ATTACHMENT A-1

TOWN OF CARRBORO

NORTH CAROLINA

TRANSMITTAL **PLANNING DEPARTMENT**

DELIVERED VIA: ☒ *HAND* ☐ *MAIL* ☐ *FAX* ☐ *EMAIL*

To: **Steve Stewart, Town Manager**
Mayor and Board of Aldermen

From: **Randy Dodd, Environmental Planner**
Patricia McGuire, Planning Administrator

Date: **October 1, 2008**

Subject: **Update to Land Use Ordinance Water Quality Buffer Provisions**

Background and Summary

Carrboro has included provisions in the Land Use Ordinance (LUO) for stream buffers since 1983. These provisions have been updated principally in response to watershed protection regulations for University Lake and planning activities for the Northern Study Area. In 2004, staff initiated an evaluation of stream buffer requirements in conjunction with an update of geographic information due to the availability of updated orthophotographs and planimetric data. When the comprehensive update of the Land Use Ordinance project was scoped out in early 2005, the objectives of the stream buffer update expanded to include: enhancing water quality protection; improving consistency for stream buffer and floodplain requirements across the different areas of the Town's planning jurisdiction; clarifying definitions and regulations for all affected and interested parties; and preparing the Town for implementation of new rules for Jordan Lake. Staff have completed a comprehensive review of the existing stream buffer requirements for three hydrojurisdictional areas: Sections 15-265 (University Lake (UL) watershed), 15-268 (area outside of the UL watershed), and 15-269 (Northern Transition Area). Staff has also: evaluated the existing requirements, particularly any difficulties in enforcement or inconsistency in interpretation that has occurred over time; developed staff consensus on recommended changes to the ordinance through a series of meetings and prepared a draft ordinance that includes these changes; reviewed buffer provisions in draft Jordan Lake rules, insuring that draft changes are in compliance with these rules; and updated the Town's geographic information system's (GIS) representation of surface waters through the creation of

new GIS data. This report provides a summary of staff findings associated with the proposed changes.

Information

Since 1983, stream buffer provisions have been updated several times in response to increased awareness and concern for stream and watershed protection. In 1988, new buffer requirements were included for the University Lake watershed as part of a watershed based strategy to protect the local drinking water supply. In 1999 (as revised in 2002), new buffer requirements were adopted as part of implementation of plans for the Northern Study Area. The major features of stream buffer requirements are summarized in Table 1.

Figure 1: Areas with Different Stream Buffer Requirements in Carrboro

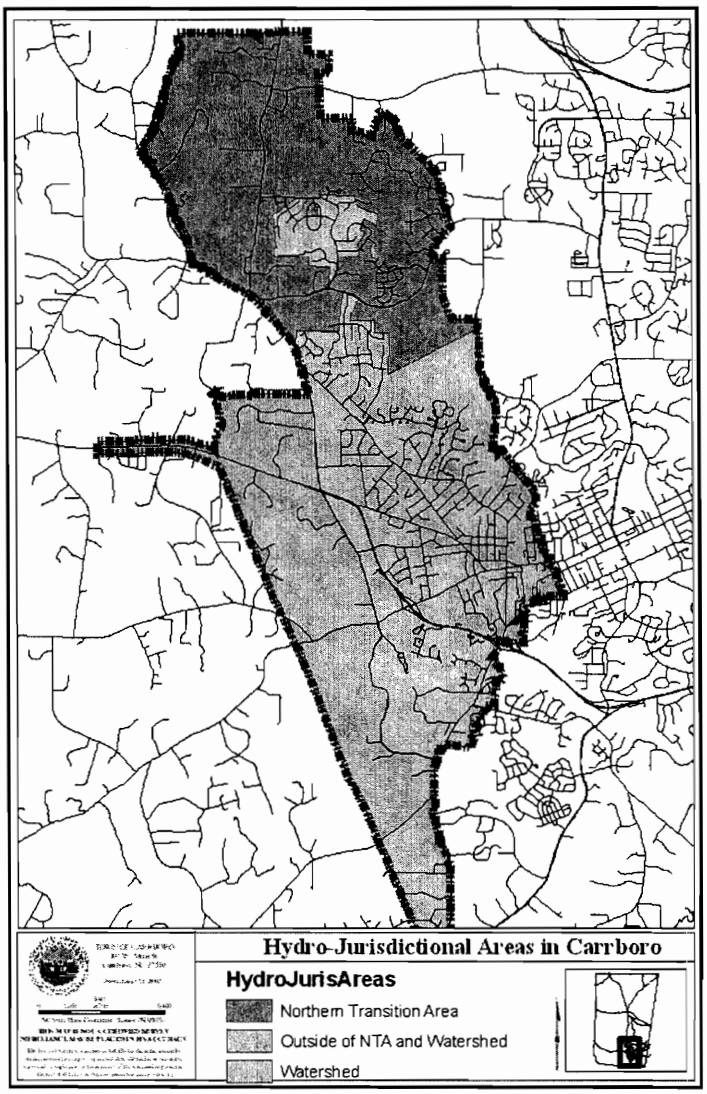

Table 1: Summary of Current Land Use Ordinance Stream Buffer Provisions

LUO Section	Area and Date Adopted	Stream type	Buffer width
15-265	University Lake Watershed (1983)	Perennial stream	50 feet + slope adjustment*
		Intermittent streams flowing into tributaries	50 feet**
		Intermittent streams flowing directly into lake	100 feet**
15-268	Outside of University Lake Watershed (1988)	50-640 acres drainage area	50 feet***
		< 50 acres drainage area	15 feet***
15-269	Northern Transition Area (1999/2002)	Perennial stream	100 feet + slope adjustment*
		Intermittent Stream	60 feet**
		Minor Intermittent Stream	30 feet **

*Measured from edge of floodplain, if defined, or center of stream if no floodplain defined
**Measured from center of stream
***Or 5 times stream width, measured from stream bank, whichever is greater. Desired to represent 100 year floodplain; allowances for site specific studies to match floodplain

The staff evaluation of ordinance provisions has yielded a number of observations, which lead to a recommendation that the Town update the LUO buffer provisions. These observations are described below:

1. The existing buffer requirements:

    a. have differing widths and stream definitions for the different hydro-jurisdictional areas;
    b. have been motivated by both water quality and flood protection; there is therefore an opportunity to more clearly separate and define provisions specific to flooding and water quality (this has, in part, been addressed in updated flood hazard provisions adopted in January 2007). Pursuing this course should aid in staff's ability to articulate the provisions to landowners, developers, advisory boards, and other interested parties, and to implement these provisions in the review of applications for land use permits;
    c. have not been updated to incorporate "the state of the art" in water quality buffers to better address considerations such as diffuse flow, zonation, and comprehensive consideration of appropriate allowable and prohibited activities in the buffer;
    d. have technical implementation challenges such as mapping and measuring the slope based buffer width distances;
    e. will not comply with anticipated new rules for Jordan Lake.

2. The Town has entered into a partnership with Chapel Hill, the State, and the EPA through the Bolin Creek Watershed Restoration Team (BCWRT) to restore Bolin Creek to a healthier aquatic ecosystem. This commitment warrants vigilance and continued review

by the Town of all relevant LUO provisions to pursue this goal, within the framework of all the Town's policies and plans.

3. As part of the consideration of revised water quality buffer provisions and in consideration of improving GIS data, an opportunity exists to study the conformity to both current and potential new buffer requirements. GIS data now allow staff to quickly and more accurately assess the degree to which buildings (many of which were sited before buffer provisions were adopted) conflict or potentially conflict with either existing or revised buffer geometry. This analysis has helped both understand the existing situation as well as inform recommendations for changes to buffer widths.

Draft Ordinance

As a result of a comprehensive technical and policy review of the Town's buffer provisions and the anticipated Jordan Lake rules, staff has drafted new ordinance provisions that represent a "watershed" overhaul of the Town's approach to buffers. A brief summary of revised ordinance sections is provided below.

15-270: Findings and Purpose: This new section would clearly articulate the purpose of the buffers to protect water quality

15-270.1: Definitions: This new section clearly defines important concepts and terminology

15-270.2: Required Buffers: This section would replace Sections 15-258 and 15-269 and dissolve differences in definition of streams to be buffered between the Northern Transition Area, the University Lake watershed, and the remainder of the Town's jurisdiction. Specific provisions would include detailed definition of State and Town protected streams to provide improved clarity and consistency with established State regulations. Buffers would be required for all streams draining greater than 5 acres. The provisions would also anticipate adoption of Jordan Lake rules, and provide allowances for exemptions based on onsite studies and established uses.

15-270.3: Width of buffers: This section defines two buffer zones, a streamside zone and a stable vegetated zone farther from the stream. It further defines widths for the total buffer and for both of these zones, which vary depending on the stream type. The absence of Zone 1 for ephemeral streams recognizes that ephemeral streams do not support aquatic life and do not require the amount of protection that intermittent and perennial streams require. The presence of Zone 2 in these locations recognizes the value of vegetated areas for reducing nutrient and other pollutant loading in receiving surface waters along even those small stream channels that only carry water in response to storm events.

Table 1: Recommend Minimum Buffer Width (*)

Waterbody type	Zone 1 width		Zone 2 width		Total width	
	Watershed	Outside of Watershed	Watershed	Outside of Watershed	Watershed	Outside of Watershed
Perennial Streams, Ponds, Lakes, Reservoirs	100'	50'	--	50'	100'	100'
Intermittent Streams	60'	30'	--	30'	60'	60'
Ephemeral Streams	--	--	30'	15'	30'	15'

* "Watershed" means within the University Lake Watershed, and "Outside of watershed" means the remainder of the Town's planning jurisdiction. For streams, the width indicated is in one direction from the stream channel; the total width is therefore twice the width indicated.

Slope Adjustment:

The ordinance has included a slope adjustment for the NTA and watershed historically to increase the buffer width for areas with steeper slopes. Staff recommend discontinuing this adjustment because: 1) the slope adjustment encourages runoff to enter the buffer and flow down steep slopes and, in the process, reconcentrate and cause gullying and channelization within the buffer. Staff believe the intent of the slope adjustment can be better achieved via the diffuse flow requirement presented in 253.4; 2) staff have also reviewed water quality buffer width requirements in other jurisdictions and find the recommended buffer widths to be adequate and in fact wider than generally recommended without a slope adjustment; 3) the slope adjustment is not conducive to GIS mapping, and is also time intensive, and therefore costly, to implement in the preparation of site plans and in the field.

15-270.4. Diffuse Flow Requirement: This section provides a key upgrade to buffer requirements by requiring diffuse flow through the buffer. Where flow concentrates into rills, ditches, and gullies through buffers, the buffers have little ability to serve a water quality improvement function, as the buffers are effectively short circuited. The drafted provision will prohibit such concentration of flow.

15-270.5 Table of Activities: This section, based on a table of uses included within the draft rules for protection of water quality in Jordan Lake, goes into substantial detail regarding specific activities within buffers that are allowed, allowed assuming no practical alternatives exist, and allowed with mitigation. It should be noted that each of these categories assumes that any activity not listed is prohibited. This table is intended to clarify for staff, property owners, developers, and other interested parties what is and is not allowed within stream buffers.

15-270.6, 15-270.7 Determination of No Practical Alternatives, Mitigation: These sections detail how persons who wish to undertake activities defined in 15-270.5 can pursue approval.

