State of Mississippi
Department of Environmental Quality
Office of Geology
Cooperating Technical Partners
Mapping Activity Statement
For DeSoto and Harrison Counties

Statement No. 1 – Digital Flood Insurance Rate Map (DFIRM) Production and Development of Updated Flood Data

In accordance with the Cooperating Technical Partners (CTP) Memorandum of Agreement dated January 28, 2003, between the State of Mississippi and the Federal Emergency Management Agency (FEMA), Mapping Activity Statement No. 1 is as follows:

1. **Statement Objective:** The objective of this Mapping Activity for the State of Mississippi is to develop a new or updated Digital Flood Insurance Rate Map(s) (DFIRM) and Flood Insurance Study (FIS) report(s) for DeSoto and Harrison Counties. The FIS and DFIRM will be produced in countywide DFIRM format. The DFIRM product will be referenced to the North American Vertical Datum of 1988 (NAVD 88).

Additionally, this project will include developing new and/or updated flood hazard data, as summarized in the following table:

County Name	Square Miles	Detailed Riverine		Detailed Coastal				Redelineation of SFHAs Using Effective Profiles	Refine/ Establish Zone A
		Hydrology	Hydraulics	Stillwater	Wave Height	Wave Runup	Erosion		
DeSoto County	497	X	X					x	
Harrison County	593	X	X					x	

This project will be completed by the Mapping Partners listed below:
1) State of Mississippi, Dept. of Environmental Quality, Office of Geology (and contractors)
2) State of Mississippi, Mississippi Emergency Management Agency
2) FEMA
3) Local Governments and Communities

The activities, and who will complete them, are summarized in the table below. The Counties listed in the Statement Objective will be identified as a part of the detailed scoping process outlined in Activity 1A. Precise estimates of watershed areas and linear miles of streams to be studied in the four counties listed in the above table will be determined based on detailed scoping activities as outlined in Activity 1A.

The following sections describe the specific mapping activities associated with this mapping project. Each activity description identifies the responsible Mapping Partners, the Standards that must be met, and

resultant map component. Activities listed under the Department of Environmental Quality (DEQ) column may include activities of subcontractors.

Activity	DEQ	FEMA	MEMA
Activity 1A – Scoping	X	X	X
Activity 1B – Outreach	X	X	X
Activity 1C – Field Surveys and Reconnaissance	X		
Activity 2 – Topographic Data Procurement	X		
Activity 3 – Independent QA/QC of Topographic Data	X	X	
Activity 4 – Hydrologic Analyses	X		
Activity 4A – Coastal Hazard Analysis			
Activity 5 – Independent QA/QC of Hydrologic Analyses	X	X	
Activity 5A – Independent QA/QC of Coastal Hazard Analysis			
Activity 6 – Hydraulic Analyses	X		
Activity 7 – Independent QA/QC of Hydraulic Analyses	X	X	
Activity 8 – Floodplain Mapping (Detailed Riverine and Redelineation Using Effective Profiles)	X		
Activity 9– Independent QA/QC of Floodplain Mapping	X	X	
Activity 10 – Base Map Acquisition and Preparation	X		
Activity 11 – DFIRM Production (Non-Revised Areas)	X		
Activity 11A – Independent QA/QC of DFIRM Production (Non-Revised Areas)	X		
Activity 12 – Merging of Revised and Non-Revised Information		X	
Activity 12A – Application of DFIRM Graphic Specifications	X		
Activity 12B – Independent QA/QC of DFIRM Graphics		X	
Activity 13 – Preparation and Issuance of Preliminary FIS and FIRM		X	
Activity 14 – Post-Preliminary Processing	X	X	X

Activity 1A – Scoping

The scoping of each watershed will provide a refined scope of work based on the statement objective, scoping process, and available funding. This refined scope of work will refine the statement objective with the written approval of the Executive Director of MDEQ, the Executive Director of MEMA, and FEMA's Regional Project Officer. The Scoping of this project will be completed in accordance with the Scoping Guidelines outlined in the Guidelines and Specifications for Flood Hazard Mapping Partners Appendix I.

Activity 1B – Outreach

Education and Outreach will be conducted through local and county governments, MDEQ, MEMA, and FEMA in order to properly inform the citizens and provide the due process requirements. In an effort to further describe the Flood Map Modernization Program to the public, outreach activities may include but not be limited to speaking engagements, mail outs, public service announcements, radio spots, development of a website, and meetings with local communities. All communication and coordination with local governments will be done in accordance with Title 44 Code of Federal Regulations Part 66.

Activity 1C – Field Surveys and Reconnaissance

Responsible Entity: MDEQ

Scope: To supplement any field reconnaissance conducted during the scoping phase of this Flood Map Project, MDEQ shall conduct a detailed field reconnaissance of the specified study area to determine conditions along the floodplain(s), types and numbers of hydraulic and/or flood-control structures, apparent maintenance status of existing hydraulic structures, locations of cross sections to be surveyed, and other parameters needed for the hydrologic and hydraulic analyses. In addition to the initial field reconnaissance, this activity includes conducting field surveys, including obtaining channel and floodplain cross sections, identifying or establishing elevation reference marks (ERMs), and obtaining the physical dimensions of hydraulic and flood-control structures. MDEQ is responsible for coordinating with other team members that may need field survey and reconnaissance data.

Standards: All work conducted under this Activity shall conform to the standards specified for this Activity in Section 5 of this Mapping Activity Statement.

Products: In accordance with the Technical Support Data Notebook (TSDN) format described in Section 2, MDEQ shall make the following products available to FEMA:

- A report summarizing the findings of the field reconnaissance;
- Maps and drawings that provide the detailed survey results; and
- Survey notebook containing cross sections and structural data.

Activity 2 - Topographic Data Procurement

Responsible Entity: MDEQ

Scope: The State strongly believes that the success of its flood mapping modernization program is premised on achieving the following three conditions:

1. The new digital flood maps should be developed from high accuracy digital elevation base maps. The state has determined that the new base maps should consist of 1" = 100' and 1" = 400' scale derived from current and newly acquired digital orthophotography for urban and rural areas of the state, respectively. The source of this map will be digital orthophotography that represents actual and current conditions accurately.

