NORTH CAROLINA
WAKE COUNTY

MEMORANDUM OF AGREEMENT

BETWEEN

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	and	NORTH CAROLINA FLOODPLAIN MAPPING PROGRAM

This **MEMORANDUM OF AGREEMENT**, hereinafter referred to as the "MOA" or "Agreement," made and entered into the 12th day of August, 2016, between the Department of Transportation, an agency of the State of North Carolina, hereinafter referred to as the "**Department**," and the North Carolina Floodplain Mapping Program, an office within Emergency Management in the Department of Public Safety of the State of North Carolina, hereinafter referred to as the "**NCFMP**."

WITNESSETH:

WHEREAS, in May1977, the President of United States issued Executive Order 11988, in which it directed Federal Agencies to take certain steps to avoid adverse impacts associated with the occupancy and modification of floodplains; and,

WHEREAS, in 1982, the Federal Highway Administration (FHWA) entered a Memorandum of Understanding with Federal Emergency Management Agency (FEMA) entitled "Procedures for Coordinating Highway Encroachments on Floodplains with the Federal Emergency Management Agency (FEMA)," in which it provides guidance to highway design engineers in regard to complying with National Flood Insurance Program (NFIP) standards for Federal-aid highway actions involving regulatory floodways; and,

WHEREAS, in 1989, the North Carolina General Assembly created the North Carolina Highway Trust Fund for the construction and improvement of North Carolina roadways and bridges; and,

WHEREAS, in July 1990, the Governor of North Carolina issued State Executive Order 123, in which it directed the Department to work directly with the Federal Department of Transportation and FEMA to apply appropriate standards and management to comply with the Floodplain Management Policy relevant to highway construction within floodplains; and,

WHEREAS, in September 1992, the FHWA issued NS 23 CFR Part 650A, Transmittal 5, in which it provides highway design engineers with guidance regarding highway crossings that encroach on floodplains where a Detailed Study has been performed, but no regulatory floodway designated, resulting in an increase of no more than 1 foot in Base Flood Elevation (BFE); and,

WHEREAS, in September 2000, FEMA delegated the responsibility to the NCFMP in the Division of Emergency Management within the North Carolina Department of Public Safety to update and maintain the Special Flood Hazard Areas (SFHAs), Digital Flood Insurance Rate Maps (DFIRMs), and all the Letter of Map Changes (LOMCs) in North Carolina; and,

WHEREAS, on August 17, 2006, the FHWA Resource Center and North Carolina Division, the FEMA Region IV, the NCDOT Hydraulics Unit and the NCFMP staff met in Raleigh, North Carolina to discuss the compliance requirements for the NFIP; and,

WHEREAS, both the Department and the NCFMP recognize the need to function as a cooperative team in order to effectively deliver the Department's multi-modal transportation programs that include road, bridge and culvert construction or repair, maintenance facilities, ferry facilities, greenways, railroad, etc.; and,

WHEREAS, the Department and the NCFMP mutually agree this Agreement allows for efficient use of both agencies' resources and has been developed in a manner to streamline project reviews and construction schedules in a cost effective way; and,

WHEREAS, on June 8, 2008 the Department and the NCFMP signed, and later modified on March 18, 2009, this Agreement to satisfy the NFIP requirements and to keep the NCFMP's DFIRMs current in regards to the Department's projects; and,

WHEREAS, in November 2011, the FHWA issued to the Department a review report entitled "Process Review of the Hydraulics Program of the North Carolina Department of Transportation," in which it expressed concern over the Non-Encroachment Areas being treated as floodways by the NCFMP, which consequently results in the construction of longer bridges than necessary on Department projects across the state. It directed the Department to adhere to the FHWA's 23 CFR 650A guidelines and work with the NCFMP to resolve this issue; and,

WHEREAS, on April 22, 2013, the Department and the NCFMP modified this Agreement to address FHWA's comments listed above. Under the modified MOA the two agencies added MOA Types 2d and 2e for the BFE increases on the Limited Detailed Studied streams; and,

