sidewalk area.
- (e) *Expansion Joints.* Preformed expansion joints 3/4-inch thick, extending the full depth of the concrete, shall be constructed at the locations indicated on the plans and at other locations as follows:
 - (1) Whenever a sidewalk is constructed between an adjoining substantial structure on one side and a curbing on the other side, an expansion joint shall be formed adjacent to the curbing.
 - (2) An expansion joint shall be placed between the sidewalk and the radius curbing at street intersections.
 - (3) When sidewalks are constructed adjacent to existing or new pavements or structures, expansion joints shall be placed to match these existing joints.
 - (4) Transverse expansion joints shall be placed at intervals of not more than 100 feet in all concrete.
 - (5) The joint should have a filler material that consists of fibers of a cellular nature or rubber, in accordance with SCDOT specifications.
- (f) *Contraction Joints.*
 - (1) The concrete slabs in sidewalks between expansion joints shall be divided into blocks 10 feet in length by scoring transversely after floating operations are complete.
 - (2) Whenever the sidewalk slabs are more than 10 feet in width, they shall be scored longitudinally in the center.
 - (3) All scoring shall extend for a depth of 1 inch and shall not be less than one-quarter inch nor more than one-half inch in width. All scoring shall be edged and finished smooth and true to line.
2. *Patching & Full-Depth Repairs.* The following requirements and procedures shall apply for all base failure, binder, and full-depth repairs:
 - (a) For full-depth repairs of finished pavement:

- (1) Saw cut pavement 12 inches beyond the extent of distresses to provide clean, unbroken edges.
 - (2) Patches will be cut to have a straight and vertical edge. The sides of the existing asphalt pavement will be clean and thoroughly tacked. The patch will tie into the existing pavement to ensure a smooth transition and ride as well as positive drainage. The cut width shall be of a compactable width or contractor shall use equipment that allows compaction of a cut less than four by four feet.
- (b) For all repairs including binder patching:
- (1) For patched areas in excess of 6 inches deep, backfill with CR-14 or equivalent.
 - (2) Depths of patches over four inches will be performed in two separate lifts.
 - (3) Thickness of binder course shall be at least 33 inches.
 - (4) In the case of failures in the repaired area, the County Engineer or his/her authorized representative may require a geotechnical firm to inspect and report recommendations to the developer/contractor in the repaired areas.

I. **Constructing Required Improvements.** When constructing the required improvements for the subdivision, the following procedures shall apply:

1. *Plans Required.* Prior to construction, a set of plans will be submitted for review to the County Engineer bearing a certificate by a registered engineer that the plans comply with the County's Unified Development Ordinance.
2. *Inspections Required.* During construction, inspections will be conducted in accordance with Section 12.8.5: *Testing & Inspections*.
3. *Record Drawings After Inspections.* After completing each phase of road and drainage improvements, the developer shall notify the County Engineer that the improvements are ready for inspection. Upon such notification, the County Engineer shall perform inspections of all required improvements. Upon completion of the improvements, "Record Drawings" shall be submitted with certification that the subdivision's design and construction are in compliance with the County's Unified Development Ordinance. Certifications are to be made by a registered professional engineer licensed in South Carolina.
4. *Water and Environmental Control Inspections.* After completing all public water improvements, the developer shall notify the Greenville Water System where

applicable, the Environmental Quality Control Office of the South Carolina Department of Health and Environmental Control (“SCDHEC”) and other appropriate district authorities, that the improvements are ready for final inspection.

5. *Sewer Improvement Inspections.* After completing all sewer improvements, the developer's engineer shall certify to the Environmental Quality Control Office of SCDHEC and the sewer providers that the improvements are ready for inspection. The Environmental Quality Control officers of SCDHEC shall issue a permit to operate for water and sewer before systems are placed into service.
6. *Additional Inspections.* In addition to the technical inspections by the appropriate agencies, the Greenville County Land Development Department staff shall make such inspections as necessary to ensure compliance with the Land Development Regulations and the preliminary plan as submitted.

