

## MINUTES OF 2009 STRUCTURE WORKSHOP

The 2009 Structure Workshop was held on March 11<sup>th</sup> in the Structure Design Unit Conference Room C in Raleigh. Those in attendance included:

Greg Perfetti	State Bridge Design Engineer
Tom Drda	FHWA – Division Bridge Engineer
Dan Holderman	State Bridge Management Engineer
Dave Henderson	State Hydraulics Engineer
Cecil Jones	State Materials Engineer
Mike Robinson	State Bridge Construction Engineer
Njoroge Wainaina	State Geotechnical Engineer
Jay Bennett	State Roadway Design Engineer
Ted Sherrod	State Roadside Environmental Field Operations Engineer
Allen Raynor	Assistant State Bridge Design Engineer
Tom Koch	Assistant State Bridge Design Engineer
Rick Nelson	Assistant State Bridge Management Engineer (Operations)
Cameron Cochran	Bridge Construction Engineer
Kevin Bowen	Bridge Construction Engineer
Lee Puckett	Bridge Construction Engineer
Larry Carpenter	Bridge Construction Engineer
Eddie Bunn	Bridge Construction Engineer
Aaron Earwood	Bridge Construction Engineer
Zaki Wafa	Bridge Management – Engineer
Aster Abraha	Bridge Management – Engineer
Paul Sprouse	Bridge Management – Staff Engineer
William Beatty	FHWA – Asset Management
K.J. Kim	Geotechnical Eastern Regional Manager
John Pilipchuk	Geotechnical Western Regional Manager
Scott Hidden	Geotechnical Support Services Supervisor
Chris Chen	Geotechnical Technical Services Supervisor
Chris Kreider	Geotechnical Eastern Regional Operations Engineer
Dean Hardister	Geotechnical Western Regional Operations Engineer
Michael Valiquette	Geotechnical Operations Engineer
John Fargher	Geotechnical Western Regional Design Engineer
Jack Cowsert	Materials and Tests – State Materials Quality Engineer
David Greene	Materials and Tests – Structural Members Engineer
Steve Walton	Materials and Tests – Metals Engineer
Chris Peoples	Materials and Tests – Chemical Testing Engineer
Trudy Mullins	Materials and Tests – Prestressed Concrete Engineer
Bill Goodwin	PDEA – Bridge Development Unit Head
Bryan Kluchar	PDEA – Project Planning Engineer Supervisor
John Williams	PDEA – Project Planning Engineer
Moy Biswas	Research and Analysis – Assistant Branch Manager
Neal Galehouse	Research and Analysis – Research Engineer
Brian Hanks	Structure Design Project Engineer
Gichuru Muchane	Structure Design Project Design Engineer
Nilesh Surti	Transportation Program Management – Design-Build Engineer

The following items of business were discussed:

***1. WELCOME:***

Mr. Drda welcomed all attendees to the meeting, noting that the Structure Workshop, Spring Tour and the Structure Topics meetings are excellent opportunities for various disciplines within the Department to share information and refine their respective designs. He added that the Department is working under very difficult financial conditions, but noted that there is a lot of support from upper management as evidenced by the decision to fund the 2009 Spring Field Review.

The welcome was followed by self-introductions.

***2. REVIEW OF THE 2008 ACTION ITEMS*** *(STRUCTURE DESIGN)*

Mr. Perfetti began the meeting with a review of the outstanding action items from the 2008 Structure Workshop meeting and 2008 Spring Field Review.

