



Ventura County
Watershed Protection District

Flood Warning and Emergency Evacuation Plan

SANTA CLARA RIVER LEVEE (SCR-1) U.S. HIGHWAY 101 TO SATICOY

Ventura County, California

(DRAFT)



January 2015



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Prepared for:

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Watershed Protection District
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ACRONYMS AND ABBREVIATIONS

44 CFR	Title 44 of the Code of Federal Regulations
AHPS	Advanced Hydrologic Prediction System
CERT	Community Emergency Response Teams
CSUCI	California State University - Channel Islands
DOC	Department Operations Center
EAS	Emergency Alert System
EF	Emergency Function
EMS	Emergency Medical Services
EOC	Emergency Operation Center
ESF	Emergency Support Function
FEMA	Federal Emergency Management Agency
FWEEP	Flood Warning and Emergency Evacuation Plan
HSPF	Hydrologic Simulation Program – Fortran
IC	Incident Commander
ICP	Incident Command Post
ICS	Incident Command System
JIC	Joint Information Center
NIMS	National Incident Management System
NOAA	National Oceanic and Atmospheric Administration
NWS	National Weather Service
PIO	Public Information Officer
SCR-1	Santa Clara River – 1 Levee System
SCR	Santa Clara River
SEMS	California Standardized Emergency Management System
SOC	Storm Operation Center
SWIF	System-Wide Improvement Framework
USACE	U.S. Army Corps of Engineers
US&R	Urban Search and Rescue
VCAHPS	Ventura County Advanced Hydrologic Prediction System
VCOES	Ventura County Office of Emergency Services
VCPWA	Ventura County Public Works Agency
VCWPD	Ventura County Watershed Protection District

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INTRODUCTION

Purpose

The purpose of the Santa Clara River 1 (SCR-1) Levee System Flood Warning and Emergency Evacuation Plan (FWEEP) is to identify and highlight response activities and strategies that will be utilized in response to a failure along the SCR-1 Levee System. Specific failure scenarios representing the highest identified risk have been identified and outlined in Appendix A.

Scope

This plan summarizes the broad monitoring, warning and response activities related to a failure of the SCR-1 levee system as it exists along a nearly five mile stretch from U.S. Highway 101 North to Saticoy. In addition, this plan specifically takes into consideration the six tactical scenarios identified in Appendix A.

Situation

The SCR-1 levee system is comprised of 4.72 miles of levee including multiple groins, drains, and gates with potential impacts to the City of Oxnard as well as unincorporated areas of Ventura County. The levee system was designed and constructed by the U.S. Army Corps of Engineers (USACE) in 1961 and is currently owned and maintained by the Ventura County Watershed Protection District (VCWPD).

The SCR-1 levee system was originally designed to control the USACE's calculated Standard Project Flood discharge of 225,000 cubic feet per second emanating from the Santa Clara River watershed. The existing levee height varies from approximately 4 feet to 13 feet. The compacted fill embankment slopes at 50 degree angles (2H to 1V) on both the landward and riverward sides of the levee and has a top width of 18 feet. The riverward side of the embankment has a 1.5-foot to 2-foot thick rock revetment, and was grouted with concrete in the vicinity of the highway bridges. The rock revetment extends from the top of the embankment to varying depths.

Pursuant to the Federal Emergency Management Agency (FEMA) Levee Certification program, the SCR-1 levee system does not currently meet requirements under Title 44 of the Code of Federal Regulations (44 CFR) Section 65.10 which outlines the minimum design, operation, and maintenance standards levee systems must meet in order to be recognized as providing protection from the base flood on a Flood Insurance Rate Map. As part of work associated with FEMA Levee Certification, a field investigation was performed that identified deficiencies in the SCR-1 levee system which require rehabilitation.

In addition, the most recent USACE periodic inspection report, *Santa Clara River 1 Levee System, Periodic Inspection Report No. 1*, dated August 2011, rated the SCR-1 levee segment/system as "unacceptable", resulting in the levee systems being put on "inactive" status in the USACE PL 84-99 Program. As such, the SCR-1 levee system is currently ineligible for federal funding for repairs if damaged during a flood event. The VCWPD is currently seeking conditional reinstatement of PL 84-99 eligibility by developing and executing a System-Wide Improvement Framework (SWIF) Plan to correct complex deficiencies.

RESPONSE CONTINUUM

The following chart identifies key activities during an evolving incident.

Flood Monitoring & Response Continuum			
	Monitoring	Elevated Threat	Response
Command & Control	<p>Activities:</p> <ul style="list-style-type: none"> VCWPD will continuously monitor stream data and weather forecasts. Computer simulations will be used to model potential risk. Increased risk will be communicated to other County agencies and the City of Oxnard. A standing stakeholder information and coordination call will be considered. 	<p>Activities:</p> <ul style="list-style-type: none"> VCWPD will closely coordinate with other County agencies and the City of Oxnard. Depending upon the level of risk, the County and City will consider opening their respective EOCs to coordinate monitoring efforts and support potential response activities. Stakeholder agencies that provide EOC staffing will be alerted to a potential activation. 	<p>Activities:</p> <ul style="list-style-type: none"> The Incident Command System (ICS) will be utilized to direct field activities. An Incident Commander (IC) will be appointed and an Incident Command Post (ICP) will be established. The City of Oxnard will request additional support from the County as needed. A Unified Command (UC) may be established if there are impacts to both the County and the City of Oxnard. The County EOC will support field activities and flood fighting as needed and coordinate mutual aid and resource requests to the State as required.
Warning	<p>Activities:</p> <ul style="list-style-type: none"> VCWPD will determine the need for patrols and active levee monitoring. NWS to provide public information on weather forecasts including watches and warnings. 	<p>Activities:</p> <ul style="list-style-type: none"> Pre-scripted public warning statements will be reviewed. Public Information Officers (PIO) will interface with the media to disseminate public information. Public messaging and the release of information will be coordinated between the County and the City of Oxnard. The establishment of a Joint Information Center (JIC) may be considered. 	<p>Activities:</p> <ul style="list-style-type: none"> Public Information will be disseminated using all available methods, including VC Alert. The County will provide the CalOES Regional Office with regular status updates.
Evacuation	<p>Activities:</p> <ul style="list-style-type: none"> VCOES and City of Oxnard will identify functional needs facilities such as schools, hospitals, and nursing homes in high risk areas. 	<p>Activities:</p> <ul style="list-style-type: none"> High-risk functional needs facilities will potentially be closed and/or evacuated. The County and the City of Oxnard will identify available staffing and flood response equipment. The American Red Cross will be notified that shelters may be required in the event of an evacuation. 	<p>Activities:</p> <ul style="list-style-type: none"> The Incident Commander will direct field activities related to the evacuation. The City of Oxnard and the County EOCs will support field activities as requested. Red Cross shelters will be opened as needed.

MONITORING ACTIVITIES

The VCWPD maintains a robust network of countywide monitoring activities collectively known as the County Flood Threat Recognition System. The system utilizes electronic rain gauges, visual inspections and staffed Storm Operations Centers (SOC) running advanced simulation software to support predictive modeling. While descriptive of countywide capabilities, the monitoring activities outlined below are inclusive of the SCR-1 levee system.

Flood Threat Recognition System Overview

The flood threat recognition system consists of the following components:

- Self-reporting rain and stream gages placed in strategic locations to provide real-time data for monitoring storms and flooding conditions.
- Primary and backup VCWPD SOC able to analyze information from the self-reporting gages and other sources in order to run hydrologic models and prepare Internet content.
- Advanced hydrologic modeling software that provides forecasts of the magnitude and timing of peak flows.
- VCWPD Subject Matter Experts staffing the SOC to analyze data, conduct modeling, and coordinate with the local National Weather Service (NWS) office located in Oxnard, California.
- Integration between the SOC and the Ventura County Sheriff's Office of Emergency Services (VCOES) in order to coordinate public warning activities, potential evacuation and flood fighting efforts or the activation of the Ventura County Emergency Operations Center (EOC).