WHEREAS, on January 30, 2015, the President of the United States issued Executive Order 13690, establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input, which amended Executive Order 11988, Floodplain Management, issued in 1977; and,

WHEREAS, on Feb 5, 2015, the Department and the NCFMP modified this Agreement to include the delegation of authority to the Department's State Hydraulics Engineer for approvals of MOA Types 1, 2a and 2d. MOA Type 2f was also added to this Agreement. Both agencies agree that this delegation further streamlines the MOA process while still ensuring appropriate reviews, and coordination continues to occur between the two agencies; and,

WHEREAS, the Department and NCFMP, in accordance with the provisions hereinafter set forth propose to modify this Agreement to include one modification of an existing process and two new processes that are necessary when:

i. there exist alternative methods or applications that result in more scientifically or technically correct estimates of flood elevations regulated under the NFIP;

ii. proposed conditions would result in an increase in the Base Flood Elevation that remains solely within the Department's Rights of Way;

iii. the As-built survey deviates from the design reports and engineering models.

Both agencies agree these changes will further support continued compliance with FEMA's NFIP.

NOW, THEREFORE, the two agencies hereto, each in consideration of the promises and undertakings of the other, as herein provided, do hereby covenant and agree, each with the other, as follows:

1. The Department shall coordinate with, and provide the information to the NCFMP as follows:

Type 1 Provide design data and map updates to the NCFMP for projects that result in No-Rise, as defined in Exhibit A;

Type 2a Provide design data and map updates to the NCFMP for projects that result in Minor Impacts, as defined in Exhibit A;

Type 2b Provide design data and map updates to the NCFMP for projects that result in Measurable Impacts, as defined in Exhibit A;

Type 2c Provide design data and map updates to the NCFMP for projects that are in the FEMA flood study areas with missing or erroneous data, as defined in Exhibit A;

Type 2d Provide design data and map updates to the NCFMP for projects that result in an increase of greater than 0.1 foot, but less than 0.5 feet in the Base Flood Elevation (BFE), in a Limited Detailed Study stream, as defined in Exhibit A;

Type 2e Provide design data and map updates to the NCFMP for projects that result in an increase of 0.5 feet or greater, but no greater than one (1) foot in the BFE in a Limited Detailed Study stream, as defined in Exhibit A;

Type 2f Provide design data and map updates to the NCFMP for projects that result in an increase of greater than one (1) foot in the BFE in a Limited Detailed Study stream, provided the increase stays within the Department's rights of way and impact no private properties or buildings, as defined in Exhibit A;

Type 2g Provide design data and map updates to the NCFMP for projects that result in an increase in the BFE in a Detailed Study stream, provided the BFE increase and floodway modifications stay within the Department's Rights of Way and impact no private properties or buildings, as defined in Exhibit A;

Type 3a Provide the As-built plans to the NCFMP, as a requirement for Department's prior Conditional Letter of Map Revision (CLOMR) approvals after the projects are completed. These apply only to FEMA's Flood Insurance Study

(FIS) and flood maps, which remain unchanged since the issuance of CLOMRs, as defined in Exhibit A;

Type 3b Provide the As-built plans to the NCFMP, as a requirement for Department's prior CLOMR approvals after the projects are completed. These apply to FEMA's FIS and flood maps, which have been restudied and/or updated since the issuance of CLOMRs, as defined in Exhibit A.

Type 3c Conduct pre-application consultation with the NCFMP on projects that require CLOMR approval or alternative hydrologic and hydraulic engineering methods prior to their submittals. The consultation may include, but is not limited to, guidance on hydrology, data sources, hydraulic modeling/design issues, encroachment widths, and mitigation.

Type 4a Provide the As-built plans, revised design reports and flood models to the NCFMP for the projects that were not constructed in accordance with the design, which may result in a BFE and MOA type changes and LOMR, as defined in Exhibit A.

