Article 6: Stormwater Regulations

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1. GENERAL PROVISIONS

A. TITLE, PURPOSE

1. This article shall constitute and be known, and may be cited as the "Stormwater Management Regulations of the City of Southport, North Carolina."
2. Flood control, groundwater recharge, and pollutant reduction shall be achieved through the use of stormwater management measures, including green infrastructure best management practices (GI BMPs) and nonstructural stormwater management strategies. GI BMPs and low-impact development (LID) should be utilized to meet the goal of maintaining natural hydrology to reduce stormwater runoff volume, reduce erosion, encourage infiltration and groundwater recharge, and reduce pollution. GI BMPs and LID should be developed based upon physical site conditions and the origin, nature and the anticipated quantity, or amount, of potential pollutants. Multiple stormwater management BMPs may be necessary to achieve the established performance standards for water quality, runoff quantity, and groundwater recharge.
3. The purpose of this article is to protect, maintain, and enhance the public health, safety, and general welfare by establishing minimum requirements and procedures to control the adverse effects of increased stormwater associated with future land development within the City of Southport. Proper management of stormwater runoff will include the following beneficial effects: (a) will minimize damage to public and private property; (b) ensure a functional drainage system; (c) reduce the effects of development on land and stream channel erosion; (d) assist in the attainment and maintenance of water quality standards;
(e) reduce local flooding and drainage problems; (f) maintain as nearly as possible the pre- developed runoff characteristics of the area; and (g) facilitate economic development by mitigating associated flooding and drainage impacts.
4. The application of this article and the provisions expressed herein shall be the minimum stormwater management requirements and shall not be deemed a limitation or repeal of any other obligations imposed by state statute or judicial decisions. The City Public Services Director or designee shall be responsible for the coordination and enforcement of the provisions of this article.

B. SCOPE OF ARTICLE

1. This chapter shall be applicable to the following major developments (as defined in Definitions):

a. Nonresidential major developments; and
b. Residential major developments:

2. This chapter shall be applicable to all minor developments (as defined in 6.1.C. Definitions) and shall be subject to requirements and design standards outlined in 6.2.B.
3. This chapter shall also be applicable to all developments undertaken by the City of Southport.

C. DEFINITIONS

For the purpose of this chapter, the following terms, phrases, words and their derivations shall have the meanings stated herein unless their use in the text of this chapter clearly demonstrates a different meaning. When not inconsistent with the context, words used in the present tense include the future, words used in the plural number include the singular number, and words used in the singular number include the plural number. The word "shall" is always mandatory and not merely directory.

BMP (BEST MANAGEMENT PRACTICE) - a structure or land management practice that filters or removes pollutants from stormwater runoff, slows the velocity of runoff, and/or reduces the volume of runoff.

CAMA (COASTAL AREA MANAGEMENT ACT) – The article that establishes a cooperative program of coastal area management between local and State governments. Local government shall have the initiative for planning, State government shall establish areas of environmental concern. Regarding planning, State government shall act primarily in a supportive standard setting and review capacity, except where local governments do not elect to exercise their initiative. Enforcement shall be a concurrent State-local responsibility.

COASTAL AREA – The 20 coastal counties designed within the CAMA that are adjacent to, intersected by, or bounded by the Atlantic Ocean or any coastal sound.

COMMUNITY BASIN — An infiltration system, sand filter designed to infiltrate, standard constructed wetland, or wet pond, or an alternate design, for an infiltration system, sand filter designed to infiltrate, standard constructed wet land, or wet pond that is designed and constructed in accordance with the North Carolina Department of Environmental Quality Stormwater Design Manual, or an alternate design, for an infiltration system, sand filter designed to infiltrate, standard constructed wet land, or wet pond that complies with the requirements of this chapter.

COMPACTION — The increase in soil bulk density.

CONTRIBUTORY DRAINAGE AREA — The area from which stormwater runoff drains to a stormwater management measure, not including the area of the stormwater management measure itself.

CORE — A pedestrian-oriented area of commercial and civic uses serving the surrounding municipality, generally including housing and access to public transportation.

DEPARTMENT — The North Carolina Department of Environmental Quality.

DESIGN ENGINEER — A person professionally qualified and duly licensed in North Carolina to perform engineering services that may include, but not necessarily be limited to, development of project requirements, creation and development of project design and preparation of drawings and specifications.

DEVELOPMENT — The division of a parcel of land into two or more parcels, the construction, reconstruction, conversion, structural alteration, relocation or enlarge-enlargement of any building or structure, any mining excavation or landfill, and any use or change in the use of any building or other structure, or land or extension of use of land.

DISTURBANCE — The placement or reconstruction of impervious surface or motor vehicle surface, or exposure and/or movement of soil or bedrock or clearing, cutting, or removing of vegetation. Milling and repaving is not considered disturbance for the purposes of this definition.

DRAINAGE AREA — A geographic area within which stormwater, sediments, or dissolved materials drain to a particular receiving water body or to a particular point along a receiving water body.

ENVIRONMENTALLY CONSTRAINED AREA — The following areas where the physical alteration of the land is in some way restricted, either through regulation, easement, deed restriction or ownership, such as: wetlands, floodplains, threatened and endangered species sites or designated habitats, and parks and preserves. Habitats of endangered or threatened species are identified using the North Carolina Wildlife Resources Commission 2015 Wildlife Action Plan or most current version and Protected Wildlife Species List.

ENVIRONMENTALLY CRITICAL AREA — An area or feature which is of significant environmental value, including but not limited to stream corridors, natural heritage priority sites, habitats of endangered or threatened species, large areas of contiguous open space or upland forest, steep slopes, and wellhead protection and groundwater recharge areas. Habitats of endangered or threatened species are identified using the North Carolina Wildlife Resources Commission 2015 Wildlife Action Plan or most current version and Protected Wildlife Species List.

EROSION — The detachment and movement of soil or rock fragments by water, wind, ice, or gravity.

EXEMPT DEVELOPMENT — Any development that creates less than 800 square feet of new impervious area or disturbs less than 2,000 square feet of land. Further, an exempt development shall not meet the definition of "minor development."

GREEN INFRASTRUCTURE — A stormwater management measure that manages stormwater close to its source by:

A. Treating stormwater runoff through infiltration into subsoil;

B. Treating stormwater runoff through filtration by vegetation or soil; or

C. Storing stormwater runoff for reuse.

HUC 14 or HYDROLOGIC UNIT CODE 14 — An area within which water drains to a particular receiving surface water body, also known as a subwatershed, which is identified by a fourteen-digit hydrologic unit boundary designation, delineated within North Carolina by the United States Geological Survey.

IMPERVIOUS SURFACE — A surface that has been covered with a layer of material that significantly reduces and prevents natural infiltration of water into the soil. Impervious surfaces include, but are not limited to, roof, patios, balconies, decks, streets, parking areas, driveways, sidewalks, and any concrete, stone, brick, asphalt, or compacted gravel surface. Driveways and parking areas constructed using approved and properly maintained pervious materials may be considered as pervious surface. Soils compacted by urban development are also highly impervious. Unwashed crushed stone containing fines is impervious. Impervious surface does not include a slatted deck; the water area of a swimming pool; a surface of number 57 stone, as designated by the American Society for Testing and Materials, laid at least four (4) inches thick over a geotextile fabric; or a trail as defined in NCGS 113A-85 that is either unpaved or paved as long as the pavement is porous with a hydraulic conductivity greater than 0.001 centimeters per second (1.41 inches per hour).

INFILTRATION — The process by which water seeps into the soil from precipitation.

LOW-IMPACT DEVELOPMENT TECHNIQUES — Utilizing strategies and measures that manage stormwater runoff quantity and quality in the absence of structural stormwater measures, such as minimizing site disturbance, preserving natural vegetation and other important site features such as forests and especially core forests, reducing and disconnecting impervious cover, minimizing proposed ground slopes, utilizing native vegetation, minimizing turf grass lawns, revegetating areas, increasing time of concentration, and maintaining and enhancing natural drainage features and characteristics.

MAJOR DEVELOPMENT —

A. An individual development, as well as multiple developments that individually or collectively result in:

1. The cumulative disturbance of 10,000 square feet or more of land since February 2, 2004;
2. The cumulative creation of 5,000 square feet or more of regulated impervious surface since February 2, 2004
3. The cumulative creation of 2,500 square feet or more of regulated motor vehicle surface since June 30, 2021; or
4. A combination of Subsection A(2) and (3) above that totals an area of 5,000 square feet or more. The same surface shall not be counted twice when

determining if the combination area equals 5,000 square feet or more.

B. Major development includes all developments that are part of a common plan of development or sale (for example, phased residential development) that collectively or individually meet any one or more of Subsection A(1), (2), (3) or (4) above. Projects undertaken by any government agency that otherwise meet the definition of "major development" but which do not require approval under the Municipal Land Use Law, N.C.G.S. 160D-200 et seq., are also considered major development.