15-253.8 Variances. This section refers to the Town's procedures for obtaining variances.

15-253.9: Requirements Specific to Forest Harvesting. This section provides details for forestry operations.

Procedures – Next Steps

Amendments to the text of the Land Use Ordinance must be referred to the Planning Board and Orange County for review, and the Board of Aldermen must receive public comment prior to taking action on the changes. Due to the provisions associated with permissible activities in stream buffers, and other provisions, the Board of Aldermen may wish to also refer the draft ordinance to the Transportation Advisory Board, Recreation and Parks Commission, Greenways Commission, Environmental Advisory Board, and the Northern Transition Area Advisory Committee.

Since the draft ordinance includes proposed changes to the University Lake watershed regulations, review by the Division of Water Quality/Environmental Management Commission is also required. Staff has been in communication with DWQ staff and expressed our intention to convey the draft ordinance following the initial review by the Board of Aldermen.

In addition to these procedural requirements, staff also recommends that the draft ordinance be forwarded to local utilities (i.e. OWASA, Piedmont Electric, Duke Energy, and Public Service Gas) due to the permissible use provisions included within Section 15-270.5 of the draft ordinance.

Staff Recommendation

Staff recommends that the Board of Aldermen accept this report, and review the draft ordinance, Staff will follow up and recommend a public hearing date for this ordinance in upcoming weeks.

PART II. STORM WATER MANAGEMENT

Section 15-261 Natural Drainage System Utilized to Extent Feasible (REWRITTEN 6/27/07).

(a) To the extent practicable, all development shall conform to the natural contours of the land and natural drainage ways shall remain undisturbed.

(b) To the extent practicable, lot boundaries shall be made to coincide with natural drainage ways within subdivisions to avoid the creation of lots that can be built upon only by altering such natural drainage ways.

Section 15-262 Development Must Drain Properly. (REWRITTEN 6/27/07)

(a) All development shall be provided with a stormwater management system containing drainage facilities that are adequately designed and constructed to prevent the undue retention of surface water on the development site. Surface water shall not be regarded as unduly retained if:

(1) The retention results from a technique, practice or device deliberately installed as part of an approved sedimentation or stormwater management plan, or

(2) The retention is not substantially different in location or degree than that experienced by the development site in its pre-development stage, unless such retention presents a danger to health or safety.

(b) No surface water may be channeled or directed into the OWASA sanitary sewer system.

(c) Whenever practicable, the drainage system of a development shall coordinate with the drainage system or drainage ways on surrounding properties or streets.

(d) Use of drainage swales rather than curb and gutter and storm sewers in subdivisions is provided for in Section 15-216. Private roads and access ways within unsubdivided developments shall utilize curb and gutter and storm drains to provide adequate drainage if the grade of such roads or access ways is too steep to provide drainage in another manner or if other sufficient reasons exist to require such construction.

(e) The minimum design storm frequency for all drainage systems shall be the 10 year storm, except that those facilities crossing streets shall be designed for the 25 year storm.

(f) Drainage culverts and associated facilities shall be suitably sized to accommodate designated storm frequencies and shall be suitably constructed and installed to insure that the

facilities will function adequately and will not deteriorate within an unreasonably short period of time. **(AMENDED 04/03/90)**

Section 15-263 Management of Stormwater (REWRITTEN 6/26/07; AMENDED 6/24/08)

(a) The requirements of this section shall apply to all development that involves the disturbance of at least 5,000 square feet of land area, subject to the following:

(1) For purposes of this section, the term "disturbance" means that the land surface is altered in some substantial way. By way of illustration without limitation, land disturbance occurs whenever the ground surface is altered by grading, clearing, adding or enlarging a structure to cover an area not previously covered, or otherwise altering it to make it less pervious. Adding new pavement to a previously unpaved surface, or the reconstruction of a previously paved area shall be considered disturbance, but repairing or resurfacing a previously paved surface shall not.

(2) Single-family and two-family residential development activities that involve the disturbance of less than 7,500 square feet of land area shall be exempt from the provisions of this section.

(3) When land is subdivided, then the amount of land disturbance attributable to such subdivision (for purposes of determining whether the requirements of this section apply) shall include not only the disturbance of land authorized by the permit or plat approval that authorizes the creation of the subdivision, but also the disturbance of land resulting from the reasonably expected development of any lot that is less than five acres in size within such subdivision.

(b) When land is subdivided, then the stormwater management system that is installed to comply with the provisions of this section shall be required to take into account not only the stormwater runoff from the subdivision if the lots so created remained undeveloped, but also the reasonably expected (according to generally accepted engineering standards) stormwater runoff from the development of all lots that are less than five acres in size within such subdivisions. When such lots are subsequently developed, they shall be exempt from further review under the provisions of this section. However, lots within such subdivisions that are five acres or more in size and that were not included in the stormwater calculations for purposes of designing a stormwater management system that satisfies the requirements of this section shall be required to comply with the requirements of this section when such lots are developed.

(c) Developments must install and maintain stormwater management systems that will control and treat runoff from the first one inch of rain as follows:

(1) Draw down the treatment volume no faster than 48 hours, but no slower than 120 hours.

(2) Achieve an eighty-five percent (85%) average annual removal rate for Total Suspended Solids.

(c1) To the extent reasonably practicable, the stormwater management systems designed and constructed to satisfy the requirements of this section shall utilize best management practices that reduce nutrient loadings. **(AMENDED 6/24/08)**

(d) Developments shall be constructed and maintained so that their stormwater management systems meet the following minimum standards:

(1) The post-development discharge rates shall be less than or equal to the pre-development discharge rates for the 1-, 2-, 5-, 10-, and 25-year 24-hour design storms.

(2) For upstream properties, the 1% chance flood elevation may not be increased.

(e) The presumption established by this section is that, to satisfy the standards set forth herein, the applicant shall design and construct all stormwater management systems required by this section in accordance with the guidelines set forth in the Town of Carrboro Storm Drainage Design Manual (Appendix I to this chapter). However, the permit issuing authority may establish different requirements when it concludes, based upon (i) the information it receives in the consideration of the specific development proposal, and (ii) the recommendations of the public works director or the town engineer, that such deviations from the presumptive guidelines are necessary to satisfy the standards set forth in this section, or that the standards can still be met with such deviations and the deviations are otherwise warranted.

(f) Approval by the town of an applicant's stormwater management plans, and construction by the applicant of the stormwater management systems as shown in such plans, shall not relieve the applicant of the responsibility of complying with the standards set forth in this section. If at any time prior to two years following the issuance of a certificate of occupancy, for an unsubdivided development, or the approval of a final plat, for a subdivision, the town determines that the stormwater management systems planned to be installed or actually installed to meet the requirements of this section do not achieve that objective, the town may require the submission of revised plans and the installation of new, altered, or additional facilities to bring the development into compliance. Prior to issuance of a certificate of occupancy or approval of a final plat, the town may require the applicant to post a performance bond or other sufficient surety to guarantee compliance with this section.

(g) Upon completion of construction of the stormwater management facilities, the permit recipient shall submit to the town "as built" plans for all such facilities in the form required by the town. Compliance with this requirement must occur prior to issuance of a certificate of occupancy, or prior to final plat approval (if applicable), unless adequate security is otherwise provided in accordance with the provisions of Sections 15-53 or 15-60.

Section 15-263.1 Maintenance of Structural BMPs.

(a) For purposes of this section, a "structural BMP" is a device constructed or installed to trap, settle out, or filter pollutants from stormwater runoff or to reduce stormwater discharge volume or velocity in order to satisfy one or more of the requirements of Section 15-263.

(b) The owner of each structural BMP installed pursuant to this ordinance shall maintain and operate it so as to preserve and continue its function in controlling stormwater quality and quantity at the degree or amount of function for which the structural BMP was designed. Such operation and maintenance shall be in accordance with the Operation and Maintenance Agreement specified in subsection (e) of this section.

(c) The owner of each structural BMP shall ensure that each such facility is inspected in accordance with the Operation and Maintenance Agreement specified in subsection (e) of this section by a qualified registered North Carolina professional or other individual specially qualified by an appropriate training, testing, and certification program. The person performing the inspections shall submit annually to the administrator a report certifying the results of such inspections. The report shall be in a format and shall contain the information prescribed by the administrator. The first report shall be due one year from the date of the as built certification required by Subsection 15-263(i), and subsequent reports shall be due on or before that anniversary date.

(d) The owner of each structural BMP shall ensure that, in accordance with the Operation and Maintenance Agreement, funds are set aside in an escrow account, sinking fund, or other arrangement, sufficient to pay major, non-routine costs associated with keeping such BMPs in proper operational condition, such as the cost of sediment removal, structural, biological, or vegetative replacement, major repair, or reconstruction. The owner shall submit annually to the administrator a report certifying that such funds have been set aside. The report shall be in a format and shall contain the information prescribed by the administrator. The first report shall be due one year from the date of the as-built certification required by Subsection 15-263(i), and subsequent reports shall be due on or before that anniversary date.

(e) Prior to final plat approval, in the case of a subdivision, or prior to the issuance of a certificate of occupancy, in the case of an unsubdivided development, the owner of a development that contains a structural BMP shall enter into an Operation and Maintenance Agreement with the town (and shall record such agreement in the Orange County Registry) that specifies that the owner, and his or her successor and assigns:

(1) Agrees to comply with the obligations set forth in subsections (b), (c), and (d) of this section;

(2) Authorizes the town and its employees or agents to enter the property where the structural BMPs are located at reasonable times to inspect the same for

compliance with the requirements of this section, the permit issued pursuant thereto, and the provisions of the Operation and Maintenance Agreement;

(3) Agrees that, if the owner fails to operate and maintain such structural BMPs in accordance with the requirements of this section, the permit issued pursuant thereto, and the provisions of the Operation and Maintenance Agreement, the town is authorized (but not obligated) to enter the property to perform such work as is necessary to bring such BMPs into compliance and to charge the owner with the costs of such work.

(f) If structural BMPs are to be owned by a property owners or homeowners association or similar entity, then the covenants applicable to such association shall clearly reference the obligations of the association, as owner of such BMPs, to fulfill the obligations of the owner relating to such BMPs as required by the provisions of this section, the permit issued pursuant thereto, and the provisions of the Operation and Maintenance Agreement.

Section 15-264 Sedimentation and Erosion Control.

(a) No zoning, special use, or conditional use permit may be issued and final plat approval for subdivisions may not be given with respect to any development that would cause land disturbing activity subject to the jurisdiction of the Orange County Erosion Control Officer or the North Carolina Sedimentation Control Commission unless such officer or agency has certified to the town; either that:

(1) Any permit required by such officer or agency has been issued or any erosion control plan required by such officer or agency has been approved; or

(2) Such officer or agency has examined the preliminary plans for the development and it reasonably appears that any required permit or erosion control plan can be approved upon submission by the developer of more detailed construction or design drawings. However, in this case, construction of the development may not begin (and no building permits may be issued) until such officer or agency issues any required permit or approves any required erosion control plan.

(b) For purposes of this section, "land disturbing activity" means any use of the land by any person in residential, industrial, educational, institutional or commercial development, highway and road construction and maintenance that results in a change in the natural cover or topography and that may cause or contribute to sedimentation. Sedimentation occurs whenever solid particulate matter, mineral or organic, is transported by water, air, gravity, or ice from the site of its origin.