2. Exhibit A denotes the criteria and associated process fees for the twelve (12) MOA types previously listed.

3. Exhibit B denotes the submittal contents and schedule of the MOA deliverables to the NCFMP. It should be noted that NFIP compliance requires certified As-built plans to be submitted within 180 days (six months) of completion of construction. This applies to all MOA types listed in Exhibit A.

4. The Department and the NCFMP shall share design and survey data, including hydrologic and hydraulic designs and engineering models. The Department shall provide to the NCFMP, at no cost, the hydrologic and hydraulic design reports for the bridges and culverts across the state, prior to the commencement of construction, as well as the as-built plans, after the construction. The NCFMP shall provide the Department, at no cost, the FIS flood data and hydraulic models.

5. The NCFMP representatives shall meet at least once per month with the Hydraulics Unit staff to review the eligibility and schedule of candidate MOA and CLOMR projects. Under no circumstance may the Department's contract consultants directly contact the NCFMP staff for meetings or consultation. Instead, their requests shall go through the Hydraulics Unit staff. The review may include the following: hydrologic and hydraulic modeling issues, training needs, emergency repairs, consultation on CLOMRs, etc. It is the Department's responsibility to make the MOA submittals to the NCFMP in a timely manner to avoid delay of project construction.

6. The NCFMP Director shall meet once per month with the State Hydraulics Engineer to review this program to ensure its full compliance with the Federal regulations and the FHWA's guidance, to resolve issues of dispute, and to review/approve recommendations for improvement. The fee schedule may be reviewed and adjusted when the NCFMP Director deems it necessary.

7. The Department's personnel shall consult with the Hydraulics Unit staff to assess the need for a review by the NCFMP for maintenance or construction activities that may have the potential to result in flooding. Examples are pipe replacement/enhancement, temporary encroachment in the floodway, etc. Upon request, the NCFMP shall meet within four (4) weeks with the Department and develop action plans consistent with FEMA's NFIP goals and objectives.

8. For emergency repairs, the State Hydraulics Engineer may request ad hoc meetings with the NCFMP representatives to review and develop action plans. Upon concurrence from the NCFMP, the Department may proceed with the emergency repairs and prepare the design data and documents after the repairs are implemented.

9. Upon request, the NCFMP may assist the Department with internal review and approvals for the MOA Types 1, 2a and 2d projects. The responsibility for these approvals has been delegated to the Department's State Hydraulics Engineer.

10. The NCFMP shall conduct a semi-annual audit on those projects to ensure Department's full compliance with the Federal and State rules and regulations. The results of audits shall be shared with the Department for further process improvement. At the May and November Department / NCFMP Coordination Meetings, the Department shall provide a listing of MOA projects reviewed by the Department's in-house staff and contract consultants. NCFMP shall review at least 10% of the projects and provide the audit results at the following Coordination Meeting.

11. The NCFMP shall provide to the Department training as needed on the NFIP compliance requirements including checklists, hydrologic and hydraulic modeling, Community Floodplain Manager Certification, training for the Department's Operations forces, etc. The Department will reimburse the NCFMP for training and other associated cost.

12. With the assistance of NCFMP staff, the Department shall provide annual NFIP awareness training for all of the Department's personnel and contractors involved in design, construction, and maintenance activities. This training shall cover general flooding-related issues, appropriate coordination with FEMA and/or NCFMP on issues of compliance, mitigation, etc.

13. The Department and the NCFMP understand and agree that proper administration of this MOA ensures that the Department is consistent with FEMA's NFIP Regulations as well as FHWA's guidance of NS 23 CFR Part 650A.

14. Projects that result in an increase in the Base Flood Elevation (BFE) of 1 foot or less in a Limited Detailed Study stream shall be processed through this MOA, provided they do not adversely impact properties or buildings, and are approved by the State Hydraulics Engineer.

15. Projects that result in an increase in the BFE in the Detailed or Redelineated Detailed Flood studies shall follow the NFIP Regulations and this MOA to obtain approval prior to project construction.

