

Article 8 | Environmental Protection

Sec. 8.1 Purpose

Durham County is endowed with an abundance of natural resources, including land, forests, streams and rivers, lakes, wildlife and natural beauty. Inappropriate development threatens the quality of the natural resources that make it a special place to live and work. Durham's governing bodies recognize that establishing standards for the protection of Durham County's natural resources represents prudent stewardship of the land and good business. The multiple purposes of natural resource protection standards are:

- A. To preserve and enhance the quality of the water in rivers, streams, ponds and lakes that flow into and out of Durham County;
- B. To minimize future flooding problems by restricting development in flood prone areas;
- C. To preserve the water carrying capacity of watercourses and the natural water storage capacity of the floodplain;
- D. To protect land and watercourses from pollutants, sedimentation and erosion;
- E. To retain open spaces in order to protect their environmentally-sensitive character;
- F. To protect and conserve significant natural resources from degradation due to inappropriate development. Such natural resources include Inventory Sites, wildlife and plant life habitats, wetland areas and riparian areas;
- G. To minimize the impact of development by controlling the location, intensity, pattern and design of development and construction activities;
- H. To enhance the aesthetic appearance of Durham as a means of improving quality of life and attracting new businesses and residents;
- I. To improve air quality by reducing the heat island effect by reducing pollution and fossil fuel used for transportation by encouraging walking, bicycling and transit; and
- J. To protect environmentally sensitive lands while recognizing the legitimate expectations of property owners and Durham's economic development goals.

Sec. 8.2 Exemptions from Environmental Protection Standards

8.2.1 Water Supply Reservoirs

Public water supply reservoirs and associated facilities shall be exempt from the requirements of this Article unless explicitly acknowledged within any section.

Sec. 8.3 Tree Protection and Tree Coverage

8.3.1 Tree Coverage Standards

A. Purpose

The primary purpose of the tree coverage standards is the preservation and maintenance of undisturbed tree cover and the provision of replacement tree cover on development sites in the Suburban Tier. Tree coverage serves to reduce glare, noise, air pollution, and soil erosion; to moderate temperatures; to reduce stormwater runoff; to preserve remnants of Durham's native ecology; to provide habitat for native plants and wildlife; to provide a healthy living environment; and to make Durham County a more attractive place to live.

B. Applicability

1. Tree coverage standards shall only be applied in the Suburban Tier.
2. Developments in the RR and RS-20 Districts shall be exempt from tree coverage requirements provided enforceable assurances are provided that no mass grading will be utilized during the development process.

C. Tree Coverage

1. New development other than additions to existing single-family detached houses shall include tree coverage areas on a portion of the development tract.
2. Additions to development existing as of the effective date of this Ordinance shall provide tree coverage as a percentage of the area proposed for disturbance.
3. **Locations**
 - a. Tree coverage areas in new subdivisions shall be located in common open space or buffers required by other provisions of this Ordinance, except that new subdivisions without buffers that make payment in lieu of required open space under Section 7.2.2, Required Open Space, may locate tree coverage areas on private lots or as otherwise specified below.
 - b. Any forested land in the floodway, non-encroachment area, floodway fringe, non-encroachment area fringe, or Areas of Shallow Flooding (Zone AO) (unless proposed to be filled or developed in accordance with Sec. 8.4.4, Development in Special Flood Hazard Areas and Future Conditions Flood Hazard Areas), preserved wetlands and wetland buffers, steep slope areas, stream buffers, Durham Natural Inventory Sites, Major Transportation Corridor (MTC) buffers, and any portion of the tract left undisturbed in order to create required perimeter buffers that satisfies the minimum size requirements established in Sec. 8.3.1D, Preserved Tree Coverage, or Sec. 8.3.1E, Replacement Tree Coverage, below may be used as tree cover.
4. Tree coverage standards may be met either by preserving existing trees on the site, by planting replacement trees, or a combination of both. The percentage of a tract which shall have tree coverage is as indicated in the table below. The total tree coverage area shown reflects the addition of replacement tree coverage area to the preserved tree coverage area shown.

Residential Development	
Preserved Tree Coverage Area (%)	Total Tree Coverage Area Required (%)
20	20
At least 15 but less than 20	23
At least 10 but less than 15	24
Less than 10	25
Nonresidential Development	
Preserved Tree Coverage Area (%)	Total Tree Coverage Area Required (%)
10	10
At least 8 but less than 10	13
At least 6 but less than 8	14
Less than 6	15

5. For the purposes of calculating tree coverage requirements, the water surface area of ponds, lakes and other water bodies (excluding stormwater control structures) shall be excluded from the total land area of the development tract.
6. Tree preservation and tree replacement areas shall be shown on all preliminary plats, final plats, site plans and development plans in order to clearly assign tree replacement responsibility to future owners. Tree preservation and tree replacement areas on any individual lot shall be clearly shown on all plot plans for the lot.
7. Property owners shall be responsible for protecting and preserving tree preservation and tree replacement areas during and after the development process in accordance with standard horticultural practice and Sec. 8.3.2, Protection of Existing Vegetation.

D. Preserved Tree Coverage

Areas proposed as tree preservation shall meet the following requirements to satisfy the tree coverage standards in Sec. 8.3.1, Tree Coverage and Protection Standards:

1. The provisions of Sec. 8.3.2, Protection of Existing Vegetation, shall be fulfilled.
2. Tree preservation areas shall be located in the areas listed in Sec. 8.3.1, Tree Coverage Standards, above. Additional tree preservation areas may be located outside of these areas, in which case they shall be located in order to preserve specimen trees and to preserve clusters of trees that add to the aesthetic quality of the development as viewed from the public right-of-way.
3. **Clusters of Trees**
 - a. The tree coverage area for a cluster of trees shall be determined by the exterior boundary of the total root protection zones for all of the trees in the cluster.
 - b. For parcels greater than one acre, no tree preservation area for a cluster of trees may be counted toward meeting the tree coverage standard unless it includes a minimum of 1,000 square feet (or such smaller area as required by paragraph 8.3.1C.4 above) and has no individual dimension of less than 25 feet.

- c.** For parcels one acre or less, no single tree preservation area for a cluster of trees may be counted toward meeting the tree coverage standard unless it includes a minimum of 500 square feet (or such smaller area as required by paragraph 8.3.1C.4 above) and has no individual dimension less than 15 feet.
- d.** At least 75% of the tree coverage included within any tree preservation area shall be composed of trees with at least a two inch dbh as determined through use of landscape sampling pursuant to Sec. 9.3.3, Sampling.
- e.** At least 75% of the root protection zone for a cluster of trees shall be located on the subject site for it to be considered a protected cluster.

4. Individual Trees

The tree coverage area for an individual tree shall be determined by the tree's root protection zone. At least 75% of the root protection zone for a tree shall be located on the subject site in order for that tree to count as preserved. Individual trees may be counted toward tree coverage credit provided that the tree's diameter is at least ten inches dbh or greater. Where specimen trees of 18 inches dbh or greater are preserved outside of other required buffers, tree coverage credit shall be granted at one and one-half times the size of the root protection zone.

5. Construction in Preserved Tree Coverage Area

- a.** Preserved tree coverage areas shall not be used for active recreational purposes, except for walking paths and foot trails constructed with minimal disturbance of tree roots and existing vegetation provided a registered arborist has certified that the construction of the trail has been designed to minimize impact to the existing trees. No tree over 10 inches dbh shall be removed for the construction of trails.
- b.** All buildings shall be set back at least 10 feet from the edge of any preserved tree coverage area.
- c.** Utility lines and drainage channels shall be minimized within the root protection zones of trees to be saved. Preferably, such facilities should be located adjacent to driveways and in groupings as allowed by sound engineering practices.