MECHANICAL TREATMENT DEVICE – A pre-fabricated stormwater treatment structure utilizing settling, filtration, absorptive/adsorptive materials, vortex separation, vegetative components, and/or other appropriate technology to remove pollutants from stormwater runoff

MINOR DEVELOPMENT — Any development that results in an increase in impervious surface of 800 or more square feet, or one that disturbs more than 2,000 square feet of land area, but does not meet the definition of a "major development." Minor development includes both private and public projects or activities.

MOTOR VEHICLE — Land vehicles propelled other than by muscular power, such as automobiles, motorcycles, autocycles, and low-speed vehicles. For the purposes of this definition, "motor vehicle" does not include farm equipment, snowmobiles, all-terrain vehicles, motorized wheelchairs, go-carts, gas buggies, golf carts, ski-slope grooming machines, or vehicles that run only on rails or tracks.

MOTOR VEHICLE SURFACE — Any pervious or impervious surface that is intended to be used by motor vehicles and/or aircraft, and is directly exposed to precipitation, including, but not limited to, driveways, parking areas, parking garages, roads, racetracks, and runways.

MUNICIPALITY — City of Southport.

NORTH CAROLINA STORMWATER DESIGN MANUAL and NORTH CAROLINA STORMWATER CONTROL MEASURE CREDIT DOCUMENT – The manual maintained by the Department providing, in part, design specifications, removal rates, calculation methods, and soil testing procedures approved by the Department as being capable of contributing to the achievement of the stormwater management standards specified in this chapter. The BMP Manual is periodically amended by the Department as necessary to provide design specifications on additional best management practices and new information on already included practices reflecting the best available current information regarding the particular practice and the Department's determination as to the ability of that best management practice to contribute to compliance with the standards contained in this chapter. Alternative stormwater management measures, removal rates, or calculation methods may be utilized, subject to any limitations specified in this chapter, provided the design engineer demonstrates to the municipality, in accordance with 6.2.C.7 of this chapter that the proposed measure and its design will contribute to achievement of the design and performance standards established by this chapter.

NUTRIENT — A chemical element or compound, such as nitrogen or phosphorus, which is essential to and promotes the development of organisms.

PERSON — Any individual, corporation, company, partnership, firm, association, political subdivision of this state and any state, interstate or federal agency.

POLLUTANT — Any dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, refuse, oil, grease, sewage sludge, munitions, chemical wastes, biological materials, medical wastes, radioactive substance [except those regulated under the Atomic Energy Act of 1954, as amended (42 U.S.C. § 2011 et seq.)], thermal waste, wrecked or discarded equipment, rock, sand, cellar dirt, industrial, municipal, agricultural, and construction waste or runoff, or other residue discharged directly or indirectly to the land, groundwaters or surface waters of the state, or to a domestic treatment works. "Pollutant" includes both hazardous and nonhazardous pollutants.

RECHARGE — The amount of water from precipitation that infiltrates into the ground and is not evapotranspired.

REGULATED IMPERVIOUS SURFACE — Any of the following, alone or in combination:

A. A net increase of impervious surface;

B. The total area of impervious surface collected by a new stormwater conveyance system (for the purpose of this definition, a "new stormwater conveyance system" is a stormwater conveyance system that is constructed where one did not exist immediately prior to its construction or an existing system for which a new discharge location is created);

C. The total area of impervious surface proposed to be newly collected by an existing stormwater conveyance system; and/or

D. The total area of impervious surface collected by an existing stormwater conveyance system where the capacity of that conveyance system is increased

REGULATED MOTOR VEHICLE SURFACE – Any of the following alone or in combination:

A. The total area of motor vehicle surface that is currently receiving water;

B. A net increase in motor vehicle surface; and/or quality treatment either by vegetation or soil, by an existing stormwater management measure, or by treatment at a wastewater treatment plant, where the water quality treatment will be modified or removed.

SEDIMENT — Solid material, mineral or organic, that is in suspension, is being transported, or has been moved from its site of origin by air, water or gravity as a product of erosion.

SITE — The lot or lots upon which major or minor development is to occur or has occurred.

SOIL — All unconsolidated mineral and organic material of any origin.

STORMWATER — Water resulting from precipitation (including rain and snow) that runs off the land's surface, is transmitted to the subsurface, or is captured by separate storm sewers or other sewage or drainage facilities or conveyed by snow removal equipment.

STORMWATER MANAGEMENT BMP — An excavation or embankment and related areas designed to retain stormwater runoff. A stormwater management BMP may either be normally dry (that is, a detention basin or infiltration system), retain water in a permanent pool (a retention basin), or be planted mainly with wetland vegetation (most constructed stormwater wetlands).

STORMWATER MANAGEMENT MEASURE — Any practice, technology, process, program, or other method intended to control or reduce stormwater runoff and associated pollutants, or to induce or control the infiltration or groundwater recharge of stormwater or to eliminate illicit or illegal nonstormwater discharges into stormwater conveyances.

STORMWATER RUNOFF — Water flow on the surface of the ground or in storm sewers resulting from precipitation.

SPECIAL FLOOD HAZARD AREA — A flood hazard area in which the flood elevation resulting from the two-, ten-, or 100-year storm, as applicable, is governed by tidal flooding from the Atlantic Ocean. Flooding in a tidal flood hazard area may be contributed to, or influenced by, stormwater runoff from inland areas, but the depth of flooding generated by the tidal rise and fall of the Atlantic Ocean is greater than flooding from any fluvial sources. In some situations, depending upon the extent of the storm surge from a particular storm event, a flood hazard area may be tidal in the 100-year storm, but fluvial in more frequent storm events.

WATER CONTROL STRUCTURE — A structure within, or adjacent to, a water, which intentionally or coincidentally alters the hydraulic capacity, the flood elevation resulting from the two-, ten-, or 100-year storm, flood hazard area limit, and/or floodway limit of the water. Examples of a water control structure may include a bridge, culvert, dam, embankment, ford (if above grade), retaining wall, and weir.

WATERS OF THE STATE — The ocean and its estuaries, all springs, streams, wetlands, and bodies of surface water or groundwater, whether natural or artificial, within the boundaries of the State of North Carolina or subject to its jurisdiction.

WETLANDS or WETLAND (1)An area that is inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions, commonly known as "hydrophytic vegetation." (2) Areas designated as Jurisdictional by applicable Federal agencies.

D. EXEMPTIONS FROM REQUIREMENTS

The following activities shall be exempt from these stormwater performance criteria:

1. Any logging and bona fide farm activity which is consistent with an approved soil conservation plan or timber management plan approved by

the City, as applicable.

2. Repairs to any stormwater treatment practice deemed necessary by the City of Southport.

E. REGULATORY CONSISTENCY

This article shall be construed to assure consistency with the requirements of the Clean Water Act and acts amendatory thereof or supplementary thereto, or any applicable implementing regulations.

2. STORMWATER MANAGEMENT DESIGN PLANS

A. DESIGN AND PERFORMANCE STANDARDS FOR STORMWATER MANAGEMENT MEASURES

1. Stormwater management measures for major and minor development shall be designed to provide erosion control, groundwater recharge, stormwater runoff quantity control, and stormwater runoff quality treatment as follows:
   a. The minimum standards for erosion control are those established under the Soil and Sediment Control Act, N.C.G.S. 113A 50-67 et seq., and implementing rules at 15A N.C.A.C. 04.
   b. The minimum standards for groundwater recharge, stormwater quality, and stormwater runoff quantity shall be met by incorporating green infrastructure.
2. The standards in this chapter apply only to new major and minor development and are intended to minimize the impact of stormwater runoff on water quality and water quantity in receiving water bodies and maintain groundwater recharge. The standards do not apply to new major development to the extent that alternative design and performance standards are applicable under a regional stormwater management plan or water quality management plan adopted in accordance with Department rules.
3. Infiltration of surface water runoff is the preferred method of managing stormwater volume and quality. Designs shall be developed to maximize infiltration in accordance with this Article.

B. STORMWATER MANAGEMENT REQUIREMENTS FOR MINOR DEVELOPMENT.

1. Design standards shall be designed to include the following stormwater management measures:
   a) Water quality. Soil erosion and sediment control measures shall be installed in accordance with the Standards for Soil Erosion and Sediment Control in North Carolina.
   b) Rate/volume control. Infiltration measures shall be provided

with a capacity of two inches of runoff for each square foot of new impervious area. The infiltration measures shall be designed with an overflow to the surface which shall be stabilized and directed to an existing stormwater conveyance system or in a manner to keep the overflow on the developed property. If the new impervious surface is not roof area, an equivalent area of existing roof may be directed to the infiltration system. This shall be permitted where the existing roof is not already directed to infiltration devices.

c) The development design shall limit the creation of stormwater runoff through implementation of low-impact development techniques to the extent technically practicable without reduction of the allowable development given the applicable zoning and other provisions of state law or regulations, or of municipal ordinance.

