This report describes my internship with Carolina Wetland Services, Inc. in Charlotte, North Carolina beginning on August 31, 2004. Carolina Wetland Services, Inc. is a natural resource consulting firm whose goal is to provide its clients with environmental site assessments, stream/wetland delineations, and prepare regulatory documentation for State and Federal agencies. Since the primary focus of my internship was Navigable Waters of the U.S., defined by Section 404/401 of the Clean Water Act, this report summarizes principles of wetland/stream classification and delineation, as well as pre-construction notifications and Nationwide Permits. My responsibilities involved completing fieldwork and preparing technical documentation to both clients and regulatory agencies including the U.S. Army Corps of Engineers (USACE) and the North Carolina Division of Water Quality (NCDWQ). This internship provided me with applicable experience in the environmental consultation process and further developed my communication, technical writing, and problem solving skills.
# TABLE OF CONTENTS

**LIST OF FIGURES** ........................................................................................................... III
**LIST OF TABLES** ........................................................................................................... III
**ACKNOWLEDGEMENTS** ................................................................................................. IV
**INTRODUCTION** ............................................................................................................ 1
**CAROLINA WETLAND SERVICES** ................................................................................ 2
**DUTIES AND RESPONSIBILITIES** .................................................................................. 3
**PRELIMINARY SITE INVESTIGATIONS AND DETERMINATIONS** ...................... 6
  - Determination Pre-Investigation ............................................................................. 6
  - Site Determination .................................................................................................. 7
  - Determination Report Preparation ......................................................................... 12
**JURISDICTIONAL DELINEATIONS AND REQUESTS FOR VERIFICATION** .... 14
  - Delineation Pre-Investigation ................................................................................ 14
  - Delineation Field Investigation .............................................................................. 14
  - Delineation and Verification Report Preparation .................................................... 19
**NATIONWIDE PERMITS AND PRE-CONSTRUCTION NOTIFICATIONS** .... 20
  - Permits and Regulatory Agencies ......................................................................... 20
  - Permitting Process ................................................................................................. 21
**REPRESENTATIVE PROJECTS** .................................................................................... 24
  - Preliminary Determination ..................................................................................... 24
  - Jurisdictional Delineation ....................................................................................... 24
  - Nationwide Permits ................................................................................................ 24
  - Site Survey ............................................................................................................. 26
**CONTINUING EDUCATION AND CERTIFICATION** ............................................. 28
  - Endangered Species ............................................................................................... 28
  - Ecology of Aquatic Insects ..................................................................................... 29
  - SWS Professional Certification .............................................................................. 30
**CONCLUSIONS** ........................................................................................................... 32
  - Education Background and IES Preparation ......................................................... 33
  - Future Goals .......................................................................................................... 34
**REFERENCES** .............................................................................................................. 35
**APPENDICES** .............................................................................................................. 36
  - Appendix I. Regulatory Agency Forms ................................................................. 37
  - Appendix II. Jurisdictional Delineation ................................................................. 43
  - Appendix III. Jurisdictional Delineation ............................................................... 47
  - Appendix IV. Nationwide Permit No. 3 ............................................................... 65
  - Appendix V. Nationwide Permit No. 14 .............................................................. 90
  - Appendix VI. Nationwide Permit No. 39 ............................................................ 116
  - Appendix VII. After-the-Fact Nationwide Permit ............................................... 129
  - Appendix VIII. Site Survey .................................................................................... 140
LIST OF FIGURES

FIGURE 1. EPHEMERAL CHANNELS ................................................................. 8
FIGURE 2. UNIMPORTANT INTERMITTENT STREAMS ...................................... 9
FIGURE 3. IMPORTANT INTERMITTENT STREAMS ......................................... 10
FIGURE 4. PERENNIAL STREAMS ................................................................. 11
FIGURE 5. ON-SITE JURISDICTIONAL FEATURES ....................................... 12
FIGURE 6. MUNSELL SOIL COLOR CHART .................................................. 17
FIGURE 7. DELINEATION FLAGGING TECHNIQUES ...................................... 18
FIGURE 8. HELIANTHUS SCHWEINITZII ....................................................... 28
FIGURE 9. HEXASTYLIS NANIFLORA ......................................................... 29
FIGURE 10. BENTHIC MACROINVERTEBRATES .......................................... 30

LIST OF TABLES

TABLE 1. PLANT INDICATOR STATUS CATEGORIES ..................................... 15
TABLE 2. PERMITTING SCENARIOS ........................................................... 22
ACKNOWLEDGEMENTS

I would like to thank everyone that I have had the pleasure to work with at Carolina Wetland Services, Inc., especially Gregg Antemann and Ron Johnson for all of their professional advice and training. I would also like to acknowledge my academic advisor, Dr. R. Hays Cummins for providing his help and assistance with this report, as well as being a true friend during my academic career at Miami University. Dr. Mark Boardman, Dr. William Renwick, and the IES faculty, staff, and fellow students also played an integral part in the completion of this report and my academic accomplishments.
INTRODUCTION

Carolina Wetland Services, Inc. (CWS) is a natural resource consulting firm based in Charlotte, NC. Since 2000, CWS has been providing environmental consulting services to a wide range of clients including construction, architectural, and engineering firms as well as a variety of government organizations throughout the Charlotte area and Carolinas. A majority of projects undertaken by CWS in involve wetland and stream ecology, and the extensive knowledge and practice of these areas remains a vital part of the company’s success. CWS’s mission is to take pride in its highly qualified staff and strive to foster beneficial and lasting relationships with clients.

My internship began with CWS on August 30, 2004 where I began filling the duties of Staff Biologist I. My responsibilities included learning company protocol in the environmental consultation process and assist senior level biologists with the completion of a variety of projects. The following report summarizes my progression in the company through the first six months of my internship and highlights the duties, representative projects, and continuing education for which I am responsible.
CAROLINA WETLAND SERVICES

Carolina Wetland Services, Inc. (CWS) is a private natural resource consulting firm based in Charlotte, NC. CWS was started in 2000 with the goal of providing quality and timely services for a variety of clients throughout the southeast. Architectural, construction, and engineering firms, as well as government organizations make up a majority of the client base. Services provided by CWS include: wetland delineations, invasive plant management, stream and wetland permitting and mitigation, protected species surveys, bioengineering services, and North Carolina and South Carolina Environmental Protection Agency documentation.

A large on-going project for CWS is the South Corridor Improvement Project. The city of Charlotte is currently planning the construction of a multi-million dollar Light Rail system to serve the residents of Charlotte and help relieve traffic congestion. The City of Charlotte Storm Water Services (CSWS) has determined that storm water drainage improvements are a necessity for the future sites of the Light Rail stations. CSWS has contracted CWS to provide jurisdictional determinations of on-site waters, perform habitat assessments, and prepare an existing conditions report. This project is highly representative of the ecologically based methodologies performed by CWS scientists on a regular basis.

Carolina Wetland Services currently maintains eleven employees in three office locations including Charlotte, Raleigh, and Columbia, SC. Each office is responsible for sustaining its client base and providing services representative of the company’s goal. A Principal Biologist performs the management of each office; these individuals provide principal reviews of documentation, engage in primary contact with clients, set up projects, and carry out common managerial tasks such as coordinating staff members. Other positions within the company include Senior Biologist, Project Biologist, Staff Biologists II and I, and Natural Resource Technicians. In general, all staff members hold masters degrees and professional certifications with strong backgrounds in biology. Each position is essential in completing timely and accurate services to clients.
**DUTIES AND RESPONSIBILITIES**

As a Staff Biologist I, my responsibilities are part of nearly every type of service and project completed by Carolina Wetland Services. A majority of the fieldwork and report preparation is budgeted for the Staff Biologist I position, so it is essential that this individual be familiar with the guidelines that follow any project. In the early part of my internship I was introduced to basic duties such as jurisdictional determinations and delineations of streams and wetlands. These projects require learning the methodologies set forth by both the U.S. Army Corps of Engineers (USACE) and the North Carolina Division of Water Quality (NCDWQ) in order to identify and classify the basic ecological components of local stream and wetland communities. A vital part of my position was to quickly learn these fundamental components including: vegetation, soil characteristics, and basic hydrology, in order to provide clients with accurate site assessments.

In gaining knowledge of these ecological factors I was able to take on the task of preparing Jurisdictional Delineation and Determination reports, as well as Pre-Construction Notifications and Nationwide Permits. In addition to field methods, a variety of skills are required for report preparation in order to meet guidelines set by the USACE and NCDWQ. In all cases, field maps are required to outline and accurately show the locations of on-site jurisdictional waters. These field maps are generated in a number of ways; I was required to learn programs such as AutoCAD, increase my knowledge of ArcMap and geographical information systems (GIS), and interpret engineering plans. Relating field data with engineering plans through these types of programs would allow me to accurately assess the amount of possible impacts to on-site waters from construction activities. These techniques are used on a day-to-day basis in my position due to the fact that pre-construction permits comprise the majority of our projects.

In addition to Pre-Construction Notifications, a small portion of my duties involved performing post-construction monitoring. During my first six months I was able to assist with a couple of different monitoring projects. These projects were often the result of a large development in which a stream channel or wetland area was largely impacted or a new wetland or stream channel was created as a source of mitigation. The
techniques involved relate back to the fundamental components of on-site wetland and stream communities in order to assess their health and progress. These monitoring activities and reports are provided to the client for a set period of time following construction activities to ensure that the natural communities that were either created or impacted are functioning properly.

Standard procedures for post-construction monitoring involve several steps including: NCDWQ stream classification, US Army Corps of Engineers stream quality assessment, stream habitat assessment, pebble counts, and evaluating hydrologic function. Stream classification and quality assessment are the two most common features of post-construction monitoring. These techniques ensure that streams or wetlands that were impacted as a result of construction return to their pre-construction conditions (i.e. an impacted perennial stream is classified and continues to function as a perennial stream).

In addition to construction impacts, another important aspect of monitoring involves bioengineering. Bioengineering is a common technique used to encourage bank stabilization and reestablish native plant and animal communities. A small percentage of my duties during my first six months involved revising a database of past bioengineering projects completed by CWS. These revisions required the ability to field-verify the types and abundance of planted species at each site and relate this data to a GIS database. Ultimately, the data obtained at each site would determine whether the species are good candidates for harvest for use in future bioengineering projects.

A final task that I was involved in was Protected, Endangered, and Threatened Species surveys (PETS). This task was viewed as one of the more important aspects of certain jurisdictional delineations. PETS surveys are generally budgeted for large scale commercial and residential developments as well as state-funded projects. A large amount of preliminary investigation and literature reviews are involved in these surveys. My responsibility of knowing what sources to utilize, such as the North Carolina Natural Heritage Program (NCNHP) and the U.S. Fish and Wildlife Service (USFWS) North Carolina Ecological Service databases, were an essential part of compiling a list and description of possible federally listed species for a certain area. Once the preliminary investigation and literature reviews were completed, the duty of field-identifying
potential species and habitats was undertaken. In general, the fieldwork for PETS surveys required not only the ability to recognize and taxonomically identify federal species, but also identify and assess the habitats and likelihood of occurrence of these species.

Each of my responsibilities as a Staff Biologist I require a certain degree of both formal and informal training and education. Employees of CWS are encouraged to attend additional training courses and apply for various certifications in order to increase the company’s overall qualification for completing projects properly. During my first six months I have attended two training courses including: Piedmont Endangered Species Identification and Taxonomy and Pollution Ecology of Aquatic Insects. These courses have vastly helped me improve my fieldwork and assessments and have increased the accuracy with which I perform these specific tasks. In addition to these training courses I am currently applying for certification as a Wetland Professional In Training (WPIT) through the Society of Wetland Scientists (SWS). This certification recognizes my educational experience from my undergraduate and graduate programs as well as my initial work as a professional wetland biologist. This certification is also a way of allowing our clients to see our qualifications and abilities to complete the projects for which we are hired.
Preliminary Site Investigations and Determinations

Preliminary site investigations and determinations are generally the most basic forms of site assessment. These tasks are performed for a client under a couple of different circumstances: 1) rezoning of a property, i.e. a residential parcel will be used for commercial use and 2) pre-planning stages for large developments. These types of investigations provide the client with a general idea of whether or not Jurisdictional Waters of the U.S. exist and their approximate locations within a specific property. Jurisdictional Waters of the U.S. include all surface waters such as all navigable waters and their tributaries, all interstate waters and their tributaries, all wetlands adjacent to these waters, and all impoundments of these waters. Identifying these features allows developers, and engineers to plan construction activities around these waters and avoid future impact.

Determination Pre-Investigation

Once authorization is received from the client, pre-investigation can begin which includes preparing all necessary project maps. Typical maps for a Jurisdictional Determination or Preliminary Investigation include a U.S. Geologic Survey (USGS) site location map, Natural Resources Conservation Service (NRCS) County soil survey, and a general field map. USGS location maps are taken from 7.5-minute topographic quadrangles and outline the project boundary as well as show nearby roads, named waterways, and regional topography. NRCS soil survey maps are created from County Soil Surveys and reveal typical soils within an area and any named waterway or major tributary. Finally, a field map can be created from a couple of different sources for approximate mapping of Jurisdictional Waters in the field. Generally, county GIS layers are used to create these field maps and detail topography, hydrologic features, parcel boundaries, building locations, and aerial photography. By combining this data, CWS is able to identify areas that will most likely exhibit stream channels or wetland areas. Another method for creating field maps is to use a site survey provided by the client; these surveys are generally more accurate than County GIS data and allow more accurate identification of jurisdictional features.
**Site Determination**

Field investigation involves identifying all possible areas for jurisdictional features from field maps and examining those potential areas. On-site Jurisdictional stream channels are classified and break points (areas in which a stream channel changes classification) are defined according recent NCDWQ\(^1\) and USACE guidance. The NCDWQ stream classification method is designed to differentiate ephemeral channels from intermittent and perennial channels. These classification forms (See NCDWQ Stream Classification Form, Appendix I) use a numerical rating system in order to determine whether a channel is ephemeral (<19 points), intermittent (≥ 19 points), or perennial (generally over 31 points). The classification form examines primary and secondary indicators among three categories including: geomorphology, hydrology, and biology. Each indicator is weighted in order to show the relative importance that each character has in determining channel classification. Each character can be ranked as absent (character not observed), weak (character present with intense search), moderate (character present with mild search), or strong (character easily observed).

Primary indicators of geomorphology involve examining characters such as the presence of riffle-pool sequences, strength of bed and bank presence, sinuosity, diversity of streambed substrate, presence of floodplains, and presence of 2\(^{nd}\) order or greater channels. Strength of the bed and bank is often a strong indicator to initially view; generally, ephemeral channels may have a very small bank (few inches) or completely lack a defined bank (Figure 1). Another strong indicator is to examine the diversity of the streambed substrate, for example, an ephemeral channel will generally have substrate similar to that of the surrounding area (silt or fine sand), whereas an intermittent or perennial channel will exhibit a higher degree of heterogeneity such as fine sand to large cobbles. The substrate of a channel is a good indicator of the amount of water that flows within a channel and its ability to move larger substrates. Secondary indicators for geomorphology include the presence of a head cut or vertical drop in a streambed (i.e. waterfall), grade control points (large rocks or roots), and local topography indicating a natural drainage way.

The primary indicator for hydrology is the presence and strength of ground water flow. Ephemeral channels will generally be located higher than the water table so that water will only be in the channel during high flow events, whereas intermittent channels may have portions of the channel at or below the water table, allowing for persistent pools (Figure 2). Secondary indicators of hydrology include presence of leaf litter in the channel, sediment on plants, wrack lines (sticks, leaves or debris piled on the upstream side of obstructions), and presence of water in channel in relation to last rainfall or during dry season. Commonly, ephemeral channels will show a larger amount of leaf litter in the channel, lack of sediment on plants, and an absence of wrack lines due to less water flow. The amount of water in the channel since the last rain fall can highly influence the amount of water conveyed by a channel; because of this, classifications should be performed at least 48 hours after a rainfall in order to reduce variability in ephemeral and intermittent channels.
The existence of biological characters is not only a strong indicator of stream classification, but these indicators allow for the further breakdown of the intermittent classification into either Unimportant Intermittent or Important Intermittent. Primary indicators of biology include the presence and abundance of fibrous roots or rooted plants in the streambed, existence of periphyton (“spongy-leafy” growth of algae or plants on rocks or logs), and presence of bivalves. Ephemeral channels will show a strong presence of fibrous roots and/or rooted plants within the streambed; additionally periphyton and bivalves will be absent due to lack of water flow and persistent pools.
Secondary indicators of biology include the presence of: fish, amphibians, aquatic turtles, crayfish, benthic macroinvertebrates, iron oxidizing bacteria/fungus, and algae. In general, these secondary indicators will be absent from ephemeral channels, however these will help further define intermittent and perennial channels. Benthic macroinvertebrates such as mayflies (Ephemeroptera), stoneflies (Plecoptera), and caddisflies (Trichoptera) (EPT) distinguish an intermittent channel as being “Important” (Figure 3). These species have life cycles that require the presence of water throughout the majority of the year, relating to a channel with persistent pools of water. These species are also very important due to the fact that they are a staple in the diets of many fish and are good indicators of pollution. Crayfish are also a very important secondary indicator. Presence of crayfish automatically classify a stream as being perennial due to their life cycles requiring a constant flow of water throughout the year (Figure 4).
In addition to the NCDWQ stream classification form, stream quality is taken into account using the USACE Stream Quality Assessment Worksheet (See USACE Worksheet, Appendix I). Much of the Quality Assessment Worksheet is similar to that of the NCDWQ form, in that similar physical and biological features are highlighted, however this form is not used to “classify” a stream. This form outlines more of the watershed features, drainage area, watershed use, and bank size; additionally, evidence of chemical and nutrient discharge and agricultural impacts are examined. This worksheet simply provides the client and/or regulatory agency with the overall health and function of on-site jurisdictional stream channels.

On-site jurisdictional wetland areas must also be identified in addition to stream channels using the USACE – Routine On-Site Determination Method. This method is defined in the 1987 Corps of Engineers Wetlands Delineation Manual² and will be described in more detail in the Jurisdictional Delineation section of this report (See Routine Wetland Determination Form, Appendix I). Three main characteristics and indicators are examined in order to determine if an area is considered to be a

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jurisdictional wetland, including: hydrophytic vegetation, hydric soils and wetland hydrology. Soil samples are taken within the area and examined for color indicating reduction and oxidation reactions (hydric soil). A basic assessment of vegetation growing within wetland area is taken in order to determine if the majority of existing plants are wetland indicator species (hydrophytic). Finally the area is examined for hydrologic indicators such as drainage patterns, inundation or saturation within the upper 12 inches of soil profile, or water marks. A Routine On-Site Data Form is also completed for surrounding non-jurisdictional upland areas in order to provide a complete assessment of the site.

Determination Report Preparation

Preliminary Site Investigation and Jurisdictional Determination reports are created to provide the client with a summary of overall site conditions and approximate locations of jurisdictional waters. This report summarizes the USACE determination methods used by CWS scientists and includes a basic summary of the on-site jurisdictional features (Figure 5). The results section of a determination report provides an in-depth description of each feature including hydrologic and biological characteristics as well as NCDWQ and USACE stream classification and quality scores.

<table>
<thead>
<tr>
<th>Potential Jurisdiction</th>
<th>Classification</th>
<th>Approximate Size</th>
<th>NCDWQ Score /71</th>
<th>USACE Score /100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stream A</td>
<td>Perennial</td>
<td>4,208 ft</td>
<td>38.5</td>
<td>65</td>
</tr>
<tr>
<td>Stream B</td>
<td>Unimportant Intermittent</td>
<td>493 ft</td>
<td>14</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>Important Intermittent</td>
<td>85 ft</td>
<td>24.5</td>
<td>46</td>
</tr>
<tr>
<td>Stream C</td>
<td>Unimportant Intermittent</td>
<td>142 ft</td>
<td>20</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>Important Intermittent</td>
<td>1,042 ft</td>
<td>26.5</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td>Perennial</td>
<td>521 ft</td>
<td>28</td>
<td>51</td>
</tr>
<tr>
<td>Wetland AA</td>
<td>Herbaceous</td>
<td>.17 ac.</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Wetland BB</td>
<td>Forested</td>
<td>.49 ac.</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Figure 5. Example of summary table of on-site jurisdictional features.

In addition to the on-site features summary, a variety of attachments are provided to the client for additional site information. These attachments include: a USGS 7.5-minute topographic quadrangle map, a NRCS soil survey, and an approximate jurisdictional boundary field map (GIS) identifying on-site features. Oftentimes determination reports are prepared for clients who plan future construction of a site so an
additional section is provided explaining the process of pre-construction permitting in the event that on-site jurisdictional features will be impacted. This section will provide the client with rules and descriptions for all Nationwide Permits, Regional Conditions, NCDWQ Water Quality Certifications, as well as the notifications and impact thresholds for the necessary permit. Nationwide Permits and Pre-Construction Notifications will be described in more detail in the permitting section of this report.
**JURISDICTIONAL DELINEATIONS AND REQUESTS FOR VERIFICATION**

Jurisdictional delineations are very similar to determinations in that the same methodology is followed by CWS scientists in order to identify and classify on-site jurisdictional waters. However, delineation involves locating (flagging) the exact boundaries of on-site jurisdictional waters in order to provide developers and engineers with the ability to plan around jurisdictional features or minimize impacts to these features. In many cases, these features will be surveyed using a sub-meter GPS unit in order to achieve precise locations. Delineations are performed on sites that are generally close to the development or construction stage. In addition to a delineation report a Request for Jurisdictional Verification is prepared for the USACE in order to have on-site features confirmed.

Delineation Pre-Investigation

Pre-investigations for jurisdictional delineations follow the same methodologies for determinations in that a variety of field maps are produced. These maps include a USGS topographic map, NRCS County soil survey, and a site plan provided by the client, developer, or engineer. These maps provide detailed topography, hydrologic features, parcel boundaries, building locations, and aerial photography of the area and allow CWS scientists to identify possible locations of jurisdictional waters of the U.S.

Delineation Field Investigation

Field investigation methodologies for jurisdictional delineations mirror those for preliminary investigations and determinations in that the NCDWQ stream classification method is used to determine if on-site waters are perennial, intermittent or ephemeral. Furthermore, USACE Stream Quality Assessment Worksheets are used to determine overall quality of the channel. In addition to stream channel classification, jurisdictional delineations require closer examination and classification of on-site jurisdictional wetland areas. As mentioned, CWS scientists use the USACE – Routine On-Site Determination Method in order to examine the three main characteristics and indicators: hydrophytic vegetation, hydric soils, and wetland hydrology.

Hydrophytic vegetation is defined as the amount of total plant life occurring in an area where the frequency and duration of saturation or flooding is sufficient enough to influence the type and abundance of plant species present. CWS scientists must be able
to provide taxonomic identification of plant species as well as relative abundance of each species within a potential wetland area. By identifying these species it is then possible to apply the hydrophytic plant classification method shown in Table 1. Each plant species is categorized according to a plant indicator status; this status is based on the likelihood of that particular plant species being found in a wetland area or upland area. These categories and plant lists were originally developed and defined by the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory.

Table 1. Plant Indicator Status Categories. Facultative Categories are further subdivided by (+) or (-) modifiers. i.e. FAC+ species are considered to be wetter than FAC and FAC- to be drier.