(c) The Orange County Erosion Control Officer is authorized by resolution of the Carrboro Board of Aldermen to enforce within the town the Orange County Soil Erosion and Sedimentation Control Ordinance. **(AMENDED 12/7/83)**

(d) **(REPEALED 12/7/83)**

Section 15-265 Designated Buffer Areas in Watershed (AMENDED 12/7/83)

(a) The Board finds that:

(1) Soil and pollutants carried overland, primarily from roads, trails, and land disturbing activities, can be effectively trapped by leaving a relatively undisturbed strip of vegetation parallel and adjacent to the watercourse.

(2) Properly managed overland water flow can be directed into this buffer area in a manner that will reduce velocity and cause dispersion of the water.

(3) Sediments and associated pollutants carried by the water will settle out as a result of this slowing and dispersion process.

(b) Developments on lots within the C, WR, B-5, or WM-3 zoning districts shall, if any of the watercourses identified in this subsection are located in whole or in part within the lots so developed, contain a designated buffer area adjacent to such watercourse. The buffer area boundaries shall be demarcated by a line connecting the points on either side of a watercourse located as follows: **(AMENDED 05/15/90)**

(1) **Creeks and tributaries** (i.e., permanent streams flowing directly into University Lake and permanent streams flowing into such streams). Measure along a line running perpendicular to the edge of the floodplain (or if no floodplain has been demarcated, the center of the stream) fifty feet from the edge of the floodplain (or if no flood plain has been demarcated, from the edge of the water) plus an additional distance equal to:

$$4 \times \text{slope} \times 100$$

where "slope" is expressed as a percentage derived by dividing by 100 the rise of elevation between the floodplain boundary line (or if no floodplain has been demarcated, the edge of the water) and a point one hundred feet from that point along the above-described perpendicular line.

(2) **Intermittent streams flowing into creeks and tributaries.** Measure along a line running perpendicular to the centerline of the intermittent stream fifty feet from such stream centerline.

(3) **Intermittent streams flowing directly into University Lake.** Measure along a line running perpendicular to the centerline of the intermittent stream one hundred feet from such stream centerline.

(4) **Intermittent streams flowing into streams which flow directly into University Lake.** Measure along a line running perpendicular to the centerline of the intermittent stream fifty feet from such stream centerline.

(5) **University Lake.** Measure along a line running perpendicular to the high water mark or floodplain boundary (whichever is farther from the Lake) one hundred feet from such high water mark or floodplain boundary (whichever is farther from the Lake) plus an additional distance equal to:

4 x slope x 100

where "slope" is expressed as a percentage derived by dividing by 100 the rise in elevation between the high water line of the Lake and a point one hundred feet from that point along the above described perpendicular line.

(c) Subject to subsection (e), the existing natural vegetation in a designated buffer area shall not be disturbed in any way that would reduce the buffer area's effectiveness in achieving the objectives set forth in subsection (a). In addition, buffer areas from which the vegetative cover has been removed shall be planted or otherwise provided with ground cover, devices, or structures sufficient to allow the buffer area to accomplish the objectives set forth in subsection (a). **(AMENDED 11/11/86)**

(d) Notwithstanding the remaining provisions of this article, whenever a floodplain lies between a watercourse and a designated buffer area or within a designated buffer area, the floodplain shall be considered a part of the buffer area for purposes of the development restrictions set forth in subsection (c).

(e) Notwithstanding the foregoing provisions, the permit issuing authority may authorize the crossing of a designated buffer area by a street, bikeway, sidewalk, water or sewer line or pump station, or water dependent structure under the circumstances specified in Subsection 15-184(g) or (h). **(AMENDED 12/14/93)**

Section 15-266 Impervious Surface Limitations (AMENDED 12/7/83; 05/15/90)

(a) Within a B-5 or WM-3 zoning district (the total area of which comprises less than one percent of the are of the University Lake Watershed and all of which is located more than one-half mile from the normal pool elevation of University Lake), not more than twenty-four percent (24%) of the land on any lot may be covered by an impervious surface such as a street, drive, sidewalk, parking lot, building, or other roofed structure, etc. In the event that the area of impervious surface is greater than six percent (6%) of the total lot, stormwater management techniques must be employed that would retain the first one inch of rainfall running off of all impervious surfaces on a lot. A registered engineer must certify that the stormwater techniques

used will accomplish this objective before a permit is issued, and it shall be a continuing condition of the permit that the owner provide necessary maintenance so that the stormwater retention techniques continue to function effectively. Such stormwater retention techniques shall be subject to inspection by the Town at least annually. In granting the conditional use permit authorizing such facilities, the Board shall require the developer to post a cash bond or other sufficient security to guarantee that the developer or his successor shall adequately maintain such stormwater retention facilities so that such facilities will continue to operate as intended. **(AMENDED 07/06/93; 10/15/96)**

(b) Subject to subsections (c) and (d), within a C or WR zoning district the maximum impervious surface coverage permissible on any lot shall be as shown in the following Table of Impervious Surface Calculations, which establishes a sliding scale of permissible impervious surface coverage based on lot size. For purposes of applying the table, lot sizes shall be rounded to the nearest tenth of an acre. Lot sizes of less than 0.5 acres may not exceed 4200 square feet of impervious surface, and lot sizes in excess of five acres may not exceed an impervious surface area equal to 4% of the lot size. For purposes of this subsection, impervious surface includes but is not limited to areas such as a street, driveway, sidewalk, parking lot, building, or other roofed or paved structure.

LOT SIZE		IMPERVIOUS SURFACE	
ACRES	SQUARE FOOTAGE	SQUARE FOOTAGE	PERCENTAGE
0.5	21,780	4,200	19.28
0.6	26,136	4,300	16.45
0.7	30,492	4,400	14.43
0.8	34,848	4,500	12.91
0.9	39,204	4,600	11.73
1.0	43,560	4,700	10.79
1.1	47,916	4,800	10.02
1.2	52,272	4,900	9.37
1.3	56,628	5,000	8.83
1.4	60,984	5,100	8.36
1.5	65,340	5,200	7.96
1.6	69,696	5,300	7.60
1.7	74,052	5,400	7.29
1.8	78,408	5,500	7.04
1.9	82,764	5,600	6.77
2.0	87,120	5,700	6.54
2.1	91,476	5,800	6.34
2.2	95,832	5,900	6.16.
2.3	100,188	6,000	5.99
2.4	104,544	6,100	5.83
2.5	108,900	6,200	5.69
2.6	113,256	6,300	5.56
2.7	117,612	6,400	5.44
2.8	121,968	6,500	5.33
2.9	126,324	6,600	5.22
3.0	130,680	6,700	5.13
3.1	135,036	6,800	5.04
3.2	139,392	6,900	4.95
3.3	143,748	7,000	4.87
3.4	148,104	7,100	4.79
3.5	152,460	7,200	4.72
3.6	156,816	7,300	4.66
3.7	161,172	7,400	4.59
3.8	165,528	7,500	4.53
3.9	169,884	7,600	4.47
4.0	174,240	7,700	4.42
4.1	178,596	7,800	4.37
4.2	182,954	7,900	4.32
4.3	187,308	8,000	4.27
4.4	191,664	8,100	4.23
4.5	196,020	8,200	4.18
4.6	200,376	8,300	4.14
4.7	204,732	8,400	4.10
4.8	209,088	8,500	4.07
4.9	213,244	8,600	4.03
5.0	217,800	8,712	4.00

(c) If a tract is subdivided, then impervious surface shall be calculated as follows:

(1) The area of each lot shown on a proposed final plat shall be calculated. For purposes of this calculation, all street right-of-way created as part of the subdivision shall be allocated to the adjoining lots by extending lot lines. If lots are created on either side of a proposed street, lot lines shall be extended to the centerline of the right-of-way.

(2) Maximum impervious surface area for each lot shall be determined in accordance with subsections (a) or (b).

(3) The sum total of impervious surface area permissible on the entire tract shall be determined by adding together the impervious surface area available to each lot as determined under subsections (a) or (b).

(4) The impervious surface area within streets and other areas, (such as common areas) outside of individual lot boundaries shall be subtracted from the total area calculated pursuant to subsection (3).

(5) Following the calculation set forth in subsection (4), the remaining permissible impervious surface area shall be allocated by the subdivide to each lot, subject to the applicable limitations set forth in this section, and subject to the further limitation that, with respect to a cluster subdivision, in no case may the overall impervious surface area allocation for the subdivided tract exceed 4% of the area of that tract. For purposes of this calculation, the area of each lot shall exclude street right-of-way. The allocation assigned to each lot shall be indicated on the face of the subdivision final plat, and purchasers of each lot shall be bound by such allocation.

(d) If a development is completed in phases or stages, the percentage restrictions set forth in this section shall apply to each separate phase or stage.

(e) All development within the JLWP that requires a sedimentation and erosion control plan under 15A NCAC 4 or the Orange County Sedimentation and Erosion Control Ordinance shall be subject to the following requirements:

(1) Density and built-upon area shall be limited as follows:

a. For single family residential subdivisions, minimum lot sizes of 20,000 square feet or maximum of two dwelling units per acre; or

b. Twenty-four percent built-upon area for all other residential and non-residential development; or

c. Three dwelling units per acre or thirty-six percent built-upon area for properties without curb and gutter systems.

(2) Stormwater runoff from such developments shall be transported by vegetated conveyances to the maximum extent practicable. **(AMENDED 10/15/96)**

(f) For purposes of this section, the term "built-upon area" means that portion of a development project that is covered by impervious or partially impervious cover, including buildings, pavement, gravel areas (e.g. roads, parking lots, paths), recreation facilities (e.g. tennis courts), etc. Wooden slatted decks and the water area of a swimming pool are considered pervious. **(AMENDED 10/15/96)**

Section 15-267 Additional Development Standards Within C and WR District. (AMENDED 11/11/86; 05/15/90)

(a) Buildings and other impervious surfaces within the C and WR zoning districts shall be located, to the extent reasonably possible, so as to *(i)* take full advantage of the assimilative capacity of the land and *(ii)* avoid areas described in subsection 15-198(e) and (f). **(AMENDED 09/05/95).**

(b) To avoid the creation of lots that will be difficult to build upon in a manner that complies with the standard set forth in subsection (a) and the impervious surface limitations set forth in Section 15-266, preliminary and final plats for the subdivision of land within the C and WR zoning districts shall show buildable area and approximate driveway locations for all lots within such subdivision. Thereafter, no zoning permit may be issued for construction of buildings or driveways outside the buildable areas so designated on the final plat unless the zoning administrator makes a written finding that the proposed location complies with the provisions of subsection (a) of this section as well as section 15-266.

Section 15-268 Protective Buffers Along Streams Outside of the Water Supply Watershed (AMENDED 12/06/88)

(a) All streams located outside of the University Lake Watershed and designated in paragraphs (b) and (c) of this section shall have a naturally vegetated, undisturbed protective buffer maintained along them. The purpose of these protective stream buffers is to minimize the likelihood for nuisance flooding by encouraging the location of structures outside of areas likely to experience flooding during large storms, as well as to promote the infiltration of stormwater into the ground and help maintain local streams' capacity for carrying off storm water.