2. The new digital flood maps should incorporate high accuracy, current digital elevation data. The state has established the following minimum accuracies for its elevation data in support of its flood mapping program:

- ❑ 1' accuracy for floodplain and flat areas of the state
- ❑ 2' accuracy for non-floodplain urban areas of the state
- ❑ 5' accuracy for the remainder of the state (rural upland areas)

The State will utilize existing elevation data that meet the above criteria or will acquire and develop new elevation data when not already available.

3. The new flood maps will be developed digitally meeting FEMA's new county-wide DFIRM specifications. The flood maps will be accessible to the public via the Internet, thus reducing or eliminating the need for hard copy flood maps. Flood maps can then be printed on demand for needed areas.

To supplement the field surveys conducted under Activity 1C, additional topographic data of the overbank areas of flooding sources will be obtained from local communities, county government, state agencies, and new topographic data collected under this grant to delineate floodplain boundaries. MDEQ is responsible for coordinating with other team members that may need or have questions about the data collected. Contour interval and/or accuracy for the topographic data used will be based on the existing FEMA guidelines and specifications. In the study areas, the topographic data obtained from new sources is primarily LIDAR, augmented by new aerial photography, and/or conventional surveys. Topographic data generation may constitute up to 50% of the cost of a map update.

This Activity also consists of developing topographic and/or Digital Elevation Models (DEMs) for the subject flooding sources using the data collected in Activity 1C. Unless directed to do otherwise by FEMA, all new topographic data must be developed and submitted in digital format. Upon completion of Lidar-based topographic data collection and processing for flooding sources listed in Section 1C, this data will be submitted to MDEQ and FEMA for an independent Quality Assurance/Quality Control (QA/QC) review under Activity 3. Data for the remaining flooding sources will be submitted for an independent QA/QC review at the completion of this Activity. MDEQ will be responsible for addressing all concerns or questions regarding this Activity raised during the QA/QC review outlined in Activity 3.

During the detailed scoping process outlined in Section 1A, the justification and need for the development of this additional topographic and orthophotographic data collection and processing will be verified in greater detail. At that time (if it is determined to be necessary) final areas of interest for data collection will be determined. Approval of the use of any FEMA funds from this Mapping Activity Statement for the completion of this Activity will be agreed upon at that time by FEMA, MEMA, and MDEQ.

Standards: All work conducted under this Activity shall conform to the standards specified for this Activity in Section 5 of this Mapping Activity Statement.

Products: In accordance with the TSDN format described in Section 2, MDEQ shall make the following products available to FEMA.

- Hardcopy topographic maps;

Completed Form No. 5 of *Revisions to National Flood Insurance Program Maps, Application/Certification Forms and Instructions* (MT-2). Complete set of MT-2 forms are available from FEMA web site at http://www.fema.gov/fhm/dl_mt-2.shtm;

- Report summarizing methodology and results;
- Mass points and breaklines data on CD-ROM;
- Digital work maps with contours;
- Checkpoint analyses to assess the accuracy of data including Root Mean Square Error (RMSE) calculations to support vertical accuracy;

- Identification of remote-sensing data voids and methods used to supplement data voids;
- National Geodetic Survey (NGS) data sheets for Network Control Points (NCPs) used to control remote sensing and ground surveys;
- Metadata compliant with Federal Geographic Data Committee standards.

Activity 3 - Independent QA/QC of Topographic Data

Responsible Entity: MDEQ and FEMA

Scope: FEMA and MDEQ and their contractor(s) shall review the mapping data obtained under Activity 2 of this Mapping Activity Statement to ensure that these data are consistent with FEMA standards as well as standard engineering practice and are sufficient to prepare or revise the FIRM. A list of what was reviewed by MDEQ and their contractor(s) as QA/QC will be submitted to FEMA. QA/QC shall be conducted by an independent contractor.

Standards: All work conducted under this Activity shall conform to the standards specified for this Activity in Section 5 of this Mapping Activity Statement.

Products: In accordance with the TSDN format described in Section 2, MDEQ shall make the following products available to FEMA.

- A Summary Report that describes the findings of the independent QA/QC review.
- Recommendations to resolve any problems that arise as a result of the internal QA/QC review.

Activity 4 – Hydrologic Analysis

Responsible Entity: MDEQ

Scope: Hydrologic analyses will be completed drainage areas for the watershed(s) listed in Section 1 of this Mapping Activity Statement. The hydrologic methods to be used in this analysis will be FEMA approved models. In addition, MDEQ will be responsible for addressing all concerns or questions regarding this Activity raised during the QA/QC review outlined in Activity 5.

Standards: All work conducted under this Activity shall conform to the standards specified for this Activity in Section 5 of this Mapping Activity Statement.

Products: Upon completion of hydrologic modeling for the flooding sources listed in Section 1, MDEQ and FEMA will perform an independent QA/QC review as described in Activity 5.

In accordance with the TSDN format described in Section 2, MDEQ shall make the following products available to FEMA.

- Digital copies of all hydrologic modeling (input and output) files for the 10%, 2%, 1%, and 0.2% annual chance storm events.
- "Summary of Discharges" table(s) presenting discharge data for each flooding source.
- Draft text for Section 3.1, Hydrologic Analyses, of FIS report.
- Appropriate SC application/certification form for hydrology.
- All backup data used in the analysis, including work maps.
- For GIS-based modeling, products include all input and output data, intermediate data processing products, GIS data layers, and final products.

Activity 4A – Coastal Hazard Analyses

Responsible Entity: N/A

Activity 5 - Independent QA/QC Review of Hydrologic Analyses

Responsible Entity: MDEQ and FEMA

Scope: FEMA and MDEQ or one of its contractors shall review the technical, scientific, and other information completed under Activity 4 of this Mapping Activity Statement to ensure that the data and modeling are consistent with FEMA standards and standard engineering practices and are sufficient to revise the FIRM. A list of what was reviewed by MDEQ or their contractor as QA/QC will be submitted to FEMA. If MDEQ utilizes a contractor to perform the QA/QC, the contractor shall not be the same one who performed the Hydrologic Analyses. This work will include, at a minimum, the following activities:

- Review submittal for technical and regulatory adequacy, completeness of required information, application/certification forms, and supporting data and documentation. The technical review will focus on:
  - Use of acceptable models;
  - Use of appropriate methodology(ies);
  - Correctly applied methodology(ies)/model(s), including QC of input parameters;
  - Comparison with gage data and/or regression equations, if appropriate; and
  - Comparison with discharges for contiguous reaches or flooding sources.
- Maintain records of all contacts, reviews, recommendations, and actions and make them readily available to FEMA.
- Maintain an archive of all data submitted for hydrologic modeling review. All supporting data should be retained for 3 years from the date funding recipient submits its final expenditure report to FEMA.