<table>
<thead>
<tr>
<th>Indicator Category</th>
<th>Indicator Symbol</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obligate Wetland Plants</td>
<td>OBL</td>
<td>Plants that occur almost always (estimated probability &gt;99%) in wetlands under natural conditions, but which may also occur rarely (estimated probability &lt;1%) in nonwetlands.</td>
</tr>
<tr>
<td>Facultative Wetland Plants</td>
<td>FACW</td>
<td>Plants that occur usually (estimated probability &gt;67% to 99%) in wetlands, but may also occur (estimated probability 1% to 33%) in nonwetlands.</td>
</tr>
<tr>
<td>Facultative Upland Plants</td>
<td>FACU</td>
<td>Plants that occur sometimes (estimated probability 1% to &lt;33%) in wetlands, but occur more often (estimated probability &gt;67% to 99%) in nonwetlands.</td>
</tr>
<tr>
<td>Obligate Upland Plants</td>
<td>OBL</td>
<td>Plants that occur rarely (estimated probability &lt;1%) in wetlands, but occur almost always (estimated probability &gt;99%) in nonwetlands under natural conditions.</td>
</tr>
</tbody>
</table>

Once plant species have been identified and recorded in the Routine Wetland Determination Form (Appendix I), it can be determined whether or not an area displays hydrophytic vegetation. If more than 50% of the dominant plant species in an area are categorized as FAC or wetter then that area is considered to hold hydrophytic vegetation. However, if less than 50% of the dominant plant species are FAC or wetter or there is an equal number of wetland and upland species then the determination of the area will be based on the soil and hydrologic parameters.

Another important indicator examined in the determination of wetlands is the existence of hydric soils. A hydric soil is a soil that is inundated, saturated, or ponded for a long enough duration during the growing season that anaerobic conditions develop and

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the growth of hydrophytic vegetation is favored\textsuperscript{3}. CWS scientists can generally determine whether or not an area exhibits soil types with inclusions of hydric soils during pre-investigation. USDA-NRCS County Soil Maps provide the locations of soil types as well as descriptions of each type. Soils that are generally poorly drained with very shallow water tables (less than 1.5 feet to 6 inches from the surface) and slow permeability of 6 inches per hour or less are more likely to have inclusions of Hydric soils. Aside from pre-investigation of soil types, visual investigation of soils within a potential jurisdictional wetland is the primary technique for determining if hydric conditions are present. While in the field, scientists will use a soil auger in order to examine the upper 12 inches of the soil profile to determine if wetland indicators exist.

The most diagnostic of all soil indicators is soil chroma and value. Colors of soil components are strongly influenced by the duration and frequency of saturation. During long inundated or saturated periods soils can display gleyed colors or low chroma colors and mottles. Gleyed soils develop under waterlogged, anaerobic conditions in which iron, manganese, and other elements are highly reduced (i.e. ferric iron, Fe\textsuperscript{3+} is reduced to ferrous iron, Fe\textsuperscript{2+}) resulting in a bluish, greenish, or grayish color. Other visual indicators may include a low chroma matrix with mottles. Low chroma soils are generally grayish in color and mottles are simply areas of contrasting color. Mottling and low chroma soils generally occur in areas that are saturated during a considerable period of the growing season, but not long enough to be gleyed (completely anaerobic). Mottles are generally a result of areas in the soil profile where aerobic conditions exist (i.e. ferrous iron, Fe\textsuperscript{2+} is oxidized to ferric iron, Fe\textsuperscript{3+}); these mottles are commonly orange or reddish in color. Wetland scientists utilize a Munsell Soil Color Chart (Figure 6) which provides an index for the matrix color of the soil in order to determine whether or not a soil is low chroma or gleyed. Within each color chart there are soil color values ranging from 2.5-8 (value 2.5 being darker) and soil chromas ranging from 1-8 (chroma 1 being more gray or containing less pigment).

\textsuperscript{3} US Department of Agriculture (USDA) Soil Conservation Service (SCS) 1985, as amended by the National Technical Committee for Hydric Soils (NTCHS) in December 1986.
Figure 6. Munsell Soil Color Chart provides scientists with varying values and chromas in order to determine the types of reactions occurring in the soil.

The third indicator examined in the USACE Routine Determination Method is wetland hydrology. The term wetland hydrology refers to all hydrologic characteristics within areas that are periodically inundated or have soils that are saturated to the surface during the growing season. A number of factors may influence the wetness of an area including the amount of precipitation, topography, soil permeability, and plant coverage.

There are a number of practical hydrologic indicators that may be used in order to determine whether or not an area can be classified as a jurisdictional wetland. One indicator is simply the visual observation of inundation or saturated soil. The presence of standing water can be very strong evidence for a wetland area and may generally occur in areas of low, flat topography with low soil permeability. In addition to the direct presence of water, there are several indicators that may provide evidence of recent inundation of an area. Watermarks and sediment deposits are often good indicators of recent inundation. Watermarks are most commonly found on woody vegetation and appear as dark stains on bark, oftentimes viewing the height of watermarks will reveal recent hydrologic activity and the extent of inundation to an area. Sediment deposits may also be common during inundation and usually involves the deposition of very fine materials such as organics or minerals on low growing plants and vertical objects.

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4 Munsell Soil Chart Figure provided by The Ben Meadows Company, available online at http://www.benmeadows.com. Accessed April 5, 2005.
Wetland hydrology indicators may be useful in determining the extent and duration of which an area is inundated, however in utilizing the Routine On-Site Determination Method it is vital to use judgment and not determine an area to be wet solely based on one indicator. For example, an ideal wetland may contain a variety of wetland plant species (FACW and OBL), gleyed or low chroma soils and mottles, as well as inundation or saturation of the soil surface, however nature is variable and oftentimes a wetland area may not display all three indicators. In these cases the scientist must make a decision based on the indicators that are present and the degree of their presence; this judgment usually comes with time and experience.

Once CWS scientists have identified an area as being a jurisdictional wetland or stream channel, these areas must be delineated (flagged) and mapped. Delineation is simply placing flags around the boundaries of a wetland or centerline of a stream channel and allows future surveyors to locate each feature (Figure 7). Flagging these features also allows the identification of break points in stream channels or the point at which a stream changes classification.

![Figure 7. Illustrates the proper flagging technique for jurisdictional wetland areas and stream channels.](image)

In addition to delineating on-site jurisdictional features, a client may request to have these features surveyed using a sub-meter GPS unit. By surveying these features for a client, CWS is able to provide an extremely accurate map of the locations of these
features allowing the client to utilize the data and plan around possible impacts using AutoCAD.

Delineation and Verification Report Preparation

The report preparation process for Jurisdictional Delineations is identical to that of Determinations in that CWS provides the client with a report of the overall site assessment including maps, stream data forms, on-site determination forms, and descriptions of on-site jurisdictional features. However, a Request for Verification is usually prepared along with these reports and submitted to the USACE. A Request for Verification is simply a form provided to the USACE asking for a confirmation of the jurisdictional features (See Request for Jurisdictional Determination Form, Appendix I). On-site jurisdictional features must be field verified before any construction activities may take place. Occasionally, projects are further along in the development stage, in which case Requests for Jurisdictional Verifications will accompany Pre-Construction Notifications and Nationwide Permits.
NATIONWIDE PERMITS AND PRE-CONSTRUCTION NOTIFICATIONS

Nationwide Permits and Pre-Construction Notifications are prepared for projects, which are nearing the development or construction phase and are required for projects that will impact Jurisdictional Waters of the U.S. There are numerous types of Nationwide Permits, each with a different set of conditions for a variety of construction activities from site grading and construction to channel excavation and stabilization. Although each permit varies by a specific set of conditions, permits are designed with the same goal in mind, to achieve certification under Sections 404/401 of the Clean Water Act (CWA). Section 404 of the CWA regulates discharge of fill and dredged materials into waters of the U.S. including wetlands\(^5\). Section 401 is similar to 404, however this section allows for States to take a more active role in waterway and wetland decisions. States will often take a more aggressive approach in controlling certification for permits to address more State-specific concerns for wetlands and waterways. Section 401 certification reviews are usually completed at the same time as the Federal agency (USACE) review\(^6\).

Permits and Regulatory Agencies

Carolina Wetland Services completes a large number of Nationwide Permits (NWPs) each year for a variety of construction activities for their clients. The type of permit and the regulatory agency that reviews it will vary depending on the types of impacts to jurisdictional features. Some common Nationwide Permits completed by CWS include Nos. 3, 14, and 39. NWP No. 3 involves the activity of stream channel maintenance and associated wetland areas. A maintenance activity generally involves a remediation of eroded or erosion prone areas within a stream channel. Construction within these areas may involve stream bed and bank regrading as well as the use of rip rap and bioengineering to provide bank stabilization. NWP No. 14 involves linear transportation projects such as road construction, road widenings and sidewalk construction. Common impacts that must be dealt with during these activities consist of stream crossings, culvert extensions, and filling of waters. The most common Nationwide Permit completed by CWS is No. 39, which involves residential,

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commercial, and institutional developments. The reason for the abundance of these permit applications is a result of Charlotte’s constant growth and urban sprawl. Construction activities for these types of projects and developments are generally on a very large scale and have potential for impacting a large amount of jurisdictional waters; this type of permit is essential in protecting the amount of on-site waters.

**Permitting Process**

The permitting process is very similar to the methodologies followed for a jurisdictional determination or delineation. The first step involves the identification and classification of on-site jurisdictional waters and combining this information with site plans or projected activities provided by the client. Combining this information allows CWS to accurately assess the type and magnitude of impacts to specific on-site waters and ultimately determine the type of permit that is required for the construction activities. The permit package is very similar to a Jurisdictional Delineation Report in that a summary of the on-site waters is included, however this package must also include a description of the purpose of the project, the type and extent of impacts, and explain the type of mitigation that will be performed after construction if it is required. Additionally, a Pre-Construction Notification Application is completed, which describes the project in general, including location, impacts, mitigation, and funding. The permit package must then be submitted to the proper regulatory agency, generally the USACE and/or the NCDWQ, where the impacts will be verified and construction will be approved. Each project requiring permitting is unique; the construction activities and type of impacts to on-site waters determine the type of permit required as well as which regulatory agency must be notified. Table 2 illustrates the general permitting schedule and impact scenarios required for a Nationwide Permit (for the purposes of this report, NWP No. 39 will be described, as it is the most common permit application completed by CWS).
Table 2. Permitting Scenarios for Nationwide Permit No. 39.

<table>
<thead>
<tr>
<th>Wetland/Stream Impact Scenario under Nationwide Permit No. 39</th>
<th>Steps for Permitting and Schedule</th>
</tr>
</thead>
</table>
| **A)** Impacts (filling, piping, rip rapping, etc.) less than 1/10 acre of wetlands and no impacts to a jurisdictional streambed or pond. | 1.) Wetlands delineation  
2.) U.S. Army Corps of Engineers (USACE) verification  
3.) A Post Construction Notification* must be submitted to the USACE within 30 days following completion of work in jurisdictional areas.  

*CWS recommends that notification be submitted to the USACE for written approval prior to activities. |
| **B)** Impacts greater than 1/10 – but less than 1/2 acre of wetlands and/or less than 150 linear feet of stream channel. | 1.) Wetlands delineation  
2.) USACE verification  
3.) Notification to USACE through a Preconstruction Notification (PCN) which may include the following:  
a. Alternatives analysis  
b. Project’s purpose and need  
c. Impact avoidance and minimization strategies  
d. Mitigation (in-kind and on-site) in the form of restoration, creation, enhancement, and/or preservation and/or payment into the Wetland Restoration Fund (WRF) with USACE approval (Payments into the WRF typically amount to $125/lf for stream impacts and $24,000/acre for wetland impacts.)  
e. USACE has 45 days to respond to a complete PCN application for NWP No. 39.  
f. USACE dictates ratios for mitigation of wetland areas: 1.5:1 restoration, 2:1 creation, and 3:1 preservation (typical).  
g. USACE will usually require the establishment of (25-50 foot) vegetated buffers (on each side) along on-site jurisdictional waters of the U.S. and a Storm Water Management Plan (SWMP) for commercial and industrial projects.  
h. Impacts to jurisdictional waters of the U.S. cannot cause more than minimal changes to the flow or water quality of any stream. |
<table>
<thead>
<tr>
<th>Wetland/Stream Impact Scenario under Nationwide Permit No. 39</th>
<th>Steps for Permitting and Schedule</th>
</tr>
</thead>
</table>
| C) Impacts between 1/10 to 1/2 acre and impacts to streams with important aquatic function between 150 to 300 linear feet. | 1.) Follow steps 1-3e (above)  
2.) Requires written concurrence from DWQ to obtain a 401 Water Quality Certification.  
   a. DWQ usually requires the certification of a Storm Water Management Plan for commercial projects.  
   b. DWQ has 60 days to respond to a PCN. |
| D) Impacts exceeding 1/2 acre of wetlands or 300 linear feet of stream with important aquatic function. | 1.) Wetlands delineation  
2.) USACE verification  
3.) Notification to the USACE and DWQ through an Individual Permit (IP) application.  
4.) A lengthy documentation procedure which includes:  
   a. An alternatives analysis  
   b. Projects purpose and need discussion  
   c. Impact avoidance and minimization  
   d. A compensatory mitigation plan  
   e. Addressing protected species and cultural resources issues  
   f. 30-day public notice (typical) and a possible public hearing  
   g. For publicly funded projects an Environmental Assessment (EA) is required by DWQ for impacts exceeding 500 linear feet of a perennial stream.  
   h. For publicly funded projects an Environmental Assessment (EA) is required by DWQ for impacts exceeding 1 acre of wetlands or 500 linear feet of channel |

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7 Impacts to an unimportant stream channel maybe greater than 300 linear feet under Nationwide Permit No. 39 and are typically calculated on an acreage basis.
**REPRESENTATIVE PROJECTS**

**Preliminary Determination**

Some of the most common Preliminary Jurisdictional Determinations that I performed during my first six months involved preparing Preliminary Wetlands Investigation letters for City of Charlotte Rezoning requirements. These projects involve investigating a particular site using the USACE Routine On-Site Determination Method for jurisdictional waters and providing the client with a brief description of the site in the format of a letter. Oftentimes, these sites will already be developed and/or contain no jurisdictional waters due to their location within the city. An example of a typical Rezoning Letter has been included as Appendix II, Bridge Partners Site. The Bridge Partners Site involved the rezoning of three parcels within Charlotte City limits for the construction of multi-family apartment homes. There were no Jurisdictional Waters of the U.S. found and a standard letter was provided to the client including a description of on-site vegetation and soils along with representative photographs and a Mecklenburg County GIS map showing the location of the project.

**Jurisdictional Delineation**

Performing Jurisdictional Delineations is a common task that I perform for CWS and many times these projects involve large areas where subdivisions and housing developments will be constructed in the future. The 450-Acre Oakvale Site (Appendix III), located north of Charlotte in Mecklenburg County, is an example of a large-scale delineation that we performed in January of 2005. This extremely large project involved the delineation and survey of approximately 21,000 linear feet of jurisdictional stream channels, 5 acres of jurisdictional wetland areas, and 10.5 acres of jurisdictional open water areas. Each of these features needed to be accurately identified, mapped, and described for client in order to plan future construction activities around jurisdictional waters and reduce future impacts.

**Nationwide Permits**

As mentioned, preparing Nationwide Permits were a regular responsibility of mine during my first six months of employment. During this time I was involved in the preparing of permit applications for activities including sidewalk improvements, storm water drainage improvements, and commercial and residential developments.
The Nathanael Green Lane Maintenance Project is an example of a permit that was completed for CSWS (Appendix IV). This project involved increasing culvert sizes for increased storm water flow, reshaping sections of a stream channel and installing stream bank stabilization measures. Due to the type of activities and extent of impacts to jurisdictional waters, this application was prepared as a NWP No. 3 and would require notification to both the NCDWQ and the USACE (see permitting scenarios, Table 2). Impacts for this particular project included 350 linear feet of perennial channel due to bank reshaping and stabilization, as well as 0.01 acre of wetland impacts from fill activities. This project will reduce flooding during high flow events to this residential area of Charlotte and prevent erosion and property loss.

The Hubbard Road Sidewalk Improvement Project was another permit application that was completed for CSWS (Appendix V). This project involved extending sidewalks and widening a section of road through a residential area, north of Charlotte. Since this was a linear construction project in which impacts totaled 236 linear feet of Important Intermittent stream channel and 37 linear feet of Perennial stream, this application would be prepared as a NWP No. 14 and would require notification to both the NCDWQ and the USACE. The types of activities for this project included extending culverts and partial fill of a jurisdictional open water area. Construction of sidewalks to this area would provide safer vehicular and pedestrian traffic to this residential area of Charlotte.

The Scott Futrell Drive Maintenance Project is an example of a NWP No. 39 that I completed for CSWS in November of 2004 (Appendix VI). The purpose of this project was to construct a new 120 linear foot section of culvert within a Perennial channel. The banks along the existing channel were deeply incised and causing large bank failures and loss of property to the commercial site as well as sediment loading to downstream waters. Since the proposed impacts for this project fell below the 150 linear foot threshold for a NWP No. 39, the permit and pre-construction notification would only require submittal to the USACE. Construction of this project would prevent further bank failure and land loss as well as downstream sediment loading.

In cases when developments are late getting started or there is financial persuasion to complete a project, contractors and developers will sometimes commence with a project before the permitting process is complete. In these cases it may necessary
to submit an After-the-Fact Nationwide Permit application in the event that jurisdictional waters are impacted. After-the-Fact permits are very similar in format to standard Nationwide Permits in that the USACE and/or NCDWQ must be notified however, depending on the extent of impacts, contractors and developers may face fines or must implement a mitigation plan. The Winecoff School Road Project (Appendix VII) is a case in point where stream impacts were performed before the permitting process could take place. The purpose of this project was to construct a commercial development on a 12-acre site. Along the back edge of the property was an unimportant intermittent stream that was converted into a detention pond and portions of the channel were piped. Since the impacts for this site were kept below 150 linear feet, an After-the-Fact NWP No. 39 was submitted to the USACE and the developer was not required to perform any compensatory mitigation.

**Site Survey**

Although jurisdictional determinations, delineations, and permits are the most common types of projects that I perform, I have had other opportunities to complete unique projects. The Shoppes at Caveness Farms (Appendix VIII) is a proposed commercial development located in Wake Forest, North Carolina. The proposed site for this project is located between a newly constructed Wal-Mart and the Caveness Farms Apartments (located downstream). During construction of the Wal-Mart, a sediment basin experienced a blow out and sediment was transported downstream, across the proposed Shoppes site and began filling the pond at the Caveness Farms Apartments. CWS was contracted to provide an existing conditions report and to perform a sediment survey of the Shoppes site and Caveness Farms Apartments pond. By establishing the extent of sediment deposition, our client would be able to show that their future construction activities will not have added to the amount of sediment, thus avoid litigation.

For this project, it was necessary to take accurate depth readings of the Caveness Farms Apartments pond in order to create a contour map and show sediment migration from upstream waters. This was done simply by setting up a grid system and taking readings from a boat with a fishing depth gauge. Once the depth readings were mapped and the contour lines formed, it was shown that the sediment had nearly filled in the
upstream quarter of the pond. In addition to pond impacts, it was necessary to take sediment depth measurements along the section of stream within the Shoppes site. Approximately every 50 feet, sediment depths were measure in the streambed using a soil auger and pebble counts were performed in order to determine the substrate composition. Pebble counts involve taking blind cross section samples of a stream bed and measuring the substrate particle size. These particle sizes are then compiled into a table and composition percentages can be calculated. Once these techniques were completed it was possible for us to determine the distance of sediment travel and provide the client with an accurate record of the existing conditions.
CONTINUING EDUCATION AND CERTIFICATION

As employees of CWS, we are encouraged to take a certain amount of course work and additional training each year. This continuing education not only helps market the company by show of experience, but also allows CWS scientists to perform specific tasks with more accuracy and assurance as well as take on new types of projects. Furthermore, this education helps individual employees apply for various certifications.

Endangered Species

The first course I enrolled in was Piedmont Endangered Species Identification during the fall of 2004. This class was held by Jake and Lori Duncan of D&D West and centered on the basics of identifying and surveying federally endangered, threatened and candidate species in the Piedmont Region of North and South Carolina. The main vegetation species of concern included: Schweinitz’s sunflower (*Helianthus schweinitzii*), dwarf-flowered heartleaf (*Hexastylis naniflora*), and the Georgia aster (*Symphyotrichum georgianum*).

In performing large scale PETS surveys it is vital to distinguish the subtle differences between these Federally endangered or threatened species and non-listed species. Identification of a Federally listed species prior to the start of a large scale project can often put construction activities on hold indefinitely, so it is imperative that these species be properly classified.

Figure 8. *Helianthus schweinitzii* (left), a Federally Endangered species can be commonly confused with *Helianthus divaricatus* (right), due to few morphological differences.
This class offered direct viewing of live specimens in their natural habitat and allowed us to compare them to more common species. Additionally, we were shown the basics of performing both small and large-scale surveys and how to distinguish habitats of interest.

Ecology of Aquatic Insects

An Introduction to the Taxonomy and Ecology of EPT was a course offered by Dave Penrose of the North Carolina State University Water Quality Group, in November of 2004. This course focused on classifying and identifying common benthic macroinvertebrates (aquatic insects) including the orders *Ephemeroptera* (Mayflies), *Plecoptera* (Stoneflies), and *Trichoptera* (Caddisflies). The ability to collect and identify these types of aquatic insects can be used for a variety of projects on many levels. Not only are these types of insects used to determine if streams are perennial or important and unimportant intermittent, but they are valuable in detecting water pollution problems and sources. In addition to identification, we were introduced to basic sampling techniques and shown areas within a stream that provide the best habitat for these insects.

The ability to collect and classify these invertebrates is one of the more important aspects I’ve learned from a course during my internship. At times it can be extremely difficult to classify a stream as perennial or intermittent based solely on hydrologic features. Being able to locate habitats and collect these specimens gives definitive evidence to regulatory agencies as to the classification of a particular feature.

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SWS Professional Certification

Along with continuing education, we are encouraged to apply for varying levels of professional certification as our experience in wetland ecology increases. The Society of Wetland Scientists (SWS) is one such organization that provides professional certification to scientists working in the fields of ecology, hydrology, soil sciences, education, and consulting who practice wetland science. The SWS Professional Certification Program was developed as a way to recognize qualified individuals working in the field of wetland science who assess and manage the Nation’s resources. This certification also helps to illustrate the company’s qualifications as an environmental consulting firm.

Two levels of certification are achievable through the SWS; these include Wetland Professional in Training (WPIT) and Professional Wetland Scientist (PWS). WPIT is the level of certification, which recognizes the educational accomplishments of an individual. Required course work for this level of certification includes: 15 semester hours of biological sciences, 15 semester hours of physical sciences, 6 semester hours of quantitative sciences, as well as 6 professional references. PWS certification is the next level, which recognizes an individual’s educational and professional experiences. In addition to the education requirement, PWS applicants must complete an additional 15 semester hours of wetland-related course work and five years of experience working in a field specifically related to wetlands management.

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During the early part of my internship, I was fortunate enough to exhibit the educational background from undergraduate and graduate level courses to apply for WPIT certification. Working at CWS provided me with professional references and the support I needed to gain this level of certification and in turn this certification shows not only my qualification as a wetland scientist to our clients, but also my commitment to the company and the field in which I work.
CONCLUSIONS

Overall, my internship with CWS has been a very gratifying and challenging experience and has given me a much greater knowledge of the environmental consultation process. The single largest benefit of my internship was that I was given the opportunity to work on every possible type of project from wetland/stream delineations and permitting to a small amount of vegetation management and protected species surveys. By completing work on a variety projects, I was provided with a broad range of technical skills and my interdisciplinary experience was greatly enhanced. From completing determination reports for a diverse client base to preparing verification letters and permits to regulatory bodies, I quickly learned the fundamentals needed in order to effectively communicate the results of my fieldwork. The internship provided me with a greater knowledge of Federal and State regulatory processes and made me realize the complexities and effectiveness of the Clean Water Act in the protection of Jurisdictional Waters of the U.S.

During the early part of my internship, I strived to demonstrate to my fellow employees and clients that I was proficient in completing tasks. I quickly learned company protocol and offered suggestions on how certain projects may be completed more efficiently. Additionally, I established beneficial relationships with my co-workers and clients, which allowed me to more effectively learn project procedure and helped me become a reliable and valuable team member.

