Chapter 6 – Flood Hazard Areas

6.1 Introduction

The responsibility for reducing flood losses is shared by all units of government—Local, State, and Federal— and the private sector. To fulfill this responsibility, landowners and/or professionals planning any "development" activity within the flood hazard areas should have the knowledge and skills to plan, design, and construct their project in compliance with flood hazard regulations.

For purposes of flood hazard areas management, "development" means any man-made change to improved and unimproved real estate, including, but not limited to, buildings or other structures, mining, dredging, filling, grading, paving, excavating, or drilling operations. Good management of flood hazard areas begins with an effective set of regulations that have as their ultimate goal to effectively promote public health, safety, and general welfare and minimize losses to life and property due to flood conditions. This should result in a safe and viable community, while providing for lower flood insurance premiums for policyholders.

Wake County seeks to promote public health, safety, and general welfare and to minimize public and private losses due to flood conditions within flood prone areas by implementing the ordinance provisions of UDO Article 14 designed to:

- Restrict or prohibit uses that are dangerous to health, safety, and property due to water or erosion hazards or that result in damaging increases in erosion, flood heights or velocities;
- Require that uses vulnerable to floods, including facilities that serve such uses, be protected against flood damage at the time of initial construction;
- Control the alteration of natural floodplains, stream channels and natural protective barriers, which are involved in the accommodation of flood waters;
- Control filling, grading, dredging and all other development that may increase erosion or flood damage; and
- Prevent or regulate the construction of flood barriers that will unnaturally divert flood waters or that may increase flood hazards to other lands.

The current floodplain ordinance was adopted by the Board of Commissioners on May 19, 2003 through RESOLUTION R-2003-29:

> INTRODUCING AN ORDINANCE AMENDING THE WAKE COUNTY ZONING ORDINANCE TO ADDRESS FLOOD HAZARD AREAS
> WHEREAS limiting development in the floodplain minimizes the amount of property damage that will occur during storms and protects lives; and
> WHEREAS undeveloped floodplains filter sediment and other pollutants and help protect water quality; and
> WHEREAS the Wake County Watershed Management Plan recommends that county regulations be revised to prohibit development and filling in the 100-year floodplain;
> The Board unanimously adopted an amendment to the Wake County Zoning Ordinance prohibiting development and fill within the 100-year floodplain.

6.2 Exceeding FEMA Minimum Standards

Wake County enforces flood protection with higher standards than those required by the State and Federal ordinances.

The flood hazard areas regulations for Wake County exceed the FEMA minimum floodplain management standards to reduce the vulnerability due to flood events that will occur in the future. Adoption of these higher standards will reduce the risk of loss of life and decrease the amount of damage in future floods. The existence of these higher standards has also provided for reduced flood insurance premiums for all policy holders in the community.

The general factors for exceeding the FEMA minimum Floodplain requirements include:

- Elevate structures (FFE) to at least the Regulatory Flood Protection Elevation; 1 foot above BFE is recommended for properties adjacent to FEMA food zones (State Model Ordinance recommends 2-4 feet above BFE)
- Elevate structures (FFE) 1 foot above flood hazard contour for Flood Soils; 2 feet above highest adjacent grade as needed
- Fill in the special flood hazard area is prohibited
- CFM certifications for staff
- Restrict development in flood hazard soils
- Require Flood elevation certificates for structures near flood hazard areas
- Require 100-year backwater elevations be shown on plans
- Require 100-year backwater easements for encroachments

In addition, Wake County has several standards to minimize flooding and protecting flood hazard areas, such as:

- Limiting residential built upon area based on zoning (6% to 30% per UDO)
- Requiring volume control for all new subdivisions
- Requiring a Downstream Impact Analysis as part of a Stormwater Management Permit
- Requiring impoundments retained within subdivisions be constructed or upgraded to accommodate and safely pass the 100-year storm and require jurisdictional determination. See Article 14 of Wake County UDO.
- Enforcing Neuse River Riparian Buffers County-wide
- Purchasing of floodplains for open space protection by the County
- Preserving natural, undisturbed vegetation within water supply watershed areas with additional buffer requirements

6.3 Flood Hazard Areas

Wake County currently regulates two primary types of flood hazard areas: FEMA Flood Zones (Special Flood Hazard Areas) identified on Digital Flood Insurance Rate Maps provided by the National Flood Insurance Program arm of the Federal Emergency Management Agency (FEMA) and Flood Hazard Soils Areas identified in "The Soil Survey, Wake County, North Carolina". Wake County also has development requirements for other flood hazard sources. Any development within these areas is subject to the standards of this chapter.

