



COLORADO WATER CONSERVATION BOARD COOPERATING TECHNICAL PARTNERS MAPPING ACTIVITY STATEMENT

Mapping Activity Statement No. 4 – Digital Flood Insurance Rate Map Production and Development of Updated Flood Data

In accordance with the Cooperating Technical Partners (CTP) Partnership Agreement dated July 15th, 2002, between Colorado Water Conservation Board (CWCB) and the Federal Emergency Management Agency (FEMA), Mapping Activity Statement (MAS) No. 4 is as follows.

SECTION 1—OBJECTIVE AND SCOPE

The objective of the Flood Map Project documented in this MAS is to develop a Digital Flood Insurance Rate Map (DFIRM) and Flood Insurance Study (FIS) report for Douglas County, Colorado and Incorporated Areas, including the Town of Castle Rock, the Town of Larkspur, the City of Lone Tree, and the Town of Parker. The final DFIRM and FIS report will include information prepared by CWCB for southern portions of Douglas County and the Towns of Castle Rock and Larkspur, as part of this MAS, and information prepared by the Urban Drainage & Flood Control District (UD&FCD) for northern portions of Douglas County and the City of Lone Tree and the Town of Parker, under a separate MAS between FEMA and UD&FCD. The product of this MAS will be a single set of digital floodplain data for the entire county.

The DFIRM and FIS report will be produced in the FEMA Countywide Format.

In addition the Mapping Partners involved in this project will develop new and/or updated flood hazard data, as summarized in the table below.

Table 1. Updated Flood Hazard Data

Flooding Source	Reach Limits	Hydrologic Analyses	Hydraulic Analyses	Floodplain Mapping	Redelineation Using Effective Flood Profiles and Updated Topographic Data	Refinement or Creation of Zone A
East Plum Creek	D/S Larkspur corporate limits – U/S Larkspur corporate limits				X	

South Platte River	Denver Water treatment facility (Waterton Canyon) – 16 miles U/S (beyond Cheesman Reservoir)			X		
Fourmile Creek	Confluence with South Platte River – 3 miles U/S					X
Horse Creek	Confluence with South Platte River – confluence of Trout Creek and West Creek					X
Trout Creek	Confluence with West Creek – 1 mile U/S					X
West Creek	Confluence with Trout Creek – 4 miles U/S					X

This Flood Map Project will be completed by the following

- CWCB;
- URS/Dewberry team, mapping contractor to CWCB;
- FEMA Flood Map Production Coordination Contractor (MCC), or other contractor designated.

For northern portions of Douglas County and incorporated municipalities, work to be utilized as part of this Map Project will be conducted by the Urban Drainage & Flood Control District (UD&FCD), under a separate MAS between FEMA and UD&FCD. Under the UD&FCD MAS, digital floodplain data for that portion of Douglas County and its incorporated municipalities within the boundaries of UD&FCD (Town of Lone Tree and Town of Parker) will be prepared and submitted to the CWCB for merging with digital floodplain data for the remainder of Douglas County and its incorporated municipalities to create a single set of digital floodplain data for the entire county.

The activities for this Flood Map Project, including required Quality Assurance/Quality Control (QA/QC) reviews, and the Mapping Partners that will complete them are summarized

in Table 1-1. The sections of this MAS that follow the table below describe the specific activities, responsible Mapping Partner(s), FEMA standards that must be met, and resultant map components.

Table 1-1. Summary of Project Activities and Assignments

Activities	CTP	FEMA
Activity 1 – Independent QA/QC Review of Existing Data Studies	X	
Activity 2 – Floodplain Mapping (Detailed Riverine)	X	
Activity 2A – Floodplain Mapping (Redelineation Using Effective Flood Profiles and Updated Topographic Data)	X	
Activity 2B – Floodplain Mapping (Refinement or Creation of Zone A)	X	
Activity 3 – Independent QA/QC Review of Floodplain Mapping (Revised Areas)		X
Activity 4 – Base Map Acquisition)	X	
Activity 5 – DFIRM Production (Non-Revised Areas)	X	
Activity 5A – Independent QA/QC Review of DFIRM Production (Non-Revised Areas)		X
Activity 6 – DFIRM Production (Merge Revised and Non-Revised Information)	X	
Activity 6A – Application of DFIRM Graphic and Database Specifications	X	
Activity 6B – Independent QA/QC Review of DFIRM Product Meeting FEMA Graphic and Database Specifications		X
Activity 7 – Preliminary DFIRM and FIS Report Distribution	X	X
Activity 8 – Post-Preliminary Processing	X	X

Activity 1 - Independent QA/QC Review of Existing Data Studies

Responsible Mapping Partners: CWCB and URS/Dewberry team.

