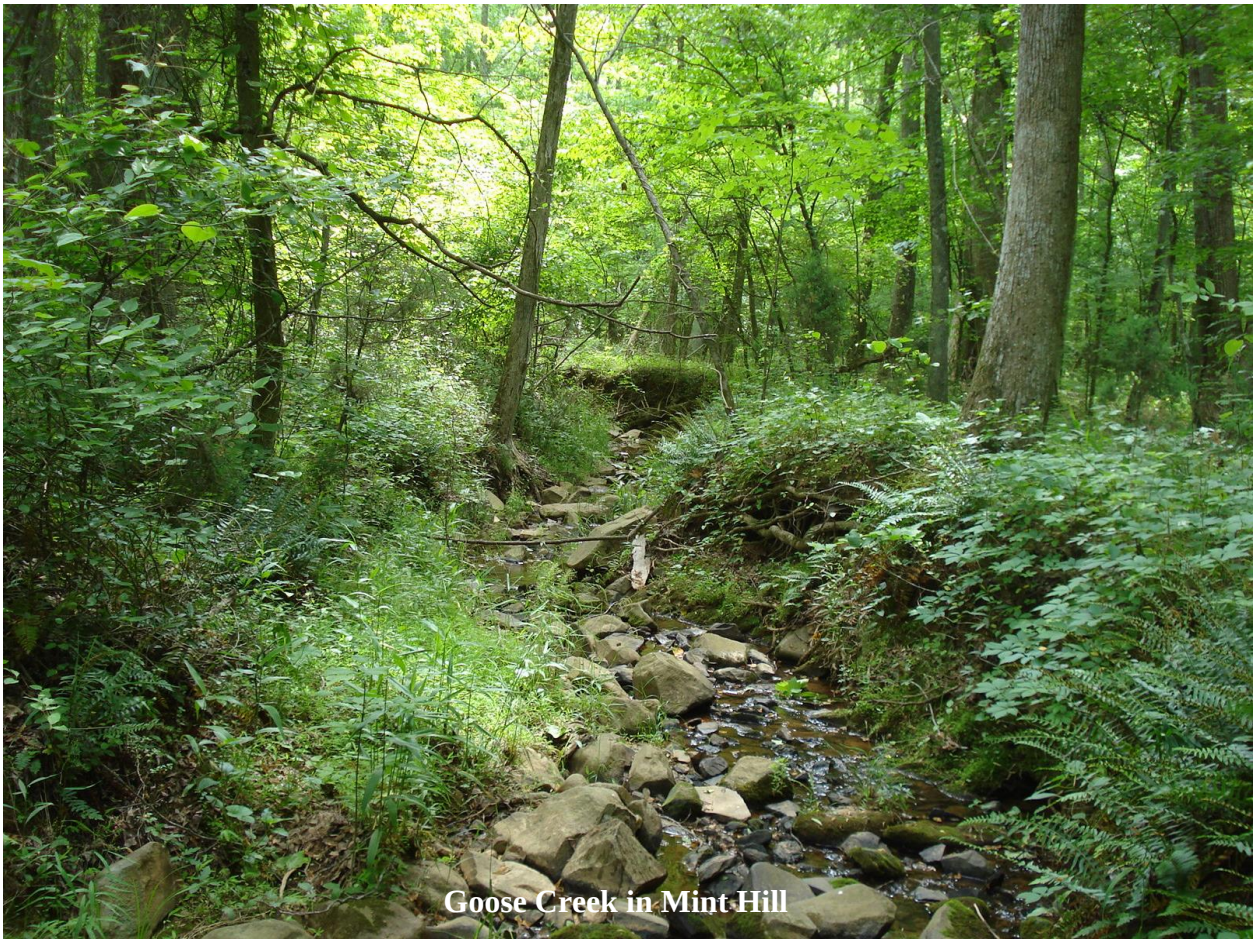
Charlotte-Mecklenburg Water Quality Buffer Implementation Guidelines


Goose Creek in Mint Hill

For Use in the City of Charlotte, Mecklenburg County and the Towns of Cornelius, Davidson, Huntersville, Matthews, Mint Hill, and Pineville

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Compiled by Charlotte-Mecklenburg Storm Water Services

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Section 1 Introduction

1.1 Purpose

The purpose of this document is to provide information regarding the different water quality buffers that exist in Charlotte-Mecklenburg and the various ordinance requirements regarding their protection. In addition, this document will describe the process that must be followed to request approval to disturb a water quality buffer and the actions necessary to restore buffers that have been impacted due to noncompliance with ordinance requirements.

1.2 Background

Water quality buffers are naturally vegetated areas adjacent to a water body that serve the following functions:

- protect water quality by filtering pollutants contained in the storm water runoff;
- physically protect and separate surface waters from future disturbance or encroachment;
- allow water to soak into the ground and recharge groundwater supplies;
- provide storage for floodwaters;
- allow channels to meander naturally;
- provide suitable habitats for wildlife;
- provide shade to reduce water temperatures; and
- provide channel stability through root mass.

Storm drainpipes end at the edge of the buffer and energy dissipaters are installed at the outlets to diffuse storm water flow and facilitate pollutant removal (see Figure 1).

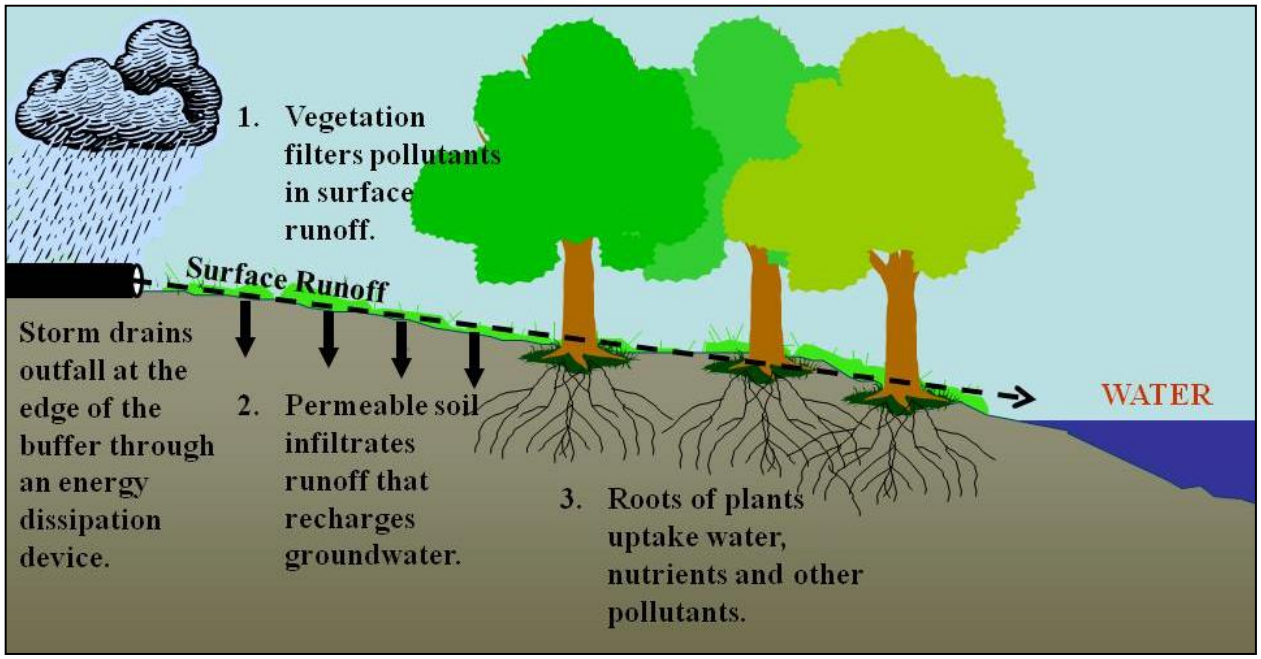


Figure 1: How a Water Quality Buffer Works to Filter Pollutants

Four (4) different types of water quality buffers exist in Charlotte-Mecklenburg as required by various ordinances adopted by the City of Charlotte, Mecklenburg County and the six (6) Towns between 1993 and 2008. The buffer requirements differ slightly based on jurisdiction and buffer type. In 1993, the first water quality buffers were established along the streams and lakes located in the drinking water supply watersheds draining directly to the Catawba River in western Mecklenburg County. These buffers were developed to protect the drinking water supply reservoirs along the Catawba, including Lake Norman, Mountain Island Lake and Lake Wylie. In 1999, the Surface Water Improvement and Management or S.W.I.M. buffers were established along all the streams in Charlotte-Mecklenburg. The purpose of these buffers is much more encompassing and includes the buffer functions listed on the previous page. S.W.I.M. buffers were the first to be applied county-wide. In 2007 and 2008, the post-construction storm water ordinances were adopted that require 30-foot buffers with a no built-upon area along streams with smaller drainages not covered by S.W.I.M. In addition, some buffer widths were increased under post-construction and the Goose Creek and Six Mile Creek buffers were established, which are the largest and most restrictive buffers in Charlotte-Mecklenburg. Each new buffer ordinance that was adopted added to the previous buffer requirements, which were allowed to remain in the local ordinances. This was done to ensure that there are no gaps in the buffer coverage due to grandfathering. For example, the S.W.I.M. buffer ordinances (or requirements, rules) were left intact when the post-construction buffer ordinances were adopted so that developments grandfathered under post-construction would in most cases still be required to comply with the S.W.I.M. buffers. In all situations where two (2) or more buffer types apply to the same stream segment, the buffer that is more protective of water quality will apply. Provided below is a summary of the four (4) different buffer types in Charlotte-Mecklenburg.

1. Water Supply Watershed Buffers – The water supply watershed buffer requirements went into effect in the City of Charlotte, Mecklenburg County and the Towns of Davidson, Cornelius and Huntersville between 1993 and 2001 through the adoption of water supply watershed rules as part of the respective jurisdictions' zoning ordinances. These buffer requirements apply to the shoreline of the Catawba River lakes and the perennial streams that drain to them, as well as the ponds they intersect, as delineated by a solid blue line on the 1: 24,000 scale (7.5 minute) quadrangle topographic maps prepared by the United States Geologic Survey (USGS). Appendix 1 contains a map illustrating the areas of Charlotte-Mecklenburg subject to the water supply watershed buffer requirements. The purpose of these buffers is to protect the public water supplies in Lake Norman, Mountain Island Lake, and Lake Wylie and to comply with the N.C. Water Supply Watershed Classification and Protection Act (NCGS 143-214.5). These buffers do not have zones and are to be left predominantly undisturbed. They vary in width from 30, 40, 50 and 100 feet or the entire 100-year floodplain depending on the density of the development and its location in the watershed. Appendix 2 provides an overview of the water supply watershed buffer requirements in a tabular format.

2. Surface Water Improvement & Management (S.W.I.M.) Buffers – The S.W.I.M. buffer requirements went into effect in all the jurisdictions in Charlotte-Mecklenburg between 1999 and 2000 through the adoption of the S.W.I.M. buffer rules as part of the respective jurisdictions' zoning ordinances. These buffer requirements apply to the streams and the ponds that they intersect in Charlotte-Mecklenburg and not to the shoreline of the

Catawba River lakes. S.W.I.M. buffers apply to intermittent and perennial streams that drain ≥100 acres in the City of Charlotte, Mecklenburg County and the Town of Pineville. S.W.I.M. buffers apply to streams draining ≥50 acres in the Towns of Cornelius, Davidson, Huntersville, Matthews, and Mint Hill. The purpose of these buffers is to physically protect and streams and ponds from future disturbance or encroachment, filter pollutants, store floodwaters, provide habitat, and contribute to the "green infrastructure" within Charlotte-Mecklenburg. S.W.I.M. buffers in all jurisdictions except the Town of Cornelius are divided into three (3) zones with varying restrictions, including the stream side zone (located immediately adjacent to the water body with no disturbance allowed), managed use zone (located adjacent to the stream side zone with minimal disturbance allowed), and upland zone (located adjacent to the managed use zone with clearing and lawns allowed). S.W.I.M. buffers in the Town of Cornelius do not have zones and are to be left undisturbed. All S.W.I.M. buffers vary in width depending on the size of the upstream drainage area. The width of the zones within these buffers also varies. Appendix 3 provides a summary of the S.W.I.M. buffer requirements as well as an illustration of the different S.W.I.M. buffer zones.

3. Post-Construction Buffers – The post-construction buffer requirements went into effect on June 30, 2007 in Mecklenburg County and the six (6) Towns, and July 1, 2008 in the City of Charlotte, through the adoption of post-construction ordinances contained in either the respective jurisdictions' existing zoning ordinances or their City Code. These buffer requirements apply to intermittent and perennial streams and the ponds that they intersect in Charlotte-Mecklenburg and not to the shoreline of the Catawba River lakes. Buffer requirements vary based on established post-construction districts. Appendix 4 contains a map that illustrates these districts. The purpose of these buffers is to establish storm water management requirements and controls to prevent water quality degradation to the extent practicable and to comply with Phase I and Phase II Storm Water Permit requirements (NCGS 143-214.7). In general terms, post-construction buffers are an expansion of the S.W.I.M. buffer requirements to include streams with smaller drainages, but in several jurisdictions and watersheds these buffers go significantly beyond the requirements established by S.W.I.M. Appendix 5 provides an overview of the post-construction buffer requirements in a tabular format.

4. Goose Creek and Six Mile Creek Buffers – The Goose Creek buffer requirements went into effect on February 1, 2009 for intermittent and perennial streams and the ponds that they intersect in the Goose Creek Watershed in the Towns of Mint Hill and Matthews. They are currently administered by Mecklenburg County Storm Water Services under delegated authority from the N.C. Environmental Management Commission. The Six Mile Creek buffer requirements went into effect with the adoption of the City of Charlotte's post-construction ordinance on July 1, 2008 and apply to intermittent and perennial streams and the ponds that they intersect located in the Six Mile Creek watershed. The Six Mile Creek buffer requirements are administered by Charlotte Storm Water Services. The Goose Creek and Six Mile Creek buffers are incorporated into the Town of Mint Hill and City of Charlotte post-construction ordinances, respectively. These buffers are distinguished by the fact that both exist for the protection of the Carolina heelsplitter, which is a federally endangered species of freshwater mussel.

Disturbances are not allowed in these buffers unless specifically listed in the "Table of Uses" contained in Appendix 6. Appendix 5 provides an overview of the Goose and Six Mile Creek buffer requirements in a tabular format.

The widths of the four (4) buffer types described above vary significantly throughout Charlotte-Mecklenburg. Refer to Appendices 2, 3 and 5 for the buffer widths associated with the different buffer types. One similarity shared by all stream buffers in Charlotte-Mecklenburg is that their widths are measured horizontally on a line perpendicular to the stream, landward from the top of the bank on each side of the stream. The widths of the lake buffers contained in the water supply watershed rules are measured in the same manner, but the measurement originates from the full pond elevation of each reservoir and not the top of the bank (see Section 2.1.3).

Water quality buffers are protected to varying extents depending on the type of buffer as described above and the jurisdiction where it is located. For all buffer types, new structures are not allowed in the buffer, including outbuildings, septic systems, home expansions, swimming pools, etc., except gazebos and storage buildings are allowed in the upland zone of S.W.I.M. buffers provided they are for non-commercial use and do not exceed 150 square feet. In addition, existing trees are to remain in place for most buffer types with a few exceptions in S.W.I.M. and post-construction buffers. Section 4 contains additional detail regarding the allowable water quality buffer disturbances.

Section 2 Applicability

2.1 POLARIS

The best tool currently available for determining if a buffer requirement **might** apply to a parcel is the Property Ownership and Land Records Information System or POLARIS 3G located at http://polaris3g.mecklenburgcountync.gov/. POLARIS is an interactive mapping system available on the Internet that works by accessing and retrieving maps and GIS data layers associated with real property in Charlotte-Mecklenburg. Mecklenburg County's GIS Department developed and maintains the system. Figure 2 provides a sample of the buffer coverage available in POLARIS. By following the steps described below, POLARIS can be used to access data layers and maps for a parcel to determine if a water quality buffer applies.

1. Enter Parcel ID # or address and depress Enter (upper left side of screen).
2. Select "Layers/Labels" (upper left side of screen).
3. Select "Water Quality Buffers (SWIM)" and "Post Construction Buffers" (left side of screen).
4. Select "Legend" (upper left side of screen) to identify the type of buffer indicated on the parcel as illustrated in Figure 2 below.

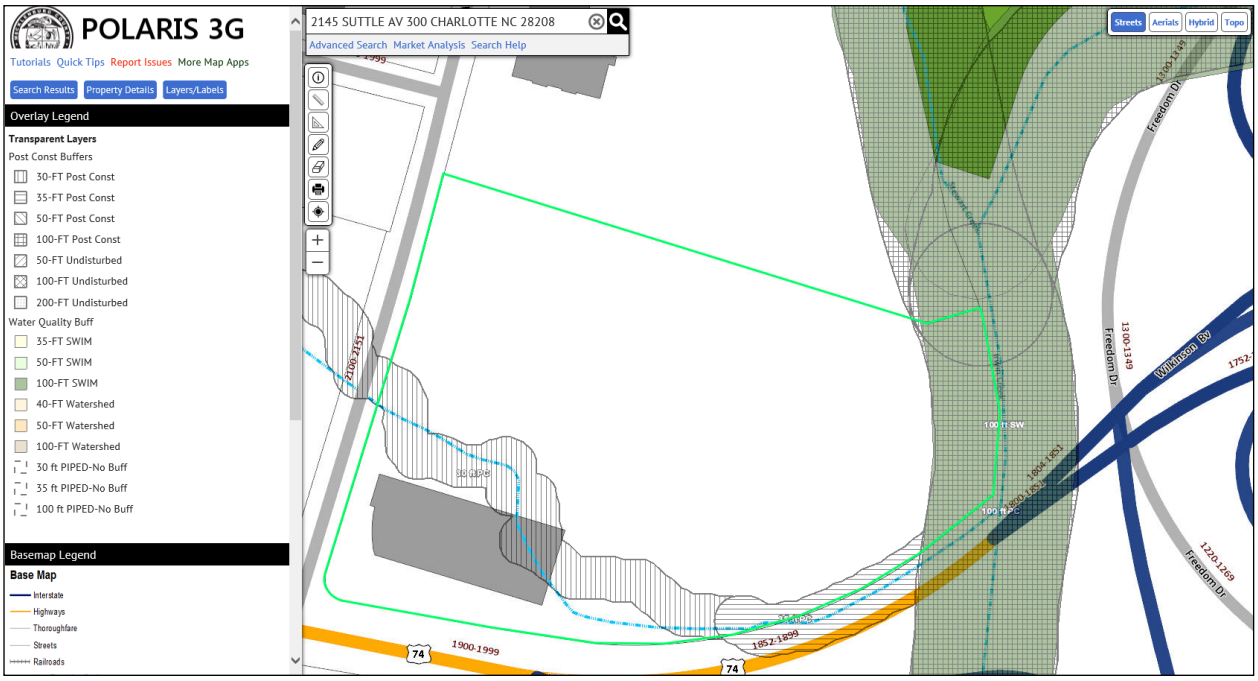


Figure 2: Identifying the Type of Buffer Using POLARIS

A parcel that is indicated in POLARIS as having a water quality buffer may or may not be subject to buffer requirements under the law. The **final** determination regarding the applicability of a water quality buffer to a parcel of land should be made utilizing the following three (3) steps as described further in the proceeding subsections:

1. Review of the applicability and exemption provisions of the applicable ordinance(s);

2. Delineation of the stream and/or lake shoreline on the ground; and
3. Delineation of the buffer area on the ground around the stream and/or lake shoreline.

2.2 Applicability and Exemption Provisions of Ordinances

The four (4) different buffer types have different requirements regarding their application to a parcel of land as described in the applicability and/or exemption provisions of the applicable ordinances. Appendix 7 provides a summary of the applicability and exemption requirements for the different buffer types by jurisdiction; however, it is extremely important to review the actual ordinance language to make a final determination. Information is provided below to facilitate access to the ordinances for the four (4) buffer types. Some general information regarding applicability and exemption provisions in the different buffer ordinances is provided in the following subsections.

1. Water Supply Watershed Ordinances – Refer to the Zoning Ordinance for the jurisdiction where the parcel of land is located and review the "Applicability" section under the appropriate "Watershed Overlay District." For example, if the parcel is located in the Mountain Island Lake Watershed in the Town of Huntersville you would review the Applicability Section of the Mountain Island Lake Watershed Overlay District found in the Town of Huntersville's Zoning Ordinance. These ordinances are available at the following website: http://stormwater.charmeck.org (select "Regulations", select jurisdiction where the parcel is located, select "Water Supply Watersheds", select "Planning", "Zoning" or "Watershed" ordinance).
2. S.W.I.M. – Refer to the Applicability Section of the S.W.I.M. Stream Buffer Ordinance adopted for the jurisdiction where the parcel is located by using the following website: http://stormwater.charmeck.org (select "Regulations", select jurisdiction where the parcel is located, select "Surface Water Improvement & Management (SWIM)"). The S.W.I.M. Stream Buffer Ordinance for the jurisdiction is also available in the jurisdiction's Zoning Ordinance located on their website under "Planning Department."
3. Post-Construction Buffers – Refer to the Applicability Section of the Post-Construction Ordinance adopted by the jurisdiction where the parcel is located by using the following website: http://stormwater.charmeck.org (select "Regulations", select jurisdiction where the parcel is located, select "Post-Construction (PCSO)").
4. Goose Creek and Six Mile Creek Buffers – For the Goose Creek buffer, refer to Subsection 305(C)(2) of the Post-Construction Ordinance for the Town of Mint Hill using the directions provided in #3 above. For Six Mile Creek, refer to the Applicability Section of the Charlotte Post-Construction Storm Water Ordinance using the directions in #3 above. The specific language regarding the Six Mile Creek buffer is provided in Section 18-145(b)(4) of this ordinance.

2.2.1 Existing Lots and Existing Development

The biggest determining factors for the applicability of buffer ordinances are the date when a lot was subdivided, or a subdivision plan submitted compared to the effective date of the ordinance. For S.W.I.M. buffers countywide, if a lot is included in a recorded subdivision **plat** prior to the ordinance going into effect, then the buffer provisions do not apply regardless of whether the lot is developed or undeveloped. For S.W.I.M. buffers, redevelopment or expansion to development

on these existing lots that are otherwise excluded from buffer requirements cannot result in an increase of impervious area in the buffer without prior approval and mitigation. For post-construction buffers in the City of Charlotte and its ETJ, the buffer does not apply if a lot was described by metes and bounds in a recorded deed prior to the effective date of the ordinance and is not part of a larger development or redevelopment provided any one (1) of the following conditions is satisfied:

1. Lot is less than 20,000 square feet;
2. Cumulative disturbance is less than one acre and existing and proposed future development of the lot will cumulatively create less than 24% built-upon area based on lot size as shown on a survey; **or**
3. Lot is included in a preliminary subdivision **plan** application or a construction plan for required improvements in the case of a minor subdivision, that has been submitted and accepted for review prior to the effective date of the ordinance. For verification, the actual subdivision **plan**, which is different from the **plat**, must be provided showing the lot. The burden of proof is on the owner of the lot to provide this verification.

In the City of Charlotte and its ETJ, all lots exempt from the post-construction ordinance are to be instructed to comply with the following buffer provisions:

1) Maintain a 10-foot undisturbed, vegetated buffer measured from the top of bank on both sides of the stream.
2) Streams to be piped must get approval (or provide notification in an NOI) from the Corps of Engineers and the State for the disturbance. Mitigation techniques approved as part of the Charlotte-Mecklenburg Buffer Implementation Guidelines are required for these piped streams.

For the Phase II jurisdictions outside the City of Charlotte and its ETJ, this exemption from the post-construction buffer requirement is handled differently. In the Phase II jurisdictions, if a lot is shown on a subdivision **plat** that includes infrastructure such as roads, then it is assumed that a subdivision plan approval process did occur and the lot is exempt from post-construction ordinance requirements, including buffers. If no infrastructure is shown on the **plat**, then the post-construction ordinance would apply in the absence of additional information that would indicate that a subdivision **plan** review occurred.

Water supply watershed buffers do not apply to existing development that occurred prior to the ordinance going into effect. However, existing lots that are undeveloped and the redevelopment or expansion of existing developments are subject to the buffer requirements. This is not the case in the Town of Cornelius where no trees larger than 2 inches in caliper can be removed from a watershed buffer for both existing lots and existing developments, unless the tree is diseased. The Town of Cornelius allows the removal of trees less than 2 inches in caliper in the watershed buffer provided they are replaced with an acceptable ground cover that stabilizes and filters storm water runoff. There is also an exception in the Town of Davidson where an expansion to a structure classified as existing development on a “lot containing a single-family residence as the principle use” does not have to comply with buffer requirements. For Goose and Six Mile Creeks, an existing use is allowed to be maintained but if the existing use is changed to another use, the stream buffer requirements apply. Change of use includes the following:

- To add built-upon area within the stream buffer;
- An agricultural operation within the stream buffer is converted to non-agricultural; or

- A lawn within the stream buffer that ceases to be maintained.

For Goose and Six Mile Creeks, the redevelopment of an existing development is exempt from buffer requirements provided the following conditions are met:

- The redevelopment occurs on the same footprint as the existing development.
- Existing storm water controls remain, including diffuse flow conditions.
- The redevelopment of nonresidential structures results in the disturbance of less than a half-acre.
- The site remains vegetated in a manner similar to existing conditions.
- Applicable storm water control requirements are met.

2.2.2 Vested Rights

Vested rights allow a landowner to proceed with a development project without regard to any subsequently promulgated land use regulations, including the buffer rules described in this document. There are generally two (2) categories of vested rights: 1) statutory vested rights and 2) common law vested rights. Statutory vested rights exist because North Carolina statutes grant the power to determine vested rights to local governments as part of their overall zoning authority. N.C. General Statute §153A-344.1 and 160A-385 contain specific language regarding statutory vested rights. The general criteria for statutory vested rights are as follows: 1) A site specific development plan; 2) Reviewed after proper notice at a quasi-judicial public hearing; and 3) Approved by the local government. The ordinances for each of the buffer types as described above contain more specific language regarding vesting. Common law vested rights exist because the courts have reviewed the facts of various cases and developed criteria for the "fairness" test when the government seeks to impose new rule requirements on an entity. The four (4) basic criteria are: 1) substantial expenditures; 2) made in good faith; 3) in reliance on a governmental permit; and 4) a detriment resulting from changing the project to comply with the new rules. All four (4) of the criteria must be met because they build upon one another. The common law vested right applies to all land development activity and may not be specifically spelled out in the applicable ordinance. Another very important fact regarding a common law vested right is that the rights never expire as described in a written determination provided by Marvin Bethune, Mecklenburg County Attorney, on September 28, 2016. According to Mr. Bethune, common law vested rights never expire because the rights run with the land. If a property is located in a subdivision that was determined to have a common law vested right, then the property, like the subdivision, would never be subject to buffer requirements because the ordinance does not apply and will never apply. This is true regardless of the property's state of development. For example, a 50-year old house on a property with no common law vested right is subject to buffer rules and could not build in the buffer; however, a house built yesterday where there is a common law vested right can build in the buffer because the ordinance does not and never will apply. The fairness of this situation may be questioned, but it is simply a matter of law according to Marvin Bethune.

2.2.3 Rezonings

Rezonings approved prior to the effective dates of the different buffer rules are considered vested and are not subject to buffer requirements unless the buffer requirement is specifically called out in the rezoning. This determination was provided by Shad Spencer, the Zoning Administrator

for the City of Charlotte. Staff with Charlotte-Mecklenburg Storm Water Services agree with this determination and will consider it applicable to all rezonings approved in Mecklenburg County, including the City of Charlotte and Towns. This exemption from buffer requirements will not apply if significant changes occur to an approved rezoning plan as determined by the Zoning Administrator for the applicable jurisdiction.

2.2.4 Applicability of State Buffer Requirements

In Mecklenburg County, NCDEQ enforces two (2) different buffer rules, including the following for the Catawba River and Goose Creek, respectively:

- 15A NCAC 02B .0243
- 15A NCAC 02B .0605 (buffer widths) and 15A NCAC 02B .0607 (buffer types and managing activities)

Regarding NCDEQ's Catawba buffer rules, the local water supply watershed buffers are wider; therefore, these rules will govern unless due to applicability provisions the local rule is excluded in which case the State rule will apply if applicable. For Goose Creek, the local and State buffer rules are identical except for the Table of Uses. The local Goose Creek buffer rules are contained in Mint Hill's Post-Construction Ordinance adopted on June 30, 2007 and revised on March 11, 2010 following the delegation of authority to Mecklenburg County by the NC Environmental Management Commission to enforce the State's Goose Creek rules. The March 11, 2010 version of Mint Hill's ordinance was identical to State law at the time that was effective February 1, 2009. At some later date, the State changed the Table of Uses contained in its ordinance, but to date the local ordinance has not been updated with this change. Therefore, until these updates are made to Mint Hill's ordinance, the State's Table of Uses will be used in Goose Creek (see Appendix 6). In addition, the City of Charlotte will use the Table of Uses in Appendix 6 for Six Mile Creek.

The State and not local buffer rules will apply to the following as stipulated in 15A NCAC 02B .0614 (13) (b) for the Catawba River and 15A NCAC 02B .0607 (k) (4) for Goose Creek:

- Activities undertaken by the State
- Activities undertaken by the United States
- Activities undertaken by multiple jurisdictions
- Activities undertaken by local units of government
- Forest harvest activities described in Rule .0608 of this Section
- Agricultural activities

The contact for the State buffer rules is as follows:

Shelton Sullivan
401 & Buffer Permitting Branch, Division of Water Resources, North Carolina Department of Environmental Quality
Location: 512 N. Salisbury Street, Archdale Building #942G, Raleigh, NC 27604
US Mail: 1617 Mail Service Center, Raleigh, NC 27699-1617
Email: shelton.sullivan@ncdenr.gov
Office Phone: (919) 707-3636
Cell Phone: (984) 272-7626

2.3 Stream and Lake Shoreline Delineation

The stream and lake shoreline must be properly delineated to confirm whether a buffer requirement applies to a parcel. The delineation methods vary based on the type of buffer and jurisdiction. Table 1 indicates the delineation methods to be used.

Table 1: Stream and Lake Shoreline Delineation Method

Buffer Type	Jurisdictions	Stream and/or Lake Shoreline Buffer Delineation	Delineation Method (1)
Post-Construction	Cornelius, Huntersville, Mint Hill (except Goose Creek), Pineville, and Meck. Co.	Perennial and intermittent streams	Mecklenburg County GIS (POLARIS)
Post-Construction	Davidson, Matthews, and Charlotte	Perennial and intermittent streams	Certified professional using approved State methodology
Goose Creek	Mint Hill	Perennial and intermittent streams	Mecklenburg County GIS (POLARIS)
Six Mile Creek	City of Charlotte	Perennial and intermittent streams	Certified professional using approved State methodology
S.W.I.M	Mecklenburg County, Charlotte, Pineville	Streams draining ≥100 acres	Mecklenburg County GIS (POLARIS)
S.W.I.M	Cornelius, Huntersville, Matthews, Mint Hill and Davidson	Streams draining ≥50 acres	Mecklenburg County GIS (POLARIS)
Water Supply Watershed	Charlotte, Davidson, Cornelius, and Huntersville	Perennial streams and lake shoreline	USGS Maps

(1) Onsite field delineations performed by a certified professional using approved State methodology always take precedent over POLARIS and USGS maps for delineation of buffers (see Section 2.3.7).

2.3.1 Delineation of Post-Construction Buffers

Post-construction ordinances specify that buffers apply to perennial and intermittent streams as described below. Buffers do not apply to ephemeral streams.

- Perennial: 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 storm water. A perennial stream exhibits the typical biological, hydrological, and physical characteristics commonly associated with the continuous conveyance of water (15A NCAC 02B .0233(2)(i)).
- Intermittent: A well-defined channel that contains water for only part of the year, typically during the winter and spring when the aquatic bed is below the water table. The flow may be heavily supplemented by storm water runoff. An intermittent stream often lacks the biological and hydrological characteristics commonly associated with the continuous conveyance of water (15A NCAC 02B .0233(2)(g)).
- Ephemeral: A feature that carries only storm water in direct response to precipitation with water flowing only during and shortly after large precipitation events. An ephemeral stream may or may not have a well-defined channel, the aquatic bed is always above the water table, and storm water runoff is the primary source of water. An ephemeral stream typically lacks the biological, hydrological, and physical characteristics

commonly associated with the continuous or intermittent conveyance of water (15A NCAC 02B .0233(2)(d)).

The post-construction ordinances for Cornelius, Huntersville, Mint Hill (except Goose Creek), Pineville, and Mecklenburg County specify that Mecklenburg County GIS will delineate the perennial and intermittent streams that require buffers using the most current digital elevation model of no greater than 10-foot cells. The ordinances further specify that this GIS coverage will be periodically updated as new data becomes available. As previously described, POLARIS is the tool used by Mecklenburg County GIS to communicate this information to the public through the overlay entitled "Post Construction Buffers." POLARIS also indicates the post-construction buffers for Davidson, Matthews, and Charlotte; however, the ordinances for these jurisdictions specifically state that the perennial and intermittent streams that require buffers must be delineated by a certified professional using U.S. Army Corps of Engineers and N.C. Division of Water Resources methodology. Charlotte-Mecklenburg Storm Water Services has determined that these delineations will be based on the latest version of the N.C. Division of Water Resource's publication entitled *Identification Methods for the Origins of Intermittent and Perennial Streams*.

2.3.2 Delineation of Goose Creek Buffers

Mint Hill's Post-Construction Ordinance specifies that stream buffers are required for all intermittent and perennial streams in Goose Creek as well as ponds, lakes and reservoirs (excluding wetlands and agricultural ponds) with hydrologic connections to these streams as approximately shown on either the most recent published version of the soil survey map prepared by the Natural Resources Conservation Service of the United States Department of Agriculture (USDA) or the most recent version of the 1:24,000 scale (7.5 minute) quadrangle topographic maps prepared by the United States Geologic Survey (USGS). The ordinance further specifies that buffers are also required in Goose Creek when stream evaluations determine that intermittent or perennial streams are present based on the latest version of the N.C. Division of Water Quality's publication entitled *Identification Methods for the Origins of Intermittent and Perennial Streams*. Such stream evaluations were performed in the Mecklenburg County portion of Goose Creek by staff with the N.C. Division of Water Resources and data was provided to Mint Hill's Storm Water Administrator in December 2012. This coverage was compared to the USGS stream delineations contained in POLARIS and the map shown in Figure 3 was produced. Due to the number of discrepancies between the USGS delineations and data provided by the N.C. Division of Water Resources, staff with Charlotte-Mecklenburg Storm Water Services selected for evaluation three (3) stream segments where there was not concurrence on the buffer status. The stream segments selected for evaluation were identified as ephemeral and not requiring a buffer by the N.C. Division of Water Resources but are considered intermittent or perennial and requiring a buffer based on the USGS delineation contained in POLARIS. The three (3) evaluated stream segments, represented in Figure 3, were selected due to the segments being among the largest areas in question and based on the relative proximity of the sites to each other, helping to facilitate efficient completion of the field work. During July and August 2017, two (2) members of Charlotte-Mecklenburg Storm Water Services with valid SWITC certification conducted evaluations of the subject streams using criteria from the most recent version of the *Identification Methods for the Origins of Intermittent and Perennial Streams*. Of

the evaluated stream segments, the lower portion of Site 1 was identified as intermittent, the upper portion was confirmed to be ephemeral, and the portion where the stream transitioned to the intermittent classification was unable to be determined due to restricted access. Site 2 was confirmed to be an ephemeral channel. Site 3 was identified as a perennial stream, with the presence of strong indicators such as many fish present in pools within the reach and the presence of diverse biological indicators. Nearly the entire reach of Site 3, as shown in Figure 3, scored as a perennial stream until reaching the I-485 interstate highway, where origination of the stream was likely a part of piped storm water infrastructure.

In summary, the Site 1 evaluation revealed that the USGS determination for the lower stream reach was correct whereas the delineation by the N.C. Division of Water Resources was correct for the upper portion. For Site 2, the N.C. Division of Water Resources was determined to have the correct delineation whereas for Site 3 the USGS delineation was confirmed as correct. With such mixed result, Charlotte-Mecklenburg Storm Water Services decided to populate POLARIS with both the USGS and N.C. Division of Water Resources determinations combined to ensure maximum buffer coverage. In addition, the corrections resulting from the stream delineations performed by Charlotte-Mecklenburg Storm Water Services as described above were included in this updated POLARIS buffer coverage. If a citizen disagrees with a buffer delineation, Charlotte-Mecklenburg Storm Water Services will perform a field evaluation free of charge for confirmation as described in Section 2.3.7. When land development permits are required, the developer must confirm buffer coverage using an independent stream delineation confirmed by staff with Charlotte-Mecklenburg Storm Water Services as described in Section 2.3.1.

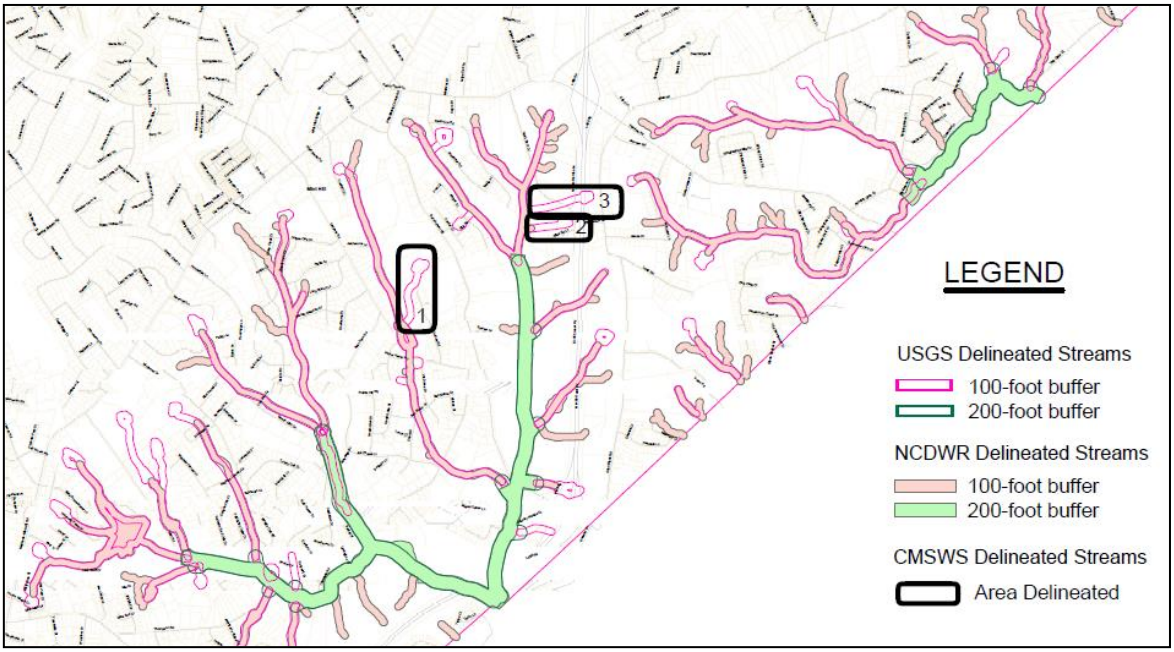


Figure 3: Comparison Between POLARIS and State Delineation Goose Creek Buffers

2.3.3 Delineation of Six Mile Creek Buffers

The City of Charlotte's Phase I Storm Water Permit effective through February 28, 2018 requires in Part II, Section F on page 7 of 14 that the post-construction buffer requirements contained in

the "N.C. Site Specific Water Quality Management Plan for the Goose Creek Watershed" must be met for Six Mile Creek. This requirement exists because, like Goose Creek, the Carolina heelsplitter is present in Six Mile Creek. The buffer requirements for Goose and Six Creeks are described in 15A NCAC 02B .0605, .0606, .0607, 0608, and .0609. These requirements were incorporated into Mint Hill's post-construction ordinance for the Goose Creek watershed, but were not incorporated into Charlotte's post-construction ordinance for Six Mile Creek. However, the Phase I Permit requirement supersedes the post-construction ordinance; therefore, the Goose Creek buffer requirements must be met in Six Mile Creek. Based on guidance provided by the State, the Goose Creek buffer requirements apply to Six Mile Creek only for those projects regulated under the State or local storm water programs. The buffer program with the State does not include rules for Six Mile Creek. Public utilities are not typically required by the State to obtain storm water permits for construction projects. Therefore, a Charlotte Water project may not be required to comply with the Goose Creek buffer requirements applied to Six Mile Creek. However, if a subdivision located in the Six Mile Creek watershed were installing sewer lines to be dedicated to Charlotte Water, then the Goose Creek buffer rules would apply provided the post-construction ordinance applies. This is different for Goose Creek, which is subject to N.C. Goose Creek Site Specific Management Plan. All sewer projects in Goose Creek, including Charlotte Water, are subject to the buffer requirements.

2.3.4 Delineation of S.W.I.M. Buffers

S.W.I.M. buffer ordinances specify that buffers apply at the point that a stream drains greater than or equal to 50 or 100 acres depending on the jurisdiction as specified in the table provided in Appendix 3, regardless of whether the stream is perennial or intermittent. The ordinances further specify that Mecklenburg County GIS will delineate these streams. This data is included in POLARIS under the layer entitled "Water Quality Buffers (SWIM)."

2.3.5 Delineation of Water Supply Watershed Buffers

Water supply watershed ordinances specify that buffers apply to the perennial streams as defined above that drain to the Catawba River lakes identified by a solid blue line on the USGS quadrangle maps. Mecklenburg County has digitally incorporated these maps into its POLARIS coverage as part of the layer entitled "Water Quality Buffers (SWIM)." The ordinances also specify that buffers apply to the lake shoreline, which must be delineated by a registered land surveyor based on the full pond elevation of the lake set by Duke Power as follows:

1. Lake Norman = 760 feet
2. Mountain Island lake = 647.5 feet
3. Lake Wylie = 569.4 feet

2.3.6 Delineation of Water Supply Watershed Buffers in the Town of Cornelius

There is considerable development in the Town of Cornelius that predates the watershed buffer rules making the implementation of these rules challenging at times. In general, lots subdivided prior to the watershed rules going into effect should comply with the lake setback or buffer indicated on the approved plat, which is usually 30 to 35 feet. If there is not a setback or buffer indicated on the plat, then the following plat dates can be used to determine the required buffer width: 30 feet for plats prior to

October 3, 1988; 40 feet for plats dating between October 3, 1988 and June 6, 1999; and the 50-foot State buffer for plats dated after June 7, 1999. For all properties with Crescent Land and Timber plats subdivided prior to the ordinance that are not part of the Peninsula HOA, a 50-foot building set-back for the primary structure and a 30-foot watershed buffer will apply. Existing lots without a structure are NOT exempt from the rules and the buffer would need to remain intact. Some of the lots in the Peninsula subdivision have a 30-foot buffer because of a petition filed in 1988. The plats that are affected by the petition have a reference to the petition in the notes section on the plat as follows: "Mecklenburg County Zoning RR(CD) Petition # 88-31(c)." Due to the challenging nature of buffer interpretations in the Town of Cornelius, the Town's Zoning Administrator should be consulted.

2.3.7 Requesting a Stream Evaluation for Possible Exclusion of Buffer Requirement

For buffers that apply to intermittent and/or perennial streams, which includes the post-construction and water supply watershed buffers, a property owner or designee can request a stream evaluation for possible exclusion from the buffer requirements using the process described below. For commercial developments and subdivisions, the same process applies except the owner or designee is required to submit a Stream Reach Evaluation Form (see Appendix 8) prepared by a certified professional for review by Charlotte-Mecklenburg Storm Water Services along with the "Application for Stream Exemption" described in step 1 below.

1. The owner or designee must submit an "Application for Stream Exemption" in the form of a letter to Richard Farmer at Charlotte-Mecklenburg Storm Water Services with Charlotte-Mecklenburg Storm Water Services, 2145 Suttle Avenue, Charlotte, NC 28208-5237, phone number 980-314-3215. A map must also be enclosed with the letter showing the location of the stream reach being requested for evaluation.
2. Upon receipt of this letter with enclosures, Charlotte-Mecklenburg Storm Water Services will assign staff to evaluate the stream reach and complete the Stream Reach Evaluation Form provided in Appendix 8.
3. Upon completion of the evaluation, staff will compare their completed Stream Reach Evaluation Form to the requirements of the applicable ordinance and determine if a buffer applies. Staff will describe their findings in an Activity Report and attach the completed Stream Reach Evaluation Form as well as the appropriate notification letter to the applicant contained in Appendices 9 and 10. Staff will also attach an aerial photo of the stream reach from POLARIS. Staff will forward this Activity Report to their Supervisor for review and approval.
4. Upon approval or disapproval, the Supervisor will forward the signed letter and attached documents to the Water Quality Administrative Assistant for mailing.
5. If the stream buffer is not properly delineated in POLARIS, the Supervisor will inform the Program Manager and the POLARIS coverage will be updated as necessary to be consistent with staff findings.
6. Appeal of a decision regarding stream reach exclusion from buffer requirements is through the Storm Water Advisory Committee (see Section 7).