The most significant thing that I learned during my internship was the important role that a company such as CWS plays in the protection of navigable waters. Early on, I contemplated that I was, in a way, contributing to urban sprawl and aiding increasing development. However, the more projects I completed, the more I began to realize that land development is inevitable whether environmental consultants are involved or not. This allowed me to realize the important role that I was able to play in upholding regulations and helping to protect existing, valuable waterways and wetland areas. It is because of this role that I am pleased with my overall internship experience and that I was able to contribute to the progression of a young environmental company in such an active and diverse field.
Education Background and IES Preparation

The acceptance of my application to Carolina Wetland Services and success in my current position can be accredited to my educational background. From 1998 to 2002, I attended Miami University as an undergraduate pursuing a Bachelor of Science degree in botany with emphasis on environmental science. My introductory biology courses provided me with a broad knowledge of biological concepts and systems such as ecological interactions between species and their environments. As I progressed in my education I completed much more specific courses such as botanical ecology and plant taxonomy. These courses refined my ability to identify particular plant species, determine why a particular species may be found in a certain environment, and how those plant species interact with and change their environment. These are fundamental skills used on a daily basis as a consulting biologist, such as determining whether or not an area can be defined as a wetland or making an accurate record of existing conditions on a particular site.

From 2002 to 2004, I completed graduate level courses at Miami University’s Institute of Environmental Sciences under my area of concentration of water resources. The courses I completed under this program further developed my skills as a student of biology such as asking questions, developing hypotheses, and testing those hypotheses; while at the same time provided me with an interdisciplinary view of environmental science. Courses such as Environmental Methodology and Environmental Measurements challenged me to develop solutions or hypotheses to existing environmental problems and develop ways to test those solutions or hypotheses. These courses developed my “what if” way of thinking by developing alternative solutions to a wide variety of environmental issues. Environmental Policy Making supplemented these courses by providing me with knowledge of the administrative side of how environmental issues are dealt with. A broad knowledge of environmental policy has become a key part of my current position in that the majority of the work I produce is sent to environmental regulatory agencies such as the U.S. Army Corps of Engineers, the North Carolina Division of Water Quality, and the South Carolina Department of Health and Environmental Control.

During my graduate program, the courses I completed were not the only experience I received that has made me a valuable member of my company. During my
first year I, along with a group of other students, was required to complete a public
service project for a community organization or governmental unit. This service project
required that we utilize all the skills from our graduate courses and diverse educational
backgrounds to solve a current issue for a particular client. My project involved
providing a watershed assessment and evaluation for the Three Valley Conservation
Trust. The Trust would then use this report in order to focus their efforts on identifying
areas within a particular watershed that would be valuable for land easements. This
project tested my organizational skills as well as made me aware of the importance of
communication with a real world client. The most important lesson I learned during this
project was the difficulties in dealing with certain clients and working in a group. I was
made aware that despite the absence of effort from several group members, how
important it was for the remainder of us to step up our efforts in order to have a
successful project. These difficulties remind me on a daily basis that others in my
company are relying on the quality of my work and completion of my responsibilities in
order to meet deadlines and have project success.

Future Goals

Throughout the first few months of internship, my goals were to make a transition
from my graduate studies to a career position; learning and mastering the duties and
responsibilities that come with the position of a staff biologist in an environmental
consulting firm. Early on, my educational background in Botany and Environmental
Sciences greatly aided my ability to perform accurate fieldwork such as site
determinations and wetland delineations, as well as gave me the organization skills
needed to complete multiple projects at once. As I begin to make the next transition in
my company towards a project biologist, some of my goals will change. In the near
future I will become a more integral part in establishing new clients, seeing projects
through from beginning to end, and maintaining communication lines with clients and
regulatory agencies on existing projects. These skills are vital to a growing company in a
rapidly changing market such as environmental consulting. Although my science
background will continue to play a key role in my ability to provide clients with timely
and accurate work, I will persistently adopt new skills from my co-workers and take on
greater responsibilities in order to become a more established biologist at Carolina
Wetland Services, Inc.
REFERENCES


U.S. Army Corps of Engineers (USACE) Environmental Laboratory. Corps of Engineers Wetlands Delineation Manual, Technical Report Y-87-1. US Army Engineer Waterways Experiment Station, Vicksburg, Mississippi.


APPENDICES
APPENDIX I. REGULATORY AGENCY FORMS
### NCDWQ Stream Classification Form

**Project Name:** ___________________________________________

**River Basin:** ____________________________________________

**County:** ________________________________________________

**Evaluator(s):** ____________________________________________

**DWQ Project Number:** ____________________________

**Nearest Named Stream:** ____________________________

**Signature(s):** ___________________________________________

**Date:** ____________

**USGS QUAD:** ____________________________

**Longitude:** ____________________________

**Latitude:** ____________________________

**Location/Directions:** ____________________________________________

*PLEASE NOTE: If evaluator and landowner agree that the feature is a man-made ditch, then use of this form is not necessary. Also, if in the best professional judgement of the evaluator, the feature is a man-made ditch and not a modified natural stream—this rating system should not be used.*

### Primary Field Indicators: (Circle One Number Per Line)

<table>
<thead>
<tr>
<th>I. Geomorphology</th>
<th>Absent</th>
<th>Weak</th>
<th>Moderate</th>
<th>Strong</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Is There A riffle-pool sequence?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>2) Is the USDA texture in streambed different from surrounding terrain?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3) Are natural levees present?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4) Is the channel sinuous?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>5) Is there an active (or relic) floodplain present?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>6) Is the channel braided?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>7) Are recent alluvial deposits present?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>8) Is there a bankfull bench present?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>9) Is a continuous bed &amp; bank present?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>10) Is a 2nd order or greater channel (as indicated on topo map and/or in field) present?</td>
<td>Yes = 3</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**PRIMARY GEOMORPHOLOGY INDICATOR POINTS:**

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### Secondary Field Indicators: (Circle One Number Per Line)

<table>
<thead>
<tr>
<th>I. Geomorphology</th>
<th>Absent</th>
<th>Weak</th>
<th>Moderate</th>
<th>Strong</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Is there a head cut present in channel?</td>
<td>0</td>
<td>0.5</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>2) Is there a grade control point in channel?</td>
<td>0</td>
<td>0.5</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>3) Does topography indicate a natural drainage way?</td>
<td>0</td>
<td>0.5</td>
<td>1</td>
<td>1.5</td>
</tr>
</tbody>
</table>

**SECONDARY GEOMORPHOLOGY INDICATOR POINTS:**

---

### II. Hydrology

<table>
<thead>
<tr>
<th>Absent</th>
<th>Weak</th>
<th>Moderate</th>
<th>Strong</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Are fibrous roots present in streambed?</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>2) Are rooted plants present in streambed?</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

**PRIMARY HYDROLOGY INDICATOR POINTS:**

---

### III. Biology

<table>
<thead>
<tr>
<th>Absent</th>
<th>Weak</th>
<th>Moderate</th>
<th>Strong</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Are fish present?</td>
<td>0</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>2) Are amphibians present?</td>
<td>0</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>3) Are aquatic turtles present?</td>
<td>0</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>4) Are crayfish present?</td>
<td>0</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>5) Are macroinvertebrates present?</td>
<td>0</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>6) Are iron oxidizing bacteria/fungi present?</td>
<td>0</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>7) Are filamentous algae present?</td>
<td>0</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>8) Are wetland plants in streambed?</td>
<td>SAV</td>
<td>Mostly 0BL</td>
<td>0.75</td>
</tr>
</tbody>
</table>

**SECONDARY BIOLOGY INDICATOR POINTS:**

---

**TOTAL POINTS (Primary + Secondary):** (If greater than or equal to 19 points the stream is at least intermittent)
1. Applicant’s Name: ___________________________ 2. Evaluator’s Name: ___________________________
9. Length of Reach Evaluated: _________________ 10. County: ________________________________
11. Location of reach under evaluation (include nearby roads and landmarks): _______________________

12. Site Coordinates (if known): ____________________________
13. Proposed Channel Work (if any): ____________________________
14. Recent Weather Conditions: ____________________________
15. Site conditions at time of visit: ____________________________

16. Identify any special waterway classifications known:  
   --- Section 10 --- Tidal Waters --- Essential Fisheries Habitat  
   --- Trout Waters --- Outstanding Resource Waters --- Nutrient Sensitive Waters --- Water Supply Watershed (I-IV)
17. Is there a pond or lake located upstream of the evaluation point?  YES  NO  If yes, estimate the water surface area: ________________
20. Estimated Watershed Land Use:  
   --- % Residential --- % Commercial --- % Industrial --- % Agricultural  
   --- % Forested --- % Cleared / Logged --- % Other (______________)
23. Channel slope down center of stream:  
   --- Flat (0 to 2%) --- Gentle (2 to 4%) --- Moderate (4 to 10%) --- Steep (>10%)  
24. Channel Sinuosity:  
   --- Straight --- Occasional Bends --- Frequent Meander --- Very Sinuous --- Braided Channel

Instructions for completion of worksheet (located on page 2): Begin by determining the most appropriate ecoregion based on location, terrain, vegetation, stream classification, etc. Every characteristic must be scored using the same ecoregion. Assign points to each characteristic within the range shown for the ecoregion. Page 3 provides a brief description of how to review the characteristics identified in the worksheet. Scores should reflect an overall assessment of the stream reach under evaluation. If a characteristic cannot be evaluated due to site or weather conditions, enter 0 in the scoring box and provide an explanation in the comment section. Where there are obvious changes in the character of a stream under review (e.g., the stream flows from a pasture into a forest), the stream may be divided into smaller reaches that display more continuity, and a separate form used to evaluate each reach. The total score assigned to a stream reach must range between 0 and 100, with a score of 100 representing a stream of the highest quality.

Total Score (from reverse): ___________  Comments: ____________________________

Evaluator’s Signature: ___________________________  Date: ___________________________
This channel evaluation form is intended to be used only as a guide to assist landowners and environmental professionals in gathering the data required by the United States Army Corps of Engineers in order to make a preliminary assessment of stream quality. The total score resulting from the completion of this form is subject to USACE approval and does not imply a particular mitigation ratio or requirement. Form subject to change – version 05/03. To Comment, please call 919-876-8441 x 26.
<table>
<thead>
<tr>
<th>#</th>
<th>CHARACTERISTICS</th>
<th>ECOREGION POINT RANGE</th>
<th>SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Coastal</td>
<td>Piedmont</td>
</tr>
<tr>
<td>1</td>
<td>Presence of flow / persistent pools in stream</td>
<td>0 – 5</td>
<td>0 – 4</td>
</tr>
<tr>
<td></td>
<td>(no flow or saturation = 0; strong flow = max points)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Evidence of past human alteration</td>
<td>0 – 6</td>
<td>0 – 5</td>
</tr>
<tr>
<td></td>
<td>(extensive alteration = 0; no alteration = max points)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Riparian zone</td>
<td>0 – 6</td>
<td>0 – 4</td>
</tr>
<tr>
<td></td>
<td>(no buffer = 0; contiguous, wide buffer = max points)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Evidence of nutrient or chemical discharges</td>
<td>0 – 5</td>
<td>0 – 4</td>
</tr>
<tr>
<td></td>
<td>(extensive discharges = 0; no discharges = max points)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Groundwater discharge</td>
<td>0 – 3</td>
<td>0 – 4</td>
</tr>
<tr>
<td></td>
<td>(no discharge = 0; springs, seeps, wetlands, etc. = max points)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Presence of adjacent floodplain</td>
<td>0 – 4</td>
<td>0 – 4</td>
</tr>
<tr>
<td></td>
<td>(no floodplain = 0; extensive floodplain = max points)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Entrenchment / floodplain access</td>
<td>0 – 5</td>
<td>0 – 4</td>
</tr>
<tr>
<td></td>
<td>(deeply entrenched = 0; frequent flooding = max points)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Presence of adjacent wetlands</td>
<td>0 – 6</td>
<td>0 – 4</td>
</tr>
<tr>
<td></td>
<td>(no wetlands = 0; large adjacent wetlands = max points)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Channel sinuosity</td>
<td>0 – 5</td>
<td>0 – 4</td>
</tr>
<tr>
<td></td>
<td>(extensive channelization = 0; natural meander = max points)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Sediment input</td>
<td>0 – 5</td>
<td>0 – 4</td>
</tr>
<tr>
<td></td>
<td>(extensive deposition= 0; little or no sediment = max points)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Size &amp; diversity of channel bed substrate</td>
<td>NA*</td>
<td>0 – 4</td>
</tr>
<tr>
<td></td>
<td>(fine, homogenous = 0; large, diverse sizes = max points)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Evidence of channel incision or widening</td>
<td>0 – 5</td>
<td>0 – 4</td>
</tr>
<tr>
<td></td>
<td>(deeply incised = 0; stable bed &amp; banks = max points)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Presence of major bank failures</td>
<td>0 – 5</td>
<td>0 – 5</td>
</tr>
<tr>
<td></td>
<td>(severe erosion = 0; no erosion, stable banks = max points)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Root depth and density on banks</td>
<td>0 – 3</td>
<td>0 – 4</td>
</tr>
<tr>
<td></td>
<td>(no visible roots = 0; dense roots throughout = max points)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Impact by agriculture or livestock production</td>
<td>0 – 5</td>
<td>0 – 4</td>
</tr>
<tr>
<td></td>
<td>(substantial impact =0; no evidence = max points)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Presence of riffle-pool/ripple-pool complexes</td>
<td>0 – 3</td>
<td>0 – 5</td>
</tr>
<tr>
<td></td>
<td>(no riffles/ripples or pools = 0; well-developed = max points)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Habitat complexity</td>
<td>0 – 6</td>
<td>0 – 6</td>
</tr>
<tr>
<td></td>
<td>(little or no habitat = 0; frequent, varied habitats = max points)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Canopy coverage over streambed</td>
<td>0 – 5</td>
<td>0 – 5</td>
</tr>
<tr>
<td></td>
<td>(no shading vegetation = 0; continuous canopy = max points)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Substrate embeddedness</td>
<td>NA*</td>
<td>0 – 4</td>
</tr>
<tr>
<td></td>
<td>(deeply embedded = 0; loose structure = max)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Presence of stream invertebrates</td>
<td>0 – 4</td>
<td>0 – 5</td>
</tr>
<tr>
<td></td>
<td>(no evidence = 0; common, numerous types = max points)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Presence of amphibians</td>
<td>0 – 4</td>
<td>0 – 4</td>
</tr>
<tr>
<td></td>
<td>(no evidence = 0; common, numerous types = max points)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Presence of fish</td>
<td>0 – 4</td>
<td>0 – 4</td>
</tr>
<tr>
<td></td>
<td>(no evidence = 0; common, numerous types = max points)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Evidence of wildlife use</td>
<td>0 – 6</td>
<td>0 – 5</td>
</tr>
<tr>
<td></td>
<td>(no evidence = 0; abundant evidence = max points)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Total Points Possible</strong></td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

**TOTAL SCORE** (also enter on first page)

* These characteristics are not assessed in coastal streams.
### DATA FORM

**ROUTINE WETLAND DETERMINATION**

(1987 CDE Wetlands Definition Manual)

<table>
<thead>
<tr>
<th>Project/Site:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicant/Owner:</td>
<td>County:</td>
</tr>
<tr>
<td>Investigator(s):</td>
<td>State:</td>
</tr>
</tbody>
</table>

**Do Normal Circumstances exist on the site?**
- Yes
- No

**Is the site significantly disturbed (Atypical Situation)?**
- Yes
- No

**Is the area a potential Problem Area?**
- Yes
- No

(If needed, explain on reverse.)

### VEGETATION

<table>
<thead>
<tr>
<th>Dominant Plant Species</th>
<th>Stratum Indicator</th>
<th>Dominant Plant Species</th>
<th>Stratum Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td>9.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td>10.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td>11.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td>12.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td>13.</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td></td>
<td>15.</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td></td>
<td>16.</td>
<td></td>
</tr>
</tbody>
</table>

Percent of Dominant Species that are ORB, FACW, or FAC:

Remarks:

### HYDROLOGY

**Recorded Data (Describe in remarks):**
- Stream, Lake or Tidal Gauges
- Aerial Photographs
- Other

**No Recorded Data Available**

**Field Observations:**

<table>
<thead>
<tr>
<th>Depth of Surface Water:</th>
<th>(in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Depth to Free Water In Pit:</th>
<th>(in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Depth to Saturated Soil:</th>
<th>(in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Wetland Hydrology Indicators:**

- **Primary Indicators:**
  - Saturated in Upper 12 Inches
  - Water Marks
  - Sediment Deposits on Plants

- **Secondary Indicators (2 or more required):**
  - Oxidized Root Channels in Upper 12 Inches
  - Water-Stained Leaves
  - Local Soil Survey Data
  - FAC-Neutral Test
  - Other (Specify in Remarks)

**Remarks:**

### SOILS

**Map Unit Name:**

**Series and Phase:**

**Taxonomy (Subgroup):**

**Conform Mapped Type?**
- Yes
- No

**Profile Description:**

<table>
<thead>
<tr>
<th>Depth (inches)</th>
<th>Horizon</th>
<th>Matrix Color</th>
<th>Matte Colors</th>
<th>Matte Abundance/Contrast</th>
<th>Texture, Concretions, Structure, etc.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Histosol
- Hist under Clay
- Organic Streaking in Sandy Soils
- Organic Streaking in Sandy Soils
- Listed on Local Hydric Soil List
- Listed on National Hydric Soil List
- Other (Explain in Remarks)

Remarks:

### WETLAND DETERMINATION

**Hydrophytic Vegetation Present?**
- Yes
- No

**Wetland Hydrology Present?**
- Yes
- No

**Hydric Soils Present?**
- Yes
- No

**Is this Sampling Point Within a Wetland?**
- Yes
- No

Remarks:

Approved by HUSDAZ 3872

Blank Routine On-Site Data Form Page 1 of 2 7/23/2005

Blank Routine On-Site Data Form Page 2 of 2 7/23/2005
REQUEST FOR JURISDICTIONAL DETERMINATION

DATE:___________

COUNTY_________________________________ TOTAL ACREAGE OF TRACT__________

PROJECT NAME (if applicable)_____________________________

PROPERTY OWNER/APPLICANT (name, address and phone):

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

NAME OF CONSULTANT, ENGINEER, DEVELOPER (if applicable):

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

STATUS OF PROJECT (check one):

(  ) On-going site work for development purposes

(  ) Project in planning stages

   (Type of project:____________________)

(  ) No specific development planned at present

(  ) Project already completed

   (Type of project:____________________)

ADDITIONAL INFORMATION REQUIRED:
Check items submitted - forward as much information as is available. At a minimum, the following first two items must be forwarded.

(X) USGS 7.5' NC Topographic Quadrangle

(X) NRCS County Soil Survey

(X) Approximate Jurisdictional Boundary Field Map

(X) Proposed Impacts

(X) Pre-Construction Notification Pursuant to a Nationwide Permit

(X) Agent Certification of Authorization Form

(X) Stream Classification Forms

(X) Routine On-Site Data Form

(X) Representative Photographs

______________________________________________
Signature of Property Owner or Authorized Agent
APPENDIX II. JURISDICTIONAL DETERMINATION

BRIDGE PARTNERS SITE
November 11, 2004

Mr. Tyler K. Foster
Bridge Partners
800 Manhasset Rd
Charlotte, NC 28209

Subject: Preliminary Wetlands Investigation Letter
Bridge Partners Site
Charlotte, North Carolina
CWS Project No. 2004-0863

Dear Mr. Foster:

On November 11, 2004 Carolina Wetland Services, Inc. (CWS) field-reviewed the properties (Parcel IDs 14916403, 14916404, 14916406) located on East Woodlawn Road and Stacy Boulevard in Charlotte, North Carolina for the presence of jurisdictional waters of the U.S., including wetlands. This study was conducted to satisfy City requirements for the rezoning of the property (Petition No. 2004-144). The attached Mecklenburg County GIS map shows the approximate location of the property (Figure 1). This investigation was conducted according to methodologies described in the 1987 Corps of Engineers Delineation Manual, as well as recent guidance from the U.S. Army Corps of Engineers (USACE).

Based on the results of this field investigation, there are no jurisdictional waters of the U.S. within the property limits. The properties are comprised of three residential lots with maintained lawns (Figure 1). Typical on-site vegetation includes Kentucky bluegrass (*Poa pratensis*), laurel oak (*Quercus laurifolia*), black walnut (*Juglans nigra*), and eastern redcedar (*Juniperus virginiana*). These properties exhibited no hydrophytic vegetation and no indicators of hydric soils. Representative photographs of the properties have been attached.

Thank you for the opportunity to provide these services on this important project. If you have any questions regarding this preliminary investigation, please don’t hesitate to give me a call at (704) 527-1177.

Sincerely,

Gregg C. Antemann, P.W.S. Matt L. Jenkins
Principal Biologist Staff Biologist

Attachments: Figure 1. Mecklenburg County GIS Map
Representative Photographs

cc: File
Photograph A. View of property facing northeast.

Photograph B. View of property facing East Woodlawn Road.
APPENDIX III. JURISDICTIONAL DELINEATION

450-ACRE OAKVALE PROPERTY
February 4, 2005

Mr. Alan Sweet
Eagle Engineering
17818 Statesville Road, Suite 211
Cornelius, NC  28031

Subject: Preliminary Jurisdictional Delineation Report
450-Acre Oakvale Property
Mecklenburg County, North Carolina
CWS Project No. 2004-0904

Dear Mr. Sweet,

Carolina Wetland Services, Inc. (CWS) was contracted by Eagle Engineering to provide a Jurisdictional Delineation Report for the approximately 450-acre Oakvale property, located northeast of the intersection of Asbury Chapel Road and Eastfield Road in northern Mecklenburg County, North Carolina (see location map, enclosed). The results of this delineation are summarized below.

From January 24 through 28, 2005, CWS biologists field reviewed the subject site for potential jurisdictional waters of the U.S.1 Jurisdictional areas were delineated using the U.S. Army Corps of Engineers (USACE) Routine On-Site Delineation Method as defined in the 1987 Corps of Engineers Wetlands Delineation Manual2. Stream channels were classified according to recent USACE3 and North Carolina Department of Environment and Natural Resources (NCDENR) Division of Water Quality (DWQ)4 guidance; including sampling with a D-shaped dip net, taking photographs, and locating breakpoints (approximate location at which the stream channel changes classification).

On-site waters include Ferrelltown Creek and tributaries, and Ferrelltown Lake, which are within the Yadkin River basin (Hydrologic Unit 030401055) and rated “Class C Waters” by DWQ. The U.S. Geological Survey (USGS) 7.5-minute Cornelius and Derita Topographic Quadrangles (enclosed) depict topography indicating several natural drainage ways, intermittent and perennial tributaries and the main stem of Ferrelltown Creek, and Ferrelltown Lake. The Natural Resources Conservation Service (NRCS, formerly the Soils Conservation Service) Soils Survey of Mecklenburg County (enclosed) depicts soils on the site that are typically found in flood plains (Monacan soils) and along drainage ways (Wilkes loam). Monacan soils (MO) are associated with the main reach of Ferrelltown Creek and significant tributaries and the Wilkes loam (WKE) is depicted around the upper reaches and intermittent tributaries. The USGS aerial photograph (enclosed) taken in January, 2002, depicts field conditions generally consistent with the January 2005 site visit.