E. Replacement Tree Coverage

Areas proposed as tree replacement shall meet the following requirements to satisfy the standards found in Sec. 8.3.1C, Tree Coverage:

- 1.** For parcels greater than one acre, no tree replacement area may be counted toward meeting the tree coverage standard unless it includes a minimum of 1,000 square feet (or such smaller area as required by paragraph 8.3.1C.4 above) and has no individual dimension of less than 25 feet.
- 2.** For parcels one acre or less, no tree replacement area may be counted toward meeting the tree coverage standard unless it includes a minimum of 500 square feet (or such smaller area as required by paragraph 8.3.1C.4 above) and has no individual dimension less than 15 feet.
- 3.** When replacement trees are provided in order to satisfy the requirements of Sec. 8.3.1C, Tree Coverage, coverage credit shall be accrued in accordance with

the following table with credit calculated based on the required planting area for the proposed trees up to a maximum credit for any single tree of 275 square feet. In meeting this standard, at least 50% of replacement trees shall be two and one-half inches dbh or greater. A minimum of 50% of replacement trees shall be large, maturing, hardwood species native to Durham County.

Hardwood Caliper (inches)	Non-Hardwood Height (feet)	Credit (square feet)
4	18 or over	275
3½	16 to 18	250
3	14 to 16	225
2½	12 to 14	200
2	10 to 12	175
1½	8 to 10	150
1	7 to 8	100
Less than 1	Less than 7	No credit

EXAMPLE: 10 trees at 2½-inch caliper requires 2,000 square feet of planting area, and provides 2,000 square feet of replacement tree credits.

4. Where evidence can be provided that a development tract is entirely in agriculture (other than forestry) and has been continuously maintained in such use since January 1, 1980, the tree coverage standard indicated in Sec. Sec. 8.3.1C, Tree Coverage, may be reduced by 33% and the replacement tree requirement may be entirely met with trees of any size greater than two inches in caliper with tree coverage credit granted in accordance with the table above. Such tree coverage requirement reductions shall not apply to nonresidential development.
5. Areas designated as replacement tree coverage shall be subject to the use limitations imposed on preserved tree coverage in Sec. 8.3.1D.5, Construction in Preserved Tree Coverage Areas, except that stormwater control measures designed as bioretention facilities shall be allowed.
6. Replacement trees shall be planted before any Certificate of Compliance is issued, unless the planting has been deferred to an appropriate season in accordance with the requirements of Sec. 9.11.2, Extensions for All Other Development.

8.3.2 Protection of Existing Vegetation

Any trees preserved on a development tract in order to meet Ordinance requirements or otherwise indicated to be preserved shall meet the following protection standards.

- A. Protection measures to be used during grading and construction shall be specified on all grading, site, and erosion control plans with details of the tree protection fence(s) and its location shown on site plans and erosion control plans.
- B. Root protection zones shall be established around all trees to be preserved. The root protection zone shall either be a six-foot radius around the tree or a one foot radius for every inch of tree dbh, whichever is greater.
- C. A tree protection fence constructed of a material resistant to degradation by sun, wind, and moisture for the duration of the construction, shall be installed at the same

time as the erosion control measures, and shall remain in place until all construction is complete. Such fencing shall be mounted on metal posts placed no further than ten feet apart. Silt fencing shall not serve as tree protection fencing except in unusual circumstances, such as when topography limits the area available for installation of both tree protection fencing and erosion control measures.

- D. At the start of grading involving the lowering of the existing grade around a tree or stripping of topsoil, a clean, sharp, vertical cut shall be made at the edge of the tree save area at the same time as other erosion control measures are installed. Tree protection fencing shall be installed on the side of this cut farthest away from the tree trunk. This procedure shall be incorporated as a note on the grading and erosion control plans.
- E. No storage of materials, dumping of waste materials, fill, or parking of equipment shall be allowed within the root protection zone, and no trespassing shall be allowed within the boundary of the root protection zone, and shall be so noted on the grading and erosion control plans and posted at each end of the tree protection fence with perimeter signs spaced a maximum of 100 feet on center thereafter. Each sign shall read “no trespassing/tree protection area” and “prohibido entrar/zona protectora para los arboles”.

8.3.3 Tree Survey

A. Purpose

The primary purpose of the tree survey requirements is to provide better information about the presence and location of significant trees on sites proposed for development. This information is needed before plans for development are so far advanced that it is unreasonable and impractical to modify the plans to protect the trees identified on the tree survey. Knowing the location and size of specimen trees helps the staff and governing body evaluate possible modifications to the proposed plans to preserve significant trees and improve the appearance of proposed development.

B. General Tree Survey

For a development plan showing building envelopes rather than building footprints, a generalized survey describing existing forest stands, indicating the range of species and approximate size of trees on the tract, shall be provided.

C. Specimen Tree Survey

1. A specimen tree survey shall be required for any development plan showing specific building footprints, site plan, or preliminary plat.
2. The specimen tree survey shall show the general location, species and size of any specimen trees, which shall be defined as all trees other than trees of the *Pinus* genus greater than 18 inches dbh. Specimen trees of the *Pinus* genus shall only be considered significant and required to be shown on tree surveys in the Rural Tier.
3. A specimen tree survey shall not be required for land in the floodway, non-encroachment area, floodway fringe, non-encroachment area fringe, or Areas of Shallow Flooding (Zone AO) (unless proposed to be filled or developed in accordance with Sec. 8.4.4, Development in Special Flood Hazard Areas and Future Conditions Flood Hazard Areas), preserved wetlands and wetland

buffers, steep slope areas, stream buffers, Major Transportation Corridor (MTC) buffers, and, if preserved, Durham Natural Inventory Sites.

D. Land Disturbance Tree Survey

1. A land disturbance tree survey shall be required for any site plan, preliminary plat, grading plan, or erosion control plan.
2. The land disturbance tree survey shall show the location, species, size and root protection zone of any tree greater than 10 inches dbh that is within a protected area and within 30 feet of any area proposed for disturbance. For the purpose of this paragraph, a protected area shall include any floodplain, steep slope area, stream buffers, required landscape buffers, tree coverage areas, Inventory sites, or wetlands. In a conservation subdivision under Sec. 6.2.4, Conservation Subdivision, a protected area shall also include any other primary or secondary conservation area.

8.3.4 Clear-Cutting

A. Standard

Properties shall not be clear-cut during the conduct of forestry activities. To maintain the visual character of the site from adjoining properties and right-of-way, a vegetated perimeter buffer shall be maintained while tree harvesting for forestry occurs. A 32-foot wide buffer of naturally existing vegetation shall be maintained along all boundaries of the property being forested that adjoin other properties. Along public rights-of-way, a 50-foot buffer of naturally existing vegetation shall be maintained, exclusive of areas required for access to the site.

B. Penalties

1. City

Site plans proposing development of properties that failed to maintain such a buffer during forestry activities shall be denied for a period of five years from the date of clearing.

2. County

Site plans proposing development of properties that failed to maintain such a buffer during forestry activities shall be denied for a period of three years from the date of clearing.

Sec. 8.4 Floodplain and Flood Damage Protection Standards

8.4.1 Purpose

The primary purpose of the floodplain and flood damage protection standards is to preserve and maintain the natural floodplain in an undisturbed vegetated state in order to maintain flood storage capacity, control stormwater, improve water quality and conserve plant and wildlife habitat. Additionally, these standards serve to promote public health, safety, and general welfare and to minimize public and private losses due to flood conditions within flood prone areas.

In addition, this section serves to facilitate implementation of the Federal Flood Insurance Program and to minimize the possibility that new construction will sustain damage from flooding by:

- A. Restricting or prohibiting uses that are dangerous to health, safety and property due to water or erosion hazards, or which result in damaging increases in erosion or in flood heights or velocities;
- B. Requiring that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;
- C. Controlling the alteration of natural floodplains, stream channels, and natural protective barriers, which are involved in the accommodation of floodwaters;
- D. Controlling filling, grading, dredging, or other development that may increase erosion or flood damage;
- E. Preventing or regulating the construction of flood barriers that unnaturally divert flood waters or that may increase flood hazards to other lands;
- F. Minimizing damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, and streets and bridges located in areas of special flood hazard; and
- G. Ensuring that property owners and potential property owners are notified that property is a Special Flood Hazard Area or Future Conditions Flood Hazard Area.