Self-Reporting Rain and Stream Gauges

VCWPD operates 75 self-reporting rain gages and 29 self-reporting stream gages. VCWPD also receives telemetered data for 57 additional rain gages and 23 stream gages operated by other agencies including the United States Geological Survey, Los Angeles Department of Public Works and the California Department of Water Resources. These gages provide dozens of data points within the Santa Clara River (SCR) Watershed and are used in hydrologic models for determining and predicting runoff and can be accessed on the VCWPD website¹.

While federal laws preventing access to wilderness regions located in Sespe and Piru Creek tributaries limit the number of rain gauges that can be used in these areas, an increased number of stream gauges have been installed to offset any loss in modeling fidelity. The remaining sections of the Santa Clara River (upper and lower sections) have an area per rain gage ratio less than 10 square miles per gauge.

Storm Operations Centers

The primary SOC is located at the Hall of Administration at the Ventura County Complex in Ventura, California outside the 500-year flood plain. The alternate SOC is located at the Saticoy Operations Yard in Ventura, California. Both centers have computers to receive telemetered data from the self-reporting

¹ www.vcwatershed.net/fws/

rain and stream gages. They also contain computers that run the hydrologic models along with communication infrastructure. The primary SOC has multiple computers with redundant capabilities and standby generator power. The alternate SOC provides a redundant communications path for the self-reporting gages in case the primary radio or antenna fails. The alternate SOC can be staffed in the event the primary SOC is compromised, however, it may also be susceptible to some flood scenarios.

Ventura County Advanced Hydrologic Prediction System (VCAHPS)

The VCAHPS is a similar system to the Advanced Hydrologic Prediction Service (AHPS) operated by the NWS. The VCAHPS differs in that it provides forecast points for all stream gage locations, not just those offered by the NWS. The system also allows the user to display observed gage data and forecasts from three integrated models if available. A particularly beneficial output of the system is the detailed identification of potential hazards and areas forecasted to have impacts from flooding.

The VCAHPS system is available to emergency personnel as well as the general public through a website maintained by the VCWPD². The observed data are updated every five minutes and the forecasts are updated every three hours. The models have the capability of being run every hour if evolving conditions warrant it. VCAHPS incorporates results from three different models as described below:

The NWS California/Nevada Forecast Center in Sacramento, California, provides forecasts for five locations in Ventura County. These locations are: the Ventura River near Ventura; Sespe Creek near Fillmore; the Santa Clara River near Piru (Upper Santa Clara tributary); the Santa Clara River at Victoria (Lower Santa Clara); and Calleguas Creek at the California State University Channel Islands (CSUCI) Bridge. This model forecast provides estimation of flows for the main stem points only.

The Hydrologic Simulation Program – Fortran (HSPF) combines three separate models for each of the major watersheds. These models were originally developed for long range watershed planning but were adapted to provide forecasted flows. The models run for an entire water year and provide an estimation of soil saturation conditions. The model provides prediction forecasts at almost every stream gage contained within each watershed, including the SCR Watershed. Peaks are also available for several critical unmonitored watersheds.

USACE HEC-1 model is an event based model and provides forecasts for all watersheds in Ventura County rather than just the three major water courses. The model allows the option of changing soil saturation criteria prior to analysis to more closely represent current conditions.

Storm Operations Center Staff

SOC staff from the VCWPD provides subject matter expertise, data collection, and modeling support as well as directly interfacing with NWS and VCOES staff. The SOC staff is also responsible for maintaining both the primary and alternate SOCs and for ensuring all self-reporting gauges are operating properly. Staff conduct a yearly exercise with the Ventura County Public Works Agency (VCPWA) and VCOES. The

² www.vcwatershed.net/fws/VCAHPS/

exercise ensures policy and procedures are up to date. In addition to this yearly exercise, equipment testing and training are conducted during the first and second small storms of each rainy season.

Warning Times

Working directly with the NWS and VCOES, the SOC staff prioritizes early warning for any potential flooding impacts. Acting upon this early information allows VCOES to coordinate potential emergency response activities such as flood fighting and evacuation before the onset of flood conditions. Hydrologic models integrating the self-reporting rain and stream gauges provide the best estimate of potential flood risks for Ventura County. Due to rugged terrain, the streams and rivers of Ventura County respond very quickly to precipitation. The local tributaries respond within 1 to 2 hours of peak rainfall. The Ventura River and Calleguas Creek respond within 3 to 4 hours of peak rainfall, and Sespe Creek responds within 4 to 6 hours. The Santa Clara River can respond within 6 to 12 hours depending on which part of the watershed is hit by a storm. Data from rain and stream gauges and the use of simulation modeling can usually provide between 1 to 4 hours of warning.

COMMAND AND CONTROL

A failure of any portion of the SCR-1 levee system will result in a complex event requiring advanced command and control activities. Coordination between county entities and the City of Oxnard, if impacted, will be crucial to an effective response. The following command and control processes are consistent with the Incident Command System (ICS), the California Standardized Emergency Management System (SEMS), and the National Incident Management System (NIMS).

Ventura County Sheriff's Office of Emergency Services

The VCOES conducts pre-event activities and supports ongoing response activities on behalf of the County Sheriff and in close coordination with other county entities. During large storm events, the VCOES monitors potential flooding closely and is in frequent communication with the VCWPD. Depending upon the severity of the event or threat, the VCOES may elect to open the (Ventura) County EOC to support monitoring or response activities.

County Emergency Operations Center (EOC)

The County EOC provides a hub of coordination for county agencies and other stakeholders. With advanced communications and other capabilities such as activating the Emergency Alert System (EAS), the County EOC provides a central location for the direction of county activities and is often the coordination point for public messaging and information. The County EOC is also the focal point for requesting and responding to requests from the State's Regional EOC, either directly or on behalf of the State EOC. This conduit makes a large assortment of resources available from state and federal entities.

On-Scene Command

In many cases, field response activities will require on-scene coordination and the presence of a field command element. In accordance with ICS, an Incident Command Post (ICP) will be established and an on-scene Incident Commander (IC) will take command of field operations. In the case of flood events the IC will most likely be a Sheriff's department representative supported by resources from the Ventura County Fire Department (VCFD), the VCPWA, and the VCOES. The County EOC may support the incident and provide policy level decisions, but tactical planning and decisions will be overseen by the IC.

Unified Command

In instances where a failure of the SCR-1 levee system impacts the City of Oxnard, a Unified Command may be established. The Unified Command will include the County IC and a representative from the City of Oxnard. Support will continue to be provided by the County EOC but may also be augmented by the City of Oxnard's EOC. It is imperative that on-scene command be integrated quickly to ensure timely response activities and efficient usage of all available resources.

Staging

Equipment, vehicle and personnel staging will be established by the IC or Unified Command and may be collocated with the ICP or at another location more suitable for these activities. Staging should be established outside of the impact area but with close access to major streets and avenues of approach.

Responder Communications

The IC shall establish communications networks, as necessary, to include command, tactical, and support frequencies. The command channel should link together key staff of the ICS such as the IC, section chiefs, division and group supervisors and the emergency operations center, if activated. There may be several tactical channels depending upon need. Tactical channels may link agencies, departments, geographical areas or specific functions. Other communications networks, such as ground to air, may be established if needed.

Mutual Aid

Robust mutual aid resources are available throughout the region and state. Within Ventura County, large numbers of available personnel and equipment can be requested. Specific to a levee breach event, additional law enforcement, swift water rescue teams, boats, jet skis and helicopters may be required to facilitate evacuations and rescue activities. All requests for mutual aid should be routed through the County EOC.