The status of the action items was reported as follows:

- **Sub-regional tier design guidelines** – Structure Design and other Units have posted the sub regional tier design guidelines and Regionalization maps on their respective websites.
- **Precast substructure design** – Structure Design has let a few projects that utilize precast substructures, but has not standardized the substructure elements.
- **Standardized cored slabs** – A few standard cored slab spans will be available via Structure Design in a few weeks. The inventory will be expanded to include a broader range of span and skew combinations over the next several months.
- **Prestressed pile build-up details** – Structure Design currently allows Contractors the option to utilize the South Carolina DOT build-up detail for prestressed piles. In the near future this detail will be made available as a Contractor option on Structure Design Standard Drawings.
- **Drilled pier casing removal** – The Geotechnical Unit has updated the Drilled Pier special provision to address requirements for piezometric head prior to casing removal.
- **Precast aesthetic bridge rail** – Structure Design investigated the feasibility of implementing precast aesthetic bridge rails. This rail type is currently infeasible because NCHRP 350 compliant crash-tested or crash equivalent connection details are currently not available.
- **Staged construction falsework** – During review of the formwork submittal, Structure Design will ensure that staged construction formwork is detailed such that a hinge is developed at all points where the formwork for stage II is supported on stage I, and that screeds are fully supported on the stage II exterior girders.
- **Heavy skewed cored slab bridges** – Materials and Tests inspectors are ensuring that requirements of the Standard Specifications are met during production of cored slab units to prevent unbalanced seating on site. Structure Design will increase the length of the solid end section to provide added rigidity and detail 1" thick elastomeric bearing pads.
- **Transverse post-tensioning holes on cored slabs** – Structure Design has increased the diameter of the transverse post-tensioning holes from 2" to 2½", for consistency with the dowel holes.
- **Standardizing disc bearings** – Structure Design & FHWA toured several bridges which have utilized disc bearings as a first step toward furthering their usage.

- **Reinforced approach fills for integral abutment bridges** – The Structure Design and Geotechnical Engineering Units worked together to develop a special provision for a post-bid design of a temporary fabric wall that will function as the reinforced bridge approach fill. Two bridges have been let with this provision, with the objective of standardizing the fabric wall design.
- **Drip beads** – Structure Design is detailing drip beads on contract plans for steel girders but has not issued a formal policy on their use.
- **Culverts with spans over 20 ft.** – Bridge Management reported that culverts with spans over 20ft are included in the bridge inventory, and will be inspected biannually.
- **H-piles in pre-augered weathered rock** – The Geotechnical design engineers are now considering piles in pre-augered rock foundations in lieu of drilled shafts.
- **Optional bolted field splice for spans less than 135 ft.** – Structure Design has issued a policy for detailing optional bolted field splices on spans less than 135 ft.
- **Resetting the bearings** – Structure Design has issued a policy on resetting elastomeric bearings.
- **4"φ drain pipe for reinforced approach fill** – Structure Design has not implemented the recommended 4"φ schedule 40 PVC drain pipe to replace the corrugated drain pending a comprehensive review of the reinforced approach fill details and approach slab sub-base.
- **Process review for placing, pumping, and curing deck concrete** – FHWA has initiated a process review for placing, pumping and curing deck concrete.
- **Process review for FEMA and scour issues** – FHWA has initiated a process review for FEMA and scour issues.
- **Accelerated construction for B-2515** – Structure Design has developed contract plans that incorporate accelerated construction. Mr. Hanks displayed pictures of a twin girder with a prefabricated composite deck superstructure system that is similar to what will be used on B-2515. He noted that six twin girder modules will be required, and micropile foundations will be utilized.
- **Reducing the minimum diameters for columns and drilled shafts** – Structure Design has informed Project Engineers to consider use of 2'-6" diameter columns whenever feasible, and thereby reduce the corresponding minimum drilled shaft diameter to 3'-0".
- **Proof load tests for bearings** – Materials and Tests reported that they have not completed a review of other States' practices regarding QA/QC for elastomeric bearings. However, they noted that they are prepared to resume proof load tests if there is a systemic problem with elastomeric bearings quality.
- **Bolts for painted areas** – Materials and Tests recommended using galvanized bolts in the painted areas in lieu of using weathering bolts.
- **Barrier rail height on the bridge** – Structure Design has informed Project Engineers to coordinate with Roadway Project Engineers to maintain the same approach roadway median barrier rail height on the bridge.