Commentary: *Losses in floodprone areas are the result of the cumulative effects of obstructions, removal of vegetative cover, and construction practices that cause an increase in flood heights and velocities. Increased flood heights and velocities create a greater threat to land uses and structures that are inadequately elevated, floodproofed, or are otherwise unprotected from flood damage. Occupancy in flood prone areas by uses vulnerable to floods or other hazards can result in loss of life, property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures of flood protection and relief, and impairment of the tax base, all of which adversely affect the public health, safety, and general welfare.*

The degree of flood protection required by this ordinance is considered reasonable for regulatory purposes and is based on scientific and engineering consideration. Larger floods can and will occur. Actual flood heights may be increased by man-made or natural causes. This ordinance does not imply that land outside the Special Flood Hazard Areas and Future Conditions Flood Hazard Areas or uses permitted within such

areas will be free from flooding or flood damages. This ordinance shall not create liability on the part of Durham City or County or by any officer or employee thereof for any flood damages that result from reliance on this ordinance or any administrative decision lawfully made hereunder.

8.4.2 Applicability

This section shall apply to all Special Flood Hazard Areas and Future Conditions Flood Hazard Areas within the City and County of Durham as identified by the Federal Emergency Management Agency (FEMA) or produced under the Cooperating Technical State (CTS) agreement between the State of North Carolina and FEMA in its Flood Insurance Study (FIS) and its accompanying flood maps, such as the Flood Insurance Rate Map(s) (FIRM) for Durham County dated May 2, 2006; February 2, 2007; April 16, 2007; June 4, 2007; August 2, 2007; or May 16, 2008, are adopted by reference and declared to be a part of this ordinance. Also adopted by reference and declared to be a part of this ordinance are associated Physical Map Revisions and Letters of Map Change issued by FEMA as June 15, 2009. The Special Flood Hazard Areas and Future Conditions Flood Hazard Areas also include those defined through standard engineering analysis for private developments or by governmental agencies, but which have not yet been incorporated in the FIRM. This includes, but is not limited to, detailed flood data:

- A. generated as a requirement of Sec. 3.22.2.B (11 & 12), Duties and Responsibilities;
- B. preliminary FIRMs where more stringent than the effective FIRM; or
- C. post-disaster Flood Recovery Maps.

8.4.3 Standards

A. General

In all Special Flood Hazard Areas and Future Conditions Flood Hazard Areas the following provisions are required:

1. All new construction and substantial improvements shall be anchored to prevent flotation, collapse, or lateral movement of the structure;
2. All new construction and substantial improvements shall be constructed with materials and utility equipment resistant to flood damage;
3. All new construction or substantial improvements shall be constructed by methods and practices that minimize flood damages;
4. Electrical, heating, ventilation, plumbing, air conditioning equipment, and other service facilities shall be designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding. These include but are not limited to HVAC equipment, water softener units, bath/kitchen fixtures, ductwork, electric meter panels/boxes, utility/cable boxes, appliances (i.e., washers, dryers, refrigerator, etc.), hot water heaters, electric outlets/switches;
5. All new and replacement water supply systems shall be designed to minimize or eliminate infiltration of flood waters into the system;
6. New and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of flood waters into the systems and discharges from the systems into flood waters;

7. On-site waste disposal systems shall be located and constructed to avoid impairment to them or contamination from them during flooding;
8. Any alteration, repair, reconstruction, or improvements to a structure which is in compliance with the provisions of this ordinance, shall meet the requirements of new construction; and
9. New solid waste disposal facilities and sites, hazardous waste management facilities, salvage yards, and chemical storage facilities shall not be permitted. A structure or tank for chemical or fuel storage incidental to an allowed use or to the operation of a water treatment plant or wastewater treatment facility may be located in a Special Flood Hazard Area only if the structure or tank is either elevated or floodproofed to at least the regulatory flood protection elevation and certified according to the certification requirements in Sec. 3.22, Floodplain Development Permit.
10. Fill material shall be used for all new construction and substantial improvements to create an elevation that is two feet above base flood elevation or future conditions flood elevation, except as otherwise authorized pursuant to Sec. 8.4.4, Development in Special Flood Hazard Areas and Future Conditions Flood Hazard Areas. The fill material shall be required to extend for a distance of 40 feet from the exterior walls of a building. Where the distance to the property line is less than 40 feet, the fill shall extend to the property line. The required fill material distance shall include a sloped edge with a maximum 3:1 slope [for example, for a fill three feet deep: 31 feet of flat fill plus nine feet of sloped fill] or a retaining wall in lieu of the slope [for example, a side yard of flat fill and a retaining wall]. Residential accessory structures which are defined as nonhabitable structures by the North Carolina Building Code are exempt from requirements to extend the fill material away from the base but are required to be placed on fill which is two feet, or five feet in Zone A, above base flood elevation. Exceptions from any of these requirements resulting from special storm water considerations shall be forwarded to the approving authority if other than the Floodplain Administrator, with a recommendation from the Floodplain Administrator.

B. Specific Standards

In all Special Flood Hazard Areas where Base Flood Elevation (BFE) data has been provided and in Future Conditions Flood Hazard Areas where future conditions flood elevations data has been provided, as set forth in Sec. 8.4.2, Applicability, or Sec. 3.22.1.B (11 & 12), Duties and Responsibilities, the following provisions are required:

1. Subdivisions

- a. Land in the Special Flood Hazard Areas and Future Conditions Flood Hazard Areas may be used for the following purposes, provided that such uses are designed and constructed to minimize clearing, grading, erosion and water quality degradation and are in compliance with the Sec. 8.4, Floodplain and Flood Damage Protection Standards. Land within Special Flood Hazard Areas and Future Conditions Flood Hazard Areas shall not serve to meet minimum lot size requirements, except in the Rural Tier and on property zoned RR or RS-20 in the Suburban Tier where at least 50% of the required lot area is located outside the floodway or non-encroachment area or floodway fringe.

- b.** When permitted, development proposals located within Special Flood Hazard Areas and Future Conditions Flood Hazard Areas shall:
 - (1) be consistent with the need to minimize flood damage;
 - (2) have public utilities and facilities such as sewer, gas, electrical, and water systems located and constructed to minimize flood damage;
 - (3) have adequate drainage provided to reduce exposure to flood hazards; and,
 - (4) have Base Flood Elevation (BFE) data provided if development is greater than the lesser of five (5) acres or fifty (50) lots/manufactured home sites. Such Base Flood Elevation (BFE) data shall be adopted by reference per Sec. 8.4.2, Applicability, to be utilized in implementing this code.

2. Residential Construction

New construction or substantial improvement of any residential structure (including manufactured homes) shall have the reference level, including basement, elevated no lower than the regulatory flood protection elevation.

3. Non-Residential Construction

New construction or substantial improvement of any commercial, industrial (other than hazardous, solid waste, salvage yards, chemical storage facilities or similar uses which are prohibited) or other non-residential structure shall have the reference level, including basement, elevated no lower than the regulatory flood protection elevation. Structures located in AE and X (Future) Zones may be floodproofed to the regulatory flood protection elevation in lieu of elevation provided that all areas of the structure below the required flood protection elevation are watertight with walls substantially impermeable to the passage of water, using structural components having the capability of resisting hydrostatic and hydrodynamic loads and the effect of buoyancy. A registered professional engineer or architect shall certify that the standards of this subsection are satisfied. Such certification shall be provided to the official as set forth in the certification requirements in Sec. 3.22, Floodplain Development Permit.

