Guide to Developing Local Flood Safety Plans

A Template for Levee Maintaining Agencies compliant with California Water Code Section 9650

Mid and Upper Sacramento
Regional Flood Management Plan
January 2014

Mid and Upper Sacramento Region Guide to Developing Local Flood Safety Plans

TABLE OF CONTENTS

INTRODUCTION

1.1 Objective of this Guide

In 2013, the California Department of Water Resources (DWR) funded the preparation of several regional flood management plans by local agencies and stakeholders in the Central Valley. Several of these planning efforts, including the Mid and Upper Sacramento Regional Flood Management Plan (RFMP), identified the lack of written local flood response plans as a significant response gap. In general, it was found that existing operational area, county, city, and special district emergency plans did not contain protocols at the level of detail needed for optimum multi-agency response to flood threats. The Department of Water Resources identified this same gap independently through its own assessment process.

The development of improved "local flood emergency plans" has, subsequently, risen to the forefront of current flood preparedness activities. Flood preparedness grants awarded in 2014 by DWR will provide the resources necessary for a broad effort to address this gap. This situation calls for a detailed plan template that LMAs and public agencies can use to ensure consistent, high-quality, planning throughout the Valley.

This Guide provides such a detailed template consistent with FEMA and State planning concepts, the National Incident Management System (NIMS), and the California Standardized Emergency Management System (SEMS). It is designed for use by levee maintaining agencies (LMA) to develop local flood safety plans using best practices developed over past decades. Plans submitted using this template have been acceptable to both DWR and the California Office of Emergency Services (OES).

1.2 Plan Nomenclature

Unfortunately, while essentially the same in general concept, several key guidance documents have used different titles for this "local flood emergency plan". California Water Code Section 9650 (AB156), which applies to all LMAs protecting 1,000 or more people, calls it a "safety plan". DWR documents referencing this statute tend to modify that title to "flood safety plan" or "levee safety plan". Finally, grant guidance issued by DWR in 2013 while making the completion of such plans an unambiguous State priority call them a "local flood emergency plan". In order to avoid confusion, this Guide will call the document referred to by all these titles a "local flood safety plan". This term should be understood as addressing both the statutory requirement, the response gap identified in regional flood management plans, and the State planning priority enunciated in DWR policy documents.

1.3 The Jurisdictional Complexity of California Flood Emergency Response

Prior to describing the flood safety plan template in detail, it is helpful to remind ourselves of the complex nature of flood response in California. Of prime importance is its jurisdictional complexity.

Issues of Jurisdiction

Earthen levees, such as those used in the Central Valley, have been a key reclamation methodology since the beginning of American settlement. This early emphasis on levees led in 1861 to the creation of the "reclamation district" entity by the California legislature. This new special purpose political jurisdiction was created to facilitate cooperative reclamation work by multiple landowners. While successful in meeting that objective, this action also added an element of complexity to modern flood emergency response that is missing in other types of disasters.

The reality is that a separate political entity, the "reclamation district", with historically little administrative structure or depth and often limited financial resources, has primary jurisdiction over a key aspect of flood emergency response, the efforts to prevent a levee from failing or to limit the extent, depth, or duration of flood waters if it does. Counties, cities, and other special purpose districts with historically broader public safety responsibilities are faced with this jurisdictional barrier when formulating their preparedness plans and flood response protocols.

Since "jurisdiction" is a basic concept behind all response, mutual aid, and disaster assistance programs this added jurisdictional complexity ends up, for all practical purposes, dividing flood response into two distinct components; the levee "flood fight" and the more traditional public safety operations (e.g. warning, evacuation, rescue). Each of these components involves different key players, different needed expertise, and different response issues. Each component does, though, share the common problem of how it should interact with the other. Any local flood safety plan must recognize this jurisdictional complexity in both its structure, development, and format.

Distinct Components of Flood Emergency Response

Flood Fight Operations

This component includes those emergency activities aimed at preventing failure of a levee during a flood or, in the event of a levee breach, to physically limit the extent, depth, and/or duration of floodwaters. These operations include levee patrol and basic remedial actions such as the placement of sandbags and plastic visqueen. They also include the common need for direct expenditure of significant funds for the acquisition of private contractor or construction services, expensive bulk materials (e.g. rock), and heavy equipment (e.g. large pumps). The reclamation district conducts these operations with possible assistance from the Department of Water Resources and the Corps of Engineers.

General Public Safety Operations

This component includes public warning, evacuation, rescue, care and shelter, and recovery functions which are the traditional jurisdiction of counties, cities, locally-based State agencies, and special purpose "fire districts". These same entities also operate the mutual aid and other coordination systems that make up the Standardized Emergency Management System (SEMS).

Interaction between Response Components

Local fire and law agencies have jurisdiction within the floodplain for protecting people and property and reclamation districts have jurisdiction for the flood fight. In a large flood the geographic scale at which these different groups of agencies establish command and control or organize their response often varies due to differences in agency jurisdictional boundaries and internal protocols. How the agencies performing each separate flood response component coordinate or assist those performing the other response component becomes a key organizational and even policy issue in the overall response.

1.4 California Requirements for Local Flood Safety Plans

Two key administrative actions have been taken to address the flood response planning deficiency. The detailed plan template described in this Guide is consistent with these mandates.

California Water Code Section 9650-51

The passage of AB156 in 2008 established a new section in the California Water Code (Sec. 9650-51) which requires levee maintaining agencies (LMA) that oversee project levees protecting 1,000 or more residents to develop a local flood safety plan. The statute identifies general required plan content and requires preparation and adoption of the plan within two years by the LMA and those jurisdictions whose residents are protected by the LMA levee.

Department of Water Resources Flood Emergency Response Projects Grants

In 2013 the DWR solicited applications from local jurisdictions for the funding of flood preparedness projects via grants from the Propositions 1E and 84 bonds. DWR application guidance established clear State priorities for the preparation of flood safety plans. Other preparedness projects such as training and acquisition of supplies and equipment were to be funded only after sufficient local flood safety plans were in place.

1.5 Ownership and Structure of the Local Flood Safety Plan

Both statute language and subsequent DWR guidance clearly makes the "local flood safety plan" a product of a local levee maintaining agency (LMA). Consistent with this, the plan developed under this template is a LMA jurisdictional plan or, in some cases, a joint jurisdictional plan of a small number of interdependent cooperating LMAs. AB156 required elements of the plan performed by non-LMA

jurisdictions, while referenced in the plan, are maintained as an integral part of those jurisdictions' emergency operations plan.

Plan Structure

The LMA local flood safety plan described in this Guide is formatted as a traditional, functional, jurisdictional emergency operations plan as shown in FEMA Comprehensive Preparedness Guide (CPG) 101. In accordance with this federal guidance, and in light of the limited responsibility of levee maintaining agencies, the flood safety plan consists of a written LMA Emergency Operations Plan (EOP) -Basic Plan and one hazard-specific annex (Flood).

Use of a Mapping Format for Template Products

This local flood safety plan template uses a map format for the display of key information and protocols that will be used by LMA and public safety responders in the field. The LMA EOP – Basic Plan, containing mostly administrative and policy protocols, remains a standard written document. Maps have been used in the past as mere supplements to a written plan. This new approach uses maps as a key methodology for displaying command level response protocols and critical information needed for crisis decision making and response organization.

Use of maps to display key procedures and information has been shown to make critical information more easily and accurately accessible, comprehended, and shared by responders in the difficult and fast moving environment of field operations. Digitized electronic map formats are also more easily shared over great distances with involved agencies and officials. Finally, substitution of maps for binders integrates plan contents perceptually with the important geographical aspect of floods.

Relationship to other Local Emergency Plans

This planning rationale will result in a single, distinct, flood safety plan for each LMA in an operational area covering a defined and distinct portion of the floodplain. In some cases, a single, joint, local flood safety plan may be prepared by a small number of adjacent interdependent LMAs. However approached, each distinct plan will contain a LMA EOP – Basic Plan and Annex A (the flood contingency map) describing how that LMA (or LMAs) will carry out its jurisdictional responsibility to protect their levee system and contain flood waters. Response procedures of non-LMA agencies and jurisdictions conducting concurrent operations in the area covered by the LMA flood safety plan will be referenced in that LMA plan but maintained within the jurisdictional emergency plans of those agencies.

THE LOCAL FLOOD SAFETY PLAN TEMPLATE

2.1 The Local Flood Safety Plan Template Components

This Guide describes a local flood safety plan comprised of the following minimum components.

1. LMA Emergency Operations Plan (EOP) – Basic Plan
2. LMA EOP Hazard Specific Annex A-Flood (flood contingency map)
3. Public Safety Agency Evacuation/Rescue Plan (evacuation/rescue map and associated general public products)

2.2 Levee Maintaining Agency Emergency Operations Plan (EOP) - Basic Plan

This Guide contains a template for a LMA EOP-Basic Plan. This template conforms to the traditional functional plan format described in FEMA Comprehensive Preparedness Guide (CPF) 101 and consistent with the DWR Section 9650 sample plan. The template contains recommended standard language shown in *normal Cambria font* text which can be retained after any needed modification to the specific Operational Area situation.