For S.W.I.M. Buffers that are required based on the size of the upstream drainage area, a property owner or designee can request a stream evaluation for possible exclusion from the buffer requirements using the following process.

1. The owner or designee must submit an "Application for Stream Buffer Change in POLARIS" in the form of a letter to Charlotte-Mecklenburg Storm Water Services at

2145 Suttle Avenue, Charlotte, NC 28208-5236. A topographic map must be enclosed with this letter identifying the stream reach in question and corresponding upstream drainage area. Calculations must be provided with this map showing the methodology for delineating the drainage area size.

2. Upon receipt of this letter with enclosures, Charlotte-Mecklenburg Storm Water Services will assign staff to evaluate the information provided and confirm the size of the upstream drainage area for the stream section in question.
3. Upon completion of the evaluation, staff will compare their findings to the requirements of the applicable ordinance and determine if a buffer applies. Staff will describe their findings in an Activity Report and forward to their Supervisor for review and approval.
4. Upon approval or disapproval, the Supervisor will inform staff to notify the property owner or designee of the determination. This notification can be in the form of an email or letter.
5. The Supervisor will inform the Program Manager of any required changes in POLARIS.
6. Appeal of a decision regarding stream reach exclusion from buffer requirements is through the Storm Water Advisory Committee (see Section 7).

In POLARIS, stream delineations are digitally derived from topography generated from aerial surveys and most of the stream sections have not been field verified; therefore, errors sometimes occur in these delineations. The USGS maps used to delineate the water supply watershed buffers can also contain errors. In some situations, a stream may be shown on a parcel with a corresponding buffer where in actuality no stream exists. This can occur when a stream is piped underground or when an error occurs in POLARIS or the USGS mapping process. In such situations, the property owner or designee can contact Charlotte-Mecklenburg Storm Water Services for assistance. If field verification is required, the process described above will be followed. In some situations, the Program Manager or Supervisor may elect to perform the evaluation without receiving a written request from the owner or designee (#1 above). In some situations, it may be determined through a field evaluation that a stream exists on a parcel that is subject to buffer requirements but is not shown in POLARIS or on USGS maps. In such situations, the buffer requirement will apply. Onsite field delineations performed by a certified professional using approved State methodology always take precedent over POLARIS and USGS maps for delineation of buffers.

In addition to the processes outlined above, a property owner or designee may contact the Charlotte-Mecklenburg Storm Water Services at 980-314-3215 to request assistance with a stream delineation for a buffer requirement. In some circumstances, Charlotte-Mecklenburg Storm Water Services may elect to delineate a stream or confirm the size of an upstream drainage basin in POLARIS without receiving a request from a property owner or other concerned party.

For all buffer types and in all jurisdictions in Mecklenburg County, water quality buffers do not apply to the following:

- Ditches and manmade conveyances other than modified natural streams.
- Manmade ponds and lakes that are not intersected by a buffered stream segment and that are located outside natural drainage ways.
- Ephemeral conveyances, which contain water only when it rains.

- Piped stream sections.

2.3.8 Review of Stream Delineations by Charlotte-Mecklenburg Storm Water Services

Stream delineations must be documented on a "Steam Reach Evaluation Form" (see Appendix 8) and approved by Charlotte-Mecklenburg Storm Water Services when such delineations are to be used in an official capacity such as for a land development projects. The credentials of the person performing the delineation must be attached to this form, including verification of completion of the necessary certification training. Staff with Charlotte-Mecklenburg Storm Water Services and the N.C. Division of Water Resources are considered certified if they have satisfactorily completed the latest version of the "Surface Water Identification Training and Certification" or SWITC. However, SWITC is not available to the private sector. Therefore, at the discretion of Charlotte-Mecklenburg Storm Water Services, the private sector may be considered certified if they have satisfactorily completed the "Intermittent and Perennial Stream Identification" class offered by N.C. State University (contact Kelly McCarter at 919-515-9563). Staff may also consider other training and experience toward meeting private sector certification requirements as deemed appropriate. Stream delineations are commonly performed by certified professionals in the private sector for new construction requiring land development permits. It is important that these delineations be submitted to Charlotte-Mecklenburg Storm Water Services for review as early as possible during the land development process to prevent permitting delays. As part of their review, certified staff with Charlotte-Mecklenburg Storm Water Services may perform an independent stream delineation using the approved form described above. Written notification will be issued by staff regarding approval status. If disapproved, the consulting professional may request a determination by staff with the N.C. Division of Water Resources. Charlotte-Mecklenburg Storm Water Services will consider this determination in its analysis. The final determination regarding the presence or absence of a buffered stream lies with the staff of Charlotte-Mecklenburg Storm Water Services. All stream delineations performed by the private sector, Charlotte-Mecklenburg Storm Water Services, and the N.C. Division of Water Resources are valid for five (5) years from the date on the delineation form.

2.4 Buffer Area Delineation

The buffer area is determined by the buffer width, which applies to both sides of the stream and along the banks of lakes and ponds. Buffer widths vary considerably based on buffer type. Buffer widths are summarized in Appendix 2 for water supply watershed buffers, Appendix 3 for S.W.I.M. buffers, and Appendix 5 for post-construction buffers, including Goose and Six Mile Creeks. For the City of Charlotte and Mecklenburg County as well as the Towns of Pineville and Davidson, the width of the S.W.I.M. and post-construction buffers for streams draining greater than or equal to 640 acres is described as 100 feet PLUS 50% of the area of the FEMA fringe beyond 100 feet. Appendix 18 describes how this buffer area is calculated. The buffer area defined by the buffer width must be located on a parcel of land for the buffer to apply. In some situations, only the buffer and not the stream may be located on a parcel of land in which case the buffer would apply. Structures existing at the time the buffer ordinance was adopted are exempt from buffer requirements and may remain in place. Expansions and/or redevelopment that impact the buffer may be prohibited; therefore, it is essential to know the extent of the buffer on the ground to determine the potential impacts. All water quality buffers are measured

horizontally on a line perpendicular to the surface water. For lakes, buffer widths are measured landward from the full pond elevation described in the previous subsection. For streams and the ponds that they intersect, buffers are measured landward from the top of the bank on both sides of the stream or pond as illustrated by Figure 4.

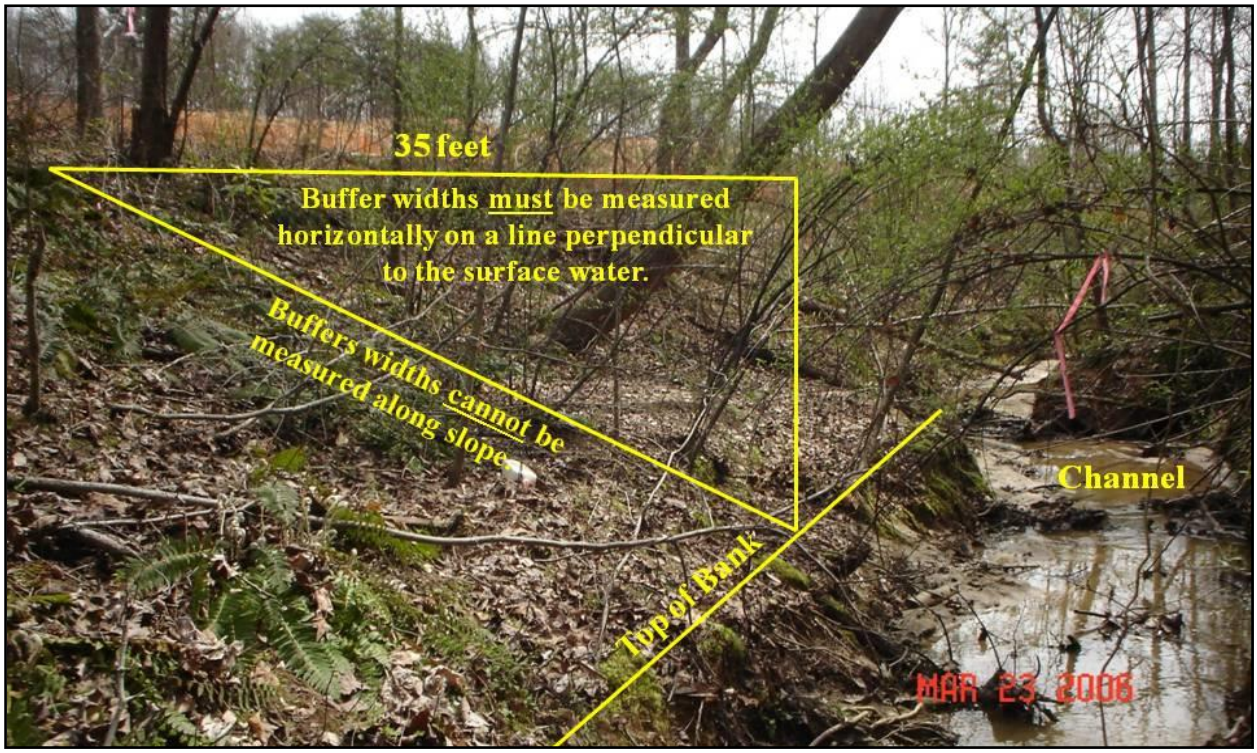


Figure 4: Buffer Area Measurement

The bank of a stream or pond is the vertical or sloped area rising from the channel where normal or base flow occurs. The top of the bank is considered the most landward location of the bank of the stream or pond, which is typically where rooted herbaceous vegetation begins to become established. The stream bank provides the lateral constraints for all stages of flow except for the flood stage when flows spill into the floodplain. Typically, there is a topographic break between the steep stream bank and the flatter floodplain. This break usually characterizes the top of the bank from where buffer widths are measured. The slope and configuration of the stream bank can vary significantly depending on flow, soil type and topography. In urban streams that are highly eroded, the stream bank may rise almost vertically from the stream channel. In more rural settings, the bank may rise much more gently. A stream may change buffer widths at multiple locations. These changes are always delineated as a straight-line perpendicular to the top of the bank as shown in Figure 5. The functionality behind POLARIS is unable to show a straight line terminus for a buffer; therefore, changes in buffer widths are misleadingly shown as an arch or "bubble" as illustrated in Figure 2. The upstream terminus of a buffer is always delineated by a bubble arching upstream from the point where the buffered stream segment begins as illustrated in Figure 5. In the case where a buffered stream has been piped, the buffer start point is a bubble arching downstream from the point where a stream enters the pipe and upstream from the point where the stream exits the pipe as illustrated in Figure 6. The arc or bubble is the same distance as the total buffer width and if there are zones, then the arc has zones as well. All buffer rules

require that the buffer area be ground delineated by a registered land surveyor. POLARIS or any other GIS coverage as well as USGS quadrangle maps cannot be used to establish a buffer width on the ground since it is impossible to account for slope without a land survey. In addition, the buffers shown in POLARIS as illustrated in Figure 2 are not to scale and cannot be used to determine the exact location of a buffer on the ground surface.

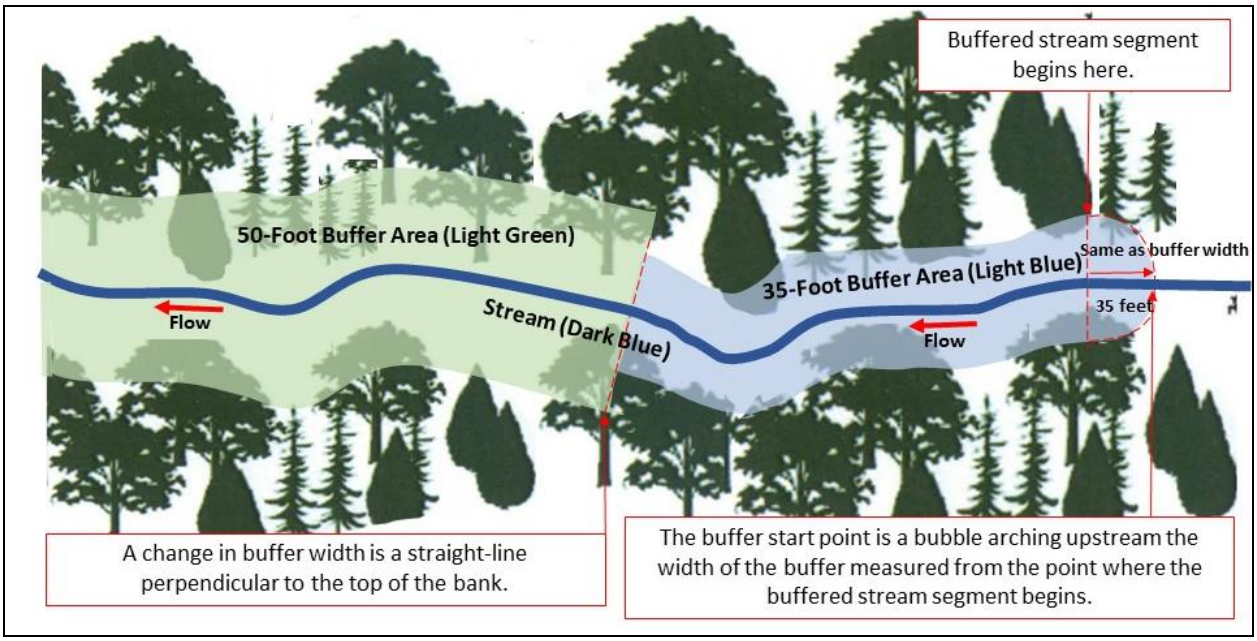


Figure 5: Identifying Where a Buffer Begins on a Stream Section

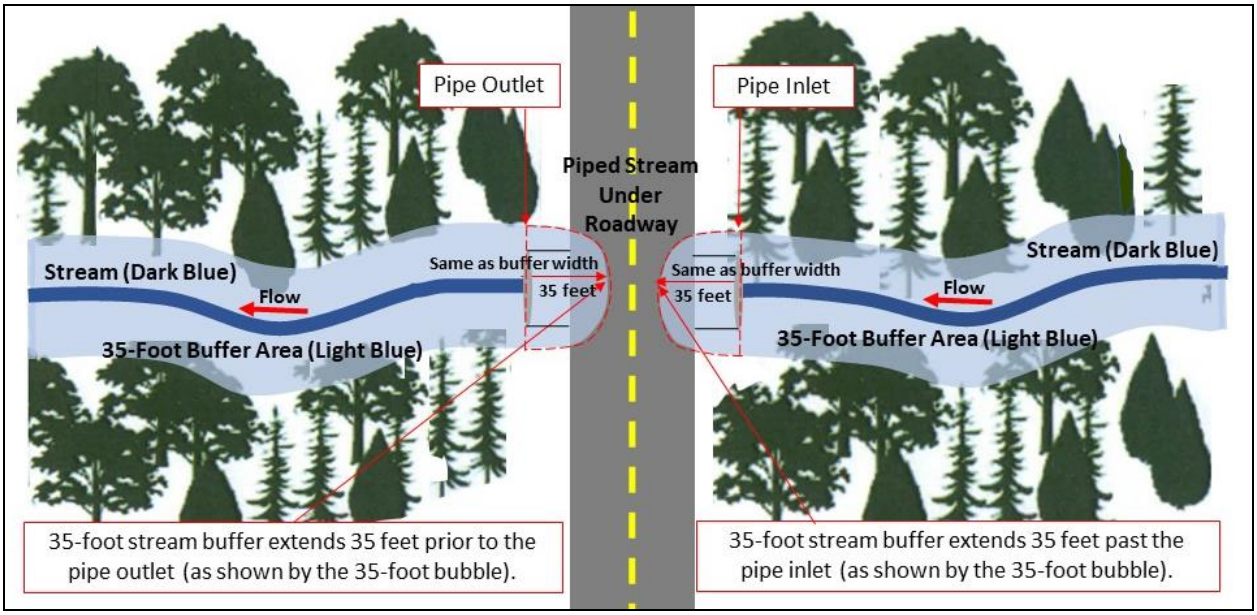


Figure 6: Identifying Where a Buffer Begins and Ends on a Piped Section

2.5 Buffers Crossing Jurisdictional Boundaries

When buffers extend beyond jurisdictional boundaries, the buffer widths that apply to the jurisdiction where the parcel and not the stream are located will always apply. This is illustrated in Figure 7 where parcel # 22764137, which is outlined in green in the image, is located in the Town of Matthews but the buffered stream is located in the City of Charlotte. In the Town of Matthews, the buffer width is 100 feet (shown in Figure 7 as the blue hatched area) plus 100% of the area of the FEMA floodfringe. In the City of Charlotte, the buffer width is 100 feet plus 50% of the area of the FEMA floodfringe beyond 100 feet. Since parcel # 22764137 is located in the Town of Matthews the buffer will be 100 feet plus the entire floodplain even though the stream is in the City of Charlotte. For the parcel across the creek in the City of Charlotte, the buffer will be 100 feet plus 50% of the area of the FEMA flood fringe beyond 100 feet.

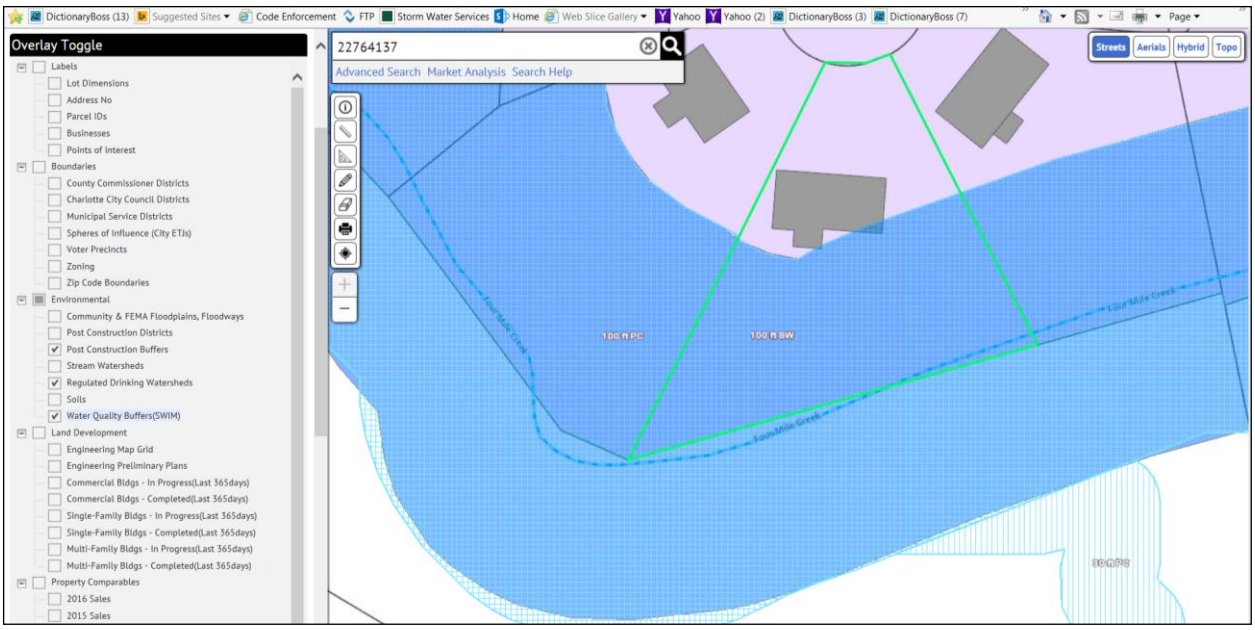


Figure 7: Buffer Crossing Jurisdictional Boundaries

2.6 Piped Stream Sections

Water quality buffer requirements do not apply to stream sections that were piped prior to the applicable buffer ordinance(s) going into effect. Pipe maintenance is allowed on these stream sections without mitigation, including removing and replacing pipes. However, if at any time the pipe is removed and not replaced resulting in the stream channel being exposed to the surface, then the stream becomes subject to the applicable buffer requirements. Prior approval and mitigation is required for piping a stream section on a parcel not grandfathered or otherwise exempt from buffer requirements after the applicable buffer ordinance has gone into effect provided the ordinance allows for this type of buffer disturbance as described in Sections 4 and 5 of this document. Prior approval and mitigation is ***not*** required for piping a stream section on a parcel that is ***grandfathered*** or otherwise exempt from buffer requirements after the applicable buffer ordinance has gone into effect. However, if the piping occurs on a grandfathered parcel with existing development and impervious area is increased in the buffer as part of a redevelopment or expansion, then mitigation is required for the increased impervious area in the buffer. In addition, State and/or federal mitigation does not satisfy the local mitigation

requirement. However, mitigation activities approved by a State or federal agency (acting pursuant to Sections 401 or 404 of the federal Clean Water Act) are exempt from the buffer requirements provided disturbed areas are properly stabilized and seeded within seven (7) days of project completion.

2.7 Stream Buffers and Wetlands

In some situations, a buffered stream will run into and/or out of a wetland. If there is no discernable channel in the wetland as shown in the top image in Figure 8, then the stream is considered non-contiguous and there is no buffer in the wetland. The buffer in this situation will end and/or begin in an arch extending beyond the channel the same width as the buffer as shown in Figure 8 and also in Figure 5. If there is no discernable channel in the wetland but the arches for the buffered streams running into and out of the wetland touch as shown in the middle image in Figure 8, then the buffer runs through the entire wetland. If the wetland has a discernable channel as shown in the bottom image in Figure 8, then the stream channel is considered contiguous, and the buffer runs through the entire wetland. Regardless of whether a wetland has a regulated stream buffer, wetland impacts must be properly permitted. The above guidance was provided by staff with the N.C. Division of Water Resources, 401 & Buffer Permitting Branch.

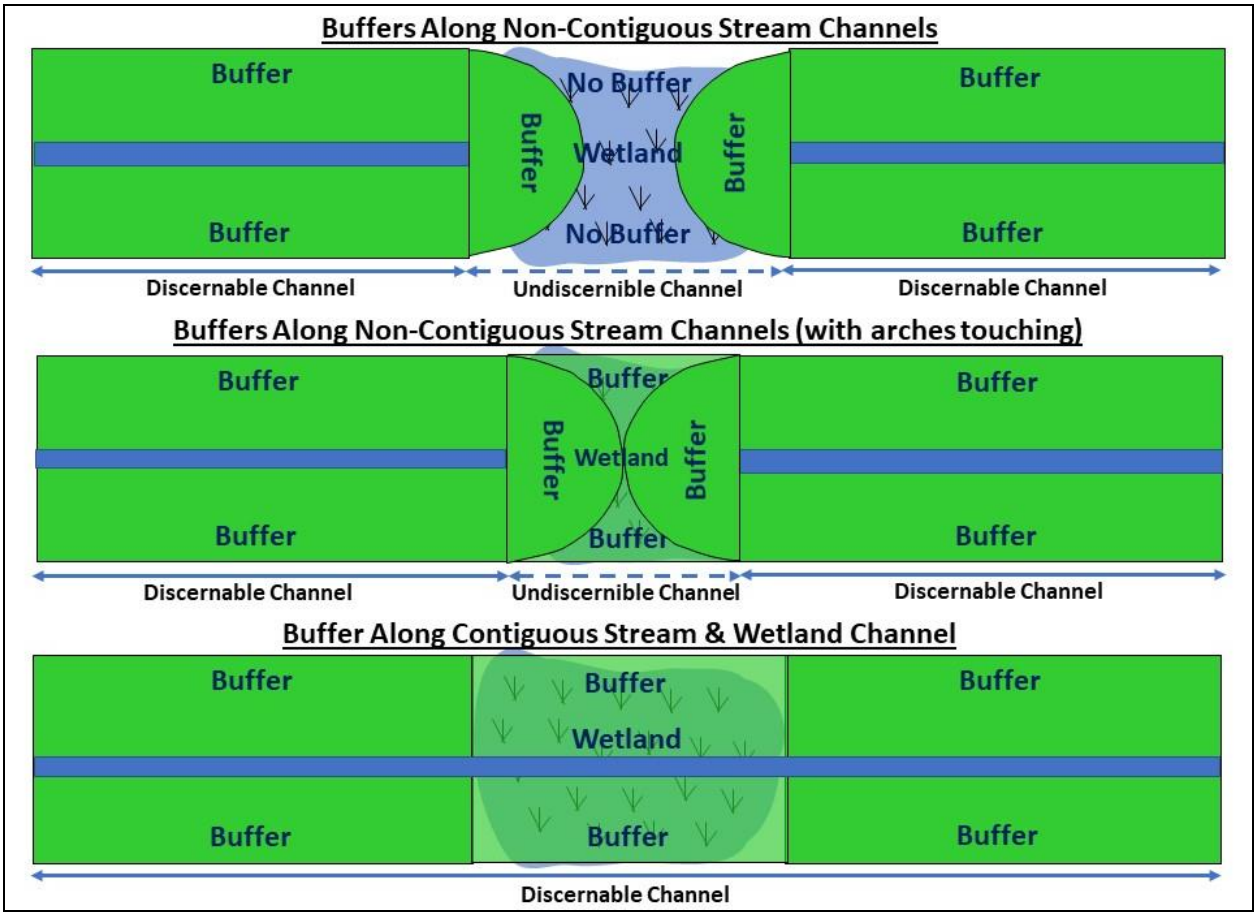
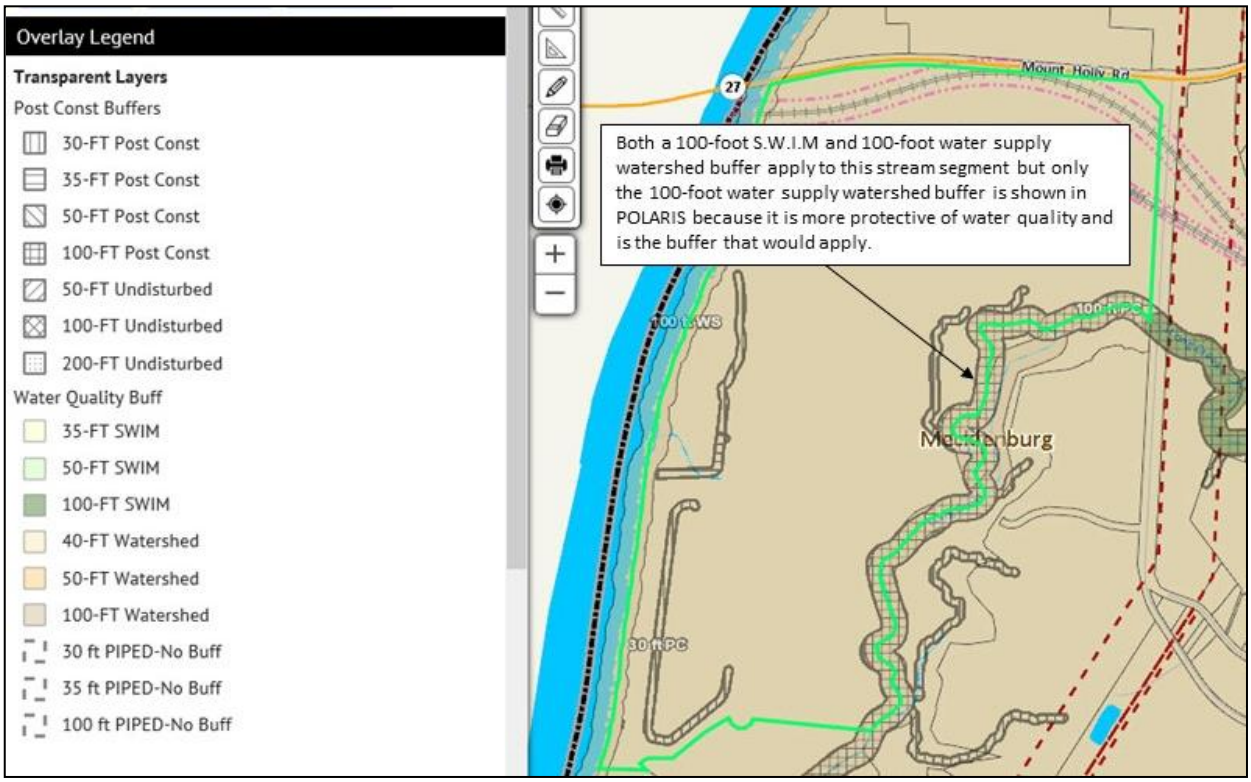


Figure 8: Stream Buffers and Wetlands

2.8 When More Than One Buffer Rule Applies

A confusing factor with the applicability of buffer ordinances is that in many cases multiple buffer types apply to the same parcel as illustrated in Figure 2. In all such situations, the buffer that is the most protective of water quality will govern. Typically, the more protective buffer is the wider buffer; however, the allowed uses within the buffer must also be considered. For example, a S.W.I.M. buffer and water supply watershed buffer for a parcel may both be 100 feet in width; however, the water supply watershed buffer is required to be left undisturbed whereas some disturbance is allowed in the S.W.I.M. buffer. Therefore, the water supply watershed buffer would apply because it would be considered more protective of water quality. In POLARIS where both a 100-foot water supply watershed buffer and 100-foot S.W.I.M. buffer apply, only the 100-foot water supply watershed buffer will be shown because it is the buffer that applies (see Figure 8). This rule was written into the GIS program that generated POLARIS in order to eliminate the confusion of having both buffers shown.

Figure 9: S.W.I.M. and Water Supply Watershed Buffers in POLARIS



2.9 S.W.I.M. and Post-Construction Buffers in Pineville

The S.W.I.M. buffer ordinance for the Town of Pineville specifies a buffer width of 100 feet plus 50% of the FEMA floodfringe beyond 100 feet for all streams draining greater than or equal to 640 acres. The Town's post-construction ordinance specifies a buffer width of 100 feet plus 100% of the FEMA floodfringe for the same streams. In addition, the Town's post-construction ordinance indicates that the provisions of the Town's S.W.I.M. ordinance shall apply. This is an obvious contradiction; therefore, Charlotte-Mecklenburg Storm Water Services shall apply the

buffer widths stated above depending on the buffer ordinance that applies. When both the S.W.I.M. and post-construction buffer requirements apply, the wider buffers specified in the post-construction ordinance shall govern. A simpler interpretation is that all the provisions of Pineville's S.W.I.M. buffer ordinance shall apply to the post-construction buffers except the widths.

2.10 Ponds

In the past, Charlotte-Mecklenburg Storm Water Services has received requests to convert an inline pond with buffer requirements, such as an old farm pond, into a structural BMP when a property is developed. There are also circumstances where a stream is converted into a pond for detention and/or water quality. As previously stated in this document, if a pond intersects a stream that has a water quality buffer, then the pond is subject to those buffer requirements. Buffers do not apply to the dams of ponds, which fall under the requirements of the N.C. Dam Safety Program that prohibits trees on dams that might affect its structural integrity. According to Alan Johnson with the Mooresville Regional Office of the N.C. Division of Water Resources, the US Army Corps of Engineers and State will usually not grant 401/404 permits for use of an inline pond for a structural BMP and therefore these conversions would typically not be allowed. However, in circumstances where permits are issued, prior approval and mitigation would be required for buffer impacts and every attempt would need to be made to maintain the integrity of the buffer. At a minimum, a 30-foot vegetated buffer, which may be grass, must be maintained around the pond when converted to meet the minimum post-construction requirements contained in the City of Charlotte's and Mecklenburg County's storm water permits.

2.11 Lots Subject to Flooding

There are two (2) separate development requirements associated with flooding along creeks that are not part of water quality buffer requirements, but that can impact the developability of a property. These requirements include:

1. Floodplain Ordinance Requirements – These requirements apply to development activities (grading, filling, building, etc.) that occur within the regulated floodplains, which include both the Community Floodplain and the FEMA Floodplain. Floodplains exist along streams that drain one square mile or greater and can restrict the extent of grading or filling, building locations, and building elevations. Any development within the floodplain requires a Floodplain Development Permit. If development activities are proposed within the floodway (areas of the floodplain with fast moving water), engineering flood studies are often required prior to allowing development activities. Floodplain maps can be viewed using two (2) Mecklenburg County applications as follows: POLARIS (http://polaris3g.mecklenburgcountync.gov/) and 3D Floodzone (http://meckmap.mecklenburgcountync.gov/3dfz/).
2. Land Development 100+1 Restrictions – These restrictions are placed on lots subject to flooding along certain streams or channels that drain less than one square mile of land surface. During the land development process, a review of storm water flowrates in streams and channels is conducted, and if that flow exceeds a certain limit, a 100+1 flood study is performed to establish a Building Restriction Flood Line (or sometimes referred to as a Storm Water Elevation Line) that is one (1) foot above the 100-year flood crest

(sometimes referred to as the Storm Water Protection Elevation or SWPE) and must be shown on the recorded plat. All habitable structures must be located outside this line and the lowest elevation of the structure must be built above the SWPE. The SWPE is also required to be shown on the recorded plat for each lot that touches the 100+1 line. In addition, certain lots may be undevelopable if they do not exceed a certain size (size varies per jurisdiction).

Where applicable, provide notification of the above floodplain requirements when responding to requests regarding the impacts of the buffer ordinances on the developability of a property. For more information regarding the above requirements, consult with the following staff: Jon Beller, Associate Project Manager, at 980-314-3212; Melonee Brock, Associate Project Manager, at 980-314-3206; or Don Ceccarelli, Floodplain Administrator, at 980-314-3236.

Section 3 Land Development Requirements

3.1 Construction Plans and Record Plats

All construction plans and record plats must adequately delineate the required water quality buffer areas. This delineation must be performed by a registered land surveyor. Plans may be prepared and sealed by a licensed professional engineer as long as the top of the bank or full pond elevation are labeled as "field located." The following requirements apply to all water quality buffers and must be adequately addressed on plans. Items 5, 8 and 9 below must be included as notations on plans. Appendix 9 provides a plan review check sheet for water quality buffer requirements.

1. The water quality buffer must be measured horizontally on a line perpendicular to the surface water, landward from the top of the bank on both sides of the stream or pond they intersect. For Catawba River lakes, this measurement is made from the full pond elevation.
2. All water quality buffers must be clearly marked and labeled on plans as "WATER QUALITY BUFFER." Plans must also label the outside boundary of the buffer and each of the buffer zones as well as the top of the bank or full pond elevation from where the buffer was measured.
3. Temporary sediment basins and other erosion control measures are not allowed in the buffer. The locations of all sediment and erosion control devices must be clearly indicated on plans.
4. The amount of disturbance allowed in a buffer varies based on the buffer type. For example, minimal disturbance is allowed in the water supply watershed, Goose Creek and Six Mile Creek buffers. Other water quality buffers, including post-construction and S.W.I.M., have different zones that determine the amount of disturbance allowed. The stream side zone of the buffer must be left completely undisturbed. In the managed use zone, a limited number of trees can be removed provided that the tree density remaining is a minimum of 8 healthy trees of a minimum 6-inch caliper per 1000 square feet. These trees should be evenly distributed throughout the managed use zone. Removal of existing vegetation must be performed by hand in such a manner as to prevent damage to the roots of remaining trees. No heavy equipment is permitted in the managed use or stream side zones except for the approved installation of utilities. No fill material can be brought into any of the buffer zones. No grubbing is allowed in the managed use or stream side zones.
5. Grading and other land disturbing activities are allowed only in the upland zone of S.W.I.M. and post-construction buffers; however, these activities must be performed in such a manner as to prevent damage to the roots of remaining trees. Grass and/or other suitable ground cover can be planted in the upland zone.
6. No structures can be placed in the water quality buffer except non-commercial buildings for storage, which can be placed in the upland zone of post-construction and S.W.I.M. buffers provided they do not exceed 150 square feet.
7. All storm water outfalls must be clearly indicated on plans and shown ending prior to the water quality buffer. Engineered or improved channels and piped storm water are not allowed in or through the buffer. Invert elevations at pipe outlets must be field verified and adjusted if needed to be zero to one foot higher than the buffer boundary.

8. Drainage outfalls must be designed to allow water to sheet flow across the buffer to filter out pollutants (see Section 3.3).
9. The outside buffer boundary must be clearly marked by orange fabric fencing prior to any land disturbing activities at the site and this fencing must be called out on the plans. In situations where the disturbed limits of a development occur prior to the water quality buffer, the orange fabric fencing may be installed at the edge of the disturbed area and prior to the outside edge of the buffer.
10. Any activity in the buffer must comply with the Ordinance and these Guidelines.
11. Water quality buffer boundaries, including the delineation of each zone (if applicable), must be shown on all surveys and record plats, including individual record plats for any lots affected.

3.2 Informing Builders and Property Owners of Buffer Requirements

The land developer should inform each builder of applicable buffer requirements prior to the initiation of construction activities. Builders should in-turn inform each homeowner of the applicable buffer requirements prior to building occupancy. In addition, the water quality buffer must be clearly marked on all record plats and labeled as "Area Not To Be Disturbed." In this way homebuyers will be made aware of the buffer requirement through the records disclosure process at loan closing. Brochures and other educational information regarding buffers are available from Mecklenburg County by contacting Rusty Rozzelle at 980-314-3217.

Buffer requirements should be referenced in homeowners' association documents. The suggested language for these documents is as follows:
"This development contains water quality buffers that filter pollutants from storm water runoff before it enters the creek or lake thus improving overall water quality conditions. <u>BE SURE to check the record plat for your property. Water quality buffers will be clearly marked.</u> If you have a water quality buffer on your property, it should remain undisturbed except for maintaining existing lawns. A disturbance of a water quality buffer violates State and local laws and could subject you to a fine. For questions or to report suspected water quality buffer violations, please call 311."

3.3 Ensuring Diffuse Flow Through the Buffer from Storm Water Outfalls

Diffuse flow of runoff must be maintained in the buffer by dispersing concentrated flow and re-establishing any disturbed vegetation. Concentrated runoff from ditches or other manmade conveyances must be converted to diffuse flow before the runoff enters the buffer. Periodic corrective action to restore diffuse flow, including maintaining/enhancing vegetative cover, must be implemented as necessary to prevent the formation of erosion gullies. Plantings downstream of the flow diffusion device must be adequate to prevent erosion. Devices for providing diffuse flow are specified in the Charlotte-Mecklenburg Land Development Standards Manual. All such devices must be located outside the buffer area. It is important to note that high volume discharges oftentimes cause these devices to fail resulting in a channel being scoured through the buffer rendering it ineffective. Figure 9 provides an example of a level spreader and filter strip with a reinforced bypass swale for high flows that has proven to be effective at addressing this problem. These bypass swales can be used in combination with a level spreader with or without the filter strip. Mecklenburg County allows these bypass devices to be placed in the buffer

because they are very effective for diverting high flows straight to the receiving stream to prevent erosion of the buffer. This particular design is available in Chapter 9 of the N.C. Department of Environmental Quality's BMP Design Manual.

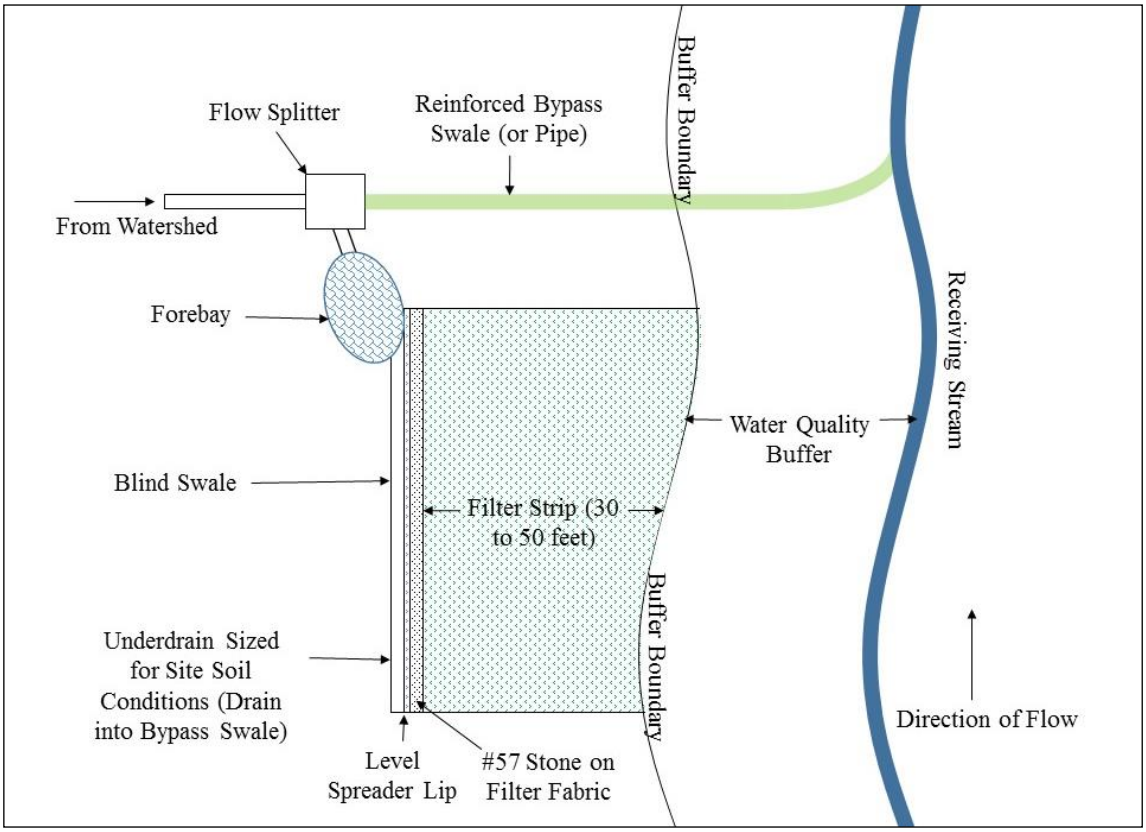


Figure 10: Level Spreader with Bypass for High Flows

Section 4 Water Quality Buffer Disturbances

4.1 Categories of Buffer Disturbances

All buffer disturbances fall into one of three (3) categories as follows:

1. Exempt (buffer rules do not apply) – Buffer disturbances designated as exempt are allowed within the buffer. Exempt disturbances must be designed, constructed and maintained to minimize soil disturbance and to provide the maximum water quality protection practicable.
2. Potentially Allowable (requires an "Authorization Certificate") – Buffer disturbances designated as potentially allowable may proceed provided it is demonstrated by the applicant that there are no practical alternatives to the requested use as described in Section 5.3. These disturbances require an Authorization Certificate from Charlotte-Mecklenburg Storm Water Services or in the case of some jurisdictions the authorization must come from the local Zoning Board of Adjustment. Most of these disturbances will require mitigation as discussed in Section 5.4. The purpose of this mitigation is to offset the effect of a buffer disturbance so there is minimal negative impact to surface water quality or aquatic life.
3. Prohibited (not allowed unless a variance is granted) – Disturbances designated as prohibited may not proceed within the buffer unless a variance is granted as described in Section 7. Site-specific mitigation may be required as a condition of variance approval.

The types of disturbances that fall into the three (3) categories differ depending on the type of buffer that applies and the jurisdiction where the buffer is located as described in the following Sections.

4.2 Water Supply Watershed Buffer Disturbances

Water supply watershed buffers were the first buffers established for the protection of water quality in Charlotte-Mecklenburg. The purpose of these buffers is to protect water quality conditions in the drinking water supply reservoirs in the Catawba River, including Lake Norman, Mountain Island Lake and Lake Wylie. These buffers do not have multiple zones with varying levels of allowable disturbances as do the more recently adopted buffer rules and generally water supply watershed buffers are considered to be "undisturbed" although some minimal disturbance is allowed.

4.2.1 Exempt Disturbances in Water Supply Watershed Buffers

Provided below are the disturbances that are considered to be exempt from the water supply watershed buffer requirements. These activities can be performed without prior authorization and do not require mitigation for the buffer impact. All disturbed land surfaces in the buffer must be stabilized using an effective groundcover.

1. Public projects such as roads, sanitary sewer lines and bridges.
2. The limbing of trees up to half the distance of their height.
3. The removal of dead trees.

4. Minimal hand clearing of small undergrowth and removal of trees two (2) inches in caliper or smaller measured six (6) inches above the root ball.
5. The addition of new trees and/or shrubs.

