



Whatcom County, Washington
Federal Emergency Management Agency
Cooperating Technical Partner
Mapping Activity Statement

Agreement WA-1-2001 Coastal Hazard Analyses and Floodplain Mapping

In accordance with the Cooperating Technical Partner (CTP) Memorandum of Agreement dated September 18, 2000, between the Whatcom County, Washington and the Federal Emergency Management Agency (FEMA), Agreement WA-1-2001 is as follows:

1. **Objective and Scope:** The objectives of this Mapping Activity are
 - To complete the detailed coastal hazard analyses and floodplain mapping for approximately 3.5 miles of shoreline in the Sandy Point area of Whatcom County, Washington, which is already underway by Whatcom County
 - To develop a detailed coastal hazard analyses and floodplain maps for approximately 4 miles of shoreline in the Birch Bay area of Whatcom County, Washington
 - To document the methods used in the Sandy Point study as guidelines for coastal floodplain mapping studies in the Pacific Northwest
 - To participate in the HAZUS FIT demonstration project for the Sandy Point coastal floodplain area

2. **Period of Performance:** This Mapping Activity may be terminated at the option of FEMA or Whatcom County in accordance with the provisions of the September 18, 2000 CTP Memorandum of Agreement. The period of performance will be in accordance with Agreement Article II.

4. **Standards:** The following standards and documents are relevant to this Mapping Activity: Detailed coastal analyses and floodplain mapping will follow the standards set forth in FEMA 37, *Guidelines and Specifications for Study Contractors* (January 1995), with exception of Chapters 4, 5, 6, and 7, which apply to riverine hydrologic and hydraulic analyses only. For coastal hydrologic and hydraulic analyses, standards set forth in Appendices 1, 1A, and 1B, (as applicable) and FEMA's *Guidelines and Specifications for Wave Elevation Determination and V Zone Mapping* (March 1995) will apply. In addition, standards set forth in Title 44 of the Code of Federal Regulations (CFR), Part 65 will apply. It is understood that methodologies will be applied in this coastal flood study that are not specifically detailed in the *Guidelines and Specifications for Study Contractors*. FEMA Region X has pre-approved these alternative methods and will use the documentation of these methods to update the procedures for Pacific Northwest coastal flood studies in the *Guidelines and Specifications for Study Contractors*.

- Computer models used for coastal analyses will meet the requirements of 44 CFR 65.6(a)(6) and be on FEMA's *Numerical Models Accepted by FEMA for NFIP Usage* (http://www.fema.gov/mit/tsd/EN_modl.htm) or be pre-approved for use by FEMA.
 - Topographic mapping used to delineate coastal floodplain boundaries and hazard zones will be of adequate scale and topographic definition to provide reasonable accuracy. Planimetric features will be compatible with the base map (with respect to horizontal accuracy) to be used by FEMA for Digital FIRM production. Topographic mapping taken from aerial photogrammetry or surveys will comply with the requirements of Appendix 4 of FEMA 37. The selection of the topographic mapping source to be used will be coordinated with the FEMA Project Officer prior to analysis and mapping.
 - Based on direction from FEMA Region X during the development of this scope of work, coastal structures shall be evaluated in a manner similar to riverine levees; i.e., the effects of flooding will be evaluated for two cases, both with and without the coastal structures in place. The worst case scenario will then be mapped as the final flood hazard boundary. Chapter 7 and Appendix 1 of FEMA 37 provides guidelines for evaluating levee systems, with specific guidance to coordinate coastal structure evaluation procedures with the FEMA Project Officer.
 - Flood elevations and coastal floodplain boundaries and hazard zones will reasonably tie in to non-revised information in accordance with 44 CFR 65.6(a)(2).
 - Digital mapping will comply with the requirements of Chapter 9 and Appendix 7 of FEMA 37.
 - Digital Elevation Models (DEMs) and field survey data will meet vertical accuracy requirements contained in Appendix 4 of FEMA 37.
5. **Products:** Whatcom County will make available items outlined in Chapter 11 of FEMA 37 in the Technical Support Data Notebook (TSDN) format. These include:
- Digital 1% annual chance floodplain boundaries and hazard zones;
 - Runup and overtopping data for each transect representing the 1% annual chance stillwater and wave crest elevations and ground profile conditions;
 - Draft Flood Insurance Study (FIS) report;
 - Draft work maps used to prepare digital floodplain boundaries and hazard zones with each transect located accordingly;
 - Digital copies of all coastal modeling (input and output files);
 - Copies of any other supporting computations; and
 - In addition to the TSDN, a coastal study technical documentation notebook should be provided with all back-up data, description of methodology, and input and output files used in the analyses and mapping (see Appendix 1A of FEMA 37).

6. Schedule and Milestones:

For Sandy Point Study:

Milestone: Complete the detailed coastal hazard analyses and floodplain mapping for approximately 3.5 miles of shoreline in the Sandy Point area of Whatcom County,

Washington, which is already underway. Response to FEMA's comments on intermediate submittals and attendance at one public meeting is included in the work to be completed.