4. Manufactured Homes

- a.** New or replacement manufactured homes shall be elevated so that the reference level of the manufactured home is no lower than the regulatory flood protection elevation.
- b.** Manufactured homes shall be securely anchored to an adequately anchored foundation to resist flotation, collapse, and lateral movement in accordance with the State of North Carolina Regulations for Manufactured/Mobile Homes, 1995 Edition, and any revision thereto adopted by the Commissioner of Insurance pursuant to NCGS §143-143.15 or a certified engineered foundation. Additionally, when the elevation would be met by an elevation of the chassis thirty-six (36) inches or less above the grade at the site, the chassis shall be supported by reinforced piers or other foundation elements of at least equivalent strength. When the elevation of the chassis is above thirty-six (36) inches in height, an engineering certification is required.

- c.** All foundation enclosures or skirting shall be in accordance with Sec. 8.4.3.B.5, Elevated Buildings.
- d.** All new, substantially improved or substantially damaged manufactured home parks or subdivisions located within Special Flood Hazard Areas or Future Conditions Flood Hazard Areas shall prepare an evacuation plan for evacuation of all residents. The plan shall be filed with the Inspections Director, or designee (as the Floodplain Administrator) and the Emergency Management Coordinator prior to the time of site plan approval, plat approval, or building permit, if site plans or plats are not required.
- e.** Manufactured homes, except replacement manufactured homes located in an existing manufactured home park or subdivision, shall not be permitted in the floodway or non-encroachment area. Permitted manufactured homes shall be subject to the non-encroachment standards of Sec. 8.4.3E, Floodway and Non-Encroachment Areas.

5. Elevated Buildings

New construction or substantial improvements of elevated buildings that include fully enclosed areas that are below the regulatory flood protection elevation shall not be designed to be used for human habitation, but shall be designed to be used only for parking of vehicles, building access, or limited storage of maintenance equipment used in connection with the premises, be constructed entirely of flood resistant materials below the regulatory flood protection level in Zone AE and X Zone (Future) and meet the following design criteria:

- a.** Measures for complying with this requirement shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters. To meet this requirement, the foundation must either be certified by a professional engineer or architect or meet the following minimum design criteria:
 - (1) Provide a minimum of two openings on different sides of each enclosed area subject to flooding.
 - (2) The total net area of all openings must be at least one (1) square inch for each square foot of each enclosed area subject to flooding.
 - (3) If a building has more than one enclosed area, each area must have openings on exterior walls to allow floodwater to directly enter;
 - (4) The bottom of all required openings shall be no higher than one (1) foot above the adjacent grade; and
 - (5) Openings may be equipped with screens, louvers, or other opening coverings or devices provided they permit the automatic flow of floodwaters in both directions. For purposes of this provision, vinyl or sheet metal skirting shall not be considered an enclosure for regulatory and flood insurance rating purposes and therefore shall not require hydrostatic openings.
- b.** Access to the enclosed area shall be the minimum necessary to allow for parking of vehicles (garage door) or limited storage of maintenance

equipment used in connection with the premises (standard exterior door) or entry to the living area (stairway or elevator). The interior portion of such enclosed area shall not be partitioned or finished into separate rooms, except to enclose storage areas.

6. Additions/Improvements

- a.** Additions and/or improvements to pre-FIRM structures when the addition and/or improvements in combination with any interior modifications to the existing structure are:
 - (1) not a substantial improvement the addition and/or improvements must be designed to minimize flood damages and must not be any more non-conforming than the existing structure; or
 - (2) a substantial improvement, the existing structure and the addition and/or improvements must comply with the standards for new construction.
- b.** Additions to post-FIRM structures with no modifications to the existing structure shall require only the addition to comply with the standards for new construction.
- c.** Additions and/or improvements to post-FIRM structures whereas the addition and/or improvements in combination with any interior modifications to the existing structure are:
 - (1) not a substantial improvement, the addition and/or improvements only must comply with the standards for new construction; or
 - (2) a substantial improvement, the existing structure and the addition and/or improvements must comply with the standards for new construction.
- d.** Where a fire wall or independent perimeter load-bearing wall is provided between the addition and the existing building, the addition(s) shall be considered a separate building and only the addition must comply with the standards for new construction.

7. Recreational Vehicles

Recreational vehicles shall not be located within Special Flood Hazard Areas or Future Conditions Flood Hazard Areas for 180 days or more and shall be licensed and ready for highway use (on wheels attached to a site by quick-disconnect type utilities with no permanently attached additions). Recreational vehicles not meeting these standards shall meet the standards of manufactured homes above.

8. Temporary Structures

Prior to the issuance of a floodplain development permit for a temporary structure, Applicants must submit to the Floodplain Administrator a written plan for the removal of such structure(s) in the event of a hurricane or flash flood warning notification. The plan must include the following information:

- a.** a proposed time period for which the temporary use will be permitted;
- b.** the name, address, and phone number of the individual responsible for the removal of the temporary structure;
- c.** the time frame prior to the event at which a structure will be removed (i.e. minimum of 72 hours before landfall of a hurricane or immediately upon flood warning notification);
- d.** a copy of the contract or other suitable instrument with a trucking company to ensure the availability of removal equipment when needed; and
- e.** designation, accompanied by documentation, of a location outside the Special Flood Hazard Area or Future Conditions Flood Hazard Area to which the temporary structure will be moved.

9. Accessory Structures

When accessory structures (sheds, detached garages, etc.) are to be placed within a Special Flood Hazard Area or Future Conditions Flood Hazard Area, the following criteria shall be met:

- a.** Accessory structures shall not be used for human habitation (including work, sleeping, living, cooking or restroom areas);
- b.** Accessory structures shall be designed to have low flood damage potential;
- c.** Accessory structures shall be constructed and placed on the building site so as to offer the minimum resistance to the flow of floodwaters;
- d.** Accessory structures shall be firmly anchored in accordance with Sec. 8.4.3, General;
- e.** All service facilities such as electrical and heating equipment shall be installed in accordance with Sec. 8.4.3, Specific Standards;
- f.** Openings to relieve hydrostatic pressure during a flood shall be provided below regulatory flood protection elevation in conformance with elevated building requirements in Sec. 8.4.3, Standards; and
- g.** An accessory structure with a footprint less than 150 square feet does not require an elevation or floodproofing certificate. Elevation or floodproofing certifications are required for all other accessory structures in accordance with the certification requirements in Sec. 3.22, Floodplain Development Permit.

C. Floodplains without Base Flood Elevations

Within the Special Flood Hazard Areas established in Sec. 8.4.2, Applicability, where no Base Flood Elevation (BFE) data has been provided, the following provisions shall apply:

- 1.** No encroachments, including fill, new construction, substantial improvements or new development shall be permitted within a distance of 20 feet each side from top of bank or five times the width of the stream whichever is greater, unless certification with supporting technical data by a registered professional engineer is provided demonstrating that such encroachments shall not result in any increase in flood levels during the occurrence of the base flood discharge.

2. The BFE used in determining the regulatory flood protection elevation shall be determined based on one of the following criteria set in priority order:
 - a. If Base Flood Elevation (BFE) data is available from other sources, all new construction and substantial improvements within such areas shall also comply with all applicable provisions of this ordinance and shall be elevated or floodproofed in accordance with standards in Sec. 3.22.1.B (11&12).
 - b. All subdivision, manufactured home park and other development proposals shall provide Base Flood Elevation (BFE) data if development is greater than five (5) acres or has more than fifty (50) lots/manufactured home sites. Such Base Flood Elevation (BFE) data shall be adopted by reference per Sec. 8.4.2, Standards, to be utilized in implementing this ordinance.
 - c. When Base Flood Elevation (BFE) data is not available from a Federal, State, or other source as outlined above, the reference level shall be elevated to or above five feet above the highest adjacent grade.