4.2.2 Potentially Allowable Disturbances in Water Supply Watershed Buffers

The following disturbances are potentially allowable requiring prior approval in the form of an "Authorization Certificate" from Charlotte-Mecklenburg Storm Water Services as well as possible mitigation. The process to follow to obtain this approval is described in Section 5. If any of these activities result in the removal of existing trees greater than 2-inch caliper measured six (6) inches above the root ball, then Level 2 revegetation authorized by Charlotte-Mecklenburg Storm Water Services is required as described in Section 6.1.2. All disturbed land surfaces both inside and outside the water quality buffer must be stabilized using an effective groundcover.

1. Removal of damaged or diseased trees larger than two (2) inch caliper measured six (6) inches above the root ball that could potentially fall and damage a structure.
2. Removal of invasive species. Information regarding invasive species in N.C. is available at the following link: https://files.nc.gov/ncdeq/Water%20Quality/Surface%20Water%20Protection/401/Riparian%20Buffers/Exotic%20Plant%20Guidlines.pdf
3. Stream bank or shoreline stabilization and dredging approved by Duke Energy.
4. Pathways that adhere to the Pathway Guidelines (see Appendix 10).
5. Irrigation systems that adhere to the Irrigation System Guidelines (Appendix 11).
6. Installation of piers approved by Duke Energy provided no trees greater than two (2) inch caliper measured six (6) inches above the root ball are removed or damaged, slatted decking is used to allow rainwater to pass through, and no roofed structures are placed within the buffer.
7. Installation of fences provided no trees greater than two (2) inch caliper measured six (6) inches above the root ball are removed or damaged and the fence is constructed with chain link, split rail, aluminum picket, or wood slat. No brick or concrete walls are allowed.
8. It is preferred that water wells be located outside the buffer. Technically, they are a permanent structure and permanent structures are not allowed in the buffer. However, sometimes due to lot constraints the buffer may be the only viable option for a water well. In such cases, they are allowed provided every effort is made to minimize buffer impacts.

On occasion, staff receive requests for minor buffer disturbances such as the installation of flag poles, signs, security lights and other new structures that result in a very minimal increase in impervious cover. In such cases, approval can be granted by Charlotte-Mecklenburg Storm Water Services on a case-by-case basis outside the normal review process described in Section 5. For such situations, approval can be granted by email without the submittal of an application or approval of mitigation.

There is considerable additional information regarding allowable and potentially allowable disturbances of watershed buffers described in the applicable Zoning Ordinances. These

ordinances should be consulted prior to making a determination regarding allowable buffer disturbances. This is illustrated by a determination made in August 2016 in response to a request from a citizen to install a structure to house a large rowboat in the buffer for Mountain Island Lake, but not in the water. The citizen claimed that the structure would satisfy the following definition of a "Water Dependent Structure" contained in Section 10.502 of Charlotte's Zoning Ordinance: *"Those structures for which the use requires access or proximity to or sitting within surface waters to fulfill its basic purpose, such as boat ramps, boat houses, docks, piers, bulkheads and similar structures. Ancillary facilities such as eating, drinking and entertainment establishments, outlet for boat supplies, parking lots, and commercial boat storage areas are not water dependent structures."* Section 10.508(3)(c) of this ordinance stipulates that water dependent structures are allowed in the buffer for Mountain Island Lake. Shad Spencer, Zoning Administrator for the City of Charlotte, determined that the structure would not be considered a boat house because a boat house is located over the water. Mr. Spencer further determined that the proposed structure was not a water dependent structure because it could fulfill its purpose by being located outside the buffer. Based on this determination, the request from the citizen to install the structure in the buffer was denied.

4.2.3 Septic System Repair Areas in Water Supply Watershed Buffers

On occasion, requests are received by the Health Department to locate a portion of a septic system repair area in a water supply watershed buffer. This is a situation where nothing is done in the buffer at the time of the request, but if the septic system fails and cannot be fixed, then the Health Department would allow an approved repair to be located within the buffer provided a variance was first obtained from the applicable Zoning authority. The following is the process that has been followed to allow this to occur.

1. A CO hold is placed on the property by the Health Department.
2. A note is placed on the recorded plat for the property stating the following: "A portion of the repair area for the septic system serving this property is located within the _____-foot buffer for the _____ Watershed measured from the full pond elevation of _____ feet. A variance must be obtained from _____ Zoning Board of Adjustment before a septic system repair can be installed within this ____-foot buffer."
3. CMSWS is provided a copy of the recorded plat to verify the inclusion of the language from #2 above. Following email verification from CMSWS, the Health Department will release the CO hold.

4.2.4 Prohibited Disturbances in Water Supply Watershed Buffers

The following disturbances are prohibited in the water supply watershed buffer.

1. Installation of permanent structures and/or built upon areas, including but not limited to septic tank systems, sidewalks, patios, gazebos, brick or concrete walls and outbuildings. Pervious asphalt, concrete, any type of gravel and pavers are also considered "built-upon area" and cannot be placed in the buffer. In the City of Charlotte, if a grandfathered structure located within the buffer is torn down, it cannot be rebuilt within the buffer. This is typically the case with the other jurisdictions but should be confirmed before a determination is made.

2. Grading, clearing or filling in the buffer.
3. Installation of ponds or structural Best Management Practices (BMPs).
4. Piping of roof drains or other drainage through the buffer. All storm water pipes must stop prior to the buffer and discharge as sheet flow.
5. Planting turf grass.
6. Installation of impervious pathways.

Any variation from the above requires a variance from the Zoning Board of Adjustment for the jurisdiction where the disturbance is proposed (see Section 7). A buffer disturbance in violation of the above criteria and in the absence of a variance is considered illegal and will require restoration (see Section 5.4.5). The exception is with the buffer rules for Lower Lake Wylie in the City of Charlotte, which includes provisions for preapproval by staff of buffer impacts in the event of a legitimate "hardship" and following approval of a mitigation plan. Three (3) mitigation techniques are allowed in Lower Lake Wylie, including Buffer Restoration, Buffer Preservation and Mitigation Credits (see Section 5.4.2).

4.3 S.W.I.M. and Post-Construction Buffer Disturbances

The Surface Water Improvement and Management (S.W.I.M.) buffer ordinances allow a variety of disturbances and are generally less restrictive than the water supply watershed buffer rules described in the previous section. In addition, the S.W.I.M. buffers have three (3) zones, including the stream side, managed use and upland zones. The allowable disturbances within the buffer vary depending on the zone (see Appendix 3). The post-construction buffer requirements for all the jurisdictions in Charlotte-Mecklenburg specify that the uses allowed in the different S.W.I.M. buffer zones, as well as the other provisions of the S.W.I.M. ordinances, apply to post-construction buffers. There are few very important distinctions regarding the post-construction buffers as follows:

1. If a S.W.I.M. buffer zone, including stream side, managed use and upland, is not indicated for a buffer width in the post-construction ordinance language, then the uses specified for these zones in the S.W.I.M. buffer ordinance do not apply and disturbance of this buffer is not allowed unless specifically stated in the post-construction ordinance. For example, in many of the jurisdictions the post-construction ordinance requires a 30-foot vegetated buffer with a 10-foot zone adjacent to the bank for streams draining less than 50 acres. This 10-foot zone is not referred to as a stream side, managed use or upland zone; therefore, the uses allowed in S.W.I.M. buffer ordinances for these zones do not apply to this 30-foot buffer, including the installation of BMPs, outbuildings, etc. The post-construction ordinance specifically states that disturbance of the 30-foot buffer is allowed and that revegetation is required; however, no built-upon area can be added to this buffer. 15A NCAC 02H .1017(c) grants an exception allowing built-upon area within this 30-foot Post-Construction buffer when there is a lack of practical alternatives. To qualify for this exception, prior approval must be obtained from the appropriate agency through the submittal of an Authorization Certification Application as described in Section 5. Section 2 of this application includes a "Request for a No Practical Alternatives Designation" that must be approved in order for an exception to be granted. Buffer mitigation may be required for the addition of built-upon area within the 30-foot Post-Construction buffer. At a minimum, Level 1 revegetation is required as described in

Section 6 except for disturbances within 10 feet of the top of the bank, which requires stream bank stabilization using bioengineering techniques.

2. The post-construction buffers in the Yadkin/Southeast Catawba District in the City of Charlotte and the Yadkin District in Matthews are described as "undisturbed" buffers. The only disturbances allowed without prior approval and mitigation are the disturbances that are allowed in the streamside zone for S.W.I.M. buffers as described in Section 4.3.1.
3. Goose and Six Mile Creeks have separate and more restrictive requirements than the S.W.I.M. buffers as described in Section 4.4 and Appendix 6. S.W.I.M. buffer zones and the uses allowed in these zones do not apply to these buffers. The reason for these restrictions is that these creeks are home to a federally endangered species of freshwater mussel called the Carolina heelsplitter, which requires a well-established buffer with minimal disturbances for its survival.

4.3.1 Exempt Disturbances

Provided below are the disturbances that are considered exempt from the S.W.I.M. and post-construction buffer requirements. Prior approval and mitigation for these disturbances is not required. The specific wording for the exemption varies slightly for the Towns and to ensure compliance refer to the language in the applicable ordinance. For all exempt disturbances, the streamside zone of the buffer shall be maintained to the maximum extent practicable. In addition, all disturbed areas must be stabilized and seeded within seven (7) days following project completion. Grasses and other herbaceous groundcovers are allowed. The natural contour of the land should be maintained.

1. Above ground utility crossings. It is recommended that woody vegetation be cleared by hand and that tree stumps remain. Land grubbing and grading is discouraged. Maintaining the vegetative root systems helps to preserve the integrity of the soil and minimize soil erosion. Construction activities should minimize the removal of woody vegetation, as well as the extent of the disturbed area and the amount of time the areas remain in a disturbed state. Measures should be undertaken after construction and during routine maintenance to ensure diffuse flow of storm water through the buffer.
2. Below ground utility crossings. For all projects constructed for Charlotte-Mecklenburg Utilities' (CMU), stabilization and seeding should be performed in accordance with the CMU Design Manual.
3. Domesticated animal trails (farming). Stream crossings must be constructed and maintained to minimize impacts to the stream side zone with fencing perpendicular and through the buffer to direct animal movement.
4. Drainage improvements/repairs for maintenance. Includes projects performed by Charlotte-Mecklenburg Storm Water Services, but also includes private sector drainage improvements and repairs.
5. Fences. Minimal disturbance of existing vegetation is allowed.
6. Flood control structures.
7. Land clearing. No cutting or clearing is allowed in the stream side zone except for the approved disturbances described in this Section. In the managed use zone, existing trees can be removed provided a density is maintained of 8 healthy trees of a minimum 6-inch caliper per 1000 square feet. In the upland zone, clearing and grading is allowed.

8. Mitigation activities. All mitigation activities are allowed in the buffer as approved by a State or Federal Agency acting pursuant to Sections 401 and/or 404 of the federal Clean Water Act.
9. Water and sewer utility installations. Installations should be near parallel to the stream.
10. Paths and trails. Pathways must use existing and proposed utility alignments or previously cleared areas and minimize tree cutting to the maximum extent practicable. Paths and trails cannot exceed 10 feet in width. To the extent possible, pathways should preserve existing drainage patterns and avoid drainage structures that concentrate storm water flow. Paths and trails made of materials considered to be built-upon area (such as asphalt, concrete, gravel, etc.) are not exempt and must remain greater than 30 feet from the top-of-bank for all developments where the Post-Construction Ordinance applies unless prior approval is obtained from the appropriate agency through the submittal of an Authorization Certification Application as described in Section 5 (see #1 in Section 4.3 above). Buffer restoration may be required as mitigation for the addition of built-upon area within the 30-foot Post-Construction buffer except for disturbances within 10 feet of the top of the bank, which requires stream bank stabilization using bioengineering techniques. As an alternative to mitigation, BMPs that promote storm water infiltration of runoff from the path may be used and can include the use of vegetated filter strips, grass swales, permeable pavement, and/or infiltration devices. These BMPs will be required to be maintained by the owner to ensure they continue to function as designed. Section 4.5 contains additional information regarding the installation of greenway trails in the buffer.
11. Piped or culverted streams. Streams that were piped or culverted prior to the effective date of the applicable ordinance are exempt from the buffer requirements.
12. Road crossings and bridges. If site plan approval is granted by the Planning Department, then road crossings and bridges for connectivity or transportation links (not including driveways) are exempt from the buffer requirements. In some situations, jurisdictions require streets for connectivity, but do not accept them for maintenance. These streets are exempt from the buffer requirements.
13. Storm water best management practices (BMPs). In the City of Charlotte, Mecklenburg County and the Towns of Mint Hill and Pineville, BMPs are allowed in the upland and managed use zones but not in the stream side zone. In the Towns of Huntersville and Matthews, BMPs are allowed in the upland use zone if approved as a condition of a buffer width variance. Also, in the Town of Huntersville BMPs are allowed in the upland use zone if located a minimum of 100 feet from the top of the stream bank. In the Town of Davidson, newly created ponds or lakes are allowed in the buffer but are required to have the same buffer as the original creek except a buffer is not required for the dam. It is possible that a BMP might be allowed in the buffer under this provision, but would need to be approved by the Planning Director for the Town. In the Town of Cornelius, there is not an ordinance provision allowing BMPs in the buffer. For all jurisdictions where BMPs are allowed in the buffer, the discharge and all energy dissipation devices associated with the BMP must end prior to the stream side zone. Sediment basins for erosion control would be considered BMPs and allowed as described above.
14. Stream bank stabilization.
15. Vegetation management. The following is allowed in the S.W.I.M. buffer for the management of vegetation:

- Emergency fire control measures provided topography is restored.
- Planting vegetation to enhance the riparian buffer.
- Pruning forest vegetation provided the health and function of the forest vegetation is not compromised.
- Removal of individual trees which are in danger of causing damage to dwellings, other structures or human life.
- Removal of poison ivy.
- Removal of understory nuisance vegetation as defined in: Smith, Cherri L. 1998. Exotic Plant Guidelines. Department of Environment and Natural Resources. Division of Parks and Recreation. Raleigh, NC. Guideline #30. These guidelines are available at the following link https://files.nc.gov/ncdeq/Water%20Quality/Surface%20Water%20Protection/401/Riparian%20Buffers/Exotic%20Plant%20Guidlines.pdf

4.3.2 Potentially Allowable Disturbances

In Mecklenburg County and the City of Charlotte as well as the Towns of Mint Hill and Pineville, any proposed disturbance of a S.W.I.M. or post-construction buffer that is not described in Section 4.3.1 above is considered potentially allowable and requires prior approval in the form of an "Authorization Certificate" (see Section 5) from Charlotte-Mecklenburg Storm Water Services, which includes mitigation. There are no prohibited buffer disturbances in these jurisdictions. All disturbances are considered potentially allowable with prior approval. Section 5 includes additional information regarding the approval process for buffer disturbances. Some of the potentially allowable buffer disturbances are listed below.

- filling or piping of streams;
- removal of vegetation from the stream side or managed use zones other than as described above;
- paths proposed within the stream side zone and the 30-foot Post-Construction buffer;
- stream relocations;
- fences and walls requiring tree removal in the stream side zone;
- filling in any of the 3 buffer zones;
- locating structures in any of the buffer zones; and
- extending a storm water outfall into the buffer without an upstream structural BMP. Since Structural BMPs are allowed in the Upland and Managed Use Zones of S.W.I.M. and post-construction buffers, the outfall from the BMP will need to be located in the buffer; therefore, no mitigation is required.

Prior approval and mitigation as described in Section 5 are required for S.W.I.M. and post-construction buffer disturbances resulting from piping in a stream or tributary. 401-404 requirements must also be satisfied.

4.3.3 Prohibited Disturbances

There are no prohibited S.W.I.M. or post-construction buffer disturbances in Mecklenburg County and the City of Charlotte as well as in the Towns of Mint Hill and Pineville. All disturbances in these jurisdictions are considered exempt or potentially allowed (see Sections 4.3.1 and 4.3.2). In the Towns of Cornelius, Davidson, Huntersville and Matthews, any variation

from the exempt disturbances described in Section 4.3.1 are considered prohibited and a variance is required (see Section 7). These jurisdictions do not provide for potentially allowable buffer disturbances as described in Section 4.3.2. For S.W.I.M. buffer disturbances, the Town's Zoning Board of Adjustment would consider the variance. For Cornelius, their Zoning Board of Adjustment would also consider variances for post-construction buffer disturbances as stated in the variance section of their post-construction ordinance. For the Towns of Davidson, Huntersville and Matthews, a variance for a disturbance of the post-construction buffer would be considered by the Charlotte-Mecklenburg Storm Water Advisory Committee. For all jurisdictions, the issuance of a 401 and/or 404 Permit does not automatically authorize an impact to the S.W.I.M. buffer unless it is an exempt disturbance, such as a road crossing, etc. If not an exempt disturbance, local approval is required.

4.4 Goose Creek and Six Mile Creek Buffer Disturbances

The buffer requirements for Goose and Six Mile Creeks are more restrictive than the S.W.I.M. and post-construction buffers, but less restrictive than the water supply watershed buffers. Also, like the water supply watershed buffers the buffers for Goose and Six Mile Creeks are considered "undisturbed" and do not include zones. The exempt, potentially allowable and prohibited disturbances for buffers along Goose and Six Mile Creeks are summarized in Appendix 6. Disturbances not included in Appendix 6 will require a variance from the Storm Water Advisory Committee (SWAC). In Goose Creek, the buffer requirements apply to all properties except those with an existing and ongoing use as of the effective date of the ordinance (February 1, 2009). These provisions are further defined in Section 4.4.1 below. In Six Mile Creek, the applicability criteria specified in Charlotte's post-construction ordinance govern whether the buffer requirements apply. In other words, if the post-construction ordinance applies so do the buffer requirements and vice-versa. This is not the case in Goose Creek where buffers have separate applicability criteria from the rest of the post-construction ordinance. The process to be followed to obtain approval for a buffer disturbance in both Goose and Six Mile Creeks is described in Section 5. The mitigation options available for buffers on Goose and Six Mile Creeks are described in Section 5.4.4.

4.4.1 Existing Uses in Goose Creek

For Goose and Six Mile Creeks, existing and ongoing uses within the stream buffer and disturbances associated with the maintenance of these uses are exempt from the buffer requirements. Only the portion of the stream buffer that contains the footprint of the existing and ongoing use is exempt. A use is considered existing and ongoing if it was present within the stream buffer as of February 1, 2009 (effective date of the N.C. Site Specific Water Quality Management Plan for Goose Creek) and has continued since that time. A use may also be considered existing and ongoing if vested rights exist. Existing uses include agriculture, buildings, industrial facilities, commercial areas, transportation facilities, maintained lawns, utility lines, and on-site sanitary sewage systems. Existing uses continue through a change in ownership. Activities necessary to maintain uses are allowed provided the site remains similarly vegetated, no built-upon area is added within the stream buffer area where it did not exist as of as February 1, 2009, and existing diffuse flow is maintained.

A use is also considered existing and ongoing and thereby exempt from buffer requirements if it can be documented to Charlotte-Mecklenburg Storm Water Services that at least one of the following criteria were met prior to February 1, 2009:

- Project requires a 401 Certification/404 Permit, and such permits are still valid;
- Project requires a State permit, such as a landfill, NPDES wastewater discharge, land application residuals and road construction activities, and has begun construction or is under contract to begin construction and has received all required State permits;
- Project is being reviewed through the Clean Water Act Section 404/National Environmental Policy Act Merger 01 Process or Safe Accountable Flexible Efficient Transportation Equity Act; a Legacy for Users (published by the US Army Corps of Engineers and Federal Highway Administration, 2003) or its immediate successor and that have reached agreement with Department of Environment and Natural Resources on avoidance and minimization; or
- Project is not required to be reviewed by the Clean Water Act Section 404/National Environmental Policy Act Merger 01 Process or Safe Accountable Flexible Efficient Transportation Equity Act; a Legacy for Users (published by the US Army Corps of Engineers and Federal Highway Administration, 2003) or its immediate successor if a Finding of No Significant Impact has been issued for the project and the project has the written approval of the Division of Water Quality.

At the time an existing use is changed to another use, the stream buffer requirements will apply. Change of use includes, but is not limited to, the following:

- The addition of built-upon area within the stream buffer;
- An agricultural operation within the stream buffer is converted to a non-agricultural use; or
- A lawn within the stream buffer that ceases to be maintained.

Redevelopment of a structure that was present within the stream buffer as of February 1, 2009 and has continued to exist since that time is considered an existing and ongoing use and is thereby exempt from buffer requirements in Goose and Six Mile Creeks provided the following applies:

- Redevelopment occurs on the same footprint as the existing development;
- Existing storm water controls remain, including diffuse flow conditions;
- Redevelopment of nonresidential structures results in the disturbance of less than a half-acre;
- Site remains vegetated in a manner similar to existing conditions; and
- Applicable storm water control requirements are met.

The final determination of whether a use is existing and ongoing is made by Charlotte-Mecklenburg Storm Water Services. Appeals of such determinations are handled by the Charlotte-Mecklenburg Storm Water Advisory Committee.

4.5 Greenway Trails

Greenway trails built by County or Town Park and Recreation Departments for public use are common along streams within Mecklenburg County. The purpose of these trails is to provide the

public with recreation, fitness, and education through exposure to wildlife habitat and natural buffers along streams. These trails are typically constructed of asphalt, concrete, or gravel and are located as far as practicable from the top of the stream bank maximizing the use of existing rights-of-ways. On occasion, no practical alternative exists to locating these trails within a water quality buffer. The following guidelines were developed by staff with Charlotte-Mecklenburg Storm Water Services in August 2016 working in cooperation with greenway planners and developers to facilitate compliance with the applicable buffer regulations when buffer disturbances are necessary for greenway trails.

4.5.1 Greenway Trails and Post-Construction Buffers

The following guidelines apply to greenways that are subject to post-construction buffer requirements.

1. The greenway trails identified in Appendix 12 are exempt from post-construction ordinance requirements because they are included in a Greenway Master Plan approved prior to the effective dates of the applicable ordinances. Exemptions for other greenway trails will be considered on a case-by-case basis.
2. Greenway trails included in #1 above are exempt from post-construction requirements for the trail width indicated on the approved Greenway Plan. If no trail width is indicated, then the greenway trail is exempt for up to 10 feet in width. For any trail width that exceeds the exempt width, post-construction ordinance applicability and buffer mitigation must be determined based on this additional width. For example, if no trail width is indicated on the grandfathered Greenway Plan and the trail is to be 16 feet wide, then the applicability criteria, including disturbed area and BUA thresholds, as well as required buffer mitigation would be based on the six (6) additional feet (16 feet – 10 feet).
3. Charlotte-Mecklenburg post-construction ordinances are applied to the "larger common plan of development or sale" that is defined as follows: "Any contiguous area where multiple separate and distinct construction or land disturbing activities will occur under one plan. A plan is any announcement or piece of documentation (including but not limited to public notice or hearing, drawing, permit application, zoning request, or site design) or physical demarcation (including but not limited to boundary signs, lot stakes, or surveyor markings) indicating that construction activities may occur on a specific plot." To comply with ordinance requirements, the project area for determining applicability criteria, including disturbed area and BUA thresholds, as well as required buffer mitigation, will be based upon the approved construction plan, including property owned and all permanent easements.
4. BMPs must be installed in accordance with the Charlotte-Mecklenburg BMP Design Manual for all greenway projects that exceed the applicable high density BUA threshold when water supply watershed or post-construction ordinances apply.
5. Section 5.4.3 describes the approval process that is to be followed for post-construction buffer mitigation.

4.5.2 S.W.I.M. Buffers and Greenway Trails

The following guidelines apply to greenways that are subject to S.W.I.M. buffer requirements.

1. Greenway trails ≤10 feet in width are allowed in the Managed Use and Upland Zones. Mitigation is required for any trail area in the Managed Use and Upland Zones beyond the 10-foot width.
2. Greenway trails are not allowed in the Streamside Zone except as described in numbers 3, 4 and 5 below. Mitigation is required for the entire width of any trail area in the Streamside Zone.
3. Greenway trails ≤10 feet in width are allowed in the Streamside Zone if located within an existing sewer right-of-way. Mitigation is required for any trail area beyond the 10-foot width.
4. Bridges and other types of creek crossings are allowed in the buffer, including the Streamside Zone, provided the channel and stream bank are properly stabilized following construction. No mitigation is required.
5. Greenway trails ≤10 feet in width are allowed in the buffer, including the Streamside Zone, to access a creek or road crossing, provided these trails take the most direct accessible route to the crossing from the Managed Use Zone. Mitigation is required for any trail area beyond the 10-foot width as well as for any trail area that represents an indirect crossing through the Streamside Zone.
6. Any local stream or post construction mitigation methods are in addition to any 401/404 or any state or federal requirements and do not absolve the project from acquiring all necessary federal, state, or local permits from other regulatory agencies.
7. In-stream stabilization of banks or stream restoration is an allowable mitigation option and will be credited at a 1:1 ratio based on square footage provided that methods are performed using pre-approved bioengineering methods (no rip rap).
8. The City of Charlotte will review and approve all buffer disturbances associated with greenway plans that include the Cross Charlotte Trail.
9. Mecklenburg County will review all other greenway buffer impacts unless the greenway is associated with a specific land development project, like a subdivision or commercial project, where City Land Development staff will have to perform plan reviews, in which case the City will review and approve all buffer impacts.
10. The allowable impacts and other provisions for the Streamside Zone, including those stated above, shall apply to the 30-foot post-construction buffer.
11. Section 5.4.3 describes the approval process that is to be followed for S.W.I.M. buffer mitigation.

4.5.3 Watershed Buffers and Greenway Trails

Greenway trails are not allowed in watershed buffers except for Lower Lake Wylie where they are potentially allowable requiring prior approval and mitigation. Section 5.4.2 describes the approval process that is to be followed.

4.5.4 Goose and Six Mile Creek Buffers and Greenway Trails

Greenway trails subject to the Goose Creek or Six Mile Creek buffer requirements are potentially allowable requiring prior approval and mitigation. Section 5.4.4 describes the approval process that is to be followed.

4.5.5 Buffer Guidelines for all Greenways Trails

The following guidelines apply to greenways that are subject to any buffer requirements.

1. For the purpose of these guidelines, rock/gravel base course covered with soil is not considered BUA and is not included in the calculation of the greenway trail width.
2. Sediment accumulation in and on structures such as greenway trails and tunnels located in the buffer is often a problem. It is the owner's responsibility to effectively manage this sediment, including removal and proper disposal. Greenway plans should provide maintenance language that addresses the management of accumulated sediment to prevent negative impacts to the creek, buffer and floodplain, including proper removal and disposal. It is an accepted practice to remove sediment and debris from greenway trails and tunnels within 24 to 48 hours after water recedes with large solids disposed of outside the buffer and floodplain and fine solids flushed into the water body provided there is no discernable increase in turbidity levels.

4.6 Built-upon Area Restrictions in Buffers

In the City of Charlotte, Mecklenburg County and the Towns of Pineville, Matthews, Mint Hill, and Huntersville, gazebos and storage buildings are allowed in the Upland Zone of a S.W.I.M. and post-construction buffer provided they are non-commercial and do not to exceed 150 square feet. Road crossings for connectivity or transportation links and public trails of varying widths are allowed in all S.W.I.M. buffers as well as public linear transportation projects (see Section 4.9). The water supply watershed rules prohibit the placement of any permanent structures in the buffer. A question that is sometimes asked is whether an overhanging porch or cantilever is allowed over a buffer. The answer is no, it is not allowed in any of the buffer types even if it is made of slatted wood with no roof. Although slatted decks are not BUA, by definition they are still part of the permanent structure and are not allowed. The overhangs, slatted and otherwise, should also not be allowed in S.W.I.M. buffers because they are not listed in the table of allowable uses. Another question that has arisen is whether solar panels and temporary sun sails/shades for the summer would count as BUA. The base of the solar panel, but not the panel itself, counts as BUA. Since a sun sail/shade is temporary and not considered a structure, it is not considered BUA.

4.7 401-404 Permit Requirements

Sections 401 and 404 of the Clean Water Act require that a 401 permit be obtained from the State and a 404 permit be obtained from the U.S. Army Corps of Engineers prior to disturbance of a stream and/or wetland that is considered "jurisdictional" water. Some examples of jurisdictional waters may include ephemeral, intermittent, and perennial streams, wetlands, lakes, rivers, and ponds. The contact information for these agencies is provided below. These agencies must be contacted prior to any impacts, including the installation of a pipe, bridge, etc.

Doug Perez
NCDEQ, Division of Water Resources
Office: (704) 235-2162; Cell: (704) 743-6872
Mooresville Regional Office

610 East Center Avenue, Suite 301
Mooresville, NC 28115
doug.perez@ncdenr.gov

David Shaeffer
U.S. Army Corps of Engineers, Charlotte Regulatory Satellite Office
Project Manager/Geographer
704-510-1437
David.l.shaeffer@usace.army.mil

4.8 Driveways and Road Crossings

All buffer rules allow NCDOT, City, and Town approved road crossings in the buffer without mitigation. Driveways are not as straight forward. The water supply watershed rules prohibit driveway crossings; therefore, a variance from the Zoning Board of Adjustment (ZBA) would be required except for the Lower Lake Wylie rules in Charlotte that include a mitigation provision. This is the only water supply watershed area in the County where a buffer disturbance such as a driveway crossing would be potentially allowable requiring approval and mitigation. The Goose Creek and Six Mile Creek buffer rules allow driveway crossings on single family residential lots that disturb equal to or less than 25 linear feet in width and are perpendicular. Driveway crossings that disturb greater than 25 linear feet in width and are perpendicular are potentially allowed, requiring approval and mitigation. The S.W.I.M. and post-construction buffer rules vary depending on the jurisdiction as follows:

- Charlotte – Buffer impacts are allowed for road crossings for connectivity or transportation links where the Charlotte-Mecklenburg Planning Commission has granted site plan approval. Unless this site plan approval is received for a driveway, a buffer disturbance would be potentially allowable requiring approval and mitigation as allowed by the Mitigation provisions of their ordinance.
- Cornelius – There is not a provision in Cornelius' ordinance for driveway crossings or mitigation; therefore, a variance from the Zoning Board of Adjustment would be required.
- Davidson – Buffer impacts are allowed for near perpendicular (75 degrees or greater) stream crossings by streets or by greenway trails, bicycle paths, sidewalks, and other pedestrian path approved by the rest of this ordinance. Other land uses within the stream buffers may be approved as part of a development plan subject to the requirement that the landowner demonstrate that the net result of the land use and strategy to mitigate the impact of the land use provide at least the same protection to the stream's water quality and ecological integrity. Therefore, a buffer disturbance for a driveway crossing would be potentially allowable requiring approval and mitigation.
- Huntersville – Buffer impacts are allowed for near perpendicular road crossings for connectivity or transportation links where the Town of Huntersville has granted site plan approval. Unless this site plan approval is received for a driveway, a variance from the ZBA would be required for a buffer disturbance for a driveway crossing. There are no mitigation provisions in Huntersville's ordinance that would allow approval and mitigation.
- Matthews – Buffer impacts are allowed for near perpendicular (≥75°) road crossings for connectivity or transportation links. There is no requirement for the Town to approve a

site plan. Town staff have indicated that buffer impacts associated with a driveway crossing could be allowed without preapproval or mitigation under this provision.

- Mint Hill – Buffer impacts are allowed for road crossings for connectivity or transportation links where the Town of Mint Hill has granted site plan approval. Unless this site plan approval is received for a driveway, a buffer disturbance would be potentially allowable requiring approval and mitigation as allowed by the Mitigation provisions of their ordinance.
- Pineville – Buffer impacts are allowed for road crossings for connectivity or transportation links where the Pineville Planning Board has granted site plan approval. Unless this site plan approval is received for a driveway, a buffer disturbance would be potentially allowable requiring approval and mitigation as allowed by the Mitigation provisions of their ordinance.

Construction of road crossings and private driveways must comply with all applicable standards for proper stabilization of disturbed areas to minimize negative effects on the quality of surface waters. Charlotte-Mecklenburg Storm Water Services also recommends notification to the N.C. Division of Water Resources (NCDWR) and U.S. Army Corps of Engineers (USACE) for disturbances to Jurisdictional Stream Channels (see Section 4.7 for contact information).

4.9 Sewer Utilities in Buffers

Charlotte-Mecklenburg watershed, S.W.I.M. and post-construction buffer rules allow parallel sewer utilities and crossings in the buffer. This was heavily debated when the ordinances were developed, but ultimately it was decided that sewer utilities needed to be allowed in the buffer because prohibiting them created significant engineering challenges with grades and higher installation and maintenance costs. The buffer rules applicable to Goose and Six Mile Creeks allow sewer utilities and crossings in the buffer with some very specific conditions as described in the Table of Uses provided in Appendix 6.

4.10 Public Linear Transportation Projects

During May 2020, a question arose as to whether compliance with the watershed, SWIM and Post-Construction buffer requirements on Long Creek would be required for the crossing of the access road to the new Stowe wastewater treatment plant. On May 7, 2020, Paul Clark with NCDEQ advised that according to 15A NCAC 02H .1002 all public linear transportation projects are exempt from State buffer requirements. A public linear transportation project is defined as a project consisting of a road, bridge, sidewalk, greenway, or railway that is on a public thoroughfare plan or provides improved access for existing development and that is owned and maintained by a public entity. NCDEQ staff indicated that the access road for the new treatment plan would be covered under this definition and would therefore be exempt from State buffer rules. City and County staff subsequently agreed that it would be exempt from all Charlotte-Mecklenburg buffer rules although not specifically indicated in the buffer ordinances for the watershed, S.W.I.M. and Post-Construction. The justification for this decision is that Charlotte-Mecklenburg allows parallel sewer utilities and crossings in the buffer so it would seem to follow that access roads to these utilities would be allowed.

Section 5 Obtaining Approval for Water Quality Buffer Disturbances

5.1 Authorization Certificate Application

Approval must be obtained for all "potentially allowable" buffer disturbances prior to the initiation of any activity (see Section 4). Approval for buffer disturbances considered as "prohibited" must be obtained through the variance process as described in Section 7. The agency responsible for issuing approvals for potentially allowable buffer disturbances depends on the buffer type and jurisdiction as summarized in Table 2.

Table 2: Agency Responsible for Approval of Potentially Allowable Buffer Disturbances

Jurisdiction	Type of Buffer Proposed for Disturbance				
	Water Supply Watershed	S.W.I.M.	Post-Construction	Goose Cr.	Six Mile Cr.
Charlotte	CMSWS (2)	CMSWS	CMSWS	N/A	CMSWS
Cornelius	CMSWS (3)	ZBA (4)	ZBA (4)	N/A	N/A
Davidson	CMSWS	ZBA (4)	SWAC (4)	N/A	N/A
Huntersville	CMSWS	ZBA (4)	ZBA (4)	N/A	N/A
Matthews	N/A	ZBA (4)	SWAC (4)	N/A	N/A
Mint Hill	N/A	CMSWS	CMSWS	CMSWS	N/A
Pineville	N/A	CMSWS	CMSWS	N/A	N/A
Mecklenburg County (1)	N/A	CMSWS	CMSWS	N/A	N/A

Acronyms: CMSWS = Charlotte-Mecklenburg Storm Water Services; ZBA = Zoning Board of Adjustment appointed by the jurisdiction; and N/A = Not Applicable

Footnotes: (1) Includes only the 1 square mile area south of Pineville where Mecklenburg County has zoning authority; (2) The Zoning Administrator for the City of Charlotte is consulted on all these buffer disturbances and usually a variance from the ZBA is required; (3) The Planning Director for the Town of Cornelius is consulted on all these buffer disturbances and usually a variance from the ZBA is not required; and (4) There are no potentially allowable buffer disturbances in these jurisdictions; therefore, all buffer disturbances require a variance from the applicable authority.

All buffer disturbances considered for approval by Charlotte-Mecklenburg Storm Water Services as indicated in Table 2 require that the property owner or their agent submit a properly completed "Authorization Certificate Application" form (see Appendix 13) prior to the initiation of any activities in the buffer. Completion of an Authorization Certificate Application form is also required for approval of mitigation/restoration for illegal buffer disturbances as described in Section 5.4.5. The Authorization Certificate is valid for 12 months following the approval date. The buffer disturbance and all mitigation measures must be completed and approved by Charlotte-Mecklenburg Storm Water Services prior to the end of 12 months or the Authorization Certificate is considered null and void and a new Authorization Certificate Application form will need to be submitted. Review and approval of Authorization Certificate Applications is performed by either City or County staff based on the following guidelines.

- City Staff Reviews (submit to Jordan Miller at Charlotte Storm Water Services, 600 East Fourth Street, Charlotte, N.C. 28202-2844, phone number 704-432-5571):
  In the City of Charlotte and its ETJ, City staff will handle all reviews of Authorization Certificate Applications for projects that are handled by Charlotte Land Development which includes all subdivisions, multifamily and commercial developments. The basic

rule to follow is that if a project is required to comply with the City's post-construction ordinance, then the buffer review process will be handled by City staff.

- County Staff Reviews (submit to Richard Farmer at Charlotte-Mecklenburg Storm Water Services, 2145 Suttle Avenue, Charlotte, NC 28208-5237, phone number 980-314-3215): In the City of Charlotte and its ETJ, County staff will handle all reviews of Authorization Certificate Applications for projects that are not handled by Charlotte Land Development which includes (but is not limited to) single-family residential developments, redevelopments and expansions that are not tied to a subdivision plan review as well as all applications for water supply watershed buffer disturbances along the Catawba River lakes in the City and its ETJ. In addition, County staff will handle Authorization Certificate Applications in the Towns and their ETJ areas.

The Authorization Certification Application form for water quality buffer disturbances includes three (3) sections as follows: Section 1 - General Information, Section 2 - Finding of No Practical Alternatives, and Section 3 - Mitigation. These Sections of the application are described further in parts 5.2, 5.3 and 5.4 below. For mitigation/restoration in response to a buffer violation, Sections 1 and 3 of the application must be completed but not Section 2 since the buffer disturbance has already occurred illegally thus there is no need for a finding of no practical alternative. For potentially allowable buffer disturbances that do not require mitigation as described in Section 4, Sections 1 and 2 of the form must be completed and not Section 3. For potentially allowable buffer disturbances that do require mitigation, all three (3) sections of the form must be completed by the applicant. The mitigation section requires the submittal of attachments as described in Section 5.4. Additional information regarding the completion of this form is provided in the following Sections. The approval of an Authorization Certification for a buffer disturbance requires that the following two (2) conditions be satisfied:

1. No practical alternatives exist for the buffer disturbance.
2. The proposed mitigation is sufficient to offset the negative impacts to the quality and usability of downstream surface waters associated with the buffer disturbance.

5.2 Section 1 – General Information

The applicant is required to provide the following general information in Section 1 of the Authorization Certificate Application form:

1. Applicant name, mailing address, phone numbers (office and cell), and email address.
2. If different from applicant, property owner name, mailing address, phone numbers (office and cell), and email address. Also, indicate applicant's affiliation with the owner. Written authorization for the buffer disturbance signed by the property owner must be attached to the application for it to be considered for approval.
3. Information regarding all contractors involved in the proposed buffer disturbance and restoration activities, including name, mailing address, phone numbers (office and cell), and email address. There is space for only one (1) contractor on the form. If multiple contractors are involved, include on a separate sheet of paper all the information required in the form for these contractors. If no contractors are involved indicated N/A for Not Applicable.
4. Location information regarding the buffer disturbance, including jurisdiction, address, subdivision name, and lot number (if applicable) of proposed buffer disturbance.

5. Type of buffer, including water supply watershed, S.W.I.M., post-construction, Goose Creek, or Six Mile Creek. Only one buffer type can be selected. If multiple buffers apply to the parcel, the more restrictive buffer will be used (see Section 4).
6. Type of buffer disturbance, including removal of vegetation, installation of structure, addition of fill, grading/land disturbing, and other (specify). All the buffer disturbances that apply must be indicated on the form.
7. Nature of the activity to be conducted by the applicant that will result in the buffer disturbance, such as shoreline stabilization, installation of a boardwalk, etc.
8. Reason for the proposed buffer disturbance, such as to improve access to a pier or dock via a boardwalk.
9. Total square footage of the parcel and the square footage of the area to be disturbed by the activity, including all equipment staging areas, access areas, etc. located both <u>inside</u> and <u>outside</u> the buffer.
10. Total square footage of the buffer on the parcel, including the square footage in each zone. If the buffer does not include zones, then indicate the width under "Total."
11. Total square footage of the buffer to be disturbed by the activity and the square footage of disturbance in each zone, including the area of the footprint of the use within the buffer that is causing the impact to the buffer; the area of the boundary of any clearing and grading activities necessary to accommodate the use outside the footprint of the use; and the area of any ongoing maintenance corridors within the stream buffer associated with the use outside the footprint and clearing/grading limits of the use. Temporary equipment access areas are not included in the disturbed area calculation provided tree removal and grading are not required and the area is properly stabilized.
12. Proposed work schedule, including the date when the buffer disturbance will occur and the date when mitigation will be completed. The mitigation is not considered complete until all disturbed areas both <u>inside</u> and <u>outside</u> the buffer have been stabilized and all mitigation measures have been installed.
13. Attach a scaled map of the parcel where the buffer disturbance is proposed that includes the following information. <u>IMPORANT NOTE:</u> If mitigation is to be performed, use this as a base map for delineating all mitigation techniques as described in Section 5.4. An example of a map including buffer disturbance and mitigation is provided in Appendix 14.
    a. Lengths of all boundary/property lines and the parcel's address where the activity and buffer disturbance are proposed.
    b. Location of all water course(s) on the property, including all perennial and intermittent streams, lakes, ponds and wetlands.
    c. Location(s) of buildings, parking areas, and other impervious surfaces.
    d. Location of the buffer area on the parcel, including lengths of all boundary lines and total square footage of the entire buffer and all buffer zones.
    e. The scale of the map, which must be smaller than 100 feet to the inch.
    f. Date of map.
    g. A small-scale vicinity map and north arrow.
    h. Location of proposed buffer disturbance, including lengths of all boundary lines and total square footage for each buffer zone. The boundary of the disturbed area must include the following: the area of the footprint of the use within the buffer that is causing the impact to the buffer; the area of the boundary of any clearing

and grading activities necessary to accommodate the use outside the footprint of the use; and the area of any ongoing maintenance corridors within the stream buffer associated with the use outside the footprint and clearing/grading limits of the use. Temporary equipment access areas are not included in the disturbed area calculation provided tree removal and grading are not required. These access areas must be shown on the map along with a note describing how these areas will be properly stabilized.

i. General location (do not survey), number, size and species of trees greater than two (2) inches in diameter that will be removed from the buffer.

5.3 Section 2 – Finding of No Practical Alternative

Buffers are important for protecting the quality and usability of Charlotte-Mecklenburg's surface water resources. For this reason, Charlotte-Mecklenburg Storm Water Services wants to ensure that there is "no practical alternative" to the proposed buffer disturbance prior to its approval and subsequent issuance of an Authorization Certificate. The burden of proof for this determination lies with the applicant who must provide responses to the following for the application to be considered for approval.

- Explain why the basic project purpose cannot be practically accomplished in a manner that would better minimize the disturbance, preserve aquatic life and habitat, and protect water quality.
- Explain why the use cannot practically be reduced in size or density, reconfigured or redesigned to better minimize the disturbance, preserve aquatic life and habitat, and protect water quality.
- Describe practices that have been incorporated into the project to minimize the buffer disturbance, preserve aquatic life and habitat, and protect water quality.

In addition to the above, Charlotte-Mecklenburg Storm Water Services will consider the impacts that the buffer disturbance may have on the overall quality and usability of the surface water resource, including its ability to support varied species of aquatic life and meet applicable water quality standards. If, after considering all available information, it is determined by staff that the applicant has satisfied the burden of proof for a determination of "No Practical Alternative" and that the overall negative impacts to the quality and usability of downstream surface waters can be adequately mitigated, then Charlotte-Mecklenburg Storm Water Services will determine that no practical alternative exists. Such a determination is required for the issuance of an Authorization Certificate allowing the buffer disturbance (see Section 5.1).