Approximately 21,208 linear feet of jurisdictional stream channels (Streams A – W), 5.188 acres of jurisdictional wetlands (Wetlands AA – MM), and 10.531 acres of open water area (Pond A) were delineated, identified with pink delineation tape, and surveyed using a sub-meter GPS unit. The results of the jurisdictional delineation are summarized in Figure 1 (enclosed) and in Tables 1 and 2, as follows:

---

1 “Jurisdictional waters of the U.S.” include essentially all surface waters such as: navigable waters and their tributaries, interstate waters and their tributaries, wetlands adjacent to these waters, and impoundments of these waters.
### Table 1. Summary of On-Site Jurisdictional Stream Channels

<table>
<thead>
<tr>
<th>Potential Jurisdiction</th>
<th>Classification</th>
<th>Approximate Size</th>
<th>NCDWQ Score /71</th>
<th>USACE Score /100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stream A</td>
<td>Perennial</td>
<td>4,208 ft</td>
<td>38.5</td>
<td>65</td>
</tr>
<tr>
<td>Stream B</td>
<td>Unimportant Intermittent</td>
<td>493 ft</td>
<td>14</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>Important Intermittent</td>
<td>85 ft</td>
<td>24.5</td>
<td>46</td>
</tr>
<tr>
<td>Stream C</td>
<td>Unimportant Intermittent</td>
<td>142 ft</td>
<td>20</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>Important Intermittent</td>
<td>1,042 ft</td>
<td>26.5</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td>Perennial</td>
<td>521 ft</td>
<td>28</td>
<td>51</td>
</tr>
<tr>
<td>Stream D</td>
<td>Unimportant Intermittent</td>
<td>433 ft</td>
<td>20</td>
<td>44</td>
</tr>
<tr>
<td>Stream E</td>
<td>Unimportant Intermittent</td>
<td>161 ft</td>
<td>20</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>Important Intermittent</td>
<td>763 ft</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>Perennial</td>
<td>254 ft</td>
<td>28</td>
<td>51</td>
</tr>
<tr>
<td>Stream F</td>
<td>Unimportant Intermittent</td>
<td>1,029 ft</td>
<td>20</td>
<td>38</td>
</tr>
<tr>
<td>Stream G</td>
<td>Unimportant Intermittent</td>
<td>662 ft</td>
<td>20</td>
<td>38</td>
</tr>
<tr>
<td>Stream H</td>
<td>Unimportant Intermittent</td>
<td>1,287 ft</td>
<td>20</td>
<td>44</td>
</tr>
<tr>
<td>Stream J</td>
<td>Unimportant Intermittent</td>
<td>561 ft</td>
<td>20</td>
<td>44</td>
</tr>
<tr>
<td>Stream K</td>
<td>Important Intermittent</td>
<td>1,254 ft</td>
<td>28</td>
<td>63</td>
</tr>
<tr>
<td>Stream L</td>
<td>Important Intermittent</td>
<td>432 ft</td>
<td>28</td>
<td>63</td>
</tr>
<tr>
<td>Stream M</td>
<td>Important Intermittent</td>
<td>799 ft</td>
<td>25.5</td>
<td>59</td>
</tr>
<tr>
<td>Stream N</td>
<td>Unimportant Intermittent</td>
<td>300 ft</td>
<td>16</td>
<td>55</td>
</tr>
<tr>
<td>Stream O</td>
<td>Unimportant Intermittent</td>
<td>508 ft</td>
<td>16</td>
<td>55</td>
</tr>
<tr>
<td>Stream P</td>
<td>Perennial</td>
<td>1,046 ft</td>
<td>37</td>
<td>59</td>
</tr>
<tr>
<td>Stream Q</td>
<td>Important Intermittent</td>
<td>1,300 ft</td>
<td>24</td>
<td>44</td>
</tr>
<tr>
<td>Stream R</td>
<td>Unimportant Intermittent</td>
<td>171 ft</td>
<td>21</td>
<td>49</td>
</tr>
<tr>
<td>Stream S</td>
<td>Unimportant Intermittent</td>
<td>611 ft</td>
<td>28</td>
<td>50</td>
</tr>
<tr>
<td>Stream T</td>
<td>Unimportant Intermittent</td>
<td>171 ft</td>
<td>18</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td>Important Intermittent</td>
<td>1,041 ft</td>
<td>26</td>
<td>55</td>
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<tr>
<td></td>
<td>Perennial</td>
<td>352 ft</td>
<td>34</td>
<td>64</td>
</tr>
<tr>
<td>Stream U</td>
<td>Unimportant Intermittent</td>
<td>77 ft</td>
<td>17.75</td>
<td>47</td>
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<tr>
<td></td>
<td>Important Intermittent</td>
<td>386 ft</td>
<td>27</td>
<td>56</td>
</tr>
<tr>
<td>Stream V</td>
<td>Unimportant Intermittent</td>
<td>885 ft</td>
<td>23.5</td>
<td>37</td>
</tr>
<tr>
<td>Stream W</td>
<td>Unimportant Intermittent</td>
<td>234 ft</td>
<td>28</td>
<td>50</td>
</tr>
</tbody>
</table>

**Stream Total:** 21,208 ft
Table 2. Summary of On-Site Jurisdictional Wetland Areas

<table>
<thead>
<tr>
<th>Potential Jurisdiction</th>
<th>Classification</th>
<th>Approximate Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wetland AA</td>
<td>Forested</td>
<td>3.728 ac</td>
</tr>
<tr>
<td>Wetland BB</td>
<td>Forested</td>
<td>0.257 ac</td>
</tr>
<tr>
<td>Wetland CC</td>
<td>Herbaceous</td>
<td>0.185 ac</td>
</tr>
<tr>
<td>Wetland DD</td>
<td>Forested</td>
<td>0.325 ac</td>
</tr>
<tr>
<td>Wetland EE</td>
<td>Forested</td>
<td>0.033 ac</td>
</tr>
<tr>
<td>Wetland FF</td>
<td>Forested</td>
<td>0.089 ac</td>
</tr>
<tr>
<td>Wetland GG</td>
<td>Forested</td>
<td>0.127 ac</td>
</tr>
<tr>
<td>Wetland HH</td>
<td>Forested</td>
<td>0.025 ac</td>
</tr>
<tr>
<td>Wetland JJ</td>
<td>Forested</td>
<td>0.125 ac</td>
</tr>
<tr>
<td>Wetland KK</td>
<td>Forested</td>
<td>0.016 ac</td>
</tr>
<tr>
<td>Wetland LL</td>
<td>Forested</td>
<td>0.194 ac</td>
</tr>
<tr>
<td>Wetland MM</td>
<td>Forested</td>
<td>0.084 ac</td>
</tr>
<tr>
<td><strong>Wetland Subtotal:</strong></td>
<td></td>
<td><strong>5.188 ac</strong></td>
</tr>
<tr>
<td>Pond A</td>
<td></td>
<td>10.531 ac</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td></td>
<td><strong>15.719 ac</strong></td>
</tr>
</tbody>
</table>

Generally, Unimportant Intermittent channels (Streams B-J, N, O, and R-W) exhibit an ordinary high water mark, little to no aquatic life, flow, and homogenous stream substrates (Photograph A). These channels are located in the upper reaches of the drainages and transition into Important Intermittent streams, Perennial streams, or wetland areas. DWQ Stream Classification scores ranged from 14 to 28, indicating intermittent status. USACE Stream Quality Assessment scores ranged from a low of 37 potentially due to low presence of flow and moderate sediment input to a high of 65 due to more pristine conditions. There are approximately 7,725 linear feet of Unimportant Intermittent stream channels on the subject property. Impacts to Unimportant Intermittent stream channels typically do not require mitigation and do not count towards the 300 linear-foot threshold for Nationwide Permit No. 39.

Important Intermittent channels (Streams B, C, E, K-M, Q, T, and U) exhibit an ordinary high water mark, significant aquatic life, intermittent flow (persistent pools), and diverse stream substrates (Photograph B). These channels are located in the upper reaches of the drainages and transition into Perennial streams, or wetland areas. DWQ Stream Classification scores ranged from 24 to 28, indicating intermittent status. USACE Stream Quality Assessment scores ranged from a low of 46 potentially due to lack of adjacent floodplains and wetlands to a high of 63 due to more pristine conditions. There are approximately 7,102 linear feet of Important Intermittent stream channels on the subject property. Impacts to Important Intermittent stream channels may require mitigation and do count towards the 300 linear-foot threshold for Nationwide Permit No. 39. Impacts to these channels are required to provide for aquatic life passage (buried culverts) and flood flows.

Perennial channels (Streams C, E, P, and T) exhibit an ordinary high water mark, significant aquatic life, perennial flow, and diverse stream substrates (Photograph C). These channels include Ferrelltown Creek and the lower reaches of the significant tributaries. DWQ Stream Classification scores ranged from 28 to 38.5, indicating perennial status. USACE Stream Quality Assessment scores ranged from a low of 51 potentially due to moderate entrenchment and lack of adjacent floodplains to a high of 64 due to more pristine conditions. There are approximately 6,381 linear feet of Perennial stream channels on the subject property. Impacts to any linear footage of Perennial stream channels will require mitigation.

Herbaceous Wetlands (Wetland CC and DD) are located adjacent to Unimportant Intermittent Streams F and O. Routine Wetland Determination Data Forms representing these wetlands are enclosed (DP3 and DP8). These
wetland areas exhibited hydrophytic vegetation including various sedges (\textit{Carex} spp.) and soft stem rush (\textit{Juncus effusus}). These areas were inundated with surface water depths ranging from 0 to 1 inch. Soils were observed to be low-chroma and mottled. Some of these areas have been cut-over and are becoming reforested through early successions.

Forest ed Riparian Wetlands (BB, GG, and LL) are located adjacent to the Perennial reach of Streams A and P. A Routine Wetland Determination Data Form representative of these wetlands is enclosed (DP5). Forested Riparian Wetlands were dominated by hydrophytic vegetation including soft stem rush, black willow (\textit{Salix nigra}), and various sedges (Photograph D). The soils were inundated and observed to be low-chroma. Wetland hydrology was indicated by sediment deposits on leaves, drift lines, and drainage patterns.

Several forested jurisdictional areas (Wetlands EE, FF, HH-KK, and MM) are located adjacent to Unimportant and Important Intermittent stream channels. Routine Wetland Determination Data Forms representative of these wetlands are enclosed (DP1 and DP3). These Forested Wetlands were dominated by hydrophytic vegetation including sycamore (\textit{Platanus occidentalis}), netted chain fern (\textit{Woodwardia areolata}), soft stem rush, and various sedges. Hydrology indicators included inundation, oxidized root channels and drainage patterns. Soils were observed to be low chroma with distinct mottles and had sulfidic odor.

One large jurisdictional area (Wetland AA) is associated with beaver activity and located downstream of Wetland BB adjacent to the Perennial reach of Stream A. A Routine Wetland Determination Data Form representing this wetland is enclosed (DP5). This wetland area was dominated by hydrophytic vegetation including black willow, soft stem rush, and various sedges and grasses (\textit{Panicum} spp.) (Photograph E). The soils were observed to be low chroma with many, distinct mottles. These areas were inundated. Ferrelltown Lake (Pond A, Photograph F) includes jurisdictional open waters as well as wetland areas associated with the shoreline and Ferrelltown Creek. Routine Wetland Determination Data Forms representing on-site upland areas are also enclosed (DP2, DP4, and DP6) for your reference.

Please do not hesitate to contact us at 704-527-1177 should you have any questions or comments regarding these findings.

Sincerely,

Gregg C. Antemann, PWS
Principal Biologist

Matt L. Jenkins
Staff Biologist

MLJ/GCA/RBD:rbd

Enclosures: Figure 1. Approximate Jurisdictional Boundary Map
USGS 7.5-Minute Cornelius and Derita Topographic Quadrangles
NRCS Mecklenburg County Soil Survey
USGS 2002 Color Aerial Photograph
DWQ Stream Classification Forms (SCP1 through SCP22)
USACE Stream Quality Assessment Worksheets (SCP1 through SCP22)
Routine Wetland Determination Data Forms (DP1 through DP8)
Representative Photographs (A through F)
Soil Survey Courtesy of the USDA-NRCS

Approximate Scale 1” = 2000’
Image Courtesy of Mecklenburg County Land Use and Environmental Services

Approximate Scale 1” = 2000’
Carolina Wetland Services
550 East Westinghouse Blvd.
Charlotte, North Carolina 28273

REFERENCE: SITE PLAN PROVIDED BY EAGLE ENGINEERING, DATED 2004

Figure 1b. Approximate Jurisdictional Boundary Map
Oakvale Site
Mecklenburg County, North Carolina
CWS Project No. 2004-0904

NOTE: JURISDICTIONAL WATERS OF THE U.S. WERE DELINEATED AND SURVEYED WITH GPS
BY CAROLINA WETLAND SERVICES, INC. (CWS) BETWEEN JANUARY 24 AND 28, 2005.
JURISDICTIONAL FEATURES HAVE NOT BEEN VERIFIED BY THE USACE.

LEGEND

PERENNIAL STREAM
IMPORTANT INTERMITTENT STREAM
UNIMPORTANT INTERMITTENT STREAM
JURISDICTIONAL WETLAND AREA
PHOTO LOCATION AND DIRECTION

APPROXIMATE SCALE: 1" = 300'

Wetland CC - 0.185 acre
Wetland MM - 0.084 acre
Wetland AA - 3.728 acres
Wetland BB - 0.257 acre
DATA FORM  
ROUTINE WETLAND DETERMINATION  
(1987 COE Wetlands Delineation Manual) 

Project/Site: Oakvale Site  
Applicant/Owner: Eagle Engineering  
Investigator(s): Ron Johnson  
Date: 01/27/05  
County: Mecklenburg  
State: NC

Do Normal Circumstances exist on the site? Yes No  
Is the site significantly disturbed (Atypical Situation)? Yes No  
Is the area a potential Problem Area? Yes No  
(If needed, explain on reverse.)

Community ID: wetland  
Transect ID: DP1  
Plot ID:  

VEGETATION

<table>
<thead>
<tr>
<th>Dominant Plant Species</th>
<th>Stratum</th>
<th>Indicator</th>
<th>Dominant Plant Species</th>
<th>Stratum</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Ligustrum sinense</td>
<td>shrub</td>
<td>FAC</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Platanus occidentalis</td>
<td>tree</td>
<td>FACW</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Panicum spp.</td>
<td>herb</td>
<td>-</td>
<td>11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Carex sp.</td>
<td>herb</td>
<td>-</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Liquidambar styraciflua</td>
<td>tree</td>
<td>FAC+</td>
<td>13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Acer rubrum</td>
<td>tree</td>
<td>FAC</td>
<td>14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td>16</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Percent of Dominant Species that are OBL, FACW or FAC

100%

Remarks:

All of all the dominant plant species are FAC or wetter.

HYDROLOGY

Recorded Data (Describe in remarks):

- Stream, Lake or Tide Gauge
- Aerial Photographs
- Other
- X No Recorded Data Available

Field Observations:

- Depth of Surface Water: 0-6 (in.)
- Depth to Free Water in Pit: N/A (in.)
- Depth to Saturated Soil: N/A (in.)

Wetland Hydrology Indicators:

Primary Indicators:

- X Inundated
- X Saturated in Upper 12 Inches
- X Water Marks
- X Drift Lines
- X Sediment Deposits (on leaves)
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):

- X Oxidized Root Channels in Upper 12 Inches
- X Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Indicators of wetland hydrology are present.
SOILS

<table>
<thead>
<tr>
<th>Depth (inches)</th>
<th>Horizon</th>
<th>Matrix Color (Munsell)</th>
<th>Mottle Colors (Munsell)</th>
<th>Mottle Abundance/Contrast</th>
<th>Texture, Concretions, Structure, etc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-12</td>
<td>B</td>
<td>2.5Y4/2</td>
<td>5YR4/6</td>
<td>many/distinct</td>
<td>silt loam</td>
</tr>
</tbody>
</table>

**Map Unit Name**
(Series and Phase): **Wilkes loam**

**Taxonomy (Subgroup):** **thermic, shallow Typic Hapludalfs**

Confirm Mapped Type? Yes [ ] No [x]

**Field Observations**

**Profile Description:**

- **Depth** (inches): 0-12
- **Horizon:** B
- **Matrix Color** (Munsell): 2.5Y4/2
- **Mottle Colors** (Munsell): 5YR4/6
- **Mottle Abundance/Contrast:** many/distinct
- **Texture, Concretions, Structure, etc.:** silt loam

**Remarks:**

Indicators of hydric soils are present.

---

**WETLAND DETERMINATION**

- **Hydrophytic Vegetation Present?** Yes [x] No [ ]
- **Wetland Hydrology Present?** Yes [x] No [ ]
- **Hydric Soils Present?** Yes [x] No [ ]

Is this Sampling Point Within a Wetland? Yes [x] No [ ]

**Remarks:**

Data point is representative of a jurisdictional wetland area.

Approved by HQUSACE 2/92
Photograph A. View of Unimportant Intermittent Stream B, facing north.

Photograph B. View of Important Intermittent Stream T facing southwest.
Photograph C. View of Perennial Stream A, facing north.

Photograph D. View of Wetland LL, facing Ferrelltown Lake.
Photograph E. View of Wetland AA, facing east towards Ferrelltown Lake.

Photograph F. View of Ferrelltown Lake from Perennial Stream P confluence.
APPENDIX IV. NATIONWIDE PERMIT NO. 3

8220 NATHANAEL GREEN LANE MAINTENANCE PROJECT
Pre-Construction Notification Pursuant to
Nationwide Permit No. 3

8220 Nathanael Green Lane Maintenance Project
Charlotte, North Carolina
Carolina Wetland Services Project No. 2004-0763

January 10, 2005

Prepared For:
The City of Charlotte Storm Water Services
600 East Fourth Street
Charlotte, North Carolina 28202
(704) 432-0966

Prepared By:
Carolina Wetland Services, Inc.
5000 Nations Crossing Road, Suite 230
Charlotte, North Carolina 28217
(704) 527-1177
Table of Contents

Executive Summary.............................................................................................................. .................. 1
Existing Conditions................................................................................................................... 2
    Current Land Use ............................................................................................................... 2
    Jurisdictional Delineation .................................................................................................. 2
Agency Correspondence............................................................................................................ 4
    Cultural Resources .......................................................................................................... 4
    Protected Species ............................................................................................................ 4
Purpose and Need for the Project............................................................................................ 4
Avoidance and Minimization.................................................................................................... 5
Proposed Impacts to Jurisdictional Waters............................................................................. 5
Compensatory Mitigation......................................................................................................... 6

List of Attachments

Attachment A – Figure 1. USGS Site Location Map
Attachment A – Figure 2. NRCS Soil Survey
Attachment A – Figure 3. Approximate Jurisdictional Boundary Field Map
Attachment B – Pre-Construction Notification Application – Nationwide Permit No. 3
Attachment C – Routine On-Site Data Forms
Attachment D – Stream Classification Forms
Attachment E – Request for Jurisdictional Determination Form
Attachment F – Agency Correspondence
Attachment G – Representative Photographs
Attachment H – Figure 4. Proposed Impacts
Attachment H – Figure 5a and 5b. Typical Channel Work
Attachment H – Figure 6. Culvert Details
Attachment H – Figures 7a and 7b. Typical Channel Cross-Sections
Executive Summary

The 8220 Nathanael Green Lane Maintenance Project is located in Charlotte, North Carolina, approximately 1.2 miles east of the Lawyers Road – Albemarle Road Intersection (Attachment A – Figures 1 and 2). The purposes of this project include: (1) to upgrade the existing, undersized culverts and (2) to complete channel reshaping activities and stabilize streambanks. Charlotte Storm Water Services (CSWS) has contracted Carolina Wetland Services, Inc. (CWS) to provide permitting services for this project.

The results of the on-site field investigation conducted by CWS indicate that there is one jurisdictional stream channel (Stream A), two jurisdictional wetlands (Wetlands AA and BB), and one non-jurisdictional ephemeral channel (Channel B) located within the project limits (Attachment A – Figure 3). CSWS is requesting written verification of the jurisdictional determination of the on-site jurisdictional features. Unavoidable impacts to Perennial Stream A total approximately 350 linear feet. These impacts are a result of bank reshaping and stabilization activities (Attachment H). Seventy linear feet of Perennial Stream A will be impacted by hard stabilization activities. Approximately 0.01 acre of wetlands will also be impacted due to fill associated with bank reshaping activities. On behalf of CSWS, CWS is submitting a Pre-Construction Notification application with attachments in accordance with Nationwide Permit General Condition No. 13, and pursuant to Nationwide Permit No. 3 and Water Quality Certification No. 3376 (Attachment B).
Existing Conditions

The 8220 Nathanael Green Lane Maintenance Project is located in Charlotte, North Carolina, approximately 1.2 miles east of the Lawyers Road – Albemarle Road Intersection (Attachment A – Figures 1 and 2). The purposes of this project include: (1) to upgrade the existing, undersized culverts and (2) to perform channel reshaping activities and stabilize streambanks. Charlotte Storm Water Services (CSWS) has contracted Carolina Wetland Services, Inc. (CWS) to provide permitting services for this project. The following sections describe the existing conditions of the project area.

Current Land Use

The current land use for the project area is residential and is comprised of maintained lawns and small wooded areas. Dominant vegetation within the project area consisted of Chinese privet (*Ligustrum sinense*), red oak (*Quercus rubra*), Japanese honeysuckle (*Lonicera japonica*), and winged elm (*Ulmus alata*). According to the Soil Survey of Mecklenburg County¹, on-site soils consist of Monacan loam, 0 to 2 percent slopes (MO) and Helena sandy loam, 2 to 8 percent slopes (HeB). Monacan loam soil type is somewhat poorly drained and exhibits moderate permeability, whereas Helena sandy loam soil is well drained with slow permeability. Both soil types are listed as having inclusions of hydric soils in Mecklenburg County².

Jurisdictional Delineation

On September 10, 2004, CWS’s Ron Johnson, WPIT and Matt Jenkins, investigated on-site jurisdictional waters of the U.S.³ using the U.S. Army Corps of Engineers (USACE) - Routine On-site Determination Method. This method is defined in the 1987 Corps of Engineers Wetlands Delineation Manual.⁴ Two wetland areas were identified within the project limits (Wetlands AA and BB). Routine On-Site Data Forms representative of Wetlands AA and BB as well as on-site non-jurisdictional upland areas have been included as Attachment C. Jurisdictional waters of the U.S. were classified according to recent North Carolina Division of Water Quality (NCDWQ)⁵ and USACE guidance. NCDWQ Stream Classification Forms and USACE Stream Quality Assessment Worksheets for Stream A and Channel B have been included as Attachment D.

³ “Jurisdictional waters of the U.S.” includes essentially all surface waters such as: all navigable waters and their tributaries, all interstate waters and their tributaries, all wetlands adjacent to these waters, and all impoundments of these waters.
The results of the on-site field investigation indicate that there are two jurisdictional stream channels (Streams A and B) and two jurisdictional wetlands (Wetlands AA and BB) located within the project limits (Attachment A – Figure 3). On-site jurisdictional stream channels are unnamed tributaries to McAlpine Creek. McAlpine Creek is part of the Catawba River basin (HU# 03050103) and is classified as “Class C” waters by the NCDWQ. CSWS is requesting written verification of the jurisdictional determination of the on-site jurisdictional features (Attachment E).

Stream A flows perpendicular from Olde Savannah Road to Nathanael Green Lane until its confluence with McAlpine Creek (Attachment A – Figure 3). Stream A was evaluated to be Perennial and exhibited a continuous bed and bank, moderate sinuosity, and substrate consisting of silt to large cobble. This reach had moderate, persistent flow with an average bankfull width of one to four feet. Biological sampling within Stream A resulted in a weak presence of macrobenthos and a moderate presence of amphibians and crayfish (Attachment D – SCP1). Perennial Stream A scored 31 out of a possible 71 points on the NCDWQ Stream Classification Form and 44 out of a possible 100 points on the USACE Stream Quality Assessment Worksheet. A photograph of Stream A has been included as Attachment F – Photograph A.

Channel B flows north along the eastern edge of the project site until its convergence with Stream A (Attachment A – Figure 3). Channel B was evaluated to be non – jurisdictional/ ephemeral and exhibited a weak continuous bed and bank, weak alluvial deposits and substrate consisting of silt. This reach showed no flow or saturation with an average bankfull width of one to two feet (Attachment D – SCP2). Non – jurisdictional Channel B scored 10.5 out of a possible 71 points on the NCDWQ Stream Classification Form and 27 out of a possible 100 points on the USACE Stream Quality Assessment Worksheet. A photograph of Channel B has been included as Attachment F – Photograph B.

Wetland AA is located adjacent to Perennial Stream A and is approximately 0.010 acre in size (Attachment A – Figure 3). Dominant vegetation includes black willow (Salix nigra), soft rush (Juncus effusus), false nettle (Boehmeria cylindrica), black gum (Nyssa sylvatica), and silky dogwood (Cornus amomum). This area exhibited low chroma, Monacan loam soils (2.5Y4/2), as well as oxidized root channels, mottles, water-stained leaves, drainage patterns, and soil saturation within the upper 12 inches of the soil surface (Attachment C – DP1).