(b) Streams located outside of the University Lake Watershed, with drainage areas smaller than one square mile (640 acres) in area, and where there are no mapped regulatory floodplains, but larger than 50 acres in area shall have a natural protective buffer width of fifty (50) feet or five times the average width of the stream as it flows through the property in question, whichever is larger, maintained on each side of the stream perpendicular to the stream channel, and

measured perpendicular to the stream channel from the edge of the stream bank. With the exception of uses permitted by the provisions of subsections (f) and (g) of this section, this protective buffer shall be kept in its natural, undisturbed state, and is not permitted to be cleared.

(c) Streams located outside of the University Lake Watershed, with drainage areas smaller than 50 acres in size shall have a natural protective buffer width of fifteen (15) feet or five times the average width of the stream as it flows through the property in question, whichever is larger, maintained on each side of the stream perpendicular to the stream channel, and measured perpendicular to the stream channel from the edge of the stream bank. With the exception of uses permitted by the provisions of subsections (f) and (g) of this section, this protective buffer shall be kept in its natural, undisturbed state, and is not permitted to be cleared.

(d) Where a property owner is not satisfied that the presumptive standard stream buffer width described in subsections (b) or (c) of this section is a reasonably accurate description of the average 100-year floodplain width along the stream through such person's property, such person may initiate a Flood Modeling Study to better determine the location of the 100-year floodplain boundaries. Such a study shall demonstrate through modeling of the drainage basin in which the subject property is located, a more precise location of the floodplain. Such a study shall:

(1) Be prepared by or under the direct supervision of a professional engineer registered in the state of North Carolina, operating within his or her area of competence, and contain the engineer's professional seal and signature; and

(2) Utilize the computer model known as HEC-II, which is used by the Army Corps of Engineers in its floodplain modeling, to define the 100-year flood elevations and the width of the floodplain; and

(3) Be based on future land use and impervious surfaces at build out conditions as predicted by the zoning in place in the drainage basins in question, and utilize as additional inputs to the model any additional information that the Land Use Administrator and Town Engineer may require; and

(4) Reflect current town requirements for drainage and stormwater management; and

(5) Provide 100-year flood elevations at each point where the stream crosses the boundary of the subject property, at points where the stream is directed into culverts or under bridges, and at intervals of 200 feet along the course of the stream within the property between these points.

When a determination is made by the town that the Floodplain Modeling Study is complete, accurate, and in an acceptable form, the 100-year floodplain area so modeled shall stand as the required protective buffer area, and development shall be limited pursuant to the provisions of this section only within those areas described by the Study as within the 100-year floodplain. Notwithstanding the foregoing, structures erected in conformity with the buffer requirements set forth in subsections (b) and (c) shall not be regarded as nonconforming if the buffer established

pursuant to a modeling effort is more extensive than the buffer otherwise established by subsection (b) and (c).

(e) Within the required protective buffer area described in subsections (a), (b), and (c) above, no clearing or grading shall be permitted other than that associated with ordinary maintenance of existing vegetation, the development of uses as described in subsections (f) and (g) below, or the addition of new vegetation consistent with the purposes described in subsection (a).

(f) The following uses are permissible in required protective buffer areas along streams outside of the University Lake Watershed, pursuant to a permit issued for a use permissible in the underlying zone as described in Section 15-146 of this Ordinance, to the extent that they are designed in a manner which minimizes intrusion into the required protective buffer area: streets, driveways, bridges, culverts, utility lines and supporting facilities, railway lines, storm drainage improvements and facilities, stream obstruction removal, sewer and water supply facilities, recreation and other similar public, community, or utility uses.

(g) Because it is not the intent of this section to render undevelopable lots of record on the effective date of this section, intrusions into the protective buffer are permitted in the event that a lot of record would otherwise be made undevelopable by the provisions of this section, to the extent necessary for the lot in question to be developed as permitted by the underlying zoning designation and in such a manner as to minimize the disruption of the protective buffer.

(h) Subsequent to December 06, 1988, no new lot may be created through a major or minor subdivision process that would be undevelopable under the provisions of this section because of the amount or dimensions of protective buffer land included in it, unless such lot has already been developed, or it plainly appears that such lot is intended to be devoted to permanent open space use.

(i) Where the natural vegetation in the protective buffer area has been disturbed by the development of any of the uses permitted in (f) and (g) above, or is otherwise disturbed accidentally during development activities, it shall be replanted with appropriate vegetation in order to re-stabilize the area in question.

(j) Areas set aside as protective stream buffers as required by this subsection may be counted towards required open space as set out in Sections 15-186, 15-187, and 15-198, so long as they are left in their natural and undisturbed state, are unencumbered with any of the permitted uses outlined in (f) and (g), above, and meet all of the other criteria required of "usable" open space as set out in the above-referenced sections.

(k) Nothing in this section shall prevent a single family residence (including a mobile home) from being located within the required protective stream buffer areas if such home *(i)* replaces a home that had been located within such buffer within six months prior to the effective date of this section and is located on the same location as the previous home, or *(ii)* is located on a mobile home pad or foundation that was in existence on the effective date of this section.

Section 15-269 Buffers in Northern Transition Area (AMENDED 05/25/99; 11/19/02)

(a) The Board finds that:

1. Soil and pollutants carried overland, primarily from roads, trails and land disturbing activities, can be effectively trapped by leaving a relatively undisturbed strip of vegetation parallel and adjacent to the watercourse.

2. Properly managed overland water flow can be directed into this buffer in a manner that will reduce velocity and cause dispersion of the water.

3. Sediments and associated pollutants carried by the water will settle out as a result of this slowing and dispersion process.

(b) For purposes of this section, the term "Northern Transition Area" shall mean not only the Transition Area portion of the Carrboro Joint Development Area as identified in the Joint Planning Agreement, but also any properties that were within this Transition Area as of September 1, 2002 but that are effectively removed from the Transition Area Classification by being annexed into the Town of Carrboro on or after September 1, 2002.

(c) Notwithstanding the foregoing, these requirements shall not apply to projects with active land use permits issued prior to the effective date of this section.

(d) Development on lots within the Northern Transition Area shall, if any of the watercourses identified below are located in whole or in part within the lots so developed, contain a designated buffer area adjacent to such watercourses. The buffer area boundaries shall be demarcated by a line connecting the points on either side of the watercourse located as follows:

1. Bolin Creek and Tributaries (permanent streams flowing into Bolin Creek) measure along a line running perpendicular to the edges of the floodplain (or if no floodplain has been demarcated, the center of the stream) one hundred (100) feet from the edge of the floodplain (or if no floodplain has been demarcated, from the edge of the water) plus an additional distance equal to

   4 x slope x 100

   where slope is expressed as a percentage derived from dividing by 100 the rise of elevation between the floodplain boundary line (or if no floodplain has been demarcated, the edge of the water) and a point one hundred (100) feet from that point along the perpendicular line described above. **(AMENDED 1/16/07).**

2. Intermittent streams flowing into Bolin Creek and its tributaries measure along a line running perpendicular to and sixty (60) feet from the center of the intermittent stream. **(AMENDED 1/16/07).**

3. Minor intermittent stream measure along a line running perpendicular to and thirty (30) feet from the center of the minor intermittent stream. **(AMENDED 1/16/07).**

(e) Subject to subsection (e), the existing natural vegetation in a buffer area designated in accordance with this section shall not be disturbed in any way that would reduce the buffer area's effectiveness in achieving the objectives set forth in subsection (a). In addition, buffer areas from which the vegetative cover does not exist, has been removed, or is inadequate shall be planted or otherwise provided with vegetative cover or devices, sufficient to allow the buffer area to accomplish the objectives set forth in subsection.

(f) Notwithstanding the foregoing provisions, the permit issuing authority may authorize the crossing of a designated buffer area by a street, bikeway, sidewalk, water or sewer line or pump station under the circumstances specified in Subsection 15-184(g). In addition, the permit issuing authority may authorize sewer lines to be constructed within buffer areas designated under this section under circumstances where such location is practicably unavoidable if the subject property is to be served under the provisions of Section 15-238(c) and an alternate design would result in greater damage to the environment, so long as such sewer line is located to the extent practicable at least twenty-five feet from the edge of any stream bank.

AN ORDINANCE REVISING ARTICLE XVI OF THE CARRBORO LAND USE ORDINANCE DEALING WITH FLOOD DAMAGE PREVENTION, STORMWATER MANAGEMENT, AND WATERSHED PROTECTION

THE BOARD OF ALDERMEN OF THE TOWN OF CARRBORO ORDAINS:

Section 1. All references in this ordinance are to Chapter 15 of the Carrboro Town Code, the Carrboro Land Use Ordinance.

Section 2. Sections 15-265, 15-268, and 15-269 of Part II of Article XVI of the Carrboro Land Use Ordinance are repealed and the following provisions are adopted in lieu thereof:

ARTICLE XVI

FLOOD DAMAGE PREVENTION, STORMWATER MANAGEMENT, AND WATERSHED PROTECTION

PART III. WATER QUALITY BUFFERS

Section 15-270 Findings and Purpose

(a) The Board finds that:

(1) Soil and pollutants carried overland from upstream land uses can be effectively trapped by leaving a relatively undisturbed strip of vegetation parallel and adjacent to a drainage feature.

(2) Properly managed overland water flow can be directed into this water quality buffer area in a manner that will minimize the concentration of flow and promote diffuse flow and infiltration of the water.

(3) Sediments and other pollutants carried by water will be reduced as a result of the dispersion and infiltration of flow and associated filtering, absorption, and uptake of pollutants.

(b) The purpose of this part is to protect, preserve, and enhance water quality buffers in order to maintain their pollutant removal functions and protect the quality of surface waters and water supplies.

Section 15-270.1 Definitions

For purposes of this part, the following terms shall have the meaning indicated:

(a) 'Access Trails' means pedestrian trails constructed of pervious or impervious surfaces, and related structures to access a surface water including boardwalks, steps, rails, signage.

(b) Archaeological Activities' means activities conducted by a Registered Professional Archaeologist (RPA).

(c) 'Buffer' means a water quality buffer, or an undeveloped area parallel and adjacent to a drainage feature to protect and enhance water quality.

(d) 'DBH' means diameter at breast height of a tree measured at 4.5 feet above ground surface level.

(e) 'Diffuse flow' means flow that generally moves down-slope via sheet flow rather than concentrating in rills, gullies, and ditches and in doing so is able to infiltrate into the soil and plant root zone.

(f) 'Ditch' means a man-made channel other than one created in order to reroute a naturally occurring stream.

(g) 'Ephemeral stream' means a drainage feature that only carries surface runoff in direct response to precipitation. An ephemeral stream may or may not have a well-defined channel and the stream bed is always above the water table. An ephemeral stream lacks the biological, hydrological, and physical characteristics commonly associated with continuous or intermittent streams.

(h) 'Forest plantation' means an area of planted trees that may be conifers (pines) or hardwoods. On a plantation, the intended crop trees are planted rather than naturally regenerated from seed on the site, coppice (sprouting), or seed that is blown or carried into the site.

(i) 'Full Pond Elevation' means the elevation equal to the top of the flood-gates at gated impoundments and the top of the open spillway at impoundments that do not have gates.

(j) 'Greenway / Hiking Trails' means pedestrian and bicycle trails constructed of pervious or impervious surfaces and related structures including but not limited to boardwalks, steps, rails, and signage.

(k) 'High Value Tree' means a tree that meets or exceeds the following standards: for pine species, 14-inch DBH or greater or 18-inch or greater stump diameter; and, for hardwoods and wetland species, 16-inch DBH or greater or 24-inch or greater stump diameter.