6.3.1 FEMA Flood Zones

The FEMA Flood Zones is often referred to as the floodplain, a land area susceptible to being inundated by water from the base flood. The FEMA Flood Zones consist of the floodway or non-encroachment area and the floodway fringe. FEMA employs a "floodway" concept for detail studied streams to regulate development within a specified distance to the creek centerline. This method employs engineering modeling which sets the location of FEMA floodway encroachment lines on both sides of the stream. On streams that have a Limited Detail Study a non-encroachment area is defined that is regulated the same as a floodway on a stream with a Detail Study (National Flood Insurance Program). FEMA mapping includes only areas with a contributing drainage area of a least one square mile (640 acres).
The current FEMA maps were adopted July 19, 2022. There are 260 panels in Wake County. See Figure 6.3.1. For the most current panel, go to the Effective Index Map at the NC FRIS website.

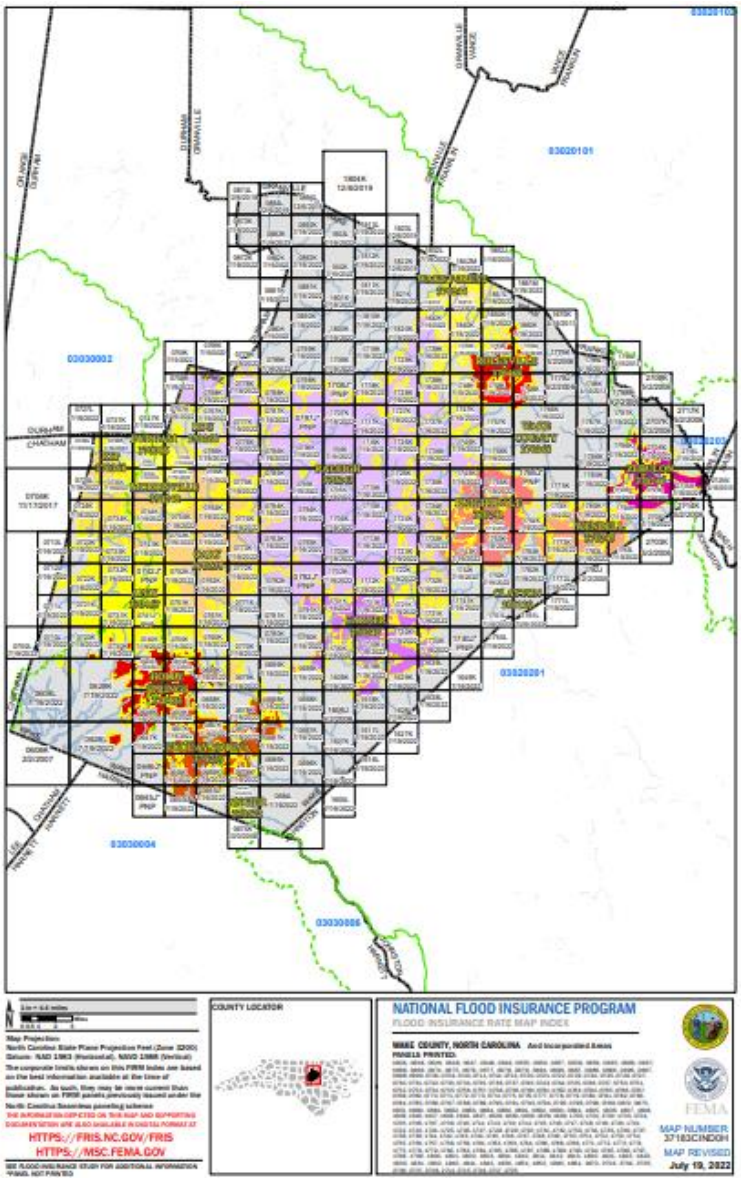

Figure 6.3.1 Wake County NFIP Map Panels

6.3.2 Flood Hazard Soils

Flood hazard soils are those soils with the characteristic of flooding, or the temporary inundation of an area caused by overflowing streams or by runoff from adjacent slopes, as indicated in the Soil Survey of Wake County and the Web Soil Survey. Wake County regulates those areas specified as flood hazard soils as having severe limitations for sites due to the risk of flooding. Best available information is used in reviewing plans.