Example:

The County of _____ maintains and hosts the operational area emergency operations center (EOC) at _____. The operational area management group (MAC) will prioritize allocation of resources including mutual aid, perform information sharing, and conduct coordination processes in accordance with the multi-agency coordination system (MACS) procedures maintained by the _____County Office of Emergency Services.

On the other hand, text in the template shown in *italicized Cambria font* within brackets describes LMA-specific protocols that will replace that text in its entirety once developed in the planning process.

Example:

> [*Insert description of routine LMA actions and procedures for ensuring preparedness of personnel, equipment, and materials at the beginning of each flood season. Describe district non-emergency levee and pumping station maintenance program.*]

2.3 Levee Maintaining Agency Hazard Specific Flood Annex (Flood Contingency Map)

Annex A (Flood) to the LMA's Emergency Operations Plan will be a map showing the LMA flood fight plan and information critical to crisis decision making. This map is otherwise known as a "flood contingency map". Map rationale, content, format, and development is briefly described in this Guide. A more detailed description of flood contingency mapping is contained in the FEMA Guide to Flood Contingency Mapping, 2nd Edition, 2012 which can be downloaded at www.musacrfmp.com.

2.4 Public Safety Agency Evacuation/Rescue Map

The additional response product required by Water Code Section 9650 is a public safety evacuation/rescue plan. This template uses a mapping approach to preparation and display of this plan. Public safety agencies of any single operational area will subsequently prepare a set of evacuation/rescue maps for the area covered by each LMA flood safety plan. A single evacuation map may cover the area protected by the levee system of a single LMA, or several LMAs or a set of maps may be necessary to adequately cover the plan area. These maps and associated general public versions are referenced in the appropriate LMA local flood safety plan but maintained by the appropriate responsible agency.

The rationale, content, format, and development of these maps is briefly described in this Guide. A more detailed description of evacuation/rescue mapping is contained in the FEMA Guide to Evacuation/Rescue Mapping, 3rd Edition, 2013 which can be downloaded from www.musacrfmp.com.

Public Safety Agency Evacuation/Rescue Maps – General Public Version

Some elements of the evacuation plan displayed on the public safety evacuation maps, such as evacuation routes and rally points, need to be communicated to the general public in a timely manner to be effective. Evacuation/Rescue maps are therefore modified upon completion to produce versions suitable for use by the general public. These modified maps are then made available to the public and local businesses as full-sized maps or as part of downloadable brochures.

WATER CODE SECTION 9650 COMPLIANCE MATRIX

California Water Code Section 9650 (AB156) Requirement	Flood Safety Plan Template Components which meet Section 9650 Requirement
Section 9650 (b)(1) A flood preparedness plan that includes storage of materials that can be used to reinforce or protect a levee when a risk of failure exists	LMA EOP Basic Plan Section 2.1 Situation Overview
	LMA EOP Basic Plan Section 2.2 General Approach to Seasonal Flood Operations • Routine Preparedness and Maintenance • Monitoring and Analysis • Alerting, Activation, and Initial Response
	LMA EOP Basic Plan Section 2.5 Federal and State Disaster Assistance
	LMA EOP Basic Plan Section 3.1 Organization
	LMA EOP Basic Plan Section 3.2 Assignment of Responsibilities • Make legal and financial commitments • Represent District • Provide Public Information • Maintain Equipment and Supplies • Monitor Water Conditions and Forecasts • Activate and Direct District Staff • Document Expenditures and Actions
	LMA EOP Basic Plan Section 4.1 Management and Control of District Operations • Management and Policy • Incident Command in the Field • Management/Coordination w/others
	LMA EOP Basic Plan Section 6.2 Resources
	LMA EOP Basic Plan Section 7.1 Plan Development and Maintenance
	LMA EOP Basic Plan Section 7.2 Training and Exercises
	LMA EOP Basic Plan Section 7.3 Plan Evaluation
	LMA EOP Annex A (Flood Contingency Map): Flood Fight History (Text Box)
	LMA EOP Annex A (Flood Contingency Map): Historic Levee Breaches (Symbols)
	LMA EOP Annex A (Flood Contingency Map): Historic Seepage Sites (Symbol)
	LMA EOP Annex A (Flood Contingency Map): Historic Erosion Sites (Symbol)
	LMA EOP Annex A (Flood Contingency Map): Special Considerations (Text Box)
	LMA EOP Annex A (Flood Contingency Map): District Topography/100-yr Elevations
	LMA EOP Annex A (Flood Contingency Map): Critical Infrastructure within District
	LMA EOP Annex A (Flood Contingency Map): Flood Fight Resources Depot Location

California Water Code Section 9650 (AB156) Requirement	Flood Safety Plan Template Components which meet Section 9650 Requirement
	LMA EOP Annex A (Flood Contingency Map): Communications Plan (Text Box) OA Flood Response Unified Command Map: Content/Format per template
Section 9650 (b)(2) A levee patrol plan for high water situations	LMA EOP Annex A (Flood Contingency Map): Patrol Plan (Text Box) • Patrol Meeting Place • Official responsible for organizing patrols • Patrol communications and reporting process • Procedure for marking problem sites • Patrol Sectors if used
	LMA EOP Annex A (Flood Contingency Map): Patrol Sectors marked on map if used
Section 9650(b)(3) A flood-fight plan for the period before state or federal agencies assume control over the flood fight	LMA EOP Basic Plan Section 2.4 Flood Fight Operations
	LMA EOP Basic Plan Section 5.1 Communications Organization
	LMA EOP Basic Plan Section 5.2 District Communications
	LMA EOP Basic Plan Section 5.3 District Communications w/ Other Jurisdictions
	LMA EOP Basic Plan Section 6.1 Mutual Aid
	LMA EOP Basic Plan Section 6.3 Procurement
	LMA EOP Basic Plan Section 6.4 Logistics Facilities
	LMA EOP Basic Plan Section 6.5 Finance and Administration
	LMA EOP Annex A (Flood Contingency Map: Unified Flood Fight Command Post (Symbol or Text)
	LMA EOP Annex A (Flood Contingency Map): District Response Facilities (Symbol)
	LMA EOP Annex A (Flood Contingency Map): District/Operational Area Supply Staging Areas (Symbol)
	LMA EOP Annex A (Flood Contingency Map): Pre-Planned Delivery Points (Symbol and Text Box)
	LMA EOP Annex A (Flood Contingency Map): Flood Contingency Options (Text Box)
	LMA EOP Annex A (Flood Contingency Map): Dry Land levees (Symbol with label)
	LMA EOP Annex A (Flood Contingency Map): Pre-Planned Emergency Berms (Symbol)
	LMA EOP Annex A (Flood Contingency Map): Tactical Plans (Text Box)
Section 9650(b)(4) an evacuation plan that includes a system for adequately warning the general public in the event of a levee failure, and a plans for the evacuation of every affected school, residential care facility for the elderly, ….	LMA EOP Basic Plan Section 2.3: Public Alert and Warning
	LMA EOP Annex A (Flood Contingency Map): Reference to name and location of Evacuation/ Rescue Map (Text Box)
	LMA EOP Annex A (Flood Contingency Map): Structures and bulk hazardous materials sites if an extremely rural area (symbols)
	Public Safety Agency Evacuation/Rescue Map: Content and Format per template
	Other Public Safety Agency Evacuation/Rescue Procedures: Referenced on Evacuation Map as appropriate

California Water Code Section 9650 (AB156) Requirement	**Flood Safety Plan Template Components which meet Section 9650 Requirement**
Section 9650(b)(5) A floodwater removal plan	LMA EOP Annex A (Flood Contingency Map): Dewatering Plan (Text Box)
	LMA EOP Annex A (Flood Contingency Map): Pumping station locations (Symbol)
	LMA EOP Annex A (Flood Contingency Map): Planned location(s) for emergency dewatering pumping station (Symbol)
	LMA EOP Annex A (Flood Contingency Map): Locations of relief cuts (Symbol)
	LMA EOP Annex A (Flood Contingency Map): Existing Tactical Plans (Text Box)

LMA EMERGENCY OPERATIONS PLAN - BASIC PLAN TEMPLATE

[Name of LMA]
Emergency Operations Plan
Basic Plan

[Insert Name of Operational Area]
[Insert Issuance Date]

Plan Promulgation

[*Insert letter from Levee Maintaining Agency (LMA) board of directors/trustees indicating that plan has been adopted and directing staff to distribute plan to appropriate officials. Letter should include any special policies adopted by the board concerning the maintenance and use of the plan. Letter should include date and manner of approval.*]

Record of Changes

Revision #	Sections Revised	Date of Distribution	Name of Approving Authority

Mid and Upper Sacramento Region Guide to Developing Local Flood Safety Plans

Table of Contents

Mid and Upper Sacramento Region Guide to Developing Local Flood Safety Plans

Section 1

Plan Introduction

1.1 Purpose

The purpose of this component to the __[LMA Name]_____ Flood Safety Plan is to ensure that LMA staff can meet response objectives in a flood emergency as well as interact with other jurisdictions performing emergency functions within and around the LMA. This plan is intended to be used in conjunction with the emergency operations plans of the State of California and the _____Operational Area to facilitate multi-jurisdictional coordination within LMA boundaries. Although this is a public document, specific procedures and information of a sensitive nature and personal information may be edited out of publicly available versions. The full document is subject to restricted-use handling procedures.

