CHAPTER 4: MITIGATION STRATEGY

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OVERVIEW OF THE"MITIGATION STRATEGY" CHAPTER

"Mitigation Strategy" of Merced's Local Hazard Mitigation Plan focuses on what actions can be taken to minimize future loss of life and property caused by hazards studied in Chapter 3. It contains the following sections:

4.1 LOCAL CAPABILITIES ASSESSMENT

4.2 MITIGATION GOALS

4.3 MITIGATION STRATEGY

4.4 NATIONAL FLOOD INSURANCE PROGRAM (NFIP) COMPLIANT MITIGATION ACTIONS

At their public meetings of July 13, 2012, and December 7, 2012, the *Technical and Plan Preparation Team* provided the City of Merced *Disaster Council* and attending stakeholders and members of the public an overview of the draft "Mitigation Strategy" Chapter of the draft Merced Hazard Mitigation Plan (MHMP). Comments were received and the draft was amended to reflect the concerns of the Disaster Council and public.

4.1 Local Capabilities Assessment

Introduction

This Chapter describes the existing capacity of the City of Merced, together with mutual aid partners and community members, to respond to hazard events. This helps to identify gaps in service that should be filled.

4.1.1 Local Capabilities Assessment

Overview

RC#C1a

Thus far, the planning process has identified the natural hazards posing a threat to the City of Merced and described, in general, the vulnerability of the City to these risks. The next step is to assess what loss prevention mechanisms are already in place. Combining risk assessment with a capability assessment results in the City's "net vulnerability" to disasters, and more accurately focuses the selection of goals and proposed actions of the Merced Hazard Mitigation Plan (MHMP).

This capacity assessment is divided into five sections:

- Emergency Service Providers and Services
- Administrative and Technical Mitigation Capabilities
- Critical Facilities
- Key Legal and Regulatory Capabilities
- Fiscal Mitigation Capabilities

4.1.2 Emergency Service Providers and Services

Overview

This section describes the service capacity of the following key emergency service providers for the City of Merced:

- City of Merced Fire Department
- CALFire
- City of Merced Police Department
- Riggs Ambulance Service

Multi-jurisdictional Cooperation

The California Statewide Interoperability Executive Committee (CalSIEC) has chartered the Central Planning Area (CPA) as one of the four authorized regions in California to coordinate interoperability. All Operational Areas in the CPA have entered into a Regional Governance Charter to enhance cooperation in a multi-jurisdictional and multi-disciplinary manner to advance preparedness and response capabilities related to interoperable communications. [57]

City of Merced Fire Department

The City of Merced Fire Department (MFD) was initially established as the Merced Hose Company #1 on November 3, 1873, and has evolved into a state-of-the-art, Insurance Services Organization (ISO) Class 2, fire department. Today, the MFD is a fully-professional organization that provides fire suppression, rescue, and emergency medical services, 24 hours a day, seven days a week, for the urban environment in the City. On a daily basis, the MFD staff's five first-line engine companies at five stations throughout the City.

The City of Merced Fire Department provides fire protection, rescue, and emergency medical services from five fire stations throughout the urban area. Fire Department personnel are typically assigned on a three-platoon work schedule, which provides the City coverage 24 hours a day, seven days a week. The Department equipment includes first-line engine companies (carry and pump water), ladder companies, reserve engines and ladder trucks, airport emergency vehicles and other miscellaneous support vehicles.[3]

Merced's fire protection system operates according to a central station concept. Under this concept, a central station can respond to calls from within its own service area or district, and can provide back-up response to other districts as well. From 1990 to 2010, response activity doubled.[3]

The Department is rated under the auspices of the Insurance Services Office (ISO) which defines protection services on a scale of 1 to 10--1 representing the best level of protection and 10 indicating no protection at all. The Department's 2009 rating is Class 2, which is considered to be well above average, despite staffing levels below national averages. This rating helps keep the costs of fire insurance premiums low for City businesses.[3]

The Department consists of one fire chief, one deputy chief, three battalion chiefs, eighteen captains, eighteen engineers, twenty firefighters, and administrative support and fire prevention staff. The MFD is an all-risk, emergency management entity with response disciplines in fire suppression, emergency medical services, hazardous materials, technical rescue, and aircraft rescue firefighting.

RESPONSE TIME

The Department has a goal of maintaining a response time of four to six minutes for the first crew to arrive at a fire or medical emergency within an assigned district. This goal was chosen on the basis of proven factors affecting property damage and, more importantly, life.[3]

As the City continues to grow in population and area, the fire protection system will have to change if it is to maintain this response time standard. This would require two existing stations to be relocated and five new facilities with personnel and equipment to be added to the system.[3] Fire station No. 56 is currently being planned to serve the Bellevue Ranch development in northern Merced. Moreover, the relocation of Fire Station No. 54 is planned to enhance response coverage to southeastern Merced by placing the station in the area of Mission and Highway 99.

Merced's current policy is to provide emergency response within 4 to 6 minutes 90 percent of the time and to provide adequate resources to combat fires in the following occupancies within the financial constraints of the City. The current response practice provides for a first-alarm assignment of three pumpers, one ladder truck, and a chief officer for all structure fires.

High-Hazard Occupancies **-** (schools, hospitals, nursing homes, and other high life hazard or large fire potential occupancies)

Medium-Hazard Occupancies **-** (apartments, offices, mercantile and industrial occupancies)

Low-Hazard Occupancies **-** (one-, two-, or three-family dwellings and scattered small businesses)

Rural Operations **-** (scattered dwellings, outbuildings, vacant lots)
Each of these land use types requires somewhat different fire suppression resources (e.g., emergency medical services, hazardous materials response, and heavy rescue). [3]

MUTUAL AID

Mutual aid agreements enable different jurisdictions to request aid from another when necessary. Through the California Master Mutual Aid and Merced County Mutual Aid Plans, the City of Merced has entered into agreements with state and local fire departments to provide and receive aid on as needed basis. The City of Merced Fire Department has a mutual aid agreement with the City of Atwater and Merced County Fire Departments.

WILDLAND FIRES

Most wildland fires outside the City limits are responded to by Merced County or CAL-Fire although the City Fire Department is often called upon to provide mutual aid when needed. The City's response to fighting wildland fires is much the same as the response to urban fires. Typically, the Fire Department will dispatch one engine to such fires and evaluate whether there is a need for additional apparatus, especially if there is a threat to nearby structures.

HAZARDOUS MATERIALS AND WASTE

The City's Emergency Plan and the County Hazardous Waste Management Plan both deal with detailed emergency response procedures under various conditions for hazardous materials spills. The Merced City Fire Department and Environmental Health Division work with the County to prevent the uncontrolled release of toxic substances into the environment by conducting inspections of toxic materials facilities, enforcing storage and use requirements, and educating local businesses on proper storage and handling of hazardous materials.

Hazardous Materials require special care in handling because of the hazards they pose to the public's health and safety, and the environment. For this special care the City of Merced has an Emergency Response Team. This team is staffed by City fire and police department personnel. The Merced City Fire Department responds to uncontrolled releases within the City limits, identifies the category of chemicals involved, contains the spill if possible, oversees cleanup activities, and makes sure that the site is safe to be occupied again.

The City also works with the State Department of Health Services to establish cleanup plans and to monitor the cleanup of known hazardous waste sites within the City.

CALFire

CALFire is charged with both assessing the threat of fire in California and suppressing fires on state and federal lands while providing mutual aid if needed to communities that do not include public lands. The California Fire Plan formalizes much of the work that has been done to assess the threat of wildfire statewide including California's Wildfire Urban Interface areas. Most wildland fires outside the City limits are responded to by Merced County or the California Department of

Forestry and Fire Protection (CDF) although the City Fire Department is often called upon to provide mutual aid when needed.

City of Merced Police Department

Central Police Station

Police protection for the entire City is provided by the City of Merced Police Department. The Police Department employs a mixture of sworn officers, non-sworn officer positions, and unpaid volunteers. The service standard used for planning future police facilities is approximately 1.32 sworn officers per 1,000 population.[3]

Merced is divided into three police districts, each with its own police facility and officers. The primary reason for the three districts is to place police officers closer to the neighborhoods and citizens they serve. The Police Department feels that this "community policing" concept will be successful in combating a growing incidence of crime as the City grows.

Citizen councils have been established in each district to meet with area commanders and develop strategies for combating crime in their neighborhoods. Neighborhood Watch programs are located throughout the City and have been highly successful.[3]

Calls for police service will increase due to population growth alone. By 2030, officer responses to incidents could increase from nearly 65,000 in 2009 to over 130,000 annually if current population trends hold true. To cope with this anticipated workload, additional officers, equipment, and facilities will need to be added. Police districts may be revised or added. The Central Station will be relocated in the future to a site in North Merced near Mansionette Drive and Yosemite Avenue. [3]

South Police Station

EVACUATION ROUTES

Earthquakes, fires, and flooding can all necessitate evacuation. However, it is not possible to know with certainty how many people will actually need to be evacuated in any given situation. Similarly, the rate at which people will evacuate and their specific routes of travel and ultimate destinations are subject to wide variation. Therefore, in

the case of an emergency, it is necessary to evaluate each situation on an individual basis and respond accordingly. [3]

The *Merced City Emergency Plan* addresses various emergency situations and **designates the Police Chief as Evacuation Coordinator** (in the case of a wider emergency, the County Sheriff is designated). At the time of an emergency, the Evacuation Coordinator will evaluate the situation, access various routes (many of which will have been planned out in advance), determine the best routes, alert the public via radio and/or TV of evacuation routes and procedures, and coordinate the evacuation with state and local officials, such as the Highway Patrol, Caltrans, etc.

Riggs Ambulance Service

Ambulance services within the City of Merced are provided by Riggs Ambulance, a private transporter, headquartered in Merced. Riggs Ambulance Services provide advanced and basic life support services as well as transport service. Their headquarters are located at 100 Riggs Avenue. The headquarters facility includes their administration offices, billing office, fleet services, training rooms, and a Public Safety Answering Point (PSAP). They have five crew quarters throughout the county, locations include: 65 W. 14th Street in Merced, 1311 Winton Way in Atwater, 2702 Sharon Lane in Dos Palos, 225 Chestnut Avenue in Los Banos, and 8335 Sycamore in Delhi.

Riggs Ambulance Service staffs ambulances 24 hours a day, seven days a week, which are strategically spaced throughout Merced County. They have a total of 25 type II ambulances and 6 Advanced Life Support (ALS) first response vehicles. Riggs Ambulance Service employees 50 Emergency Medical Technicians (EMT), 43 paramedics, and 13 dispatchers.

RESPONSE TIMES

Riggs Ambulance Service uses fractile response times: from the time of phone pick up in the dispatch center to on scene arrival, the response time must be >90% for each compliance zone based on ProQA prioritization.

TRAINING

Extensive ongoing training for staff members includes: Incident Command System (ICS), Mass Casualty Incidents (MCI), and Hazardous Material Awareness. Riggs Ambulance is also a lead agency in Region 5 for an ambulance strike team for disaster responses and has a disaster response unit on site. All of the operations management and supervisory staff are trained to the ICS 400 level.

4.1.3 Administrative and Technical Mitigation Capabilities

Overview

The administrative and technical capability assessment identifies the personnel and community resources available within the City to engage in mitigation planning and carry out mitigation projects. Where feasible, the City may increase its technical resources through collaboration with Merced County staff. The administrative and technical capabilities of the City are listed in Table 4-1.