Flood hazard soil boundaries may be modified by field investigation by a North Carolina licensed soil scientist. The report of the field investigation must conclude with a description of the actual soil horizons which were encountered on the site. These soils must be placed in a soil complex or major soil association as prescribed by the standards and guidelines of the American Registry of Certified Professionals in Agronomy, Crops, and Soils, or the checklist of the Department of Environmental Services(see 6.4.3 Development Located in Flood Hazard Soils for list to re-delineate the flood hazard area). Alternatively, a North Carolina licensed surveyor may survey and seal the extent of flood hazard soils adjusted for topography, either as determined by a soil scientist or as verified from the published Wake County Soil Survey Map. A Flood Study may be used in lieu of a soil scientist at the discretion of the Watershed Management staff. More guidance on flood hazard soils may be found in UDO Article 14.

The 1970 Soil Survey must be used for buffer delineation. Revised soils maps have been provided through the Web Soil Survey (WSS). North Carolina participated in the National Cooperative Soil Survey by providing technical support in Wake County update. Approximately 185,000 acres of the survey (or 35% of the county) has been re-mapped to represent the soil types and changes more accurately in land use. The mapping has been updated using ArcGIS supported by data collection in the field and data analysis.

Wake County has added the Web Soil Survey (WSS) soils layer to internal iMAPS is using the more restrictive of the soils layers (1970 or web soil survey) in evaluating permits. Soil studies with borings to accurately map soils on a project site are accepted for staff review and approval.

6.3.3 Impoundments and Dams

Dams are owned and operated by individuals, private and public organizations, and various levels of government. The responsibility for operating and maintaining a safe dam rests with the owner(s). The North Carolina Dam Safety Law of 1967 defines a dam as "a structure and appurtenant works erected to impound or divert water." Maintaining a safe dam is a key element in preventing failure and limiting the liability that an owner could face. Owners can be fiscally and criminally liable for any failure of a dam and all damages resulting from its failure. Any uncontrolled release of the reservoir, whether the result of an intentional release or dam failure, can have devastating effects on persons, property, and the environment.

Dams are classified to identify their potential hazard by North Carolina Dam Safety. Owners of High and Intermediate Hazard dams are required to prepare and update annually Emergency Action Plans. Plans shall be submitted to the North Carolina Dam Safety Program.

Dams created for erosion control and stormwater measures may be subject to the NC Dam Safety Act. Construction plans shall be submitted to the State for a jurisdictional review. Any construction, repair, alteration, or removal of a jurisdictional dam shall obtain approval from appropriate jurisdictional authorities. Impoundments retained or constructed in subdivisions are required to accommodate the 100-year, 24-hour storm event. Minor and minor-limited subdivisions have the option of obtaining jurisdictional determination/hazard classification from the North Carolina Dam Safety Program in place upgrading impoundments to meet the 100-year, 24-hour storm event. If applicable, the provided dam state identification number must be recorded on the subdivision plat along with a note regarding responsibility for dam maintenance and repair.

Construction below dams is reviewed as a flood hazard and is discouraged. Additional analyses may be requested on a case-by-case basis to identify hazard areas and set finished floor elevations. Data shall be submitted to the State Dam Safety office for review.

6.3.4 Other Potential Flood Hazards

In addition to restricting development from FEMA mapped areas and areas of flood hazard soils, Wake identifies and restricts development in other high hazard areas. These include areas below high hazard dams, adjacent to water features (buffered and non-buffered), backwater areas from culverts, and stormwater devices and other site-specific features that may increase flood potential. Drainage basins that have a contributing drainage area of 640 acres or greater may require a study to identify flood hazards. The County requires these items to be noted on record plats and submitted development plans. Lots that are wholly or substantially in a flood hazard area may not be considered for Minor Subdivisions per Wake County UDO Article 19-32-2(f).

6.4 Permitting

As a participant in the National Flood Insurance Program, Wake County is required by FEMA to regulate development within FEMA flood zones. Any allowable development within flood hazard areas must comply with applicable regulations and procedures. Development is defined as "any man-made change to improved or unimproved real estate, including, but not limited to, buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations, or storage of equipment or materials."

Any activity in the flood hazard areas that goes beyond routine maintenance, gardening, and farming requires Watershed Management approval prior to beginning to work. Passive land use activities, typically on-going and routine in nature are allowable uses without a permit. The following section contains a list of activities allowable without a permit provide the uses and/or activities in the flood hazard areas will not alter the topography and drainage by construction, increase the base flood elevation and does not involve development. Even though a project may not require a flood permit, additional permits may be required from per UDO Article 19-42 Permits.

