

# **MAS NO. 2005-02 STATE OF MONTANA APPENDIX B**

## **SCOPE OF WORK**

### **Flathead County, Montana Digital Flood Insurance Rate Map Production and Development of Updated Flood Data**

**Date August 17, 2005**

#### **Section 1**

#### **INTRODUCTION**

The objective of the Flood Map Project documented in this Scope of Work (SOW) is to develop a Digital Flood Insurance Rate Map (DFIRM) and Flood Insurance Study (FIS) report for Flathead County and Incorporated Areas. This project will be completed by the PBS&J Team, hereafter called the Consultant; the State of Montana Department of Natural Resources and Conservation, Water Resources Division, Floodplain Program (DNRC); and the Federal Emergency Management Agency (FEMA), primarily acting through their consultant, Michael Baker Jr., Inc., hereafter called the National Service Provider (NSP).

The majority of the project work will be performed by the Consultant. DNRC will perform many of the outreach activities and the NSP will perform independent QC activities. All activities and their responsible parties will be specifically defined in this SOW.

This SOW is based on the Mapping Activity Statement (MAS), specifically, MAS No. 2005-02, dated June 28, 2005; and is directly related to the MAS. Tasks documented herein directly match with the Activities defined in the MAS. Modifications to the MAS in the form of Special Problem Reports or other change orders are also considered modifications to this SOW. The Consultant should reference the MAS for FEMA Standards and requirements for project processes and deliverables.

This SOW covers Flathead County and Incorporated areas, including the City of Columbia Falls, City of Whitefish, and City of Kalispell, all of which municipalities lie entirely within the boundaries of Flathead County. The product of this SOW will be a single set of digital floodplain data for the entire county. By reference, the signed MAS for this project shall be incorporated into this SOW. PBS&J shall be responsible for completing activities in the MAS that have been assigned to the DNRC. PBS&J is not responsible for completing activities in the MAS that have been assigned to FEMA or the National Service Provider (NSP). PBS&J shall prepare all new digital information, including maps and flood profiles, in elevations that are adjusted to NAVD 1988 datum, regardless of the datum for the source information. PBS&J shall respond to and address all comments and deficiencies that are brought forth during the QA/QC process and by the project Sponsors. PBS&J will complete all tasks and provide final deliverables to the DNRC, FEMA and Flathead County by the end of the performance period, which will not extend beyond September 30, 2007 for the associated Mapping Activity Statement.

This project is being funded primarily by Federal monies and under FEMA's National Flood Insurance Program. As such, the project must be performed in accordance with and meet FEMA's standards. The Consultant will ensure that the project meets all of FEMA's requirements and standards for this project. FEMA has developed DFIRM Tools, including the WISE Scoping Tool, and the Consultant will either use these tools and update FEMA's databases as needed or ensure that their products meet with FEMA's Data Capture Standards. FEMA will be providing download/upload capability for such submittals

through the Mapping Information Platform (MIP). As this capability is provided, products identified in the activities of the MAS (and associated SOW), and as outlined in FEMA Guidance and Specifications will be uploaded to the MIP. Alternatively, the Consultant will submit to the NSP at the following milestones in accordance with the Data Capture Specifications:

- Project Scoping (as specified);
- Terrain Data Processing Completed;
- Field Survey Completed;
- Hydrology Completed (draft and final);
- Hydraulics Completed (draft and final); and
- DFIRM Mapping (draft and preliminary).

## **ATTACHMENTS**

To supplement this SOW, the following items are attached:

- Detailed Costs for DFIRM Conversion and Individual H&H Studies (Attachment A),
- Panelization Scheme (Attachment B),
- Project Schedule (and revised Project Schedules) (Attachment C),
- Common Terminology and Definitions of this SOW and MAS No. 2005-02
- Special Problem Reports or other modifications to MAS No. 2005-02.

## **CONTENTS**

This project is defined by the following major tasks, which are defined throughout the rest of this document:

- Pre-Scoping
- Scoping
- Base Map Acquisition
- Field Surveys
- Topographic Data Development
- Hydrologic Analysis
- Hydraulic Analysis
- Floodplain Mapping: Detailed, Approximate, and Redelineation
- DFIRM/FIS Production: Non-revised areas, Revised areas, Graphics/Database, and FIS Production
- Preliminary DFIRM/FIS Distribution
- Post-Preliminary Processing
- Meetings and Coordination
- Schedule and Reporting
- H&H-Specific Tasks