Scope: CWCB, through URS/Dewberry team, shall review the technical, scientific, and other information submitted by CWCB, through URS/Dewberry team and others, 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 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.)

Standards: All work under Activity 1 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*, CWCB, through URS/Dewberry team, 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 are identified during the independent QA/QC review.

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at www.fema.gov/mit/tsd/frm_gsam.pdf.

Activity 2 - Floodplain Mapping (Detailed Riverine)

Responsible Mapping Partner: CWCB and URS/Dewberry team

Scope: CWCB shall delineate the 1- and 0.2-percent-annual-chance floodplain boundaries and the regulatory floodway boundaries (if required) for the flooding sources for which detailed hydrologic, and/or hydraulic analyses were performed. CWCB shall incorporate all new or revised hydrologic and/or hydraulic modeling and shall use the best available topographic data to delineate the floodplain and regulatory floodway boundaries on a digital work map. In addition, CWCB shall incorporate the results of all effective Letters of Map Change (LOMCs) within the revised areas as appropriate. Also, CWCB, through URS/Dewberry team and others, shall address all concerns or questions regarding

Activity 2 that are raised by CWCB, through URS/Dewberry team, during the independent QA/QC review under Activity 1.

Standards: All work under Activity 2 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: Upon completion of floodplain mapping for the flooding sources described in Table 1, CWCB shall submit the results to FEMA for an independent QA/QC review under Activity 3. The mapping for the remaining flooding sources is to be submitted for a final QA/QC review at the completion of this activity.

In accordance with the TSDN format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, CWCB 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;
- 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;
- Any backup or supplemental information used in the mapping required for the independent QA/QC review outlined under Activity 3; and
- An explanation for the use of existing topography for the studied reaches, if appropriate.

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at www.fema.gov/mit/tsd/frm_gsam.pdf.

Activity 2A - Floodplain Mapping (Redelineation of Detailed Floodplain Boundaries Using Updated Topographic Data)

Responsible Mapping Partner: CWCB and URS/Dewberry team

Scope: CWCB, through URS/Dewberry team, shall delineate the 1- and 0.2-percent-annual-chance floodplain boundaries and the regulatory floodway boundaries (if required) for the flooding sources listed earlier in this MAS. CWCB shall use the best available topographic data 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 effective study, CWCB shall evaluate the topographic data to determine if changes are significant enough to invalidate the floodplain boundary and regulatory floodway boundary redelineations. If so, CWCB shall contact the FEMA Regional Project Officer identified in Section 11 of this MAS with a recommendation. In addition, CWCB shall address all concerns or questions regarding Activity 2A that are raised by PBS&J team and FEMA during the independent QA/QC review under Activity 3.

Standards: All work under Activity 2A shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: Upon completion of floodplain mapping for the flooding sources described in Table 1, CWCB shall submit the results to FEMA for an independent QA/QC review under Activity 3. CWCB shall submit the mapping for the remaining flooding sources for a final QA/QC review at the completion of this activity.

In accordance with the TSDN format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, CWCB 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;
- 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;
- Any backup or supplemental information used in the mapping required for the independent QA/QC review outlined under Activity 3; and
- An explanation for the use of existing topography for the studied reaches, if appropriate.

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at www.fema.gov/mit/tsd/frm_gsam.pdf.

Activity 2B - Floodplain Mapping (Refinement or Creation of Zone A)

Responsible Mapping Partner: CWCB and URS/Dewberry team

Scope: CWCB, through URS/Dewberry team, shall delineate the 1-percent-annual-chance floodplain boundaries for the flooding sources listed earlier in this MAS. CWCB shall use the best available existing topographic data to delineate the floodplain boundaries on a digital work map. In addition, CWCB shall address all concerns or questions regarding Activity 2B that are raised by PBS&J team and FEMA during the independent QA/QC review under Activity 3.

CWCB 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 the FEMA Regional Project Officer identified in Section 11 of this MAS before analysis and mapping begin.