### 3. *STABILIZATION ISSUES ON TIP B-PROJECTS:*

*(ROADSIDE ENVIRONMENTAL)*

Mr. Sherrod discussed erosion control and side slope stabilization issues on TIP bridge replacement and purchase order contract projects. He stated that it has become necessary to remobilize after the final project inspection for the purpose of reseeded, establishing vegetative cover, and removal of sediment storage basins. This has resulted in cost overruns for erosion control quantities. He noted that the Roadside environmental Unit is focusing on the top five erosion control items with overruns to mitigate the problem.

During the discussion Mr. Sherrod noted that Contractors have not been in favor of erosion control intermediate contract times. He suggested that the Construction Unit consider ways to stage construction to minimize remobilization. He added that the Roadside Environmental Unit is evaluating ways to adjust the erosion control design models for the conditions during the final stages of construction. The Construction Unit made several suggestions, such as smaller sediment basins that are left in place, and/or providing alternate access for their removal.

**Action Item(s):**

- ▶▶ Construction will actively evaluate and suggest ways to mitigate erosion control cost overruns.

**4. FHWA REORGANIZATION:** (FHWA)

Mr. Drda stated that the FHWA North Carolina Division Office has reorganized to align with the Department's recent TMT reorganization. Mr. Beatty briefly reviewed the FHWA North Carolina Division's mission, organization, functions, and oversight agreement. He noted that the oversight agreement, which was effective in November 1998, provides FHWA with federal-aid program responsibility regardless of project authority. This agreement was revised in October 2001 and the next revision will be this year.

**Action Item(s):**

- ▶▶ None

**5. STIMULUS PACKAGE:** (FHWA)

Mr. Beatty discussed the *American Recovery and Reinvestments Act (ARRA) of 2009*, which is commonly known as the *Stimulus Package*. He provided an overview of the provisions for distribution of the funds, project eligibility requirements, reporting requirements, and FHWA stewardship and oversight. Mr. Beatty emphasized the need to ensure projects selected for funding will proceed without unforeseen impediments. As such, he encouraged everyone to speak out on any known issues that have the potential to delay a project. He also provided an overview of the federal-aid construction authorization checklist and federal-aid plans, specifications and estimates review.

**Action Item(s):**

- ▶▶ None

**6. CORED SLAB DETAILS:** (CONSTRUCTION)

The Construction Unit reported construction problems attributed to the plan dimension showing the height of the sidewalk parapet when detailed on cored slabs or box beams. Currently, the dimension as shown suggests that it is constant for the entire span, whereas in reality it varies. They suggested showing the minimum dimension and noting that it varies.

The Construction Unit also suggested that for cored slabs supported on crowned bent caps, Structure Design should place a note on the plans to require grouting of the shear keys prior to transverse post-tensioning. This will improve seating of the units on the bent cap.

**Action Item(s):**

- ▶▶ Structure Design will revise the sidewalk parapet dimension to indicate that it varies.

**7. RIP RAP DETAILS:**

(CONSTRUCTION)

The Construction Unit expressed concerns with stabilizing end slopes of low bridges that shade areas under the bridge. The shading makes it difficult to establish a stand of vegetation. They inquired who determines the limits of the rip rap slope protection material.

After some discussion it was suggested that the Construction Unit document several cases that can be presented to the regulatory agencies. The documentation will be used to show that in some situations it may be necessary to extend the rip-rap stabilization beyond the limits shown in permit drawings.

**Action Item(s):**

- ▶▶ Construction will document bridges where it is difficult to establish a stand of vegetation on the end slopes.

**8. DETOUR ALIGNMENTS:**

(CONSTRUCTION)

The Construction Unit discussed conflicts that arise when on-site detour bridges are too close to the constructed bridge. The conflicts often result in staged end bents and/or unanticipated shoring.