12.8.5 TESTING & INSPECTIONS

A. Description.

1. *Testing.* Testing shall include proofrolling, compaction, and density testing of in-situ base soils, roadway fill areas, backfill within utility trenches, stone base courses, and/or asphalt pavement, but may include other material tests as required by the County Engineer or his/her authorized representative.
2. *Inspections.* Inspections shall consist of periodic field visits during various phases of construction for the purposes of investigating present site conditions & activities, and documenting all substandard methods, materials, or conditions. Periodic (key) inspections by the Engineer of record shall be required during the course of the project, and shall be conducted jointly with the County representative at critical stages of construction.

B. Testing Requirements.

1. *Proofrolling.* The proofroll is good for 72 hours if no rain events have occurred between the proof roll and the request to pave. The proofrolling shall be performed using a fully loaded tandem dump truck weighing not less than 30 tons gross, or equivalent. Any areas which show visible deflection will be required to be repaired, and a second proofroll may be required prior to verify the repairs. Compaction tests by a geotechnical engineering firm may also be required in problem areas as directed by the County Engineer or his/her authorized representative.
2. *Compaction Testing.*
 - (a) *Applicability.* The grading contractor and/or utility installation contractor shall be responsible for providing compaction testing and reporting as described below.

- (b) *Compaction Requirements.* Testing by a geotechnical engineering company shall be performed for all backfill over utility installations and fill areas in the road right-of-way. The minimum required compaction shall be 95% Standard Proctor +/- 2% optimum moisture content for the roadways and 98% Standard Proctor for all trench and fill areas within the right-of-way.
- (c) *Location & Frequency of Tests.* Compaction tests shall be taken at random locations and at random depths at each location to provide a range of sampling depths. The required frequency of testing shall be as follows:
- (1) *Sanitary Sewer.* Test along the line at 300 feet intervals, and randomly at service connections at the rate of one test per eight services and at manholes at the rate of one test for every three manholes. Tests shall be required for all repair work requiring cutting of the asphalt binder course.
 - (2) *Water Mains.* Test along the line at 300 feet intervals, and randomly at valve and blowoff locations in the roadway at the rate of one for every three valve and blowoff locations in the roadway. Test randomly at service connections at the rate of one test per eight services and at manholes at the rate of one test for every three manholes.
 - (3) *Storm Drains.* Test along the line at 300 feet intervals, and at all cross lines.
 - (4) *Other Utilities.* Test along the line at 300 feet intervals, and at all road crossings (excluding borings).
 - (5) *Fill Areas.* Fill should be placed, compacted, and tested at no more than 18 inch intervals. The test shall be performed at 150 feet intervals, staggered on the left and right sides of the roadway. If bridging in the fill is required, a Geotechnical Engineer will provide a report for recommendations to be submitted to the County Engineer or his/her authorized representative. Additional testing in problem areas may be required as directed by the County Engineer or his/her authorized representative.

Note: The Engineer of Record or geotechnical testing firm shall determine the location for tests, and shall obtain prior approval from the County Engineer if the proposed testing frequency is less than shown above.

- (d) *Reporting.* The results of all compaction tests shall be reviewed by the Engineer of Record and forwarded to the County Engineer with comments as necessary prior to the request for proofroll. A copy of the overall site plan or the appropriate road plan sheets, showing the test locations and depth below subgrade elevation, shall be submitted with the test results. No roadways shall

be paved until the County Engineer has reviewed and approved the compaction tests results for the section of roadway to be paved.

- (e) *Expiration.* The compaction report expires after 60 days.

3. *Asphalt Quality Control.*

- (a) *Density.* During pavement application, the required density for the asphalt shall be achieved by suitable rolling equipment and methods. The contractors will use a highway class paver exceeding 12,000 pounds, a steel wheel front roller of five to eight tons or more, nine wheel rubber tire intermediate roller, and a five to eight ton steel wheel back roller or equipment the County Engineer deems equal or better. If proper compaction of the asphalt is questionable, the County Engineer may require a series of asphalt density tests to verify proper compaction of the asphalt. The minimum asphalt density shall be 90% of the theoretical maximum density by the RICE method.
- (b) *Extraction and Gradation Testing.* The County Engineer may require extraction and gradation testing to determine mix composition and verify compliance with SCDOT specifications.
- (c) *Binder and Asphalt Mixes.* Greenville County Mixes for binder and surface asphalt will meet the following criteria: a current SCDOT approved job mix for each facility or an equivalent mix designed and stamped by a Geo-Technical firms’ P.E. Hydrated lime will be required in all mixes at the rate of 1% of the dry aggregate.