1.2 Scope

This levee maintaining agency (e.g. reclamation district or other special district), as an independent jurisdiction, has responsibility for the maintenance of the levee and drainage systems within its jurisdictional boundaries. While the LMA will work with, and assist if possible, the local jurisdiction(s) responsible for other public safety functions within the LMA, this LMA emergency operations plan only contains detailed procedures for its emergency responsibilities. The manner of interacting with other jurisdictions is described, but the operational plans of other jurisdictions with public safety responsibilities within the area protected by LMA levees are only referenced in this document.

This plan will cover in detail the following;

- LMA Flood Preparedness Procedures
- LMA Levee Patrol Procedures
- LMA Flood Fight Procedures
- LMA Flood Water Removal Procedures
- LMA Recovery and After-Action Follow up Procedures

1.3 Plan Structure

This Flood Safety Plan is structured as a traditional functional emergency operations plan in accordance with Comprehensive Preparedness Guide (CPG) 101 issued by the Federal Emergency Management Agency (FEMA). Consistent with that guidance, and a levee maintaining agency's limited responsibilities and lack of internal departments, this emergency operations plan consists of this Basic Plan, containing an overview of LMA response procedures, and one hazard-specific annex, Annex A – Flood, containing details of the LMA's flood response plan. This Annex A – Flood is in map format and is also called a flood contingency map in reference and guidance documents.

Mid and Upper Sacramento Region Guide to Developing Local Flood Safety Plans

Section 2

Concept of Operations

2.1 Situation Overview

See the _____ Operational Area Hazard Mitigation Plan for a comprehensive flood risk assessment. See Annex A – Flood (flood contingency map) for LMA jurisdictional boundaries, levees, pumping stations, supply depots, historical flooding summary, locations of past breaches and areas of historic seepage or erosion, topography, and characteristics of waterways fronting LMA levees.

[*Insert brief description of type of flooding threat (e.g. tidal and/or riverine), that creates high water conditions affecting LMA. Describe significant characteristics of waterways that face LMA levees; average fetch and channel width, any important obstructions and sand berms, etc. Describe levees as to certification status, height, crown, crown surface, and notable characteristics. Describe population within the LMA and critical infrastructure.*]

2.2. General Approach to Seasonal Flood Operations

LMA staff will carry out routine preparedness activities at the beginning of flood season as described in this section. Annex A – Flood of this plan describes the concept of operations and protocols for active LMA flood fight activities. Section 3, Organization and Responsibilities, describes authorities and responsibilities for performing routine and emergency activities.

2.2.1 Routine Preparedness and Infrastructure Maintenance

[*Insert description of routine LMA actions and procedures for ensuring preparedness of personnel, equipment, and materials at the beginning of each flood season. Describe LMA's non-emergency levee and pumping station maintenance program.*]

2.2.1 Monitoring and Analysis

The LMA will monitor and analyze throughout flood season the water conditions, elevations, and forecasts for waterways affecting LMA levees for the purpose of promptly identifying heightened threats to the integrity of levee and drainage systems. The objective of this monitoring effort is to identify conditions that warrant additional actions beyond routine flood season preparedness activities.

The LMA will use the following gages and information sources in its monitoring effort.

[*List the stream and/or river gages, specific reports, and displays in the California Data Exchange Center (CDEC) that the LMA monitors to determine the level of its flood threat and whether to take additional preparedness and response actions.*]

2.2.2 Alerting, Activation, and Initial Response

Gauges and information sources previously identified will be monitored to detect the following objective conditions which will trigger the response actions shown next to each. These, and additional actions as directed by LMA trustees, may be taken by LMA staff at any time it is felt that conditions affecting the levees and drainage system warrant such action.

[*Insert list of monitored gauges and information sources showing specific stage(s) or other objective conditions that will trigger additional LMA action. At a minimum LMA must establish objective conditions, or a clear protocol, for the following actions:*

1) Alert the LMA board of directors/trustees and staff
2) Activate LMA staff, LMA field command post and/or emergency operations center
3) Initiate levee patrols
4) Contact the agency responsible for public safety within the LMA
5) Contact the State-Federal Flood Operations Center

If the LMA recognizes "phases" (groups of actions to be taken together) tied to specific objective conditions, then list the phases, the condition or trigger that initiates the phase, and the group of actions that will be taken under that phase (See DWR Sample Plan Template for examples of such a system).]

[If the LMA has no specific response triggers, then explain the LMA process for determining when to take additional emergency or preparedness actions.]

LMA staff will also take the above actions upon the identification, or verified report, of any out of the ordinary condition on a LMA levee that presents a potential risk of failure.

2.3 Public Alert and Warning

The jurisdiction(s) identified below has the responsibility for alerting and warning the general public within LMA boundaries. The LMA will promptly notify this jurisdiction(s) of identified threats to its levees or internal drainage system and will provide detailed information on the characteristics of the threat. The LMA will assist, to the extent possible, with notification of the public if requested. All alert and warning of the general public will be carried out in accordance with the plan(s) referenced below.

[*Insert the name of the public agency(ies) responsible for public alert and warning and provision of emergency information to the general public within LMA boundaries. Reference the name and location of agency plans and procedures for performing this function within the LMA. This should include the name and location of the* ***evacuation/rescue map(s)*** *completed for this area in accordance with this flood safety plan template. Also insert the name of any agencies with special notification or warning for any private resorts, trailer parks, etc. within the LMA.*

2.4 Flood Fight Operations

Flood fight operations, including levee patrol, will be conducted in accordance with the procedures in this Basic Plan and those shown on Annex A-Flood, the LMA flood contingency map. Annex A-Flood

displays the LMA's concept of operations for emergency communications, patrol, flood fight, and dewatering operations. This concept of operations will be modified as needed to meet the demands of actual emergency conditions. Plans of jurisdictions with responsibility for warning and evacuation within the LMA are referenced on Annex A as well as in this plan.

2.5 Federal and State Disaster Assistance

[*Describe the LMA's procedures or policies for accessing federal and state disaster assistance under PL84-99, the Stafford Act, the California Disaster Assistance Act, and any other applicable disaster assistance statute as effectively as possible. Identify staff or contractors pre-assigned to maintain documentation during the event and/or develop and process claims during the recovery period.*]

Mid and Upper Sacramento Region Guide to Developing Local Flood Safety Plans

Section 3

Organization and Assignment of Responsibilities

3.1 Organization

The LMA will use its paid, contract, and volunteer staff as shown below to perform its responsibilities in a flood emergency.

[*Insert organization chart showing the emergency organization of the LMA to include elected officials, paid staff, volunteers, and contract employees or organizations such as attorneys, engineering firms, and accounting/financial firms. Show by position title if there is one, or by description, e.g. "owner of XYZ Farms acting as a volunteer". Where the position or description covers more than one individual then indicate the number of employees or volunteers filling that position.*]

3.2 Assignment of Responsibilities

The LMA Board of Directors/Trustees has made the following assignments of authority and responsibility to ensure that needed emergency actions can be taken promptly and efficiently.

[*Identify in each section below the LMA officials, staff, or contract employees or organizations authorized and responsible for the following key functions in an emergency. If there are specific limitations on level of the authority shown then describe the limitations, e.g. "LMA superintendent is authorized to commit LMA funds up to $50,000. Total expenditures above $50,000 must be approved by a vote of the Board of Directors", etc*.]

3.2.1 Make Legal and Financial Commitments on behalf of LMA

[*Insert LMA positions by title that are authorized to 1) Make legal or financial commitments during emergency operations, 2) initiate and sign emergency contracts with private vendors or other public agencies, and/or 3) purchase supplies and equipment in an emergency situation. Also which officials have authority to request the Operational Area logistics section to acquire resources on behalf of the LMA. Describe any limitations or special conditions for such authority.*]

3.2.2 Represent LMA in Operational Area Multi-Agency Coordination (MAC) Group

[*Insert LMA position(s) by title authorized to represent the LMA as an "agency representative" at meetings of local, State, and federal agencies for the purpose of coordinating response. This would include meetings of unified commands in the field and the Operational Area. Representatives must be authorized to speak for the LMA in matters of the condition of the levee, recommendations to take public safety actions in the LMA, or agreeing to modify LMA response as a result of the multi-agency coordination process*]

3.2.3 Provide Risk Communications

[*Insert LMA position(s) by title authorized to speak to the media on behalf of the LMA and participate in any established Operational Area Joint Information Center (JIC).*]

3.2.4 Maintain Emergency Equipment, Supplies, and Resources

[*Insert LMA position(s) by title which are responsible and authorized to maintain LMA equipment, supplies, and resources needed for emergency response. Supplies must meet minimum requirements issued by the Department of Water Resources.*]

3.2.5 Monitor Water Conditions, Elevations, and Forecasts

[*Insert LMA position(s,) by title, which are responsible and authorized to monitor water conditions, elevations, and forecasts for the purposes of identifying conditions warranting additional action beyond routine flood season preparedness per Section 2.2.1 above*.]