Table: 4-1: Administrative and Technical Resources for Hazard Mitigation

Personnel Resources	Role/Department
Director of Emergency Services	City Manager
Provide for preparation of plans for the protection of persons and property within the City in the event of an emergency	City Disaster Council
Planner(s) or engineer(s) with knowledge of land development	Planning and Engineering Divisions
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	Engineering Division
Planner(s), engineer(s) or emergency response personnel with an understanding of natural or human-made hazards	Planning, Engineering, and Fire Departments
Floodplain Manager	Engineering Division
Personnel skilled in GIS	GIS Coordinator
Purchasing	Finance
Public Information Officer	Mayor's Office
Full-Time Building Official	Development Services
Law enforcement trained in emergency situations.	Police Department
Personnel skilled in water, sewer, storm drainage, traffic signals and lighting issues during hazardous events.	Public Works Department

4.1.4 Critical Facilities

Overview

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Critical facilities and infrastructure are those that are essential to the health and welfare of the population. Continued operation of these facilities becomes especially important after any hazard event. For the purposes of the Merced Hazard Mitigation Plan, a critical facility is defined as:

> *A facility that is vital for the City's ability to provide essential services and protect life and property and/or the loss of which would have a severe economic or catastrophic impact.*

Critical Facility Categories

A catalog of critical facilities within Merced was created to assess their potential vulnerabilities to each of the hazards addressed by this plan. The risk assessment for each hazard anecdotally discusses critical facilities with regard to specific hazards. This section of the plan identifies these facilities by type and geography. A detailed listing of the facilities with their addresses is not provided in this plan. Figures 4-1 to 4-5 illustrate their general location. The facilities are sorted into five categories:

CITY HALL AND DEPARTMENTS

- City Civic Center
- County Administrative Offices

PARKS AND COMMUNITY SERVICES

- Educational Facilities
- City Parks
- Non-profit Community Services

PUBLIC SAFETY

- Health Centers
- Fire Stations
- Police Stations

PUBLIC WORKS

- Water Supply
- Corporation Yard
- Wastewater Treatment Facilities
- Power Grid
- Storm Drainage Systems

TRANSPORTATION

- State Highways
- Major Arterial Streets
- Rail Bridges (rail and creek)
- Railroads
- Airports

This "Critical Facilities" information and associated maps on the following pages are an important component of the MHMP *Asset Inventory*, Section 3.4.1.

Critical Facilities within the MHMP Plan Area	
Facility Type	**Number**
Sewer Lift Stations	20
Storm Drainage Pumps	65
High Voltage Electric Transmission Lines	24.5 miles
Electric Power Substations	2
Bridges	64
Transportation Hubs (airport, train and bus stations)	4
Merced County Administration Buildings	1
Merced Civic Center	1
Schools	58
Parks	61
Hospital	1
Emergency Operation Center	1
Urgent Care	4
Police Stations	2
Fire Stations	5
Wastewater Treatment Plant	1
Water Wells	23
Total Number of Critical Facilities	**313**

