RICHLAND COUNTY GOVERNMENT

DEVELOPED BY:

DEPARTMENT OF COMMUNITY PLANNING AND DEVELOPMENT

DEPARTMENT OF PUBLIC WORKS

2020 REVISION

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FEMA

US Army Corps of Engineers.

TABLE OF CONTENTS

LIST OF FIGURES & TABLES

APPENDICES

Appendix A: Co-Permittee Intergovernmental Agreements
Appendix B: Major Residential Development Forms
Appendix C: Linear Utility Permit Application
Appendix D: Encroachment Permit Application
Appendix E: Individual Lot Notice of Intent
Appendix F: Residential Plan Requirements
Appendix G: Plan Review Revision Form
Appendix H: Stormwater Management Design Guidance Document
Appendix I: Detention Waiver Request Form
Appendix J: Universal Soil Loss Equation Input Values
Appendix K: Landscape Plant Materials List
Appendix L: Road Design Standards
Appendix M: Proof Roll Request Process and Inspection Form
Appendix N: Enforcement Response Guide
Appendix O: Residential Final Inspection SOP
Appendix P: Closeout Process
Appendix Q: Road Right-of-Way Deed Template
Appendix R: Storm Drainage Easement Deed Template
Appendix S: Affidavit for Deeds Templates
Appendix T: Construction Bond Process
Appendix U: Statement of Conditions
Appendix V: Bond Memorandum of Understanding

Chapter 1: General

Purpose

The purpose of the Land Development Manual (Manual) is to establish minimum standards for design and construction of site grading and land development and re-development projects within the unincorporated areas of Richland County and other municipalities as approved by the Richland County Council. This document contains the policies and procedures used by the Richland County Department of Public Works and Department of Community Planning and Development. This Manual provides parameters and criteria for addressing some of the specific issues which must be resolved during the planning, designing, and construction phases of land development. The minimum standards for site and land development are intended to protect and promote the general welfare of all citizens. The purpose of this Manual is to provide engineers, developers, plan reviewers, inspectors, contractors, property owners, and interested citizens involved in land development within the unincorporated, non-SCDOT regulated areas of Richland County and within any municipality that chooses to participate as a co-permittee with Richland County in its National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit, with the following information:

- Summarization of the plan submission process;
- Submittal requirements and the plan review process;
- Guidelines for designing and constructing roads in accordance with SCDOT standards;
- Roadway testing requirements;
- Guidelines for designing, implementing, and maintaining stormwater Best Management Practices (BMPs) to be used in Richland County to improve water quality, and minimize stormwater runoff impacts due to increased flow volumes and peak discharge rates from developed areas; and
- Stormwater management requirements.

The Manual is designed to accomplish the following objectives:

- Reduce stormwater impacts on water quality;
- Reduce stormwater impacts on water quantity;
- Protect downstream areas from adverse stormwater impacts resulting from development;
- Ensure that roads taken into the County inventory are designed and constructed to last for 25 years; and
- Explain all internal procedures associated with development, to include conveying property to the County.

The minimum standards and other submittal information required to obtain a land disturbance permit are provided in the Manual. For developments that are fully complied with (that is, no deviations are required), the review process can be completed in a relatively straightforward manner, often with no questions asked nor any additional information requested; for developments where deviations/exceptions are required, the submitting developer/engineer should include rationale/justification to support the desired changes. Proposed deviations from the standards will be considered on a case by case basis.

It must be recognized that some tracts of land are simply not economically feasible for certain types of development. In other cases, certain types of development may be economically feasible, but prohibited by ordinance measures, such as road classification or the 100-year floodway designations. Therefore, coordination with County staff is encouraged during the initial concept and planning stages of a development, before significant resources are committed privately. It is Richland County's desire to provide safe, adequate, maintainable, and attractive infrastructure essential for the planned development within our borders.

Effort has been made to cover the common conditions and information needed by those involved in land development activities, however, the requirements in this Manual and the County Ordinances should be reviewed carefully to ensure that all requirements are being met. If the Manual fails to resolve any interpretation conflicts, the Department of Public Works and Department of Community Planning & Development has the authority to settle any such issues related to land development.

Intergovernmental Agreements between the County and co-permittees (i.e., SCDOT, City of Forest Acres, Town of Arcadia Lakes, Town of Blythewood, and Town of Irmo) can be found in **Appendix A**: Co-Permittee Intergovernmental Agreements.

Scope

The scope of the Manual is limited to the requirements for submitting site plans and related projects to the Department of Community Planning & Development (CP&D). The CP&D is only one part of the Richland County review process, as is explained further. State and federal agencies may have additional requirements other than those listed. The Manual is not intended as a textbook or a comprehensive engineering design reference.

Site plans, details, calculations, construction specifications, and other technical documents must be designed and sealed by a Professional Engineer or Tier B Land Surveyor registered in the state of South Carolina.

Most types of engineering calculations are not explained or defined within the Manual, either due to the very complex nature of the subject matter or the fact that the design equations and methods are well-known.

The Manual contains several references to some of the most common technical design manuals, such as the Natural Resources Conservation Service's (NRCS) TR-55 and South Carolina Department of Health and Environmental Control's (DHEC) BMP Manual, and where such information can be found.

In addition to technical design, submitted projects must also meet federal and state standards for health and safety. For instance, trenching and excavations must satisfy OSHA standards in 29 CFR 1926 Subpart P - Excavations. Scaffolding and temporary work platforms must also meet OSHA standards. Traffic signs must be designed to meet FHWA and AASHTO requirements unless otherwise specified in this Manual. Consideration for public safety must be emphasized throughout the design process.

Manual Organization

The Manual contains eleven chapters, organized to present recommended technical and engineering procedures along with the criteria needed to comply with the State of South Carolina's Stormwater Management and Sediment Reduction Act (SC Code Ann. §§ 48-14-10 et seq R.72- 300), the South Carolina Construction General Permit (SCR10000), the Medium Municipal Separate Stormwater System Permit (SCS030000), and Richland County's Stormwater Management and Flood Damage Prevention Ordinances. This chapter provides information on Richland County's authority to develop and enforce design requirements along with several legal matters and some background information on stormwater management and its importance.

Authorization

The Manual has been prepared under the direction of the Department of Public Works (DPW) and the Department of Community Planning and Development (CP&D), which has been granted the authority to develop engineering design standards and enact programs and policies to ensure compliance with State and Federal laws for the purposes described above. A detailed description of the law, regulations, and assigned authorizations to Richland County is provided below.

Clean Water Act

Federal Water Pollution Act, as amended by the Clean Water Act (CWA) requires the reduction of water pollution and gave EPA the congressional authority to develop programs to improve the health of navigable waters. EPA in response developed regulations that created a program of discharge permits as part of the National Pollutant Discharge Elimination System (NPDES) to regulate point source from a variety of discharges. The 1987 amendments to the CWA extended NPDES permits to industrial discharges, including stormwater runoff associated with land disturbing activity. The 1987 CWA Amendments also require NPDES permitting for stormwater runoff from urbanized areas. A municipal separate storm sewer system (MS4) NPDES permit is required based on population. Authority to administer the NPDES permit program was delegated to state agencies, such as DHEC and the EPA.

South Carolina Pollution Control Act

South Carolina Pollution Control Act (PCA) (S.C. Code Ann. §§ 48-1-10 et seq.) was originally enacted in 1950 and was last amended in 1970 during the initial stages of the environmental movement. It was written very broadly and is applicable to essentially any activity that could negatively impact the environment by requiring attainment of a permit and implementation of measures to mitigate potential impacts.

South Carolina Stormwater Management and Sediment Reduction Act

The South Carolina Stormwater Management and Sediment Reduction Act of 1991 (SMSRA) (S.C. Code Ann. §§ 48-14-10 et seq.) was enacted to address the increase in stormwater runoff rate and quantity, the decrease of rainwater infiltration, and the increase in erosion associated with the extensive urban development that has been occurring throughout the state. Richland County was authorized to implement the requirements of this Act and its associated regulations through delegated review development and implementation of a Stormwater Management Program (SWMP), and other

measures deemed necessary. The Act gave legislative authority to SCHEC to enact programs to meet its purpose. This authority has also been given the local governments to administer the necessary steps to address stormwater impacts on waters of the State.

Description and Use of the Manual

The Manual is developed under the assumption that the user possesses a basic understanding of stormwater control design, construction, or land development depending on the user's particular area of expertise. The Manual provides those groups and others with required information for proper formatting of application packages on proposed land disturbance activities in Richland County. Users of this Manual who are not justly qualified by education or experience in the fields of stormwater control design, construction, or land development should consult with a qualified professional in one or more of these areas prior to planning for land disturbance activities.

This Manual is not intended to be a systematic design methodology that addresses every land development situation that may occur in Richland County, nor is it a detailed reference for the various methods and procedures used in the design process. The application of engineering principles and judgment combined with the information contained within this and other referenced material are necessary to successfully complete the planning, design, and preparation of documents for acquiring a land disturbance permit. References to guidance documents from federal, state, and local agencies are given throughout the Manual to provide additional information to users.

This Manual is not intended to restrain or inhibit engineering creativity, freedom of design, or the need for engineering judgment. When shown to be applicable, it is encouraged that new procedures, techniques, and innovative stormwater BMPs be submitted. The use of such approaches should be substantiated with submitted documentation by design professionals showing that the proposed design is equal to, or exceeds, the traditional procedures in terms of performance and economic feasibility.

Updates to the Manual

This Manual is intended to be a working document. As design technology and criteria evolve or change or it becomes evident that additional measures are needed to ensure the public general welfare, the Manual will be updated. Updates will always include oversight by a process that involves a stakeholders group.

Table 1 contains an errata table to log changes that have been made to the document since the initial release of the Richland County Land Development Manual. All changes noted in the table have been made to this version of the Land Development Manual and reflect the latest and most correct information available at the time of updating.

Table 1: Errata Table

(Chapter) Section: Subsection if Applicable	Description	Revision
(All) General Updates Throughout	Updated organization/phrasing of existing information, formatting, department names, and Appendices to improve clarity and readability.	2020
(3) Downstream Analysis	Added requirements for downstream analysis for new development and re-development sites.	2020
(3) Post-Construction Water Quality Design Standards	Added post-construction water quality design standards and reference to the IDEAL Model as the preferred method of demonstrating standard compliance.	2020
(3) Types of Storage: Parking Lot Storage	Parking Lot Storage requirements updated, limited to sites under ½ acre.	2020
(3) Selection of Permanent BMPs, Acceptable Post-Construction Water Quality BMPs	Removed references to "water quality volume" and added directions for BMPs to meet water quality requirements described in Post-Construction Water Quality Standards section.	2020
(6) Storm Sewer Design Criteria: Vegetated Channels	Provided more detailed design guidance about when to use various erosion protection measures.	2020
(7) Road Right-of-Way Widths	Updates made to road right-of-way widths for various road types.	2020
(7) Road Geometric Design, Visibility at Intersections	Content from Richland County Road Design Standards added to the LDM to provide context for existing table references.	2020
(7) Road Subgrade and Pavement Structure Requirements	Updates made to pavement layer requirements to be Modified SCAPA Standards.	2020
(8) Materials and Equipment, Roadway Repairs	Requirement added for Geotechnical Firm lab certification credentials.	2020
(9) Inspections and Enforcement	General updates to reflect current County inspection and enforcement processes and match Land Development Code.	2020
(10) Closeout (Project Completion), (11) Warranty Period	Updated warranty and bond requirements.	2020
(Definitions) C-SWPPP	Added definition for C-SWPPP.	2020
(Definitions) Land Development Manual	Updated definition of Land Development Manual to establish that it is to be used synonymously with "BMPs Design Manual" and "Stormwater Design Manual" that are defined in the Land Development Code.	2020

Chapter 2: Project Classifications

Project Types

Commercial Development (Major)

Commercial projects that meet or exceed the threshold of 100,000 square feet of non-residential floor space or involve the development of 150 or more multi-family residential dwelling units, lots, or manufactured home spaces in a manufactured home district are considered Major.

Due to the size of these projects, a more formal review process is required. This review process is established to ensure the safety of the public and to assure that adequate services and facilities can be provided for these developments and to assure that they do not negatively impact the area in which they are proposed to be located or the county as a whole.

Commercial Development (Minor)

A project is defined as Minor if projects are less than the threshold of 100,000 square feet of non-residential floor space or have less than 150 or more multi-family residential dwelling units, lots, or manufactured home spaces in a manufactured home district. However, if a phased project would reach the thresholds for a Major land development within a five-year period, then the project shall be treated as a Major land development, regardless of the size of the individual phases. To be considered a minor land development, the subdividing of property or the dedication of land to the county for open space or other public purposes shall not be part of the development.

Residential Development (Major)

A Residential Development is considered Major when it involves 50 or more single-family residential dwelling units or lots or when land for open space or other public purpose is to be dedicated to the County.

Due to the size of these projects, a more formal review process is required. This review process is established to ensure the safety of the public and to assure that adequate services and facilities can be provided for these developments and to assure that they do not negatively impact the area in which they are proposed to be located or the county as a whole. The checklist and application for Major Residential Developments can be found in **Appendix B**: Major Residential Development Forms.

Residential Development (Minor)

A project is defined as Minor if projects are less than the maximum threshold of 50 single-family residential dwelling units. However, if a phased project would reach the thresholds for a Major land development within a five-year period, then the project shall be treated as a Major land development, regardless of the size of the individual phases. To be considered a Minor land development, the subdividing of property or the dedication of land to the county for open space or other public purposes shall not be part of the development.

Linear Utility

Linear Utility projects occur in County-owned right-of-way, as well as private roads. Land disturbing activities in the right-of-way include but are not limited to: installation of utilities, driveway connections involving a curb cut or pipe installation, curb cuts, utility taps, utility crossings, and storm drainage installation.

A Linear Utility Permit is required for all linear construction greater than 50 linear feet within or affecting the right-of-way of any County maintained road. The Linear Utility Permit Application can be found in **Appendix C**: Linear Utility Permit Application.

Encroachment Permit

An encroachment permit is required for any work proposed in the County Roadway, to include utilities, driveway installation and/or modification, storm drainage installation and/or modification, open cuts, pavement structure repairs, etc. The encroachment permit is reviewed and issued by the Department of Community Planning & Development and will include coordination with the Department of Public Works.

Encroachment Permits must include an anticipated date of completion. If the work is minor in scope, the review may be conducted by the Department of Public Works exclusively. The Encroachment Permit Application can be found in **Appendix D**: Encroachment Permit Application.

Application Process

The first step to obtain a Land Disturbance Permit is to log in to *Trakit* and apply for a "Project" as described in the following Submittal Process section.

Note: Encroachment Permits and Individual Lot NOIs will be applied for as a "Permit" as described in the Permitting Procedures section (skip Submittal Process section). Instead of selecting Land Disturbance Permit in the drop-down menu, select the appropriate Permit. The Individual Lot NOI can be found in **Appendix E**: Individual Lot Notice of Intent.

Submittal Process

The submittal process is summarized by the flow chart in **Figure 1**: Submittal Process Flow Chart.

All documentation that is required to meet the minimum DHEC standard for issuance of a NPDES permit needs to be uploaded with the project. The requirements for plan submittal can be found in **Appendix F**: Residential Plan Requirements.

At a minimum:

1. Notice of Intent (NOI)
2. C-SWPPP (Include all calculations)
3. Construction Plans
4. Permanent Stormwater Maintenance Agreement and Plan
5. DHEC Checklist for Design Professionals
6. Any encroachment permit applications sent to outside Agencies (Include all Exhibits)

Note: Engineering Review will be delayed/disapproved if all required documents are not submitted as a complete package. The Plan Review Revision Form can be found in **Appendix G**: Plan Review Revision Form.

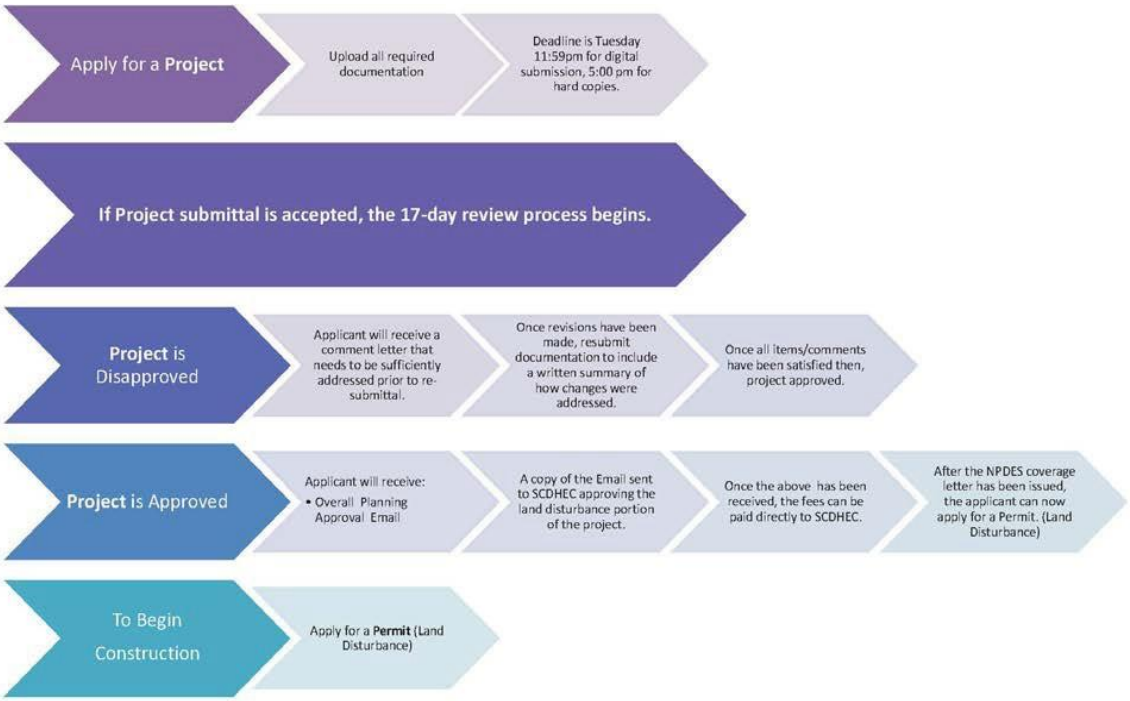


Figure 1: Submittal Process Flow Chart

Permitting Procedures

The land disturbance permit process is summarized in the flow chart in **Figure 2**.

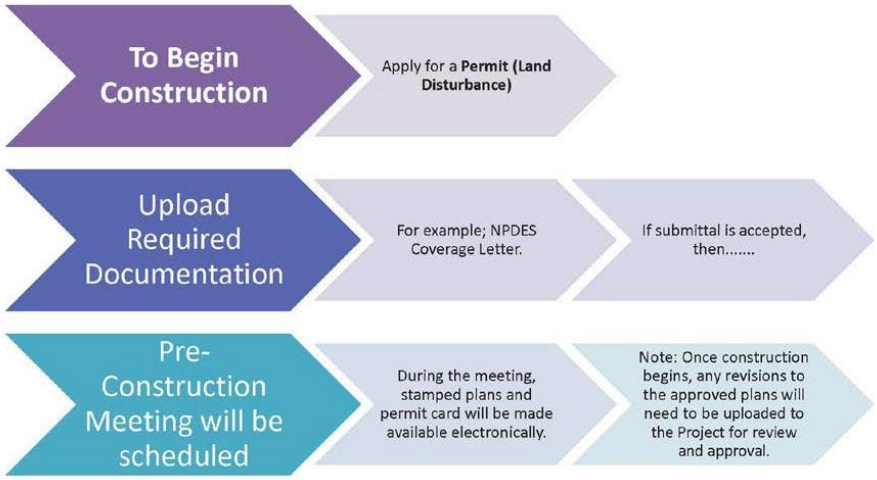


Figure 2: Land Disturbance Permit Process Flow Chart

Once the Project has been approved and the DHEC NPDES approval letter has been issued, log in to *Trakit* and apply for a "Permit". This is an administrative function that will inform Richland County that a pre-construction meeting is being requested. Instructions are as follow:

1. In the drop-down menu select "Land Disturbance".
2. Input all pertinent information.

   Note: Project Description should be the same name that was used when the project was submitted.
3. Upload the NPDES letter and all outside agencies approved permits (e.g., SCDOT encroachment, USACE) to the permit.
4. The applicant will be notified dates/times that are available to schedule the pre-construction meeting.

   Note: The developer/owner, engineer, contractor and third-party inspector are required to attend the pre-construction meeting.
5. At the conclusion of the meeting, all approved/stamped construction documents will be available for download. At that time any building permits will be able to be issued as well.

Note: This is an administrative function only. Once it is confirmed that the DHEC NPDES coverage letter has been attached to the Permit, a pre-construction meeting can be scheduled. If the Project is less than an acre and not part of a Larger Common Plan, there will not be any DHEC NPDES coverage letter required.

Land Disturbance Permit

A land disturbance permit (LDP) is required for any land-disturbing activity, to include all improvements to land as defined in the Richland County Land Development Ordinance. The LDP is issued by the Department of Community Planning & Development after the project is approved by all required divisions and outside agencies (if applicable). The land disturbance permit has an expiration of two (2) years. If no land disturbance occurs within two (2) years of issuance, the permit shall expire and be deemed invalid.

If no land disturbance occurs within two (2) years of issuance, the developer can renew the permit with a written request to the Department of Community Planning & Development (c/o Engineering Services) and attend a new mandatory pre-construction meeting; an updated permit will be issued.

The Land Disturbance Permit is issued at the required pre-construction meeting. Upon approval of the project, the developer and Engineer-of-Record will receive an email stating that the project is approved, and a pre-construction meeting can be requested. The developer or Engineer-of-Record can login into the Permitting Software system and "Apply" for the Land Disturbance Permit and indicate a preferred date and time to meet. The request will be acknowledged within 24 hours, and a representative will call to complete the scheduling of the pre-construction meeting.

Pre-construction meetings are held in the office. For projects disturbing 10 acres or more, a required on-site meeting must occur. In some cases, the Department can coordinate with the contractor to satisfy all meeting requirements. The following representatives are required at the pre-construction

meeting:

- Developer/Owner
- Grading Contractor
- Engineer-of-Record
- Third-party SWPPP Inspector

The following items are discussed at the pre-construction meeting:

- Project Construction
- Stormwater Pollution Prevention Plan (SWPPP)
- County Expectations
- Enforcement
- Communication
- Permitting Software System

Permitting Software Guidelines

All submittals are to be made using the *Trakit* electronic system. Guidelines for submission can be found in the *Trakit* User Manual on the County website.

Fees

The Richland County fees for land development are as described below in **Table 2**. The County reserves the right to revise the fees as deemed necessary by the Department of Community Planning and Zoning.

Table 2: Land Development Fees

Fee Type	Fee Description	
Engineering Inspection:	$368.59 flat fee added to all Projects	
Commercial Development (Major/Minor):	For the first 15,000 sq. ft.:	$210.00 plus $0.20/ square foot
	For 15,001 to 60,000 sq. ft.:	Add $0.15/ square foot
	For 60,001 sq. ft. and up:	Add $0.10/ square foot
If Commercial Project is Multi-family:	$526.55 plus $10.53/Unit	
If Commercial Project is a Communication Tower:	$210.62 plus 1% of the construction cost	
Residential Development (Major):	For Lots 1-80:	$421.25 plus $16.86/Lot
	For Lots 81 or more:	Add $8.42/Lot

Chapter 3: Stormwater Management General Design Requirements

Special Protected Areas

When designing for maximum water quantity, erosion prevention, sediment control, and water quality benefits, the design professional should take the following considerations in mind:

- Stormwater quantity and quality are best controlled at the source of the problem by reducing the potential maximum amount of runoff and pollutants.
- Best site design techniques implement stormwater management by using simple, nonstructural methods along with or in place of traditional stormwater management structures when applicable.
- Conservation of site resources and natural undisturbed areas helps to reduce the post development runoff volume and provide areas for natural stormwater management. Some natural site resources that should be maintained include, but are not limited to:
    - Natural drainage ways,
    - Vegetated buffer areas along natural waterways,
    - Floodplains,
    - Areas of undisturbed vegetation,
    - Low areas within the site terrain, and
    - Natural forested infiltration areas and wetlands.

Low Impact Site Layout Techniques

Lower impact site layout techniques involve identifying and analyzing the location and configuration of structures on the site to be developed. Where applicable, the following options that create lower impacts layouts should be used:

- Fit the design layout to follow the natural contours of the site to minimize clearing and grading and preserve natural drainage ways.
- Limit the amount of clearing and grading by identifying the smallest possible area on the site that would require land disturbance.
- Place development areas on the least sensitive areas of the site.
- Utilize nontraditional lot designs for residential areas to reduce the overall imperviousness of the site by providing more undisturbed open space by minimizing clear-cutting.
- Utilize vegetated buffers and undisturbed areas on the site to control sheet flow (not concentrated flows) by providing infiltration, runoff velocity reduction, and pollutant removal.
- Where ditched roadways are not practicable, curb and gutter systems may be combined with vegetated swales at outfalls to provide added water quality benefits versus the traditional piped outfall designs.
- When applicable, direct rooftop runoff to pervious natural areas for water quality treatment and infiltration instead of connecting rooftop drains to roadways and other structural stormwater conveyance systems.

Hydrology and Hydraulics

The design of properly sized storm drainage facilities requires knowledge of the hydrologic behavior of the watershed(s) in question. For small watershed areas, it is adequate to estimate the peak discharge of the drainage area for the required design frequency using the rational method. Larger, more complicated watersheds require the use of models in order to estimate the discharge hydrograph.

Every model has certain limitations that will affect its behavior for different size drainage areas. The designer should be familiar with the limitations of the method used. In general, street drainage and small drainage areas (less than two (2) acres) can be modeled using the rational method. Larger areas can be modeled using methods developed by the Natural Resources Conservation Service. Many hydrologic methods and models are available determining peak runoff rate and runoff volumes. Richland County will accept commonly used hydrologic and hydraulic computers models. If other methods are used, they should first be calibrated to local conditions and tested for accuracy and reliability. Any assumptions used in the computations shall be clearly identified. The computation results shall be presented in a format that will provide confirmation of the results.

Rainfall Frequency

The rainfall frequency, or return period, is the average time interval between equal magnitude storms. The rainfall frequency to be used in storm drainage design in Richland County varies with the watershed size for the drainage structure under consideration, rounded to the nearest acre, as presented in **Table 3**.

Table 3: Design Storm Recurrence Interval

Watershed Size (acres, rounded to the nearest acre)	Design Storm Recurrence Interval (years)
0 to 40	10-year; 25-year for ditches and channels
41 to 100	25-year
101 to 300	50-year
301 and larger	100-year

In addition, the 100-year rainfall is required for determination of minimum building elevations, floodplain boundaries, etc.

Note: This is <u>not</u> applicable for just the disturbed acres but the entire drainage area of the contributing watershed. A watershed map clearly showing the area is required with the submittal.

Rainfall

The storm duration for computational purposes shall be the 24-hour rainfall event; SCS Type II distribution with a 0.1-hour burst duration time increment. **Table 4** contains the 24-hour rainfall depths for the 2-, 10-, 25-, 50-, and 100-year rainfalls for Richland County.

Table 4: Richland County 24-Hour Rainfall Depths for Type II Storm Events (Inches)

2-yr	10-yr	25-yr	50-yr	100-yr
3.6	5.3	6.4	7.3	8.3

Rational Method

The design discharge rate for a single pipe or culvert that is not part of a pipe network or system draining a watershed of two (2) acres or less may be calculated using the rational method. In general, for larger areas the rational method will yield over-simplified results.

When using the rational method some precautions should be considered:

- In determining the C value (land use) for the drainage area, hydrologic analysis should take into account any changes in land use.
- The rational method uses a composite C value for the entire drainage area. If the distribution of land uses within the drainage basin will affect the results of hydrologic analysis, then the basin should be divided into two or more sub-drainage basins for analysis.

The charts, graphs, and tables included in this section are given to assist the designer in applying the rational method. The designer should use good engineering judgment in applying these design aids and should make appropriate adjustments when specific site characteristics dictate that these adjustments are appropriate.

The rational method is based on the assumption that rainfall is uniformly distributed over the entire drainage area and at a steady rate, causing flow to reach a maximum at the outlet to the watershed at the time to peak (Tp). The rational method also assumes that all land uses within a drainage area are uniformly distributed throughout the area. If it is important to locate a specific land use within the drainage area, then another hydrologic method should be used where hydrographs can be generated and routed through the drainage system.

The rational formula estimates the peak rate of runoff at any location in a watershed as a function of the drainage area, runoff coefficient, and mean rainfall intensity for a duration equal to the time of concentration (the time required for water to flow from the most remote point of the basin to the location being analyzed).

The rational formula is expressed as follows:

$$Q = CiA$$

Where:

Q = discharge rates (cubic feet per second)
C = runoff coefficient for the watershed
i = rainfall intensity (for duration equal to time of conc.) (inches per hour)
A = area of watersheds contributing to the design location (acres)

Rainfall Intensity (i)

Rainfall intensity (i) is the average rainfall rate, in inches per hour, for duration equal to the time of concentration for a selected rainfall frequency. Rainfall intensities may be computed using the following formula:

$$i = \frac{a}{(b + t_c)^c}$$

Where:

i = rainfall intensity (inches per hour)
t_C = time of concentration (minutes)
a, b, and c are coefficients as included in **Table 5**:

Table 5: Rainfall Intensity Coefficients (a, b, c)

Recurrence Interval (years)	a	b	c
2	244.34492	34.95806	1.03155
5	258.50572	32.75684	1.01773
10	267.54247	31.39986	1.00904
25	279.77346	29.59043	0.99735
50	288.71309	28.26125	0.98879
100	296.66217	27.04859	0.98111

Source: South Carolina Department of Transportation, Columbia area: https://www.scdot.org/business/pdf/stormwater/rainfall_intensity.pdf or latest update

Alternatively, rainfall intensities (*i*) may be selected using **Table 6**:

Table 6: Richland County Rainfall Intensities (i) (Inches per Hour)

Time of concentration (t_c) (minutes)	Recurrence Intervals (years)				
	2	10	25	50	100
5	6.36	8.14	9.13	9.92	10.70
10	5.08	6.51	7.27	7.91	8.5
15	4.26	5.49	6.15	6.67	7.16
30	2.94	3.98	4.55	5.03	5.48
60	1.85	2.59	3.03	3.40	3.78

Source: NOAA Atlas 14 Point Precipitation Frequency Estimates for SC, Columbia Airport: https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=sc or latest update

Time of Concentration

The time of concentration (t_c) shall be determined by calculating the time for a particle of water to travel from the hydraulically most remote point of the project area to the point of interest. Richland County will accept commonly used time of concentration calculations and methodologies.

The storm duration shall be equal to the time of concentration (t_c) of the contributing drainage area, with a minimum time of concentration equal to five (5) minutes.

The maximum allowable overland (sheet flow) flow paths are 100 feet in urban areas and 300 feet in rural areas.

NRCS (SCS) Unit Hydrograph

Runoff calculations involving any watershed greater than two (2) acres, multiple sub-watersheds or multiple drainage inlets and pipes must be analyzed using computer or numerical models that model complex hydrologic and hydraulic watershed responses. Models that incorporate the NRCS/SCS unit hydrograph methodology are acceptable.

The County reserves the right to require verification of hydrologic computations by use of a second computational method at its discretion. The County may require drainage systems to be designed assuming future conditions or build-out of the contributing watershed.

Pond routing is required for computing flow rates through detention ponds. Multiple methods, including the NRCS routing methods are accepted. The quantity of runoff in the NRCS method can be attributed to several factors. Watershed slope, soil type, ground cover, and antecedent moisture content all affect the quantity of runoff.

Change in Storage Equation

Hydrologic routing is used to model the change in storage in a detention facility by comparing inflow and outflow at small increments in time.

Inflow Hydrograph Formulation

The nature of impoundment basin routing is such that the inflow to the basin must be described in small time increments. In order to accomplish this, an inflow hydrograph must be formulated for each of the design storm events. If one of the more complex hydrologic methods is used to determine discharge from the drainage area, the inflow hydrograph is already available and can be used for the routing. If only the peak discharge has been determined, a hydrograph must be formulated based on that peak.

It is widely accepted that storms in Richland County can generally be described by the SCS Type II storm distribution.

Soil types are divided into four (4) major hydrologic soil groups (HSG) denoted by the letters A through D. HSG A soils are those which have high infiltration capacity and subsequently low runoff rates. HSG D soils are those with very low infiltration capacity and very high runoff rates. Soil data for soils common in South Carolina and Richland County can be found at USDA Natural Resources Conservation Service (NRCS) Web Soil Survey (WSS) (https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm or latest update).

For the purposes of the NRCS method, antecedent moisture content (AMC) is divided into dry, normal, and wet conditions based on the rainfall in the prior five (5) days. If the five-day antecedent rainfall is greater than 2.1 inches in the growing season or 1.1 inches in the dormant season, the moisture content is presumed wet (AMC III). If the five-day antecedent rainfall is less than 1.4 inches or 0.5 inches respectively, it is presumed dry (AMC I). Typical posted runoff curve numbers are based on normal conditions (AMC II). For design of proposed facilities, normal conditions are generally used.

Watershed Areas

On-site watershed areas (drainage area maps) shall be determined from the topographic maps of the proposed development. This topographic map, with the watershed area delineated for each drainage structure, is to be submitted to the County Engineer's office together with the drainage plans and calculations for any project requiring the review and approval of that office.

In all cases, drainage systems shall be designed to accommodate the runoff from those portions of the natural watershed located off-site as well as on-site areas. For developments with multiple phases and/or anticipated future development, commercial or residential, the future use of any undeveloped land located in off-site watershed areas shall be evaluated by considering such factors as zoning, location relative to transportation facilities, and nearby development trends. Runoff coefficients and curve numbers appropriate to the expected future land use of off-site watershed areas are to be used in all drainage calculations and design.

Downstream Analysis

The purpose of this section is to identify potential problem areas and show by calculations that the proposed development will not make the existing downstream conditions any worse.

Downstream analysis shall be required for all new development and re-development sites unless the County Engineer or designee determines it is not required. In some cases, the design professional may verify that stormwater quantity controls may adversely impact downstream conditions. Therefore, downstream analysis shall be performed prior to sizing stormwater quantity control structures to determine the extent of the controls to be implemented. Downstream analysis may show that more stringent controls need to be implemented to effectively prevent any adverse downstream impacts.

The downstream peak flow analysis shall include the assumptions, results, and supporting calculations to show safe passage of post-development design flows downstream. The analysis of downstream conditions in the report shall address each discharge point along the project site's boundaries at which runoff exits the property. The analysis shall focus on the portion of the drainage channel or watercourse immediately downstream from the project. This area shall extend downstream from the project to a selected point of concern. In calculating runoff volumes and discharge rates, consideration may need to be given to any planned or known future upstream land use changes.

Downstream Analysis Limits

Hydrologic and hydraulic engineering analysis shall be implemented to determine the downstream effects from any development activity. This analysis shall extend downstream to a specific point of concern. The point of concern may be identified by the County Engineer. The following are typical points of concern:

- The point downstream where the development represents less than 10 percent of the total drainage of the watershed,
- The first downstream road crossing,
- Downstream development,
- Downstream receiving waterbody,
- Location of known existing flooding, drainage, or erosion problems, and
- Any point as directed by the County at the pre-application meeting.

The primary areas of analysis shall be done for the following:

- The development area,
- All drainage exits points from the property,
- The receiving channel or storm drainage system at the exit points, and
- Each component of the downstream system including:
    - Channels
    - Pipes
    - Culverts
    - Bridges
    - Overbank areas
    - Overbank structures

If there is any discrepancy or question about points of concern, please contact the County for a pre-application meeting. The County reserves the right to request a pre-application meeting at its discretion.

Downstream Analysis Design Storm Events

The downstream analysis shall determine whether the design storm events of interest (2-, 10-, and 25-year) cause or increase flooding, drainage, or erosion impacts to downstream properties or road crossings. The analysis criteria shall include but is not limited to:

- Existing land use curve numbers shall be used for undeveloped and developed areas upstream;
- Where future development areas are known upstream, the County Engineer may require these areas to be considered developed in the future land use condition;
- Existing land use for downstream areas of interest may be used, but future land use, when applicable, is recommended for conservative results;
- Routing of flows using accepted hydrologic and hydraulic methods;
- Hydraulic step-backwater calculations (Corps of Engineer's HEC-2 or HEC-RAS models or equivalent) shall be performed to determine flood elevations of any downstream impacted areas; and
- The effects of any upstream and proposed stormwater quantity or quality structures.

Improvement Options

If the downstream analysis determines that the development of a particular site does contribute to flooding, drainage, or erosion problems, then at least one the following improvements shall be implemented:

- On-site water quantity control,
- Off-site water quantity control, and
- Improvements to the downstream stormwater conveyance system.

Post-Construction Water Quality Design Standards

Best Management Practices (BMPs) are required to control and minimize water quality degradation resulting from post-construction land uses. These BMPs shall be designed according to one of the two Richland County Water Quality (WQ) Design Standards, shown in **Table 7.**

Table 7: Richland County Water Quality Design Standards

Water Quality Design Standard	Non-sensitive Watersheds	Sensitive Watersheds [1]
WQ Design Standards #1: Water Quality Storm Event Design Standard	Manage the runoff from the Water Quality Storm Event	
WQ Design Standard #2: TSS Removal Design Standard [2]	Obtain 85% removal efficiency of the annual TSS loading	Demonstrate that the annual post-development pollutant loading does not exceed the annual pre-development pollutant loading for the pollutant(s) of concern

1. Sensitive watersheds include TMDL, 303(d), or other sensitive watersheds as determined by the County.
2. A Hardship Exemption may be approved in exceptional circumstances such that the TSS Removal Design Standard results in unnecessary hardship and does not fulfill the intent of the requirement. See Hardship Exemption Criteria section below.

Site-specific factors (location within the County, soil type, groundwater table depth, available space, and other constraints) will dictate the feasibility of meeting each specific Design Standard. It is the responsibility of the designer to select and demonstrate compliance with Richland County WQ Design Standard requirements, as laid out in this section. For further guidance refer to **Appendix H:** Stormwater Management Design Guidance Document.

IDEAL Model

In an effort to aid the design community as well as assist the County in meeting the MS4 permit goals, the County has developed and made available the IDEAL model (software application). Selection of a particular BMP to achieve the required pollutant removal efficiency shall be determined through the use of the IDEAL model, or through the review of monitoring studies of similar BMPs, applicable computation methods and other methodologies as deemed acceptable by the County Engineer. For further guidance on the IDEAL model refer to **Appendix H**.

WQ Design Standard #1: Manage the Water Quality Storm Event Design Standard

This Richland County performance standard defines BMP effectiveness in terms of managing (infiltrating) the runoff from the majority of storm events, characterized by the Water Quality (WQ) Storm Event.

The WQ Storm Event is defined as:

A. The 90th percentile storm, or the storm with a 24-hour rainfall amount that is greater than or equal to 90 percent of storms based on historical data.

B. The 1.4-inch, 24-hour duration, NRCS Type II storm event.

BMPs shall be designed (using the IDEAL model) and constructed to manage (infiltrate) the runoff generated by the WQ Storm Event from the developed or redeveloped portion of the site. This infiltration shall occur within 72 hours of the end of the storm event.

This is typically the most feasible Design Standard in areas with sandy soil types (i.e., Sand, Loamy Sand, Sandy Loam) with higher infiltration rates and should be the primary methodology utilized by sites in those areas.

For site constraints, soil conditions, or groundwater table conditions which do not permit the infiltration of the WQ Storm Event within a 72-hour period after the storm event, the County will approve BMPs meeting the TSS Removal Standard, described in the following section.

WQ Design Standard #2: TSS Removal Design Standard

This Richland County performance standard defines BMP effectiveness in terms of removal of total suspended solids (TSS) from polluted stormwater. Water quality impairment results, in part, because a number of pollutants are preferentially adsorbed onto mineral or organic particles found in fine sediment. The interconnected process of erosion (detachment of the soil particles), sediment transport, and delivery is therefore an important conduit for introducing other key pollutants, such as nutrients (particularly phosphorus), metals, and organic compounds into surface waters. Pollutants also exist in particulate forms which may be transported through the same processes as sediment and trapped along with sediment. Thus, TSS is a good indicator for many stormwater pollutants in evaluating a BMP's effectiveness in pollutant removal.

Richland County has adopted a BMP performance standard that requires all permanent BMPs be designed (using the IDEAL model) and constructed to accommodate the expected sediment loading from post-construction land use with a removal efficiency of 85 percent of total suspended solids (TSS) based on an annual removal basis.

This Design Standard is typically the most feasible Design Standard in areas with silt/clay type soils (i.e., Clay, Silty Clay, Silty Clay Loam, Clay Loam, Silt Loam, Silt) where infiltration is infeasible or problematic and should be the primary methodology utilized by sites in those areas.

Sites that cannot achieve 85 percent removal efficiency of annual TSS loadings due to very low initial TSS loads or other site constraints may be applicable to meet the Hardship Exemption Criteria.

Sensitive Watersheds

For sites utilizing the TSS Removal Design Standard which are in TMDL, 303(d), or other sensitive

watersheds, designers must also show that the annual post-development pollutant loading does not exceed the annual pre-development pollutant loading for the pollutant(s) of concern.

Hardship Exemption Criteria

The Department of Community Development and Planning Staff may approve a Hardship Exemption if there are exceptional circumstances applicable to the site such that strict adherence to the provisions of the TSS Removal Design Standard requirement results in unnecessary hardship and does not fulfill the intent of the requirement. A written request should be provided to the Department of Community Development and Planning Staff that states the reason with supporting data. The Department of Community Development and Planning Staff may not grant an approval unless and until sufficient specific reasoning to justify the exception is provided by the applicant. The Department of Community Development and Planning typically conducts its review of the request for exemption approval within 17 working days.

The required Hardship Exemption criteria are:

- The designer demonstrates that by the nature of the development, it is impractical to reduce the size of the facility and parking area;
- The designer shows that there is no space for additional stormwater treatment practices other than proprietary devices;
- All pervious areas are designed to produce the least amount of runoff practicable;
- Sensitive watershed requirements, if applicable, are met; and
- The designer utilizes the IDEAL model to demonstrate that the annual post-development TSS loading leaving the site is no more than 600 pounds/acre/year.

Sensitive watershed requirements for sites receiving a Hardship Exemption are the same as when utilizing the TSS Removal Design Standard. The designer should show that the annual post-development pollutant loading does not exceed the annual pre-development pollutant loading for the pollutant(s) of concern.

Receiving Waters with TMDLs or Impairments

If an impaired or TMDL water with a pollutant of concern applicable to stormwater discharges from the proposed land development has been established and is in effect, then the SWPPP should address the following, depending on the total disturbed area.

Disturbed area less than 25 acres:
For construction projects that disturb *less than 25 acres*, carefully evaluate all selected BMPs and their ability to control the pollutant(s) of concern.

Disturbed area greater than or equal to 25 acres:
Construction projects that disturb *25 acres or more* require a **written quantitative and qualitative assessment** showing that the selected BMP controls the discharge of the pollutant, or pollutants, of concern from construction and post construction within a TMDL watershed, or to a water on the 303(d) List of Impaired Waters.

Design professionals should determine whether runoff from the proposed land development contains pollutants that are already causing impairment of the adjacent waterbody. These pollutant discharges vary from site to site.

If stormwater runoff from the proposed land development contributes pollutants that already cause water quality impairment, the design professional should demonstrate to the extent practicable that the measures and controls to be implemented prevent further problems to the impairment.

The IDEAL model should be used by designers to calculate the annual loading for the pollutant(s) of concern for the pre-developed condition as a baseline and compare the baseline to the developed annual loading condition. No increase in annual loading of the pollutant(s) of concern provides a quantitative assessment showing that the selected BMP(s) control the discharge of the pollutant(s) of concern.

Alternative approaches, methodologies and solutions may be allowed; however, it is incumbent on the designer proposing an alternative to adequately demonstrate both the effectiveness and equivalency of that alternative.

For pollutants causing impairment for which a numeric water quality standard has been adopted (fecal coliform, pH, metals), calculations should be performed and submitted showing that the pollutants in the runoff from the development site should not exceed the applicable in-stream water quality standards. The runoff discharged through the last water quality BMP should have a water quality level equal to or better than the in-stream standard.

The design professional should demonstrate to the extent practicable in a different manner when the water quality impairment is not a pollutant itself but is affected by a pollutant that can be regulated such as dissolved oxygen levels are affected by biochemical demand. In these situations, a reasonable approach to show that runoff should not further degrade the adjacent impaired waterbody is to show that the post-development loading of a particular pollutant is less than or equal to pre-development loading.

This demonstrates to the extent practicable that there should be no net increase of loading of that particular pollutant and no further lowering of the water quality standard. In most cases, the effectiveness of the designed water quality BMPs should not require water quality sampling. However, for certain situations, it may be required for the applicant or landowner to collect monitoring data to confirm the effectiveness of the BMPs.

Pre-Treatment Practices

Pre-treatment practices for post-construction BMPs improve BMP function and reduce the overall maintenance requirement. Typical pre-treatment methods are forebays and manufactured treatment devices. Pre-treatment is recommended for all post-construction BMPs. Pre-treatment is strongly recommended for industrial and commercial projects due to the tendency for pollutants

from these sites to hinder the function of post-construction BMPs (e.g., clogging due to trash, surface sealing due to oil and grease that hinders infiltration).

BMP Pollutant Removal

BMPs can be used independently as the "only" management practice employed for a specific area or combined as components in an overall BMP plan, frequently called a stormwater "treatment train". Estimation of BMP efficiency (i.e., the pollutant removal rate) for a single BMP measure is simple and straightforward.

For two or more BMPs used in series, the pollutant removal rates are not additive. For example, for two (2) BMPs in series, the second BMP will function very differently than if it was the only BMP used to treat the polluted stormwater. The first BMP will capture the more easily removed larger particle sizes, passing on an outflow with a lower concentration, but with a considerably higher proportion of finer particle sizes.

Upstream BMPs in a treatment train thus reduce downstream structural control average pollutant removal percentages. When calculating removal of pollutants to achieve a target, the removal efficiency of a downstream control must be reduced to account for the pollutant removal achieved by an upstream control(s).

As an alternative to these calculations, computer models such as the IDEAL model are capable of calculating site-specific pollutant removal for a stormwater treatment train of BMPs.

Figure 3 provides an example of a stormwater treatment train including a filter strip, grass swale, and extended dry detention pond. This can be modeled in the IDEAL model or estimated in the manner described below.

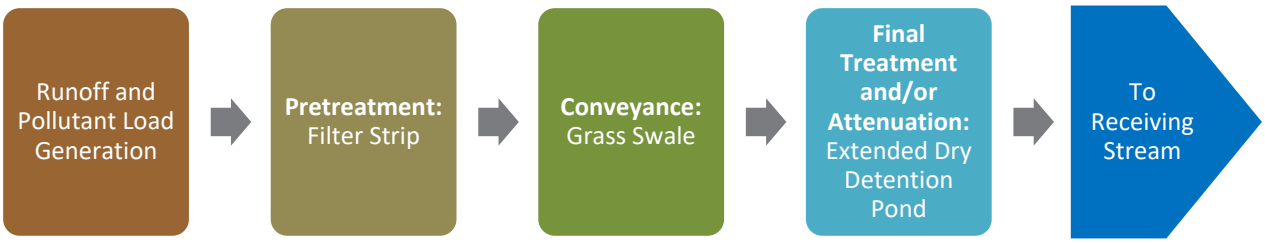


Figure 3: Example of a Stormwater Treatment Train

To estimate the pollutant removal rate of structural controls in series, a method may be used in which the removal efficiency of a downstream structural control is reduced to account for the pollutant removal of the upstream control(s). The following steps are used to estimate the pollutant removal:

1. For each drainage area list the structural controls in order, upstream to downstream, along with their expected average pollutant removal rates for the pollutants of concern.

2. Apply the following equation for calculation of approximate total accumulated pollution

removal for Controls in series:

> ***Final Pollutant Removal*** *= (Total load × Control1 removal rate) + (Remaining load × Control2 removal rate) + … for other Controls in series*

Table 8 demonstrates these calculations for the example stormwater treatment train presented above in Figure 3.

Table 8: Stormwater Treatment Train Calculations

State in Stormwater Treatment Train	Inflow Pollutant Load	X	Pollutant Removal Efficiency	=	Remaining Pollutant Load (%TSS)
Runoff and Pollutant Load Generation	=		=		100%
Pretreatment: Filter Strip	100%	X	50%	=	50%
Conveyance: Grass Swale	50%	X	30%	=	15%
Final Treatment and/or Attenuation: Extended Dry Detention Pond	15%	X	45%	=	7%
			Initial TSS Load		100%
			Final TSS Load	-	77%
			TSS Removal Efficiency		93%

Water Quantity Design Requirements

Water quantity control is an integral component of overall stormwater management. The following design criteria for flow control are established for water quantity control purposes:

- Post-development peak discharge rates shall not exceed pre-development discharge rates for the 2-, 10-, and 25-year frequency, 24-hour duration storm event. The County may require a less frequent storm event (e.g., 50- or 100-year, 24-hour) to address existing or future stormwater quantity or quality problems.
- The appropriateness of stormwater storage facilities for mitigating peak flow increases should be determined in consultation with the County Engineer. At the request of the County, a comprehensive hydrology study of a receiving drainage system, stream or identified watershed under pre-development and post-development conditions may be required to assess potential impacts. Based on the finding of such studies, the design criteria for stormwater quantity management may be revised.

Impoundment (Basin) Design Requirements

The design standards of this Manual may require that some form of impoundment, either detention or retention, be used for development and redevelopment projects. The type and size of the facility required will typically depend on the size of the proposed development, the impact on the downstream watercourse and the impact on water quality. If areas immediately downstream of the proposed development are not sensitive to increases in runoff but areas further downstream are sensitive, a regional impoundment facility may be an option. If areas immediately downstream of the proposed development are sensitive to any increases in runoff, an on-site impoundment may be the better option. It is the intention of the County to control stormwater problems resulting from development and lessen some existing flooding problems through the placement of impoundments as close to the problem area as possible. Therefore, impoundments may not apply to every new development and may be a combination of large and small facilities.

The design of impoundment facilities may be simple, as is the case with some small on-site facilities. Larger facilities, however, can be complex. This Manual is intended to serve as a reference to the designer by providing general guidelines and techniques for analysis. Complex designs should only be undertaken by professionals with a thorough knowledge of impoundments. All impoundment designs and their associated calculations should be sealed by a Professional Engineer registered in South Carolina.

Types of Storage

In general, the type of storage device selected depends on the quantity of water to be stored and the associated cost of storage. Guidelines for each are included herein. The selection of the type of storage used is up the individual owner or engineer. Although all of the following types of facilities will work, some will present more of a maintenance problem.

Dry Basins

Dry detention basins should be designed such that the primary outlet devices restrict the flow and allow water to pond in a safe contained fashion. A properly designed emergency spillway should be provided capable of passing the 100-year storm. Side slopes should be no steeper than 3H:1V with vegetative groundcover. If site constraints are such that the slopes warrant anything steeper than 3H:1V, then slopes that are designed at 2H:1V will require matting, ECBs or TRMs. The basin should be constructed to ensure positive drainage. This will reduce the risk of mosquito problems and reduce maintenance costs. In larger basins, a concrete low flow swale is recommended since vegetation may be difficult to maintain with frequent flow through the basin.

Note: Multiple configurations may need to be considered to ensure no system “short-circuits”.

Wet Basins

The same basic standards apply to wet basins as to dry impoundment facilities. Outlet devices should be appropriately sized and an emergency spillway provided. Because of their added benefit to water quality, wet basins are highly encouraged by the County. Although they may be impractical for smaller

areas, their use in larger drainage areas can provide improved water quality and an attractive, aesthetic component to the development. Hydrologic modeling of the wet basin is similar to that of other basins with only some minor changes to the stage-storage curve. Careful consideration should be given to the frequency of inflow and nutrient levels in the influent when deciding whether or not to use a wet impoundment basin. Low flows and high nutrient levels may result in the eutrophication of the pond and subsequently high maintenance costs.

Parking Lot Storage

For on-site detention where topography or space is a problem, parking lot storage may be an option. Naturally, not much runoff water can be stored in a parking lot. Therefore, it should be considered for only small sites less than one-half (1/2) acre with little or no off-site drainage entering the parking lot. The depth of storage should be limited to eight (8) inches and if possible, should be restricted to a remote portion of the parking lot. Storage may not inundate handicap spaces or the primary access to the site. Some form of stable emergency overflow should be provided to pass the 100-year storm, usually by overtopping the curb. Since small outlet devices are required for parking lot storage, weirs are preferred to orifices. In general, parking lot storage creates more of a maintenance problem than any other type of on-site storage and should be used only when other facilities are impractical.

Pipe Storage

When space is severely limited on the site, pipe storage may be an option. Oversized pipes with a restricted outlet can provide storage but usually only at a very high cost. Access to the pipe and outlet device must be provided for adequate maintenance. Debris control should be a prime consideration in designing pipe storage since the restricting outlet device is generally much smaller than the storage or inflow pipes.

Note: Pipe storage can only be a design consideration for Commercial sites where the County will not have maintenance responsibilities.

Underground Storage

When space is severely limited on the site, underground storage may be an option. Underground pipes, chambers, or facilities with a restricted outlet can provide storage but usually at a high cost. Access to the underground storage area and outlet device must be provided for adequate maintenance. Trash and debris control is a prime consideration in designing underground storage.

Underground storage design includes:

- Materials: Corrugated metal structures are prohibited for underground storage.
- Emergency Spillways: Overflow must discharge to a stable outlet.
- Pretreatment: All underground storage systems must include pretreatment for the removal of sediments and debris prior to entering the main detention structure.
- Water Quality Design: Underground storage alone is not applicable for water quality treatment during construction. Additional water quality treatment measures such as MTDs may be required to meet water quality standards.

- Observation Ports: Underground storage systems must have multiple observation ports for monitoring sediment and debris levels and determining when maintenance is required.
- Access Port: Access to the underground storage system must be provided to allow for the removal of accumulated sediment and debris.
- Design to support a minimum of an AASHTO HL-93 live load together with the appropriate dead load. Heavier live loads may be required if conditions dictate.
- Minimum life expectancy is 75 years.

Detention and Retention Design Parameters

The construction of detention structures usually requires excavation or the placement of earthen embankments to obtain a required storage volume. This section discusses the design criteria of detention structures to ensure the long-term function of the structure while minimizing the maintenance responsibilities. A detention waiver may be requested using the form in **Appendix I**: Detention Waiver Request Form.

Outlet structures shall be designed in accordance with accepted engineering principles, with particular attention to appropriate hydraulics including orifice, weir, and culvert hydraulics. Outlet structures shall be designed to discharge equal to or less than the pre-development runoff peak flow rates for the 2-, 10-, and 25-year frequency, 24-hour duration Type II storm event.

If downstream drainage facilities are inadequate to convey the peak discharge for the design storm events for the development of a particular site, please refer to the sub-section Improvement Options in the Downstream Analysis section of this Manual.

Where a basin discharges into a stream, ditch, swale, or water body, appropriate velocity dissipation devices and/or erosion prevention BMPs are required to minimize soil erosion and sediment transport. An emergency spillway shall be required for detention and retention basins to discharge flows for the 100-year, 24-hour storm event with one (1) foot of freeboard. The spillway shall be located so the discharge does not erode the basin or receiving channel. If the 100-year storm can be retained completely on site, an emergency spillway is not required.

Detention Structure Design Criteria

The following are design criteria for the design and construction of all detention structures.

Shape

Place inlets and outlet as far apart as feasible. Provide a long and narrow basin shape, with a minimum flow length to flow width ratio of 2L: 1W and an optimum flow length to flow width ratio of 3L: 1W. Design runoff to travel the longest distance possible thorough the basin before being discharged. The flow length to flow width ratio can be increased by:

- Designing irregularly shaped basins such as a kidney bean shape,
- Using baffles to create a longer path of flow,
- Utilizing double chamber ponds, or

- A combination of these techniques.

The shallow and narrow end of the basin should be located near the inlet and the deeper and wider end near the outlet. The allowable dead storage space of a basin is limited to a maximum of 20 percent.

Side Slopes
Vegetated embankments shall be less than 15 feet in height and shall have side slopes no steeper than 3H:1V. Vegetated embankments shall be protected with Erosion Control Blankets or Turf Reinforcement Matting. Geotechnical slope stability analysis is required for slopes greater than eight (8) feet in height and embankments that have steeper slopes than 3H:1V.

Inlet
The inlet must be designed with riprap or other energy dissipater, such as a baffle below the inflow structure to reduce erosive forces and pretreatment to remove sediment. Sediment forebays will be required on all ponds for post-construction water quality and shall be designed with a minimum length to width ratio of 2L:1W. Prevention of scour at the inlet is necessary to reduce maintenance problems and prevent damage to basin floor vegetation. The velocities of flow through the inlet sediment control structure and basin should not exceed 2.5 feet per second. Energy dissipation should be provided at the inlet and outlet to prevent scour and reduce the velocity of stormwater.

Dry Detention Bottom Slopes
The bottom of detention structures shall be graded towards the outlet structure to prevent standing water conditions and be stabilized to prevent scour. A minimum two (2) percent bottom slope is recommended for both cross slope and a minimum 0.5 percent bottom slope is recommended longitudinal slope.

Under Drains
If the two (2) percent grade cannot be obtained an acceptable alternative is to install an under drain. The under drain shall be constructed in the following manner:

- The under drain shall be one of the last items to be installed to eliminate any sediment build-up that would cause the under drain to not function properly.
- A non-woven geotextile fabric shall be laid in the excavated trench first. The perforated drainpipe shall be covered with washed stone.
- Both stone and drain shall then be wrapped with the non-woven geotextile and backfilled with sandy porous material.

Permanent Pool Detention
The maximum depth of permanent storage facilitates shall be determined by site conditions, design constraints, and environmental needs. The facility should provide a permanent pool of water with a depth sufficient to discourage weed growth without creating undue potential for anaerobic bottom conditions. The minimum allowable permanent pool depth is four (4) feet and the maximum allowable depth is 12 feet. A depth of six (6) to eight (8) feet is reasonable unless fishery requirements dictate

otherwise. Aerating may be required for permanent pools to prevent anaerobic conditions. Wildlife experts shall be contacted where aquatic habitat is required.

Principal Spillways
All principal spillways shall be made of reinforced concrete structures. Corrugated metal principal spillways are not accepted.

Trash Racks
All principal basin outlets must have a trash rack to control clogging by debris and to provide safety to the public. The surface area of each rack must be at least four (4) times the outlet opening it is protecting. The spaces between rack bars must be no more than six (6) inches or one-half (1/2) the dimension of the smallest outlet opening behind it, whichever is less. Trash racks should be inclined to be self-cleaning.

Pipe Barrel Materials
All pipe barrel material shall be concrete pipe. Corrugated Metal Pipe is not accepted. All pipe barrel pipe joints shall be watertight using AASHTO M-315 (13PSI) pipe joint, O-ring gaskets (ASTM C361), or a coupling band.

Seepage Control
Use a watertight pipe outlet barrel to riser connection. All pipes that extend though an embankment shall have anti-seep collars or filter diaphragms to control the migration of soil materials to prevent potential embankment failure from “piping” within the backfill soil along the conduit. All constructed dams or embankments for dry and wet basins shall have a clay core with an excavated cutoff trench.

Anti-floatation
All outlets employing a riser structure must be designed to prevent the riser from floating.

Emergency Spillways
Emergency spillways shall be designed to covey the routed runoff of the 100-year, 24-hour design storm event while maintaining at least one (1) foot of freeboard between the high-water elevation and the top of the embankment crest. Overflow must discharge to a stable channel or stable area.

Location of Spillways
Emergency spillways must be located on undisturbed, non-fill soil wherever possible. If the spillway must be located on fill soils, then it must be horizontally offset at least 20 feet from the principal outlet. Discharge from the emergency spillway should not impinge upon the toe of the dam or the embankment.

Protection
Emergency spillways must be designed with a permanent erosion prevention lining (e.g., riprap, permanent turf reinforcement matting, nonflexible lining). Grass only emergency spillways are acceptable, if it is in the cut section. The top elevation of the spillway shall be the actual top of the permanent erosion prevention lining.

Exit Channel
All exit channels must be designed with a permanent erosion prevention lining (e.g., riprap, permanent turf reinforcement matting, articulated blocks, concrete, nonflexible lining). Grass only exit channels are not acceptable. All erosion prevention linings must be evaluated for stability at the design channel grade.

Outlet
Each basin outlet shall be designed to prevent scour and to reduce velocities during peak flow conditions. Each outlet should be directed towards pre-existing point source discharges or be equipped with a mechanism to release the discharge as close to sheet flow as possible to prevent the creation of new point source discharges.

Restrict the basin outlet from being placed within 20 linear feet of adjacent properties lines.

Devices
The following Orifices and Riser-Barrel Outlets sub-sections provide a general description of some common outlet devices used in impoundment facilities. Other devices are available. Because controlling multiple design storms may be required, some complex outlet devices may result. To the extent possible, it is recommended to keep outlet devices simple. This may require an optimal design for one storm frequency and an over design for other storm events.

Orifices
The discharge through an orifice can be described by an energy balance analysis. Assuming the upstream velocity is negligible (i.e., a reservoir) and the water surfaces both upstream and downstream are free surfaces, the energy balance can be simplified using the orifice equation.

Riser-Barrel Outlets
Riser-barrel outlets act as a combination of several types of outlet devices. At different stages the outlet may behave differently. At shallow depths the riser may act as a weir. As the depth increases the riser may begin to act as an orifice or the barrel may begin to control. The controlling factor will be that with the smallest discharge at a given depth. The following equations should be considered.

- Sharp Crested Weir Equation
- Orifice Equation
- Barrel as an Orifice Equation
- Barrel as a Pipe Equation

Earthen Dam Embankment
Earthen dam embankments shall be no steeper than 3H: 1V with vegetative groundcover. If site constraints are such that the slopes warrant anything steeper than 3H:1V, then slopes that are designed at 2H:1V will require matting, ECBs, or TRMs. Earthen dam embankment shall not be planted with shrubs, trees, or woody vegetation.

The minimum earthen dam top width shall be 10 feet for embankments to provide adequate maintenance access.

Engineer Certification
The engineer or geotechnical engineer must certify embankments of all constructed dams to ensure proper compaction, clay core installation, and seepage control measure installation.

Maintenance Access
Maintenance access at least 10 feet wide with a maximum slope of 15 percent and a maximum cross slope of three (3) percent shall be provided and shall be stabilized. Sufficient areas for equipment access for basin maintenance shall be provided. This access shall extend to the forebay, micropool, and outlet structure. It should never cross the emergency spillway, unless the spillway has been designed for that purpose. To the extent feasible, maintenance access should be designed to allow for vehicle turnaround. An easement may be required.

Provide a flat maintenance shelf/berm with a minimum width of 10 feet around the perimeter of the basin; nothing shall encroach within the property boundary line. The basin berm must provide load bearing capability for industrial maintenance mowers.

Reduced maintenance access may be allowable on a limited case by case basis depending on site constraints and the design of the pond as determined during formal review submittal.

Safety Fence
A safety fence or vegetative barrier is required where a detention structures interior side slopes are steeper than 3H: 1V or when the impoundment is a wall greater than 24 inches in height. If the wall is adjacent to a walkway or street a railing may be required instead of a fence.

Basins on Slopes
When basins are created by cutting and filling a slope, care should be taken that the seasonal groundwater table on the slope above the basin is not exposed, thus creating a seasonal spring. Controlling the groundwater flow or spring flow into a basin may be accomplished by the proper installation of a subsurface interceptor drainage system. To prevent destabilization from groundwater seepage, riprap may be needed.

Relationship to Groundwater
The basin bottom should be located two (2) feet above the seasonal high groundwater table to avoid standing water in dry basins or groundwater intrusion in wet basins to the maximum extent practicable.

S.C. Dams and Reservoirs Safety Act
According to the S.C. Dams and Reservoirs Safety Act (Title 49, Article 3 of the S.C. Code of Laws), a dam is defined as being an artificial barrier used for the impoundment or diversion of water. Dams that are 25 feet or greater in height or that have a capacity of 50 acre-feet or more are subject to regulation by DHEC. Dams that are smaller than these requirements are exempt from regulation unless the dam

poses a threat to life downstream, as determined by DHEC. Any questions concerning specific design applications should be addressed by DHEC.

During Construction Basic Design Procedures

Control of sedimentation from construction sites may be accomplished through the utilization of a variety of erosion and sediment control BMPs. The complexity of the erosion prevention and sediment control plan will vary depending on the individual site conditions. The goal of implementing the erosion prevention plan is to limit the quantity of sediment being eroded from and leaving a construction site. This may be partially accomplished through the implementation of sediment control BMPs. However, these sediment trapping controls typically only remove a small portion of the clay particles eroded from the site. The best protection is provided by a combination of practices including temporary and permanent stabilization, flow diversions, and streambank protection, all which minimize the amount of soil that is eroded from the site.

All land development shall be planned in such a way to control and limit erosion and sediment discharge from construction sites. The goals of these erosion prevention and sediment control BMPs are to:

- Minimize the extent and duration of disturbed soil exposure,
- Protect off-site and downstream locations, drainage systems and natural waterways from the impacts of erosion and sedimentation,
- Limit the exit velocities of the flow leaving the site to non-erosive or pre-development conditions,
- Design and implement an ongoing inspection and maintenance plan, and
- Remove all temporary BMPs prior to final project closeout.

During Construction Water Quality Design Requirements

Best Management Practices (BMPs) are required to control and minimize water quality degradation resulting from construction activities. Richland County has implemented a during construction performance standard that defines BMP effectiveness in terms of removal of total suspended solids (TSS) from stormwater runoff.

Richland County has adopted a BMP performance standard that requires all temporary during construction BMPs shall be designed and constructed to accommodate the expected sediment loading from construction activities with a removal efficiency of 80 percent of total suspended solids (TSS). The design efficiency shall be calculated for disturbed conditions for the 10-year, 24-hour design event.

The removal efficiency may be calculated using South Carolina Design Aids, SEDIMOT, SEDCAD4, Pond Pack, SEDPRO, or other computer models that utilize eroded particle size distributions and calculate a corresponding 80 percent trapping efficiency for TSS.

Stormwater runoff that drains to a single outlet from land disturbing activities which disturb five (5) acres or more shall be controlled during the land disturbing activity by a sediment basin where

sufficient space and other factors allow these controls to be used. The outfall device or system design shall take into account the total drainage area flowing through the disturbed area to be served by the basin. When discharging stormwater runoff from sediment basins, utilize outlet structures that only withdraw water from near the surface of the basin or impoundment, unless infeasible. The use of perforated riser structures during construction are not allowed. This outlet structure should be capable of conveying the flow for the 10-year, 24-hour storm event.

Temporary sediment basins shall be designed to completely dewater in a minimum of two (2) days with a maximum of five (5) days.

Unless infeasible, properly design, install and maintain porous baffles, or similar control measures capable of enhancing settling capabilities and restricting the accumulation of sediment around the outlet structure, in all sediment basins to reduce velocity, turbulence, and improve sediment trapping efficiency. Each sediment basin must be equipped with a cleanout stake indicating when the basin is to be cleaned.

Perform temporary stabilization by seeding and install temporary erosion control blankets on exposed basin side slopes.

Sediment basins may be converted to permanent use for detention or water quality after construction is completed provided all accumulated silt is removed from the basin and disposed of after all disturbed areas have been stabilized.

Stormwater runoff that drains to a single outlet from land disturbing activities which disturb less than five (5) acres shall be controlled during the land disturbing activity by sediment control BMPs. The allowable drainage area for a single sediment trap shall be less than five (5) acres.

Unless infeasible, properly design, install, and maintain porous baffles or similar control measures capable of enhancing settling capabilities and restricting the accumulation of sediment around the outlet structure in all temporary sediment traps to reduce velocity, turbulence, and improve sediment trapping efficiency.

SWPPP Development Standards

Stormwater Pollution Prevention Plans (SWPPPs) shall be developed to achieve an 80 percent design removal efficiency of total suspended solids (TSS) goal. The design storm event associated with this level of control is the 10-year, 24-hour SCS Type II storm event. SCS procedures should be used to determine runoff amounts. It is important to note that when a BMP is designed for the 10-year, 24-hour storm event, the BMP will have a greater trapping efficiency for more frequent events such as the 2-year, 24-hour storm event.

Each SWPPP must delineate the following elements:

- All Sensitive Features (including steep slopes 30 percent grade or steeper),
- Sources of sediment that may potentially leave the site,

- The location and depth of all structural and nonstructural BMPs necessary to achieve the 80 percent design removal efficiency goal to protect receiving water bodies, off-site areas, and all Sensitive Features,
- Installation and maintenance of required BMPs, and
- The sequencing of construction activities to be utilized on the project.

The following nonstructural site management practices shall be utilized on the plans where applicable:

- Minimize site disturbance to preserve and maintain existing vegetative cover.
- Limit the number of temporary access points to the site for land disturbing activities.
- Phase and sequence construction activities to minimize the extent and duration of disturbed soil exposure.
- Locate temporary and permanent soil disposal areas, haul roads and construction staging areas to minimize erosion, sediment transport, and disturbance to existing vegetation.

SWPPPs shall comply with the following specific standards and review criteria:

- Sediment Tracking Control: Stabilized construction entrances shall be located and utilized at all points of ingress/egress on a construction site. The transfer of soil, mud, and dust onto public rights of ways shall be prevented.
- Crossings of waterways during construction should be minimized and must be approved by the County Engineer. Encroachment into stream buffers, riparian areas, and wetlands should be avoided when possible.
- Topsoil shall be stockpiled and preserved from erosion or dispersal both during and after site grading operations when applicable.
- Temporary Stabilization Measures: Where construction or land disturbance activity will or has temporarily ceased on any portion of a site, temporary site stabilization measures shall be required as soon as practicable, but no later than 14 calendar days after the activity has ceased.
- Final Stabilization: Final Stabilization of the site shall be required within 14 calendar days of construction completion.
- Temporary Structural Controls installed during construction shall be designed to accomplish maximum stabilization and control of erosion and sedimentation, and shall be installed, maintained, and removed at the end of the project.

SWPPPs shall include requirements for the design, installation and maintenance of effective pollution prevention measures for construction site operators to:

- Minimize the discharge of pollutants from equipment and vehicle washing, wheel wash water and other wash waters. Wash waters must be treated in a sediment basin or alternative control that provides equivalent or better treatment prior to discharge.
- Minimize the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste, and other materials present on site to precipitation and to stormwater runoff that may cause adverse impacts to water quality.
- Minimize the discharge of pollutants from spills and leaks and implement chemical spill and

leak prevention and response procedures.

SWPPPs shall ensure the following discharges from construction sites are prohibited:

- Wastewater from washout of concrete, unless managed by an appropriate control,
- Wastewater from washout and cleanout of stucco, paint, from release oils, curing compounds, and other construction materials,
- Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance, and
- Soaps or solvents used in vehicle and equipment washing.

Phased Sediment and Erosion Control Plans

Phased Sediment and Erosion Control Plans are not required when the total land disturbance is two (2) acres or less.

For land disturbance between two (2) and five (5) acres, a ***minimum*** of a two-phase stormwater management and sediment and erosion control plan is required for all non-linear projects. Each phase must be shown on a separate plan sheet. Plans should address the transition between phases.

Phase 1 – Initial Land Disturbance – Must include perimeter sediment and erosion control BMPs required prior to initial/mass clearing and other appropriate BMPs needed to maintain compliance with the permit. On some sites, this may include appropriate BMPs for demolition of existing structures.

Phase 2 – Stabilization – Includes sediment and erosion control BMPs required during the remainder of grading and construction. Must also include appropriate BMPs for stabilization, grassing, inlet protection, etc.

For land disturbance greater than five (5) acres, a ***minimum*** of a three-phase stormwater management and sediment and erosion control plan is required for all non-linear projects. Each phase must be shown on a separate plan sheet. Plans should address the transition between phases.

Phase 1 – Initial Land Disturbance – Must include perimeter sediment and erosion control BMPs required prior to initial/mass clearing and other appropriate BMPs needed to maintain compliance with the permit. On some sites, this may include appropriate BMPs for demolition of existing structures.

Phase 2 – Construction – Includes sediment and erosion control BMPs required during the majority of grading and construction activities.

Phase 3 – Stabilization – Includes sediment and erosion control BMPs required near the completion of the construction project. Must also include appropriate BMPs for stabilization, grassing, inlet protection, etc.

Note: Some sites may require multiple plans for each Phase to accurately reflect the sequence of

construction that will best manage sediment and erosion.

Alternative Erosion Prevention and Sediment BMPs

To encourage the development and testing of innovative alternative erosion prevention and sediment control BMPs, alternative management practices may be allowed upon review and approval. To use an alternative BMP, the design professional shall submit substantial evidence that the proposed measure will perform at least equivalent to currently approved methods.

Evidence may include, but is not limited to:

- Supporting hydraulic and trapping efficiency calculations,
- Research results as reported in professional journals, and
- Manufacturer literature.

To justify the efficiency of innovative erosion prevention and sediment control BMPs, the owner may be required to monitor the trapping efficiency of the structure. If satisfactory results showing that trapping efficiencies of 80 percent or greater are obtained, the innovative BMP may be used, and no other monitoring studies shall be required. If monitoring shows that a certain BMP is not sufficient or if Richland County finds that a BMP fails or is inadequate to contain sediment, other upstream and downstream BMPs shall be implemented to reach the required efficiency.

Multipurpose Basin Design

Permanent multipurpose basin storage volumes, dimensions, and riser configurations are designed to meet the permanent post-construction requirements for the specific basin.

Two (2) spillway configurations are required for permanent multipurpose basins that are used for both during construction sediment control and post-construction water quantity or water quality control. The first configuration is the temporary sediment basin primary riser spillway consisting of a solid concrete riser with no staged discharges. Runoff only enters the primary riser structure by overtopping and through the floating skimmer.

The second configuration is the permanent basin riser spillway designed to reduce applicable post-development peak flow rates to pre-development peak flow rates and designed for post-construction water quality control.

Post-construction staged orifices, low flow orifices, or staged weirs are securely covered or sealed during the construction phase. Uncover post-construction staged orifices, low flow orifices, or staged weirs after the construction phase is complete.

Floating skimmers and baffles may be removed when the construction phase ends. Clean the temporary sediment basin of deposited sediment and re-grade the basin to meet the permanent basin contours if necessary when the construction phase ends.

Assessing Sediment and Erosion Control Measures

Sediment Storage Volumes and Maintenance Schedules

Calculating the appropriate sediment storage volume is very important in sediment basin and sediment trap design. This volume is the storage occupied by the sediment deposited over the given design period. Design periods may be the life of the basin, or the time between scheduled clean outs. Sediment storage volumes may be predicted by the Modified and the Revised Universal Soil Loss Equations or methods acceptable to the County Engineer or designee.

Note: These calculations are required within the project submittal.

Using the computed sediment yields, Y_D, from the Modified and Revised Universal Soil Loss Equations (MUSLE and RUSLE), along with the sediment bulk (or weight) density, the sediment storage volume can be calculated by:

$$V_{SS} = \frac{Y_D}{W \times 27}$$

Where:

V_{SS} = is the sediment storage volume (cubic yards)
Y_D = is the sediment deposited over the design period (pounds)
W = is the weight density (bulk density) of the deposited sediment (pounds per cubic foot)

W can be determined from soil survey data (usually given in grams per cubic centimeter) or from **Table 9** which provides weight/bulk densities (pounds per cubic foot) applicable for Richland County.

Table 9: Default Weight Density Values for Sediment Storage

Type of Basin Operation	W (lb/ft^3)
Sediment always submerged (Wet Pond)	96
Basin normally empty (Dry Pond)	97

R Factors and EI Values

When designing for sediment storage volume, the sediment deposited over the design period Y_D, must be calculated. This value can be obtained by converting the sediment yield calculated by both the Modified and Revised Universal Soil Loss Equation (MUSLE and RUSLE) into pounds of sediment.

By using the MUSLE equation below, sediment yield from a watershed can be calculated for the smaller storm events.

$$T = \Psi \text{ x } (V \text{ x } Q_p)^{0.56} \text{ x } (K \text{ x } LS \text{ x } CP)$$

Where:

T = Sediment yield per storm event (tons)
Ψ = 95.0 for Imperial units
V = Volume of runoff (acre-feet)
Qp = Peak flow (cubic feet per second)
K, LS, and CP are MUSLE and RUSLE Parameters

One of the variables used in the RUSLE is the R factor. R is the factor in the RUSLE that accounts for the damaging effects of rainfall. The R factor indicates the erosivity of the rainfall, not the average annual precipitation in a locality. The R factor is defined as the number of erosion index (EI) values in a normal year's rain. The EI index value of a given storm is equal to the kinetic energy of the storm (hundreds of foot-tons per acre) multiplied by its maximum 30-minute intensity (inches per hour). The EI values of individual storms may be summed to get an EI value for a month, six months, or for any period of time. When EI values are summed and averaged over a period of years, they become R factors.

The distribution of EI values becomes important when soil losses need to be calculated for a period of time less than one (1) year, such as a construction season. The distribution of the EI values over a known period of time is used to calculate an R factor for that time period. **Table 10** below shows the distribution of EI values for Richland County as a percentage of the R factor for Richland County. This design procedure shall require a minimum EI value of 50 for any construction period.

Table 10: Average Example Distribution of Rainfall Erosion Index (EI Curves) for Richland County

Date	Percent of EI Value
1-Jan	0.0
15-Jan	1.0
1-Feb	2.0
15-Feb	3.0
1-Mar	5.0
15-Mar	7.0
1-Apr	10.0
15-Apr	14.0
1-May	18.0
15-May	22.0
1-Jun	27.0
15-Jun	32.0
1-Jul	37.0

Date	Percent of EI Value
15-Jul	46.0
1-Aug	58.0
15-Aug	69.0
1-Sep	80.0
15-Sep	89.0
1-Oct	93.0
15-Oct	94.0
1-Nov	95.0
15-Nov	96.0
1-Dec	97.0
15-Dec	97.0
1-Jan	100.0

Note: The minimum EI value for any construction period shall be 50. The annual R factor value for Richland County is 350.

Factors and EI Value Example Problem:

- The annual R factor value for Richland County is **350**.
- If construction of a particular site is scheduled to take place for 5 months from January 1 to June 1, the EI Curve value would be 27.0 – 0.0 = **27.0**
- The corresponding R factor for this time period is calculated to be 0.27 x 350 = **94.5.**
- If construction of a particular site is scheduled to take place for 5 months from March 1 to August 1, the EI Curve value would be 58.0 – 5.0 = **53.0**
- The corresponding R factor for this time period is calculated to be 0.53 x 350 = **185.5**

Calculating Sediment Storage Volumes

Use the following steps to determine the storage volume for a sediment trapping structure. All Modified and Revised Universal Soil Loss Equation input values can be found in **Appendix J**: Universal Soil Loss Equation Input Values.

1. Determine the average soil loss per unit area from the site using the Revised Universal Soil Loss Equation:

$$E = R \, x \, K \, x \, LS \, x \, CP$$

Where:

E = Annual erosion rate in (dry weight) (tons/acre/year)

R = Rainfall erosive factor and is an erosion index for the 10-year, 24-hour individual storm (tons/acre/year) (EI Value for given design period * average annual R Value)

K = Soil erodibility factor and is a numerical representation on the susceptibility of a soil to particle detachment and transport by rainfall and runoff

LS = Topographic factor. A numerical representation as to how topographic length and slope steepness impact the rate of erosion. Length-slope steepness factor (length is the slope distance from the point of origin of overland flow to the point of concentrated flow or until deposition occurs (dimensionless)

CP = Control practice factor. A numerical representation on how erosion and sediment control practices minimize soil loss and suspended particles in runoff waters when compared to bare soil conditions. The smaller the number, the more effective (dimensionless)

RUSLE assumes the following about potential erosion rates on construction sites:

- R-Factors and K-Factors are site specific parameters that do not change.
- K-Factor accounts for seasonal changes, such as freezing and thawing, soil moisture and soil consolidation.
- LS-Factors can change by altering the distance runoff flows and varying slope steepness of the land.
- CP-Factor values represent the "ineffectiveness" of a practice to minimize soil erosion and remove sediment from runoff waters when compared to bare ground conditions.

2. Determine the weight density (***W***) of the specific soil. Use Richland County default data from **Table 9**, results from site specific soil test, or the Richland County Soil Survey, which provides soil bulk density usually given in grams/cm^3.
   - Convert (grams/cm^3) to (lb/ ft^3) by multiplying by 62.43
   - $W = (\text{bulk density in grams/cm}^3)\ \text{x}\ (62.43) = \text{lb/ft}^3$

3. Calculate sediment yield ($\mathbf{Y_D}$) in pounds.
   - Determine the total disturbed area **DA** (acres).
   - Determine the sediment yield ($\mathbf{Y_D}$) in tons, calculated by multiplying **A** X **DA**

     $(\text{tons/acre})\ \text{x}\ (\text{acres}) = \text{tons}$

   - Convert tons to pounds to calculate $\mathbf{Y_D}$:

     $\mathbf{Y_D}$ in pounds $= (\text{tons})\ *\ (2000\ \text{lb/ton})$

4. Calculate the required sediment storage volume, $\mathbf{V_{SS}}$, in cubic yards (yd^3):

   $V_{SS} = \frac{Y_D}{Wx27} = Cubic\ Yards$ (yd^3)

5. The design professional can determine the elevation the required sediment storage corresponds with and require a clean out stake to be installed marking this elevation. The contractor shall be required to clean out the basin or trap when this level is reached. The designer shall state the clean out time interval on which the calculations were based, such as weeks, months, or years.

Sediment Storage Volume Example:

Given: A 10-acre construction site is to be cleared to a bare soil condition and developed. The contributing runoff slope length is 400 feet with a 2.5 percent slope. The primary soil is Lakeland Sand. A normally dry sediment basin is to be designed to be the primary sediment control structure on the site.

Calculate: Required sediment storage volume if construction takes place between March 1 and September 1.

1. Determine the average soil loss per unit area from the site using the Revised Universal Soil Loss Equation.

$$E = R\,x\,K\,x\,LS\,x\,C\,x\,P$$

Where:

R = From **Table 10**
EI for September 1 = 80.0 and EI for March 1 = 5.0 (80.0-5.0) = 75% of 350 =**262.5**

K = **0.10** for Lakeland Sand soil

LS = **0.362** for 400 ft slope length with 2.5%

CP = **1.0** for a bare soil condition

Then:

$$\mathbf{E = (262.5)\ x\ (0.10)\ x\ (0.365)\ x\ (1.0) = 9.58\ tons/acre}$$

2. Determine the weight density (**W**) of the Lakeland Sand soil.

The default dry sediment basin weight density for Richland County is: $\mathbf{W = 97\ lb/ft^3}$

3. Calculate sediment yield ($\mathbf{Y_D}$) in pounds.
   - Determine the total disturbed area **DA**: **10 acres**
   - Determine the sediment yield ($\mathbf{Y_D}$) in tons, calculated by multiplying **E (from part 1.) * DA**

$$9.58\ (\text{tons/acre}) * 10\ (\text{acres}) = \mathbf{95.8\ tons}$$

   - Convert tons to pounds to calculate $\mathbf{Y_D}$

$$\mathbf{Y_D} = (95.8\ \text{tons}) * (2000\ \text{lb/ ton}) = 191{,}600\ \text{pounds}$$

4. Calculate the required sediment storage volume, **VSS**, in cubic yards:

$$V_{SS} = \frac{Y_D}{W \times 27} = Cubic\ Yards$$

$$\mathbf{V_{SS} = 191{,}600\ pounds\ /\ (97\ lb/ft^3 * 27\ cubic\ yards/ft^3) = \underline{73.2\ Cubic\ Yards}}$$

Selection of During Construction BMPs

Table 11 lists the acceptable BMPs that may be used during construction activities.

Table 11: Acceptable During Construction BMPs

Erosion Prevention BMPs	Sediment Control BMPs	Runoff Conveyance BMPs
• Surface Roughening • Temporary Seeding/Stabilization • Mulching • Erosion Control Blankets (ECB) • Turf Reinforcement Matting (TRM) • Hydraulic Erosion Control Products (HECPs) • Permanent Seeding/Stabilization • Sodding • Riprap • Outlet Protection • Dust Control • Polyacrylamide (PAM) • Slope Interruption Devices	• Sediment Basin • Floating Skimmer • Porous Baffle • Sediment Trap • Silt Fence • Rock Checks • Sediment Tubes • Construction Entrance • Inlet Protection • Filter Fabric Inlet Protection • Sediment Tube Inlet Protection • Wire Mesh and Stone Inlet Protection • Block and Gravel Inlet Protection • Rigid Inlet Protection • Surface Course Curb Inlet Protection • Inlet Tubes • Rock Sediment dikes	• Pipe Slope Drains • Temporary Steam Crossing • Diversion Measures • Level spreader • Subsurface Drains • Construction Dewatering • Concrete Washout

Erosion Prevention BMPs

Use erosion prevention measures during and after construction site preparation in order to safely convey clean water to storm drains or adequate watercourses. One or more measures should be utilized as appropriate during the project's construction phase. Such measures may include but are not limited to phasing and construction sequencing, surface roughening, temporary seeding, mulching, erosion control blankets, and turf reinforcement matting. Each of these measures is discussed in the sections below. In addition to site-specific erosion control measures, the grading plan includes the following general measures as a minimum:

- Vegetated finished cut and fill slopes should not be steeper than 3H:1V, unless an erosion control blanket or turf reinforcement matting is used.
- Do not place cuts or fills close to property, endangering adjoining property without adequately protecting such properties against erosion, sedimentation, slippage, settlement, subsidence, or other damages.
- Provide subsurface drainage in areas having a high-water table to intercept seepage that affects slope stability, bearing strength, and undesirable wetness.

- Do not place fill material where it can slide or wash onto another property.
- Do not place fill adjacent to channel banks where it can create bank failure, reduce the capacity of the stream, or result in downstream sediment deposition.
- Include all borrow and disposal areas as part of the grading plan.
- Provide adequate channels and floodways to safely convey increased runoff from the developed area to an adequate outlet without causing significant channel degradation or increased off-site flooding.
- Grade the site to direct flows to appropriate controls.

Table 12 lists erosion prevention BMPs that may be used during construction activities.

Table 12: Erosion Prevention BMPs

Erosion Prevention BMPs	Description
Surface Roughening	• Surface roughening is the creation of horizontal grooves, depressions, or steps that run **parallel** to the contour of the land. Several methods can be used for surface roughening. The most commonly used method is tracking. • Perform tracking as soon as possible after vegetation is removed and immediately after grading activities have ceased. • Perform tracking by moving equipment up and down the slope. • Avoid excessive compacting of the soil surface when tracking; **use as few passes as possible with the machinery in order to minimize compaction.**
Temporary Seeding/Stabilization	• Temporary stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily ceased, but in no case later than 14 days after work has ceased, except as stated below. • Where stabilization by the 14th day is precluded by snow cover or frozen ground conditions, stabilization measures must be initiated as soon as practicable. • Where construction activity on a portion of the site is temporarily ceased, and earth-disturbing activities will be resumed within 14 days, temporary stabilization measures do not have to be initiated on the portion of the site. • Initiate temporary stabilization measures on any exposed steep slope (3H:1V or greater) where land-disturbing activities have temporarily ceased and will not resume for a period of seven (7) calendar days.

Erosion Prevention BMPs	Description
Mulching	• Mulching is a temporary soil stabilization erosion control method where materials such as hay, straw, wood chips, wood fibers, or hydraulic erosion control products (HECPs) are placed or installed on the soil surface. • In addition to stabilizing soils, mulching enhances the absorption of water by the soil, reduces evaporation losses, regulates soil temperatures, and reduces the velocity of stormwater runoff over an area.
Erosion Control Blankets (ECB)	• Temporary erosion control blankets (ECBs) are products composed primarily of biologically, photo-chemically, or otherwise degradable constituents such as wheat straw, coconut fiber, or aged curled excelsior wood product with longevity of approximately one (1) to three (3) years. • Applicable for slopes 2H:1V or flatter only. Slopes greater than 2H:1V require Turf Reinforcement Matting (TRM). The maximum allowable continuous slope length for ECB applications is 50 feet. • Applicable for channels and concentrated flow areas with a maximum calculated shear stress less than 1.75 lb/ft^2. Channels and concentrated flow areas with design shear stresses greater than 1.75 lb/ft^2 require TRM. • Consist of double netted matting, defined as matting with netting on both sides of the blanket. • If necessary, slopes, which exceed eight (8) vertical feet, should be stabilized with erosion control blankets or turf reinforcement mats in addition to hydroseeding. • See SCDOT Qualified Products List (QPL) 55, or latest update, for acceptable Temporary Erosion Control Blankets.

Turf Reinforcement Matting (TRM)	Turf reinforcement matting (TRM) products are composed primarily of nondegradable materials that enhance the ability of living plants to stabilize soils. They bind with roots to reinforce the soil matrix with longevity greater than five (5) years.
	• The appropriate type of TRM is determined based on slope and shear stress:
	  ○ Use TRM Type 1 on slopes 2.0H:1V or flatter or in channels where the calculated design shear stress is 4.0 lb/ft^2 or less.
	  ○ Use TRM Type 2 on slopes 1.5H:1V or flatter or in channels where the calculated design shear stress is 8.0 lb/ft^2 or less.
	  ○ Use TRM Type 3 on slopes 1.0H:1V or flatter or in channels where the calculated design shear stress is 12.0 lb/ft^2.

Erosion Prevention BMPs	Description
Turf Reinforcement Matting (TRM) (Continued)	• If necessary, slopes which exceed eight (8) vertical feet should be stabilized with erosion control blankets or turf reinforcement mats in addition to hydroseeding. • See SCDOT Qualified Products List (QPL) 56, or latest update, for acceptable Turf Reinforcement Matting.
Hydraulic Erosion Control Products (HECPs)	• Use HECPs as an allowable mulch for temporary cover by mulch, temporary cover by seeding, or permanent cover by seeding applications. • Do not use HECPs as a channel liner or for areas receiving concentrated flow. • Apply HECP Type 1, 2, 3, and 4 at the appropriate rate on the appropriate maximum slope gradient. Type 1: Slope $\leq$ 4H:1V @ 2,000 lbs./acre Type 2: 4:1 < Slope $\leq$ 3:1 @ 2,500 lbs./acre Type 3: 3:1 < Slope $\leq$ 2:1 @ 3,000 lbs./acre Type 4: 2:1 < Slope $\leq$ 1:1 @ 3,500 lbs./acre • The maximum allowable continuous slope length for HECP application is 50 feet. Provide slope interruption devices for continuous slope length longer than 50 feet. • See SCDOT Qualified Product List (QPL) 65, or latest update, for acceptable HECPs.
Permanent Seeding/Stabilization	Permanent stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have ceased, but in no case more than 14 days after work has ceased, except as stated below. • Where stabilization by the 14th day is precluded by snow cover or frozen ground conditions initiate permanent stabilization measures as soon as practicable. • Initiate permanent stabilization measures on any exposed steep slope (3H: 1V or greater) where land-disturbing activities have permanently ceased.
Sodding	• Sodding is transplanting vegetative sections of plant materials to promptly stabilize areas that are subject to erosion. • Use commercial sod which is a cultured product utilizing specific grass species. • Sodding is appropriate for any graded or cleared area that may erode, and where a permanent, long-lived plant cover is immediately needed.

Erosion Prevention BMPs	Description
Sodding (Continued)	• Examples of where sodding is used are yards, buffer zones, streambanks, dikes, swales, slopes, outlets, level spreaders, and filter strips. • In general, do not use sod on slopes greater than 2H:1V or 3H:1V if it is to be mowed. If sod is placed on steep slopes, lay it with staggered joints and/or staple the sod down.
Riprap	• Riprap is a permanent, erosion-resistant channel lining aggregate consisting of large, loose, angular, stone with a filter fabric, or granular underlining. • The purpose pf riprap is to protect the soil from the erosive force of concentrated runoff and to slow runoff velocities while enhancing the potential for infiltration. • The purpose of the filter fabric or granular underlining is to prevent undermining of the riprap layer by the migration of soil particles through the riprap.
Outlet Protection	• Outlet protection dissipates the energy of concentrated stormwater flows thereby reducing erosion or scouring at stormwater outlets and paved channel sections. In addition, outlet protection lowers the potential for downstream erosion. • This type of protection can be achieved through a variety of techniques, including permanent TRMs, riprap, concrete aprons, paved sections, and other structural materials. The most typical application is riprap for outlet protection. • Outlet protection should be placed at the outlets for all pipes, channels, and other stormwater conveyance structures in order to reduce the potential for erosion. • The design criteria, calculations, and procedures for sizing the riprap and determining the dimensions of riprap pads shall be provided.
Dust Control	• Wind erosion occurs when the surface soil is loose and dry, vegetation is sparse or absent, the wind is sufficiently strong, and when construction traffic disturbs the soil. • Wind erodes soils and transports the sediment off-site in the form of fugitive dust, where it may be washed into receiving water bodies by the next rainfall event. • Fugitive dust is a nuisance for neighbors. It settles on automobiles, structures, and windows and finds its way into homes. It also makes breathing difficult for those with respiratory problems and becomes a safety problem when it blinds motorists, equipment operators, and laborers.

Erosion Prevention BMPs	Description
Dust Control (Continued)	• Utilize dust control methods whenever there are offsite dust impacts, especially during periods of drought. Implement dust control as needed until final stabilization is reached.
Polyacrylamide (PAM)	• The most common flocculants used in stormwater treatment systems are anionic Polyacrylamide (PAM) typically available in four (4) media types (dry, powder, liquid, emulsion, and solid). • Apply PAM as a means of sediment and turbidity control in highly sensitive areas or waterbeds. PAM is used to treat construction stormwater runoff that contains high amounts of eroded fine silt, clay, or colloidal particles resulting in high turbidity in the runoff water. • Conduct a site-specific assessment (soil and water testing) by a qualified manufacturer or qualified professional to select the specific PAM, application rate, application method(s), and maintenance procedure tailored to the site-specific soil characteristics, topography, hydrology, and the type of sediment control structure utilized.
Slope Interruption Devices	• Use slope interruption devices for erosion prevention on slopes greater than 50 feet in length for Hydraulic Erosion Control Products (HECPs) and Temporary Erosion Control Blanket (ECB) slope applications. • At the discretion of the engineer, use slope interruption devices on slope lengths less than 50 feet when slope erosion is expected or observed. • For slope interruption devices for erosion prevention, use non-weighted sediment tubes composed of processed degradable natural material within synthetic or natural fiber tubular, flexible outer netting. • Do not use straw bales, pine bales, leaf mulch, and/or grass clippings for slope interruption devices. Ensure that the inner material is long term biodegradable and/or photodegradable. • Use tube diameter ranging from six (6) inches to 12 inches. • See SCDOT Qualified Product List (QPL) 58, Type F Non-Weighted Inlet Tubes or latest update, for acceptable slope interruption devices.

Sediment Control BMPs

Standard application sediment control BMPs are recommended for use in a wide variety of application situations. These sediment control BMPs have demonstrated the ability to effectively treat during construction stormwater runoff for TSS removal. Design methodologies and computer models are

available that can compute the efficiency of these BMPs.

Table 13 lists sediment control BMPs to be used during construction activities.

Table 13: Sediment Control BMPs

Sediment Control BMPs	Description
Sediment Basin	• Sediment Basins are used to collect and impound stormwater runoff from disturbed areas of five (5) acres or more to restrict sediments and other pollutants from being discharged off-site. • Sediment basins work most effectively in conjunction with additional erosion prevention and sediment control BMPs installed and maintained up gradient of the basins. • Trapping efficiency calculations show that all sediment basins are capable of achieving a sediment trapping efficiency of at least 80 percent TSS for the 10-year, 24-hour storm event. • Sediment basins provide storage for the 10-year, 24-hour storm event for disturbed conditions to obtain 80 percent TSS removal efficiency or 3,600 ft3/acre draining to the basin. • When discharging stormwater runoff from sediment basins, utilize outlet structures that only withdraw water from near the surface of the basin or impoundment, unless infeasible. The use of perforated riser structures during construction are not allowed. This outlet structure should be capable of conveying the flow for the 10-year, 24-hour storm event. • Sediment basins are designed for the total area draining to them. • Forebays accounting for 20 percent of the overall sediment storage volume must be installed, unless infeasible. • A riprap berm, gabion, or an earthen berm with a rock filled outlet may be constructed across the bottom of the sediment basin to create a cell within the basin for use as the sediment forebay. • The location and height of the forebay berm should be designed to meet the appropriate sediment forebay volume and depth criteria. • Alternatively, plunge pools or rock berms may be constructed around each inlet to create a combined forebay volume behind the berms equal to the minimum sediment forebay volume recommendation. • The depth of the forebay will be dependent upon the required volume. It is recommended to keep the forebay depth between two (2) and four (4) feet.

Sediment Control BMPs	Description
Sediment Basin (continued)	• A fixed sediment forebay cleanout stake is recommended. This cleanout stake is beneficial since the forebay may become inundated with sediment faster than the rest of the basin. • The recommended cleanout height for sediment forebays is one-half (1/2) the height of the forebay berm. • A clean-out stake marked at 50 percent of the designed sediment storage depth shall be provided in all sediment basins. • Basin length to width ratio minimum of 2L:1W. • Bottom slope shall be 0.5 percent or steeper. • Maximum embankment side slopes shall be 2H:1V. The recommended slope is 3H:1V to allow for ease of maintenance and stabilization of the banks. • Promptly stabilize all areas disturbed by the construction of the embankment including embankment side slopes and access areas. • All earthen basin side slope shall be protected with an erosion control blanket and appropriate seeding. • Temporary or permanent stabilization measures should be conducted as necessary. • Each outlet shall be designed to prevent scour and to reduce velocities during peak flow conditions. Each outlet should be directed towards pre-existing point source discharges or be equipped with a mechanism to release the discharge as close to sheet flow as possible to prevent the creation of new point source discharges. • Restrict the outlet from being placed within 20 linear feet of adjacent properties lines.
Floating Skimmer	• Sediment basins must dewater via an outlet structure that pulls water from the surface, unless infeasible. Options for this include skimmers and flashboard risers. • Sediment basins shall be designed to fully dewater in a minimum of two (2) days and a maximum of five (5) days. • Provide drawdown calculations of the selected skimmer(s).
Porous Baffle	• Porous baffles must be provided in all sediment basins and sediment traps, unless infeasible. • A minimum of three (3) porous baffle rows should be installed across the width of the entire sediment basin (including side slopes) where the basin length is greater than 50 feet. • For basins with a length of 50 feet or less, only two (2) rows of porous baffles are necessary to be installed. • The minimum spacing between baffle rows is 10 feet. • The recommended height of each baffle is three (3) feet.