Standards: All work conducted under this Activity shall conform to the standards specified for this Activity in Section 5 of this Mapping Activity Statement.

Products: In accordance with the TSDN format described in Section 2, MDEQ shall make the following products available to FEMA.

- A Summary Report that describes the findings of the independent QA/QC review; and
- Recommendations to resolve any problems that arise as a result of the QA/QC review.

Activity 5A – Independent QA/QC of Coastal Hazard Analyses

Responsible Entity: N/A

Activity 6 – Hydraulic Analyses

Responsible Entity: MDEQ

Scope: MDEQ or one of its contractors will perform hydraulic analyses for the flooding sources scoped in the Section 1 of this Mapping Activity Statement. The hydraulic methods to be used in this analysis will be FEMA approved models. The modeling will include the 10%, 2%, 1% and 0.2% annual chance storm events based on peak discharges computed under Activity 4 as well as floodway development. FEMA approved methods will be used for hydrologic analysis. In addition, MDEQ will address all concerns or questions regarding this Activity raised during the independent QA/QC review under Activity 7.

Standards: All work conducted under this Activity shall conform to the standards specified for this Activity in Section 5 of this Mapping Activity Statement.

Products: Upon completion of hydraulic modeling for the flooding sources listed in Section 1, MDEQ will perform an internal QA/QC review as described in Activity 7.

In accordance with the TSDN format described in Section 2, MDEQ shall make the following products available to FEMA:

- Digital profiles of the 10%, 2%, 1% and 0.2% annual chance water-surface elevations representing existing conditions using FEMA's RASPLOT program or similar software;
- Floodway Data Table(s) for each subject flooding source. The Floodway Data Table(s) must be compatible with the DFIRM database;
- Digital copies of all hydraulic modeling (input and output) files;
- Table with range of Manning's "n" values;
- An explanation for each unresolved message from CHECK-2 or CHECK-RAS program, as appropriate;
- All backup data used in the analyses;
- Draft text for inclusion in Section 3.2, Hydraulic Analyses, of FIS report; and
- For GIS-based modeling, products include all input and output data, intermediate data processing products, GIS data layers, and final products.

Activity 7 - Independent QA/QC Review of Hydraulic Analyses

Responsible Entity: MDEQ and FEMA

Scope: MDEQ or one of its contractors and FEMA shall review the technical, scientific, and other information completed under Activity 6 of this Mapping Activity Statement to ensure that the data and modeling are consistent with FEMA standards and standard engineering practices and are sufficient to revise the FIRM. A list of what was reviewed by MDEQ or their contractor as QA/QC will be submitted to FEMA. QA/QC shall be conducted by an independent contractor. This independent QA/QC review of the hydraulic analyses will include, at a minimum, the following activities:

- Review submittal for technical and regulatory adequacy, completeness of required information, application/certification forms, and supporting data and documentation. The technical review will focus on:
  - Use of acceptable models;
  - Starting water-surface elevations;
  - Cross section geometry;
  - Manning's "n" values and expansion/contraction coefficients;
  - Bridge and culvert modeling;
  - Discharges;
  - Regulatory floodway computation methods; and
  - Tie-in to upstream and downstream non-revised profiles.
- Use FEMA-approved programs to flag potential problems and focus review efforts.
- Maintain records of all contacts, reviews, recommendations, and actions and make them readily available to FEMA.
- Maintain an archive of all data submitted for hydraulic modeling review. (All supporting data must be retained for 3 years from the date funding recipient submits its final expenditure report to FEMA.)

Standards: All work conducted under this Activity shall conform to the standards specified for this Activity in Section 5 of this Mapping Activity Statement.

Products: In accordance with the TSDN format described in Section 2, MDEQ shall make the following products available to FEMA:

- A Summary Report that describes the findings of the independent QA/QC review and
- Recommendations to resolve any problems that arise as a result of the independent QA/QC review.

Activity 8 – Floodplain Mapping (Detailed Riverine and Redelineation Using Effective Profiles and Updated Topographic Data)

Responsible Entity: MDEQ

Scope: MDEQ will delineate 1% and .2% floodplain and regulatory floodway boundaries for new detail studies in the watersheds identified under scoping activities detailed in Activity 1A of this Mapping Activity Statement. The mapping will incorporate all revised hydraulic modeling and newly acquired topographic data. MDEQ will also incorporate all of the final Letters of Map Change as necessary. MDEQ will delineate the floodplain boundaries for the 1% and 0.2% annual chance recurrence intervals and the regulatory floodway boundaries on a digital work map for current effective FIRM information. If new topography does not reflect the same hydraulic characteristics as in the effective study, MDEQ will evaluate the topography to determine if changes are significant enough to invalidate the floodplain boundary and regulatory floodway boundary redelineations. Also, MDEQ will contact Laura Algeo, FEMA Regional Project Officer, with a recommendation. In addition, MDEQ will address all concerns or questions regarding this Activity raised during the independent QA/QC review outlined in Activity 10.

Standards: All work conducted under this Activity shall conform to the standards specified for this Activity in Section 5 of this Mapping Activity Statement.

Products: Upon completion of floodplain mapping for the watersheds identified in Section 1, MDEQ and FEMA will perform an independent QA/QC review as outlined under Activity 9.