(l) 'Intermittent stream' means a well-defined channel that contains water for only part of the year, typically during winter and spring when the aquatic bed is below the water table. The flow may be heavily supplemented by stormwater runoff. An intermittent stream often lacks the biological and hydrological characteristics commonly associated with the conveyance of water.

(m) 'Perennial stream' means a well-defined channel that contains water year round during a year of normal rainfall with the aquatic

bed located below the water table for most of the year. Groundwater is the primary source of water for a perennial stream, but it also carries stormwater runoff. A perennial stream exhibits the typical biological, hydrological, and physical characteristics commonly associated with the continuous conveyance of water.

(n) 'Riparian buffer enhancement' is defined as the process of converting a non-forested riparian area, where woody vegetation is sparse (greater than or equal to 100 trees per acre but less than 200 trees per acre) to a forested riparian buffer area. The enhanced, forested riparian buffer area shall include at least two native hardwood tree species planted at a density sufficient to provide 320 trees per acres at maturity, and diffuse flow through the riparian buffer shall be maintained.

(o) 'Riparian buffer restoration' is defined as the process of converting a non-forested riparian area, where woody vegetation is absent (less than 100 trees per acre) to a forested riparian buffer area. The restored, forested riparian buffer area shall include predominately native hardwood tree species planted at a density sufficient to provide 320 trees per acres at maturity, and diffuse flow through the riparian buffer shall be maintained.

(p) 'Shoreline stabilization' is the in-place stabilization of an eroding shoreline. Stabilization techniques which include "soft" methods or natural materials (such as root wads, or rock vanes) may be considered as part of a restoration design. However, stabilization techniques that consist primarily of "hard" engineering, such as concrete lined channels, rip rap, or gabions, while providing bank stabilization, shall not be considered stream restoration.

(q) "Stream' means a body of concentrated flowing water in a natural low area or natural channel on the land surface.

(r) 'Stream restoration' is defined as the process of converting an unstable, altered or degraded stream corridor, including adjacent riparian zone and flood-prone areas to its natural or referenced, stable conditions considering recent and future watershed conditions. This process also includes restoring the geomorphic dimension, pattern, and profile as well as biological and chemical integrity, including transport of water and sediment produced by the stream's watershed in order to achieve dynamic equilibrium. 'Referenced' or 'referenced reach' means a stable stream that is in dynamic equilibrium with its valley and contributing watershed. A reference reach can be used to develop natural channel design criteria for stream restoration projects. 'Stump diameter' means the diameter of a tree measured at six inches above the ground surface level.

(s) 'Surface waters' means any ephemeral, intermittent, or perennial stream, lake, pond, or reservoir.

(t) 'Temporary road' means a road constructed temporarily for equipment access to build or replace hydraulic conveyance structures or water dependent structures, or to maintain public traffic during construction.

(u) 'Tree' means a woody plant with a DBH equal to or exceeding five inches or a stump diameter exceeding six inches.

Section 15-270.2 Required Buffers

(a) Subject to the remaining provisions of this part, the water quality buffer areas described in this section are hereby designated as described below. The width of these buffers shall be as prescribed in Section 15-270.3. Disturbance of the area within these buffers is restricted or prohibited as provided in Section 15-270.5

(b) Buffers shall be established adjacent to all surface waters designated as such on either the most recent version of the soil survey map prepared by the Natural Resources Conservation Service of the United States Department of Agriculture, the most recent version of the 1:24,000 scale (7.5 minute) quadrangle topographic maps prepared by the United States Geologic Survey (USGS), or other more accurate mapping approved by the N.C. Environmental Management Commission.

(1) If surface water is not designated as such on any of the foregoing maps, then the buffer requirements of this article applicable to perennial streams, intermittent streams, lakes, or ponds shall not apply, but buffers applicable to ephemeral streams may apply.

(2) Where the specific initiation point of an intermittent stream is in question, a publication of the N.C. Division of Water Quality entitled Identification Methods for the Origins of Intermittent and Perennial Streams shall be used to establish that point.

(3) When a landowner or other affected party believes that surface waters shown on the above described maps have been inaccurately designated as perennial streams, intermittent stream, lakes or ponds, then such landowner or other affected party may have an on-site evaluation completed by a party who has successfully completed the NC Division of Water Quality *Surface Water Identification Training Certification* course, its successor, or other equivalent training curriculum approved by the Division, and submit the results of that evaluation to the town. The decision as to the type of surface water, if any, present on the site shall be made by the permit issuing authority when it makes a final decision on the issuance of the permit.

(c) Buffers shall also be established adjacent to all ephemeral streams that have a contributing drainage area that is at least five acres in size, as depicted in the Town's GIS database.

(1) When a landowner or other affected party believes that the designation of an area by the town as an ephemeral stream with a contributing drainage area of at least five acres is in error, such landowner or other affected party may request that Town staff perform an onsite visit and/or submit to the town data sufficient to make this case. Upon request, Town staff shall make a site visit and consider the information submitted by the landowner or other affected party as well as other relevant information.

(2) The decision as to the existence of an ephemeral stream with a contributing drainage area of at least five acres shall be made by the permit issuing authority when it makes a final decision on the issuance of the permit.

(d) The administrator may require that the precise location of any surface water be surveyed and accurately shown on development plans whenever necessary to ensure that a proposed development complies with the provisions of this article.

Section 15-270.3 Width of Buffers

(a) ZONES OF THE RIPARIAN BUFFER. The protected riparian buffer shall have two zones as follows:

(1) A streamside zone ("Zone 1') shall consist of an undisturbed area except as provided for in Section 15-270.5. The function of the streamside zone is to protect the physical and ecological integrity of the stream ecosystem, and filter runoff received from Zone 2. The desired vegetation for Zone 1 is mature forest. The location of Zone 1 shall be as follows:

a. Zone 1 shall begin at the most landward limit of the top of the bank. Where the location defining the top of bank cannot be readily determined, Zone 1 shall be measured from the center of the stream. Zone 1 shall extend landward on either side of the stream as indicated in Table 1, measured horizontally on a line perpendicular to a vertical line marking the origin of the buffer as defined above.

b. For ponds, lakes and reservoirs, Zone 1 shall begin at the most landward limit of the normal water level and extend landward as indicated in Table 1, measured horizontally on

a line perpendicular to a vertical line marking the edge of the surface water.

(2) Zone 2 shall consist of an undisturbed area except as provided for in Section 15-270.5. The functions of this zone are to: protect the streamside zone, to filter runoff from upland development, and deliver runoff to Zone 1 in a dispersed fashion. Grading and revegetating Zone 2 is allowed provided that the health of the vegetation in Zone 1 is not compromised. Zone 2 shall begin at the outer edge of Zone 1 and extend landward as indicated in Table 1 as measured horizontally on a line perpendicular to the surface water. The desired vegetation for this zone is mature native vegetation; forest cover is encouraged.

(3) The total buffer width shall be the sum of the widths of the two zones, as indicated in Table 1, and shall extend on all sides of the waterbody.

Table 1: Required Minimum Buffer Width (*)

Waterbody type	Zone 1 width		Zone 2 width		Total width	
	Watershed	Outside of Watershed	Watershed	Outside of Watershed	Watershed	Outside of Watershed
Perennial Streams, Ponds, Lakes, Reservoirs	100'	50'	--	50'	100'	100'
Intermittent Streams	60'	30'	--	30'	60'	60'
Ephemeral Streams	--	--	30'	15'	30'	15'

* "Watershed" means within the University Lake Watershed, and "Outside of watershed" means the remainder of the Town's planning jurisdiction. For streams, the width indicated is in one direction from the stream channel; the total width is therefore twice the width indicated.

(4) Notwithstanding the other provisions of this section, in no case shall the width of any buffer be less extensive than the special flood hazard area for the same stream, pond, or lake drainage feature designated in accordance with the provisions of Part I of this article.

Section 15-270.4 Diffuse Flow Requirement

To the extent practicable and in consideration especially of topography and existing uses, diffuse flow of runoff at non-erosive velocities shall be established before the runoff enters the buffer, and maintained in the buffer by dispersing runoff that has concentrated into rills, gullies, and ditches, and reestablishing vegetation where concentrated flow has displaced vegetation. Corrective action to restore diffuse flow shall be taken if necessary to impede the formation or expansion of erosion rills or gullies. Where site conditions constrain the ability to ensure diffuse flow through both Zones 1 and 2, emphasis will be placed on ensuring diffuse flow through Zone 1, as provided for in 15-270.3. No new engineered stormwater devices or conveyances are allowed in the buffers except as provided for in Section 15-270.5.

Section 15-270.5 Exempt and Allowable Activities

(a) The table set forth in subsection (c) below sets out the activities and their designation under this part as exempt, allowable, or allowable with mitigation, except as provided for in 15-270.2. All activities not designated as exempt, allowable, or allowable with mitigation are prohibited within the buffer unless a variance is granted pursuant to Section 15-270.8.

(b) Activities designated in the table below as exempt, allowable, and allowable with mitigation shall be subject to the following requirements. All activities shall be designed, constructed and maintained to minimize soil disturbance and to provide the maximum water quality treatment capacity of the buffer.

(1) Exempt. Activities designated as exempt are allowed within the buffer. In addition, exempt uses shall meet the requirements listed in the table and the accompanying notes for the specific use

(2) Allowable. Activities designated as allowable are permissible within the buffer provided that there are no practical alternatives to the requested use as determined in accordance with Section 15-270.6.

(3) Allowable With Mitigation. Activities designated as allowable with mitigation are permissible within the buffer provided that there are no practical alternatives to the requested use as determined in accordance with Section 15-270.6, and an appropriate mitigation strategy has been approved pursuant to Section 15-270.7.

(c) Table of Exempt and Allowable Activities in Water Quality Buffers

Activity	Exempt	Allowable	Allowable with Mitigation
Drainage, Stormwater, Erosion Control, and other Water-based activities			
Dam maintenance activities: • Dam maintenance activities that do not cause additional buffer disturbance beyond the footprint of the existing dam or those covered under the U.S. Army Corps of Engineers Nationwide Permit No. 3 • Dam maintenance activities that do cause additional buffer disturbance beyond the footprint of the existing dam or those not covered under the U.S. Army Corps of Engineers Nationwide Permit No. 3	X	X	
Drainage of a pond in a natural drainage way provided that a new buffer that meets the requirements of this Section is established adjacent to the new channel			X

Activity	Exempt	Allowable	Allowable with Mitigation
Drainage ditches, roadside ditches and stormwater conveyances through buffers: • New stormwater flows to existing drainage ditches, roadside ditches, and stormwater conveyances provided that flows do not alter or result in the need to alter the conveyance and are managed to minimize the sediment, nutrients and other pollution that conveyed.	X		
• Realignment of roadside drainage ditches retaining the design dimensions provided that no additional travel lanes are added and the minimum required roadway typical section is used based on traffic and safety considerations.		X	
• New or altered drainage ditches, roadside ditches and stormwater outfalls provided that a stormwater management facility is installed to manage water quality and quantity before the conveyance discharges through the buffer			X
• New drainage ditches, roadside ditches and stormwater conveyances that do not provide a stormwater management facility due to topography constraints provided that other practicable BMPs have been employed.		X	