6.4.1 Uses Allowed Without a Flood Permit

The following uses are allowed within a special flood hazard areas without a permit provided the existing topography and drainage is not altered by construction, the level of the base flood is not increased, and the use does not involve any man-made change to improved or unimproved real estate (including, but not limited to, buildings or other structures, mining, dredging, filling, grading, paving, excavation, drilling operations, or storage of equipment or materials):

- General farming, pasture, outdoor plant nurseries, horticulture, forestry, wildlife sanctuary, game farm, and other similar agricultural, wildlife and related uses;
- Ground level loading areas, parking areas, rotary aircraft ports and other similar ground level area uses;
- Lawns, gardens, play areas, and similar uses; and
- Golf courses, tennis courts, driving ranges, archery ranges, picnic grounds, parks, hiking or horseback riding trails, open space and other similar private and public recreational uses.

Permits are required for all other projects that do not meet the requirements of those listed in Uses Allowed Without a Flood Permit. Residential projects are reviewed through the building permit review process. Non-residential projects are subject to review by the Floodplain Administrator and may require a Floodplain Encroachment Permit.

6.4.2 Building Permits and Flood Hazard Areas Review

The North Carolina Building Code establishes minimum regulations to govern the construction and maintenance of buildings and structures and is adopted and maintained by the Building Code Council. Additional building requirements can be found in Article 5 – Lot and Building Standards of the Wake County UDO. All buildings or structures in the special flood hazard area must comply with all applicable requirements in the NC Building Code. Please note that the NC Building Code does not supersede the requirements of the special flood hazard areas, as some requirements may be more restrictive.

Construction of new buildings and structures adjacent to or within flood hazard areas require flood permitting. Any proposed new buildings and structures on a lot that has flood hazard areas on the property will be required to have a Flood Certification review for compliance with the flood hazard areas regulations as part of the building permitting process. UDO Article 14-14-2 outline items that should accompany the building permit application. In most cases, additional information is not necessary, and the building permit will not be delayed from being issued. In other cases, survey information or a separate Flood Permit is necessary to ensure compliance with the flood hazard areas regulations.

The typical steps for permitting residential structures within the flood hazard areas on the property can be found in Section 4.4. Non-residential and utility projects with flood encroachment that do not cause an increase in flood levels such as underground utilities and power pole replacements shall apply through the Permit Portal for a Flood Encroachment Permit. Additional information such as a site plan and/or No Rise Certification may be required. If the utility project causes a change in base flood elevations, then a flood study will be required. Applicants shall contact the Floodplain Administrator for direction.

6.4.3 Flood Hazard Elevation Certification

The Flood Hazard Elevation Certificate is an important administrative tool for Wake County. It is to be used to provide elevation information necessary to ensure compliance with Wake County's Unified Development Ordinance. A Flood Hazard Elevation Certificate may be required if any development activity has been proposed for property located in areas of flood hazard areas. All Flood Certifications must be performed by a North Carolina licensed Land Surveyor and reviewed by Wake County Watershed Management Staff.

Development Located Within 100 Feet of Flood Hazard Areas

If structures are located within 100 feet of a flood hazard area, the Professional Land Surveyor may need to complete pre-construction Flood Hazard Elevation Certification Form prior to construction to verify the structure is located outside of the flood hazard area. Inspections and permits may be placed on hold until the pre-construction certification form is received. A post-construction Flood Hazard Elevation Certificate Form will be required to verify the structure is not within the flood hazard area. The pos-construction form is required prior to receiving the Certificate of Occupancy.

Development Located Within Flood Hazard Soil

If structures or fill are to be placed within the limits of flood hazard soils and have a drainage area of five or more acres, there are two options available: re-delineation of flood hazard soil boundary or completion of a flood study to determine the flood boundary and set the base flood elevation.
To re-delineate the flood hazard area, a Licensed Soil Scientist may modify flood hazard soil boundaries by means of field investigation. The report must include a narrative of how the soil evaluations were conducted, method of sampling, and profile/pedon descriptions of major soil series (indicate dominant soil series or complex of soil series). Soils are to be described in accordance with the Field Book for Describing and Sampling Soils, reference USDA-NRCS. Information supporting the field investigation is to include a map to scale with legend, which delineating soils limits per the Wake County Soil Survey, location of soil borings/samples, and the re-delineated soil series areas. Re-delineation of soil areas is also to be supported by field flagging.

When the flood hazard area has been re-delineated, The Professional Land Surveyor should record a new plat to document the revised flood hazard condition.