The discussion noted that during design the detour structure type, geometry, and configuration is unknown. The distance between the on-site detour bridge and the constructed bridge is typically based on the geometry of the existing structure, the proposed structure and the approximate limits of the detour structure. In addition, this distance is also influenced by stream regulations and potential impacts. The Construction Unit suggested accounting for the geometry of the new proposed bridge, and using a minimum spacing of 10 ft. between the wing wall of the proposed bridge and the edge of pavement for the detour alignment.

There was consensus to raise awareness of this issue in the Roadway and Structure Design Units. When a detour structure is required, the preliminary hydraulic report should include sketches of the detour structure, and the clearance between the proposed and detour structures needs to be discussed during the scoping meeting. In addition, it was suggested that Structure Design include the clearance limits of the detour alignment and structure on Preliminary General Drawings that are sent to Bridge Construction Engineers for review and comments.

**Action Item(s):**

- ▶▶ Roadway and Structure Design Units will raise awareness of the issue within their respective units.
- ▶▶ Roadway and Structure Design Project Engineers will discuss detour structures at the scoping meeting and will coordinate to eliminate conflicts.
- ▶▶ Structure Design will show clearance limits of the detour alignment and structure on the PGD for BCE review and comments.
- ▶▶ Hydraulics Unit will include sketches of the detour structure in the preliminary hydraulics report.

**9. DECK POUR DIRECTION:**

(CONSTRUCTION)

The Construction Unit sought clarification on the relationship between the direction of the deck pour and the relative location of fixed and expansion ends of spans.

During the discussion Structure Design stated that the pour sequence is determined in the last stages of design and typically the Wisconsin pour sequence is detailed on the plans, albeit prestressed girder bridges include an optional pour sequence. Construction noted that ideally the bridge deck should be finished in the uphill direction.

It was suggested that Structure Design provide the Bridge Construction Engineer with a preliminary pour sequence for review and comments.

**Action Item(s):**

- ▶▶ Structure Design will consult with the appropriate BCE when determining the pour sequence.

**10. DRILLED PIER / COLUMN ISSUES:**

(CONSTRUCTION)

The Construction Unit requested Structure Design discontinue detailing drilled shafts that extend to the bottom of the bent cap. They noted that when oversize casings are utilized, the drilled piers were wider than the bent cap. They stated that to help control drilled pier quantities, it was preferable to terminate the drilled shaft either a foot below the ground or a foot above the normal water elevation, as appropriate, and detail a short column on the drilled shaft. In addition, for columns that are too short to allow a rebar splice, they requested that Structure Design discontinue detailing rebar mechanical couplers, and detail 'M' bars, with hooks, that extend into the cap.

**Action Item(s):**

- ▶▶ Structure Design Units discontinue extending drilled shafts to the bottom of cap.
- ▶▶ Structure Design will discontinue use of rebar mechanical couplers.

**11. INTEGRAL ABUTMENT BRIDGE ISSUES:**

(CONSTRUCTION)

The Construction Unit reported that Contractors are in favor of the temporary fabric wall that also functions as the reinforced bridge approach fill on integral abutment bridges. They noted that Contractors were not necessarily setting a crane on the temporary fabric wall, but it facilitates several other construction operations. As such, the temporary fabric wall may not need to be designed for crane loads.

Structure Design stated that two projects have been let with a post-bid designed temporary fabric wall, which will assist in developing a standard temporary fabric wall and reinforced approach fill for integral abutment bridges.

**Action Item(s):**

- ▶▶ None

**12. TRANSVERSE JOINT SHEAR KEY DETAIL:**

(CONSTRUCTION)

The Construction Unit reported that it is difficult for Contractors to form the keyed transverse construction joint detailed on bridge decks. Based on the constructability concerns, they suggested Structure Design consider eliminating the detail.

**Action Item(s):**

- ▶▶ Structure Design will look into eliminating the keyed transverse joint detail.