D. Floodplains with Base Flood Elevations but no Established Floodway or Non-Encroachment Areas

Along rivers and streams where Base Flood Elevation (BFE) data is provided but neither floodway nor non-encroachment areas are identified for a Special Flood Hazard Area on the FIRM or in the FIS, no encroachments, including fill, new construction, substantial improvements, or other development, shall be permitted unless certification with supporting technical data by a registered professional engineer is provided demonstrating that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point within the community.

E. Floodway and Non-Encroachment Areas

Located within the Special Flood Hazard Areas established in Sec 8.4.2, Applicability, are areas designated as floodways or non-encroachment areas, which are extremely hazardous due to the velocity of floodwaters that have erosion potential and carry debris and potential projectiles. In such areas no encroachments, including fill, new construction, substantial improvements, or other development shall be permitted unless the Federal Emergency Management Agency (FEMA) authorizes conditional approval of the proposed encroachment via a Conditional Letter of Map Revision (CLOMR) or a professional engineer registered in the State of North Carolina certifies that such uses will result in no increases in flood levels during the occurrence of a base flood, as demonstrated through hydrologic and hydraulic analysis performed in accordance with standard engineering practice if required by the Floodplain Administrator.

F. Standards for Areas of Shallow Flooding (Zone AO)

Located within the Special Flood Hazard Areas established in Sec 8.4.2, Applicability, are areas designated as shallow flooding areas. These areas have special flood hazards associated with base flood depths of one (1) to three (3) feet where a clearly defined channel does not exist and where the path of flooding is unpredictable and

indeterminate. In addition to the general standards in 8.4.3.A, all new construction and substantial improvements shall meet the following requirements.

1. The reference level shall be elevated at least as high as the depth number specified on the Flood Insurance Rate Map (FIRM), in feet, plus a freeboard of 2 feet, above the highest adjacent grade; or at least five feet above the highest adjacent grade if no depth number is specified.
2. Non-residential structures may, in lieu of elevation, be floodproofed to the same level as required in Sec. 8.4.3.F.1 so that the structure, together with attendant utility and sanitary facilities, below that level shall be watertight with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy. Certification is required as per Sec. 3.22.6, Certification Requirements, and Sec. 8.4.3.B.3, Non-Residential Construction.
3. Adequate drainage paths shall be provided around structures on slopes, to guide floodwaters around and away from proposed structures.

8.4.4 Development in Special Flood Hazard Areas and Future Conditions Flood Hazard Areas

Development and land disturbing activity within Special Flood Hazard Areas and Future Conditions Flood Hazard Areas shall be prohibited, except as provided below. The Floodplain Administrator and the governing bodies shall not approve development that is located below the regulatory flood protection elevation if such development is otherwise required to be located at or above the regulatory flood protection elevation or is not permitted within the Special Flood Hazard Areas or Future Conditions Flood Hazard Areas. Development addressed under Sec. 8.4.3C, Floodplains without Base Flood Elevations, and Sec. 8.4.3D, Floodplains with Base Flood Elevations but no Established Floodway or Non-Encroachment Areas, shall be deemed floodway development for purposes of this section.

A. Development Allowed

Land in Special Flood Hazard Areas may be used for the following purposes, with no special approvals required:

1. Agricultural uses, including active agriculture, pasture forestry, wildlife sanctuary, game farms, and similar uses; and
2. Lawns and gardens.

B. Development Requiring Floodplain Administrator Approval

1. Development of one single-family or duplex residence on a single lot of record that exists as of January 1, 2006, may utilize fill, pursuant to a floodplain development permit issued under Sec. 3.22, Floodplain Development Permit, in the floodway fringe, non-encroachment area fringe, or Areas of Shallow Flooding (Zone AO) if the Floodplain Administrator determines that:

Flood Hazard Areas as nearly perpendicular to the stream as possible. Such facilities may run within and parallel to the stream if no other access to the property is feasible.

- b. Intakes, docks, piers, utilities (including water and wastewater treatment, stormwater control and sedimentation and erosion control facilities), bridges, other public facilities and water-dependent structures.
- c. Other encroachments authorized by FEMA.

D. Development Requiring Governing Body Approval

1. Fill or Development in the Floodway Fringe or Non-Encroachment Area Fringe

Fill or development (e.g., parking or floodproofing or elevation by design) in the floodway fringe, non-encroachment area fringe, or Areas of Shallow Flooding (Zone AO) that is not authorized above is not permitted unless it is in support of otherwise permissible uses and authorized by a major special use permit issued under Sec. 3.9, Special Use Permit, and provided that the appropriate governing body finds that:

- a. The proposed fill or development provides for a better balance between overall efficiency of the site design, and improved conservation elsewhere on the site than would be possible without intrusion into the floodway fringe, non-encroachment area fringe, or Areas of Shallow Flooding (Zone AO); and
- b. The proposed fill or development represents the minimum amount of floodway fringe, non-encroachment area fringe, or Areas of Shallow Flooding (Zone AO) intrusion to achieve this better balance.

Commentary: Intrusion within the floodway fringe or non-encroachment area fringe may allow preservation of other significant resources on the site, and the governing body is empowered to review the balancing of these two concepts.

- E. No credit shall be allowed for land in the floodway or non-encroachment area, except in the RR District where 100% density credit may be given for land in the floodway or non-encroachment area in Conservation Subdivisions pursuant to Sec 6.2.4, Conservation Subdivision.
- F. The amount of land in the floodway fringe or non-encroachment area fringe may be credited for residential density on adjacent land in the same development at a rate of 50% of that allowed by the zoning, except in the RR District where 100% density credit may be given for land in the floodway fringe or non-encroachment area fringe in Conservation Subdivisions pursuant to Sec 6.2.4, Conservation Subdivision.

Sec. 8.5 Stream Buffer Protection Standards

8.5.1 Purpose

The primary purpose of the stream buffer protection standards is to maintain land adjacent to streams in a vegetated state in order to enhance and maintain water quality, protect stream channel wetlands, minimize stormwater runoff, reduce sedimentation and erosion, conserve plant and wildlife habitat and protect wildlife movement corridors.

Commentary: Note that streams may have additional stream buffer requirements in accordance with Sec. 8.7, Watershed Protection Overlay Standards, Section 401 Water Quality Certification administered by the North Carolina Division of Water Quality, and related requirements within the jurisdiction of the US Environmental Protection Agency and US Army Corps of Engineers.

8.5.2 Types of Stream Buffers

- A. The stream buffer protection standards shall apply to intermittent streams, perennial streams, and naturally occurring ponds and lakes. Stream buffers shall be clearly indicated on all development plans, site plans, preliminary plats and final plats.
- B. Where maps show a difference in stream type for a particular reach of stream, the map that shows the greater level of stream protection shall apply.
- C. Relief from buffer requirements in the Neuse River Basin may be allowed when surface waters are not present in accordance with the provisions of 15A NCAC 02B.0233(3)(a) as determined by the North Carolina Department of Environment and Natural Resources (NCDENR). The City Public Works Director, County Engineer, or designees, as appropriate, may allow relief from buffer requirements outside the Neuse River Basin pursuant to the applicable City or County standards and procedures.

8.5.3 Pond Removal

Commentary: Note that ponds that appear on USGS or NRCS maps may be wetlands and may require approval from the North Carolina Department of Environment and Natural Resources and the US Army Corps of Engineers prior to being drained.

If a property owner or applicant proposes to remove a pond and such removal is approved by the City Public Works Director, County Engineer, or designees, a stream buffer of the size required on the stream immediately downstream of the pond shall be maintained along the portion of the stream located where the pond is to be removed.

8.5.4 Stream Buffer Size

Stream buffers shall apply on each side of the stream and shall begin at the most landward limit of the top of the bank perpendicular to the direction of stream flow.

Stream buffers for both intermittent and perennial streams shall be a minimum of 50 feet in width.