Table 12.8.5-1: Composition Limits for Hot Mix Binder Courses

| Required Gradation | |
|--------------------|------------------------------|
| Sieve Designation | Percentage by Weight Passing |
| 1 inch | 100 |
| ¾ inch | 97 -100 |
| ½ inch | 83-100 |
| No. 4 | 58-95 |
| No. 8 | 42-62 |
| No. 30 | 20-50 |
| No. 100 | 6-20 |
| No. 200 | 2-10 |

Note: The amount between any two consecutive sieves smaller than ½ inch shall not be less than 3%. See most recent SCDOT supplemental specs for low volume or secondary roads.

Table 12.8.5-1: Composition Limits for Hot Mix Binder Courses

| Required Gradation | |
|--|-------------------------------------|
| Sieve Designation | Percentage by Weight Passing |
| Percent of Total Mixture | |
| Asphalt Binder Limits (%) | 5.0 – 6.8 |
| Binder Grade | |
| Required Job Mix Marshall Design Criteria | |
| Minimum Stability, lbs. | 1200 |
| Air Voids, % | 3.5-6.0 |
| Flow, 0.01 inch | 8-16 |
| Dust/ Asphalt Ratio | 0.6-1.2 |
| Voids in Mineral Aggregates | |
| Nominal Maximum Aggregate | 1000 |
| ¾ inch | 14.0% |
| ½ inch | 15.0% |
| Required Field Marshall Criteria | |
| Minimum Stability, lbs. | No requirement |
| Air Voids, % | 3.0-6.0 |
| Dust/Asphalt Ratio | 0.6-1.2 |

Table 12.8.5-2: Composition Limits for Hot Mix Asphalt Surface Courses

| Graduation Requirements – Type 3 | |
|---|----------------------------|
| Sieve Designation | % by Weight Passing |
| ¾ inch | 100 |
| ½ inch | 97-100 |
| 3/8 inch | 80-100 |
| No. 4 | 58-78 |
| No. 8 | 42-64 |
| No. 30 | 18-40 |
| No. 100 | 5-20 |
| No. 200 | 2-8 |

| Table 12.8.5-2: Composition Limits for Hot Mix Asphalt Surface Courses | |
|---|---------------------|
| Graduation Requirements – Type 3 | |
| Sieve Designation | % by Weight Passing |
| Note: The amount between any two consecutive sieves smaller than 3/8 inch shall not be less than 3% | |
| Percent of Total Mixture | |
| Asphalt Binder | 5.0-6.5 |
| Required Job Mix Marshall Design Criteria | |
| No. Blows per face | 50 |
| Min. Stability, Lbs. | 600 |
| Air Voids, % | 4.0-6.0 |
| Flow, 0.01 in. | 8-16 |
| Dust/ Asphalt Ratio | 0.60-1.20 |
| % Voids Filled | 68-77 |
| Minimum VMA, % | |
| Nominal Maximum Aggregate Size | |
| ½ inch | 15.0 |
| 3/8 inch | 16.0 |

C. Inspection Procedures.

1. *Inspections by the Engineer of Record.*
 - (a) *Key Inspections.* The following key inspections shall be performed by the Engineer of Record during the course of construction. If any problems are encountered, the necessary repairs will be made at the direction of the Engineer of Record.
 - (1) *Inspection #1 - At Completion of Clearing and Grubbing Operations.* The Engineer of Record will verify that all organic materials (i.e., stumps, logs, and brush) have been removed from the roadway area. The Engineer of Record will also document any unsuitable soil conditions in the right-of-way.
 - (2) *Inspection #2 - At Completion of Rough Grading.* The Engineer of Record will inspect the roadway, especially any fill areas and slopes, to identify unsuitable soil conditions. The Engineer of Record will review the compaction test results in the fill areas to verify that the required

compaction has been achieved. The Engineer of Record will check the location of edge of curb to ensure proper road and curb widths are achieved.