16. The NCFMP shall invoice the Department monthly for the approved projects. The Department shall pay within 30 days after receipt of the invoice. The NCFMP shall be responsible for maintaining appropriate records in accordance with State accounting procedures and regulations.

17. All design and modeling work shall be performed in accordance with Federal regulations, policies and guidelines, as well as the Department's *Guidelines for Drainage Studies and Hydraulic Design*. All reviews and approvals of the hydraulic design reports and engineering flood models shall be performed by Professional Engineers registered in the State of North Carolina.

18. This Agreement shall remain in effect from the date of execution of this Agreement unless cancelled in writing as provided below. It is anticipated that this Agreement may be reviewed annually, or at a time mutually agreed upon by both parties. In the event either party to this Agreement should choose to terminate this Agreement, written notification must be given to the Director of the NCFMP and the Chief Engineer of the Department ninety (90) days prior to withdrawal.

IN WITNESS WHEREOF, this MOA has been executed, in duplicate, the day and year heretofore set out, on the part of the Department and the NCFMP by authority duly given.

NORTH CAROLINA DEPARTMENT OF PUBLIC SAFETY – EMERGENCY MANAGEMENT – FLOODPLAIN MAPPING PROGRAM

ATTEST:

BY: _____

TITLE: Chief NC Geodetic Survey

DATE: 8-10-16

BY: John Kay Doman

TITLE: Asst. EM Director for Risk Mngt

DATE: 8-10-16

Remittance Address:

North Carolina Department of Public Safety – Floodplain Mapping Program
4105 Reedy Creek Road, Raleigh, NC 27607

30-0712287
Federal Tax Identification Number

N.C.G.S. § 133-32 and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

BY: _____

TITLE: CHIEF ENGINEER

DATE: 8/11/16

BY: _____

TITLE: Director, Technical Services

DATE: 8/12/16

To the extent this Agreement is a "Cooperative Agreement," as that term is defined by N.C.G.S. § 143B-24, and to the extent approval of the Department of Administration is required; based on the assurances from the parties to this Agreement, approval is hereby given as indicated below by the signature of the Secretary of the Department of Administration.

DEPARTMENT OF ADMINISTRATION

BY: Kathryn Johnston

TITLE: Secretary

DATE: August 11, 2016

APPROVED BY BOARD OF TRANSPORTATION ITEM O: 8/4/16 (Date)

EXHIBIT A: MOA Types and Fees Schedule

Through this Agreement, the Department and the NCFMP mutually agree that the data sharing agreements and services provided herein are conducive to efficient cooperation and project timelines for the two agencies. Twelve (12) distinct MOA types are identified as services to be provided by the NCFMP as part of this Agreement:

Type 1 For a project that results in the BFE change of 0.1foot, or less, the State Hydraulics Engineer shall review the Hydrologic and Hydraulic (H&H) designs and issue a No Rise or No Impact certification. The State Hydraulics Engineer shall notify the NCFMP of the certification along with the MOA design packet.

The NCFMP shall incorporate these data and the associated As-built plans into its future flood map studies and Digital Flood Insurance Rate Map (DFIRM) updates.

There is no review fee made to the NCFMP for a Type 1 project. The Department agrees to coordinate biannually with the NCFMP to evaluate cost share with NCFMP in processing its future map maintenance study.

Type 2a For a project that results in the BFE decrease of greater than 0.1 foot, but less than 0.5 feet (Minor Impact), the State Hydraulics Engineer shall review the H&H designs and issue a Minor Impact certification. The State Hydraulics Engineer shall notify the NCFMP of the certification along with the MOA design packet.

The NCFMP shall incorporate these data and the associated As-built plans into its future flood map studies and DFIRM updates.

There is no review fee made to the NCFMP for a Type 2a project. The Department agrees to coordinate biannually with the NCFMP to evaluate cost share with NCFMP in processing its future map maintenance study.

Type 2b For a project that results in the BFE decrease of 0.5 feet, or greater (Measurable Impact), the Department shall submit the H&H design packet to the NCFMP for review and approval. After the project is completed, the Department shall consult with the NCFMP in preparing and processing a Letter of Map Revision (LOMR).