8.5.5 Stream Buffer Use Limitations

- A. Land within the stream buffer shall not serve to meet minimum lot size requirements, except in the Rural Tier and on property zoned RR or RS-20, in the Suburban Tier, where at least 50% of the required lot area is outside the stream buffer.
- B. Buildings and other features that require grading and construction shall be set back at least ten feet from the edge of the stream buffer.
- C. To avoid a loss of effectiveness in protecting streams, the stream buffer shall remain in natural undisturbed vegetation in the Suburban and Rural Tiers, except as provided by this section or allowed pursuant to a variance approved by the Board of Adjustment in accordance with Sec. 3.15, Variances. Except in the Neuse Basin, where the 30 feet closest to the stream shall remain in undisturbed vegetation, clearing and revegetating stream buffers in the Suburban and Rural Tiers for the purposes of improving pollutant removal efficiency may be permitted based upon a conclusive finding by the Development Review Board that such efficiency will be improved.
- D. Except in the Neuse Basin, where the 30 feet closest to the stream shall remain in undisturbed vegetation, stream buffers within the Urban, Compact Neighborhood, and Downtown Tiers may be landscaped rather than left in an undisturbed state, at the discretion of the property-owner in accordance with an approved revegetation plan.
- E. Any use allowed by this section shall be designed and constructed to minimize the amount of intrusion into the stream buffer and to minimize clearing, grading, erosion and water quality degradation.
- F. Crossings by streets, driveways, railroads, recreational features, intakes, docks, utilities, bridges or other facilities shall be allowed provided that they are designed to minimize the amount of intrusion into the stream buffer. Such facilities may run generally within and parallel to the stream buffer only where no alternative location is practical and when their design minimizes the amount of intrusion of the stream buffer.
- G. Stormwater control structures and temporary erosion control structures shall be considered utilities for the purposes of this section and may be allowed in stream buffers, provided that:
 - 1. The property owner or applicant demonstrates to the satisfaction of the City Public Works Director or County Engineer, or their designees, as appropriate, that such facilities cannot be practicably located outside of the stream buffer, and that any proposed stormwater control structure is sited and designed to minimize disturbance of the stream and stream buffer. Siting stormwater control structures away from the stream channel shall be considered preferable to siting such structures in the stream channel;
 - 2. Alternate methods of stormwater and erosion control shall be considered prior to approval of such structures in the stream buffers; and

B. Intermittent Streams

Except in the Rural Tier, intermittent streams may be piped, thereby exempting the piped section of the stream from stream buffer requirements, only when the Development Review Board, or, for projects that do not require a site plan by any other provision of this ordinance, the City Public Works Director or County Engineer, or their designee, as appropriate, determines that:

1. The site plan proposing intermittent stream piping includes features on the site, such as best management practices, that provide water quality benefits at least equal to those of the stream buffer; and
2. The proposed intermittent stream piping is not substantially in conflict with the other objectives of this section.

C. Where stream piping is approved, a vegetated buffer area or other device approved by the City Public Works Director or County Engineer, or their designee, as appropriate, shall be provided at any intake structure. All buffers and physical improvements related to the stream piping shall be located entirely on the site or on easements adjacent to the site.

8.5.7 Density Credits

No credit shall be allowed for land within stream buffers, except in the RR District, where density credits may be given for stream buffers in conservation subdivisions pursuant to Sec. 6.2.4, Conservation Subdivision.

Sec. 8.6 Water Supply Reservoir Buffer

8.6.1 Reservoir Buffer Standards

- A. A reservoir buffer shall be maintained from the normal pool of all water supply reservoirs as shown in the table below, except that the buffer around any reservoir shall not apply to land that does not naturally drain to that reservoir.

Reservoir	Buffer Width
Lake Michie	250 feet
Little River Reservoir	250 feet
Jordan Reservoir	250 feet ¹
Falls Reservoir	250 feet ¹

¹ On nonresidential uses, the buffer width shall extend to 1,000 feet in accordance with Sec. 4.11.4, Nonresidential Land Use Restrictions.

- B. Reservoir buffers shall remain in natural undisturbed vegetation, except for intrusions allowed pursuant to Sec. 8.5.5, Stream Buffer Use Limitations.

8.6.2 Buffer Reductions

- A. At the request of a property owner, the governing body may reduce the reservoir buffer requirements through the issuance of a Major Special Use Permit, pursuant to Sec. 3.9, Special Use Permit, whenever it determines that:
1. The reservoir buffer would result in exceptional hardship, depriving the property owner of all reasonable use of the property.
 2. The proposed intrusion into the reservoir buffer is the minimum amount necessary to relieve that exceptional hardship.
- B. In making its determination, the governing body shall consider topography, erosion potential, and the size of the parcel, in addition to the review factors specified in Sec. 3.9.8, Criteria for Approval or Major and Minor Special Use Permits.

Sec. 8.7 Watershed Protection Overlay Standards

8.7.1 Applicability

The watershed protection overlay standards of this section shall apply to the Watershed Protection Overlay as set forth in Sec. 4.11, Watershed Protection Overlay.

8.7.2 General Requirements

A. Minimum Lot Size

1. In all Watershed Protection Overlays, except F/J-B and E-B, the minimum lot sizes indicated in the following table shall be applied in all new subdivisions unless the subdivision uses the cluster provision in accordance with Sec. 6.7, Cluster Subdivision, or the conservation subdivision provisions of Sec. 6.2.4, Conservation Subdivision.

Overlay	Minimum Lot Size	
	Rural Tier	Suburban Tier
M/LR-A	3 acres	20,000 square feet
M/LR-B	3 acres	20,000 square feet
F/J-A	3 acres	1 acre
E-A	Not Applicable	20,000 square feet

2. In the F/J-B and E-B overlays, developers of single-family subdivisions shall comply with the requirements of the underlying zoning district.

B. Impervious Surface Limits

1. Any development in a Watershed Protection Overlay shall be subject to limits on the amount of impervious surfaces permitted in accordance with the following table. Development plans, site plans, preliminary plats, and final plats shall clearly identify the amount of existing and proposed impervious surfaces.

Overlay	Low Density Option	High Density Option
	Impervious Surface Limit	Impervious Surface Limit
M/LR-A	6%	Not permitted
M/LR-B	6%	Not permitted
F/J-A	Within one-half mile of the normal pool: 6%; Between one-half and one mile from the normal pool: 9%	Not permitted in the Rural Tier. 40%, for all areas not in the Rural Tier and for those uses allowed in Sec. 4.11.4; Nonresidential Land Use Restrictions, intensities greater than 25% shall require a Major Special Use Permit pursuant to Sec. 3.9, Special Use Permit.
F/J-B, E-B	24%	70%
E-A	24%	Not permitted

2. The impervious surface limit provisions of this section may be exceeded through an impervious surface credit transfer. Credit for the impervious surfaces allowed on one or more parcels (“donor parcels”) may be transferred to non-contiguous parcels (“receiving parcels”), such that the amount of impervious surface available for a development project would be the total of

what is normally allowed on the receiving parcel plus what is transferred from the donor parcel(s). Impervious surface credit transfer is subject to the following provisions:

- a.** The donor parcel and receiving parcel shall be located within the same water supply watershed.
- b.** The impervious surface credit transfer shall not be from a donor parcel in Area B to any receiving parcel in Area A.
- c.** The portion of the donor parcel which is restricted from development as part of the impervious surface credit transfer shall remain in a vegetated or natural state or used for crop production or pasture provided that best management practices (BMPs) as developed by the Soil and Water Conservation District are utilized. The portion of the donor site restricted from development shall be protected from all future development through use of a permanent conservation easement in favor of either:
 - (1) Durham County or the City of Durham; or
 - (2) A land trust or similar conservation-oriented non-profit organization with legal authority to accept such easements (the organization shall be bona fide and in perpetual existence and the conveyance instruments shall contain an appropriate provision for retransfer to the County or City, as appropriate, in the event the organization becomes unable to carry out its functions). If the entity accepting the easement is not the County or City, then a third right of enforcement favoring the County or City, as appropriate, shall be included in the easement.
- d.** The impervious surface credit transfer shall be reviewed and approved through use of the site plan process pursuant to Sec. 3.7, Site Plan Review.
- e.** The donor parcel shall be deemed appropriate for acceptance by the County or City, as appropriate, under the Durham County Review Criteria for Acceptance of Conservation Easements for Impervious Surface Transfer.