In accordance with the TSDN format described in Section 2, MDEQ shall make the following products available to FEMA:

- Digital work maps, with 1% and 0.2% annual chance floodplain boundary delineations, regulatory floodway boundary delineations, cross sections, BFEs, zone designation labels and all applicable base map features;
- DFIRM mapping files, in one of the GIS file and database formats specified in FEMA's DFIRM Specifications;
- Metadata files describing the DFIRM data, including the required information shown in the examples shown in FEMA's DFIRM Specifications;
- Complete set of plots of DFIRM panels showing all detailed flood hazard information at a suitable scale;
- A QA/QC report that includes a description and the results of all automated or manual QA/QC steps taken during the preparation of the DFIRM.

Activity 9 - Independent QA/QC Review of Floodplain Mapping

Responsible Entity: MDEQ and FEMA

Scope: MDEQ or one of its contractors and FEMA shall review the floodplain work maps completed under Activities 8 and 9 of this Mapping Activity Statement to ensure that the results of the hydraulic analyses are accurately represented on the work maps. A list of what was reviewed by MDEQ or their contractor as QA/QC will be submitted to FEMA. If MDEQ utilizes a contractor to perform the QA/QC, the contractor

shall not be the same one who performed the floodplain mapping. This work will include, at a minimum, the following activities:

- Review the cross sections for proper location and orientation on the work map and agreement with the Floodway Data Table.
- Review the BFE's shown on the work map for proper location and agreement with the results of the hydraulic modeling.
- Review the regulatory floodway widths for agreement with the widths shown in the Floodway Data Table and the results of the hydraulic modeling.
- Review the floodplain boundaries for agreement with the flood elevations shown in the Floodway Data Table and the contour lines and other topographic information shown on the work maps.
- Floodplain widths at cross section must match floodway data table. Floodplain boundaries as shown on work maps match profiles.
- Ensure zone designations are indicated properly.
- Ensure DFIRM mapping files are in one of the GIS file and database formats specified in FEMA's DFIRM Specifications and conform to those specifications for content and attribution.
- Ensure metadata files describing the DFIRM data include the required information and follow the examples shown in FEMA's DFIRM specifications.

Standards: All work conducted under this Activity shall conform to the standards specified for this Activity in Section 5 of this Mapping Activity Statement.

Products: In accordance with the TSDN format described in Section 2, MDEQ shall make the following products available to FEMA:

- A Summary Report that describes the findings of the independent QA/QC review noting any deficiencies and providing recommendations to resolve them or agreeing with the mapping results; and
- An annotated work map with all questions and/or concerns indicated if necessary.

Activity 10 - Base Map Acquisition and Preparation

Responsible Entity: MDEQ

Scope: This is a required activity when Activities 8 and 9, are performed. This activity consists of obtaining the digital base map for the project. MDEQ shall:

- Obtain digital files (raster or vector) of the base map;
- Secure necessary permissions from the map source to allow FEMA's use and distribution of hardcopy and digital map products using the digital base map, free of charge;
- Certify that the digital data meet the minimum standards and specifications that FEMA requires for DFIRM production; and
- Populate the DFIRM database for base map features and applicable data.

Standards: All work conducted under this Activity shall conform to the standards specified for this Activity in Section 5 of this Mapping Activity Statement.

Products: In accordance with the TSDN format described in Section 2, MDEQ shall make the following products available to FEMA:

- Written certification that the digital data meet the minimum FEMA standards and specifications; and
- Documentation that FEMA can use the digital base map.

Activity 11 – DFIRM Production (Non-Revised Areas)

Responsible Entity: MDEQ

Scope: For all flooding sources except those segments for which updated flood data will be developed under Activities 1 through 9, MDEQ shall convert the information shown on the effective FIRM and Flood Boundary Floodway Map (FBFM) panels for all incorporated and unincorporated areas of the Counties listed in Table 1 to digital format in conformance with FEMA DFIRM specifications. MDEQ shall use the base map acquired under Activity 10 for the conversion. V-zone areas will only be revised to reflect the newly acquired topographic data. Existing V-zone delineation will be digitized and incorporated into newly developed DFIRM's.

Standards: All work under Activity 11 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: In accordance with the TSDN format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, MDEQ and its contractor shall make the following products available to FEMA:

- Digital work maps showing the 1- and 0.2-percent-annual-chance floodplain boundary delineations, regulatory floodway boundary delineations, cross sections, BFEs, flood insurance risk zone labels, and all applicable base map features;
- DFIRM mapping files, prepared in accordance with the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners*;
- Metadata files describing the DFIRM data, including all required information shown in *Guidelines and Specifications for Flood Hazard Mapping Partners*;
- Complete set of plots of DFIRM panels showing all detailed flood hazard information at a suitable scale; and
- A Summary Report that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM, including a check that the road and floodplain relationship is maintained for all non-revised areas.

Activity 11A – Independent QA/QC of DFIRM Production (Non-Revised Areas)

Responsible Entity: MDEQ

Scope: QA/QC shall be conducted by an independent contractor. MDEQ and FEMA shall review the DFIRM panels submitted under Activity 11 to ensure that the new DFIRM panels accurately represent the information shown on the effective FIRMs and FBFMs for the area mapped. This work shall include, at a minimum, checking the following:

- Cross sections were properly located and oriented as shown on the FIRM or FBFM.
- BFEs are properly located and agree with the BFEs shown on the FIRM.
- Regulatory floodway widths agree with the widths shown on the FIRM or FBFM.
- The 1 and 0.2-percent-annual-chance floodplain boundaries agree with the floodplain boundaries shown on the FIRM and the contour lines, other topographic information, and planimetric information shown on the DFIRM base.

- For coastal studies, setup and run-up height elevations shown on the work map agree with those shown on the data table(s), and stillwater elevations are shown where coastal and riverine flooding studied in detail join.
- Flood insurance risk zone designations are indicated properly.
- Road and floodplain relationships are maintained for all unrevised areas.
- DFIRM mapping files meet the GIS file and database format requirements specified in FEMA's *Guidelines and Specifications for Flood Hazard Mapping Partners* and conform to those requirements for content and attribution.
- Metadata files describing the DFIRM data include the required information.

Standards: All work under Activity 11A shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: In accordance with the TSDN format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, MDEQ shall make the following products available to FEMA:

- A Summary Report that describes the findings of the QA/QC review noting any deficiencies in or agreeing with the mapping results;
- Recommendations to resolve any problems that are identified during the independent QA/QC review; and

An annotated copy of the DFIRM with all questions and/or concerns indicated, if necessary.