Sediment Control BMPs	Description
Porous Baffle (Continued)	• When feasible, the height of each baffle should be equal to or above the 10-year, 24-hour storm design water surface elevation within the sediment basin. • Porous baffles should be composed of coir-based materials or TRMs with a light penetration (open space) between 10 percent and 35 percent. • Do not use baffles made of straw materials. • **Silt fence shall not be used as porous baffles.** • Use steel posts with a minimum weight of 1.25 lb. per liner foot. • Install steel posts at a maximum of four (4) feet on center. • A rope or wire can be used along the top of the baffle to prevent excessive sagging between the posts.
Sediment Trap	• Sediment traps are used for drainage areas **less than 5 acres.** • Do not place sediment traps in Waters of the State or USGS blue-line streams. • Trapping efficiency calculations show a sediment trapping efficiency of at least 80 percent TSS for the 10-year, 24-hour storm event. • Sediment traps provide storage for the 10-year, 24-hour storm event for disturbed conditions or 1,800 ft^3/acre draining to the trap. • The 10-year, 24-hour storm event for construction conditions cannot overtop the trap's spillway. • Sediment traps are designed for total area draining to them. • Rock outlet structure composed of 12-inch D50 riprap with 1-inch D50 washed stone on the upstream face. Place an underlying non-woven geotextile beneath the rock. • Design internal side slopes to be 3H:1V or flatter. Embankment Requirements: – Maximum dam height: 5 feet – Maximum stone height: 3.5 feet – Maximum rock bottom width: 3 feet – Maximum top flow length at top of riprap: 2 feet – Maximum rock embankment upstream and downstream side slopes: 2H:1V • Surface dewatering is not required for sediment traps. • Install at least two (2) rows of porous baffles in the sediment trap. • There should be at least 10 feet between each baffle and between any baffle row and any of the sediment trap inlets or outlet. • Install clean-out stake, marked at 50 percent of the designed sediment storage volume.

Sediment Control BMPs	Description
Silt Fence	• Only use silt fence in areas with drainage areas of less than one-fourth (1/4) acre per 100 linear feet of fence and do not use in areas with concentrated flows. • The maximum allowable slope steepness perpendicular to the fence line is 2H:1V. • See SCDOT Qualified Product (QPL) 34, or latest update, for acceptable silt fence fabric. Install filter fabric from continuous rolls cut to the length of the barrier. • 12 inches of fabric should be placed within an excavated trench and toed in when the trench is backfilled. • Install filter fabric a minimum of 24 inches above the ground.
Rock Checks	• A rock check dam is a small, temporary or permanent rock fill dam constructed across a drainage ditch, swale, or channel to lower the speed of concentrated flows. • Design rock check dams to have an 80 percent design removal efficiency goal of the total suspended solids (TSS) in the inflow. • Do not place check dams in Waters of the State or USGS blue-line streams (unless approved by Federal authorities). • Install in steeply sloped swales or in swales where adequate vegetation cannot be established. Use rock check dams in small open channels. • Place a non-woven geotextile fabric over the soil surface where the rock ditch check is to be placed. • Composed of 12-inch D50 riprap with 1-inch D50 washed stone on the upstream face. • Shall not exceed a height of two (2) feet at the center line of the channel. Ensure center of ditch check is lower than the edges. • Have a minimum top flow length of two (2) feet. • Place riprap over channel banks to prevent runoff from cutting around the ditch check. • Place riprap by hand or mechanical placement (no dumping of rock to form dam). • Spacing varies with the bed slope of the ditch. Space rock checks such that the toe of the upstream check is at the same elevation as the top of the downstream check.
Sediment Tubes	• Sediment tubes are elongated tubes of compacted geotextiles, curled excelsior wood, natural coconut fiber, or hardwood mulch. • Straw, pine needle, and leaf mulch-filled sediment tubes are not permitted.

Sediment Control BMPs	Description
Sediment Tubes (continued)	• Do not use straw, curled excelsior wood, or natural coconut rolled erosion control products (RECPs) rolled up to create a sediment tube. • See SCDOT Qualified Product List (QPL) 57, or latest update, for acceptable Sediment Tubes. • Install sediment tubes along contours, in drainage conveyance swales, and around inlets to help reduce the effects of soil erosion by energy dissipation and retaining sediment. • Sediment tubes, when used as checks within channels should range between 18 and 24 inches depending on the channel dimensions. Diameters outside this range may be allowed where necessary when approved. • Install each sediment tube in a trench with a depth of 20 percent the tube diameter. • Place sediment tubes up the side slopes of the channel a minimum of one (1) foot above the design flow depth of the channel.
Construction Entrance	• A stabilized construction entrance is a temporary stone-stabilized pad located at all points of vehicular ingress and egress on a construction site to reduce the amount of mud, dirt, and rocks transported onto public roads by motor vehicles equipment and runoff. • Install a non-woven geotextile fabric on the underlying soil prior to placing stone. • Install a culvert pipe underneath the entrance when needed to provide positive drainage. • Consists of 2-inch to 3-inch D50 stone placed at a minimum depth of six (6) inches.
Inlet Protection	• Storm drain inlet protection is achieved by placing a temporary filtering device around any inlet to trap sediment. This mechanism prevents sediment from entering inlet structures. Additionally, it serves to prevent the silting-in of inlets, storm drainage systems, or receiving channels. See SCDOT Qualified Product List (QPL) 58, or latest update, for acceptable Inlet Protection. There are seven (7) types of inlet structure filters, including: – Type A- Low Flow – Type B- Medium Flow, Low Velocity – Type C- Medium Flow, Medium Velocity – Type D- High Flow, High Velocity – Type E- Surface Course Curb Inlet

Sediment Control BMPs	Description
Inlet Protection (Continued)	– Type F- Inlet Tubes – Type G- Suspended Internal Inlet Filters
Type A – Filter Fabric Inlet Protection	• Low Flow Inlet Filters include filter fabric inlet protection. • Applicable for inlets with peak flow rates less than one (1) cubic feet per second where the inlet drainage area has grades less than five (5) percent and the immediate drainage area (five-foot radius around the inlet) has grades less than one (1) percent. • Do not use Type A inlet filters for areas receiving concentrated flow.
Type A – Sediment Tube Inlet Protection	• Low Flow Inlet Filters include 18-inch diameter sediment tubes. • Applicable for inlets with peak flow rates less than one (1) cubic feet per second where the inlet drain area has grades less than five (5) percent and the immediate drainage area (five-foot radius around the inlet) has grades less than one (1) percent. • Do not use Type A inlet filters for areas receiving concentrated flow.
Type B – Wire Mesh and Stone Inlet Protection	• Medium Flow, Low Velocity Inlet Filters include wire mesh and stone inlet protection. • Applicable for inlets with peak flow rates less than three (3) cubic feet per second where the inlet drain area has grades less than five (5) percent. • Flow velocities to the inlet may not exceed three (3) feet per second. • Applicable where an overflow capacity is not required to prevent excessive ponding around the structure.
Type C – Block and Gravel Inlet Protection	• Medium Flow, Medium Velocity Inlet Filters include block and gravel inlet protection. • Applicable for inlets with peak flow rates less than three (3) cubic feet per second where the inlet drain area has grades less than five (5) percent. • Flow velocities to the inlet may not exceed five (5) feet per second. • Applicable where an overflow capacity is not required to prevent excessive ponding around the structure. • Not applicable in areas exposed to traffic, such as median drains.
Type D – Rigid Inlet Protection	• Rigid Inlet Filters include prefabricated inlet filters composed of a geotextile fabric connected to a rigid structure. • Applicable for drainage areas up to two (2) acres with peak flow rates greater than three (3) cubic feet per second where the inlet drain area has grades greater than five (5) percent. • Flow velocities to the inlet may exceed three (3) feet per second.

Sediment Control BMPs	Description
Type D – Rigid Inlet Protection (Continued)	• These filters are used for median applications (Type D1) and for sump applications (Type D2). • Applicable where an overflow capacity is required to prevent excessive ponding around the structure. • Capable of protecting inlet structures not associated with curb inlets. The inlets may include, but are not limited to yard inlets, DI 24-inches, DI 24-inches by 36-inches and manholes.
Type E – Surface Course Curb Inlet Protection	• Surface Course Curb Inlet Filters include prefabricated inlet filters composed of a synthetic material that has aggregate compartments for stone, sand, or other weighted mechanisms to hold the unit in place. • Applicable for roadway catch basins after the road surface course is places.
Type F – Inlet Tube	• Inlet Tubes are classified in two (2) categories: weighted and non-weighted. – Weighted inlet tubes are applicable for inlets with drainage areas less than one (1) acre. Weighted inlet tubes are used for placement on gravel, concrete, asphalt or other hard surfaces around drainage inlets where stakes cannot be driven. Weighted inlet tubes are applicable where construction traffic may occur around the inlet. All weighted Type F Inlet Structure Filters are applicable as Type E Inlet Structure Filters. – Non-weighted inlet tubes are inlet tubes applicable for Catch Basins with drainage areas less than one (1) acre where stakes or posts are driven to hold the tube in place. For non-weighted inlet tube applications, an inlet tube is placed on subgrade and is applicable until the road base course is placed. • Both weighted and non-weighted inlet tubes are applicable as weep hole inlet filters, but non-weighted inlet tubes can only be used in situations where stakes are driven into the ground or subgrade to secure the tube.
Type G – Suspended Internal Inlet Filters	• Install a Type G suspended inlet filter for inlets with drainage areas less than one (1) acre and peak flow rates to the inlet less than three (3) cubic feet per second. • Use Type G suspended inlet filters to protect inlet structures such as Catch Basin Type 9, yard inlets, Drop Inlet 24 inches by 24 inches, Drop Inlet 24 inches by 36 inches, and manholes. • Use Type G internal inlet filters that are manufactured to fit the opening of the catch basin or drop inlet. Use Type G internal inlet filters during construction to prevent silt and sediment from

Sediment Control BMPs	Description
Type G – Suspended Internal Inlet Filters (Continued)	entering drainage systems while allowing water to pass through freely.
Rock Sediment Dikes	• Rock sediment dikes are semi-circular sediment control structures constructed across drainage ditches, swales, low areas, or other areas that receive concentrated flow. • A rock sediment dike consists of a half circular shaped rock embankment with a sump area constructed for sediment storage. Design rock sediment dikes to have an 80 percent design removal efficiency goal of the total suspended solids (TSS). • Rock sediment dikes are most effective in areas where sediment control is needed with minimal disturbance. Use as a sediment control structures for the outfalls of diversion swales, diversion dikes, in low areas or other areas where concentrated sediment laden flow is expected. • Use rock sediment dikes for drainage less than two (2) acres. • Do not place rock sediment dikes in Waters of the State (unless approved by DHEC, State, or Federal authorities).

Runoff Conveyance BMPs

Standard application runoff conveyance BMPs are recommended for use in a wide variety of application situations. These structural controls have demonstrated the ability to effectively convey runoff or standing water during construction. Design methodologies are available to design these BMP types.

Table 14 lists runoff conveyance BMPs that may be used during construction activities.

Table 14: Runoff Conveyance BMPs

Runoff Conveyance BMPs	Description
Pipe Slope Drains	• Pipe slope drains reduce the risk of erosion by discharging concentrated runoff from the top to the bottom of slopes. • Use pipe slope drains where it is necessary for water to flow down a slope without causing erosion, especially before a slope has been stabilized or before permanent drainage structures are installed. Install temporary pipe slope drains prior to construction of permanent drainage structures. • Stabilize the inlets and outlets of pipe slope drains with flared end sections, Erosion Control Blankets (ECBs), Turf Reinforcement

Runoff Conveyance BMPs	Description
Pipe Slope Drains (Continued)	Mats (TRMs), or riprap. Fully compact the soil around the pipe entrance to prevent bypassing and undercutting of the structure. Stabilize the discharge end of the pipe and along the bottom of any swales that lead to sediment trapping structures. • Typical pipe slope drains are made of non-perforated corrugated plastic pipe and are designed to pass the peak flow rates for the 10-year, 24-hour storm event.
Temporary Stream Crossing	• A temporary stream crossing is a bridge or culvert across a stream or watercourse for short-term use by construction vehicles and heavy equipment. A stream crossing provides a means for construction vehicles to cross streams or watercourses without moving sediment to streams, damaging the stream bed or channel, or causing flooding. • Prior to constructing a temporary stream crossing, the owner/person financially responsible for the project must submit an Application for Permit to construct across or along a stream to DHEC. • Temporary stream crossings require authorization. Refer to the US Army Corps of Engineers and DHEC nationwide 401 and 404 regulations, or latest update, for information on permitting requirements.
Diversion Measures	• Diversion dikes and berms (ridges of compacted soil) and diversion swales (excavated depressions) are used to divert upslope runoff from crossing areas where there is a high risk of erosion. Use runoff conveyance structures as temporary clean water diversions, temporary sediment laden diversions, or permanent clean water diversions. Use runoff control measures as either temporary or permanent stormwater control structures. • Complete stabilization of stormwater conveyance channels within seven (7) days of channel construction. Examples of vegetative and non-vegetative stabilization techniques include channel liners, rolled erosion control products (e.g., erosion control blankets and turf reinforcement mats), riprap, geotextiles, or other armoring materials that are suitable for use in areas with concentrated or channelized flow. • Application of mulch, HECP, tackifier, or similar erosion prevention practices that are erodible, conveyable, or that obstruct flow when used in areas with concentrated or channelized flow in stormwater conveyance channels is prohibited.

Runoff Conveyance BMPs	Description
Level Spreader	• A level spreader is a permanent outlet for dikes and diversions consisting of an excavated channel constructed at zero grade across a slope that converts concentrated runoff to sheet flow and releases it onto areas stabilized by existing vegetation. • Sediment-laden waters should not be directed towards level spreaders.
Subsurface Drains	• A subsurface drain is a perforated pipe or conduit placed beneath the surface of the ground at a designed depth and grade. Subsurface drains are used to do the following: – Draining areas by intercepting and conveying groundwater – Lower the water table – Drain or de-water stormwater detention structures – Prevent sloping soils from becoming excessively wet and subject to slippage
Construction Dewatering	• Construction dewatering involves removing stormwater or ground water from bore pits, trenches, and other excavations on a construction site. Typically, this removal of water involves the pumping of the water to an appropriate receiving area. Direct pumping to lakes, rivers, and streams is illegal and must be avoided. • Size the pump utilized for de-watering purposes properly. Each pump has its own unique rating curve; therefore, it is not feasible to list them in this chapter. The pump rating curve is used to calculate pump design flows based on head loss through the pump system. • Pump sediment-laden water directly to: – A sediment control structure (sediment basin, sediment trap, manufactured de-watering device or bag) – An infiltration trench – A buffer strip or zone
Concrete Washout	• Concrete washouts are designed to minimize or eliminate the discharge of concrete waste materials to storm drain systems or to waterbodies. Concrete waste management procedures and practices are implemented on construction projects where: – Concrete or mortar is used as a construction material or where concrete dust and debris result from demolition activities. – Slurries containing Portland cement concrete (PCC) or asphalt concrete (AC) are generated, such as from saw cutting, coring, grinding, grooving, and hydro-concrete demolition. – Concrete trucks and other concrete-coated equipment are washed on site.

Runoff Conveyance BMPs	Description
Concrete Washout (continued)	– Mortar-mixing stations exist. • Place a sign within 30 feet of each temporary concrete washout facility to inform concrete equipment operators to utilize the proper facilities. • Temporary concrete washout facilities are located a minimum of 50 feet from storm drain inlets, open drainage facilities, waterbodies, creek banks, or perimeter control unless determined infeasible by the Design Engineer. Each facility is located away from construction traffic or access areas to prevent disturbance or tracking. • Above Grade Temporary concrete washout facilities are constructed with a minimum length and width of 10 feet and sufficient quantity and volume to contain all liquid and concrete waste generated by washout operations. The length and width of a facility may be increased, upon approval from the Design Engineer. Plastic lining material is a minimum of 10-millimeter polyethylene sheeting and is free of holes, tears, or other defects that compromise the impermeability of the material. Portable delineators are applied only to a clean, dry surface. • Below Grade Temporary concrete washout facilities are constructed with a recommended minimum length and width of 10 feet and sufficient quantity and volume to contain all liquid and concrete waste generated by washout operations. The length and width of a facility may be increased, upon approval of the Design Engineer. Lath and flagging shall be commercial type. Plastic lining material is a minimum of 10-millimeter polyethylene sheeting and is free of holes, tears, or other defects that compromise the impermeability of the material. The soil base is prepared free of rocks or other debris that may cause tears or holes in the plastic lining material. • Clean out all temporary concrete washout facilities when they are 50 percent full. • When temporary concrete washout facilities are no longer required for the work, the hardened concrete shall be removed and disposed of in conformance with the provisions in the Project Standard Specifications. Materials used to construct temporary concrete washout facilities shall be removed from the site of the work. Holes, depressions, or other ground disturbance caused by the removal of the temporary concrete washout facilities shall be backfilled and stabilized.

Maintenance of BMPs During Construction

Proper operation and maintenance of BMPs is critical to ensure that the effectiveness and integrity of the BMPs as water quality control is maximized. This insurance is critical in a performance-based program of stormwater runoff controls. BMP maintenance is the responsibility of the facility owner.

All BMPs and other protective measures identified in the SWPPP shall be maintained in effective operating condition. If construction site inspections identify BMPs that are not operating effectively, maintenance shall be performed within seven (7) calendar days, before the next inspection, or as soon as reasonably possible, and before the next storm event whenever practicable to maintain the continued effectiveness of the BMPs.

If periodic inspection or other information indicates that a BMP has been used inappropriately, or incorrectly, the Permittee shall address the necessary replacement or modification required to correct the BMP within 48 hours of identification. If existing BMPs need to be modified or if additional BMPs are necessary, implementation shall be completed before the next storm event whenever practicable. If implementation before the next storm event is impracticable, the situation shall be documented in the SWPPP and alternative BMPs shall be implemented as soon as reasonably possible.

Remove deposited sediment from sediment traps or sedimentation basins when the design capacity has been reduced by 50 percent or the sediment has reached the clean out point on the cleanout stake (whichever occurs first).

Remove deposited sediment collected by sediment control measures (silt fence, check dams, sediment tubes, etc.) when the deposited sediment reaches one-third (1/3) the height of the above-ground portion of these BMPs, or as directed by the engineer.

Selection of Permanent BMPs

There are two (2) major categories of permanent best management practices (BMPs), non-structural and structural. Non-structural BMPs are passive or programmatic BMPs. Non-structural BMPs include public education and outreach, used oil recycling, household hazardous waste turn-in, litter control programs, zoning and land use controls, chemical applicator certification and training, etc. Non-structural BMPs tend to be source control BMPs that reduce pollution in runoff by reducing the opportunity for the pollutants to be exposed to stormwater runoff.

Structural BMPs are physical structures that can be seen on the ground, including wet and dry ponds, bioretention areas, grassed swales, filter strips, buffer strips, and manufactured BMPs, such as catch basin inserts. Some structural BMPs are passive and are considered source controls while others are considered end of pipe treatment.

BMP selection is a complex process. There are a number of competing factors that need to be addressed when selecting the appropriate BMP or suite of BMPs. BMPs should be incorporated into a comprehensive stormwater management plan. Without proper BMP selection, design, construction, and maintenance, BMPs will not be effective in managing stormwater runoff. BMP selection can be

tailored to address the various sources of runoff and pollutants produced from urbanized areas. Site suitability for selecting a particular BMP strategy is key to successful performance. Most BMPs have limitations for their applicability and therefore cannot be applied in all areas. Considerations to incorporate into BMP selection are:

- Size of drainage area
- Land use
- Average rainfall frequency, duration and intensity
- Runoff volumes and flow rates
- Soil types
- Site slopes and geology/topography
- Availability of land for BMP installation
- Future development/land use in watershed
- Depth to groundwater table
- Availability of supplemental water to support vegetative BMPs
- Susceptibility to freezing
- Safety and community acceptance
- Proper access for maintenance
- Periodic and long-term maintenance and rehabilitation needs

BMP Selection Considerations

In most cases, Permanent Wet/Dry Detention Ponds are the most common post-construction feature that is for both stormwater quantity and quality control. Other practices may be acceptable to the County if they can be show equivalent or superior pollutant removal efficiency and provide adequate peak flow control. Use of other BMP practices shall be approved as determined during the formal review submittal.

Floodplains

Placement of stormwater BMPs within a designated 100-year floodplain as shown on FEMA's Flood Insurance Rate Map (FIRM), is strongly discouraged. In case of a large flood, floodwaters could cause significant damage to the BMP. No stormwater BMP will be allowed in the designated "floodway" without a Conditional Letter of Map Revision (CLOMR) obtained from FEMA certifying that the proposed BMP will not adversely affect flood elevations. Stormwater BMPs placed in the floodplain should be appropriately constructed to prevent damage from floodwaters.

Stream Buffers

Stream buffers protect the overall quality of the stream by achieving pollutant removal as runoff flows through the buffer and by providing shade for the stream and habitat for wildlife. Placing stormwater BMPs in stream buffers is strongly discouraged; other alternative locations should be examined. Whenever there is a practical alternative, structural BMPs should not be placed in stream buffers. If encroachment into the stream buffer is needed, the amount of stream buffer area that is impacted should be minimized and the distance between the impact and the stream channel should be

maximized. In addition, consideration should be given to the design of the BMP discharge to prevent erosion in the buffer zones and of stream banks.

Waterbodies and Wetlands
It is the intent to design stormwater management devices to remove pollutants before they have a chance to enter jurisdictional waters and wetlands. Stormwater BMPs should be constructed outside of perennial streams and natural wetland areas unless no practical alternative exists. In addition, natural or existing lakes, ponds, and wetlands should not be considered for stormwater BMP retrofits until Federal and State Permits for such purpose have been obtained. The U.S. Army Corps of Engineers (USACE) requires that all impacts to jurisdictional waters and wetlands are reported. Depending on the impact, the USACE and other federal and state agencies may require the applicant to obtain permits, prepare environmental documents, mitigate for the impact, and adhere to other permit requirements.

Impoundment Safety
Stormwater BMPs designed to impound water may pose a potential hazard to downstream citizens and property. Because stormwater BMPs are mostly used in urbanized areas or rapidly growing areas, potential hazards related to water impoundments and dams are increased. Construction of a dam to create a stormwater impoundment (pond) shall be classified according to size and potential hazard to downstream areas and meet South Carolina dam safety regulations applicable for those size and hazard classifications.

Maintenance
All permanent BMPs must have as-built certifications submitted to the appropriate Richland County department for recording. All permanent BMPs must be shown on an as-built plat, have appropriate access for maintenance, and must include the appropriate maintenance agreement.

Impervious Areas
Runoff shall be discharged from impervious surfaces through retention basins, detention basins, filtering BMPs, Manufactured Treatment Devices (MTDs) and/or subject to some type of BMP prior to discharge from the project site. BMP means a practice or combination of practices determined by the design professional to be the most effective means of preventing or reducing the amount of siltation and pollution discharged from the project site.

Stagnant Water Conditions
Dead end flow configurations, which create stagnant water conditions, shall not be allowed. All BMPs shall be designed, constructed, and maintained with consideration for the proper control of mosquitoes and other vectors.

Stormwater Management Structure Access and Maintenance
Areas to be utilized for the conveyance or storage of stormwater shall be legally reserved for that purpose by plat, easement or other means so that subsequent owners or others may not remove such areas from their intended use. Such areas shall be connected to a public road or other location from which operation and maintenance is legally available. Ease of maintenance shall be considered as a site design component. Access to the stormwater management structure shall be provided.

A clear statement of defined maintenance responsibility shall be established during the SWPPP review and approval process. A Maintenance Agreement shall be signed for all permanent structural BMPs.

Upstream Runoff

Runoff from higher adjacent or upstream lands shall be considered and provisions for conveyance of such runoff shall be included in drainage plans. As directed by the County Engineer, upstream analysis shall be conducted to demonstrate to the extent practicable the project has capacity to convey upstream runoff and does not cause adverse upstream impacts, such as flooding.

Infiltration BMP Design Requirements

Infiltration can be an effective practice of controlling post-construction stormwater runoff since it reduces the volume of runoff that is discharged to receiving waters and the associated water quality and quantity impacts that runoff can cause. Infiltration is also an important mechanism for pollutant control. As runoff infiltrates into the ground, particulates and attached contaminants such as metals and nutrients are removed by filtration, and dissolved constituents can be removed by adsorption. Infiltration is not appropriate in all areas. Low soil infiltration rates, high or perched groundwater tables, or bedrock may limit the feasibility and/or the effectiveness of infiltration practices.

If infiltration BMPs are selected, strict development designs will have to be approved by the County Engineer.

Permanent infiltration practices, when used, shall be designed to meet Richland County WQ Design Standards, described previously in the Post-Construction Water Quality Standards section.

The minimum allowable infiltration rates of all underlying soils shall be greater than 0.5 inches per hour. Infiltration BMPs shall be designed for the prevention of clogging by fine materials and for ease of cleaning with conventional vacuum cleaning equipment. This may include but not necessarily be limited to wrapping of the Infiltration BMP (perforated pipes/chambers/trenches) with an appropriate fabric and providing sufficient clean outs for the system.

Systems shall have an overflow to a positive drainage system with a control device, if necessary, between the subsurface system and the positive drainage system. The overflow pipe shall be sized for the allowable discharge.

Soil Testing – Infiltration Rates

Soil testing for infiltration rates shall be performed by a registered licensed geotechnical engineer for BMPs such as Infiltration Trenches, Bioretention, Dry Detention Ponds, and Wet Detention Ponds. A minimum of five (5) separate locations shall be tested for infiltration rates for each BMP. In general, these tests shall be conducted in the four (4) corners and the center of the BMP.

The initial test elevation locations shall be at the same contour elevation as the bottom/invert of the Infiltration BMP.

For tests involving excavation of a test well or extraction of a soil core, each test shall be conducted to a depth 4 feet below the bottom/invert of the BMP.

Infiltration BMPs shall be designed and validated based on actual test data. Tests shall be consistent as to soil conditions, proposed infiltration BMP elevations, infiltration BMP locations and water table depths with the proposed infiltration BMP system.

The following tests are allowable to determine infiltration rate for soils (other test methods must be approved by the County Engineer):

- Laboratory Permeameter Test for saturated hydraulic conductivity on undisturbed soil samples (ASTM D5084)
- Double Ring Infiltrometer Test to estimate the initial vertical unsaturated permeability data of the upper soil layer (ASTM D 3385)
- Constant Head Test in soils with permeability that allow keeping the test hole filled with water during the field test (AASHTO T 215)
- Falling Head Test in areas with excellent soil percolation where keeping the test hole filled with water is not feasible during the test

Acceptable Post-Construction Water Quality BMPs

Table 15 lists the acceptable water quality BMPs that may be used and notes whether they are appropriate for standard, limited, or minimal applications.

Design methodologies and computer models such as the IDEAL model are available that can compute the efficiency of these BMPs to demonstrate compliance with Richland County WQ Standards described previously in the Post-Construction Water Quality Design Standards section.

Table 15: Acceptable Post-Construction Water Quality BMPs

Standard Application Structural BMPs	Limited Application Structural BMPs	Minimal Application Controls
• Wet Detention Ponds • Wet Modified Extended Detention Ponds • Dry Extended Detention Ponds • Infiltration Trenches and Dry Wells • Bioretention • Vegetated Filter Strip	• Grass Swale • Enhanced Swale • Porous Paver Systems • Porous Asphalt or Concrete • MTD Type 3 (Media Filter Inserts)	• Infiltration Basin • Constructed Stormwater Wetlands

Standard Application Structural BMPs

Standard application structural BMPs are recommended for use in a wide variety of application situations. These structural controls have demonstrated the ability to effectively treat stormwater runoff for water quality for post-development stormwater runoff.

Standard application structural BMPs are recommended for use in a wide variety of application situations. These structural controls have demonstrated the ability to effectively treat stormwater runoff for water quality for post-development stormwater runoff. Design methodologies and computer models such as the IDEAL model are available that can compute the efficiency of these BMP types.

Table 16 lists the standard application structural BMPs.

Table 16: Standard Application Structural BMPs

Standard Application Structural BMPs	Description
Wet Detention Ponds	• Wet Detention Ponds are constructed stormwater basins that have a permanent pool of water. • Are applicable to drainage areas over 25 acres. • Stormwater runoff from each rain event is detained and treated in the temporary water quality pool and released at a designed rate to achieve water quality requirements. • Are also applicable to achieve water quantity requirements.
Wet Modified Extended Detention Ponds	• Wet Modified Extended Detention Ponds are constructed stormwater basins that have a permanent micropool of water. • Are applicable to drainage areas between 10 and 25 acres. • Stormwater runoff from each rain event is detained and treated in the temporary water quality pool and released at a designed rate to achieve water quality requirements. • Are also applicable to achieve water quantity requirements.
Dry Extended Detention Ponds	• Dry Extended Detention Ponds are constructed stormwater basins that do not have a permanent pool of water. • Are restricted to sites with a maximum drainage area of 25 acres. • Stormwater runoff from each rain event is detained and treated in the temporary water quality pool and released at a designed rate to achieve water quality requirements. • Are also applicable to achieve water quantity requirements.

Standard Application Structural BMPs	Description
Infiltration Trench	• An infiltration trench is an excavated trench filled with stone aggregate used to capture and allow infiltration of stormwater runoff into the surrounding soils from the bottom and sides of the trench to achieve water quality requirements. • Alone, typically not applicable to achieve water quantity requirements. • Applicable for drainage areas up to two (2) acres.
Bioretention	• Bioretention Areas are shallow stormwater basins or landscaped areas that utilize engineered soils and vegetation to capture and treat stormwater runoff to achieve water quality requirements. • Runoff may be returned to the conveyance system or partially exfiltrated into the soil. • Alone, typically not applicable to achieve water quantity requirements. • Applicable for drainage areas up to two (2) acres.
Vegetated Filter Strips	• Vegetated filter strips provide filtering of stormwater runoff as it flows across the vegetation and are capable of achieving water quality requirements for small drainage areas less than 1 acre.
Manufactured Treatment Devices (MTDs) Type 1 and Type 2	• MTDs use the movement of stormwater runoff through a specially designed structure to achieve water quality requirements. • MTDs are not designed or intended to store a water quality volume. • MTD pollutant removal efficiencies are variable and are highly dependent on storm size, influent pollutant concentrations, rainfall intensity, and other factors. • There are three (3) types of MTDs: MTD Type 1 – Separation, Hydrodynamic Devices; MTD Type 2 – Filtration Devices; and MTD Type 3 – Catch Basin Inserts (Filter Media Inlet Protection). • MTD Type 1 and 2 are Standard Application BMPs that are applicable for drainage areas up to three (3) acres. (See Limited Application BMPs for MTD Type 3).

Limited Application Structural BMPs

Limited application structural controls are recommended only for limited use with special site or design conditions. Limited application structural controls may be used within a system of water quality controls. Limited application structural controls should be used only in situations where regular maintenance is practicable. Limited structural controls demonstrate the ability to effectively treat stormwater runoff for water quality.

Table 17 lists the limited application structural BMPs.

Table 17: Limited Application Structural BMPs

Limited Application Structural BMPs	Description
Grassed Swale	• Grassed swales provide filtering of stormwater runoff as it flows across vegetation and may be capable of achieving water quality standards • Grassed swales are best used as pretreatment measures or part of a treatment system approach. • Grassed channels and swales must be a minimum of 100 feet long with minimum 0.5-foot high flow controls structures installed to provide effective treatment. • The maximum drainage area to grassed swales is five (5) acres.
Enhanced Swales	• Enhanced Swales are vegetated open channels that are explicitly designed and constructed to capture and treat stormwater runoff in dry or wet cells formed by flow control structures to achieve water quality requirements.
Porous Paver Systems	• Porous paver systems consist of open void paver units laid on gravel subgrade to promote stormwater infiltration. Porous pavers provide water quality and quantity benefits but have high maintenance requirements.
Porous Asphalt or Concrete	• The use of porous pavement other than the modular block porous pavers provides limited water storage and infiltration of runoff from small, low-intensity storm events. • Porous asphalt and concrete pavement surfaces are easily clogged by clays, silts, and oils resulting in a potentially high maintenance burden to maintain the effectiveness of this structural control. • Without proper maintenance porous pavement systems may become partially or totally clogged within five (5) years. • Failure has been attributed to inadequate construction techniques, low permeable soils and/or restricting layers, heavy vehicular traffic, and resurfacing with nonporous pavement materials.
MTD Type 3 (Media Filter Inserts)	• MTDs use the movement of stormwater runoff through a specially designed structure to achieve water quality requirements. • MTDs are not designed or intended to store a water quality volume. • MTD pollutant removal efficiencies are variable and are highly dependent on storm size, influent pollutant concentrations, rainfall intensity, and other factors. • MTD Type 3 is a Limited Application BMP applicable for drainage areas up to 0.5 acres.

Minimal Application Controls

Minimal application controls present difficulties in long term operation and maintenance. **Table 18** lists minimal application controls.

Table 18: Minimal Application Controls

Minimal Application Controls	Rationale for Lack of Recommendation
Infiltration Basin	• While in theory, infiltration basins provide excellent pollutant removal capabilities, the reality is that infiltration basins have historically experienced high rates of failure due to clogging associated with poor design, poor soil testing, poor soils, improper construction and lack of needed maintenance. • Records show that 60 to 100 percent of infiltration basins studied could no longer exfiltrate runoff after five (5) years. • Major design refinement and site investigation will be required to achieve sufficient longevity. • They also require an exceptionally high maintenance burden.
Constructed Stormwater Wetlands	• Stormwater wetlands are capable of removing pollutants by acting like natural wetlands. • To accomplish pollutant removal goals, maintain adequate pool depths, and remain safe, aesthetically pleasing, and free of mosquitoes, they must be maintained properly. • Constructed wetlands must have the proper underlying soils to maintain the proper water level to support the wetland environment while also receiving enough base flow or intermediate flow to inhibit the system from becoming stagnant. • Without consistent maintenance, modification, and upkeep of the wetland vegetation, the effectiveness of the stormwater wetland rapidly decreases.

Using Other or New Structural Stormwater BMPs

Innovative technologies are allowed and encouraged providing there is sufficient documentation as to their effectiveness and reliability. Other structural stormwater BMPs not presented in this Manual are allowed, subject to pre-approval by the County Engineer. Justification for use of other stormwater controls must be based on independently derived information concerning performance, maintenance, and use requirements and limitations.

More specifically, new structural stormwater control designs will not be accepted for inclusion in this Manual until independent pollutant removal performance monitoring data determines that the practice can aid in meeting County water quality/quantity objectives, and that the stormwater control conforms with local and/or State criteria for treatment, maintenance, and environmental impact.

Required Specifications

Due to the variable nature and limited performance data available for most innovative technologies, it is highly recommended that the designer meets with County staff to discuss the proposal before developing detailed plans and calculations. All available data concerning system efficiencies and performance will be evaluated at that time.

If applicable, follow the manufacturer's specifications for installing proprietary systems.

A maintenance plan and schedule shall be submitted for approval. When maintenance guidelines are available from the manufacturer, they should be incorporated into the maintenance plan.

If the innovative technology will ultimately be maintained by the County, easements will be required for access. Adequate grading and widths shall be provided to safely accommodate the County's operation and maintenance vehicles.

Chapter 4: Water Quality Buffer Requirements

It is the intent of the Department of Public Works to establish minimal acceptable requirements for the design of buffers to protect the streams, wetlands, and floodplains of the County of Richland; to protect the water quality of watercourses, reservoirs, lakes, and other significant water resources; to protect riparian and aquatic ecosystems; and to provide for the environmentally sound use of the County's land resources.

A water quality buffer is an area of original or re-established vegetation that borders streams, rivers, ponds, lakes, wetlands, and seeps. Buffers are most effective when stormwater runoff is flowing into and through the buffer zone as shallow sheet flow, rather than concentrated flow such as channels, gullies, or wet weather conveyances. Therefore, it is critical that design of all development include management practices, to the maximum extent practical, that will result in stormwater runoff flowing into the buffer zone as shallow sheet flow. Water quality buffers provide numerous environmental protection and resource management benefits including:

- Restoring and maintaining the chemical, physical and biological integrity of the water resources;
- Removing pollutants delivered in urban stormwater;
- Reducing erosion and controlling sedimentation;
- Stabilizing stream banks;
- Providing infiltration of stormwater runoff;
- Maintaining base flow of streams;
- Contributing the organic matter that is a source of food and energy for the aquatic ecosystem;
- Providing tree canopy to shade streams and promote desirable aquatic organisms;
- Providing riparian wildlife habitat; and
- Furnishing scenic value and recreational opportunity.

Exemptions

The water quality buffer requirements shall not apply to the following, as stated in Section 26-187 (b) of the Richland County Land Development Code:

- Ephemeral streams, ditches, manmade ponds, and lakes, which are outside of natural hydrologic connectivity;
- Any existing structure or structure under construction located within the buffer area provided the landowner can document prior existence;
- The addition or expansion to an existing structure provided it does not result in an increase in the total impervious area within the buffer area;
- Activities associated with emergency operations, such as hazardous materials removal, flood or fire control, evacuations, and storm damage clean up; and
- Single-family parcels of land, which exist as individual lots that are two (2) acres or less and are not part of a new subdivision development.

If any portion of a parcel proposed for development lies within an area designated on an officially

adopted Conservation Easement as a proposed trail or greenway, the developer shall construct the designated improvements in accordance with County standards and dedicate such land to the County.

Stream Buffers

Stream buffers shall be considered a "no disturb zone" along jurisdictional lines. Vegetation cannot be disturbed, removed or replanted unless a buffer restoration plan has been approved by the Department of Community Planning and Development Staff. The following are requirements to expand the buffer widths depending on slopes, water pollution hazards, or other uses that may contribute to water quality degradation. The buffer width shall be calculated as follows, as stated in Section 26-187 (c) (1) of the Richland County Land Development Code:

- Along jurisdictional perennial streams identified by the USACE, not associated with a floodplain or wetlands, the buffer shall be at least 50 feet perpendicular from the jurisdictional line on each side of the waterway.
- In areas where a floodway profile has been computed along a perennial stream (AE Zones) as part of an approved flood study, the buffer area shall be equal to the width of the floodway, but never less than 50 feet.
- In areas where a floodway profile has not been computed along a perennial stream (A Zones), the developer shall perform a flood study, determine the floodway and follow the buffer requirements outlined above. As an alternative to preparing the flood study, the buffer limits shall extend to the delineated flood plain limits.
- Along jurisdictional intermittent streams identified by the USACE, the buffer shall be at least 50 feet perpendicular from the jurisdictional line on each side of the waterway. If these streams have associated floodway as described above, the same requirements would apply to have a total width of 50 feet.
- For delineated wetland areas associated with perennial streams, the buffer shall be at least 50 feet during construction. This buffer width is independent of any wetland offset requirements of the USACE.
- For delineated wetland areas associated with intermittent streams, the buffer shall be at least 50 feet. This buffer width is independent of any wetland offset requirements of the USACE.
- For wetland areas not associated with perennial, intermittent streams, or floodway, the buffer shall be the extent of the wetland area plus an additional 50 feet perpendicular beyond the wetland edge.

Stream Buffers During Construction

Considered on a case-by-case basis only, and where there is a hardship to provide the 50-foot buffer due to site constraints, isolated areas may be averaged to a minimum of 30 feet, provided that the engineer demonstrates how the area affected by the reduced buffer is protected with additional BMPs.

Stream Buffer Management and Maintenance

The function of the stream buffer is to protect the physical and ecological integrity of the waterway, to reduce flooding potential, and to filter runoff from all development. The objective of a stream buffer is undisturbed native vegetation.

Management of the stream buffer includes specific limitations on alteration of the natural conditions. The following practices and activities are restricted within stream buffers, except with prior approval by the Department of Public Works, as stated in Section 26-187 (c) (2) of the Richland County Land Development Code:

- Clearing or grubbing of existing vegetation;
- Clear cutting of vegetation;
- Soil disturbance by grading, stripping, or other practices;
- Filling or dumping;
- Use, storage, or application of pesticides, herbicides, and fertilizers;
- Conversion of vegetation from native to exotic species; and
- Motor vehicles are not permitted in stream buffers unless during the installation of certain utilities permitted in the buffer zone.

The following structures, practices, and activities are permitted in the stream buffer, subject to prior approval of the Department of Public Works, and when specific design or maintenance features are adhered to:

- Transportation rights-of-way, pedestrian crossings, public access, boat ramps, docks, fishing platforms, unpaved paths (i.e., trails and greenways), and stream bank stabilization efforts.
- Utilities are allowed and shall be installed a minimum distance of 25 feet measured perpendicular from the jurisdictional line within the buffer area.

The following requirements are applicable for stream crossings for utilities:

- An applicant shall demonstrate that stream crossings are minimized;
- The right of way should be the minimum width needed to allow for maintenance access and installation;
- The angle of a crossing shall be as nearly perpendicular to the stream or buffer as practical in order to minimize clearing requirements; and
- The minimum number of crossings should be used within each development, and no more than one crossing is allowed for every 1,000 linear feet of buffer zone unless the applicant demonstrates to the Department of Public Works the need for additional crossings. Where possible, the design of roadways and lots within a development should be aligned such that all streams are either to the rear or the side of individual lots, never along the front.

In order to maintain the functional value of the stream buffer, indigenous vegetation may be removed as follows:

- Dead, diseased, or dying trees that are in danger of falling and causing damage to dwellings or other structures may be removed with approval from the Department of Public Works;
- Debris in the buffer area that is caused by storm damage may be removed; and
- Invasive plant species may be removed if they are replaced by native species that are equally effective in retarding runoff, preventing erosion and filtering non-point source pollution from

runoff. A buffer restoration plan for removal of invasive species must be approved by the Department of Public Works.

Shoreline Buffers

Shoreline buffers shall be considered an area of managed vegetation adjacent to shorelines with hydrologic connectivity (stream leading into/out of the pond/lake or obvious spring input). The shoreline buffer width shall be 50 feet perpendicular from the jurisdictional line. For ponds and lakes, the buffer shall be a minimum of 50 feet from the jurisdictional line.

For Lake Murray, the buffer shall be measured from the 360-foot elevation or current jurisdictional line as determined by USACE.

Shoreline Buffer Management and Maintenance

The function of the shoreline buffer is to protect the physical and ecological integrity of the water body by providing a functional distance to reduce flooding potential, reduce erosion and sedimentation, and filter runoff between development and the water body.

Management of the shoreline buffer includes specific limitations on alteration of the natural conditions. The following structures, practices and activities are restricted in the shoreline buffer unless prior approval is granted by the Department of Public Works, as stated in Section 26-187 (d) (2) of the Richland County Land Development Code:

- Septic systems;
- Permanent structures;
- Impervious cover, with the exception of paths;
- Soil disturbance by grading, stripping or other practice;
- Filling or dumping;
- Stormwater management facilities; and
- Use, application, or storage of pesticides or herbicides except for the spot spraying of noxious weeds or other nonnative species consistent with approved agency recommendations. Approved agencies include Richland County, South Carolina Forestry Commission, and Dominion Energy (formerly South Carolina Electric & Gas) Department of Lake Management.

The following structures, practices, or activities are permitted in the shoreline buffer, subject to the prior approval of the Department of Public Works, as stated in Section 26-187 (d) (2) of the Richland County Land Development Code:

- Biking or hiking paths;
- Recreational uses as approved by the Department of Public Works; and
- Limited tree or underbrush clearing with approval from the Department of Public Works.

Water Quality Buffer Requirements

Water Quality Buffer Width Adjustment Requirements

Adjustments to the buffer width shall be made for the following conditions, as stated in Section 26-187 (g) of the Richland County Land Development Code:

1. If streams are on a current 303d list or with an approved TMDL, the buffer area shall be increased to 100 feet.
2. If water bodies are on DHEC's Outstanding National Resource Waters (ONRW) list, the buffer area shall be increased to 100 feet.
3. If there are 15 percent to 24 percent slopes within the required buffer area, the buffer width must be adjusted to include an additional 10 feet.
4. If there are 25 percent or greater slopes within the required buffer area width, the buffer width must be adjusted to include an additional 25 feet.
5. If the adjacent land use involves drain fields from on-site sewage disposal and treatment systems (i.e., septic systems), subsurface discharges from a wastewater treatment plant, or land application of bio-solids or animal waste, the buffer area width must be adjusted to include an additional 25 feet.
6. If the land use or activity involves the storage of hazardous substances or petroleum facilities, the buffer area width must be adjusted to include an additional 50 feet.
7. If the land use or activity involves raised septic systems or animal feedlot operations, the buffer area width must be adjusted to include an additional 100 feet.
8. If the land use or activity involves solid waste landfills or junkyards, the buffer area width must be adjusted to include an additional 200 feet. However, see also Section 26-187 (g) (10) of the Richland County Land Development Code below.
9. If all on-site stormwater runoff is captured and routed through a permanent water quality basin, and there is no sheet flow discharging into the buffer, the buffer area may be reduced to 25 feet. This is intended to apply in limited situations, such as small commercial developments.
10. If the applicant satisfactorily demonstrates that there will be no degradation of the receiving water body by implementing the proposed stormwater quality controls, then the established buffer may be reduced on a case by case basis upon approval by the Department of Public Works.

Water Quality Buffer Averaging Option

This subsection outlines the criteria for buffer averaging on new and redevelopment sites. Buffer averaging can be utilized to adjust the required buffer width, allowing some flexibility for site development. Using buffer averaging, the width of the buffer can be varied with the criteria stated below, as long as a minimum average width of 50 feet from the jurisdictional line are maintained.

1. The following criteria must be met in order to utilize buffer averaging on a development site, as stated in Section 26-187 (h) (1) of the Richland County Land Development Code:
   a) An overall average buffer width of 50 feet, depending on the water quality buffer requirement, must be achieved within the boundaries of the property to be developed.
   b) The average width must be calculated based upon the entire length of the stream bank or

shoreline that is located within the boundaries of the property to be developed. When calculating the buffer length, the natural stream channel should be followed.

c) Stream buffer averaging shall be applied to each side of a stream independently. If the property being developed includes both sides of a stream, buffer averaging can be applied to both sides of the stream but must be applied to both sides of the stream independently.
d) That portion of buffers in excess of 100 feet will not be credited toward the buffer averaging formula within the boundaries of the property to be developed. The total width of the buffer shall not be less than 30 feet, or the width of the floodway at any location, except at approved stream crossings.
e) Those areas of the buffer having a minimum width of 30 feet (or less at approved stream crossings) can comprise no more than 50 percent of the buffer length.

2. Buffer width averaging is prohibited in developments that have, or will have after development, the land-uses listed below, as stated in Section 26-187 (h) (2) of the Richland County Land Development Code:
   a) Developments or facilities that include on-site sewage disposal and treatment systems (i.e., septic systems), raised septic systems, subsurface discharges from a wastewater treatment plant, or land application of bio-solids or animal waste;
   b) Landfills (demolition landfills, permitted landfills, closed-in-place landfills);
   c) Junkyards;
   d) Commercial or industrial facilities that store and/or service motor vehicles;
   e) Commercial greenhouses or landscape supply facilities;
   f) Developments or facilities that have commercial or public pools;
   g) Animal care facilities, kennels, and commercial/business developments or facilities that provide short-term or long-term care of animals;
   h) Other land uses deemed by the Department of Public Works to have the potential to generate higher than normal pollutant loadings.

Water Quality Buffer Plan and Plat Requirements

As stated in Section 26-187 (e) of the Richland County Land Development Code, all preliminary, bonded and final plats prepared for recording and all right-of way-plats shall clearly:

1. Show the extent of any stream or shoreline buffer on the subject property by metes and bounds;
2. Label the stream and shoreline buffer;
3. Provide a note to reference all buffers stating: “There shall be no clearing, grading, construction or disturbance of vegetation except as permitted by the Department of Public Works”;
4. Provide a note to reference any protective covenants governing all buffer areas stating: “Any buffer shown on the plat is subject to protective covenants which may be found in the land records and which restrict disturbance and use of these areas”;
5. If the buffer area will not be part of an individual lot, then ownership must be stated by identifying who is the responsible party; and
6. Provide the location of permanent boundary marker signs.

As stated in Section 26-187 (f) of the Richland County Land Development Code, the design requirements for water quality buffers are as follows:

1. The buffer plan must be submitted in conjunction with the sediment and erosion control plan, SWPPP document, and all applicable calculations for a land disturbance permit.
2. It is a requirement that the buffer be marked off with a warning barrier (orange safety fence) to show that no disturbance is allowed in the buffer area.
3. The following steps shall be taken during the site plan development and site construction process to protect water quality buffers during construction, as stated in Section 26-187 (f) (3) of the Richland County Land Development Code:
   a) Water quality buffers must be clearly identified on all stormwater management plans and construction drawings and marked with the statement "Water Quality Buffer. Do Not Disturb."
   b) Water quality buffers cannot be encroached upon or disturbed during project construction unless in accordance with Section 26-187 (b) or Section 26-187 (k) of the Richland County Land Development Code, or unless they are being established, restored, or enhanced in accordance with an approved Buffer Enhancement Plan.
   c) Water quality buffers must be clearly marked with a warning barrier before the preconstruction conference. The marking shall be maintained until completion of construction activities. All contractors and others working on the construction site must be made aware of the existence of the buffer(s) and the restrictions on disturbing the buffer(s).
   d) All areas of the water quality buffer, including stream banks, must be left in the existing condition upon completion of construction activities. Should construction activities associated with development cause degradation to stream banks, all eroding, bare or unstable stream banks shall be restored to existing conditions.
   e) If any trees are allowed to be removed, the tree location shall be shown, and a note shall be provided stating that the tree must be hand cleared.
   f) The locations of all signage must be clearly shown on plans.
   g) A narrative stating the extent of the buffer areas, including any allowed disturbance in the buffer areas (this should be in the narrative as well as in the SWPPP document), must be included with the plans.
   h) A double row of silt fence (with metal posts and wire backing) shall be shown on the upstream side of applicable buffer area(s) that are adjacent to a land disturbance.
   i) The stream buffer shall be shown and labeled on the engineering plans, preliminary, bonded and final plat.
   j) If the stream buffers are dedicated to Richland County, placed in a conservation easement, or turned over to a Homeowners Association (HOA), the buffers shall be maintained in accordance with the maintenance and inspection requirements for permanent stormwater management structures.
      1. If the buffer is dedicated to viable third party:
         a) All property lines shall terminate at the water quality buffer.
         b) Access easements shall be a minimum of 20 feet wide to allow maintenance of the buffer.

c) Access points for these easements will be coordinated with storm drainage easements during the plan review process.

2. If placed in a conservation easement or if the easement is held by a viable third party, such as a land trust, land management company, or utility, the organization shall:
   a) Have the legal authority to accept and maintain such easements;
   b) Be bona fide and in perpetual existence; and
   c) Have conveyance instruments that contain an appropriate provision for retransfer in the event the organization becomes unable to carry-out functions.
3. If given to an HOA, the following criteria must be met:
   a) Membership in the HOA is mandatory and automatic for all homeowners for the subdivision and their successors;
   b) The HOA shall have lien authority to ensure the collection of dues from all members; and
   c) The HOA assumes the responsibility for protecting, monitoring and maintaining the area as an undisturbed natural area, in perpetuity.

4. Shoreline buffers shall be shown and labeled on the engineering plans. Shoreline buffers shall be maintained by the owner in accordance with the maintenance and inspection requirements for permanent stormwater management structures outlined in this chapter. Shoreline buffers may be placed in a conservation easement or deeded to the HOA.

Water Quality Buffer Signage

Permanent boundary marker signs are required for stream buffers prior to bonding of the subdivision and/or finalizing the subdivision with the intent to transfer property. Permanent boundary markers are required to ensure that property owners are aware of the buffer. Permanent boundary markers are recommended, but not required, in shoreline buffers. The Department of Public Works has the authority to require the person or entity responsible for permanent maintenance of the buffer to replace boundary markers that have been removed or destroyed. The following general requirements shall apply to buffer boundary markers, as stated in Section 26-187 (i) of the Richland County Land Development Code:

1. Generally, buffer boundary markers shall be located on the landward edge of the buffer, and at other locations which will approximately delineate the buffer boundary. For commercial developments, markers shall be posted every 100 feet along the buffer boundary. For subdivisions where multiple lots are located along the buffer, it is recommended that a buffer boundary marker be located at the intersection of every other lot line with the landward edge of the buffer.
2. Buffer boundary markers shall include the statement “Water Quality Buffer – Do Not Disturb”.
3. Where possible, the markers should be mounted to a tree larger than three (3) inches in diameter. Where it is not possible to mount the marker to a tree, a treated wood or metal signpost must be used. The post must extend below the ground surface at least 24 inches.
4. The boundary markers must be mounted between four (4) and six (6) feet above the ground surface.
5. The boundary markers must be at least 12 by 18 inches.

Water Quality Buffer Restoration and Enhancement Plans

Buffer restoration is required when a buffer is disturbed without prior approval from the Department of Public Works. A developer or property owner may also wish to enhance a buffer to bring it closer to an optimal, undisturbed native forest condition. Prior to reestablishing or planting the buffer, a restoration and/or enhancement plan must be submitted to and approved by the Department of Public Works. Buffer restoration and/or enhancement plans must include the following, as stated in Section 26-187 (j) of the Richland County Land Development Code:

1. A drawing or plan that shows the location of the buffer in relation to the existing or planned development and to the buffered waterway; the disturbance limits for the planned buffer restoration; direction of flow of runoff from the site and flow within the water feature; erosion prevention and sediment control measures to be installed to protect the waterway; any existing or proposed stream crossings; existing or proposed stream bank stabilization measures; access to a water source for the purposes of watering vegetation; and other pertinent information. For large scale restoration and enhancement projects the plan(s) must be stamped by a registered landscape architect.
2. A visual plan and a narrative that describes the vegetation plan for the buffer; stream buffers must be planted with native trees, shrubs, and grasses that will not be mowed. Suitable native plants can be chosen from the recommended plant species, as listed in **Appendix K**: Landscape Plant Materials List. Species of plants other than those listed on the pre-approved list shall be approved by the Department of Public Works prior to planting.
3. The schedule for when plantings will occur and a two-year survival guarantee provided by the responsible party.

Water Quality Buffer Waiver Option

No waiver shall be granted to alter a buffer unless the Department of Community Planning & Development (or the Planning Commission, in the event of an appeal) determines that a hardship exists, and relief meets the general purpose and intent of this section. Within Water Quality Protection Areas, no waiver shall be granted unless the applicant demonstrates that alternative protection measures can be provided that exceed the protection afforded by the established buffer.

In granting a request for a waiver, the Department of Community Planning & Development or Planning Commission may require site design, landscape planting, fencing, the placement of signs, and the establishment of water quality best management practices in order to reduce adverse impacts on water quality, streams, wetlands, and floodplains.

Waiver requests shall only be considered if a request meets any of the criteria listed below, as stated in Section 26-187 (k) (3) of the Richland County Land Development Code:

- The project involves construction of one (1) single-family home for residential use by the owner of the property and the property has an unusual shape or topography and there is no opportunity to develop under any reasonable design configuration.
- The project involves the construction or repair of a structure which, by its nature, must be located within the buffer (e.g., dams, public water supply intakes, wastewater discharges, docks, boat

launches, stabilization areas of public access to water).

- Buffer intrusion is necessary to provide access to the property.
- The project will:
    a. Require a Wetland Permit from USACE for impacts to jurisdictional wetlands; and
    b. The USACE has approved a mitigation plan; and
    c. Implementation of the plan is a 404 permit condition.

Buffer Waiver Submittal Requirements

The applicant shall submit a written request for a waiver to the Department of Community Planning & Development (Engineering Services). The request shall include specific reasons justifying the waiver and any other information necessary to evaluate the proposed waiver request. The Department of Community Planning & Development may require an alternative analysis that clearly demonstrates that no other feasible alternative exists, and that minimal impact will occur as a result of the project or development.

The Department of Community Planning & Development shall make a determination and decision concerning the waiver request. An appeal may be made to the Planning Commission. An appeal of the Department of Community Planning & Development's decision shall be filed in writing within 30 days after the final decision. The Planning Commission shall make all final determinations and decisions.

Chapter 5: Floodplain Management

The National Flood Insurance Program (NFIP) provides federally backed flood insurance within Richland County. To qualify for the NFIP, the County has adopted and enforces a Floodplain Management Ordinance to regulate development in flood hazard areas, protect human life and health, minimize property damage, and encourage appropriate construction practices to minimize the potential for flood damage to future development. Under the NFIP, Richland County is required to regulate all land development activities within the identified Special Flood Hazard Area (SFHA), which are subject to a one (1) percent annual chance of flooding, formerly called the 100-year floodplain.

Development is defined by the Federal Emergency Management Agency (FEMA) as any manmade change to improved or unimproved property including, but not limited to, buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations. Development and/or land uses permitted within the SFHA of Richland County shall be in accordance with Section 26-106 of the Richland County Land Development Code – FP Floodplain Overlay District. The Richland County Floodplain Manager may also refer to the State of South Carolina and FEMA publications, policies, and guidelines to assist in the implementation of these regulations.

Overview of Floodplains

The SFHA is comprised of the floodway and flood fringe. The floodway is the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to pass the base flood discharge without increasing flood depths. **Figure 4** and **Figure 5** on the following page present the special flood hazard area in a cross-sectional view and on a sample Flood Insurance Rate Map. The "South Carolina Quick Guide for Riverine Floodplains, Development, and Maps" is a recommended source for basic information on watersheds and riverine floodplains. The Guide also provides an overview of the methods used to develop and maintain flood maps. The Guide is available for download from the South Carolina Department of Natural Resources website.

The SFHA for Richland County is identified by FEMA in a scientific and engineering report entitled "Flood Insurance Study for Richland County, South Carolina, and Incorporated Areas" with an accompanying Flood Insurance Rate Map (FIRM). The current Flood Insurance Study and the effective FIRM are available at FEMA's website, on the County's website, or at the Floodplain Manager's office at 2020 Hampton Street, 1st Floor, Columbia, SC 29204.

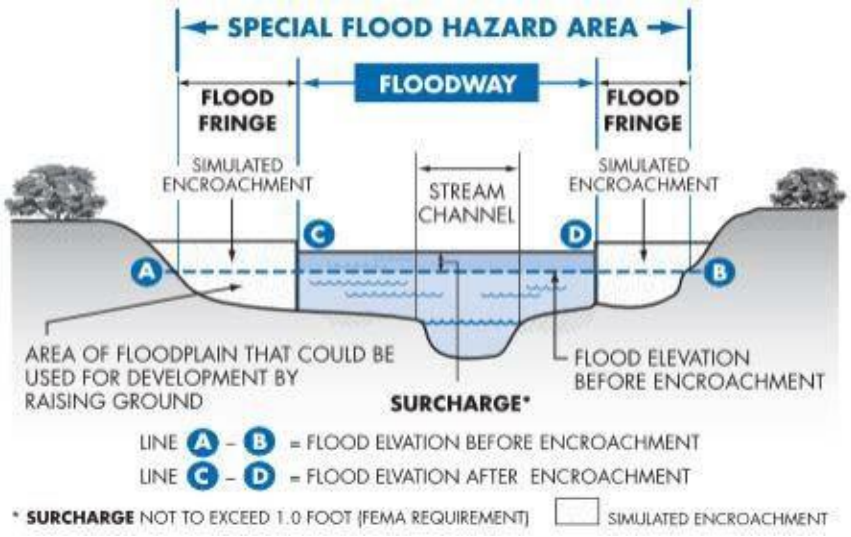


Figure 4: Cross Section of the Special Flood Hazard Area
(Source: SCDNR)

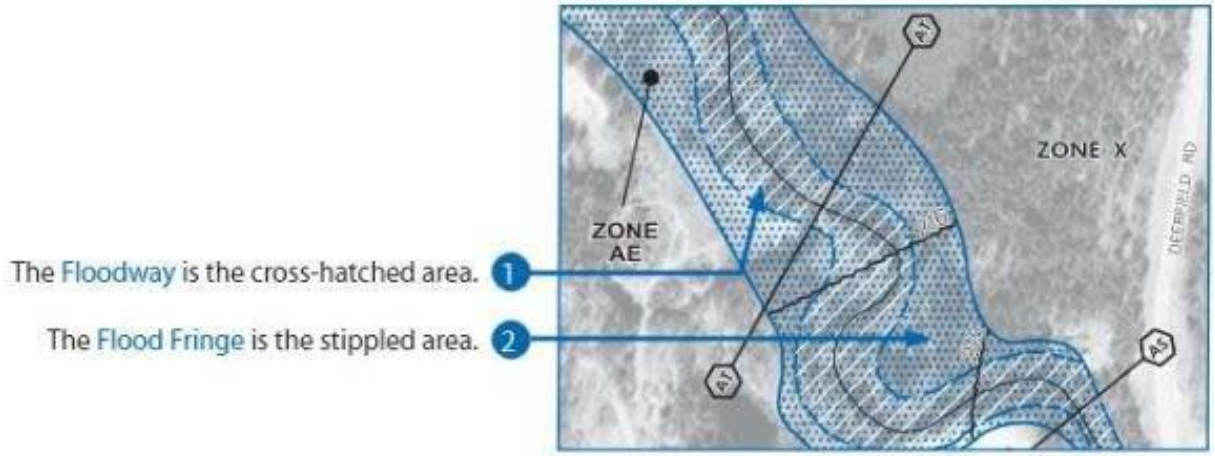


Figure 5: Plan View of the Special Flood Hazard Area
(Source: SCDNR)

Floodplain Development

Before construction or development begins within the SFHA, a building permit shall be attained by first submitting the application forms furnished by the Department of Community Planning & Development or through the County's electronic permitting system. If the application or the construction documents indicate construction or development within the SFHA, the applicant shall be referred to the Richland County Floodplain Manager within Community Planning & Development for further consultation.

The Richland County Floodplain Manager will inform the applicant of the floodplain regulations and provide guidance on residential and commercial construction within the SFHA. The Richland County Floodplain Manager will require scaled plans which shall include, but are not limited to: the nature, location, dimensions, and elevations of the project area; existing and proposed structures; and the

location of fill and compensatory areas. Specifically, the following information is required:

1. A plot plan that shows the 100-year floodplain contour or a statement that the entire lot is within the floodplain must be provided by the applicant when the lot is within or appears to be within the floodplain as mapped by the Federal Emergency Management Agency. The plot plan must be prepared by or under the direct supervision of a South Carolina licensed registered land surveyor or professional engineer and certified by such professional. The plot plan must show the floodway, if any, as identified by the Federal Emergency Management Agency (FEMA).

2. When base flood elevation data is available, plan submittal for a development permit within the flood hazard area shall show:

    - The elevation (in relation to mean sea level) of the lowest floor of all new and substantially improved structures; and
    - If the structure will be flood-proofed in accordance with the Non-Residential Construction requirements, must include the elevation to which the structure will be flood-proofed.

3. When base flood elevation data is not available, the provisions in the standards for streams without estimated base flood elevations and floodways must be met (Section 26-106(e) of the Richland County Land Development Code).

The information submitted for the permit shall be certified by a South Carolina licensed registered land surveyor, engineer, or architect authorized by law to certify the required information and plans.

The Richland County Floodplain Manager shall review all applications for a flood development permit and approve or deny such applications. Approval or denial of a flood development permit shall be based on all applicable provisions of this chapter and the following relevant factors:

- The danger to life and property due to flooding or erosion damage;
- The susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the individual owner;
- The danger that material may be swept onto other lands to the injury of others;
- The compatibility of the proposed use with existing and anticipated development;
- The safety of access to the property in times of flood for ordinary and emergency vehicles;
- The costs of providing governmental services during and after flood conditions, including maintenance and repair of roads and bridges and public utilities and facilities such as sewer, gas, electrical and water systems; and
- The relationship of the proposed use to any comprehensive planning document for that area.

A floodplain development permit is required in conformance with the provisions of the Richland County Land Development Code (particularly Section 26-106) prior to the commencement of any development activities in the FP Floodplain Overlay District. The purpose of this permit is to ensure that compliance with all regulations concerning floodplain development is achieved.

Chapter 6: Street Drainage and Easements

Storm Sewer Design Criteria

1. Pipes that are part of a storm sewer system consisting of catch basins, junction boxes and connecting pipes are to be sized for a discharge at full pipe flow.
2. The minimum allowable velocity to reduce sedimentation in the storm sewer system is two (2) feet per second.
3. Avoid junctions that create excessive energy loss.
4. Minimum slopes for storm drainage pipes that will be conveyed to Richland County in a dedicated easement is 0.5 percent.
5. Maximum slope is 12 percent**.** Greater slopes may be approved by the County Engineer upon submittal of appropriate detailed structural designs and other supporting documentation.
6. Richland County will accept commonly used computers models or methodologies capability of analyzing the hydraulic capacity of proposed storm drain pipelines and systems.

Pipe Systems

The following are specific requirements applicable to storm sewer system pipes.

Pressure Flow

Storm drainage systems may be designed to flow under pressure flow. In these instances, the hydraulic grade line is to be calculated and plotted on the storm drain profiles and submitted with the drainage plans and calculations. In these cases, the pipes are to be sized such that the hydraulic grade line remains a minimum of one (1) foot below the ground surface at all inlets and junction boxes.

Discharge Velocity

Appropriate velocity dissipation devices and/or erosion prevention BMPs must be placed at pipe discharge locations and along the length of any outfall channel to provide non-erosive flow from the culvert to a water course so that the natural physical and biological characteristics and functions are maintained and protected. Outlet protection measures, such as reinforced vegetation or riprap, may be required to minimize erosion and scour potential. Provide calculations or procedures utilized to select the proper outlet protection and protection dimensions.

Materials

Reinforced concrete pipe, HDPE, and Polypropylene pipe respectively are acceptable.

Minimum Pipe Size and Easement Width

The minimum acceptable storm sewer pipe diameter is 15 inches. **Table 19** lists the minimum easement width required based on pipe size.

Table 19: Minimum Required Easement Widths

Pipe Size (in.)	Easement (ft.)
15" – 30"	15'
36" – 54"	20'
54" +	30'

Catch Basins, Junction Boxes and Manholes

A catch basin, junction box, or manhole shall be required at all changes of grade, size, or direction of a pipe and at junctions of two (2) or more pipes. They may be constructed of reinforced concrete or concrete brick masonry. Precast concrete junction boxes, either round or rectangular, are also acceptable. Cast-in-place or precast concrete junction boxes are required for pipe sizes larger than 36 inches in diameter. Shop drawings must be provided for all precast concrete junction boxes. Construction plans must be provided for all cast-in-place junction boxes.

Prefabricated Bends

Prefabricated reinforced concrete or corrugated metal pipe bends are acceptable when the pipe size remains constant. The design of the bend should provide for the addition of a catch basin or manhole for surface access. Shop plans must be provided for all such installations.

Invert Elevations

Invert elevations for incoming and outgoing pipes shall be set such that the elevation drop across a junction box, manhole or catch basin equals or exceeds the energy loss across it or the change in pipe diameter, whichever is larger.

Catch Basins Placement

Catch basins are to be placed at close enough intervals along a street so that the curb and gutter are not overtopped during the 10-year rainfall event. A sufficient number of catch basins should be provided so that the peak discharge delivered to each one does not exceed its calculated inlet capacity for this condition.

Standard Catch Basins

Where Richland County is to accept maintenance responsibility for the streets and drainage system, Richland County standard catch basins are to be used. Standard details for catch basin types A, B, and C may be obtained from the County Engineer's office. **Table 20** shows calculated inlet capacities for these catch basins, when located in a sump.

Table 20: Inlet Capacity for Richland County Standard Catch Basins

Catch Basin Type	Inlet Capacity (cfs)
A	12.1
B	10.6
C	9.4

Access
When the depth of a catch basin, junction box, or manhole exceeds four (4) feet, metal rungs or a suitable alternative will be provided for safe ascent and descent.

Headwalls
Reinforced concrete headwalls, similar or identical to one of Richland County's standard headwalls or a "flared end section" shall be placed at the ends of any culvert or closed storm sewer system. Precast or cast-in-place concrete headwalls are acceptable. Richland County's standard headwall details may be obtained from the County Engineer's office.

Open Channels
Open channels may be used instead of closed storm sewers when the channel is designed as part of the stormwater water quality management plan. The County Engineer, for environmental or aesthetic purposes, may require the use of vegetated open channels for stormwater conveyance and water quality on a case-by-case basis.

Design Considerations
The following factors should be considered in the design of vegetated open channels:

- Hydraulic capacity,
- Erosion potential,
- Future maintenance requirements,
- Safety,
- Aesthetics,
- Minimum slope is one (1) percent or minimum velocity of 2.5 ft/sec on slopes,
- Side slopes for vegetated open channels in residential areas should be no greater than 3H:1V for stability, safety, and ease of maintenance, and in no case will open channel side slopes steeper than 2H:1V be approved.

In the interest of preserving existing vegetation (helps to stabilize banks) and to preserve the aesthetics of natural channels, not all open channels have to be altered to protect them from erosion.

However, existing channels which are an integral part of the development and storm drainage system should be evaluated for the need for additional erosion protection. In addition, those existing channels which will be subject to peak flow increases of 100 percent or more as the result of complete build-out of the contributing watershed and those existing channels with sharp bends should also be evaluated for the need for additional erosion protection.

Capacity

Open channels shall be designed to contain the design discharge within the banks with 0.5 feet of freeboard. Richland County will accept the use of the Manning's Equation or other commonly accepted computer models for open channel design. The designer shall select the proper Manning's roughness coefficient based on channel type and permanent channel lining.

Analyze outlet conditions to confirm that the channel can discharge the peak design flow at the computed normal depth. For conditions in which the capacity of the channel to discharge the design flow is governed by conditions on the outlet (high tailwater condition) or the channel is traversed by one or more stream crossings, either bridge or culvert, then analysis of these conditions using acceptable computer models (HEC-RAS) must demonstrate that the channel can contain the design discharge within the channel banks.

Erosion Protection

The allowable velocities and shear forces for non-vegetated (erodible) open channels are relatively small and the design typically requires wide, shallow channels to carry the design flow rates. In all situations, permanent open channel banks and bottom must be stabilized with vegetation or other applicable erosion prevention measures, bare soil open channels will not be accepted.

Vegetated Channels

The design of stabilized open channels must address both peak flow velocity and peak shear stress and may be done by using computer software that is capable of designing open channels for stability and capacity.

Vegetation or other erosion prevention measures protect the channel from the erosive action of design flows and binds the channel material together. Vegetated channels can be used to carry stormwater runoff but are generally not recommended to carry sustained base flows because most vegetation cannot survive continual submergence or saturation of the root zone.

The design of vegetated channels is more complex than a basic earth lined, or structurally lined channel. The additional design consideration for vegetated channels involves a variation in roughness (Manning's n) with the height and type of vegetation. Generally, a tall grass provides much resistance when flow in the channel is shallow. As the flow depth increases, the resistance of some vegetation may decrease. In many cases, the vegetation will lay over in the direction of the flow when the flow reaches a sufficient depth. When vegetation lies over, the resistance produced by the vegetation is

considerably less than it is during shallow flow conditions. The design of vegetated channels shall be performed for the following two (2) design conditions:

- Stability/Permissible Velocity: This design process involves evaluating how the channel will respond under low vegetation retardance conditions. This condition is defined when vegetation is cut low or lies down, producing a lower Manning's n value, lower flow depths, and higher flow velocities. The limiting factor for stability design is the permissible velocity of the flow in the vegetated channel.
- Capacity: This design process involves evaluating how the channel will respond under high vegetation retardance conditions. This condition is defined when vegetation is not maintained or is very long and rigid, producing a higher Manning's n value, higher flow depths, and lower flow velocities. The limiting factor for capacity design is the cross-sectional area of the vegetated channel.

The design of stabilized open channels must address both peak flow velocity and peak shear stress and may be done by using computer software that is capable of designing open channels for stability and capacity.

Vegetation only channel bottom and bank protection measures are limited to:

- Channel bottom must be established by sodding,
- Channel banks established with double netted temporary erosion control blanket,
- Maximum flow velocities of five (5) feet per second,
- Maximum shear stress of one (1) pound per square foot, and
- Maximum channel slope of five (5) percent.

Erosion Protection Measures

The designer shall provide all calculations and procedures utilized to select the proper protection and protection dimensions. Acceptable bank and channel protective measures include but are not limited to:

- Vegetation only,
  - Maximum velocity of 5 feet per second
  - Maximum shear stress of 1 pound per square foot
- Vegetated permanent Turf Reinforcement Matting (TRM),
  - See Table 12 for vegetated permanent TRM requirements
- Geogrid or similar structural erosion control measures,
- Transition Mats or Flexible Revetment Systems,
- Bio-engineered or other stream stabilization measures,
- Riprap,
- Articulated concrete block (ACB),
- Articulated concrete block (ACB) mats,

- Reinforced concrete or concrete cloth, and
- Other protective measures acceptable to County Engineer.

Discharge Velocity
Appropriate velocity dissipation devices and/or erosion prevention BMPs must be placed at discharge locations and along the length of any outfall channel to provide non-erosive flow from the structure to a water course so that the natural physical and biological characteristics and functions are maintained and protected. Outlet protection measures, such as reinforced vegetation or riprap, may be required to minimize erosion and scour potential. Provide calculations or procedures utilized to select the proper outlet protection and protection dimensions.

Culverts

A culvert is a relatively short conduit conveying stormwater through an embankment. Its capacity depends on, among other things, the depth to which headwater is allowed to pond at its inlet. The headwater depth will be different depending on whether the culvert is functioning under "inlet control" or "outlet control" conditions. In designing the culvert, both conditions must be investigated.

Culvert Requirements
The following are specific requirements applicable to culverts.

Analysis of Inlet and Outlet Control Conditions
Inlet control occurs when the capacity of the culvert barrel exceeds the capacity of the entrance. Under this condition, the culvert flows only part full. The configuration and size of the inlet and the headwater elevation determine its capacity.

Outlet control occurs when the capacity of the culvert entrance exceeds the capacity of the barrel. Under this condition, the culvert flows full. The capacity is dependent on the tailwater depth, the slope, length, roughness and size of the barrel, the inlet configuration and the hydraulic head available.

A thorough assessment of culvert hydraulics is presented in FHWA Hydraulic Design Series No. 5 (HDS-5), Hydraulic Design of Highway Culverts (1985). HDS-5 includes nomographs for analysis of culvert hydraulics under inlet control and outlet control and culvert barrel capacity, which are incorporated in the Richland County design standards. Use of the FWHA culvert analysis program HY-8, or other computer model based on FHWA procedures, is acceptable.

Design Requirements
The headwater required to convey the design discharge must be determined under both inlet and outlet control conditions. The control requiring the highest headwater governs. The culvert should be designed such that:

- The headwater at the design discharge does not exceed an elevation one (1) foot below the top of curb or edge of road shoulder at the lowest point.
- The headwater depth at the design discharge does not exceed the culvert diameter by a factor greater than two (2) or by four (4) feet, whichever is smaller.
- The headwater depth at the design discharge does not cause water to rise above the top of approach channels or beyond established flooding easements.
- The headwater at the 100-year discharge does not exceed an elevation two (2) feet below the elevation of adjacent building sites.
- Minimum allowable velocity to reduce sedimentation in the storm sewer system is two (2) feet per second.
- Minimum slope is 0.5 percent.
- Maximum slope is 12 percent**.** Greater slopes may be approved by the County Engineer upon submittal of appropriate detailed structural designs and other supporting documentation.

Discharge Velocity

Appropriate velocity dissipation devices and/or erosion prevention BMPs must be placed at culvert discharge locations and along the length of any outfall channel to provide non-erosive flow from the culvert to a water course so that the natural physical and biological characteristics and functions are maintained and protected. Outlet protection measures, such as riprap, may be required to minimize erosion and scour potential. Provide calculations or procedures utilized to select the proper outlet protection and protection dimensions.

Plans and Calculations

Culvert drainage calculations shall include headwater calculations for both the design storm and the 100-year storm. These depths shall be plotted on profiles and the corresponding floodplains delineated on the topographic map of the project.

Culvert Materials

Culverts and closed storm drainage systems may be constructed using any of the materials listed in this section. In selecting the culvert material, consider structural requirements and corrosion potential at the site as well as hydraulic requirements. Design culverts to support a minimum of an AASHTO HL-93 live load together with the appropriate dead load. Heavier live loads may be required if conditions dictate. Bury depths greater than 15 feet shall have written approval by the County Engineer or County appointed designee. Minimum life expectancy for all culvert materials is 75 years.

All excavations and trenches shall be clean, dry and free of debris before placing pipe. Minimum compaction shall be 90 percent SPD for all pipes and structures, unless higher compaction levels are required by the design engineer. Verification of compaction throughout the pipe's backfill zone trench shall be provided by a registered geotechnical engineer. Open graded backfill such as washed stone, shall be wrapped with a minimum eight-ounce non-woven geotextile to prevent migration of fines into the backfill. Fabric design shall be verified by a registered geotechnical engineer. A 24-hour notice is

required prior to installation.

Reinforced Concrete Pipe (RCP)
RCP pipe culverts and storm drainage systems are acceptable and shall meet ASTM C76 and be Class III or greater. Joints shall meet ASTM C443 or ASTM C1628 and use gaskets that meet ASTM F477. Nitrile gaskets are allowed if required by onsite conditions, per the project design engineer's recommendation. Mastic style joints shall not be used. The pipe shall be installed following an ASTM C1479 Type 2 installation in the right-of-way and a Type 3 installation outside the right-of-way. Fill heights shall comply with Manufacturer's published standards. Fill heights requiring a special design shall be signed and sealed by a licensed professional engineer in the State of South Carolina. Joints shall be capable of passing an ASTM C969 test when required by project engineer. Pipes provided to the County shall comply with the Q-cast or NPCA quality certification program. Pipe velocity shall not exceed 10 feet per second unless approved by the County Engineer.

Concrete Box Culverts
Cast in place or precast concrete box culverts are acceptable. Project plans should include structural details for cast in place concrete, or shop plans for precast that have been signed and sealed by a licensed professional engineer in the State of South Carolina. Joints shall be capable of passing an equivalent ASTM C969 test when required by project engineer.

Prefabricated Structures
Prefabricated culvert structures such as CONSPAN® or similar structures are acceptable if designed and installed in accordance with the manufacturer's recommendations. Project plans should include structural details and shop plans that are signed and sealed by a licensed professional engineer in the State of South Carolina.

High Density Polyethylene (HDPE) Pipe
HDPE pipe culverts and storm drainage systems are acceptable when designed and constructed in accordance with the manufacturer's recommendation, and County Standards. HDPE pipe culverts and storm drainage systems shall meet AASTHO M294 (Type S) pipe. Joints shall comply with ASTM D3212 and have gaskets that meet ASTM F477. Nitrile gaskets are allowed if required by onsite conditions as verified by the engineer or record. The pipe shall be installed following an ASTM D2321 with minimum and maximum fill heights complying with manufacturers published fill height standards. Backfill shall be an ASTM D2321 Class II or better. Pipe velocity shall not exceed 15 feet per second unless approved by the County Engineer.

Polypropylene (PP) Pipe
PP pipe culverts and storm drainage systems are acceptable and shall meet ASTM F2881 or F2764. Joints shall comply with ASTM D3212 and have gaskets that meet ASTM F477. Nitrile gaskets are allowed if required by onsite conditions as verified by the engineer or record. The pipe shall be installed following an ASTM D2321 with minimum and maximum fill heights complying with

manufacturers published fill height standards. Backfill shall be an ASTM D2321 Class III or better. Pipe velocity shall not exceed 15 feet per second unless approved by the County Engineer.

Minimum Culvert Size

The minimum acceptable pipe culvert diameter is 15 inches.

End Treatments and Transitions

Acceptable end treatments may consist of, but are not limited to, pipe end with riprap, concrete headwalls, concrete or metal flared end sections, DOT approved safety ends, and any other end treatment that is approved by the County Engineer or County appointed designee. HDPE flared end treatments are not allowed.

Transition from pipe of dissimilar materials shall requires a Dissimilar Materials Adapter incorporating a geotextile coupler with mastic coating and stainless-steel straps that is properly backfilled per general pipe installation instructions.

Post Installation Inspection

All newly constructed pipe systems shall be visually inspected. Joints shall all be panned and inspected and any visible issues such as joint separation, cracking, holes in pipe, or excessive deflection shall be noted. At the County's discretion, where evidence of poorly installed or damaged pipe is found, 100 percent of the pipe system may be required to be inspected.

Chapter 7: Roadway Design Requirements

Roadway designs must meet the South Carolina Asphalt Pavement Association (SCAPA) guidelines. All new roads and storm drainage, or improvements and upgrades, shall be installed or constructed by the developer at no cost to the county, except as may otherwise be specifically provided. The developer shall be responsible for obtaining all permits. Required improvements under this section shall not be installed or constructed until required site plans have been approved by the Department of Community Planning and Development; and an order to proceed has been issued.

Development may be designated to be constructed and/or platted in phases and the Department of Community Planning and Development may not approve a phasing plan when in its opinion such phasing will not provide for adequate roadway facilities to support any such phase(s) independent of the overall development plan. In approving phases, the Department of Community Planning and Development may require that additional roads be constructed as part of the phase or phases in order to ensure that sufficient public facilities will be in place to support such phase(s) independent of any future development.

Road Classification

- Local Street
- Collector (Minor) *Commercial*
- Collector (Minor) *Residential*
- Collector (Major)
- Arterial (Minor)
- Arterial (Major)
- Industrial
- Rural Road
- Alleyway
- Loop Road
- Park Road

Local Street (Residential)
Provides direct access to lots and which does not provide connectivity to properties other than those served. Access streets shall be designed so no road section conveys an ADT greater than 250 within residential areas.

Minor Collector (Residential)
Provides direct access to lots and carries traffic of local streets. Designed to carry higher traffic than local streets with traffic limited to motorists having origin or destination within the immediate neighborhood or between adjoining neighborhoods. Sub-collectors shall be designed so that no road section conveys an ADT greater than 1,000 within residential areas. If proposed ADT exceeds this

threshold, then an increase in pavement traffic classification is required. Example: If pavement design is calculated to be a Traffic Class 2, but the ADT exceeds 1,000, then a Traffic Class 3 pavement would be required.

Minor Collector (Commercial)
Provides direct access to lots and carries traffic of adjoining access streets. This road is designed to carry large traffic volumes at low to moderate speeds. Designed with traffic limited to motorists having origin or destination within the immediate development. The road shall be designed so that they do not promote use as a shortcut by non-development traffic. Sub-collector shall be designed so that no road section conveys an ADT greater than 1,500 within commercial areas. If proposed ADT exceeds this threshold, then an increase in pavement traffic classification is required. Example: If pavement design is calculated to be a Traffic Class 2, but the ADT exceeds 1,500, then a Traffic Class 3 pavement would be required.

Major Collector
Conducts and distributes traffic between access/sub-collector and arterial streets. Carries large traffic volume at high speed. Function is to promote free traffic flow; therefore, parking and direct access to homes from this level of street shall be prohibited. Collectors shall be designed so that they do not promote use as a shortcut by non-neighborhood traffic. Collectors shall be designed so that no road section conveys an ADT greater than 2,000. If proposed ADT exceeds this threshold, then an increase in pavement traffic classification is required. Example: If pavement design is calculated to be a Traffic Class 2, but the ADT exceeds 2,000, then a Traffic Class 3 pavement would be required.

Arterial-Minor
Principal traffic artery within residential or commercial areas that carry relatively high traffic volumes and convey traffic from arterial streets access, sub-collector and collector streets. Its function is to promote the free flow of traffic; as such, no parking or residences shall be permitted along or have direct access to such roads. Minor arterial shall be designed and constructed according to most current SCDOT standards.

Arterial-Major
Principal traffic artery within residential or commercial areas that carry relatively high traffic volumes and convey traffic from arterial streets to collector streets. Its function is to promote the free flow of traffic; as such, no parking or residences shall be permitted along or have direct access to such roads. Minor arterial shall be designed and constructed according to most current SCDOT standards.

Rural
A road serving development in low density, primarily rural areas and which would not be classified as a collector or arterial road.

Alleyway
A private road primarily designed to serve as a secondary access to the side or rear of those properties whose principal frontage is on another road, either public or private, and meets the minimum county requirements, as determined by the county engineer.

Industrial
A road for which the intended use is somewhat less than that of an arterial road and somewhat greater than that of a collector road. Such roads will generally be located in industrial/commercial areas or be used to provide access for heavy vehicles or heavy vehicular volumes to such areas.

Loop Road
A roadway that arches away from a road and re-intersects the same road at some distance away from the "first" intersection.

Park Road
A one-way road within a residential subdivision.

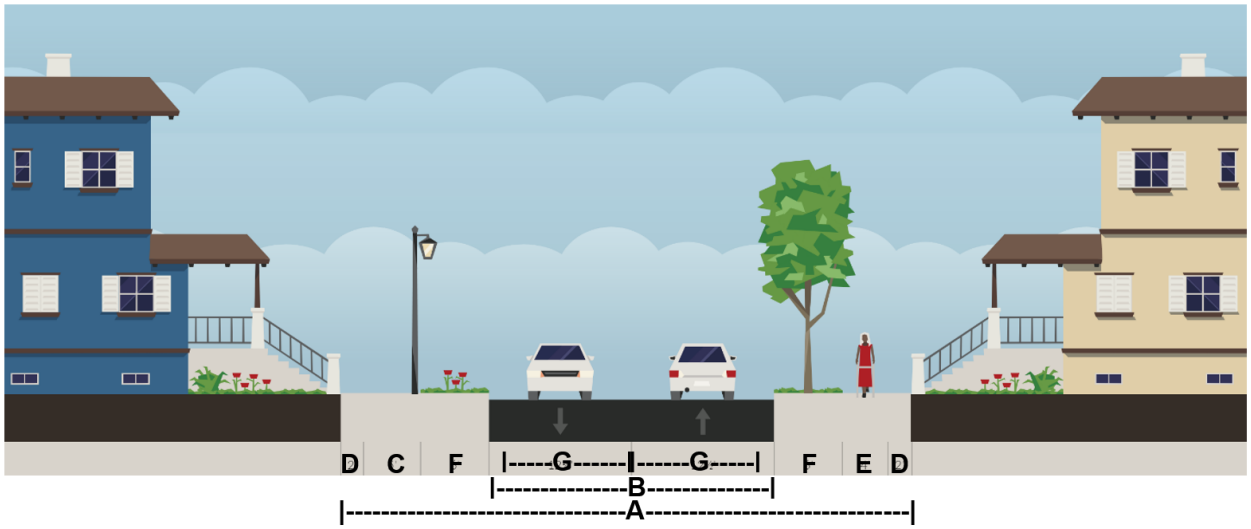
Road Right-of-Way Widths

The following sections are descriptions, either textual or graphical, of typical required road right-of-way widths for select categories of road types:

- Rural Road
- Local Street
- Collector (Major), Collector (Minor) Commercial and Industrial
- Collector (Minor) Residential

Rural Road
Rural roads shall have a travel lane width of 12 feet with a 6-foot shoulder on each side containing a ditch/swale for drainage. Driveway culvert pipes are required for access to each parcel/house.

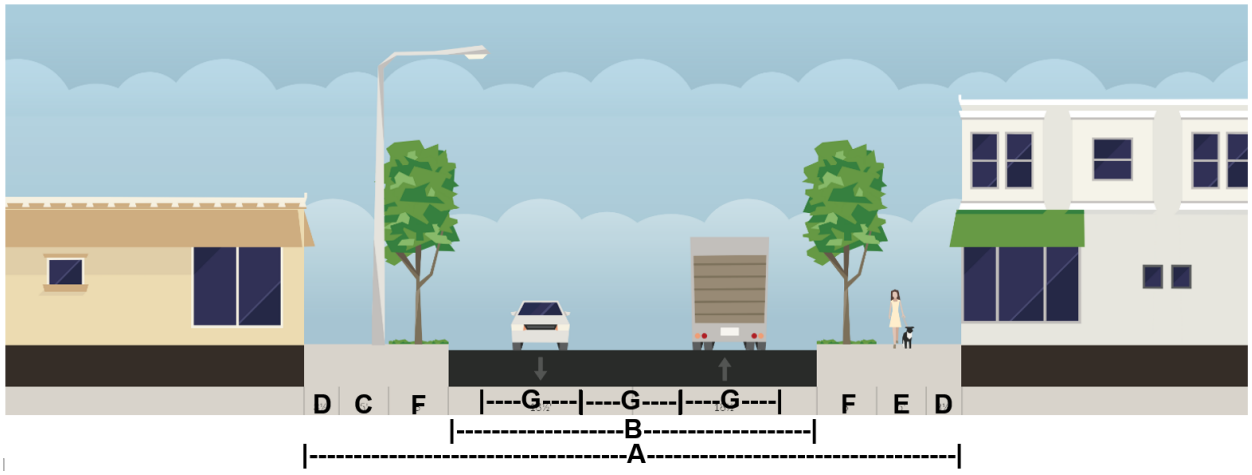
Local Street



Width	
A. Right of Way Width	51’
B. Back-of-curb to back-of-curb	25’
Streetscape	
C. Utility placement easement (min)	5’ (one side)
D. Maintenance strip (min)	2’ (each side)
E. Sidewalk (min)	5’ (one side)
F. Planting area	6’ (each side)
Travelway	
G. Travel lane	11’
General	
Walkway type	Sidewalk
Planting Type	Tree lawn
Tree Spacing	40’ o.c. avg.
Parking Type	N/A
Mailboxes	N/A

Engineering Specifications	
Design Speed (mph)	25 mph
Design Vehicle	Passenger Vehicle
Driveway Spacing	As needed
Median Opening Distance	N/A
Cul-de-sac Island	N/A
Partial Medians/Island	No
Curb Radii	25’
Lighting	Required on all public streets for new development

Collector (Major), Collector (Minor) Commercial and Industrial

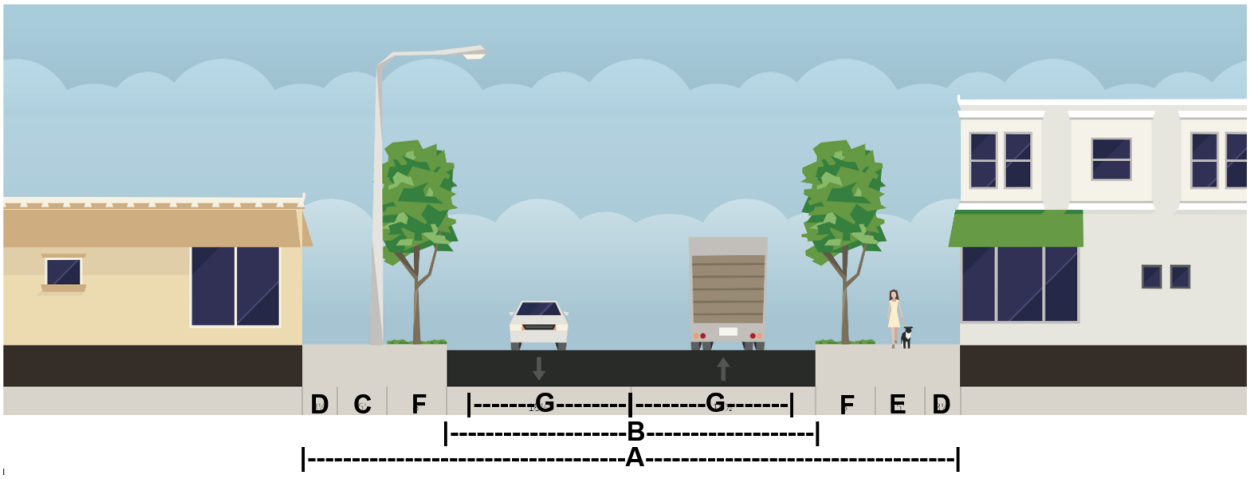


Width	
A. Right of Way Width	68’
B. Back-of-curb to back-of-curb*	39’
Streetscape	
C. Utility placement easement (min)	5’ (one side)
D. Maintenance strip (min)	3.5’ (each side)
E. Sidewalk (min)	5’ (one side)
F. Planting area (min)	6’ (each side)
Travelway	
G. Travel lane**	12’
General	
Walkway type	Sidewalk
Planting Type	Tree lawn
Tree Spacing	40’ o.c. avg.

Engineering Specifications	
Design Speed (mph)	40 mph
Design Vehicle	All Vehicles
Signalized Intersection Density	As warranted
Driveway Spacing	As needed
Median Opening Distance	N/A
Partial Medians/Island	No
Curb Radii	5-10’
Lighting	Required on all public streets for new development, pedestrian scale optional and responsibility of developer
Permitted Furniture	Bicycle racks, benches, parking meters

*Use of swales instead of curb and gutter may be approved on a case by case basis by County Engineer
**Number of travel lanes will be determined by the traffic count

Collector (Minor) Residential



Width	
A. Right of Way Width	56’
B. Back-of-curb to back-of-curb	27’
Streetscape	
C. Utility placement easement (min)	5’ (one side)
D. Maintenance strip (min)	3.5’ (each side)
E. Sidewalk (min)	5’ (one side)
F. Planting area (min)	6’ (each side)
Travelway	
G. Travel lane	12’
General	
Walkway type	Sidewalk
Planting Type	Tree lawn
Tree Spacing	40’ o.c. avg.

Engineering Specifications	
Design Speed (mph)	40 mph
Design Vehicle	All Vehicles
Signalized Intersection Density	As warranted
Driveway Spacing	As needed
Median Opening Distance	N/A
Partial Medians/Island	No
Curb Radii	5-10’
Lighting	Required on all public streets for new development, pedestrian scale optional and responsibility of developer
Permitted Furniture	Bicycle racks, benches, parking meters

Pavement Width

Pavement width for rural roads shall be measured from pavement edge to pavement edge. Residential, commercial, collector, and industrial roads shall measure pavement width from back-of-curb to back-of-curb or from low-point-of-valley to low-point-of-valley.

The mixing of rural and any other road classification is prohibited. Curb and gutters shall be installed on all paved roads unless the county engineer determines that another system is acceptable. Roads without curb and gutter shall have a minimum right-of-way of 66 feet; provided, however, when stormwater swales or other stormwater features are located along the roadside and specifically outside of the right-of-way, then the right-of-way may be reduced to 50 feet. The stormwater swales or other stormwater feature must be within a minimum eight (8) foot drainage easement or conservation easement, with clearly defined maintenance by a private owner or homeowners' association.

In the event the development of property includes or abuts an existing platted county road that does not conform to the minimum requirements set forth in this chapter, or in the event that the development will result in an increase in the average daily traffic using the road to the extent that the classification of the road will change under these regulations, or the road is shown on the county's thoroughfare plan, the preliminary land development (land development or subdivision) plan must provide for sufficient right-of-way to increase the size of the right-of-way to the width needed under the new classification. In the event that the development abuts only one (1) side of such a road, the additional right-of-way reserved shall not exceed one-half (1/2) of the additional right-of-way required under the new classification, measured from the centerline of the existing right-of-way. The plat shall clearly denote that any subject right-of-way described above is reserved for future road widening. Lot area requirements and setback requirements shall not use the reserved right-of-way area in their measurements.

Road Geometric Design

Unless specifically addressed in these regulations, all geometric elements of roadway design for streets and roads in the County Road System will be in accordance with the AASHTO Policy on Geometric Design of Highways and Streets.

Horizontal Curves

Horizontal curves are to be introduced at all changes of direction on collector, local commercial and industrial service streets and at changes of direction on residential streets where the deflection angle exceeds 10 degrees. The minimum radii of curvature are to be in accordance with **Table 21**.

Table 21: Street Classification Requirements

Street Classification	Stopping Site Distance (ft.)	Min. Curve Radius (ft.)	Max. Grade (%)
Rural	*	*	12
Minor Residential	160	150	15
Local Residential	160	150	15
Local Commercial	275	350	12
Collector	275	350	12
Industrial Service	275	350	12
Arterial	*	*	*

* Dependent on design speed selected

Speed limits on each street will be determined according to the shortest curve radius on the street. For streets with two (2) percent cross slopes (1/4 inch per foot crown) the maximum acceptable speed limits are shown in **Table 22**.

Table 22: Maximum Acceptable Speed Limits

Radius (ft.)	Speed Limit (mph)
150-179	20
180-299	25
300-459	30
460-674	35
675-939	40

Vertical Curves

Crest vertical curves are to be of sufficient length to provide the minimum stopping sight distance at the design speed. The lengths required are as shown in **Table 23**. The lengths are calculated using the formulas:

$$\text{Where S} < \text{L}, L = (S^2 xA)/1400$$
$$\text{Where S} > \text{L}, L = 25 - 1400/A$$

Where:

S = Stopping site distance (feet)
L = Length of vertical curve (feet)
A = Algebraic difference in grades

Table 23: Minimum Length of Crest Vertical Curves (Feet)

Algebraic Difference in Grades	For Stopping Sight Distances of:			
	160 feet	275 feet	300 feet	350 feet
4.0	---	200.0	250.0	350.0
5.0	40.0	270.0	321.4	437.5
6.0	86.7	324.1	385.7	525.0
7.0	120.0	378.1	450.0	612.5
8.0	145.0	432.1	514.3	700.0
9.0	164.6	486.2	578.6	787.5
10.0	182.9	540.2	642.9	875.0
11.0	201.1	594.2	707.1	962.5
12.0	219.1	648.2	771.4	1050.0
13.0	237.7	702.2	835.7	1137.5
14.0	256.0	756.3	900.0	1225.0
15.0	274.3	810.3	964.3	1312.5
16.0	292.6	864.3	1028.6	1400.0
17.0	310.9	918.3	1092.9	1487.5
18.0	329.1	972.3	1157.1	1575.0
19.0	347.4	1026.3	1221.4	1662.5
20.0	365.7	1080.4	1285.7	1750.0

Intersections

The centerlines of no more than two (2) streets shall intersect at any one point. Whenever possible, the centerlines of intersecting streets are to be perpendicular but in no case is the angle of intersection to be less than 60 degrees. All angles and distances are measured relative to the intersection of a street centerline.

Intersections in Curves

Intersections within a horizontal curve are permitted provided that the intersecting street has a 100-foot minimum tangent at the intersection and the required corner sight distance is maintained. Whenever possible, the tangent of the intersecting street is to be radial to the curve but in no case will it be more than 30 degrees from radial.

Reverse Curves

Reverse curves are permissible provided that applicable sight distances are maintained.