Figure 4-1: Administrative Facilities

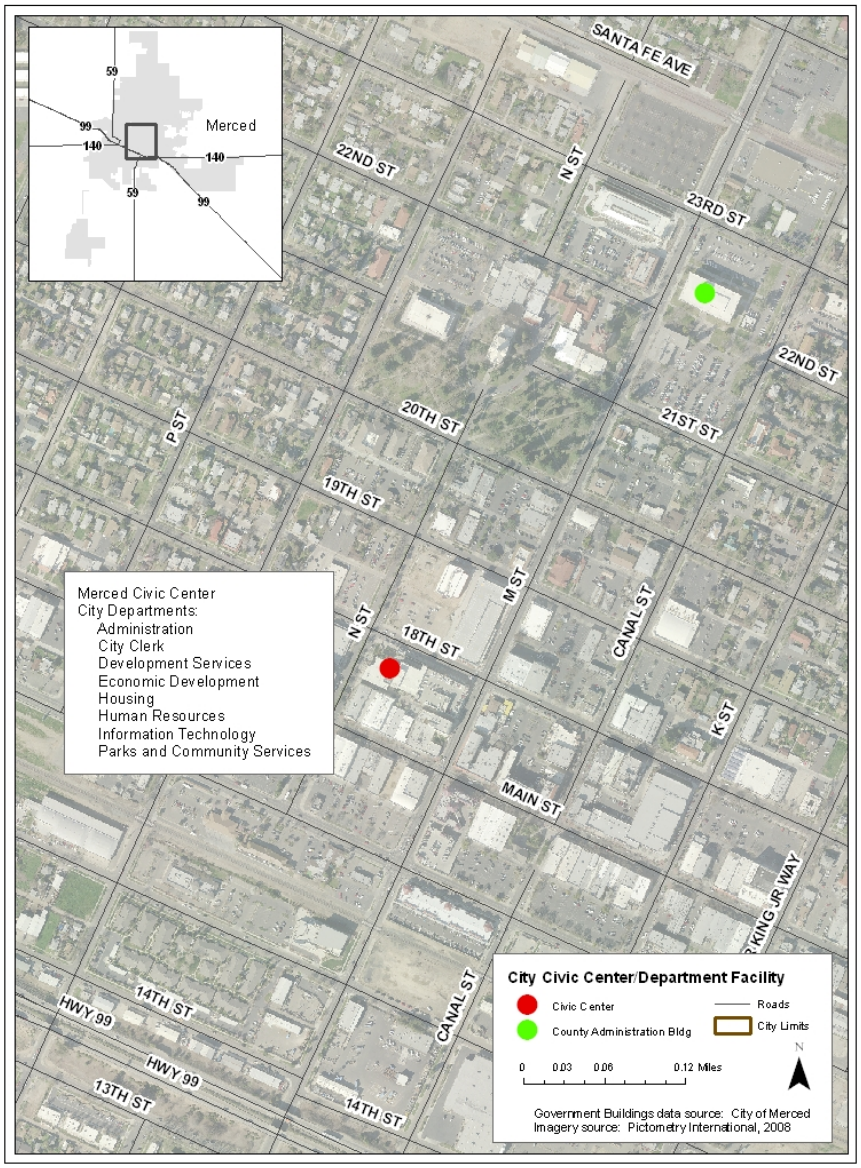


Figure 4-2: Parks and Schools

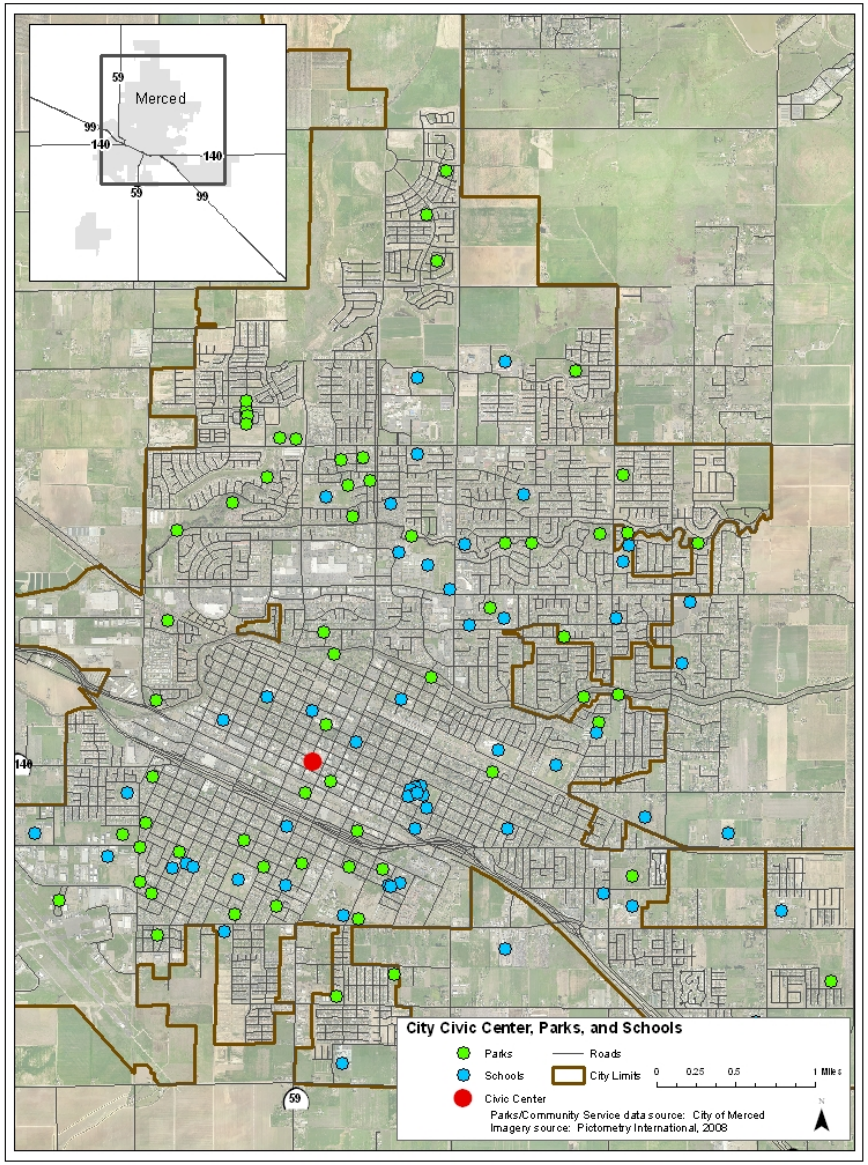


Figure 4-3: Public Safety Facilities

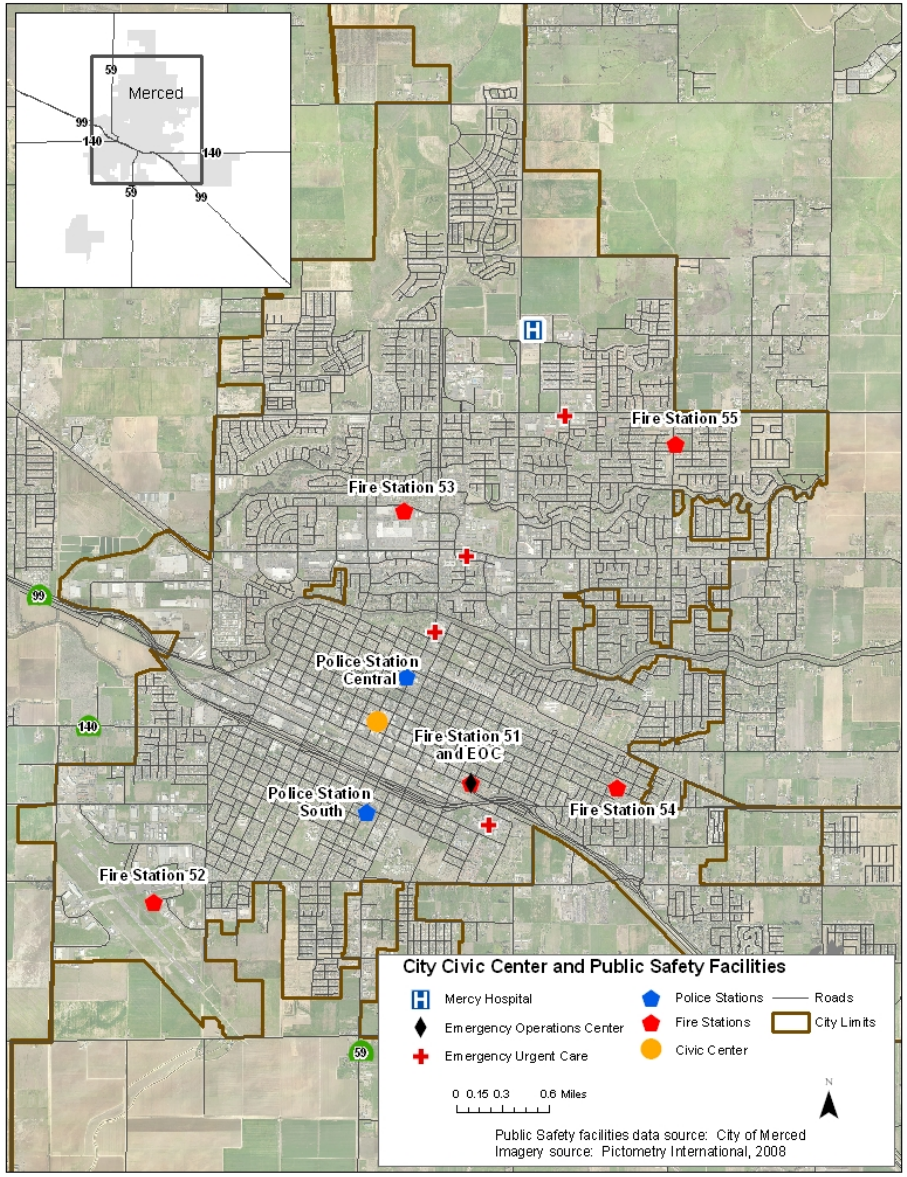


Figure 4-4: Public Works Facilities

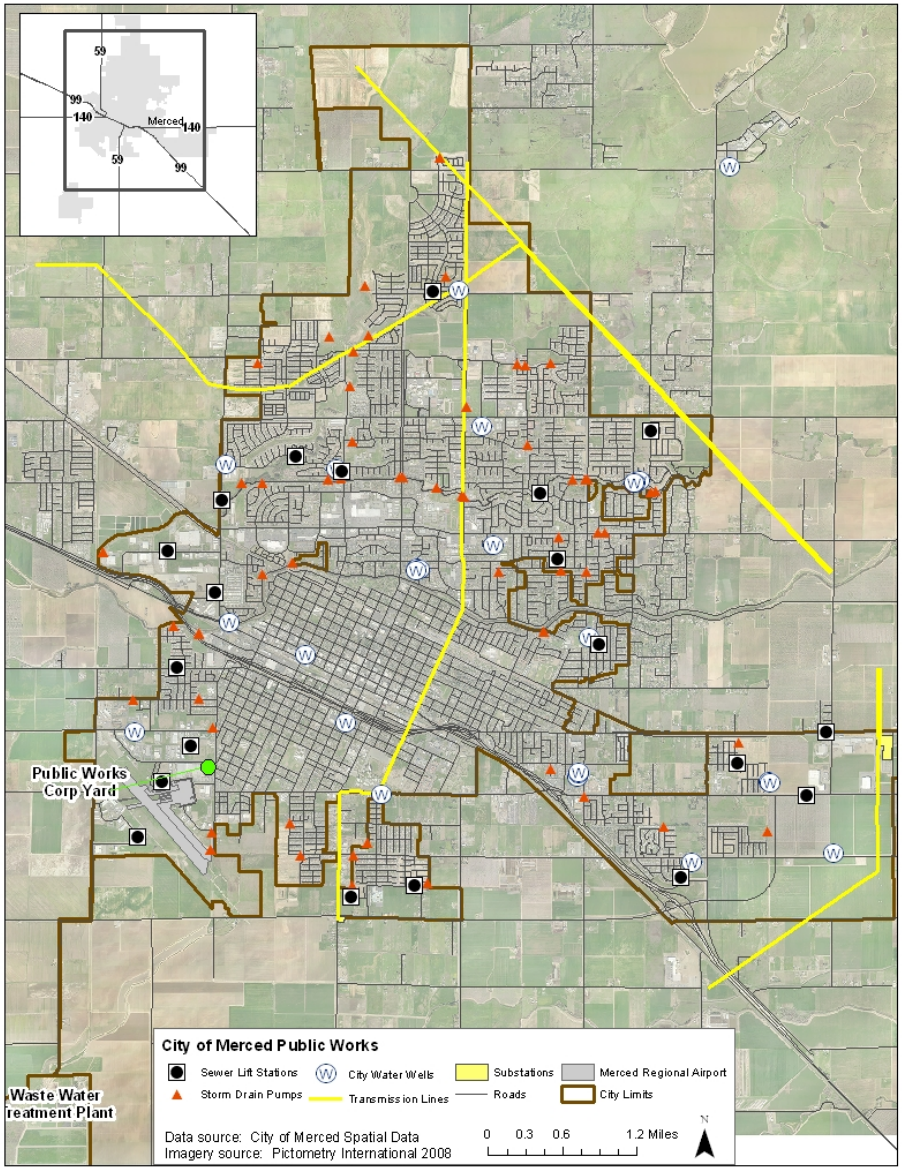
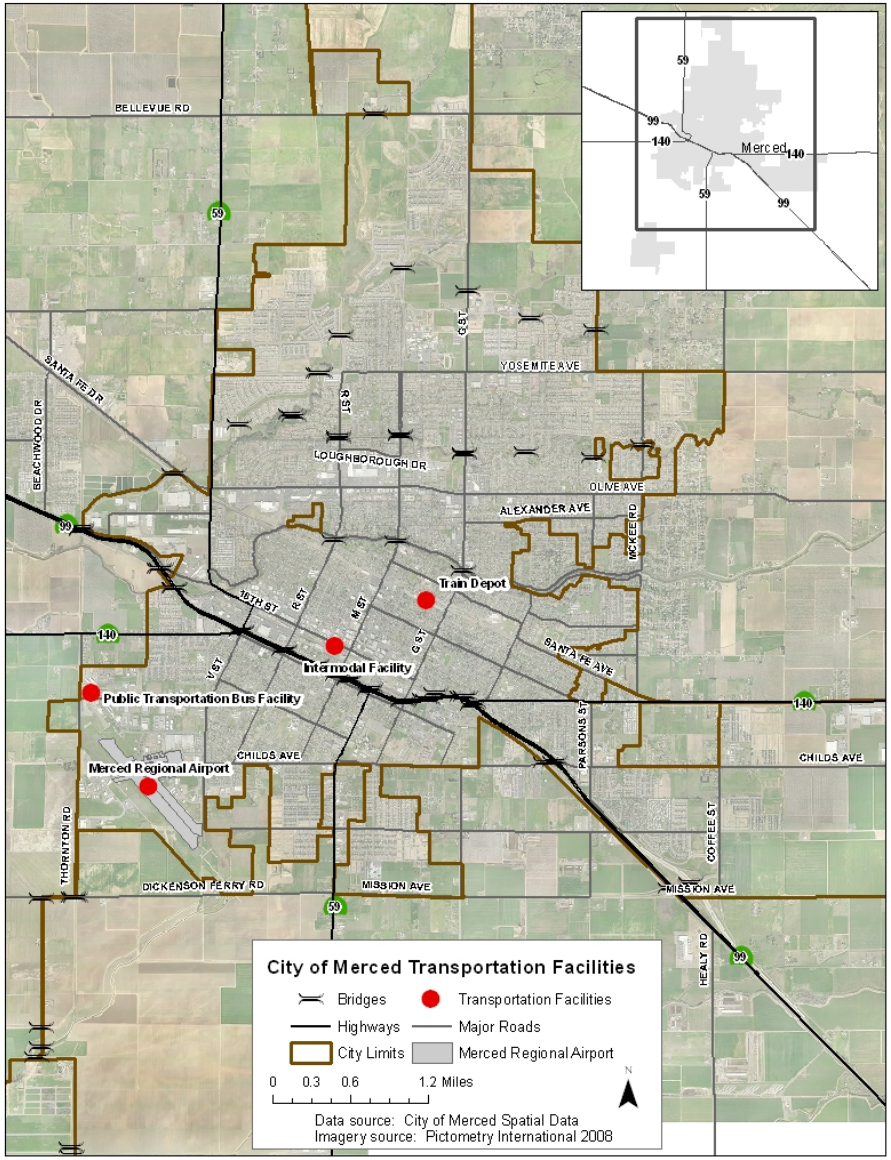


Figure 4-5: Transportation Facilities



4.1.5 Key Legal and Regulatory Capabilities

Overview

The City currently supports hazard mitigation through its regulations, plans and programs. The Merced Municipal Code contains hazard mitigation-related ordinances.

Table 4-2 lists planning and land management tools typically used by local jurisdictions to implement hazard mitigation activities, and indicate those that are in place in the City of Merced. Detailed descriptions of the plans, policies, regulations, and programs follow to provide more information on existing mitigation capabilities.

Table: 4-2: Legal and Regulatory Resources Available for Hazard Mitigation

Legal and Regulatory Resources	Used by City of Merced
PLANS	
General Plan – Safety Element	✕
Capital Improvement Plan	✕
Local Emergency Operations Plan	✕
Stormwater Management Plan	✕
PROGRAMS	
Fire Department ISO Rating	✕
Elevation Certificates	✕
National Flood Insurance Program (NFIP)	✕
Weed Abatement (fire control)	✕
POLICIES AND CODES	
Zoning and Subdivision Ordinance	✕
Site Plan Review Ordinance	✕
Growth Management Ordinance.	
Floodplain Ordinance	✕
Building Code	✕
Water Conservation Ordinance	X

Description of Existing Mitigation Strategies

FLOODING

- City is using FEMA's model flood ordinance.
- City automatically incorporates FEMA flood map updates.
- City has adopted on-site storm water retention policies into the City design standards. These help safeguard local canals and creeks against peak flow increases due to development.

RC#C2a

- In the last 6 years, numerous elevation certificates were completed. These help reduce or eliminate flood insurance requirements for structures in a special flood hazard area (SFHA). This also demonstrates enforcement of FEMA flood requirements through Merced Municipal Code.
- Current Wastewater Treatment Plant is installing tertiary treatment and solids handling. It is also raising adjacent berms to comply with updated State flood proofing requirements.
- Three Developer-initiated FEMA LOMR processes have been approved for Bellevue East, Compass Pointe, and Bellevue West. These updated FEMA maps removed large sections of from the floodplain.

FIRE

The City has adopted ordinances to require fire sprinkler systems in all commercial occupancies greater than 5,000 square feet, and uses a codified fire prevention inspection program to minimize the risk of fire to the community.