## **Section 2**

### **DFIRM PRODUCTION TASKS**

#### ***Task 1: Pre-Scoping (MAS Activity 1)***

Pre-Scoping will be performed by the DNRC and the NSP; the Consultant will review the deliverables and become familiar with the project. The Pre-Scoping involves collecting data from a variety of sources including community surveys, other Federal and State Agencies, NFIP State Coordinators, Community Assistance Visits (CAVs) and FEMA archives. The NSP will collect and compile such data and evaluate the effective FIS report and FIRM maps to see if they need to be updated. The NSP will compile lists of mapping needs from the MNUSS database, community surveys, the Scoping Tool, and CAVs if available. The NSP will provide:

- Copies of all digital files obtained and lists of files that may be available at a later date;
- A Pre-Scoping Report including all data compiled from the described research;
- Summary of the Community's needs; and
- Scoping Tool project files.

DNRC will make initial contact with the communities and establish a contact list. DNRC will perform brief interviews with the communities to inform them of the project and gather general information about ordinances, mapping needs, and existing base map data. DNRC will provide:

- Contact information for all communities and project team members
- Pre-Scoping Interviews and Coordination Briefing

The Consultant will be provided with copies of the above deliverables and will review and become familiar with the information.

#### ***Task 2: Scoping (MAS Activity 2)***

The NSP will provide an Available Data Inventory document to DNRC and the Consultant. This document will include:

- Details of Mapping Needs Assessments, including a summary of MNUSS data;
- Description of the effective FIRM panels, FIRM panels, FIS reports, and other flood hazard data or existing study data, including data for adjacent counties.
- CAV and CAC file overview;
- A scoping map;
- Inventory of available base map information;
- Inventory of available topographic data;
- Inventory of available flood hazard data; and
- Inventory of other available hydrologic and hydraulic information and data.

The Consultant will review the provided documentation and utilize the information.

The Consultant will be expected to monitor the project on an ongoing basis and bring to DNRC's attention any issues that could delay or prohibit the Flood Map Project. Some examples of potential obstacles to completing the project in a timely fashion include the following: inability to address mapping needs adequately with available funding; difficulty coordinating community funding with FEMA funding; lack of an available base map meeting FEMA minimum specifications; hydrologic and/or hydraulic issues; community concerns; reliance on other studies or data (e.g., topographic mapping) that will not be available within the project's scheduling constraints; needs not having as high a priority as originally identified; and other relevant project constraints.

Deliverables:

- As needed, email communication and documentation of potential obstacles.

***Scoping Subtask 2-1: Project Scope***

The Consultant will develop a Project Scope. The following items will be addressed in the Project Scope: review available information; determine if and how effective FIS data can be used in new project; identify other data needed to complete the Project and its source; and the DFIRM format. This scope will be coordinated with members of the Project Team and the communities and county involved with the project. The Project Scope will establish priority levels for flooding sources to be analyzed and mapped, and estimate schedules and associated costs for completion of the components of flood mapping. A Draft Project Scope will be prepared following the Scoping Meeting, and will include reach lengths identified to date; estimated costs for approximate, limited detail, and detailed mapping; and a draft panelization scheme. The Final Project Scope will include final numbers and details associated with the project.

Deliverables:

- Draft Project Scope document
- Final Project Scope document
- A QA/QC plan for the review of specific project deliverables associated with Tasks outlined in this SOW and Activities outlined in the MAS No. 2005-02.

***Scoping Subtask 2-2: Scoping Meeting***

The DNRC will coordinate, set up, and conduct the Scoping Meeting. FEMA/NSP shall be responsible for compiling the necessary information for the meeting as contained on the Scoping Meeting Item Checklist. These items may include: FIS and FIRM for affected communities; USGS quads for the study area(s); best available community base map(s); effective FIRM summary; Available Data Inventory; Scoping Map; aerial photos/topographic mapping if available; existing drainage studies or other Hydrology & Hydraulics (H&H) data; Community master plan(s)/Drainage Master Plan(s); Zoning Maps; Street Maps; As-built plans; and Floodplain Ordinance(s).

The Consultant will send the Project Manager and a GIS Specialist to attend the Scoping Meeting. DNRC will open the meeting with a project overview, then the Consultant will work with DNRC to lead discussion of the following, as necessary:

*Review and Refinement of Flood Hazard Identification Methodologies (H&H)*

The attendees shall discuss the extent of riverine modeling required for the project. The research completed during the pre-Scoping Meeting phase shall be reviewed to determine the extent and applicability of previous modeling. Issues to be discussed include the following: models to be used from FEMA's approved models list; requirements for tie-ins to adjacent NFIP maps; areas where complex models might be required; and vertical datum.