Where flood soils are associated with wetlands rather than riverine conditions, modeling may not be an option to remove the flood soils. Proposed construction activity may require wetland delineations, soil surveys to determine depth to water table, etc. Fill placed in these areas may be subject to 401/404 permitting and would require a flood study to determine the impact of fill on adjacent properties. Construction in these areas is not recommended. Protection as open space should be considered.

6.4.4 Flood Studies

A flood study must be performed if the proposed construction activity involves a roadway, driveway and/or other encroachments into or through Wake County Flood hazard soils, FEMA floodplain or other areas identified as flood hazards.

Minor subdivisions with proposed road crossing of flood hazard areas, shall submit for flood study permit prior to plat approval. Flood backwater areas shall be delineated on the plat as BFE plus one foot. Regular subdivisions with proposed road crossings or share driveways crossing flood hazard areas, shall submit for flood study permit prior to construction plan approval. Stormwater devices are allowed in flood hazard areas on a case-by-case basis and will require flood study permit approval. See the SCM section for restrictions on device types.

A flood study must show compliance with Article 14 of the Wake County Unified Development Ordinance and accomplish the following:

1. Ensure flood depths are not increased on neighboring properties. Off-site easements may be required as needed to document and establish MFFE.
2. Ensure the lowest building level is built above the 1% annual chance flood elevation (MFFE shall be recorded on adjacent lots).
3. The 100-year backwater elevation shall be defined and recorded on the subdivision plat.
4. Determine if flood waters will top the foundation pilings/piers under the house during the 1% annual chance storm and required freeboard; provide a minimum of one (1) foot of vertical freeboard for flood hazard soils and two (2) feet of vertical freeboard as by recommendation from FEMA. If the foundation will be topped by floodwaters (i.e., natural ground elevation at the building site is below the 1% annual chance flood elevation), a special foundation design is required. The foundation must be designed to withstand the various forces it will be subjected to during the 1% annual chance storm event.
5. Public roads may not be overtopped; private roads and driveways may not be overtopped by more than six inches during the 1% annual chance event.
6. An as built survey is required for each approved flood crossing. Building permits may be required for bridges.

A flood study must be performed by a Professional Engineer and reviewed by Wake County Watershed Management Staff. Applicants shall apply for a permit through the Permit Portal and select "Flood Study". The Wake County Checklist for Flood Study Submittal is required.

Fees per crossing	Drainage area	Permit Fee
Minor	< 100 acres	$500
Major	>100 acres	$1,000

Minor flood studies for drainage area between 5 acres and 100 acres may use design flows based on NCDOT Guidelines for Drainage Studies and Hydraulic Design.

The design must be based upon the establishment of a temporary or permanent benchmark and an analysis of the effects of the proposed encroachment to establish a base flood elevation or depth of flow, using Manning's Equation, field surveyed cross-sections including channel slope, Wake County Topographic Maps, and, where appropriate, use of Culvert Headwater Charts.

Benchmarks are not required when establishing a depth of flow. A minimum of one vertical foot must be added to the calculated base flood elevation or depth of flow to provide a factor of safety due to the potential backwater effects of the encroachment. The analysis must conclude that no existing structures, proposed structures or offsite properties will be inundated by the base flood. An as-built certification of compliance with the construction drawings must be provided prior to receiving a footing inspection from the Wake County Building Inspections Division on any structures on any lots involved in the analysis. The as-built certification with the construction drawings is in addition to any elevation certifications which may be required for the structures.

Structure design shall be for at least the Q10 storm, Q25 in watershed water supply areas. The flood evaluation shall be for the Q100 storm.

Submittal Requirements for Minor Flood Studies:

1. Current Submittal Checklist
2. Narrative / Discussion of methods and results
3. Drainage area maps
4. Site plan with location, plan and profile of crossing
5. Location photos
6. Calculations and/or modeling

Major flood studies for drainage areas greater than 100 acres and FEMA crossings require FEMA no rise certification or map revision must conduct modeling analysis using HEC-RAS and follow the HEC-RAS submittal checklist. Areas with greater than 640 acres of drainage shall be modeled in a manner consistent with FEMA methods.