Activity 12 – Merging of Effective and Revised Information

Responsible Entity: FEMA

Scope: Upon completion of the Floodplain Mapping Activity (Activities 8 and 9) for the revised flooding sources, the digital floodplain data will be merged into a single, updated DFIRM. This work will include tie-in of flood hazard information with contiguous communities that were not studied as part of this project. Also, the revised and non-revised Flood Profiles, floodplain boundaries, and regulatory floodway boundaries will be tied-in. FEMA will coordinate with the Mapping Partners conducting Activities 8 and 9, as necessary, to resolve any potential tie-in issues.

Standards: All work conducted under this Activity shall conform to the standards specified for this Activity in Section 5 of this Mapping Activity Statement.

Products: In accordance with the TSDN format described in Section 2, FEMA shall make the following products available.

- Digital work maps, with 1% annual chance floodplain boundary delineations, cross sections, BFEs, zone designation labels, and all applicable base map features shown;
- DFIRM mapping files, in one of the GIS file and database formats specified in FEMA's DFIRM Specifications, provided on CD-ROM;
- Metadata files describing the DFIRM data, including the required information shown in the examples shown in FEMA's DFIRM Specifications, provided on CD-ROM;
- Complete set of plots of DFIRM panels showing all detailed flood hazard information at a suitable scale;
- A QA/QC report that includes a description and the results of all automated or manual QA/QC steps taken during the preparation of the DFIRM.

Activity 12A – Application of DFIRM Graphic Specifications

Responsible Entity: MDEQ

Scope: Upon completion of merging of effective and revised floodplain mapping into a single, updated DFIRM (Activity 14), MDEQ shall apply the final FEMA DFIRM graphic specifications to the DFIRM mapping files. This work will include adding all required annotation, line patterns, area shading, and map collar information (e.g., map borders, title blocks, legends, and notes to user).

Standards: All work conducted under this Activity shall conform to the standards specified for this Activity in Section 5 of this Mapping Activity Statement.

Products: In accordance with the TSDN format described in Section 2, MDEQ shall make the following products available to FEMA.

- DFIRM mapping files in one of the GIS file and database formats specified in FEMA's DFIRM Specifications, provided on CD-ROM;
- DFIRM database files in one of the database formats specified in FEMA's DFIRM Specifications, provided on CD-ROM;
- Metadata files describing the DFIRM data including the required information based on the examples shown in FEMA's DFIRM Specifications, provided on CD-ROM;
- Complete set of plots of the DFIRM panels showing all the detailed flood hazard information at a suitable scale;
- A QA/QC report that includes a description and the results of all automated or manual quality assurance steps taken during the preparation of the DFIRM.

Activity 12B - Independent QA/QC Review of DFIRM Graphics

Responsible Entity: FEMA

Scope: FEMA shall review the DFIRM panels submitted by MDEQ under Activity 15 of this Mapping Activity Statement to ensure that the DFIRM panels conform to FEMA's DFIRM graphic standards. This work will include, at a minimum, the following:

- All required DFIRM features are accurately and legibly labeled and follow the examples shown in FEMA's DFIRM Specifications. This includes all flood hazard zones, BFEs, cross sections, coastal transects, studied streams, mapped political entities, and all roads within and adjacent to the 1% annual chance flood hazard areas.
- All DFIRM features are correctly symbolized with the appropriate symbol, line pattern, or area shading and follow the examples shown in FEMA's DFIRM Specifications.
- All map collar information is complete, correct, and follows the examples shown in FEMA's DFIRM Specifications.
- DFIRM mapping files are in one of the GIS file and database formats specified in FEMA's DFIRM Specifications and conform to those specifications for content and attribution.
- DFIRM database files are in one of the database formats specified in FEMA's DFIRM Specifications and conform to those specifications for content and attribution.
- Metadata files describing the DFIRM data include the required information and follow the examples shown in FEMA's DFIRM Specifications.

Standards: All work conducted under this Activity shall conform to the standards specified for this Activity in Section 5 of this Mapping Activity Statement.

Products: In accordance with the TSDN format described in Section 2, FEMA shall make the following products available:

- A Summary Report that describes the findings of the independent QA/QC review, noting any deficiencies and providing recommendations to resolve them or agreeing with the mapping results; and
- Annotated DFIRM panels with all questions and/or concerns indicated, if necessary.

Activity 13 – Preparation and Issuance of Preliminary FIS and DFIRM

Responsible Entity: FEMA

Scope: This Activity consists of the final preparation, review, and distribution of the Preliminary copies of the FIRM and FIS report for community and public review and comment. The activities to be performed are summarized below.

- *FIS Report Preparation:* FEMA, with participation by MEMA and MDEQ, will prepare the revised FIS report in the format of the existing FIS report, revising the report only to reflect current conditions and include updated data tables and flood profiles. At a minimum, the FIS report will include the following: text; cover; vicinity map; data tables; photographs (if available); flood profiles; floodway schematic; and, when necessary, transect schematic and transect location map.
- *Quality Assurance/Quality Control:* FEMA, with participation by MEMA and MDEQ, will complete a final QA/QC review of the FIS report, including all data tables, profiles, and other components of the FIS, as appropriate, and the news release will be conducted. The QA/QC procedures will be consistent with FEMA standards outlined below for this activity.
- *Discrepancy Resolution:* FEMA, with participation by MEMA and MDEQ, will be responsible for working with local governments and communities to resolve discrepancies identified during QA/QC.
- *Distribution of Preliminary DFIRM and FIS Report:* FEMA, with participation by MEMA and MDEQ, will distribute the preliminary copies of the FIS report and DFIRM to the affected communities, State agencies, and others as identified by FEMA, MEMA, and MDEQ.
- *News Release and Federal Register Notice Preparation:* FEMA, with participation by MEMA and MDEQ, will prepare the news release notifications of BFE changes. The news release will summarize newly proposed BFEs, modifications to existing BFEs, and any changes to the community's floodplain management ordinances to be NFIP compliant. Upon completion of a 30-day community comment period and/or final meeting with the community, and upon initiation of the 90-day appeal period, FEMA, in coordination with MEMA and MDEQ, will arrange for and verify that the news release is published in the prominent newspaper(s) with local circulation within each affected community. FEMA, in coordination with MEMA and MDEQ, also will arrange for and verify that a similar notice is published in the *Federal Register*.