Standards: All work under Activity 2B shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: Upon completion of floodplain mapping for the flooding sources described in Table 1, CWCB shall submit the results to FEMA for an independent QA/QC review under Activity 3. CWCB shall submit the mapping for the remaining flooding sources for a final QA/QC review at the completion of this activity.

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

- Digital work maps showing the 1-percent-annual-chance floodplain boundary delineations, 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 3;
- 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
- 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.

If automated GIS-based models are applied, all input data, output data, intermediate data processing products, and GIS data layers shall be submitted.

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at www.fema.gov/mit/tsd/frm_gsam.pdf.

Activity 3 - Independent QA/QC Review of Floodplain Mapping (Revised Areas)

Responsible Mapping Partner: FEMA

Scope: FEMA shall review the floodplain mapping submitted by CWCB under Activities 2, 2A, and 2B to ensure that the results of the analyses performed are accurately represented. This work shall include, at a minimum, the activities listed below.

- Review the cross sections for proper location and orientation on the work map and agreement with the Floodway Data Table.
- Review the BFEs 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.
- Review the floodplain widths at cross sections as shown on the work maps to ensure they match the Floodway Data Table.
- Review the floodplain boundaries as shown on the work maps to ensure they match the Flood Profiles.
- Review the flood insurance risk zones as shown on the work maps to ensure they are labeled properly.
- Review the DFIRM mapping files to ensure they were prepared in accordance with the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners*.
- Review the metadata files to ensure they include all required information shown in *Guidelines and Specifications for Flood Hazard Mapping Partners*.

Standards: All work under Activity 3 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*, PBS&J team and FEMA shall make the following products available:

- 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 work map with all questions and/or concerns indicated, if necessary.

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at www.fema.gov/mit/tsd/frm_gsam.pdf.

Activity 4 - Base Map Acquisition

Responsible Mapping Partner: CWCB

Scope: Activity 4 consists of obtaining the digital base map for the project. CWCB shall provide the digital base map. The required activities are as follows:

- 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 meets the minimum standards and specifications that FEMA requires for DFIRM production.
- Populate the DFIRM database with the information required by FEMA.

Standards: All work under Activity 4 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*, CWCB shall make the following products available to FEMA:

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

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at www.fema.gov/mit/tsd/firm_gsam.pdf.

Activity 5 – DFIRM Production (Non-Revised Areas)

Responsible Mapping Partner: CWCB and URS/Dewberry team

Scope: For all flooding sources except those segments for which updated flood data will be developed under Activities 1 through 3, CWCB, through URS/Dewberry team, shall convert the information shown on the effective FIRM and Flood Boundary Floodway Map (FBFM) panels for all incorporated and unincorporated areas of Douglas County to digital format in conformance with FEMA DFIRM specifications. CWCB shall use the base map acquired under Activity 4 for the conversion. The scope of Activity 5 covers the digitization of 78 FIRM panels. CWCB also shall incorporate the results of LOMCs issued by FEMA since the date of the current effective FIRM for each affected community. Also, CWCB shall address all comments and questions regarding Activity 5 that are raised by PBS&J team and FEMA during the independent QA/QC review under Activity 5A.

CWCB shall not digitize the flood theme for those segments of flooding sources for which updated flood data will be developed. Rather, CWCB shall leave these as “holes” in the digital flood theme that will be filled in as part of Activity 6 using the digital flood data developed under Activities 2, 2A, and 2B.

Standards: All work under Activity 5 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*, CWCB 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.

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at www.fema.gov/mit/tsd/frm_gsam.pdf.

Activity 5A – Independent QA/QC Review of DFIRM Production (Non-Revised Areas)

Responsible Mapping Partner: FEMA

Scope: FEMA shall review the DFIRM panels submitted by CWCB under Activity 5 to ensure that the new DFIRM panels accurately represent the information shown on the effective FIRMs 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.
- 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 5A 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*, FEMA shall make the following products available:

- 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.

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at www.fema.gov/mit/tsd/frm_gsam.pdf.