5.4 Section 3 – Mitigation

The purpose of mitigation is to offset the effect of a buffer disturbance so there is minimal negative impact to surface water quality or aquatic life. Most of the potentially allowable buffer disturbances described in Section 4 require some form of mitigation, which varies significantly based on the type of buffer and the nature of the disturbance. In addition, Charlotte-Mecklenburg Storm Water Services may require mitigation for any buffer disturbance if it is determined to be necessary for the protection of the quality and usability of downstream surface water resources and the propagation of aquatic life. Mitigation is also required for all illegal

buffer disturbances but under these circumstances it is referred to as "Restoration." All mitigation must be approved by Charlotte-Mecklenburg Storm Water Services before an Authorization Certificate Application allowing the disturbance can be approved. The applicant must include general information regarding the proposed mitigation in Section 3 of the application. A variety of additional information must be attached to the application to fully satisfy the submittal requirements for consideration of a proposed mitigation option. The following Sections describe the information that must be provided in Section 3 of the form as well as all additional information. Completion of the mitigation requirements specified below satisfies the second requirement for the issuance of an Authorization Certificate allowing a buffer disturbance (see Section 5.1), which specifies that the proposed mitigation must be sufficient to offset the negative impacts to the quality and usability of downstream surface waters associated with the buffer disturbance. On a case-by-case basis, Charlotte-Mecklenburg Storm Water Services may deviate from the requirements specified below when it is deemed necessary and appropriate for the protection of water quality.

5.4.1 Calculating the Total Disturbed Area in the Buffer

For mitigation purposes, the total disturbed area in the buffer is calculated by adding the following three (3) areas together without counting any area twice:

1. Area of the footprint of the use within the buffer that is causing the impact to the buffer;
2. Area of the boundary of any clearing and grading activities necessary to accommodate the use within the buffer outside the footprint of the use; and
3. Area of any ongoing maintenance corridors within the stream buffer associated with the use outside the footprint and clearing/grading limits of the use.

Temporary equipment access areas are not included in the disturbed area calculation provided tree removal and grading are not required and the area is properly stabilized. The map attached to the Authorization Certificate Application form as described in Section 5.2 must include the locations of the temporary access areas along with a note describing how these areas will be stabilized.

The following example calculation of the total disturbed area of a buffer is provided for clarification.

1. The proposed footprint within the buffer of a wastewater collection system and pump station is 1,000 square foot.
2. Trees must be cleared, and the ground graded in an area covering 2,000 square feet of the buffer with 1,000 of these square feet located outside of the footprint from number 1 above.
3. A gravel driveway is proposed for access to the pump station for ongoing maintenance that includes 200 square feet in the buffer with 100 square feet outside the areas included in numbers 1 and 2 above.
4. The total disturbed area is calculated as follows: 1,000 square feet (footprint) + 1,000 square feet (clearing limits outside the footprint) + 100 square feet (maintenance corridor outside the footprint and clearing limits) = 2,100 square feet of disturbed area in the buffer.

5.4.2 Mitigating for Water Supply Watershed Buffer Disturbances

Unless otherwise approved by Charlotte-Mecklenburg Storm Water Services, the only option available for mitigating/restoring a water supply watershed buffer disturbance is Level 2 revegetation of an area equal or greater in size than the area disturbed based on the calculation method described in Section 5.4.1, except in Lower Lake Wylie where additional mitigation measures are allowed as described below. This revegetation area must be on the same parcel as the buffer disturbance. It is recommended that chemical fertilizers and pesticides not be applied in the buffer. Compost and other organic fertilizers should be used and the removal of invasive species should be accomplished by hand clearing. In addition, diffuse flow must be maintained through the buffer in perpetuity following buffer revegetation. The following information must be provided in Section 3 of the Authorization Certificate Application form for a proposed disturbance of a water supply watershed buffer.

- Verification that Level 2 revegetation will be used on the same parcel as the buffer disturbance.
- Verification that the size of the buffer revegetation area is equivalent or greater than the area of buffer disturbance that has been calculated as described above.

For all water supply watershed buffer mitigation, a Water Quality Buffer Revegetation Plan must be submitted along with the Authorization Certificate Application form. This Plan can be incorporated into the scaled map prepared in Section 1 of the application as described in Section 5.2 above. This Plan must be prepared in strict accordance with Section 6.4. The following information must be included on the Plan in addition to what is specified in Section 6.4 if the Plan is for mitigation associated with a disturbance of a water supply watershed buffer. A sample Water Quality Buffer Revegetation Plan is provided in Appendix 14.

- If the plan is being submitted for shoreline stabilization or dredging, it must clearly illustrate the location of equipment access and staging areas and the restoration plans for these areas.
- The percentage of built-upon area on the lot where the buffer disturbance and revegetation is to occur should be indicated in the “Notes” area of the Plan.

The property owner or designee must submit annual reports to Charlotte-Mecklenburg Storm Water Services for a period of five (5) years after the mitigation has been completed showing that the trees planted have survived and that diffuse flow through the stream buffer has been maintained. This report must include a statement as to the number and percentage of trees that are surviving, and the number of trees replanted. The report should also include a statement as to whether diffuse flow through the buffer has been maintained. Photographs of the mitigation area showing trees and ground cover must be attached to the report. The property owner or designee should replace all dead and restore diffuse flow as needed prior to submitting this report.

One exception to the above described process occurs with the buffer requirements for Lower Lake Wylie in the City of Charlotte, which includes a provision allowing staff to pre-approve buffer disturbances in the event of a legitimate hardship. The mitigation techniques described below are included in the ordinance. **IMPORTANT NOTE:** Always receive approval from Charlotte’s Zoning Administrator prior to initiating the review process for a proposed disturbance to a Lower Lake Wylie buffer. It is very likely that approval from the Zoning Board

of Adjustment (ZBA) will be required. If the Zoning Administrator determines that ZBA approval is not required and that the normal review process can occur, then the process described in Section 5.5 will be followed.

- Buffer Restoration: The owner may restore and preserve the buffer area on any stream of equivalent or greater drainage area within the Lower Lake Wylie Watershed area the condition of which is determined to be qualified for restoration by the Mecklenburg County Environmental Protection Department on a 1:1 basis utilizing the square feet of buffer impacted. This restoration shall include stream bank improvements.
- Buffer Preservation: The owner may purchase, fee simple, other stream segments at equivalent or greater drainage area on a 1:1 square foot basis and convey fee simple and absolute title to the land to the City/County or other conservation organization.
- Mitigation Credits: The purchase of mitigation credits on a 1:1 basis utilizing the square feet of buffer impacted and the established rate of purchase of $10/square foot shall allow for stream buffer impacts on the specific site. Mitigation credits purchased under any other program (i.e., U.S. Army Corp of Engineers) shall not cover this requirement unless the issuing agency agrees to relinquish the funds to the appropriate City/County agency.

A second exception to the above described process occurs with certain minor buffer disturbances for which an abbreviated review process has been established as described in Section 5.7.

5.4.3 Mitigating for S.W.I.M. and Post-Construction Buffer Disturbances

As previously discussed in Section 4, the post-construction buffer requirements for all the jurisdictions in Charlotte-Mecklenburg specify that the provisions of the S.W.I.M. ordinances apply to post-construction buffers, including the mitigation provisions. The S.W.I.M. buffer ordinances for the City of Charlotte and Mecklenburg County as well as the Towns of Mint Hill and Pineville identify eight (8) pre-approved mitigation techniques as described below. This is considered "by-right" mitigation, meaning the mitigation option is not to be denied if the buffer disturbance is demonstrated to have "no practical alternatives." For the Towns of Cornelius, Davidson and Matthews, no pre-approved mitigation techniques are identified and "by-right" mitigation does not exist. All S.W.I.M. buffer disturbances for the Towns of Cornelius, Davidson and Matthews not specifically allowed by their S.W.I.M. ordinances must obtain a variance from the Zoning Board of Adjustment for the jurisdiction prior to the initiation of any buffer disturbance activity. For the Town of Cornelius, the Zoning Board of Adjustment must also issue a variance for any disturbance of the post-construction buffer not specifically allowed by the post-construction ordinance. In the Towns of Davidson and Matthews, variances for post-construction buffer disturbances are considered by the Charlotte-Mecklenburg Storm Water Advisory Committee as specified in the Towns' post-construction ordinances and not by their Zoning Board of Adjustments. These variances are oftentimes difficult to obtain. The Town of Huntersville identifies in their S.W.I.M. buffer ordinance the eight (8) mitigation techniques described below; however, they are not referred to as pre-approved and like the Towns of Davidson and Matthews all S.W.I.M buffer (I clarified this here because Table 2 says SWAC in Davidson and Matthews for PCCO) buffer disturbances not specifically allowed by the ordinance must receive a variance from the Town's Zoning Board of Adjustment. For all jurisdictions, mitigation should be performed in the same basin as the allowed buffer disturbance based on the following 19 basin delineations: Sugar/Irwin, Little Sugar/Briar, McMullen, McAlpine, Four

Mile, Six Mile, Stevens/Goose, Clear, McKee, Reedy, Back, Mallard, Clarks, Rocky River, McDowell, Gar, Long, Paw, and Steele. Deviations from this policy are allowed provided it is in the best interest of water quality.

Provided below are the eight (8) pre-approved mitigation techniques for S.W.I.M. and post-construction buffer disturbances in the City of Charlotte and Mecklenburg County as well as the Towns of Cornelius, Mint Hill and Pineville**.** An applicant can propose alternative mitigation measures to those specified below; however, prior to consideration by staff the applicant must demonstrate that the alternative measure will result in a net improvement in water quality compared to pre-development conditions. This proof must include the use of water quality modeling or other means determined to be appropriate by staff. A description of the alternative mitigation measure and proof of its effectiveness must be attached to the Authorization Certificate Application form when submitted for review. **IMPORTANT NOTE:** If the parcel is subject to an ordinance that requires the implementation of one or more of these techniques, such as water supply watershed protection or post-construction, then those techniques are not available for use on the parcel to mitigate for a buffer disturbance.

1. Installation of Structural Best Management Practices (BMPs)
   This mitigation option requires the installation of single or multiple structural BMPs designed to meet the criteria described below. This mitigation option must be fulfilled by installing a structural BMP to achieve an average annual 85% total suspended solids (TSS) removal efficiency for runoff generated from the first inch of rainfall from the built-upon area on the property where the buffer impact occurs. All BMPs used to fulfill this 85% TSS removal requirement must comply with the criteria specified in the most recent edition of the Charlotte-Mecklenburg BMP Design Manual that is available on the following website: http://stormwater.charmeck.org (select "Regulations", select "Post-Construction Programs & Manuals", select "Mecklenburg County, Towns of …….," select "Charlotte-Mecklenburg BMP Design Manual"). The following information must be included in Section 3 of the Authorization Certificate Application:
   - Type of BMP or infiltration method;
   - Size of drainage area to be treated (acres); and
   - Percentage of impervious cover in this drainage area.

   In addition, the location and dimensions of the BMP(s) and maintenance easements must be delineated on the scaled map prepared in Section 1 of the application as described in Section 5.2 above. If the Authorization Certificate is issued for the proposed buffer disturbance, the applicant will be notified in writing by Charlotte-Mecklenburg Storm Water Services and made aware that the following additional information must be provided for review prior to the release of building permits for the project:
   - Construction plans must be provided that have been sealed by a professional engineer.
   - An Operation and Maintenance Agreement and Maintenance Plan must be provided for each BMP. The purpose of these maintenance agreements and plans is to ensure that all structures are satisfactorily maintained in perpetuity. Digital versions of these documents are available on the website indicated above by selecting "Forms" instead of "Charlotte-Mecklenburg BMP Design Manual." The

maintenance of all structures installed for buffer mitigation is the responsibility of the owner or designee who must ensure that they are inspected by a qualified professional for compliance with approved plans and specifications on at least an annual basis. Any deficiencies detected as a result of these inspections must be corrected immediately. Inspection forms are available at the above website under "Forms" and "BMP Maintenance and Inspection Checklists." These completed forms must be mailed to the attention of the submit to Richard Farmer at Charlotte-Mecklenburg Storm Water Services, 2145 Suttle Avenue, Charlotte, NC 28208-5237 (phone number 980-314-3215).

- All the requirements associated with the installation of BMPs for compliance with post-construction ordinance requirements must be satisfied in addition to the requirements specified above.

Following the installation of the BMP(s) and prior to the release of Certificates of Occupancy, Charlotte-Mecklenburg Storm Water Services will conduct inspections to ensure compliance with construction plans. Following approval, an as-built drawing for each BMP must be submitted to Charlotte-Mecklenburg Storm Water Services for approval. A copy of a recorded plat showing the location and dimensions of each structure, including maintenance easements for BMPs, must be provided to Charlotte-Mecklenburg Storm Water Services for approval. Each structure must be labeled on the plat as a "Water Quality Treatment Device – Do Not Disturb." In addition, the approved Operation and Maintenance Agreement and Maintenance Plan must be recorded, and a copy provided to Charlotte-Mecklenburg Storm Water Services.

2. Stream Buffer Restoration – An area located on the same parcel as the buffer disturbance that is equal or greater in size compared to the total disturbed area of the buffer and each buffer zone must be revegetated and preserved in perpetuity. The total area of the buffer disturbance must be calculated using the method described in Section 5.4.1. In order to qualify for mitigation, the area proposed for restoration must be lacking in adequate vegetative cover to the extent that the restoration will result in the significant enhancement of the sites overall water quality buffering capabilities compared to predevelopment conditions. At a minimum, the number of trees located in the water quality buffer for the site should increase by a minimum of 50% over predevelopment conditions as a result of the restoration. The following information must be included in Section 3 of the Application for an Authorization Certification:
   - Verification of the proposed type of buffer revegetation, including Level 1 or Level 2.
   - Verification that the size of the restoration area is equivalent or greater than the area of buffer disturbance, including each buffer zone.

   A Water Quality Buffer Revegetation Plan must be submitted along with the Authorization Certificate Application form. This Plan can be incorporated into the scaled map prepared in Section 1 of the application as described in Section 5.2 above. This Plan must be prepared in strict accordance with Section 6.4. A sample Water Quality Buffer Revegetation Plan is provided in Appendix 14. The following additional requirement applies to stream buffer restorations performed for mitigation of a S.W.I.M. and post-

construction buffer disturbance for the purpose of protecting the area from future disturbance:

- If a buffer mitigation area could be disturbed in the future and not violate buffer ordinances (i.e. on a lot that is grandfathered from buffer requirements), then the area must be delineated on a map produced by a N.C. Registered Surveyor that also shows all parcel and buffer boundaries and the map must be recorded with the Mecklenburg County Register of Deeds Office. The following language must be included on the map identifying the buffer restoration area: "Water Quality Buffer Restoration Area - Disturbance of this area is strictly prohibited by law." This map must be recorded at the Mecklenburg County Register of Deeds Office and a copy provided to Charlotte-Mecklenburg Storm Water Services. If future disturbance of the mitigation area would result in a buffer violation, then the area does not need to be mapped and recorded. This applies to all types of buffers. For example, on a lake front where trees less than 2-inch caliper can be removed from a buffer, a mitigation involving the planting of trees in this buffer as mitigation for a buffer violation would need to be recorded if the trees planted were less than 2 inches. If trees are planted in the streamside zone to mitigate for a SWIM buffer disturbance on a lot where the buffer applies, then the area does not need to be recorded because the ordinance does not allow the removal of these trees.

3. Stream Buffer Preservation – A parcel with equivalent or greater buffer area than the area of the buffer being disturbed, including each buffer zone, must be preserved in perpetuity through the establishment of a conservation easement held by the City, County or conservation organization. Staff may consider other means for preserving the parcel on a case-by-case basis. The total area of the buffer disturbance must be calculated using the method described in Section 5.4.1. The stream buffer preservation area cannot include any area that is subject to water quality buffer or open space requirements. This must be an area that if not preserved for buffer mitigation would be available for development. The upstream drainage area of the buffered stream on the donated parcel must be similar in size ($\pm$10%) to the buffered stream on the impacted parcel. Charlotte-Mecklenburg Storm Water Services reserves the right to reject a parcel based on the findings of a Phase I Environmental Site Evaluation as well as other conditions that are determined to render the parcel unsuitable as a buffer preservation area. The following information must be included in Section 3 of the Application for an Authorization Certification:

   - Verification that the size of the buffer preservation area is equivalent or greater than the area of buffer disturbance, including each buffer zone.

   The following information must be attached to the Authorization Certificate Application form:

   - Scaled map showing the boundaries of the property to be donated along with the specific location and dimensions of the buffer preservation area, including the delineation of each buffer zone and the square footage in each zone. The map must also illustrate the location and dimensions of any existing structures and easements on the property as well as the quantity, type and size of existing trees and other vegetative cover.

- 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.
- 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.
- A title certificate.
- A Phase I Environmental Site Assessment report prepared in accordance with American Society for Testing and Methods (ASTM) Standard 1527-05.
- Written verification of the method for providing continued protection of the buffer through conservation easement or other means deemed acceptable by staff. The Mecklenburg County Park and Recreation Department and Catawba Lands Conservancy are 4.3 on page 40two (2) organizations operating in Mecklenburg County that are currently setup to accept and effectively manage a conservation easement suitable for satisfying the buffer preservation requirement. Both organizations have specific criteria for qualifying a parcel for a conservation easement. The criteria for the Mecklenburg County Park and Recreation Department are listed below.
    1. The tract must be located in close enough proximity to an existing County facility or a planned future facility, including a greenway, whereby it would provide a suitable amenity.
    2. The tract should contain a unique geographic feature and/or endangered or threatened flora or fauna that warrants preservation.
    3. The tract should include considerable acreage (>10 acres) to provide a standalone amenity to the community.

  In general, the Catawba Lands Conservancy will consider fee simple ownership or conservation easement on land that meets one or more of the conservation purposes described below. For more information, contact the Catawba Lands Conservancy at 704-342-3330.
    1. Protection of natural habitats for fish, wildlife, plants or similar ecosystems;
    2. Protection of surface water quality, including protection of riparian buffers, wetlands and floodplains;
    3. Preservation of open space, including farmland or forestland, for scenic enjoyment of the general public;
    4. Preservation of open space in furtherance of government policy;
    5. Preservation of cultural or historically important areas; and/or
    6. Preservation of land for outdoor recreation or education.

4. Wetlands Preservation – A parcel containing a certified wetland covering twice the area of the buffer disturbance must be preserved in perpetuity by conveying the parcel fee simple to the City, County or conservation organization. Staff may consider other means for preserving this parcel on a case-by-case basis. The total area of the buffer disturbance must be calculated using the method described in Section 5.4.1. The wetland preservation area cannot include any area that is subject to water quality buffer or open space requirements. This must be an area that if not preserved for buffer mitigation would be available for development. Charlotte-Mecklenburg Storm Water Services reserves the right to reject a parcel based on the findings of a Phase I Environmental Site Evaluation as well as other conditions that are determined to render the parcel unsuitable as a wetland preservation area. The following information must be included in Section 3 of the Application for an Authorization Certification:
    - Verification that the size of the wetland preservation area is equivalent or greater than twice the area of buffer disturbance.

    The following information must be attached to the Authorization Certificate Application form:
    - Scaled map showing the boundaries of the property to be donated along with the specific location and dimensions of the wetland preservation area. The map must also illustrate the location and dimensions of any existing structures and easements on the property as well as the quantity, type and size of existing trees and other vegetative cover.
    - 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.
    - 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.
    - Written certification by a wetlands specialist that the area to be preserved meets the criteria for wetland delineation.
    - A title certificate.
    - A Phase I Environmental Site Assessment report prepared in accordance with American Society for Testing and Methods (ASTM) Standard 1527-05.
    - Written verification of the method for providing continued protection of the wetland through conservation easement or other means deemed acceptable by staff.

5. Bottom Land Hardwood Preservation – A parcel containing bottom land hardwoods covering twice the area of the buffer disturbance must be preserved in perpetuity by

conveying the parcel fee simple to the City, County or conservation organization. Staff may consider other means for preserving this parcel on a case-by-case basis. The total area of the buffer disturbance must be calculated using the method described in Section 5.4.1. The bottom land hardwood preservation area cannot include any area that is subject to water quality buffer or open space requirements. This must be an area that if not preserved for buffer mitigation would be available for development. Charlotte-Mecklenburg Storm Water Services reserves the right to reject a parcel based on the findings of a Phase I Environmental Site Evaluation as well as other conditions that are determined to render the parcel unsuitable as a nature preserve. The following information must be included in Section 3 of the Authorization Certification Application:

- Calculations verifying that the size of the bottom land hardwood preservation area is twice the size of the area of buffer being disturbed.

The following information must be attached to the Authorization Certificate Application form:

- Scaled map showing the boundaries of the property to be donated along with the specific location and dimensions of the bottom land hardwood preservation area. The map must also illustrate the location and dimensions of any existing structures and easements on the property as well as the quantity, type and size of existing trees and other vegetative cover.
- 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.
- 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.
- A title certificate.
- A Phase I Environmental Site Assessment report prepared in accordance with American Society for Testing and Methods (ASTM) Standard 1527-05.
- Written verification of the method for providing continued protection of the bottom land hardwood through conservation easement or other means deemed acceptable by staff.

6. <u>Controlled Impervious Cover</u> – Impervious cover on the parcel where the buffer disturbance is proposed must be equal to or less than 24%. Preservation of the stream side zone is encouraged. If the developed parcel is required to comply with water supply watershed protection or post-construction regulations, both of which have impervious area requirements, then this mitigation option is available for use only if the post-development built-upon area remains below the high-density threshold for the applicable

watershed district. For example, if a site is required to comply with the post-construction ordinance in the City of Charlotte and is located in the Western Catawba Watershed District, then the post-development built-upon area must stay under the 12% high density threshold for this mitigation option to be used. If a site is exempt from water supply watershed protection and/or post-construction regulations, then the 24% limit on impervious cover is allowed for mitigation. For example, if a project is located in the City of Charlotte and less than 1 acre is disturbed and built-upon area is held below 24% then the project would be excluded from post-construction ordinance requirements and the buffer mitigation would be approved for limiting impervious area to less than 24%. To apply for this option, the following information must be included in Section 3 of the Application for an Authorization Certification:

- Calculations verifying that the total impervious area on the parcel is equal to or less than 24% (or another applicable BUA threshold as described above).

The following information must be attached to the Authorization Certificate Application form:

- To prevent impervious area from increasing beyond 24% (or other applicable BUA threshold as described above), the full extent of all impervious cover must be delineated on a map produced by a N.C. Registered Surveyor that also shows all parcel and buffer boundaries. The following language must be included on the map: "Impervious area is restricted to compensate for disturbance of the stream buffer. Impervious area cannot be increased from what is allocated on this plat/survey." This map must be recorded at the Mecklenburg County Register of Deeds Office and a copy provided to Charlotte-Mecklenburg Storm Water Services.

7. Open Space Development – Preserve as undisturbed open space at least 50% of the total land area of the site where the buffer disturbance is proposed. No land clearing, grading, removal of vegetation or other disturbance can occur in this area. This open space cannot include any area that is subject to water quality buffer or open space requirements. This must be area that if not preserved for buffer mitigation would be available for development. Preservation of the stream side zone is encouraged. The following information must be included in Section 3 of the Application for an Authorization Certification:

   - Calculations verifying that the open space on the parcel is equal to or greater than 50%.

   The following information must be attached to the Authorization Certificate Application form:

   - Scaled map showing the boundaries of the open space area. The map must also illustrate the location and dimensions of all structures and easements on the property as well as the quantity, type and size of existing trees and other vegetative cover. Since this undisturbed open space is required to be on the same parcel as the proposed buffer disturbance, the map prepared in Section 1 of the Authorization Certificate Application form as described in Section 5.2 of this document should be used as a base map for illustrating this undisturbed open space area.

- 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.
- To prevent the future disturbance of this open space, the full extent of all open space must be delineated on a map produced by a N.C. Registered Surveyor that also shows all parcel and buffer boundaries. The following language must be included on the map: "Water Quality Buffer Mitigation Area - Disturbance of this area is strictly prohibited by law." This map must be recorded at the Mecklenburg County Register of Deeds Office and a copy provided to Charlotte-Mecklenburg Storm Water Services.

8. Mitigation Credits – Mitigation credits may be purchased on a 1:1 basis utilizing the square feet of the disturbed area and the prevailing rate of $10 / square foot. The total area of the buffer disturbance must be calculated using the method described in Section 5.4.1. The mitigation money will be incorporated into the Stream Buffer Mitigation Fund maintained by Charlotte-Mecklenburg Storm Water Services. Monies from this Fund will be used to improve water quality conditions through stream and/or buffer restoration, open space preservation, installation of BMPs or other means deemed appropriate by that agency. Preservation of the stream side zone is encouraged. The following information must be included in Section 3 of the Application for an Authorization Certification:
   - Calculations verifying the size of the proposed buffer impact and the associated total mitigation cost.

   The mitigation fee must be paid in full prior to the initiation of the approved buffer disturbance activity. Charlotte-Mecklenburg Storm Water Services will review the fee every two (2) years and compare it to the actual cost of restoration activities conducted by local and State agencies, including site identification, planning, implementation, monitoring and maintenance costs. Based upon this biennial review, Charlotte-Mecklenburg Storm Water Services will recommend revisions to the above fee as deemed necessary.

An exception to the above-described process occurs with certain minor buffer disturbances for which an abbreviated review process has been established as described in Section 5.7.

5.4.4 Mitigating for Goose Creek and Six Mile Creek Buffer Disturbances

Mitigation is required for specific buffer disturbances in Goose and Six Mile Creeks as described in Appendix 6. For Six Mile Creek, the State's buffer program has indicated that the Goose Creek buffer requirements apply only for those projects regulated under the State or local storm water programs. Unlike Goose Creek, the State's buffer program does not include rules for Six Mile Creek. Public utilities are not typically required by the State or local programs to obtain storm water permits for construction projects; therefore, a Charlotte Water project would not be

required to comply with the Goose Creek buffer requirements applied to Six Mile Creek. Instead, the buffer disturbance and mitigation provisions of the S.W.I.M. and post-construction buffers would apply if applicable. However, if a subdivision were installing sewer lines to be dedicated to Charlotte Water, then the Goose Creek buffer rules would apply provided the post-construction ordinance applies to the larger subdivision. In this case, the mitigation guidelines for the S.W.I.M. and post-construction buffers would apply as described in Section 5.4.3.

Mitigation in Goose Creek is handled differently than Six Mile Creek because it is regulated by the State's buffer program under the N.C. Goose Creek Site Specific Management Plan. Mecklenburg has been delegated authority by the State to administer this plan in its jurisdiction and in the Town of Mint Hill. Mint Hill's post-construction ordinance contains the provisions for compliance with the buffer requirements described in the plan. Section 305(C)(11) of the post-construction ordinance states that Goose Creek buffer mitigation shall be performed in accordance with 15A NCAC 02B .0295. CMSWS will administer the mitigation process in strict accordance with this State law. State staff must be copied on all written correspondence regarding Goose Creek buffer violations and mitigation. The State contact is as follows:

Shelton Sullivan
401 & Buffer Permitting Branch, Division of Water Resources, North Carolina Department of Environmental Quality
Location: 512 N. Salisbury Street, Archdale Building #942G, Raleigh, NC 27604
US Mail: 1617 Mail Service Center, Raleigh, NC 27699-1617
Email: shelton.sullivan@ncdenr.gov
Office Phone: (919) 707-3636
Cell Phone: (984) 272-7626

The following is the process to be followed for approval of mitigation for buffer disturbances in the Goose Creek watershed:

1. An Authorization Certificate Application must be submitted to CMSWS for all buffer impacts and mitigation in the Goose Creek Watershed in Mecklenburg County. A Mitigation Plan must be attached to this Application that contains the specifics regarding the proposed mitigation in accordance with 15A NCAC 02B .0295. The following types of mitigation are available in the Goose Creek Watershed:
   a) Riparian buffer restoration or enhancement pursuant to Paragraph (n) of the Rule;
   b) Purchase credits from an approved mitigation bank or Division of Mitigation Services (DMS);
   c) Donation of real property or of an interest in real property pursuant to Paragraph (k) of the Rule;
   d) Alternative buffer mitigation pursuant to Paragraph (o) of the Rule; or
   e) Other buffer mitigation as approved by the Environmental Management Commission as a condition of a variance approval.
2. The bank or other mitigation provider must provide a Statement of Availability of credits that must be attached to the Authorization Certificate Application for submission to CMSWS.
3. CMSWS will review the Application per the requirements (avoidance, minimization, purpose and need, etc.) and the approved impacts may be less than proposed. Mitigation would only be due based on the approved impacts, plus the applicable ratios.

4. If approved, CMSWS will issue a Buffer Approval Letter listing the approved impacts, mitigation requirements, and list the source of the credits proposed for purchase.
5. Before impacts occur, mitigation payment or other form of approved mitigation must be completed, and verification provided to CMSWS for recordation.
6. CMSWS will provide a copy of the approved Application, Buffer Approval Letter, and verification of mitigation payment and/or completion to Shelton Sullivan with the 401 & Buffer Permitting Branch of the Division of Water Resources.

Helpful Links:

https://deq.nc.gov/about/divisions/mitigation-services/dms-customers

https://deq.nc.gov/about/divisions/water-resources/water-quality-permitting/401-buffer-permitting/nutrient-offset-buffer-mitigation-program

5.4.5 Mitigating for Unauthorized (Illegal) Buffer Disturbances

For all unauthorized/illegal buffer disturbances, a Notice of Violation (NOV) will be issued to the property owner except for water supply watershed and S.W.I.M. buffer violations that fall under Zoning Ordinances in which case a Corrective Action Request (CAR) will be issued. A different CAR must be used for the Town of Cornelius. The property owner will be notified to submit an Authorization Certificate Application form with an attached Water Quality Buffer Revegetation Plan to the inspector at the address provided within no more than 30 days. This Application and Plan must be written in strict accordance with Section 6.4 of this document and must adhere to the Level 2 revegetation criteria as well as the planting and species diversity requirements specified in Sections 6.1.2, 6.2 and 6.3 of this document. The inspector will complete a review of the documents within three (3) workdays of receipt. If disapproved, a letter will be sent to the property owner notifying them of the disapproval and all deficiencies. The letter will also provide a deadline for submittal of a revised Application and Plan that addresses the identified deficiencies. This deadline shall not be more than two (2) weeks from the date of the disapproval letter. Once the Application and Plan are approved, a letter will be sent to the property owner setting a deadline for the completion of the activities specified in the Plan, including installing all plants, mulch, etc. This deadline may vary to coincide with Mecklenburg County's planting season, which typically runs from November through early March. For example, if the Plan is approved in May, the inspector may want to set the deadline in November to coincide with the planting season. If the Plan is approved in February, a deadline may be set for early March to avoid running past the planting season. However, the deadline must be within one (1) year of approval of the plan. If a buffer mitigation area could be disturbed in the future and not violate buffer ordinances (i.e. on a grandfathered lot), then the area must be delineated on a map produced by a N.C. Registered Surveyor that also shows all parcel and buffer boundaries and the map must be recorded with the Mecklenburg County Register of Deeds Office. The following language must be included on the map identifying the buffer restoration area: "Water Quality Buffer Restoration Area - Disturbance of this area is strictly prohibited by law." This map must be recorded at the Mecklenburg County Register of Deeds Office and a copy provided to Charlotte-Mecklenburg Storm Water Services. If future disturbance of the mitigation area would result in a buffer violation, then the area does not need to be mapped and

recorded. This applies to all types of buffers. For example, on a lake front where trees less than 2-inch caliper can be removed from a buffer, a mitigation involving the planting of trees in this buffer as mitigation for a buffer violation would need to be recorded if the trees planted were less than 2 inches. If trees are planted in the streamside zone to mitigate for a SWIM buffer disturbance on a lot where the buffer applies, then the area does not need to be recorded because the ordinance does not allow the removal of these trees.

Within no more than two (2) workdays following the deadline established in the approval letter, staff will conduct an inspection of the property to determine compliance. If noncompliance is identified, a second NOV will be issued to the property owner notifying them of the corrective actions necessary and the deadline for completion. Follow up inspections will be conducted by staff within no more than two (2) workdays of this deadline. Upon determining compliance, staff will issue notification to the property owner.

Permit and/or Occupancy Holds may also be placed on properties that are in violation in order to ensure compliance with applicable regulations.

If at any point during the process outlined above, the violator fails to make substantial progress toward compliance, a supervisor will be notified for consideration of enforcement action.

5.5 Inspections

The purpose of inspections is to ensure compliance with the requirements of the applicable water quality buffer requirements and verify that buffer disturbances are properly mitigated as per the approved mitigation plan. The inspections performed by Charlotte-Mecklenburg Storm Water Services are described below.

1. Prior to approval of a requested water quality buffer disturbance, assigned staff will perform an initial site inspection to verify the existing conditions of the stream and buffer. Digital pictures will be taken for documentation.
2. Assigned staff will conduct a field evaluation within three (3) workdays following the specified completion date of mitigation activities to ensure that negative water quality impacts have not occurred as a result of the buffer disturbance and that mitigation measures have been fully installed in compliance with the approved mitigation plan.
3. Assigned staff will conduct field evaluations of approved buffer impacts and associated mitigation measures at a minimum of once every five (5) years following the installation and approval of the mitigation measure. Any documented failure of the functionality of a mitigation measure will result in the issuance of a NOV or CAR (see Appendices 25 and 26). If the owner fails to complete the necessary corrective actions within the time period specified, the matter will be referred for issuance of possible fines.
4. Charlotte-Mecklenburg Storm Water Services will conduct inspections of buffers while performing annual stream walk activities. All water quality buffer violations will be documented and the necessary follow up actions conducted to ensure compliance.
5. For all inspection activities, an inspection report must be created in Cityworks Server and the inspection must be tied to a GIS point. In addition, the following spreadsheet must be updated with all inspection activities: G:\WQ_Xfer\WQ\Buffers\Mitigation Records.

5.6 Documentation

The following documentation is to be completed for activities related to water quality buffers:

1. Complete an Activity Report under "Administration" in Cityworks Server documenting who, what, when, where, how and why, as well as whether the application was approved or denied. Attach to the Activity Report the application, associated attachments and all letters as well as pre-development pictures of the site.
2. Complete the Excel spreadsheet located on the LAN as follows: G:\WQ_Xfer\WQ\Buffers\Mitigation Record. Obtain from this spreadsheet the next Case Number in the far-left column and indicate this number preceded by the calendar year as the "Authorization Certificate Number ___" in all correspondence.
3. Following a site inspection verifying that mitigation has been completed, finalize the Activity Report established in number 1 above. Document in the Activity Report all site inspections conducted. Take pictures of completed mitigation and attach to the Activity Report. Also attach to the report all recorded documents described in Section 5.5.1 above. Forward the Activity Report to your Supervisor for closure.
4. For all inspection activities, an inspection report must be created in Cityworks Server and the inspection must be tied to a GIS point. In addition, the following spreadsheet must be updated with all inspection activities: G:\WQ_Xfer\WQ\Buffers\Mitigation Records. The date of the inspection, identification of deficiencies and whether the deficiencies were corrected will be documented in the far-right column of this spreadsheet called "Site Inspections Following Installation (every 5 years)." Forward all Cityworks Server inspection reports to the Supervisor for review and closure.

5.7 Abbreviated Review Process for a Proposed Buffer Disturbance

Some proposed minor disturbances to water quality buffers are allowed to follow an abbreviated review process at the discretion of the Supervisor or Program Manager. For S.W.I.M. and post-construction buffers, minor disturbances are considered those that impact less than 100 square feet of the upland and/or managed use zones. Any impact to the stream side zone would not be considered a minor disturbance and must follow the normal review process. For Goose, Six Mile Creek and water supply watershed buffers, minor disturbance would include the removal of a small number of trees (usually less than 5) to accomplish a permitted activity such as shoreline stabilization or stream restoration or the removal of a small number of trees (usually less than 3) to eliminate a threat to structures and/or public safety.

The extent and nature of the abbreviated process is left to the discretion of the supervisor provided the minimum criteria specified below are met (see Appendix 15).

- The applicant must submit a written request for approval of a proposed buffer disturbance. This request must include a written mitigation plan of sufficient detail to accurately describe the mitigation measure(s) and the time frame for completion. The request and plan can be submitted in the form of a letter or email.
- The request and plan must include the location, type and size of the proposed disturbed and mitigation areas (including each buffer zone if applicable) as well as the name, address and phone number of the property owner.

- The plan must include a statement that the mitigation measure will be maintained in perpetuity.
- Staff must conduct an inspection to ensure activities are performed in accordance with the approved plan.
- All activities must be documented in Cityworks.
- The appropriate information must be entered in the Mitigation Record located on the LAN as follows: G:\WQ_Xfer\WQ\Buffers\Mitigation Record.

5.8 Standard Review Process for a Proposed Buffer Disturbance

If the buffer disturbance exceeds the requirements for an abbreviated review process as described in Section 5.7 above, then the standard review process as described in this Section will be followed. The standard review process for a proposed buffer disturbance includes four (4) major components as follows:

1. Receive applicable information and document.
2. Determine if there is no practical alternative to the buffer disturbance.
3. Determine if the proposed mitigation measure is adequate to offset the negative water quality impacts associated with the proposed buffer disturbance.
4. Conduct inspections to ensure the proper installation of the mitigation measures and stabilization of the disturbed area.

Provided below is a summary of the standard review process for a proposed buffer disturbance. A flowchart of the process is provided in Appendix 15.

1. For all proposed buffer disturbances that are not considered minor as described in Section 5.7 above, an Authorization Certificate Application and attachments must be submitted to Charlotte-Mecklenburg Storm Water Services. The Supervisor will assign staff for follow up in Cityworks. If greater than 25 percent of the entire buffer area or any of the stream side zone is impacted, then the application should be reviewed by a Supervisor.
2. For shoreline stabilization and excavation projects on the lakes, the owner or contractor submits a project application to Duke Energy and a copy is provided to Charlotte-Mecklenburg Storm Water Services. The Supervisor sends a letter to the property owner and contractor making them aware of the buffer requirements. If, as a result of the required pre-construction meeting, staff determine that mitigation is required for the disturbance then the owner is informed to submit an Authorization Certificate Application. Following the receipt of the application, the Supervisor will assign staff for follow up in Cityworks.
3. Assigned staff will enter all applicable information into the Mitigation Records maintained on the LAN as follows: G:\WQ_Xfer\WQ\Buffers\Mitigation Records.xls. Staff will obtain the next certification number off this table and enter it on the Authorization Certificate Application in the block entitled “Authorization Certificate Number” that is located in the top right-hand corner of the form. The first two (2) digits in the Authorization Certificate Number must always correspond to the current calendar year followed by a dash with the last two (2) digits corresponding to next number in sequence for the calendar year. The numbering sequence always restarts at the beginning of the new calendar year. For example, 11-01, 11-02, 11-03, 11-04….. Assigned staff

must ensure that this table is complete with all applicable information or "N/A" is entered, which indicates "Not Applicable." No column can be left blank.

4. If the mitigation is associated with new construction, assigned staff will apply a certificate of occupancy hold on the project with the notation "Water Quality Buffer Mitigation Required."
5. Assigned staff will review the application and attachments for completeness within three (3) workdays of receipt. If incomplete, staff will issue immediate written notification of the additional information required. During this time period, assigned staff will conduct an initial site inspection to verify the existing conditions of the stream and buffer. Existing conditions will be documented with digital photos.
6. If the proposed buffer disturbance exceeds 20,000 square feet and is not associated with a project requiring review by the City Land Development, assigned staff will issue notifications to adjoining property owners within three (3) workdays of receipt of a complete application and attachments. At the discretion of the Supervisor, written notice can be issued to adjoining property owners for any requested buffer disturbance. Adjoining property owners will have 30 calendar days to comment on the proposed buffer impact. The Water Quality Program Manager has the right to waive this notification requirement as well as increase or decrease the 30-day comment period.
7. All comments in opposition to the proposed buffer disturbance will be provided to the Supervisor for consideration. The applicant will in good faith consider any comments from adjacent property owners concerning the proposed buffer impact and the mitigation plan requirements. All comments are to be considered with regard to the water quality impacts associated with the proposed buffer disturbance. They are also to be considered with regard to the finding of "no practical alternative" which is required prior to the approval of any buffer disturbance.
8. Following the 30-day staff review and public comment period, assigned staff will determine approval, approval with modifications or denial of the buffer impact and mitigation. This decision will be based on a finding of "no practical alternative" as described in Section 5.3 and compliance with the mitigation measures contained in Section 5.4 which serve to compensate for the negative water quality impacts associated with the buffer disturbance. If uncertain, assigned staff will consult with the Supervisor who may in turn consult with the Program Manager. In certain situations, water quality modeling may be performed to confirm the effectiveness of the proposed mitigation measure. If the model indicates that the mitigation measure will remove an equal or greater pollutant load than is removed by the undisturbed buffer, then the impact and mitigation will likely be approved.
9. Assigned staff will issue written notification to the applicant regarding approval, approval with modifications or denial of the buffer impact and associated mitigation (see Appendices 30 and 31). The letter must be approved by the Supervisor prior to issuance. A letter indicating approval with modifications must include details regarding the required modifications.
10. If a buffer disturbance is approved, a signed version of the Authorization Certificate Application form, including all attachments, must be returned to the applicant along with the approval letter. This Authorization Certificate will serve as the formal approval document for the buffer disturbance and strict compliance with the information contained in this certificate is required. Failure to comply will result in the immediate revocation of

the certificate, which will subject the violator to immediate penalties. To ensure compliance, any variation from the information contained in this certificate must receive approval from Charlotte-Mecklenburg Storm Water Services prior to initiating any buffer disturbance activities.

11. The Authorization Certificate is valid for 12 months following the approval date. The buffer disturbance and all mitigation measures must be completed and approved by Charlotte-Mecklenburg Storm Water Services prior to the end of 12 months or the Authorization Certificate is considered null and void and a new Authorization Certificate Application form will need to be submitted. An extension of the 12-month period is allowed following approval from the Program Manager.
12. If the approved mitigation option is a structural BMP, notification will be issued to the applicant that the Authorization Certificate has been preliminarily approved and that final approval is contingent upon the submittal and approval of construction plans for the BMP. These plans must be sealed by a professional engineer and reviewed in accordance with the jurisdiction's land development policies and post-construction ordinance requirements. The exception is that mitigation for a buffer disturbance on a single-family residential lot may use an infiltration BMP and submit a scaled drawing not prepared by a professional engineered (see #1 in Section 5.4.3).
13. If the approved mitigation option is a structural BMP, then a construction bond is required prior to the initiation of buffer disturbance activities and following construction a minimum two (2) year maintenance bond is required in accordance with the jurisdiction's land development policies and post-construction ordinance requirements.
14. The applicant is required to notify Charlotte-Mecklenburg Storm Water Services immediately upon the completion of the buffer disturbance and all mitigation activities. Staff will conduct an inspection within three (3) workdays of receipt of this notification to ensure compliance with ordinance requirements and the Authorization Certificate. If this notification is not received by the completion date indicated in the Authorization Certificate Application form, staff will automatically conduct a follow up inspection within three (3) workdays following this date.
15. The applicant must provide staff with all the additional documentation and information specified in Section 5.4 for the mitigation option being implemented for the buffer disturbance, included copies of recorded documents, maintenance agreements, etc.
16. If the inspection reveals noncompliance or if all the required documentation has not been received, a letter will be sent to the applicant notifying them of the necessary corrective actions and setting a deadline for compliance.
17. Once all corrective measures have been completed and verified by a follow up inspection and all additional mitigation information and documentation has been received, the applicant will be issued written notification by staff of the approval of the mitigation activities.
18. Assigned staff will release the certificate of occupancy hold and surety guaranteeing installation (if applicable) on the project immediately following approval of the installation of mitigation measures.
19. If at any time during the process, the applicant fails to comply with an approved Authorization Certificate or causes damage to surface waters as a result of a buffer impact, the Supervisor is to be immediately notified for consideration of the initiation of the necessary enforcement action.

All buffer disturbances considered for approval by anyone other than Charlotte-Mecklenburg Storm Water Services as indicated in Table 2, including the Zoning Board of Adjustment or Planning Director, will usually require the issuance of a variance by the jurisdiction where the proposed disturbance is located. Contact the Planning Director to obtain the proper forms. Contact information is available on the jurisdiction's website. This document provides no additional information regarding these approvals. Charlotte-Mecklenburg Storm Water Services will become involved in the issuance of these variances only at the request of the jurisdiction.

5.9 Disturbances of Easements and Rights-of-Ways

Many water quality buffers include easements and rights-of-ways for storm sewer and sanitary sewer utilities. It is important that buffer disturbances and the revegetation of buffers do not violate the requirements for properly maintaining these easements. The following subsections contain information to this end.