PUBLIC WARNING

This section outlines Ventura County capabilities tailored to public warning and information. Each of the outlined activities may be supported or augmented by additional resources provided by the City of Oxnard depending upon the impacted area.

National Weather Service

The NWS Weather Warning Program uses an escalating approach including outlooks, watches and warnings to increase public awareness of potential issues. The NWS coordinates closely with VCWPD in determining the impacts of approaching weather conditions and notifying the public accordingly. The NWS can also issue a Civil Emergency Message for any emergency situation requiring public warning. Dissemination methods of the NWS include: National Oceanic and Atmospheric Administration (NOAA) Weather Wire System, NOAA Weather Radio, and AP Wire Service.

Emergency Alert System

The Emergency Alert System (EAS) is a system for national, state or local emergency warnings to the public. An EAS warning may be for a few blocks, a large portion of a city, or the entire county, state or nation. The EAS provides a means of distributing emergency information quickly by radio stations, television stations and cable entities for timely and large scale mass distribution. Ventura County maintains and tests the countywide EAS system. Its use can be requested by an on-scene IC but must be authorized through VCOES or the activated Ventura County EOC. The request process can be expedited and routed through 911 if necessary.

VC Alert/Reverse 911

Ventura County has implemented a state-of-the-art emergency notification system to alert residents about emergencies and other important community news. The emergency notification system enables officials to provide essential information quickly when there is a threat to the health or safety of residents. Building on technology sometimes referred to as “Reverse 911”, the VC Alert Emergency Notification System database currently includes all listed and unlisted landline telephone numbers serviced by AT&T and Verizon. Additional notifications can be made to cellular phones, work phones, TTY devices, emails, faxes or text message, but require individuals to register utilizing an opt-in portal³ or the VC Alert Hotline at (805) 648-9283. Ongoing public awareness and education efforts are helping to expand the number of alternative devices registered in the system.

VC Alert allows the County to target residences and businesses within a distinct geographic area to receive pre-scripted messages on landlines of other registered devices. The VC Alert system has the capacity to make hundreds of automated calls concurrently and can be a significant asset in notifying residents who are not currently monitoring another form of media.

³ <https://member.everbridge.net/index/1772417038942453#/login>

Television and Radio News Broadcasts/Public Service Announcements

In addition to scripted messages broadcast through the EAS system, the use of media outlets to provide more detailed public information is critical to most public warning campaigns. In many instances the public may require additional information such as what to do, where to go, and how to access additional services. In many cases, it is important to establish the critical nature of the public warning in order to convince residents that action on their part is truly needed. Ventura County maintains a cadre of trained Public Information Officers (PIO) that are trained in disseminating information through the media. PIOs can be found on-scene, at the County EOC or potentially at a Joint Information Center (JIC).

Vehicles Equipped with Loudspeakers/Door-to-Door

Law enforcement, fire, or other emergency personnel may warn the public by driving through the designated area in vehicles equipped with loudspeakers, or by going door-to-door, or by aircraft equipped with loudspeakers. In some cases members of Neighborhood Watch Organizations, Community Emergency Response Teams (CERT) or Amateur Radio Operators may assist emergency responders. The warning message delivered should include actions to be taken by the public, any special instructions, and how to obtain more information.

Public Messaging

Providing clear and concise information is paramount regardless of whether the information is delivered directly to the public or through the media. In addition, public messaging is often time critical and does not allow for careful review or editing of public messages. To save time and ensure consistent messaging, the use of pre-scripted message templates is recommended. Samples and template notifications applicable to the SCR-1 levee system are included in the appendices of this plan.

EVACUATION

As one of the primary response activities associated with the protection of human life during a flood event, evacuations are critical to a successful flood response strategy. Given the significant potential impacts caused by a failure of the SCR-1 levee system, it is imperative that the County and City are prepared to conduct evacuation operations efficiently and that all segments of the affected population are considered. This includes people with access or functional needs. While evacuations in response to potential failures of the SCR-1 levee system will most likely be conducted before actual overtopping or significant flooding occurs, rapid onset weather conditions may necessitate evacuation activities during periods of inclement weather and rising flood waters.

Evacuation Orders

The decision to order an evacuation before a levee failure or overtopping is generally a policy decision that should be made and promulgated by the County or City EOC, depending upon the impacted population. In the event of sudden onset flooding, an evacuation can be ordered by the on-scene IC. California law allows for voluntary evacuations which are strong recommendations for residents to leave their homes but prevent emergency responders from compelling them to do so. Once a resident has evacuated voluntarily, law enforcement can prevent them from returning to the area until it is deemed safe.

Evacuation Assembly Points

While self-evacuation is the preferred method of evacuation, depending upon the impacted area, evacuation assembly points may need to be designated for those residents that lack resources or cannot otherwise self-evacuate. Evacuation assembly points will rely on the use of transportation assets such as buses, vans or ambulances to ferry residents to higher ground or reception centers. In some cases, flood conditions or individual disabilities may prevent residents from reaching designated assembly points. In these instances, specialized resources such as ambulances, boats or high wheel base vehicles may be needed to reach stranded residents.

Evacuation Routes

Specific evacuation routes may need to be established for the impacted areas. In the scenarios identified in Appendix A, the main arterial routes within the potential impact areas appear to be sufficient to handle the relevant population loads and the limited distances necessary to reach high ground, making the identification of specific routes unnecessary. In all identified scenarios along the SCR-1 levee system, movement southeast of Vineyard Road or west of the Highway 101 will remove residents from the impacted area and none of the potentially impacted areas are more than a mile from these destinations.

Contraflow

Contraflow activities include allowing outbound traffic to utilize inbound traffic lanes in order to increase the capacity and flow of outbound traffic. However, effectively implementing contraflow is often resource intensive and the loss of inbound traffic corridors may prevent emergency services vehicles from accessing the impacted areas. This may include ambulances and other transportation assets attempting to assist populations that are unable to self-evacuate, such as people with access or functional needs. Given the relatively short evacuation distances related to SCR-1 levee system failure scenarios, the benefits of contraflow appear to be minimal and are likely outweighed by related impacts to response operations.

Traffic Control

Effective traffic control is one of the most important factors in ensuring a safe and timely evacuation. Law enforcement personnel and barriers may be needed to maintain the integrity of evacuation routes while ensuring that response vehicles and other resources are still able to enter the area. In addition, it will be important to ensure that vehicle traffic does not impact the ability of residents to evacuate the area on foot if necessary. Traffic control is primarily a law enforcement function and will most likely be organized at the tactical level through the ICP by the VCSD, in coordination with the Oxnard Police Department as appropriate. Additional support may be needed from the VCPWA in the form of traffic barriers, messaging signs, or other equipment as needed. In addition, requesting standby support from tow trucks to remove disabled vehicles may be prudent if floodwaters have already impacted portions of the area.