Activity 6 –DFIRM Production (Merging Revised and Non-Revised Information)

Responsible Mapping Partner: CWCB and URS/Dewberry team

Scope: Upon completion of the floodplain mapping activities (Activities 2, 2A, and/or 2B) for the revised flooding sources and the DFIRM production for non-revised areas (Activity 5), and upon completion, under a separate MAS between FEMA and UD&FCD of floodplain mapping activities and DFIRM production, to be conducted by UD&FCD, for the portion of Douglas County and incorporated municipalities that lies within the boundaries of UD&FCD, CWCB, in cooperation with UD&FCD, shall merge the digital floodplain data prepared under this MAS and the UD&FCD MAS into a single, updated DFIRM. This work is to include tie-in of flood hazard information for areas that were not studied as part of the Flood Map Project documented in this MAS, in particular, those areas studied as part of the Flood Map Project documented in the UD&FCD MAS. CWCB also 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 this MAS, in particular, those communities studied as part of the Flood Map Project documented in the UD&FCD MAS. CWCB shall coordinate with those Mapping Partners responsible for Activities 2, 2A, 2B, and 5, and with UD&FCD, as necessary, to resolve any potential tie-in issues.

Standards: All work under Activity 6 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*, CWCB 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.

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at www.fema.gov/mit/tsd/frm_gsam.pdf.

Activity 6A – DFIRM Production (Application of DFIRM Graphics and Database Specifications)

Responsible Mapping Partner: CWCB and URS/Dewberry team

Scope: CWCB, in cooperation with UD&FCD, shall apply the final FEMA DFIRM graphic and database specifications to the DFIRM files produced under Activity 6 for the portion of Douglas County and incorporated municipalities within the boundaries of UD&FCD, studied under a separate MAS with UD&FCD, and for the portion of Douglas County and incorporated municipalities outside the boundaries of UD&FCD, studied under this MAS. It is understood that UD&FCD, through its MAS with FEMA, shall carry the application of final FEMA DFIRM graphic and database specifications to its fullest possible completion prior to submitting its work products to CWCB for finalization. The work initiated by CWCB and UD&FCD and finalized by CWCB shall include adding all required annotation, line pattern, area shading, and map collar information (e.g., map borders, title blocks, legends, notes to user). CWCB shall coordinate with those Mapping Partners responsible for Activities 2, 2A, 2B, 5, and 6, and with UD&FCD, as necessary, to resolve any problems that are identified during Activity 6A.

Standards: All work under Activity 6A 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*, CWCB 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.

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at www.fema.gov/mit/tsd/frm_gsam.pdf.

Activity 6B – Independent QA/QC Review of DFIRM Product Meeting FEMA Graphics and Database Specifications

Responsible Mapping Partner: FEMA.

Scope: Upon completion of the floodplain mapping activities (Activities 2, 2A, and/or 2B) and DFIRM production activities (Activities 5, 6, and 6A), FEMA shall review the DFIRM to ensure it meets current FEMA graphic specifications. In addition, FEMA shall review the DFIRM spatial

database to determine if it meets current FEMA database specifications. FEMA shall coordinate with other Mapping Partners, as necessary, to resolve any problems identified during this QA/QC review. This work shall ensure that the requirements below are met.

- All required DFIRM features are accurately and legibly labeled and follow the examples shown in the FEMA DFIRM specifications. This includes all flood insurance risk zones, BFEs, cross sections, studied streams, mapped political entities, and all roads within and adjacent to the 1-percent-annual-chance floodplains.
- All DFIRM features are correctly symbolized with the appropriate symbol, line pattern, or area shading and follow the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners*.
- All map collar information is complete, correct, and follows the requirements specified in *Guidelines and Specifications for Flood Hazard Mapping Partners*.
- DFIRM mapping files are in one of the GIS file and database formats specified in FEMA's *Guidelines and Specifications for Flood Hazard Mapping Partners* and conform to those specifications for content and attribution.
- DFIRM database files are in one of the database formats specified in FEMA's *Guidelines and Specifications for Flood Hazard Mapping Partners* and conform to those specifications for content and attribution.
- Metadata files describing the DFIRM data include all required information shown in *Guidelines and Specifications for Flood Hazard Mapping Partners*.
- The FIS report is prepared in the FEMA Countywide Format as documented in Appendix J of *Guidelines and Specifications for Flood Hazard Mapping Partners*.

Standards: All work under Activity 6B 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*, FEMA 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 and the results of all automated or manual QA/QC steps taken during the independent QA/QC review;
- 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.

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at www.fema.gov/mit/tsd/frm_gsam.pdf.

Activity 7 - Preliminary DFIRM and FIS Report Distribution

Responsible Mapping Partners: CWCB and FEMA

Scope: Activity 7 consists of 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. The activities to be performed are summarized below.