After the project is completed, the Department shall submit the As-built plans and consult with the NCFMP in preparing and processing a Letter of Map Revision (LOMR).

The review fee made to the NCFMP for a Type 2b project is $3,000. The Department agrees to cost share with the NCFMP in processing a LOMR and/or its future map maintenance study.

Type 2c The NCFMP will review projects involving FEMA-regulated streams in the FIS, for which missing data or major errors were encountered in the original models, resulting in major hydraulic modeling difficulty.

Examples: Effective FIS hydraulic models are not available, have missing or illegible data, FIS model output does not match the published data, missing or incorrect structures/cross sections, major discrepancies/errors in topographic data, erroneous hydrologic analysis, etc.

With the prior consultation and concurrence of the NCFMP, the Department may opt to develop H&H design reports using its own field survey data and a minimum of six (6) section analysis and develop the BFE comparison table for the existing and proposed conditions.

The proposed upstream BFE is not required to match within one-half foot of the published the BFE. The Department shall submit the H&H design data to the NCFMP for review and approval.

The NCFMP shall incorporate this data and the associated As-built plans into its future map maintenance studies and DFIRM updates.

The review and process fee made to the NCFMP for a Type 2c project is $14,000.

Type 2d For a project that results in the BFE increase of greater than 0.1 foot, but less than 0.5 feet, over a Limited Detailed Study stream, the State Hydraulics Engineer shall review the H&H designs and issue a Minor Impact certification. The design engineer shall follow Department's *Guidelines for Drainage Studies and Hydraulic Design* to assess flood risk and impacts to properties as well as the safety of the traveling public. The State Hydraulics Engineer shall notify the NCFMP of the certification along with the MOA design packet.

The NCFMP shall incorporate this data and the associated As-built plans into its future map maintenance studies and DFIRM updates.

There is no review fee made to the NCFMP for a Type 2d project. The Department agrees to coordinate biannually with the NCFMP to evaluate cost share with NCFMP in processing its future map maintenance study.

Type 2e The NCFMP shall review a project that is over a Limited Detailed Study stream which results in the BFE increase of 0.5 feet or greater, but no greater than one (1) foot. The design engineer shall follow the Department's *Guidelines for Drainage Studies and Hydraulic Design* to assess flood risk and impacts to the adjoined properties as well as the traveling public.

After the project is completed, the Department shall submit the As-built plans and consult with the NCFMP in preparing and processing a Letter of Map Revision (LOMR).

The review fee made to the NCFMP for a Type 2e project is $3,000. The Department agrees to cost share with the NCFMP in processing a LOMR and/or its future map maintenance study.

Type 2f The NCFMP shall review a project that is over a Limited Detailed Study stream that results in the BFE increase greater than one (1) foot; the increase shall stay within the Department's Rights of Way, to include areas obtained by easement, and has no impact to private properties or buildings. The design engineers shall follow the Department's *Guidelines for Drainage Studies and Hydraulic Design* to assess flood risk and impacts to the properties as well as the traveling public. This requires a special approval from both the State Hydraulics Engineer and the NCFMP Director. The Department shall submit all pertinent H&H design data and documentation that are outlined in 44CFR 65.12.a. After the project is completed, the Department shall consult with the NCFMP in preparing and processing a Letter of Map Revision (LOMR).

The NCFMP shall incorporate this data into and the associated As-built plans into its future map studies and DFIRM updates.

The review fee made to the NCFMP for a Type 2f project is $3,000. The Department agrees to cost share with the NCFMP in processing a LOMR and/or its future map maintenance study.