Curb Radius

The minimum acceptable curb radius at intersections is 25 feet. Larger radii must be provided in accordance with the AASHTO Policy on Geometric Design of Highways and Streets when significant

tractor-trailer, or other large vehicle, traffic is expected.

Medians
Natural or planted medians separating opposing traffic lanes are acceptable. The minimum width of pavement on either side of the median is to be in accordance with the minimum lane widths contained in **Table 24**. Barrier type curbs or adequate lateral clearance, however, must be provided on the median. Painted medians are required on collectors, local commercial and industrial service streets.

Table 24: Lane Widths and Design Speeds for Various Street Classifications

Street Classification	Min. R/W Width (ft.)	Min. Pave. Width (ft.)	Min. Lane Width (ft.)	Design Speed (mph)
Rural	66 (3)	22 (2)	11	(1)
Minor Residential	50	20	10	25
Local Residential	50	24	12	25
Local Commercial	66	36	12	40
Collector	66	36	12	40
Industrial Service	66	36	12	40
Industrial Service	80	36 (2)	12	40
Arterial	100	52	24	

Islands
A natural or planted island may be used in the center of cul-de-sacs on residential and rural streets provided that a minimum pavement width of 18 feet is maintained around the island.

Cul-de-Sacs
Cul-de-sacs shall not be used to avoid connection with an existing road or to avoid connection to adjoining property. Cul-de-sacs shall not be used to provide access to development on the boundary of the development except where a cul-de-sac is necessitated by topography or property accessibility or is appropriate for land use separation.

Cul-de-sac Length
Cul-de-sacs shall not exceed 1,200 feet in length unless necessitated by topography or property accessibility, and are approved by the development review team. Measurement shall be from the point where the centerline of the dead-end road intersects with the centerline of a general circulation road to the center of the turnaround of the cul-de-sac. Where one cul-de-sac extends from another cul-de-sac, the end of each cul-de-sac shall be no more than 1,200 feet from a general circulation road as measured by the centerline of the roads.

Cul-de-sac Design
Cul-de-sacs shall terminate in a circular turnaround having a minimum right-of-way of at least 100 feet

in diameter and a paved turnaround with a minimum outside diameter of 80 feet, or other approved type of turn around, including Ts, Ys or landscaped islands with a minimum right-of-way sufficient for county maintenance. In addition, all cul-de-sacs must have a landscaped interior island, at least 40 feet in diameter. The minimum pavement width around a cul-de-sac island shall be 16 feet, and this portion of the pavement shall be designated as a one-way for traffic purposes. A provision for adequate drainage must be designed for the island, and a provision for maintenance of landscaping on the island must be included in the recorded restrictive covenants for the subdivision.

Sidewalks

All sidewalks within future or Richland County Right-of Way shall be installed prior to the final inspection of streets and storm drainage and formal street acceptance. If the sidewalks are not completed when the developer is ready to turn the roads over to the County, then a surety bond equal to the construction cost of the sidewalks shall be provided for the incomplete sidewalks. This bond can be reduced as sidewalks are completed.

Temporary Dead-end Road and Half Roads

Dead-end Roads

Temporary dead-end roads shall be provided with a temporary turnaround having a roadway surface diameter of 80 feet or other type of approved turnaround.

Half Roads

Half roads of less than two (2) lanes are prohibited. Whenever a road is planned adjacent to the proposed development tract boundary, the entire road right-of-way shall be platted within the proposed development, or a portion of the road may be platted and reserved with adequate provision for the concurrent dedication of the remaining portion of the right-of-way by the adjacent landowner, evidence of which shall be furnished by the developer through an acquired and recorded easement.

Visibility at Intersections

All roadways are to be designed so that adequate corner sight distance is provided at all intersections. Corner sight distance at an intersection is measured from a point on the intersecting street 15 feet from the edge of pavement on the through street and 3.75 feet above the street surface to an object 4.5 feet high on the through street. The minimum corner sight distance is equal to the stopping distance shown in Section 5.2.4 of the Richland County Road Design Standards (**Appendix L**: Road Design Standards) at the design speed, or posted speed limit, on the through street.

The stopping distance is the distance that a vehicle travels during the time in which the driver perceives a hazard in the road, reacts, and brings the vehicle to a halt. Stopping distance can be calculated using the following equation:

$$d = 1.47V_t + 1.075\frac{V^2}{a}$$

Where:

d = stopping distance (feet)
t = brake reaction time (seconds)
V = design speed (miles per hour)
a = driver deceleration (feet per second squared)

When *t* is 2.5 seconds and *a* is 11.2 ft/s^2, **Table 25** indicates the resulting stopping distances for varying design speeds.

Table 25: Stopping Distances

Design Speed, V (mph)	Stopping Distance, d (ft.)
10	46.3
20	111.9
25	151.9
30	196.6
35	246.2
40	300.6
45	359.7
50	423.7
55	492.5

The road standards for visibility at intersections include the following, as described in Section 26-181 (c) of the Richland County Land Development Code:

1. *Sight clearance to be maintained.* At each corner of each road or driveway/road intersection, a sight area shall be maintained. Within the sight area, no fence, wall, sign, slope, embankment, parked vehicle, hedge, foliage, planting, object, or structure shall be placed, erected, or maintained that will obstruct visibility within the sight area.
2. *Dimensions of the sight area.* The horizontal dimensions of sight areas are defined as triangular areas formed by the intersecting right-of-way lines and a straight line joining the right-of-way lines at points that are measured along the right-of-way lines as seen in **Figure 6** and described below.

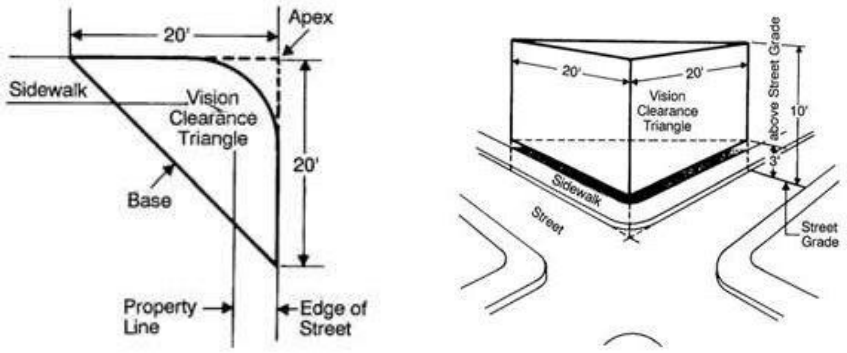


Figure 6: Horizontal Dimensions of Sight Areas

a) Fifteen (15) feet distant from the point of the intersection of the right-of-way lines in commercial and industrial districts.

b) Twenty-five (25) feet distant from the point of the intersection of the right-of-way lines in residential districts

Those sight areas shall be established regardless of the angle of intersection of the right-of-way lines. For the intersection of a driveway and a road, the triangular area is that formed by the right-of- way and the edge of the driveway and a straight line joining the right-of-way and driveway edge at points that are 15 feet distant from the point of intersection.

The vertical dimensions (cross-visibility) of sight areas are defined as the vertical space between the heights of 2.5 feet and 10 feet in elevation above the nearest edge of the road pavement of a paved road or above the nearest edge of the riding surface of an unpaved road. Trees having limbs and foliage trimmed so that the cross-visibility within the triangle is not obscured shall be allowed to overhang the sight triangle, provided the location of any tree does not create a traffic hazard.

NOTE: The profile of existing streets on either side of a proposed intersection shall be provided to ensure that adequate site distances are available.

Lateral Clearance

A minimum lateral clearance as shown below shall be maintained from the edge of pavement or from the back of curb or valley gutter:

- Rolled curb and gutter..... 6.0 feet
- Barrier type curb.....4.0 feet
- Valley gutter.....6.0 feet
- Flat pavement..... 10.0 feet

No entrance gates or other obstructions, with the exception of traffic control, street name signs, and mailboxes, are to be placed within these distances from the edge of the street.

Trees are allowed at the right-of-way line only and must utilize a root barrier on the sidewalk and/or roadway side.

It should be noted that the above setbacks are minimums based on the obstruction being located on a tangent. When an obstruction is located within a horizontal curve, the setback must be calculated using the equation:

$$R = \frac{S^2}{8M}$$

Where:

R = Radius of curvature at the centerline of the lane closest to the obstruction (feet)
M = Distance from the centerline of the lane to the obstruction (feet)
S = Stopping sight distance (feet)

Provided the above setbacks and sight distance requirements are met, trees may be retained or planted within the right-of-way for aesthetic or environmental purposes.

Road Subgrade and Pavement Structure Requirements

Table 26 indicates the various traffic classes for different types of roads. Refer to the Road Classification section of Chapter 7 for additional information on types of roads.

Table 26: Traffic Classes

Class 1	Class 2	Class 3	Class 4
• Access Street* • Park Road* • Alleyways* • Local Street* * [ADT<250]	• Local Street [ADT>250] • Minor Collector (Residential) [ADT<1000] • Minor Collector (Commercial) [ADT<1500]	• Minor Collector (Residential)* • Major Collector (Commercial)* *[1000<ADT<2000]	• Major Arterial • Local Industrial • Major Service Drives or Entrance

Table 27 provides detail on subgrade categories. The three (3) subgrade categories (poor, medium, and good) are illustrated in **Figure 7**, **Figure 8**, and **Figure 9**, respectively. In all three cases, the minimum pavement section consists of 3-inch Asphalt and 6-inch Macadam Base.

Table 27: Subgrade Categories

	Poor	Medium	Good

Description	• Becomes soft and plastic when wet.
	• Clay and fine silts
	  ○ ≥ 50% passing No. 200
	• Coarse silts and sandy loans
	  ○ Deep frost penetration
	  ○ High water table
		• Retains a moderate degree of firmness under adverse conditions
		• Loams, silty sands, and sandy-gravels containing moderate amounts of fine silts.
			• Retains a substantial amount of load-supporting capacity when wet.
			• Clean sands, sand-gravels, and those free of detrimental amounts of plastic fines.
			  ○ ≤ 10% passing No. 200
			• Relatively unaffected by moisture or frost.

Typical Properties	CBR < 6 LL > 40 PI > 10 GI > 4	CBR: 6-9 LL: 25-40 PI: 6-0 GI: 2-4	CBR ≥ 10 LL < 25 PI < 6 GI < 2

$$GI = (F_{200} - 35)[0.2 + 0.005(LL - 40)] + 0.01(F_{200} - 15)(PI - 10)$$

Where:

F_{200} = Percent of subgrade soil passing the No.200 sieve
LL = Liquid limit of subgrade soil
PI = Plastic index of subgrade soil

A geotechnical professional needs to provide design plans, reports and/or details. A soils report is required to determine subgrade conditions (i.e., poor, medium, or good).

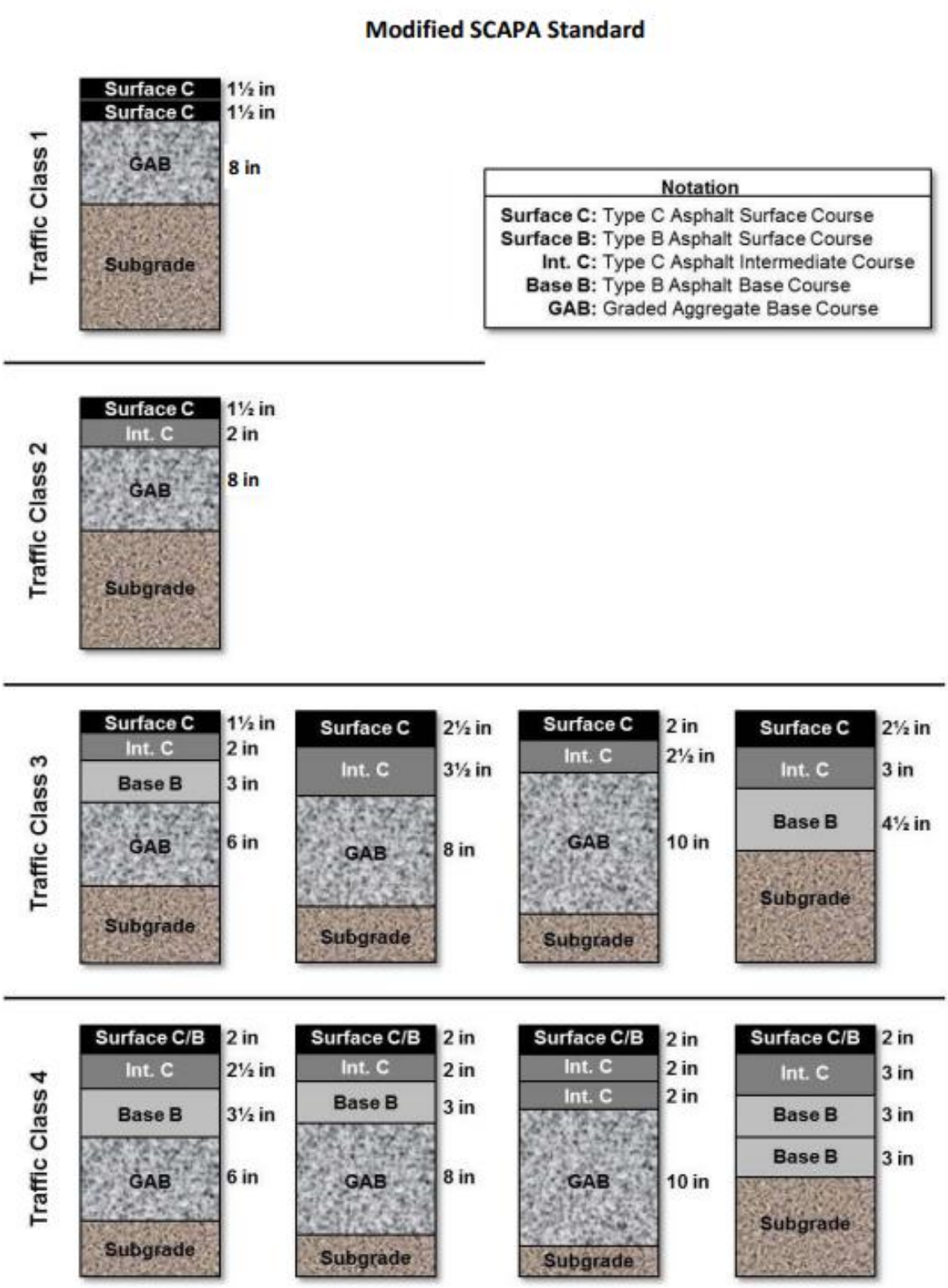


Figure 7: Poor Subgrade

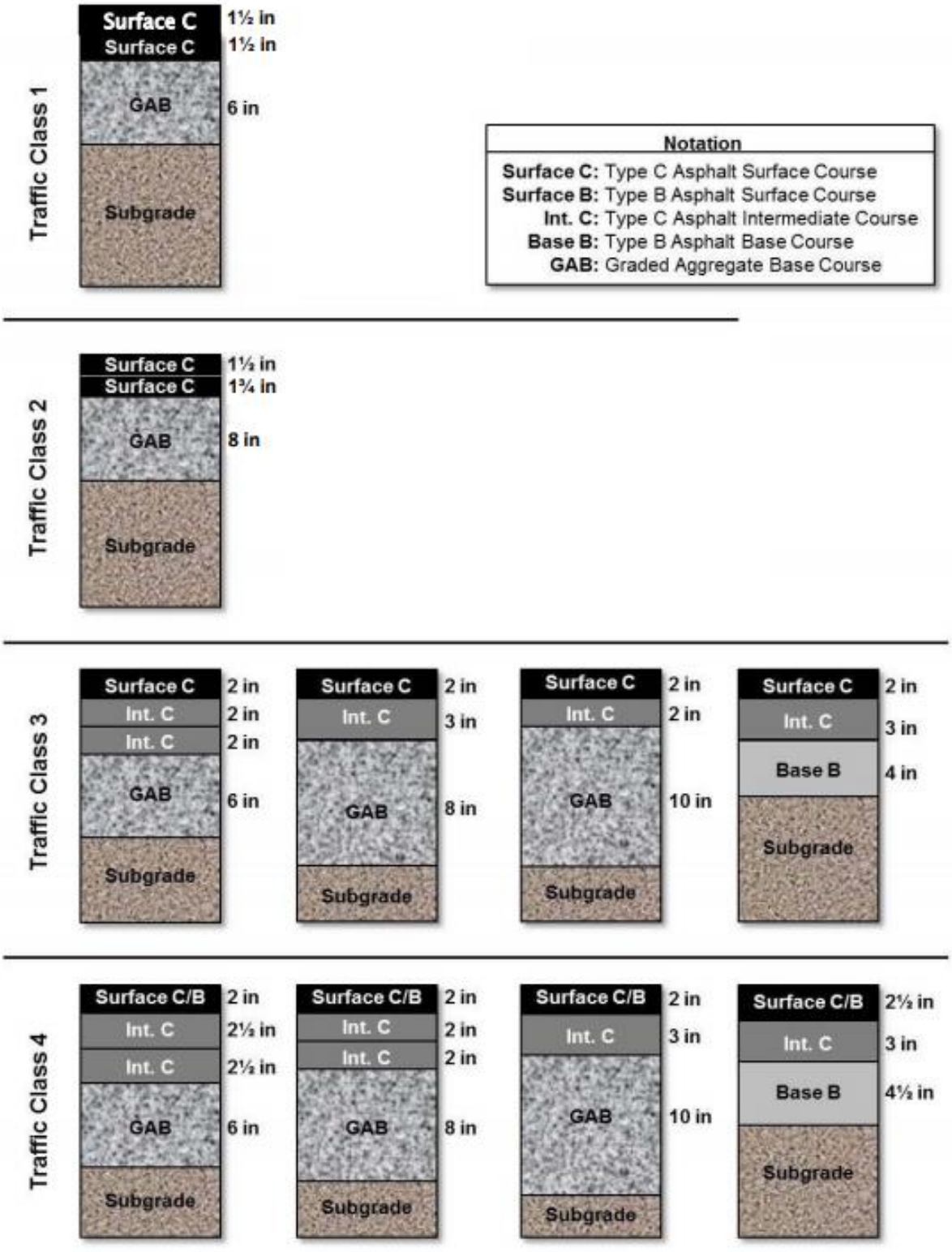


Figure 8: Medium Subgrade

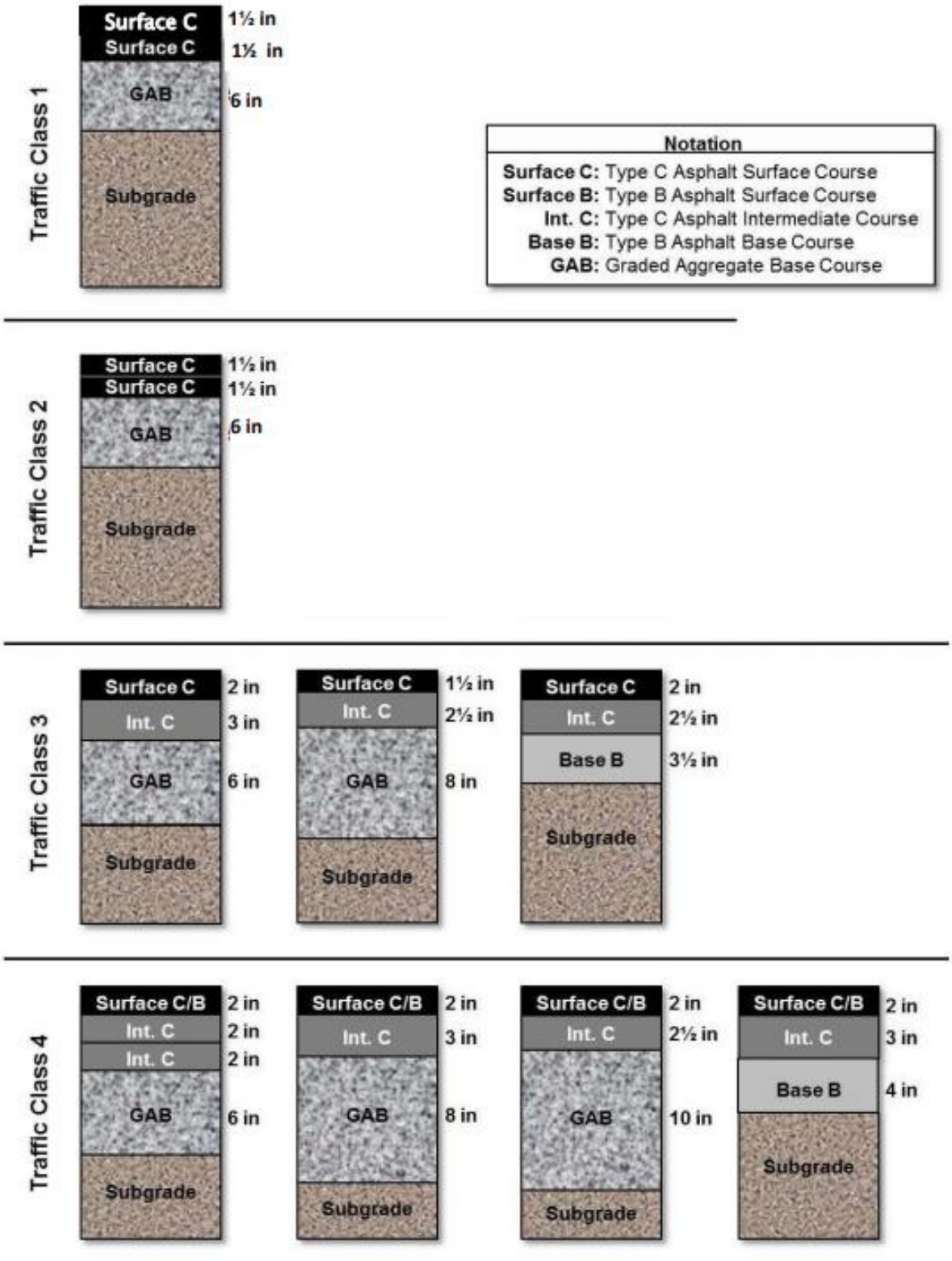


Figure 9: Good Subgrade

Road Connectivity

The arrangement of roads in a subdivision shall provide for the alignment and continuation or extension of existing roads in adjoining areas in compliance with the standards set forth in this section. Greater widths may be required if the existing road is identified for widening in the County's thoroughfare plan.

Where it is deemed necessary to the development of a logical road pattern and transportation network, roads and rights-of-way shall be extended to the boundary of adjoining property. Incompatible characteristics of adjoining property shall be given due consideration in making a determination of what shall constitute a logical road pattern. Reserve strips adjoining road rights-of-way for the purpose of preventing access to adjacent property shall not be permitted.

Reservation of Road Connections

In certain situations, the development review team may permit a platted lot to be "reserved for future connection" in lieu of construction of the road connection. In the event the connection is constructed, any remaining property shall be conveyed to adjoining property owners.

In the event that the adjoining property is later developed in such a manner that it is determined that the connection is not required or desirable, the reservation will be terminated, ownership of the lot will remain with the developer. If the extension has not been constructed within the 10-year period, the development review team will determine the continued necessity of the extension and may recommend that the reservation be terminated, with ownership of the lot remaining with the developer.

Conservation Area Access

One (1) private access easement shall be allowed across a conservation area, provided that such access is at least 20 feet in width and provides access to no more than one (1) parcel.

Chapter 8: Road Construction and Testing

Clearing and Grubbing

All work associated with clearing and grubbing of all debris, vegetative matter, trees, stumps and obstructions within the limits of disturbance such as roadway, right-of-way, easement areas, ditches, etc., unless otherwise stated to remain in accordance with the approved set of plans. All clearing and grubbing work shall be authorized under a Richland County issued land disturbance permit. The Contractor shall confirm all organic, vegetative matter (roots, stumps, logs, etc.) have been removed from the roadway area and document any unsuitable soil conditions with the right-of-way. The report shall be submitted to the County Engineer's office for review and approval.

Road Embankment

All stumps and large roots must be removed from the roadbed prior to placement of fill for embankments regardless of fill height. All roadway embankment and embankment fill must be approved and signed off on by the geotechnical engineer. Roadway embankment fill is to be placed and compacted in lifts not exceeding eight (8) inches. The contractor is responsible for providing geotechnical testing and documentation that the embankment material has been compacted to 95 percent of maximum proctor density. Density testing of embankment fill is to be performed every 16 inches of fill or the fill limit, whichever is less. Spacing of density testing is to be every 250 feet of road, alternating lanes. There shall be a minimum of two (2) tests per road per 16 inches of fill (or the fill limit, whichever is less). The Department of Community Development and Planning's office is to be copied on all testing. No proof-roll of the sub grade will be scheduled until the compaction has been documented.

Road Embankment Modifications

Any roadway embankment modifications (extra stone, soil cement, lime treatment, geo grid, etc.) must be approved by the geotechnical engineer and the Community Planning and Development's office notified of such modifications.

Materials and Equipment

Materials and Equipment used for all Roadway Courses shall be in accordance with the latest edition of the SCDOT Standard Specifications and in working condition necessary for the construction, application, placement and maintenance.

Any Geotechnical Firm that is to conduct work in Richland County shall hold at least one lab certification from the following agencies:

1. SCDOT
2. AASHTO
3. CMEC
4. USACE

Each firm is responsible for providing their credentials when the initial proof roll is requested.

Road Construction Requirements

The typical flexible pavement structure consists of subgrade (subbase) course, base course, and surface course and shall be in conformance with lines, grades, dimensions, and cross-sections shown on approved construction plans. Testing requirements for each course are listed below in **Table 28.**

Table 28: Roadway Course Testing Requirements

Roadway Courses	Mix Design Required?	Thickness Testing Frequency	Prime Coat Required?
Subgrade Course			
Cement Modified	**Yes**	500 ft per 2 lane roadway	No
Soil Aggregate	No	250 ft per 2 lane roadway	**Yes**
Base Course			
Sand Clay	No	250 ft per 2 lane roadway	**Yes**
Soil Aggregate	No	250 ft per 2 lane roadway	**Yes**
Stabilized Aggregate	No	250 ft per 2 lane roadway	No
Cement Modified Recycled	No	500 ft per 2 lane roadway	**Yes** (curing coat)
Cement Stabilized Earth (Soil Cement)	**Yes**	250 ft per 2 lane roadway	**Yes** (curing coat)
Macadam	No	250 ft per 2 lane roadway	**Yes**
Recycled Portland Concrete Cement	**Yes**	250 ft per 2 lane roadway	**Yes**
Cement Stabilized Aggregate	**Yes**	250 ft per 2 lane roadway	**Yes** (curing coat)
Intermediate Course			
Asphalt Binder or Intermediate Course	No	500 ft per 2 lane roadway	**Yes** (tack coat)
Surface Course			
Asphalt Surface Course Type C or Type D	**Yes**	500 ft per 2 lane roadway	**Yes** (tack coat)

Further information about each roadway course is provided in the sub-sections below.

Subgrade Course

The following subgrade course types are acceptable to Richland County:

- Native Soils Subgrade can be used as a subgrade and must be properly prepared for construction and pavement structure.
- Cement Modified Subgrade can be used in the modification of an existing subgrade by adding Portland cement, pulverizing the in-place soil, mixing, shaping, compacting, curing, and finishing the mixed material to form a subbase for a pavement structure.
- Soil Aggregate Subgrade can be used for the increasing the strength of the subgrade or subbase by adding aggregate, crushed stone and the construction of a soil-aggregate subbase on a properly prepared foundation course (subgrade or subbase) for pavement structure.

Construction of Subgrade Courses

Cement Modified and Soil Aggregate Subgrade Courses shall include roadbed preparation, pulverization, cement application, mixing, compacting, curing, and surface smoothness in accordance with the latest edition of the SCDOT Standard Specifications.

Prior to placement of these subgrade courses, the subgrade shall be prepared in accordance with the latest edition of the SCDOT Standard Specifications.

Curing, opening to traffic, and the reconstruction process shall be in accordance with the latest edition of the SCDOT Standard Specifications.

Subgrade course testing requirements are summarized in **Table 28** above.

Maintenance of Subgrade Courses

Cement Modified and Soil Aggregate Subgrade Courses shall be maintained in good condition until all work is complete and accepted. Any defects that may occur must be repaired immediately. Any repairs made shall be to the full depth of the subbase.

Mix Design Requirements

Prior to field installation of Cement Modified Subgrade or at the time of design construction plans submittal, a proposed mix design shall be submitted to the Community Planning and Development's office for review and approval. The geotechnical engineer or design professional shall submit the proposed mix design. The mix design shall include the following:

- Aggregate gradation data,
- Liquid limit,
- Plastic limit and plasticity index of soils,
- Cementitious materials,
- Compressive strength,
- Standard proctor Moisture Density relationship curve, and
- Auger boring data.

The subgrade will need to be maintained in smooth, rut free, fully compacted condition. The subgrade must remain adequately drained and free from depressions and deleterious materials.

Under no circumstances can any base, surface course or pavement be placed on the subgrade before it is inspected and approved by the Department of Community Development and Planning.

Under no circumstances can materials be stockpiled or stored on the subgrade without prior approval of the Department of Community Development and Planning.

Under no circumstances can any base, surface course, or pavement be placed on the subgrade that is muddy, frozen, or unstable.

Base Course

The following base course types are acceptable to Richland County:

- Sand Clay Base Course,
- Soil Aggregate Base Course,
- Graded Aggregate Base Course: Macadam Base Course and Recycled Portland Cement Concrete,
- Base Course,
- Stabilized Aggregate Base Course or Graded Aggregate Base Course,
- Cement Modified Recycled Base Course, and
- Cement Stabilized Earth Base Course (Soil Cement).

Construction of Base Courses

Base courses shall include subbase preparation, pulverization, cement application, mixing, compacting, curing, and surface smoothness in accordance with the latest edition of the SCDOT Standard Specifications.

Prior to placement of base courses, the subgrade course shall be prepared in accordance with the latest edition of the SCDOT Standard Specifications.

Curing, opening to traffic, and the reconstruction process shall be in accordance with the latest edition of the SCDOT Standard Specifications.

Base course testing requirements are summarized in **Table 28** above. Note that in addition to those requirements, Cement Stabilized Earth (Soil Cement) must have a required 300 psi compressive strength.

Maintenance of Base Courses

Base courses shall be maintained in good condition until all work is complete and accepted. Any defects that may occur must be repaired immediately. Any repairs made shall be to the full depth of the subbase.

Mix Design Requirements
Prior to field installation of base courses requiring mix design (see **Table 28**) or at the time of design construction plans submittal, a proposed mix design shall be submitted to the Community Planning and Development's office for review and approval. The geotechnical engineer or design professional shall submit the proposed mix design. The mix design shall include the following:

- Aggregate gradation data,
- Liquid limit,
- Plastic limit and plasticity index of soils,
- Cementitious materials,
- Compressive strength,
- Standard proctor Moisture Density relationship curve, and
- Auger boring data.

Binder or Intermediate Course
The following Binder or Intermediate Course types are acceptable to Richland County:

- Asphalt Concrete Binder Course
- Asphalt Concrete Intermediate Course

Construction of Binder or Intermediate Course
Asphalt Concrete Binder or Intermediate Course shall be constructed in accordance with the latest edition of the SCDOT Standard Specifications.

Maintenance of Binder or Intermediate Course
Asphalt Concrete Binder or Intermediate Course shall be maintained in good condition until all work is complete and accepted. Any defects that may occur must be repaired immediately. Any repairs made shall be to the full depth of the intermediate course.

If asphalt concrete binder or intermediate course is in place for nine (9) months without surface course, the binder course is subject to an inspection. A proof roll inspection and geotechnical engineering evaluation will be required to assess the condition of the course. If the proof roll fails, then a geotechnical recommendation must be submitted for review within 10 days of the proof roll. Repairs, according to the approved geotechnical evaluation, must be completed within 30 days of the approval by Richland County. The intermediate I binder course is subject to a proof roll and geotechnical evaluation every six (6) months until the surface course is installed.

Surface Course
The following Surface Course types are acceptable to Richland County:

- Asphalt Surface Course Type C
- Asphalt Surface Course Type D

Construction of Surface Course
Compacting, rolling, finishing, and opening to traffic shall be in accordance with the latest edition of the SCDOT Standard Specifications.

Maintenance of Surface Course
Asphalt Surface Course Type C and D shall be maintained in good condition until all work is complete and accepted. Any defects that may occur must be repaired immediately. Any repairs made shall be to the full depth of the surface course.

Weather Restrictions
Asphalt Surface Course Type C and Asphalt Surface Course Type D cannot be applied on a wet surface or when the ambient temperature is below 45°F.

Asphalt Mixture Placement Quality Control Verifications
During all asphalt mixture placement and compaction operations, a density gauge shall be in use. Asphalt roadway quality control verifications shall be documented by a certified Asphalt Roadway Technician. The rolling and compacting roadway verification shall include the following:

- Proper number and type of rolling and compacting equipment,
- Rolling equipment meet the SC-T-65 procedure for SCDOT specifications,
- Establish a roller pattern,
- Identify asphalt type, depth thickness, mixture placement, and compaction during production, and
- Document ambient air and temperature

Materials, mixture composition, equipment, and construction of Hot Mixed Asphalt Surface Courses (Types 1, 2, 3 and 4 or latest equivalent approved by SCDOT) may be used with prior approval of the County Engineer's Office and in accordance with the latest edition of SCDOT Standard Specifications and AASHTO standards.

If the County Engineer's Office determines that the asphalt surface course has areas of non-uniformity between coarse and fine aggregate particles within the compacted surface course pavement, the contractor and developer are responsible for correcting all segregated areas. These areas are to be removed and replaced for the full depth of the surface course with 10 feet on either side of the segregated areas for the full width of the paving lane.

Proof Rolling

A proof roll inspection involves the following components: the specifications for equipment, construction and requirements of testing the roadway embankment and subgrade for compaction uniformity and stability through a proof roll inspection. The request process for a proof roll as well as the proof roll inspection form can be found in **Appendix M**: Proof Roll Request Process and Inspection Form.

Equipment

The contractor shall ensure that the equipment used is in acceptable working condition necessary for the construction and testing in areas subject to proof roll inspections. A fully loaded tandem axle dump truck or an approved equivalent by the County Engineer's Office is accepted for proof rolling. The approved equipment shall only have air-filled pneumatic tires with a pressure between 70 and 90 psi while proof rolling.

Special Condition | A motor grader can be used for proof rolling concrete curb and gutter only as an alternative to a fully loaded tandem axle dump truck.

Proof Rolling Method

Each lift of embankment and subgrade below the finished subgrade elevation before placement of subsequent lifts shall be proof rolled. Prior to scheduling any proof roll inspections, all density testing data must be submitted to and approved by the Department of Community Development and Planning.

All proof rolls are to be performed in the presence of the County Engineer's Office representative or a certified earthwork, drainage and base inspector designated by the Department of Community Development and Planning, geotechnical engineer, and contractor.

Proof Roll Types

The following proof roll types are described in the sub-sections that follow:

- Concrete Curb and Gutter
- Cement Stabilized Earth (Soil Cement)
- Subgrade
- Embankment
- Base Course
- Existing Base Courses (in some cases)
- Existing Surface Courses (in some cases)

Concrete Curb and Gutter Proof Roll and Soil Cement

Proof rolls may be performed for concrete curb & gutter and soil cement at the request of the contractor. No proof roll inspection can be conducted without prior Richland County approval of the submitted density and subgrade condition reports. Proof roll inspection shall use a fully loaded tandem axle dump truck or full-sized motor grader (for concrete curb & gutter only).

The contractor shall schedule this inspection with the Department of Community Development and Planning. The geotechnical engineer, Richland County Engineer's office and contractor shall be represented and in attendance for the proof roll inspection. The County Engineer's Office reserves the right to conduct or require additional testing at any time.

At the request of the contractor, Concrete Curb & Gutter Proof Roll can be conducted with soil cement proof rolls simultaneously with prior approval from the Department of Community Development and Planning. A proof roll geotechnical engineer's inspection/observation report shall be submitted to the Department of Community Development and Planning.

Embankment, Subgrade and Base Course Proof Rolls
Proof rolls may be performed for embankment, subgrade and base course at the request of the contractor. No proof roll inspection can be conducted without prior Richland County approval of the submitted density and subgrade condition reports. Proof roll inspection shall use a loaded tandem axle dump truck only. The contractor shall schedule this inspection with the Department of Community Development and Planning. The geotechnical engineer, Richland County Engineer's office and contractor shall be represented and in attendance for the proof roll inspection. The Department of Community Development and Planning reserves the right to conduct or require additional testing at any time. A proof roll geotechnical engineer's inspection/observation report shall be submitted to the Department of Community Development and Planning.

Existing Binder Course Proof Roll
Proof rolls may be performed for existing base course that has been in place for six (6) months at the request of the contractor or if the County deems current conditions require further testing. No proof roll inspection can be conducted without prior Richland County approval of the submitted density and subgrade condition reports. Proof roll inspection shall use a fully loaded tandem axle dump truck only. The contractor shall schedule this inspection. The geotechnical engineer, Richland County Engineer's office and contractor shall be represented and in attendance for the proof roll inspection. The County Engineer's Office reserves the right to conduct or require additional testing at any time. A proof roll geotechnical engineer's inspection/observation report shall be submitted to the County Engineer's Office.

Existing Surface Course Proof Roll
Proof rolls may be performed for existing surface course that has been in place for six (6) months at the request of the contractor or if the County deems current conditions require further testing. No proof roll inspection can be conducted without prior Richland County approval of the submitted density and subgrade condition reports. Proof roll inspection shall use a fully loaded tandem axle dump truck only. The contractor shall schedule this inspection. The geotechnical engineer, Richland County Engineer's office and contractor shall be represented and in attendance for the proof roll inspection. The County Engineer's Office reserves the right to conduct or require additional testing at any time. A proof roll geotechnical engineer's inspection report shall be submitted to the County Engineer's Office.

Flowable Fill

Flowable fill is acceptable to Richland County for the use of backfilling for abutments, bedding and encasement of pipes, catch basins, manholes, drop inlets, utility trenches, etc. The materials, equipment, construction, preparation and placement of Flowable Fill shall be in accordance with the latest edition of the SCDOT Standard Specifications.

Roadway Repairs

All roadway repairs must be approved by the Department of Community Development and Planning prior to repair work. A geotechnical roadway repair recommendation must be submitted to the Department of Community Development and Planning for review and approval. A geotechnical observation report of the repair must be submitted to the Department of Community Development and Planning once work is complete.

Note: Any Geotechnical Firm that is to conduct work in Richland County shall hold at least one lab certification from the following agencies:

1. SCDOT
2. AASHTO
3. CMEC
4. USACE

Each firm is responsible for providing their credentials when the initial proof roll is requested.

Full Depth Asphalt Pavement Patching

Full Depth Asphalt Pavement Patching removes the material in the failed area and is replaced with fresh asphalt mixture. The approved method of full depth asphalt pavement patching shall include excavation or removal of damaged/failed area as determined by the County Engineer's office with straight and vertical cuts. The excavation or removal of the pavement shall be as much pavement as necessary, including granular base and subgrade, until a firm foundation is reached. The foundation shall be at least strong as the original pavement.

The minimum patch size shall be of six (6) feet by six (6) feet with at least 25 feet between patches. If unsuitable material is encountered during excavation, remove additional material as directed by the County Engineer's office. The faces of excavation or removal should be straight, vertical and solid. The sides of the existing asphalt pavement before placing the asphalt patch material shall be thoroughly tacked. The asphalt patch material shall be backfilled in layers not exceeding three (3) inches. The asphalt patch material shall be carefully to avoid segregation in the mix. Each layer shall be thoroughly compacted with a vibratory roller. After compaction, ensure that enough material is at grade with the surrounding existing pavement.

All full depth asphalt pavement patching work shall be conducted so that the removal and repair work is conducted within the same day and open to traffic within the same day. Ensure that the finished patch surface is smooth. Full depth asphalt pavement patching work shall not be conducted when the existing surface is wet or frozen.

Milling Existing Asphalt Pavement

Existing asphalt pavement is to be milled according to the specified width, depth and cross-slopes at locations shown on the approved set of construction plans or roadway repair recommendations.

Existing Asphalt Pavement can be milled as directed by the County Engineer. The milled surface shall be smooth, clean and free from of all loose particles. All milled material shall be disposed. Existing drives and intersections are to be tied to milled surfaces.

Removal of Existing Asphalt Pavement before Patching

Damaged asphalt pavement shall be removed to the width and depth as approved by the County Engineer's office based on a signed, sealed geotechnical engineer recommendation. Patching cannot occur when the existing surface is wet or frozen. Ensure that the finished patch is smooth riding surface. The minimum patch size shall be of six (6) feet by six (6) feet with at least 25 feet between patches. If unsuitable material is encountered during excavation, remove additional material as directed by the County Engineer's office. The faces of excavation or removal should be straight, vertical and solid.

Removal of Existing Concrete Curb and Gutter, Sidewalk or Driveway

The removal of existing Concrete Curb and Gutter, Sidewalk or Driveway shall include excavation or removal of damaged/failed area as determined by the County Engineer's office with straight and vertical cuts. The excavation or removal of the pavement shall be as much pavement as necessary. The foundation shall be at least strong as the original pavement.

Ensure that the manner of construction, mixing and placing of concrete, expansion and contraction joints, final finish, protection and curing shall be in accordance with the latest edition of the SCDOT Standard Specifications. If unsuitable material is encountered during excavation, remove additional material as directed by the Community Planning and Development's office. Suitable material shall be placed as directed by the Community Planning and Development's office.

Roadway Signs/Traffic Control Devices

Road signs, in conformance with the requirements of the Federal Highway Administration's Manual on Uniform Traffic Control Devices 2009 Edition with Revisions dated May 2012; provided, however, if a later edition is published, this latest edition shall be used; and with the addressing coordinating specialist, shall be located at all intersections in a manner approved by the county engineer.

Roadway Signs

Any sign within a new development shall be installed by the developer at his/her own expense. Signs will be aluminum blanks on metal posts fabricated and mounted in a standard design established by the director of public works. Such signs shall have white reflective lettering a minimum of six (6) inches in height on a reflective background. Signs located on multi-lane roads with a speed limit of 40 mph or greater shall have lettering a minimum of eight (8) inches in height. A green background shall denote a public road and a blue background shall denote a private road.

Unless directed otherwise by the County Engineer, speed limits shall be posted at the maximum allowable design speed based on the geometric design criteria of the road defined in this chapter and

based on the current legal speed limit

Traffic Control Devices

All traffic control devices required by the Federal Highway Administration's Manual on Uniform Traffic Control Devices 2009 Edition with Revisions dated May 2012 incorporated shall be installed by the developer at his/her own expense. All devices shall conform to the required size and reflectivity found in the Manual on Uniform Traffic Control Devices 2009 Edition with Revisions dated May 2012 incorporated. Provided, however, if a later edition of the "Manual on Uniform Traffic Control Devices" is published, this latest edition shall be used.

Chapter 9: Inspections and Enforcement

Inspection and Enforcement Authority

Department of Community Development and Planning Inspectors are authorized by Richland County to inspect and enforce the requirements of the Land Development Ordinance. The inspectors shall ensure that construction is in accordance with the approved plans, third-party inspections are conducted, all required permits (e.g., building, grading) have been issued prior to the commencement of work, sediment and erosion control measures are in place, there is proper installation and/or proper maintenance of BMPs, all required documentation is onsite, there is no adverse/offsite impact to any adjacent property, environmental feature, water body or stormwater system. The Enforcement Response Guide can be found in **Appendix N**: Enforcement Response Guide.

The inspectors shall be:

- Authorized to conduct inspections and file reports for periodic inspections as necessary during construction to assure compliance with the approved plans.
- Authorized to furnish the permittee or agent the results of inspections in a timely manner after the completion of each required inspection.
- Authorized to issue a "Notice of Violation (NOV)", subject to Section 26-273 of the Richland County Land Development Code.
- Authorized to issue a "Stop Work Order (SWO)", subject to Section 26-272 Richland County Land Development Code.
- Authorized to conduct a final inspection upon the completion of the project to determine if the completed work is constructed in accordance with the approved set of design plans and/or as-built plan certified by the permittee's registered professional engineer.

Inspections

Richland County Inspectors shall conduct periodic site inspections on all land disturbing activities. The person responsible for the land disturbing activity must arrange for the appropriate representatives to attend a Richland County pre-construction meeting and shall notify the Richland County Inspector before the initiation of construction and upon project completion. After the project completion is certified by a design professional, a final inspection will be conducted to ensure compliance with the approved Land Disturbance Permit. Richland County Inspectors shall:

- Ensure that the approved set of plans and associated (onsite) Stormwater Pollution Prevention Plan (SWPPP) are located on the project site and are properly being followed and implemented,
- Ensure that active construction sites are inspected for compliance with the approved plans on a regular basis,
- Provide the attendees of the pre-construction meeting (or designee) a written report after every inspection,
- Document the date and location of the site inspection,
- Provide inspection status: "Compliant" or "Non-compliant,"

- List all deficiencies and time frames by which to correct,
- Provide pictures on the report for some of the urgent deficiencies, and
- Notify the attendees of the pre-construction meeting (or designee) in writing within seven (7) working days after the issuance of a violation (posted card) order.

Third Party Inspections

Third-party inspectors shall conduct inspections for compliance of the approved set of plans and approved stormwater pollution prevention plan during the construction phase (until Notice of Termination is processed by Richland County) of a project:

- Every seven (7) calendar days and within 24 hours after each rainfall event that produces 0.5 inches or more of precipitation,
- At the request of Richland County,
- At request of the permittee, and
- Due to a complaint of any construction impacts.

Reports must be placed in the construction box onsite within 72 hours of completion and must be emailed to pwconstructionreports@rcgov.us within 72 hours of completion.

Sediment & Erosion Control Inspections

Upon the issuance of a Land Disturbance Permit, construction can commence. Projects disturbing more than one (1) acre are required by DHEC to hire an inspector to conduct sediment & erosion control inspections weekly until the project is complete, per the local jurisdiction, and coverage has been terminated by DHEC. Richland County Inspectors will conduct their own compliance inspections which includes making sure third-party inspections are being conducted and are accurate.

Roadway Inspections

Richland County Inspectors shall conduct periodic site inspections on roadway construction inspections. Richland County Inspectors shall enforce the following inspection items and ensure that the road is built with quality construction materials, best practices are followed, and that the roadway is being built according to the approved set of plans.

Final Inspections

Upon completion of a project, a Final Inspection can be requested. All final inspection (and follow-up) requests must be sent to pwinspections@rcgov.us with “FINAL INSPECTION REQUEST” in the subject line. The email shall be acknowledged within 24 hours. After verification that the closeout package is complete, an inspection will be scheduled within five (5) to seven (7) business days. The Engineer Certification (.pdf) must be attached to the request. Partial inspections are not granted. The Standard Operating Procedure (SOP) for Residential Final Inspections can be found in **Appendix O**: Residential Final Inspection SOP.

Enforcement

In accordance with Article XII, Code Compliance, of the Richland County Land Development Code, the Department of Community Development and Planning may issue a 'Notice of Violation' and/or 'Stop Work Order' upon findings of violations of the Richland County Land Development Ordinance.

The inspectors will consider the following criteria when determining a proper response:

- Magnitude of the violation,
- Duration of the violation,
- Effect of the violation on the receiving water body,
- Effect of the violation on the stormwater system,
- Compliance history of the violator, and
- Good faith of the violator.

Special Investigations

Richland County Inspectors shall conduct investigations on any related land disturbing activities or project sites. The inspector will ensure that best management practices are being used and proper permitting and authorization has been followed.

Issuing Violations

The Department of Community Development and Planning shall issue a 'Notice of Violation' and/or 'Stop Work Order' upon non- compliance of the Richland County Land Development Ordinance. In most cases, the 'Notice of Violation' is used as the first offense for ignoring a failed report. Subsequent non-compliance with the
Ordinance or failure to take corrective action within the specified time period may result in a 'Stop Work Order.'

For violations that involve the safety of life, or an imminent threat of serious damage to the environment and public or private property, 'Notice of Violations' and 'Stop Work Orders' may be issued for, but not limited to the following:

- Construction not in accordance with the approved plans,
- Failure to have third-party inspections conducted,
- Working without grading, building, or other applicable permits,
- Failure to have sediment and erosion control measures in place, improper installation and/or improper maintenance of BMPs,
- Failure to have the required documentation onsite, or
- Adverse/offsite impact to any adjacent property, environmental feature, water body or stormwater system.

Notice of Violation

The purpose of this correction order is to notify the owner/permittee and/or contractor/developer of deficiencies noted during specific inspections. Construction can commence but the contractor 'must' work towards corrective actions. 'Notice of Violations' shall be submitted in writing, and a card posted onsite if it shall result in immediate compliance as the work is being completed. The Department of Community Development and Planning shall give written notice to the violator within seven (7) working days of the inspection.

The inspectors will consider the following criteria when determining a proper response:

- Magnitude of the violation,
- Duration of the violation,
- Effect of the violation on the receiving water body,
- Effect of the violation on the stormwater system,
- Compliance history of the violator, and
- Good faith of the violator.

Stop Work Order

The purpose of this correction order is to 'stop' the owner/permittee and/or contractor/developer from all land-disturbing activity. Stop Work Orders shall be submitted in writing and a card posted onsite immediately. The Department of Community Development and Planning shall give written notice to the violator within seven (7) working days of the inspection.

The inspectors will consider the following criteria when determining a proper response:

- Response to any previous order or failed report,
- Magnitude of the violation,
- Duration of the violation,
- Effect of the violation on the receiving water body,
- Effect of the violation on the stormwater system, and
- Compliance history of the violator.

Civil Citations

The issuance of Civil Citations by the Inspector may be made for the following situations:

- When a 'Notice of Violation' and/or 'Stop Work Order' has not been complied with or there has no substantial progress in complying with the 'Notice of Violation' or 'Stop Work Order.'
- When a 'Stop Work Order' has been issued and work still continues in defiance of the order. Under such circumstances, the Civil Citation shall be issued for the stormwater management violation.
- When repeated, reoccurring violations take place at the same development site or when repeated reoccurring violations take place by the same responsible party. Each day that a violation remains uncorrected constitutes a separate applicable violation.
- Citations will be sent by Certified Mail. Owners, agents, permittees, lessees, builders,

contractors, developers, firms, corporations, or partnerships listed on the permit application or tax record may be cited under this provision.

Criminal Penalties

The County has the authority to charge any person violating any provision of this ordinance with a misdemeanor punishable within the jurisdictional limits of magistrate's court. Each day of a violation shall constitute a new and separate offense.

Chapter 10: Project Closeout & Dedication

Closeout (Project Completion)

All Projects that have been submitted, approved, and received Land Disturbance Permits will require a Closeout Package to be submitted. This package needs to include at a minimum:

1. Surveyed as-built drawings
2. As-built calculations
3. PTOs for applicable utilities
4. Notice of Termination
5. Engineer's Certification
6. SCDOT Encroachment Permit (if applicable)
7. Permanent Maintenance Responsibility Agreement

A guide to the Closeout Process can be found in **Appendix P**: Closeout Process.

For Residential Projects, roadways, and associated storm drainage constructed according to the approved set of plans may be dedicated to Richland County for ownership and maintenance. This is accomplished through the County's Closeout Process and the County reserves the right to deny acceptance of any project petitioned to be turned over to the County.

Once a Closeout Package has been submitted to the Department of Community Planning and Development for review, a Final Inspection can be scheduled. The package must include the above-referenced items and items in Steps one (1) and two (2) can be submitted simultaneously. All information must be submitted through the *Trakit* system and the applicant should choose "Closeout Permit" when applying for the permit and should include the following:

- Record Drawings – The drawings must include "ALL" improvements and final road and storm drainage profiles.
- Record Drawings (CAD) – The digital submission should be a (.dwg) or (.dxf) file and must include all layers.

Also, as a condition for acceptance of infrastructure into the County system, Richland County requires a one-year or two-year warranty depending on the circumstances during construction as determined by the County Engineer, accompanied by a bond in the amount of 10 percent of the construction costs associated with the deeded infrastructure. The warranty will pertain to the design and construction of the streets and accompanying drainage system in accordance with the Road Design Standards and their satisfactory performance during the warranty period. The warranty period begins with the County's execution of the deed.

All pavement failures and other structural defects that are detected during the warranty period are to be corrected by the grantor upon official notification by the Department of Public Works.

Dedication of Infrastructure

Upon receipt of the dedication package, the Department will review all information for accuracy. If all information is accounted for and accurate, a recommendation will be submitted to the County Engineer for acceptance of the project into the County inventory within three (3) days of receipt of a complete package. The dedication package must include the following:

- Certificate of Title
- Deeds (Road Right-of-Way)
- Deeds (Storm Drainage Easements)
- Affidavit (For Department of Revenue)
- Final Plat (Last Revised)
- Memorandum of Understanding

Templates for the Road Right-of-Way Deed, Storm Drainage Easement Deed, and Affidavit for Deeds Templates can be found in **Appendix Q**: Road Right-of-Way Deed Template, **Appendix R**: Storm Drainage Easement Deed Template, and **Appendix S**: Affidavit for Deeds Templates.

Chapter 11: Bond, Warranties and Agreements

Financial Surety

For purposes of these Standards, "Financial Surety" shall refer to a County approved instrument and arrangement undertaken by and at the expense of the developer, established to provide a financial guarantee in favor of the County. In the event of default or failure by the developer, the Financial Surety shall be seized upon so as to provide funds for the completion of all required infrastructure improvements.

In lieu of the completion of a subdivision (infrastructure improvements), prior to final plat approval, the developer can provide financial surety in an amount with surety and conditions satisfactory to it, providing for and securing to the County the actual construction and installation of all improvements within a specified time period as expressed in the financial documents. The construction bond process can be found in **Appendix T**: Construction Bond Process.

Types of Surety Bonds

The following types of bonds shall be acceptable to the county, subject to review and approval by the Richland County Legal Department and/or the County Engineer or his/her authorized representative:

Surety Bond

A surety bond issued by an insurance company licensed to do business in the State of South Carolina in an amount equal to 125 percent of the estimated cost of improvements. The county engineer or his/her authorized representative will validate the remaining scope of work presented and the estimated cost of improvements.

Escrow Funds

A Cashier's Check may be accepted in an amount equal to 125 percent of the estimated cost of improvements. The county engineer or his/her authorized representative must validate remaining scope of work presented along with the estimated cost of improvements. The contract may authorize a reduction of the escrow account upon completion of a portion of the improvements, but at no time shall the escrow account be less than 125 percent of the remaining improvements.

Letter of Credit

An Irrevocable Letter of Credit may be accepted by a lending institution/bank licensed to do business in the State of South Carolina in an amount equal to 125 percent of the estimated cost of improvements. The county engineer or his/her authorized representative must validate remaining scope of work presented along with the estimated cost of improvements.

Financial Surety Submissions

The Financial Surety Package shall be submitted directly to the Department, 2020 Hampton Street, 1st Floor, Columbia, SC 29202, Attention: Community Planning and Development - New Development. A

complete financial surety package shall include the following:

- Engineers Cost Estimate (Prepared by Engineer) Sealed and Signed. The cost estimate must include a breakdown of work to be completed to include unit cost and totals.
- Statement of Conditions (SOC) (Prepared by Developer or Representative). The SOC is the formal agreement between the County and Developer. This document will specify the terms of the agreement and specify an expiration date of the agreement. A copy of the SOC can be found in **Appendix U**: Statement of Conditions.
- Bond, Letter-of-Credit or Cashier's Check (Prepared by Bank or Insurance Company)
- Memorandum of Understanding (Prepared by Richland County). The memorandum of understanding is an agreement between the Bank/Insurance Company and the County which describes the terms of the surety agreement between the Developer and County. A copy of the memorandum can be found in **Appendix V**: Bond Memorandum of Understanding.
- The Bonded Plat should be submitted directly to the Department of CP&D electronically.

Financial Surety Conditions

All financial sureties shall state that the financial surety shall automatically be extended for a one-year period from the present and any future expiration dates as approved by Richland County unless at least 60 days prior to the expiration of date, the financial institution shall notify Richland County in writing by certified mail or overnight courier service that the financial institution elects not to consider the financial surety renewed for an additional period. The County will also require the bank or insurance company to sign a memorandum of understanding as it relates to the agreement between the developer and the County.

Financial Surety Reductions

Developers may apply for a reduction in the amount of the Financial Surety posted based on completed infrastructure improvements. In order to qualify for the reduction, a significant portion of any one of the following items must be installed in accordance with the approved plans: storm drainage, base, asphalt, curb and gutter, and sidewalks.

Richland County Inspectors will verify completed work certified by the developer or the developer's engineer of record. Developers should be advised that they must ensure relevant work is complete and in accordance with the approved construction plans prior to making the reduction request.

Financial Surety Termination

Financial Surety must be kept current and in effect until such time a final inspection is performed, outstanding items are addressed, and the County Engineer or his/her authorized representative have made final acceptance of the project.

Upon final acceptance of the project, the County Engineer or his/her authorized representative will release the Financial Surety instrument within three (3) days of acceptance. A certified release letter will be sent to the developer and bank/lending institution of the release.

Warranty Period

Roads and stormwater management systems that are to be dedicated to Richland County for public maintenance shall be under warranty by the developer for a period of two (2) years. The warranty period shall begin upon acceptance of the roads by Richland County. The DPW/CP&D shall maintain surveillance over the infrastructure and will provide written notification to the developer if repair work is required during the warranty period. The developer shall provide the DPW/CP&D with a timeline for the completion of the required repairs. If not completed within the approved timeline, the DPW/CP&D may correct the repairs and pursue the developer for associated cost of repair. Emergency road and/or stormwater conveyance defects that directly affect public health and safety shall be addressed immediately.

Financial Surety Security Period

All Financial Security instruments shall be posted with the County Engineer or his/her authorized representative for and on behalf of the County of Richland. The initial agreement will be in effect for two (2) years, subject to conditions specified by the County and all subsequent extensions will be reviewed for eligibility to extend.

If requested by the developer, the Department, in its sole discretion, can extend the Financial Surety for a maximum of one (1) year. Prior to granting an extension, the County Engineer or his/her authorized representative shall review actual cost estimates and work to be completed to ensure that the extended security is adequate to cover the remaining work.

Warranty Bonds

In the event the developer elects to dedicate easements and right-of-way to the public, a warranty bond, certified by a registered engineer, is required which will hold the construction contractor liable for any problems for a minimum of 24 months following the date of such dedication.

The amount of the bond shall be formulated as follows:

- 10 percent cost for roadway
- 10 percent cost for storm drainage
- 100 percent cost for incomplete sidewalks
- 100 percent cost for permanent stabilization

Warranty Bond Format

The warranty bond shall include a warranty bond estimate formatted as follows:

Richland County
Warranty Bond Estimate

Date

Subdivision - Phase #
(Lots #)
Engineering #

DESCRIPTION OF WORK/MATERIALS	QUANTITY	UNIT	UNIT PRICE ($)	%	AMOUNT
ROADWAY					
Macadam Base (8")	1970	SY	$10.75	10%	$2,117.75
AC Black Base (2")	1970	SY	$9.50	10%	$1,871.50
AC Surface (1.5")	1970	SY	$8.25	10%	$1,625.25
Rolled Curb	1483	LF	$8.50	10%	$1,260.55
			SUB-TOTAL		$6,875.05
STORM DRAINAGE					
15" RCP	301	LF	$21.00	10%	$632.10
24" RCP	229	LF	$30.00	10%	$687.00
Catch Basin 4 x 4	2	EA	$2,000.00	10%	$400.00
Junction Box 4 x 4	3	EA	$2,000.00	10%	$600.00
Florida Type Box	2	EA	$325.00	10%	$65.00
Type 9 Junction Box Tops	3	EA	$300.00	10%	$90.00
			SUB-TOTAL		$2,474.10
MISCELLANEOUS					
Sidewalk	460	LF	$15.00	100	$6,900.00
			SUB-TOTAL		$6,900.00
PERMANENT STABILIZATION					
Grassing	1.34	AC	$3,000.00	100	$4,020.00
			SUB-TOTAL		$4,020.00
			TOTAL		$20,269.15

Engineering Certificate of Warranty Bond Estimate

I hereby certify that all installed road and site improvements, storm drainage infrastructure, and pollution prevention measures that will be owned and maintained by Richland County have been designed to meet or exceed the minimum standards required by Richland County, and a bond document with surety adequate to guarantee satisfactory completion of the remaining improvements shall be provided to Richland County.

Name of Project Engineer _____ Signature _____ Date _____

Definitions

Access point. An intersection, driveway, or any entry point on the right-hand side of a road. An entry point on the opposite side of a road or a median opening may be considered an access point, if it is expected to influence traffic flow in the direction of interest. (Ord. 038-09HR; 7-21-09)

Alley. A private road primarily designed to serve as a secondary access to the side or rear of those properties whose principal frontage is on another road, either public or private, meeting minimum county requirements.

Americans with Disabilities Act (ADA). A federal law enacted in 1990 to protect the civil rights of individuals with physical or mental disabilities from intentional or unintentional discrimination in housing, employment, education, access to public services and telecommunications and to ensure that persons with disabilities have equal access to same. (Ord. 033-11HR; 6-21-11)

Annual Average Daily Trips (AADTs). The average 24-hour traffic volume on a given roadway segment over a 365-day period. (Ord. 038-09HR; 7-21-09)

Area of special flood hazard. The land in the floodplain subject to a one (1) percent or greater chance of flooding in any given year. This term also includes all wetlands within a community. For purposes of these regulations, the term “area of special flood hazard” is synonymous in meaning with the phrase “special flood hazard area.”

Arterial road - minor. A SCDOT designated roadway, as depicted on their “Functional Classification Map for the Columbia Urbanized Area”, that carries a mix of local and through traffic and which links collector roads, and sometimes local streets, with principal arterials. (Ord. 038-09HR; 7-21-09)

Arterial road - principal. A SCDOT designated roadway, as depicted on their “Functional Classification Map for the Columbia Urbanized Area” that is primarily intended to provide traffic service between urban areas. (Ord. 038-09HR; 7-21-09)

Base flood or regulatory flood. The flood having a one (1) percent chance of being equaled or exceeded in any given year.

Best Management Practices (stormwater management). A structural or nonstructural management-based practice used singularly or in combination to reduce nonpoint source inputs to receiving waters in order to achieve water quality and quantity protection goals.

BMPs. Best Management Practices (stormwater management); an acronym used to describe a structural or nonstructural management-based practice used singularly or in combination to reduce nonpoint source inputs to receiving waters in order to achieve water quality and quantity protection goals. (Ord. 006-10HR; 1-19-10)

BMPs Design Manual (stormwater management). The manual of design, performance and review standards for stormwater management BMPs to be used in Richland County. The requirements established by the BMPs Design Manual are mandatory. (Ord. 006-10HR; 1-19-10) The "BMPs Design Manual" is synonymous with the "Land Development Manual."

Borrow pits. An excavated area where naturally occurring earthen materials are to be removed for use as ordinary fill at another location.

C-SWPPP. Comprehensive Stormwater Pollution Prevention Plan; an acronym used for a document that includes a narrative, drawings, and calculations to describe BMPs and activities that will be implemented to eliminate or reduce pollutant discharges to stormwater, stormwater conveyance systems, and/or receiving waters. The C-SWPPP must include the SWPPP, prepared according to DHEC requirements for the General Construction Permit, as well as the NOI and Engineering Report.

Capital Improvement Plan (CIP). A general description of all existing public facilities and their existing deficiencies within the service area or areas of the governmental entity, a reasonable estimate of all costs, and a plan to develop the funding resources including existing sources of revenues related to curing the existing deficiencies including, but not limited to, the upgrading, updating, improving, expanding, or replacing of these facilities to meet existing needs and usage; and otherwise complies with the requirements of Section 6-1-960 (B) of the S.C. Code of Laws. (Ord. 038-09HR; 7-21-09)

Central Midlands Council of Governments (CMCOG). An association of local governments in Fairfield, Newberry, Lexington, Richland and portions of Kershaw and Calhoun counties to address multi-jurisdictional problems and opportunities. (Ord. 038-09HR; 7-21-09)

Clean Water Act. The Federal Water Pollution Control Act, as amended, codified at 33 U.S.C. §§ 1252 et seq. (Ord. 006-10HR; 1-19-10)

Collector Road. A roadway which provides connection between the arterial road system and local roads as well as traffic circulation within residential, commercial and industrial areas. (Ord. 038-09HR; 7-21-09)

Collocate. The act of using a single support structure and/or site by more than one (1) communication (i.e., wireless) provider.

Common Area. Land within a development, not individually owned or dedicated for public use, which is designed and intended for the common use or enjoyment of the residents of the development.

Conservation Area. Any parcel or area of undeveloped land conserved in its natural state for perpetuity through deeds or other legal measures. (Ord. 035–08HR; 6-17-08)

Controlled Access Zone. The area of an intersection that requires controlled traffic movement to preserve the safety of pedestrians, drivers, and other intersection users. (Ord. 018-10HR; 4-20-10)

Critical Root Zone. An area on the ground and adjacent to a protected tree that encompasses a distance of one (1) foot of space for every one (1) inch of the tree DBH measured outward from the center of the tree in all directions. (Ord. 055-12HR; 10-16-12)

Cross-Access Easement. An easement wherein a grantor conveys to a grantee, his/her/its heirs, successors in interest, and/or assigns, a perpetual nonexclusive easement that may include such matters as: vehicular and pedestrian access, ingress, egress; the location and amount of parking of vehicles; and/or landscaped areas; and/or any shared maintenance responsibilities. (Ord. 014- 10HR; 3-16-10)

Cul-de-sac. A road having one end open to traffic and the other end terminated by a vehicular turnaround; a dead-end street.

Design Capacity. The volume of annual average daily trips (AADTs) of a given roadway segment at which traffic flows with minimal delay. The design capacity is based on the geometry of the roadway segment and its functional classification. (Ord. 038-09HR; 7-21-09)

Designated Water Resource. A perennial surface water body that normally flows or contains water throughout the year, except during extreme droughts. These water bodies typically have a defined channel or shoreline and support a diverse population of aquatic insects, including some with life cycles that require permanent water. Those water bodies with channels are able to sort and move channel materials.

Developer. Any person acting on his own behalf as a property owner, or as an agent for a property owner, who makes application for development plan approval as set forth in this chapter [Chapter 26 of the Richland County Code of Ordinances].

Development. Any of the following actions undertaken by a public or private individual or entity: (a) any land altering activities associated with the division of a lot, tract, or parcel of land into two (2) or more lots, plots, sites, tracts, parcels, or other divisions by plan or deed; or (b) any human-made change to improved or unimproved real estate, including, but not limited to, buildings or other structures, clearing, mining, dredging, filling, grading, paving, berming, diking, excavation, or drilling operations, or storage of equipment or materials.

Development with Open Space Design. A development pattern that arranges the layout of buildings in a compact area of the site which reserves a portion of a site for open space preservation and is protected in perpetuity. (Ord. 045-13HR; 9-10-13)

DHEC. The South Carolina Department of Health and Environmental Control.

Drainage. A general term applied to the outflow of water or other fluid from a given area, whether by natural means (surface water runoff) or artificial means (drains, grading, etc.).

Drainage Channel. Any natural or man-made conveyance for surface water, including open channels, enclosed storm sewers, streams, rivers, lakes, ponds, or marshes.

Drainage System. The surface and subsurface system for removal of water from the land, including both the natural elements of streams, marshes, swales, and ponds, whether of an intermittent or continuous nature; and the manmade elements such as improved open channels, culverts, retention facilities, and enclosed storm sewers.

Easement. A grant or reservation by the owner of land for the use of such land by others for a specific purpose or purposes.

Erodible soils. Soils that can erode at excessive rates, such as Hydrologic Groups B and C. (Ord. 045-13HR; 9-10-13)

Encroachment (floodplain overlay district standards). The advance or progression of uses, fill, excavation, buildings, structures, or developments into a floodplain or floodway.

Encroachment permit. A permit issued by the County on county-maintained roadways or by SCDOT on state-maintained roadways to use a public right-of-way for any purpose. (Ord. 038- 09HR; 7-21-09)

Engineer. A person practicing engineering and licensed in the State of South Carolina pursuant to the requirements of Section 40-22-10, et seq., of the South Carolina Code of Laws, as amended.

Entitled Property. Any property that, prior to January 19, 2010 has been subject to either "Permitted Development Activity" or a "Valid Government Approval." If a Permitted Development Activity or Valid Governmental Approval has occurred with respect to any tract and such tract was subsequently subdivided, or in the future is subdivided, by an approved subdivision plat, then all subdivided parcels that were part of the original tract shall be considered Entitled Property. (Ord. 006-10HR; 1-19-10)

Ephemeral stream. A stream or reach of a stream that flows briefly only in direct response to precipitation in the immediate locality and whose channel is at all times higher than the water table. (Ord. 006-10HR; 1-19-10)

Erosion. The general process by which soil and rock fragments are detached and moved by the action of wind, water, ice and gravity, either naturally or induced.

Erosion and sediment control plan. A plan which adequately describes necessary land management practices and control measures, including a timetable or schedule for their installation, which will effectively minimize soil erosion and sedimentation; prepared and approved as provided herein for application to a particular land area. This plan shall be incorporated into the Stormwater Pollution

Prevention Plan (SWPPP). (Ord. 006-10HR; 1-19-10)

Federal Highway Administration (FWHA). The agency that administers federal surface transportation regulations and provides funding for federal roads and MPO activities. (Ord. 038- 09HR; 7-21-09)

FEMA. The Federal Emergency Management Agency.

Fill. The placement of fill material at a specified location to bring the ground surface up to a desired elevation.

Fill material. Natural sands, dirt, soil and rock. For the purposes of floodplain management, fill material may include concrete, cement, soil cement, brick or similar material as approved on a case-by-case basis.

FIRM. See "Flood Insurance Rate Map".

Flood or Flooding. A general and temporary condition of partial or complete inundation of normally dry land areas, caused by the overflow of a watercourse or the unusual and rapid accumulation or runoff of surface waters from any source.

Flood Insurance Rate Map (FIRM). An official map of a community on which the FEMA has delineated both the areas of special flood hazard and the risk premium zones applicable to the community.

Flood Insurance Study. An official report provided by FEMA. The report contains flood profiles, as well as the Flood Boundary Floodway Map and the water surface elevation of the base flood. A Flood Insurance Study may include a study using detailed hydrologic and hydraulic analyses to model the base flood, determine base flood elevations, and designate floodways and risk zones (Zones AE, A1-30, AH and AO).

Floodplain. The areas adjoining a river, stream, watercourse, lake, or other body of standing water that have been or may be covered by floodwater.

Floodplain Development Permit. A document issued by the county authorizing the applicant to undertake development and related activity in a regulated floodplain.

Flood Prone Area. The area of land susceptible to being inundated by a flood (see definition of "flood").

Floodproofing. Design and construction of nonresidential structures and attendant utility and sanitary facilities that are watertight to at least two (2) feet above the base flood elevation. Walls are substantially impermeable to the passage of water and have structural components capable of resisting hydrostatic and hydrodynamic loads and the effects of buoyancy.

Flood Resistant Materials. Any building material capable of withstanding direct and prolonged contact with flood waters without sustaining significant damage. The term "prolonged contact" means at least 72 hours, and the term "significant damage" means any damage requiring more than low-cost cosmetic repair (such as painting).

Floodway. The channel of a river or other watercourse and the adjacent land areas which must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than one (1) foot.

Functional Classification. An FHWA process, adopted by SCDOT and the MPO, by which roads are grouped into classes, or systems, according to the character of the service they are intended to provide. The MPO classifies roads as interstate, principal arterial, minor arterial, or collector. (Ord. 038-09HR; 7-21-09)

Grading. Any displacement of soil by stripping, excavating, filling, stockpiling, or any combination thereof, and shall include the land in its excavated or filled state.

Hazardous Material. Any substance that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment.

Highest Adjacent Grade. The highest natural elevation of the ground surface, existing prior to construction, next to the proposed walls of the structure.

Illegal Discharge. Any activity that results in a discharge to a stormwater system or receiving waters that is not composed entirely of stormwater; provided, however, this does not include: (a) discharge pursuant to an NPDES permit (other than the NPDES permit issued for the Richland County stormwater system and its co-permittees), (b) discharges resulting from fire-fighting activities, and (c) any activity specifically addressed in this Code of Ordinances [Richland County Code of Ordinances] or by Richland County as not being significant sources of pollution. (Ord. 006-10HR; 1-19-10)

Illegal Dumping. The disposal of waste in an unpermitted area or the pouring of liquid wastes or trash into stormwater drains. (Ord. 006-10HR; 1-19-10)

Illicit Connection. A connection to a stormwater system that results in a discharge that is not composed entirely of stormwater run-off; provided, however, this does not include discharges pursuant to an NPDES permit (other than the NPDES permit issued for the Richland County stormwater system and its co-permittees). (Ord. 006-10HR; 1-19-10)

Illicit Discharge Detection and Elimination (IDDE) Program. The third Minimum Control Measure of the Stormwater Phase II Rule; it is a program, employing a plan that should include procedures for locating priority areas likely to have illicit discharges, procedures for tracing the source of an illicit discharge, procedures for removing the source of the discharge, and procedures for program

evaluation and assessment. (Ord. 006-10HR; 1-19-10)

Improper Disposal. Any disposal other than through an illicit connection that results in an illegal discharge, including, but not limited to, the disposal of used oil, toxic materials or other hazardous liquids or substances resulting from the improper management of these materials. (Ord. 006-10HR; 1-19-10)

Impede the free flow of water. Any change to water elevation or velocity due to obstructions, diversions, or retardation, including changes to the flow characteristics of the waters of the regulatory flood as they pass both the upstream and the downstream boundaries of the property.

Impervious Surface. Any hard-surfaced, man-made area that does not readily absorb or retain water, including, but not limited to, building roofs, parking and driveway areas, graveled areas, sidewalks, and paved recreation areas.

Impervious Surface Ratio. The ratio between the surface areas of a lot that is covered by impervious surfaces compared to the total surface area of a lot. (Ord. 018-10HR; 4-20-10)

I**mprovements**. Pavements, curbs, gutters, sidewalks, paths, bikeways, sedimentation control facilities, re-vegetation, water mains, sanitary and storm sewers, drain ways, gas lines, electrical and telephone lines and appurtenances, street signs, trees and lights, and any other similar items required for compliance with the regulations of this chapter [Chapter 26 of the Richland County Code of Ordinances] or the conditions of approval.

Industrial Road. A road for which the intended use is somewhat less than that of an arterial road and somewhat greater than that of a collector road. Such roads will generally be located in industrial/commercial areas or be used to provide access for heavy vehicles or heavy vehicular volumes to such areas.

Inflow and infiltration. Groundwater or stormwater entering into a sanitary sewer system as a result of damaged collection lines or manholes or from direct stormwater connections, such as from catch basins or roof drains. (Ord. 006-10HR; 1-19-10)

Infrastructure. Facilities and services that are needed to sustain industry, residential, commercial, and all other land use activities, including water and sewer lines and other utilities, streets and roads, communications and public facilities, such as fire stations, parks, etc. (Ord No. 061-08HR; 10-21-08)

Irrigation. A permanent, underground watering system equipped with surface, subsurface or overhead emitters and which provides 100 percent water coverage.

Jurisdictional Line. A line identified or approved by the United States Army Corp of Engineers (USACE) describing areas to be protected under the Federal Clean Water Act. (Ord. 006-10HR; 1- 19-10)

Land. Any ground, soil, or earth including marshes, swamps, drainage-ways and areas not permanently covered by water.

Land Development Manual. The name of this manual, which serves as a comprehensive reference for land development requirements. The "Land Development Manual" is to be considered synonymous with the "BMPs Design Manual" and "Stormwater Design Manual" as defined in the Land Development Code and in this Definitions section. The requirements are mandatory and shall be updated as often as necessary.

Land Development Permit. A document signed by an authorized county official, as required in this chapter [Chapter 26 of the Richland County Code of Ordinances], as a condition precedent to the commencement of a use or the erection, construction, reconstruction, restoration, alteration, conversion or installation of a structure or building, which acknowledges that such use, structure, or building complies with the provisions of this chapter [Chapter 26 of the Richland County Code of Ordinances] or an authorized variance therefrom.

Land Development Review, Major. The review of projects, exclusive of residential and commercial subdivisions, involving one (1) or more of the following: 100,000 or more square feet of nonresidential floor space; 150 or more multi-family residential units, lots or manufactured home spaces in a manufactured home district; and/or the dedication of new public road segments or the dedication to the county of land for open space or other public purposes.

Land Development Review, Minor. The review of projects, exclusive of residential and commercial subdivisions, which do not meet the standards for applicability for "land development compliance review" or "major land development review." Land disturbance. Any activity involving the clearing, grading, transporting, filling, and/or any other activity which causes the land to be exposed to the dangers of erosion.

Land Disturbance Permit. A certificate issued by Richland County to perform work pursuant to an approved SWPPP prepared under the provisions of this chapter [Chapter 26 of the Richland County Code of Ordinances]. It is issued after DHEC issues coverage under an NPDES General Permit for Large and Small Construction Activities. (Ord. 006- 10HR; 1-19-10)

Land Surveyor. A person currently licensed pursuant to the requirements of Section 40-22-10, et. seq., of the South Carolina Code of Laws, as amended.

Landscape Architect. A person practicing landscape architecture and licensed in the State of South Carolina pursuant to the requirements of Section 40-28-10, et. seq., of the South Carolina Code of Laws, as amended.

Levee. A man-made structure, usually an earthen embankment, designed and constructed in accordance with sound engineering practices to contain, control, or divert the flow of water so as to provide protection from temporary flooding.

Level of Service (LOS). A qualitative term describing how the traffic flow on a given road segment is perceived by its users, (i.e., good conditions = A or B; tolerable conditions = C or D; and intolerable conditions = E or F). This relationship is measured by its current traffic volume to its engineering designed traffic volume ratio (v/c): (Ord. 038-09HR; 7-21-09)

LOS A = a v/c ratio of 0.00 to 0.49	LOS D = a v/c ratio of 1.01 to 1.15
LOS B = a v/c ratio of 0.50 to 0.74	LOS E = a v/c ratio of 1.16 to 1.34
LOS C = a v/c ratio of 0.75 to 1.00	LOS F = a v/c ratio of 1.35 plus

Local Commercial Road. A road in a commercial area used primarily for access to abutting properties and to feed traffic to collector roads. This classification includes roads located parallel and adjacent to limited access roads or highways that provide access to abutting commercial properties and protection from through traffic.

Local Residential Road. A road in a residential area used primarily for access to abutting properties and to feed traffic to collector roads. This classification includes roads located parallel and adjacent to limited access roads or highways that provide access to abutting residential properties and protection from through traffic. Average daily traffic is less than 2,000 vehicles.

Loop Lane. A roadway that arches away from a road and re-intersects the same road at some distance away from the "first" intersection. (Ord. 055-12HR; 10-16-12)

Lot. A parcel of land clearly defined by plat or by metes and bounds description and held, or intended to be held, in separate lease or ownership.

Lot Coverage. A measure of intensity of land use that represents the portion of a site that is impervious (i.e., does not absorb water). This portion includes, but is not limited to, all areas covered by buildings, parked structures, driveways, roads, sidewalks, and any area of concrete asphalt.

Lot frontage. That part of a lot (a lot line) abutting on a road.

Lot width. The distance between straight lines connecting front and rear lot lines at each side of a lot, measured at the required front setback, provided that the width between side lot lines at their foremost points (where they intersect with the road line) shall not be less than 80 percent of the required lot width. In the case of lots fronting on a curve or cul-de-sac, the lot width may be measured up to a distance 50 percent greater than the required front yard as defined within each zoning district classification, provided the lot width at the minimum required front yard setback is 80 percent of the minimum required yard width. The measurement shall be taken tangent to the midpoint at the setback line. Where lots are contiguous to a natural or manmade body of water, the lot width may be measured at the building site line provided all required setbacks can be met, and the lot has a minimum of 25 linear feet of public road frontage. Where lots are one (1) acre or larger, the lot width

may be measured at the building site line provided all required setbacks can be met and the lot has a minimum of 50 linear feet of public road frontage.

Lowest floor. The lowest floor of the lowest enclosed area. Any unfinished or flood resistant enclosure, usable solely for parking of vehicles, building access, or limited storage in an area other than a basement area, is not considered a building's lowest floor provided that such an enclosure is not built so as to render the structure in violation of other provisions of this chapter [Chapter 26 of the Richland County Code of Ordinances].

Low Impact Development (LID). An ecologically friendly approach to site development and stormwater management that aims to mitigate development impacts to land, water, and air. The approach emphasizes the integration of site design and planning techniques that conserve natural systems and hydrologic functions on a site. (Ord. 019-08; 3-18-08)

Marginal access road. A service road that runs parallel to a higher order road, which for purposes of safe ingress and egress, provides access to abutting properties and separation of through traffic. This term shall include the term "frontage road".

Mean sea level. The average height of the sea for all stages of the tide. It is used as a reference for establishing various elevations within the floodplain. For purposes of this chapter [Chapter 26 of the Richland County Code of Ordinances], the term is synonymous with National Geodetic Vertical Datum (NGVD).

Minor residential road. A loop road which serves not more than 40 dwelling units or a cul-de-sac road that serves not more than 20 dwelling units, either of which carries no through traffic and is used for access to abutting residential lots.

More intense use. A use of greater intensity as determined by the Land Use Impact Table set forth at Section 26-176(f)(3) of this chapter [Chapter 26 of the Richland County Code of Ordinances].

MS4. Municipal Separate Storm Sewer System; an acronym used in the NDPES Stormwater Permit that is synonymous with stormwater system for the purposes of this chapter [Chapter 26 of the Richland County Code of Ordinances]. (Ord. 006- 10HR; 1-19-10)

National Geodetic Vertical Datum (NGVD). As corrected in 1929, elevation reference points set by National Geodetic Survey based on mean sea level.

Non-linear projects. All construction activities and projects other than utility line installation, pipeline construction, and other examples of long, narrow, linear construction activities. (Ord. 006-10HR; 1-19-10)

Non-stormwater discharge. Any discharge to the stormwater system that is not comprised entirely of stormwater. (Ord. 006-10HR; 1-19-10)

NPDES. National Pollutant Discharge Elimination System; an acronym used to describe the national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under §§ 307, 402, 318, and 405 of the federal Clean Water Act. (Ord. 006-10HR; 1-19-10)

NPDES Stormwater Permit. The permit issued by DHEC under the primacy authority from the U.S. Environmental Protection Agency (EPA) that authorizes the discharge of pollutants, in this case stormwater, to waters of the United States, whether the permit is applicable on an individual, group, or general area-wide basis. (Ord. 006-10HR; 1-19-10)

One-hundred-year rainfall. A rainfall of an intensity expected to be equaled or exceeded, on the average, once in 100 years.

On-site stormwater management. The design and construction of a stormwater management facility within and for a single development.

Open space. An area that is designed for environmental, scenic, or recreational purposes. Open space may include, but is not limited to, lawns, walkways, active and passive recreation areas, playgrounds, swimming pools, wooded areas, and watercourses. Open space shall not be deemed to include driveways, parking lots, or other surfaces designed or intended for vehicular travel.

Open stormwater conveyance. A permanent, designed waterway, shaped, sized, and lined with appropriate vegetation or structural material used to safely convey stormwater runoff within or away from developing areas. (Ord. 006-10HR; 1-19-10)

Parking, off-road. Space occupied by automobiles for parking on premises other than roads.

Pedestrian walkway. A marked path for pedestrian traffic.

Pedestrian zone. An area where cars are prohibited, such as sidewalks, bikeways, trails, lawns, and landscaped areas. (Ord. 088-08HR; 12-16-08)

Performance bond. A document issued by a surety, in return for a fee or premium, guaranteeing the performance of the terms and conditions of development approval.

Permitted Development Activity. The property owner has commenced construction of a building or of any portion of a potable water distribution or transportation system, a sanitary sewer distribution or transportation system, a storm drainage system or a public road; or the property owner has commenced grading or other land disturbance activities in conformance with valid permits issued by Richland County. (Ord. 006-10HR; 1-19-10)

Planning department. The Richland County Department of Community Planning and Development.

Planting strip. A strip of land intended to be planted with trees, shrubs, or other vegetation to separate a sidewalk from adjacent curbs or the edge of interior street pavement. (Ord. 033-11HR; 6-21-11)

Plat. A map, or delineated representation of the subdivision of lands, prepared by a surveyor licensed in South Carolina, being a complete and exact representation of the subdivision or parcel and including other information, which is in compliance with all the relevant requirements of this chapter [Chapter 26 of the Richland County Code of Ordinances] and other county statutes, laws, and regulations.

Plat, final. A set of drawings, and other documentation, prepared in compliance with the requirements of this chapter [Chapter 26 of the Richland County Code of Ordinances] and that are presented for final approval and recordation by the county.

PM Peak Hour (PMPH). The estimated average hourly traffic volume on a given roadway segment between 4:00 PM and 6:00 PM. (Ord. 038-09HR; 7-21-09)

Pollutant. Dredged spoil; solid waste; incinerator residue; sewage; garbage; sewage sludge; munitions; medical waste; chemical wastes; biological materials; radioactive materials; heat; wrecked or discarded equipment; rock; sand; cellar dirt; municipal, agricultural and industrial waste; and certain characteristics of wastewater (e.g., the measure of acidity or basicity of a solution (pH), temperature, Total Suspended Solids (TSS), turbidity, color, Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), toxicity, or odor). A foreign substance, that if permitted to get into the public water system, will degrade its quality so as to constitute a moderate hazard, or impair the usefulness or quality of the water to a degree which does not create an actual hazard to the public health but which does adversely and unreasonably affect such water for domestic use. (Ord. 006-10HR; 1-19-10)

Post-development. Land surface conditions as changed due to development.

Pre-development. Natural or existing land surface conditions prior to proposed development.

Primary drainage channel. A drainage channel, stream, or creek draining an area of 300 acres or more.

Private roadway. An area of land that is privately owned, provides vehicular access to residential lots, and has not been dedicated; or a private right-of-way created by recorded easement, or other instrument, where no recording has taken place, or no right of interest has accrued to the public and has not been designated as part of the county road maintenance system. (Ord. 022-10HR; 5-18-10)

Public works department. The Richland County Department of Public Works.

Regulatory floodway. The channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water

surface elevation by more than one (1) foot, as identified on an official Flood Insurance Rate Map or other available information.

Retention structure. A permanent structure whose primary purpose is to permanently store a given volume of stormwater runoff.

Road. An open way designed for the operation of vehicles, including, but not limited to, streets, avenues, boulevards, highways, freeways, lanes, and/or courts. This definition shall not include driveways or ingress/egress easements.

Road frontage. The distance for which a lot line of a lot adjoins a public road, from one lot line intersecting said road to the furthest distance lot line intersecting the same road.

Road, half. A street or road that is intended to be developed by constructing one-half (1/2) of a required width of a road with the remainder to be provided at some future date.

Road, main. The main entrance(s) to a Conservation subdivision, which collects traffic from internal park roads, connecting to arterial roads external to the subdivision. (Ord. 035-08HR; 6-17-08)

Road, minor rural. A road serving 20 or fewer lots in low density, primarily rural areas, and which does not provide connectivity to properties other than those served. (Ord. 055-12HR; 10-16-12)

Road, park. A one-way road within a residential subdivision. (Ord. 055-12HR; 10-16-12)

Road, rural. A road serving development in low density, primarily rural areas, and which would not be classified as a collector or an arterial road. (Ord. 055-12HR; 10-16-12)

Road*, T*. A road that ends in a T shape; also known as a hammer head road. (Ord. 055-12HR; 10-16-12)

Runoff. The portion of the precipitation on the land that reaches the drainage system.

Safe access. The minimum number of access points, direct or indirect, necessary to provide safe ingress and egress to the state and local road system in consideration of the existing, and projected, traffic volume and the type and density/intensity of adjacent land uses. (Ord. 038-09HR; 7-21-09)

Sedimentation. The process which operates at or near the surfaces of the ground, to deposit soil, debris, and other materials either on other ground surfaces or in water channels.

Seepage. Percolation of underground water through the banks and into a stream or other body of water, or into or out of a sewer. (Ord. 006-10HR; 1-19-10)

Sign, road or street. A sign placed at a roadway intersection that indicates the road name and block number. (Ord. 022-10HR; 5-18-10)

Sketch plan. A sketch preliminary plat or site plan to enable the developer/subdivider to save time and expense in reaching a general agreement with authorized officials of Richland County as to the form of the plat or plan and the objectives of this chapter [Chapter 26 of the Richland County Code of Ordinances].

South Carolina Department of Transportation (SCDOT). The State agency responsible for maintaining state and federal roads and administering distribution of the state and federal gas tax funds. (Ord. 038-09HR; 7-21-09)

Start of construction. The date the building permit was issued; provided, however, the actual start of construction, repair and reconstruction, rehabilitation, addition, or substantial improvement was within 180 days of the permit date. The actual start means the first placement of permanent construction of a structure (including a manufactured home) on a site, such as the pouring of slabs or footings, installation of piles, construction of columns, or any work beyond the stage of excavation or the placement of a manufactured home on a foundation. Permanent construction does not include land preparation, such as clearing, grading, and filling; nor does it include the installation of roads and/or walkways; nor does it include excavation for footings, piers or foundations, or the erection of temporary forms; nor does it include the installation on the property of accessory buildings, such as garages or sheds not occupied as dwelling units or not part of the main structure. For a substantial improvement, the actual start of construction means the first alteration of any wall, ceiling, floor, or other structural part of the building, whether or not that alteration affects the external dimensions of the building. (Ord. 060-10; 9-28-10)

Stormwater. Any surface flow, runoff and drainage consisting entirely of water from any form of natural precipitation and resulting from such precipitation. (Ord. 006-10HR; 1-19-10)

Stormwater Design Manual. The manual of design, performance and review standards for stormwater management, prepared under the direction of the county engineer, with input from stakeholders. The requirements established by the "Stormwater Design Manual" are mandatory, and shall be updated as often as necessary. (Ord. 006-10HR; 1-19-10) The "Stormwater Design Manual" is synonymous with the "Land Development Manual."

Stormwater management. The collection, conveyance, storage, treatment and disposal of stormwater runoff in a manner to minimize channel erosion, flood damage, and or degradation of water quality and in a manner to enhance and insure the public health, safety, and general welfare.

Stormwater management facilities. Structures and man-made features designed for the collection, conveyance, storage, treatment and disposal of stormwater runoff into and through the drainage system. Stormwater management facilities include vegetative and/or structural measures, to control the increased volume and rate of stormwater runoff caused by manmade changes to the land.

Stormwater outfall. The point at which a stormwater system discharges to the receiving waters. (Ord. 006-10HR; 1-19-10)

Stormwater runoff. The direct response of a watershed to precipitation, including surface and subsurface flows, resulting from precipitation.

Stormwater system. The publicly owned facilities by which stormwater is collected and/or conveyed, including, but not limited to roads with drainage systems, streets, gutters, curbs, inlets, piped storm drains, pumping facilities, basins, drainage channels, or other drainage structures. (Ord. 006-10HR; 1-19-10)

Subdivision. All divisions of a tract or parcel of land into two (2) or more lots, building sites, or other divisions for the purpose, whether immediate or future, of sale, lease, or building development. The definition of subdivision includes:

(a) All division of land involving a new road or change in existing roads.
(b) Re-subdivision involving a further division or relocation of lot lines of any lot or lots within a subdivision previously made and approved or recorded according to law.
(c) The alteration of any roads or the establishment of any new roads within any subdivision previously made and approved or recorded according to law.
(d) Combinations of recorded lots.

The following exceptions are included within this definition only for the purpose of requiring that Richland County have a record of these subdivisions:

(a) The combination or recombination of portions of previously platted lots where the total number of lots is not increased and the resultant lots are equal to the standards of this chapter [Chapter 26 of the Richland County Code of Ordinances].
(b) The division of land into parcels of five (5) acres or more where no new road is involved and plats of these exceptions must be received as information by the Richland County Department of Planning and Development Services.
(c) The combination or recombination of entire lots of record where no new road or change in existing roads is involved.

Subdivision, major. Any subdivision that does not meet the criteria for a subdivision exception (see subdivision definition) or a minor subdivision. (Ord. No. 074-05HR; 10-18-05)

Subdivision, minor. Those divisions of land that do not qualify for administrative subdivision review, but which consist of less than 50 lots. Additionally, a minor subdivision shall not involve the dedication of land to the county for open space or other public purposes. (Ord. No. 074-05HR; 10-18-05) and (Ord. No. 031-06; 4-18-06)

SWPPP. Stormwater Pollution Prevention Plan; an acronym used for a document that describes the BMPs and activities to be implemented by a person or business to identify sources of pollution or contamination at a site and the actions to eliminate or reduce pollutant discharges to stormwater,

stormwater conveyance systems, and/or receiving waters to the maximum extent practicable. (Ord. 006-10HR; 1-19-10)

Technical representative. South Carolina Registered Professional Civil Engineer, Registered Landscape Architect, or Tier B. Land Surveyor responsible for sealing stormwater management plans.

Ten-year frequency rainfall. A rainfall of an intensity expected to be equaled or exceeded, on the average, once in 10 years.

Thoroughfare road. Interstates, other freeways, expressways or major roads that provide for the expeditious movement of high volumes of traffic within the county.

TMDL. Total Maximum Daily Load; an acronym used to describe the sum of the individual wasteload allocations (WLAs) for point sources and load allocations (LAs) for nonpoint sources and natural background. If a receiving water has only one-point source discharger, the TMDL is the sum of that point source WLA plus the LAs for any nonpoint sources of pollution and natural background sources, tributaries, or adjacent segments. TMDLs can be expressed in terms of either mass per time, toxicity, or other appropriate measure. (Ord. 006-10HR; 1-19-10)

Top of bank. The elevation of the uppermost point on the rise of land which borders of a water resource such as a river, creek, or lake.

Traditional Neighborhood Design. A planning concept that calls for residential neighborhoods to be designed in the format of a small, village-type atmosphere within neighborhoods. These are characterized by homes and buildings on smaller lots, narrow front yards with front porches and gardens, detached garages in the backyard, walkable streets (sidewalks), pubic parks, and green spaces. (Ord. 005-09HR; 2-17-09)

Traffic Impact Assessment (TIA). A document which analyzes the transportation impacts of proposed land development projects on the adjacent roadways, nearby intersections, and affected property owners and provides recommended mitigation measures to address the identified impacts. (Ord. 038-09HR; 7-21-09)

Traffic mitigation agreement. A written agreement among Richland County, SCDOT and the applicant to allow the LOS mitigation measures identified in the TIA to be provided in a timely manner. At a minimum, the agreement shall include: (Ord. 038-09HR; 7-21-09)
1) A specific list of the required mitigation measures and preliminary cost estimates,
2) A timetable by which the improvements will be phased and/or completed,
3) A proportionate cost sharing agreement for such improvements,
4) A designation of the party, or parties, responsible to ensure the recommended improvement is completed in a timely manner; and
5) Any other such matters as may be appropriate to the specific agreement.

Twenty-five-year frequency rainfall. A rainfall of an intensity expected to be equaled or exceeded, on the average, once in 25 years.

USACE. The United States Army Corp of Engineers. (Ord. 006-10HR; 1-19-10)

Utilities. Electricity, gas, steam, communications, transportation, wastewater, or water that is furnished to the public under state or county regulations by a person, firm, corporation, municipal department, or board. (Ord. 061-08HR; 10-21-08)

Valid Governmental Approval. The issuance by Richland County of a permit to commence a Permitted Development Activity; or approval by Richland County of subdivision of the property, of planned development district zoning for the property, or of a sketch plan for development of the property. (Ord. 006-10HR; 1-19-10)

Vegetation. All plant growth, including trees, shrubs, grasses, and mosses.

Vision clearance. An area of unobstructed vision at road intersections or intersections between roads and driveways.

Water quality. Those characteristics of stormwater runoff that relate to the physical, chemical, biological, and radiological integrity of water.

Water quality protection areas. The areas that come under the current DHEC 303 (d) list, are TMDL sites, or are EP Environmental Protection Districts identified by Richland County Council, and any other areas that are identified by DHEC or Richland County Council. (Ord. 006-10HR; 1-19-10)

Waters. For the purpose of identifying NPDES stormwater permit "point discharges", waters means surface water, within Richland County's jurisdictional boundaries as identified on USGS 1:24,000 scale quadrangle sheets.

Waters of the state. Refer to the State of South Carolina Department of Health and Environmental Control, Regulation R.61-9.122, Part A, Section 122.2 "Definitions", or latest update.

Watershed. The drainage area contributing stormwater runoff to a single point.

Wetlands. Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

Appendix A: Co-Permittee Intergovernmental Agreements

IGA-25-14

Cooperative Intergovernmental Agreement
Between
Richland County, South Carolina
And
South Carolina Department of Transportation
For
Richland County Sales Tax Transportation Program

THIS AGREEMENT is made this 7th day of February, 2014, by and between Richland County, hereinafter referred to as County, and the South Carolina Department of Transportation, hereinafter referred to as SCDOT.
WITNESSETH THAT:

WHEREAS, the County and the SCDOT desire to work together in the planning and implementation of the Richland County Sales Tax Transportation Program and,

WHEREAS, the County is a body politic with all the rights and privileges of such including the power to contract as necessary and incidental powers to carry out the County's functions covered under this Agreement; and,

WHEREAS, the SCDOT is an agency of the State of South Carolina with the authority to enter into contracts necessary for the proper discharge of its functions and duties,

NOW THEREFORE, in consideration of the several promises to be faithfully performed by the parties hereto as set forth herein, the County and the SCDOT do hereby agree as follows:

I. GENERAL RECITALS:

A. Purpose

The purpose of this work is to construct and improve certain transportation facilities throughout Richland County using, in part, funds derived from the one (1) cent special sales and use tax imposed by Richland County and approved by referendum held November 6, 2012.

B. Description of Work

The projects for this agreement include only those projects that are listed in Attachment "A" and are hereinafter referred to as the "Project(s)" and the collective group of Projects is hereinafter referred to as the "Program". The provisions herein shall only apply to Projects listed in Attachment "A" and all are currently on the State Highway System or are proposed to be conveyed to the SCDOT for acceptance into the State Highway System. Unless otherwise agreed, these provisions shall not apply to projects which are to be owned or maintained by the County, a municipality or another non-state entity. Where local roadways tie into state or federal roadways, changes within the SCDOT's right of way will fall under

the terms of this agreement unless changes are approved by the SCDOT through an encroachment permit.

Prior to project initiation for each project, the County shall identify whether it will develop the Project to maintain eligibility for Federal Transportation Funding. The Projects declared federally eligible shall be developed and constructed to federal standards. The Federal Highway Administration (FHWA) will make the determination of eligibility for Federal Transportation Funding for each Project for which those funds are requested at the time of request for authorization of each phase.