*Final Prioritization of Restudy Areas (H&H)*

The attendees will review the documented community mapping needs and agree upon a priority of those needs. The Consultant will gather data on any existing models and other details needed to determine detailed costs for the identified reaches, as well as establish a contact and date by which the models will be received (within one month wherever possible).

*Review of Proposed Paneling Scheme (H&H)*

The scoping map shall be used to review the proposed paneling and scale scheme. The Consultant will document panelization changes suggested by the community and use this information to develop a revised panelization.

*Review and Refinement of Base and Topographic Map Sources (GIS)*

FEMA's base map specifications will be discussed. The discussion shall include the following topics: Base map source (i.e., locally developed data or DOQs meeting FEMA's minimum specifications) to be used for the project; Topographic and planimetric data sources; Coordination of countywide issues, if necessary; horizontal and vertical datums; and acquisition of the base map, if digital files are not available. The Consultant will document the available data from each community representative including a date by which the community will forward to them the specified files (within one month wherever possible).

*Finalization of Map Production and Database Options:*

The proposed DFIRM format and optional features and data for the enhanced DFIRM Database (e.g., GIS data for watershed boundaries, stream reach hydrologic network structure, land use data, soil data, digital elevation certificates, photographs of structures) from the draft Scope of Project shall be reviewed, refined, and finalized.

At the meeting, the Consultant will be responsible for ensuring that all necessary information for the development of the Project Scope and detailed cost estimates for the selected reaches have been collected.

The Consultant will prepare meeting notes, including a proposed schedule and task assignments, and will submit the documentation to DNRC following the meeting. DNRC will review and finalize the meeting notes, schedule, task assignments, and will make this information available to attendees, upon request.

Deliverables:

- Attendance at Scoping Meeting by Project Manager and GIS Specialist
- Hard copy map of draft panelization, including indication of existing flood hazard data
- Presentation or handouts as needed to relay information to Scoping Meeting attendees
- Documentation of schedule of receipt of Base Mapping and Existing Model data
- Documentation of prioritized reaches for restudy
- Meeting notes

### ***Task 3: Base Map Acquisition (MAS Activity 12)***

The Consultant shall provide the digital base map for the project. This will include the following:

- 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,
- Document that the digital data meets the minimum standards and specifications that FEMA requires for DFIRM production,
- Coordinate with and notify Flathead County and the Cities of Kalispell, Columbia Falls, and Whitefish of the final base map (raster or vector).
- Populate the DFIRM database with the information required by FEMA.

Deliverables: In accordance with FEMA Standards, provided to DNRC and FEMA/NSP:

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

### ***Task 4: Profile Digitization and Vertical Datum Conversion (MAS Activity 10)***

Profiles will be digitized and geo-referenced to the NAVD1998 datum using conversion factors determined from FEMA specifications. This work shall include, at a minimum, the activities listed below.

#### Datum Conversion

- Unless a community-wide conversion factor can be used, a stream-by-stream conversion factor must be determined for each flooding source. The datum conversion process is documented in Appendix B of the FEMA Guidelines & Specifications for Flood Hazard Mapping Partners.

#### Profile Digitization

- Many of the specifications for digitizing profiles in the correct format can be found in Appendix J of the FEMA Guidelines & Specifications for Flood Hazard Mapping Partners.
- All communities and unincorporated areas are combined to produce a seamless set of county-wide profiles for each reach.
- LOMC's are incorporated.
- The datum conversion factor is applied to each flooding source.

### ***Task 5: Review of LOMCs and Existing Data Study Information (MAS Activity 10)***

PBS&J shall review the technical, scientific, and other information supporting Existing Data Studies (XDS) submitted by the DNRC or the Mapped Communities to ensure that the data and modeling are consistent with FEMA standards and standard engineering practice and are sufficient to prepare the DFIRM. This work shall include, at a minimum, the activities listed below.

- Review of LOMCs
- Review of XDSs

- Review the submittal for regulatory adequacy, completeness of required information, and supporting data and documentation.
- Use of acceptable model(s);
- Flood discharges;
- Regulatory floodway computation methods; and
- Tie-in to upstream and downstream non-revised Flood Profiles.
- 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 of receipt.)

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

- A Summary Report that describes the findings of the independent QA/QC review; and
- Recommendations to resolve any problems that are identified during the independent QA/QC review.