Type 2g The NCFMP shall review a project that is over a Detailed Study stream that results in a BFE increase and/or increase and modification to the regulatory floodway that remains solely within the Department's Rights of Way, to include areas obtained by easement, and has no impact to private properties or buildings. The design engineers shall follow the Department's *Guidelines for Drainage Studies and Hydraulic Design* to assess flood risk and impacts to the properties as well as the traveling public. This requires special approval from both the State Hydraulics Engineer and the NCFMP Director. The Department shall submit all pertinent H&H design data and documentation that are outlined in 44CFR 65.12.a. After the project is completed, the Department shall consult with the NCFMP in preparing and processing a Letter of Map Revision (LOMR).

The NCFMP shall incorporate this data into and the associated As-built plans into its future map maintenance studies and DFIRM updates.

The review fee made to the NCFMP for a Type 2g project is $3,000. The Department agrees to cost share with the NCFMP in processing a LOMR and/or its future map maintenance study.

Type 3a For the approved CLOMR projects, the Department shall submit, after project completion, the As-built plans with its design models and data to the NCFMP for its inclusion in the future DFIRM mapping needs. This applies to streams for which DFIRM mapping is still current after the issuance of CLOMR approval.

The review fee made to the NCFMP for a Type 3a project is $3,000. The Department agrees to cost share with the NCFMP in processing a LOMR and/or its future map maintenance study.

Type 3b For the approved CLOMR projects, the Department shall submit, after project completion, the As-built plans with its design models and data to the NCFMP for its inclusion in the future DFIRM mapping needs. This applies to streams for which H&H models were restudied and FIRM mapping modified since the issuance of CLOMR approval.

The review fee made to the NCFMP for a Type 3b project is $3,000. The Department agrees to cost share with the NCFMP in processing a LOMR and/or its future map maintenance study.

Type 3c When a project is determined to require a CLOMR approval, or the published flood elevations are scientifically or technically incorrect, due to error in application of hydrologic and hydraulic methods, the Department's design engineer may initiate a pre-application consultation to discuss with an NCFMP representative the hydrologic and hydraulic design issues, such as interpretation of the NFIP regulations, model source data, hydrology, hydraulic design, flood maps, risk analysis, encroachments, etc.

This process enables the NCFMP to provide guidance to the Department during the design process through its representatives and/or contract consultant. It includes the assistance from the NCFMP on consultation with FEMA on behalf of the Department, data search/verification, flood model review, technical guidance and CLOMR data pre-reviews.

There is no fee made to the NCFMP for a Type 3c project.

Type 4a For a project that was previously approved as an MOA or CLOMR and its field survey data from the As-built plans deviate from the design plans and flood models. It may result from unanticipated field conditions during construction, such as bedrock, utilities, etc. The Department shall submit the As-Built plans, revised design reports and flood models to the NCFMP for review and acceptance.

The review fee made to the NCFMP for a Type 4a project is $3,000. The Department agrees to cost share with the NCFMP in processing a LOMR, if warranted.

EXHIBIT B: MOA Data Deliverables and Submittal Schedule by NCDOT

	MOA TYPES											
DELIVERABLES	**1**	**2a**	**2b**	**2c**	**2d**	**2e**	**2f**	**2g**	**3a**	**3b**	**3c**	**4a**
FEMA Coordination Form	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MOA Transmittal Form	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Title Sheet or Vicinity Map	✓	✓	✓	✓	✓	✓	✓	✓			✓	
Micro-Station (CADD) files (mapping, etc.)	✓	✓	✓	✓	✓	✓	✓	✓			✓	
Bridge /Culvert Survey Report(s) (PDF)	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓
Effective Hydraulic Model	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓
Project Hydraulic Models (HEC-RAS)	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓
Hydraulic Modeling Narrative	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓
Output Comparison Table (Excel format)	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓
No Rise Certification	✓											
Parcel/Property Owner Information (in CADD)			✓			✓	✓	✓			✓	✓
Documentation of NCFMP Concurrence				✓							✓	
"As-Built" Plans (PDF, Final submittal)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

SUBMITTAL SCHEDULE												
INITIAL , minimum days before project construction	90	90	90	90	90	60	90	90	N/A	N/A	90	N/A
FINAL, within days following project completion	180	180	180	180	180	180	180	180	180	180	180	180