Table 5: Sample Minor Development BMPs

Rain garden basin	Small-scale infiltration
Dry well basin	Small-scale bioretention
Grass Swale	Small-scale sand filter
Vegetative filter strip	Cistern

d) Soil testing shall be performed to confirm the permeability of the soils and the depth of the water table and seasonal highwater table.

e) A maintenance manual shall be supplied detailing the means and requirements of maintaining the stormwater management measure which shall comply with the requirements of 6.2.L.2 and 3.

f) A maintenance agreement shall be filed with the Office of the Brunswick County Register of Deeds in order to insure the future maintenance of the stormwater management measure.

g) All storm sewer structures, piping, basins, downspout discharges, and BMPs shall be offset a minimum of 10 feet from all property lines and right-of-way lines. Waiver of this requirement may be granted by the City Engineer but only in cases where it is not practicable to maintain the minimum required offset distance and there would be no adverse impact

to adjacent properties.

h) The lowest elevation of any BMP (below any sand or stone bottom layer) shall be a minimum of two feet above the water table and seasonal high water table. The two-foot vertical separation shall be established through soil testing.

2. Waivers and exceptions.

a) Standards for relief. Waivers from strict compliance with the design standards shall only be granted upon showing that meeting the standards would result in an exceptional hardship on the applicant or that the benefits to the public good of the deviation from the standards would substantially outweigh any detriments of the deviation. A hardship will not be considered to exist if reasonable reductions in the scope of the project would eliminate the noncompliance.

b) Mitigation. If city staff determines that a waiver is appropriate, the applicant must execute a mitigation plan. The scope of the mitigation plan shall be commensurate with the size of the project and the magnitude of the relief required. The mitigation project may be taken from the list of projects in the Municipal Stormwater Management Plan or another project identified by the applicant. All mitigation projects are subject to the approval of the Stormwater Administrator. A monetary contribution to the City may be made in lieu of the work identified in the mitigation plan, subject to the approval of the reviewing agency. The applicant may proportionally reduce the monetary contribution by installing such stormwater management systems as practicable.

C. STORMWATER MANAGEMENT REQUIREMENTS FOR MAJOR DEVELOPMENT

1. All major developments shall incorporate a maintenance plan for the stormwater management measures incorporated into the design of a major development in accordance with 6.2.L.
2. The development design shall limit the creation of stormwater runoff through implementation of low-impact development techniques to the extent technically practicable without reduction of the allowable development given the applicable zoning and other provisions of state law or regulations, or of municipal ordinance.
3. Stormwater management measures shall avoid adverse impacts of concentrated flow to Jurisdictional areas, or on habitat for threatened and endangered species.
4. The following linear development projects are exempt from the groundwater recharge, stormwater runoff quality, and stormwater

runoff quantity requirements of 6.2.C.16, 6.2.D, 6.2.E:

a) The construction of an underground utility line provided that the disturbed areas are revegetated upon completion;
b) The construction of an aboveground utility line provided that the existing conditions are maintained to the maximum extent practicable; and
c) The construction of a public pedestrian access, such as a sidewalk or trail with a maximum width of 14 feet, provided that the access is made of permeable material.

5. A waiver from strict compliance from the green infrastructure, groundwater recharge, stormwater runoff quality, and stormwater runoff quantity requirements of 6.2.C.15, 6.2.C.16, 6.2.D, 6.2.E. may be obtained from the Stormwater Administrator for the enlargement of an existing public roadway or railroad; or the construction or enlargement of a public pedestrian access, provided that the following conditions are met:

a) The applicant demonstrates that there is a public need for the project that cannot be accomplished by any other means;
b) The applicant demonstrates, through an alternatives analysis, that through the use of stormwater management measures, the option selected complies with the requirements of 6.2.C.15, 6.2.C.16, 6.2.D, 6.2.E. to the maximum extent practicable;
c) The applicant demonstrates that, in order to meet the requirements of 6.2.C.15, 6.2.C.16, 6.2.D, 6.2.E., existing structures currently in use, such as homes and buildings, would need to be condemned; and
d) The applicant demonstrates that it does not own or have other rights to areas, including the potential to obtain through condemnation lands not falling under 6.2.C.4.C above within the upstream drainage area of the receiving stream, that would provide additional opportunities to mitigate the requirements of §6.2.C.15, 6.2.C.16, 6.2.D, 6.2.E. that were not achievable on site.

6. Tables 1 through 3 below summarize the ability of stormwater best management practices identified and described in the North Carolina Stormwater Design Manual and North Carolina Stormwater Control Measure Credit Document to satisfy the green infrastructure, groundwater recharge, stormwater runoff quality and stormwater runoff quantity standards specified in 6.2.C.15, 6.2.C.16, 6.2.D, 6.2.E. When designed in accordance with the most current version of the North Carolina Stormwater Design Manual and North Carolina

Stormwater Control Measure Credit Document, the stormwater management measures listed below in Tables 1, 2 and 3 are presumed to be capable of providing stormwater controls for the design and performance standards as outlined in the tables below.

7. Where the BMP tables in the NC Stormwater Management Rule are different due to updates or amendments with the tables in this chapter, the more stringent shall take precedence.

Table 1

Green Infrastructure BMPs for Groundwater Recharge, Stormwater Runoff Quality, and/or Stormwater Runoff Quantity

Best Management Practice	Stormwater Runoff Quality TSS Removal Rate (percent)	Stormwater Runoff Quantity	Groundwater Recharge	Minimum Separation from Seasonal High Water Table (feet)
Cistern	0	Yes	No	—
Dry well[a]	0	No	Yes	2
Grass swale	50 or less	No	No	2[e]
				1[f]
Green roof	0	Yes	No	—
Manufactured treatment device[a][g]	50 or 80	No	No	Dependent upon the device
Pervious paving system[a]	80	Yes	Yes[b]	2[b]
			No[c]	1[c]
Small-scale bioretention basin[a]	80 or 90	Yes	Yes[b]	2[b]
			No[c]	1[c]
Small-scale infiltration basin[a]	80	Yes	Yes	2
Small-scale sand filter	80	Yes	Yes	2
Vegetative filter strip	60-80	No	No	—

(Notes corresponding to annotations[(a)] through [(g)] are found at the bottom of Table 3.)

Table 2

Green Infrastructure BMPs for Stormwater Runoff Quantity

Best Management Practice	Stormwater Runoff Quality TSS Removal Rate (percent)	Stormwater Runoff Quantity	Groundwater Recharge	Separation from Seasonal High Water Table (feet)
Bioretention system	80 or 90	Yes	Yes[b]	2[b]
			No[c]	1[c]
Infiltration basin	80	Yes	Yes	2
Sand filter[b]	80	Yes	Yes	2
Standard constructed wetland	90	Yes	No	N/A
Wet pond[d]	50 to 90	Yes	No	N/A

(Notes corresponding to annotations[(a)] through [(g)] are found at the bottom of Table 3.)

Table 3

BMPs for Groundwater Recharge, Stormwater Runoff Quality, and/or Stormwater Runoff Quantity

Best Management Practice	Stormwater Runoff Quality TSS Removal Rate (percent)	Stormwater Runoff Quantity	Groundwater Recharge	Minimum Separation from Seasonal High Water Table (feet)
Blue roof	0	Yes	No	N/A
Extended detention basin	40-60	Yes	No	1
Manufactured treatment device[(h)]	50 or 80	No	No	Dependent upon the device
Sand filter[(c)]	80	Yes	No	1
Subsurface gravel wetland	90	No	No	1
Wet pond	50 to 90	Yes	No	N/A

Notes to Tables 1, 2, and 3:

(a) Subject to the applicable contributory drainage area limitation specified at

6.2.C.15.b.;

(b) Designed to infiltrate into the subsoil;

(c) Designed with underdrains;

(d) Designed to maintain at least ten-foot-wide area of native vegetation along at least 50% of the shoreline and to include a stormwater runoff retention component designed to capture stormwater runoff for beneficial reuse, such as irrigation;

(e) Designed with a slope of less than 2%;

(f) Designed with a slope of equal to or greater than 2%;

(g) Manufactured treatment devices that meet the definition of "green infrastructure" at 6.1.C;

(h) Manufactured treatment devices that do not meet the definition of "green infrastructure" at 6.1.C.

8. An alternative stormwater management measure, alternative removal rate, and/or alternative method to calculate the removal rate may be used if the design engineer demonstrates the capability of the proposed alternative stormwater management measure and/or the validity of the alternative rate or method to the city. Alternative stormwater management measures may be used to satisfy the requirements at 6.2.C.15 only if the measures meet the definition of "green infrastructure" at 6.1.C.. Alternative stormwater management measures that function in a similar manner to a BMP listed at 6.2.C.15.b. are subject to the contributory drainage area limitation specified at 6.2.C.15.b. for that similarly functioning BMP. Alternative stormwater management measures approved in accordance with this subsection that do not function in a similar manner to any BMP listed at 6.2.C.15.b. shall have a contributory drainage area less than or equal to 2.5 acres, except for alternative stormwater management measures that function similarly to cisterns, grass swales, green roofs, standard constructed wetlands, vegetative filter strips, and wet ponds, which are not subject to a contributory drainage area limitation. Alternative measures that function similarly to standard constructed wetlands or wet ponds shall not be used for compliance with the stormwater runoff quality standard unless a variance or a waiver from strict compliance in accordance with 6.2.C.5. is granted from 6.2.C.15.