Activity	Exempt	Allowable	Allowable with Mitigation
Ponds created by impounding streams and not used as stormwater BMPs: • New ponds in Zone 2 only provided that the diffuse flow requirements in 15-270.4 are established • All other new ponds		X	X
Scientific studies and stream gauging	X		
Stormwater BMPs: • Constructed wetlands in Zone 1, if not closer than 30' to surface waters • Wet detention, bioretention, and constructed wetlands in Zone 2 if diffuse flow of discharge is provided into Zone 1	X	X	
Stream relocation The alteration of location of the channel of an stream so long as the newly created buffer area provides equal or better runoff treatment capabilities than the buffer in its original location, subject to State and Federal requirements	X		
Stream restoration	X		
Stream bank stabilization	X		

Activity	Exempt	Allowable	Allowable with Mitigation
Temporary sediment and erosion control devices: • In Zone 2 only, devices that are greater than 50' from the most landward limit of the surface water provided that the vegetation in Zone 1 within that 50' is not compromised and that discharge is released as diffuse flow in accordance with Section 15-270.5 • In Zones 1 and 2, devices that are within 50' from the most landward limit of the drainage feature to control impacts associated with uses approved by the Town or that have received a variance provided that sediment and erosion control for upland areas is addressed to the maximum extent practical outside the buffer • In-stream temporary erosion and sediment control measures for work within a stream channel	X	X X	
Water dependent structures: • Water dependent structures as defined in 15A NCAC 02B .0202 where installation and use do not result in disturbance to riparian buffers • Water dependent structures as defined in 15A NCAC 02B .0202 where installation and use result in disturbance to riparian buffers	X	X	
Water wells • Single family residential water wells • All other water wells	X	X	

Activity	Exempt	Allowable	Allowable with Mitigation
Wetland, stream and buffer restoration that results in impacts to the riparian buffers: • Wetland, stream and buffer restoration that requires DWQ approval for the use of a 401 Water Quality Certification	X		
• Wetland, stream and buffer restoration that does not require DWQ approval for the use of a 401 Water Quality Certification		X	
Miscellaneous			
Archaeological activities	X		
Fences: • Fences provided that disturbance is minimized and installation does not result in removal of trees as defined in Section 15-316	X		
• Fences provided that disturbance is minimized and installation results in removal of trees as defined in Section 15-316		X	
Grading and revegetation in Zone 2 only provided that diffuse flow and the health of existing vegetation in Zone 1 is not compromised and disturbed areas are stabilized until they are revegetated	X		
Mining activities: • Mining activities that are covered by the Mining Act provided that new buffers that meet the requirements of this section are established adjacent to the relocated channels		X	
• Mining activities that are not covered by the Mining Act OR where new buffers that meet the requirements of this section are not established adjacent to the relocated channels			X
• Wastewater or mining dewatering wells with approved NPDES permit	X		
Preservation or maintenance of historic or cultural sites		X	

Activity	Exempt	Allowable	Allowable with Mitigation
Protection of existing structures, facilities and stream banks when this requires additional disturbance of the riparian buffer or the stream channel		X	
Removal of previous fill or debris provided that diffuse flow is maintained, a stabilizing ground cover sufficient to restrain erosion is established, and any woody vegetation removed is restored		X	
Recreation			
Access trails: Pedestrian access trails leading to the surface water, docks, fishing piers, boat ramps and other water dependent activities: • Pedestrian access trails that are restricted to the minimum width practicable and do not exceed 4 feet in width of buffer disturbance, and provided that installation and use does not result in removal of trees as defined in Section 15-316 and no impervious surface is added to the buffer • Pedestrian access trails that exceed 4 feet in width of buffer disturbance, the installation or use results in removal of trees as defined in this Section or impervious surface is added to the buffer	X	X	
Canoe Access provided that installation and use does not result in removal of trees as defined in Section 15-316 and no impervious surface is added to the buffer.	X		
Greenway / hiking trails[1] designed, constructed and maintained to maximize nutrient removal and erosion protection, minimize adverse effects on aquatic life and habitat, and protect water quality to the maximum extent practical		X	

[1] To the extent practicable, greenway easements shall be located a minimum of 10 feet from the top of bank; surfaces shall be a minimum of 15 feet from the top of bank

Activity	Exempt	Allowable	Allowable with Mitigation
Playground equipment: • Playground equipment on single family lots • Playground equipment installed on lands other than single-family	X	X	
Recreational and accessory structures • Gazebos and sheds in Zone 2, o Total footprint of less than 150 square feet per lot. o Total footprint of more than 150 square feet per lot. • Slatted decks and associated steps o Deck at least eight feet in height and no vegetation removed from Zone One. o Deck less than eight feet in height or vegetation removed from Zone One.		X X	 X X
Transportation			
Bridges		X	
Driveway crossings of streams and other surface waters subject to this Section: • Individual driveway crossings that disturb equal to or less than 25 linear feet or 2,500 square feet of buffer • Individual driveway crossings that disturb greater than 25 linear feet or 2,500 square feet of buffer • Multiple driveway crossings in any development that cumulatively disturbs equal to or less than 150 linear feet or one-third of an acre of buffer • Multiple driveway crossings in any development that cumulatively disturbs greater than 150 linear feet or one-third of an acre of buffer • Driveway impacts other than crossing of a stream or other surface waters subject to this Section	X	X X	 X X

Activity	Exempt	Allowable	Allowable with Mitigation
Railroad impacts other than crossings of streams and other surface waters subject to this Section.		X	
Railroad crossings of streams and other surface water drainage features subject to this Part: • Railroad crossings that impact equal to or less than 40 linear feet of riparian buffer • Railroad crossings that impact greater than 40 linear feet but equal to or less than 150 linear feet or one-third of an acre of riparian buffer • Railroad crossings that impact greater than 150 linear feet or one-third of an acre of riparian buffer	X	X	X
Road relocation: Relocation of existing private access roads associated with public road projects where necessary for public safety: • Less than or equal to 2,500 square feet of buffer impact • Greater than 2,500 square feet of buffer impact		X	X
Temporary roads, provided that restoration activities, such as soil stabilization and revegetation, occur immediately after construction: • Less than or equal to 2,500 square feet of buffer disturbance • Greater than 2,500 square feet of buffer	X	X	

Activity	Exempt	Allowable	Allowable with Mitigation
Transportation (vehicular, pedestrian, bike) crossings of streams and other surface waters subject to this Section: • Transportation crossings that impact equal to or less than 40 linear feet of riparian buffer • Transportation crossings that impact greater than 40 linear feet but equal to or less than 150 linear feet or one-third of an acre of riparian buffer • Transportation crossings that impact greater than 150 linear feet or one-third of an acre of riparian buffer	X	X	X
Transportation impacts other than crossings of streams and other surface waters subject to this Section			X
Vehicle access roads and boat ramps leading to the surface water, docks, fishing piers, and other water dependent activities: • Vehicular access roads and boat ramps to the surface water but not crossing the surface water that are restricted to the minimum width practicable not to exceed 10 feet in width • Vehicular access roads and boat ramps to the surface water but not crossing the surface water that are restricted to the minimum width practicable and exceed 10 feet in width		X	X
Utilities			
Electric utility, aerial, perpendicular crossings[2,3,4]: • Disturb equal to or less than 150 linear feet of buffer • Disturb greater than 150 linear feet of buffer	X	X	

[2] Provided that, in Zone One, all of the following BMPs for overhead utility lines are used. If all of these BMPs are not used, then the overhead utility lines shall require a no practical alternative evaluation by the Administrator as defined in Section 15-270.6.

Activity	Exempt	Allowable	Allowable with Mitigation
Electric utility, aerial, other than perpendicular crossings[3]: • Impacts in Zone Two • Impacts in Zone One[2,4]		X	X
Electric utility, underground, perpendicular crossings[3,4,5]: • Disturb less than or equal to 40 linear feet of buffer • Disturb greater than 40 linear feet of buffer	X	X	
Electric utility, underground, other than perpendicular crossings[3,5]: • Impacts in Zone Two • Impacts in Zone One[2]	X X		

• A minimum zone of 10 feet wide immediately adjacent to the water body shall be managed such that only vegetation that poses a hazard or has the potential to grow tall enough to interfere with the line is removed.
• Woody vegetation shall be cleared by hand. No land grubbing or grading is allowed.
• Vegetative root systems shall be left intact to maintain the integrity of the soil. Stumps shall remain where trees are cut.
• Riprap shall not be used unless it is necessary to stabilize a tower.
• No fertilizer shall be used other than a one-time application to re-establish vegetation.
• Construction activities shall minimize the removal of woody vegetation, the extent of the disturbed area, and the time in which areas remain in a disturbed state.
• Active measures shall be taken after construction and during routine maintenance to ensure diffuse flow of stormwater through the buffer.
• In wetlands, mats shall be utilized to minimize soil disturbance.

[3] Perpendicular crossings are those that intersect the surface water at an angle between 75 degrees and 105 degrees.

[4] Provided that poles or aerial infrastructure shall not be installed within 10 feet of a water body unless the Administrator completes a no practical alternative evaluation as defined in Section 15-270.6

[5] Provided that, in Zone One, all of the following BMPs for underground utility lines are used. If all of these BMPs are not used, then the underground utility line shall require a no practical alternative evaluation by the Administrator, as defined in Section 15-270.6.
• Woody vegetation shall be cleared by hand. No land grubbing or grading is allowed.
• Vegetative root systems shall be left intact to maintain the integrity of the soil. Stumps shall remain, except in the trench created for the line installation.
• Underground cables shall be installed by vibratory plow or trenching.
• The trench shall be backfilled with the excavated soil material immediately following cable installation.
• No fertilizer shall be used other than a one-time application to re-establish vegetation.
• Construction activities shall minimize the removal of woody vegetation, the extent of the disturbed area, and the time in which areas remain in a disturbed state.

Activity	Exempt	Allowable	Allowable with Mitigation
Non-electric utility, perpendicular crossings[3,5]: • Disturb equal to or less than 40 linear feet of buffer with a maintenance corridor equal to or less than10 feet in width • Disturb equal to or less than 40 linear feet of buffer with a maintenance corridor greater than 10 feet in width • Disturb greater than 40 linear feet but equal to or less than 150 linear feet of buffer with a maintenance corridor equal to or less than 10 feet in width • Disturb greater than 40 linear feet but equal to or less than 150 linear feet of buffer with a maintenance corridor greater than 10 feet in width • Disturb greater than 150 linear feet of buffer	X	X X	X X
Non-electric utility, other than perpendicular crossings [3,5]: • Impacts in Zone Two • Impacts in Zone One[2]		X	X
Vegetation Management			
Forest harvesting - see Section 15-270.9			
Fertilizer application: • One-time fertilizer application to establish vegetation	X		

Activity	Exempt	Allowable	Allowable with Mitigation
Vegetation management:			
• Emergency fire control measures provided that topography is restored	X		
• Mowing and harvesting of plant products in Zone 2 only	X		
• Planting vegetation to enhance the riparian buffer	X		
• Pruning forest vegetation provided that the health and function of the forest vegetation is not compromised	X		
• Removal of individual trees which are in danger of causing damage to dwellings, other structures or human life	X		
• Removal of poison ivy	X		
• Removal of invasive exotic vegetation as defined by the North Carolina Botanical Gardens	X		

(d) Additional Setback Requirements for Specific Water Pollution Hazards

The following activities are designated as potential water pollution hazards, and must be set back from any stream or waterbody by the required buffer width provided in 15-270.3 or the distance indicated below, whichever is greater:

Activity	**Setback**
Above or below ground storage of hazardous substances, petroleum or biofuels	150 feet
Animal feedlot operations	250 feet
Land application of biosolids	100 feet
Solid waste landfills or junkyards	300 feet

(e) In addition to the foregoing requirements, no impervious surface within any C, WR, B-5, or WM-3 zoning district may be located in or closer than twenty feet to the nearest edge of a designated buffer area, as described in Section 15-265, except that the permit-issuing authority may authorize the crossing of a designated buffer area and the presence of impervious surface there and in the setback area from the buffer area by or for: **(AMENDED 12/7/83; 11/11/86; 05/15/90)**

(1) a subcollector, local or minor street where the permit-issuing authority finds that the crossing is justified

(a) in that without such a crossing over 50% of a tract would be without access and therefore undevelopable; or

(b) in that the crossing is necessary to comply with overriding Town policies relating to safety, as in provisions for dual access for police and fire protection; or

(c) in that it allows a design that would clearly result in less damage to the watershed environment than would result if the property were developed without such a crossing;

(2) a bike or pedestrian path;

(3) water and/or sewer lines and pump stations where the permit-issuing authority finds that

(a) it is practicably unavoidable if the subject property is to be served under the provisions of Section 15-238(c) and an alternate design would result in greater damage to the watershed environment; **(AMENDED 05/15/90)** and

(b) the system, taken as a whole, emphasizes placement outside of the buffer area; and

(c) to the extent practical, and consistent with (a) and (b) above, the direction of the line crossing is perpendicular to the stream; and

(d) in the case of sewer lines, the lines are constructed of ductile iron pipe, or of comparable material which will not require significant clearing of vegetation, and

(e) in the case of a pump station, the station will be capable of pumping peak water flow with the main pump out of service, have an emergency power supply and a telemetering system that will provide the Orange Water and Sewer Authority with information concerning the status of the pumps, electricity, and the wet well level).

(4) Water dependent structures. **(AMENDED 12/14/93)**

(f) Notwithstanding the provision of subsection (g), **(AMENDED 1/22/85)**

(1) No crossing shall be allowed except where full measures are employed to minimize, to the maximum extent practicable, potential adverse effects. In meeting this standard, the permit issuing authority shall consider factors such as the use of bridges as opposed to culverts, the length of bridge spans, the redirecting of storm water run-off through a buffer or filtering mechanism, safeguards to line breakages, and other similar factors.

(2) The provisions of subsection (g) may not be utilized to allow the crossing of a designated buffer if the situation otherwise justifying the crossing has been created by or results from the subdivision of a tract after the effective date of this section.

(g) Because it is not the intent of this section to render undevelopable lots of record on the effective date of this section (Article?), intrusions into the protective buffer are permitted in the event that a lot of record would otherwise be made undevelopable by the provisions of this section, to the extent necessary for the lot in question to be developed as permitted by the underlying zoning designation and in such a manner as to minimize the disruption of the protective buffer.

(h) Subsequent to December 06, 1988, no new lot may be created through a major or minor subdivision process that would be undevelopable under the provisions of this section because of the amount or dimensions of protective buffer land included in it, unless such lot has already been developed, or it plainly appears that such lot is intended to be devoted to permanent open space use.

(i) Areas set aside as protective stream buffers as required by this subsection may be counted towards required open space as set out in Sections 15-186, 15-187, and 15-198, so long as they are left in their natural and undisturbed state, are unencumbered with any of the permitted uses outlined in (f) and (g), above, and meet all of the other criteria required of "usable" open space as set out in the above-referenced sections.

(j) Nothing in this section shall prevent a single family residence (including a mobile home) from being located within the required protective stream buffer areas if such home *(i)* replaces a home that had been located within such buffer within six months prior to the effective date of this section and is located on the same location as the previous home, or *(ii)* is located on a mobile home pad or foundation that was in existence on the effective date of this section.

Section 15-270.6 Determination of "No Practical Alternatives"

(a) Persons who wish to undertake uses designated as allowable or allowable with mitigation under Section 15-270.5 shall submit a written request to the permit issuing authority for a "no practical alternatives" determination. The applicant shall certify that the criteria identified in subsection (b) are met and may submit any information deemed relevant to the permit issuing authority determination, in addition to the plans and other information submitted as part of the application for a permit under Article IV of this chapter. A "no practical alternatives" determination shall only be made for proposed developments with respect to which permit applications under Article IV are pending.

(b) The permit issuing authority shall make a "no practical alternatives" determination if s/he concludes, after reviewing the project plans and any other applicable information, that:

(1) The basic project purpose cannot be practically accomplished in a manner that would better minimize disturbance, preserve aquatic life and habitat, and protect water quality, and;

(2) Best management practices shall be used if necessary to minimize disturbance, preserve aquatic life and habitat, and protect water quality.

(c) Requests for a "no practical alternatives" determination shall be reviewed and either approved or denied. The permit issuing authority shall issue his/her decision in writing.

Section 15-270.6 Mitigation for Water Quality Buffers

(a) PURPOSE. The purpose of this section is to set forth the mitigation requirements for water quality buffer protection

(b) THE AREA OF MITIGATION. Staff shall determine the required area of mitigation, which shall apply to all mitigation options identified in this section, according to the following:

(1) The impacts in square feet to each zone of the buffer shall be determined by adding the area of the footprint of the activity causing the impact to the riparian buffer, including any clearing and grading within the buffer necessary to

accommodate other activities, and the area of any ongoing maintenance corridors within the buffer associated with the activity.

(2) The required area of mitigation shall be determined by applying the following multipliers to the impacts determined in subsection (b)(1) to each zone of the riparian buffer:

a. Impacts to Zone one of the riparian buffer shall be multiplied by three;

b. Impacts to Zone two of the riparian buffer shall be multiplied by one and one-half.

(c) THE LOCATION OF MITIGATION. The mitigation effort shall be located within the Town's planning jurisdiction, and as close to the location of the impact as feasible.

(d) OPTIONS FOR MEETING THE MITIGATION DETERMINATION. The mitigation determination may be met through one of the following options:

(1) Payment of a compensatory mitigation fee to the Town's Water Quality Enhancement Fund;

(2) Donation of real property or of an interest in real property pursuant to subsection (e) of this Section;

(c) Riparian buffer enhancement, or riparian buffer restoration. This shall be accomplished by the applicant after submittal and approval of a restoration plan pursuant to Item (f) of this Section.

(e) PAYMENT TO THE WATER QUALITY ENHANCEMENT FUND. Persons who choose to satisfy their mitigation determination by paying a compensatory mitigation fee to the Water Quality Enhancement Fund as allowed here shall use the following procedure:

(1) The Town shall establish annually, and include on the Miscellaneous Fees and Charges Schedule, a per square foot buffer mitigation fee. The fee shall be based upon a reasonable estimate of the per square foot cost of accomplishing riparian buffer restoration.

(2) The amount of the compensatory mitigation fee due shall be determined by multiplying the area in square feet of mitigation calculated in accordance with subsection (b) by the per square foot buffer mitigation fee.

(3) The required fee shall be submitted to the Town prior to construction plan approval.

(f) DONATION OF PROPERTY. Persons who choose to satisfy their mitigation determination by donating real property or an interest in real property to the Town shall meet the following requirements:

(1) The donation of real property interests may be used to either partially or fully satisfy the payment of a compensatory mitigation fee to the Water Quality Enhancement Fund. The value of the property interest shall be determined by an appraisal performed in accordance with subsection (f)(4)d of this Section. The donation shall satisfy the mitigation determination if the appraised value of the donated property interest is equal to or greater than the required fee. If the appraised value of the donated property interest is less than the required fee, the applicant shall pay the remaining balance due.

(2) The donation of conservation easements to satisfy compensatory mitigation requirements shall be accepted only if the conservation easement is granted in perpetuity.

(3) Donation of real property interests to satisfy the mitigation determination shall be accepted only if such property meets all of the following requirements:

a. The property shall contain riparian buffers that are in need of restoration.

b. The restorable riparian buffer on the property shall have a minimum length of 200 linear feet along a surface water and a minimum width of 50 feet as measured horizontally on a line perpendicular to the surface water.

c. The size of the restorable riparian buffer on the property to be donated shall equal or exceed the acreage of riparian buffer required to be mitigated under the mitigation responsibility determined pursuant to Item (b) of this Section.

d. The property shall not require excessive measures for successful restoration, such as removal of structures or infrastructure. Restoration of the property shall be capable of fully offsetting the adverse impacts of the requested use.

e. The property shall be suitable to be successfully restored, based on existing hydrology, soils, and vegetation.

f. The estimated cost of restoring and maintaining the property shall not exceed the value of the property minus site identification and land acquisition costs.

g. The property shall not contain any building, structure, object, site, or district that is listed in the National Register of Historic Places established pursuant to Public Law 89-665, 16 U.S.C. 470 as amended.

h. The property shall not contain any hazardous substance or solid waste.

i. The property shall not contain structures or materials that present health or safety problems to the general public. If wells, septic, water or sewer connections exist, they shall be filled, remediated or closed at owner's expense in accordance with state and local health and safety regulations.

j. The property and adjacent properties shall not have prior, current, and known future land use that would inhibit the function of the restoration effort.

k. The property shall not have any encumbrances or conditions on the transfer of the property interests.

(4) At the expense of the applicant or donor, the following information shall be submitted to the Town with any proposal for donations or dedications of interest in real property:

a. Documentation that the property meets the requirements laid out in subsection (f)(3) of this Section;

b. Documentation showing the location of the property to be donated along with information on existing site conditions, vegetation types, presence of existing structures and easements;

c. A current property survey performed in accordance with the procedures of the North Carolina Department of Administration, State Property Office as identified by the State Board of Registration for Professional Engineers and Land Surveyors in "Standards of Practice for Land Surveying in North Carolina." Copies may be obtained from the North Carolina State Board of Registration for Professional Engineers and Land Surveyors, 3620 Six Forks Road, Suite 300, Raleigh, North Carolina 27609;

d. A current appraisal of the value of the property performed in accordance with the procedures of the North Carolina Department of Administration, State Property Office as identified by the Appraisal Board in the "Uniform Standards of Professional North Carolina Appraisal Practice." Copies may be obtained from the Appraisal Foundation, Publications Department, P.O. Box 96734, Washington, D.C. 20090-6734; and

e. A title certificate from a licensed NC attorney.

(g) RIPARIAN BUFFER RESTORATION OR ENHANCEMENT. Persons who choose to meet their mitigation requirement through riparian buffer restoration or enhancement shall meet the following requirements:

(1) The applicant may restore or enhance a non-forested riparian buffer if either of the following applies:

a. The area of riparian buffer restoration is equal to the required area of mitigation determined pursuant to subsection (b) of this Section; or

b. The area of riparian buffer enhancement is three times larger than the required area of mitigation determined pursuant to subsection (b) of this Section.

(2) The location of the riparian buffer restoration or enhancement shall comply with the requirements in subsection (c) of this Section.

(3) The width of the riparian buffer restoration or enhancement site shall comply with Section 15-270.3.

(4) The applicant shall submit a restoration or enhancement plan for approval. The restoration or enhancement plan shall contain the following:

a. A map of the proposed restoration or enhancement site;

b. A vegetation plan. The vegetation plan shall include a minimum of at least two native hardwood tree species planted at a density sufficient to provide 320 trees per acre at maturity;

c. A grading plan. The site shall be graded in a manner to ensure diffuse flow through the riparian buffer;

d. A fertilization plan; and

e. A schedule for implementation.