Planning

In order to mitigate the risk and impact of fire within Merced, the City has adopted the concepts of Community Fire Protection Master Planning (C.F.P.M.P.). As a system with many components, C.F.P.M.P. received a commitment from the City Council since 1982 to provide fire protection planning with a goal of a "fire-safe community." As a system, C.F.P.M.P. states that fire protection planning requires involvement of all City agencies, individuals, and organizations that have input and support community health, safety, development, and stability.[3]

Public Education Programs

Merced's current number one cause of residential fires is cooking. Kitchen safety revolves mainly around an individual's safety practices. For this reason, the Fire Department has developed and is conducting several public education programs. These programs stress emphasis on children and senior citizens who have been identified by the National Fire Protection Agency as high-risk groups for fire death and injuries.[3]

Inspection Programs

The California Building Codes and the California Fire Codes work together to regulate building construction and related items such as the care of vacant lots and the storage of flammable liquids. Naturally, the use of built-in protection such as fire resistant materials and automatic sprinklers in all structures beyond that required by the Building and Fire Codes significantly reduces the risk of urban fires and may reduce the City's reliance upon fire suppression crews. Each year the Fire Department engine companies conduct in excess of 4,000 inspections and eliminate approximately 8,000 Fire Code violations

which could contribute to the cause and severity of a fire. The inspection program primarily targets the high and medium hazard occupancies. To provide effective fire prevention activities for low hazard land uses, the Fire Department conducts year-round hazard removal programs (primarily weed abatement). [3]

Weed Control Program

Since the 1960's there have not been any structure or life losses as a result of wildland fires (K. Mitten, personal communication, January 20, 2009; MFD, n.d.). Additionally, the Department is very proactive with fire prevention activities. As an example, the annual weed abatement program, which began in the late 1980's, has nearly eradicated the incidence of wildland fires within City limits. In order to prevent wildland fires before they start, the City's weed abatement program requires that vegetation on vacant lots be plowed under or mowed down if it is not irrigated agricultural land. Every spring, each property within the City is served with notice to remove weeds, etc. Similarly, the Police, Fire, and Inspection Services Departments collaborate to make sure that abandoned vehicles or buildings (potential fire hazards) are removed. [3]

EXTREME HEAT

The Center for Disease Control (CDC) (2006) stressed that illness from heat exposure is preventable; public awareness about heat illness and the associated risk factors could greatly reduce the number of deaths.

The National Weather Service (NWS) will initiate its Heat Index Program Alert procedures when the high temperature is expected to exceed 105° to 110° (depending on local climate) for at least two consecutive days. Based on this NWS Heat Index Program Alert, the City of Merced can assess when extreme heat is expected. The City offers instructions on what to do in an extreme heat emergency and provides locations for cooling centers where citizens have a chance to get relief from the extreme heat. In a press release on the City of Merced Website, dated 8/30/07, it stated that "….The City of Merced is prepared to open a cooling center whenever needed to give residents an escape from the searing heat. The decision to open the cooling center will be made by 1 p.m. daily based on the heat index, a guide that uses the outside air temperatures and relative humidity…." http://www.cityofmerced.org/news/displaynews.asp

Cooling centers provide air conditioning, liquids, and places to rest for the general public during heat waves. Sending out public information on these along with public health tips (drink fluids, find shade, and the like) will also contribute to the public's ability to deal with heat waves. The City (2008) identified that the creation and use of the centers have reduced the number of emergency room visits.

HAZARDOUS MATERIALS

To minimize risk of hazardous incidents effecting critical facilities it is advised that the facility be located at a distance away from hazardous materials facilities and transport zones. Locating the facilities too far from these areas will create conflict with planning a centralized city and locating facilities close to population, and thus the two needs must be weighed based on current situation.

Like critical facilities, structures within a one mile radius of transportation corridors, pipelines, and fixed hazardous materials facilities are at an elevated risk. The role of highways and roads in both being probable sites for a materials transport incident, and providing ways to exit in case of emergency, requires attention when drawing up emergency response plans. Future structures built should be built with equal consideration for the proximity to hazardous materials facilities and transport zones, but needs to be weighed against needs for users of these structures.

There is, of course, a distinction between a specific material and the harm it can cause. Thus, the safety of the public health and the environment depend on proper containers and transport of these materials. For many of these substances, secondary containment becomes imperative should these items spill or their initial containers

be breached or sustained damage. Many fixed location sites have some type of secondary containment facility and these are often required by law. For in-transit materials, many efforts are made to keep materials away from sewer and storm drain inlets. Emergency response plans and personnel are familiar with what inlets are near highways and railroads. The City's Emergency Response Center keeps information on all fixed sites as well as how to isolate spills or hazardous release areas along highways and railroads.

To aid in identification of hazardous materials, US Department of Transportation Pipeline and Hazardous Materials Safety Administration uses place cards indicating properties associated with the hazardous material being transported. Examples of material properties indicated on the place card include: explosives, gases, flammable liquids, flammable solids, oxidizers and organic peroxide, poisons, radioactive, corrosive, and miscellaneous. These place cards allow responders to identify the possible dangers associated with the spill and combined with the amount and location of spill could lead to assessment of the severity of the incident.

Natural Gas Pipelines

- *Pipeline Monitoring:* PG&E has a comprehensive monitoring and inspection program to ensure the safety of its natural gas transmission pipeline system. They monitor the system twenty-four hours a day/365 days a year. They perform different types of inspections including patrols, leak surveys, and cathodic protection (corrosion protection) system inspections for the natural gas pipelines. They also perform integrity assessments of certain gas transmission pipelines in urban and suburban areas.

  PG&E performs patrolling of transmission pipelines aerially or on the ground at least quarterly to look for indications of pipeline leaks, missing pipeline markers, construction activity and other factors that may threaten the pipeline. The transmission line leak surveys are conducted at least annually and generally by a leak surveyor walking above the pipeline with leak detection instruments capable of detecting leaks as small as a few parts per million of gas in air. Newer leak detection instrumentation they employ utilizes infrared or laser technology. They have an active cathodic protection (CP) system on their gas transmission pipelines to protect them against corrosion. They inspect these CP systems every two months to ensure they are operating correctly.

  For transmission pipelines qualifying for an integrity assessment, there are three federally-approved methods to complete this pipeline integrity management assessment: In-Line Inspection (ILI), External Corrosion Direct Assessment (ECDA) and Pressure Testing. An In-Line Inspection involves a tool (commonly known as a "pig" or "smart pig") being inserted into the pipeline to identify any areas of concern such as potential metal loss (corrosion) or geometric abnormalities (dents) in the pipeline. An ECDA involves an indirect, above-ground electrical survey to detect coating defects and the level of cathodic protection. Pressure testing is a strength test normally conducted using water which is also referred to as a hydrostatic test. Excavations are performed in areas of concern as required by federal regulations.

  Gas transmission pipelines and facilities are generally resistant to earthquake damage and are expected to be operational following earthquakes. Where, at specific locations, there is a risk of pipeline failure from an earthquake, the common practice is to address the threats and mitigate the risk to prevent damage to the pipeline or replace this section of line with a design that is more resistant to failure during an earthquake. PG&E immediately walks the system by foot and then conducts aerial assessments by helicopter a short time later to determine whether their facilities and pipelines have been damaged as a result of the earthquake

- *Agency Coordination:* PG&E has annual meetings with first responders and joint exercises to foster open lines of communication and to improve emergency coordination. Generally, PG&E's emergency coordination plans and procedures with local first responders are intended to establish and maintain strong ties with the appropriate fire and police officials. PG&E has eight Senior Public Safety Specialists to maintain their presence within the first responder community and ensure their lines of communication are clear within that population. To further coordination, PG&E recently launched its gas transmission web portal specifically for first responders to access pipeline mapping data in real time. The portal allows a registered first responder to view certain line segment characteristics through a secure web environment and this portal is accessible by IPAD, smart phones, lap tops or desk tops. Once registered, the first responder can view line segment location, pipe size, Maximum Operating Pressure, main line valve location and line segment material.

  Coordination is important not only for potential emergencies that may arise, but also to coordinate assistance for routine matters, such as car-pole accidents, downed electrical wire, house fires requiring the interruption of gas/electric services and any maintenance work involving PG&E's gas and/or electric facilities. Further, PG&E offers a "Responding to Gas & Electric Emergencies" seminar for local first responders. Additionally, PG&E's gas transmission pipeline maintenance personnel offer informational meetings regarding safety for local first responders. Finally, PG&E sends annual communication containing safety information and resources to first responders, as well as local public officials, via the Pipeline Association for Public Awareness (PAPA).

- *Pipeline Safety Enhancement Plan (PSEP):* PG&E's PSEP Phase 1, which is currently (August 2012) before the CPUC, is PG&E's plan to enhance safety and improve operations by fundamentally changing the way PG&E manages its gas pipeline assets. Ultimately, PG&E will comprehensively assess all 5,786 miles of its natural gas transmission pipelines. The efforts included in PSEP are part of a broader coordinated PG&E Gas Operations strategy and are in addition to the improvements PG&E is making to its existing pipeline replacement and maintenance, risk mitigation and integrity management programs. PSEP Phase 1 covers 2011-2014, with Phase 2 commencing in 2015.

  There are four main components to PG&E's PSEP:

  (1) *Pipeline Modernization* – PG&E will establish a known margin of safety on every gas transmission pipeline segment and verify pipeline integrity through strength testing, pipeline replacement, and pressure reductions, and will retrofit pipelines to accommodate the use of In-Line Inspection (ILI) tools.

  (2) *Valve Automation* – PG&E will install automated valves in highly populated areas and where pipelines cross active seismic faults to enable PG&E to remotely or automatically shut off the flow of gas in the event of a pipeline rupture. In addition, PG&E will upgrade its Supervisory Control and Data Acquisition (SCADA) system to allow operators in its Gas Control Center to identify and respond quickly to isolate sections of pipeline if a line rupture occurs.

  (3) *Pipeline Records Integration* – PG&E is proposing to transition away from reliance on traditional paper records and to move to a fully integrated electronic asset management system. PG&E will consolidate its gas transmission pipeline data and records systems, collect and verify all pipeline strength tests and pipeline features data necessary to calculate the MAOP for all gas transmission pipelines and associated components, and implement a new fully electronic data management system that will facilitate enhancements in

system operations, maintenance, inspections and compliance with new regulatory requirements.

(4) *Interim Safety Enhancement Measures* – To increase the safety of pipelines prior to testing or replacement, PG&E will validate the MAOP for all transmission pipeline segments in the system, has already reduced pressure on many pipelines (which will remain in effect until PSEP work on such pipe is completed), and has increased the number of patrols and leak surveys. PG&E will expand these interim safety enhancement measures under the implementation PSEP.

EARTHQUAKE

The most effective single element in mitigating earthquake losses to buildings is the consistent application of a modern set of design and construction standards, such as those incorporated in modern building codes. The codes are updated regularly to include the most effective design and construction measures that have been found by testing and research or observed in recent earthquakes to reduce building damage and losses. Local government building departments using a modern code, such as the 2010 California Building Code, regulate the vast majority of buildings. Exceptions include acute care hospitals, public K-12 schools, and state-owned buildings, which are regulated by state agencies in accordance with an even more stringent set of building code provisions that are incorporated in the 2010 California Building Code.

DROUGHT

In 1993, the City adopted a resolution for a program of mandatory prohibitions related to water conservation. The City adopted this ordinance in response to the water shortage emergency associated with the drought of 1987 through 1991. The regulations associated with this ordinance were revised in 2000, but have remained in force due to the overdraft of the Merced sub-basin. Currently, Chapter 15.42 of the City Municipal Code, implemented through Ordinance 1842, comprises the City's water shortage contingency plan. Since the ordinance was a declaration of a water emergency, stages of action are not defined and the water shortage contingency plan is currently active.[55]

Mandatory Water-Wasting Prohibitions

- Washing of sidewalks, driveways, and other outdoor surfaces
- Washing of external building or trailer walls
- Non-re-circulating fountains
- Use of water from the City's distribution system for non-domestic purposes when another adequate source of water is available
- Waste of water for reasons not stated without reasonable purpose. The ordinance also includes mandatory conservation measures consisting of prohibitions on non-essential water uses, including replacement of broken plumbing fixtures and sprinklers, limited irrigation hours, and restriction of outdoor irrigation by day of week (based on odd and even street address).