Preliminary Transmittal Letter Preparation. CWCB and FEMA shall 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.

Final QA/QC Review of Preliminary DFIRM and FIS Report: CWCB and FEMA 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. The QA/QC review procedures shall be consistent with the *Guidelines and Specifications for Flood Hazard Mapping Partners*.

Discrepancy Resolution: CWCB and FEMA shall cooperate as appropriate to resolve discrepancies identified during the final QA/QC review.

Distribution of Preliminary DFIRM and FIS Report: CWCB and FEMA 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.

News Release Preparation: CWCB and FEMA shall prepare news release notifications of BFE changes for all affected communities if appropriate and perform QA/QC reviews of the notices for accuracy and compliance with FEMA format requirements. CWCB and FEMA shall file the notifications for later submittal for review.

Preliminary Summary of Map Actions (SOMA) Preparation: CWCB and FEMA shall prepare Preliminary SOMAs for all affected communities if appropriate. The SOMA shall list pertinent information regarding LOMCs that will be affected by the issuance of the DFIRM (i.e., superseded, incorporated, revalidated).

Standards: All work under Activity 7 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* and the requirements documented in Section 1 and Appendix A of the *FEMA Document Control Procedures Manual*. CWCB and FEMA shall make the products listed below available.

- Preliminary transmittal letters shall be prepared. These letters and any additional letters required by FEMA shall be prepared in accordance with the current version of the *FEMA Document Control Procedures Manual*.
- Preliminary copies of the DFIRM and FIS report, including all updated data tables and Flood Profiles shall be mailed to the Chief Executive Officer (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.
- Preliminary SOMAs, prepared in accordance with FEMA requirements, shall be provided as 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.
- 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.
- 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 shall be provided.

Activity 8 - Post-Preliminary Processing

Responsible Mapping Partners: CWCB and FEMA

Scope: Activity 8 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 activities to be performed are summarized below.

Initiation of Statutory 90-Day Appeal Period: When required, upon completion of a 30-day community comment period and/or final coordination meeting with the affected communities, the MCC and CWCB shall arrange for and verify that the following activities are completed in accordance with the current version of the FEMA *Guidelines and Specifications for Flood Hazard Mapping Partners* and *Document Control Procedures Manual*:

- Proposed BFE determination letters are sent to the community CEOs and floodplain administrators.
- News release notifications of BFE changes are published in prominent newspapers with local circulation.
- The appropriate notices (Proposed Rules) are published in the *Federal Register*.

Resolution of Appeals and Protests: FEMA and CWCB shall cooperate 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.

FEMA shall mail all associated correspondence upon authorization by FEMA.

Preparation of Special Correspondence: FEMA and CWCB shall cooperate in responding to comments not received within the 90-day appeal period (referred to as “special correspondence”), including drafting responses for FEMA review when appropriate and finalizing responses when requested by FEMA. FEMA also shall mail the final correspondence (and enclosures if appropriate) and distribute appropriate copies of the correspondence and enclosures.

Revision of DFIRM and FIS Report: If necessary, FEMA and CWCB shall work together to revise the DFIRM and FIS report at the direction of the FEMA Regional Project Officer and 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.

Final SOMA Preparation: CWCB and FEMA shall prepare Final SOMAs for the affected communities as appropriate.

Processing of Letter of Final Determination: FEMA and CWCB shall cooperate to establish the effective date for the DFIRM and FIS report, and shall prepare a Letter of Final Determination (LFDs) for each affected community for FEMA review in accordance with the FEMA *Document Control Procedures Manual*. FEMA also shall mail the final signed LFDs and enclosures and distribute appropriate copies of the signed LFDs and enclosures.

Processing of Final DFIRM and FIS Report for Printing: CWCB and FEMA 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. FEMA 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.

Revalidation Letter Processing. CWCB and FEMA, when appropriate, shall prepare and distribute 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.

Archiving Data: CWCB and FEMA shall ensure that technical and administrative support data are packaged in the FEMA required format and stored properly in the library archives until they are transmitted to the FEMA Engineering Study Data Package Facility.