5.9.1 Storm Sewer Easements and Right's-of-Ways

Jurisdictions in Mecklenburg County are responsible for a minimal number of storm sewer easements and rights-of-ways by virtue of a recordation of a permanent easement. Most drainage easements are recorded as a public drainage easement, which implies that it has been offered by the owner to the jurisdiction at such time they choose to accept it. Most property owners believe that if the drainage system comes from the street the jurisdiction that owns the street must also own the drainage system on private property. This is not the case. These systems are considered private until such time the jurisdiction records a new easement to accept that responsibility. This makes the maintenance of these easements very challenging. It is recommended that all questions relating to the maintenance of easements and rights-of-ways for the storm sewer system be referred to the following staff at Charlotte Storm Water Services:

- Stewart Edwards, PE at stedwards@charlottenc.gov (704-336-7036) or
- Emily Perry at eperry@ci.charlotte.nc.us (704-336-3106).

5.9.2 Sanitary Sewer Easements and Right's-of-Ways

The following restrictions apply to sanitary sewer easements and rights-of-ways in Mecklenburg County:

1. Nothing permanent may be stored or built on top of the easement. This includes but is not limited to slabs, walls, fill, permanent sheds, pools, gazebos and medium-large size trees.
2. A property owner may not install any new fence or gated area to restrict access to an existing Easement. If a fence was previously installed on the property prior to the easement acquisition, Charlotte Water will consider it to remain on a case by case basis. If deemed acceptable, a Charlotte Water locking device will be provided to the property owner, which provides them and other pertinent individuals a method of access.
3. Charlotte Water has a 'Landscaping/Planting Guidelines' document that can help a property owner decide what to plant within an easement. Certain plants and trees are restricted, as follows:

   a. No trees are allowed within a permanent easement.
   b. Plants with an invasive root system are not allowed.
   c. Gardens, crops, shrubbery and ornamental trees with shallow roots are acceptable within an easement, but not directly over the pipe.
4. Installing a concrete/asphalt driveway partially over the easement is possible but with the following restrictions:
   a. The property owner will be responsible for any damage caused to the pipe. Care should be taken in compacting the excavated area to avoid damage to the pipe.
   b. The property owner will call 811 to have utilities located before digging inside easement.
   c. A driveway must be shallow (not to exceed 1 foot and shouldn't cover any existing access points or manholes).
5. Irrigation systems are not permitted within water and sewer easements. Charlotte Water is not responsible for the repair of any irrigation systems installed within a permanent easement.

Section 6 Water Quality Buffer Revegetation Requirements

6.1 Water Quality Buffer Revegetation Levels and Planting Densities

Charlotte-Mecklenburg uses two (2) revegetation methods to mitigate for water quality buffer disturbances, including Level 1 revegetation that involves planting smaller trees at a greater density and Level 2 revegetation that involves larger but fewer trees. Level 1 provides a more cost-effective method of revegetating large buffers but does not achieve the immediate benefits of Level 2 that are important in more critical buffer areas such as in water supply watersheds and Six Mile Creek. Table 3 identifies how these two (2) revegetation levels are applied to different buffer disturbances. The plants to be used for all revegetations are contained in Appendix 16. The two (2) revegetation methods and the other requirements contained in this Section can be altered at the discretion of a Supervisor or the Program Manager when it is determined to be in the best interest of water quality. Trees added to the buffer and associated flood zones are covered by a general permit related to flood plain allowances under "forestry." For Goose Creek, all revegetation must be performed in strict accordance with 15A NCAC 02B .0295.

Table 3: Revegetation Levels Required for the Type of Buffer Disturbance

Type of Buffer Disturbance	Revegetation Levels	
	Level 1	Level 2
Illegal Buffer Disturbance	Not Allowed	Required
Authorized Disturbance of S.W.I.M. and Post-Construction Buffers	Allowed if >10,000 square feet is disturbed	Allowed
Authorized Disturbance of Water Supply Watershed and Six Mile Creek Buffers	Not Allowed	Required
Voluntary Buffer Revegetation	Allowed	Allowed
Goose Creek	15A NCAC 02B .0295	

6.1.1 Level 1 Revegetation

Level 1 revegetation allows for denser planting of smaller trees on large sites. As summarized in Table 3 above, Level 1 revegetation is allowed for all voluntary buffer revegetation and for revegetation associated with authorized disturbances of S.W.I.M. and post-construction buffers provided the disturbed area is greater than 10,000 square feet. Level 1 revegetation is <u>not</u> allowed for revegetation associated with illegal buffer disturbances and preapproved disturbances of water supply watershed and Six Mile buffers unless otherwise authorized by the Program Manager or designee. The following criteria apply to a Level 1 revegetation.

1. Tree Requirements:
    - 10 trees must be planted for every 1,000 square feet (100 square feet per tree or 436 trees per acre)
    - Trees may be live stakes or dormant cuttings from the previous season's growth. Live stakes must a minimum of ¾ inch in diameter and 3 feet long. Dormant cuttings must be a minimum of ½ inch in diameter and 2 feet long.
    - 40% to 60% of the trees must be understory species.
    - No greater than 10% of the trees can be pines.

2. Shrub Requirements:
    - 20% of the area to be revegetated can be planted in shrubs instead of trees at a density of 30 shrubs for every 1,000 square feet (33 square feet/shrub or 1,307 shrubs per acre).
    - Shrubs must be containerized or bare root stock.
    - Shrubs must be planted in groups more densely around the outer edges of the buffer to prevent light penetration and recolonization by invasive species.
3. Groundcover Requirements:
    - Achieve 100% groundcover of all exposed soil (no bare areas larger than one square foot) using native seed mixes, grass-like plants, and forbs (from the approved plant list in Appendix 16); <u>or</u> mulch in accordance with the following criteria:
        - When mulch is used as the groundcover option, it must be maintained for a minimum of two (2) years at a minimum depth of two (2) inches. The mulch must be shredded or chipped wood or leaf mold. Sawdust, pine/wheat straw and pine bark cannot be used.
    - Mulch must be maintained around the bases of all trees and shrubs for a minimum five (5) years following planting at a minimum depth of two (2) inches. The mulch must be shredded or chipped wood or leaf mold. Sawdust, pine/wheat straw and pine bark cannot be used.
4. Additional Requirements:
    - All trees and shrubs must be maintained in perpetuity and replaced as necessary to ensure that the original planting density is maintained.
    - The use of tree shelters is strongly recommended to protect against deer grazing and mower damage.
    - Erosion within the buffer is strictly prohibited. If mulch is not sufficient to prevent erosion, a vegetative ground cover is required.

6.1.2 Level 2 Revegetation

Level 2 revegetation requires the use of larger plants, which allows a tree canopy to be reestablished more quickly thus affording better water quality protection. As summarized in Table 3 above, Level 2 revegetation is allowed for all buffer disturbances and voluntary buffer revegetation. Level 2 revegetation is required for mitigation of all illegal buffer disturbances as well as for authorized disturbances of water supply watershed and Six Mile buffers unless otherwise authorized by the Program Manager or designee. The following criteria apply to a Level 2 revegetation.

1. Tree Density Requirements:
    - 8 trees must be planted for every 1,000 square feet (125 square feet per tree or 348 trees per acre)
    - All trees must be a minimum 1.5-inch caliper measured 6 inches above root ball or 15 gallon containerized.
    - 40% to 60% of trees must be understory species.
    - No pines or other evergreen trees are allowed for use with a Level 2 revegetation.
2. Shrub Density Requirements:

- 10% of the area to be revegetated can be planted in shrubs instead of trees at a density of 30 shrubs for every 1,000 square feet (33 square feet/shrub or 1,307 shrubs per acre).
- Shrubs must be at least 1 gallon containerized.
- Shrubs must be planted in groups more densely around the outer edges of the buffer to prevent light penetration and recolonization by invasive species.

3. Groundcover Requirements:
   - Achieve 100% groundcover of all exposed soil (no bare areas larger than one square foot) using native seed mixes, grass-like plants, and forbs (from the approved plant list in Appendix 16); <u>or</u> mulch in accordance with the following criteria:
     - Vegetative ground cover is preferred over mulch and may be required for steep slopes where erosion is a concern.
     - When mulch is used as the groundcover option, it must be maintained for a minimum of two (2) years at a minimum depth of two (2) inches. The mulch must be shredded or chipped wood or leaf mold. Sawdust, pine/wheat straw and pine bark cannot be used.
   - Mulch must be maintained around the bases of all trees and shrubs for a minimum five (5) years following planting at a minimum depth of two (2) inches. The mulch must be shredded or chipped wood or leaf mold. Sawdust, pine/wheat straw and pine bark cannot be used.
4. Additional Requirements:
   - All trees and shrubs must be maintained in perpetuity and replaced as necessary to ensure that the original planting density is maintained.
   - The use of tree shelters is strongly recommended to protect against deer grazing and mower damage.
   - Erosion within the buffer is strictly prohibited. If mulch is not sufficient to prevent erosion, a vegetative ground cover is required.

6.2 Planting Requirements

The following planting requirements will apply to all buffer revegetation:

1. All plants will be native to the North Carolina Piedmont Region. See Appendix 16 for a list of approved plant species for use in a water quality buffer. Plant species not listed in Appendix 16 may be used subject to approval by Charlotte-Mecklenburg Storm Water Services.
2. Invasive species will not be used in any water quality buffer revegetation.
3. For disturbed areas with slopes 3:1 or greater, soil will be stabilized with matting or other approved stabilization method until permanent vegetation is established. Only 100% biodegradable material will be used.
4. Planting allowances may be made for existing trees.
5. It is recommended that chemical fertilizers and pesticides not be used in the buffer due to the risk of storm water pollution. Instead, compost or organic matter should be incorporated into the soil, which will provide sufficient nutrients for adequate plant growth. Invasive species should be removed by hand clearing instead of using pesticides.
6. Plantings should occur at the appropriate time of year to promote survivability. In Mecklenburg County, this is typically from November through early March.

6.3 Species Diversity Requirements

The following species diversity requirements will apply to all buffer revegetation:

1. A minimum of six (6) species of trees will be planted for Water Quality Buffer Revegetation Plans calling for greater than 20 trees.
2. A minimum of three (3) species of shrubs will be planted for Water Quality Buffer Revegetation Plans calling for greater than 15 shrubs.
3. A minimum of two (2) species of grasses or grass-like plants and a minimum of two (2) species of forbs will be planted when these plants are used to establish ground cover in areas greater than 1,000 square feet.

6.4 Water Quality Buffer Revegetation Plan

An Authorization Certificate Application form must be submitted for all buffer revegetation conducted for mitigation of a buffer disturbance. Section 5 includes directions on how to complete this application. In addition, a Water Quality Buffer Revegetation Plan must be submitted along with this application. Both the application and plan must be approved by Charlotte-Mecklenburg Storm Water Services prior to the disturbance of any water quality buffer area. Provided below is the information that must be included in the Water Quality Buffer Revegetation Plan. If the buffer revegetation is to occur on the same parcel as the buffer disturbance, the Water Quality Buffer Revegetation Plan can be incorporated onto the buffer disturbance map developed as part of Section 1 of the Authorization Certificate Application form described in Section 5.2. This can be done by adding numbers 10 through 19 below to this buffer disturbance map, which already includes numbers 1 through 9. An example of a map including the buffer disturbance area and a Water Quality Buffer Revegetation Plan is provided in Appendix 14. If the revegetation is to occur on a separate parcel from the buffer disturbance, include numbers 1 through 9 on a scaled site map of the property where the buffer disturbance is to occur and numbers 10 through 19 on a scaled site map of the property to be revegetated. Both maps must be attached to the Authorization Certificate Application form.

1. Lengths of all boundary/property lines and the parcel's address where the activity and buffer disturbance are proposed.
2. Location of all water course(s) on the property, including all perennial and intermittent streams, lakes, ponds and wetlands.
3. Location(s) of buildings, parking areas, and other impervious surfaces.
4. Location of the buffer area on the parcel, including lengths of all boundary lines and total square footage of the entire buffer and all buffer zones.
5. The scale of the map, which must be smaller than 100 feet to the inch.
6. Date of map.
7. A small-scale vicinity map and north arrow.
8. Location of proposed buffer disturbance, including lengths of all boundary lines and total square footage for each buffer zone. The boundary of the disturbed area must include the following: the area of the footprint of the use within the buffer that is causing the impact to the buffer; the area of the boundary of any clearing and grading activities necessary to accommodate the use outside the footprint of the use; and the area of any ongoing maintenance corridors within the stream buffer associated with the use outside the

footprint and clearing/grading limits of the use. Temporary equipment access areas are not included in the disturbed area calculation provided tree removal and grading are not required. These access areas must be shown on the map along with a note describing how these areas will be properly stabilized.

9. General location (do not survey), number, size and species of trees greater than two (2) inches in diameter that will be removed from the buffer.
10. Location of the proposed buffer area to be restored, including lengths of all boundary lines and total square footage for each buffer zone.
11. Existing vegetative cover in the proposed restoration area, including the location, number, size and species of trees and other ground cover.
12. Location, number, size, and species of all trees and shrubs to be planted in the restoration area. Specify whether a Level 1 or Level 2 revegetation. All plantings must be of a variety specified in Appendix 16 unless otherwise authorized by Charlotte-Mecklenburg Storm Water Services.
13. Distance between plantings or density of plantings.
14. Type of ground cover to be placed in the restoration area as well as the ground cover to be used to stabilize disturbed areas.
15. The scaled map must contain the following statement: "Following buffer restoration, diffuse flow will be maintained through the buffer in perpetuity."
16. The scaled map must contain the following statement: "It is recommended that chemical fertilizers and pesticides not be applied in the buffer."
17. The scaled map must contain the following statement: "All plants will be maintained in perpetuity and will be replaced as necessary to ensure that the original planting density is maintained."
18. The scaled map must contain the following statement: "Following the complete installation of the approved Water Quality Buffer Revegetation Plan, a final inspection and written approval must be made by Charlotte-Mecklenburg Storm Water Services. Call 980.314.3215 to schedule a final inspection."

The scaled map must contain the following statement: "It is the responsibility of the property owner to maintain the revegetated site and repair, protect, and add additional controls to protect the buffer as necessary at their sole expense.

Section 7 Variances and Appeals

7.1 Variances

Approval to perform any prohibited buffer disturbance as defined in Section 4 can only be obtained by securing a variance from either the Zoning Board of Adjustment for the jurisdiction with the applicable buffer regulation or the Charlotte-Mecklenburg Storm Water Advisory Committee depending on the buffer type as described in Section 1 and the jurisdiction (see Table 2). There are two (2) exceptions as follows:

1. S.W.I.M. and post-construction buffers in the Towns of Davidson, Huntersville and Matthews require a variance and possible mitigation for any buffer disturbance that is not exempt (see Section 4.3).
2. Goose Creek buffers in the Town of Mint Hill require a variance from Charlotte-Mecklenburg Storm Water Advisory Committee followed by approval from the N.C. Environmental Management Commission (EMC).

Table 4: Appropriate Organization for Granting Variances and Appeals

Buffer Type (see Section 1)	Organization Based on Jurisdiction (1)							
	Charlotte	Cornelius	Davidson	Huntersville	Matthews	Mint Hill	Pineville	Meck. Co.
Water Supply Watershed	ZBA	ZBA	ZBA	ZBA	N/A	N/A	N/A	N/A
S.W.I.M.	ZBA	ZBA	ZBA	ZBA	ZBA	ZBA	ZBA	ZBA
Post-Construction	SWAC	ZBA	SWAC	ZBA	SWAC	SWAC	SWAC	SWAC
Goose & Six Mile	SWAC	N/A	N/A	N/A	N/A	SWAC/EMC	N/A	N/A

Notes:
(1) ZBA = Zoning Board of Adjustment
SWAC = Storm Water Advisory Committee
EMC = NC Environmental Management Commission
N/A = This type of buffer does not occur in this jurisdiction.

For a variance to be granted, the applicant must demonstrate that there are practical difficulties or unnecessary hardships that prevent compliance with the strict letter of the buffer protection requirements. Practical difficulties or unnecessary hardships are evaluated in accordance with the following:

1. If the applicant complies with the provisions of the water quality buffer requirements, he/she can secure no reasonable return from, nor make reasonable use of, his/her property. Merely proving that the variance would permit a greater profit from the property is not adequate justification for a variance. Moreover, consideration will be given as to whether the variance is the minimum possible deviation from the terms of the buffer requirements that will make reasonable use of the property possible.
2. The hardship results from the application of the buffer requirements to the property rather than from other factors such as deed restrictions or other hardships.
3. The hardship is due to the physical nature of the applicant's property and is unique to the applicant's property, such as its size, shape, or topography, such that compliance with the

provisions of the applicable buffer ordinance would not allow reasonable use of the property.

4. The applicant did not cause the hardship by knowingly or unknowingly violating the buffer requirements.
5. The variance is in harmony with the general purpose and intent of the buffer protection requirements and preserves its spirit; and
6. In granting the variance, the public safety and welfare have been assured, water quality has been protected, and substantial justice has been done.

The process for obtaining a variance is initiated by the submittal of a petition by the owner of the affected property, an agent authorized in writing to act on the owner's behalf, or a person having written contractual interest in the affected property. If the organization responsible for granting the variance is the Zoning Board of Adjustment (see Table 5), then the petition must be submitted to the Zoning Administration for the jurisdiction where the buffer disturbance is proposed. The form to be used and address for submittal can be obtained by contacting the jurisdiction where the proposed buffer impact is located. Contact information can be obtained from the jurisdiction's website under the Planning Department. If the responsible organization is the Storm Water Advisory Committee, then the petition form and instructions for proper submittal can be obtained from the Clerk to the Charlotte-Mecklenburg Storm Water Advisory Committee at 704-336-6171. All petitions for a variance filed with the Storm Water Advisory Committee must be accompanied by a $100 filing fee along with a list of adjoining properties, including tax parcel numbers and the name and address of each owner.

For variance petitions submitted to Charlotte-Mecklenburg Storm Water Services, the Clerk will transmit copies of all information pertaining to the variance to the nine (9) members of the Committee upon receipt of a variance petition. The Charlotte-Mecklenburg Storm Water Advisory Committee will hold public hearings for all variance petitions in accordance with the rules adopted for such purposes. Prior to the public hearing, written notice will be mailed to the petitioner and surrounding property owners regarding the time, location and subject of the public hearing. The hearing will be conducted in the nature of a quasi-judicial proceeding with all findings of fact supported by competent, material evidence. The Charlotte-Mecklenburg Storm Water Advisory Committee bylaws will determine the number of concurring votes needed to grant a variance. A similar process will be followed for variance petitions submitted to Zoning Board of Adjustment.

7.2 Appeals

Any disagreement regarding any order, decision, or determination relating to the interpretation or application of a water quality buffer ordinance, including assessment of penalties, is resolved through an appeal to either the Zoning Board of Adjustment for the jurisdiction with the applicable buffer regulation or the Charlotte-Mecklenburg Storm Water Advisory Committee, which differs based on the buffer type and jurisdiction as described in Table 5. If the buffer ordinance is part of a jurisdiction's Zoning Ordinance, then decisions regarding the application and administration of the buffer rules are made by the Zoning Administrator for the jurisdiction with assistance from Charlotte-Mecklenburg Storm Water Services and appeals to these decisions are heard by the jurisdiction's Zoning Board of Adjustment. If the buffer ordinance is

part of City Code and not the Zoning Ordinance, then decisions regarding the application and administration of the buffer rules are made by Charlotte-Mecklenburg Storm Water Services and appeals to these decisions are heard by the Charlotte-Mecklenburg Storm Water Advisory Committee. The one exception is that any disagreement over a determination regarding an Authorization Certificate for Goose Creek is referred to the Director of the N.C. Division of Water Resources for a decision. For an appeal to be granted, the Zoning Board of Adjustment or Charlotte-Mecklenburg Storm Water Advisory Committee must find an error in the application of the ordinance by the Zoning Administrator or staff of Charlotte-Mecklenburg Storm Water Services. If the appeal pertains to the assessment of a civil penalty and the Zoning Board of Adjustment or Charlotte-Mecklenburg Storm Water Advisory Committee finds that a violation of the ordinance has occurred, but that in setting the amount of the penalty the appropriate weight was not given to either mitigating or aggravating factors, then they will either decrease or increase the per day civil penalty within the range allowed by the ordinance. If it is determined that a violation has not occurred, then the penalty will be rescinded.

The process for filing an appeal is initiated by the submittal of a notice of appeal by the owner of the affected property, an agent authorized in writing to act on the owner's behalf, or a person having written contractual interest in the affected property. A notice of appeal must be filed within 30 working days of the day the disputed order, decision, determination or interpretation was made. If the organization responsible for granting the appeal is the Zoning Board of Adjustment (see Table 5), then the petition must be submitted to the Zoning Administration for the jurisdiction with the applicable buffer ordinance. The form to be used and address for submittal can be obtained by contacting the jurisdiction where the buffer is located. Contact information can be obtained from the jurisdiction's website under the Planning Department. If the responsible organization is the Charlotte-Mecklenburg Storm Water Advisory Committee, then the petition form and instructions for completion and submittal can be obtained from the Clerk to the Committee at 704-336-6171. All appeals filed with the Charlotte-Mecklenburg Storm Water Advisory Committee must be accompanied by a $100 filing fee.

Upon receipt of a notice of appeal, Charlotte-Mecklenburg Storm Water Services will transmit to the Storm Water Advisory Committee copies of all administrative papers, records, and other information regarding the subject matter of the appeal. The filing of such notice shall stay any proceedings in furtherance of the contested action, except Charlotte-Mecklenburg Storm Water Services may certify in writing to the Storm Water Advisory Committee that because of facts stated in the certificate, a stay imposes an imminent peril to life or property or would seriously interfere with the enforcement of the Ordinance. The Storm Water Advisory Committee will then review the certificate and may override the stay of further proceedings. The Storm Water Advisory Committee will hold a public hearing on every notice of appeal in accordance with the rules adopted by it for such purposes. Prior to the hearing, the Storm Water Advisory Committee will mail written notice of the time, place and subject of the hearing to the person or persons filing the notice, to the owners of the subject property and to the owners of property adjacent to the subject property. The hearing will be conducted in the nature of a quasi-judicial proceeding with all findings of fact supported by competent, material evidence. The Storm Water Advisory Committee bylaws will determine the number of concurring votes needed to grant an appeal. A similar process will be followed for variance petitions submitted to Zoning Board of Adjustment.

Section 8 Responsibilities for Ensuring Compliance with Buffer Requirements

8.1 Charlotte-Mecklenburg Storm Water Services and Zoning Department

The water supply watershed and S.W.I.M. buffer ordinances for the City of Charlotte and all the Towns are contained in the Zoning Ordinances for the respective jurisdictions; therefore, the responsibility for ensuring compliance lies with the jurisdictions' Zoning Departments and not Charlotte-Mecklenburg Storm Water Services. However, the Zoning Departments in Charlotte-Mecklenburg have granted approval to Charlotte-Mecklenburg Storm Water Services to issue a Corrective Action Request (see Appendices 19 and 20) to the violator notifying them of the violation and the actions necessary to ensure compliance. If the conditions of this Corrective Action Request are not satisfied in the time period indicated, the violation is referred to the appropriate Zoning Department for issuance of a Notice of Violation. If the conditions of this Notice of Violation are not satisfied in the time period indicated, enforcement action, including the assessment of penalties, can be taken by the jurisdiction for violations of their Zoning Ordinance.

The post-construction, Goose Creek and Six Mile Creek buffer requirements are contained in the post-construction ordinances for the City of Charlotte and Towns. The enforcement of the post-construction ordinances, including the buffer requirements, is the responsibility of the Storm Water Administrator as identified in the applicable ordinance. In the City of Charlotte, the Storm Water Administrator is identified as the City Engineer or designee, which includes the staff of Charlotte Storm Water Services. For all the Towns except Cornelius, Mecklenburg County's Water Quality Program Manager has been designated as the Storm Water Administrator. In Cornelius, this title has been assigned to their Planning Director. Therefore, in the City of Charlotte, Notices of Violation and enforcement actions for post-construction and Six Mile Creek buffers are issued by Charlotte Storm Water Services. In the Towns, this task is fulfilled by Mecklenburg County's Water Quality Program Manager, except in Cornelius where the County issues Corrective Action Requests as described above for S.W.I.M. buffer violations followed by a Notice of Violation and possible enforcement action by the Town if compliance is not achieved.

Charlotte Storm Water Services will handle all matters relating to water quality buffers for new construction requiring compliance with post-construction ordinance requirements in the City of Charlotte and its ETJ, including processing Authorization Certificate Applications for buffer disturbances. The one exception is that Mecklenburg County Storm Water Services may comment on water quality buffers for rezonings. Mecklenburg County Storm Water Services will handle all matters relating to water quality buffers, including processing Authorization Certificate Applications, for existing developments in the City of Charlotte and its ETJ, including additions and expansions that do not involve plan submittal to Charlotte Land Development. In addition, staff with Mecklenburg County Storm Water Services will work with the Towns to ensure compliance with their water quality buffer requirements for both existing development and new construction.

Mecklenburg County Storm Water Services staff will document all authorizations allowing the installation if built-upon area within 30-foot Post-Construction buffer. Staff will document the activity in an Activity report in CityWorks under program element PC-1 and include the exception request, completed Authorization Certificate Application, the decision of the governing body, and final disposition of the request. A summary of these requests will be included as part of the annual reports prepared for the City of Charlotte and the Phase II co-permittees.

Charlotte-Mecklenburg Storm Water Services is also responsible for providing the technical expertise and guidance necessary to ensure compliance with all water quality buffer requirements. Buffer information is maintained on its website at http://stormwater.charmeck.org and educational materials have been developed and are distributed to inform the public of the water quality buffer requirements. These materials are available on the website by selecting "Regulations" and then "Buffers & BMPs." Staff also provides the jurisdictions and citizens with a variety of guidance and information concerning compliance with buffer regulations.

Mecklenburg County Storm Water Services inspects water quality buffers while conducting annual stream walk activities during the winter months. These inspections are concentrated below storm water outfalls. If erosion is observed below an outfall or if other violations of the buffer rules are detected, the Supervisor is notified, and corrective actions are initiated immediately. All buffer inspections will be documented along with other stream walk data.

8.2 City and County Land Development

City and County Land Development's responsibilities for ensuring compliance with water quality buffer requirements are described below.

1. Ensure the proper delineation of water quality buffers on all land development plans.
2. Ensure that temporary sediment basins and other erosion control measures are located outside the buffer except for S.W.I.M. and post-construction buffers where they must be kept out of the stream side zone.
3. Ensure that water quality buffer notations are properly located on land development plans. Land Development staff will conduct random inspections of stream buffers during site development to ensure compliance. These inspections will be conducted as a component of routine erosion control inspection activities.
4. Ensure that stream buffer requirements are properly identified on all commercial site plans (includes everything except single family residences and duplexes).
5. Issue Notices of Violation when a buffer disturbance during development results in noncompliance with approved plans and/or applicable regulations. Zoning will be advised of possible violations of the Zoning Ordinance.
6. Ensure that orange fabric fencing is installed on site along the outer edge of the buffer prior to any land disturbing activities and ensure that all construction activities are performed in compliance with buffer requirements. Sight line cutting for surveying purposes is allowed.
7. Inspect buffer at the completion of construction activities to ensure compliance with all applicable regulations. If violations are detected, take the necessary action to ensure compliance.

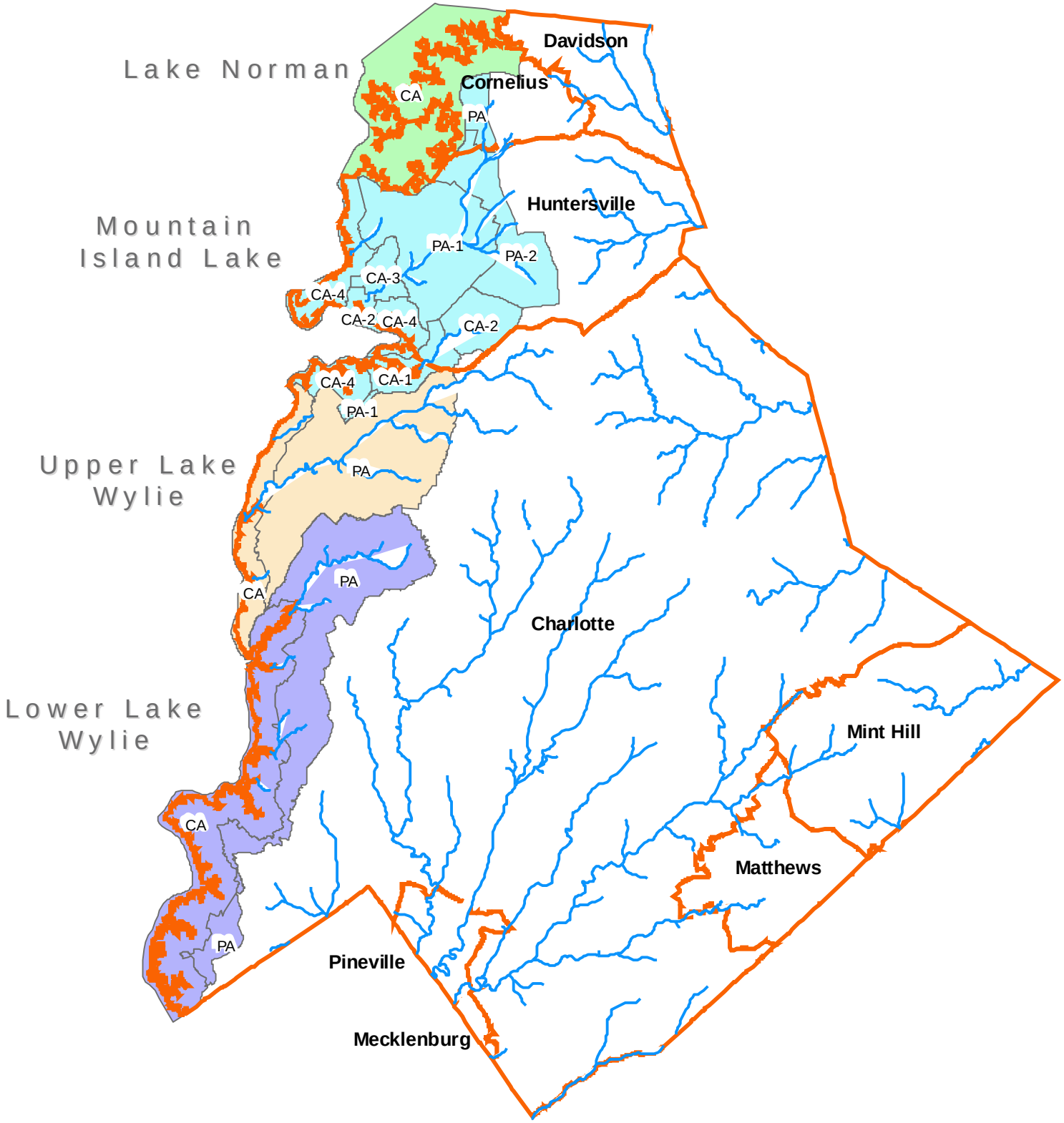
8.3 Property Owners

The following are the responsibilities of property owners for ensuring compliance with water quality buffer requirements:

1. Ensure that vegetative cover is maintained within the stream buffer area in compliance with the applicable regulation(s).
2. Ensure that the buffer remains undisturbed except as allowed by the applicable regulations. For example, S.W.I.M. and post-construction buffers allow disturbances in the managed use and upland zones provided vegetative targets are maintained and no fill or impervious area is added to the buffer (see Section 4).
3. If a buffer disturbance is necessary, obtain prior approval from the appropriate agency as described in Section 5.
4. If BMPs are required to be installed as part of an exception request or mitigation, the property owner must ensure the BMPs are maintained in perpetuity to function as designed.
5. Upon the transfer of ownership of property with water quality buffer requirements, ensure that the buffers, including all zones, are clearly identified on record plats, title surveys and deeds. In addition, ensure that the new property owner is fully informed of all stream buffer requirements.
6. If a potential buffer violation is observed, it should be reported by contacting 311.

Appendix 1: Water Supply Watershed Area Map

Water Supply Water Area Map



Appendix 2: Summary of Water Supply Watershed Buffer Requirements

Summary of Water Supply Watershed Buffer Requirements

Lake Norman Watershed

Zone	Zoning Jurisdiction	Built Upon Area	Lake/Stream Buffer
Critical Area (CA)	Davidson	≤ 24% - Low Density ≤ 50% - High Density	40 Feet 100 Feet
Critical Area (CA)	Cornelius	≤ 24% - Low Density ≤ 50% - High Density	50 Feet 100 Feet
Critical Area (CA)	Huntersville	≤ 24% - Low Density ≤ 50% - High Density	50 Feet 100 Feet

Mountain Island Lake Watershed

Zone	Zoning Jurisdiction	Built Upon Area	Lake/Stream Buffer
Protected Area (PA)	Cornelius	≤ 24% - Low Density ≤ 70% - High Density	50 Feet 100 Feet
Protected Area 1 (PA1)	Huntersville	≤ 24% - Low Density ≤ 70% - High Density	50 Feet 100 Feet
Protected Area 1 (PA1)	Charlotte/Mecklenburg	≤ 24% - Low Density ≤ 50% - High Density	50 Feet 100 Feet
Protected Area 2 (PA2)	Huntersville	≤ 24% - Low Density ≤ 70% - High Density	30 Feet 100 Feet
Critical Area 1 (CA1)	Huntersville	≤ 6% - Low Density	100 Feet or 100 yr. Floodplain (whichever is greater)
Critical Area 1 (CA1)	Charlotte/Mecklenburg	≤ 6% - Low Density	100 Feet or 100 yr. Floodplain (whichever is greater)
Critical Area 2 (CA2)	Huntersville	≤ 12% - Low Density	100 Feet or 100 yr. Floodplain (whichever is greater)
Critical Area 3 (CA3)	Huntersville	≤ 12% - Low Density	100 Feet or 100 yr. Floodplain (whichever is greater)
Critical Area 4 (CA4)	Huntersville	≤ 24% - Low Density	100 Feet
Critical Area 4 (CA4)	Charlotte/Mecklenburg	≤ 24% - Low Density	100 Feet or 100 yr. Floodplain (whichever is greater)

Upper Lake Wylie Watershed

Zone	Zoning Jurisdiction	Built Upon Area	Lake/Stream Buffer
Protected Area (PA)	Charlotte/Mecklenburg	≤ 24% - Low Density ≤ 70% - High Density	40 Feet 100 Feet
Critical Area (CA)	Charlotte/Mecklenburg	≤ 24% - Low Density ≤ 50% - High Density	100 Feet 100 Feet

Lower Lake Wylie Watershed

Zone	Zoning Jurisdiction	Built Upon Area	Lake/Stream Buffer
Protected Area (PA)	Charlotte/Mecklenburg	≤ 24% - Low Density ≤ 70% - High Density	40 Feet 100 Feet
Critical Area (CA)	Charlotte/Mecklenburg	≤ 20% - Low Density ≤ 50% - High Density	50 Feet 100 Feet*

* *For Lower Lake Wylie Watershed only, buffer width is increased 50% for lots with an average slope greater than or equal to 50%. This applies only to new development proposed along the lake shore, and using the high density option.*

General Notes

Drinking Water Supply Watershed Buffers are required along the shorelines of Lake Norman, Mountain Island Lake and Lake Wylie, and along each side of all perennial streams as defined by the United States Geological Survey (USGS).

Drinking Water Supply Watershed Buffers are measured horizontally from the top of the stream bank. Lake buffers are measured horizontally from the full pond elevation of each lake, as follows: Lake Norman – 760 feet, Mountain Island Lake – 648 feet, Lake Wylie – 569.4 feet.

All zoning jurisdictions within Charlotte-Mecklenburg have Surface Water Improvement and Management (S.W.I.M.) and Post Construction stream buffer regulations. If multiple buffers apply to a property, then the most restrictive will govern.

Contacts:

Charlotte/Mecklenburg Zoning– 704/336-3569
Town of Davidson – 704/892-7591
Town of Cornelius – 704/896-2461
Town of Huntersville – 704/875-6541
Mecklenburg County Water Quality Program – 980-314-3217

Effective Dates:

- Lake Norman
  Mecklenburg County.....June 20, 1994
  Davidson.....October 1, 1993

Cornelius.....September 20, 1993

- Mountain Island Lake
  Mecklenburg County.....March 8, 1993
  Charlotte.....June 21, 1993
  Cornelius.....September 20, 1993
  Huntersville.....October 1, 1993
- Upper Lake Wylie
  Mecklenburg County.....June 20, 1994
  Charlotte.....June 21, 1993
- Lower Lake Wylie
  Mecklenburg County.....July 10, 2001
  Charlotte.....September 17, 2001

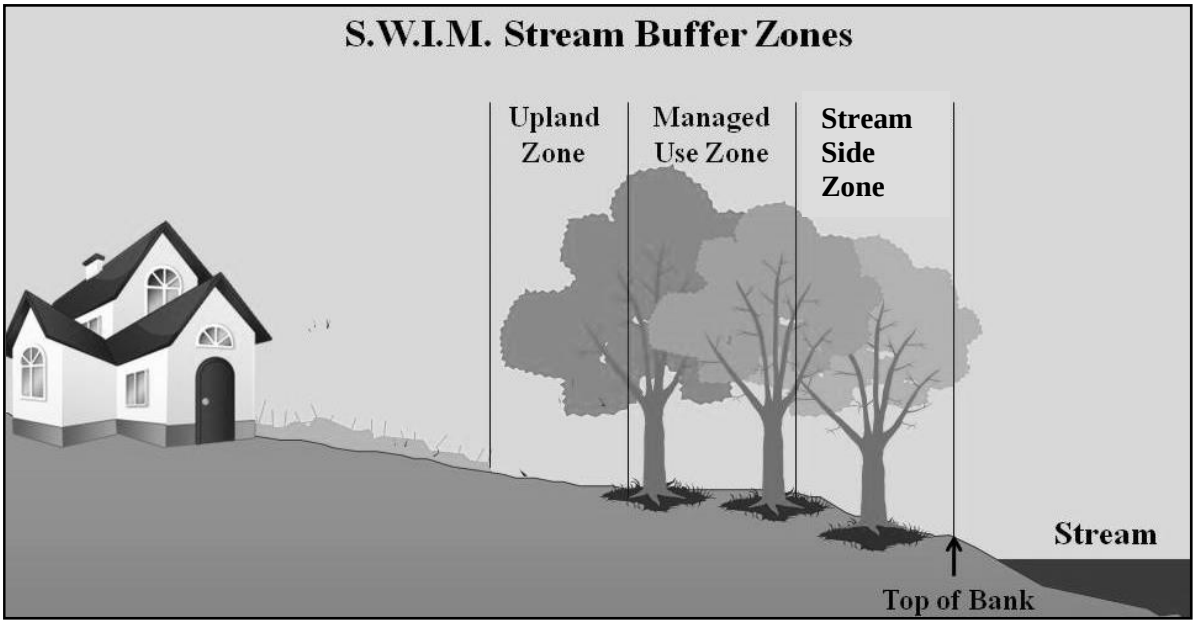
Appendix 3: Summary of S.W.I.M. Buffer Requirements

Summary of S.W.I.M. Buffer Requirements

Jurisdiction (Effective Date)	***Total Buffer Widths***			
	≥ 640 acres	***≥ 300 acres***	***≥ 100 acres***	***≥ 50 acres***
Mecklenburg County (1) unincorporated (11/9/1999)	total = 100 ft + 50% of area of floodfringe beyond 100 ft stream side=30ft. managed use=45ft. upland=25ft +50% of area of floodfringe beyond 100 ft	total = 50 ft stream side=20ft managed use =20ft. upland=10ft	total = 35 ft stream side=20ft managed use =none upland=15ft	No Buffer Requirements
Charlotte (1) (11/15/1999	same as Mecklenburg County	same as Mecklenburg County	same as Mecklenburg County	same as Mecklenburg County
Pineville (1) (4/11/2000)	same as Mecklenburg County	same as Mecklenburg County	same as Mecklenburg County	same as Mecklenburg County
Cornelius (2) (12/6/1999)	total = entire floodplain but no less than 100 feet	total = 50 feet no zones	total = 35 ft no zones	
Huntersville (1) (10/19/1999)	total = floodway + 100% of floodfringe but no less than 100 ft stream side=30ft managed use=45 ft upland=remainder	total = 50 feet stream side=20ft managed use =20ft. upland=10ft	total = 35 ft stream side=20ft managed=none upland=15ft	
Matthews (1) (2/14/2000)	same as Huntersville	same as Huntersville	same as Huntersville	
Mint Hill (1) (7/20/2000)	same as Huntersville	same as Huntersville	same as Huntersville	
Davidson (1) (June 2001)	Total buffer width = a minimum of 100 feet for all streams within Davidson's jurisdiction. For all FEMA regulated streams the width is 100 feet + 50% of the area of the floodfringe beyond 100 feet – stream side zone = 30 feet, managed use = 45 feet and upland = 25 feet + 50% of area of floodfringe			

Footnotes:

1. Function, vegetative targets and uses for each of the buffer zones correspond to the buffer plan developed by the S.W.I.M. Panel dated April 20, 1999 (as summarized on the following page).
2. No buffer zones have been designated. The entire buffer area is designated in the Ordinance as "UNDISTURBED."



Buffer function, vegetative targets and use vary according to the different buffer zones as described in the following table.

Characteristics	***Stream Side Zone***	***Managed Use Zone***	***Upland Zone***
Function	Protect the integrity of the ecosystems	Provide distance between upland development and the stream side zone	Prevent encroachment and filter runoff
Vegetative Targets (1)	**Undisturbed (no cutting or clearing allowed)** - If existing tree density is inadequate, reforestation is encouraged	**Limited clearing** - Existing tree density must be retained to a minimum of 8 healthy trees of a minimum 6-inch caliper per 1000 square feet - If existing tree density is inadequate, re-forestation is encouraged	**Grass** or other herbaceous ground cover allowed - Forest is encouraged
Uses (2)	**Very restricted** - Permitted uses limited to: flood control structures and bank stabilization as well as installation of utilities and road crossings with stabilization of disturbed areas as specified in "III E" above.	**Restricted** - Permitted uses limited to: all uses allowed in the Stream Side Zone, as well as storm water best management practices (BMPs), bike paths, and greenway trails (not to exceed 10 feet in width)	**Restricted** - Permitted uses limited to: all uses allowed in the Stream Side and Managed Use Zones, as well as grading for lawns, gardens, and gazebos and storage buildings (non-commercial and not to exceed 150 square feet)

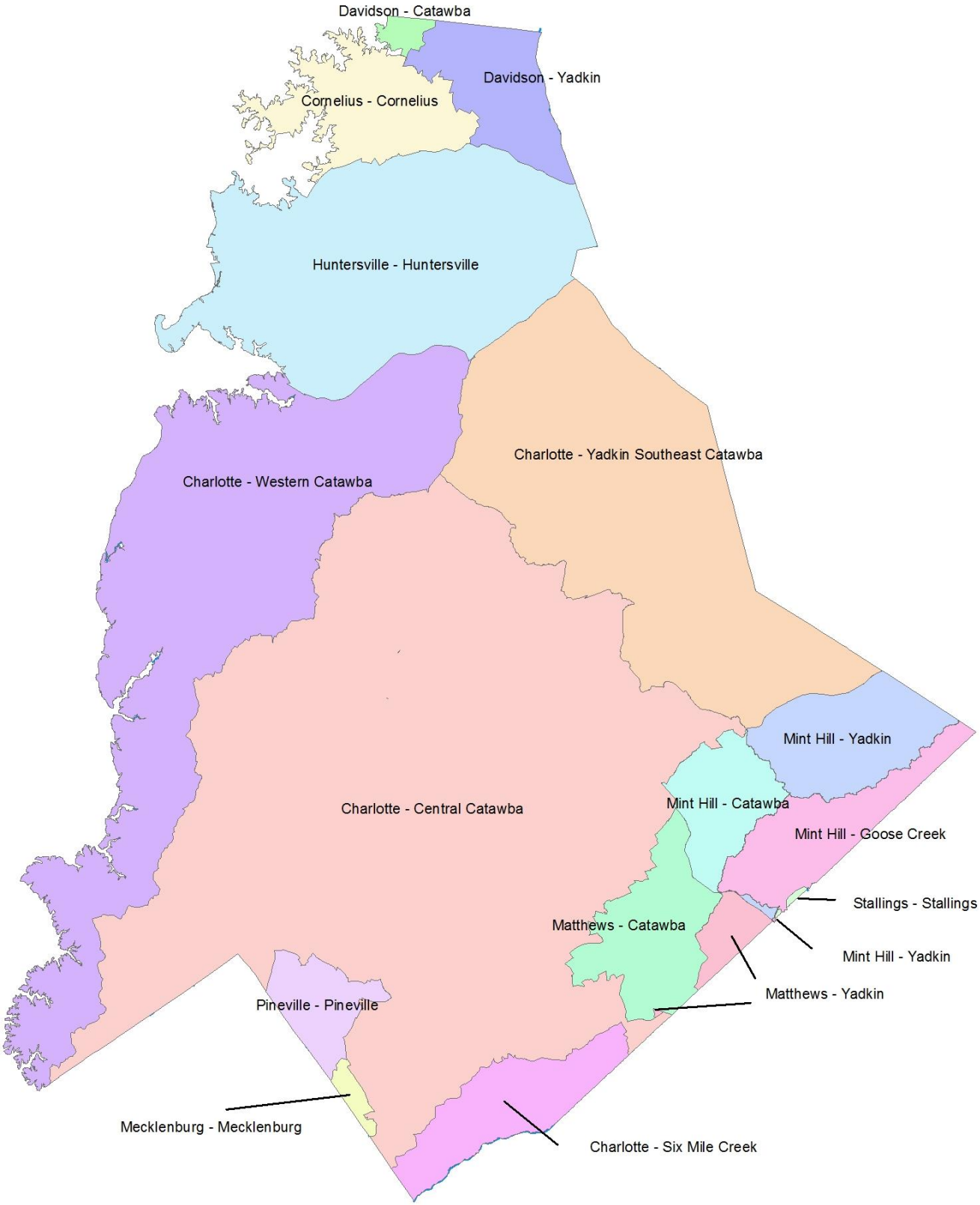
Footnotes:

(1) Re-vegetation of disturbed buffers is required when such disturbances result in the failure of the buffer system to comply with the vegetative targets specified above.