***Task 6: Floodplain Mapping/Redelineations (MAS Activity 10C and 10D)***

The Consultant shall delineate the 1- and 0.2-percent-annual-chance floodplain boundaries and the regulatory floodway boundaries (if required) for all effective flooding sources identified as requiring redelineation. The extent of redelineation efforts will depend upon many factors including availability of adequate topographic mapping and/or aerial photography and availability of adequate hydrologic/hydraulic data. Where inadequate topographic and hydrologic/hydraulic information is available, approximate A zones may be redelineated based on aerial photography only, however, this will be reviewed with the DNRC prior to any redelineation efforts. The Consultant shall use the topographic data acquired previously to delineate the floodplain and regulatory floodway boundaries as appropriate on a digital work map. If the new topographic data do not reflect the same hydraulic characteristics as in the effective study, the Consultant shall evaluate the topographic data to determine if changes are significant enough to invalidate the floodplain boundary and regulatory floodway boundary redelineations. If so, the Consultant shall contact DNRC (and the FEMA/NSP as needed) with a recommendation. In addition, Consultant shall incorporate the results of all effective Letters of Map Change (LOMCs) issued by FEMA and Existing Data Studies (XDS) approved by FEMA since the date of the current effective FIRM for each community, within the revised areas as appropriate. If LOMCs and XDSs do not reflect the same hydraulic characteristics as in the effective study, the consultant shall contact DNRC (and the FEMA/NSP as needed) with a recommendation. This issue is particularly applicable to West Spring Creek.

Deliverables: In accordance with the FEMA Standards; provided to DNRC and FEMA/NSP:

- Digital work maps showing the 1 and 0.2-percent-annual-chance floodplain boundary delineations and redelineations, regulatory floodway boundaries (as applicable), cross-sections, BFEs, flood insurance risk zone labels, and all applicable base map features;
- Written summary of the analysis methodologies;

- Any backup or supplemental information, including supporting calculations and assumptions for any computed 1-percent-annual-chance water-surface elevations used in the mapping required for the independent QA/QC review under Activity 11;
- Hardcopy and digital versions of input and output for any computer programs that were used;
- 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
- Documentation that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM;
- NSP Format Mapping Database or Intermediate Data Delivery consistent with the NSP Data Capture Standards.
- If automated GIS-based models are applied, all input data, output data, intermediate data processing products, and GIS data layers shall be submitted.

***Task 7: DFIRM and FIS Production (MAS Activity 13, 13a)***

Upon completion of the DFIRM panels and FIS, the Consultant shall submit the panels or FIS to FEMA/NSP for an independent QA/QC review. The Consultant shall address all related comments and questions that are identified by FEMA/NSP during the independent QA/QC review.

***Task 7a: Non-Revised Areas (MAS Activity 13)***

For all flooding sources except those segments for which updated flood data will be developed as part of this project, the Consultant shall convert the information shown on the effective FIRM and Flood Boundary Floodway Map (FBFM) panels for all incorporated and unincorporated areas to digital format in conformance with FEMA DFIRM specifications. The redelineation will include adjustment of approximate zones utilizing best available aerial photography and/or topographic mapping. The Consultant shall use the base map acquired previously for the conversion. The Consultant shall digitize 65 FIRM panels, and create a total of 74 printed DFIRM panels, as documented in the attached panelization scheme (Attachment B).

The Consultant also shall incorporate the results of LOMCs issued by FEMA since the date of the current effective FIRM for each affected community. In areas with Mappable Letters of Map Revision (LOMRs) that are based on better topographic data than available in the project base map acquired under Activity 12 the LOMR data shall be incorporated by digitization of the LOMR map data. This situation may arise where a topographic survey was performed specifically for a LOMR and that data was not available for incorporation into the base map compiled under Activity 12 or the data was of a small scale not practical for incorporation.

The Consultant shall not digitize the flood theme for those segments of flooding sources for which updated flood data will be developed. Rather, the Consultant shall leave these as “holes” in the digital flood theme that will be filled in as part of Task 12 (as applicable).

Deliverables: In accordance with the FEMA Standards; provided to DNRC and FEMA/NSP:

- 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.

#### ***Task 7b: Merging Revised and Non-Revised Information (MAS Activity 14)***

Upon completion of the floodplain mapping activities for the revised areas (Task 12) and the DFIRM production for non-revised areas (Task 7a), the Consultant shall merge the digital floodplain data into a single, updated DFIRM. This work includes the tie-in of flood hazard information for areas that were not studied as part of this Flood Map Project. The Consultant shall tie in the revised and non-revised Flood Profiles, floodplain boundaries, and regulatory floodway boundaries with contiguous communities that were not studied as part of the Flood Map Project documented in the MAS. The Consultant shall coordinate with FEMA and those Mapping Partners responsible for Task 12, as necessary, to resolve any potential tie-in issues.

Deliverables: In accordance with the FEMA Standards; provided to DNRC and FEMA/NSP:

- 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
- Documentation that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM.