Security

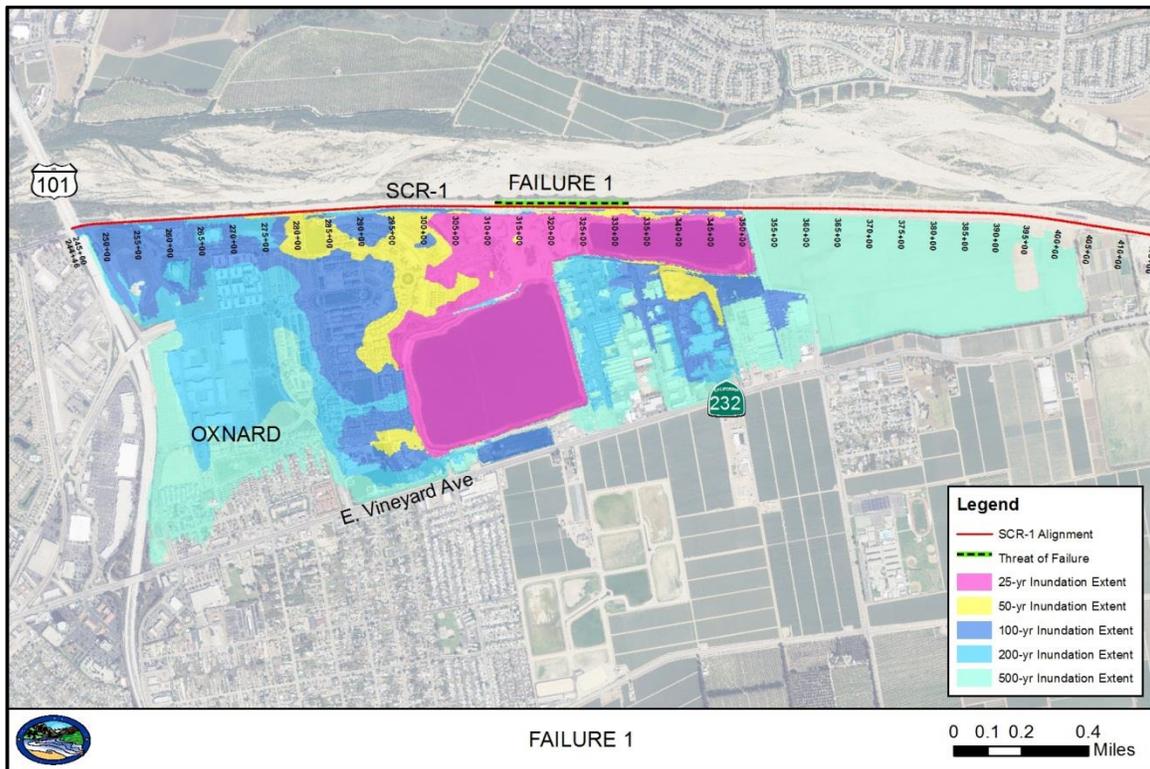
Ensuring the security and integrity of the evacuated area goes hand in hand with traffic control. As resources warrant, security precautions should be taken to establish a perimeter around the evacuated area, including traffic control measures to prevent the return of civilian traffic until authorized by the IC. Effective security will prevent opportunists from entering the area and vandalizing or burglarizing empty homes and businesses, while simultaneously preventing thrill seekers and onlookers from entering the impacted area and potentially endangering themselves.

APPENDIX A – FAILURE SCENARIOS AND LOCATIONS

Based on the identification of the potential failure modes and likelihood of occurrence, six failure scenarios have been identified. For each of these scenarios a potential area of inundation has been determined using the existing available USACE hydraulic modeling.

Failure 1 – Breach from Station 311+00 – 348+00

This failure is expected to be a “Breach Prior to Overtopping” failure. In general the landside toe along this reach is at a lower elevation than the riverside toe. A failure of the levee embankment would lead to inundation of the adjacent floodplain. The riverside toe becomes hydraulically loaded at the 50-year to 100-year storm events. However, damage history shows that river impingement for the 25-year event leads to groin damage and levee breaches. In this reach, a levee breach would cause inundation of the residential housing between two local detention basins from Station 300+00 to approximately 325+00.

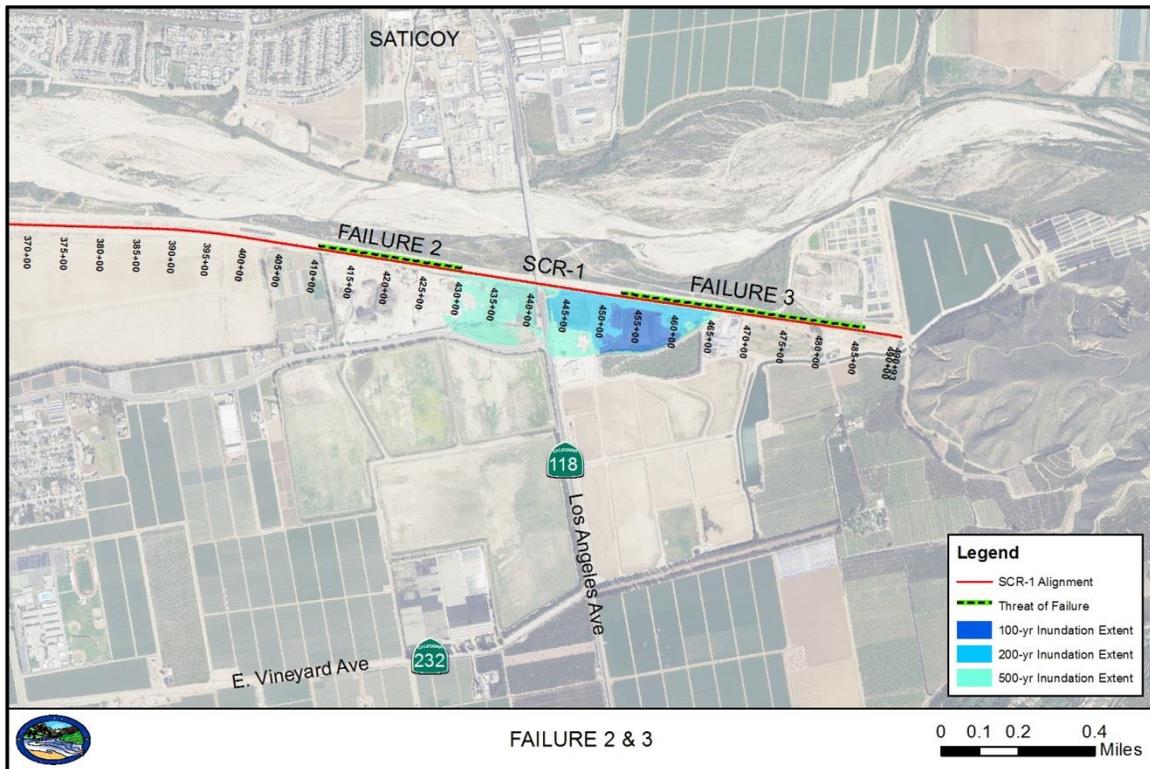


Failure 2 – Breach from Station 410+00 – 430+00

This failure is expected to be a “Breach Prior to Overtopping” failure. In general the landside toe along this reach is at a higher elevation than the riverside toe. A failure of the levee embankment would lead to inundation of the adjacent floodplain only once the landside toe elevation is exceeded. The riverside toe becomes hydraulically loaded at the 200-year storm event. However, damage history shows that river impingement for the 25-year event leads to groin damage and levee breaches. The relatively high ground on the landside will protect area from flood inundation. There is a potential for significant bank erosion along the asphalt plant property which accounts for most of the anticipated damages.