Other Active Measures

- Continue to comply with State mandates for new developments over 300 dwelling units to demonstrate the presence and adequacy of water supply.
- Continue grant funded efforts to construct access ramps at street corners for the disabled.
- Complete the existing City of Merced Water Supply Study and Report
- Continue pursuing existing multijurisdictional efforts to ensure City water supply and water quality.
- Continue City's program to comply with State mandate by installing water meters on all existing services that do not have one.
- Continue to implement siphon manhole usage in storm drainage. These remove oils from water.

DAM FAILURE

The County Evacuation Plan for both dams shows the Merced County Fairgrounds as the evacuee assembly point and addresses what evacuation routes, priorities, and procedures should be followed. The City's ability to supply the potable water requirements during this time will depend on which dam failed and the height of the inundation swell.

INFLUENZA

In recent years, both the City of Merced (2007) and Merced County (2006) have developed and adopted pandemic influenza response plans. Both plans provided a categorical approach to a pandemic outbreak, ranging from a few ill personnel, to widespread illness that could impact the daily operations of the City/County.

4.1.6 Fiscal Mitigation Capabilities

Overview

The fiscal capability assessment lists the specific financial and budgetary tools that are available to the City for hazard mitigation activities. These capabilities, which are listed in Table 4-3, include both local and Federal entitlements. Actual use of these funding sources for future hazard mitigation projects will be based on the direction of the City Manager and/or action of the City of Merced City Council.

Table: 4-3: Financial Resources for Hazard Mitigation

Financial Resources	Effect on Hazard Mitigation
Community Development Block Grants	Can be used for any Hazard Mitigation Activity
Capital Improvement Project Funding	Can be used for any Improvement-based Hazard Mitigation Activity
Authority to levy taxes for specific purposes	Can be used for any Hazard Mitigation Activity
Impact fees for new development	Improvement-based Hazard Mitigation Activity for water, wastewater, transportation, and FD or PD Stations.
Incur debt through general obligation bonds	Can be used for any Hazard Mitigation Activity
Incur debt through special tax bonds	Can be used for any Hazard Mitigation Activity
Incur debt through private activities	Can be used for any Hazard Mitigation Activity
FEMA Hazard Mitigation Grant Program (HMGP) and Pre Disaster Mitigation (PDM) grants	Can be used for any Hazard Mitigation Activity
Fire Prevention Fees and Fines	Can be used for Hazard Mitigation
Enterprise Funds	Can be used for Hazard Mitigation
General Funds	Can be used for Hazard Mitigation

4.2 Mitigation Goals

Introduction

Mitigation goals provide guidance and direction as to the selection of actions that will reduce the affect of hazards to the City, and which will improve and enhance our capacity to respond to hazards.

4.2.1 Process to Develop Plan Goals

Overview

Deliberate steps were taken to structure goals that would result in appropriate mitigation actions. Selection of the goals were based on guidance from community goals and findings of the Risk Assessment and Capability Assessment, and were confirmed by the Disaster Council in July 2012. This section describes how Plan goals and objectives were developed by the Plan Leadership Team (PLT) and Disaster Council.

Development of Goals

HAZARD MITIGATION VISION STATEMENT

The first step to create plan goals is to create a vision statement. A vision statement broadly defines the purpose of hazard mitigation planning. The Plan Leadership Team (PLT) opted to utilize the mission statement of the *2010 Hazard Mitigation Plan for the State of California* as the foundation to create the MHMP's mission statement, which is:

> *The vision of the MHMP is: To develop a safe and resilient City of Merced by integrating knowledge, laws and programs into an active mitigation program that guides the City to significantly reduce potential casualties and property damage, as well as physical, social, economic, and environmental disruption from disasters.*

IDENTIFY POSSIBLE COMMUNITY-RELATED GOALS

To establish a bulkhead of possible goals for use in the Merced Hazard Mitigation Plan, the Plan Leadership Team (PLT) collected and sorted existing goals from similar communities. To assure that these goals were an appropriate fit with the City of Merced, the PLT examined them against two filters, namely: 1) consistency with community goals; and, 2) comparison with the findings of the Plan's Risk Assessment and Capability Assessment.

COMPATIBILITY WITH COMMUNITY GOALS

The Plan Leadership Team (PLT) sought to identify greater definition of the vision based on state and local community-related goals, and collected existing goals from various sources; Section 4.3.2 of this Plan identifies four sets of these goals, including those from the:

- 2010 California State Hazard Mitigation Plan;
- Merced Vision 2030 General Plan;
- City of Merced Emergency Operations Plan; and,
- Merced County Hazardous Waste Management Plan.

RISK ASSESSMENT FINDINGS

The Plan Leadership Team (PLT) also compared the list of possible goals with the Plan's "Risk Assessment" and "Capability" findings.

4.2.2 Plan Goals

Overview

Plan goals help to guide the direction of future activities aimed at reducing risk and preventing loss from hazards. They represent a long-term vision for hazard reduction or enhancement of mitigation capabilities. Within this sub-section are provided:

- a listing of related community goals that served as broad parameters for selecting the LHMP Goals; and,
- a description of Risk Assessment and Capability Findings.

Using these filters, a final list of Hazard Mitigation Plan goals were selected, and are listed at the end of this sub-section.

Bulkhead of Possible Goals

The Plan Leadership Team (PLT) collected and sorted existing goals from similar communities in order to establish a bulkhead of possible goals for use in the Merced Hazard Mitigation Plan. These are listed in Appendix F.

Existing Community Goals

The PLT conducted a review of existing Plans to assess whether or not the goals listed in these plans conflicted with the draft LHMP goals to reduce the effects of hazards. These plans include:

- 2010 State of California Hazard Mitigation Plan
- Merced Vision 2030 General Plan
- City of Merced Emergency Operations Plan
- Merced County Hazardous Waste Management Plan

STATE OF CALIFORNIA GOALS AND OBJECTIVES

Cal EMA
CALIFORNIA EMERGENCY MANAGEMENT AGENCY

Goal 1: Significantly reduce life loss and injuries.

This goal emphasizes the theme of reducing potential casualties from disasters through long-term physical changes that make places and buildings safer through mitigation investments and actions.

Objective 1: Improve understanding of the locations, potential impacts, and linkages among hazards, vulnerability, and measures needed to protect life safety and health.

Objective 2: Provide updated information about hazards, vulnerabilities, and mitigation processes to state and local agencies.

Objective 3: Ensure that enforcement of relevant state regulations and local ordinances significantly reduces life loss and injuries.

Objective 4: Ensure that structures are modified, as necessary, over time to meet life safety standards.

Objective 5: Ensure that mitigation measures are incorporated into repairs, major alterations, new development, and redevelopment practices, especially in areas subject to substantial hazard risk.

Objective 6: Identify and mitigate imminent threats to life safety.

Goal 2: Minimize damage to structures and property, as well as disruption of essential services and human activities.

This goal includes structures as an important aspect of both life safety and property damage and reflects the desired outcome of minimizing disruption of essential services (e.g., police, fire, and medical response) as well as normal human activities after a disaster.

Objective 1: Encourage new development to occur in locations avoiding or minimizing exposure to hazards and enhance design requirements to improve resiliency in future disasters.

Objective 2: Encourage life and property protection measures for all communities and structures located in hazard areas.

Objective 3: Reduce repetitive property losses due to flood, fire, and earthquake by updating land use, design, and construction policies.

Objective 4: Research, develop, and promote adoption of cost-effective building and development laws, regulations, and ordinances exceeding the minimum levels needed for life safety.

Objective 5: Establish and maintain partnerships among all levels of government, private sector, community groups, and institutions of higher learning that improve and implement methods to protect life and property.

Objective 6: Ensure the protection of vital records to minimize post-disaster disruption and facilitate short-term and long-term recovery.

Goal 3: Protect the environment.

Objective 1: Review all hazard mitigation projects for compliance with applicable environmental laws.

Objective 2: Encourage hazard mitigation measures that result in the least adverse effect on the natural environment and that use natural processes.

Objective 3: Ensure that all state and local hazard mitigation planning reflects the goal of protecting the environment.

Objective 4: Implement wildfire mitigation and watershed protection strategies that reduce losses of wildlife, habitat, and water.

Objective 5: Promote the use of sustainable hazard mitigation measures.

Objective 6: Provide guidance to local jurisdictions about California Environmental Quality Act (CEQA) compliance vis-a-vis mitigation planning, particularly the local mitigation strategy.

Goal 4: Promote hazard mitigation as an integrated public policy.

This goal is the same as in the 2007 SHMP. It suggests both governmental and societal attention to the need for mitigation. Corresponding objectives are essentially the same as in the 2007 SHMP, except for minor rewording of Objective 8.

Objective 1: Encourage all cities, counties, special districts, and tribal organizations to develop, adopt, and implement a Local Hazard Mitigation Plan.

Objective 2: Encourage all cities and counties to adopt their Local Hazard Mitigation Plans as part of an updated general plan safety element.

Objective 3: Improve the quality and effectiveness of local hazard mitigation planning through effective training and guidance that strengthens linkages between the Local Hazard Mitigation Plans, general plan safety elements, and SHMP.

Objective 4: Promote general public understanding of the benefits of hazard mitigation in reducing casualty and property losses and ensuring continuity of business, institutional, and government functions.

Objective 5: Continually build operational linkages among hazard mitigation, disaster preparedness, and recovery programs within the public and private sectors.

Objective 6: Use mandatory local general plan, zoning, and subdivision requirements to create disaster-resistant sustainable communities.

Objective 7: Promote continuous regional hazard mitigation coordination among state agencies, cities, counties, special districts, and tribal organizations.

Objective 8: Encourage councils of governments, metropolitan planning organizations, and regional transportation planning agencies to use Regional Blueprint and Strategic Growth Planning processes to promote hazard mitigation and help create disaster-resistant sustainable communities within a regional context.

Objective 9: Create financial and regulatory incentives to motivate stakeholders to mitigate hazards and risk.

Objective 10: Enhance and integrate public education efforts by state and local agencies that have mitigation-directed programs.