For Birch Bay Study:

Milestone 1 (Scoping Phase): Upon completion, products for the first milestone will be provided to the FEMA Project Officer. These include:

- Annotated copies of effective FIRMs depicting limits of proposed study.
- Documentation of the proposed source of topographic data, including: scale; contour interval; source/methodology; date of survey/data collection; vertical and horizontal datums; and comparison of planimetric features with the Digital FIRM base map planned for use by FEMA.
- A written summary of the initial data research; proposed coastal analysis methodologies; and a work plan.
- Copies of topographic maps depicting proposed wave transect locations.

Milestone 2 (Still Water Analysis Phase): Upon completion, products for the second milestone will be provided to the FEMA Project Officer. This includes draft hydrologic analyses in accordance with the TSDN format.

Milestone 3 (Wave Analysis and Erosion Phase): Upon completion, products for the third milestone will be provided to the FEMA Project Officer. These include:

- Runup and overtopping data for each transect depicting the 1% annual chance stillwater and wavecrest elevations and ground profiles.
- Hydraulic models for all transects and sample floodplain and hazard zone mapping.
- Erosion assessment

Milestone 4 (Final Products): Upon completion, final products will be provided to the FEMA Project Officer. These include:

- The completed TSDN and accompanying coastal flood study documentation data containing the information outlined in Section 5 of this Mapping Activity Statement.
- A QA/QC report documenting the results of the independent review of all computational and data processing procedures.

FEMA Pacific Northwest Coastal Flood Study Guidelines:

Milestone: Document the methods used in the Sandy Point study as guidelines for coastal floodplain mapping studies in the Pacific Northwest.

FEMA HAZUS Flood Information Tool Demonstration Project:

Milestone: Participate in the HAZUS FIT demonstration project for the Sandy Point coastal floodplain area.

Final products will be made available in accordance with the Period of Performance described in Section 2 of this Mapping Activity Statement.

7. **Certification:** The following certifications apply to this Mapping Activity (as appropriate):
 - Coastal hydrologic and/or hydraulic analyses and data will be certified by a registered professional engineer or licensed land surveyor in accordance with 44 CFR 65.6(f).
 - Topographic information will be certified by a registered professional engineer or licensed land surveyor in accordance with 44 CFR 65.5(c).
 - In areas outside the V-Zone, if fill is to be considered in the mapping to raise land areas above the 1% annual chance flood elevation, certification of the fill will be provided in accordance with 44 CFR 65.5(a)(6) by the community's NFIP permit official, a registered professional engineer, or a licensed land surveyor. No fill can be used or considered in V-Zone areas unless adequately protected by an armored structure.
 - Coastal structure (non-levee) certification from Federal/State agency.

8. **Technical Assistance and Resources:** Whatcom County may obtain from FEMA's Flood Map Production Coordination Contractor (FMPCC), as part of the initial data research, copies of LOMCs, archived engineering back-up data, and data collected as part of the FEMA's Mapping Needs Assessment. Copies of FEMA's accepted coastal models (or directions to where copies may be obtained or purchased), as well as FEMA's coastal guidelines and specifications and other referenced documents may also be obtained through the FMPCC. The FMPCC may be contacted at 1-877-FEMA-MAP (336-2627). General technical and programmatic information can be downloaded from FEMA's Flood Hazard Mapping Web site (www.fema.gov/mit/tsd). Specific technical and programmatic support may be provided through FEMA's FMPCC; such assistance should be requested through the FEMA Project Officer specified in Section 12 of this Mapping Activity Statement.

Whatcom County may also consult with the FEMA Project Officer to request support in the areas of: recommended data sources, recommended digital data accuracy standards, assessing vertical data accuracy, data collection methods or sub-contractors, and modeling training.

9. **Subcontractors:** Philip Williams & Associates, Ltd. (PWA) has been retained by Whatcom County to manage and perform the technical analyses to complete the tasks described in this MAS. Subconsultants to PWA will include: Wilson Engineering for land surveying; Coastal Geologic Services for coastal geomorphology; and Walker Associates for topographic mapping, and Dr. Paul Komar for independent peer review of the Pacific Northwest coastal floodplain mapping methodology. Procurement of subcontractors using Federal funds provided as part of this Mapping Activity will comply with the requirements of 44 CFR 13.36.

10. **Quality Assurance/Quality Control (QA/QC) Procedures:** The QA/QC procedures outlined in Chapter 10 of the *Guidelines and Specifications for Study Contractors* should be followed during the development of the hydrologic and hydraulic analyses and floodplain and hazard zone mapping. Analyses and mapping should be independently reviewed for compliance with the standards defined in Section 4 of this Mapping Activity Statement. This independent review will be conducted by Whatcom County Public Works Department.

11. Reporting: Reporting requirements will be in accordance with Agreement Articles V & VI.

12. Points of Contact: The FEMA Project Officer is Larry Basich FEMA Region X and the CTP's Project Manager is Paula Cooper, or subsequent personnel of comparable experience who are appointed to fulfill these responsibilities.

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

Jeffrey M. Morse
CTP Partner's authorized representative

Carl A. Cook
FEMA authorized representative

7/23/01
date

7/30/01
date

State representative*

date

* In States where statutory and/or regulatory requirements require the State's review and/or approval of new flood hazard data, the State will be a signatory to a community's Mapping Activity Statement.