C. Stormwater Control Requirements

Where development proposes intensity greater than the maximum authorized by the Low Density Option, engineered stormwater controls shall be used to control stormwater runoff from the first inch of rainfall in order to meet water quality concerns.

D. Ownership, Design and Maintenance of Engineered Stormwater Controls

- 1.** Unless otherwise approved, ownership of the engineered stormwater controls shall remain with the property owner or a property owner's association, which shall be responsible for the continued care and maintenance of such controls.
- 2.** Engineered stormwater controls shall be designed and constructed in accordance with standards and specifications established by the City Public Works Director or County Engineer, or their designees, as appropriate.
- 3.** Except as allowed in (c.) below, no building permit shall be issued for a site proposed for development, until:

- a.** The City Public Works Director or County Engineer, or their designees, as appropriate, has approved plans and specifications for the proposed engineered stormwater controls and the property owner has entered into an Agreement and Covenants or Operation and Maintenance Agreement with the City or County, as appropriate, in accordance with the terms established by either the City Public Works Director or County Engineer, or their designees, as appropriate; and
- b.** The property owner has posted a performance bond, other surety instrument, or other payment satisfactory to the City or County, as appropriate, in an amount determined by the City Public Works Director or County Engineer, or their designees, as appropriate to assure construction, maintenance, repair, and/or reconstruction necessary for adequate performance of the engineered stormwater controls.
- c.** For office, institutional, commercial, industrial and multi-family projects, building permits may be issued but construction drawing approval or water or sewer permit approval shall be withheld until compliance with paragraph a and b above.

The Agreement and Covenants or Operation and Maintenance Agreement required under paragraph a. above may be required prior to site plan or preliminary plat approval.

- 4.** No certificate of compliance shall be issued for any structure constructed within a site proposed for development, other than as allowed below, until the City Public Works Director or County Engineer, or their designees, as appropriate, has approved construction of the engineered stormwater controls and after review and approval of submitted “as-built” drawings. Notwithstanding this requirement, the Stormwater Division of the City may allow for delay in approval of construction of stormwater controls and submission and approval of as-built drawings for single family housing, duplexes, and townhouses) and other developments requiring multiple certificates of occupancy in accordance with adopted policies of the City.

E. Stream Buffers

Stream buffers subject to the use limitations of Sec. 8.5.5, Stream Buffer Use Limitations, shall apply to all perennial and intermittent streams as defined in Sec. 8.5.2, Types of Stream Buffers, in a Watershed Protection Overlay, with the width of the buffer measured from the top of stream bank perpendicular to the direction of flow as set forth below:

Overlay	Perennial Stream Buffer Width	Intermittent Stream Buffer Width
M/LR-A	150 feet	50 feet
M/LR-B	150 feet	50 feet
F/J-A	150 feet	100 feet
F/J-B, E-B	100 feet	50 feet High Density Option 100 feet
E-A	150 feet	50 feet

F. Wastewater Treatment and Facilities

1. Wastewater Treatment

Except as indicated below, wastewater treatment facilities shall be prohibited in all Watershed Protection Overlays.

- a.** Individual on-site ground absorption systems shall be permitted, subject to the approval of the Durham County Health Department or the State of North Carolina, as applicable.
- b.** A spray irrigation wastewater treatment system to serve a single-family house shall be permitted, provided that:
 - (1) The owner enters into a written agreement with the Durham County Health Department which:
 - (a) Provides for Health Department access to the property for the purpose of monitoring the system during its construction and operation; and
 - (b) Provides that the owner and certified operator shall provide to the Health Department copies of any and all applications, plans, permits, reports and any other documents concerning but not limited to the permitting, system, design, construction, operation, monitoring or repair of the system.
 - (2) The owner shall not act as the certified operator for a spray irrigation system to be installed on his or her property.
- c.** Publicly-owned wastewater treatment facilities, and replacement and expansions of such facilities, shall be allowed in F/J-B and E-B overlays.
- d.** Wastewater treatment facilities may be permitted in the F/J-A overlay through the issuance of a Major Special Use Permit pursuant to Sec. 3.9, Special Use Permit, subject to the restrictions described in Sec. 12.7, Water and Sanitary Sewer Systems.

2. Sanitary Sewer Services

- a.** Except in the Rural Tier, public and private sanitary sewer lines, force mains, and pump stations shall be permitted within all Watershed Protection Overlays. Public and private pump stations shall be equipped with the following safety features:
 - (1) Battery-backed alarm systems activated by pump failure or power outage, connected by an automatic dialer to a 24-hour maintenance service approved by the City Public Works Director or County Engineer, or their designees, as appropriate.
 - (2) Provision for connection of a portable generator. The City Public Works Director or County Engineer, or their designees, as appropriate, may require the pump station to be equipped with on-site, stand-by power.
- b.** Within the Rural Tier, new public or private sanitary sewer lines or outfalls, including necessary force mains and pump stations, may be

permitted within the Watershed Protection Overlays subject to City Council or Board of Commissioners approval, as appropriate:

- (1) To serve an existing use or structure for which a health hazard has been documented by the County Health Department or the State of North Carolina; or
 - (2) If associated with a wastewater treatment facility permitted pursuant to paragraph 1, Wastewater Treatment, above.
- c.** In considering such extensions, all reasonable alternatives shall be considered prior to a decision to extend the sewer services. All service connections, installed in accordance with the North Carolina Plumbing Code, shall be permitted only in accordance with Article III, Water and Sewer Main Extensions*, of Chapter 70, Utilities*, of the Durham City Code.

G. Hazardous and Nuclear Materials

- 1.** Prior to site plan approval, an Emergency Contingency Plan shall be prepared and submitted through the Planning Department to the Durham County Fire Marshall and the Environmental Resources Director for review and approval. The Emergency Contingency Plan shall be prepared in accordance with the requirements in the Superfund Amendments and Reauthorization Act (SARA), Title III and shall be updated annually. In addition, the Emergency Contingency Plan shall include:
 - a.** A site plan showing buildings and the locations of points of storage, transfer and use of nuclear and hazardous materials;
 - b.** A list of nuclear and hazardous materials kept on-site in any quantities;
 - c.** The location of spill control valves on any bridges and causeways; and
 - d.** The person responsible for on-site spill control and containment, and the appropriate means of contacting that person on a 24-hour basis.
- 2.** Any container or tank used to store hazardous materials shall be equipped with leak detection devices and shall be double-walled or have other secondary containment features.
- 3.** Points of storage, transfer and use of substantial quantities of hazardous materials shall be protected by a dike or comparable containment structure, constructed of a material resistant to hazardous material the dike or structure is designed to contain. The dike or structure shall be sized to handle at least the maximum amount of material to be stored or used and shall be constructed and installed in a manner to exclude rainwater and stormwater runoff.
- 4.** All floor drains that could collect hazardous materials shall be connected to a corrosion resistant tank or catch basin sized to handle the maximum amount of hazardous material to be stored or used. These floor drains shall not be open to the site's natural drainage system and discharges to the site's storm drainage system or to adjacent surface waters shall be prohibited.
- 5.** Points of storage, transfer and use of hazardous or nuclear materials shall have roof coverage.