Standards: All work under Activity 8 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* and the requirements documented in Section 1 and Appendix A of the FEMA *Document Control Procedures Manual*, FEMA and CWCB shall make the following products available:

- Documentation that the news releases 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;
- LOMC Revalidation Letters if appropriate; and
- Complete, organized archived technical and administrative support data

SECTION 2—TECHNICAL AND ADMINISTRATIVE SUPPORT DATA SUBMITTAL

The Project Team members for this Flood Map Project that have responsibilities for activities included in this MAS shall comply with the data submittal requirements summarized below.

All supporting documentation for the activities in this Mapping Activity Statement shall be submitted in the TSDN format in accordance with Appendix M of the FEMA *Guidelines and Specifications for Flood Hazard Mapping Partners*, dated February 2002. Appendix M is available for viewing or download on the FEMA Web site at http://www.fema.gov/pdf/fhm/frm_gsam.pdf. Table 2-1 indicates the sections of the TSDN that apply to each mapping activity.

If any issues arise that could affect the completion of an activity within the proposed scope or budget, the responsible Mapping Partner shall complete a Special Problem Report (SPR) as soon as possible after the issue is identified and submitted to FEMA. The SPR is to describe the issue and propose possible resolutions. (For additional information on SPRs, refer to Appendix M, Subsection M.2.1.1 of *Guidelines and Specifications for Flood Hazard Mapping Partners*.)

Additionally, FEMA shall collect and maintain a set of products for all Activities and shall compile a comprehensive TSDN for the entire project. Table 2-1 below lists all of the applicable sections in the TSDN for each Mapping Activity. The table does not include columns for Activities 3A or 5B because there is no relevant information for those two activities within the TSDN.

Table 2-1. Mapping Activities and Applicable TSDN Sections

TSDN Section	Mapping Activities							
	1	2, 2A, 2B	3	4	5, 5A	6, 6A	7	8
General Documentation								
Special Problem Reports	X	X	X	X	X	X	X	X
Telephone Conversation Reports	X	X	X	X	X	X	X	X
Meeting Minutes/Reports	X	X	X	X	X	X	X	X
General Correspondence	X	X	X	X	X	X	X	X
Engineering Analyses								
Hydrologic Analyses	X	X	X					
Hydraulic Analyses	X	X	X					
Engineering Analyses (continued)								
Key to Cross-Section Labeling	X	X	X					
Key to Transect Labeling	X	X	X					
Draft FIS Report	X							
Mapping Information		X	X	X	X	X	X	X
Miscellaneous Reference Information	X	X	X	X	X	X	X	X

SECTION 3—PERIOD OF PERFORMANCE

The mapping activities outlined in this MAS have been divided into five (5) groups of activities. Group 1 includes Activities 1, 2, 2A, 2B and 3. Group 2 includes Activities 4, 5 and 5A. Group 3 includes Activities 6, 6A and 6B. Group 4 includes only Activity 7. Group 5 includes only Activity 8. Group 1 activities will begin on August 15, 2003, and will be completed no later than November 7, 2003. Group 2 activities will be completed no later than January 16, 2004. Group 3 activities will be completed no later than March 5, 2004. The one activity within Group 4, Activity 7, will be completed no later than March 5, 2004. The one activity within Group 5, Activity 8, is not included within the

period of performance for this MAS. Activity 8 will be scheduled cooperatively by FEMA and CWCB upon completion of Activity 7. The mapping activities may be terminated at the option of FEMA or CWCB in accordance with the provisions of the Partnership Agreement dated July 15th, 2002.

SECTION 4—FUNDING/COST-SHARING

FEMA is providing funding, in the amount of \$ _____, to CWCB for the completion of this Flood Map Project. CWCB shall provide any additional resources required to complete the assigned activities for this Flood Map Project.

SECTION 5—STANDARDS

The standards relevant to this Mapping Activity Statement are provided in Tables 5-1 and 5-2. Information on the correct volume, appendix, section, or subsection of the FEMA *Guidelines and Specifications for Flood Hazard Mapping Partners* to be referenced for each mapping activity is summarized in Table 5-2.

These Guidelines are available for viewing or download from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/mit/tsd/dl_cgs.htm.