Standards: All work conducted under this Activity shall conform to the standards specified for this Activity in Section 5 of this Mapping Activity Statement.

Products: In accordance with the TSDN format described in Section 2, FEMA, with assistance from MEMA and MDEQ, shall make the following products available:

- One set of printed preliminary DFIRMs and FIS reports, including all updated data tables and flood profiles for mailing to the CEO of each community, the State NFIP Coordinator, the FEMA Regional Office, and others as directed by FEMA;
- Preliminary transmittal letter(s);

- DFIRM mapping files in one of the database formats specified in FEMA's DFIRM Specifications;
- DFIRM database files in one of the database formats specified in FEMA's DFIRM Specifications;
- Metadata files describing the DFIRM data, including the required information as presented in the examples shown in FEMA's DFIRM Specifications;
- A QA/QC report that includes a description and the results of all automated or manual QA/QC steps taken during the preparation of the preliminary copies of the DFIRM and FIS report; and
- Documentation showing that the news release(s) was published correctly in accordance with FEMA requirements and that a similar notice was published correctly in the *Federal Register* in accordance with FEMA requirements.

Activity 14 - Post-Preliminary Processing

Responsible Entity: MDEQ, MEMA, and FEMA

Scope: This Activity consists of finalizing the DFIRM and FIS report after the preliminary FIS and DFIRM have been issued for public review and comment. The activities to be performed include:

- *Participating in Public Meetings:* When MEMA and MDEQ hold public meetings to present and discuss the results of this Flood Map Project, FEMA may attend the meetings and assist MEMA and MDEQ in the presentation as required.
- *Resolving Appeals and Protests:* Appeals and protests received during the 90-day appeal period will be reviewed and resolved prior to finalizing the FIRMs and FIS report. MEMA and MDEQ will provide support to FEMA in resolving appeals and protests. Activities may include, but not limited to, attending community meetings and assisting FEMA in addressing any issues that may arise in resolving appeals and protests from affected communities. For a typical appeal and protest, the following activities will be conducted: initial processing of the appeal/protest, performing a technical review of the appeal/protest, preparing letters to request additional data, performing revised analyses, and preparing a proposed resolution for FEMA's review. FEMA, MEMA, and MDEQ will mail all associated correspondence upon authorization by FEMA.
- *Special Correspondence:* Comments received within the 90-day appeal period (referred to as "special correspondence") will be reviewed, and responses will be drafted by MEMA and MDEQ for FEMA's review. MEMA and MDEQ will also mail the final correspondence upon authorization by FEMA.
- *Revise DFIRMs and FIS Report:* If necessary, FEMA, MEMA, and MDEQ will work with those parties responsible for preparing the DFIRM to prepare revised preliminary copies of the DFIRMs and FIS report, including all data tables and flood profiles. MEMA and MDEQ will mail all revised preliminary copies of DFIRMs and associated correspondence upon authorization by FEMA.
- *Letter of Final Determination:* FEMA will work with MEMA and MDEQ to establish an effective date for the DFIRM and FIS report. Unless otherwise directed by FEMA, MEMA and MDEQ will prepare a Letter of Final Determination (LFD) for FEMA review and signature and prepare a final notice for publication in the *Federal Register,* will mail the LFD with appropriate enclosures and coordinate publication of the final notice in the *Federal Register.*
- *GPO Processing:* MDEQ will prepare final copies of the DFIRM and FIS report, and provide them to MEMA and FEMA. This will include preparing camera-ready film negatives of the DFIRM and paper copies of the FIS report, including flood profiles; preparing appropriate paperwork to be included with DFIRM and FIS report materials, including the transmittal letter to the community CEO, the print processing worksheet, the Printing Requisition Form, and the Community Map Action Form; and delivering the final materials and paperwork to MEMA and FEMA in the format prescribed by FEMA.

- *Archiving Data:* MDEQ will package the backup data and correspondence for this Flood Map Project and transmit it to the Engineering Study Data Package Facility. In addition, MDEQ will maintain and archive all the technical data for at least 3 years.

Standards: All work conducted under this Activity shall conform to the standards specified for this Activity in Section 5 of this Mapping Activity Statement.

Products: In accordance with the TSDN format described in Section 2, MEMA and MDEQ shall make the following products available to FEMA as required:

- Draft LFD and associated backup data and information for FEMA review;
- Draft Special Correspondence and backup data and information for FEMA review;
- Appeal and Protest resolution letters, and all backup data and information for FEMA review;
- One set of DFIRM negatives and paper FIS reports, including all updated data tables and flood profiles;
- Paperwork required for printing of DFIRM panels and FIS report;
- Complete DFIRM spatial database; and
- Completed and organized Engineering Study Data Packages.

2. **Technical and Administrative Support Data Submittal:** The Project Team members for this project that have responsibilities for activities included in this Mapping Activity Statement shall comply with the following data submittal requirements:
   - All supporting documentation for the activities in this Mapping Activity Statement shall be submitted in accordance with Appendix M, Section M.2.1 of FEMA's *Guidelines and Specifications for Flood Hazard Mapping Partners*, available at FEMA's website at **www.fema.gov/fhm/gs_main.shtm** . The following table indicates the sections of the TSDN that apply to each activity.

TSDN—Applicable Sections

Section of TSDN	Activities												
	1	2	3	4	5	6	7	8, 9	10	11	14, 15, and 16	17	18
General Documentation													
Special Problem Reports	X	X	X	X	X	X	X	X	X	X	X	X	X
Telephone Conversation Reports	X	X	X	X	X	X	X	X	X	X	X	X	X
Meeting Minutes/Reports	X	X	X	X	X	X	X	X	X	X	X	X	X
General Correspondence	X	X	X	X	X	X	X	X	X	X	X	X	X
Engineering Analyses													
Hydrologic and Hydraulic Analyses	X	X		X	X	X	X						
Key to Cross-section Labeling and Key to	X	X				X	X	X	X				

Section of TSDN	Activities												
	1	2	3	4	5	6	7	8, 9	10	11	14, 15, and 16	17	18
Transect Labeling													
Draft FIS Report				X		X						X	X
Mapping Information		X						X	X	X	X	X	X
Miscellaneous Reference Materials	X	X	X	X	X	X	X	X	X	X	X	X	X

- If any issues arise that could affect the completion of an activity within the proposed scope or budget, the party responsible for that activity must complete a Special Problem Report (SPR) as soon as possible after the issue is identified and submitted to FEMA. The SPR should describe the issue and propose possible resolutions.