The scope of each individual Project shall be determined by the County during the planning phase of each Project. The County shall carry out the specific activities necessary to implement and construct each Project, which includes planning, design, right of way acquisition, construction and other associated coordination and administrative activities, unless noted otherwise herein.

C. Scope of Work

The scope of the Program has been described in Attachment A. Nothing contained in this Agreement shall be construed to require the County to undertake or complete any particular Project in the Program. Those obligations shall be solely governed by the actions of Richland County Council and applicable State law.

II. COMMUNICATIONS:

A. The County and SCDOT agree that regular and thorough communication about this work is essential to the effective execution of the Program. The County and SCDOT further agree that each party will strive to communicate at both the management level and staff level.

1. The County Transportation Director and/or the designated County Representative shall meet with the Program Manager from the SCDOT on an as-needed basis.

2. Additional coordination meetings will be planned and mutually agreed upon as necessary to coordinate the work.

B. The SCDOT will provide such technical support and advice as requested by the County to assist in the planning and execution of the Program.

III. OBLIGATIONS OF SCDOT:

A. The County shall prepare, in the SCDOT's name, all documentation required under the implementing regulations of the National Environmental Policy Act of 1969, 23 C.F.R. §771, et seq, or as specified by the SCDOT. The SCDOT agrees to expedite the review and approval of necessary environmental documentation as it applies within the SCDOT's authority. The SCDOT further agrees to use its best efforts to coordinate with the Federal

Agencies on behalf of the County to expedite the approval of required environmental documentation, if necessary.

B. To the extent permitted by existing South Carolina law, the SCDOT hereby assumes complete responsibility for any loss resulting from bodily injuries (including death) or damages to property, arising out of any negligent act or negligent failure to act on the SCDOT's part, or the part of any employee or agent of the SCDOT in the performance or participation in the work undertaken under this Agreement.

C. Upon final completion of Projects on the state system, the County agrees to assign a right of entry or other property rights necessary for the SCDOT to maintain the Project until such time as all rights of way and other property rights are turned over to the SCDOT after the completion of the Project. The SCDOT agrees to accept the Project on the state system for maintenance within 30 days once all obligations of the County have been completed as outlined in Section V.F.5 of this agreement.

IV. OBLIGATIONS OF THE COUNTY:

A. To the extent permitted by existing South Carolina law, the County hereby assumes complete responsibilities for any loss resulting from bodily injuries (including death) or damages to property, arising out of any negligent act or negligent failure to act on the County's part, or the part of any employee of the County in performance of the work undertaken under this Agreement.

B. The County shall provide or cause to be provided all services for the execution of activities for the planning, development, and delivery of each Project, unless noted otherwise herein.

C. The County shall reimburse the SCDOT for costs incurred as part of the SCDOT's reviews, coordination, and oversight. The SCDOT will invoice the County no more often than quarterly for those costs.

D. The cost of each Project shall be borne solely by Richland County unless additional funding is secured through the SCDOT or other sources or as otherwise provided for in this agreement.

V. GENERAL PROVISIONS:

A. Conformance:

All Projects shall be developed and constructed to SCDOT standards and specifications any other applicable legal standards and will be accorded equal priority for completion. The current edition of each standard and specification shall be the edition as of the beginning of the design work for each Project with the expectation that the standards and specifications shall be applicable through the completion of the Project. However, where there is a significant delay in the completion of the design of a Project, the most current standards and specifications may be incorporated into the contract documents. It is the intent of both the

County and the SCDOT to design the Projects in compliance with the applicable standards and specifications. However, both parties recognize that exceptions to these standards and specifications may be mutually beneficial. Such exceptions will be granted if both parties agree.

B. Planning Activities

The County shall consider each Project and shall make a determination as to the exact scope of the proposed improvement. In this planning phase, the County shall consider the following aspects of the Projects in determining the scope of the proposed improvements:

-Public involvement
-Funding
-Environmental considerations including determination of necessary environmental documentation
-Traffic requirements for the Projects based on traffic projections for the design year 20 years beyond the scheduled construction date of the Project. For example, a scheduled construction start in 2015 would yield design year traffic projections for the year 2035. Where available, the local Central Midlands Council of Governments (CMCOG) traffic projections would be supplied by the SCDOT for use in these planning activities. Where these CMCOG traffic projections are not available, the County will make traffic projections based on standard industry methodology for the appropriate design year as indicated above.
-Right of way issues and impacts
-Constructability
-Other issues impacting the planning and execution of the work as deemed appropriate and beneficial to the County

The County will also carry out their work or services in compliance with all applicable Federal, State, and local environmental laws and regulations, and shall monitor and oversee each Project for such compliance. This responsibility shall include:

1. Complying with those stipulations and conditions under which the SCDOT received approval of applicable environmental documents and permits. The County will ensure compliance with all secured permits. The County will be the sole party responsible for resolution of any enforcement actions as a result of non-compliance with permit conditions and requirements to the extent that the County or its agents were responsible for such breach or action causing the enforcement action.

2. Complying with applicable laws and regulations relating to potential or actual hazardous materials that may be encountered in the course of implementing each Project.

3. Carrying out all required social, economic, and environmental studies required by law, and

4. Make all necessary modifications to approved permits as required by law.

The County recognizes that the SCDOT and/or the FHWA or other agencies may have final review and approval for the environmental documentation required under the implementing regulations of the National Environmental Policy Act of 1969, 23 C.F.R. §771, et seq. The County will be responsible for the preparation of necessary permit applications required by any governmental agency to complete the Projects and will work with the SCDOT in coordinating and negotiating with the agency to secure the permits. All work performed must be in accordance with the SCDOT's Environmental Consultant Scope, latest edition, and any amendments thereafter, if applicable. Where required by law, the County shall prepare all permit applications in the name of the SCDOT. The County will comply with any regulatory agency requirements, and be responsible for resolution of any enforcement actions that may arise as a result of non-compliance with regulatory agency requirements. All permit conditions set by the regulatory agencies must be reviewed and approved by the SCDOT for all roads in the state system.

Upon approval of the SCDOT and other applicable regulatory agencies, Richland County may use credits from environmental mitigation banks controlled by or developed for use by the SCDOT. If credits are used by the County from a mitigation bank controlled by or developed for use by the SCDOT, the County will pay to the SCDOT the costs of these credits as mutually agreed upon by the County and the SCDOT.

The County shall conduct required public involvement meetings for each Project in accordance with NEPA regulations, or as otherwise specified by the SCDOT. In addition, non-mandatory public meetings may be held to discuss Project issues if desired by the County. The County shall notify representatives of the SCDOT in advance of all meetings and shall notify other representatives from state, federal, and resource agencies as required. Projects shall not be advanced to right of way acquisition and/or construction phases until final approval of environmental documentation is obtained.

C. Design Activities

Design of the Projects will be the responsibility of the County except as provided for otherwise in this agreement.

1. Since availability of State or Federal funding has not been determined, and since it is the County's desire to proceed with certain aspects of the Projects, the SCDOT shall assign Project Identification Numbers to the Projects for tracking purposes. The County shall use these numbers on all right of way instruments, plans, and permits as applicable.

2. All Project surveys related to the setting of horizontal control, vertical control, mapping, and aerial photography will comply with the SCDOT's current edition of the "Preconstruction Survey Manual".

3. All structural components of the Projects shall comply with the AASHTO Standard Specifications for Highway Bridges, latest edition, including the latest Interim

Specifications thereto. Bridge structures shall be designed with the LRFD criteria. This will include all seismic requirements in accordance with these AASHTO criteria.

4. Upon completion of the work, the County shall certify that the contract documents have been prepared in conformance with the provisions of Items 1, 2, and 3 above. The County shall require that all construction plans and specifications be sealed by a South Carolina registered professional engineer.

5. If the County intends to seek reimbursement for state or federal funds that may become available for individual Projects, the County shall comply with all applicable federal and state statutes and regulations to maintain the eligibility of those funds for reimbursement.

6. In the event that state or federal funding becomes available for the Project, and in the event that the County should desire to utilize these funds, the parties shall cooperate with regard to amendments to this Agreement that may be required to secure that funding. Such amendments will provide for policies and procedures including direct SCDOT administration or assistance with administration of the Project that would be most advantageous in securing that funding.

7. The SCDOT's Office of Materials and Research shall approve the pavement design on roads within or intended for the state system and shall respond to the County within 30 business days of the time the County submits the pavement design for review.

8. The SCDOT will provide reviews of the design plans and other contract documents and provide written comments to the County. Plans or other design documentation will be sent to the SCDOT at the following stages of the Project: concept (optional), preliminary (optional), right of way and final design. The County shall submit the design in a form that is acceptable to the SCDOT's reviewer. Design reviews will be accomplished by the SCDOT and review comments will be returned to the County within 25 business days of the time the County submits the review documents to the SCDOT. The County will notify the SCDOT at least two weeks in advance of the submission of documents to be reviewed. Should the review comments not be returned within the designated period, the County is not required to consider the comments in the revisions to the plans. Comment or failure to comment by the SCDOT shall in no way relieve the County or its agents of any responsibility in regard to individual Projects. Projects shall not be advanced to right-of-way or construction until written authorization is provided by the SCDOT.

9. Design plans and documents submitted for reviews by the SCDOT shall be provided in electronic (.pdf) format. The County shall utilize file transfer protocol (FTP) or other agreed upon platform to transfer the documents to be reviewed.

10. The SCDOT's written "authority to proceed" with right-of-way acquisition activities shall serve as approval for the County to begin right-of-way activities on individual Projects. The SCDOT agrees to provide written notice of "authority to proceed" or

review comments for the right-of-way plans within 25 business days of the time the County submits the right-of-way plans for review.

11. The SCDOT's written "authority to proceed" with construction shall serve as approval of right of entry and encroachment by the SCDOT for construction of individual Projects by the County. The SCDOT agrees to provide written notice of "authority to proceed" or review comments for the final plans within 25 business days of the time the County submits the final plans for review.

12. In the event that federal funding is sought by the County through the SCDOT, the County shall perform a value engineering analysis as required by 23 C.F.R. Part 627.

D. Utility Activities

1. Utility relocations will be paid based on prior rights. Where a utility establishes a prior right of occupancy in its existing location, the County will be responsible for the cost of that relocation, including all real and actual costs associated (engineering, easements, construction, inspections, etc.). Prior Rights may be established by the following means:

    a. The Utility holds a fee, an easement, or other real property interest, the taking of which is compensable in eminent domain.

    b. The Utility occupies SCDOT right of way, and per an existing agreement with the SCDOT, is not required to relocate at its own expense.

2. Where the utility cannot establish a prior right of occupancy, the utility will be required to relocate at its own expense. However, in some cases for municipal, county and special purpose district owned and operated utilities, the County, may elect to use Program funds for all or part of such utility relocation costs.

3. Utility work will be coordinated and executed in accordance with Chapter 5 of the SCDOT Design Manual and Section 105.6 of the SCDOT construction manual.

4. If Federal funds are used for utility relocations, the County shall comply with the applicable State law and the Federal Code (23 CFR 645 A and B) for those utility relocations.

5. Utilities to remain in SCDOT rights of way, or to be relocated to a point within SCDOT rights of way, shall be in accordance with SCDOT's "A Policy for Accommodating Utilities on Highway Rights of Way."

6. The County will honor the terms of any pre-existing agreements between the SCDOT and a utility owner.

7. The County will provide utility deliverables as defined in Section VI-E.

E. Right of Way Acquisition Activities

1. The County shall acquire all right-of-way necessary for highway purposes in its own name. Acquisition of rights-of-way to be turned over to the SCDOT and rights-of-way for projects that may or will be using federal funds shall be acquired in accordance with the *United States Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, P.L. 91-646, 42 U.S.C. §§4601* et seq., and regulations thereunder, 49 C.F.R., Part 24 and the South Carolina Eminent Domain Procedures Act. Title instruments acquired on those routes shall be documented on SCDOT standard forms. The County shall acquire right of way title in fee simple for any Project where utilization of federal funding is contemplated. Right-of-way limits shall be set according to standard SCDOT practices, utilizing the SCDOT Highway Design Manual and the SCDOT Road Design Plan Preparation Guide. These limits shall encompass all pertinent highway facilities and structures necessary for the construction and maintenance of the roadway. With respect to the acquisitions:

   The County Shall:

   a. Perform title searches for properties to be acquired and provide the SCDOT a Certificate of Title signed by a South Carolina attorney. Preliminary title abstracts must be provided prior to property being appraised.

   b. In accordance with the SCDOT's Appraisal Manual, provide an acceptable appraisal for each tract by an appraiser from the SCDOT's approved appraisal list. All contracts for appraisals shall obligate the appraiser to provide court testimony in the event of condemnation. The County shall obtain appraisal reviews complying with technical review guidelines of the Appraisal Manual and make a recommendation of just compensation. The Appraisal reviewer shall be approved by the SCDOT. The reviewed appraisal must be approved by the SCDOT's right-of-way representative prior to the offer to purchase being made to the Landowner.

   c. Secure approval from the SCDOT's right of way representative for any settlement above the approved appraisal.

   d. Titles shall be in fee simple absolute by recordable warranty deeds unless otherwise approved by the SCDOT. All titles shall be recorded in the land records of Richland County.

   e. In the event of condemnation the necessary documents as required by the Eminent Domain Procedures Act, S.C. Code Ann. §§ 28-2-10 *et. seq.*, will be prepared and the County will utilize its Eminent Domain authority to acquire title. The County will provide legal counsel. Condemnation shall be by way of trial after rejection of the amount tendered as provided in Code § 28-2-240.

   f. Retain all records dealing with property acquisition and all other costs associated with this project for 3 years after the final phase of construction work on the Project. The County or its authorized representative upon request will make such records available for audit and review.

g. The County is responsible for establishing and maintaining Quality Control and Quality Assurance procedures for the entire right of way acquisition process.

h. Provide relocation assistance in accordance with the SCDOT's Relocation Manual. All relocation housing payment offers shall be approved by the SCDOT prior to being offered to displacees. The County shall issue (90) and (30) - day notices of displacement in accordance with State and federal guidelines.

i. The County shall be responsible for the disposition of all identified improvements being acquired on the Project prior to the obligation date of the construction. The County shall furnish the SCDOT with a list of all surplus properties that are purchased on a Project that are to be conveyed to it. Surplus property is defined as property not needed for current or planned future projects. Proceeds received from the sale of surplus property shall be distributed based on the funding source used to secure the property.

j. Establish specific milestone dates for the different phases of the right-of-way acquisition and provide bi-monthly reports indicating the status of each individual parcel.

k. Provide a Right-of-Way Certification in a form acceptable to the SCDOT insuring that all property necessary for construction of the Project has been secured and that all displacees have been relocated prior to advertising for construction bids.

The SCDOT Shall:

a. Designate a right-of-way representative to approve offers of just compensation as well as any settlements above the approved appraisal amounts.

b. The right-of-way representative will provide approval for all relocations benefits for those displaced by the project.

c. Provide approval of the Right-of-Way Certification and authorization to proceed to construction.

F. Construction Activities

1. The County will construct the Projects in conformance with the technical sections of the SCDOT's current Standard Specifications for Highway Construction and related AASHTO standards as called for in the construction contract documents. The County must obtain approval from the SCDOT if there is a circumstance where there may be any significant deviation from the contract documents.

2. The County and the SCDOT agree to conduct a final inspection of the completed Project prior to acceptance of the work by the SCDOT.

3. To the extent applicable, materials shall be procured in accordance with Richland County Procurement Procedures and in conformance with the S.C. Code Ann. §§ 11-35-10 et seq., as amended, SCDOT standard policies, and applicable Federal (23CFR635) and State statutes and regulations.

4. The County shall provide administrative, management, Quality Control, and other services sufficient to provide certification to the SCDOT that the construction and the materials used for construction are in conformance with the specifications set forth in the contract documents. The inspectors and/or engineers performing Quality Control or other inspections shall be certified and/or licensed in South Carolina. The County shall ensure testing is performed based on project quantities in accordance with the SCDOT's Construction Manual.

5. The County shall coordinate with the SCDOT during the construction of the work. When the County concludes that all aspects of the Project have been properly and fully performed and the work is substantially complete, the County shall notify the SCDOT of the date for final inspection of the work. The County and the SCDOT shall jointly conduct the final inspection and develop a Final Project Punchlist, list of items that need remedial action, if necessary. As used herein, "Substantial Completion" shall mean when an entire road or other transportation facility is ready for safe use by the public. The County shall require that the deficiencies identified on the Final Project Punchlist are appropriately addressed and shall advise the SCDOT in writing of the completion of those actions. The date of this notice shall then become the date of Final Completion. The SCDOT agrees to respond to the County within 20 business days from the time the County submits the Final Completion notification. If additional centerline miles are created by the project, once Final Completion is accepted by the SCDOT, the Project will be presented by SCDOT Staff to the SCDOT Commission. The Commission will determine if additional mileage is to be accepted by the SCDOT.

6. The SCDOT shall conduct construction oversight on all State-maintained roadways at the discretion of the Deputy Secretary for Engineering. All SCDOT costs associated with construction oversight shall be reimbursed by the County in accordance with section IV.C.

    a. The County, or its agent, shall perform all acceptance sampling and testing in accordance with the quality control (QC) sampling and testing schedule and frequency specified in the SCDOT's Construction Manual.

    b. The SCDOT will perform independent assurance (IA) sampling and testing on projects with federal funding. For projects that do not have federal funding, the County shall arrange for IA sampling and testing to be performed by an independent qualified entity. All IA procedures shall be in accordance with the SCDOT's Construction Manual.

c. The SCDOT may at any time ask for, and the County shall immediately provide, any construction inspection or testing related documents. The SCDOT may also perform its own tests, and obtain its own samples, at any time.

d. The Project may be subject to periodic reviews/inspections by the SCDOT's Quality Management Team at the discretion of the SCDOT.

7. To facilitate the coordination of construction activities and to ensure that the work is constructed in accordance with the applicable provisions, the County and the SCDOT agree as follows:

   a. Weekly Project field reviews will be made by the County and the SCDOT's construction representatives to discuss project status, mutual concerns and construction issues.

   b. Contract documents will be furnished to the SCDOT.

   c. Copies of test results will be submitted to the SCDOT so test data and results can be coordinated. Periodic reviews of test reports and summaries will be made by the SCDOT.

   d. Project traffic control reviews for safety and specification compliance will be made and documented on the daily report by the County.

   e. Erosion control reviews will be made on a schedule as required in the NPDES General Construction Permit. Erosion Control reviews will be made in accordance with the SCDOT's Supplemental Specification on Seeding and Erosion Control Measures, latest edition. Observations will be documented on the SCDOT's Erosion Control form. The County will apply for and acquire all necessary land disturbance permits such as the NPDES General Construction Permit in the name of the County. The County will comply with any NPDES requirements, and be responsible for resolution of any enforcement actions that may arise as a result of non-compliance with NPDES requirements.

8. The County shall obtain SCDOT concurrence prior to awarding the contract. If applicable, the County will include the required Federal Aid Contract Provisions for the contract.

VI. OTHER PROVISIONS:

A. Maintenance of Traffic

The County shall require that its contractors keep open to traffic all existing State highways while they are undergoing improvements except for temporary construction detours or closures and shall be responsible for maintaining the entire section or sections of highway within the limits of the work being performed from the time its construction contractor is issued the Notice to Proceed until the Project is delivered to the SCDOT under the terms of this Agreement. Traffic control activities shall be in accordance with the MUTCD (current edition), the SCDOT District 1 Daytime Lane Closure policy (current edition), and the

SCDOT's standard guidelines and standard drawings for maintenance of traffic in a work zone.

B. Maintenance of Project

1. The County shall accept responsibility for normal maintenance of the roadway within the Project limits during construction.

2. The SCDOT shall accept responsibility for normal maintenance of the roadway within the Project limits once the Project has been constructed and accepted by the SCDOT as described in Section V.F.5. above.

C. Tie-in Agreements

Where the limits of the Project meet or overlap into the project limits established for projects that are or will be executed by the SCDOT before the completion of that individual County Project, the County and the SCDOT will develop agreements to outline provisions that would be beneficial to both the County Projects and the SCDOT projects with respect to funding, traffic control, improved safety for the traveling public, coordination of drainage systems, or other design or construction considerations. These agreements will stipulate the funding implications of such provisions and the responsible parties thereof.

D. Encroachment Rights

The SCDOT shall deliver possession of its highways to the County in the same manner and under the same terms it does to highway contractors working under contract with it and hereby grants encroachment and access rights to the right of way and easements along the proposed Project corridors as set forth below. This possession shall be delivered after approval of the final construction plans as outlined below.

1. When a construction Project has been awarded by the County, the County will notify the SCDOT of the anticipated Notice to Proceed date for the contract. After written approval of the final construction plans by the SCDOT as outlined in Section V.C.9 above and on the Notice to Proceed date for construction, the County and/or its agents will assume maintenance responsibilities for the Project.

2. Where applications for encroachment permits with regard to any segment of road covered by the Project are received by the SCDOT, it will forward those applications to the County within 10 business days of receipt for review to assure that those proposed improvements described in the permit applications will not conflict with the Project plans. The County shall review the applications and return comments within 15 business days.

From and after execution of this Agreement, the SCDOT hereby grants the County access to the Project corridors for the purposes of gathering field information necessary for accomplishing the planning, design, and right of way aspects of the Project. The County

will publish an Eminent Domain notice for the Projects in accordance with the Eminent Domain Act Section 28-2-70(c).

E. Close-out Documents

Upon completion of the Projects, the County will provide the following Project documentation to the SCDOT.

1. Copies of required environmental documents
2. Design documents
   a. As described elsewhere in this agreement
   b. Final Project plans suitable for delivery and recording pursuant to S.C. Code §57-5-570 (1991)
   c. Electronic files of the Final Project plans as described in the SCDOT's "Road Design Reference Material for Consultant Prepared Plans".
   d. Final Stormwater Reports
3. Right of way documents
   a. Appraisals
   b. Title search information
   c. Deeds sufficient to convey to the SCDOT the additional highway right of way acquired by the County. Titles shall be by special warranty and sufficient to convey the entire interest obtained by the County from the Landowner.
   d. Correspondence with property owners
   e. Diaries or agents worksheets related to the acquisition of right of way
4. Construction documents
   a. As-built drawings - In addition to those documents set forth elsewhere in this Agreement, the County shall provide, within 90 days after Final Completion, two marked-up sets of final construction drawings reflecting the as-built condition of each Project based on information provided by the construction contractor and verified by the County. "As-built" plans must be drawn to scale, and be based on the project survey stationing. These plans will include as-built information for utilities. These plans will be sufficient to establish the precise location of all utilities and appurtenances as well as provide key information for future determination of the extent of prior rights. "As-built" utility plans must include at a minimum the following:
      - Survey centerline and existing roadway centerline if different, with labeled stationing.
      - Existing and new right of way lines, and County easement lines
      - Final location of utility lines and appurtenances
   b. Test reports
   c. Daily construction diaries

5. Other documents
   a. Assignments to the SCDOT of all contractors' payment and performance bonds in connection with the Project or Consents of Surety on the SCDOT's standard form.
   b. Releases, affidavits or other proof of payment to indicate full payment of all claims by contractors, their subcontractors or suppliers.
   c. All permits of government regulatory agencies

F. Certifications

Upon final completion of each Project, the County will provide a letter to the SCDOT stating the following:

The County has provided construction oversight and material for Name of Project. The workmanship and materials used in the construction of the Project are in conformance with the contract documents."

G. Warranty

1. The County warrants that it will perform the work necessary under this agreement in accordance with the standards of care and diligence normally practiced in the transportation industry for work of similar nature. To the extent the County's construction contractor warranties are obtained in connection with any Project intended to be turned over to the SCDOT, the County shall assure that those warranties are assignable.

2. The County shall take all steps necessary to transfer to the SCDOT any manufacturer or other third party warranties of any materials or other services used in the construction of a Project.

VII. Miscellaneous General Provisions:

A. Disputes

The County and the SCDOT shall cooperate and consult with each other with respect to those Projects intended to be turned over to the SCDOT for maintenance to the extent set forth herein and may utilize the Issues Escalation and Dispute Resolution Process included as Attachment "B" to determine the appropriate person(s) and timeframe to resolve issues that arise. In the event that a dispute arises, the following procedures will be used to resolve the matter.

Any dispute or claim arising out of or related to this Agreement shall be submitted for resolution under the procedures outlined in Attachment "B". Within (90) days of the date of this Agreement, an ad hoc board, the Dispute Resolution Board, will be selected pursuant to the procedures identified below. The Dispute Resolution Board will consist of two members of the County and two members of the SCDOT. These four members shall choose

a fifth member employed neither by the County nor the SCDOT. This fifth member shall be a mediator certified in the State of South Carolina. The cost for the mediator shall be shared equally between the County and the SCDOT. The board shall be empanelled for the entire duration of this Agreement and shall hear all disputes between the County and the SCDOT relating to this Agreement that cannot be resolved through the normal resolution process outlined in the Issues Escalation chart. Exhaustion of this Dispute Resolution Process is a condition precedent to the filing of a lawsuit. Any lawsuit arising out of or relating to this Agreement shall be filed for non-jury proceedings in Richland County, South Carolina.

B. Successors/Assigns

The County and the SCDOT each binds itself, its successors, executors, administrators, and assigns to the other party with respect to these requirements, and also agree that neither party shall assign, sublet, or transfer its interest in the Agreement without the written consent of the other.

C. Disadvantaged Business Enterprises

The County will provide opportunities for Disadvantaged Business Enterprises as required by state laws or regulations. The County will coordinate with the SCDOT's DBE Office when establishing goals for specific Projects. The parties hereto and their agents shall not discriminate on the basis of race, color, national origin or sex in the performance of this Agreement or the work provided for herein. Where required the parties hereto and their agents shall carry out applicable requirements of 49 C.F.R. Part 26 in the administration of this Agreement.

D. Enforceability

All of the terms, provisions and conditions of this Agreement shall be binding upon and enforceable by the parties, their respective elected officials, legal representatives, agents and employees and their respective successors.

E. Amendment

This Agreement may be amended or modified only by a written document, which has been signed by the parties hereto, or by their duly authorized officials. The County, or its authorized agent, shall agree to hold consultations with the SCDOT as may be necessary with regard to the execution of supplements to this Agreement during the course of the Program for the purpose of resolving any items that may have been unintentionally omitted from this Agreement or arise from unforeseen events or conditions. Such supplemental agreements shall be subject to the approval and proper execution of the parties hereto. No modifications or amendments to this Agreement shall be effective or binding upon either party unless both parties agree in writing to any such changes.

F. Waiver

No waiver of a breach of any of the covenants, promises or provisions contained in this Agreement shall be construed as a waiver of any succeeding breach of the same covenant or promise or any other covenant or promise thereof. In no event shall any failure by either party hereto to fully enforce any provision of this Agreement be construed as a waiver by such party of its right to subsequently enforce, assert or rely upon such provision.

G. Governing Law

This Agreement shall be governed by the laws of the State of South Carolina, and by execution of this Agreement, the parties consent to the exclusive jurisdiction of the courts of Richland County, South Carolina, for resolution of any dispute arising hereunder.

H. Severability

In the event that any part or provision of this Agreement shall be determined to be invalid and/or unenforceable, the remaining parts and provisions which can be separated from the invalid and/or unenforceable provision or provisions shall continue in full force and effect.

I. Captions

The captions or headings herein are for convenience only and in no way define, limit or describe the scope or intent of any provisions or sections of this Agreement.

J. Notices

All notices pertaining to this Agreement shall be in writing and addressed as set forth below, and shall be deemed properly delivered, given or served when (i) personally delivered, or (ii) sent by overnight courier, or (iii) three (3) days have elapsed following the date mailed by certified or registered mail, postage prepaid.

Notices to County:

Mr. Tony McDonald
Richland County Administrator
P.O. Box 192
Columbia, South Carolina 29202

Notices to SCDOT:

South Carolina Department of Transportation
Attn: Deputy Secretary for Engineering
PO Box 191
Columbia, South Carolina 29202

K. Further Documents

Each party will, whenever and as often as it shall be requested by another party, promptly and within a reasonable time, execute, acknowledge and deliver, or cause to be executed,

acknowledged and delivered such further instruments or documents as may be necessary to carry out the intent and purpose of this Agreement.

L. Assignment

Except as otherwise provided by applicable law, this Agreement may not be assigned by either party without the written consent of the other party.

M. No Third-party Beneficiaries

No rights in any Third-party are created by this Agreement, and no person not a party to this Agreement may rely on any aspect of this Agreement, notwithstanding any representation, written or oral, to the contrary, made by any person or entity. The parties hereto affirmatively represent that this Agreement is made solely for the benefit of the parties hereto and their respective successors and assigns and not for the benefit of any Third-party who is not a signature party hereto. No party other than the signature parties and their respective successors and assigns hereto shall have any enforceable rights hereunder, or have any right to the enforcement hereof, or any claim for damages as a result of any alleged breach hereof.

N. Multiple Counterparts

This Agreement is executed in multiple counterparts, each of which shall be deemed an original but all of which collectively shall constitute one and the same Agreement.

O. Prior Agreements, Entire Agreement

All obligations of the parties, each to the other, relating to the subject matter of this Agreement, contained in any other document or agreement or based on any other communication prior to the execution of this Agreement have been satisfied or are superseded by this Agreement. This Agreement constitutes the entire agreement between the parties relating to the subject matter hereof.

This Agreement, with the Appendices hereto, sets forth the full and complete understanding of the parties as of the date first above stated, and it supersedes any and all agreements and representations made or dated prior thereto.

The parties make no representations, covenants, warranties or guarantees, express or implied, other than those expressly set forth herein. The parties' rights, liabilities, responsibilities and remedies with respect to the services provided for in this Agreement shall be exclusively those expressly set forth in this Agreement.

P. Reviews and Approvals

Any and all reviews and approvals required of the parties herein shall not be unreasonably denied, delayed or withheld.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed by their duly authorized representative the day and year first above written.

SIGNED, SEALED AND DELIVERED
IN THE PRESENCE OF:

RICHLAND COUNTY

By:_____
Kelvin Washington
Chairman, Richland County Council

Attest:_____

SIGNED, SEALED AND DELIVERED
IN THE PRESENCE OF:

SOUTH CAROLINA DEPARTMENT
OF TRANSPORTATION

By:_____
Secretary of Transportation ACTING

Attest:_____

RECOMMENDED:

By:_____
Deputy Secretary for Engineering or Designee

By:_____
Deputy Secretary for Finance and
Administration or Designee

By :_____
Chief Procurement Officer or Designee

CERTIFICATION OF SCDOT

I hereby certify that I am the Deputy Secretary of the Department of Transportation of the State of South Carolina and the COUNTY or its legal representatives have not been required directly or indirectly as an expressed or implied condition in connection with obtaining or carrying out this Agreement to:

(a) Employ or retain, or agree to employ or retain, any firm or person or
(b) Pay, or agree to pay, to any firm, person, or organization, any fee, contribution, donation, or consideration of any kind, except as herein expressly stated (if any).

In accordance with Section 635.105 of Title 23 C.F.R., I further certify that any work stipulated in this agreement to be performed by the COUNTY is adequately staffed and suitably equipped to undertake and satisfactorily complete such work, including the performance of proper maintenance on the highway facilities constructed under the terms of this agreement.

I acknowledge that this certificate is to be furnished to the Federal Highway Administration, U.S. Department of Transportation, in connection with this Agreement, and is subject to applicable State and Federal laws, both criminal and civil.

1/31/2014
(Date)

(SCDOT Signature)

CERTIFICATION OF COUNTY

I hereby certify that I am the County Administrator and duly authorized representative of the COUNTY, whose address is Post Office Box 192, Columbia, South Carolina, 29202 and that neither I nor the above COUNTY I here represent has:

(a) Employed or retained for a commission, percentage, brokerage, contingent fee, or other consideration, any firm or person (other than a bona fide employee working solely for me or the above COUNTY) to solicit or secure this Agreement, or

(b) Agreed, as an expressed or implied condition for obtaining this Agreement, to employ or retain the services of any firm or person in connection with carrying out the Agreement, or

(c) Paid, or agreed to pay, to any firm, organization or person (other than a bona fide employee working solely for me or the above COUNTY) any fee, contribution, donation, or consideration of any kind for, or in connection with, procuring or carrying out the contract except as herein expressly stated (if any).

In accordance with Section 635.105 of Title 23 C.F.R., I further certify that any work stipulated in this agreement to be performed by the COUNTY can be more advantageously performed by said COUNTY and that said COUNTY is adequately staffed and suitably equipped to undertake and satisfactorily complete such work, including the performance of proper maintenance on the highway facilities constructed under the terms of this agreement.

I acknowledge that this certificate is to be furnished to the SCDOT and the Federal Highway Administration, U.S. Department of Transportation, in connection with this Agreement, and is subject to applicable State and Federal laws, both criminal and civil.

_____ (Date)

_____ COUNTY (Signature)

Certification for Grants, Loans, and Cooperative Agreements

The undersigned certifies, to the best of his or her knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a member of Congress, or an officer or employee of a member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuations, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a member of Congress, or an officer or employee of a member of Congress in connection with this contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying", in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subgrants, and contracts and subcontracts under grants, subgrants, loans, and cooperative agreements) which exceed $100,000, and that all such subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

_____	_____
(Date)	COUNTY (Signature)
1/31/2014	_____
(Date)	SCDOT (Signature)

COUNTY
DRUG-FREE WORKPLACE CERTIFICATION

In accordance with Section 44-107-30, South Carolina Code of Laws (1976), as amended, and as a condition precedent to the execution of this Agreement, the undersigned, who is an authorized representative of the COUNTY certifies on behalf of the COUNTY that the COUNTY will provide a drug-free workplace by:

(1) Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensations, possession, or use of a controlled substance is prohibited in the COUNTY's workplace and specifying the actions that will be taken against employees for violations of the prohibition;

(2) Establishing a drug-free awareness program to inform employees about:
- (a) the dangers of drug abuse in a workplace;
- (b) the person's policy of maintaining a drug-free workplace;
- (c) any available drug counseling, rehabilitation, and employee assistance programs; and
- (d) the penalties that may be imposed upon employees for drug violations;

(3) Making it a requirement that each employee to be engaged in the performance of the Agreement be given a copy of the statement required by Item (1);

(4) Notifying the employee in the statement required by Item (1) that, as a condition of employment of this Agreement, the employee will:
- (a) abide by the terms of the statement; and
- (b) notify the employer of any criminal drug statute conviction for a violation occurring in the workplace no later than five days after the conviction;

(5) Notifying the South Carolina Department of Transportation within ten days after receiving notice under item (4)(b) from an employee or otherwise receiving actual notice of the conviction;

(6) Imposing a sanction on, or requiring the satisfactory participation in a drug abuse assistance or rehabilitation program by, any employee convicted as required in Section 44-107-50; and

(7) Making a good faith effort to continue to maintain a drug-free workplace through implementation of Items (1), (2), (3), (4), (5), and (6).

COUNTY: _____

SCDOT DRUG-FREE WORKPLACE CERTIFICATION

In accordance with Section 44-107-30, South Carolina Code of Laws (1976), as amended, and as a condition precedent to the execution of this Agreement, the undersigned, who is an authorized representative of the SCDOT certifies on behalf of the SCDOT that the SCDOT will provide a drug-free workplace by:

(1) Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensations, possession, or use of a controlled substance is prohibited in the SCDOT's workplace and specifying the actions that will be taken against employees for violations of the prohibition;

(2) Establishing a drug-free awareness program to inform employees about:
   (a) the dangers of drug abuse in a workplace;
   (b) the person's policy of maintaining a drug-free workplace;
   (c) any available drug counseling, rehabilitation, and employee assistance programs; and
   (d) the penalties that may be imposed upon employees for drug violations;

(3) Making it a requirement that each employee to be engaged in the performance of the Agreement be given a copy of the statement required by Item (1);

(4) Notifying the employee in the statement required by Item (1) that, as a condition of employment of this Agreement, the employee will:
   (a) abide by the terms of the statement; and
   (b) notify the employer of any criminal drug statute conviction for a violation occurring in the workplace no later than five days after the conviction;

(5) Notifying the County within ten days after receiving notice under Item (4)(b) from any employee involved with the Program or otherwise receiving actual notice of the conviction;

(6) Imposing a sanction on, or requiring the satisfactory participation in a drug abuse assistance or rehabilitation program by, any employee convicted as required in Section 44-107-50; and

(7) Making a good faith effort to continue to maintain a drug-free workplace through implementation of items (1), (2), (3), (4), (5), and (6).

SCDOT: _____

Attachment "A"
List of Projects

2012 Roadway Projects			
Type	Project Name	Begin Location	End Location
Widening	Pineview Rd	Bluff Rd	Garners Ferry Rd
Widening	Atlas Rd	Bluff Rd	Garners Ferry Rd
Widening	Clemson Rd	Old Clemson Rd	Sparkleberry Crossing Rd
Widening	Hardscrabble Rd	Farrow Road	Lake Carolina Blvd
Widening	Blythewood Rd	Syrup Mill Rd	I-77
Widening	Lower Richland Blvd	Rabbit Run Rd	Garners Ferry Rd
Widening	Broad River Rd	Royal Tower Rd	I-26 (Exit 97)
Widening	Shop Rd	I-77	George Rogers Blvd
Widening	Polo Rd	Mallet Hill Rd	Two Notch Rd
Widening	Bluff Rd	I-77	Rosewood Dr
Widening	Blythewood Rd	Winnsboro Rd	Syrup Mill Rd
Widening	Spears Creek Church Rd	Two Notch Rd	Percival Rd
Widening	North Main Street (Phases IA2 & III; II & IV)	Anthony Avenue	Fuller Avenue
Widening	Leesburg Road	Fairmont Rd	Lower Richland Blvd
Special	Shop Road Extension	na	na
Special	Kelly Mill Rd.	na	na
Special	Assembly Street RR Grade Separation	na	na
Intersection	Clemson Rd. and Rhame Rd./North Springs Rd.	Clemson Rd.	Rhame Rd./North Springs Rd.
Intersection	Farrow Rd. and Pisgah Church Rd.	Farrow Rd.	Pisgah Church Rd.
Intersection	Wilson Blvd. and Pisgah Church Rd.	Wilson Blvd.	Pisgah Church Rd.
Intersection	North Main St. and Monticello Rd.	North Main St.	Monticello Rd.
Intersection	Broad River Rd. and Rushmore Rd.	Broad River Rd.	Rushmore Rd.
Intersection	Wilson Blvd. and Killian Rd.	Wilson Blvd.	Killian Rd.
Intersection	Garners Ferry Rd. and Harmon Rd.	Garners Ferry Rd.	Harmon Rd.
Intersection	Clemson Rd. and Sparkleberry Ln. (to Mallet Hill Rd.)	Clemson Rd.	Sparkleberry Ln. (to Mallet Hill Rd.)
Intersection	North Springs Rd. and Risdon Way	North Springs Rd.	Risdon Way
Intersection	Hardscrabble Rd. and Kelly Mill Rd./Rimer Pond Rd.	Hardscrabble Rd.	Kelly Mill Rd./Rimer Pond Rd.
Intersection	Bull St. and Elmwood Ave.	Bull St.	Elmwood Ave.
Intersection	Screaming Eagle Rd. and Percival Rd.	Screaming Eagle Rd.	Percival Rd.
Intersection	Kennerly Rd. and Coogler Rd./Steeple Ridge Rd.	Kennerly Rd.	Coogler Rd./Steeple Ridge Rd.
Intersection	North Springs Rd. and Harrington Rd.	North Springs Rd.	Harrington Rd.
Interchange	I-20/ Broad River Rd.	I-20/ Broad River	I-20/ Broad River

2012 Bike / Pedestrian / Greenway Projects			
Type	Location	Highway Name 1	Highway Name 2
Intersection	Broad River Rd and Bush River Rd		
Intersection	Huger St and Gervais St		
Intersection	Elmwood Ave and Park St		
Intersection	Main St and Elmwood Ave		
Intersection	Elmwood Ave and Bull St		
Intersection	Two Notch Rd and Alpine Rd		
Intersection	Two Notch Rd and Maingate Dr/Windsor Lake Blvd		
Intersection	Two Notch Rd and Brickyard Rd		
Intersection	Two Notch Rd and Sparkleberry Ln		
Intersection	Blossom St and Saluda Ave		
Intersection	Devine St and Harden St/Santee Ave		
Intersection	Two Notch Rd and Decker Blvd/Parklane Rd		
Intersection	Huger St and Blossom St		
Intersection	Huger St and Greene St		
Intersection	Huger St and Lady St		
Intersection	Assembly St and Gervais St		
Intersection	Assembly St and Washington St		
Intersection	Assembly St and Laurel St		
Intersection	Assembly St and Calhoun St		
Intersection	Rosewood Dr and Marion St		
Intersection	Rosewood Dr and Pickens St		
Intersection	Rosewood Dr and Harden St		
Intersection	Rosewood Dr and Holly St		
Intersection	Rosewood Dr and Ott Rd		
Intersection	Rosewood Dr and Kilbourne Rd		
Intersection	Rosewood Dr and Beltline Blvd		
Intersection	Harden St and Gervais St		
Intersection	Garners Ferry and Atlas Road (1)		
Intersection	Garners Ferry Rd and Hallbrook Dr / Pineview Rd (2)		
Intersection	Two Notch Rd and Polo Rd (3)		
Intersection	Polo Rd and Mallet Hill Rd (4)		
Intersection	Assembly St and Greene St (5)		
Intersection	Assembly St and Pendleton St (6)		
Sidewalk	Assembly St	Whaley St	Beltline Blvd
Sidewalk	Clemson Rd	Longtown Rd	Two Notch Rd
Sidewalk	Colonial Dr	Harden St	Academy St
Sidewalk	Broad River Rd	Greystone Blvd	Broad River Bridge
Sidewalk	Blossom St	Williams St	Huger St
Sidewalk	Gervais St	450' west of Gist St	Gist St
Sidewalk	Alpine Rd	Two Notch Rd	Percival Rd
Sidewalk	Blythewood Rd	I-77	Main St
Sidewalk	Broad River Rd	Harbison Blvd	Bush River Rd
Sidewalk	Superior St	Whaley St	Airport Blvd
Sidewalk	Leesburg Rd	Garners Ferry Rd	Semmes Rd
Sidewalk	Two Notch Rd	Alpine Rd	Spears Creek Church Rd
Sidewalk	Gervais St	Gist St	Huger St
Sidewalk	Huger St	Blossom St	Gervais St
Sidewalk	Broad River Rd	I-26	Harbison Blvd
Sidewalk	Park St	Gervais St	Senate St
Sidewalk	Polo Rd	Mallet Hill Rd	Alpine Rd
Sidewalk	Clemson Rd	Two Notch Rd	Percival Rd
Sidewalk	Bratton St	King St	Maple St
Sidewalk	Franklin St	Sumter St	Bull St
Sidewalk	Fort Jackson Blvd	Wildcat Rd	I-77
Sidewalk	Grand St	Shealy St	Hydrick St
Sidewalk	Jefferson St	Sumter St	Bull St
Sidewalk	Lyon St	Gervais St	Washington St
Sidewalk	Magnolia St	Two Notch Rd	Pinehurst Rd
Sidewalk	Mildred Ave	Westwood Ave	Duke Ave
Sidewalk	School House Rd	Two Notch Rd	Ervin St
Sidewalk	Senate St	Gladden St	Kings St
Sidewalk	Shandon St	Wilmot St	Wheat St
Sidewalk	Wildwood Ave	Monticello Rd	Ridgewood Ave
Sidewalk	Windover St	Two Notch Rd	Belvedere Dr
Sidewalk	Lower Richland Blvd	Rabbit Run Rd	Garners Ferry Rd
Sidewalk	Harrison Road	Harrison Rd	Harrison Rd
Sidewalk	Koon	Malinda Road	Farmview Street
Sidewalk	Pinehurst	Harrison Road	Forest Drive
Sidewalk	Prospect	Wilmot Avenue	Yale
Sidewalk	Sunset	Elmhurst Road	River Drive
Sidewalk	Veterans	Garners Ferry Road	Wormwood Drive
Sidewalk	Veterans	Coachmaker Road	Coatsdale Road
Sidewalk	Percival Road	Forest Dr	Decker Blvd
Sidewalk	Polo Rd (7)	Two Notch Rd	Mallet Hill Rd
Sidewalk	Bluff Rd (8)	Rosewood Dr	Beltline Blvd
Sidewalk	Atlas Rd (9)	Fountain Lake Way	Garners Ferry Rd
Sidewalk	Broad River Rd (10)	Royal Tower Rd	Woodrow St
Sidewalk	Broad River Rd (11)	Lake Murray Blvd	Western Ln

2012 Bike / Pedestrian / Greenway Projects			
Type	Location	Highway Name 1	Highway Name 2
Bikeways	Broad River Rd	Greystone Blvd	Broad River Bridge
Bikeways	Harden St	Devine St	Rosewood Dr
Bikeways	Trenholm Rd	South of Dent Middle School	Decker Blvd
Bikeways	Two Notch Rd	Beltline Blvd	Parklane Rd
Bikeways	Hampton St	Pickens St	Harden St
Bikeways	Pendleton St	Lincoln St	Marion St
Bikeways	Sumter St	Washington St	Senate St
Bikeways	Beltline Blvd/Devine St	Rosewood Dr	Chateau Dr
Bikeways	Beltline Blvd	Forest Dr	Valley Rd
Bikeways	Beltline Blvd/Colonial Dr/Farrow Rd	Harden St	Academy St
Bikeways	Bonham Rd/Devereaux Rd/Heathwood Cir/Kilbourne	Blossom St	Fort Jackson Blvd
Bikeways	Chester St/Elmwood Ave/Wayne St	Hampton St	Park St
Bikeways	Clement Rd/Duke Ave/River Dr	Main St	Monticello Rd
Bikeways	Edgefield St/Park St	Calhoun St	River Dr
Bikeways	Gervais St/Gladden St/Hagood Ave/Page St/Senate	Millwood Ave	Beltline Blvd
Bikeways	Sumter St	Blossom St	Wheat St
Bikeways	Huger St/Lady St/Park St	Gervais St (east)	Gervais St (west)
Bikeways	Ott Rd	Jim Hamilton Blvd	Blossom St
Bikeways	Saluda Ave	Wheat St	Greene St
Bikeways	Wheat St	Sumter St	Assembly St
Bikeways	Blossom St	Williams St	Huger St
Bikeways	Gervais St	450' west of Gist St	Gist St
Bikeways	Assembly St	Blossom St	Rosewood Dr
Bikeways	Beltline Blvd	Rosewood Dr	Devine St
Bikeways	Broad River Rd	Bush River Rd	Greystone Blvd
Bikeways	Broad River Rd	Harbison Blvd	Bush River Rd
Bikeways	Decker Blvd/Parklane Rd/Two Notch Rd	Two Notch Rd	Percival Rd
Bikeways	Fort Jackson Blvd	Devine St	Newell Rd
Bikeways	Garners Ferry Rd	Rosewood Dr	True St
Bikeways	Gervais St	Park St	Millwood Ave
Bikeways	Oneil Ct	Decker Blvd	Parklane Rd
Bikeways	Rosewood Dr	Bluff Rd	Garners Ferry Rd
Bikeways	Leesburg Rd	Garners Ferry Rd	Semmes Rd
Bikeways	Gervais St	Gist St	Huger St
Bikeways	Huger St	Blossom St	Gervais St
Bikeways	Shop Rd	Beltline Blvd	Pineview Dr
Bikeways	Blossom St	Assembly St	Sumter St
Bikeways	Bull St	Elmwood Ave	Victoria St
Bikeways	Main St	Elmwood Ave	Sunset Dr
Bikeways	Elmwood Ave	Wayne St	Proposed Greenway Connector
Bikeways	Broad River Rd/Lake Murray Blvd	I-26	Harbison Blvd
Bikeways	Blythewood Rd	Winnsboro Rd	Main St
Bikeways	Clemson Rd	Longtown Rd	Brook Hollow Dr
Bikeways	Clemson Rd	Summit Pky	Percival Rd
Bikeways	Alpine Rd	Two Notch Rd	Percival Rd
Bikeways	Polo Rd	Two Notch Rd	640' south of Mallet Hill Rd
Bikeways	Clemson Rd	Brook Hollow Dr	Summit Pky
Bikeways	Two Notch Rd	Alpine Rd	Spears Creek Church Rd
Bikeways	Pickens St	Washington St	Rosewood Dr
Bikeways	Assembly St	Blossom St	Rosewood Dr
Bikeways	Greene St	Assembly St	Bull St
Bikeways	Bull St/Henderson St/Rice St	Wheat St	Heyward St
Bikeways	Blossom St	Huger St	Assembly St
Bikeways	Whaley St	Lincoln St	Pickens St
Bikeways	Whaley St	Lincoln St	Church St
Bikeways	Craig Rd	Harrison Rd	Covenant Rd
Bikeways	Shop Rd (12)	George Rogers Blvd	Northway Rd
Bikeways	Bluff Rd (13)	Berea Rd	Beltline Blvd
Bikeways	Shop Rd (14)	Northway Rd	Beltline Blvd
Bikeways	Bluff Rd (15)	Rosewood Dr	Berea Rd
Bikeways	Wilson Blvd (16)	I-77	Farrow Rd
Bikeways	Broad River Rd (17)	Woodrow St	I-26 (Exit 97)
Bikeways	Hardscrabble Rd (18)	Farrow Rd	Lee Rd
Bikeways	Hardscrabble Rd (19)	Lee Rd	Lake Carolina Blvd
Bikeways	Pineview Rd (20)	Bluff Rd	Garners Ferry Rd
Bikeways	Atlas Rd (21)	Bluff Rd	Garners Ferry Rd
Bikeways	Broad River Rd (22)	Royal Tower Rd	Woodrow St
Bikeways	Broad River Rd (23)	Lake Murray Blvd	Western Ln
Bikeways	Dutch Fork Rd (24)	Broad River Rd	Rauch Metz

Attachment "B"
Issue Escalation and Dispute Resolution Process

The purpose of this process is to define the different levels of management in the County and the SCDOT that have the authority and responsibility to make decisions when lower levels of staff are unable to resolve issues that may arise during the life of the Program. Such issues should be addressed promptly in order to minimize delays to the Program and to avoid negative impacts to the Program, the County and the SCDOT. The County and the SCDOT agree that if an issue cannot be resolved by the normal process of communications between the County or its designee and the SCDOT's Program Manager, the following procedure will be adhered to by the County and the SCDOT. This diagram describes the escalation process, personnel involved, and time limitations for resolution. Should resolution not be reached in the duration listed below, the next level of management will be informed of the issue and they will then be responsible to make a decision within the allotted time period as shown below. These allotted time periods may be changed based on mutual agreement of the managers working to resolve the issue. Decisions reached through this process will be recorded in writing and signatures of the responsible person from the County and the SCDOT will sign an acknowledgement of the decision made within two days of concluding the decision.

SCDOT (PLANNING,DESIGN, RIGHT OF WAY ISSUES)	SCDOT (CONSTRUCTION ISSUES)	COUNTY	WORK DAYS
Program Manager	District Engr. Administrator	Director of Transportation	2
Director of Preconstruction	Director of Construction	Director of Transportation	3
Dep. Secretary for Engineering	Dep. Secretary for Engineering	County Administrator	5

The Deputy Secretary for Engineering hall review and make the final determination on unresolved issues pertaining to right of way, design and construction for routes within or to be added to the State Highway System. Should the County Administrator and the Deputy Secretary for Engineering be unable to resolve other issues that may arise during the program, either party may request a resolution by the Dispute Resolution Board that shall hear the matter and reach a resolution to the dispute within ten days. By majority decision of the Board, this ten-day time frame to reach a resolution may be amended.

STATE OF SOUTH CAROLINA	)	INTERGOVERMENTAL AGREEMENT
	)	FOR ROAD MAINTENANCE, DRAINAGE
	)	MAINTENANCE, PLAN REVIEW,
COUNTY OF RICHLAND	)	INSPECTION, AND NPDES STORMWATER PERMIT COMPLIANCE

This agreement, made and entered into in duplicate originals this 22ND day of July, 2003, by and between the **County of Richland**, a body politic duly created and existing pursuant to the provisions of the S.C. Code Ann. § 4-9-10 *et seq*., (hereinafter referred to as "the County"), and the **City of Forest Acres**, a municipal corporation, created and existing pursuant to S.C. Code Ann. § 5-7-10 *et seq*. (hereinafter referred to as "the Municipality ");

W I T N E S S E T H:

ARTICLE 1 - ROADS, DRAINAGE, SEDIMENT CONTROL, PLAN REVIEW, AND INSPECTION.

WHEREAS, the Municipality wishes to provide for the maintenance of roads and drainage infrastructure within its corporate limits; and

WHEREAS, the Municipality has no staff or equipment for maintenance of roads or drainage infrastructure; and

WHEREAS, the County has staff and equipment for maintenance of roads and drainage infrastructure and provides these services in the unincorporated parts of Richland County; and

WHEREAS, the Municipality wishes to establish consistency with the County with regard to the design and construction of roads and drainage infrastructure, sediment control, and floodplain management; and

WHEREAS, the County has adopted and administers comprehensive design and construction standards for roads, drainage infrastructure, and sediment control measures constructed under its jurisdiction; and

WHEREAS, both parties hereto are authorized to enter into this agreement by virtue of the provisions of Section 4-9-40 of the South Carolina Code of Laws of 1976.

NOW, THEREFORE, in consideration of the promises, and the mutual understanding and obligations hereinafter set forth, the parties hereto agree as follows:

Section I – County Responsibilities

A. Through its Department of Public Works, the County will provide routine maintenance on all those roads, located within the corporate limits of the Municipality, that have been accepted for maintenance either by the County in accordance with Section 21-7 of the Richland County Code of Ordinances or by the Municipality.

The level of maintenance provided will be subject to the availability of funds, labor, and equipment for the County's overall road maintenance responsibility. The same level of maintenance will be provided on roads within the corporate limits as on those in unincorporated areas. Maintenance will include, but not be limited to:

- Pavement
- Drainage within the R/W
- Traffic Control signs
- Street name signs
- Shoulders, if necessary

With the exception of street name signs, the County will not provide maintenance on roads that have been taken into the State Highway System. The County will provide name signs on all roads within the corporate limits.

B. The County will incorporate the County maintained roads within the corporate limits into its pavement management system. All roads will be selected and prioritized for resurfacing based on their overall condition relative to all other roads in the pavement management system as measured by their pavement condition rating.

C. The drainage infrastructure located off of road rights-of-way within the corporate limits will be maintained by the County subject to the limitations contained in Section 21-5 of the Richland County Code of Ordinances. The level of maintenance provided will be subject to the availability of funds, labor, and equipment available for the County's overall drainage maintenance responsibilities. The same level of maintenance will be provided within the corporate limits as in unincorporated areas.

Maintenance under the terms of this agreement is comprised of, but not limited to, activities such as:

- Cleaning drainage ditches
- Cleaning and/or repairing closed storm sewers
- Cleaning and/or repairing catch basins, drop inlets, junction boxes, etc.
- Minor ditch excavation
- Minor storm sewer installation that can be accomplished by County maintenance forces.

Maintenance does not include construction of major capital drainage improvement projects. Under the terms of this agreement, a major capital drainage improvement project is one requiring a private construction contract in the judgement of the County's Public Works Director.

D. Upon the request of the Municipality, the County Engineer's Office will review the road, grading, stormwater management, and erosion control plans for new developments within the corporate limits for compliance with the County's ordinances and design standards. The County Engineer's approval or disapproval will be communicated in writing to the Municipality's planning staff.

E. The County Engineer's Office will provide construction inspections on those projects for which the plans were reviewed pursuant to Article 1, Section I-D, above. The County Engineer's determination with regard to the project's compliance with the County's construction standards and the approved plans will be communicated in writing to the Municipality's planning staff. The County Engineer's Office will also monitor and enforce implementation of the erosion control measures depicted on the approved plans.

Section II – Municipal Responsibilities

A. As a prerequisite to its authorization for the construction of new developments within the corporate limits involving new roads and/or drainage infrastructure, the Municipality will require the review and approval of plans by the County Engineer's Office.

B. As a prerequisite to its issuance of building permits or land disturbance permits for new commercial buildings within the corporate limits, the Municipality will require the review and approval of site plans by the County Engineer's Office with regard to erosion control measures, floodplain management requirements, and road access regulations. The exemptions provided for in the County's Stormwater Management Ordinance, however, will apply.

C. As a prerequisite to its acceptance of maintenance responsibilities for new roads and/or drainage systems within the corporate limits, the Municipality will require a certification from the County Engineer that they were constructed in accordance with approved plans and the County's construction specifications.

D. As a prerequisite to its issuance of certificates of occupancy for new commercial buildings within the corporate limits, the Municipality will require the inspection and approval of site improvements related to stormwater management, floodplain management, and road access.

E. The Municipality will submit, or have the developer submit, plans for developments and commercial buildings within the corporate limits to the County's Planning Department for assessment and collection of applicable subdivision processing fees. The plans will then be forwarded to the County Engineer's Office for review and approval.

F. The Municipality, within a reasonable time after the execution of this agreement, shall adopt or amend applicable ordinances as required to make them compatible with existing County ordinances and standards.

Section III - Funding

The County will assess the residents of the Municipality the same taxes and fees for the aforementioned services, and at the same rates that are assessed in the unincorporated areas of Richland County. The taxes and fees generated thereby shall be full compensation to the County for the services provided by the County pursuant to this agreement. The provisions of this section are applicable to:

- Real and personal property taxes
- Automobile registration fees
- Subdivision processing fees

"C" funds allocated to Richland County pursuant to State statute will be utilized by the County for road improvement projects within the corporate limits as well as in the unincorporated parts of Richland County. The County will initiate projects on behalf of the Municipality in accordance with its established capital road improvement programs.

Section IV – Capital Drainage Improvements

Capital improvement programs to improve drainage and reduce the impact of flooding in the unincorporated parts of Richland County are occasionally funded by the County through the issuance of bonds. To participate in these programs, the Municipality must request and agree to have the millage for bond debt service levied within the corporate limits. If approved by County Council, capital projects within the corporate limits will be eligible for inclusion in the program. The County would provide program management and project management. Project selection within the corporate limits will be done in consultation with the Municipality.

ARTICLE 2 – NPDES STORMWATER PERMIT COMPLIANCE

WHEREAS, the County, as a Phase 1 permittee under National Pollutant Discharge Elimination System ("NPDES") Permit No. SCS 400001 ("the Permit") issued by the South Carolina Department of Health and Environmental Control ("DHEC"), is implementing a Stormwater Management Plan ("SWMP"); and

WHEREAS, the Municipality must submit an application for an NPDES Permit as a Small Municipal Separate Storm Sewer Systems ("SMS4") by March 10, 2003; and

WHEREAS, the Municipality is responsible for compliance with NPDES stormwater discharge permit requirements within its corporate limits; and

WHEREAS, the Municipality's Permit allows it to partner with a Phase 1 NPDES permittee as a co-permittee to develop and implement its SWMP; and

WHEREAS, the Municipality and the County have determined that it is in the public interest that the County provide the services required by the Municipality's Permit within the corporate limits; and

WHEREAS, both parties hereto are authorized to enter into this agreement by virtue of the provisions of Section 4-9-40 of the South Carolina Code of Laws of 1976.

NOW, THEREFORE, in consideration of the promises, and the mutual understanding and obligations hereinafter set forth, the parties hereto agree as follows:

Section I – Obligation to Comply with Permit

Pursuant to this Agreement, the Municipality shall be eligible to become a co-permittee under the Permit, and as such is required to perform both the operational and the administrative tasks identified in the Permit. These tasks include:

- The implementation of ordinances, regulations, or policies to control the discharge of pollutants to Waters of the State;
- Best management programs, both structural and programmatic, to implement and enforce the conditions of the Permit; coordination of a public involvement program; and
- Monitoring, record keeping, and reporting.

A compliance schedule is provided in the Permit for the five-year period beginning April 16, 2000, and running through April 15, 2005. The Municipality and the County, acting on the Municipality's behalf under the terms of this Agreement, are responsible for ensuring compliance with the terms and conditions of the Permit within the corporate limits. The Permit encourages cooperation between the Municipality and the County and requires that a single annual progress report be issued.

Section II – County Responsibilities

Under the terms of this Agreement, the County shall be responsible for activities and services identified in the Permit, including, but not limited to, the following:

- Coordination of a public involvement program;
- Development and implementation of a public education and outreach program;
- Development and implementation of an illicit discharge detection program, including identification of the stormwater outfalls and dry weather screening and sampling of stormwater outfalls to detect non-stormwater discharges;
- Development of uniform rules and regulations for the County and Municipality for construction site runoff control and post-construction stormwater management for development and re-development;
- Assistance in compliance with the pollution prevention/good housekeeping requirements;
- Compilation of the annual permit progress report required by the Permit for Municipal Separate Storm Sewer Systems;
- Plan review and site inspections for construction site runoff control and post-construction stormwater management for development and re-development, if requested by the Municipality; and

In addition, the County may participate in capital improvement projects in cooperation with the Municipality or other entities to improve the water quality of waterbodies in Richland County.

Section III – Municipal Responsibilities

By execution of this Agreement, the Municipality agrees that it hereby consents to the delegation of authority to the County to undertake the services identified in this Agreement and authorizes the levy of the Stormwater Management Millage upon properties within the Municipality's corporate limits.

Under the terms of this Agreement, the Municipality shall be responsible for the following activities and services required by the Permit for Municipal Separate Storm Sewer Systems:

- Adopting a municipal companion ordinance that mirrors the regulatory provisions of Richland County Ordinance No. 022-01HR § I 48-14-10 et seq.;
- Administration of the subdivision review and approval process for developments within the corporate limits to ensure compliance with the stormwater management and sediment control requirements of the Permit;
- Administration of the building permit process for developments within the corporate limits to ensure compliance with the stormwater management and sediment control requirements of the Permit;
- Providing assistance to the County in identifying and removing sources of illicit discharges;
- Adopting uniform rules and regulations for construction site runoff control and post-construction stormwater management for development and re-development as developed by the County;
- Performing pollution prevention/good housekeeping activities identified in the NPDES Permit for Municipal Separate Storm Sewer Systems management plan;
- Providing information to the County on all Municipal activities as identified in the NPDES Permit for Municipal Separate Storm Sewer Systems management plan to assist the County in preparing the annual progress report to DHEC; and
- "Land disturbing activity" that is undertaken by the Municipality itself must be submitted to, and permitted by, DHEC and the County. This agreement does not cover industrial stormwater permitting necessary for municipal facilities, including, but not limited to, maintenance facilities, landfills, and materials recovery stations.

In addition, the Municipality will assist the County in completing capital improvement projects to improve the water quality of waterbodies in the Municipality, and assist the County and planning agencies to develop and adopt components of regional stormwater management master plans.

Section IV – Right-of-Entry

For the term of this Agreement, the Municipality grants to the County the status of a designated representative of the Municipality for the purposes of carrying out stormwater permit compliance services and other activities identified in this Agreement.

Section V – Funding for Services Provided by the County

The County funds its NPDES Permit compliance activities through a millage levy dedicated specifically to Stormwater Management. The same millage levied in the unincorporated parts of Richland County will be levied annually by the governing body of the Municipality on property within the corporate limits to fund the cost of providing these services to the Municipality pursuant to this agreement. Revenue generated from this millage will be used exclusively to fund NPDES Permit compliance and related stormwater management activities. Such activities will not include routine maintenance of storm drainage infrastructure or capital improvement projects intended to reduce the impacts of flooding.

Plan review and inspection activities undertaken by the County within the corporate limits pursuant to this agreement will be funded through the subdivision processing fees collected by the County's Planning Department. The same fee schedule that is applied to

developments in the unincorporated parts of Richland County will be applicable to developments within the corporate limits.

Section VI – Limitations on Liability

The Municipality is liable for compliance with all terms and conditions of the Permit within its corporate limits, and will be subject to enforcement actions resulting from non-compliance, with the exception of those activities identified in this Agreement that are to be performed on behalf of the Municipality by the County. The County assumes responsibility for completion of those tasks identified in this Agreement to the extent that the Municipality provides all required documentation, or other supporting information, to the County in a timely manner.

ARTICLE 3 - GENERAL

Section I– Severability

The provisions of this Agreement are to be considered joint and severability such that the invalidity of any one section will not invalidate the entire agreement.

Section II– Successors and Assigns

Whenever in this Agreement the Municipality or the County is named or referred to, it shall be deemed to include its or their successors and assigns and all covenants and agreements in this Agreement contained by or on behalf of the Municipality or the County shall bind and inure to the benefit of its or their successors and assigns whether so expressed or not.

Section III – Extension of Authority

The parties agree that all authorizations, empowerments, and all rights, titles, and interest referred or referenced to in this Agreement are intended to supplement the authority the County has or may have under any provision of law.

Section IV – Termination by the County

The County shall be entitled to terminate this Agreement, and the County shall be released from any obligations under this agreement if: (1) the County is rendered unable to charge or collect the applicable taxes or fee; or (2) the County Council acts to terminate this Agreement with the Municipality due to an adverse court decision affecting the intent of this Agreement.

Section V– Termination by the Municipality

The Municipality shall be entitled to terminate this Agreement, and the County shall be released from any obligations under this agreement if the Municipal governing body acts to terminate this Agreement with the County due to an adverse court decision regarding this Agreement or a contrary EPA/SC DHEC regulation or the refusal of either to issue a separate

NPDES permit to the Municipality. In the latter event, the County and the Municipality shall negotiate the inclusion of the Municipality as a co-permittee under the County's NPDES Permit.

In the event the Municipality terminates this agreement, the County shall be entitled to continue to collect all applicable taxes and fees within the Municipality for the tax year when the termination occurs. However, the Municipality will be entitled to a pro-rata distribution of such collections based on the percentage of the calendar year such services were provided.

Section VI– Insurance

For the duration of this Agreement, each party shall maintain a liability program adequate to meet at least the limits of the South Carolina Tort Claims Act.

Section VII– Duration

The duration of this Agreement shall be for a term of five (5) years, and will be automatically renewed for a like term unless one of the parties to the Agreement gives written notice to the other parties of an intent to terminate. Said notices must be given at least sixty (60) days prior to the County Auditor's calculations of the millage rates for the upcoming tax year; or unless otherwise terminated pursuant to Article III, Section IV or V, above.

Section VIII– Previous Agreements

This agreement supersedes all previous agreements between the County and the Municipality covering provision of these services.

IN WITNESS WHEREOF, the parties hereto have hereunder caused their names to be affixed as heretofore duly authorized on the date first above written.

WITNESSES:

Tony McDonald

Stephany Snowden

Robert Keaseer

COUNTY OF RICHLAND

By: T. Cary McSwain

T. Cary McSwain
County Administrator

Richland County Attorney's Office
Approved As To LEGAL Form Only.
No Opinion Rendered As To Content.

CITY OF FOREST ACRES

By: Ron Garbinsky

Ron Garbinsky
City Administrator

STATE OF SOUTH CAROLINA	)	INTERGOVERMENTAL AGREEMENT
	)	FOR ROAD MAINTENANCE, DRAINAGE
	)	MAINTENANCE, PLAN REVIEW,
COUNTY OF RICHLAND	)	INSPECTION, AND NPDES STORMWATER PERMIT COMPLIANCE

This agreement, made and entered into in duplicate originals this 14th day of July, 2003, by and between the **County of Richland**, a body politic duly created and existing pursuant to the provisions of the S.C. Code Ann. § 4-9-10 *et seq.*, (hereinafter referred to as "the County"), and the **Town of Arcadia Lakes**, a municipal corporation, created and existing pursuant to S.C. Code Ann. § 5-7-10 *et seq.* (hereinafter referred to as "the Municipality ");

WITNESSETH:

ARTICLE 1 - ROADS, DRAINAGE, SEDIMENT CONTROL, PLAN REVIEW, AND INSPECTION.

WHEREAS, the Municipality wishes to provide for the maintenance of roads and drainage infrastructure within its corporate limits; and

WHEREAS, the Municipality has no staff or equipment for maintenance of roads or drainage infrastructure; and

WHEREAS, the County has staff and equipment for maintenance of roads and drainage infrastructure and provides these services in the unincorporated parts of Richland County; and

WHEREAS, the Municipality wishes to establish consistency with the County with regard to the design and construction of roads and drainage infrastructure, sediment control, and floodplain management; and

WHEREAS, the County has adopted and administers comprehensive design and construction standards for roads, drainage infrastructure, and sediment control measures constructed under its jurisdiction; and

WHEREAS, both parties hereto are authorized to enter into this agreement by virtue of the provisions of Section 4-9-40 of the South Carolina Code of Laws of 1976.

NOW, THEREFORE, in consideration of the promises, and the mutual understanding and obligations hereinafter set forth, the parties hereto agree as follows:

Section I – County Responsibilities

A. Through its Department of Public Works, the County will provide routine maintenance on all those roads, located within the corporate limits of the Municipality, that have been accepted for maintenance either by the County in accordance with Section 21-7 of the Richland County Code of Ordinances or by the Municipality.

The level of maintenance provided will be subject to the availability of funds, labor, and equipment for the County's overall road maintenance responsibility. The same level of maintenance will be provided on roads within the corporate limits as on those in unincorporated areas. Maintenance will include, but not be limited to:

- Pavement
- Drainage within the R/W
- Traffic Control signs
- Street name signs
- Shoulders, if necessary

With the exception of street name signs, the County will not provide maintenance on roads that have been taken into the State Highway System. The County will provide name signs on all roads within the corporate limits.

B. The County will incorporate the County maintained roads within the corporate limits into its pavement management system. All roads will be selected and prioritized for resurfacing based on their overall condition relative to all other roads in the pavement management system as measured by their pavement condition rating.

C. The drainage infrastructure located off of road rights-of-way within the corporate limits will be maintained by the County subject to the limitations contained in Section 21-5 of the Richland County Code of Ordinances. The level of maintenance provided will be subject to the availability of funds, labor, and equipment available for the County's overall drainage maintenance responsibilities. The same level of maintenance will be provided within the corporate limits as in unincorporated areas.

Maintenance under the terms of this agreement is comprised of, but not limited to, activities such as:

- Cleaning drainage ditches
- Cleaning and/or repairing closed storm sewers
- Cleaning and/or repairing catch basins, drop inlets, junction boxes, etc.
- Minor ditch excavation
- Minor storm sewer installation that can be accomplished by County maintenance forces.

Maintenance does not include construction of major capital drainage improvement projects. Under the terms of this agreement, a major capital drainage improvement project is one requiring a private construction contract in the judgement of the County's Public Works Director.

D. Upon the request of the Municipality, the County Engineer's Office will review the road, grading, stormwater management, and erosion control plans for new developments within the corporate limits for compliance with the County's ordinances and design standards. The County Engineer's approval or disapproval will be communicated in writing to the Municipality's Town Clerk.

E. The County Engineer's Office will provide construction inspections on those projects for which the plans were reviewed pursuant to Article 1, Section I-D, above. The County Engineer's determination with regard to the project's compliance with the County's construction standards and the approved plans will be communicated in writing to the Municipality's Town Clerk. The County Engineer's Office will also monitor and enforce implementation of the erosion control measures depicted on the approved plans.

Section II – Municipal Responsibilities

A. As a prerequisite to its authorization for the construction of new developments within the corporate limits involving new roads and/or drainage infrastructure, the Municipality will require the review and approval of plans by the County Engineer's Office.

B. As a prerequisite to its issuance of building permits or land disturbance permits for new commercial buildings within the corporate limits, the Municipality will require the review and approval of site plans by the County Engineer's Office with regard to erosion control measures, floodplain management requirements, and road access regulations. The exemptions provided for in the County's Stormwater Management Ordinance, however, will apply.

C. As a prerequisite to its acceptance of maintenance responsibilities for new roads and/or drainage systems within the corporate limits, the Municipality will require a certification from the County Engineer that they were constructed in accordance with approved plans and the County's construction specifications.

D. As a prerequisite to its issuance of certificates of occupancy for new commercial buildings within the corporate limits, the Municipality will require the inspection and approval of site improvements related to stormwater management, floodplain management, and road access.

E. The Municipality will submit, or have the developer submit, plans for developments and commercial buildings within the corporate limits to the County's Planning Department for assessment and collection of applicable subdivision processing fees. The plans will then be forwarded to the County Engineer's Office for review and approval.

F. The Municipality, within a reasonable time after the execution of this agreement, shall adopt or amend applicable ordinances as required to make them compatible with existing County ordinances and standards.

Section III - Funding

The County will assess the residents of the Municipality the same taxes and fees for the aforementioned services, and at the same rates that are assessed in the unincorporated areas of Richland County. The taxes and fees generated thereby shall be full compensation to the County for the services provided by the County pursuant to this agreement. The provisions of this section are applicable to:

- Real and personal property taxes
- Automobile registration fees
- Subdivision processing fees

"C" funds allocated to Richland County pursuant to State statute will be utilized by the County for road improvement projects within the corporate limits as well as in the unincorporated parts of Richland County. The County will initiate projects on behalf of the Municipality in accordance with its established capital road improvement programs.

Section IV – Capital Drainage Improvements

Capital improvement programs to improve drainage and reduce the impact of flooding in the unincorporated parts of Richland County are occasionally funded by the County through the issuance of bonds. To participate in these programs, the Municipality must request and agree to have the millage for bond debt service levied within the corporate limits. If approved by County Council, capital projects within the corporate limits will be eligible for inclusion in the program. The County would provide program management and project management. Project selection within the corporate limits will be done in consultation with the Municipality.

ARTICLE 2 – NPDES STORMWATER PERMIT COMPLIANCE

WHEREAS, the County, as a Phase 1 permittee under National Pollutant Discharge Elimination System ("NPDES") Permit No. SCS 400001 ("the Permit") issued by the South Carolina Department of Health and Environmental Control ("DHEC"), is implementing a Stormwater Management Plan ("SWMP"); and

WHEREAS, the Municipality must submit an application for an NPDES Permit as a Small Municipal Separate Storm Sewer Systems ("SMS4") by March 10, 2003; and

WHEREAS, the Municipality is responsible for compliance with NPDES stormwater discharge permit requirements within its corporate limits; and

WHEREAS, the Municipality's Permit allows it to partner with a Phase 1 NPDES permittee as a co-permittee to develop and implement its SWMP; and

WHEREAS, the Municipality and the County have determined that it is in the public interest that the County provide the services required by the Municipality's Permit within the corporate limits; and

WHEREAS, both parties hereto are authorized to enter into this agreement by virtue of the provisions of Section 4-9-40 of the South Carolina Code of Laws of 1976.

NOW, THEREFORE, in consideration of the promises, and the mutual understanding and obligations hereinafter set forth, the parties hereto agree as follows:

Section I – Obligation to Comply with Permit

Pursuant to this Agreement, the Municipality shall be eligible to become a co-permittee under the Permit, and as such is required to perform both the operational and the administrative tasks identified in the Permit. These tasks include:

- The implementation of ordinances, regulations, or policies to control the discharge of pollutants to Waters of the State;
- Best management programs, both structural and programmatic, to implement and enforce the conditions of the Permit; coordination of a public involvement program; and
- Monitoring, record keeping, and reporting.

A compliance schedule is provided in the Permit for the five-year period beginning April 16, 2000, and running through April 15, 2005. The Municipality and the County, acting on the Municipality's behalf under the terms of this Agreement, are responsible for ensuring compliance with the terms and conditions of the Permit within the corporate limits. The Permit encourages cooperation between the Municipality and the County and requires that a single annual progress report be issued.

Section II – County Responsibilities

Under the terms of this Agreement, the County shall be responsible for activities and services identified in the Permit, including, but not limited to, the following:

- Coordination of a public involvement program;
- Development and implementation of a public education and outreach program;
- Development and implementation of an illicit discharge detection program, including identification of the stormwater outfalls and dry weather screening and sampling of stormwater outfalls to detect non-stormwater discharges;
- Development of uniform rules and regulations for the County and Municipality for construction site runoff control and post-construction stormwater management for development and re-development;
- Assistance in compliance with the pollution prevention/good housekeeping requirements;
- Compilation of the annual permit progress report required by the Permit for Municipal Separate Storm Sewer Systems;
- Plan review and site inspections for construction site runoff control and post-construction stormwater management for development and re-development, if requested by the Municipality; and

In addition, the County may participate in capital improvement projects in cooperation with the Municipality or other entities to improve the water quality of waterbodies in Richland County.

Section III – Municipal Responsibilities

By execution of this Agreement, the Municipality agrees that it hereby consents to the delegation of authority to the County to undertake the services identified in this Agreement and authorizes the levy of the Stormwater Management Millage upon properties within the Municipality's corporate limits.

Under the terms of this Agreement, the Municipality shall be responsible for the following activities and services required by the Permit for Municipal Separate Storm Sewer Systems:

- Adopting a municipal companion ordinance that mirrors the regulatory provisions of Richland County Ordinance No. 022-01HR § I 48-14-10 et seq.;
- Administration of the subdivision review and approval process for developments within the corporate limits to ensure compliance with the stormwater management and sediment control requirements of the Permit;
- Administration of the building permit process for developments within the corporate limits to ensure compliance with the stormwater management and sediment control requirements of the Permit;
- Providing assistance to the County in identifying and removing sources of illicit discharges;
- Adopting uniform rules and regulations for construction site runoff control and post-construction stormwater management for development and re-development as developed by the County;
- Performing pollution prevention/good housekeeping activities identified in the NPDES Permit for Municipal Separate Storm Sewer Systems management plan;
- Providing information to the County on all Municipal activities as identified in the NPDES Permit for Municipal Separate Storm Sewer Systems management plan to assist the County in preparing the annual progress report to DHEC; and
- "Land disturbing activity" that is undertaken by the Municipality itself must be submitted to, and permitted by, DHEC and the County. This agreement does not cover industrial stormwater permitting necessary for municipal facilities, including, but not limited to, maintenance facilities, landfills, and materials recovery stations.

In addition, the Municipality will assist the County in completing capital improvement projects to improve the water quality of waterbodies in the Municipality, and assist the County and planning agencies to develop and adopt components of regional stormwater management master plans.

Section IV – Right-of-Entry

For the term of this Agreement, the Municipality grants to the County the status of a designated representative of the Municipality for the purposes of carrying out stormwater permit compliance services and other activities identified in this Agreement.

Section V – Funding for Services Provided by the County

The County funds its NPDES Permit compliance activities through a millage levy dedicated specifically to Stormwater Management. The same millage levied in the unincorporated parts of Richland County will be levied annually by the governing body of the Municipality on property within the corporate limits to fund the cost of providing these services to the Municipality pursuant to this agreement. Revenue generated from this millage will be used exclusively to fund NPDES Permit compliance and related stormwater management activities. Such activities will not include routine maintenance of storm drainage infrastructure or capital improvement projects intended to reduce the impacts of flooding.

Plan review and inspection activities undertaken by the County within the corporate limits pursuant to this agreement will be funded through the subdivision processing fees collected by the County's Planning Department. The same fee schedule that is applied to

developments in the unincorporated parts of Richland County will be applicable to developments within the corporate limits.

Section VI – Limitations on Liability

The Municipality is liable for compliance with all terms and conditions of the Permit within its corporate limits, and will be subject to enforcement actions resulting from non-compliance, with the exception of those activities identified in this Agreement that are to be performed on behalf of the Municipality by the County. The County assumes responsibility for completion of those tasks identified in this Agreement to the extent that the Municipality provides all required documentation, or other supporting information, to the County in a timely manner.

ARTICLE 3 - GENERAL

Section I– Severability

The provisions of this Agreement are to be considered joint and severability such that the invalidity of any one section will not invalidate the entire agreement.

Section II– Successors and Assigns

Whenever in this Agreement the Municipality or the County is named or referred to, it shall be deemed to include its or their successors and assigns and all covenants and agreements in this Agreement contained by or on behalf of the Municipality or the County shall bind and inure to the benefit of its or their successors and assigns whether so expressed or not.

Section III – Extension of Authority

The parties agree that all authorizations, empowerments, and all rights, titles, and interest referred or referenced to in this Agreement are intended to supplement the authority the County has or may have under any provision of law.

Section IV – Termination by the County

The County shall be entitled to terminate this Agreement, and the County shall be released from any obligations under this agreement if: (1) the County is rendered unable to charge or collect the applicable taxes or fee; or (2) the County Council acts to terminate this Agreement with the Municipality due to an adverse court decision affecting the intent of this Agreement.

Section V– Termination by the Municipality

The Municipality shall be entitled to terminate this Agreement, and the County shall be released from any obligations under this agreement if the Municipal governing body acts to terminate this Agreement with the County due to an adverse court decision regarding this Agreement or a contrary EPA/SC DHEC regulation or the refusal of either to issue a separate

NPDES permit to the Municipality. In the latter event, the County and the Municipality shall negotiate the inclusion of the Municipality as a co-permittee under the County's NPDES Permit.

In the event the Municipality terminates this agreement, the County shall be entitled to continue to collect all applicable taxes and fees within the Municipality for the tax year when the termination occurs. However, the Municipality will be entitled to a pro-rata distribution of such collections based on the percentage of the calendar year such services were provided.

Section VI– Insurance

For the duration of this Agreement, each party shall maintain a liability program adequate to meet at least the limits of the South Carolina Tort Claims Act.

Section VII– Duration

The duration of this Agreement shall be for a term of five (5) years, and will be automatically renewed for a like term unless one of the parties to the Agreement gives written notice to the other parties of an intent to terminate. Said notices must be given at least sixty (60) days prior to the County Auditor's calculations of the millage rates for the upcoming tax year; or unless otherwise terminated pursuant to Article III, Section IV or V, above.

Section VIII– Previous Agreements

This agreement supersedes all previous agreements between the County and the Municipality covering provision of these services.

IN WITNESS WHEREOF, the parties hereto have hereunder caused their names to be affixed as heretofore duly authorized on the date first above written.

WITNESSES:

Tony McDonald

Amelia R. Linder

Elizabeth A. McLean

COUNTY OF RICHLAND

By: T. Cary McSwain

T. Cary McSwain
County Administrator

Richland County Attorney's Office
Approved As To LEGAL Form Only.
No Opinion Rendered As To Content.

TOWN OF ARCADIA LAKES

By: Richard W. Thomas, Jr.

Richard W. Thomas, Jr.
Mayor

STATEOFSOUTHCAROLINA)
)
RICHLANDCOUNTY)

INTERGOVERMENTAL AGREEMENT
(Road and Storm Drainage)

THIS AGREEMENT entered into 9 day of December, 2014, by and between Richland County (hereinafter the "County") and the Town of Blythewood (hereinafter the "Town").

RECITALS

WHEREAS, the County and the Town previously entered into an agreement for uniformity of roads and storm drainage system improvements within the Town; and

WHEREAS, the Town desires to continue utilizing the services of the County Public Works Department to obtain such uniformity; and

WHEREAS, the County is willing to continue providing the Town said services; and

WHEREAS, the parties desire to continue their contractual relationship pursuant to this Agreement;

NOW, THEREFORE, it is mutually agreed by and between the parties hereto as follows:

1. The Public Works Department of the County shall provide such services as are necessary to secure the uniformity of roads and storm drainage improvements within the Town of Blythewood in compliance with the ordinances and policies of the County and the laws of the State of South Carolina where applicable.

2. The County shall accept roads within the Town limits into the County Roads Maintenance System only if such road fully complies with the County's ordinances regarding acceptance of roads.

3. The Town shall not authorize the construction or installation of such improvements until such time as the County has been provided with and approves plans for road or storm drainage installation.

4. The County, upon satisfactory completion of such improvements in accordance with the plans approved by the County, shall agree to maintain such improvements as part of the County system of such improvements. Roads may be dedicated to the County for perpetual maintenance as defined in Section 21-6 of the Richland County Code of Ordinances.

5. The Town agrees that the county shall manage all "C" funds on the Town's behalf and that the Town shall not be permitted to request "C" funds from the County Transportation Committee (CTC) without the written consent of the County.

6. In any and all instances where an ordinance of the Town conflicts, restrains or is unreasonably burdensome to any storm drainage and roadway ordinances of the County that have been adopted by the Town, the County's standards and ordinances shall take precedence since it is hereby declared to be the intent of the parties to give the County exclusive authority regarding the construction and maintenance of roadways and storm drainage improvements within the territorial limits of the Town of Blythewood which lie within the jurisdiction of Richland County.

7. This Agreement shall have a term of four (4) years from the date of execution or until sooner terminated by either party upon such party giving six months written notice to the other party of its intent to terminate this agreement.

8. This Agreement may be amended, modified or changed only upon the written agreement between the County Council for Richland County and the Town Council for Blythewood.

9. The County shall continue to assess, levy, and collect property taxes from the residents of that portion of the Town of Blythewood which lies within the boundaries of Richland County for the above services. Such assessment and levy shall not exceed that which is assessed and levied on property in the unincorporated areas of Richland County. The taxes generated by such assessment and levy shall be designated as an offset to the costs of providing these services and shall constitute the compensation to the County for the undertaking of these services.

IN WITNESS WHEREOF, the parties have executed this Agreement as of the day and year first above written.

WITNESSES:

Michelle Apley

Penny Wise

RICHLAND COUNTY

By: Norman Jackson, Richland County Council Chairperson

Gary Parker
Town Administrator

TOWN OF BLYTHEWOOD

By: J. Michael Ross
Mayor

STATE OF SOUTH CAROLINA	)	INTERGOVERMENTAL AGREEMENT
	)	FOR ROADS & MAINTENANCE AND
COUNTY OF RICHLAND	)	NPDES PHASE II COMPLIANCE

This agreement, made and entered into in duplicate originals this __ day of July, 2007, by and between the **County of Richland,** a body politic duly created and existing pursuant to the provisions of the S.C. Code Ann. § 4-9-10 *et seq.,* (hereinafter referred to as "the County"), and the **Town of Irmo,** a municipal corporation, created and existing pursuant to S.C. Code Ann. § 5-7-10 *et seq.* (hereinafter referred to as "the Municipality ");

WITNESSETH:

ARTICLE 1 - ROADS, DRAINAGE, SEDIMENT CONTROL, PLAN REVIEW, AND INSPECTION.

WHEREAS, the Municipality wishes to provide for the maintenance of roads and drainage infrastructure within its corporate limits; and

WHEREAS, the Municipality has no staff or equipment for maintenance of roads or drainage infrastructure; and

WHEREAS, the County has staff and equipment for maintenance of roads and drainage infrastructure and provides these services in the unincorporated parts of Richland County; and

WHEREAS, the Municipality wishes to establish consistency with the County with regard to the design and construction of roads and drainage infrastructure, sediment control, and floodplain management; and

WHEREAS, the County has adopted and administers comprehensive design and construction standards for roads, drainage infrastructure, and sediment control measures constructed under its jurisdiction; and

WHEREAS, both parties hereto are authorized to enter into this agreement by virtue of the provisions of Section 4-9-40 of the South Carolina Code of Laws of 1976.

NOW, THEREFORE, in consideration of the promises, and the mutual understanding and obligations hereinafter set forth, the parties hereto agree as follows:

Section I - County Responsibilities

A. Through its Department of Public Works, the County will provide routine maintenance on all those roads, located within the corporate limits of the Municipality, that have been accepted for maintenance either by the County in accordance with Section 21-7 of the Richland County Code of Ordinances or by the Municipality.

The level of maintenance provided will be subject to the availability of funds, labor,

and equipment for the County's overall road maintenance responsibility. The same level of maintenance will be provided on roads within the corporate limits as on those in unincorporated areas. Maintenance will include, but not be limited to:

- Pavement
- Drainage within the R/W
- Traffic Control signs
- Street name signs
- Shoulders, if necessary

With the exception of street name signs, the County will not provide maintenance on roads that have been taken into the State Highway System. The County will provide name signs on all roads within the corporate limits.

B. The County will incorporate the County maintained roads within the corporate limits into its pavement management system. All roads will be selected and prioritized for resurfacing based on their overall condition relative to all other roads in the pavement management system as measured by their pavement condition rating.

C. The drainage infrastructure located off of road rights-of-way within the corporate limits will be maintained by the County subject to the limitations contained in Chapters 21 & 26 of the Richland County Code of Ordinances. The level of maintenance provided will be subject to the availability of funds, labor, and equipment available for the County's overall drainage maintenance responsibilities and strictly within County's guidelines. The same level of maintenance will be provided within the corporate limits as in unincorporated areas.

Maintenance under the terms of this agreement is comprised of, but not limited to, activities such as:

- Cleaning drainage ditches
- Cleaning and/or repairing closed storm sewers
- Cleaning and/or repairing catch basins, drop inlets, junction boxes, etc.
- Minor ditch excavation
- Minor storm sewer installation that can be accomplished by County maintenance forces.

Maintenance does not include construction of major capital drainage improvement projects. Under the terms of this agreement, a major capital drainage improvement project is one requiring a private construction contract in the judgement of the County's Public Works Director.

D. Beginning September 1, 2007, Municipality will be responsible for plan review. The County recognizes the Municipality as an approved Delegated Entity. The County will accept roads and drainage maintenance for these approved projects in accordance with Chapters 21 & 26 of the Richland County Code of Ordinances. The County may require from time to time

documentation as needed, to insure its standards are being met. In addition, the County reserves the right, at any time, to inspect plan review process or inspection reports of a land disturbance project as necessary for quality assurance purposes. The County will be the final authority of issues related to construction quality of facilities it is expected to maintain.

Section II - Municipal Responsibilities

A. As a prerequisite to its authorization for the construction of new developments within the corporate limits involving new roads and/or drainage infrastructure, the Municipality will maintain an approved Delegated Entity.

B. As a prerequisite to its issuance of building permits or land disturbance permits for new commercial buildings within the corporate limits, the Municipality will require the review and approval of site plans with regard to erosion control measures, floodplain management requirements, and road access regulations.

C. As a prerequisite to its acceptance of maintenance responsibilities for new roads and/or drainage systems within the corporate limits, the Municipality will require a certification that they were constructed in accordance with approved plans and specifications.

D. As a prerequisite to its issuance of certificates of occupancy for new commercial buildings within the corporate limits, the Municipality will require the inspection and approval of site improvements related to stormwater management, floodplain management, and road access.

E. The Municipality will submit plans (preliminary plans, approved plans and as-built plans) for developments and commercial buildings within the corporate limits to the County's Engineer's office for Quality Assurance and data management purposes. Municipality will copy to County any of the quality inspection reports during the execution of the project and any other related documentation for County filing purposes.

F. The Municipality, within a reasonable time after the execution of this agreement, shall adopt or amend applicable ordinances as required to make them compatible with the requirements of a Delegated Entity for SC DHEC approval.

Section III – Funding

The County will assess the residents of the Municipality the same taxes and fees for the aforementioned services, and at the same rates that are assessed in the unincorporated areas of Richland County. The taxes and fees generated thereby shall be full compensation to the County for the services provided by the County pursuant to this agreement. The provisions of this section are applicable to:

- Real and personal property taxes
- Automobile registration fees
- Subdivision processing fees

"C" funds allocated to Richland County pursuant to State statute will be utilized by the

County for road improvement projects within the corporate limits as well as in the unincorporated parts of Richland County. The County will initiate projects on behalf of the Municipality in accordance with its established capital road improvement programs.

Section IV - Capital Drainage Improvements

Capital improvement programs to improve drainage and reduce the impact of flooding in the unincorporated parts of Richland County are occasionally funded by the County through the issuance of bonds. To participate in these programs, the Municipality must request and agree to have the millage for bond debt service levied within the corporate limits. If approved by County Council, capital projects within the corporate limits will be eligible for inclusion in the program. The County would provide program management and project management. Project selection within the corporate limits will be done in consultation with the Municipality.

ARTICLE 2 – NPDES STORMWATER PERMIT COVERAGE

WHEREAS, the Municipality is responsible for compliance with NPDES stormwater discharge permit requirements within its corporate limits; and

WHEREAS, the Municipality and the County have determined that the Municipality will be responsible for providing the services required by the NPDES permit within the corporate limits; and

WHEREAS, both parties hereto are authorized to enter into this agreement by virtue of the provisions of Section 4-9-40 of the South Carolina Code of Laws of 1976.

NOW, THEREFORE, in consideration of the promises, and the mutual understanding and obligations hereinafter set forth, the parties hereto agree as follows:

Section I- Obligation to Comply with Permit

The Municipality shall be responsible for compliance with the NPDES permit and the County shall have no responsibility for compliance. The County shall only be responsible for maintenance of the storm drainage system per Article 1.

ARTICLE 3 - GENERAL

Section I- Severability

The provisions of this Agreement are to be considered joint and severability such that the invalidity of any one section will not invalidate the entire agreement.

Section II- Successors and Assigns

Whenever in this Agreement the Municipality or the County is named or referred to, it shall be deemed to include its or their successors and assigns and all covenants and agreements in this

Agreement contained by or on behalf of the Municipality or the County shall bind and inure to the benefit of its or their successors and assigns whether so expressed or not.

Section III - Extension of Authority

The parties agree that all authorizations, empowerments, and all rights, titles, and interest referred or referenced to in this Agreement are intended to supplement the authority the County has or may have under any provision of law.

Section IV - Termination by the County

The County shall be entitled to terminate this Agreement, and the County shall be released from any obligations under this agreement if: (1) the County is rendered unable to charge or collect the applicable taxes or fee; or (2) the County Council acts to terminate this Agreement with the Municipality due to an adverse court decision affecting the intent of this Agreement.

Section V- Termination by the Municipality

The Municipality shall be entitled to terminate this Agreement, and the County shall be released from any obligations under this agreement if the Municipal governing body acts to terminate this Agreement with the County due to an adverse court decision regarding this Agreement or a contrary EPA/SC DHEC regulation.

In the event the Municipality terminates this agreement, the County shall be entitled to continue to collect all applicable taxes and fees within the Municipality for the tax year when the termination occurs. However, the Municipality will be entitled to a pro-rata distribution of such collections based on the percentage of the calendar year such services were provided.

Section VI- Insurance

For the duration of this Agreement, each party shall maintain a liability program adequate to meet at least the limits of the South Carolina Tort Claims Act.

Section VII- Duration

The duration of this Agreement shall be for a term of five (5) years, and will be automatically renewed for a like term unless one of the parties to the Agreement gives written notice to the other parties of an intent to terminate. Said notices must be given at least sixty (60) days prior to the County Auditor's calculations of the millage rates for the upcoming tax year; or unless otherwise terminated pursuant to Article III, Section IV or V, above.

Section VIII- Previous Agreements

This agreement supersedes all previous agreements between the County and the Municipality covering provision of these services.

IN WITNESS **WHEREOF,** the parties hereto have hereunder caused their names to be affixed

as heretofore duly authorized on the date first above written.

WITNESSES:

COUNTY OF RICHLAND

By: _____
J. Milton Pope
County Administrator

Richland County Attorney's Office

Approved As To LEGAL Form Only.
No Opinion Rendered As To Content.

TOWN OF IRMO

By: _____
John L. Gibbons
Mayor

Appendix B: Major Residential Development Forms

Richland County
Planning & Development Services

MAJOR SUBDIVISION DEVELOPMENT Final Plat

www.richlandonline.com

Major Subdivision – Major subdivisions are all divisions of land in Richland County that do not meet the requirements for subdivision exemption (Section 26-22) and that do not qualify for administrative or minor subdivision review (Section 26-54(c)(1) and Section 26-54(c)(2)). Any subdivision that involves the dedication of land to the county for open space or other public purposes shall be considered a major subdivision.

Applications must be submitted to the Planning & Development Services Department. Major subdivision sketch plans will be reviewed by the Development Review Team (DRT). All submittals must be found complete prior to being scheduled for a DRT meeting. Deadline for the DRT submittals is the first working day of each month.

Major Subdivision Submittal Checklist
FINAL PLAT

This checklist must be completed, signed, and submitted with application. ALL ITEMS ON CHECKLIST MUST BE ADDRESSED. PLEASE PROVIDE SUPPORTING DOCUMENTS OR NOTATIONS JUSTIFYING ITEMS THAT ARE NOT APPLICABLE.

Project Name: _____ **Applicant:** _____

APPLICANT CHECKLIST

- ☐ Subdivision Review Application
- ☐ Ten (10) 24" x 36" signed and sealed final plat
- ☐ Two (2) 11" x 17" plats
- ☐ Digital submission on CD to include AutoCAD file in DXF format of the plans, metadata text file and elevation text file
- ☐ DHEC Permit to Operate for water and sewer **OR** DHEC approval for on-site septic tank and wells (if applicable)

DESIGNER CHECKLIST

- ☐ Title block with subdivision name and designer information
- ☐ Required map elements to include scale, north arrow, location map, and tax map sheet (TMS) number
- ☐ Property zoning and property boundary lines
- ☐ Project road names, adjacent roads with road name and right-of-way width
- ☐ Adjacent owners and parcel numbers (TMS numbers)
- ☐ Lot numbers
- ☐ Lot sizes
- ☐ Current flood statement identifying the Flood Insurance Rate Map (FIRM) panel, flood zones and boundaries

Applicant: _____ Date: _____

Development Review Committee Use Only Below

- ☐ Application is **COMPLETE** and is **ACCEPTED** for Plan Review.
- ☐ Application is **NOT** complete and is **DENIED** for Plan Review for the following reasons:
  1. _____
  2. _____
  3. _____

Designer Contacted By: _____ **Date:** _____

Staff: _____ **Date:** _____

DISCLAIMER: This is not to be construed as containing all items, documents, or written information to be addressed or required by the Richland County Land Development Code (Chapter 26 of the Richland County Code of Ordinances) and/or other Richland County ordinances and laws. Project submittals that are mailed to Richland County are subject to the same review process and requirements as projects that are hand-delivered. Richland County does not assume responsibility for projects that are considered incomplete and not picked up as required.

Planning & Development Services
2020 Hampton Street, 1st Floor • Columbia, SC 29204
Phone: 803-576-2180 • Fax: 803-576-2182

SUBDIVISION REVIEW APPLICATION

(Please type or write clearly – illegible applications will be returned)

Date Submitted:_____ RC Project #: _____

Property Owner Name: _____

Address: _____ Email: _____

Engineer Name:_____

Address: _____ Email: _____

Applicant Name: _____

Applicant Mailing Address: _____

City, State _____ Zip Code: _____

Email Address:_____Phone Number: Fax Number: _____

Tax Map Sheet (TMS) Number(s):_____Total Number of Lots: _____

Site Location:_____

Current Zoning: _____ Size in Acres:_____

Source of Water Service:_____Source of Sewer Service: _____

Variance #: _____ Special Exception #: _____ Map Amendment #: _____

☐ **Minor Subdivision Plan**
- ☐ Sketch Plan
- ☐ Preliminary Plan
- ☐ Final/Bonded Plat

☐ **Major Subdivision Plan**
- ☐ Sketch Plan
- ☐ Preliminary Plan
- ☐ Final/Bonded Plat

If the applicant is someone other than the property owner of record in the Assessor's Office, the applicant must include a copy of the "Owner Authorization Form" which authorizes the applicant to apply for review on his/her behalf.