9. Whenever the stormwater management design includes one or more BMPs that will infiltrate stormwater into subsoil, the design engineer shall assess the hydraulic impact on the groundwater table and design the site so as to avoid adverse hydraulic impacts. Potential adverse hydraulic impacts include, but are not limited to, exacerbating a naturally or seasonally high water table, so as to cause surficial

ponding, flooding of basements, or interference with the proper operation of subsurface sewage disposal systems or other subsurface structures within the zone of influence of the groundwater mound, or interference with the proper functioning of the stormwater management measure itself.

10. Design standards for stormwater management measures are as follows:
    a) Stormwater management measures shall be designed to take into account the existing site conditions, including, but not limited to, environmentally critical areas; wetlands; flood-prone areas; slopes; depth to seasonal high water table; soil type, permeability, and texture; drainage area and drainage patterns; and the presence of solution-prone carbonate rocks (limestone);
    b) Stormwater management measures shall be designed and demonstrated not to negatively impact wetlands or watercourses on site or adjacent to the property;
    c) Stormwater management measures shall be designed to minimize maintenance, facilitate maintenance and repairs, and ensure proper functioning. Trash racks shall be installed at the intake to the outlet structure, as appropriate, and shall have parallel bars with one-inch spacing between the bars to the elevation of the water quality design storm. For elevations higher than the water quality design storm, the parallel bars at the outlet structure shall be spaced no greater than 1/3 the width of the diameter of the orifice or 1/3 the width of the weir, with a minimum spacing between bars of one inch and a maximum spacing between bars of six inches. In addition, the design of trash racks must comply with the requirements of 6.2.J.3;
    d) Stormwater management measures shall be designed, constructed, and installed to be strong, durable, and corrosion resistant.
    e) Stormwater management BMPs shall be designed to meet the minimum safety standards for stormwater management BMPs at 6.2.J.3; and
    f) The size of the orifice at the intake to the outlet from the stormwater management BMP shall be a minimum of 2 1/2 inches in diameter.
11. Manufactured treatment devices may be used to meet the requirements of this article, provided the pollutant removal rates are verified by the North Carolina Department of Environmental Quality.

Manufactured treatment devices that do not meet the definition of "green infrastructure" at 6.1.c. may be used only under the circumstances described at 6.2.C.16.d.

12. If there is more than one drainage area, the groundwater recharge, stormwater runoff quality, and stormwater runoff quantity standards at 6.2.C.16, 6.2.D, 6.2.E. shall be met in each drainage area, unless the runoff from the drainage areas converge on site and no adverse environmental impact would occur as a result of compliance with any one or more of the individual standards being determined utilizing a weighted average of the results achieved for that individual standard across the affected drainage areas.
13. Any stormwater management measure authorized under the municipal stormwater management plan or ordinance shall be reflected in a deed notice recorded in the office of the Brunswick County Register of Deeds. A form of deed notice shall be submitted to the municipality for approval prior to filing. The deed notice shall contain a description of the stormwater management measure(s) used to meet the green infrastructure, groundwater recharge, stormwater runoff quality, and stormwater runoff quantity standards at 6.2.C.15, 6.2.C.16, 6.2.D, 6.2.E., and shall identify the location of the stormwater management measure(s) in NAD 1983 State Plane North CaroliA FIPS 2900 US feet or latitude and longitude in decimal degrees. The deed notice shall also reference the maintenance plan required to be recorded upon the deed pursuant to 6.2.L.2.g. Prior to the commencement of construction, proof that the above required deed notice has been filed shall be submitted to the municipality. Proof that the required information has been recorded on the deed shall be in the form of either a copy of the complete recorded document or a receipt from the Register of Deeds or other proof of recordation provided by the recording office. However, if the initial proof provided to the municipality is not a copy of the complete recorded document, a copy of the complete recorded document shall be provided to the municipality within 180 calendar days of the authorization granted by the municipality.
14. A stormwater management measure approved under the municipal stormwater management plan or ordinance may be altered or replaced with the approval of the municipality, if the municipality determines that the proposed alteration or replacement meets the design and performance standards pursuant to 6.2.C. of this article and provides the same level of stormwater management as the previously approved stormwater management measure that is being altered or replaced. If an alteration or replacement is approved, a revised deed notice shall be

submitted to the municipality for approval and subsequently recorded with the Office of the Brunswick County Register of Deeds and shall contain a description and location of the stormwater management measure, as well as reference to the maintenance plan, in accordance with 6.2.C.13. Prior to the commencement of construction, proof that the above required deed notice has been filed shall be submitted to the city in accordance with 6.2.C.13.

15. Green infrastructure standards.

a) This subsection specifies the types of green infrastructure BMPs that may be used to satisfy the groundwater recharge, stormwater runoff quality, and stormwater runoff quantity standards.

b) To satisfy the groundwater recharge and stormwater runoff quality standards at 6.2.C.15, 6.2.C.16, 6.2.D, the design engineer shall utilize green infrastructure BMPs identified in Table 1 at 6.2.C.7. and/or an alternative stormwater management measure approved in accordance with 6.2.C.8. The following green infrastructure BMPs are subject to the following maximum contributory drainage area limitations:

Best Management Practice	Maximum Contributory Drainage Area
Dry well	1 acre
Manufactured treatment device	2.5 acres
Pervious pavement systems	Area of additional inflow cannot exceed three times the area occupied by the BMP
Small-scale bioretention systems	2.5 acres
Small-scale infiltration basin	2.5 acres
Small-scale sand filter	2.5 acres

c) To satisfy the stormwater runoff quantity standards at 6.2.E., the design engineer shall utilize BMPs from Table 1 or from Table 2 and/or an alternative stormwater management measure approved in accordance with 6.2.C.8.

d) If a waiver from strict compliance in accordance with 6.2.C.5 is granted by the Stormwater Administrator from the requirements of this subsection, then BMPs from Table 1, 2, or 3, and/or an alternative stormwater management measure approved in accordance with 6.2.C.8, may be used to meet the groundwater

recharge, stormwater runoff quality, and stormwater runoff quantity standards at 6.2.C.16, 6.2.D, 6.2.E.

e) For separate or combined storm sewer improvement projects, such as sewer separation, undertaken by a government agency or public utility (for example, a sewerage company), the requirements of this subsection shall only apply to areas owned in fee simple by the government agency or utility, and areas within a right-of-way or easement held or controlled by the government agency or utility; the entity shall not be required to obtain additional property or property rights to fully satisfy the requirements of this subsection. Regardless of the amount of area of a separate or combined storm sewer improvement project subject to the green infrastructure requirements of this subsection, each project shall fully comply with the applicable groundwater recharge, stormwater runoff quality control, and stormwater runoff quantity standards at 6.2.C.16, 6.2.D, 6.2.E, unless the project is granted a waiver from strict compliance in accordance with 6.2.C.5.

16. Groundwater recharge standards.

a) This subsection contains the minimum design and performance standards for groundwater recharge as follows:

b) The design engineer shall, using the assumptions and factors for stormwater runoff and groundwater recharge calculations at 6.2.G, either:

1) Demonstrate through hydrologic and hydraulic analysis that the site and its stormwater management measures maintain 100% of the average annual pre-construction groundwater recharge volume for the site; or

2) Demonstrate through hydrologic and hydraulic analysis that the increase of stormwater runoff volume from pre-construction to post-construction for the two-year storm is infiltrated.

c) This groundwater recharge requirement does not apply to projects within the urban redevelopment area or to projects subject to Subsection 16d below.

d) The following types of stormwater shall not be recharged:

1) Stormwater from areas of high pollutant loading. High pollutant loading areas are areas in industrial and commercial developments where solvents and/or petroleum products are loaded/unloaded, stored, or applied; areas where pesticides are loaded/unloaded or stored; areas where hazardous materials are expected to be present in greater than "reportable quantities" as defined by the United States Environmental Protection Agency (EPA) at 40 CFR 302.4; areas where recharge

would be inconsistent with Department-approved remedial action work plan or landfill closure plan and areas with high risks for spills of toxic materials, such as gas stations and vehicle maintenance facilities; and

2) Industrial stormwater exposed to source material. "Source material" means any material(s) or machinery, located at an industrial facility, that is directly or indirectly related to process, manufacturing or other industrial activities, which could be a source of pollutants in any industrial stormwater discharge to groundwater. Source materials include, but are not limited to, raw materials; intermediate products; final products; waste materials; by-products; industrial machinery and fuels, and lubricants, solvents, and detergents that are related to process, manufacturing, or other industrial activities that are exposed to stormwater.