Table 5-1. Applicable Standards for Project Activities

Applicable Standards	Activities							
	1	2, 2A, 2B	3	4	5, 5A	6, 6A	7	8
<i>Guidelines and Specifications for Flood Hazard Mapping Partners</i> , February 2002	X	X	X	X	X	X	X	X
American Congress on Surveying and Mapping (ACSM) procedures								
Global Positioning System (GPS) Surveys: National Geodetic Survey (NGS-58), “Guidelines for Establishing GPS-Derived Ellipsoid Heights,” November 1997								
EM 1000-1-1000, <i>Photogrammetric Mapping</i> , March 31, 1993								
EM 1110-2-1003, <i>Hydrographic Surveys</i> , October 31, 1994								
Numerical Models Accepted by FEMA for NFIP Usage, January 11, 2002	X							
<i>Content Standards for Digital Geospatial Metadata</i> (Federal Geographic Data Committee, 1998)		X	X	X	X	X	X	X
<i>Document Control Procedures Manual</i> , December 2000						X	X	X

Table 5-2. Project Activities and Applicable Portions of FEMA Guidelines and Specifications

Activity Number	Activity Description	Applicable Volume, Section/Subsection, and Appendix
1	Independent QA/QC Review of Hydraulic Analyses	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
2	Floodplain Mapping (Detailed Riverine)	Volume 1, Section 1.4 (specifically Subsection 1.4.2.3) Appendix C, Sections C. 4 and C.6 Appendices K, L, and M
2A	Floodplain Mapping (Redelineation Using Effective Flood Profiles and Updated Topographic Data)	Volume 1, Section 1.4 (specifically Subsections 1.4.2.2 and 1.4.2.3) Appendices K, L, and M
2B	Floodplain Mapping (Refinement or Creation of 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
3	Independent QA/QC Review of Floodplain Mapping (Revised Areas)	Volume 1, Section 1.4 (specifically Subsection 1.4.2.3) Appendix C, Sections C.4 and C.6 Appendices K, L, and M

Table 5-2. Project Activities and Applicable Portions of FEMA Guidelines and Specifications (Cont'd)

Activity Number	Activity Description	Applicable Volume, Section/Subsection, and Appendix
4	Base Map Acquisition and Preparation	Volume 1, Section 1.3 (specifically Subsection 1.3.1.8) and 1.4 (specifically Subsection 1.4.3) ----- Appendices A and B
5	Independent QA/QC Review of 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
5A	DFIRM Production (Merging Revised and Non-Revised Areas)	Volume 1, Section 1.4 (specifically Subsection 1.4.3) ----- Appendices K, L, and M
6	DFIRM Production (Merging Revised and Non-Revised Areas)	Volume 1, Section 1.4 (specifically Subsections 1.4.2.3 and 1.4.3.3) ----- Appendices K, L, and M
6A	DFIRM Production (Application of DFIRM Graphic and Database Specifications)	Volume 1, Section 1.4 (specifically Subsection 1.4.3) ----- Appendices K, L, and M
6B	Independent QA/QC Review of DFIRM Product Meeting FEMA Graphic and Database Specifications	Volume 1, Section 1.4 (specifically Subsections 1.4.2.3 and 1.4.3.3) ----- Appendices K, L, and M
7	Preliminary DFIRM and FIS Report Distribution	Volume 1, Section 1.4 (specifically Subsections 1.4.2 and 1.4.3) ----- Appendix C, Sections C.4 and C.6 ----- Appendices J, K, L, and M
8	Post-Preliminary Processing	Volume 1, Section 1.4 (specifically Subsection 1.4.2 and 1.4.3) ----- Appendices J, K, L, and M

SECTION 6—SCHEDULE

The activities documented in this MAS shall be completed in accordance with the project schedule shown in Table 6-1. If changes to this schedule are required, the responsible Mapping Partner shall coordinate with FEMA and the other Mapping Partners in a timely manner.

Table 6-1. Project Schedule

ACTIVITIES	RESPONSIBLE PARTNER(S)	DATE DUE
Activity 1 – Independent QA/QC Review of Existing Studies	CWCB, URS	8/22/03
Activity 2 – Floodplain Mapping (Detailed Riverine)	CWCB, URS	9/26/03
Activity 2A – Floodplain Mapping (Redelineation Using Effective Flood Profiles and Updated Topographic Data)	CWCB, URS	10/24/03
Activity 2B – Floodplain Mapping (Refinement or Creation of Zone A)	CWCB URS	10/24/03
Activity 3 – Independent QA/QC Review of Floodplain Mapping (Revised Areas)	FEMA	11/7/03
Activity 4 – Base Map Acquisition	CWCB	11/28/03
Activity 5 – DFIRM Production (Non-Revised Areas)	CWCB, URS	1/2/04
Activity 5A – Independent QA/QC Review of DFIRM Production (Non-Revised Areas)	FEMA	1/23/04
Activity 6 – DFIRM Production (Merge Revised and Non-Revised Information)	CWCB, URS	2/6/04
Activity 6A – Application of DFIRM Graphic and Database Specifications	CWCB, URS	2/27/04
Activity 6B – Independent QA/QC Review of DFIRM Product Meeting FEMA Graphics and Database Specifications	FEMA	3/5/04
Activity 7 – Preliminary DFIRM and FIS Report Distribution	CWCB, FEMA	3/5/04
Activity 8 – Post-Preliminary Processing	CWCB, FEMA	N.A.