The design must be based upon the establishment of a temporary or permanent benchmark based on National Geodetic Vertical Datum and an analysis of the effects of the proposed encroachment to establish a base flood elevation; using Manning's Equation, the Standard Step Method to analyze backwater effect, field surveyed cross sections including channel slope, and where appropriate, use of Culvert Headwater Charts. The analysis must conclude that no existing or proposed structures, or offsite properties will be inundated by the base flood. As-built certification of compliance with the construction drawings must be provided prior to receiving a footing inspection from the Wake County Building Inspections Division on any structures on any lots involved in the analysis. The as-built certification with

the construction drawings is in addition to any elevation certifications which may be required for the structures (UDO Article 14).

Crossings shall be designed for at least the Q10 storm, Q25 in watershed water supply areas. The flood study evaluation shall be for the Q100 storm. Larger conveyances may be needed to avoid offsite impacts.

Submittal Requirements for Major Flood Studies:

- HEC RAS submittal checklist (this is in addition to the County Flood Submittal checklist)
- Submittal in the format provided by the HEC RAS Study Format Figure 1 image
- Cover Page
- Table of Contents
- Narrative / Discussion
- Drainage area maps
- Site plan with location, plan and profile of crossing
- Location photos
- Calculations and modeling output

Permit Details

- Flood Hazard regulations are outlined in the Wake County Unified Development Ordinance, Article 14. For Flood Hazard Soils Areas, the following rules and procedures apply:
- Encroachments may be exempt if there is less than 5 acres of drainage (may require Professional Land Surveyor or Professional Engineer to check the drainage area and certify that the drainage area is less than 5 acres).
- Flood Hazard Soil Boundaries may be modified by a field investigation by a Licensed Soil Scientist. The report of the field investigation shall conclude with a description of the actual soil horizons that were encountered on the site.
- A flood study may be performed by a licensed design professional (professional engineer, landscape architect or surveyor) to delineate the 1% annual chance floodplain. This is the most accurate way to determine the actual flood limits for a floodplain area. In Zone A, a flood study is required for subdivisions with greater than 50 lots or 5 acres of drainage to establish BFE. Flood boundaries and elevations shall be delineated on the recorded plat and Minimum Finished Floor Elevations (MFFE) identified on lots as needed.
- Note: The options above are performed at the applicant's expense. Wake County Flood Permit fees apply.

For FEMA-Identified Special Flood Hazard Areas, the following rules and procedures apply:

- Flood studies, prepared by a Registered Professional Engineer from field-surveyed information supplied by a Registered Professional Land Surveyor.
- If the mapping error involves an area of high land that was not reflected on the FEMA FIRM maps, it is possible to correct these errors with the assistance of a Registered Professional Land Surveyor

only. Changes to FEMA maps require FEMA approval through a Letter of Map Amendment (LOMA). Please note, Wake County does not allow fill in FEMA flood hazard areas and LOMR-F may not be recognized by the Floodplain Administrator.

- The applicant is responsible for the expense of flood studies and LOMAs. There are review fees charged by both FEMA and Wake County for flood studies as well as fees for changes to the FIRM maps, if required.

6.4.5 Letters of Map Revision and No Rise Certifications

Prior to issuing any permits involving activities in a FEMA-Flood Zones, Wake County may require a no-rise certification stating the proposed development will not impact the pre-project base flood elevations, floodway elevations, or floodway data widths. No Rise Certifications for allowable encroachments (typically road projects) will be submitted through the Permit Portal with the construction plans. Technical reviews of any No Rise modeling will also be conducted by NC DPS staff. To establish a "No-Rise", a Registered Professional Engineer will perform hydraulic modeling in accordance with standard engineering practice to determine the impacts on the stream.

Required model runs (NC NFIP Guidance Document #1: NC NFIP Review of No-Rise Submittals) include:

- Effective Model
- Duplicate Effective Model
- Corrected Effective Model
- Existing Conditions
- Proposed Conditions

For some cases in which a no-rise certification is achieved but the FEMA-Flood Zones is significantly affected, the Floodplain Administrator may require a Letter of Map Revision after construction. When a project causes a rise in the FEMA-Flood Zones, it will need to undergo the Conditional Letter of Map Revision (CLOMR) process and receive comments regarding the impacts of the proposed project. A CLOMR is FEMA's comment on a proposed project that would, upon construction, affect the hydrologic or hydraulic characteristics of a flooding source and thus result in the modification of the existing regulatory floodway, the effective Base Flood Elevations (BFEs), or the Special Flood Hazard Area (SFHA). The letter does not revise an effective NFIP map, it indicates whether the project, if built as proposed, would be recognized by FEMA. FEMA charges a fee for processing a CLOMR to recover the costs associated with the review. Building permits cannot be issued based on a CLOMR, because a CLOMR does not change the NFIP map.