- (3) *Inspection #3 - At Completion of Subgrade & After Major Utility Installation.* The Engineer of Record will verify that all major utilities are installed and trenches are backfilled and compacted. If unsuitable material is encountered, then the Engineer of Record will document the location of deficiencies, specific correction outlined to the contractor, and material used for correction. This information should be provided to the County Engineer as a part of the reports needed for final acceptance. The Engineer of Record will check the road subgrade for proper elevations, grades, and crown, and will check the catch basin locations and configurations to identify any possible deviations from the plans. The Engineer of Record will review all compaction test reports and verify the necessary number and location of tests and the required compaction at each location.
- (4) *Inspection #4 - Proofroll.* The County Engineer shall meet the Engineer of Record on-site to conduct the proofroll prior to binder or stone base installation. All necessary repairs will be made based on the proofroll results.
- (5) *Inspection #5 - During Binder/Surface Combination or Stone Base Installation.* The Engineer of Record, his/her representative, or SCDOT Level 2 Asphalt inspector will periodically monitor the paving application in order to provide direction and document the binder or stone base installation. The County Engineer will plan to be on-site, but the County's presence will not relieve the Engineer of Record or Level 2 Inspector of his/her duty to document and certify proper installation. If stone base is used, the Engineer of Record will also certify the application of the prime coat if required.
- (6) *Inspection #6 - Binder Punch-List Inspection.* The Engineer of Record and County Engineer shall conduct a thorough punch-list inspection of the roadway, including curbs and catch basins, to identify base failures, broken curbs, broken CB aprons, water valve and/or manhole cover problems, etc. In the inspection report, the Engineer of Record will detail the items to be corrected and the tentative schedule for repair.
- (7) *Inspection #7 - Follow-Up Inspection Prior to Final Surface Installation.* The Engineer of Record shall meet the County Engineer on-site to go over the repairs to the binder, curbs, and/or catch basins. If all repairs are satisfactory, the final surface will be installed.

- (8) *Inspection #8 - During Final Surface Installation.* The Engineer of Record, his/her representative, or SCDOT Level 2 Inspector will periodically monitor the paving application on-site to provide direction and document the final surface installation. The County Engineer will plan to be on-site, but the County's presence will not relieve the Engineer of Record or other representative of his/her duty to document and certify proper installation of the final surface.
 - (9) *Inspection #9 - Final Punch-List Inspection.* The Engineer of Record, Developer, Contractor, County Engineer, and County Maintenance Superintendent or his/her authorized representative shall meet on the site to go over the project. In the inspection report, the Engineer of Record will detail the results of the meeting, any items to be corrected, and the tentative schedule for repair. If repairs are not substantially complete within 45 calendar days, a new punch list may be required.
 - (10) *Inspection #10 - Final Acceptance.* The Engineer of Record will meet the County Engineer on-site to go over the finished punch-list items. If all items are complete, the County Engineer will proceed to issue the notice of acceptance.
- (b) *Follow-Up and Repeat Inspections.* The Engineer of Record will be expected to conduct follow-up or repeat inspections as needed to resolve problems or provide the County with complete information and documentation as required above. Please see Construction review and Inspection fee table available at the Greenville County Land Development Division for repeat inspection cost.

2. *Inspections by the County.*

- (a) *Start Up or Pre-construction Meeting.* At the direction of the County Engineer, a start-up or pre-construction meeting will be required to discuss construction issues prior to beginning work. The Engineer of Record, Contractor, Utility Providers and County Engineer will attend the meeting, preferably on-site.
- (b) *Proofrolls.* The County Engineer, or County approved third party Geotechnical Engineer, shall be on site for the proofroll, and any follow-up proofrolls as required. The County Engineer shall review all compaction test results submitted by the Engineer of Record and shall approve the reports before the contractor installs the binder.
- (c) *Storm Drainage Inspection.* After installation of the storm drain system and prior to the binder installation, the County Engineer will perform an inspection of the storm drainage system. All lids and covers will be required to be removed for the inspection.