MERCED VISION 2030 GENERAL PLAN

The General Plan is a statement of the community's vision of its long-term or ultimate physical form. The heart of the General Plan is the set of integrated and internally consistent "Goals," "Policies," and "Implementing Actions" in each chapter. *Goals* are long range; they state finished conditions--the community's vision of what should be done and where.[3] The Goals of the *Merced Vision 2030 General Plan* are as follows:

Urban Expansion

- A Compact Urban Form
- Preservation of Agriculturally Significant Areas
- Efficient Urban Expansion

Land Use

<u>Residential & Neighborhood Development</u>

- Housing Opportunities in Balance with Jobs Created in the Merced Urban Area
- A Wide Range of Residential Densities and Housing Types in the City
- Preservation and Enhancement of Existing Neighborhoods
- Quality Residential Environments
- Mixed-use, Transit, and Pedestrian-Friendly Residential Environments
- Ensure Adequate Housing is Available to All Segments of the Population

Economic Development

- Increased Employment Opportunities for the Citizens of Merced
- A Diverse and Balanced Economy
- Preservation and Expansion of the City's Economic Base
- High Quality Industrial Areas
- More High-Quality Research & Development Parks
- Ready Access to Commercial Services Throughout the City
- A Distinguished Downtown

Urban Growth and Design

- Living Environments which Encourage People to Use a Variety of Transportation Modes
- A Compact Urban Village Design for New Growth Areas
- Self-sustaining, Mixed-Use, Pedestrian-Friendly Villages
- Transit-Oriented Development Adjacent to the High Speed Rail Station

Transportation and Circulation

Streets and Roads

- An Integrated Road System that is Safe and Efficient for Motorized Uses
- A Circulation System that is Convenient and Flexible
- A Circulation System that Minimizes Adverse Impacts upon the Community
- A Comprehensive System of "Complete Streets" Which Addresses All Modes of Transportation

Bicycles, Pedestrians, and Public Transit

- An Efficient and Comprehensive Public Transit System
- A Comprehensive System of Safe and Convenient Bicycle Routes (Within the Community and Throughout the Urban Area)
- A Comprehensive System of Safe and Convenient Pedestrian ways
- A Comprehensive System of "Complete Streets" Addressing All Modes of Transportation
- Air and Rail Systems that Provide Safe and Convenient Service to the Community

Public Services and Facilities

- Maintenance and Improvement of Merced's Existing Infrastructure
- New Development Which Includes a Full Complement of Infrastructure and Public Facilities
- Efficient and Cost-Effective Public Service Delivery
- Maximum Crime and Fire Protection Services
- An Adequate Water Source, Distribution, and Treatment Infrastructure System in Merced
- An Adequate Wastewater Collection, Treatment, and Disposal System in Merced
- An Adequate Storm Drainage Collection and Disposal System in Merced
- Solid Waste Management Services That Accommodate the Local Population Without Causing Significant Damage to Environmental Resources
- Adequate School Facilities for All Students in the Merced Urban Area
- Excellent Cooperative Relationships between the City, the School Districts, and the Development Community

- Support for Cultural and Community Services that Improve and Maintain the Quality of Life for the Residents of Merced
- Development of Infrastructure and Service to Allow All Merced Residents to Utilize New Technologies to Communicate with the Region, the Nation, and the World

Urban Design

- An Integrated Urban Form
- Transit-Ready Community Design
- Pedestrian- and Bicycle-Compatible Neighborhoods
- A Unique Community Image
- Attractive Neighborhoods and Districts
- Attractive and Memorable Public Streets

Open Space, Conservation, and Recreation

- Maintenance of Merced's Biological Resources
- A High-Quality, Expanding Urban Forest
- Preservation of Scenic Corridors and Resources
- Improvement and Enhancement of Water Quality
- Protection of Regional Agricultural Resources
- High-Quality Recreational Open Space
- Adequate Public Recreation Facilities
- Comprehensive Urban Trail and Bike Path System
- A Safe Environment For Merced's Citizens
- Conservation of Water Resources
- Preservation and Protection of Soil Resources

Sustainable Development

- Clean Air With Minimal Toxic Substances and Odor
- Clean Air with Minimal Particulate Content
- Effective and Efficient Transportation Infrastructure
- Coordinated and Cooperative Inter-Governmental Air Quality Programs
- Reduction in the Generation of Greenhouse Gases (GHG) from New Development
- A Diverse and Rich Historic and Cultural Resource Environment
- A Long-Term Community Historic Preservation/Improvement Program
- Sustainable Energy Resource Use in the City of Merced
- Healthy Lives for Community Residents
- A Healthy Environment for All Residents

Housing

- Increase the Stock of Affordable Housing
- Encourage a Mix of Housing Throughout the City to Meet the Needs of Different Income Groups
- Conservation and Rehabilitation of the Existing Housing Stock
- Increase Homeownership Opportunities
- Coordinate Innovative Housing Efforts

Noise

- To Protect City residents from the Harmful and Annoying Effects of Exposure to Excessive Noise

- To Protect the Economic Base of the City by Preventing Incompatible Land Uses from Encroaching upon Existing or Planned Noise-Producing Uses
- To Encourage the Application of State of the Art Land Use Planning Methodologies in Areas of Potential Noise Conflicts

Safety

The main purpose of the Safety Element is to provide policies and implementing actions aimed at reducing injuries, death, property damage, and the economic and social dislocation resulting from natural hazards. The Safety Element is based on an analysis of geologic and other hazards relevant to Merced and on ways of protecting the community from any unreasonable risk associated with such hazards.[3]

- General Disaster Preparedness
- Reasonable Safety for City Residents from the Hazards of Earthquake and Other Geologic Activity
- A City Free From Other Than Street Flooding
- Fire and Hazardous Material Safety for the Residents of the City and For Those Working in Fire Suppression
- A Safe Airport Environment Both Above and On the Ground
- Reduced Criminal Activity and an Increased Feeling of Safety and Security in the Community
- Hazardous Materials Safety for City Residents

CITY OF MERCED EMERGENCY OPERATIONS PLAN (EOP) GOALS

The purpose of the Emergency Operations Plan (EOP) is to provide emergency planning, organization, and response. The Plan deals with emergency management through the Incident Command System (ICS)/National Incident Management System (NIMS), law enforcement, traffic control, fire, medical, rescue and radiological material, shelter and support, and resources. The plan is designed to prepare the community for responding to an emergency situation in a highly organized and efficient way so that chaotic situations are avoided.[3]

During the response phase, the agencies that are charged with responsibilities in the EOP are directed to focus on the following five goals:

- Mitigate Hazards
- Meet Basic Human Needs
- Address Needs of People with Access and Functional Needs
- Restore Essential Services
- Support Community and Economic Recovery

MERCED COUNTY HAZARDOUS WASTE MANAGEMENT PLAN GOALS

In 1986, the California legislature passed legislation requiring each county to develop a hazardous waste management plan and requiring all cities to either adopt the County plan by reference in their general plans or adopt their own plan. The 1989 Merced County Hazardous Waste Management Plan addresses waste reduction and onsite treatment, the siting of off-site hazardous waste facilities, public and industry education, transportation of hazardous wastes, cleanup of contaminated sites, and emergency response procedures. The plan also recommends a series of goals, policies, and implementation actions to deal with hazardous waste throughout the County.[3]

The goal statement of this plan is to: *Protect the health and welfare of the public, environment, and economy of Merced County through a comprehensive countywide program to ensure the safe and efficient management of hazard wastes.*" The plan includes eight objectives covering the following topics:

- waste management technologies
- waste management facilities
- small quantity generator / household hazardous waste
- public education
- hazardous waste inventory
- local regulation of hazardous waste management
- clean up previous disposal sites
- emergency incident response

In 2011, an *Area Plan for Emergency Response to Hazardous Material Incidents* was prepared. This plan addresses how hazardous material incidents will be handled, and is intended to facilitate multi-agency and multi-jurisdictional coordination, to successfully counter the effects of an emergency involving hazardous material. [56]

Risk Assessment/Capability Findings

Hazard Mitigation Goals that were found to be consistent with the community's existing goals (as listed on previous pages), were retained; those that were not were removed from the list of possible goals. The remaining list of possible goals was assessed by the Disaster Council for their applicability to the Plan's "Risk Assessment" and "Capability" findings. These findings are listed below, and were presented and discussed at the May 11, 2012, Disaster Council Meeting.

Findings:

Hazard Causal Factors

- Floods result from heavy rains in upper watershed located in Sierra Nevada Foothills.
- Urban-interface wildfires are prone to occur at urban development sites near grasslands, especially with dry fuels and windy conditions.

Note Hazard Characteristics

- Earthquakes in Merced are generally low magnitude and very infrequent, but central Merced structures are highly vulnerable to such an event.
- Extreme heat events occur yearly, but generally last only a few days; hotter and longer-term events could negatively affect sensitive populations.
- Though the City experiences generally low-impact flood events, larger historical events could negatively affect the City, cutting off local and regional lifelines and services.

Critical Assets in Hazard Areas

- Some existing and many future arterial roads cross floodways.

Characteristics of Assets that Contribute to Vulnerability

- After the 1989 Loma Prieta earthquake, the City conducted an evaluation of the downtown buildings. A 1999 follow-up study concluded that 30% of the downtown buildings assessed required major remodeling, rehabilitation, seismic upgrades, or demolition.

Where is the area to experience the most losses?

- Flood Damage occurs repeatedly near Highway 140 and Thornton Road, at the confluence of Bear Creek and Black Rascal Creek.

Hazard Mitigation Plan Goals

At their July 13, 2012, Disaster Council meeting, the Disaster Council reviewed and confirmed the PLT's draft work and selection of the MHMP's vision and goal statements.

Goals are stated without regard to implementation, that is, implementation cost, schedule, and means are not considered. Goals are defined before considering how to accomplish them so that the goals are not dependent on the means of achievement. Goal statements form the basis for actions that will be used as means to achieve the goals.

MHMP GOALS

Listed below are the goals of the Merced Hazard Mitigation Plan to reduce or avoid long-term vulnerabilities and effects of the profiled hazards addressed in this plan's risk assessment.

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Goal 1: Provide protection for people's lives from hazards.

Goal 2: Minimize or reduce damage to property.

Goal 3: Minimize disruption of essential services, facilities, and infrastructure.

Goal 4: Maintain, enhance, and restore the natural environment's capacity to deal with the impacts of disasters.

Goal 5: Promote hazard mitigation as an integrated policy.

Goal 6 Increase public awareness.

Table 4-5 in Section 4.3.3, the Action Plan of the MHMP, correlates these goals with the recommended prioritized list of mitigation actions.

4.3 Mitigation Strategy

Introduction

This Section identifies, evaluates, and prioritizes mitigation strategies that address the Plan's goals and objectives. These actions form the core of the mitigation plan, and will be the most outward representation of the planning process.

4.3.1 A Comprehensive Range of Mitigation Actions

Identification and Analysis of a Catalog of Potential Actions

For each hazard, City Staff created a comprehensive catalog of sample mitigation actions that were applicable to the City of Merced (Appendix G). The hazards for which sample mitigation actions were created are those in which the City is most vulnerable to, based on the MHMP Risk Assessment. The specific actions themselves were based upon the MHMP vulnerability assessment. The catalog was not meant to be exhaustive or site-specific, but rather to inspire discussion. The sample mitigation actions in the catalog derived from numerous sources, including: 1) the City's "Community Risk Assessment"; and, 2) hazard mitigation plans, notably from Central Valley California communities.

The initiatives included in the catalog was meant to be new action items, and do not include current mitigation actions, though improvement of a current activity may be listed. The catalog also addresses how the proposed actions affected new and existing buildings and infrastructure.

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Finally, recognizing that Merced's economic setting could improve, and because external funding sources may also become available, the selection process of actions was not limited due to lack of local funds.

Mitigation Sorted by Type

To facilitate a greater understanding of the nature of actions, the sample actions were also sorted by mitigation type. Mitigation efforts fall into one or more of these types:

- *Prevention*: Administrative or regulatory actions that influence the way land is developed and buildings are built, such as: planning, zoning, building codes, capital improvement projects, open space, and floodway preservation, and storm water management safeguards.
- *Property Protection* – Actions that involve the modification of existing buildings to protect them from the hazard area, such as: removal from elevation, retrofits, relocation, and flood-proofing.
- *Public Education* – Actions to inform citizens about hazards and the techniques they can use to protect themselves and their property, such as: outreach, disclosure information for real estate transactions, information brochures along with public mailings and educational programs.
- *Resource Protection*: Actions that, in addition to minimizing hazard losses, also preserve or restore the functions of natural systems, such as: cleaning of creeks, debris removal, management of City trees, restorative plantings, and dedicating creek-side open space to the City.
- *Emergency Services*: Actions that protect people and property during and immediately after a hazard event, such as: improved response times, special training classes, standby power for critical facilities, and emergency personnel communications.
- *Structural Projects*: cleaning of creeks, cooling centers, projects to modify FEMA maps.