#### ***Task 7c: Application of FEMA Graphics and Database Specifications (MAS Activity 14a)***

The Consultant shall apply the final FEMA DFIRM graphics and database specifications to the DFIRM files. This work shall include adding all required annotation, line pattern, area shading, and map collar information (e.g., map borders, title blocks, legends, notes to users). The Consultant shall coordinate with FEMA and those Mapping Partners responsible for Tasks 12 through 13, as necessary, to resolve any problems that are identified.

Deliverables: In accordance with the FEMA Standards; provided to DNRC and FEMA/NSP:

- 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; and
- NSP Format DFIRM Database or Intermediate Data Delivery consistent with the NSP Data Capture Standards.

#### ***Task 7d: FIS Production***

The Consultant shall compile a countywide FIS Report for the subject county. This work shall include converting any hardcopy FIS texts into digital format and recompiling the texts into one FIS in countywide format or adding all required sections to the FIS text. All Floodway Data Tables and Flood Profiles will be converted to NAVD 88.

Deliverable: In accordance with the FEMA Standards; provided to DNRC and FEMA/NSP:

- FIS Report, in a countywide format.

#### ***Task 8: Preliminary DFIRM and FIS Report Distribution (MAS Activity 15)***

This Task involves the final preparation, review, and distribution of the Preliminary copies of the DFIRM and FIS report for community official and general public review and comment. This Task will be performed by the Consultant, DNRC, and FEMA/NSP as defined below.

The Consultant shall prepare the FIS report in the FEMA Countywide Format according to FEMA Standards. The Consultant shall also prepare letters to transmit the Preliminary copies of the DFIRM and FIS report and related enclosures to all affected communities, all other Project Team members, the State NFIP Coordinator, the FEMA Regional Office, and others as directed by FEMA.

The NSP shall perform a final QA/QC review of the Preliminary DFIRM and FIS report, including all data tables, Flood Profiles, and other components of the FIS report, according to FEMA Standards. The

NSP shall work with the Consultant, DNRC, and FEMA as appropriate to resolve discrepancies identified during the final QA/QC review.

The Consultant shall distribute the Preliminary copies of the DFIRM and FIS report to all affected communities, all other Project Team members, the State NFIP Coordinator, the FEMA Regional Office, and others as directed by FEMA. The Consultant shall prepare news release notifications of BFE changes for all affected communities if appropriate and perform QA/QC reviews of the notifications for accuracy and compliance with FEMA format requirements. The Consultant shall file the notifications for later submittal to FEMA for review.

The Consultant shall prepare Preliminary SOMAs for all affected communities if appropriate. The SOMAs shall list pertinent information regarding LOMCs that will be affected by the issuance of the DFIRM (i.e., superseded, incorporated, revalidated).

Deliverables: In accordance with the FEMA Standards; provided to DNRC and FEMA/NSP:

- Preliminary transmittal letters;
- Preliminary copies of the DFIRM and FIS report, including all new or updated data tables and Flood Profiles;
- Preliminary copies of the DFIRM and FIS report shall be mailed to the Chief Executive Officer (CEO) or floodplain administrator of each affected community, all other Project Team members, the State NFIP Coordinator, the FEMA Regional Office, and others as directed by FEMA;
- Preliminary SOMAs, prepared in accordance with FEMA requirements, shall be mailed with the Preliminary copies of the DFIRM and FIS report when appropriate;
- Revised DFIRM mapping files, prepared in accordance with the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners*, shall be provided on CD-ROM;
- Revised DFIRM database files, prepared in accordance with the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners*, shall be provided on CD-ROM; and
- Revised metadata files describing the DFIRM data, including all required information shown in *Guidelines and Specifications for Flood Hazard Mapping Partners*, shall be provided on CD-ROM.

### ***Task 9: Post-Preliminary Processing (MAS Activity 16)***

This task consists of finalizing the DFIRM and FIS report after the Preliminary copies of the DFIRM and FIS report have been issued to community officials and the public for review and comment. The tasks will be performed by the Consultant, DNRC, and FEMA/NSP as defined below.

When required, upon completion of a 30-day community comment period and/or final coordination meeting with the affected communities, the Consultant shall initiate the 90-day appeal period, if necessary, by completing the following (in accordance with FEMA Standards):

- Prepare and mail proposed BFE determination letters to the community CEOs and floodplain administrators;
- Prepare and place news release notifications of BFE changes in prominent newspapers with local circulation; and
- Prepare and place the appropriate notices (Proposed Rules) in the *Federal Register*.