(5) Within one year after the permit issuing authority has approved the restoration or enhancement plan, the applicant shall present proof that the riparian buffer has been restored or enhanced. If proof is not presented within this

timeframe, then the person shall be in violation of the riparian buffer protection program.

(6) The mitigation area shall be placed under a perpetual conservation easement that will provide for protection of the property's nutrient removal functions.

(7) The applicant shall submit annual reports for a period of five years after the restoration or enhancement showing that the trees planted have survived and that diffuse flow through the riparian buffer has been maintained. The applicant shall replace trees that do not survive and restore diffuse flow if needed during that five-year period.

Section 15-270.7 Variances

(a) For purposes of this section, a "State minor variance" request pertains to activities that are proposed only to impact any portion of a buffer on State-protected drainage features that is greater than 30' and less than or equal to 50' from the most landward limit of the drainage feature. A "State major variance" request pertains to activities that are proposed to impact any portion of a buffer on State-protected drainage features within 30'of the most landward limit of the drainage feature. All other buffer variances shall be considered "Town variances."

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(b) All Town variances shall first be considered and acted upon in accordance with the provisions of Section 15-270.6 of this section, and then in accordance with the provisions of Section 15-92.

(c) If a Town variance or State minor variance request is approved by the Board of Adjustment, no further action need be taken to make that decision effective. If a State major variance request is approved by the Board of Adjustment, that decision shall not become effective unless and until that decision is affirmed by the Environmental Management Commission.

Section 15-270.8 Requirements Specific to Forest Harvesting

The requirements of this section shall apply to forest harvesting operations and practices within the buffers prescribed by this part.

(a) All the following measures shall apply in the entire buffer as applicable:

1. Logging decks and sawmill sites shall not be placed in the buffer.
2. Access roads and skid trails shall be prohibited except for temporary and permanent stream crossings established in accordance with 15A NCAC 1I .0203. Temporary stream crossings shall be permanently stabilized after any site disturbing activity is completed.
3. Timber felling shall be directed away from the stream or water body.

4. Skidding shall be directed away from the stream or water body and shall be done in a manner that minimizes soil disturbance and prevents the creation of channels or ruts.
5. Individual trees may be treated to maintain or improve their health, form or vigor.
6. Harvesting of dead or infected trees as necessary to prevent or control the spread of tree pest and disease infestation shall be allowed. These practices must be approved by the Division of Forest Resources for a specific site pursuant to the rule.
7. Removal of individual trees that are in danger of causing damage to structures or human life shall be allowed.
8. Natural regeneration of forest vegetation and planting of trees, shrubs, or ground cover plants to enhance the buffer shall be allowed provided that soil disturbance is minimized. Plantings shall consist primarily of native species.
9. High intensity prescribed burns shall not be allowed.
10. Application of fertilizer shall not be allowed except as necessary to provide a stabilizing ground cover sufficient to restrain erosion. Broadcast application of fertilizer or herbicides to the adjacent forest stand shall be conducted that the chemicals are not applied directly to or allowed to drift into the buffer.

(b) In Zone 1, forest vegetation shall be protected and maintained. Selective harvest as provided for below is allowed on forest lands that have a deferment for use value under forestry in accordance with G.S. 105-277.2 through 277.6 or on forest lands that have a forest management plan prepared or approved by a registered professional forester. A plan drafted under either option shall meet the standards set out in this Item. Copies of either the approval of the deferment for use value under forestry or the forest management plan shall be produced upon request. For such forest lands, selective harvest is allowed in accordance with the following:

(1) Tracked or wheeled vehicles are not permitted for the purpose of selective timber harvesting where there is no other practical alternative for removal of individual trees provided activities comply with forest practice guidelines for water quality as defined in Rule 15A NCAC 01I .0101 through .0209, and provided no equipment shall operate within the first 10 feet immediately adjacent to the stream except at stream crossings designed, constructed and maintained in accordance with Rule 15A NCAC 1I .0203;

(2) Soil disturbing site preparation activities are not allowed; and

(3)Trees shall be removed with the minimum disturbance to the soil and residual vegetation.

(c) In addition to the requirements of (b) in this item, the following provisions for selective harvesting shall be met:

(1) The first 10 feet of Zone 1 directly adjacent to the stream or waterbody shall be undisturbed except for the removal of individual high value trees as defined provided that no trees with exposed primary roots visible in the stream bank be cut.
(2) In the outer 20 feet of Zone 1, a maximum of 50 percent of the trees greater than five inches DBH may be cut and removed. The reentry time for harvest shall be no more frequent than every 15 years, except on forest plantations where the reentry time shall be no more frequent than every five years. In either case, the trees remaining after harvest shall be as evenly spaced as possible; and
(3) In Zone 2, harvesting and regeneration of the forest stand shall be allowed in accordance with 15A NCAC 01I .0100 through .0200 as enforced by the Division of Forest Resources.

Section 3. Subsection 15-198 (b) (4) of the Carrboro Land Use Ordinance is amended by the rewording of subdivisions (b) and (e) so that they read as follows:

b. Hardwood areas as depicted within the Geographic Information System (GIS) of the Town of Carrboro.
e. With respect to streams designated in the GIS of the Town of Carrboro, those areas within an average perpendicular distance of sixty feet from the edge of the floodway of the stream, if the floodway is designated in the Flood Insurance Study (FIS) and its accompanying Flood Insurance Rate Maps (FIRM), for Orange County, dated February 2, 2007 orthose areas included within any designated stream buffers or floodplains, whichever is greater.

Section 4. All provisions of any town ordinance in conflict with this ordinance are repealed.

Section 5. This ordinance shall become effective upon approval by the North Carolina Environmental Management Commission, following adoption by the Carrboro Board of Aldermen.

ATTACHMENT D-1

TOWN OF CARRBORO

NORTH CAROLINA

TRANSMITTAL **PLANNING DEPARTMENT**

DELIVERED VIA: ☒ *HAND* ☐ *MAIL* ☐ *FAX* ☐ *EMAIL*

To: **Steve Stewart, Town Manager**
Mayor and Board of Aldermen

From: **Randy Dodd, Environmental Planner**

Date: **October 8, 2008**

Subject: **Jordan Lake Nutrient Rulemaking Process Update**

Background and Summary

The North Carolina Environmental Management Commission (EMC) and Division of Water Quality (DWQ) have been managing nitrogen and phosphorus inputs to Jordan Lake since the early 1980's. In the past decade, legislative mandates and technical studies have prompted the EMC and DWQ to consider new regulations. The Board of Aldermen has received several reports from Town and Triangle J COG staff during this period and considered Land Use Ordinance amendments in response to the draft rules in 2007. In May, 2008, Town staff provided a detailed summary and an update subsequent to the public hearings held in July 2007 and DWQ, Hearing Officer, and EMC response to public hearing feedback. The purpose of this memo is to provide a brief update of State proceedings since May 2008.

Information

Description of Strategy

The State's proposed strategy is designed around nitrogen (N) and phosphorus (P) percentage reduction goals for each of the three arms (upper and lower New Hope and Haw River arms) of Jordan Reservoir. Separate goals were needed for each arm because of the hydrologically distinct behavior exhibited by each arm. The watershed of the Upper New Hope Arm, in which Carrboro, Chapel Hill, and Durham are located, faces the greatest reduction needs. The Lower New Hope Arm has the least reduction need. Its watershed is relatively small but is being rapidly developed. Finally, the Haw River arm, which compromises 80% of the entire Jordan watershed, contains the rapidly growing Piedmont Triad area.

The proposed rules reflect a comprehensive effort to address nutrient sources to Jordan Reservoir to meet the reduction goals established in the TMDL. The strategy includes reductions by point source discharges and in nutrient runoff from agriculture, existing development, and new development. In addition, riparian buffer protection rules would largely stem loading increases that would otherwise result from loss of

those landscape features, while requirements to establish buffers during a change in land use would achieve some loading reduction. Lastly, a fertilizer management rule would result in training of fertilizer applicators in the watershed, potentially reducing nutrient inputs through education. Table 1 lists the set of rules comprising the proposed strategy.

The EMC met on May 8, 2008 and unanimously adopted the proposed rules. There are two noteworthy considerations before these proposed rules can be adopted. First, the draft rules received sufficient public opposition as drafted to require review by the General Assembly during the session beginning in January 2009. Second, the rules are being reviewed by the North Carolina Rules Review Commission (RRC). The RRC delivered review comments to the EMC during the summer; the EMC subsequently revised the rules in response to RRC review comments on September 8, 2008. At its September meeting, the RRC reviewed the revised rules. The primary outcome at this meeting was an extension of the period of RRC review in order to further study the authority for these rules, especially the rules relating to the requirements to retrofit existing development to deal with stormwater and nutrient loading.

Table 1. List of Proposed Rules Comprising the Jordan Nutrient Strategy

15A NCAC 02B Rule Number	Rule Title	Staff Recommendation for Next Steps
.0262	Purpose and Scope	Monitor rule adoption; little or no impact likely
.0263	Definitions	Monitor rule adoption; little or no impact likely
.0264	Agriculture	Monitor rule adoption; little or no impact likely
.0265	Stormwater Management for New Development	Likely to be adopted with little further change; monitor rule adoption; plan for update of LUO.
.0266	Stormwater Management for Existing Development	Monitor rule adoption. Higher uncertainty in final disposition than other rules. In conjunction with finalization of .0273 and establishment of Town Water Quality Enhancement Fund, report on fiscal implications in 2009
.0267	Protection of Existing Riparian Buffers	Addressed in Draft Ordinance
.0268	Mitigation for Riparian Buffers	Addressed in Draft Ordinance (supplements State Rule)
.0269	Riparian Buffer Mitigation Fees to the NCEEP	Monitor rule adoption; little or no impact likely
.0270	Wastewater Discharge Requirements	Monitor rule adoption (applies to OWASA;)
.0271	Stormwater Requirements for State and Federal Entities	No action necessary; no impact
.0272	Fertilizer Management	Monitor rule adoption (Town Code provision adopted in June 2008; BOA reviewing in October 2008)
.0273	Options for Offsetting Nutrient Loads	Likely to be adopted with little further change. In conjunction with response to .0265 and .0266 and establishment of Town Water Quality Enhancement Fund, report on fiscal implications in 2009 and consider update of LUO.

The rules for stormwater management for existing development (.0266) are believed by staff to present the largest challenge to the Town. Staff believe that it is likely that new rules will be adopted during the General Assembly 2009 session, with the remaining outstanding question regarding requirements for treating runoff from existing development.

As indicated in Table 1, staff have reviewed updates to the proposed rules, and have drafted the Water Quality Buffer ordinance to insure compliance with 2B.0267-2B.0269. Staff have included in this ordinance provisions for a local mitigation program that would supplement, and not conflict with, 2B.0268 and 2B.0269.

Staff Recommendation

Staff recommends that the Board of Aldermen accept this report. Planning staff also recommends that the Town accelerate efforts to plan for requirements under 2B.0265 and 2B.0273 because deferral will in the long run have a larger cost to the Town. Staff also recommends that the BOA direct staff to continue to monitor rule adoption, analyze fiscal implications of State rules for existing development and offsets, and report to the BOA at a time to be determined in 2009.