8.7.3 Exceptions

All development within Watershed Protection Overlays shall be subject to the restrictions in this section, with the following exceptions:

A. Existing Development

For the purposes of this section, existing development shall be considered to include any impervious surfaces constructed before January 1, 1994. All new uses and activities and all expansions of previously-existing uses and activities shall conform to Sec. 4.11.4, Nonresidential Land Use Restrictions and Sec. 8.7.2, General Requirements.

B. Existing Single-Family Lots

New construction and additions to existing residential buildings on single-family residential lots recorded prior to January 1, 1994 shall be constructed in accordance with the watershed protection regulations, if any, in effect at the time the lot was created.

C. Stormwater Control Exemptions

Proposed development projects not in the Rural Tier, and in F/J-B or E-B overlays involving less than one acre cumulatively, of land disturbing activity shall be exempt from the stormwater control requirements indicated in this Section.

8.7.4 High Density Option Approval

Any development utilizing the High Density Option within the F/J-A overlay shall require site plan approval by the appropriate governing body.

8.7.5 Changes to Tier Boundaries

Neither the City nor the County shall extend the Urban or Suburban Tier boundaries further into the M/LR-A or F/J-A overlays.

Sec. 8.8 Steep Slope Protection Standards

8.8.1 Purpose

The primary purpose for the slope protection standards is to minimize grading, land instability and the removal of vegetation in order to:

- A. Protect the quality of wetlands and water courses below the slope from increased sedimentation;
- B. Protect steep slope plant and animal habitat from disturbance and development; and
- C. Preserve the aesthetic quality of the natural terrain.

8.8.2 Exception – Sedimentation and Erosion Control

Notwithstanding the requirements of this section, steep slopes for purposes of sedimentation and erosion control are defined in Sec.12.10.4B, Stabilization of Disturbed Land, and regulated under Sec. 3.8, Sedimentation and Erosion Control, and Sec. 12.10, Sedimentation and Erosion Control.

8.8.3 Steep Slope Areas

- A. Slope is the relationship of vertical rise to horizontal run, expressed as a percentage. Steep slope areas shall be defined as land areas that:
 - 1. Have a grade of 25% or more;
 - 2. Have an area of 5,000 square feet or greater; and
 - 3. Are located within 200 feet of any floodway fringe or perennial stream or within 100 feet of an intermittent stream.
- B. Steep slope areas refer to natural grades and shall not include man-made grades. Slope calculations shall use the smallest contour interval for which maps are available. Steep slope areas shall be determined irrespective of tract boundaries.
- C. Steep slope areas shall be clearly indicated on all site plans, development plans, preliminary plats and final plats. When a property owner or developer believes that the presence or location of a steep slope area is different than what is shown on the appropriate topographic map, the Development Review Board shall have the authority to determine the location or presence of the moderate or steep slope area for purposes of meeting the requirements of this section.

8.8.4 Steep Slope Development Limitations

Development and land disturbing activity on steep slope areas shall be conducted only in accordance with the following requirements. Compliance with these requirements shall be determined by the approving authority.

- A. Development shall be designed and constructed in order to minimize disturbance to the natural landform as much as possible. Development shall demonstrate appropriate terrain-adaptive design and construction techniques. An inability to design a particular development allowed by the underlying zone without significant disturbance to the natural landform may indicate that the site should not accommodate the full amount of proposed development. Alternate site design and construction measures shall be encouraged to mitigate the effects of development on

steep slopes. The grade of reconstructed slopes shall not exceed 50%. Non-load bearing retaining walls shall be encouraged in order to reduce the amount of disturbance to the natural slope.

- B. In order to accommodate building placement on steep slope areas, street and side yard setbacks on lots on the interior of the development may be reduced by up to 50% by the Development Review Board.
- C. On any tract proposed for construction, no more than 15% of the steep slope area on the tract shall be graded. For purposes of this calculation, the land areas of individual steep slope areas on the tract shall be added together to establish the total steep slope area for the tract.
- D. Development shall be designed and arranged in order to minimize the impact of street construction on steep slope areas. Proposed right-of-way for major thoroughfares, minor thoroughfares and collector streets shall be exempt from the steep slope area grading limits of this section, provided that the Development Review Board determines that proposed rights-of-way are designed and arranged in order to minimize the impact on steep slope areas.

8.8.5 Density Credits

The amount of land designated as steep slopes may be credited for residential density on adjacent land in the same development at a rate of 15% of that allowed by the zoning.

Sec. 8.9 Wetlands Protection Standards

8.9.1 Purpose

The primary purpose of the wetlands protection standards is to conserve and maintain natural wetlands in an undisturbed vegetated state in order to provide storage of stormwater runoff, minimize degradation of preserved wetlands from the impacts of adjacent development, improve water quality and preserve plant and wildlife habitat.

8.9.2 Application of Wetlands Protection

The City and County acknowledge the pre-eminence of the Federal and State governments with regard to the identification and regulation of wetlands. Accordingly, the standards contained within this section shall not duplicate the requirements of the US Army Corps of Engineers (the Corps) or the North Carolina Department of Environment and Natural Resources (DENR), Division of Water Quality (DWQ), but shall require the buffering of wetland areas, identified by these agencies, on development plans, site plans, preliminary plats, and final plats.

8.9.3 Exemptions from Wetland Buffer Requirements

- A. The wetland buffer shall not apply to any wetland approved for dredging or filling under a Section 404 Permit issued by the Corps or a Section 401 Water Quality Certification issued by the DWQ.
- B. The wetland buffer shall not apply to wetland areas associated with man-made ponds or man-made drainage ditches.
- C. The wetland buffer shall not apply to any retained wetland area less than one acre in size.

8.9.4 Wetland Buffer Width

- A. The wetland buffer shall be provided along the perimeter boundary of the wetland area and shall be at least 25 feet in width.
- B. The approving authority may reduce the wetland buffer to as little as ten feet in width, provided it determines that the proposed development includes site features or will employ construction management techniques to provide at least a comparable level of protection for the wetland area. Such site features and construction management techniques shall include but not be limited to additional grass or revegetated buffers, double silt fencing, diversion ditches with temporary slope drains and application of sod on any slope adjacent to wetlands.

8.9.5 Wetland Buffers Use Limitations

Wetland buffers shall remain in natural undisturbed vegetation, except as provided below.

- A. Crossings by streets, driveways, culverts, railroads, recreational features, intakes, docks, utilities, bridges or other facilities shall be allowed. Stormwater control facilities and wetlands constructed for mitigation purposes shall be allowed in wetland buffers.

- B.** Wetland buffers may be used for passive recreational activities, such as walking and bicycling trails, provided that service facilities for such activities, including but not limited to parking, picnicking and sanitary facilities, are located outside of the wetland buffer. Water-oriented recreational facilities, such as boat or fishing piers located within wetland buffer areas, shall require a use permit from the Board of Adjustment pursuant to Sec. 3.8, Sedimentation and Erosion Control.
- C.** Land within the wetland buffer shall not serve to meet minimum lot size requirements except in the Rural Tier and on properties zoned RR or RS-20, in the Suburban Tier, where at least 50% of the lot is outside of the wetland buffer or wetland.
- D.** Any use allowed by this section shall be designed and constructed to minimize the amount of intrusion into the wetland buffer and to minimize clearing, grading, erosion and water quality degradation.

Sec. 8.10 Durham Inventory Site Protection Standards

Sites listed in the Durham County Inventory of Important Natural Areas, Plants and Wildlife, which in the case of a conflict may be superseded or supplemented by more current information from the North Carolina Heritage Program as determined by the Planning Director, are protected through a series of development standards, including, but not limited to:

- A. Site plan review procedure in Sec. 3.7;
- B. Special use permits in Sec. 3.9;
- C. Conservation subdivisions in Sec. 6.2.4;
- D. Open space in Sec. 7.2; and
- E. Tree protection and tree coverage in Sec. 8.3.

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