The Consultant shall support FEMA in reviewing and resolving appeals and protests received during the 90-day appeal period. For each appeal and protest, the following activities shall be conducted as appropriate:

- Initial processing and acknowledgment of submittal;
- Technical review of submittal;
- Preparation of letter(s) requesting additional supporting data;
- Performance of revised analyses; and
- Preparation of a draft resolution letter and revised DFIRM and FIS report materials for FEMA review.

The Consultant shall mail all associated correspondence upon authorization by DNRC and FEMA.

The Consultant shall support FEMA/NSP in responding to comments not received within the 90-day appeal period or 30-day comment period (referred to as “special correspondence”), including drafting responses for FEMA review when appropriate and finalizing responses when requested by FEMA. The Consultant also shall mail the final correspondence (and enclosures if appropriate) and distribute appropriate copies of the correspondence and enclosures upon receipt of authorization from DNRC and FEMA.

If necessary, the Consultant shall work cooperatively with the NSP to revise the DFIRM and FIS report at the direction of DNRC and the FEMA Regional Project Officer and the Consultant shall distribute Revised Preliminary copies of the DFIRM and FIS report to the CEO and floodplain administrator of each affected community, all other Project Team members, the State NFIP Coordinator, the FEMA Regional Office, and others as directed by FEMA.

The Consultant shall prepare Final SOMAs for the affected communities as appropriate.

The Consultant shall work with DNRC and FEMA/NSP to establish the effective date for the DFIRM and FIS report, and shall prepare a Letter of Final Determination (LFD) for each affected community for FEMA review in accordance with the FEMA *Document Control Procedures Manual*. The Consultant also shall mail the final signed LFDs and enclosures (including the Final SOMA and the Final Rule for publication in the *Federal Register*, when appropriate) and distribute appropriate copies of the signed LFDs and enclosures upon receipt of authorization from FEMA.

The Consultant shall prepare final reproduction materials for the DFIRM and FIS report and provide these materials to the FEMA Map Service Center for printing by the U.S. Government Printing Office. The Consultant also shall prepare the appropriate paperwork to accompany the DFIRM and FIS report (including Print Processing Worksheet, Printing Requisition Forms, and Community Map Actions Form) and transmittal letters to the community CEOs.

The Consultant, when appropriate, shall prepare and distribute revalidation letters to the community CEOs and floodplain administrators to notify the affected communities about LOMCs for which determinations will remain in effect after the DFIRM and FIS report become effective.

The Consultant will maintain detailed records of costs associated with Post-Preliminary tasks. In the event that anticipated costs for Post-Preliminary Processing are exceeded, the Consultant will work with DNRC to prepare a Special Problems Report for FEMA to request additional funding. DNRC and

PBS&J will have a meeting(s) before a Special Problems Report is officially prepared to identify and agree upon the specific tasks needed to address the issues at hand and costs associated with those tasks.

The NSP shall ensure that technical and administrative support data are packaged in the FEMA-required TSDN format and stored properly in the library archives.

Deliverables: In accordance with FEMA Standards, provided to DNRC and NSP/FEMA:

- Documentation that the news release notifications were published in accordance with FEMA requirements;
- Documentation that the appropriate *Federal Register* notices (Proposed and Final Rules) were published in accordance with FEMA requirements;
- Draft and final Special Correspondence (and all associated enclosures, backup data, and other related information) for FEMA review and signature as appropriate;
- Draft and final Appeal and Protest acknowledgment, additional data, and resolution letters (and all associated enclosures, backup data, and other related information) for FEMA review and signature as appropriate;
- Draft and final LFDs (and all associated enclosures, backup data, and other related information) for FEMA review and signature;
- DFIRM negatives and final FIS report materials, including all updated data tables and Flood Profiles;
- Paperwork for the final DFIRM and FIS report materials;
- Transmittal letters for the printed DFIRM and FIS report; and
- LOMC Revalidation Letters if appropriate.

#### ***Task 10: Meetings and Coordination (MAS Activity 17)***

The DNRC and the Consultant will include local officials as part of the Project Team and will coordinate with Project Team members throughout the life of the project. The Consultant shall meet and coordinate with DNRC and project stakeholders (e.g., Mapped Communities) to ensure successful implementation of project objectives. DNRC will coordinate and facilitate the meetings, and the Consultant will prepare for, attend, participate, and prepare meeting notes for project-related meetings.