Certification
I hereby certify that I have read this application and the information supplied herein is true and correct to the best of my knowledge. I agree to comply with all applicable County Ordinances and State Laws related to land development. I am the property owner, or have received the owner's written authorization to act as his agent regarding this matter. I understand that falsifying any information herein may result in nullification of this request and/or appropriate legal remedies.

Signature _____Date: _____

RESTRICTED COVENANTS AFFECTING PERMIT ACTIVITY

I, _____, am the Applicant for a _____ permit, and I hereby truthfully disclose that the tract or parcel of land subject to said permit:

_____ is restricted by a recorded covenant that is contrary to, conflicts with, or prohibits the activity for which this permit applies.

_____ is NOT restricted by a recorded covenant that is contrary to, conflicts with, or prohibits the activity for which this permit applies.

I further understand and agree that unless stated above, Richland County does not have actual notice of any recorded covenant that is contrary to, conflicts with, or prohibits the activity for which this permit applies. Applicant therefore agrees to indemnify and hold harmless Richland County from any Liabilities resulting from any Claims in the event that the permitted activity is found to be in violation of a recorded covenant.

As used herein:

(1) 'actual notice' is not constructive notice of documents filed in local offices concerning the property, and does not require Richland County to conduct searches in any records offices for filed restrictive covenants;

(2) 'permit' does not mean an authorization to build or place a structure on a tract or parcel of land; and

(3) 'restrictive covenant' does not mean a restriction concerning a type of structure that may be built or placed on a tract or parcel of land."

_____
SIGNATURE OF APPLICANT/AGENT

_____
PRINTED NAME OF APPLICANT/AGENT

_____
ADDRESS

_____
CITY/STATE/ZIP

_____
DATE

Appendix C: Linear Utility Permit Application

Richland County Department of Public Works

Engineering (Land Development) Division

Linear Utility Permit

What Is a Linear Utility Permit?

A Linear Utility Permit is required for all linear construction greater than 50 linear feet within or affecting the right-of-way of any County maintained road.

When Does It Apply?

Linear Utility permits are needed for projects occurring in the right-of-way of any County owned as well as private roads. Land disturbing activities in the right-of-way include, but are not limited to: installation of utilities, driveway connections involving a curb cut or pipe installation, curb cuts, utility taps, utility crossings and storm drainage installation.

What Is Required In a Linear Utility Submission?

Required Items

- ☐ Notice of Intent (*NOI*)
- ☐ Complete Set of Plans *(24" x 36".pdf & dwg)*
- ☐ Comprehensive SWPPP (*C-SWPPP*)
- ☐ Checklist for Design Professionals *(see link below)*
- ☐ Other permits if applicable (*e.g. USACE Wetlands, Encroachment, Flood, and etc.*)

Must Show on Plans:

- ☐ Limits of Disturbance
- ☐ All BMP Locations
- ☐ Signed & Sealed Certification Statements
- ☐ Construction Sequence
- ☐ Scale, North Arrow & Legend on each Plan
- ☐ All Details (*BMPs, Drainage, Signage, & etc.*: *See Section Below on Details*)
- ☐ SCDHEC Standard Notes *(see Link below)*
- ☐ Permanent & Temporary Stabilization
- ☐ Traffic Management Method *(If Applicable)*
- ☐ Profiles for Drainage (*If Applicable*)
- ☐ Profiles for Sewer (*If Applicable*)

A Comprehensive SWPPP Must Include:

- ☐ Certification Statement
- ☐ Construction Sequence
- ☐ Site & Environmental Features (*Wetlands Flood Plain, Ditch, Creek, etc.)*
- ☐ Narrative *(identify scope of work to be performed)*

C-SWPPP (*Continued*)

- ☐ Buffer Zone Management
- ☐ Potential Sources of Pollution
- ☐ Maps: Topo *(Contours)*, Floodway, Vicinity, & Soils
- ☐ Management of Non-Stormwater Discharges

*****Note: DHEC Coverage 'may' be required regardless of the amount of acres disturbed*****

Types of Plans that Must be Submitted:

- ☐ Cover Sheet
- ☐ Existing Condition Plan
- ☐ Grading Plan
- ☐ Water Quality Buffer Plan *(if Applicable)*
- ☐ Sediment/Erosion Control

Resources:

- NOI Application: 2012 NOI Form d-2617
- Land Development Ordinance (Stormwater Pollution Prevention Plans) http://rcgov.us/Portals/0/Departments/DevServices/ENGLandDevelopment/Docs/Stormwater%20Management%20and%20SWPPPs%2026_202.pdf
- SC NPDES General Permit for Stormwater Discharges from Construction Activities (Section 2.2.3 (A) Utility Providers & Utility Contractors - Annual Blanket NOI). Construction General Permit
- Checklist for Design Professionals and SCDHEC Standard Notes: http://rcgov.us/Portals/0/Departments/DevServices/ENGLandDevelopment/Docs/Stormwater%20Management%20and%20SWPPPs%2026_202.pdfhttp://www.scdhec.gov/Environment/docs/erfchecklist.pdf

Details/Specifications: (Below is a list of most commonly used details)

- Silt Fence http://www.scdhec.gov/Environment/docs/sedim-siltFence.pdf
- Construction Entrance http://www.scdhec.gov/Environment/docs/sedim-construction.pdf
- Seeding Schedule http://www.scdhec.gov/Environment/docs/eros-tSeeding.pdf
- Inlet Protection http://www.scdhec.gov/Environment/docs/sedim-inletprotect.pdf
- Check dams & Sediment tubes http://www.scdhec.gov/Environment/docs/Appendix_H.pdf
- Etc.

Special Conditions

- If project impacts private property, then written permission from the property owner is required.
- SCDOT encroachment permit is required for all encroachments in the SCDOT's right-of-way.
- A floodplain development permit will be required if any work is proposed in a Special Flood Hazard Area (SFHA). Contact Andrea Bolling, P.E. (803) 576-2150.

Review Process

Step 1: Go to eTrakit (Link) Apply for a Project and SELECT: **["Linear Utility"]**

- Linear Utility Permit Reviews are not part of the 18-review process. The review time is 5-7 days.

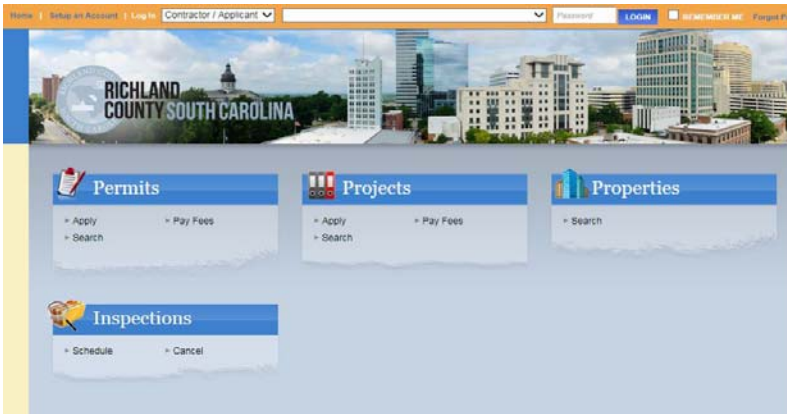
Step 2: Project Application is reviewed by the Department within (5) Business days and an email notification will be sent with status.

- If Approved, the email notification will state this and the applicant can log in to their account to retrieve the approval notice and stamped (digital) plans.

- If Disapproved, the email notification will state this and the applicant can log in to their account to retrieve reasons for disapproval.

Step 3: Retrieve status and follow instructions of the status email.

http://etrakit.rcgov.us/etrakit3/



www.richlandmaps.com

To SETUP a New Account: http://etrakit.rcgov.us/etrakit3/publicUserAccount.aspx?action=npa

Appendix D: Encroachment Permit Application

APPLICATION FOR ENCROACHMENT PERMIT

RICHLAND COUNTY, SOUTH CAROLINA

Name/Address of Applicant:

The undersigned applicant hereby applies to the Richland County Department of Public Works and Engineering for permit for encroachment on Right of Way of Road _____ as shown by sketch plan below.

Sketch Plan

This permit shall become null and void unless the work contemplated herein shall have been completed prior to _____ .

Restoration Approved	Date	Approved-County Engineer or Designee	Date

I (We) do hereby agree to comply with all the provisions, terms, conditions, and restrictions set out herein. I (We) do hereby further agree and bind my (our) heirs, successors and assigns, to assume any and all liability the County might otherwise have in connection with accidents or injuries to persons, or damage to property, including the highway, that may be caused by the construction, maintenance, use, moving or removing of the encroachment contemplated herein and agree to indemnify the County for any liability incurred or injury or damage sustained by reason of the past, present, or future existence of said encroachment.

_____

Signature of Applicant Date

GENERAL PROVISIONS

1. NOTICE PRIOR TO STARTING WORK: Before starting the work contemplated herein within the limits of the highway right of way, the County Engineer, County Administrator, and the Sheriff's Department shall be notified 48 hours in advance so that adequate public notice can take place.
2. PERMIT SUBJECT TO INSPECTION: This permit shall be kept at the site of the work at all times while said work is under way and must be shown to any representative of the County Engineer's office or law enforcement official on demand.
3. PROTECTION OF HIGHWAY TRAFFIC: Adequate provisions shall be made for the protection of the highway traffic at all times. Necessary detours, barricades, warning signs and watchmen shall be provided by and at the expense of the permittee. The work shall be planned and carried out so that there will be the lease possible inconvenience to the highway traffic. The applicant agrees to observe all rules and regulations of the County while carrying on the work contemplated herein and take all other precautions that circumstances warrant.
4. STANDARDS OF CONSTRUCTION: All work shall conform to recognized standards of construction and shall be performed in a workman like manner. Adequate provisions shall be made for maintaining the proper drainage of the highway. All work shall be subject to the supervision and satisfaction of the County Engineer.
5. FUTURE MOVING OF ENCROACHMENT: If, in the opinion of the County Engineer, it should ever become necessary to move or remove the encroachment, or any part thereof, contemplated herein, on account of changed in location of the highway widening of the highway, or for any other sufficient reason, such moving or removing shall be done on demand of the Richland County council at the expense of the applicant.
6. RESTORATION OF HIGHWAY FACILITIES UPON MOVING OR REMOVING OF ENCROACHMENT: If, and when, the encroachment contemplated herein shall be moved or removed, either on the demand of the County or at the option of the applicant, the highway and facilities shall immediately be restored to their original condition at the expense of the applicant.
7. COST: All work in connection with the construction, maintenance, moving or removing of the encroachment contemplated herein shall be done by and at the expense of the applicant.
8. PERMITTEE: The words "Permittee and Applicant" used herein shall mean the name of the person, firm, or corporation to whom this permit is addressed, his, her, its, heirs, successors and assigns.
9. PERMISSION OF ABUTTING PROPERTY OWNERS: It is distinctly understood that this permit does not in any wise grant or release any rights lawfully possessed by the abutting property owners. Any such rights necessary shall be secured from said abutting property owners by the applicant.
10. PIPES, CONDUITS, ETC:
    (a) Service and other small diameter pipes shall be jacked, driven, or otherwise forced underneath the pavement on any surfaced road without disturbing said pavement/ **No pavement shall be cut unless specifically authorized herein.**
    (b) Tunneling shall not be permitted except on major work and as may be specifically authorized herein
    (c) No excavation shall be made nearer than three (3) feet to the edge of the pavement on any hard surface road unless specifically authorized herein and all trenches or tunnel's within the limits of the highway right of way shall be backfilled, and thoroughly tamped in layers not greater than 6 inched in thickness, or backfilled and puddled, and maintained until final settlement has taken place.
    (d) The section of pipe, of service and other small pipes, under the highway pavement and within a distance of two feet on either side shall be continuous and without joint.
    (e) Unless specifically authorized herein, all pipes and conduits under the highway shall be placed at approximately right angles to the centerline of the highway **and at lease two feet below the surface of the highway.**
    (f) Pipes and utilities paralleling the highway shall be located at a distance beyond the edge of the highway surfacing and at a depth as specifically stipulated herein.
11. DRIVEWAYS AND APPROACHES:
    (a) The existing crown of the highway shall be continued to the outside shoulder line of the highway.
    (b) If the driveway or approach is of concrete pavement, the pavement shall be constructed at lease 6 inches thick, and of a mix not leaner than 1-2-4. There shall be a bituminous expansion joint not less than ¾ inch in thickness, placed between the highway paving and the paving of the approach for the full depth of the former and the full width of the later.

Appendix E: Individual Lot Notice of Intent

INDIVIDUAL LOT NOTICE OF INTENT (IL-NOI)
For Coverage(s) of Secondary Permittees (Within Residential Subdivisions) Under South Carolina NPDES General Permit For Stormwater Discharges From Construction Activities SCR100000

(Maintain As Part of On-Site SWPPP)

For Official Use Only

File Number: _____

Permit Number: SCR10_____

Submittal package complete: _____

Submission of this Individual Lot Notice of Intent (IL-NOI) constitutes notice that the Applicant identified in Section B intends to be authorized as a Secondary Permittee in the state of South Carolina under NPDES General Permit SCR1000000. ***A fee of $125 is required for NPDES coverage under this permit.***

Date: _____

☐ New Secondary Permittee ☐ Change of Information ☐ Other: _____

☐ Person ☐ Company

If a Company, are you a ☐ Lending Institution or ☐ Government Entity?
Company EIN **(If applicable):** EIN: _____

A. Secondary Permittee (Applicant) Information

1. Name: _____ Title/Position: _____
   Company Name (As Applicable): _____
   Mailing Address: _____ City: _____ State: ____ Zip: _____
   Phone: _____ Fax: _____ Email Address: _____
2. Contact (ODSA) Name (If different from above): _____ Title/Position: _____
   Mailing Address: _____ City: _____ State: ____ Zip: _____
   Phone: _____ Fax: _____ Email Address: _____

B. Current (Approved) Project/Site Information

1. Project/Site Name (As Approved by the Department): _____ County: _____
2. Current Primary Pemittee (Owner/Operator) Name: _____
   Mailing Address: _____ City: _____ State: ____ Zip: _____
   Phone: _____ Fax: _____ Email Address: _____
3. Property Owner Name (If different from Owner/Operator): _____
   Mailing Address: _____ City: _____ State: ____ Zip: _____
   Phone: _____ Fax: _____ Email Address: _____
4. Larger Common Plan for Development or Sale (LCP) Name or Subdivision Name: (As previously approved by the Department):
   _____
5. LCP NPDES Coverage No. or State Permit (Tracking) No(s): _____
6. If Applicable: MS4 Reviewer: _____ MS4 Operator: _____

C. Individual Lot Information

1. Type of Construction Activity: ☐ Single Lot ☐ Multiple Lots
2. Individual Lot(s) Information (See Note below. If additional space is required, submit as an attachment to this NOI):

a. Lot No(s)	b. Phase No(s) (As Applicable)	c. Disturbed Area (Nearest tenth of an acre)	d. Lot(s) Currently Stabilized?	e. Lot(s) Currently Abandoned, Under Foreclosure or Bankruptcy Proceedings?	f. Will the SWPPP, Individual Lot Controls, or Drainage Provisions be Modified by this project? (If yes, See Note Below)
			☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
			☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No

NOTE: **Attach a Narrative, Copy of the Plat, Site Plans or Maps** outlining each lot identified on this NOI. **Attach Project Plans** demonstrating individual lot grading, sediment and erosion control, and best management practices that will be followed. Clearly define all proposed modifications to the SWPPP in the narrative and identify on the project plans. If centralized controls or BMPs will be impacted, identify the controls or BMPs and proposed plans for continued maintenance in the narrative and on the project plans. Attach a Maintenance Agreement for permanent centralized controls, as applicable. (See Section 2.2.2.B of the CGP)

3.Proposed Start /Completion Dates: Start (MM/DD/YYYY): _____ Completion (MM/DD/YYYY): _____

4. Coastal Zone ONLY: If impacts have not been previously addressed by the Primary Permittee to jurisdictional wetlands, non-jurisdictional wetlands, direct Critical Area, or coastal resources, define proposed impacts below. (Attach additional sheet if necessary):

_____

D. Certifications DO NOT SIGN IN BLACK INK! Read the Certification statements below (in entirety).

SECONDARY PERMITTEE (APPLICANT) CERTIFICATION

"I or I (on behalf of my company and its contractors and agents), as the case may be, certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I also hereby certify that all land-disturbing construction and associated activity pertaining to this site shall be accomplished pursuant to and in keeping with the terms and conditions of the approved plans and SCR100000. I understand that I am solely responsible for the individual lot(s) covered by this NOI and am responsible for installing and maintaining the appropriate sediment and erosion control measures for each lot until the site is stabilized. I further certify that I also understand that SCDHEC is authorized to inspect the lot(s) identified in the notice pursuant to regulations and standards identified in the NPDES General Permit for Stormwater Discharges from Construction Activities (CGP)."

Select only ONE of the following statements and initial as indication of agreement. Provide your title and date and sign the agreement below.

_____" As Secondary Permittee, I further certify that I or I (on behalf of my company and its contractors and agents), as the case may be, have read the CGP and approved On-Site Stormwater Pollution Prevention Plan (OS-SWPPP). I will adhere to the provisions of the Primary Permittee's OS-SWPPP while conducting any construction activity at the site and I agree **follow the *approved* individual lot controls and drainage provisions** developed in the approved OS-SWPPP for the LCP. "

Or

_____"As Secondary Permittee, I further certify that I or I (on behalf of my company and its contractors and agents), as the case may be, have read the CGP and approved On-Site Stormwater Pollution Prevention Plan (OS-SWPPP). I will **follow the *modified OS-SWPPP, including* individual lot controls and/or drainage provisions** developed for the above-referenced lot(s) to be consistent with the provisions of Section 3 of the CGP."

Name of Secondary Permittee (Printed or Typed)	**Title/Position**
Signature of Secondary Permittee	**Date Signed**

CURRENT PRMARY PERMITTEE (OWNER/OPERATOR) CERTIFICATION

Provide your name, title, and date and sign the agreement below.

If the signature of the current Owner/Operator cannot be obtained, please check this box: ☐ **Provide explanation in the project Narrative.**

"I hereby certify that the Secondary Permittee was provided a copy of the Construction General Permit (CGP) and approved On-Site Stormwater Pollution Prevention Plan (OS-SWPPP), or information to readily access these documents. I understand that the Secondary Permittee is solely responsible for the individual lot(s) covered by this NOI and is responsible for installing and maintaining the appropriate sediment and erosion control measures for each lot until the site is stabilized. I further certify that I also understand that SCDHEC is authorized to inspect the lot(s) identified in the notice pursuant to regulations and standards identified in the NPDES General Permit for Stormwater Discharges from Construction Activities) (CGP). "

Select only one of the following statements and initial as indication of agreement.

_____"I also herby certify (by my initials) that I understand that the Secondary Permittee has agreed to **follow the approved OS-SWPPP, including individual lot controls and/or drainage provisions** developed in the approved OS-SWPPP for the LCP."

OR

_____"I also herby certify (by my initials) that I understand that the Secondary Permittee has **chosen to follow the modified OS-SWPPP, including individual lot controls and/or drainage provisions** developed for the above-referenced lot(s) to be consistent with the provisions of Section 3 of the CGP."

Name of Primary Permittee (Printed or Typed)	**Title/Position**
Signature of Primary Permittee	**Date Signed**

E. Fees (Identify ONE method of payment below and please do not send fees directly to the Bureau of Finance.

☐ **Payment by Check:**

Attach a **signed and dated check payable to S.C. DHEC** to the **front** of this Fee Schedule.
Please note that all checks must be **less than 30 days old** and must be for the **entire required fees**.

☐ **Payment by Credit Card: (Check here if you wish to pay via credit card using the on-line payment system).**

The Department will contact you to provide an invoice number and instructions for online payment.
Please provide an e-mail address where the invoice number may be sent: _____

For official use only: Invoice Number QB _ _ _ _ _ _

Instructions for Completing the Individual Lot Notice or Intent (NOI)

If you are uncertain whether you need to obtain coverage under the NPDES General Permit for Stormwater Discharges From Construction Activities SCR100000 (CGP), if you cannot access the websites listed in these instructions, or if you have any other questions, contact the Stormwater Permitting Section (SWP) at (803) 898-4300 or Coastal Stormwater Permitting Section (CSWP) at (843) 953-0200. Projects located in the S.C. Coastal Zone (**SCCZ**—Beaufort, Berkeley, Charleston, Colleton, Dorchester, Georgetown, Horry, and Jasper counties) are reviewed by **CSWP**. Please see the Bureau of Water, Stormwater Permitting website: http://www.scdhec.gov/stormwater for guidance and additional information regarding the CGP.

This NOI form must be completed by an individual lot owner or residential builder assuming coverage (project ownership and responsibility) as a Secondary Permittee for an individual lot or a group of individual lots within a previously permitted residential subdivision. The completed form must be submitted to the Department at least seven (7) business days prior to commencement of construction activities by the new lot owner or residential builder. *For projects located in the Coastal Zone, see Section C below.* **A FEE OF $125 IS REQUIRED FOR NPDES COVERAGE.**

What is Expected of Individual Lot Owners or Residential Builders as Secondary Permittees?

As a Secondary Permittee, the new lot owner or residential builder assumes sole responsibility for the building phase of development for the lot(s) identified in Section C of this form, and sole responsibility for installation and maintenance of sediment control measures necessary to comply with the terms and conditions of the Construction General Permit (CGP) and the approved On-Site SWPPP (OS-SWPPP). Secondary Permittees may choose to either follow the Primary Permittee's approved OS-SWPPP or may select to develop a C-SWPPP for their discharges consistent with the provisions of Section 3 of this permit.

When the Secondary Permittee elects to not follow the Primary Permittee's approved SWPPP or proposes to make extensive revisions to the approved individual lot controls and/or drainage provisions, the Primary Permittee, the Department, the Regulated MS4, or entity implementing SC Regulation 72-300 may also require the applicant obtain coverage under this permit as a Primary Permittee. Each individual lot(s) owner or residential builder obtaining coverage under this permit as a Secondary Permittee will be issued a new NPDES permit coverage number and assigned a state file number linked to the residential subdivision as part of a Larger Common Plan (LCP).

What is Expected of the Primary Permittee?

The Primary Permittee is transferring ownership of a lot or group of lots within a residential subdivision to the person or company or residential builder that will be issued NPDES coverage as the new Owner/Operator**.** The Primary Permittee must make the Individual Lot Notice of Intent form, the approved On-Site SWPPP, and a copy of the CGP available or accessible to the applicant seeking individual lot(s) coverage under this permit. *One application form may be submitted to the Department for coverage of multiple lots within a single residential subdivision.*

Where To File the NOI:

SC Department of Health & Environmental Control
Bureau of Water

Non-Coastal Counties
Stormwater Permitting Section
2600 Bull Street
Columbia, SC 29201-1708

Coastal Counties
Coastal Stormwater Section
1362 McMillan Avenue
Suite 400
Charleston, SC 29405

Completing the Form

Complete both sides of the form. Abbreviate if necessary to stay within the space allowed for each item. Submit a completed form to the SCDHEC-Bureau of Water or the appropriate Municipal Separate Storm Sewer System as necessary.

Section A - Secondary Permittee (Applicant) Information

Identify whether your application is for a new application or a change to previous information. List the complete legal name of the new lot owner and the title/position. If a company, provide the company name and the Employer Identification Number (EIN) as established by the U.S. Internal Revenue Service. Provide complete mailing addresses, telephone numbers, fax and e-mail addresses.

Section B – Current (Approved) Project/Site Information

Provide the project/site name, Primary Permittee name, and property owner name. Provide the contact information for each. Identify the name and NPDES or File (tracking) number of the approved LCP. This information should be the same as in the approved C-SWPPP. If this project is in a MS4 area, identify the entity designated as the MS4 Reviewer and Operator (i.e., Lexington County, Lexington County Department of Public Works, City of Greer, etc.)

Section C - Individual Lot Information

Complete this section in its entirety. Identify whether this notice is for a single lot or multiple lots. Identify the specific project phase, as applicable; the total disturbed area for each lot; and whether the lot is stabilized. If abandoned or under pending foreclosure or bankruptcy proceedings, indicate so, as applicable. If your project will modify the approved On-Site SWPPP, individual lot controls, or drainage provisions, see the NOTE below this table and provide all requested documentation. Identify proposed start and completion dates. *For lots located in the Coastal Zone, identify proposed impacts to jurisdictional wetlands, non-jurisdictional wetlands, direct Critical Area, and coastal resources.* ***If not previously addressed in the approved OS-SWPPP by the Primary Permittee, consult DHEC's Office of Ocean and Coastal Resource Management regarding any potential coastal zone consistency submittal requirements. Additional time may be necessary for this review. See http://www.scdhec.gov/environment/ocrm/czc.htm*** **for additional information.**

Section D – Certifications

Read the certification statements (in entirety). Provide your printed name, title/position, date, and signature. Initial the applicable OS-SWPPP certification agreement. *Only one certification agreement may be initialed.* **DO NOT SIGN IN BLACK INK**.

Section E – Fees

Submit application fee of $125 by check payable to S.C. DHEC and attach to the front of the IL-NOI or indicate in Section E if you wish to pay via credit card using DHEC's online payment system.

Appendix F: Residential Plan Requirements

Richland County Department of Public Works

Engineering (Land Development) Division

Richland Development Services
Progressive • Timely • Professional

Residential Plan Requirements

What Is Considered a Residential Project?

A project is considered a Residential project when it is a single-family development whose improvements include but are not limited to roads, storm drainage, water and sanitary sewer.

When Does It Apply?

All Residential projects are required to be submitted and reviewed by Development Services. There are some exceptions and a determination is made on a case-by-case basis.

What Is The Basic Requirements for a Residential Project?

Basic Required Items

- ☐ Notice of Intent (NOI)
- ☐ Comprehensive SWPPP (C-SWPPP)
- ☐ Permanent Stormwater Maintenance Agreement
- ☐ Full set of Construction Site Plans (to scale)(*.pdf*)
- ☐ 2012 Checklist for Design Professionals
- ☐ Other permits if applicable (*e.g. USACE permit encroachment permits, and etc.)*

A Comprehensive SWPPP Must Include:

- ☐ Certification Statement
- ☐ Narrative
- ☐ Construction Sequence
- ☐ Site & Environmental Features (*Wetlands Flood Plain, Ditch, Creek, etc.)*
- ☐ BMP Narrative (*During & Post Construction for Water Quality & Quantity*)
- ☐ Management of Non-Stormwater Discharges
- ☐ Engineering Reports (*Calculations to Include:*)
  - Curve Number
  - Pre & Post Drainage Maps
  - Pre & Post Discharge Analysis
  - Permanent Water Quality Analysis
  - Dewatering Calculations
  - Sedimentology & Trapping Efficiencies
  - Detention Analysis (Includes:)
    - Summary Table
    - Peak Inflows vs Outflows
    - Pre vs. Post Discharge Velocities
      Max Water Surface Elevations for the2, 10, 25, and 100 Year Storms
    - Stage Storage Discharge Table
    - Dewatering Time

C-SWPPP (*Continued*)

- ☐ Information on How Temporary & Permanent Water Quality will be Addressed
- ☐ Geotechnical Report (*If Applicable*)
- ☐ Permanent Stormwater Management Maintenance Plan (*Include Temporary Plan*)
- ☐ Permanent Stormwater Maintenance Agreement.
- ☐ Buffer Zone Management
- ☐ Potential Sources of Pollution
- ☐ Maps: Topo *(Contours)*, Floodway, Vicinity, & Soils
- ☐ Total Maximum Daily Loads (*TMDL & 303d List*: *Identify impaired areas in the receiving waters and show how the construction activities will not contribute or cause further impairments and, if there is a TMDL, describe the controls in place to meet the TMDL requirements*

Construction Plans Should Include:

- ☐ Limits of Disturbance
- ☐ All BMP Locations
- ☐ Signed & Sealed Certification Statements
- ☐ Construction Sequence (*Subject to Phased Requirements)*
- ☐ 2012 SCDHEC Standard Notes
- ☐ Permanent & Temporary Stabilization
- ☐ Separate Plan Sheets for Phased Construction (*See Section Below on Phased Construction*)
- ☐ Scale, North Arrow, & Legend on each Plan

Types of Plans that Must be Submitted:

- ☐ Cover Sheet
- ☐ Existing Condition Plan
- ☐ Site Layout Plan
- ☐ Grading Plan

Types of Plans (*Continued*):

- ☐ Drainage and Water Quality Plan
- ☐ Water Quality Buffer Plan *(if Applicable)*
- ☐ Landscape Plan
- ☐ Utility Plan
- ☐ Traffic & Roads Plan *(If Applicable)*
- ☐ Profiles Sediment Basin & Water Quality Pond
- ☐ Profiles for Roads
- ☐ Profiles for Drainage
- ☐ Profiles for Sewer (*If Applicable*)
- ☐ All Details (*BMPs, Drainage, Signage, & etc.*: *See Section Below on Details*)
- ☐ Sediment & Erosion Control Plan (*Subject to Phased Requirements: See Section Below*)

Phased Construction Plans Requirements

- **5-10 acres (Minimum 2 Phases):**
  - Initial Land Disturbance Phase (Necessary controls to be installed prior to ***initial/mass*** grading):
    Some Examples to Include in the Initial Phase are:
    Construction Entrance
    Perimeter BMPs
    Sediment & Erosion Control BMPs (Ponds & Basins, Traps, Stormwater Conveyance Measures)

    Stabilization Phase (Necessary controls to be installed, maintained or retrofitted until final

    Stabilization is achieved.)

- **10 acres or more (Minimum 3 Phases):**
  - Initial Land Disturbance Phase (Necessary controls to be installed prior to ***initial/mass*** grading):
  - Some Examples to Include in the Initial Phase are:
    Construction Entrance
    Perimeter BMPs
    Sediment & Erosion Control BMPs (Ponds & Basins, Traps, Stormwater Conveyance Measures).
    If Applicable: show locations of swales and/or diversions to be installed to indicate how runoff is routed on site during construction to the BMPs.
    Construction Phase
  - Additional BMPs: To control, maintain, and contain sediment within the site. For example, stormwater conveyance measures that may be needed to route stormwater as the infrastructure is installed.

    Stabilization Phase (Necessary controls to be installed, maintained or retrofitted until final

    Stabilization is achieved.)

Note: Construction Sequence must correspond with their respective Phased Plan Sheet.

Resources:

- NOI Application: 2012 NOI Form d-2617
- SWPPP Template: http://www.scdhec.gov/Environment/docs/SWPPP-CGP-template.doc
- Stormwater Management & Sediment & Erosion Control Plan Review Checklist for Design Professionals: DHEC SWPPP Checklist
- SCDHEC BMP Handbook: DHEC BMP Manual
- Permanent Stormwater Maintenance Agreement: DHEC Permanent Stormwater Maintenance Agreement
- SC NPDES General Permit for Stormwater Discharges from Construction Activities: Construction General Permit
- Construction Sequence Guidance: DHEC Sample Construction Sequence
- Larger Common Plan (LCP): DHEC Larger Common Plan (LCP) Guidance
- 303(d) List: http://www.scdhec.gov/Environment/docs/tmdl_10-303d.pdf
- Approved TMDL List: DHEC Approved TMDL List
- Richland County Land Development Ordinance (Stormwater Pollution Prevention Plans): http://rcgov.us/Portals/0/Departments/DevServices/ENGLandDevelopment/Docs/Stormwater%20Management%20and%20SWPPPs%2026_202.pdf

Details/Specifications: (Below is a list of commonly used details)

- Silt Fence http://www.scdhec.gov/Environment/docs/sedim-siltFence.pdf
- Construction Entrance http://www.scdhec.gov/Environment/docs/sedim-construction.pdf
- Sediment Basins & Detention Ponds http://www.scdhec.gov/Environment/docs/tmdl_10sites.pdf
- Cleanout Stake and Elevation http://www.scdhec.gov/Environment/docs/Appendix_H.pdf
- Baffles http://www.scdhec.gov/Environment/docs/Appendix_H.pdf
- Skimmer & Dewatering http://www.scdhec.gov/Environment/docs/Appendix_H.pdf
- Forebay and Spillway http://www.scdhec.gov/Environment/docs/Appendix_H.pdf
- Outlet Protection http://www.scdhec.gov/Environment/docs/eros-outlet.pdf
- Rock Check Dams http://www.scdhec.gov/Environment/docs/sedim-Dams.pdf
- Sediment Traps http://www.scdhec.gov/Environment/docs/sedim-Trap.pdf
- Sediment Tubes http://www.scdhec.gov/Environment/docs/sedim-Tubes.pdf
- Level Spreaders http://www.scdhec.gov/Environment/docs/runoff-Spreader.pdf
- Swales and Berms http://www.scdhec.gov/Environment/docs/Runoff-dMeasures.pdf
  Erosion Control Mats http://www.scdhec.gov/Environment/docs/eros-mats.pdf
- Catch Basins SCDOT Catch Basin Details
- Seeding Schedule http://www.scdhec.gov/Environment/docs/eros-tSeeding.pdf
- Inlet Protection http://www.scdhec.gov/Environment/docs/sedim-inletprotect.pdf
- Bioretention http://www.scdhec.gov/Environment/docs/wqc-bioretention.pdf
- Infiltration http://www.scdhec.gov/Environment/docs/Appendix_J.pdf
- Low Impact Development BMPs http://www.lid-stormwater.net/lid_techniques.htm
- Roads Richland County Road Design Standards
- Signage, Striping, and Sidewalks (ADA Compliant)

Note: DHEC Coverage may be required regardless of the amount of acres disturbed

Special Conditions

- **Detention Waivers**: A detention waiver must be submitted as separate document. Click on link for Detention Waiver Requirements: Detention Waiver Requirements
- **Low Impact Development (LID) and Alternative Designs:**
  - For all infiltration practices, submit a copy of the geotechnical report indicating the soils have sufficient permeability to allow water to infiltrate.
  - Submit all plan and details for all proposed alternative and/or LID BMPs.
  - Submit all calculations where applicable related to sedimentology, peak flow rate, pre & post discharge, trapping efficiency, and dewatering.
  - Submit information on BMP installation requirements and specifications.
  - Submit Permanent Stormwater Maintenance Agreement and Permanent & Temporary Maintenance Plan(s).
  - Note that LID and infiltration practices, in general for post construction stormwater
  - management, should be constructed only after the drainage area to these practices has been stabilized.
  - Note that other BMPs not listed in SC DHEC Stormwater Management Handbook or Richland County Stormwater Manual must be designed, installed, and maintained to achieve maximum pollutant removal to the extent that the permittee's discharges will not cause or contribute to violations of water quality standards, as outlined by the design criteria identified in *State Regulation 72-307 – Specific Design Criteria, Minimum Standards and Specifications, unless specifically exempted by SC Regulation 72-302.A.*
- **Regional Detention/Retention:**
  - If using off-site or regional detention, submit calculations that include of the entire proposed development and any areas that could potentially be developed in the future. If the calculations have already been completed in an earlier phase, be sure to submit them with the latest proposed project and ensure that the submitted calculations consider both the past development, proposed, and any potential future development that may utilize the detention pond or basin.
  - Submit Permanent Stormwater Maintenance Agreement and Permanent & Temporary Maintenance Plan(s).

- **Roads:**
  - Include profiles and details that include specifications on all surface courses and composition.
  - Provide information used to determine strength of pavement component layers, paving course stages and stage construction.
  - Place calculated structural number on plans.
  - Note location of stop signs, road name signs and all pavement markings on plans. Also provide details for all signage and pavement markings and include a note that states: *all pavement markings within the right-of-way are to be thermoplastic.*
  - If sidewalks are proposed, please provide sidewalk detail to reflect the sidewalk cross slope as no steeper than 1:48. ***2010 ADA Standards for Accessible Design section 403.3.***
  - If applicable, provide a copy of the SCDOT encroachment permit application.

- **Required Geotechnical Information & Inspections**:

  - **Compaction Testing Required When:**
    - Detention pond built with fill
    - Detention pond dikes and trenches
    - Storm drain boxes placed in fill areas
    - Trenching and Backfilling for Storm Drainage Lines
    - Roadway Embankments
    - Underdrains
    - Sub-Grade surface
    - Base Course
  - **Other Required Geotechnical Testing**:
    - Infiltration Rates (*Required for all Infiltration BMPS*)
  - **Proof Rolls Required**:
    - Sub-Base
    - Base Course
    - Curb & Gutter
    - Road Easement

  Note: Submit detailed a Geotechnical Report
  Asphalt Core Testing for all phases of paving: Binder, Intermediate, and Surface Course

As-Builts:

- Closeout Requirements:
  - Submit Record Drawing (*Include: As-Builts, Storm Drainage & Inverts, Roads, Drainage Profiles, Signage & Pavement Markings, Any Permanent Stormwater BMPs, Buffers, & Easement Widths*)
  - Submit Record Drawing Plan in pdf & (Digital) dwg Formats
  - Notice of Termination (NOT)
  - Approved SCDOT Permit (*If Applicable*)
  - Approval for Water Services & DHEC Approval if Well *(If Applicable)*
  - Approval for Sewer Services & DHEC Approval if Septic *(If Applicable)*
- Sidewalks: Show Linear Footage (*Plan View*)
- Sidewalk Crosswalk Slope (*ADA Compliance*)
- Storm Drainage Profiles (*Design vs. As-Built*)
- Storm Drainage (*Plan View*) Locations & Easements (*Widths*)
- Pavement Markings And Signage.

- As-Built Surveys:
  - All existing grades, contours, and depths of structures
  - All elevations and dimensions of all outlet structures, including:
    - Pipe & orifice inverts and diameters
    - Weir elevations and dimensions
    - Riser dimensions and elevations
    - Emergency spillway dimensions and elevations
    - Locations and inverts for all pipes discharging into pond(s)
  - Spot Elevations along the top of structural BMP's embankment
  - Contours, dimension, and locations of all structural components (e.g. forebays, level spreaders, rip-rap
  - aprons, inlet structures) of all structural BMPs.
  - Notice of Termination (NOT)
- Bond Information

Review Process

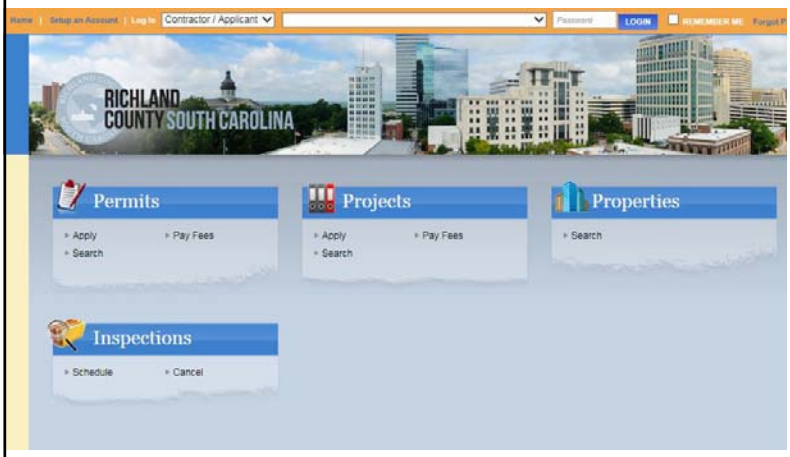
Step 1: Upload project into Trakit9 (Link) SELECT: [Apply for "Project"]

- Commercial Project Reviews are part of the 17-review process.

Step 2: Project is reviewed by the Department (17) Business days within and an email notification will be sent with status.

- If **Approved**:
  - Applicant will receive overall planning approval letter and a copy of the email sent to DHEC approving the land disturbance portion of the project.
  - Once DHEC has been notified that the County has approved the project (DHEC email), the fees can be paid directly to DHEC.
  - Once the project has been approved by Planning and the NPDES coverage letter has been issued by DHEC, the applicant may apply for the Land Disturbance Permit in **eTrakit,** if they are ready to schedule a Pre-Construction Meeting. When applying for the Land Disturbance Permit in **eTrakit**, choose "Apply" under "Permit" and select Land Disturbance Permit. Be sure to upload the SCDHEC Coverage Letter and (if applicable) the approved SCDOT Encroachment Permit. Upon completion, this will prompt a request to the County for a Pre-Construction Meeting, and you will be contacted within 24 (business) hours.
- If **Disapproved**:
  - The applicant will receive a comment letter that needs to be sufficiently addressed before resubmittal. When resubmitting a revised project, include a written summary of how the changes were addressed.

http://etrakit.rcgov.us/etrakit3/



www.richlandmaps.com

To SETUP a New Account: http://etrakit.rcgov.us/etrakit3/publicUserAccount.aspx?action=npa

Appendix G: Plan Review Revision Form

Richland County Community Planning & Development Department

Plan Review Revision Form
2020 Hampton Street, Columbia, South Carolina 29202
(803) 576-2190 / www.rcgov.us

Date:

Representative:

(•) Engineer ( ) Surveyor ( ) Contractor ( ) Owner

Company:

Email: Phone:

This form is required when submitting 'any' revisions to Richland County via our Land Development Tracking Software. This form must be complete and uploaded to the system along with all supporting information to support approval of the revised plans. All revisions must be uploaded to the existing project number.

Project Name:

Project Type: Select Type

Project Number:

Tax Map Number:

Reason for Change:

Narrative of the Change (Details):

CLEAR FORM

Appendix H: Stormwater Management Design Guidance Document

STORMWATER MANAGEMENT DESIGN GUIDANCE DOCUMENT

OCTOBER 2020

RICHLAND COUNTY
DEPARTMENT OF COMMUNITY DEVELOPMENT AND PLANNING
2020 HAMPTON STREET
COLUMBIA, SC 29204

Revision History

Version	Date	Amendment	Author
1.0	5/15/2018	Initial Issue	Woolpert
2.0	6/29/2018	Revisions per County comments	Woolpert
3.0	10/01/2020	Formatting, updates to departmental references	Woolpert

Table of Contents

Table of Figures

Section 1: Introduction

Purpose

This guidance document was created to add clarity and provide examples for the design community and plan reviewers on several important concepts within the *Richland County Storm Drainage Design Standards*. It is intended to be used in conjunction with the Design Standards. It is not intended to be used in place of the Design Standards or as a comprehensive explanation of all design requirements. The following concepts are contained in this guidance document:

- Post-construction water quality design standards (Section 2)
- Downstream analysis requirements (Section 3)
- TMDL or impaired receiving waters (Section 4)
- The IDEAL model (Section 5)

Applicability

Stormwater management design requirements, including but not limited to the contents of this guidance document, are applicable to all new development or significant redevelopment projects that result in land disturbance of equal to or greater than one (1) acre, including projects that result in disturbance of less than one acre of total land area that are part of a Larger Common Plan (LCP) of development or sale, that discharge into the Richland County Municipal Separate Storm Sewer System (MS4).

Plan Submittal and Review

Richland County has been delegated responsibility for plan review, inspection and enforcement by the South Carolina Department of Health and Environmental Control (SCDHEC) under the provisions of the "South Carolina Stormwater Management and Sediment Reduction Act of 1991" and the "South Carolina Pollution Control Act of 1976" as of September 16, 1996.

The Department of Community Development and Planning is responsible for plan review and approval of all commercial and residential design plans. This Department works in conjunction with the County Engineer and is located at 2020 Hampton Street, 1st floor.

Step by step instructions on plan submittal requirements and the overall plan review process can be found on the Richland County website at http://rcgov.us/DevServ/Step-by-Step-Process.

A flowchart of the plan submittal and review process is shown in Figure 1.

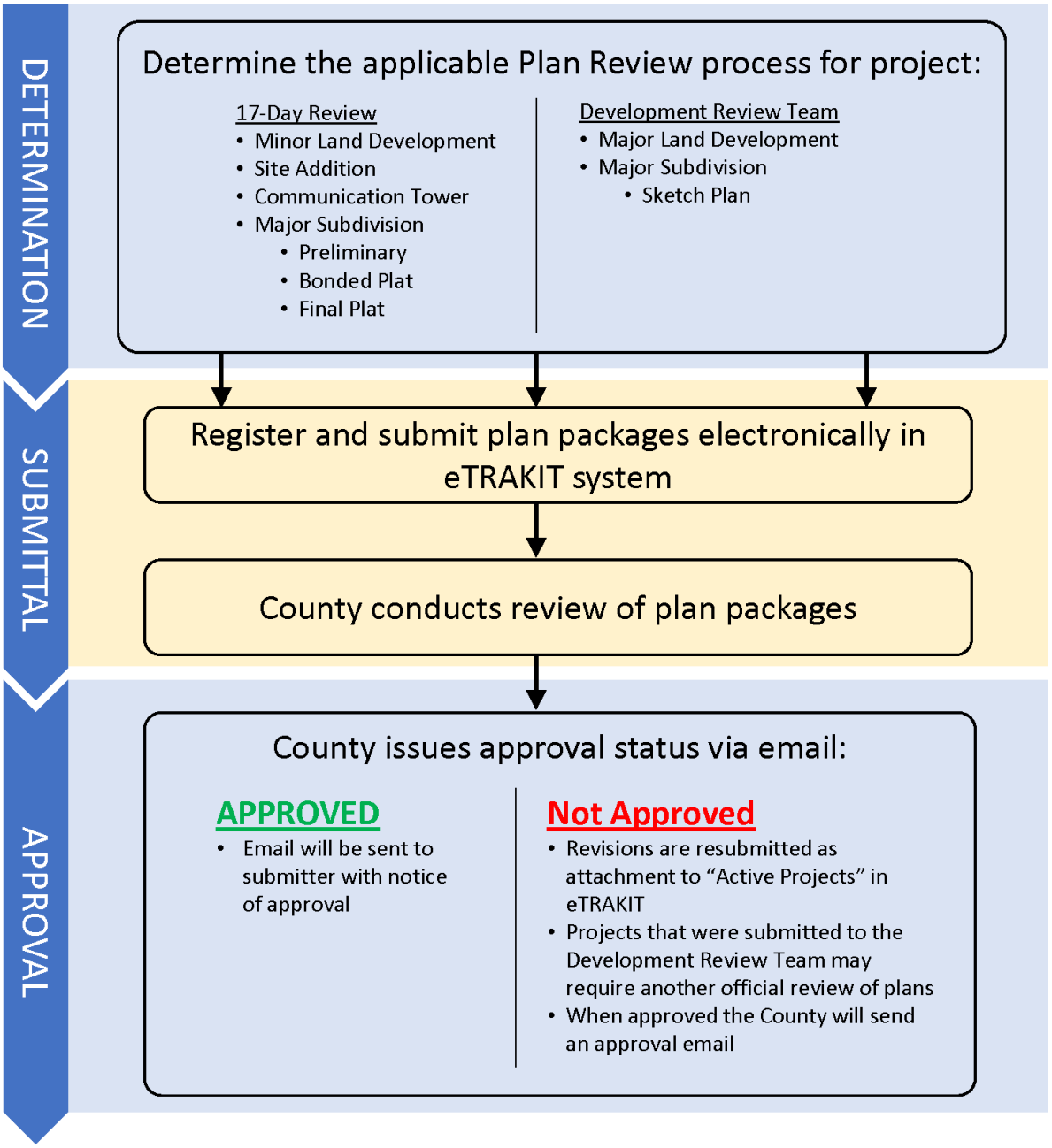


Figure 1. Flowchart of plan submittal and review process

Section 2: Post-Construction Water Quality Control

Design Standard Identification

Best Management Practices (BMPs) are required to control and minimize water quality degradation resulting from post-construction land uses. These BMPs should be designed according to one of the two Richland County Water Quality (WQ) Design Standards, which are:

Water Quality Design Standard	Non-sensitive Watersheds	Sensitive Watersheds[1]
WQ Design Standard #1: Water Quality Storm Event Design Standard	Manage the runoff from the Water Quality Storm Event	
WQ Design Standard #2: TSS Removal Design Standard[2]	Obtain 85% removal efficiency of the annual TSS loading	Demonstrate that the annual post-development pollutant loading does not exceed the annual pre-development pollutant loading for the pollutant(s) of concern.

1. Sensitive watersheds include TMDL, 303(d), or other sensitive watersheds as determined by the County.
2. A Hardship Exemption may be approved in exceptional circumstances such that the TSS Removal Design Standard results in unnecessary hardship and does not fulfill the intent of the requirement. See Hardship Exemption Criteria section below.

Refer to the SCDHEC Water Quality Tool (https://gis.dhec.sc.gov/water/stormwater.html) for identification of sensitive watersheds. Sensitive watersheds require additional buffer width as described in Chapter 4 of the *Richland County Land Development Manual*.

Site specific factors (location within the County, soil type, groundwater table depth, available space, and other constraints) may dictate the feasibility of meeting each specific Design Standard. It is the responsibility of the designer to select and demonstrate compliance with Richland County Design Standard requirements, as laid out in the *Richland County Land Development Manual* and further explained in this guidance document.

IDEAL Model - In an effort to aid the design community as well as assist the County in meeting MS4 permit goals, the County has developed and made available the IDEAL Model (software application). Selection of a particular BMP to achieve the required pollutant removal efficiency should be determined through the use of the IDEAL model, or through review of monitoring studies of similar BMPs, applicable computation methods and other methodologies as deemed acceptable by the County Engineer. See Section 5 for further guidance on the IDEAL model.

A flowchart of the design standard identification process is shown in Figure 2.

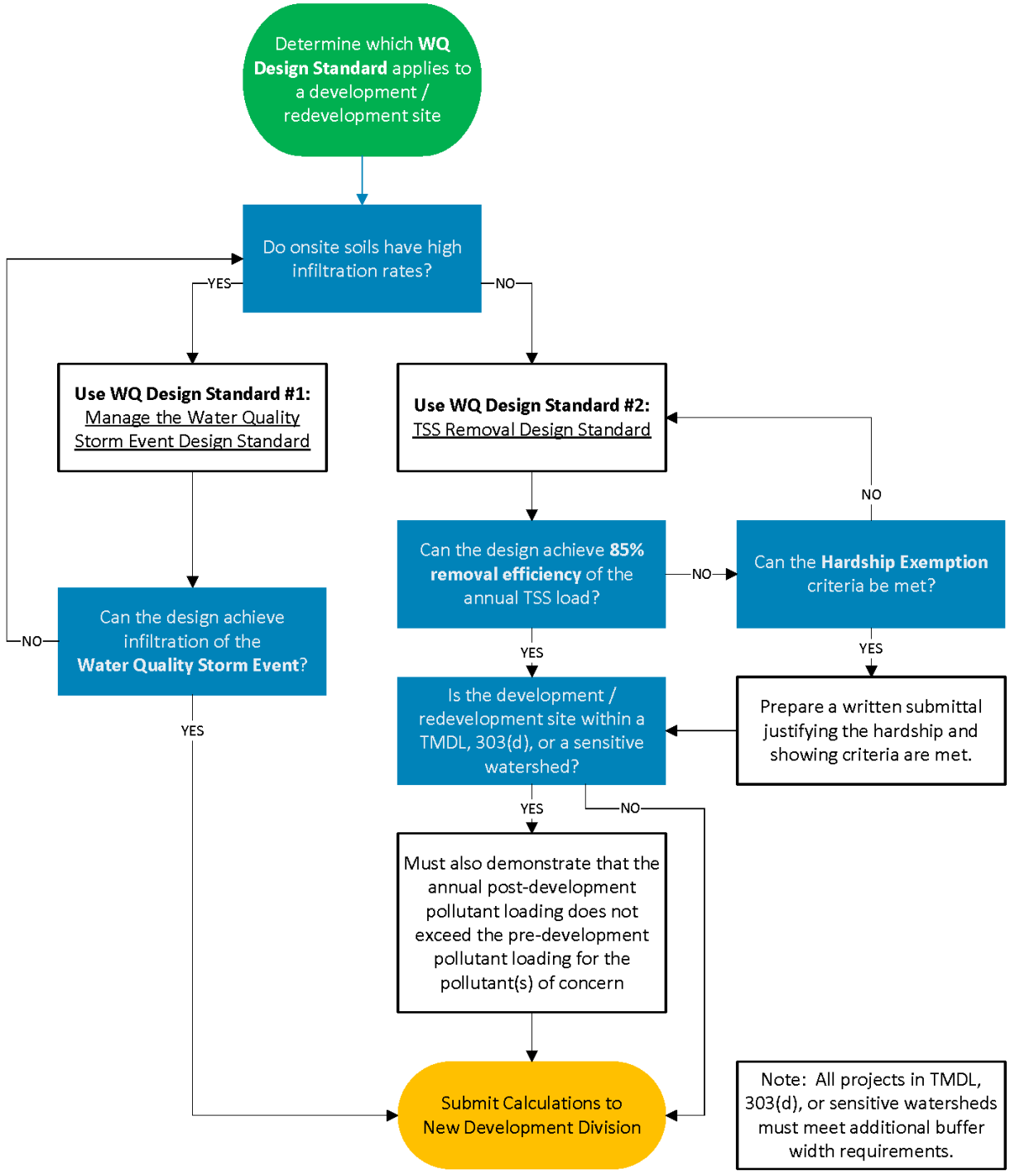


Figure 2. Flowchart of post-construction design standards process

WQ Design Standard #1: Manage the Water Quality Storm Event Design Standard

This Richland County performance standard defines BMP effectiveness in terms of managing (infiltrating) the runoff from the majority of storm events, characterized by the Water Quality (WQ) Storm Event.

The WQ Storm Event is defined as:

A. The 90th percentile storm, or the storm with a 24-hour rainfall amount that is greater than or equal to 90% of storms based on historical data
B. The 1.4-inch, 24-hour duration, NRCS Type II storm event

BMPs should be designed (using the IDEAL model) and constructed to manage (infiltrate) the runoff generated by the WQ Storm Event from the developed or redeveloped portion of the site. This infiltration should occur within 72 hours of the end of the storm event.

This is typically the most feasible Design Standard in areas with sandy soils with high infiltration rates and should be the primary methodology utilized by sites in those areas.

For site constraints, soil conditions, or groundwater table conditions which do **not** permit the infiltration of the WQ Storm Event within a 72-hour period after the storm event, the County may approve BMPs meeting the TSS Removal Standard, described in the following section.

WQ Design Standard #2: TSS Removal Design Standard

This Richland County performance standard defines BMP effectiveness in terms of removal of total suspended solids (TSS) from polluted stormwater. Water quality impairment results, in part, because a number of pollutants are preferentially adsorbed onto mineral or organic particles found in fine sediment. The interconnected process of erosion (detachment of the soil particles), sediment transport, and delivery is therefore an important conduit for introducing other key pollutants, such as nutrients (particularly phosphorus), metals, and organic compounds into surface waters. Pollutants also exist in particulate forms which may be transported through the same processes as sediment and trapped along with sediment. Thus, TSS is a good indicator for many stormwater pollutants in evaluating a BMP's effectiveness in pollutant removal.

Richland County has adopted a BMP performance standard that requires all permanent BMPs be designed (using the IDEAL model) and constructed to accommodate the expected sediment loading from post-construction land use with a **removal efficiency of 85%** of total suspended solids (TSS) based on an annual removal basis.

Sensitive Watersheds - For sites utilizing the TSS Removal Design Standard which are in TMDL, 303(d), or other sensitive watersheds, designers should also show that the **annual post-development pollutant loading does not exceed the annual pre-development pollutant loading** for the pollutant(s) of concern. See Section 4 for further discussion of sensitive watersheds and pollutants of concern.

This Design Standard is typically the most feasible Design Standard in areas with silt/clay soils where infiltration is infeasible or problematic and should be the primary methodology utilized by sites in those areas.

Sites that cannot achieve 85% removal efficiency of annual TSS loadings due to very low initial TSS loads or other site constraints may be applicable to meet the Hardship Exemption criteria.

Hardship Exemption Criteria

The Department of Community Development and Planning may approve a Hardship Exemption if there are exceptional circumstances applicable to the site such that strict adherence to the provisions of the TSS Removal Design Standard requirement results in unnecessary hardship and does not fulfill the intent of the requirement. A written request should be provided to the Department of Community Development and Planning that states the reason with supporting data. The Department of Community Development and Planning may not grant an approval unless and until sufficient specific reasoning to justify the exception is provided by the applicant. The Department of Community Development and Planning typically conducts its review of the request for exemption approval within 17 working days.

The required Hardship Exemption criteria are:

- The designer demonstrates that by the nature of the development, it is impractical to reduce the size of the facility and parking area;
- The designer shows that there is no space for additional stormwater treatment practices other than proprietary devices;
- All pervious areas are designed to produce the least amount of runoff practicable;
- Sensitive watershed requirements, if applicable, are met;
- The designer utilizes the IDEAL model to demonstrate that the annual post-development TSS loading leaving the site is no more than 600 pounds/acre/year.

Sensitive watershed requirements for sites receiving a Hardship Exemption are the same as when utilizing the TSS Removal Design Standard. Designers should show that the annual post-development pollutant loading does not exceed the annual pre-development pollutant loading for the pollutant(s) of concern. See Section 4 for further discussion of sensitive watersheds and pollutants of concern.

Pre-Treatment Practices

Pre-treatment practices for post-construction BMPs improve BMP function and reduce the overall maintenance requirement. Typical pre-treatment methods are forebays and manufactured treatment devices. Pre-treatment is recommended for all post-construction BMPs. Pre-treatment is strongly recommended for industrial and commercial projects due to the tendency for pollutants from these sites to hinder the function of post-construction BMPs (e.g. clogging due to trash, surface sealing due to oil and grease that hinders infiltration, etc.).

Design Standards Example Problems

Example Problem #1: Using Bioretention to Meet WQ Standards

Soil types and associated infiltration rates vary significantly throughout Richland County. The following scenarios illustrate how water quality design changes based on soil type and the presence of sensitive receiving water bodies.

General Site Narrative - Two acres of undisturbed woods is to be developed into a residential area with ¼-acre lots. The project has a detention waiver but needs to address water quality. The following scenarios show how a Bioretention Cell may be used to meet Richland County water quality design standards. For all scenarios, the Bioretention Cell modeled in IDEAL was a simple design with a perforated pipe under drain, sandy loam filter media, and a mulch layer at the surface. The initial design assumed a Bioretention Cell surface area of 0.06 acres, which is 3% (minimum recommended size) of the 2-acre watershed (maximum allowable drainage area to a single Bioretention Cell). See Bioretention Cell inputs below.

Physical Characteristics		
Cell Area	0.06	ac
Number of Layers	2	-
Layer 1 Depth	4	in
Layer 1 Media Name	Mulch	-
Layer 2 Depth	24	in
Layer 2 Media Name	Sandy Loam	-

Scenario 1-A - The soil type is Lakeland Sand (HSG A). The receiving water body may or may not be a sensitive water body.

The WQ Storm Event (1.4-inch, 24-hour, NRCS Type II storm event) was simulated in the IDEAL model and the 0.06-acre Bioretention Cell infiltrates the WQ Storm Event with no discharge. This is determined by examining "Single Event Results – Hydrology" for the Bioretention Cell in the IDEAL report. See below.

Single Event Results - Hydrology		
Surface Area	2614	sq-ft
Total Inflow Volume	0.0003764	ac-ft
Total Rainfall on BMP	0.007	ac-ft
Total Discharge Volume	0	ac-ft
EMS Discharge Volume	0	ac-ft
Riser Outlet Discharge Volume	0	ac-ft
Underdrain Discharge Volume	0	ac-ft

The zero (0) ac-ft of Total Discharge Volume indicates that **WQ Standard #1 is met**. When WQ Standard #1 is met, it is applicable for ALL watersheds including sensitive watersheds.

Scenario 1-B - The soil type is Nason Silt Loam (HSG C). The receiving water body is not a sensitive water body.

The Nason Silt Loam generates more runoff and has a lower infiltration rate than the Lakeland Sand so a 0.06-acre Bioretention Cell does not infiltrate the WQ Storm Event when simulated in the IDEAL model. This is determined by examining "Single Event Results – Hydrology" for the Bioretention Cell in the IDEAL report. See below.

Single Event Results - Hydrology		
Surface Area	2614	sq-ft
Simple Infiltration Rate	0.07492	in
Total Inflow Volume	0.05376	ac-ft
Total Rainfall on BMP	0.007	ac-ft
Total Discharge Volume	0.01113	ac-ft
EMS Discharge Volume	0	ac-ft
Riser Outlet Discharge Volume	0	ac-ft
Underdrain Discharge Volume	0.01113	ac-ft

The Bioretention Cell has a Total Discharge Volume of 0.01113 ac-ft (485 cf) or runoff around 20% of the Total Inflow Volume. A Total Discharge Volume greater than zero (0) ac-ft indicates that **WQ Standard #1 is not met**.

However, the Bioretention Cell may meet WQ Standard #2. The annual probability distribution of storms was simulated in IDEAL and the Bioretention Cell achieves 97.52% trapping efficiency of sediment (TSS). This is determined by examining "Watershed Results" in the IDEAL report generated by the annual simulation. See below.

Watershed Results		
Treatment Train 1		
Parameter	**Value**	**Units**
Objects in Tree	Outlet 4, Bioretention Cell 8, 2 ac Nason	-
Overall Trapping Efficiency of Sediment	97.52	%

An Annual TSS trapping efficiency of 97.52% is greater than 85%, so **WQ Standard #2 is met**. This analysis is adequate for receiving water bodies that are not sensitive waters.

Scenario 1-C - The soil type is Nason Silt Loam (HSG C). The receiving water body is a sensitive water body that has a biological/macroinvertebrate (BIO) impairment on the 303(d) list.
For a macroinvertebrate (BIO) impairment, TSS is the surrogate Pollutant of Concern (PoC) that should be modeled. See Section 4 or further discussion of pollutants of concern and modeling of TSS as a surrogate.

In Scenario B, it was demonstrated that the Bioretention Cell modeled in IDEAL achieves

greater than 85% annual TSS trapping efficiency. Scenario C is the same Bioretention Cell but with the added challenge of the BIO impairment, for which TSS is the surrogate PoC to be modeled. Therefore, the annual post-development TSS load should be less than or equal to the annual pre-development TSS load. To make this assessment, both pre-development and post-development conditions were modeled in IDEAL and the annual probability distribution of storms was simulated for each model. The total annual sediment load is determined by examining the "Annual Loading Results" at the system outlet. The Total Sediment Discharged for the pre-development condition is shown below.

Outlet 4		
Name	Outlet 4	
Description	Please enter a brief description.	
Annual Loading Results		
Parameter	**Value**	**Units**
Total Runoff Volume	0.4585	ac-ft
Total Drainage Area	2	ac
Total Modeled Area	2	ac
Total Sediment Discharged	36.65	lbs

The pre-development annual sediment load coming from the site is 36.65 lbs. Similarly obtained, the post-development results indicated a sediment load of 75.51 lbs. The post-development load of the PoC should be less than or equal to the pre-development load, so this Bioretention Cell needs to be modified. Increasing the surface area of the Bioretention Cell from 0.06 acres to 0.09 acres decreases the post-development sediment load to 26.65 lbs, which **meets WQ Standard #2** for this sensitive watershed.

Example Problem #1 Summary - The table below summarizes the BMP designs and WQ Standards met for each of the scenarios.

Scenario	Soil Type	Sensitive RWB?	BMP Design	WQ Standard Met
1-A	Lakeland Sand	No	0.06 ac Bioretention Cell	#1 – Infiltrate the WQSE
1-B	Nason Silt Loam	No	0.06 ac Bioretention Cell	#2 – 85% Annual TSS Trapping
1-C	Nason Silt Loam	Yes, PoC is TSS.	0.09 ac Bioretention Cell	#2 – 85% Annual TSS Trapping and Post < Pre for TSS

Example Problem #2: Using A Detention Pond to Meet WQ Standards

In this example, a dry detention pond designed for water quantity is considered as a possible water quality BMP, both as-is and with modifications. Consideration is also given to the possibility of a sensitive receiving water body where the Pollutant of Concern (PoC) is bacteria.

General Site Narrative - A 1.33-acre site is initially meadow/open space with Georgeville Silt Loam (HSG B) soil. The developed condition will be a commercial facility that is approximately 55% impervious which drains to a manufactured treatment device (to remove trash, debris, and oil/grease) and then to a 0.15-acre dry detention pond. The pond was initially designed to meet Richland County water quantity design requirements for 2-year, 10-year, and 25-year peak flows.

Scenario 2-A - Can the dry detention pond meet WQ Standard #1?
No. The Water Quality Storm Event (WQSE) was simulated in the IDEAL model and the existing pond discharges. Therefore, the WQSE is not infiltrated so **WQ Standard #1 is not met**.

Scenario 2-B - Can the dry detention pond meet WQ Standard #2?
Yes. The annual probability distribution of storms was simulated in the IDEAL model and the existing pond achieves 87.31% annual TSS removal efficiency. This is greater than 85%, so **WQ Standard #2 is met**. This analysis is adequate for receiving water bodies that are not sensitive waters.

Scenario 2-C - What if the site discharges to a sensitive receiving waterbody where the PoC is bacteria?
In this case, the annual post-development bacteria load should be less than or equal to the pre-development bacteria load. This was assessed using IDEAL model simulations of pre-development and post-development conditions. Bacteria, or other pollutant loadings, may be found in the "Annual Loading Results" section at the system outlet. Sediment, nitrogen, and phosphorus are measured in pounds of pollutant (lbs) and bacteria is measured by number of colony-forming-units (cfu). The Total Bacteria Discharged for the pre-development condition is shown below.

Outlet 4		
Name	Outlet 4	
Description	Please enter a brief description.	
Annual Loading Results		
Parameter	**Value**	**Units**
Total Bacteria Discharged	2.515E+10	cfu
Total Bacteria Discharged (Sorbed To Clay)	0	cfu
Total Bacteria Discharged (Sorbed To Silt)	0	cfu
Total Bacteria Discharged (Planktonic)	2.515E+10	cfu
Bacteria Concentration	1139	cfu/100 ml

The post-development IDEAL model results indicated an increase in bacteria load (see table below), so modification of the dry detention pond is necessary to meet sensitive waterbody requirements. Bioretention is an effective BMP for removing bacteria, so conversion of the dry detention pond to a Bioretention Cell was considered. A Bioretention Cell of the same size as the dry detention pond was modeled in IDEAL and the annual probability distribution of storms was simulated. The resulting annual bacteria load is shown in the following table along with loads from pre-development conditions and the original dry detention pond.

Conditions	BMPs	Annual Bacteria Load (cfu)	Does this meet sensitive RWB requirements?
Pre-Development	None	2.515E+10	-
Post- Development	Dry Detention Pond	1.428E+11	No, post > pre
Post- Development	Bioretention Cell (same size as dry pond)	8.450E+09	Yes, post < pre

IDEAL model simulations show that, for this example site, a Bioretention Cell that is the same size as the dry detention pond will reduce bacteria levels and meet sensitive waterbody requirements. With properly sized outlet control (underdrain, riser, and emergency spillway), this Bioretention Cell also meets peak flow water quantity requirements and drawdown time requirements.

Example Problem #3: Hardship Exemption

This example describes a situation where a site has low TSS loads and limited space for BMPs such that it is impracticable to meet WQ Standard #2 (85% reduction of the annual TSS load). To qualify for a Hardship Exemption, the designer should submit a written request to the County satisfying all the Hardship Exemption criteria described in Section 2. The criterion that annual sediment loading should be less than 600 lbs/ac/yr should be demonstrated using IDEAL.

General Site Narrative - The existing condition of the site is a 1-acre paved lot with an old commercial building. The soil type is Georgeville Silt Loam (HSG B). The developed condition requires demolition of the existing building and construction of a multi-level parking garage. There are no existing stormwater BMPs on the site. The site does not drain to a sensitive receiving water body. Due to limited space for BMPs, the designer intends to address water quality using a manufactured/proprietary treatment device.

Analysis - An IDEAL model was created routing flow from the entire site to a manufactured treatment device (MTD). The annual probability distribution of storms was simulated and the MTD achieved 69.02% trapping efficiency of sediment (TSS). This is determined by examining "Watershed Results" in the IDEAL report generated by the annual simulation. See below.

Watershed Results		
Treatment Train 1		
Parameter	**Value**	**Units**
Objects in Tree	Outlet 3, Manufactured Treatment Device, Impervious Area 2	-
Overall Trapping Efficiency of Sediment	69.02	%

The annual TSS trapping efficiency of 69.02% is less than 85%, so **WQ Standard #2 is NOT met**. If there are no other practicable options and the designer shows that all Hardship Exemption criteria are met, then the County may approve the site with a Hardship Exemption.

One of the Hardship Exemption criteria is that the site should have an annual sediment load per acre of less than or equal to 600 lbs/ac/yr. This is determined in IDEAL by examining the "Annual Loading Results" at the system outlet. See below.

Outlet 3			
Name	Outlet 3		
Description	Please enter a brief description.		
Annual Loading Results			
Parameter		**Value**	**Units**
Total Runoff Volume		2.476	ac-ft
Total Drainage Area		1	ac
Total Modeled Area		1	ac
Total Sediment Discharged		242	lbs
Total Sediment Discharged (Clay)		199	lbs
Total Sediment Discharged (Silt)		42.96	lbs
Total Sediment Discharged (Sand)		0	lbs
Total Sediment Discharged (Small Agg.)		0	lbs
Total Sediment Discharged (Large Agg.)		0	lbs
Total Sediment Yield Per Acre		242	lbs

Total Sediment Yield Per Acre is 242 lbs/ac/yr. This is less than 600 lbs/ac/yr so that specific Hardship Exemption criterion is met. Assuming all other Hardship Exemption criteria are met, this site meets water quality requirements.

Section 3: Downstream Analysis

Downstream analysis is typically required for all new development and re-development sites unless the County Engineer or designee determines it is not required. In some cases, the design professional may verify that stormwater quantity controls may adversely impact downstream conditions. Therefore, downstream analysis should be performed prior to sizing stormwater quantity control structures to determine the extent of the controls to be implemented. Downstream analysis may show that more stringent controls need to be implemented to effectively prevent any adverse downstream impacts.

The downstream analysis should include the assumptions, results and supporting calculations to show safe passage of post-development design flows downstream. The analysis of downstream conditions in the report should address each discharge point along the project site's boundaries at which runoff exits the property. The analysis should focus on the portion of the drainage channel or watercourse immediately downstream from the project. This area should extend downstream from the project to a selected point of concern. In calculating runoff volumes and discharge rates, consideration may need to be given to any planned or known future upstream land use changes.

Downstream Analysis Limits

Hydrologic and hydraulic engineering analysis should be implemented to determine the downstream effects from any development activity. This analysis should extend downstream to a specific point of concern. The point of concern may be identified by the County Engineer. The following are typical points of concern:

A. The point downstream where the development represents less than ten (10) percent of the total drainage of the watershed
B. The first downstream road crossing
C. Downstream development
D. Downstream receiving waterbody
E. Location of known existing flooding, drainage, or erosion problems
F. Any point as directed by the County at pre-application meeting

The primary areas of analysis should be done for the following:

- The development area;
- All drainage exit points from the property;
- The receiving channel or storm drainage system at the exit points; and
- Each component of the downstream system including channels, pipes, culverts, bridges, overbank areas, and overbank structures.

If there is any discrepancy or question about points of concern, please contact the County for a pre-application meeting. The County reserves the right to request a pre-application meeting at its discretion.

A flowchart of the downstream analysis development process is shown in Figure 3.

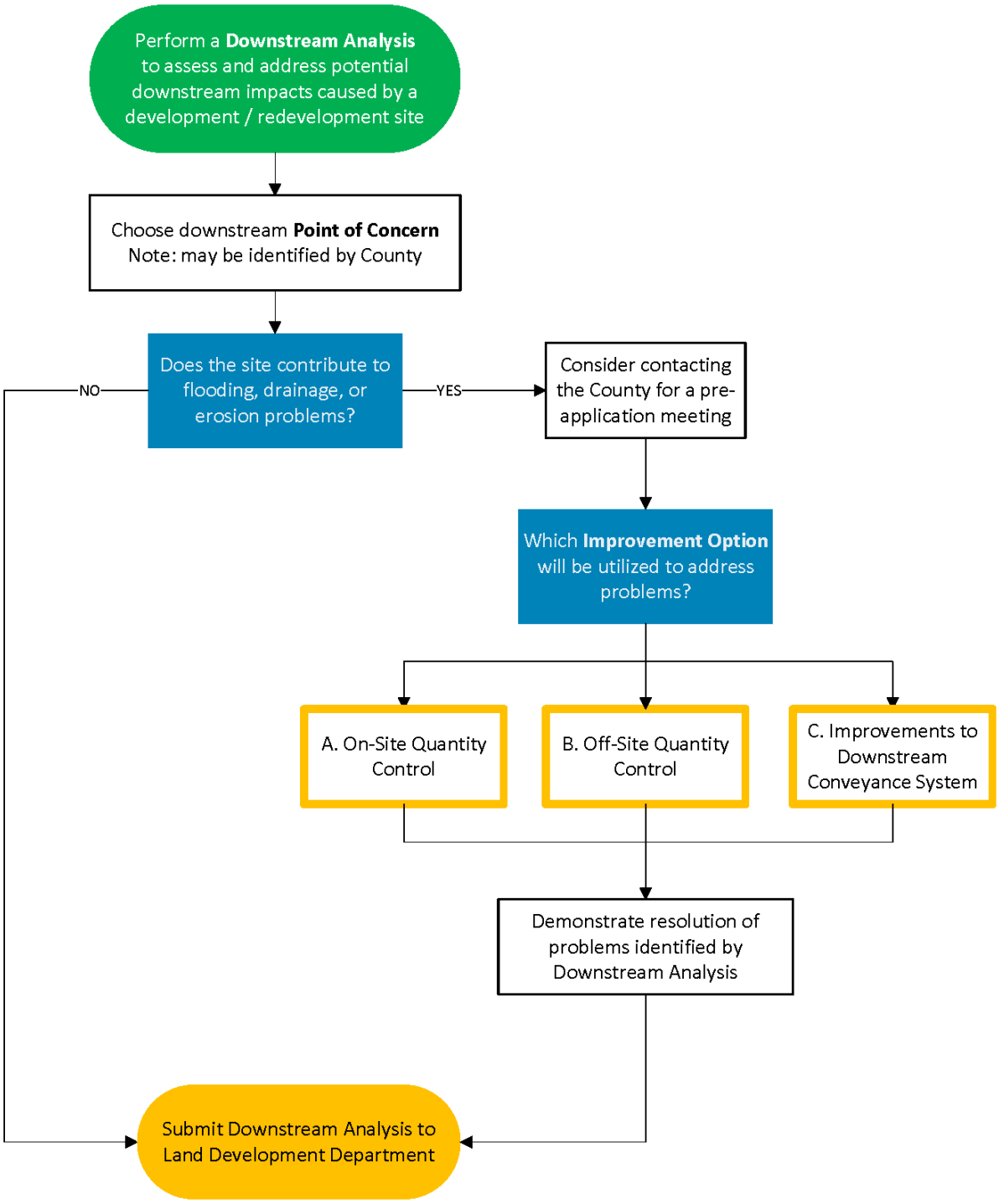


Figure 3. Flowchart of downstream analysis establishment process

Downstream Analysis Design Storm Events

The downstream analysis should determine whether the design storm events of interest (2-year, 10-year, and 25-year) cause or increase flooding, drainage, or erosion impacts to downstream properties or road crossings. The analysis criteria should include but is not limited to:

- Existing landuse curve numbers should be used for undeveloped and developed areas upstream.
- Where future development areas are known upstream, the County Engineer may require these areas to be considered developed in the future land use condition;
- Existing landuse for downstream areas of interest may be used, but future landuse, when applicable, is recommended for conservative results;
- Routing of flows using accepted hydrologic and hydraulic methods;
- Hydraulic step-backwater calculations (Corps of Engineer's HEC-2 or HEC-RAS models or equivalent) should be performed to determine flood elevations of any downstream impacted areas; and
- The effects of any upstream and proposed stormwater quantity or quality structures.

Improvement Options

If the downstream analysis determines that the development of a particular site does contribute to flooding, drainage, or erosion problems, then at least one the following improvements should be implemented:

A. On-site water quantity control.
B. Off-site water quantity control.
C. Improvements to the downstream stormwater conveyance system.

A. On-Site Water Quantity Control

The design professional may select to implement on-site water quantity control structures. These structures may consist of nonstructural controls such as swales, open drainage ways, and low areas within the site terrain. These structures may also consist of structural approaches such as engineered detention facilities.

Example: On-Site Water Quantity Control

The downstream analysis determines that an immediate downstream road crossing that does not overtop in the 25-year storm event in pre-development conditions will overtop in the 25-year storm event for the post-development conditions. The designer experiments with modifying the dry detention pond design and discovers that making the pond 15% larger eliminates the overtopping. This change is made to the design in order to prevent downstream overtopping of the road.

B. Off-Site Water Quantity Control

The design professional may use an off-site publicly or privately owned facility to prevent adverse

downstream impacts. The use of off-site facilities should meet the following requirements:

- The facility to be used should be functional,
- The owner/entity has agreed to accept runoff from the proposed development site,
- The owner has an implemented maintenance agreement for the facility,
- The facility is sized to effectively handle increased flow rates and flow volumes, and
- There are no significant adverse impacts between the outlet from the proposed development site and the inlet to the off-site facility.

Example: Off-Site Water Quantity Control

A developer creates a master plan for a multi-use community that will include multiple neighborhoods of single family homes, a commercial area of shops and restaurants, an elementary school, and a large park. The master plan utilizes a large pond in the middle of the community, surrounded by the park, which acts as a shared detention facility for water quantity control. The developer has the master plan engineer design the pond to ensure it has adequate storage capacity for the final built-out conditions. Each individual designer routes their runoff to the pond and provides site details to the developer to update the water quantity model for the entire community.

C. Improvements to the Downstream Stormwater Conveyance System

The design professional may perform and provide supporting calculations that indicate that the best solution is to upgrade the downstream system. This option may be implemented under the following requirements:

- The downstream property owner of the facilities to be improved has granted temporary construction easements, and permanent easement for maintenance.
- The downstream improvements are economically feasible, and
- The improvement will not cause any other significant problems downstream.

Example: Improvements to Downstream Conveyance System

The downstream analysis for a commercial site identifies that, even though the site itself meets peak flow requirements, the post-development flows cause a downstream shared conveyance channel to flood its banks in the 25-year storm event. The cause of the flooding is constriction of the flow by a 12-inch culvert. The designer upsizes to an 18-inch culvert in the model and this eliminates the constriction and flooding. The designer contacts the property owner, explains the situation, and an agreement is reached that the culvert will be replaced prior to construction of the new commercial site.

Section 4: Sensitive Watersheds

Sensitive watersheds are those that have a receiving water with a TMDL, 303(d) listed impairment, or are otherwise classified as sensitive by the County. Refer to the SCDHEC Water Quality Tool (https://gis.dhec.sc.gov/water/stormwater.html) for identification of sensitive watersheds. In addition to the requirements below, sensitive watersheds require additional buffer width as described in Chapter 4 of the *Richland County Land Development Manual*.

Receiving Waters with TMDLs or Impairments

If an Impaired or TMDL Water with a pollutant of concern applicable to stormwater discharges from the proposed land development has been established and is in effect, then the SWPMP should address the following, depending on the total disturbed area.

Disturbed area less than 25 acres:

For construction projects that disturb *less than 25 acres*, carefully evaluate all selected BMPs and their ability to control the pollutant(s) of concern.

Disturbed area greater than or equal to 25 acres:

Construction projects that disturb *25 acres or more* require a **written quantitative and qualitative assessment** showing that the selected BMP controls the discharge of the pollutant, or pollutants, of concern from construction and post construction within a TMDL watershed, or to a water on the 303(d) List of Impaired Waters.

Design professionals should determine whether runoff from the proposed land development contains pollutants that are already causing impairment of the adjacent waterbody. These pollutant discharges vary from site to site.

If stormwater runoff from the proposed land development contributes pollutants that already cause water quality impairment, the design professional should *demonstrate to the extent practicable* that the measures and controls to be implemented prevent further problems to the impairment.

The IDEAL model should be used by designers to calculate the annual loading for the pollutant(s) of concern for the pre-developed condition as a baseline and compare the baseline to the developed annual loading condition. No increase in annual loading of the pollutant(s) of concern provides a **quantitative assessment** showing that the selected BMP(s) control the discharge of the pollutant(s) of concern.

Alternative approaches, methodologies and solutions may be allowed; however, it is incumbent on the designer proposing an alternative to adequately demonstrate both the effectiveness and equivalency of that alternative.

For pollutants causing impairment for which a numeric water quality standard has been adopted (fecal coliform, pH, metals), calculations should be performed and submitted showing that the pollutants in the runoff from the development site should not exceed the applicable in-stream water quality standards. The runoff discharged through the last water quality BMP should have a water quality level equal to or better than the in-stream standard.

The design professional should demonstrate to the extent practicable in a different manner when the water quality impairment is not a pollutant itself, but is affected by a pollutant that can be regulated such as dissolved oxygen levels are affected by biochemical demand. In these situations, a reasonable approach to show that runoff should not further degrade the adjacent impaired waterbody is to show that the post-development loading of a particular pollutant is less than or equal to pre-development loading.

This demonstrates to the extent practicable that there should be no net increase of loading of that particular pollutant and no further lowering of the water quality standard. In most cases, the effectiveness of the designed water quality BMPs should not require water quality sampling. However, for certain situations, it may be required for the applicant or landowner to collect monitoring data to confirm the effectiveness of the BMPs.

Pollutant(s) of Concern

Some impairments (sediment, bacteria, nitrogen, phosphorus) are for pollutants of concern that can be modeled explicitly in IDEAL software to show that the annual post-development pollutant loading does not exceed the annual pre-development pollutant loading for the pollutant of concern. For other pollutants of concern that cannot be modeled directly (BIO, metals, pH, dissolved oxygen, turbidity), TSS should be used as the surrogate pollutant for IDEAL modeling to show that the annual post-development TSS loading does not exceed the annual pre-development TSS loading. TSS is a good indicator for other stormwater pollutants, as discussed previously with WQ Design Standard #2 in Section 2 of this guidance document.

Section 5: The IDEAL Model

Model Background

The IDEAL (Integrated Design, Evaluation, and Assessment of Loadings) model provides Richland County-specific design methods that give reasonable assurance that stormwater discharges meet desired performance measures without the lengthy design process typically associated with a performance standard. The use of area-specific design methods also provides a means of achieving control without the steep learning curve associated with simulation techniques. The IDEAL model should be used as a tool to show compliance with the Manage the Water Quality Storm Event Standard, the 85% TSS Trapping Standard, and the Hardship Exemption criteria. It is also suitable for use with nearly any other standard, so changes to standards will not require designers to learn entirely new methods of demonstrating compliance in the future.

The IDEAL Model, a model for post-construction water quality, ties water quality modeling together with physical, chemical, and biological relationships to provide a realistic simulation of processes that are taking place in the real world. Its calculations and results have been validated in actual field installations. The IDEAL model was built around two major processes – pollutant generation from land surfaces and pollutant trapping in BMPs – that are simulated for an annual probability distribution of storms (equivalent to an average year of rainfall in terms of precipitation depths, frequency, and seasonality). Pollutant generation is modeled using Richland County-specific conditions (soils and climate) adjusted by the designer for the individual site using inputs such as time of concentration, length of flow path, slope of flow path, and land use.

Using IDEAL to Meet Water Quality Design Standards

The IDEAL model assists in streamlining the stormwater permitting application process for new development and redevelopment projects. The IDEAL model is neither rules nor regulations promulgated by the County, but is a tool to design BMPs that meet the applicable water quality requirements. Because the IDEAL model is not the only a tool for calculating pollutant loading, alternative approaches, methodologies and solutions may be allowed; however, it is incumbent on the designer proposing an alternative to adequately demonstrate both the effectiveness and equivalency of that alternative. Likewise, other tools may require additional review time. IDEAL is available through the Richland County website, but requires that a hardware key be mailed, so designers should plan design schedules accordingly.

Appendix I: Detention Waiver Request Form

www.rcgov.us

Richland County Detention Waiver Request Form
Residential, Commercial, & Linear Projects

Project Name & Phase	Date: (i.e. 12/25/16)

Engineering Company	Engineer / Applicant

Waivers are granted on a case-by-case basis. The supporting documentation is reviewed for the purpose of ruling out options other than designing the project without detention. Next, the technical information is reviewed to validate the conditions required to be met. The engineer of record must seal and sign this document.

A waiver shall only be granted after a written request is submitted by the applicant containing descriptions, drawings, and any other information that is necessary to evaluate the proposed land disturbing activity. This form will serve as a guideline of items to include in the request and serve as the official written request. The County will review and respond to your request along with the review of your project. **This document must be a stand alone document.**

The following must be included in the waiver request:

- Project Name
- Project size and scope (size in acres to the nearest tenth of an acre, both disturbed area and total size of project).
- Descriptions of adjacent and receiving properties (include information on any wetlands, streams, and Waters of State on or in close proximity to the site and flood zone information).
- Location of the site within the Watershed (use USGS "HUC 14" watersheds) these watersheds are also delineated on the Richland County GIS website. (Map required)
- A set of hydrologic and hydraulic calculations, for detention analysis and design, that considers the impact of hydrograph timing modifications of the proposed land disturbance, with and without detention. (pre- and post-summary table required)
- Describe in detail how water quality is to be addressed without detention both during construction and post construction.

Based on the information prepared, the following conditions must be certified (all of the following conditions must be certified by sealing and signing this document):

☐ The calculations prepared demonstrate that the project will have no significant adverse impacts on receiving water bodies or downstream properties,

or

☐ The calculations prepared demonstrate that the imposition of peak control requirements for rates of stormwater runoff discharging from on-site detention will not aggravate or add to downstream flooding.

☐ The downstream drainage system has been analyzed and has sufficient capacity to receive any increase in runoff for the design storm.

☐ Supporting Documentation Attached

STAFF USE ONLY

Waiver Granted
☐ YES
☐ NO

Staff

Community Planning & Development
2020 Hampton Street, Columbia, SC 29202
(803) 576-2420

Engineer's Certification

Appendix J: Universal Soil Loss Equation Input Values

UNIVERSAL SOIL LOSS EQUATION INPUT VALUES

JULY 2020

RICHLAND COUNTY NEW DEVELOPMENT DIVISION
2020 HAMPTON STREET
COLUMBIA, SC 29204

Rainfall Erosive Factor, R

The Rainfall Erosive Factor, R, is determined by the following equation:

$$R = (EI\ Value)\ x\ (Avg.Annual\ R\ Value)$$

Where:

Avg. Annual R Value for Richland County = 350 (dimensionless)
EI Value comes from the following table:

Date	Erosion Index, EI
January 1	0.0
January 15	1.0
February 1	2.0
February 15	3.0
March 1	5.0
March 15	7.0
April 1	10.0
April 15	14.0
May 1	18.0
May 15	22.0
June 1	27.0
June 15	32.0
July 1	37.0
July 15	46.0
August 1	58.0
August 15	69.0
September 1	80.0
September 15	89.0
October 1	93.0
October 15	94.0
November 1	95.0
November 15	96.0
December 1	97.0
December 15	97.0
January 1	100.0

Soil Erodibility Factor, K

Textural Class	K Factor (tons/acre)		
	Average OMC*	Less than 2% OMC	More Than 2% OMC
Clay	0.22	0.24	0.21
Clay Loam	0.30	0.33	0.28
Coarse Sandy Loam	0.07	---	0.07
Fine Sand	0.08	0.09	0.06
Fine Sandy Loam	0.18	0.22	0.17
Heavy Clay	0.17	0.19	0.15
Loam	0.30	0.34	0.26
Loamy Fine Sand	0.11	0.15	0.09
Loamy Sand	0.04	0.05	0.04
Loamy Very Fine Sand	0.39	0.44	0.25
Sand	0.02	0.03	0.01
Sandy Clay Loam	0.20	---	0.20
Sandy Loam	0.13	0.14	0.12
Silt Loam	0.38	0.41	0.37
Silty Clay	0.26	0.27	0.26
Silty Clay Loam	0.32	0.35	0.30
Very Fine Sand	0.43	0.46	0.37
Very Fine Sandy Loam	0.35	0.41	0.33

Topographic Factor, LS

Slope (%)	Slope Length (feet)																	
	20	50	75	100	120	150	200	250	300	350	400	450	500	600	700	800	900	1000
0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.11	0.114	0.12	0.12	0.13	0.13	0.13	0.137	0.141	0.145	0.148	0.152
1.0	0.1	0.11	0.12	0.13	0.14	0.14	0.15	0.15	0.17	0.18	0.19	0.20	0.20	0.22	0.23	0.24	0.25	0.25
2.0	0.12	0.16	0.18	0.20	0.21	0.22	0.24	0.26	0.27	0.29	0.30	0.31	0.32	0.34	0.36	0.37	0.38	0.40
3.0	0.17	0.23	0.26	0.28	0.30	0.32	0.35	0.37	0.38	0.41	0.43	0.45	0.46	0.49	0.51	0.53	0.55	0.57
4.0	0.21	0.30	0.35	0.40	0.43	0.47	0.52	0.57	0.62	0.66	0.69	0.73	0.76	0.81	0.87	0.91	0.96	1.00
5.0	0.23	0.37	0.46	0.53	0.58	0.65	0.75	0.84	0.92	1.00	1.07	1.13	1.19	1.31	1.41	1.51	1.60	1.69
6.0	0.30	0.47	0.58	0.67	0.73	0.82	0.95	1.06	1.16	1.25	1.34	1.42	1.50	1.64	1.78	1.90	2.01	2.12
7.0	0.36	0.58	0.71	0.82	0.90	1.01	1.16	1.30	1.42	1.54	1.65	1.75	1.84	2.02	2.18	2.33	2.47	2.60
8.0	0.44	0.70	0.85	0.99	1.08	1.21	1.40	1.56	1.71	1.85	1.98	2.10	2.21	2.42	2.62	2.80	2.97	3.13
9.0	0.52	0.82	1.01	1.17	1.28	1.43	1.65	1.85	2.03	2.19	2.34	2.48	2.62	2.87	3.10	3.31	3.52	3.71
10.0	0.61	0.96	1.18	1.36	1.50	1.67	1.93	2.16	2.37	2.56	2.74	2.90	3.06	3.35	3.62	3.87	4.10	4.33
11.0	0.70	1.11	1.36	1.58	1.73	1.93	2.23	2.49	2.73	2.95	3.16	3.35	3.53	3.87	4.18	4.46	4.74	4.99
12.0	0.80	1.27	1.56	1.80	1.97	2.21	2.55	2.65	3.12	3.37	3.60	3.82	4.03	4.42	4.77	5.10	5.41	5.70
13.0	0.91	1.44	1.76	2.04	2.23	2.50	2.88	3.23	3.53	3.82	4.08	4.33	4.56	5.00	5.40	5.77	6.12	6.46
14.0	1.02	1.62	1.98	2.29	2.51	2.81	3.24	3.62	3.97	4.29	4.58	4.86	5.13	5.62	6.07	6.49	6.88	7.25
15.0	1.14	1.81	2.21	2.56	2.80	3.13	3.62	4.04	4.43	4.79	5.12	5.43	5.72	6.27	6.77	7.24	7.68	8.09
16.0	1.26	2.00	2.45	2.83	3.11	3.47	4.01	4.48	4.91	5.31	5.67	6.02	6.34	6.95	7.51	8.02	8.51	8.97
17.0	1.40	2.21	2.71	3.13	3.42	3.83	4.42	4.94	5.42	5.85	6.26	6.64	7.00	7.66	8.28	8.85	9.39	9.89
18.0	1.53	2.42	2.97	3.43	3.76	4.20	4.85	5.43	5.94	6.42	6.86	7.28	7.68	8.41	9.08	9.71	10.3	10.9
19.0	1.67	2.65	3.24	3.75	4.10	4.59	5.30	5.93	6.49	7.01	7.50	7.95	8.38	9.18	9.92	10.6	11.3	11.9
20.0	1.82	2.88	3.53	4.07	4.46	4.99	5.76	6.45	7.06	7.63	8.15	8.65	9.12	10.0	10.7	11.5	12.2	12.9
25.0	2.63	4.16	5.1	5.89	6.45	7.21	8.33	9.31	10.2	11.0	11.8	12.5	13.2	14.4	15.6	16.7	17.7	18.6
33.3	4.22	6.67	8.17	9.44	10.3	11.6	13.4	14.9	16.4	17.7	18.9	20.0	21.1	23.1	25.0	26.7	28.3	29.9
40.0	5.65	8.94	8.94	12.7	13.9	15.5	17.9	20.0	21.9	23.7	25.3	26.8	28.3	31.0	33.5	35.8	38.0	40.0
50.0	7.97	12.6	12.6	17.8	19.5	21.8	25.2	28.2	30.9	33.3	35.6	37.8	39.9	43.7	47.2	50.4	53.5	56.4
66.6	11.9	18.9	18.9	26.7	29.2	32.7	37.7	42.2	46.2	49.9	53.3	56.6	59.6	65.3	70.5	75.4	80.0	84.3
100.0	18.9	29.9	29.9	42.2	46.3	51.7	59.7	66.8	73.2	79.0	84.5	89.6	94.5	103.0	112.0	120.0	126.0	134.0

Control Practice Factor, CP

Condition	CP Factor
Bare Soil	1.0
Compacted Root Raked Soil	1.2
Compacted Bulldozer Scraped Soil	1.2
Fresh Unprepared Seedbed	0.64
Temporary Seeding 0-60 Days	0.40
Temporary Seeding After 60 Days	0.05
Permanent Seeding 2-12 Months	0.05
Brush	0.35
Erosion Control Blankets	0.01 – 0.1

Sources

SCDOT Stormwater Quality Design Manual, Appendix H.
https://www.scdot.org/business/pdf/stormwater/Appendix_H.pdf

Greenville County Stormwater Design Manual, January 2018.
https://www.greenvillecounty.org/LandDevelopment/pdf/designmanual/DesignManualChapter8revJan2018.pdf

Appendix K: Landscape Plant Materials List

WATER QUALITY BUFFER PLANTS
RECOMMENDED PLANT SPECIES

JULY 2020

RICHLAND COUNTY NEW DEVELOPMENT DIVISION
2020 HAMPTON STREET
COLUMBIA, SC 29204

Perennial Grasses and Sedges

Common Name	Scientific Name	Height (ft)	Habit	Moisture	Light Preference	Attracts Wildlife?
Broomsedge	*Andropogon* spp.	1-4	Clump	Wet to Dry	Full Sun	Yes
Switchcane	*Arundinaria gigantea*	4-7	Spreading	Moist to wet	Full Sun to Partial Shade	
Sedges	*Carex* spp.	1-2	Clumping	Moist to Dry	Partial Shade	
River Oats	*Chasmanthium latifolium*	3-5	Clump	Dry to Moist	Sun to Shade (very shade tolerant)	
Oatgrass	*Danthonia* spp.	1	Clump	Dry to Moist	Sun to Partial Shade	Yes
Witchgrass	*Dichanthelium* spp.	1-2	Spreading	Moist to Dry	Sun to Partial Shade	Yes
Rush	*Juncus* spp.	1-3	Clumping	Moist to Wet	Sun to Partial Shade	
Rice Cutgrass	*Leersia oryzoides*	2-5	Spreading	Wet	Full Sun to Partial Shade	
Switchgrass	*Panicum virgatum*	2-4	Spreading	Wet to Dry	Full Sun	Yes
Green Needlegrass	*Piptochaetium avenaceum*	1-3	Clump	Dry to Moist	Sun to Shade (very shade tolerant)	Yes
Bent-awn Plumegrass	*Saccharum contortum*	10	Clump	Moist	Full Sun to Partial Shade	
Little Bluestem	*Schizachyrium scoparium*	2-3	Clump	Moist to Dry	Full Sun	Birds, Mammals
Bulrushes	*Scirpus* spp.	up to 5	Clump	Moist to Wet	Full Sun to Partial Shade	

Shrubs

Common Name	Scientific Name	Evergreen/Deciduous	Mature Height (ft) / Spread (ft)	Soil Moisture	Light Preference	Attracts Wildlife
Salt Myrtle	*Baccharis halimifolia*	Semi-Evg to Dec	3-9 / 4-6	No Pref.	Sun to Shade	
American Beautyberry	*Callicarpa americana*	Dec	3-8 / 6	Dry to Moist	Sun to Partial Shade	Yes
Sweetshrub	*Calycanthus floridus*	Dec	6-9 / 6-12	Moist	Partial Shade to Shade	
Buttonbush	*Cephalanthus occidentalis*	Dec	3-6 / 3-6	Moist to Wet	Sun to Shade	Yes
Sweet Pepper Bush	*Clethra alnifolia*	Dec	4-8 / 4-6	Wet to Moist, Acidic	Sun to Shade	
Silky Dogwood	*Cornus amomum*	Dec	6-10 / 6-10	Moist to Wet	Sun to Shade	
Titi	*Cyrilla racemiflora*	Semi-Evg to Dec	10-15+ / 10-15+	Wet to Moist, Acidic	Sun to Partial Shade	
St. Johnswort	*Hypericum* spp.	Semi-Evg to Dec	1-4	Dry	Sun to Partial Shade	
Winterberry Holly	*Ilex verticillata*	Dec	6-10 / 6-10	Moist to Wet	Sun to Partial Shade	
Virginia Sweetspire	*Itea virginica*	Dec	3-6 / 3-4	Moist or Wet, Acidic	Sun to Shade	Yes
Dog-Hobble	*Leucothoe axillaris*	Evg	2-4 / 6	Moist	Partial Shade to Shade	
Southern Waxmyrtle	*Myrica cerifera*	Evg	15-20 / 15-20	No Pref.	Sun to Partial Shade	Yes
Pinxterbloom Azalea	*Rhododendron periclymenoides*	Dec	6-10 /	Moist, well-drained	Partial Shade	

Shrubs (Continued)

Common Name	Scientific Name	Evergreen/Deciduous	Mature Height (ft) / Spread (ft)	Soil Moisture	Light Preference	Attracts Wildlife
Swamp Azalea	*Rhododendron viscosum*	Dec	5 / 5+	Moist to Wet	Partial Shade	
Wild Rose	*Rosa carolina*	Evg	3 / 3+	Dry to Moist, well-drained	Sun	Yes
Elderberry	*Sambucus canadensis*	Dec	5-12	Dry to Moist	Sun to Partial Shade	Yes
Sparkleberry	*Vaccinium arboreum*	Evg to Semi-Evg	15-20	Well-Drained	Sun to Partial Shade	Yes
Mayberry	*Vaccinium elliottii*	Dec	6-12	Moist to Wet	Sun to Partial Shade	Yes
Possumhaw, Smooth Witherod	*Viburnum nudum*	Dec	6-10 / 6-10	Moist to Wet	Sun to Partial Shade	Yes
Rusty Blackhaw	*Viburnum rufidulum*	Evg	10-20 /	Dry to Moist	Sun to Partial Shade	Yes
Bear-grass	*Yucca filamentosa*	Evg	2-4 / 1-2	Dry	Full Sun to Partial Shade	Yes

Small Trees

Common Name	Scientific Name	Evergreen/Deciduous	Mature Height (ft) / Spread (ft)	Soil Moisture	Light Preference	Attracts Wildlife
Red Buckeye	*Aesculus pavia*	Dec	15-20 / 15-25	Wet	Sun to Shade	
Hazel Alder	*Alnus serrulata*	Dec	15-20 /	Moist to Wet	Sun to Partial Shade	
Shadblow Serviceberry	*Amelanchier canadensis*	Dec	20-25 / 15-20	Moist to Wet	Sun to Partial Shade	Birds, Mammals
Eastern Redbud	*Cercis canadensis*	Dec	20-30 / 15-30	Dry to Moist	Full Sun to Partial Shade	Birds
Fringetree	*Chionanthus virginicus*	Dec	30 /	Dry to Moist	Full Sun to Partial Shade	Birds, Mammals
Flowering Dogwood	*Cornus florida*	Dec	20-30 / 20-25	Dry to Moist	Partial Shade	Birds
Parsley-leaf Hawthorn	*Crataegus marshallii*	Dec	20 /	Wet	Sun	Birds, Mammals
Carolina Buckthorn	*Frangula caroliniana syn. Rhamnus caroliniana*	Dec	12-15 / 10-15	Dry to Moist	Sun to Shade	Birds
Witch-hazel Hydrids	*Hamamelis x intermedia*	Dec	15-20 /	Dry to Moist	Sun to Partial Shade	
Witch-hazel	*Hamamelis virginiana*	Dec	20-30 / 20-25	Dry to Moist	Sun to Partial Shade	Birds, Mammals
American Holly	*Ilex opaca*	Evg	40-50 / 15-25	Dry to Moist	Sun to Shade	Birds, Mammals
Bigleaf Magnolia	*Magnolia pyramidata*	Dec	10-20 /	Moist	Sun to Partial Shade	
Sweetbay Magnolia	*Magnolia virginiana*	Semi-Evg	40-50 / 15-25	Moist	Sun to Partial Shade	

Small Trees (Continued)

Common Name	Scientific Name	Evergreen/Deciduous	Mature Height (ft) / Spread (ft)	Soil Moisture	Light Preference	Attracts Wildlife
Southern Wax Myrtle	*Myrica cerifera*	Evg	15-20 / 20-25	Dry to Wet	Sun to Partial Shade	Birds, Mammals
Black Gum	*Nyssa sylvatica*	Dec	30-50 / 20-30	Dry to Moist	Sun to Partial Shade	Birds, Mammals
Hop Hornbeam	*Ostrya virginiana*	Dec	30-40 / 25-35	Dry to Moist	Sun to Partial Shade	Birds
Redbay	*Persea borbonia*	Evg	20-30 / 15-20	Moist	Sun to Partial Shade	
Cherry Laurel	*Prunus caroliniana*	Evg	20-30 / 15-25	Moist	Sun to Partial Shade	Birds
Sassafras	*Sassafras albidum*	Dec	30-60 / 25-40	Dry to Moist	Full Sun to Partial Shade	Birds
American Snowbell	*Styrax americanus*	Dec	6-10 /	Moist to Wet	Sun to Partial Shade	
Bigleaf Snowbell	*Styrax grandifolius*	Dec	8-15 /	Moist	Sun to Partial Shade	Birds
Horse-sugar	*Symplocos tinctoria*	Semi-Evg to Dec	30 /	Moist	Partial Shade to Shade	

Large Trees

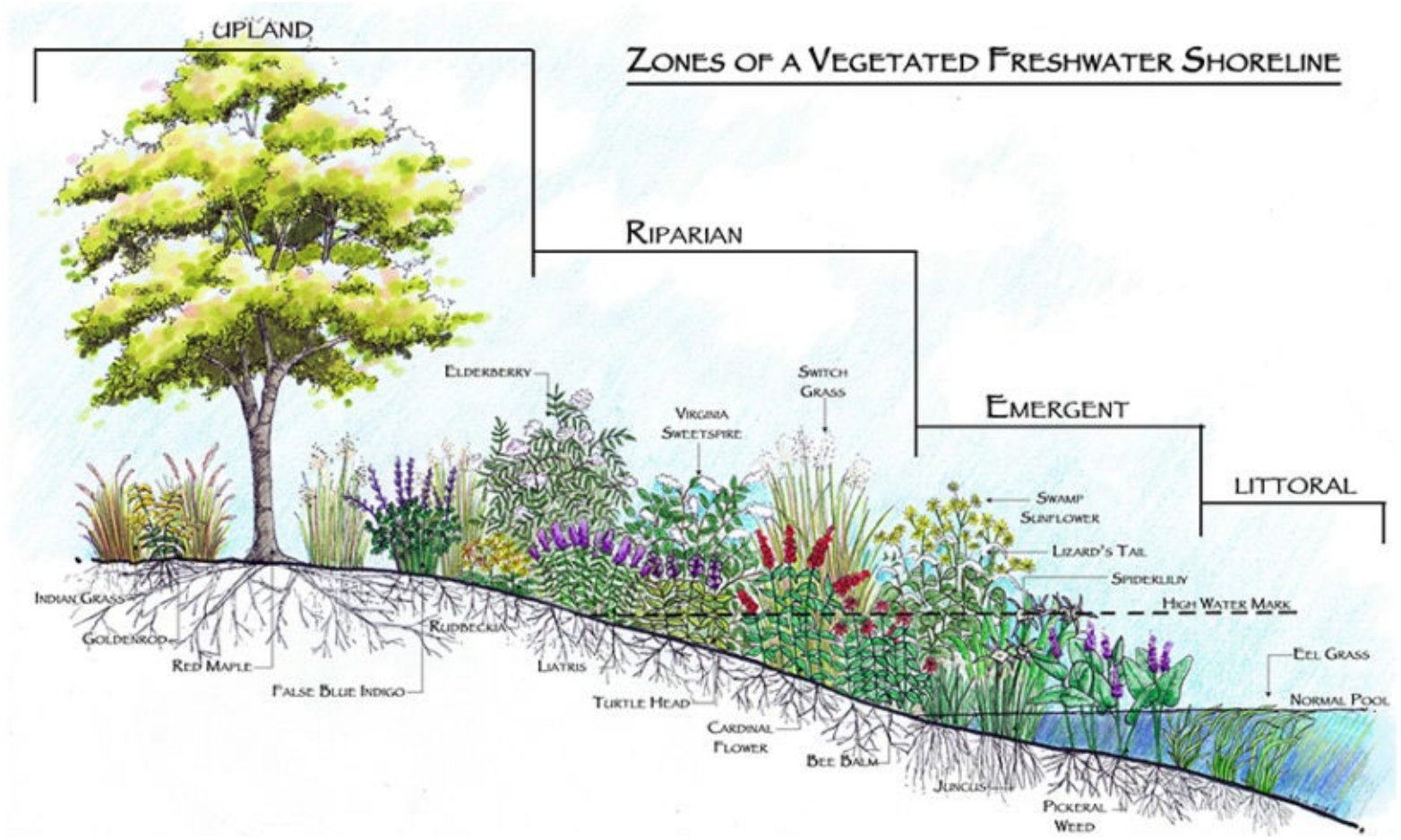
Common Name	Scientific Name	Evergreen/Deciduous	Mature Height (ft) / Spread (ft)	Soil Moisture	Light Preference	Attracts Wildlife
Southern Sugar Maple	*Acer barbatum*	Dec	50-60 / 25-40	Moist to Wet	Sun to Partial Shade	Mammals
Boxelder	*Acer negundo*	Dec	30-50 / 35-40	Dry to Moist	Sun to Partial Shade	
Red Maple	*Acer rubrum*	Dec	40-60 / 40-60	Dry to Wet	Sun to Partial Shade	Birds
Bitternut Hickory	*Carya cordiformis*	Dec	50-75	Dry to Wet	Sun to Partial Shade	Birds, Mammals
Mockernut Hickory	*Carya tomentosa*	Dec	65-100 /	Dry to Moist, Well-drained	Sun to Partial Shade	Birds, Mammals
Shagbark Hickory	*Carya ovata*	Dec	60-80 / 25-35	Dry to Moist	Sun to Partial Shade	Mammals
Fruitless Sweetgum	*Liquidambar styraciflua 'Rotundiloba'*	Dec	50-70 / 35-45	Moist	Sun to Partial Shade	
Tulip Tree	*Liriodendron tulipifera*	Dec	40-100 / 20-40	Moist	Sun	Birds, Butterflies, Mammals
Longleaf Pine	*Pinus palustris*	Evg	60-80 / 30-40	Dry to Wet	Sun to Partial Shade	Birds, Mammals
Pond Pine	*Pinus serotina*	Evg	30-50	Moist to Wet	Sun	Birds, Mammals
Loblolly Pine	*Pinus taeda*	Evg	60-90	Moist, well-drained	Sun	Birds, Mammals
Sycamore	*Platanus occidentalis*	Dec	70-100 / 60-80	Moist to Wet	Sun	
White Oak	*Quercus alba*	Dec	60-100 / 60-80	Moist, Well-Drained, Acidic	Sun	Birds, Mammals

Large Trees (Continued)

Common Name	Scientific Name	Evergreen/Deciduous	Mature Height (ft) / Spread (ft)	Soil Moisture	Light Preference	Attracts Wildlife
Scarlet Oak	*Quercus coccinea*	Dec	50-80 / 40-50	Dry	Sun	Birds, Mammals
Southern Red Oak	*Quercus falcata*	Dec	70-80 / 40-50	Dry, Acidic	Sun to Partial Shade	Birds, Mammals
Laurel Oak	*Quercus laurifolia*	Evg	60-70 / 50	Dry to Moist	Sun to Partial Shade	Birds, Mammals
Overcup Oak	*Quercus lyrata*	Dec	35-45 / 35-40	Moist to Wet	Sun to Partial Shade	Birds, Mammals
Swamp Chestnut Oak	*Quercus michauxii*	Dec	60-70 / 30-50	Moist to Wet	Sun	Birds, Butterflies, Mammals
Chestnut Oak	*Quercus montana*	Dec	60-70 / 60-70	Dry	Sun	Birds, Mammals
Water Oak	*Quercus nigra*	Dec	50-75 / 30-40	Moist to Wet	Sun to Partial Shade	Birds, Mammals
Willow Oak	*Quercus phellos*	Dec	60-80 /30-40	Moist to Wet	Sun	Birds, Mammals
Post Oak	*Quercus stellata*	Dec	40-50	Dry	Sun	Birds, Mammals
Black Oak	*Quercus velutina*	Dec	50-60	Dry to Moist	Sun to Partial Shade	Birds, Mammals
Live Oak	*Quercus virginiana*	Evg	60-80 / 60-120	Dry to Wet	Sun	Birds, Mammals
Winged Elm	*Ulmus alata*	Dec	45-70 / 30-40	Dry to Wet	Sun to Partial Shade	
American Elm	*Ulmus americana*	Dec	80-100 / 60-80	Wet to Moist	Sun to Partial Shade	

Additional Plants to Consider for Shoreline Applications

Common Name	Scientific Name	Planting Zone (see Figure 1)	Resistant to Waterfowl Damage
Tape-grass	*Vallisneria americana*	Littoral	
Lizard's Tail	*Saururus cernuus*	Emergent	
Bulrush	*Scirpus* spp.	Riparian	Yes
Mallow Hibiscus	*Hibiscus moscheutos*	Riparian	Yes
Swamp Sunflower	*Helianthus angustifolius*	Riparian	Yes
Cardinal Flower	*Lobelia cardinalis*	Riparian	
Bog Lily	*Crinum americanum*	Riparian	
River Oats	*Chasmanthium latifolium*	Riparian	Yes
Lizard's Tail	*Saururus cernuus*	Riparian	Yes
Big Bluestem	*Andropogon gerardii*	Upland	Yes
Switchgrass	*Panicum virgatum*	Upland	Yes
Butterfly Weed	*Asclepias tuberosa*	Upland	
False Indigo	*Baptisia australis*	Upland	Yes
Tickseeds	*Coreopsis*	Upland	
Hardy Ageratum	*Conoclinium coelestinum*	Upland	
Blazing Star	*Liatris* spp.	Upland	
Verbena	*Verbena* spp.	Upland	Yes
Goldenrod	*Solidago* spp.	Upland	
Salvia	*Salvia* spp.	Upland	



*Plants species shown in Figure 1 are typical of shoreline plantings statewide and intended as examples of the Planting Zones. Please refer to the above lists for specific plant species recommended for use in Richland County.