Review and Ranking of Catalog of Potential Actions

The catalogs were presented at the July 13, 2012, Disaster Council meeting, as well as at a general public meeting about local hazard mitigation planning held at the regular meeting of the City's Planning Commission on July 18, 2012. On August 9, 2012, the action catalogs were brought to the general public for input at the City's "Market on Main Street" event. At these venues, the PLT requested and encouraged the Disaster Council, the Planning Commission and the public to review, discuss, and comment on the draft catalogs, focusing on the following tasks:

- A numeric ranking of the ideas in each table;
- Comments of each cataloged action, as appropriate; and,
- Describe new actions.

The Planning Leadership Team (PLT) collected these comments and rankings (1 being best, 2 next best, etc.) from the Disaster Council, stakeholders, the Planning Commission, and members of the public, which are presented in Appendix G and include: 1) the original comprehensive set of suggested actions; 2) numeric rankings; and, 3) comments, including suggested new action items.

CREATING A FOCUSED LIST OF MITIGATION ACTIONS

As part of the review of a comprehensive range of potential mitigation actions, the PLT narrowed the potential mitigation actions listed in Appendix G, from 54 potential actions to 10 actions.

Changes to the comprehensive list of potential mitigation actions were based on meetings with technical City Staff, as described in "Flood Related Actions" and "Other Recommended Hazard Mitigation Actions" (see sub-sections below), as well as several factors, and include:

Scores: Scores ranged from a best (1) to least supported (7). Actions with scores of 4-7 were generally removed, while those with scores 1-3 were generally kept.

Mitigation Action and Projects: Ineligible actions, as defined by FEMA's updated regulation checklist (formerly called crosswalk) were removed from the list of recommended actions. For example, actions that are emergency response or operation preparedness in nature are ineligible, and hence, were removed from the recommended list of mitigation actions.

Hazard Threat: Actions that aligned with high threat hazards were generally kept, whereas actions that aligned with low threat hazards were generally removed.

Current or LHMP-related Actions: Actions that are currently undertaken or which have been addressed in the Local Hazard Mitigation Plan were removed.

The resulting "focused list" of 10 mitigation actions is presented in Appendix I. This list was the basis of further discussion and prioritization performed at the Disaster Council public meeting of December 7, 2012.

Although low-scoring mitigation actions are not included in the Action Plan, they can be reconsidered during the MHMP update process.

FLOOD RELATED ACTIONS

On August 7, 2012, a meeting with flood hazard specialists representing the City of Merced, the County of Merced, and the Merced Irrigation District, met to identify flood-related projects for the LHMP plan area. These recommended actions are listed below, and were included in the focused list of actions.

- Increased storm-water storage (see detail below)
- Upstream storm-water Diversions
- Black Racal Creek detention basin

A water diversion structure on Fahrens Creek, south of Yosemite Avenue, diverts water into the large basin that is located between that point and Buena Vista Avenue. Storm-water diversion currently begins when the flow in Fahrens Creek is at 50 cubic feet per second (CFS). Hicham M. Eltal of the Merced Irrigation District (MID) recommended that the diversion should occur at 200 cfs, so that storage capacity is not wasted during larger flooding events. A new diversion design and improvements would be necessary for this change.

OTHER RECOMMENDED HAZARD MITIGATION ACTIONS

RC#C4c

On November 26, 2012, City Staff from the Airport, Fire Department, Engineering Department, Building Department, and the Public Works Department met to discuss hazard vulnerability and needs to existing buildings and infrastructure. The group offered several recommendations, specifically, the group:

- supported the focused action to perform building-specific, structural seismic vulnerability assessments of City-owned critical facilities (buildings and infrastructure) constructed prior to 1980, especially as it relates to several old fire stations; the original (phase 1) of the "M" Street police station; and the public works corporation yard;
- emphasized the need to refer to shelters instead of cooling centers;
- supported the focused action to address wildland fire interface zones with an emphasis on the development interface with natural open spaces; and,
- Strongly identified the need to plan for and develop resources to provide energy-back-up systems for critical infrastructure and buildings.

INELIGIBLE ACTIONS

Some of the potential mitigation actions received high scores from the community, yet were removed due to ineligibility requirements of the Local Hazard Mitigation Program, or simply reiterated current City practices. These actions are listed here to signify their value to the community.

Response-Based Actions

- Develop Community Emergency Response Teams (CERT) of residents and businesses to aid first responders and volunteers.
- Strengthen emergency operations by increasing collaboration and coordination among public agencies, non-profit organizations, businesses, and industries. For example, standardize systems among agencies to provide for better interoperability.
- Coordinate with medical community to quicken the reporting of damage to a medical facility office, pharmacy (and so on).

Planning-Based Actions

- Support management and land use planning practices with hazard mitigation to protect life.
- Require a master drainage plan as part of the approval process for all specific plans and large development projects. The plan's intent is to ensure that the overall rate of runoff from a project does not exceed predevelopment levels.

MERCED INTEGRATED REGIONAL WATER MANAGEMENT PLAN

In March 2013, the "Flood Management Summary" of the *Merced Integrated Regional Water Management Plan* (IRWMP) listed potential projects that may mitigate flood risk within the planning area

of the MHMP, though the majority of these projects would occur outside the planning area of the MHMP. This plan's recommended action #4 indirectly supports the list of projects below. Detailed descriptions and cost-estimates are provided in the referenced "Flood Management Summary" of the Merced IRWMP.

Options to Reduce the Flow Entering Merced

- Black Rascal Creek Dam (Haystack Reservoir)
- Black Rascal Creek Detention Basin
- Bear, Burns, Owens, and/or Mariposa Reservoir Enlargements
- Route Flood Flows to Agricultural Lands South of Merced
- Ecosystem Restoration Along Waterways
- Bear Creek Detention Basin/Groundwater Recharge Facility
- Bear Creek Diversion Channel
- Le Grand/Planada Flood Control/Conjunctive Use Expansion Study
- Bear Creek Siphon and Diversion Structure (BCSDS) Expansion

Options to Contain the Flow through Merced

- Levees along Channels
- Channel Dredging and/or Vegetation Removal
- Various local drainage improvements

Options to get out of the way of the flow

- Modify Land Use and Building Restrictions
- Develop Emergency Response Plans
- Ring Levees around Flood-Prone Areas or Critical Facilities
- Increase Public Awareness of Flooding
- Establish a Regional Flood Control District

4.3.2 Prioritization of Actions

The activities of the Plan Leadership Team (PLT) and *Disaster Council* at public meetings resulted in the selection of a focused set of 10 non-prioritized mitigation actions. At their December 7, 2012, meeting, the Disaster Council prioritized this focused list of actions. This section is a narrative of how the community prioritized the mitigation actions, and includes a discussion of "Benefit-Cost Review" and "Prioritization Methodology."

Benefit-Cost Review

This section discusses three interrelated topics: 1) the requirement for a cost-benefit assessment; 2) the approach of this Plan's Cost-Benefit Review (CBR); and, 3) future project-level Benefit-Cost Analysis (BCA).

SCOPE OF COST BENEFIT ANALYSIS

A full-blown cost-benefit analysis (CBA) is not required; rather, a Benefit-Cost Review (BCR) satisfies the DMA 2000 requirements even if it is relatively simple. As allowed by DMA 2000, the City's benefit-cost review was primarily qualitative.

BENEFIT-COST REVIEW (BCR) CRITERIA

An emphasis was placed on the importance of a benefit-cost review in determining action priority. Criteria used to assist in evaluating the benefit-cost of a mitigation action included in the "Economic" criteria discussed below, under "STAPLEE" CRITERIA.

FUTURE PROJECT-LEVEL BENEFIT-COST ANALYSIS (BCA)

For many of the actions identified in the MHMP action plan, the City of Merced may seek financial assistance under FEMA's Hazard Mitigation Grant Program (HMGP) or Pre-Disaster Mitigation Grant Program (PDM) programs. Both of these programs require detailed benefit/cost analysis as part of the application process. These analyses will be performed on the projects at the time of application preparation. However, for projects not seeking financial assistance from grant programs that require this sort of analysis, the City reserves the right to define "benefits" according to the parameters that meet the needs and the goals of the MHMP.

Prioritization Methodology

CRITERIA USED

RC#C5a

After the focused set of mitigation actions was assembled, the *Disaster Council* utilized several decision-making tools to rank the importance and effectiveness of the actions. These tools included: 1) Benefit-Cost Review "economic" criteria; 2) FEMA's recommended prioritization criteria, STAPLEE; and, 3) community input gathered from the City's *Natural Hazard Community Awareness Survey* (Appendix C).

"STAPLEE" CRITERIA

RC#C5b

The criteria listed below were used to assess the strengths and weaknesses, opportunities and constraints, and costs and benefits associated with mitigation actions. This section includes a general description of each criterion, along with related questions to help the community and Disaster Council rate the value of potential mitigation measures.

S ***Social:*** Mitigation actions are acceptable to the community if they do not adversely affect a particular segment of the population, do

not cause relocation of lower income people, and if they are compatible with the communities social and cultural values.

- Will the mitigation action be socially accepted within the community where it will be implemented?
- Will the mitigation action adversely impact one particular segment of the population (neighborhood, culture, religion, etc?)

T ***Technical:*** Mitigation actions are technically most effective if they provide long-term reduction of losses and have minimal secondary adverse impacts.

- Is the mitigation action technically feasible?
- Will the mitigation action help to reduce losses in the long term?
- Will there be any secondary effects which could nullify the action's benefits?

A ***Administrative:*** Mitigation actions are easier to implement if the jurisdiction has the necessary staffing and funding.

- Does the jurisdiction have the staffing capability to implement the action, and can it be readily obtained?
- Has the jurisdiction allocated or funded the action (i.e. annual budget, CIP, grants, etc)?
- Can the community provide the necessary maintenance work required to maintain the mitigation action?

P ***Political:*** Mitigation actions can truly be successful if all stakeholders have been offered an opportunity to participate in the planning process and if there is public support of the action.

- Is there political support to implement and maintain the mitigation action?
- Is there a local champion (private or public) willing to help see the action to completion?
- Is there enough public support to ensure the success of the mitigation action?

L ***Legal:*** It is critical that the jurisdiction or implementing agency have the legal authority to implement and enforce a mitigation action.

- Do State regulations exist that support the implementation of the mitigation actions?
- Are the proper local laws, ordinances, and resolutions in place to implement the mitigation action?
- Is the mitigation action likely to be challenged by stakeholders who may be negatively affected?

E ***Economical:*** Budget constraints can significantly deter the implementation of mitigations actions. Hence, it is important to evaluate whether an action is cost-effective.

- Do the benefits of the mitigation action exceed the associated costs?
- Does the cost seem reasonable for the size of the problem and likely benefits?
- Does the action contribute to other community economic goals, such as capital improvements or economic development?
- How many people will benefit from the action? How large an area is impacted?
- Does the action protect infrastructure, community assets, or critical facilities?
- What will the action cost? What is the timing of available funding? Will outside sources of funding be required?
- What is the action's ability to reduce expected future damages and losses?

□ Project Cost information is presented in the MHMP Action Plan (Section 4.3.3).

□ Economic-related vulnerabilities are discussed in section 3.4.7.

E ***Environmental:*** Mitigation actions that do not have an adverse effect on the environment, that comply with Federal, State, and local environmental regulations, and that are consistent with the community's environmental goals, have mitigation benefits while being environmentally sound.