The anticipated meetings will include the following:

- Formal progress/review meetings with DNRC and other stakeholders as requested by the DNRC;
- Public meetings/open houses with Mapped Communities to present draft/preliminary products and to educate interested parties and members of the public regarding the DFIRM conversion project and its potential implications for NFIP purposes; and
- Informal meetings as needed (in person or teleconference) with the federal-state team to resolve issues, receive input, and clarify SOW items.
- Attendance as a technical witness at state and local map adoption hearings, as needed

#### ***Task 11: Project Management and Reporting***

The Consultant shall adhere to the project schedule as attached. Any changes to the schedule must be approved in advance by DNRC and attached to this SOW.

The Consultant shall comply with the following reporting requirements:

- Provide weekly project updates by email to DNRC;
- Provide monthly cost and progress reporting, itemized by SOW Tasks, to the DNRC in the format provided by DNRC;
- Collect and maintain a set of deliverables for all tasks during contract performance.

**Section 3**  
**NEW FLOODPLAIN (REVISED) AREAS**

Task 12 outlines the work associated with new floodplain mapping studies for the following areas:

**New Floodplain Analysis Study Table**

Flooding Source	Reach Limits	Hydrologic Analyses	Hydraulic Analyses	Floodplain Mapping (Detailed)	Redelineation Using Effective Flood Profiles and Updated Topographic Data	Refinement or Creation of Zone A
North Fork Flathead River	Confluence with Middle Fork Flathead River to upstream 15 miles					x

The work generally consists of the following activities:

1. Field Surveys and Reconnaissance (MAS Activity 3)
2. Topographic Data Development (MAS Activity 4)
3. Hydrologic Analyses (MAS Activity 6)
4. Hydraulic Analyses (MAS Activity 8)
5. Floodplain Mapping (MAS Activity 10)

FEMA and NSP review is generally required after all activities. Each flooding source identified in the H&H Study Table will be addressed either by:

- a. Detailed Riverine Mapping,
- b. Limited Detail Riverine Mapping,
- c. Redelineation Using Effective Flood Profiles and Updated Topographic Data or Aerial Photography, or
- d. Refinement or Creation of Zone A.

For each of these, the Consultant shall delineate floodplain and floodway boundaries as required for the flooding sources identified in the H&H Study Table. The Consultant shall incorporate all new or revised modeling as required and shall use the best available topographic data to delineate the boundaries on a digital work map. Upon completion of floodplain mapping (for each mapping method: a, b, and c), the Consultant shall submit the mapping to FEMA/NSP for an independent QA/QC review. The Consultant shall address all related concerns or questions that are identified by FEMA/NSP during the independent QA/QC review.

## **Task 12 – North Fork Flathead River Floodplain Mapping**

### **1. Introduction**

The PBS&J Team shall perform hydraulic analyses for the North Fork Flathead River from the confluence with Middle Fork Flathead upstream 15 miles. A Zone A will be designated for the 1-percent-annual-chance event based on peak discharge from a regression equation based hydrology analysis. The hydraulic analysis methods used for this analysis will include the HEC-RAS computer program.

Additionally, the PBS&J Team will adhere to ASFPM’s May 12, 2003 resolution on topographic data development and floodplain mapping which states: “The flood elevations and the floodplain delineations on the maps must correlate reasonably to the best available topographic information for the stream and adjacent corridor.”

For this analysis, existing topographic data will be used.

The PBS&J Team shall use the FEMA CHECK-2 or CHECK-RAS checking program to check the reasonableness of the hydraulic analyses. To facilitate independent QA/QC review, the PBS&J Team shall provide explanations for unresolved messages from the CHECK-2 or CHECK-RAS program, as appropriate. In addition, the PBS&J Team shall address all concerns or questions regarding this task that are raised by FEMA during independent QA/QC review.

### **2. Project Management, Coordination and Meetings**

The PBS&J team will conduct the following items, as necessary, for the management and coordination of the project:

**2.1 Project Management.** PBS&J management will coordinate all aspects of the work, including data collection, research, surveying, topographic verification and hydraulic analysis. As part of the management task, PBS&J will prepare and submit monthly progress reports and invoices to the DNRC. A written summary of progress presented as percent complete for specific work tasks will be included with the monthly invoices.

**2.2 Coordination and Progress Meetings.** PBS&J will attend a total of 1 progress meeting with the DNRC during the duration of the project.

**2.3 Internal Team Meetings and Coordination.** PBS&J’s Project Manager will be responsible for ongoing internal coordination of the project team. Internal team meetings will be held with adequate frequency to keep the study proceeding on schedule and to ensure thorough communication on technical issues and approaches.

**2.4 Public Meeting.** This proposal assumes that one formal meeting, involving Flathead County, oversight agencies (FEMA and/or DNRC), the public, or a combination thereof, will be held during the project duration. This subtask provides time to prepare for and attend that meeting.