D. STORMWATER RUNOFF QUALITY STANDARDS

1. This subsection contains the minimum design and performance standards to control stormwater runoff quality impacts of major development. Stormwater runoff quality standards are applicable when the major development results in an increase of 10,000 SF or more of regulated motor vehicle surface.

2. Stormwater management measures shall be designed to reduce the post-construction load of total suspended solids (TSS) in stormwater runoff generated from the water quality design storm as follows:

   a) Eighty percent TSS removal of the anticipated load, expressed as an annual average, shall be achieved for the stormwater runoff from the net increase of motor vehicle surface

   b) If the surface is considered regulated motor vehicle surface because the water quality treatment for an area of motor vehicle surface that is currently receiving water quality treatment either by vegetation or soil, by an existing stormwater management measure, or by treatment at a wastewater treatment plant is to be modified or removed, the project shall maintain or increase the existing TSS removal of the anticipated load expressed as an annual average

3. The requirement to reduce TSS does not apply to any stormwater runoff in a discharge regulated under a numeric effluent limitation for TSS imposed under the North Carolina Pollutant Discharge Elimination System (NCPDES) rules, 15A N.C.A.C. 02, or in a discharge specifically exempt under a NCPDES permit from this requirement. Every major development, including any that discharge into a combined sewer system, shall comply with Subsection 6.2.D.2. above, unless the major development is itself subject to a NCPDES permit with a numeric effluent limitation for TSS or the NCPDES permit to

which the major development is subject exempts the development from a numeric effluent limitation for TSS.

4. The water quality design storm is 1.5 inches of rainfall in two hours.

5. If more than one BMP in series is necessary to achieve the required 80% TSS reduction for a site, the applicant shall utilize the following formula to calculate TSS reduction:

   R = A + B - (A x B)/100
   Where:
   R = Total TSS percent load removal from application of both BMPs; and
   A = The TSS percent removal rate applicable to the first BMP;
   B = The TSS percent removal rate applicable to the second BMP.

6. Stormwater management measures shall also be designed to reduce, to the maximum extent feasible, the post-construction nutrient load of the anticipated load from the developed site in stormwater runoff generated from the water quality design storm. In achieving reduction of nutrients to the maximum extent feasible, the design of the site shall include green infrastructure BMPs that optimize nutrient removal while still achieving the performance standards in 6.2.C.16, 6.2.D, 6.2.E.

7. The Coastal Area Management rules 15A NCAC 07H defines four (4) areas of environmental concern (AEC). All development within the designated AECs must receive approval by the Division of Coastal Management prior to commencing construction.

8. These stormwater runoff quality standards do not apply to the construction of one individual single-family dwelling, provided that it is not part of a larger development or subdivision that has received preliminary or final site plan approval prior to December 3, 2018, and that the motor vehicle surfaces are made of permeable material(s) such as gravel, dirt, and/or shells.

E. STORMWATER RUNOFF QUANTITY STANDARDS.

1. This subsection contains the minimum design and performance standards to control stormwater runoff quantity impacts of major development.

2. In order to control stormwater runoff quantity impacts, the design engineer shall, using the assumptions and factors for stormwater runoff calculations at 6.2.G, complete one of the following:

   a) Design stormwater management measures so that the post-construction peak runoff rates for the two-, ten- and 100-year storm events are 50%, 75% and 80%, respectively, of the pre-

construction peak runoff rates. The percentages apply only to the post-construction stormwater runoff that is attributable to the portion of the site on which the proposed development or project is to be constructed; or

b) In tidal flood hazard areas, stormwater runoff quantity analysis in accordance with Subsection E(2)(a) immediately above is required unless the design engineer demonstrates through hydrologic and hydraulic analysis that the increased volume, change in timing, or increased rate of the stormwater runoff, or any combination of the three, will not result in additional flood damage below the point of discharge of the major development. No analysis is required if the stormwater is discharged directly into any ocean, bay, inlet, or the reach of any watercourse between its confluence with an ocean, bay, or inlet and downstream of the first water control structure

3. The stormwater runoff quantity standards shall be applied at the site's boundary to each abutting lot, roadway, watercourse, or receiving storm sewer system.

F. TECHNICAL STANDARDS.

1. Structural stormwater management measures shall be designed to take into account the existing site conditions, including, for example, environmentally critical areas; wetlands; flood-prone areas; slopes; depth to seasonal high water table; soil type, permeability and texture; drainage area and drainage patterns; and the presence of solution-prone carbonate rocks (limestone).

2. Structural stormwater management measures shall be designed, constructed and installed to be strong, durable, and corrosion resistant. All materials used in the construction of storm sewers, bridges and other drainage structures shall be in accordance with current specifications of NCDOT for road and bridge construction, as prepared by the North Carolina Department of Transportation, and any supplements, addenda and modifications thereto unless otherwise specified by the reviewing municipal agency. Modifications or changes of these specifications may be requested by the applicant but may be implemented only with the knowledge and written consent of the City Engineer after review and discussion.

3. Pipe sizes shall be determined by acceptable drainage design procedures; provided that the pipe size in a surface water drainage system shall be no less than 15 inches in diameter. Design engineers may use a twelve-inch-diameter pipe as a cross drain to a single inlet providing that the cross drain is 30 linear feet or less.

4. Drainage inlets shall be located at all intersections, with inlets on both sides

of a street at intervals of not more than 400 feet or such shorter distances as required to prevent the flow of surface water from exceeding six cubic feet per second at the drainage inlet. Access manholes shall be placed at maximum 400-foot intervals throughout the system and at pipe junctions where there are no drainage inlets.

5. Surface water in all paved areas shall be collected at intervals so that it will not obstruct the flow of vehicular or pedestrian traffic and will not create ponding in paved areas. Area inlets in parking lots should be limited to three cubic feet per second. Gutters or paved swales shall be used whenever, in the judgment of the City Engineer, they are necessary to avoid erosion.

6. Lots shall be graded so as to drain surface water away from foundation walls. The grade away from foundation walls shall fall a minimum of six inches within the first 10 feet (2018 NC Residential Building Code, Section R401.3). Unless the relief is granted by the city review board, lawn areas shall be graded at a minimum 2% grade in order to secure proper drainage. Additionally, drainage shall be provided in a manner which will prevent the collection of stormwater in pools, or other unauthorized concentrations of flow and water shall not flow across adjacent property lines at greater than pre-development rates.

7. Approval of drainage structures shall be obtained from the appropriate municipal, state and federal agencies. Where required, each applicant shall make application to NCDEQ, the and the City Stormwater Administrator. Final approval shall not be effective until letters of approval from the proper governmental authorities shall be furnished to the city Stormwater Administrator.

8. Surface drainage of each lot will be reviewed to assure that stormwater flows will not cascade from one lot to another in a manner that would be detrimental to the use of an adjoining developed or undeveloped lot. This may require surface water controls such as swales, surface drainage inlets and appropriate easements.

9. All storm sewer structures, piping, basins and BMPs shall be offset a minimum of 10 feet from all property lines and right-of-way lines.

10. Stormwater BMPs may not be constructed within municipal rights-of-way.

11. Concrete low flow channels are discouraged in the City and should not be installed in extended detention basins.

G. CALCULATION OF STORMWATER RUNOFF AND GROUNDWATER RECHARGE.
Stormwater runoff shall be calculated in accordance with the following:

1. The design engineer shall calculate runoff using one of the following

methods:

a) The USDA Natural Resources Conservation Service (NRCS) methodology, including the NRCS Runoff Equation and Dimensionless Unit Hydrograph, as described in Chapters 7, 9, 10, 15 and 16, Part 630, Hydrology National Engineering Handbook, incorporated herein by reference as amended and supplemented. This methodology is additionally described in Technical Release 55 - Urban Hydrology for Small Watersheds (TR-55), dated June 1986, incorporated herein by reference as amended and supplemented. Information regarding the methodology is available from the Natural Resources Conservation Service website at https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1044171.pdf or at United States Department of Agriculture Natural Resources Conservation Service North Carolina State Office; or

b) The Rational Method for peak flow and the Modified Rational Method for hydrograph computations. The Rational Method is described in Section B of the NCDEQ Stormwater Design Manual.

2. For the purpose of calculating runoff coefficients and groundwater recharge, there is a presumption that the pre-construction condition of a site or portion thereof is a wooded land use with good hydrologic condition. The term "runoff coefficient" applies to both the NRCS methodology above at 6.2.G.1.a. and the Rational and Modified Rational Methods at 6.2.G.1.b. A runoff coefficient or a groundwater recharge land cover for an existing condition may be used on all or a portion of the site if the design engineer verifies that the hydrologic condition has existed on the site or portion of the site for at least five years without interruption prior to the time of application. If more than one land cover have existed on the site during the five years immediately prior to the time of application, the land cover with the lowest runoff potential shall be used for the pre-construction computations. In addition, there is the presumption that the site is in good hydrologic condition (if the land use type is pasture, lawn, or park), with good cover (if the land use type is woods), or with good hydrologic condition and conservation treatment (if the land use type is cultivation).