3.2.6 Activate and/or Direct LMA Staff during emergency operations

[*Insert positions by title which are authorized and responsible for 1) activating LMA staff and resources, 2) directing and/or supervising LMA personnel, contractors, and other staff provided to LMA under mutual aid, 3) requesting from, or providing assistance to, other jurisdictions under mutual aid provisions, and/or 4) directing flood fight operations. At a minimum, responsibility for organizing and directing levee patrols, organizing and directing flood fight actions, organizing and directing flood water removal activities, and organizing and directing financial and recovery activities must be shown*.]

3.2.7 Document Expenditures, Emergency Actions, and Requests for Mutual Aid

[*Insert positions by title authorized and responsible for 1) documenting LMA expenditures and emergency actions, 2) documenting damage to LMA infrastructure, and 3) preparing and submitting disaster assistance claims during the recovery period*.]

Mid and Upper Sacramento Region Guide to Developing Local Flood Safety Plans

Section 4

Direction, Control, and Coordination

4.1 Management and Control of LMA Operations and Coordination within LMA

LMA staff authorized and responsible for carrying out the actions outlined in Section 3, Organization and Responsibilities will use the direction, control, and coordination facilities and processes described in this section. Communications and logistics systems for command, coordination, and response are described in Sections 5 and 6.

LMA staff will use the National Incident Management System (NIMS), and the Standardized Emergency Management System (SEMS), to organize LMA response activities. LMA staff will comply with the procedures of any established Field Unified Command to which the LMA is assigned, the Operational Area Multi-Agency Coordination System (MACS) or any other "as needed" command structure put in place by local officials purposes of inter-agency coordination.

4.1.1. Management and Policy

[Insert a description of the location and procedures that the Board of Directors/Trustees of the LMA will use to meet and make decisions during an emergency.]

4.1.2 Incident Command Facilities

[*Insert description of any incident facilities the LMA will use or establish to organize and carry out emergency activities, e.g. patrol within its jurisdiction. Describe their location and function. If the LMA will direct elements of its operations from a unified field command post provided by another jurisdiction (city or county) then describe the pre-planned location of this unified field command post. If there is no pre-planned location then explain the process for determining its location at the time of the emergency. Command post locations should be identified on Annex A - Flood (flood contingency map). Reference the Operational Area Flood Response Unified Command Map if in existence.*]

4.2 Management and Coordination with Other Jurisdictions

The LMA will ensure that proper management and coordination is maintained with 1) other public agencies and jurisdictions operating within the LMA, 2) neighboring reclamation LMAs, and 3) the _____Operational Area. The following procedures will be followed to accomplish this function.

4.2.1 Unified Flood Fight Command Post

[*Insert the name of the field unified command to which the LMA belongs. If the unified command post is on the LMA Annex A – Flood (flood contingency map) then reference that map. If the unified command post is not located on the LMA flood contingency map then describe its location and reference the Flood Response Unified Flood Fight Command Map if that exists.*]

4.2.2 Operational Area Emergency Operations Center

The County of _____ maintains and hosts the operational area emergency operations center (EOC) at _____. The operational area management group (MAC) will prioritize allocation of resources including mutual aid, perform information sharing, and conduct coordination processes in accordance with the multi-agency coordination system (MACS) procedures maintained by the _____County Office of Emergency Services.

The Operational Area Planning/Intelligence Section will provide disaster intelligence and situational status to participating jurisdictions upon activation in an emergency. This LMA will participate in this disaster intelligence and information sharing process. See _____ for relevant _____ Operational Area plans and procedures.

[*Insert a description of the means the LMA will use to contact LMA staff to attend operational area meetings and activities, the general travel times, and any issues. Describe ability of LMA to remote conference or communicate with the Operational Area.*

4.2.3 State-Federal Flood Operations Center

The Department of Water Resources has special authority under Water Code Section 128 to assist reclamation LMAs with flood fight operations. The Department of Water Resources maintains the State-Federal Flood Operations Center (FOC) to perform these functions and support the operations of other State and Federal agencies. The LMA will maintain communications with the FOC in order to receive and provide information with that facility and to request technical assistance.

[*Insert a reference to means of communication with the FOC and relevant DWR plans.*]

4.2.4 Operational Area Joint Information Center

Risk communication to the general public will also be coordinated, planned, and carried out through the _____Operational Area Joint Information Center (JIC). The LMA will assist with risk communication as requested through the operational area. See _____ for relevant Operational Area plans and procedures.

The LMA will provide an information officer as requested who will have authority to approve information releases. The LMA information officer will identify the location and schedule of the joint information center if established from the Operational Area Information Officer at the beginning of the flood event.

Mid and Upper Sacramento Region Guide to Developing Local Flood Safety Plans

Section 5

Communications

5.1 Communications Organization

The LMA will maintain adequate communications equipment to implement this emergency plan. This section identifies equipment and/or systems available for communications,

1) Between LMA staff, contractors, and other staff working under LMA supervision
2) With other public agencies operating within the LMA
3) With neighboring reclamation LMAs
4) With the Operational Area EOC
5) With the State Flood Operations Center

5.2 LMA Communications

[*Insert description of LMA equipment, equipment provided by volunteers, or equipment confirmed as available from an outside agency or vendor. Describe processes for ensuring the following communications needs can be met:*

1) With LMA board
2) With and between levee patrols
3) With LMA staff, contractors, and volunteers conducting flood fight activities

Describe equipment, its location, and any pre-established issuance assignments or frequencies or phone numbers assigned for particular functions. If a procedure or protocol will be used to ensure communications (meeting schedule, etc.) then describe.]

5.3 Communications with Other Jurisdictions

[*Describe method or equipment that LMA will use to establish and maintain adequate communications with neighboring LMAs and other public agencies conducting emergency operations within the LMA.*]

5.3.1 _____ Operational Area EOC

[*Describe communications systems for maintaining adequate communications with the Operational Area organization.*

5.3.2 Department of Water Resources State-Federal Flood Operations Center

[*Describe how the LMA plans on establishing and maintaining adequate communications with the flood operations center and technical staff operating in the LMA.*]

Mid and Upper Sacramento Region Guide to Developing Local Flood Safety Plans

Section 6

Logistics and Finance/Administration

6.1 Mutual Aid

The LMA is a signatory to the California Master Mutual Aid Agreement and will follow the processes outlined in those documents and the California Standardized Emergency Management System (SEMS) for requesting and providing mutual aid. Mutual aid requests for technical assistance and services, flood fight crews, supplies and materials, and other resources will be made through the _____ representative in the Operational Area Logistics Section. See _____for operational area plans and procedures.

[*Insert any LMA specific policies, procedures, or assignments for requesting resources and personnel from other public agencies.*]

6.2 Resources

[*Insert inventory of flood fight materials maintained by LMA and their location. If more than one location is maintained, provide a distinct designation for each site. Add sites to Annex A – Flood (flood contingency map). Insert separate inventory for each site. Supplies must meet minimum Department of Water Resources requirements.*]

6.3 Procurement

[*Insert description of LMA process for procuring supplies and materials during an emergency. Describe LMA process for initiating, finalizing, and processing contracts with private vendors.*]

6.4 Logistics Facilities

See Annex A - Flood (Flood Contingency Map), for locations of pre-planned delivery points, locations of LMA supplies, and LMA supply staging areas and points.

[*If LMA has pre-identified locations where it stages sandbags or other materials for use by patrols or LMA staff then describe here. Describe LMA process for activating and establishing such supply staging areas or in mobilizing stockpiles owned by LMA. Pre-identified locations should also be shown on Annex A – Flood (flood contingency map).*]

6.5 Finance and Administration

[*Insert LMA policies and procedures for maintenance of financial documentation relevant to flood emergency response. Insert administrative policies and procedures concerning emergency response activities such as the provision for overtime for employees, work rules, work restrictions and safety rules, and other administrative controls that the board of directors/trustees have put in place.*

Mid and Upper Sacramento Region Guide to Developing Local Flood Safety Plans

Section 7

Plan Development and Maintenance

7.1 Plan Development and Maintenance

[*Insert description of LMA process for developing and maintaining this plan. Include frequency of plan review and update. Describe process for approving initial plan and subsequent revisions and changes. Describe who is responsible for periodic review of plan and determining the need for revisions.*]

7.2 Training and Exercises

The LMA will maintain a training program for its staff to ensure implementation of this emergency operations plan and to meet minimum federal and state requirements for disaster reimbursement. All LMA training will comply with the National Incident Management System (NIMS) and the Standardized Emergency Management System (SEMS).

All LMA trustees, employees, and volunteers who have emergency assignments will receive NIMS/SEMS training and bi-annual refreshers in accordance with the District Training Policy shown on Attachment 1. In addition, LMA employees will receive training on the following subjects.

LMA EOP – Basic Plan and Annex A – Flood Contingency Map

LMA staff will participate in internal exercises and exercises sponsored by the _____ Operational Area.