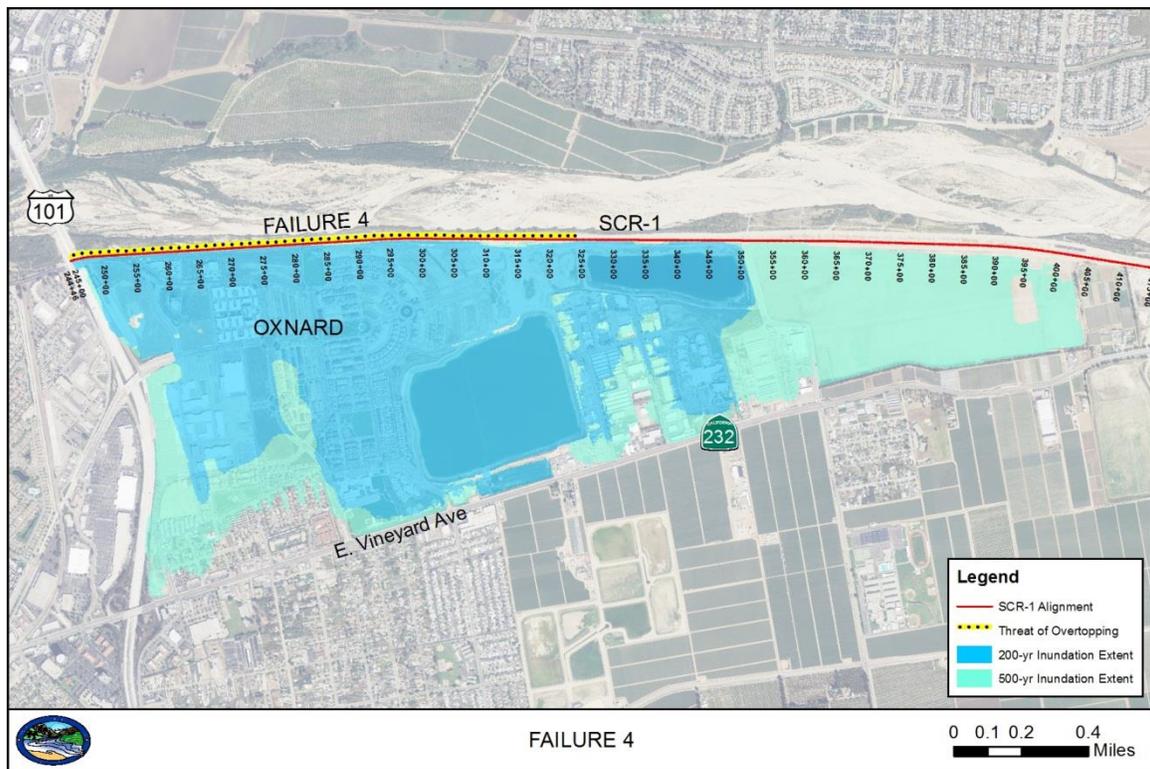
Failure 3 – Breach from Station 452+00 – 486+00

This failure is expected to be a “Breach Prior to Overtopping” failure. In general the landside toe along this reach is at a lower elevation than the riverside toe in the lower portion of the reach (Station 452+00 – 465+00) only. A failure of the levee embankment in the lower reach would lead to inundation of the adjacent floodplain. The riverside toe becomes hydraulically loaded at the 100-year to 200-year storm events in the lower reach; in the upper reach the loading occurs beyond the 500-year event. However, damage history shows that river impingement for the 25-year event leads to groin damage and levee breaches. In the upper reach (Station 465+00 – 486+00) the area consists primarily of agricultural fields and related structures which account for most of the damages.



Failure 4 – Overtopping from Station 244+00 – 314+00

This failure is an overtopping failure caused when continuous storm events hit the region over days or weeks, giving flood fighting agencies warning such a large event is coming. Despite best efforts, the river overtops the levee, inundating the area north of US Highway 101. Commercial areas from Station 320+00 to 355+00, north and east of the detention basins, is inundated with backwater. Typical inundation depths from this event in this neighborhood would top out from 2 feet to 7 feet. Residential areas from Station 275+00 to 310+00, south of the detention basins, would be inundated by river flow. Typical inundation depths from this event in this neighborhood would range from 4 to 10 feet. Commercial areas along the river from Station 250+00 to 275+00, would be inundated by river flow. Typical inundation depths from this event in this neighborhood would range from 2 to 7 feet. No other overtopping failure locations were considered because of the infrequent occurrence of events to cause this failure (i.e. 500-year and greater flow events).

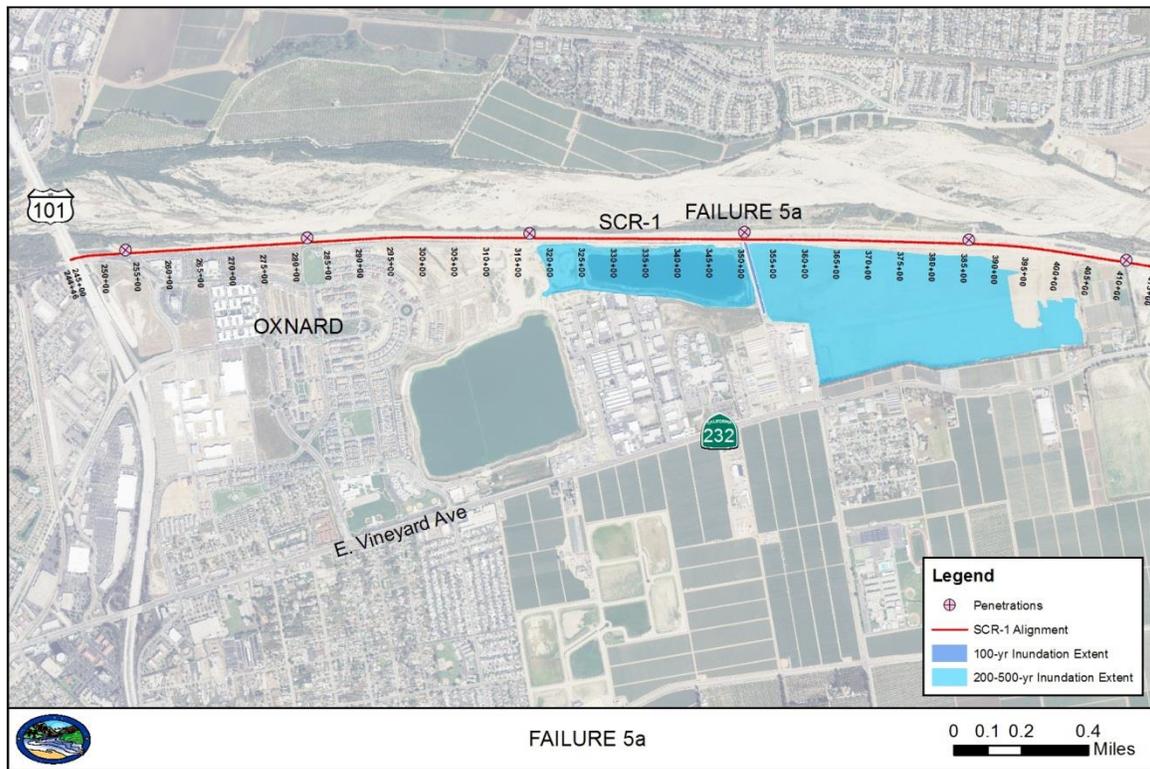


Failure 5 – Storm Drains Failure

The fifth identified failure scenario involves 3 potential sub-scenarios as follows:

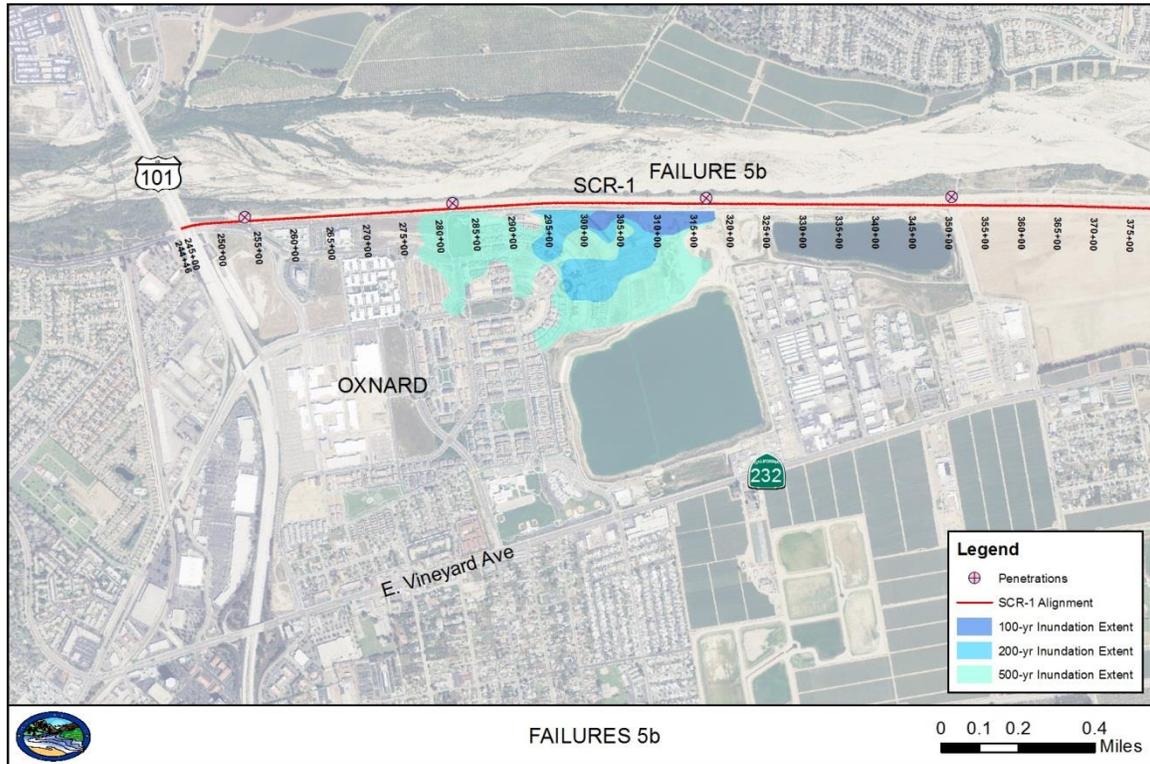
Failure 5A Type – Malfunction of Levee System Components

Frequency: >25-yr event. Description: Central Avenue Drain, 2-72” RCP with flap gates (on riverward side) are not closed in a storm event. The culverts lead to a large drainage channel with elevated banks that contain flood depths almost to the 200-yr floodplain (which does not extend past Vineyard Ave), but begins to fill and backwater above the 25-yr event. The storm drain continues underground to Central Avenue, and then becomes an open channel at Rio Mesa High School, where it turns north and winds through agricultural fields. Failure to close the flap gates may lead to localized interior drainage flooding at storm drain intakes to the Central Avenue Drain system outside of any potential Santa Clara River inundation areas. Storm water runoff not entering the drainage system is likely to flow parallel to the Santa Clara River along roads such as Vineyard Avenue and Rose Avenue, and through agricultural fields in between, until it finds another outlet. Mitigating factors include: (1) local interior flooding will not likely occur at the flood peak time for Santa Clara River, minimizing risk from such a failure scenario, and (2) the backwater effects become significant only at larger interval events, such as the 100-yr or 200-yr.



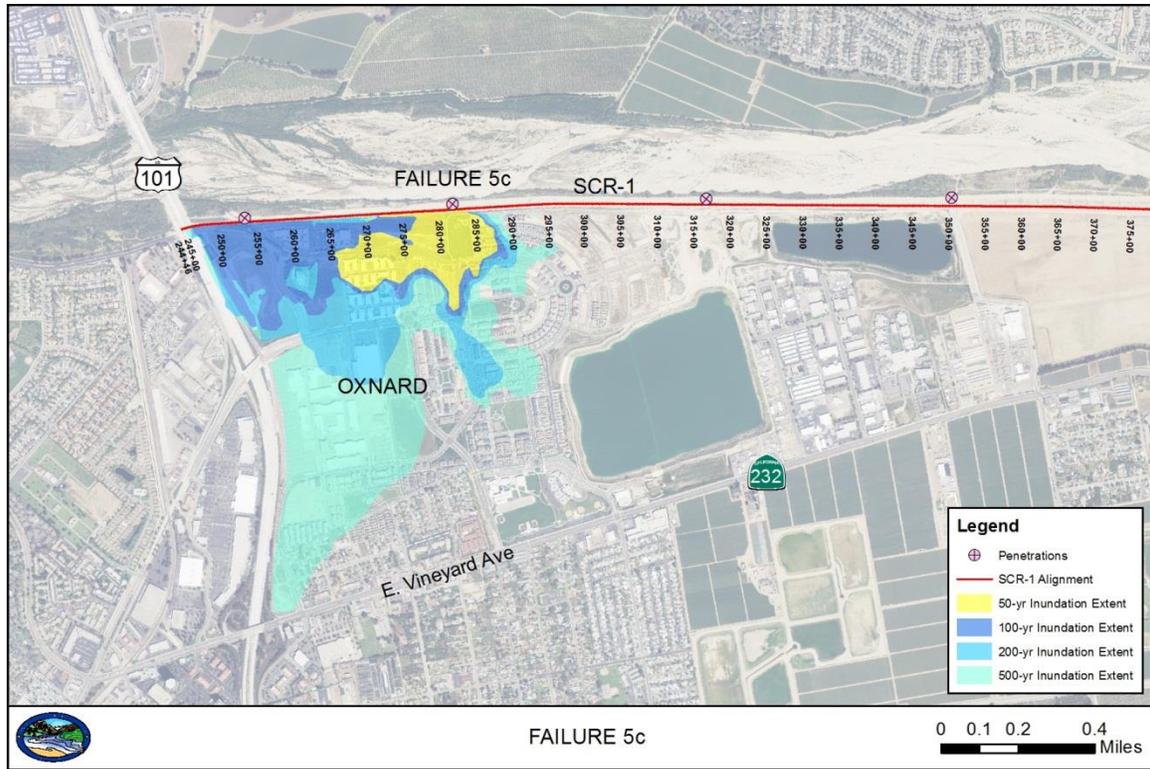
Failure 5B Type – Malfunction of Levee System Components

Frequency: >25-yr event. Description: Side Drain No. 4, 48” RCP and flap gate (on landward side) is not closed in a storm event. The culvert leads and opens directly to the landward side of the levee, just upstream of the northern extent of the newly developed residential area. Topography indicates water entering this area will begin to inundate the residential area and potentially backwatering into the detention basins to the north or east. Failure to close the flap gates will lead to significant interior drainage flooding in residential neighborhoods from Stations 300+00 to 316+60.



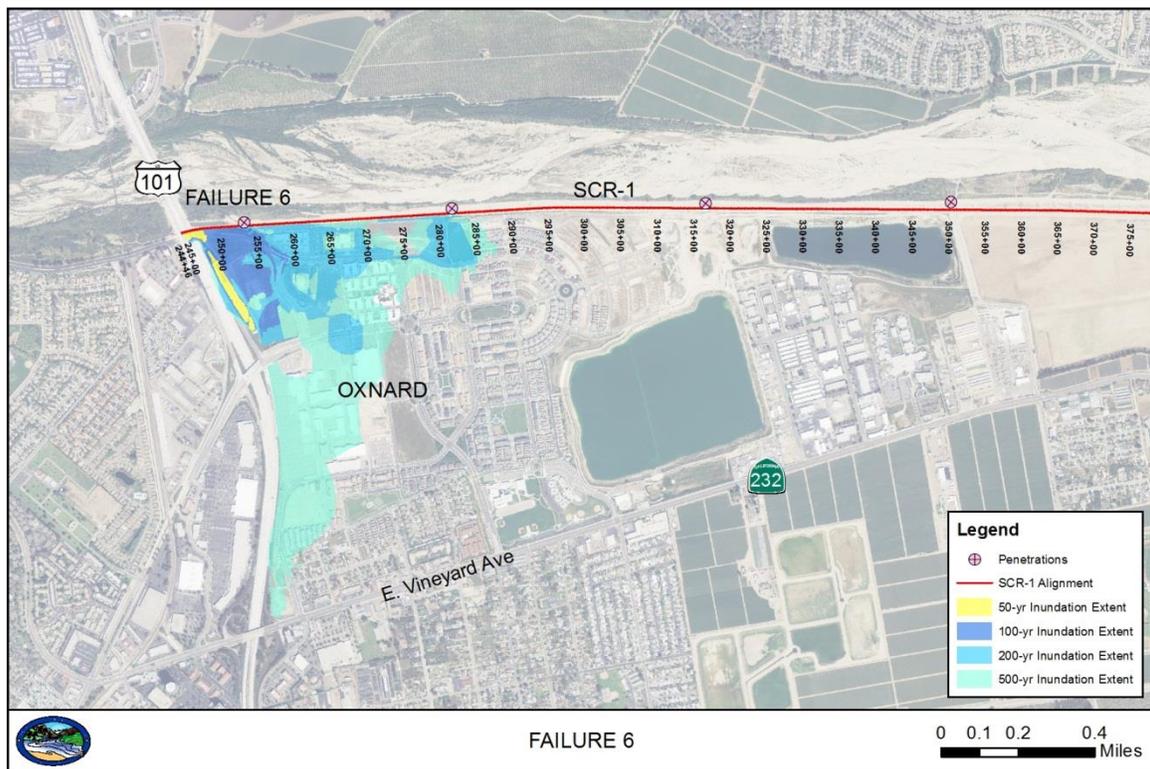
Failure 5C Type – Malfunction of Levee System Components