(2) Fill material cannot be brought into the buffer. Grading is allowed only in the Upland Zone. Commercial buildings or occupied structures are not allowed in the buffer. Permitted uses within the buffer zones should be coordinated to ensure minimal disturbance of the buffer system. For example, if it is necessary to install utilities within the buffer, every attempt should be made to build greenway trails so they follow the cleared areas instead of requiring additional clearing.

Appendix 4: Post-Construction Ordinance District Map

Post-Construction Ordinance District Map



Appendix 5: Summary of Post-Construction Buffer Requirements

Summary of Post-Construction Buffer Requirements

Jurisdiction	Watershed District	Buffer Width					Buffer Delineation		
		Existing SWIM + 30-ft. no-build zone on <50 acres	50-ft on <50 acres & 100-ft on ≥50 acres for all intermittent & perennial streams	200-ft on perennial & intermittent streams inside the 100-yr floodplain & 100 ft on all other perennial & intermittent streams	100-ft on intermittent & 200-ft. on perennial streams	200-ft on intermittent & perennial streams in FEMA floodplain & 100-ft. on all others	GIS (using POLARIS)	On-Site Delineation (using DWQ methods)	USGS & USDA Maps
City of Charlotte	Central Catawba	X						X	
	Western Catawba	X						X	
	Yadkin-Southeast Catawba		X+ floodplain (undisturbed)					X	
	Six Mile Creek			X (undisturbed)				X	
Cornelius	N/A	X					X		
Davidson	Catawba	X						X	
	Yadkin		X (3 zones)					X	
Huntersville	N/A	X					X		
Matthews	Catawba	X						X	
	Yadkin		X+ floodplain (undisturbed)					X	
Mint Hill	Catawba	X					X		
	Yadkin	X					X		
	Goose Creek			X (undisturbed)					X
Pineville	N/A	X					X		
Mecklenburg Co.	N/A	X					X		

Appendix 6: Table of Buffer Uses and Designations for Goose and Six Mile Creeks

Table of Buffer Uses and Designations for Goose and Six Mile Creeks

(copied from 15A NCAC 02B .0607 on July 28, 2022)

The potential new uses described in the table below shall have the following designation requirements.
Deemed Allowable: These uses may occur within the riparian buffer, but must be designed, constructed, and maintained to minimize vegetation and soil disturbance and to provide the maximum water quality protection practicable, including construction, monitoring, and maintenance activities.
Allowable Upon Authorization: These uses require a written Authorization Certificate from the Storm Water Administrator for impacts within the riparian buffer before the use can proceed.
Allowable With Mitigation Upon Authorization: These uses require a written Authorization Certificate from the Storm Water Administrator for impacts within the riparian buffer that includes an appropriate mitigation strategy before the use can proceed.
Prohibited: These uses may not proceed within the riparian buffer unless a Variance is granted by the Charlotte-Mecklenburg Storm Water Advisory Committee (SWAC). Mitigation may be required as a condition of Variance approval.

Use Description	Deemed Allowable	Allowable Upon Authorization	Allowable with Mitigation Upon Authorization	Prohibited
(A) Airport facilities:				
(i) Vegetation removal activities necessary to comply with Federal Aviation Administration requirements (e.g., line of sight requirements) provided the disturbed areas are stabilized and revegetated	X			
(ii) Airport facilities that impact equal to or less than one-third of an acre of riparian buffer		X		
(iii) Airport facilities that impact greater than one-third of an acre of riparian buffer			X	
(B) Archaeological activities	X			
(C) Bridges:				
(i) Impact equal to or less than one-tenth of an acre of riparian buffer	X			
(ii) Impact greater than one-tenth of an acre of riparian buffer		X		
(D) Dam maintenance activities:				
(i) Dam maintenance activities that do not cause additional riparian buffer disturbance beyond the footprint of the existing dam	X			
(ii) Dam maintenance activities that do cause additional riparian buffer disturbance beyond the footprint of the existing dam		X		
(E) Drainage of a pond subject to Paragraph (c) of this Rule provided that a new riparian buffer is established by natural regeneration or planting, within 50 feet of any stream which naturally forms or is constructed within the drained pond area. Drained ponds shall be allowed to naturalize for a minimum of six months from completion of the draining activity before a stream determination is conducted pursuant to Paragraph (d) of this Rule	X			
(F) Fences:				
(i) Fencing livestock out of surface waters	X			
(ii) Installation does not result in removal of trees	X			
(iii) Installation results in removal of trees		X		
(G) Fertilizer application:				

Use Description	Deemed Allowable	Allowable Upon Authorization	Allowable with Mitigation Upon Authorization	Prohibited
(i) One-time fertilizer application at agronomic rates in the riparian buffer to establish replanted vegetation. No runoff from this one-time application in the riparian buffer is allowed in the surface water	X			
(ii) Ongoing fertilizer application				X
(H) Forest harvesting - see Rule .0608 of this Section				
(I) Greenways, trails, sidewalks or linear pedestrian/bicycle transportation systems:				
(i) In outer riparian buffer (landward of 50 feet) provided that no built upon area is added within the riparian buffer	X			
(ii) In the inner riparian buffer provided that no built upon area is added within the riparian buffer and the installation does not result in the removal of tree(s)	X			
(iii) When built upon area is added to the riparian buffer, equal to or less than 10 feet wide with two-foot-wide shoulders. Shall be located landward of 50 feet unless there is no practical alternative		X		
(iv) When built upon area is added to the riparian buffer, greater than 10 feet wide with two-foot-wide shoulders. Shall be located landward of 50 feet unless there is no practical alternative			X	
(J) Historic Preservation	X			
(K) New Landfills as defined by G.S. 130A-290				X
(L) Maintenance access on modified natural streams or canals: a grassed travel way on one side of the waterbody when less impacting alternatives are not practical. The width and specifications of the travel way shall be only that needed for equipment access and operation. The travel way shall be located to maximize stream shading		X		
(M) Mining activities:				
(i) Mining activities that are covered by the Mining Act provided that new riparian buffers that meet the requirements of Paragraph (h) of this Rule and Rule .0605 of this Section are established adjacent to any relocated channels		X		
(ii) Wastewater or mining dewatering wells with approved NPDES permit			X	
(N) On-site sanitary sewage systems - new ones that use ground absorption				X
(O) Pedestrian access trail and associated steps leading to a surface water, dock, canoe or kayak access, fishing pier, boat ramp or other water dependent structure:				
(i) Equal to or less than six feet wide that does not result in the removal of any tree(s) within	X			

Use Description	Deemed Allowable	Allowable Upon Authorization	Allowable with Mitigation Upon Authorization	Prohibited
the riparian buffer and does not result in the addition of built upon area to the riparian buffer (ii) Equal to or less than six feet wide that results in the removal of tree(s) or the addition of built upon area to the riparian buffer (iii) Greater than six feet wide		X	X	
(P) Playground equipment: (i) Playground equipment on single-family lots provided that installation and use does not result in removal of vegetation (ii) Playground equipment on single-family lots where installation or use results in the removal of vegetation (iii) Playground equipment installed on lands other than single-family lots	X	X X		
(Q) Ponds created or modified by impounding streams subject to riparian buffers pursuant to Paragraph (c) of this Rule and not used as stormwater control measures (SCMs): (i) New ponds provided that a riparian buffer that meets the requirements of Paragraph (h) of this Rule and Rule .0605 of this Section is established adjacent to the pond		X		
(R) Protection of existing structures and facilities when this requires additional disturbance to the riparian buffer		X		
(S) Public Safety - publicly owned spaces where it has been determined by the head of the local law enforcement agency with jurisdiction over that area that the riparian buffers pose a risk to public safety. The head of the local law enforcement agency shall notify the local government with land use jurisdiction over the publicly owned space and the Division of Water Resources of any such determination in writing	X			
(T) Removal of previous fill or debris provided that Paragraph (h) of this Rule is complied with and any vegetation removed is restored	X			
(U) Restoration or enhancement (wetland, stream) as defined in 33 CFR Part 332 available free of charge on the internet at: http://water.epa.gov/lawsregs/guidance/wetlands mitigation_index.cfm (i) Wetland or stream restoration that is part of a compensatory mitigation bank, nutrient offset bank, or the In Lieu Fee program (ii) Wetland or stream restoration other than those listed above	X	X		
(V) Road, driveway or railroad - impacts other than perpendicular crossings of streams and other surface waters subject to this Rule			X	

Use Description	Deemed Allowable	Allowable Upon Authorization	Allowable with Mitigation Upon Authorization	Prohibited
(W) Road, driveway or railroad - perpendicular crossings of streams and other surface waters subject to this Rule:				
(i) Impact equal to or less than one-tenth of an acre of riparian buffer	X			
(ii) Impact greater than one-tenth of an acre but equal to or less than one-third of an acre of riparian buffer		X		
(iii) Impact greater than one-third of an acre of riparian buffer			X	
(iv) Driveway crossings in a residential subdivision that cumulatively impact equal to or less than one-third of an acre of riparian buffer		X		
(v) Driveway crossings in a residential subdivision that cumulatively impact greater than one-third of an acre of riparian buffer			X	
(vi) Farm roads and forest roads that are exempt from permitting from the U.S. Army Corps of Engineers per Section 404(f) of the Federal Clean Water Act	X			
(X) Road relocation of existing private access roads associated with public road projects where necessary for public safety:				
(i) Less than or equal to 2,500 square feet of riparian buffer impact		X		
(ii) Greater than 2,500 square feet of riparian buffer impact			X	
(Y) Scientific studies and stream gauging	X			
(Z) Slatted uncovered decks, including steps and support posts, which are associated with a dwelling, provided that it meets the requirements of Paragraph (h) of this Rule and Rule .0605 of this Section and installation does not result in removal of vegetation		X		
(AA) Stormwater Control Measure (SCM) as defined in 15A NCAC 02H .1002:				
(i) In the outer riparian buffer (landward of 50 feet) if Paragraph (h) of this Rule is complied with		X		
(ii) In the outer riparian buffer (landward of 50 feet) if Paragraph (h) of this Rule is not complied with			X	
(BB) Streambank or shoreline stabilization		X		
(CC) Temporary roads, provided that the disturbed area is restored to pre-construction topographic and hydrologic conditions and replanted with comparable vegetation within two months of when construction is complete. Tree planting may occur during the dormant season. At the end of five years, any restored wooded riparian buffer shall comply with the restoration criteria in Rule				

Use Description	Deemed Allowable	Allowable Upon Authorization	Allowable with Mitigation Upon Authorization	Prohibited
.0295(i) of this Subchapter:				
(i) Less than or equal to 2,500 square feet of riparian buffer disturbance	X			
(ii) Greater than 2,500 square feet of riparian buffer disturbance		X		
(iii) Associated with culvert installation or bridge construction or replacement		X		
(DD) Temporary sediment and erosion control devices provided that the disturbed area is restored to preconstruction topographic and hydrologic conditions and replanted with comparable vegetation within two months of when construction is complete. Tree planting may occur during the dormant season. At the end of five years, any restored wooded riparian buffer shall comply with the restoration criteria in Rule .0295(i) of this Subchapter:				
(i) In the outer riparian buffer (landward of 50 feet) provided that ground cover is established within the timeframes required by the Sedimentation and Erosion Control Act, vegetation in the inner riparian buffer is not compromised, and that discharge is released in accordance with Paragraph (h) of this Rule	X			
(ii) In the inner and outer riparian buffer to control impacts associated with uses identified in this Table or uses that have received an Authorization Certificate with Exception provided that sediment and erosion control for upland areas is addressed outside the riparian buffer		X		
(iii) In-stream temporary erosion and sediment control measures for work within a stream channel that is authorized under Sections 401 and 404 of the Federal Clean Water Act	X			
(EE) Utility Lines - Streambank stabilization for the protection of publicly owned utility lines (not including new line installation):				
(i) Less than 150 feet of streambank disturbance	X			
(ii) Greater than 150 feet of streambank disturbance		X		
(FF) Utility Lines - Sewer Lines - Sanitary Sewer Overflows:				
(i) Emergency sanitary sewer overflow response activities, provided that the disturbed area within the riparian buffer outside of the existing utility line maintenance corridor: is the minimum necessary to respond to the emergency overflow, is restored to pre-construction topographic and hydrologic conditions, and is replanted with comparable vegetation (e.g., grass with grass, hardwoods with hardwoods) within two months of when	X			

Use Description	Deemed Allowable	Allowable Upon Authorization	Allowable with Mitigation Upon Authorization	Prohibited
disturbance is complete (ii) Emergency sanitary sewer overflow response activities that do not meet the listing above. For any new proposed permanent impacts are not a "Deemed Allowable Activity", an application for an Authorization Certificate shall be submitted to the Authority no later than 30 calendar days of conclusion of the emergency response activities		X		
(GG) Utility - Sewer Lines – Vegetation maintenance activities that remove forest vegetation from existing sewer utility right of ways (not including new line installation) outside of the existing utility line maintenance corridor: (i) Impacts outside of the inner 50 feet nearest the stream (ii) Impacts in the inner 50 feet nearest the stream: For lines that have not been maintained, the vegetation can be mowed, cut or otherwise maintained without disturbance to the soil structure for a maintenance corridor that is equal to or less than 30 feet wide (iii) Impacts in the inner 50 feet nearest the stream other than those listed above	X X	X		
(HH) Utility – Sewer Lines - Replacement/ Rehabilitation of existing sewer lines within, or adjacent to, an existing right of way but outside of an existing utility line maintenance corridor provided that comparable vegetation (e.g., grass with grass, hardwoods with hardwoods) is allowed to regenerate in disturbed riparian buffers outside of the permanent maintenance corridor and riparian buffers outside of the permanent maintenance corridor are not maintained: (i) Permanent maintenance corridor equal to or less than 30 feet wide provided there is no grading and/or grubbing within 10 feet of the top of bank when the sewer line is parallel to the stream (ii) Grading and/or grubbing within 10 feet of the top of bank when the sewer line is parallel to the stream and permanent maintenance corridor equal to or less than 30 feet wide (iii) Permanent maintenance corridor greater than 30 feet wide. For impacts other than perpendicular crossings, mitigation is only required for impacts in the inner 50 feet nearest the stream. For perpendicular crossings that disturb equal to or less than 40 linear feet, no mitigation is required. For perpendicular crossings that disturb greater than 40 linear feet, mitigation is only	X	X	X	

Use Description	Deemed Allowable	Allowable Upon Authorization	Allowable with Mitigation Upon Authorization	Prohibited
required for impacts in the inner 50 feet nearest the stream				
(II) Utility - Sewer Lines – New Line Construction/Installation Activities – Perpendicular crossings of streams and other surface waters subject to this Rule or perpendicular entry into the riparian buffer that does not cross a stream or other surface water subject to this Rule provided that vegetation is allowed to regenerate in disturbed areas outside of the permanent maintenance corridor:				
(i) Construction corridor of less than or equal to 40 linear feet wide and a permanent maintenance corridor that is equal to or less than 30 feet wide	X			
(ii) Construction corridor of greater than 40 linear feet wide and less than or equal to 150 linear feet wide and a permanent maintenance corridor that is equal to or less than 30 feet wide		X		
(iii) Construction corridor of greater than 150 linear feet wide and a permanent maintenance corridor that is equal to or less than 30 feet wide			X	
(iv) Permanent maintenance corridor that is greater than 30 linear feet wide. For impacts other than perpendicular crossings, mitigation is only required for impacts in the inner 50 feet nearest the stream. For perpendicular crossings that disturb equal to or less than 40 linear feet, no mitigation is required. For perpendicular crossings that disturb greater than 40 linear feet, mitigation is only required for impacts in the inner 50 feet nearest the stream			X	
(JJ) Utility - Sewer Lines – New Line Construction/ Installation Activities – Impacts other than perpendicular crossings provided that vegetation is allowed to regenerate in disturbed areas outside of the permanent maintenance corridor:				
(i) Impacts outside of the inner 50 feet nearest the stream	X			
(ii) Less than 2,500 square feet of impacts in the inner 50 feet nearest the stream when impacts are solely the result of tying into an existing utility line and when grubbing or grading within 10 feet immediately adjacent to the surface water is avoided		X		
(iii) Impacts to the inner 50 feet nearest the stream other than noted above			X	
(KK) Utilities – Non-Sewer Underground Lines. Vegetation maintenance activities that remove forest vegetation from existing utility right of				

Use Description	Deemed Allowable	Allowable Upon Authorization	Allowable with Mitigation Upon Authorization	Prohibited
ways (not including new line installation) outside of the existing utility line maintenance corridor:				
(i) Impacts outside of the inner 50 feet nearest the stream	X			
(ii) Impacts in the inner 50 feet nearest the stream: For lines that have not been maintained, the vegetation can be mowed, cut or otherwise maintained without disturbance to the soil structure for a maintenance corridor that is equal to or less than 30 feet wide	X			
(iii) Impacts in the inner 50 feet nearest the stream other than those listed above		X		
(LL) Utilities – Non-Sewer Underground Lines. Perpendicular crossings of streams and other surface waters subject to this Rule or perpendicular entry into the riparian buffer that does not cross a stream or other surface water subject to this Rule provided that vegetation is allowed to regenerate in disturbed areas outside of the permanent maintenance corridor:				
(i) Construction corridor of less than or equal to 50 linear feet wide and a permanent maintenance corridor that is equal to or less than 30 feet wide	X			
(ii) Construction corridor of greater than 40 linear feet wide and less than or equal to 150 linear feet wide and a permanent maintenance corridor that is equal to or less than 30 feet wide		X		
(iii) Construction corridor of greater than 150 linear feet wide and a permanent maintenance corridor that is equal to or less than 30 feet wide			X	
(iv) Permanent maintenance corridor that is greater than 30 linear feet wide (mitigation is required only for impacts within the inner 50 feet nearest the stream)			X	
(MM) Utilities – Non-Sewer Underground Lines. Impacts other than perpendicular crossings provided that vegetation is allowed to regenerate in disturbed areas outside of the permanent maintenance corridor:				
(i) Impacts outside of the inner 50 feet nearest the stream	X			
(ii) Impacts in the inner 50 feet nearest the stream to less than 2,500 square feet when impacts are a result of tying to an existing utility line and when grubbing or grading within 10 feet immediately adjacent to the surface water is avoided		X		
(iii) Impacts to the inner 50 feet nearest the stream other than noted above			X	

Use Description	Deemed Allowable	Allowable Upon Authorization	Allowable with Mitigation Upon Authorization	Prohibited
(NN) Utilities – Non-Sewer Aerial Lines. Perpendicular crossings of streams and other surface waters subject to this Rule or perpendicular entry into the riparian buffer that does not cross a stream or other surface water subject to this Rule:				
(i) Disturb equal to or less than 150 linear feet wide of riparian buffer provided that a minimum zone of 10 feet wide immediately adjacent to the waterbody is managed such that only vegetation that poses a hazard or has the potential to grow tall enough to interfere with the line is removed, that no land grubbing or grading is conducted in the inner 50 feet nearest the stream, and that that poles or aerial infrastructure are not installed within 10 feet of a waterbody	X			
(ii) Disturb greater than 150 linear feet wide of riparian buffer		X		
(OO) Utilities – Non-Sewer Aerial Lines - Impacts other than perpendicular crossings of streams and other surface waters subject to this Rule or perpendicular entry into the riparian buffer that does not cross a stream or other surface water subject to this Rule:				
(i) Impacts outside of the inner 50 feet nearest the stream	X			
(ii) Impacts in the inner 50 feet nearest the stream provided that a minimum zone of 10 feet wide immediately adjacent to the waterbody is managed such that only vegetation that poses a hazard or has the potential to grow tall enough to interfere with the line is removed, that no land grubbing or grading is conducted in the inner 50 feet nearest the stream, and that that poles or aerial infrastructure are not installed within 10 feet of a waterbody		X		
(PP) Vegetation management:				
(i) Emergency fire control measures provided that topography is restored	X			
(ii) Placement of mulch ring around restoration plantings for a period of five years from the date of planting	X			
(iii) Planting non-invasive vegetation to enhance the riparian buffer	X			
(iv) Pruning forest vegetation provided that the health and function of the forest vegetation is not compromised	X			
(v) Removal of individual trees, branches or limbs which are in danger of causing damage to dwellings, existing utility lines, other structures or human life, or are imminently	X			

Use Description	Deemed Allowable	Allowable Upon Authorization	Allowable with Mitigation Upon Authorization	Prohibited
endangering stability of the streambank provided that the stumps are left or ground in place without causing additional land disturbance				
(vi) Removal of individual trees that are dead, diseased or damaged	X			
(vii) Removal of poison ivy, oak or sumac. If removal is significant, then the riparian buffer shall be replanted with non-invasive species	X			
(viii) Removal of understory nuisance vegetation as defined in: Smith, Cherri L. 2008. Invasive Plants of North Carolina. Dept. of Transportation. Raleigh, NC (available at http://portal.ncdenr.org/c/document). If removal is significant then the riparian buffer shall be replanted with non-invasive species	X			
(ix) Removal of woody vegetation in the riparian buffer provided that Paragraph (h) of this Rule is complied with			X	
(QQ) Vehicle access roads and boat ramps (excluding parking areas) leading to surface water, docks, fishing piers, and other water dependent activities:				
(i) Single vehicular access road and boat ramp to the surface water but not crossing the surface water that are restricted to the minimum width practicable not to exceed 15 feet wide	X			
(ii) 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 15 feet wide		X		
(RR) Water dependent structures (except for boat ramps) as defined in Rule .0202 of this Subchapter		X		
(SS) Water wells	X			
(TT) Wildlife passage structures		X		

Appendix 7: Summary of Exemptions from Water Quality Buffer Requirements

Summary of Exemptions from Water Quality Buffer Requirements

The table below provides a list of the exemptions from the buffer requirements in Charlotte-Mecklenburg based on the jurisdiction and buffer type. The exemption types are indicated in the rows and the jurisdictions in the columns. The buffer types are represented in the key below. If a keyed buffer type appears under a jurisdiction for a particular exemption, then if that exemption is met for a parcel in that jurisdiction then that buffer type will not apply. For all jurisdictions, if more than one buffer type is required, the buffer that is more protective of water quality will always apply. This document only presents a summary of the buffer exemptions. For more detailed information, refer to the specific ordinance.

Key:
Water Supply Watershed Buffers = W
S.W.I.M. Buffers = S
Post-Construction Buffers = P (includes Goose and Six Mile Creek Buffers)

Exemption	Charlotte	Cornelius	Davidson	Huntersville	Matthews	Mint Hill	Pineville	Goose Cr.	County
Existing development (1)(2)(4)	W		W	W					
Expansions to uses classified as existing development for single-family residential only			W						
Certificate of compliance issued (2)	S(7), P	S, P	S, P	S(7), P	P	S(7), P	S(7), P		S(7), P
Valid building permit issued (2)	S(7), P	P	P	S(7), P	P	S(7), P	S(7), P		S(7), P
Vested rights established (2)(3)	W, S(7), P	W, P	W, P	W, S(7)	S(7), P	S(7), P	S(7), P		S(7), P
Existing lot (2)(5)			W (SF only)	W					
Expansion of existing utilities (2)	W (with exceptions)			W (public utilities with exceptions)					
Reconstruction of bldgs. or built-upon-area (2)		W							
Have been subdivided by a recorded subdivision plat (2)	S(7)			S(7)	S(7)	S(7)	S(7)		S(7)
Have been described by metes and bounds in a recorded deed (2)(6)	S(7)			S(7)		S(7)	S(7)		S(7)
Are included on a valid preliminary subdivision plan (2)	S(7)			S(7), P (or sketch plan)	S(7)	S(7)	S(7)		S(7)
Piped sections of a stream	S	S	S	S	S	S	S		S
For residential development and redevelopment, preliminary subdivision plan application or in the case of minor subdivisions, construction plan for required improvements, submitted and accepted for review (2)	P				P (does not include redevelopment)	P (does not include redevelopment)	P (does not include redevelopment)		P (does not include redevelopment)
For nonresidential development and redevelopment, preliminary subdivision plan application submitted and accepted for review, provided that subdivision-wide water quality and quantity features required at the time of submittal	P				P (does not include redevelopment)	P (does not include redevelopment)	P (does not include redevelopment)		P (does not include redevelopment)

Exemption	Charlotte	Cornelius	Davidson	Huntersville	Matthews	Mint Hill	Pineville	Goose Cr.	County
are contained within the submittal and provided the plan is subsequently approved and all easements are properly established (2)									
Zoning use application submitted and accepted for review for uses that do not require a building permit (2)	P	P	P	P		P	P		P
Conditional zoning district apprvd (2)	P		P	P (conditional rezoning app. submitted by May 1, 2007)	P	P	P		P
Residential development that cumulatively disturbs less than one acre and cumulatively creates less than 24% built upon area based on lot size or the lot is less than 20,000 square feet (lot must have been described by metes and bounds in a recorded deed and cannot be part of a larger development or redevelopment)	P		P		P		P		P
Commercial and industrial development that cumulatively disturbs less than one acre and cumulatively creates less than 20,000 square feet of built upon area (built upon area includes gravel and other partially impervious materials)	P		P		P		P		P
Redevelopment that disturbs less than 20,000 square feet, is not part of a larger development, does not decrease existing storm water controls and renovation and/or construction costs (excluding trade fixtures) do not exceed 100% of the tax value of the property	P		P	P (for non-single family homes only)			P		P
Activities exempt from permit requirements of Section 404 of the federal Clean Water Act, as specified in 40 CFR 232 (primarily, ongoing farming and forestry activities)	P	P	P		P	P	P		P
Major site plans, major subdivision and conditional use plans submitted and accepted for review (2)		P							
Development that cumulative disturbs less than one acre and is not part of a larger plan of development or sale		P		P (new development, redevelopment & expansions)		P			
Redevelopment or expansion that cumulatively disturbs less than one acre and is not part of a		P				P			

Exemption	Charlotte	Cornelius	Davidson	Huntersville	Matthews	Mint Hill	Pineville	Goose Cr.	County
larger plan of development or sale									
Master plan approved			P						
Redevelopment of transit station areas, distressed business districts, brownfields and conditional planning areas approved by the Town Board provided there is no net increase in built upon area and storm water control is greater than or equal to previous development			P						
Redevelopment or expansions that result in no net increase in built-upon area and provide equal or greater storm water control than the previous development		P			P	P			
Redevelopment that cumulatively disturbs less than 20,000 square feet and is not part of a larger plan of development or sale					P				
Residential development activity that disturbs less than one acre of land and is not part of a larger common plan of development or sale, including new development, redevelopment or expansions, is not subject to the provisions of this regulation			P						
Non-residential development activity that disturbs less than ½ acre of land and is not part of a larger common plan of development or sale, including new development, redevelopment or expansions			P						
Development and redevelopment projects within transit station areas designated by the Planning Director based on Corridor Record of Decisions or distressed business districts designated by the Economic Development Director are allowed by right to forego meeting the requirements of this ordinance, except for peak control and downstream analysis requirements (specific provisions have to be met)	P								
Use is existing and ongoing (9)		W						P	
Project requires a 401 Certification/ 404 Permit		W							
Redevelopment is allowed for residential and non-residential structures provided that less than an additional half acre is disturbed during the redevelopment for non-residential structures								P	

Appendix 7: Summary of Exemptions from Water Quality Buffer Requirements
Footnotes

(1) Existing development means projects that are built or projects that at a minimum have established a vested right under N.C. zoning law as of the effective date of the ordinance as described in (2) and (3) below.

(2) As of the effective date of the ordinance as indicated below:

Water Supply Watershed

- Lake Norman
  - Mecklenburg County ..... June 20, 1994
  - Davidson ..... October 1, 1993
  - Cornelius ..... September 20, 1993
- Mountain Island Lake
  - Mecklenburg County ..... March 8, 1993
  - Charlotte ..... June 21, 1993
  - Cornelius ..... September 20, 1993
  - Huntersville ..... October 1, 1993
- Upper Lake Wylie
  - Mecklenburg County ..... June 20, 1994
  - Charlotte ..... June 21, 1993
- Lower Lake Wylie
  - Mecklenburg County ..... July 10, 2001
  - Charlotte ..... September 17, 2001

S.W.I.M.

- Charlotte ..... November 15, 1999
- Cornelius ..... December 6, 1999
- Davidson ..... June 2001
- Huntersville ..... October 19, 1999
- Matthews ..... February 14, 2000
- Mint Hill ..... July 20, 2000
- Pineville ..... April 11, 2000
- Mecklenburg County ..... November 9, 1999

Post-Construction

- County & Towns ..... June 30, 2007
- City of Charlotte ..... July 1, 2008

Goose Creek

- Mint Hill ..... February 1, 2009

(3) Vested rights are established under N.C. law if at least one of the following are met except for the Town of Huntersville, which has significantly different criteria that will require a review of their specific Zoning Ordinance under Article 2, Section 2.2:

- Substantial expenditure of resources (time, labor, money) based on a good faith reliance upon having received a valid local government approval to proceed with the project; or
- Having an outstanding valid building permit; or
- Having an approved site specific or phased development plan.

(4) Expansion to structures classified as existing development must meet the buffer requirements.

(5) An existing lot is defined as a lot which is part of a subdivision, a plat of which has been recorded in the office of the register of deeds prior to the adoption of this ordinance, or a lot described by metes and bounds, the description of which has been so recorded prior to the adoption of the ordinance.

(6) Have been described by metes and bounds in a recorded deed which:
- If to be used for residential purposes:
  Are 1 acre or less in size.
- If to be used for nonresidential purposes:
  Are 4 acres or less in size if located on a non-FEMA regulated floodway, or
  Are 7 acres or less in size if located on a FEMA regulated floodway.

(7) Redevelopment or expansions to uses included in this category are not subject to S.W.I.M. buffer requirements unless it would result in an increase in the total impervious area within the buffer.

(8) S.W.I.M. Buffer requirements do not apply to the shoreline of the Catawba River lakes

(9) Only the portion of the buffer that contains the footprint of the existing and ongoing use is exempt. Activities necessary to maintain uses are allowed provided that the site remains similarly vegetated, no impervious surface is added within the buffer area where it did not exist as of February 1, 2009 and existing diffuse flow is maintained. In the Town of Cornelius, this is expanded to allow existing development to continue and be maintained provided that no additional disturbance occurs in the buffer.

Appendix 8: Stream Reach Evaluation Form

Charlotte-Mecklenburg STORM WATER Services

2145 Suttle Avenue
Charlotte, NC 28208
StormWater.CharMeck.org

Stream Reach Evaluation Form

(Unless otherwise specified by the Storm Water Administrator, approval must be obtained from the property owner before proceeding with a stream reach evaluation. The finding indicated on this form is valid for five (5) years from the date indicated below.)

Date:		Evaluator:		Easting:	
Project:				Northing:	

Total Points: Stream is at least intermittent if ≥ 19 or perennial if ≥ 30 (right-click the purple **number** and left-click **Update Field** to summarize points)	0.0

A. Geomorphology	Absent	Weak	Moderate	Strong	**SCORE**
1[a]. Continuity of channel bed and bank	0	1	2	3	
2. Sinuosity of channel along thalweg	0	1	2	3	
3. In-channel structure: riffle- / step- pool sequence	0	1	2	3	
4. Particle size of stream substrate	0	1	2	3	
5. Active/relic floodplain	0	1	2	3	
6. Depositional bars or benches	0	1	2	3	
7. Recent alluvial deposits	0	1	2	3	
8. Head cuts	0	1	2	3	
9. Grade controls	0	1	2	3	
10. Natural valley	0	1	2	3	
11. Second or greater order channel	No = 0		Yes = 3		
				Geomorphology Subtotal	

[a] Man-made ditches are not rated: see discussion in NCDWQ Manual

B. Hydrology					
12. Presence of Baseflow	0	1	2	3	
13. Iron Oxidizing Bacteria	0	1	2	3	
14. Leaf litter	1.5	1	0.5	0	
15. Sediment on plants or debris	0	0.5	1	1.5	
16. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5	
17. Soil-based Evidence of high-water table?	No = 0		Yes = 3		
				Hydrology Subtotal	

C. Biology					
18. Fibrous roots in streambed	3	2	1	0	
19. Rooted upland plants in streambed	3	2	1	0	
20. Macrobenthos (note diversity and abundance)	0	0.5	1	1.5	
21. Aquatic Mollusks	0	1	2	3	
22. Fish	0	0.5	1	1.5	
23. Crayfish	0	0.5	1	1.5	
24. Amphibians	0	0.5	1	1.5	
25. Algae	0	1	2	3	
26. Wetland plants in streambed	FACW= 0.75, OBL= 1.5, Other= 0				
				Biology Subtotal	

* Perennial streams may also be identified using other methods. See page 35 of NCDWQ manual.

Notes:	
I certify that this evaluation conforms to the latest version of the NCDWQ document entitled Methodology for Identification of Intermittent and Perennial Streams and their Origins.	_____ Signature of Certified Evaluator

Form # PCO39 (Version 4.11)

Appendix 9: Water Quality Buffer Plan Review Check Sheet

Water Quality Buffer Plan Review Check Sheet

Subdivision Name:_____

Tax Parcel #:_____

Date of Review:_____

Reviewed by:_____

Reviewed for:_____

Buffer Widths:

____ Buffer widths on the plan are correct based off Internet coverage (http://polaris.mecklenburgcountync.gov/website/redesign/viewer.htm - select "WATER QUALITY") and are measured horizontally on a line perpendicular to the surface water, landward from the top of the bank on each side of the stream.

Water Quality Buffer Delineation:

____ Buffer areas are clearly identified on plans in bold, clear type as "WATER QUALITY BUFFER."

____ The outside boundary of each buffer zone is clearly marked on plans.

____ The top of the bank from where the buffer width is measured is clearly labeled on plans.

____ The outside boundary of the buffer is permanently marked with an iron pin or other acceptable property corner marker at all street crossings and this iron is called out on plans.

____ The outside boundary of the buffer is delineated with orange fabric fencing prior to land disturbing activities and this fencing is called out on plans.

____ Streams and buffer boundaries including the delineation of each zone and a dimension from a specific location are shown on all surveys and record plats, including individual record plats for any lots affected.

Vegetative Targets:

____ Plans clearly indicate that the stream side zone is to be left "undisturbed."

____ Plans clearly indicate that a limited number of trees (or none at all) can be removed from the managed use zone. Some trees can be removed provide that the tree density remaining is a minimum of 8 healthy trees of a minimum 6 inch caliper per 1000 square feet. Removal of existing vegetation must be performed in such a manner as to prevent damage to the roots of remaining trees.

____ Plans clearly indicate that if grading is performed in the upland zone, it must be performed in such a manner as to prevent damage to the roots of remaining trees. Grass or other suitable ground cover can be applied to the upland zone.

____ Plans clearly indicate that no fill material is to be brought into the buffer and that no structures are allowed within any of the buffer areas (except non-commercial out buildings not exceeding 150 square feet).

____ Plans indicate plantings below storm water outfalls to prevent erosion.

____ Activities in the buffer comply with the applicable Zoning Ordinance.

Storm Water Outfalls:

____ All storm water outfalls are shown on plans.
____ Plans indicate that all storm water outfalls end prior to the outer edge of the buffer.
____ Engineered channels and piped storm water flow are NOT shown in the buffer.
____ Plans indicate that approved energy dissipators are located at the end of all storm water outfalls outside of the buffer.
____ Plans provide "details" for energy dissipators.

Erosion Control Devices:

____ Erosion control measures are adequate to protect the buffer.
____ The locations of temporary sediment basins are clearly shown on plans.
____ All temporary sediment basins and other erosion control devices are located outside the buffer.

Required Plan Notations:

____ The stream side zone of the buffer must be left completely undisturbed. In the managed use zone, a limited number of trees can be removed provided that the tree density remaining is a minimum of 8 healthy trees of a minimum 6 inch caliper per 1000 square feet. Removal of existing vegetation must be performed in such a manner as to prevent damage to the roots of remaining trees. No fill material can be brought into the buffer.
____ Grading and other land disturbing activities are allowed only in the upland zone; however, these activities must be performed in such a manner as to prevent damage to the roots of remaining trees. Grass or other suitable ground cover can be applied to the upland zone.
____ The outside buffer boundary must be clearly marked by orange fabric fencing prior to any land disturbing activities at the site and this fencing must be called out on the plans.
____ The outside boundary of the stream buffer must be permanently marked with an iron pin or other acceptable property corner marker at street crossings and this marker must be called out on plans.

Notes:

_____

_____

_____

_____

_____

Appendix 10: Pathway Guidelines for Water Supply Watershed Buffers

Pathway Guidelines for Water Supply Watershed Buffers

Pedestrian pathways are allowed through the buffer to provide access to the water or to a pier, provided they are pre-approved by Charlotte-Mecklenburg Storm Water Services. Pathways should meander through the buffer avoiding trees and minimizing environmental impact. Openings for pathways should not exceed four (4) feet in width and only one (1) pathway is allowed per residential lot. Pathways should take the most direct route from the house to the water or pier to minimize disturbance. Pathways must be made of pervious materials such as mulch or sand. Pathways made of concrete, asphalt, pavers, rock or gravel are not allowed in buffer. Slatted boardwalks are allowed, provided the following guidelines are adhered to:

Boardwalk:

1. Boardwalks are allowed but spaces must be at least 1/4 inch apart between boards. The ground beneath the boardwalk must be comprised of pervious material.
2. No trees can be cut or damaged during installation.
3. Width may be no more than 3 feet at any location.

Appendix 11: Irrigation System Guidelines for Water Supply Watershed Buffers

Water Supply Watershed Irrigation System Guidelines

1. Homeowners will notify Charlotte-Mecklenburg Storm Water Services in writing of their intent to install an irrigation system through a buffer. An Authorization Certificate Application form (see Appendix 13) must be submitted.

2. No trees larger than two (2) inches in diameter can be cut from the buffer.

3. No heavy mechanical equipment such as trenchers may be used in the buffer. Only hand clearing and hand digging tools are allowed.

4. No fuel powered pumps are allowed in the buffer. Small electrical pumps are permitted.

5. No impervious pads (concrete, asphalt, etc.) are permitted in the buffer. Wooden frames may be placed around pumps for support.

6. All irrigation lines must be installed in such a way as to prevent the back flow of water to the lake. The use of back flow prevention and foot valves is recommended.

7. Irrigation lines installed through the buffer must disturb as little area as possible.

8. Erosion control devices such as high hazard silt fence must be installed and maintained if the ground is disturbed longer than 24 hours, or if rain is predicted at any time during construction.

9. After installation, the disturbed area must be stabilized with a vegetative groundcover or covered with mulch or pine straw.

Appendix 12: Mecklenburg County Greenways Exempt from Post-Construction Requirements (including buffers)

Mecklenburg County Greenways Exempt from Post-Construction Requirements

October 8, 2014

Background:

The attached table and corresponding map illustrate the greenway sections in Charlotte-Mecklenburg that are included in either the 1999 Greenway Master Plan or the 2004 Little Sugar Creek Greenway Master Plan, which were developed by the Mecklenburg County Park & Recreation Department and subsequently approved by the Mecklenburg Board of County Commissioners. These greenway sections are not subject to the post-construction ordinances in Charlotte-Mecklenburg because they are included in a plan approved prior to the effective dates of the ordinances, including June 30, 2007 for the Towns and County and July 1, 2008 for the City of Charlotte.

How to Use the Table and Map:

The attached table includes an ID number, name, and description of each exempt greenway section. The ID number in the table pertains to individual greenway sections and does not match the ID number on the attached map, which corresponds to larger greenway projects. To match a greenway section from the table to the map, use the greenway name. The color coding of greenway sections on the map indicates the year construction was completed. Sections that are gray indicate that construction has not been completed as of 10/8/2014. If a greenway section is colored in any way, including gray, then it is covered under a master plan that existed prior to any of the post-construction ordinances going into effect and is therefore exempt from all post-construction ordinance requirements, including the buffer requirements. The attached table and map do not apply to S.W.I.M. buffers. All greenways are required to comply with S.W.I.M. buffer requirements.