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Wetland BB is located along Perennial Stream A and is approximately 0.027 acre in size (Attachment A – Figure 3). Dominant vegetation includes soft rush (*Juncus effusus*), Chinese privet (*Ligustrum sinense*), black gum (*Nyssa sylvatica*), and roundleaf greenbrier (*Smilax rotundifolia*). This area exhibited low chroma, Helena sandy loam soils (2.5Y4/2), as well as oxidized root channels, mottles, water-stained leaves, drainage patterns, and soil saturation within the upper 12 inches of the soil surface (Attachment C – DP3).

**Agency Correspondence**

**Cultural Resources**
A letter was forwarded to the State Historic Preservation Office (SHPO) on September 7, 2004 to determine the presence of any areas of architectural, historic, of archaeological significance that would be affected by the project. In a letter dated September 22, 2004 the SHPO stated that they “are aware of no historic resources which would be affected by the project” (Attachment F).

**Protected Species**
A letter was forwarded to the North Carolina Natural Heritage Program (NCNHP) on September 7, 2004 to determine the presence of any federally-listed, candidate endangered, threatened species or critical habitat located within the project area. In a letter dated September 8, 2004 the NCNHP stated that they “do not show records of such natural heritage elements in the project area” (Attachment F).

**Purpose and Need for the Project**

High flow events are causing flooding upstream of Olde Savannah Road, property along Mulberry Grove Road, Herb House Court and Nathanael Green Lane. In addition, high flows are causing erosion of streambanks at 8220 Nathanael Green Lane as well as upstream from Herb House Court. The existing culverts along the reach of Perennial Stream A are currently undersized and flooding will worsen after construction of the new subdivision (Applegate) upstream is completed. The purpose of this project is to reduce street and property flooding by replacing the existing culverts and reshaping the channel along the reach of Perennial Stream A to accommodate the increased pipe size.
Avoidance and Minimization

Impacts to on-site jurisdictional waters of the U.S. have been reduced to the maximum extent practicable. The project design has also limited the length of hard stabilization to the minimal length necessary to stabilize the outfalls along this reach of Stream A and according to current City design standards. Wetland impacts have been reduced to 0.01 acre. Wetland BB (0.027 acre) will be avoided during construction of this project. Proper sediment and erosion control measures will be used to minimize disturbances to downstream waters.

Proposed Impacts to Jurisdictional Waters

Unavoidable impacts to Perennial Stream A will total approximately 350 linear feet of channel reshaping along with the installation of 35 linear feet of rip rap aprons (Attachment H – Figure 4). Channel reshaping activities will be restricted to no more than 200 feet from existing infrastructure and will remain within the conditions of Nationwide Permit No. 3. Typical channel work plans have been included as Attachment H – Figures 5a. and 5b. The proposed pipe replacements under Olde Savannah Road, Herb House Court, and Nathanael Green Lane will not be buried. The longer pipes are systems with angled connections and grade changes and not typical “culverts” and cannot be buried. For example, the existing culvert under Olde Savannah Road runs to a manhole and the outlet pipe leaves in a different direction from the inlet pipe to the catch basin on Olde Savannah Road. Culvert details have been included as Attachment H – Figure 6. The driveway culvert (located at Mulberry Grove) will be buried one foot deep and will be a 6-foot wide by 5-foot high box culvert. Additionally, reshaped banks will be stabilized using 100% biodegradable erosion control matting and grassed. Streambanks will be bioengineered according to easement negotiations, which are currently underway. Approximately 0.01 acre of wetlands will also be impacted due to fill associated with equipment access (Attachment H – Figure 4). Typical channel cross-sections have been included as (Attachment H – Figures 7a and 7b.) On behalf of CSWS, CWS is submitting a Pre-Construction Notification application with attachments in accordance with Nationwide Permit General Condition No. 13, and pursuant to Nationwide Permit No. 3 and Water Quality Certification No. 3376 (Attachment B).
Compensatory Mitigation

Construction of this project will limit the amount of hard stabilization to less than 150 linear feet, therefore no mitigation is currently being proposed. Rip rap removal will occur on a 100 foot section above Herb House Court along with 15 feet of concrete removal upstream of the bottomless driveway culvert. In addition, an 8 foot section of pipe near the confluence of Stream A and McAlpine Creek will be removed as part of this project. These activities will result in an overall benefit to the water quality of downstream waters by reducing bank erosion, downstream sediment loading, and remaining hard stabilization and pipe sections.
NOTE: JURISDICTIONAL WATERS OF THE U.S. WERE DETERMINED AND CLASSIFIED BY CAROLINA WETLAND SERVICES (CWS) ON SEPTEMBER 10, 2004. JURISDICTIONAL FEATURES HAVE NOT BEEN VERIFIED BY THE USACE.

Carolina Wetland Services
5000 Nations Crossing Road, Suite 230
Charlotte, North Carolina 28217

Figure 4. Proposed Impacts
8220 Nathanael Green Lane Maintenance Project
Charlotte, North Carolina
CWS Project No. 2004-0763

LEGEND

JURISDICTIONAL STREAM CHANNEL
NON-JURISDICTIONAL STREAM CHANNEL
CULVERT REPLACEMENT
JURISDICTIONAL WETLAND AREA
CHANNEL RESHAPING
PROPOSED RIP RAP

APPROXIMATE SCALE: 1" = 200'

PREPARED BY: OL
DATE: 10-4-04
CHECKED BY: OL
DATE: 11-4-04
**NCDWQ Stream Classification Form**

**SCP1 – Perennial Stream A**

Project Name: *Nathanael Green Lane Maintenance Project*

River Basin: Catawba

County: Mecklenburg

Evaluator(s): RGJ & MLJ

DWQ Project Number: 

Nearest Named Stream: McAlpine Creek

Location/Directions: From downtown Charlotte, travel north on Interstate 77 (I-77) to I-277 exit (exit #9B). Merge onto US-74 exit (exit #2B) toward Independence Blvd. Turn left onto Albemarle Rd. Turn right onto Nathanael Green Ln.

**Signature(s):**

Date: 9/10/04

USGS QUAD: Mint Hill, NC

Longitude: W80º 42' 9.66"

Latitude: N35º 12' 22.4"

---

*PLEASE NOTE:* If evaluator and landowner agree that the feature is a man-made ditch, then use of this form is not necessary. Also, if in the best professional judgement of the evaluator, the feature is a man-made ditch and not a modified natural stream—this rating system should not be used.

---

**Primary Field Indicators:** (Circle One Number Per Line)

<table>
<thead>
<tr>
<th>I. Geomorphology</th>
<th>Absent</th>
<th>Weak</th>
<th>Moderate</th>
<th>Strong</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Is There A Riffle-Pool Sequence?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>2) Is The USDA Texture In Streambed Different From Surrounding Terrain?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3) Are Natural Levees Present?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4) Is The Channel Sinuous?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>5) Is There An Active (Or Relic) Floodplain Present?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>6) Is The Channel Braided?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>7) Are Recent Alluvial Deposits Present?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>8) Is There A Bankfull Bench Present?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>9) Is A Continuous Bed &amp; Bank Present?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

**PRIMARY GEOMORPHOLOGY INDICATOR POINTS:** 12

<table>
<thead>
<tr>
<th>II. Hydrology</th>
<th>Absent</th>
<th>Weak</th>
<th>Moderate</th>
<th>Strong</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Is There A Groundwater Flow/Discharge Present?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

**PRIMARY HYDROLOGY INDICATOR POINTS:** 2

<table>
<thead>
<tr>
<th>III. Biology</th>
<th>Absent</th>
<th>Weak</th>
<th>Moderate</th>
<th>Strong</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Are Fibrous Roots Present In Streambed?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>2) Are Rooted Plants Present In Streambed?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3) Is Periphyton Present?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4) Are Bivalves Present?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

**PRIMARY BIOLOGY INDICATOR POINTS:** 6

**Secondary Field Indicators:** (Circle One Number Per Line)

<table>
<thead>
<tr>
<th>I. Geomorphology</th>
<th>Absent</th>
<th>Weak</th>
<th>Moderate</th>
<th>Strong</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Is There A Head Cut Present In Channel?</td>
<td>0</td>
<td>0.5</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>2) Is There A Grade Control Point In Channel?</td>
<td>0</td>
<td>0.5</td>
<td>1</td>
<td>1.5</td>
</tr>
</tbody>
</table>

**SECONDARY GEOMORPHOLOGY INDICATOR POINTS:** 2.5

<table>
<thead>
<tr>
<th>II. Hydrology</th>
<th>Absent</th>
<th>Weak</th>
<th>Moderate</th>
<th>Strong</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Is This Year’s (Or Last’s) Leaf litter Present In Streambed?</td>
<td>0</td>
<td>0.5</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>2) Is Sediment On Plants (Or Debris) Present?</td>
<td>0</td>
<td>0.5</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>3) Are Wrack Lines Present?</td>
<td>0</td>
<td>0.5</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>4) Is Water In Channel And &gt;48 Hrs. Since Last Known Rain? (<em>NOTE: If Ditch Indicated In #9 Above Skip This Step And #5 Below</em>)</td>
<td>0</td>
<td>0.5</td>
<td>1</td>
<td>1.5</td>
</tr>
</tbody>
</table>

**SECONDARY HYDROLOGY INDICATOR POINTS:** 6

<table>
<thead>
<tr>
<th>III. Biology</th>
<th>Absent</th>
<th>Weak</th>
<th>Moderate</th>
<th>Strong</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Are Fish Present?</td>
<td>0</td>
<td>0.5</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>2) Are Amphibians Present?</td>
<td>0</td>
<td>0.5</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>3) Are Aquatic Turtles Present?</td>
<td>0</td>
<td>0.5</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>4) Are Crayfish Present?</td>
<td>0</td>
<td>0.5</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>5) Are Macrobenthos Present?</td>
<td>0</td>
<td>0.5</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>6) Are Iron Oxidizing Bacteria/Fungus Present?</td>
<td>0</td>
<td>0.5</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>7) Is filamentous Algae Present?</td>
<td>0</td>
<td>0.5</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>8) Are Wetland Plants In Streambed?</td>
<td>SAV</td>
<td>Mostly OBL</td>
<td>Mostly FACW</td>
<td>Mostly FAC</td>
</tr>
</tbody>
</table>

**SECONDARY BIOLOGY INDICATOR POINTS:** 2.5

**TOTAL POINTS:** (Primary + Secondary) = 31 (If Greater Than Or Equal To 19 Points The Stream Is At Least Intermittent)
**NCDWQ Stream Classification Form**

**SCP2 – Non – Jurisdictional Channel B**

**Project Name:** Nathanael Green Lane Maintenance Project

**River Basin:** Catawba

**County:** Mecklenburg

**Evaluator(s):** RGJ & MLJ

**DWQ Project Number:**

**Nearest Named Stream:** McAlpine Creek

**Signature(s):**

**Date:** 9/10/04

**USGS QUAD:** Mint Hill, NC

**Longitude:** W80º 42' 9.66“

**Latitude:** N35º 12' 22.4”

**Location/Directions:** From downtown Charlotte, travel north on Interstate 77 (I-77) to I-277 exit (exit #9B). Merge onto US-74 exit (exit #2B) toward Independence Blvd. Turn left onto Albemarle Rd. Turn right onto Nathanael Green Ln.

**PLEASE NOTE:** If evaluator and landowner agree that the feature is a man-made ditch, then use of this form is not necessary. Also, if in the best professional judgement of the evaluator, the feature is a man-made ditch and not a modified natural stream—this rating system should not be used.

### Primary Field Indicators

(Circle One Number Per Line)

**I. Geomorphology**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Absent</th>
<th>Weak</th>
<th>Moderate</th>
<th>Strong</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Is There A Riffle-Pool Sequence?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>Is The USDA Texture In Streambed Different From Surrounding Terrain?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>Are Natural Levees Present?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>Is The Channel Sinuous?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>Is There An Active (Or Relic) Floodplain Present?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>Is The Channel Braided?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>Are Recent Alluvial Deposits Present?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>Is There A Bankfull Bench Present?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>9</td>
<td>Is A 2nd Order Or Greater Channel (As Indicated On Topo Map And/Or In Field) Present?</td>
<td>Yes = 3</td>
<td>No = 0</td>
<td></td>
</tr>
</tbody>
</table>

**PRIMARY GEOMORPHOLOGY INDICATOR POINTS: 2**

**II. Hydrology**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Absent</th>
<th>Weak</th>
<th>Moderate</th>
<th>Strong</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Is There A Groundwater Flow/Discharge Present?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

**PRIMARY HYDROLOGY INDICATOR POINTS: 0**

**III. Biology**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Absent</th>
<th>Weak</th>
<th>Moderate</th>
<th>Strong</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Are Fibrous Roots Present In Streambed?</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Are Rooted Plants Present In Streambed?</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Is Periphyton Present?</td>
<td>0</td>
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</tr>
<tr>
<td>4</td>
<td>Are Bivalves Present?</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

**SECONDARY BIOLOGY INDICATOR POINTS: 5**

### Secondary Field Indicators

(Circle One Number Per Line)

**I. Geomorphology**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Absent</th>
<th>Weak</th>
<th>Moderate</th>
<th>Strong</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Is There A Head Cut Present In Channel?</td>
<td>0</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Is There A Grade Control Point In Channel?</td>
<td>0</td>
<td>0.5</td>
<td>1</td>
</tr>
</tbody>
</table>

**SECONDARY GEOMORPHOLOGY INDICATOR POINTS: 1.5**

**II. Hydrology**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Absent</th>
<th>Weak</th>
<th>Moderate</th>
<th>Strong</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Is This Year’s (Or Last’s) Leaflitter Present In Streambed?</td>
<td>1.5</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>2</td>
<td>Is Sediment On Plants (Or Debris) Present?</td>
<td>0</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Are Wrack Lines Present?</td>
<td>0</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Is Water In Channel And ~48 Hrs. Since Last Known Rain? (<em>NOTE: If Ditch Indicated In #9 Above Skip This Step And #5 Below</em>)</td>
<td>0</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>Is There Water In Channel During Dry Conditions Or In Growing Season?</td>
<td>0</td>
<td>0.5</td>
<td>1</td>
</tr>
</tbody>
</table>

**SECONDARY HYDROLOGY INDICATOR POINTS: 1.5**

**III. Biology**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Absent</th>
<th>Weak</th>
<th>Moderate</th>
<th>Strong</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Are Fish Present?</td>
<td>0</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Are Amphibians Present?</td>
<td>0</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Are Aquatic Turtles Present?</td>
<td>0</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Are Crayfish Present?</td>
<td>0</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>Are Macroinvertebrates Present?</td>
<td>0</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>Are Iron Oxidizing Bacteria/Fungus Present?</td>
<td>0</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>Is Filamentous Algae Present?</td>
<td>0</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>Are Wetland Plants In Streambed?</td>
<td>SAH</td>
<td>Mostly OBL</td>
<td>Mostly FACW</td>
</tr>
<tr>
<td>9</td>
<td>Are Total Absence Of All Plants In Streambed As Noted Above Skip This Step UNLESS SAH Present!*</td>
<td>2</td>
<td>1</td>
<td>0.75</td>
</tr>
</tbody>
</table>

**SECONDARY BIOLOGY INDICATOR POINTS: 0.5**

**TOTAL POINTS (Primary + Secondary)= 10.5 (If Greater Than Or Equal To 19 Points The Stream Is At Least Intermittent)**
### SCP1 – Perennial Stream A

**STREAM QUALITY ASSESSMENT WORKSHEET**

1. Applicant’s Name: Charlotte Storm Water Services
2. Evaluator’s Name: Ron Johnson & Matt Jenkins
3. Date of Evaluation: 9/10/04
4. Time of Evaluation: 10:30 am
5. Name of Stream: UT to McAlpine Creek
6. River Basin: Catawba
7. Approximate Drainage Area: 65.5 acres
8. Stream Order: first
9. Length of Reach Evaluated: 1,600 linear feet
10. County: Mecklenburg

11. Location of reach under evaluation (include nearby roads and landmarks): From downtown Charlotte, travel north on Interstate 77 (I-77) to I-277 exit (exit #9B). Merge onto US-74 exit (exit #2B) toward Independence Blvd. Turn left onto Albemarle Rd. Turn right onto Nathanael Green Ln.

12. Site Coordinates (if known): N35° 12' 22.4", W80° 42' 9.6"
13. Proposed Channel Work (if any): channel reshaping, bank stabilization, and pipe replacement
14. Recent Weather Conditions: heavy rain within 48 hours
15. Site conditions at time of visit: 85 degrees and sunny

16. Identify any special waterway classifications known: 
   - Section 10
   - Tidal Waters
   - Essential Fisheries Habitat
   - Trout Waters
   - Outstanding Resource Waters
   - Nutrient Sensitive Waters
   - Water Supply Watershed (I-IV)

17. Is there a pond or lake located upstream of the evaluation point? YES NO

18. Does channel appear on USGS quad map? YES NO

19. Does channel appear on USDA Soil Survey? YES NO

20. Estimated Watershed Land Use: 100% Residential
   - % Commercial
   - % Industrial
   - % Agricultural
   - % Forested
   - % Cleared / Logged
   - % Other (Institutional)

22. Bank Height (from bed to top of bank): 1-2'

23. Channel slope down center of stream: Flat (0 to 2%) X Gentle (2 to 4%) Moderate (4 to 10%) Steep (>10%)

24. Channel Sinuosity: Straight X Occasional Bends Frequent Meander Very Sinuous Braided Channel

**Instructions for completion of worksheet (located on page 2):** Begin by determining the most appropriate ecoregion based on location, terrain, vegetation, stream classification, etc. Every characteristic must be scored using the same ecoregion. Assign points to each characteristic within the range shown for the ecoregion. Page 3 provides a brief description of how to review the characteristics identified in the worksheet. Scores should reflect an overall assessment of the stream reach under evaluation. If a characteristic cannot be evaluated due to site or weather conditions, enter 0 in the scoring box and provide an explanation in the comment section. Where there are obvious changes in the character of a stream under review (e.g., the stream flows from a pasture into a forest), the stream may be divided into smaller reaches that display more continuity, and a separate form used to evaluate each reach. The total score assigned to a stream reach must range between 0 and 100, with a score of 100 representing a stream of the highest quality.

<table>
<thead>
<tr>
<th>Total Score (from reverse):</th>
<th>44</th>
<th>Comments:</th>
</tr>
</thead>
</table>

**Evaluator’s Signature**

**Date**

This channel evaluation form is intended to be used only as a guide to assist landowners and environmental professionals in gathering the data required by the United States Army Corps of Engineers in order to make a preliminary assessment of stream quality. The total score resulting from the completion of this form is subject to USACE approval and does not imply a particular mitigation ratio or requirement. Form subject to change – version 05/03. To Comment, please call 919-876-8441 x 26.
<table>
<thead>
<tr>
<th>#</th>
<th>CHARACTERISTICS</th>
<th>ECOREGION POINT RANGE</th>
<th>SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Presence of flow / persistent pools in stream</td>
<td>Coastal: 0 – 5; Piedmont: 0 – 4; Mountain: 0 – 5</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>(no flow or saturation = 0; strong flow = max points)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Evidence of past human alteration</td>
<td>Coastal: 0 – 6; Piedmont: 0 – 5; Mountain: 0 – 5</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>(extensive alteration = 0; no alteration = max points)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Riparian zone</td>
<td>Coastal: 0 – 6; Piedmont: 0 – 4; Mountain: 0 – 5</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>(no buffer = 0; contiguous, wide buffer = max points)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Evidence of nutrient or chemical discharges</td>
<td>Coastal: 0 – 5; Piedmont: 0 – 4; Mountain: 0 – 4</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>(extensive discharges = 0; no discharges = max points)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Groundwater discharge</td>
<td>Coastal: 0 – 3; Piedmont: 0 – 4; Mountain: 0 – 4</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>(no discharge = 0; springs, seeps, wetlands, etc. = max points)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Presence of adjacent floodplain</td>
<td>Coastal: 0 – 4; Piedmont: 0 – 4; Mountain: 0 – 2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>(no floodplain = 0; extensive floodplain = max points)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Entrenchment / floodplain access</td>
<td>Coastal: 0 – 5; Piedmont: 0 – 4; Mountain: 0 – 2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>(deeply entrenched = 0; frequent flooding = max points)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Presence of adjacent wetlands</td>
<td>Coastal: 0 – 6; Piedmont: 0 – 4; Mountain: 0 – 2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>(no wetlands = 0; large adjacent wetlands = max points)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Channel sinuosity</td>
<td>Coastal: 0 – 5; Piedmont: 0 – 4; Mountain: 0 – 3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>(extensive channelization = 0; natural meander = max points)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Sediment input</td>
<td>Coastal: 0 – 5; Piedmont: 0 – 4; Mountain: 0 – 4</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>(extensive deposition= 0; little or no sediment = max points)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Size &amp; diversity of channel bed substrate</td>
<td>NA*</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>(fine, homogenous = 0; large, diverse sizes = max points)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Evidence of channel incision or widening</td>
<td>Coastal: 0 – 5; Piedmont: 0 – 4; Mountain: 0 – 5</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>(deeply incised = 0; stable bed &amp; banks = max points)</td>
<td></td>
<td></td>
</tr>
<tr>
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<td>Presence of major bank failures</td>
<td>Coastal: 0 – 5; Piedmont: 0 – 5; Mountain: 0 – 5</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>(severe erosion = 0; no erosion, stable banks = max points)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Root depth and density on banks</td>
<td>Coastal: 0 – 3; Piedmont: 0 – 4; Mountain: 0 – 5</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>(no visible roots = 0; dense roots throughout = max points)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Impact by agriculture or livestock production</td>
<td>Coastal: 0 – 5; Piedmont: 0 – 4; Mountain: 0 – 5</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>(substantial impact =0; no evidence = max points)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Presence of riffle-pool/ripple-pool complexes</td>
<td>Coastal: 0 – 3; Piedmont: 0 – 5; Mountain: 0 – 6</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>(no riffles/ripples or pools = 0; well-developed = max points)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Habitat complexity</td>
<td>Coastal: 0 – 6; Piedmont: 0 – 6; Mountain: 0 – 6</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>(little or no habitat = 0; frequent, varied habitats = max points)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Canopy coverage over streambed</td>
<td>Coastal: 0 – 5; Piedmont: 0 – 5; Mountain: 0 – 5</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>(no shading vegetation = 0; continuous canopy = max points)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Substrate embeddedness</td>
<td>NA*</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>(deeply embedded = 0; loose structure = max)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Presence of stream invertebrates</td>
<td>Coastal: 0 – 4; Piedmont: 0 – 5; Mountain: 0 – 5</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>(no evidence = 0; common, numerous types = max points)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Presence of amphibians</td>
<td>Coastal: 0 – 4; Piedmont: 0 – 4; Mountain: 0 – 4</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>(no evidence = 0; common, numerous types = max points)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Presence of fish</td>
<td>Coastal: 0 – 4; Piedmont: 0 – 4; Mountain: 0 – 4</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>(no evidence = 0; common, numerous types = max points)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Evidence of wildlife use</td>
<td>Coastal: 0 – 6; Piedmont: 0 – 5; Mountain: 0 – 5</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>(no evidence = 0; abundant evidence = max points)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Total Points Possible</strong></td>
<td>100 100 100</td>
<td></td>
</tr>
</tbody>
</table>

**TOTAL SCORE** (also enter on first page) 44

* These characteristics are not assessed in coastal streams.
1. Applicant’s Name: Charlotte Storm Water Services
2. Evaluator’s Name: Ron Johnson & Matt Jenkins
3. Date of Evaluation: 9/10/04
4. Time of Evaluation: 10:30 am
5. Name of Stream: UT to McAlpine Creek
6. River Basin: Catawba
7. Approximate Drainage Area: 0.21 acre
8. Stream Order: first
9. Length of Reach Evaluated: 100 linear feet
10. County: Mecklenburg
11. Location of reach under evaluation (include nearby roads and landmarks): From downtown Charlotte, travel north on Interstate 77 (I-77) to I-277 exit (exit #9B). Merge onto US-74 exit (exit #2B) toward Independence Blvd. Turn left onto Albemarle Rd. Turn right onto Nathanael Green Ln.
12. Site Coordinates (if known): N35º 12’ 22.4”, W80º 42’ 9.6”
13. Proposed Channel Work (if any): N/A
14. Recent Weather Conditions: heavy rain within 48 hours
15. Site conditions at time of visit: 85 degrees and sunny
16. Identify any special waterway classifications known: ___Section 10 ___Tidal Waters ___Essential Fisheries Habitat ___Trout Waters ___Outstanding Resource Waters ___Nutrient Sensitive Waters ___Water Supply Watershed ___(I-IV)
17. Is there a pond or lake located upstream of the evaluation point? YES NO If yes, estimate the water surface area:
20. Estimated Watershed Land Use: ___100% Residential ___% Commercial ___% Industrial ___% Agricultural ___% Forested ___% Cleared / Logged ___% Other (Institutional_________) ___
23. Channel slope down center of stream: ___Flat (0 to 2%) X Gentle (2 to 4%) ___Moderate (4 to 10%) ___Steep (>10%)
24. Channel Sinuosity: X ___Straight ___Occasional Bends ___Frequent Meander ___Very Sinuous ___Braided Channel

Instructions for completion of worksheet (located on page 2): Begin by determining the most appropriate ecoregion based on location, terrain, vegetation, stream classification, etc. Every characteristic must be scored using the same ecoregion. Assign points to each characteristic within the range shown for the ecoregion. Page 3 provides a brief description of how to review the characteristics identified in the worksheet. Scores should reflect an overall assessment of the stream reach under evaluation. If a characteristic cannot be evaluated due to site or weather conditions, enter 0 in the scoring box and provide an explanation in the comment section. Where there are obvious changes in the character of a stream under review (e.g., the stream flows from a pasture into a forest), the stream may be divided into smaller reaches that display more continuity, and a separate form used to evaluate each reach. The total score assigned to a stream reach must range between 0 and 100, with a score of 100 representing a stream of the highest quality.