**13. VERTICAL CURVES ON HEAVY SKEWS:**

(CONSTRUCTION)

The Construction Unit reiterated the challenges of constructing bridges with a vertical curve on a heavy skew. The Roadway Unit responded by stating that they proactively try to minimize conditions that affect constructability. It was noted that this topic has been discussed at several Structure Workshop meetings, and there is consensus that it is sometimes difficult to eliminate the combination of geometric conditions that create construction challenges.

**Action Item(s):**

- ▶▶ None

**14. OPTIONAL APPROACH SLAB SUB-BASE WITH REINFORCED APPROACH FILL:** (STRUCTURE DESIGN)

The Structure Design Unit reported that some Contractors have questioned the need for an approach slab sub-base when used in conjunction with the reinforced approach fill. The approach slab standards currently detail an 'ABC' gravel sub-base, with the option to construct a concrete sub-base. Most Contractors choose the concrete sub-base, but would prefer to pour it monolithically with the approach slab, as this would shorten the construction time.

After some discussion it was suggested that Structure Design discuss the issue with Tom Hearn of the Geotechnical Engineering Unit, as he may have some concerns regarding settlement of the approach slab.

**Action Item(s):**

- ▶▶ Structure Design will consult Tom Hearn when reviewing the need for approach slab sub-base.

**15. ELECTRONIC SUBMITTALS / USE OF TECHNOLOGY:** (STRUCTURE DESIGN)

The Structure Design Unit brought up, for discussion, the issue of electronic submittals and use of technology to streamline business activities, such as submittal reviews.

The need to be more open to electronic submittals was emphasized especially for Units that are heavy recipients of submittals. The discussion acknowledged that there are documents, such as shop drawings, that will require hard copies for onsite use. In addition, issues with chain of command and communication would need to be carefully considered. The majority were in favor of electronic submittals and there was consensus to promote use of technology to streamline routine business functions within the respective Units.

**Action Item(s):**

- ▶▶ None.

**16. ELASTOMERIC JOINTS:** (BRIDGE MANAGEMENT)

The Bridge Management Unit (BMU) reported that most joint failures are a result of the armor angle failing. Typically, a void forms around the embedded stud or the angle breaks away from the stud. Failure rates of armored joints with various newer formulations of elastomeric concrete headers have been consistent, with the exception of the older armored joints with 2800 psi elastomeric concrete. BMU and Construction suggested Structure Design eliminate the armor angle from all joints.

Structure Design responded by noting that the final report of a research study on the performance of elastomeric concrete in joint headers was near completion. The report will make recommendations on the critical properties necessary for satisfactory performance of joints. BMU was not in favor of reducing the compressive strength of the elastomeric concrete.

Armored joints on bridge widenings was another area of concern, which Structure Design and Construction are currently reviewing. In the interim, BMU will continue to monitor armored joints, and Structure Design will review the standard joint details.

**Action Item(s):**

- ▶▶ Structure Design and Construction will review the policy on the use of armored joints.

**17. CORED SLAB JOINTS:** (BRIDGE MANAGEMENT)

The Bridge Management Unit suggested Structure Design consider reducing the 1½" end bent joint to ½" on cored slab bridges or bridge types that do not have a backwall.

There was some discussion on the effects of a smaller joint on fabrication tolerances and ability to form the approach slab. In addition there were some concerns regarding the ability to replace cored slab units in the future, should it be necessary. The general consensus was that a ½" would be too small, and Bridge Management should review the issue and make a recommendation on joint size.

**Action Item(s):**

- ▶▶ Bridge Management will review the size of the joint opening and make a new recommendation to Structure Design.

**18. RESETTING ELASTOMERIC BEARINGS:**

*(BRIDGE MANAGEMENT)*

The Bridge management Unit expressed some concerns on the practicality of resetting elastomeric bearings at approximately 60°F, as required by a recent Structure Design policy memorandum. There were questions on the temperature range that was acceptable for resetting the bearings.

The discussion elaborated on field observations made on several bridges, where elastomeric bearings were in a sheared position during the coolest part of the day. This condition may limit the bearing's ability to accommodate girder expansion without damage. As such, the policy is intended to ensure bearing performance and durability.