[*Insert LMA specific policies or procedures for providing training to LMA staff and volunteers.*]

7.3 Plan Evaluation

[*Insert LMA policy for preparing after action reports and evaluations following exercises and actual events. Describe LMA policies for using such reports and other processes to evaluate its emergency operations plan and the need for changes, additions, and revisions.*]

Mid and Upper Sacramento Region Guide to Developing Local Flood Safety Plans

Section 8

Authorities and References

Federal

Federal Civil Defense Act of 1950 (Public Law 920, as amended)

Robert T Stafford Disaster Relief and Emergency Assistance Act of 1988 (Public Law 93-288, as amended)

State

California Emergency Services Act (Chapter 7, Division 1 of Title 2 of the Government Code)

Standardized Emergency Management System Regulations (Chapter 1 of Division 2 of Title 19 of the California Code of Regulations

Local

[*Insert LMA and other documents and references relevant to flood emergency response and multi-agency coordination.]*

Attachment 1 to Emergency Operations Plan – Basic Plan

_____ Emergency Response and Training Policy
Name of LMA

_____Board of Trustees hereby adopts the National Incident Management System (NIMS) for organizing emergency response activities. The Board further establishes the following emergency response and training policies.

Emergency Response

In an emergency, the District Board of Trustees is responsible for determining general response policy and performing financial oversight. The District _____ and _____ are responsible for organizing District response activities, supervising any hired staff or contractors working for the District, and for coordinating with outside agencies. The District hereby establishes the position of Emergency Levee Worker for purposes of hiring or re-assigning staff at the time of the emergency for levee patrol and basic flood fight duties.

National Incident Management System Training Guidance

In regard to meeting national and State training requirements, the District will comply with the provisions of the National Incident Management System Training Program Manual, September 2011 and any subsequent revisions to that document. The District will also comply with California Standardized Emergency Management System (SEMS) training requirements.

The NIMS Training Program Manual indicates that federal training guidance is not absolute and that organizations should tailor their training to the level of incident complexity that their staff would potentially manage. After careful review of the definitions of incident complexity levels shown on Page 16 of the NIMS Training Program Manual, this Board has determined that District responsibilities to patrol its levees and respond to threats to levee structural integrity would require District staff to manage Type 4 incidents. District training requirements outlined below meet NIMS training recommendations for Type 4 incidents (pages 17 and 18, NIMS Training Program Manual, September 2011) and SEMS training requirements.

_____ Training Requirements
Name
The Board of Trustees hereby establishes the following training requirements for District staff involved in flood emergency operations.

Members of the Board of Trustees shall complete the G-402, Incident Command System Overview for Executives and Senior Officials and the SEMS Executive Course.

Staff hired or transferred to serve as Emergency Levee Workers at the time of an emergency shall receive a 2-hour Emergency Safety and NIMS/SEMS Course that will include a 60 minute summary of

the SEMS Introduction, ICS-100, ICS-200, and IS-700 courses and specific procedures and safety information for their emergency duties prior to beginning work.

Individuals appointed as District Incident Commander and Deputy Incident Commander at the time of the emergency shall have completed, at a minimum, the SEMS Introduction, ICS-100 Introduction to the Incident Command System, ICS-200 ICS for Single Resources and Initial Action Incidents, and IS-700 NIMS An Introduction courses to meet Type 4 incident management requirements. If neither individual has completed those courses prior to this assignment, then both individuals will attend the 2-hour Emergency Safety and NIMS/SEMS Course and an additional 30-minute module on Incident Commander protocols.

This policy is hereby approved by the Board of Trustees on _____
by the following vote.

By: _____

_____
Title

_____

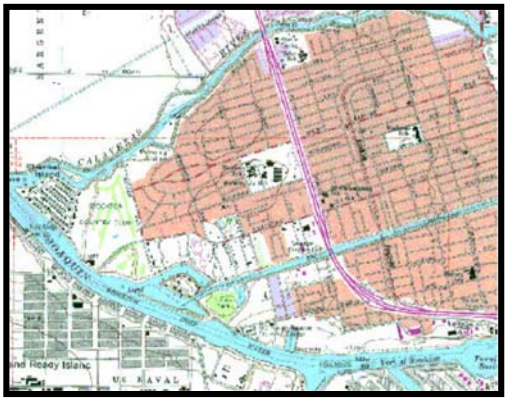
DEVELOPING THE HAZARD-SPECIFIC FLOOD ANNEX A (FLOOD CONTINGENCY MAP)

The development of a flood contingency map as Annex A of the LMA flood safety plan will follow a standard process; an initial draft map will be prepared, agency discussions will be conducted to generate plan details to be posted on the map, and the final map will be reviewed and approved. This section provides a summary of the map development process. For a more in-depth discussion of map development see the Guide to Flood Contingency Mapping, 2nd Edition, 2012 at www.musacrfmp.com from which this Appendix was excerpted. The GIS Technical Guide to Developing Flood Contingency Maps (separate document) also provides more detail on setting up the GIS mapping software.

PREPARATION OF FLOOD CONTINGENCY MAP (ANNEX A)

Step 1: Prepare an initial draft map

An early decision will be the selection of the background for the maps. The United States Geological Survey (USGS) topographical map series may be used if that older data still adequately portrays the area being mapped, or if cost is a major issue. Aerial photos may be used in lieu of the USGS data as an alternate background. Use of existing map products such as the USGS topographical map series means that details not of interest or use in flood fight operations may end up cluttering the final map. If possible, digitized versions of such existing general map products can be manipulated to "erase" unneeded or out-of-date content and add needed information.



Creation of a vector background from scratch is possible with more sophisticated mapping software. While more costly and time consuming, the advantage is that the final maps will not be cluttered with unneeded information and will only include background elements needed by responders. For example, only key elevation contours, rather than all contours, could be displayed in a custom-made background.

Program and technical staff should create an initial draft map prior to the involvement of the agencies or organizations providing the input for that individual map. The availability of a draft map at initial meetings will facilitate discussion and improve results. This preliminary work also allows program staff to resolve technical issues such as best map scale, exact map coverage, and best placement of text boxes and legends. While completing the initial draft map, project staff can collect historical and other data obtained from the same documents and sources and add this to the map. All of this work will save time once group discussions begin.

Step 2: Conduct Agency Meetings

Program staff now schedule and conduct meetings with the different levee maintaining and support agencies responsible for flood fight operations in the area covered by each map. An agenda, the initial draft map, and the list of data elements and other map specifications worked out at the beginning of the program are used to facilitate discussions. Appendix 4 shows an example list of data elements for the flood contingency maps. The resulting collaborative discussions will generally address the following key issues.

Identification of Information Needs

Information needed for analyzing potential failure scenarios and response options will be identified in the course of discussions. Program staff records these needs and develops a collection plan. Some technical field work may be required and resources to pay for this should be built into the program budget.

This work generally only involves straightforward data collection. For example, a tentative location for installing emergency pumps for dewatering may have been identified in the map development meetings but a follow up survey is needed to confirm that this is the best site for placement of intakes and pumps. Information collected is added to the draft map or otherwise shared at the next meeting for approval by the group.

Coordination of Future Flood Fight Operations

Agencies will collaboratively pre-plan supply delivery points, patrol and mutual aid procedures, and multi-agency coordination processes. These locations and procedures are placed on the map as symbols or in text boxes to serve as cues and references. If a procedure is too extensive for placement on the map, a summary of the procedure can be placed on the map with a pointer to the complete document. Detailed technical surveys can also be summarized on the map with an appropriate pointer.

Analysis of Failure Scenarios and Response Options

Identification of failure scenarios for the primary levee or other control structure, and related opportunities for containing the resulting floodwaters, will be a key product of the discussions. Historical information, input from local residents, and local institutional knowledge help in this process. The potential use of relief cuts, emergency berms, and existing embankments and elevated freeways to contain floodwaters will be analyzed for each distinct failure scenario. Options determined to be impractical are also added to the map to prevent unproductive discussion in a future crisis.

A common problem at this stage is the tendency of officials to exclude potential containment options based on pre-conceived notions of what the future flood will be like. Ingrained use of 100-year flood elevations from the NFIP process should be discarded and the demonstrated fact that actual floods come in all sizes and depths should be kept in mind. Similarly, what is politically acceptable at the time of a

flood can differ from what is thought to be acceptable in discussions before the emergency. The intent of the mapping program is to identify practical engineering options for containing floodwaters that officials can consider once the characteristics of the actual flood are known.

Detailed risk assessment, mitigation, and implementation planning will often follow the identification of potential options for containing a flood. This additional work will increase the possibility of success in limiting damage. This follow-on planning is discussed later in this Guide.

Identification of Mitigation Opportunities

During the map development process, critical infrastructure vulnerable to flooding if the primary flood protection structure fails will become apparent. In some cases, an option for protecting the structure during the flood if that contingency materializes may be identified. In many cases, however, there may be no practical option for protecting this infrastructure from damage in the event of failure once the flood arrives. These vulnerabilities should be noted on the maps for future risk assessment and mitigation purposes. In this way, the map becomes a stimulus for pre-event efforts to add second "lines" of local protection (e.g. ring dikes or flood proofing of structures) to facilities critical to the functioning of the community and region.

Step 3: Review and Approval of Final Flood Contingency Map (Annex A)

The process for final approval of completed maps should be clearly worked out with the participants at the beginning of the program. A formal sign off by all involved agencies may be needed or one key agency may be authorized to approve the final map after receiving input from the others. It is also important to identify the agency or agencies that will maintain the maps and initiate their periodic update. This maintenance function may be centralized or de-centralized depending on local circumstances but must be established if the program is to remain effective into the future.