Total Score (from reverse): 27

Comments:

Evaluator’s Signature ____________________________ Date ________________

This channel evaluation form is intended to be used only as a guide to assist landowners and environmental professionals in gathering the data required by the United States Army Corps of Engineers in order to make a preliminary assessment of stream quality. The total score resulting from the completion of this form is subject to USACE approval and does not imply a particular mitigation ratio or requirement. Form subject to change – version 05/03. To Comment, please call 919-876-8441 x 26.
<table>
<thead>
<tr>
<th>#</th>
<th>CHARACTERISTICS</th>
<th>ECOREGION POINT RANGE</th>
<th>SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Coastal</td>
<td>Piedmont</td>
</tr>
<tr>
<td>1</td>
<td>Presence of flow / persistent pools in stream (no flow or saturation = 0; strong flow = max points)</td>
<td>0 – 5</td>
<td>0 – 4</td>
</tr>
<tr>
<td>2</td>
<td>Evidence of past human alteration (extensive alteration = 0; no alteration = max points)</td>
<td>0 – 6</td>
<td>0 – 5</td>
</tr>
<tr>
<td>3</td>
<td>Riparian zone (no buffer = 0; contiguous, wide buffer = max points)</td>
<td>0 – 6</td>
<td>0 – 4</td>
</tr>
<tr>
<td>4</td>
<td>Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)</td>
<td>0 – 5</td>
<td>0 – 4</td>
</tr>
<tr>
<td>5</td>
<td>Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)</td>
<td>0 – 3</td>
<td>0 – 4</td>
</tr>
<tr>
<td>6</td>
<td>Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)</td>
<td>0 – 4</td>
<td>0 – 4</td>
</tr>
<tr>
<td>7</td>
<td>Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)</td>
<td>0 – 5</td>
<td>0 – 4</td>
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<td>0 – 4</td>
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<td>9</td>
<td>Channel sinuosity (extensive channelization = 0; natural meander = max points)</td>
<td>0 – 5</td>
<td>0 – 4</td>
</tr>
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<td>10</td>
<td>Sediment input (extensive deposition = 0; little or no sediment = max points)</td>
<td>0 – 5</td>
<td>0 – 4</td>
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<td>11</td>
<td>Size &amp; diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)</td>
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<td>Evidence of channel incision or widening (deeply incised = 0; stable bed &amp; banks = max points)</td>
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<td>0 – 4</td>
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<td>13</td>
<td>Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)</td>
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</tr>
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<td>15</td>
<td>Impact by agriculture or livestock production (substantial impact = 0; no evidence = max points)</td>
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<td>0 – 4</td>
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<td>0 – 5</td>
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<td>Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)</td>
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<td>0 – 6</td>
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<td>Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)</td>
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<td>Substrate embeddedness (deeply embedded = 0; loose structure = max)</td>
<td>NA*</td>
<td>0 – 4</td>
</tr>
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<td>20</td>
<td>Presence of stream invertebrates (no evidence = 0; common, numerous types = max points)</td>
<td>0 – 4</td>
<td>0 – 5</td>
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<td>0 – 4</td>
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<td>Presence of fish (no evidence = 0; common, numerous types = max points)</td>
<td>0 – 4</td>
<td>0 – 4</td>
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<tr>
<td>23</td>
<td>Evidence of wildlife use (no evidence = 0; abundant evidence = max points)</td>
<td>0 – 6</td>
<td>0 – 5</td>
</tr>
<tr>
<td></td>
<td><strong>Total Points Possible</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TOTAL SCORE** (also enter on first page) 27

* These characteristics are not assessed in coastal streams.
**DATA FORM**

**ROUTINE WETLAND DETERMINATION**  
(1987 COE Wetlands Delineation Manual)

| Project/Site: | 8220 Nathanael Green Lane | Date: | 09/10/04 |
| Applicant/Owner: | Charlotte Storm Water Services | County: | Mecklenburg |
| Investigator(s): | Ron Johnson and Matt Jenkins | State: | NC |

Do Normal Circumstances exist on the site? **Yes**  **No**  
Is the site significantly disturbed (Atypical Situation)? **Yes**  **No**  
Is the area a potential Problem Area? **Yes**  **No**  
(If needed, explain on reverse.)

**VEGETATION**

<table>
<thead>
<tr>
<th>Dominant Plant Species</th>
<th>Stratum</th>
<th>Indicator</th>
<th>Dominant Plant Species</th>
<th>Stratum</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. Polygonum pennsylvanicum</td>
<td>herb</td>
<td>FACW</td>
<td>12.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td></td>
<td></td>
<td>16.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Percent of Dominant Species that are OBL, FACW or FAC: **100%**

Remarks:  
**All of the dominant plant species are FAC or wetter.**

**HYDROLOGY**

<table>
<thead>
<tr>
<th>Recorded Data (Describe in remarks):</th>
<th>Wetland Hydrology Indicators:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stream, Lake or Tide Gauge</td>
<td>Primary Indicators:</td>
</tr>
<tr>
<td>Aerial Photographs</td>
<td>Inundated</td>
</tr>
<tr>
<td>Other</td>
<td>Saturated in Upper 12 Inches</td>
</tr>
<tr>
<td>X No Recorded Data Available</td>
<td>Water Marks</td>
</tr>
<tr>
<td></td>
<td>Drift Lines</td>
</tr>
<tr>
<td></td>
<td>Sediment Deposits (on leaves)</td>
</tr>
<tr>
<td></td>
<td>Drainage Patterns in Wetlands</td>
</tr>
<tr>
<td></td>
<td>Oxidized Root Channels in Upper 12 Inches</td>
</tr>
<tr>
<td></td>
<td>Water-Stained Leaves</td>
</tr>
<tr>
<td></td>
<td>Local Soil Survey Data</td>
</tr>
<tr>
<td></td>
<td>FAC-Neutral Test</td>
</tr>
<tr>
<td></td>
<td>Other (Explain in Remarks)</td>
</tr>
</tbody>
</table>

Field Observations:  
- Depth of Surface Water: **N/A** (in.)  
- Depth to Free Water in Pit: **N/A** (in.)  
- Depth to Saturated Soil: **<12** (in.)

Remarks:  
**Wetland hydrology indicators are present.**
### SOILS

**Map Unit Name**
- **Monacan loam, 0 to 2 percent slopes**
- **Drainage Class**: poorly-drained
- **Taxonomy (Subgroup)**: Fluvaquentic Eutrochrepts
  - **Confirm Mapped Type?**: Yes, No

**Profile Description**

<table>
<thead>
<tr>
<th>Depth (inches)</th>
<th>Matrix Color (Munsell Moist)</th>
<th>Mottle Colors (Munsell Moist)</th>
<th>Mottle Abundance/Contrast</th>
<th>Texture, Concretions, Structure, etc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-12</td>
<td>2.5Y4/2</td>
<td>7.5YR4/6</td>
<td>few/distinct</td>
<td>silt loam</td>
</tr>
</tbody>
</table>

- **Histosol**
- **Histic Epipedon**
- **Concretions**
- **Gleyed or Low-Chroma Colors**
- **High Organic Content in Surface Layer in Sandy Soils**
- **Organic Streaking in Sandy Soils**
- **Listed on Local Hydric Soils List (Inclusions)**
- **Listed on National Hydric Soils List**
- **Reducing Conditions**
- **Listed on National Hydric Soils List**
- **Sulfidic Odor**
- **Other (Explain in Remarks)**

**Remarks:**

- **Hydric soil indicators are present.**

### WETLAND DETERMINATION

<table>
<thead>
<tr>
<th>Hydrophytic Vegetation Present?</th>
<th>Yes</th>
<th>No</th>
<th>(Circle)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wetland Hydrology Present?</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Hydric Soils Present?</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Is this Sampling Point Within a Wetland?</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:**

- **Data point is representative of a jurisdictional wetland area.**

---

**Routine On-Site Data Form**

Page 2 of 2

6/12/2006
REQUEST FOR JURISDICTIONAL DETERMINATION

DATE: January 6, 2005

COUNTY Mecklenburg County, North Carolina	TOTAL ACREAGE OF TRACT N/A Linear Tract

PROJECT NAME (if applicable) 8220 Nathanael Green Lane Maintenance Project

PROPERTY OWNER/APPLICANT (name, address and phone):

Charlotte Storm Water Services

POC: Mr. Jarrod J. Karl, at (704) 432-0966

600 East Fourth Street

Charlotte, North Carolina 28202-2844

NAME OF CONSULTANT, ENGINEER, DEVELOPER (if applicable):

__________________________________________________________

__________________________________________________________

__________________________________________________________

STATUS OF PROJECT (check one):

( ) On-going site work for development purposes

( X ) Project in planning stages

(Type of project: maintenance)

( ) No specific development planned at present

( ) Project already completed

(Type of project: ______________________)

ADDITIONAL INFORMATION REQUIRED:

Check items submitted - forward as much information as is available. At a minimum, the following first two items must be forwarded.

(X ) USGS Site Location Map (Attachment A – Figure 1)
(X ) NRCS Soil Survey (Attachment A – Figure 2)
(X ) Approximate Jurisdictional Boundary Field Map (Attachment A – Figure 3)
(X ) Pre-Construction Notification Application – Nationwide Permit No. 3 (Attachment B)
(X ) Routine On-Site Data Forms (Attachment C)
(X ) Stream Classification Forms (Attachment D)
(X ) Agency Correspondence (Attachment F)
(X ) Representative Photographs (Attachment G)
(X ) Proposed Impacts (Attachment H – Figure 4)
(X ) Typical Channel Work (Attachment H – Figures 5a and 5b)
(X ) Culvert Details (Attachment H – Figure 6)
(X ) Typical Channel Cross-Sections (Attachment H – Figures 7a and 7b)

Signature of Property Owner or
Authorized Agent
Mr. Jarrod J. Karl
September 22, 2004

Matt L. Jenkins
Staff Biologist
Carolina Wetland Services
5000 Nations Crossing, Suite 230
Charlotte, NC 28217

Re: 8220 Nathanael Green Lane Maintenance Project, Charlotte,
     Mecklenburg County, Project No. 2004-0763, ER 04-2406

Dear Ms. Hughes:

Thank you for your letter of September 8, 2004, concerning the above project.

We have conducted a review of the project and are aware of no historic resources which would be affected by
the project. Therefore, we have no comment on the project as proposed.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the
Advisory Council on Historic Preservation’s Regulations for Compliance with Section 106 codified at 36 CFR
Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment,
please contact Renee Gledhill-Earley, environmental review coordinator, at 919/733-4763. In all future
communication concerning this project, please cite the above-referenced tracking number.

Sincerely,

Peter B. Sandbeck

PBS:w
September 8, 2004

Mr. Matt L. Jenkins  
Carolina Wetland Services, Inc.  
5000 Nations Crossing Road, Suite 230  
Charlotte, NC 28217

Subject: 8220 Nathanael Green Lane Maintenance Project; Charlotte, Mecklenburg County  
CWS Project No. 2004-0763

Dear Mr. Jenkins:

The Natural Heritage Program has no record of rare species, significant natural communities, or priority natural areas at the site nor within a mile of the project area. Although our maps do not show records of such natural heritage elements in the project area, it does not necessarily mean that they are not present. It may simply mean that the area has not been surveyed. The use of Natural Heritage Program data should not be substituted for actual field surveys, particularly if the project area contains suitable habitat for rare species, significant natural communities, or priority natural areas.

You may wish to check the Natural Heritage Program database website at <www.ncsparks.net/nhp/search.html> for a listing of rare plants and animals and significant natural communities in the county and on the topographic quad map. Please do not hesitate to contact me at 919-715-8697 if you have questions or need further information.

Sincerely,

Harry E. LeGrand, Jr.,  
Zoologist  
Natural Heritage Program

HEL/hel
Photograph A. View of Perennial Stream A, facing Nathanael Green Lane.

Photograph B. View of Non-Jurisdictional Channel B.
APPENDIX V. NATIONAL PERMIT NO. 14
HUBBARD ROAD SIDEWALK IMPROVEMENT PROJECT
Pre-Construction Notification Pursuant to Nationwide Permit No. 14

Hubbard Road Sidewalk Improvement Project
Charlotte, North Carolina
Carolina Wetland Services Project No. 2004-0859

March 1, 2005

Prepared For:

The City of Charlotte Storm Water Services
600 East Fourth Street
Charlotte, North Carolina 28202
(704) 432-0966

Prepared By:

Carolina Wetland Services, Inc.
550 East Westinghouse Blvd.
Charlotte, North Carolina 28273
(704) 527-1177
Table of Contents

Executive Summary.............................................................................................................. 1
Existing Conditions ................................................................................................................ 2
  Current Land Use ............................................................................................................... 2
  Jurisdictional Delineation................................................................................................. 2
Agency Correspondence..................................................................................................... 4
  Cultural Resources............................................................................................................ 4
  Protected Species............................................................................................................. 4
Purpose and Need for the Project .......................................................................................... 4
Avoidance and Minimization................................................................................................. 5
Proposed Impacts to Jurisdictional Waters........................................................................... 5
Compensatory Mitigation..................................................................................................... 5

List of Attachments

Attachment A – Figure 1. USGS Site Location Map
Attachment A – Figure 2. NRCS Soil Survey
Attachment A – Figure 3. USGS 2002 Color Aerial Photograph
Attachment A – Figure 4. Wetland Boundary Survey
Attachment B – Pre-Construction Notification Application – Nationwide Permit No. 14
Attachment C – Routine On-Site Data Forms
Attachment D – Stream Classification Forms
Attachment E – Request for Jurisdictional Determination Form
Attachment F – Agency Correspondence
Attachment G – Representative Photographs
Attachment H – Figures 5a and 5b. Proposed Impacts
Executive Summary

The Hubbard Road Sidewalk Improvement Project is located in Charlotte, North Carolina, along Hubbard Road between Mallard Creek Road and Sugar Creek Road (Attachment A – Figure 1). The purpose of this project is to install new sidewalks along Hubbard Road. Charlotte Storm Water Services (CSWS) has contracted Carolina Wetland Services, Inc. (CWS) to provide 404/401 permitting services for this project.

The results of the on-site field investigation indicate that there are four jurisdictional stream channels (Streams A, B, C, and D), one jurisdictional wetland (Wetland AA) and one jurisdictional open water area (Pond A) located within the project corridor (Attachment A – Figure 4). CSWS is requesting written verification of the jurisdictional determination of the on-site jurisdictional features. Unavoidable impacts to Important Intermittent Stream A total approximately 236 linear feet (no single crossing exceeds 150 lf) and impacts to Pond A total approximately 0.047 acre. Unavoidable impacts to Perennial Stream C total approximately 37 linear feet. These impacts are a result of new rip rap and culvert placement and fill activities (Attachment H – Figures 5a and 5b). On behalf of CSWS, CWS is submitting a Pre-Construction Notification application with attachments in accordance with Nationwide Permit General Condition No. 13, pursuant to Nationwide Permit No. 14, and Water Quality Certification No. 3404 (Attachment B).
Existing Conditions

The Hubbard Road Sidewalk Improvement Project is located in Charlotte, North Carolina, along Hubbard Road between Mallard Creek Road and Sugar Creek Road (Attachment A – Figure 1). The purpose of this project is to install new sidewalks along Hubbard Road. Charlotte Storm Water Services (CSWS) has contracted Carolina Wetland Services, Inc. (CWS) to provide 404/401 permitting services for this project. The following sections describe the existing conditions of the project area.

Current Land Use

The current land use for the project area is residential and is comprised of maintained lawns, driveways, and adjacent wooded areas. Dominant vegetation within the project area consists of Kentucky bluegrass (Poa pratensis), Japanese honeysuckle (Lonicera japonica), winged elm (Ulmus alata), and common blackberry (Rubus argutus). According to the Soil Survey of Mecklenburg County\textsuperscript{1}, on-site soils consist of Monacan soils (MO). Monacan soils are typically found in flood plain areas, are poorly drained and exhibit high water capacity.

Jurisdictional Delineation

On December 7 and 13, 2004, CWS’s Ron Johnson, WPIT and Matt Jenkins investigated on-site jurisdictional waters of the U.S.\textsuperscript{2} using the U.S. Army Corps of Engineers (USACE) - Routine On-site Determination Method. This method is defined in the 1987 Corps of Engineers Wetlands Delineation Manual.\textsuperscript{3} There was one jurisdictional wetland area (Wetland AA) identified within the project corridor. Routine On-Site Data Forms representative of Wetland AA as well as on-site non-jurisdictional upland areas have been enclosed (Attachment C). Jurisdictional waters of the U.S. were classified according to recent North Carolina Division of Water Quality (NCDWQ)\textsuperscript{4} and USACE guidance. NCDWQ Stream Classification Forms and USACE Stream Quality Assessment Worksheets for Streams A – D have been enclosed. The USGS aerial photograph (Attachment A – Figure 3) taken in January, 2002, depicts field conditions generally consistent with the December 2004 site visit.

The results of the on-site field investigation indicate that there are four jurisdictional stream channels (Streams A, B, C, and D), one jurisdictional wetland (Wetland AA) and one jurisdictional open water

\textsuperscript{1} United States Department of Agriculture, 1980. Soil Survey of Mecklenburg County, North Carolina.
\textsuperscript{2} “Jurisdictional waters of the U.S.” includes essentially all surface waters such as: all navigable waters and their tributaries, all interstate waters and their tributaries, all wetlands adjacent to these waters, and all impoundments of these waters.
\textsuperscript{3} Environmental Laboratory, "Corps of Engineers Wetlands Delineation Manual," Technical Report Y-87-1, US Army Engineer Waterways Experiment Station, Vicksburg, Mississippi.
area (Pond A) located within the project corridor (Attachment A – Figure 4). The on-site jurisdictional stream channels include Doby Creek and two unnamed tributaries to Doby Creek. Doby Creek is part of the Yadkin River basin (HU# 03040105)\(^5\) and is classified as “Class C” waters by the NCDWQ. CSWS is requesting written verification of the jurisdictional determination of the on-site jurisdictional features (Attachment E).

Stream A flows parallel to Hubbard Road until its confluence with Doby Creek (Attachment A – Figure 4). Stream A was evaluated to be Important Intermittent and exhibited a continuous bed and bank, moderate sinuosity, and substrate consisting of fine sand to small pebbles. This reach had moderate, persistent flow with an average bankfull width of four to six feet. Biological sampling within Stream A resulted in a weak presence of filamentous algae (Attachment D – SCP1). Important Intermittent Stream A scored 26.5 out of a possible 71 points on the NCDWQ Stream Classification Form and 43 out of a possible 100 points on the USACE Stream Quality Assessment Worksheet. A photograph of Stream A has been provided (Attachment G – Photograph A).

Stream B converges with Important Intermittent Stream A south of Farlow Road. Stream B was evaluated to be Unimportant Intermittent and showed weak riffle-pool sequences and a moderate bed and bank (Attachment D – SCP4). Unimportant Intermittent Stream B scored a 15 out of a possible 71 points on the NCDWQ Stream Classification Form and 30 out of a possible 100 points on the USACE Stream Quality Assessment Worksheet.

Stream C (Doby Creek) flows perpendicular to Hubbard Road until its off-site convergence with Mallard Creek (Attachment A – Figure 4). Stream C was evaluated to be Perennial and displayed a strong continuous bed and bank, weak sinuosity, and substrate consisting of silt to fine sand. This reach exhibited strong, persistent flow with an average bankfull width of fifteen feet. Biological sampling within Stream C resulted in a weak presence of crayfish and filamentous algae (Attachment D – SCP3). Perennial Stream C scored 29.5 out of a possible 71 points on the NCDWQ Stream Classification Form and 47 out of a possible 100 points on the USACE Stream Quality Assessment Worksheet. A photograph of Stream C has been enclosed (Attachment G – Photograph B).

Stream D is located south of Farlow Road between Haybridge Road and Morsey Court. Stream D was evaluated to be Perennial and exhibited a strong continuous bed and bank, moderate flow, and moderate riffle-pool sequences. Biological sampling resulted in a weak presence of macrobenthic...\(^5\) “HU#” is the Hydrologic Unit Code. U.S. Geological Survey, 1974. Hydrologic Unit Map, State of North Carolina.
invertebrates and a moderate amount of amphibians (Attachment D – SCP5). Perennial Stream D scored 33 out of a possible 71 points on the NCDWQ Stream Classification Form and 43 out of a possible 100 points on the USACE Stream Quality Assessment Worksheet. Due to the existence of sidewalks already at this crossing, Stream D will not be included in construction activities.

Wetland AA is contiguous with Perennial Stream A and is approximately 0.066 acre in size (Attachment A – Figure 4). Dominant vegetation includes soft stem rush (*Juncus effusus*), black willow (*Salix nigra*), ironwood (*Carpinus caroliniana*), tag alder (*Alnus serrulata*), and seed box (*Ludwigia alternifolia*). This area exhibited low chroma, Monacan soils (2.5YR 4/1), with mottles (7.5YR 4/6), drainage patterns, and soil saturation within the upper 12 inches of the soil surface (Attachment C – DP1). Photographs of Wetland AA have been enclosed as Photographs C and D (Attachment G).

Pond A is located adjacent to Stream A and Hubbard Road and is approximately 0.135 acre in size. Pond A is jurisdictional due to its surface water connections to jurisdictional waters of the U.S. In addition, it appears that Pond A was created by damming Stream A.

**Agency Correspondence**

**Cultural Resources**

A letter was forwarded to the State Historic Preservation Office (SHPO) on December 9, 2004 to determine the presence of any areas of architectural, historic, of archaeological significance that would be affected by the project. In a letter dated December 22, 2004 the SHPO stated that they “are aware of no historic resources which would be affected by the project” (Attachment F).

**Protected Species**

A letter was forwarded to the North Carolina Natural Heritage Program (NCNHP) on December 9, 2004 to determine the presence of any federally-listed, candidate endangered, threatened species or critical habitat located within the project area. In a letter dated December 13, 2004 the NCNHP stated that they have “no record of rare species, significant natural communities, or priority natural areas at the site nor within a mile of the project area” (Attachment F).