Frequency: ~50-yr event. Description: Side Drain No. 6, 48” RCP and flap gate (on landward side) is not closed in a storm event. The culvert leads and opens directly to the landward side of the levee at Station 282+00, into a recreational and vacant open spaces surrounded by residential lots, with commercial spaces downstream. The landside elevation suggests flooding occurs only in events close to the 50-yr event. Topography in this scenario indicates water entering this area will flood open spaces, potentially backwatering with minimal flooding into the residential community just east and upstream of the culvert.



Failure 6 – Gate Structure Failure at Station 246+20

This failure involves the malfunction of Levee System Components caused when the Stroube Drain – Unit I, Gate Structure is not closed in a storm event. The gate structure box culvert leads to the landward side of the levee at Station 246+20, where it acts as the terminus for the underground storm drain system that services nearly the entire Oxnard neighborhood north of U.S. Highway 101. Failure to close in a 25-yr event would lead to interior drainage flooding only, potentially backing up storm drain intakes throughout the entire system. The system impact area would generally match the lower ground occupied by this recently developed area of the city of Oxnard. Backed up storm drains will leave water flowing along surface streets downstream towards Stroube Drain outlet. Topography suggests backwater will flow south on Ventura Road and pond under the U.S. Highway 101 bridge. Ponding is expected to be limited to roadways and vacant lots adjacent to the Santa Clara River around the U.S. Highway 101 Bridge. A mitigating factor is that local interior flooding will not likely occur at the flood peak time for Santa Clara River, which minimizes risk from such a failure scenario.



APPENDIX B - EMERGENCY FUNCTION (EF) RESPONSE ACTIVITIES

The state of California and Ventura County utilize EFs to organize and group response activities during an event. Nearly identical to Federal Emergency Support Functions (ESF), each EF is only activated if needed in a particular event. The following EFs would most likely be activated and tasked with the following responsibilities:

EF-1 – Transportation

- Coordinate with the County Public Works Mutual Aid to determine the county and state roads affected by the levee breach/flood and located in the inundation zones.
- Coordinate with EF-4 (firefighting), EF-6 (Mass Care), EF-8 (Health and Medical Services), and EF-13 (Public Safety & Security), to determine the transportation assistance that may be required to evacuate citizens in the inundation zones.
- Coordinate with EF-15 (Public Affairs) for all press releases involving roads and streets that may be closed.
- Assist with the transportation of citizens in the inundation zones to shelters as required.
- Coordinate with EF-13, and Public Works Mutual Aid to obtain barricades to control traffic in and around the inundation zones.
- Review assignments and safety procedures with subordinates.
- If EOC is activated, keep EOC informed of situation and resources status, hazardous situations and significant events.
- Resolve tactical assignments and logistics problems, and maintain Incident Logs.
- Coordinate with the county and state to insure that structural evaluations are performed on all bridges and railroad crossings over waterways that cross affected levees.

EF-2 – Communications/911 Dispatch

- As soon as notification is received that a levee breach/flood event is threatening or is occurring in the county, immediately notify the Director of Emergency Services.
- Be prepared to assist agencies, activities and departments in the response with communications support.

EF-3 – Public Works

- Determine the impact of the levee breach/flood on water and sewer systems located in the inundation zones.
- Determine if damaged water and sewer systems can be rerouted around the inundation zone.
- Review assignments and safety procedures with subordinates.
- If EOC is activated, keep EOC informed of situation and resources status, hazardous situations and significant events.
- Resolve tactical assignments and logistics problems, and maintain Incident Logs.

- Perform Rapid Safety Assessments of adjacent private properties for potential debris items and reporting potential problems to the Departmental Operations Center (DOC) or EOC.
- Coordinate with county or state authorities, as necessary, to notify them and the VCPWA, or the EOC if activated, of actual or potential problems with their facilities.
- Direct supervisors to notify private property owners that have potential debris problems which need their attention.
- Assign additional task forces/personnel to divisions as needed to correct identified problems.
- Direct Public Works Task Forces to clean debris and inspect drainage facilities for damage or overflow.
- Notify the EOC when road rights-of-way are closed due to flooding conditions (unsafe travel or potential vehicle wake damage prevention). Task forces will be re-deployed as necessary by the Public Works Division Supervisor.
- If mutual aid is required, the Supervisor will notify the Public Works Director (the EOC Public Works Branch Director if the EOC has been activated), indicating:
 - Nature and scope of the mission to be assigned to the mutual aid.
 - Number of personnel needed, and the number and type of equipment needed.
 - Staging area to which the mutual aid is to report. (The Public Works Division Supervisor will establish a staging area for the reception and assignment of mutual aid if it is requested.)

EF-4 – Firefighting

- In conjunction with EF-8 (Health & Medical Services) and EF-13 (Public Safety & Security), coordinate all EF-9 (Urban Search and Rescue[US&R]) and EF-10 (Hazardous Materials) conducted in and around the inundation zones.
- Determine the impact of the levee breach/flood on fire hydrants and the ability to supply water for firefighting operations in and around the inundation zones.
- Review assignments and safety procedures with subordinates.
- If EOC is activated, keep EOC informed of situation and resources status, hazardous situations and significant events.
- Resolve tactical assignments and logistics problems, and maintain Incident Logs.
- Determine if response routes for each fire station located in and near the inundation zones are affected by the flood waters.

EF-6 – Mass Care, Housing & Human Services

- Coordinate with the American Red Cross to support potential shelter operations when initially notified.
- If shelter operations are determined to be necessary after a levee breach or flood, open shelters as soon as possible (less than 4 hours) upon notification.

- If pre-identified shelters are not available, consider utilizing schools or other county and municipal facilities outside of the inundation area that are not currently used for daily operations and may be available for use as a shelter.
- Coordinate with the Red Cross to ensure all shelter locations are accessible to people with disabilities and otherwise compliant with the Americans with Disabilities Act (ADA).
- Review assignments and safety procedures with subordinates.
- If EOC is activated, keep EOC informed of situation and resources status, hazardous situations and significant events.
- Resolve tactical assignments and logistics problems, and maintain Incident Logs.
- Be prepared to assist with feeding operations at different locations in the county or consider establishing several sites across the county to conduct feeding operations.