Greenway Projects Exempt from Post-Construction Ordinance Requirements
August 14, 2014

ID	Greenway Name	Description
Greenways Outside Charlotte (before June 30, 2007)		
1	Sixmile Creek Greenway	East Providence Rd. to Union and Lancaster Counties
2	South Prong Rocky River Greenway	Main St (Davidson) to Cabarrus County line
3	Torrence Creek Greenway	I-77 at Huntersville Business Park to McDowell Creek
4	South Prong Clarke Creek Greenway	Hill St. to Cabarrus County Line
5	West Branch Rocky River Greenway	Iredell and Cabarrus Counties to Cabarrus County at West Branch Rocky River
6	McDowell Creek Greenway	West Catawba Avenue to Mountain Island Lake
7	Torrence Creek Tributary	Cambridge Road to Gilead Road
8	Rocky River Greenway	Riverford Drive to Cabarrus County
9	Ramah Creek Greenway	Caldwell Station Area to Cabarrus County Line
Greenways in Charlotte (before July 1, 2008)		
1	Back Creek Greenway	Cabarrus County Line to Reedy Creek Park and Nature Preserve
2	Briar Creek Greenway	Shamrock Road to Little Sugar Creek
3	Campbell Creek Greenway	Albemarle Road to McAlpine Creek
4	Clark's Creek Greenway	Fairlea Drive to Amaranthus Court and Mallard Creek
5	Clark's Creek Tributary	Victory Avenue to Silvermere Way
6	Coffey Creek Greenway	Shopton Road to Sugar Creek
7	Edward's Branch Greenway	Winterfield Place to Briar Creek
8	Fourmile Creek Greenway	South Trade St and East John St to McAlpine Creek
9	Gum Branch Greenway	Belhaven Road to Long Creek
10	Irvins Creek Greenway	Sunset Road, Mint Hill to McAlpine Creek
11	Irwin Creek Greenway	Nevin Community Park to Billy Graham Parkway
12	Little Sugar Creek Greenway	N. Davidson at Cordelia Park to South Carolina State Line
13	Long Creek Greenway	Victoria Avenue to Catawba River
14	Mallard Creek Greenway	Amaranthus Court to Cabarrus County Line

ID	Greenway Name	Description
Greenways in Charlotte (before July 1, 2008)		
15	Mallard Creek Tributary	W. T. Harris Boulevard to West Sugar Creek Road
16	McAlpine Creek Greenway	Highway 74 to Pineville Matthews Road
17	McIntyre Creek Greenway	Beatties Ford Road at Hornet's Nest Park to Long Creek
18	McMullen Creek Greenway	Independence Boulevard to McAlpine Creek
19	Paw Creek Greenway	Exchange Street to Old Dowd Road
20	Reedy Creek Greenway	Reedy Creek Park and Nature Preserve to Cabarrus County Line
21	Stewart Creek Greenway	Interstate 85 to Irwin Creek
22	Steele Creek Greenway	Brown-Grier Road to Cabarrus County Line
23	Sugar Creek Greenway	Irwin Creek at Billy Graham Parkway to Lancaster County Line
24	Toby Creek Greenway	Elizabeth Drive to Mallard Creek
25	Walker Branch Greenway	South Tryon Street to South Carolina State Line
26	Wesley Heights Greenway	Bruns Avenue to Interstate 77 (parallel to NCDOT rail)

Mecklenburg County Greenways: Development Displayed by Completion Date with 1999 Greenway Master Plan and 2004 Little Sugar Creek Greenway Master Plan

Legend:

Greenway outside Charlotte (June 30, 2007)

Developed by:

- 5/1/2002
- 5/1/2004
- 5/1/2006

Greenway in Charlotte (July 1, 2008)

Developed by:

- 1/15/2000
- 10/1/2002
- 3/20/2008
- 4/1/2004
- 5/1/1978
- 5/1/1993
- 5/1/1995
- 5/1/1999
- 5/1/2000
- 5/1/2005
- 5/1/2006
- 5/20/2008
- 6/1/2007

Greenway developed after (July 1, 2008)

Greenway Master Plan

- Future Development

Transportation

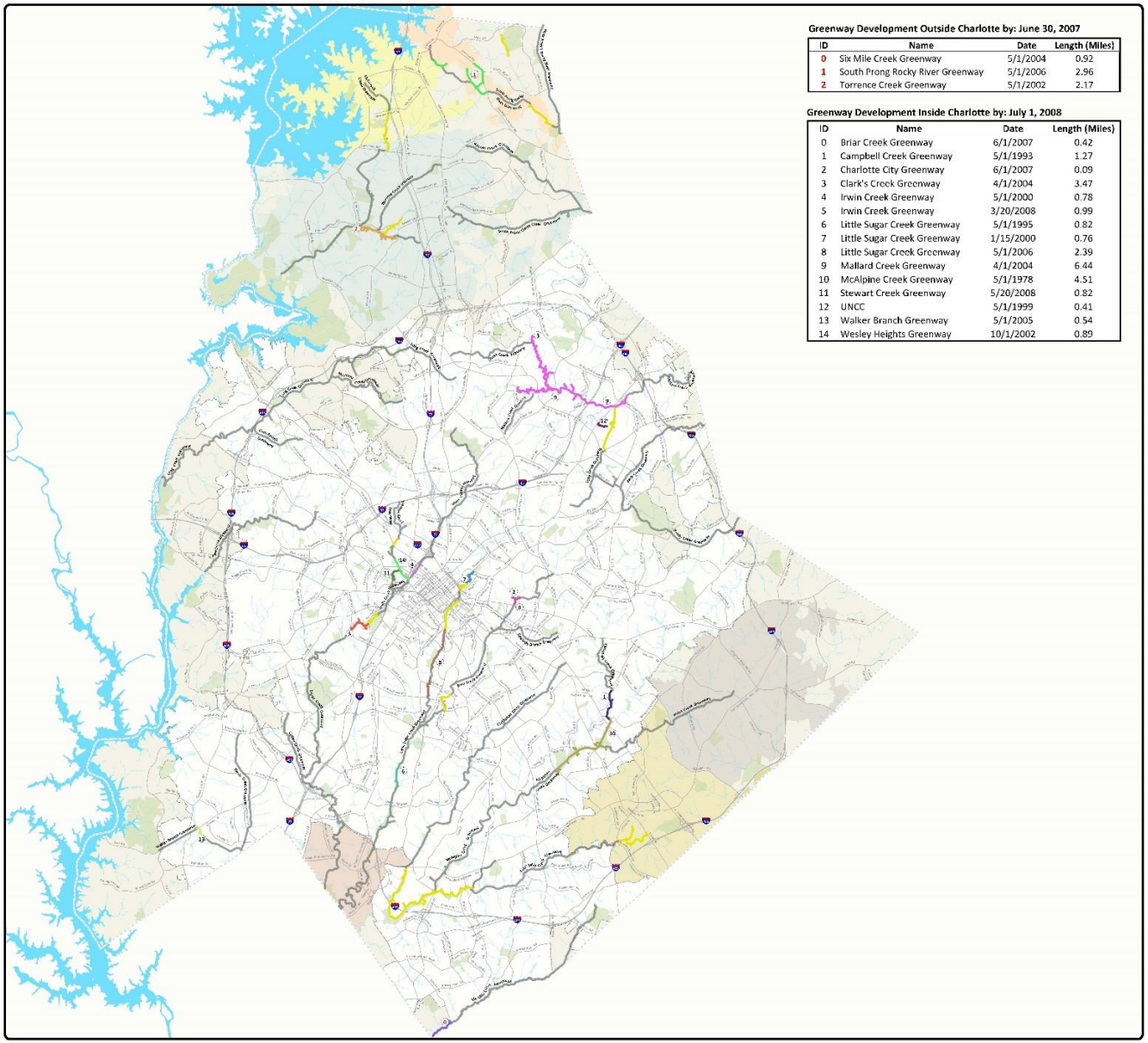
- Interstate
- I-485 Extension
- Major Roads
- Thoroughfare

Streams

- Park Property

Jurisdiction

- Charlotte
- Cornelius
- Davidson
- Huntersville
- Matthews
- Mecklenburg
- Mint Hill
- Pineville
- Stallings



Greenway Development Outside Charlotte by: June 30, 2007

ID	Name	Date	Length (Miles)
0	Six Mile Creek Greenway	5/1/2004	0.92
1	South Prong Rocky River Greenway	5/1/2006	2.96
2	Torrence Creek Greenway	5/1/2002	2.17

Greenway Development Inside Charlotte by: July 1, 2008

ID	Name	Date	Length (Miles)
0	Briar Creek Greenway	6/1/2007	0.42
1	Campbell Creek Greenway	5/1/1993	1.27
2	Charlotte City Greenway	6/1/2007	0.09
3	Clark's Creek Greenway	4/1/2004	3.47
4	Irwin Creek Greenway	5/1/2000	0.78
5	Irwin Creek Greenway	3/20/2008	0.99
6	Little Sugar Creek Greenway	5/1/1995	0.82
7	Little Sugar Creek Greenway	1/15/2000	0.76
8	Little Sugar Creek Greenway	5/1/2006	2.39
9	Mallard Creek Greenway	4/1/2004	6.44
10	McAlpine Creek Greenway	5/1/1978	4.51
11	Stewart Creek Greenway	5/20/2008	0.82
12	UNCC	5/1/1999	0.41
13	Walker Branch Greenway	5/1/2005	0.54
14	Wesley Heights Greenway	10/1/2002	0.89

Mecklenburg County GIS: Wednesday, October 01, 2014

Appendix 13: Authorization Certificate Application for a Water Quality Buffer Disturbance

Authorization Certificate Application for a Water Quality Buffer Disturbance

FOR OFFICE USE ONLY: Application Received Date: _____ Complete Submittal ☐Yes ☐No	**FOR OFFICE USE ONLY:** Authorization Certificate Number: _____

Instructions for the proper completion of this form are available on the following website: http://stormwater.charmeck.org (Select "Regulations", select "Buffers & BMPs", select "Water Quality Buffer Implementation Guidelines" see Section 5).

SECTION 1: GENERAL INFORMATION
Applicant's Name:
Applicant's Mailing Address:
Applicant's Phone Numbers: Office Cell
Applicant's Email:
Owner's Name (if different from above applicant):
Owner's Address:
Owner's Phone: Office Cell
Owner's Email:
If applicant is different from owner, describe affiliation and attach to this application written authorization for the buffer disturbance signed by the property owner:
Contractor's Name (or name of other parties involved in buffer disturbance and/or mitigation if applicable):
Contractor's Mailing Address:
Contractor's Phone Numbers: Office Cell
Contractor's Email:
Jurisdiction/Town where Proposed Buffer Disturbance is Located:
Address and/or Parcel # of Proposed Buffer Disturbance:
Name of Development where Proposed Buffer Disturbance is Located (if applicable):
Type of Buffer (select only one): Water Supply ☐; S.W.IM. ☐; Post-Construction ☐; Goose Creek ☐; or Six Mile Creek ☐
Type of Buffer Disturbance (select all that apply): Removal of Vegetation ☐; Installation of Structure ☐; Addition of Fill ☐; Grading/Land Disturbance ☐; and/or Other Specify:
Specify the Nature of the Activity that will Disturb the Buffer:
Specify the Reason for the Buffer Disturbance:
Square Footage of Parcel: Square Footage of Disturbed Area:
Square Footage of Buffer on the Parcel: Stream Side Zone ; Managed Use Zone ; Upland Zone ; Total
Square Footage of Buffer to be Disturbed: Stream Side Zone ; Managed Use Zone ; Upland Zone ; Total
Date When Buffer Impact will Occur/When Unauthorized Disturbances Occurred:
Date When Mitigation will be Completed:
Map: ***Attach to this application a scaled map (copy of survey is acceptable) containing the following information:***
1. Lengths of all boundary/property lines for the parcel and parcel address where the buffer disturbance is to occur.
2. Location(s) of all water course(s) on the property, including all perennial and intermittent streams, lakes, ponds, and wetlands.
3. Location(s) of buildings, parking areas, and other impervious surfaces.
4. Location(s) of the buffer area on the parcel, including lengths of all boundary lines and total square footage of the entire buffer (including all buffer zones if applicable).
5. The scale of the map, which must not be smaller than 100 feet to the inch.
6. Date of map.
7. A small scale vicinity map and north arrow.
8. Location of buffer disturbance (boundary lines and total square footage for each zone), including the area of the footprint of the use, the area of the boundary of any clearing and grading activities, and the area of any ongoing maintenance corridors. The boundaries of temporary equipment access areas must be shown on the map but are not included in the total disturbed area calculation provided tree removal and grading do not occur in the area and it is properly stabilized.
9. Location, number, size, and species of trees greater than two (2) inches in diameter that will be or have been removed from the buffer.
SECTION 2: REQUEST FOR A NO PRACTICAL ALTERNATIVES DETERMINATION (Not Applicable for Unauthorized Impacts)
Explain why the basic project purpose cannot be practically accomplished in a manner that would better minimize the disturbance, preserve aquatic life and habitat, and protect water quality.
Explain why the use cannot practically be reduced in size or density, reconfigured or redesigned to better minimize the disturbance, preserve aquatic life and habitat, and protect water quality.
Describe the plans for practices that have been incorporated into the project to minimize the buffer disturbance.
General Comments:

SECTION 3: MITIGATION PLAN

Instructions: ***Select either Part A: Authorized Buffer Disturbances or Part B: Unauthorized Buffer Disturbances, select the type of buffer disturbed or proposed for disturbance, identify the mitigation option being proposed and provide the information requested below that option (only one buffer type can be selected). Also, submit with this application the additional information specified in Section 5.4 of the "Water Quality Buffer Implementation Guidelines" available at the website described at the top of page 1 of this application. Important Note: If the mitigation techniques described below are required for compliance with another ordinance, the technique cannot be used as mitigation for water quality buffer impacts.***

Part A: Authorized Buffer Disturbances (For Unauthorized Buffer Disturbances see Part B of this Section)

☐ **Water Supply Watershed Buffer Disturbance:**

☐ Buffer Restoration on Same Parcel (this is the only mitigation option available for this type of buffer disturbance)

- Is a Level 2 revegetation plan being proposed? Yes ☐ No ☐ If "No", explain why:
- Square Footage of Buffer to be Revegetated:

☐ **S.W.I.M., Post-Construction, Six Mile Creek or Lower Lake Wylie Buffer Disturbance:**

☐ Installation of Structural BMP

- Type of BMP or Infiltration Method:
- Size of Drainage Area to be Treated (acres):
- Percentage of Impervious Cover in this Drainage Area:

☐ Buffer Restoration

- Revegetation Type: Level 1 ☐ Level 2 ☐
- Square Footage of Buffer to be Revegetated (if buffer does not have zones, indicate under "Total"): Stream Side Zone ; Managed Use Zone ; and/or Upland Zone Total

☐ Buffer Preservation

- Square Footage of Buffer to be Preserved (if buffer does not have zones, indicate under "Total"): Stream Side Zone ; Managed Use Zone ; and/or Upland Zone Total

☐ Wetland Preservation

- Square Footage of Wetland to be Preserved:

☐ Bottom Land Hardwood Preservation

- Square Footage of Bottom Land Hardwood Area to be Preserved:

☐ Controlled Impervious Cover

- Amount of Impervious Cover on Parcel square feet ÷ Size of Parcel square feet = x 100 = %

☐ Open Space Development

- Amount of Preserved Open Space on Parcel square feet ÷ Size of Parcel square feet = x 100 = %

☐ Mitigation Payment/Credit

- Area of Buffer Disturbance square feet x $10 = $

☐ Alternative Mitigation Techniques (not pre-approved) Specify:

☐ **Goose Creek Buffer Disturbance:**

- Buffer Disturbance Area: Footprint of Use in Buffer square feet + Clearing Limits Outside the Footprint square feet + Maintenance Corridor Outside the Footprint and Clearing Limits square feet = square feet
- Mitigation Area: Buffer Disturbance Area square feet x 3 = square feet

☐ Mitigation Payment

- Mitigation Area square feet x $.96 = $

☐ Donation of Property

- Appraised Value of Donated Property Interest $ ÷ Calculated Mitigation Payment $ = x 100 = %

☐ Stream Buffer Restoration or Enhancement

- Buffer Restoration Area square feet ÷ Calculated Mitigation Area square feet = x 100 = %
- Buffer Enhancement Area square feet ÷ Calculated Mitigation Area square feet = x 100 = %

Part B: Unauthorized (Illegal) Buffer Disturbance:

- Buffer Restoration (Level 2 revegetation plan is the only mitigation option available for this type of buffer disturbance)

Type of Buffer (select only one): Water Supply ☐; S.W.IM. ☐; Post-Construction ☐; Goose Creek ☐; or Six Mile Creek ☐

- Square Feet of Buffer to be Revegetated (if buffer does not have zones, indicate under "Total"): Stream Side Zone ; Managed Use Zone ; and/or Upland Zone Total

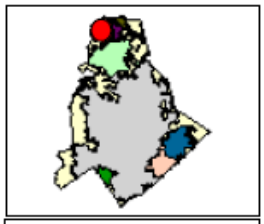
Issuance of the Authorization Certificate: ***Upon the approval and subsequent signing of this Application, the Authorization Certificate for approval of the buffer disturbance is granted and remains valid for a period of 12 months following the approval date indicated below. All buffer disturbances and mitigation must be performed in strict accordance with the information contained herein and attached to this Application. Failure to do so will immediately render this Authorization Certificate null and void and all buffer disturbances will be subject to penalties. Ensure that proper erosion control is practiced during all land disturbing activities and that once the buffer disturbance is completed that all disturbed areas are properly stabilized. In addition, diffuse flow through the buffer must be maintained in perpetuity.***

FOR OFFICE USE ONLY: ☐ Disapproved ☐ Approved

Issued By: _____ Date: _____

Appendix 14: Examples of Water Quality Buffer Revegetation Plans

Water Quality Buffer Revegetation Plan (October 21, 2011)
Level 2 Revegetation
Scale: 1 inch = 30 feet



Vicinity Map

Comment regarding this example: This Buffer Revegetation Plan is an example for an unauthorized buffer disturbance such as might occur along the lake to facilitate a view. For an authorized disturbance, the trees proposed for removal would need to be shown as well as the location of any structures to be installed in the case of a S.W.I.M. or post-construction buffer.

Vegetation Key:

Existing = Black

Removed = Red

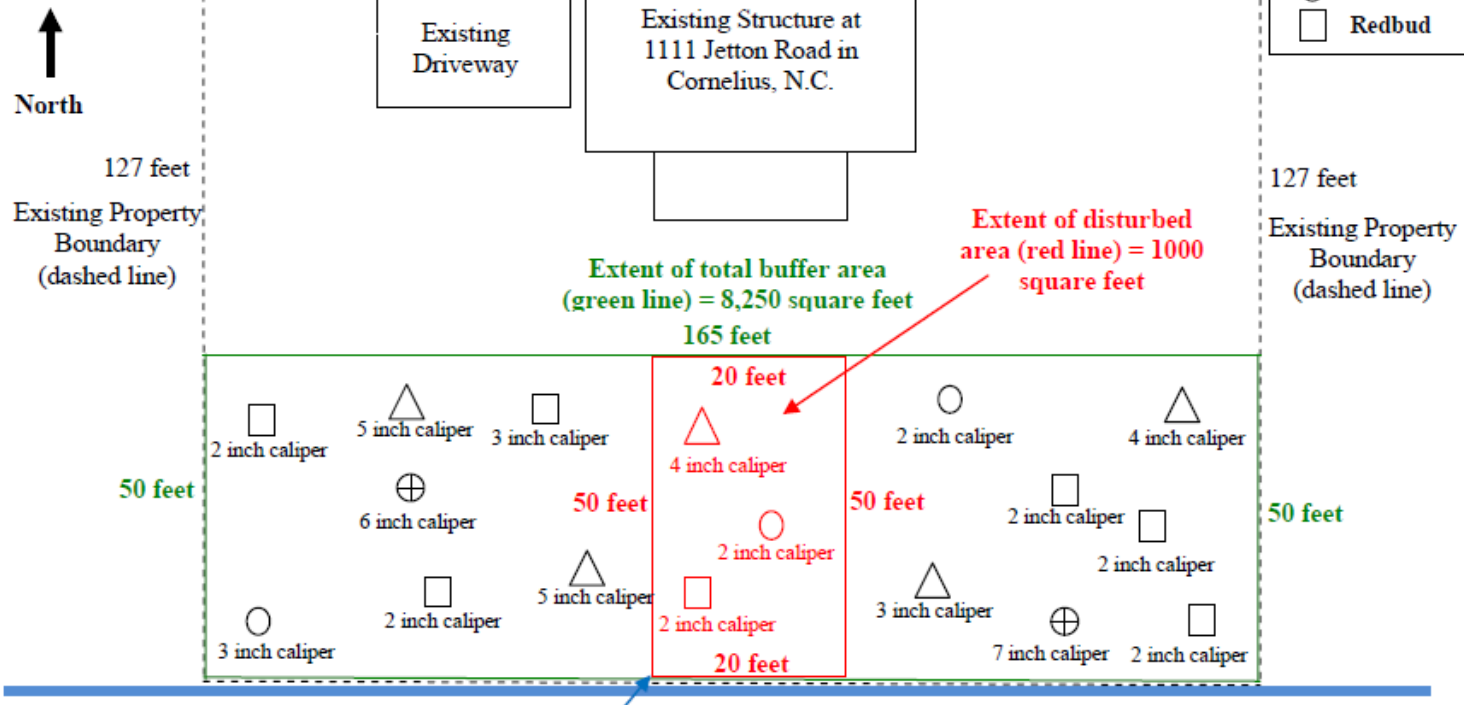
Planted = Blue

△ Green Ash

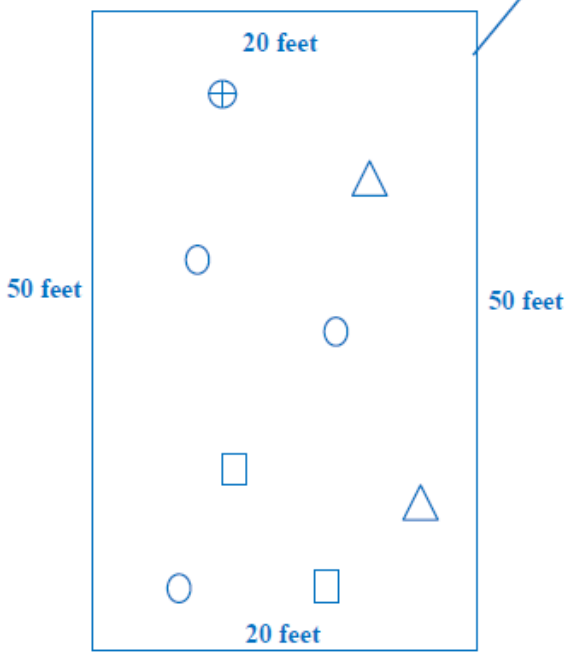
⊕ Willow Oak

○ Dogwood

□ Redbud



Inset of Restoration Area
Scale: 1 inch = 15 feet



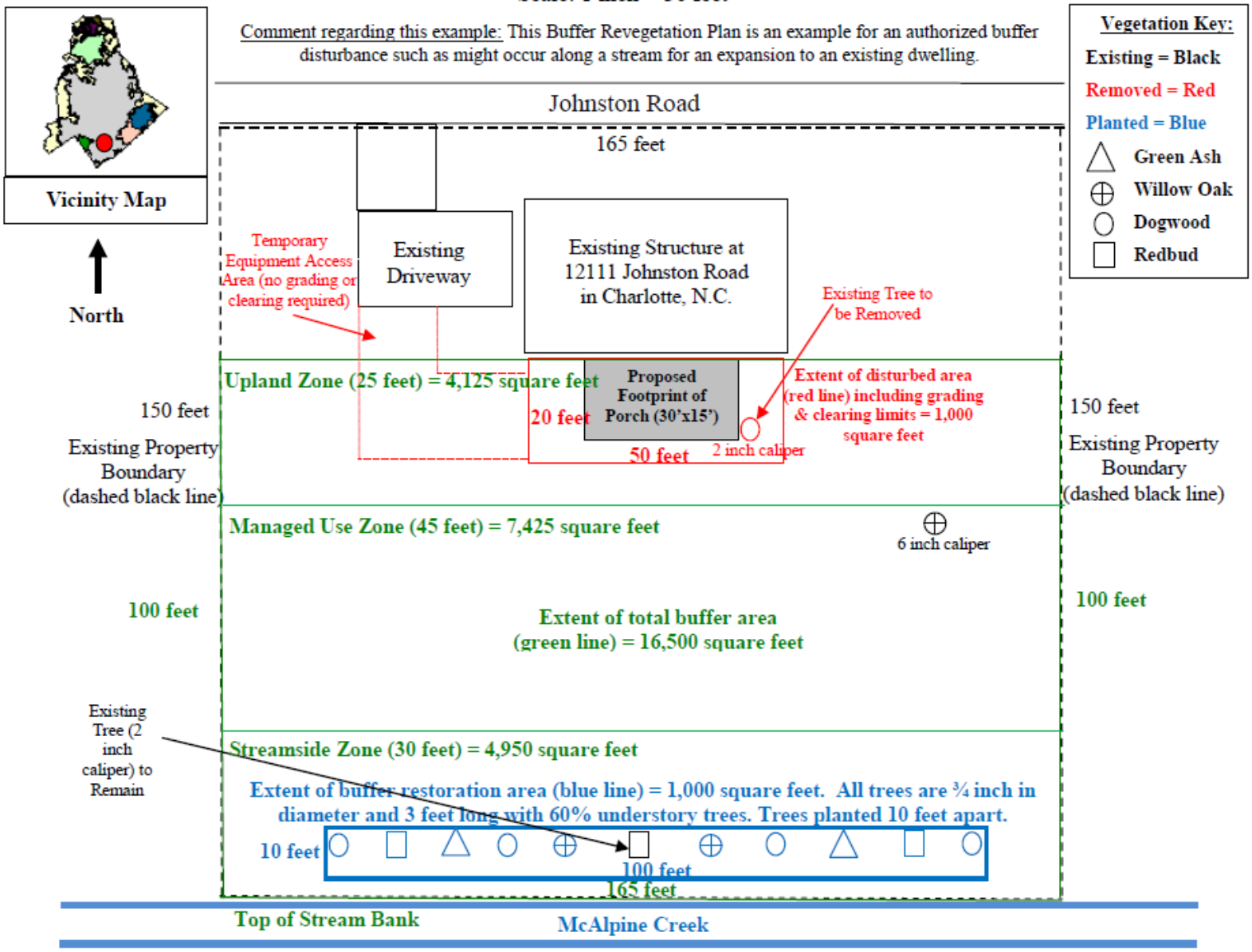
Extent of buffer area to be restored (blue line) = 1000 square feet. All trees are 1.5 inch caliper measured 6 inches above the root ball with 60% understory trees.

Notes:

1. The total area of the lot is 20,955 square feet (127 feet x 165 feet).
2. 8 containerized trees to be planted in restoration area at a density of 8 trees/1000 square feet with 60% understory trees.
3. All trees to be planted will be a minimum of 1.5 inches in caliper measured 6 inches above the root ball.
4. All exposed soil in the restoration area will be covered with 2 inches of hardwood mulch.
5. Tree shelters will be used to protect against deer grazing and mower damage.
6. Organic mulch will be applied in a ring around the base of new trees at a minimum depth of 2 inches to aid in establishment and prevent competition by ground layer plantings.
7. Following buffer restoration, diffuse flow will be maintained through the buffer in perpetuity.
8. Chemical fertilizers and pesticides will not be applied in the buffer.
9. All plants will be maintained in perpetuity and will be replaced as necessary to ensure that the original planting density is maintained.
10. Following the complete installation of the approved Revegetation Plan, a final inspection and written approval must be made by Charlotte-Mecklenburg Storm Water Services. Call (704) 336-5456 to schedule a final inspection.
11. It is the responsibility of the property owner to maintain the revegetation site and repair, protect, and add additional controls to protect the buffer as necessary at their sole expense.

Water Quality Buffer Revegetation Plan (October 21, 2011)
Level 1 Revegetation

Scale: 1 inch = 30 feet

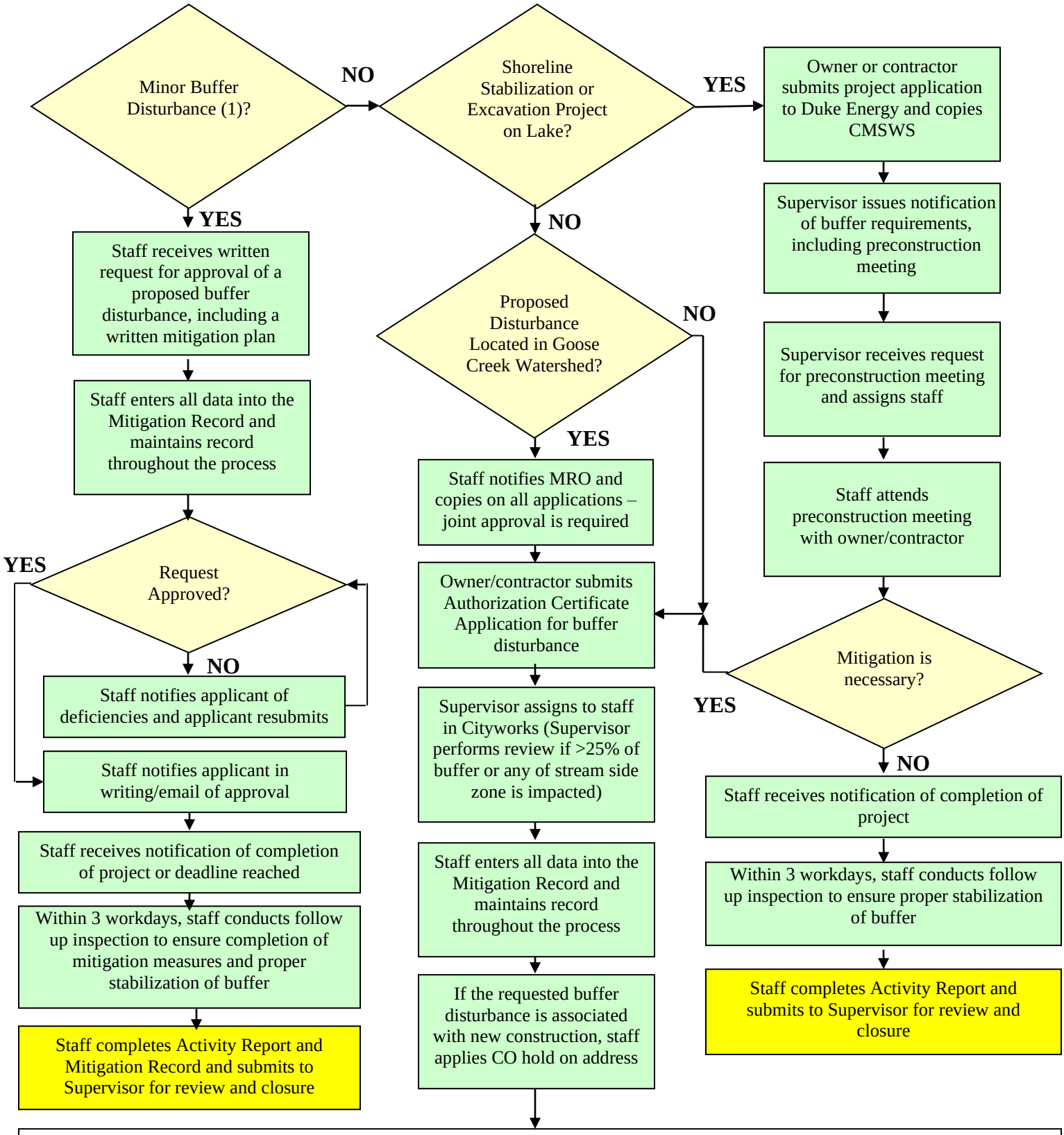


Notes:

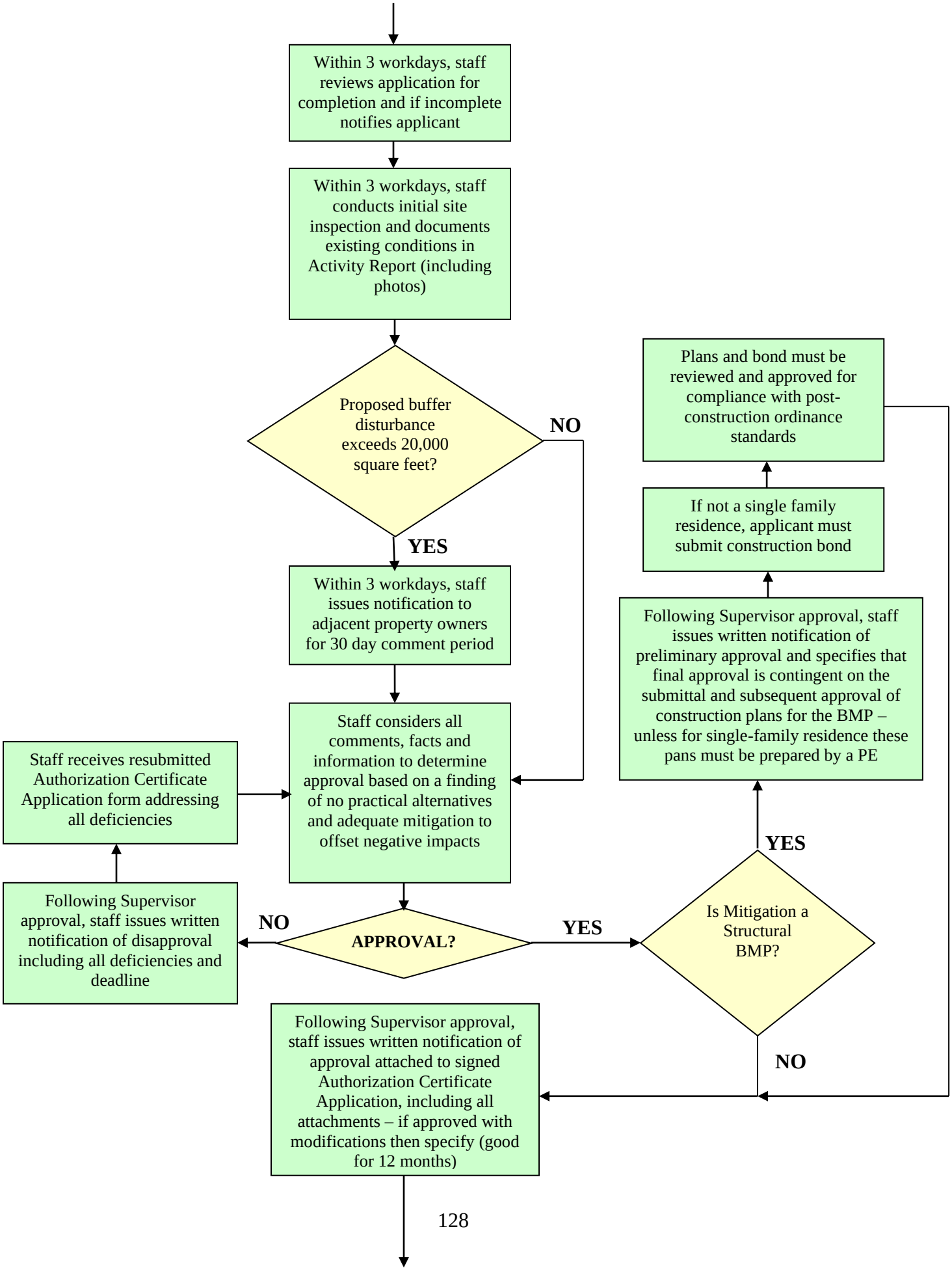
1. The total area of the lot is 24,750 square feet (150 feet x 165 feet).
2. 10 live stake trees to be planted 10 feet apart in the restoration area at a density of 10 trees/1000 square feet for a Level 1 Revegetation.
3. All trees to be planted will be a minimum of ¾ inch in diameter and 3 feet long.
4. All exposed soil in the restoration area will be covered with the approved herbaceous seed mix specified in the Buffer Implementation Guidelines.
5. All disturbed areas outside the buffer will be stabilized with Kentucky 31 Fescue within 24 hours following the completion of construction activities.
6. Tree shelters will be used to protect against deer grazing and mower damage.
7. Organic mulch will be applied in a ring around the base of new trees at a minimum depth of two (2) inches to aid in establishment and prevent competition by ground layer plantings.
8. Following buffer restoration, diffuse flow will be maintained through the buffer in perpetuity.
9. Chemical fertilizers and pesticides will not be applied in the buffer.
10. All plants will be maintained in perpetuity and will be replaced as necessary to ensure that the original planting density is maintained.
11. Following the complete installation of the approved Revegetation Plan, a final inspection and written approval must be made by Charlotte-Mecklenburg Storm Water Services. Call (704) 336-5456 to schedule a final inspection.
12. It is the responsibility of the property owner to maintain the revegetation site and repair, protect, and add additional controls to protect the buffer as necessary at their sole expense.

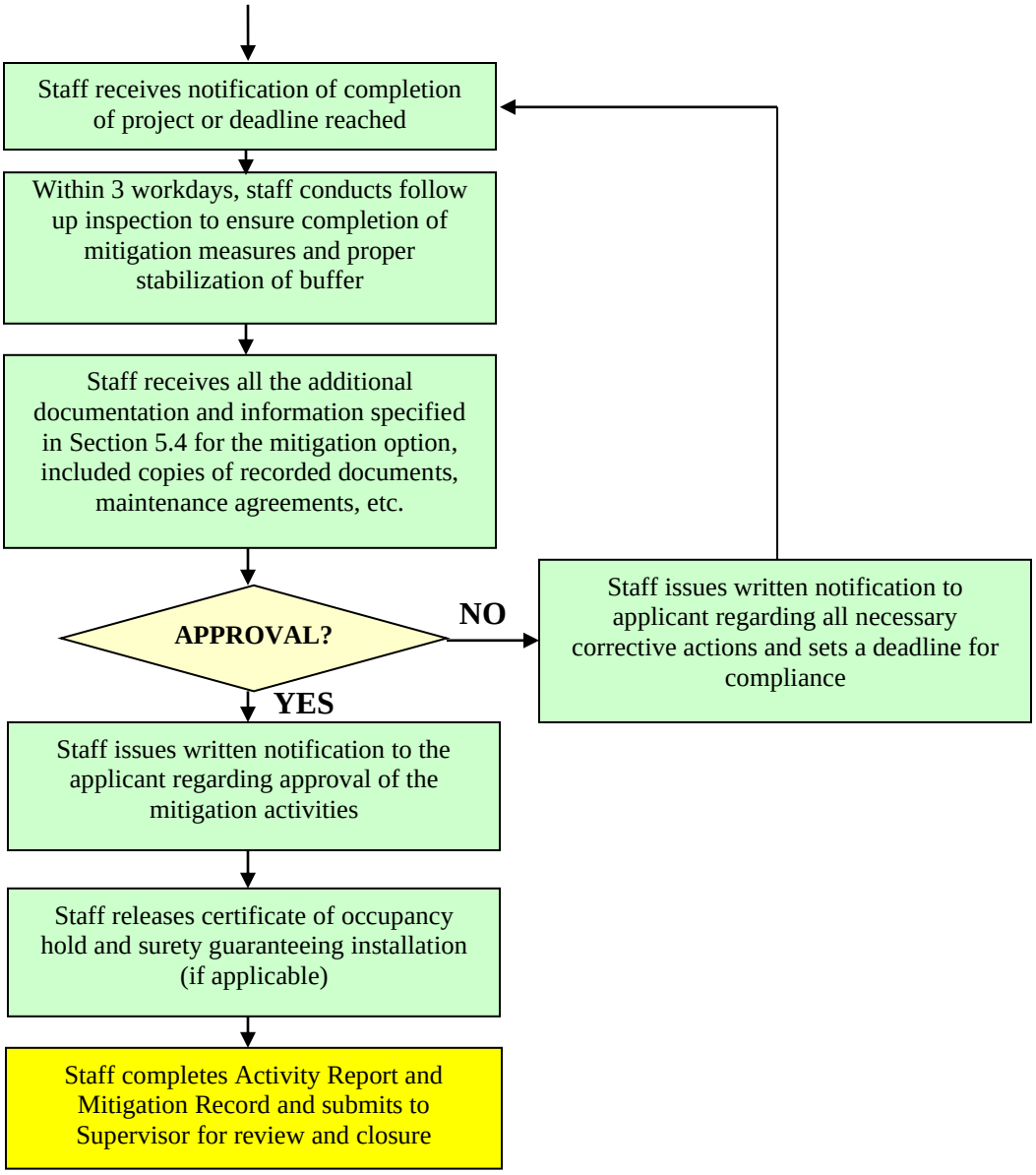
Appendix 15: Review Process for a Proposed Water Quality Buffer Disturbance

Review Process for a Proposed Water Quality Buffer Disturbance



1. Minor Buffer Disturbances include the following:
   - S.W.I.M. and post-construction buffers where the disturbed area includes less than 100 square feet of the upland and/or managed use zones.
   - Goose, Six Mile and water supply watershed buffers where the disturbance includes the removal of a small number of trees (usually less than 5) to accomplish a permitted activity such as shoreline stabilization or stream restoration or the removal of a small number of trees (usually less than 3) to eliminate a threat to structures and/or public safety.