**Action Item(s):**

- ▶▶ None.

**19. RESEARCH:**

*(REASERCH & DEVELOPMENT)*

The Research and Development Unit gave a presentation on the status of current Structures and Construction research projects. They noted that there are:

- 5 projects in progress,
- 6 new projects are under consideration for fiscal year 2010 funding,
- 4 Active IBRD projects, and
- 2 IBRD projects under consideration for funding.

The presentation provided highlights of the objectives of each research project and a progress status. Everyone was encouraged to begin formulating their research ideas for the for the next research cycle, as solicitations will be sent out in July.

**Action Item(s):**

- ▶▶ None.

**20. APPROVAL PROCESS FOR MISCELLANEOUS STEEL PRODUCT FABRICATORS:**

*(MATERIALS & TESTS)*

The Materials and Tests Unit (M&T) stated that the Standard Specifications are vague on the approval process for steel fabricators and suppliers of miscellaneous steel products. The Specifications are not clear on whether approved fabricators need to be AISC certified, noting that some AISC certified fabrication shops would not qualify for NC welding certification.

M&T recommends the Department maintain a list of approved fabricators and suppliers. Towards this end, the Unit will be developing approval requirements and procedures.

**Action Item(s):**

- ▶▶ M&T will develop approval requirements and procedures for steel product fabricators.

**21. WELDING ON TOP FLANGE OF STEEL GIRDERS:**

*(MATERIALS & TESTS)*

The Materials and Tests Unit reported that the new NC Welding Certification has improved the quality of welding on the Department's projects. However, welding to the top flange of steel girders remained a concern because Contractors often have difficulty hiring qualified welders. It was suggested the Department transition to using straps to support formwork in lieu of welding to the top flange.

After some discussion, it was agreed to continue with our current practice and Structure Design offered to poll other States on their practices.

**Action Item(s):**

- ▶▶ Structure Design (Mr. Perfetti) will poll other States on how they support formwork on steel girders.

**22. APPROVED WELDING PROCEDURES:**

*(MATERIALS & TESTS)*

The Materials and Tests Unit distributed a booklet on the Department's welding procedures. The booklet consisted of an introduction, requirements for cleanliness, work quality, welding details, and pre-heating. Mr. Walton noted that this information and the welding procedure forms are available on the Materials and Tests Unit's website. He added that Contractors still have the option to submit their own welding procedures for approval.

**Action Item(s):**

- ▶▶ None.

**23. LIST OF APPROVED PILE POINTS AND SPLICERS :**

*(MATERIALS & TESTS)*

The Materials and Tests Unit reported that the list of approved pile point and pile splicers were available via the internet on the Approved Products List. It was noted that the Geotechnical Engineering Unit will review and comment on the list.

**Action Item(s):**

- ▶▶ None.

**24. DOMESTIC STEEL AND FASTENERS**

*(MATERIALS & TESTS)*

The Materials and Tests Unit reported that the Standard Specifications will soon be reviewed to clarify and remove the existing ambiguity on domestic steel fasteners. It was noted that FHWA will assist with the definitions of fasteners.

**Action Item(s):**

- ▶▶ None.

**25. STRUCTURAL ELEMENTS NOT CAMBERING AS PREDICTED**

*(MATERIALS & TESTS)*

The Materials and Tests Unit (M&T) reported that there have been an increasing number of cases where structural elements are not cambering as predicted. M&T is currently handling these cases through non-conformance reports (NCRs) and will inform the Construction Unit of decisions made during the NCR review. Structure Design noted that they will soon initiate a research project to update camber prediction models.

**Action Item(s):**

- ▶▶ None.

**26. HIGH STRENGTH CONCRETE (7000 PSI) FOR P/S CONCRETE PILES:** (GEOTECHNICAL)

The Geotechnical Engineering Unit (GEU) stated that an increase in concrete strength for prestressed concrete piles would help mitigate excessive pile driving stresses, without adding cost to the piles. As such, they requested Structure Design consider increasing the concrete strength on the standard prestressed concrete piles.