3. In computing pre-construction stormwater runoff, the design engineer shall account for all significant land features and structures, such as ponds, wetlands, depressions, hedgerows, or culverts, that may reduce pre-construction stormwater runoff rates and volumes.

4. In computing stormwater runoff from all design storms, the design engineer shall consider the relative stormwater runoff rates and/or volumes of pervious and impervious surfaces separately to accurately

compute the rates and volume of stormwater runoff from the site. To calculate runoff from unconnected impervious cover, urban impervious area modifications as described in the NRCS Technical Release 55 - Urban Hydrology for Small Watersheds or other methods may be employed.

5. If the invert of the outlet structure of a stormwater management measure is below the flood hazard design flood elevation the design engineer shall take into account the effects of tailwater in the design of structural stormwater management measures.

H. SOURCES FOR TECHNICAL GUIDANCE.

Technical guidance for stormwater management measures can be found in the documents listed below, which are available to download from the Department's website at: https://www.deq.nc.gov/about/divisions/energy-mineral-and-land-resources/stormwater/stormwater-program/stormwater-design-manual.

2. Guidelines for stormwater management measures are contained in the North Carolina Stormwater Design Manual and Noth Carolina Stormwater Control Measure Credit Document, as amended and supplemented. Information is provided on stormwater management measures such as, but not limited to, those listed in Tables 1, 2, and 3.

3. Additional maintenance guidance is available on the Department's website at: https://www.deq.nc.gov/about/divisions/energy-mineral-and-land-resources/stormwater/stormwater-program.

I. SOLIDS AND FLOATABLE MATERIALS CONTROL STANDARDS.

Site design features identified under 6.2.C.7 above, or alternative designs in accordance with 6.2.C.8. above, to prevent discharge of trash and debris from drainage systems shall comply with the following standard to control passage of solid and floatable materials through storm drain inlets. For purposes of this section, "solid and floatable materials" means sediment, debris, trash, and other floating, suspended, or settleable solids. For exemptions to this standard see 6.2.I.2. below.

1. Design engineers shall use one of the following grates whenever they use a grate in pavement or another ground surface to collect stormwater from that surface into a storm drain or surface water body under that grate:

    a) The New Carolina Department of Transportation (NCDOT) bicycle-safe grate, or

    b) A different grate, if each individual clear space in that grate has an area of no more than seven square inches, or is no greater than 0.5 inch across the smallest dimension.

        i) Examples of grates subject to this standard include grates in grate inlets, the grate portion (non-curb-opening portion) of combination inlets, grates on storm sewer manholes, ditch

grates, trench grates, and grates of spacer bars in slotted drains. Examples of ground surfaces include surfaces of roads (including bridges), driveways, parking areas, bikeways, plazas, sidewalks, lawns, fields, open channels, and stormwater system floors used to collect stormwater from the surface into a storm drain or surface water body.

c) For curb-opening inlets, including curb-opening inlets in combination inlets, the clear space in that curb opening, or each individual clear space if the curb opening has two or more clear spaces, shall have an area of no more than seven square inches, or be no greater than two inches across the smallest dimension. See the Southport Engineering Department Details and Specifications Manual for Type "N-Eco" curb piece detail.

2. The standard in 6.2.I.1. does not apply:

a) Where each individual clear space in the curb opening in existing curb- opening inlet does not have an area of more than nine square inches;

b) Where the municipality agrees that the standards would cause inadequate hydraulic performance that could not practicably be overcome by using additional or larger storm drain inlets;

c) Where flows from the water quality design storm are conveyed through any device (e.g., end of pipe netting facility, manufactured treatment device, or a catch basin hood) that is designed, at a minimum, to prevent delivery of all solid and floatable materials that could not pass through one of the following:

i) A rectangular space 4 5/8 inches long and 1 1/2 inches wide (this option does not apply for outfall netting facilities); or

ii) A bar screen having a bar spacing of 0.5 inch.

d) Where flows are conveyed through a trash rack that has parallel bars with one- inch spacing between the bars, to the elevation of the water quality design storm; or

e) Where the action to meet this standard is an undertaking that constitutes an encroachment or will damage or destroy a Register listed historic property.

J. SAFETY STANDARDS FOR STORMWATER MANAGEMENT BASINS.

1. This section sets forth requirements to protect public safety through the proper design and operation of stormwater management BMPs. This section applies to any new stormwater management BMP.

2. The provisions of this section are not intended to preempt more stringent municipal or county safety requirements for new or existing stormwater management BMPs. Municipal and county stormwater management plans and ordinances may, pursuant to their authority, require existing stormwater management BMPs to be retrofitted to meet one or more of the safety standards in 6.2.J.3.a-c. for trash racks, overflow grates, and escape provisions at outlet structures.

3. Requirements for trash racks, overflow grates and escape provisions.

    a) A trash rack is a device designed to catch trash and debris and prevent the clogging of outlet structures. Trash racks shall be installed at the intake to the outlet from the stormwater management BMP to ensure proper functioning of the BMP outlets in accordance with the following:

        i) The trash rack shall have parallel bars, with no greater than six-inch spacing between the bars;

        ii) The trash rack shall be designed so as not to adversely affect the hydraulic performance of the outlet pipe or structure;

        iii) The average velocity of flow through a clean trash rack is not to exceed 2.5 feet per second under the full range of stage and discharge. Velocity is to be computed on the basis of the net area of opening through the rack; and

        iv) The trash rack shall be constructed of rigid, durable, and corrosion- resistant material and designed to withstand a perpendicular live loading of 300 pounds per square foot.

    b) An overflow grate is designed to prevent obstruction of the overflow structure. If an outlet structure has an overflow grate, such grate shall meet the following requirements:

        i) The overflow grate shall be secured to the outlet structure but removable for emergencies and maintenance.

        ii) The overflow grate spacing shall be no less than two inches across the smallest dimension.

        iii) The overflow grate shall be constructed and installed to be rigid, durable, and corrosion resistant, and shall be designed to withstand a perpendicular live loading of 300 pounds per square foot.

    c) Stormwater management BMPs shall include escape provisions as follows:

        i) If a stormwater management BMP has an outlet structure,

escape provisions shall be incorporated in or on the structure. Escape provisions include the installation of permanent ladders, steps, rungs, or other features that provide easily accessible means of egress from stormwater management BMPs. With the prior approval of the municipality pursuant to 6.2.J.3., a freestanding outlet structure may be exempted from this requirement;

ii) Safety ledges shall be constructed on the slopes of all new stormwater management BMPs having a permanent pool of water deeper than 2 1/2 feet. Safety ledges shall be comprised of two steps. Each step shall be four feet to six feet in width. One step shall be located approximately 2 1/2 feet below the permanent water surface, and the second step shall be located one foot to 1 1/2 feet above the permanent water surface. See 6.2.J.5. for an illustration of safety ledges in a stormwater management BMP; and

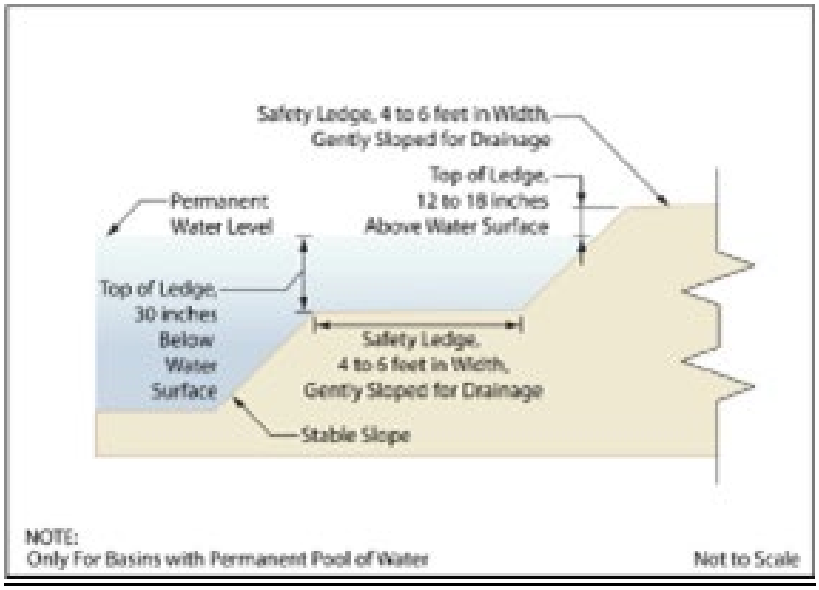
iii) In new stormwater management BMPs, the maximum interior slope for an earthen dam, embankment, or berm shall not be steeper than three horizontal to one vertical.

iv) For emergency purposes, wet ponds shall be equipped with a drain that can quickly dewater the pond to the maximum extent possible. The drainpipe intake shall be designed to prevent deposited sediment from clogging the pipe and for it to become clogged during draining. A gate valve or other similar device shall be installed for opening the drain. The emergency drainage measure shall be maintained in good working condition.