Additionally, MEMA, MDEQ, and FEMA will be responsible for collecting and maintaining a set of products for all Activities and shall compile a comprehensive TSDN for the entire project.

3. **Period of Performance**: The mapping activities outlined in this Mapping Activity Statement will be completed within 24 months from notice to proceed, not to extend beyond September 30, 2005.

4. **Funding/Leveraging:**

The parties hereby recognize and agree that DEQ funding of this Mapping Activity Statement will be conditioned upon the inclusion, funding, and approval of the Mapping Activity Statement

5. **Standards:** Table 5-1 indicates the standards and documentation relevant to this Mapping Activity Statement. Table 5-2 shows the applicable sections of FEMA's *Guidelines and Specifications for Flood Hazard Mapping Partners* for each activity.

Table 5-1 Applicable Standards per Activity

Applicable Standards	Activities													
	1	2	3	4, 4A	5, 5A	6	7	8, 8A, 8B	9	10	11, 11A	12, 12A, 12B	13	14
Guidelines and Specifications for Flood Hazard Mapping Partners	X	X	X	X	X	X	X	X	X	X	X	X	X	X
American Congress on Surveying and Mapping (ACSM) procedures	X	X	X											
Global Positioning System (GPS) Surveys: National Geodetic Survey (NGS-58), "Guidelines for Establishing GPS-Derived Ellipsoid Heights," November 1997	X	X	X											
EM 1000-1-1000, "Photogrammetric Mapping," March 31, 1993	X	X	X											
EM 1110-2-1003, "Hydrographic Surveys," October 31, 1994	X		X											
Numerical Models Accepted by FEMA for NFIP Usage, January 11, 2002				X	X	X	X							
Content Standards for Digital Geospatial Metadata (Federal Geographic Data Committee, 1998)		X	X					X	X	X	X	X	X	X
Document Control Procedures Manual dated October 1993.													X	X

Table 5-2. Mapping Activities and Applicable Sections of Guidelines and Specifications for Flood Hazard Mapping Partners.

Activity	Applicable Volume, Section/Subsection, and Appendix of Guidelines and Specifications
Activity 1 – Field Surveys and Reconnaissance	Volume 1, Sections 1.2, 1.3, 1.4 (specifically Subsection 1.4.2.1) Appendix A, Sections A.5, A.6, A.7, and A.8 Appendices B, C, and M
Activity 2 – Topographic Data Development	Volume 1, Section 1.4 (specifically Subsection 1.4.2.1) Appendix A, Sections A.2 and A.3 Appendix M
Activity 3 – Independent QA/QC of Topographic Data	Volume 1, Section 1.4 (specifically Subsections 1.4.1 and 1.4.2.1) Appendix A, Sections A.2, A.3, A.7 (specifically Subsection A.7.5), and A.8 (specifically Subsection A.8.6) Appendix M
Activity 4 –Hydrology	Volume 1, Section 1.4 (specifically Subsections 1.4.2.2 and 1.4.2.4) Appendix C, Sections C.1 and C.7 Appendices E, F, G, H, and M
Activity 4A – Coastal Hazard Analyses	Volume 1, Section 1.4 (specifically Subsection 1.4.2.2) Appendix A, Section A.4 Appendices B, D, and M
Activity 5 – Independent QA/QC of Hydrology	Volume 1, Section 1.4 (specifically Subsection 1.4.1) Appendix C, Section C.2 Appendices E, F, G, H, and M
Activity 5A – Independent QA/QC of Coastal Hazard Analyses	Volume 1, Section 1.4 (specifically Subsection 1.4.1) Appendix A, Section A.4 Appendices B, D, H, and M
Activity 6 – Hydraulics	Volume 1, Section 1.4 (specifically Subsections 1.4.2.2 and 1.4.2.4) Appendix A, Section A.4 (specifically Subsection A.4.7) Appendix C, Sections C.3 and C.7 Appendices B, E, F, G, H, and M
Activity 7 – Independent QA/QC of Hydraulics	Volume 1, Section 1.4 (specifically Subsection 1.4.1) Appendix A, Section A.4 (specifically Subsection A.4.7) Appendix C, Section C.5 Appendices B, E, F, G, H, and M

Activity	Applicable Volume, Section/Subsection, and Appendix of Guidelines and Specifications
Activity 8 – Floodplain Mapping (Detailed Riverine or Coastal Analysis)	Volume 1, Section 1.4 (specifically Subsection 1.4.2.3) Appendix C, Sections C. 4 and C.6 Appendices K, L, and M
Activity 8A – Floodplain Mapping (Redelineation Using Effective Profiles)	Volume 1, Section 1.4 (specifically Subsections 1.4.2.2 and 1.4.2.3) Appendices K. L, and M
Activity 8B – Floodplain Mapping (Refine/Establish Zone A)	Volume 1, Section 1.4 (specifically Subsection 1.4.2.3) Appendix C, Sections C.4 and C.6 Appendices K, L, and M
Activity 9 – Independent QA/QC of Floodplain Mapping	Volume 1, Section 1.4 (specifically Subsections 1.4.1 and 1.4.2.3) Appendix C, Sections C.4 and C.6 Appendices D, K, L, and M
Activity 10 – Base Map Acquisition and Preparation	Volume 1, Sections 1.3 (specifically Subsection 1.3.1.8) and 1.4 (specifically Subsection 1.4.3) Appendices A and B
Activity 11 – DFIRM Production (Non-Revised Areas)	Volume 1, Section 1.4 (specifically Subsections 1.4.2.3 and 1.4.3.2) Appendices K, L, and M
Activity 11A – Independent QA/QC of DFIRM Production (Non-Revised Areas)	Volume 1, Section 1.4 (specifically Subsection 1.4.3) Appendices K, L, and M
Activity 12 – Merge Effective and Revised Information	Volume 1, Section 1.4 (specifically Subsections 1.4.2.3 and 1.4.3.3) Appendices K and L
Activity 12A – Apply DFIRM Graphic Specifications	Volume 1, Section 1.4 (specifically Subsection 1.4.3) Appendices K and L
Activity 12B – Independent QA/QC of DFIRM Graphics	Volume 1, Section 1.4 (specifically Subsection 1.4.3) Appendices K, L, and M
Activity 13 – Issue Preliminary FIS and FIRM	Volume 1, Sections 1.4 (specifically Subsections 1.4.2 and 1.4.3) and 1.5 (specifically Subsection 1.5.1) Appendices J, K, L, and M