Within 3 workdays, staff reviews application for completion and if incomplete notifies applicant
Within 3 workdays, staff conducts initial site inspection and documents existing conditions in Activity Report (including photos)
Proposed buffer disturbance exceeds 20,000 square feet?
NO
YES
Within 3 workdays, staff issues notification to adjacent property owners for 30 day comment period
Staff considers all comments, facts and information to determine approval based on a finding of no practical alternatives and adequate mitigation to offset negative impacts
Staff receives resubmitted Authorization Certificate Application form addressing all deficiencies
Following Supervisor approval, staff issues written notification of disapproval including all deficiencies and deadline
NO
APPROVAL?
YES
Is Mitigation a Structural BMP?
YES
Following Supervisor approval, staff issues written notification of preliminary approval and specifies that final approval is contingent on the submittal and subsequent approval of construction plans for the BMP – unless for single-family residence these pans must be prepared by a PE
If not a single family residence, applicant must submit construction bond
Plans and bond must be reviewed and approved for compliance with post-construction ordinance standards
NO
Following Supervisor approval, staff issues written notification of approval attached to signed Authorization Certificate Application, including all attachments – if approved with modifications then specify (good for 12 months)


Staff receives notification of completion of project or deadline reached
Within 3 workdays, staff conducts follow up inspection to ensure completion of mitigation measures and proper stabilization of buffer
Staff receives all the additional documentation and information specified in Section 5.4 for the mitigation option, included copies of recorded documents, maintenance agreements, etc.
APPROVAL?
NO
Staff issues written notification to applicant regarding all necessary corrective actions and sets a deadline for compliance
YES
Staff issues written notification to the applicant regarding approval of the mitigation activities
Staff releases certificate of occupancy hold and surety guaranteeing installation (if applicable)
Staff completes Activity Report and Mitigation Record and submits to Supervisor for review and closure

Appendix 16: Approved Plants for Use in Water Quality Buffers

Common Name	Botanical Name	Light Conditions	Soil Conditions	Height / Diameter	Notes
Deciduous Trees					
Ash, Green	*Fraxinus pennsylvanica*	sun	moist	60-100 ft./1.5 ft.	prefers moist soils along streams and floodplains, tolerant of flooding for extended periods, used for lawn and shade trees because of its initial rapid growth and adaptability
Basswood (White Basswood, Linden)	*Tilia heterophylla /americana*	sun	moist	60-100 ft./ 2-3 ft.	prefers moist soils of valleys and uplands
Beech, American	*Fagus grandifolia*	sun	moist	80-100 ft./3 ft.	prefers moist soils of uplands and well drained lowlands, nuts important to wildlife
Birch, River (Red Birch)	*Betula nigra*	sun/partial shade	wet	60-80 ft./1-2 ft.	prefers wet soils along stream banks, swamps and floodplains
Blackhaw	*Viburnum prunifolium*	sun/shade	moist	20 ft./4 in.	prefers moist soils of upland slopes or around margins of swamps, understory tree
Cherry, Black	*Prunus serotina*	sun	moist	80 ft./2 ft.	prefers a variety of sites except extremely dry or wet sites
Cottonwood, Eastern (Carolina Poplar)	*Populus deltoides*	sun/partial shade	wet	100 ft./5 ft.	prefers wet soils along stream banks and floodplains, extensive root system, rapid growth
Elm, Slippery (Red Elm)	*Ulmus rubra*	sun	moist	70-80 ft./2-3 in.	prefers moist soils on lower slopes and in the floodplain, grows rapidly
Fringe Tree	*Chionanthus virginicus*	sun/partial shade	moist/dry	30 ft.	prefers moist, well drained soil
Hickory, Bitternut	*Carya cordiformis*	sun	moist	60-80 ft./1-2 ft.	prefers moist soils in valleys, along streams and in floodplains, fastest growing hickory, makes a good shade tree when planted in moist soils
Hickory, Pignut	*Carya glabra*	sun	moist to dry	70-80 ft./	common on moist to drier upland sites in association with other oaks and hickories
Hickory, Mockernut	*Carya tomentosa*	sun	dry	90 ft./	most common hickory, prefers drier soils in upland areas

Common Name	Botanical Name	Light Conditions	Soil Conditions	Height / Diameter	Notes
Deciduous Trees (continued)					
Hickory, Shagbark	*Carya ovata*	sun	moist	70-90 ft./	prefers moist soils along streams, rivers and in valleys
Hornbeam, American (Blue Beech, Ironwood)	*Carpinus caroliniana*	sun/partial shade	moist	35 ft./1 ft.	shade tolerant and prefers moist, rich soils along streams and ravines, nutlets eaten by squirrels and song birds
Maple, Ash-leaved (Boxelder)	*Acer negundo*	sun/partial shade	moist/wet	30-60 ft./2.5 ft.	prefers wet or moist soils along stream banks and floodplains, shade tolerant and reproduces prolifically in open disturbed sites
Maple, Red	*Acer rubrum*	sun	moist/dry	60-90 ft./3 ft.	prefers wet or moist soils along stream banks and floodplains or drier upland sites, good ornamental because of rapid growth and good fall color, relatively free of insects
Mulberry, Red	*Morus rubra*	sun	moist	60 ft./2 ft.	prefers moist soils in hardwood forests as well as drier upland slopes, fruit important to wildlife
Oak, Post	*Quercus stellata*	sun	dry	30-80 ft./1-2 ft.	prefers dry woodlands, drought tolerant well drained soils of uplands and lowlands
Oak, Scarlet	*Quercus coccinea*	sun	dry	70-80 ft.	prefers dry, sandy, usually acidic soils
Oak, Shumard	*Quercus shummardii*	sun	moist	60-90 ft./2.5 ft.	prefers moist, well drained soils along streams and floodplains, currently underutilized as an ornamental, striking green leaves and is moderately fast growing
Oak, Southern Red	*Quercus falcata*	sun	dry	100 ft./3-4 ft.	prefers dry, less fertile soils, occasionally it occurs in moist locations
Oak, Swamp Chestnut (Basket Oak)	*Quercus michauxii*	sun	moist	60-80 ft./2-3 ft.	prefers moist, well drained soils along streams and in floodplains

Common Name	Botanical Name	Light Conditions	Soil Conditions	Height / Diameter	Notes
Deciduous Trees (continued)					
Oak, Water	*Quercus nigra*	sun	moist/wet	60-100 ft./2.5 ft.	prefers wet or moist soils along streams, floodplains and swamps, acorns important to wildlife
Oak, White (Stave Oak)	*Quercus alba*	sun/partial shade	moist/dry	80-100 ft./4-5 ft.	prefers rich, well-drained soils
Oak, Willow	*Quercus phellos*	sun	moist	90-100 ft./1-2 ft.	prefers low, wet sites of river floodplains, bottomlands or richer upland soils, acorns important to wildlife
Persimmon	*Diospyros virginiana*	sun/partial shade	moist/dry	20-70 ft./ 1-2 ft.	prefers moist soils along stream bottoms to drier upland sites, edible fruit important to wildlife, can be planted as an ornamental
Silverbell, Carolina	*Halesia carolina*	partial shade	moist	30-50 ft./1 ft.	prefers moist wooded slopes and along stream banks
Sourwood	*Oxydendrum arboreum*	sun/partial shade	moist	50 ft./1 ft.	prefers moist soils and also drier sites
Sycamore (Planetree)	*Platanus occidentalis*	sun	wet	60-100 ft./3-5 ft.	prefers moist sites along streams and bottomlands, also tolerates drier upland sites, grows rapidly and is planted as a shade tree or ornamental
Tulip Poplar (Yellow Poplar)	*Liriodendron tulipifera*	sun	moist	80-120 ft./3-4 ft.	prefers moist, well drained sites along streams, river bottoms and lower upland slopes, intolerant of shade, should be planted where it has a lot of space to grow
Tupelo, Black (Blackgum)	*Nyssa sylvatica*	sun	moist	50-100 ft./2-3 ft.	prefers moist, well drained soils along streams and dry upland sites, intolerant of prolonged flooding
Walnut, Black	*Juglans nigra*	sun	moist	70-100 ft./4 ft.	prefers rich woods on moist, well-drained soils, other plants may not do well if planted next to Black Walnut due to the root production of juglone
Willow, Black	*Salix nigra*	sun/partial shade	wet	80-100 ft./2.5 ft.	prefers stream banks and floodplains, used for erosion

Common Name	Botanical Name	Light Conditions	Soil Conditions	Height / Diameter	Notes
(Swamp Willow)					control along streams due to dense root system
Understory Trees (Deciduous)					
Blackhaw, Rusty	*Viburnum rufidulum*	sun/partial shade	moist	25 ft./4-5 in.	prefers moist lower slopes to drier uplands, good ornamental, understory tree
Dogwood, Flowering	*Cornus florida*	sun/partial shade	moist/dry	30 ft./8 in.	prefers moist or dry soils along streams, floodplains and lower slopes, understory tree
Dogwood, Silky	*Cornus amomum*	sun/partial shade	wet/moist	12 ft.	prefers moist soils along streams and floodplains
PawPaw	*Asimina triloba*	sun/partial shade	moist	25 ft./1-2 ft.	prefers moist sites along floodplains, can be used for naturalizing along streams or moist sites, fruit is source of food for wildlife
Redbud (Judas Tree)	*Cercis canadensis*	sun	moist	40 ft./8 in.	prefers moist soils along streams and bottomlands to drier slopes
Snowbell, Bigleaf	*Styrax grandifolius*	sun/partial shade	moist	20 ft./1-2 ft.	prefers moist soils along streams, valleys, and uplands, good understory tree that could be used as an ornamental
Evergreen Trees					
Cedar, Eastern Red	*Juniperus virginiana*	sun	moist/dry	40-60 ft./1-2 ft.	prefers a wide variety of dry upland areas as well as moist stream banks and floodplains, not shade tolerant, should not be planted next to apple trees
Pine, Shortleaf	*Pinus echinata*	sun/partial shade	dry	70-100 ft./2-3 ft.	prefers a wide variety of upland soils including heavy clays of Piedmont
Pine, Virginia	*Pinus virginiana*	sun	dry	40-70 ft./1-1.5 ft.	prefers a wide variety of upland areas and quickly invades abandoned farmland and burned areas
Understory Trees (Evergreen)					
Holly, American	*Ilex opaca*	partial shade	moist/wet	40-70 ft./1-2 ft.	prefers moist sites and is an understory species
Alder, Common (Hazel Alder, Tag Alder)	*Alnus serrulata*	sun/partial shade	wet	20 ft./4 in.	prefers wet soil along stream banks
Azalea,	Rhododendron	sun/partial	moist	8 ft./2-3 ft.	prefers stream banks in

Common Name	Botanical Name	Light Conditions	Soil Conditions	Height / Diameter	Notes
Pinxter	periclymenoides (nudiflorum)	shade			deciduous forests and can be found in low woodlands
Deciduous Shrubs					
Azalea, Swamp	*Rhododendron viscosum*	sun/partial shade	moist/dry	8 ft./3 ft.	prefers a variety of upland sites and stream banks
Beautyberry, American	*Callicarpa americana*	sun/partial shade	moist/dry	5-10 ft.	Prefers moist to dry soils
Buttonbush (Honey Balls)	*Cephalanthus occidentalis*	sun/partial shade	wet	20 ft./4 in.	prefers moist sites along streams, swamps, floodplains and edges of ponds, is used as an ornamental in naturally moist or poorly drained sites
Elder, American (Elderberry)	*Sambucus canadensis*	sun/partial shade	moist/wet	16 ft./6 in.	prefers wet soils along stream banks, drainage areas and bottomlands near margins of fields and forests
Mountain Laurel	*Kalmia latifolia*	partial shade	moist/dry	20-25 ft./8-10 in.	prefers well drained, acidic soil with ample humus
Possum haw (Deciduous holly)	*Ilex decidua*	sun/partial shade	dry/moist	20 ft.	prefers moist, acidic, organic soils
Red Chokeberry	*Sorbus (Aronia) arbutifolia*	sun/partial shade	wet/moist	6-9 ft.	prefers rich, moist, well-drained, slightly acid soil
Sparkleberry	*Vaccinium arboreum*	sun/partial shade	moist/dry	25 ft./6 in.	prefers sandy upland soils
Spicebush	*Lindera benzoin*	shade	wet/moist	6-12 ft.	prefers moist fertile soil
Strawberry Bush	*Euonymus americanus*	shade	dry/moist	3-5 ft/	prefers thick woods, swampy areas and the margin of stream sand bars
Sweet Shrub	*Calycanthus floridus*	sun/partial shade	moist/dry	5 ft./3-5 in.	prefers moist slopes and moist soils along stream banks
Viburnum, Possumhaw	*Viburnum nudum*	sun/partial shade	moist/wet	16 ft./4 in.	prefers moist soils near streams and swamps, used as an ornamental on moist to poorly drained sites, fruit good source of wildlife food
Witch-hazel	*Hamamelis virginiana*	partial shade	moist	30-35 ft.	prefers well-drained, acidic soil amended with humus
Virigina Willow	*Itea virginica*	partial shade	moist	5 ft. /3-5 in.	prefers moist but well drained soil
Southern Arrowood	*Viburnum dentatum*	sun/partial shade	moist/wet	16 ft / 4 in.	tolerates saturation or inundation

Common Name	Botanical Name	Light Conditions	Soil Conditions	Height / Diameter	Notes
Wildflowers					
Black-eyed Susan	*Rudbeckia hirta*	sun	dry		yellow flower, attract birds and butterflies
Butterfly Weed	*Asclepias tuberosa*	sun/partial shade	dry		orange flower, attracts butterflies
Columbine, Eastern Wild	*Aquilegia canadensis*	shade	moist/dry	2-3 ft.	red flower, attracts hummingbirds and butterflies
Cardinal Flower	*Lobelia cardinalis*	shade	moist	2-4 ft.	red flowers
Goatsbeard	*Aruncus dioicus*	shade	moist	2-4 ft.	white flowers
Joe Pye Weed	*Eupatorium fistulosum*	sun	wet		light purple flower, attracts butterflies
Mallow, Rose	*Hibiscus moscheutos*	sun/partial shade	moist	5-6 ft.	pink-white flower
Milkweed, Pink Swamp	*Asclepias incarnata*	sun	moist	3-5 ft.	white-pink flowers, attracts butterflies
Purple Coneflower	*Echinacea purpurea*	sun	dry		purple flower, attracts birds and butterflies
Swamp Sunflower	*Helianthus angustifolius*	sun/partial shade	moist		yellow flower, attracts wildlife
Groundcover					
Broom Sedge (bunch grass)	*Andropogon virginicus*	sun	dry/moist	11-12 in.	drought tolerant, good for revegetating stream banks
Christmas fern	*Polystichium acrostichoides*	shade	moist	18 in.	prefers shaded, north or east-facing slopes in humus-rich soil
Cinnamon fern	*Osmunda cinnamomea*	shade/partial shade	moist/wet	12-20 in.	prefers swamps, bogs and moist woodlands
Deer Tongue (bunch grass)	*Dicanthelium (Panicum) clandestinum*	sun	dry/moist	7-8 in.	takes a few years to establish, low woods, ditches
Dog Hobble	*Leucothoe fontanesiana (editorum)*	sun/partial shade	dry/moist	3-6 ft.	prefers acidic, well drained organic soils in partial to full shade, all parts of plant are poisonous if ingested
Southern Lady Fern	*Athyrium asplenioides*	shade	moist/wet	12-18 in.	prefers dappled sunlight to light shade, moist conditions, and a loose loamy soil that is slightly acidic
Switch Grass (bunch grass)	Panicum anceps (or - virgatum)	sun	dry/moist	11-12 in.	takes a few years to establish, low woods, ditches, fields
Virginia Wild Rye (bunch grass)	Elymus virginicus	sun	moist	11-12 in.	takes a few years to establish, low woods, ditches, fields

Common Name(1)	Botanical Name	Percentage of Mix(2)
Herbaceous Groundcover Seed Mix		
Common white snakeroot	*Ageratina altissima*	5
Tickseed sunflower	*Bidens aristosa*	10
Partridge pea	*Chamaecrista fasciculata*	10
River oats	*Chasmanthium latifolium*	10
Longstalk coreopsis	*Coreopsis lanceolata*	10
Boneset	*Eupatorium perfoliatum*	5
Narrowleaf sunflower	*Helianthus angustifolius*	10
Sundrops	*Oenothera biennis*	5
Pennsylvania smartweed	*Polygonum pennsylvanicum*	10
Black-eye Susan	*Rudbeckia hirta*	10
Blue-stem goldenrod	*Solidago caesia*	5
Heath aster	*Symphyotrichum pilosum*	10

(1) The above Herbaceous Ground Cover Seed Mixes are all commercially available. Below are a few links to nurseries that carry this stock. The seed mix can be obtained from Ernst Seed Co.
http://www.curenursery.com/plants.htm
http://www.mellowmarshfarm.com/
http://coastalplainnursery.com/
http://www.ernstseed.com/seed-mixes/

(2) Seed mix at 30 pounds per acre. Overseed with 20 pounds per acre rye grain (*Secale cereale*) and 10 pounds per acre Foxtail millet (*Setaria italica*).

References: Brown and Kirkman "Trees of Georgia and Adjacent States", Radford, Ashe, Bell "Manual of the Vascular Flora of the Carolinas", Justice, Bell "Wildflowers of North Carolina", Chris Matthews, "*Riparian and Shoreline Mitigation Plantings"*

Appendix 17: Mitigation Program Requirements for Protection and Maintenance of Riparian Buffers (15A NCAC 02B .0295)

MITIGATION PROGRAM REQUIREMENTS FOR PROTECTION AND MAINTENANCE OF RIPARIAN BUFFERS
(15A NCAC 02B .0295)

(a) PURPOSE. The purpose of this Rule is to set forth the mitigation requirements that apply to applicants listed in Paragraph (c) of this Rule and to set forth requirements for buffer mitigation providers.

(b) DEFINITIONS. For the purpose of this Rule, these terms shall be defined as follows:

(1) "Authority" means either the Division or a local government that has been delegated or designated pursuant to Rules .0233, .0243, .0250, .0259, .0267, or .0607 of this Subchapter to implement the riparian buffer program.

(2) "Compensatory Buffer Mitigation Bank" means a buffer mitigation site created by a mitigation provider and approved for mitigation credit by the Division through execution of a mitigation banking instrument.

(3) "Division" means the Division of Water Resources of the North Carolina Department of Environment and Natural Resources.

(4) "Enhancement Site" means a riparian zone site characterized by conditions between that of a restoration site and a preservation site such that the establishment of woody stems (i.e., tree or shrub species) will maximize nutrient removal and other buffer functions.

(5) "Hydrologic Area" means the Watershed Boundary Dataset (WBD), located at no cost at http://data.nconemap.com/geoportal/catalog/search/resource/details.page?uuid={16A42F31-6DC7-4EC3-88A9-03E6B7D55653} using the eight-digit Hydrologic Unit Code (HUC) prepared by the United States Geological Survey.

(6) "Locational Ratio" means the mitigation ratio applied to the mitigation requirements based on the location of the mitigation site relative to the impact site as set forth in Paragraph (f) of this Rule.

(7) "Mitigation banking instrument" means the legal document for the establishment, operation, and use of a mitigation bank.

(8) "Monitoring period" means the length of time specified in the approved mitigation plan during which monitoring of vegetation success and other anticipated benefits to the adjacent water as listed in the mitigation approval is done.

(9) "Non-wasting endowment" means a fund that generates enough interest to cover the cost of the long term monitoring and maintenance.

(10) "Outer Coastal Plain" means the portion of the state shown as the Middle Atlantic Coastal Plain (63) on Griffith, et al. (2002) "Ecoregions of North and South Carolina." Reston, VA, United States Geological Survey available at no cost at http://www.epa.gov/wed/pages/ecoregions/ncsc_eco.htm.

(11) “Preservation Site" means riparian zone sites that, as determined by a site visit conducted by the Authority, are characterized by a forest consisting of the forest strata and diversity of species appropriate for the location.

(12) "Restoration Site" means riparian zone sites that are characterized by an absence of trees and by a lack of dense growth of smaller woody stems (i.e., shrubs or saplings) or sites that are characterized by scattered individual trees such that the

tree canopy is less than 25 percent of the cover and by a lack of dense growth of smaller woody stems (i.e., shrubs or saplings).

(13) "Riparian buffer mitigation unit" means a unit representing a credit of riparian buffer mitigation as set forth in Paragraph (m) of this Rule.

(14) "Riparian wetland" means a wetland that is found in one or more of the following landscape positions:

(A) in a geomorphic floodplain;

(B) in a natural topographic crenulation;

(C) contiguous with an open water equal to or greater than 20 acres in size; or

(D) subject to tidal flow regimes excluding salt/brackish marsh wetlands.

(15) "Stem" means a woody seedling, sapling, shrub, or tree, no less than 10 centimeters in height.

(16) "Urban" means an area that is either designated as an urbanized area under the most recent federal decennial census available at no cost at http://www.census.gov/ or is located within the corporate limits of a municipality.

(17) "Zonal Ratio" means the mitigation ratio applied to impact amounts in the respective zones of the riparian buffer as set forth in Paragraph (e) of this Rule.

(c) MITIGATION REQUIREMENTS. Buffer mitigation is required when one of the following applies:

(1) The applicant has received an authorization certificate for impacts pursuant to Rule .0233, .0243, .0250, .0259, .0267, or .0607 of this Subchapter and is required to perform mitigation as a condition of the authorization certificate; or

(2) The applicant has received a variance pursuant to Rule .0233, .0243, .0250, .0259, .0267, or .0607 of this Subchapter and is required to perform mitigation as a condition of a variance approval.

Any applicant covered under this Paragraph shall submit to the Authority a written mitigation proposal that calculates the required area of mitigation and describes the area and location of each type of proposed mitigation. The applicant shall not impact buffers until the Authority approves the mitigation plan and issues written approval.

(d) AREA OF IMPACT. The Authority shall determine the area of impact in square feet to each Zone as defined by the applicable Rule .0233, .0243, .0250, .0259, .0267, or .0607 of this Subchapter of the proposed riparian buffer by adding the following:

(1) The area of the footprint of the use impacting the riparian buffer;

(2) The area of the boundary of any clearing and grading activities within the riparian buffer necessary to accommodate the use; and

(3) The area of any ongoing maintenance corridors within the riparian buffer associated with the use.

The Authority shall deduct from this total the area of any wetlands that are subject to and compliant with riparian wetland mitigation requirements under 15A NCAC 02H .0506 and are located within the proposed riparian buffer impact area.

(e) AREA OF MITIGATION REQUIRED ON ZONAL MITIGATION RATIOS. The Authority shall determine the required area of mitigation for each Zone by applying each of the following ratios to the area of impact calculated under Paragraph (d) of this Rule:

Basin/Watershed	**Zone 1 Ratio**	**Zone 2 Ratio**
Neuse River Basin (15A NCAC 02B .0233)	3:1	1.5:1
Catawba River Basin (15A NCAC 02B .0243)	2:1	1.5:1

Basin/Watershed	Zone 1 Ratio	Zone 2 Ratio
Randleman Lake Watershed (15A NCAC 02B .0250)	3:1	1.5:1
Tar-Pamlico River Basin (15A NCAC 02B .0259)	3:1	1.5:1
Jordan Lake Watershed (15A NCAC 02B .0267)	3:1	1.5:1
Goose Creek Watershed (15A NCAC 02B .0607)	3:1[A]	

[A] The Goose Creek Watershed does not have a Zone 1 and Zone 2. The mitigation ratio in the Goose Creek Watershed is 3:1 for the entire buffer.

(f) AREA OF MITIGATION REQUIRED ON LOCATIONAL MITIGATION RATIOS. The applicant or mitigation provider shall use the following locational ratios as applicable based on location of the proposed mitigation site relative to that of the proposed impact site. Locational ratios shall be as follows:

Location	Ratio
Within the 12-digit HUC[A]	0.75:1
Within the eight-digit HUC[B]	1:1
Outside of the eight-digit HUC[B]	2:1

[A] Except within the Randleman Lake Watershed. Within the Randleman Lake Watershed the ratio is 1:1.

[B] Except as provided in Paragraph (g) of this Rule.

(g) GEOGRAPHIC RESTRICTIONS ON LOCATION OF MITIGATION. Mitigation shall be performed in the same river basin where the impact is located with the following additional specifications:

(1) In the following cases, mitigation shall be performed in the same watershed where the impact is located:

(A) Falls Lake Watershed, as defined in Rule .0275 of this Section;

(B) Goose Creek Watershed, as defined in Rule .0601 of this Subchapter;

(C) Randleman Lake Water Supply Watershed, as defined in Rule .0248 of this Section;

(D) Each subwatershed of the Jordan Lake watershed, as defined in Rule .0262 of this Section; and

(E) Other watersheds as specified in riparian buffer protection rules adopted by the Commission.

(2) Buffer mitigation for impacts within watersheds with riparian buffer rules that also have federally listed threatened or endangered aquatic species may be done within other watersheds with the same federally listed threatened or endangered aquatic species as long as the impacts are in the same river basin as the mitigation site.

(h) MITIGATION OPTIONS FOR APPLICANTS. The applicant may propose any of the following types of mitigation:

(1) Riparian buffer restoration or enhancement pursuant to Paragraph (n) of this Rule;

(2) Payment of a compensatory mitigation fee to a compensatory buffer mitigation bank pursuant to Paragraph (i) of this Rule or payment of a compensatory mitigation fee to the Riparian Buffer Restoration Fund pursuant to Paragraph (j) of this Rule. Payment shall conform to the requirements of G.S. 143-214.20;

(3) Donation of real property or of an interest in real property pursuant to Paragraph (k) of this Rule;

(4) Alternative buffer mitigation pursuant to Paragraph (o) of this Rule; or

(5) Other buffer mitigation as approved by the Environmental Management Commission as a condition of a variance approval.

(i) PURCHASE OF BUFFER MITIGATION CREDITS FROM A PRIVATE OR PUBLIC COMPENSATORY BUFFER MITIGATION BANK. Applicants who choose to satisfy some or all of their mitigation by purchasing mitigation credits from a private or public compensatory buffer mitigation bank shall meet the following requirements:

(1) The compensatory buffer mitigation bank from which credits are purchased shall have available riparian buffer credits approved by the Division;

(2) The compensatory buffer mitigation bank from which credits are purchased shall be located as described in Paragraphs (e), (f), and (g) of this Rule; and

(3) After receiving a mitigation acceptance letter from the compensatory buffer mitigation bank, proof of payment for the credits shall be provided to the Authority prior to any activity that results in the removal or degradation of the protected riparian buffer.

(j) PAYMENT TO THE RIPARIAN BUFFER RESTORATION FUND. Applicants who choose to satisfy some or all of their mitigation requirement by paying a compensatory mitigation fee to the Riparian Buffer Restoration Fund shall meet the requirements of Rule .0269 of this Section. Payment made to the NC Division of Mitigation Services (DMS) shall be contingent upon acceptance of the payment by the DMS. The DMS shall consider their financial, temporal, and technical ability to satisfy the mitigation request to determine whether they shall accept or deny the request.

(k) DONATION OF PROPERTY. Applicants who choose to satisfy their mitigation requirement by donating real property or an interest in real property to fully or partially offset an approved payment into the Riparian Buffer Restoration Fund pursuant to Paragraph (j) of this Rule shall do so in accordance with 15A NCAC 02R .0403.

(l) MITIGATION SITE REQUIREMENTS FOR APPLICANTS AND MITIGATION PROVIDERS. For each mitigation site proposed by an applicant or mitigation provider under Paragraphs (n) or (o) of this Rule, the Authority shall identify functional criteria to measure the anticipated benefits of the mitigation to the adjacent water. The Authority shall issue a mitigation determination that specifies the area, type, and location of mitigation and the water quality benefits to be provided by the mitigation site. All mitigation proposals shall meet the following criteria:

(1) The location of the buffer mitigation site shall comply with the requirements of Paragraphs (f) and (g) of this Rule. In the Catawba watershed, buffer mitigation may be done along the lake shoreline as well as along intermittent and perennial stream channels throughout the watershed.

(2) The mitigation proposal shall include a commitment to provide:

(A) a perpetual conservation easement or similar preservation mechanism to ensure perpetual stewardship that protects the mitigation site's nutrient removal and other water quality functions;

(B) a non-wasting endowment or other dedicated financial surety to provide for the perpetual land management and hydrological maintenance of lands and maintenance of structures as applicable; and

(C) financial assurance in the form of a completion bond, credit insurance, letter of credit, escrow, or other vehicle acceptable to the Authority payable to, or for the benefit of, the Authority in an amount sufficient to ensure that the property is secured in fee title or by easement, and that

planting or construction, monitoring and maintenance are completed as necessary to meet success criteria as specified in the approved mitigation plan. This financial assurance obligation shall not apply to the NC DMS.

(3) Diffuse flow of runoff shall be maintained in the riparian buffer. Any existing impervious cover or stormwater conveyances such as ditches, pipes, or drain tiles shall be eliminated and the flow converted to diffuse flow. If the applicant or mitigation provider determines that elimination of existing stormwater conveyances is not feasible, then they shall include a justification and shall provide a delineation of the watershed draining to the stormwater outfall and the percentage of the total drainage by area treated by the riparian buffer with the mitigation plan specified in Paragraph (n) or (o) of this Rule for Authority approval. During mitigation plan review and approval, the Authority may reduce credit proportionally.

(4) Sewer easement within the buffer. If the proposed mitigation site contains a sewer easement in Zone 1, that portion of the sewer easement within Zone 1 shall not be suitable for buffer mitigation credit. If the proposed mitigation site contains a sewer easement in Zone 2, the portion of the sewer easement in Zone 2 may be suitable for buffer mitigation credit if:

(A) the applicant or mitigation provider restores or enhances the forested buffer in Zone 1 adjacent to the sewer easement;

(B) the sewer easement is required to be maintained in a condition that meets the vegetative requirements of the collection system permit; and

(C) diffuse flow is provided across the entire buffer width.

(5) The applicant or mitigation provider shall provide a site specific credit/debit ledger to the Authority at regular intervals as specified in the mitigation plan approval or mitigation banking instrument once credits are established and until they are exhausted.

(6) Buffer mitigation credit, nutrient offset credit, wetland mitigation credit, and stream mitigation credit shall be accounted for in accordance with the following:

(A) Buffer mitigation used for buffer mitigation credit shall not be used for nutrient offset credits;

(B) Buffer mitigation credit shall not be generated within wetlands that provide wetland mitigation credit required by 15A NCAC 02H .0506; and

(C) Buffer mitigation credit may be generated on stream mitigation sites as long as the width of the restored or enhanced riparian buffer meets the requirements of Subparagraph (n)(1) of this Rule.

(m) RIPARIAN BUFFER MITIGATION UNITS. Mitigation activities shall generate riparian buffer mitigation units as follows:

Mitigation Activity	**Square Feet of Mitigation Buffer**	**Riparian Buffer Mitigation Units Generated**
Restoration Site	1	1
Enhancement Site	2	1
Preservation Site on Non-Subject Urban Streams	3	1
Preservation Site on Subject Urban Streams	3	1
Preservation Site on Non-Subject Rural Streams	5	1

Mitigation Activity	Square Feet of Mitigation Buffer	Riparian Buffer Mitigation Units Generated
Preservation Site on Subject Rural Streams	10	1

(n) RIPARIAN BUFFER RESTORATION SITE OR ENHANCEMENT SITE. Authority staff shall make an on-site determination as to whether a potential mitigation site qualifies as a restoration site or enhancement site as defined in Paragraph (b) of this Rule. Riparian buffer restoration sites or enhancement sites shall meet the following requirements:

(1) Buffer restoration sites or enhancement sites may be proposed as follows:

Buffer width (ft)	Proposed Percentage of Full Credit
Less than 20	0%
20-29	75%
30-100	100%
101-200	33%

(2) The applicant or mitigation provider shall submit a restoration or enhancement mitigation plan to the Authority for written approval. The plan shall demonstrate compliance with the requirements of this Paragraph and Paragraphs (l) and (m) of this Rule and shall also contain the following:

(A) A map of the proposed restoration or enhancement site;

(B) A vegetation plan that shall detail the activities proposed to ensure a final performance standard of 260 stems per acre at the completion of monitoring. The final performance standard shall include a minimum of four native hardwood tree species or four native hardwood tree and native shrub species, where no one species is greater than 50 percent of stems. Native hardwood and native shrub volunteer species may be included to meet the final performance standard of 260 stems per acre. The Authority may approve alternative vegetation plans upon consideration of factors, including site wetness and plant availability, to meet the requirements of this Part;

(C) A grading plan (if applicable). The site shall be graded in a manner to ensure diffuse flow through the entire riparian buffer;

(D) A schedule for implementation, including a fertilization and herbicide plan if applicable; and

(E) A monitoring plan to document whether the site is expected to meet the final performance standards as defined in Part (n)(2)(B) of this Rule and other anticipated benefits to the adjacent water. The plan shall include a proposed schedule and method for monitoring the vegetative status of the restoration or enhancement site for five years, including the health and average stem densities of native hardwood tree or tree and shrub species that are to be counted toward the final performance standard.

(3) Within one year after Authority approval of the mitigation plan, the applicant or mitigation provider shall present documentation to the Authority that the riparian buffer has been restored or enhanced unless the applicant or mitigation provider requests, and the Authority agrees in writing prior to that date, to a longer time period.

(4) The applicant or mitigation provider shall submit written annual reports, unless an alternative schedule has been approved by the Authority during the mitigation plan approval, for a period of five years after completion of the activities identified in Part (n)(2)(B) of this Rule at the restoration site or enhancement site showing:

(A) compliance with the monitoring plan approved pursuant to Part (n)(2)(E) of this Rule; and

(B) that diffuse flow through the riparian buffer has been maintained.

If the Authority determines that the native hardwood tree or tree and shrub species at the site are not expected to meet the final performance standards listed in Part (n)(2)(B) of this Rule, then the Authority may require that the applicant or mitigation provider replace trees or trees and shrubs as needed during that five-year period. If the Authority determines that diffuse flow through the buffer is not being maintained, then the Authority may require that the applicant or mitigation provider restore diffuse flow. If the Authority determines that the final performance standards listed in Part (n)(2)(B) of this Rule have not been achieved at the end of the five-year monitoring period, the Authority may require additional years of monitoring. The Authority shall make determinations referenced in this Subparagraph on a site specific basis based on the annual reports, any supplemental information submitted by the applicant or mitigation provider, or a site evaluation by the Authority.

(o) ALTERNATIVE BUFFER MITIGATION OPTIONS. Alternative buffer mitigation options are detailed in this Paragraph. Any proposal for alternative buffer mitigation shall be provided in writing to the Division, shall meet the content and procedural requirements for approval by the Division, shall meet the requirements set out in Paragraphs (l) and (m) of this Rule and the requirements set out in the named Subparagraph of this Paragraph addressing that applicable alternative buffer mitigation option:

(1) Retroactive Credit. Alternative buffer mitigation sites constructed and within the required monitoring period on the effective date of this Rule shall be eligible for use as alternative buffer mitigation sites. Alternative buffer mitigation sites that have completed monitoring and were released by the Division on or within the past 10 years of the effective date of this Rule shall be eligible for use as alternative buffer mitigation sites. All alternative buffer mitigation site proposals submitted under this Subparagraph shall meet the following:

(A) A map or maps of the proposed alternative buffer mitigation site;

(B) Documentation of pre-existing conditions showing that the proposed alternative buffer mitigation site met the criteria to qualify for the applicable alternative buffer mitigation type identified in the applicable Subparagraph of this Paragraph;

(C) Documentation of the activities that were conducted at the proposed alternative buffer mitigation site to meet success criteria identified in the applicable Subparagraph of this Paragraph; and

(D) Documentation that the proposed alternative buffer mitigation site met the success criteria identified in the applicable Subparagraph of this Paragraph.

These alternative buffer mitigation sites shall receive credit in accordance with the criteria set forth in Paragraph (m) and Subparagraph (n)(1) of this Rule.

(2) Coastal Headwater Stream Mitigation. Wooded buffers planted along Outer Coastal Plain headwater stream mitigation sites may also be approved as riparian buffer mitigation credit if the site meets all applicable requirements of Paragraph (n) of this Rule. In addition, all success criteria specified in the approval of the stream mitigation site by the Division shall be met. The area of the buffer shall be measured perpendicular to the length of the valley being restored. The area within the proposed buffer mitigation site shall not also be used as wetland mitigation.

(3) Buffer Restoration and Enhancement on Non-Subject Streams. Restoration or enhancement of buffers may be conducted on intermittent or perennial streams that are not subject to the applicable Rule .0233, .0243, .0250, .0259, .0267, or .0607 of this Subchapter. These streams shall be confirmed as intermittent or perennial streams by Division staff certified per G.S. 143-214.25A using the Division publication, "Methodology for Identification of Intermittent and Perennial Streams and Their Origins (v.4.11, 2010)" available at no cost at http://portal.ncdenr.org/web/wq/swp/ws/401/waterresources/streamdeterminations . The proposal shall meet all applicable requirements of Paragraph (n) of this Rule.

(4) Preservation of Buffer on Non-Subject Streams. Preservation of buffers on intermittent or perennial streams that are not subject to the applicable Rule .0233, .0243, .0250, .0259, .0267, or .0607 of this Subchapter may be proposed in order to permanently protect the buffer from cutting, clearing, filling, grading, and similar activities that would affect the functioning of the buffer. These streams shall be confirmed as intermittent or perennial streams by Division staff certified per G.S. 143-214.25A using the Division publication, "Methodology for Identification of Intermittent and Perennial Streams and Their Origins (v4.11, 2010)." The preservation site shall meet the requirements of Subparagraph (n)(1) of this Rule and the requirements set forth in 15A NCAC 02R .0403(c)(7), (8), and (11). The area of preservation credit within a buffer mitigation site shall comprise of no more than 25 percent of the total area of buffer mitigation.

(5) Preservation of Buffers on Subject Streams. Buffer preservation may be proposed on streams that are subject to the applicable Rule .0233, .0243, .0250, .0259, .0267, or .0607 of this Subchapter in order to permanently protect the buffer from cutting, clearing, filling, grading, and similar activities that would affect the functioning of the buffer beyond the protection afforded by the existing buffer rules on sites that meet the definition of a preservation site. The preservation site shall meet the requirements of Subparagraph (n)(1) and the requirements set forth in 15A NCAC02R .0403(c)(7), (8), and (11). The area of preservation credit within a buffer mitigation site shall comprise of no more than 25 percent of the total area of buffer mitigation.

(6) Enhancement of grazing areas adjacent to streams. Buffer credit at a 2:1 ratio shall be available for an applicant or mitigation provider who proposes permanent exclusion of grazing livestock that otherwise degrade the stream and riparian zone through trampling, grazing, or waste deposition by fencing the livestock out of the stream and its adjacent buffer. The applicant or mitigation provider shall provide

an enhancement plan as set forth in Paragraph (n) of this Rule. The applicant or mitigation provider shall demonstrate that grazing was the predominant land use since the effective date of the applicable buffer rule.

(7) Mitigation on ephemeral channels. For purposes of riparian buffer mitigation as described in this Part, an "ephemeral channel" is defined as a natural channel exhibiting discernible banks within a topographic crenulation (V-shaped contour lines) indicative of natural drainage on the 1:24,000 scale (7.5 minute) quadrangle topographic map prepared by the U.S. Geologic Survey, or as seen on digital elevation models with contours developed from the most recent available LiDAR data, available at no cost at http://www.ncfloodmaps.com/lidar.com. Ephemeral channels only flow for a short period of time after precipitation in the drainage area and do not have periods of base flow sustained by groundwater discharge. The applicant or mitigation provider shall provide a delineation of the watershed draining to the ephemeral channel. The entire area proposed for mitigation shall be within the contributing drainage area to the ephemeral channel. The ephemeral channel shall be directly connected to an intermittent or perennial stream and contiguous with the rest of the mitigation site protected under a perpetual conservation easement. The area of the mitigation site on ephemeral channels shall comprise no more than 25 percent of the total area of buffer mitigation. The proposal shall meet all applicable requirements of Paragraph (n) of this Rule for restoration or enhancement. The proposal shall meet all applicable requirements of Subparagraph (o)(4) or (o)(5) of this Rule for preservation.

(8) Restoration and Enhancement on Ditches. For purposes of riparian buffer mitigation as described in this Part, a "ditch" is defined as a man-made channel other than a modified natural stream that was constructed for drainage purposes. To be used for mitigation, a ditch shall meet all of the following criteria:

(A) be directly connected with and draining towards an intermittent or perennial stream;

(B) be contiguous with the rest of the mitigation site protected under a perpetual conservation easement;

(C) stormwater runoff from overland flow shall drain towards the ditch;

(D) be between one and three feet in depth; and

(E) the entire length of the ditch shall have been in place prior to the effective date of the applicable buffer rule.

The width of the restored or enhanced area shall not be less than 30 feet and shall not exceed 50 feet for crediting purposes. The applicant or mitigation provider shall provide a delineation of the watershed draining to the ditch. The watershed draining to the ditch shall be at least four times larger than the restored or enhanced area along the ditch. The perpetual conservation easement shall include the ditch and the confluence of the ditch with the intermittent or perennial stream, and provide language that prohibits future maintenance of the ditch. The proposal shall meet all applicable requirements of Paragraph (n) of this Rule for restoration or enhancement.

(9) Stormwater Treatment Options. All stormwater treatment options shall meet the following requirements:

(A) Structural options already required by other local, state, or federal rule or permit cannot be used as alternative buffer mitigation credit, except to the

extent such measure(s) exceed the requirements of such rule or permit. Stormwater Best Management Practices (BMPs), including bioretention facilities, constructed wetlands, infiltration devices and sand filters are all potentially approvable BMPs by the Division for alternative buffer mitigation credit. Other BMPs may be approved only if they meet the nutrient removal levels outlined in Part (o)(9)(B) of this Rule. Existing or planned BMPs for a local, state, or federal rule or permit may be retrofitted or expanded to improve their nutrient removal if this level of treatment is not required by other local, state, or federal rules. In this case, the predicted increase in nutrient removal may be counted toward alternative buffer mitigation credit;

(B) Minimum treatment levels: Any structural BMP shall provide at least 30 percent total nitrogen and 35 percent total phosphorus removal as demonstrated by a scientific and engineering literature review as approved by the Division. The mitigation proposal shall demonstrate that the proposed alternative removes an equal or greater annual mass load of nutrients to surface waters as the buffer impact authorized in the authorization certificate or variance, following the calculation of impact and mitigation areas pursuant to Paragraphs (d), (e), and (f) of this Rule. To estimate the rate of nutrient removal of the impacted buffer, the applicant or mitigation provider may use the "NC Division of Water Quality – Methodology and Calculation for determining nutrient reductions associated with Riparian Buffer Establishment" available at no cost at http://portal.ncdenr.org/c/document_library/get_file?uuid=55c3758f-5e27-46cf-8237-47f890d9329a&groupId=38364. The applicant or mitigation provider may propose an alternative method of estimating the rate of nutrient removal for consideration and review by the Division;

(C) All proposed structural BMPs shall follow the Division's "2009 Stormwater Best Management Practice Design Manual" available at no cost at http://portal.ncdenr.org/web/lr/bmp-manual. If a specific proposed structural BMP is not addressed in this Manual, the applicant or mitigation provider shall follow Chapter 20 in this Manual for approval;

(D) All structural options are required to have Division approved operation and maintenance plans;

(E) All structural options are required to have continuous and perpetual maintenance and shall follow the Division's "2009 Stormwater Best Management Practice Design Manual";

(F) Upon completion of construction, the designer for the type of BMP installed shall certify that the system was inspected during construction and that the BMP was constructed in conformity with plans and specifications approved by the Division;

(G) Removal and replacement of structural options: If a structural option is proposed to be removed and cannot be replaced on-site, then a structural or non-structural measure of equal or better nutrient removal capacity, as determined by calculations submitted to and approved by the Division, in

a location as specified by Paragraphs (f) and (g) of this Rule shall be constructed as a replacement;

(H) Renovation or repair of structural options: If the applicant, mitigation provider, or the Division determines that a structural option must be renovated or repaired, it shall be renovated to provide equal or better nutrient removal capacity than as originally designed; and

(I) Structural options, as well as their operation and maintenance, are the responsibility of the landowner or easement holder unless the Division gives written approval for another responsible party to operate and maintain them. Structural options shall be located in recorded drainage easements for the purposes of operation and maintenance and shall have recorded access easements to the nearest public right-of-way. These easements shall be granted in favor of the party responsible for operating and maintaining the structure, with a note that operation and maintenance is the responsibility of the landowner, easement holder, or other responsible party.

(10) Approval for other alternative buffer mitigation options. Other alternative riparian buffer mitigation options not specified within this Rule may be submitted to the Division for review and recommendation to the Environmental Management Commission on a case-by-case basis. Any proposal submitted under this Paragraph shall provide documentation or calculations to demonstrate that the proposed alternative mitigation option removes an equal or greater annual mass load of nutrients to surface waters as a riparian buffer. Upon completion of the Division's review, and prior to recommendation to the Environmental Management Commission, the Division shall issue a 30-calendar day public notice through the Division's website and the DWRwetlands Listserve. Division staff shall present their recommendations, including comments received during the public notice period, to the Environmental Management Commission for a final decision. If approved by the Environmental Management Commission, the alternative buffer mitigation option may be proposed by other applicants and mitigation providers.

History Note:

Authority G.S. 143-214.1; 143-214.5; 143-214.7; 143-214.20; 143-215.3(a)(1); 143-215.6A; 143-215.6B; 143-215.6C; 143-215.8A; 143-215.8B; 143-282(c); 143B-282(d); S.L. 1998-221; S.L. 1999-329, s. 7.1; S.L. 2001-418, s. 4.(a); S.L. 2003-340, s. 5; S.L. 2005-190; S.L. 2006-259; S.L. 2009-337; S.L. 2009-486; S.L. 2014-95;
Temporary Adoption Eff. October 24, 2014;
Eff. November 1, 2015.

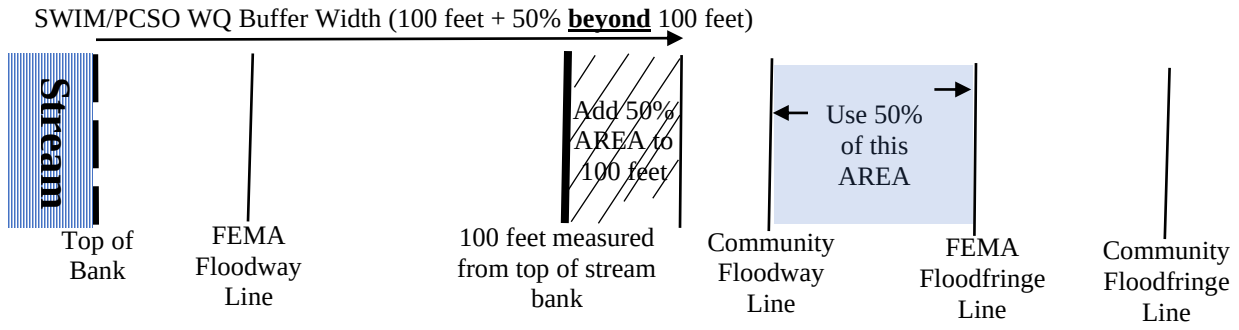
Appendix 18: Calculation of Additional 50% Area for Buffers Draining ≥640 Acres

Calculation of Additional 50% Area for S.W.I.M. & Post-Construction Stormwater Ordinance Water Quality Buffers where DA>=640 AC

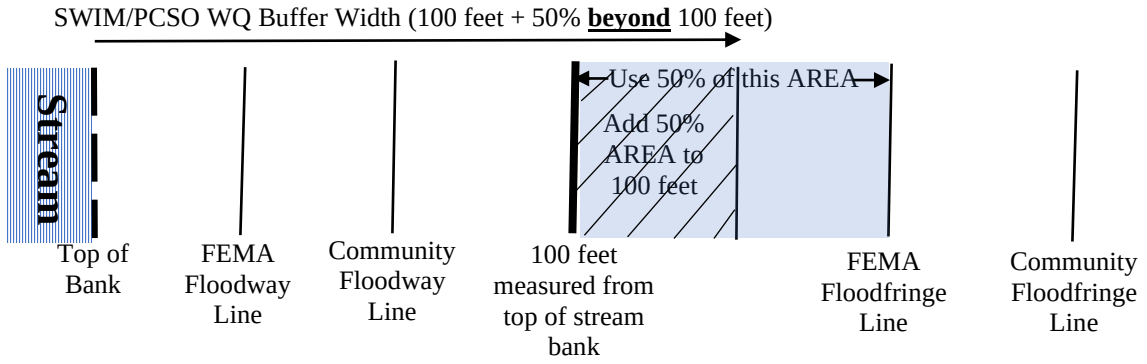
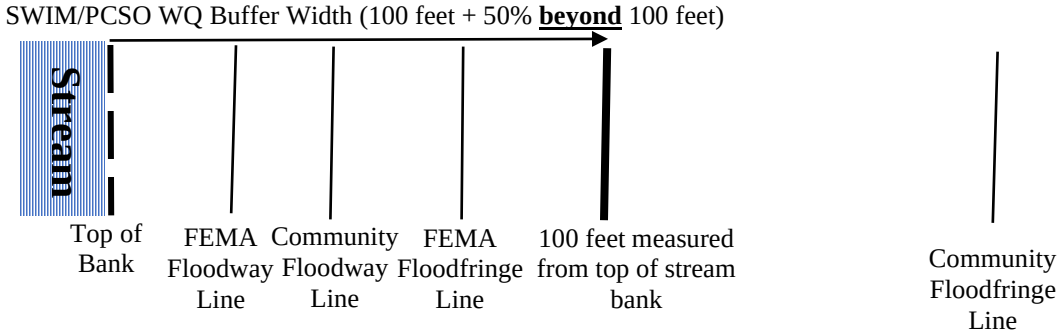
Important Notes:

1. The Community Floodway and Floodfringe lines were previously known as the FLUM, Future Conditions, and Future Floodway and Floodfringe lines. The floodway line is also sometimes referred to as the encroachment line.
2. The table in the S.W.I.M. Buffer Ordinance describing the width of the buffers includes the following text for streams draining greater than or equal to 640 acres: "100 feet PLUS 50% of the area of the FEMA fringe beyond 100 feet." Footnote (1) under the table attempts to clarify how this width is measured as follows: "The FEMA fringe and FLUM floodway encroachment lines will be used for floodplain and buffer calculations." The following examples are meant to explain how this buffer width is to be measured based on this ordinance language.

Example 1: Community Floodway & FEMA Floodfringe Lines are more than 100 feet from top of bank



Example 2: Community Floodway Line is less than 100 feet from top of bank



Example 3: Community Floodway & FEMA Floodfringe Lines are less than 100 feet from top of bank