MAP CONTENT AND SPECIFICATIONS

Detailed information on map semiotics, data elements, and GIS map file setup is contained in the GIS Technical Guide to Developing Flood Contingency Maps (separate document). The following discussion covers a general discussion on the considerations that went into determining map content, display specifications, geographic framework, and administrative protocols.

Map Content

Map content may be divided into two key types of data, objective and subjective. Objective data elements are technical or historical facts that merely need to be collected and verified. Examples are ground elevations, dates and characteristics of past floods, and elevation profiles of existing dry land levees. Subjective data elements result from decisions made in the collaborative planning process. Examples would be joint decisions on where to locate a command post or supply delivery point, whether a relief cut is an option for limiting floodwater extent, or the trigger condition that will be used to start levee patrols.

Each data element making up that content is defined as to the degree of detail required, metadata standards, and the process for collection. It may be decided to collect some data in detail but to display it summarily on the map with a reference to the location of the full version.

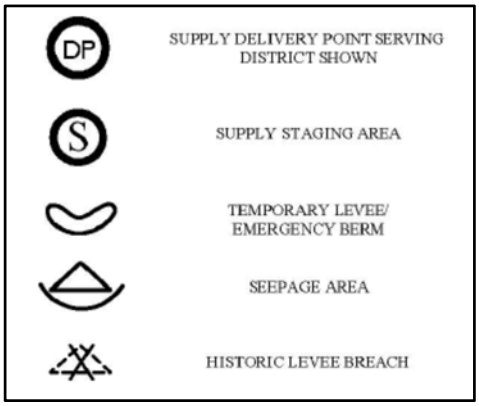
The GIS Technical Guide to Developing Flood Contingency Maps (separate document), provides a list of the data elements making up the flood contingency map content along with display methodology. This list was developed from practical experience in the field.

Display Specifications

Map data elements are graphically displayed on the map as symbols, labels, text boxes, and within the map background. General display specifications such as type size and fonts, visual hierarchy requirements, placement decisions, and standardized color schemes are set in the GIS Technical Guide to Developing Flood Contingency Maps (separate document).

Map Symbols

The use of symbols is a key advantage of using the map format to display information. Symbols with a short accompanying label convey information very economically. With a little familiarity, responders can assimilate information conveyed by symbols more rapidly than from reading text descriptions. This makes the maps easier to use under difficult light or other conditions or time stresses.



There is no national, comprehensive, standard symbol set for the specific needs of flood response. The GIS Technical Guide to Developing Flood Contingency Maps (separate document) shows the symbol set developed for this flood safety plan template. Some symbols were part of the National Incident Management System (NIMS) and others, with no counterpart in NIMS, were developed by the California Department of Water Resources. Still others were developed for a specific map content not addressed elsewhere.

Two general observations about the symbols recommended in this template. First, all symbols have the simplest possible design while still being easily recognizable. This facilitates hand drawing of symbols on maps during emergency operations and helps ensure consistency of look if the symbols are created with different mapping software. Second, the symbols and any accompanying label are prominently displayed on the map since information conveyed by the symbols will rank high in the intellectual and visual hierarchy of the map. Making symbols too small, or printing maps at a too small a scale, weakens the maps effectiveness (see discussion on visual hierarchy).

Labels and Text Boxes


Levee Patrol Procedures and Considerations

Some information does not lend itself to display through a symbol. Text heavy information such as summaries of historical floods, descriptions of flood containment options, or levee patrol plans, should be placed inside "text boxes".

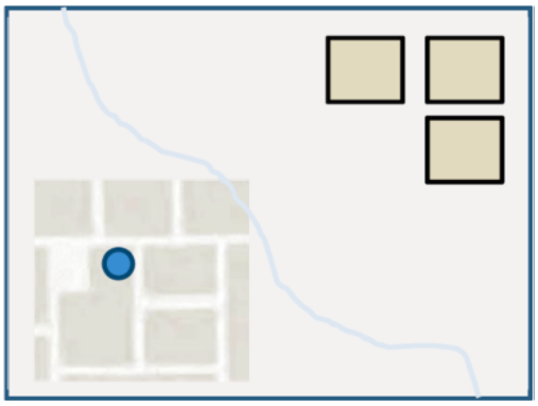
These text boxes are placed in peripheral portions of the map where they do not obstruct the area of focus of the map. When the boundary of a flood contingency map is set at the beginning of the mapping program, the need for this peripheral area should be considered. Text placed outside of text boxes should be limited and rigorously edited to prevent map clutter.

Since text boxes are closed figures they help ensure that the information within them stands out clearly from the background. Their borders are color-coded to facilitate the rapid identification of needed information. Color-coding is by category of information, e.g. historical, patrol plan. The GIS Technical Guide to Developing Flood Contingency Maps (separate document) shows text box types and color code specifications.

INTELLECTUAL AND VISUAL HIERARCHY

An important concept in cartography is figure-ground. This element of map design involves giving a map visual depth so that its intended message is clearly communicated to users. Techniques for developing good figure-ground include differentiation, use of enclosed forms or figures, centrality, and smoothing of outlines or contours. These techniques are used to convert a pre-planned map "intellectual hierarchy" to a corresponding map "visual hierarchy".

The "intellectual hierarchy" of a map is the relative importance of map contents for communicating the map's purpose as determined by the potential map users. An intellectual hierarchy, or scale of concepts, should be consciously defined when map content is first identified. Intellectual hierarchy, by ordering the importance of map data elements, drives how each will be visually presented on the map.



Good Visual Hierarchy makes the most important map elements *stand out* to better communicate the information that responders need to see and focus on

Proper intellectual hierarchy also includes a clear and logical separation of information needed by distinctly different emergency functions into separate map products. This last is an important consideration because combining different information used by different responders with distinctly different missions on one map risks making the map difficult to read by all of them.

The "visual hierarchy" of the map contents in this template reflect the intellectual hierarchy established by users in a model program. This includes specifications for drawing initial attention to relatively more important information, assisting with locating needed information, and the rapid distinction between different kinds of information. Visual hierarchy techniques used in this template include sizing, placement, closed forms, and other visual qualities that give the map content a planned visual "order" and clarity.

Intellectual and visual hierarchy may well be the most important element of the map design reflected in this template since good information poorly displayed undermines the key advantage of the map format. This visual "depth" is the key to rapid comprehension of the map in difficult operational circumstances.

DYNAMIC MAPS

Advances in modern geographical information systems (GIS) and computer aided drawing programs (CADD) offer improved ability to quickly create modified products from existing maps for real-time response needs. These enhanced mapping capabilities have obvious advantages for timely, effective, flood response by making map products more dynamic to meet the needs of actual response.

For example, almost certainly when the actual emergency arrives some of the organizational information shown on the reference map will need to be modified to conform to the specific situation and constraints the incident command is facing. Use of GIS maps allows such organizational information (e.g. location of the command post) to be rapidly changed and new map products produced at the time of the actual emergency. In addition, real-time information such as flood extent, road-closures, and status of critical infrastructure can be quickly added to maps that were created prior to the emergency. Information on the original maps that is no longer required can also be easily dropped off.

The desire to incorporate such real-time changes into the maps will be an inevitable result of having the maps in the first place. But to add this dynamic capability, the original mapping program must be more carefully thought out, designed, and managed. See the Guide to Flood Contingency Mapping, 2nd Edition, 2012 for a fuller discussion on developing a dynamic mapping capability.

MAP CONTENT AND GRAPHICS TABLES

Tables 1, 2, and 3 on the following pages show the standard content and graphic specifications for flood contingency maps developed as an element of a flood safety plan. These tables are extracted from the guidance documents referenced above.

Table 1: Flood Contingency Map Data Elements

Data Element	Display Type
Topographic	
Topographic Information and Elevation Contours	Graphic
100-year Flood Elevations	Numeric Symbol
Levees with Levee Miles/Stationing/River Miles	Numeric Symbol
Spot Elevations of Levee Crowns	Numeric Symbol
Spot Ground Elevations	Numeric Symbol
Dry Land/Secondary Levees with elevation profiles	Symbol with Numeric Ranges
Elevated Freeways, RR Embankments, etc. with elevation profile	Symbol w/ Numeric Ranges
Levee Anomalies - Old pipes/known sand lens etc.	Labeled Symbol
Critical Infrastructure – e.g. regional power lines, treatment plants	Symbol/Graphic
Occupied/Unoccupied Structures (Rural areas only)	Symbol
Large Hazardous Materials Storage Containers (Rural areas only)	Symbol with Label
Commonly used nicknames for key topographic or other features	Label to background feature
Source/Datum/Methodology for Topographic Information	Text Box
Historical	
Flood History Synopsis (Historic Flows/Dates/Description)	Text Box
Location of Prior Breaks/Seepage/Erosion/Settlement	Labeled Symbol
Extent of Flooding (Historic or 100 year Projections)	Graphic
Historic water flow patterns and historic channels	Graphic