EF-8 – Health and Medical Services

- Determine if any Emergency Medical Services (EMS) bases or medical facilities are no longer accessible to patients or ambulances due to flooding.
- In conjunction with Public Works, determine which roads or bridges in the inundation zones are no longer accessible or have been determined to be unsafe for vehicle operations for EMS or Rescue Squad response.
- Provide medical support to EF-9 (USR) and EF-10 (Hazardous Materials) as necessary to support ongoing search and rescue operations and hazardous materials operations in the county.
- Coordinate with the volunteer Rescue Squads to determine their ability to continue providing medical care in their assigned coverage zones.
- Review assignments and safety procedures with subordinates.
- If EOC is activated, keep EOC informed of situation and resources status, hazardous situations and significant events.
- Resolve tactical assignments and logistics problems, and maintain Incident Logs.
- Coordinate with local nursing homes and assisted living facilities to determine if their services are adversely affected by the levee breach or flooding.

EF-11 – Food & Water

- Identify food and water requirements from EF-3.
- Coordinate food and water transportation needs with EF-1.
- In conjunction with EF-9 provide security for food and water staging and distribution areas.
- Review assignments and safety procedures with subordinates.
- If EOC is activated, keep EOC informed of situation and resources status, hazardous situations and significant events.
- Resolve tactical assignments and logistics problems, and maintain Incident Logs.

EF-13 – Public Safety & Security

- In conjunction with the Law Enforcement Mutual Aid reroute traffic as necessary around inundation zones.
- In conjunction with Public Works, barricade roads and bridges as necessary to stop the use of unsafe roads and bridges.
- In conjunction with Law Enforcement Mutual Aid provide security for areas that may require evacuation.
- Review assignments and safety procedures with subordinates.
- If EOC is activated, keep EOC informed of situation and resources status, hazardous situations and significant events;
- Resolve tactical assignments and logistics problems, and maintain Incident Logs.
- In conjunction with EF-4 (Fire), EF-8 (Health & Medical), EF-9 (USR) and EF-10 (Hazardous Materials) assist with security and manpower during search and rescue and hazardous materials operations in and around the inundation zones.

EF-15 – Public Information

- In conjunction with the Director of Emergency Services and the Policy Group coordinate the emergency public information program for the county.
- Issue press releases as necessary to announce the opening and locations of emergency shelters.
- Review assignments and safety procedures with subordinates.
- If EOC is activated, keep EOC informed of situation and resources status, hazardous situations and significant events.
- Resolve tactical assignments and logistics problems, and maintain Incident Logs.
- If deemed necessary, open and operate a county JIC.

APPENDIX C – CITIZEN INSTRUCTIONS FOR FLOODING

The following instructions can be communicated to the public either through available public messaging venues or directly as an informational handout:

Before the Flood

- a. Assess the likely floodplain in relation to your property so when flooding is predicted you are aware of the potential risk.
- b. Determine the location of the nearest safe area and evacuation routes.
- c. Keep a stock of food that requires little or no cooking and refrigeration; electric power may be interrupted.
- d. Keep a portable radio, emergency cooking equipment, lights and flashlights in working order.
- e. Keep first-aid and critical medical supplies (prescriptions, insulin, etc.) at hand.
- f. Keep your automobile fueled; if electric power is cut off, filling stations may not be able to operate pumps for several days.
- g. Keep materials like sandbags, sand, plywood, plastic sheeting, and lumber handy for emergency waterproofing.
- h. Do not stack sandbags directly upon the outside wall of your home in an attempt to keep water out of a basement or subfloor. Water penetration is still likely and the additional pressure of the sandbags upon the walls and under the floors may cause structural damage.
- i. Bring outdoor possessions inside the house or tie them down securely.

When You Receive a Flood Warning

- a. Store drinking water in closed, clean containers, and bathtubs, sinks, etc. Water service may be interrupted.
- b. If flooding is likely and time permits, move essential items, valuable papers, jewelry, and furniture to upper floors of your house or higher elevations.
- c. If forced or advised to leave your home, move to a safe area before access is cut off by floodwater.
- d. Shut off all electric circuits at the fuse panel or disconnect all electrical appliances. Shut off the water service and gas valves in your home.

During the Flood

- a. Avoid areas subject to a sudden flooding.
- b. If you are caught in the house by rising floodwaters, move to the second floor, and if necessary, to the roof. Take warm clothes, a flashlight, and portable radio with you. Wait for help. Don't try to swim to safety.
- c. When outside the house try to avoid flooded areas and do not attempt to cross a flowing stream where water is above your knees.

- d. Do not attempt to drive over a flooded road. You can be stranded and trapped.
- e. If your vehicle stalls, abandon it immediately and seek higher ground. Many people drown while trying to rescue their car

After the Flood

- a. Do not call 911 unless you have an emergency.
- b. If your home, apartment, or business has been damaged, contact your insurance company.
- c. Ensure buildings have not potentially sustained structural damage.
- d. Prior to entering, turn off outside gas lines at the meter or tank and allow sufficient time for the structure to air out.
- e. Use flashlights rather than tools with exposed flames such as matches, lanterns, or torches to provide illumination as gas or other flammables may still be trapped inside.
- f. Be alert for damaged power lines or submerged electrical equipment and do not handle or manipulate impacted electrical systems until they have been checked by a licensed electrician.
- g. Report broken utility lines to police, fire or other appropriate authorities.
- h. Do not use fresh food that has come in contact with floodwaters.
- i. Test drinking water for potability; wells should be pumped out and the water tested before drinking.
- j. Do not visit disaster areas; your presence will probably hamper rescue and other emergency operations.
- k. Monitor radio and TV stations for advice and instructions on:
 - i. Where to go to obtain necessary medical care in your area.
 - ii. Where to go for emergency assistance such as housing, clothing, food, etc.
 - iii. Ways to help yourself and your community recover from the emergency.
- l. The following agencies/numbers should be contacted for issues regarding:
 - i. Damage to roads or streets: [Agency].
 - ii. Gas leaks: [Agency].
 - iii. Downed power lines: [Agency].
 - iv. Structural damage to buildings that may create a danger to people: [Agency].

APPENDIX D – NOTIFICATIONS AND PRE-SCRIPTED MESSAGES

Vehicle/Door to Door Notifications

Instructions: Divide the involved area into sectors. Personnel assigned to specific sectors should begin near the incident and move outward. To notify the public by vehicle to evacuate, record the designated shelters and evacuation routes below, then follow these steps:

1. Drive slowly along the streets and roads of your assigned route with the High-Low siren engaged.
2. Stop frequently, turn off siren and use public address system to make the appropriate evacuation or shelter-in-place announcement.
3. Instruct evacuees to use the designated evacuation routes **[Insert Evacuation Routes]**
4. Continue along your assigned route until all residents and businesses have been notified to evacuate.

Pre-Scripted Messages

The following messages have been pre-scripted by the VCSO for mass notifications using VC Alert and can be used or modified to support other messaging efforts.

Evacuation Advisory

“This is an emergency message from the Ventura County Sheriff’s Office. Your neighborhood is now under an evacuation advisory due to *[insert incident]* at *[insert location]*. This is not an order to evacuate. Should conditions worsen, an evacuation order will be issued. Please prepare your personal belongings including valuables and pets and be ready to leave in a moment’s notice. A Red Cross Shelter has been setup at *[insert location]*. For additional information, please call the incident hotline at (805) 465-6650 or visit www.vcemergency.com.”

Evacuation Order

“This is an emergency message from the Ventura County Sheriff’s Office. Your neighborhood is now under an evacuation order due to *[insert incident]* at *[insert location]*. The threat is imminent, please evacuate the area immediately. A Red Cross Shelter has been setup at *[insert location]*. For additional information, please call the incident hotline at (805) 465-6650 or visit www.vcemergency.com.”

Shelter-In-Place

“This is an emergency message from the Ventura County Sheriff’s Office. Your neighborhood is now under a shelter-in-place order due to *[insert incident]* at *[insert location]*. Residents are advised to stay inside and close all doors and windows until the situation is resolved. For additional information, please call the incident hotline at (805) 465-6650 or visit www.vcemergency.com.”