4. Variance or exemption from safety standard. A variance or exemption from the safety standards for stormwater management BMPs may be granted only upon a written finding by the municipality that the variance or exemption will not constitute a threat to public safety.

5. Safety ledge illustration.

Elevation View — Basin Safety Ledge Configuration



K. REQUIREMENTS FOR SITE DEVELOPMENT STORMWATER PLAN

1. Submission of site development stormwater plan.

    a) Whenever an applicant seeks municipal approval of a development subject to this chapter, the applicant shall submit all of the required components of the checklist for the site development stormwater plan at 6.2.K.1. below as part of the submission of the application for approval.

    b) The applicant shall demonstrate that the project meets or exceeds the standards set forth in this chapter.

    c) The applicant shall submit three copies of the materials listed in the checklist for site development stormwater plans in accordance with 6.2.K.1.of this chapter.

2. Site development stormwater plan approval. The applicant's site development project shall be reviewed as a part of the review process by the municipal board or official from which municipal approval is sought. That municipal board or official shall consult the municipality's review engineer to determine if all of the checklist requirements have been satisfied and to determine if the project meets the standards set forth in this chapter.

3. Submission of site development stormwater plan. The following information shall be required:

    a) Topographic base map. The reviewing engineer may require

upstream tributary drainage system information as necessary. It is recommended that the topographic base map of the site be submitted which extends a minimum of 400 feet beyond the limits of the proposed development, at a scale of one-inch equals 200 feet or greater, showing two-foot contour intervals. The map as appropriate may indicate the following: existing land use, existing surface water drainage, shorelines, steep slopes, soils, erodible soils, perennial or intermittent streams that drain into or upstream of the Category One waters, wetlands and floodplains along with their appropriate buffer strips, marshlands and other wetlands, pervious or vegetative surfaces, existing man-made structures, roads, bearing and distances of property lines, and significant natural and man- made features not otherwise shown.

b) Environmental site analysis. A written and graphic description of the natural and man-made features of the site and its surroundings should be submitted. This description should include a discussion of soil conditions, slopes, wetlands, waterways and vegetation on the site and within the areas beyond the limits of the proposed development as outlined in6.2.K.3a of this chapter. Particular attention should be given to unique, unusual, or environmentally sensitive features and to those that provide particular opportunities or constraints for development.

c) Project description and site plans. A map (or maps) at the scale of the topographical base map indicating the location of existing and proposed buildings, roads, parking areas, utilities, structural facilities for stormwater management and sediment control, and other permanent structures. The map(s) shall also clearly show areas where alterations will occur in the natural terrain and cover, including lawns and other landscaping, and seasonal high groundwater elevations. A written description of the site plan and justification for proposed changes in natural conditions shall also be provided.

d) Land use planning and source control plan. This plan shall provide a demonstration of how the goals and standards of 6.2.B. through 6.2.G. are being met. The focus of this plan shall be to describe how the site is being developed to meet the objective of controlling groundwater recharge, stormwater quality and stormwater quantity problems at the source by land management and source controls whenever possible.

e) Stormwater management facilities map. The following information, illustrated on a map of the same scale as the topographic base map, shall be included:

i) Total area to be disturbed, paved or built upon, proposed surface contours, land area to be occupied by the stormwater management facilities and the type of vegetation thereon, and details of the proposed plan to control and dispose of stormwater.

ii) Details of all stormwater management facility designs, before, during and after construction, including discharge provisions, drain, discharge capacity for each outlet at different levels of detention and emergency spillway provisions with maximum discharge capacity of each spillway.

f) Calculations.

i) Comprehensive hydrologic and hydraulic design calculations for the pre- development and post-development conditions for the design storms specified in 6.2.C. of this chapter.

ii) When the proposed stormwater management control measures depend on the hydrologic properties of soils or require certain separation from the seasonal highwater table, then a soils report shall be submitted. The soils report shall be based on on-site boring logs or soil pit profiles. The number and location of required soil borings or soil pits shall be determined based on what is needed to determine the suitability and distribution of soils present at the location of the control measure.

g) Maintenance and repair plan. The design and planning of the stormwater management facility shall meet the maintenance requirements of 6.2.L.

h) Waiver from submission requirements. The city engineer reviewing an application under this chapter may waive submission of any of the requirements in 6.2.K.3.a-f. of this chapter when it can be demonstrated that the information requested is impossible to obtain or it would create a hardship on the applicant to obtain and its absence will not materially affect the review process.

L. MAINTENANCE AND REPAIR.

1. Applicability. Projects subject to review as in 6.1.C. of this chapter shall comply with the requirements of 6.2.L.2-3.

2. General maintenance.

a) The design engineer shall prepare a maintenance plan for the stormwater management measures incorporated into the design of

a major development.

b) The maintenance plan shall contain specific preventative maintenance tasks and schedules; cost estimates, including estimated cost of sediment, debris, or trash removal; and the name, address, and telephone number of the person or persons responsible for preventative and corrective maintenance (including replacement). The plan shall contain information on BMP location, design, ownership, maintenance tasks and frequencies, and other details, as well as the tasks specific to the type of BMP, as described in the applicable chapter containing design specifics.

c) The design engineer shall prepare an engineer's cost estimate for maintenance of the stormwater management measures, including maintenance required during development construction, at the end of development construction, and routine maintenance after development construction is completed. Cost estimate shall include management of sediment, including disposal, debris removal, operation and maintenance of drains and controls, and any other required activities. For developments where construction is scheduled to be completed over a period of three years or more from initial ground disturbance, the engineer's cost estimate shall for be for a period no less than 25-years and shall be updated annually until completed of development construction.

d) If the maintenance plan identifies a person other than the property owner (for example, a developer, a public agency or homeowners' association) as having the responsibility for access and/or maintenance, the plan shall include documentation of such person's or entity's agreement to assume this responsibility, or of the owner's obligation to dedicate a stormwater management facility to such person under an applicable ordinance or regulation.

e) Responsibility for maintenance shall not be assigned or transferred to the owner or tenant of an individual property in a residential development or project, unless such owner or tenant owns or leases the entire residential development or project. The individual property owner may be assigned incidental tasks, such as weeding of a green infrastructure BMP, provided the individual agrees to assume these tasks; however, the individual cannot be legally responsible for all of the maintenance required.

f) If the party responsible for maintenance identified under 6.2.L.2.D. revisions based on 6.2.L.2.H below shall be recorded upon the deed of record for each property on which the maintenance described in the maintenance plan must be undertaken.

g) Preventative and corrective maintenance shall be performed to maintain the functional parameters (storage volume, infiltration rates, inflow/outflow capacity, etc.) of the stormwater management measure, including, but not limited to, repairs or replacement to the structure; removal of sediment, debris, or trash; exercising of drain valves; restoration of eroded areas; snow and ice removal; fence repair or replacement; restoration of vegetation; and repair or replacement of nonvegetated linings.

h) The party responsible for maintenance identified under 6.2.L.2.D above shall perform all of the following requirements:

1) Maintain a detailed log of all preventative and corrective maintenance for the structural stormwater management measures incorporated into the design of the development, including a record of all inspections and copies of all maintenance-related work orders;

2) Evaluate the effectiveness of the maintenance plan at least once per year and adjust the plan and the deed as needed; and

3) Retain and make available, upon request by any public entity with administrative, health, environmental, or safety authority over the site, the maintenance plan and the documentation required by 6.2.L.2.G and H., above.

i) The requirements of 6.2.L.2.D and E. do not apply to stormwater management facilities that are dedicated to and accepted by the municipality or another governmental agency, subject to all applicable municipal stormwater general permit conditions, as issued by the Department.

j) In the event that the stormwater management facility becomes a danger to public safety or public health, or if it is in need of maintenance or repair, the municipality shall so notify the responsible person in writing. Upon receipt of that notice, the responsible person shall have 14 days to affect maintenance and repair of the facility in a manner that is approved by the reviewing engineer or his designee. The municipality, in its discretion, may extend the time allowed for effecting maintenance and repair for good cause. If the responsible person fails or refuses to perform such maintenance and repair, the municipality or county may immediately proceed to do so and shall bill the cost thereof to the responsible person. Nonpayment of such bill may result in a lien on the property.

3. Nothing in this section shall preclude the municipality in which the major development is located from requiring the posting of a maintenance

guarantee in accordance with N.C.G.S. 160D-804.1 (Performance guarantees).