### **3. Assumptions and Approach**

- Reach boundaries will extend from the confluence with Middle Fork Flathead upstream 15 river miles.

- The hydraulic model will use normal depth for the North Fork Flathead as the starting water surface elevation.
- Existing topographic mapping will be used for the study. No new topographic survey is included.
- The Consultant may expand on the approaches for analyzing Zone A areas outlined in *Guidelines and Specifications for Flood Hazard Mapping Partners* and in FEMA 265, *Managing Floodplain Development in Approximate Zone A Areas* (April 1995), and/or develop new approaches. Such approaches must be coordinated with DNRC and the FEMA Regional Project Officer before analysis and mapping begin.
- Any work related to Summary of Past Map Actions (LOMR, LOMA, etc), revalidations, and public notices is excluded from this Scope of Work.
- Submittal and review fees charged by FEMA will either be waived by FEMA or will be paid by DNRC or the local agencies.

#### 4. General information

- Length of segment to be modeled is approximately 15 miles measured along the channel.
- Approximate number of bridges and other hydraulic structures is assumed to be zero.
- Engineers will collect and examine orthophotography for roughness assignment.

#### 5. Deliverables

In accordance with the FEMA Standards; provided to DNRC and FEMA/NSP:

- Digital work maps showing the new 1-percent-annual-chance floodplain boundary delineations and redelineations, flood insurance risk zone labels, and all applicable base map features;
- Written summary of the analysis methodologies;
- Any backup or supplemental information, including supporting calculations and assumptions for any computed 1-percent-annual-chance water-surface elevations used in the mapping required for the independent QA/QC review under Activity 11;
- Hardcopy and digital versions of input and output for any computer programs that were used;
- 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
- Documentation that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM;
- NSP Format Mapping Database or Intermediate Data Delivery consistent with the NSP Data Capture Standards.
- If automated GIS-based models are applied, all input data, output data, intermediate data processing products, and GIS data layers shall be submitted.

***ATTACHMENT A1: DETAILED COSTS FOR DFIRM CONVERSION AND  
INDIVIDUAL H&H STUDIES***

***ATTACHMENT B: PANELIZATION SCHEME***

***ATTACHMENT C: PROJECT SCHEDULE  
(AND REVISED PROJECT SCHEDULES)***

**Table 6-1. Project Schedule - Flathead**

<b>ACTIVITIES</b>	<b>RESPONSIBLE PARTNER(S)</b>	<b>DATE DUE</b>
Activity 1 – Pre-Scoping	DNRC, FEMA/NSP	2/30/05
Activity 2 - Scoping	DNRC, FEMA/NSP	5/30/05
Activity 3 – Field Surveys and Reconnaissance	DNRC	11/15/05
Activity 4 – Topographic Data Development	DNRC	11/15/05
Activity 5 – Independent QA/QC Review of Topographic Data	FEMA/NSP	12/15/05
Activity 6 –Hydrologic Analyses	DNRC	2/15/06
Activity 7–Independent QA/QC Review of Hydrologic Analyses	FEMA/NSP	3/1/06
Activity 8 – Hydraulic Analyses	DNRC	4/15/06
Activity 9 – Independent QA/QC Review of Hydraulic Analyses	FEMA/NSP	5/1/06
Activity 10 – Floodplain Mapping Redelineation	DNRC	1/15/06
Activity 11 – Independent QA/QC Review of Floodplain Mapping (Revised Areas)	FEMA/NSP	2/15/06
Activity 12 – Base Map Acquisition	DNRC	11/1/05
Activity 13 – DFIRM Production (Non-Revised Areas)	DNRC	3/1/06
Activity 13A – Independent QA/QC Review of DFIRM Production (Non-Revised Areas)	FEMA/NSP	3/15/06
Activity 14 – DFIRM Production (Merging Revised and Non-Revised Information)	DNRC	4/15/06
Activity 14A – DFIRM Production (Application of DFIRM Graphics and Database Specifications)	DNRC	5/1/06
Activity 14B – Independent QA/QC Review of DFIRM Product Meeting FEMA Graphics and Database Specifications	FEMA/NSP	6/1/06
Activity 15 – Preliminary DFIRM and FIS Report Distribution	DNRC, FEMA/NSP	8/15/06
Activity 16 – Post-Preliminary Processing	DNRC, FEMA/NSP	9/30/07
Activity 17 - Outreach	DNRC	N/a

***ATTACHMENT D: TERMINOLOGY AND  
DEFINITIONS OF THIS SOW AND MAS 2005-02***

***ATTACHMENT E: SPECIAL PROBLEM REPORTS OR OTHER  
MODIFICATIONS TO THE MAS OR SOW***