- Will the mitigation action significantly affect the environment?
- Is the mitigation action consistent with the community's environmental values and goals?

PROCESS

Prior to the prioritization exercise, the PLT presented these criteria to the *Disaster Council* for review and discussion at their meeting of December 7, 2012. The public was also given an opportunity to comment on the criteria and the focused list of mitigation actions (Appendix I).

The *Disaster Council* and the public present were given eighteen colored dots to prioritize the actions with the above criteria in mind, emphasizing the benefit-cost review criteria. The values of the dots were as follows:

Table 4-4: Dot Priority Values

	Red	Blue	Yellow
Priority	High	Medium	Low
Dot Value	4	3	2
Number of Dots	6	6	6

PRIORITIZATION SCORES

The PLT totaled the dot values to determine the priority of the recommended actions. The values ranged from 171 to 67, and are listed in Table 4-4: Prioritized Actions. The highest scoring action, with 171 points, was to prepare an Energy Assurance Plan.

Table 4-4: Prioritized Actions

Score	Recommended Action
171	(1) Prepare *Energy Assurance Plan*
140	(2) Enhance Storm-Water drainage Improvements
129	(3) Develop *Disaster Preparedness Program*
120	(4) Support the Haystack Alternative
108	(5) Update City's Storm-water Drainage Master Plan
105	(6) Prepare a *Shelter and Emergency-Provision Plan*
102	(7) Prepare Natural Area Fire Prevention Plan
94	(8) Seismic Vulnerability Assessments/City-owned Critical Facilities
67	(9) Retrofit Unreinforced Masonry Buildings

The draft action to convert overhead utilities to underground services was combined with the action to create an Energy Assurance Plan.

4.3.3 Administration of Actions

Implementation Factors

RC#C5

Described in the Action Plan below are the following implementation factors: 1) the goal(s) that each Action Item meets; 2) an expected schedule for completion; 3) the responsible lead of the Action Item, 4) potential funding sources; and, 5) anticipated project costs.

SCHEDULE

This describes the timeframe for completing the project. In the Action Plan, this is listed as "ongoing," or the anticipated plan year(s) to be completed.

LEAD

This may be a position, office, department, agency, or combination of who is responsible for implementing and administering the action. Other departments and/or agencies are partnered with the lead agency to implement the action.

FUNDING

These may be existing or future funding sources, not limited to local, state, or federal sources.

Action Plan

RC#C5

The recommended and prioritized mitigation strategies of the MHMP are described in Table 4-7. Implementation Factors are applied to each strategy, as well as economic information used to rank the actions.

The Planning Leadership Team, guided by FEMA plan development requirements determined which of the six Plan Goals were met for each Action, when implementation is to occur within the 5-year Plan timeline, which organization/department would be responsible for overseeing the Action, potential funding sources, and estimated project costs.

In the course of preparing the Mitigation Plan Action Strategy Matrix, the Technical Staff considered combining two Actions (Actions #9 and #10) since they were similar (one dealt with critical buildings and the other with critical infrastructure). The Disaster Council concurred with the PLT at their meeting of January 25, 2013.

Plan Goals

RC#C3b

In Section 4.2.2 of the MHMP, plan goals were selected by the Disaster Council. As shown in Table 4-5, "Alignment of Plan Goals and Actions," the nine recommended mitigation strategies are consistent with the goals of the MHMP:

Goal 1: Provide protection for people's lives from hazards.

Goal 2: Minimize or reduce damage to property.

Goal 3: Minimize disruption of essential services, facilities, and infrastructure.

Goal 4: Maintain, enhance, and restore the natural environment's capacity to deal with the impacts of disasters.

Goal 5: Promote hazard mitigation as an integrated policy.

Goal 6 Increase public awareness.

Table 4-5: Alignment of Plan Goals and Actions						
Action	**Goal 1**	**Goal 2**	**Goal 3**	**Goal 4**	**Goal 5**	**Goal 6**
1. Prepare Energy Assurance Plan		●	●		●	
2. Enhance storm-water drainage improvements		●		●		
3. Create a Disaster Preparedness Program	●	●			●	●
4. Support the Haystack Alternative	●	●				
5. Update City's Storm-water Drainage Master Plan		●		●		
6. Prepare a Shelter and Emergency-Provision Plan	●					●
7. Prepare Natural Area Fire Prevention Plan	●	●		●		●
8. Seismic vulnerability assessment/improvements of City-owned critical facilities	●	●	●			
9. Create a program to retrofit/upgrade unreinforced masonry buildings	●	●				

Table 4-7: LOCAL HAZARD MITIGATION PLAN ACTION STRATEGY MATRIX

Strategy Actions	Goal/Hazard	Implementation within the 5-Year Plan Timeline	Lead and Partner Organization(s)	Potential Funding Sources	Project Cost
Action Item #1: Prepare an *Energy Assurance Plan* that includes: 1) the identification and assessment of power-backup capabilities for all the City's critical infrastructure (for example, pumps, data centers, dispatch) and buildings utilized for essential services (such as health-safety, water, sewer, waste, and transportation); 2) coordination of energy resources among public and private partners; 3) establishment of a program and schedule to implement recommended power upgrades and coordination programs; and, 4) an examination of a program of conversion of overhead utilities to underground service that serve critical facilities or other sensitive sites to reduce exposure to hazards, where possible.	Goals: 2, 3 & 5 Hazard: Flooding, Earthquake, Wildfire & other likely hazards	Start: 2014; Plan years 1-2.	**Public Works**	FEMA Cal E M A Rule 20A State and Federal Grants. PDM	$200,000
Action Item #2: Develop and enhance storm-water drainage improvements to reduce frequent flooding. Projects may involve canals, storm-water drains, basins, trunk lines, auxiliary pipes, and interconnections. For example, increase the current stormwater diversion (at Fahrens Creek, south of Yosemite Avenue) of 50 cubic feet per second (cfs) to 200 cfs, so that storage capacity is not wasted during larger flooding events.	Goals: 2 & 4 Hazard: Flooding	Ongoing	**Development Services**	PDM, IRWMP FMA	$2,650,000 (Average Project Price is $442,000)

Table 4-7: LOCAL HAZARD MITIGATION PLAN ACTION STRATEGY MATRIX (pg. 2 continued)

Strategy Actions	Goal/Hazard	Implementation within the 5-Year Plan Timeline	**Lead** and Partner Organization(s)	Potential Funding Sources	Project Cost
Action Item #3: Create a *Disaster Preparedness Program* that educates populations (residents, property owners, and businesses) that are vulnerable to Merced's natural hazards about: 1) shelter sites; 2) disaster advisory and warning systems; and, 3) "before, during, and after" resources from community entities (e.g. hospitals, schools, public works), to prepare for natural disasters. Develop and deploy methods that assure access to this information and to these resources.	Goals: 1,2, 5 & 6 Hazard: Flooding, Earthquake, Wildfire & other likely hazards	Start: 2014; Plan years 1-2.	**Fire Department**	PDM; Emergency Mgmt. Preparedness Grant; State Homeland Security Grant Program; Local Funding	$250,000
Action Item #4: Support Merced County efforts to construct the Haystack Alternative of Black Rascal Creek.	Goals: 1 & 2 Hazard: Flooding	Ongoing	**Development Services**/ Public Works Merced County MID	State Grants FEMA SRL; FMA and PDM grants	$100,000 staff time
Action Item #5: Update the City's Storm-water Drainage Master Plan.	Goals: 2 & 4 Hazard: Flooding	Start: 2014; Plan years 1-3.	**Development Services**	City Funding Capital Improvement Plan; FEMA FMA grant	$150,000
Action Item #6: Prepare a *Shelter and Emergency-Provision Plan* resulting in identification of existing and future sites and buildings, as well as improvements for their establishment or enhancement.	Goals: 1 & 6 Hazard: Flooding, Earthquake, Wildfire & other likely hazards	Start: 2016; Plan years 3-4.	**Fire Department** Cal E M A FEMA Red Cross School Districts	Emergency Mgmt. Preparedness Grant; PDM; State Homeland Security Grant Program; Local Funding	$150,000

Table 4-7: LOCAL HAZARD MITIGATION PLAN ACTION STRATEGY MATRIX (pg. 3 continued)

Strategy Actions	Goal/Hazard	Implementation within the 5-Year Plan Timeline	Lead and Partner Organization(s)	Potential Funding Sources	Project Cost
Action Item #7: Prepare a *Natural Area Fire Prevention Plan* for those areas of Merced to be developed adjacent to natural open space areas (as opposed to agricultural fields or private property) in order to determine the best approach to address and provide a coordinated plan for conflicting needs (for example, air quality, natural resource protection, and property rights). Methods would include acceptable site designs, building designs, and weed abatement.	Goals: 1, 2, 4 & 6 Hazard: Wildfire	Start: 2018; Plan year 5.	**Fire Department**/ Development Services Outside Agencies: Dept. of Fish & Game, MID, Corp of Engineers Cal Fire	State Grants; FEMA PDM grant	$75,000
Action Item #8: Perform building-specific, structural seismic vulnerability assessment of City-owned critical facilities (buildings and infrastructure) constructed prior to 1980, and take actions to upgrade or retrofit as needed.	Goals: 1, 2 & 3 Hazard: Earthquake	Start: 2016; Plan years 3-5.	**Public Works**	Cal EMA; FEMA PDM grant	$100,000
Action Item #9: Create a program to **r**etrofit or upgrade unreinforced masonry buildings in Downtown Merced, or other buildings in the Plan area.	Goals: 1 & 2 Hazard: Earthquake	Start: 2017; Plan years 4-5	**Development Services** Private Building Owners	State Grants; FEMA PDM grant	$150,000

FEMA Pre-Disaster Programs:

SRL – Severe Repetitive Loss Program

PDM – Pre-disaster mitigation program

FMA – Flood Mitigation Assistance Program

Table 4-8: Target Implementation Schedule and Responsible Leadership					
Lead Agency	**2015**	**2016**	**2017**	**2018**	**2019**
Public Works Stan Murdock, Public Works Director of Operations	Action 1		Action 8		
Fire Department Michael McLaughlin, City of Merced Fire Chief	Action 3		Action 6		Action 7
Development Services/Eng David Gonzalves, Director of Development Services	Action 4				
Development Services/Eng David Gonzalves, Director of Development Services	Action 2				
Development Services/Eng David Gonzalves, Director of Development Services	Action 5				
Development Services/Bldg David Gonzalves, Director of Development Services				Action 9	

4.4 National Flood Insurance Program (NFIP) Compliant Mitigation Actions

Introduction

The National Flood Insurance Program (NFIP) is a Federal program, created by Congress in 1968, that makes flood insurance available in communities that enact minimum floodplain management regulations. This Chapter describes Mitigation Actions of this report that are compliant with the NFIP.

4.4.1 National Flood Insurance Program (NFIP) Compliant Mitigation Actions

Overview

This section of the MHMP identifies, analyzes, and prioritizes actions related to continued compliance with NFIP requirements, as appropriate. A description of the City of Merced's participation in the National Flood Insurance Program (NFIP) is described in section 3.4.1 (Risk Assessment: Flooding) of the MHMP.

RC#C2a

NFIP Mitigation Actions

The Action Plan of the MHMP, Table 4-5, identifies three mitigation strategies intended to reduce the area's flood and levee failure risks, and include Action numbers 2, 4, and 5. The table is the result of the Plan Leadership Team (PLT) and Disaster Council's assessment and prioritization of mitigation actions.