- (d) *Binder Punch-list and Follow-up.* The County Engineer shall meet the Engineer of Record to inspect and prepare a punch list for the binder, curbs, and catch basins prior to installing the final surface. A follow-up meeting will be held as necessary to review and approve any required repairs.
- (e) *Final Punch-list and Follow-up.* The County Engineer shall meet the Engineer of Record and others to inspect all aspects of the roadway and drainage system and prepare the final punch list prior to acceptance. A follow-up meeting will be held as necessary to review and approve any required repairs.
- (f) *Paving.* The County Engineer and Engineer of Record/Level 2, SCDOT Inspector will plan to be on-site during paving installations, but will ultimately rely on the Engineer of Record's inspection report and certification of the paving operation.
- (g) *Follow-up Inspections.* The County Engineer will make additional inspections of the site as needed to meet with the Engineer of Record, review and approve repairs, or address other problems.
- (h) *Prior Notice for inspections.* The County inspection can be scheduled with 48-hours' notice prior to any of the above key inspections. Failure to provide this advance notice may result in scheduling conflicts, delay of the County's inspection, and possible disruption of the project schedule.

D. Asphalt Plant & Material Certification.

1. *Certification Requirements.*

- (a) *SCDOT Certified Asphalt Plant.* All plants currently on the SCDOT Asphalt Plant Certification list are automatically qualified to supply asphalt materials for proposed County roads.
- (b) *SCDOT Certified Inspector.* All contractors supplying mix to Greenville County Projects will have a level 2 (or above) SCDOT certified inspector on staff. If a company does not have this individual then he will hire a level 2 Inspector from a Geo-Technical firm while Greenville County mix is being produced to perform proper quality assurance procedures.

E. Acceptance, One-Year Warranty, and Construction Damage Bond.

1. *Acceptance.* At completion of all paving, storm drainage system installation, major utility installation, traffic and street sign installation, curbing, sidewalk installation (if applicable) and grassing/mulching of the right-of-way, the County Engineer shall conduct an inspection of the project or project phase to determine if it is substantially complete. The only exception to the substantially complete requirement would be if the developer elects the sidewalk construction bond option outlined under **Section 17.6: Final Plats (Major Subdivisions)**. If the project road(s) in that phase are approved, the

County Engineer will notify the Subdivision Administrator that once all the requirements of Sections 12.7: *Street Classification & Design* and 12.8: *Street Construction Standards* are completed and the Subdivision Administrator has received the documents in **Section 12.8.1: Construction Plan Submittal Requirements**, a written notice of acceptance will be issued. The roads may be accepted into the County inventory for maintenance if a financial security is in place for only the remaining sidewalk.

2. *One Year Warranty.*

- (a) *Agreement.* As a condition of the notice of acceptance, the subdivider, either an individual, partnership, corporation, or other legal entity, will enter into an agreement with Greenville County wherein they agree that they will repair, upon written notification by Greenville County and at their own expense, all defects in material and workmanship which occur in the roadways or drainage system accepted by Greenville County pursuant to the granting of such acceptance for a period of one year from the date such work is accepted by Greenville County.
- (b) *Warranty Period.* The one-year warranty period shall begin immediately after acceptance and shall cover all defects in materials, installation, and workmanship for the roadway pavement, storm drainage system, drainage outfall channels, curbs, sidewalks, grassing/erosion control, and traffic and street signage. Any significant problems, failures, or defects observed during the warranty period shall be repaired by the developer at their expense, as deemed necessary by the County Engineer. Damage caused by construction activity or other external forces is excluded from the one-year warranty, and shall be covered under a separate construction damage fund.

- F. **Encroachment Fee.** An encroachment fee as part of the Building Permit fee is required by the Greenville County Codes Department. This nonrefundable fee in the amount \$60 is charged to account for any damages to the catch basin lids, curb and gutter, roadway, or sidewalk due to homebuilding and development and covers the cost of the driveway encroachment.