M. INSPECTION AND SUBSEQUENT FINES FOR NONCOMPLIANCE

1. All best management practice facilities are to be maintained by the property owner, homeowners' association or City of Southport. Where the City of Southport is named to be the party responsible for maintaining the facility, a developer's maintenance contribution shall be made.
    a) Calculations for maintenance contributions for traditional BMPs shall be based on City of Southport's Developer Maintenance Contribution Worksheet Schedule A.
    b) Calculations for maintenance contributions for nontraditional (as determined by the City Engineer) BMPs shall require an engineer's cost estimate for maintenance required over a twenty-five-year period. Cost estimate calculations shall be performed in accordance with City of Southport's Developer Maintenance Contribution Worksheet Schedule A.
2. All stormwater management measures within the City are subject to the stormwater maintenance permit and periodic inspection. An annual stormwater maintenance permit is required in January of each year.
3. Recordkeeping, inspection and repair guidelines and noncompliance penalties.
    a) Quarterly maintenance records shall be submitted to the City of Southport Municipal Clerk's office. The maintenance records for the period:
        i) January 1 to March 31 must be reported no later than April 30.
        ii) April 1 to June 30 must be reported no later than July 31.
        iii) July 1 to September 30 must be reported no later than October 31.
        iv) October 1 to December 31 must be reported no later than January 31.
    b) Mechanically treated structures which utilize filters shall have on record and be provided to the City, the requirements of the replacement of the filters as per the manufacturer and the dates the filters have been replaced.
    c) Inspections shall include and not be limited to:
        i) Detention basin outflow structures;

ii) Vegetation;

iii) Trash racks and overflow grates;

iv) Embankment erosion; and

v) Sediment removal and pond maintenance.

d) The owner of the stormwater management measure shall complete minor repairs of the facility within 30 days of the date of notice.

e) The owner of the stormwater management measure, immediately upon notice, must complete repairs that may adversely affect the public's health, safety and welfare.

f) Each act of violation, and every day upon which any violation shall occur or continues to occur shall constitute a separate offense.

g) Failure to obtain an annual stormwater maintenance permit: $100.

h) Failure to provide quarterly maintenance records: $50.

4. The municipality, in its discretion, may extend the time allowed for effecting maintenance and repair for good cause. If the responsible person fails or refuses to perform such maintenance and repair, the municipality may immediately proceed to do so and shall bill the cost thereof to the responsible person.

5. Nothing in this section shall preclude the municipality in which the major development is located from requiring the posting of a performance or maintenance guaranty in accordance with N.C.G.S. 160D-804.1.

N. FEES.

Residential Stormwater Plan Review	$100.00/per plan (single lot)
	$200.00/per plan (2-3 lots)
(up to two acres; and more than three lots)	$300.00/per plan
(over two acres; and more than three lots)	$500.00/per plan
Commercial Stormwater Plan Review (up to two acres)	$300.00/per plan
(over two acres)	$500.00/per plan

O. PERMIT REQUIREMENTS

No building or zoning permits for improvements or plat recordation for a subdivision,

for which a stormwater management plan is required, shall be approved or modified by the City without the approval of the following stormwater management regulatory items.

1. Right of entry for emergency maintenance.
2. Any recorded off-site easements needed.
3. An approved stormwater management design plan.
4. A maintenance agreement.
5. Recorded easements for stormwater management facilities.

P. PERMIT SUSPENSION AND REVOCATION

1. Notice of Violation. When the City determines that an activity is not being carried out in accordance with the requirements of this ordinance, it shall issue a written notice of violation to the owner of the property. The notice of violation shall contain:
   a) The name and address of the owner or applicant.
   b) The address when available or a description of the building, structure, or land upon which the violation is occurring.
   c) A statement specifying the nature of the violation.
   d) A description of the remedial measures necessary to bring the development activity into compliance with this ordinance and a time schedule for the completion of such remedial action.
   e) A statement of the penalty or penalties that shall or may be assessed against the person to whom the notice of violation is directed.
2. Stop Work Orders. Persons receiving a notice of violation will be required to halt all construction activities. This “stop work order” will be in effect until the City confirms that the development activity is in compliance and the violation has been satisfactorily addressed. Failure to address a notice of violation in a timely manner can result in civil, criminal, or monetary penalties in accordance with the enforcement measures authorized in this ordinance.
3. Restoration of Lands. Any violator may be required to restore land to its undisturbed condition. In the event that restoration is not undertaken within a reasonable time after notice, the City may take necessary corrective action, the cost of which shall become a lien upon the property until paid.

Q. PROFESSIONAL REGISTRATION REQUIREMENTS

1. Stormwater management preliminary and design plans that are incidental to the design of a residential subdivision or commercial development shall be prepared by a qualified registered North Carolina Professional Engineer, Surveyor, or Landscape Architect, using

acceptable standards and practices. All other stormwater management preliminary and design plans and calculations shall be prepared by a qualified registered North Carolina Professional Engineer, using acceptable engineering standards and practices.

2. The engineer, surveyor, or landscape architect shall perform services only in areas of his/her competence, shall undertake to perform engineering, landscape architecture, or land surveying assignments only when qualified by education and/or experience in the specific technical field.

3. OWNERSHIP, INSPECTION, AND MAINTENANCE

A. OWNERSHIP AND MAINTENANCE OF STORMWATER MANAGEMENT FACILITIES

1. Any stormwater management facility required by this article shall be privately-owned and maintained; provided, however, the owner thereof shall grant to the City, a perpetual, nonexclusive easement which allows for public inspection and emergency repair, in accordance with Section 6.2.L.
2. Stormwater management facilities shall be publicly owned and/or maintained only if accepted for maintenance by the City. If a stormwater management facility is not accepted by the City, the property owner has the maintenance responsibility for this facility.
3. Private maintenance requirements shall be a part of the deed to the affected property.
4. Any stormwater management facility required by this article shall be in compliance with Section K of the City of Southport Stormwater Management Technical Manual.

B. CONSTRUCTION INSPECTION SCHEDULE

1. Prior to the approval of the stormwater management design plan, the applicant shall submit a proposed applicant or designated party (responsible party) inspection schedule. The stormwater management design plan shall indicate a phase line for approval otherwise the inspection schedule will be for the entire development. The City may make additional inspections during and after construction if deemed necessary by the City.
2. If a responsible party fails or refuses to meet the requirements of the maintenance covenant, the City, after reasonable notice, may correct a violation of the design standards or the maintenance needs by performing all necessary work to place the facility in proper working condition. If, after an inspection, the condition of a facility presents an immediate danger to the public health, safety, or general welfare due to unsafe conditions or improper maintenance, the City shall have the right, but not the duty, to take such action as may be necessary to protect the public and make the facility safe. Any cost incurred by the City shall be

paid by the owner. In addition, the City shall notify the owner(s) in writing of the facility of any violation, deficiency, or failure to comply with this article within 10 days of the discovery of the violation. Upon a failure to correct violations requiring maintenance work within 10 days after, notice thereof, the City may provide for all necessary work to place the facility in proper working condition. The owner(s) of the facility shall be assessed the costs of the work performed by the City.

3. The permittee shall provide the City of Southport actual "as-built" plans for any stormwater management practice or facility located on the site after final construction certified by a professional engineer (as outlined in Section 6.3.I).
4. The professional engineer shall certify to the City that:
   a) The facility has been constructed as shown on the as-built plan, and
   b) The facility meets the approved stormwater management design plan and specifications or achieves the function for which it was designed.

C. ACCEPTANCE OF CERTIFICATION IN LIEU OF CONSTRUCTION INSPECTIONS

The City of Southport, at its sole discretion, may accept the certification of a registered engineer in lieu of any inspection required by this article.

4. MISCELLANEOUS PROVISIONS

A. APPEALS

The disapproval or required modification of any proposed stormwater management plans or design plans or the determination of noncompliance or failure to maintain by the City shall entitle the aggrieved person to appeal this decision or lack of action to the Board of Adjustment in accordance with Section2.7.E. Such appeal must be made in writing to the city clerk and the UDO Administrator within 30 days of written notice of disapproval, or modification of a design stormwater management plan, or determination of noncompliance or failure to maintain.

B. PENALTIES

Civil penalties shall be as follows:

1. All acts or conditions constituting a violation of this article shall subject the offender to a civil penalty of $500 per violation or per day for any continuing violation.

C. VEGETATION

1. Vegetation for stabilization of side slopes shall be a hearty ground cover such as the following, listed in order of best overall suitability:
   a) Tall Fescue
   b) Bermuda Grass
   c) Pensacola Bahia grass

d) Reed Canary Grass

2. All of these are well suited for flooding tolerance and waterways and channels. The bahia grass is excellent for sandy sites. The others spread by rootstocks, making a well anchored and stable ground covering.
3. The designer shall consult with the Public Services Department regarding landscape standards such as selection, spacing, location, and planting requirements of all grasses and plants which are to be incorporated in the system. Approval of a landscaping plan by the Public Services Department will be required prior to issuance of a construction permit.