Figure 1. Planting Zones for Shoreline Water Quality Buffer Plants

Sources

Perennial Grasses and Sedges, Shrubs, Small Trees, Large Trees

Roth, L. (2004). *Life at the Water's Edge: A Shoreline Resident's Guide to Natural Lakeshore and Streamside Buffers for Water Quality Protection in South Carolina*. Clemson University Public Service Pub.

Additional Plants to Consider for Shoreline Applications, Figure 1

Caflisch, M., Foster, C. R., White, S. A., & Callahan, K. (2013, April 22). Shorescaping Freshwater Shorelines, HGIC 1855. Retrieved July 01, 2020, from https://hgic.clemson.edu/factsheet/shorescaping-freshwater-shorelines/

Additional Information

USDA PLANTS Database. Retrieved July 01, 2020, from https://plants.sc.egov.usda.gov/java/

Appendix L: Road Design Standards

SECTION 5
ROAD DESIGN STANDARDS

5.0 General: The County Engineer will approve all plans for construction or upgrading of streets or roads in the County Road System to include:

1. New construction
2. Staged development of roadways (overlays)
3. Roadway widening
4. Appurtenant roadway improvements such as storm drains and curb and gutter
5. Encroachments

To be eligible for acceptance into the County Road System, a street or road must be designed and constructed in accordance with these standards and approved by the County Engineer.

In general, roadways should be designed for the anticipated traffic density 20 years from the proposed date of construction. Special conditions such as long range planning studies, proposed zoning, industrial parks, proposed interstate facilities, etc. should be considered in the design.

5.0.1 Road Designation: Roadways in the County Road System are classified as one of the following:

1. Rural
2. Residential (Minor/Local)
3. Collector
4. Local Commercial
5. Industrial Service
6. Arterial

The determination of the appropriate classification should be made in consultation with the Planning Department.

5.0.2 Drainage: Storm sewer systems constructed to drain streets accepted into the County Road System are eligible for acceptance by the County if designed and constructed in accordance with the Richland County Stormwater Management Ordinance.

5.0.3 Plans: Complete construction plans and specifications together with all appropriate design calculations are to be submitted and approved prior to the commencement of construction. Plans are to be provided in digital format on computer disc as well as on 24" x 36" sheets. Plans are to be on state plane coordinates in accordance with Richland County's digital submission standard and to contain the following information:

1. Plan
2. Profile
3. Horizontal curve data
4. Vertical curve data
5. Grades
6. Stations of all PI's, PC's, PT's and intersections

7. Existing and proposed grades at half station
8. Typical cross section
9. Pavement design - to include supporting soil data (Grain Size, Attenberg limits, CBR's)
10. Drainage Structures
11. Utilities - all known or suspect (gas, phone, cable, electric, sewer and water)
12. Signing Plan
13. Pavement Marking Plan
14. Length of Proposed Roadways rounded to 0.01 Mile

5.0.4 As-Builts: As-built plans on computer disc are to be provided before final approval will be issued. As-built plans will also comply with the County's digital submission standard.

5.0.5 Standard Sections: Standard cross sections for the various road classifications and subgrade soil support values are available from the County Engineer's office.

5.0.6 Dedication: Roadways designed and constructed in accordance with these standards and approved by the County Engineer's office may be dedicated to Richland County for maintenance. This is accomplished through the submittal and acceptance of a deed for the right-of-way. Standard deed forms for this purpose are available from the County Engineer's office. The deed form, entitled Title to Real Estate, is reproduced at page 21. Executed deeds must be provided as a prerequisite for final approval.

5.0.7 Guarantee: As a condition for acceptance of a road into the County Road System, Richland County requires a one year warrantee accompanied by a bond in the amount of the construction cost. The warranty and bond will pertain to the design and construction of the streets and accompanying drainage system in accordance with these standards and their satisfactory performance during the warranty period.

All pavement failures and other structural defects that are detected during the warranty period are to be corrected by the grantor upon official notification by the County Engineer's office. A guarantee clause is contained in the easement and right-of-way deed itself. The guarantee period begins with the County's execution of the deed.

5.0.8 Constructions Zones: Within the County Easements/ROW's.

1. **Structural Zones** Any area that will or may receive an additional loading of weight or energy. To include all roads, road easements, detention or retention ponds.

2. **Non Structural Zones** Landscaped storm drain easements.

Note: Refer to section 5.0.12: Required Geotechnical Testing and County Inspections.

5.0.9 Inspection: All elements of roadway and storm drain system construction, in both Structural and Non Structural Zones must be inspected and approved by the County Engineer's office as a prerequisite for acceptance by Richland County. This will include:

1. Sub grade Surface
2. Storm Drain System and all related structures

3. Detention/Retention Ponds
4. Embankments
5. Utilities within the structural zone
6. Utilities in Landscaped zones
7. Sub grade for roads
8. Finished grade of road easements/ROW
9. Sub base
10. Base Course
11. Asphalt Paving

It is the contractor's responsibility to insure the County Engineer's office is notified upon completion of each phase of construction and has the opportunity to make their inspections before proceeding to the next phase. Instructions for coordination of the inspections with the contractor's activities are provided in Section 5.0.10 and 5.0.11.

It should be understood that the inspections conducted by the County Engineer's office are for the protection of Richland County only. They are not intended to certify the contractor's satisfactory discharge of his contractual obligation to the owner, nor do they relieve the project engineer from any of his responsibilities with regard to inspection and contract administration.

5.0.10 General Instructions to Contractors: The following procedures for implementation of the County's inspections and final approval shall be followed. It is recommended that these instructions be included in the contract documents for the construction contract.

Applicability: As a prerequisite to County approval and acceptance of new streets, all phases of construction must be inspected and approved by the County Engineer's office. This applies to all subdivision streets constructed under the jurisdiction of Richland County Land Development Regulation whether they are to be dedicated to Richland County or not.

Specifications: All construction and materials shall comply with the latest edition of the SCDOT Standard Specifications for Highway Construction unless specifically noted otherwise herein. These requirements and SCDOT specifications shall supersede the engineer's specifications in the event of a discrepancy.

Testing: The contractor is responsible for providing all geotechnical and materials testing and the accompanying documentation at no cost to the County. All testing is to be performed by a licensed certified agency and signed off on by the engineer. All testing is to be identified on forms as to the exact location (SD No.'s, Street name, Sta. No.'s, and elevation in regards to finished grade.) The County will be responsible for providing its own quality assurance testing. Unless otherwise stated herein, the proctor densities required under these procedures are standard proctor densities.

Notification: After receiving approval of street, storm drainage and sediment and erosion control plans, the contractor or engineer must contact the County Engineer's office with a start date for construction at least 48 hours in advance. Upon completion of site clearing and grubbing and erosion control installation a mandatory site meeting will be held. Meeting is to be arranged by the contactor or project engineer. Meeting shall be attended by project engineer, contractor, developer, geotechnical engineer, county engineer, and any utilities that will or may encroach on/into a Structural Zone. (Attendee must be a responsible

representative, meeting should be timely planned and the county notified at least 48 hours in advance.)

Erosion Control: Before starting any grading work, install sediment and erosion control measures per the approved plans to protect any downstream water bodies. The contractor is responsible for implementation and weekly or bi-weekly monitoring of the sediment and erosion control plan in accordance with SC DHEC Regulations, insuring inspection logs are available on site at all times, and for insuring that silt and sediment do not leave the site.

Inspections: Requests for any inspection must be arranged with the County Engineer's office 24 hours in advance.

Other Regulations: The developer and contractor are also responsible for compliance with all applicable regulations administered by other agencies such as:

- SCDHEC
- Corps of Engineers
- SCDOT
- Richland County Planning and Zoning

The County Engineer's office may withhold approval at any stage of construction, including final approval, for failure to comply with these regulations.

5.0.11 Required Geotechnical Testing and County Inspections:

Mandatory Initial Sub grade Surface Inspection: After clearing and rough grading of streets but prior to placement of any storm drain or fill for road way embankments, a mandatory sub grade surface inspection is required.

The developer, contractor, project engineer, geotechnical engineer, any utilities that may be working within a structural zone and the County Engineer's office should be present. This inspection shall be set up by the contractor or the project engineer.

A rubber tired backhoe or motor grader are needed for this inspection in order to confirm that all stumps, roots and unacceptable soils have been removed. A proof-roll may be conducted during this inspection at the discretion of the County Engineer's office or geotechnical engineer. Underdrain requirements may also be identified at this point. All deficiencies identified during this inspection must be corrected by the contractor before the next inspection is requested. The consulting engineer or geotechnical engineer as well as the County Engineer's office and contractor should be represented. This inspection shall be set up by the contractor or the consulting engineer.

Detention/Retention Ponds: Such areas to be considered Structural Zones. Pond dikes are to be constructed with fill approved by and signed off on by the geotechnical engineer; absolutely No Organics are permitted in dikes. Fill material is to be tested every 1 ft. in elevation and every 100 l/ft., with a minimum of 2 tests per lift. Trenches through a pond dike are to be considered a Structural Zone and should be tested accordingly. All fill must be compacted to at least 95% of maximum proctor density. County Engineer is to be copied on all testing.

Trenching and Backfilling: Storm drain trench bedding and backfill must be a SCDOT approved material, be visually inspected, and signed off on by the geotechnical inspector and a copy of the inspection must be sent to Richland County.

The contractor shall notify the County Engineer's office when backfilling of storm drainage or utility excavations within a Structural Zone is to take place. Backfill in these excavations shall be compacted at the proper moisture content in lifts not exceeding 6 inches. The contractor shall provide geotechnical testing and documentation, at no cost to the County, confirming that all backfill has been compacted to at least 95% of maximum proctor density.

Trenches in the Structural Zone: Such trenches are to have density testing beginning at the pipe haunches, both sides, every 100 ft. or any portion of that, testing to be performed every 1 ft. of fill every 100 ft. until sub grade elevation is met.

Trenches in a Non Structural Zone: Such trenches are to have a density testing beginning at pipe haunches both sides every 200 ft., or any portion of that, testing to be performed every 2 ft. of fill every 200 ft. until sub grade elevation is achieved. Density Requirement in a Non Structural Zone to be 95% of maximum proctor density within the pipe zone and 85% from top of pipe zone to finished grade..

County Engineer is to be copied on all testing. If not properly notified, or if the test results are unsatisfactory, the County Engineer's office may require excavation and re-compaction of the backfill. No proof-roll of the sub grade will be scheduled until the backfill compaction has been documented. Flowable fill may be used in lieu of compaction in 6" lifts and geotechnical testing. Notification, however, is still required so that an inspection of the excavations can be accomplished prior to placement of flowable fill.

Erosion Control: Install sediment and erosion control measures around storm drain inlets as they constructed. Sediment basins and detention ponds must be in places at this time.

Storm Drain Boxes:

1. **Boxes inside a Structural Zone -** fill around boxes to have 1 density test for every 2 ft. of fill placed. Density test must meet 95% of maximum proctor density.
2. **Boxes inside a Non Structural Zone -** fill around boxes to have 1 density test for every 3 ft. of fill placed. Density test must meet 85% of maximum proctor density. County Engineer is to be copied on all testing.

Embankments: All stumps and large roots must be removed from the roadbed prior to placement of fill for embankments regardless of fill height. All roadway embankment and embankment fill must be approved by and signed off on by the geotechnical engineer. Roadway embankments fill to be placed and compacted in lifts not exceeding 8". The contractor is responsible for providing geotechnical testing and documentation that the embankment material has been compacted to 95% of maximum proctor density. Density testing of embankment fills to be performed every 1ft. of fill every 250 ft. alternating lanes with a minimum of 2 tests per road, per 1ft. of fill. County Engineer's office is to be copied on all testing. No proof-roll of the sub grade will be scheduled until the compaction has been documented.

Embankment Modifications: Any roadway embankment modifications (extra stone, soil cement, lime treatment, geo grid, etc) must be approved by the geotechnical engineer and the County Engineer notified of such modifications.

Curb and Gutter Proof-Roll: Curb and gutter must be placed on compacted and approved sub grade or base material. Prior to scheduling a curb and gutter proof-roll the County Engineer's office must be in receipt of all density testing data required to be completed at this stage of construction. The geotechnical inspector, contractor, project engineer and County Engineer shall be present for this proof-roll.

> **NOTE:** Upon completion of a passing curb and gutter proof-roll, absolutely no excavation or trenching is to be done in a Structural Zone (Roadway or Roadway Easement) without the approval of the Richland County Engineer's office.

Underdrains: The need for and location of underdrains will be identified in conjunction with the proof-roll of the sub grade. Required underdrains will be clearly marked on the contractor's and County Engineer's plans and must be installed prior to requesting the next inspection. The location of underdrains must also be shown on the as-built plans.

Sub Grade Proof-Roll: Prior to scheduling a sub grade proof-roll, the County Engineer's office must be in receipt of all density testing data (sub grade should have been tested every 250 ft., alternating lanes testing to be completed on cut or fill), required to be completed at this stage of construction. It is the responsibility of the contractor to provide independent density verification prior to proof-rolling and at no cost to Richland County.

After fine grading of sub grade, but prior to placing base material, the sub grade must be proof-rolled with a loaded tandem axle dump truck or pan. The contractor shall schedule this inspection. The geotechnical engineer, County Engineer's office and contractor shall be represented. The County Engineer's office reserves the right to conduct or require additional testing at any time. The minimum acceptable sub grade density is 95% of maximum proctor density.

No base course material or curbs should be placed prior to written approval of the sub grade from the County Engineer's office.

> **NOTE:** Any completed and approved sub grade left exposed for over two weeks or damaged by inclement weather must be re-inspected and approved by the County Engineer's office. This may include another proof-roll if necessary in the judgment of the County Engineer's office.

Any excavation within a tested and county approved sub grade shall be treated as new excavation and complete density testing and proof-rolling requirements must be met.

Catch Basins: The location and orientation of the catch basins relative to the curb and gutter, as well as the roadway width, should be confirmed at this time. Catch basins improperly placed must be relocated and/or reconstructed. All catch basins must have a temporary drain by which standing water can be drained from the surface of the sub grade and base during construction. These drains must be properly plugged before the final inspection is requested.

Base Course: Placement of base course material is only permitted on a County approved sub grade. Base course material other than graded aggregate base course must be approved by the County Engineer's office (sand clay, cement, stabilized, geo grid etc.) All base course materials are to be density tested every 250 feet in alternating lanes with a minimum of 2 tests on any road no matter the length. Thickness of base course material must be verified at each density test location.

The following compaction requirements must be met:

- Graded Aggregate Base Course (98% of modified proctor density)
- Sand Clay Base Course (100% of maximum proctor density)
- Cement Modified Earth Base Course (95% of maximum proctor density)

It is the responsibility of the contactor to provide independent density verification at no cost to Richland County.

Graded Aggregate Base Course: If base course is thicker than 8 inches it shall be placed and compacted in equal lifts, if base course is less than 12 inches it can be tested as 1 lift. If base course is 12 inches or greater it must be placed compacted and density tested in equal lifts (12 inches, compact and test at 6 inches and 12 inches).

Base Course Proof-roll: Prior to scheduling a Base Course Proof-Roll the County must be in receipt of all base course density testing and thickness verification reports. If the average base course thickness is found to be deficient by more than ½ inch or any individual measurement deficient by more than 1 inch, the deficiency will be corrected by scarifying, adding base material, re-compacting and density testing. Upon completion of the curbing and base course, the contractor shall schedule an inspection to proof-roll the base with a loaded tandem axle dump truck or pan. The geotechnical engineer, County Engineer and contractor shall be represented. The contractor will provide proctor and gradation information on the base material from an independent testing firm as well as verification that all applicable compaction and depth requirements have been satisfied.

> **NOTE:** Any completed and approved stone base left exposed for over one week or damage by inclement weather must be re-inspected and approved by the County Engineer's office. This may include another proof-roll if necessary in the judgment of the County Engineer's office.

5.0.12 Paving:

Asphalt Requirements: Unless another type has been approved in advance, by the County Engineer's office for a specific project, hot mix asphalt pavements will be:

Binder Type 1 or 2 (Intermediate Type B or C)	for binder (Intermediate) courses
Surface Type 1 (Surface Type C)	for surfaces courses

All hot mix asphalt will contain hydrated lime as an anti-stripping agent. A roadway will not be approved and accepted by the County without this additive in the asphalt

Coordination: After approval of the base or sub grade, there must be coordination between the paving contractor and the County Engineer's office with regard to the schedule for paving. If possible, a County inspector will be present during paving operations but it is not mandatory unless so designate by the County Engineer.

1. Asphalt is only to be placed on a county approved base.

2. If more than one week passes or there is 1/4 in or more rain prior to paving an approved base, the base must be re-inspected by the County visually, and possibly proof-rolled.

3. Minimum Asphalt thickness for initial/ first lift is 2 in.

4. Asphalt concrete surface course may not be placed during the months of December, January and February except with the written permission of the County Engineer. Placement of hot mix Asphalt will not be authorized when surface temperatures are less than 45 degrees F.

5. Richland County Engineer's office to visually inspect pavement and review Asphalt core test data at all phases of paving, binder, intermediate and surface course.

6. Asphalt tack coat to be placed between all course no exceptions.

Final Surface Course: An existing asphalt concrete binder or base course must be inspected and approved prior to placement of the asphalt surface course. Verification of in-place density and thickness of the binder or base course must be provided as a prerequisite to this approval. Failure to obtain this approval will make the street ineligible for final approval and acceptance by the County.

Asphalt Requirements: Asphalt verification testing will be conducted in accordance with Section 401.30 of the SCDOT Standard Specifications for Highway Construction, Newest Edition. The contractor shall be responsible for providing verification of the asphalt type, asphalt binder content, gradation and the average laboratory bulk specific gravity (BSG) for all asphalt mixes used on Richland County projects as well as the in-place asphalt density and thickness. The asphalt contractor must have an asphalt laboratory certified by the SCDOT for state highway projects.

For each day's production, the contractor's asphalt lab must provide:

- Average laboratory BSG
- Asphalt binder content
- Gradation
- Mix type

The in-place density and thickness determination of asphalt surface and binder courses will be based on the core data for each day's production. Cores will be obtained every 500 ft. in alternating lanes with a minimum of one core on any road no matter the length, immediately after completion and the holes patched with hot asphalt from the same day's production. The cores will be taken and evaluated by either the asphalt contractor or an independent materials testing firm certified by the SCDOT for state highway projects.
The pavement will be rejected, removed and replaced if the average in-place core density is less than 96% of the average laboratory BSG with all cores exceeding 95%.

The average pavement thickness must be equal to or greater than the plan thickness with no individual core thin by more than 0.25". Pavements that are deficient with regard to thickness will either be removed and replaced or overlaid at the discretion of the County Engineer. Each core will be tested for the presence of hydrated lime in the mix.

Documentation of the asphalt verification testing must be provided prior to requesting a final inspection. The Richland County Engineer's office reserves the right to conduct or require additional verification testing at any time.

Proof-Roll of Road Easement: Easements should be properly graded and compacted according to plans. Fill along curb line is to be a minimum of ½ inch above curb line and compacted. No water should be allowed to stand behind the curbing once it is completed. All water is either to drain away from or over the curb. In lieu of density testing in Roadway Easements, a proof-roll will be conducted by the County Engineer's office. Proof-Roll is to be scheduled by the contractor prior to grassing. A rubber tire backhoe pick-up truck, rubber tire skid loader is preferred for this proof-roll. A maximum of 1 inch deflection is permitted during this proof-roll.

5.0.13 Signs: Traffic control signs and name signs on new streets are to be installed by the developer in accordance with an approved signing plan as a prerequisite for acceptance by Richland County.

A standard detail for the name signs may be found on Page 29. For the sake of uniformity and ease of maintenance, this is the only acceptable name sign for County maintained streets unless and alternate design is submitted to and approved by the County Engineer's office.

Traffic control signs are to be fabricated and erected strictly in accordance with the S.C. Manual on Uniform Traffic Control Devices.

5.0.14 Final Approval:

Final Inspection: After the paving is completed and all utility, storm drainage and associated work is complete, a final inspection can be scheduled. The following items should all be completed before a final inspection is requested:

- Permanent grass on road shoulders; cut and fill slopes and easements
- Fence around detention ponds
- Street name signs (County Standard or an approved alternate)
- Traffic control signs (per SC MUTCD)
- Pavement marking (Thermoplastic)
- As-built Drawings

Documentation: As a prerequisite to conducting the final inspection, the following must be provided:

- Digital submission of as-built plans
- 12"x18" hard copy of as-built plans
- Right-of-way deeds for roads and drainage system
- One year warranty bond for road and drainage systems
- Documentation of asphalt verification testing

Bond Estimate: If approval of a bond in lieu of completion is sought, the engineer must provide an estimate of the quantities of the uncompleted items of work together with their contract values and total cost. When the uncompleted work includes the final surface course, the estimate must include remedial work on a minimum of 25% of the total pavement area.

Punch List: A written punch list of deficiencies found during the final inspection will be provided. All items should be completed before requesting a re-inspection.

Final Approval: Upon satisfactory completion of all punch list items, a final approval letter recommending County acceptance of the streets and drainage system will be issued by the County Engineer.

Failure to comply with any of the above listed requirements could render the streets and storm drainage systems ineligible for acceptance by Richland County.

5.0.15 Encroachment Permits:

An encroachment permit, approved by the County Engineer's office, is required for all construction, undertaken by parties other than the Richland County Public Works Department or its authorized contractor, within or affecting the right-of-way of any County maintained road. This requirement applies, but is not be limited, to:

- Driveway connections involving a curb cut or pipe installation
- Curb cuts
- Utility taps
- Utility crossings
- Storm drainage installation
- Storm drainage discharge
- Subdivision entrance signs or gateways

The permittee is required to indemnify the County for any liability incurred or damages sustained as a result of the encroachment.

The permittee is responsible for:

- Notifying the County Engineer's office when construction begins on an encroachment
- Ensuring that a copy of the encroachment permit is on the construction site
- Ensuring that the construction and the restoration of the roadway have been approved by the County Engineer's office
- All construction

The encroachment permit application form may be obtained from the County Engineer's office.

Anyone who encroaches on the right-of-way of a County maintained road without securing an encroachment permit or who fails to adequately restore the road and right-of-way after an encroachment is subject to fines of up to $500.00 per day in accordance with County ordinance.

5.1 Pavement Design Standards:

5.1.1 General: In determining the required pavement strengths, the following factors shall be considered:

1. Road designation
2. Traffic Data. DHV, ADT, Percent Trucks (T)
3. Soil characteristics and strength
4. Traffic growth rates
5. Pavement strengths
6. Structural number
7. Stage development
8. Parking
9. Drainage
10. Geometries

5.1.2 Road Designation: A road's designation as Rural, Residential, Collector, Local Commercial, Industrial Service or Arterial, should be determined in consultation with the Planning Department.

5.1.3 Reserved

5.1.4 Traffic Data: The following information shall be provided for each proposed road improvement:

A. ADT, Average Daily Traffic, the daily traffic flow in both directions of travel, for a 24-hour period.

B. DHV, Design Hour Volume, the 30th highest hourly volume of the year is designated the DHV. If this information is not readily available DHV may be calculated as 12% of the ADT.

C. T, Percentage of Trucks, the quantity of trucks during the ADT or DHV, expressed as a percent of that total traffic. For the purpose here, light delivery trucks, such as panels and pick ups, are considered as passenger cars. In lieu of the actual field data, T can be considered 10% on Arterials, 5% on Collector and minor Residential. Special conditions must be discussed with the County Engineer for the Industrial Road Designations.

C.1 Trucks shall be further identified as follows, during the traffic counting.

2DT - Unit truck, two axles
3SU - Unit truck, three axles
2S1 - Semi truck, two axles on cab, one axle on tailor
2S2 - Semi truck, two axles on cab, two axles on tailor
2AX - Truck with five axles or more

C.2 In lieu of the actual traffic count to determine T, and utilizing the percentages provided in Section 5.1.4C the following road designations shall contain the respective road groups as follows:

A. Residential (or Local) - Road Group B
B. Collector - Road Group D
C. Commercial - Road Group D
D. Industrial - Road Group J

Road group loads and their effect on pavement design as related to these road groups is as shown on Data Sheet 1 of the design sheets.

D. Lane Factor: In two lane roads the total one-way traffic is obvious. In four lane roads the most heavily traveled lane will be the right most lane and a factor of 0.8 will be applied to the total one-way traffic. In six lane roads, the most heavily traveled lane will be the right lane also, and a factor of 0.7 will be applied to the total one-way traffic.

E. Average one-way ADT, or when the 20-year ADT is calculated based upon section shall be taken as the following: In or near City Suburbs - 55% - Rural Areas - 65%.

5.1.5 Subgrade Soil Support Value: In the case of proposed new construction, the soil support value of the Subgrade will be provided by the tri-axial shear test; modulus of deformation may be developed by laboratory testing and correlated with the accompanying soil support scale to provide these data. This value is requested also for staged road work (overlays) and road widening work. In lieu of an actual soils evaluation, a value of 1.50, 2.5 or 3.5 (as determined by the County Engineer) may be used for the value of S. Data Sheet 4 gives the estimated Soil Support Value and other related data for those soils occurring in Richland County as identified by the Soil Conservation Service.

The designer should be aware that the maximum soil support value that will be accepted without a laboratory analysis of the subgrade soil is 3.5.

5.1.6 Traffic Growth Rate: A figure of 4% per year has been identified as the growth rate characterizing traffic within the United States. This figure should be used for forecasting anticipated ADT with the pavement design life. Other figures from local expertise are acceptable, when qualified as acceptable by the County Engineer.

5.1.7 Coefficients of Relative Strength of Pavement Component Layers: The required thickness of a given layer or layers varies with their respective tensile strength. This strength is expressed in terms of relative coefficient. The estimated values of coefficients of the pavement components used in AASHO Interim Guide for the Design of Flexible Pavement Structures and ASHTO Road Test Equations applied to the Design of Bituminous Pavements in Illinois are utilized in this standard. It is to be understood that these coefficients may change if and when future studies are made to more accurately evaluate their respective tensile strength. At that time the County Engineer will provide updated coefficients for incorporation with these standards.

5.1.8 Structural Number: An index number derived from an analysis of traffic and design features which may be converted to pavement thickness through the use of suitable factors related to the type of material being used in the pavement structure.

This dimensionless number reflects the product of the necessary thickness of the various road building components of pavement, i.e., sub-base, base-course, binder and/or leveling course, surface course and existing surface course, and their respective Coefficient of Relative Strength which when totaled together for the final pavement design must equal or exceed the Structural Number (SN).

The designer should be aware that the minimum structural number for the particular road designations are as follows:

Residential and Rural	1.56
Collector	2.00
Local Commercial	2.44
Industrial Service	2.44

These minimum structural numbers are applicable to roads constructed on subgrade soils with soil support values equal to or greater than 5.5. When constructed on poorer soils, the pavement must have a structural number appropriate to the road designation and soil support value for the subgrade soil on the particular site.

5.1.9 Stage Construction: Various items of road construction such as pavement courses, lane requirements for future traffic density, or other sequential work must have the approval of the County Engineer prior to consideration for acceptance by the County of Richland.

Pavements on which the total asphalt thickness equals 2.5" or greater will be placed in two stages. The base and asphalt concrete binder course will be placed as the first stage. At this stage, a surety bond may be posted and a bonded plat recorded for the subdivision in accordance with the provisions of the Land Development Regulations. After a minimum period of nine (9) months, all pavement failures and distresses will be repaired to the satisfaction of the County Engineer, or his representative, and a minimum of 1" of asphalt concrete surface course placed. At this stage, the road may be dedicated to the County through the execution and acceptance of a deed for the right-of-way.

The surety bond placed at the completion of the first stage will be in an amount equal to 125% of the estimated value of the remaining improvements. The estimated value will include, as a minimum, the cost of the surface course and repair of pavement failures on at least 25% of the pavement surface.

5.1.10 Flexible Pavement Design Method: The following explains the use of Data Sheets 1, 2 and 3 accompanying the Road Design Standards:

Data Sheet 1 is a summary of the traffic data, Data Sheet 2 is a nomograph relating the Soil Support Value and the Equivalent Daily 18 KIP Single Axle Load Application to the Structural Number, and Data Sheet 3 provides the Coefficients of Relative Strength for Flexible Pavement Components.

Most of the first two lines of Data Sheet 1 are obvious. The truck %, (T), Designation, and number of lanes are derived from the traffic count (ADT) and the design standards. In the event that this is to be a new road, this information will be obtained from the County Engineer. Section 5.1.4.C may be consulted for traffic information in lieu of an actual traffic count.

With the results of the traffic count (ADT) Columns 1 and 2 and the percent trucks, T can be inserted. The 20-year figure is obtained from the design criteria, or by the utilization of their growth rates acceptable to the County Engineer.

The average one-way ADT is derived from the design criteria, Section 5.1.4.E and is inserted in Column 3. Average one-way ADT factor is shown in Table IV. Average one-way trucks, are computed to be T multiplied by Column 3 with the result divided by 100 and then inserted in Column 4. The Truck weight, Column 5 represents either the design criteria road group equivalent 18 KIP applications per 100 trucks, or a computed equivalent 18 KIP applications per 100 trucks. The design criterion's road group is a shown in Table I. The computed value is calculated by utilizing the traffic count, and the percent trucks T, with the actual quantity of each respective truck designation as described in the design criteria. The number of trucks of each respective designation when multiplied by its equivalent 18 KIP per 100 vehicles of a type (Table II), and then divided by 100 will be the equivalent truck weight figure based on the traffic count (ADT).

Column 6 is obtained by multiplying Column 5 by Column 4. Column 7 is obtained by going to Table III and selecting the appropriate lane factor, based upon the number of lanes in the project. Column 8 is obtained by multiplying Column 7 by Column 6. Column 8 becomes one point on the nomograph on Data Sheet 2, and is plotted on the Equivalent Daily 18 KIP single axle load applications.

The Soil Support Value, or the modulus of deformation is obtained through a soil test and is a measure of the bearing strength of the supporting subgrade under the pavement components. In lieu of a field test the values in the design criteria section 5.1.5 may be employed for S.

The tri-axial shear test is utilized for the field determination of the value of S. or the modulus of deformation, and becomes the second point on the nomograph shown on Data Sheet 2, under its appropriate scale shown. It is also to be shown on Data Sheet 1 to provide all information to the designer in a concise package.

The two points described in the preceding paragraphs describe a straight line, which is extended to intersect with the line segment designated as a total pavement strength measure, which is to be equaled or exceeded by the total of the respective pavement section strengths. This formula employed is $SN = T_1a_1 + T_2a_2 + T_3a_3$ where:

T_1 = thickness of bituminous surface courses, in inches
T_2 = thickness of base course, in inches
T_3 = thickness of subbase course, in inches

a_1, a_2, a_3 = Coefficients of Relative Strengths which are obtained from Data Sheet 3 accompanying this example.

When the aforementioned equation computes out to equal or exceed the SN obtained from nomograph, the design pavement is valid and may be proposed. The designer should verify that the minimum asphalt thickness, 1½", has been used in the surface courses and that the minimum pavement thickness for each component or its equivalent is in accord with that established for its respective road designation.

5.1.11 Standard Design: In lieu of a pavement design as prescribed above, the engineer may elect to use a pavement as shown on Richland County's Standard Street Cross Section, Alternate 1, 2, 3 or 4. The appropriate alternate is to be selected according to the estimated soils support value for the subgrade soil prevalent at the site as follows:

Soil Support Value	Alternate
1.5	1
2.5	2
3.5	3
5.5	4

Estimated soil support values for the various soil types identified on the Soil Survey of Richland County are provided in Data Sheet 4.

It should be noted that the standard pavement design may not be used in lieu of an individual pavement design based on subgrade or traffic conditions known or anticipated to be different from those on which the standard design is based.

5.1.12 Rigid Pavement Design: Rigid pavements are currently not approved for use on the County Road System.

TRAFFIC DATA FOR PAVEMENT LOADING

ROAD_____ DESIGNATION_____ FROM_____ TO_____
T% TRUCKS_____ PAVEMENT TYPE_____ # OF LANES_____ DATE_____

1 ADT	2 DESIGN PERIOD	3 ONE-WAY ADT	4 ONE-WAY TRUCKS	5 TRUCK WEIGHT	6 ADJUSTED TRUCKS	7 LANE FACTOR	8 ONE-WAY EQUIV. DAILY 18 KIP SINGLE AXLE LOAD APPLICATION

TABLE I

ROAD	DISTRIBUTION BY TYPE					EQUIV. 18 KIP APP PER 100 TRUCKS	
GROUP	2DT	3SU	2SI	2S2	5AX	FLEXIBLE	RIGID
B	92.9	1.6	1.4	2.7	1.4	23.14	25.71
D	86.5	0.6	3.1	5.2	4.6	28.92	34.44
G	71.7	6.5	2.4	12.5	6.8	39.97	52.11
J	54.0	6.8	3.5	20.2	15.5	55.70	77.30

TABLE II

EQUIV. 18 KIP APP PER 100 VEHICLES OF A TYPE		
VEHICLE TYPE	FLEXIBLE	RIGID
2DT	17.83	17.75
3SU	62.69	101.52
2SI	76.91	76.84
2S2	109.88	145.54
	109.14	185.32

TABLE III

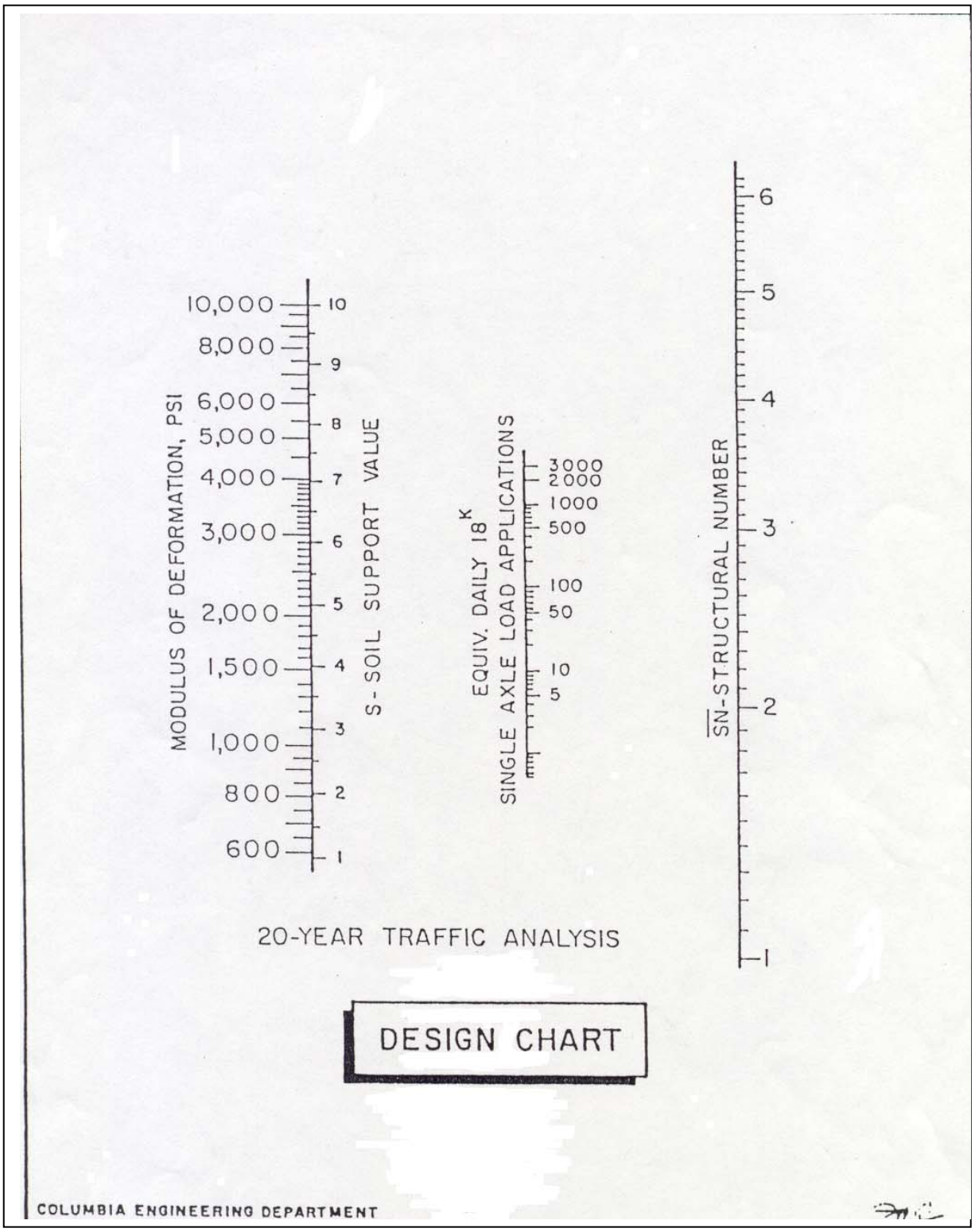
NO. OF LANES	LANE FACTOR
2	1
4	0.8
6	0.7

TABLE IV

AVERAGE ONE-WAY ADT FACTOR	
IN CITY	0.55
NEAR CITY (5~MI)	0.65

SOIL SUPPORT VALUE_____

DATA SHEET NO. 2



DATA SHEET NO. 3
S.C. DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION
COEFFICIENTS OF RELATIVE STRENGTH FOR FLEXIBLE PAVEMENT COMPONENTS
July 1, 1979

Pavement Components	Coefficients		
	a_1	a_2	a_3
Surface Course			
Hot Laid Asphalt Concrete Surface	0.44		
Hot Laid Asphalt Concrete Binder	0.44		
Bituminous Surfacing	0.35		
Old Surface			
Old Asphalt Concrete Surface Course	0.26		
Old Asphalt Concrete Binder Course	0.26		
Old Sand Asphalt	0.16		
Bituminous Surfacing	0.21		
Base			
Earth Type Base Course (Sand Clay)		0.12-0.20*	
Coquina Shell Base Course		0.12	
Mcadam Base Course		0.15	
Cement Stabilized Earth Base Course			0.25
Hot Laid Sand Asphalt Base Course		0.20-0.25*	
Stabilized Aggregate Base Course (Fossil/Limestone)		0.22	
Stabilized Aggregate Base Course (Non-Fossil/Limestone)		0.15	
Hot Laid Asphalt Concrete Binder Course		0.34	
Hot Laid Asphalt Aggregate Base Course		0.34	
Cement Stabilized Aggregate Base Course		0.34	
Old PCC Pavement		0.40	
Sub-base			
Soil Aggregate Subbase Course			0.10
Cement-Modified Subgrade			0.15

(*) Coefficient dependent on quality of material available.

Note: In general, it is recommended that, in computing SN for resurfaced flexible pavements, the coefficient for the former base be no greater than 0.7 of its original value, and that for the former subbase be no greater than 0.8 of its original value.

Data Sheet No. 4

Soil Name & Map Symbol	% Passing 200 Sieve (F)	Liquid Limit (LL)	Plasticity Index (PI)	Group Index (GI)	Soil Support Value (S)
Ailey - AeC	40	40	16	2.5	3.5
Altavista - AtA	75	45	26	18.6	2.5
Blanton - BaB	12	--	--	0	3.5
Cantey - Ca	95	60	25	30.0	1.5
Chastain - Cd	98	75	40	48.5	1.5
Chewacla - Ce, CH	98	61	30	35.8	1.5
Clarendon - Cn	55	40	15	6.0	3.5
Congaree - Co	90	50	22	28.2	1.5
Coxville - Cx	80	55	35	28.6	1.5
Dorovan - Dn	NA	NA	NA	NA	NA
Dothan - DoA, DoB, DuB	45	40	25	3.5	3.5
Faceville - FaA, FaB	72	43	23	15.4	2.5
Fuguay - FuA, FuB	35	--	--	0	3.5
Georgeville - GeB, GeC	98	75	35	44.4	1.5
Goldsboro - GoA	55	35	16	5.9	3.5
Herndon - HeB, HeC, HnB	98	70	30	38.6	1.5
Johnston - Jo	75	35	10	7.0	3.5
Kershaw - KeC	--	--	--	0	3.5
Kirksey - Krb	95	40	15	16.0	2.5
Lakeland - LaB, LaD, LkB	--	--	--	0	3.5
Lucy - LuB	30	30	15	0	3.5
Marlboro - MaA, MaB	70	48	20	13.9	3.5
Nason - NaB, NaC, NaE	95	66	36	40.6	1.5

Soil Name & Map Symbol	% Passing 200 Sieve (F)	Liquid Limit (LL)	Plasticity Index (PI)	Group Index (GI)	Soil Support Value (S)
Norfolk - NoA, NoB	55	40	20	8.0	3.5
Orange - OaB	90	99	70	72.2	1.5
Orangeburg, Oba, ObB, ObC, OgB, OgD	35	30	4	0	3.5
Pelion - PeB, PeD, PnC	55	40	18	7.2	3.5
Persanti - Ps	95	60	30	34.0	1.5
Rains - Ra	70	40	18	11.8	3.5
Smithboro - Sm	95	60	30	34.0	1.5
State - StA	70	41	15	9.9	3.5
Tawcaw - Tc	98	65	33	39.6	1.5
Toccoa - To	55	30	4	0.6	3.5
Trooup - TrB	35	--	--	0	3.5
Vaucluse - VaC, VaD	50	40	18	5.8	3.5
Wedowee - WeB	70	58	25	18.4	2.5

5.2 Geometric Design Criteria: Unless specifically addressed in these regulations, all geometric elements of roadway design for streets and roads in the County Road System will be in accordance with the AASHTO Policy on Geometric Design of Highways and Streets.

5.2.1 Right-of-Way: The minimum right-of-way width acceptable under these standards is 50 feet. Required right-of-way widths for the several road classifications are shown in Table I. In all instances, the centerline of the road and the right-of-way are to be coincident.

5.2.2 Pavement Width: Minimum pavement widths are to be as shown in Table I. The pavement widths shown are as measured from face to face of curbs except for the rural road and industrial service road on which the width is measured edge to edge of pavement.

5.2.3 Design Speed: Stopping distances, sight distances, minimum curve radii, vertical curve lengths and other design criteria are based on the design speeds for the different road classifications shown in Table I.

5.2.4 Stopping Sight Distance: The distance that a vehicle travels during the time in which the driver perceives a hazard in the road, reacts and brings the vehicle to a halt is the stopping distance.
Stopping distance can be calculated using the equation:

$d = 1.47Vt + 1.075 \frac{V^2}{a}$ where:

d = Stopping distance, Ft.
t = brake reaction time, Sec.
V = Design Speed, mph
a = driver deceleration, Ft./Sec.^{2}

When t = 2.5 Sec. and a =11.2 Ft./Sec^2 , the above equation yields the following values for d at the design speeds shown:

V(mph)	d (Ft.)
10	46.3
20	111.9
25	151.9
30	196.6
35	246.2
40	300.6
45	359.7
50	423.7
55	492.5

The sight distance, measured along the road centerline from the eye at 3.75 feet above the road surface to an object, 0.5 feet high, is the stopping sight distance and at no point should it be less than the stopping distance. Minimum requirements for stopping sight distances are shown in Table II.

5.2.5 Horizontal Curves: Horizontal curves are to be introduced at all changes of direction on collector, local commercial and industrial service streets and at changes of direction on residential streets where the deflection angle exceeds 10^o. The minimum radii of curvature are to be in accordance with Table II. Speed limits on each street will be determined according to the shortest curve radius on the street. For streets with 2% cross slopes (1/4 " per Ft. crown) the maximum acceptable speed limits are

Radius (Ft.)	Speed Limit (MPH)
150 to 179	20
180 to 299	25
300 to 459	30
460 to 674	35
675 to 939	40

5.2.6 Vertical Curves: Crest vertical curves are to be of sufficient length to provide the

minimum stopping sight distance at the design speed. The lengths required are as shown in Table III. The lengths are calculated using the formulas:

$$L = \frac{S^2 A}{1400} \qquad \text{where } S<L$$

and

$$L = 2S - \frac{1400}{A} \qquad \text{where } S>L$$

in which:

S = Stopping sight distance in ft.
L = Length of vertical curve in ft.
A = Algebraic difference in grades.

5.2.7 Grades: A minimum grade of 0.5% is to be maintained on all streets to insure proper drainage.

The maximum permissible grade on local and minor residential streets is 15%. Grades less than 12% are preferred.

The maximum permissible grade on collector, rural, local commercial and industrial service streets is 12%. Grades less than 8% are preferred.

5.2.8 Crown: All streets are to have a minimum cross slope of 1/4" per foot. Inverted crowns or center gutters are not acceptable.

5.2.9 Curb and Gutter: With the exception of rural and industrial service streets, all streets are to either have concrete curbs and gutters or asphalt valley gutters. Either rolled curb and gutter or barrier type curbs are acceptable except that the barrier type is required on some local commercial streets. Other types of curb and gutter may be approved by the County Engineer.

5.2.10 Medians: Natural or planted medians separating opposing traffic lanes are acceptable. The minimum width of pavement on either side of the median is to be in accordance with the minimum lane widths contained in Table I. Barrier type curbs or adequate lateral clearance, however, must be provided on the median. Painted medians are required on collectors, local commercial and industrial service streets.

5.2.10.1 Median Openings: The minimum number of median openings required to serve abutting property are to be provided. Care should be taken to locate openings only where there is adequate site distance.

5.2.10.2 Left Turn Lanes: On collector, local commercial and industrial service streets, left turn lanes are to be provided at all median openings and intersections. The length of the turn lane is to be such that adequate storage under the expected traffic loading is provided. The minimum length, however, is 100 feet.

5.2.11 Cul-de-Sacs: All permanent dead-end streets are to terminate in a paved turnaround with a minimum radius of 40 feet. The right-of-way shall have a minimum radius of 50 feet.

5.2.12 Islands: A natural or planted island may be used in the center of cul-de-sacs on residential and rural streets provided that a minimum pavement width of 18 feet is maintained around the island.

5.2.13 Corner Sight Distance: All roadways are to be designed so that adequate corner sight distance is provided at all intersections. Corner sight distance at an intersection is measured from a point on the intersecting street 15 feet from the edge of pavement on the through street and 3.75 feet above the street surface to an object 4.5 feet high on the through street. The minimum corner sight distance is equal to the stopping distance shown in section 5.2.4 at the design speed, or posted speed limit, on the through street.

5.2.14 Intersections: The centerlines of no more than two streets shall intersect at any one point. Whenever possible, the centerlines of intersecting streets are to be perpendicular but in no case is the angle of intersection to be less than 60 degrees. All angles and distances are measured relative to the intersection of a street centerline.

5.2.14.1 Intersections in Curves: Intersections within a horizontal curve are permitted provided that the intersecting street has a 100-foot minimum tangent at the intersection and the required corner sight distance is maintained. Whenever possible, the tangent of the intersecting street is to be radial to the curve but in no case will it be more than 30 degrees from radial.

5.2.14.2 Curb Radius: The minimum acceptable curb radius at intersections is 25 feet. Larger radii must be provided in accordance with the AASHTO Policy on Geometric Design of Highways and Streets when significant tractor-trailer, or other large vehicle, traffic is expected.

5.2.14.3 Existing Streets: The profile of existing streets on either side of a proposed intersection shall be provided to insure that adequate site distances are available.

5.2.15 Reverse Curves: Reverse curves are permissible provided that applicable sight distances are maintained.

5.2.16 Lateral Clearance: A minimum lateral clearance as shown below shall be maintained from the edge of pavement or from the back of curb or valley gutter:

Rolled curb and gutter.....	6.0'
Barrier type curb.....	4.0'
Valley gutter.....	6.0'
Flat pavement.....	10.0'

No trees, entrance gates or other obstructions, with the exception of traffic control and street name signs and mailboxes, are to be placed within these distances from the edge of the street.

It should be noted that the above setbacks are minimums based on the obstruction being located on a tangent. When an obstruction is located within a horizontal curve, the setback must be calculated using the equation:

$$R = \frac{S^2}{8M} \quad \text{where:}$$

R = The radius of curvature at the centerline of the lane closest to the obstruction in ft.
M = Distance from the centerline of the lane to the obstruction in ft.
S = Stopping sight distance in ft.

Provided the above setbacks and sight distance requirements are met, trees may be retained or planted within the right-of-way for aesthetic or environmental purposes.

5.2.17 Driveway Connections: Driveway aprons that do not involve a curb cut are to abut the back of curb or valley gutter for no more than 25 feet, including the corner radius.

For all new construction, the builder or developer is to be responsible for construction of paved driveway aprons in accordance with an approved plan.

5.2.18 Curb Cuts: Curb cuts are to be made at all points of access for traffic generators such as shopping centers, apartment buildings and complexes, restaurants, warehouses and other commercial developments. Curb cuts are to be a maximum length of 25 feet plus twice the corner radius and shall not begin closer than one foot from the extension of a side property line.

5.2.18.1 Encroachment Permits: All curb cuts on existing County maintained streets require the submittal and approval of a Richland County encroachment permit application before construction begins. The application form may be obtained from the County Engineer's office.

All construction is the responsibility of the applicant.

5.2.18.2 Sight Distance: Entrances onto County maintained streets are to be made only at points where adequate corner sight distance is provided in accordance with Table II.

5.2.19 Superelevation: In general, superelevation is not required on streets in the County Road System. In situations involving rural or arterial roads where design speeds will exceed 45 MPH, however, superelevation may be required. In these cases, superelevation will be designed in accordance with the AASHTO Policy on Geometric Design of Highways and Streets.

TABLE I

Street Classification	Min. R/W Width (Ft.)	Min. Pave. Width (Ft.)	Min. Lane Width (Ft.)	Design Speed (MPH)
Rural	66(3)	22(2)	11	(1)
Minor Residential	50	20	10	25
Local Residential	50	24	12	25
Local Commercial	66	36	12	40
Collector	66	36	12	40
Industrial Service	66	36	12	40
Industrial Service	80	36(2)	12	40
Arterial	100	52	24	

(1) Determined in consultation with County Engineer
(2) Edge to Edge of Pavement
(3) May be reduced to 50' at the discretion of the County Engineer if the ground elevations at the 25' R/W line are no more than 0.85' above the proposed centerline elevation.

TABLE II

Street Classification	Stopping Site Dist. (Ft.)	Min. Curve Radius (Ft.)	Max. Grade (%)
Rural	*	*	12
Minor Residential	160	150	15
Local Residential	160	150	15
Local Commercial	275	350	12
Collector	275	350	12
Industrial Service	275	350	12
Industrial Service	275	350	12
Arterial	*	*	*

* Dependent on design speed selected

TABLE III: MINIMUM LENGTH OF CREST VERTICAL CURVES

Algebraic Difference In Grades	For Stopping Sight Distances of: 160’	275’	300’	350’
4.0	---	200.0	250.0	350.0
5.0	40.0	270.0	321.4	437.5
6.0	86.7	324.1	385.7	525.0
7.0	120.0	378.1	450.0	612.5
8.0	145.0	432.1	514.3	700.0
9.0	164.6	486.2	578.6	787.5
10.0	182.9	540.2	642.9	875.0
11.0	201.1	594.2	707.1	962.5
12.0	219.1	648.2	771.4	1050.0
13.0	237.7	702.2	835.7	1137.5
14.0	256.0	756.3	900.0	1225.0
15.0	274.3	810.3	964.3	1312.5
16.0	292.6	864.3	1028.6	1400.0
17.0	310.9	918.3	1092.9	1487.5
18.0	329.1	972.3	1157.1	1575.0
19.0	347.4	1026.3	1221.4	1662.5
20.0	365.7	1080.4	1285.7	1750.0

THE STATE OF SOUTH CAROLINA)
) **TITLE TO REAL ESTATE**
COUNTY OF RICHLAND) ***For Subdivision Streets***

KNOW ALL MEN BY THESE PRESENTS, That I (or we) _____ _____ (the "Grantor") for and in consideration of the sum of One ($1.00) Dollar to the Grantor paid by Richland County, South Carolina (the "Grantee"), the receipt whereof is hereby acknowledged, has granted, bargained, sold and released, and by these presents does grant, bargain, sell and release in fee simple absolute unto Richland County, South Carolina, its successors and assigns, all that certain real property comprising road rights-of-way, _____ feet in width, hereinafter described for the purpose of constructing, improving and/or maintaining streets or roads thereon:

DESCRIPTION:

SPECIAL PROVISIONS: The Grantor understands and acknowledges that said streets or roads were designed and constructed by the Grantor; that the streets or roads will tend to collect surface waters into artificial channels and cast same onto the lands adjoining said streets or roads in concentrated form; that the Grantee does not hold itself out to perform, nor does it have equipment and material or appropriations of money to adequately pipe and ditch the lands adjoining said streets or roads; and it is therefore agreed as one of the material considerations and inducements for acceptance of said streets or roads by the Grantee, that the Grantor does hereby assume all risks of loss, damage, destruction or claims, of every kind, present or future, suffered by the Grantor, his (her/their/its) heirs, assigns or successors in title resulting from the collection of surface water and casting of same onto said lands.

And the Grantor does hereby bind itself and its successors and assigns to save and hold harmless and release the Grantee, its successors and assigns, from all such losses, damages, destruction and claims hereinabove specified, and shall guarantee the herein described streets and roads and the accompanying drainage system for a period of three years from the date this Deed is recorded and shall make any and all repairs as become necessary in the sole judgment of the Grantee or its representative. The Grantee does hereby bind itself and its successors and assigns and agrees to maintain and repair said streets or roads in a reasonably good and workman like manner thereafter.

Together with all and singular the rights, members, hereditaments and appurtenances to the said premises belonging, or in anywise incident or appertaining.

TO HAVE AND TO HOLD in fee simple, absolute and singular, the said property and the rights hereinbefore granted, unto the Grantee, its successors and assigns forever.

And the Grantor does hereby bind itself and its successors and assigns, to warrant and forever defend all and singular the said premises unto the said Grantee, its successors and assigns, against it and its successors and assigns, and against every person whomsoever lawfully claiming or to claim the same, or any part thereof.

WITNESS the hand(s) and seal(s) of the Grantor(s) and Grantee this ____ day of

_____, 200__.

IN THE PRESENCE OF:

_____

_____

GRANTOR:

By: _____

GRANTEE:

_____

By: _____

_____

THE STATE OF SOUTH CAROLINA)
)
COUNTY OF RICHLAND)

PROBATE
(Grantor)

PERSONALLY appeared before me the undersigned witness, who, being duly sworn, says that (s)he saw the within-name Grantor by its officer(s) or partner(s) as its act and deed, sign, seal and deliver the within Deed; and that (s)he with the other witness whose signature appears above witnessed the execution thereof.

_____
(Witness)

SWORN to before me this ____ day of
_____, 200__.

_____ (Seal)
Notary Public for South Carolina
My Commission Expires: _____

THE STATE OF SOUTH CAROLINA)
)
COUNTY OF RICHLAND)

PROBATE
(Grantee)

PERSONALLY appeared before me the undersigned witness, who, being duly sworn, says that (s)he saw the County Administrator of Richland County, the County's duly authorized officer, sign, seal, and as the act and deed of the County of Richland, deliver the within written Instrument for the uses and purposes therein mentioned and that (s)he with the other above named witness witnessed the execution thereof.

_____
(Witness)

SWORN to before me this ____ day of
_____, 200__.

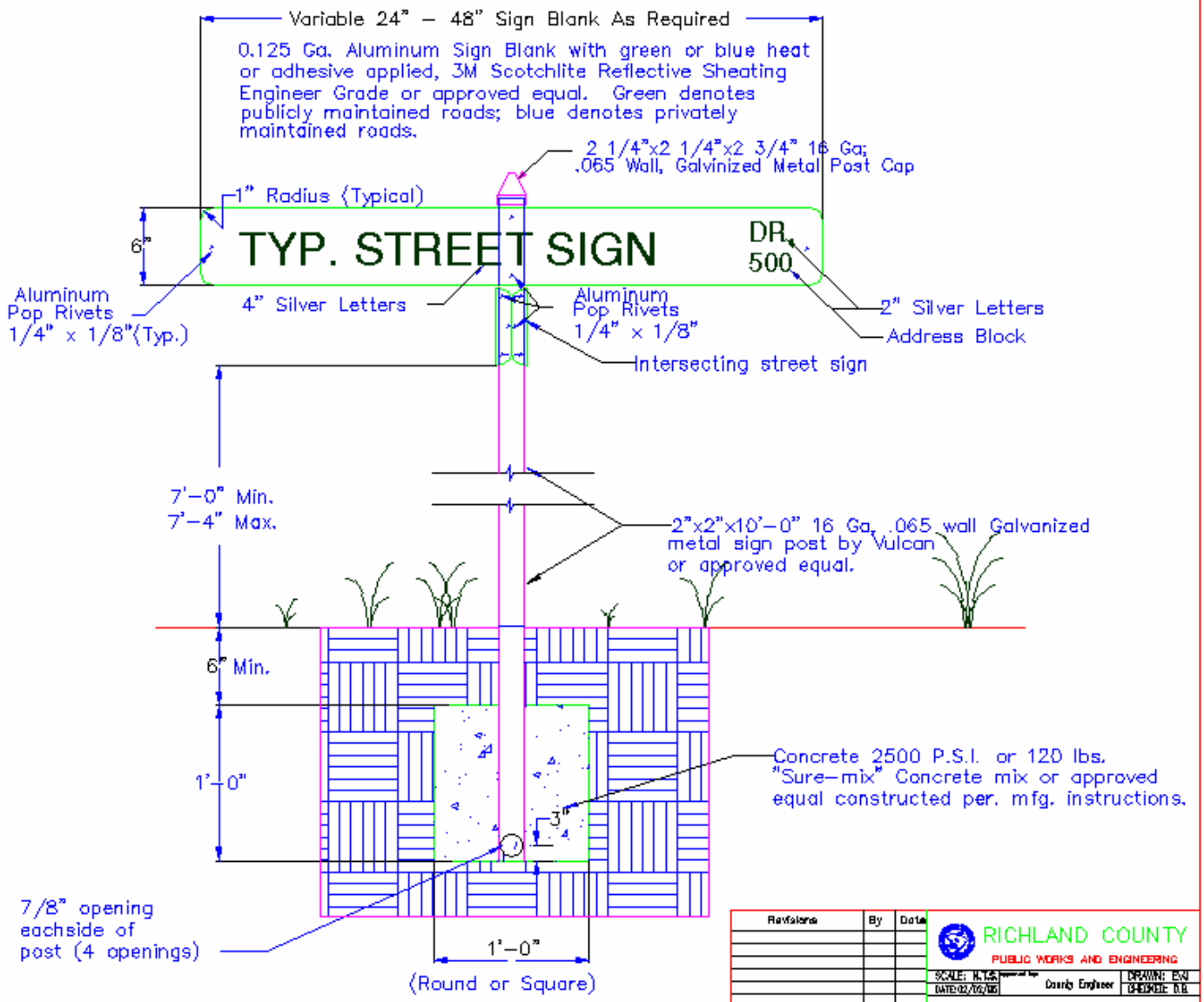
_____ (Seal)
Notary Public for South Carolina
My Commission Expires: _____

TYPICAL STREET SIGN DETAIL

Scale: 1 1/2"========1'- 0"

General Notes:

1. Submit sample of a completed sign (excluding concrete base) to the County Engineer's office for approval prior to installation.
2. All letters and numbers are to be silver 3M Scotchlite Reflective sheeting High Intensity Grade.



Revisions	By	Date

RICHLAND COUNTY
PUBLIC WORKS AND ENGINEERING
SCALE: N.T.S. DRAWN: EW
DATE: 02/05/08 County Engineer CHECKED: D.B.
TYPICAL SUBDIVISION ROAD SIGN DETAIL
DETAIL DRAWING: 1

5.3 Standard Details:

Richland County
Public Works Department

5.3.1 STANDARD STREET CROSS SECTIONS

DISCLAMER: This is a product of the Richland County Department of Public Works. The standards depicted here have been developed with extensive cooperation from other county departments, as well as other federal, state and local government agencies. Reasonable efforts have been made to ensure the accuracy of these designs. Richland County expressly disclaims responsibility for damages or liability that may arise from the use of these designs.

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Richland County Engineering
400 Powell Rd.
Columbia, SC 29203

Richland County Public Works Department

Design Data for

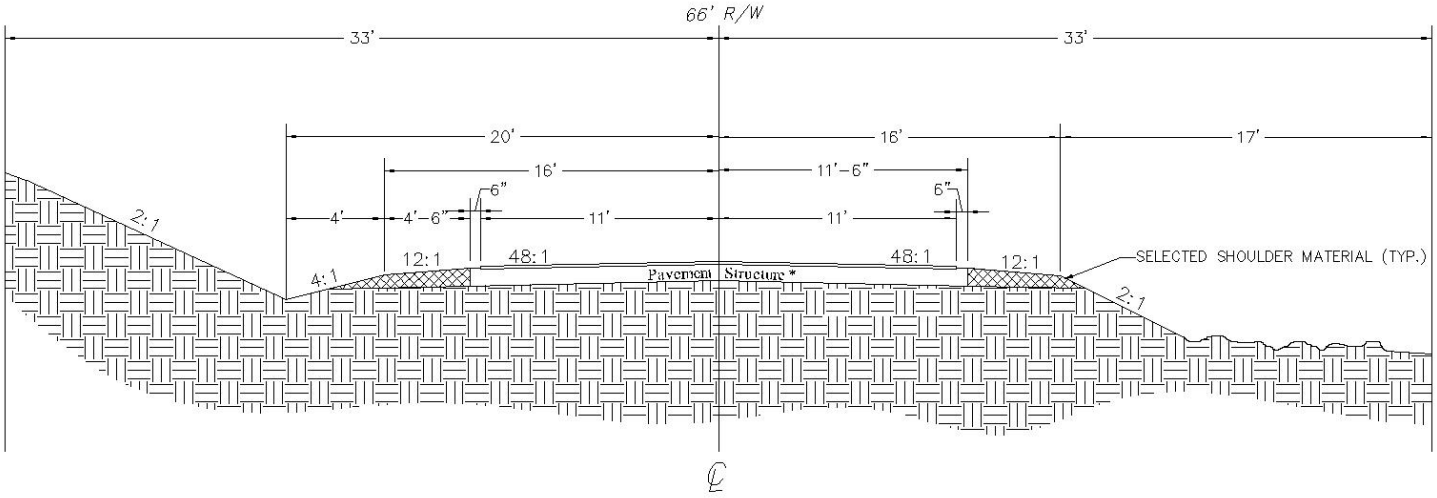
Standard Street Cross Sections

COEFFICIENTS OF RELATIVE STRENGTH					
PAVEMENT (UPPER 4" MAX)	**COEFF**	**BASE COURSE**	**COEFF**	**SUBBASE**	**COEFF**
Asphalt Concrete Surface Course	0.44	Earth Type Base Course (Top Soil)	0.12	Earth Type Subbase Course (top soil)	0.08
Asphalt Concrete Binder Course	0.44	Earth Type Base Course (Sand Clay)	0.15	Earth Type Subbase Course	0.10
		Macadam Base course	0.15	Soil Aggregate Subbase Course	0.10
		Cement Stabilized Earth Base Course	0.25	Cement Stabilized Earth Subbase	0.15
OLD PAVEMENT		Hot Laid Asphalt Base Course	0.24		
Asphalt Concrete Surface Course	0.26	Stabilized Aggregate Base Course	0.16	Old Base- 70% of original value	
Asphalt Concrete Binder Course	0.26	H.L. Asphalt Aggregate Base Course	0.34	Old Sub-Base 80% of original value	
Old Sand Asphalt	0.21	Cement Stabilized Aggregate Base Course	0.34		
Old Bituminous Surfacing	0.21	Old P.C.C. Pavement	0.40		

DESIGN DATA									
Types of Streets	Equiv.18^K Load App's	**Alternate 1**		**Alternate 2**		**Alternate 3**		**Alternate 4**	
		S.S.V.	Min S.N.	S.S.V.	Min S.N.	S.S.V.	Min. S.N.	S.S.V.	Min. S.N.
Local Residential	6	1.5	2.80	2.5	2.50	3.5	2.12	5.5	1.56
Collector	24	1.5	3.55	2.5	3.08	3.5	2.69	5.5	2.00
Industrial Service	80	1.5	4.12	2.5	3.70	3.5	3.20	5.5	2.44
Local Commercial	80	1.5	4.12	2.5	3.70	3.5	3.20	5.5	2.44
Rural	6	1.5	2.80	2.5	2.50	3.5	2.12	5.5	1.56

Notes: (1) The minimum structural numbers (Min. S.N.) shown above are based on the soil support values (S.S.V.) and traffic loading (Equiv. 18^K Load App's) shown. If these factors on a particular site differ significantly from the values shown, the pavement design must be adjusted accordingly.

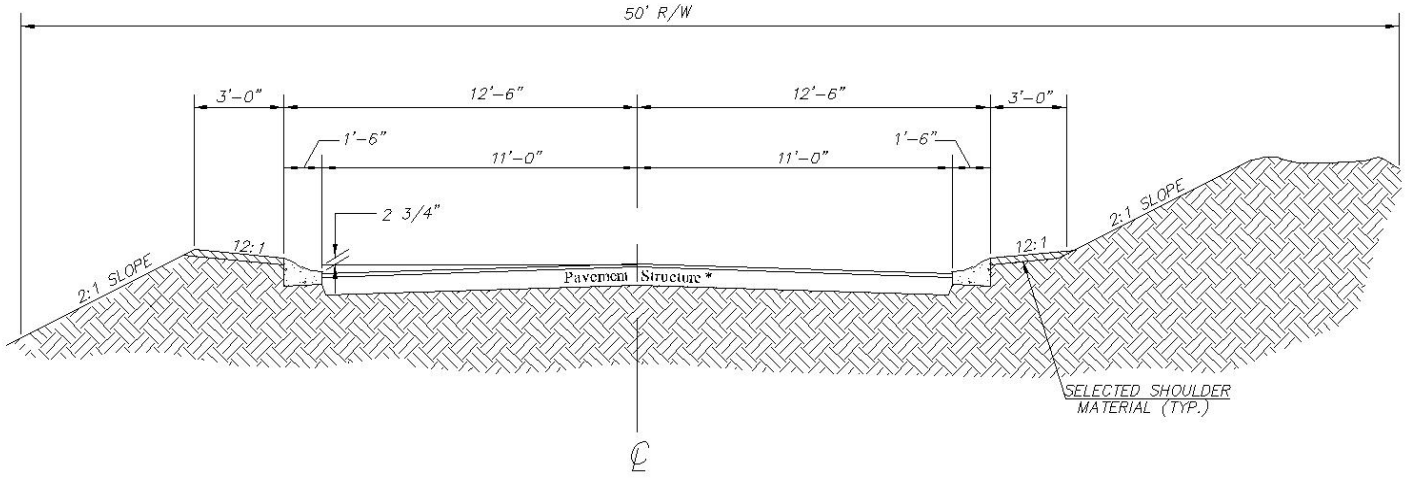
22' Farm-To-Market



RURAL (FARM-TO-MARKET)

** STRUCTURAL NUMBER AS PER DESIGN DATA TABLE*

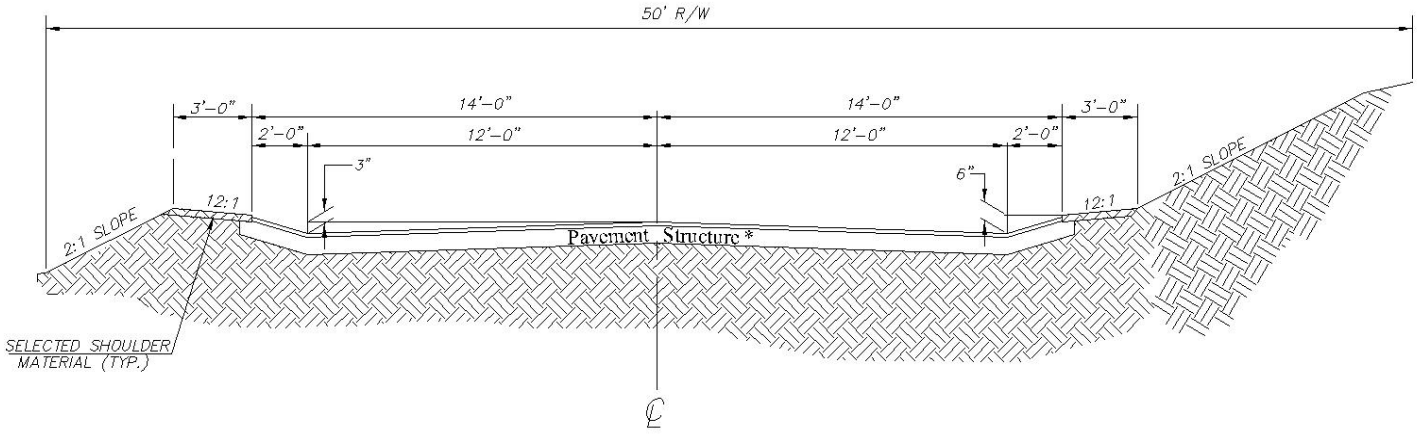
24’ OG Curb



LOCAL RESIDENTIAL STREET

** STRUCTURAL NUMBER AS PER DESIGN DATA TABLE*

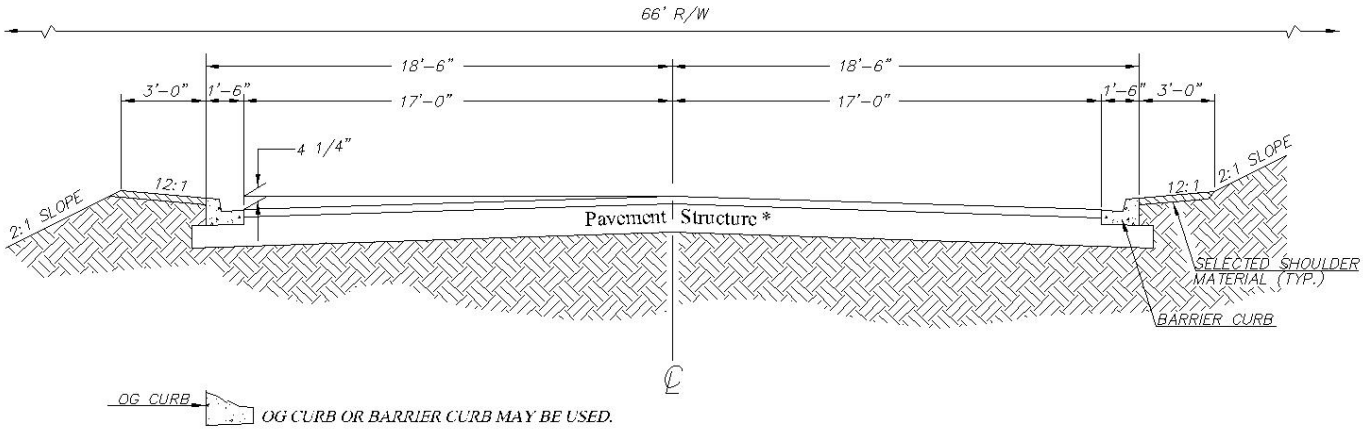
24’ Valley Gutter



LOCAL RESIDENTIAL STREET

** STRUCTURAL NUMBER AS PER DESIGN DATA TABLE*

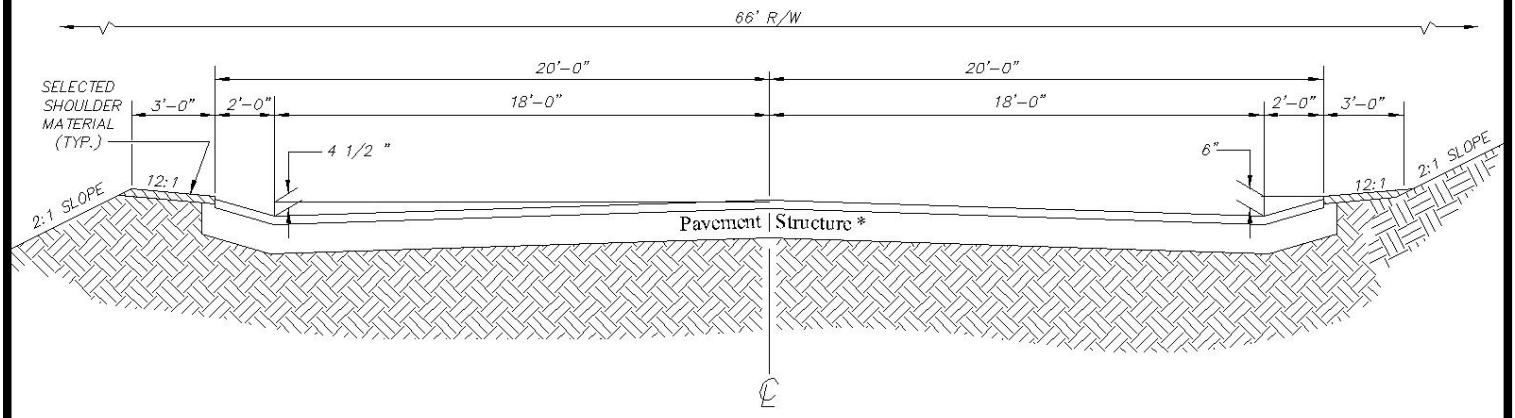
36’ Curb Section



COLLECTOR, INDUSTRIAL SERVICE, AND LOCAL COMMERCIAL STREETS

** STRUCTURAL NUMBER AS PER DESIGN DATA TABLE*

36’ Valley Gutter



COLLECTOR, INDUSTRIAL SERVICE, AND LOCAL COMMERCIAL STREETS

** STRUCTURAL NUMBER AS PER DESIGN DATA TABLE*

5.3.2 STANDARD CATCH BASIN DETAILS

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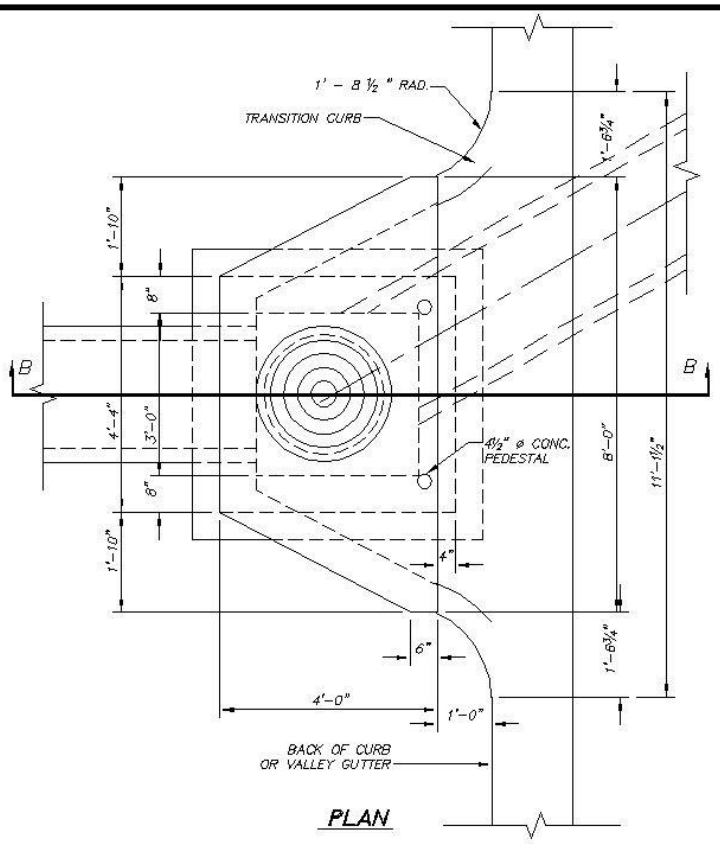
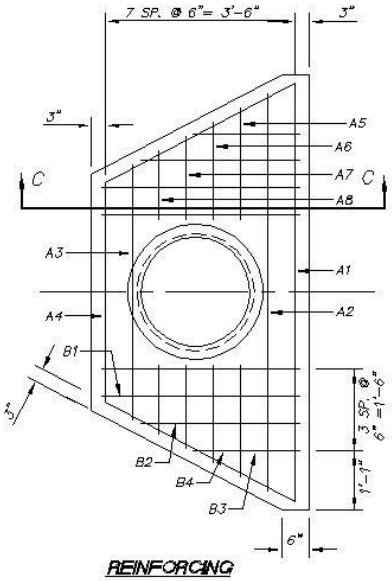
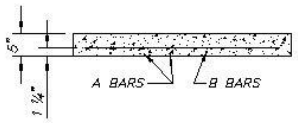


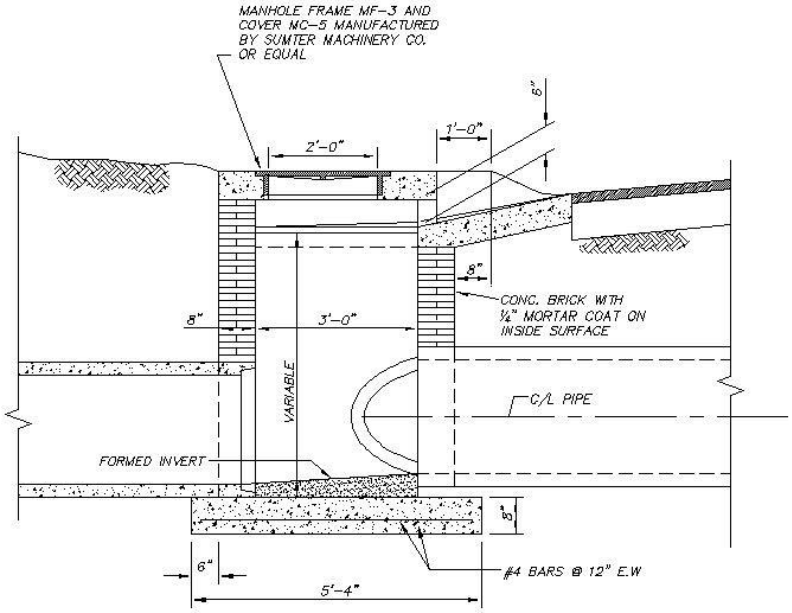
PLAN



REINFORCING DETAILS



SECTION C-C

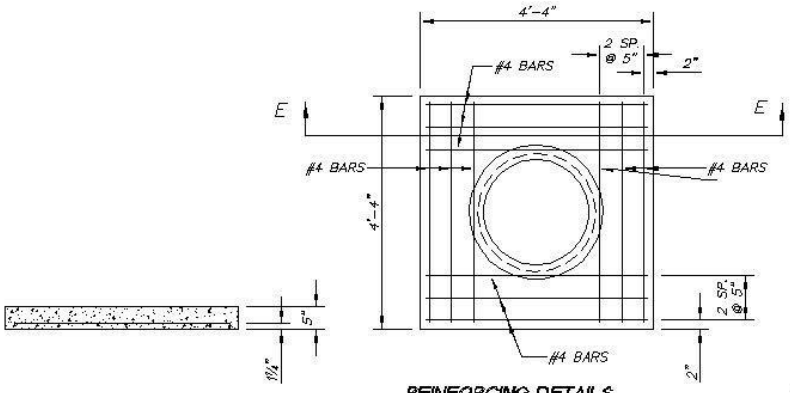


SECTION B-B

REINFORCING STEEL SCHEDULE			
MARK	NO.	SIZE	LENGTH
A1	1	4	7'-9 7/8"
A2	1	4	7'-3 9/16"
A3	1	4	4'-8 1/8"
A4	1	4	4'-1 7/8"
A5	2	4	2'-0 3/8"
A6	2	4	1'-9 1/4"
A7	2	4	1'-6 1/8"
A8	2	4	1'-3"
B1	4	4	3'-7"
B2	2	4	2'-7"
B3	2	4	1'-7"
B4	2	4	4'-1"

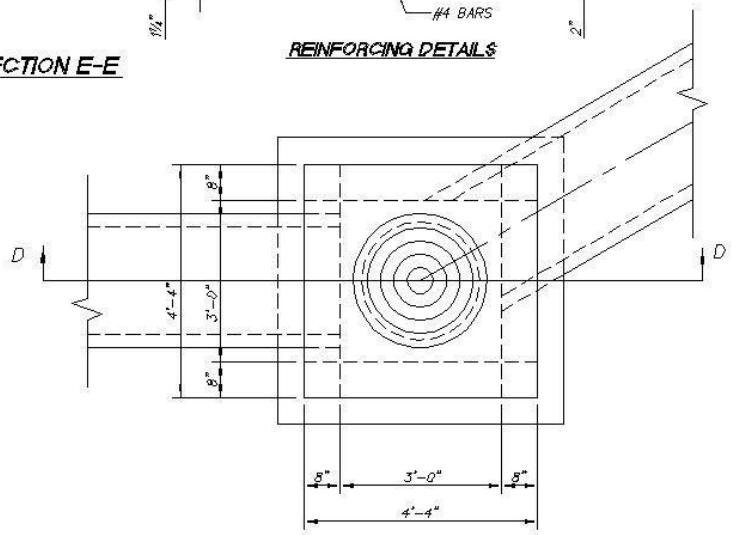
TYPE A

MAXIMUM Q = 12.1 CFS

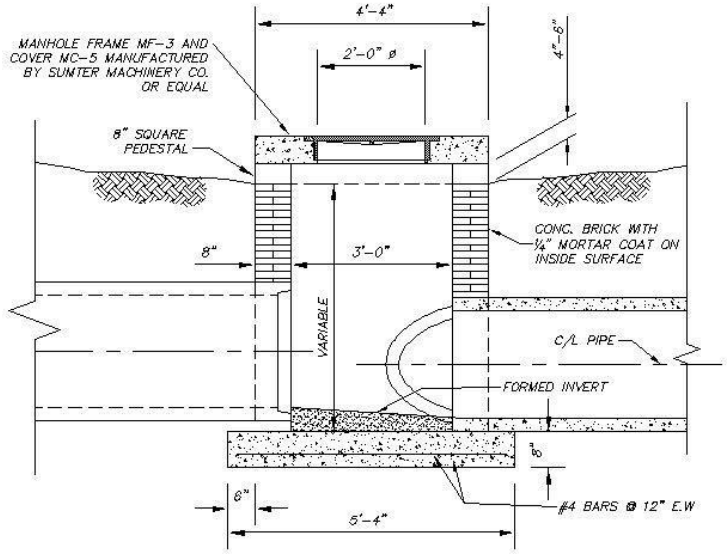


SECTION E-E

REINFORCING DETAILS



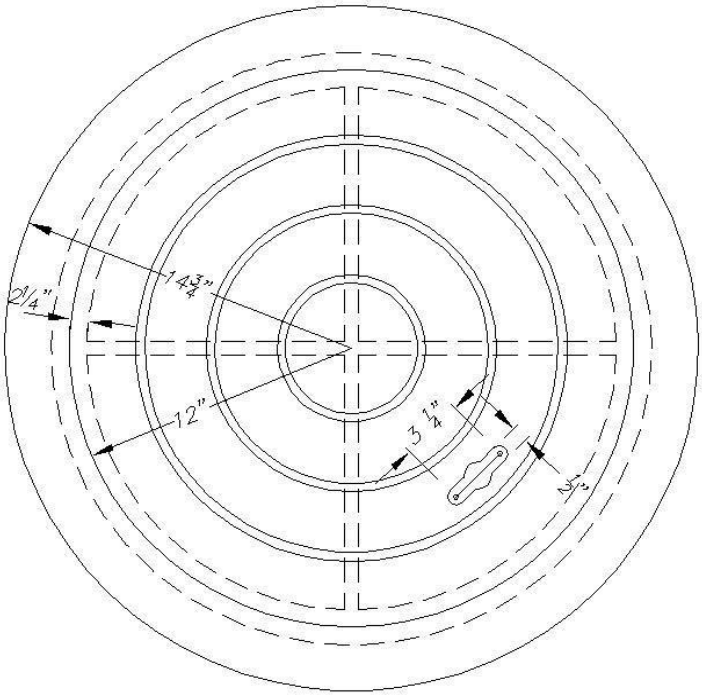
PLAN



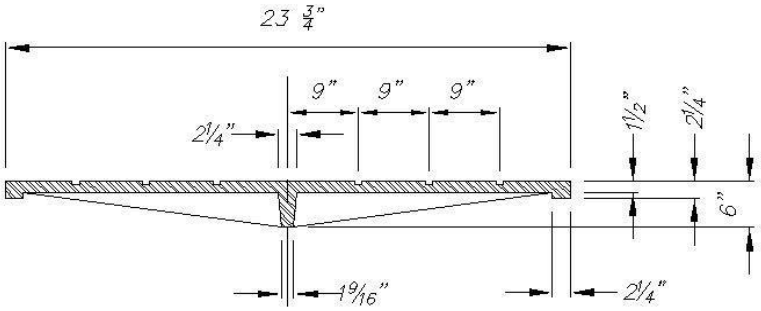
SECTION D-D

TYPE B

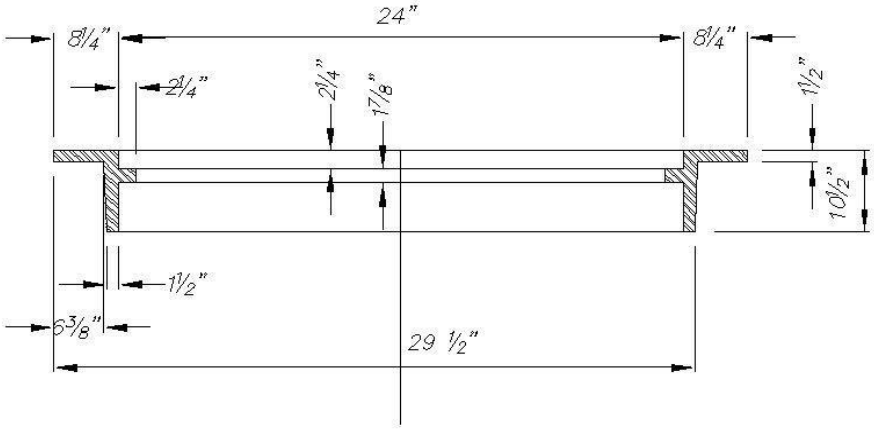
MAXIMUM Q = 10.6 CFS



PLAN OF MANHOLE
FRAME AND COVER

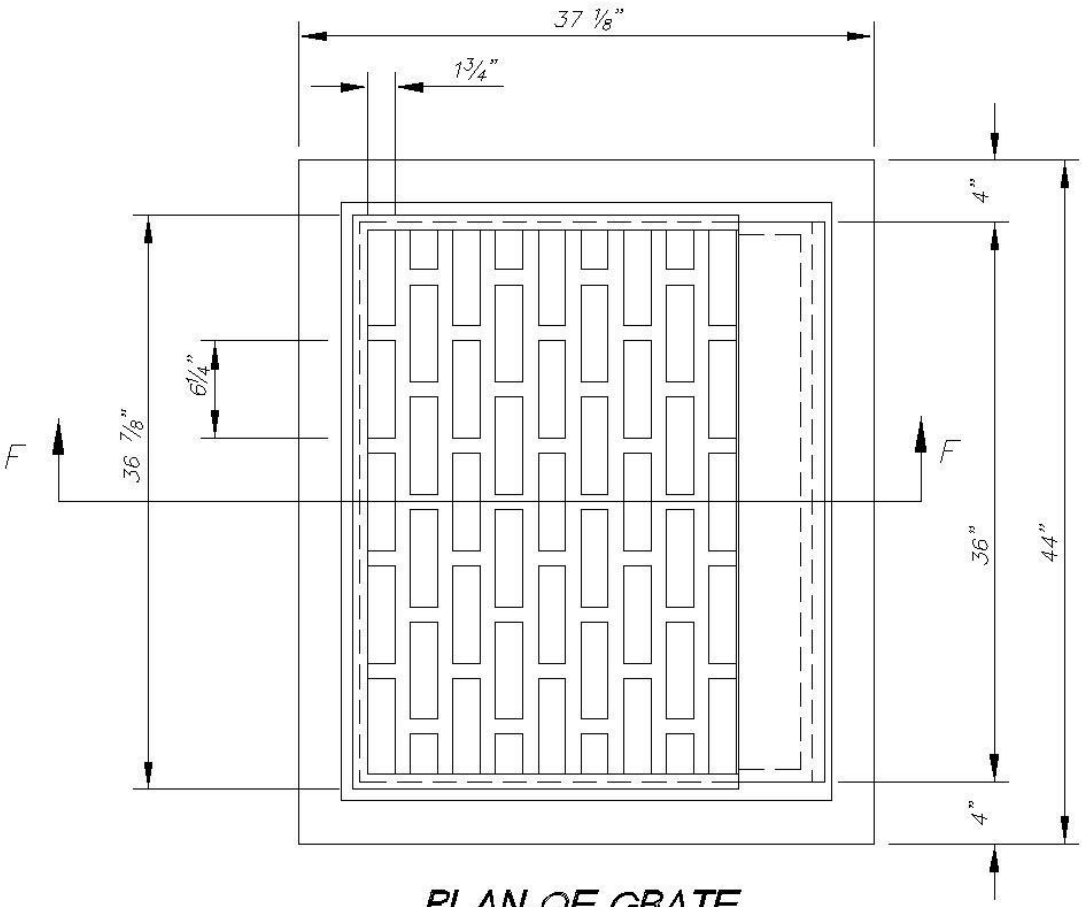


SECTION THRU COVER



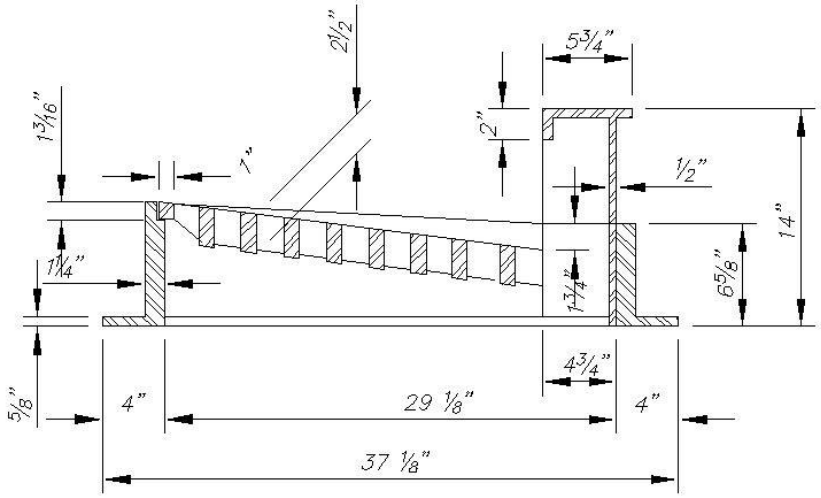
SECTION THRU FRAME

SCALE: 1/8" = 1'