**Purpose and Need for the Project**

The purpose of this project is to install new sidewalks along this section of Hubbard Road as well as widen sections of the road throughout the project corridor. This project will provide safer
vehicular and pedestrian traffic traveling between Sugar Creek Road and Mallard Creek Road. This area has a large number of apartments which is creating the need for these traffic improvements due to the higher density of residents in the area.

**Avoidance and Minimization**

Impacts to on-site jurisdictional waters of the U.S. have been reduced to the maximum extent practicable. The project design has also limited the length of culvert placement to the minimum length necessary and according to current City design standards. Proper sediment and erosion control measures will be used to minimize disturbances to downstream waters.

**Proposed Impacts to Jurisdictional Waters**

Unavoidable impacts to Important Intermittent Stream A will total approximately 236 linear feet. 178 linear feet of these impacts involve new culvert placement and 10 linear feet of rip rap placement for two stream crossings at the Wade E Morgan Road – Hubbard Road intersection. Approximately 48 linear feet of Stream A will also be impacted as a result of fill activities adjacent to Pond A. Approximately 111 linear feet (0.005 acre) of Unimportant Intermittent Stream A will be impacted due to fill. Unavoidable impacts to Unimportant Intermittent Stream B will total approximately 20 linear feet (0.002 acre) due to a culvert extension and associated rip rap apron. Impacts to Perennial Stream C north of the Wade E Morgan Road intersection will total approximately 37 linear feet due to a culvert extension and associated rip rap apron at the outfall. Open water impacts to Pond A will total approximately 0.047 acre due to fill activities (Attachment H – Figures 5a and 5b). On behalf of CSWS, CWS is submitting a Pre-Construction Notification application with attachments in accordance with Nationwide Permit General Condition No. 13, and pursuant to Nationwide Permit No. 14 (Attachment B).

**Compensatory Mitigation**

Construction of this project will limit the amount of stream impacts to less than 150 linear feet of perennial stream per crossing and limit open water impacts to less than 0.10 acre, therefore no mitigation is currently being proposed.
Approximate Scale 1” = 2000’
Reference: Aerial Photograph Provided by Mecklenburg County Land Use and Environmental Services, Dated 2002.

Carolina Wetland Services
5000 Nations Crossing Road, Suite 230
Charlotte, North Carolina 28217

Figure 3. Aerial Photograph of Project Vicinity
Hubbard Road Sidewalk Improvement Project
Charlotte, North Carolina
CWS Project No. 2004-0859

PREPARED BY
MLS
DATE 12-9-04
CHECKED BY 6-05
DATE 2-11-05
If any particular item is not applicable to this project, please enter "Not Applicable" or "N/A" rather than leaving the space blank.

I. Processing

1. Check all of the approval(s) requested for this project:
   - [x] Section 404 Permit
   - [ ] Section 10 Permit
   - [x] 401 Water Quality Certification
   - [ ] Riparian or Watershed Buffer Rules

2. Nationwide, Regional or General Permit Number(s) Requested:__________
   Nationwide Permit No. 14

3. If this notification is solely a courtesy copy because written approval for the 401 Certification is not required, check here: [ ]

4. If payment into the North Carolina Wetlands Restoration Program (NCWRP) is proposed for mitigation of impacts (see section VIII – Mitigation), check here: [ ]

II. Applicant Information

1. Owner/Applicant Information
   Name: City of Charlotte Storm Water Services, Contact: Mr. Darrin M. Peine
   Mailing Address: 600 East Fourth Street
   Charlotte, North Carolina 28202

   Telephone Number: (704) 336-7605  Fax Number: (704) 336-6586
   E-mail Address: dpeine@ci.charlotte.nc.us

2. Consultant Information (A signed and dated copy of the Agent Authorization letter must be attached if the Agent has signatory authority for the owner/applicant.)
   Name:______________________________
   Company Affiliation:______________________________
   Mailing Address:______________________________
   Telephone Number:______________________________  Fax Number:______________________________
   E-mail Address:______________________________
III.  Project Information

1. Name of project: Hubbard Road Sidewalk Improvement Project

2. T.I.P. Project Number (NCDOT Only): N/A

3. Property Identification Number (Tax PIN): N/A (linear tract)

4. Location
   County: Mecklenburg  Nearest Town: Charlotte
   Subdivision name (include phase/lot number): N/A
   Directions to site (include road numbers, landmarks, etc.): From Charlotte, travel north on I-77 and take the I-85 exit (exit 13A). Travel 3 miles and take the Sugar Creek Road exit (exit 41). Turn left onto Sugar Creek Road and travel approximately 1.5 miles to Mallard Creek Road. Turn right onto Mallard Creek Road, travel 1 mile and turn left onto Hubbard Road.

5. Site coordinates, if available (UTM or Lat/Long): N35° 19’ 22” W80° 47’ 52”
   (Note – If project is linear, such as a road or utility line, attach a sheet that separately lists the coordinates for each crossing of a distinct waterbody.)

6. Describe the existing land use or condition of the site at the time of this application:
   The existing land use of the project area is residential with adjacent wooded areas.

7. Property size (acres): N/A linear tract

8. Nearest body of water (stream/river/sound/ocean/lake): Mallard Creek

9. River Basin: Yadkin River
   (Note – this must be one of North Carolina's seventeen designated major river basins. The River Basin map is available at http://h2o.enr.state.nc.us/admin/maps/.)

10. Describe the purpose of the proposed work: The purpose of this project is to install new sidewalks along this section of Hubbard Road as well as widen sections of the road throughout the project corridor. This project will provide safer vehicular and pedestrian traffic traveling between Sugar Creek Road and Mallard Creek Road. This area has a large number of apartments which is creating the need for these traffic improvements due to the higher density of residents in the area.

11. List the type of equipment to be used to construct the project: A trackhoe and typical excavation equipment will be used for this project.

12. Describe the land use in the vicinity of this project: The land use surrounding the project is mainly residential with adjacent wooded areas.
IV. **Prior Project History**

There is no prior history for this site.

V. **Future Project Plans**

There are no future project plans for this site.

VI. **Proposed Impacts to Waters of the United States/Waters of the State**

1. **Wetland Impacts**

<table>
<thead>
<tr>
<th>Wetland Impact Site Number (indicate on map)</th>
<th>Type of Impact</th>
<th>Area of Impact (acres)</th>
<th>Located within 100-year Floodplain** (yes/no)</th>
<th>Distance to Nearest Stream (linear feet)</th>
<th>Type of Wetland***</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

* List each impact separately and identify temporary impacts. Impacts include, but are not limited to: mechanized clearing, grading, fill, excavation, flooding, ditching/drainage, etc. For dams, separately list impacts due to both structure and flooding.

** 100-Year floodplains are identified through the Federal Emergency Management Agency’s (FEMA) Flood Insurance Rate Maps (FIRM), or FEMA-approved local floodplain maps. Maps are available through the FEMA Map Service Center at 1-800-358-9616, or online at http://www.fema.gov.

*** List a wetland type that best describes wetland to be impacted (e.g., freshwater/saltwater marsh, forested wetland, beaver pond, Carolina Bay, bog, etc.)

List the total acreage (estimated) of existing wetlands on the property: 0.066 acre

Total area of wetland impact proposed: N/A

2. **Stream Impacts, including all intermittent and perennial streams**

<table>
<thead>
<tr>
<th>Stream Impact Site Number (indicate on map)</th>
<th>Type of Impact</th>
<th>Length of Impact (linear feet)</th>
<th>Stream Name**</th>
<th>Average Width of Stream Before Impact</th>
<th>Perennial or Intermittent? (please specify)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stream A Culvert Placement</td>
<td>178 lf</td>
<td>UT to Doby Creek</td>
<td>3-5’</td>
<td>Important Intermittent</td>
<td></td>
</tr>
<tr>
<td>Stream A Rip Rap</td>
<td>10 lf</td>
<td>UT to Doby Creek</td>
<td>3-5’</td>
<td>Important Intermittent</td>
<td></td>
</tr>
<tr>
<td>Stream A Fill</td>
<td>48 lf</td>
<td>UT to Doby Creek</td>
<td>3-5’</td>
<td>Important Intermittent</td>
<td></td>
</tr>
<tr>
<td>Stream A Fill</td>
<td>111 lf</td>
<td>UT to Doby Creek</td>
<td>3-5’</td>
<td>Unimportant Intermittent</td>
<td></td>
</tr>
<tr>
<td>Stream B Culvert Placement</td>
<td>10 lf</td>
<td>UT to Doby Creek</td>
<td>1-2’</td>
<td>Unimportant Intermittent</td>
<td></td>
</tr>
<tr>
<td>Stream B Rip Rap</td>
<td>10 lf</td>
<td>UT to Doby Creek</td>
<td>1-2’</td>
<td>Unimportant Intermittent</td>
<td></td>
</tr>
</tbody>
</table>
List each impact separately and identify temporary impacts. Impacts include, but are not limited to: culverts and associated rip-rap, dams (separately list impacts due to both structure and flooding), relocation (include linear feet before and after, and net loss/gain), stabilization activities (cement wall, rip-rap, crib wall, gabions, etc.), excavation, ditching/straightening, etc. If stream relocation is proposed, plans and profiles showing the linear footprint for both the original and relocated streams must be included.

Stream names can be found on USGS topographic maps. If a stream has no name, list as UT (unnamed tributary) to the nearest downstream named stream into which it flows. USGS maps are available through the USGS at 1-800-358-9616, or online at www.usgs.gov. Several internet sites also allow direct download and printing of USGS maps (e.g., www.topozone.com, www.mapquest.com, etc.).

Cumulative impacts (linear distance in feet) to all streams on site: 404 linear feet

3. Open Water Impacts, including Lakes, Ponds, Estuaries, Sounds, Atlantic Ocean and any other Water of the U.S. N/A

<table>
<thead>
<tr>
<th>Open Water Impact Site Number (indicate on map)</th>
<th>Type of Impact*</th>
<th>Area of Impact (acres)</th>
<th>Name of Waterbody (if applicable)</th>
<th>Type of Waterbody (lake, pond, estuary, sound, bay, ocean, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pond A</td>
<td>Fill</td>
<td>0.047</td>
<td>N/A</td>
<td>Pond</td>
</tr>
</tbody>
</table>

* List each impact separately and identify temporary impacts. Impacts include, but are not limited to: fill, excavation, dredging, flooding, drainage, bulkheads, etc.

4. Pond Creation

If construction of a pond is proposed, associated wetland and stream impacts should be included above in the wetland and stream impact sections. Also, the proposed pond should be described here and illustrated on any maps included with this application.

Pond to be created in (check all that apply): ☐ uplands ☐ stream ☐ wetlands

Describe the method of construction (e.g., dam/embankment, excavation, installation of draw-down valve or spillway, etc.): N/A

Proposed use or purpose of pond (e.g., livestock watering, irrigation, aesthetic, trout pond, local stormwater requirement, etc.): N/A

Size of watershed draining to pond: N/A

Expected pond surface area: N/A

VII. Impact Justification (Avoidance and Minimization)

Impacts to on-site jurisdictional waters of the U.S. have been reduced to the maximum extent practicable. The project design has also limited the length of culvert placement to the minimum length necessary and according to current City design standards. Proper sediment and erosion control measures will be used to minimize disturbances to downstream waters.
VIII. Mitigation

Construction of this project will limit the amount of stream impacts to less than 150 linear feet per stream crossing and limit open water impacts to less than 0.10 acre, therefore no mitigation is currently being proposed.

1. Mitigation may also be made by payment into the North Carolina Wetlands Restoration Program (NCWRP) with the NCWRP’s written agreement. Check the box indicating that you would like to pay into the NCWRP. Please note that payment into the NCWRP must be reviewed and approved before it can be used to satisfy mitigation requirements. Applicants will be notified early in the review process by the 401/Wetlands Unit if payment into the NCWRP is available as an option. For additional information regarding the application process for the NCWRP, check the NCWRP website at http://h2o.enr.state.nc.us/wrp/index.htm. If use of the NCWRP is proposed, please check the appropriate box on page three and provide the following information:

   Amount of stream mitigation requested (linear feet): N/A
   Amount of buffer mitigation requested (square feet): N/A
   Amount of Riparian wetland mitigation requested (acres): N/A
   Amount of Non-riparian wetland mitigation requested (acres): N/A
   Amount of Coastal wetland mitigation requested (acres): N/A

IX. Environmental Documentation (DWQ Only)

Does the project involve an expenditure of public funds or the use of public (federal/state/local) land?

Yes ☒ No ☐

If yes, does the project require preparation of an environmental document pursuant to the requirements of the National or North Carolina Environmental Policy Act (NEPA/SEPA)?

Note: If you are not sure whether a NEPA/SEPA document is required, call the SEPA coordinator at (919) 733-5083 to review current thresholds for environmental documentation.

Yes ☐ No ☒

If yes, has the document review been finalized by the State Clearinghouse? If so, please attach a copy of the NEPA or SEPA final approval letter.

Yes ☐ No ☒

X. Proposed Impacts on Riparian and Watershed Buffers (DWQ Only)

It is the applicant's (or agent's) responsibility to determine, delineate and map all impacts to required state and local buffers associated with the project. The applicant must also provide justification for these impacts in Section VII above. All proposed impacts must be listed herein, and must be clearly identifiable on the accompanying site plan. All buffers must be shown on a map, whether or not impacts are proposed to the buffers. Correspondence from the DWQ
Regional Office may be included as appropriate. Photographs may also be included at the applicant's discretion.

Will the project impact protected riparian buffers identified within 15A NCAC 2B .0233 (Neuse), 15A NCAC 2B .0259 (Tar-Pamlico), 15A NCAC 2B .0250 (Randleman Rules and Water Supply Buffer Requirements), or other (please identify: ______)?

Yes □ No ☒ If you answered “yes”, provide the following information: Identify the square feet and acreage of impact to each zone of the riparian buffers. If buffer mitigation is required calculate the required amount of mitigation by applying the buffer multipliers. N/A

<table>
<thead>
<tr>
<th>Zone*</th>
<th>Impact (square feet)</th>
<th>Multiplier</th>
<th>Required Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Zone 1 extends out 30 feet perpendicular from near bank of channel; Zone 2 extends an additional 20 feet from the edge of Zone 1.

If buffer mitigation is required, please discuss what type of mitigation is proposed (i.e., Donation of Property, Conservation Easement, Riparian Buffer Restoration / Enhancement, Preservation or Payment into the Riparian Buffer Restoration Fund). Please attach all appropriate information as identified within 15A NCAC 2B .0242 or .0260.

N/A

XI. Stormwater (DWQ Only)

Describe impervious acreage (both existing and proposed) versus total acreage on the site. Discuss stormwater controls proposed in order to protect surface waters and wetlands downstream from the property. Sources of nearby impervious cover include roads, driveways, and rooftops. This project will cause a slight increase in the impervious coverage of the project area.

XII. Sewage Disposal (DWQ Only)

Clearly detail the ultimate treatment methods and disposition (non-discharge or discharge) of wastewater generated from the proposed project, or available capacity of the subject facility.

N/A
XIII. Violations (DWQ Only)

Is this site in violation of DWQ Wetland Rules (15A NCAC 2H .0500) or any Buffer Rules?
Yes ☐ No ☒

Is this an after-the-fact permit application?
Yes ☐ No ☒

XIV. Other Circumstances (Optional):

It is the applicant's responsibility to submit the application sufficiently in advance of desired construction dates to allow processing time for these permits. However, an applicant may choose to list constraints associated with construction or sequencing that may impose limits on work schedules (e.g., draw-down schedules for lakes, dates associated with Endangered and Threatened Species, accessibility problems, or other issues outside of the applicant's control). Construction is scheduled to begin immediately following receipt of the appropriate permits.

Applicant/Agent's Signature ___________________________ Date ________________
(Agent's signature is valid only if an authorization letter from the applicant is provided.)
REQUEST FOR JURISDICTIONAL DETERMINATION

DATE: March 1, 2005

COUNTY: Mecklenburg County, North Carolina
TOTAL ACREAGE OF TRACT: linear project

PROJECT NAME (if applicable): Hubbard Road Sidewalk Improvement Project

PROPERTY OWNER/APPLICANT (name, address and phone):

Charlotte Storm Water Services
POC: Mr. Darrin M. Peine, at (704) 336-7605
600 East Fourth Street
Charlotte, North Carolina 28202-2844

NAME OF CONSULTANT, ENGINEER, DEVELOPER (if applicable):

STATUS OF PROJECT (check one):

( ) On-going site work for development purposes

( X ) Project in planning stages
   (Type of project: sidewalk construction)

( ) No specific development planned at present

( ) Project already completed
   (Type of project: ________________)

ADDITIONAL INFORMATION REQUIRED:
Check items submitted - forward as much information as is available. At a minimum, the following first two items must be forwarded.

(X) USGS Site Location Map (Figure 1)
(X) NRCS Soil Survey (Figure 2)
(X) Aerial Photograph of Project Vicinity (Figure 3)
(X) Wetland Boundary Survey (Figure 4)
(X) Pre-Construction Notification Application – Nationwide Permit No. 14
(X) Routine On-Site Data Forms
(X) Stream Classification Forms
(X) Agency Correspondence
(X) Representative Photographs
(X) Proposed Impacts (Figures 5a and 5b)

__________________________________
Signature of Property Owner or
Authorized Agent
Mr. Darrin M. Peine
December 13, 2004

Mr. Matt Jenkins
Carolina Wetland Services, Inc.
5000 Nations Crossing Road, Suite 230
Charlotte, NC 28217

Subject: Hubbard Road Sidewalk Improvement Project; Charlotte, Mecklenburg County
        CWS Project No. 2004-0859

Dear Mr. Jenkins:

The Natural Heritage Program has no record of rare species, significant natural communities, or
priority natural areas at the site nor within a mile of the project area. Although our maps do not
show records of such natural heritage elements in the project area, it does not necessarily mean
that they are not present. It may simply mean that the area has not been surveyed. The use of
Natural Heritage Program data should not be substituted for actual field surveys, particularly if
the project area contains suitable habitat for rare species, significant natural communities, or
priority natural areas.

You may wish to check the Natural Heritage Program database website at
<www.ncsparks.net/nhp/search.html> for a listing of rare plants and animals and significant
natural communities in the county and on the topographic quad map. Please do not hesitate to
contact me at 919-715-8697 if you have questions or need further information.

Sincerely,

Harry E. LeGrand, Jr., Zoologist
Natural Heritage Program

HEL/hel
December 22, 2004

Matt L. Jenkins
Staff Biologist
Carolina Wetland Services
5000 Nations Crossing Road
Suite 230
Charlotte, NC 28217

Re: Hubbard Road Sidewalk Improvement Project, Charlotte, CWS Project No. 2004-0859,
Mecklenburg County, ER 04-3162

Dear Mr. Jenkins:

Thank you for your letter of December 9, 2004, concerning the above project.

We have conducted a review of the proposed undertaking and are aware of no historic resources which would be affected by the project. Therefore, we have no comment on the undertaking as proposed.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation’s Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, environmental review coordinator, at 919/733-4763. In all future communication concerning this project, please cite the above referenced tracking number.

Sincerely,

[Signature]

Peter B. Sandbeck
Photograph A. View of Perennial Stream A, facing south.

Photograph B. View of Perennial Stream C facing Hubbard Road.
Photograph C. View of Wetland AA, adjacent to Perennial Stream C.

Photograph D. View of Wetland AA from Hubbard Road.
Pond A
0.047 acre fill impacted

Fill 48 If impacted

Important Intermittent Stream A

Unimportant Intermittent Stream A - 0.005 acre impacted
111 If Fill

Unimportant Intermittent Stream B - 0.002 acre impacted
10 If Rip Rap & 10 If Culvert placement

NOTE: JURISDICTIONAL WATERS OF THE U.S. WERE DELINEATED AND SURVEYED WITH GPS BY CAROLINA WETLAND SERVICES, INC. (CWS) ON DECEMBER 7 AND 13, 2004. JURISDICTIONAL FEATURES HAVE NOT BEEN VERIFIED BY THE USACE.
Perennial Stream C

Wetland AA - 0.066 acre

Rip Rap Apron
10 ft

Culvert placement
126 ft

Culvert placement
52 ft

Important Intermittent Stream A

14 ft Rip Rap & 23 ft Culvert placement

Doby Creek

Morgan Rd

Existing culvert

Wade E

LEGEND

- JURISDICTIONAL STREAM CHANNEL
- STREAM CHANNEL IMPACTS
- JURISDICTIONAL WETLAND AREA
- OPEN WATER IMPACTS
- PHOTO LOCATION AND DIRECTION

APPROXIMATE SCALE: 1" = 100'

Carolina Wetland Services
550 East Westinghouse Blvd.
Charlotte, North Carolina 28217

REFERENCE: PROJECT PLAN PROVIDED BY CHARLOTTE STORM WATER SERVICES, DATED 2004

Figure 5b. Proposed Impacts
Hubbard Road Sidewalk Improvement Project
Charlotte, North Carolina
CWS Project No. 2004-0859

PREPARED BY

MLS

DATE
3/1/05

CHECKED

DATE
3/1/06
APPENDIX VI. NATIONWIDE PERMIT NO. 39
SCOTT FUTRELL DRIVE MAINTENANCE PROJECT
Pre-Construction Notification Pursuant to
Nationwide Permit No. 39

Scott Futrell Drive Maintenance Project
Charlotte, North Carolina
Carolina Wetland Services Project No. 2004-0844

November 11, 2004

Prepared For:

The City of Charlotte Storm Water Services
600 East Fourth Street
Charlotte, North Carolina 28202
(704) 432-0966

Prepared By:

Carolina Wetland Services, Inc.
5000 Nations Crossing Road, Suite 230
Charlotte, North Carolina 28217
(704) 527-1177
Table of Contents

Executive Summary.............................................................................................................. .................. 1
Existing Conditions .................................................................................................................. 2
    Current Land Use ............................................................................................................... 2
    Jurisdictional Delineation................................................................................................. 2
Agency Correspondence........................................................................................................... 3
    Cultural Resources.............................................................................................................. 3
    Protected Species.............................................................................................................. 3
Purpose and Need for the Project .......................................................................................... 3
Avoidance and Minimization ................................................................................................. 4
Proposed Impacts to Jurisdictional Waters ........................................................................ 4
Compensatory Mitigation........................................................................................................ 4

List of Attachments

Attachment A – Figure 1. USGS Site Location Map
Attachment A – Figure 2. NRCS Soil Survey
Attachment A – Figure 3. Approximate Jurisdictional Boundary Field Map
Attachment B – Pre-Construction Notification Application – Nationwide Permit No. 39
Attachment C – Routine On-Site Data Form
Attachment D – Stream Classification Forms
Attachment E – Request for Jurisdictional Determination Form
Attachment F – Representative Photographs
Attachment G – Figure 4. Proposed Impacts
Executive Summary

The Scott Futrell Drive Maintenance Project is located in Charlotte, North Carolina, approximately ¾ mile east of the Billy Graham Parkway – Interstate 85 interchange (Attachment A – Figures 1 and 2). The purpose of this project is to install new culvert along a reach of the unnamed tributary adjacent to Scott Futrell Drive. Charlotte Storm Water Services (CSWS) has contracted Carolina Wetland Services, Inc. (CWS) to provide 404/401 permitting services for this project.

The results of the on-site field investigation conducted by CWS indicate that there is one jurisdictional stream channel (Stream A) within the project limits (Attachment A – Figure 3). CSWS is requesting written verification of the jurisdictional determination of the on-site jurisdictional features. Unavoidable impacts to Perennial Stream A total approximately 120 linear feet. These impacts are a result of new culvert placement (Attachment H). On behalf of CSWS, CWS is submitting a Pre-Construction Notification application with attachments in accordance with Nationwide Permit General Condition No. 13, and pursuant to Nationwide Permit No. 39 (Attachment B).
Existing Conditions

The Scott Futrell Drive Maintenance Project is located in Charlotte, North Carolina, approximately ¾ mile east of the Billy Graham Parkway – Interstate 85 interchange (Attachment A – Figures 1 and 2). The purpose of this project is to install new culvert along a reach of the unnamed tributary adjacent to Scott Futrell Drive. Charlotte Storm Water Services (CSWS) has contracted Carolina Wetland Services, Inc. (CWS) to provide permitting services for this project. The following sections describe the existing conditions of the project area.