Once a project has been completed, the community (local government) must request a revision to the Flood Insurance Rate Map (FIRM) to reflect the project. "As-built" certification and other data must be submitted to FEMA to support the revision request. Once accepted, the official Digital Flood Insurance Rate Map (DFIRM), Flood Boundary and Floodway Map (FBFM), or both, are updated by FEMA to reflect the new FEMA-Flood Zones conditions.

Wake County signs off on MT-2 forms for Letters of Map Revision for any projects submitted in Wake County. The permitting authority stays with the local government (Apex, Cary, Raleigh, etc.). Wake County will provide Property Owner Notification (PON) letters on County letterhead for impacted residents in the unincorporated areas. Mass mailings will be handled by the permitting local government or their consultant.

Engineering Analysis

The following section outlines the procedures for completing an engineering analysis of flood hazard area impacts. It includes paths to conducting an analysis for FEMA-Flood Zones by: (1) verification of no adverse impacts to FEMA-Flood Zones and (2) verification of known adverse impacts and the subsequent map and model updates. Analysis for flood hazard soils can be complete by using culvert headwater charts for inlet and outlet computations or the standard step-backwater computer model. In addition to the Flood Study Submittal Checklist, there are several documents that must be submitted for review to confirm compliance with UDO Article 14.

Below is a summary of the documentation that may be required to be submitted with a permit application:

Local, State and Federal Permits: State and federal permits may be required for some types of development, such as compliance with Endangered Species Act requirements or permits through the U.S. Army Corps of Engineers or the North Carolina Department of Environmental Quality for working within Waters of the United States. If required, all applicable state and federal permits must be submitted prior to the permit being approved. Permit numbers for other locally required permits (e.g. building permit, land disturbance permit) must also be provided.

Site Plan: A site plan must be provided for all proposed development in and adjacent to the flood hazard area. The site plan must show the type of flood hazard, setback distances from the flood hazard to the building(s) (if applicable), footprint of proposed development, scale bar, north arrow, property information (e.g., address, PIN), existing land use/land cover, and topography data matching what was used in the flood analysis.

Engineering Report: The Engineering Report is a concise statement of the study including the general location, purpose, objectives, a brief history, any observations or engineering judgments, and property documentation. The report must show all relevant calculations associated with the proposed development.

- The report must also contain one copy of the flood study. All hydrologic and hydraulic analyses shall be signed and sealed by a Professional Engineer licensed in North Carolina, and all topographic maps, grading plans, and construction drawings shall be signed and sealed by a licensed professional.

Engineering Drawings: Drawings sealed by a design engineer shall include plan and profile views of the crossing design and include materials.

- For any hydraulic analysis, field surveyed cross-sections must be submitted on signed and sealed engineering drawings with a title block and a true scale. A cross-section location plan showing topography, extent, and orientation of each cross-section is also required.

6.4.5 FEMA Elevation Certificate

For structures located on properties with FEMA flood hazard areas, three FEMA Elevation Certificates providing elevation and flood vent information shall be provided. The most current FEMA Elevation Certificate (EC) form shall be used. The EC is an important administrative tool for the NFIP, as it is used to determine the proper flood insurance premium rate, to document elevation information necessary to ensure compliance with SFHA regulations and to support a request for a Letter of Map Change (LOMC).

The certification process is as follows:

- The first EC form shall be submitted with the permit application indicating the proposed lowest floor based on drawings,
- The second EC form shall be submitted after the lowest floor has been constructed. This EC form must be approved by Watershed Management staff before vertical construction may continue, and
- The third EC form shall be submitted after final construction has been completed, and must be approved by Watershed Management staff prior to the Certificate of Occupancy being issued.

6.4.6 Flood Hazard Encroachment Permit

The intent of the Flood Hazard Encroachment Permit is to document uses or activities in the flood hazard area which inherently will not increase or will result in no technically measurable increase in base flood elevations for projects. The projects may consist of construction activities, typically underground or above ground activities that are not technically measurable in hydraulic modeling or construction and maintenance activities, typically above ground and known to not increase flood levels. These projects are all approved under the Flood Hazard Encroachment Permit. To obtain a Flood Hazard Encroachment Permit, a completed application must be submitted along with a site plan. Contact the Floodplain Administrator for additional guidance on specific activities that may be considered under the Flood Hazard Encroachment Permit.

6.4.7 Floodproofing Certificate

While Wake County prohibits fill and development in the floodway and flood fringe, Wake County is required to include the State minimum floodplain language for compliance with NFIP.