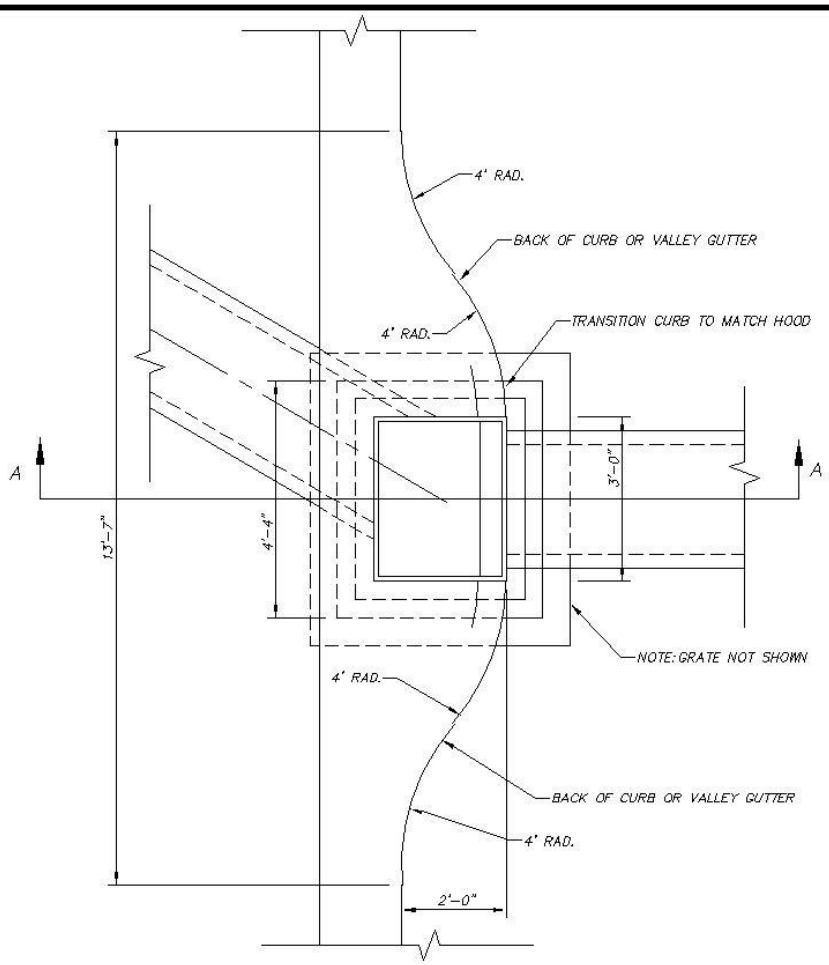


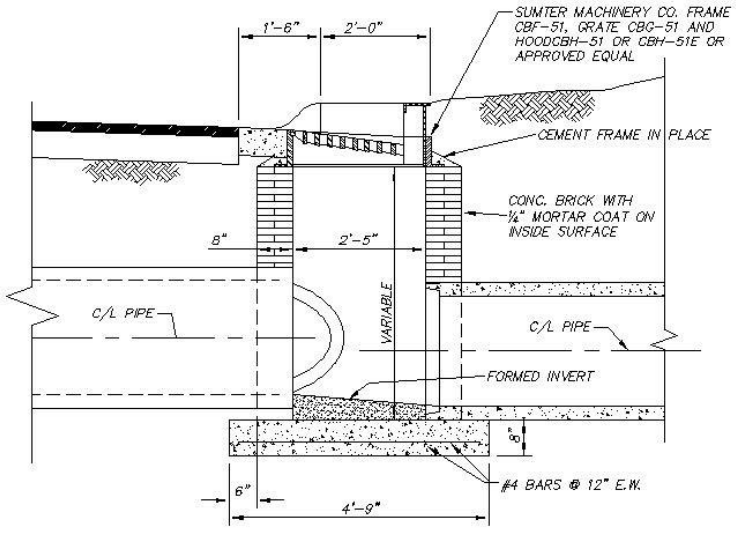
PLAN OF GRATE, FRAME AND HOOD

SCALE: 1/4" = 1'



SECTION F-F





SECTION A-A

TYPE C

MAXIMUM Q = 9.4 CFS

5.3.3 STANDARD HEAD WALL DETAILS

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66" & 72" PIPE HEADWALLS

SCHEDULE

BARS IN ONE HEADWALL

66" PIPE						72" PIPE			
1 1/2:1 SLOPE		2:1 SLOPE		4:1 SLOPE		1 1/2:1 SLOPE		2:1 SLOPE	
MARK	NO.	MARK	NO.	MARK	NO.	MARK	NO.	MARK	NO.
A	21	A	24	A	44	A	20	A	26
B	2	B3	2	B6	2	B9	2	B12	2
B1	2	B4	2	B7	2	B10	2	B13	2
B2	1	B5	1	B8	1	B11	1	B14	1
C	2	C1	2	C6	2	C2	2	C3	2
C4	2	C6	2	C15	2	C5	2	C7	2
C8	2	C10	2	C17	2	C9	2	C12	2
C11	8	C14	8	C18	8	C13	8	C16	8
H	1	H2	1	H4	1	H6	1	H8	1
H1	1	H3	1	H5	1	H7	1	H9	1
P	4	P	4	P	4	P	4	P	4
V	4	V	6	V	10	V1	4	V1	6
V3	4	V4	4	V2	10	V4	4	V5	4
V7	4	V7	4	V6	10	V9	4	V8	6
V11	4	V10	6	V10	10	V12	6	V12	6

SIZES OF STRAIGHT BARS

MARK	SIZE	LENGTH
A	1/2"ø	3'-3"
C	1/2"ø	1'-8"
C1	"	2'-2"
C2	"	2'-6"
C3	"	2'-9"
C4	"	3'-6"
C5	"	4'-4"
C6	"	4'-5"
C7	"	5'-2"
C8	"	5'-4"
C9	"	6'-2"
C10	"	6'-10"
C11	"	7'-3"
C12	"	7'-7"
C13	"	8'-2"
C14	"	9'-2"
C15	"	9'-3"
C16	"	10'-2"
C17	"	14'-2"
C18	"	19'-2"
P	1/2"ø	2'-1"

DIMENSIONS AND QUANTITIES

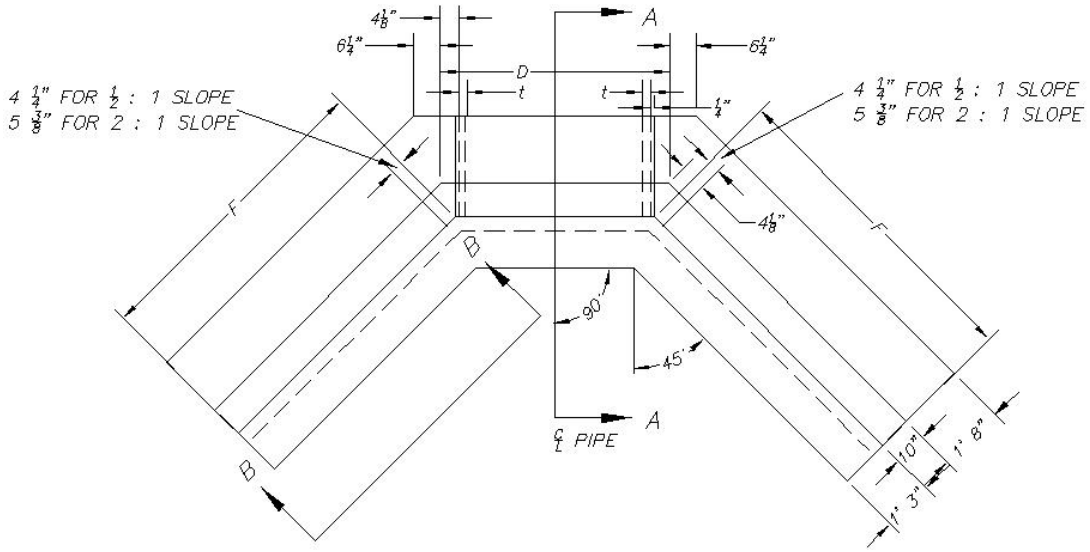
INSIDE DIAMETER OF PIPE	SLOPE OF FILL	DIMENSIONS					2 HEADWALLS	
							CLASS "A" CONCRETE	STEEL REINFORCEMENT
		B	C	D	F	T	CUBIC YDS.	LBS.
66"	1 1/2:1	3'-2"	7-0 1/2"	7'-3 3/4"	7'-5 1/8"	6 1/2"	14.58	574
	2:1	3'-2"	7'-0 1/2"	7'-3 3/4"	9'-9 3/4"	6 1/2"	17.76	700
72"	4:1	3'-2"	7'-0 1/2"	7'-3 3/4"	19'-4 3/8"	6 1/2"	31.12	1308
	1 1/2:1	3'-5"	7'-7"	7'-10 3/4"	8'-0 5/8"	7"	16.34	620
	2:1	3'-5"	7'-7"	7'-10 3/4"	10'-7 3/4"	7"	20.06	788

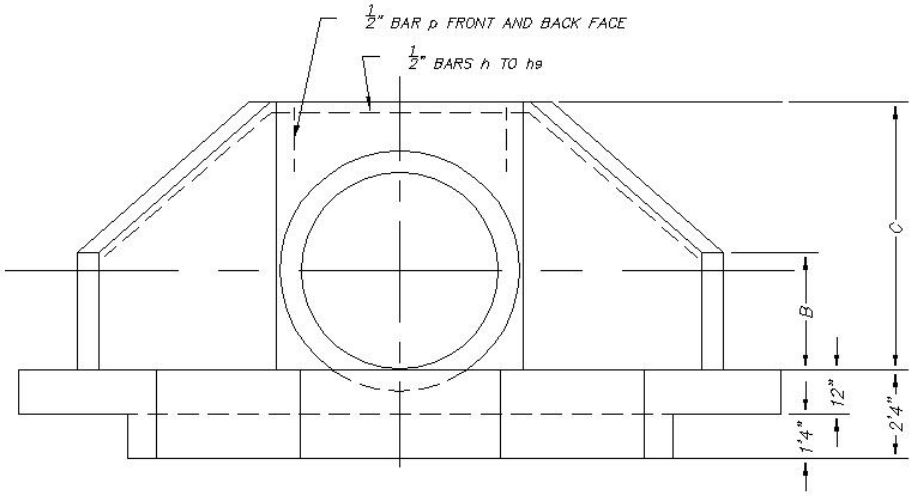
DIMENSIONS OF BENT BARS

1/2"ø BARS B TO B14			
MARK	A	B	TOTAL LENGTH
B	6'-0 1/2"	7'-5 1/8"	20'-10 3/4"
B1	7'-1 3/4"	7'-11 3/4"	23'-1 3/4"
B2	8'-3 3/4"	8'-6 3/4"	25'-5 1/4"
B3	6'-0 1/2"	9'-9 3/4"	25'-8"
B4	7'-1 3/4"	10'-4 3/8"	27'-10 1/2"
B5	8'-3 3/4"	10'-11 3/8"	30'-2 1/2"
B6	6'-0 1/2"	19'-4 3/8"	44'-9 1/4"
B7	7'-1 3/4"	19'-11 1/4"	46'-11 3/4"
B8	8'-3 3/4"	20'-6"	49'-3 3/4"
B9	6'-2 3/4"	7'-5 7/8"	21'-2 1/2"
B10	7'-3 3/4"	8'-0 3/8"	23'-4"
B11	8'-5 3/4"	8'-7 3/8"	25'-8"
B12	6'-2 3/4"	10'-1"	26'-4 3/4"
B13	7'-3 3/4"	10'-7 1/2"	28'-4 3/4"
B14	8'-5 3/4"	11'-2 1/2"	30'-10 3/4"

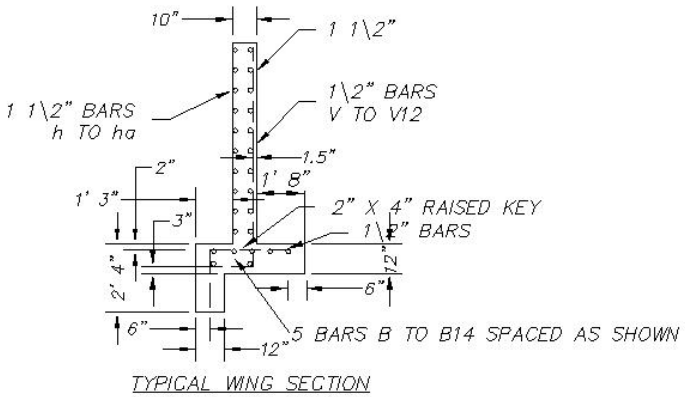
1/2"ø BARS V TO V12		
MARK	C	TOTAL LENGTH
V	3'-8"	5'-6"
V1	4'-11"	5'-9"
V2	4'-8"	6'-6"
V3	4'-9"	6'-7"
V4	5'-0"	6'-10"
V5	5'-2"	7'-0"
V6	5'-4"	7'-6"
V7	5'-10"	7'-8"
V8	6'-0"	7'-10"
V9	6'-1"	7'-11"
V10	6'-8"	8'-6"
V11	7'-0"	8'-10"
V12	7'-2"	9'-0"

1/2"ø BARS H TO H9			
MARK	A	B	TOTAL LENGTH
H	7'-0 1/2"	8'-3"	23'-6 1/2"
H1	7'-5 1/2"	8'-5 1/2"	24'-4 1/2"
H2	7'-0 1/2"	10'-0"	27'-0 1/2"
H3	7'-5 1/2"	10'-2 1/2"	27'-10 1/2"
H4	7'-0 1/2"	19'-6"	46'-0 1/2"
H5	7'-5 1/2"	19'-8 1/2"	46'-10 1/2"
H6	7'-7 1/2"	8'-6"	24'-7 1/2"
H7	8'-0 1/2"	8'-8 1/2"	25'-5 1/2"
H8	7'-7 1/2"	10'-10"	29'-3 1/2"
H9	8'-0 1/2"	11'-0 1/2"	30'-1 1/2"



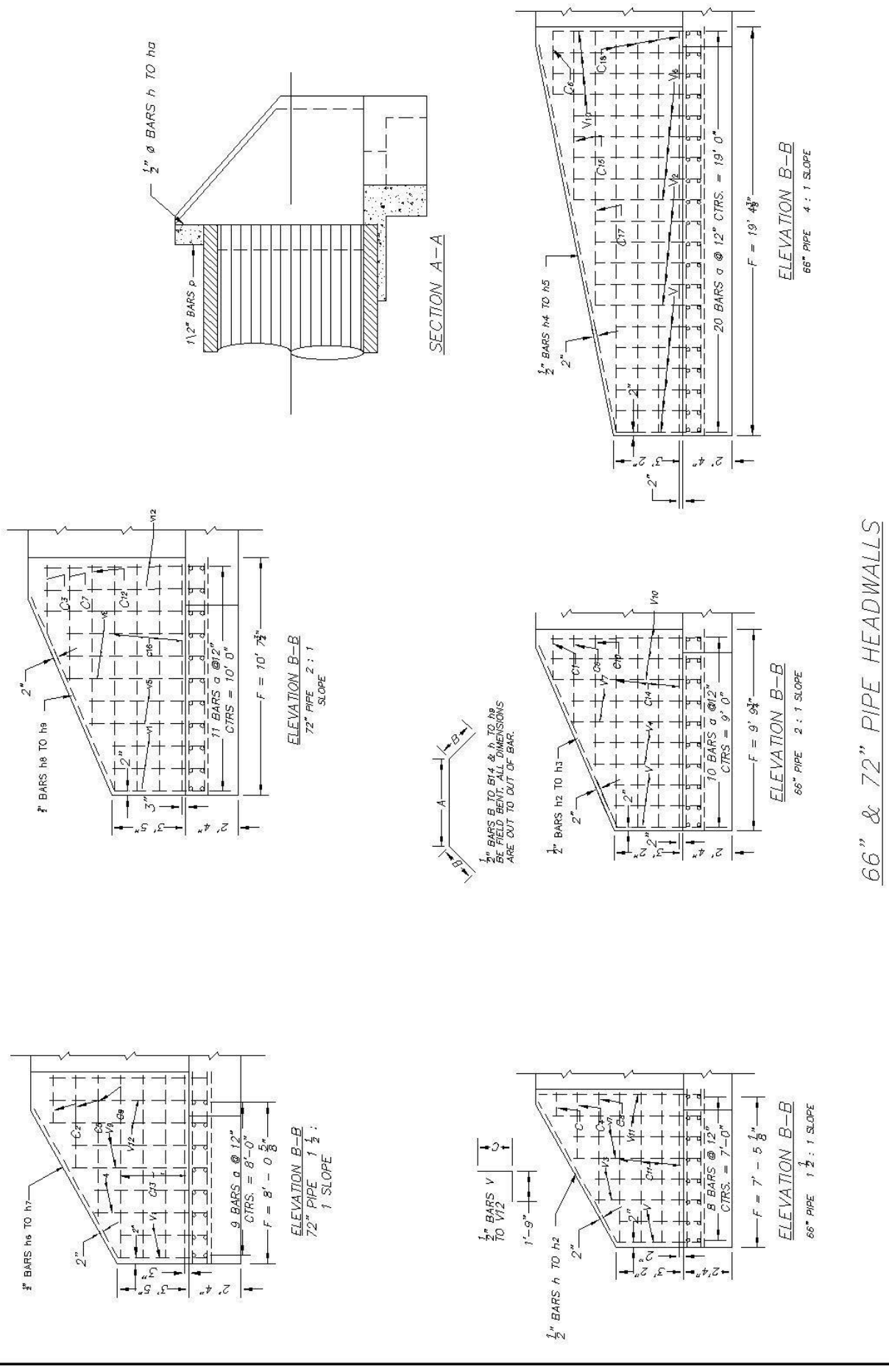


END ELEVATION



TYPICAL WING SECTION

66" & 72" PIPE HEADWALLS


66" & 72" PIPE HEADWALLS
SECTION A–A
ELEVATION B–B
72" PIPE 2 : 1 SLOPE
ELEVATION B–B
66" PIPE 4 : 1 SLOPE
ELEVATION B–B
72" PIPE 1½ : 1 SLOPE
ELEVATION B–B
66" PIPE 2 : 1 SLOPE
ELEVATION B–B
66" PIPE 1½ : 1 SLOPE

48", 54" & 60" PIPE HEADWALLS

DIMENSIONS OF BENT BARS

5/8"ø BARS V TO V42		
MARK	C	TOTAL LENGTH
V	2'-10"	4'-9"
V1	3'-1"	5'-0"
V2	3'-3"	5'-2"
V3	3'-4"	5'-3"
V4	3'-5"	5'-4"
V5	3'-6"	5'-5"
V6	3'-7"	5'-6"
V7	3'-8"	5'-7"
V8	3'-9"	5'-8"
V9	3'-10"	5'-9"
V10	3'-11"	5'-10"
V11	4'-0"	5'-11"
V12	4'-1"	6'-0"
V13	4'-2"	6'-1"
V14	4'-3"	6'-2"
V15	4'-4"	6'-3"
V16	4'-5"	6'-4"
V17	4'-6"	6'-5"
V18	4'-7"	6'-6"
V19	4'-9"	6'-8"
V20	4'-10"	6'-9"
V21	5'-0"	6'-11"
V22	5'-1"	7'-0"
V23	5'-2"	7'-1"
V24	5'-3"	7'-2"
V25	5'-4"	7'-3"
V26	5'-5"	7'-4"
V27	5'-6"	7'-5"
V28	5'-7"	7'-6"
V29	5'-8"	7'-7"
V30	5'-9"	7'-8"
V31	5'-10"	7'-9"
V32	5'-11"	7'-10"
V33	6'-0"	7'-11"
V34	6'-1"	8'-0"
V35	6'-2"	8'-1"
V36	6'-3"	8'-2"
V37	6'-4"	8'-3"
V38	6'-5"	8'-4"
V39	6'-6"	8'-5"
V40	6'-8"	8'-7"
V41	6'-9"	8'-8"
V42	6'-10"	8'-9"

5/8"ø BARS H TO H8			
MARK	A	B	TOTAL LENGTH
H	5'-3"	5'-8"	16'-7"
H1	5'-3"	7'-2"	19'-7"
H2	5'-3"	13'-6"	32'-3"
H3	5'-11"	6'-5"	8'-9"
H4	5'-11"	8'-2"	22'-3"
H5	5'-11"	15'-9"	37'-5"
H6	6'-5"	7'-3"	20'-11"
H7	6'-5"	13'-7"	33'-7"
H8	6'-5"	26'-5"	59'-3"

DIMENSIONS AND QUANTITIES

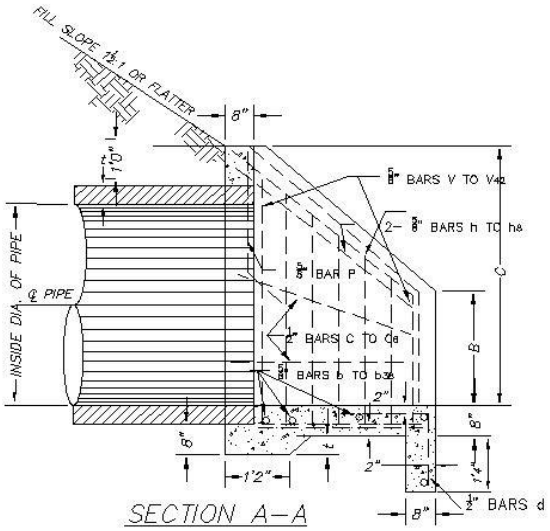
INSIDE DIAMETER OF PIPE	SLOPE OF FILL	DIMENSIONS							CLASS "A" CONCRETE 2 HEADWALLS	STEEL REINFORCEMENT 2 HEADWALLS
		A	B	C	D	E	F	T	CUBIC YDS.	LBS.
48"	1 1/2:1	3'-9"	2'-5"	5'-5"	4'-10"	13'-3"	5'-3 1/2"	5"	5.88	414
	2:1	4'-11 3/4"	2'-5"	5'-5"	4'-10"	15'-8 3/4"	7'- 0 1/2"	5"	7.84	522
	4:1	9'-11 1/2"	2'-5"	5'-5"	4'-10"	25'-8 1/2"	14'-1"	5"	16.50	1042
54"	1 1/2:1	4'-2 1/4"	2'-8"	5'-11 1/2"	5'-5"	14'-10"	5'-11 1/4"	5 1/2"	7.26	516
	2:1	5'-7"	2'-8"	5'-11 1/2"	5'-5"	17'-7 1/4"	7'-10 3/4"	5 1/2"	9.60	660
	4:1	11'-2"	2'-8"	5'-11 1/2"	5'-5"	28'-9 1/4"	15'-9 1/2"	5 1/2"	20.96	1272
60"	1 1/2:1	4'-7 1/2"	2'-11"	6'-6"	6'-0"	16'-2 1/4"	6'-6 1/2"	6"	7.70	582
	2:1	6'-1 7/8"	2'-11"	6'-6"	6'-0"	19'-3 1/8"	8'-8 3/4"	6"	10.30	1020
	4:1	12'- 3 3/4"	2'-11"	6'-6"	6'-0"	31'-6 7/8"	17'-5 1/8"	6"	22.96	2108

BARS IN ONE HEADWALL

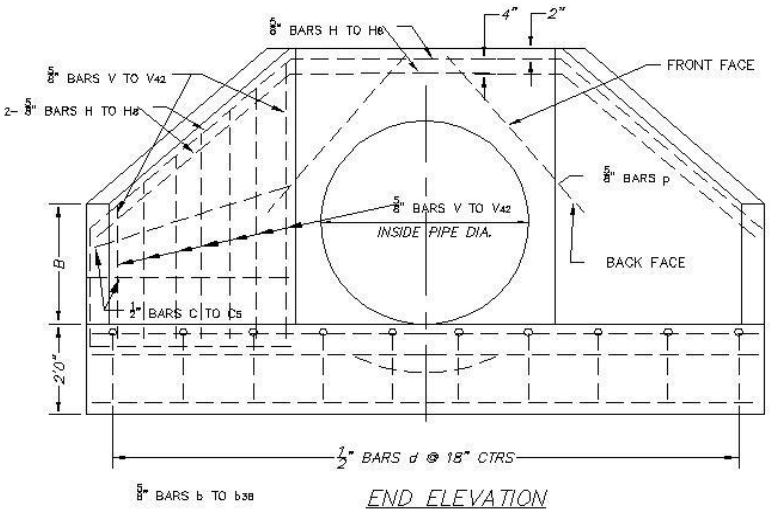
48" PIPE						54" PIPE						60" PIPE					
1 1/2:1 SLOPE		2:1 SLOPE		4:1 SLOPE		1 1/2:1 SLOPE		2:1 SLOPE		4:1 SLOPE		1 1/2:1 SLOPE		2:1 SLOPE		4:1 SLOPE	
MARK	NO.	MARK	NO.	MARK	NO.	MARK	NO.	MARK	NO.	MARK	NO.	MARK	NO.	MARK	NO.	MARK	NO.
B	1	B	1	B	1	B1	1	B1	1	B1	1	B2	1	B2	1	B2	1
B1	1	B1	1	B1	1	B3	1	B3	1	B3	1	B4	1	B4	1	B4	1
B7	1	B6	1	B8	1	B5	1	B5	1	B9	1	B12	1	B14	1	B10	1
B13	2	B13	1	B15	1	B11	1	B11	1	B16	1	B19	2	B23	1	B20	1
		B19	2	B21	1	B17	2	B19	1	B22	1			B27	1	B25	1
				B24	1			B23	2	B26	1			B31	2	B30	1
				B29	1					B28	1					B33	1
				B31	2					B32	1					B35	1
										B34	2					B36	1
																B37	1
																B38	2
C	4	C1	4	C3	4	C	4	C2	4	C4	4	C1	4	C3	4	C5	4
D	9	D	10	D	17	D	11	D	12	D	19	D	11	D	13	D	21
H	2	H1	2	H2	2	H3	2	H4	2	H5	2	H6	2	H7	2	H8	2
		M1	2	M4	2	M	2	M2	2	M5	2	M	2	M3	2	M6	2
N	2	N2	2	N5	2	N1	2	N3	2	N6	2	N2	2	N4	2	N7	2
						P	2	P	2	P	2	P	2	P	2	P	2
V	2	V	2	V	2	V1	2	V1	2	V1	2	V3	2	V3	2	V2	2
V5	2	V3	2	V7	2	V8	2	V9	2	V2	2	V10	2	V6	2	V4	2
V13	2	V9	2	V3	2	V18	2	V12	2	V5	2	V17	2	V9	2	V8	2
V20	2	V15	2	V6	2	V21	2	V17	2	V8	2	V22	2	V13	2	V7	2
V27	2	V20	2	V9	2	V29	2	V21	2	V11	2	V29	2	V16	2	V9	2
V30	2	V25	2	V12	2	V36	2	V27	2	V14	2	V36	2	V19	2	V11	2
		V31	2	V15	2			V32	2	V17	2	V42	2	V21	2	V13	2
				V18	2			V38	2	V19	2			V25	2	V15	2
				V20	2					V21	2			V28	2	V16	2
				V22	2					V23	2			V31	2	V18	2
				V25	2					V26	2			V35	2	V19	2
				V28	2					V29	2			V39	2	V20	2
				V30	4					V31	2			V41	4	V21	2
										V35	2					V23	2
										V37	4					V24	2
																V26	2
																V28	2
																V29	2
																V31	2
																V33	2
																V34	2
																V36	2
																V38	2
																V39	2
																V40	2
																V42	4

SIZES OF STRAIGHT BARS

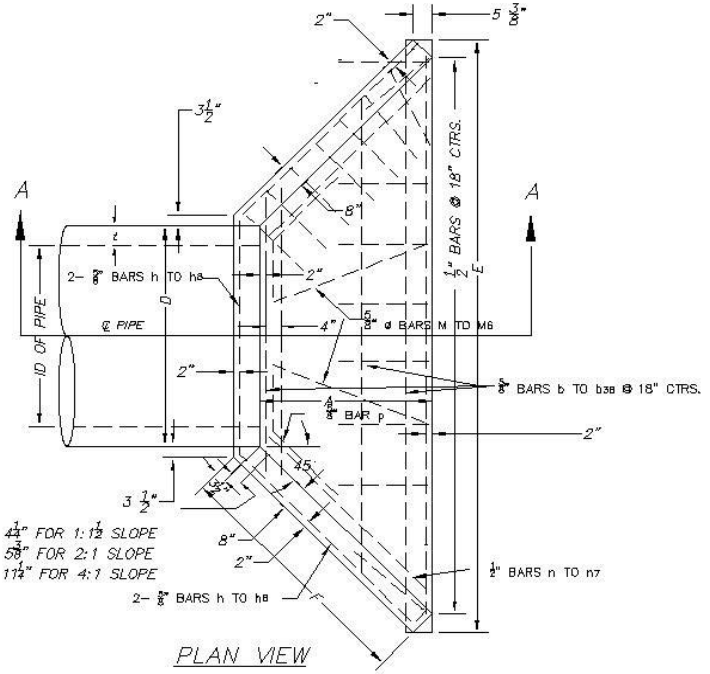
MARK	SIZE	LENGTH
B	5/8"ø	6'-7"
B1	"	7'-3"
B2	"	7'-10"
B3	"	8'-0"
B4	"	8'-8"
B5	"	9'-2"
B6	"	9'-9"
B7	"	10'-4"
B8	"	10'-10"
B9	"	11'-3"
B10	"	12'-0"
B11	"	12'-2"
B12	"	12'-4"
B13	"	12'-10"
B14	"	13'-5"
B15	"	13'-10"
B16	"	14'-3"
B17	"	14'-7"
B18	"	15'-2"
B19	"	15'-9"
B20	"	16'-0"
B21	"	16'-10"
B22	"	17'-3"
B23	"	17'-6"
B24	"	19'-10"
B25	"	20'-0"
B26	"	20'-3"
B27	"	20'-9"
B28	"	22'-4"
B29	"	22'-10"
B30	"	24'-0"
B31	"	25'-3"
B32	"	26'-5"
B33	"	28'-0"
B34	"	28'-11"
B35	"	32'-0"
B36	"	36'-0"
B37	"	40'-0"
B38	"	43'-8"
C	1/2"ø	5'-3"
C1	"	6'-3"
C2	"	7'-9"
C3	"	13'-2"
C4	"	15'-1"
C5	"	26'-2"
M	5/8"ø	4'-6"
M1	"	5'-0"
M2	"	5'-6"
M3	"	8'-0"
M4	"	10'-0"
M5	"	11'-0"
M6	"	19'-6"
N	1/2"ø	4'-0"
N1	"	4'-9"
N2	"	5'-9"
N3	"	6'-9"
N4	"	11'-6"
N5	"	12'-9"
N6	"	14'-9"
N7	"	24'-6"



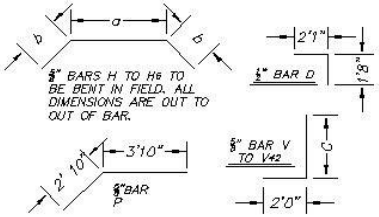
SECTION A–A



END ELEVATION



PLAN VIEW



BENT BAR DETAIL

48", 54" & 60" PIPE HEADWALLS

30", 36" & 42" PIPE HEADWALLS

DIMENSIONS AND QUANTITIES

INSIDE DIAMETER OF PIPE	SLOPE OF FILL	DIMENSIONS							CLASS "A" CONCRETE 2 HEADWALLS	STEEL REINFORCEMENT 2 HEADWALLS
		A	B	C	D	E	F	T	CUBIC YDS.	LBS.
30"	1½ :1	2'-5 ¼"	1'-8"	3'-9½"	3'-1"	8'-10½"	3'-5½"	3 1/2"	3.02	254
	2 :1	3'-3"	1'-8"	3'-9½"	3'-1"	10'-6"	4'-7"	3 1/2"	3.98	306
	4 :1	5'-5 ¾"	1'-8"	3'-9½"	3'-1"	15'-11¾"	9'-2"	3 1/2"	7.78	534
36"	1½ :1	2'-10 ½"	1'-11"	4'-4"	3'-8"	10'-4¼"	4'-0½"	4"	3.76	318
	2 :1	3'-9 ¾"	1'-11"	4'-4"	3'-8"	12'-3"	5'-4¼"	4"	4.98	372
	4 :1	7'-7 ¾"	1'-11"	4'-4"	3'-8"	19'-10¼"	10'-9 ¾"	4"	10.48	738
42"	1½ :1	3'-3"	2'-2"	4'-10½"	4'-3"	11'-8"	4'-8 ½"	4 1/2"	4.76	348
	2 :1	4'-4"	2'-2"	4'-10½"	4'-3"	13'-10"	6'-1½"	4 1/2"	6.14	466
	4 :1	8'-8"	2'-2"	4'-10½"	4'-3"	23'-1"	12'-2 ⅝"	4 1/2"	13.10	934

BARS IN ONE HEADWALL

30" PIPE						36" PIPE						42" PIPE					
1 1/2:1		2:1		4:1		1 1/2:1		2:1		4:1		1 1/2:1		2:1		4:1	
MARK	NO.	MARK	NO.	MARK	NO.	MARK	NO.	MARK	NO.	MARK	NO.	MARK	NO.	MARK	NO.	MARK	NO.
B	1	B	1	B	1	B1	1	B1	1	B1	1	B2	1	B2	1	B2	1
B1	1	B1	1	B6	1	B2	1	B2	1	B2	1	B3	1	B3	1	B3	1
B4	1	B5	1	B15	1	B6	1	B10	1	B7	1	B10	1	B9	1	B7	1
B8	2	B13	2	B20		B12	2	B17	2	B9	1	B16	2	B17	1	B14	1
				B23	2					B20	1			B18	2	B19	1
										B22	1					B23	1
										B24	2					B25	1
																B26	2
C	4	C1	4	C4	4	C1	4	C2	4	C5	4	C1	4	C3	4	C6	4
D	6	D	7	D	11	D	7	D	8	D	13	D	8	D	9	D	15
H	2	H1	2	H2	2	H3	2	H4	2	H5	2	H6	2	H7	2	H8	2
				M	2					M1	2					M2	2
N	2	N1	2	N4	2	N1	2	N2	2	N5	2	N1	2	N3	2	N6	2
V	2	V	2	V	2	V1	2	V1	2	V1	2	V3	2	V3	2	V3	2
V4	2	V3	2	V1	2	V6	2	V5	2	V2	2	V8	2	V7	2	V4	2
V10	2	V7	2	V3	2	V13	2	V9	2	V4	2	V15	2	V12	2	V6	2
V17	2	V12	2	V5	2	V19	2	V14	2	V6	2	V20	2	V16	2	V8	2
		V17	2	V7	2	V21	2	V19	2	V8	2	V24	2	V20	2	V11	2
				V3	2			V22	2	V11	2			V23	2	V13	2
				V12	2					V13	2			V25	2	V16	2
				V14	2					V16	2					V18	2
				V17	4					V18	2					V20	2
										V20	2					V22	2
										V22	2					V23	2
																V25	4

SIZES OF STRAIGHT BARS

MARK	SIZE	LENGTH
B	5/8"ø	4'-9"
B1	"	5'-5"
B2	"	6'-0"
B3	"	6'-7"
B4	"	6'-11"
B5	"	7'-8"
B6	"	8'-1"
B7	"	8'-3"
B8	"	8'-5"
B9	"	8'-8"
B10	"	8'-11"
B11	"	9'-3"
B12	"	9'-10"
B13	"	10'-0"
B14	"	10'-6"
B15	"	11'-1"
B16	"	11'-4"
B17	"	11'-9"
B18	"	13'-5"
B19	"	13'-7"
B20	"	14'-2"
B21	"	15'-2"
B22	"	16'-1"
B23	"	16'-6"
B24	"	19'-5"
B25	"	19'-8"
B26	"	22'-0"
C	1/2"ø	3'-2"
C1	"	4'-3"
C2	"	5'-2"
C3	"	6'-3"
C4	"	9'-1"
C5	"	10'-2"
C6	"	12'-2"
M	5/8"ø	9'-6"
M1	"	11'-0"
M2	"	12'-6"
N	1/2"ø	2'-0"
N1	"	3'-0"
N2	"	4'-0"
N3	"	5'-0"
N4	"	8'-0"
N5	"	9'-0"
N6	"	11'-0"

DIMENSIONS OF BENT BARS

5/8"ø BARS H TO H8

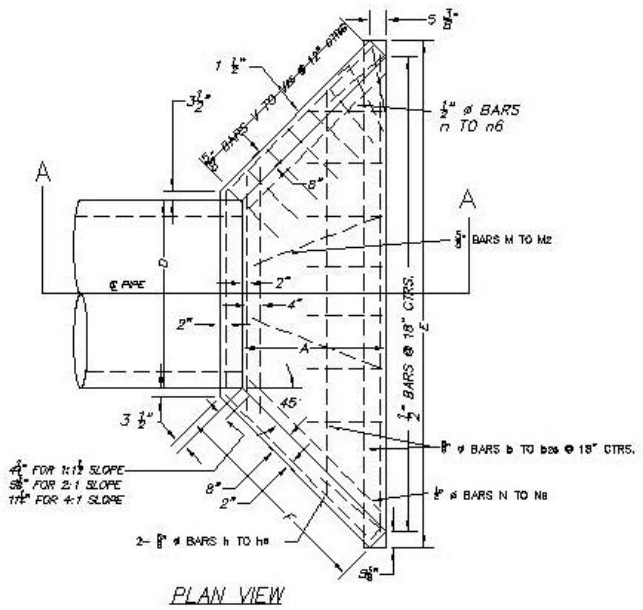
MARK	A	B	TOTAL LENGTH
H	3'-6"	4'-0"	11'-6"
H1	3'-6"	5'-1"	13'-8"
H2	3'-6"	10'-0"	23'-6"
H3	4'-1"	4'-8"	13'-5"
H4	4'-1"	5'-11"	15'-11"
H5	4'-1"	11'-8"	27'-5"
H6	4'-8"	5'-4"	15'-4"
H7	4'-8"	6'-10"	18'-4"
H8	4'-8"	13'-6'	31'-8'

5/8"ø BARS V TO V16

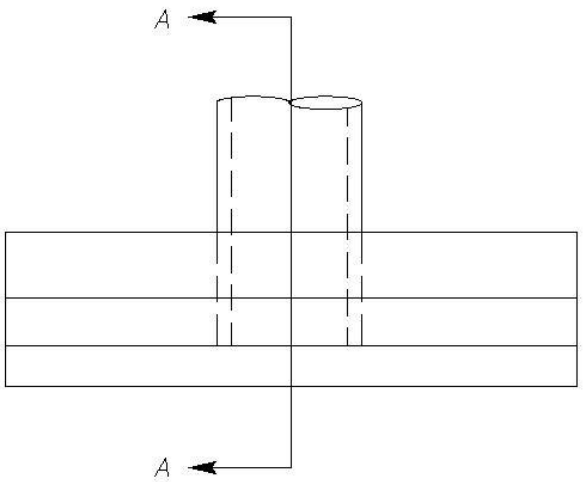
MARK	C	TOTAL LENGTH
V	2'-1"	4'-0"
V1	2'-4"	4'-3"
V2	2'-6"	4'-5"
V3	2'-7"	4'-6"
V4	4'-9"	4'-8"
V5	2'-10"	4'-9"
V6	3'-0"	4'-11"
V7	3'-1"	5'-0"
V8	3'-3"	5'-2"
V9	3'-4"	5'-3"
V10	3'-5"	5'-4"
V11	3'-6"	5'-5"
V12	3'-7"	5'-6"
V13	3'-9"	5'-8"
V14	3'-10"	5'-9"
V15	3'-11"	5'-10"
V16	4'-0"	5'-11"

5/8"ø BARS V17 TO V25

MARK	C	TOTAL LENGTH
V17	4'-1"	6'-0"
V18	4'-3"	6'-2"
V19	4'-4"	6'-3"
V20	4'-6"	6'-5"
V21	4'-8"	6'-7"
V22	4'-9"	6'-8"
V23	5'-0"	6'-11"
V24	5'-2"	7'-1"
V25	5'-3"	7'-2"



30", 36" & 42" PIPE HEADWALLS



PLAN

NOTES:

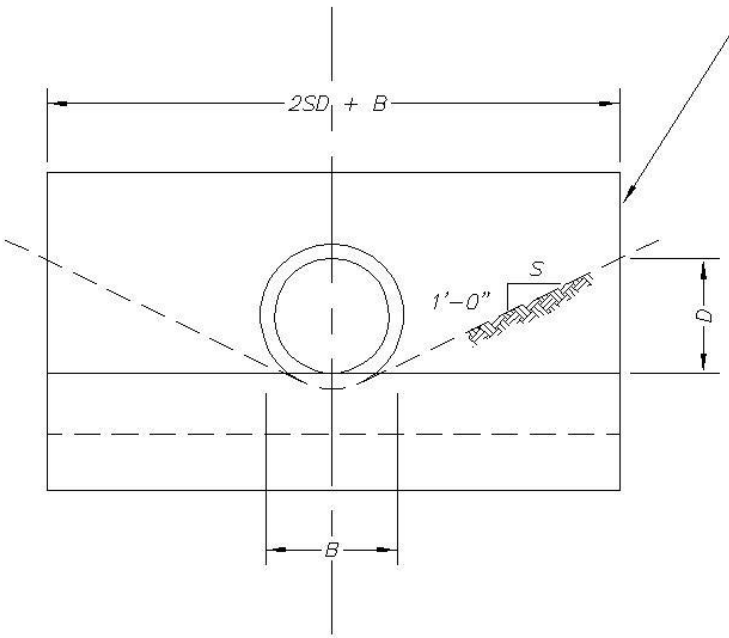
(1) CONCRETE FOR HEADWALLS TO BE CLASS "A" (F'C=3000 PSI).

(2) REINFORCING STEEL SHALL COMPLY WITH ASTM A 615.

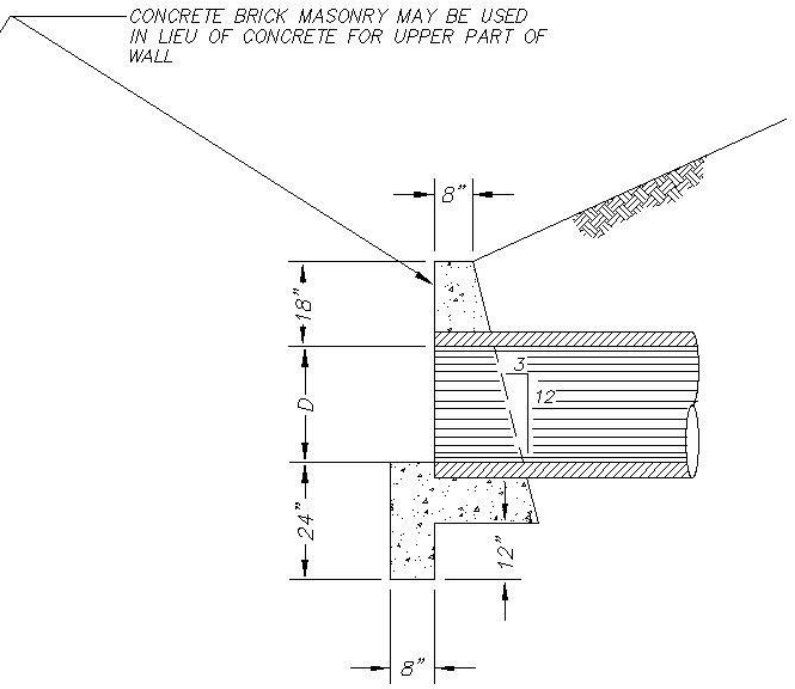
(3) PRECAST CONCRETE HEADWALLS MAY BE USED IN LIEU OF CAST IN PLACE OF CONCRETE. SHOP DRAWINGS TO BE SUBMITTED TO THE ENGINEER AND APPROVED BEFORE USE.

(4) CAST IN PLACE CONCRETE TO BE CONSTRUCTED IN ACCORDANCE WITH SECTION 702 OF THE S.C. DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION STANDARD SPECIFICATIONS (LATEST EDITION).

(5) ALL EXPOSED CONCRETE EDGES TO BE CHAMFERED 3/4 INCH EXCEPT WHERE NOTED.



END ELEVATION



SECTION A–A

15", 18" & 24" PIPE HEADWALL

RIP RAP (6"–10" STONES)

BROKEN CONCRETE USED ONLY AS APPROVED BY THE ENGINEER.

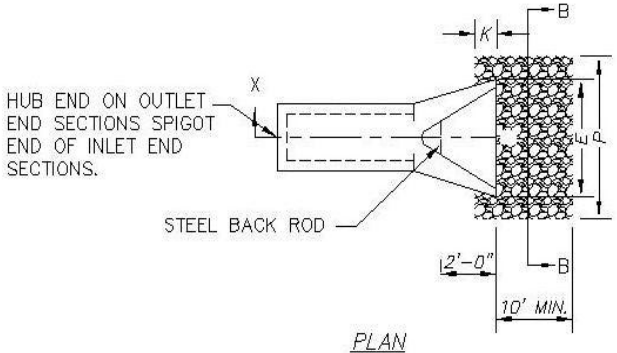
STONES SHALL VARY IN WEIGHT FROM 5 TO 200LBS.

AT LEAST 30% OF THE TOTAL WEIGHT OF THE RIP RAP SHAL BE IN INDIVIDUAL PIECES WEIGHING A MINIMUM OF 60LBS. EACH.

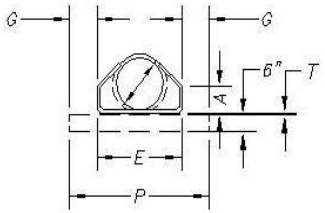
NOT MORE THAN 10% OF THE TOTAL WEIGHT OF THE RIP RAP MAY BE IN INDIVIDUAL PIECES WEIGHING LESS THAN 15 LBS. EACH OR AS SPECIFIED.

REFER TO STANDARD NO. 20.17 FOR CONCRETE SPLASH PAD.

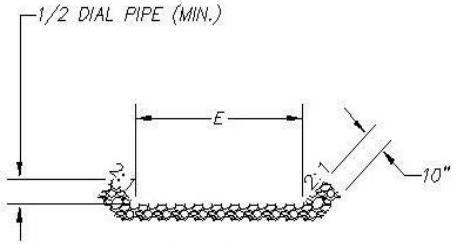
ALL SUBGRADE FOR STRUCTURE TO BE COMPACTED TO 95% OR GREATER.



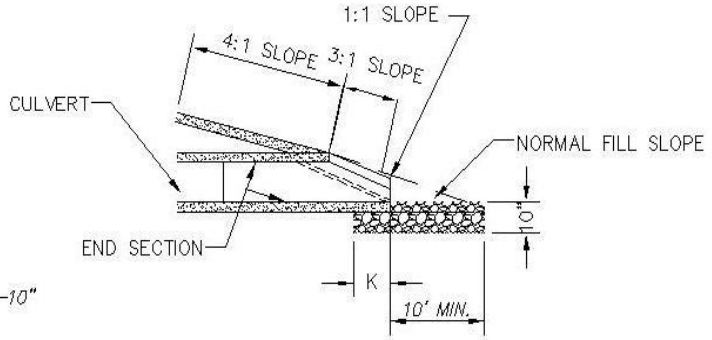
PLAN



FRONT ELEVATION



SECTION B–B



SLOPE DETAIL

RODS IN FLARED END SECTION			
PIPE DIA.	NO. & DIM OF RODS	REINF. LBS.	FABRIC
15"	2–#3x4'–0" SIDE RODS	3.008	18"–2x8–W2.1xW1.7
18"	2–#3x4'–0" SIDE RODS	3.008	16"–2x8–W2.1xW1.7
24"	2–#3x6'–0" SIDE RODS	4.512	24"–2x8–W2.9xW2.9
30"	2–#4x6'–0" SIDE RODS	8.016	30"–2x8–W4xW2.9
36"	2–#4x8'–0" SIDE RODS	10.668	42"–2x8–W4xW2.9
36"	2–#4x8'–0" BACK RODS	8.016	

END SECTIONS DIMENSIONS									
PIPE DIA.	A	B	C	E	F	T	G	K	P
15"	6"	2'–3"	3'–10"	2'–6"	6'–1"	1 7/8"	1'–2"	9"	4'–10"
18"	9"	2'–3"	3'–10"	3'–0"	6'–1"	2"	1'–5"	11"	5'–10"
24"	9 1/2"	3' –7 1/2"	2'–6"	4'–0"	6'–1 1/2"	2 1/2"	1'–8"	11"	7'–4"
30"	1'–0"	4'–6"	1'–7 3/4"	5'–0"	6'–1 3/4"	2 3/4"	1'–11"	1'–1"	8'–10"
36"	1'–3"	5'–3"	2'–10 3/4"	6'–0"	8'–1 3/4"	3"	2'–3"	1'–3"	10'–6"
42"	1'–10"	5'–3"	2'–11"	6'–6"	8'–2"	3 1/2"	2'–9"	1'–6"	12'–0"
48"	2'–1"	6'–0"	2'–2"	7'–0"	8'–2"	4"	3'–4"	1'–8"	13'–6"

RIP RAP APRON

FOR FLARED END SECTION

N.T.S.

Appendix M: Proof Roll Request Process and Inspection Form

Proof Roll Request Process

Step 1: Request a Proof Roll (via Trakit Software)

- The proof roll will be scheduled without the field density testing results, but it is expected that coordination between the Geotechnical Professional and Contractor has taken place prior to the proof roll. Specify a requested date and time in the "notes" box.
- The proof roll will be scheduled for the first available date and time.
- Prior to the proof roll, an unofficial report must be received from the Geotechnical Professional (via Trakit Software).

Step 2: Submit the Unofficial Report (via Trakit Software)

- Prior to the proof roll, an unofficial report must be received from the Geotechnical Professional (via Trakit Software).
- The Geotechnical Professional has to submit the unofficial report at a specified time depending on when the proof roll is requested.
- Proof rolls scheduled prior to 12:00 pm; The Geotechnical Professional must upload the unofficial report by 3:00 pm on the prior day. A review will be conducted on the report by 5 pm and resulted in Trakit.
- Proof rolls scheduled after 1:00 pm; The Geotechnical Professional must upload the unofficial report by 11:59 pm on the prior day. A review will be conducted on the report by 8:30 am and resulted in Trakit.
- If the reports are not received in time or if the reports are not compliant, the proof roll request will be cancelled (via Trakit Software).

Step 3: Submit the Official Report (via Trakit Software)

- The Official Report must be uploaded to the project (via Trakit Software) within 48 hours of a "PASSED" proof roll.
- The Official Report must mirror the Unofficial Report. If there are discrepancies, this could render the road ineligible to be considered for acceptance by Richland County.
- If the proof roll "FAILS," then the contractor will mitigate the issue, make repairs, and request another proof roll. An observation report from the Geotechnical Professional must be received prior to granting another proof roll. These reports must include a professional determination of the failure AND the method of repair.

Project Name:
Developer:
Contractor:
Geotechnical Firm:
Road Names & Locations:

Proctor Information

Proctor Reference Number:
Classification/Description:

Laboratory Test Method:

Gauge Number:
Density Standard:
Moisture Standard:

Source/Material:

The tests were performed in general accordance with applicable ASTM, AASHTO, or DOT test methods. This report is exclusively for the use of the client indicated above and shall not be reproduced except in full without the written consent of the company. Test results transmitted herein are only applicable to the actual samples tested at location(s) referenced and are not necessarily indicative of the properties of other apparently similar or identical materials.

Date	Num	Type/Location	Density	Optimum Moisture	Soil Type

Appendix N: Enforcement Response Guide

Richland County
Enforcement Response Guide for Stormwater Management and Floodplain Management Programs

File No. 46423420

May 2008
Updated September 2015

Prepared for:
RICHLAND COUNTY DEPARTMENT OF PUBLIC WORKS
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Prepared by:
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TABLE OF CONTENTS

Section 1
INTRODUCTION

The purpose of this Enforcement Response Guide (Guide) is to provide Richland County's Stormwater Management Division and Floodplain Management Division staff with guidance for inspections as well as enforcing the Stormwater Management Program, Floodplain Management Program, and Richland County Ordinance. The guidance in the Guide does not carry the force of law. It is intended to provide a framework for ensuring fair and consistent enforcement of the Richland County Stormwater Management and Floodplain Management Programs.

Richland County reserves the right to modify this Guide at any time without public notice. In addition, Richland County may deviate from this Guide as it deems necessary in order to carry out the intent of the Richland County Stormwater Management Program, Floodplain Management Program, and Richland County Ordinance.

Section 2

OVERVIEW OF ENFORCEMENT PROGRAM

The following Enforcement Response Guide provides inspection procedures and defines a range of appropriate enforcement actions based on the nature and severity of noncompliance events and other relevant factors. The County may initially rely on informal actions such as a warning ticket or "Notice of Violation" (NOV) where violations are non-significant or when the violator is cooperative in resolving its problems. However, when the violation is significant and/or when the violator does not promptly undertake corrective action, the County must respond with more severe enforcement responses which may include legal proceedings. Similarly, when the violator fails to return to compliance following the initial enforcement response, the County may need to "escalate" its enforcement response in a follow-up (more stringent) action, which may include fines assessed daily for each violation. The Stormwater General Manager will initiate and supervise all enforcement actions originated by the Stormwater Management Division. The County Engineer and Engineering Inspector Supervisor will initiate and supervise all enforcement actions originated by the Engineering Division. The Floodplain Manager will initiate and supervise all enforcement actions originated by the Floodplain Division.

Enforcement measures will be initiated by the Stormwater Management Division Inspectors, Stormwater General Manager, Engineering Division Inspectors, County Engineer, or Floodplain Manager in each instance that non-compliance is detected.

The County will also evaluate appropriate enforcement responses in the context of the violator's prior violations. For example, if the violator continues its minor non-compliance despite informal enforcement measures (that is, despite issuance of repeated warning tickets or NOVs), the County will adopt a more stringent approach. Similarly, if a violator has committed several types of violations, the County response must address each violation. **Since stormwater and floodplain management enforcement is a matter of strict liability**, the knowledge, intent, or negligence of the violator will not normally be taken into consideration.

The enforcement response selected must also be appropriate to the violation. This determination is often a matter of common sense. For example, while a verbal warning may be an appropriate response for incomplete recordkeeping, illegal dumping merits a more immediate and stringent response. The County will normally consider the following criteria when determining a proper response:

- Magnitude of the violation
- Duration of the violation
- Effect of the violation on the receiving water
- Effect of the violation on the stormwater system
- Compliance history of the violator
- Good faith of the violator
- Response to any previous order or failed report

The County begins its enforcement process by identifying a violation. Once a violation is identified, the County must determine the appropriate response. This response will be proportionate to the violation's severity, promote compliance in a timely manner, and be authorized under State law and Richland County's Ordinance as filed with the State of South Carolina.

Five (5) basic enforcement responses will be available to the County and will be described briefly in the following section. These five (5) enforcement responses are:

1. Notice of Violation
2. Warning Letter/Ticket
3. Summons to Magistrate's Court
4. Stop Work Order
5. Withhold or Revoke Business License

Section 3

BASIC ENFORCEMENT RESPONSES

Richland County has the authority to enforce their ordinance and programs developed in order to meet the requirements of their Stormwater NPDES permit and the Floodplain Overlay Ordinance. The maximum fine Richland County may impose for a violation is $1,092.50 per violation per day. Once a ticket is written by a Richland County inspector, it is sent to the Magistrate in order for a court date to be scheduled. The ticket may be made null at any time prior to the scheduled court appearance.

Appendix A includes tables which outline a range of appropriate enforcement actions based on the nature and severity of noncompliance events and other relevant factors. Richland County may deviate from this guidance as it deems necessary in order to carry out the intent of the Richland County Stormwater Management Program, Floodplain Management Program, and Richland County Ordinance.

3.1 Notice of Violation (NOV)

The NOV is an official communication from the County to the non-compliant violator which informs the violator that a stormwater or floodplain program violation has occurred. The NOV is an appropriate initial response to non-significant violations. In the case of significant non-compliance, an NOV may also be issued prior to issuing a ticket which summons the offender to magistrate's court. The NOV's purpose is to notify the violator of the violation(s); it may be the only response necessary in cases of infrequent and generally minor violations. If the violator does not return to compliance following receipt of the NOV, the County must proceed to more stringent enforcement measures. The NOV should be written and delivered to the violator immediately upon detection of the violation. The NOV should be received by the violator no later than seven (7) working days after discovery of the non-compliance. The NOV should either be hand delivered by County personnel or be sent to the violator via certified mail. Construction can commence but the contractor must work towards corrective actions. A card is posted onsite

if it shall result in immediate compliance as the work is being completed. An example of an NOV is included in Appendix B.

3.2 Warning Letter/Ticket

The warning letter/ticket is an official communication from the County to the non-compliant violator which informs the violator that a stormwater or floodplain management program violation has occurred. The warning letter/ticket is an appropriate initial response to non-significant violations. In the case of significant non-compliance, a warning letter/ticket may also be issued prior to issuing a ticket which summons the offender to magistrate's court. The warning letter/ticket's purpose is to notify the violator of the violation(s); it may be the only response necessary in cases of infrequent and generally minor violations. If the violator does not return to compliance following receipt of the warning letter/ticket, the County must proceed to more stringent enforcement measures. The warning letter/ticket should be written and delivered to the violator immediately upon detection of the violation. The warning letter/ticket should be received by the violator no later than seven (7) working days after discovery of the non-compliance. The warning letter/ticket should either be hand delivered by County personnel or be sent to the violator via certified mail. Construction can commence but the contractor must work towards corrective actions. An example of a warning letter/ticket is included in Appendix B.

3.3 Summons to Magistrate's Court

Richland County has the authority to charge any person violating any provision of the County ordinance with a misdemeanor punishable within the jurisdictional limits of magistrate's court. Each day of a violation shall constitute a new and separate offense. The maximum fine Richland County may impose for a violation is $1,092.50 per violation per day.

3.3.1 Court Room Procedures

Magistrate's Court hears civil cases involving landlord tenant issues and injury or property damage where the claim is under $7,500.00. Ticket books are issued by the Court Administration Office at 1400 Huger Street in Columbia. To get new ticket books, contact the Court Administrator with the amount of books needed and arrange for pick up.

Some Richland County Public Works officials have been commissioned by Richland County Council as code enforcement officers, and as such, have the ability to issue citations to magistrate's court. If the defendant requests a jury trial, immediately notify the Stormwater Manger and Public Works Director. Jury trials will be referred to the Richland County Legal Office for review. Bench trials will be tried by the Public Works Commissioned officer who issued the ticket. Any non-commissioned Public Works employees who have direct knowledge or information related to the case are to be called as witnesses.

Before court the officer must put together a complete file on the case which includes the Richland County Public Works Court Evidence Checklist (Appendix C), inspection reports, information on all correspondence with the accused (e.g. emails, voice messages, certified letters, etc.), pictures, witness information (if applicable), and sections of the ordinance that the defendant is accused of violating. The defendant and all witnesses will be notified of the court date and given a reminder call the day before.

3.4 Stop Work Order

The purpose of a stop work order is to "stop" the owner/permittee and or contractor/developer from all land-disturbing activity. Stop Work Orders shall be submitted in writing and a card posted onsite immediately. The County shall give written notice to the violator within seven (7) working days of the inspection. An example of stop work order is included in Appendix B.

3.5 Withhold or Revoke Business License

In the event of repeated non-compliance by a business or industry, the Richland County Stormwater or Floodplain Division can notify the Business License Department of the non-compliance, and the County can withhold or revoke the business license of the non-compliant business.

Section 4
INSPECTION PROCEDURES

For all inspections conducted by County employees, documentation is critical to ensure that the County is able to present the required evidence to a judge in the event a violator is issued a summons. Documentation should include pictures from every inspection, dates for each violation, records of inspections, records of any actions taken (i.e., every letter, NOV, warning ticket, etc.), and sample results from a certified laboratory with chain of custody, if applicable.

4.1 Construction Inspections

Richland County inspectors are authorized by Richland County to inspect and enforce the requirements of the Stormwater Management Program, Floodplain Management Program, and Richland County Ordinance. The inspectors shall be:

- Authorized to conduct inspections and file reports for periodic inspections as necessary during construction to assure compliance with the approved plans.
- Authorized to furnish the permittee or agent the results of inspections in a timely manner after the completion of each required inspection.
- Authorized to issue a NOV to the permittee or agent when any portion of the work does not comply with the approved plans.
- Authorized to issue a Stop Work Order to the permittee or agent wen any portion of the work does not comply with the approved plans.
- Authorized to pursue Civil Litigation as a result of unsafe conditions, working without a permit, unsatisfactory work progress, or other non-compliance.
- Authorized to conduct a final inspection upon the completion of the project to determine if the completed work is constructed in accordance with the approved set of design plans and/or as-built plans certified by the permittee' s registered professional engineer.

Richland County inspectors shall conduct periodic site inspections on all land disturbing activities. The person responsible for the land disturbing activity must arrange for the

appropriate representatives to attend a Richland County pre-construction meeting and shall notify the Richland County inspector before the initiation of construction and upon project completion. After the project completion is certified by a design professional, a final inspection will be conducted to ensure compliance with the approved Land Disturbance Permit. Richland County inspectors shall enforce the following inspection items:

- Ensure that the approved set of plans and associated (onsite) stormwater pollution prevention plan are located on the project site and are property being followed and implemented.
- Ensure that active construction sites are inspected for compliance with the approved plans on a regular basis.
- Provide the person financially responsible (or designee) for the land disturbing activities a written report after every inspection.
    - Date and location of the site inspection
    - Compliance status of "pass" or "fail"
    - List of deficiencies and time frames by which to correct
    - Pictures on the report for some of the urgent deficiencies
- Notify the person financially responsible (or designee) for the land disturbing activities in writing within seven (7) working days after the issuance of a violation (posted card) order including:
    - Nature of violation
    - Proposed penalty
    - Required corrective actions, and
    - Time period for adequately correcting the deficiencies

In addition to the above criteria, construction of individual structures located within the special flood hazard area will also be inspected by Richland County staff to ensure compliance with the permitted activities. The same criteria, as the above, outline compliance with Land Disturbance Permits and will be enforced.

Follow-up actions for continuing or recurring violations will be taken within 60 days of the initial enforcement response.

4.1.1 Third Party Inspections

Third party inspectors shall conduct inspections for compliance of the approved set of plans and approved stormwater pollution prevention plan during the construction phase (until Notice of Termination is processed by Richland County) of a project.

- Every seven (7) calendar days and within 24-hours after each rainfall event that produces ½ inches or more of precipitation.
- At the request of Richland County
- At the request of the permittee, and
- Due to a compliant of any construction impacts
- Reports must be placed in the construction box onsite within 72 hours of completion and must be e-mailed to pwconstructionreports@rcgov.us within 72 hours of completion.

The third party inspector also has the freedom to make unscheduled inspections to assure compliance with the plans.

4.2 Post-Construction Inspections

The purpose of post-construction inspections is to ensure that permanent stormwater management Best Management Practices (BMPs) are working properly and remain functional. In accordance with the maintenance agreement signed by the owner or lessee, all post-construction BMPs shall be maintained and records of such activities shall be kept and made available upon request by the Richland County Stormwater Division.

Richland County inspectors are authorized to enter onto a property to conduct a post-construction inspection. A copy of the inspection report shall be sent to the owner.

Upon refusal by any property owner to allow an inspector to enter or continue an inspection, the inspector shall terminate the inspection or confine the inspection to areas where no objections are raised. The inspector shall immediately report the refusal and grounds to the Stormwater Manager.

The owner of the post-construction BMP will be notified in writing within 3 working days when a violation(s) is observed. Both Warning Tickets and NOVs will include the following information:

i. Nature of the violations along with pictures of the violation
ii. Proposed penalty,
iii. Required corrective actions, and
iv. The time period for adequately correcting the violations.

The inspector also has the freedom to make unscheduled inspections to assure compliance with the agreed to maintenance schedules.

4.3 Facility Inspections

Richland County personnel will conduct onsite inspections of all facilities as required by their NPDES permit and Stormwater Programs. These inspections will include a review of all records, BMPs and control measures. The inspector will review any self-monitoring reports that are required by a user to determine if BMPs or control measures are required.

4.4 IDID Inspections

Richland County is notified of complaints, which are potential Illicit Discharge and Improper Disposals (IDIDs) via One Stop, phone call, or e-mail. When the County is notified, an inspector is sent to investigate the potential IDID within 24 hours. The procedures for investigation and follow up are the same as those detailed below for IDID detected during dry weather screening.

In addition Richland County inspectors are authorized by Richland County to conduct dry weather screening. Inspectors should reference Richland County's Standard Operating Procedures for the Illicit Discharge Detection and Elimination (IDDE) Program. During the course of conducting the screening, illicit discharges may be discovered. If flow is present from the outfall during dry weather screening, a preliminary illicit discharge investigation should be performed. This initial testing requires no equipment, but it is important in determining the priority of the IDID investigation on the site. First note the quantity of flow. This is simply a qualitative estimate – **trickle, low but steady flow**, or **significant discharge**. The initial test should also include:

- Visual analysis
    - Does the discharge appear to be clear?
    - Is there any discoloration, rust, or suspended sediment?
    - Is there sheen to the discharge, i.e., does it look oily?
    - Does the discharge contain floating debris?
    - Does the water appear foamy?

The Richland County Standard Operating Procedures for the IDDE Program provides detailed information on conducting the visual analysis as well as documentation for the inspection. Staff observing an illicit discharge should document with photos and information should be recorded including the time, date, location, and type of discharge. Any obvious illicit discharges noted during the field screening should be reported to the Stormwater Manager. A follow-up IDID investigation should be scheduled. The minimum investigation requirements include:

- Report immediately the occurrence of any dry weather flows believed to be an immediate threat to human health or the environment to DHEC Emergency Response, 1-888-481-0125.
- Consider illicit discharges suspected of being sanitary sewage and/or significantly contaminated to be **HIGH PRIORITY** and address in a timeframe consistent with the Richland County Storm Water Management Plan (SWMP).
- Delay suspected cooling water, wash water, or natural flows until after all discharges suspected of having potential to adversely impact human health or water quality have been investigated, eliminated and/or resolved.

- Track all illicit discharge investigations and document at a minimum the date(s) the illicit discharge was observed; the results of the investigation; any follow-up of the investigation; and the date the investigation was closed.

Once potential illicit discharges have been identified through the dry weather screening process, follow-up IDID screening should be performed on all of the outfalls exhibiting visible discharge. Priority should be used to determine the most effective means of tracing the discharges. Details on prioritization are included in the Richland County Standard Operating Procedures for the IDDE Program.

Once the outfalls have been categorized, investigation should begin with the HIGH PRIORITY areas. IDID investigation should proceed to initially identify the pollutant that has resulted in the chemical or physical nature of the discharge. Details on site testing are included in the Richland County Standard Operating Procedures for the IDDE Program. Richland County inspectors should conduct a source investigation for IDIDs. Details on conducting the source investigation are included in the Richland County Standard Operating Procedures for the IDDE Program.

Section 5
LEGAL REVIEW

In order to be able to effectively implement the procedures in this Enforcement Response Guide, Richland County must establish or have already established the legal authority to carry out the enforcement actions.

5.1 General Enforcement Provisions

Chapter 26 of the Richland County Code of Ordinances (Chapter 26) contains provisions for the enforcement of several of the programs discussed in this document. Enforcement authority for the Delegated Qualifying Local Program (QLP), Stormwater Pollution Prevention Plans, Illicit Discharge Detection and Elimination Program, Stormwater Structural Controls and Refuse Control and Illegal Dumping is included in this Chapter.

In addition to enforcement authority specific to each program, Chapter 26 also contains general enforcement provisions for all programs included in the chapter. Specifically, Section 26-272(a) discusses liabilities for violations, stating "[a]ny person who…alters property in violation of this chapter shall be subject to penalties in accordance with this article." In addition, Section 26-272(b) contains provisions allowing the County to utilize criminal penalties against any person who violates Chapter 26.

Section 26-272(c) allows the county to utilize "injunctive relief and other remedies" as necessary for the enforcement of the provisions of Chapter 26. These remedies may be used either in addition to other remedies or in lieu of, at the discretion of Richland County officials.

5.2 Land Development Ordinance

The Richland County ordinance incorporates all of the programs required by the Richland County NPDES stormwater permit. The ordinance provides Richland County with the authority to enforce their NPDES permit and the required programs.

APPENDIX A

RICHLAND COUNTY
INDUSTRIAL RUNOFF PROGRAM
ENFORCEMENT RESPONSE GUIDE

NATURE OF VIOLATION		ENFORCEMENT RESPONSES
A.	**Unauthorized Discharge (No Permit Coverage)**	
1.	Failure to obtain coverage under the General Permit for Industrial Activities, when required. No environmental or stormwater system damage	Phone call; NOV with NOI form (Copy DHEC on correspondence.)
2.	Failure to obtain coverage under the General Permit for Industrial Activities, when required. Environmental or stormwater system damage	Fine and Summons to Magistrate's Court
3.	Continuing unpermitted discharge due to no coverage under the General Permit for Industrial Activities, when required	Fine and Summons to Magistrate's Court
		Withhold or Revoke Business License
B.	**Unauthorized Discharge**	
1.	Illegal discharge to the stormwater system, no intent, no environmental or stormwater system damage	NOV in the form of the inspection form findings with timeframe to have resolved
		Warning letter/ticket with timeframe to comply
		Fine and Summons to Magistrate's Court
		Withhold or Revoke Business License

NATURE OF VIOLATION		ENFORCEMENT RESPONSES
B.	**Unauthorized Discharge Continued**	
2.	Illegal discharge to the stormwater system, no intent, environmental or stormwater system damage	Fine and Summons to Magistrate's Court
		Withhold or Revoke Business License
3.	Illegal discharge to the stormwater system, intent, no environmental or stormwater system damage	Fine and NOV in the form of the inspection form findings with timeframe to have resolved.
		Fine and warning letter/ticket with timeframe to comply
		Fine and Summons to Magistrate's Court
		Withhold or Revoke Business License
4.	Illegal discharge to the stormwater system, intent, environmental or stormwater system damage	Fine and Summons to Magistrate's Court
		Withhold or Revoke Business License
C.	**Recordkeeping**	
1.	No Stormwater Pollution Prevention Plan (SWPPP), as required.	NOV in the form of the inspection form findings with timeframe to have resolved. (Copy DHEC on correspondence.)
		Warning letter/ticket with timeframe to comply
		Fine and Summons to Magistrate's Court

NATURE OF VIOLATION	ENFORCEMENT RESPONSES
C. Recordkeeping Continued	
2. Incomplete records for SWPPP (e.g., inspection records, annual certifications, non-stormwater discharge certification, or training records), when required.	NOV in the form of the inspection form findings with timeframe to have resolved
	Warning letter/ticket with timeframe to comply
	Fine and Summons to Magistrate's Court
D. Monitoring	
1. Incomplete monitoring records, when required. No intent.	NOV in the form of the inspection form findings with timeframe to have resolved.
	Warning letter/ticket with timeframe to comply using form
	Fine and Summons to Magistrate's Court
2. Incomplete monitoring records, when required. Intent.	Warning letter/ticket with timeframe to comply
	Fine and Summons to Magistrate's Court
3. No monitoring conducted, when required.	NOV in the form of the inspection form findings with timeframe to have resolved
	Warning letter/ticket with timeframe to comply
	Fine and Summons to Magistrate's Court

NATURE OF VIOLATION	ENFORCEMENT RESPONSES
E. Failure to Implement BMPs	
1. Failure to implement BMPs or control measures specified from an inspection or based upon self-monitoring results	Fine and warning letter/ticket with timeframe to comply
	Fine and Summons to Magistrate's Court

RICHLAND COUNTY
PESTICIDE, HERBICIDE & FERTILIZER PROGRAM
ENFORCEMENT RESPONSE GUIDE

NATURE OF VIOLATION	ENFORCEMENT RESPONSES
A. Use of Non-Certified or Not Documented Applicators	
1. Use of non-certified applicators (licensed through Clemson University Department of Pesticide Regulation (DPR)) for private property owners (e.g., golf courses, country clubs, subdivisions, etc.)	Notify Clemson University Department of Pesticide Regulation
2. Use of non-certified applicators (licensed through Clemson University Department of Pesticide Regulation (DPR)) – Repetitive	Notify Clemson University Department of Pesticide Regulation
3. Use of non-certified applicators (licensed through Clemson University Department of Pesticide Regulation (DPR)) for Richland County owned facilities	Internal notification to Division Manager
	Internal notification to Department Manager
	Internal notification to Assistant County Administrator
4. Use of applicators that documentation was not provided for at private property owners (e.g., golf courses, country clubs, subdivisions, etc.)	Notify Clemson University Department of Pesticide Regulation
B. Failure to Implement BMPs	
1. Failure to implement BMPs or control measures specified from an inspection	Fine and warning letter/ticket with timeframe to comply
	Fine and Summons to Magistrate's Court

NATURE OF VIOLATION		ENFORCEMENT RESPONSES
C.	**Recordkeeping and Postings**	
1.	Failure to maintain proper documentation for applicators	NOV in the form of the inspection form findings with timeframe to have resolved.
		Warning letter/ticket with timeframe to comply
		Fine and Summons to Magistrate's Court
2.	Failure to post signs in application areas that expose the general public	NOV in the form of the inspection form findings with timeframe to have resolved
		Warning letter/ticket with timeframe to comply
		Fine and Summons to Magistrate's Court
D.	**Spills**	
1.	Spill or leak of PHFs in Richland County-owned facility	Internal notification to Division Manager
		Internal notification to Department Manager
		Internal notification to Assistant County Administrator
2.	Spill or leak of PHFs in privately owned facility (e.g., golf courses, country clubs, subdivisions, etc.), no environmental or stormwater system damage	NOV in the form of the inspection form findings with timeframe to have resolved
		Warning letter/ticket with timeframe to comply
3.	Spill or leak of PHFs in privately owned facility (e.g., golf courses, country clubs, subdivisions, etc.), environmental or stormwater system damage	Fine and NOV in the form of the inspection form findings with timeframe to have resolved
		Warning letter/ticket with timeframe to comply
		Fine and Summons to Magistrate's Court

NATURE OF VIOLATION	ENFORCEMENT RESPONSES
E. Improper Citizen Application	
1. Citizen(s) applying PHFs near surface waters or right before a rain event	Public education using brochures
	Warning letter/ticket

NATURE OF VIOLATION	ENFORCEMENT
A. Non-Point Sources Identified	
1. A community, business, or industry is identified as the potential cause of non-point source pollution through wet weather monitoring. (e.g., fecal coliform from a chicken plant)	Public education with brochures, public meetings, etc.
	For business or industry with continued non-point source contribution, may add to the Industrial Program and may require BMPs or control measures

RICHLAND COUNTY
ILLICIT DISCHARGE DETECTION AND ELIMINATION PROGRAM
ENFORCEMENT RESPONSE GUIDE

NATURE OF VIOLATION		ENFORCEMENT
A.	**Illicit Discharge, No intent**	
1.	Illicit connection of a wastewater system to the stormwater system	Certified NOV to the wastewater system with timeframe to comply
		Fine and Summons to Magistrate's Court
2.	Leaking sanitary sewer lines	Certified NOV to the wastewater system with timeframe to comply
		Fine and Summons to Magistrate's Court
3.	Large-scale car washes not connected to the wastewater sewer system (e.g., not individual homeowners washing cars in driveway or yard)	Certified NOV with timeframe to comply. (Copy the applicable wastewater system on correspondence.)
		Fine and Summons to Magistrate's Court
		Withhold or Revoke Business License
4.	Failing septic tanks resulting in sewage being introduced to the stormwater system	Warning letter/ticket with timeframe to comply
		Fine and Summons to Magistrate's Court
5.	Major illicit discharge such as: gray water discharge, swimming pool backwash, etc. with significant environmental impact (Does not include those discharges allowed by Sec 26-203.b(2).d)	Fine and warning letter/ticket with timeframe to have illicit discharge tied into sanitary sewer or septic tank
		Fine and Summons to Magistrate's Court
6.	Minor illicit discharge such as: gray water discharge, swimming pool backwash, etc. with the potential for environmental impact (Does not include those discharges allowed by Sec 26-203.b(2).d)	Warning letter/ticket with timeframe to have illicit discharge tied into sanitary sewer or septic tank
		Fine and Summons to Magistrate's Court

NATURE OF VIOLATION	ENFORCEMENT
B. Illicit Discharge, Intent	
1. Large-scale car washes not connected to the wastewater sewer system (e.g., not individual homeowners washing cars in driveway or yard)	Fine and warning letter/ticket with timeframe to comply. (Copy the applicable wastewater system on correspondence.)
	Fine and Summons to Magistrate's Court
2. Major illicit discharge such as: gray water discharge, swimming pool backwash, etc. with significant environmental impact (Does not include those discharges allowed by Sec 26-203.b(2).d)	Fine and Summons to Magistrate's Court
3. Minor illicit discharge such as: gray water discharge, swimming pool backwash, etc. with the potential for environmental impact (Does not include those discharges allowed by Sec 26-203.b(2).d)	Fine and warning letter/ticket with timeframe to comply. (Copy the applicable wastewater system on correspondence.)
	Fine and Summons to Magistrate's Court

RICHLAND COUNTY
CONSTRUCTION PROGRAM
ENFORCEMENT RESPONSE GUIDE

NATURE OF VIOLATION		ENFORCEMENT RESPONSES
A.	**Construction Site Violations**	
1.	Not implementing BMPs or control measures as specified in RC approved plans	Verbal warning during inspection with a certified NOV giving 14 days to correct the violation
		Fine and Stop Work Order
		Fine and Summons to Magistrate's Court
2.	Unable to provide inspection reports during an inspection by RC staff	Verbal warning during inspection with a follow up certified NOV giving 14 days to correct the violation
		Fine and Stop Work Order
		Fine and Summons to Magistrate's Court
3.	Failing BMPs (such as fallen silt fences)	Verbal warning during inspection with a certified NOV giving 14 days to correct the violation
		Fine and Stop Work Order
		Fine and Summons to Magistrate's Court
4.	Unable to provide SWPPP	Verbal warning during inspection with a certified NOV giving 14 days to correct the violation
		Fine and Stop Work Order
		Fine and Summons to Magistrate's Court

NATURE OF VIOLATION		ENFORCEMENT RESPONSES
A.	**Construction Site Violations Continued**	
5.	Tracking sediment from site onto roadways	Verbal warning during inspection with a certified NOV giving 14 days to correct the violation
		Fine and Stop Work Order
		Fine and Summons to Magistrate's Court
6.	General litter on site (discarded building materials, food wrappers, etc.)	Verbal warning during inspection with a certified NOV giving 14 days to correct the violation
		Fine and Summons to Magistrate's Court
		Stop Work Order
7.	Not maintaining BMPs as required in stormwater construction permit	Verbal warning during inspection with a follow up certified NOV giving 14 days to correct the violation
		Fine and Stop Work Order
		Fine and Summons to Magistrate's Court
8.	Not having a SWPPP as required	Verbal warning during inspection with a follow up certified NOV giving timeframe to correct the violation
		Fine and Stop Work Order
		Fine and Summons to Magistrate's Court
9.	Incomplete records for SWPPP (e.g., dates for clearing, grubbing, etc., non-stormwater discharge certification)	Verbal warning during inspection with a follow up certified NOV giving 14 days to correct the violation
		Fine and Stop Work Order
		Fine and Summons to Magistrate's Court

NATURE OF VIOLATION	ENFORCEMENT RESPONSES
A. Construction Site Violations Continued	
10. Illegal discharge to the stormwater system	Warning letter/ticket and notify Stormwater Management Division of illegal discharge
	Stop Work Order
	Fine and Summons to Magistrate's Court

RICHLAND COUNTY
POST CONSTRUCTION PROGRAM
ENFORCEMENT RESPONSE GUIDE

NATURE OF VIOLATION		ENFORCEMENT RESPONSES
A.	**Post Construction Violations**	
1.	Not operating and/or maintaining BMPs or control measures as required, no intent, no environmental or stormwater system damage	NOV
		Warning letter/ticket with timeframe to comply
		Fine and Summons to Magistrate's Court
2.	Not operating and/or maintaining BMPs or control measures as required, no intent, environmental or stormwater system damage	Warning letter/ticket with timeframe to comply
		Fine and Summons to Magistrate's Court
3.	Not operating and/or maintaining BMPs or control measures as required, intent, no environmental or stormwater system damage	Fine and NOV with timeframe to comply
		Fine and warning letter/ticket with timeframe to comply
		Fine and Summons to Magistrate's Court
4.	Not operating and/or maintaining BMPs or control measures as required, intent, environmental or stormwater system damage	Fine and Summons to Magistrate's Court

RICHLAND COUNTY
SANITARY SEWER OVERFLOWS (SSOs)
ENFORCEMENT RESPONSE GUIDE

NATURE OF VIOLATION		ENFORCEMENT RESPONSES
A.	**Sanitary Sewer Overflows (SSOs)**	
1.	Non-significant, enters water body or stormwater sewer system	Review SSO Form submitted by wastewater system to ensure it was noted that SSO entered water body or stormwater sewer system
2.	Recurring at same location	Copy DHEC on correspondence to wastewater system. Issue should be resolved through DHEC's Enforcement Division.
3.	Action not taken to minimize or reduce amount of SSO	Copy DHEC on correspondence to wastewater system. Issue should be resolved through DHEC's Enforcement Division.

RICHLAND COUNTY
SPILL PREVENTION CONTROL AND COUNTERMEASURE (SPCC) PROGRAM
ENFORCEMENT RESPONSE GUIDE

NATURE OF VIOLATION		ENFORCEMENT RESPONSES
A.	**Spill event**	
1.	Spill that reaches stormwater conveyance	NOV in the form of the inspection form findings with timeframe to have resolved
		Warning letter/ticket with timeframe to comply
		Fine and Summons to Magistrate's Court
2.	Failure to notify Richland County of a spill event that reaches a water body	NOV in the form of the inspection form findings with timeframe to have resolved
		Fine and Warning letter/ticket (if repeat offender)
		Fine and Summons to Magistrate's Court
		Withhold or Revoke Business License
3.	Failure to notify Richland County Stormwater Division of a spill event that reaches a water body	Internal notification to Division Manager
		Internal notification to Department Manager
		Internal notification to Assistant County Administrator
4.	Spill from a Richland County owned facility that reaches stormwater conveyance	Internal notification to Division Manager
		Internal notification to Department Manager
		Internal notification to Assistant County Administrator
B.	**Recordkeeping**	
1.	Incomplete records for SPCC (e.g., inspection forms, training, plan certification(s), etc.)	NOV in the form of the inspection form findings with timeframe to have resolved
		Fine and Warning letter/ticket (if repeat offender)
		Fine and Summons to Magistrate's Court
		Withhold or Revoke Business License

NATURE OF VIOLATION		ENFORCEMENT RESPONSES
B.	**Recordkeeping Continued**	
2.	Incomplete records for SPCC (e.g., inspection forms, training, plan certification(s), etc.) for Richland County owned facility	Internal notification to Division Manager
		Internal notification to Department Manager
		Internal notification to Assistant County Administrator
C.	**Secondary Containment**	
1.	Lack of required secondary containment	NOV in the form of the inspection form findings with timeframe to have resolved.
		Fine and Warning letter/ticket (if repeat offender)
		Fine and Summons to Magistrate's Court
		Withhold or Revoke Business License
2.	Lack of required secondary containment for Richland County owned facility	Internal notification to Division Manager
		Internal notification to Department Manager
		Internal notification to Assistant County Administrator

RICHLAND COUNTY
STORMWATER POLLUTION PREVENTION PLANS (SWPPPs)
ENFORCEMENT RESPONSE GUIDE

NATURE OF VIOLATION		ENFORCEMENT RESPONSES
A.	**Unauthorized Discharge**	
1.	Illegal discharge to the stormwater system, no intent, no environmental or stormwater system damage	NOV in the form of the inspection form findings with timeframe to have resolved
		Fine and Warning letter/ticket (if repeat offender)
		Fine and Summons to Magistrate's Court
		Withhold or Revoke Business License
2.	Illegal discharge to the stormwater system, no intent, environmental or stormwater system damage	Fine and Warning letter
		Fine and Summons to Magistrate's Court
		Withhold or Revoke Business License
3.	Illegal discharge to the stormwater system, intent, no environmental or stormwater system damage	Fine and Warning letter/ticket
		Fine and Summons to Magistrate's Court
		Withhold or Revoke Business License
4.	Illegal discharge to the stormwater system, intent, environmental or stormwater system damage	Fine and Summons to Magistrate's Court
		Withhold or Revoke Business License
B.	**Recordkeeping**	
1.	No Stormwater Pollution Prevention Plan (SWPPP), as required.	NOV in the form of the inspection form findings with timeframe to have resolved. (Copy DHEC on correspondence.)
		Fine and Warning letter/ticket
		Fine and Summons to Magistrate's Court
		Withhold or Revoke Business License

NATURE OF VIOLATION	ENFORCEMENT RESPONSES
B. Recordkeeping Continued	
2. Incomplete records for SWPPP (e.g., inspection records, annual certifications, non-stormwater discharge certification, or training records), when required.	NOV in the form of the inspection form findings with timeframe to have resolved
	Fine and Warning letter/ticket
	Fine and Summons to Magistrate's Court
	Withhold or Revoke Business License
C. Monitoring	
1. Incomplete monitoring records, when required. No intent.	NOV in the form of the inspection form findings with timeframe to have resolved
	Fine and Warning letter/ticket
	Fine and Summons to Magistrate's Court
	Withhold or Revoke Business License
2. Incomplete monitoring records, when required. Intent.	Fine and Warning letter/ticket
	Fine and Summons to Magistrate's Court
	Withhold or Revoke Business License
3. No monitoring conducted, when required.	NOV in the form of the inspection form findings with timeframe to have resolved
	Fine and Warning letter/ticket
	Fine and Summons to Magistrate's Court
	Withhold or Revoke Business License
D. Failure to Implement BMPs	
1. Failure to implement BMPs or control measures specified from an inspection or based upon self monitoring results	Fine and Warning letter/ticket
	Fine and Summons to Magistrate's Court
	Withhold or Revoke Business License

RICHLAND COUNTY
STORMWATER STRUCTURAL CONTROLS INSPECTION
ENFORCEMENT RESPONSE GUIDE

NATURE OF VIOLATION		ENFORCEMENT RESPONSES
A.	**Operation and Maintenance**	
1.	Not properly operating and maintaining private detention ponds or other structures (e.g., ditch cleaning, catch basin/head wall repair, inlet cleaning, minor channel repair work, storm sewer cleaning, and vegetation control)	Warning letter/ticket with timeframe to comply
		Fine and Summons to Magistrate's Court
2.	Not making required repairs to the stormwater system when Richland County does not have an easement (e.g., blow out)	Warning letter/ticket with timeframe to comply
		Fine and Summons to Magistrate's Court

RICHLAND COUNTY
MISCELLANEOUS VIOLATIONS
ENFORCEMENT RESPONSE GUIDE

NATURE OF VIOLATION	ENFORCEMENT RESPONSES
A. Not obtaining stormwater-related permits	
1. Failure to obtain an encroachment permit	Stop Work Order Fine and Summons to Magistrate's Court
2. Failure to obtain coverage under the DHEC General Stormwater permit for construction activities	Stop Work Order (Copy DHEC on correspondence.) Fine and Summons to Magistrate's Court
3. Failure to obtain a land disturbance permit	Stop Work Order Fine and Summons to Magistrate's Court
4. Disturbing wetlands without a permit.	Notify DHEC and the Army Corps of Engineers for enforcement actions

RICHLAND COUNTY
REFUSE CONTROL & ILLEGAL DUMPING PROGRAMS
ENFORCEMENT RESPONSE GUIDE

NATURE OF VIOLATION		ENFORCEMENT RESPONSES
A.	**Illegal Dumping**	
1.	Dumping tires, appliances, etc. into streams, ditches or other waterways	Warning letter/ticket and Richland County's Stormwater General Manager is copied. A fine is also levied per violation.
		Fine and Summons to Magistrate's Court
2.	Spill on roadway of hydraulic oil, etc. which enters into streams, ditches or other waterways	Fine and notify Richland County's Stormwater General Manager
B.	**Littering**	
1.	Littering which enters into streams, ditches or other waterways	Fine per violation
C.	**Improper Disposal**	
1.	Disposal of paint, oil, grease, etc. down the storm drain	Copy DHEC on correspondence. Issue should be resolved through DHEC's Enforcement Division. Contact Richland County's Stormwater Management Division.
2.	Improper storage of paint, oil, grease, etc. which is in close proximity to a storm drain or water body	Copy DHEC on correspondence. Issue should be resolved through DHEC's Enforcement Division. Contact Richland County's Stormwater Management Division.
3.	Improper storage of paint, oil, grease, etc. which is in close proximity to a storm drain or water body by a Richland County facility	Contact Richland County's Stormwater Management Division Manager
		Internal notification to Department Manager
		Internal notification to Assistant County Administrator

RICHLAND COUNTY
FLOODPLAIN MANAGEMENT PROGRAM
ENFORCEMENT RESPONSE GUIDE

NATURE OF VIOLATION	ENFORCEMENT RESPONSES
A. Illegal Dumping	
1. Failure to obtain a floodplain development permit or construction out of compliance with permitted plan set.	Stop Work Order Fine and Summons to Magistrate's Court

APPENDIX B

Example Notice of Violation

Stormwater Management Division

Department of Public Works

Stormwater Management Division

NOTICE OF VIOLATION

Date: _____

Name of Responsible Party: _____

Project: _____

Address: _____

City, State Zip code: _____

Permit No: _____

Violated Ordinance Section(s): _____

This Notice of Violation (NOV) serves as a warning concerning activities on the above mentioned site.

The issuance of this NOV is based on the results of a Richland County inspection carried out on_____. A verbal warning was also given to_____at the time of the inspection. A copy of our inspection report detailing the deficiencies is enclosed with this NOV.

You have until _____to correct the deficiencies noted on the inspection report. At that time our inspector will revisit your site. Failure to comply with this NOV will result in an escalation of enforcement which could include **fines.**

If you have any questions concerning this warning, you may contact our office at 803-576-2465.

Signed by: _____

Printed Name: _____

Engineering Division

Notice of Violation

RICHLAND COUNTY Department of Public Works
Engineering Division
NPDES Storm Water Construction Compliance Inspection Report

Notice of Violation

☐ PASS ☑ FAIL ☑ PHOTOS

Type of Inspection:
- ☐ Pre-Construction Follow-Up
- ☑ Sediment & Erosion Control
- ☐ Proof Roll
  - ☐ Curb and Gutter
  - ☐ Subgrade
  - ☐ Base Course
- ☐ Final Inspection
- ☐ Follow up Inspection (Complaint)
- ☐ Follow up Inspection (Requires Detailed Notes)
- ☐ As-Built Verification
  - ☐ 70% Cover Achieved

Project Name: Portrait Hills

Phase/Tract: Phase 1

Inspector: Web Lyons

Time of Inspection: 0930 (1.75 hr)

2nd Inspector: Gary Gamble

Date of Inspection: 150401

Weather Conditions: Sunny

Tentative Re-Inspection: 150415

1) Are the following items available?
- ☑ SWPPP
- ☑ Land Disturbance Permit/Approved Plans
- ☑ NOI
- ☑ Copy of the General Permit
- ☑ DHEC Coverage Letter
- ☐ (N/A) for All -Less than (1) Acre
- ☐ (N/A) for All Documentation Verified On: _____

2) Are inspections being conducted and on-site? ☑ Yes ☐ No

Inspector: Jesse DeFrance

Contractor: _____

3) Is the Construction Entrance/Exit properly installed according to plans? ☑ Yes ☐ No

4) Is the perimeter silt fence and/or other controls properly installed? ☑ Yes ☐ No *If No, Identify deficiency and location(s).

5) Is construction activity following the phasing and sequencing? ☑ Yes ☐ No *If No, provide description(s).

6) Has construction activity on the site ceased for 14 days or more? ☐ Yes ☑ No *If YES, have temporary stabilization measures been installed within 14 days? ☑ Yes ☐ No *If No, identify location(s) needing stabilization.

7) Are litter construction debris, oils, fuels, building products & construction chemicals being properly addressed and/or removed? ☑ Yes ☐ No *If No, identify location(s).

Notice of Violation

Deficiencies/Corrections

(If applicable, provide location and date to be completed)

Notice of Violation

Previous findings: (Repeat)
1. SD 3 has been installed in Pond 1. Add baffle and apron per plans.
2. Pond 3 is incomplete. It still needs grading according to the plans. The outlet structure and skimmer are in place. Baffles are not installed. What is time frame for completion.
3. Install all rock apron per design and location on approved plans at outlet locations.
4. SD 36 has the pipe installed in box to go to Pond 2. The pipe is not visible nor is the forebay. Can not verify location.
5. Install silt fence around Lots 5, 6 & 9 as per Individual Lot NOI.
6. Contractors leaving from entrance that is not an approve construction entrance and is tracking in the road.
7. Inlet protection to be installed at all curb and gutter inlets.
8. SD 30 the curb has been wash out underneath. Need to repair.

Deficiencies/Corrections

(If applicable, provide location and date to be completed)

Additional comments:
1. Rough grading of the road
2. Curb and gutting going in.
3. All onsite documents for all phases of protect will be kept end on site in box. Location has been discussed. Documents will be place at location by end of week.

Site is being issued a Notice of Violation for construction sequence violation. Pond 1 (baffle missing) and Pond 3 is not complete. These pond need to be completed prior to building of homes.

Site Information:

Roadway: Rough layout
Curb and Gutter: Installing
Sidewalks:
Signage:
Striping:
Storm Drain: Installing
Pond: Installed (final grade of Pond 3 not complete)

If you have any questions or concerns regarding any information presented on this report, please contact the inspector at (803) 457-0606 or Chief Inspector (803) 576-2385

THE ABOVE DEFICIENCIES MUST BE CORRECTED AND SUPPORTING DOCUMENTATION REVIEWED AND APPROVED PRIOR TO FINAL APPROVAL OR PLACEMENT OF BASE MATERIAL.