The discussion noted that if the higher concrete strength is feasible then GEU would let a pilot project to study the impact on cost of the piles. In addition, they requested the Materials and Test Unit inquire on concrete cost difference from the Ready Mix producers.

**Action Item(s):**

- ▶▶ Structure Design will investigate the feasibility and benefits of utilizing higher strength concrete in prestressed concrete piles.

**27. CURRENT PRACTICE FOR INTEGRAL ABUTMENT FOUNDATIONS:** (GEOTECHNICAL)

The Geotechnical Unit stated that the guidelines for integral abutment bridges need to be strengthened. The minimum pile embedment was cited as an example that lacks clear guidelines, and as a result, the pile embedment is currently determined on a case-by-case basis.

**Action Item(s):**

- ▶▶ None.

**28. MSE ABUTMENT WALLS:** (GEOTECHNICAL)

The Geotechnical Engineering Unit (GEU) noted that on Design-Build projects mechanically stabilized earth (MSE) abutment walls are routinely considered early in the bridge design process. It appears that Design-Build teams' decision to use MSE walls is a function of the unit cost of the bridge. However, within the Department, MSE walls are usually considered after other options have been discounted.

The discussion noted that considerations such as the roadway future capacity and cost of MSE walls sometimes preclude use of MSE walls. It was also noted that the Materials and Tests Unit collects data on the corrosion rate of the steel reinforcement in the walls. Preliminary research on the corrosion rates indicate the rates are half of what they were designed for. There was consensus to consider MSE walls when their use can yield bridge cost savings. GEU will collect current MSE wall costs that will be used when determining if MSE walls are cost effective.

**Action Item(s):**

- ▶▶ Geotechnical Unit will collect current MSE wall cost data.

**29. SUBSTRUCTURE STANDARDS:** (GEOTECHNICAL)

The Geotechnical Engineering Unit (GEU) reported that they will be working with the Structure Design Unit (SDU) to develop standardized substructures for cored slab bridges. Standard cored slab bridge (superstructure and substructure) plans will be used by the Divisions and SDU.

**Action Item(s):**

- ▶▶ None.

**30. SCOPING 100-150 BRIDGE PROJECTS:**

*(GEOTECHNICAL)*

The Geotechnical Engineering Unit (GEU) reported that they are preparing to scope 100 – 150 bridge projects, and they will be working closely with the Division Construction Engineers on this effort.

**Action Item(s):**

▶▶ None.

**31. MEMORANDUM OF AGREEMENT:**

*(HYDRAULICS)*

The Hydraulics Unit reported that a Memorandum of Agreement (MOA) was recently signed between the Department and the North Carolina Floodplain Mapping Program (NCFMP). The intent of the MOA is to facilitate expediting the bridge replacement program and maintain compliance with NCFMP.

Mr. Henderson provided an overview of the MOA, which highlighted permitted bridge site activities, FEMA reporting and notification requirements. He noted that for permitted bridge activities that resulted in a decrease in water surface elevation (WSE), the Department can proceed with the activities and need not wait for 6-8 months for a review by a FEMA Consultant. However, the Department needed to notify FEMA for maintenance of the inventory of features on the hydrological system. For projects with major impacts, i.e. projects where insurable structures are affected, the Department would be required to complete a Letter of Map Revision (LOMR) and/or a Conditional Letter of Map Revision (CLOMR). The MOA also establishes a procedure for NCFMP to notify the Hydraulics Unit of hydrological changes prior to construction.

**Action Item(s):**

▶▶ None.

**32. SPRING FIELD REVIEW ITINERARY:**

*(STRUCTURE DESIGN)*

Mr. Hanks distributed a proposed itinerary for the Spring Field Review. He gave a brief overview of the itinerary. He also welcomed suggestions for additional sites of interest that were in the vicinity of the basic itinerary.