Current Land Use

The current land use for the project area is commercial and is comprised of maintained lawns and parking lots adjacent to a wooded area. Dominant vegetation within the project area consists of Kentucky bluegrass (*Poa pratensis*) and American holly (*Ilex opaca*). According to the Soil Survey of Mecklenburg County¹, on-site soils are classified as Urban land (Ur). This map unit characterizes areas in which more than 85 percent is covered with impervious structures such as asphalt, concrete, or buildings. Common problems include high volume, surface runoff events and flooding in low-lying areas.

Jurisdictional Delineation

On November 5, 2004, CWS’s Ron Johnson, WPIT and Matt Jenkins, investigated on-site jurisdictional waters of the U.S.² using the U.S. Army Corps of Engineers (USACE) - Routine On-Site Determination Method. This method is defined in the 1987 Corps of Engineers Wetlands Delineation Manual.³ There were no jurisdictional wetland areas identified within the project area. Routine On-Site Data Forms representative of on-site non-jurisdictional upland areas have been included as Attachment C. Jurisdictional waters of the U.S. were classified according to recent North Carolina Division of Water Quality (NCDWQ)⁴ and USACE guidance. NCDWQ Stream Classification Forms and USACE Stream Quality Assessment Worksheets for Stream A have been included as Attachment D.

The results of the on-site field investigation indicate that there is one jurisdictional stream channel (Stream A) located within the project limits (Attachment A – Figure 3). The on-site jurisdictional stream channel is an unnamed tributary to Taggart Creek. Taggart Creek is part of the Catawba River.

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² “Jurisdictional waters of the U.S.” includes essentially all surface waters such as: all navigable waters and their tributaries, all interstate waters and their tributaries, all wetlands adjacent to these waters, and all impoundments of these waters.
basin (HU# 03050103)\(^5\) and is classified as “Class C” waters by the NCDWQ. CSWS is requesting written verification of the jurisdictional determination of the on-site jurisdictional feature (Attachment E).

Stream A flows parallel to Scott Futrell Drive until its off-site confluence with Taggart Creek (Attachment A – Figure 3). Stream A was evaluated to be Perennial and exhibited a continuous bed and bank, weak sinuosity, and substrate consisting of silt to large cobble. This reach had strong, persistent flow with an average bankfull width of 20 feet. Biological sampling within Stream A resulted in a strong presence of crayfish (Attachment D – SCP1). Perennial Stream A scored 22 out of a possible 71 points on the NCDWQ Stream Classification Form and 31 out of a possible 100 points on the USACE Stream Quality Assessment Worksheet. A photograph of Stream A has been included as Attachment F – Photograph A.

**Agency Correspondence**

**Cultural Resources**

A letter was forwarded to the State Historic Preservation Office (SHPO) on November 5, 2004 to determine the presence of any areas of architectural, historic, or archaeological significance that would be affected by the project. As of the date of this submittal, a response from SHPO has not been received.

**Protected Species**

A letter was forwarded to the North Carolina Natural Heritage Program (NCNHP) on November 5, 2004 to determine the presence of any federally-listed, candidate endangered, threatened species or critical habitat located within the project area. As of the date of this submittal, a response from NCNHP has not been received.

**Purpose and Need for the Project**

Currently, the on-site portion of Stream A is deeply incised with banks supported by hard stabilization. However, there is evidence of bank failures despite this stabilization, causing sediment loading to downstream waters. The purpose of this project is to reduce sediment loading from further bank failures by installing 120 linear feet of new culvert along the reach of Perennial Stream A.

Avoidance and Minimization

Impacts to on-site jurisdictional waters of the U.S. have been reduced to the maximum extent practicable. The project design has also limited the length of culvert placement to the minimum length necessary and according to current City design standards. Proper sediment and erosion control measures will be used to minimize disturbances to downstream waters.

Proposed Impacts to Jurisdictional Waters

Unavoidable impacts to Perennial Stream A will total approximately 120 linear feet with the installation of new culvert (Attachment H – Figure 4). On behalf of CSWS, CWS is submitting a Pre-Construction Notification application with attachments in accordance with Nationwide Permit General Condition No. 13, and pursuant to Nationwide Permit No. 39 (Attachment B).

Compensatory Mitigation

Construction of this project will limit the amount of stream impacts to less than 150 linear feet, therefore no mitigation is currently being proposed. These activities will result in an overall benefit to the water quality of downstream waters by reducing bank erosion and downstream sediment loading.
NOTE: JURISDICTIONAL WATERS OF THE U.S. WERE DETERMINED AND CLASSIFIED BY CAROLINA WETLAND SERVICES, INC. (CWS) ON NOVEMBER 5, 2004. JURISDICTIONAL FEATURES HAVE NOT BEEN VERIFIED BY THE USACE.
REQUEST FOR JURISDICTIONAL DETERMINATION

DATE: November 11, 2004

COUNTY Mecklenburg County, North Carolina TOTAL ACREAGE OF TRACT 3 acres

PROJECT NAME (if applicable) Scott Futrell Drive Maintenance Project

PROPERTY OWNER/APPLICANT (name, address and phone):

Charlotte Storm Water Services

POC: Mr. Jarrod J. Karl, at (704) 432-0966

600 East Fourth Street

Charlotte, North Carolina 28202-2844

NAME OF CONSULTANT, ENGINEER, DEVELOPER (if applicable):

__________________________________

STATUS OF PROJECT (check one):

( ) On-going site work for development purposes

( X ) Project in planning stages

(Type of project: maintenance)

( ) No specific development planned at present

( ) Project already completed

(Type of project: ____________)

ADDITIONAL INFORMATION REQUIRED:

Check items submitted - forward as much information as is available. At a minimum, the following first two items must be forwarded.

(X ) USGS Site Location Map (Attachment A – Figure 1)

(X ) NRCS Soil Survey (Attachment A – Figure 2)

(X ) Approximate Jurisdictional Boundary Field Map (Attachment A – Figure 3)

(X ) Pre-Construction Notification Application – Nationwide Permit No. 39 (Attachment B)

(X ) Routine On-Site Data Form (Attachment C)

(X ) Stream Classification Forms (Attachment D)

(X ) Representative Photographs (Attachment F)

(X ) Proposed Impacts (Attachment G – Figure 4)

__________________________________

Signature of Property Owner or Authorized Agent

Mr. Jarrod J. Karl
Photograph A. View of Perennial Steam A, facing northwest.
APPENDIX VII. AFTER-THE-FACT NATIONWIDE PERMIT
WINECOFF COMMONS SITE
February 21, 2005

Mr. Hall Johnston
Real Estate Development Partners
PO Box 35193
Charlotte, North Carolina 28235

Subject: After-the-Fact Permit Application Pursuant to Nationwide Permit No. 39
Winecoff Commons Site
Kannapolis, North Carolina
Carolina Wetland Services Project No. 2005-0918

The Winecoff Commons Site is located in Kannapolis, North Carolina. This site is generally bound to the south by Interstate 85 and is adjacent to the Orphanage Road – Winecoff School Road intersection (Figure 1, enclosed). The purpose of this project is to develop approximately 12.3 acres into a commercial shopping center. Real Estate Development Partners has contracted Carolina Wetland Services, Inc. (CWS) to provide 404/401 permitting services for this project.

Past Land Use
The past land use for the project area was early successional fields and an adjacent wooded lot surrounded by residential areas. Dominant vegetation within the project area consisted of white oak (*Quercus alba*), Japanese honeysuckle (*Lonicera japonica*), poison ivy (*Toxicodendron radicans*), red cedar (*Juniperus virginiana*), and various grasses (*Panicum* spp.) and sedges (*Carex* spp.). According to the Soil Survey of Cabarrus County\(^1\), on-site soils consist of Enon sandy loam, 2 to 8 percent slopes (EnB) and Enon sandy loam, 8 to 15 percent slopes (EnD). Enon soils are typically found in upland areas throughout the county and are well drained, exhibiting moderate water capacity.

Jurisdictional Delineation
On October 8, 2004, CWS’s Matt Jenkins and Steven Busbee investigated on-site jurisdictional waters of the U.S.\(^2\) using the U.S. Army Corps of Engineers (USACE) - Routine On-site Determination Method. This method is defined in the 1987 Corps of Engineers Wetlands Delineation Manual.\(^3\) No jurisdictional wetland areas are located within the property boundary. A Routine On-Site Data Form representative of on-site non-jurisdictional upland areas has been enclosed (DP1). Jurisdictional waters of the U.S. were classified according to recent North Carolina Division of Water Quality (NCDWQ)\(^4\) and USACE guidance. NCDWQ Stream Classification Forms and USACE Stream Quality Assessment Worksheets for Stream A have been enclosed (SCP1).

The results of the on-site field investigation indicate that there is one jurisdictional stream channel (Stream A) located within the project area (Figure 1, enclosed). The on-site jurisdictional stream

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\(^2\) “Jurisdictional waters of the U.S.” includes essentially all surface waters such as: all navigable waters and their tributaries, all interstate waters and their tributaries, all wetlands adjacent to these waters, and all impoundments of these waters.
\(^3\) Environmental Laboratory. “Corps of Engineers Wetlands Delineation Manual,” Technical Report Y-87-1, US Army Engineer Waterways Experiment Station, Vicksburg, Mississippi.
channel is an unnamed tributary to Irish Buffalo Creek. Irish Buffalo Creek is part of the Yadkin River basin (HU# 03040105) and is classified as “Class C” waters by the NCDWQ.

Stream A flows south for approximately 231 linear feet along the eastern corner of the project area until its off site confluence with Irish Buffalo Creek (Figure 1, enclosed). Stream A was evaluated to be Unimportant Intermittent. This channel exhibited weak sinuosity, a weak continuous bed and bank, and substrate consisting of silt to coarse sand. Stream A scored 50 out of a possible 100 points on the USACE Stream Quality Assessment Form and 17 out of 71 possible points on the NCDWQ Stream Classification Form (SCP1, enclosed). On-Site jurisdictional features have been verified by the USACE Asheville Field Office.

Agency Correspondence

Cultural Resources

A letter was forwarded to the State Historic Preservation Office (SHPO) on February 9, 2005 to determine the presence of any areas of architectural, historic, of archaeological significance that would be affected by the project. As of the date of this submittal, a response from SHPO has not been received.

Protected Species

A letter was forwarded to the North Carolina Natural Heritage Program (NCNHP) on February 9, 2005 to determine the presence of any federally-listed, candidate endangered, threatened species or critical habitat located within the project area. As of the date of this submittal, a response from NCNHP has not been received.

Purpose and Need for the Project

The current site plan is developing approximately 12.3 acres of early successional fields and woodlands into a commercial shopping center. This development will increase tax revenues and serve residents of the local community. The site is located adjacent to Interstate 85 (I-85), a major route between Kannapolis and Charlotte. The surrounding area is becoming increasingly commercial in nature to serve new residents in the area.

Avoidance and Minimization

Impacts to on-site jurisdictional waters of the U.S. have been reduced to the maximum extent practicable. Impacts to on-site stream channels have been reduced to below 150 linear feet. Therefore, this project will not require written concurrence from the NCDWQ. Proper sediment and erosion control measures are being used to minimize disturbances to downstream waters.

Proposed Impacts to Jurisdictional Waters

Unavoidable impacts to Unimportant Intermittent Stream A total approximately 138 linear feet. Approximately 60 linear feet of these impacts involve two 30-linear foot rip rap aprons. In addition, approximately 78 linear feet of new culvert was installed along with a junction box that will be converted to an outlet structure for a detention pond (Figure 2, enclosed). On behalf of Real Estate Development Partners, CWS is submitting an After-the-Fact Permit application with attachments in accordance with Nationwide Permit General Condition No. 13, and pursuant to an After-the-Fact Nationwide Permit No. 39 (enclosed).

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Compensatory Mitigation

Construction of this project has limited the amount of stream impacts to less than 150 linear feet, therefore no mitigation is currently being proposed.

Please do not hesitate to contact us at 704-527-1177 should you have any questions or comments regarding these findings.

Gregg C. Antemann, PWS                   Matt L. Jenkins
Principal Biologist                     Biologist

Enclosures:  USGS 7.5’ Concord/Kannapolis Topographic Quadrangles
NRCS Cabarrus County Soil Survey
Figure 1.  Wetland Boundary Survey
Figure 2.  Proposed Impacts
After-the-Fact Permit Application Pursuant to a Nationwide Permit No. 39
Agent Certification of Authorization Form
DWQ Stream Classification Form (SCP1)
USACE Stream Quality Assessment Worksheet (SCP1)
USACE Routine Wetland Determination Data Form (DP1)

Y:\2005\Projects\2005-0918-07 Winecoff Commons Permitting\Permitting\NWP39report.doc
Image Courtesy of the U.S. Geological Survey

7.5 Minute Topographic Map Series, Kannapolis and Concord, North Carolina, dated 1996 and 1991 respectively. Approximate Scale 1” = 2000’
Soil Survey Courtesy of the USDA-NRCS

Approximate Scale 1" = 2000'
Unimportant Intermittent Stream A - 138 linear feet impacted

Proposed Rip Rap Apron - 30'
42" Culvert - 37'
Junction Box/Outlet Structure to Detention Pond
48" Culvert - 41'
Detention Pond
Proposed Rip Rap Apron - 30'

Legend:
- Jurisdictional Stream Channel
- Impacted Jurisdictional Channel
- New Culvert
- Rip Rap Apron

Approximate Scale: 1" = 50'

Carolina Wetland Services
550 East Westinghouse Blvd.
Charlotte, North Carolina 28217

Figure 2b. Proposed Impacts
Winozzo Commons Site
Kanapole, North Carolina
CWS Project No. 2905.0918

Prepared by: M. S.
Check: 2/14/05
Date: 2/10/05
February 15, 2005

Mr. Matt L. Jenkins
Carolina Wetland Services
550 East Westinghouse Blvd.
Charlotte, NC 28273

Subject: Winecoff Commons Site; Kannapolis, Cabarrus County
CWS Project No. 2005-0918

Dear Mr. Jenkins:

The Natural Heritage Program has no record of rare species, significant natural communities, or priority natural areas at the site nor within a mile of the project area. Although our maps do not show records of such natural heritage elements in the project area, it does not necessarily mean that they are not present. It may simply mean that the area has not been surveyed. The use of Natural Heritage Program data should not be substituted for actual field surveys, particularly if the project area contains suitable habitat for rare species, significant natural communities, or priority natural areas.

You may wish to check the Natural Heritage Program database website at <www.ncsparks.net/nhp/search.html> for a listing of rare plants and animals and significant natural communities in the county and on the topographic quad map. Please do not hesitate to contact me at 919-715-8697 if you have questions or need further information.

Sincerely,

Harry E. LeGrand, Jr., Zoologist
Natural Heritage Program

HEL/HEL
March 2, 2005

Matt Jenkins, Biologist
Carolina Wetland Services
550 East Westinghouse Boulevard
Charlotte, NC 28273

Re: Request for Records Search, Winecoff Commons Site, Kannapolis, Cabarrus County, ER 05-0261

Dear Mr. McMillan:

Thank you for the additional information concerning the above project.

We have conducted a review of the proposed undertaking and are aware of no historic resources which would be affected by the project. Therefore, we have no comment on the undertaking as proposed.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation’s Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, environmental review coordinator, at 919/733-4763. In all future communication concerning this project, please cite the above referenced tracking number.

Sincerely,

[Signature]

Peter B. Sandbeck
Sediment Survey Report

The Shoppes at Caveness Farms
Wake Forest, North Carolina
Carolina Wetland Services Project No. 2004-0808

October 26, 2004

Prepared for:

Mr. Brian Rollar
REALTICORP
14120 Ballantyne Corporate Place, Suite 160
Charlotte, North Carolina 28277
(704) 542-7773

Prepared by:

Mr. Gregg C. Antemann, P.W.S.
Mr. Matt L. Jenkins
Carolina Wetland Services
5000 Nations Crossing Road, Suite 230
Charlotte, North Carolina 28217
(704) 527-1177
Table of Contents

Executive Summary ........................................................................................................................ 1
Introduction ..................................................................................................................................... 2
Methods ........................................................................................................................................ 2
Results ......................................................................................................................................... 3
Conclusions ................................................................................................................................. 3

List of Attachments

Attachment A – Figure 1. USGS Site Location Map
Attachment A – Figure 2. NRCS Soil Survey
Attachment A – Figure 3. Sediment Survey Map
Attachment A – Figure 4. Water Depth Contour Map
Attachment B – Pebble Count Results (Figures 5a – 5c)
Attachment C – Representative Photographs
Executive Summary

The Shoppes at Caveness Farms is located in Wake Forest, North Carolina. The property is approximately 55 acres in size and is generally bordered to the west by Capital Boulevard (US 1), to the north by the Caveness Farms Apartment Complex, and to the south and east by undeveloped woodlands (Attachment A – Figures 1 and 2). Carolina Wetland Services, Inc. (CWS) visited the site on October 12, 2004 to perform a pond and stream sediment survey for the property. The purpose of this project was to collect baseline pre-existing condition information on the property prior to construction. This project performed both pond and stream monitoring services. REALTICORP has contracted CWS to provide a Sediment Survey Report for this project.
Introduction

The Shoppes at Caveness Farms is located in Wake Forest, North Carolina. The property is approximately 55 acres in size and is generally bordered to the west by Capital Boulevard (US 1), to the north by the Caveness Farms Apartment Complex, and to the south and east by undeveloped woodlands (Attachment A – Figures 1 and 2). Carolina Wetland Services, Inc. (CWS) visited the site on October 12, 2004 to perform a pond and stream sediment survey of the property. The purpose of this project was to collect baseline pre-existing condition information on the property prior to construction. This project performed both pond and stream monitoring services. REALTICORP has contracted CWS to provide a Sediment Survey Report for this project.

Methods

On October 12, 2004 CWS's Gregg C. Antemann, PWS and Matt L. Jenkins performed a sediment survey of on-site jurisdictional waters of the U.S.1 within the project area as well as an off-site, downstream pond located within the Caveness Farms Apartments Complex (Attachment A – Figure 3). The methods included the use of a kayak and Eagle® Cuda™ 168 Fish Finder model sonar in order to record sediment depths along 16 transects within the Caveness Farms Apartment complex’s pond. Sediment depth readings were also taken at nine points along on-site portions of Stream A through the use of a soil auger (Attachment A – Figure 4).

Pebble counts were conducted at three cross sections along the reach of Stream A in accordance with Rosgen’s Stream Classification Methods2. Pebble counts are used to determine the particle size distribution of channel materials and are useful in defining a channel’s hydrologic velocity, extent of sedimentation and sediment transport, and biological function. This method consists of randomly selecting bed and bank material, determining each particle’s size, and then getting a composite total for all particle sizes for stream classification purposes. For this investigation, 25 samples were obtained within each cross section, for a total of 75 samples for Stream A.

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1 “Jurisdictional waters of the U.S.” includes essentially all surface waters such as: all navigable waters and their tributaries, all interstate waters and their tributaries, all wetlands adjacent to these waters, and all impoundments of these waters.
Results

The results of the on-site field investigations conducted by CWS indicate evidence of sediment deposition (> 6 inches) along a reach of Stream A that is adjacent to Wetland B. Sediment depths range from six inches to greater than one foot in this portion of Stream A (Attachment A – Figure 3). Sediment deposition is also evident upstream along Stream A ranging in depth from 1 to 6 inches (Attachment A – Figure 3).

In general, substrate and pebble counts showed a decrease in diversity and size going from upstream to downstream (Cross Sections No. 1 to No. 3). The results of the pebble count are presented as Attachment B – Figures 5a – 5c. The D50$^3$ for Cross Sections No. 1 and 2 is between 2.0 and 8.0 millimeters, or fine gravel (Attachment B – Figures 5a and 5b). Cross Section No. 1 exhibits a slightly higher D50 than Cross Section No. 2, indicating a somewhat more stable stream substrate. The D50 for Cross Section No. 3 is between 0.062 and 0.25 millimeters, or fine sand (Attachment B – Figure 5c). Cross Section No. 3 shows that downstream areas have a much lower diversity of particle sizes. A low D50 value also indicates weaker stream substrate adjacent to jurisdictional wetland areas. Photographs of Stream A have been included as Attachment C – Photographs A and B.

The pond depth survey at Caveness Farms Apartments indicates a significant amount of deposition at the culvert outlet under Caveness Farms Avenue. Water depths of the pond range from 0-10.8 feet from the surface of the water. Depth contour patterns show possible migration of sediments from the culvert outlets (Attachment A – Figure 4). The shallowest depth of the pond occurs in its northern end. Photographs of the Caveness Farms Pond have been included as Attachment C – Photographs C and D.

Conclusions

The purpose of this project was to collect baseline pre-existing condition information on the property prior to construction. Based on the results of this investigation, it appears that sediment was released from the upstream, breached pond at some time in the past. This is primarily evident in Photograph B of Stream A and Photograph C at the Caveness Farms Apartments Pond immediately below the Caveness Farms Avenue stream crossing. However, on-site sediment and erosion control measures appeared to be functioning properly during this on-site investigation due to the lack of sediment observed within upstream on-site channel segments immediately down

$^3$ D50 = 0.5mm indicates that 50 percent of the sampled population is equal to or finer than 0.5mm in diameter.
stream of the large sediment basin. CWS recommends strict adherence to a satisfactory Erosion and Sediment Control Plan during on-site construction activities. In addition, we recommend monitoring the devices installed through this plan immediately following a rainfall event and repairing problems in a timely manner.
NOTE: CWS USED AN EAGLE® CUDA™ 168 FISH FINDER MODEL SONAR TO SURVEY WATER DEPTH OF POND ON OCTOBER 12, 2004.

Legend:
- **Blue Line**: Pond Depth
- **Dashed Area**: Sediment Deposition Area
- **Arrow**: Photo Location and Direction

Approximate Scale: 1" = 140'

Carolina Wetland Services
5000 Nations Crossing Road, Suite 230
Charlotte, North Carolina 28217


**Figure 4. Water Depth Contour Map**
The Shoppes at Caveness Farms
Wake Forest, North Carolina
CWS Project No. 2004-0808

Prepared by: MLJ
Date: 10-26-04
Checked by: GCO
Date: 1-2-05
Figure 5b. Cross Section No. 2 Pebble Count

Cumulative Percent (%)

Percent (%)

Particle Size (mm)

<0.062 0.062-0.25 0.25-0.5 0.5-1.0 1.0-2.0 2.0-8.0 8.0-16.0 16.0-32.0 32.0-64.0 64.0-128 128-256 256-512 512-1024 1024-2048 2048-4096
Figure 5c. Cross Section No. 3 Pebble Count

Cumulative Percent (%)

Percent (%)

0 5 10 15 20 25 30 35 40 45 50 60 70 80 90 100

Particle Size (mm)

<0.062 0.062-0.25 0.25-0.5 0.5-1.0 1.0-2.0 2.0-8.0 8.0-16.0 16.0-64.0 64.0-256.0 256.0-1024.0 1024.0-4096.0

- Silty Clay
- Fine Sand
- Medium Sand
- Coarse Sand
- Very coarse Sand
- Fine Gravel
- Medium Gravel
- Coarse Gravel
- Very coarse Gravel
- Small Boulders
- Medium Boulders
- Large Boulders
- Very large Boulders
- Small Cobbles
- Medium Cobbles
- Large Cobbles
- Very coarse Cobbles
- Small Boulders
- Medium Boulders
- Large Boulders
- Very coarse Boulders
- 0.5-1.0
- 1.0-2.0
- 2.0-8.0
- 8.0-16.0
- 16.0-64.0
- 64.0-256.0
- 256.0-1024.0
- 1024.0-4096.0

Percent (%) vs. Particle Size (mm)
Photograph A. View of Perennial Stream A, facing north.

Photograph B. View of Perennial Stream A, facing north.
Photograph C. View of Caveness Farms Pond from Caveness Farms Avenue.

Photograph D. View of Caveness Farms Pond, facing north.