The NFIP regulations require buildings to be designed and constructed to resist flood damage, which is achieved primarily through elevation. The floodproofing of non-residential buildings may be permitted as an alternative to elevating to or above the base flood elevation; however, a floodproofing design certification is required. For insurance rating purposes, a building's floodproofed design elevation must be at least one foot above the base flood elevation to receive full rating credit for the floodproofing. If the building is floodproofed only to the base flood elevation, the flood insurance rates will be considerably higher.

When floodproofing is used, the certification shall be prepared by or under the direct supervision of a North Carolina Licensed Professional Engineer or Architect and certified by same. The Floodplain Administrator shall review the certificate data submitted. Deficiencies identified during the review shall be corrected by the applicant prior to permit approval. If the building is not constructed in accordance with the certified plans, the Certificate of Occupancy could be withheld.

6.4.8 Emergency Authorization

In some cases, development must be conducted immediately to protect the environment and/or public health, safety, or welfare, and the applicant does not have time to first apply for permits. In such cases, the applicant may request an Emergency Authorization. If the Floodplain Administrator issues an Emergency Authorization, the applicant must still apply for a Flood Permit and ensure that all development complies with UDO Article 14 after the Emergency Authorization is granted.

6.5 Specific Development Activities and Requirements

This section is intended to provide additional guidance on specific development activities and requirements outlined in Article 14. - Flood Hazard Areas of the UDO. This does not include all types of development, nor does it include all ordinance requirements that apply within flood hazard areas.

6.5.1 Substantial Improvements or Substantial Damage

Substantial damages and substantial improvements require that structures be brought into compliance with the current requirements for new construction with UDO Article 14. Substantial Improvement is any improvement to a structure where the cost of the improvements is greater than or equal to 50% of the market value of the structure before the start of construction of the improvement. A Substantial Damage is damage to a structure from any origin, not just flooding, where the cost to repair the structure to the pre-damaged value equals or exceeds 50% of the market value of the structure before the damage occurred. By definition, a substantial damage is also considered a substantial improvement. Additional information is available in FEMA's Substantial Improvement/ Substantial Damage Desk Reference.

If existing violations of state or local health, sanitary, or safety codes were identified through the county's code enforcement process before a substantial damage or substantial improvement occurs, the costs to address the violation may not be incorporated into the substantial damage or substantial improvement determination. However, the violation must have been documented in writing and must be the minimum improvements necessary to assure safe living conditions.

6.5.2 Flood Insurance

Wake County has a State approved floodplain ordinance so that its residents may qualify for flood insurance through the National Flood Insurance Program (NFIP).

FEMA is focused on building a culture of preparedness by closing the insurance gap. Recognizing that purchasing flood insurance can be confusing and time-consuming, the National Flood Insurance Program (NFIP) is redesigning its risk rating plan to improve the policyholder experience. Historically, FEMA flood maps have been the basis of flood insurance rates. Risk Rating 2.0 aims to deliver rates that are fair, easy to understand, and better reflect a property's unique flood risk.

Risk Rating 2.0 will fundamentally change the way FEMA rates a property's flood risk and prices insurance. The previous rating methodology had not changed since the 1970s and FEMA's rates were based predominantly on Flood Insurance Rate Map zone and Base Flood Elevation. With Risk Rating 2.0, FEMA is pairing state-of-the-art industry technology with the NFIP's mapping data to establish a more comprehensive understanding of risk at both the community and individual level.

Risk Rating 2.0 will help customers better understand their flood risk and provide them with more accurate rates based on their unique risk. This will include determining a customer's flood risk by incorporating multiple, logical rating characteristics–like different types of floods, the distance a building is from the coast or another flooding source, or the cost to rebuild a home. The new rating plan will also aim to ensure customers will no longer face dramatic rate increases during map changes or at the edge of flood zones. By reflecting the cost to rebuild, the new rating plan will also aim to deliver fairer rates for owners of lower-value homes.

Risk Rating 2.0 will comply with existing statutory caps on premium increases. This will help transition policyholders who may face otherwise substantial rate increases. The goal through Risk Rating 2.0 is to help people better understand their flood risk so they can make informed decisions when it comes to protecting the financial investments, they have made in their homes.

Risk Rating 2.0 will initially provide credits for three mitigation actions:

- Installing flood openings per the 44 CFR 60.3 criteria;
- Elevating structures onto posts, piles, and piers;
- Elevating machinery and equipment above the lowest floor.