Activity	Applicable Volume, Section/Subsection, and Appendix of Guidelines and Specifications
Activity 14 – Post-Preliminary Processing	Volume 1, Section 1.5 Appendices J, K, L, and M

6. Schedule and Milestones:

The submittals from each activity that are due on the dates indicated are the products that were listed in the individual Activity details.

ACTIVITY	RESPONSIBLE ENTITY	DAYS FROM NOTICE TO PROCEED
Activity 1A – Scoping	MDEQ & MEMA	60
Activity 1B – Outreach	MDEQ, MEMA, & FEMA	120
Activity 1C – Field Surveys and Reconnaissance	MDEQ	120
Activity 2 – Topographic Data Procurement	MDEQ	120
Activity 3 – Independent QA/QC of Topographic Data	MDEQ & FEMA	150
Activity 4 –Hydrology	MDEQ	210
Activity 5 – Independent QA/QC of Hydrology	MDEQ	270
Activity 6 – Hydraulics	MDEQ	210
Activity 7 – Independent QA/QC of Hydraulics	MDEQ & FEMA	270
Activity 8 – Floodplain Mapping (Detailed Riverine and Redelineation Using Effective Profiles)	MDEQ	210
Activity 9 – Floodplain Mapping (Refine/Establish Zone A)	MDEQ & FEMA	210
Activity 10 – Independent QA/QC of Floodplain Mapping	MDEQ	270
Activity 11 – Base Map Acquisition and Preparation	MDEQ	120
Activity 14 – Merge Effective and Revised Information	FEMA	270
Activity 15 – Apply DFIRM Graphic Specifications	MDEQ	330
Activity 16 – Independent QA/QC of DFIRM Graphics	FEMA	390
Activity 17 – Issue Preliminary FIS and FIRM	MDEQ	460
Activity 18 – Post-Preliminary Processing	MDEQ, MEMA, & FEMA	580

7. Certification: The following certifications apply to this Mapping Activity Statement (as appropriate):

Activity 1 (Field Surveys and Reconnaissance) and Activity 2 (Topographic Data Development)

- Registered Professional Engineer or Licensed Land Surveyor will certify topographic information, in accordance with 44 CFR 65.5(c).
- Certification of topographic information by the American Society for Photogrammetry and Remote Sensing is also acceptable.

Activity 11 (Base Map Acquisition and Preparation)

- Community official or responsible party will provide written certification that the digital data meet FEMA's minimum standards and specifications.
- Responsible Mapping Partner will provide documentation that the digital base map can be used by FEMA.

Activities 8 and 9 (Floodplain Mapping)

- The DFIRM metadata files will include a description of the horizontal and vertical accuracy of the DFIRM base map and floodplain information.

Activity 4 (Hydrology), Activity 6 (Hydraulics), and Activities 8 and 9 (Floodplain Mapping)

- Hydrologic and/or hydraulic analyses and data will be certified by a Registered Professional Engineer or Licensed Land Surveyor in accordance with 44 CFR 65.6(f).
- Topographic information will be certified by a Registered Professional Engineer or Licensed Land Surveyor in accordance with 44 CFR 65.5(c).
- Any levee systems to be accredited will be certified in accordance with 44 CFR 65.10(e).

8. **Technical Assistance and Resources**: MDEQ may obtain copies of FEMA-issued LOMCs, archived engineering backup data, and data collected as part of the Mapping Needs Assessment Process for Mobile and Baldwin Counties from FEMA. To obtain this data, FEMA may be contacted at 1-877 FEMA MAP (1-877-336-2627). General technical and programmatic information, such as FEMA 265, the Quick-2 computer program, and the MT-2 forms, can be downloaded from FEMA's Flood Hazard Mapping website (www.fema.gov/fhm). Specific technical and programmatic support may be provided through FEMA; such assistance should be requested through the FEMA Regional Project Officer.

   MDEQ may also consult with the FEMA Regional Project Officer to request support in the areas of selection of data sources, digital data accuracy standards, assessment of vertical data accuracy, data collection methods or sub-contractors, and GIS-based engineering and modeling training.

9. **Contractors**: MDEQ will ensure that procurement of subcontractors as part of this Mapping Activity Statement complies with the requirements of 44 CFR 13.36.

10. **Reporting**

    Financial Reporting: Financial reporting requirements will be in accordance all federal regulations.

    Status Reporting: Status reports will be submitted on a quarterly basis in accordance with the financial reporting submittals. At a minimum these reports will include a summary of the work that was completed during the quarter and a comparison for the % work completed to the % of funds expended. The Project Officer, as needed, may request additional information on status.

11. **Points of Contact:** The FEMA Regional Project Officer is Laura Algeo, and the CTP Project Manager is Cragin Knox (Director, Mississippi Dept. of Environmental Quality, Office of Geology) , or subsequent personnel of comparable experience who are appointed to fulfill these responsibilities. When necessary, any additional assistance from FEMA should be requested through the FEMA Regional Project Officer.

Each party has caused this Mapping Activity Statement to be executed by its duly authorized representative.

Charles H. Chisolm
Executive Director, Mississippi Dept. of Environmental Quality

9/25/03
Date

Robert R. Latham, Jr.
Executive Director, Mississippi Emergency Management Agency

9/24/03
Date

Laura Algeo, P.E.
FEMA Regional Project Officer
Federal Emergency Management Agency

9/29/03
Date