THESE DEFICIENCES SHOULD BE CONSIDERED TO BE THE MINIMUM COMPLIANCE REQUIREMENTS; ANY SITE OR PLAN DEFICIENCY WILL BE CONSIDERED A NON-COMPLIANCE ISSUE WHETHER OR NOT IT IS IDENTIFIED ON THIS REPORT

Webster H. Lyons 04/01/2015

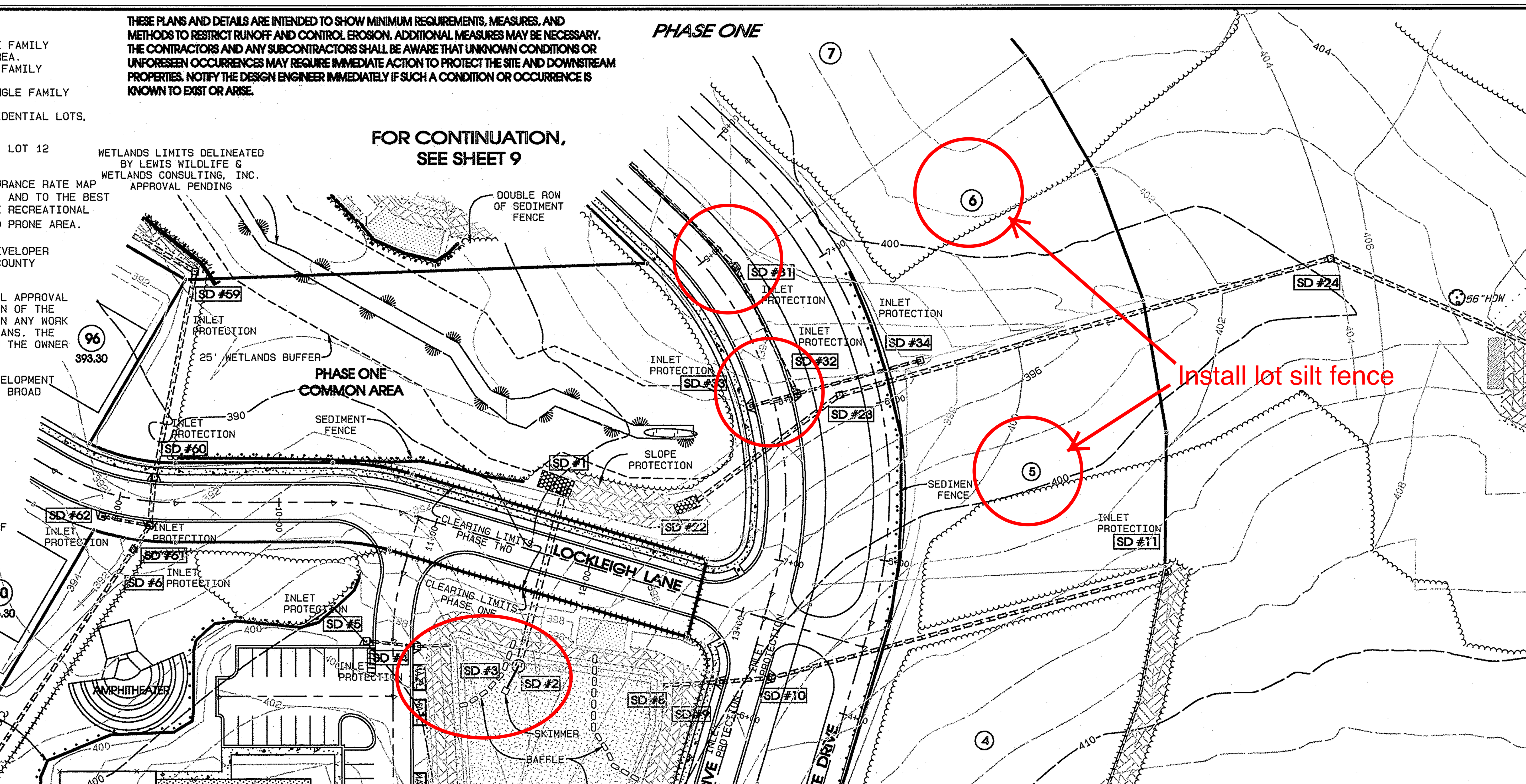
Inspector Date

I AGREE THAT THE ABOVE REFERENCED INSPECTION DID OCCUR AND HAVE COMMUNICATED ALL DEFICIENCIES.

NOTES & REFERENCES:

1. PHASE ONE: 23.93 TOTAL AC. TO BE SUBDIVIDED INTO 30 SINGLE FAMILY RESIDENTIAL LOTS INCLUDING COMMON AREA AND RECREATIONAL AREA.
   PHASE TWO: 9.05 TOTAL AC. TO BE SUBDIVIDED INTO 27 SINGLE FAMILY RESIDENTIAL LOTS AND COMMON AREA.
   PHASE THREE: 8.62 TOTAL ACRES TO BE SUBDIVIDED INTO 24 SINGLE FAMILY RESIDENTIAL LOTS AND COMMON AREA.
   41.60 TOTAL ACRES TO BE DIVIDED INTO 81 SINGLE FAMILY RESIDENTIAL LOTS, RECREATIONAL AREA AND COMMON AREA.
2. A PORTION OF RICHLAND COUNTY TAX MAP SHEET 01700, BLOCK 4, LOT 12 ZONED PDD.
3. I HEREBY CERTIFY THAT I HAVE CONSULTED THE FEMA FLOOD INSURANCE RATE MAP COMMUNITY PANEL # 45079C 0070 K, DATED SEPTEMBER29, 2010, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF, PHASES ONE, TWO, THREE AND THE RECREATIONAL AREA IS LOCATED IN ZONE X, NOT A DESIGNATED 100-YEAR FLOOD PRONE AREA.
4. AREAS SHOWN AS "COMMON AREA" ARE APPROXIMATE. THE OWNER/DEVELOPER RESERVES THE RIGHT TO MODIFY, WITHIN APPLICABLE RICHLAND COUNTY REGULATIONS, THE SHAPE AND SIZE OF THE COMMON AREA.
5. EACH CONTRACTOR OR SUBCONTRACTOR SHALL OBTAIN COPIES OF ALL APPROVAL LETTERS, PERMITS AND APPROVED PLANS RELATING TO HIS PORTION OF THE CONSTRUCTION. CONTRACTORS OR SUBCONTRACTORS SHALL NOT BEGIN ANY WORK UNTIL HAVING POSESSION OF ALL SAID LETTERS, PERMITS AND PLANS. THE CONTRACTOR SHALL REQUEST A PRECONSTRUCTION CONFERENCE WITH THE OWNER AND ENGINEER.
6. BENCHMARK: NAIL IN TREE IN THE SOUTHEAST CORNER OF THE DEVELOPMENT 870'± EAST OF THE INTERSECTION OF PORTRAIT HILL DRIVE WITH BROAD RIVER ROAD. ELEVATION = 412.22 MSL (NAVD 88 DATUM)
7. TOTAL DISTURBED AREA:
   RECREATIONAL AREA = 4.1 ACRES
   PHASE ONE = 21.4 ACRES
   PHASE TWO = 8.4 ACRES
   PHASE THREE = 6.8 ACRES
8. ALL PONDS SHALL HAVE A PERMANENT WATER AND A FLAT BOTTOM (NO CROSS SLOPE ON BOTTOM)
9. GRASS SWALES NEED TO BE STABILIZED WITHIN SEVEN (7) DAYS OF COMPLETED CONSTRUCTION.

THESE PLANS AND DETAILS ARE INTENDED TO SHOW MINIMUM REQUIREMENTS, MEASURES, AND METHODS TO RESTRICT RUNOFF AND CONTROL EROSION. ADDITIONAL MEASURES MAY BE NECESSARY. THE CONTRACTORS AND ANY SUBCONTRACTORS SHALL BE AWARE THAT UNKNOWN CONDITIONS OR UNFORESEEN OCCURRENCES MAY REQUIRE IMMEDIATE ACTION TO PROTECT THE SITE AND DOWNSTREAM PROPERTIES. NOTIFY THE DESIGN ENGINEER IMMEDIATELY IF SUCH A CONDITION OR OCCURRENCE IS KNOWN TO EXIST OR ARISE.



SEE SHEET #33 FOR ADDITIONAL GRADING AND EROSION CONTROL NOTES

DISTURBED AREA FOR RECREATIONAL AREA = 4.1 ACRES. ONLY A SINGLE STAGE OF LAND DISTURBANCE IS REQUIRED (AS SHOWN ON THIS SHEET)

RECREATIONAL AREA CONSTRUCTION SEQUENCE:

THE ANTICIPATED TIME FOR COMPLETION OF THE PROJECT INFRAS[TRUCTURE] SHOWN ON THESE DRAWINGS IS SIX MONTHS FROM THE TIME OF IN[ITIAL] DISTURBANCE.

ALL PERIMETER CONTROLS (CONSTRUCTION EXIT, SEDIMENT FENCE ... BE IN PLACE BEFORE ANY OTHER EARTH-MOVING ACTIVITIES BEGI[N]

1. RECEIVE NPDES COVERAGE FROM DHEC.
2. ON-SITE PRE-CONSTRUCTION MEETING.
3. NOTIFY RICHLAND COUNTY OFFICE 48 HOURS PRIOR TO BEGINNING LAND DISTURBANCE ACTIVITIES.
4. INSTALL GRAVEL CONSTRUCTION EXIT. MAINTAIN THROUGHOUT OTHER STAGES AS NEEDED
5. CONSTRUCT AND MAINTAIN ALL NECESSARY EROSION CONTROL MEASURES BEFORE BEGINNING EACH SEQUENCE.
6. IDENTIFY ALL TREES TO BE PROTECTED.
7. CLEARING AND GRUBBING AS NECESSARY FOR INSTALLATION OF PERIMETER CONTROLS (e.g., SEDIMENT FENCING)
8. INSTALL PERIMETER CONTOLS (e.g., SEDIMENT FENCING)
9. CLEARING AND GRUBBING ONLY IN AREAS OF WATER QUALITY BASIN, OUTFALL PIPE AND ROADWAY ACCESS TO THE POND.
10. CONSTRUCT BASIN AS SHOWN ON THIS SHEET. (OUTLET STRUCTURES MUST BE COMPLETELY INSTALLED AS SHOWN ON THE DETAIL SHEET BEFORE PROCEEDING TO THE FOLLOWING STEPS).
11. CLEAR AND GRUB REMAINING AREAS TO BE DISTURBED.
12. ROUGH GRADING.
13. INSTALL UTILITIES AND STORM DRAINAGE LINES.
14. INSTALL TEMPORARY INLET PROTECTION AT ALL CATCH BASINS.
15. PAVEMENT, BUILDING AND REMAINING IMPROVEMENTS CONSTRUCTION.

APPLICANT'S CERTIFICATION

"I (WE) HEREBY CERTIFY THAT ALL CLEARING, GRADING, CONSTRUCTION AND/OR DEVELOPMENT WILL BE DONE PURSUANT TO THIS PLAN."

02-21-14
REV. 4-16-14
DATE PERMIT APPLICANT

I HEREBY CERTIFY THAT THIS PLAN IS DESIGNED TO CONTAIN SILT ON THE PROPERTY CONCERNED TO THE MAXIMUM EXTENT FEASIBLE. PROVISIONS FOR EROSION AND SEDIMENT CONTROL ARE IN ACCORDANCE WITH THE RICHLAND COUNTY SEDIMENT CONTROL ORDINANCE.

02-21-14
REV. 4-16-14
DATE WILLIAM H. BROWN, P.E., R.L.S. #4953

FUTURE SECTION

LOCATION OF CONCRETE WASH OUT AREA TO BE FIELD DETERMINED AS PROJECT IS DEVELOPED

US ROUTE 176 BROAD RIVER ROAD 75' R.O.W.

THE OWNER IS:
DEVELOPMENT SERVICES, LLC
441 WESTERN LANE
IRMO, S.C. 29063
TEL: 803/749-9000
FAX : 803/179-4873
ATTN: MR. BILL DIXON
EMAIL: BDIXON@MUNGO.COM

THE SURVEYOR IS:
BELTER & ASSOCIATES, INC.
144 FRIARSGATE BLVD.
IRMO, S.C. 29063
TEL: (803) 732-4004
FAX: (803) 732-2891
ATTN: MR. GEORGE BRADLEY
EMAIL: GBRADLEY-BELTER@SC.RR.COM

THE ENGINEER IS:
CIVIL ENGINEERING OF COLUMBIA
3608 FERNANDINA ROAD
COLUMBIA, S.C. 29210
TEL: (803) 798-2820
FAX: (803) 798-2826
ATTN: MR. WILLIAM H. BROWN
EMAIL: WHB@CECOLA.COM

THE WATER OPERATOR IS:
THE CITY OF COLUMBIA
POST OFFICE BOX 147
COLUMBIA, S.C. 29217
TEL: (803) 545-3400
FAX: (803) 733-8674
ATTN: MR. SCOTT ROGERS
EMAIL: MSROGERS@COLUMBIASC.NET

THE SEWER OPERATOR IS:
RICHLAND COUNTY UTILITIES
7525 BROAD RIVER ROAD
COLUMBIA, S.C. 29063
TEL: (803) 401-0050
FAX: (803) 401-0030
ATTN: MR. RENALDO ANGOLUAN
EMAIL: ANGOLUANR@RCGOV.US

CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING UNDERGROUND UTILITIES (HORIZONTAL & VERTICAL) PRIOR TO CONSTRUCTION (INCLUDING BUT NOT LIMITED TO: GAS LINES, WATER LINES, SEWER LINES, ELECTRICAL AND TELECOMMUNICATION LINES, AND FIBER OPTIC CABLES.)

CALL PALMETTO UTILITY PROTECTION SERVICE AT: 811

AT LEAST 3 DAYS BEFORE CONSTRUCTION. UNLESS STATED OTHERWISE IN CONTRACT WITH OWNER, THE CONTRACTOR SHALL INCLUDE ANY UTILITY RELOCATION COSTS IN HIS ORIGINAL AGREEMENT WITH THE OWNER.

RECREATIONAL AREA AND PARTIAL PHASE ONE

Portrait Hill

RICHLAND COUNTY, SOUTH CAROLINA

50 25 0 50 100 150
SCALE IN FEET

CIVIL ENGINEERING of COLUMBIA
CONSULTING ENGINEERING, SURVEYING AND PLANNING
3608 FERNANDINA ROAD, COLUMBIA, SOUTH CAROLINA 29210
TELEPHONE (803) 798-2820 FAX (803) 798-2826

NO.	DATE	DESCRIPTION	BY
1	4-16-14	RICHLAND CO. LETTER 3-28-14	MJD

RECREATIONAL AREA AND PARTIAL PHASE ONE POLLUTION PREVENTION PLAN
PREPARED FOR DEVELOPMENT SERVICES, LLC IRMO, SOUTH CAROLINA

JOB NUMBER 13074
SCALE 1" = 50'
DATE FEB. 21, 2014
DRAWN M. DINKINS
DESIGNED M. DINKINS
DRAWING NUMBER 8 OF 33

PHASE ONE CONSTRUCTION SEQUENCE:

THE ANTICIPATED TIME FOR COMPLETION OF THE PROJECT INFRASTRUCTURE SHOWN ON THESE DRAWINGS IS SIX MONTHS FROM THE TIME OF INITIAL DISTURBANCE.

ALL PERIMETER CONTROLS (CONSTRUCTION EXIT, SEDIMENT FENCE, ETC.) MUST BE IN PLACE BEFORE ANY OTHER EARTH-MOVING ACTIVITIES BEGIN.

1. RECEIVE NPDES COVERAGE FROM DHEC.
2. ON-SITE PRE-CONSTRUCTION MEETING.
3. NOTIFY RICHLAND COUNTY OFFICE 48 HOURS PRIOR TO BEGINNING LAND DISTURBANCE ACTIVITIES.

STAGE ONE

4. INSTALL GRAVEL CONSTRUCTION EXIT. MAINTAIN THROUGHOUT OTHER STAGES AS NEEDED
5. CONSTRUCT AND MAINTAIN ALL NECESSARY EROSION CONTROL MEASURES BEFORE BEGINNING EACH SEQUENCE.
6. IDENTIFY ALL TREES TO BE PROTECTED.
7. CLEARING AND GRUBBING AS NECESSARY FOR INSTALLATION OF PERIMETER CONTROLS (e.g., SEDIMENT FENCING)
8. INSTALL PERIMETER CONTOLS (e.g., SEDIMENT FENCING)
9. CLEARING AND GRUBBING ONLY IN AREAS OF WATER QUALITY BASINS, OUTFALL PIPES AND ROADWAY ACCESS TO THE PONDS
10. CONSTRUCT BASINS AS SHOWN ON THIS SHEET. (OUTLET STRUCTURES MUST BE COMPLETELY INSTALLED AS SHOWN ON THE DETAIL SHEET BEFORE PROCEEDING TO THE FOLLOWING STEPS).

STAGE TWO

11. CLEAR AND GRUB REMAINING AREAS TO BE DISTURBED.
12. ROUGH GRADING.
13. INSTALL UTILITIES AND STORM DRAINAGE LINES.
14. INSTALL TEMPORARY INLET PROTECTION AT ALL CATCH BASINS.
15. ROADWAY CONSTRUCTION.

STAGE THREE

16. CLEAR INDIVIDUAL LOTS FOR LOT CONSTRUCTION (2.9 AC.).
17. FINAL GRADING AND VEGETATIVE STABILIZATION.
18. FINAL INSPECTION BY GOVERNING AGENCIES.
19. REMOVAL OF TEMPORARY EROSION CONTROL STRUCTURES.

NOTES & REFERENCES:

1. PHASE ONE: 23.93 TOTAL AC. TO BE SUBDIVIDED INTO 30 SINGLE FAMILY RESIDENTIAL LOTS INCLUDING COMMON AREA AND RECREATIONAL AREA. PHASE TWO: 9.05 TOTAL AC. TO BE SUBDIVIDED INTO 27 SINGLE FAMILY RESIDENTIAL LOTS AND COMMON AREA. PHASE THREE: 8.62 TOTAL ACRES TO BE SUBDIVIDED INTO 24 SINGLE FAMILY RESIDENTIAL LOTS AND COMMON AREA. 41.60 TOTAL ACRES TO BE DIVIDED INTO 81 SINGLE FAMILY RESIDENTIAL LOTS, RECREATIONAL AREA AND COMMON AREA.
2. A PORTION OF RICHLAND COUNTY TAX MAP SHEET 01700, BLOCK 4, LOT 12 ZONED PDD.
3. I HEREBY CERTIFY THAT I HAVE CONSULTED THE FEMA FLOOD INSURANCE RATE MAP COMMUNITY PANEL # 45079C 0070 K, DATED SEPTEMBER29, 2010, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF, PHASES ONE, TWO, THREE AND THE RECREATIONAL AREA IS LOCATED IN ZONE X, NOT A DESIGNATED 100-YEAR FLOOD PRONE AREA.
4. AREAS SHOWN AS "COMMON AREA" ARE APPROXIMATE. THE OWNER/DEVELOPER RESERVES THE RIGHT TO MODIFY, WITHIN APPLICABLE RICHLAND COUNTY

APPLICANT'S CERTIFICATION

"I (WE) HEREBY CERTIFY THAT ALL CLEARING, GRADING, CONSTRUCTION AND/OR DEVELOPMENT WILL BE DONE PURSUANT TO THIS PLAN."

02-21-14
REV. 4-16-14

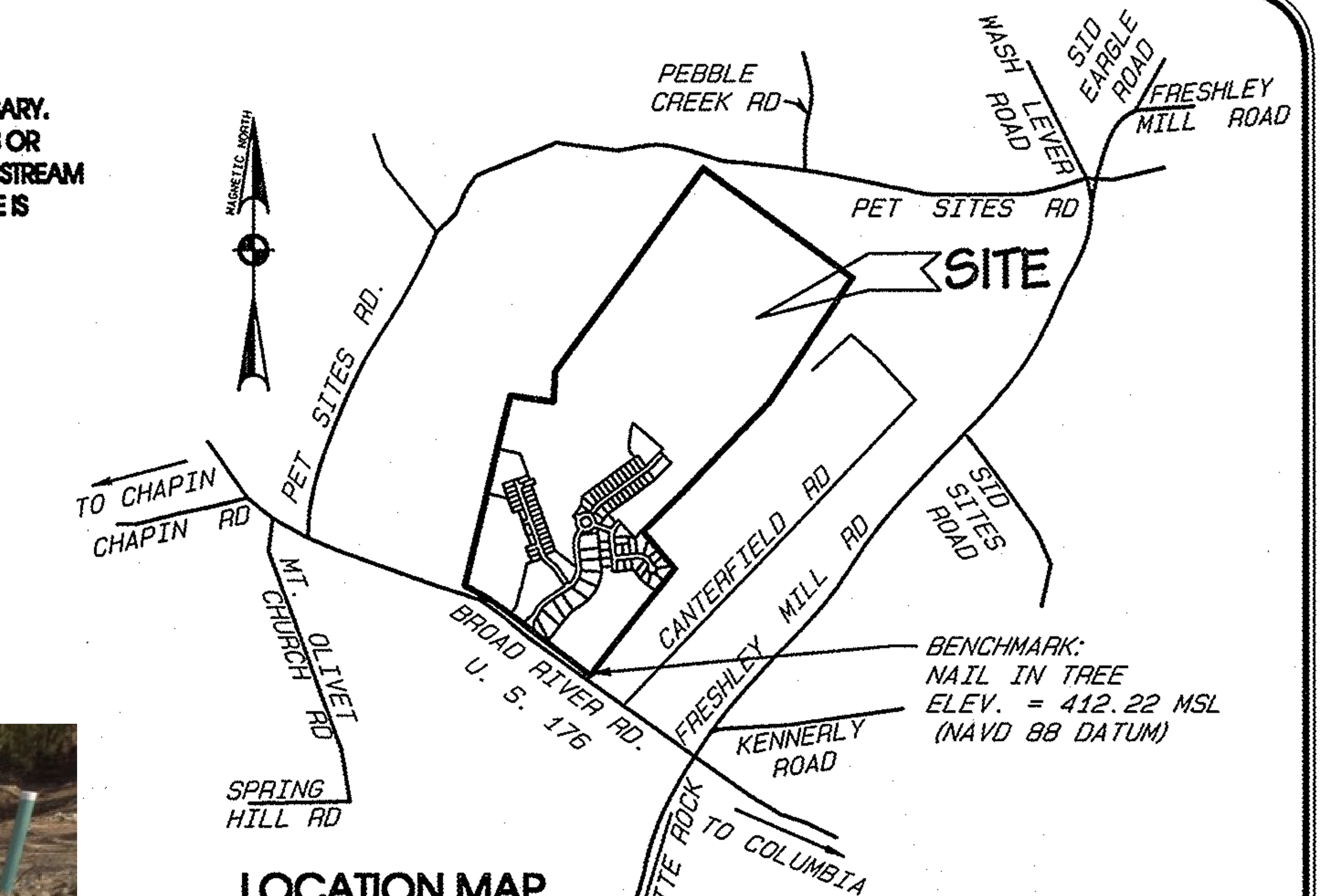
DATE PERMIT APPLICANT

I HEREBY CERTIFY THAT THIS PLAN IS DESIGNED TO CONTAIN SILT ON THE PROPERTY CONCERNED TO THE MAXIMUM EXTENT FEASIBLE. PROVISIONS FOR EROSION AND SEDIMENT CONTROL ARE IN ACCORDANCE WITH THE RICHLAND COUNTY SEDIMENT CONTROL ORDINANCE.

02-21-14
REV. 4-16-14

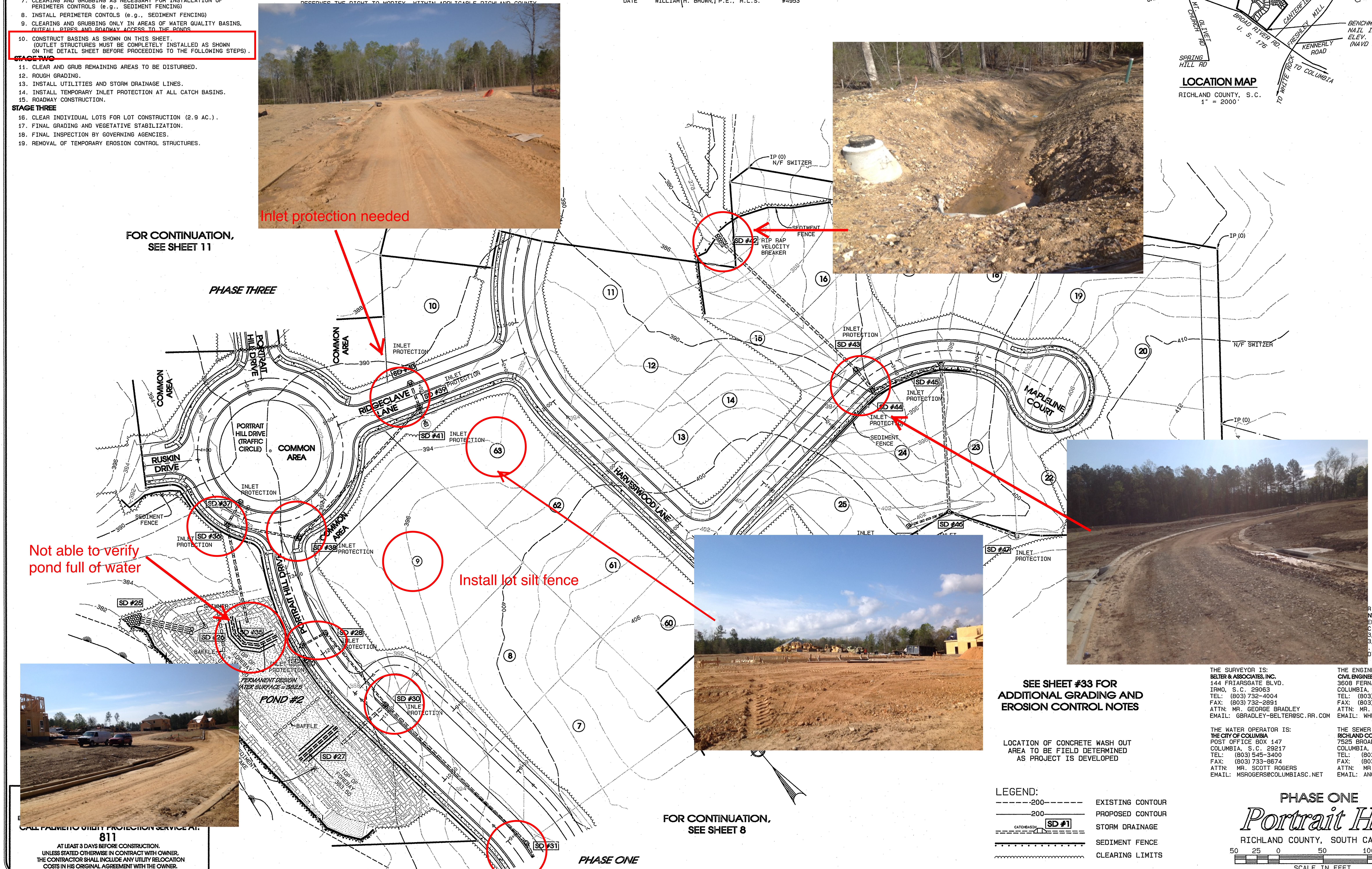
DATE WILLIAM H. BROWN, P.E., R.L.S. #4953

THESE PLANS AND DETAILS ARE INTENDED TO SHOW MINIMUM REQUIREMENTS, MEASURES, AND METHODS TO RESTRICT RUNOFF AND CONTROL EROSION. ADDITIONAL MEASURES MAY BE NECESSARY. THE CONTRACTORS AND ANY SUBCONTRACTORS SHALL BE AWARE THAT UNKNOWN CONDITIONS OR UNFORESEEN OCCURRENCES MAY REQUIRE IMMEDIATE ACTION TO PROTECT THE SITE AND DOWNSTREAM PROPERTIES. NOTIFY THE DESIGN ENGINEER IMMEDIATELY IF SUCH A CONDITION OR OCCURRENCE IS KNOWN TO EXIST OR ARISE.



LOCATION MAP

RICHLAND COUNTY, S.C.
1" = 2000'



CALL PALMETTO UTILITY PROTECTION SERVICE AT:
811
AT LEAST 3 DAYS BEFORE CONSTRUCTION.
UNLESS STATED OTHERWISE IN CONTRACT WITH OWNER, THE CONTRACTOR SHALL INCLUDE ANY UTILITY RELOCATION COSTS IN HIS ORIGINAL AGREEMENT WITH THE OWNER.

SEE SHEET #33 FOR ADDITIONAL GRADING AND EROSION CONTROL NOTES

LOCATION OF CONCRETE WASH OUT AREA TO BE FIELD DETERMINED AS PROJECT IS DEVELOPED

...R IS:
...NT SERVICES, LLC
...ERN LANE
...C. 29063
...3/749-9000
...3/179-4873
... BILL DIXON
...DIXON@MUNGO.COM

THE SURVEYOR IS:
BELTER & ASSOCIATES, INC.
144 FRIARSGATE BLVD.
IRMO, S.C. 29063
TEL: (803) 732-4004
FAX: (803) 732-2891
ATTN: MR. GEORGE BRADLEY
EMAIL: GBRADLEY-BELTER@SC.RR.COM

THE ENGINEER IS:
CIVIL ENGINEERING OF COLUMBIA
3608 FERNANDINA ROAD
COLUMBIA, S.C. 29210
TEL: (803) 798-2820
FAX: (803) 798-2826
ATTN: MR. WILLIAM H. BROWN
EMAIL: WHB@CECOLA.COM

THE WATER OPERATOR IS:
THE CITY OF COLUMBIA
POST OFFICE BOX 147
COLUMBIA, S.C. 29217
TEL: (803) 545-3400
FAX: (803) 733-8674
ATTN: MR. SCOTT ROGERS
EMAIL: MSROGERS@COLUMBIASC.NET

THE SEWER OPERATOR IS:
RICHLAND COUNTY UTILITIES
7525 BROAD RIVER ROAD
COLUMBIA, S.C. 29063
TEL: (803) 401-0050
FAX: (803) 401-0030
ATTN: MR. RENALDO ANGOLUAN
EMAIL: ANGOLUANR@RCGOV.US

LEGEND:

------200------	EXISTING CONTOUR
——200——	PROPOSED CONTOUR
CATCHBASIN SD #1	STORM DRAINAGE
	SEDIMENT FENCE
	CLEARING LIMITS

PHASE ONE
Portrait Hill
RICHLAND COUNTY, SOUTH CAROLINA

50 25 0 50 100 150
SCALE IN FEET

REVISION

NO.	DATE	DESCRIPTION	BY
1	4-16-14	RICHLAND CO. LETTER 3-28-14	MJD

SOUTH CAROLINA CIVIL ENGINEERING OF COLUMBIA, INC NO. 000256 CERTIFICATE OF AUTHORIZATION

CIVIL ENGINEERING of COLUMBIA
CONSULTING ENGINEERING, SURVEYING AND PLANNING
3608 FERNANDINA ROAD, COLUMBIA, SOUTH CAROLINA 29210
TELEPHONE (803) 798-2820 FAX (803) 798-2826

ANY CERTIFICATIONS, WARRANTIES, OR GUARANTEES SIGNED BY THE ENGINEER OR SURVEYOR OF RECORD FOR THIS PROJECT ARE INTENDED TO EXPRESS THAT STANDARD AND REASONABLE CARE WERE USED IN PREPARATION OF THESE DOCUMENTS.

THE PRODUCT ON THIS SHEET WAS PREPARED FOR A SPECIFIC CLIENT FOR A SPECIFIC PURPOSE. USE BY ANY OTHER PERSON, WITHOUT WRITTEN PERMISSION FROM THE DESIGN ENGINEER, IS STRICTLY PROHIBITED.

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER & LAND SURVEYOR NO. 4953 WILLIAM H. BROWN

PHASE ONE
POLLUTION PREVENTION PLAN
PREPARED FOR
DEVELOPMENT SERVICES, LLC
IRMO, SOUTH CAROLINA

JOB NUMBER 13074

CHECKED BY:

SCALE 1" = 50'
DATE FEB. 21, 2014
DRAWN M. DINKINS
DESIGNED M. DINKINS

DRAWING NUMBER
9 OF 33

Floodplain Management Division

Richland Development Services
Progressive • Timely • Professional

Floodplain Division | 2020 Hampton Street, Columbia, SC 29202 | (803) 576-2150 | bollinga@rcgov.us

CERTIFIED MAIL

VIOLATION NOTICE

(Date)

(Owners Name and Address)

Subject: Stop Work Notice or Notice of Violation

Site Address:

Permit Number:

Dear _____:

On (type date of inspection) the Richland County Floodplain Inspector posted a Stop Work Notice or Notice of Violation on your property at (type site address of violation) for (type description of violation).

As of this date, no permits have been issued to clear the Stop Work Notice or Notice of Violation. You must apply for any required permits and approvals, pay all associated fees and/or take necessary action to correct the violation by **date** (30 days of this notice). At that time our inspector will revisit your site. No permits, licenses, or other entitlements may be issued by any County Department until this violation has been cleared. Failure to comply with this Notice of Violation will result in an escalation of enforcement which could include **fines**.

If you have any questions concerning this warning, you may contact our office at 803-576-2150.

Signed by: _____

Printed Name: _____

Warning Letter/Ticket

Richland County Solid Waste Code Enforcement

Officer's Name _____

Officer's Contact# _____

Citizen's Information

Name _____

Address _____

DL# _____

Tag# _____

Type of Violation _____

WARNING

Potential fine up to $1,092.50 and/or 30 days in jail

Ordinance Violation# _____

Date of Violation _____

Compliance by Date _____

Citizen's Signature:

_____

Note: This warning is for the violations set forth herein and may be used in conjunction with other evidence in future cases involving the same or similar violations.

Ticket# XXXXXX

Stop Work Orders

Engineering Division

Department of Public Works

Engineering Division

STOP WORK ORDER

Date: _____

Name of Responsible Party: _____

Project: _____

Address: _____

City, State Zip code: _____

Permit No: _____

Violated Ordinance Section(s): _____

You are hereby served notice that you are in violation of Chapter 26 of the Richland County Code of Ordinances at the abovementioned site. A **"STOP WORK"** order is being posted on this property effective **IMMEDIATELY**. In addition, a civil penalty in the amount of $1,092.50/day per violation may be issued if Richland County so deems it appropriate.

The issuance of this Order is due to failure to comply with a Notice of Violation issued on_____ and the results of a Richland County follow up inspection completed on _____. A copy of our inspection report is enclosed with this violation.

Your site must be inspected by a Richland County Inspector prior to resuming any construction activity. Any activity other than work leading to compliance with this Stop Work Order will result in the issuance of a civil penalty in the amount of **$1,092.50/day per violation and/or jail time.** At a minimum, work may not be resumed at this site sooner than 48 hours of the issuance of this Order.

If you have questions concerning this Order you can contact our office at 803-576-2412.

Signed by: _____

Printed Name: _____

Floodplain Management Division

Richland Development Services
Progressive • Timely • Professional

Floodplain Division | 2020 Hampton Street, Columbia, SC 29202 | (803) 576-2150 | bollinga@rcgov.us

STOP WORK ORDER

Date: _____

Name of Responsible Party: _____

Project: _____

Address: _____

City, State Zip code: _____

Permit No: _____

You are hereby served notice that you are in violation of Chapter 26 of the Richland County Code of Ordinances at the abovementioned site. A **"STOP WORK"** order is being posted on this property effective **IMMEDIATELY**. In addition, a civil penalty in the amount of $1,092.50/day per violation may be issued if Richland County so deems it appropriate.

The issuance of this Order is due to failure to comply with a Notice of Violation issued on_____ and the results of a Richland County follow up inspection completed on _____. A copy of our inspection report is enclosed with this violation.

Your site must be inspected by a Richland County Inspector prior to resuming any construction activity. Any activity other than work leading to compliance with this Stop Work Order will result in the issuance of a civil penalty in the amount of **$1,092.50/day per violation and/or jail time.** At a minimum, work may not be resumed at this site sooner than 48 hours of the issuance of this Order.

If you have questions concerning this Order you can contact our office at 803-576-2150.

Signed by: _____

Printed Name: _____

APPENDIX C

Richland County Public Works Court Evidence Checklist

File Folder Checklist for Court Cases

- [ ] Property owner information: Address (Richland County), phone number, etc.
- [ ] Copy of County Ordinance with section referencing violation
- [ ] Copy of Inspection Report(s)
- [ ] Copy of Notice of Violation Letter
- [ ] Copy of photos of non-compliance issues
- [ ] Copy of correspondence with Property owner:

[ ] Phone texts [ ] emails [ ] letters [ ] voicemails

- [ ] Copy of Record Drawings or Approved Construction plans
- [ ] Copy of Aerial GIS Map
- [ ] Copy of Tax Records
- [ ] Copy of the property owners Driver License information
- [ ] Copy of warning ticket
- [ ] Copy of citation ticket
- [ ] Witness contact information: Address, Phone number, etc.
- [ ] Copy of signed Permanent Stormwater Maintenance Agreement

Complainant/Witness

Name: _____

Address: _____

City: _____ Zip Code: _____

Telephone Number: _____

Complainant/Witness

Name: _____

Address: _____

City: _____ Zip Code: _____

Telephone Number: _____

*Call all witnesses the day before court to remind them of the location and time and ensure they are coming.

Appendix O: Residential Final Inspection SOP

Standard Operating Procedure
Department of Public Works

Richland County, Columbia, SC

Conducting a Final Inspection of Completed Construction of a Residential Development
#3005-2012-1

September 7, 2012
(Revised June 13, 2014)

By

Land Development Division

Approved:

(Signature) *(Date)*
Deputy Director / County Engineer

(Signature) *(Date)*
Land Development Division Manager

(Signature) *(Date)*
Engineering Associate II-Inspections Supervisor

FOREWARD

The Richland County Department of Public Works has developed a comprehensive approach to permitting and regulating construction activity in Richland County. This approach goes into great detail about inspection, enforcement, plan review and other departmental related items.

Questions regarding this document or other associated processes should be directed to the Department of Public Works, Development Division.

Department of Public Works
Land Development Division
2020 Hampton Street
Columbia, SC 29201
(803) 576-2413
simonw@rcgov.us

TABLE OF CONTENTS

1.0 SCOPE & APPLICABILITY

In compliance with the provisions of the SC Pollution Control Act (S.C. Code Sections 48-1-10 et seq., 1976) and with the provisions of the Clean Water Act, 33 U.S.C. §1251 et. seq., (hereafter CWA or the Act), as amended by the Water Quality Act of 1987, P.L. 100-4, Operators of large and small construction activities that are described in Subpart 1.3 of this National Pollutant Discharge Elimination System (NPDES) general permit, except for those activities excluded from authorization of discharge in Subpart 1.3.C of this permit, are authorized to discharge pollutants to Surface Waters of the State in accordance with the conditions and requirements set forth herein. Permit coverage is required from the "commencement of construction activities" until "final stabilization."

This Construction General Permit (CGP) states that NPDES permit coverage should be terminated as follows: "Where a site has been finally stabilized and all storm water discharges from construction activities that are authorized by this permit are eliminated, the operator of the facility must submit a Notice of Termination (NOT) that is signed in accordance with Part VI.G of the permit."

Section 21-7 [Easement and/or right-of-way acceptance authority]……*the County Administrator and/or his designee(s) are hereby authorized to accept any easement or deed for rights-of-way, drainage easements, and sewer easements; emergency maintenance easements, dirt road rights-of-way, additional rights-of-way, sewer extension agreements, water line easements and other instruments authorized by the County Code of Ordinances; and is authorized to establish procedures for the acceptance and recording of such instruments.*

As a prerequisite to County approval and acceptance of new roads and storm drains, all phases of construction must be inspected and approved by the County Engineer's office. After paving is completed and all utility, storm drainage and associated work is complete & as-builts are submitted, a final inspection can be scheduled.

Final Inspection requests can be made by phone, fax, or email. Request can be made by calling t he Administrative Assistant at (803) 576-3641, or by fax at (803) 576-
2499; the fax must include contact information and the specific project and phase. Also, reques t can be made with email through pwinspections@rcgov.us
and the requestor will receive an acknowledgement response within 24 hours.

2.0 SUMMARY OF METHOD

Upon an official request for final inspection and eligibility to conduct a final inspection has been approved, the inspector will commence to schedule a visit to the site to verify completion of all construction, removal of temporary controls, sufficient stabilization and the accurate installation of all roads, storm drains & associated structures, detention/retention ponds, utilities, sidewalks, landscaping and common areas per the approved as-built drawings. The inspector will record all inaccuracies, omissions and incomplete items on a "punch list." The

Developer will be furnished a copy of the “punch list” and can request a follow-up inspection after deficiencies have been corrected.

3.0 DEFINITIONS

“Best Management Practices” (BMPs) means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants to Surface Waters of the State. BMPs also include treatment requirements, operating procedures, and practice to control plant Site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

“Co-Permittee” means a permittee to an NPDES permit that is only responsible for permit conditions relating to the discharge for which it is Operator.

“Commencement of Construction Activities” means the initial disturbance of soils associated with clearing, grading, or excavating activities or other construction-related activities (e.g., stockpiling of fill material).

“Control Measure” as used in this permit, refers to any BMP or other method used to prevent or reduce the discharge of pollutants to “Waters of the State”.

“CWA” means the Clean Water Act or the Federal Water Pollution Control Act, 33 U.S.C. section 1251 et seq.

“DHEC” means the South Carolina Department of Health and Environmental Control’s Office of Environmental Quality Control.

“Discharge” when used without qualification means the ‘‘discharge of a pollutant.’’

“Discharge of Storm Water Associated with Construction Activity” as used in this permit, refers to a discharge of pollutants in storm water from areas where soil disturbing activities (e.g., clearing, grading, or excavation), construction materials or equipment storage or maintenance (e.g., fill piles, borrow area, concrete truck washout, fueling), or other industrial storm water directly related to the construction process (e.g., concrete or asphalt batch plants) are located.

“Eligible” means qualified for authorization to discharge storm water under this general permit.

“Facility” or “Activity” means any “point source” or any other facility or activity (including land or appurtenances thereto) that is subject to regulation under the NPDES program.

“Federal Facility” means any buildings, installations, structures, land, public works, equipment, aircraft, vessels, and other vehicles and property, owned by, or constructed or manufactured for the purpose of leasing to, the Federal government.

4.0 HEALTH & SAFETY WARNINGS

Proper personal protective equipment (PPE) should be worn at all times and inspectors should exercise caution at all times.

- Inspector should not enter an area that could be perceived as dangerous.
- Inspector should not enter or walk into an area that he/she cannot see some ground.
- Inspector should not enter confined spaces.
- Inspectors should not enter ponds.
- Inspector should park vehicle in a safe place and place a cone in the front and rear of the vehicle.
- Inspector should wear proper clothing in the summer and winter months.

5.0 PERSONNEL QUALIFICATIONS/RESPONSIBILITIES

"Qualified personnel" means a person knowledgeable in the principles and practice of erosion and sediment controls who possesses the skills to assess conditions at the construction Site that could impact storm water quality and to assess the effectiveness of any sediment and erosion control measures selected to control the quality of storm water discharges from the construction activity. After June 30, 2006, this person must be an individual who has been certified through a Construction Site Inspector Certification Course that has been approved by DHEC.

6.0 EQUIPMENT & SUPPLIES

- IPAD
- Measuring Wheel
- Lid Puller
- Level (3ft)
- Clipboard
- Hammer & Nails
- Spray Gun & Paint
- Steel Toe Boots
- Safety Vests
- Hard Hats
- Gloves

7.0 PROCEDURES

The following is a list of construction items that will be verified in the field. The inspector will reference the as-built drawings to check accuracy and completeness of construction items, and will reference other manuals or documents as necessary. A check will be placed by all items inspected and notes will be recorded as necessary on the final inspection form.

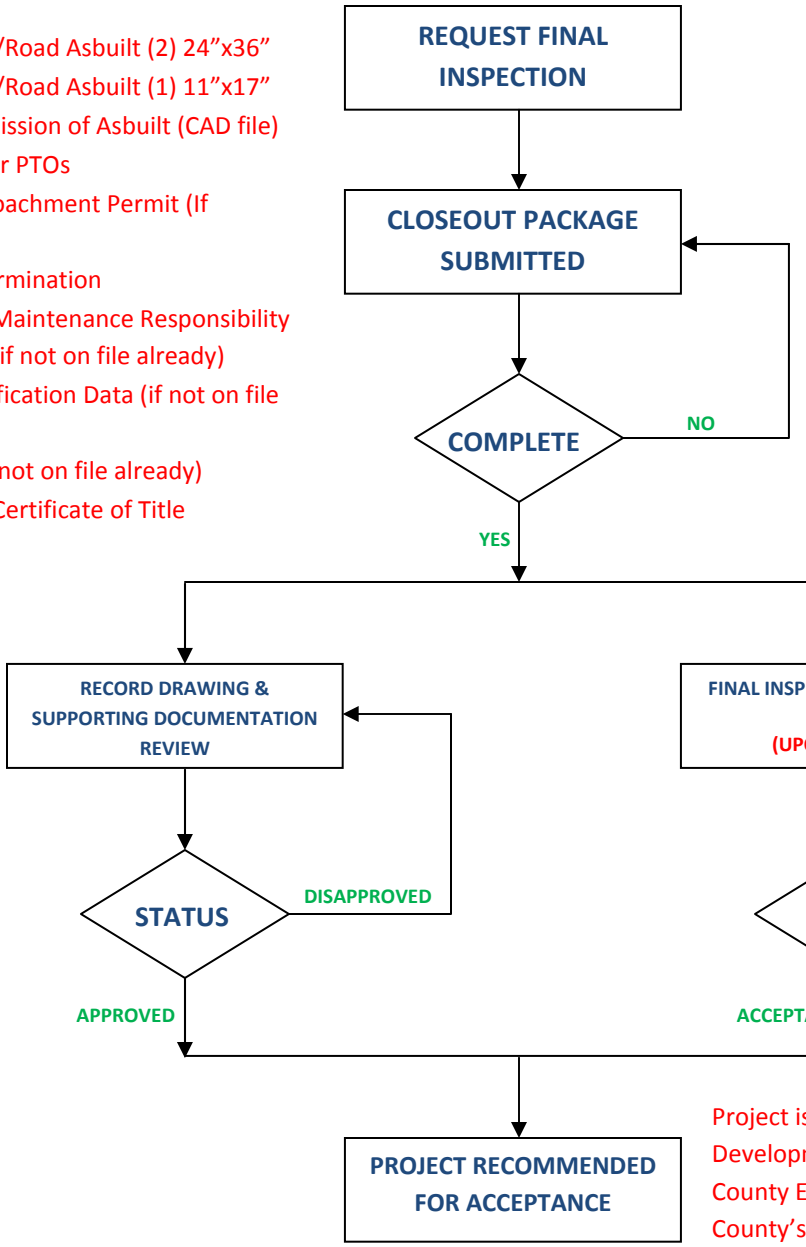
As a prerequisite to Richland County's approval and acceptance of new roads and storm drains, all phases of construction must be inspected and approved by the County Engineer's office. After paving is completed and all utility, storm drainage and associated work is complete & record drawings are submitted, a final inspection can be scheduled.

Upon an official request for final inspection and eligibility to conduct a final inspection has been approved, the inspector will commence to schedule a visit to the site to verify completion of all construction. The inspector will record all inaccuracies, omissions and incomplete items on a "report." The Developer will be furnished a copy of the "report" and can request a follow-up inspection after deficiencies have been corrected.

FINAL INSPECTION PROCEDURES (TIME FRAMES/NOTES)

Closeout Package must include:

- Storm Drain/Road Asbuilt (2) 24"x36"
- Storm Drain/Road Asbuilt (1) 11"x17"
- Digital Submission of Asbuilt (CAD file)
- Water/Sewer PTOs
- SCDOT Encroachment Permit (If Applicable)
- Notice of Termination
- Permanent Maintenance Responsibility Agreement (if not on file already)
- Asphalt Verification Data (if not on file already)
- Final Plat (if not on file already)
- Deeds with Certificate of Title



Final Inspection can be requested by email, phone or fax, response given within 24

FINAL INSPECTION APPROVAL depends on how fast the contractor address items on the punch list **and items required to correct per the engineer-of-record**

RECORD DRAWING REVIEW is **not part of the 18-day process**, but drawings are usually reviewed within that time-frame. Final approval depends on how fast the engineer-of-record address plan deficiencies

Project is recommended, by the Development Division Manager to the County Engineer, for acceptance into the County's inventory for perpetual maintenance **3-5 business days**

The following is a list of construction items that will be verified in the field. The inspector will reference the as-built drawings to check accuracy and completeness of construction items, and will reference other manuals or documents as necessary.

1. **Road/Curb**
   - **a) Installation** (Complete / Incomplete / Not Installed)
   - **b) Configuration**.....*per approved design plans; unless specifically addressed in the regulations, all geometric elements of roadway design for streets and roads will be in accordance with the AASHTO Policy on Geometric Design of Highway and Streets.*
   - **c) Specification**
     - Pavement Design (Cross-Section).....*if alternate design has been recommended by the geotechnical professional, this design must be approved by the County Engineer.*
     - Curb Type.....*per approved design plans*
     - Surface Width.....*per approved design plans*
     - R.O.W. Width.....*per approved design plans; must meet lateral clearance distances.*
   - **d) Failures**
     - Asphalt
     - Curb

2. **Road Data**.....***the in-place density and thickness determination of asphalt surface and binder courses will be based on the core data for each day's production. Cores will be obtained every 500 ft. in alternating lanes with a minimum of one core on any road no matter the length, immediately after completion and the holes patched with hot asphalt from the same day's production. The cores will be taken and evaluated by either the asphalt contractor or an independent materials testing firm certified by the SCDOT for state highway projects.***
   - ***a)*** **Thicknesses**.....***the average pavement thickness must be equal to or greater than the plan thickness with no individual core thin by more than 0.25." Pavements that are deficient with regards to thickness will either be removed and replaced or overlaid at the discretion of the County Engineer. Each core will be tested for the presence of hydrated lime in the mix.***
   - ***b)*** **Densities**.....***the pavement will be rejected, removed and replaced if the average in-place core density is less than 96% of the average laboratory BSG with all cores exceeding 95%.***
   - **c) Pavement Design (As-built)**.....***must be shown on as-built drawings even if alternative design has been approved, drawings must reflect what was actually constructed.***

3. **Pavement Markings**.....***per SC MUTCD***
   - **a) Installation** (Complete / Incomplete / Not Installed)
   - **b) Specification**
     - Reflectivity
     - Width/Length
     - Location
     - Color
     - Thermoplastic

4. **Signage**.....***Traffic Control Signs-per SC MUTCD / Street Signs-per County Standard or an approved alternate***
   - **a) Installation** (Complete / Incomplete / Not Installed)
   - **b) Specification**
     - Size/Reflectivity
     - Pole Type

- Mounting Method
- Fastening Method
- Location
- Height

5. **Sidewalks**.....***per ADA Requirements & approved design plans***
   a) **Installation** (Complete / Incomplete / Not Installed)
   b) **Specification**
      - Width.....*per approved design plans*
      - Cross Slope.....*per ADA Requirements*
      - Connectivity.....*per approved design plans*
      - Joints.....*per approved design plans*
      - Linear Slope.....*per approved design plans*
      - ADA Ramps.....*per approved design plans*
   c) **Failures**
      - Cracks
      - Broken Sidewalks
      - Trip Hazards (Uneven Sidewalks)

6. **Landscaping**
   a) **Installation** (Complete / Incomplete / Not Installed)
   b) **Specification**
      - Planting Type
      - Location.....*distance from back of curb*
      - Irrigation.....*presence or location of irrigation if applicable*

7. **Utilities**
   a) **Installation** (Complete / Incomplete / Not Installed)
   b) **Specification**
      - Location
      - Protrusion

8. **Stabilization.....the shoulders of the road and vacant lots (if no controls are in place)**
   a) **Sufficient**
   b) **Insufficient**

9. **Storm Drain Structures**
   a) **Installation** (Complete / Incomplete / Not Installed)
   b) **Specification**
      - Type (Box/Pipe).....*per approved design plans*
      - Size (Pipe)..... *per approved design plans*
      - Location..... *per approved design plans*
      - Functionality (Inspect box for standing water, sediment accumulation, steps, etc.)
      - Easements..... *per approved design plans*

10. **Ponds**
    a) **Installation** (Complete / Incomplete / Not Installed)
    b) **Specification**
       - Pond Configuration
       - Pond Discharge

1. Compliant With Plans
2. Installed Properly

- Pond Structure
  1. Compliant With Plans
  2. Installed Properly
- Pond Bottom
  1. Sediment Removed…..*per cleanout stake or design capacity*
  2. Sufficiently Stabilized
  3. Free of Excessive Vegetation
  4. Slope Percent…..*per approved design plans*
- Pond Slopes
  1. Free from Erosion
  2. Free of Excessive Vegetation
  3. Sufficiently Stabilized
  4. Slope Accuracy…..*per approved design plans*
- Pond Spillway
  1. Compliant With Plans
  2. Installed Properly
- Functionality (Dewatering Time)

8.0 DATA & RECORDS MANAGEMENT

Inspection Reports are prepared after every inspection is conducted and pictures are taken of all referenced deficiencies, and both are entered into a digital system, as well as a report and emailed to all parties.

- Inspection Form

9.0 REFERENCES

Land Development Code, Chapter 26-Land Development, Richland County, SC.

Road Design Standards, Engineering Division, Richland County, SC. (Revised 2007)

Storm Drain Design Standards, Engineering Division, Richland County, SC. (Revised 2007)

Manual on Uniform Traffic Control Devices (MUTCD). (2009)

American Association of State and Transportation Officials (AASHTO) Design Guideline, a Policy on Geometric Design of Highways and Streets. (2011)

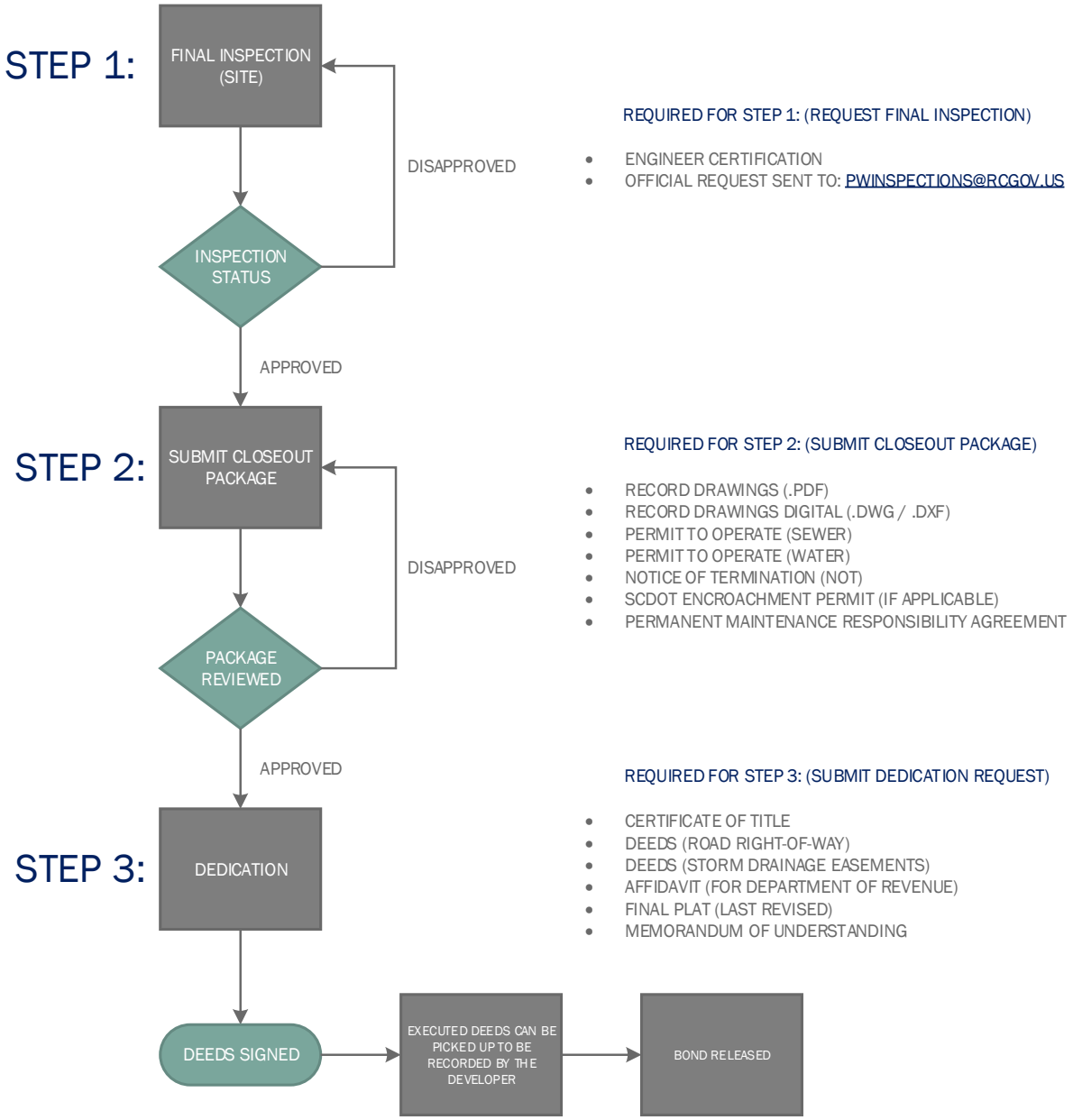
Approved Set of Plans

Appendix P: Closeout Process

CLOSEOUT PROCESS

Roadways and associated storm drainage constructed according to the approved set of plans may be dedicated to Richland County for ownership and maintenance. This is accomplished through the County's Closeout Process and the County reserves the right to deny acceptance of any project petitioned to be turned over to the County. As a condition for acceptance of infrastructure into the County system, Richland County requires a one year warranty accompanied by a bond in the amount of 100% of the construction cost. The warranty will pertain to the design and construction of the streets and accompanying drainage system in accordance with the Road Design Standards and their satisfactory performance during the warranty period. The warranty period begins with the County's execution of the deed.

All pavement failures and other structural defects that are detected during the warranty period are to be corrected by the grantor upon official notification by the Department of Public Works.



REQUIRED FOR STEP 1: (REQUEST FINAL INSPECTION)

- ENGINEER CERTIFICATION
- OFFICIAL REQUEST SENT TO: PWINSPECTIONS@RCGOV.US

REQUIRED FOR STEP 2: (SUBMIT CLOSEOUT PACKAGE)

- RECORD DRAWINGS (.PDF)
- RECORD DRAWINGS DIGITAL (.DWG / .DXF)
- PERMIT TO OPERATE (SEWER)
- PERMIT TO OPERATE (WATER)
- NOTICE OF TERMINATION (NOT)
- SCDOT ENCROACHMENT PERMIT (IF APPLICABLE)
- PERMANENT MAINTENANCE RESPONSIBILITY AGREEMENT

REQUIRED FOR STEP 3: (SUBMIT DEDICATION REQUEST)

- CERTIFICATE OF TITLE
- DEEDS (ROAD RIGHT-OF-WAY)
- DEEDS (STORM DRAINAGE EASEMENTS)
- AFFIDAVIT (FOR DEPARTMENT OF REVENUE)
- FINAL PLAT (LAST REVISED)
- MEMORANDUM OF UNDERSTANDING

Richland County Community Planning & Development
2020 Hampton Street, 1st Floor
Columbia, SC 29201

Final Inspection

Upon completion of a project, a Final Inspection can be requested. All final inspection (and follow-up) requests must be sent to pwinspections@rcgov.us with "FINAL INSPECTION REQUEST" in the subject line. The email will be acknowledged within 24 hours and an inspection can be scheduled within 5-7 business days due to the necessary coordination among departments. The Engineer Certification (.pdf) must be attached to the request.

Partial inspections are not granted. Prior to requesting a final inspection, the engineer will certify the following:

- All infrastructure is in and functioning according to the design.
- All temporary controls have been removed (unless special exception is granted)
- All ponds are in there permanent state which includes being stabilized, sediment removed, skimmers and baffles removed, and forebay removed and restored.
- Etc. (remainder on certification)

Submit Closeout Package

Upon being granted an approved final inspection, a Closeout Package can be submitted to the Department of Public Works for review. The package must include the above-referenced items and items in Steps (1) & (2) can be submitted simultaneously. All information must be submitted through the Trakit system and the applicant should choose "Closeout Permit" when applying for the permit and should include the following: http://etrakit.rcgov.us/etrakit3/login.aspx?lt=either&rd=~/dashboard.aspx

- Record Drawings – The drawings must include "ALL" improvements and final road & storm drainage profiles.
- Record Drawings (CAD) – The digital submission should be a (.dwg) or (.dxf) file and must include all layers.

Dedication

Upon receipt of the dedication package, the Department will review all information for accuracy. If all information is accounted for and accurate, a recommendation will be submitted to the County Engineer for acceptance of the project into the County inventory within three (3) days of receipt of a complete package. The dedication package must include the following:

- Certificate of Title
- Deeds (Road Right-of-Way)
- Deeds (Storm Drainage Easements)
- Affidavit (For Department of Revenue)
- Final Plat (Last Revised)
- Memorandum of Understanding
- [Condition Must Be Met] Site Has Received an Approved Final Inspection
- [Condition Must Be Met] As-built Digital Submission Approved

Appendix Q: Road Right-of-Way Deed Template

THE STATE OF SOUTH CAROLINA)
)
COUNTY OF RICHLAND)

TITLE TO REAL ESTATE
For Subdivision Streets
SUBDIVISION NAME

KNOW ALL MEN BY THESE PRESENTS, **That LAKEPORT, LLC**, (The "Grantor") for and in consideration of the sum of One ($1.00) Dollar to the Grantor paid by Richland County, South Carolina (The "Grantee"), the receipt whereof is hereby acknowledged, has granted, bargained, sold and released, and by these presents does grant, bargain, sell and release in fee simple absolute unto Richland County, South Carolina, its successors and assigns, all that certain real property comprising road rights-of-way, - fifty feet in width, hereinafter described for the purpose of constructing, improving and/or maintaining streets or roads thereon:

DESCRIPTION

SEE EXHIBIT "A"

SPECIAL PROVISIONS: The Grantor understands and acknowledges that said streets or roads were designed and constructed by the Grantor; that the streets or roads will tend to collect surface waters into artificial channels and cast same onto the lands adjoining said streets or roads in concentrated form; that the Grantee does not hold itself out to perform, nor does it have equipment and material or appropriations of money to adequately pipe and ditch the lands adjoining said streets or roads; and it is therefore agreed as one of the material considerations and inducements for acceptance of said streets or roads by the Grantee, that the Grantor does hereby assume all risks of loss, damage, destruction or claims, of every kind, present or future, suffered by the Grantor, his (her/their/its) heirs, assigns or successors in title resulting from the collection of surface water and casting of same onto said lands.

And the Grantor does hereby bind itself and its successors and assigns to save and hold harmless and release the Grantee, its successors and assigns, from all such losses, damages, destruction and claims hereinabove specified, and shall guarantee the herein described streets and roads and the accompanying drainage system for a period of one year from the date this deed is recorded in the Richland County ROD and shall make any and all repairs as become necessary in the sole judgment of the Grantee or its representative

The Grantee does hereby bind itself and its successors and assigns and agrees to maintain and repair said streets or roads in a reasonably good and workman like manner thereafter.

Together with all and singular the rights, members, hereditaments and appurtenances to the said premises belonging, or in anywise incident or appertaining.

TO HAVE AND TO HOLD in fee simple, absolute and singular, the said property and the rights hereinbefore granted, unto the Grantee, its successors and assigns forever.

And the Grantor does hereby bind itself and its successors and assigns, to warrant and forever defend all and singular the said premises unto the said Grantee, its successors and assigns, against it and its successors and assigns, and against every person whomsoever lawfully claiming or to claim the same, or any part thereof.

WITNESS the hand and seal of the Grantor(s) this ____ day of December, 2013.

SIGNED, SEALED AND DELIVERED
IN THE PRESENCE OF:

GRANTOR

.....
1st witness

.....
Property owner(s) signature

.....
2nd witness

……..
Print owner(s) name and title if appropriate

As to Grantor

THE STATE OF SOUTH CAROLINA)
) **PROBATE**
COUNTY OF RICHLAND)

PERSONALLY appeared before me the undersigned witness, who, being duly sworn, says that (s)he saw the within-name Grantor by its officer(s) or partner(s) as its act and deed, sign, seal and deliver the within Deed; and that (s)he with the other witness whose signature appears above witnessed the execution thereof.

SWORN to before me this..... .....
(1st Witness)

day of.....….....20.....

.....(Seal)
Notary Public for South Carolina
MCE…….....…..

GRANTEE

.....
1st witness

By.....
County Administrator

.....
2nd witness

As to Grantee

THE STATE OF SOUTH CAROLINA)
) **PROBATE**
COUNTY OF RICHLAND) **(Grantee)**

PERSONALLY appeared before me the undersigned witness, who being duly sworn says that (s)he saw the County Administrator of Richland County, its duly authorized officer, sign, seal, and as their act and deed of the County of Richland deliver the within written Instrument for the uses and purposes therein mentioned and that (s)he with the other above named witness witnessed the execution thereof.

SWORN to before me this..... .....
(1st Witness)

day of.....20.....

.....(Seal)
Notary Public for South Carolina
MCE…….....…..

Appendix R: Storm Drainage Easement Deed Template

THE STATE OF SOUTH CAROLINA)
) **EASEMENT AND RIGHT OF WAY**
COUNTY OF RICHLAND) ***For Subdivision Drainage***

KNOWN ALL MEN BY THESE PRESENTS, That I (or we) _____(The Grantor), of the County and State aforesaid, for and in consideration of the sum of One ($1.00) Dollar to the Grantor paid by Richland County, South Carolina, (The Grantee), the receipt whereof is hereby acknowledged, and in further consideration of the agreements and conditions hereinafter contained do mutually agree as follows:

That the Grantor does hereby grant unto the Grantee, their successors in office, easements and rights-of-way, _____ feet in width, over and across the lands hereinafter described for the purpose of constructing, maintaining and/or improving a drainage system for conveyance of storm water runoff across, through and under the lands hereinafter described, together with the right to excavate and refill ditches and/or trenches, and the further right to remove trees, bushes, undergrowth, crops and/or other obstructions interfering with the construction, maintenance and/or improvement of said drainage system:

DESCRIPTION

SEE EXHIBIT "A"

SPECIAL PROVISIONS: TO HAVE AND TO HOLD the said easements and rights-of-way unto the said Grantee, their successors and assigns, upon the following conditions:
The Grantor understands and acknowledges that said drainage system was designed and constructed by the Grantor; that the drainage system will tend to collect surface waters into artificial channels and cast same on the lands adjoining said rights-of-way in concentrated form; that the Grantee do not hold themselves out to perform, nor do they have equipment and material or appropriations of money to adequately pipe and ditch the lands adjoining said rights-of-way; and it is therefore agreed as one of the material considerations and inducements for acceptance of said drainage system by the Grantee, that the Grantor does hereby assume all risks of loss, damage, destruction or claims, of every kind, present or future, suffered by the Grantee his(her/their/its) heirs, assigns or successors in title resulting from the collection of surface water and casting of same onto said lands.
And the said Grantor for them and for their heirs, assigns or successors to title does hereby further agree to save and hold harmless and release the Grantee, their successors in office, and Richland County, from all such losses, damages, destruction and claims hereinabove specified.

It is understood and agreed that the Grantor shall guarantee the herein described drainage system for a period of one year from the date of recording of this Right-of-Way Easement in the Richland County ROD and shall make any and all repairs as become necessary in the sole judgment of the grantee or their representative. And the Grantee, their successors in office agree to maintain and repair said drainage system in a reasonably good and workmanlike manner thereafter

And the Grantors agree to warrant and forever defend The County of Richland, State of South Carolina rights against themselves or their heirs and against any other person lawfully claiming or to claim the same or any part thereof.

WITNESS the hand and seal of the grantor(s) this _____day of _____, 20____ .

SIGNED, SEALED AND DELIVERED
IN THE PRESENCE OF:

GRANTOR

....
1st witness Property owner(s) signature

..... ……..
2nd witness Print owner(s) name and title if appropriate

As to Grantor

THE STATE OF SOUTH CAROLINA)
) **PROBATE**
COUNTY OF RICHLAND)

PERSONALLY appeared before me the undersigned witness, who, being duly sworn, says that (s)he saw the within-name Grantor by its officer(s) or partner(s) as its act and deed, sign, seal and deliver the within Deed; and that (s)he with the other witness whose signature appears above witnessed the execution thereof.

SWORN to before me this..... .....
(1st Witness)

day of.....20.....

.....(Seal)
Notary Public for South Carolina
MCE…….....…..

..... GRANTEE
1st witness

..... By.....
2nd witness County Administrator

As to Grantee

THE STATE OF SOUTH CAROLINA)
) **PROBATE**
COUNTY OF RICHLAND) **(Grantee)**

PERSONALLY appeared before me the undersigned witness, who being duly sworn says that (s)he saw the County Administrator of Richland County, its duly authorized officer, sign, seal, and as their act and deed of the County of Richland deliver the within written Instrument for the uses and purposes therein mentioned and that (s)he with the other above named witness witnessed the execution thereof.

SWORN to before me this..... .....
(1st Witness)

day of.....20.....

.....(Seal)
Notary Public for South Carolina
MCE…….....…..

Appendix S: Affidavit for Deeds Templates

STATE OF SOUTH CAROLINA
DEPARTMENT OF REVENUE
300A Outlet Pointe Blvd., Columbia, South Carolina 29210
P.O. Box 12265, Columbia, South Carolina 29211

SC INFORMATION LETTER #15-20

SUBJECT:	Sample Affidavits (Deed Recording Fee)
DATE:	December 11, 2015
SUPERSEDES	SC Information Letter #15-6
REFERENCE:	S. C. Code Ann. Section 12-24-10 (2014) S. C. Code Ann. Section 12-24-70 (2014) S. C. Code Ann. Section 62-3-907 (Supp. 2014) S. C. Code Ann. Section 12-59-140(E)(6) (Act. No. 59 of 2015)
AUTHORITY:	S. C. Code Ann. Section 12-4-320 (2014) S.C. Code Ann. Section 1-23-10(4) (2005) SC Revenue Procedure #09-3
SCOPE:	An Information Letter is a written statement issued to the public to announce general information useful in complying with the laws administered by the Department. An Information Letter has no precedential value.

When recording a deed, Code Section 12-24-70 requires an affidavit to be filed with a deed and states:

> (A)(1) The clerk of court or register of deeds shall require an affidavit showing the value of the realty to be filed with a deed. The affidavit required by this section must be signed by a responsible person connected with the transaction, and the affidavit must state that connection. The clerk of court or register of deeds, at his discretion, may waive the affidavit requirement.
>
> (2) For deeds exempt from the provisions of this chapter, the value is not required to be stated on the affidavit, but the affidavit must state the reason the deed is exempt from the fee.

(B) The clerk of court or register of deeds shall file these affidavits in his office.

(C) A person required to furnish the affidavit who wilfully furnishes a false or fraudulent affidavit is guilty of a misdemeanor and, upon conviction, must be fined not more than one thousand dollars or imprisoned not more than one year, or both.

(D) An affidavit is not required for an instrument or deed of distribution assigning, transferring, or releasing real property to the distributee of an estate pursuant to Section 62-3-907 as evidence of the distributee's title.

The Department has two sample affidavits that it provides as a convenience for taxpayers and local recording officials. (Note: Local officials may require an affidavit with additional information to meet local needs.)

The first affidavit may be used for either taxable transfers or exempt transfers. The second affidavit may be used only for exempt transfers. These sample affidavits are attached.

In addition, from time to time local recording officials receive affidavits that reference an "arm's length transaction." These affidavits are based on a sample affidavit developed by the Department in 1996 for a prior version of the deed recording fee law and are no longer valid. Any affidavit that references an "arm's length transaction" should no longer be used, or accepted, when a deed is filed.

The purpose of this information letter is to update the two sample affidavits to address the amendment to Code Section 12-59-140 which now provides in subsection (E) that deductions from "value" pursuant to Code Section 12-24-30(B) include "any lien or encumbrance on realty in possession of a forfeited land commission which may subsequently be waived or reduced after the transfer under a signed contract or agreement between the lien holder and the buyer existing before the transfer." See Item 5 of the "Affidavit for Taxable and Exempt Transfers."

For additional information on the deed recording fee, see the following advisory opinions on the Department's website at **www.dor.sc.gov**:

SC Revenue Ruling #15-3	Question and Answer Summary
SC Revenue Ruling #99-2	IRC Section 1031 – Tax Deferred Exchanges
SC Revenue Procedure #15-1	Refund Procedures

Note: "An instrument or deed of distribution assigning, transferring, or releasing real property to the distributee of a decedent's estate pursuant to Section 62-3-907 as evidence of the distributee's title to the property is not a deed subject to [the deed recording fee.]" Code Section 12-24-10(B).

In addition, "[a]n affidavit is not required for an instrument or deed of distribution assigning, transferring, or releasing real property to the distributee of an estate pursuant to Section 62-3-907 as evidence of the distributee's title." Code Section 12-24-70(D).

As such, the exemption is not listed on the sample affidavits. However, if a person wishes to use and file an affidavit stating that the transaction is exempt under Code Section 12-24-10(B), such person may complete the affidavit and reference this exemption and code section.

STATE OF SOUTH CAROLINA) .....
COUNTY OF _____) .....**AFFIDAVIT FOR TAXABLE OR EXEMPT TRANSFERS**

PERSONALLY appeared before me the undersigned, who being duly sworn, deposes and says:

1. I have read the information on this affidavit and I understand such information.

2 The property being transferred is located at_____, bearing County Tax Map Number _____ , was transferred by _____ _____

to _____on _____.

3. Check one of the following: The deed is

(a) _____ subject to the deed recording fee as a transfer for consideration paid or to be paid in money or money's worth.

(b) _____ subject to the deed recording fee as a transfer between a corporation, a partnership, or other entity and a stockholder, partner, or owner of the entity, or is a transfer to a trust or as a distribution to a trust beneficiary.

(c) _____ exempt from the deed recording fee because (See Information section of affidavit):

_____

(If exempt, please skip items 4 - 7, and go to item 8 of this affidavit.)

If exempt under exemption #14 as described in the Information section of this affidavit, did the agent and principal relationship exist at the time of the original sale and was the purpose of this relationship to purchase the realty? Check Yes_____ or No _____

4. Check one of the following if either item 3(a) or item 3(b) above has been checked (See Information section of this affidavit.):

(a) _____ The fee is computed on the consideration paid or to be paid in money or money's worth in the amount of _____.

(b) _____ The fee is computed on the fair market value of the realty which is _____.

(c) _____ The fee is computed on the fair market value of the realty as established for property tax purposes which is _____.

5. Check Yes_____ or No _____ to the following: A lien or encumbrance existed on the land, tenement, or realty before the transfer and remained on the land, tenement, or realty after the transfer. (This includes, pursuant to Code Section 12-59-140(E)(6), any lien or encumbrance on realty in possession of a forfeited land commission which may subsequently be waived or reduced after the transfer under a signed contract or agreement between the lien holder and the buyer existing before the transfer.) If "Yes," the amount of the outstanding balance of this lien or encumbrance is: _____.

6. The deed recording fee is computed as follows:

(a) Place the amount listed in item 4 above here: _____

(b) Place the amount listed in item 5 above here: _____
(If no amount is listed, place zero here.)

(c) Subtract Line 6(b) from Line 6(a) and place result here: _____

7. The deed recording fee due is based on the amount listed on Line 6(c) above and the deed recording fee due is: _____.

8. As required by Code Section 12-24-70, I state that I am a responsible person who was connected with the transaction as: _____

9. I understand that a person required to furnish this affidavit who wilfully furnishes a false or fraudulent affidavit is guilty of a misdemeanor and, upon conviction, must be fined not more than one thousand dollars or imprisoned not more than one year, or both.

_____
Responsible Person Connected with the Transaction

_____
Print or Type Name Here

SWORN to and subscribed before me this
_____ day of _____ 20 _____
Notary Public for _____
My Commission Expires: _____
Notary (L.S.): _____
Notary (printed name): _____

INFORMATION

Except as provided in this paragraph, the term "value" means "the consideration paid or to be paid in money or money's worth for the realty.' Consideration paid or to be paid in money's worth includes, but is not limited to, other realty, personal property, stocks, bonds, partnership interest and other intangible property, the forgiveness or cancellation of a debt, the assumption of a debt, and the surrendering of any right. The fair market value of the consideration must be used in calculating the consideration paid in money's worth. Taxpayers may elect to use the fair market value of the realty being transferred in determining fair market value of the consideration. In the case of realty transferred between a corporation, a partnership, or other entity and a stockholder, partner, or owner of the entity, and in the case of realty transferred to a trust or as a distribution to a trust beneficiary, "value" means the realty's fair market value. A deduction from value is allowed for the amount of any lien or encumbrance existing on the land, tenement, or realty before the transfer and remaining on the land, tenement, or realty after the transfer. (This includes, pursuant to Code Section 12-59-140(E)(6), any lien or encumbrance on realty in possession of a forfeited land commission which may subsequently be waived or reduced after the transfer under a signed contract or agreement between the lien holder and the buyer existing before the transfer.) Taxpayers may elect to use the fair market value for property tax purposes in determining fair market value under the provisions of the law.

Exempted from the fee are deeds:

(1) transferring realty in which the value of the realty, as defined in Code Section 12-24-30, is equal to or less than one hundred dollars;
(2) transferring realty to the federal government or to a state, its agencies and departments, and its political subdivisions, including school districts;
(3) that are otherwise exempted under the laws and Constitution of this State or of the United States;
(4) transferring realty in which no gain or loss is recognized by reason of Section 1041 of the Internal Revenue Code as defined in Section 12-6-40(A);
(5) transferring realty in order to partition realty as long as no consideration is paid for the transfer other than the interests in the realty that are being exchanged in order to partition the realty;
(6) transferring an individual grave space at a cemetery owned by a cemetery company licensed under Chapter 55 of Title 39;
(7) that constitutek a contract for the sale of timber to be cut;
(8) transferring realty to a corporation, a partnership, or a trust as a stockholder, partner, or trust beneficiary of the entity or so as to become a stockholder, partner, or trust beneficiary of the entity as long as no consideration is paid for the transfer other than stock in the corporation, interest in the partnership, beneficiary interest in the trust, or the increase in value in the stock or interest held by the grantor. However, except for transfers from one family trust to another family trust without consideration or transfers from a trust established for the benefit of a religious organization to the religious organization, the transfer of realty from a corporation, a partnership, or a trust to a stockholder, partner, or trust beneficiary of the entity is subject to the fee, even if the realty is transferred to another corporation, a partnership, or trust;
(9) transferring realty from a family partnership to a partner or from a family trust to a beneficiary, provided no consideration is paid for the transfer other than a reduction in the grantee's interest in the partnership or trust. A "family partnership" is a partnership whose partners are all members of the same family. A "family trust" is a trust, in which the beneficiaries are all members of the same family. The beneficiaries of a family trust may also include charitable entities. "Family" means the grantor and the grantor's spouse, parents, grandparents, sisters, brothers, children, stepchildren, grandchildren, and the spouses and lineal descendants of any the above. A "charitable entity" means an entity which may receive deductible contributions under Section 170 of the Internal Revenue Code as defined in Section 12-6-40(A);
(10) transferring realty in a statutory merger or consolidation from a constituent corporation to the continuing or new corporation;
(11) transferring realty in a merger or consolidation from a constituent partnership to the continuing or new partnership;
(12) that constitute a corrective deed or a quitclaim deed used to confirm title already vested in the grantee, provided that no consideration of any kind is paid or is to be paid under the corrective or quitclaim deed;
(13) transferring realty subject to a mortgage to the mortgagee whether by a deed in lieu of foreclosure executed by the mortgagor or deed pursuant to foreclosure proceeding;
(14) transferring realty from an agent to the agent's principal in which the realty was purchased with funds of the principal, provided that a notarized document is also filed with the deed that establishes the fact that the agent and principal relationship existed at the time of the original purchase as well as for the purpose of purchasing the realty;
(15) transferring title to facilities for transmitting electricity that is transferred, sold, or exchanged by electrical utilities, municipalities, electric cooperatives, or political subdivisions to a limited liability company which is subject to regulation under the Federal Power Act (16 U.S.C. Section 791(a)) and which is formed to operate or to take functional control of electric transmission assets as defined in the Federal Power Act.

STATE OF SOUTH CAROLINA)
COUNTY OF _____)

AFFIDAVIT FOR EXEMPT TRANSFERS

PERSONALLY appeared before me the undersigned, who being duly sworn, deposes and says:

1. I have read the information on the back of this affidavit and I understand such information.

2. The property being transferred is located at _____,
bearing _____ County Tax Map Number _____
was transferred by _____
to _____
_____ on
_____.

3. The deed is exempt from the deed recording fee because (See Information section of affidavit):
_____
_____
_____
_____

If exempt under exemption #14 as described in the Information section of this affidavit, did the agent and principal relationship exist at the time of the original sale and was the purpose of this relationship to purchase the realty? Check Yes _____ or No ___

4. As required by Code Section 12-24-70, I state that I am a responsible person who was connected with the transaction as:
_____
_____.

5. I understand that a person required to furnish this affidavit who wilfully furnishes a false or fraudulent affidavit is guilty of a misdemeanor and, upon conviction, must be fined not more than one thousand dollars or imprisoned not more than one year, or both.

_____
Responsible Person Connected with the Transaction

_____
Print or Type Name Here

SWORN to and subscribed before me this
_____ day of _____ 20____
Notary Public for _____
My Commission Expires: _____
Notary (L.S.): _____
Notary (printed name): _____

INFORMATION

Except as provided in this paragraph, the term "value" means "the consideration paid or to be paid in money or money's worth for the realty." Consideration paid or to be paid in money's worth includes, but is not limited to, other realty, personal property, stocks, bonds, partnership interest and other intangible property, the forgiveness or cancellation of a debt, the assumption of a debt, and the surrendering of any right. The fair market value of the consideration must be used in calculating the consideration paid in money's worth. Taxpayers may elect to use the fair market value of the realty being transferred in determining fair market value of the consideration. In the case of realty transferred between a corporation, a partnership, or other entity and a stockholder, partner, or owner of the entity, and in the case of realty transferred to a trust or as a distribution to a trust beneficiary, "value" means the realty's fair market value. A deduction from value is allowed for the amount of any lien or encumbrance existing on the land, tenement, or realty before the transfer and remaining on the land, tenement, or realty after the transfer. (This includes, pursuant to Code Section 12-59-140(E)(6), any lien or encumbrance on realty in possession of a forfeited land commission which may subsequently be waived or reduced after the transfer under a signed contract or agreement between the lien holder and the buyer existing before the transfer.) Taxpayers may elect to use the fair market value for property tax purposes in determining fair market value under the provisions of the law.

Exempted from the fee are deeds:

(1) transferring realty in which the value of the realty, as defined in Code Section 12-24-30, is equal to or less than one hundred dollars;
(2) transferring realty to the federal government or to a state, its agencies and departments, and its political subdivisions, including school districts;
(3) that are otherwise exempted under the laws and Constitution of this State or of the United States;
(4) transferring realty in which no gain or loss is recognized by reason of Section 1041 of the Internal Revenue Code as defined in Section 12-6-40(A);
(5) transferring realty in order to partition realty as long as no consideration is paid for the transfer other than the interests in the realty that are being exchanged in order to partition the realty;
(6) transferring an individual grave space at a cemetery owned by a cemetery company licensed under Chapter 55 of Title 39;
(7) that constitute a contract for the sale of timber to be cut;
(8) transferring realty to a corporation, a partnership, or a trust as a stockholder, partner, or trust beneficiary of the entity or so as to become a stockholder, partner, or trust beneficiary of the entity as long as no consideration is paid for the transfer other than stock in the corporation, interest in the partnership, beneficiary interest in the trust, or the increase in value in the stock or interest held by the grantor. However, except for transfers from one family trust to another family trust without consideration or transfers from a trust established for the benefit of a religious organization to the religious organization, the transfer of realty from a corporation, a partnership, or a trust to a stockholder, partner, or trust beneficiary of the entity is subject to the fee, even if the realty is transferred to another corporation, a partnership, or trust;
(9) transferring realty from a family partnership to a partner or from a family trust to a beneficiary, provided no consideration is paid for the transfer other than a reduction in the grantee's interest in the partnership or trust. A "family partnership" is a partnership whose partners are all members of the same family. A "family trust" is a trust, in which the beneficiaries are all members of the same family. The beneficiaries of a family trust may also include charitable entities. "Family" means the grantor and the grantor's spouse, parents, grandparents, sisters, brothers, children, stepchildren, grandchildren, and the spouses and lineal descendants of any the above. A "charitable entity" means an entity which may receive deductible contributions under Section 170 of the Internal Revenue Code as defined in Section 12-6-40(A);
(10) transferring realty in a statutory merger or consolidation from a constituent corporation to the continuing or new corporation;
(11) transferring realty in a merger or consolidation from a constituent partnership to the continuing or new partnership;
(12) that constitute a corrective deed or a quitclaim deed used to confirm title already vested in the grantee, provided that no consideration of any kind is paid or is to be paid under the corrective or quitclaim deed;
(13) transferring realty subject to a mortgage to the mortgagee whether by a deed in lieu of foreclosure executed by the mortgagor or deed pursuant to foreclosure proceedings;
(14) transferring realty from an agent to the agent's principal in which the realty was purchased with funds of the principal, provided that a notarized document is also filed with the deed that establishes the fact that the agent and principal relationship existed at the time of the original purchase as well as for the purpose of purchasing the realty; and
(15) transferring title to facilities for transmitting electricity that is transferred, sold, or exchanged by electrical utilities, municipalities, electric cooperatives, or political subdivisions to a limited liability company which is subject to regulation under the Federal Power Act (16 U.S.C. Section 791(a)) and which is formed to operate or to take functional control of electric transmission assets as defined in the Federal Power Act.

Appendix T: Construction Bond Process

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RICHLAND COUNTY DEPARTMENT OF PUBLIC WORKS
CONSTRUCTION BOND PROCESS

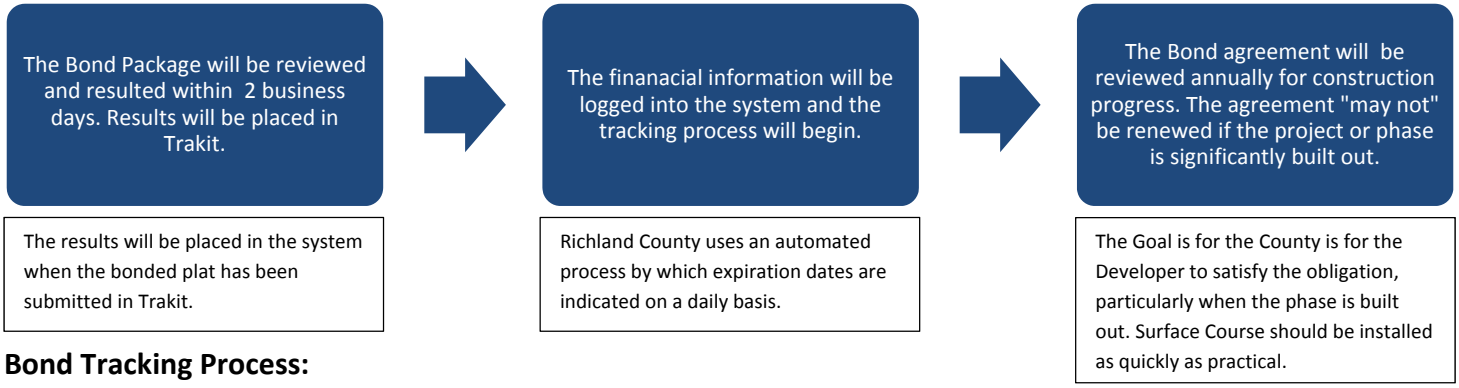
Ordinance Section 26-223.*Financial Surety*

> In lieu of the completion of a subdivision development previous to final plat approval, the county may accept a bond, in an amount and with surety and conditions satisfactory to it, providing for and securing to the county the actual construction and installation of all improvements within a specified time period as expressed in the bond documents. The following types of bonds shall be acceptable to the county, subject to review and approval by the Richland County Legal Department and/or the county engineer.
>
> (a) *Surety bond.* A surety bond issued by a company licensed to do business in the State of South Carolina in an amount equal to one hundred twenty- five percent (125%) of the estimated cost of improvements. The county engineer shall determine the estimated cost of improvements.
>
> (b) *Escrow funds.* Escrow funds in an account in the name of Richland County in an amount equal to one hundred twenty-five percent (125%) of the estimated cost of improvements. The county engineer shall determine the estimated cost of improvements. The contract may authorize a reduction of the escrow account upon completion of a portion of the improvements, but at no time shall the escrow account be less than one hundred twenty-five percent (125%) of the remaining improvements.
>
> (c) *Securities.* The developer may pledge securities in the form of negotiable stocks or bonds in favor of the county in an amount at least two (2) times the estimated cost of improvements. The county engineer shall determine the estimated cost of improvements.
>
> (d) *Omitted*
>
> (e) *Letter of credit.* An irrevocable letter of credit issued by a responsible financial institution, in an amount equal to one hundred twenty-five percent (125%) of the estimated cost of improvements. The estimated cost of improvements shall be determined by the county engineer.

Bond Submittal Requirements *(Complete Bond Package):*

- Engineers Cost Estimate (Prepared by Engineer) Sealed and Signed
- Statement of Conditions (Prepared by Developer or Representative)
- Letter-of-Credit or Bond or Cash Bond (Prepared by Bank or Insurance Company)
- Bonded Plat (Prepared by Surveyor) Sealed and Signed

Bond Submittal Process *(The process below is in conjunction with the overall submittal procedures for bonded plats):*



Bond Tracking Process:

Bonds are tracked for the benefit of Richland County. The Developer should not reply upon reminders from Richland County to manage the terms of the surety instrument, however, the County will take an active role in the process and establish a relationship with the bank or insurance company.

The County will also require the bank or insurance company to sign a memorandum of understanding as it relates to the agreement between the developer and the County.

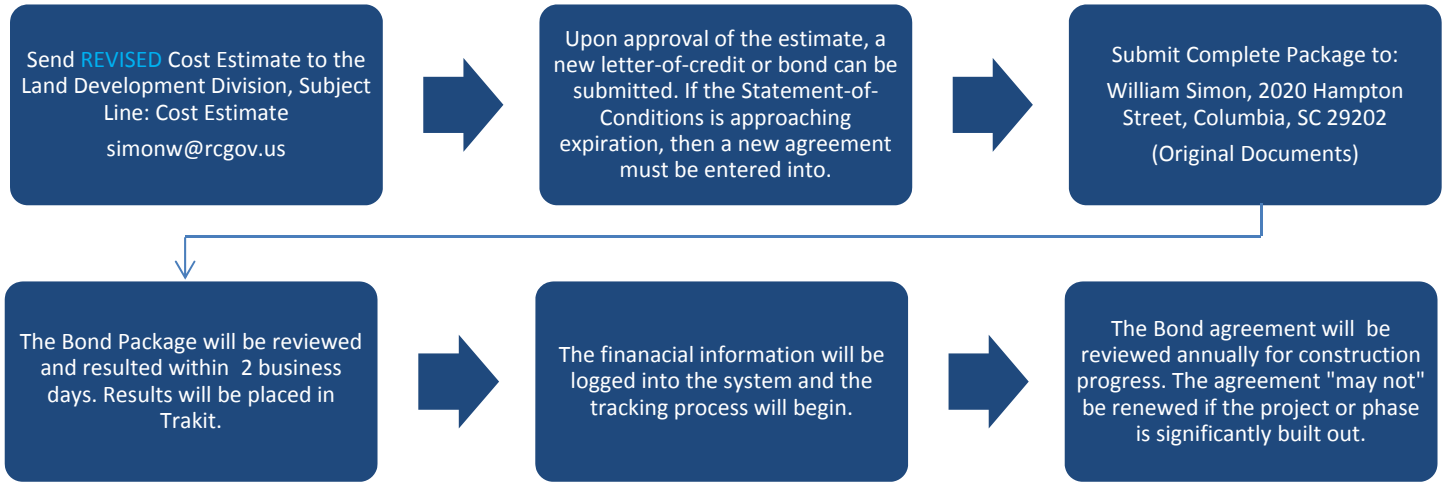
The tracking process includes sending letters, at specified times prior to expiration, to all relevant parties. The following criteria apply:

- 90-Day Letter (Sent to Developer)
- 45-Day Letter (Sent to Developer & Lending Institution) ***CERTIFIED***
- 30-Day Letter (Series of call made to the Developer & Surety Institution)
- 15-Day Letter (Claims Letter Sent to Lending Institution – Developer Cc'd) ***CERTIFIED***

Bond Reductions:

There is no codified language that allows reductions on letters-of-credit or bonds, however, it has been practice that these reductions are allowed. The County reserves the right to modify this practice with support from County Administration and proper notification to the Developing Community.

NOTE: BONDS WILL NO LONGER BE ALLOWED TO BE REDUCED TO MINIMAL AMOUNTS PRIOR TO ACCEPTANCE BY THE COUNTY. (i.e. A $200,000.00 Bond cannot be reduced to $7,000.00 the next day after surface course installation; the site is still subject to final inspection which could identify road failures after this installation and up to the day of acceptance by the County; and adequate surety must remain in place until acceptance. **To reduce a bond, the following procedures must be followed:**



Bond Termination: Bonds are terminated upon acceptance by the County or satisfaction of the obligation. Cash Bonds (Certified Checks) are held by the finance Department and refunds must be requested in writing to William Simon after project completion.

Appendix U: Statement of Conditions

SAMPLE

STATE OF SOUTH CAROLINA	)	STATEMENT OF CONDITIONS FOR
	)	IMPROVEMENTS (Performance Bond)
COUNTY OF RICHLAND	)	

KNOW ALL MEN BY THESE PRESENTS, that the undersigned _____, by _____, its _____ (hereinafter the "Principal"), is held and firmly bound unto the County of Richland, South Carolina, in the sum of _____ ($_____) Dollars. The undersigned does bind itself, its heirs and assigns, firmly by these presents:

THE CONDITIONS OF ITS OBLIGATIONS are such that whereas the Principal made application to the Richland County Planning and Development Services Department for approval of a subdivision plat known as "_____", located within the planning jurisdiction of Richland County, South Carolina; and

WHEREAS, the lots contained in said proposed subdivision are to be offered for sale upon the representation that the improvements, as shown on said plat, are to be constructed in such a manner that the County of Richland, South Carolina, will accept the same for maintenance, and upon the further representation that public utility services will be provided and extended to each lot in said subdivision; and

WHEREAS, the Richland County Public Works Department will accept said streets and surface water drainage system for maintenance purposes, provided that the Principal stabilizes the same in accordance with the minimum design standards of Richland County; and

WHEREAS, it appears to the County of Richland that 125% of the costs of said road construction, together with the costs of installation and provision of public utility services as required by the County of Richland will be approximately _____ ($_____) Dollars; and

WHEREAS, the Richland County Planning and Development Services Department approved the preliminary plans for a subdivision plat known as "_____" on __(date)__, subject to the aforesaid work being completed by the above-bound Principal; and

WHEREAS, the County of Richland has agreed to allow and does hereby allow the above-bound Principal a period of time in which to complete the aforesaid work in the manner herein above set forth, such time period to expire on _____; and

WHEREAS, the County of Richland has agreed to allow the plat of the aforesaid subdivision to be recorded, conditioned upon the execution of this obligation and the presentation of a Performance Bond in the above amount for the benefit of Richland County, as security for the road construction and installation of utility services as herein above set forth; and

WHEREAS, in the event that the Principal shall not comply with the terms and conditions as herein set out, then the same shall be considered in default, and the County of

SAMPLE

Richland may call upon its representatives to make demand on the collateral pledged by the Performance Bond in the manner therein provided for.

NOW, THEREFORE, if the Principal shall well and truly and with reasonable diligence and promptness cause the said improvements herein above mentioned to be made, this obligation shall become null and void; otherwise the same is to be and does hereby remain in full force and effect. The conditions in this Agreement are in addition to and do not limit conditions as provided in the Performance Bond executed by "_____" for the undersigned Entity on _____.

IN WITNESS WHEREOF, the Principal has its name and seal affixed hereto, this the _____ day of _____, 20__.

WITNESSES:

[COMPANY NAME]

_____

By: _____
[Name of person signing document]
Its Authorized Agent

_____

STATE OF SOUTH CAROLINA)
) PROBATE
COUNTY OF RICHLAND)

PERSONALLY appeared before me the undersigned witness and made oath that s/he saw the within named _____, by _____, its _____, sign, seal and deliver the within written instrument, and that s/he, with the other witness whose signature appears above, witnessed the execution thereof.

_____
Witness

SWORN to before me this
_____ day of _____, 20__

_____
NOTARY PUBLIC FOR SOUTH CAROLINA
My Commission Expires: _____

Appendix V: Bond Memorandum of Understanding

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Memorandum of Understanding

This is a partnership agreement

Richland County Department of Public Works Engineering Division William Simon Representative Name Signature	Between And	_____ Bank / Insurance Company _____ Representative Name _____ Signature

WHEREAS, the undersigned _____ , by _____ , it's _____ (hereinafter the "Principal"), is held firmly bound unto the County of Richland, South Carolina, in the sum of _____ ($_____) Dollars. The undersigned does bind itself, its heirs and assigns, firmly by these presents:

WHEREAS, the Richland County Planning & Development Services Department approved the preliminary plans for a subdivision known as " _____ ," on _____ (date), subject to the aforesaid work being completed by the above-bound Principal; and

WHEREAS, the County of Richland has agreed to allow and does hereby allow the above-bound Principal a period of time in which to complete the aforesaid work in the manner herein above set forth, such time to expire on _____ (date); and

WHEREAS, the County of Richland has agreed to allow the plat of the aforesaid subdivision to be recorded, conditioned upon the execution of this obligation and the presentation of a Construction Bond in the above amount for the benefit of Richland County, as security for the road construction and installation of utility services as herein above set forth; and

WHEREAS, in the event that the Principal shall not comply with the terms and conditions as herein set out, then the same shall be considered in default, and the County of Richland may call upon its representative to make demand on the collateral pledged by the Construction Bond in the manner therein provided for.

SWORN to be before me this

_____ Day of _____ , 20___

_____

NOTARY PUBLIC FOR SOUTH CAROLINA

My Commission Expires: _____