SECTION 7—CERTIFICATIONS

The following certifications apply to this MAS:

Task 2 (Floodplain Mapping— Detailed Riverine), Task 2A (Floodplain Mapping {Redelineation Using Effective Flood Profiles and Updated Topographic Data}), and Task 2B (Floodplain Mapping {Refinement or Creation of Zone A})

- A Registered Professional Engineer or Licensed Land Surveyor will certify hydrologic and hydraulic analyses and data in accordance with 44 CFR 65.6(f).
- A Registered Professional Engineer or Licensed Land Surveyor will certify topographic information 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).

Task 2 (Floodplain Mapping— Detailed Riverine), Task 2A (Floodplain Mapping {Redelineation Using Effective Flood Profiles and Updated Topographic Data}), and Task 2B (Floodplain Mapping {Refinement or Creation of Zone A}), Task 3 (Independent QA/QC Review of Floodplain Mapping {Revised Areas}), Task 5 (DFIRM Production {Non-Revised Areas}), Task 6 (DFIRM Production {Merging Revised and Non-Revised Information}), and Task 6A (Application of DFIRM Graphic and Database Specifications)

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

Activity 4 (Base Map Acquisition and Preparation)

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

SECTION 8—TECHNICAL ASSISTANCE AND RESOURCES

Project Team members may obtain copies of FEMA-issued LOMCs, archived engineering backup data, and data collected as part of the Mapping Needs Assessment Process from the MCC, who may be contacted by telephone at 703-317-6531 or by facsimile at 703-329-3023.

General technical and programmatic information, such as FEMA 265 and the Quick-2 computer program, can be downloaded from the FEMA Web site (www.fema.gov/fhm). Specific technical and programmatic support may be provided through the MCC; such assistance should be requested through the FEMA Project Officer specified in Section 11 of this MAS.

Project Team members also may 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 subcontractors, and GIS-based engineering and modeling training.

SECTION 9—CONTRACTORS

CWCB intends to use the services of URS/Dewberry team as a contractor for this Flood Map Project. CWCB shall ensure that the procurement for all contractors used for this Flood Map Project complies with the requirements of 44 CFR 13.36. For all work prepared under the UD&FCD MAS, by UD&FCD's contractors, and subsequently used by CWCB as part of this Flood Map Project UD&FCD shall ensure that the procurement for all contractors used for the UD&FCD Flood Map Project complies with the requirements of 44 CFR 13.36.

Part 13 may be downloaded in PDF or text format from the U.S. Government Printing Office Web site at http://www.access.gpo.gov/nara/cfr/waisidx_02/44cfr13_02.html.

SECTION 10—FINANCIAL REPORTING

Because funding has been provided to CWCB by FEMA, financial reporting requirements for CWCB will be in accordance with Cooperative Agreement Articles V and VI.

SECTION 11—POINTS OF CONTACT

The points of contact for this Flood Map Project are Steve Olsen, the FEMA Regional Project Officer; Brian Hyde, the Project Manager for CWCB; or subsequent personnel of comparable experience who are appointed to fulfill these responsibilities. When necessary, the assistance of the MCC should be requested through the FEMA Project Officer, Max Yuan.

Each party has caused this MAS to be executed by its duly authorized representative.

Brian R. Hyde

Brian Hyde
Project Manager
Colorado Water Conservation Board

8/8/03

Date

Bill DeGroot

Bill DeGroot
Project Manager
Urban Drainage & Flood Control District

8/11/03

Date

Steve Olsen

Steve Olsen
Regional Project Officer
Federal Emergency Management Agency, Region 6

8/11/03

Date

Max Yuan

Max Yuan
Project Officer
Federal Insurance and Mitigation Administration

8-11-03

Date