Table 1: Flood Contingency Map Data Elements, Continued

Emergency Response	
Levee Maintaining Agencies Patrol Plan	Text Box
Levee Maintaining Agencies Supply Delivery Points	Text Box and Symbol
Flood Fight Supply Logistics Bases	Labeled Symbol
Flood Fight Supply Staging Areas	Labeled Symbol
Flood Fight Command Post	Symbol
Special Considerations (Past problems or critical issues)	Text Box
Flood Contingency Options (Scenario with Response Options)	Text Box
Locations for Possible Levee Relief Cuts	Labeled Symbol
Locations for placement of emergency pumping stations	Labeled Symbol
Locations of potential emergency berms and barriers	Labeled Symbol
Available Preliminary Engineering Designs	Text Box
Description of Vulnerability to Critical Infrastructure/Assets	Text Box

Table 2: Flood Contingency Map Symbols

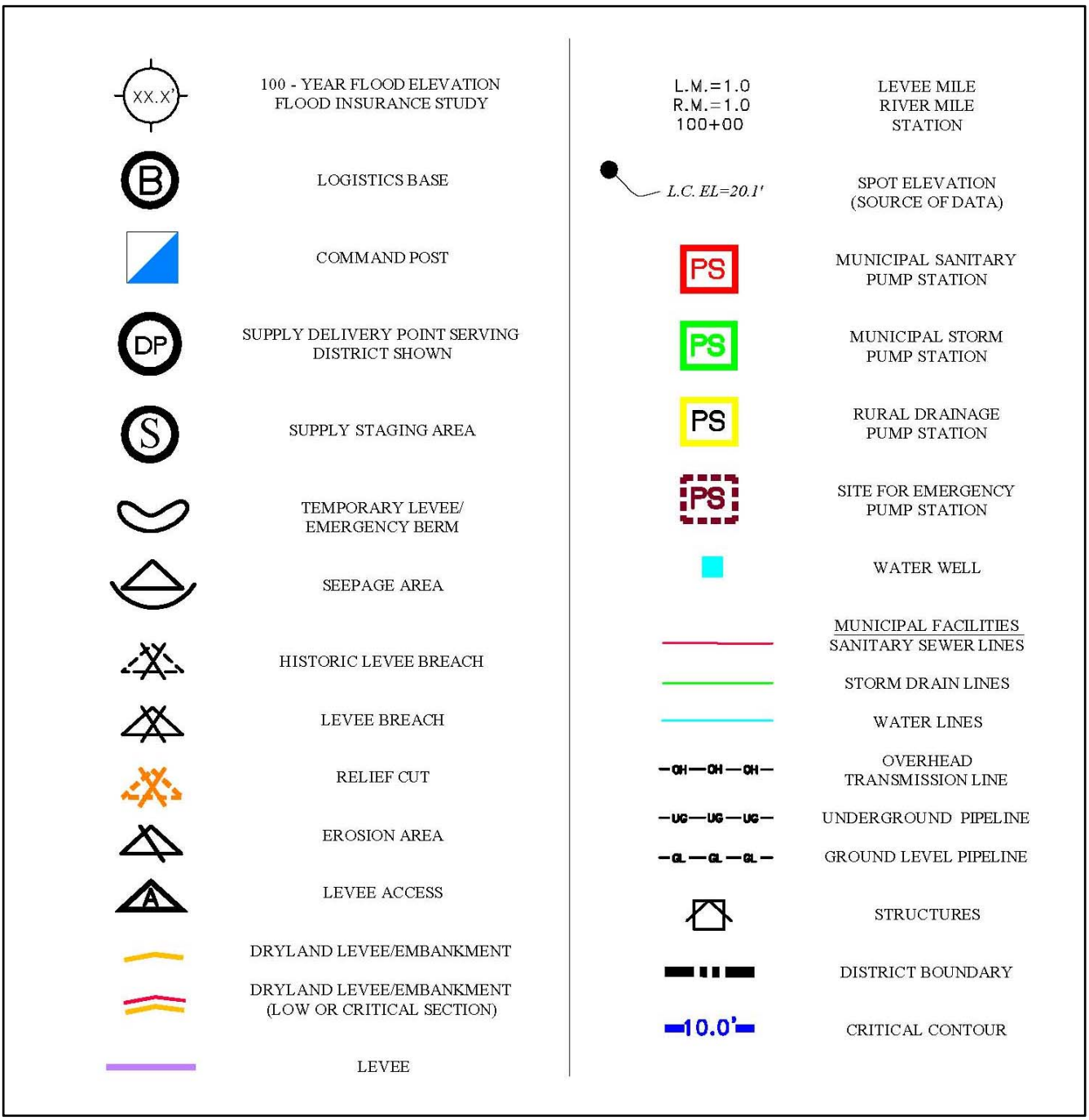


Table 3: Flood Contingency Map Text Box Borders

Text Box Content	Border Color
PREPAREDNESS	
Communications Plans	Black, Single Line
Flood Fight History	Black, Single Line
Special Considerations	Black, Single Line
Reference to Existing Evacuation Plans	Black, Single Line
LEVEE PATROL	
Levee Patrol Procedures	Blue, Single Line
FLOOD FIGHT PLAN	
Flood Contingency Options	Red, Single Line
Supply Delivery Points	Red, Single Line
Preliminary Engineering Designs Reference	Red, Single Line
Flood Water Removal Plan	Red, Single Line
REFERENCE	
Legend	Black, Double Line
Survey Information	Black, Double Line
Elevation Information or Data	Black, Double Line

DEVELOPING THE PUBLIC SAFETY AGENCY EVACUATION/RESCUE MAP

The LMA Emergency Operations Plan – Basic Plan and associated Annex A (flood contingency map) is supplemented with evacuation/rescue maps prepared by local public safety agencies with responsibility in the area protected by the LMA levee. The evacuation/rescue map displays command, tactical, and logistical response cues for responders organizing warning/evacuation/rescue operations together with critical community information such as the locations of vulnerable populations.

The basic process for developing flood contingency maps described above can be applied to the process for developing evacuation/rescue maps. The process for setting up GIS mapping software to produce flood contingency maps described in the GIS Technical Guide to Developing Flood Contingency Maps can also be applied to the evacuation/rescue maps. This Section discusses issues specific to the evacuation/rescue planning process and map product. A more detailed discussion of the evacuation/rescue mapping is available in the FEMA Guide to Evacuation/Rescue Mapping, 3d Edition, 2013 from which the following discussion was excerpted.

CONSIDERATIONS SPECIFIC TO DEVELOPING EVACUATION/RESCUE MAPS

Identifying Evacuation/Rescue Map Coverage

An evacuation/rescue map will be developed for each area covered by a single LMA flood safety plan. This map becomes an integral part of the flood safety plan for that area as well as a component for the county/city emergency operations plan. In some cases the area covered by a flood safety plan is so geographically extensive or heavily populated that multiple maps are needed in order to maintain a useable map scale. Planners can deal with these situations by either subdividing the area into multiple evacuation zones, each with a corresponding map, or by developing a small-scale overall evacuation/rescue map with complementing larger-scale “sector” maps for operational use.

Standard Evacuation/Rescue Response Structure and Organization

A major evacuation/rescue operation can be organized in any number of ways while complying with the standards and procedures of the National Incident Management System (NIMS). It is a major benefit, therefore, if a standard incident command organizational structure can be agreed upon by all public safety agencies operating in the area covered by the mapping program. This will simplify the map development process as well as subsequent training activities and operations. A common organizational structure will also make mutual aid operations more effective.

If a standard evacuation organization is established, a chart showing this organization can be placed on each needed evacuation/rescue map as a cue for initial responders. Once emergency operations begin, the organizational structure can be modified if necessary by responders based on the actual situation.

Developing individual evacuation/rescue maps

The development of individual maps will follow a similar process. An initial draft map is created prior to the involvement of the public safety agencies that will provide the input for its completion. The availability of a draft map at initial meetings will facilitate discussion and improve results. With an initial draft map in hand, project staff schedule joint meetings with the different agencies and/or individuals responsible for evacuation operations within that evacuation zone. Technical staff adds information to the map as it is developed through this collaborative planning process until a complete draft is ready for review and approval. There are several common types of decisions that will be made during this process.

Command Post and Resource Staging Sites

Pre-planned locations for establishing field command posts and resource staging areas can be identified. Alternate sites for each of these facilities can be selected but these should be limited to prevent confusion and to avoid map clutter. Physical visits to the evacuation zone may be necessary to confirm these locations. If sites for staging areas for specific response functions cannot be determined in advance, then a text box for recording these locations at the time of the emergency can be added to the map.

Tactical Facilities

Tactical facilities to support response activities are also be pre-identified. These would include emergency helispots, watercraft launch sites (into potentially flooded areas), and other specialized response facilities. Again, alternate sites can be selected and surveyed if desired to provide pre-planned options to responders. Other key locations, such as access points to levee crowns, can also be added to the map. All these facilities and their locations are also listed in a text box on the map for rapid reference.

Command and Tactical Communications Frequencies

Command and tactical communications frequencies are worked out and added to the map. If security of this information is of concern, then the map can merely reference where the communications plan is located. Communications is usually a major issue in a large response so this planning should be thorough and detailed.

Evacuation Routes, Traffic Control, and Security Checkpoints

Primary evacuation routes and sites for traffic control, ingress/egress, and other control points are determined and placed on the map. Different symbols can be used to discriminate between sites where unstaffed barricades or staffed vehicles will be used. Enlarged insets of key or complex intersections can be placed on the map to assist with displaying or recording the traffic control plan for these locations.

Where multiple different evacuation scenarios are possible within an evacuation zone, planners may not identify specific evacuation directions. In this case, traffic control points may be left off of the map and recorded on the map at the time of the emergency. Or, the traffic control point symbols can be color-coded to indicate which points would be staffed for each movement direction. In this case, a text box can be added to the map to record evacuation direction once it is determined at the time of the emergency. Mapping technicians can then remove the unneeded symbols by turning off that "layer" of the digital map file.

Rally Points

Any evacuation plan needs to make provisions for people who cannot leave the evacuation zone on their own. Some people will not be able to leave their house due to a medical or physical handicap while others may be physically mobile but not able to expeditiously leave the area due to lack of a vehicle or other problem. In the case of those evacuees who are physically mobile, public safety agencies will need to establish locations where they can obtain transportation assistance. There is no standard term for such locations so "Rally Point" is used in this Guide to designate such gathering places. Rally points should be locations with adequate space for loading operations and which are familiar to residents of the area.

Additional procedures will need to be developed to assist individuals who are house bound due to handicaps or medical conditions and cannot even reach a rally point. The field incident command organization should include a function and procedures for providing this assistance.

Summaries of Other Concurrent Operations in the Evacuation Zone

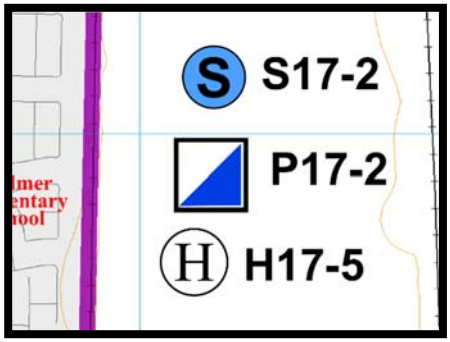
Evacuation operations are rarely conducted in total isolation from other emergency operations taking place at the same time. For example, in a flood there may be engineering efforts to prevent levee failure or reduce the impact of flood flows proceeding simultaneously with evacuation operations. Key elements of the pre-plans for such concurrent emergency operations which might affect evacuation and rescue operations are placed on the maps to help with coordination.

Other Map Elements

Review of the map should continue until all desired map data elements are addressed and the results of discussions and planning posted on the final draft map. Any general information, such as locations of facilities with vulnerable populations, that has not already been added should be collected at this time and placed on the map.

MAP CONTENT

The discussion on the rationale for use of symbols and text boxes and other formats on the flood contingency map also applies to evacuation/rescue maps. The following are some considerations specific to evacuation/rescue planning. Table 4 in this Section provides suggested content for evacuation/rescue maps. This can be modified for specific regions and needs as necessary.



Symbols

Table 5 shows standard symbols used for evacuation/rescue maps. ICS and NIMS symbols are used where they exist but for many of the symbols there is no national standard. Any symbols used in an evacuation/rescue mapping program should, however, comply with two key principals. Symbols must be easily distinguished from each other while being simple enough in design to be drawn by freehand.

Text Boxes

Table 6 shows the color scheme for text borders. As noted elsewhere, some facilities or structures, such as command posts, rally points, or schools, may be shown as a point symbol at their specific location and also within a text box as part of a list of similar facilities. Text boxes can include check boxes, lines, and/or space for recording actions and information next to each facility name.

Tactical Facilities Designations

Public safety agencies will inevitably identify multiple tactical facilities with the same function within individual maps and throughout the set of maps. These tactical facilities, such as command posts or emergency helispots, should be assigned unique designators to prevent confusion and assist with communication. The use of unique designators will shorten tactical communications and allow quicker identification of a tactical facility on a map.

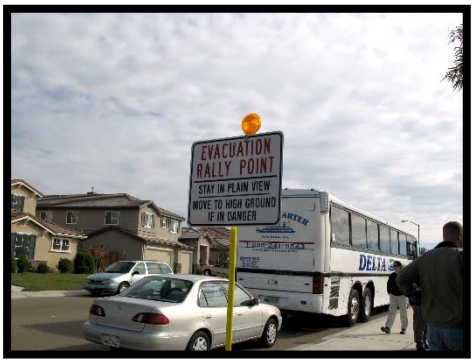
The designator for each tactical facility should be unique for the entire area being mapped and not just for the specific map where it is placed. The model maps use a simple designator system that combines an initial letter indicating the type of facility with two letters from the name of the zone map in which it is found and a unique number. Other designation systems can be created as appropriate to local circumstances. The chosen designation scheme becomes part of the map specifications.

Field Operations Guides, Checklists, and Specific Procedures

The development of a standard evacuation organizational scheme can be the stimulus for additional planning to develop specific procedures and forms for each specialized function. Such specialized field guides can be then used in conjunction with generic incident command system guides. These specialized guides can be posted with the evacuation maps for easy access.

Tactical Facility Surveys

Tactical facilities identified in the mapping process can be surveyed and planned in more detail. Some facilities may only need a brief survey while other facilities may benefit from more detailed planning. An example would be emergency helispot sites. Pilots, or other staff knowledgeable with helicopter operations, can survey sites tentatively identified by public safety agencies and confirm the suitability of each location and classify it by the size of aircraft it can safely support. The result of these surveys would confirm the suitability of sites and also provide a pilot advisory which can be posted on the map repository for use by responding aircrew.



Acquisition of Equipment and Supplies

The effectiveness of any major response will depend on the availability of specialized equipment needed to effectively implement pre-plans shown on the map. Custom signage for traffic control points and rally points can improve the quality and effectiveness of those operations. The process of developing the evacuation maps will serve to focus attention on the equipment needed to effectively implement the response plan displayed. The existence of this equipment, and how to access it, can be posted on the map to ensure that there is no delay in mobilizing it.

EVACUATION/RESCUE MAPS FOR THE GENERAL PUBLIC

Some elements of the evacuation plan displayed on the public safety evacuation maps, such as evacuation routes and rally points, need to be communicated to the general public in a timely manner to be effective. The map format can be used to assist with this education process. As with responders, the development of maps designed for use by residents will allow the general public to more quickly access evacuation information in relation to their location or home. A model general public map developed from one of the model public safety evacuation maps is included with this Guide as an example of the following discussion.

Development of the General Public Map

A general public map can be developed for each evacuation zone by extracting the information that the public needs to know from the respective public safety agency map. This will usually include at least

evacuation routes, rally points and the means for obtaining evacuation information. Information that the general public does not need to know, such as the location of command posts, is not transferred.

General public maps should use different symbols that are more intuitively understood by the layman. Short and concise definitions of symbols can be included on the map to help with understanding. Additional safety information or instructions for the public can be added to the map if desired but these maps should be kept as simple as possible providing only critical information residents need to evacuate the area.

Making Maps Available to the General Public - Websites and Hard Copies

As with the public safety agencies, a separate dedicated website can be established for the use by the general public to view their maps. Hard copies of the maps can be made available in libraries and other public locations and within the evacuation zones themselves by preparing framed hard copies for posting at schools, malls, or parks. This latter action would be particularly important where there would only be very short notice to residents of a potential evacuation.

Table 4: Evacuation/Rescue Map Data Elements

Data Element	Method of Display
Topographic	
Waterways and key physical features	Graphic or GIS data
Flood Depths and potential extent, if appropriate	Graphic or GIS data
Streets, Highways, Road Systems	Graphic or GIS data
Critical Community and Infrastructure Information	
Care Facilities, Hospitals, Group Homes, Schools	Point Symbol and Text Box
Controllable Signal Lights, Cameras	Point Symbol and Text Box
Enlarged Map Inserts of Key Intersections	Map Insert
Emergency Response	
ICS Organizational Chart for Evacuation Operations	Graphic in Text Box
Pre-Planned Tactical Facilities	Point Symbol and Text Box
Command Post/Initial Resource Staging Locations	Point Symbol and Text Box
Communications - Command and Tactical	Text Box
Rally Points	Point Symbol and Text Box
Traffic Control Points - Staffed and Unstaffed Barricade	Point Symbols

Table 4: Evacuation/Rescue Map Data Elements, Continued

Data Element	Method of Display
Specialized Evacuation Equipment - Summary of Type/Location	Text Box
Warning and Information Systems	Text Box
Special Considerations or Information	Text Box
Summaries of Expected Concurrent Operations in Evacuation Zone	Text Box
Display of Real-Time Decisions	
Direction of Evacuation	Text Box
Evacuation Ingress Controls	Text Box
Mass Care Shelters, Reception Centers	Text Box
State/Federal Resources and Assignments	Text Box

Table 5: Evacuation/Rescue Map Symbols

Table 6: Evacuation/Rescue Map Text Box Borders

Text Box Content	Border Color	
Command Post, Tactical Facilities, Organizational Chart	Black	
Infrastructure, Evacuation Equipment	Black	
Communications	Green	
Mass Care, Ingress Controls	Green	
Mutual Aid Resources Tracking	Green	
Rally Points	Brown	
Schools	Red	
Care Homes, Group Homes, etc.	Purple	
Legend, Special Considerations	Black